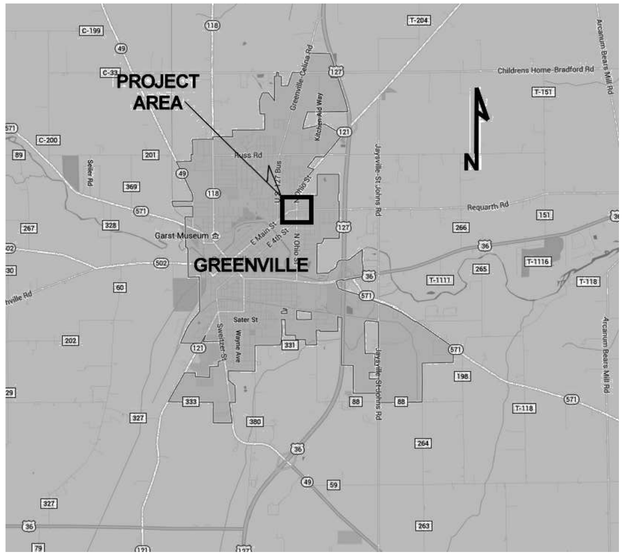


LOCATION MAP

LATITUDE: 40°06'41.75"N LONGITUDE: 84°37'4.47"W

CITY OF GREENVILLE

TRAFFIC SIGNAL OHIO STREET AT EAST MAIN STREET

GREENVILLE, OH
DARKE COUNTY

PROJECT DESCRIPTION

THE PURPOSE OF THESE PLANS AND SPECIFICATIONS IS TO RESULT IN THE INSTALLATION OF A NEW, FULLY FUNCTIONAL TRAFFIC SIGNAL AT THE INTERSECTION OF OHIO STREET AND EAST MAIN STREET. THE TRAFFIC SIGNAL INSTALLATION WILL INCLUDE A NEW CONTROLLER AND CABINET, MAST ARM SIGNAL SUPPORTS, VEHICULAR SIGNAL HEADS, PEDESTRIAN SIGNAL HEADS AND PUSH BUTTONS, STOP BAR RADAR VEHICLE DETECTION, CONDUIT AND PULL BOXES, ETC.

THE NEW TRAFFIC SIGNAL SHALL OPERATE ACCORDING TO THE REQUIREMENTS OF THE OHIO MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (OMUTCD).

DESIGN DESIGNATION

CURRENT ADT (2015)	6,370
DESIGN YEAR ADT (2035)	8290
DESIGN HOURLY VOLUME (2035)	750
DIRECTIONAL DISTRIBUTION	50%
TRUCKS	2%
DESIGN SPEED	35 MPH
LEGAL SPEED	35 MPH
DESIGN FUNCTIONAL CLASSIFICATION	MINOR ARTERIAL
NHS PROJECT	NO

DESIGN EXCEPTIONS

NONE

INDEX OF SHEETS

TITLE SHEET	1
TRAFFIC SIGNAL PLANS	2–3
TRAFIC SIGNAL SPECIFICATIONS	4

2013 SPECIFICATIONS

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

48 HOURS
BEFORE YOU DIG
CALL 811 or 800–362–2764
TOLL FREE
OHIO UTILITIES PROTECTION SERVICE
NON–MEMBERS MUST BE CALLED DIRECTLY

ENGINEERS SEAL:

STATE OF OHIO
JASON D OAKS
E-75634
REGISTERED
PROFESSIONAL ENGINEER

SIGNED:_____
DATE: 16 DEC. 2015

STANDARD CONSTRUCTION DRAWINGS						SUPPLEMENTAL SPECIFICATIONS	
HL-30.11	01-16-15	TC-83.10	01-17-14	MT-95.60	07-19-13	800	10-16-15
HL-40.10	01-17-14	TC-83.20	07-17-15	MT-95.61	07-19-13		
		TC-85.10	10-18-13	MT-96.11	07-17-15	832	01-17-14
TC-21.20	01-16-15	TC-85.20	01-16-15	MT-97.10	07-18-14		
TC-52.10	10-18-13			MT-110.10	07-19-13		
TC-52.20	07-18-14			MT-120.00	07-19-13		
TC-81.21	07-17-15						

APPROVED_____

DATE_____ MAYOR, CITY OF GREENVILLE

APPROVED_____

DATE_____ SAFETY AND SERVICE DIRECTOR, CITY OF GREENVILLE

APPROVED_____

DATE_____ PLANNING AND ZONING DIRECTOR, CITY OF GREENVILLE

DESIGNED JDO
CHECKED RLO

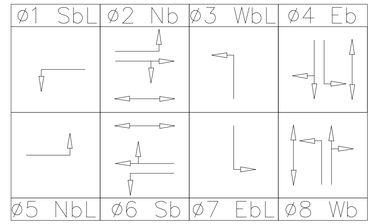
TRAFFIC SIGNAL PLAN
OHIO STREET AT EAST MAIN STREET

OAKS ENGINEERING, LLC
1448 JACKSON RD., VANDALIA, OH 45377

DETECTOR UNIT SUMMARY

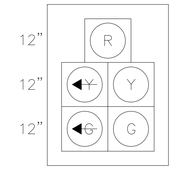
LOOP	SIZE	RADAR UNIT	CONNECT TO PHASE	PRESENCE/ PULSE	LOCK/ NON-LOCK	CALL/ EXTEND	EXTEND (SEC)	DELAY (SEC)
ZN1	6xVAR	RU-N	2	PRESENCE	NON-LOCK	EXTEND	1.0	0.0
ZN2F	6x25	RU-N	2	PRESENCE	NON-LOCK	CALL	0.0	2.0
ZN2B	6x25	RU-N	5	PRESENCE	NON-LOCK	CALL+EX	2.0	3.0
ZS1	6xVAR	RU-S	6	PRESENCE	NON-LOCK	EXTEND	1.0	0.0
ZS2F	6x25	RU-S	6	PRESENCE	NON-LOCK	CALL	0.0	2.0
ZS2B	6x25	RU-S	1	PRESENCE	NON-LOCK	CALL+EX	2.0	3.0
ZE1F	6x25	RU-E	4	PRESENCE	NON-LOCK	CALL	0.0	8.0
ZE1B	6xVAR	RU-E	4	PRESENCE	NON-LOCK	EXTEND	1.0	0.0
ZE2F	6x25	RU-E	4	PRESENCE	NON-LOCK	CALL	0.0	2.0
ZE2B	6x25	RU-E	7	PRESENCE	NON-LOCK	CALL+EX	2.0	3.0
ZW1F	6x25	RU-W	8	PRESENCE	NON-LOCK	CALL	0.0	8.0
ZW1B	6xVAR	RU-W	8	PRESENCE	NON-LOCK	EXTEND	1.0	0.0
ZW2F	6x25	RU-W	8	PRESENCE	NON-LOCK	CALL	0.0	2.0
ZW2B	6x25	RU-W	3	PRESENCE	NON-LOCK	CALL+EX	2.0	3.0

1. CONTRACTOR SHALL COORDINATE WITH CITY ENGINEER OR APPOINTED CITY REPRESENTATIVE FOR FIELD LOCATION AND PROGRAMMING OF VEHICLE RADAR DETECTION UNITS. 48 HOURS ADVANCE NOTICE SHALL BE REQUIRED.
2. DELAY-DEFEAT SHALL BE ACTIVE WHEN IN THE RESPECTIVE PHASE.
3. DELAY AND EXTENSION SHALL BE PROGRAMMED IN THE CONTROLLER, NOT IN THE RADAR SOFTWARE.
4. LEFT TURN LANE DETECTION: FRONT ZONES (ZX2F) SHALL ONLY CALL THE THRU PHASE AND EXTEND ARROW PHASE. BACK ZONES (ZX2B) CALL+EXTEND THE ARROW PHASE AND EXTEND THE THRU PHASE.



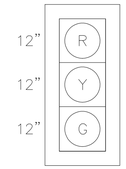
PHASE DIAGRAM

-BACK PANEL SHALL BE WIRED SO THAT ø1 AND ø5 ARE OMITTED WHEN ø2 AND ø6 ARE ON, RESPECTIVELY.
-BACK PANEL SHALL BE WIRED SO THAT ø3 AND ø7 ARE OMITTED WHEN ø4 AND ø8 ARE ON, RESPECTIVELY.



PROP. VEHICULAR SIGNAL

N2, S2, E2, W2



PROP. VEHICULAR SIGNAL

N1, S1, E1, W1

PROP. PEDESTRIAN SIGNAL HEAD

PS1N, PS1W, PS2S, PS2W, PS3S, PS3E, PS4N, PS4E

PROP. R3-5L 30"x36"

OS1, OS2, OS3, OS4

PROP. OSB-222 5.5"x7.5"

B1E, B2E, B3W, B4W

PROP. OSB-222 5.5"x7.5"

B1S, B2N, B3N, B4S

OHIO ST

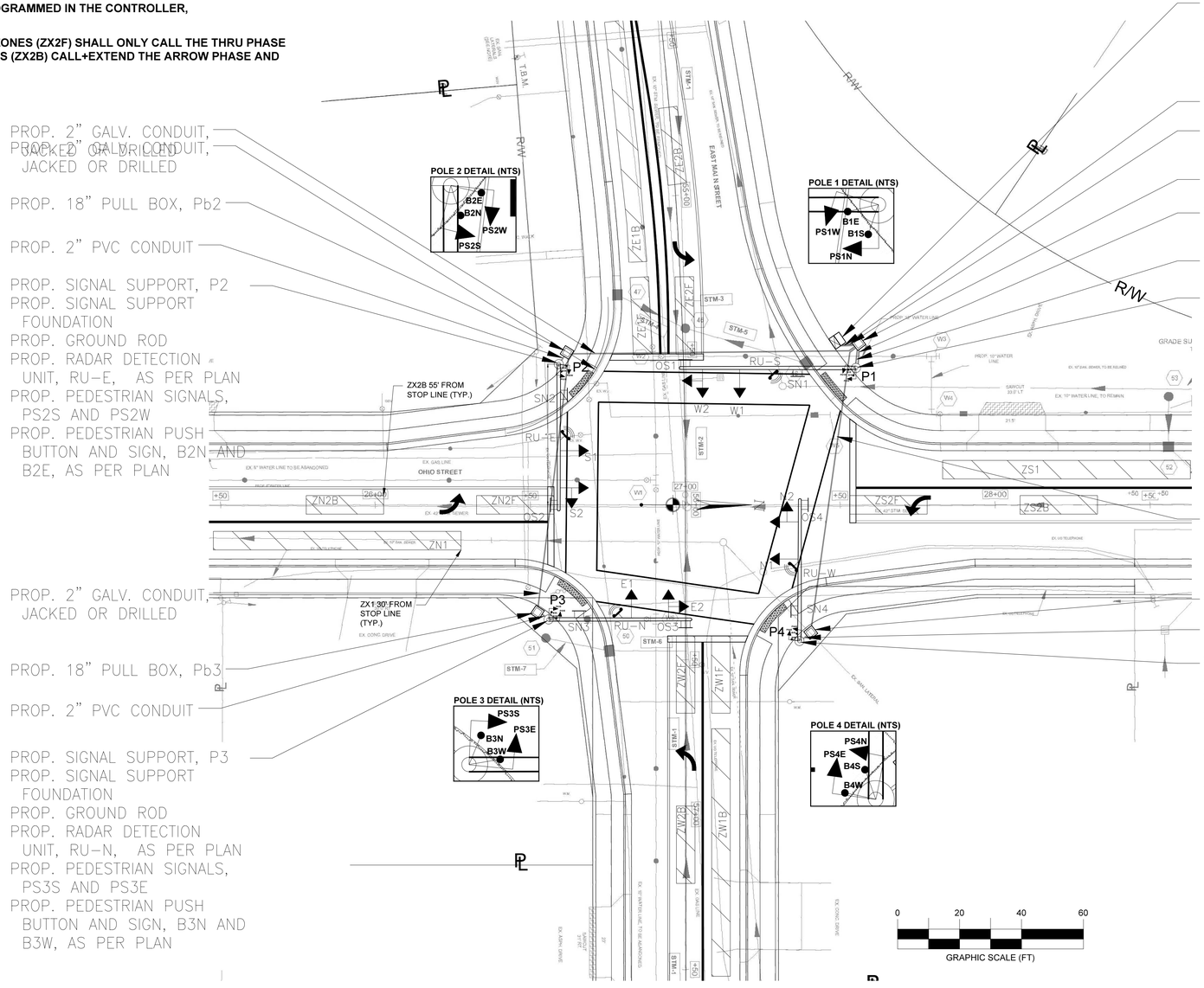
PROP. D3-1 18"xVAR

SN1, SN3

E MAIN ST

PROP. D3-1 18"xVAR

SN2, SN4



DESIGNED JDO
CHECKED RLO

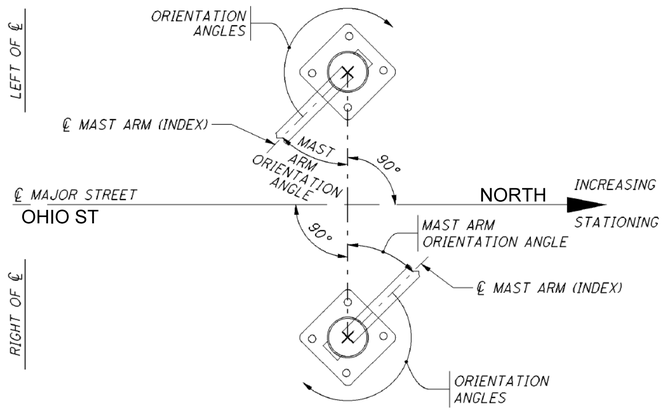
TRAFFIC SIGNAL PLAN
OHIO STREET AT EAST MAIN STREET

OAKS ENGINEERING, LLC
1448 JACKSON RD., VANDALIA, OH 45377

POLE ORIENTATION

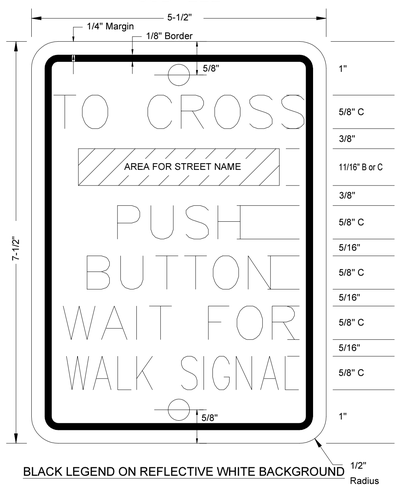
POLE NUMBER	MAST ARM (INDEX) ANGLE (DEG)	ODOT DESIGN NUMBER (TC-12.30)	MAST ARM LENGTH (FT)	STATION	OFFSET (FT)	ANGLES (DEG) FROM INDEX LINE: PEDESTRIAN SIGNALS	PEDESTRIAN PUSHBUTTONS	POWER SERVICE	CONDUIT ELL	HANDHOLE
P1	90	13	58	27+55	W-44.3	20/270	290/350	100	100	180
P2	0	12	47	26+59	W-45.5	15/275	285/340	-	215	180
P3	90	12	47	26+56	E-37.1	10/270	290/350	-	220	180
P4	0	12	47	27+37	E-44.0	10/280	280/340	-	50	180

NOTE: STATIONS, OFFSETS AND ANGLES ARE SUBJECT TO FIELD ADJUSTMENTS FOR THE RESPECTIVE ITEMS AS REQUIRED IN THESE PLANS.



POLE ORIENTATION

PEDESTRIAN PUSHBUTTON SIGN
OSB-222



BLACK LEGEND ON REFLECTIVE WHITE BACKGROUND

NOTES:
1. OPTICALLY CENTER AND SPACE LEGEND
2. USE ODOT TYPE "G" SHEETING (HIGH INTENSITY)
3. STREET NAMES SHALL BE APPLIED AT FACTORY

TRAFFIC SIGNAL CONTROLLER TIMING CHART

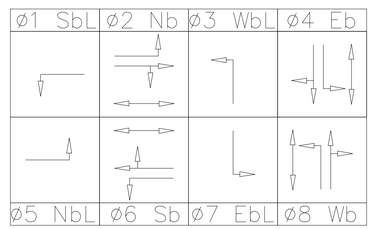
INTERSECTION: OHIO STREET @ EAST MAIN STREET

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: ON
REST IN RED: RING 1- RING 2-
SIMULTANEOUS GAP ON

OVERLAP PHASES	A	B	C	D

INTERVAL OR FEATURE		CONTROLLER MOVEMENT No. 1	2	3	4	5	6	7	8
INTERSECTION MOVEMENT		SbL	Nb	WbL	Eb	NbL	Sb	EbL	Wb
MINIMUM GREEN (INITIAL)	(SEC.)	7.0	15.0	7.0	10.0	7.0	15.0	7.0	10.0
* ADDED INITIAL	(SEC./ACTUATION)								
MAXIMUM INITIAL	(SEC.)								
PASSAGE TIME (PRESET GAP)	(SEC.)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
* MINIMUM GAP	(SEC.)								
TIME BEFORE REDUCTION	(SEC.)								
* TIME TO REDUCE	(SEC.)								
MAXIMUM GREEN I	(SEC.)	22	40	22	35	22	40	22	35
MAXIMUM GREEN II	(SEC.)								
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.)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
WALK	(SEC.)	-	7.0	-	7.0	-	7.0	-	7.0
PED CLEAR	(SEC.)	-	17.0	-	14.0	-	17.0	-	14.0
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
FLASH		-	Y	-	R	-	Y	-	R
MEMORY	(ON/OFF)	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
REST IN WALK	(NO/YES)	NO	NO	NO	NO	NO	NO	NO	NO
CALL TO NON-ACTUATED	No. 1								
	No. 2								



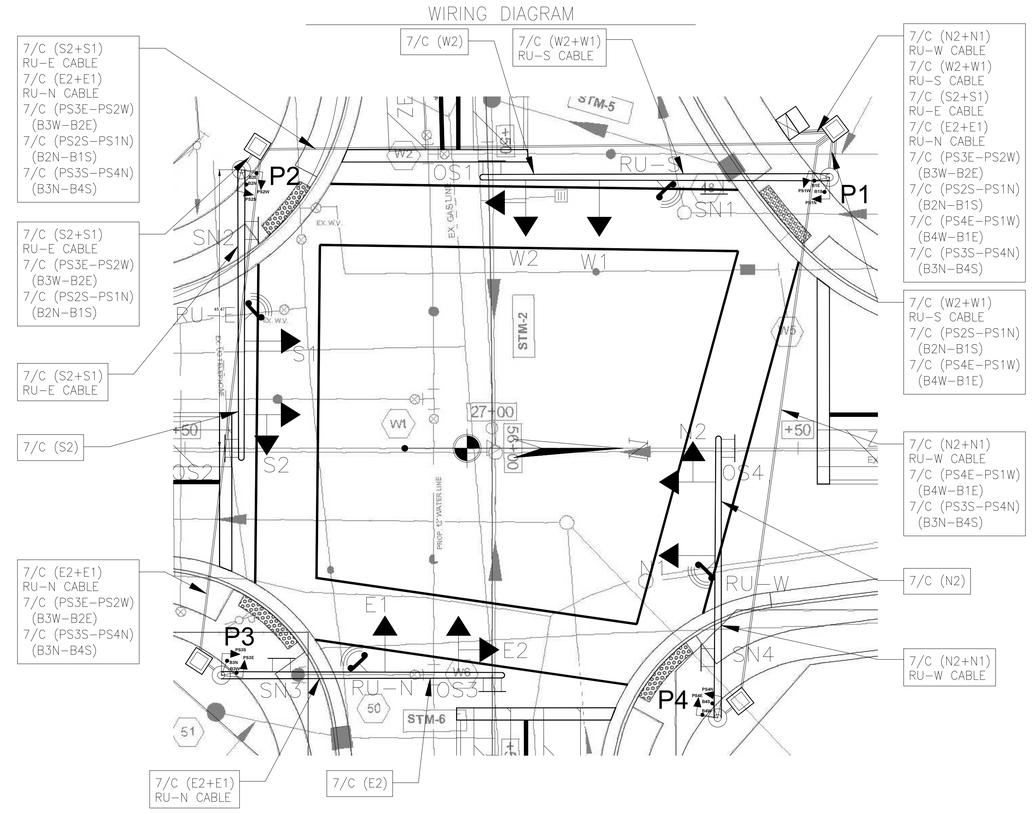
PHASE DIAGRAM

-BACK PANEL SHALL BE WIRED SO THAT ø1 AND ø5 ARE OMITTED WHEN ø2 AND ø6 ARE ON, RESPECTIVELY.
-BACK PANEL SHALL BE WIRED SO THAT ø3 AND ø7 ARE OMITTED WHEN ø4 AND ø8 ARE ON, RESPECTIVELY.

SUB SUMMARY

ITEM	DESCRIPTION	UNITS	QNTY
625	CONDUIT, 1", 725.04	FT	10
625	CONDUIT, 2", 725.05	FT	30
625	CONDUIT, 3", 725.05	FT	10
625	CONDUIT, JACKED OR DRILLED, 2", 725.04	FT	295
625	GROUND ROD	EACH	5
625	PULL BOX, 725.08, 18"	EACH	3
625	PULL BOX, 725.08, 24"	EACH	1
625	TRENCHING	EACH	30
630	SIGN HANGER ASSEMBLY, MAST ARM	EACH	8
630	SIGN, FLAT SHEET	SF	30
630	SIGN, STREET NAME	EACH	4
632	POWER CABLE, 3 CONDUCTOR, NO. 6 AWG	FT	30
632	POWER SERVICE	EACH	1
632	SERVICE CABLE, 3 CONDUCTOR, NO. 6 AWG	FT	500
632	SIGNAL CABLE, 7 CONDUCTOR, NO. 14 AWG	FT	1750
632	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 12, AS PER PLAN	EACH	3
632	SIGNAL SUPPORT, TYPE TC-81.21, DESIGN 13, AS PER PLAN	EACH	1
632	SIGNAL SUPPORT FOUNDATION, AS PER PLAN	EACH	4
632	COVERING OF VEHICULAR SIGNAL HEAD	EACH	8
632	COVERING OF PEDESTRIAN SIGNAL HEAD	EACH	8
632	VEHICULAR SIGNAL HEAD, LED, YELLOW, 3-SECTION, 12" LENS, 1-WAY, WITH BACKPLATE, AS PER PLAN	EACH	4
632	VEHICULAR SIGNAL HEAD, LED, YELLOW, 5-SECTION, 12" LENS, 1-WAY, WITH BACKPLATE, AS PER PLAN	EACH	4
632	PEDESTRIAN SIGNAL HEAD (LED) , (COUNTDOWN), TYPE D	EACH	8
632	PEDESTRIAN PUSHBUTTON, AS PER PLAN	EACH	8
633	CONTROLLER WORK PAD	EACH	1
633	CABINET FOUNDATION	EACH	1
633	CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN	EACH	1
809	STOP BAR DETECTION RADAR, AS PER PLAN	EACH	4
614	MAINTAINING TRAFFIC	LS	1
614	WORK ZONE CENTER LINE, CLASS III, 642 PAINT, AS PER PLAN	MILE	0.47
614	WORK ZONE CHANNELIZING LINE, CLASS III, 642 PAINT, AS PER PLAN	FT	800
614	WORK ZONE CROSSWALK LINE, CLASS III, 642 PAINT, AS PER PLAN	FT	550
614	WORK ZONE ARROW, CLASS III, 642 PAINT, AS PER PLAN	EACH	6
614	WORK ZONE STOP LINE, CLASS III, 642 PAINT, AS PER PLAN	FT	115

WIRING DIAGRAM



DESIGNED JDO
CHECKED RLO

TRAFFIC SIGNAL PLAN
OHIO STREET AT EAST MAIN STREET

OAKS ENGINEERING, LLC
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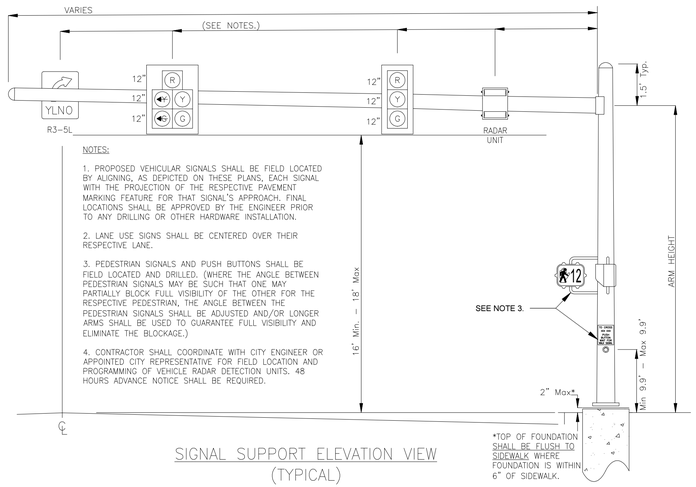
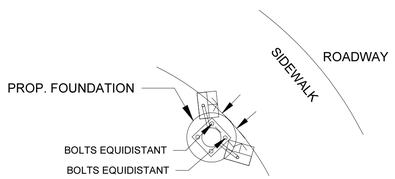


SIGNAL SUPPORT ELEVATION VIEW
(TYPICAL)



SIGNAL SUPPORT FOUNDATION
(TYPICAL)

ODOT SPECIFICATIONS AND STANDARD CONSTRUCTION DRAWINGS

THIS PROJECT SHALL BE ADMINISTERED USING CURRENT OHIO DEPARTMENT OF TRANSPORTATION (ODOT) SPECIFICATIONS. THE ODOT STANDARD CONSTRUCTION DRAWINGS IN THESE PLANS SHALL BE USED FOR THIS TRAFFIC SIGNAL INSTALLATION.

QUALIFICATION/CERTIFICATION

THE CONTRACTOR MAY BE REQUIRED TO SUBMIT CERTIFICATION FOR IMSA LEVEL III. ALSO, THE CONTRACTOR MAY BE REQUIRED TO SUBMIT UP TO THREE DIFFERENT RECENT PROJECT AND / OR LOCATIONS AND THE NAME AND CONTACT INFORMATION OF THE PROJECT ENGINEER / MANAGER OF THE MAINTAINING AGENCY FOR EACH DIFFERENT PROJECT. IT IS EXPECTED THAT MOST OF THE SAME PERSONNEL THAT WERE WORKING ON THESE EXAMPLES OF SIMILAR PROJECTS WILL BE WORKING ON THIS BID PROJECT. NOTE THAT PROOF MAY BE REQUIRED. ANY AND ALL OF THESE FACTORS MAY BE USED IN EVALUATING AND DETERMINING THE AWARD OF THE PROJECT.

THE CONTRACTOR IS TO SUBMIT A COMPLETION DATE FOR THIS PROJECT. THIS IS TO BE BASED ON THE CONTRACTORS WORK LOAD ON OTHER PROJECTS, AVAILABLE QUALIFIED PERSONNEL AND EQUIPMENT AND OTHER CONSIDERATIONS; AND THE CAPABILITY OF THE CONTRACTOR TO OBTAIN AND TAKE DELIVERY OF HARDWARE, POLES, SIGNALS, CONTROLLER AND OTHER VARIOUS COMPONENTS TO MAKE THE ALL ASPECTS OF THE SIGNAL OPERATIONALLY COMPLETE TO THE SATISFACTION OF THE CITY AND ITS ENGINEER. THE CONTRACTOR MAY BE REQUIRED TO SUBMIT WRITTEN PROOF OF THE DELIVERY SCHEDULE OF ANY AND ALL COMPONENTS. ANY AND ALL OF THESE FACTORS MAY BE USED IN EVALUATING AND DETERMINING THE AWARD OF THE PROJECT.

FIELD DRILLING OF TRAFFIC SIGNAL APPURTENANCES

ALL HOLES FOR PEDESTRIAN FACILITIES, POWER FACILITIES, CABLE ENTRANCES, ETC. SHALL BE FIELD DRILLED. BLIND HALF COUPLINGS SHALL NOT BE PERMITTED. ENGINEER SHALL APPROVE LOCATION BEFORE DRILLING. 48 HOUR ADVANCE NOTICE SHALL BE REQUIRED. THE COST OF FIELD DRILLING SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PERTINENT CONTRACT ITEMS.

STAINLESS STEEL HARDWARE

HARDWARE FOR ALL SIGNS AND SIGNALS SHALL CONFORM TO 730.10 OF THE ODOT SPECIFICATIONS. THE COST OF STAINLESS STEEL HARDWARE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PERTINENT CONTRACT ITEMS.

ITEM 632, VEHICULAR SIGNAL HEAD, LED, BY SECTION, 12" LENS, BY WAY, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF ODOT SPECIFICATIONS 632 AND 732, THE FOLLOWING REQUIREMENTS SHALL APPLY:

-VEHICULAR SIGNAL HEADS AND VISORS SHALL BE CONSTRUCTED OF POLYCARBONATE PLASTIC AND MEET ITE SPECIFICATIONS.
-THE COLOR OF THE VEHICULAR SIGNAL HEADS SHALL BE ALL YELLOW. PROPER EXTERIOR COLORS SHALL BE OBTAINED BY USE OF COLORED PLASTIC MATERIAL RATHER THAN PAINTING.
-EACH LED SHALL HAVE A UNIFORM, NON-PIXELATED APPEARANCE AND SHALL MEET CURRENT ITE SPECIFICATIONS.
-THE CONTRACTOR SHALL PROVIDE THE ENGINEER, IN WRITING, THE LED MANUFACTURER NAME, SERIAL NUMBER, PART NUMBER, DESCRIPTION OF LAMP, AND DATE OF MANUFACTURE FOR ALL LED UNITS TO BE USED IN THE TRAFFIC SIGNAL HEADS PRIOR TO INSTALLATION, FOR ACCEPTANCE AND WARRANTY PURPOSES.
-SIGNAL HEADS SHALL BE PROVIDED WITH CUTAWAY VISORS.
-FIELD LOCATION OF ALL SIGNAL HEADS SHALL BE APPROVED BY THE ENGINEER PRIOR TO FINAL WIRING. 48 HOUR ADVANCE NOTICE SHALL BE REQUIRED.

PAYMENT WILL BE MADE AT THE UNIT BID PRICE FOR EACH ITEM 632, VEHICULAR SIGNAL HEAD, LED, BY SECTION, 12" LENS, BY WAY, AS PER PLAN WHICH SHALL BE FULL COMPENSATION FOR ALL LABOR, MATERIALS AND INCIDENTALS REQUIRED TO COMPLETE THIS ITEM IN A SATISFACTORY AND WORKMANLIKE MANNER.

ITEM 632, SIGNAL SUPPORT, TYPE TC-81.21, BY DESIGN, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS SECTIONS 632 AND 732, AND ODOT STANDARD CONSTRUCTION DRAWINGS, POLES SHALL CONFORM TO THE FOLLOWING:

-STAINLESS STEEL SCREWS MEETING THE REQUIREMENTS OF 730 SHALL BE USED FOR CONDUIT FITTINGS, ETC. TO STEEL POLES.
-THE POLE FINISH SHALL CONSIST OF A BLACK POLYESTER, ANTI-GASSING, POWDER COAT FINISH APPLIED DIRECTLY OVER HOT DIPPED GALVANIZING THAT CONFORMS TO ODOT CMS 711.
-THE CONTRACTOR IS RESPONSIBLE TO PROVIDE ADEQUATE PROTECTION FOR THE FINISH OF THE POLES. IF THE FINISH IS DAMAGED DURING HANDLING AND/OR INSTALLATION, THE CONTRACTOR SHALL REPAIR THE FINISH PER THE POLE MANUFACTURER'S RECOMMENDATIONS.
-ALL POLES SHALL BE FIELD LOCATED. WHERE UNDERGROUND UTILITIES ARE IN QUESTION, FOUNDATIONS SHALL BE HYDRO EXCAVATED.

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

ITEM 623, SIGNAL SUPPORT FOUNDATION, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS SECTIONS 632 AND 732, AND ODOT STANDARD CONSTRUCTION DRAWINGS, FOUNDATIONS SHALL:

-HAVE A FINISHED ELEVATION FLUSH TO THE SIDEWALK (WHERE APPLICABLE) WHEN WITHIN 6" OF THE SIDEWALK
-HAVE BOLTS PLACED SO THAT THE CORNERS OF THE BASE PLATE OF THE PROPOSED SIGNAL POLE ARE REASONABLY CLOSE TO EQUIDISTANT/"PARALLEL" TO THE EDGE OF THE SIDEWALK TO MINIMIZE ANY POTENTIAL TRIPPING HAZARD FOR PEDESTRIANS.

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

ITEM 633, CONTROLLER UNIT, TYPE TS2/A2, WITH CABINET, TYPE TS1, AS PER PLAN

IN ADDITION TO THE REQUIREMENTS OF CMS 633.07 AND 733.02, THE CONTROLLER SHALL MEET, AS A MINIMUM, ALL APPLICABLE SECTIONS OF THE NEMA STANDARDS PUBLICATION NO. TS2-1992. THE CONTROLLER UNIT SHALL BE NTCIP LEVEL 2 AS DEFINED BY SECTION 3.3.6 OF NEMA TS2-2003. NTCIP v2.06 CAPABILITIES SHALL INCLUDE ALL NTCIP MANDATORY AND OPTIONAL OBJECTS. THIS SPECIFICATION SHALL GOVERN WHERE DIFFERENCES OCCUR IN THE ODOT STANDARD CONSTRUCTION AND MATERIAL SPECIFICATION. THE TS2 TYPE 2 CONTROLLER SHALL BE FURNISHED WITH THE MOST RECENT SOFTWARE AND PROVIDE ALL FEATURES OF THE LATEST MODEL AVAILABLE.

THE CONTROLLER SHALL BE AN INTELIGHT, ECONOLITE OR APPROVED EQUAL NEMA CONTROLLER.

THE CONTROLLER UNIT SHALL BE FURNISHED IN ACCORDANCE WITH NEMA TS2 TYPE 2 (1992) STANDARDS AND SHALL BE CONNECTED TO AND MADE FULLY FUNCTIONAL WITH ALL PROPOSED EQUIPMENT INCLUDING BUT NOT LIMITED TO: LOOP DETECTOR UNITS, DETECTION EQUIPMENT, CONFLICT MONITOR OR MALFUNCTION MANAGEMENT UNIT (MMU), AND ALL OTHER CABINET EQUIPMENT, COMPLETE.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROGRAMMING THE CONTROLLER. THE EXISTING PHASING AND TIMING INCLUDED IN THE EXISTING CONTROLLER SHALL BE MAINTAINED WITHIN THE NEW CONTROLLER, UNLESS SPECIFICALLY SPECIFIED IN THE PLANS OR AS DEVELOPED DURING THE SYSTEM ANALYSIS.

THE CONTROLLER UNIT SHALL INCLUDE ANY NECESSARY ETHERNET COMMUNICATION AND TELEMETRY MODULES REQUIRED FOR PROPER COMMUNICATION AND OPERATION IN THE PROPOSED TRAFFIC SIGNAL SYSTEM.

THE CONTROLLER UNIT SHALL FULLY SUPPORT THE USE OF A USB MEMORY STICK FOR STORAGE OF CONTROLLER DATABASE(S) AND SOFTWARE UPDATES.

THE CONTROLLER UNIT SHALL FULLY SUPPORT THE USE OF A SECURE WIRELESS WI-FI USB PLUG-IN DEVICE FOR OPTIONAL COMMUNICATION TO TECHNICIAN LAPTOP COMPUTERS AND COMPUTER TABLET DEVICES HAVING WEB BROWSER SUPPORT.TESTING

THE CONTROLLER TO BE INSTALLED MUST BE PRE-TESTED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER FOR INSTALLATION.

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 CONTROLLER INTERSECTION NAME, 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. THE COST FOR THE CONTROLLER TESTING SHALL BE INCLUDED IN THE PRICE OF THE CONTROLLER FURNISHED COMPLETE.

THE CONTROLLER AND ALL RELATED COMPONENTS SHALL BE IN PERFECT WORKING ORDER AND READY FOR INSTALLATION/OPERATION AS A RESULT OF THE WORK DESCRIBED IN THIS ITEM.

CABINET

THE PROPOSED CABINET SHALL BE MANUFACTURED WITHOUT BUS INTERFACE UNITS (HYBRID CABINET).

FURNISH EACH CABINET MAIN DOOR WITH A STURDY, PERMANENTLY LUBRICATED LOCK THAT IS COVERED WITH A WEATHERPROOF TAB. KEY THE PROJECT LOCKS TO THE MASTER KEY USED (CORBIN #2). SUPPLY TWO KEYS WITH EACH LOCK. ALSO, EQUIP THE SMALL DOOR-IN-DOOR (POLICE ACCESS PANEL WITH A LOCK THAT IS KEYED TO THE MAINTAINING AGENCY'S POLICE DOOR MASTER KEY.

THE PROPOSED CABINET SHALL BE EQUIPPED WITH A MOMENTARY PUSHBUTTON CONTACT SWITCH FOR INTERVAL ADVANCE DURING MANUAL OPERATION WITH INTERNAL OPERATION. THE SWITCH IS TO BE MOUNTED ON A 5-FEET MINIMUM FLEXIBLE WEATHERPROOF EXTENSION CORD IN THE POLICE ACCESS PANEL.

THE PROPOSED CABINET SHALL BE EQUIPPED WITH MOMENTARY TEST PUSH BUTTONS FOR VEHICLE AND PEDESTRIAN INPUTS ON THE INSIDE OF THE MAIN DOOR.

WARRANTY

THE CONTROLLER SHALL BE WARRANTED FOR DEFECTS IN MATERIAL AND WORKMANSHIP FOR A MINIMUM OF FIVE YEARS. THE WARRANTY SHALL INCLUDE SOFTWARE UPDATES AND SUPPORT FOR THE ENTIRE WARRANTY PERIOD.

DOCUMENTATION

TWO (2) COMPLETE SETS OF THE FOLLOWING SHALL BE PROVIDED FOR EACH CABINET:
•USER MANUALS
•DEVICE PROGRAMMING MANUALS
•WIRING DIAGRAMS AND PARTS LISTS
•INSTALLATION AND DIAGNOSTIC MANUALS
•SOFTWARE AND FIRMWARE UPDATES SHALL BE ACCOMPANIED BY COMPLETE DOCUMENTATION THAT REFERENCES AN UPGRADE VERSION, AND PROVIDES A LIST OF PROBLEMS RESOLVED WITH THE UPGRADE (IF APPLICABLE). ALL FUNCTIONS, FEATURES, AND CAPABILITIES NOT ADDRESSED SHALL OPERATE AS INTENDED BEFORE THE UPGRADE WAS IMPLEMENTED.

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 PLAW IN PLACE INCLUDING ALL CONNECTIONS TESTED AND ACCEPTED.

ITEM 809, STOP BAR DETECTION RADAR, AS PER PLAN

THIS ITEM OF WORK SHALL CONSIST OF FURNISHING AND INSTALLING A STOP BAR DETECTION UNIT CAPABLE OF INTERSECTION DETECTION CONTROL UTILIZING ABOVE GROUND DIGITAL WAVE RADAR TECHNIQUES. THE UNIT SHALL BE NON-INTRUSIVE AND SHALL DETECT VEHICLES FROM 6 FEET UP TO 140 FEET FOR A 90 DEGREE FIELD OF VIEW FROM THE UNIT. THE UNIT SHALL PROVIDE REAL-TIME PRESENCE DATA FOR AT LEAST 10 LANES. THE UNIT SHALL PROVIDE AT LEAST 16 DETECTION ZONES SIMULTANEOUSLY FOR INTERSECTION CONTROL. THE DETECTION UNIT SHALL INCLUDE THE FOLLOWING LIST OF FEATURES AND CAPABILITIES:

-THE UNIT SHALL PROVIDE ACCURATE PRESENCE-DETECTION OF MOVING VEHICLES. THE UNIT SHALL BE MOUNTED IN A FORWARD-FIRE OR SIDE-FIRE POSITION, LOOKING AT EITHER APPROACHING OR DEPARTING TRAFFIC AND SHALL ONLY DETECT VEHICLES IN ONE DIRECTION OF TRAVEL.
-THE UNIT SHALL BE TESTED TO MEET NEMA TS2 ENVIRONMENTAL STANDARDS AND MAINTAIN ACCURATE PERFORMANCE IN ALL WEATHER CONDITIONS. -THE UNIT SHALL INCLUDE A SIMPLE SETUP ROUTINE THAT SHALL AUTOMATICALLY CONFIGURE AND CALIBRATE THE UNIT FOR PROPER OPERATION DURING INSTALLATION. THE UNIT SHALL ALSO BE CAPABLE OF BEING PROGRAMMED AND UPDATED FROM A LAPTOP COMPUTER OR OTHER PORTABLE PROGRAMMING DEVICE, SUCH AS A POCKET PC, VIA A LOCAL OR REMOTE ETHERNET CONNECTION USING VENDOR SUPPLIED SOFTWARE. THE SOFTWARE SHALL SUPPORT TCP/IP CONNECTIVITY, UNIT CONFIGURATION BACK-UP AND RESTORE, AND REAL- TIME TRAFFIC VISUALIZATION FOR PERFORMANCE VERIFICATION AND TRAFFIC DISPLAY. THE GRAPHICAL USER INTERFACE SHALL OPERATE ON A WINDOWS PLATFORM.
-THE UNIT SHALL HAVE TWO HALF-DUPLEX RS-485 COMMUNICATION PORTS AND SHALL HAVE THE ABILITY TO UPGRADE FIRMWARE OVER ANY COMMUNICATION PORT.
-THE UNIT SHALL BE MOUNTED DIRECTLY TO A POLE OR MAST ARM, AS RECOMMENDED BY THE MANUFACTURER. CABLES SHALL BE PROVIDED AS REQUIRED AND RECOMMENDED BY THE MANUFACTURER.
-URGE PROTECTION DEVICES, AS RECOMMENDED BY THE MANUFACTURER, SHALL BE INCLUDED BOTH AT THE POLE WHERE THE UNIT IS LOCATED TO PROTECT THE UNIT AND IN THE TRAFFIC CABINET TO PROTECT THE CABINET ELECTRONICS.
-POWER SHALL BE PROVIDED FROM THE TRAFFIC CABINET. THE UNIT SHALL CONSUME LESS THAN 10 WATTS AND OPERATE FROM A DC INPUT BETWEEN 9 VDC AND 28 VDC. COMPLETE AND AUTOMATIC RECOVERY FROM A POWER FAILURE SHALL BE WITHIN 15 SECONDS AFTER RESUMPTION OF NORMAL POWER.
-ALL REQUIRED INPUTS CARDS SHALL BE INCLUDED IN THE TRAFFIC CABINET AND SHALL BE COMPATIBLE WITH CAL TRANS, NEMA TSI AND NEMA TS2 DETECTOR RACKS. THE CARDS SHALL PROVIDE TRUE PRESENCE DETECTOR CALLS OR CONTACT CLOSURE TO THE TRAFFIC CONTROLLER.
-THE MANUFACTURER'S REPRESENTATIVE SHALL BE ON SITE DURING INSTALLATION AND TESTING AND SHALL PROVIDE ONSITE TRAINING ON THE SETUP, OPERATION, AND MAINTENANCE OF THE UNIT.
-THE UNIT SHALL COME WITH A 2-YEAR MANUFACTURER SUPPLIED WARRANTY.

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

ITEM 614, WORK ZONE (BY TYPE), CLASS III, 642 PAINT, AS PER PLAN
IN ADDITION TO THE REQUIREMENTS OF ODOT ITEM 614, ALL PAVEMENT MARKINGS SHALL BE INSTALLED IN COORDINATION WITH OTHER PAVING PROJECT(S) ON OHIO ST AND MAIN ST.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PAVEMENT MARKING INSTALLATION AND COORDINATION AT THE TRAFFIC SIGNAL AS WELL AS ON ALL APPROACHES TO THE INTERSECTION. THIS SHALL INCLUDE, BUT IS NOT LIMITED TO, GUARANTEE THAT CENTERLINES ALIGN ALONG THE ROADWAY AND THROUGH THE INTERSECTION, CHANNELIZING LINES ALIGN WITH PAVEMENT MARKINGS THROUGH THE INTERSECTION, STOP LINES AND CROSSWALK LINES ARE INSTALLED PER THE OMUTCD, ETC.

WORK ZONE PAVEMENT MARKING LAYOUT SHOULD BE COORDINATED TO ASSURE CONTINUITY OF ALL PAVEMENT MARKINGS.

PAYMENT FOR ITEM 614, WORK ZONE (BY TYPE), CLASS III, 642 PAINT, AS PER PLAN SHALL BE MADE AT THE CONTRACT UNIT BID PRICE FOR EACH ITEM, COMPLETE.

GUARANTEE

THE CONTRACTOR SHALL FURNISH ANY AND ALL NECESSARY COMPONENTS AND LABOR TO MAKE THE INSTALLATION FULLY AND OPERATIONALLY COMPLETE.

THE CONTRACTOR SHALL GUARANTEE THAT THE TRAFFIC CONTROL SYSTEM INSTALLED AS PART OF THIS CONTRACT SHALL OPERATE SATISFACTORILY FOR A PERIOD OF 180 DAYS FOLLOWING COMPLETION OF THE 10-DAY PERFORMANCE TEST. 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 DUE TO POOR WORKMANSHIP OR DEFECTIVE EQUIPMENT SHALL BE BORNE BY THE CONTRACTOR. CUSTOMARY MANUFACTURER'S GUARANTEES FOR ALL ITEMS SHALL BE TURNED OVER TO THE ENGINEER FOLLOWING ACCEPTANCE OF THE EQUIPMENT.

THE COST OF GUARANTEEING SATISFACTORY OPERATION OF THE TRAFFIC CONTROL SYSTEM WILL BE INCIDENTAL TO THE PROJECT AND INCLUDED IN THE UNIT COST PER EACH ITEM.

DESIGNED JDO
CHECKED RLO

TRAFFIC SIGNAL PLAN
OHIO STREET AT EAST MAIN STREET

OAKS ENGINEERING, LLC
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