<table>
<thead>
<tr>
<th>Standard</th>
<th>Modification Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1</td>
<td>Fiber Optic System Typicals and Drawings</td>
</tr>
<tr>
<td></td>
<td>Added notes for locate and trace wires.</td>
</tr>
<tr>
<td></td>
<td>New sheet for 48&quot; X 72&quot; torsion assist handhole detail.</td>
</tr>
</tbody>
</table>
GENERAL NOTES:

1. UNDERGROUND CONDUIT SHALL BE PLACED AT 42" MINIMUM COVER UNLESS OTHERWISE SPECIFIED ON THE PLANS.

2. UNDERGROUND CONDUIT SHALL BE PLACED AT 48" MINIMUM COVER UNLESS OTHERWISE SPECIFIED ON THE PLANS.

3. IF WHILE LOWERING THE CONDUIT THERE IS NOT ENOUGH SLACK, ADDITIONAL CONDUIT SHALL BE ADDED. EMPTY CONDUITS CAN BE CUT AND HAVE NEW CONDUIT FUSED ON. CONDUITS WITH FIBER INSTALLED SHALL BE THICK CUT WITH A TUBE CUTTER SO AS NOT TO DAMAGE THE FIBER.

4. ALL CONDUIT USED ABOVE GROUND SHALL BE PVC COATED GALVANIZED STEEL AS MODIFIED BY THE TOLLWAY SUPPLEMENTAL SPECIFICATIONS, AS MODIFIED BY THE TOLLWAY SUPPLEMENTAL SPECIFICATIONS.

5. LOCATE/TRACE WIRE SHALL BE DIRECT BURIED WITH EVERY CONDUIT BUNDLE PATH AS CLOSE TO THE CENTER OF THE CONDUITS AS POSSIBLE. LOCATE/TRACE WIRE SHALL NOT BE INSTALLED IN A CONDUIT WITHOUT APPROVAL OF THE ENGINEER.

6. WHEN AN OPTIC FIBER CONDUIT SEPARATES FROM A CONDUIT BUNDLE OR CONDUIT BANK, AN ADDITIONAL LOCATE WIRE SHALL BE INSTALLED WITH THAT SEPARATE CONDUIT PATH GOING BACK TO THE PREVIOUS HANDHOLE.

7. ALL LOCATE/TRACE WIRE WILL BE TESTED PER SPECIFICATIONS PRIOR TO ANY FIBER BEING INSTALLED.

8. ALL UNUSED CONDUIT SHALL HAVE 1200 LB MULE TAPE INSTALLED FOR FUTURE USE.

9. SPECIFIED INNERDUCT BUNDLE QTY AND SIZE VARIES

10. SPECIFIED CONDUIT BUNDLE QTY AND SIZE VARIES

11. TRENCHED CONDUIT BUNDLES

12. PLewed CONDUIT BUNDLES

QTY VARIES

QTY VARIES

NOTES:

A. A MINIMUM OF 4" OF SAND SHALL BE PLACED UNDER THE CONDUIT, SAND SHALL TRANSITION TO BACKFILL ACCORDING TO NOTE B 4" ABOVE CONDUIT.

B. BACKFILL SHALL BE ACCORDING TO ARTICLE 810.04 OF THE STANDARD SPECIFICATIONS.

DATE: 3-31-2017

REVISIONS: 3-01-2019

STANDARD LI-01
GENERAL NOTES:
1. Underground conduit shall be placed at 42" minimum cover unless otherwise specified on the plans.
2. Underground conduit shall be placed at 48" minimum cover under streams, creek and drainage ditches unless otherwise specified on the plans.
3. The minimum cover under a public roadway, Illinois Tollway highway and ramps shall be 120" or such greater depth as may be required to clear the pavement structure.
4. If while lowering the ducts there is not enough slack in the duct, additional duct shall be added. Empty ducts can be cut and have new duct fused on. Ducts with field installed shall be fused cut with a tube cutter so as not to damage the fiber.
5. Hope casing shall extend from toe of back slope to toe of back slope unless otherwise approved.
6. Bore and receiving pits shall be a minimum of 30 feet from the edge of shoulder or hill slopes unless otherwise approved.
7. Top of casing shall be a minimum of 48" below the designed ditch grades on each side of highway.
8. Ends of all casing shall be foam plugged. (ARCO HYDRA-SEAL S-60 or engineer approved equal).
9. Pits for boring shall be not permitted in the highway median.
10. Top of hope casing shall be a min. of 120" below lowest Illinois Tollway road surface.
11. All conduit used above ground shall be PVC coated galvanized rigid steel according to Section 611 of the IDOT Standard Specifications, as modified by the Illinois Tollway Supplemental Specifications.
12. Handholes shall be installed on both sides of any stream, creek, or road crossing.

CONSTRUCTION NOTES: TRENCHED HDPE BUNDLES
A. A minimum of 3" of sand shall be placed under the conduit. Sand shall transition to backfill according to Note B 4" above conduit.
B. Backfill shall be according to Article 8 of the standard specifications.
NOTES FOR RAILROAD BORE OR JACK
1. CASING SHALL EXTEND 25 FT. EACH SIDE OF EACH EDGE OF OUTERNOST TRACK OR AS DECREED BY RAILROAD PERMIT.
2. R.R. BALLAST SHALL NOT BE DISTURBED.
3. BORE AND RECEIVING PITS SHALL NOT BE EXCAVATED CLOSER THAN 10 FT. FROM THE TOP OF SLOPE ON EACH SIDE OF TRACK.
4. ENDS OF ALL CASING SHALL BE FOAM PLUGGED (ARNCO HYDRA-SEAL 3-60 OR ENGINEER APPROVED EQUAL). SEE SHEET 2 OF THIS SERIES.
5. ALL OPERATIONS SHALL MEET REGULATING AGENCY REQUIREMENTS.
6. CASING AS REQUIRED BY CUSTOMER OR RAILROAD OWNER.
7. DEPTH TO TOP OF CASING TO TOP OF RR TIE MAY BE GREATER THAN 60" AS DECREED BY RAILROAD OWNER, NEVER LESS THAN 66".

NOTES FOR CITY STREET AND DRIVEWAY BORE OR JACK
1. HOPE SHALL EXTEND 5 FT. EACH SIDE OF EDGE OF SMALLER/BACK OF CURB.
2. BORE AND RECEIVING PITS SHALL NOT BE EXCAVATED CLOSER THAN 5 FT. FROM THE TOP OF SLOPE ON EACH SIDE OF TRACK.
3. ENSURE CASING SHALL BE FOAM PLUGGED (ARNCO HYDRA-SEAL 3-60 OR ENGINEER APPROVED EQUAL). SEE SHEET 2 OF THIS SERIES.
4. HOPE SHALL BE A MINIMUM OF 48" BELOW STREET ELEVATION TO TOP OF HOPE, MAY BE GREATER THAN 48" AS DECREED BY CITY, VILLAGE, AND/OR TWP/COUNTY.
5. ALL OPERATIONS SHALL MEET REGULATING AGENCY REQUIREMENTS.
NOTES:

1. IF 18" MIN COVER CANNOT BE ACHIEVED, HDPE MUST BE PLACED UNDER EXISTING UTILITY.

2. 12" MIN SEPARATION MUST BE ACHIEVED BETWEEN GALVANIZED RIGID STEEL/CASING HDPE AND EXISTING UTILITY.

3. NO DIRECT BURY UNDER ANY EXISTING UTILITY.

4. UP TO 24" SEPARATION FOR OIL, GAS UTILITY BETWEEN PIPE AND CONDUIT.

5. IF CROSSING AN EXISTING UTILITY, SHOULD BE CONSTRUCTED AS CLOSE TO 90° AS POSSIBLE.

EXISTING UTILITY

LOCATE HOLE

GALVANIZED RIGID STEEL OR HDPE CASING UNDER EXISTING UTILITY

20' MIN
FUSION COUPLINGS DETAIL

NOTE:
IN A PROPER ELECTROFUSION JOINT, MOLTEN MATERIAL FLOWS TO THE COLD ZONE WHERE IT SOLIDIFIES AND PREDICTS OFF THE ESCAPE PATH. WITH THE HOTTER MATERIAL CONSUMED, MOLTEN PENETRATION WILL INCREASE INTERFACE PRESSURE. WIRE WINDINGS WILL FLOW IN A DESIGNED AND CONTROLLED PATTERN AND A PROPER BONDING OF MATERIALS CAN BE OBTAINED.

PROPER FUSION DETAIL

STANDARD JOINING PROCEDURES
1. ONLY FUSION COUPLINGS SHALL BE USED. COMPRESSION COUPLINGS SHALL NOT BE ALLOWED.
2. SMALL INSTALL PER FUSION COUPLING MANUFACTURER RECOMMENDATIONS.
3. THE PIPE SHALL HAVE A SQUARE EVEN CUT.
4. REMOVE ANY BURRS OR SHAVING FROM THE PIPE ENDS THAT MAY HAVE DEVELOPED DURING THE CUTTING PROCESS.
5. CLEAN PIPE ENDS INSIDE AND OUT WITH A CLEAN CLOTH TO REMOVE ANY DIRT OR CONTAMINANTS.
6. PIPE PREPARATION AND CONTAMINATION ARE VERY IMPORTANT CONSIDERATIONS IN THE ELECTROFUSION PROCESS. THEREFORE, CAREFUL ATTENTION SHALL BE GIVEN TO PROPER SCRAPING AND CLEANING PROCEDURES.
7. SCRAPE PIPE ENDS TO REMOVE ANY OXIDATION OR SURFACE CONTAMINATION. FOR BEST RESULTS, SECURE TOOL ON PIPE AND MAKE TWO REVOLUTIONS.
8. DISCONNECT LEADS FROM FITTING. CLAMPING DECKS SHALL REMAIN IN PLACE TO SECURE PIPE AND FITTING DURING THE RECOMMENDED COOLING TIME. AFTER REMOVING CLAMP, ADDITIONAL COOLING TIME SHALL BE ALLOWED BEFORE SUBJECTING THE JOINT TO BENDING, BURYING, PRESSURE TESTING, OR SIMILAR HANDLING AND BACKFILL STRESS.
9. CLEAN PIPE ENDS INSIDE AND OUT WITH A CLEAN CLOTH TO REMOVE ANY DIRT OR CONTAMINANTS.
10. REMOVE ANY BURRS OR SHAVING FROM THE PIPE ENDS THAT MAY HAVE DEVELOPED DURING THE CUTTING PROCESS.

NOTE: IN THE EVENT OF OUT-OF-ROUND PIPE, IT IS IMPORTANT TO ASSURE AN ADEQUATE AND EVEN SCRAPE IS ACHIEVED AROUND THE ENTIRE CIRCUMFERENCE OF THE PIPE. A RUBBER PIPE STOPPER CAN BE PLACED IN THE END OF THE PIPE TO AID IN AVOIDING THE Joints TO BE SCRAPE.
11. MULTIPLE DUCTS FUSION SHALL BE STAGGERED AND AFTER COMPLETION SHALL BE BOUND TOGETHER WITH TY-STRAPS 5’ SPACING TO OCCUPY MINIMUM POSSIBLE SPACE AND THEN BACKFILLED.
NOTES:
1. NO MARKING ON LID.
2. ALL BOLTS SHALL BE 1/4" x 3/8" HEX HEAD ASTM STANDARD A276 STAINLESS STEEL BOLTS.
3. NO CORE/DRILLING OR ALTERATION OF HANDHOLE SHALL BE ALLOWED.

4'x6' HANDHOLE
2 OR 3 SECTION SPLIT LID
(PG STYLE LARGE BOX)
5-1 1/4" OR MORE DUCTS

3'x5' HANDHOLE
SINGLE OR SPLIT LID
LESS THAN 5-1 1/4" DUCTS
HOPE AND FIBER OPTIC CABLE PLACEMENT IN HANDHOLE

**TABLE “A”**

<table>
<thead>
<tr>
<th>Fiber Count</th>
<th>Minimum Bend Radius (AT REST)</th>
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</thead>
<tbody>
<tr>
<td>96F</td>
<td>6&quot;</td>
</tr>
<tr>
<td>72F</td>
<td>6&quot;</td>
</tr>
<tr>
<td>54F</td>
<td>6&quot;</td>
</tr>
<tr>
<td>36F</td>
<td>6&quot;</td>
</tr>
<tr>
<td>18F</td>
<td>10&quot;</td>
</tr>
<tr>
<td>12F</td>
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</tr>
<tr>
<td>8F</td>
<td>10&quot;</td>
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<td>288F</td>
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<tr>
<td>1F</td>
<td>188F</td>
</tr>
</tbody>
</table>

**NOTES:**

1. **Fiber optic cables shall have a cable tag on both sides of the slack coil, identifying the owner, duct color, cable count, and direction.**

2. **Color noted on viewpoints is for reference only.**

3. **Coil fiber cable in handhole ensuring that the bend radius does not exceed values in Table “A.”**

4. **Each fiber cable coil shall be tied together in a single tight bundle.**

5. **Each fiber coil bundle shall be called together with a slack coil identifying the owner, duct color, coil beginning with the first sequential number outside the inner duct of as directed on plan drawings.**

6. **Provide a min. of 50’ slack coil beginning with the first sequential number outside the inner duct as directed on plan drawings.**

7. **Fiber splice container shall be placed in the handhole allowing for easy access and labeled with owner, end location, fiber type, and fiber count.**

8. **Fiber conduit shall extend into the handhole 12 to 18 inches with the end turned up and sealed to withstand water entering the conduit.**

---

**Diagram Notes:**

- Split duct plug (type)
- Duct plug (type) resistant - 2-1/2" min.
- 14 hole cable rack horizontally applied 6" down from bottom of cover varieties on each end wall. Secure each 1/2" hole to cable rack with cable tie.
- 24” pea gravel
- 12” of pea gravel prior to setting handhole
- Sample cable tag
- Cables tagged with sequential number outside the inner duct of as directed on plan drawings.
**GENERAL NOTES:**

1. **PLATE** MANNER SHALL BE PLACED 1 FOOT FROM HANDHOLE OR AT FENCE LINE IF POSSIBLE.
2. **HANDHOLES** SHALL BE BACKFILLED ONLY TO THE TOP OF THE BOX, FLUSH TO EXISTING GRADE.
3. **COIL** FIBER CABLE IN HANDHOLE ENSURING THAT THE BEND RADIUS SHALL NOT EXCEED 6".
4. **INSTALL** GROUND WIRE & EXOTHERMIC WELD AS PER MANUFACTURER’S INSTRUCTIONS. PLACE THE #6 GROUND WIRE (TYPE XHHW, SOLID, GREEN INSULATED) THAT HAS BEEN ATTACHED TO THE GROUND ROD AND TO THE CENTER LUG OF THE LOCATE POST.
5. **BACKFILL** MATERIAL SHALL BE COMPACTED TO THE SATISFACTION OF THE ENGINEER.
6. **GROUND WIRE** SHALL BE BONDED TO BOTH SHEATHS OF ARMORED FIBER OPTIC CABLE IN THE SPLICE ENCLOSURE USING #6 GROUND STRANDED, GREEN INSULATED WIRE. EACH GROUND SHALL BE ISOLATED WITHIN THE ENCLOSURE.
7. **INSTALL** GROUND WIRE CONDUIT FROM HANDHOLE TO WARNING POST TO ALLOW GROUNDING CABLE AND LOCATE TRACER WIRES TO BE INSTALLED.
8. **PLACE** 1" HDPE OVER FIBER OPTIC CABLE TO PROVIDE CRUSH PROTECTION EXTEND NO MORE THAN MINIMUM
9. **NO** HANDHOLES WILL BE ALLOWED IN PAVED ROADWAYS OR SHOULDER.
10. **THE TOPS** OF ALL HANDHOLES SHALL BE FLUSH WITH THE EXISTING GRADE.
11. **HANDHOLE** SHALL NOT BE INSTALLED ON STEEP BANKS OR SLOPES WHERE THE COVER CANNOT BE LEVELED WITHIN A TOLERANCE OF ONE INCH (1") OF DROP TO TWELVE INCHES (12") OF GRADE AND REMAIN BURIED.
12. **A WATER PROOF SEALING SIMPLEX DUCT PLUG** SHALL BE INSTALLED AROUND THE FIBER OPTIC TO SEAL AROUND THE CONDUIT. A WATER PROOF SEALING PLUG SHALL BE INSTALLED IN ALL VACANT CONDUIT.
13. **ANY WORK** IN AN EXISTING SINGLE HOSE KLINE OR INVOLVING AN EXISTING SINGLE HOSE DUCT AND FIBERS KLINE BE COORDINATED WITH THE TOLLWAY FIBER OPTIC CONTRACTOR, USING A-36 PROCESS.
14. **FOR ALL SPLICE AND HANDHOLE** NUMBER DECKLES SHALL BE APPLIED AFTER INSTALLATION IS COMPLETE.
15. **LOCATION** OF SIGNS IS PREFERRED TO USE SIGNS FROM ROAD. SIGNS ONLY BE USED WHERE SIGN IS NOT VISIBLE FROM ROAD.
HANDHOLE SPLICE GROUNDING
THIRD PARTY CONDUIT

1. WARNING LOCATE POST SHALL BE PLACED 1 FOOT FROM HANDHOLE OR AT FENCE LINE IF POSSIBLE.

2. HANDHOLES SHALL BE BACKFILLED ONLY TO THE TOP OF THE BOX FLUSH TO EXISTING GRADE.

3. INSTALL GROUND ROD & EXOTHERMIC WELD AS PER MANUFACTURER'S INSTRUCTIONS. PLACE THE "1" HDPE OVER FIBER OPTIC CABLE TO PROVIDE CRUSH PROTECTION.

4. GROUND WIRE SHALL BE BONDED TO BOTH SHEATHS OF ARMORED FIBER OPTIC CABLE IN THE SPLICE ENCLOSURE USING #6 STRANDED GREEN INSULATED TYPE XHHW GROUND WIRE. EACH GROUND SHALL BE ISOLATED WITHIN THE ENCLOSURE.

5. PLACE 1/2" PIPE OVER FIBER OPTIC CABLE TO PROVIDE CRUSH PROTECTION EXTEND PIPE 1' INSIDE HANDHOLE.

6. NO HANDHOLES SHALL BE ALLOWED IN PAVED ROADWAYS OR SHOULDERS.


8. A WARNING LOCATE POST SHALL BE INSTALLED AT ALL HANDHOLES.

9. LOCATE WIRE SHALL BE TESTED FROM HANDHOLE TO HANDHOLE PRIOR TO ANY FIBER BEING INSTALLED IN CONDUIT.

10. LOCATE WIRES SHALL BE TAGGED INSIDE LOCATE POST. THE TAG SHALL SHOW THE FIBER OWNER, FIBER COUNT, FIBER TYPE, DIRECTION (N,S,E,W), DISTANCE TO NEXT LOCATE POST, AND MILE POST AT THAT LOCATION.
Note:  The maximum pipe strap spacing shall be 30" max. vertical and 18" horizontal maximum distance. A minimum of two pipe straps shall be placed for any conduit placed higher than 4' above grade.

1. All penetrations shall utilize existing unused building penetrations to the maximum extent possible.
2. All exterior materials shall be stainless steel unless otherwise noted.
3. All anchors shall be installed in sound concrete or masonry.
4. Use approved masonry anchors.

General Notes:

<table>
<thead>
<tr>
<th>Detail</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Front View</td>
</tr>
<tr>
<td>B</td>
<td>Side View</td>
</tr>
<tr>
<td>C</td>
<td>Above Grade</td>
</tr>
<tr>
<td>D</td>
<td>Above Grade</td>
</tr>
<tr>
<td>E</td>
<td>Below Grade</td>
</tr>
<tr>
<td>F</td>
<td>Below Grade</td>
</tr>
</tbody>
</table>

Materials:
- Galvanized rigid steel conduit
- Steel conduit
- Plastic bushing
- Steel sleeve
- Non-shrink grout
- Concrete foundation wall
- Block wall
- Link seal
- Lock nut

Construction:
- Cut 8" hole in pull box around wall penetration place 1/4" split rubber tube over sheet metal edge and secure with contact cement
- Fill sleeve with approved firestop sealant, sealant to be 1" deep and on each face of wall with general wall used as a backed material
- Concrete wall/floor penetration

Installation:
- Use approved masonry anchors
- Place higher than 4' above grade
- All penetrations shall utilize existing unused building penetrations to the maximum extent possible
- All exterior materials shall be stainless steel unless otherwise noted
- All anchors shall be installed in sound concrete or masonry
UNDERGROUND PENETRATION DETAIL

1. Galvanized rigid steel conduit extending through foundation wall shall be one continuous piece and configured square with building at a slight angle to the exterior to prevent water seepage.

2. Non-shrink grout shall be used and 4" outward grout 360° around pipe and through wall core hole.

3. Foam seal to 4" HDPE duct cement as required.

4. Core hole 4" HDPE duct to recessed 1" in wall.

5. Weatherproof link seal.

GENERAL NOTES:

- Blank plug.
- Duct plug detail.
- Quad duct plug.
- Not to scale.

GENERAL NOTES:

- Blank plug.
- Conduit shall be flush with wall.
- Duct plug and quad duct shall be plugged with triplex duct plug.
- Weatherproof link seal.
- Interior surface flush with wall.
- Non-shrink grout.

MANHOLE PENETRATION DETAIL NOT TO SCALE

- Core drill 4" SS.
- Foam seal conduct to a manhole 2" depth.
- Core hole through manhole wall.
- Exterior surface.

MANHOLE PENETRATION DETAIL NOT TO SCALE

- Core drill 4" SS.
- Duct plug.
- Duct plug detail.
- Duct plug Front View.
- Conduit shall be flush with wall.
- Duct plug and quad duct shall be plugged with triplex duct plug.
- Weatherproof link seal.
- Interior surface flush with wall.
- Non-shrink grout.

CONCRETE TROUGH PENETRATION NOT TO SCALE

- Core drill 4" SS.
- Foam seal conduct to a manhole 2" depth.
- Core hole through wall.
- Exterior surface.
- Core hole 4" HDPE duct.
- Core hole 6" core for 4" galvanized prod steel.
- Non-shrink grout.
- Core hole through wall core hole.
- Weatherproof link seal.
- Exterior surface flush with wall.
- Non-shrink grout.
- Core hole 4" HDPE duct cement as required.
- Core hole 4" HDPE duct as required.
1. Maintain a minimum distance of 5' from any utility pole or pedestal sign, marked pole, or any other structure.

2. Warning markers shall be placed at 1000' intervals and at changes in cable location/direction or to mark the location of manholes or at crossing point of other underground facilities. The contractor shall adjust excavation as necessary to avoid hidden obstacles and to maintain minimum distance from the edge of pavement. All locations shall be approved by the engineer.
ROUTE MARKER INSTALLATION PROCEDURE

Installation of Warning Post:

1. Install warning post according to manufacturer's instructions and recommendations.

2. Placement of post shall not interfere with the removal of handhole lids.

3. Warning sign shall be attached to sign fence wherever possible. UV stabilized black polyethylene cable (5/16" length, 1/4" width, 120 lbs tensile strength) (4 ea.) wraps each tie, shall be used to attach warning sign to fence.

4. See sheet 14 of this series for fiber optic system, warning label and warning sign details.

WARNING

BURIED FIBER OPTICS CABLE IN THIS VICINITY BEFORE DIGGING CALL

H H #

(630) 241-6800 ext. 3420

EXISTING GRADE

WARNING SIGN

FENCE MOUNTED WARNING SIGN

FENCE

1. INSTALLATION OF WARNING POST:

2. PLACEMENT OF POST SHALL NOT INTERFERE

3. WARNING SIGN SHALL BE ATTACHED TO SIGN

4. SEE SHEET 14 OF THIS SERIES FOR FIBER OPC SYSTEM, WARNING LABEL AND WARNING SIGN DETAILS.
FIBER WARNING LABEL & WARNING SIGN DETAILS

WARNING
BURIED
FIBER OPTICS CABLE
IN THIS VICINITY
BEFORE DIGGING CALL ISTHA
(630) 241-6800 EXT. 3420
HH#
FENCE SIGN

Part #: SIA-ISTHA
Size: 12" T X 9" W
Material: Polyethylene
Color: Black text with Orange
Holes: 4 - 3/16"

Part #: PPS-ISTHA
Size: 6'
Material: Polydome
Color: Orange Post and dome

CAUTION FIBER OPTIC CABLE BURIED BELOW
ISTHA (630) 241-6800 EXT.3420
ROUTE MARKER POST
ROUTE MARKER POST
DECAL

Part #: PTP66000-ISTHA - 4" X 6,000", 6MIL Orange with black text
WARNING TAPE

Part #: D-214-ISTHA
Size: 14" x 3"
Material: Decal
Color: Orange with black text,
Black "Warning" panel with white text. White no dig
Scale: Shown 60%

NOTE:
SIGNS AND LABEL SHOWN IS AVAILABLE THROUGH ACP INTERNATIONAL.
ALTERNATE SIGN LABELS SHALL BE SUBMITTED FOR APPROVAL BY
THE ENGINEER.
DMS CABINET SPLICING DETAILS

IN GROUND SPLICING ENCLOSED DEVICES HANDHOLE

NEXT DOWNSTREAM ITS DEVICE CABINET

144 SMFO ITS COMMUNICATIONS CABLE TO

AQUA
ROSE
VIOLET
YELLOW
BLACK
RED
WHITE
SLATE
BROWN
GREEN
ORANGE
BLUE
SLATE
BROWN
GREEN
ORANGE
BLUE
WHITE
BLACK
RED
VIOLET
ROSE
AQUA

TUBES PASS THROUGH UNBROKEN UNSPLICED STRANDS IN BUFFER TUBE PASS THROUGH UNBROKEN UNSPLICED STRANDS IN THE BUFFER TUBE

RWIS & WIM SUBGROUP (LOCAL FIELD DEVICES)
- BUFFER TUBE #6 (WHITE)
MVDS SUBGROUP (LOCAL FIELD DEVICES)
- BUFFER TUBE #5 (SLATE)
DMS (TYPE 1 & TYPE 2) SUBGROUP (LOCAL FIELD DEVICES)
- BUFFER TUBE #4 (BROWN)
CCTV & CO-LOCATED ITS DEVICES SUBGROUP (LOCAL FIELD DEVICES)
- BUFFER TUBE #3 (GREEN)
SECONDARY INFRASTRUCTURE SUBGROUP
- BUFFER TUBE #2 (ORANGE)
PRIMARY INFRASTRUCTURE SUBGROUP
- BUFFER TUBE #1 (BLUE)

ITS DEVICE GROUP FIBER ASSIGNMENTS (144 SMFO ITS COMMUNICATIONS CABLE)

SC CONNECTORS
FIBER PATCH PANEL
FUSION SPLICE
FIBER OPTIC COILED IN SPLICE TRAY
BARE FIBER LEFT
SINGLE MODE FIBER OPTIC PIGTAIL,
SINGLE MODE FIBER OPTIC JUMPER,
J
P

NOTE:
SEE SHEET 1 OF 7 FOR NOTES.
RWIS / WIM CABINET SPlicing DETAILS

IN GROUND SPLICING ENCLOSED

DEVICE HAND HOLE

NEXT DOWNSTREAM ITS DEVICE CABINET

144 SMFO ITS COMMUNICATIONS CABLE TO NEXT UPSTREAM ITS DEVICE CABINET

TUBES PASS THROUGH UNBROKEN UNSPLICED STRANDS IN BUFFER

NOTE:
SEE SHEET 1 OF 7 FOR NOTES.
**SPLICING DETAILS**

**FIBER OPTIC SHEET 6 OF 7**

144 SMFO TOLLWAY BACKBONE CABLE TO NEXT TOLL PLAZA

- Tube Pass Through Unbroke Strands in Buffer Cable to Next Toll Plaza

**Legend**
- SC Connectors
- Fiber Optic Patch Panel, Fusion Splice
- Coiled in Splice Tray
- Bare Fiber Left
- Single Mode Fiber Optic Pigtail
- Single Mode Fiber Optic Jumper

**NOTE:**
See Sheet 1 of 7 for Notes.

**APPROVED DATE**
Chief Engineer
3-31-2017
NOTES:

1. LOCALLY CONNECTED DEVICES
2. LOCALLY CONNECTED DEVICES
3. LOCALLY CONNECTED DEVICES
4. LOCALLY CONNECTED DEVICES
5. LOCALLY CONNECTED DEVICES
6. LOCALLY CONNECTED DEVICES
7. LOCALLY CONNECTED DEVICES
8. LOCALLY CONNECTED DEVICES
9. LOCALLY CONNECTED DEVICES
10. LOCALLY CONNECTED DEVICES
11. LOCALLY CONNECTED DEVICES
12. LOCALLY CONNECTED DEVICES

13. (ITS) DMS SUBGROUP - DOWNLINK
14. (ITS) DMS SUBGROUP - UPLINK
15. (ITS) CCTV & CO-LOCATED DEVICES SUBGROUP - DOWNLINK
16. (ITS) CCTV & CO-LOCATED DEVICES SUBGROUP - UPLINK
17. (AET/ITS) SECONDARY LAYER 3 DOWNLINK
18. (AET/ITS) SECONDARY LAYER 3 UPLINK
19. NOT USED
20. NOT USED
21. NOT USED
22. NOT USED
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41. NOT USED
42. NOT USED

43. NOT USED
44. NOT USED
45. NOT USED
46. NOT USED
47. NOT USED
48. NOT USED

9. MVDS SUBGROUP - UPLINK
10. MVDS SUBGROUP - DOWNLINK
11. CONNECTED VEHICLE - DOWNLINK
12. CONNECTED VEHICLE - UPLINK
13. DMS MVDS SUBGROUP - DOWNLINK
14. DMS MVDS SUBGROUP - UPLINK
15. DMS CCTV & CO-LOCATED DEVICES SUBGROUP - DOWNLINK
16. DMS CCTV & CO-LOCATED DEVICES SUBGROUP - UPLINK

17. FWI COMMUNICATION BOARD / WIM CONTROLLER
18. RS3 COMMUNICATION BOARD / RS3 EVI CONTROLLER
19. IP RELAY CAT-6 CONNECTION
20. MVDS
21. LOCAL USE
22. LOCAL USE
23. LOCAL USE
24. LOCAL USE
25. FIELD SWITCH DOWNLINK
26. FIELD SWITCH UPLINK
27. DMS CONTROLLER
28. CCTV CAT-6 CONNECTION
29. CCTV CAT-6 CONNECTION
30. CCTV CAT-6 CONNECTION
31. CCTV CAT-6 CONNECTION
32. CCTV CAT-6 CONNECTION
33. CCTV CAT-6 CONNECTION
34. CCTV CAT-6 CONNECTION
35. CCTV CAT-6 CONNECTION
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