

GENERAL NOTES POWER ADJUSTMENTS

| | | |
|-------------------|-------|---------|
| FED. RD. DISTRICT | STATE | PROJECT |
| 2 | OHIO | |

274A
384

LAKE COUNTY
LAK-2-14.22

POLE LINE HARDWARE

ALL POLE LINE HARDWARE SHALL BE HOT-DIP-GALVANIZED - SUITABLE WASHERS SHALL BE INSTALLED UNDER BOLT HEADS AND NUTS ON WOOD SURFACES. WASHERS USED ON THROUGH BOLTS AND DOUBLE-ARMING BOLTS SHALL BE APPROXIMATELY 2 1/4 INCHES SQUARE AND 3/16 INCH THICK. THE DIAMETER OF HOLES IN WASHERS SHALL BE THE CORRECT STANDARD SIZE FOR THE BOLTS ON WHICH THEY ARE USED. WASHERS FOR USE UNDER THE HEAD OF CARRIAGE BOLTS SHALL BE OF PROPER SIZE TO FIT OVER THE SQUARE SHANK OF THE BOLT. EYEBOLTS, BOLT EYES, EYENUTS, STRAIN PLATES, AND CLEAVISES SHALL BE USED WHEREVER REQUIRED TO ADEQUATELY SUPPORT THE POLES, CROSSARMS, GUY WIRES, AND INSULATORS.

INITIAL STRINGING SAG-WEATHERPROOF COPPER WIRE SAG IN INCHES

| SIZE AWG | TEMP. DEG. F. | SPAN IN FEET | | |
|-------------|------------------|--------------|-----|-----|
| | | 100 | 125 | 150 |
| 6 | 30 | 11 | 18 | 36 |
| | 60 | 15 | 22 | 40 |
| | 90 | 18 | 26 | 45 |
| 4 | 30 | 9 | 14 | 22 |
| | 60 | 12 | 18 | 27 |
| | 90 | 17 | 23 | 32 |
| 2 | 30 | 9 | 14 | 22 |
| | 60 | 12 | 18 | 27 |
| | 90 | 17 | 23 | 32 |
| 1/0 | 30 | 9 | 14 | 21 |
| | 60 | 12 | 18 | 26 |
| | 90 | 16 | 23 | 31 |

ACSR CONDUCTORS SHALL BE STRETCHED AND THEN SAGGED AT TEMPERATURE INVOLVED.

#1/0 ACSR SHALL BE PULLED-UP TO 2,000 POUNDS TENSION PER CONDUCTOR AND THEN SAGGED-IN AT PROPER TEMPERATURE AS NOTED ON CHART BELOW.

#2 ACSR SHALL BE PULLED-UP TO 1,440 POUNDS TENSION PER CONDUCTOR THEN SAGGED-IN LIKEWISE.

INITIAL STRINGING SAG - ACSR CABLE

| SPAN FT. | ACSR AWG | 100° | SAG IN FEET AT DEG. F. | | | | | | | | | |
|-------------|-------------|------|------------------------|------|------|------|------|------|------|------|-----|------|
| | | | 90° | 80° | 70° | 60° | 50° | 40° | 30° | 20° | 10° | 0° |
| 405 | #1/0 | 6.05 | 5.3 | 4.8 | 4.3 | 3.9 | 3.6 | 3.3 | 3.0 | 2.8 | 2.6 | 2.45 |
| 320 | #1/0 | 3.8 | 3.35 | 3.0 | 2.7 | 2.45 | 2.25 | 2.05 | 1.9 | 1.75 | 1.6 | 1.5 |
| 298 | #1/0 | 3.3 | 2.95 | 2.6 | 2.35 | 2.1 | 1.95 | 1.78 | 1.65 | 1.5 | 1.4 | 1.3 |
| 287 | #1/0 | 3.05 | 2.7 | 2.4 | 2.17 | 1.95 | 1.8 | 1.65 | 1.5 | 1.4 | 1.3 | 1.2 |
| 240 | #1/0 | 2.2 | 1.9 | 1.7 | 1.5 | 1.35 | 1.25 | 1.15 | 1.05 | 0.95 | 0.9 | 0.84 |
| 356 | #2 | 7.15 | 6.7 | 6.25 | 5.8 | 5.35 | 4.9 | 4.5 | 4.1 | 3.7 | 3.3 | 3.0 |

TRANSFORMERS

TRANSFORMERS SHALL BE OF THE OIL-IMMERSED, SELF-COOLED, OUTDOOR, 2 WINDING TYPE OF RATINGS NOTED ON PLANS.

PRIMARY SINGLE PHASE VOLTAGE 2400 VOLTS; SECONDARY 120/240 VOLTS, EXCEPT THAT 37 1/2 KVA TRANSFORMER FOR INTERCHANGE LIGHTING SHALL BE 220/480 VOLT SECONDARY.

TRANSFORMER INSTALLATIONS SHALL INCLUDE ONE PRIMARY FUSE CUTOFF AND ONE LIGHTNING ARRESTOR FOR EACH UNGROUNDED PHASE WIRE. FUSE LINKS SHALL HAVE A CURRENT RATING EQUAL TO 150% OF THE TRANSFORMER FULL LOAD RATING OR NEXT LARGER STANDARD SIZE. TRANSFORMERS SHALL CONFORM TO FEDERAL SPECIFICATION W-T-631, EXCEPT THAT TRANSFORMERS FOR WHICH TAPS ARE NOT REQUIRED UNDER THE FEDERAL SPECIFICATION SHALL BE PROVIDED WITH FOUR 2 1/2-PERCENT OR TWO 5-PERCENT FULL CAPACITY HIGH VOLTAGE WINDING TAPS BELOW RATED VOLTAGE. ACCESSORIES SHALL CONFORM TO THE APPLICABLE RECOMMENDATIONS, REGULATIONS, AND STANDARDS OF THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION STANDARD 48-132. EACH TRANSFORMER SHALL HAVE ITS KVA RATING STENCILED IN WHITE FIGURES APPROXIMATELY 3 INCHES HIGH NEAR THE CENTER OF THE FRONT.

OTHER CONDUCTORS-SERVICE DROPS

SERVICE DROPS SHALL BE ALUMINUM NO. 4 TRIPLEX, AND SELF-SUPPORTED ON APPROVED CLAMPS BY THE NEUTRAL CONDUCTOR. THE NEW SERVICE DROP SHALL BE CONNECTED TO THE EXISTING RESIDENCE SERVICE AS REQUIRED.

STREET LIGHT CONDUCTORS WITHIN MAST ARMS AND DOWN POLES UNDER WOOD MOULDING SHALL BE NO. 10, TYPE RHW WITH USE OUTER COVERING.

5000 VOLT CABLE IN UNDERGROUND DUCT RUNS SHALL BE OF SIZES INDICATED ON PLANS, AND AS FOLLOWS:

1/C #4 AWG 7/W COATED ANNEALED COPPER, SEMI-CONDUCTING TAPE, 10/64 BUTARONE INSULATION, 3/64" GENCASEAL JACKET OVERALL, 5 KV PER IPCEA FOR CONDUIT OR UNDERGROUND DUCT INSTALLATION.

1/C #6 AWG 7/W SAME AS #4 BUT 2/64" GENCASEAL JACKET OVERALL.

1/C #4/0 AWG 19/W SAME AS #4 BUT 4/64" GENCASEAL JACKET OVERALL.

TERMINATE CABLES(4KV) IN FUSED CUT-OUTS OR TAPED SPLICES MADE WEATHERTIGHT WITH NEOPRENE TAPE FOR ALL OTHERS.

SUPPORT CABLES AT TOPS OF EACH ALUMINUM CONDUIT WITH CABLE SUPPORT WEDGES AND SEAL WITH "DUCT SEAL".

TYPE TW, THERMOPLASTIC, 600 V, CODE GRADE WIRE SHALL BE USED WHERE INDICATED.

WHERE NEUTRAL PRIMARY CONDUCTOR IS REQUIRED BELOW CROSS ARM LEVEL AND SECONDARY CONDUCTORS ALSO EXIST, THE SECONDARY NEUTRAL CONDUCTOR SHALL SERVE ALSO AS PRIMARY NEUTRAL CONDUCTOR.

INCANDESCENT STREET LIGHTS (SERIES)

STREET LIGHTS SHALL BE SERIES TYPE WITH FILM CUTOFF, 20 INCH RADIAL WAVE REFLECTOR, 2500-6000 LUMEN WET PROCESS PORCELAIN HEAD, EXTERNAL TERMINALS, JOSLYN TYPE C3 ENAMELED REFLECTOR, 8 FOOT PIPE MAST ARM JOSLYN NO. 80608, 30 FOOT MOUNTING HEIGHT. LAMP SIZE AS INDICATED ON PLANS SHALL BE FURNISHED FOR 6.6 AMPERE OPERATION. FEED WIRES SHALL BE INCLUDED IN THE PRICE BID FOR NEW OR RELOCATED STREET LIGHTS.

MERCURY STREET LIGHTS

400 WATT, MERCURY, 20,000 LUMEN, NON-COLOR CORRECTED WITH BALLAST IN LUMINAIRE AND PHOTOELECTRIC CONTROL, 240 VOLT CONSTANT WATTAGE BALLAST.

LUMINAIRES SHALL BE EQUAL TO LINE MATERIAL 2 A 2 LINE, CATALOG NO. LM 15 A 4 WITH PHOTO-ELECTRIC CONTROL. IES TYPE III LIGHT DISTRIBUTION UNLESS OTHERWISE SHOWN.

BRACKETS SHALL BE ELLIPTICAL STEEL, 12 FOOT, UNION METAL CO. DESIGN NO. 13, OR EQUAL.

ATTACH WITH THROUGH BOLTS AND LAGS TO WOOD POLES AT LOCATIONS SHOWN ON PLANS WITH 30 FOOT MOUNTING HEIGHT TO LIGHT CENTER ABOVE PAVEMENT.

CONNECT DIRECTLY TO SECONDARIES USING 2 - #10 TYPE, RHW-USE IN WOOD MOULDING ON POLE.

GROUNDING

NON-CURRENT CARRYING PARTS OF EQUIPMENT AND NEUTRALS AT EACH TRANSFORMER INSTALLATION, AND DISCONNECT SWITCH FRAMES, AND LIGHTNING ARRESTORS AND UNDERGROUND CONDUITS SHALL BE GROUNDED INCLUDING ALL TRANSFORMER CASES.

GROUND CONDUCTORS SHALL BE SOFT-DRAWN COPPER, NO. 6 AWG, CONNECTED TO GROUND ROD OR PLATE ON BOTTOM OF POLE.

TOTAL GROUND RESISTANCE AT EACH GROUND LOCATION SHALL NOT EXCEED 10 OHMS. WHERE 10 OHMS RESISTANCE CANNOT BE MET, ADDITIONAL 3/4" X 8 FT. GROUND ROBS SHALL BE DRIVEN TO MEET REQUIRED RESISTANCE.

GROUND CONDUCTOR SHALL BE PROTECTED IN WOOD OR PLASTIC MOULDING TO A HEIGHT OF AT LEAST 8 FEET ABOVE THE FINISHED GRADE.

CONNECTIONS TO ALUMINUM SHALL BE BY SPECIALLY TREATED OR LINED CONNECTORS.

PRIMARY FUSE CUTOFFS

FUSE CUTOFFS SHALL BE ENCLOSED, PORCELAIN, CROSS ARM MOUNTED, DROP-OUT, 5.2 KV RATING, CONTINUOUS CURRENT RATING 100 AMPERES, FUSE SIZES SHALL BE COORDINATED WITH CITY OF PAINESVILLE, ELECTRICAL DEPARTMENT FOR TRANSFORMERS INVOLVED; WESTINGHOUSE TYPE EA OR EQUAL.

CUTOFFS OR UNDERGROUND CABLE TAPS SHALL BE 200 AMPERE DISCONNECT BLADE, WESTINGHOUSE TYPE EA, OR EQUAL.

LIGHTNING ARRESTORS

LIGHTNING ARRESTORS SHALL BE VALVE TYPE, PORCELAIN, CROSS ARM MOUNTED, SUITABLE FOR 4160 VOLT GROUNDED THREE PHASE SYSTEM, WESTINGHOUSE TYPE LV, OR EQUAL.

INTERCHANGE LIGHT SERVICE

ELECTRICAL SERVICE FOR INTERCHANGE LIGHTING SHALL BE UNDERGROUND UNDER RICHMOND STREET IN 2 - 2 INCH ALUMINUM CONCRETE ENCASED CONDUITS TO STANDARD LIGHTING PULL BOX AS INDICATED ON PLANS.

THERE SHALL BE 2 - 480 VOLT CIRCUITS, A-1 AND A-2, AS INDICATED ON THE PLANS, EACH CIRCUIT 2 - #4 TYPE RR 600 VOLT WIRES.

OIL SWITCH SHALL BE 120 VOLT ELECTRICALLY OPERATED AND RATED 200 AMPERES AT 14,400 VOLTS, WESTINGHOUSE TYPE CSO OR EQUAL.

PHOTO-ELECTRIC CONTROLLER SHALL BE FISHER-PIERCE 63000 SERIES, 120 VOLT, PLUG-IN CONSTRUCTION, OR EQUAL.

WIRE A SINGLE POLE SWITCH ON POLE AT HEIGHT OF 6 FEET, 6 INCHES ABOVE GROUND FOR EMERGENCY OPERATION IN CASE OF PHOTO-ELECTRIC CONTROLLER FAILURE, KEY OPERATED, CROUSE - HINDS NO. EFS2129S16, OR EQUAL.

INSULATING TRANSFORMER

INSULATING TRANSFORMER (TYPE I. L.) SHALL BE 2 WINDING INSULATING STYLE, SUBWAY TYPE WITH 6.6 AMPERE PRIMARY AND 6000 LUMEN SECONDARY.

ALUMINUM CONDUIT

ALUMINUM CONDUIT SHALL BE RIGID TYPE OF ALCOA ALLOY NO. 6063.

ALL THREADING SHALL BE DONE USING A CONVENTIONAL CUTTING OIL.

ALL ALUMINUM CONDUIT EMBEDDED IN CONCRETE SHALL HAVE AN ORGANIC PROTECTIVE COATING. NO CALCIUM CHLORIDE OR OTHER ADMIXTURES SHALL BE USED IN CONCRETE ENCASED ALUMINUM CONDUIT.

ALL STRAPS, SUPPORTS, CONNECTORS AND BUSHINGS SHALL BE OF A TYPE TO PREVENT GALVANIC ACTION WITH THE ALUMINUM.

NON-METALLIC DUCT

NON-METALLIC UNDERGROUND DUCTS ENCASED IN CONCRETE SHALL BE 4 INCH SIZE, FIBER, FEDERAL SPECIFICATION W-C-581, TYPE I.

DUCT BANKS SHALL BE SET TO GRADES SHOWN ON THE PLANS. CHANGES IN DIRECTION OF OVER 10 DEGREES SHALL BE ACCOMPLISHED BY USE OF SPECIAL COUPLINGS OR BENDS MANUFACTURED FOR THIS PURPOSE.

WHERE A TAPERED END MUST BE CUT ON A PIECE OF FIBER DUCT, A SPECIAL TOOL OR LATHE DESIGNED TO CUT TAPER TO MATCH THE TYPE DUCT BEING USED, SHALL BE USED TO MAKE THE CUT.

SPACING BLOCKS SHALL BE MADE OF CONCRETE OR OTHER SUITABLE NON-METALLIC, NON-DECAYING MATERIAL. JOINTS IN MULTIPLE DUCT RUNS SHALL BE STAGGERED AT LEAST SIX (6) INCHES.

TAPERED ENDS OF FIBER SHALL BE SWABBED WITH BITUMINOUS COMPOUND BEFORE COUPLING IS APPLIED. DUCTS SHALL BE SECURELY ANCHORED TO PREVENT MOVEMENT DURING PLACEMENT OF CONCRETE.

CONNECTIONS FROM FIBER TO METALLIC CONDUITS SHALL BE MADE WITH PROPER ADAPTERS.

MANHOLES

MANHOLES SHALL BE CONSTRUCTED AS INDICATED ON THE PLANS.

CONCRETE, FORMS, MIXING, POURING, AND REINFORCING SHALL CONFORM TO CONCRETE SPECIFICATIONS OF THE STANDARD SPECIFICATIONS FOR CLASS "C" CONCRETE, ITEM S-1, CONCRETE FOR STRUCTURES.

MANHOLE FRAMES AND COVERS SHALL BE 30" DIAMETER, CAST IRON, ROADWAY TYPE, FLOCKHART FOUNDRY TYPE 615-B OR EQUAL. TOP OF COVER SHALL BE FLUSH WITH FINISHED ROAD SURFACE.

CABLES SHALL BE WELL SUPPORTED ON WALLS BY HOT DIP-GALVANIZED CABLE RACKS EQUIPPED WITH ADJUSTABLE HOOKS AND INSULATORS, 2 HOOKS AND 2 INSULATORS PER RACK. CABLE RACKS SHALL BE 30 INCHES LONG, JOSLYN NO. 5126 WITH J 5131 HOOK AND J 5122 INSULATOR.

PULLING-IN IRONS SHALL BE HOT DIPPED GALVANIZED, OPPOSITE EACH DUCT BANK, JOSLYN NO. J 8120.

ALL DUCTS ENTERING MANHOLES SHALL TERMINATE IN DUCT END BELLS FLUSH WITH INNER WALL.

EACH MANHOLE SHALL HAVE A 6" DRAIN TO A STORM SEWER, AS SHOWN ON THE PLANS AND SHALL BE PAID FOR IN THE PRICE BID FOR EITHER MANHOLE, ELECTRICAL TYPE "A" OR "B".

IN EACH MANHOLE AT A CONVENIENT POINT CLOSE TO THE WALL, A 3/4" COPPER OR COPPER CLAD STEEL GROUND ROD SHALL BE DRIVEN INTO THE EARTH NOT LESS THAN SIX (6) FEET BEFORE THE MANHOLE FLOOR IS POURED. THE GROUND ROD SHALL EXTEND APPROXIMATELY 6 INCHES ABOVE THE FINISHED MANHOLE FLOOR.

UNDERGROUND DUCTS

UNDERGROUND DUCTS STUBBED OUT FOR FUTURE USE & NOT FINISHING AGAINST EXISTING DUCTS ARE TO BE PLUGGED AT STUB END, USING WOOD, FIBER, OR OTHER SIMILAR TYPE MATERIAL TO PREVENT ENTRY OF FOREIGN MATERIAL INTO DUCTS.