MICROFILMED
MAR 26 1984

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DEC 7 1990

STATE OF OHIO
DEPARTMENT OF TRANSPORTATION

CALCULATED BY Ow DATE 8-13-82
CHECKED BY SKS DATE 8-18-82

LIC-79-7.02 FAI-188-24.52 HES-898(1). RSG-888(5)	OHIO FHWA REGION 5 FEDERAL PROJECT

1/11

LIC-79-7.02 FAI-188-24.52

UNION TOWNSHIP WALNUT TOWNSHIP
LICKING COUNTY FAIRFIELD COUNTY

CONVENTIONAL SIGNS

County Line
Township Line
Section Line
Corporation Line or
Fence Line (existing) (proposed)
Center Line 352 353
Trees, Stumps, (to be removed)
Utility Poles: Telephone, Power, Light

Limited Access (only) LA
Right of Way (only) RW
Limited Access & Right of Way LA & RW
Existing Right of Way
Property Line (in existing fence)
Railroad or
Guardrail (existing) (proposed)

INDEX OF SHEETS

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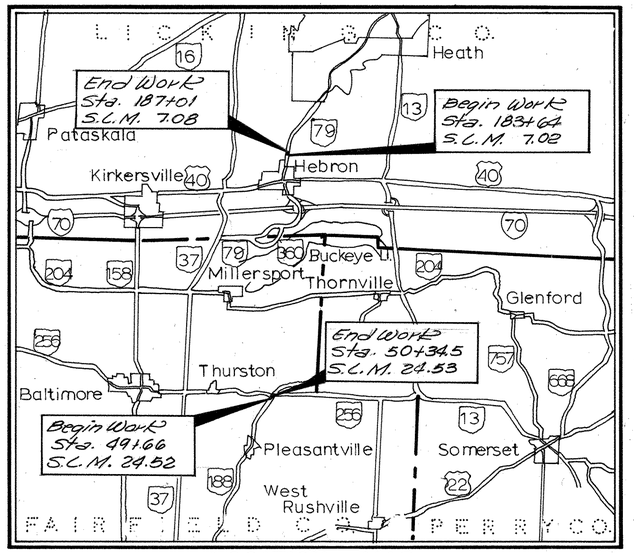

LOCATION MAP

SCALE IN MILES
0 3 6 9 12

M-12

Portion to be improved
State & Federal Routes
Other Roads

SCALES

Plan 0 20' 40'

Cross Section: Horizontal 0 10' 20', Vertical 0' 10' 20'

UNDERGROUND UTILITIES
48 HOURS
BEFORE YOU DIG
Call 800-362-2764 (Toll Free)
OHIO UTILITIES PROTECTION SERVICE
NON-MEMBERS
MUST BE CALLED DIRECTLY

LINE DATA

Length of Project = 0.00 Lin.Ft. or 0.000 Miles
LIC-79 & FAI-188

Begin Work LIC-79 = Sta. 183+64
End Work LIC-79 = Sta. 187+01
Length of Work LIC-79 = 337.00 Lin.Ft. or 0.063 Mile

Begin Work FAI-188 = Sta. 49+66
End Work FAI-188 = Sta. 50+34.5
Length of Work FAI-188 = 68.50 Lin.Ft. or 0.012 Mile

Total Length of Work = 405.50 Lin.Ft. or 0.076 Mile
LIC-79 & FAI-188

Plan Prepared By:
District No-5
Ohio Department of Transportation

SUPPLEMENTAL PRINTS OF STANDARD CONSTRUCTION DRAWINGS				
HL-10 6-1-79				
TC-21.20 5-31-79				
TC-81.10 4-10-79				
TC-83.10 4-13-79				
TC-84.20 4-17-79				
TC-85.20 4-18-79				

SUPPLEMENTAL SPECIFICATIONS	
843 10-23-75	

1981 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 approve these plans and declare that the making of this improvement will not require the closing to traffic of the highway and that provisions for the maintenance and safety of traffic will be as set forth on the plans and estimates.

Approved John W Watkins
Date 8-18-82 District Deputy Director of Transportation

Approved
Date Engineer, Bureau of Bridges and Structural Design

Approved Garnett Fongeneche
Date 2-18-83 Chief Engineer, Operations

Approved Warren J Smith
Date 3-4-83 Director, Department of Transportation

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED:

DIVISION ADMINISTRATOR DATE

Project: LIC-79-7.02 FAI-188-24.52
Date of Letting 19, Contract No.
LD0300 Rev. 11-1-78

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GENERAL NOTES

CALCULATED BY [illegible] DATE 8-13-82
CHECKED BY SKJ DATE 8-18-82

FHWA REGION	STATE	PROJECT	
5	OHIO		

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LIC-79-7.02 RSG-888( )
FAI-188-24.52 HES-898( )

TRAFFIC CONTROL STANDARD CONSTRUCTION DRAWINGS:

References to Supplemental Specifications 857, 858, 859, 957, 958 & 959 on the Traffic Control Standard Construction Drawings in these plans shall be considered to read as respective references to item 630, 631, 632, 730, 731 & 732

632 LOOP DETECTOR AMPLIFIERS, AS PER PLAN

In addition to the requirements of 632 and 732.07 or 732.08, loop detector amplifiers shall have the following requirements or features:

The output device shall be a relay, and all contacts shall be included in the wiring harness.

The unit shall be self tuning.

The unit's electrical connection plugs or wiring harness shall allow ready replacement with a single channel amplifier as described in the final paragraph of 732.07.

ITEM 605 UNDERDRAINS FOR PULL BOXES:

Reference is made to Standard Drawing HL-10 for details of draining pull boxes. Underdrains for pull boxes shall be used as directed by the Engineer and shall be provided where the length required for a satisfactory outlet does not exceed approximately 20 feet. An estimated quantity of "40 linear feet of item 605.4 "shallow pipe underdrains" is included in the General Summary for this purpose.

632.27 TESTING:

In addition to the requirements of 632.27 the following shall apply:

Short Circuit Test. Prior to the performance of any cable insulation tests or performance test, a short circuit test shall be performed with a volt-ohmmeter or other approved instrument. Short circuit tests of external controller cabinet cabling shall be conducted with electrical loads, power sources or grounds, including disconnected. Signal cable routed to signal heads may be tested with connections made to lamp sockets without lamps installed.

Each conductor shall be measured against every other conductor and ground to assure that no short circuits, cross circuits or other improper connections exist. Continuity shall not exist between any conductor and another conductor including ground.

Circuit Continuity Test. Each circuit branch shall be temporarily jumpered at its termination and the temporarily looped circuit checked for continuity to assure that no open circuits exist, the circuit branch is according to plan, no high resistance connections exist and each circuit is properly identified. Lead-in cable for loop detector wire shall be tested before and after the cable is spliced to the loop wire. Circuit continuity testing of signal head may be done by applying 120 volts to each outgoing circuit and observing that only the specified lamps are lighted.

Functional Test. Before the 10 day performance test begins, the Contractor shall make the following checks and demonstrate to the Engineer that the system is ready for the performance test. The incoming voltage shall be a nominal 120 volts. The cabinet ventilating fan, fan thermostat, and convenience outlet with lamp shall be operational. Timing settings on the controller shall be correct according to the plans. All cabinet switches including the power on/off switch and flash switch shall be checked. All controller functions shall be checked to verify correct operation. The detector amplifiers shall be checked to determine which pavement loop is associated with which amplifier. The visual indication of amplifiers shall be checked to determine that each vehicle class (truck, car and motorcycle) entering sensor areas is detected on the associated amplifier and that no extraneous calls occur when the sensor area is vacant. The flash switch shall be checked to verify transfer of signal operation to flash and return to stop-and-go operation. The conflict monitor shall be checked to verify that it is not activated by normal signal operations or by the manipulation of cabinet switches. If the monitor is activated, the Contractor shall determine the cause of the problem and make appropriate changes and adjustments before beginning the performance test. The Contractor shall test the conflict monitor by artificially causing a number of different conflicting indications and verify that at each test the monitor causes the signals to begin flashing and places the controller in a "stop timing" mode. Artificial causation may be achieved by touching a jumper wire between two conflicting load switch outputs or by other methods approved by the Engineer. The signal shall flash when the monitor is disconnected.

UTILITIES NOTIFICATION:

At least two working days prior to commencing construction operations in an area which may involve underground utility facilities, the Contractor shall notify the Project Engineer, the registered utility protection service and the owners of each underground utility facility shown in the plans.

The owner of the underground utility facility shall, within forty-eight hours, excluding Saturdays, Sundays and Legal Holidays, after notice is received, stake, mark or otherwise designate the location of the underground utility facilities in the construction area in such a manner as to indicate their course together with the approximate depth at which they were installed. The marking or locating shall be coordinated to stay approximately two days ahead of the planned construction.

UNDERGROUND UTILITIES

The locations of the underground utilities shown on the plans are as obtained from the owners of the utility as required by Section 153.64 ORC.

WARRANTY OR GUARANTEE OF ELECTRICAL EQUIPMENT:

The Contractor shall warrant or guarantee satisfactory operation of electrical control equipment for a period of 90 days following acceptance of the equipment by the State. The Contractors responsibility shall be limited to necessary repairs, replacement of defective parts with parts equal to or better than those originally specified in remedying faulty installation in an approved manner including all labor, material and equipment costs related there to. During this period the Contractor shall be responsible for the maintenance and proper operation of all Contractor installed equipment.

The Engineer shall contact the Contractor if the equipment failure is his responsibility. The Contractor shall provide the Engineer such addresses and phone numbers where his maintenance forces are located. The Contractor shall provide one or more persons to receive all calls and dispatch the necessary maintenance forces to correct the outage. The Contractor shall have sufficient personnel and equipment available to restore normal operation within 4 hours after notification. When the Contractor fails to respond to an outage or malfunction of equipment in accordance with the requirements described above, the Engineer may invoke the provisions of Section 105.15.

The following items shall be provided with specified guarantee:

1. Traffic signal controllers and associated control equipment.
2. Loop detector amplifiers, in addition the manufacturers equipment for which guarantees are normally provided shall be assigned and delivered to the State.

The Contractor shall install and handle items in accordance with the manufacturers recommended procedures, provided such procedures are not in conflict with the plans and specifications. Costs for provision and performance of guarantees and warranties herein described will be incidental to and included in the unit price(s) bid for the various traffic control items.

632 POWER SERVICE, AS PER PLAN:

The disconnect switch with enclosure provided as a part of this item, shall conform to 732.21 and additionally shall be designed or modified such that it can be padlocked in both the "on" and "off" positions.

843 TRAFFIC SIGNAL AND FLASHER CONTROLLER CABINETS:

Cabinets shall be aluminum, either cast formed of sheet or drawn with welded braing and stiffeners as needed to assure a strong, rigid and weatherproof cabinet.

ITEM 632 POWER SUPPLY FOR TRAFFIC SIGNALS:

Electric power shall be obtained from the Ohio Power Company for LIC-79-7.00 and from the South Central Power Company for FAI-188-24.52 at the location shown on the plans. Existing Voltage is 120/240 Volts, single phase for FAI-188 and LIC-79.

All necessary work to install a complete operational system will be included in the various electrical bid items in this contract.

UTILITY OWNERSHIP:

The following utilities and owners are located within the work limits of this project.

LIC-79

Ohio Power Company
P.O. Box 400
Canton, Ohio 44701 Phone 216-456-8173

Tower Cable T.V.
111 N. 11th Street
Newark, Ohio 43055 Phone 614-345-4081

United Telephone
5 N. Gay Street
Mt. Vernon, Ohio 43050 Phone 614-397-5757

FAI-188

South Central Co-Op
Box 250
Lancaster, Ohio 43130 Phone 614-653-4422

General Telephone
500 Lancaster Pike
Circleville, Ohio 43113 Phone 614-474-5033

MOBILIZATION AS PER PLAN:

The Contractor shall provide a suitable field office having a minimum of 150 sq. ft. of floor space which shall be in accordance with 619.01 and 619.02. Payment shall be included in the lump sum price bid for Item 624, Mobilization, As Per Plan.

ADDITIONAL GENERAL NOTES ON SHEET 6.

ITEM 843 CONTROLLER, FULL ACTUATED, 2 PHASE, SOLID STATE DIGITAL, MICROPROCESSOR TYPE, WITH POLE MOUNTED CABINET, AS PER PLAN:

In addition to 843, the controller shall be in accordance with NEMA Standards TS-1-1976 Parts 1, 2, 13 & 14 and their latest revisions. The overlap programming shall be by use of an interchangeable plug-in printed circuit board assembly as described in parts 14 of TS-1-1976. Overlap capabilities shall be provided and brought to acessible terminal points. Manual control timing switches and cords are not required. Load switches and flasher shall conform to the latest revision of Parts 5 & 8 of NEMA TS-1-1976. The load switches shall contain indicator lights for each circuit visible from the front. In addition to NEMA requirements, the conflict monitor shall also have the following capabilities: to cause the signal to flash when all of the red lamps on the solid state load switch are burned out; when the conflict monitor is disconnected; when green and yellow are lighted on the same phase; and to display on the front panel indicators the exact channel in which a switch output failure occurs. Controller cabinet size shall comply to the requirements of 843 assuming the controller frame size to be a minimum of 15" wide x 14" high x 14" deep. The controller harness length shall be sufficient to reach any point within the space provided for the controller. The controller housing shall be keyed to the State master. Controller cabinet shall be painted yellow Federal Standard 595 color 13655. The controller cabinet shall be equipped with convenience 3 wire duplex outlet and a standard lamp socket with lamp, both to be wired in advance of police panel power switch. Lightning protection shall be provided as shown on Lightning Protection System detail sheet and will be paid for under this item. Payment for Item 843 Controller, Full Actuated, 2 phase Solid State Digital, Microprocessor Type, with pole mounted cabinet, will be at the contract bid price per each complete and in place including all connections tested and accepted.

843 FLASHER CONTROL WITH CABINET, AS PER PLAN:

A flasher unit with cabinet shall be furnished and installed where indicated on the plans. The flasher unit shall be for the operation of overhead flashing beacons furnished under other items of work. The flasher unit shall be in accordance with supplemental specification 843.10, shall be solid state, jack-mounted and shall have two circuits each rated at 10 amperes. The cabinet shall conform to applicable sections of 843.09 except that: shelves, a police door and a fan are not required; cabinet shall be of adequate size to accommodate the flasher unit mounted on the side or the back. Cabinets shall be provided with a main on/off power switch with an integral 15 amprere circuit breaker; cabinets shall be fitted with lightning protective devices as shown on sheet 10 on incoming power wires; and cabinets shall be designed for pole mounting with a 2 1/2 inch conduit opening in the bottom. In addition to 843, the flasher shall comply with NEMA Standard TS-1-1976-part 8, Type 2.

Payment will be at the contract unit price for each flasher unit with cabinet, furnished, in place, complete and ready for service under Item 843 each Flasher Control With Cabinet, As Per Plan.

SIGNAL CONTROLLER CABINET MOUNTING:

In lieu of the details shown on Standard Constrution Drawing TC-83.10, the controller cabinets at both intersections shall be mounted as shown in details on Sheet 10. The blind half coupling for the 2 1/2" LB shall be centered 6" below the bottom of the handhole frame and at 90° to the handhole.

614 MAINTAINING TRAFFIC:

When it is necessary to close one lane of traffic, the closure shall be accomplished by the application of traffic control devices as shown on sheet 11 of the plans.

All advance warning signs for any condition which restricts traffic shall be erected before any such restriction is put into effect. All such signs shall be covered or removed from the view of traffic when they are not applicable, as determined by the Engineer.

If the contractor fails to comply with the provisions for traffic control as set forth in these plans or with provisions of the manual, such failure results in a condition at the work site which is unsafe for traffic, the Engineer shall suspend work until the Contractor complies with the necessary requirements.

Payment for all the above shall be included in the lump sum price bid for Item 614 Maintaining Traffic.

632 WEATHERHEADS & BLIND HALF COUPLINGS:

In addition to the requirements of 632.28 strain poles shall include weatherheads and blind half couplings.

FOUNDATION CONDUIT:

Unless otherwise detailed in the plans, the signal support foundation shall contain a minimum of one 2 inch capped conduit ell in conformance with Standard Construction Drawing TC-21.20 and the direction shall be indicated on the top of the concrete foundation.

ITEM 632:

See Sheet 9 for Loop Detector Wire, As Per Plan & Loop Detector Pavement Cutting, As Per Plan, and Loop Detector Lead in Cable, 2c#14 UF, Direct Burial.

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GENERAL SUMMARY

CALCULATED BY Ron DATE 8-13-82
CHECKED BY SKJ DATE 8-18-82

FHWA Region	STATE	PROJECT	
5	OHIO		

LIC-79-7.02 RSG-888( )
FAI-188-24.52 HES-898( )

ITEM	SHEET NUMBER 2	2	6	6	ITEM	HES	RSG	TOTAL	UNIT	DESCRIPTION
843				1	843		1	1	Each	Controller, Full Actuated, 2 Phase, Solid State Digital Microprocessor Type, with Pole Mounted Cabinet, As Per Plan.
843			1		843	1		1	Each	Flasher Control with Cabinet, As Per Plan
632			4		632	4		4	Each	Vehicular Signal Head 1-Section 12 inch lens, 1-way
632			1		632	1		1	Each	Vehicular Signal Head 1-Section 12 inch lens, 4-way
632				1	632		1	1	Each	Vehicular Signal Head 3-Section 12 inch lens, 2-way
632				4	632		4	4	Each	Vehicular Signal Head 3-Section 12 inch lens, 1-way
632				1	632		1	1	Each	Loop Detector Amplifier, As Per Plan
632				156	632		156	156	Lin.Ft.	Loop Detector Pavement Cutting, As Per Plan
632			3.00	4.82	632	3.00	4.82	7.82	Cu.Yd.	Concrete for Anchor Base Foundations
632			2		632	2		2	Each	Strain Pole, Type 81.10, Design 3
632			1	2	632	1	2	3	Each	Cable Support Assembly
632			84	112	632	84	112	196	Lin.Ft.	Messenger Wire 7 Strand, 3/8" Dia with Accessories
632			111	240	632	111	240	351	Lin.Ft.	Signal Cable 5 Conductor No. 14 AWG
632				402	632		402	402	Lin.Ft.	Loop Detector Wire, As Per Plan
632				458	632		458	458	Lin.Ft.	Loop Detector Lead in Cable
632			5	5	632	5	5	10	Each	Covering of Vehicular Signal Head
632			1	1	632	1	1	2	Each	Power Service, As Per Plan
632			30	30	632	30	30	60	Lin.Ft.	Power Cable, 3 Conductor No. 8 AWG
632			63	76	632	63	76	139	Lin.Ft.	Service Cable, 3 Conductor No. 6 AWG
625				3	625		3	3	Each	Pull Box, Metal 18"
625			2	2	625	2	2	4	Each	Ground Rod
625				425	625		425	425	Lin.Ft.	Trench, 24" Deep
632				830	632		830	830	Lin.Ft.	Loop Detector Lead in Cable, 2C #14UF Direct Burial
632				2	632		2	2	Each	Strain Pole, Type TC-81.10, Design 6
605		40			605		40	40	Lin.Ft.	4" Shallow Pipe Underdrains
632				2	632		2	2	Each	Loop Detector Amplifier with Built in Delay
624			Lump	Lump	624	Lump	Lump	Lump	Lump	Mobilization, As Per Plan
614			Lump	Lump	614	Lump	Lump	Lump	Lump	Maintaining Traffic

SIGNAL TIMING

Phase	Φ1	Φ2
Min. Int.	16	6
Passage Time	3	2
No. of Act. to Give Var. Int.	25	10
Time to Reduce Gap	30	30
Var. Int.	30	15
Min. Gap	3.5	3
Max. Green	50	30
Veh. Cl.	4	4
All Red Cl.	1	1
RECALL	ON	OFF

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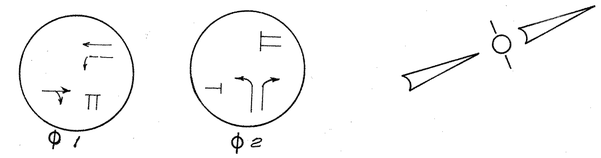
SIGNAL DISPLAY SCHEDULE

Phase	Φ1			Φ2			Flash
Head	R/W	Cl.		R/W	Cl.		
1	G	Y	R	R	R	R	Y
2	G	Y	R	R	R	R	Y
3	G	Y	R	R	R	R	Y
4	G	Y	R	R	R	R	Y
5	R	R	R	G	Y	R	R
6	R	R	R	G	Y	R	R

SIGNAL PHASING



CALCULATED BY [illegible] DATE 8-13-82
CHECKED BY SKJ DATE 8-18-82

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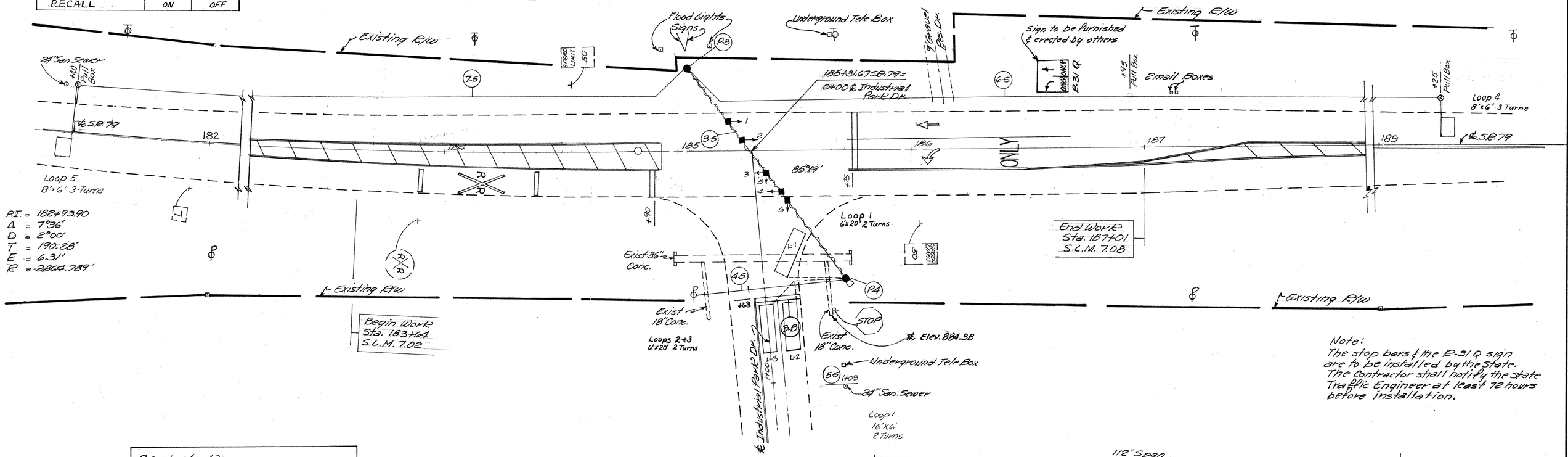
LIC-79-7.02 RSG-888( )
FA1-188-24.52 HES-898( )



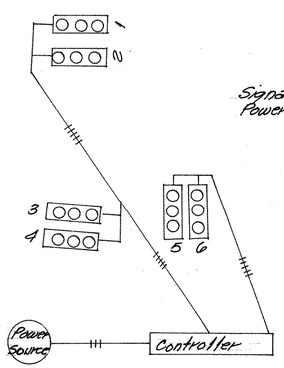
Note:
The stop bars & the R-31 Q sign are to be installed by the State. The Contractor shall notify the State Traffic Engineer at least 72 hours before installation.

Bench Mark:
Hilti Nail middle of South Headwall 37' Rt. of Sta. 192+06 ℄ S.R. 79
Elevation 885.75

Bench Mark:
R.R. spike in Power Pole 60.5' Rt. of Sta 185+06.5 ℄ S.R. 79
Elevation 889.25

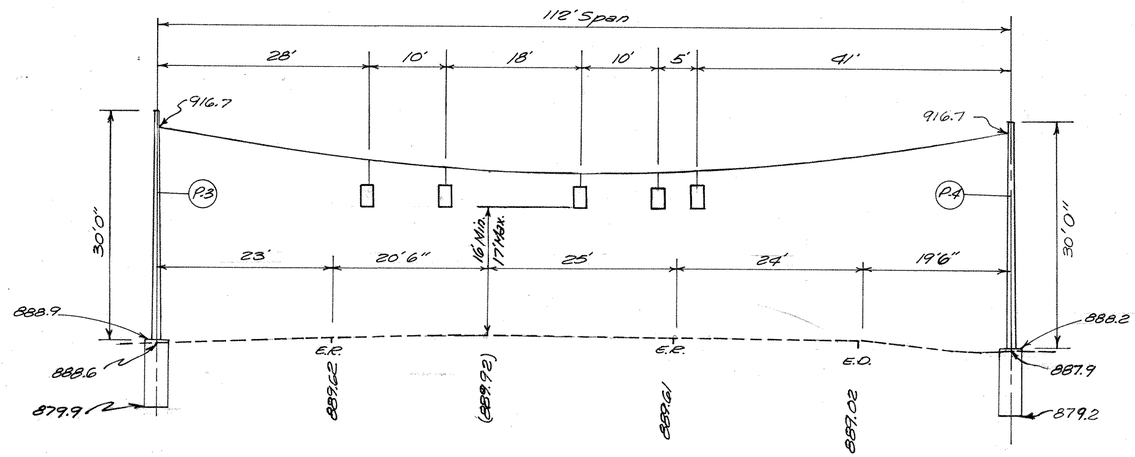
LEGEND

- Vehicular Signal Head
- Messenger Wire with Accessories
- Signal Strain Pole
- Pole mounted Controller
- Overhead Service Cable
- Pull Box
- Loop Detector



Signal Cable 5/c IIIII
Power Cable 3/c III

WIRING DIAGRAM



place 2-2" ells in both foundations.

TC-81.10 DESIGN #6

Concrete for Anchor Base Foundations
$(8.2)(\pi)(1.5)^2 = 57.96$
$(.8)(3)^2 = 7.20$
65.16
$65.16 \div 27 = 2.41$ C.Y.

PLAN SHEET

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MAR 2 6 1984

CALCULATED BY Qm DATE 8-17-82
CHECKED BY SKI DATE 8-18-82

F.H.W.A. Region	STATE	PROJECT	
5	OHIO		

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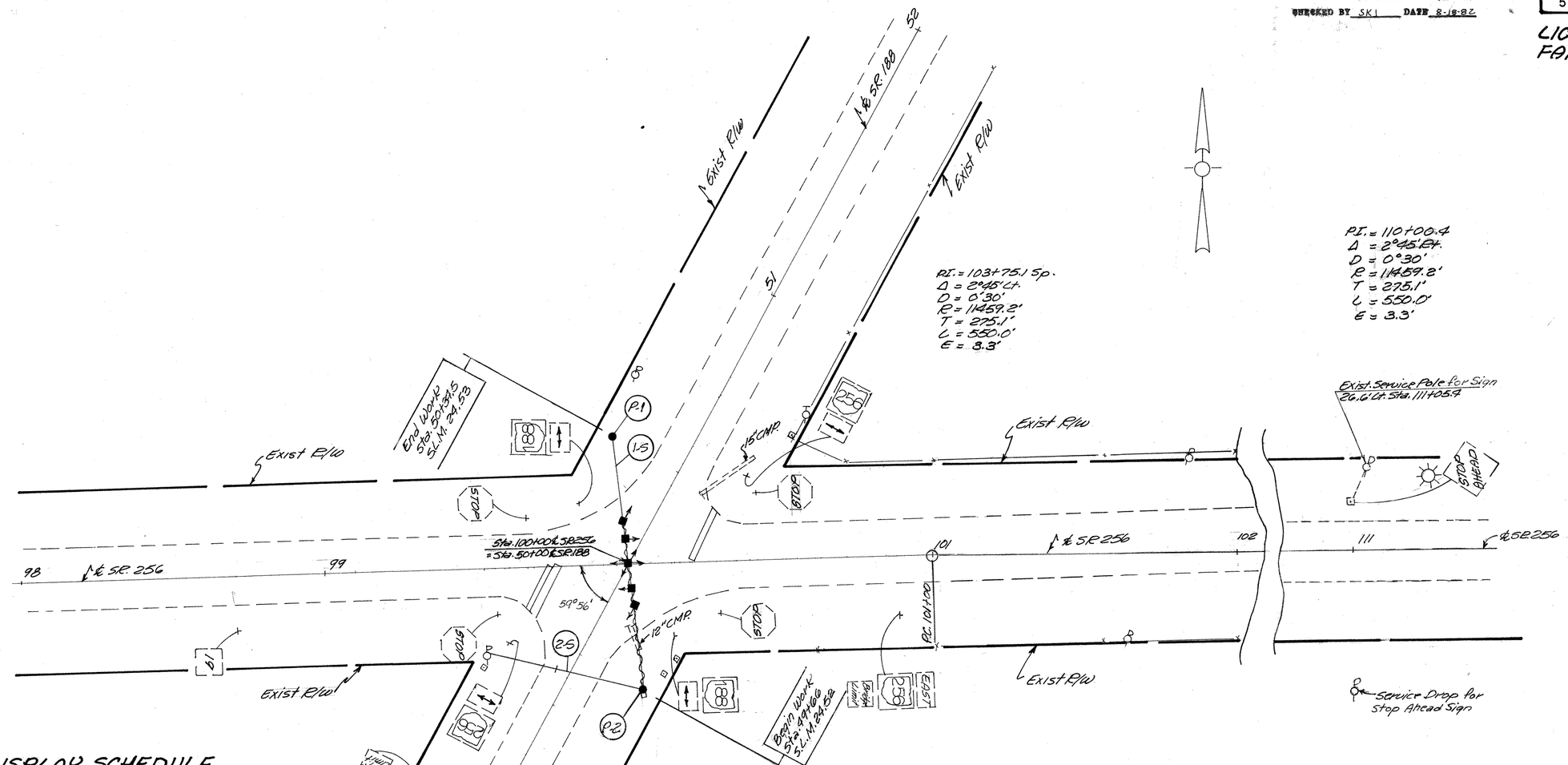


SIGNAL DISPLAY SCHEDULE

Flash Red on S.R. 256 Approaches

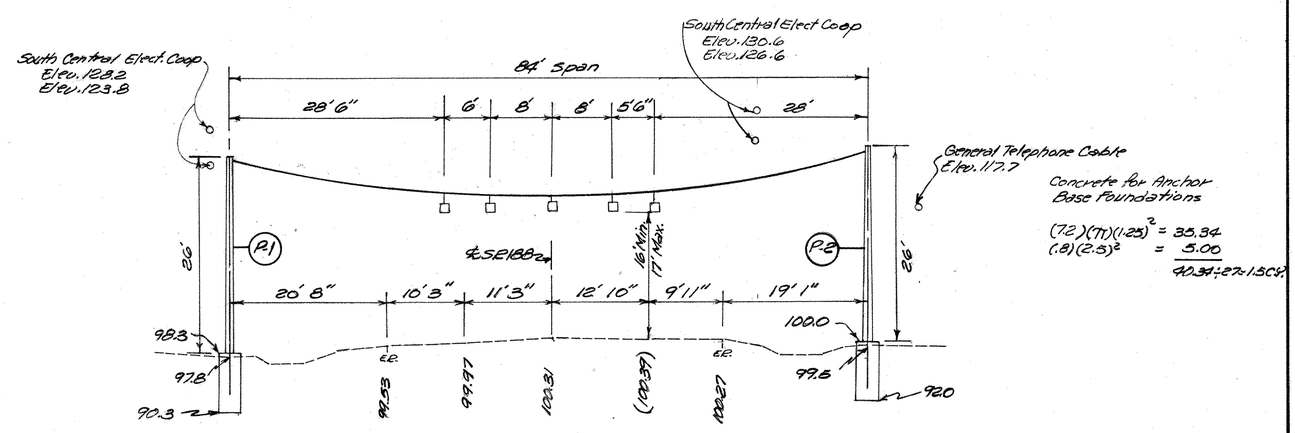
Flash Yellow on S.R. 188 Approaches

BENCH MARK:

Spike south side 10" Hackberry
23.5' Lt. of Sta 99+21 ℄ S.R. 256
Assumed Elevation 100.00

LEGEND

- Vehicular Signal Head
- Messenger Wire with Accessories
- Signal Strain Pole
- Pole mounted Controller
- Overhead Service Cable



Concrete for Anchor Base Foundations

$(72)(17)(1.25)^2 = 33.34$
$(.8)(2.5)^2 = 5.00$
$40.34 \div 27 = 1.50$ C.Y.

TG-81.10 Design #3

PLAN SHEET

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MAR 2 6 1984

SUB - SUMMARY

CALCULATED BY Pm DATE 8-13-82
CHECKED BY SKJ DATE 8-18-82

FHWA REGION	STATE	PROJECT	
5	OHIO		

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LIC-79-7.02 RSG-898( )
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Mark	Station to Station	Side	ITEM 843 Controller, Full Actuated, 2 Phase Solid State Digital Microprocessor Type with Pole Mounted Cabinet As Per Plan	ITEM 843 Flasher Control with Cabinet As Per Plan	ITEM 632 Vehicular Signal Head, 1 section, 12 inch lens, 1-way	ITEM 632 Vehicular Signal Head, 1 section, 12 inch lens, 4-way	ITEM 632 Vehicular Signal Head, 3 section, 12 inch lens, 2-way	ITEM 632 Vehicular Signal Head, 3 section, 12 inch lens, 1-way	ITEM 632 Loop Detector Amp., 4 per As Per Plan	ITEM 632 Loop Detector Pavement Cutting As Per Plan	ITEM 632 Concrete for Arterial Base Foundations	ITEM 632 Strain Pole, Type TC-11.0 Design 3	ITEM 632 Cable Support Assembly	ITEM 632 Messenger Wire 7 Strands 3/8 Dia. with Accessories	ITEM 632 Signal Cable 5 Conductor No. 14 AWG	ITEM 632 Loop Detector Wire As Per Plan	ITEM 632 Loop Detector Lead in Cable	ITEM 632 Covering of Vehicular Signal Head	ITEM 632 Power Service, As Per Plan	ITEM 632 Power cable 3 Conductor No. 8 AWG	ITEM 632 Service cable 3 Conductor No. 8 AWG	ITEM 632 Loop Detector Lead-in Cable, 2 C #14 UF, Direct Bur.	ITEM 632 Strain Pole, Type TC-8.110 Design 6	ITEM 632 Loop Detector AMP. w/ Built-in Delay, as per plan			Item 625 Pull Box, Metal 18"	Item 625 Ground Rod	Item 625 Trench, 24" Deep
			Each	Each	Each	Each	Each	Each	Each	Lin.Ft.	Cu.Yd.	Each	Each	Lin.Ft.	Lin.Ft.	Lin.Ft.	Lin.Ft.	Each	Each	Lin.Ft.	Lin.Ft.		Each					Each	Each	Lin.Ft.
P-1	50+34.5 - 24.5' Lt.	Lt									1.50	2																	1	
1-5	50+34.5 - 49+66	Lt.-Rt.			4	1								84	81			5												
P-2	49+66 - 24' Rt.	Rt.		1							1.50		1		30				1	30									1	
2-5	49+66 - 99+52.5	Rt.																			63									
Service Drop	99+52.5 - 28' Rt.	Rt.																												
P-3	185+05 - 35' Lt.	Lt.									2.41		1				80						1						1	
3-5	185+05 - 185+72	Lt.-Rt.					1	4						112	180		234	5												
P-4	185+72 - 55' Rt.	Rt.	1						1		2.41		1		60		75		1	30			1	2					1	
4-5	185+72 - 185+06.5	Rt.																			76									
Service Drop	185+06.5 - 60.5' Rt.	Rt.																												
5-5	185+72 - 1+09	Rt.								204						525												1		65
6-5	185+05 - 187+01	Lt.								33						110						445						1		210
7-5	185+05 - 183+64	Lt.								37						154						385						1		150
Totals		H.E.S.		1	4	1					3.00	2	1	84	111			5	1	30	63								2	
Totals		RSG	1				1	4	1	274	4.82		2	112	240	789	458	5	1	30	76	830	2	2				3	2	425

632.04 General & 843.05 As-Built Controller Cabinet Wiring Diagrams

In lieu of the 7th paragraph of 632.04 and the 3rd and 4th paragraphs of 843.05, the following shall apply.

Before starting installation of the controller and/or controller cabinet, the Contractor shall furnish to the Engineer, two copies each of cabinet wiring diagrams, service manuals and installation and maintenance instructions for each installation, including all components and interconnections.

Before starting installation of other signal components, the Contractor shall furnish to the Engineer, two copies each of wiring diagrams, service manuals, and installation and maintenance instructions for each component.

Prior to commencement of the 10-day functional test, the Contractor shall modify these documents as necessary to reflect current conditions. On completion of the signal work and prior to its acceptance, the Contractor shall again replace or modify the documents as necessary. The Engineer will retain the documents at the project until the signal work has been accepted at which time they will be transferred to the Department's or local agency's traffic control maintenance unit.

Manufacturer's guarantees and warranties on all installed traffic signal and signal-control equipment shall be transferred to the Department or other maintaining agency on completion and acceptance of the signal work.

UTILITY PLAN

CALCULATED BY [illegible] DATE 8-13-82
CHECKED BY SKJ DATE 8-18-82

FHWA REGION	STATE	PROJECT	
5	OHIO		

7/11

LIC-79-7.02 RSG-888( )
FAI-188-24.52 HES-898( )

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MAR 2 6 1984

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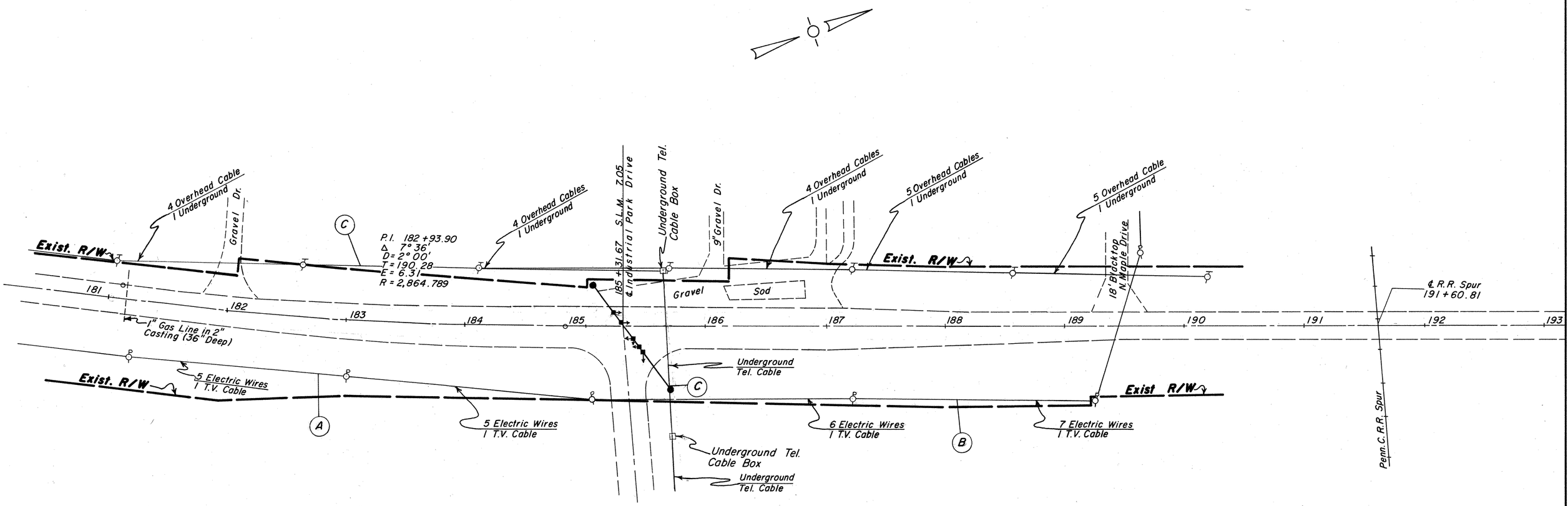
MAR 2 6 1984



Note:
All underground cable
36" under ground profile.

MARK	OWNER	UTILITY
A	Ohio Power Company	Electric
B	Tower Cable T.V.	T.V. Cable
C	United Telephone	Telephone

UTILITY PLAN

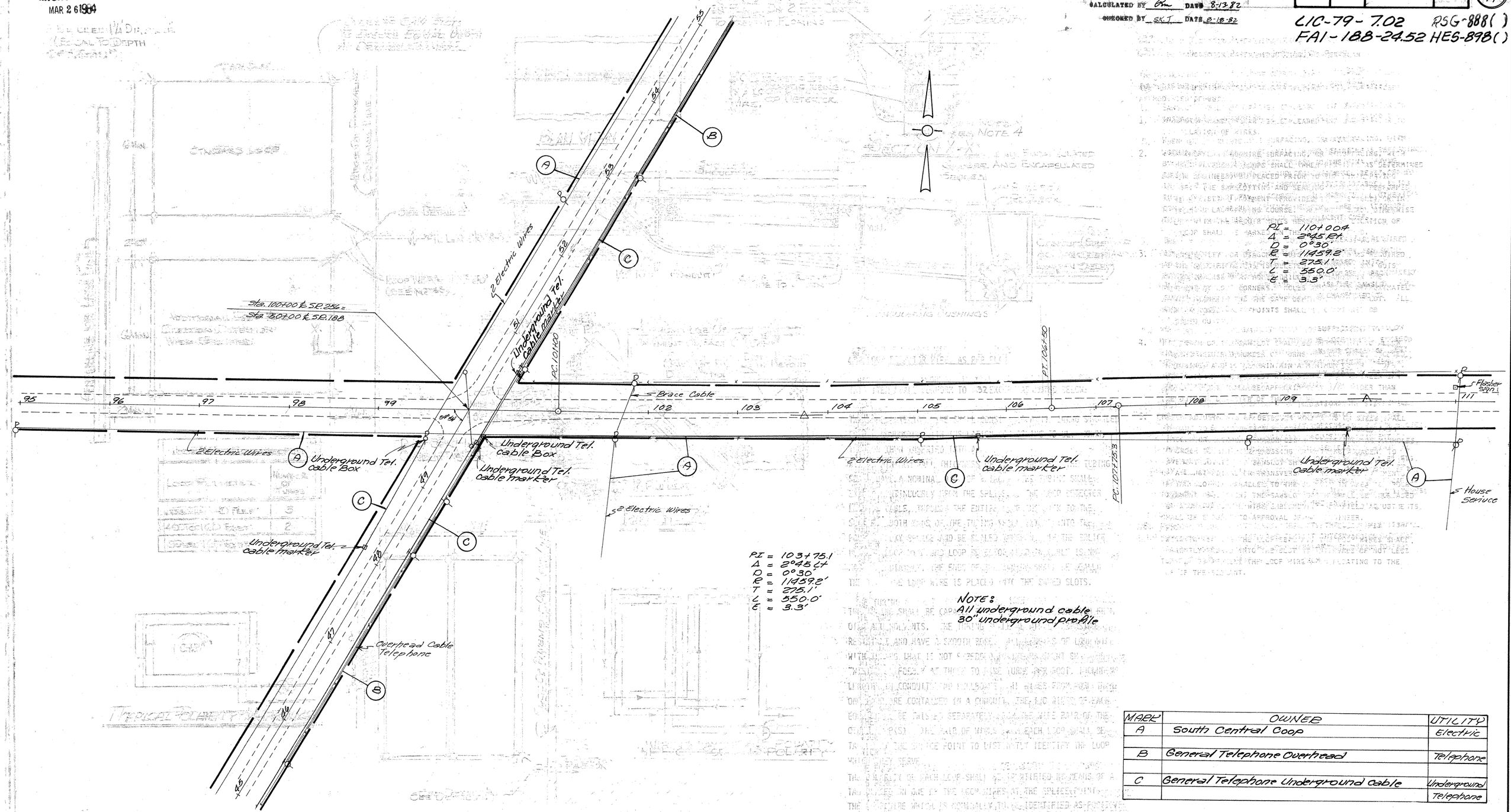
UTILITY PLAN

MICROFILMED
MAR 2 6 1984

CALCULATED BY Bm DATE 8-13-82
CHECKED BY SKJ DATE 8-18-82

8/11

LIC-79-7.02 RSG-888( )
FAI-188-24.52 HES-898( )



PI = 110+00.4
Δ = 2°45' Rt.
D = 0°30'
R = 11459.2'
T = 275.1'
L = 550.0'
E = 3.3'

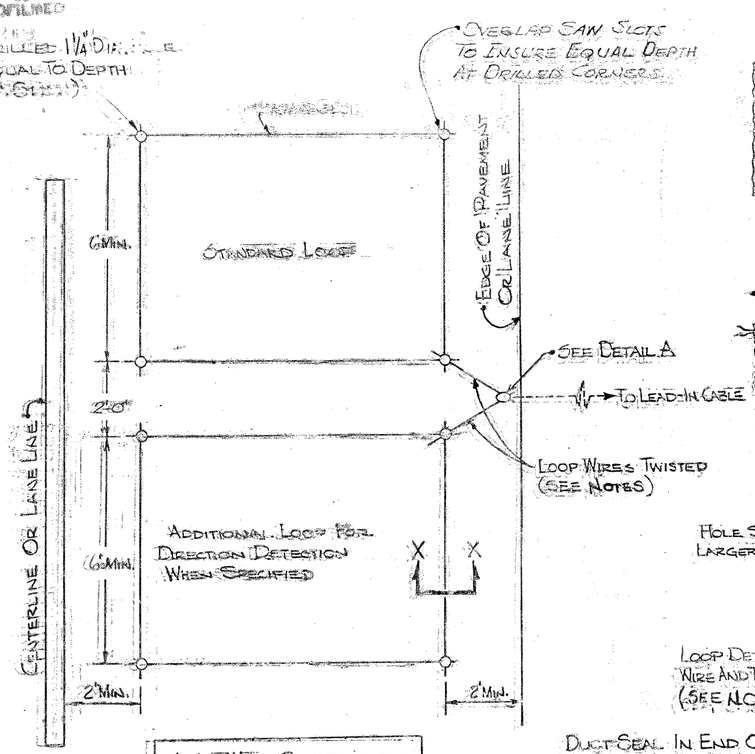
PI = 103+75.1
Δ = 2°45' Lt.
D = 0°30'
R = 11459.2'
T = 275.1'
L = 550.0'
E = 3.3'

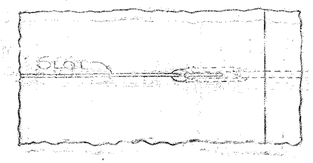
NOTE:
All underground cable 30" underground profile

MARK	OWNER	UTILITY
A	South Central Coop	Electric
B	General Telephone Overhead	Telephone
C	General Telephone Underground cable	Underground
		Telephone

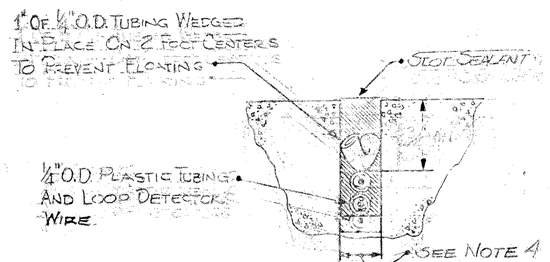
UTILITY PLAN

MICROFILMED
MAR 2 6 1984
MICROFILMED

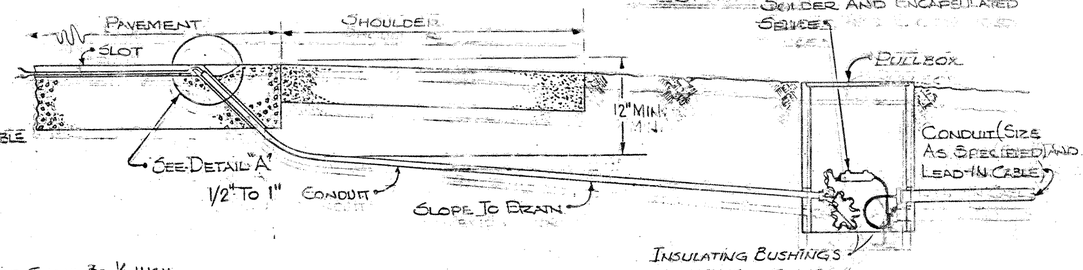


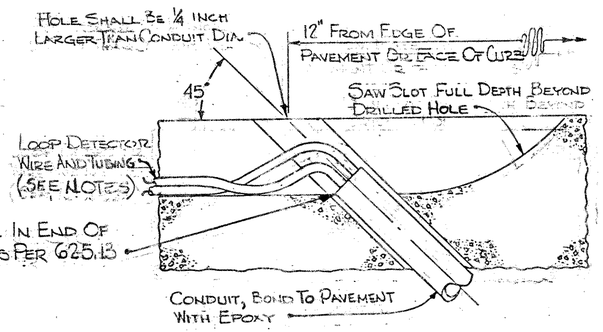


Plan View



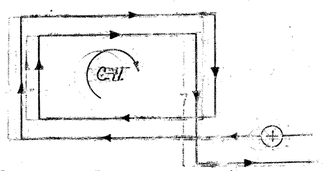
Section X-X



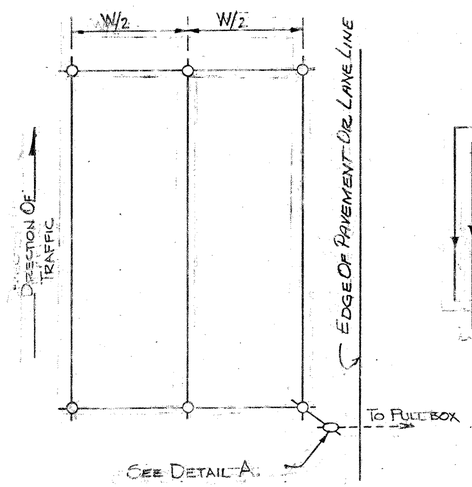


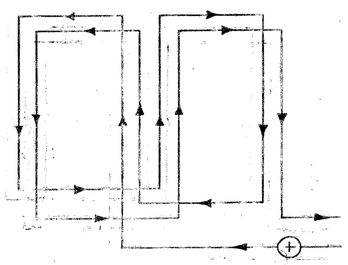
Detail "A"

Loop Wire Construction	
Loop Perimeter	Number of Turns
Less Than 40 Feet	3
40 To 160 Feet	2
Over 160 Feet	1



Typical Polarity Marking





Wiring Layout And Polarity

Figure 8 Loop Details

632 - Loop Detector Pavement Cutting, As Per Plan

THE WORK UNDER THIS ITEM SHALL COMPLY WITH THIS SPEC EXCEPT AS MODIFIED BELOW:

1. SAWSLOTS SHALL BE CAREFULLY CLEANED AND DRIED PRIOR TO INSTALLATION OF WIRES.

2. WHEN THE PLANS REQUIRE SURFACING, OR RESURFACING, WITH ASPHALT PAVEMENT, LOOPS SHALL (WHEN FEASIBLE AS DETERMINED BY THE ENGINEER) BE PLACED PRIOR TO THE FINAL PAVING COURSE. THE SAWSLOTTING AND SEALING SHALL BE PERFORMED IN THE EXISTING PAVEMENT (PROVIDED IT IS STABLE) OR IN THE SECOND LAST PAVING COURSE. ALL WORK SHALL OTHERWISE COMPLY WITH THE REQUIREMENTS HEREON. THE LOCATION OF THE LOOP SHALL BE MARKED ON THE ADJACENT CURB.

3. THE NECESSITY FOR DIAGONAL CUTS AT CORNERS AS REQUIRED BY THE SPECIFICATIONS IS DELETED. HOWEVER, SAW CUTS ARE TO INTERSECT AT HOLES DRILLED OR BORED IN THE PAVEMENT AT LOOP CORNERS. HOLES ARE TO BE APPROXIMATELY 1 1/4" DIAMETER AND THE SAME DEPTH AS THE SAWSLOT. ALL SHARP EDGES AT TURN POINTS SHALL BE CHAMFERED OR CHISELED OUT.

4. THE DEPTH OF THE SAWSLOT SHALL BE SUFFICIENT TO ALLOW FOR THE REQUIRED NUMBER OF TURNS OF LOOP WIRE, ENCASED IN TUBING, AND STILL MAINTAIN A MINIMUM COVER OF 3/4". THE WIDTH OF THE SAWSLOT WILL NORMALLY BE BETWEEN 1/4" AND 1/2", BUT SHALL BE APPROXIMATELY 1/8" WIDER THAN THE OUTSIDE DIAMETER OF THE TUBING.

5. FIELD ADJUSTMENTS OF DETECTOR LOCATIONS OR SIZES SHALL BE MADE TO AVOID DETECTOR LOCATIONS WHICH WOULD PASS THROUGH OR ENCOMPASS MAJOR OBSTRUCTIONS SUCH AS MANHOLES. IN ORDER TO MINIMIZE CROSSING OR CUTTING ADJACENT TO PAVEMENT JOINTS, NO SAWSLOT SHALL BE LOCATED WITHIN 12" OF A LONGITUDINAL OR TRANSVERSE JOINT IN PCC PAVEMENTS, IF THE SLOT IS PARALLEL TO THE JOINT. IN AREAS OF POOR PAVEMENT CONDITION, THE SAWSLOT DEPTH SHALL BE INCREASED TO INSURE ADEQUATE WIRE EMBEDMENT. ALL FIELD ADJUSTMENTS SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.

6. PRIOR TO POURING THE LOOP SEALANT, THE LOOP WIRES SHALL BE GENTLY WEDGED INTO THE SLOT AT INTERVALS OF NOT LESS THAN 2' TO PREVENT THE LOOP WIRE FROM FLOATING TO THE TOP OF THE SEALANT.

632 LOOP DETECTOR WIRE, AS PER PLAN

THIS ITEM SHALL CONFORM TO 632 EXCEPT AS NOTED BELOW:

THE LOOP DETECTOR WIRE SHALL CONSIST OF A NO. 14AWG STRANDED COPPER CONDUCTOR WITH INSULATION CONFORMING TO UL: XHHW, THHN OR THWN INSERTED INTO A Polyvinyl Chloride or Polyethylene Tubing WITH A MINIMUM WALL THICKNESS OF 0.025 INCHES. THE TUBING SHALL HAVE A NOMINAL O.D. OF ¼ INCH. THE TUBING SHALL EXTEND CONTINUOUSLY FROM THE SPLICE AT THE LOOP DETECTOR LEAD-IN CABLE, THROUGH THE ENTIRE LOOP AND BACK TO THE SPLICE. BOTH ENDS OF THE TUBING SHALL EXTEND INTO THE POURED EPOXY SPLICE AND BE SEALED THEREIN. IF THE SPLICE BETWEEN LOOP WIRE AND LOOP DETECTOR LEAD-IN CABLE IS NOT MADE IMMEDIATELY, THE ENDS OF THE TUBING SHALL BE SEALED AT THE TIME THE LOOP WIRE IS PLACED INTO THE SAWED SLOTS.

THE TUBING SHALL BE CAPABLE OF RESISTING DETERIORATION FROM OILS AND SOLVENTS. THE TUBING SHALL BE HIGHLY ABRASION RESISTANT AND HAVE A SMOOTH BORE. ALL LENGTHS OF LOOP WIRE WITH TUBING THAT IS NOT EMBEDDED IN THE PAVEMENT SHALL BE TWISTED UNIFORMLY AT THREE TO FIVE TURNS PER FOOT, INCLUDING LENGTHS IN CONDUITS AND PULLBOXES. IF WIRES FROM MORE THAN ONE LOOP ARE CONTAINED IN A CONDUIT, THE TWO WIRES OF EACH LOOP SHALL BE TWISTED SEPARATELY FROM THE WIRE PAIR OF THE OTHER LOOP(S). THE PAIR OF WIRES FROM EACH LOOP SHALL BE TAGGED AT THE SPLICE POINT TO DISTINCTLY IDENTIFY THE LOOP WHICH THEY SERVE.

THE POLARITY OF EACH LOOP SHALL BE IDENTIFIED BY MEANS OF A TAG PLACED ON ONE OF THE LOOP WIRES AT THE SPLICE POINT. THE LOOP WIRE WHICH IS NOMINALLY TO BE IDENTIFIED AS POSITIVE (+) SIGN SHALL BE THE ONE WHICH, IF FOLLOWED FROM THE SPLICE AND AROUND THE LOOP, TRACES A CLOCKWISE PATTERN.

632 - LOOP DETECTOR LEAD-IN CABLE, 2c #14UF, DIRECT BURIAL

THIS ITEM SHALL INCLUDE THE INSTALLATION OF DIRECT BURIAL SHIELDED SOLID OR STRANDED CABLE CONFORMING TO SPECIFICATION IMSA-19-5 OR 20.5. THE METHOD OF BURIAL MAY BE EITHER BY TRENCHING OR VIBRATORY PLOWING TO A MINIMUM DEPTH OF 18".

1/19/81
REVISED 12/31/80

SPECIAL LOOP DETECTOR DETAILS AND GENERAL NOTES

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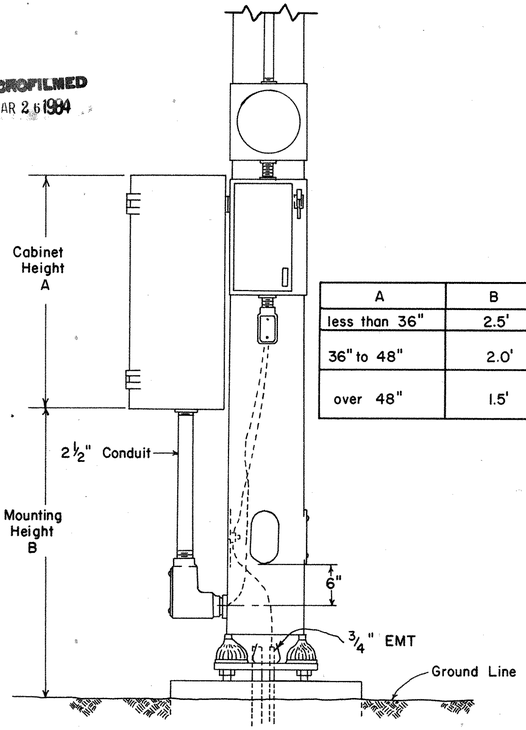
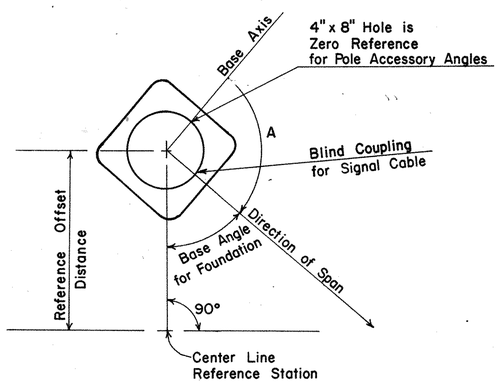
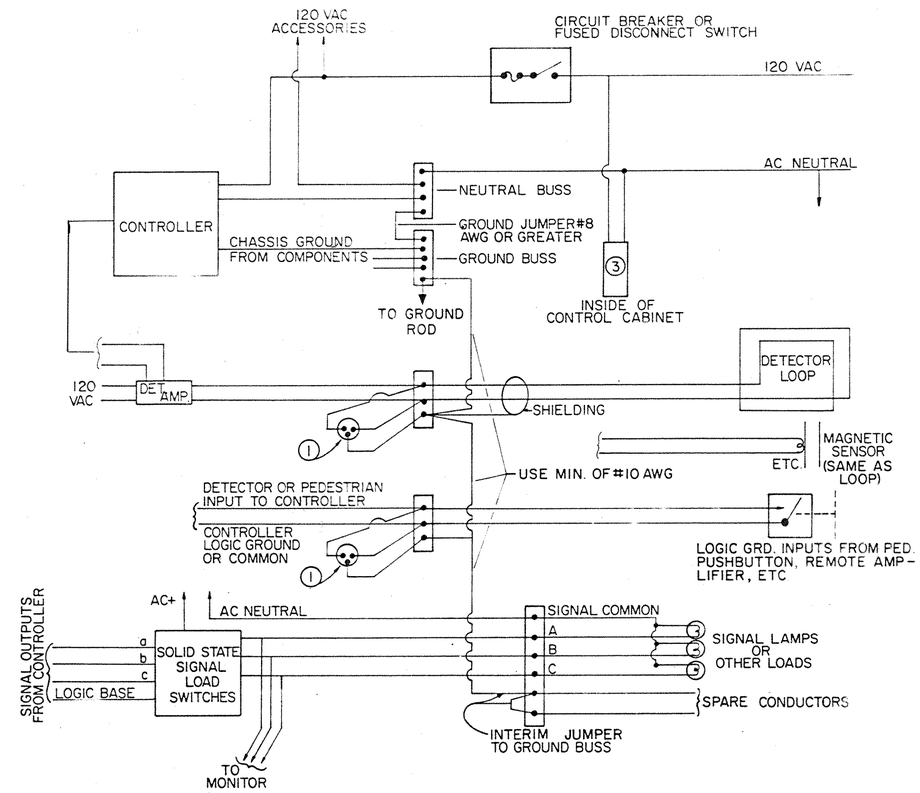


A	B
less than 36"	2.5'
36" to 48"	2.0'
over 48"	1.5'



POLE	FOUNDATION STATION	FOUNDATION OFFSET	BASE ANGLE FOR FOUNDATION	ANGLE OF 4 x 8 HANDHOLE	BLIND COUPLING SIZE	BLIND COUPLING ANGLE A	BLIND COUPLING FROM TOP
P-1	50+34.5	24.5' Lt.	54° 42'	270°	2"	270°	12"
P-2	49+66	24' Rt.	54° 42'	90°	2"	90°	12"
P-3	185+05	35' Lt.	36° 40'	270°	2"	270°	12"
P-4	185+72	55' Rt.	36° 40'	90°	2"	90°	12"

ORIENTATION DIAGRAM FOR STRAIN POLE



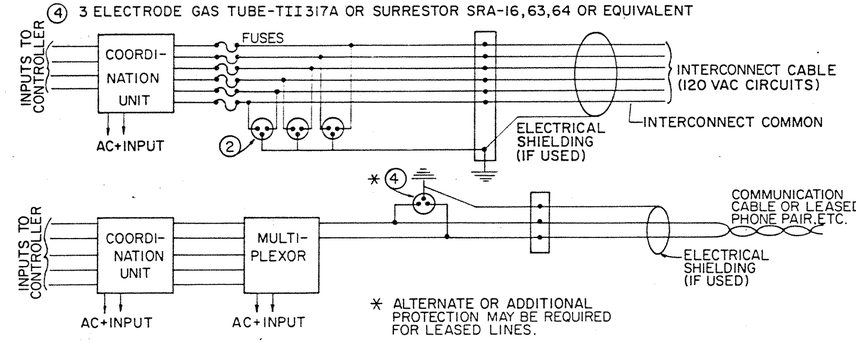
(1) 3 ELECTRODE GAS TUBE-TII340A-20 OR SURRESTOR SRA-16 OR EQUIVALENT (FOR LOOP AMP NOT EXCEEDING 20V ON LOOP CIRCUIT)

(2) 3 ELECTRODE GAS TUBE-TII 317B OR SURRESTOR SPA-60A OR EQUIVALENT

(3) POWER LINE ARRESTOR (3 ELECTRODE) TII 412A-(20) OR SURRESTOR SPA 300

NOTE: ALL UNUSED CONDUCTORS MUST BE GROUNDED AT BOTH ENDS AND ALL ARRESTORS SHOULD BE MOUNTED AS CLOSE AS POSSIBLE TO THE FIRST TERMINATION OF INCOMING PROTECTED LINE.

(4) 3 ELECTRODE GAS TUBE-TII 317A OR SURRESTOR SRA-16, 63, 64 OR EQUIVALENT



* ALTERNATE OR ADDITIONAL PROTECTION MAY BE REQUIRED FOR LEASED LINES.

LIGHTNING PROTECTION SYSTEM

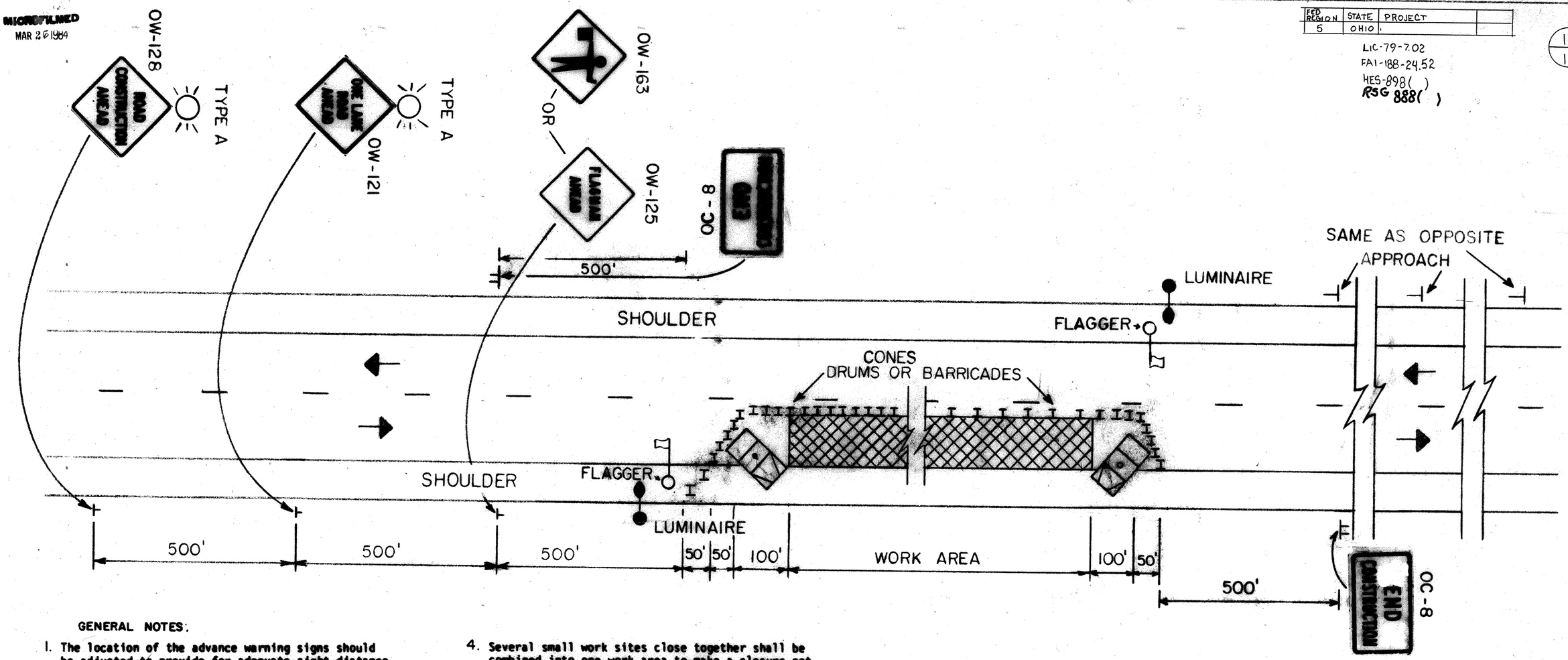
10-1-82

DETAILS

MICROFILMED
MAR 26 1984

FED REGION	STATE	PROJECT
5	OHIO	

LIC-79-7.02
FAI-188-24.52
HES-898( )
RSG 888( )



GENERAL NOTES:

1. The location of the advance warning signs should be adjusted to provide for adequate sight distance for the existing vertical and horizontal roadway alignment. The distances shown are minimums.

2. Flaggers shall be used to control traffic continuously for as long as a one lane operation is in effect. The flaggers shall communicate with each other at all times as described in the Ohio Manual of Uniform Traffic Control Devices (OMUTCD) in Section 7H: Control of Traffic Through Work Areas.

3. Cones drums or barricades shall be spaced at approximately 50' to 60' center to center for the first 1000 feet of the work area and at a maximum of 100' to 120' center to center for the balance of the work area. Cones, drums or barricades on the advance and return tapers shall be spaced at 10' center to center. Cones may be substituted for barricades or drums for short term lane closures. Cones shall be reflectorized, delineat or internally illuminated for short term night lane closures.

4. Several small work sites close together shall be combined into one work area to make a closure not more than 2000 feet long including tapers. Closures of more than 2000 feet may be approved by the Engineer. The minimum length between closures shall be 2000 feet. Only one side of the road shall be closed in any one work area.

5. The work vehicles shown at the beginning and end of the work area shall be in place and unoccupied whenever workers are in the work area. These work vehicles shall be removed from the pavement whenever workers are not in the work area. Other protective devices may be used in lieu of the work vehicles shown when approved by the Engineer. The vehicles shall be equipped with a 360° rotating or flashing amber beacon clearly visible in all directions a minimum of a ½ mile.

6. The Type A flashing barricade warning lights shown on the "Road Construction Ahead" and the "One Lane Road Ahead" signs are required whenever a night lane closure is necessary.

7. Type C steady burning barricade warning lights shall be erected on drums or barricades for night lane closures. The maximum spacing shall be identical to the channelizing device spacing requirements described in Note 3.

8. Adequate area illumination to clearly identify the flagger station at night for long term operations shall be provided by using 150 watt minimum high pressure sodium luminaires or 250 watt minimum mercury luminaires. Luminaires shall be located adjacent to one flagger station for each direction of traffic as shown above. The mounting height for temporary luminaires shall be a minimum of 27 feet above the pavement and the overhead conductor clearance shall be 20 feet above the pavement.

OHIO DEPARTMENT OF TRANSPORTATION

FLAGGERS CLOSING
I LANE OF A 2 LANE
HIGHWAY

DATE 12/82

DR. | CK.