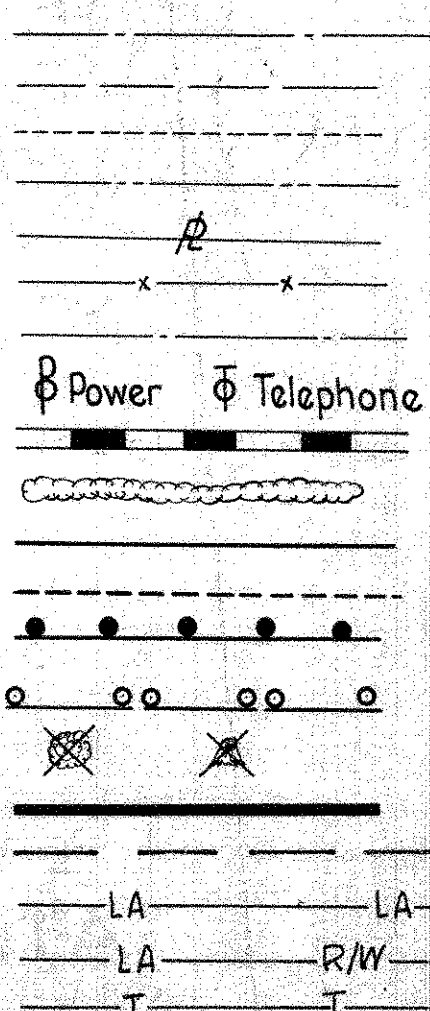


## CONVENTIONAL

## SIGNS

COUNTY LINE  
TOWNSHIP LINE  
SECTION LINE  
CORPORATION LINE  
PROPERTY LINE  
FENCE LINE  
CENTER LINE  
POLE LINE  
RAILROAD  
HEDGE  
DRAIN PIPE (NEW)  
DRAIN PIPE (OLD)  
GUARD RAIL (NEW)  
GUARD RAIL (OLD)  
TREES & STUMPS TO BE REMOVED  
R/W LINE (PROPOSED)  
R/W LINE (EXISTING)  
LIMITED ACCESS LINE  
LIMITED ACCESS AND R/W  
R/W LINE (TEMPORARY)



## LINE DATA

S.R. 47 Relocation Project to be  
accomplished by others  
LO6-47-DA-(0.56)  
LO6-47-(14.16-14.57)

BEGIN WORK STA. 748+32  
BEGIN PROJECT STA. 750+00  
STATION EQUATION STA. 781+31.65 BACK=STA. 782+62.89 AHEAD = -131.24 Lin. Ft.  
STATION EQUATION STA. 902+83.12 BACK=STA. 904+56.23 AHEAD = -173.17 Lin. Ft.  
END PROJECT STA. 915+75  
END WORK STA. 918+40.51  
ADD FOR APPROACHES:

TWP. ROAD #56 500 LIN. FT.  
BEGIN WORK STA. 18+00 ; END WORK STA. 23+00

EXIST. U.S.R. #68 1990 LIN. FT.  
BEGIN WORK STA. 496+10 ; END WORK STA. 516+00  
EXIST. U.S.R. #33 Deduct 50.16' for U.S. 33 994.84 LIN. FT.  
BEGIN WORK STA. 1056+30 ; END WORK STA. 1066+75  
Prop. TWP. ROAD #183 Deduct 25.54' for U.S. 33 1439.46 LIN. FT.  
BEGIN WORK STA. 20+75 ; END WORK STA. 35+40

NET LENGTH OF PROJECT 16,270.59 LIN. FT. OR 3.081 MILES  
NET LENGTH OF WORK 21,628.40 LIN. FT. OR 4.096 MILES

## INDEX OF SHEETS

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R/W PLANS 337-357

FILE NUMBER LOGAN COUNTY - LOG-33-14.18  
DATE OF LETTING  
CONTRACT NO.

## SUPPLEMENTAL SPECIFICATIONS

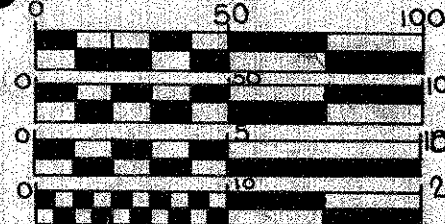
NO. Date  
I-127 R. 1-13-62 GE-101.04 5-22-56  
I-129 R. 4-5-61 L-120 R. 12-62 S-307

## LOCATION MAP

Scale: 1" = 1 Mile

PORTION TO BE IMPROVED  
STATE HIGHWAYS  
OTHER ROADS  
DETOUR

## SCALES



## SUPPLEMENTAL SPECIFICATIONS

NO. Date  
I-212 R. 6-23-61  
M-107.18 R. 7-3-61  
S-101 7-12-62  
S-307 10-1-64

STATE OF OHIO  
DEPARTMENT OF HIGHWAYS  
**LOG-33-14.18**  
N.Y.C. R.R. GRADE SEPARATION  
LOGAN COUNTY

CITY OF BELLEFONTAINE  
HARRISON TOWNSHIP  
LAKE TOWNSHIP  
JEFFERSON TOWNSHIP



BEGIN PROJECT  
STA. 750+00

END PROJECT  
STA. 915+75

APPROVED  
DATE

4-28-65

DIVISION DEPUTY DIRECTOR

APPROVED  
DATE

5-18-65

ENGINEER OF BRIDGES

APPROVED  
DATE

5-18-65

ENGINEER OF LOCATION &amp; DESIGN

APPROVED  
DATE

5-18-65

DEPUTY DIRECTOR OF DESIGN &amp; CONSTRUCTION

APPROVED  
DATE

5-20-65

DEPUTY DIRECTOR OF RIGHT OF WAY

APPROVED  
DATE

5-20-65

DEPUTY DIRECTOR OF PLANNING &amp; PROGRAMMING

APPROVED  
DATE

FIRST ASSISTANT DIRECTOR

APPROVED  
DATE

5/20/65

DIRECTOR OF HIGHWAYS

## STANDARD DRAWINGS

No.	Date	No.	Date
DR-1	1-3-55	HW-E	2-1-63
F-1	2-1-63	I-1	11-13-60
L.J. No. 1	7-1-55	I-80.C.B. No. 1-2A & B	2-1-63
RJ-1	9-1-64	I-80.C.B. No. 2-2A & B	2-1-63
G-107	4-1-64	I-80.C.B. No. 6	2-1-63
AS-1-54	7-5-62	I-80.C.B. No. 8	2-1-63
SP-53	6-30-61	CSB-2-56, Sheets 1, 2, 3	2-2-59
T-35	1-2-56	AR-1-57	4-2-62
L-1	4-1-50	SD-2-64	11-25-64
L-3	4-1-50	FSB-1-62	1-15-63
L-3A	4-1-50	RB-1-55	2-2-59
I-12	2-1-63		
I-21-23	3-10-64		
I-15 No. 1	11-15-60		
I-15 No. 2	11-15-60		
I-15 No. 2A	8-17-60		
I-15 No. 5-B	2-1-63		
I-15 No. 6	2-1-63		

SHEET NO. 22 REVISED 7-7-65 C.E.H.

Sheet No. 305 Revised 2-13-68 JEP

MICROFILMED

SEP 3 1969

GROUND PHOTO LAB



# PROP. U.S.R. 33 & EXIST. U.S.R. 68 INTERCHANGE NORTH OF BELLEFONTAINE LIGHTING LAYOUT SHEET

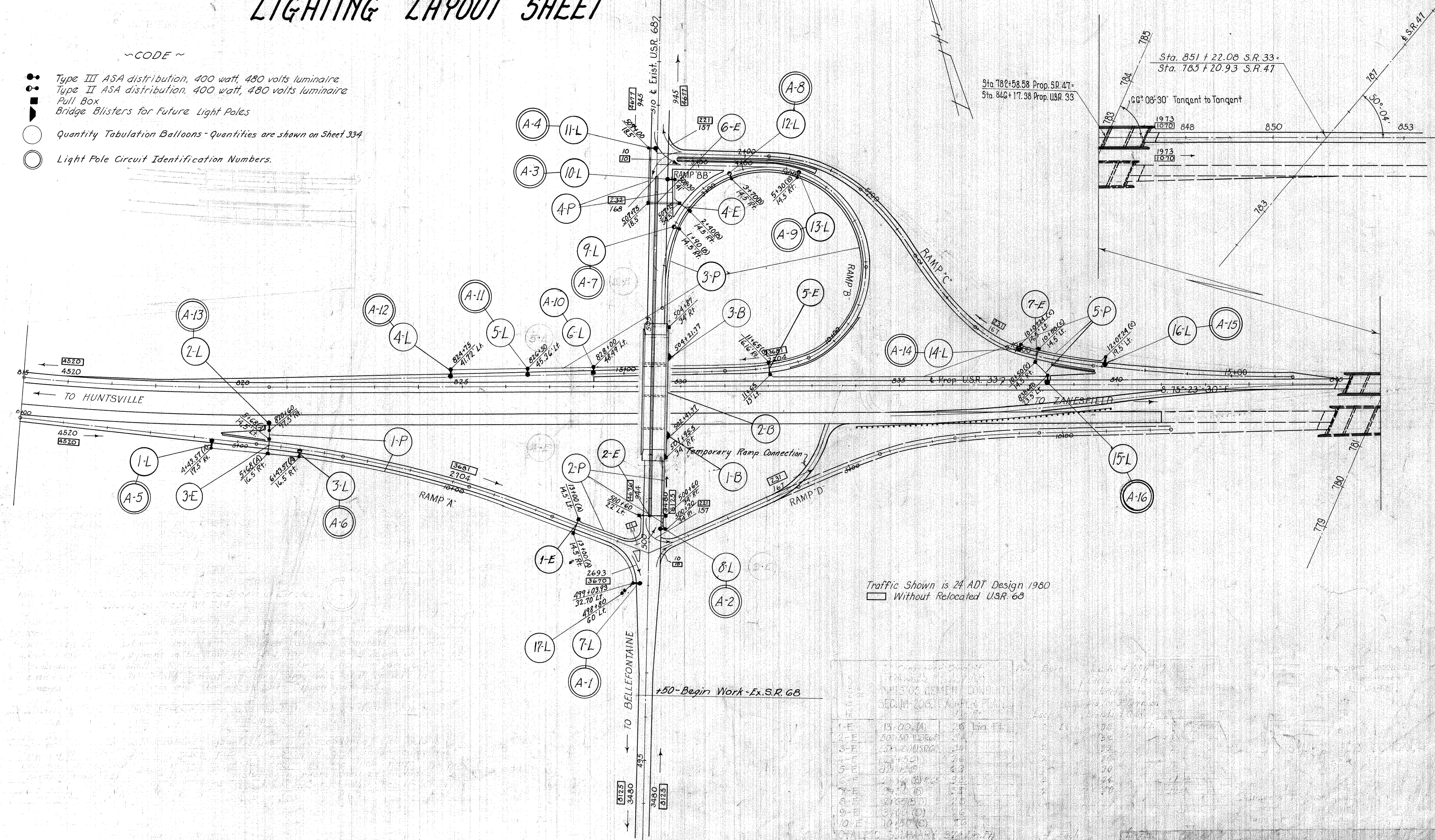
FED. RD. DIVISION	STATE	PROJECT
2	OHIO	

332  
357

LOGAN COUNTY  
LOG-33-14.18

~CODE~

- Type III ASA distribution, 400 watt, 480 volts luminaire
- Type II ASA distribution, 400 watt, 480 volts luminaire
- Pull Box
- Bridge Blisters for Future Light Poles
- Quantity Tabulation Balloons - Quantities are shown on Sheet 334
- Light Pole Circuit Identification Numbers.



Traffic Shown is 24 ADT Design 1980  
Without Relocated U.S.R. 68

Item	Description	Quantity
1-E	13-00-00	26
2-E	50-00-00	26
3-E	37-00-00	26
4-E	24-00-00	26
5-E	11-00-00	26
6-E	00-00-00	26
7-E	11-00-00	26
8-E	24-00-00	26
9-E	37-00-00	26
10-E	50-00-00	26



# LIGHTING NOTES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

333  
357

LOGAN COUNTY  
LOG-33-14.18

GENERAL: Lighting and electrical materials covered by these specifications shall be inspected and certified as follows:

1. Inspection ~ Lighting and electrical materials are subject to inspection at the project site. Such inspection will include but is not limited to the identification of the item, type, size and manufacturer's markings, and documentation of these data. When required by the laboratory, random samples will be selected from the material delivered or at the place of manufacture or warehouse prior to delivery.

2. Certification ~ When required by the laboratory a manufacturer's certification shall be provided for the lighting and electrical materials in lieu of samples. Certifications are statements covering manufacturer's test data sworn to by a person having legal authority to act for the company supplying the materials. Independent laboratory reports covering test data or the welders qualifications are acceptable in lieu of or supplementary to manufacturer's certifications. The certifications and laboratory reports shall include the Department project number.

In the case of light standards, certified copies in triplicate of the chemical and physical properties of all materials incorporated in the standards and accessories, the test results obtained from the deflection and permanent set tests and the welder qualification tests shall be furnished the laboratory.

3. Working Plans ~ The Contractor shall comply with all the requirements of Sec. S-25.05 of the Construction and Material Specifications of the State of Ohio before ordering any Electrical or Mechanical Material for Lighting.

LIGHT STANDARD SPECIFICATIONS: This standard is established to provide acceptable steel light standards for use on Ohio Department of Highway Projects. If standards manufactured of other metals are presented for approval, they must meet these specifications in all applicable requirements and will only be considered after complete testing (destructive testing initially) and evaluation of these tests has been completed. These specifications shall not abridge municipal standard specifications but be supplemented by them so long as such modifications do not make the standard specification proprietary.

A. Shafts ~ Shafts shall be tapered steel tubes fabricated from not less than (11 gauge) steel. It shall have only one longitudinal, automatically electrically welded joint and shall have no intermediate transverse joints or welds. Only one length of steel sheet shall be used, which shall be formed into a shaft, having a continuous taper of approximately .14" per foot.

1. Manufacture ~ Shafts shall develop a minimum yield strength of 48,000 p.s.i. and have a uniform thickness throughout (including the weld area).

2. Deflection ~ Shafts shall be capable of withstanding loadings applied 18" from top of shafts without exceeding the permanent set and deflection measured in inches 18" from top of shaft as tabulated for the respective pole sizes in the attached tables.

Pole Size	Elastic Deflection Rate in/100#	At 2/3 Yield			At Yield		
		Load (lbs)	Total Deflection (in)	Permanent Set (inches)	Load (lbs)	Total Deflection (in)	Permanent Set (inches)
9"x4.87"x29'-6"	2.16	659	14.73	.50	989	24.00	2.64
8"x3.87"x29'-6"	3.32	517	17.66	.50	776	28.84	3.08

3. Shaft Fittings ~ Each shaft shall be fitted with a "J" hook and a pole top interchangeable with those used by the agency maintaining the system.

The shafts of anchor base standards shall be fitted with a 4" x 6 1/2" minimum sized reinforced hand hole, locking steel cover with captive chain and 1/2"-13 grounding nut welded to inside of shaft opposite hand hole. Hand holes on ground mounted standards shall be on the side opposite the luminaire support arm.

B. Anchor Type Bases ~ Anchor bases shall be one-piece cast steel conforming to Section M-7.7 and with a top flange secured to the lower end of the shaft by two continuous electric arc welds. The base shall telescope the shaft with one weld at the lower end of shaft and the other weld at the top of the base. The two welds shall be not less than 1 1/2" apart. The welded connection shall develop the full strength of the adjacent shaft section. The base shall be provided with (4) four holes to receive the anchor bolts, four (4) holes for ventilation located in the body of the base directly behind each anchor bolt hole, and four (4) tapped holes for attaching the four bolt covers furnished.

D. Anchor Bolts ~ Four high grade steel anchor bolts fitted with hex nuts shall be furnished for each standard. Each anchor bolt shall have an "L" bend at the bottom end and be threaded at the top end. Threaded ends and nuts shall be galvanized in accordance with ASTM A-153 with galvanizing extending 1" to 4" beyond threads. Anchor bolts shall conform to ASTM A107, Grade 1035 Special Quality, and shall have a minimum yield strength of 46,000 p.s.i.. Bolt stock shall conform with ASTM Spec. A-29 and nominal bar size shall equal nominal bolt size.

E. Luminaire Support Arms ~ 1. The luminaire support arm assembly shall consist of an upper and lower member securely joined by means of vertical strut or struts. The upper and lower members shall be standard steel pipe of 2" N.P.S. (or larger as required) ASTM ~ 120 Schedule 40. The shaft end of member shall have a welded steel fitting, which will permit positioning the arm on the shaft plate and will support the arm while

securing to the shaft. Two cap screws shall be provided per fitting. All arms shall accommodate a 2" slip fitter luminaire. Fitting and shaft plate shall be similar to those now in use by the agency maintaining the system to provide interchangeability of arms.

2. Support arms and their shaft attachments shall sustain a vertical load of 250 lbs. applied within 3" of the luminaire end of the arm without collapse or rupture of any portion of the standard assembly.

3. The support arms and their shaft attachments shall sustain a vertical load of 100 lbs. applied within 3" of the luminaire end of the arm and with the arm attached to a rigid structure. The vertical deflection shall not exceed 5 1/2 % of the arm length. This includes a maximum allowance of 1/2 of 1% of the arm length for testing methods and permanent set.

4. The support arms and their shaft attachments shall sustain a transverse horizontal load of 50 lbs. applied within 3" of the luminaire end of the arm with the arm attached to a rigid structure. The horizontal deflection shall not exceed 5% of the arm length and the shaft attachments shall not develop any looseness within the specified loading range.

5. Deflection is defined as the total transverse displacement of the longitudinal centerline of the shaft or luminaire support at the point of test load application between its initially unloaded and fully loaded positions.

6. Permanent set is defined as the total transverse displacement of the longitudinal centerline of the shaft at the point of test load application between its initially unloaded position and the final unloaded position after application of test loads.

F. Welding ~ Welders and welding operators shall be prequalified for class A welding according to the instructions given in "Instructions from the Laboratory, Pre-Qualification of Electric Arc Welders and Welding Operators." Welding equipment shall be of sufficient capacity of such design and in such condition as to make possible the production of first class welds. All surfaces to be welded shall be smooth, uniform and free from fins, tears, and other defects which might adversely effect the quality of the welds. Surfaces to be welded shall be free from loose scale, slag, rust, moisture, grease, paint and other foreign material. Mill scale shall be removed by power brushing, blasting or grinding.

G. Galvanizing ~ All steel standards shall be hot dipped galvanized after fabrication in accordance with the requirements of Section M-7.4(d). (After erection, standard shall be inspected for scratches in the galvanized surfaces. Such scratches shall be given two coats of a zinc rich base paint. Second coat shall be applied after first coat has completely dried.)

ELECTRICAL CABLE: Cable of the size and type specified shall conform to the Federal Aviation Agency, Advisory Circular Number AC 150/5345-7 dated November 4, 1963, Specification for L-824 Underground Electrical cables for Airport Lighting Circuits, Type A, 600 Volt.

UNIT TYPE DUCT-CABLE SYSTEMS:  
1. Scope ~ This item shall consist of insulated conductor cables and insulated neutral cables, of the number and size specified, factory assembled inside a polyethylene duct.  
2. Conductors and neutrals ~ The cables used as conductors and neutrals shall conform to the note "electrical cable".  
3. Polyethylene Duct ~ Duct shall conform to ASTM D 2104, Schedule 40, Type II Grade 3 or Type III.

MERCURY LAMPS: Mercury lamps for use in the luminaire specified shall be first line, high quality lamps having heat resistant clear glass envelopes, with a quartz arc tube interior. The horizontal initial lumens and approximate hours of life shall not be less than for the following American Standards Association Designations.

ASA Designation	Watts	Bulb	Horizontal Initial Lumens	Approximate Hours Life
H-33-1CD	400	B7-37	19500	16000

The lumen output of the mercury lamp after 16000 hours use shall produce 80% of its initial lumen rating.

CABLE CONDUCTOR KITS FOR 600 VOLT MULTIPLE CIRCUITS:  
Scope ~ This specification covers cable connector kits for use in hand holes of signing and lighting standards as well as in junction and pull boxes.

Requirements ~ Cable conductor kits furnished under this specification shall conform to one of the following types:

Type I ~ In-line connector kits. In-line connector kits shall contain:  
(a) A copper pin and copper receptacle, both of at least 90% conductivity, to be crimped to the cable. The receptacle shall establish contact pressure with the pin through the use of a copper beryllium sleeve spring and shall be equipped with a disposable mounting pin. The copper pin shall be of at least half hard material and the crimping portion shall be fully annealed while the rest of the pin is maintained in its original state of hardness. The receptacle shall have a centrally located recessed locking area so constructed that it is filled and retained by the rubber housings.

(b) A plug and a receptacle housing each made of water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight. Each housing shall form a water seal around the cable and between the two housings at the point of disconnection. The interior arrangement shall be such as to suitably receive and retain the copper pin and receptacle. Each kit shall be supplied with sufficient silicone compound to lubricate the metal parts and the rubber housings for easy assembly.

(c) Each kit shall also be provided with complete installation instructions.

TYPE II ~ Fused quick disconnect Y cable connector kit. This type of connector kit shall contain:

(a) A pair of spring loaded, 90% minimum conductivity, contacts suitable for gripping the specified size of cartridge fuse, two terminal lugs, a bolt and a self locking nut. One of the contacts shall be so constructed that it can be crimped to the cable and retained securely in the proper position within a rubber load-side housing. The second contact shall be pre-assembled and retained in a rubber Y insert body and shall provide a mounting hole by which the terminal lugs shall be fastened with the bolt and self locking nut. Both contacts shall be fully annealed.

(b) A load-side housing, a Y insert body and a Y housing each made of water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight. The load-side housing shall have an interior arrangement to suitably receive and retain the crimpable copper fuse contact and to retain the fuse when disconnected and shall be permanently marked "load-side". The Y insert body shall retain the second copper fuse contact. A water seal shall be provided between the housings and the cables, between the insert body and the Y housing and between the housings at the point of disconnection. Each kit shall be supplied with sufficient silicone compound to lubricate the metal parts and rubber housings for easy assembly, and a disposable mounting pin used in assembling the load-side terminal.

(c) Each kit shall also be provided with complete installation instructions.

TYPE III ~ Unfused, quick disconnect Y cable connector kit. This type of connector kit shall contain:

(a) A copper pin and copper receptacle both of at least 90% conductivity, two terminal lugs, a bolt and a self locking nut. The copper pin, to be crimped to the conductor, shall be of at least half hard material and the crimping portion shall be fully annealed while the rest of the pin is maintained in its original state of hardness. The pin shall have a centrally located recessed locking area so constructed that it is filled and retained by a rubber plug (tap) housing. The receptacle shall establish contact pressure with the pin through the use of a copper beryllium sleeve spring and shall be pre-assembled and retained in a rubber Y insert body. The receptacle shall be fully annealed and shall provide a mounting hole by which the terminal lugs can be fastened with the bolt and self locking nut.

(b) A plug (tap) housing, a Y insert body and a Y housing each made of insulating water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight. The plug housing shall have an interior arrangement to suitably receive and retain the copper receptacle. A water seal shall be provided between the housings and the cables, between the insert body and the Y housing and between the housings at the point of disconnection. Each kit shall be supplied with sufficient silicone compound to lubricate the metal parts and the rubber housings for easy assembly.

(c) At the end of a circuit, one insulated plug the same diameter as the cable shall be provided.

(d) Each kit shall also be provided with complete installation instructions.

TYPE IV ~ Semi-permanent, Y cable connector kit. This type of connector kit shall contain:

(a) Three terminal lugs, a bolt and self locking nut. The three lugs shall each be provided with a mounting hole by which they shall be fastened together with the bolt and nut.

(b) A tap housing and a Y housing each made of water resistant synthetic rubber suitable for burial in the ground or exposure to sunlight. The Y housing shall have an interior arrangement to receive the terminal lugs. A water seal shall be provided between the housings and the cables, between the housings at the point of disconnection. Each kit shall be supplied with sufficient silicone compound to lubricate the metal parts and the rubber housings for easy assembly.

(c) Each kit shall also be provided with complete installation instructions.

WROUGHT IRON GROUND RODS: Ground Rods shall be one inch diameter round solid wrought iron rods ten feet long having a driving point on one end and conforming to ASTM A 189.

LIGHTING STANDARDS: Standards of the specified type and sizes shall be erected upon the completed concrete foundations and plumbed or aligned by using metal shims. After erection each standard shall be adequately connected to the ground provided for in the plans.

After erection standards shall be inspected for defects in the galvanized surfaces. Minor scratches shall be given two coats of an approved zinc rich base paint. The second coat shall not be applied until after the first coat has completely dried. Standards having major scratches or defects in the galvanized surfaces will not be accepted.

STRUCTURE PULL BOXES: Pull boxes shall be flush mounted and shall be furnished and installed in structures as required. Boxes shall be of sufficient size to accommodate cable connector kits as required. All boxes embedded in concrete, shall be galvanized. Boxes shall be provided with 3/4 inch rigid galvanized steel conduit or pipe drains.



# LIGHTING NOTES CONT.

# TABLES

FED. RD. DIVISION	STATE	PROJECT	
2	OHIO		

LOGAN COUNTY  
LOG - 33-14.18

**STRUCTURE GROUNDS:** A complete grounding system shall be provided for the bridge. The furnishing of all materials such as ground cables, conduits, ground rods, grounding fittings, etc. necessary to provide the entire structure grounding system, complete in place shall be included in this item.

Wire used in grounding structures shall be 1/0 seven strand soft annealed bare copper cable.

The bridge having a steel superstructure shall be grounded at one or more locations. In general, this grounding shall be accomplished by connecting the upper ends of ground cables to the steel superstructure and lower ends to steel piling,

or by the means as specified or ordered. Connections shall be made by exothermic welds. Each ground shall provide a maximum resistance of 25 ohms. Each structure lighting standard shall be grounded by connecting one end of a ground cable to a light standard anchor rod and the other end to the top flange of the outside girder or beam of the superstructure by exothermic welds.

Metal pull boxes and metallic conduit shall be grounded in the same manner as structure lighting standards except that where convenient, the ends of grounding cables from such units may be welded to lighting standard anchor bolts that have been properly grounded to the steel superstructure.

**TESTS:** The Contractor shall be responsible for furnishing all personnel and equipment required to successfully perform the following tests and shall furnish 6 certified copies of complete test records to the Engineer:

(a) Ground Test - The resistance to ground for each ground rod installation shall not exceed 25 ohms. Where resistance exceeds 25 ohms, additional lengths and/or numbers of rods shall be installed.

(b) Circuit Test - The resistance to ground for each insulated multiple circuit conductor, including insulated ground, shall not be less than 10 megohms. The test shall be performed for each circuit with all ballasts disconnected from the circuit. In the case of a grounded circuit, the insulated ground return shall be tested before circuit ground connections are made to ground rods in the handholes of standards.

(c) Performance Test - Prior to acceptance, the Contractor shall operate the lighting system, including automatic control equipment and other specified apparatus, from sunset to sunrise for seven consecutive days without interruption or failure attributable to poor workmanship or defective material, after all faults have been corrected. The Contractor shall record each fault, the method and date of correction of each, and the beginning and end of the seven day test. The Contractor shall arrange with the servicing agency to purchase electric power necessary to conduct the performance tests. Portable generating plants will not be considered as suitable sources of power for the performance tests. All costs of personnel, materials, equipment, electrical energy and incidentals required for performing the tests shall be included in the contract unit prices for the respective items tested.

(d) Potential Test - Conduct the following test on each insulated conductor (including insulated ground) of each multiple light and signing circuit after insulation is complete.

Before performing the potential test, disconnect the pole and bracket cable at the connector kits in each light standard handhole, and remove the circuit protection fuses at the control panels.

Conduct the D-C high potential test per the cable manufacturer's recommendation and per applicable sections of the following specifications: ASTM Designation D-470-59T and ASTM Designation D-1350-58T.

All defective circuits shall be repaired or replaced by the Contractor and the test resumed and conducted until all multiple circuit conductors meet the requirements.

**CIRCUIT AND LIGHTING STANDARD IDENTIFICATION:** Each lighting standard shall be identified by a number which will indicate both the circuit number and the pole number. Identifying numbers shall be as indicated on the circuit drawings in the plans or as specified by the maintaining agency.

Identification shall be by adhesive type decals with silver white reflective characters on a reflective green background in accordance with Military Specifications - MIL-R-13689A. Identification shall be located approximately 7 feet above the ground line, on the quadrant of the surface of the pole that faces oncoming traffic.

**METHOD OF MEASUREMENT:** When the contract stipulates that payment will be made for various elements of an electrical installation on a "linear foot" lump sum or "each" basis, measurement will be made as follows:

(a) Trench - The number of linear feet of trench acceptably completed will be measured from center to center of foundations, pull boxes, etc., and shall include all excavations, granular and other backfill material, compaction, and disposal of surplus materials.

(b) Conduit - The number of linear feet of conduit acceptably furnished and installed will be measured from center to center of pull boxes, foundations, etc., and shall include all fittings and appurtenances, joints, bends, grounds and concrete encasement where specified.

(c) Cable - The number of linear feet of circuit cable acceptably furnished and installed will be measured as twice the distance from center to center of foundation, pull boxes, etc., plus 20 feet per each spacing to allow for slack and splicing leads. The number of linear feet of pole and bracket cable acceptably furnished and installed will be measured as twice the lighting standard mounting height plus twice the designated arm length or lengths.

(d) Cable Duct - The number of linear feet of cable duct acceptably furnished and installed will be measured from center to center of pull boxes, foundations, etc., plus 10 feet per each spacing to allow for slack and splicing leads.

(e) The number of "lighting standards," "lighting standard foundations," "luminaires," "lamps," "ground rod units," "pull boxes," "connector kits," "structure grounding system" and "structure junction boxes" acceptably furnished and installed will be the actual number of each, complete in place.

(f) Service pole - The Service pole will be measured as a lump sum for the installation specified and shall include all materials, equipment and incidentals, complete in place.

(g) Circuit and Lighting Standard Identification - The specified identification of all circuits and poles on the project will be included with light standard.

**FOUNDATION:** Foundation for light standards shall be poured-in-place concrete. The lower portion may be poured in a 2'-0" diameter or 2'-0" square hole with forms, unless, at the discretion of the Engineer soil stability precludes the need for forms. The top portion shall be formed 2'-0" square for at least 1'-0" deep or a minimum six (6) inches below the finished grade line. Foundation must be to a minimum depth of six (6) feet below lowest point of finished grade, additional depth required depending upon soil conditions. Conform with Class "C" concrete.

**PULL BOX:** Pull box shall be fiber and eighteen (18) inches inside diameter for single conduit runs and twenty-four (24) inches inside diameter for multiple conduit runs.

**PULL BOX COVERS:** Pull box covers shall be lightweight cast iron or drawn steel as detailed and noted on pull box details.

**FOUNDATION CONDUIT:** Foundation conduit shall be type I filter duct or standard weight galvanized steel conduit. Conduit shall project 2" minimum above top and full length (or per plan) beyond face of foundation. Both ends of conduit shall be capped or plugged until light standard and electrical conductors are installed. Steel conduit ends shall be equipped with bushings.

**CROSSOVER CONDUIT:** Rigid steel conduit hot-dipped galvanized inside and outside, after threading with an enameled or plastic inside coating. Conduit shall conform to ASA Spec. Designation C-80.1 and further comply with (a) Supplemental Specification M-106.11 or Fed. Gen. Ser. Specification N° W WP-441B for wrought iron. Locate pull boxes at both ends of crossover and install N° 10 Galvanized pull wire and cap each end of spare conduit or future conduit.

**MARKER:** Conform with Class "C" Concrete, N° 4 max. aggregate. Set flush with finished grade, and install at abrupt change in direction of Duct-Cable or Direct Burial Cable.

**TRENCHING:** Trenches shall be the size as shown on the Detail Sheet and shall be backfilled with material conforming to Section I-1.07, Type 4, except the material in the first 4" above the cable duct only shall have no pieces larger than 1".

**LUMINAIRES:** shall be 400 watt I.E.S. Type III or II with integral regulator ballast, 480 volt mercury type, G.E.-M-400, Wesco-OV-25, Line Material "Unitstyle," or approved equal.

GENERAL SUMMARY			
S-25 ITEMS			
Bridge No. 1566	Roadway	Quantity	Unit
		11	Each
		5	Each
		16	Each
		10	Each
		6	Each
		16	Each
		16	Each
537	832	Lin. Ft.	Circuit Cable, 1/c N° 6 AWG, FAA (L-824 Type A, 600 V.)
	3991	Lin. Ft.	Cable - Duct, 2-1/c N° 6 AWG, FAA (L-824 Type A, 600 V.)
	17	Each	Connector Kits Type I
	16	Each	Connector Kits Type II
4	16	Each	Connector Kits Type III
	14	Each	Pull Box Type I
	3548	Lin. Ft.	Trenching
2		Each	Structure Junction Box
	10	Lin. Ft.	2" Corrosion Resistant Conduit
259		Lin. Ft.	2" Galvanized Steel Conduit
	278	Lin. Ft.	3" Corrosion Resistant Conduit
	Lump	Lump	Service Pole as per plan w/complete electrical equipment.
	1312	Lin. Ft.	Pole + Bracket Cable 1/c No. 12 AWG - FAA, Type A, 600 V.
	14	Each	Connector Kit, Type IV
	Lump	Lump	Structure Grounding System, complete.
	2	16	Set of 4 Anchor bolts

SERVICE POLE AND LAMP STANDARDS											
Reference Number	Station	Type II-ASA Distribution 480 Volts 400 Watts Luminaire	Type III-ASA Distribution 480 Volts 400 Watts Luminaire	Lamp 400 Watt H33-1CD	Standard 9'x4.87' x29'-6" w/15' Bracket	Standard 8'x3.87' x29'-6" w/10' Bracket	Grounding Units (Ground Rods)	Service Pole as per Plan	Connector Kits Type II	Connector Kits Type III	Pole & Bracket Cable 1/c N° 12 AWG FAA
		Each	Each	Each	Each	Each	Each	Lump	Each	Each	Lin. Ft.
											Each
1-L	4143.57(R)		1	1	1	1	1	1	1	1	85
2-L	8201.60		1	1	1	1	1	1	1	1	85
3-L	6143.57(R)	1		1		1	1	1	1	1	77
4-L	8241.75		1	1	1	1	1	1	1	1	85
5-L	8261.50		1	1	1	1	1	1	1	1	85
6-L	8281.00		1	1	1	1	1	1	1	1	85
7-L	499103.93(R)		1	1	1	1	1	1	1	1	77
8-L	500130.85(R)		1	1	1	1	1	1	1	1	85
9-L	1190(L)	1		1		1	1	1	1	1	77
10-L	508130.85(R)		1	1	1	1	1	1	1	1	85
11-L	509100.45(R)		1	1	1	1	1	1	1	1	85
12-L	3170(L)	1		1		1	1	1	1	1	77
13-L	5130(L)	1		1		1	1	1	1	1	77
14-L	1010724(C)	1		1		1	1	1	1	1	77
15-L	8381.40		1	1	1	1	1	1	1	1	85
16-L	1210724(C)		1	1	1	1	1	1	1	1	85
17-L	4981.80							Lump			
Total		5	11	16	10	6	16	Lump	16	16	1312

CROSSOVER CONDUIT						
Reference Number	Station	3" Crossover Conduit (Corrosion Resistant)	Pull Boxes As per Plan	1/c N° 6 AWG Cable	Connector Kits	
		Lin. Ft.	Each	Lin. Ft.	Type I	Type II
					Each	Each
1-E	13100(R)	29	2	78	2	2
2-E	500160.45(R)	58	2	136	2	2
3-E	5168(R)	31	2	82	2	2
4-E	2140(B)	29	2	78		4
5-E	11165(B)	29	2	78	2	2
6-E	507175.45(R)	73	1	166	1	
7-E	10150(C)	29	2	78	2	2
Total		278	13	696	11	14

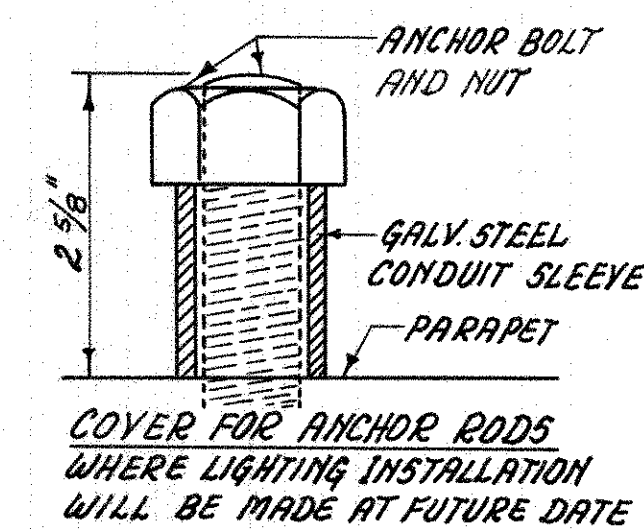
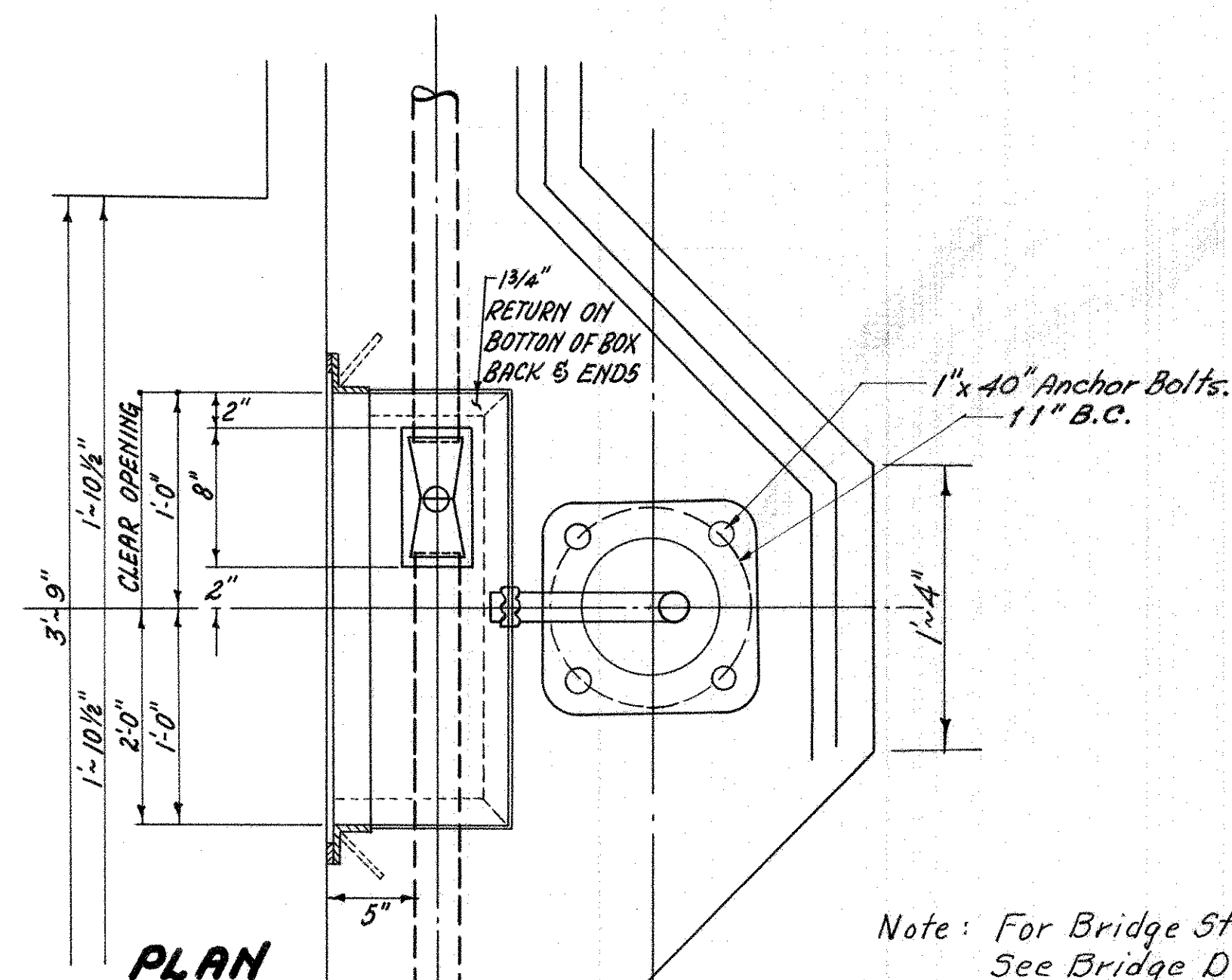
POWER DISTRIBUTION SYSTEM							
Reference Number	Stationing	Trenching	Circuit Cable 1/c N° 6 AWG FAA	Cable Duct 2-1/c N° 6 AWG FAA	2" Corrosion Resistant Conduit	2" Galvanized Steel Conduit	Pull Boxes as per plan
					Lin. Ft.	Lin. Ft.	Each
1-P	4143.57(R) to 13100(R)	1183	48	1179		14.0	17L-1
2-P	13100(R) to 502120.02	361	44	592	5	12.6	
3-P	502120.02 to 5041052.00	1573	44	1689	5	12.6	
4-P	5041052.00 to 507175.45	185		225			
5-P	507175.45 to 1210724(C)	246		306			
Total		3548	136	3991	10	40	1

BRIDGE LIGHTING QUANTITIES							
Reference Number	Stationing	2" Galvanized Steel Conduit	Circuit Cable 1/c N° 6 AWG FAA	Structure Junction Box	Connector Kit Type III	Structure Grounding System	Anchor Bolts
					Each	Lump	Set of 4
1-B	502141.77			1	2	Lump	1
2-B	502141.77 to 504120.52	258.5	537				
3-B	504120.52			1	2	Lump	1
Total		259	537	2	4	Lump	2

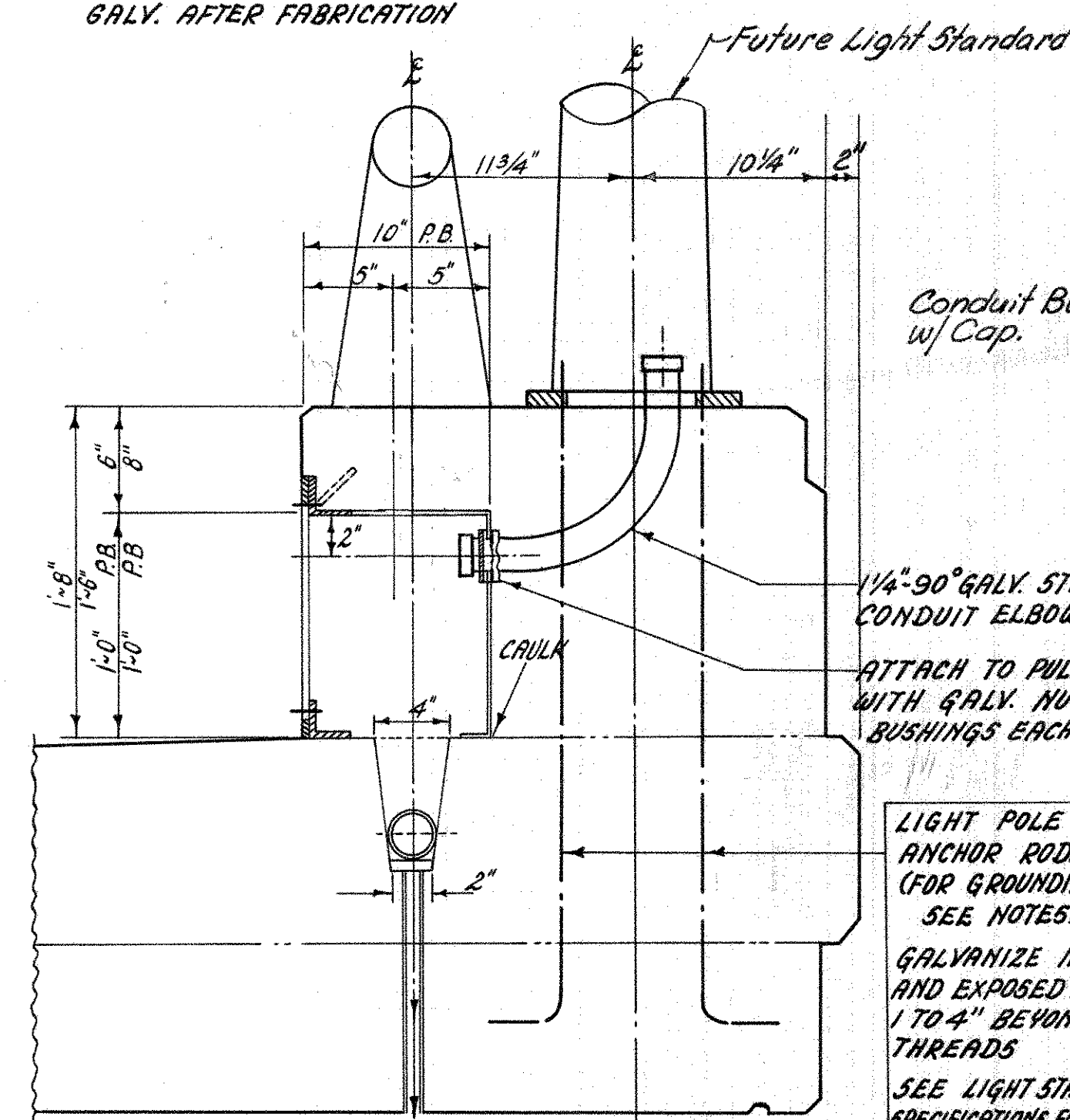
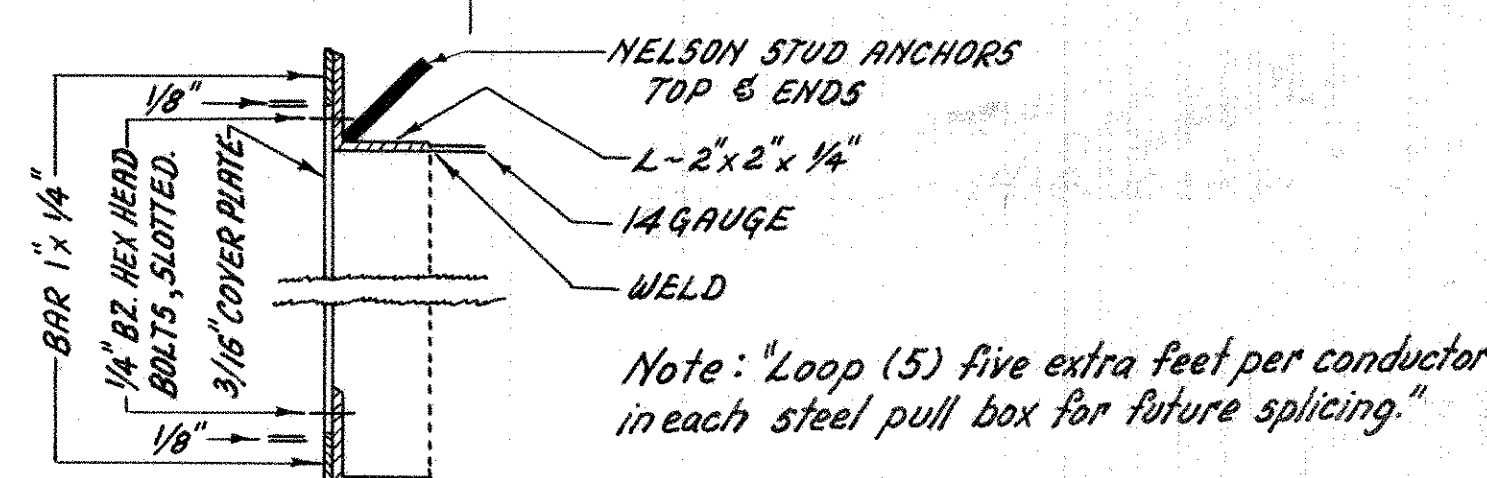
**RIGID-STEEL CONDUIT:** Conduit not encased in concrete shall conform to Specifications for Crossover Conduit. Conduit encased in concrete shall be hot-dipped galvanized inside and outside, after threading, with an enameled or plastic inside coating. Conduit shall conform to ASA Spec. Designation C-80.1.



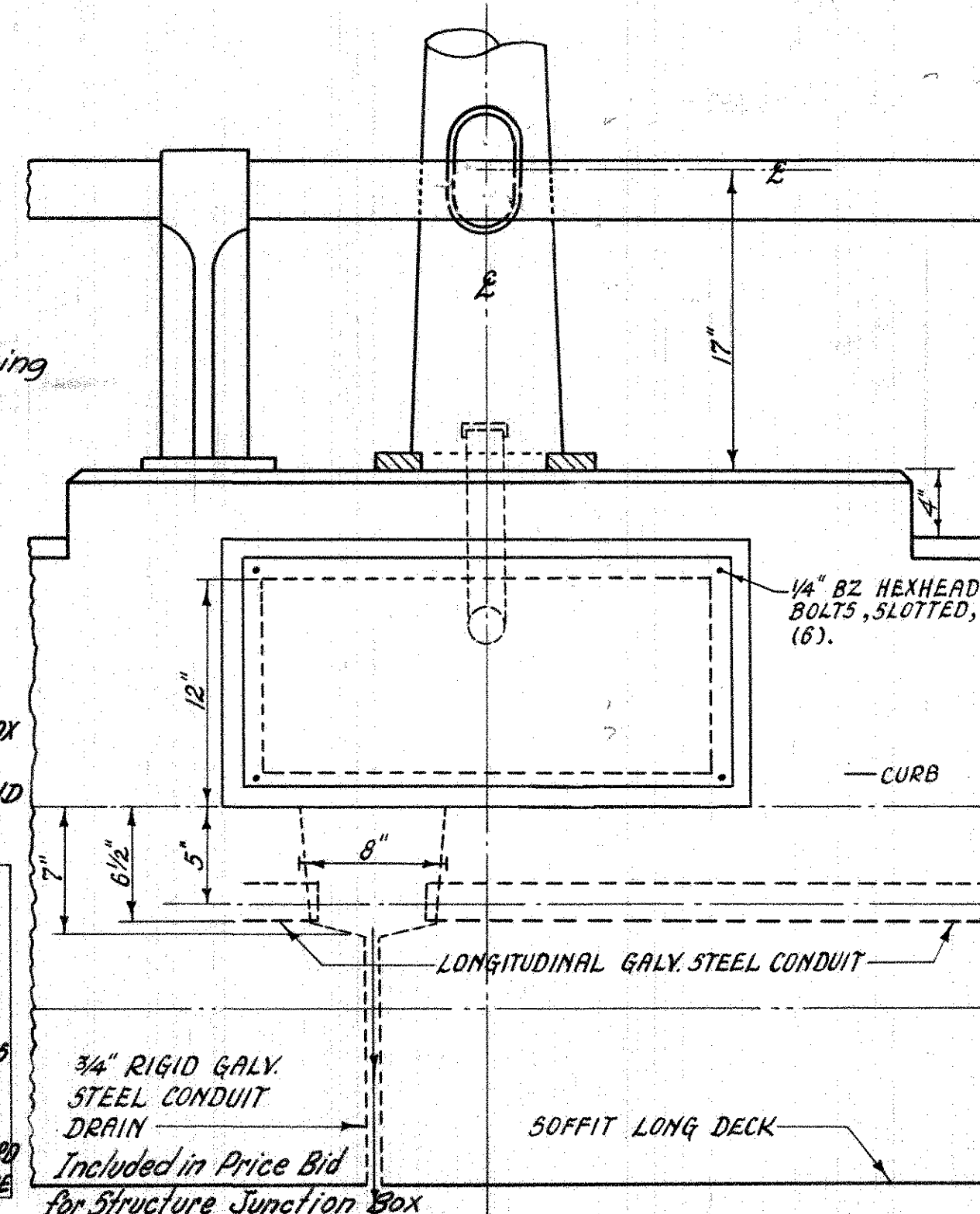
LOGAN COUNTY  
LOG-33-14.18



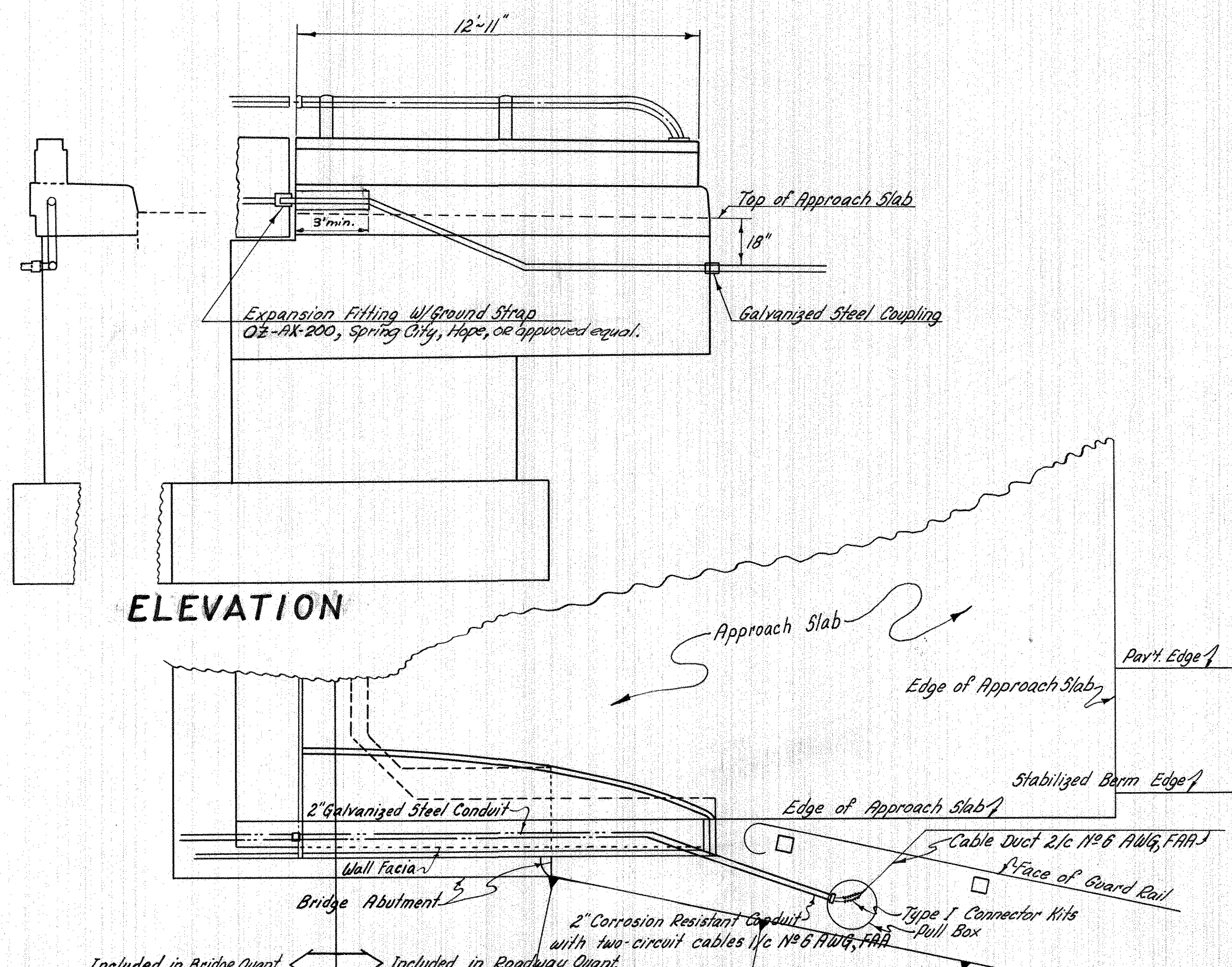
Note: For Bridge Structural Details & Physical Dimension, See Bridge Drawings, Sheets Nos. 315, 323



SERIES CIRCUIT

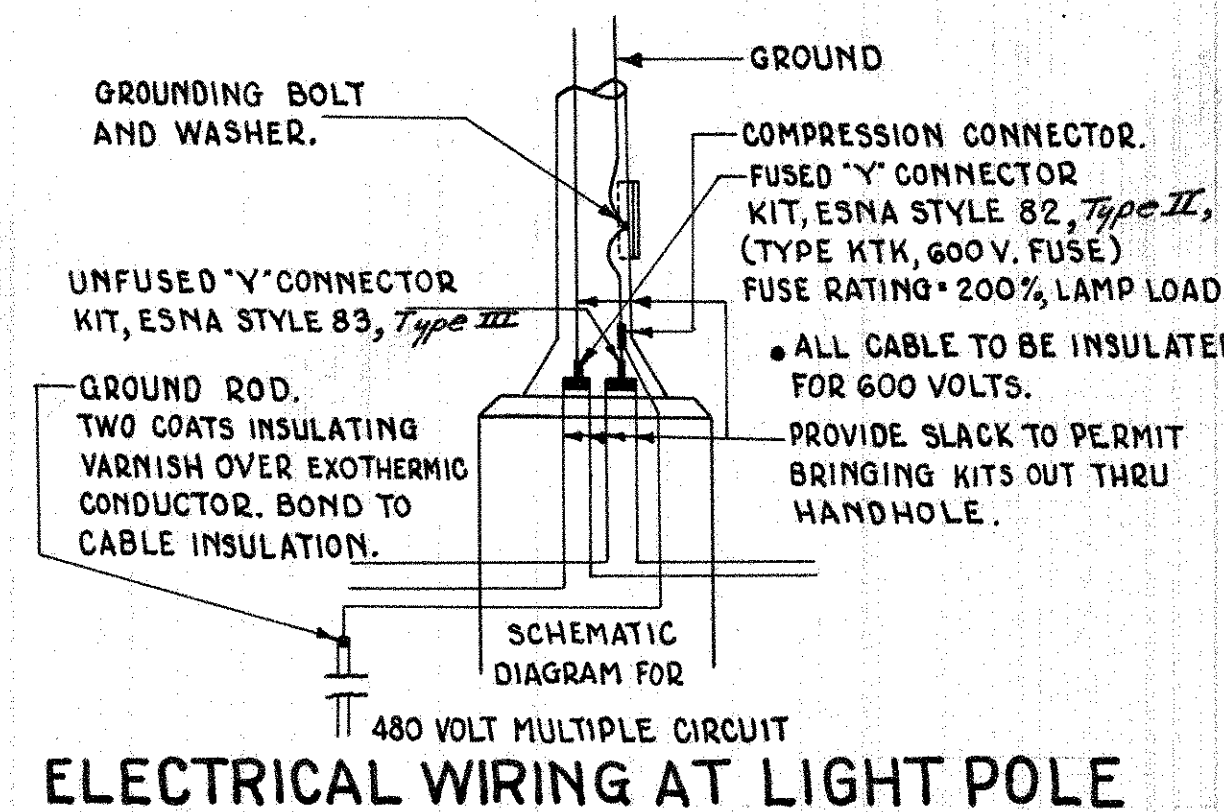
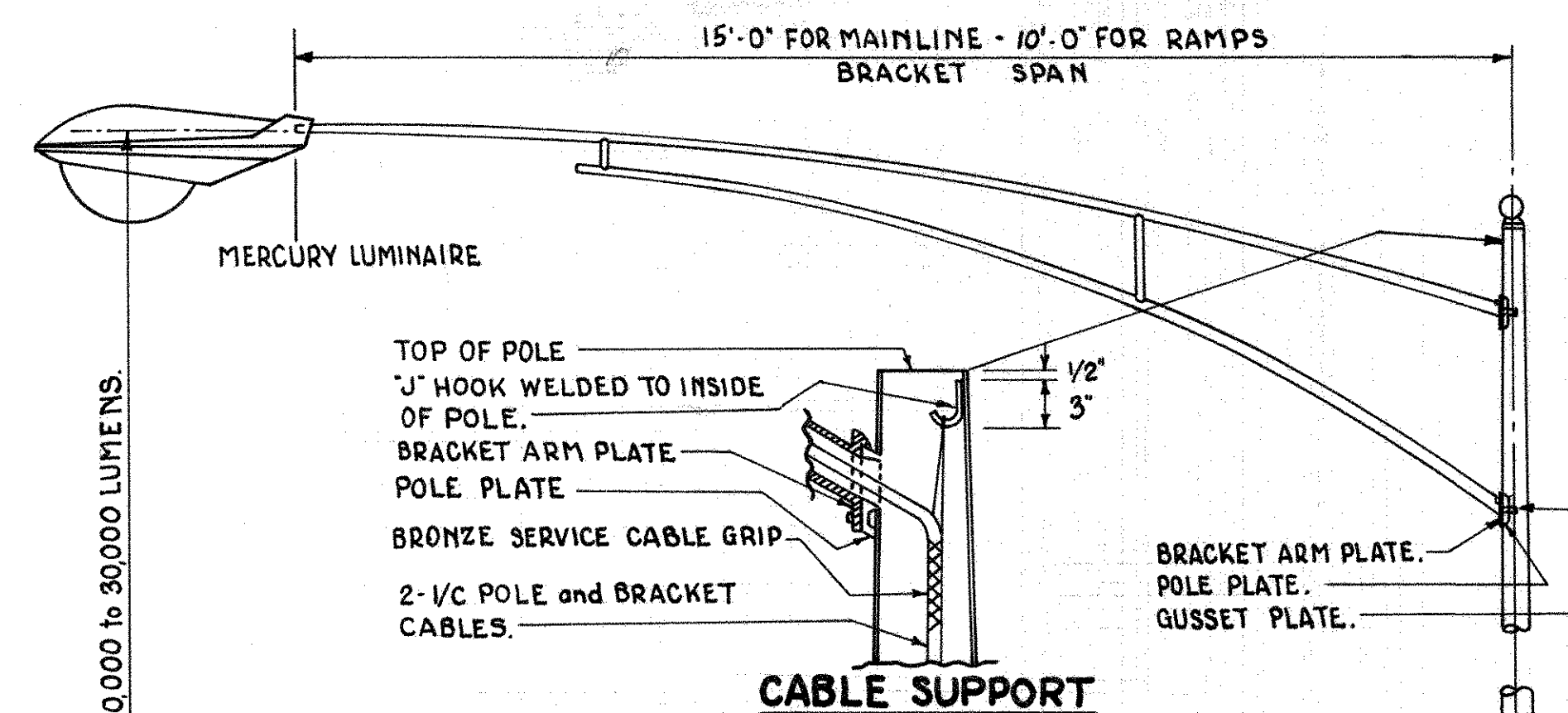


ELEVATION

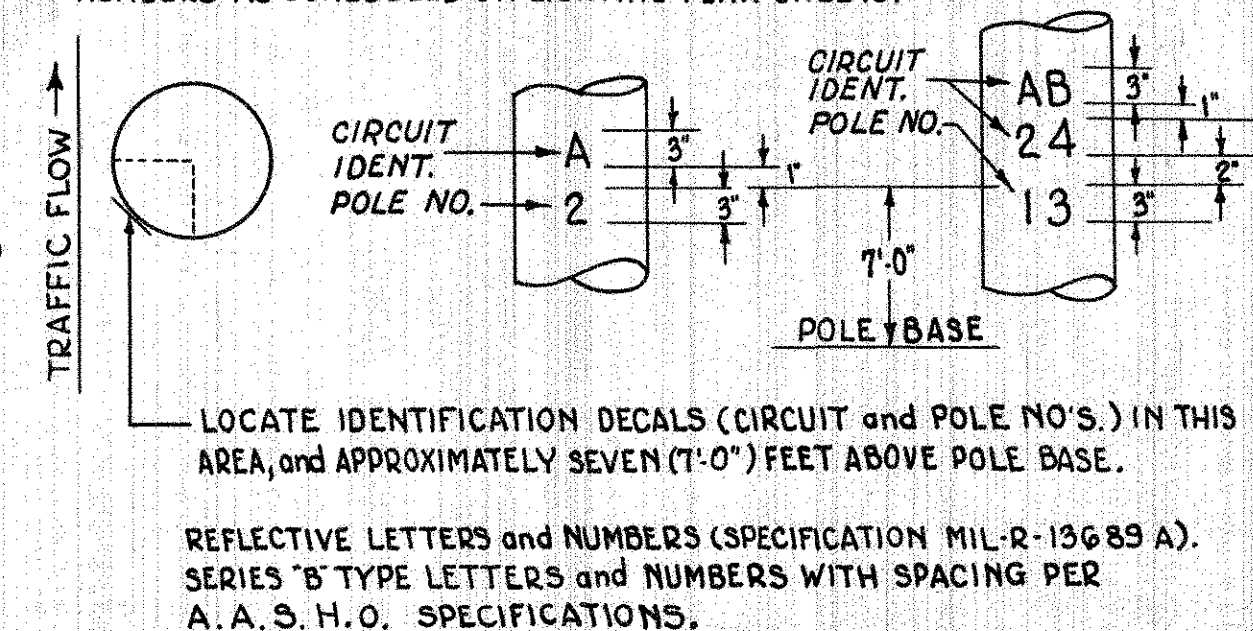


SUPER-STRUCTURE ABUTMENT

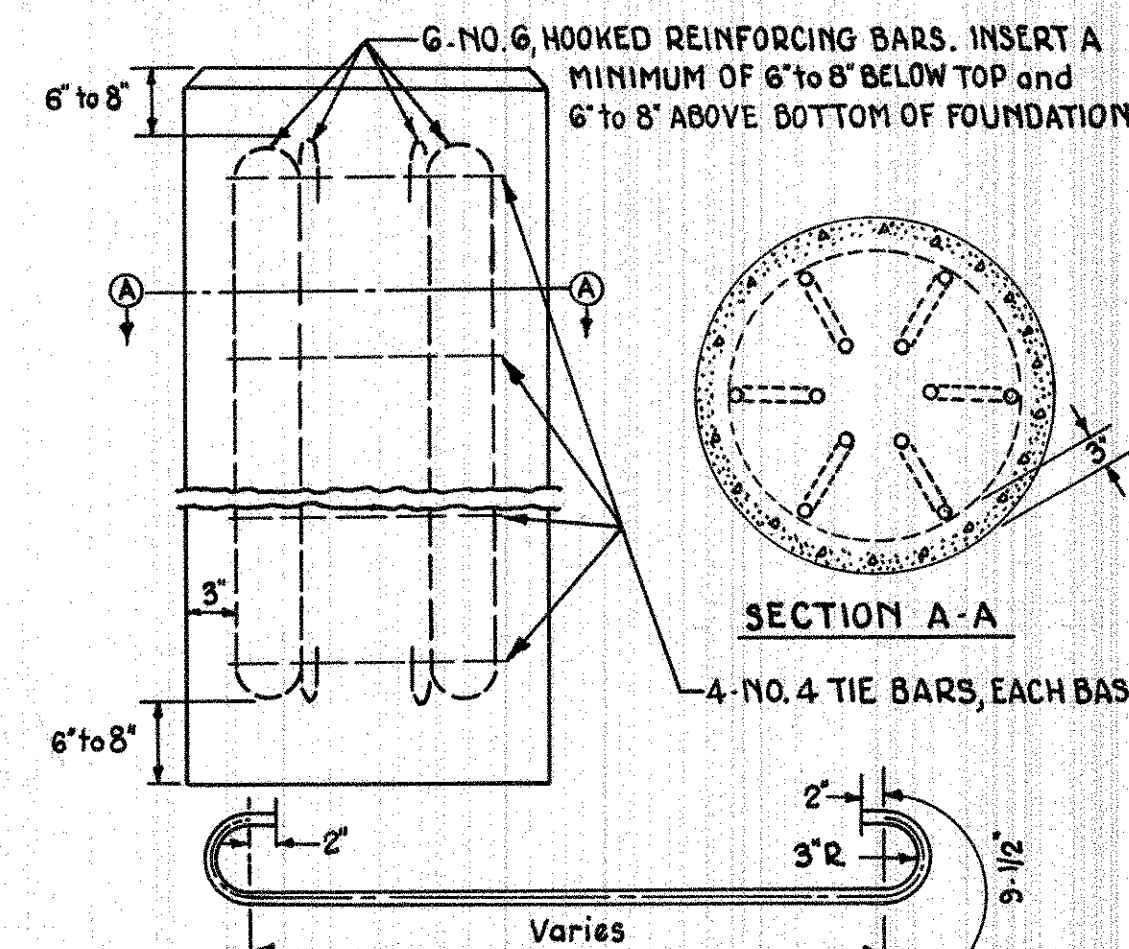
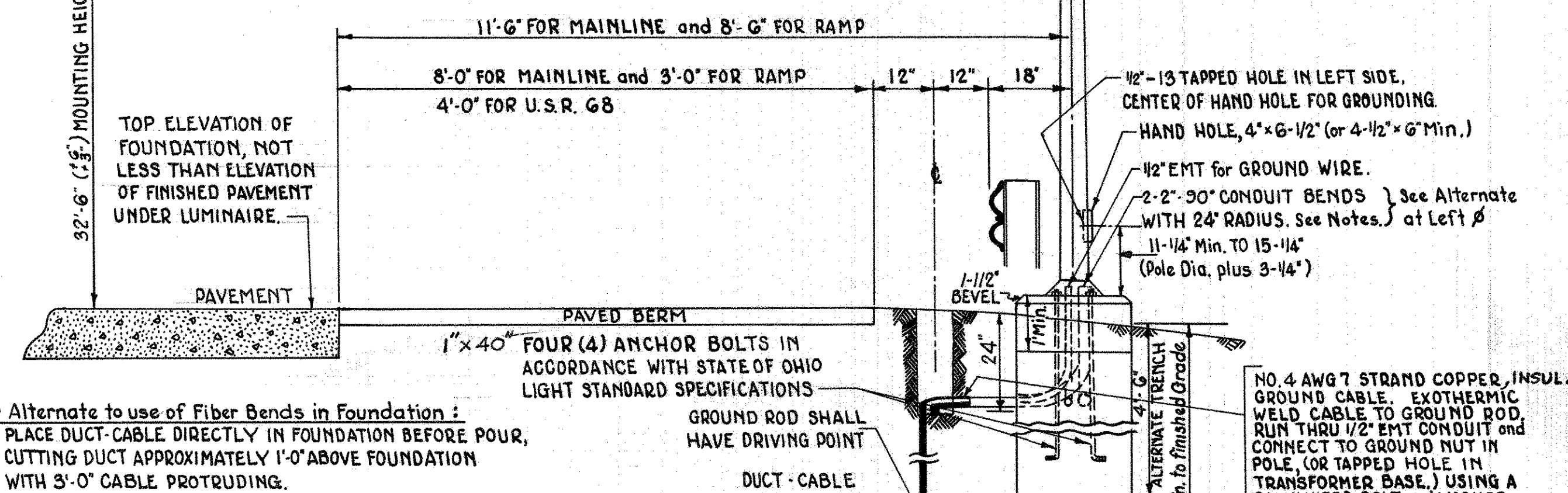




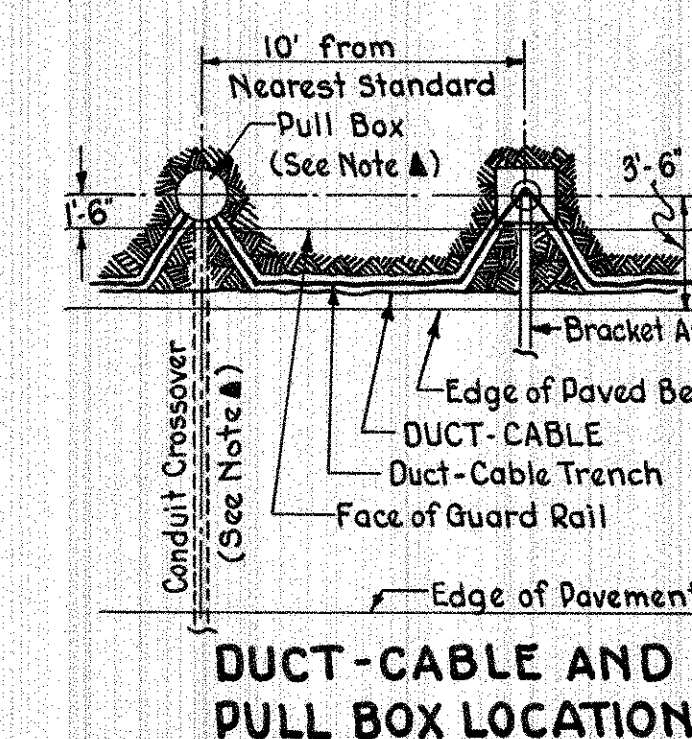
DECALS SHALL BE ADHESIVE TYPE WITH SILVER WHITE REFLECTIVE CHARACTERS ON A REFLECTIVE GREEN BACKGROUND, WITH CIRCUIT AND POLE NUMBERS AS SCHEDULED ON LIGHTING PLAN SHEETS.



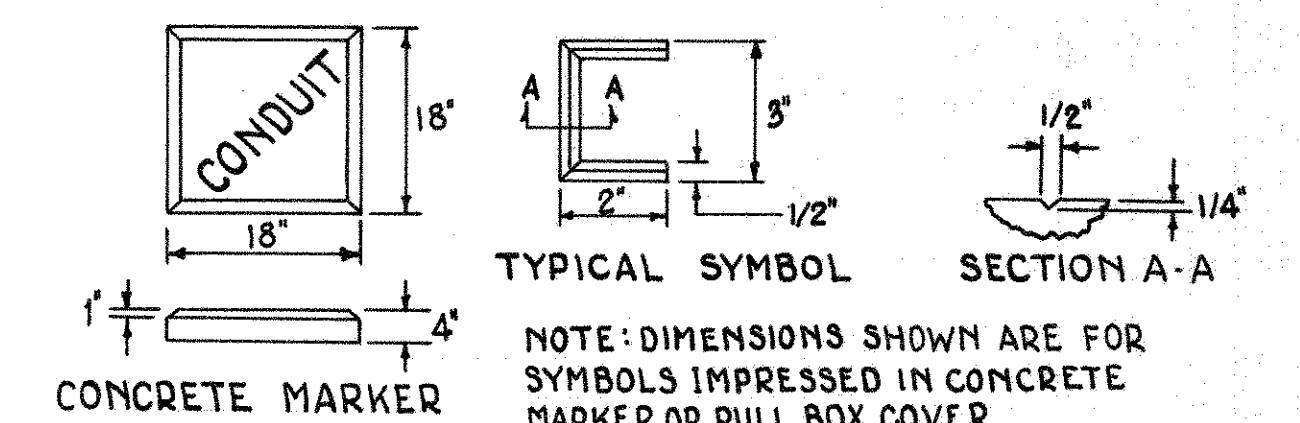
## LIGHT POLE CIRCUIT IDENTIFICATION



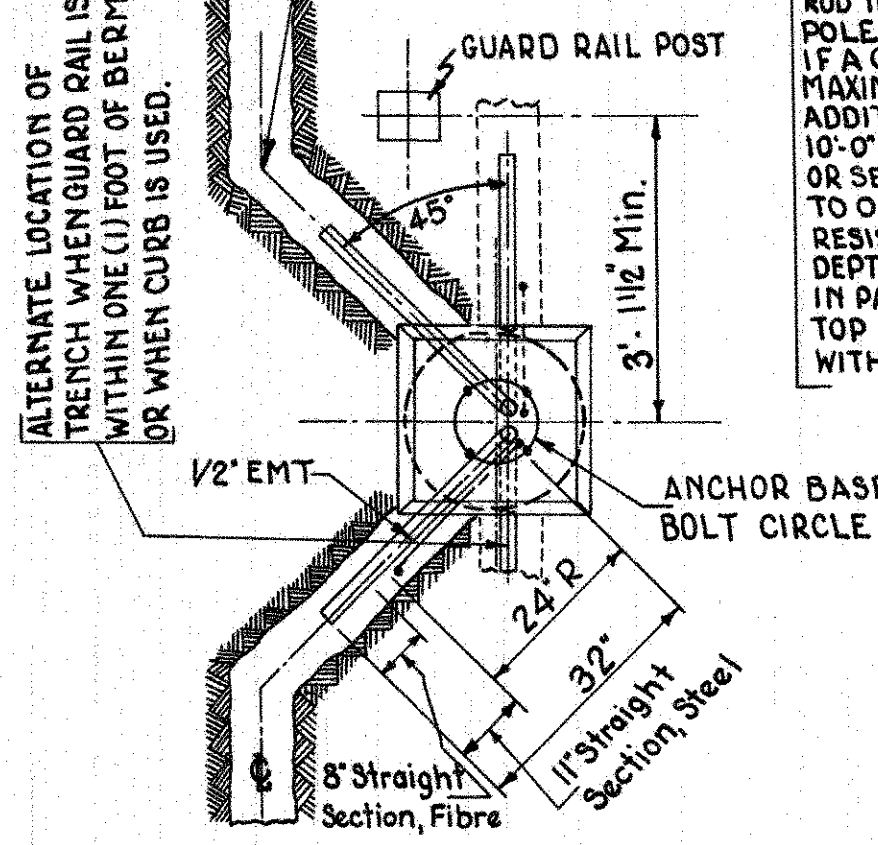
## REINFORCING BARS (FOUNDATION)



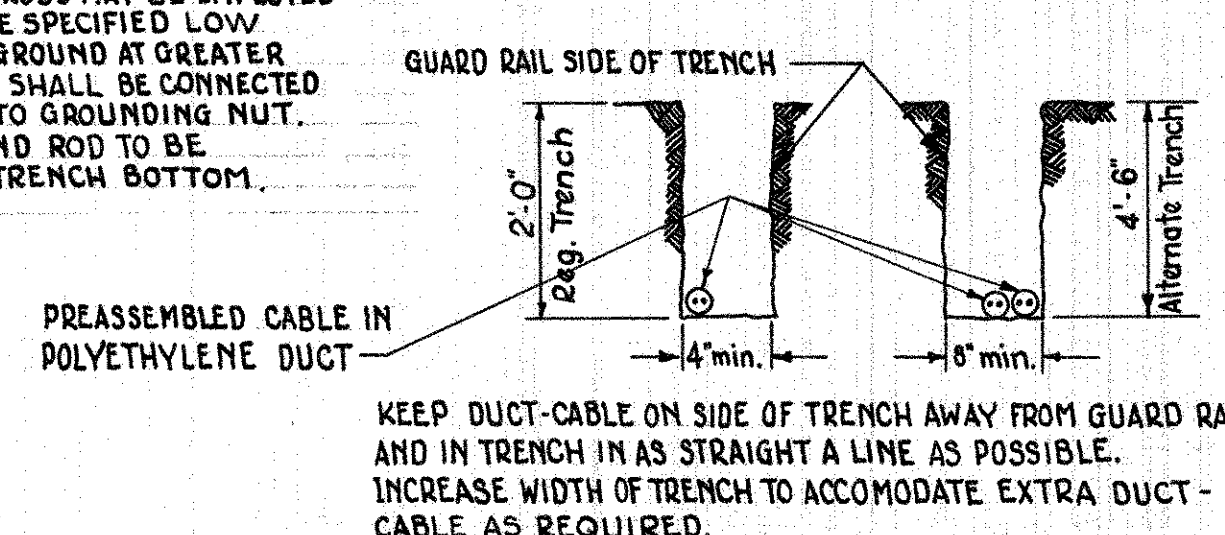
## DUCT-CABLE AND PULL BOX LOCATIONS



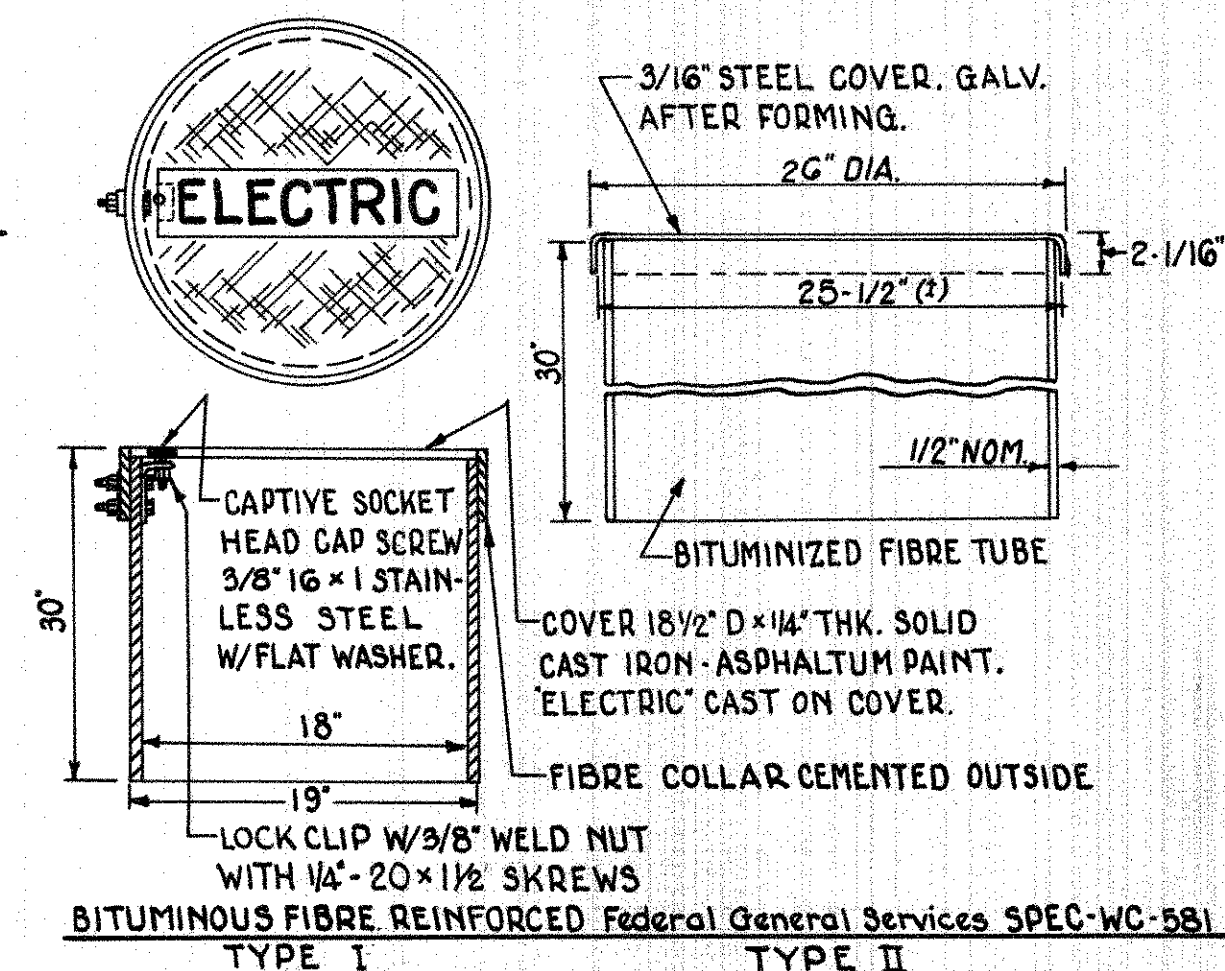
## MARKER DETAILS



## LIGHT POLE & FOUNDATION DETAILS



## TYPICAL DUCT-CABLE TRENCH

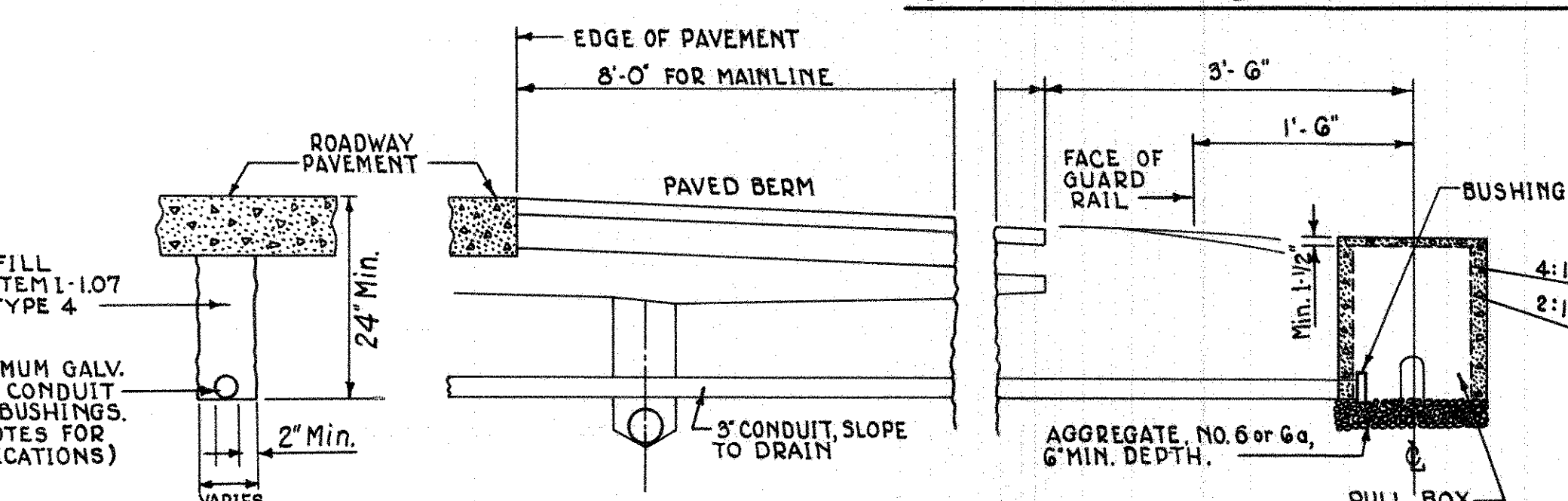


## PULL BOX DETAILS

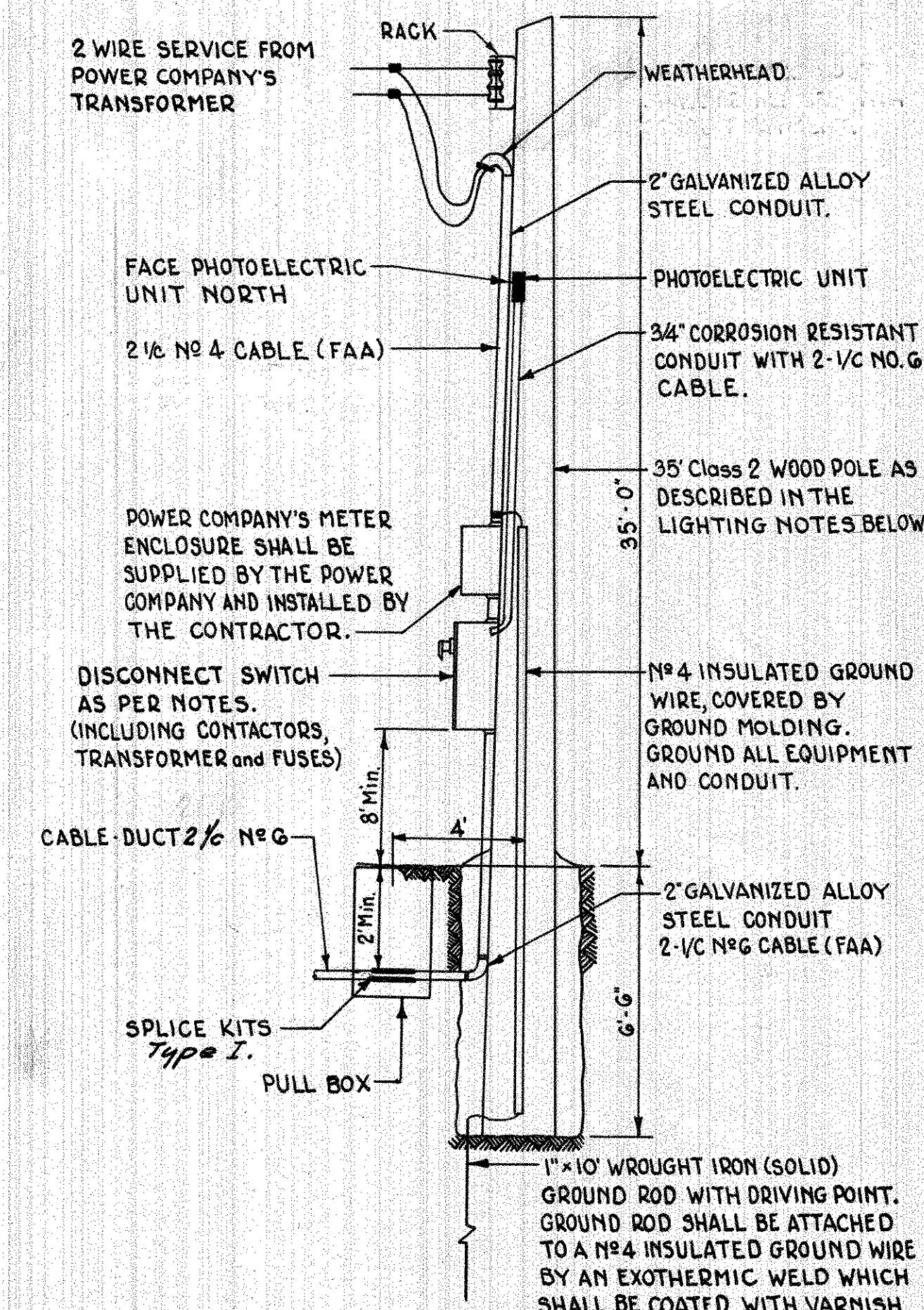
## NOTES

SERVICE POLE - Service Pole shall be wood, 35' in length, class 2, either Southern Pine, fully treated from top to bottom with creosote or pentachlorophenol, with a minimum retention of 6 lbs. per cubic foot, or butt treated Douglas Fir, or Western Red Cedar and shall conform to the American Standards 05.1 as to shape, condition and fiber stress. Poles shall be machine shaved, roof sawed, round sound, well proportioned from butt to top without short kinks or crooks. Butt treated poles shall be treated by an approved process from the bottom to a point not less than one foot above the finished ground line and shall be set not less than 6'-6" deep in normal firm ground.

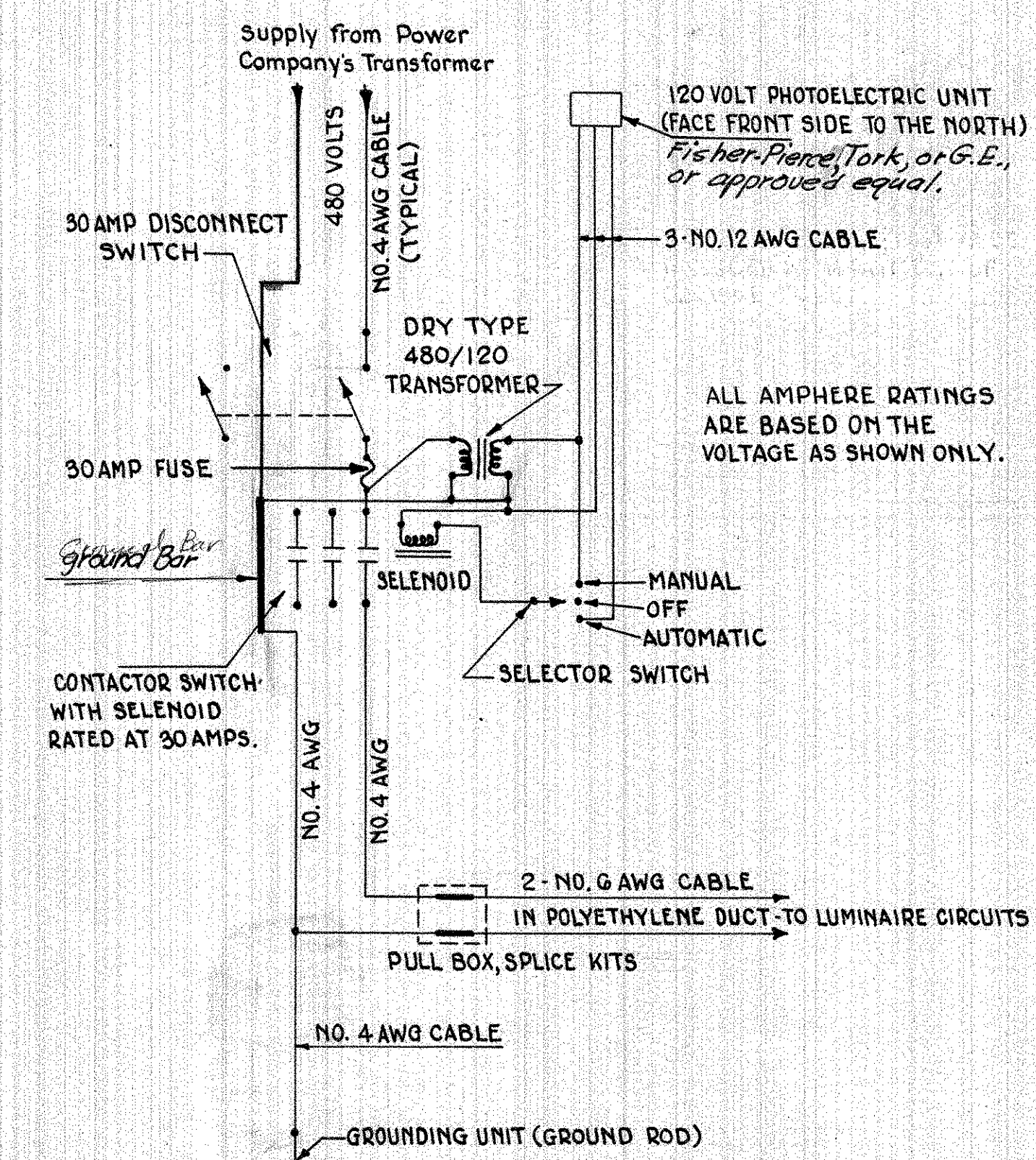
DISCONNECT SWITCH - Disconnect Switch shall have 3 blades and clips rated at 30 amps each with three fuses (30 amps). A photoelectric automatic control device with necessary dry type transformer to operate it at the necessary voltage and 30 amp contactor wired as shown on the details. All the above equipment shall be housed in the disconnect switch casing (except the photoelectric unit). The casing shall be capable of being locked in both the on and off position. The disconnect switch shall be similar to those switches manufactured by 'Square D' Columbus Electric Works, General Electric, or an approved equal, stainless steel NEMA 4 enclosure.



## TYPICAL CONDUIT CROSSOVER DETAIL

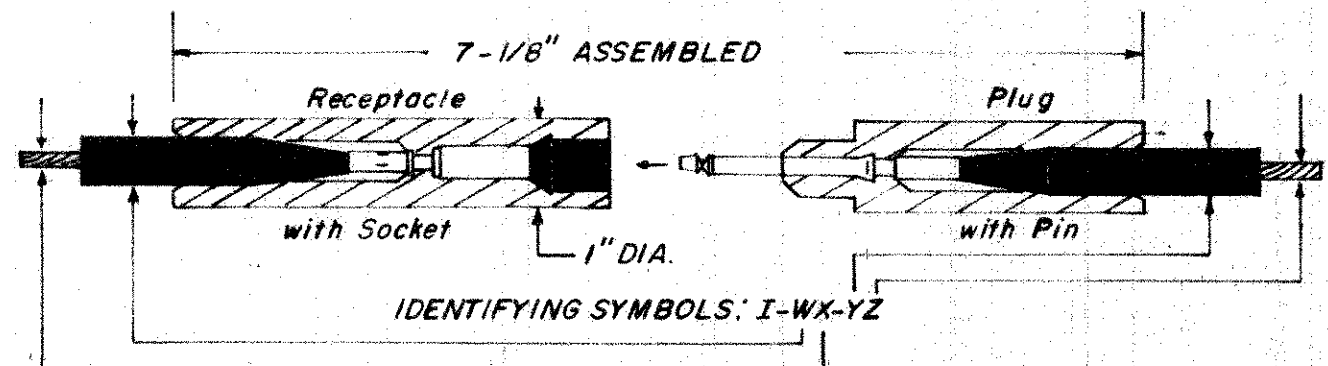


## SERVICE POLE DETAIL



## CIRCUIT SCHEMATIC AT POLE





TO IDENTIFY THE PROPER KIT FOR AN INSTALLATION, SELECT FROM THE TABLES BELOW THE SYMBOLS WHICH COINCIDE WITH THE REQUIREMENTS AND SUBSTITUTE FOR (W,X) AND (Y,Z) RESPECTIVELY.

EXAMPLE

IF THE INSTALLATION REQUIRES A RECEPTACLE FOR NO. 6 STRANDED CONDUCTOR AND A CABLE DIA. OF .660" AND A PLUG FOR NO. 8 SOLID CONDUCTOR AND A CABLE DIA. OF .460", THE KIT NO. IS I-F3-E6.

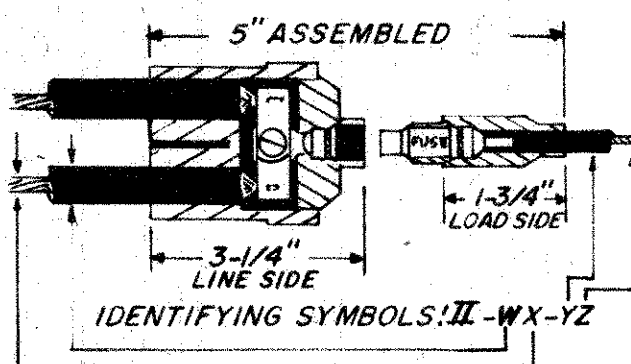
CONDUCTOR SIZE		AWG NO.		SYMBOL FOR X AND Z
Concentric Stranded	Solid			
10, 12	8, 10			6
8	6			4
6	4			3
4	—			2

DIAMETERS VARY ALONG CABLE LENGTHS. TAKE SEVERAL MEASUREMENTS. SELECT A TIGHT FIT RATHER THAN A LOOSE ONE.

CABLE DIA.		SYMBOL FOR W AND Y
MIN.	MAX.	
.195"	.260"	B*
.250"	.330"	C*
.320"	.430"	D*
.420"	.585"	E
.575"	.785"	F
.775"	.985"	G
.975"	1.125"	H

\*MOLDED RUBBER ADAPTERS ARE A PART OF THESE KITS FOR SMALL DIA. CABLE.

**TYPE I**  
INLINE SELF LOCKING CONNECTOR KIT FOR PULL BOX INSTALLATION.

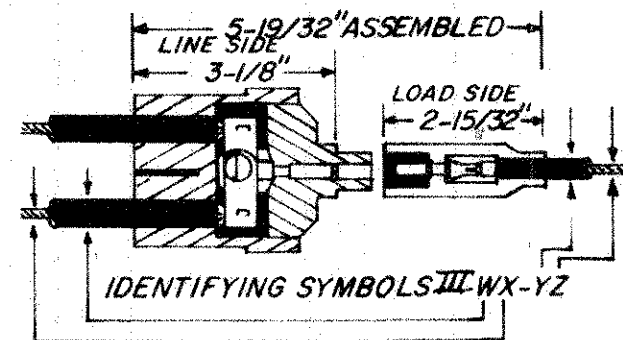


FOR LIGHT AT END OF A CIRCUIT, PLUG ONE OPENING WITH INSULATED PLUG HAVING SAME DIAMETER AS CABLE. ANY STANDARD MIDGET, FERRULE TYPE, FUSE MAY BE USED IN THIS CONNECTOR. A FUSE CAPABLE OF INTERRUPTING THE SHORT CIRCUIT CAPACITY OF THE SUPPLY CIRCUIT MUST BE USED.

(X)		(Z)		(W)		(Y)	
CONDUCTOR SIZE (X)	AWG NO.	CONDUCTOR SIZE (Z)	AWG NO.	CABLE DIA. (W)	SYMBOL FOR X	CABLE DIA. (Y)	SYMBOL FOR Y
Concentric Stranded	Solid	Concentric Stranded	Solid	MIN. MAX.	FOR X	MIN. MAX.	FOR Y
8	6	14, 16	12, 14	.250" .330"	C	.120" .160"	S
8	6	10, 12	8, 10	.320" .380"	DA	.155" .205"	A
6	4	8	6	.370" .430"	DB	.195" .260"	B
4	—	6	4	.420" .505"	EA	.250" .330"	C
2	—	4	3	.495" .585"	EB	.320" .430"	D
1	—	0	—	.575" .685"	FA		
1/0	—	10	—	.675" .785"	FB		
2/0	—	20	—				

DIAMETERS VARY ALONG CABLE LENGTHS. TAKE SEVERAL MEASUREMENTS. SELECT A TIGHT FIT RATHER THAN A LOOSE ONE.

**TYPE II**  
FUSED "Y" CONNECTOR KIT FOR POLE BASE INSTALLATION.



FOR LIGHT AT END OF A CIRCUIT, PLUG ONE OPENING WITH INSULATED PLUG HAVING SAME DIAMETER. TO IDENTIFY THE PROPER KIT FOR AN INSTALLATION, SELECT FROM THE TABLES BELOW THE SYMBOLS WHICH COINCIDE WITH THE REQUIREMENTS AND SUBSTITUTE FOR (W,X) AND (Y,Z) RESPECTIVELY.

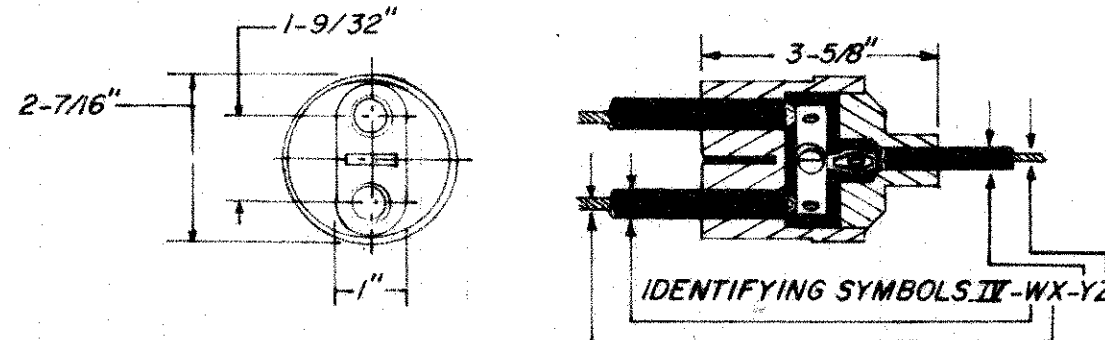
EXAMPLE

IF THE LINE SIDE CABLES ARE NO. 2 STRANDED CONDUCTOR WITH AN OUTSIDE DIAMETER OF .54", AND THE LOAD SIDE CABLE IS NO. 12 STRANDED CONDUCTOR WITH AN OUTSIDE DIAMETER OF .29", THE KIT NO. IS 3-EB1-C6.

(X)			(Z)			(W)			(Y)		
CONDUCTOR SIZE (X) AWG NO.		SYMBOL FOR X	CONDUCTOR SIZE (Z) AWG NO.		SYMBOL FOR X	CABLE DIA. (W)		SYMBOL FOR W	CABLE DIA. (Y)		SYMBOL FOR Y
Concentric Stranded	Solid		Concentric Stranded	Solid		MIN.	MAX.		MIN.	MAX.	
8	6	4	14, 16	12, 14	8	.250"	.330"	C	.120"	.160"	S
8	6	4	10, 12	8, 10	6	.320"	.380"	DA	.155"	.205"	A
6	4	3	8	6	4	.370"	.430"	DB	.195"	.260"	B
4	—	2	6	4	3	.420"	.505"	EA	.250"	.330"	C
2	—	1	4	—	—	.495"	.585"	EB	.320"	.430"	D
1	—	0	—	—	—	.575"	.685"	FA	—	—	—
1/0	—	10	—	—	—	.675"	.785"	FB	—	—	—
2/0	—	20	—	—	—	—	—	—	—	—	—

DIAMETERS VARY ALONG CABLE LENGTHS. TAKE SEVERAL MEASUREMENTS. SELECT A TIGHT FIT RATHER THAN A LOOSE ONE.

**TYPE III**  
UNFUSED "Y" CONNECTOR KIT FOR POLE BASE INSTALLATION.



TO IDENTIFY THE PROPER KIT FOR AN INSTALLATION, SELECT FROM THE TABLES BELOW THE SYMBOLS WHICH COINCIDE WITH THE REQUIREMENTS AND SUBSTITUTE FOR (W,X) AND (Y,Z) RESPECTIVELY.

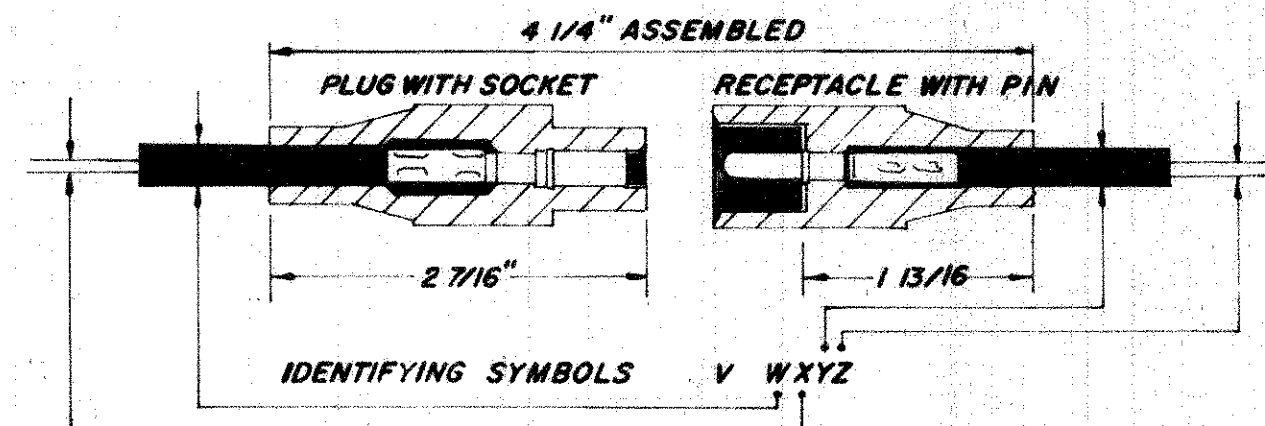
EXAMPLE

IF THE TWIN CABLES ARE NO. 2 STRANDED CONDUCTOR WITH AN OUTSIDE DIA. OF .54" AND THE SINGLE CABLE IS NO. 12 STRANDED CONDUCTOR WITH AN OUTSIDE DIA. OF .29", THE KIT NO. IS 4-EB1-C6.

(X)				(Z)				(W)				(Y)			
CONDUCTOR SIZE (X)		SYMBOL	CONDUCTOR SIZE (Z)		SYMBOL	CABLE DIA. (W)	SYMBOL	CABLE DIA. (Y)		SYMBOL					
AWG NO.			AWG NO.					MIN.	MAX.		MIN.	MAX.			
Concentric Stranded	Solid	FOR X	Concentric Stranded	Solid	FOR Z										
—	8	6	14, 16	12, 16	8	.250"	.330"	C	.155"	.205"	A				
8	6	4	10, 12	8, 10	6	.320"	.380"	DA	.195"	.260"	B				
6	4	3	8	6	4	.370"	.430"	DB	.250"	.330"	C				
4	—	2	6	4	3	.420"	.505"	EA	.320"	.430"	D				
2	—	1	4	—	2	.495"	.585"	EB	.420"	.585"	E				
1	—	0	2	—	1	.575"	.685"	FA	.575"	.785"	F				
1/0	—	10	1	—	0	.675"	.785"	FB							
2/0	—	20													

DIAMETERS VARY ALONG CABLE LENGTHS. TAKE SEVERAL MEASUREMENTS. SELECT A TIGHT FIT RATHER THAN A LOOSE ONE.

**TYPE IV**  
UNFUSED "Y" CONNECTOR KIT FOR PULL BOX INSTALLATION



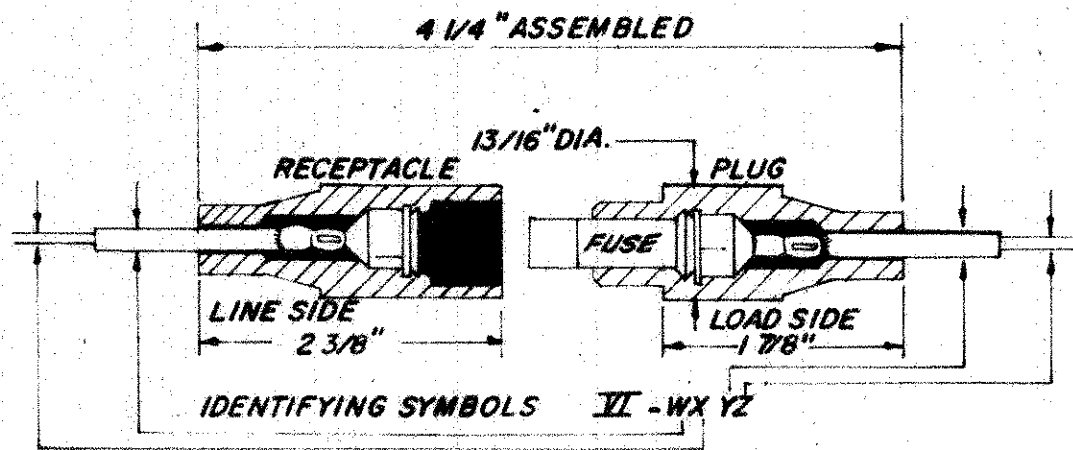
TO IDENTIFY THE PROPER KIT FOR AN INSTALLATION, SELECT FROM THE TABLES BELOW THE SYMBOLS WHICH COINCIDE WITH THE REQUIREMENTS AND SUBSTITUTE FOR (W,X) AND (Y,Z) RESPECTIVELY.

EXAMPLE: IF THE INSTALLATION REQUIRES A PLUG FOR NO. 8 STRANDED CONDUCTOR AND A CABLE DIAMETER OF .38" AND A RECEPTACLE FOR NO. 14 STRAND CONDUCTOR AND A CABLE DIAMETER OF .27", THE KIT NO. IS V-D4-C8.

Conductor Size		AWG		Symbol for X and Z
Concentric Strd.	Solid			
14, 16	12, 14			8
10, 12	8, 10			6
8	6			4
6	4			3

DIAMETERS VARY ALONG CABLE LENGTHS. TAKE SEVERAL MEASUREMENTS. SELECT A TIGHT FIT RATHER THAN A LOOSE ONE.

**TYPE V**  
UNFUSED INLINE CONNECTOR KIT FOR JUNCTION BOX INSTALLATION.



TO IDENTIFY THE PROPER KIT FOR THE INSTALLATION, SELECT FROM THE TABLES BELOW THE SYMBOLS WHICH COINCIDE WITH THE REQUIREMENTS AND SUBSTITUTE FOR (W,X) AND (Y,Z) RESPECTIVELY.

EXAMPLE: IF THE INSTALLATION REQUIRES A RECEPTACLE FOR THE LINE SIDE FOR NO. 6 STRANDED CONDUCTOR AND A CABLE DIAMETER OF .42" AND A PLUG FOR THE FUSE FOR THE LOAD SIDE FOR NO. 12 STRANDED CONDUCTOR AND A CABLE DIAMETER OF .29", THE KIT NO. IS VI-D3-C6.

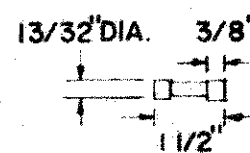
Conductor Size		AWG		Symbol for X and Z
Concentric Strd.	Solid			
14, 16	12, 14			8
10, 12	8, 10			6
8	6			4
6	4			3

Cable Diameter		Symbol for Y and W
MIN.	MAX.	
.120"	.160"	S
.155"	.205"	A
.195"	.260"	B
.250"	.330"	C
.320"	.430"	D

DIAMETERS VARY ALONG CABLE LENGTHS. TAKE SEVERAL MEASUREMENTS. SELECT A TIGHT FIT RATHER THAN A LOOSE ONE.

**TYPE VI**  
FUSED INLINE CONNECTOR KIT FOR JUNCTION BOX INSTALLATION.

MIDGET SIZE FUSE



MIDGET FUSES ARE AVAILABLE IN THE FOLLOWING CAPACITIES: 600 VOLTS OR LESS, 1/10 TO 30 AMPS.

ANY STANDARD MIDGET, FERRULE TYPE FUSE (EXCEPT GLASS TUBE) MAY BE USED IN THIS CONNECTOR. A FUSE CAPABLE OF INTERRUPTING THE SHORT CIRCUIT CAPACITY OF THE SUPPLY CIRCUIT MUST BE USED.