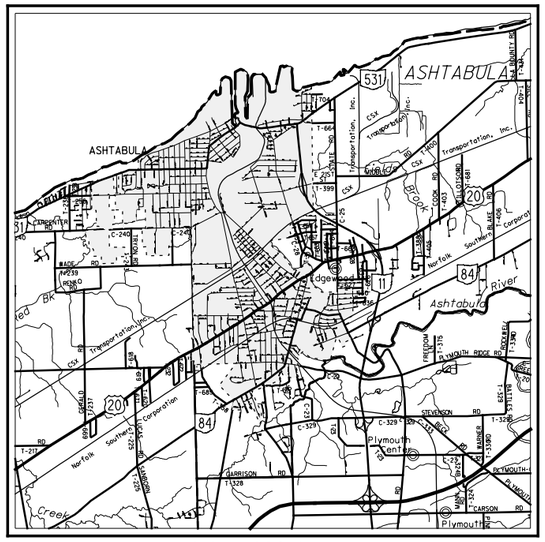


LOCATION MAP

LATITUDE: 41 °51'56" LONGITUDE: 80 °47'24"

SCALE IN MILES

0 1 2 3 4

N

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

DESIGN DESIGNATION

CURRENT ADT (20) N/A
DESIGN YEAR ADT (20) N/A
DESIGN HOURLY VOLUME (20) N/A
DIRECTIONAL DISTRIBUTION N/A
TRUCKS (24 HOUR B&C) N/A
DESIGN SPEED N/A
LEGAL SPEED N/A
DESIGN FUNCTIONAL CLASSIFICATION:
N/A
NHS PROJECT N/A

DESIGN EXCEPTIONS

NONE REQUIRED

UNDERGROUND UTILITIES

CONTACT BOTH SERVICES
CALL TWO WORKING DAYS
BEFORE YOU DIG

CALL
1-800-362-2764
(TOLL FREE)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

OIL & GAS PRODUCERS UNDERGROUND
PROTECTION SERVICE CALL: **1-800-925-0988**

PLAN PREPARED BY:

DESIGN AGENCY
LJB Inc. • 2500 Newmark Drive
Miamisburg, OH 45342
(937) 259-5000 tel • (937) 259-5100 fax • LJBinc.com

ENGINEERS SEAL:

SIGNED:
DATE:

ENGINEERS SEAL:

SIGNED:
DATE:

STATE OF OHIO

DEPARTMENT OF TRANSPORTATION

ATB - ASHTABULA SIGNAL UPGRADE

CITY OF ASHTABULA

ASHTABULA COUNTY

INDEX OF SHEETS:

PROJECT DESCRIPTION

UPGRADE SIGNALS AND REPLACE CURB RAMPS

PROJECT EARTH DISTURBED AREA:	ACRES
ESTIMATED CONTRACTOR EARTH DISTURBED AREA:	ACRES
NOTICE OF INTENT EARTH DISTURBED AREA:	ACRES

2013 SPECIFICATIONS

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

I HEREBY APPROVED 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
DATE DISTRICT DEPUTY DIRECTOR

APPROVED
DATE DIRECTOR, DEPARTMENT OF TRANSPORTATION

STAGE 3 SUBMITTAL - 08/01/2013

STANDARD CONSTRUCTION DRAWINGS						SUPPLEMENTAL SPECIFICATIONS	SPECIAL PROVISIONS
BP-5.1 7/28/00						800-2013	
BP-7.1 10/15/10						815	
MT-110.10 7/20/12						906	
TC-21.20 01/18/13	TC-84.20 01/21/11						
TC-41.40 07/16/04	TC-84.21 01/19/07						
TC-41.41 01/21/11	TC-85.10 10/16/09						
TC-52.10 01/18/13	TC-85.20 01/18/13						
TC-52.20 01/18/13							
TC-71.10 10/19/12							
TC-81.10 01/18/13	HL-30.11 01/18/13						
TC-81.21 01/18/13	HL-30.22 01/18/13						
TC-82.10 01/18/13							
TC-83.10 01/18/13							
TC-83.20 04/20/12							

FEDERAL PROJECT NO. E 120 192

PID NO. 92243

CONSTRUCTION PROJECT NO.

RAILROAD INVOLVEMENT NONE

ATB - ASHTABULA SIGNAL UPGRADE

1/63

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

GAS:
DOMINION EAST OHIO
320 SPRINGSIDE DRIVE
FAIRLAWN, OH 44333
PH: 330-664-2494

ELECTRIC:
ILLUMINATING COMPANY
6896 MILLER ROAD
BRECKSVILLE, OH 44141
PH: 440-717-6845

WATER:
AQUA OHIO
8644 STATION STREET
MENTOR, OH 44060
PH: 440-255-3984

TELECOM:
WINDSTREAM WESTERN RESERVE
1111 SUPERIOR AVE, SUITE 500
CLEVELAND, OH 44114
PH: 440-274-0209

SEWER:
CITY OF ASHTABULA
501 WEST 24TH STREET
ASHTABULA, OH 44004
PH: 440-993-8101

THE LOCATION OF THE UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE AS OBTAINED FROM THE OWNERS AS REQUIRED BY SECTION 153.64 O.R.C.

CONSTRUCTION NOTIFICATION
THE CONTRACTOR WILL ADVISE THE PROJECT ENGINEER A MINIMUM OF 14 DAYS PRIOR TO THE FOLLOWING: THE START OF CONSTRUCTION ACTIVITIES, LANE CLOSURES, AND ROAD CLOSURES. THE PROJECT ENGINEER WILL FORWARD THIS INFORMATION TO THE CITY OF WEST CARROLLTON PUBLIC INFORMATION OFFICER. THE PUBLIC INFORMATION OFFICER WILL IN TURN, NOTIFY THE PUBLIC, THE LOCAL EMERGENCY SERVICES, EFFECTED SCHOOLS AND BUSINESSES, AND ANY OTHER IMPACTED LOCAL PUBLIC AGENCY OF ANY OF THE ABOVE MENTIONED ITEMS, VIA MEDIA SOURCES.

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.

CLEARING AND GRUBBING
ALTHOUGH THERE ARE NO TREES OR STUMPS SPECIFICALLY MARKED FOR REMOVAL WITHIN THE LIMITS OF THE PROJECT, A LUMP SUM QUANTITY IS INCLUDED IN THE GENERAL SUMMARY FOR ITEM 201, CLEARING AND GRUBBING. ALL PROVISIONS AS SET FORTH IN THE SPECIFICATIONS UNDER THIS ITEM ARE INCLUDED IN THE LUMP SUM PRICE BID FOR ITEM 201, CLEARING AND GRUBBING.

CONSTRUCTION NOISE
ACTIVITIES AND LAND USE ADJACENT TO THIS PROJECT MAY BE AFFECTED BY CONSTRUCTION NOISE. IN ORDER TO MINIMIZE ANY ADVERSE CONSTRUCTION NOISE IMPACTS, DO NOT OPERATE POWER-OPERATED CONSTRUCTION-TYPE DEVICES BETWEEN THE HOURS OF 7 AM AND 7 PM. IN ADDITION, DO NOT OPERATE AT ANY TIME ANY DEVICE IN SUCH A MANNER THAT THE NOISE CREATED SUBSTANTIALLY EXCEEDS THE NOISE CUSTOMARILY AND NECESSARILY ATTENDANT TO THE REASONABLE AND EFFICIENT PERFORMANCE OF SUCH EQUIPMENT.

SEEDING AND MULCHING
THE FOLLOWING QUANTITIES ARE PROVIDED TO PROMOTE GROWTH AND CARE OF PERMANENT SEEDED AREAS:

659, TOPSOIL 56 CU. YD.
659, SEEDING AND MULCHING 500 SQ. YD.
659, COMMERCIAL FERTILIZER 0.1 TON
659, WATER 3 M. GAL.

SEEDING AND MULCHING SHALL BE APPLIED TO ALL AREAS OF EXPOSED SOIL BETWEEN THE RIGHT-OF-WAY LINES, AND WITHIN THE CONSTRUCTION LIMITS FOR AREAS OUTSIDE THE RIGHT-OF-WAY LINES COVERED BY WORK AGREEMENT OR SLOPE EASEMENT. QUANTITY CALCULATIONS FOR SEEDING AND MULCHING ARE BASED ON THESE LIMITS.

SURVEYING PARAMETERS
PRIMARY PROJECT CONTROL MONUMENTS GOVERN ALL POSITIONING ON ODOT PROJECTS. SEE SHEETS 6 TO 17 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: SEE TABLE

VERTICAL POSITIONING

ORTHOMETRIC HEIGHT DATUM: NAVD88
GEOID: 09

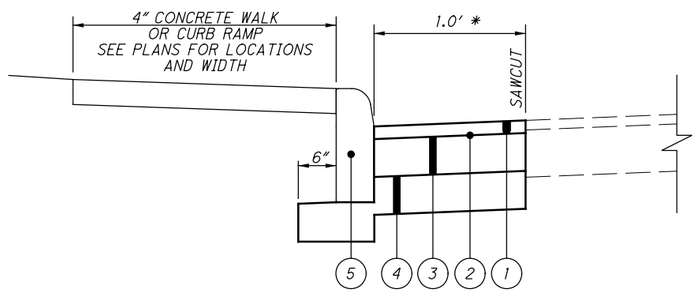
HORIZONTAL POSITIONING

REFERENCE FRAME: NAD 83 (CORS96)
ELLIPSOID: GRS80
MAP PROJECTION: LAMBERT CONFORMAL CONIC
COORDINATE SYSTEM: OHIO STATE PLANE, NORTH ZONE
COMBINED SCALE FACTOR: SEE TABLE
ORIGIN OF COORDINATE SYSTEM: 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 SUPPLEMENTAL SPECIFICATION 823.

UNITS ARE IN U.S. SURVEY FEET.

INTERSECTION	MONUMENT TYPE	COMBINED SCALE FACTOR
EAST 23RD / COLUMBUS	MN5	1.00001589
WEST 9TH / LAKE	MN2	1.00001816
WEST 19TH / LAKE	MN1	1.00001528
WEST 24TH / LAKE	MN1	1.00001395
WEST 26TH / LAKE	MN3	1.00001456
WEST 32ND / LAKE	MN1	1.00001395
EAST PROSPECT / LAKE	MN2	1.00001039
WEST PROSPECT / STATION	MN2	1.00001039
WEST PROSPECT / CENTER	MN2	1.00000873
WEST PROSPECT / WEST	MN2	1.00000873
WEST PROSPECT / WOODMAN	MN22	1.00000724
BUNKER HILL / JEFFERSON	MN1	1.00000102



1 ITEM 448 - 2" ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG 64-22
2 ITEM 407 - TACK COAT @ 0.075 GAL/SQ YD
3 ITEM 301 - 6" ASPHALT CONCRETE BASE, PG 64-22
4 ITEM 304 - 6" AGGREGATE BASE
5 ITEM 609 - CURB TYPE 6

TYPICAL SECTION

* UNLESS OTHERWISE SHOWN

CALCULATED JWB
CHECKED DJH

GENERAL NOTES AND TYPICAL SECTION

ATB-ASHTABULA
SIGNAL UPGRADE

2
63

Q:\City of Ashtabula\0106521A.00 - Ashtabula Signal System Design\92243\roadway\sheets\92243GN001.dgn 8/2/2013 2:28:57 PM EHundt

MAINTENANCE OF TRAFFIC

ITEM 614, MAINTAINING TRAFFIC

A MINIMUM OF ONE LANE OF TRAFFIC IN EACH DIRECTION SHALL BE MAINTAINED AT ALL TIMES ON ALL STREETS UNLESS SHOWN OTHERWISE IN THESE PLANS BY USE OF THE EXISTING PAVEMENT.

LENGTH AND DURATION OF LANE CLOSURES 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.

ALL WORK AND TRAFFIC CONTROL DEVICES SHALL BE IN ACCORDANCE WITH CMS 614 AND OTHER APPLICABLE PORTIONS OF THE SPECIFICATIONS, AS WELL AS THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

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.

DUST CONTROL

THE CONTRACTOR SHALL FURNISH AND APPLY WATER FOR DUST CONTROL AS DIRECTED BY THE ENGINEER. THE FOLLOWING ESTIMATED QUANTITIES HAVE BEEN INCLUDED FOR DUST CONTROL PURPOSES:

ITEM 616, WATER 10 M. GAL.

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 CMS 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 THE ENTIRE ADVANCE PREPARATION AND CLOSURE SEQUENCE WHERE COMPLETE BLOCKAGE OF TRAFFIC IS REQUIRED.

* 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).

IN ADDITION TO THE REQUIREMENT OF CMS 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) SHOULD BE PROVIDED FOR THE FOLLOWING TRAFFIC CONTROL TASKS:

* 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). IN GENERAL, LEOS SHOULD BE POSITIONED AT THE POINT OF LANE RESTRICTION OR ROAD CLOSURE AND TO MANUALLY CONTROL TRAFFIC MOVEMENTS THROUGH INTERSECTIONS IN WORK ZONES.

* WHEN CONSTRUCTION VEHICLES ARE ENTERING/EXITING THE ZONE DIRECTLY FROM/INTO AN OPEN LANE OF TRAFFIC. IF A LANE HAS BEEN CLOSED TO PROVIDE AN ACCELERATION-DECELERATION LANE FOR THE VEHICLE, THE LEO WILL NOT BE REQUIRED.

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.

THE LEOS WORK AT THE DIRECTION OF THE CONTRACTOR. 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 PATROL CAR FOR ASSISTANCE 100 HOURS

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.

ITEM 614 - MAINTAINING TRAFFIC SIGNAL

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 WORK IS ACCEPTED.

THE CONTRACTOR SHALL CORRECT 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 WITHIN 4 HOURS OF NOTIFICATION. 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.

WHERE THE CONTRACTOR HAS FAILED TO OR CANNOT RESPOND TO AN OUTAGE OR SIGNAL EQUIPMENT MALFUNCTION AT THE LOCATIONS WITHIN THE PERIODS AS SPECIFIED ABOVE, THE ENGINEER MAY DEDUCT MONIES DUE OR TO BECOME DUE TO THE CONTRACTOR FOR ANY SUBSEQUENT BILLINGS TO THE CITY FOR POLICE SERVICES AND MAINTENANCE SERVICES. THE CONTRACTOR SHALL PROVIDE THE MAINTENANCE SERVICE ENTIRELY WITH HIS FORCES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO ANY TRAFFIC SIGNAL COMPONENTS HANDLED DURING THE RELOCATION OF POLES AND INSTALLATION OF 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 7 AM TO 9 AM AND 3 PM TO 6 PM UNLESS AUTHORIZED BY THE ENGINEER.

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 INSTALLATION OF TEMPORARY "STOP" SIGNS FURNISHED BY THE CONTRACTOR.

ANY OTHER WORK THAT DOES NOT REQUIRE THE INTERSECTION TO BE TAKEN OUT OF SERVICE MAY BE PERFORMED DURING NORMAL WORK HOURS IN ACCORDANCE WITH THE PROJECT ENGINEER. ANY VEHICULAR OR PEDESTRIAN SIGNAL HEAD, EITHER NEW OR EXISTING, WHICH WILL BE OUT OF OPERATION, SHALL BE COVERED IN THE MANNER DESCRIBED IN 632.25.

THE CONTRACTOR SHALL MAINTAIN COMPLETE RECORDS OF MALFUNCTIONS INCLUDING:

1. TIME OF NOTIFICATION OF MALFUNCTION;
2. TIME OF WORK CREWS ARRIVAL TO CORRECT THE MALFUNCTION
3. ACTIONS TAKEN TO CORRECT THE MALFUNCTION, INCLUDING A LIST OF PARTS REPAIRED OR REPLACED
4. TIME OF COMPLETION OF THE REPAIR AND SYSTEM RESTORED TO FULL SERVICE

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

MAINTENANCE OF PEDESTRIAN TRAFFIC

THE CONTRACTOR SHALL MAINTAIN PEDESTRIAN TRAFFIC AT ALL TIMES. DETOURING PEDESTRIANS CAN BE ACCOMPLISHED FOLLOWING SCD MT-110.10. THE CONTRACTOR SHALL COVER ALL FOUNDATION HOLES AND TRENCHES OVER NIGHT AND DURING THE DAY WHEN NO WORK WILL BE PERFORMED IN THE AREA WITHIN A REASONABLE TIME FRAME. THIS WORK SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. COSTS SHALL BE INCLUDED IN THE LUMP SUM UNIT PRICE BID FOR ITEM 614 MAINTAINING TRAFFIC.

CALCULATED JWB
CHECKED DJH

MAINTENANCE OF TRAFFIC NOTES

ATB-ASHTABULA
SIGNAL UPGRADE

SHEET NUMBER								PARTICIPATION					ALT.	ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
						2	5						(X)						
																		ROADWAY	
						LUMP								201	11000	LUMP		CLEARING AND GRUBBING	
							86							202	23010	86	SQ YD	PAVEMENT REMOVED, ASPHALT	
							4232							202	30000	4232	SQ FT	WALK REMOVED	
							523							202	32000	523	FT	CURB REMOVED	
							4909							608	10000	4909	SQ FT	4" CONCRETE WALK	
							4							608	52110	4	EACH	CURB RAMP, TYPE A1	
							2							608	52130	2	EACH	CURB RAMP, TYPE B1	
							14							608	52140	14	EACH	CURB RAMP, TYPE B2	
							1							608	52144	1	EACH	CURB RAMP, TYPE B3	
							1							608	52150	1	EACH	CURB RAMP, TYPE C1	
							6							608	52160	6	EACH	CURB RAMP, TYPE C2	
							32							608	53000	32	EACH	TRUNCATED DOMES	
																		EROSION CONTROL	
						56								659	00300	56	CU YD	TOPSOIL	
						500								659	10000	500	SQ YD	SEEDING AND MULCHING	
						0.1								659	20000	0.1	TON	COMMERCIAL FERTILIZER	
						3								659	35000	3	M GAL	WATER	
																		PAVEMENT	
							14.2							301	46000	14.2	CU YD	ASPHALT CONCRETE BASE, PG64-22	
							23.9							304	20000	23.9	CU YD	AGGREGATE BASE	
							6.4							407	10000	6.4	GALLON	TACK COAT	
							4.7							448	47020	4.7	CU YD	ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22	
							523							609	26000	523	FT	CURB, TYPE 6	
																		WATER WORK	
							1							638	10800	1	EACH	VALVE BOX ADJUSTED TO GRADE	
																		TRAFFIC CONTROL	21
																		TRAFFIC SIGNALS	21-22
																		INCIDENTALS	
														614	11000	LUMP		MAINTAINING TRAFFIC	
														623	10000	LUMP		CONSTRUCTION LAYOUT STAKES AND SURVEYING	
														624	10000	LUMP		MOBILIZATION	

CALCULATED JWB
CHECKED DJH

GENERAL SUMMARY

ATB-ASHTABULA
SIGNAL UPGRADE

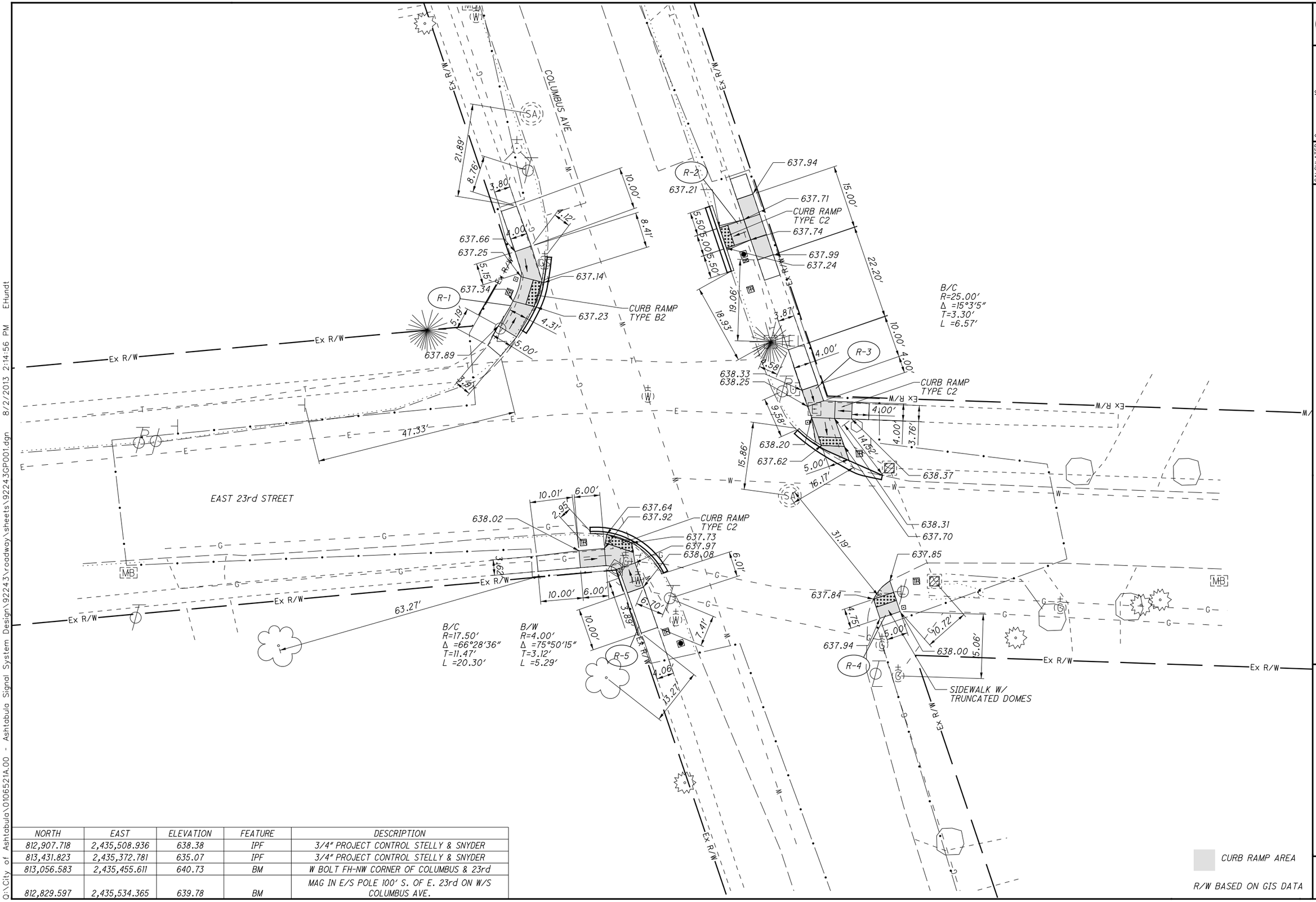
REF. NO.	SHEET NO.	202 PAVEMENT REMOVED, ASPHALT SQ YD	202 WALK REMOVED SQ FT	202 CURB REMOVED FT	301 ASPHALT CONCRETE BASE CU YD	304 AGGREGATE BASE CU YD	407 TACK COAT GALLON	448 ASPHALT CONCRETE SURFACE COURSE, TYPE 1, PG64-22 CU YD		608 4" CONCRETE WALK SQ FT	608 CURB RAMP, TYPE A1 EACH	608 CURB RAMP, TYPE B1 EACH	608 CURB RAMP, TYPE B2 EACH	608 CURB RAMP, TYPE B3 EACH	608 CURB RAMP, TYPE C1 EACH	608 CURB RAMP, TYPE C2 EACH	608 TRUNCATED DOMES SQ FT	609 CURB, TYPE 6 FT	638 VALVE BOX ADJUSTED TO GRADE EACH
R-1	6	2.1	144	18	0.35	0.69	0.16	0.12		162			1					18	
R-2	6	1.8	98	16	0.30	0.59	0.13	0.10		131						1		16	
R-3	6	2.6	143	7	0.63	0.76	0.28	0.21		158						1		7	
R-4	6									32							10		
R-5	6	2.3	167	20	0.39	0.76	0.18	0.13		171						1		20	1
R-6	9	1.9	147	19	0.35	0.70	0.16	0.12		146			1					19	
R-7	9	1.6	116	17	0.31	0.63	0.14	0.10		122			1					17	
R-8	10	2.0	206	19	0.37	0.72	0.17	0.12		203			1					19	
R-9	10	3.0	226	32	0.59	1.19	0.27	0.20		203			1					32	
R-10	10	2.2	208	21	0.39	0.78	0.18	0.13		216			1					21	
R-11	10	1.4	136		0.24	0.24	0.11	0.08		127				1					
R-12	11	1.6	161	12	0.22	0.44	0.10	0.07		161	1							12	
R-13	11	3.1	221	26	0.52	1.00	0.23	0.17		223					1			26	
R-14	11	4.3	353	36	1.00	1.67	0.45	0.33		354			1					36	
R-15	12	2.7	73	23	0.43	0.85	0.19	0.14		216			1					23	
R-16	12	1.8	74	16	0.31	0.61	0.14	0.10		155			1					16	
R-17	12	3.1	70	27	0.52	1.02	0.23	0.17		167		1						27	
R-18	12	4.4	41	18	0.33	0.67	0.15	0.11		100	2							18	
R-19	12	2.8	104	11	0.20	0.41	0.09	0.07		235							1	11	
R-20	13	7.3	199	21	1.30	1.69	0.58	0.43		201			1					21	
R-21	13	4.4	185	20	0.81	1.19	0.37	0.27		195			1					20	
R-22	13	4.0	200	25	0.48	0.94	0.22	0.16		206			1					25	
R-23	13	3.0	156	23	0.46	0.89	0.21	0.15		156			1					23	
R-24	14	0.8	101	7	0.13	0.26	0.06	0.04		126						1		7	
R-25	14	0.8	219	7	0.13	0.26	0.06	0.04		253						1		7	
R-26	14		45							45									
R-27	17	14.3	272	64	2.43	3.61	1.09	0.81		300		1	1					64	
R-28	17		22														22		
R-29	17	6.7	145	18	1.02	1.35	0.46	0.34		145	1							18	

CALCULATED JWB
CHECKED DJH

ESTIMATED QUANTITIES

ATB-ASHTABULA
SIGNAL UPGRADE

5
63



NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
812,907.718	2,435,508.936	638.38	IPF	3/4" PROJECT CONTROL STELLY & SNYDER
813,431.823	2,435,372.781	635.07	IPF	3/4" PROJECT CONTROL STELLY & SNYDER
813,056.583	2,435,455.611	640.73	BM	W BOLT FH-NW CORNER OF COLUMBUS & 23rd
812,829.597	2,435,534.365	639.78	BM	MAG IN E/S POLE 100' S. OF E. 23rd ON W/S COLUMBUS AVE.

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
E. 23rd STREET AND COLUMBUS AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

6
63

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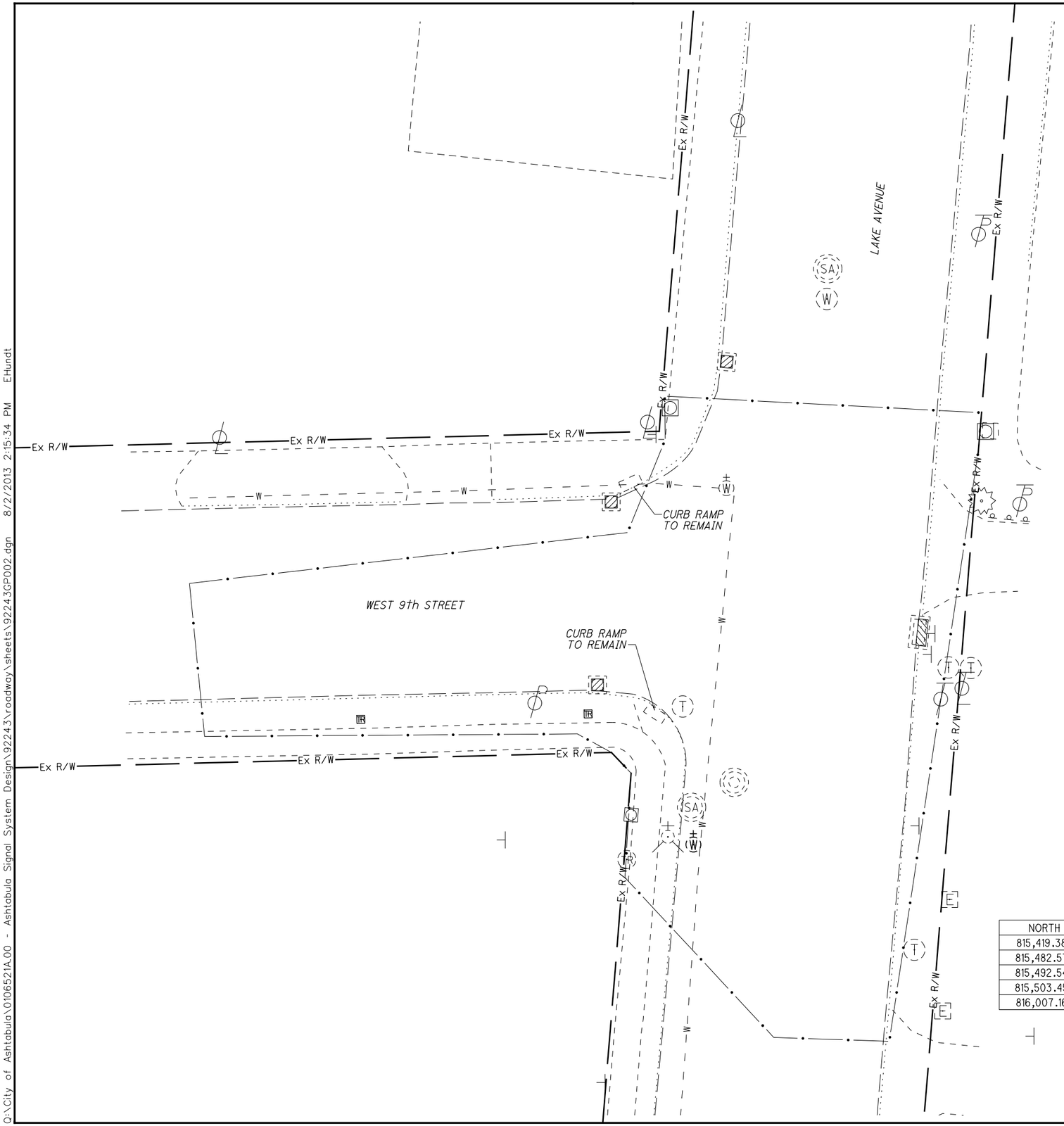

NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
815,419.388	2,429,907.016	631.47	BM	M IN MUELLER ON FIRE HYDRANT
815,482.575	2,429,510.630	630.88	GOVCON	BRASS DISK IN CONCRETE IN SQ. BOX
815,492.545	2,429,908.540	629.81	GOVCOM	BRASS DISK IN CONCRETE IN SQ. BOX
815,503.459	2,429,894.702	630.74	MAG	
816,007.168	2,429,952.869		GOVCOM	BRASS DISK IN CONCRETE IN SQ. BOX

R/W BASED ON GIS DATA AND EXISTING PLANS
FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
W. 9th STREET AND LAKE AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

7
63

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NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
812,498.569	2,430,917.205	643.65	BM	M IN MUELLER ON FIRE HYDRANT NE QUAD LAKE & WEST
812,456.796	2,430,979.971	641.88	BM	NW CORNER OF NW ABUT. WALL BRIDGE OVER RAILROAD
812,332.487	2,430,987.984	645.17	BM	RR SPIKE IN POLE SE QUAD LAKE AND WEST
812,777.860	2,430,524.951	625.02	IPF	3/4" PROJECT CONTROL STELLY & SNYDER
812,444.957	2,430,960.156	645.49	IPF	3/4" PROJECT CONTROL STELLY & SNYDER

LAKE AVENUE

EX R/W

Ex R/W

Ex R/W

CURB RAMP TO REMAIN

CURB RAMP TO REMAIN

CURB RAMP TO REMAIN

CURB RAMP TO REMAIN

WEST 19th STREET

Ex R/W

Ex R/W

Ex R/W

Ex R/W

Ex R/W

WEST AVENUE

LAKE AVENUE

Ex R/W

Ex R/W

Ex R/W

R/W BASED ON GIS DATA
FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
W. 19th STREET AND WEST AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

8
63

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B/C
R=40.00'
Δ =26°31'40"
T=9.43'
L =18.52'

B/W
R=25.00'
Δ =18°24'15"
T=4.05'
L =8.03'

B/C
R=35.00'
Δ =27°48'4"
T=8.66'
L =16.98'

EAST 24th STREET

WEST 24th STREET

LAKE AVENUE

LAKE AVENUE

CURB RAMP TYPE B2

CURB RAMP TYPE B2

CURB RAMP TO REMAIN

CURB RAMP TO REMAIN

Ex R/W

636.04
635.88
635.98
636.41
635.78
635.88
635.87
635.54
635.44
635.64
635.54
636.07

NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
		638.74	BM	SE CORNER CONC. AT OLD GAS STATION
811,240.259	2,432,273.596	638.86	BM	U IN MUELLER ON FIRE HYDRANT NW QUAD LAKE & 24th
810,886.943	2,432,721.874	637.93	GOVCOM	BRASS DISK IN CONCRETE IN SQ. BOX
810,690.217	2,432,927.718	638.82	GOVCOM	BRASS DISK IN CONCRETE IN SQ. BOX
811,258.462	2,432,441.850	636.81	IPF	3/4" PROJECT CONTROL STELLY & SNYDER

R/W BASED ON GIS DATA AND EXISTING PLANS

FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
W. 24th STREET AND LAKE AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

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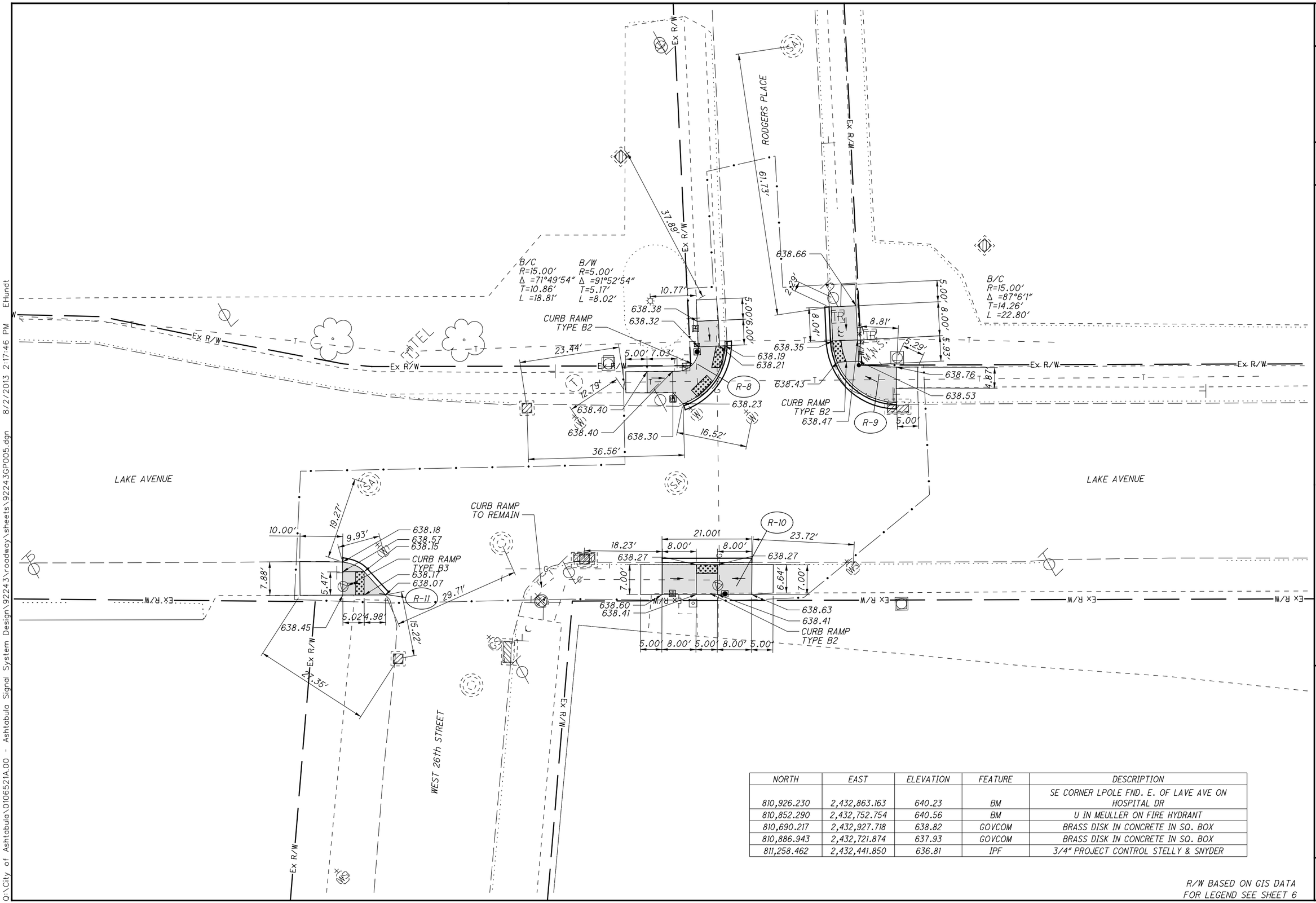

NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
810,926.230	2,432,863.163	640.23	BM	SE CORNER LPOLE FND. E. OF LAVE AVE ON HOSPITAL DR
810,852.290	2,432,752.754	640.56	BM	U IN MEULLER ON FIRE HYDRANT
810,690.217	2,432,927.718	638.82	GOVCOM	BRASS DISK IN CONCRETE IN SQ. BOX
810,886.943	2,432,721.874	637.93	GOVCOM	BRASS DISK IN CONCRETE IN SQ. BOX
811,258.462	2,432,441.850	636.81	IPF	3/4" PROJECT CONTROL STELLY & SNYDER

R/W BASED ON GIS DATA
FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
RODGERS PL. AND LAKE AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

10
63

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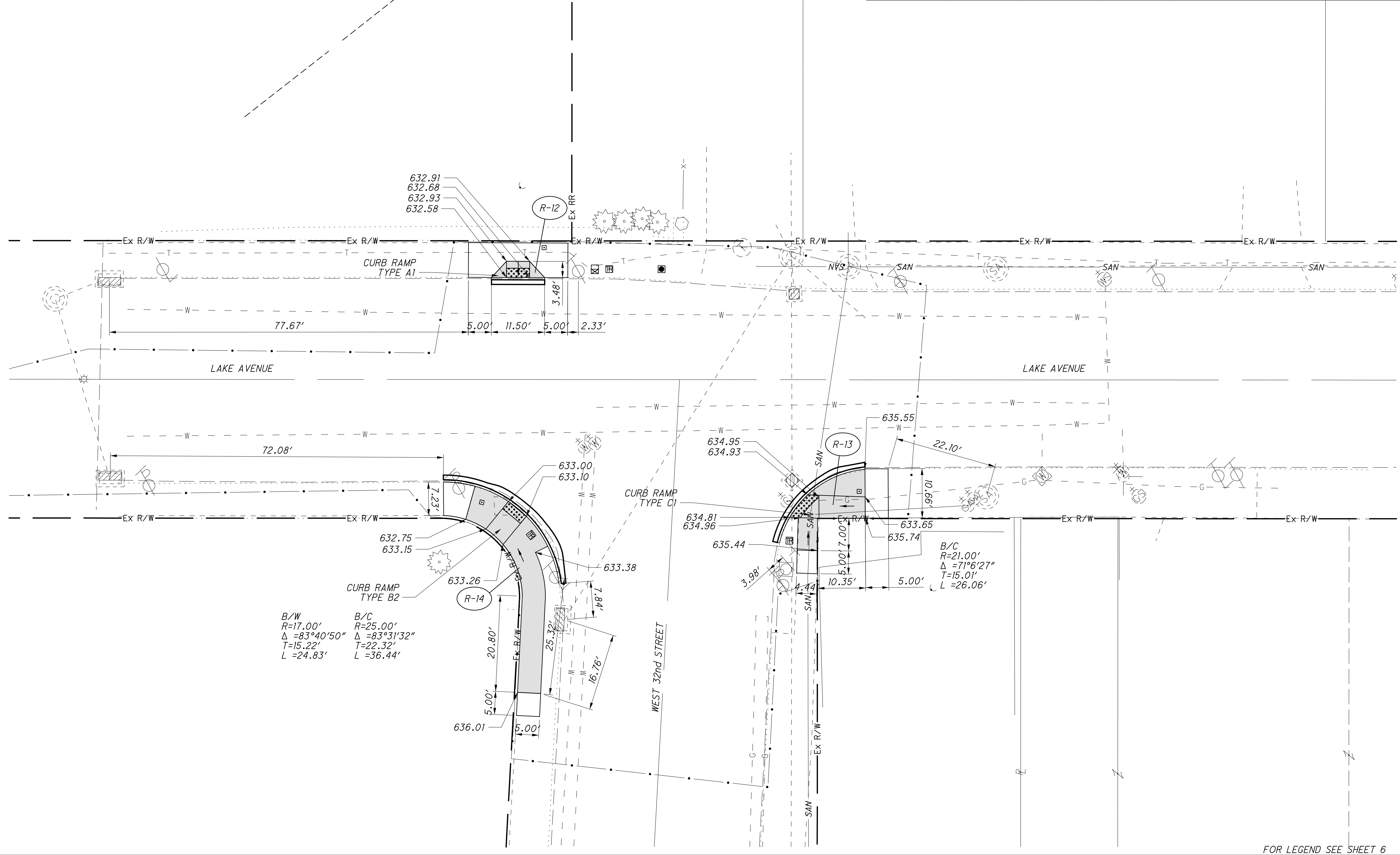
NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
809,681.691	2,433,984.540	640.30	BM	U-MUELLER ON FH SW QUAD LAKE & 23ND
809,751.719	2,433,867.789	636.86	BM	SW END OF WALL AT NW QUAD LAKE-W.32ND
810,128.981	2,433,513.144	637.25	GOVCON	BRASS DISK IN CONC. INSIDE ROUND BOX
809,525.215	2,434,133.376	644.48	GOVCON	CROSS CUT FOUND IN BRASS DISK IN CONCRETE
809,946.984	2,533,703.500	631.25	GOVCON	BRASS DISK FOUND IN CONCRETE
809,325.721	2,434,339.047	646.49	GOVCON	PUNCH HOLE FOUND IN BRASS DISK
809,474.169	2,433,579.696	643.83	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
809,784.305	2,433,952.253	635.05	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER



FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET 0 5 10 20

CALCULATED JWB
CHECKED DJH

INTERSECTION DETAIL
W 32nd STREET AND LAKE AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

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NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
807,755.570	2,436,375.085	677.65	BM	SE COR CONC BASE FOR YMCA SIGN NE COR LAKE & PROSPECT
807,618.167	2,436,351.170	678.92	BM	NE BOLT ON WALGREENS SIGN BASE SW COR LAKE & PROSPECT
807,428.929	2,435,931.377	675.00	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
807,716.437	2,436,484.629	678.28	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
807,610.358	2,436,597.994	680.26	MONBOX	CENTER OF LID
807,794.074	2,436,568.704	677.96	MONBOX	CENTER OF LID

NORTH RIDGE ROAD WEST
(WEST PROSPECT ROAD)

LAKE AVENUE

PARK AVENUE

CURB RAMP
TYPE B2

B/W
R=42.50'
Δ =24°42'09"
T=9.70'
L =19.07'

B/C
R=50.00'
Δ =25°02'40"
T=11.46'
L =22.52'

677.19
676.52
676.74
676.42
676.27
676.37
R-15

B/C
R=30.00'
Δ =26°38'50"
T=7.10'
L =13.95'

679.61
678.94
678.78
679.66
678.88
R-16

CURB RAMP
TYPE C2
675.66
676.33
675.83
675.76
675.90
677.27
R-19

CURB RAMP
TYPE A1
679.10
679.10
679.00
678.60
679.20
679.18
R-18

CURB RAMP
TYPE A1
78.70
679.08

679.40
680.48
679.41
679.53
CURB RAMP
TYPE B1
R-17

CURB RAMP TO REMAIN
CURB RAMP TO REMAIN

R/W BASED ON GIS DATA AND EXISTING PLANS
FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
N. RIDGE ROAD W. AND LAKE AVE

ATB-ASHTABULA
SIGNAL UPGRADE

12
63

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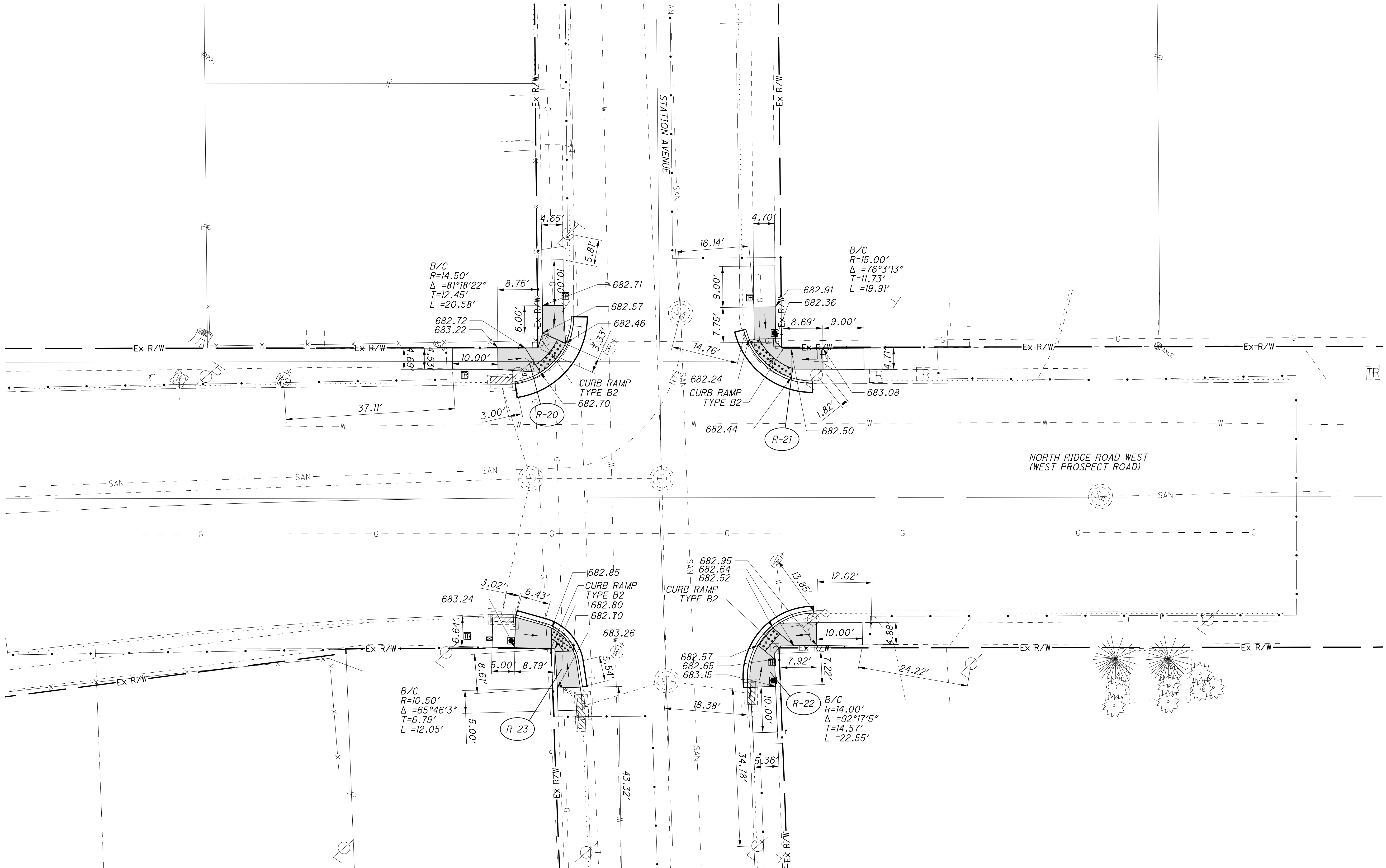


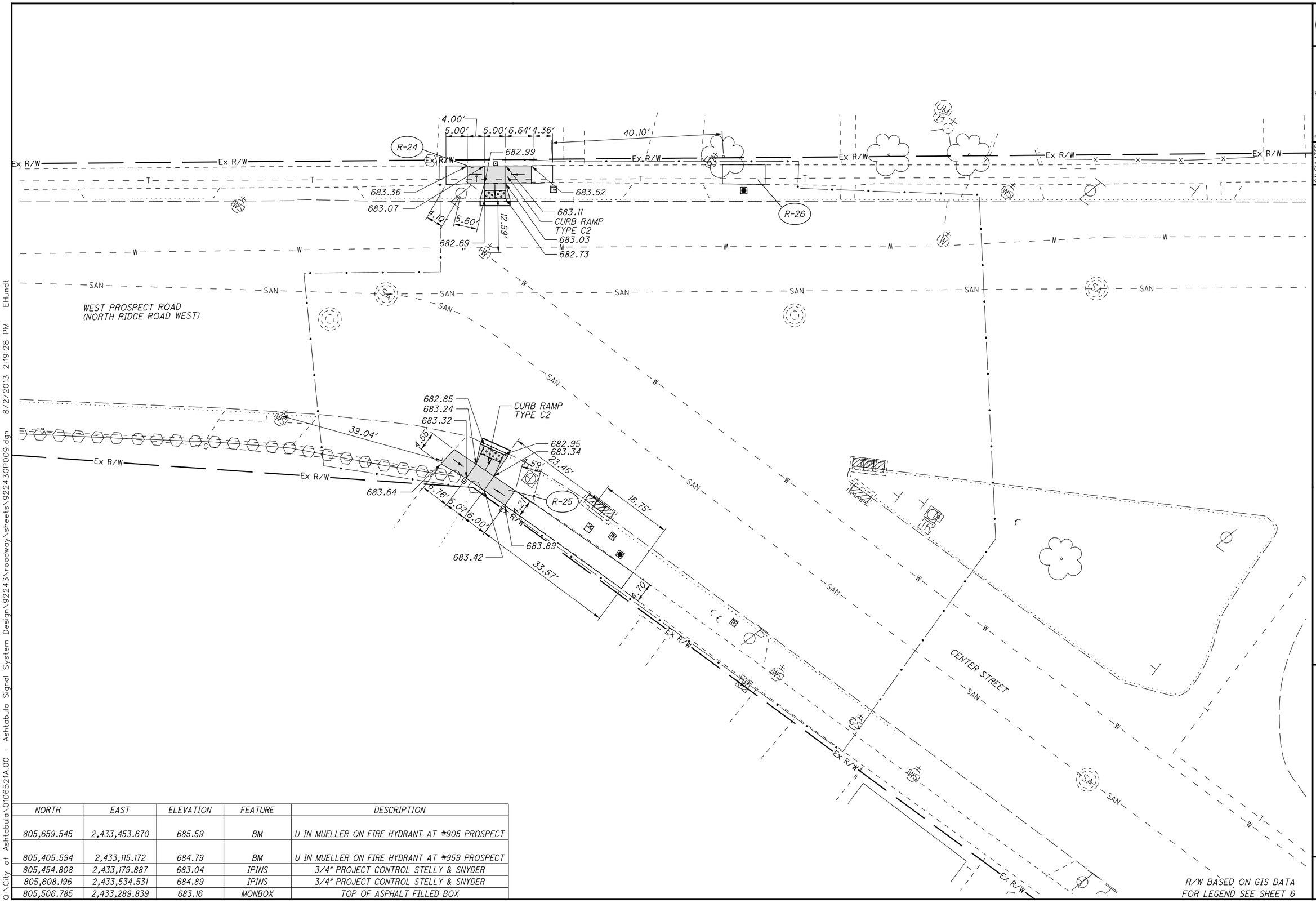
NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
807,428.929	2,435,931.377	675.00	IPINS	* 3/4" PROJECT CONTROL STELLY & SNYDER
806,981.310	2,435,262.881	682.20	AXLE	* FLUSH
806,930.757	2,435,200.681	682.63	GOVCON	CROSS CUT ACE NO LID
807,252.262	2,434,975.607	669.24	GOVCON	PUNCH HOLE ACE ROUND BOX
806,685.544	2,434,842.828	685.05	GOVCON	SQ BOX NO LID

FOR LEGEND SEE SHEET 6

CALCULATED JWB
CHECKED DJH

INTERSECTION DETAIL
N. RIDGE ROAD W. AND STATION AVE.

ATB-ASHTABULA SIGNAL UPGRADE



NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
805,659.545	2,433,453.670	685.59	BM	U IN MUELLER ON FIRE HYDRANT AT #905 PROSPECT
805,405.594	2,433,115.172	684.79	BM	U IN MUELLER ON FIRE HYDRANT AT #959 PROSPECT
805,454.808	2,433,179.887	683.04	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
805,608.196	2,433,534.531	684.89	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
805,506.785	2,433,289.839	683.16	MONBOX	TOP OF ASPHALT FILLED BOX

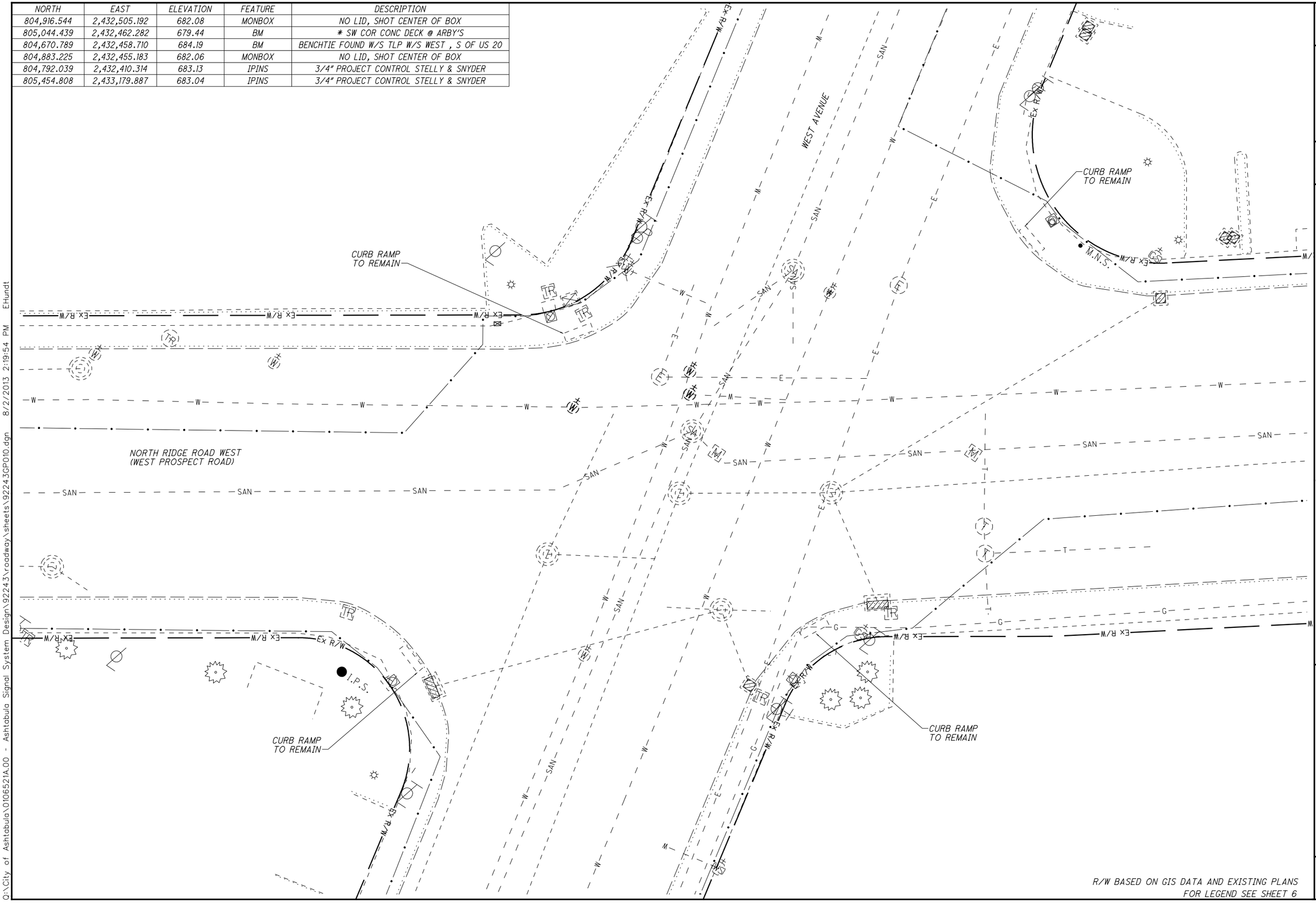
HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
CENTER STREET AND WEST PROSPECT ROAD

ATB-ASHTABULA
SIGNAL UPGRADE

NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
804,916.544	2,432,505.192	682.08	MONBOX	NO LID, SHOT CENTER OF BOX
805,044.439	2,432,462.282	679.44	BM	* SW COR CONC DECK @ ARBY'S
804,670.789	2,432,458.710	684.19	BM	BENCHTIE FOUND W/S TLP W/S WEST , S OF US 20
804,883.225	2,432,455.183	682.06	MONBOX	NO LID, SHOT CENTER OF BOX
804,792.039	2,432,410.314	683.13	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
805,454.808	2,433,179.887	683.04	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER



HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
WEST AVE. AND N. RIDGE ROAD W.

ATB-ASHTABULA
SIGNAL UPGRADE

15
63

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NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
803,042.409	2,429,419.259	679.55	BM	NE COR WALK SIGNAL BASE NE QUAD PROSPECT/WOODMAN
802,895.843	2,429,302.297	682.00	BM	U IN MUELL ON FIRE HYDRANT SW QUAD US20/WOODMAN
802,896.711	2,429,376.011	680.61	IPIN	3/4" R/W ODOT DISTRICT-4 S-7798
802,902.532	2,429,333.395	679.91	IPIN	3/4" R/W ODOT DISTRICT-4 S-7799
803,044.054	2,429,416.970	679.03	IPIN	3/4" R/W ODOT DISTRICT-4 S-7800
802,884.375	2,429,444.807	680.20	MONBOX	CENTER OF LID
803,048.962	2,429,506.881	678.85	MONBOX	CENTER OF LID
802,908.174	2,429,245.940	679.58	MONBOX	CENTER OF LID

WOODMAN AVENUE

NORTH RIDGE ROAD WEST
(WEST PROSPECT ROAD)

CURB RAMP TO REMAIN

Ex R/W

Ex SH

I.P.F.

SAN

R/W BASED ON GIS DATA AND EXISTING PLANS
FOR LEGEND SEE SHEET 6

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
WOODMAN AVE. AND N. RIDGE ROAD W.

ATB-ASHTABULA
SIGNAL UPGRADE

16
63

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NORTH	EAST	ELEVATION	FEATURE	DESCRIPTION
800,543.239	2,433,855.934	778.28	BM	U IN MUELLER ON FH NE QUAD BUNKER HILL/JEFFERSON RD
800,416.607	2,433,791.553	781.70	BM	E BOLT ON E SIGNBASE SW QUAD BUNKER HILL & JEFFERSON ROAD
800,541.476	2,433,854.198	776.27	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER
800,156.374	2,433,836.064	788.48	IPINS	3/4" PROJECT CONTROL STELLY & SNYDER

HORIZONTAL SCALE IN FEET
0 5 10 20

CALCULATED UWB
CHECKED DJH

INTERSECTION DETAIL
JEFFERSON ROAD AND BUNKER HILL ROAD

ATB-ASHTABULA
SIGNAL UPGRADE

17
63

BUNKER HILL ROAD
JEFFERSON ROAD
Ex R/W
51.17′
19.55′
30.14′
777.27
777.17
15.56′
R-29
7.49′
8.85′
8.89′
28.72′
15.46′
776.98
776.88
18.39′
CURB RAMP TYPE A1
CURB RAMP TYPE B1
777.68
25.75′
27.02′
777.78
38.26′
8.82′
778.45
778.49
778.40
778.50
CURB RAMP TYPE B2
777.76
777.86
5.00′
R-27
B/W
R=64.00′
Δ =31°56′39″
T=18.32′
L =35.68′
778.49
778.59
779.09
9.28′
7.27′
11.56′
B/W
R=40.26′
Δ =10°31′23″
T=3.71′
L =7.39′
B/C
R=68.50′
Δ =53°39′5″
T=34.64′
L =64.14′
21.97′
6.12′
6.45′
85.74′
28.69′
11.13′
16.26′
13.67′
R-28
TRUNCATED DOMES
SAN
W
G
T
E
FOR LEGEND SEE SHEET 6

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GENERAL REQUIREMENTS
THE PURPOSE OF THIS SPECIFICATION AND THE ASSOCIATED PLANS IS TO UPGRADE EXISTING SIGNAL EQUIPMENT AND TO COMPLETE A TRAFFIC SIGNAL SYSTEM FOR THE LAKE AVENUE AND PROSPECT ROAD CORRIDORS IN THE CITY OF ASHTABULA, OHIO. THESE PLANS AND SPECIFICATIONS ARE TO RESULT IN THE COMPLETE INSTALLATION OF A FULLY FUNCTIONAL SIGNAL SYSTEM. THE SIGNAL SYSTEM SHALL OPERATE ACCORDING TO THE REQUIREMENTS OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD).

THE INTERSECTIONS WITHIN THE CORRIDORS SPECIFIED ABOVE WILL COMMUNICATE VIA SPREAD SPECTRUM RADIO. THE COMPLETED SYSTEM SHALL INCLUDE ALL HARDWARE AND SOFTWARE TO MAKE THE SYSTEM OPERATIONAL. THE EQUIPMENT MODULES AND SOFTWARE SHALL BE THE LATEST MODULES AND VERSIONS, SHALL BE PROVIDED WITH COMPLETE OPERATION MANUALS AND INSTRUCTIONS, SHALL BE PRE-TESTED, AND SHALL FUNCTION AS A SYSTEM.

THE OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIAL SPECIFICATION DATED JANUARY 1, 2013, SHALL GOVERN THIS PROJECT (EXCEPT WHEN OTHERWISE NOTED). ITEMS LISTED SHALL CONFORM TO THE STATE OF OHIO DEPARTMENT OF TRANSPORTATION CONSTRUCTION AND MATERIALS SPECIFICATIONS, TO THE ODOT STANDARD CONSTRUCTION DRAWINGS, AND TO ANY SUPPLEMENTAL SPECIFICATIONS AND/OR SPECIFIC REQUIREMENTS NOTED. BIDDERS SHALL COMPLY WITH ALL APPLICABLE PROVISIONS OF THE OHIO REVISED CODE AND ADMINISTRATIVE CODE.

NOTIFICATION
THE CONTRACTOR SHALL GIVE THE MUNICIPALITY, 10 WORKING DAYS NOTICE PRIOR TO THE NEW SIGNAL BEING PLACED IN OPERATION.

THE SIGNAL INSTALLATION SHALL BE INSPECTED BY CITY OF ASHTABULA PERSONNEL. ALL DEFICIENCIES SHALL BE CORRECTED BY THE CONTACTOR AND APPROVED BY THE MUNICIPALITY.

GROUNDING AND BONDING
THE REQUIREMENTS OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS (CMS) AND THE TC SERIES OF STANDARD CONSTRUCTION DRAWINGS ARE MODIFIED AS FOLLOWS:
1. ALL METALLIC PARTS CONTAINING ELECTRICAL CONDUCTORS SHALL BE PERMANENTLY JOINED TO FORM AN EFFECTIVE GROUND FAULT CURRENT PATH BACK TO THE GROUNDED CONDUCTOR IN THE POWER SERVICE DISCONNECT SWITCH.
A. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR IN METALLIC CONDUITS (725.04) IN ADDITION TO THE CONDUCTORS SPECIFIED AND BOND THE CONDUIT TO THIS GROUNDING CONDUCTOR.
B. WHEN AN EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN PLASTIC CONDUIT (725.05), THE INSTALLATION SHALL INCLUDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN ADDITION TO THE CONDUCTORS SPECIFIED.
C. METALLIC CONDUIT CARRYING THE LOOP WIRES FROM IN THE PAVEMENT TO THE PULL BOX SPLICE LOCATION WILL ONLY BE BONDED AT THE PULL BOX END, AND WILL NOT CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
D. IF MULTIPLE CONDUIT RUNS BEGIN AND END AT THE SAME POINTS, ONLY ONE EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED.
E. IF AN EQUIPMENT GROUNDING CONDUCTOR IS NEEDED IN CONDUIT BETWEEN SIGNALIZED INTERSECTIONS FOR UNDERGROUND INTERCONNECT CABLE, THE GROUNDING SYSTEM FOR EACH SIGNALIZED INTERSECTION WILL BE SEPARATED ABOUT MIDWAY BETWEEN THE INTERSECTIONS.
F. THE MESSENGER WIRE AT SIGNALIZED INTERSECTIONS WILL BE USED AS THE CONDUCTIVE PATH FROM CORNER TO CORNER IF CONDUIT IS NOT PROVIDED UNDER THE ROADWAY. WHEN CONDUIT CONNECTS THE CORNERS OF AN INTERSECTION, AN EQUIPMENT GROUNDING CONDUCTOR SHALL BE USED IN THE CONDUIT.

2. CONDUITS.
A. THE 725.04 CONDUIT SHALL HAVE GROUNDING BUSHINGS INSTALLED AT ALL TERMINATION POINTS. THE BUSHING MATERIAL SHALL BE COMPATIBLE WITH GALVANIZED STEEL CONDUIT AND THE GROUNDING LUG MATERIAL SHALL BE COMPATIBLE FOR USE WITH COPPER WIRE. THREADED OR COMPRESSION TYPE BUSHINGS MAY BE USED.
B. THE 725.05 CONDUIT SHALL HAVE THE INSIDE AND OUTSIDE DIAMETERS OF THE CONDUIT DEBURRED AT ALL TERMINATION POINTS.
C. BOTH ENDS OF METALLIC CONDUIT SHALL BE BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.
D. METALLIC CONDUIT MAY BE BONDED TO METALLIC BOXES THROUGH THE USE OF CONDUIT FITTINGS UL APPROVED FOR THIS TYPE OF CONNECTION, WITH THE BOX BONDED TO THE EQUIPMENT GROUNDING CONDUCTOR.

3. WIRE FOR GROUNDING AND BONDING.
A. USE INSULATED, COPPER WIRE FOR THE EQUIPMENT GROUNDING CONDUCTOR. BONDING JUMPERS IN BOXES AND ENCLOSURES MAY BE BARE OR INSULATED COPPER WIRE. WIRE SIZE SHALL BE AS FOLLOWS:
I. USE 4 AWG BETWEEN THE POWER SERVICE AND SUPPORTS, POLES, PEDESTALS, CONTROLLER OR FLASHER CABINETS.
II. USE A MINIMUM 8 AWG BETWEEN LOOP DETECTOR PULL BOXES AND THE FIRST CONDUIT THAT REQUIRES A LARGER SIZE AS SPECIFIED IN 3.A.I ABOVE.
III. 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 ¾ 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 SPICE.
B. THE SERVICE NEUTRAL (AC-) SHALL ONLY BE CONNECTED TO GROUND AT THE PRIMARY POWER SERVICE DISCONNECT SWITCH.
I. NEMA CONTROLLER CABINETS: IF A POWER SERVICE DISCONNECT SWITCH IS LOCATED BEFORE THE CONTROLLER CABINET, THE NEUTRAL (AC-) AND THE GROUNDING BARS IN THE CONTROLLER CABINET SHALL NOT BE CONNECTED TOGETHER AS SHOWN IN NEMA TS-2, FIGURE 5-4.
II. IF SECONDARY DISCONNECT SWITCHES ARE CONNECTED AFTER THE PRIMARY DISCONNECT SWITCH, THE NEUTRAL (AC-) SHALL ONLY BE GROUNDED AT THE PRIMARY SWITCH. EQUIPMENT GROUNDING CONDUCTORS SHALL BE BROUGHT TO THE PRIMARY SWITCH, BUT SHALL BE GROUNDED AT BOTH SECONDARY AND PRIMARY SWITCHES.

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

ITEM 632, VEHICULAR SIGNAL HEAD, (LED), BLACK, <BY SECTION>, 12" LENS, <BY WAY>, POLYCARBONATE, <WITH BACKPLATE>, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF CMS ITEM 632 AND CMS 732, THE FOLLOWING REQUIREMENTS SHALL APPLY:

SIGNAL SECTIONS:
1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
2. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
3. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING. THE HEADS SHALL HAVE FEDERAL YELLOW DOORS AND HOUSING WITH BLACK VISORS.

MOUNTING HARDWARE:
1. FOR MAST ARM INSTALLATIONS, ALL SIGNAL HEADS SHALL BE RIGIDLY MOUNTED TO THE MAST ARM WITH THE RED LENS LOCATED IN FRONT OF THE MAST ARM.
2. ALL UPPER SIGNAL SUPPORT HARDWARE AND PIPING UP TO AND INCLUDING THE WIRE INLET FITTING SHALL BE FERROUS METAL FOR SIGNAL DISPLAYS OF TWO OR MORE SECTIONS.
3. FOR SPAN WIRE INSTALLATIONS, THE ENTRANCE FITTING SHALL BE OF THE TRI-STUD DESIGN WITH SERRATED RINGS IN ORDER TO ACHIEVE POSITIVE LOCKING.
4. FOR SPAN WIRE INSTALLATIONS WITHOUT TETHERING, BALANCE ADJUSTERS SHALL NOT BE USED ON ONE-WAY HEADS.

THE DEPARTMENT WILL MEASURE VEHICULAR SIGNAL HEAD, (LED), BLACK, <BY SECTION>, 12" LENS, <BY WAY>, POLYCARBONATE, <WITH BACKPLATE>, AS PER PLAN BY THE NUMBER OF COMPLETE UNITS FURNISHED AND INSTALLED, AND WILL INCLUDE ALL SUPPORT AND MOUNTING HARDWARE, DISCONNECT HANGERS, CLOSURE CAPS, DIMMERS, AND LAMPS AS SPECIFIED.

ITEM 632, PEDESTRIAN SIGNAL, (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
ITEM 632, PEDESTRIAN SIGNAL (LED), TYPE D2, COUNTDOWN, AUDIBLE, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF CMS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL ALSO APPLY:
1. SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE AND MEET ITE SPECIFICATIONS.
2. PIPE, SPACERS AND FITTINGS CONSTRUCTED OF POLYCARBONATE PLASTIC MAY BE USED IN LIEU OF GALVANIZED STEEL OR ALUMINUM.
3. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING. ALL EQUIPMENT UNDER THIS ITEM SHALL BE BLACK.

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

ITEM 632, MESSENGER WIRE
THE MESSENGER WIRE SHALL BE AS PER SPECIFICATION 632 AND STANDARD CONSTRUCTION DRAWING TC - 84.20 EXCEPT THE "ALTERNATE MESSENGER WIRE ASSEMBLY" SHALL NOT BE USED.

ITEM 632, STRAIN POLE FOUNDATION, AS PER PLAN
ITEM 632, SIGNAL SUPPORT FOUNDATION, AS PER PLAN
THIS PROJECT REQUIRES CONSTRUCTION OF SIGNAL SUPPORT FOUNDATIONS IN LOCATIONS WHICH CONTAIN NUMEROUS EXISTING UNDERGROUND AND OVERHEAD UTILITIES. ORDERS FOR SIGNAL POLES AND MAST ARMS SHALL BE PLACED SYSTEMATICALLY AFTER THEIR RESPECTIVE FOUNDATIONS HAVE BEEN CONSTRUCTED. FOUNDATIONS THAT HAVE BEEN CONSTRUCTED SHALL BE PROTECTED AS PER SECTION 107.07 OF THE CONSTRUCTION AND MATERIAL SPECIFICATIONS.

WITHIN TWO [2] WEEKS OF RECEIVING A SIGNED CONTRACT, THE CONTRACTOR SHALL LAYOUT THE PERIMETER OF EACH FOUNDATION THEN CONTACT OUPS [1-800-362-2764], OGPUPS [1-800-925-0988] AND ODOT [330-786-4818]. A MEETING BETWEEN THE CONTRACTOR, ENGINEER AND A REPRESENTATIVE FROM THE MAINTAINING AGENCY WILL BE HELD ON SITE NO LATER THAN TWO [2] WEEKS AFTER THE OUPS NOTIFICATION. BASED UPON THE PRIORITIES DETERMINED AT THIS MEETING, THE CONTRACTOR WILL CONSTRUCT FOUNDATIONS BEGINNING WITH THE HIGHEST PRIORITY FIRST.

IF A UTILITY OR OTHER CONFLICT EXISTS WHICH REQUIRES THAT A SIGNAL SUPPORT BE CONSTRUCTED AT A LOCATION OTHER THAN WHAT IS INDICATED IN THE PLAN, THE MAINTAINING AGENCY AND THE ENGINEER SHALL DETERMINE WHETHER THE SPECIFIED MAST ARM LENGTH IS APPROPRIATE. IF A LONGER ARM IS REQUIRED, WITHIN TEN [10] WORKING DAYS, THE MAINTAINING AGENCY WILL PROVIDE THE CONTRACTOR WITH REVISED POLE AND ARM DATA. THE CONTRACTOR SHALL NOT ORDER THE POLES PRIOR TO RECEIVING THIS DATA. SUPPORT FOUNDATION LOCATIONS SHALL BE ADJUSTED ONLY WHEN APPROVED BY THE ENGINEER.

THE CONTRACTOR IS ADVISED TO LOCATE AND CONSTRUCT THE SIGNAL SUPPORT FOUNDATIONS AS SOON AS POSSIBLE IN ORDER TO PROVIDE AMPLE LEAD TIME TO ORDER THE SIGNAL SUPPORTS AND THEIR ASSOCIATED MAST ARMS. ALL FOUNDATIONS SHALL BE HAND EXCAVATED UNLESS OTHERWISE DIRECTED BY THE ENGINEER. NO TIME EXTENSIONS SHALL BE GRANTED FOR DELAYS WHICH ARE CAUSED BY THE CONTRACTOR'S FAILURE TO PLAN FOUNDATION WORK AS SOON AS POSSIBLE IN THE CONTRACTORS PROGRESS SCHEDULE.

WORK SHALL CONSIST OF INSTALLING AN ADDITIONAL UNUSED 2-INCH CONDUIT ELL FOR FUTURE USE BEYOND THAT WHICH IS SHOWN ON THE PLANS. THE CONDUIT ELL SHALL BE INSTALLED IN THE SAME ORIENTATION AS THE CONDUIT ELL FOR THE PROPOSED SIGNAL CABLE. BOTH ENDS OF THE CONDUIT ELL SHALL BE TEMPORARILY SEALED TO PREVENT INTRUSION OF SOIL AND/OR OTHER DEBRIS.

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

ITEM 632 - POWER SERVICE, AS PER PLAN
POWER SERVICE SHALL BE AS PER SPECIFICATION 632 AND STANDARD CONSTRUCTION DRAWING TC-83.10 WITH THE FOLLOWING EXCEPTIONS:
1) THE METER BASE MOUNTING HEIGHT SHALL BE NO MORE THAN FIVE (5) FEET HIGH TO THE CENTER OF THE METER BASE FROM THE GROUND.
2) THE CONTRACTOR SHALL SUPPLY THE NECESSARY METER BASES.
3) ALL POWER SERVICES SHALL BE METERED. THE METER SHALL HAVE A LEVER OPERATED BYPASS.
4) THE POWER SERVICE BLIND HALF COUPLING SHALL BE TWENTY-SEVEN [27] INCHES ABOVE THE BOTTOM OF THE STRAIN POLE BASE PLATE AND SHALL BE WELDED TO THE STRAIN POLE.
5) CONDUIT FROM THE BOTTOM OF THE DISCONNECT SWITCH ENCLOSURE INTO THE BOTTOM OF THE CONTROLLER CABINET WILL NOT BE PERMITTED. POWER SERVICE WIRES FROM THE DISCONNECT SWITCH ENCLOSURE TO THE CONTROLLER CABINET SHALL BE ROUTED THROUGH THE STRAIN POLE.

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL NOTES

ATB-ASHTABULA SIGNAL UPGRADE

ITEM 632 - POWER SERVICE, AS PER PLAN - (CONTINUED)
DISCONNECT SWITCH ENCLOSURES FURNISHED 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 THE POWER COMPANY FOR INFORMATION REGARDING THE METER BASE INSTALLATION PRIOR TO ORDERING POLES. THE CONTRACTOR WILL BE RESPONSIBLE FOR REQUESTING AND SCHEDULING ANY INSPECTIONS THE POWER COMPANY MAY REQUIRE FOR THE POWER SERVICE HOOK UP. THE CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT THE POWER COMPANY FOR THE ELECTRICAL SERVICE CONNECTION. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR SPLICE POWER CABLE INTO THE POWER COMPANY'S CIRCUITS. THE VOLTAGE SUPPLIED SHALL BE NOMINALLY 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 MAINTAINING AGENCY.

POWER SUPPLY FOR TRAFFIC SIGNALS
ELECTRIC POWER SHALL BE OBTAINED FROM FIRST ENERGY AT THE LOCATIONS INDICATED ON THE PLANS. POWER SUPPLIED SHALL BE 120 VOLTS.

FIRST ENERGY
(THE ILLUMINATING COMPANY)
7757 AUBURN ROAD
CONCORD TOWNSHIP, OHIO 44077
PHONE: (440) 350-7699

632 - SIGNAL SUPPORT, <BY TYPE>, AS PER PLAN
632 - STRAIN POLE, <BY TYPE>, AS PER PLAN
632 - PEDESTAL, <BY SIZE>, TRANSFORMER BASE, AS PER PLAN
IN ADDITION TO PROVISIONS OF THE ODOT CMS THE SIGNAL SUPPORTS, STRAIN POLES AND PEDESTALS SHALL BE FURNISHED AND INSTALLED IN ACCORDANCE WITH ODOT STANDARD CONSTRUCTION DRAWINGS AND INCLUDE THE FOLLOWING REQUIREMENTS.

THE SIGNAL POLES AND PEDESTALS SHALL HAVE A BLACK POWER COAT FINISH IN LIEU OF GALVANIZING.

ITEM 632 REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
TRAFFIC SIGNAL INSTALLATIONS, INCLUDING SIGNAL HEADS, CABLE, MESSENGER WIRE, STRAIN POLES, CABINET, CONTROLLER, ETC., SHALL BE REMOVED IN ACCORDANCE WITH CMS 632.26 AND AS INDICATED ON THE PLANS. REMOVED ITEMS SHALL BE REUSED AS PART OF A NEW INSTALLATION ON THE PROJECT OR STORED ON THE PROJECT FOR SALVAGE BY CITY OF ASHTABULA IN ACCORDANCE WITH THE LISTING GIVEN IN THE PLANS, WHICH MAY INCLUDE THE FOLLOWING:
CABINET AND ASSOCIATED HARDWARE (STORAGE)
TIMER (STORAGE)
VEHICULAR SIGNAL HEADS (STORAGE)
PEDESTALS (STORAGE)
SIGNAL SUPPORTS (STORAGE)
PEDESTRIAN SIGNAL HEADS (STORAGE)
PRE-CAST PULL BOXES (STORAGE)
PREEMPTION HARDWARE (STORAGE)
METAL PULL BOXES (DISPOSAL)
SIGNAL AND LOOP WIRE (DISPOSAL)
CONDUIT (ABANDON OR DISPOSAL)

NO REMOVED ITEMS SHALL BE REUSED IN THE NEW TRAFFIC SIGNAL INSTALLATION UNLESS OTHERWISE NOTED ON THE PLANS.

ITEMS NOTED TO BE REMOVED FOR STORAGE SHALL BE DELIVERED TO THE FOLLOWING:
CITY OF ASHTABULA PUBLIC WORKS,
501 WEST 24TH STREET,
ASHTABULA, OH
PHONE: (440) 993-7036

THE CONTRACTOR SHALL NOTIFY THE CITY THREE (3) WORKING DAYS PRIOR TO DELIVERY.

IN THE EVENT THE ITEMS STORED ON THE PROJECT FOR SALVAGE BY THE LOCAL AGENCY 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.

ITEM 632, REUSE OF STRAIN POLE, AS PER PLAN
POLES ARE TO BE FIELD PAINTED BLACK IN COLOR ACCORDING TO PROCEDURES IN ITEM 514 PAINTING.

ITEM 633, CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
ITEM 633, CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN
ITEM 633, CABINET, TYPE TS1, AS PER PLAN
IN ADDITION TO ITEM 633.07, 733.02, AND 733.03 THE CONTROLLER SHALL MEET, AS A MINIMUM, ALL APPLICABLE SECTIONS OF THE NEMA STANDARDS PUBLICATION NO. TS2-2003 (R2008). THIS SPECIFICATION SHALL GOVERN WHERE DIFFERENCES OCCUR IN THE ODOT STANDARD CONSTRUCTION AND MATERIAL SPECIFICATION. THE CONTROLLER SHALL BE FURNISHED WITH THE MOST RECENT SOFTWARE AND PROVIDE ALL FEATURES OF THE LATEST MODEL AVAILABLE. NO CONTROLLER TYPE SHALL BE ACCEPTED FOR THIS PROJECT WHERE THE MANUFACTURER CANNOT SHOW A MINIMUM OF 200 INSTALLED UNITS WITHIN THE STATE OF OHIO AT THE TIME OF BID, UNLESS OTHERWISE APPROVED BY THE CITY.

THE CONTROLLER UNIT SHALL BE FURNISHED IN ACCORDANCE WITH NEMA TS2 TYPE 2 (2003) STANDARDS AND SHALL BE CONNECTED TO A MALFUNCTION MANAGEMENT UNIT AND TO RACK MOUNTED DETECTOR AMPLIFIERS IN A NEMA TS1 CABINET WITH POINT TO POINT WIRING FOR THE TERMINALS AND FACILITIES AS SPECIFIED IN TS1-1989 (R2005).

LOCAL CONTROLLER EQUIPMENT
THE LOCAL CONTROLLER SHALL BE ABLE TO OPERATE TIME OF DAY PATTERNS. THE FOLLOWING FEATURES SHALL BE FURNISHED IN ADDITION TO ALL NEMA TS2 TYPE 2 STANDARDS, ENHANCED MEASURES OF EFFECTIVENESS, AND DIAGNOSTICS THAT ARE AVAILABLE WITH THE MOST RECENT VERSION OF CONTROLLER:

1. THE PEDESTRIAN CLEARANCE INTERVAL SHALL BE USER PROGRAMMABLE IN THE LOCAL CONTROLLER TO PERMIT EXTENDING THE FLASHING DON'T WALK INTERVAL THROUGH THE YELLOW CHANGE INTERVAL AND/OR THE ALL-RED CLEARANCE INTERVAL.

2. THE MALFUNCTION MANAGEMENT UNIT SHALL BE OF A RECORDING TYPE. THE MMU SHALL ALSO HAVE EXTENDED MONITORING OPERATIONAL FOR EACH LOAD SWITCH IN USE IN ACCORDANCE WITH 733.03.A2. THE MONITOR SHALL MONITOR EACH LOAD SWITCH SEPARATELY. EACH SIGNALIZED APPROACH TO THE SIGNAL SHALL HAVE A SEPARATE LOAD SWITCH. THE DESIGN OF THE MONITOR SHALL USE MICROPROCESSOR ARCHITECTURE.

3. THE OVERLAP PROGRAMMING SHALL BE BY USE OF AN INTERCHANGEABLE PLUG IN PRINTED CIRCUIT BOARD ASSEMBLY AS DESCRIBED IN PART 14 OF TS-1-1989.

CABINET EQUIPMENT
CABINETS SHALL BE FURNISHED FULLY EQUIPPED WITH THE FOLLOWING FEATURES READY FOR CONTROLLER INSTALLATION AS REQUIRED:

1. THE CONTROLLER CABINET SHALL NOT BE PAINTED. PRINTED BOARD TYPE BACK PANELS OF THE CONTROLLER CABINET WILL NOT BE ACCEPTABLE. SOLDERED CONNECTIONS WILL BE PERMITTED FOR WIRING ON THE BACK SIDE OF THE BACK PANEL.

2. FURNISH A SHEET ALUMINUM CABINET, FREE OF DEFECTS THAT WOULD IMPAIR SERVICEABILITY OR DETRACT FROM GENERAL APPEARANCE WITH TWO REMOVABLE SHELVES MOUNTED ON ADJUSTABLE CHANNELS. FURNISH A PULL OUT SHELF FOR A LAPTOP COMPUTER. INCLUDE ALL MOUNTING HARDWARE. RACK MOUNT DETECTOR AMPLIFIERS IN A TS2 FORMAT WITH THE BACK PANEL WIRED AS TS1.

3. ALL LOAD SWITCHES SHALL BE SUPPORTED BY A BRACKET EXTENDING AT LEAST HALF THE LENGTH OF THE LOAD SWITCH. THE MINIMUM NUMBER OF LOAD SWITCH SOCKETS IN THE CABINET FOR 2 THROUGH 4 PHASE CONTROLLERS SHALL BE 8. THE MINIMUM NUMBER OF LOAD SWITCH SOCKETS IN THE CABINET FOR 5, 6, 7 AND 8 PHASE CONTROLLERS SHALL BE 16. DUMMY LOAD SWITCHES SHALL BE PROVIDED ON LEFT TURN PHASES REGARDLESS OF CONTROLLER PROGRAMMING CAPABILITIES. LOOP DETECTOR DELAYS SHALL NOT BE PROGRAMMED INTO THE CONTROLLER. "NO SKIP" WIRES SHALL BE PROVIDED ON THE BACKPANEL WHEN PHASES 1 AND/OR 5 ARE IN USE.

4. ALL CONTROLLER AND MALFUNCTION MANAGEMENT UNIT CABLES SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE UNITS TO BE PLACED ON EITHER SHELF OR ON THE TOP OF THE CABINET IN THE OPERATING MODE. CONNECTING CABLES SHALL BE SLEEVED IN A BRAIDED NYLON MESH. THE USE OF EXPOSED TIE-WRAPS OR INTERWOVEN CABLES IS UNACCEPTABLE.

5. ALL SIGNAL CABLE AND LOOP DETECTOR LEAD-IN CABLE TERMINATIONS IN THE CABINET SHALL HAVE NO MORE THAN FOUR (4) INCHES OF THE OUTER INSULATING JACKET REMOVED.

6. THE CABINET SHALL BE EQUIPPED WITH A MOMENTARY PUSHBUTTON CONTACT SWITCH FOR SUBSTITUTING MANUAL OPERATION OF INTERNAL TIMING FOR AUTOMATIC INTERVAL TIMING. THE SWITCH IS TO BE MOUNTED ON A 5 FOOT MINIMUM FLEXIBLE WEATHERPROOF EXTENSION CORD IN ACCORDANCE WITH ITEM 733.03.A.2(J).

7. THE CABINET SHALL BE EITHER POLE OR GROUND MOUNTED AS SPECIFIED ON THE SIGNAL PLANS. THE CABINET SHALL HAVE A NOMINAL CABINET DIMENSION OF AT LEAST 51 INCH HIGH X 36 INCH WIDTH X 18 INCH DEEP UNLESS OTHERWISE APPROVED BY THE ENGINEER.

CONTROLLER AND CABINET TESTING
THE CONTRACTOR SHALL PERFORM BENCH TESTING OF THE COMPONENTS OF THIS SECTION ON THE CONTROLLER CABINET. TESTING OF THE MALFUNCTION MANAGEMENT UNIT SHALL BE DONE BY THE CONTRACTOR BEFORE INSTALLING THE INTERSECTION CONTROLLER AND CABINET IN THE FIELD. SOFTWARE AND FIRMWARE SHALL BE LOADED ON THE CONTROLLER AND CHECKED FOR CORRECT OPERATION OF TIMING PLANS, PHASING SCHEMES, AND PRE-EMPTS.

TESTING OF COMPONENTS BY THE CONTRACTOR FOR PROPER OPERATION SHALL INCLUDE THE FOLLOWING MINIMUM REQUIREMENTS:

1. TERMINAL SCREWS TIGHTENED.
2. CORRECT TERMINAL JUMPERS.
3. FAN & THERMOSTAT OPERATION.
4. DOOR CLOSER SWITCH OPERATION.
5. MALFUNCTION MANAGEMENT UNIT TEST.
6. FORCE HARDWIRE CONFLICTS FOR ALL PHASE COMBINATIONS TO VERIFY STOP TIMING AND CONFLICT INDICATION.
7. GFI RECEPTACLE TEST.
8. POLICE PANEL OPERATION.
9. MAINTENANCE PANEL OPERATION.
10. DETECTORS.
11. TEST FOR PHASE OPERATION, SEQUENCE AND INTERVAL LENGTH ON MIN RECALL, MAX RECALL AND NO CALL.
12. SHELVES, MOUNTING.
13. ALL PANELS, MOUNTING.
14. ATSI MALFUNCTION MANAGEMENT UNIT TEST TO DOCUMENT THE MALFUNCTION MANAGEMENT UNIT OPERATION. THE TEST RESULTS ARE TO BE LOGGED AND FURNISHED TO THE ENGINEER.
15. PROPER FLASH SEQUENCE.
16. AUXILIARY EQUIPMENT OPERATION.
17. CABINET LAMP.
18. SIGNAL OUTPUTS ARE TO BE TESTED WHILE CONNECTED TO A MIN 60 WATT LOAD ON EACH SIGNAL INDICATION.

REPAIRS/CORRECTIONS, IF REQUIRED, SHALL BE MADE BY THE CONTRACTOR AND RECORDED BEFORE DELIVERY. THE ENGINEER SHALL ALSO BE NOTIFIED OF ANY PROBLEMS. THE CONTROLLER IS TO OPERATE WITHOUT PROBLEMS ON MINIMUM RECALL OF ALL MINOR PHASES FOR 48 HOURS WITH FULL LOAD ON EACH OUTPUT. (NOTE THAT TESTING ALSO REQUIRES OPERATION WITH DETECTORS IN A NO CALL AND CALL TO MAXIMUM CONFIGURATION).

A WRITTEN REPORT STATING THE CABINET INTERSECTION NUMBER, DATE AND TIME OF TEST, SIGNED OFF BY THE TECHNICIAN WHO PERFORMED THE TESTS, SHALL BE SUBMITTED TO THE ENGINEER UPON SUCCESSFUL COMPLETION OF THE ABOVE TESTS. THE SUCCESSFUL TESTING SHALL BE DEMONSTRATED TO THE ENGINEER PRIOR TO INSTALLATION IF REQUESTED. THE TEST AREA MAY BE ERECTED AT A LOCATION DETERMINED BY THE CONTRACTOR. ALL COSTS RELATED TO INSPECT AND OBSERVE THE BENCH TESTING SHALL BE INCLUDED AS PART OF CONTROLLER TESTING.

THE CONTROLLER AND ALL RELATED COMPONENTS SHALL BE IN WORKING ORDER AND READY FOR INSTALLATION/OPERATION AT THE SPECIFIED INTERSECTION. THE COST FOR THE CONTROLLER AND CABINET TESTING SHALL BE INCLUDED IN THE PRICE OF THE CONTROLLER FURNISHED COMPLETE.

ALL SOFTWARE AND FIRMWARE UPGRADES AND NEW RELEASES FOR FEATURES FURNISHED AS A PART OF THIS CONTRACT SHALL BE FREE OF CHARGE FOR TWO (2) YEARS AFTER THE COMPLETION OF THE 10-DAY PERFORMANCE TEST.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH OF ITEM 633 - CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN; ITEM 633, CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN; OR ITEM 633, CABINET, TYPE TS-1, AS PER PLAN IN PLACE INCLUDING ALL CONNECTIONS, TESTED AND ACCEPTED.

633, CABINET FOUNDATION, AS PER PLAN
IN ACCORDANCE WITH 633.10 AND STANDARD CONSTRUCTION DRAWING TC-83.20 AND SHEETS 60-61, A NEW CABINET FOUNDATION SHALL BE CONSTRUCTED AT THE LOCATION SHOWN ON THE PLANS. PROVIDE AN ADDITIONAL 3-INCH CONDUIT ELL FOR FUTURE USE. THE CONDUIT ELL SHALL BE INSTALLED IN THE SAME ORIENTATION AS THE CONDUIT ELL FOR THE PROPOSED SIGNAL CABLE. BOTH ENDS OF THE CONDUIT ELL SHALL BE TEMPORARILY SEALED TO PREVENT INTRUSION OF SOIL AND/OR OTHER DEBRIS.

PAYMENT FOR ITEM 633, CABINET FOUNDATION, AS PER PLAN WILL BE MADE AT THE CONTRACT UNIT PRICE PER EACH AND WILL INCLUDE ANCHOR BOLTS AND CONDUIT ELLS.

633 - UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF CMS 633 AND 733, THE CONTRACTOR SHALL FURNISH, INSTALL AND TEST UNINTERRUPTIBLE POWER SUPPLY (UPS) STATUS INDICATOR LAMPS THAT ALLOW MAINTENANCE PERSONNEL AND LAW ENFORCEMENT TO QUICKLY ASSESS WHETHER A TRAFFIC SIGNAL CABINET IS BEING POWERED BY A UPS. A 1-INCH WATERPROOF FLASHING STROBE SHALL BE USED TO INDICATE THE CABINET IS OPERATING UNDER UPS BACKUP POWER (THE "BACKUP" OPERATING CONDITION). THIS LAMP SHALL BE WIRED USING MINIMUM 20GA STRANDED, INSULATED HOOKUP WIRE TO THE STATUS RELAY OUTPUTS OF THE UPS. THE WIRES SHALL BE TERMINATED BY LUGS AT THE DISPLAY END AND PERMANENTLY LABELED "BACKUP POWER STATUS DISPLAY," WITH WIRE POLARITY INDICATED.
THIS ITEM INCLUDES PROGRAMMING THE UPS STATUS RELAY OUTPUTS TO PRODUCE THE LAMP STATUS DISPLAYS. THE STATUS DISPLAY SHALL BE SOLID 100% DUTY CYCLE (NOT FLASHING). THE LAMP SHALL BE PLACED IN THE UPS CABINET WALL (NOT THE ROOF) IN SUCH A MANNER AS TO BE SEALED FROM WATER INTRUSION AND VISIBLE FROM A VEHICLE AT THE STOP LINE IN THE CLOSEST LANE OF AT LEAST ONE APPROACH TO THE SIGNALIZED INTERSECTION. THE OPERATING VOLTAGE OF THE LED LAMP SHALL BE 120V AC.

PAYMENT FOR ITEM 633, UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN WILL BE MADE AT THE CONTRACT UNIT PRICE PER EACH AND WILL INCLUDE THE BATTERIES, CABLING, CABINET AND OTHER HARDWARE NECESSARY TO PROVIDE A FULLY-FUNCTIONAL BATTERY BACKUP.

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL NOTES

ATB-ASHTABULA SIGNAL UPGRADE

ITEM 633, CONTROLLER, MISC., REUSE OF CABINET
THE CONTRACTOR SHALL REUSE THE EXISTING TRAFFIC CONTROL CABINET, WHILE INSTALLING A NEW SIGNAL CONTROLLER (TIMER). THIS ITEM SHALL INCLUDE THE REWIRING OF THE CABINET AND RECONNECTION OF ALL EXISTING EQUIPMENT/HARDWARE WITHIN THE CABINET. THE WIRING AND HARDWARE WITHIN THE CABINET SHALL BE APPROPRIATELY LABELED AND SHALL BE VERIFIED TO BE FULLY FUNCTIONAL. THE NEW CONTROLLER SHALL BE PROGRAMMED WITH THE SIGNAL TIMING SHOWN ON THE SIGNAL PLANS.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH OF ITEM 633 - CONTROLLER MISC., REUSE OF CABINET IN PLACE INCLUDING ALL CONNECTIONS, TESTED AND ACCEPTED.

ITEM 633, PREEMPTION, AS PER PLAN
THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPTION EQUIPMENT IN THE LOCATIONS AND LOCAL CONTROLLERS AS SHOWN IN THE PLANS. THE PREEMPTION SHALL CONFORM TO ODOT SPECIFICATION 633 AND SHALL UTILIZE COMMUNICATIONS TO IDENTIFY THE PRESENCE OF AN EMERGENCY PRIORITY VEHICLE. IT SHALL CAUSE THE TRAFFIC SIGNAL CONTROLLER TO SELECT A PRE-PROGRAMMED PREEMPTION PLAN THAT WILL DISPLAY AND HOLD THE DESIRED SIGNAL PHASE FOR THE DIRECTION OF THE EMERGENCY VEHICLE. THE CONTRACTOR SHALL COORDINATE WITH THE CITY FOR REQUIRED PREEMPTION TIMING.

THE COMMUNICATIONS MEDIUM SHALL EMPLOY SOUND DETECTION TECHNIQUES TO DETERMINE AND LOG THE PRESENCE OF THE EMERGENCY VEHICLE. THE SYSTEM SHALL DETECT THE PRESENCE OF THE VEHICLE THROUGH AN EMITTING DEVICE LOCATED ON THE EMERGENCY VEHICLE. THE SYSTEM SHALL ACTIVATE THE PREEMPTION SEQUENCE BY APPLYING A SIGNAL TO ONE OF THE CONTROLLER'S PREEMPT DISCRETE INPUTS. THE SYSTEM SHALL BE COMPLETELY COMPATIBLE WITH THE CONTROLLER.

THE EQUIPMENT SHALL BE SHELF OR RACK MOUNTED AND EASILY REMOVABLE AND REPLACEABLE WITHIN THE CABINET. THE EQUIPMENT SHALL BE SUPPLIED COMPLETELY WIRED IN THE CONTROLLER CABINET AND TESTED. THE SYSTEM SHALL BE CAPABLE OF PREEMPTING AND RECEIVING PRIORITY FOR EACH APPROACH TO THE INTERSECTION. IT SHALL BE POSSIBLE TO DETECT THE EMERGENCY VEHICLE UP TO 1200 FEET FROM THE INTERSECTION.

EACH INTERSECTION SHOWN IN THE PLANS SHALL BE SUPPLIED WITH THE COMPONENTS LISTED BELOW.
1. PREEMPT RECEIVING UNITS
2. PREEMPT DETECTOR CABLES
3. PREEMPT PHASE SELECTOR ASSEMBLY AND INTERFACE WIRING PANEL
4. PREEMPT CONFIRMATION LIGHTS, LED (ONE PER RECEIVER).

THE CONTRACTOR SHALL INVENTORY ALL FIRE AND EMS VEHICLES TO DETERMINE COMPATIBILITY OF THE SIRENS WITH THE SYSTEM. EACH VEHICLE THAT IS DETERMINED TO BE NOT COMPATIBLE SHALL BE NOTED IN A REPORT TO THE CITY. THE MODEL SUPPLIED SHALL BE MANUFACTURED BY SONEM 2000, TRAFFIC SYSTEMS LLC, RIGHT-O-WAY MANUFACTURED BY WAPITI MICROSYSTEMS, OR APPROVED EQUAL.

THE CITY SHALL BE SUPPLIED WITH SOFTWARE REQUIRED TO CALIBRATE, LOG, AND OPERATE THE SYSTEM. THE SOFTWARE SHALL BE CAPABLE OF OPERATING UNDER WINDOWS 7, 32-BIT OPERATING SYSTEM. TWO (2) OPERATING AND INSTRUCTION MANUALS SHALL BE SUPPLIED WITH THE SOFTWARE.

THE CONTRACTOR SHALL THOROUGHLY TEST THE INSTALLED SYSTEM. AS A MINIMUM, THE CONTRACTOR SHALL VERIFY THAT ALL CONNECTIONS ARE PROPERLY MADE TO THE CONTROLLER CABINETS. THE CONTRACTOR SHALL CHECK THAT THE RANGE SETTING IS PROPER FOR EACH INTERSECTION. THE CONTRACTOR SHALL DETERMINE THAT ALL PHASE SELECTORS ARE SELECTING THE PROPER PHASE AND TIMING ACCURATELY. THE CONTRACTOR SHALL VERIFY THAT ALL VEHICLE EMITTERS ARE BEING PROPERLY DETECTED.

IF THE PROPOSED PREEMPT SYSTEM IS NOT COMPATIBLE WITH THE EXISTING SYSTEM, THE CONTRACTOR SHALL PROVIDE TRAINING FOR UP TO FIFTEEN (15) PERSONS IN THE OPERATION OF THE SYSTEM. IT SHALL BE PROVIDED WITHIN 48 HOURS OF THE INSTALLATION OF THE SYSTEM. IT SHALL CONSIST OF HANDS-ON INSTRUCTION FOR A MINIMUM OF SIXTEEN (16) HOURS. THE CONTRACTOR SHALL PROVIDE TRAINING FOR UP TO FOUR (4) PERSONS IN THE INSTALLATION AND MAINTENANCE OF THE SYSTEM. IT SHALL CONSIST OF A MINIMUM OF EIGHT (8) HOURS OF INSTRUCTION. TRAINING SHALL BE SUPPLIED WITHIN SEVEN (7) DAYS OF THE INSTALLATION OF THE SYSTEM. ALL TRAINING SHALL BE HELD IN A CITY SUPPLIED LOCATION. TRAINING SHALL BE CONDUCTED BY SOMEONE WHO HAS PERFORMED THIS WITHIN THE LAST YEAR AND DOES IT ON A REGULAR BASIS. THE COST OF TRAINING, INCLUDING COURSE MATERIAL, TRAVEL SUBSISTENCE AND RELATED COSTS, SHALL BE ENTIRELY BORNE BY THE CONTRACTOR AND SHALL BE INCIDENTAL TO THE PREEMPTION EQUIPMENT.

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

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

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

PREEMPTION DETECTOR CABLE SHALL CONFORM TO ODOT SPECIFICATION 632. ONLY ONE EXTERNAL SPLICE SHALL BE PERMITTED BETWEEN PREEMPTION RECEIVER UNIT AND CONTROLLER CABINET. THIS SPLICE SHALL MEET THE REQUIREMENTS OF C&MS 632.23 USING A WATERPROOF EPOXY SPLICE KIT. THE CABLE SHALL BE APPROVED FOR BOTH OVERHEAD AND UNDERGROUND USE. THE JACKET SHALL WITHSTAND EXPOSURE TO SUNLIGHT AND ATMOSPHERIC TEMPERATURES AND STRESSES REASONABLY EXPECTED IN NORMAL INSTALLATIONS.

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

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

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

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

PREEMPT CONFIRMATION LIGHT, LED
THIS ITEM SHALL CONSIST OF FURNISHING AND INSTALLING PREEMPT CONFIRMATION LIGHTS INCLUDING HARDWARE AND ALL OTHER ACCESSORIES THAT ARE NECESSARY TO MAKE THE PREEMPT CONFIRMATION LIGHT COMPLETELY FUNCTIONAL AND OPERATIONAL AS SHOWN IN THE PLANS.

A CONFIRMATION LIGHT SHALL BE SUPPLIED FOR EACH INTERSECTION TO INDICATE THAT THE EMERGENCY VEHICLE HAS ACHIEVED CONTROL OF THE TRAFFIC SIGNAL.

THE CONFIRMATION LIGHT SHALL BE A VAPOR TIGHT ALUMINUM LIGHTING FIXTURE. IT SHALL BE SUPPLIED WITH A CLEAR GLOBE, LED LAMP AND MOUNTING HARDWARE TO ATTACH TO THE TRAFFIC SIGNAL MAST ARM. THE CONFIRMATION LIGHT SHALL BE POWERED BY A LOAD SWITCH IN THE TRAFFIC SIGNAL CONTROLLER. SIGNAL CABLE CONFORMING TO 732.19 SHALL BE USED FOR CONFIRMATION LIGHTS. A MINIMUM OF 4-CONDUCTOR CABLE SHALL BE USED WITH THE GREEN WIRE SERVING AS THE SAFETY GROUND CONDUCTOR.

PAYMENT FOR ITEM 633 "PREEMPTION, AS PER PLAN" SHALL BE MADE AT THE CONTRACT UNIT PRICE FOR EACH INTERSECTION PREEMPTION SYSTEM IN PLACE AND FULLY OPERATIONAL AS SHOWN IN THE PLANS.

ITEM 815, SPREAD SPECTRUM RADIO, AS PER PLAN
IN ADDITION TO SUPPLEMENTAL SPECIFICATION 815 AND 906, THE FOLLOWING REQUIREMENTS SHALL BE MET. THIS ITEM SHALL CONSIST OF THE INSTALLATION OF RADIO INTERCONNECT EQUIPMENT AT EACH INTERSECTION, INCLUDING BUT NOT LIMITED TO THE SPREAD SPECTRUM RADIO, ANTENNA, MOUNTING HARDWARE, CABLING AND ESTABLISHING COMMUNICATIONS BETWEEN ADJACENT INTERSECTIONS. THE EQUIPMENT SHALL MEET THE FOLLOWING SPECIFICATIONS:
1. A 902-928 MHZ SPREAD SPECTRUM RADIO SHALL BE USED.
2. THE RADIO SHALL HAVE THE ABILITY TO BOTH RECEIVE AND TRANSMIT SIGNALS BETWEEN THE MASTER CONTROLLER AND LOCAL CONTROLLERS.
3. THE ANTENNA SHALL BE MOUNTED TO THE TOP OF THE POLE P1, INCLUDING ALL MOUNTING HARDWARE AND CABLING NECESSARY.
4. THE INTERSECTION OF PROSPECT ROAD AND LAKE AVENUE SHALL INCLUDE AN OMNI-DIRECTIONAL ANTENNA.
5. THE FOLLOWING INTERSECTIONS SHALL INCLUDE YAGI ANTENNAS:
   - LAKE AVENUE AND WEST 9TH STREET
   - LAKE AVENUE AND CARPENTER ROAD/ WEST AVENUE
   - LAKE AVENUE AND 24TH STREET
   - LAKE AVENUE AND ROGERS PLACE
   - LAKE AVENUE AND 32ND STREET
   - PROSPECT ROAD AND STATION AVENUE
   - PROSPECT ROAD AND CENTER STREET
   - PROSPECT ROAD AND WEST AVENUE
   - PROSPECT ROAD AND WOODMAN AVENUE

ALL EQUIPMENT NECESSARY TO COMPLETE A FUNCTIONAL INTERCONNECT BETWEEN THE MASTER CONTROLLER AND THE LOCAL CONTROLLERS AND ALLOW FOR FUTURE EXPANSION OF THE SYSTEM SHALL BE INCLUDED AS A PART OF THIS ITEM. IF A RADIO REPEATER IS NEEDED BETWEEN INTERSECTIONS DUE TO A LACK OF AVAILABLE SIGHT LINES, THIS REPEATER SHALL BE INCLUDED AS A PART OF THIS ITEM FOR THE NEAREST SIGNALIZED INTERSECTION TO THE REPEATER.

PAYMENT WILL BE MADE AT THE CONTRACT UNIT PRICE BID PER EACH INTERSECTION COMPLETELY INSTALLED PER THE MANUFACTURERS RECOMMENDATION, INCLUDING WIRING, TESTING AND DOCUMENTATION OF ITEM 815, SPREAD SPECTRUM RADIO, AS PER PLAN, COMPLETE.

GUARANTEE
THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 90 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: CONTROLLERS AND ASSOCIATED EQUIPMENT, DETECTOR UNITS, INTERCONNECTION ITEMS, AND MASTER CONTROL EQUIPMENT. CUSTOMARY MANUFACTURER'S GUARANTEES FOR THE FOREGOING ITEMS SHALL BE TURNED OVER TO THE STATE OR THE MAINTAINING AGENCY 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.

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL NOTES

ATB-ASHTABULA SIGNAL UPGRADE

SHEET NUMBER												PARTICIPATION		ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
25	28	30	33	36	39	42	45	48	51	53	56								
																		TRAFFIC CONTROL	
			0.04	0.02		0.25	0.24	0.08	0.12					644	00200	0.75	MILE	LANE LINE, 4"	
0.07	0.06		0.04	0.07	0.08	0.09	0.16	0.06	0.13		0.08			644	00300	0.84	MILE	CENTER LINE	
38	265		250		94	465	150	75	729		185			644	00400	2251	FT	CHANNELIZING LINE, 8"	
70	66		134	50	66	234	90	84	163		65			644	00500	1022	FT	STOP LINE	
262	79		475	131	203	506	366	116	678		218			644	00600	3034	FT	CROSSWALK LINE	
1	6		4		3	8	3		8		6			644	01300	39	EACH	LANE ARROW	
					116			372						644	01500	488	FT	DOTTED LINE, 4"	
543			1259			200	2560							644	30000	4562	FT	REMOVAL OF PAVEMENT MARKING	
																		TRAFFIC SIGNALS	
106	66			6	28		14	127			55			625	25408	402	FT	CONDUIT, 2", 725.051	
16		5	5	25	37	28	66	17	40		14			625	25504	253	FT	CONDUIT, 3", 725.051	
90				46	116		166				67			625	25902	485	FT	CONDUIT, JACKED OR DRILLED, 725.04, 3"	
114	66	5	5			14		138			62			625	29000	404	FT	TRENCH	
				31	62		75		20					625	29500	188	FT	TRENCH IN PAVED AREA, TYPE A	
5				3	2		4	2			3			625	30700	19	EACH	PULL BOX, 725.08, 18"	
1					1		1	1						625	30706	4	EACH	PULL BOX, 725.08, 24"	
5		1	1	2	5	1	5	5	1		5			625	32000	31	EACH	GROUND ROD	
	14					42								630	03100	56	EACH	GROUND MOUNTED SUPPORT, NO. 3 POST	
			5			1			18					630	79000	24	EACH	SIGN HANGER ASSEMBLY, SPAN WIRE	
				3	3		4							630	79100	10	EACH	SIGN HANGER ASSEMBLY, MAST ARM	
3	3		4			6		3	4		4			630	79500	27	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED	
	6.3		37.5			25			135		4			630	80100	207.8	SQ FT	SIGN, FLAT SHEET	
3	3		4			6		3	4		2			630	80500	25	EACH	SIGN, DOUBLE SIDED, STREET NAME	
				3	3		4							630	80510	10	EACH	SIGN, STREET NAME	
	4		6			10			1					632	05005	21	EACH	VEHICULAR SIGNAL HEAD (LED), 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN	18
6				6	7		8	6			5			632	05007	38	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, WITH BACKPLATE, AS PER PLAN	18
2											1			632	05067	3	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 4-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, WITH BACKPLATE, AS PER PLAN	18
	2		2			4			7					632	05085	15	EACH	VEHICULAR SIGNAL HEAD, (LED), 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE, AS PER PLAN	18
6	2	4	8		4		8	2		8	4			632	20731	46	EACH	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D2, AS PER PLAN	18
				2		8			8					632	20741	18	EACH	PEDESTRIAN SIGNAL HEAD (LED) , TYPE D2, COUNTDOWN, AUDIBLE, AS PER PLAN	18
				2		6			4					632	20750	12	EACH	ACCESSIBLE PEDESTRIAN PUSHBUTTON	
8	6		8	6	7	14	8	6	8		6			632	25000	77	EACH	COVERING OF VEHICULAR SIGNAL HEAD	
6	2		8	2	4	8	8	2	8	8	4			632	25010	60	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD	
2			4		2		4	2			2			632	26000	16	EACH	PEDESTRIAN PUSHBUTTON	
3	3		6	1	2	10	4	2	17	2	3			632	26500	53	EACH	DETECTOR LOOP	
										2				632	27200	2	EACH	LOOP DETECTOR TIE IN	
100	175		325			175		90	380		143			632	30200	1388	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES	
100	175		325			175		90	380		143			632	30600	1388	FT	TETHER WIRE, WITH ACCESSORIES	
664	176		1070	126	457	1197	932	316	1353		378			632	40500	6669	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG	
403	314		501	274	365	1194	592	354	1012		352			632	40700	5361	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG	
2								2			3			632	64001	7	EACH	STRAIN POLE FOUNDATION, AS PER PLAN	18
				2	1		3							632	64010	6	EACH	SIGNAL SUPPORT FOUNDATION, AS PER PLAN	18
3					3		1	2			2			632	64020	11	EACH	PEDESTAL FOUNDATION	
513	153		1057	25	294	1868	434	126	4461		141			632	65200	9072	FT	LOOP DETECTOR LEAD-IN CABLE	
40				33	57	50	87	62	62		50			632	68300	441	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG	

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CHECKED LAS

TRAFFIC SIGNAL - GENERAL SUMMARY

ATB-ASHTABULA
SIGNAL UPGRADE

SHEET NUMBER												PARTICIPATION		ITEM	ITEM EXT.	GRAND TOTAL	UNIT	DESCRIPTION	SEE SHEET NO.
25	28	30	33	36	39	42	45	48	51	53	56								
																		TRAFFIC SIGNALS (CONT'D)	
50				50	50	50	50	50	50		50			632	69800	400	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG	
1				1	1	1	1	1	1		1			632	70001	8	EACH	POWER SERVICE, AS PER PLAN	18-19
					1									632	75126	1	EACH	SIGNAL SUPPORT, TYPE TC-12.30 DESIGN 5 POLE, WITH MAST ARMS	19
																		TC-81.21 DESIGN 1 AND DESIGN 11	
							1							632	75206	1	EACH	SIGNAL SUPPORT, TYPE TC-12.30 DESIGN 7 POLE, WITH MAST ARMS	19
																		TC-81.21 DESIGN 13 AND DESIGN 2	
				1			1							632	80103	2	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 1, AS PER PLAN	19
							1							632	80303	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 3, AS PER PLAN	19
				1										632	80503	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 11, AS PER PLAN	19
											2			632	82701	2	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 7, AS PER PLAN	19
								2						632	82801	2	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 8, AS PER PLAN	19
											1			632	83001	1	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 10, AS PER PLAN	19
2														632	83201	2	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 12, AS PER PLAN	19
3					2		1	2			2			632	89901	10	EACH	PEDESTAL, 8', TRANSFORMER BASE, AS PER PLAN	19
					1									632	90001	1	EACH	PEDESTAL, 11', TRANSFORMER BASE, AS PER PLAN	19
1	1	1	1		1	1		1	1	1	1			632	90103	10	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN	19
			4			4			4					632	90209	12	EACH	REUSE OF STRAIN POLE, AS PER PLAN	19
	1	1	1							1				633	01541	4	EACH	CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN	19
1				1	1		1	1	1		1			633	01581	7	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN	19
						1								633	39000	1	EACH	CONTROLLER UNIT, MASTER, TRAFFIC RESPONSIVE	
						1								633	65501	1	EACH	CABINET, TYPE TS-1, AS PER PLAN	19
		1			1	1	1	1	1					633	67000	6	EACH	CABINET RISER	
		1	1		1	1	1	1	1					633	67101	7	EACH	CABINET FOUNDATION, AS PER PLAN	19
		1	1			1		1						633	67200	4	EACH	CONTROLLER WORK PAD	
			1			1			1					633	67301	3	EACH	PREEMPTION, AS PER PLAN	20
1	1	1	1	1	1	1	1	1	1	1	1			633	75001	12	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN	19
	1	1	1											633	99000	3	EACH	CONTROLLER ITEM, MISC.: REUSE OF CABINET	20
	1	1	1	1	1	1	1	1	1	1				815	30001	10	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN	20
														633	72500	LUMP		SYSTEM ANALYSIS	

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SIGNAL - GENERAL SUMMARY

TRAFFIC SIGNAL

ATB-ASHTABULA
SIGNAL UPGRADE

22
63

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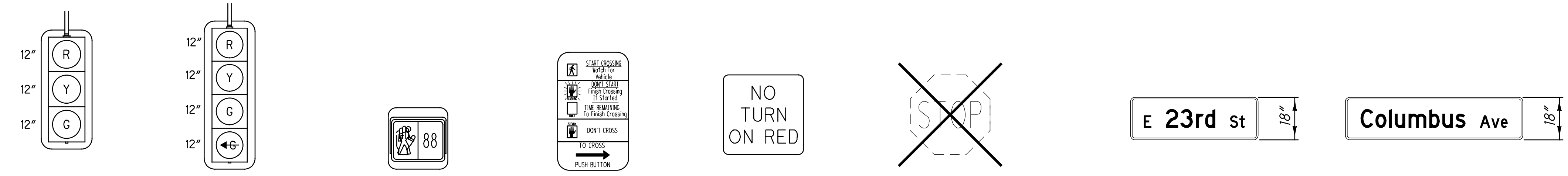
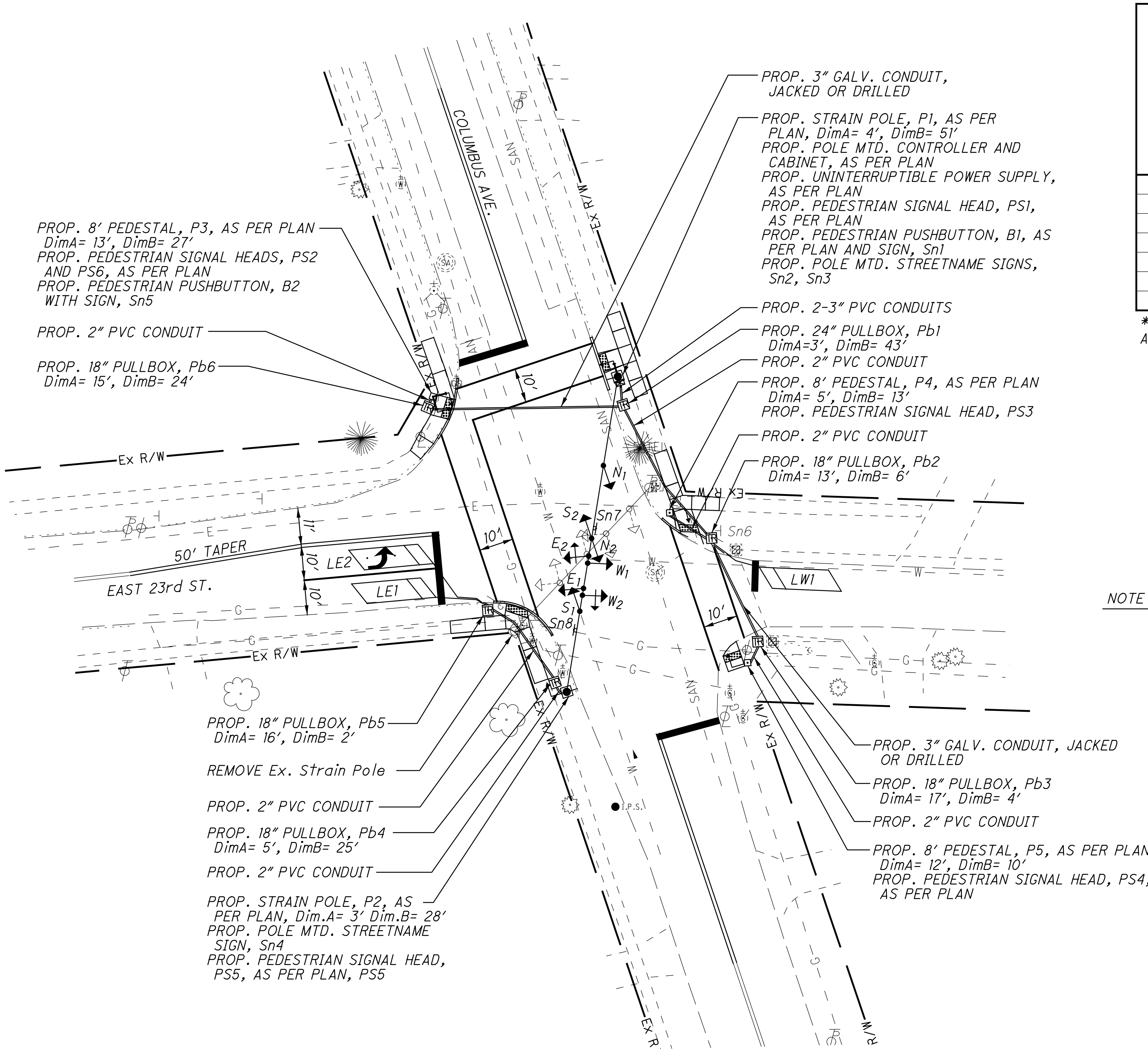


PROPOSED POLYCARBONATE SIGNAL HEAD (w/BACKPLATE)	PROPOSED POLYCARBONATE SIGNAL HEAD (w/BACKPLATE)	PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)	PROPOSED R10-3E-9	PROPOSED R10-11B-36	Existing R1-1-30 (Ground Mtd.)	PROPOSED D3-1-54	PROPOSED D3-1-75
N1, N2, S1, S2, E1, W1	W2, E2	PS1, PS2, PS3, PS4, PS5, PS6	Sn1, Sn5	Sn7, Sn8	Sn6	Sn2, Sn4	Sn3



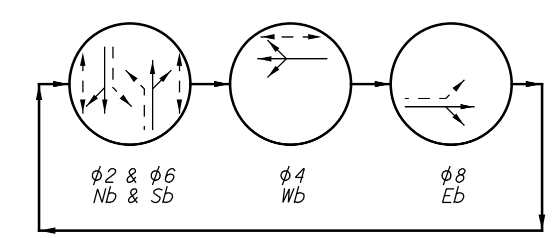
POLE ORIENTATION

POLE NUMBER	ODOT DESIGN TYPE	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG) (HANDHOLE)	ANGLES (DEG) FROM INDEX LINE: PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CABINET / UPS	POWER SERVICE	WEATHERHEAD	CONDUIT ELL	BRACKET ARM	SIGN	SPREAD SPECTRUM RADIO	VEHICULAR SIGNAL HEAD
P1	81.10	12	32	TBD	90	0	0	180	180	225	180	-	180/270	-	-
P2	81.10	12	32	TBD	90	-	-	-	-	135	135	-	270	-	-
P3		PED	8	TBD	225	135/225	225	-	-	-	270	-	-	-	-
P4		PED	8	TBD	180	0	-	-	-	-	45	-	-	-	-
P5		PED	8	TBD	180	180	-	-	-	-	315	-	-	-	-

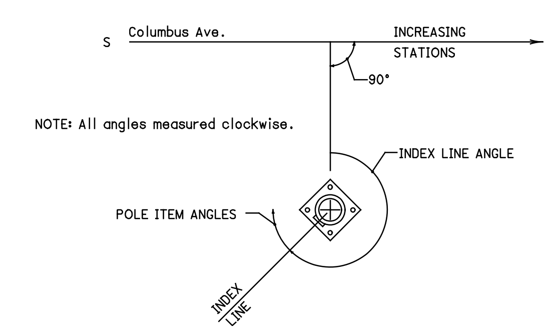
***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.

NOTE :

1. REMOVE AND REPLACE ALL PAVEMENT MARKINGS WITHIN 100′ OF THE STOP BAR, UNLESS OTHERWISE NOTED.



SIGNAL PHASING

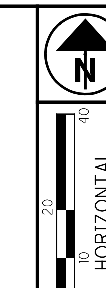


REMOVAL ITEMS FOR DISPOSAL

MESSENGER WIRE
SIGNAL CABLES
GROUND MTD. SIGN
STRAIN POLE

REMOVAL ITEMS FOR STORAGE

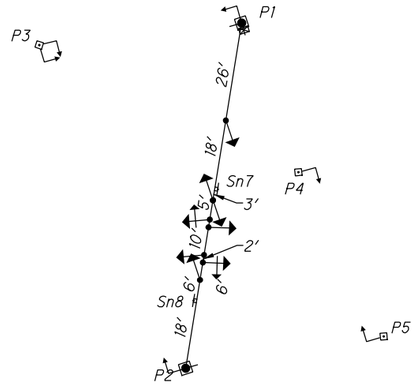
CONTROLLER/ CABINET.........1
VEHICLE SIGNAL HEADS.........7
PEDESTRIAN SIGNAL HEADS.....2



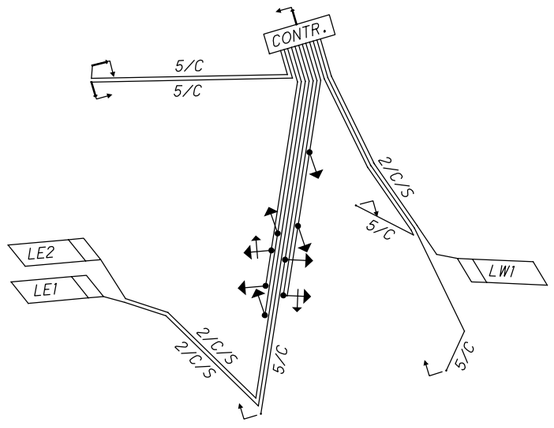
CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #1
COLUMBUS AVE & EAST 23rd STREET

ATB-ASHTABULA SIGNAL UPGRADE



MAST ARM DIAGRAM
N.T.S.



WIRING DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LE1	P	6X25	3	8		PRES	NON-LOCK	1	A	-	-
LE2	P	6X25	3	8		PRES	NON-LOCK	1	B	-	-
LW1	P	6X25	3	4		PRES	NON-LOCK	2	A	-	-

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 6 R	R	S1	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
N2	RED	Ph. 6 R	R	S2	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
E1	RED	Ph. 8 R	R	W1	RED	Ph. 4 R	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 8 G			GREEN	Ph. 4 G	
E2	RED	Ph. 8 R	R	W2	RED	Ph. 4 R	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 8 G			GREEN	Ph. 4 G	
	GRN ARROW LT	Ph. 8 G	-		GRN ARROW LT	Ph. 4 G	-
PS1 (North Leg)	WALK	Ph. 4 G	-	PS4 (East Leg)	WALK	Ph. 6 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 6 G	
	DON*T WALK	Ph. 4 Y, R			DON*T WALK	Ph. 6 Y, R	
PS2 (North Leg)	WALK	Ph. 4 G	-	PS5 (West Leg)	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 2 G	
	DON*T WALK	Ph. 4 Y, R			DON*T WALK	Ph. 2 Y, R	
PS3 (East Leg)	WALK	Ph. 6 G	-	PS6 (West Leg)	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 6 G			FLASHING DW	Ph. 2 G	
	DON*T WALK	Ph. 6 Y, R			DON*T WALK	Ph. 2 Y, R	
B1	ACTUATE	Ph. 4 G	-	B2	ACTUATE	Ph. 4 G	-

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #1
COLUMBUS AVE & EAST 23rd STREET

ATB-ASHTABULA
SIGNAL UPGRADE

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	106	FT	CONDUIT, 2", 725.051
625	16	FT	CONDUIT, 3", 725.051
625	90	FT	CONDUIT, JACKED OR DRILLED, 725.04, 3"
625	114	FT	TRENCH
625	5	EACH	PULL BOX, 725.08, 18"
625	1	EACH	PULL BOX, 725.08, 24"
625	5	EACH	GROUND ROD
630	3	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	3	EACH	SIGN, DOUBLE FACED, STREET NAME
632	6	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			WITH BACKPLATE, AS PER PLAN
632	2	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 4-SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			WITH BACKPLATE, AS PER PLAN
632	6	EACH	PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
632	8	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	6	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	2	EACH	PEDESTRIAN PUSHBUTTON
632	3	EACH	DETECTOR LOOP
632	100	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	100	FT	TETHER WIRE, WITH ACCESSORIES
632	664	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	403	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	2	EACH	STRAIN POLE FOUNDATION, AS PER PLAN
632	3	EACH	PEDESTAL FOUNDATION
632	513	FT	LOOP DETECTOR LEAD-IN CABLE
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	2	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 12, AS PER PLAN
632	3	EACH	PEDESTAL, 8', TRANSFORMER BASE, AS PER PLAN
632	40	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
644	0.07	MILE	CENTER LINE
644	38	FT	CHANNELIZING LINE, 8"
644	70	FT	STOP LINE
644	262	FT	CROSSWALK LINE
644	1	EACH	LANE ARROW
644	543	FT	REMOVAL OF PAVEMENT MARKING

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: East 23rd Street & Columbus Avenue

START UP
START IN: Y/R FLASH- X ALL RED-
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - 2 & # - 6
COLOR DISPLAYED: GREEN- YELLOW- X

DUAL ENTRY: YES
REST IN RED: RING 1- RING 2-
SIMULTANEOUS GAP YES

OVERLAP PHASES	A	B	C	D

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT			Sb		Wb		Nb		Eb
MINIMUM GREEN (INITIAL)	(SEC.)		10		7		10		7
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)				3.0				3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)		23		10		23		10
MAXIMUM GREEN II	(SEC.)		28		10		28		16
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)		3.6		3.6		3.6		3.6
ALL RED CLEARANCE	(SEC.)		2.9		1.6		2.9		2.2
WALK	(SEC.)		7		7		7		
PED CLEAR	(SEC.)		15		11		10		
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)				OFF				OFF
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

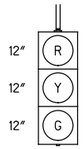
NOTES: PHASE 4 AND PHASE 8 ARE SPLIT PHASING. MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

CALCULATED EMH CHECKED LAS

TRAFFIC SIGNAL PLAN #1
COLUMBUS AVE & EAST 23rd STREET

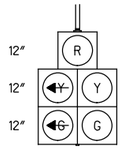
ATB-ASHTABULA
SIGNAL UPGRADE

25
63



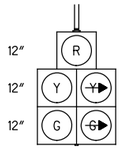
PROPOSED POLYCARBONATE SIGNAL HEAD

N1, S1, E1, E2



PROPOSED POLYCARBONATE SIGNAL HEAD

N2



PROPOSED POLYCARBONATE SIGNAL HEAD

S2

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

PS1, PS2

PROPOSED D3-1-51

Sn2

PROPOSED D3-1-51

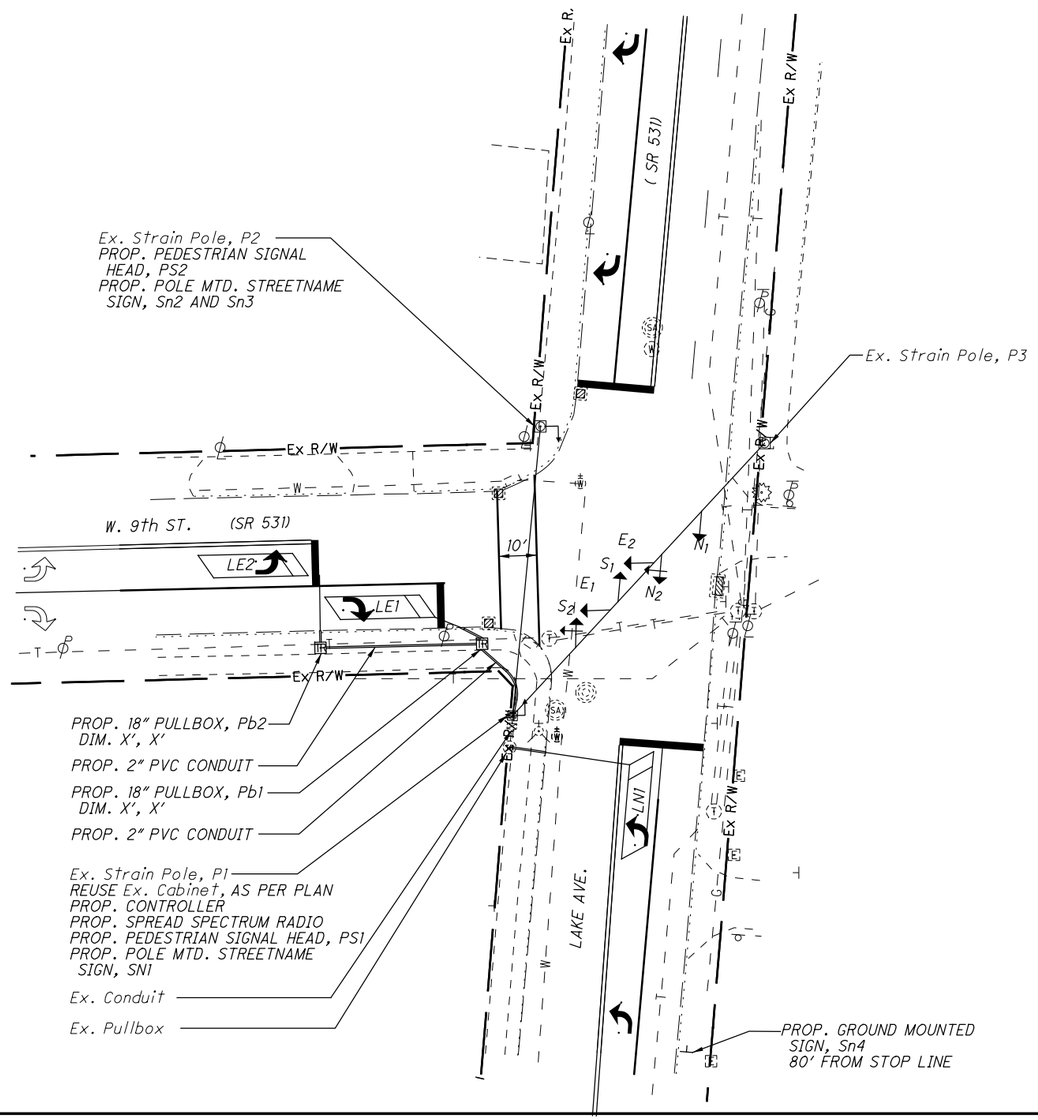
Sn1, Sn3

PROPOSED (GROUND MTD) R3-H8BA-30

Sn4

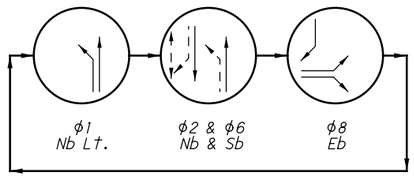
POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE									
					PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER / CABINET	POWER SERVICE	WEATHERHEAD	CONDUIT ELL	BRACKET ARM	SIGN	SPREAD SPECTERUM RADIO	VEHICULAR SIGNAL HEAD
P1	Ex.	Ex.	Ex.	90	270	-	Ex.	Ex.	Ex.	Ex.	-	270	0	-
P2	Ex.	Ex.	Ex.	270	90	-	-	-	Ex.	Ex.	-	90/180	-	-
P3	Ex.	Ex.	Ex.	180	-	-	-	-	Ex.	Ex.	-	-	-	-



NOTE :

1. REFRESH ALL PAVEMENT MARKINGS WITHIN 100' OF THE STOP BAR, UNLESS OTHERWISE NOTED.
2. ALL PROPOSED PEDESTRIAN SIGNAL HEADS WILL MOUNTED IN THE SAME OREINTATION AS EXISTING PEDESTRIAN SIGNAL HEADS.



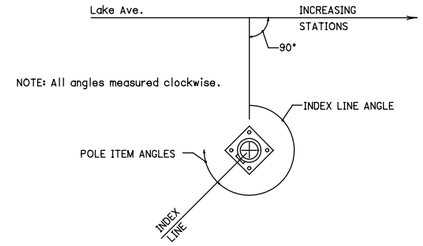
SIGNAL PHASING

REMOVAL ITEMS FOR DISPOSAL

MESSENGER WIRE
SIGNAL CABLES

REMOVAL ITEMS FOR STORAGE

CONTROLLER.....1
VEHICLE SIGNAL HEADS.....6
PEDESTRIAN SIGNAL HEADS.....2



N

0 10 20 40 HORIZONTAL SCALE IN FEET

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #2

W. 9th ST., (S.R. 531) & LAKE AVE., (S.R. 531)

ATB-ASHTABULA SIGNAL UPGRADE

26
63

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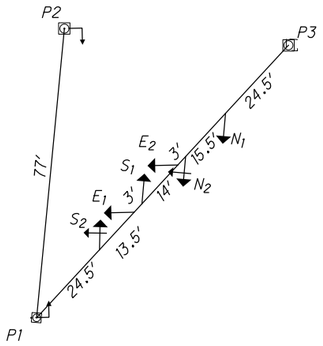
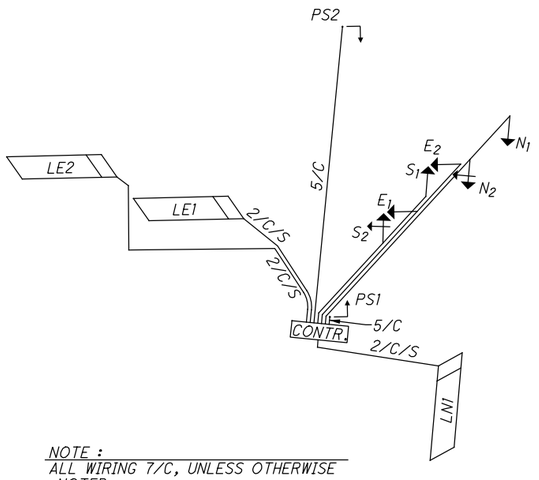


SPAN WIRE DIAGRAM
N.T.S.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LE1	P	6X25	3	8		PRES	NON-LOCK	1	A	-	-
LE2	P	6X25	3	8		PRES	NON-LOCK	1	B	-	-
LN1	P	6X25	3	1		PRES	NON-LOCK	2	A	-	-

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 6 R	R	S1	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
N2	RED	Ph. 6 R	R	S2	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
	YLW ARROW LT	Ph. 1 YA	-		YLW ARROW RT	Ph. 2 YA	-
	GRN ARROW LT	Ph. 1 GA			GRN ARROW RT	Ph. 2 GA	
E1	RED	Ph. 8 R	R	E2	RED	Ph. 8 R	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 8 Y	
	GREEN	Ph. 8 G			GREEN	Ph. 8 G	
PS1	WALK	Ph. 2 G	-	PS2	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 2 G			FLASHING DW	Ph. 2 G	
	DON*T WALK	Ph. 2 Y, R			DON*T WALK	Ph. 2 Y, R	

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #2

W. 9th ST., (S.R. 531) & LAKE AVE., (S.R. 531)

ATB-ASHTABULA SIGNAL UPGRADE

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	66	FT	CONDUIT, 2", 725.051
625	66	FT	TRENCH
630	3	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	3	EACH	SIGN, DOUBLE SIDED, STREET NAME
630	14	FT	GROUND MOUNTED SUPPORT, NO. 3 POST
630	6.3	SQ F	SIGN, FLAT SHEET
632	4	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3 SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			AS PER PLAN
632	2	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 5 SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			AS PER PLAN
632	2	EACH	PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
632	6	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	2	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	3	EACH	DETECTOR LOOP
632	175	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	175	FT	TETHER WIRE, WITH ACCESSORIES
632	176	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	314	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	153	FT	LOOP DETECTOR LEAD-IN CABLE
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
633	1	EACH	CONTROLLER ITEM MISC.: REUSE OF CABINET
644	0.06	MILE	CENTER LINE
644	265	FT	CHANNELIZING LINE, 8"
644	66	FT	STOP LINE
644	79	FT	CROSSWALK LINE
644	6	EACH	LANE ARROW
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: West 9th Street & Lake Avenue

START UP
START IN: Y/R FLASH- X ALL RED-
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - 2 & # - 6
COLOR DISPLAYED: GREEN- YELLOW- X

DUAL ENTRY: YES
REST IN RED: RING 1- RING 2-
SIMULTANEOUS GAP YES

OVERLAP	A	B	C	D
PHASES				

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT		NbL	Sb				Nb		Eb
MINIMUM GREEN (INITIAL)	(SEC.)	7	10				10		10
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)	3.0							3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)	7	15				27		10
MAXIMUM GREEN II	(SEC.)	7	22				34		16
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)	3.0	3.0				3.0		3.0
ALL RED CLEARANCE	(SEC.)	2.0	2.0				2.0		2.7
WALK	(SEC.)		7						
PED CLEAR	(SEC.)		8						
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	YES	NO	NO	NO	NO	NO	NO
MEMORY	(ON/OFF)								
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

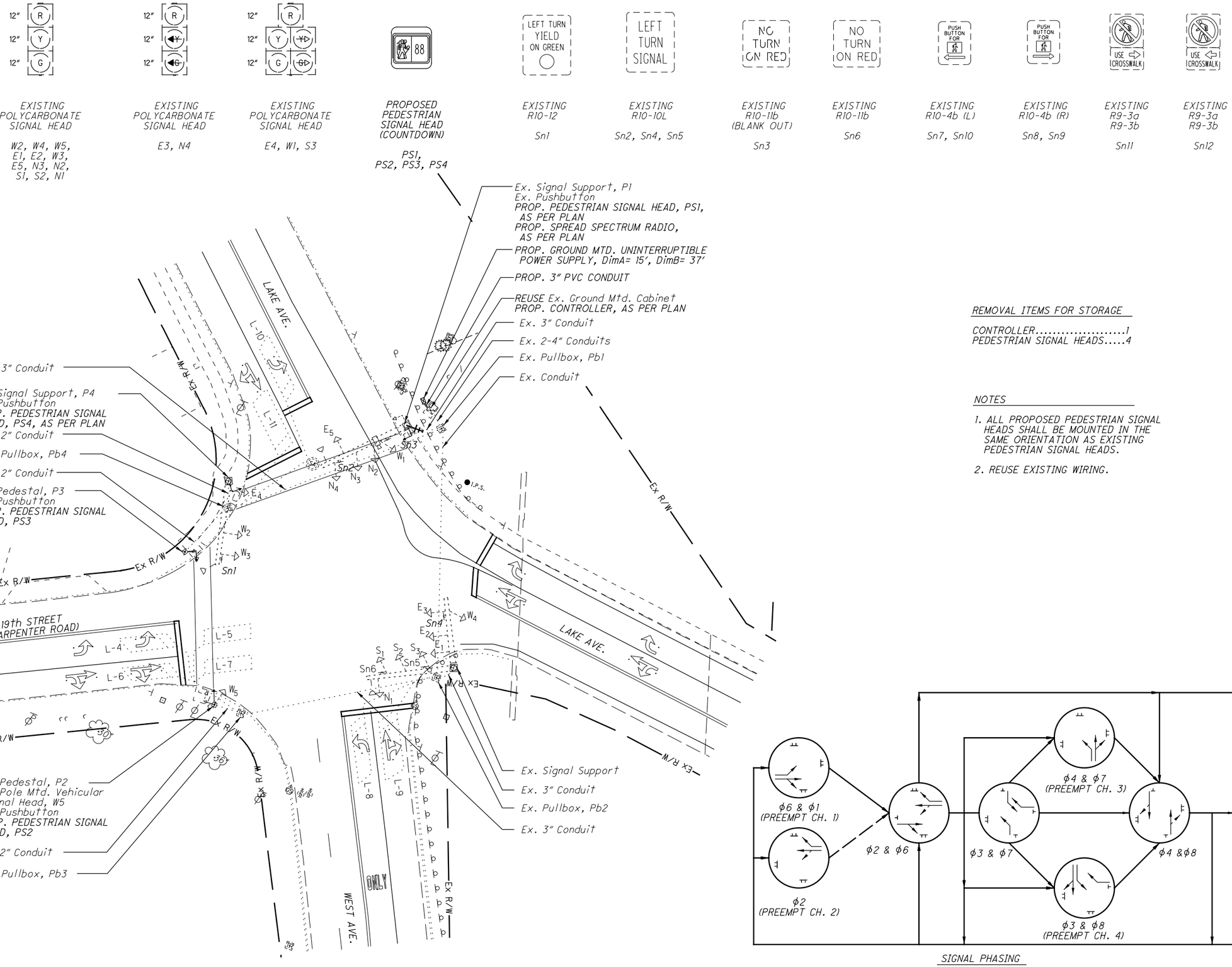
NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

CALCULATED EMH CHECKED LAS

TRAFFIC SIGNAL PLAN #2
W. 9th ST., (S.R. 531) & LAKE AVE., (S.R. 531)

ATB-ASHTABULA
SIGNAL UPGRADE

28
63



HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #3

ATB-ASHTABULA SIGNAL UPGRADE

LAKE AVE & WEST AVE & 19TH (CARPENTER RD)

29
63

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SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	5	FT	CONDUIT, 3", 725.051
625	5	FT	TRENCH
625	1	EACH	GROUND ROD
632	4	EACH	PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT
633	1	EACH	CONTROLLER ITEM MISC.: REUSE OF CABINET
633	1	EACH	CABINET RISER
633	1	EACH	CONTROLLER WORK PAD
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: 19th Street & Lake Avenue

START UP
START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [2] & # - [6]
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: YES
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP YES

INTERVAL OR FEATURE		OVERLAP PHASES	A	B	C	D
		CONTROLLER MOVEMENT No.				
		1	2	3	4	6	7	8	9
INTERSECTION MOVEMENT		EbL	Wb	SbL	Nb	Eb	NbL	Sb	ped
MINIMUM GREEN (INITIAL)	(SEC.)	7	12	12	12	12	7	12	
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)	7	20	20	16	20	11	20	-
MAXIMUM GREEN II	(SEC.)	7	43	28	25	43	13	40	
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)	3.0	3.6	3.0	3.6	3.6	3.0	3.6	2.0
ALL RED CLEARANCE	(SEC.)	3.0	2.6	2.6	2.6	2.6	2.5	2.6	1.0
WALK	(SEC.)								7
PED CLEAR	(SEC.)								18
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	MIN (NO/YES)	NO	YES	NO	NO	YES	NO	NO	NO
	PED (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
MEMORY	(ON/OFF)	ON	OFF	ON	OFF	OFF	ON	ON	OFF
CALL TO NON-ACTUATED	No. 1								
	No. 2								

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

COORDINATION TIMING

Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	6	7	8	9
1 - 00:00	MTWTF	FREE	-								
2 - 06:00	MTWTF	105	6	13	33	34	25	46	13	46	0
3 - 10:00	MTWTF	FREE	-								
4 - 16:00	MTWTF	105	3	13	36	33	23	49	18	38	0
5 - 18:30	MTWTF	FREE	-								
6 - 00:00	SAT,SUN	FREE	-								
7 - 09:30	SAT,SUN	105	6	13	33	34	25	46	13	46	0
8 - 19:00	SAT,SUN	FREE	-								

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #3
LAKE AVE & WEST AVE & 19TH (CARPENTER RD)

ATB-ASHTABULA
SIGNAL UPGRADE

30
63

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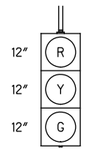
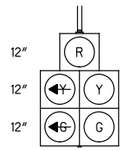


PROPOSED POLYCARBONATE SIGNAL HEAD

N1, S1, E1, E2, W1, W2



PROPOSED POLYCARBONATE SIGNAL HEAD

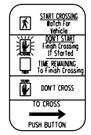
N2, S2

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

PS1, PS2, PS3, PS4, PS5, PS6, PS7, PS8

PROPOSED R10-3E-9 (L)

Sn4, Sn11



PROPOSED R10-3E-9 (R)

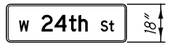
Sn1, Sn7

PROPOSED R3-5R-30

Sn9

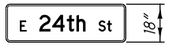
PROPOSED R3-5L-30

Sn3, Sn6, Sn10, Sn13



PROPOSED D3-1-57

Sn12

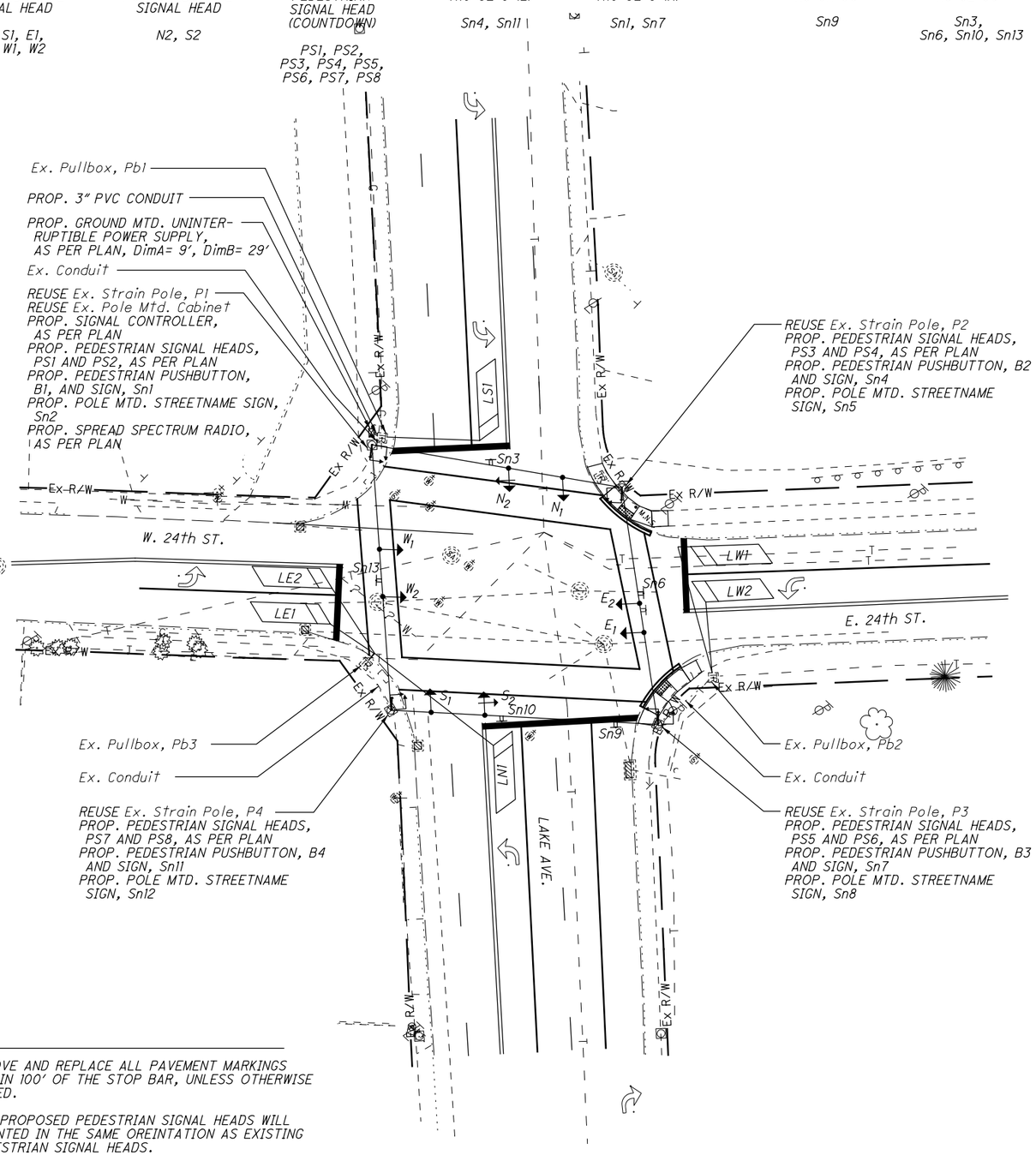


PROPOSED D3-1-57

Sn5

PROPOSED D3-1-51

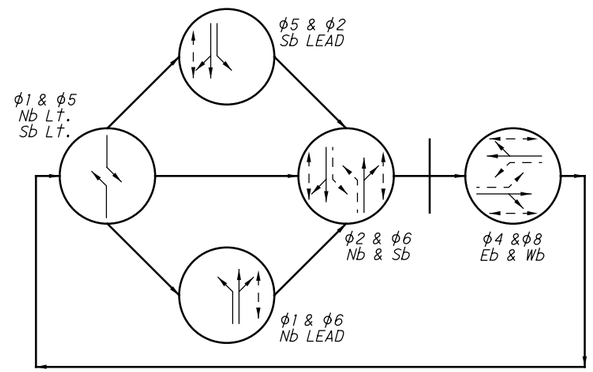
Sn2, Sn8



POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE								
					PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	WEATHERHEAD	CONDUIT ELL	BRACKET ARM	SIGN	VEHICULAR SIGNAL HEAD
P1	Ex.	Ex.	Ex.	0	0/90	90	Ex.	Ex.	Ex.	Ex.	-	90	-
P2	Ex.	Ex.	Ex.	0	0/270	270	-	-	Ex.	Ex.	-	0	-
P3	Ex.	Ex.	Ex.	0	90/180	90	-	-	Ex.	Ex.	-	90	-
P4	Ex.	Ex.	Ex.	0	0/270	270	-	-	Ex.	Ex.	-	0	-

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.



SIGNAL PHASING

NOTE :

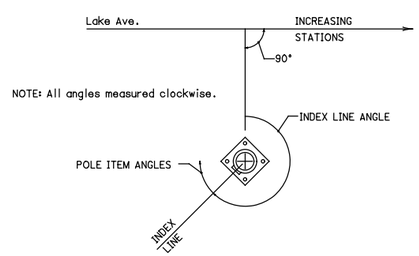
1. REMOVE AND REPLACE ALL PAVEMENT MARKINGS WITHIN 100' OF THE STOP BAR, UNLESS OTHERWISE NOTED.
2. ALL PROPOSED PEDESTRIAN SIGNAL HEADS WILL MOUNTED IN THE SAME OREINTATION AS EXISTING PEDESTRIAN SIGNAL HEADS.

REMOVAL ITEMS FOR DISPOSAL

MESSENGER WIRE
SIGNAL CABLES

REMOVAL ITEMS FOR STORAGE

CONTROLLER.....1
VEHICULAR SIGNAL HEADS.....8
PEDESTRIAN SIGNAL HEADS.....8
PEDESTRIAN PUSHBUTTONS.....4



SCALE IN FEET
0 10 20 40

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #4
W. & E. 24TH STREET AND LAKE AVENUE

ATB-ASHTABULA
SIGNAL UPGRADE

31
63

8/2/2013 1:40:37 PM EHundt

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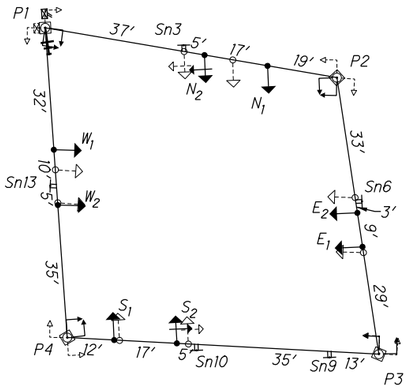
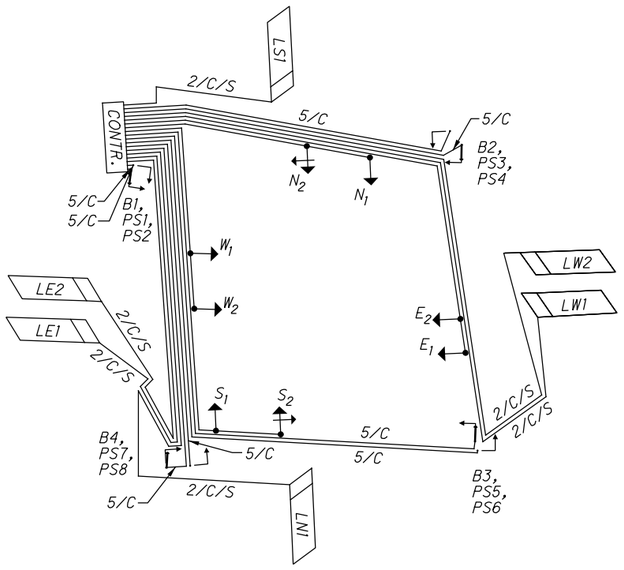


SPAN WIRE DIAGRAM
N.T.S.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LN1	P	6X25	3	1		PRES	NON-LOCK	1	A	-	3.0
LS1	P	6X25	3	5		PRES	NON-LOCK	1	B	-	3.0
LW1	P	6X25	3	4		PRES	NON-LOCK	2	A	-	3.0
LW2	P	6X25	3	4		PRES	NON-LOCK	2	B	-	5.0
LE1	P	6X25	3	8		PRES	NON-LOCK	3	A	-	3.0
LE2	P	6X25	3	8		PRES	NON-LOCK	3	B	-	5.0

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 6 G	R	S1	RED	Ph. 2 G	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 R			GREEN	Ph. 2 R	
N2	RED	Ph. 6 R	R	S2	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
	YLW ARROW LT	Ph. 1 YA	-		YLW ARROW LT	Ph. 5 YA	-
	GRN ARROW LT	Ph. 1 GA			GRN ARROW LT	Ph. 5 GA	
E1	RED	Ph. 8 G	R	W1	RED	Ph. 4 G	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 8 R			GREEN	Ph. 4 R	
E2	RED	Ph. 8 G	R	W2	RED	Ph. 4 G	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 8 R			GREEN	Ph. 4 R	
PS1 (North Leg)	WALK	Ph. 4 G	-	PS3 (North Leg)	WALK	Ph. 4 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 4 G	
	DON*T WALK	Ph. 4 Y, R			DON*T WALK	Ph. 4 Y, R	
PS2 (West Leg)	WALK	Ph. 2 G	-	PS8 (West Leg)	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 2 G			FLASHING DW	Ph. 2 G	
	DON*T WALK	Ph. 2 Y, R			DON*T WALK	Ph. 2 Y, R	
PS4 (East Leg)	WALK	Ph. 6 G	-	PS5 (East Leg)	WALK	Ph. 6 G	-
	FLASHING DW	Ph. 6 G			FLASHING DW	Ph. 6 G	
	DON*T WALK	Ph. 6 Y, R			DON*T WALK	Ph. 6 Y, R	
PS6 (South Leg)	WALK	Ph. 8 G	-	PS7 (South Leg)	WALK	Ph. 8 G	-
	FLASHING DW	Ph. 8 G			FLASHING DW	Ph. 8 G	
	DON*T WALK	Ph. 8 Y, R			DON*T WALK	Ph. 8 Y, R	
B1			-	B2			-
	ACTUATE	Ph. 4 G			ACTUATE	Ph. 4 G	
B3			-	B4			-
	ACTUATE	Ph. 8 G			ACTUATE	Ph. 8 G	

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #4
W. & E. 24TH STREET AND LAKE AVENUE

ATB-ASHTABULA SIGNAL UPGRADE

32
63

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SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	5	FT	CONDUIT, 3", 725.051
625	5	FT	TRENCH
625	1	EACH	GROUND ROD
630	4	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	5	EACH	SIGN HANGER ASSEMBLY, SPAN WIRE
630	37.5	SQ FT	SIGN, FLAT SHEET
630	4	EACH	SIGN, DOUBLE SIDED, STREET NAME
632	6	EACH	VEHICULAR SIGNAL HEAD, (LED), YELLOW, 3 SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			AS PER PLAN
632	2	EACH	VEHICULAR SIGNAL HEAD, (LED), YELLOW, 5 SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			AS PER PLAN
632	8	EACH	PEDESTRIAN SIGNAL HEAD (LED), (COUNTDOWN), TYPE D2, AS PER PLAN
632	8	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	8	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	4	EACH	PEDESTRIAN PUSHBUTTON
632	6	EACH	DETECTOR LOOP
632	325	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	325	FT	TETHER WIRE, WITH ACCESSORIES
632	1070	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	501	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	1057	FT	LOOP DETECTOR LEAD-IN CABLE
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
632	4	EACH	REUSE OF STRAIN POLE, AS PER PLAN
633	1	EACH	PREEMPTION, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN
633	1	EACH	CONTROLLER WORK PAD
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
633	1	EACH	CONTROLLER ITEM MISC.: REUSE OF CABINET
644	0.04	MILE	LANE LINE
644	0.04	MILE	CENTER LINE
644	250	FT	CHANNELIZING LINE, 8"
644	134	FT	STOP LINE
644	475	FT	CROSSWALK LINE
644	4	EACH	LANE ARROW
644	1259	FT	REMOVAL OF PAVEMENT MARKING
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: 24th Street & Lake Avenue

START UP
START IN: Y/R FLASH- [X] ALL RED- [ ]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [2] & # - [6]
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: [YES]
REST IN RED: RING 1- [X] RING 2- [ ]
SIMULTANEOUS GAP [YES]

	OVERLAP	A	B	C	D
	PHASES				

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT		NbL	Sb		Wb	SbL	Nb		Eb
MINIMUM GREEN (INITIAL)	(SEC.)	7	10		10	7	10		10
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)	3.0			3.0	3.0			3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)	10	30		28	10	30		28
MAXIMUM GREEN II	(SEC.)	14	52		41	21	40		41
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)	3.0	3.0		3.0	3.0	3.0		3.0
ALL RED CLEARANCE	(SEC.)	2.5	2.5		2.8	2.5	2.5		2.8
WALK	(SEC.)		7		7		7		7
PED CLEAR	(SEC.)		14		19		13		21
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

COORDINATION TIMING

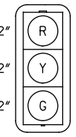
Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6	7	8
1 - 00:00	MTWTF	FREE	-								
2 - 06:00	MTWTF	105	12	13	57		35	26	44		35
3 - 10:00	MTWTF	FREE	-								
4 - 16:00	MTWTF	105	79	19	39		47	13	45		47
5 - 18:30	MTWTF	FREE	-								
6 - 00:00	SAT,SUN	FREE	-								
7 - 09:30	SAT,SUN	105	12	13	57		35	26	44		35
8 - 19:00	SAT,SUN	FREE	-								

CALCULATED EMH CHECKED LAS

TRAFFIC SIGNAL PLAN #4
W. & E. 24TH STREET AND LAKE AVENUE

ATB-ASHTABULA SIGNAL UPGRADE

33
63



PROPOSED POLYCARBONATE SIGNAL HEAD (w/BACKPLATE)

N1, N2, S1, S2, W1, W2

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

PS1, PS2

PROPOSED R10-3E-9

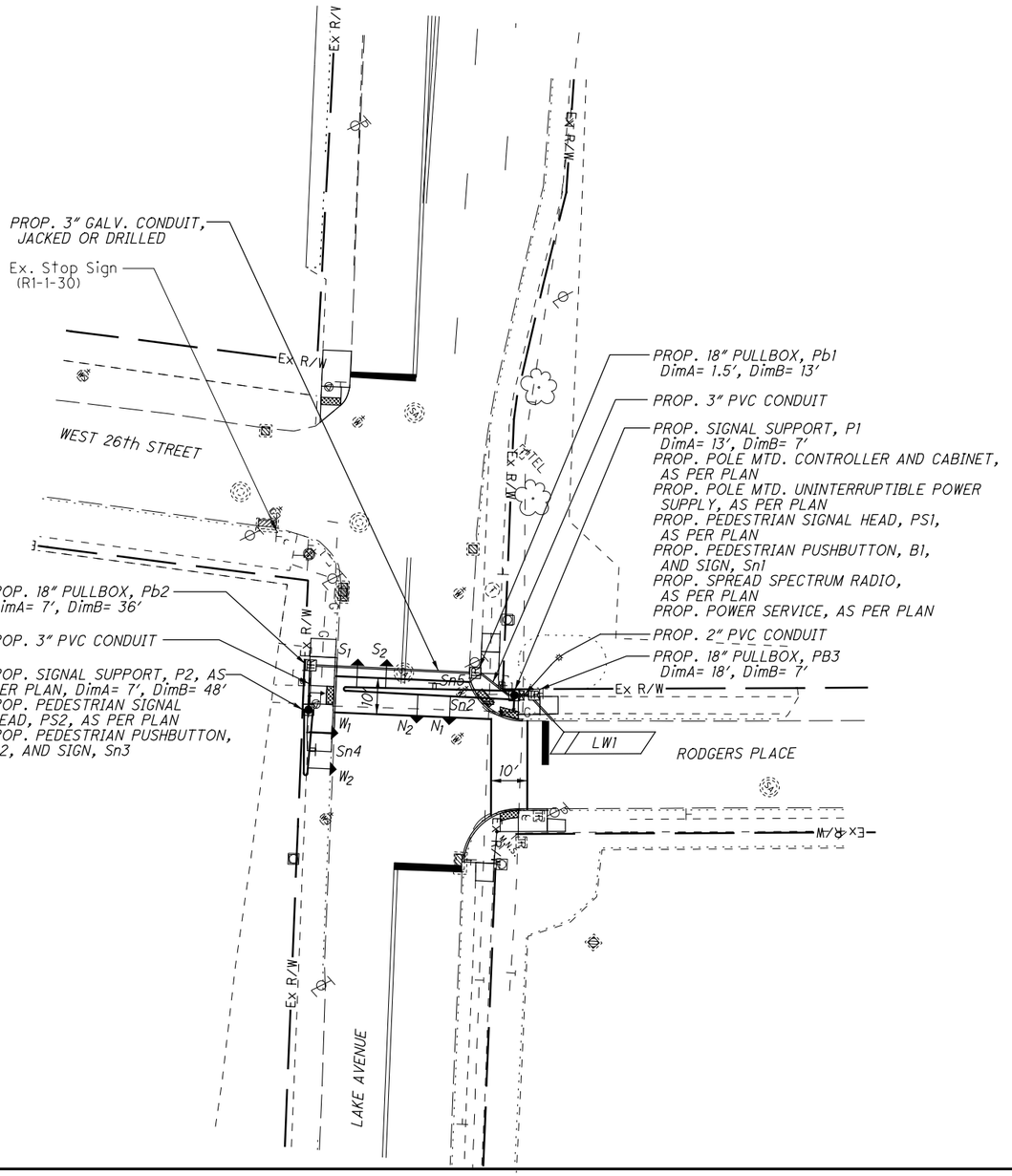
Sn1, Sn3

PROPOSED D3-1-51

Sn4

PROPOSED D3-1-60

Sn2, Sn5



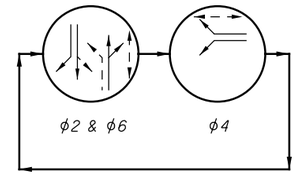
POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	MAST ARM A ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE								
					PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CABINET/ UPS	POWER SERVICE	WEATHERHEAD	CONDUIT ELL	BRACKET ARM	SIGN	SPREAD SPECTRUM RADIO	HANDHOLE
P1	11	23	TBD	0	270	270	180	180	-	0/180	-	-	270	180
P2	1	23	TBD	90	180	180	-	-	-	180	-	-	-	180

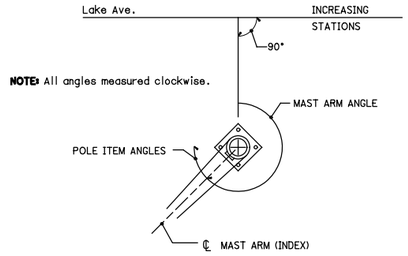
***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.

NOTES :

1. REFRESH ALL PAVEMENT MARKINGS WITHIN 100' OF THE STOP BAR, UNLESS OTHERWISE NOTED.
2. THE EXISTING TRAFFIC SIGNAL INSTALLATION IS TO BE REMOVED BY OTHERS.



SIGNAL PHASING



HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #5
WEST 26th ST. / RODGERS PL. AND LAKE AVE.

ATB-ASHTABULA SIGNAL UPGRADE

34
63

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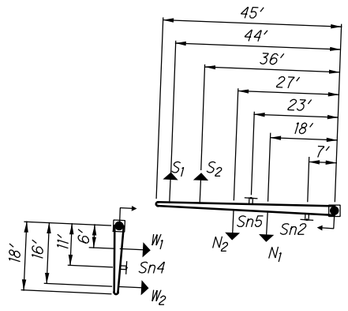


MAST ARM DIAGRAM
N.T.S.

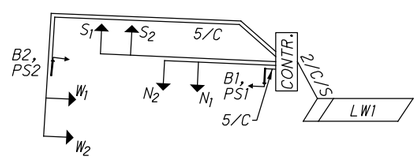
LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LW1	P	6X25	3	4		PRES	NON-LOCK	1	A	-	5.0

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 6 R	R	S1	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
N2	RED	Ph. 6 R	R	S2	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
W1	RED	Ph. 4 R	R	W2	RED	Ph. 4 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 4 G	
PS1 (North Leg)	WALK	Ph. 4 G	-	PS2 (North Leg)	WALK	Ph. 4 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 4 G	
	DON*T WALK	Ph. 4 Y, R			DON'T WALK	Ph. 4 Y, R	
B1			-	B2			-
	ACTUATE	Ph. 4 G			ACTUATE	Ph. 4 G	



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #5
WEST 26th ST. / RODGERS PL. & LAKE AVE.

ATB-ASHTABULA
SIGNAL UPGRADE

35
63

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SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	46	FT	CONDUIT, JACKED OR DRILLED, 725.04, 3"
625	6	FT	CONDUIT, 2", 725.051
625	25	FT	CONDUIT, 3", 725.051
625	31	FT	TRENCH IN PAVED AREAS, TYPE A
625	3	EACH	PULL BOX, 18", 725.08
625	2	EACH	GROUND ROD
630	3	EACH	SIGN HANGER ASSEMBLY, MAST ARM
630	3	EACH	SIGN, STREET NAME
632	6	EACH	VEHICULAR SIGNAL HEAD, (LED), YELLOW, 3 SECTION, 12" LENS, 1-WAY, POLYCARBONATE,
			WITH BACKPLATE, AS PER PLAN
632	2	EACH	PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AUDIBLE, AS PER PLAN
632	6	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	2	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	2	EACH	ACCESSIBLE PEDESTRIAN PUSHBUTTON
632	1	EACH	DETECTOR LOOP
632	126	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	274	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	2	EACH	SIGNAL SUPPORT FOUNDATION, AS PER PLAN
632	25	FT	LOOP DETECTOR LEAD-IN CABLE
632	33	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 1, AS PER PLAN
632	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 11, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TS-1, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
642	0.07	MILE	CENTER LINE
642	0.02	MILE	LANE LINE
642	50	FT	STOP LINE
642	131	FT	CROSSWALK LINE
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: Rogers Place & Lake Avenue

START UP
START IN: Y/R FLASH- [X] ALL RED- [ ]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [2] & # - [6]
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: [YES]
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP [YES]

OVERLAP PHASES	A	B	C	D

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT			Sb		Wb		Nb		
MINIMUM GREEN (INITIAL)	(SEC.)		10		10		10		
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)				3.0				
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)		20		14		20		
MAXIMUM GREEN II	(SEC.)		84		14		84		
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)		3.0		3.0		3.0		
ALL RED CLEARANCE	(SEC.)		3.0		1.6		3.0		
WALK	(SEC.)				7		7		
PED CLEAR	(SEC.)				9		5		
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	NO	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)		OFF		OFF		OFF		
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

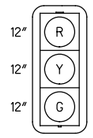
COORDINATION TIMING

Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6	7	8
1 - 00:00	MTWTF	FREE	-								
2 - 06:00	MTWTF	105	29	-	78	-	27	-	78	-	-
3 - 10:00	MTWTF	FREE	-								
4 - 16:00	MTWTF	105	57	-	77	-	28	-	77	-	-
5 - 18:30	MTWTF	FREE	-								
6 - 00:00	SAT,SUN	FREE	-								
7 - 09:30	SAT,SUN	105	29	-	78	-	27	-	78	-	-
8 - 19:00	SAT,SUN	FREE	-								

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #5
WEST 26th ST. / RODGERS PL. & LAKE AVE.

ATB-ASHTABULA
SIGNAL UPGRADE



PROPOSED
POLYCARBONATE
SIGNAL HEAD
(w/BACKPLATE)

S1,
S2, S3, N1,
N2, E1, E2

PROPOSED
PEDESTRIAN
SIGNAL HEAD
(COUNTDOWN)

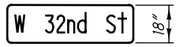
PS1,
PS2, PS3, PS4

PROPOSED
R10-3E-9

Sn4, Sn5

PROPOSED
D3-1-51

Sn1



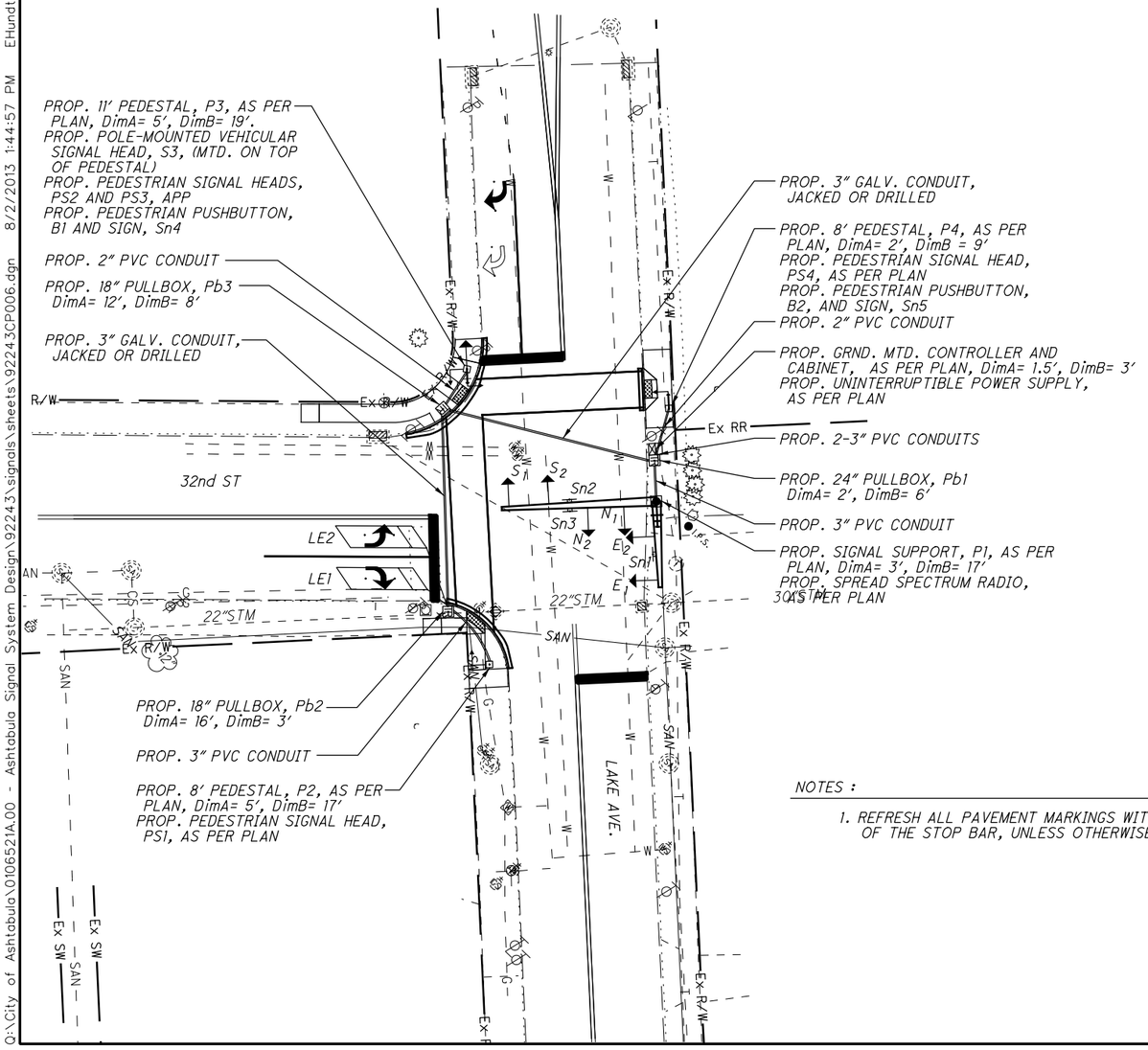
PROPOSED
D3-1-57

Sn2, Sn3

POLE ORIENTATION

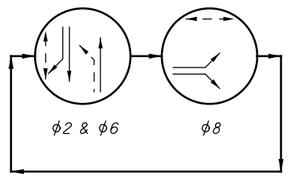
POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	MAST ARM A / INDEX ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE									
					MAST ARM B	PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CABINET/ UPS	POWER SERVICE	SPREAD SPECTRUM RADIO	CONDUIT ELL	VEHICULAR SIGNAL HEAD	SIGN	SPREAD SPECTRUM RADIO	HANDHOLE / INDEX
P1	5	23	TBD	270	90	-	-	-	180	0	180	-	-	0	270
P2	PED	8	TBD	-	-	0	-	-	-	-	45	-	-	-	180
P3	PED	11	TBD	-	-	0/270	270	-	-	-	315	90	-	-	180
P4	PED	8	TBD	-	-	270	270	-	-	-	135	-	-	-	180

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.

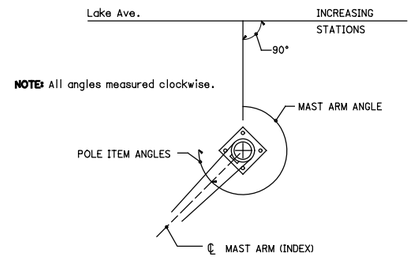


NOTES :

1. REFRESH ALL PAVEMENT MARKINGS WITHIN 100' OF THE STOP BAR, UNLESS OTHERWISE NOTED.



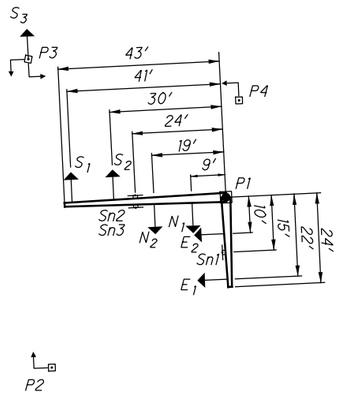
SIGNAL PHASING



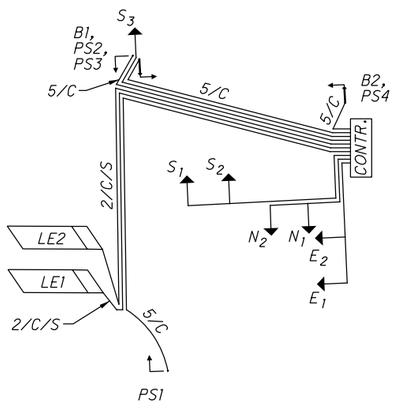
HORIZONTAL SCALE IN FEET
0 10 20 40
CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #6
LAKE AVENUE AND W. 32ND STREET
ATB-ASHTABULA SIGNAL UPGRADE

37
63



MAST ARM DIAGRAM
N.T.S.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

MAST ARM DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LE1	P	6X25	3	8		PRES	NON-LOCK	1	A	-	5
LE2	P	6X25	3	8		PRES	NON-LOCK	1	B	-	-

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 6 R	R	S1	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
N2	RED	Ph. 6 R	R	S2	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
E1	RED	Ph. 8 R	R	S3	RED	Ph. 2 R	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 8 G			GREEN	Ph. 2 G	
E2	RED	Ph. 8 R	R				
	YELLOW	Ph. 8 Y					
	GREEN	Ph. 8 G					
PS1 (West Leg)	WALK	Ph. 2 G	-	PS2 (West Leg)	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 2 G			FLASHING DW	Ph. 2 G	
	DON'T WALK	Ph. 2 Y, R			DON'T WALK	Ph. 2 Y, R	
PS3 (North Leg)	WALK	Ph. 8 G	-	PS4 (North Leg)	WALK	Ph. 8 G	-
	FLASHING DW	Ph. 8 G			FLASHING DW	Ph. 8 G	
	DON'T WALK	Ph. 8 Y, R			DON'T WALK	Ph. 8 Y, R	
B1	ACTUATE	Ph. 8 G	-	B2	ACTUATE	Ph. 8 G	-

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #6
LAKE AVENUE AND W. 32ND STREET

ATB-ASHTABULA
SIGNAL UPGRADE

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	116	FT	CONDUIT, JACKED OR DRILLED, 725.04, 3"
625	37	FT	CONDUIT, 3", 725.051
625	28	FT	CONDUIT, 2", 725.051
625	62	FT	TRENCH IN PAVED AREA, TYPE A
625	2	EACH	PULL BOX, 725.08, 18"
625	1	EACH	PULL BOX, 725.08, 24"
625	5	EACH	GROUND ROD
630	3	EACH	SIGN HANGER ASSEMBLY, MAST ARM
630	3	EACH	SIGN, STREET NAME
632	7	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			WITH BACKPLATE, AS PER PLAN
632	4	EACH	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D2, AS PER PLAN
632	7	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	4	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	1	EACH	SIGNAL SUPPORT FOUNDATION, AS PER PLAN
632	3	EACH	PEDESTAL FOUNDATION
632	457	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	365	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	57	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	2	EACH	PEDESTAL, 8' , TRANSFORMER BASE, AS PER PLAN
632	1	EACH	PEDESTAL, 11', TRANSFORMER BASE, AS PER PLAN
632	2	EACH	PEDESTRIAN PUSHBUTTON
632	1	EACH	SIGNAL SUPPORT, TYPE TC-12.30 DESIGN 5 POLE, WITH MAST ARMS TC-81.21 DESIGN 1
			AND DESIGN 11
632	2	EACH	DETECTOR LOOP
632	294	EACH	LOOP DETECTOR LEAD-IN CABLE
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
633	1	EACH	CABINET RISER
644	0.08	MILE	CENTER LINE
644	94	FT	CHANNELIZING LINE, 8"
644	203	FT	CROSSWALK LINE
644	66	FT	STOP LINE
644	3	EACH	LANE ARROW
644	116	FT	DOTTED LINE, 4"
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: West 32nd Street & Lake Avenue

START UP — START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [2] & # - [6]
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: [YES]
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP [YES]

OVERLAP PHASES	A	B	C	D

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT			Sb				Nb		Eb
MINIMUM GREEN (INITIAL)	(SEC.)		10				10		10
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)								3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)		30				30		15
MAXIMUM GREEN II	(SEC.)		82				82		18
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)		3.6				3.6		3.0
ALL RED CLEARANCE	(SEC.)		2.1				2.1		2.0
WALK	(SEC.)		7						7
PED CLEAR	(SEC.)		15						12
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	YES	NO	NO	NO	NO	NO	NO
MEMORY	(ON/OFF)		OFF				OFF		OFF
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

COORDINATION TIMING

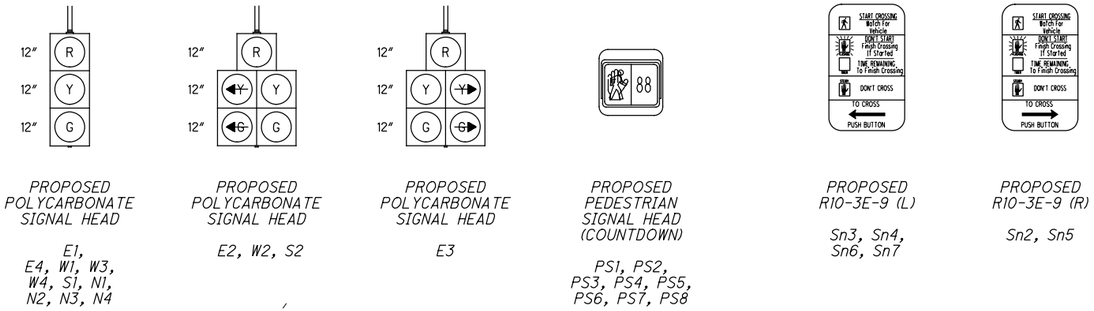
Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6	7	8
1 - 00:00	MTWTF	FREE									
2 - 06:00	MTWTF	105	66		72				72		33
3 - 10:00	MTWTF	FREE									
4 - 16:00	MTWTF	105	48		74				74		31
5 - 18:30	MTWTF	FREE									
6 - 00:00	SAT,SUN	FREE									
7 - 09:30	SAT,SUN	105	66		72				72		33
8 - 19:00	SAT,SUN	FREE									

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #6
LAKE AVENUE AND W. 32ND STREET

ATB-ASHTABULA
SIGNAL UPGRADE

39
63



PROPOSED POLYCARBONATE SIGNAL HEAD

E1, E4, W1, W3, W4, S1, N1, N2, N3, N4

PROPOSED POLYCARBONATE SIGNAL HEAD

E2, W2, S2

PROPOSED POLYCARBONATE SIGNAL HEAD

E3

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

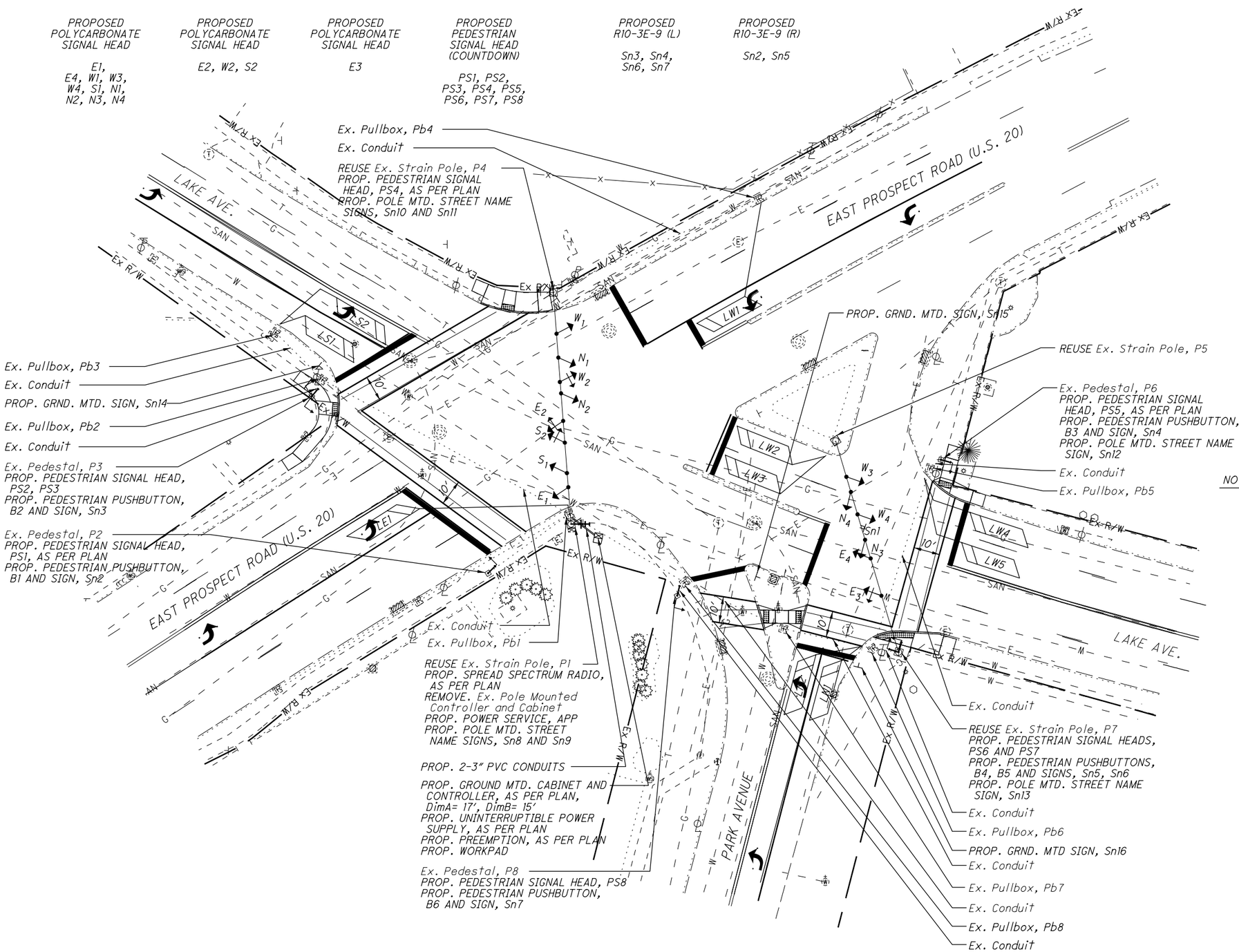
PS1, PS2, PS3, PS4, PS5, PS6, PS7, PS8

PROPOSED R10-3E-9 (L)

Sn3, Sn4, Sn6, Sn7

PROPOSED R10-3E-9 (R)

Sn2, Sn5



Lake Ave 18"

PROPOSED D3-1-54

Sn8, Sn10, Sn12

Park Ave 18"

PROPOSED D3-1-54

Sn13

E Prospect Rd 18"

PROPOSED D3-1-78

Sn9, Sn11

PROPOSED R10-15R-30 (GRND. MTD.)

Sn14, Sn15, SN16

PROPOSED D3-2-30

Sn1

NOTE :

1. REMOVE AND REPLACE ALL PAVEMENT MARKINGS WITHIN 50' OF THE STOP BAR, UNLESS OTHERWISE NOTED.
2. ALL PROPOSED PEDESTRIAN SIGNAL HEADS WILL MOUNTED IN THE SAME OREINTATION AS EXISTING PEDESTRIAN SIGNAL HEADS.

REMOVAL ITEMS FOR DISPOSAL

MESSENGER WIRE
SIGNAL CABLES

REMOVAL ITEMS FOR STORAGE

POLE MTD. CONTROLLER & CABINET.....1
VEHICLE SIGNAL HEADS.....8
PEDESTRIAN SIGNAL HEADS.....6

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #7

LAKE AVE. & PARK AVE. & PROSPECT RD., (U.S. 20)

ATB-ASHTABULA SIGNAL UPGRADE

40
63

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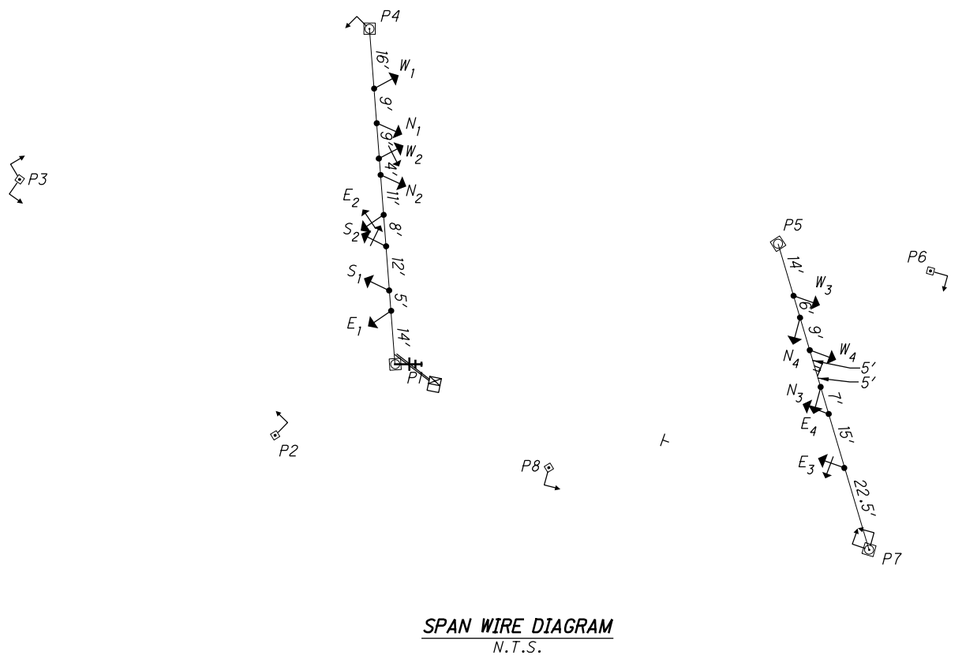
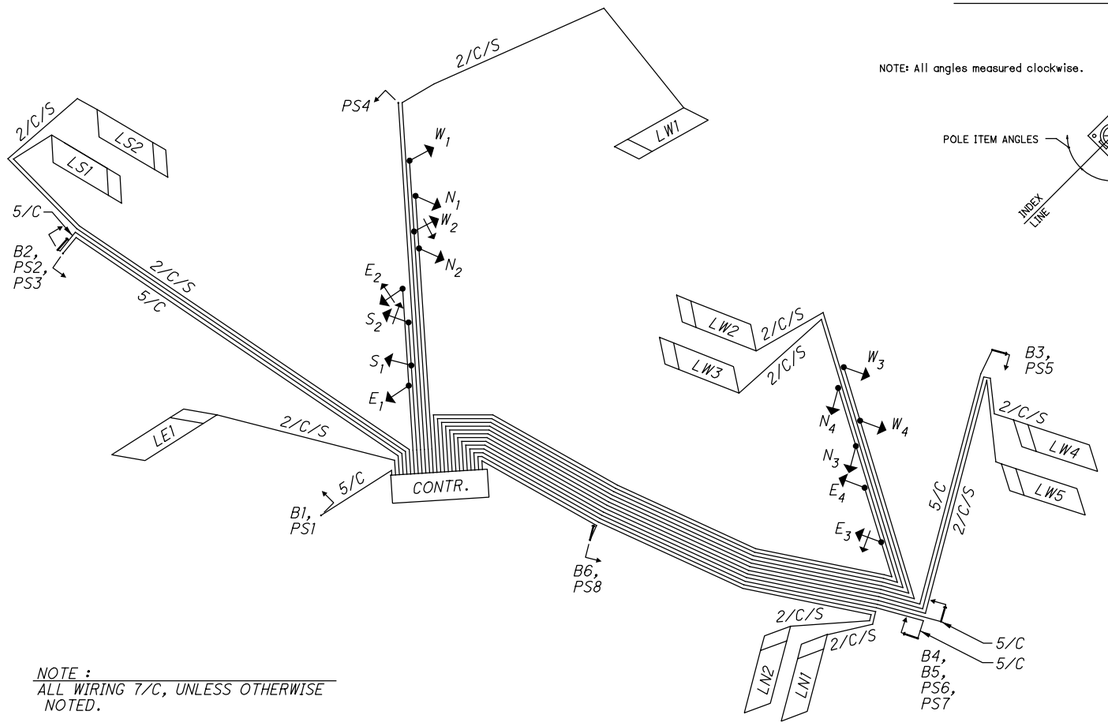
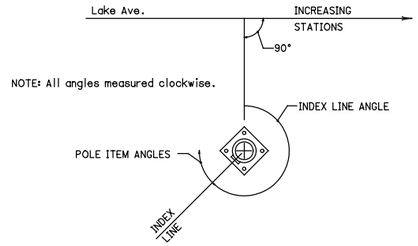


SPAN WIRE DIAGRAM
N.T.S.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

SPAN WIRE DIAGRAM
N.T.S.



LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LE1	P	6X25	3	5		PRES	NON-LOCK	1	A	-	-
LW1	P	6X25	3	1		PRES	NON-LOCK	1	B	-	-
LW2	P	6X25	3	4		PRES	NON-LOCK	2	A	-	-
LW3	P	6X25	3	4		PRES	NON-LOCK	2	B	-	-
LW4	P	6X25	3	4		PRES	NON-LOCK	3	A	-	-
LW5	P	6X25	3	4		PRES	NON-LOCK	3	B	-	-
LN1	P	6X25	3	1		PRES	NON-LOCK	4	A	-	5.0
LN2	P	6X25	3	1		PRES	NON-LOCK	4	B	-	-
LS1	P	6X25	3	8		PRES	NON-LOCK	5	A	-	5.0
LS2	P	6X25	3	3		PRES	NON-LOCK	5	B	-	-

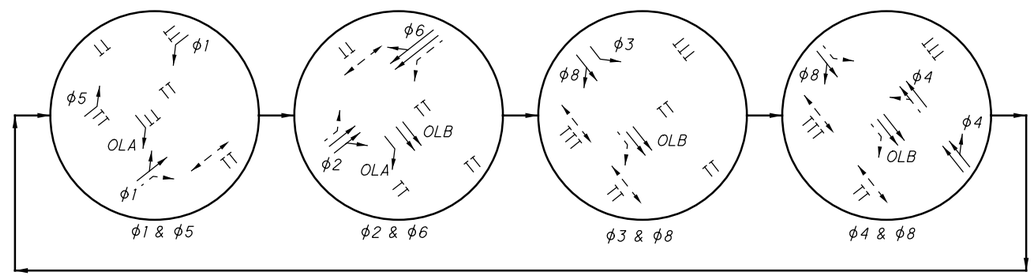
1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE: PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	WEATHERHEAD	CONDUIT ELL	SPREAD SPECTRUM RADIO	SIGN	VEHICULAR SIGNAL HEAD
P1	Ex.	Ex.	Ex.	135	-	-	-	Ex.	180	180	270	135/225	-
P2	PED	Ex.	Ex.	90	270	270	-	-	-	Ex.	-	-	-
P3	PED	Ex.	Ex.	180	0/135	180	-	-	-	Ex.	-	-	-
P4	Ex.	Ex.	Ex.	135	315	-	-	-	180	Ex.	-	135/225	-
P5	Ex.	Ex.	Ex.	135	-	-	-	-	180	Ex.	-	135	-
P6	PED	Ex.	Ex.	180	90	90	-	-	-	Ex.	-	-	-
P7	Ex.	Ex.	Ex.	180	90/180	90/180	-	-	135	Ex.	-	180	-
P8	PED	Ex.	Ex.	225	315	135	-	-	-	Ex.	-	-	-

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.

SIGNAL PHASING



OLA = ϕ1 & ϕ2 (EB-RIGHT, GREEN ARROW)
OLB = ϕ2 & ϕ8 (EB-THRU-RIGHT, GREEN BALL)

FOR FIELD WIRING HOOK-UP CHART, THIS INTERSECTION, SEE SHEET 54.

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #7
LAKE AVE. & PARK AVE. & PROSPECT RD., (U.S. 20)

ATB-ASHTABULA
SIGNAL UPGRADE

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	28	FT	CONDUIT, 3", 725.051
625	14	FT	TRENCH
625	1	EACH	GROUND ROD
630	1	EACH	SIGN HANGER ASSEMBLY, SPAN WIRE
630	6	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	25	SF	SIGN, FLAT SHEET
630	6	EACH	SIGN, DOUBLE SIDED, STREET NAME
630	42	FT	GROUND MOUNTED SUPPORT, NO. 3 POST
632	10	EACH	VEHICULAR SIGNAL HEAD (LED), YELLOW, 3 SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			AS PER PLAN
632	4	EACH	VEHICULAR SIGNAL HEAD (LED), YELLOW, 5 SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			AS PER PLAN
632	8	EACH	PEDESTRIAN SIGNAL HEAD (LED), TYPE D2, COUNTDOWN, AUDIBLE, AS PER PLAN
632	14	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	8	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	6	EACH	ACCESSIBLE PEDESTRIAN PUSHBUTTON
632	10	EACH	DETECTOR LOOP
632	175	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	175	FT	TETHER WIRE, WITH ACCESSORIES
632	1197	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	1194	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	1868	FT	LOOP DETECTOR LEAD-IN CABLE
632	50	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
632	4	EACH	REUSE OF STRAIN POLE, AS PER PLAN
633	1	EACH	CONTROLLER, MASTER, TRAFFIC RESPONSIVE
633	1	EACH	CABINET, TYPE TS-1, AS PER PLAN
633	1	EACH	CONTROLLER WORK PAD
633	1	EACH	PREEMPTION, AS PER PLAN
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	CABINET RISER
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
644	0.25	MILE	LANE LINE, 4"
644	0.09	MILE	CENTER LINE
644	465	FT	CHANNELIZING LINE, 8"
644	234	FT	STOP LINE
644	506	FT	CROSSWALK LINE
644	8	EACH	LANE ARROW
644	200	FT	REMOVAL OF PAVEMENT MARKING
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: West Prospect Road & Lake Avenue

START UP
START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [2] & # - [6]
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: YES
REST IN RED: RING 1- [X] RING 2- [ ]
SIMULTANEOUS GAP: YES

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
		OVERLAP PHASES				A	B	C	D
INTERSECTION MOVEMENT		WbL/Park	Eb (SR-20)	SEbL	NWb (Lake)	EbL	Wb (SR-20)	-	SEb (Lake)
MINIMUM GREEN (INITIAL)	(SEC.)	10	10	7	10	10	10		10
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)	3.0		3.0	3.0	3.0			3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)	12	25	10	10	10	25		28
MAXIMUM GREEN II	(SEC.)	12	34	27	13	10	34		46
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)	3.6	3.6	3.6	3.6	3.6	3.6		3.6
ALL RED CLEARANCE	(SEC.)	2.2	2.2	3.0	3.0	2.2	2.2		3.0
WALK	(SEC.)	7					7		7
PED CLEAR	(SEC.)	13					18		21
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	NO	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF		OFF
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

NOTES:

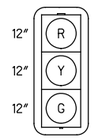
COORDINATION TIMING

Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6	7	8
1 - 00:00	MTWTF	FREE	-								
2 - 06:00	MTWTF	105	0	27	28	31	19	17	38	-	50
3 - 10:00	MTWTF	FREE	-								
4 - 16:00	MTWTF	105	0	26	26	34	19	16	36	-	53
5 - 18:30	MTWTF	FREE	-								
6 - 00:00	SAT,SUN	FREE	-								
7 - 09:30	SAT,SUN	105	0	27	28	31	19	17	38	-	50
8 - 19:00	SAT,SUN	FREE	-								

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #7
LAKE AVE. & PROSPECT RD., (U.S. 20)

ATB-ASHTABULA
SIGNAL UPGRADE



PROPOSED POLYCARBONATE SIGNAL HEAD (w/BACKPLATE)

N1, N2, S1, S2, E1, E2, W1, W2

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

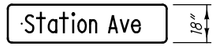
PS1, PS2, PS3, PS4, PS5, PS6, PS7, PS8

PROPOSED R10-3E-9

Sn3, Sn7

PROPOSED R10-3E-9

Sn2, Sn5



PROPOSED D3-1-96

Sn6, Sn8

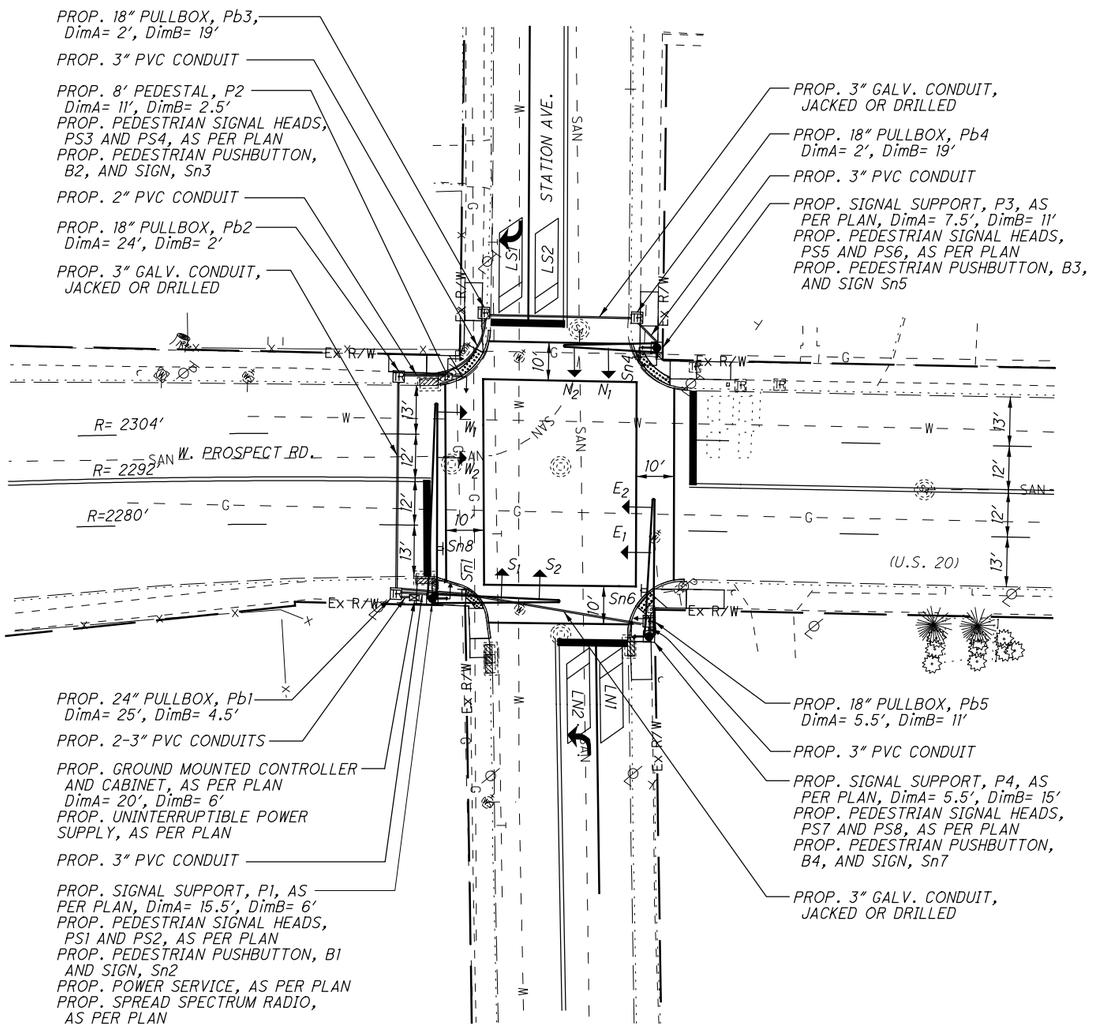
PROPOSED D3-1-78

Sn1, Sn4

POLE ORIENTATION

POLE NUMBER	POLE DESIGN TYPE	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	MAST ARM A ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE								
						MAST ARM B	PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	VEHICULAR SIGNAL HEAD	CONDUIT ELL	SPREAD SPECTRUM RADIO	SIGN	HANDHOLE
P1	12.30	7	23	TBD	90	270	0/270	0	-	180	-	180	45	-	90
P2	-	PED	8	TBD			0/90	90	-	-	-	270		-	180
P3	81.21	1	23	TBD	90		0/270	0	-	-	-	45		-	180
P4	81.21	3	23	TBD	0		0/270	270	-	-	-	0		-	180

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.



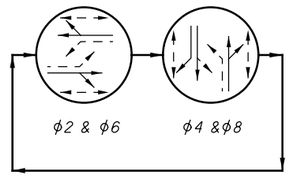
NOTES:
1. REMOVE ALL EXISTING PAVEMENT MARKING BY GRINDING AND REPLACE AS SHOWN FOR THE FOLLOWING LIMITS:
   A) PROSPECT RD. BETWEEN CLEVELAND AVE. AND 300FT EAST OF STATION AVE.
   B) STATION AVE. FOR 100FT NORTH AND SOUTH OF PROSPECT RD.
   ALL MARKINGS MUST MEET EXISTING MARKINGS. ESTIMATED QUANTITIES ARE PROVIDED IN THE SIGNAL SUB-SUMMARY.

REMOVAL ITEMS FOR DISPOSAL

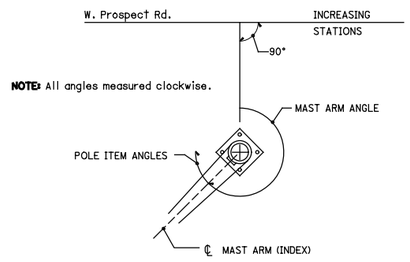
MESSENGER WIRE
SIGNAL CABLES
PEDESTALS.....2

REMOVAL ITEMS FOR STORAGE

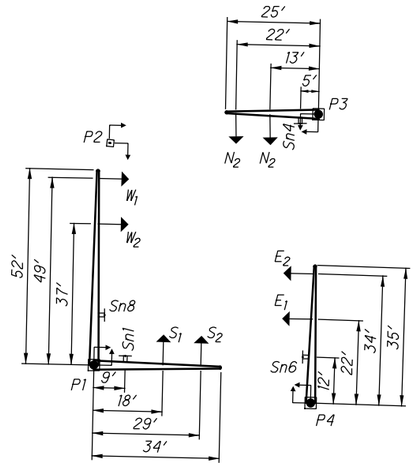
CONTROLLER & CABINET.....1
VEHICLE SIGNAL HEADS.....8
PEDESTRIAN SIGNAL HEADS.....8



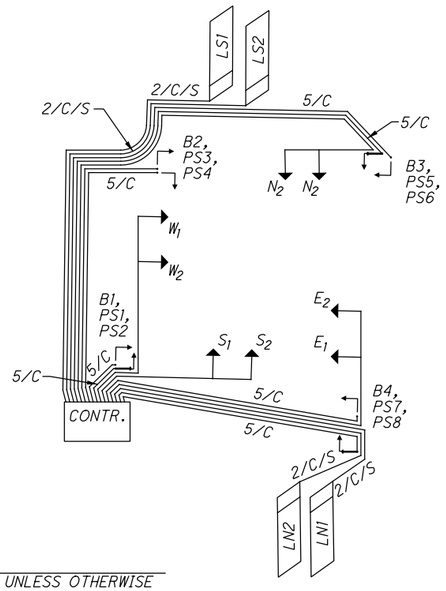
SIGNAL PHASING



HORIZONTAL SCALE IN FEET
0 10 20 40
CALCULATED EMH CHECKED LAS



MAST ARM DIAGRAM
N.T.S.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LS1	P	6 X 25	3	8		PRESENCE	NON-LOCK	1	A		
LS2	P	6 X 25	3	8		PRESENCE	NON-LOCK	1	B		
LN1	P	6 X 25	3	4		PRESENCE	NON-LOCK	2	A		
LN2	P	6 X 25	3	4		PRESENCE	NON-LOCK	2	B		

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 4 R	R	E1	RED	Ph. 6 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 6 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 6 G	
N2	RED	Ph. 4 R	R	E2	RED	Ph. 6 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 6 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 6 G	
S1	RED	Ph. 8 R	R	W1	RED	Ph. 2 R	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 8 G			GREEN	Ph. 2 G	
S2	RED	Ph. 8 R	R	W2	RED	Ph. 2 R	R
	YELLOW	Ph. 8 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 8 G			GREEN	Ph. 2 G	
PS1 (West Leg)	WALK	Ph. 8 G	-	PS3 (West Leg)	WALK	Ph. 8 G	-
	FLASHING DW	Ph. 8 G			FLASHING DW	Ph. 8 G	
	DON*T WALK	Ph. 8 Y, R			DON*T WALK	Ph. 8 Y, R	
PS2 (South Leg)	WALK	Ph. 6 G	-	PS8 (South Leg)	WALK	Ph. 6 G	-
	FLASHING DW	Ph. 6 G			FLASHING DW	Ph. 6 G	
	DON*T WALK	Ph. 6 Y, R			DON*T WALK	Ph. 6 Y, R	
PS4 (North Leg)	WALK	Ph. 2 G	-	PS5 (North Leg)	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 2 G			FLASHING DW	Ph. 2 G	
	DON*T WALK	Ph. 2 Y, R			DON*T WALK	Ph. 2 Y, R	
PS6 (East Leg)	WALK	Ph. 4 G	-	PS7 (East Leg)	WALK	Ph. 4 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 4 G	
	DON*T WALK	Ph. 4 Y, R			DON*T WALK	Ph. 4 Y, R	
B1			-	B2			-
	ACTUATE	Ph. 8 G			ACTUATE	Ph. 8 G	
B3			-	B4			-
	ACTUATE	Ph. 4 G			ACTUATE	Ph. 4 G	

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #8
STATION AVE. AND W. PROSPECT ROAD (U.S. 20)

ATB-ASHTABULA
SIGNAL UPGRADE

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	166	FT	CONDUIT, JACKED OR DRILLED, 725.04, 3"
625	14	FT	CONDUIT, 2", 725.051
625	66	FT	CONDUIT, 3", 725.051
625	75	FT	TRENCH IN PAVED AREAS, TYPE A
625	4	EACH	PULL BOX, 725.08, 18"
625	1	EACH	PULL BOX, 725.08, 24"
625	5	EACH	GROUND ROD
630	4	EACH	SIGN HANGER ASSEMBLY, MAST ARM
630	4	EACH	SIGN, STREET NAME
632	8	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			WITH BACKPLATE, AS PER PLAN
632	8	EACH	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D2, AS PER PLAN
632	8	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	8	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	3	EACH	SIGNAL SUPPORT FOUNDATION, AS PER PLAN
632	932	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	592	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	4	EACH	DETECTOR LOOP
632	434	EACH	LOOP DETECTOR LEAD-IN CABLE
632	87	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	PEDESTAL, 8', TRANSFORMER BASE, AS PER PLAN
632	1	EACH	PEDESTAL FOUNDATION
632	4	EACH	PEDESTRIAN PUSHBUTTON
632	1	EACH	SIGNAL SUPPORT, TYPE TC-12.30 DESIGN 7 POLE, WITH MAST ARMS TC-81.21 DESIGN 13
			AND DESIGN 2, AS PER PLAN
632	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 1, AS PER PLAN
632	1	EACH	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 3, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
633	1	EACH	CABINET RISER
644	0.24	MILE	LANE LINE, 4"
644	0.16	MILE	CENTER LINE
644	150	FT	CHANNELIZING LINE, 8"
644	90	FT	STOP LINE
644	366	FT	CROSSWALK LINE
644	3	EACH	LANE ARROW
644	2560	FT	REMOVAL OF PAVEMENT MARKING
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: West Prospect Road & Station Avenue

START UP
START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - 2 & # - 6
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: YES
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP YES

INTERVAL OR FEATURE		OVERLAP PHASES	A	B	C	D
		CONTROLLER MOVEMENT No.				
		1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT			Wb		Nb		Eb		Sb
MINIMUM GREEN (INITIAL)	(SEC.)		10		10		10		10
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)				3.0				3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)		30		15		30		15
MAXIMUM GREEN II	(SEC.)		83		19		83		19
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)		3.6		3.6		3.6		3.6
ALL RED CLEARANCE	(SEC.)		2.0		2.0		2.0		2.0
WALK	(SEC.)		7		7		7		7
PED CLEAR	(SEC.)		10		13		9		13
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	YES	NO	NO	NO	YES
	PED (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)		OFF		OFF		OFF		OFF
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

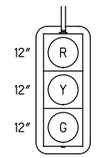
COORDINATION TIMING

Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6	7	8
1 - 00:00	MTWTF	FREE									
2 - 06:00	MTWTF	105	51		65		40		65		40
3 - 10:00	MTWTF	FREE									
4 - 16:00	MTWTF	105	2		66		39		66		39
5 - 18:30	MTWTF	FREE									
6 - 00:00	SAT,SUN	FREE									
7 - 09:30	SAT,SUN	105	51		65		40		65		40
8 - 19:00	SAT,SUN	FREE									

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #8
STATION AVE. AND WEST PROSPECT ROAD (U.S. 20)

ATB-ASHTABULA
SIGNAL UPGRADE



PROPOSED POLYCARBONATE SIGNAL HEAD (w/BACKPLATE)

N1, N2, S1, S2, W1, W2

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

PS1, PS2

PROPOSED R10-3E-9 (R)

Sn3, Sn4

PROPOSED D3-1-54

Sn2, Sn5

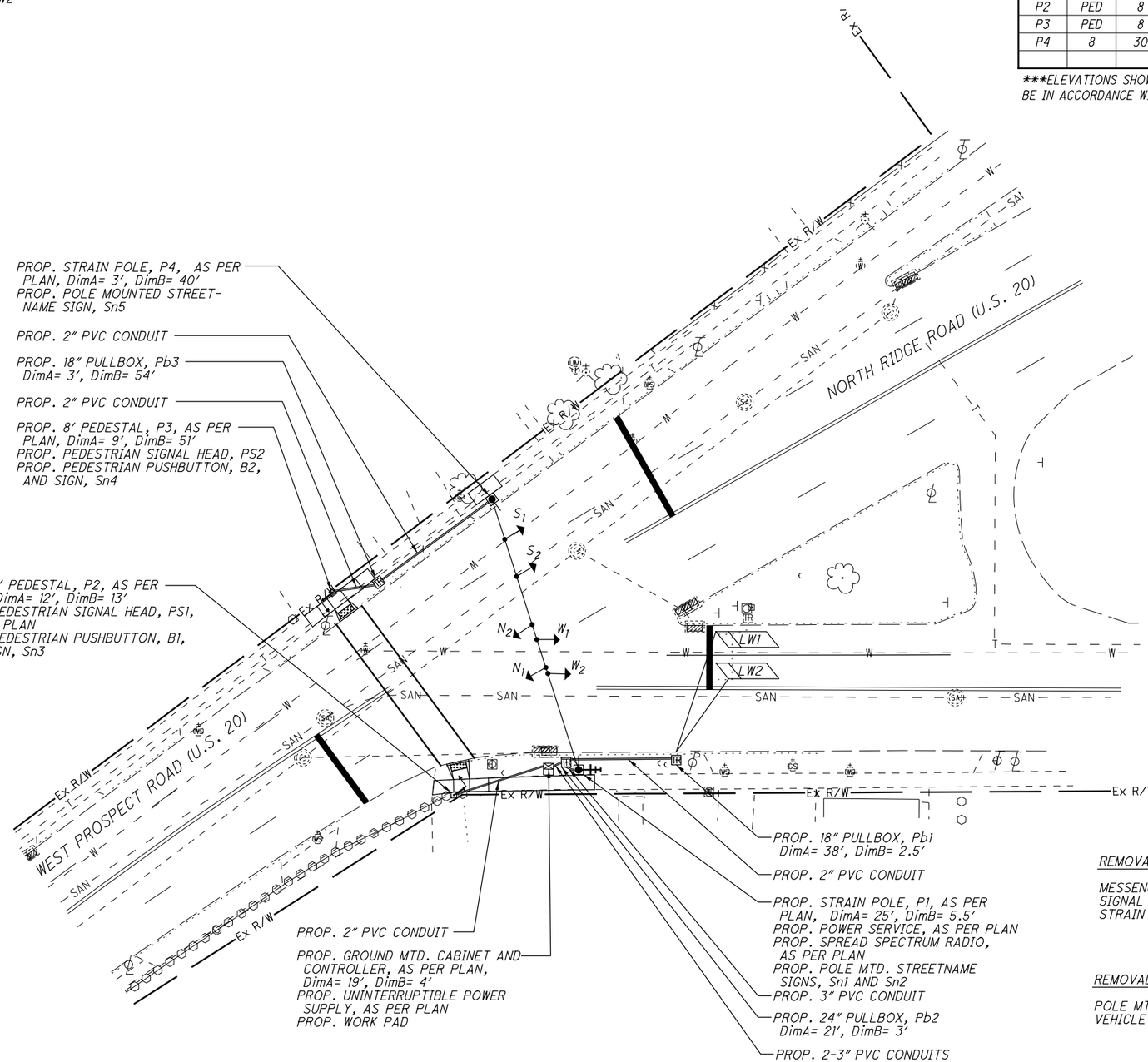
PROPOSED D3-1-78

Sn1

POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE								
					PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	WEATHERHEAD	CONDUIT ELL	SPREAD SPECTRUM RADIO	SIGN	VEHICULAR SIGNAL HEAD
P1	8	30	TBD	225	-	-	-	135	180	135	270	135/180	-
P2	PED	8	TBD	225	225	225	-	-	-	225	-	-	-
P3	PED	8	TBD	180	270	270	-	-	-	135	-	-	-
P4	8	30	TBD	180	-	-	-	-	180	270	-	180	-

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.



NOTE :

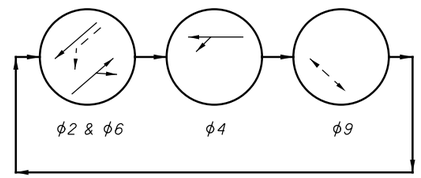
1. REFRESH ALL PAVEMENT MARKINGS WITHIN 100' OF THE STOP BAR, UNLESS OTHERWISE NOTED.

REMOVAL ITEMS FOR DISPOSAL

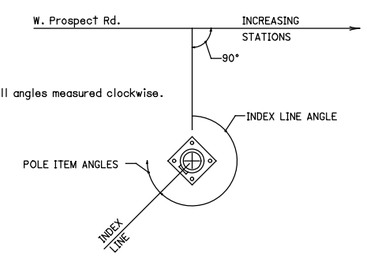
MESSENGER WIRE
SIGNAL CABLES
STRAIN POLES

REMOVAL ITEMS FOR STORAGE

POLE MTD. CONTROLLER & CABINET.....1
VEHICLE SIGNAL HEADS.....6



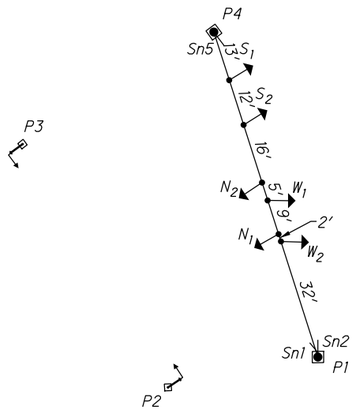
SIGNAL PHASING



Q:\City of Ashtabula\0106521A.00 - Ashtabula Signal System Design\92243\signals\sheets\92243GP009.dgn 8/2/2013 1:49:22 PM EHundt

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #9
CENTER ST. & W. PROSPECT RD./ N. RIDGE ROAD (US 20)
ATB-ASHTABULA
SIGNAL UPGRADE



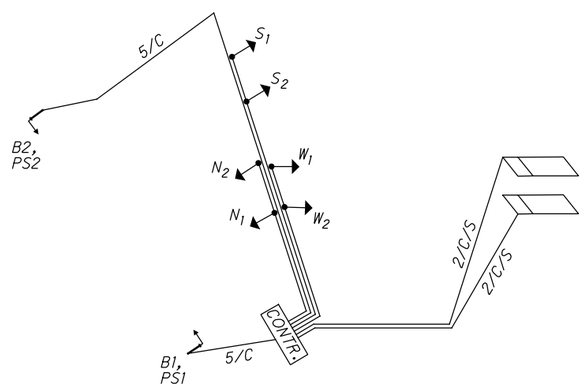
SPAN WIRE DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LW1	P	5X20	3	4	PRES	NON-LOCK	1	A	-	-
LW2	P	5X20	3	4	PRES	NON-LOCK	1	B	-	-

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 6 R	R	W1	RED	Ph. 4 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 4 G	
N2	RED	Ph. 6 R	R	W2	RED	Ph. 4 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 4 G	
S1	RED	Ph. 2 R	R	PS1 (South Leg)	WALK	Ph. 9 G	-
	YELLOW	Ph. 2 Y			FLASHING DW	Ph. 9 G	
	GREEN	Ph. 2 G			DON*T WALK	Ph. 9 Y, R	
S2	RED	Ph. 2 R	R	PS2 (South Leg)	WALK	Ph. 9 G	-
	YELLOW	Ph. 2 Y			FLASHING DW	Ph. 9 G	
	GREEN	Ph. 2 G			DON*T WALK	Ph. 9 Y, R	
B1			-	B2			-
	ACTUATE	Ph. 9 G			ACTUATE	Ph. 9 G	



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #9
CENTER ST. & W. PROSPECT RD./N. RIDGE ROAD (US 20)

ATB-ASHTABULA
SIGNAL UPGRADE

47
63

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SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	17	FT	CONDUIT, 3", 725.051
625	127	FT	CONDUIT, 2", 725.051
625	138	FT	TRENCH
625	2	EACH	PULL BOX, 725.08, 18"
625	1	EACH	PULL BOX, 725.08, 24"
625	5	EACH	GROUND ROD
630	3	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	3	EACH	SIGN, DOUBLE SIDED, STREET NAME
632	6	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			WITH BACKPLATE, AS PER PLAN
632	2	EACH	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D2, AS PER PLAN
632	6	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	2	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	2	EACH	PEDESTRIAN PUSHBUTTON
632	2	EACH	DETECTOR LOOP
632	90	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	90	FT	TETHER WIRE, WITH ACCESSORIES
632	316	EACH	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	354	EACH	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	2	EACH	STRAIN POLE FOUNDATION, AS PER PLAN
632	2	EACH	PEDESTAL FOUNDATION
632	126	EACH	LOOP DETECTOR LEAD-IN CABLE
632	62	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	2	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 8, AS PER PLAN
632	2	EACH	PEDESTAL, 8', TRANSFORMER BASE, AS PER PLAN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
633	1	EACH	CABINET RISER
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	CONTROLLER WORK PAD
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
644	0.06	MILE	CENTER LINE
644	0.08	MILE	LANE LINE, 4"
644	75	FT	CHANNELIZING LINE, 8"
644	84	FT	STOP LINE
644	116	FT	CROSSWALK LINE
644	372	FT	DOTTED LINE, 4"
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: Center Street & West Prospect Road

START UP
START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - 2 & # - 6
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: YES
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP [ ] YES

INTERVAL OR FEATURE		OVERLAP / PHASES	CONTROLLER MOVEMENT No. 1	2	3	4	5	6		9
							A	B	C	D
INTERSECTION MOVEMENT				Sb		Wb		Nb		PED
MINIMUM GREEN (INITIAL)	(SEC.)			10		10		10		
* ADDED INITIAL	(SEC./ACTUATION)									
MAXIMUM INITIAL	(SEC.)									
PASSAGE TIME (PRESET GAP)	(SEC.)					2.0				
* MINIMUM GAP	(SEC.)									
TIME BEFORE REDUCTION	(SEC.)									
* TIME TO REDUCE	(SEC.)									
MAXIMUM GREEN I	(SEC.)			30		14		30		21
MAXIMUM GREEN II	(SEC.)			83		14		83		21
MAXIMUM GREEN III	(SEC.)									
YELLOW CHANGE	(SEC.)			3.6		3.0		3.6		2.0
ALL RED CLEARANCE	(SEC.)			2.6		3.0		2.6		1.0
WALK	(SEC.)									7
PED CLEAR	(SEC.)									14
PED CLEAR THROUGH YELLOW	(SEC.)									
ADJUST	(SEC.)									
LIMIT	(SEC.)									
SET	(SEC.)									
CLEAR	(SEC.)									
RECALL	MAX (NO/YES)		NO	NO	NO	NO	NO	NO	NO	NO
	MIN (NO/YES)		NO	YES	NO	NO	NO	YES	NO	NO
	PED (NO/YES)		NO	NO	NO	NO	NO	NO	NO	NO
MEMORY	(ON/OFF)			OFF		OFF		OFF		OFF
CALL TO NON-ACTUATED	No. 1			X				X		
	No. 2									

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

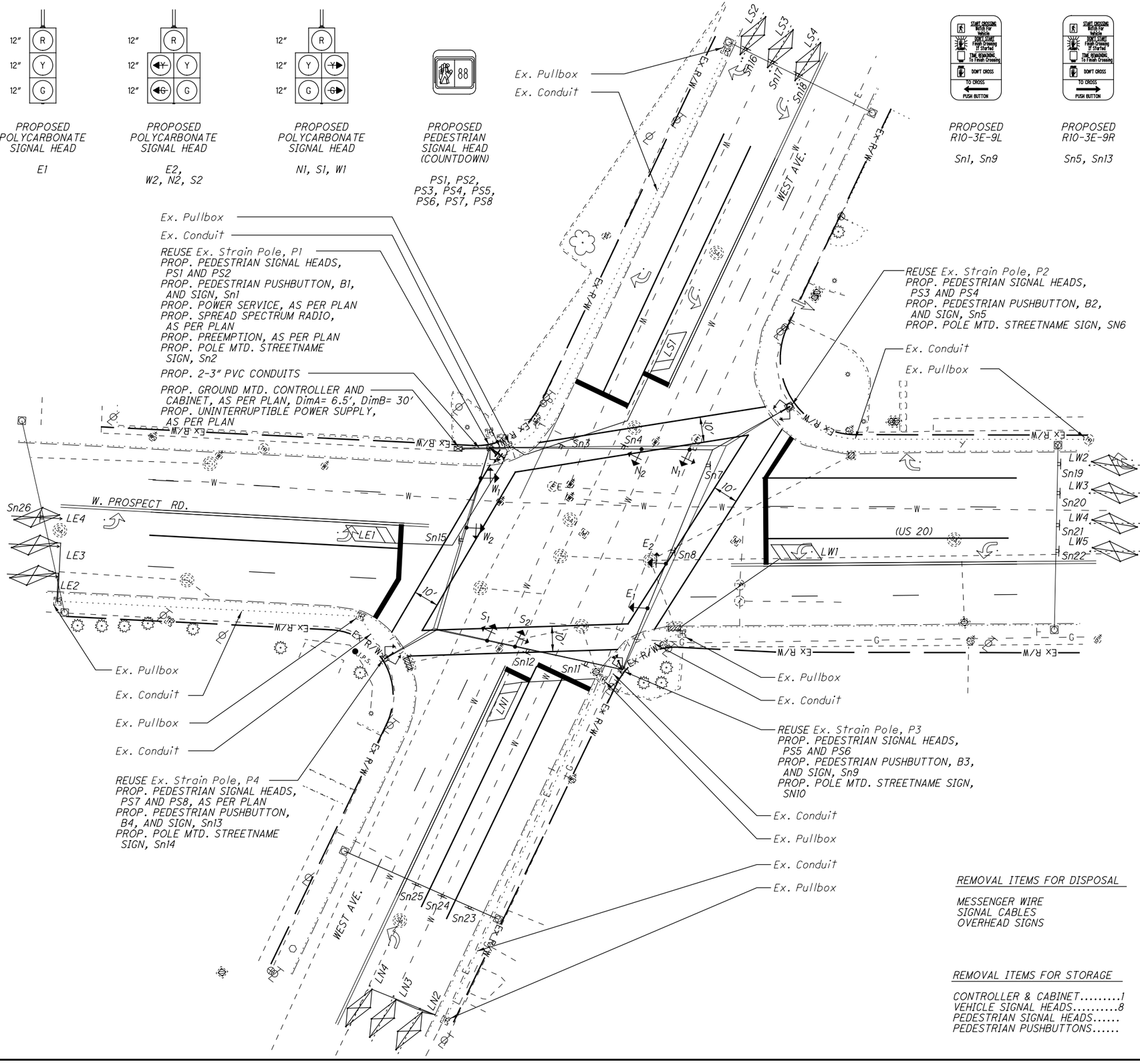
COORDINATION TIMING

Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6		9
1 - 00:00	MTWTF	FREE									
2 - 06:00	MTWTF	105	0		52		29		52		24
3 - 10:00	MTWTF	FREE									
4 - 16:00	MTWTF	105	0		53		28		53		24
5 - 18:30	MTWTF	FREE									
6 - 00:00	SAT,SUN	FREE									
7 - 09:30	SAT,SUN	105	0		52		29		52		24
8 - 19:00	SAT,SUN	FREE									

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #9
W. PROSPECT RD./N. RIDGE ROAD (US 20)
CENTER ST. & W.

ATB-ASHTABULA
SIGNAL UPGRADE



PROPOSED POLYCARBONATE SIGNAL HEAD
E1

PROPOSED POLYCARBONATE SIGNAL HEAD
E2, W2, N2, S2

PROPOSED POLYCARBONATE SIGNAL HEAD
N1, S1, W1

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)
PS1, PS2, PS3, PS4, PS5, PS6, PS7, PS8

PROPOSED R10-3E-9L
Sn1, Sn9

PROPOSED R10-3E-9R
Sn5, Sn13

PROPOSED R3-5R-30
Sn3, Sn7, Sn11, Sn16, Sn19, Sn23

PROPOSED R3-5A-30
Sn17, Sn20, Sn21, Sn24

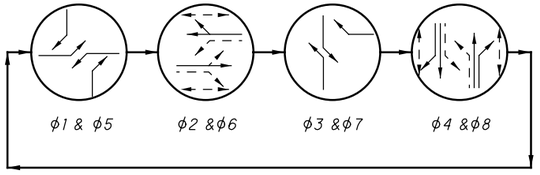
PROPOSED R3-5L-30
Sn4, Sn8, Sn12, Sn15, Sn18, Sn22, Sn25, Sn26

PROPOSED D3-1-54
Sn2, Sn10

PROPOSED D3-1-78
Sn6, Sn14

NOTE :

1. REFRESH ALL PAVEMENT MARKINGS WITHIN 100' OF THE STOP BAR, UNLESS OTHERWISE NOTED.



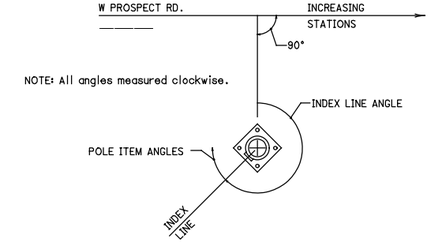
SIGNAL PHASING

REMOVAL ITEMS FOR DISPOSAL

MESSENGER WIRE
SIGNAL CABLES
OVERHEAD SIGNS

REMOVAL ITEMS FOR STORAGE

CONTROLLER & CABINET.....1
VEHICLE SIGNAL HEADS.....8
PEDESTRIAN SIGNAL HEADS.....
PEDESTRIAN PUSHBUTTONS.....



HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #10
WEST AVE. & W PROSPECT RD. (US 20)
ATB-ASHTABULA SIGNAL UPGRADE

49
63

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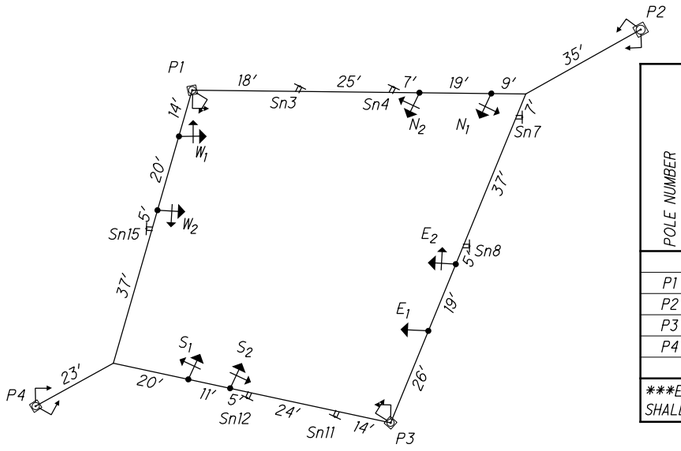
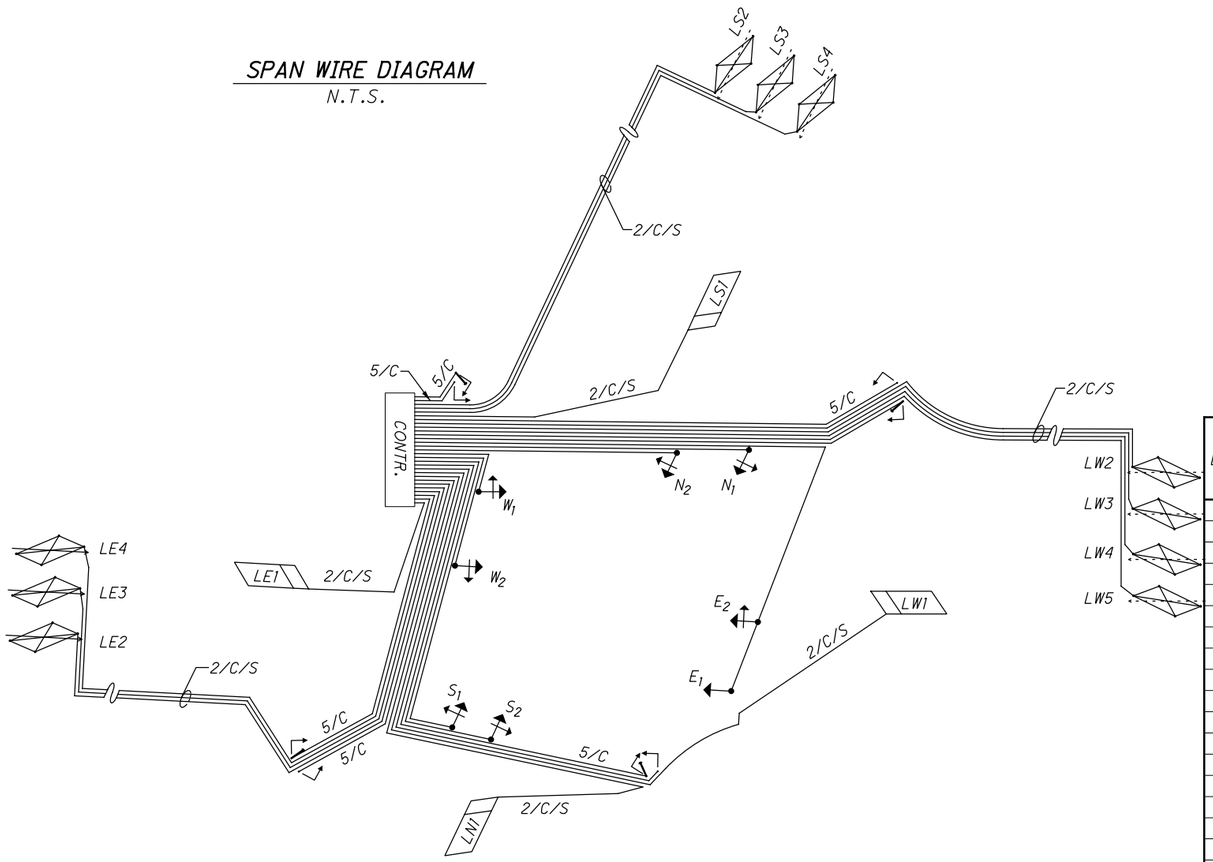


SPAN WIRE DIAGRAM
N.T.S.

POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE							
					PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	SPREAD SPECTRUM RADIO	CONDUIT ELL	SIGN	WEATHERHEAD
P1	Ex.	Ex.	Ex.	135	135/180	135	-	Ex.	135	270	225	90/225
P2	Ex.	Ex.	Ex.	225	135/225	180	-	-	-	Ex.	225	180
P3	Ex.	Ex.	Ex.	135	180/225	225	-	-	-	Ex.	270	135/270
P4	Ex.	Ex.	Ex.	225	135/225	180	-	-	-	Ex.	225	180

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
N1	RED	Ph. 4 R	R	S1	RED	Ph. 8 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 8 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 8 G	
	YLW ARROW RT	Ph. 5 YA	-		YLW ARROW RT	Ph. 1 YA	-
	GRN ARROW RT	Ph. 5 GA			GRN ARROW RT	Ph. 1 GA	
N2	RED	Ph. 4 R	R	S2	RED	Ph. 8 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 8 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 8 G	
	YLW ARROW LT	Ph. 7 YA	-		YLW ARROW LT	Ph. 3 YA	-
	GRN ARROW LT	Ph. 7 GA			GRN ARROW LT	Ph. 3 GA	
E1	RED	Ph. 6 R	R	W1	RED	Ph. 2 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 2 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 2 G	
E2	RED	Ph. 6 R	R		YLW ARROW RT	Ph. 3 YA	-
	YELLOW	Ph. 6 Y			GRN ARROW RT	Ph. 3 GA	
	GREEN	Ph. 6 G		W2	RED	Ph. 2 R	R
	YLW ARROW LT	Ph. 1 YA	-		YELLOW	Ph. 2 Y	
	GRN ARROW LT	Ph. 1 GA			GREEN	Ph. 2 G	
					YLW ARROW LT	Ph. 5 YA	-
					GRN ARROW LT	Ph. 5 GA	
PS1 (North Leg)	WALK	Ph. 2 G	-	PS3 (North Leg)	WALK	Ph. 2 G	-
	FLASHING DW	Ph. 2 G			FLASHING DW	Ph. 2 G	
	DON*T WALK	Ph. 2 Y, R			DON*T WALK	Ph. 2 Y, R	
PS2 (West Leg)	WALK	Ph. 8 G	-	PS8 (West Leg)	WALK	Ph. 8 G	-
	FLASHING DW	Ph. 8 G			FLASHING DW	Ph. 8 G	
	DON*T WALK	Ph. 8 Y, R			DON*T WALK	Ph. 8 Y, R	
PS4 (East Leg)	WALK	Ph. 4 G	-	PS5 (East Leg)	WALK	Ph. 4 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 4 G	
	DON*T WALK	Ph. 4 Y, R			DON*T WALK	Ph. 4 Y, R	
PS6 (South Leg)	WALK	Ph. 6 G	-	PS7 (South Leg)	WALK	Ph. 6 G	-
	FLASHING DW	Ph. 6 G			FLASHING DW	Ph. 6 G	
	DON*T WALK	Ph. 6 Y, R			DON*T WALK	Ph. 6 Y, R	
B1	ACTUATE	Ph. 8 G	-	B4	ACTUATE	Ph. 8 G	-
B2	ACTUATE	Ph. 4 G	-	B3	ACTUATE	Ph. 4 G	-

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LS1	P	6X20	3	3		PRES	NON-LOCK	1	A	-	-
LW1	P	6X20	3	5		PRES	NON-LOCK	2	A	-	-
LN1	P	6X20	3	7		PRES	NON-LOCK	3	A	-	-
LE1	P	6X20	3	1		PRES	NON-LOCK	4	A	-	-
LS2	ADD	9X18	4	1		PULSE	NON-LOCK	5	A	-	2.8
LS3	ADD	9X18	4	8		PULSE	NON-LOCK	5	B	-	2.8
LS4	ADD	9X18	4	3		PULSE	NON-LOCK	6	A	-	2.8
LW2	ADD	9X18	4	3		PULSE	NON-LOCK	7	A	-	2.5
LW3	ADD	9X18	4	2		PULSE	NON-LOCK	7	B	-	2.5
LW4	ADD	9X18	4	2		PULSE	NON-LOCK	8	A	-	2.5
LW5	ADD	9X18	4	5		PULSE	NON-LOCK	8	B	-	2.5
LN2	ADD	9X18	4	5		PULSE	NON-LOCK	9	A	-	2.8
LN3	ADD	9X18	4	4		PULSE	NON-LOCK	9	B	-	2.8
LN4	ADD	9X18	4	7		PULSE	NON-LOCK	10	A	-	2.8
LE2	ADD	9X18	4	6		PULSE	NON-LOCK	11	A	-	2.6
LE3	ADD	9X18	4	6		PULSE	NON-LOCK	11	B	-	2.6
LE4	ADD	9X18	4	1		PULSE	NON-LOCK	12	A	-	2.6

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #10
WEST AVENUE AND W PROSPECT RD. (US20)
ATB-ASHTABULA SIGNAL UPGRADE

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	40	FT	CONDUIT, 3", 725.051
625	20	FT	TRENCH IN PAVED AREA, TYPE A
625	1	EACH	GROUND ROD
630	18	EACH	SIGN HANGER ASSEMBLY, SPAN WIRE
630	4	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	135	SF	SIGN, FLAT SHEET
630	4	EACH	SIGN, DOUBLE SIDED, STREET NAME
632	1	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			AS PER PLAN
632	7	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 5-SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			AS PER PLAN
632	8	EACH	PEDESTRIAN SIGNAL HEAD (LED) , TYPE D2, COUNTDOWN, AUDIBLE, AS PER PLAN
632	4	EACH	ACCESSIBLE PEDESTRIAN PUSHBUTTON
632	8	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	8	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	17	EACH	DETECTOR LOOP
632	380	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	380	FT	TETHER WIRE, WITH ACCESSORIES
632	1353	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	1012	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	4461	FT	LOOP DETECTOR LEAD-IN CABLE
632	62	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
632	4	EACH	REUSE OF STRAIN POLE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
633	1	EACH	CABINET RISER
633	1	EACH	CABINET FOUNDATION, AS PER PLAN
633	1	EACH	PREEMPTION, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
644	0.12	MILE	LANE LINE, 4"
644	0.13	MILE	CENTER LINE
644	729	FT	CHANNELIZING LINE
644	163	FT	STOP LINE
644	678	FT	CROSSWALK LINE
644	8	EACH	LANE ARROW
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: West Prospect Road & West Avenue

START UP
START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - 2 & # - 6
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: YES
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP [YES]

INTERVAL OR FEATURE		OVERLAP PHASES	A	B	C	D
		CONTROLLER MOVEMENT No.				
		1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT		EbL	Wb	SbL	Nb	WbL	Eb	NbL	Sb
MINIMUM GREEN (INITIAL)	(SEC.)	7	10	7	10	7	10	7	10
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)	11	33	11	33	7	30	11	28
MAXIMUM GREEN II	(SEC.)	11	33	18	22	9	33	11	29
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)	3.0	3.6	3.0	3.6	3.0	3.6	3.0	3.6
ALL RED CLEARANCE	(SEC.)	3.0	3.0	2.2	2.2	3.0	3.0	2.2	2.2
WALK	(SEC.)		7		7		7		7
PED CLEAR	(SEC.)		26		26		23		21
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	MIN (NO/YES)	NO	YES	NO	YES	NO	YES	NO	YES
	PED (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
CALL TO NON-ACTUATED	No. 1								
	No. 2								

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

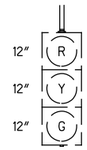
COORDINATION TIMING

Plan No. - TOD		CYCLE LENGTH	OFFSET	1	2	3	4	5	6	7	8
1 - 00:00	MTWTF	FREE									
2 - 06:00	MTWTF	105	0	13	41	12	39	13	41	12	39
3 - 10:00	MTWTF	FREE									
4 - 16:00	MTWTF	105	48	13	40	13	39	13	40	13	39
5 - 18:30	MTWTF	FREE									
6 - 00:00	SAT,SUN	FREE									
7 - 09:30	SAT,SUN	105	0	13	41	12	39	13	41	12	39
8 - 19:00	SAT,SUN	FREE									

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #10
WEST AVENUE AND W PROSPECT RD. (US20)

ATB-ASHTABULA
SIGNAL UPGRADE



EXISTING POLYCARBONATE SIGNAL HEAD

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

PS2, PS4, PS6, PS8, PS10, PS12, PS14, PS16

EXISTING (REMOVE) PEDESTRIAN SIGNAL HEAD

PS1, PS3, PS5, PS7, PS9, PS11, PS13, PS15

EXISTING D3-1

EXISTING D3-1

POLE ORIENTATION

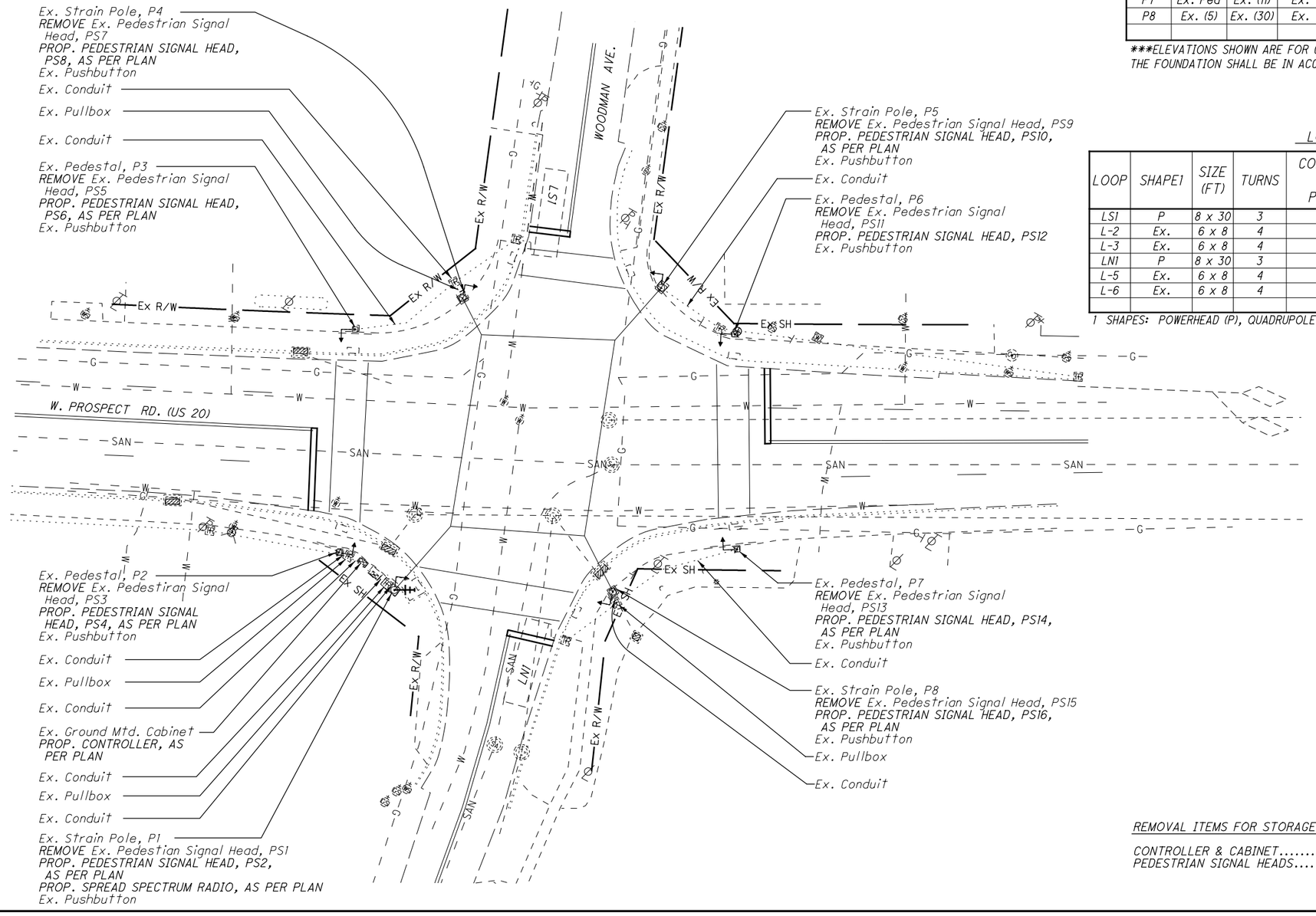
POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE					
					PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	SPREAD SPECTRUM RADIO	CONDUIT ELL
P1	Ex. (5)	Ex. (30)	Ex.	225	135	Ex.	-	Ex.	270	Ex.
P2	Ex. Ped	Ex. (11)	Ex.	0	90	Ex.	-	-	-	Ex.
P3	Ex. Ped	Ex. (11)	Ex.	180	270	Ex.	-	-	-	Ex.
P4	Ex. (5)	Ex. (30)	Ex.	135	45	Ex.	-	-	-	Ex.
P5	Ex. (5)	Ex. (30)	Ex.	225	315	Ex.	-	-	-	Ex.
P6	Ex. Ped	Ex. (11)	Ex.	180	270	Ex.	-	-	-	Ex.
P7	Ex. Ped	Ex. (11)	Ex.	0	270	Ex.	-	-	-	Ex.
P8	Ex. (5)	Ex. (30)	Ex.	135	45	Ex.	-	-	-	Ex.

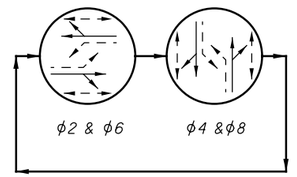
***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.

LOOP DETECTOR UNIT SUMMARY

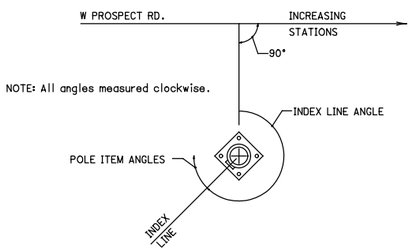
LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	DELAY (SEC.)
LS1	P	8 x 30	3	8	PRESENCE	NON-LOCK	REUSE EX.	REUSE EX.	5.0
L-2	Ex.	6 x 8	4		PULSE	NON-LOCK	EX	EX	
L-3	Ex.	6 x 8	4		PULSE	NON-LOCK	EX	EX	
LN1	P	8 x 30	3	4	PRESENCE	NON-LOCK	REUSE EX.	REUSE EX.	5.0
L-5	Ex.	6 x 8	4		PULSE	NON-LOCK	EX	EX	
L-6	Ex.	6 x 8	4		PULSE	NON-LOCK	EX	EX	

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).





SIGNAL PHASING



REMOVAL ITEMS FOR STORAGE

CONTROLLER & CABINET.....1
PEDESTRIAN SIGNAL HEADS.....8

HORIZONTAL SCALE IN FEET
0 10 20 40

CALCULATED FDS
CHECKED MDJ

TRAFFIC SIGNAL PLAN #11
WOODMAN AVE. & W PROSPECT RD. (US20)

ATB-ASHTABULA
SIGNAL UPGRADE

52
63

Q:\City of Ashtabula\0106521A.00 - Ashtabula Signal System Design\92243\signals\sheets\92243CP011.dgn 8/2/2013 1:54:11 PM EHundt

SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
632	8	EACH	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D2, AS PER PLAN
632	8	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	2	EACH	DETECTOR LOOP
632	2	EACH	LOOP DETECTOR TIE IN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
815	1	EACH	SPREAD SPECTRUM RADIO, AS PER PLAN

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: West Prospect Road & Woodman Avenue

START UP
START IN: Y/R FLASH- [ ] ALL RED- [X]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [2] & # - [6]
COLOR DISPLAYED: GREEN- [X] YELLOW- [ ]

DUAL ENTRY: YES
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP: YES

OVERLAP PHASES	A	B	C	D

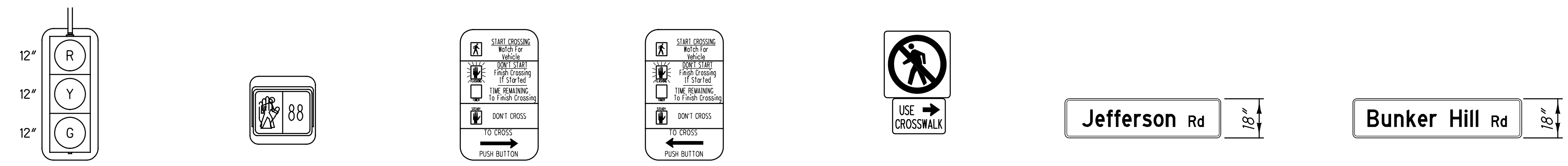
INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	6	8
INTERSECTION MOVEMENT			Wb		Nb	Eb	Sb
MINIMUM GREEN (INITIAL)	(SEC.)		15		10	15	10
* ADDED INITIAL	(SEC./ACTUATION)						
MAXIMUM INITIAL	(SEC.)						
PASSAGE TIME (PRESET GAP)	(SEC.)		3.0		3.0	3.0	3.0
* MINIMUM GAP	(SEC.)						
TIME BEFORE REDUCTION	(SEC.)						
* TIME TO REDUCE	(SEC.)						
MAXIMUM GREEN I	(SEC.)		20		15	20	15
MAXIMUM GREEN II	(SEC.)		26		19	26	19
MAXIMUM GREEN III	(SEC.)						
YELLOW CHANGE	(SEC.)		3.6		3.0	3.6	3.0
ALL RED CLEARANCE	(SEC.)		3.0		3.0	3.0	3.0
WALK	(SEC.)		7		7	7	7
PED CLEAR	(SEC.)		12		19	18	18
PED CLEAR THROUGH YELLOW	(SEC.)						
ADJUST	(SEC.)						
LIMIT	(SEC.)						
SET	(SEC.)						
CLEAR	(SEC.)						
RECALL	MAX (NO/YES)		NO		NO	NO	NO
	MIN (NO/YES)		YES		NO	YES	NO
	PED (NO/YES)		NO		NO	NO	NO
MEMORY	(ON/OFF)		ON		OFF	ON	OFF
CALL TO NON-ACTUATED	No. 1						
	No. 2						

NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #11
WOODMAN AVE. & W PROSPECT RD. (US20)

ATB-ASHTABULA
SIGNAL UPGRADE



PROPOSED POLYCARBONATE SIGNAL HEAD (w/BACKPLATE)

N1, N2, N3, E1, E2, W1, W2

PROPOSED PEDESTRIAN SIGNAL HEAD (COUNTDOWN)

PS1, PS2, PS3, PS4

PROPOSED R10-3E-9R

Sn1

PROPOSED R10-3E-9L

Sn2

PROPOSED R9-3-24 R9-3BP-18

Sn5

PROPOSED D3-1-72

Sn3

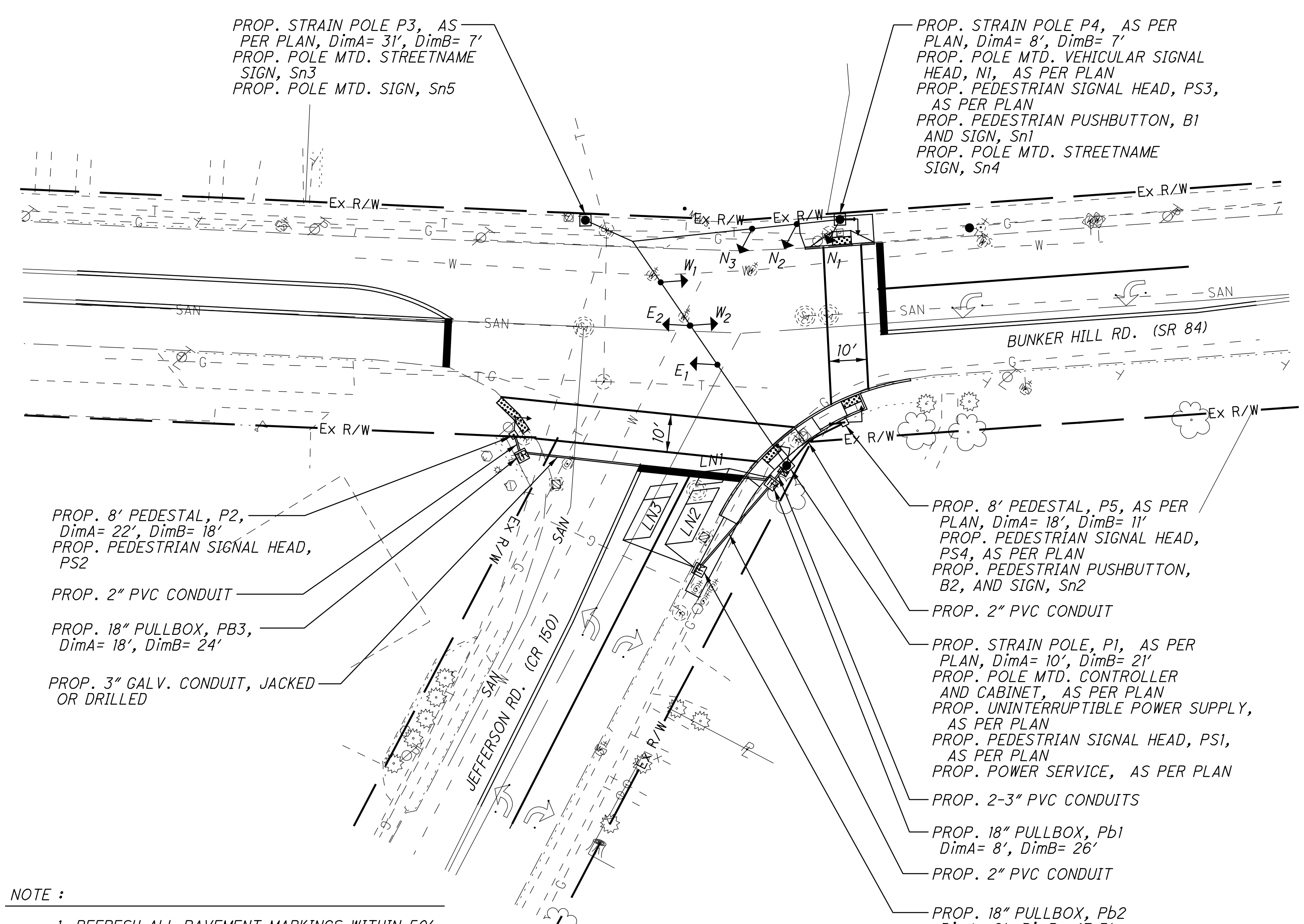
PROPOSED D3-1-78

Sn4

POLE ORIENTATION

POLE NUMBER	ODOT DESIGN NUMBER	POLE HEIGHT (FT)	FOUNDATION ELEVATION	INDEX LINE ANGLE (DEG)	ANGLES (DEG) FROM INDEX LINE: PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	CONTROLLER/ CABINET	POWER SERVICE	SPREAD SPECTRUM RADIO	CONDUIT ELL	BRACKET ARM	SIGN	VEHICULAR SIGNAL HEAD
P1	7	30		315	225		90			90/270			
P2	PED	8		45	135					270			
P3	10	32		180								180/180	
P4	7	30		180	90	90						270	225
P5	PED	8		315	315	135				90			

***ELEVATIONS SHOWN ARE FOR COMPUTATIONAL PURPOSES ONLY. THE ACTUAL ELEVATION OF THE FOUNDATION SHALL BE IN ACCORDANCE WITH SCD TC-21.20.



NOTE :

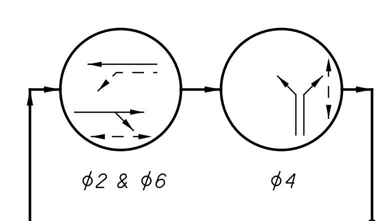
1. REFRESH ALL PAVEMENT MARKINGS WITHIN 50' OF THE STOP BAR, UNLESS OTHERWISE NOTED.

REMOVAL ITEMS FOR DISPOSAL

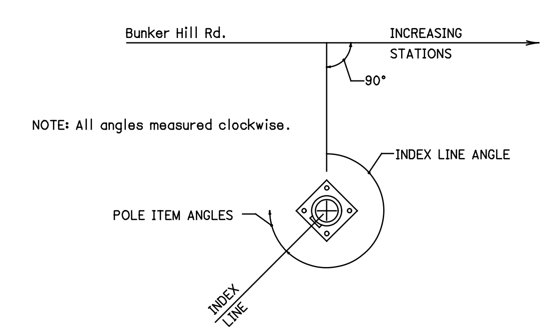
MESSENGER WIRE....................
SIGNAL CABLES......................
STRAIN POLES.......................2
PEDESTALS..........................1

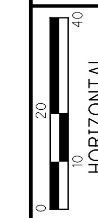
REMOVAL ITEMS FOR STORAGE

CONTROLLER & CABINET.........1
VEHICLE SIGNAL HEADS..........6
PEDESTRIAN SIGNAL HEADS......5
PEDESTRIAN PUSHBUTTONS......



SIGNAL PHASING

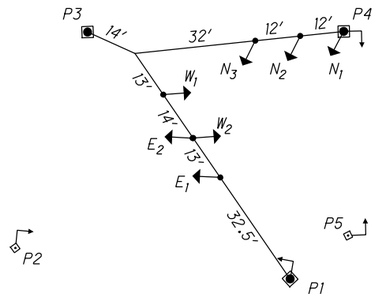




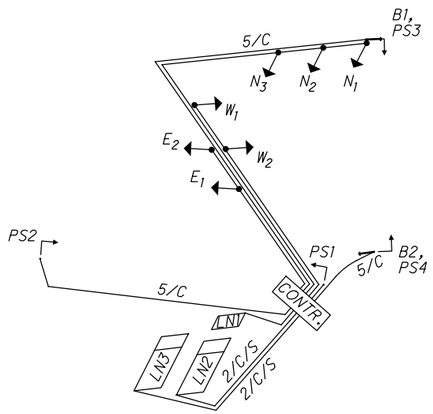
CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #12
BUNKER HILL RD. (SR 84) & JEFFERSON RD. (CR 50)

ATB-ASHTABULA SIGNAL UPGRADE



SPAN WIRE DIAGRAM
N.T.S.



NOTE :
ALL WIRING 7/C, UNLESS OTHERWISE NOTED.

WIRING DIAGRAM
N.T.S.

LOOP DETECTOR UNIT SUMMARY

LOOP	SHAPE1	SIZE (FT)	TURNS	CONNECT TO PHASE	OVERRIDE PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	LOOP UNIT	LOOP CHAN	EXTEND (SEC.)	DELAY (SEC.)
LN1	R	3X6	2	4		PRES	NON-LOCK	1	A	-	5
LN2	P	6X20	3	4		PRES	NON-LOCK	1	B	-	5
LN3	P	6X20	3	4		PRES	NON-LOCK	2	A	-	-

1 SHAPES: POWERHEAD (P), QUADRUPOLE (Q), ANGULAR DESIGN DETECTOR (ADD), RECTANGULAR (R), OR DIAMOND (D).

FIELD WIRING HOOK-UP CHART

SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
E1	RED	Ph. 6 R	R	N1	RED	Ph. 6 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 6 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 6 G	
E1	RED	Ph. 6 R	R	N2	RED	Ph. 6 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 6 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 6 G	
W1	RED	Ph. 6 R	R	N3	RED	Ph. 6 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 6 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 6 G	
W2	RED	Ph. 6 R	R				
	YELLOW	Ph. 6 Y					
	GREEN	Ph. 6 G					
PS1 (South Leg)	WALK	Ph. 6 G	-	PS2 (South Leg)	WALK	Ph. 6 G	-
	FLASHING DW	Ph. 6 G			FLASHING DW	Ph. 6 G	
	DON*T WALK	Ph. 6 Y, R			DON*T WALK	Ph. 6 Y, R	
PS3 (East Leg)	WALK	Ph. 4 G	-	PS4 (East Leg)	WALK	Ph. 4 G	-
	FLASHING DW	Ph. 4 G			FLASHING DW	Ph. 4 G	
	DON*T WALK	Ph. 4 Y, R			DON*T WALK	Ph. 4 Y, R	
B1	ACTUATE	Ph. 4 G	-	B2	ACTUATE	Ph. 4 G	-

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #12
BUNKER HILL (SR 84) & JEFFERSON RD. (CR 150)

ATB-ASHTABULA
SIGNAL UPGRADE

55
63

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SUB-SUMMARY

ITEM	QUAN.	UNIT	DESCRIPTION
625	67	FT	CONDUIT, JACKED OR DRILLED, 725.04, 3"
625	14	FT	CONDUIT, 3", 725.051
625	55	FT	CONDUIT, 2", 725.051
625	62	FT	TRENCH
625	3	EACH	PULL BOX, 725.08, 18"
625	5	EACH	GROUND ROD
630	4	EACH	SIGN SUPPORT ASSEMBLY, POLE MOUNTED
630	4	SF	SIGN, FLAT SHEET
630	2	EACH	SIGN, DOUBLE SIDED, STREET NAME
632	5	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3-SECTION, 12" LENS, 1-WAY, POLYCARBONATE
			WITH BACKPLATE, AS PER PLAN
632	1	EACH	VEHICULAR SIGNAL HEAD, (LED), BLACK, 3 SECTION, 12"LENS, 2-WAY, POLYCARBONATE,
			WITH 2-WAY BACKPLATE, AS PER PLAN
632	4	EACH	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D2, AS PER PLAN
632	6	EACH	COVERING OF VEHICULAR SIGNAL HEAD
632	4	EACH	COVERING OF PEDESTRIAN SIGNAL HEAD
632	2	EACH	PEDESTRIAN PUSHBUTTON
632	3	EACH	DETECTOR LOOP
632	143	FT	MESSENGER WIRE, 7 STRAND, 3/8" DIAMETER WITH ACCESSORIES
632	143	FT	TETHER WIRE, WITH ACCESSORIES
632	3	EACH	STRAIN POLE FOUNDATION, AS PER PLAN
632	2	EACH	PEDESTAL FOUNDATION
632	141	FT	LOOP DETECTOR LEAD-IN CABLE
632	378	FT	SIGNAL CABLE, 5 CONDUCTOR, NO. 14 AWG
632	352	FT	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG
632	50	FT	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG
632	50	FT	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG
632	1	EACH	POWER SERVICE, AS PER PLAN
632	2	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 7, AS PER PLAN
632	1	EACH	STRAIN POLE, TYPE TC-81.10, DESIGN 10, AS PER PLAN
632	2	EACH	PEDESTAL, 8', TRANSFORMER BASE, AS PER PLAN
632	1	EACH	REMOVAL OF TRAFFIC SIGNAL INSTALLATION FOR STORAGE, AS PER PLAN
633	1	EACH	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN
633	1	EACH	UNINTERRUPTIBLE POWER SUPPLY (UPS), 1000 WATT, AS PER PLAN
644	0.08	MILE	CENTER LINE
644	185	FT	CHANNELIZING LINE, 8"
644	65	FT	STOP LINE
644	218	FT	CROSSWALK LINE
644	6	EACH	LANE ARROWS

TRAFFIC SIGNAL CONTROLLER TIMING CHART

INTERSECTION: Bunker Hill Road & Jefferson Avenue

START UP
START IN: Y/R FLASH- [X] ALL RED- [ ]
TIME FOR FLASH OR ALL RED: 5 SEC
FIRST PHASE(S): # - [ ] & # - [ ]
COLOR DISPLAYED: GREEN- [ ] YELLOW- [X]

DUAL ENTRY: YES
REST IN RED: RING 1- [ ] RING 2- [ ]
SIMULTANEOUS GAP YES

OVERLAP	A	B	C	D
PHASES				

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT			Wb		Nb		Eb		
MINIMUM GREEN (INITIAL)	(SEC.)		10		10		10		
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)				3.0				
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)		32		10		32		
MAXIMUM GREEN II	(SEC.)		33		14		33		
MAXIMUM GREEN III	(SEC.)								
YELLOW CHANGE	(SEC.)		3.6		3.9		3.6		
ALL RED CLEARANCE	(SEC.)		2.7		3.0		2.7		
WALK	(SEC.)				7		7		
PED CLEAR	(SEC.)				12		25		
PED CLEAR THROUGH YELLOW	(SEC.)								
ADJUST	(SEC.)								
LIMIT	(SEC.)								
SET	(SEC.)								
CLEAR	(SEC.)								
RECALL	MAX (NO/YES)	NO	YES	NO	NO	NO	YES	NO	NO
	MIN (NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
	PED (NO/YES)	NO	NO	NO	NO	NO	YES	NO	NO
MEMORY	(ON/OFF)								
CALL TO NON-ACTUATED	No. 1		X				X		
	No. 2								

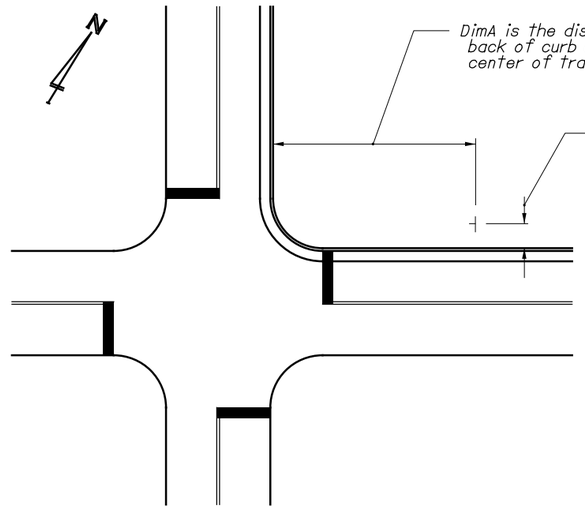
NOTES: MAX II ENABLE FROM 06:00 TO 08:00 AND 16:00 TO 18:30

CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL PLAN #12
BUNKER HILL (SR 84) & JEFFERSON RD. (CR 150)

ATB-ASHTABULA
SIGNAL UPGRADE

56
63



MISCELLANEOUS SIGNAL EQUIPMENT DETAIL

N.T.S.

FIELD WIRING HOOK-UP CHART							
SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH	SIGNAL HEAD #	INDICATION	FIELD TERMINAL	FLASH
E1	RED	Ph. 2 R	R	E4	RED	OLB (2, 8)	R
	YELLOW	Ph. 2 Y			YELLOW	OLB (2, 8)	
	GREEN	Ph. 2 G			GREEN	OLB (2, 8)	
E2	RED	Ph. 2 R	R	E3	RED	OLB (2, 8)	R
	YELLOW	Ph. 2 Y			YELLOW	OLB (2, 8)	
	GREEN	Ph. 2 G			GREEN	OLB (2, 8)	
	YLW ARROW (LT)	Ph. 5 YA	-		YLW ARROW (RT)	OLA (1, 2)	-
	GRN ARROW (LT)	Ph. 5 GA			GRN ARROW (RT)	OLA (1, 2)	
W1	RED	Ph. 6 R	R	S1	RED	Ph. 8 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 8 Y	
	GREEN	Ph. 6 G			GREEN	Ph. 8 G	
W2	RED	Ph. 6 R	R	S2	RED	Ph. 8 R	R
	YELLOW	Ph. 6 Y			YELLOW	Ph. 8 Y	
	GREEN	Ph. 6 G			GREEN	Ph.8 G	
	YLW ARROW (LT)	Ph. 1 YA	-		YLW ARROW (LT)	Ph. 3 YA	-
	GRN ARROW (LT)	Ph. 1 GA			GRN ARROW (LT)	Ph. 3 GA	
W3	RED	Ph. 4 R	R	N1	RED	Ph. 4 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 4 G	
W4	RED	Ph. 4 R	R	N2	RED	Ph. 4 R	R
	YELLOW	Ph. 4 Y			YELLOW	Ph. 4 Y	
	GREEN	Ph. 4 G			GREEN	Ph. 4 G	
N3	RED	Ph. 1 R	R	N4	RED	Ph. 1 R	R
	YELLOW	Ph. 1 Y			YELLOW	Ph. 1 Y	
	GREEN	Ph. 1 G			GREEN	Ph. 1 G	
PS1 (WEST LEG)	WALK	Ph. 8 G	-	PS2 (WEST LEG)	WALK	Ph. 8 G	-
	FLASHING DW	Ph. 8 G			FLASHING DW	Ph. 8 G	
	DON*T WALK	Ph. 8 Y, R			DON*T WALK	Ph. 8 Y, R	
PS3 (NORTH LEG)	WALK	Ph. 6 G	-	PS4 (NORTH LEG)	WALK	Ph. 6 G	-
	FLASHING DW	Ph. 6 G			FLASHING DW	Ph. 6 G	
	DON*T WALK	Ph. 6 Y, R			DON*T WALK	Ph. 6 Y, R	
PS5 (EAST LEG)	WALK	Ph. 1 G	-	PS6 (EAST LEG)	WALK	Ph. 1 G	-
	FLASHING DW	Ph. 1 G			FLASHING DW	Ph. 1 G	
	DON*T WALK	Ph. 1 Y, R			DON*T WALK	Ph. 1 Y, R	
PS7 (SOUTH LEG)	WALK	Ph. 8 G	-	PS8 (SOUTH LEG)	WALK	Ph. 8 G	-
	FLASHING DW	Ph. 8 G			FLASHING DW	Ph. 8 G	
	DON*T WALK	Ph. 8 Y, R			DON*T WALK	Ph. 8 Y, R	
B1, B2 (WEST LEG)			-	B3, B4 (EAST LEG)			-
	ACTUATE	Ph. 8			ACTUATE	Ph. 1	
B5, B6 (SOUTH LEG)			-				
	ACTUATE	Ph. 8					

SIGNAL PLAN # 7

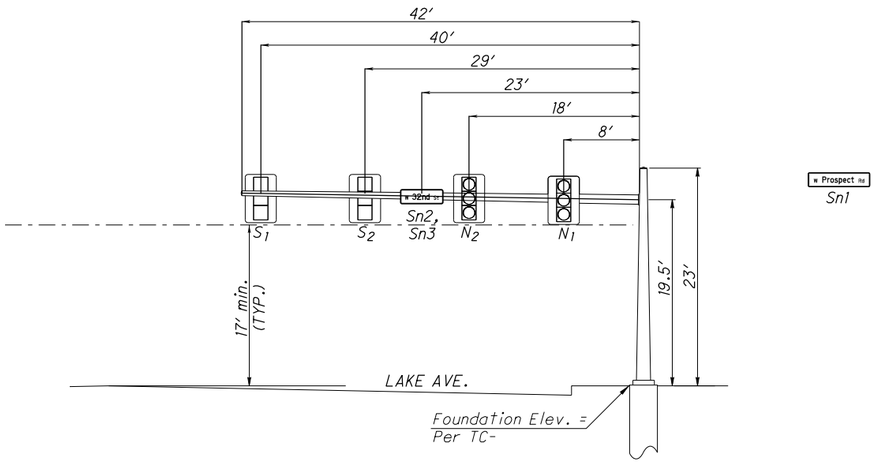
LAKE AVE. & PARK AVE. & PROSPECT RD.

CALCULATED EMH
CHECKED LAS

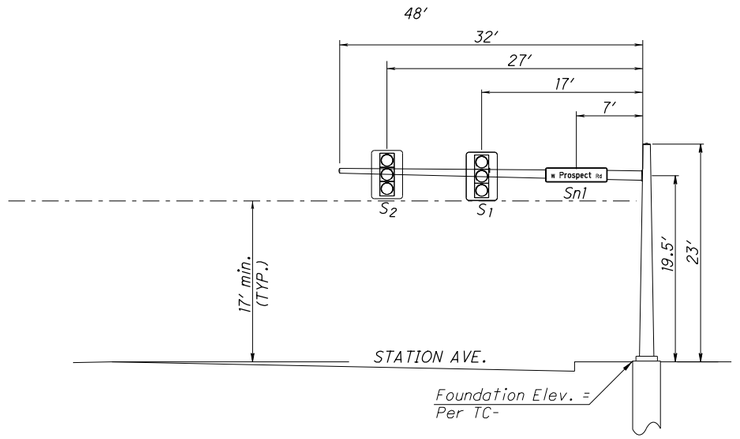
TRAFFIC SIGNAL PLAN #7

LAKE AVE. & PARK AVE. & PROSPECT RD., (U.S. 20)

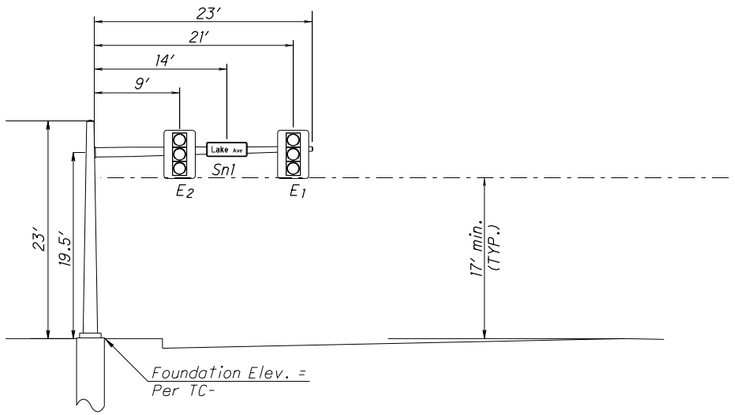
ATB-ASHTABULA SIGNAL UPGRADE



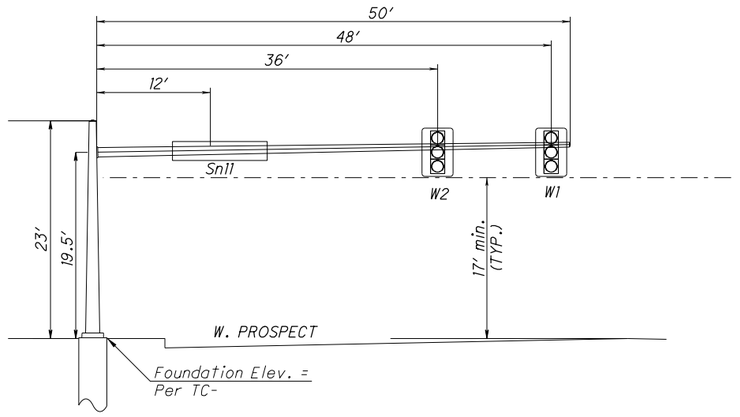
SIGNAL PLAN #6
LAKE AVE. AND W. 32ND ST.
(FACING NORH)
SIGNAL POLE, P1
ODOT TC-12.30
DESIGN 5



SIGNAL PLAN #8
WEST PROSPECT RD. AND STATION
AVE.
(FACING SOUTH)
SIGNAL POLE, P1
ODOT TC-12.30
DESIGN 5



SIGNAL PLAN #6
(LAKE AVE. AND W 32nd ST.)
(FACING EAST)
SIGNAL POLE, P1
ODOT TC-12.30
DESIGN 5



SIGNAL PLAN #8
WEST PROSPECT RD. AND STATION
AVE.
(FACING SOUTH)
SIGNAL POLE, P1
ODOT TC-12.30
DESIGN 5

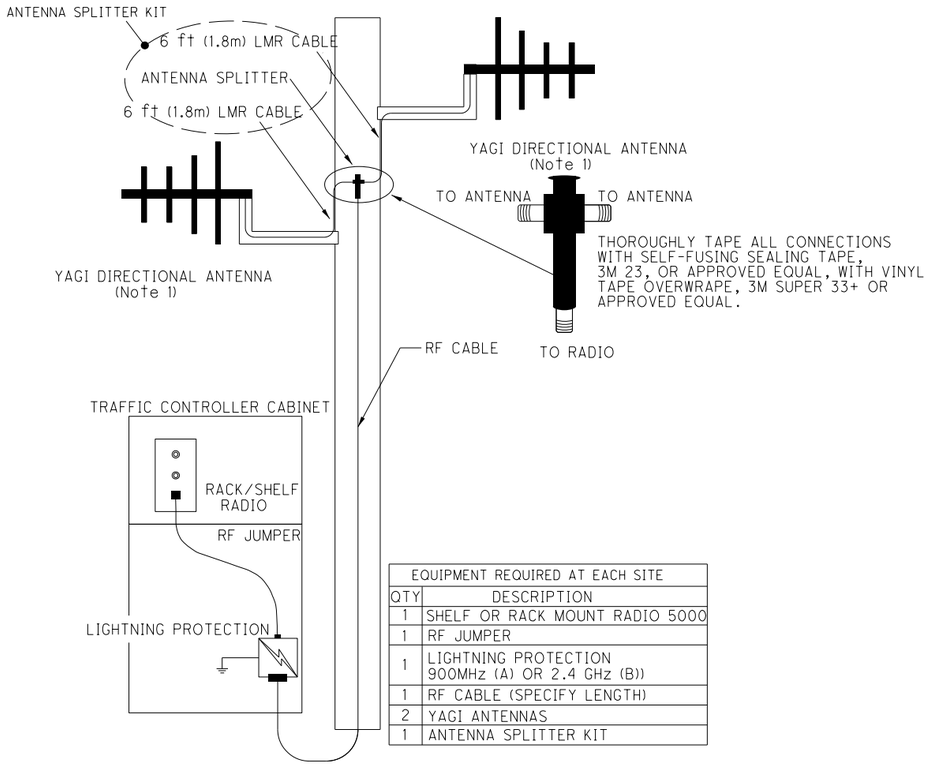
CALCULATED EMH
CHECKED LAS

TRAFFIC SIGNAL ELEVATIONS

ATB-ASHTABULA
SIGNAL UPGRADE

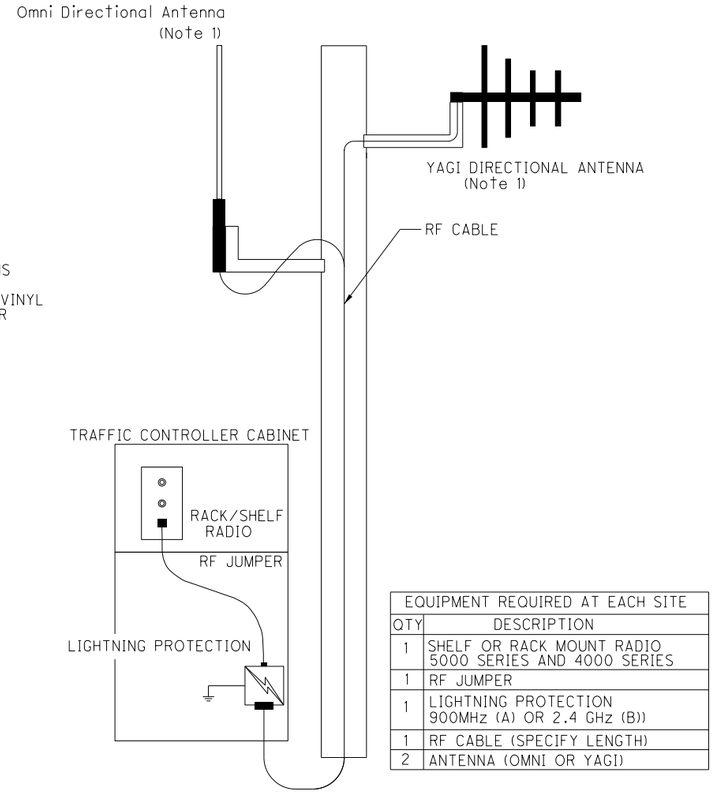
NOTES

1. All antenna links shall use vertical polarization, unless otherwise authorized by the engineer.



EQUIPMENT REQUIRED AT EACH SITE	
QTY	DESCRIPTION
1	SHELF OR RACK MOUNT RADIO 5000
1	RF JUMPER
1	LIGHTNING PROTECTION 900MHz (A) OR 2.4 GHz (B))
1	RF CABLE (SPECIFY LENGTH)
2	YAGI ANTENNAS
1	ANTENNA SPLITTER KIT

ANTENNA SPLITTER KIT



EQUIPMENT REQUIRED AT EACH SITE	
QTY	DESCRIPTION
1	SHELF OR RACK MOUNT RADIO 5000 SERIES AND 4000 SERIES
1	RF JUMPER
1	LIGHTNING PROTECTION 900MHz (A) OR 2.4 GHz (B))
1	RF CABLE (SPECIFY LENGTH)
2	ANTENNA (OMNI OR YAGI)

OMNI OR YAGI DIRECTIONAL ANTENNA

OFFICE OF TRAFFIC ENGINEERING

DESIGNED | REVIEWED KRD

REVISION DATE 04/20/12 | CHECKED

PID NUMBER 207560

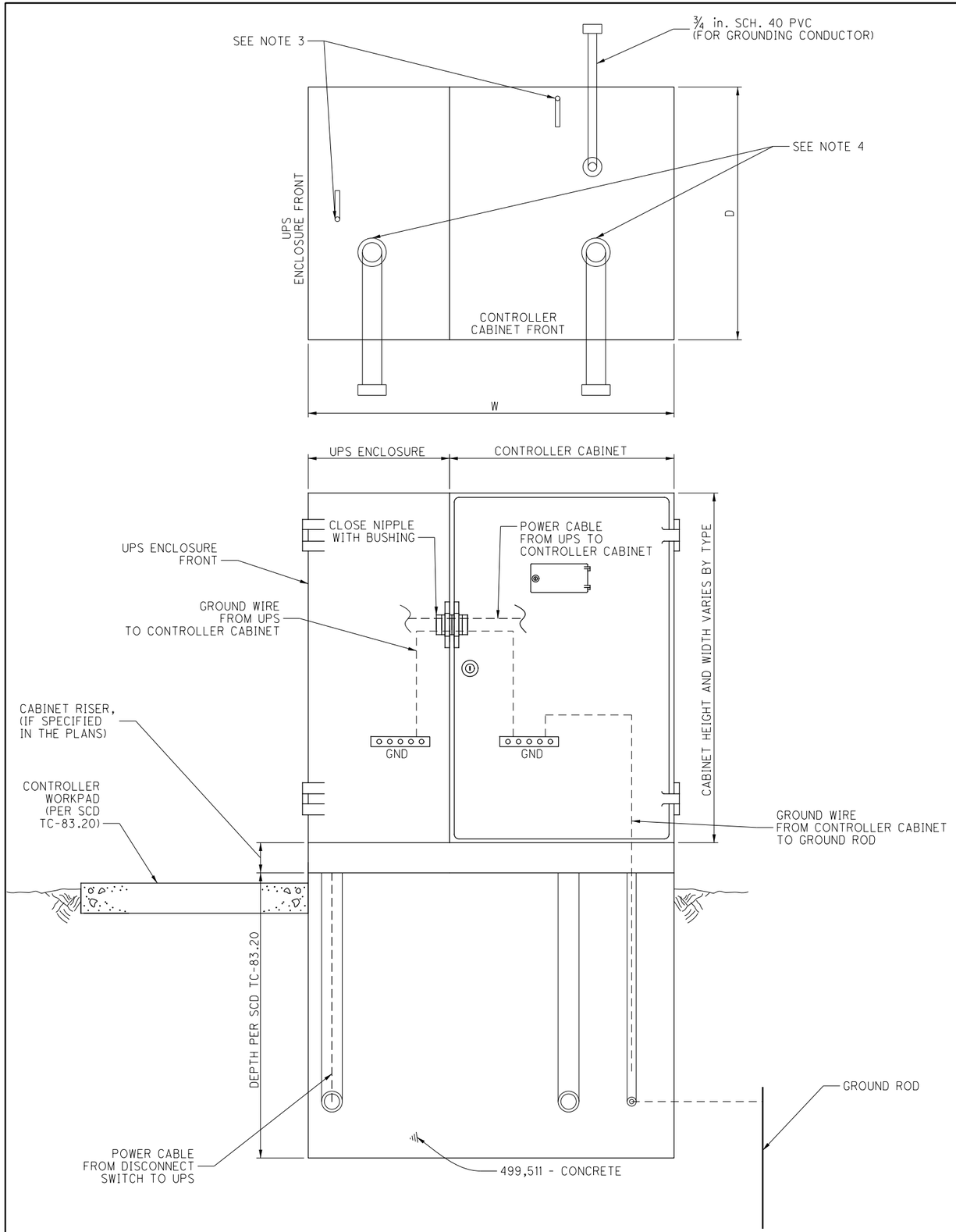
PLAN INSERT SHEET

RADIO INTERCONNECT DETAILS

ATB-ASHTABULA SIGNAL UPGRADE

1 / 1

59
63



1. The Uninterruptible Power Supply (UPS) enclosure shall be mounted flush up against the traffic signal cabinet and sealed with silicone. The Contractor shall be responsible for providing the necessary power cable between the UPS unit and signal cabinet.

2. The UPS should be placed on the opposite side of the pull box on a 332/336 cabinet (per Standard Construction Drawing TC-83.20). The UPS placement for a NEMA cabinet varies, placement should provide adequate access with respect to slope, guardrail spacing, etc...

3. The size, number, and location of anchor bolts shall be in accordance with the manufacturer's recommendations.

4. The size, number, and orientation of conduit ells shall be as shown in the plan, except that a ¾ inch schedule 40 PVC shall be installed in each foundation.

5. ½ inch preformed joint filler as per CMS 705.03 shall be used between foundations and adjacent paved areas.

6. See Standard Construction Drawing TC-83.20 for further details.

TYPE	W (Inches)	D (Inches)	FOUNDATION CONCRETE (Cu. Yd.)
TS-1	60	24	1.23
TS-2	70	36	2.16
2070/170	50	36	1.54

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REVISION DATE 04/20/12 | CHECKED

PID NUMBER 208320

PLAN INSERT SHEET

UNINTERRUPTIBLE POWER SUPPLY (UPS) AND CONTROLLER CABINET FOUNDATION

ATB-ASHTABULA SIGNAL UPGRADE

1 / 1

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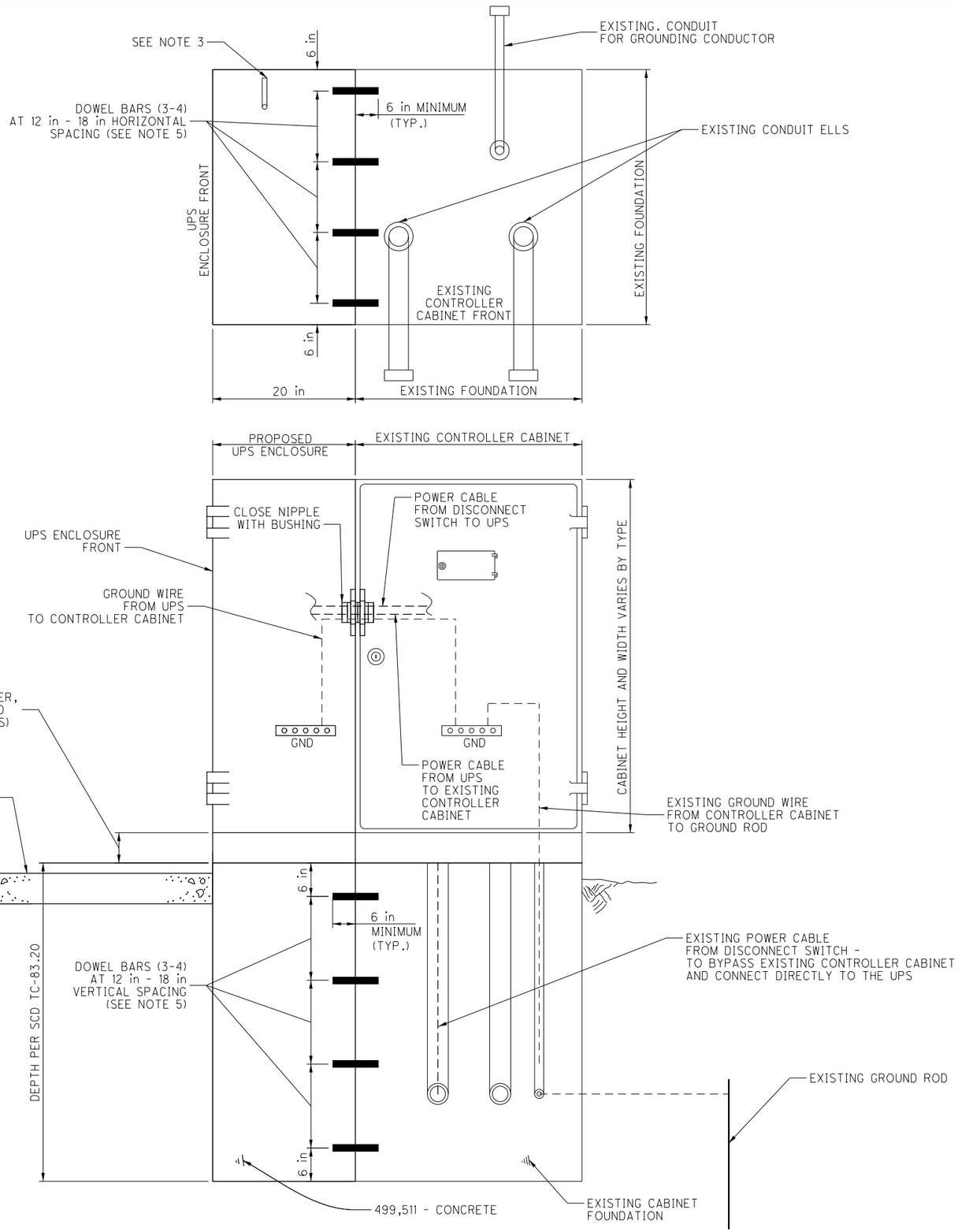

1. The Uninterruptible Power Supply (UPS) enclosure shall be mounted flush up against the traffic signal cabinet and sealed with silicone. The Contractor shall be responsible for providing the necessary power cable between the UPS unit and signal cabinet.

2. The UPS should be placed on the opposite side of the pull box on a 332/336 cabinet (per Standard Construction Drawing TC-83.20). The UPS placement for a NEMA cabinet varies, placement should provide adequate access with respect to slope, guardrail spacing, etc...

3. The size, number, and location of anchor bolts shall be in accordance with the manufacturer's recommendations.

4. The size, number, and orientation of conduit ells shall be as shown in the plan, except that a ¾ inch schedule 40 PVC shall be installed in each foundation.

5. New UPS enclosure foundations with abutting existing cabinet foundations are to be doweled to each other by use of ¾ inch diameter by 18 inch long epoxy coated deformed dowel bars, as per CMS 509 and 510. The number of horizontal dowel bars required varies based on the existing foundation dimensions.

6. See Standard Construction Drawing TC-83.20 for further details.

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RJL	JMY

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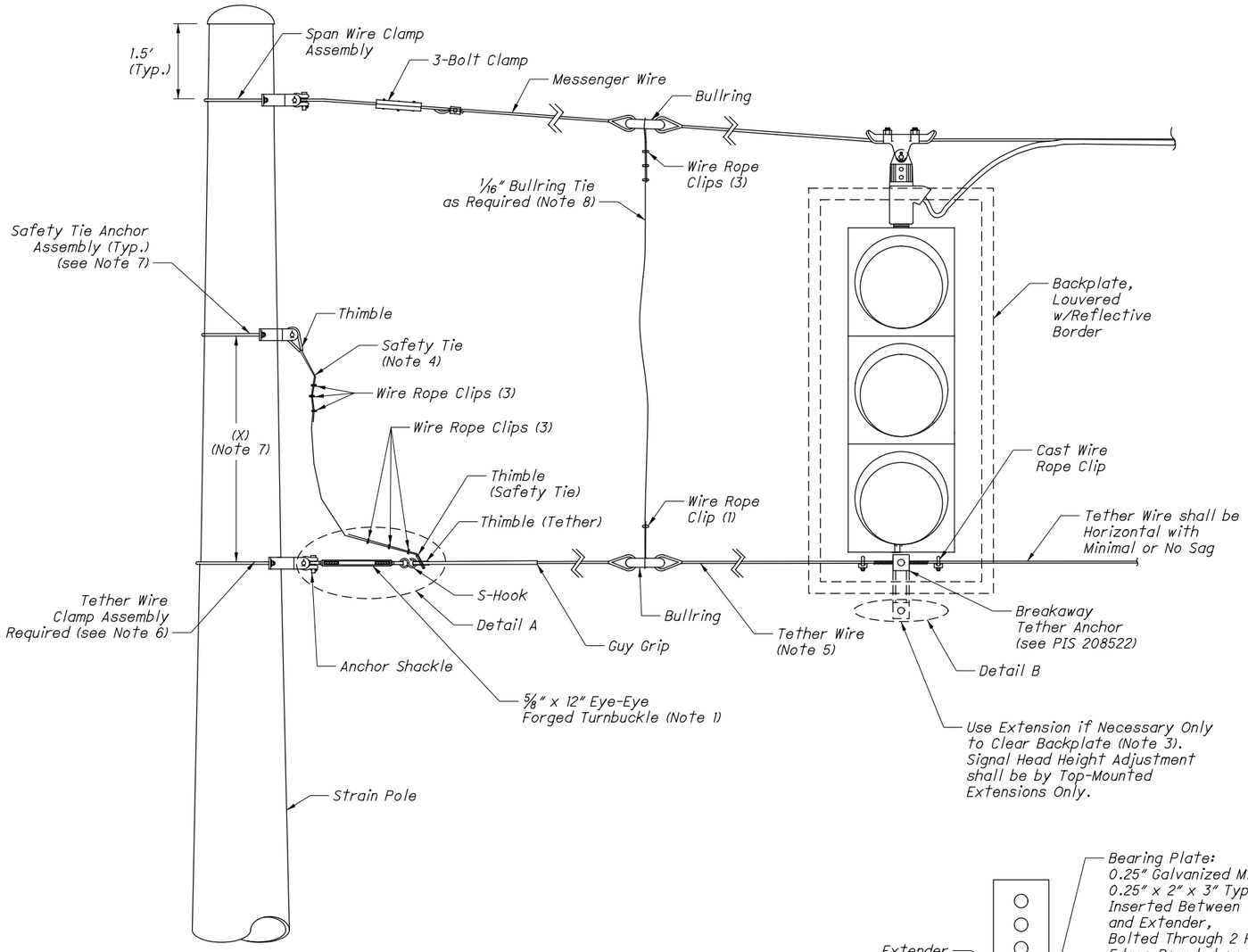
UNINTERRUPTIBLE POWER SUPPLY (UPS) FOUNDATION RETROFIT

ATB-ASHTABULA SIGNAL UPGRADE



NOTES

1. S-Hook is matched to the strain pole design number (see table). S-Hook and turnbuckle are required only at one end of simple spans, all ends of complex spans. S-Hook shall be closed at pole end. If S-Hook begins to yield during installation, it shall be removed and replaced. The wire tension shall be adjusted to minimize movement of signal heads in high winds. Typical tension is 600 to 800 lbs.

2. Lock wire shall be stainless steel, 1/8″ soft temper, wound to prevent turning of the turnbuckle body. Finished span shall have at least 2″ of space for turnbuckle adjustment. Turnbuckle shall not be overtightened. Use 8″ hand tools, maximum.

3. If signal orientation is not perpendicular to span and tether wire, then use an anchor extension. Clamp assembly must be attached to the flat side of the extender bar.

4. Install safety tie at each turnbuckle. This wire shall be 1 x 19, 1/8″ stainless steel. Tie should be slack, but not so slack as to contact pole. Use 3 clips per end at 3-1/4″ spacing.

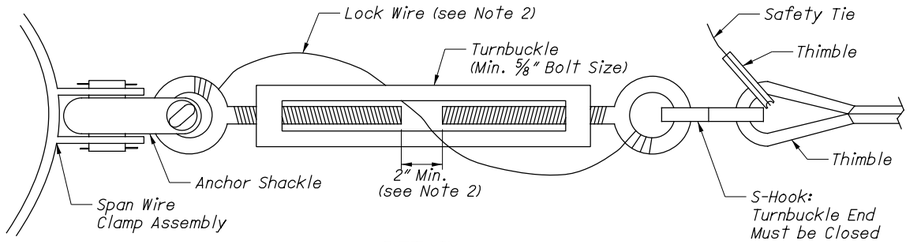
5. Tether wire shall be 7-strand ASTM A475 HS or EHS Grade 1/4″. On all spans, install tether horizontally. Maintain clearance of 17′ to 19′ over roadway.

6. Span wire clamp as per Standard Construction Drawing TC-81.10 required for tether wire attachment or approved equal rated at 3000 lbs or higher. Alternate attachment method shall not be permitted.

7. Safety tie anchor height above tether is adjusted in the field before S-Hook is installed. Dimension X (Safety Tie Height) shall be adjusted so that the minimum vertical clearance of the sagging tether wire above the pavement without the S-Hook installed is at least 14′. Minimum distance between the safety tie clamp and tether clamp shall be 1.5′ and contain enough slack for head to sway in high winds. Safety tie anchor may be any galvanized or stainless steel pole clamp assembly rated at 3000 pounds or higher.

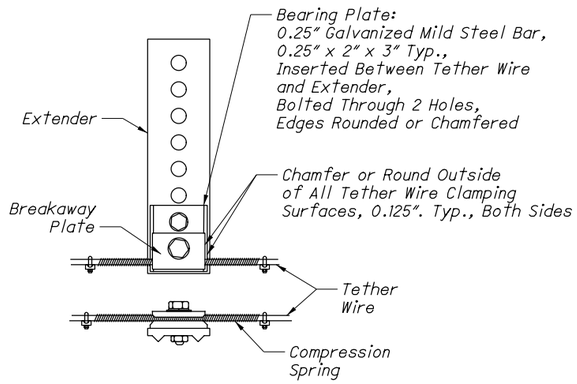
8. On spans with bullrings, a tie shall be provided between messenger and tether bullrings if a 14′ clearance cannot be maintained after S-Hook opening. This vertical tie shall be 1 x 19, 1/16″ stainless steel. Tie shall be slightly slack, tied back using cast wire rope clips as shown. Wire rope clips shall not be over-tightened.

Strain Pole Design No.	Galvanized Mild Steel S-Hook Wire Diameter (Inches)	S-Hook Yield Point (+10% / -20%) (Pounds)
1 - 4	3/8	2000
5 - 14	1/2	3300



DETAIL A

(Top View)
(Not to Scale)



DETAIL B

(Front View)
(Bottom View)

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PLAN INSERT SHEET

TETHER ATTACHMENT

SIGNAL

PIS 208521

ATB-ASHTABULA SIGNAL UPGRADE

1 / 1

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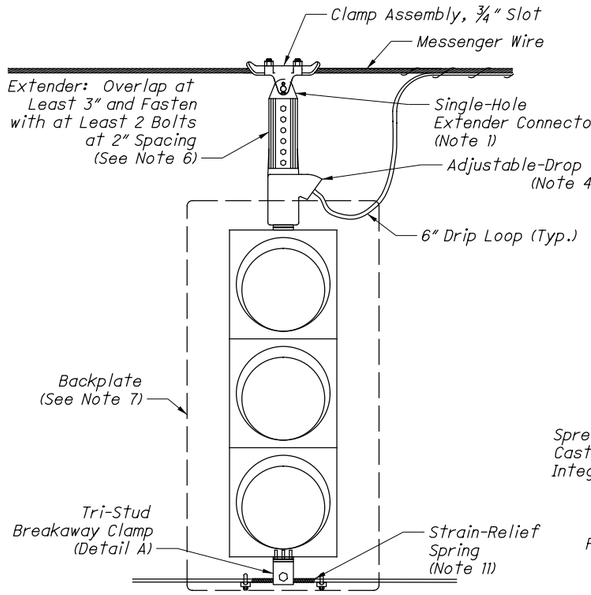
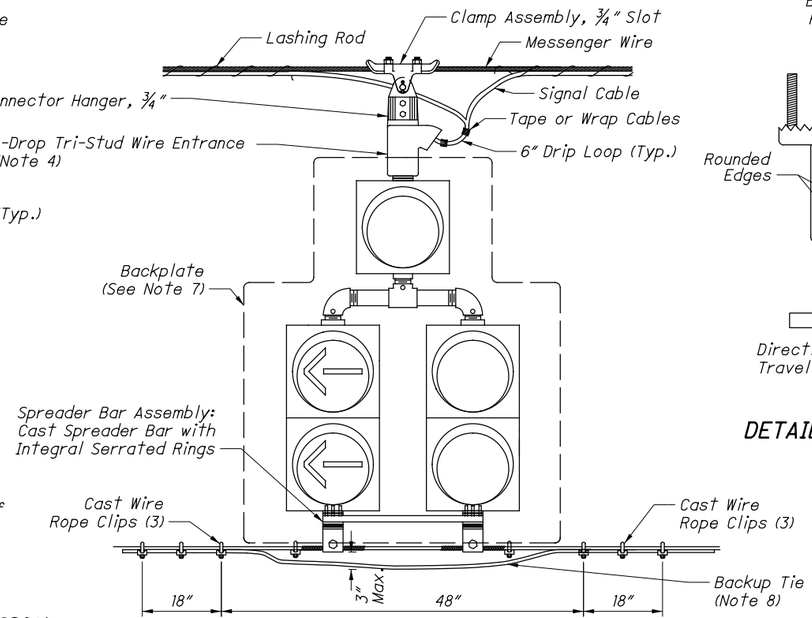


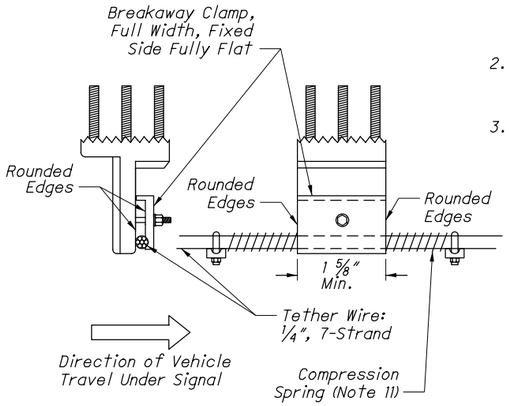
1 - 4 SECTION SIGNAL HEAD SUSPENSION

(NOTE 10)

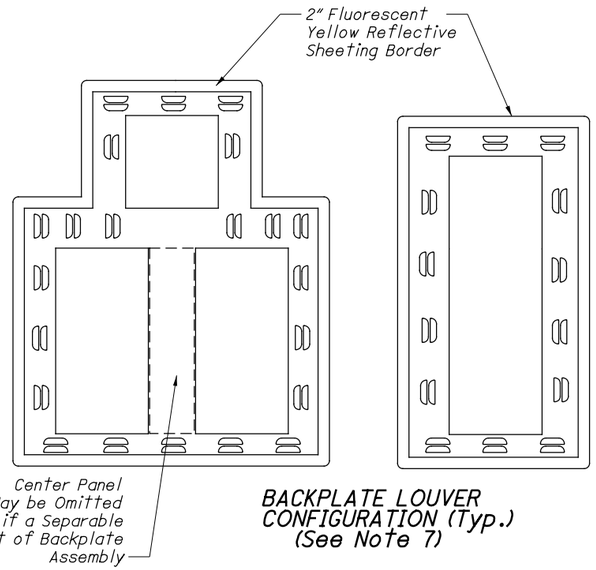


5 SECTION SIGNAL HEAD SUSPENSION

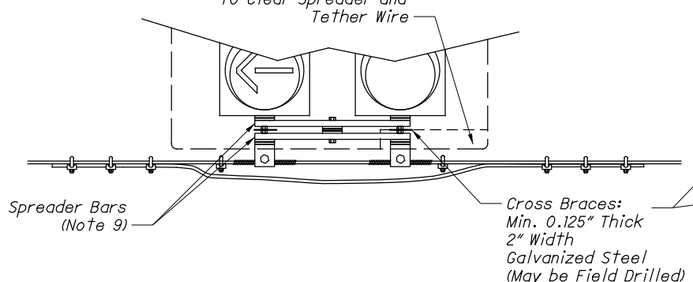
(NOTE 10)



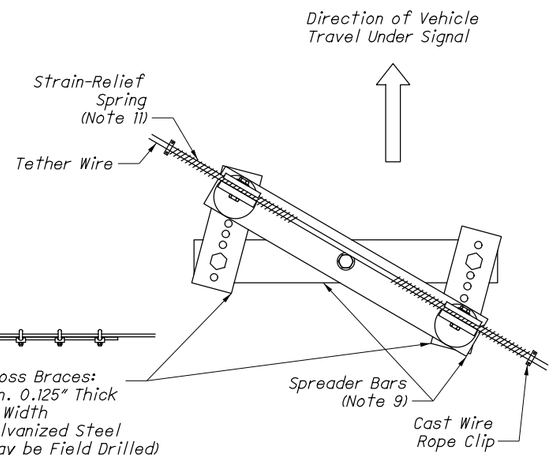
DETAIL A: BREAKAWAY TETHER ANCHOR (TYPICAL, SEE NOTE 6)



BACKPLATE LOUVER CONFIGURATION (Typ.) (See Note 7)



DETAIL B1: DOUBLE SPREADER BARS AND CROSS-BRACING ON DIAGONAL SPANS (FRONT VIEW)



DETAIL B2: DOUBLE SPREADER BARS AND CROSS-BRACING ON DIAGONAL SPANS (BOTTOM VIEW) (TYP.)

NOTES

1. Adjust hanger and span wire clamp to eliminate all play between hanger and clamp by using shim washers as necessary. Cast ¾" aluminum matching clamps and hangers with a tight initial fit shall be used.
2. All signal head assemblies shall be installed in a plumb position and perpendicular to the approach lane.
3. All signal heads shall be installed with their lowest part (including tether attachment hardware and backplates) with a clearance above the roadway pavement at all points of 17' to 19'. It is intended that this clearance be obtained without the use of bottom extenders, but rather by the careful selection of foundation heights, attachment heights, span wire sag, and other factors during the installation. If the installation cannot be adjusted to the proper clearance the Contractor shall advise the Engineer of all signals which exceed the maximum. The Engineer will, in consultation with the maintaining agency, direct the use of extenders or waive the maximum clearance requirement for each head. If extenders are necessary, adjustable signal hangers as detailed may be used. Only top extenders shall be used; see Note 6.
4. Signal head rotation shall be prevented by the use of serrated rings and tri-studs or other positive devices incorporated in the signal housing and at critical locations in the supporting hardware. Only single-piece tri-stud entrance ports shall be used, not inserts. Nylon locking or deformed-thread nuts shall be used.
5. All conductors shall have adequate clearance between hangers, thimbles, bullrings, etc. in order to avoid damage from rubbing.
6. For all tethered installations, breakaway tether anchor(s) shall be installed in bottom bracket. Bottom tether anchor extender shall be used only if there is interference between backplate and tether wire. Signal height adjustment shall be made by top- mounted extenders only. Breakaway clamp shall be full width with rounded edges. Clamp should compress tether wire only against a flat surface (Detail A).
7. All backplates shall have louvers and 2" fluorescent yellow reflective border. Border shall not be applied over louvers. Louvers should be oriented to scoop air from the front side and oriented with the openings facing alternate directions by groups, as shown. Louver open area shall be at least 8 percent of the total backplate area. 5-section backplates shall have notched top corners, as shown.
8. Backup tie shall be ¼", 7- strand wire identical to tether wire. Three cast wire rope clips on each side shall be used with 18" overlap and spacing as shown. Tie shall hang no lower than 16.5' above pavement, and must not rub against the breakaway clamp. Ties under 3-section heads are recommended in windy areas; shall be installed if specified in plans, or if directed by the Engineer. Spacing of clips may be adjusted to accommodate adjacent heads. Closely spaced adjacent heads may share a single backup tie and wire rope clips. There shall be a minimum of three wire rope clips between heads.
9. On diagonal spans, a double spreader bar assembly shall be used. Each spreader bar shall be cast aluminum or steel with integral serrations, two on the ends, one in the middle on the opposite side. These shall be attached as shown in Details B1 and B2. All spreader bar hardware shall be stainless steel, with nylon locking or deformed-thread nuts.
10. Multi-way heads with backplates shall not be used on tethered spans. Existing multi-way heads shall be separated as directed by the Engineer. Rewire as necessary to separate the heads per the proper alignment.
11. Compression spring, 0.375" OD, 0.054" wire diameter, 10-12 coils per inch, stainless steel 6" minimum length.

PIS 208522

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OVERHEAD SIGNAL ATTACHMENTS, SPAN WIRE

ATB-ASHTABULA SIGNAL UPGRADE

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