

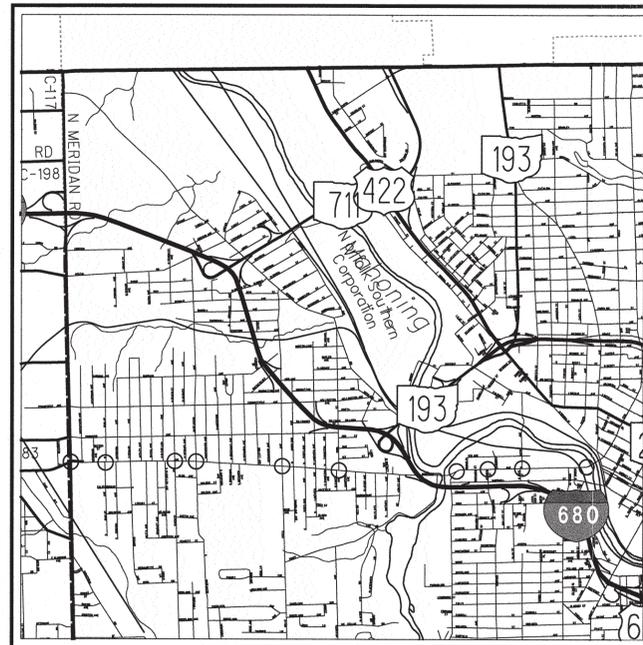
STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

MAH-YOUNGSTOWN SIGNAL UPGRADE

CITY OF YOUNGSTOWN
MAHONING COUNTY

PROJECT DESCRIPTION

THIS PROJECT CONSISTS OF RECONSTRUCTION OF 10 TRAFFIC SIGNALS ALONG THE MAHONING AVE. CORRIDOR. THIS PROJECT ALSO INCLUDES ASSOCIATED PAVEMENT MARKINGS, SIGNING AND RECONSTRUCTION OF CURB RAMPS AT THE SIGNALIZED INTERSECTIONS.



○ PROJECT LOCATION

LOCATION MAP

LATITUDE: 41°06'7.5" LONGITUDE: 80°43'56.0"

SCALE IN MILES



PORTION TO BE IMPROVED	—————
INTERSTATE HIGHWAY	—————
FEDERAL ROUTES	—————
STATE ROUTES	—————
COUNTY & TOWNSHIP ROADS	—————
OTHER ROADS	—————

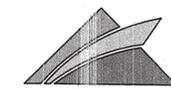
DESIGN DESIGNATION

	MAHONING AVE.
CURRENT ADT (2020)	15,500
DESIGN YEAR ADT (2040)	18,600
DESIGN SPEED	35 MPH
LEGAL SPEED	35 MPH
DESIGN FUNCTIONAL CLASSIFICATION:	MINOR ARTERIAL
NHS PROJECT	N/A

DESIGN EXCEPTIONS

NONE

PLAN PREPARED BY:



GPD GROUP*
Glaus, Pyle, Schreier, Burns & Dehaven,
100 Federal Plaza East
Youngstown, OH 44503
330.595.4321
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ENGINEERS SEAL



SIGNED: *Michael A. Hobbs*
DATE: 07/01/22

INDEX OF SHEETS:

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2019 SPECIFICATIONS

THE STANDARD SPECIFICATIONS OF THE STATE OF OHIO, DEPARTMENT OF TRANSPORTATION, INCLUDING SUPPLEMENTAL SPECIFICATIONS LISTED IN THE PLANS AND CHANGES LISTED IN THE PROPOSAL SHALL GOVERN THIS IMPROVEMENT.

I HEREBY APPROVE THESE PLANS AND DECLARE THAT THE MAKING OF THIS IMPROVEMENT WILL NOT REQUIRE THE CLOSING TO TRAFFIC OF THE HIGHWAY AND THAT PROVISIONS FOR THE MAINTENANCE AND SAFETY OF TRAFFIC WILL BE AS SET FORTH ON THE PLANS AND ESTIMATES.

APPROVED: *Jamael T. Brown*
DATE: _____ MAYOR, JAMAEL T. BROWN

APPROVED: *Jeff Limbian*
DATE: 6-1-22 DIRECTOR OF LAW, JEFF LIMBIAN

APPROVED: *Ryle Miasiek*
DATE: 5/25/22 DIRECTOR OF FINANCE, KYLE MIASEK

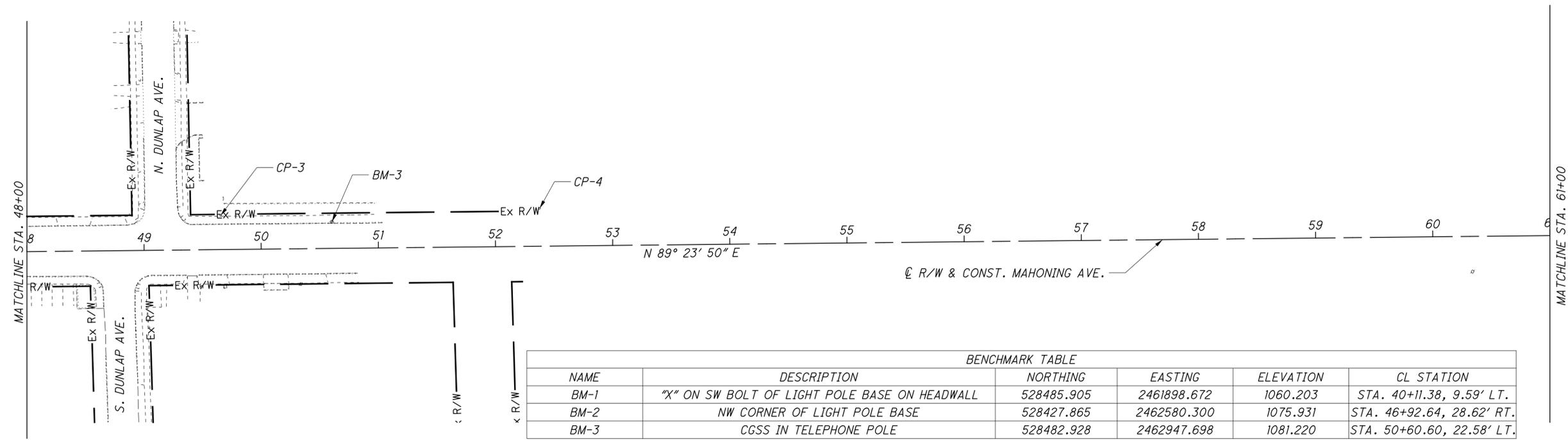
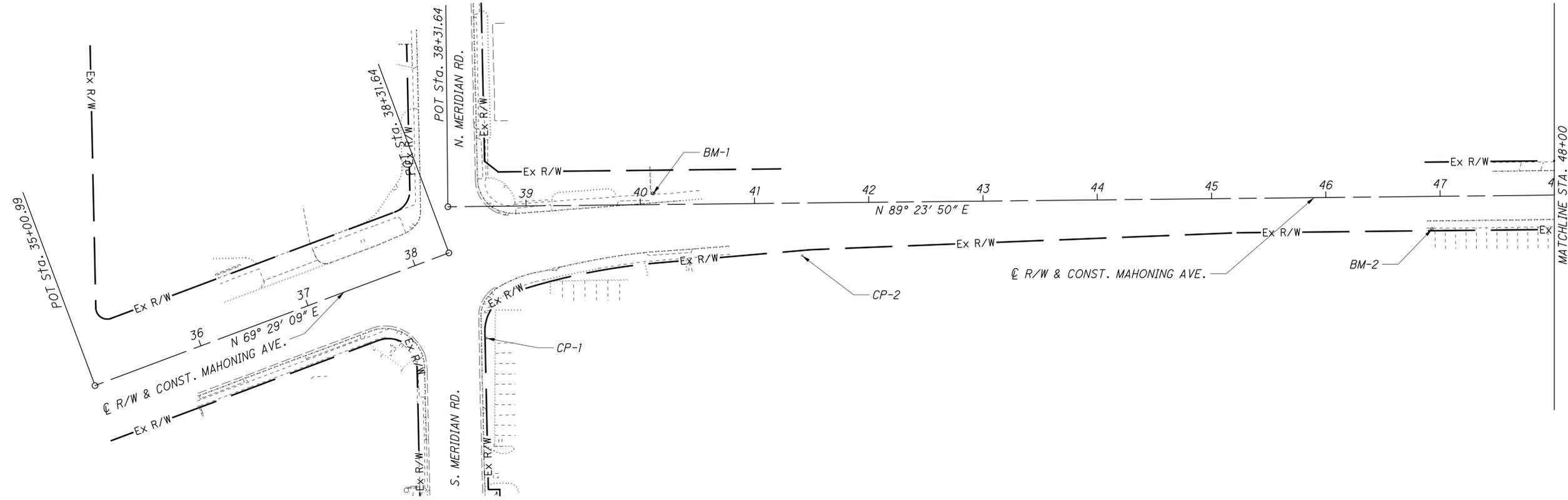
APPROVED: *Chuck Shasho*
DATE: 5-25-22 DEPUTY DIRECTOR OF PUBLIC WORKS, CHUCK SHASHO

STANDARD CONSTRUCTION DRAWINGS				SUPPLEMENTAL SPECIFICATIONS		SPECIAL PROVISIONS	
BP-3.1	1/21/22	TC-12.31	4/15/22	TC-85.10	4/17/20	800-2019	4/15/22
BP-5.1	1/21/22	TC-16.22	7/16/21	TC-85.20	7/20/18	805	7/16/10
BP-7.1	1/21/22	TC-21.21	7/16/21	TC-85.21	7/16/21	809	4/15/22
		TC-41.20	10/18/13	TC-85.22	1/19/18	821	4/20/12
		HL-30.11	1/15/21	TC-41.40	10/18/13	903	7/20/12
		HL-30.22	1/15/21	TC-42.20	10/18/13	909	4/15/22
		TC-52.10	10/18/13			921	4/20/12
		MT-95.31	7/19/19	TC-52.20	1/15/21		
		MT-95.32	4/19/19	TC-71.10	7/16/21		
		MT-97.10	4/19/19	TC-74.10	1/21/22		
		MT-97.12	1/20/17	TC-81.11	7/16/21		
		MT-99.20	4/19/19	TC-81.22	7/16/21		
		MT-105.10	1/17/20	TC-82.10	7/19/19		
		MT-110.10	7/19/13	TC-83.20	7/21/17		
				TC-84.20	10/18/13		
				TC-84.21	10/18/13		

FEDERAL PROJECT NO. E180749
PID NO. 107228
CONSTRUCTION PROJECT NO. N/A
RAILROAD INVOLVEMENT NONE
MAH-YOUNGSTOWN SIGNAL UPGRADE
1/86

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BENCHMARK TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
BM-1	"X" ON SW BOLT OF LIGHT POLE BASE ON HEADWALL	528485.905	2461898.672	1060.203	STA. 40+11.38, 9.59' LT.
BM-2	NW CORNER OF LIGHT POLE BASE	528427.865	2462580.300	1075.931	STA. 46+92.64, 28.62' RT.
BM-3	CGSS IN TELEPHONE POLE	528482.928	2462947.698	1081.220	STA. 50+60.60, 22.58' LT.

CONTROL POINT TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
CP-1	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528332.636	2461752.875	1049.257	STA. 38+64.26, 115.14' RT.
CP-2	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528404.665	2462029.117	1064.062	STA. 41+41.25, 46.02' RT.
CP-3	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528448.329	2462852.694	1079.286	STA. 49+65.66, 28.98' LT.
CP-4	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528494.414	2463125.011	1083.844	STA. 52+38.02, 32.20' LT.

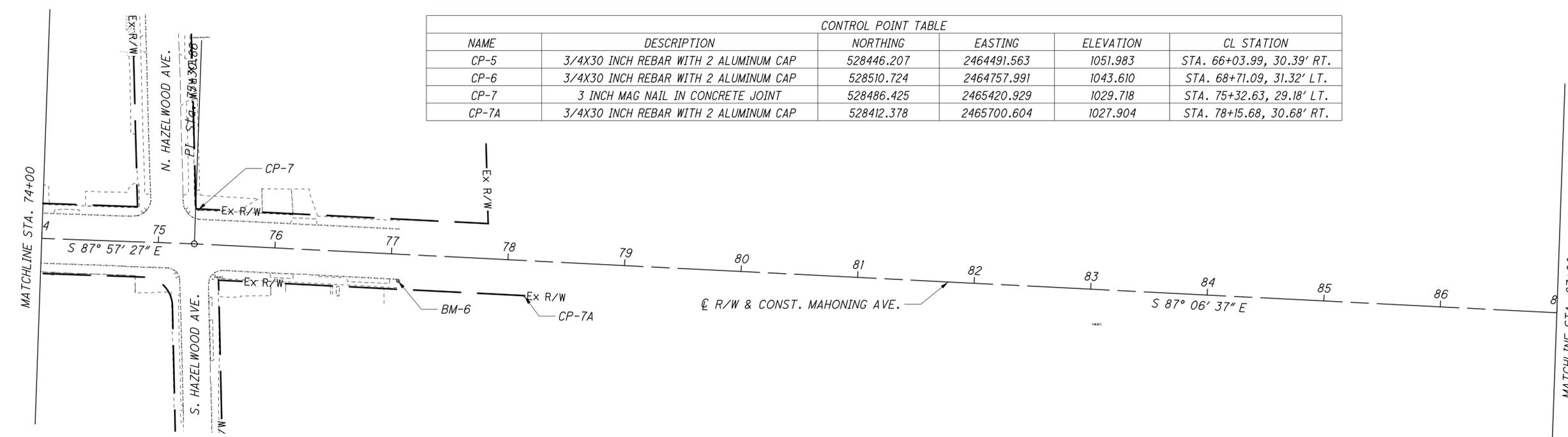
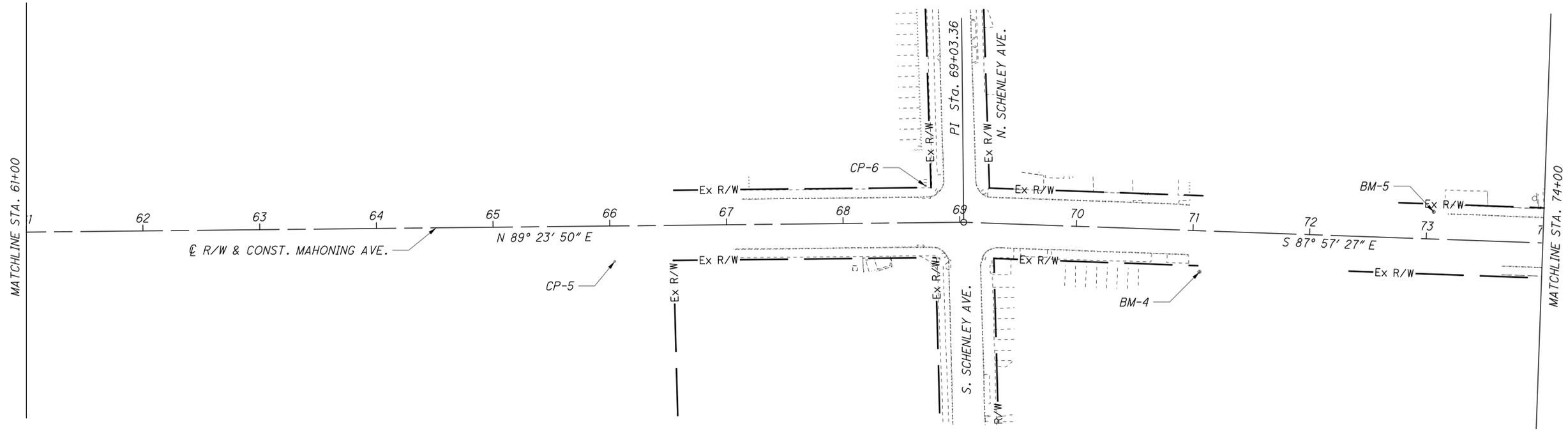


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**SCHEMATIC PLAN
BEGIN TO STA. 61+00**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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BENCHMARK TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
BM-4	TOP NW CORNER OF SIGN	528437.256	2464992.723	1039.672	STA. 71+06.88, 35.25' RT.
BM-5	CGSS IN LIGHT POLE BASE	528488.530	2465193.493	1033.471	STA. 73+05.69, 22.17' LT.
BM-6	CGSS IN TELEPHONE POLE	528425.585	2465592.264	1029.071	STA. 77+06.82, 22.95' RT.

CONTROL POINT TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
CP-5	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528446.207	2464491.563	1051.983	STA. 66+03.99, 30.39' RT.
CP-6	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528510.724	2464757.991	1043.610	STA. 68+71.09, 31.32' LT.
CP-7	3 INCH MAG NAIL IN CONCRETE JOINT	528486.425	2465420.929	1029.718	STA. 75+32.63, 29.18' LT.
CP-7A	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528412.378	2465700.604	1027.904	STA. 78+15.68, 30.68' RT.



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**SCHEMATIC PLAN
STA. 61+00 TO STA. 87+00**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

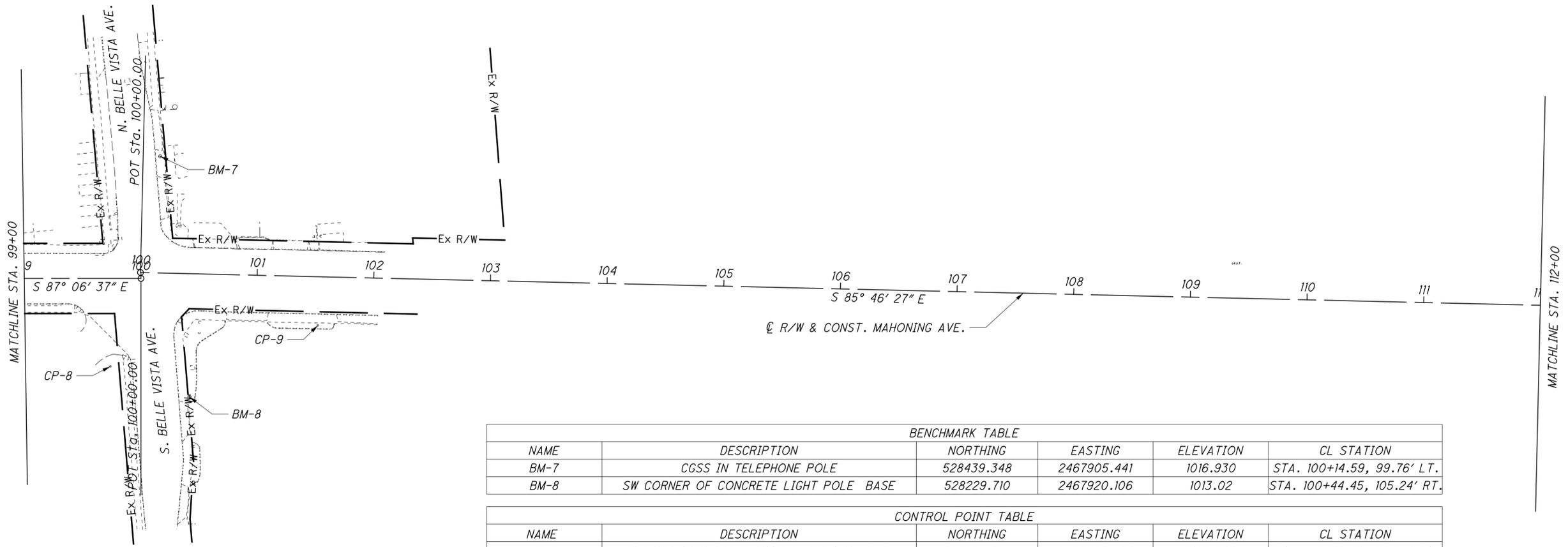
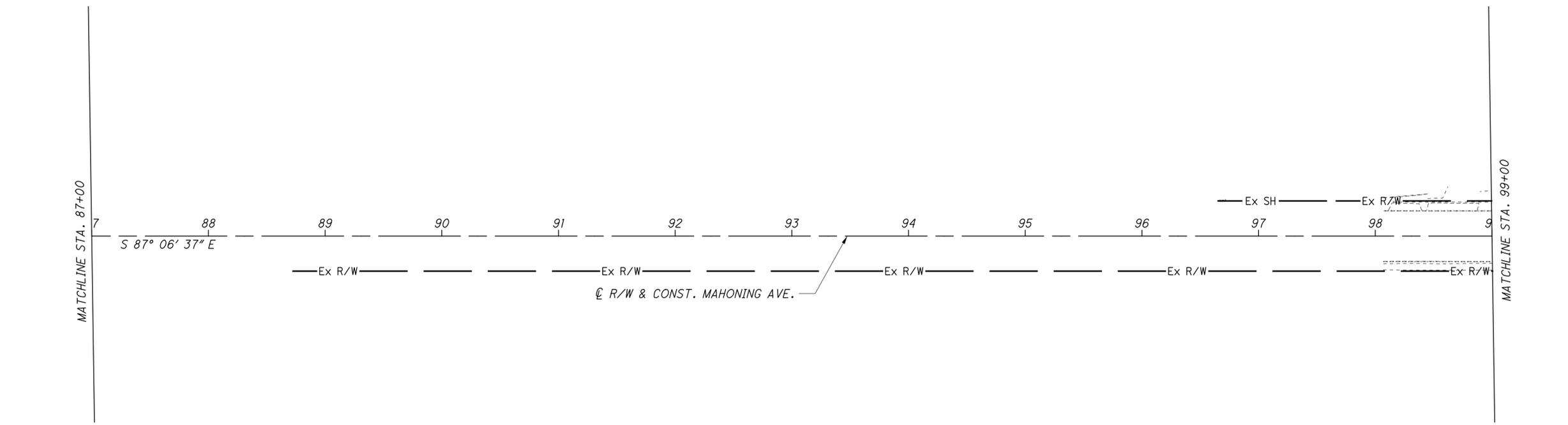
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**SCHEMATIC PLAN
STA. 87+00 TO STA. 112+00**

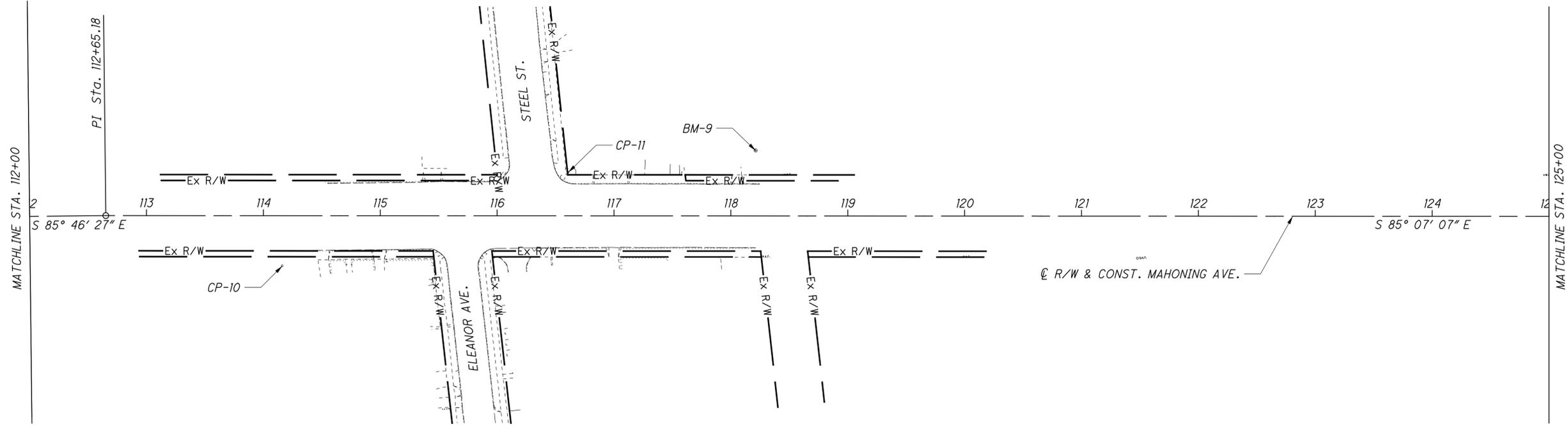
**MAH-YOUNGSTOWN
SIGNAL UPGRADE**



BENCHMARK TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
BM-7	CGSS IN TELEPHONE POLE	528439.348	2467905.441	1016.930	STA. 100+14.59, 99.76' LT.
BM-8	SW CORNER OF CONCRETE LIGHT POLE BASE	528229.710	2467920.106	1013.02	STA. 100+44.45, 105.24' RT.

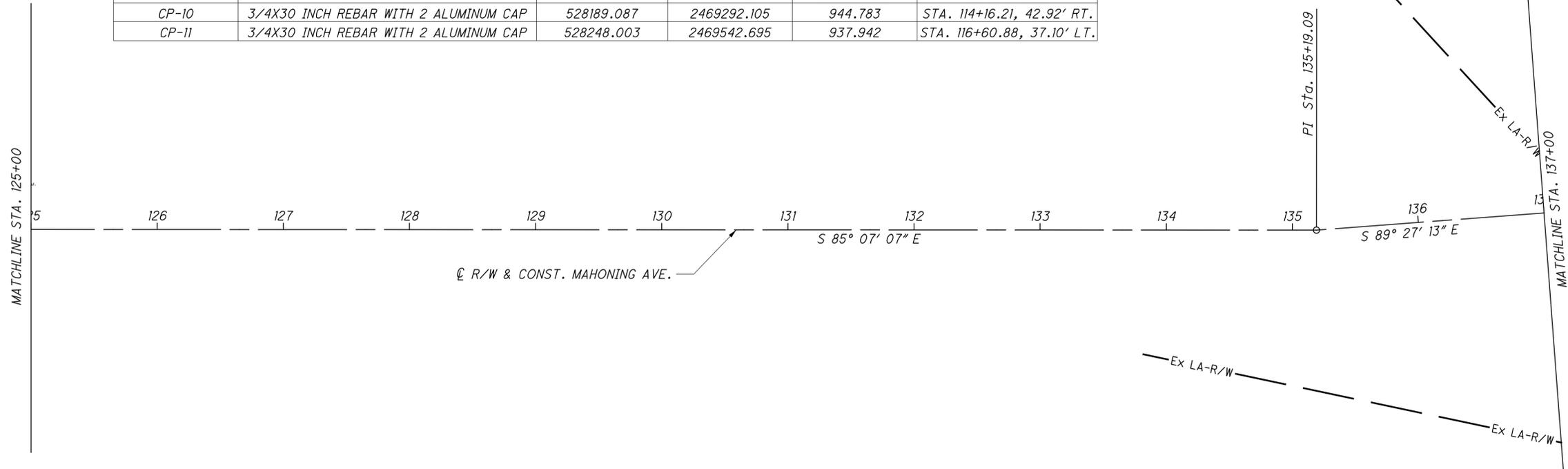
CONTROL POINT TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
CP-8	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528259.064	2467853.853	1013.937	STA. 99+73.92, 75.24' RT.
CP-9	8 INCH MAG NAIL	528285.140	2468033.095	1009.364	STA. 101+53.04, 41.63' RT.

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BENCHMARK TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
BM-9	CGSS IN TELEPHONE POLE	528252.902	2469704.041	934.200	STA. 118+21.22, 55.72' LT.

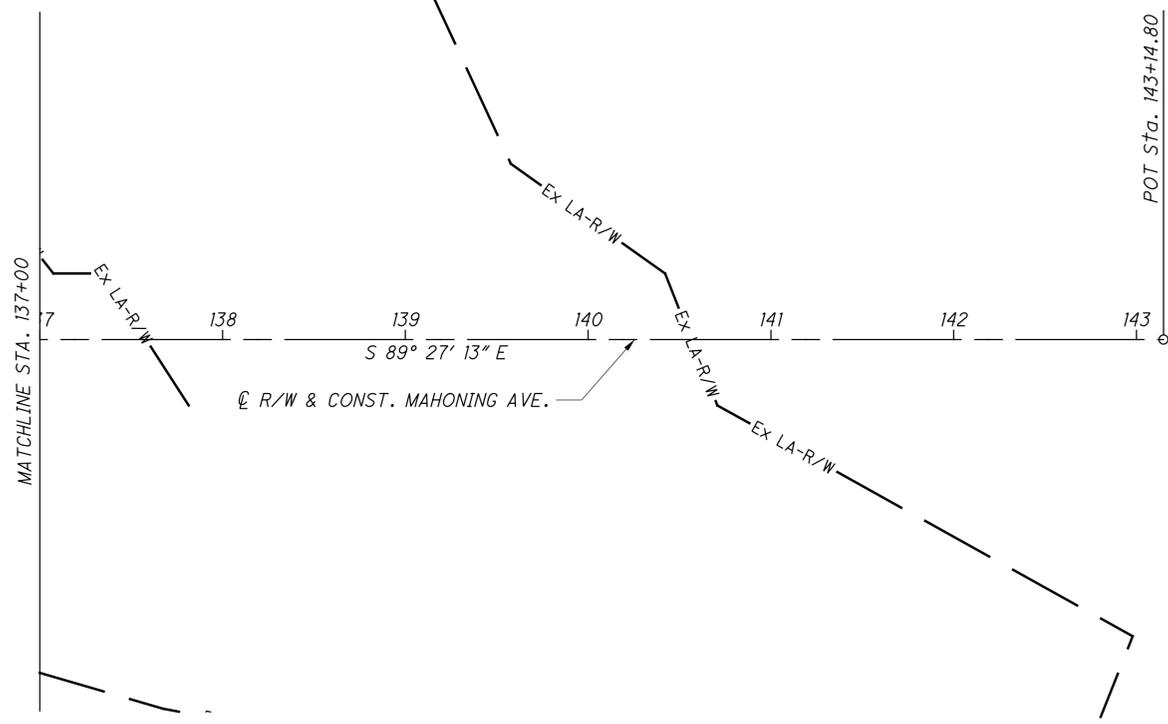
CONTROL POINT TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
CP-10	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528189.087	2469292.105	944.783	STA. 114+16.21, 42.92' RT.
CP-11	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528248.003	2469542.695	937.942	STA. 116+60.88, 37.10' LT.



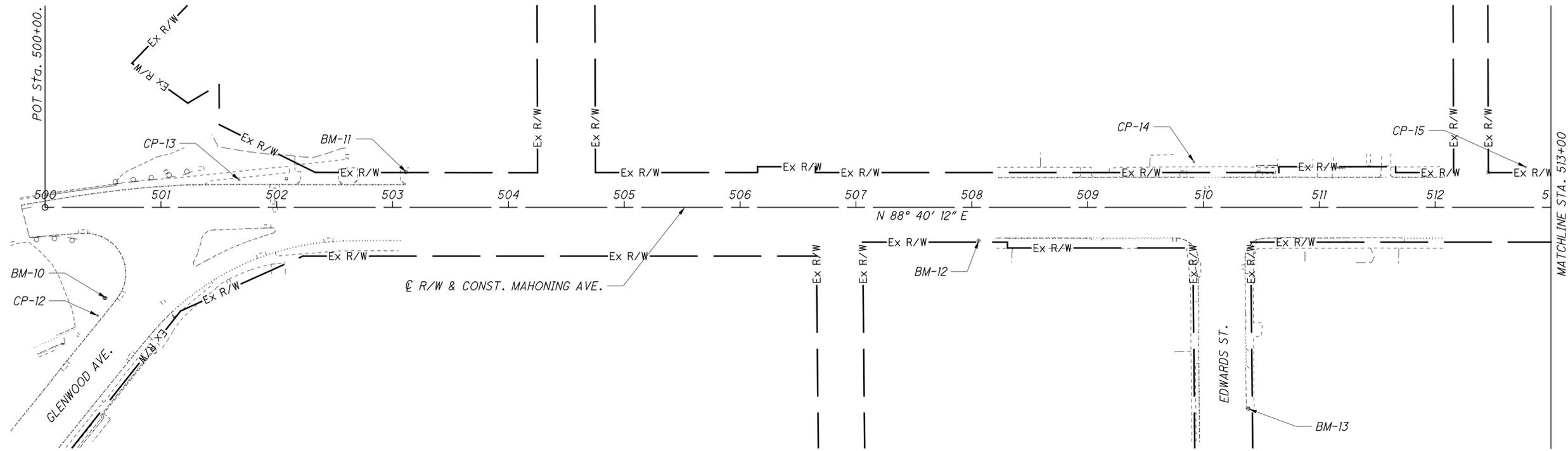
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**SCHEMATIC PLAN
STA. 112+00 TO STA. 137+00**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**



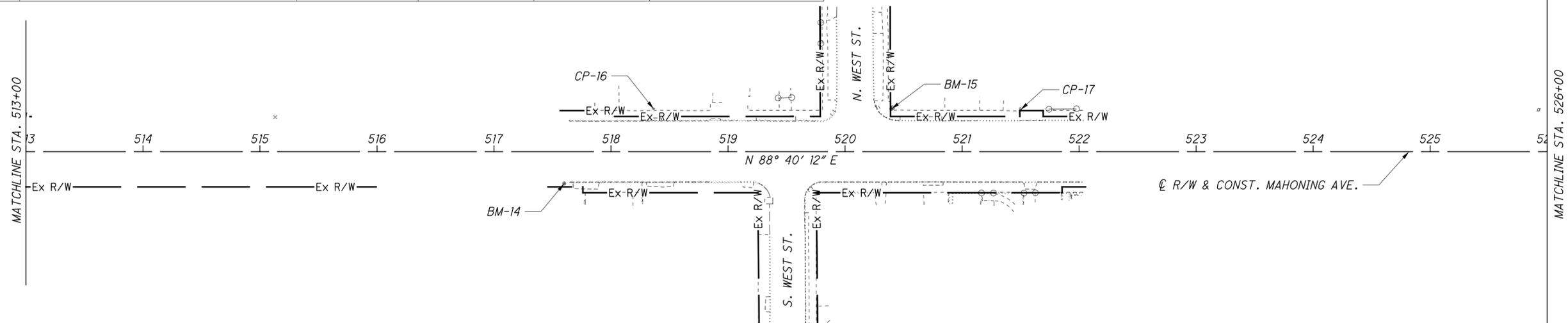
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**SCHEMATIC PLAN
BEGIN TO STA. 526+00**

BENCHMARK TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
BM-10	SE TOP CORNER OF LIGHT POLE BASE	528128.417	2472800.309	874.796	STA. 500+52.39, 78.10' RT.
BM-11	CGSS IN TELEPHONE POLE	528242.868	2473057.035	871.493	STA. 503+11.70, 30.36' LT.
BM-12	CGSS IN POWER POLE 81399	528195.326	2473552.629	868.513	STA. 508+06.06, 28.67' RT.
BM-13	CGSS IN TELEPHONE POLE 16645	528055.734	2473788.926	870.103	STA. 510+39.06, 173.71' RT.
BM-14	CGSS IN TELEPHONE POLE 81408	528218.924	2474506.254	851.408	STA. 517+59.98, 27.21' RT.
BM-15	SW CORNER OF CONCRETE SIGN BASE	528288.979	2474784.231	848.343	STA. 520+39.51, 36.45' LT.

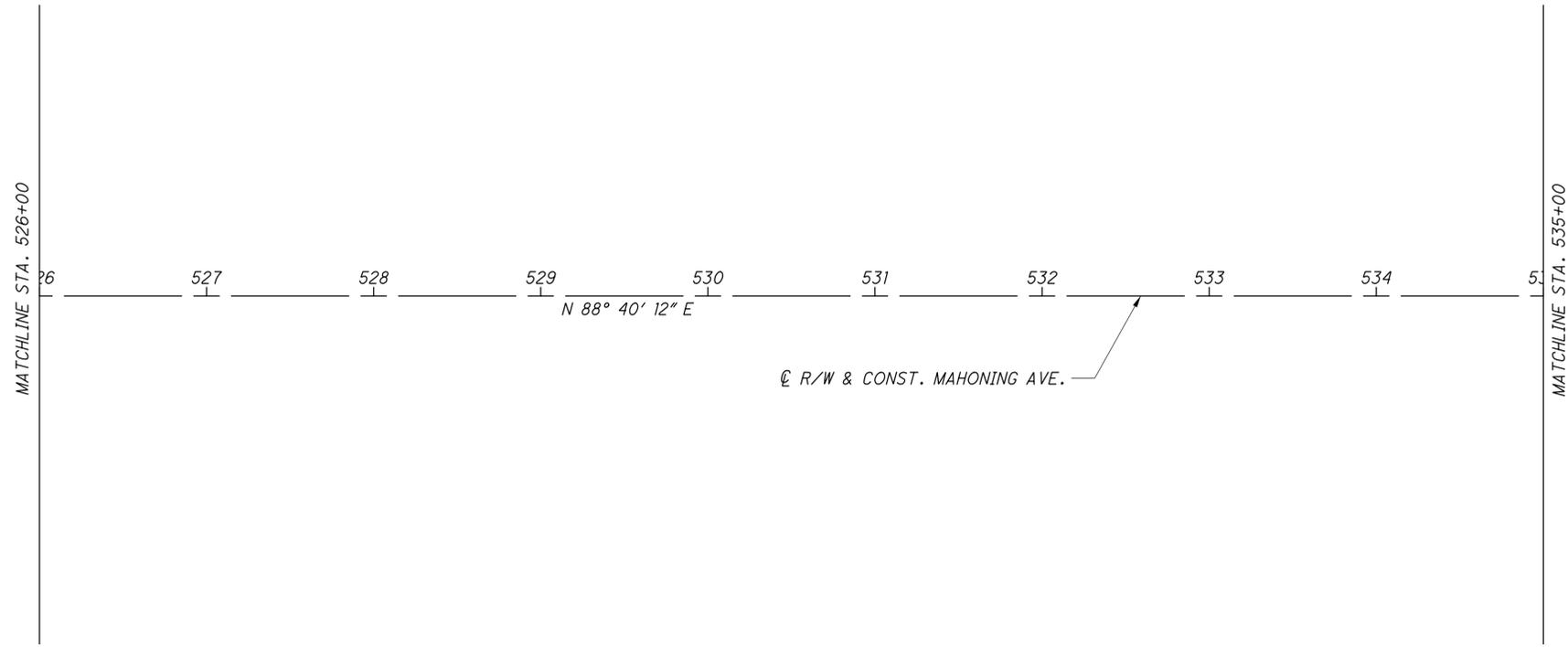


CONTROL POINT TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
CP-12	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528113.081	2472793.827	874.700	STA. 500+45.56, 93.28' RT.
CP-13	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528232.688	2472913.200	872.295	STA. 501+67.67, 23.53' LT.
CP-14	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528267.297	2473736.853	867.311	STA. 509+91.91, 39.01' LT.
CP-15	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528269.684	2474023.317	865.147	STA. 512+78.29, 34.72' LT.
CP-16	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528284.253	2474581.224	849.493	STA. 518+36.44, 36.36' LT.
CP-17	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528290.787	2474894.644	847.005	STA. 521+49.93, 35.62' LT.

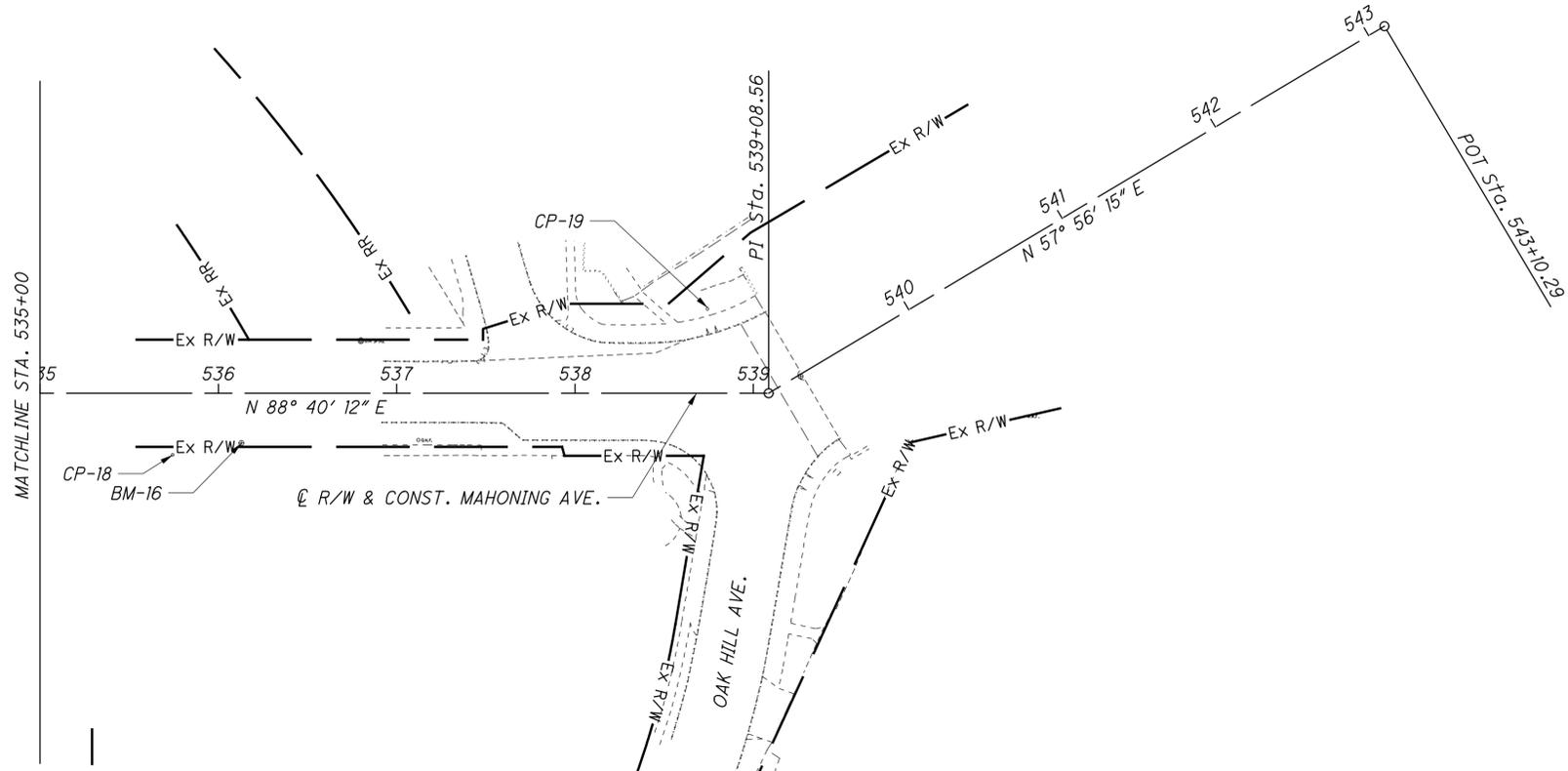
**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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BENCHMARK TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
BM-16	BENCH TIE IN TELEPHONE POLE	528261.200	2476358.731	840.533	STA. 536+12.94, 27.94' RT.



CONTROL POINT TABLE					
NAME	DESCRIPTION	NORTHING	EASTING	ELEVATION	CL STATION
CP-18	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528253.739	2476320.307	840.105	STA. 535+74.35, 34.51' RT.
CP-19	3/4X30 INCH REBAR WITH 2 ALUMINUM CAP	528342.287	2476618.283	847.478	STA. 538+74.30, 47.10 LT.



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SCALE IN FEET

SCHEMATIC PLAN
STA. 526+00 TO END

MAH-YOUNGSTOWN
SIGNAL UPGRADE

UTILITIES

LISTED BELOW ARE ALL UTILITIES LOCATED WITHIN THE PROJECT CONSTRUCTION LIMITS TOGETHER WITH THEIR RESPECTIVE OWNERS:

DOMINION EAST OHIO
320 SPRINGSIDE DRIVE, SUITE 320
AKRON, OHIO 44333
ATTN: BRYAN D DAYTON
PHONE: 330-664-2409

OHIO EDISON
730 SOUTH AVE.
YOUNGSTOWN, OHIO 44502
PHONE: 330-740-7704

AT&T
50 W. BOWERY ST., 6TH FLOOR
AKRON, OHIO 44308
PHONE: 330-384-2245

WINDSTREAM WESTERN RESERVE
245 N HIGH ST.
HUDSON, OHIO 44236
PHONE: 330-650-8000

CITY OF YOUNGSTOWN WATER DEPARTMENT
26 S. PHELPS STREET
YOUNGSTOWN, OHIO 44503
ATTN: EUGENE J. LESON
PHONE: 330-742-8746

CITY OF YOUNGSTOWN
CITY HALL, 5TH FLOOR
26 S. PHELPS STREET
YOUNGSTOWN, OHIO 44503
ATTN: CHUCK SHASHO
PHONE: 330-742-8788

THE UNDERGROUND UTILITIES ON THIS PLAN HAVE BEEN LOCATED BY USING A SUBSURFACE UTILITY ENGINEERING COMPANY [SUE]. IF THERE ARE ANY DISCREPANCIES BETWEEN FIELD MARKINGS AND WHAT THE PLAN INDICATES, PLEASE CONTACT THE CITY OF YOUNGSTOWN, PRIOR TO ANY SUBSURFACE WORK BEING INITIATED.

SURVEYING PARAMETERS

PRIMARY PROJECT CONTROL MONUMENTS SHALL GOVERN THIS PROJECT. SEE SHEETS 2_-8_ OF THE PLANS FOR A TABLE CONTAINING PROJECT CONTROL INFORMATION.

USE THE FOLLOWING PROJECT CONTROL, VERTICAL POSITIONING, AND HORIZONTAL POSITIONING PARAMETERS FOR ALL SURVEYING:

PROJECT CONTROL

POSITIONING METHOD: ODOT VRS
MONUMENT TYPE: TYPE B

VERTICAL POSITIONING

ORTHOMETRIC HEIGHT DATUM: NAVD88
GEOID: 12B

HORIZONTAL POSITIONING

REFERENCE FRAME: NAD83(2011)
ELLIPSOID: GRS80
MAP PROJECTION: LAMBERT CONFORMAL CONIC
COORDINATE SYSTEM: OHIO STATE PLANE COORDINATE SYSTEM, NORTH ZONE 3401
COMBINED SCALE FACTOR: 1.000103839
METHOD OF OBTAINING SCALE FACTOR: TRIMBLE BUSINESS CENTER
ORIGIN OF COORDINATE SYSTEM (BASE POINT FOR SCALING): 0,0

USE THE POSITIONING METHODS AND MONUMENT TYPE USED IN THE ORIGINAL SURVEY TO RESTORE ALL MONUMENTS RELATED TO PRIMARY PROJECT CONTROL THAT ARE DAMAGED OR DESTROYED BY CONSTRUCTION ACTIVITIES. RESTORE THE DAMAGED OR DESTROYED MONUMENTS IN ACCORDANCE WITH CMS 623.

UNITS ARE IN U.S. SURVEY FEET.

WORK LIMITS

THE WORK LIMITS SHOWN ON THESE PLANS ARE FOR PHYSICAL CONSTRUCTION ONLY. PROVIDE THE INSTALLATION AND OPERATION OF ALL WORK ZONE TRAFFIC CONTROL AND WORK ZONE TRAFFIC CONTROL DEVICES REQUIRED BY THESE PLANS WHETHER INSIDE OR OUTSIDE THESE WORK LIMITS.

PROTECTION OF RIGHT-OF-WAY LANDSCAPING

PRIOR TO BEGINNING WORK, THE CONTRACTOR, THE PROJECT ENGINEER, AND A REPRESENTATIVE OF THE MAINTAINING AGENCY WILL REVIEW AND RECORD ALL LANDSCAPING ITEMS WITHIN THE RIGHT OF WAY (BOTH WITHIN AND OUTSIDE THE CONSTRUCTION LIMITS). A RECORD OF THIS REVIEW WILL BE KEPT IN THE PROJECT ENGINEER'S FILES. PRIOR TO FINAL ACCEPTANCE, A FINAL REVIEW OF LANDSCAPING ITEMS WILL BE MADE.

CONSTRICT ALL ACTIVITIES, EQUIPMENT STORAGE, AND STAGING TO WITHIN THE CONSTRUCTION LIMITS. UNLESS OTHERWISE IDENTIFIED IN THE PLANS OR PROPOSAL, THE CONSTRUCTION LIMITS ARE IDENTIFIED AS 30 FEET FROM THE EDGE OF PAVEMENT.

SUBMIT A WRITTEN REQUEST TO THE PROJECT ENGINEER TO USE ANY AREA OUTSIDE THESE LIMITS. THE DOCUMENT SUBMITTED MUST CLEARLY IDENTIFY THE AREA AND EXPLAIN THE PROPOSED USE AND RESTORATION OF THE AREA. USE OF THESE AREAS FOR DISPOSAL OF WASTE MATERIAL AND CONSTRUCTION DEBRIS, EXCAVATION OF BORROW MATERIAL AND PLACEMENT OF PORTABLE PLANTS IS PROHIBITED. THE REQUEST MUST BE APPROVED, IN WRITING, BEFORE THE CONTRACTOR HAS PERMISSION TO USE THE AREA.

ANY ITEMS DAMAGED BEYOND THE CONSTRUCTION LIMITS AS DEFINED ABOVE WILL BE REPLACED IN KIND OR AS APPROVED BY THE PROJECT ENGINEER.

ITEM SPECIAL - ROADWAY, MISC.: PRECONSTRUCTION VIDEO RECORDING

THE CONTRACTOR SHALL SUBMIT A DVD RECORDING OF THE CONSTRUCTION LIMITS TO THE CITY PRIOR TO ANY WORK PERFORMED. THE RECORDING SHALL TAKE SPECIAL NOTE OF ALL SURFACE FEATURES INCLUDING DRIVEWAYS, TREES, FENCES, LANDSCAPING FEATURES AND PLANTERS. THE RECORDING WILL BE USED TO ASSIST THE ENGINEER IN THE CASE THAT PROPERTY OWNERS CLAIM DAMAGE HAS BEEN DONE TO THE PROPERTY BY THE CONTRACTOR DURING CONSTRUCTION. AREAS THAT HAVE BEEN DAMAGED DUE TO CONTRACTOR NEGLIGENCE AS DETERMINED BY THE ENGINEER SHALL BE RESTORED TO ITS ORIGINAL CONDITION BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY OR PROPERTY OWNER.

DOMINION EAST OHIO GUIDANCE

IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN THE LATERAL AND SUBJACENT SUPPORT OF DOMINION'S PIPELINE(S), IN COMPLIANCE TO 29 CFR, PART 1926, SUBPART P, (SAFE EXCAVATION & SHORING). ONE-FOOT MINIMUM VERTICAL AND HORIZONTAL CLEARANCE MUST BE MAINTAINED BETWEEN DOMINION EAST OHIO'S (DEO) EXISTING PIPELINE(S) AND ALL OTHER IMPROVEMENTS. EXTREME CARE SHOULD BE TAKEN NOT TO HARM ANY DEO FACILITY (PIPELINE, ETC.) OR APPURTANANCE (PIPE COATING, TRACER WIRE, CATHODIC PROTECTION TEST STATION WIRES & DEVICES, VALVE BOXES, ETC.). DEO FACILITIES MUST BE PROTECTED WITH A TARP DURING BRIDGE CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE AND LIABLE FOR ENSURING THAT ALL DEO EXISTING FACILITIES, ABOVE AND BELOW GROUND, REMAIN UNDAMAGED, ACCESSIBLE AND IN WORKING ORDER. THE CROSSING OF DEO'S PIPELINE WITH ANOTHER STEEL FACILITY MAY CREATE A POTENTIAL CORROSION ISSUE FOR THE PROPOSED FACILITY AND THE EXISTING DEO FACILITY. PLEASE CONTACT DOMINION'S CORROSION DEPARTMENT: DAVE CUTLIP (330-266-2121), RICK McDONALD (330-266-2122), OR AL HUMRICHOUER (330-478-3757).

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GENERAL NOTES

MAH - YOUNGSTOWN
SIGNAL UPGRADE

ITEM 614 - MAINTENANCE OF TRAFFIC

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

1. A MINIMUM OF ONE TEN FOOT LANE IN EACH DIRECTION SHALL BE MAINTAINED ON THE EXISTING PAVEMENT DURING CONSTRUCTION OF THE WORK.
2. THE CONTRACTOR SHALL INFORM THE CITY OF YOUNGSTOWN (330) 742-8800, TEN (10) DAYS PRIOR TO THE BEGINNING OF WORK.
3. TRUCK MOUNTED ATTENUATORS (TMAs) SHALL BE USED AS SHOWN IN THE STANDARD CONSTRUCTION DRAWINGS.
4. 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 PERFORMING WORK.
5. ONLY DURING OFF-PEAK PERIODS (I.E. ANY PERIOD OTHER THAN 6-9AM AND 3-6PM) SHALL THE CONTRACTOR INSTALL AND SUBSEQUENTLY RESET ALL TRAFFIC CONTROL NECESSARY FOR THE WORK ZONE FOR EACH CONSTRUCTION PHASE.
6. NO LANE CLOSURE SHALL BE IMPLEMENTED DURING THE HOURS OF 6:00 AM TO 9:00 AM OR 3:00 PM TO 6:00 PM WEEKDAYS. ALL ADVANCE WARNING SIGNS FOR ANY CONDITION WHICH RESTRICTS TRAFFIC SHALL BE ERECTED BEFORE ANY SUCH RESTRICTION IS PUT INTO EFFECT. ALL SUCH SIGNS SHALL BE COVERED OR REMOVED FROM THE VIEW OF TRAFFIC WHEN THEY ARE NOT APPLICABLE, AS DETERMINED BY THE ENGINEER. LANE RESTRICTIONS AND LANE REDUCTIONS SHALL BE SIGNED AND DELINEATED PER SCD MT-95.31.
7. LENGTH AND DURATION OF LANE CLOSURE AND RESTRICTIONS SHALL BE AT THE APPROVAL OF THE ENGINEER. IT IS THE INTENT TO MINIMIZE THE IMPACT TO THE TRAVELING PUBLIC. LANE CLOSURES OR RESTRICTIONS OVER SEGMENTS OF THE PROJECT IN WHICH NO WORK IS ANTICIPATED WITHIN A REASONABLE TIME FRAME, AS DETERMINED BY THE ENGINEER, SHALL NOT BE PERMITTED. THE LEVEL OF UTILIZATION OF MAINTENANCE OF TRAFFIC DEVICES SHALL BE COMMENSURATE WITH THE WORK IN PROGRESS.
8. IF IT IS NECESSARY TO STOP ALL TRAFFIC FOR THE ERECTION OF A MAST ARM SIGNAL SUPPORT, THE WORK SHALL BE SO ARRANGED THAT THE STOPPAGE IS LESS THAN TEN (10) MINUTES IN ANY ONE (1) THIRTY (30) MINUTE PERIOD. NO STOPPAGE OF TRAFFIC SHALL OCCUR FOR THE ERECTION OF SIGNAL SUPPORTS AND HANGING OF SIGNAL HEADS WITHOUT A LAW ENFORCEMENT OFFICER WITH A PATROL CAR AT THE SITE FOR ASSISTANCE IN CONTROLLING TRAFFIC. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THE SERVICES AND SCHEDULING OF SAID LAW ENFORCEMENT OFFICER WITH PATROL CAR.

TOTAL STOPPAGES OF TRAFFIC CAN ONLY OCCUR DURING THE FOLLOWING TIME PERIODS AS APPROVED BY THE ENGINEER:

- 12:00 MIDNIGHT - 6:00 AM
- 9:00 AM - 11:00 AM
- 1:00 PM - 3:00 PM
- 8:00 PM - 12:00 MIDNIGHT

ITEM 614 - MAINTENANCE OF TRAFFIC

9. THE CONTRACTOR SHALL MAINTAIN PEDESTRIAN TRAFFIC DURING CONSTRUCTION TO THE GREATEST EXTENT POSSIBLE. PROVISIONS SHALL BE MADE TO CREATE SAFE WALKING PATHS DURING CONSTRUCTION AND TO PROTECT NEW EQUIPMENT AS DIRECTED BY THE ENGINEER. PEDESTRIAN DETOUR METHODS, LIGHTING, SIGNAGE, CHANNELIZATION, TEMPORARY WALKWAYS, ETC., SHALL BE IN ACCORDANCE WITH STANDARD CONSTRUCTION DRAWING MT-110.10 "PEDESTRIAN DETOUR METHODS". ALL PEDESTRIAN DETOURS SHALL OCCUR AT EXISTING CROSSWALK LOCATIONS.
10. IF THE CONTRACTOR FAILS TO COMPLY WITH THE PROVISIONS FOR TRAFFIC CONTROL AS SET FORTH IN THESE PLANS AND PROVISIONS OF THE OMUTCD AND THE FAILURE RESULTS IN A CONDITION AT THE WORK SITE WHICH IS UNSAFE FOR TRAFFIC, THE ENGINEER MAY SUSPEND WORK UNTIL THE CONTRACTOR COMPLIES WITH THE NECESSARY REQUIREMENTS.
11. NO WORK SHALL BE PERFORMED AND ALL EXISTING LANES SHALL BE OPEN TO TRAFFIC ON SUNDAYS AND DURING THE FOLLOWING DESIGNATED HOLIDAYS OR EVENTS:

NEW YEARS
MEMORIAL DAY
FOURTH OF JULY
LABOR DAY
THANKSGIVING
CHRISTMAS

THE PERIOD OF TIME THAT THE LANES ARE TO BE OPEN DEPENDS ON THE DAY OF THE WEEK ON WHICH THE HOLIDAY OR EVENT FALLS. THE FOLLOWING SCHEDULE SHALL BE USED TO DETERMINE THIS PERIOD:

DAY OF HOLIDAY OR EVENT	TIME ALL LANES MUST BE OPEN TO TRAFFIC
SUNDAY	12:00N FRIDAY THROUGH 6:00 AM MONDAY
MONDAY	12:00N FRIDAY THROUGH 6:00 AM TUESDAY
TUESDAY	12:00N MONDAY THROUGH 6:00 AM WEDNESDAY
WEDNESDAY	12:00N TUESDAY THROUGH 6:00 AM THURSDAY
THURSDAY	12:00N WEDNESDAY THROUGH 6:00 AM FRIDAY
THURSDAY (THANKSGIVING ONLY)	12:00N WEDNESDAY THROUGH 6:00 AM MONDAY
FRIDAY	12:00N THURSDAY THROUGH 6:00 AM MONDAY
SATURDAY	12:00N FRIDAY THROUGH 6:00 AM MONDAY

SHOULD THE CONTRACTOR FAIL TO MEET ANY OF THESE REQUIREMENTS, THE CONTRACTOR SHALL BE ASSESSED A DISINCENTIVE IN THE AMOUNT OF \$50 FOR EACH MINUTE THE ABOVE DESCRIBED LANE CLOSURE RESTRICTIONS ARE VIOLATED.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH C&MS 614 AND OTHER APPICABLE PORTIONS OF THE SPECIFICATIONS, AS WELL AS THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, CURRENT EDITION, LATEST REVISION. PAYMENT FOR ALL LABOR, EQUIPMENT AND MATERIALS SHALL BE INCLUDED IN THE LUMP SUM CONTRACT PRICE FOR ITEM 614 - MAINTAINING TRAFFIC, UNLESS SEPARATELY ITEMIZED IN THE PLAN.

NOTIFICATION OF TRAFFIC RESTRICTIONS

THROUGHOUT THE DURATION OF THE PROJECT, THE CONTRACTOR SHALL NOTIFY THE CITY OF YOUNGSTOWN IN WRITING OF ALL TRAFFIC RESTRICTIONS AND UPCOMING MAINTENANCE OF TRAFFIC CHANGES. THE CONTRACTOR SHALL ENSURE THE WRITTEN NOTIFICATION IS SUBMITTED IN A TIMELY MANNER TO ALLOW THE PROJECT ENGINEER TO MEET THE REQUIRED TIME FRAMES SET FORTH IN THE TABLE BELOW TO INFORM THE CITY OF YOUNGSTOWN. THIS NOTIFICATION SHALL BE RECEIVED BY THE PROJECT ENGINEER PRIOR TO THE PHYSICAL SETUP OF ANY APPLICABLE SIGNS OR MESSAGE BOARDS.

INFORMATION SHOULD INCLUDE, BUT IS NOT LIMITED TO, ALL CONSTRUCTION ACTIVITIES THAT IMPACT OR INTERFERE WITH TRAFFIC AND SHALL LIST THE SPECIFIC LOCATION, TYPE OF WORK, ROAD STATUS, DATE AND TIME OF RESTRICTION, DURATION OF RESTRICTION, NUMBER OF LANES MAINTAINED, NUMBER OF LANES CLOSED, MINIMUM VERTICAL CLEARANCE, MINIMUM WIDTH OF DRIVABLE PAVEMENT, DETOUR ROUTES, IF APPLICABLE, AND ANY OTHER INFORMATION REQUESTED BY THE CITY OF YOUNGSTOWN.

NOTIFICATION TIME TABLE		
ITEM	DURATION OF CLOSURE	NOTICE DUE TO OFFICE OF COMMUNICATIONS
ROAD CLOSURES	>= 2 WEEKS	21 CALENDAR DAYS PRIOR TO CLOSURE
	> 12 HOURS & < 2 WEEKS	14 CALENDAR DAYS PRIOR TO CLOSURE
	< 12 HOURS	4 BUSINESS DAYS PRIOR TO CLOSURE
LANE CLOSURES & RESTRICTIONS	>= 2 WEEKS	14 CALENDAR DAYS PRIOR TO CLOSURE
	< 2 WEEKS	5 BUSINESS DAYS PRIOR TO CLOSURE
START OF CONSTRUCTION & TRAFFIC PATTERN CHANGES	N/A	14 CALENDAR DAYS PRIOR TO IMPLEMENTATION

ANY UNFORESEEN CONDITIONS NOT SPECIFIED IN THE PLANS REQUIRING TRAFFIC RESTRICTIONS SHALL ALSO BE REPORTED TO THE PROJECT ENGINEER USING THE NOTIFICATION TIME TABLE.

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MAINTENANCE OF TRAFFIC NOTES

MAH - YOUNGSTOWN SIGNAL UPGRADE

MAINTENANCE OF TRAFFIC SIGNAL/FLASHER INSTALLATION

THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRAFFIC SIGNAL/FLASHER INSTALLATIONS WITHIN THE PROJECT UNDER THE FOLLOWING CONDITIONS:

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

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

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

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

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

MAINTENANCE OF TRAFFIC SIGNAL/FLASHER INSTALLATION (CONTINUED)

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

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

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE 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 4 HOURS AND SHALL NOT INCLUDE THE HOURS OF 6-9AM AND 3-6PM. 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 YOUNGSTOWN POLICE, HIRED BY THE CONTRACTOR:

1. MAHONING AVE. / MERIDIAN RD.
2. MAHONING AVE. / DUNALP AVE.
3. MAHONING AVE. / SCHENLEY AVE.
4. MAHONING AVE. / HAZELWOOD AVE.
5. MAHONING AVE. / BELLE VISTA AVE.
6. MAHONING AVE. / ELEANOR AVE. / STEEL ST.
7. MAHONING AVE. / GLENWOOD AVE.
8. MAHONING AVE. / EDWARDS ST.
9. MAHONING AVE. / WEST ST.
10. MAHONING AVE. / OAK HILL AVE.

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

MAINTENANCE OF TRAFFIC SIGNAL/FLASHER INSTALLATION (CONTINUED)

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;
5. TIME OF COMPLETION OF THE 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.

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 614 - LAW ENFORCEMENT OFFICER (WITH PATROL CAR) FOR ASSISTANCE DURING CONSTRUCTION OPERATIONS

USE OF LAW ENFORCEMENT OFFICERS (LEOS) BY CONTRACTORS OTHER THAN THE USES SPECIFIED BELOW WILL NOT BE PERMITTED AT PROJECT COST. LEOS SHOULD NOT BE USED WHERE THE OMUTCD INTENDS THAT FLAGGERS BE USED.

IN ADDITION TO THE REQUIREMENTS OF C&M 614 AND THE OMUTCD, A UNIFORMED LEO WITH AN OFFICIAL PATROL CAR (CAR WITH TOP-MOUNTED EMERGENCY FLASHING LIGHTS AND COMPLETE MARKINGS OF THE APPROPRIATE LAW ENFORCEMENT AGENCY) SHALL BE PROVIDED FOR THE FOLLOWING TRAFFIC CONTROL TASKS:

DURING A TRAFFIC SIGNAL INSTALLATION WHEN IMPACTING THE NORMAL FUNCTION OF THE SIGNAL OR THE FLOW OF TRAFFIC OR WHEN TRAFFIC NEEDS TO BE DIRECTED THROUGH AN ENERGIZED TRAFFIC SIGNAL CONTRARY TO THE SIGNAL DISPLAY (E.G., DIRECTING MOTORISTS THROUGH A RED LIGHT).

FOR LANE CLOSURES: DURING INITIAL SET-UP PERIODS, TEAR DOWN PERIODS, SUBSTANTIAL SHIFTS OF A CLOSURE POINT OR WHEN NEW LANE CLOSURE ARRANGEMENTS ARE INITIATED FOR LONG TERM LANE CLOSURES/SHIFTS (FOR THE FIRST AND LAST DAY OF MAJOR CHANGES IN TRAFFIC CONTROL SETUP).

LEOS SHOULD NOT FORGO THEIR TRAFFIC CONTROL RESPONSIBILITIES TO APPREHEND MOTORISTS FOR ROUTINE TRAFFIC VIOLATIONS. HOWEVER, IF A MOTORIST'S ACTIONS ARE CONSIDERED TO BE RECKLESS, THEN PURSUIT OF THE MOTORIST IS APPROPRIATE.

IN GENERAL LEOS SHOULD BE POSITIONED IN ADVANCE OF AND ON THE SAME SIDE AS THE LANE RESTRICTION OR AT THE POINT OF ROAD CLOSURE, AND TO MANUALLY CONTROL TRAFFIC MOVEMENTS THROUGH SIGNALIZED INTERSECTIONS IN WORK ZONES.

ITEM 614 - LAW ENFORCEMENT OFFICER (WITH PATROL CAR) FOR ASSISTANCE DURING CONSTRUCTION OPERATIONS (CONTINUED)

THE LEOS WORK AT THE DIRECTION OF THE ENGINEER. THE CONTRACTOR IS RESPONSIBLE FOR SECURING THE SERVICES OF THE LEOS WITH THE APPROPRIATE AGENCIES AND COMMUNICATING THE INTENTIONS OF THE PLANS WITH RESPECT TO DUTIES OF THE LEOS. THE ENGINEER SHALL HAVE FINAL CONTROL OVER THE LEOS' DUTIES AND PLACEMENT, AND WILL RESOLVE ANY ISSUES THAT MAY ARISE BETWEEN THE TWO PARTIES.

THE LEO SHALL REPORT IN TO THE CONTRACTOR PRIOR TO THE START OF THE SHIFT, IN ORDER TO RECEIVE INSTRUCTIONS REGARDING SPECIFIC WORK ASSIGNMENTS DURING HIS/HER SHIFT. THE LEO IS EXPECTED TO STAY AT THE PROJECT SITE FOR THE ENTIRE DURATION OF HIS/HER SHIFT. THE LEO SHALL REPORT TO THE CONTRACTOR AT THE END OF HIS/HER SHIFT. ONCE THE LEO HAS COMPLETED THE DUTIES DESCRIBED ABOVE AND STILL HAS TIME REMAINING ON HIS/HER SHIFT, THE LEO MAY BE ASKED TO PATROL THROUGH THE WORK ZONE (WITH FLASHING LIGHTS OFF) OR BE PLACED AT A LOCATION TO DETER MOTORISTS FROM SPEEDING. SHOULD IT BE NECESSARY TO LEAVE THE PROJECT SITE, THE LEO SHALL NOTIFY THE ENGINEER. THE CONTRACTOR SHALL PROVIDE THE LEO WITH A TWO-WAY COMMUNICATION DEVICE WHICH SHALL BE RETURNED TO THE CONTRACTOR AT THE END OF HIS/HER SHIFT.

LEOS (WITH PATROL CAR) REQUIRED BY THE TRAFFIC MAINTENANCE TASKS ABOVE SHALL BE PAID FOR ON A UNIT PRICE (HOURLY) BASIS UNDER ITEM 614, LAW ENFORCEMENT OFFICER (WITH PATROL CAR) FOR ASSISTANCE. THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN CARRIED TO THE GENERAL SUMMARY.

ITEM 614 - LAW ENFORCEMENT OFFICER WITH 120 HOURS PATROL CAR FOR ASSISTANCE

THE HOURS PAID SHALL INCLUDE ANY MINIMUM SHOW-UP TIME REQUIRED BY THE LAW ENFORCEMENT AGENCY INVOLVED.

ANY ADDITIONAL COSTS (ADMINISTRATIVE OR OTHERWISE) INCURRED BY THE CONTRACTOR TO OBTAIN THE SERVICES OF AN LEO ARE INCLUDED WITH THE BID UNIT PRICE FOR ITEM 614, LAW ENFORCEMENT OFFICER WITH PATROL CAR FOR ASSISTANCE.

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MAINTENANCE OF TRAFFIC NOTES

MAH-YOUNGSTOWN
SIGNAL UPGRADE

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SHEET NUMBER													ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.						
15	25	26	27	28	29	30	31	32	33	34	35	36												
																			ROADWAY					
													202	23000	302	SY	PAVEMENT REMOVED							
													202	30000	8,894	SF	WALK REMOVED							
													202	32000	1,130	FT	CURB REMOVED							
													202	32500	135	FT	CURB AND GUTTER REMOVED							
													608	10000	3,050	SF	4" CONCRETE WALK							
													608	52000	6,639	SF	CURB RAMP							
													609	12000	142	FT	COMBINATION CURB AND GUTTER, TYPE 2							
													609	26000	1,084	FT	CURB, TYPE 6							
													623	39500	1	EACH	MONUMENT BOX ADJUSTED TO GRADE							
																			DRAINAGE					
													611	98630	4	EACH	CATCH BASIN ADJUSTED TO GRADE							
													611	99150	19	EACH	INLET ADJUSTED TO GRADE							
													611	99654	2	EACH	MANHOLE ADJUSTED TO GRADE							
																			PAVEMENT					
													252	01500	1,482	FT	FULL DEPTH PAVEMENT SAWING							
													304	20000	47	CY	AGGREGATE BASE							
													407	10000	16	GAL	TACK COAT							
													441	50000	16	CY	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, (448), PG64-22							
													441	50300	32	CY	ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 2, (448)							
																			WATER WORK					
													638	10400	2	EACH	FIRE HYDRANT ADJUSTED TO GRADE							
													638	10800	3	EACH	VALVE BOX ADJUSTED TO GRADE							
																			OTHER UTILITIES					
													611	99700	14	EACH	SPECIAL - GAS VALVE BOX ADJUSTED TO GRADE							
																			TRAFFIC CONTROL					
													630	02100	13.1	FT	GROUND MOUNTED SUPPORT, NO. 2 POST							
													630	79101	50	EACH	SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN	25						
													630	79501	15	EACH	SIGN ATTACHMENT ASSEMBLY, POLE MOUNTED, AS PER PLAN	25						
													630	80100	1021.4	SF	SIGN, FLAT SHEET							
													630	84900	1	EACH	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL							
													630	86002	1	EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL							
													630	87400	19	EACH	REMOVAL OF OVERHEAD MOUNTED SIGN AND DISPOSAL							
													630	87500	37	EACH	REMOVAL OF POLE MOUNTED SIGN AND DISPOSAL							
													630	97700	1	EACH	SIGNING, MISC.: REMOVAL AND REERECTION OF WAYFINDING SIGN	25						
													642	00200	0.01	MILE	LANE LINE, 4", TYPE 1							
													642	00300	0.02	MILE	CENTER LINE, TYPE 1							
													642	00400	15	FT	CHANNELIZING LINE, 8", TYPE 1							
													642	00500	523	FT	STOP LINE, TYPE 1							
													642	00600	2496	FT	CROSSWALK LINE, TYPE 1							
													488	45	319	82	69	404	642	30000	1407	FT	REMOVAL OF PAVEMENT MARKING	

GENERAL SUMMARY

MAH-YOUNGSTOWN SIGNAL UPGRADE

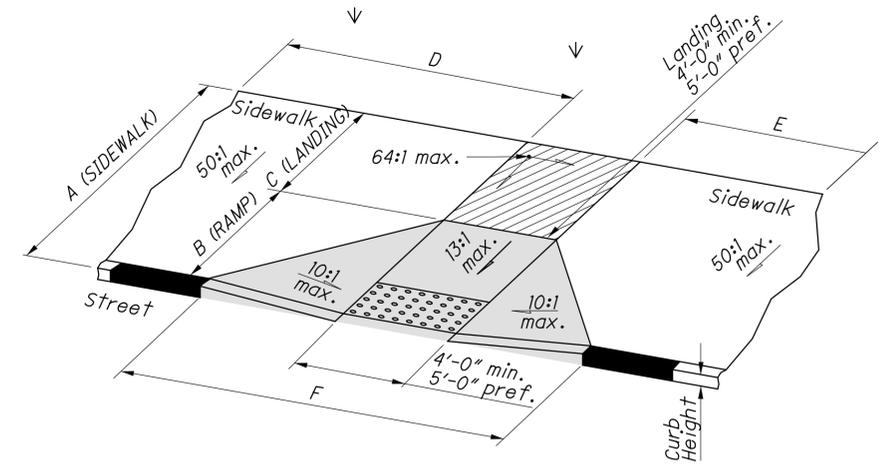
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SHEET NUMBER								ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
				43	44								
												TRAFFIC SIGNALS	
								625	25400	702	FT	CONDUIT, 2", 725.04	
								625	25500	477	FT	CONDUIT, 3", 725.04	
								625	25600	276	FT	CONDUIT, 4", 725.04	
								625	25802	1794	FT	CONDUIT, CONCRETE ENCASED, 4"	
								625	29000	1155	FT	TRENCH	
								625	29400	1,949	FT	TRENCH IN PAVED AREA	
								625	30700	21	EACH	PULL BOX, 725.08, 18"	
								625	30706	28	EACH	PULL BOX, 725.08, 24"	
								625	32000	70	EACH	GROUND ROD	
								625	36010	3,104	FT	UNDERGROUND WARNING/MARKING TAPE	
								632	05006	60	EACH	VEHICULAR SIGNAL HEAD, (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE	
								632	05064	8	EACH	VEHICULAR SIGNAL HEAD, (LED), 4-SECTION, 12" LENS, 1-WAY, POLYCARBONATE	
								632	05086	8	EACH	VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE	
								632	20731	58	EACH	PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AS PER PLAN	42
								632	25000	76	EACH	COVERING OF VEHICULAR SIGNAL HEAD	
								632	25010	58	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD	
								632	26001	26	EACH	PEDESTRIAN PUSHBUTTON, AS PER PLAN	43
								632	26500	28	EACH	DETECTOR LOOP	
								632	29900	75	FT	MESSANGER WIRE, 7 STRAND, 1/4" DIAMETER WITH ACCESSORIES	
								632	30600	75	FT	TETHER WIRE, WITH ACCESSORIES	
								632	40500	7,624	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG	
								632	40700	6,870	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG	
								632	64000	2	EACH	STRAIN POLE FOUNDATION	
								632	64010	29	EACH	SIGNAL SUPPORT FOUNDATION	
								632	64020	19	EACH	PEDESTAL FOUNDATION	
								632	64950	10	EACH	TEST HOLE PERFORMED	43
								632	65200	6,969	FT	LOOP DETECTOR LEAD-IN CABLE	
								632	69200	2,583	FT	POWER CABLE, 2 CONDUCTOR, NO. 4 AWG	
								632	70001	10	EACH	POWER SERVICE, AS PER PLAN	43
								632	70400	10	EACH	CONDUIT RISER, 2" DIAMETER	
								632	71225	1	EACH	SIGNAL SUPPORT, TYPE TC-12.31 DESIGN 6 POLE, WITH MAST ARMS TC-81.22 DESIGN 4 AND DESIGN 4, AS PER PLAN	43
								632	71245	1	EACH	SIGNAL SUPPORT, TYPE TC-12.31 DESIGN 6 POLE, WITH MAST ARMS TC-81.22 DESIGN 12 AND DESIGN 4, AS PER PLAN	43
								632	72101	12	EACH	SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 2, AS PER PLAN	43
								632	72111	7	EACH	SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 4, AS PER PLAN	43
								632	72131	3	EACH	SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 12, AS PER PLAN	43
								632	72141	3	EACH	SIGNAL SUPPORT, TYPE TC-81.22, DESIGN 13, AS PER PLAN	43
								632	72301	2	EACH	SIGNAL SUPPORT, TYPE TC-81.22 DESIGN 4 POLE, WITH MAST ARMS TC-81.22 DESIGN 2 AND DESIGN 2, AS PER PLAN	43
								632	86130	2	EACH	STRAIN POLE, TYPE TC-81.11, DESIGN 10	
								632	89900	19	EACH	PEDESTAL, 8", TRANSFORMER BASE	
								632	90101	10	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN	43
								633	45000	10	EACH	GPS (GLOBAL POSITIONING SYSTEM) CLOCK ASSEMBLY	
								633	65511	10	EACH	CABINET, TYPE TS-2, AS PER PLAN	43
								633	67100	10	EACH	CABINET FOUNDATION	
								633	67200	1	EACH	CONTROLLER WORK PAD	
								809	69101	2	EACH	STOP LINE RADAR DETECTION, AS PER PLAN	43

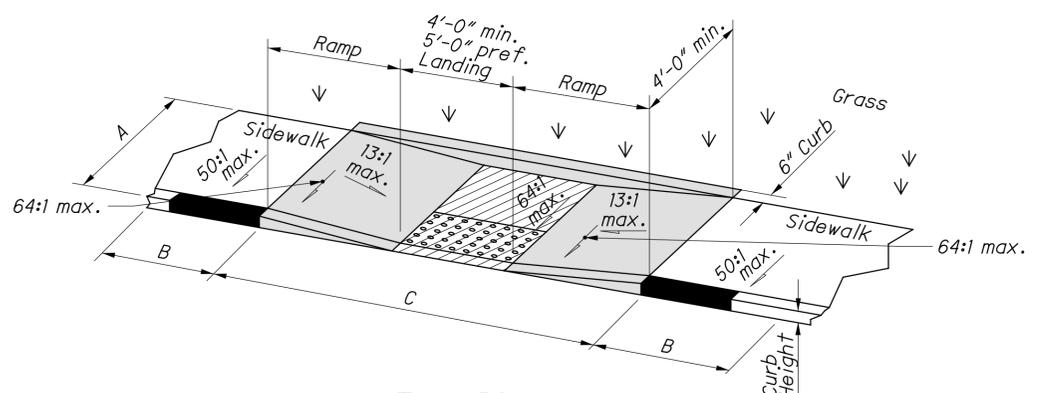
GENERAL SUMMARY
MAH-YOUNGSTOWN SIGNAL UPGRADE

CALCULATED
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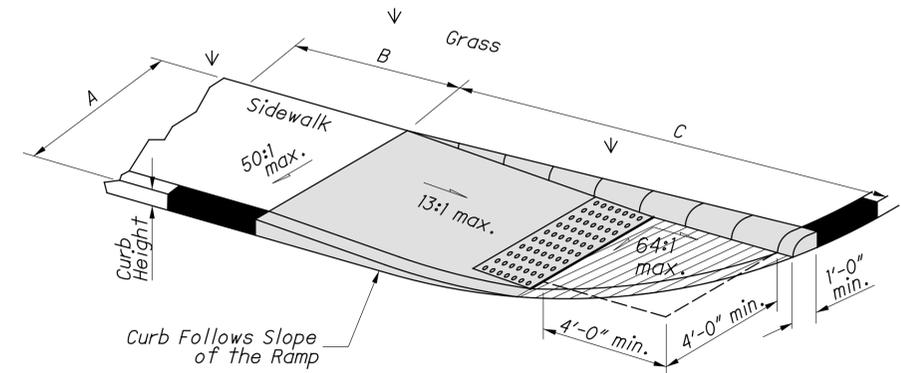
REF. NO.	MAIN ROUTE	INTERSECTION ROUTE	QUADRANT	CURB RAMP TYPE	DIMENSIONS (FEET)						
					A	B	C	D	E	F	G
CR-1	MAHONING AVE.	MERIDIAN RD.	RL	A1	10.5	6.5	4.0	-	-	11.0	-
CR-2	MAHONING AVE.	MERIDIAN RD.	RL	A1	10.7	6.7	4.0	-	-	15.0	-
CR-3	MAHONING AVE.	MERIDIAN RD.	FL	B2	6.1	-	25.4	-	-	-	-
CR-4	MAHONING AVE.	MERIDIAN RD.	RR	B2	7.1	-	29.9	-	-	-	-
CR-5	MAHONING AVE.	MERIDIAN RD.	FR	A1	8.6	4.6	4.0	-	-	14.5	-
CR-6	MAHONING AVE.	MERIDIAN RD.	FR	A1	8.5	4.5	4.0	-	-	18.9	-
CR-7	MAHONING AVE.	DUNLAP AVE.	RL	B2	5.8	-	22.4	-	-	-	-
CR-8	MAHONING AVE.	DUNLAP AVE.	FL	B2	8.8	-	17.9	-	-	-	-
CR-9	MAHONING AVE.	DUNLAP AVE.	RR	B2	6.9	-	26.5	-	-	-	-
CR-10	MAHONING AVE.	DUNLAP AVE.	FR	B2	10.0	-	26.0	-	-	-	-
CR-11	MAHONING AVE.	SCHENLEY AVE.	RL	B2	9.9	-	18.0	-	-	-	-
CR-12	MAHONING AVE.	SCHENLEY AVE.	FL	A1	9.7	5.7	4.0	-	-	15.2	-
CR-13	MAHONING AVE.	SCHENLEY AVE.	FL	A1	10.5	6.5	4.0	-	-	15.0	-
CR-14	MAHONING AVE.	SCHENLEY AVE.	RR	B2	7.7	-	22.8	-	-	-	-
CR-15	MAHONING AVE.	SCHENLEY AVE.	FR	A1	8.7	4.7	4.0	-	-	15.0	-
CR-16	MAHONING AVE.	SCHENLEY AVE.	FR	A1	8.7	4.5	4.2	-	-	15.0	-
CR-17	MAHONING AVE.	HAZELWOOD AVE.	RL	B2	7.2	-	26.4	-	-	-	-
CR-18	MAHONING AVE.	HAZELWOOD AVE.	FL	A1	10.7	6.7	4.0	-	-	15.0	-
CR-19	MAHONING AVE.	HAZELWOOD AVE.	FL	A1	10.5	6.5	4.0	-	-	15.0	-
CR-20	MAHONING AVE.	HAZELWOOD AVE.	RR	A1	8.7	4.5	4.2	-	-	14.0	-
CR-21	MAHONING AVE.	HAZELWOOD AVE.	RR	A1	10.9	6.9	4.0	-	-	15.0	-
CR-22	MAHONING AVE.	HAZELWOOD AVE.	FR	B2	7.9	-	26.5	-	-	-	-
CR-23	MAHONING AVE.	BELLE VISTA AVE.	RL	B2	6.8	-	15.0	-	-	-	-
CR-24	MAHONING AVE.	BELLE VISTA AVE.	RL	A1	10.8	6.8	4.0	-	-	15.0	-
CR-25	MAHONING AVE.	BELLE VISTA AVE.	FL	B2	5.8	-	27.9	-	-	-	-
CR-26	MAHONING AVE.	BELLE VISTA AVE.	RR	B3	7.0	-	13.2	-	-	-	-
CR-27	MAHONING AVE.	BELLE VISTA AVE.	FR	B2	10.5	-	33.0	-	-	-	-
CR-28	MAHONING AVE.	STEEL ST.	RL	A1	11.3	6.5	4.8	-	-	15.0	-
CR-29	MAHONING AVE.	STEEL ST.	RL	B2	12.1	-	33.2	-	-	-	-
CR-30	MAHONING AVE.	STEEL ST.	FL	A1	9.6	5.6	4.0	-	-	11.0	-
CR-31	MAHONING AVE.	STEEL ST.	RR	B2	11.5	-	25.3	-	-	-	-
CR-32	MAHONING AVE.	STEEL ST.	FR	B2	11.0	-	21.5	-	-	-	-
CR-33	MAHONING AVE.	EDWARDS ST.	FL	A1	9.0	5.0	4.0	-	-	15.0	-
CR-34	MAHONING AVE.	EDWARDS ST.	RR	B2	9.3	-	25.3	-	-	-	-
CR-35	MAHONING AVE.	EDWARDS ST.	FR	B2	8.7	-	30.3	-	-	-	-
CR-36	MAHONING AVE.	WEST AVE.	RL	A1	9.5	5.5	4.0	-	-	9.0	-
CR-37	MAHONING AVE.	WEST AVE.	RR	B2	10.3	-	20.7	-	-	-	-
CR-38	MAHONING AVE.	WEST AVE.	FR	B2	9.6	-	22.6	-	-	-	-



Type A1



Type B2



Type B3

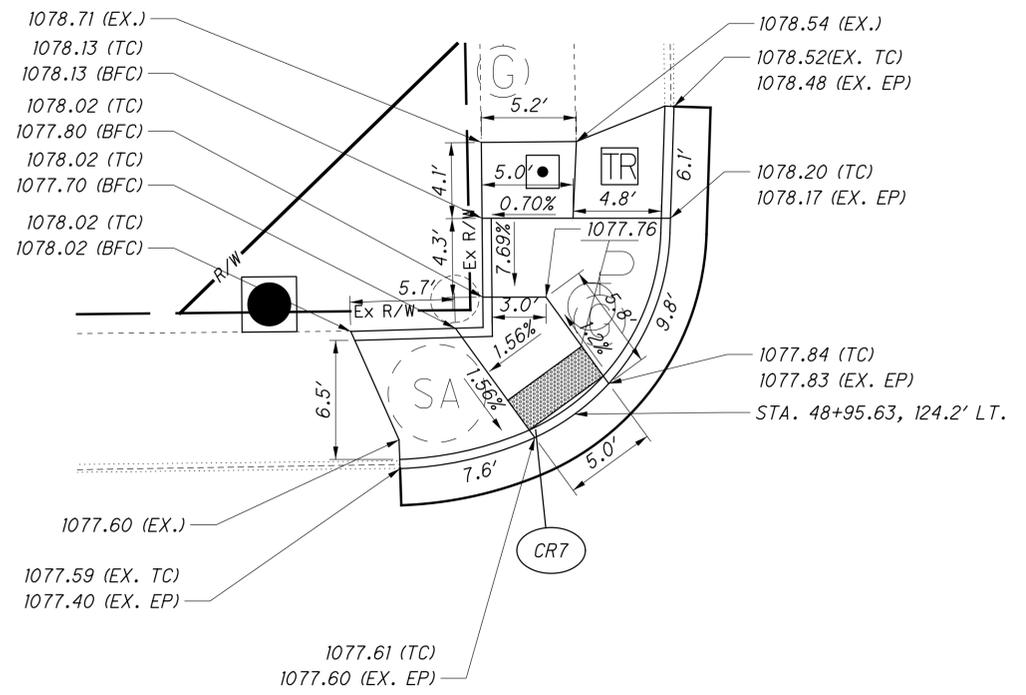
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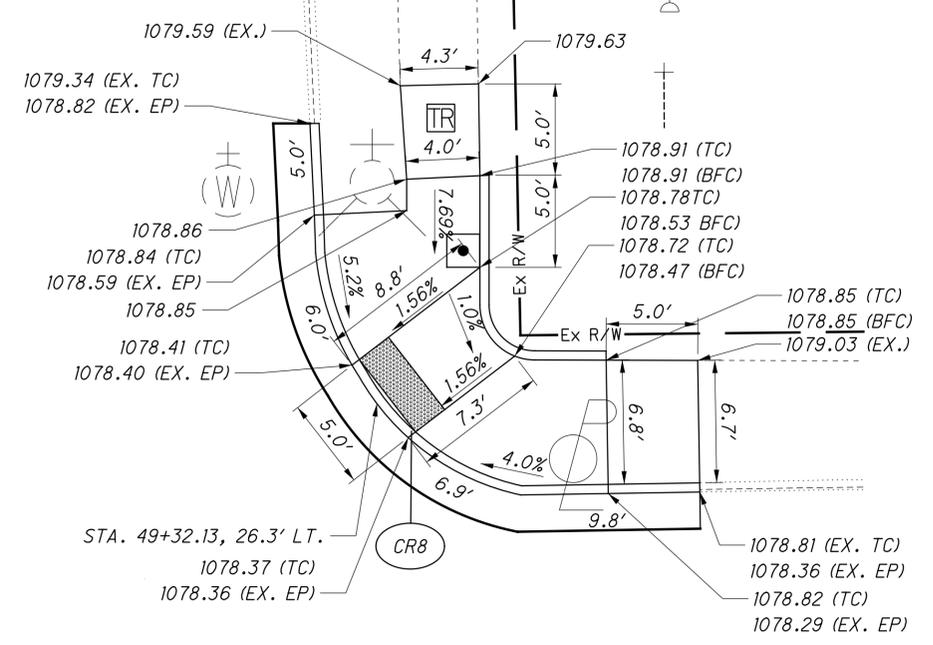
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**CURB RAMP DETAILS / DUNLAP AVE.
MAHONING AVE. / DUNLAP AVE.**

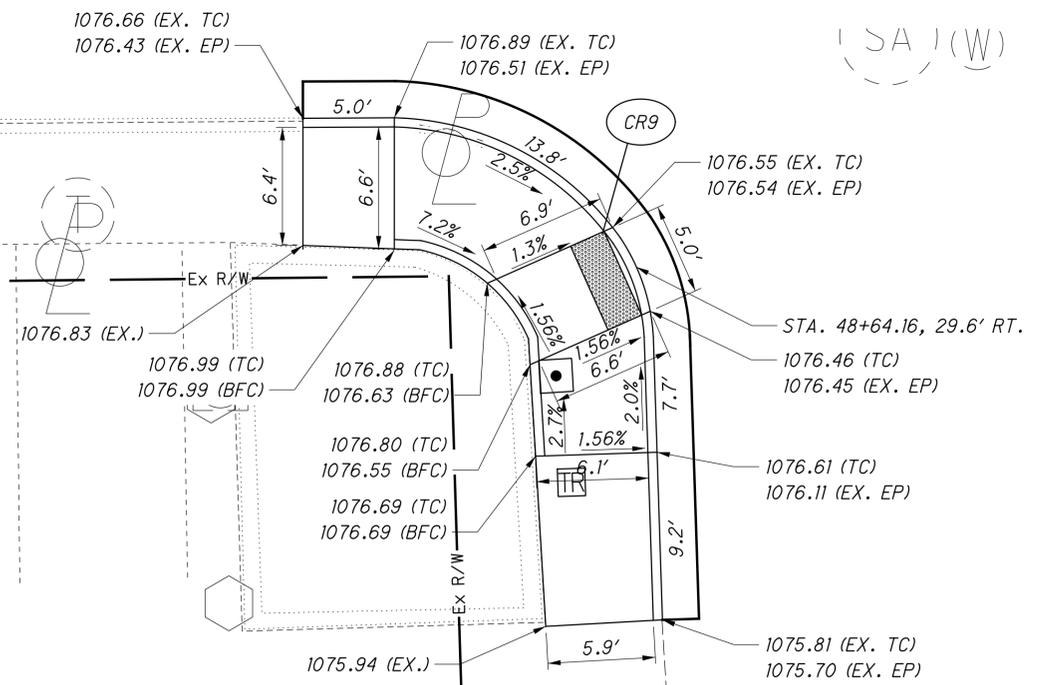
**MAH-YOUNGSTOWN
SIGNAL UPGRADE**



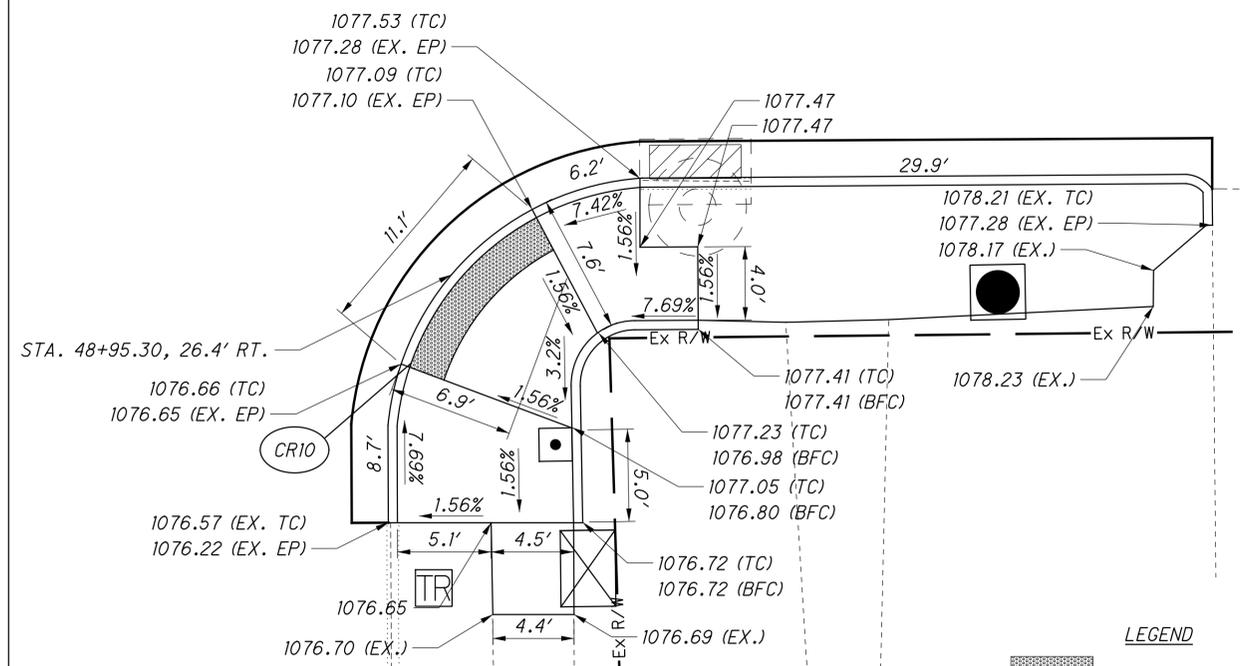
NW CORNER DETAIL



NE CORNER DETAIL



SW CORNER DETAIL



SE CORNER DETAIL

LEGEND
 DETECTABLE WARNING

NOTES:
 1. CENTERLINE CALLOUT AT FACE OF CURB.
 2. BFC = BOTTOM FACE OF CURB
 EX. EP = EXISTING EDGE OF PAVEMENT
 TC = TOP OF CURB / TOB OF CASTING

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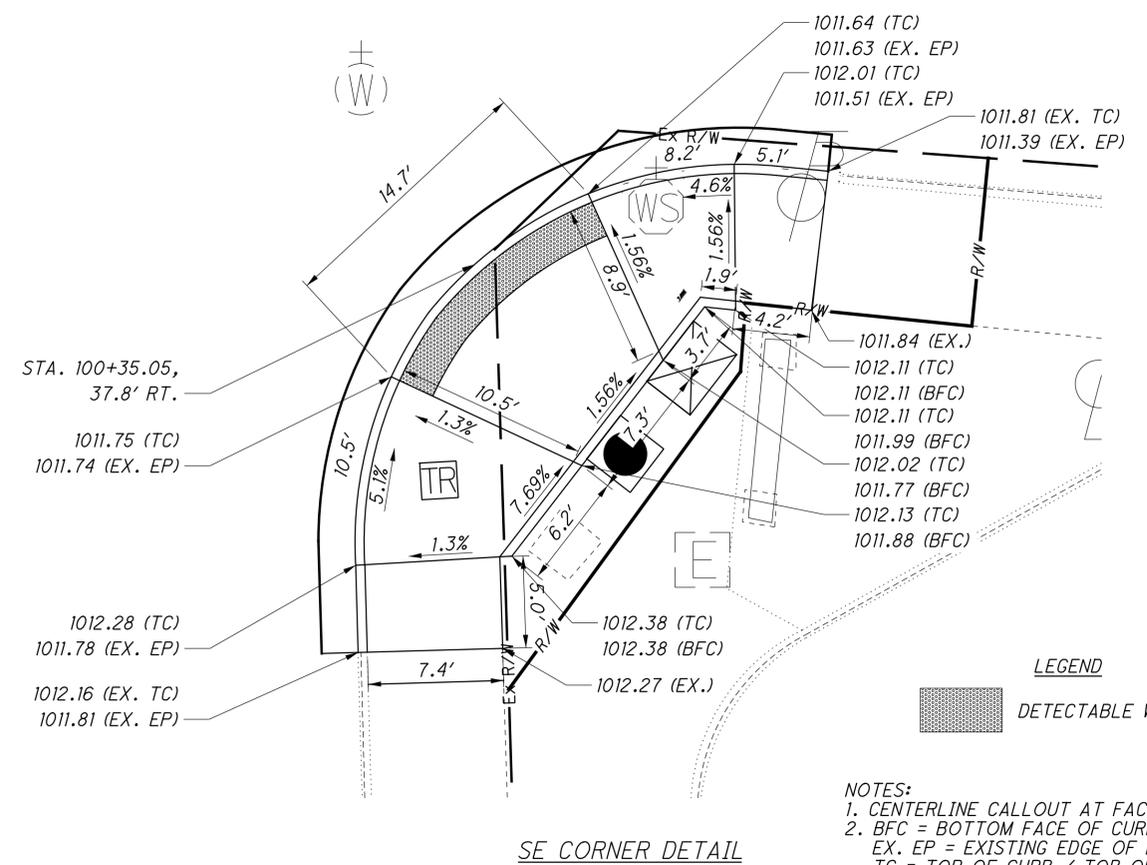
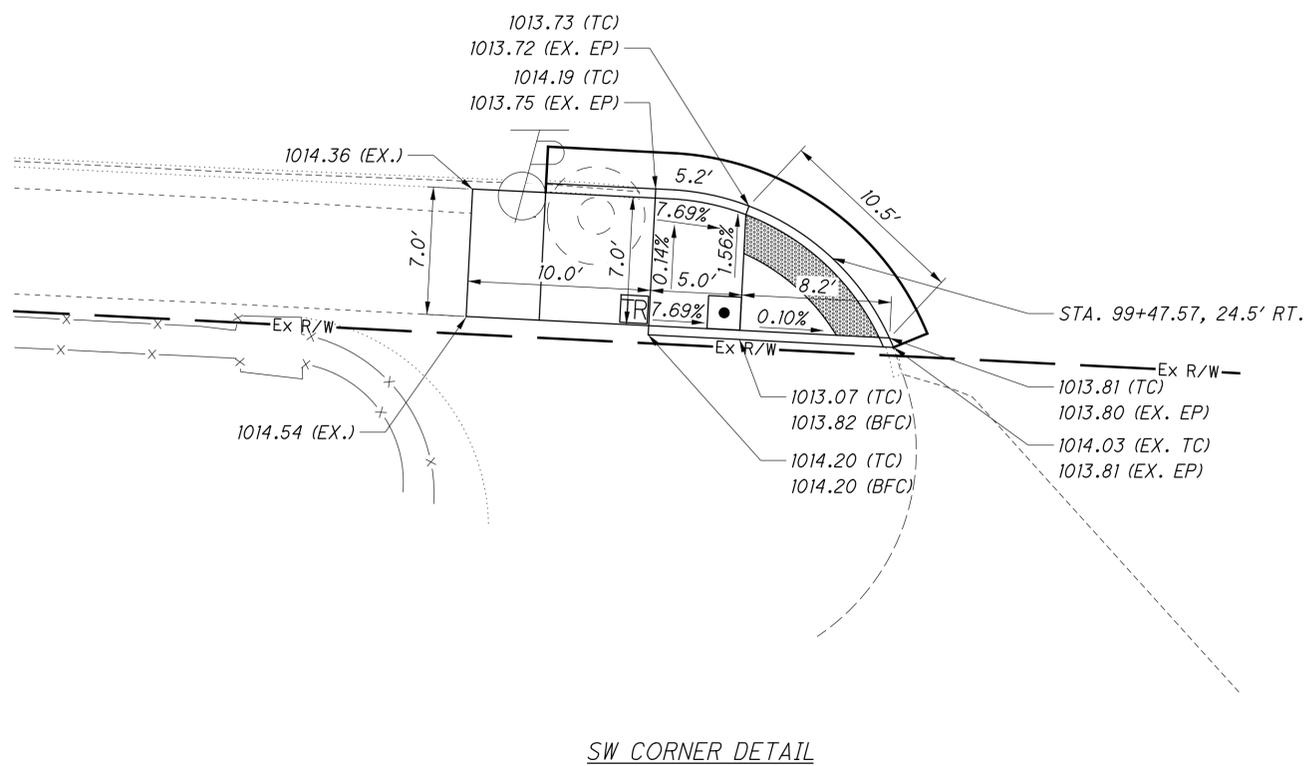
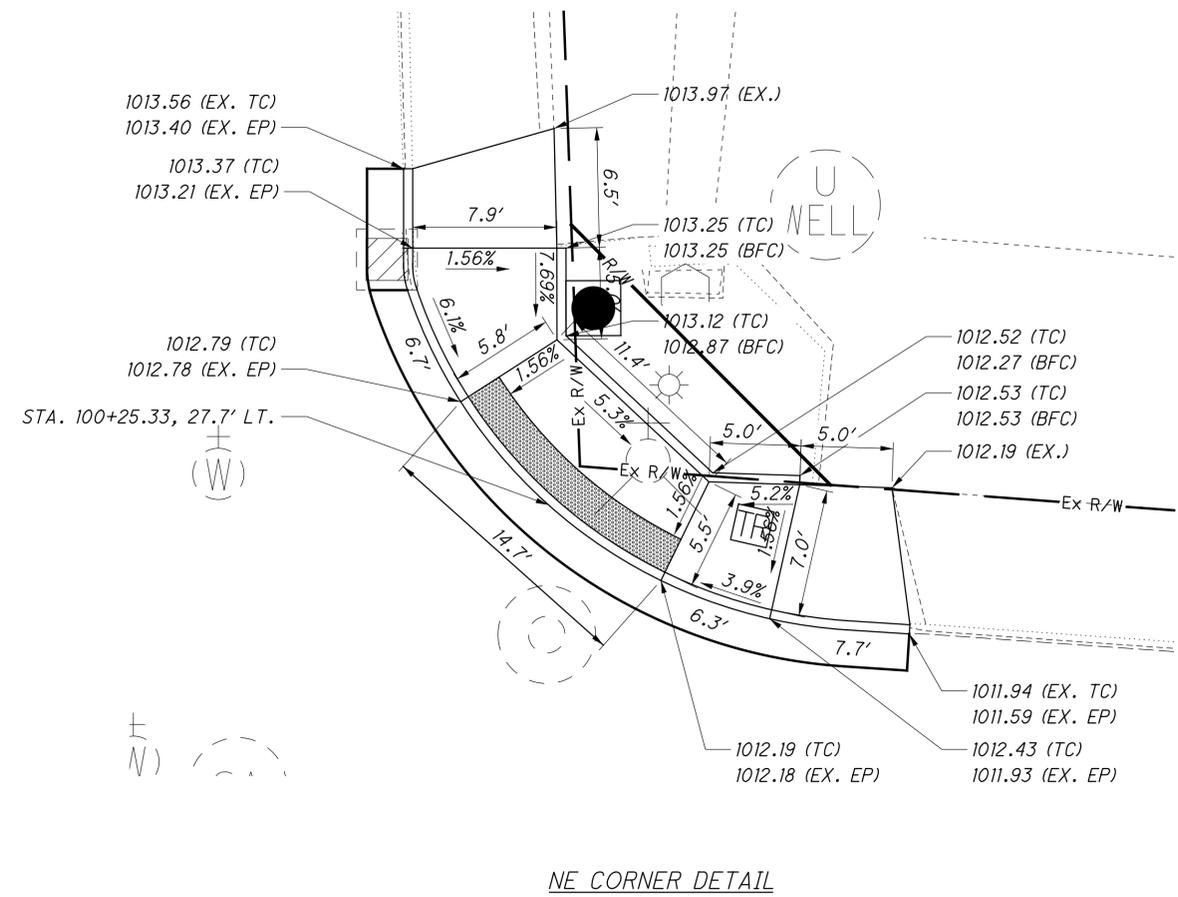
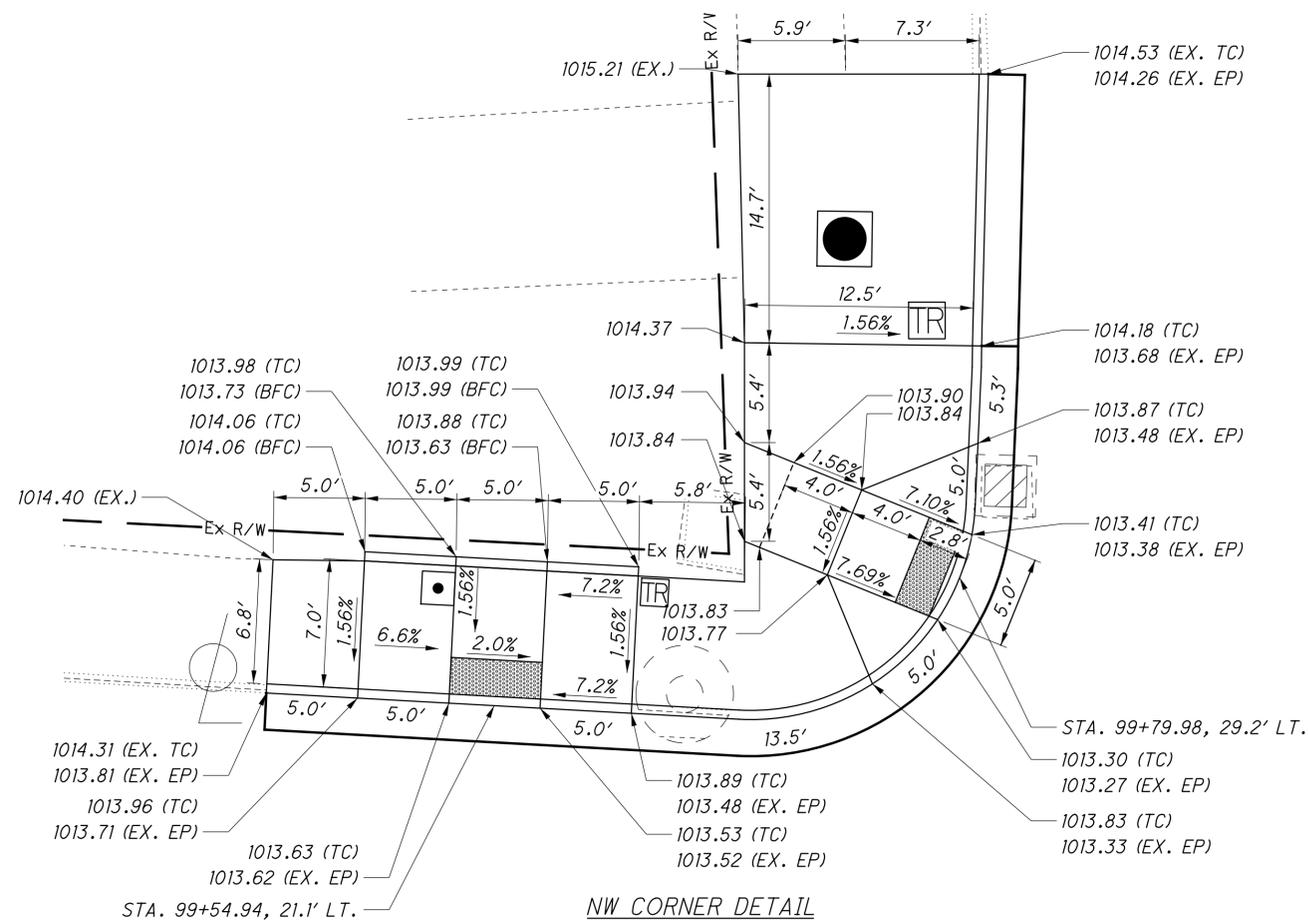


2.5' HORIZONTAL SCALE IN FEET

CALCULATED
MSS
CHECKED
KMG

CURB RAMP DETAILS
MAHONING AVE. / BELLE VISTA AVE.

MAH-YOUNGSTOWN SIGNAL UPGRADE



LEGEND
DETECTABLE WARNING

NOTES:
1. CENTERLINE CALLOUT AT FACE OF CURB.
2. BFC = BOTTOM FACE OF CURB
EX. EP = EXISTING EDGE OF PAVEMENT
TC = TOP OF CURB / TOB OF CASTING

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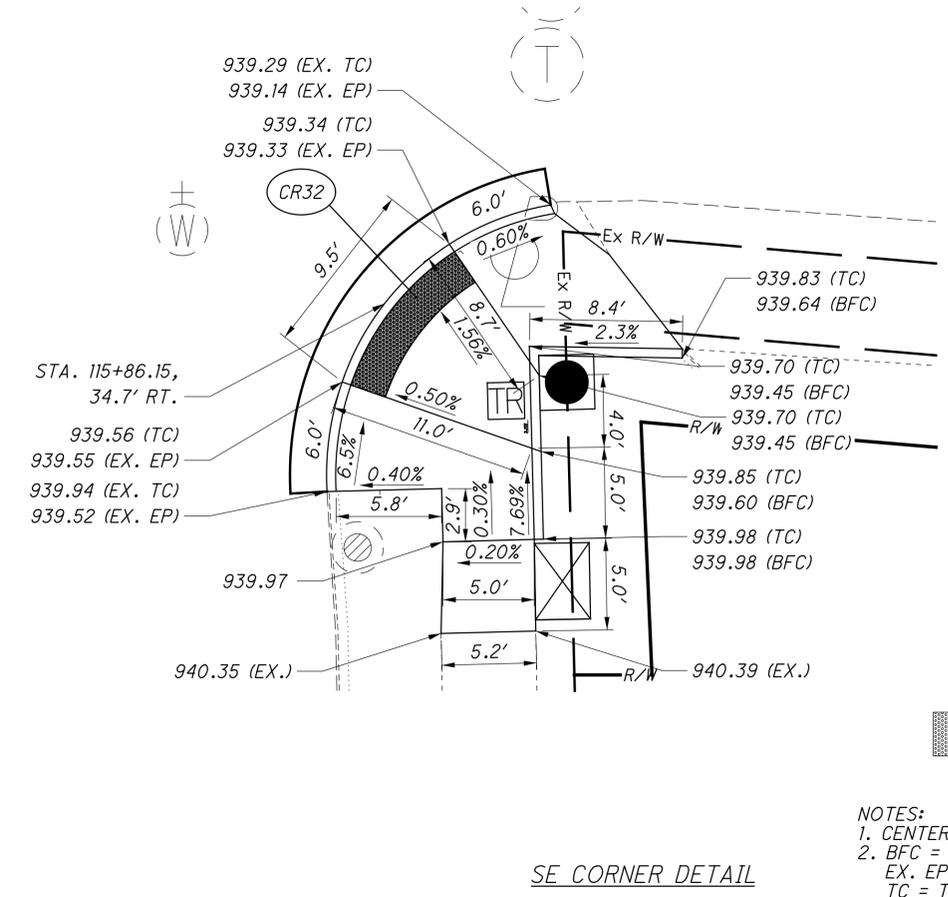
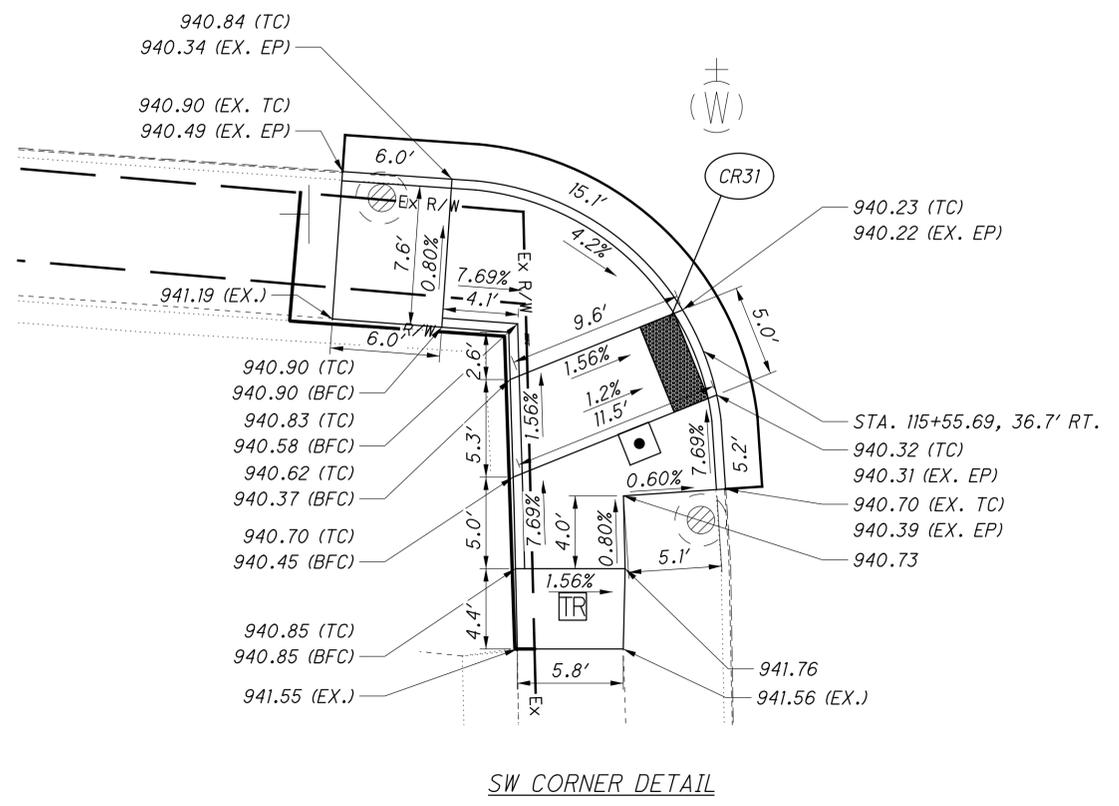
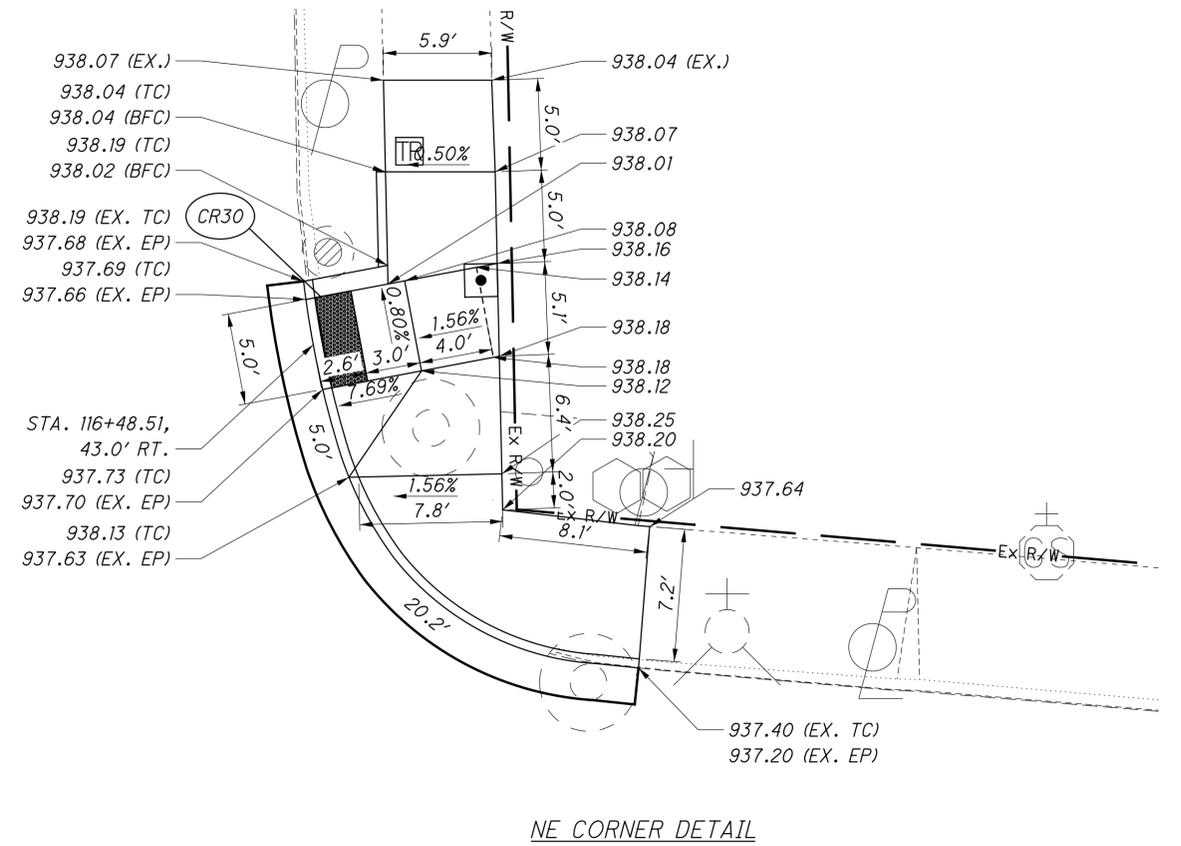
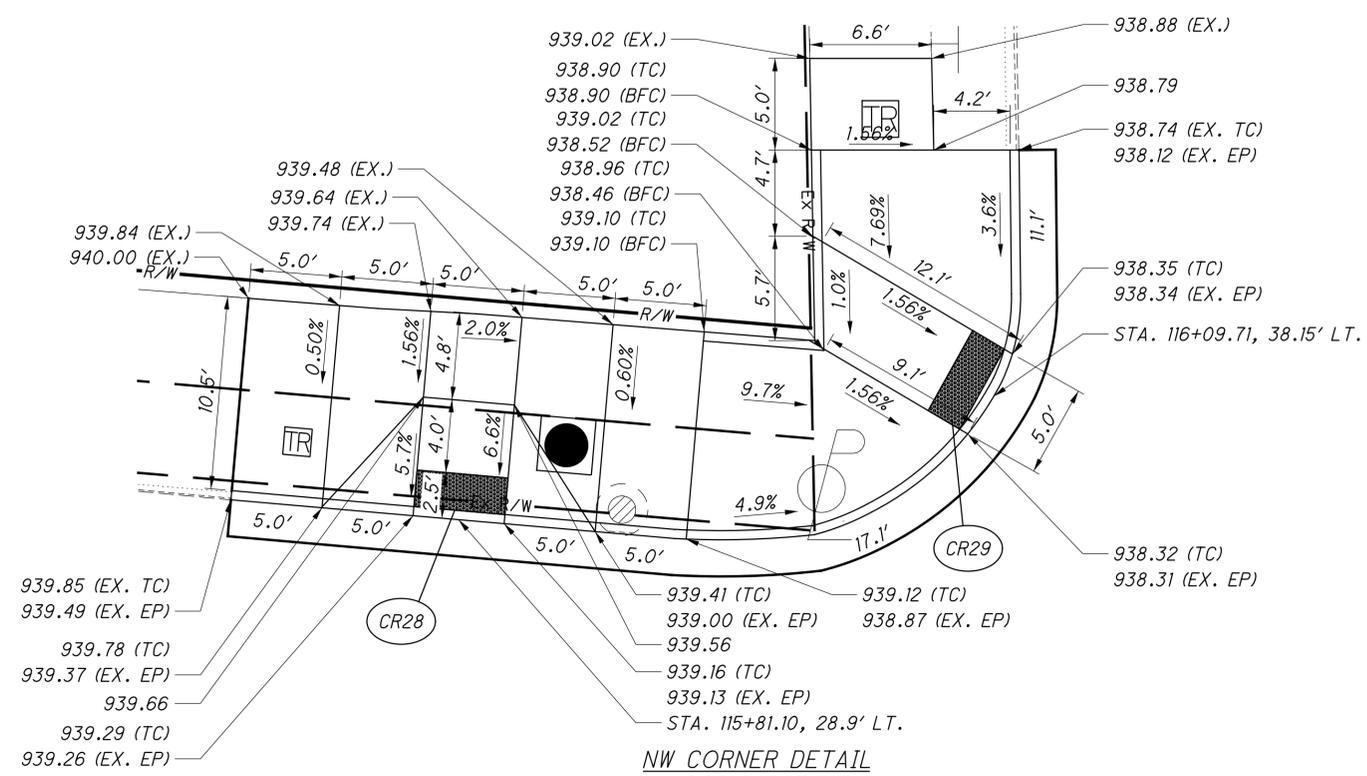
2.5' HORIZONTAL SCALE IN FEET

CALCULATED
MSS
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**CURB RAMP DETAILS
MAHONING AVE. / STEEL ST.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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LEGEND

DETECTABLE WARNING

NOTES:
 1. CENTERLINE CALLOUT AT FACE OF CURB.
 2. BFC = BOTTOM FACE OF CURB
 EX. EP = EXISTING EDGE OF PAVEMENT
 TC = TOP OF CURB / TOB OF CASTING



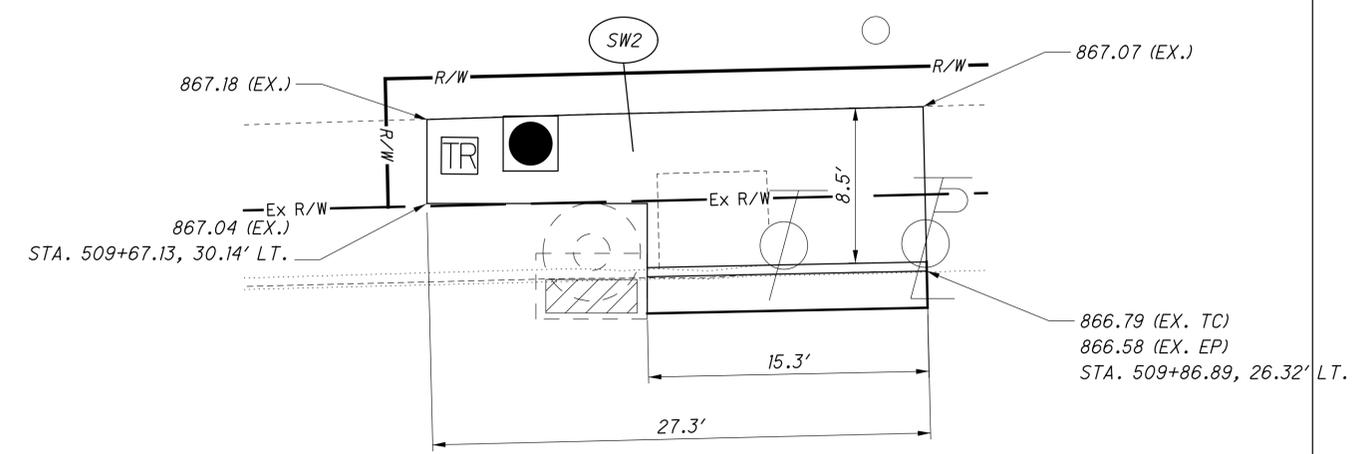
2.5' HORIZONTAL SCALE IN FEET

CALCULATED
MSS
CHECKED
KMG

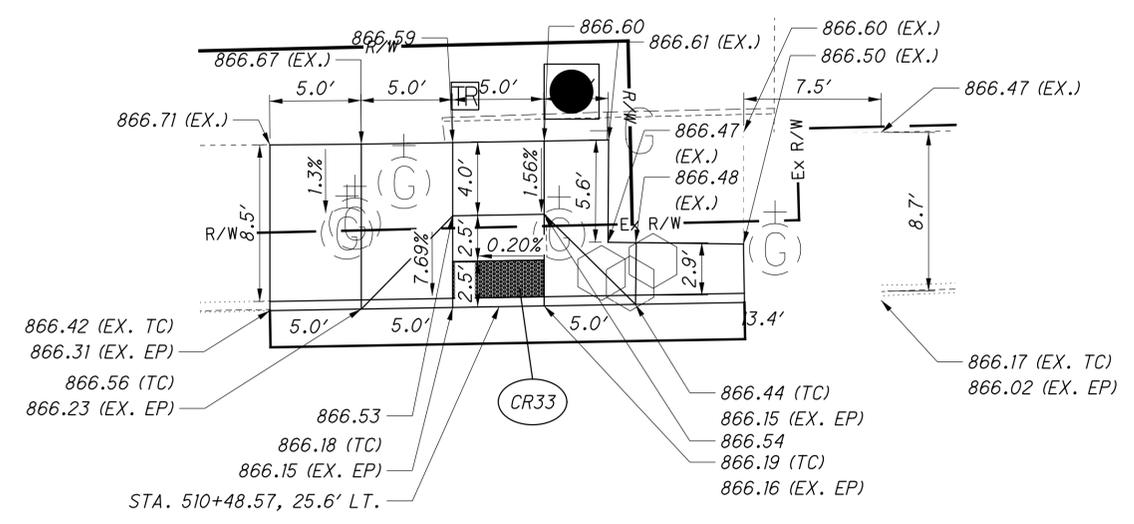
CURB RAMP DETAILS
MAHONING AVE. / EDWARDS ST.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

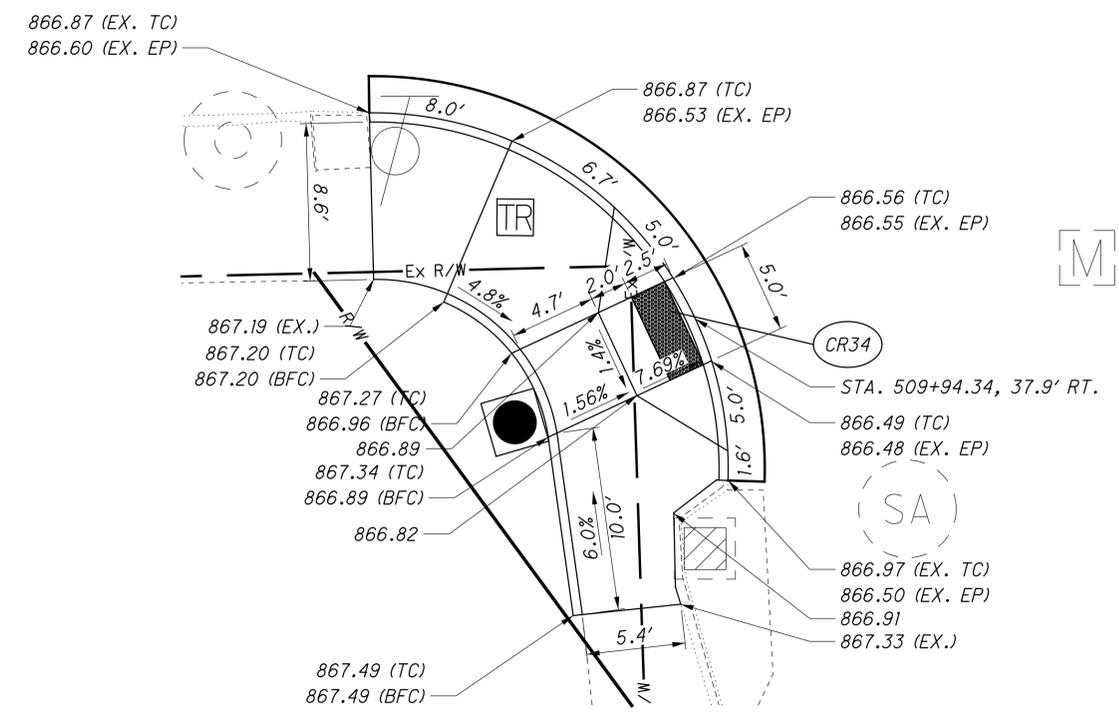
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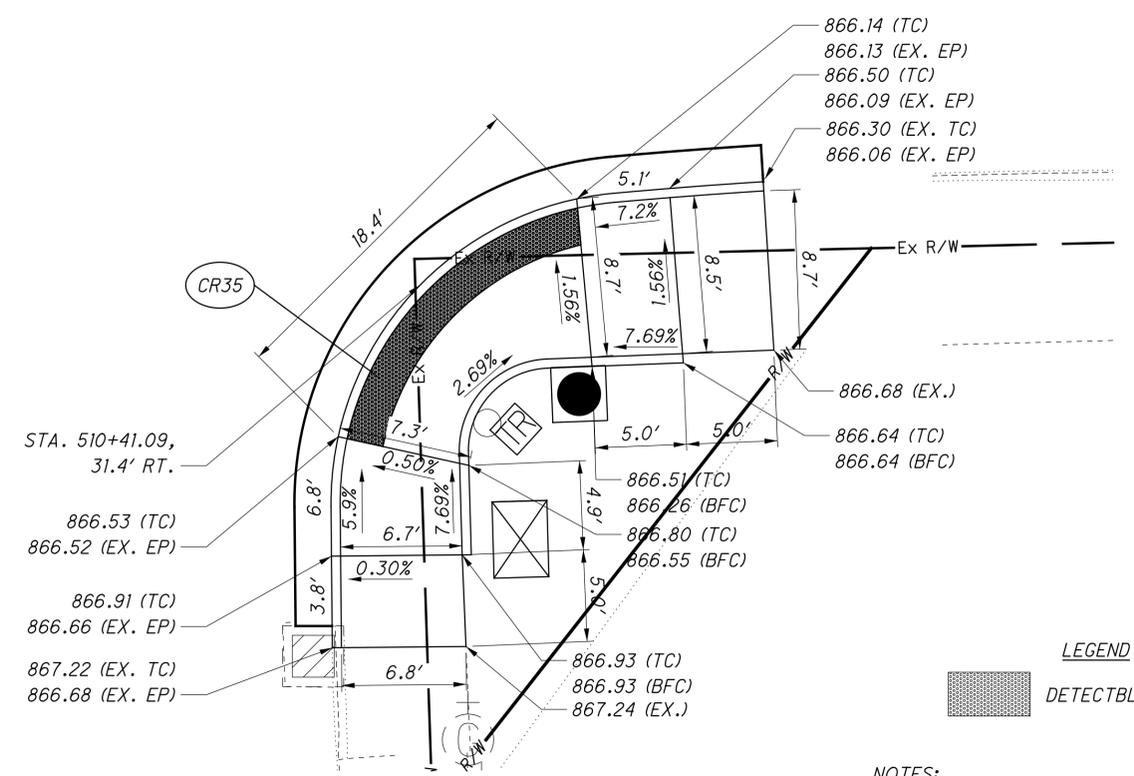
NW CORNER DETAIL



NE CORNER DETAIL



SW CORNER DETAIL



SE CORNER DETAIL

LEGEND
 DETECTBLE WARNING

NOTES:
 1. CENTERLINE CALLOUT AT FACE OF CURB.
 2. BFC = BOTTOM FACE OF CURB
 EX. EP = EXISTING EDGE OF PAVEMENT
 TC = TOP OF CURB / TOB OF CASTING

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ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN

FLAT SHEET SIGNS SHALL BE RIGIDLY ATTACHED TO TRAFFIC SIGNAL MAST ARMS WITH THE SIGN CENTERED VERTICALLY ON THE ARM, USING THE SIGN BRACKET DETAIL ON STANDARD CONSTRUCTION DRAWING TC-16.22, OR ANOTHER METHOD OF RIGID ATTACHMENT AS APPROVED BY THE ENGINEER. THE CONTRACTOR SHALL ENSURE THAT THE SIGN FACE IS MOUNTED PERPENDICULAR (90 DEGREES) TO THE DIRECTION OF TRAFFIC.

PAYMENT FOR ITEM 630 - SIGN HANGER ASSEMBLY, MAST ARM, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH. PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, EQUIPMENT, AND ALL PARTS NECESSARY TO ATTACH ONE SIGN.

ITEM 630 - SIGN SUPPORT ASSEMBLY, POLE MOUNTED, AS PER PLAN

ALL MOUNTING HARDWARE SHALL BE PAINTED WITH A SEMI-GLOSS BLACK FINISH (FEDERAL COLOR NO. 27038). PAINTING OF THE HARDWARE SHALL BE COMPLETED IN THE SAME METHOD AS THE SIGNAL EQUIPMENT IS PAINTED.

PAYMENT FOR ITEM 630 - SIGN SUPPORT ASSEMBLY, POLE MOUNTED, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH, PAYMENT SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, EQUIPMENT, AND ALL PARTS NECESSARY TO ATTACH ONE SIGN.

ITEM 630 - SIGNING MISC.: REMOVAL AND REERECTION OF WAYFINDING SIGN

IN ACCORDANCE WITH C&MS 630.12, THE EXISTING WAYFINDING SIGN LOCATED AT APPROXIMATELY STA. 519+79.1, 42.2' LT. SHALL BE CAREFULLY REMOVED AND REERECTED PRIOR TO THE INSTALLATION OF THE PROPOSED SIGNAL SUPPORT FOUNDATION. THE CONTRACTOR SHALL COORDINATE WITH THE CITY TO DETERMINE THE NEW LOCATION OF THE REERECTED WAYFINDING SIGN AND SUPPORT.

THE CONTRACTOR SHALL TAKE GREAT CARE AS TO NOT DAMAGE THE EXISTING SIGN AND SUPPORT, AS IT IS THE DESIGNER'S INTENT TO REUSE THE EQUIPMENT. IF IT IS DETERMINED BY THE ENGINEER, THAT THE EXISTING EQUIPMENT HAS BEEN DAMAGED DUE TO CONTRACTOR NEGLIGENCE, THEN THE CONTRACTOR SHALL REPLACE THE SIGNAL EQUIPMENT IN LIKE KIND AT THE COST OF THE CONTRACTOR.

THE CONTRACTOR SHALL MEASURE THE EXISTING ANCHOR BOLTS AND COORDINATE WITH THE CITY TO DETERMINE THE APPROPRIATE ANCHOR BOLT TYPE, PATTERN AND SIZE TO SECURELY INSTALL THE SIGN SUPPORT TO THE NEW FOUNDATION. ANCHOR BOLTS AND SUPPORT FOUNDATION SHALL BE CONSIDERED INCIDENTAL TO THIS ITEM OF WORK.

PAYMENT SHALL BE MADE AT THE UNIT PRICE PER EACH FOR ITEM 630 SIGNING, MISC.: REMOVAL AND REERECTION OF WAYFINDING SIGN AND SHALL INCLUDE ALL LABOR, EQUIPMENT, MATERIALS AND OTHER INCIDENTALS NECESSARY, INCLUDING THE SUPPORT FOUNDATION AND ANCHOR BOLTS, TO REMOVE AND REERECT THE EXISTING SIGNAGE IN A LOCATION APPROVED BY THE CITY ENGINEER. A QUANTITY OF 1 HAS BEEN CARRIED TO THE GENERAL SUMMARY.

TRAFFIC CONTROL LEGEND	
	PROPOSED SIGN
	EXISTING SIGN TO BE REMOVED
	SIGN SUPPORT
	EXISTING SIGN TO BE REMOVED
	PROPOSED SIGN
	CENTER LINE, DOUBLE SOLID
	CROSSWALK LINE
	STOP LINE
	LANE LINE
	CHANNELIZING LINE

CALCULATED
DLS
CHECKED
AKF

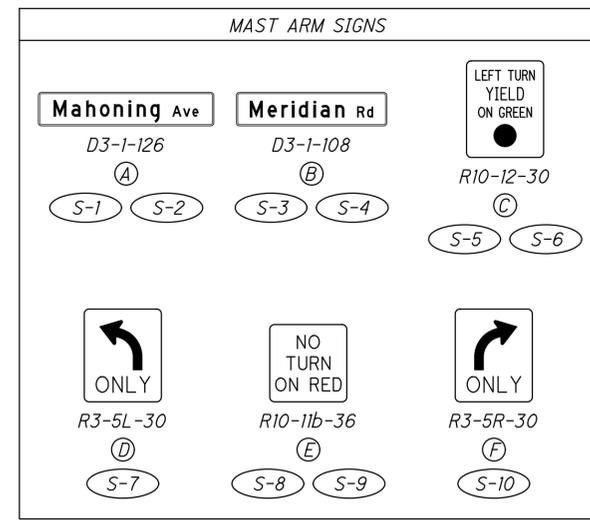
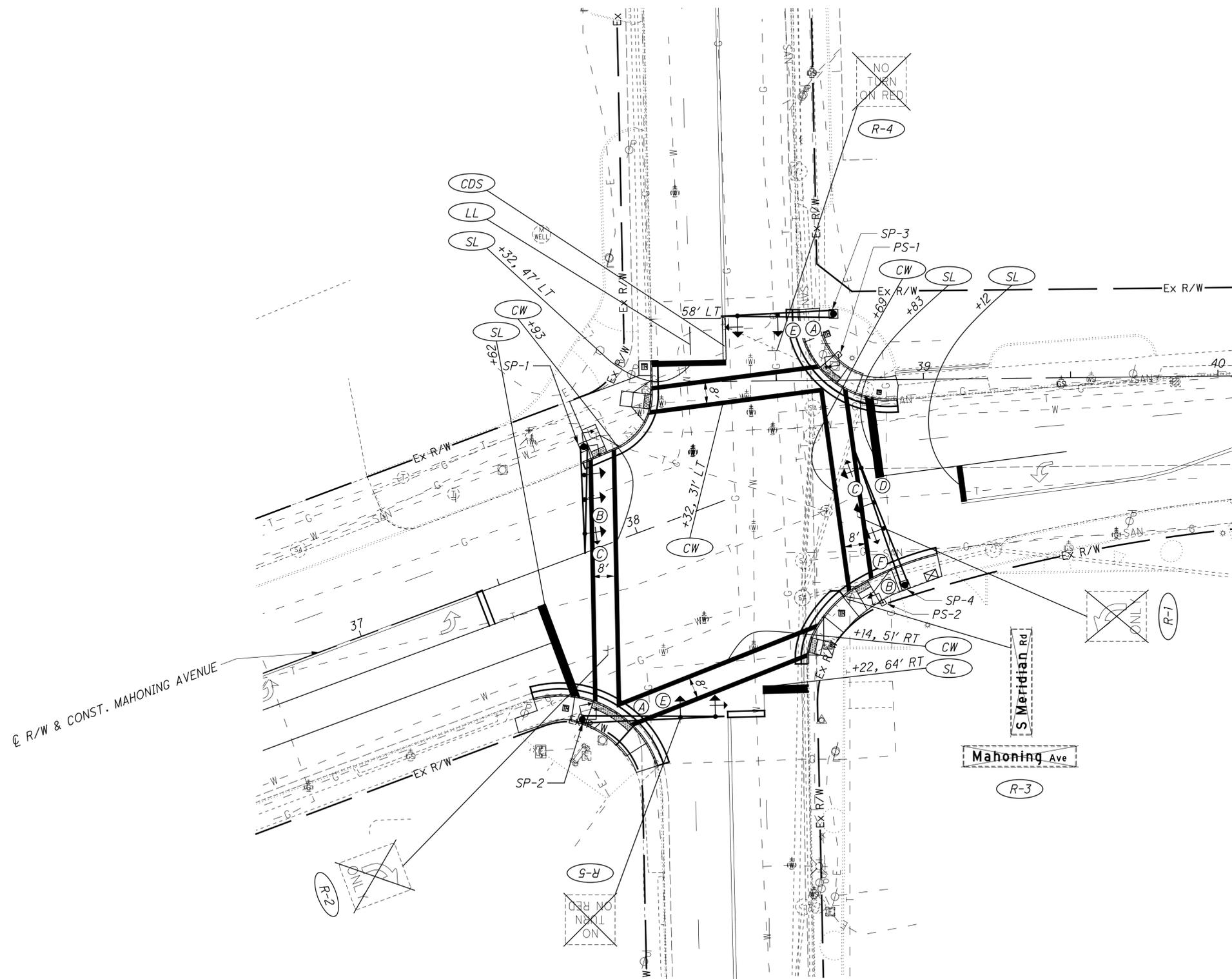
TRAFFIC CONTROL NOTES AND LEGEND

MAH-YOUNGSTOWN
SIGNAL UPGRADE

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SHEET NO.	REFERENCE NO.	LOCATION	STATION	SIDE	CODE	SIZE (INCHES)	630	630	630	630	630	630	630	630	630	630	630	630	630	630	630		
							GROUND MOUNTED SUPPORT, NO. 2 POST FT	SIGN HANGER ASSEMBLY, MAIST ARM, AS PER PLAN EACH	SIGN ATTACHMENT ASSEMBLY, POLE MOUNTED, AS PER PLAN EACH	SIGN, FLAT SHEET SF	REMOVAL OF GROUND MOUNTED SIGN AND DISPOSAL EACH	REMOVAL OF GROUND MOUNTED POST SUPPORT AND DISPOSAL EACH	REMOVAL OF OVERHEAD MOUNTED SIGN AND DISPOSAL EACH	REMOVAL OF POLE MOUNTED SIGN AND DISPOSAL EACH									
35	S-31	SP-2			SPECIAL	102 X 24		1		17.0													
35	S-32	SP-3			SPECIAL	102 X 24		1		17.0													
35	S-33	SP-1			D3-1-138	138 X 24		1		23.0													
35	S-34	SP-4			D3-1-138	138 X 24		1		23.0													
35	S-35	SP-1			R10-12-30	30 X 36		1		7.5													
35	S-36	SP-4			R10-12-30	30 X 36		1		7.5													
35	S-37	SP-1			R3-5L-30	30 X 36		1		7.5													
35	S-38	SP-4			R3-5L-30	30 X 36		1		7.5													
35	R-19	MAHONING AVE.		RT	R3-5L										1								
35	R-20	MAHONING AVE.		RT	R3-5L										1								
35	R-21	MAHONING AVE.		LT	D3-1															1			
					D3-1															1			
36	S-39	SP-2			D3-1-126	126 X 24			1	21.0													
36	S-40	SP-1			SPECIAL	138 X 48			1	46.0													
36	S-41	SP-2			SPECIAL	138 X 48			1	46.0													
36	S-42	SP-4			SPECIAL	102 X 24			1	17.0													
36	R-22	MAHONING AVE.			D3-1																1		
36	R-23	MAHONING AVE.			D3-1																1		
					D3-1																1		
36	R-24	MAHONING AVE.			D3-1																1		
					D3-1																1		
36	R-25	MAHONING AVE.			R1-1						1	1											
37	S-43	SP-3			D3-1-126	126 X 24		1		21.0													
37	S-44	SP-1			D3-1-120	120 X 24		1		20.0													
37	S-45	SP-2			D3-1-120	120 X 24		1		20.0													
37	S-46	SP-1			R10-12-30	30 X 36		1		7.5													
37	S-47	SP-3			R10-H5b-24	24 X 30		1		5.0													
37	S-48	SP-2			R10-11b-36	36 X 36		1		9.0													
37	S-49	SP-3			R9-3-18	18 X 18			1	2.3													
37	R-26	MAHONING AVE.		LT	D3-1																1		
					D3-1																1		
37	R-27	MAHONING AVE.		LT	R10-11b										1								
37	R-28	MAHONING AVE.		RT	R10-H5b										1								
37	R-29	MAHONING AVE.		RT	D3-1																1		
					D3-1																1		
					R9-3																1		
38	S-50	SP-3			D3-1-126	126 X 24		1		21.0													
38	S-51	SP-1			D3-1-108	108 X 24		1		18.0													
38	S-52	SP-4			D3-1-108	108 X 24		1		18.0													
38	S-53	SP-2			SPECIAL	102 X 24		1		17.0													
38	S-54	SP-1			R9-3-18	18 X 18			1	2.3													
					R9-3bPR-18	18 X 12			1	1.5													
38	S-55	MAHONING AVE.	509+84	RT	R9-3-18	18 X 18	13.1			2.3													
					R9-3bPL-18	18 X 12				1.5													
38	R-30	MAHONING AVE.		LT	D3-1																1		
					D3-1																1		
TOTALS CARRIED TO GENERAL SUMMARY							13.1	18	7	406.4	1	1	4	15									

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ITEM 642 - REMOVAL OF PAVEMENT MARKING

THE CONTRACTOR SHALL REMOVE THE EXISTING CONFLICTING PAVEMENT MARKINGS PER CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 614.11G. THE FOLLOWING LIMITS SHALL BE USED WHEN REMOVING THE EXISTING CONFLICTING PAVEMENT MARKINGS:

STOP LINE	
-STA. 37+64 (RT)	32 FT
-STA. 38+45 (RT)	15 FT
-STA. 38+74 (RT)	40 FT
-STA. 38+32 (LT)	25 FT
CHANNELIZING LINE	
-STA. 37+60 TO STA. 37+64 (RT)	4 FT
-STA. 37+60 TO STA. 37+64 (RT)	4 FT
-STA. 38+45 (RT)	9 FT
-STA. 38+69 TO STA. 39+13 (RT)	18 FT
CENTER LINE	
-STA. 38+69 TO STA. 38+87 (RT)	24 FT
LANE LINE	
-STA. 38+69 TO STA. 38+87 (RT)	18 FT
CROSSWALK	
-STA. 38+70 (RT/LT)	132 FT
-STA. 38+27 (RT)	167 FT

THE FOLLOWING QUANTITIES HAVE BEEN CARRIED TO THE PAVEMENT MARKING SUBSUMMARY:

ITEM 642 - REMOVAL OF PAVEMENT MARKING	488 FT
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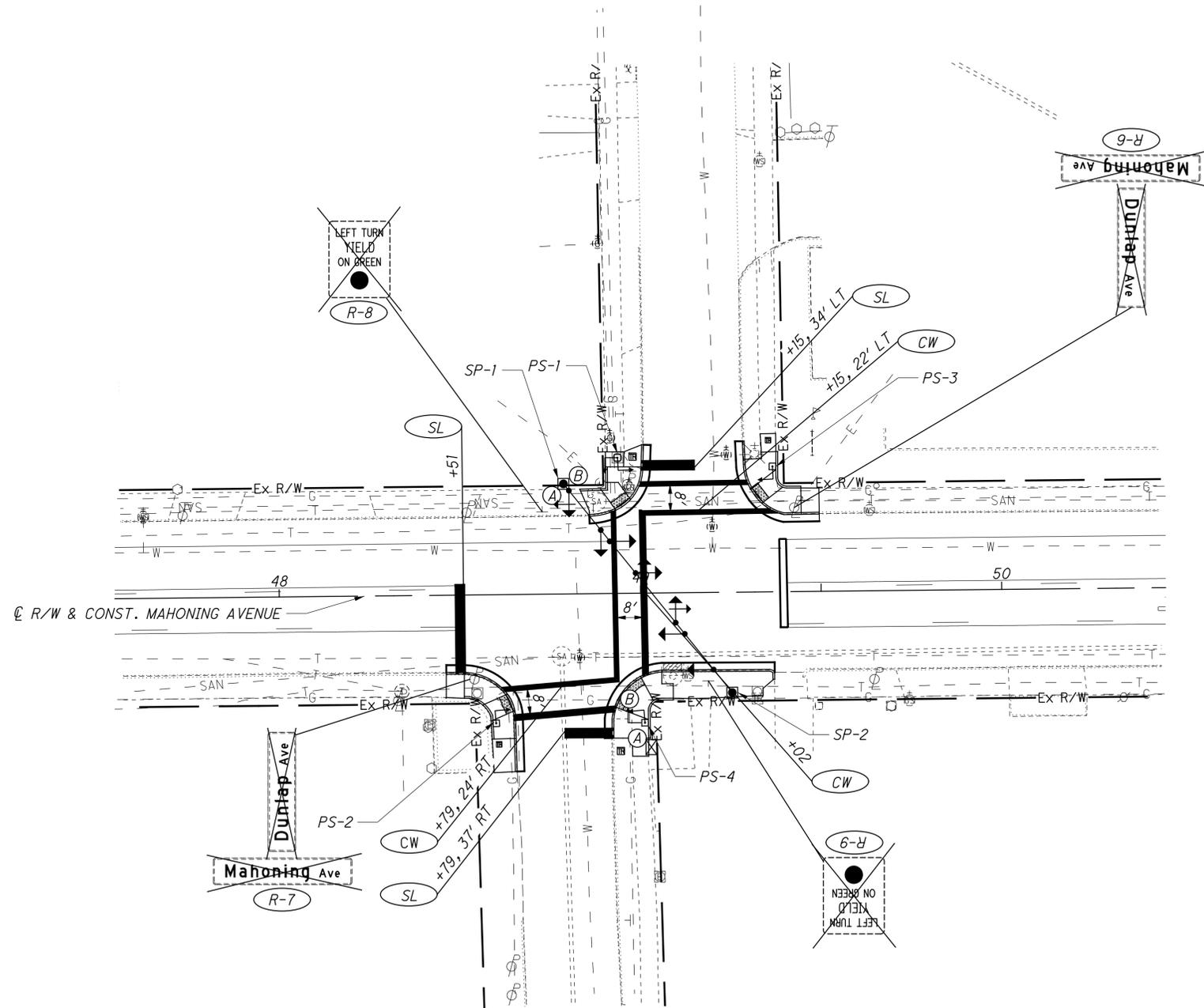
- NOTES:**
- FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
 - ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.

CALCULATED DLS CHECKED AKF

TRAFFIC CONTROL PLAN
 MAHONING AVE. / MERIDIAN RD.

31
86

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POLE MOUNTED SIGNS	
Mahoning Ave	Dunlap Ave
D3-1-126 TO BE MOUNTED ON SP-1 & SP-2	D3-1-102 TO BE MOUNTED ON SP-1 & SP-2
(A)	(B)
(S-11) (S-12)	(S-13) (S-14)
*THE TOP SIGN SHALL BE MOUNTED 3' BELOW SPAN WIRE ATTACHMENT POINT. SECOND SIGN SHALL BE LOCATED 1" BELOW BOTTOM OF FIRST SIGN.	



ITEM 642 - REMOVAL OF PAVEMENT MARKING

THE CONTRACTOR SHALL REMOVE THE EXISTING CONFLICTING PAVEMENT MARKINGS PER CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 614.11G. THE FOLLOWING LIMITS SHALL BE USED WHEN REMOVING THE EXISTING CONFLICTING PAVEMENT MARKINGS:

STOP LINE
-STA. 48+61 (RT/LT) 25 FT

CENTER LINE
-STA. 48+49 TO STA. 48+59 (LT) 10 FT
-STA. 48+49 TO STA. 48+59 (RT) 10 FT

THE FOLLOWING QUANTITIES HAVE BEEN CARRIED TO THE PAVEMENT MARKING SUBSUMMARY:

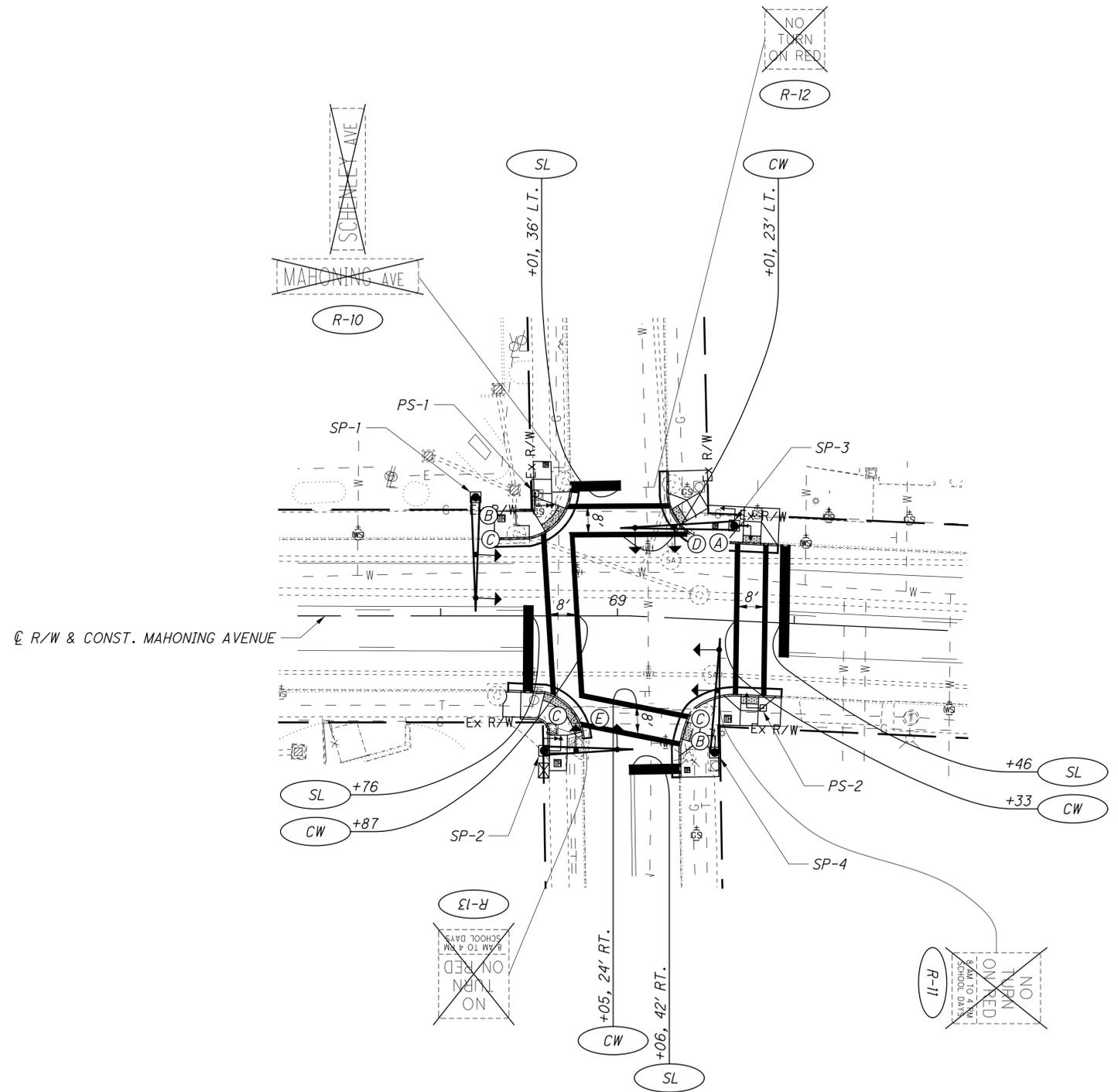
ITEM 642 - REMOVAL OF PAVEMENT MARKING 45 FT

**TRAFFIC CONTROL PLAN
MAHONING AVE. / DUNLAP AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

NOTES:

- FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
- ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.



MAST ARM SIGNS		
Mahoning Ave D3-1-126 A S-15	Schenley Ave D3-1-120 B S-16 S-17	NO TURN ON RED 8 AM TO 4 PM SCHOOL DAYS C R10-111f-36 S-18 S-19 S-20
NO TURN ON RED R10-11b-36 D S-21	Mahoning Ave SPECIAL E S-22	

ITEM 642 - REMOVAL OF PAVEMENT MARKING

THE CONTRACTOR SHALL REMOVE THE EXISTING CONFLICTING PAVEMENT MARKINGS PER CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 614.116. THE FOLLOWING LIMITS SHALL BE USED WHEN REMOVING THE EXISTING CONFLICTING PAVEMENT MARKINGS:

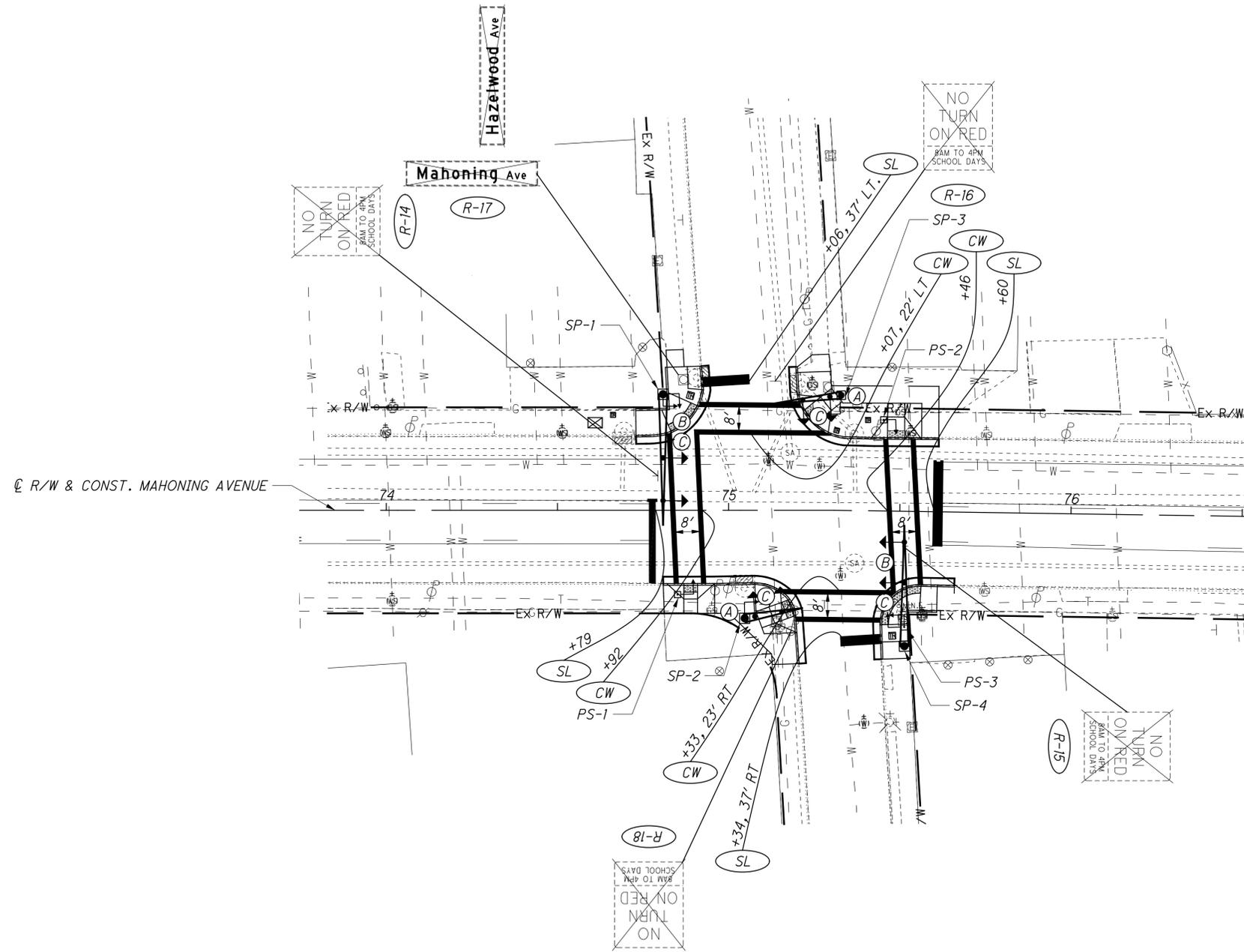
STOP LINE	
-STA. 68+78 (RT/LT)	24 FT
-STA. 69+29 (LT/RT)	25 FT
-STA. 69+03 (RT)	13 FT
CENTER LINE	
-STA. 69+31 TO STA. 69+48 (LT)	17 FT
-STA. 69+31 TO STA. 69+48 (RT)	17 FT
EDGE LINE	
-STA. 69+31 TO STA. 69+48 (LT)	17 FT
CROSSWALK LINE	
-STA. 68+87 (LT/RT)	103 FT
-STA. 69+17 (LT/RT)	103 FT

THE FOLLOWING QUANTITIES HAVE BEEN CARRIED TO THE PAVEMENT MARKING SUBSUMMARY:

ITEM 642 - REMOVAL OF PAVEMENT MARKING 319 FT

- NOTES:**
- FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
 - ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.

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POLE MOUNTED SIGN	MAST ARM SIGNS
<p>Mahoning Ave</p> <p>D3-1-126 TO BE MOUNTED ON SP-1 & SP-2</p> <p>(A)</p> <p>S-23 S-24</p>	<p>Hazelwood Ave</p> <p>SPECIAL</p> <p>(B)</p> <p>S-25 S-26</p> <p>(C)</p> <p>NO TURN ON RED 8AM TO 4PM SCHOOL DAYS R10-H11f-36</p> <p>S-27 S-28 S-29 S-30</p>
*SIGNS SHALL BE MOUNTED 3' BELOW ARM ATTACHMENT	

ITEM 642 - REMOVAL OF PAVEMENT MARKING

THE CONTRACTOR SHALL REMOVE THE EXISTING CONFLICTING PAVEMENT MARKINGS PER CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 614.11G. THE FOLLOWING LIMITS SHALL BE USED WHEN REMOVING THE EXISTING CONFLICTING PAVEMENT MARKINGS:

STOP LINE
 -STA. 74+80 (RT/LT) 20 FT
 -STA. 75+52 (LT/RT) 24 FT

CENTER LINE
 -STA. 75+54 TO STA. 75+62 (LT) 8 FT
 -STA. 75+54 TO STA. 75+62 (RT) 8 FT

EDGE LINE
 -STA. 75+40 TO STA. 75+62 (LT) 22 FT

THE FOLLOWING QUANTITIES HAVE BEEN CARRIED TO THE PAVEMENT MARKING SUBSUMMARY:

ITEM 642 - REMOVAL OF PAVEMENT MARKING 82 FT

NOTES:

- FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
- ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.

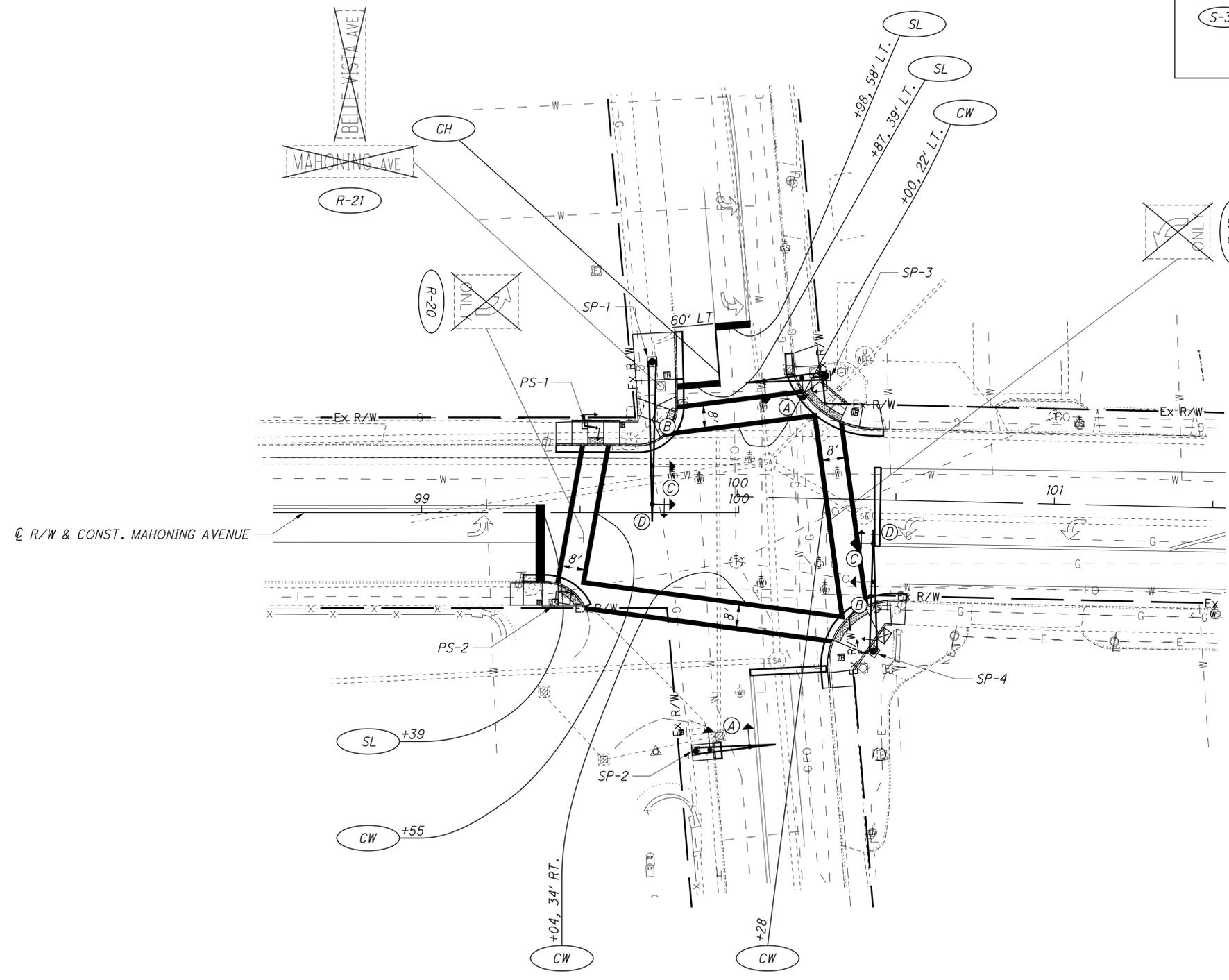
CALCULATED
DLS
CHECKED
AKF

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

**TRAFFIC CONTROL PLAN
MAHONING AVE. / HAZELWOOD AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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MAST ARM SIGNS

Mahoning Ave SPECIAL (A) S-31 S-32	Belle Vista Ave D3-1-138 (B) S-33 S-34	LEFT TURN YIELD ON GREEN (C) R10-12-30 S-35 S-36	ONLY (D) R3-5L-30 S-37 S-38
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N

0 20 40
HORIZONTAL
SCALE IN FEET

CALCULATED
DLS
CHECKED
AKF

ITEM 642 - REMOVAL OF PAVEMENT MARKING

THE CONTRACTOR SHALL REMOVE THE EXISTING CONFLICTING PAVEMENT MARKINGS PER CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 614.116. THE FOLLOWING LIMITS SHALL BE USED WHEN REMOVING THE EXISTING CONFLICTING PAVEMENT MARKINGS:

STOP LINE	
-STA. 99+44 (RT/LT)	23 FT
-STA. 99+93 (LT)	22 FT
CENTER LINE	
-STA. 99+37 TO STA. 99+42 (LT)	5 FT
CHANNELIZING LINE	
-STA. 99+37 TO STA. 99+42 (RT)	5 FT
EDGE LINE	
-STA. 99+48 TO STA. 99+62 (LT)	14 FT

THE FOLLOWING QUANTITIES HAVE BEEN CARRIED TO THE PAVEMENT MARKING SUBSUMMARY:

ITEM 642 - REMOVAL OF PAVEMENT MARKING	69 FT
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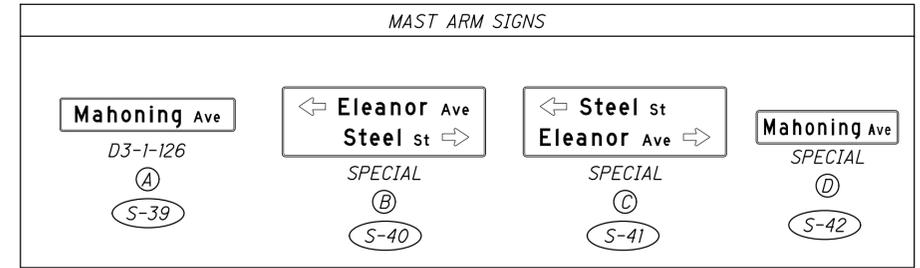
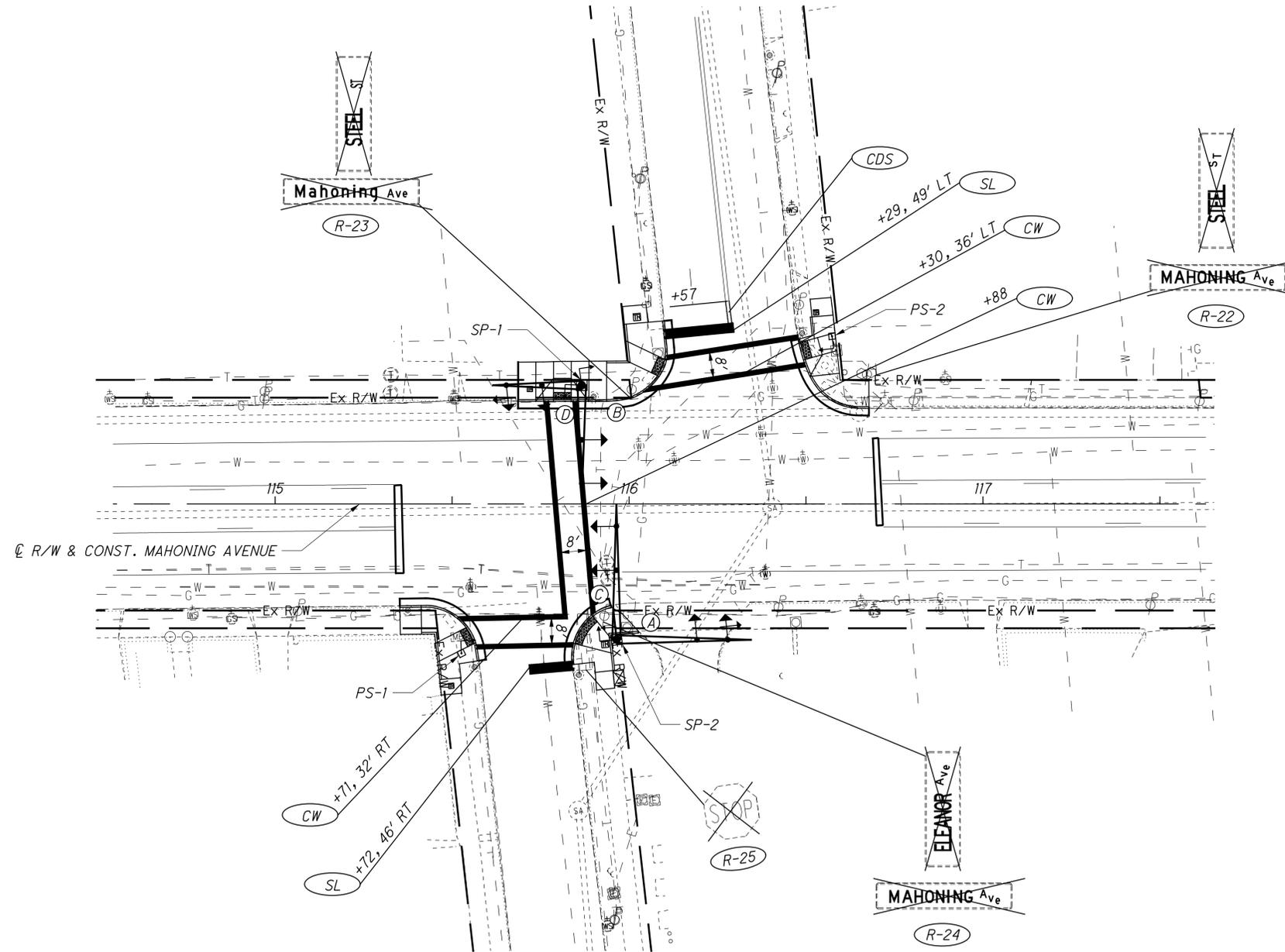
NOTES:

- FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
- ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.

**TRAFFIC CONTROL PLAN
MAHONING AVE. / BELLE VISTA AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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ITEM 642 - REMOVAL OF PAVEMENT MARKING

THE CONTRACTOR SHALL REMOVE THE EXISTING CONFLICTING PAVEMENT MARKINGS PER CONSTRUCTION AND MATERIALS SPECIFICATION SECTION 614.116. THE FOLLOWING LIMITS SHALL BE USED WHEN REMOVING THE EXISTING CONFLICTING PAVEMENT MARKINGS:

CROSSWALK LINE	
-STA. 116+04 (RT/LT)	124 FT
-STA. 116+31 (LT)	85 FT
-STA. 116+55 (LT/RT)	110 FT
-STA. 115+70 (RT)	68 FT

EDGE LINE	
-STA. 115+77 TO STA. 115+94 (LT)	17 FT

THE FOLLOWING QUANTITIES HAVE BEEN CARRIED TO THE PAVEMENT MARKING SUBSUMMARY:

ITEM 642 - REMOVAL OF PAVEMENT MARKING	404 FT
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NOTES:

1. FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
2. ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.

HORIZONTAL SCALE IN FEET

CALCULATED: DLS
CHECKED: AKF

TRAFFIC CONTROL PLAN

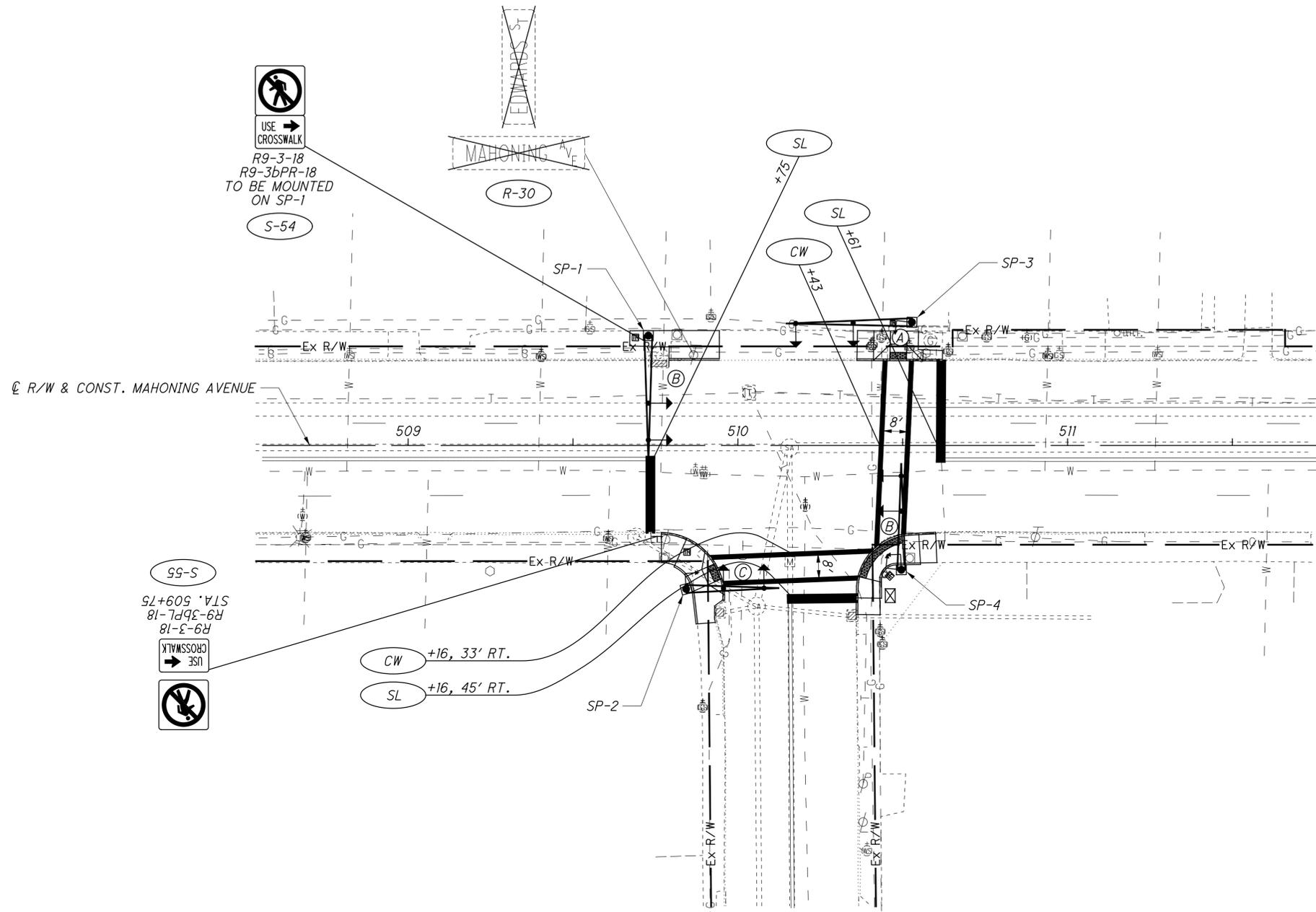
MAHONING AVE. / STEEL ST. / ELEANOR AVE.

MAH-YOUNGSTOWN SIGNAL UPGRADE

36

86

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MAST ARM SIGNS		
Mahoning Ave	Edwards st	Mahoning Ave
D3-1-126	D3-1-108	SPECIAL
(A)	(B)	(C)
(S-50)	(S-51) (S-52)	(S-53)

CALCULATED
DLS
CHECKED
AKF

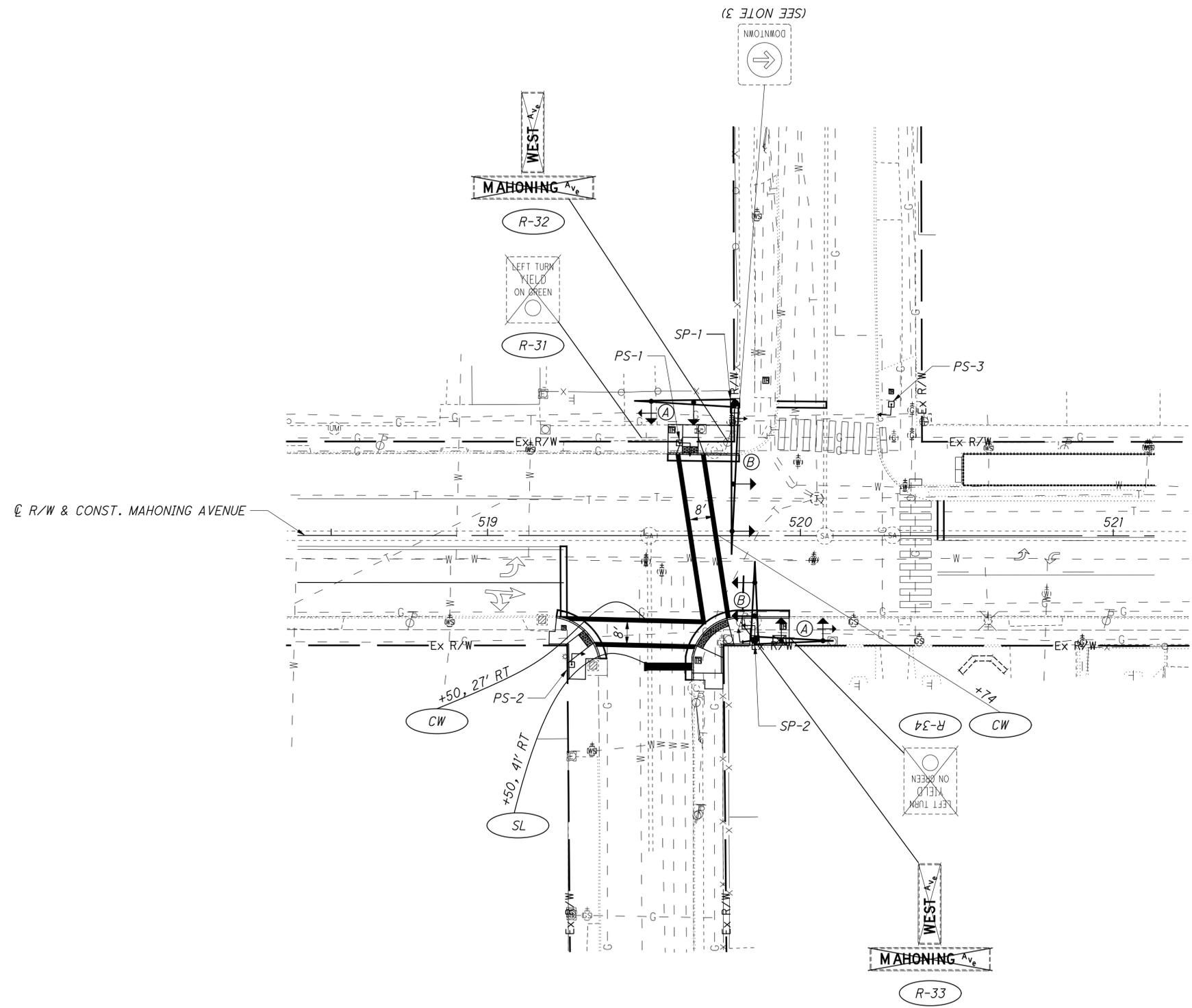
0 20 40
HORIZONTAL
SCALE IN FEET

**TRAFFIC CONTROL PLAN
MAHONING AVE. / EDWARDS ST.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

- NOTES:**
- FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
 - ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.

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MAST ARM SIGNS			
Mahoning Ave	West Ave		
D3-1-126	D3-1-84		
(A)	(B)		
(S-56) (S-57)	(S-58) (S-59)		

CALCULATED
DLS
CHECKED
AKF

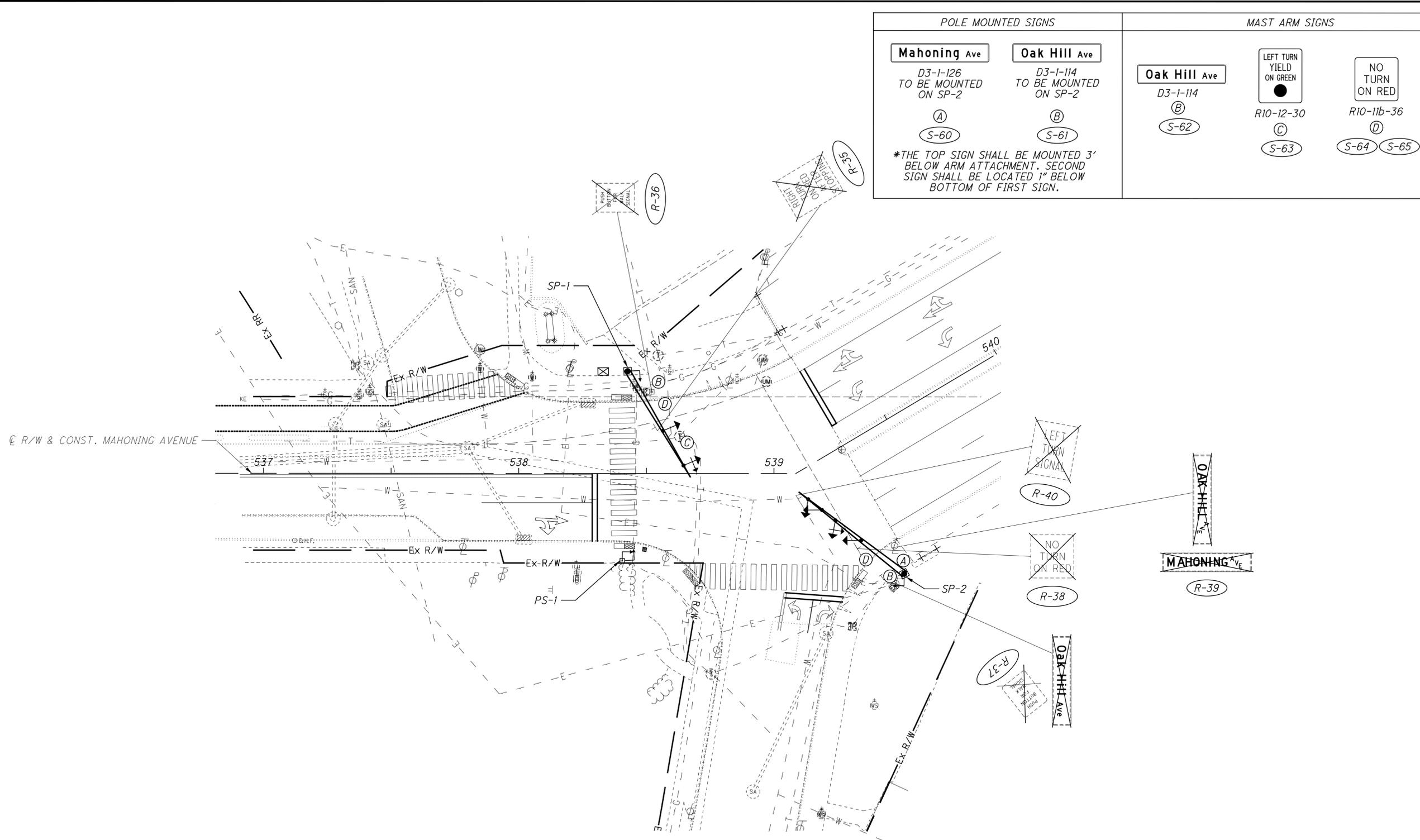
0 20 40
HORIZONTAL
SCALE IN FEET

**TRAFFIC CONTROL PLAN
MAHONING AVE. / WEST AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

- NOTES:**
1. FOR TRAFFIC CONTROL LEGEND, SEE SHEET 25.
 2. ALL EXISTING SIGNS NOT SHOWN SHALL REMAIN.
 3. THE CONTRACTOR SHALL COORDINATE WITH THE CITY ENGINEER TO REMOVE AND REERECT THE EXISTING WAYFINDING SIGN PRIOR TO THE SIGNAL SUPPORT INSTALLATION. ALL WORK SHALL BE PAID FOR UNDER ITEM 630-REMOVAL AND REERECTION OF WAYFINDING SIGN.

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MAH-YOUNGSTOWN SIGNAL UPGRADE

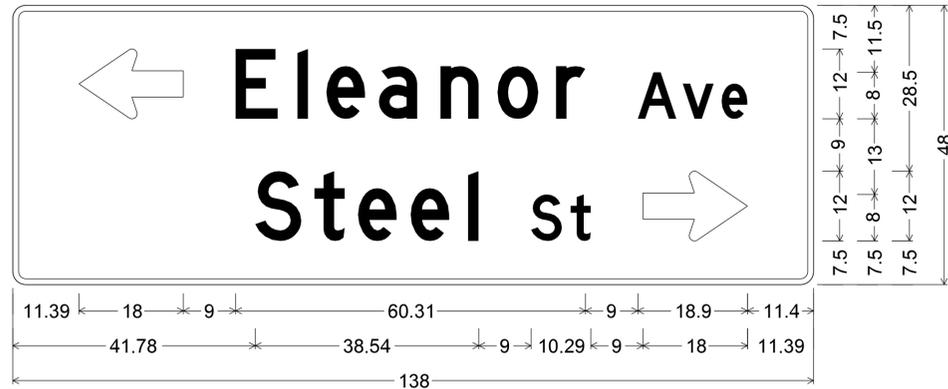
TRAFFIC CONTROL PLAN

MAHONING AVE. / OAK HILL AVE.

CALCULATED: DLS
CHECKED: AKF

0 20 40
HORIZONTAL SCALE IN FEET

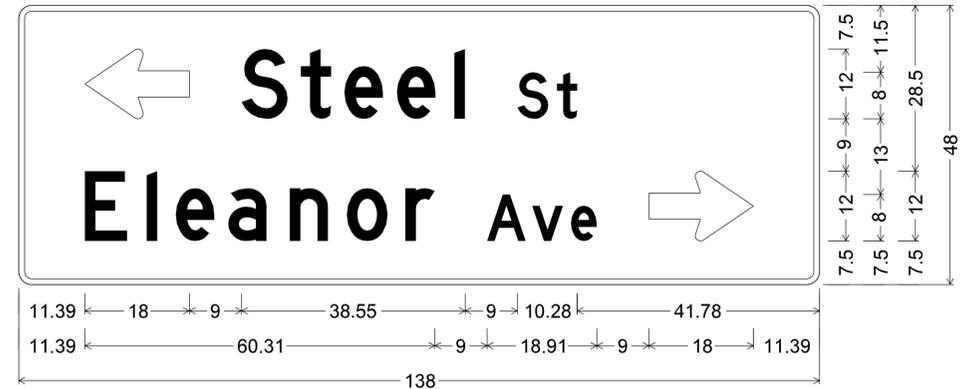
40
86



2.25" Radius, 1.00" Border, White on Green;
 Standard Arrow Custom 18.00" X 12.00" 180°; [Eleanor] D; [Ave] D; [Steel] D;
 [St] D; Standard Arrow Custom 18.00" X 12.00" 0°;
 Table of letter and object lefts.

←	E	l	e	a	n	o	r	A	v	e	
11.39	38.39	49.05	54.05	63.11	73.71	83.53	93.61	107.70	115.46	122.15	
S	t	e	e	l	S	t	→				
41.78	51.98	59.50	68.56	78.45	89.32	96.13	108.61				

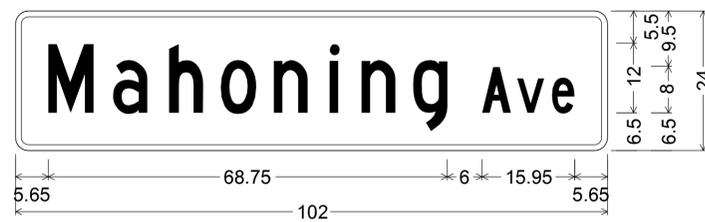
ALL DIMENSIONS ARE IN INCHES



2.25" Radius, 1.00" Border, White on Green;
 Standard Arrow Custom 18.00" X 12.00" 180°; [Steel] D; [St] D; [Eleanor] D;
 [Ave] D; Standard Arrow Custom 18.00" X 12.00" 0°;
 Table of letter and object lefts.

←	S	t	e	e	l	S	t				
11.39	38.39	48.60	56.11	65.17	75.06	85.94	92.74				
E	l	e	a	n	o	r	A	v	e	→	
11.39	22.05	27.05	36.11	46.71	56.53	66.61	80.70	88.46	95.15	108.61	

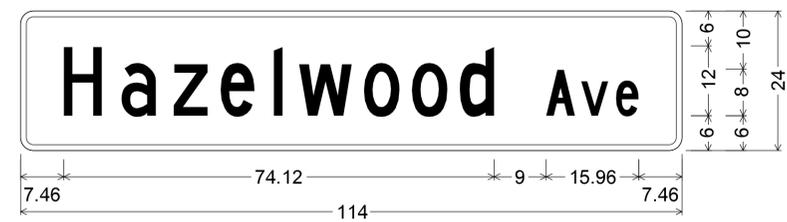
ALL DIMENSIONS ARE IN INCHES



2.25" Radius, 1.00" Border, White on Green;
 [Mahoning] C; [Ave] C;
 Table of letter and object lefts.

M	a	h	o	n	i	n	g
5.65	16.81	26.47	35.37	44.50	54.16	59.62	68.52
A	v	e					
80.40	86.44	92.44					

ALL DIMENSIONS ARE IN INCHES



2.25" Radius, 1.00" Border, White on Green;
 [Hazelwood] C; [Ave] C;
 Table of letter and object lefts.

H	a	z	e	l	w	o	o	d
7.46	17.41	26.38	34.48	43.45	48.01	59.19	67.45	75.71
A	v	e						
90.58	96.63	102.62						

ALL DIMENSIONS ARE IN INCHES

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SIGN DETAILS

MAH-YOUNGSTOWN
SIGNAL UPGRADE

NOTIFICATION

THE CONTRACTOR SHALL GIVE THE PROJECT ENGINEER AND CHUCK SHASHO, CITY OF YOUNGSTOWN DEPUTY DIRECTOR OF PUBLIC WORKS, (330) 742-8800, 10 WORKING DAYS NOTICE PRIOR TO THE NEW SIGNALS BEING PLACED IN OPERATION.

THE SIGNAL INSTALLATIONS SHALL BE INSPECTED BY CITY PERSONNEL. ALL DEFICIENCIES SHALL BE CORRECTED BY THE CONTRACTOR AND APPROVED BY THE PROJECT ENGINEER.

GUARANTEE

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC SIGNAL SYSTEMS INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 120 DAYS FOLLOWING COMPLETION OF THE 10-DAY PERFORMANCE TEST. IN THE EVENT OF UNSATISFACTORY OPERATION, THE CONTRACTOR SHALL CORRECT FAULTY INSTALLATIONS, MAKE REPAIRS AND REPLACE DEFECTIVE PARTS WITH NEW PARTS OF 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: CONTROLLER AND ASSOCIATED EQUIPMENT, AND LED LAMP UNITS.

CUSTOMARY MANUFACTURER'S GUARANTEES FOR ALL TRAFFIC SIGNAL SYSTEM ITEMS SHALL BE TURNED OVER TO THE CITY OF YOUNGSTOWN FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

THE COST OF GUARANTEEING THE TRAFFIC CONTROL SYSTEM WILL BE INCIDENTAL TO AND INCLUDED IN THE CONTRACT UNIT PRICE OF THE VARIOUS ITEMS MAKING UP THE SYSTEM.

SIGNAL ACTIVATION

PRIOR TO ACTIVATING THE NEW TRAFFIC SIGNAL TO STOP-AND-GO MODE AND/OR REMOVING THE EXISTING TRAFFIC SIGNAL FROM SERVICE, ALL ITEMS IN THE PROPOSED SIGNAL PLAN SHALL BE FULLY COMPLETED, (I.E., VEHICLE DETECTION, PEDESTRIAN SIGNAL HEADS, ETC.) IF THERE ARE CONSTRUCTABILITY ISSUES (I.E., ROADWAY WIDENING, ETC.) THAT PREVENT THE SIGNAL FROM BEING COMPLETED PRIOR TO ACTIVATION, IT SHALL BE BROUGHT TO THE ATTENTION OF THE PROJECT ENGINEER AND THE CITY OF YOUNGSTOWN. THE PROJECT ENGINEER WILL THEN REVIEW, APPROVE OR REJECT PROPOSALS TO ACTIVATE THE TRAFFIC SIGNAL PRIOR TO COMPLETION.

THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER AND THE CITY OF YOUNGSTOWN AT LEAST 10 WORKING DAYS PRIOR TO SCHEDULING THE FINAL INSPECTION OF THE SIGNAL INSTALLATION. FINAL INSPECTION IS NOT CONSIDERED COMPLETE UNTIL DESIGNATED PERSONNEL INSPECT THE TRAFFIC SIGNAL AND ISSUE WRITTEN APPROVAL. IF ISSUES ARE FOUND DURING THE FINAL INSPECTION THAT EFFECT THE SAFETY OF THE TRAVELING PUBLIC AND/OR THE EFFICIENCY OF THE INTERSECTION, THE SIGNAL SHALL NOT BE ACTIVATED ON THE PROPOSED DATE. ANY PUNCH LIST ITEMS THAT ARE FOUND SHALL BE CORRECTED AND REINSPECTED BY DESIGNATED PERSONNEL PRIOR TO FINAL ACCEPTANCE. THE CITY OF YOUNGSTOWN SHALL ONLY ASSUME DAY TO DAY MAINTENANCE OF THE TRAFFIC SIGNAL AFTER FINAL WRITTEN ACCEPTANCE HAS BEEN ISSUED.

GROUNDING AND BONDING

THE REQUIREMENTS OF THE ODOT CONSTRUCTION AND MATERIAL SPECIFICATIONS (C&MS) 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 GROUNDING 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.

GROUNDING AND BONDING (CONT.)

- III. USE A MINIMUM 8 AWG BETWEEN THE "PREPARE TO STOP WHEN FLASHING" INSTALLATION (INCLUDING SUPPORT) AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
- IV. THE INSULATION SHALL BE GREEN OR GREEN WITH YELLOW STRIPE(S). FOR 4 AWG OR LARGER, INSULATION MAY ALSO BE BLACK WITH GREEN TAPE/LABELS INSTALLED AT ALL ACCESS POINTS.
- B. IN A HIGHWAY LIGHTING SYSTEM, THE EQUIPMENT GROUNDING CONDUCTOR SHALL BE THE SAME WIRE SIZE AS THE DUCT CABLE OR DISTRIBUTION CABLE CIRCUIT CONDUCTORS, WITH THE MINIMUM CONDUCTOR SIZE OF 4 AWG. BONDING JUMPERS WILL BE MINIMUM SIZE 4 AWG.
4. GROUND ROD.
 - A. A 3/4 INCH SCHEDULE 40 PVC CONDUIT WILL BE USED IN FOUNDATIONS AND CONCRETE WALLS FOR THE GROUNDING CONDUCTOR (GROUND WIRE) RACEWAY TO THE GROUND ROD. SHOULD METALLIC CONDUIT BE USED, BOTH ENDS OF THE CONDUIT SHALL BE BONDED TO THE GROUNDING CONDUCTOR.
 - B. THE TYPICAL GROUNDING CONDUCTOR (GROUND WIRE) SHALL BE 4 AWG INSULATED, COPPER.
5. 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 SPLICE.
 - 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 MATERIAL AND WORK REQUIRED TO COMPLETE THE EFFECTIVE GROUND FAULT CURRENT PATH SYSTEM ARE INCIDENTAL TO THE CONDUCTORS INSTALLED BY CONTRACT.

WORK INSPECTION

THE CONTRACTOR SHALL PROVIDE THE PROJECT ENGINEER AND THE CITY OF YOUNGSTOWN WITH 72-HOUR NOTICE OF ANY SIGNAL WORK TO BE PERFORMED AT THE INTERSECTION SITE(S) SO THAT INSPECTION SERVICES CAN BE SUPPLIED.

DETECTION MAINTENANCE

IF VEHICLE DETECTION BECOMES UNEXPECTEDLY DISABLED, REQUIRES MODIFICATION, OR IS SCHEDULED TO BE TEMPORARILY REMOVED DURING THE CONSTRUCTION PROJECT, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER AND THE CITY OF YOUNGSTOWN.

IF THE LOSS OF VEHICLE DETECTION IS KNOWN PRIOR TO THE START OF CONSTRUCTION, IT SHALL BE DISCUSSED AT THE PRECONSTRUCTION MEETING. AT SUCH TIME, THE CITY OF YOUNGSTOWN SHALL ADVISE THE PROJECT ENGINEER AND CONTRACTOR ON THE APPROPRIATE ACTION TO RECTIFY ANY LOSS OF VEHICLE DETECTION. THIS MAY INCLUDE PLACING THE TRAFFIC SIGNAL ON MINIMUM OR MAXIMUM RECALL, MODIFYING THE MINIMUM GREEN TIMES, AND REMOVING THE MALFUNCTIONING DETECTION FROM SERVICE. WHERE NONINTRUSIVE DETECTION (I.E. VIDEO, RADAR) ALREADY EXISTS, THE CONTRACTOR SHALL INSURE THAT DETECTION IS OPERATING AND MAINTAINED BY RECONFIGURING THE DETECTION UNITS ACCORDINGLY DURING ALL CONSTRUCTION PHASES. THIS IS TO AVOID THE SIGNAL FROM MAXING OUT THE EFFECTED SIGNAL PHASE AND CREATING UNNECESSARY DELAYS.

LOCATIONS WHERE NON-INTRUSIVE DETECTION IS PROPOSED AND THE EXISTING VEHICLE DETECTION IS TO BE ABANDONED, THE NON-INTRUSIVE VEHICLE DETECTION SHALL BE INSTALLED, CONFIGURED AND MADE FULLY FUNCTIONAL PRIOR TO THE EXISTING DETECTION BEING DISABLED. THE CONTRACTOR SHALL CONTINUE TO MAINTAIN AND MODIFY THE DETECTION UNTIL FINAL ACCEPTANCE OF THE TRAFFIC SIGNAL. THIS IS TO ENSURE VEHICLE DETECTION REMAINS FULLY FUNCTIONAL THROUGHOUT CONSTRUCTION.

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

IN ADDITION TO THE REQUIREMENTS OF C&MS 632 AND 732 THE FOLLOWING SHALL APPLY:

1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF BLACK POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
2. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
3. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
4. THE PEDESTRIAN SIGNAL HEAD SHALL BE OF THE LED COUNTDOWN TYPE.
5. NEW ATTACHMENT HARDWARE AND FITTINGS SHALL BE USED.
6. THE LIGHT EMITTING DIODE (LED) MODULES SHALL MEET THE REQUIREMENTS OF C&MS 732.04-C. THE CONTRACTOR SHALL PROVIDE THE CITY OF YOUNGSTOWN, IN WRITING, WITH THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS THAT ARE TO BE USED IN THE SIGNAL HEAD PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.

PAYMENT FOR ITEM 632 PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN SHALL BE MADE FOR THE NUMBER OF COMPLETE SIGNAL HEAD FURNISHED AND INSTALLED, INCLUDING ALL LABOR, EQUIPMENT, MATERIALS AND NEW ATTACHMENT HARDWARE.

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TRAFFIC SIGNAL NOTES

MAH-YOUNGSTOWN
SIGNAL UPGRADE

ITEM 632 - REMOVAL OF TRAFFIC SIGNAL INSTALLATION, AS PER PLAN

TRAFFIC SIGNAL INSTALLATIONS, INCLUDING SIGNAL HEADS, CABLE, MAST ARMS, SIGNAL SUPPORT POLES, CABINET, PULL BOXES, CONTROLLER, ETC., SHALL BE REMOVED IN ACCORDANCE WITH C&MS 632.26 AND AS INDICATED ON THE PLANS. REMOVED ITEMS SPECIFIED FOR STORAGE SHALL BE STORED ON THE PROJECT FOR SALVAGE BY THE CITY OF YOUNGSTOWN. THE CONTRACTOR SHALL CONTACT THE CITY OF YOUNGSTOWN TO ARRANGE A MUTUALLY AGREEABLE TIME TO DELIVER THE SIGNAL MATERIALS.

ITEMS TO BE REUSED:
NONE

THE ITEMS TO BE DELIVERED OR DISPOSED OF SHALL BE PER THE REMOVAL CHARTS ON THE SIGNAL PLANS FOR THE FOLLOWING INTERSECTIONS:

1. MAHONING AVE. / MERIDIAN RD.
2. MAHONING AVE. / DUNLAP AVE.
3. MAHONING AVE. / SCHENLEY AVE.
4. MAHONING AVE. / HAZELWOOD AVE.
5. MAHONING AVE. / BELLE VISTA AVE.
6. MAHONING AVE. / STEEL ST. / ELEANOR AVE.
7. MAHONING AVE. / GLENWOOD AVE.
8. MAHONING AVE. / EDWARDS ST.
9. MAHONING AVE. / WEST AVE.
10. MAHONING AVE. / OAK HILL AVE.

IN THE EVENT THE ITEMS STORED ON THE PROJECT FOR SALVAGE BY THE CITY OF YOUNGSTOWN ARE NOT REMOVED, THE CONTRACTOR SHALL, WHEN DIRECTED BY THE ENGINEER IN WRITING, REMOVE AND DISPOSE OF THE ITEMS AT NO ADDITIONAL COST TO THE PROJECT.

ITEMS NOT SPECIFIED FOR STORAGE SHALL BE DISPOSED OF BY THE CONTRACTOR.

ITEM 632 - TEST HOLE PERFORMED

IT IS ANTICIPATED THAT THE CONTRACTOR WILL ENCOUNTER UNDERGROUND UTILITIES WHILE EXCAVATING FOR SIGNAL SUPPORT FOUNDATIONS OR SIMILAR FOUNDATIONS. AFTER ACCURATELY IDENTIFYING THE PROPOSED LOCATION OF THE FOUNDATION, AS SHOWN IN THE PLANS AND AFTER MODIFYING THAT LOCATION, IF NECESSARY, BASED ON THE FIELD MARKING OF UNDERGROUND UTILITY LOCATION, THE CONTRACTOR DISCOVERS A UTILITY CONFLICT DURING THE EXCAVATION OPERATION, THE CONTRACTOR WILL BE COMPENSATED FOR EACH PARTIAL FOUNDATION EXCAVATION ACCORDING TO THE BID PRICE.

BEFORE THE CONTRACTOR BEGINS THE EXCAVATION AT THE MODIFIED LOCATION, THE CONTRACTOR SHALL VERIFY THAT THERE WILL BE NO OVERHEAD UTILITY CONFLICTS RESULTING FROM THE NEW SIGNAL SUPPORT LOCATION. NEW SUPPORT LOCATIONS ARE TO BE APPROVED BY THE ENGINEER.

THE WORK WILL INCLUDE BACKFILLING, COMPACTING, AND RESTORATION OF THE EXCAVATION TO THE SITE'S ORIGINAL CONDITION.

EXCAVATIONS SHALL NOT BE LEFT OPEN OVERNIGHT. PAYMENT FOR THIS ITEM SHALL BE AT THE UNIT PRICE BID PER EACH ITEM 632 TEST HOLE PERFORMED TO BE USED AT THE DIRECTION OF THE ENGINEER. A QUANTITY OF 10 HAS BEEN CARRIED TO THE GENERAL SUMMARY.

ITEM 632 - PEDESTRIAN PUSHBUTTON, AS PER PLAN

IN ORDER TO CONFORM TO THE AMERICANS WITH DISABILITIES ACT (ADA), THE REQUIREMENTS OF C&MS ITEM 632.09 AND 732.06 ARE MODIFIED AS FOLLOWS:

1. THE PUSHBUTTON SHALL BE RAISED AND SHALL BE A MINIMUM OF 2 INCHES (50 MILLIMETERS) AT ITS SMALLEST DIMENSION.
2. THE PUSHBUTTON SHALL BE EQUIPPED TO EMIT AN AUDIBLE CHIRP AS THE BUTTON IS PUSHED TO CONFIRM THAT THE PEDESTRIAN CALL HAS BEEN PLACED.
3. THE PUSHBUTTON SHALL BE EQUIPPED WITH A RED INDICATOR LIGHT.

THIS ITEM SHALL INCLUDE ALL LABOR AND MATERIAL COSTS ASSOCIATED WITH THE PROVISION AND INSTALLATION OF THE PUSHBUTTON AS OUTLINED ABOVE. PAYMENT FOR THIS WORK SHALL BE AT THE CONTRACT UNIT PRICE FOR ITEM 632 - PEDESTRIAN PUSHBUTTON, AS PER PLAN AND WILL BE MEASURED BY THE NUMBER OF COMPLETE UNITS FURNISHED, INSTALLED AND ACCEPTED.

ITEM 632 - POWER SERVICE, AS PER PLAN

POWER SERVICE SHALL BE AS PER C&MS ITEM 632.24 AND SCD TC-83.10 WITH THE FOLLOWING EXCEPTIONS:

1. ALL POWER SERVICES SHALL BE METERED. THE METER SHALL HAVE A LEVER OPERATED BYPASS.
2. THE CONTRACTOR SHALL SUPPLY THE NECESSARY METER BASES.
3. THE METER BASE MOUNTING HEIGHT SHALL BE NO MORE THAN 5 FEET HIGH TO THE CENTER OF THE METER BASE FROM THE GROUND.
4. THE METER BASE AND DISCONNECT SWITCHES SHALL BE MOUNTED ON THE CONTROLLER CABINET AS DETAILED ON SHEET 86. FIELD ADJUSTMENTS MAY BE MADE IN MOUNTING THE METER BASE AND DISCONNECT SWITCHES WITH THE APPROVAL OF THE ENGINEER.

THE CONTRACTOR SHALL OBTAIN A METER PROVIDED BY OHIO EDISON. DISCONNECT SWITCH ENCLOSURES FURNISHED IN ACCORDANCE WITH C&MS 632.24 SHALL INCLUDE A PADLOCK EQUAL TO MASTER NO. 4BKA OR WILSON BOHANNON 660, WITH LOCK BODY OF BRONZE OR BRASS AND KEYING SHALL BE TO THE STATE MASTER.

THE CONTRACTOR SHALL CONTACT THE METER SECTION OF OHIO EDISON FOR INFORMATION REGARDING THE METER BASE INSTALLATION. THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS OHIO EDISON MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT OHIO EDISON FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO OHIO EDISON'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 120 VOLTS. 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 YOUNGSTOWN.

THE COST FOR ALL NECESSARY ITEMS AND ASSOCIATED LABOR SHALL BE INCLUDED IN THE CONTRACT BID PRICE FOR ITEM 632 - POWER SERVICE, AS PER PLAN.

ITEM 632 - SIGNAL SUPPORT, TYPE TC-81.22, DESIGN (), AS PER PLAN

ALL SIGNAL SUPPORTS SHALL CONFORM TO C&MS ITEM 632.15 AND 732.11, EXCEPT THAT ALL POLES SHALL BE TAPERED TUBES OF CONTINUOUS TAPER. POLES CONSISTING OF STRAIGHT SECTIONS WITH A TAPERED EFFECT ACCOMPLISHED BY THE USE OF REDUCERS SHALL NOT BE PERMITTED. OCTAGON SHAPED POLES ARE NOT PERMITTED.

PAYMENT SHALL BE AT THE CONTRACT UNIT PRICE AND WILL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY FOR EACH SUPPORT FURNISHED, IN PLACE, COMPLETE AND ACCEPTED.

ITEM 632 - SIGNAL SUPPORT FOUNDATION

PRIOR TO ORDERING THE SIGNAL SUPPORTS, THE CONTRACTOR SHALL CONTACT OUPS TO HAVE ALL THE UTILITIES LOCATED IN THE FIELD THEN MEET WITH THE PROJECT ENGINEER TO LOCATE THE PROPOSED SUPPORT LOCATIONS TO ENSURE THERE ARE NO CONFLICTS WITH UTILITIES. IF THERE ARE ISSUES, THE PROJECT ENGINEER SHALL PROVIDE GUIDANCE AS TO THE RELOCATION OF THE SUPPORT POLES.

PAYMENT WILL BE AT THE CONTRACT UNIT PRICE AND WILL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS, TOOLS, EQUIPMENT AND OTHER INCIDENTALS NECESSARY FOR EACH FOUNDATION FURNISHED, IN PLACE, COMPLETE AND ACCEPTED.

ITEM 633 - CABINET, TYPE TS-2, AS PER PLAN

THE CABINET SHALL BE FURNISHED AND INSTALLED ACCORDING TO C&MS 633 AND 733 AND BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS LIST (TAP).

THE GROUND-MOUNTED CABINET SHALL BE A NEMA TS-2, TYPE 2, CABINET SIZE 6 WITH 16 LOAD SWITCH BAYS, LED UNDER-SHELF LIGHTING, POWER HARNESSSES FOR BOTH TS2 TYPE 1 AND TYPE 2 CONTROLLERS AND SHALL HAVE A MINIMUM OF TWO SHELVES.

EACH CABINET SHALL COME EQUIPPED WITH TWO 16-CHANNEL CABINET DETECTOR RACKS (CDR) INCLUDING BUS INTERFACE UNITS (BIU). THE LOOP DETECTOR TERMINATION PANEL FOR THE SECOND DETECTOR RACK SHALL BE OMITTED.

THE CABINET SHALL BE FURNISHED WITH AN EDI MMU AS ALLOWED ON THE TAP/APPROVED PRODUCTS LIST.

PAYMENT FOR ITEM 633 - CABINET, TYPE TS-2, AS PER PLAN WILL BE AT THE CONTRACT BED PRICE PER EACH COMPLETE AND IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 - ATC CONTROLLER, AS PER PLAN (ALTERNATE 1)

THE CONTROLLER UNIT SHALL BE FURNISHED AND INSTALLED PER SS809 AND BE LISTED ON THE TRAFFIC AUTHORIZED PRODUCTS (TAP) LIST.

PAYMENT FOR ITEM 809 - ATC CONTROLLER, AS PER PLAN (ALTERNATE 1) BE MADE AT THE CONTRACT UNIT PRICE PER EACH, COMPLETE AND IN PLACE, ALL CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 - ATC CONTROLLER, AS PER PLAN (ALTERNATE 2)

IN ADDITION TO MEETING THE REQUIREMENTS OF THE BASE BID ITEM, THE CONTROLLER UNIT SHALL BE A M60 CONTROLLER MANUFACTURED BY SIEMENS MOBILITY, INC., 9225 BEE CAVE ROAD, BUILDING B, SUITE 101, AUSTIN, TEXAS 78733, (512) 837-8300.

PAYMENT FOR ITEM 809 - ATC CONTROLLER, AS PER PLAN (ALTERNATE 2) WILL BE AT THE CONTRACT BID PRICE PER EACH COMPLETE AND IN PLACING INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

ITEM 809 - STOP-LINE RADAR DETECTION, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A STOP-LINE RADAR DETECTION UNIT. THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING:

1. POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET.
2. ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CALTRANS, NEMA TS1 AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
3. THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLE(S) SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
4. SURGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
5. THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION AND MAINTENANCE OF THE UNIT.
6. A SERIAL TO ETHERNET COMMUNICATIONS MODULE AND ETHERNET CABLE (MINIMUM 7 FEET).
7. THE POWER SUPPLY AND COMMUNICATION MODULES SHALL BE SECURED TO A SINGLE PANEL THAT CAN BE MOUNTED INTERIOR TO THE TRAFFIC CABINET. THE PANEL SHALL INCLUDE MODULAR-PLUG STYLE CONNECTIONS FOR UP TO FOUR (4) SENSOR CABLES. ADDITIONAL SENSORS MAY BE HARD-WIRED TO THE COMMUNICATION MODULES, AS NECESSARY.
8. THE CONTRACTOR SHALL INSTALL THE RADAR DETECTION PRIOR TO MILLING/DISABLING EXISTING LOOPS.
9. THE INSTALLATION SHALL INCLUDE ALL CONTROLLER PROGRAMMING FOR COMPLETE INSTALLATION, WHICH INCLUDES MODIFICATIONS FOR REMOVAL OF EXISTING DETECTION.

PAYMENT FOR ITEM 809 - STOP-LINE RADAR DETECTION, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH UNIT, COMPLETE AND IN PLACE INCLUDING ALL REQUIRED CABINET HARDWARE, MOUNTING BRACKETS, CABLES, CONDUIT AND CONNECTIONS TESTED AND ACCEPTED.

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PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	38+22.0	LT	51.9'	24" X 24"
PB-2	37+56.5	RT	47.0'	24" X 24"
PB-3	38+67.5	LT	15.6'	24" X 24"
PB-4	38+85.0	RT	4.2'	18" X 18"
PB-5	38+71.5	RT	78.9'	24" X 24"



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TRAFFIC SIGNAL PLAN
MAHONING AVE. / MERIDIAN RD.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR REFERENCE TO SIGNS (A), (B), (C), (D) & (E), SEE SHEET 31.

(1)-4" CONDUIT (725.05) WITH (1)-7C, (2)-5C AND (3)-2C LEAD-IN ENCASED IN TRENCH IN PAVED AREA = 63'

PB-1

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN IN TRENCH = 35'

SP-1, TYPE TC-81.22, DESIGN 4 WITH A 36' MAST ARM, (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P3A' STA. 37+93.3, 33.7' LT.

PB-2

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN IN TRENCH = 7'

SP-2, TYPE TC-81.22, DESIGN 12 WITH A 48' MAST ARM, (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P3B' STA. 37+60.4, 52.7' RT.

(1)-4" CONDUIT (725.05) WITH (1)-7C, (2)-5C AND (2)-2C LEAD-IN ENCASED IN TRENCH IN PAVED AREA = 100'

SIGNAL TYPES

(2B), (3A), (4A)

(6A) & (6B)

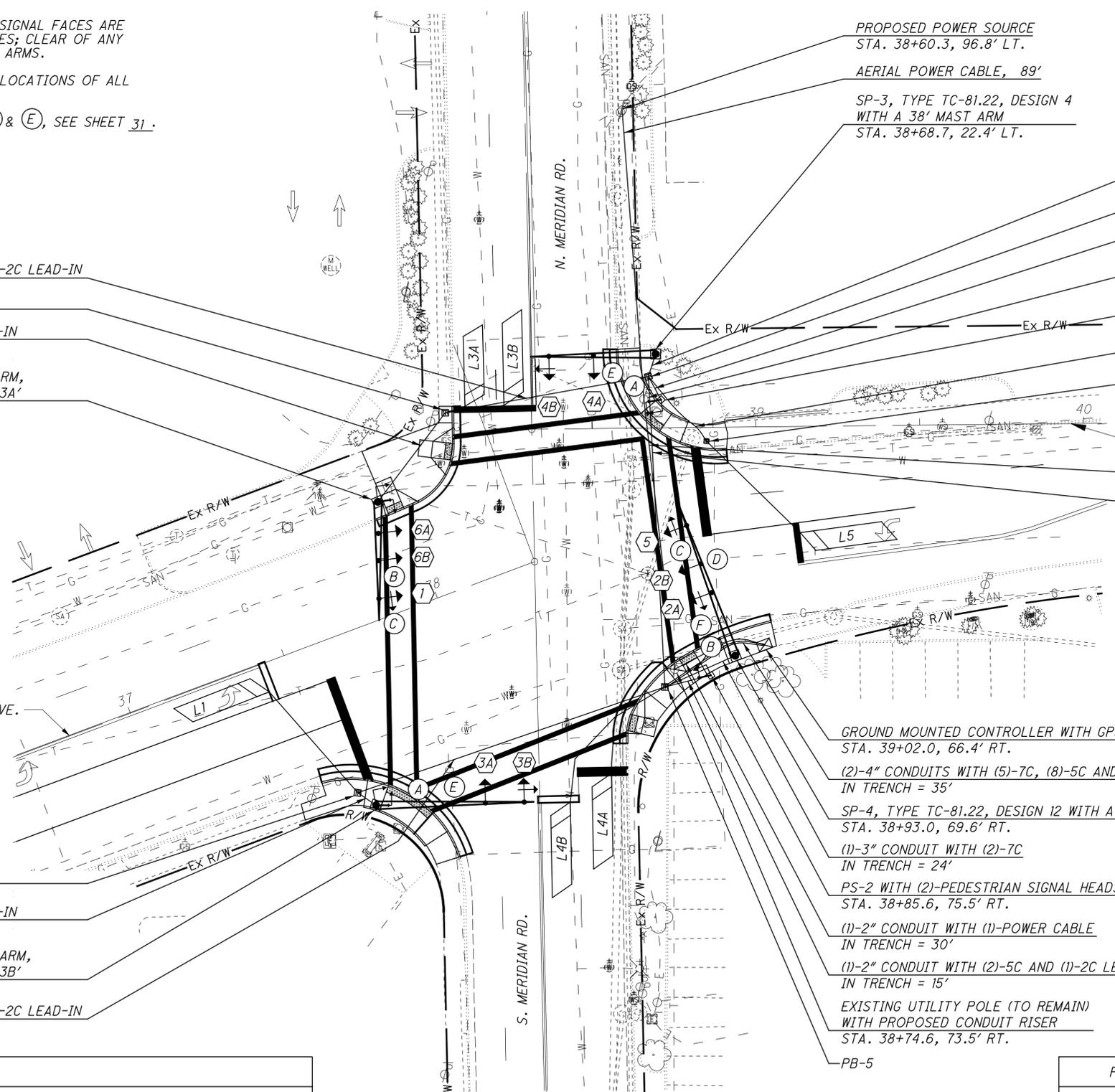
(3B) & (4B)

(1) & (5)

(2A)

PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.



PROPOSED POWER SOURCE
STA. 38+60.3, 96.8' LT.

AERIAL POWER CABLE, 89'

SP-3, TYPE TC-81.22, DESIGN 4
WITH A 38' MAST ARM
STA. 38+68.7, 22.4' LT.

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 8'

PB-3

(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 9'

EXISTING UTILITY POLE (TO REMAIN)
STA. 38+66.0, 8.7' LT.

PS-1 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P4B'
STA. 38+71.2, 8.5' LT.

(1)-2" CONDUIT WITH (1)-2C LEAD-IN
IN TRENCH = 27'

PB-4

EX R/W & CONST. MAHONING AVE.

AERIAL POWER CABLE, 83'

(1)-4" CONDUIT (725.05) WITH (2)-7C, (4)-5C AND (5)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 95'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY
STA. 39+02.0, 66.4' RT.

(2)-4" CONDUITS WITH (5)-7C, (8)-5C AND (10)-2C LEAD-IN
IN TRENCH = 35'

SP-4, TYPE TC-81.22, DESIGN 12 WITH A 48' MAST ARM
STA. 38+93.0, 69.6' RT.

(1)-3" CONDUIT WITH (2)-7C
IN TRENCH = 24'

PS-2 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P4A'
STA. 38+85.6, 75.5' RT.

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH = 30'

(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 15'

EXISTING UTILITY POLE (TO REMAIN)
WITH PROPOSED CONDUIT RISER
STA. 38+74.6, 73.5' RT.

PB-5

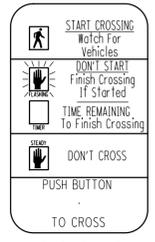
LEGEND

	PROP	EXIST
TRAFFIC SIGNAL, 3 UNIT HEAD, 12"		
TRAFFIC SIGNAL, 4 OR 5 UNIT HEAD, 12"		
SIGNAL SUPPORT POLE		
PEDESTRIAN SIGNAL		
PEDESTRIAN PUSH BUTTON		
PEDESTAL SUPPORT		
CONTROLLER CABINET AND WORK PAD (TS-2)		
POLE MOUNTED CONTROLLER CABINET		
TRAFFIC PULL BOX		
DETECTOR LOOP		
STOP BAR RADAR DETECTION UNIT		
DETECTION ZONE		

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PEDESTRIAN SIGNS



R10-3e-9
2 - LEFT ARROWS (SP-1, PS-2)
2 - RIGHT ARROWS (SP-2, PS-1)

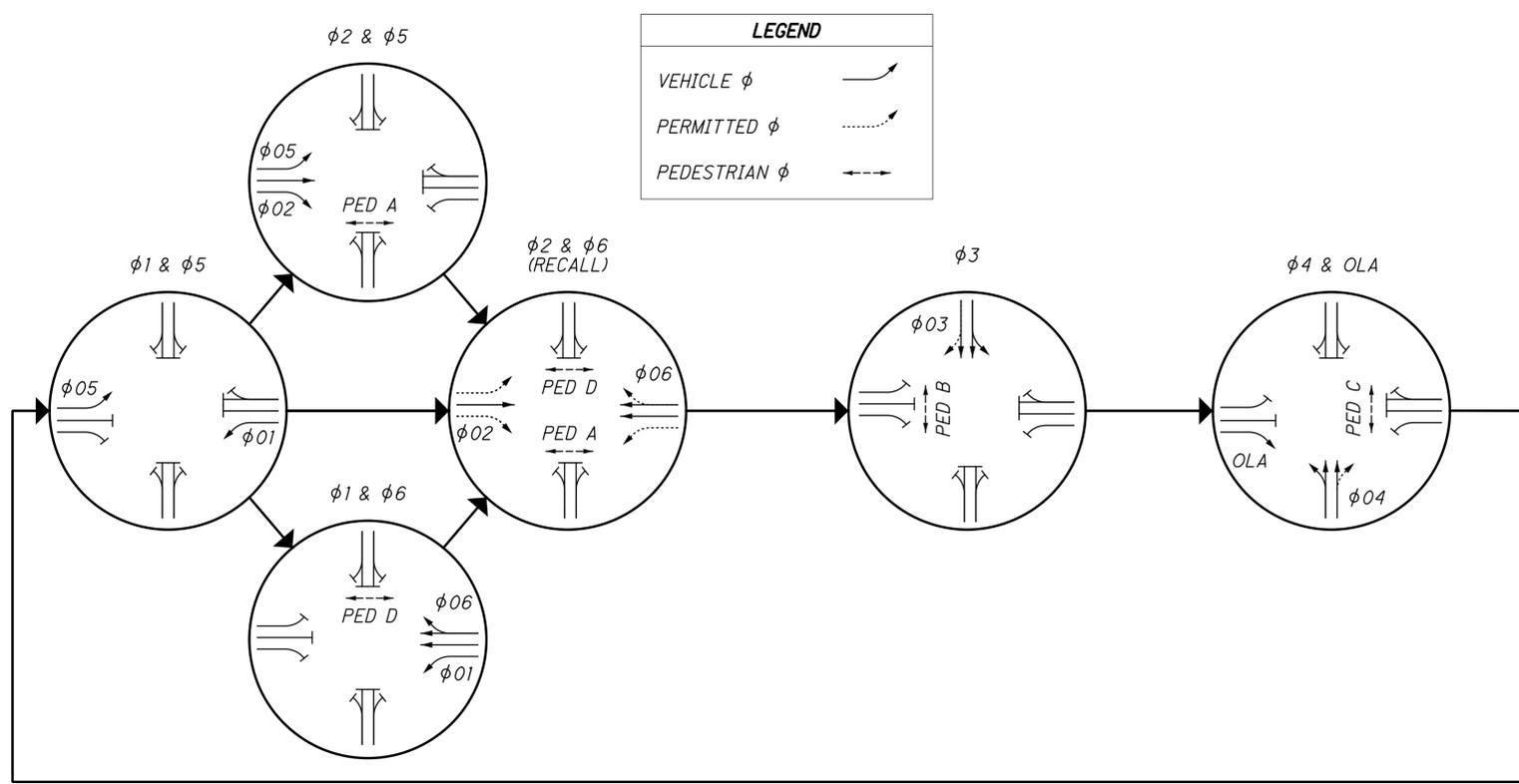
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / MERIDIAN RD. MAINTAINING AGENCY: CITY OF YOUNGSTOWN									
START UP		DUAL ENTRY: YES		PHASES: 2, 6					
START IN: ALL-RED FLASH		REST IN RED: RING 1 - RING 2 -		OVERLAP		A	B	C	D
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		PHASES		4	-	-	-		
FIRST PHASE(S): $\phi 2 + \phi 6$									
COLOR DISPLAYED: GREEN									
INTERVAL OR FEATURE		CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)		1	2	3	4	5	6	7	8
DIRECTION	WB LT	EB	SB	NB	EB LT	WB	-	-	-
MINIMUM GREEN (INITIAL) (SEC.)	7	20	10	10	7	20	-	-	-
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	3.0	-	3.0	3.0	3.0	-	-	-	-
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	15	30	30	30	15	30	-	-	-
MAXIMUM GREEN II (SEC.)	15	35	35	30	15	35	-	-	-
YELLOW CHANGE (SEC.)	3.5	4.5	4.4	3.7	3.5	4.5	-	-	-
ALL RED CLEARANCE (SEC.)	3.1	1.0	1.0	1.0	3.1	1.0	-	-	-
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-	-
WALK (SEC.)	-	9	11	10	-	9	-	-	-
PEDESTRIAN CLEARANCE (SEC.)	-	17	22	18	-	17	-	-	-
RECALL	MAXIMUM (ON/OFF)	-	ON	-	-	ON	-	-	-
	MINIMUM (ON/OFF)	-	-	-	-	-	-	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

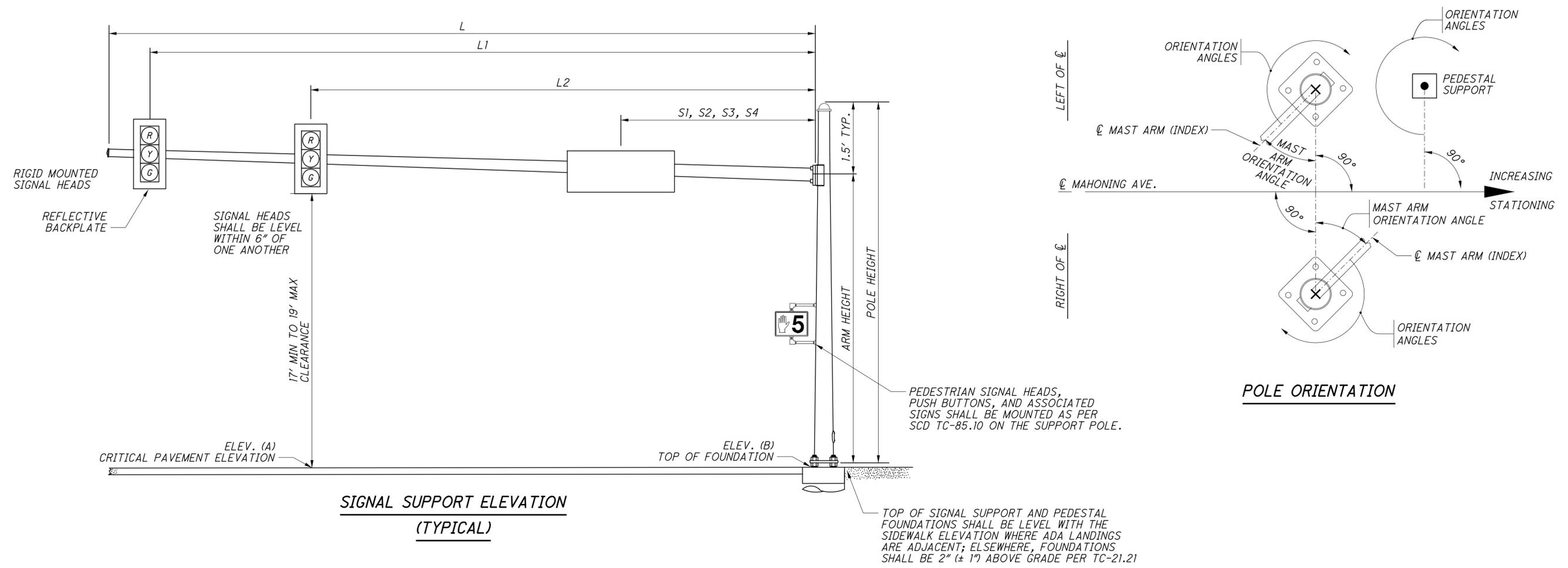
- FOR PROTECTED/PERMISSIVE PHASES, IMPLEMENT CALL OMITTS TO AVOID YELLOW BALL TRAP.
- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.
- THE CONTRACTOR SHALL PROGRAM THE TRAFFIC SIGNAL CONTROLLER TO EXECUTE THE FOLLOWING:
 - 1) MAXIMUM GREEN I SHALL RUN DURING THE HOURS OF 12:00 AM TO 3:00 PM AND 7:00 PM TO 12:00 AM.
 - 2) MAXIMUM GREEN II SHALL RUN DURING THE HOURS OF 3:00 PM TO 7:00 PM.

TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L1	P	25	6	3	3.0	1-1	$\phi 1$
L3A	P	25	6	3	3.0	2-1	$\phi 3$
L3B	P	25	6	3	3.0	2-2	$\phi 3$
L4A	P	25	6	3	3.0	3-1	$\phi 4$
L4B	P	25	6	3	3.0	3-2	$\phi 4$
L5	P	25	6	3	3.0	4-1	$\phi 5$

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

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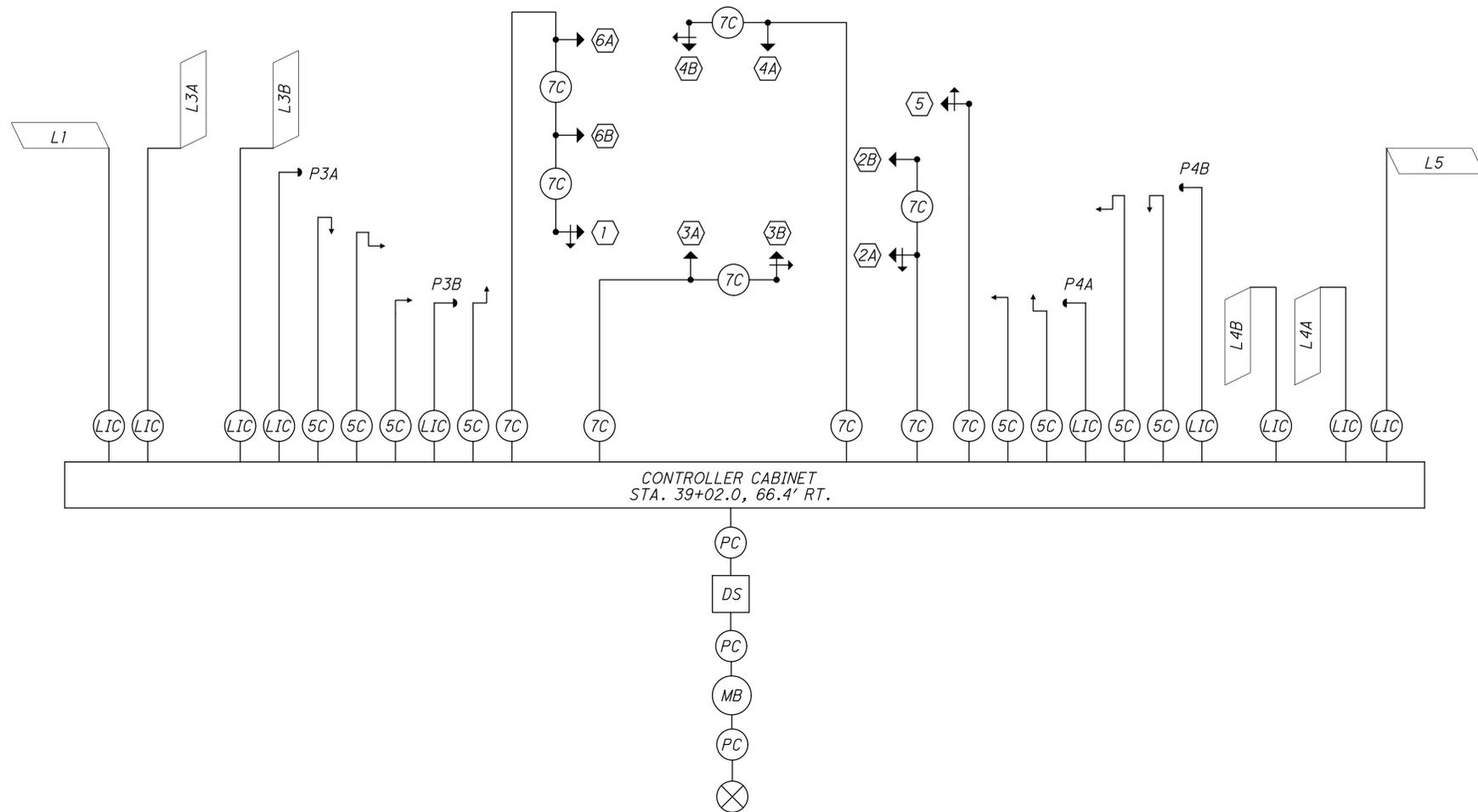
MAST ARM TABLE

SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS													MAST ARM A ANGLE	ORIENTATION ANGLES FROM MAST ARM A		
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	L3	S1	S2	S3	S4	PEDESTRIAN SIGNAL		PEDESTRIAN PUSHBUTTON	HANDHOLE	
																					FT
SP-1	37+93.3	33.7' LT.	1048.96	1049.66	TC-81.22	4	21	19.5	36	29.5	17.5	9.5	33.5	23.5	-	-	20	180/260	260	180	
SP-2	37+60.4	52.7' RT.	1048.48	1047.90*	TC-81.22	12	23	21.5	48	45	33.5	-	30	15	-	-	110	0/260	0	180	
SP-3	38+68.7	22.4' LT.	1052.65	1053.95	TC-81.22	4	21	19.5	38	30.5	17	-	14	6.5	-	-	90	-	-	180	
SP-4	38+93.0	69.6' RT.	1052.33	1052.10	TC-81.22	12	22	20.5	48	42.5	30	20.5	39	38	17	8	340	-	-	180	
PS-1	38+71.2	8.5' LT.	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	0/80	80	180	
PS-2	38+85.6	75.5' RT.	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	260/350	260	180	

*NOTE: TOP OF FOUNDATION SHALL BE FLUSH WITH TOP OF CURB.

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
1 (WB LT)	R	φ6 R	R	5 (EB LT)	R	φ2 R	R
	Y	φ6 Y			Y	φ2 Y	
	G	φ6 G			G	φ2 G	
	<--Y-->	φ1 Y			<--Y-->	φ5 Y	
	<--G-->	φ1 G		<--G-->	φ5 G		
2A (EB)	R	φ2 R	R	6A, 6B (WB)	R	φ6 R	R
	Y	φ2 Y			Y	φ6 Y	
	G	φ2 G			G	φ6 G	
	<--Y-->	φ4 Y / LS 13 Y			<--Y-->	φ6 R	
	<--G-->	φ4 G / LS 13 G		<--G-->	φ6 Y		
PEDESTRIAN MOVEMENTS							
2B (EB)	R	φ2 R	R	PED A	W	φ2 PED / LS 9 G	OUT
	Y	φ2 Y		DW	φ2 PED / LS 9 R		
	G	φ2 G		PED B	W	φ3 PED / LS 10 G	OUT
	<--Y-->	φ3 Y		DW	φ3 PED / LS 10 R		
3A (SB)	R	φ3 R	R	PED C	W	φ4 PED / LS 11 G	OUT
	Y	φ3 Y		DW	φ4 PED / LS 11 R		
	G	φ3 G		PED D	W	φ6 PED / LS 12 G	OUT
	<--Y-->	φ3 Y		DW	φ6 PED / LS 12 R		
3B (SB)	R	φ3 R	R	OVERLAPS			
	Y	φ3 Y		OLA	<--Y-->	φ4 Y / LS 13 Y	OUT
	G	φ3 G		<--G-->	φ4 G / LS 13 G		
OLA = LS 13							
4A (NB)	R	φ4 R	R	LS = LOAD SWITCH			
	Y	φ4 Y					
	G	φ4 G					
4B (NB)	R	φ4 R	R				
	Y	φ4 Y					
	G	φ4 G					
	<--G-->	φ4 G					

LEGEND

	4 OR 5 SECTION VEHICULAR SIGNAL HEAD, 1-WAY		SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
	3 SECTION VEHICULAR SIGNAL HEAD, 1-WAY		SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
	PEDESTRIAN SIGNAL HEAD		RADAR DETECTOR CABLE
	PEDESTRIAN PUSHBUTTON		POWER SOURCE
	STOP LINE RADAR DETECTION UNIT		POWER CABLE, 2 CONDUCTOR, NO. 4 AWG
	VEHICLE LOOP DETECTOR		METER BASE
	2/C NO. 14 AWG (LEAD-IN CABLE)		SIGNAL DISCONNECT SWITCH



CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL PLAN
MAHONING AVE. / DUNLAP AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

NOTES:

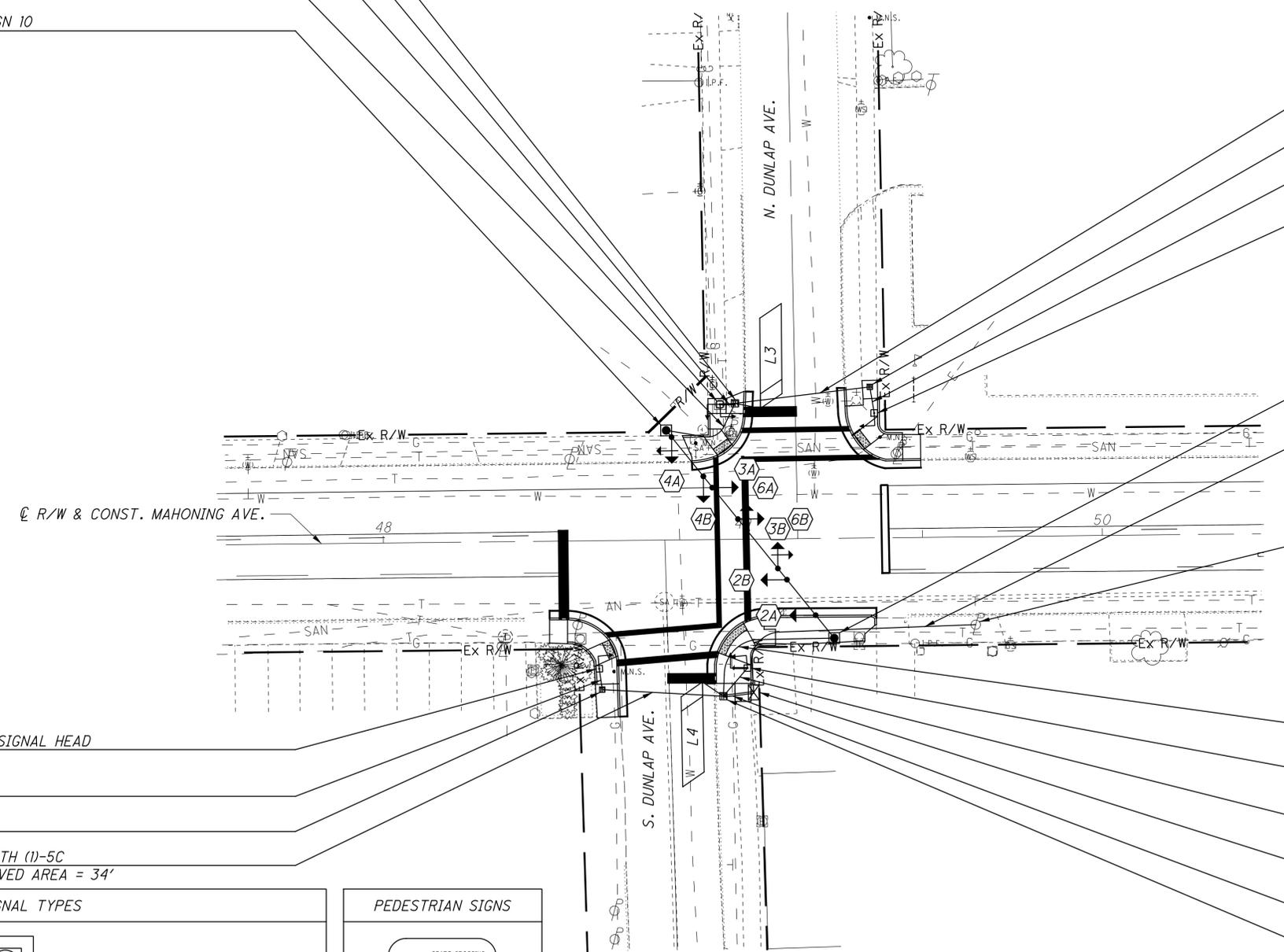
1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE SPAN WIRE.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. THE PROPOSED PEDESTAL LOCATED AT STA. 48+94.0, 37.5' LT. IS TO BE INSTALLED AT THE SAME LOCATION AS THE EXISTING STRAIN POLE. THE CONTRACTOR SHALL ENSURE ALL SIGNAL EQUIPMENT AND FOUNDATIONS ARE REMOVED PRIOR TO EXCAVATING FOR THE PROPOSED EQUIPMENT FOUNDATION.

PB-1
(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 5'

PS-1 WITH (2)-PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P3A'
STA. 48+94.0, 37.5' LT.
(SEE NOTE 4)

(1)-3" CONDUIT WITH (3)-5C AND (2)-2C LEAD-IN
IN TRENCH = 25'

SP-1, TYPE TC-81.11, DESIGN 10
STA. 48+79.0, 30.4' LT.



(1)-4" CONDUIT (725.05) WITH (1)-5C
ENCASED IN TRENCH IN PAVED AREA = 38'

PB-3
(1)-2" CONDUIT WITH (1)-5C
IN TRENCH = 8'

PS-3 WITH A PEDESTRIAN SIGNAL HEAD
STA. 49+36.9, 34.6' LT.

SP-2, TYPE TC-81.11, DESIGN 10
STA. 49+25.2, 27.7' RT.

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH IN PAVED AREA = 30'
IN TRENCH = 46'
(TOTAL CONDUIT LENGTH = 76')

PROPOSED POWER SOURCE
WITH PROPOSED CONDUIT RISER
STA. 49+64.6, 24.4' RT.

(1)-3" CONDUIT WITH (4)-7C, (3)-5C AND (2)-2C LEAD-IN
IN TRENCH = 43'

PS-4 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P3B'
STA. 49+00.9, 35.8' RT.

(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 11'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY
STA. 49+02.6, 42.5' RT.

(2)-4" CONDUITS WITH (4)-7C, (6)-5C AND (4)-2C LEAD-IN
IN TRENCH = 9'

PB-4

PS-2 WITH A PEDESTRIAN SIGNAL HEAD
STA. 48+59.7, 35.5' RT.

(1)-2" CONDUIT WITH (1)-5C
IN TRENCH = 6'

PB-2
(1)-4" CONDUIT (725.05) WITH (1)-5C
ENCASED IN TRENCH IN PAVED AREA = 34'

SIGNAL TYPES

PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS

R10-3e-9
2 - LEFT ARROWS
(PS-1, PS-4)

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
3	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	48+98.3	LT	37.7'	24" X 24"
PB-2	48+60.5	RT	41.3'	18" X 18"
PB-3	49+35.8	LT	41.9'	18" X 18"
PB-4	48+94.2	RT	43.5'	24" X 24"

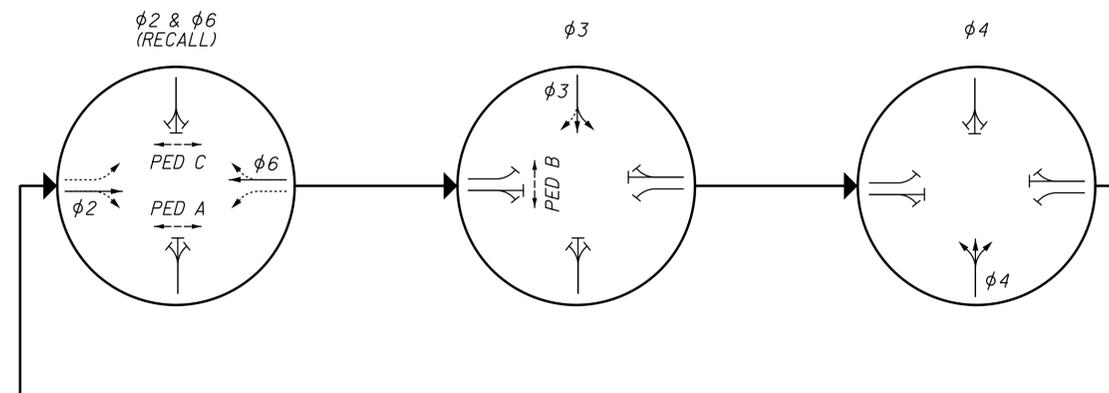
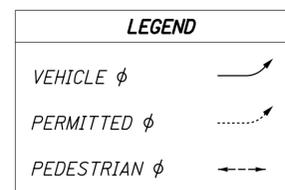
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / DUNLAP AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP		DUAL ENTRY: YES		PHASES: 2, 6				
START IN: ALL-RED FLASH		REST IN RED:		RING 1		RING 2		
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		OVERLAP		A	B	C	D	
FIRST PHASE(S): $\phi 2 + \phi 6$		PHASES		-	-	-	-	
COLOR DISPLAYED: GREEN								
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	-	EB	SB	NB	-	WB	-	-
MINIMUM GREEN (INITIAL) (SEC.)	-	20	10	10	-	20	-	-
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	-	-	3.0	3.0	-	-	-	-
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	-	60	30	30	-	60	-	-
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	-	4.3	3.8	3.0	-	4.3	-	-
ALL RED CLEARANCE (SEC.)	-	1.0	1.1	1.1	-	1.0	-	-
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	7	10	-	-	7	-	-
PEDESTRIAN CLEARANCE (SEC.)	-	8	12	-	-	8	-	-
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L3	P	25	6	10	3.0	1-1	$\phi 3$
L4	P	25	6	10	3.0	1-2	$\phi 4$

*CONFIGURATIONS: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

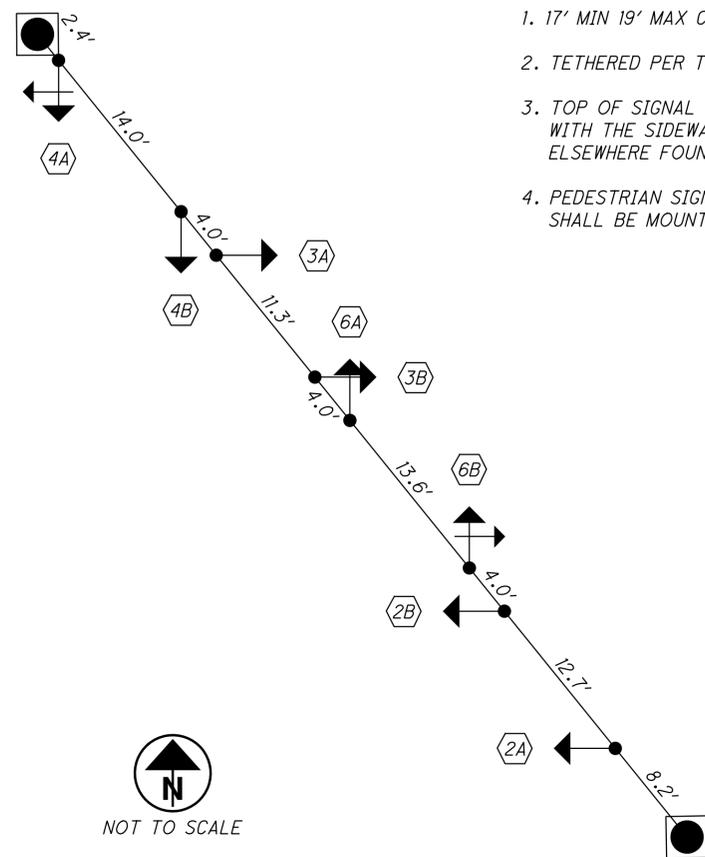
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CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL DETAIL
MAHONING AVE. / DUNLAP AVE.

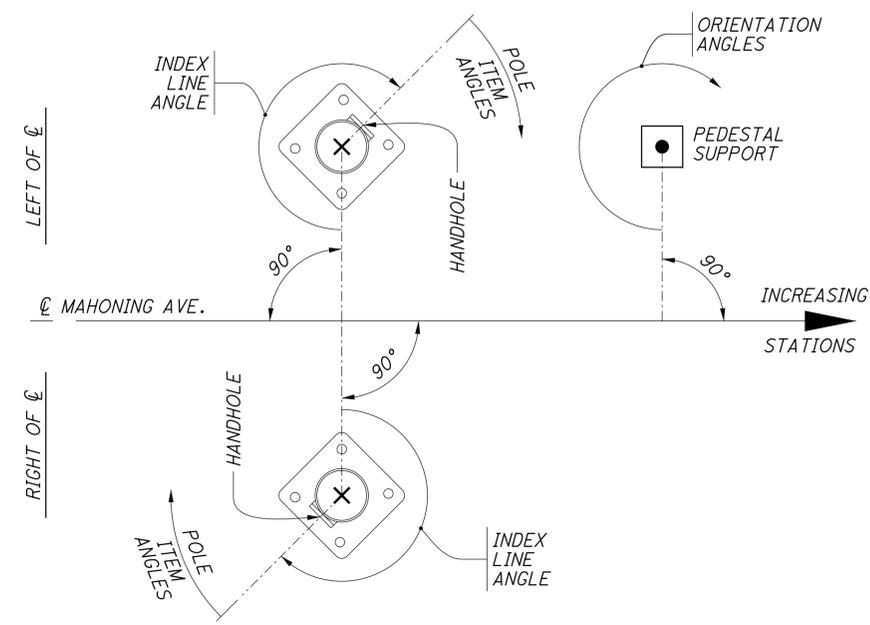
MAH-YOUNGSTOWN
SIGNAL UPGRADE

PLAN VIEW



NOTES:

1. 17' MIN 19' MAX CLEARANCE PER TC-85.22.
2. TETHERED PER TC-85.21.
3. TOP OF SIGNAL SUPPORT AND PEDESTAL FOUNDATIONS SHALL BE LEVEL WITH THE SIDEWALK ELEVATION WHERE ADA LANDINGS ARE ADJACENT; ELSEWHERE FOUNDATIONS SHALL BE 2" (+/-) ABOVE GRADE PER TC-21.21.
4. PEDESTRIAN SIGNAL HEADS, PUSHBUTTONS AND ASSOCIATED SIGNS SHALL BE MOUNTED AS PER TC-85.10 ON THE POLE.



NOTES:

- ALL ANGLES ARE MEASURED CLOCKWISE.
- THE INDEX LINE GOES THROUGH THE CENTER OF THE HANDHOLE.

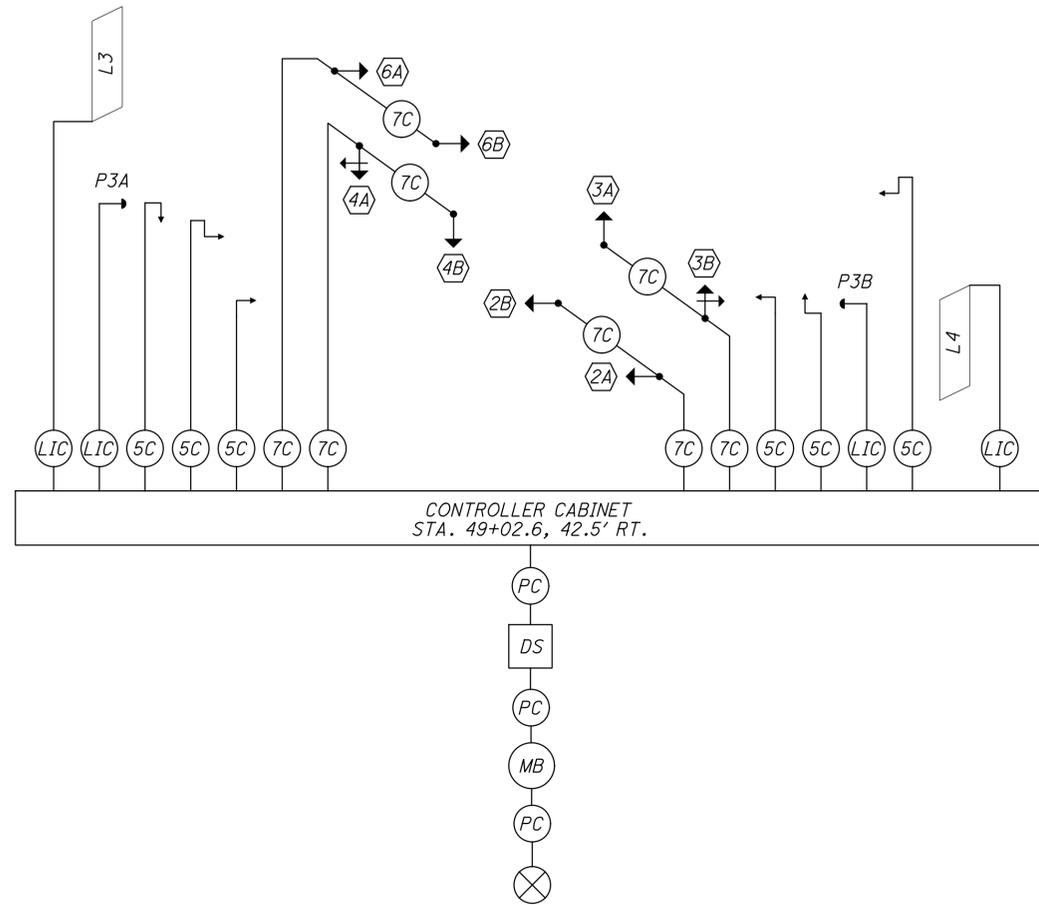
POLE ORIENTATION

PLAN DETAILS FOR STRAIN POLES

SUPPORT NO.	STATION	OFFSET	DESIGN TYPE	DESIGN NO.	POLE HEIGHT (FT.)	FOUNDATION ELEV.	SPAN WIRE ATTACHED HEIGHT	CABLE ENTRANCE DISTANCE FROM TOP (IN.)	INDEX LINE ANGLE (DEG.)	ANGLES (DEG.) FROM INDEX LINE		
										PEDESTRIAN SIGNALS	PEDESTRIAN PUSH BUTTON	CABLE ENTRANCE
SP-1	48+79.0	30.4' LT.	TC-81.11	10	27	1078.05	25.5	18	180	-	-	142
SP-2	49+25.2	27.7' RT.	TC-81.11	10	27	1078.14	25	24	180	-	-	142
PS-1	48+94.0	37.5' LT.	-	-	8	-	-	-	180	0/90	270	-
PS-2	48+59.7	35.5' RT.	-	-	8	-	-	-	180	355	-	-
PS-3	49+36.9	34.6' LT.	-	-	8	-	-	-	180	0	-	-
PS-4	49+00.9	35.8' RT.	-	-	8	-	-	-	180	270/355	270	-

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
3A (SB)	R	φ3 R	R
	Y	φ3 Y	
	G	φ3 G	
3B (SB)	R	φ3 R	R
	Y	φ3 Y	
	G	φ3 G	
	←-G---	φ3 G	
4A (NB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
4B (NB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
6A, 6B (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ3 PED / LS 10 G	OUT
	DW	φ3 PED / LS 10 R	
PED C	W	φ6 PED / LS 11 G	OUT
	DW	φ6 PED / LS 11 R	
LS = LOAD SWITCH			

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CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / DUNLAP AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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(1)-4" CONDUIT (725.05) WITH (1)-7C, (2)-5C, AND (2)-2C LEAD-IN ENCASED IN TRENCH IN PAVED AREA = 62'

PB-1

(1)-2" CONDUIT WITH (1)-2C LEAD-IN IN TRENCH = 20'

PS-1 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P4A' STA. 68+76.8, 34.6' LT. (SEE NOTE 4)

(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN IN TRENCH = 12'

PB-2

SP-1, TYPE TC-81.22, DESIGN 2 WITH A 32' MAST ARM STA. 68+59.9, 33.4' LT.

(1)-3" CONDUIT WITH (1)-7C IN TRENCH = 10'

EXISTING UTILITY POLE (TO REMAIN) WITH PROPOSED CONDUIT RISER STA. 68+76.4, 23.7' RT.

(1)-2" CONDUIT WITH (1)-POWER CABLE IN TRENCH = 21'

SP-2, TYPE TC-81.22, DESIGN 2 WITH A 24' MAST ARM WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P4B' STA. 68+79.3, 35.1' RT.

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN IN TRENCH = 6'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY STA. 68+79.2, 43.6' RT.

(2)-4" CONDUITS WITH (4)-7C, (8)-5C AND (6)-2C LEAD-IN IN TRENCH = 5'

PB-3

(1)-4" CONDUIT (725.05) WITH (3)-7C, (6)-5C AND (5)-2C LEAD-IN ENCASED IN TRENCH IN PAVED AREA = 37'

PB-4

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN IN TRENCH = 6'

SP-3, TYPE TC-81.22, DESIGN 2 WITH A 32' MAST ARM, (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P8B' STA. 69+31.8, 26.8' LT.

(1)-4" CONDUIT (725.05) WITH (2)-7C, (4)-5C AND (3)-2C LEAD-IN ENCASED IN TRENCH IN PAVED AREA = 55'

CL R/W & CONST. MAHONING AVE.

PS-2 WITH A PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P8A' STA. 69+42.4, 24.2' RT.

(1)-2" CONDUIT WITH (1)-5C AND (1)-2C LEAD-IN IN TRENCH = 11'

PB-5

(1)-3" CONDUIT WITH (2)-7C, (5)-5C AND (4)-2C LEAD-IN IN TRENCH = 20'

SP-4, TYPE TC-81.22, DESIGN 2 WITH A 32' MAST ARM, AND A PEDESTRIAN SIGNAL HEAD STA. 69+29.3, 37.4' RT.

(1)-3" CONDUIT WITH (1)-7C AND (1)-5C IN TRENCH = 10'

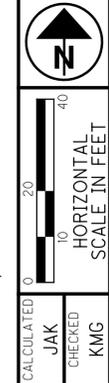
PB-6

AERIAL POWER CABLE, 85'

PROPOSED POWER SOURCE STA. 68+88.1, 107.7' RT.

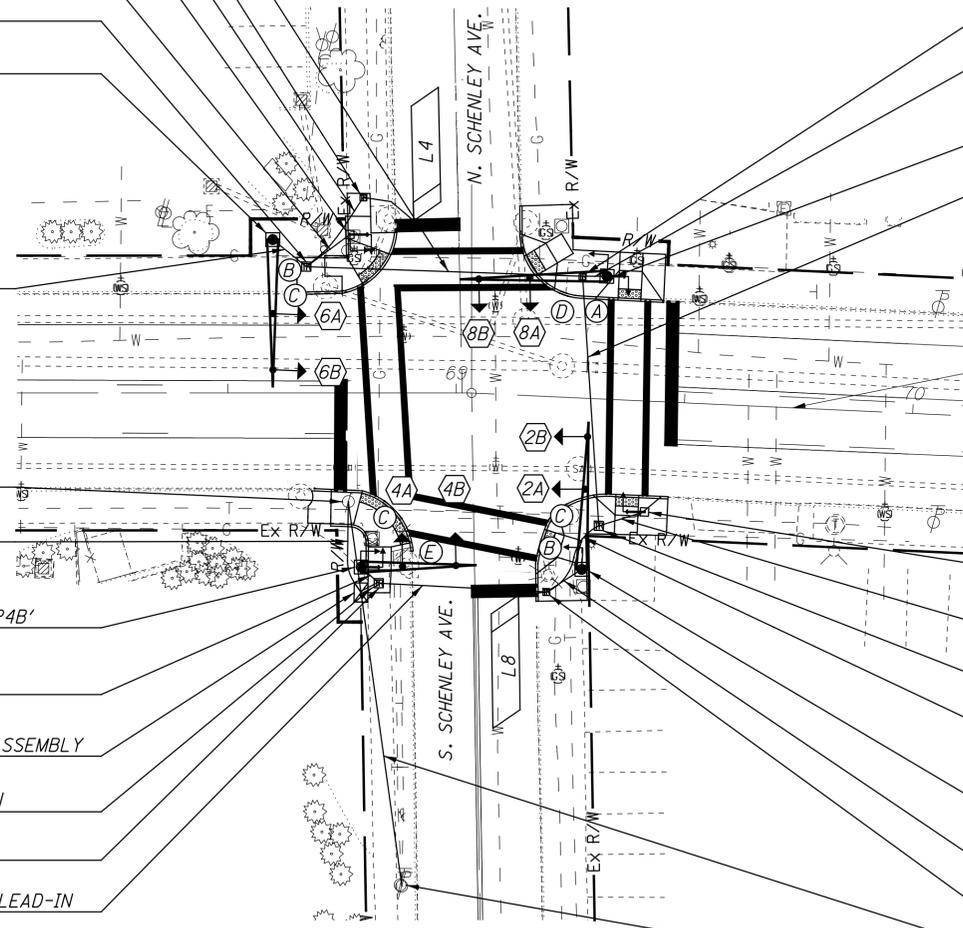
NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. THE PROPOSED PEDESTAL LOCATED AT STA. 68+76.8, 34.6' LT. IS TO BE INSTALLED AT THE SAME LOCATION AS THE EXISTING STRAIN POLE SUPPORT. THE CONTRACTOR SHALL ENSURE ALL SIGNAL EQUIPMENT AND FOUNDATIONS ARE REMOVED PRIOR TO EXCAVATING FOR THE PROPOSED EQUIPMENT FOUNDATION.
5. FOR REFERENCE TO SIGNS (A), (B), (C), (D) & (E), SEE SHEET 33.

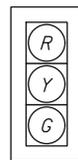


TRAFFIC SIGNAL PLAN
MAHONING AVE. / SCHENLEY AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE



SIGNAL TYPES



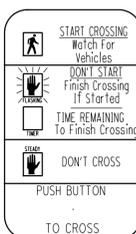
(2A), (2B), (4A), (4B),
(6A), (6B), (8A) & (8B)



PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS



- 3 - LEFT ARROWS (SP-3, PS-1, PS-2)
1 - RIGHT ARROW (SP-2)

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
4	PEDESTRIAN SIGNAL HEADS		X
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PULL BOX TABLE

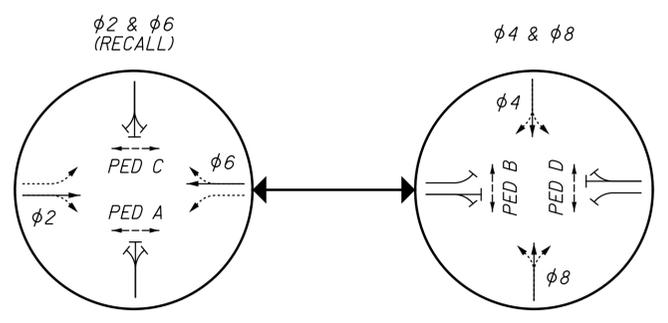
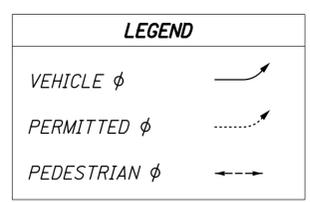
PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	68+79.7	LT	42.7'	18" X 18"
PB-2	68+67.2	LT	27.5'	24" X 24"
PB-3	68+83.2	RT	41.6'	24" X 24"
PB-4	69+26.5	LT	26.5'	18" X 18"
PB-5	69+32.6	RT	27.7'	24" X 24"
PB-6	69+21.8	RT	42.7'	18" X 18"

SIGNAL TIMING CHART

INTERSECTION: MAHONGING AVE. / SCHENLEY AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP		DUAL ENTRY: YES		PHASES: 2, 4, 6, 8				
START IN: ALL-RED FLASH		REST IN RED:		RING 1		RING 2		
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		OVERLAP		A	B	C	D	
FIRST PHASE(S): $\phi 2 + \phi 6$		PHASES		-	-	-	-	
COLOR DISPLAYED: GREEN								
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	-	EB	-	SB	-	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)	-	20	-	10	-	20	-	10
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	-	-	-	3.0	-	-	-	3.0
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	-	60	-	30	-	60	-	30
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	-	4.4	-	4.2	-	4.4	-	4.2
ALL RED CLEARANCE (SEC.)	-	1.0	-	1.0	-	1.0	-	1.0
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY* (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	7	-	10	-	7	-	10
PEDESTRIAN CLEARANCE (SEC.)	-	7	-	12	-	7	-	12
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

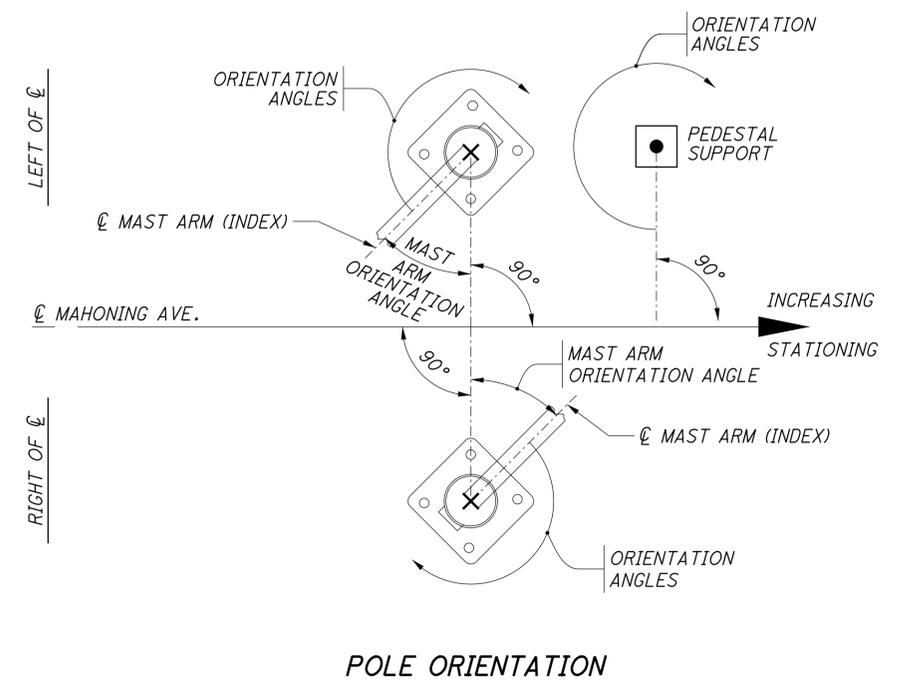
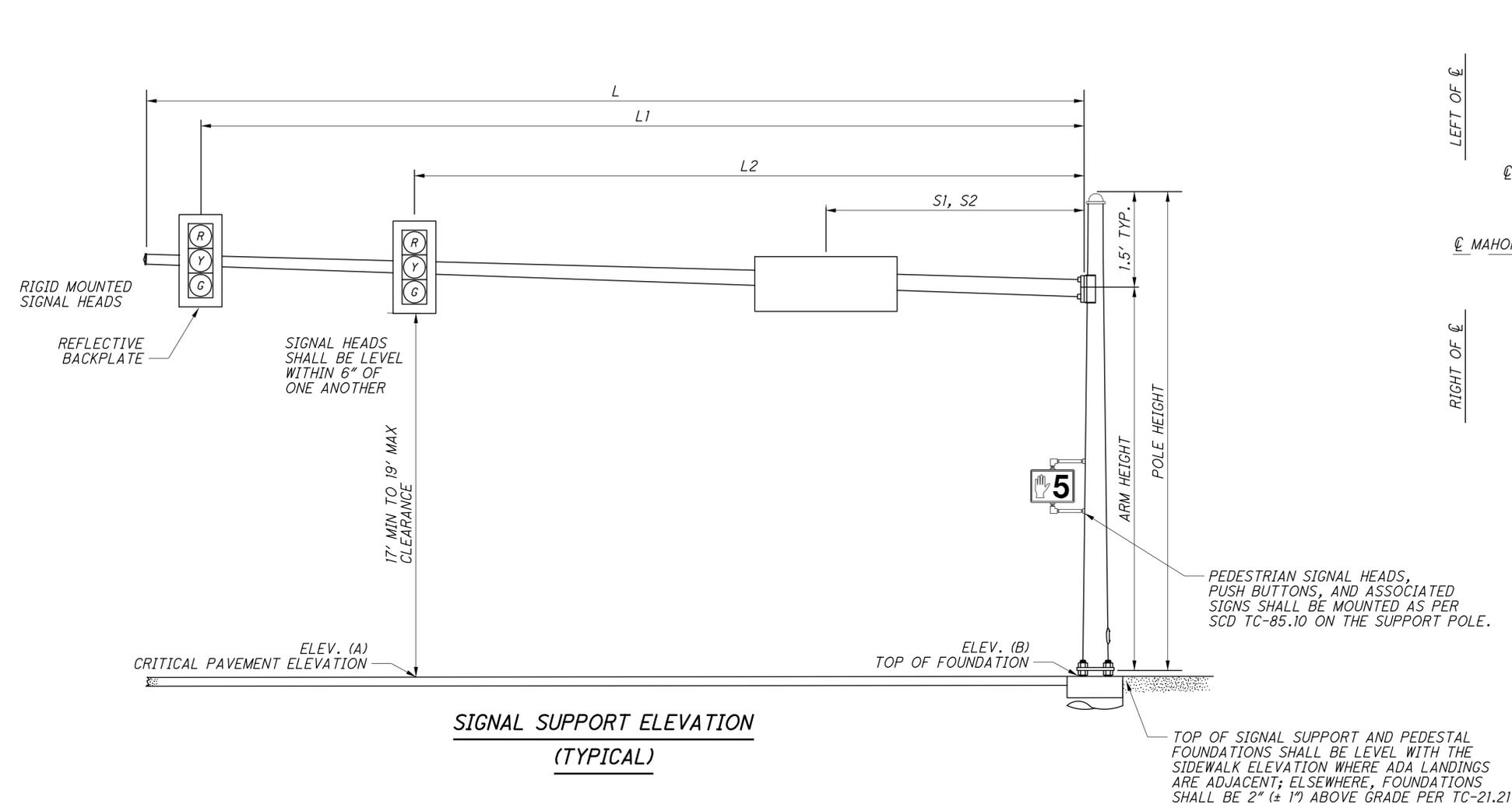
- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTOR CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L4	P	25	6	3	3.0	1-1	$\phi 4$
L8	P	25	6	3	3.0	2-1	$\phi 8$

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

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**SIGNAL SUPPORT ELEVATION
(TYPICAL)**

MAST ARM TABLE

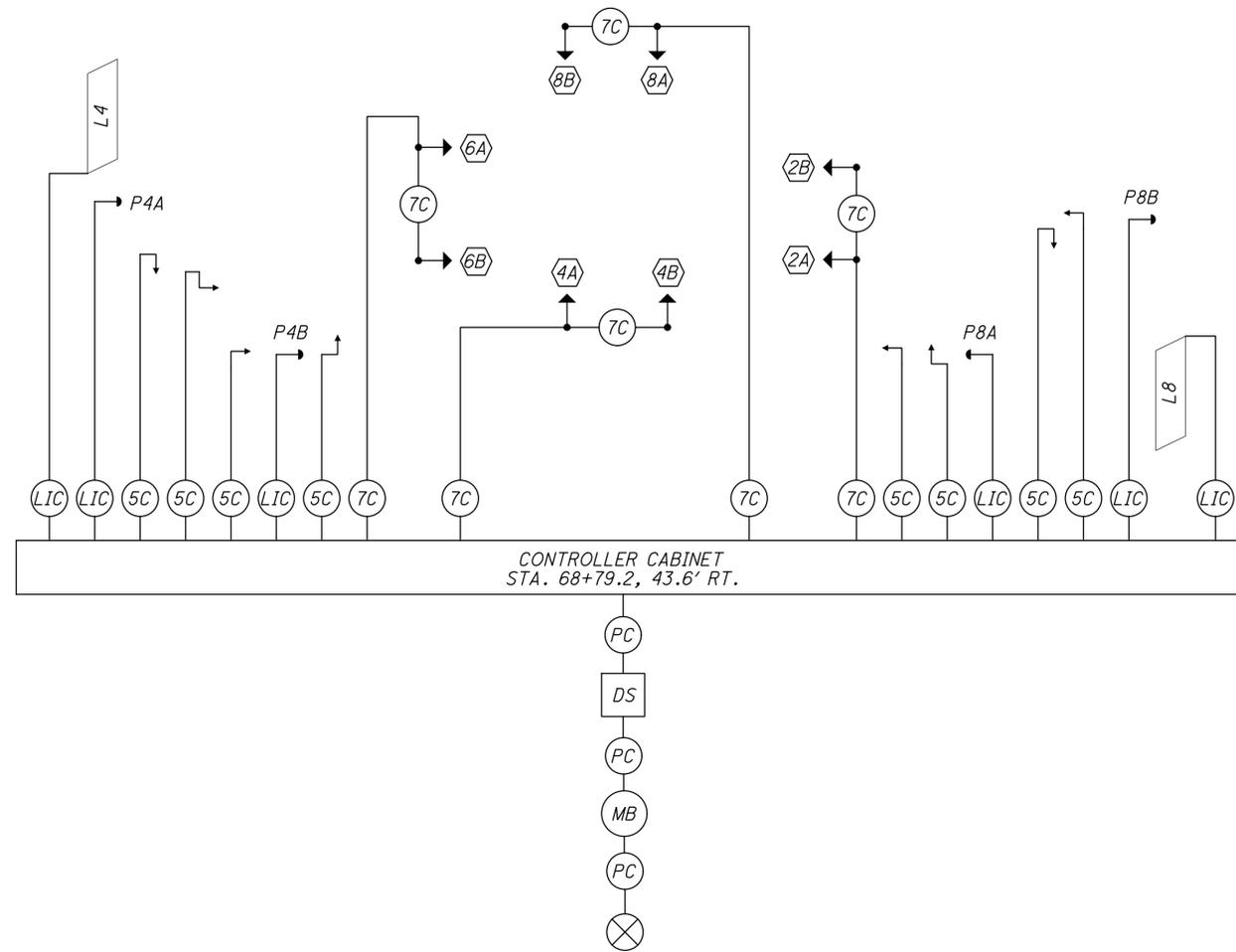
SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS										MAST ARM A ANGLE DEG	ORIENTATION ANGLES FROM MAST ARM A / INDEX LINE		
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	S1	S2	PEDESTRIAN SIGNAL DEG		PEDESTRIAN PUSHBUTTON DEG	HANDHOLE DEG	
																		FT
SP-1	68+59.9	33.4' LT.	1043.88	1044.42	TC-81.22	2	21	19.5	32	28.5	17	13.5	6	0	-	-	180	
SP-2	68+79.3	35.1' RT.	1042.84	1043.08*	TC-81.22	2	21	19.5	25	20.5	9	15	5.5	90	0/270	0	180	
SP-3	69+31.8	26.8' LT.	1042.46	1042.08	TC-81.22	2	22	20.5	32	28	17	14	6.5	90	90/180	180	90	
SP-4	69+29.3	37.4' RT.	1042.12	1042.36	TC-81.22	2	21	19.5	32	29	17.5	14	6	0	0	-	180	
PS-1	68+76.8	34.6' LT.	-	-	-	-	8	-	-	-	-	-	-	-	0/270	270	180	
PS-2	69+42.4	24.2' RT.	-	-	-	-	8	-	-	-	-	-	-	-	270	270	180	

*NOTE: TOP OF FOUNDATION SHALL BE FLUSH WITH TOP OF CURB.

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
4A, 4B (SB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
6A, 6B (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
8A, 8B (NB)	R	φ8 R	R
	Y	φ8 Y	
	G	φ8 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ4 PED / LS 10 G	OUT
	DW	φ4 PED / LS 10 R	
PED C	W	φ6 PED / LS 11 G	OUT
	DW	φ6 PED / LS 11 R	
PED D	W	φ8 PED / LS 12 G	OUT
	DW	φ8 PED / LS 12 R	
LS = LOAD SWITCH			

CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / SCHENLEY AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

56
86



0 20 40
HORIZONTAL
SCALE IN FEET

CALCULATED
JAK
CHECKED
KMG

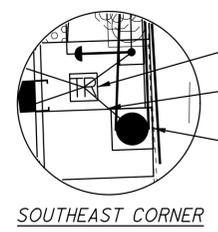
TRAFFIC SIGNAL PLAN
MAHONING AVE. / HAZELWOOD AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

57
86

NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. THE PROPOSED PEDESTAL LOCATED AT STA. 75+52.3, 33.7' RT. IS TO BE INSTALLED AT THE SAME LOCATION AS THE EXISTING STRAIN POLE SUPPORT. THE CONTRACTOR SHALL ENSURE ALL SIGNAL EQUIPMENT AND FOUNDATIONS ARE REMOVED PRIOR TO EXCAVATING FOR THE PROPOSED EQUIPMENT FOUNDATION.
5. FOR REFERENCE TO SIGNS (B) & (C), SEE SHEET 34.



(1)-4" CONDUIT (725.05) WITH POWER CABLE
ENCASED IN TRENCH IN PAVED AREA = 66'

(1)-4" CONDUIT (725.05) WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 53'

PB-1

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 9'

SP-1, TYPE TC-81.22, DESIGN 4 WITH A 38' MAST ARM,
(2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P4A'
STA. 74+80.8, 33.7' LT.

(2)-4" CONDUITS WITH (4)-7C, (8)-5C AND (6)-2C LEAD-IN
IN TRENCH = 19'
IN TRENCH IN PAVED AREA = 12'
(TOTAL CONDUIT LENGTH = 31')

PB-6

(1)-2" CONDUIT WITH POWER CABLE
IN TRENCH IN PAVED AREA = 6'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY
STA. 74+61.0, 25.4' LT.

(1)-4" CONDUIT (725.05) WITH (2)-7C, (4)-5C
AND (3)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 62'

AERIAL POWER CABLE, 89'

Q R/W & CONST. MAHONING AVE.

PS-1 WITH A PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P4B'
STA. 74+85.1, 24.6' RT.

(1)-2" CONDUIT WITH (1)-5C AND (1)-2C LEAD-IN
IN TRENCH = 27'

EXISTING UTILITY POLE (TO REMAIN)
STA. 74+96.0, 23.5' RT.

PB-2

SP-2, TYPE TC-81.22, DESIGN 2 WITH A 17' MAST ARM AND A
PEDESTRIAN SIGNAL HEAD
STA. 75+04.7, 31.5' RT.

PB-4

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 5'

SP-4, TYPE TC-81.22, DESIGN 4 WITH A 35' MAST ARM
STA. 75+51.9, 39.3' RT.

SOUTHEAST CORNER

EXISTING UTILITY POLE (TO REMAIN)
WITH PROPOSED CONDUIT RISER
STA. 75+22.2, 61.4' LT.

(1)-2" CONDUIT WITH POWER CABLE
IN TRENCH = 40'

SP-3, TYPE TC-81.22, DESIGN 2 WITH A 20' MAST ARM
AND A PEDESTRIAN SIGNAL HEAD
STA. 75+32.4, 33.5' LT.

(1)-3" CONDUIT WITH (1)-7C AND (1)-5C
IN TRENCH = 11'

(1)-2" CONDUIT WITH (1)-5C AND (1)-2C LEAD-IN
IN TRENCH = 5'

PS-2 WITH A PEDESTRIAN SIGNAL HEAD AND BUSHBUTTON 'P8B'
STA. 75+44.9, 26.5' LT.

PB-3

PB-5

PROPOSED POWER SOURCE
STA. 75+90.2, 24.6' RT.

AERIAL POWER CABLE, 94'

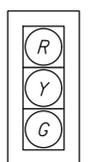
PS-3 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P8A'
STA. 75+51.8, 33.7' RT.

(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 5'

(1)-4" CONDUIT (725.05) WITH (1)-7C, (2)-5C AND (2)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 40'

(1)-3" CONDUIT WITH (1)-7C AND (1)-5C
IN TRENCH = 10'

SIGNAL TYPES



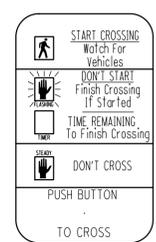
(2A), (2B), (4A), (4B),
(6A), (6B), (8A) & (8B)



PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS



R10-3e-9

- 3 - LEFT ARROWS (SP-1, PS-2, PS-3)
1 - RIGHT ARROW (PS-1)

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
6	PEDESTRIAN SIGNAL HEADS		X
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	74+88.9	LT	33.4'	24" X 24"
PB-2	75+10.7	RT	24.6'	24" X 24"
PB-3	75+40.3	LT	26.4'	18" X 18"
PB-4	75+48.3	RT	36.3'	24" X 24"
PB-5	75+31.2	LT	23.2	18" X 18"
PB-6	74+66.2	LT	27.7'	18" X 18"

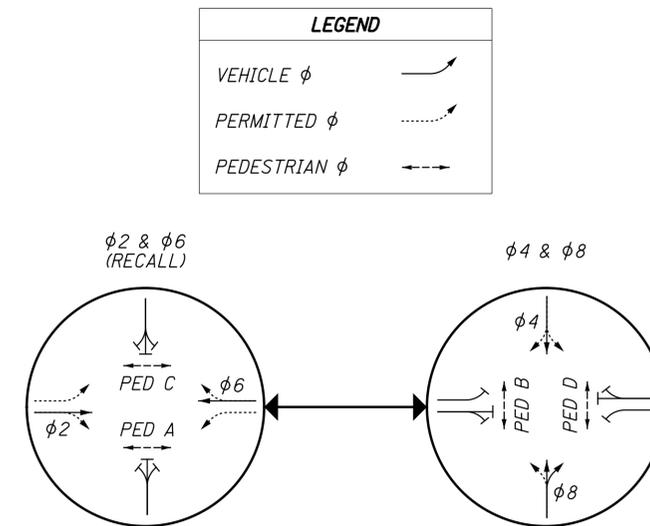
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / HAZELWOOD AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP		DUAL ENTRY: YES	PHASES: 2,4,6,8					
START IN: ALL-RED FLASH		REST IN RED: RING 1 - RING 2 -						
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		OVERLAP	A	B	C	D		
FIRST PHASE(S): PHASE 2 & 6		PHASES	-	-	-	-		
COLOR DISPLAYED: GREEN								
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	-	EB	-	SB	-	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)	-	20	-	10	-	20	-	10
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	-	-	-	3.0	-	-	-	3.0
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	-	60	-	30	-	60	-	30
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	-	4.3	-	3.6	-	4.3	-	3.6
ALL RED CLEARANCE (SEC.)	-	1.0	-	1.0	-	1.0	-	1.0
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	7	-	9	-	7	-	9
PEDESTRIAN CLEARANCE (SEC.)	-	7	-	11	-	7	-	11
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L4	P	25	6	3	3.0	1-1	φ4
L8	P	25	6	3	3.0	1-2	φ8

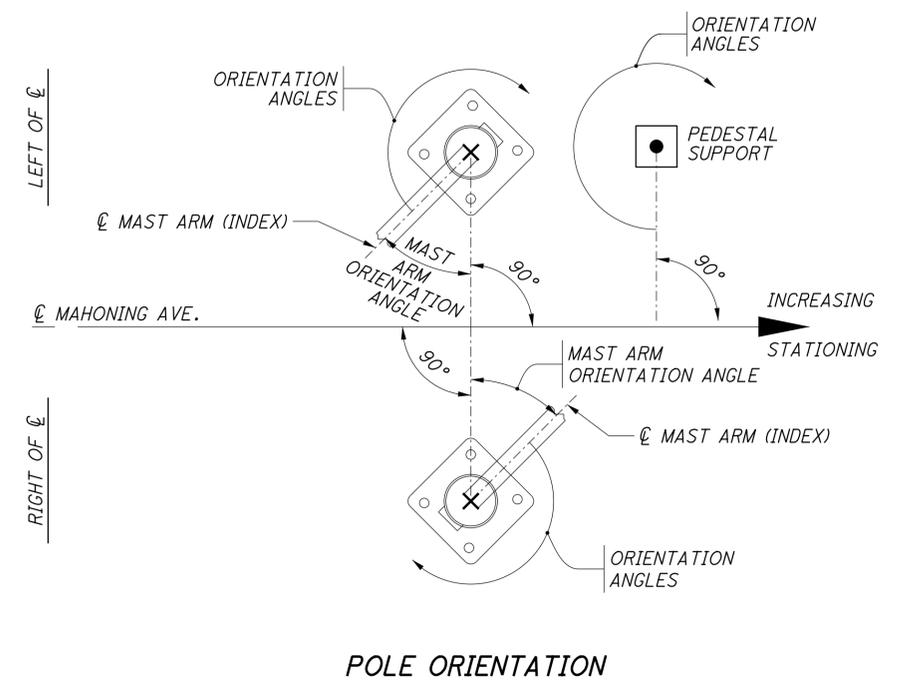
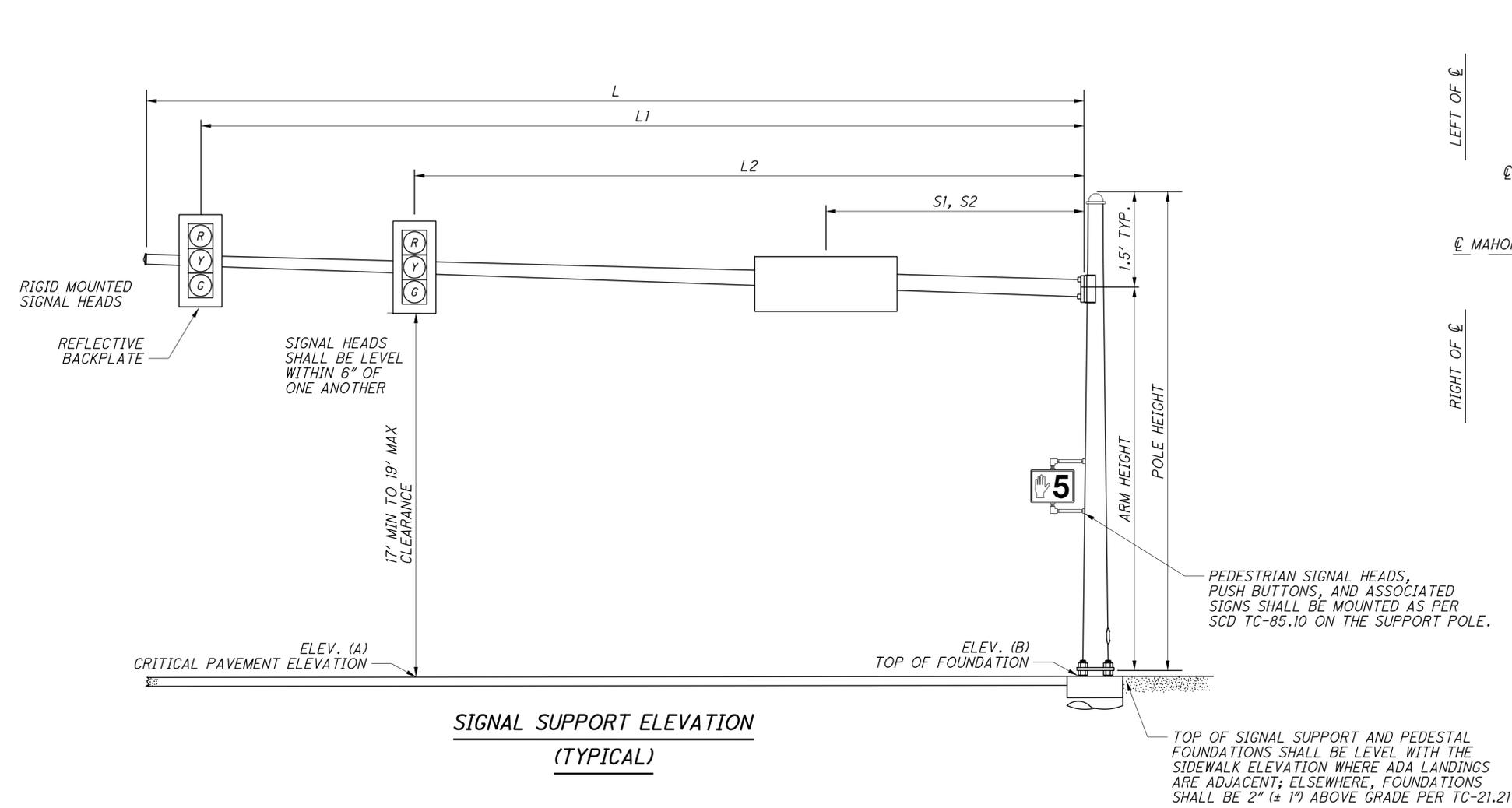
*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

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CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL DETAIL
MAHONING AVE. / HAZELWOOD AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE



MAST ARM TABLE

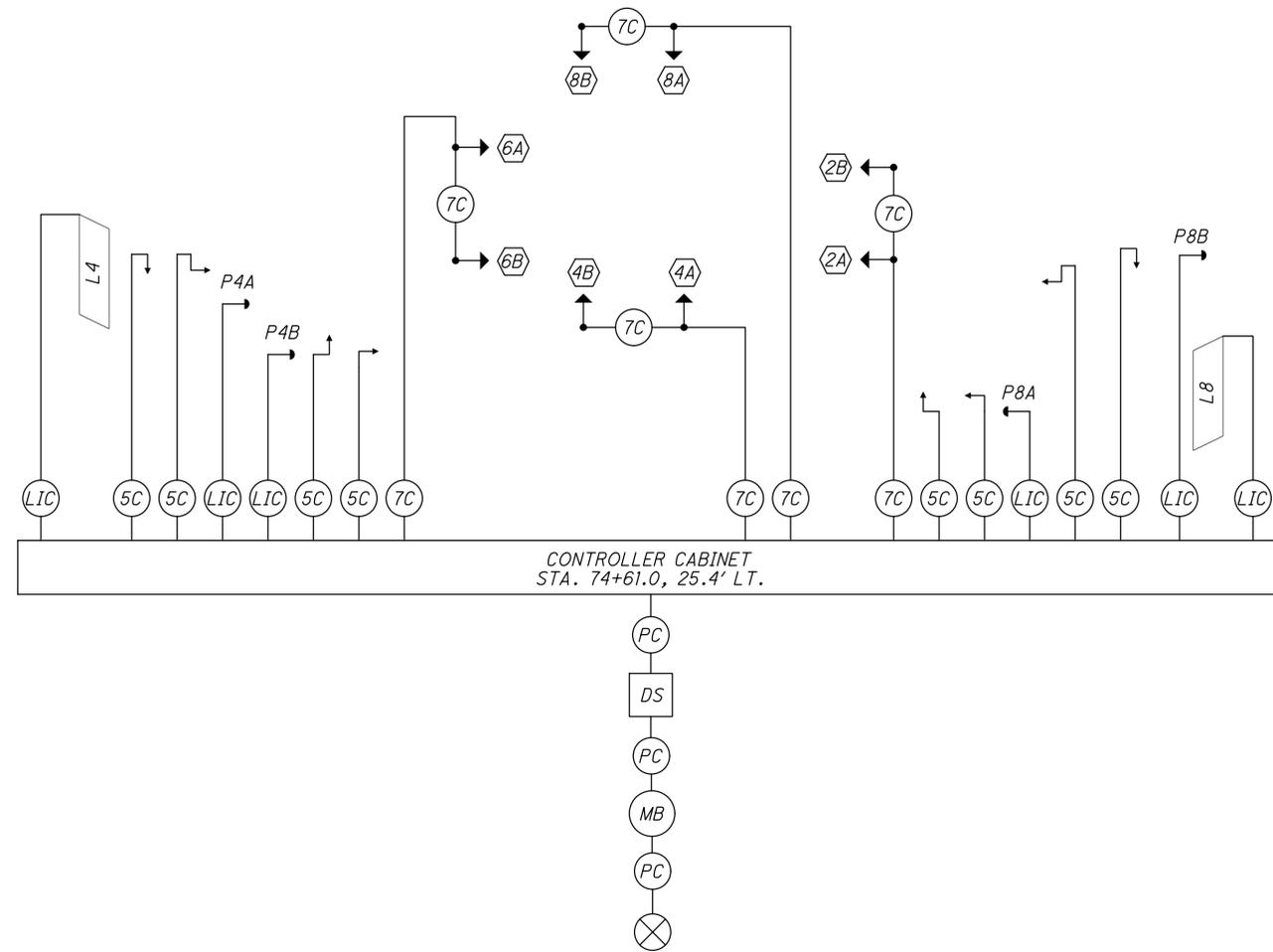
SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS										ORIENTATION ANGLES FROM MAST ARM A		
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	S1	S2	MAST ARM A ANGLE	PEDESTRIAN SIGNAL	PEDESTRIAN PUSHBUTTON	HANDHOLE
SP-1	74+80.8	33.7' LT.	1029.74	1029.63*	TC-81.22	4	22	20.5	38	31	18.5	15.5	7.5	0	0/270	270	0
SP-2	75+04.7	31.5' RT.	1029.40	1029.29	TC-81.22	2	22	20.5	17	11	3	6	-	80	280	-	180
SP-3	75+32.4	33.5' LT.	1029.75	1029.72	TC-81.22	2	22	20.5	20	11.5	3.5	6	-	90	270	-	180
SP-4	75+51.9	39.3' RT.	1029.10	1029.11	TC-81.22	4	22	20.5	35	30	18.5	24	11.5	0	-	-	180
PS-1	74+85.1	24.6' RT.	-	-	-	-	8	-	-	-	-	-	-	-	90	90	180
PS-2	75+44.9	26.5' LT.	-	-	-	-	8	-	-	-	-	-	-	-	270	270	180
PS-3	75+51.8	33.7' RT.	-	-	-	-	8	-	-	-	-	-	-	-	0/270	270	180

*NOTE: TOP OF FOUNDATION SHALL BE FLUSH WITH CURB.

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
4A, 4B (SB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
6A, 6B (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
8A, 8B (NB)	R	φ8 R	R
	Y	φ8 Y	
	G	φ8 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ4 PED / LS 10 G	OUT
	DW	φ4 PED / LS 10 R	
PED C	W	φ6 PED / LS 11 G	OUT
	DW	φ6 PED / LS 11 R	
PED D	W	φ8 PED / LS 12 G	OUT
	DW	φ8 PED / LS 12 R	
LS = LOAD SWITCH			

CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / HAZELWOOD AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

60
86



0 10 20 30 40
HORIZONTAL
SCALE IN FEET

CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL PLAN
MAHONING AVE. / BELLE VISTA AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. THE PROPOSED PEDESTAL LOCATED AT STA. 99+42.2, 28.6' RT. IS TO BE INSTALLED AT THE SAME LOCATION AS THE EXISTING STRAIN POLE SUPPORT. THE CONTRACTOR SHALL ENSURE ALL SIGNAL EQUIPMENT AND FOUNDATIONS ARE REMOVED PRIOR TO EXCAVATING FOR THE PROPOSED EQUIPMENT FOUNDATION.
5. FOR REFERENCE TO SIGNS (A), (B), (C), (D) & (E), SEE SHEET 35.

SP-1, TYPE TC-81.22, DESIGN 13 WITH A 50' MAST ARM
STA. 99+72.8, 47.5' LT.

PB-1
(1)-3" CONDUIT WITH (1)-7C AND (2)-2C LEAD-IN
IN TRENCH = 26'

PB-2
(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 12'

PS-1 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON
'P4A'
STA. 99+51.5, 27.3' LT.

(1)-4" CONDUIT (725.05) WITH (2)-5C AND (2)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 62'

PROPOSED POWER SOURCE
STA. 99+30.8, 22.3' RT.

PB-3
(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 5'

PS-2 WITH (2)-PEDESTRIAN SIGNAL HEADS
AND PUSHBUTTON 'P4B'
STA. 99+42.2, 28.2' RT.
(SEE NOTE 4)

(1)-4" CONDUIT (725.05) WITH (1)-7C
ENCASED IN TRENCH IN PAVED AREA = 56'

PB-4
(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 8'

SP-2, TYPE TC-81.22, DESIGN 2 WITH A 25' MAST ARM
STA. 99+86.6, 74.9' RT.

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 7'

(1)-4" CONDUIT (725.05) WITH (1)-7C, (4)-5C AND (5)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 74'

SP-3, TYPE TC-81.22, DESIGN 2 WITH A 25' MAST ARM,
(2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P8B'
STA. 100+27.0, 38.7' LT.

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 18'

PB-5

(1)-4" CONDUIT (725.05) WITH (6)-5C, (2)-7C AND (7)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 78'

AERIAL POWER CABLE, 121'

EXISTING UTILITY POLE (TO REMAIN)
WITH PROPOSED CONDUIT RISER
STA. 100+52.6, 32.9' RT.

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH = 12'

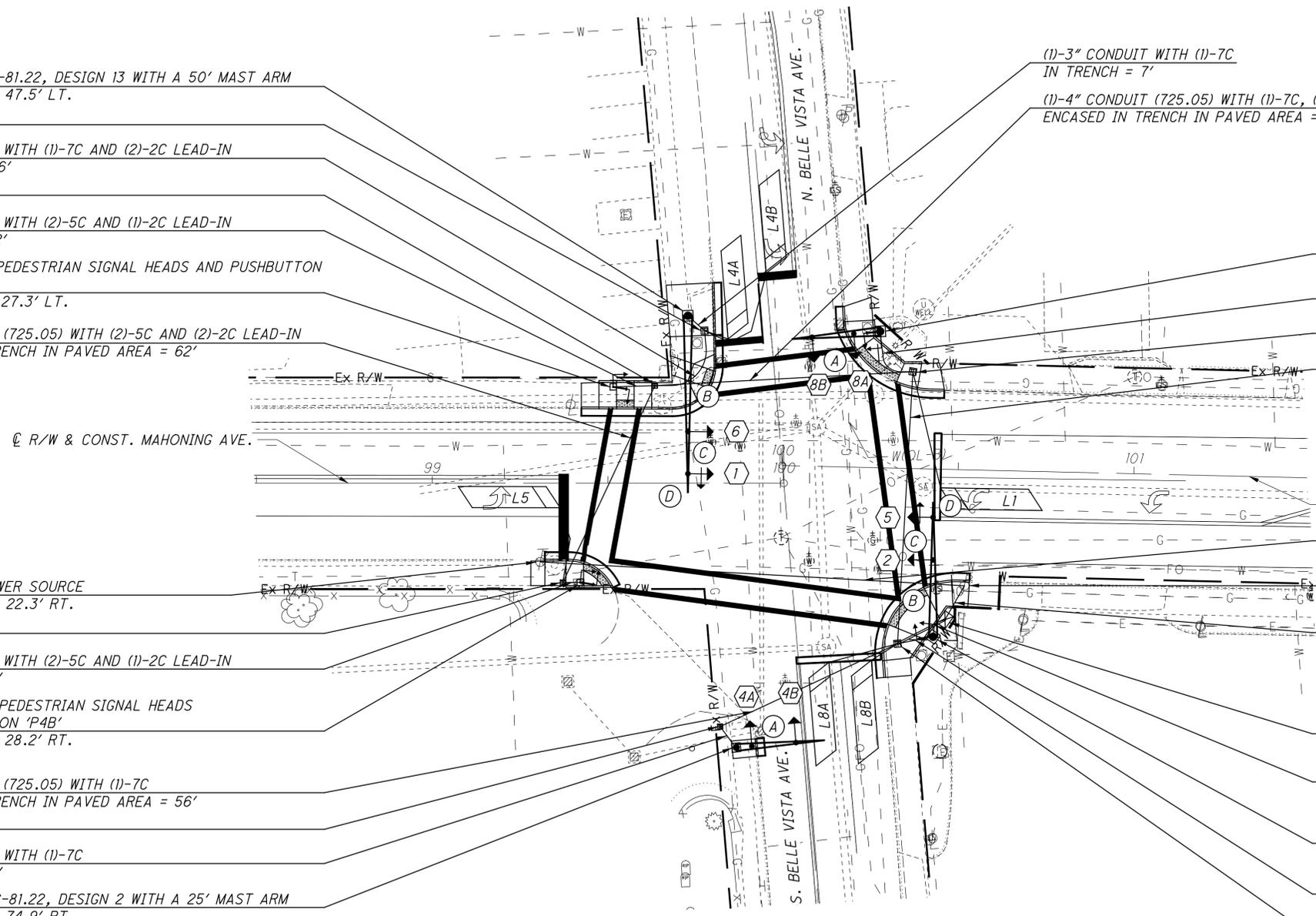
GROUND MOUNTED CABINET WITH GPS TIME CLOCK ASSEMBLY
STA. 100+47.3, 42.6' RT.

(2)-4" CONDUITS WITH (4)-7C, (8)-5C AND (10)-2C LEAD-IN
IN TRENCH = 16'

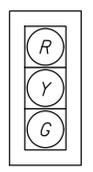
SP-4, TYPE TC-81.22, DESIGN 4 WITH A 38' MAST ARM,
(2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P8A'
STA. 100+44.1, 47.6' RT.

(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 11'

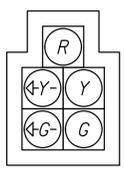
PB-6



SIGNAL TYPES



(2), (4A), (4B),
(6), (8A) & (8B)



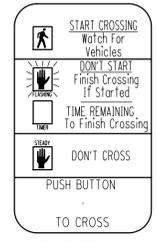
(1) & (5)



PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS



R10-3e-9

- 2 - LEFT ARROWS (PS-1, SP-4)
- 2 - RIGHT ARROWS (PS-2, SP-3)

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	99+77.5	LT	43.3'	18" X 18"
PB-2	99+63.4	LT	27.7'	24" X 24"
PB-3	99+37.2	RT	28.2'	18" X 18"
PB-4	99+82.0	RT	69.0'	18" X 18"
PB-5	100+36.6	LT	27.5'	24" X 24"
PB-6	100+34.0	RT	49.8'	24" X 24"

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

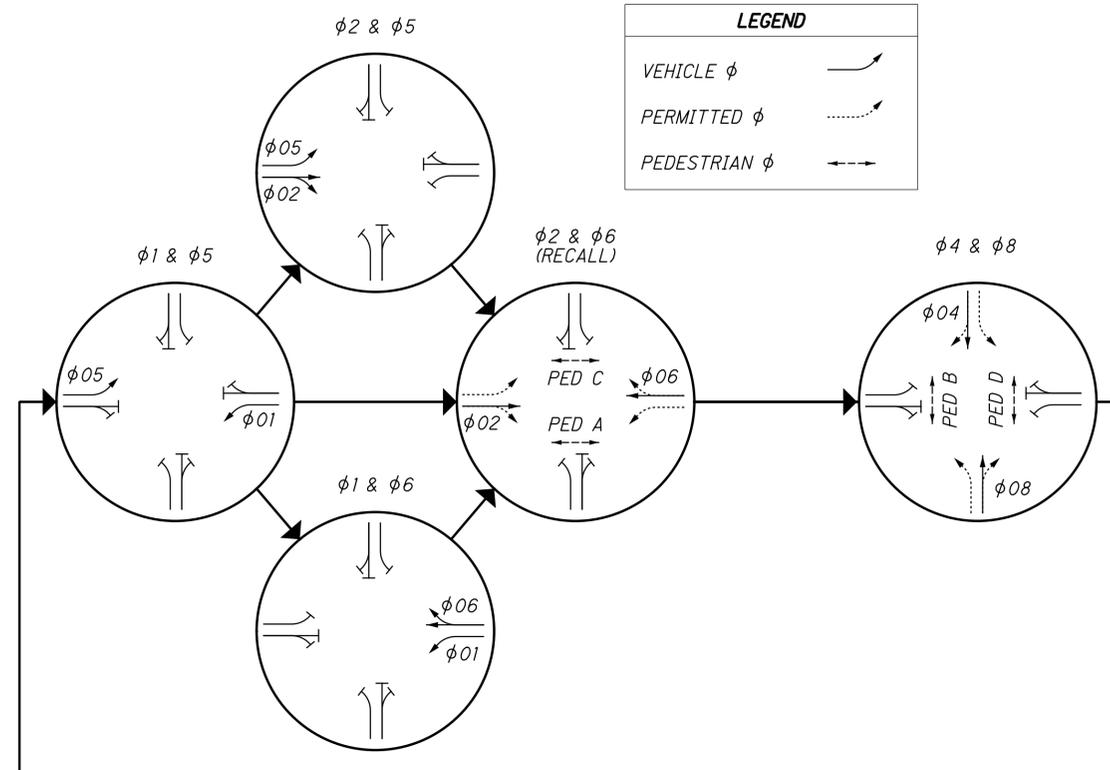
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / BELLE VISTA AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP	DUAL ENTRY:	YES	PHASES:				2,4,6,8	
	REST IN RED:		RING 1	-	RING 2	-		
	OVERLAP		A	B	C	D		
START IN:	ALL-RED FLASH							
TIME FOR: FLASH, ALL RED (SEC.):	9, 6							
FIRST PHASE(S):	φ2+φ6							
COLOR DISPLAYED:	GREEN							
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	WB LT	EB	-	SB	EB LT	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)	7	20	-	10	7	20	-	10
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	3.0	-	-	3.0	3.0	-	-	3.0
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	15	60	-	30	15	60	-	30
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	3.3	4.3	-	4.2	3.3	4.3	-	4.2
ALL RED CLEARANCE (SEC.)	2.2	1.0	-	1.0	2.2	1.0	-	1.0
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	10	-	10	-	10	-	10
PEDESTRIAN CLEARANCE (SEC.)	-	22	-	15	-	22	-	15
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

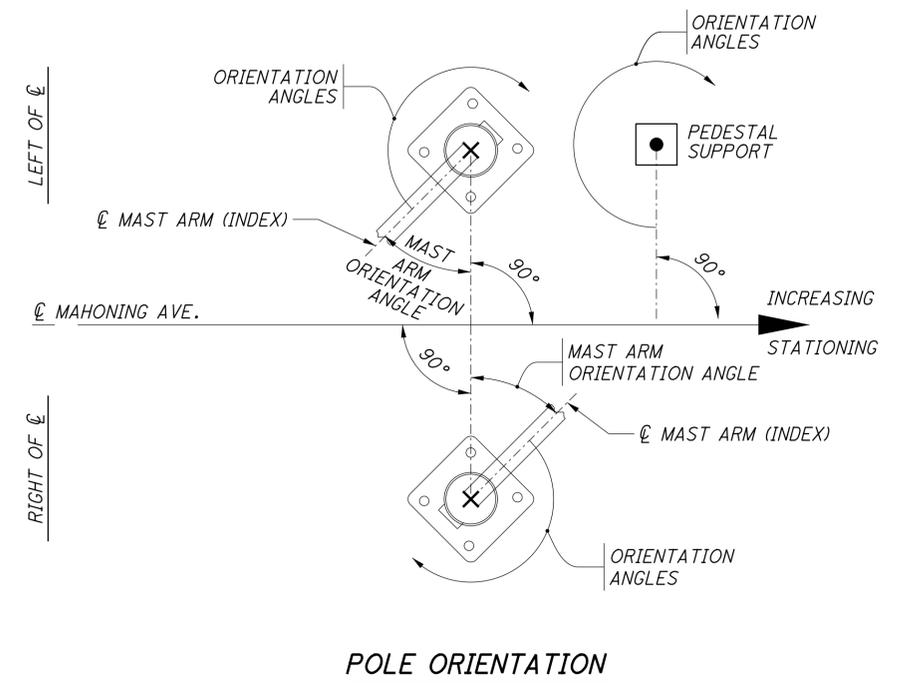
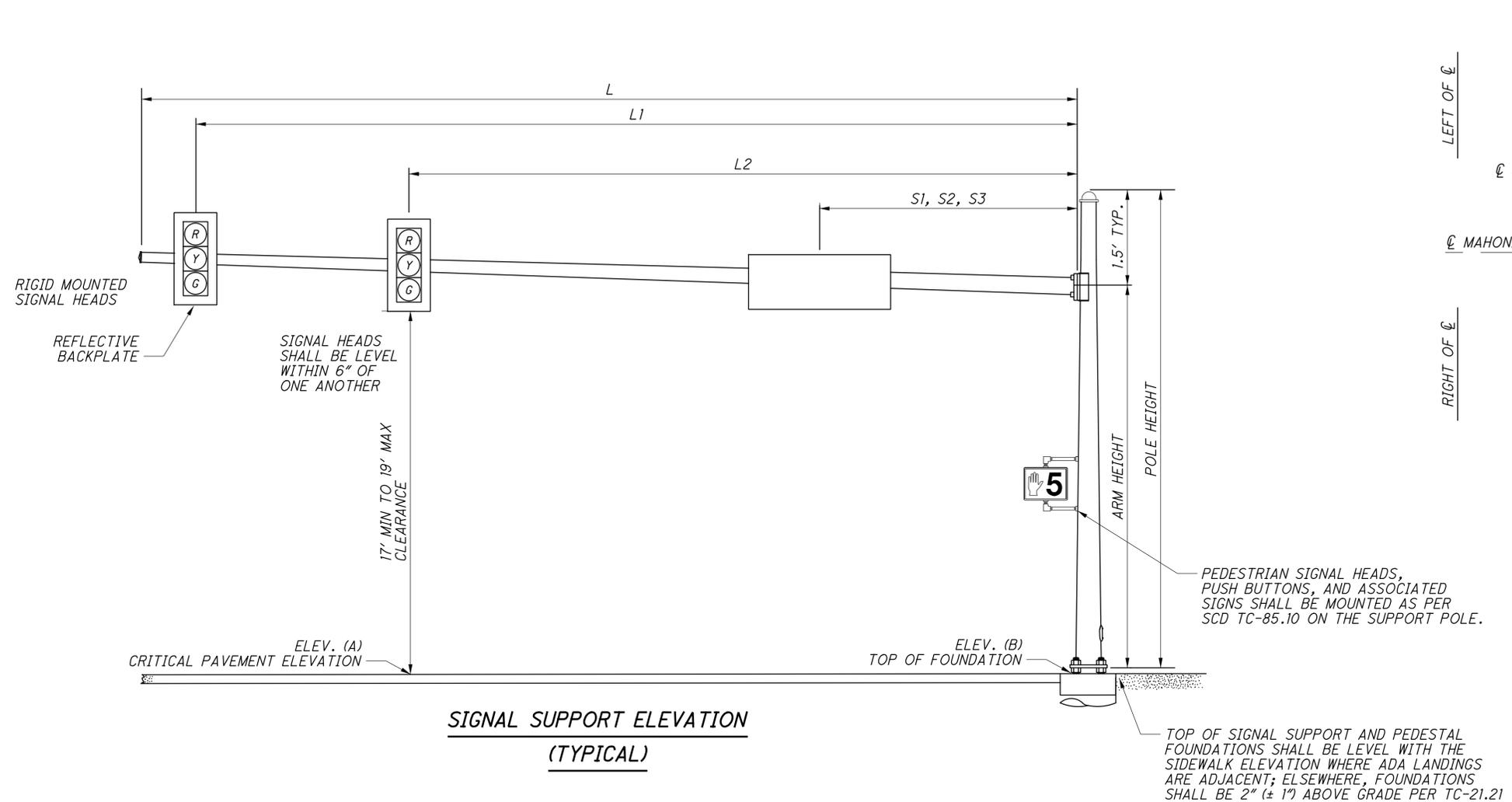
- FOR PROTECTED/PERMISSIVE PHASES, IMPLEMENT CALL OMITTS TO AVOID YELLOW BALL TRAP.
- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMITCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L1	P	25	6	3	3.0	1-1	φ1
L4A	P	25	6	10	3.0	2-1	φ4
L4B	P	25	6	3	3.0	2-2	φ4
L5	P	25	6	3	3.0	3-1	φ5
L8A	P	25	6	10	3.0	2-2	φ8
L8B	P	25	6	3	3.0	4-1	φ8

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

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**SIGNAL SUPPORT ELEVATION
(TYPICAL)**

PEDESTRIAN SIGNAL HEADS, PUSH BUTTONS, AND ASSOCIATED SIGNS SHALL BE MOUNTED AS PER SCD TC-85.10 ON THE SUPPORT POLE.

TOP OF SIGNAL SUPPORT AND PEDESTAL FOUNDATIONS SHALL BE LEVEL WITH THE SIDEWALK ELEVATION WHERE ADA LANDINGS ARE ADJACENT; ELSEWHERE, FOUNDATIONS SHALL BE 2" (\pm 1") ABOVE GRADE PER TC-21.21

MAST ARM TABLE

SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS										MAST ARM A ANGLE	ORIENTATION ANGLES FROM MAST ARM A		
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	S1	S2	S3		PEDESTRIAN SIGNAL	PEDESTRIAN PUSHBUTTON	HANDHOLE
SP-1	99+72.8	47.5' LT.	1013.59	1014.58	TC-81.22	13	21	19.5	50	45	33	47	41.5	16.5	0	-	-	180
SP-2	99+86.6	74.9' RT.	1012.41	1012.85	TC-81.22	2	22	20.5	25	17	4.5	10.5	-	-	90	-	-	90
SP-3	100+27.0	38.7' LT.	1013.42	1013.12	TC-81.22	2	22	20.5	25	19.5	7.5	13.5	-	-	90	0/270	0	180
SP-4	100+44.1	47.6' RT.	1012.06	1012.13	TC-81.22	4	22	20.5	38	34	22	35.5	30.5	11	0	0/260	260	180
PS-1	99+51.5	27.3' LT.	-	-	-	-	8	-	-	-	-	-	-	-	-	180/280	280	180
PS-2	99+42.2	28.2' RT.	-	-	-	-	8	-	-	-	-	-	-	-	-	0/100	100	270

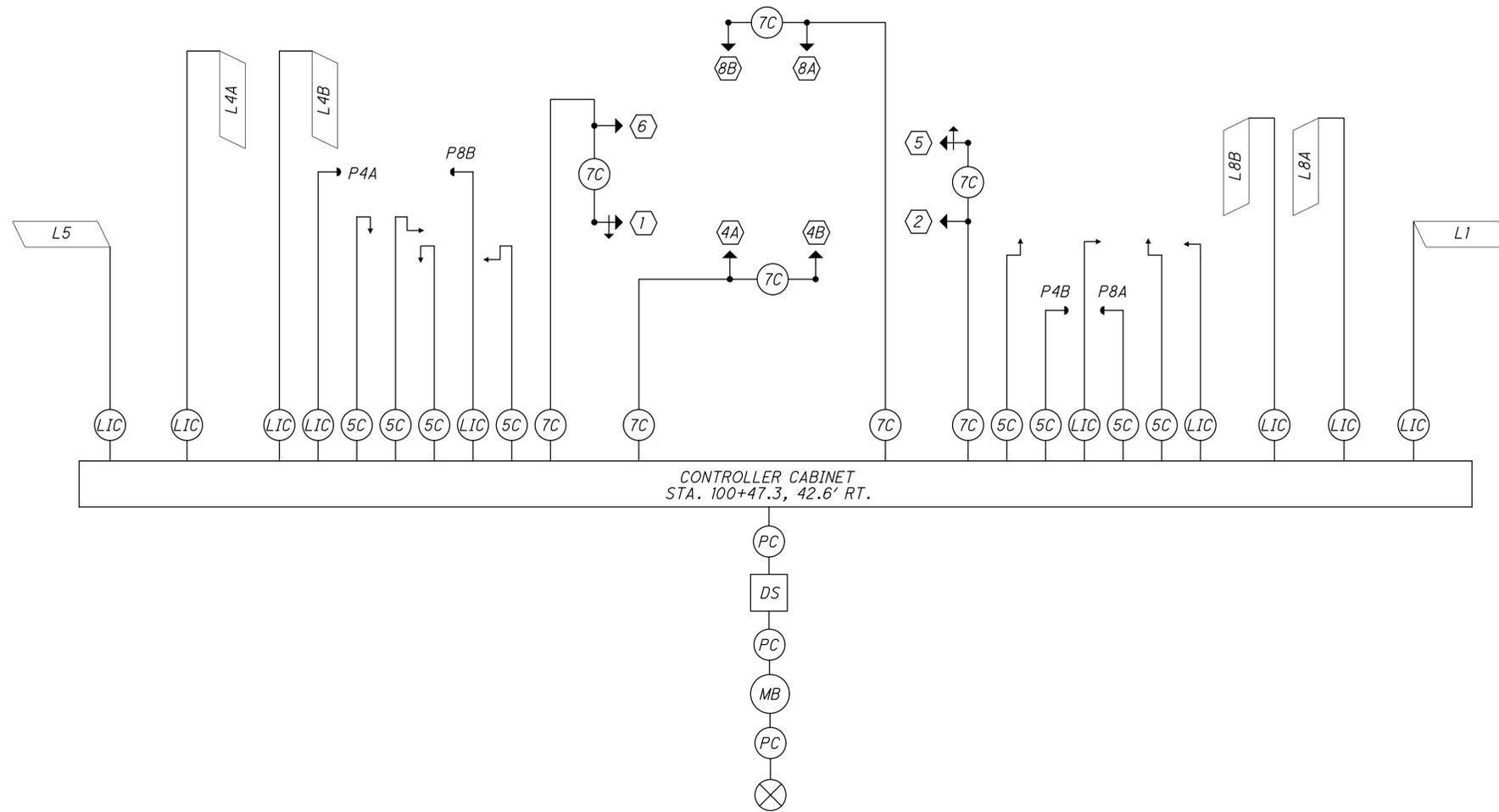
CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL DETAIL
MAHONING AVE. / BELLE VISTA AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
1 (WB LT)	R	φ6 R	R
	Y	φ6 Y	
	G	φ6 G	
	<--Y---	φ1 Y	
2 (EB)	R	φ2 R	R
	Y	φ2 Y	
	G	φ2 G	
	<--G---	φ1 G	
4A, 4B (SB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
5 (EB LT)	R	φ2 R	R
	Y	φ2 Y	
	G	φ2 G	
	<--Y---	φ5 Y	
6 (WB)	R	φ6 R	R
	Y	φ6 Y	
	G	φ6 G	
	<--G---	φ5 G	
8A, 8B (NB)	R	φ8 R	R
	Y	φ8 Y	
	G	φ8 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ4 PED / LS 10 G	OUT
	DW	φ4 PED / LS 10 R	
PED C	W	φ6 PED / LS 11 G	OUT
	DW	φ6 PED / LS 11 R	
PED D	W	φ8 PED / LS 12 G	OUT
	DW	φ8 PED / LS 12 R	
LS = LOAD SWITCH			

CALCULATED
JAK
CHECKED
KMG

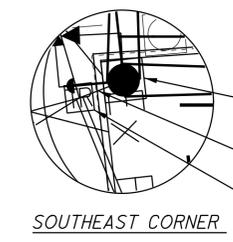
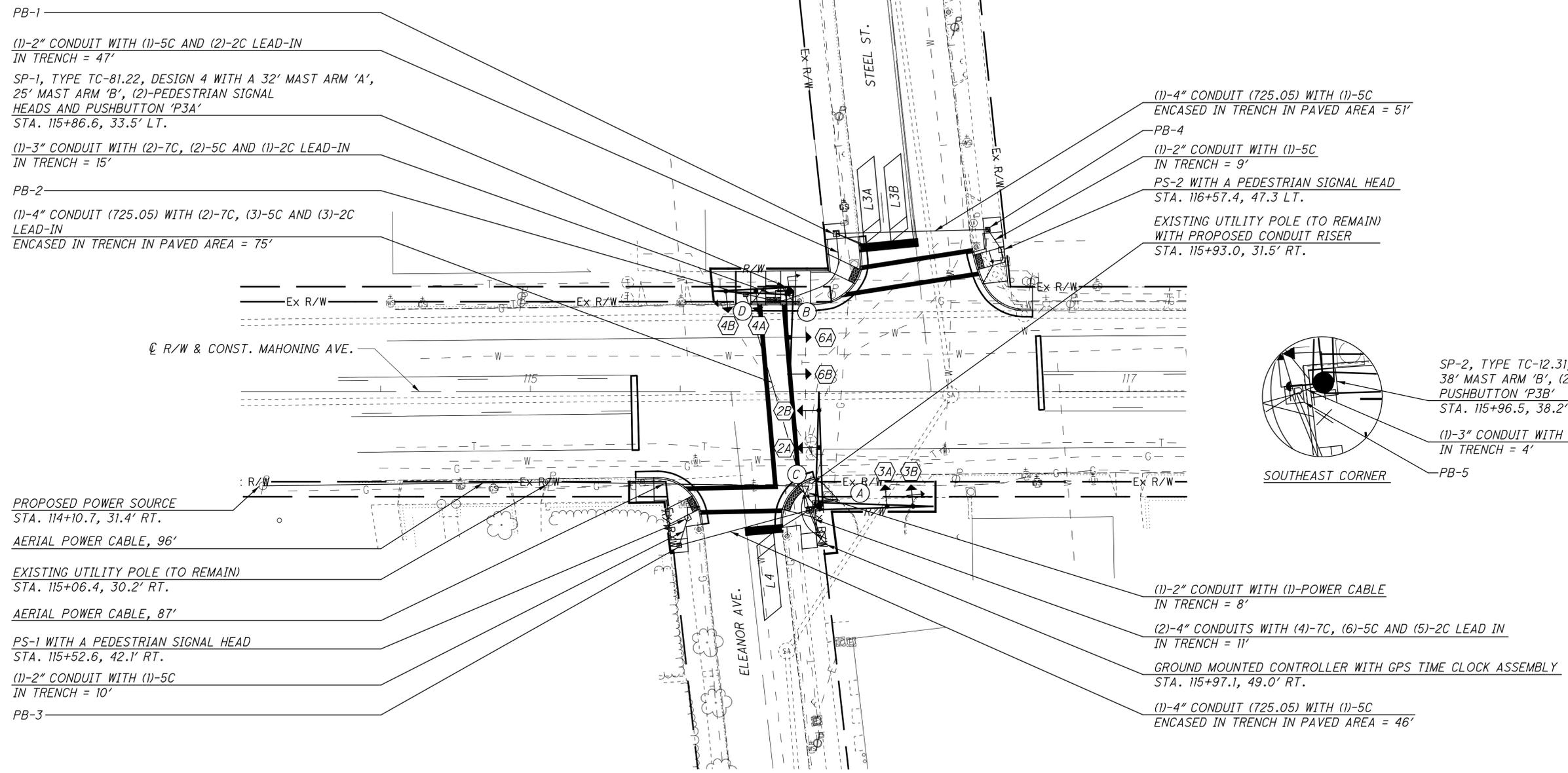
**TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / BELLE VISTA AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

64
86

FOR TRAFFIC SIGNAL WIRING LEGEND, SEE SHEET 48.

- NOTES:
1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
 2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
 3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
 4. FOR REFERENCE TO SIGNS (A), (B), (C) & (D), SEE SHEET 36.



SIGNAL TYPES

(2A), (2B), (3A),
 (6A), (6B) & (4A)

(3B) & (4B)

PEDESTRIAN HEADS
 (LED, COUNTDOWN,
 TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS

R10-3e-9
 1 - LEFT ARROW (SP-2)
 1 - RIGHT ARROW (SP-1)

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
6	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET		X
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	116+02.2	LT	52.7'	24" X 24"
PB-2	115+72.0	LT	32.4'	18" X 18"
PB-3	155+49.8	RT	51.2'	18" X 18"
PB-4	116+52.9	LT	54.0'	18" X 18"
PB-5	115+93.2	RT	39.5'	24" X 24"

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SIGNAL TIMING CHART

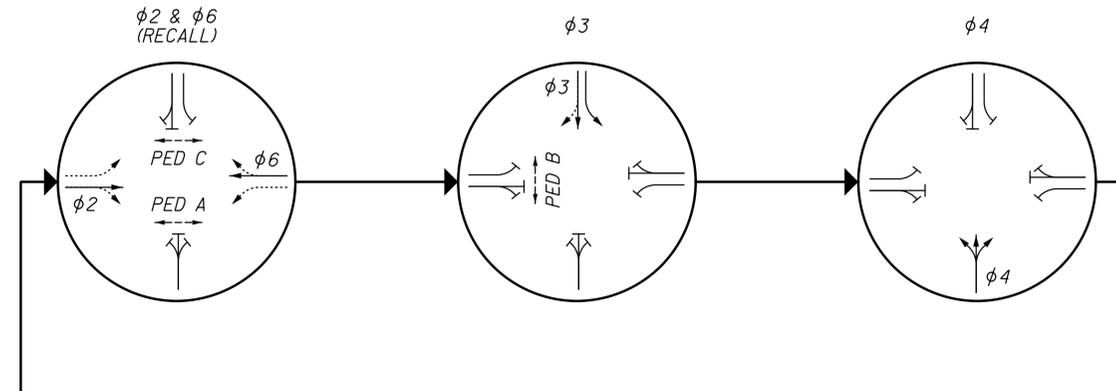
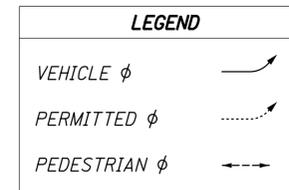
INTERSECTION: MAHONING AVE. / STEEL ST. / ELEANOR AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP START IN: ALL-RED FLASH TIME FOR: FLASH, ALL RED (SEC.): 9, 6 FIRST PHASE(S): $\phi 2 + \phi 6$ COLOR DISPLAYED: GREEN	DUAL ENTRY:	YES	PHASES: 2,6					
	REST IN RED:		RING 1	-	RING 2	-		
	OVERLAP		A	B	C	D		
	PHASES		-	-	-	-		
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	-	EB	SB	NB	-	WB	-	-
MINIMUM GREEN (INITIAL) (SEC.)	-	20	10	10	-	20	-	-
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	-	-	3.0	3.0	-	-	-	-
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	-	60	30	30	-	60	-	-
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	-	4.4	4.1	4.3	-	4.4	-	-
ALL RED CLEARANCE (SEC.)	-	1.0	1.0	1.0	-	1.0	-	-
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	7	10	-	-	7	-	-
PEDESTRIAN CLEARANCE (SEC.)	-	9	16	-	-	9	-	-
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

NOTES:

- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

PHASING DIAGRAM

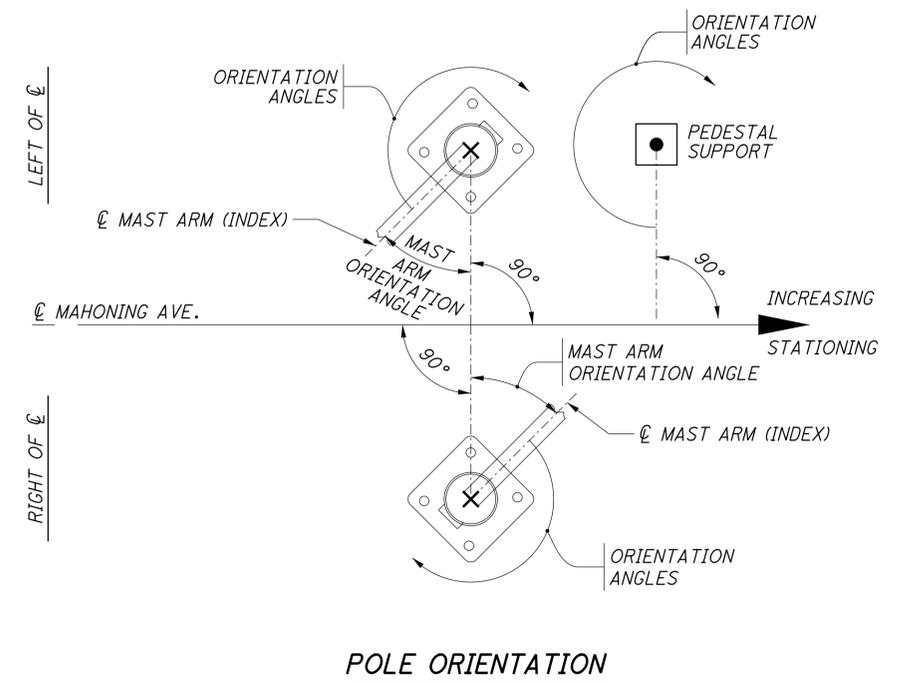
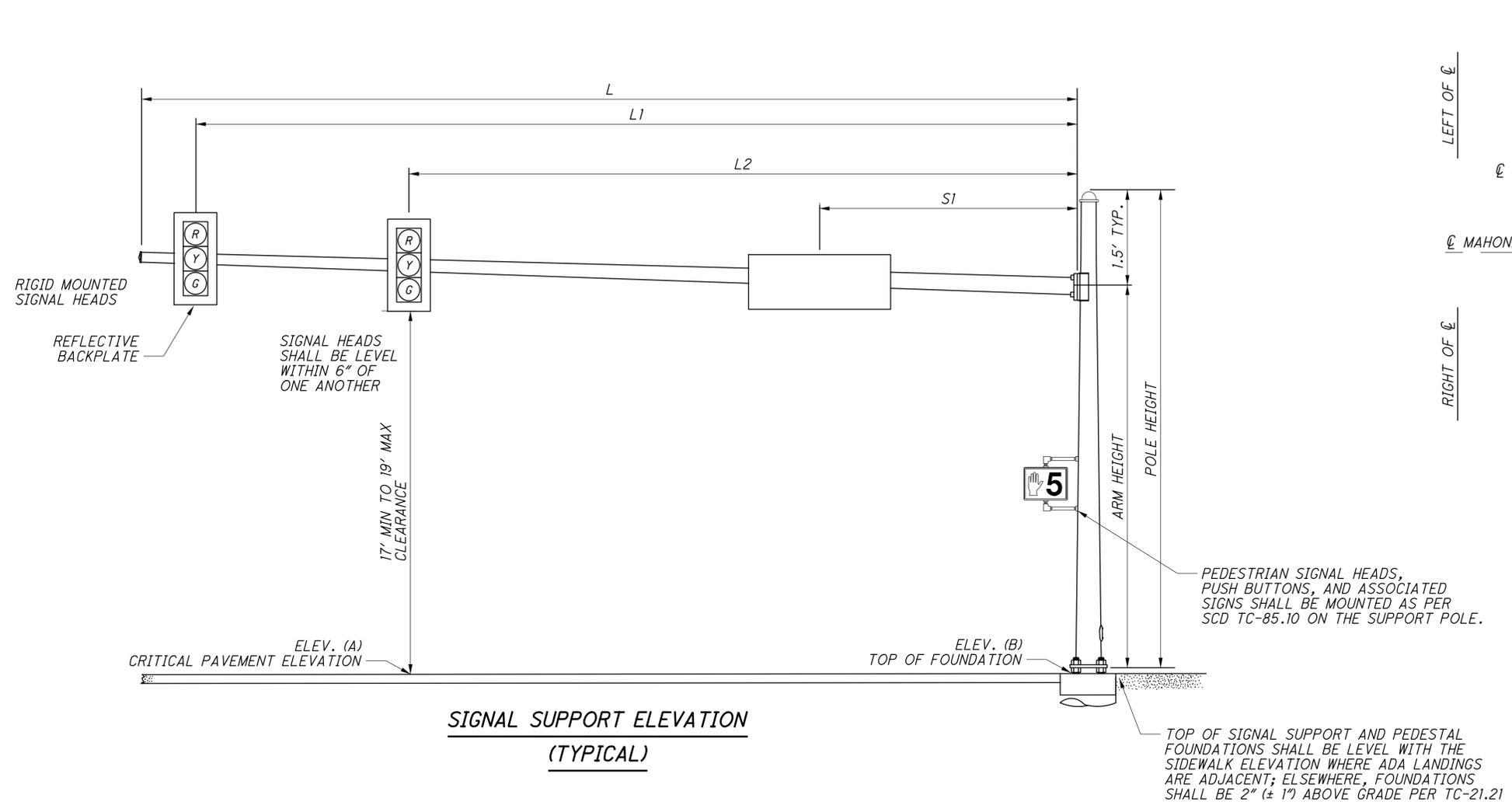


TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L3A	P	25	6	10	3.0	1-1	$\phi 3$
L3B	P	25	6	3	3.0	1-2	$\phi 3$
L4	P	25	6	10	3.0	2-1	$\phi 4$

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

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**SIGNAL SUPPORT ELEVATION
(TYPICAL)**

PEDESTRIAN SIGNAL HEADS, PUSH BUTTONS, AND ASSOCIATED SIGNS SHALL BE MOUNTED AS PER SCD TC-85.10 ON THE SUPPORT POLE.

TOP OF SIGNAL SUPPORT AND PEDESTAL FOUNDATIONS SHALL BE LEVEL WITH THE SIDEWALK ELEVATION WHERE ADA LANDINGS ARE ADJACENT; ELSEWHERE, FOUNDATIONS SHALL BE 2" (\pm 1") ABOVE GRADE PER TC-21.21

MAST ARM TABLE

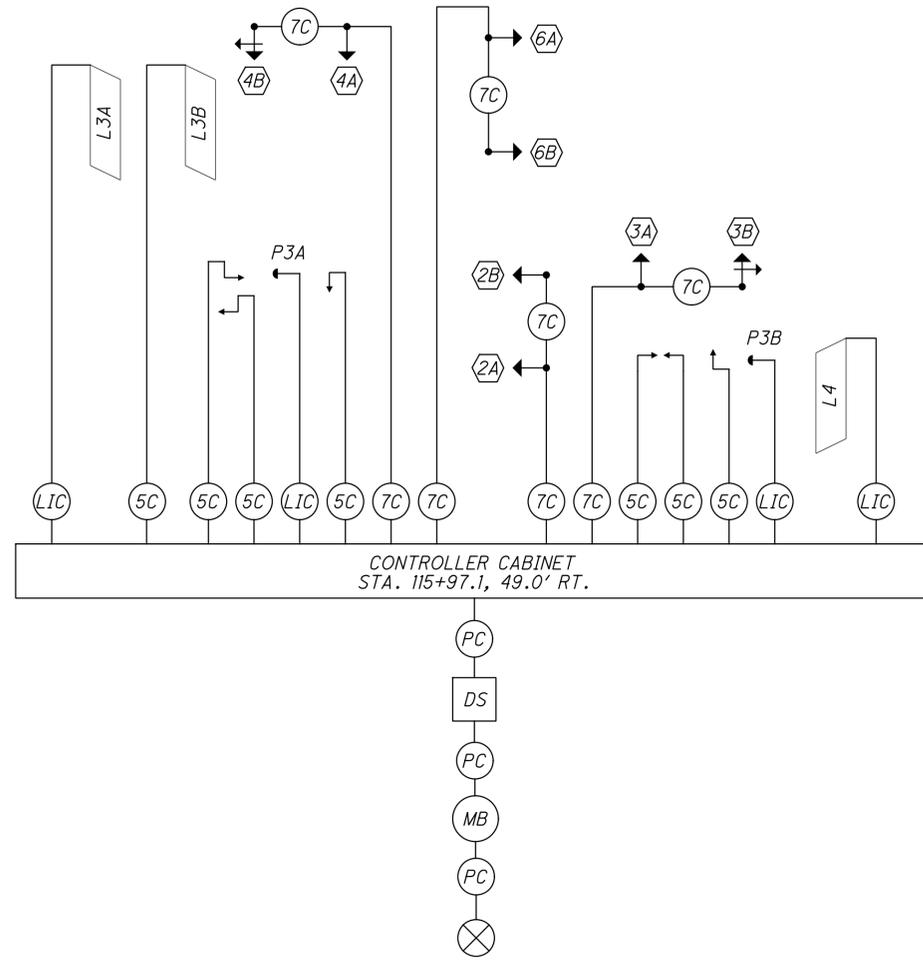
SUPPORT NO.	ARM	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS								MAST ARM A ANGLE DEG	ORIENTATION ANGLES FROM MAST ARM A			
				A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT FT	ARM HEIGHT FT	L FT	L1 FT	L2 FT	S1 FT		MAST ARM B ANGLE DEG	PEDESTRIAN SIGNAL DEG	PEDESTRIAN PUSHBUTTON DEG	HANDHOLE DEG
SP-1	A	115+86.6	33.5' LT.	939.65	939.56	TC-81.22	4	22	20.5	32	27.5	15.5	7.5	0	-	90/170	90	180
-	B	-	-	939.94	-	-	-	-	20.5	25	21.5	11	16.5	-	90	-	-	-
SP-2	A	115+96.5	38.2' RT.	939.49	939.70	TC-12.31	6	22	20.5	38	32	19.5	10	0	-	0/270	270	180
-	B	-	-	939.74	-	-	-	-	20.5	38	31.5	23	11.5	-	90	-	-	-
PS-1	-	115+52.6	42.1' RT.	-	-	-	-	8	-	-	-	-	-	-	-	0	-	180
PS-2	-	116+57.4	47.3' LT.	-	-	-	-	8	-	-	-	-	-	-	-	0	-	180

CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL DETAIL
MAHONING AVE. / STEEL ST. / ELEANOR AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
3A (NB)	R	φ3 R	R
	Y	φ3 Y	
	G	φ3 G	
3B (NB LT)	R	φ3 R	R
	Y	φ3 Y	
	G	φ3 G	
	<--G---	φ3 G	
4A (SB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
4B (SB LT)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
	<--G---	φ4 G	
6A, 6B (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ3 PED / LS 10 G	OUT
	DW	φ3 PED / LS 10 R	
PED C	W	φ6 PED / LS 11 G	OUT
	DW	φ6 PED / LS 11 R	
LS = LOAD SWITCH			

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CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / STEEL ST. / ELEANOR AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE



CALCULATED JAK CHECKED KMG

TRAFFIC SIGNAL PLAN
MAHONING AVE. / GLENWOOD AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. THE PROPOSED POWER SOURCE IS THE EXISTING UTILITY POLE LOCATED AT STA. 504+67.8, 54.0' LT. THE CONTRACTOR SHALL AERIALY ATTACH THE POWER CABLE TO THE EXISTING UTILITY POLES ALONG THE ROADWAY TO THE POLE LOCATED AT STA. 501+33.6, 38.8' LT.
5. FOR REFERENCE TO SIGNS (A), (B), (C), (D) & (E), SEE SHEET 37.

(1)-2" CONDUIT WITH (1)-7C
IN TRENCH = 59'
IN TRENCH IN PAVED AREA = 7'
(TOTAL CONDUIT LENGTH = 66')

SP-1, TYPE TC-81.22, DESIGN 2 WITH A 32' MAST ARM
STA. 500+96.0, 32.3' LT.

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 7'

PB-1

EXISTING UTILITY POLE
WITH PROPOSED CONDUIT RISER
STA. 501+33.6, 38.8' LT.
(SEE NOTE 4)

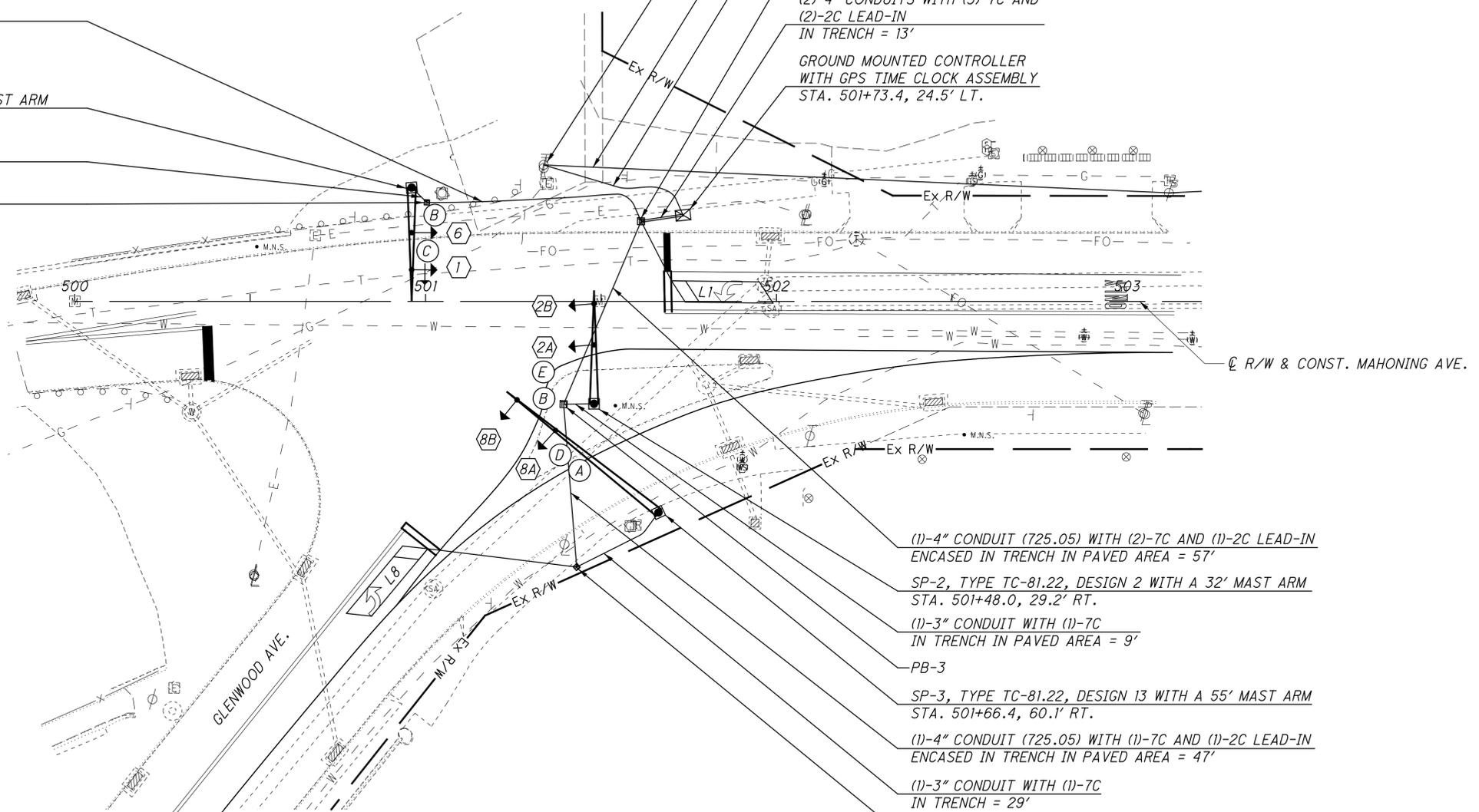
AERIAL POWER CABLE, 366'
(SEE NOTE 4)

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH = 38'
IN TRENCH IN PAVED AREA = 7'
(TOTAL CONDUIT LENGTH = 45')

PB-2

(2)-4" CONDUITS WITH (3)-7C AND
(2)-2C LEAD-IN
IN TRENCH = 13'

GROUND MOUNTED CONTROLLER
WITH GPS TIME CLOCK ASSEMBLY
STA. 501+73.4, 24.5' LT.



(1)-4" CONDUIT (725.05) WITH (2)-7C AND (1)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 57'

SP-2, TYPE TC-81.22, DESIGN 2 WITH A 32' MAST ARM
STA. 501+48.0, 29.2' RT.

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH IN PAVED AREA = 9'

PB-3

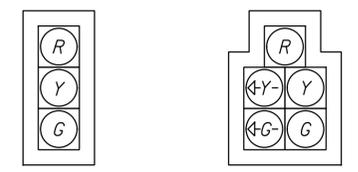
SP-3, TYPE TC-81.22, DESIGN 13 WITH A 55' MAST ARM
STA. 501+66.4, 60.1' RT.

(1)-4" CONDUIT (725.05) WITH (1)-7C AND (1)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 47'

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 29'

PB-4

SIGNAL TYPES



1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
6	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET		X
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	501+00.4	LT	28.1'	18" X 18"
PB-2	501+61.4	LT	22.7'	24" X 24"
PB-3	501+39.3	RT	29.3	24" X 24"
PB-4	501+43.1	RT	75.6'	18" X 18"

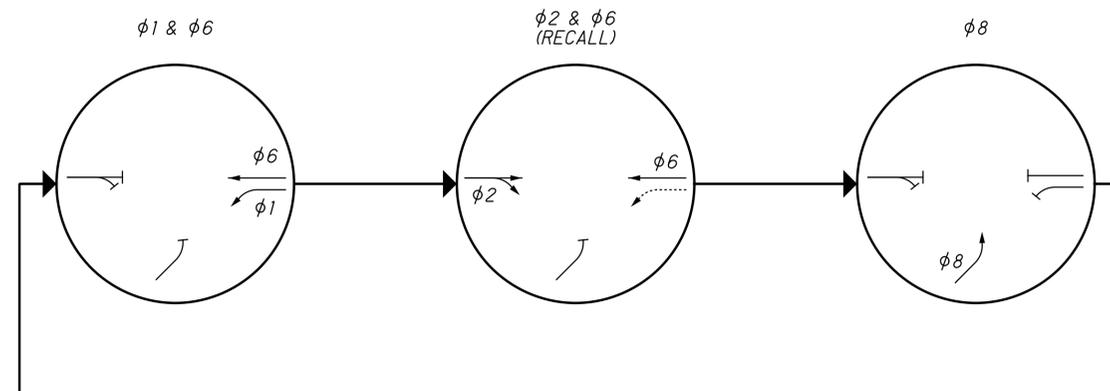
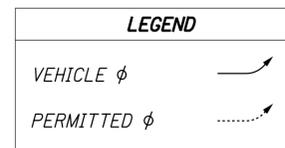
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / GLENWOOD AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN									
START UP		DUAL ENTRY: YES		PHASES: 2, 6					
START IN: ALL-RED FLASH		REST IN RED:		RING 1		RING 2			
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		OVERLAP		A	B	C	D		
FIRST PHASE(S): $\phi 2 + \phi 6$		PHASES		-	-	-	-		
COLOR DISPLAYED: GREEN									
INTERVAL OR FEATURE		CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)		1	2	3	4	5	6	7	8
DIRECTION		WB LT	EB	-	-	-	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)		7	20	-	-	-	20	-	10
ADDED INITIAL *(SEC./ACTUATION)		-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)		-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)		3.0	-	-	-	-	-	-	3.0
TIME BEFORE REDUCTION *(SEC.)		-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)		-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)		-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)		15	60	-	-	-	60	-	30
MAXIMUM GREEN II (SEC.)		-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)		3.1	4.4	-	-	-	4.4	-	5.3
ALL RED CLEARANCE (SEC.)		1.2	1.0	-	-	-	1.0	-	1.0
DELAYED GREEN (LPI) # (SEC.)		-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY* (SEC.)		-	-	-	-	-	-	-	-
WALK (SEC.)		-	-	-	-	-	-	-	-
PEDESTRIAN CLEARANCE (SEC.)		-	-	-	-	-	-	-	-
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	-	-	-	-	-	-	-
MEMORY (ON/OFF)		-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



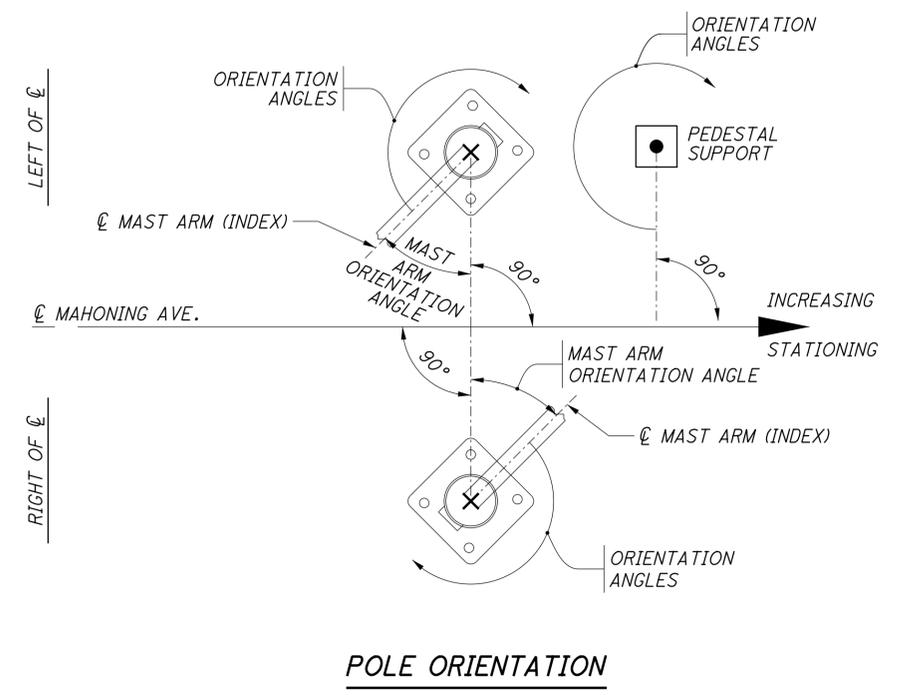
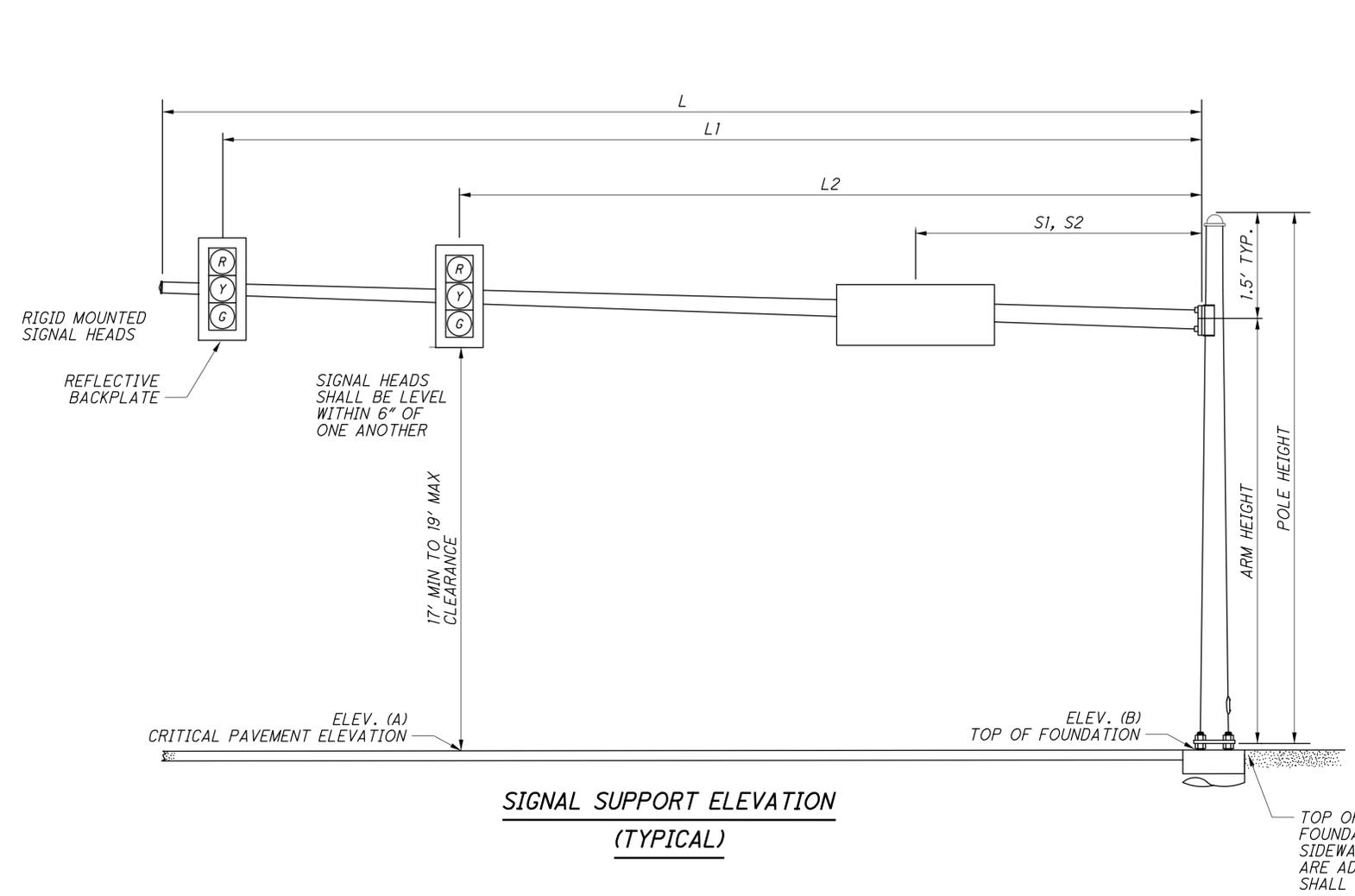
NOTES:

- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTOR CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L1	P	25	6	3	3.0	1-1	$\phi 1$
L8	P	25	6	3	3.0	1-2	$\phi 8$

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10



**SIGNAL SUPPORT ELEVATION
(TYPICAL)**

TOP OF SIGNAL SUPPORT AND PEDESTAL FOUNDATIONS SHALL BE LEVEL WITH THE SIDEWALK ELEVATION WHERE ADA LANDINGS ARE ADJACENT; ELSEWHERE, FOUNDATIONS SHALL BE 2" (\pm 1") ABOVE GRADE PER TC-21.21

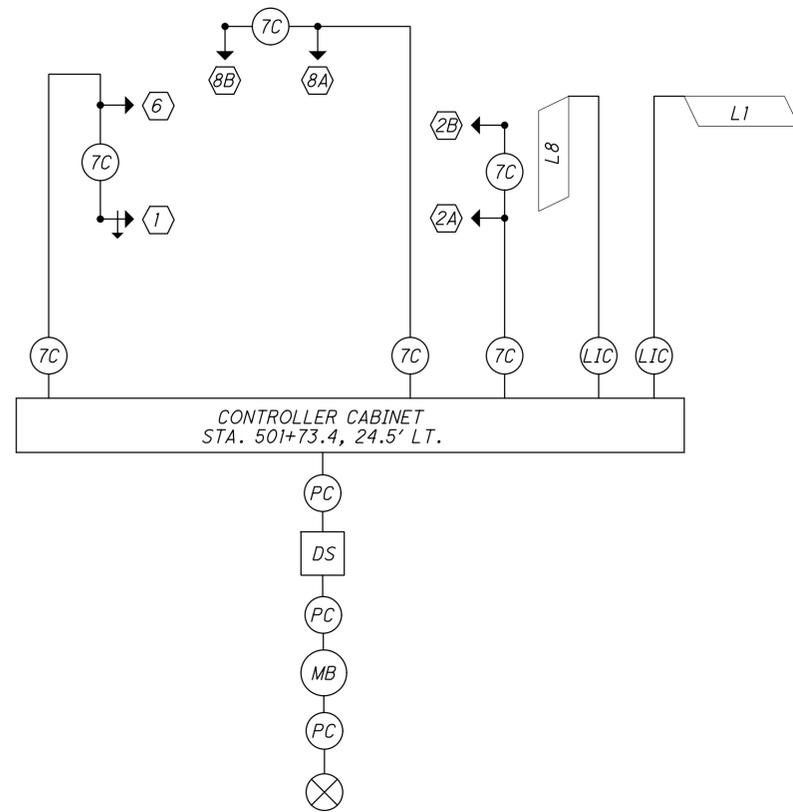
MAST ARM TABLE

SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS										MAST ARM A ANGLE DEG	ORIENTATION ANGLES FROM MAST ARM A	
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT FT	ARM HEIGHT FT	L FT	L1 FT	L2 FT	S1 FT	S2 FT	HANDHOLE DEG			
SP-1	500+96.0	32.3' LT.	873.96	873.47	TC-81.22	2	22	20.5	32	23.5	13	18.5	6	0	180		
SP-2	501+48.0	29.2' RT.	872.49	872.54	TC-81.22	2	22	20.5	32	28.5	17	14	7	0	180		
SP-3	501+66.4	60.1' RT.	872.70	871.91	TC-81.22	13	22	20.5	55	51.5	37.5	34.5	18	310	180		

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
1 (WB LT)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
	<--Y---	φ1 Y	
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
6 (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
8A, 8B (NB)	R	φ8 R	R
	Y	φ8 Y	
	G	φ8 G	

LS = LOAD SWITCH

CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL DETAIL
MAHONING AVE. / GLENWOOD AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

72
86

AERIAL POWER CABLE, 98'

PROPOSED POWER SOURCE
STA. 509+94.3, 27.4' LT.

SP-1, TYPE TC-81.22, DESIGN 4 WITH A 38' MAST ARM
STA. 509+72.9, 33.3' LT.

(1)-3" CONDUIT WITH (1)-7C
IN TRENCH = 4'

PB-1

(1)-4" CONDUIT (725.05) WITH (1)-7C
ENCASED IN TRENCH IN PAVED AREA = 67'

PB-3

(1)-3" CONDUIT WITH (1)-7C, (1)-5C, (1)-2C LEAD-IN AND (1)-RADAR
IN TRENCH = 6'

SP-3, TYPE TC-81.22, DESIGN 4 WITH A 38' MAST ARM,
PEDESTRIAN SIGNAL HEAD, PUSHBUTTON 'P8B' AND
RADAR DETECTOR

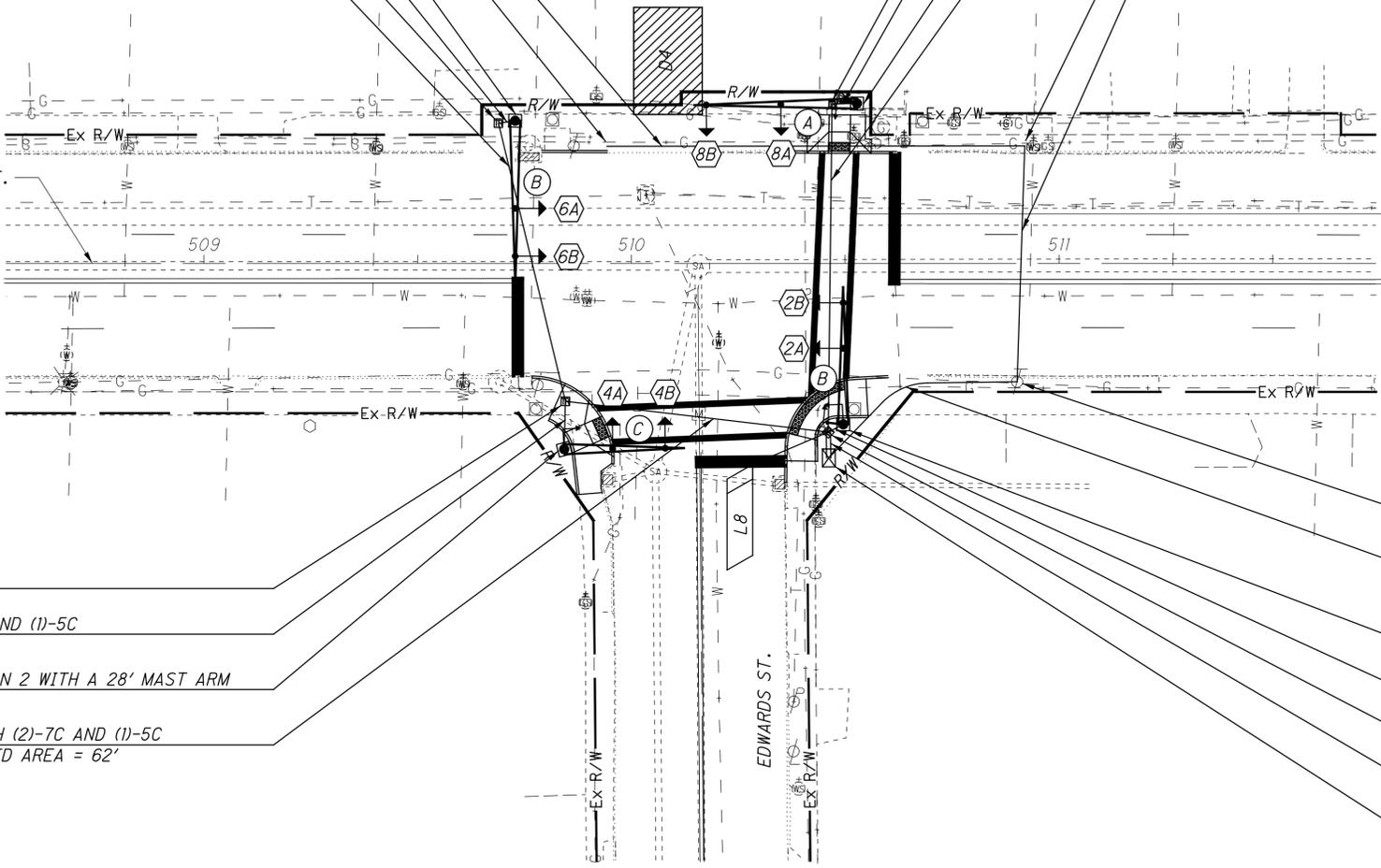
STA. 510+52.9, 37.3' LT.

(1)-4" CONDUIT (725.05) WITH (1)-7C, (1)-5C, (1)-2C LEAD-IN AND (1)-RADAR
ENCASED IN TRENCH IN PAVED AREA = 77'

EXISTING UTILITY POLE (TO REMAIN)
STA. 510+92.1, 27.4' LT.

AERIAL POWER CABLE, 56'

☐ R/W & CONST. MAHONING AVE.



NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC TO THE SIGNAL LEGEND, SEE SHEET 45.
4. FOR REFERENCE TO SIGNS (A), (B) & (C), SEE SHEET 38.

PB-2

(1)-3" CONDUIT WITH (1)-7C AND (1)-5C
IN TRENCH = 12'

SP-2, TYPE TC-81.22, DESIGN 2 WITH A 28' MAST ARM
STA. 509+84.4, 43.4' RT.

(1)-4" CONDUIT (725.05) WITH (2)-7C AND (1)-5C
ENCASED IN TRENCH IN PAVED AREA = 62'

EXISTING UTILITY POLE (TO REMAIN)
WITH PROPOSED CONDUIT RISER
STA. 510+90.3, 27.7' RT.

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH IN PAVED AREA = 51'

SP-4, TYPE TC-81.22, DESIGN 2 WITH A 32' MAST ARM,
(2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P8A'
STA. 510+49.6, 37.6' RT.

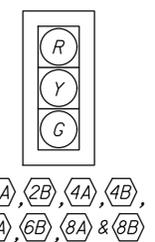
(1)-3" CONDUIT WITH (1)-7C, (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 4'

PB-4

(2)-4" CONDUITS WITH (4)-7C, (4)-5C, (3)-2C LEAD-IN AND (1)-RADAR
IN TRENCH = 7'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY
STA. 510+46.3, 45.5' RT.

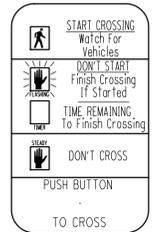
SIGNAL TYPES



PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS



- R10-3e-9
- 1 - LEFT ARROW (SP-4)
 - 1 - RIGHT ARROW (PS-1)

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	509+69.0	LT	32.7'	24" X 24"
PB-2	509+84.6	RT	32.2'	24" X 24"
PB-3	510+47.0	LT	37.2'	18" X 18"
PB-4	510+46.1	RT	39.4'	24" X 24"

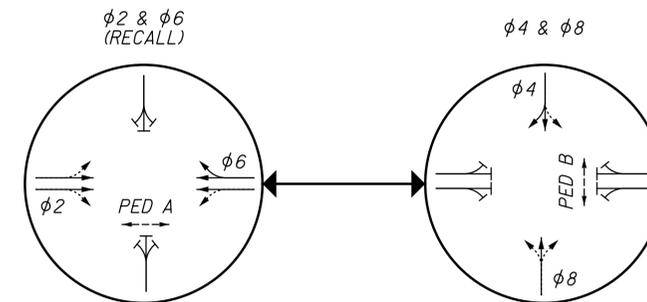
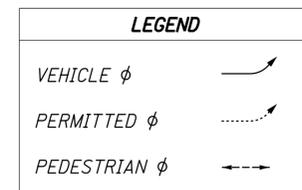
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / EDWARDS ST. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP		DUAL ENTRY: YES	PHASES: 2, 4, 6, 8					
START IN: ALL-RED FLASH		REST IN RED: RING 1 - RING 2 -	OVERLAP					
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		PHASES		A	B	C	D	
FIRST PHASE(S): $\phi 2 + \phi 6$		PHASES		-	-	-	-	
COLOR DISPLAYED: GREEN		PHASES		-	-	-	-	
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	-	EB	-	SB	-	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)	-	20	-	10	-	20	-	10
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	-	-	-	3.0	-	-	-	3.0
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	-	60	-	30	-	60	-	30
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	-	4.1	-	3.5	-	4.1	-	3.5
ALL RED CLEARANCE (SEC.)	-	1.0	-	1.0	-	1.0	-	1.0
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	8	-	10	-	-	-	-
PEDESTRIAN CLEARANCE (SEC.)	-	11	-	14	-	-	-	-
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	-	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMUTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTION CHART

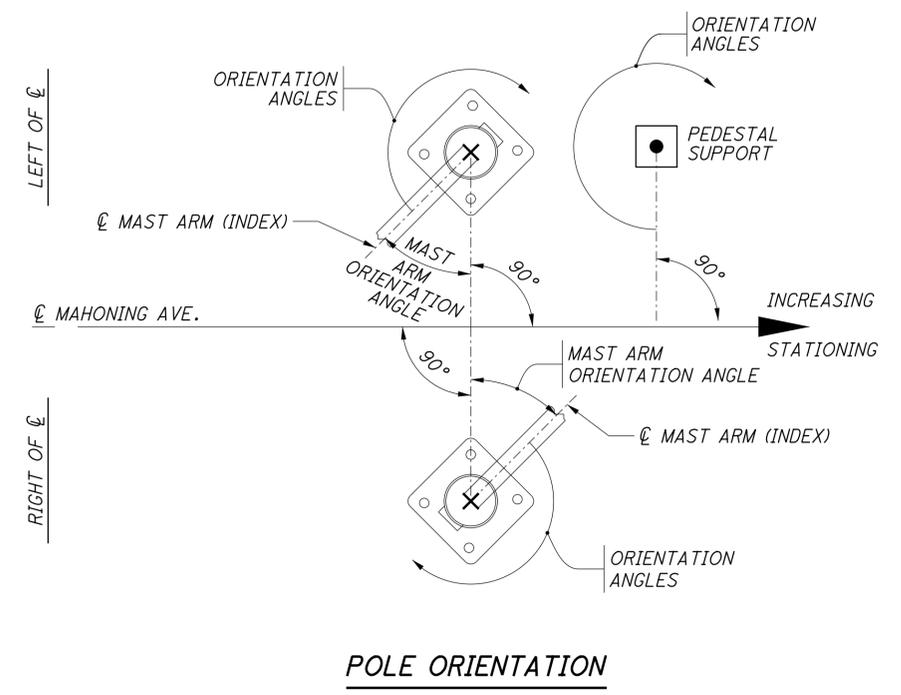
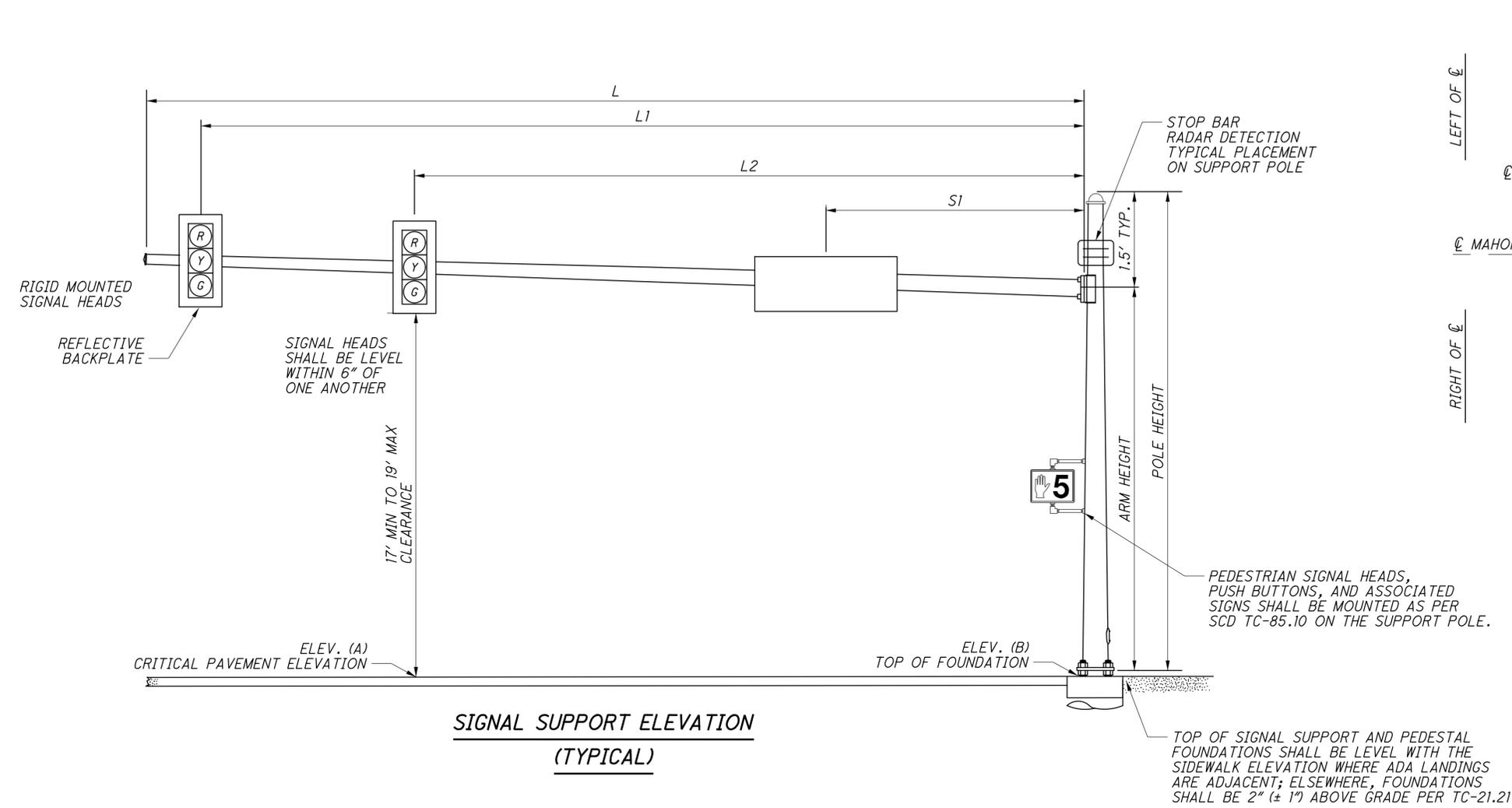
LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L8	P	25	6	10	3.0	1-1	$\phi 8$

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

RADAR DETECTION CHART

DETECTION ZONE	MOVEMENT	WIDTH (FT)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	DELAY INHIBIT PHASE	PURPOSE	DETECTION ZONE LENGTH (FT)
D4	SB	16	10	3.0	$\phi 4$	STOP LINE	25

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**SIGNAL SUPPORT ELEVATION
(TYPICAL)**

PEDESTRIAN SIGNAL HEADS, PUSH BUTTONS, AND ASSOCIATED SIGNS SHALL BE MOUNTED AS PER SCD TC-85.10 ON THE SUPPORT POLE.

TOP OF SIGNAL SUPPORT AND PEDESTAL FOUNDATIONS SHALL BE LEVEL WITH THE SIDEWALK ELEVATION WHERE ADA LANDINGS ARE ADJACENT; ELSEWHERE, FOUNDATIONS SHALL BE 2" (± 1") ABOVE GRADE PER TC-21.21

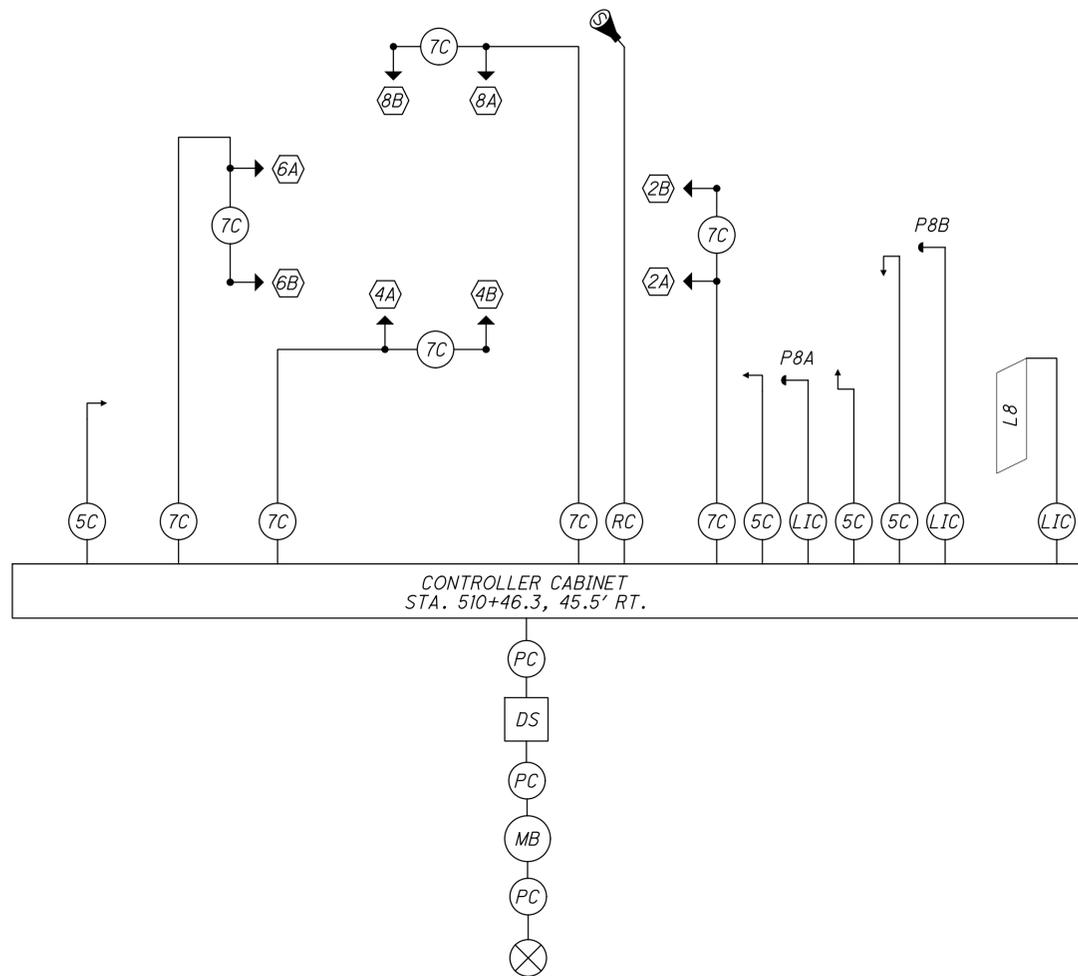
MAST ARM TABLE

SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS								MAST ARM A ANGLE	ORIENTATION ANGLES FROM MAST ARM A		
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	S1		PEDESTRIAN SIGNAL	PEDESTRIAN PUSHBUTTON	HANDHOLE
SP-1	509+72.9	33.3' LT.	867.18	867.14	TC-81.22	4	22	20.5	38	31.5	20.5	10	0	-	-	180
SP-2	509+84.4	43.4' RT.	866.80	867.34	TC-81.22	2	21	19.5	28	23.5	11.5	17.5	90	270	-	180
SP-3	510+52.9	37.3' LT.	866.96	866.60	TC-81.22	4	22	20.5	38	35	17.5	8.5	90	5	5	90
SP-4	510+49.6	37.6' RT.	866.49	866.51	TC-81.22	2	22	20.5	32	28.5	18	9	0	0/275	275	180

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
4A, 4B (SB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
6A, 6B (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
8A, 8B (NB)	R	φ8 R	R
	Y	φ8 Y	
	G	φ8 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ8 PED / LS 10 G	OUT
	DW	φ8 PED / LS 10 R	
LS = LOAD SWITCH			

CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / EDWARDS ST.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

76
86



0 20 40
HORIZONTAL
SCALE IN FEET

CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL PLAN
MAHONING AVE. / WEST AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

77
86

PB-1
(1)-2" CONDUIT WITH (1)-5C AND (1)-2C LEAD-IN
IN TRENCH = 23'
IN TRENCH IN PAVED AREA = 18'
(TOTAL CONDUIT LENGTH = 41')

SP-1, TYPE TC-12.31, DESIGN 6 WITH A 48' MAST ARM 'A' AND
32' MAST ARM 'B' AND PEDESTRIAN SIGNAL HEAD
STA. 519+79.1, 42.2' LT.
(SEE NOTE 5)

(1)-3" CONDUIT WITH (2)-7C AND (1)-5C
IN TRENCH = 30'

EXISTING UTILITY POLE (TO REMAIN)
STA. 519+76.7, 29.8' LT.

PB-2
(1)-2" CONDUIT WITH (1)-5C AND (1)-2C LEAD-IN
IN TRENCH = 5'

PS-1 WITH PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P3A'
STA. 519+61.3, 29.5' LT.

(1)-4" CONDUIT (725.05) WITH (2)-7C, (3)-5C AND (2)-2C LEAD-IN
ENCASED IN TRENCH IN PAVED AREA = 74'

AERIAL POWER CABLE, 58'

EXISTING UTILITY POLE (TO REMAIN)
WITH PROPOSED CONDUIT RISER
STA. 519+80.9, 27.6' RT.

(1)-4" CONDUIT (725.05) WITH (1)-5C
ENCASED IN TRENCH IN PAVED AREA = 41'

PB-4
(1)-2" CONDUIT WITH (1)-5C
IN TRENCH IN PAVED AREA = 5'

PS-3 WITH A PEDESTRIAN SIGNAL HEAD
STA. 520+29.0, 41.9' LT.

AERIAL POWER CABLE, 108'

EXISTING UTILITY POLE (TO REMAIN)
STA. 520+84.3, 27.6' LT.

PROPOSED POWER SOURCE
STA. 522+13.2, 27.3' LT.

AERIAL POWER CABLE, 129'

Ex R/W & CONST. MAHONING AVE.

PB-3
(1)-2" CONDUIT WITH (1)-5C
IN TRENCH = 13'

PS-2 WITH A PEDESTRIAN SIGNAL HEAD
STA. 519+26.9, 41.2' RT.

(1)-4" CONDUIT (725.05) WITH (1)-5C
ENCASED IN TRENCH IN PAVED AREA = 45'

PB-5

(2)-4" CONDUITS WITH (4)-7C, (6)-5C AND (4)-2C LEAD IN
IN TRENCH = 5'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY
STA. 519+93.3, 33.4' RT.

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH = 15'

(1)-3" CONDUIT WITH (2)-7C, (2)-5C AND (1)-2C LEAD-IN
IN TRENCH = 11'

SP-2, TYPE TC-81.22, DESIGN 4 WITH A 25' MAST ARM 'A' AND
25' MAST ARM 'B', PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P3B'
STA. 519+85.4, 33.4' RT.

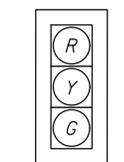
(1)-3" CONDUIT WITH (2)-7C, (4)-5C AND (3)-2C LEAD-IN
IN TRENCH = 32'

PB-6

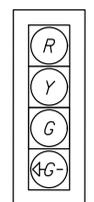
NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. FOR REFERENCE TO SIGNS (A) & (B), SEE SHEET 39.
5. THE PROPOSED SIGNAL SUPPORT IS IN CONFLICT WITH AN EXISTING WAYFINDING SIGN. THE CONTRACTOR SHALL COORDINATE WITH THE CITY ENGINEER TO RELOCATE THE SIGN PRIOR TO THE FOUNDATION INSTALLATION. THE SIGN RELOCATION SHALL BE PAID FOR UNDER ITEM 630-SIGNING MISC.: REMOVAL AND REERECTION OF WAYFINDING SIGN.

SIGNAL TYPES



(2A), (2B), (3A),
(6A), (6B) & (4A)



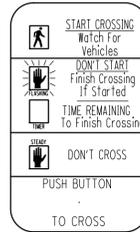
(3B) & (4B)



PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS



R10-3e-9
2 - LEFT ARROWS (SP-2,
PS-1)

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	519+88.9	LT	49.5'	24" X 24"
PB-2	519+59.0	LT	33.7'	24" X 24"
PB-3	519+24.4	RT	29.4'	18" X 18"
PB-4	520+29.0	LT	45.9'	18" X 18"
PB-5	519+94.5	RT	28.8'	24" X 24"
PB-6	519+67.4	RT	39.7'	24" X 24"

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET		X
4	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

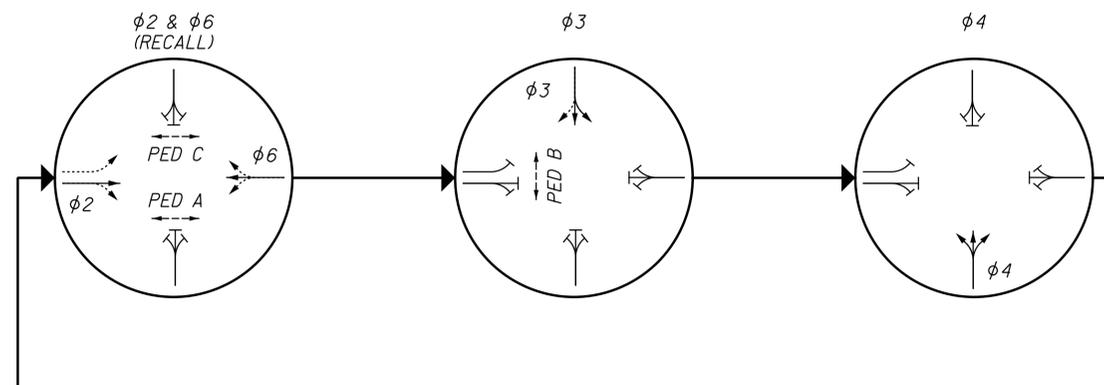
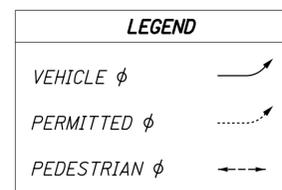
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / WEST AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP	DUAL ENTRY: YES		PHASES: 2,6					
	REST IN RED:		RING 1		RING 2			
START IN:	ALL-RED FLASH							
TIME FOR: FLASH, ALL RED (SEC.):	9, 6							
FIRST PHASE(S):	φ2+φ6							
COLOR DISPLAYED:	GREEN							
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	-	EB	SB	NB	-	WB	-	-
MINIMUM GREEN (INITIAL) (SEC.)	-	20	10	10	-	20	-	-
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	-	-	3.0	3.0	-	-	-	-
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	-	60	30	30	-	60	-	-
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	-	4.3	3.3	3.7	-	4.3	-	-
ALL RED CLEARANCE (SEC.)	-	1.0	1.0	1.0	-	1.0	-	-
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	7	9	-	-	7	-	-
PEDESTRIAN CLEARANCE (SEC.)	-	8	13	-	-	8	-	-
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	ON	-	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	ON	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER OMTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L3	P	25	6	10	3.0	1-1	φ3
L4	P	25	6	10	3.0	1-2	φ4

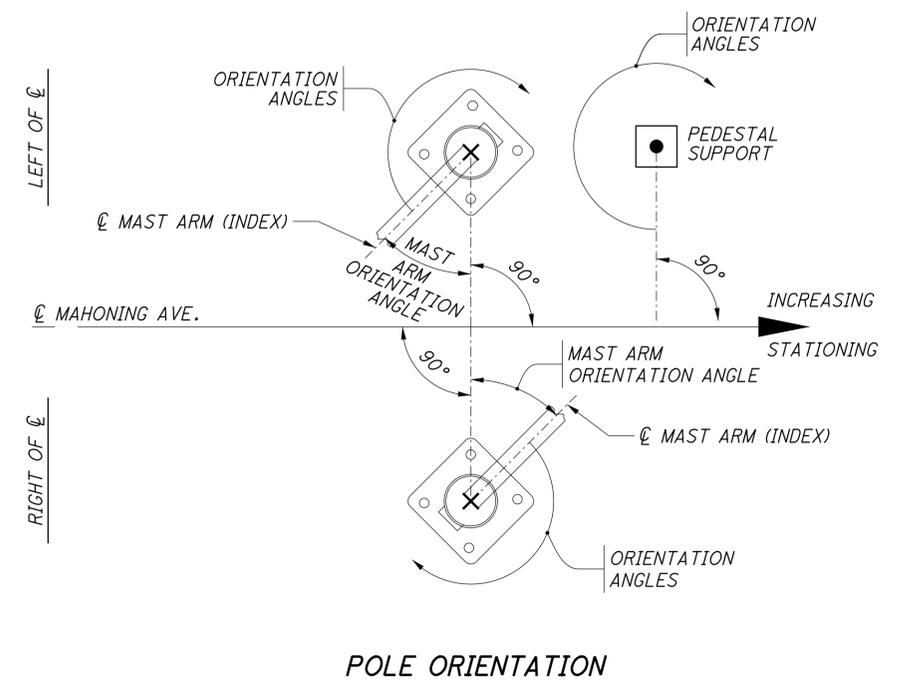
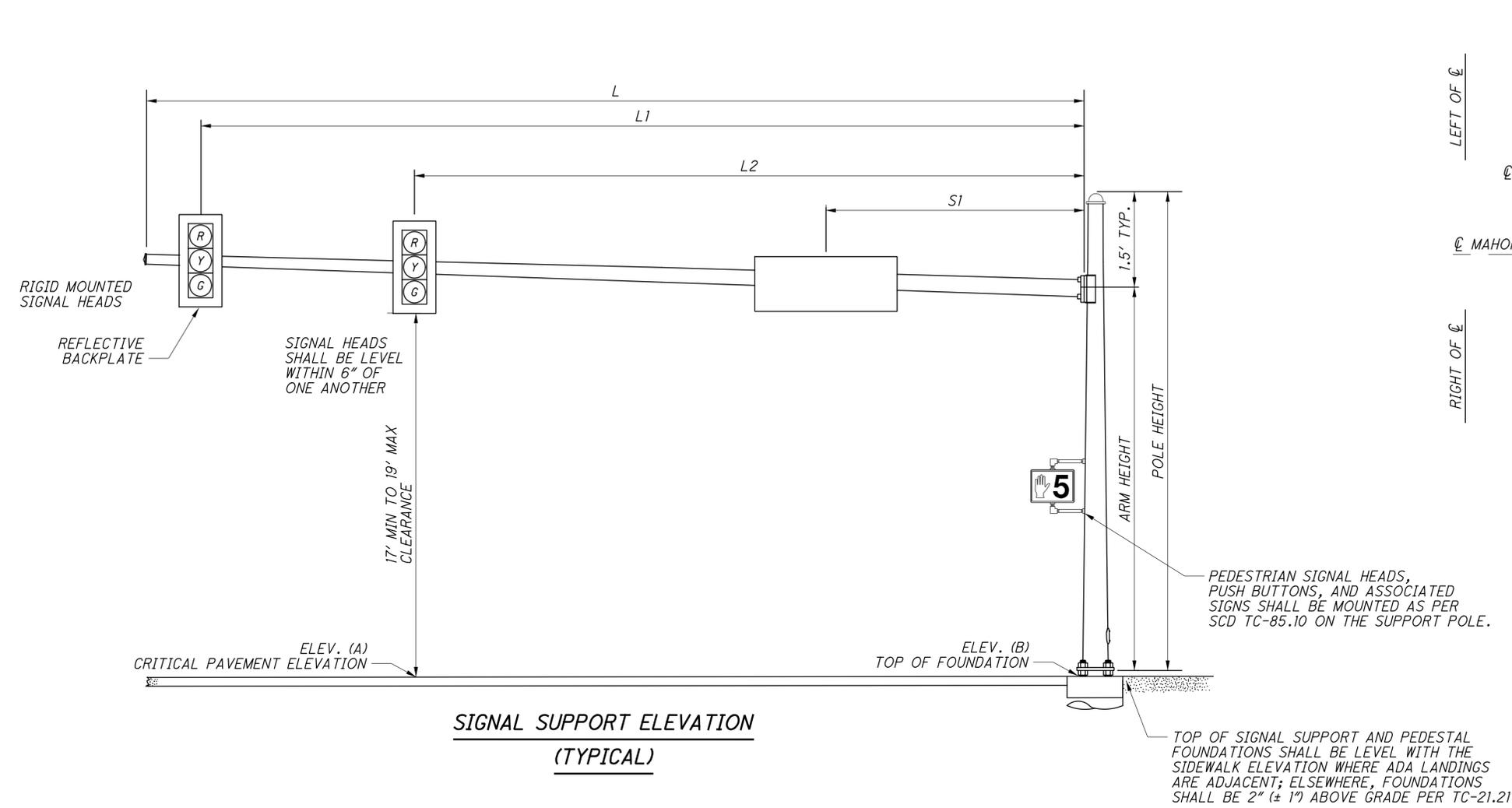
*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

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CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL DETAIL
MAHONING AVE. / WEST AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

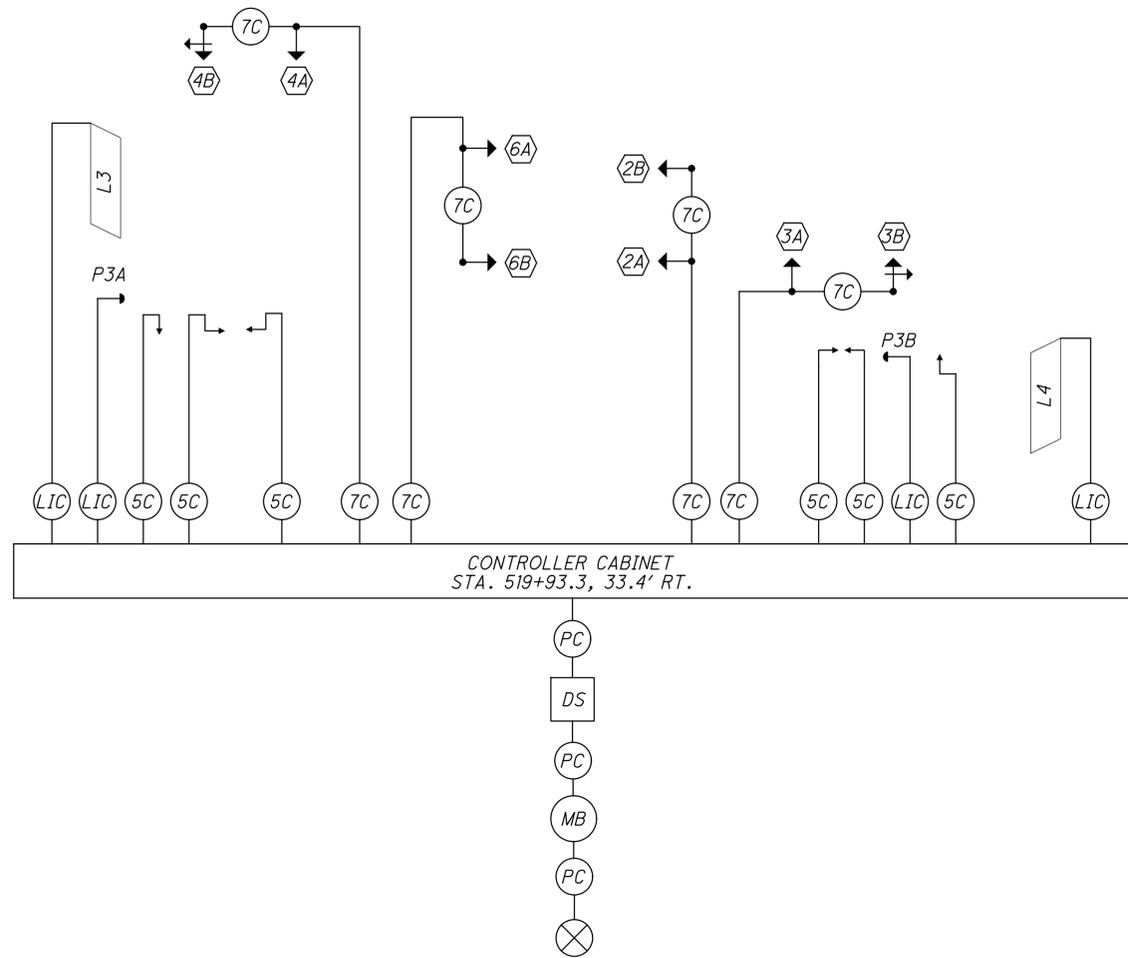


MAST ARM TABLE

SUPPORT NO.	ARM	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS								ORIENTATION ANGLES FROM MAST ARM A				
				A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	S1	MAST ARM A ANGLE	MAST ARM B ANGLE	PEDESTRIAN SIGNAL	PEDESTRIAN PUSHBUTTON	HANDHOLE
SP-1	A	519+79.1	42.2' LT.	848.40	847.98	TC-12.31	6	22	20.5	48	40.5	25.5	12.5	0	-	0	-	180
-	B	-	-	848.51	-	-	-	-	20.5	32	27	13	20	-	90	-	-	-
SP-2	A	519+85.4	33.4' RT.	848.29	848.66	TC-81.22	4	22	20.5	25	18.5	8	4	0	-	0/260	260	180
-	B	-	-	848.51	-	-	-	-	20.5	25	22	8.5	13.5	-	90	-	-	-
PS-1	-	519+61.3	29.5' LT.	-	-	-	-	8	-	-	-	-	-	-	-	270	270	180
PS-2	-	519+26.9	41.2' RT.	-	-	-	-	8	-	-	-	-	-	-	-	0	-	180
PS-3	-	520+29.0	41.9' LT.	-	-	-	-	8	-	-	-	-	-	-	-	0	-	180

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
2A, 2B (EB)	R	φ2 R	Y
	Y	φ2 Y	
	G	φ2 G	
3A (SB)	R	φ3 R	R
	Y	φ3 Y	
	G	φ3 G	
3B (SB LT)	R	φ3 R	R
	Y	φ3 Y	
	G	φ3 G	
	<--G-->	φ3 G	
4A (NB)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
4B (NB LT)	R	φ4 R	R
	Y	φ4 Y	
	G	φ4 G	
	<--G-->	φ4 G	
6A, 6B (WB)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
PEDESTRIAN MOVEMENTS			
PED A	W	φ2 PED / LS 9 G	OUT
	DW	φ2 PED / LS 9 R	
PED B	W	φ3 PED / LS 10 G	OUT
	DW	φ3 PED / LS 10 R	
PED C	W	φ6 PED / LS 11 G	OUT
	DW	φ6 PED / LS 11 R	
LS = LOAD SWITCH			

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CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL DETAIL
MAHONING AVE. / WEST AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

80
86



CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL PLAN
MAHONING AVE. / OAK HILL AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

(2)-4" CONDUITS WITH (3)-7C, (4)-5C, (4)-2C LEAD-IN AND (1)-RADAR
IN TRENCH = 6'

GROUND MOUNTED CONTROLLER WITH GPS TIME CLOCK ASSEMBLY AND
WORK PAD
STA. 538+33.1, 39.8' LT.

(1)-2" CONDUIT WITH (1)-POWER CABLE
IN TRENCH = 14'

PROPOSED POWER SOURCE
WITH PROPOSED CONDUIT RISER
STA. 538+20.1, 41.3' LT.

(1)-4" CONDUIT (725.05) WITH (2)-7C, (3)-5C, (3)-2C LEAD-IN AND
(1)-RADAR
ENCASED IN TRENCH IN PAVED AREA = 74'

PB-1
(1)-3" CONDUIT WITH (1)-7C, (1)-5C AND (1)-2C LEAD-IN
IN TRENCH = 6'

SP-1, TYPE TC-81.22, DESIGN 12 WITH A 48' MAST ARM,
PEDESTRIAN SIGNAL HEAD AND PUSHBUTTON 'P8A'
STA. 538+42.7, 40.0' LT.

NOTES:

1. THE CONTRACTOR SHALL ENSURE THAT ALL SIGNAL FACES ARE CLEARLY VISIBLE TO ALL ONCOMING VEHICLES; CLEAR OF ANY OBSTRUCTION ONCE MOUNTED TO THE MAST ARMS.
2. THE CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS OF ALL UTILITIES PRIOR TO EXCAVATION.
3. FOR TRAFFIC SIGNAL LEGEND, SEE SHEET 45.
4. FOR REFERENCE TO SIGNS (B), (C) & (D), SEE SHEET 40.

CL R/W & CONST. MAHONING AVE.

PS-1 WITH (2)-PEDESTRIAN SIGNAL HEADS AND PUSHBUTTON 'P8B'
STA. 538+40.6, 34.1' RT.

(1)-2" CONDUIT WITH (2)-5C AND (1)-2C LEAD-IN
IN TRENCH IN PAVED AREA = 10'

PB-2

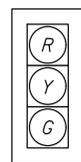
(1)-4" CONDUIT (725.05) WITH (2)-7C, (1)-5C, (2)-2C LEAD-IN AND
(1)-RADAR
ENCASED IN TRENCH IN PAVED AREA = 103'

SP-2, TYPE TC-81.22, DESIGN 13 WITH A 52' MAST ARM,
RADAR DETECTOR AND A PEDESTRIAN SIGNAL HEAD
STA. 539+25.1, 55.3' RT.

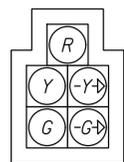
(1)-3" CONDUIT WITH (2)-7C, (1)-5C AND (1)-RADAR
IN TRENCH = 9'

PB-3

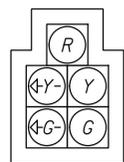
SIGNAL TYPES



(2A), (2B),
(6) & (8B)



(8A)



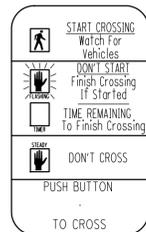
(1)



PEDESTRIAN HEADS
(LED, COUNTDOWN,
TYPE D2)

1. ALL SIGNAL HEADS SHALL HAVE 12" LED LENSES.
2. ALL SIGNAL HEADS SHALL BE BLACK IN COLOR AND HAVE BACKPLATES.
3. ALL SIGNAL HEAD VISORS SHALL BE CUTAWAY TYPE.

PEDESTRIAN SIGNS



R10-3e-9

- 1 - LEFT ARROW (SP-1)
- 1 - RIGHT ARROW (PS-1)

PULL BOX TABLE

PULL BOX #	STATION	SIDE	OFFSET	SIZE (IN.)
PB-1	538+37.7	LT	43.0'	24" X 24"
PB-2	538+49.3	RT	29.7'	18" X 18"
PB-3	539+20.1	RT	62.2'	24" X 24"

REMOVAL CHART

QUANTITY	REMOVAL ITEM DESCRIPTION	DELIVERED	DISPOSED
8	VEHICULAR SIGNAL HEADS	X	
2	PEDESTRIAN SIGNAL HEADS		X
2	PUSHBUTTON		X
1	CONTROLLER	X	
1	POLE MOUNTED CONTROLLER CABINET	X	
2	STRAIN POLE SUPPORTS		X
LUMP	SIGNAL CABLES		X

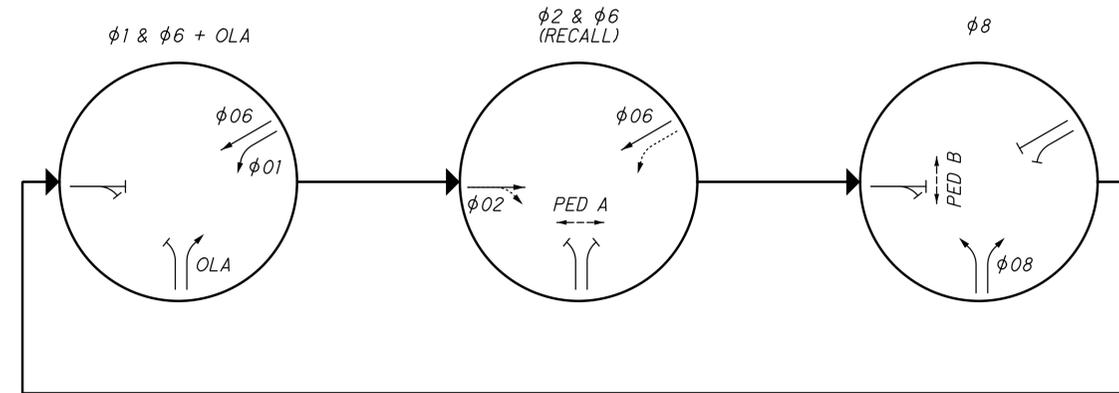
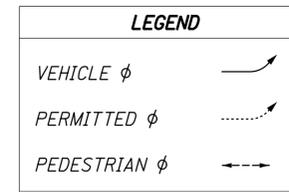
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SIGNAL TIMING CHART

INTERSECTION: MAHONING AVE. / OAK HILL AVE. MAINTAINING AGENCY: CITY OF YOUNGSTOWN								
START UP		DUAL ENTRY: YES		PHASES: 2,6				
START IN: ALL-RED FLASH		REST IN RED:		RING 1		RING 2		
TIME FOR: FLASH, ALL RED (SEC.): 9, 6		OVERLAP		A	B	C	D	
FIRST PHASE(S): $\phi 2 + \phi 6$		PHASES		1	-	-	-	
COLOR DISPLAYED: GREEN								
INTERVAL OR FEATURE	CONTROLLER MOVEMENT NO.							
INTERSECTION MOVEMENT (PHASE)	1	2	3	4	5	6	7	8
DIRECTION	WB LT	EB	-	-	-	WB	-	NB
MINIMUM GREEN (INITIAL) (SEC.)	7	20	-	-	-	20	-	10
ADDED INITIAL *(SEC./ACTUATION)	-	-	-	-	-	-	-	-
MAXIMUM INITIAL (SEC.)	-	-	-	-	-	-	-	-
PASSAGE TIME (PRESET GAP) (SEC.)	3.0	-	-	-	-	-	-	3.0
TIME BEFORE REDUCTION *(SEC.)	-	-	-	-	-	-	-	-
MINIMUM GAP *(SEC.)	-	-	-	-	-	-	-	-
TIME TO REDUCE *(SEC.)	-	-	-	-	-	-	-	-
MAXIMUM GREEN I (SEC.)	15	60	-	-	-	60	-	30
MAXIMUM GREEN II (SEC.)	-	-	-	-	-	-	-	-
YELLOW CHANGE (SEC.)	3.5	4.5	-	-	-	4.5	-	3.0
ALL RED CLEARANCE (SEC.)	1.2	1.0	-	-	-	1.0	-	1.4
DELAYED GREEN (LPI) # (SEC.)	-	-	-	-	-	-	-	-
FLASHING YELLOW ARROW DELAY° (SEC.)	-	-	-	-	-	-	-	-
WALK (SEC.)	-	8	-	-	-	-	-	10
PEDESTRIAN CLEARANCE (SEC.)	-	15	-	-	-	-	-	13
RECALL	MAXIMUM (ON/OFF)	-	-	-	-	-	-	-
	MINIMUM (ON/OFF)	-	ON	-	-	-	ON	-
	PEDESTRIAN (ON/OFF)	-	ON	-	-	-	-	-
MEMORY (ON/OFF)	-	-	-	-	-	-	-	-

*VOLUME DENSITY CONTROLS

PHASING DIAGRAM



NOTES:

- COUNTDOWN PEDESTRIAN SIGNALS SHALL GO TO ZERO ON YELLOW PER ODOTCD FIGURE 4E-2.
- ALL DETECTOR DELAYS SHALL BE PLACED IN THE CONTROLLER.

TRAFFIC SIGNAL DETECTION CHART

LOOP DESIGNATION	LOOP CONFIGURATION*	SIZE (FT.)	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	CONNECT TO DETECTOR UNIT (UNIT-CHANNEL)	ASSOCIATED CONTROLLER PHASE
L8A	P	25	6	3	3.0	1-1	$\phi 8$
L8B	P	25	6	10	3.0	1-2	$\phi 8$

*CONFIGURATION: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), OR RECTANGULAR (R); PER SCD TC-82.10

RADAR DETECTION CHART

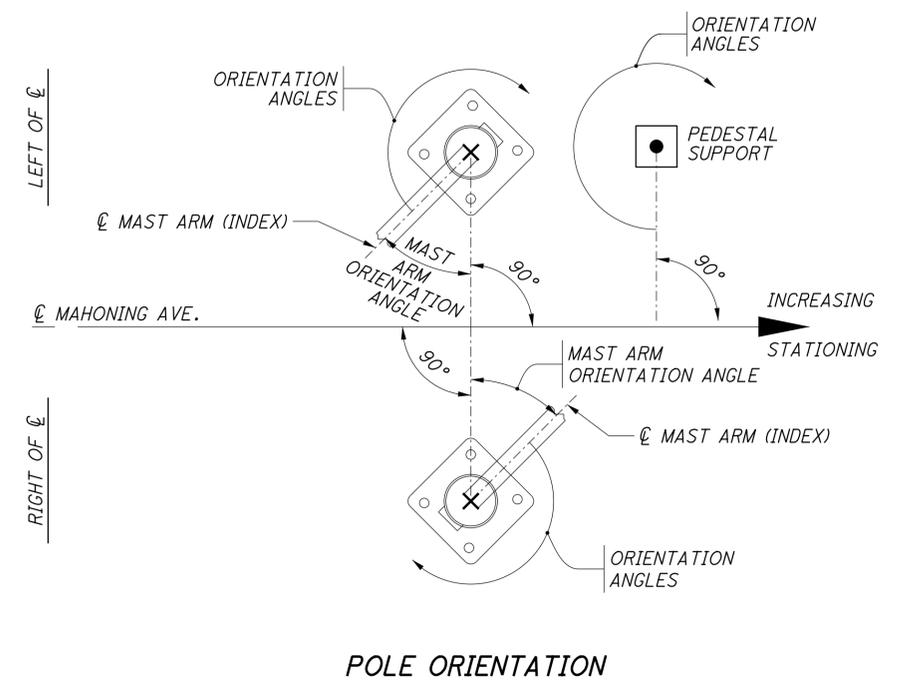
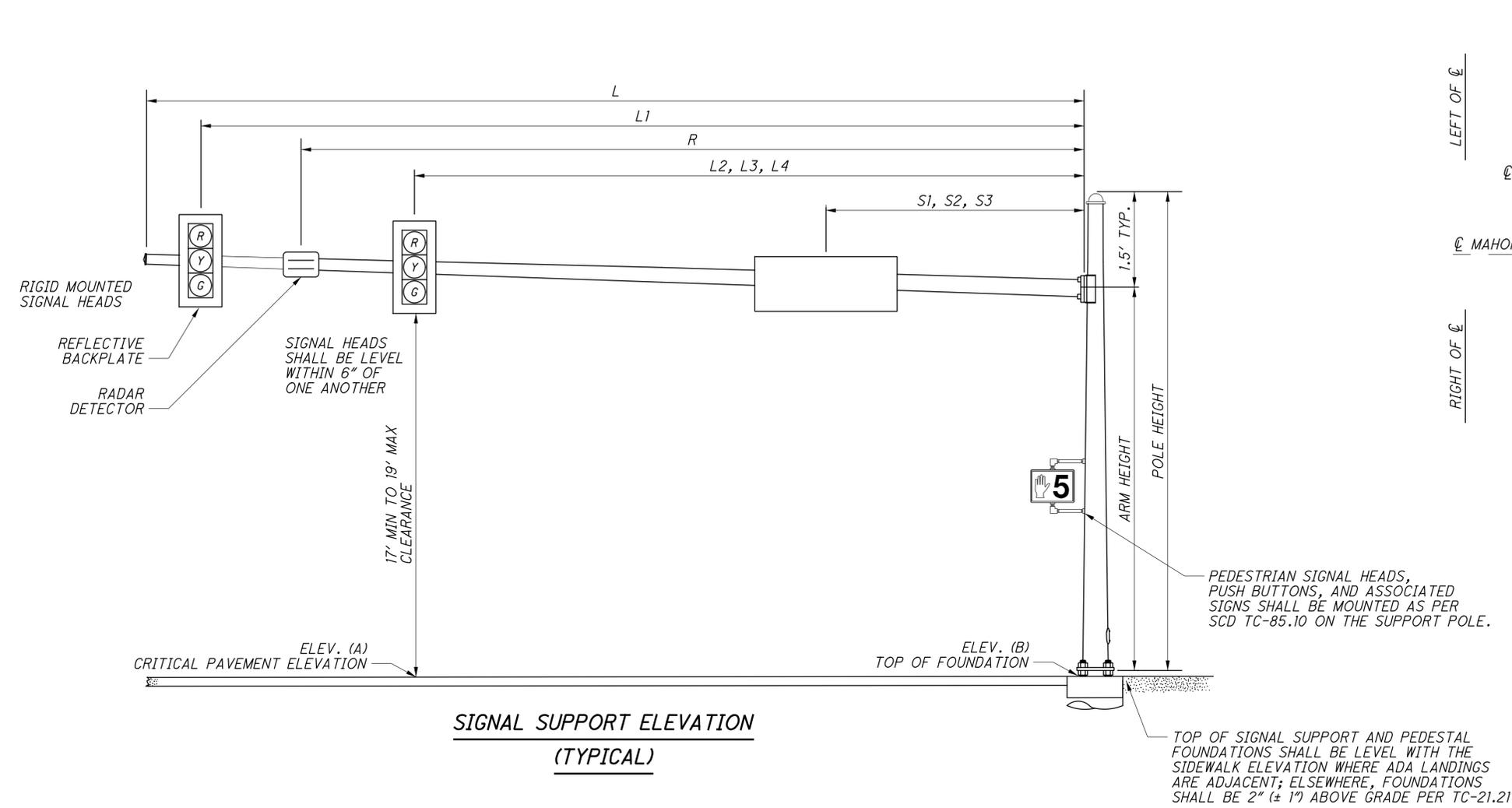
DETECTION ZONE	MOVEMENT	WIDTH (FT.)	DELAY PROGRAMMED IN CONTROLLER (SEC.)	EXTENSION PROGRAMMED IN CONTROLLER (SEC.)	DELAY INHIBIT PHASE	PURPOSE	DETECTION ZONE LENGTH (FT.)
D1	WB LT	8	3	3.0	$\phi 1$	STOP-LINE	40

CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL DETAIL
MAHONING AVE. / OAK HILL AVE.

MAH-YOUNGSTOWN
SIGNAL UPGRADE

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**SIGNAL SUPPORT ELEVATION
(TYPICAL)**

PEDESTRIAN SIGNAL HEADS, PUSH BUTTONS, AND ASSOCIATED SIGNS SHALL BE MOUNTED AS PER SCD TC-85.10 ON THE SUPPORT POLE.

TOP OF SIGNAL SUPPORT AND PEDESTAL FOUNDATIONS SHALL BE LEVEL WITH THE SIDEWALK ELEVATION WHERE ADA LANDINGS ARE ADJACENT; ELSEWHERE, FOUNDATIONS SHALL BE 2" (± 1") ABOVE GRADE PER TC-21.21

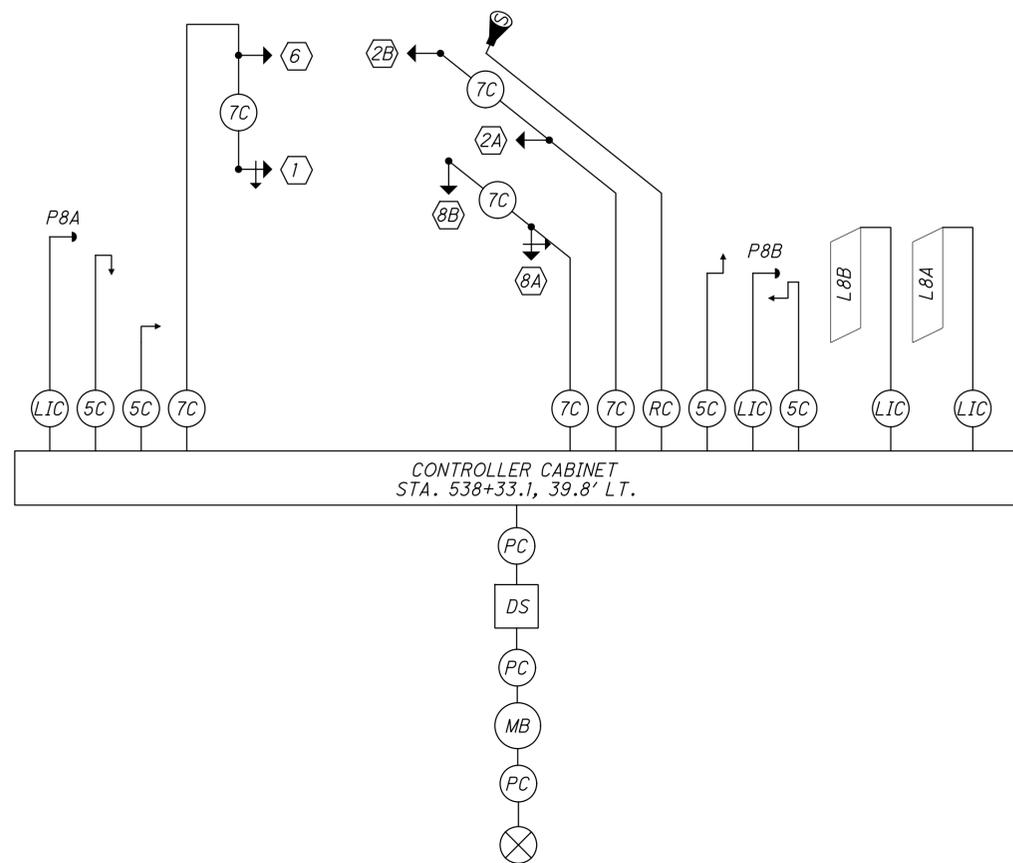
MAST ARM TABLE

SUPPORT NO.	STATION	OFFSET	ELEVATION		SIGNAL SUPPORT DETAILS													MAST ARM A ANGLE DEG	ORIENTATION ANGLES FROM MAST ARM A		
			A (PAVEMENT ELEVATION)	B (TOP OF FOUNDATION)	DESIGN TYPE	DESIGN NO.	POLE HEIGHT	ARM HEIGHT	L	L1	L2	L3	L4	S1	S2	S3	R		PEDESTRIAN SIGNAL DEG	PEDESTRIAN PUSHBUTTON DEG	HANDHOLE DEG
SP-1	538+42.7	40.0' LT.	844.95	844.45	TC-81.22	12	22	20.5	48	43	27	-	-	39.5	24	12	-	330	300	300	180
SP-2	539+25.1	55.3' RT.	848.13	849.90	TC-81.22	13	20	18.5	52	47.5	41	34	21.5	18.5	-	-	47.5	340	235	-	180
PS-1	538+40.6	34.1' RT.	-	-	-	-	8	-	-	-	-	-	-	-	-	-	-	-	0/90	90	180

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WIRING DIAGRAM



FIELD WIRING HOOK-UP CHART

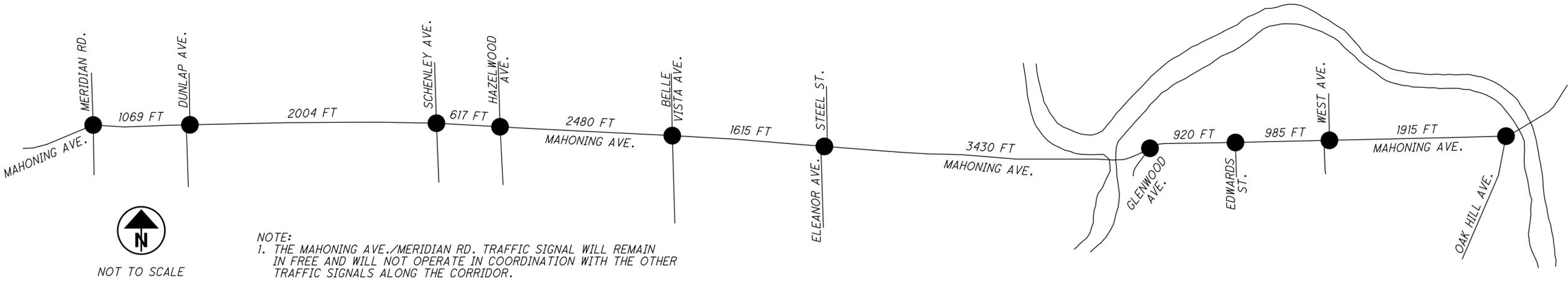
SIGNAL HEAD	INDICATION	FIELD TERMINAL	FLASH
1 (WB LT)	R	φ6 R	Y
	Y	φ6 Y	
	G	φ6 G	
	<--Y-->	φ1 Y	
2A, 2B (EB)	<--G-->	φ1 G	Y
	R	φ2 R	
	Y	φ2 Y	
6 (WB)	G	φ2 G	Y
	R	φ6 R	
	Y	φ6 Y	
8A (NB RT)	G	φ6 G	R
	R	φ8 R	
	Y	φ8 Y	
	---Y-->	φ1 Y / LS 13 Y	
8B (NB)	---G-->	φ1 G / LS 13 G	R
	R	φ8 R	
	Y	φ8 Y	
PED A	G	φ8 G	OUT
	W	φ2 PED / LS 9 G	
PED B	DW	φ2 PED / LS 9 R	OUT
	W	φ8 PED / LS 10 G	
OLA	DW	φ8 PED / LS 10 R	OUT
	---Y-->	φ1 Y / LS 13 Y	
OVERLAPS			OUT
---G-->			
OLA = LS 13			
LS = LOAD SWITCH			

CALCULATED
JAK
CHECKED
KMG

**TRAFFIC SIGNAL SIGNAL DETAIL
MAHONING AVE. / OAK HILL AVE.**

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**

84
86



NOTE:
1. THE MAHONING AVE./MERIDIAN RD. TRAFFIC SIGNAL WILL REMAIN IN FREE AND WILL NOT OPERATE IN COORDINATION WITH THE OTHER TRAFFIC SIGNALS ALONG THE CORRIDOR.

COORDINATION TIMING CHART

MAHONING AVE. / DUNLAP AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	EB	SB	NB	-	WB	-	-		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	-	30	30	20	-	30	-	-	5	-
1/2/2	-	30	30	20	-	30	-	-	0	-
1/3/3	-	30	30	20	-	30	-	-	5	-

MAHONING AVE. / SCHENLEY AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	EB	SB	NB	-	WB	-	-		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	-	50	30	50	-	30	-	-	50	-
1/2/2	-	50	30	50	-	30	-	-	45	-
1/3/3	-	50	30	50	-	30	-	-	45	-

MAHONING AVE. / HAZELWOOD AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	EB	SB	NB	-	WB	-	-		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	-	50	30	50	-	30	-	-	60	-
1/2/2	-	50	30	50	-	30	-	-	45	-
1/3/3	-	50	30	50	-	30	-	-	45	-

MAHONING AVE. / BELLE VISTA AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	WB LT	EB	-	SB	EB LT	WB	-	NB		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	13	38	-	29	13	38	-	29	0	-
1/2/2	15	38	-	27	15	38	-	27	0	-
1/3/3	15	38	-	27	15	38	-	27	0	-

MAHONING AVE. / STEEL ST. / ELEANOR AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	EB	SB	NB	-	WB	-	-		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	-	28	32	20	-	28	-	-	30	-
1/2/2	-	28	32	20	-	28	-	-	25	-
1/3/3	-	28	32	20	-	28	-	-	30	-

MAHONING AVE. / GLENWOOD AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	WB LT	EB	-	-	-	WB	-	NB LT		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	15	40	-	-	-	55	-	25	10	-
1/2/2	15	40	-	-	-	55	-	25	75	-
1/3/3	15	40	-	-	-	55	-	25	40	-

MAHONING AVE. / EDWARDS ST.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	EB	-	SB	-	WB	-	NB		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	-	50	-	30	-	50	-	30	35	-
1/2/2	-	50	-	30	-	50	-	30	30	-
1/2/3	-	50	-	30	-	50	-	30	35	-

MAHONING AVE. / WEST AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	-	EB	SB	NB	-	WB	-	-		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	-	30	30	20	-	30	-	-	35	-
1/2/2	-	30	30	20	-	30	-	-	30	-
1/3/3	-	30	30	20	-	30	-	-	10	-

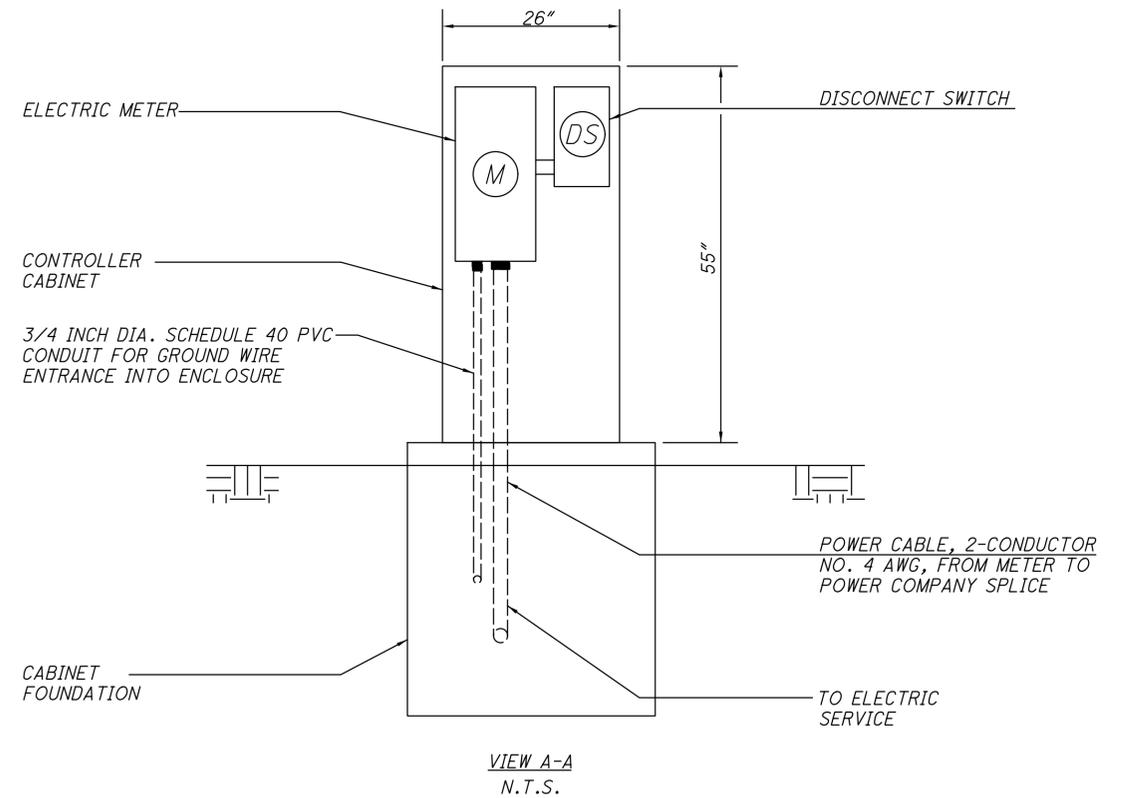
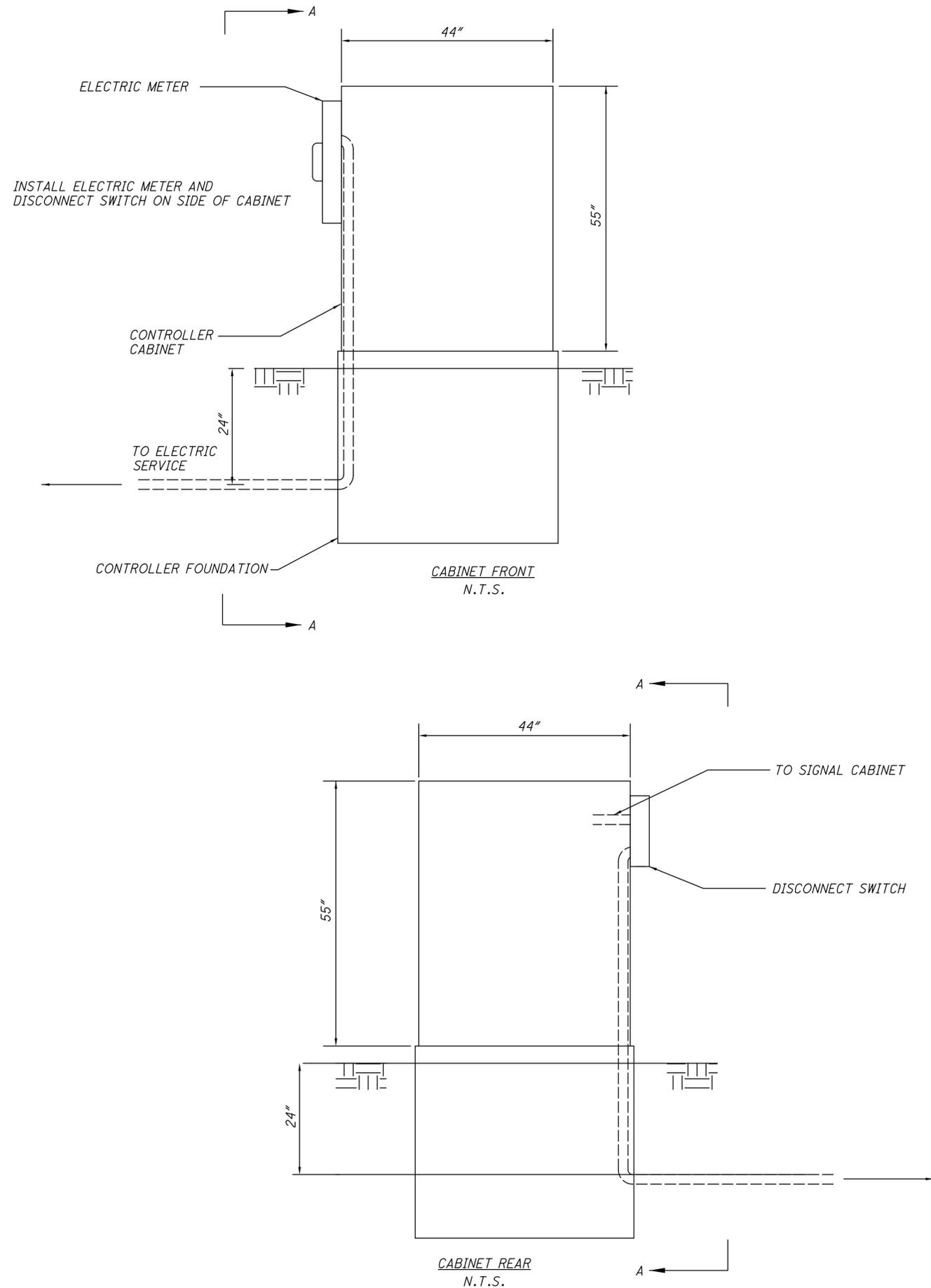
MAHONING AVE. / OAK HILL AVE.										
PHASE	1	2	3	4	5	6	7	8	OFFSET 1 (SEC)	OFFSET 2 (SEC)
DIRECTION	WB LT	EB	-	-	-	WB	-	NB LT		
PLAN NO. OR C/S/O	SPLITS (G+Y+AR) IN SECONDS									
1/1/1	15	35	-	-	-	50	-	30	70	-
1/2/2	15	35	-	-	-	50	-	30	75	-
1/3/3	15	35	-	-	-	50	-	30	50	-

COORDINATION TIMING PLANS

DAY(S) OF WEEK	PLAN NAME	HOURS	PLAN NO. OR CYCLE/SPLIT/OFFSET	CYCLE LENGTH (SEC)
MON - FRI	FREE	00:00 - 06:30	-	-
MON - FRI	PATTERN 1	06:30 - 09:00	1/1/1	80
MON - FRI	PATTERN 2	09:00 - 14:00	1/2/2	80
MON - FRI	PATTERN 3	14:00 - 18:30	1/3/3	80
MON - FRI	FREE	18:30 - 24:00	-	-
SAT - SUN	FREE	00:00 - 24:00	-	-

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O:\2019\2019343\MAH\107228\Design\Signals\Sheets\107228_CD400.dgn Sheet 6/30/2022 4:58:29 PM kgoetz



CALCULATED
JAK
CHECKED
KMG

TRAFFIC SIGNAL SIGNAL DETAIL

**MAH-YOUNGSTOWN
SIGNAL UPGRADE**