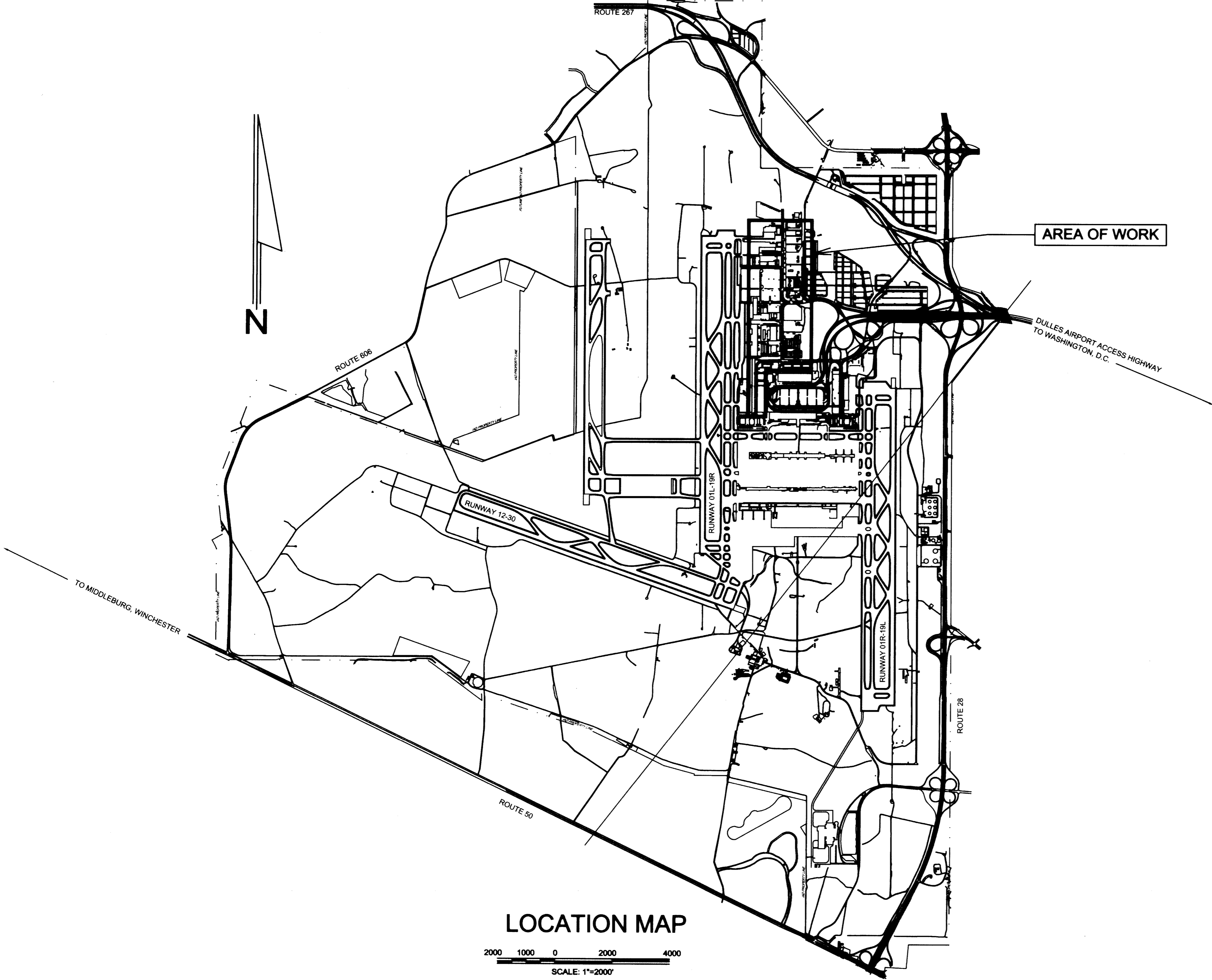


WASHINGTON DULLES INTERNATIONAL AIRPORT

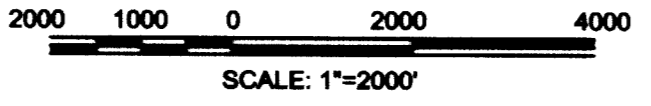
UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT

AUGUST 17, 2012

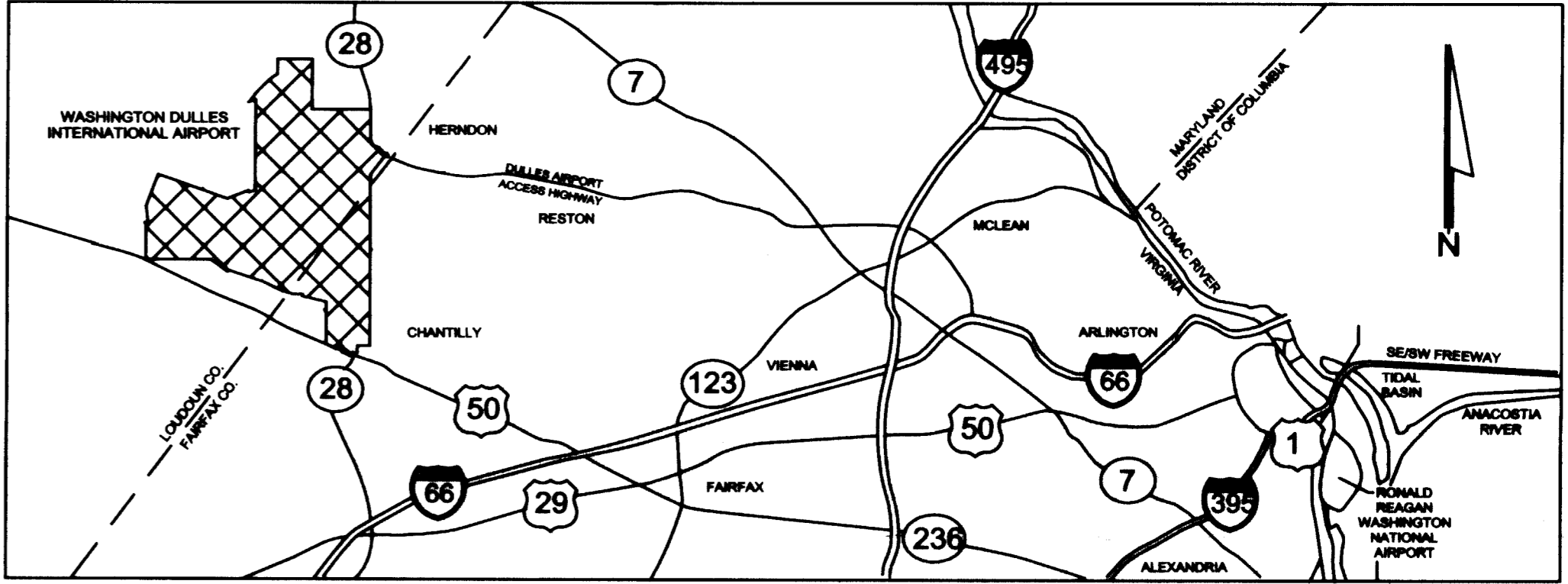
VOLUME 1 OF 1



LOCATION MAP



VICINITY MAP



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METROPOLITAN WASHINGTON AIRPORTS AUTHORITY

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ACCEPTED BY *Larry Chandler* DESIGN PROJECT MANAGER
 SUBMITTED BY *Diane Hirsch* DIANE R. HIRSCH MANAGER OF DESIGN
 APPROVED BY *Frank D. Holly* FRANK D. HOLLY VICE PRESIDENT FOR ENGINEERING

DATE *11/28/12*

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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | GN00.1 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 1 of 14 |

VOLUME 1 OF 1

GENERAL

- 1 OF 14 GN00.1 COVER SHEET
- 2 OF 14 GN01.1 DRAWING INDEX

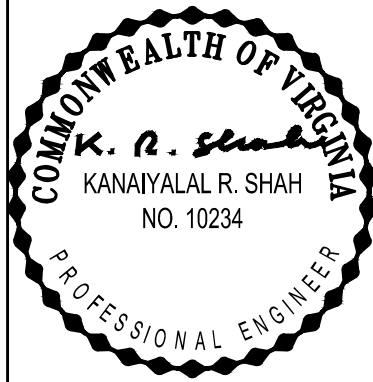
ELECTRICAL

- 3 OF 14 EL00.1 SYMBOLS, ABBREVIATIONS, GENERAL NOTES AND SEQUENCE OF WORK
- 4 OF 14 EL01.1 SITE PLAN - EXISTING AND NEW WORK
- 5 OF 14 EL07.1 MANHOLE BUTTERFLY DRAWINGS 6EP-10, 6EP2-1 TO 6EP2-3 - EXISTING, DEMOLITION AND NEW WORK
- 6 OF 14 EL07.2 MANHOLE BUTTERFLY DRAWINGS 6EP2-4 TO 6EP2-7 - EXISTING, DEMOLITION AND NEW WORK
- 7 OF 14 EL07.3 MANHOLE BUTTERFLY DRAWINGS 6EP2-8 TO 6EP2-11 - EXISTING, DEMOLITION AND NEW WORK
- 8 OF 14 EL07.4 MANHOLE BUTTERFLY DRAWINGS 6EP2-12 TO 6EP2-13 - EXISTING, DEMOLITION AND NEW WORK
- 9 OF 14 EL07.5 MANHOLE BUTTERFLY DRAWINGS 7EP1-1 TO 7EP1-4 - EXISTING, DEMOLITION AND NEW WORK
- 10 OF 14 EL07.6 MANHOLE BUTTERFLY DRAWINGS 7EP1-5, 7EP1-5A AND 7EP1-6 - EXISTING, DEMOLITION AND NEW WORK
- 11 OF 14 EL07.7 MANHOLE BUTTERFLY DRAWINGS 7EP1-7 TO 7EP1-10 - EXISTING, DEMOLITION AND NEW WORK
- 12 OF 14 EL07.8 MANHOLE REPAIR MATRIX - DEMOLITION, NEW WORK AND DRAWING NOTES
- 13 OF 14 EL07.9 NEW CABLE INSTALLATION AND MANHOLE ACCESSORIES DETAILS
- 14 OF 14 EL07.10 DUCTBANK REPLACEMENT DETAILS

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UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT
WASHINGTON DULLES INTERNATIONAL AIRPORT
WASHINGTON, D.C.

DRAWING INDEX

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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | GN01.1 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 2 of 14 |

ELECTRICAL SYMBOLS

| SYMBOL | DESCRIPTION |
|--------|--|
| | CABLE RACK |
| | CABLE RACK WITH BRACKET ARMS |
| | PULLING IRON (P.I.) |
| F | INDICATES FLOOR MOUNTED |
| W | INDICATES WALL MOUNTED |
| C | INDICATES CEILING MOUNTED |
| | 13.2 KV CABLE |
| | OTHER TYPE CABLE OR CONDUIT AS NOTED |
| | GROUND CABLE |
| | SUMP IN FLOOR OF MANHOLE |
| | OPENING IN ROOF OF MANHOLE |
| | DUCT IN WALL OF MANHOLE - 5" SIZE |
| | DEADBREAK JUNCTION MOUNTED ON MANHOLE WALL OR CHANNEL |
| | 600A SEPARABLE CONNECTOR |
| | 13.2KV (MV) CABLE SPLICE |
| | VERTICAL SLOT FOR CABLE RACK/OR HORIZONTAL CHANNEL FOR DEADBREAK JUNCTIONS |
| | EMPTY DUCT IN WALL OF MANHOLE |
| | OCCUPIED DUCT IN WALL OF MANHOLE |

ABBREVIATIONS

| ABBREVIATION | DESCRIPTION |
|--------------|--|
| " | INCH |
| ∅ | PHASE |
| A | AMPERE |
| AFF | ABOVE FINISHED FLOOR |
| AIC | AMPERE INTERRUPTING CAPACITY |
| AWG | AMERICAN WIRE GAUGE |
| C | CONDUIT |
| CKT | CIRCUIT |
| COTR | CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE |
| CU | COPPER |
| DIA | DIAMETER |
| ELEC | ELECTRICAL |
| EMH | ELECTRICAL MANHOLE |
| ETR | EXISTING TO REMAIN |
| EXIST | EXISTING |
| FDR | FEEDER |
| FT | FEET |
| G | GROUND |
| JB | JUNCTION BOX |
| KAIC | KILOAMPERE INTERRUPTING CAPACITY |
| KCMIL | KILO CIRCULAR MILS |
| KV | KILOVOLTS |
| KVA | KILOVOLTAMPERE |
| LV | LOW VOLTAGE |
| MAX | MAXIMUM |
| MIN. | MINIMUM |
| MV | MEDIUM VOLTAGE |
| NEC | NATIONAL ELECTRICAL CODE |
| NEMA | NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION |
| NESC | NATIONAL ELECTRICAL SAFETY CODE |
| NFPA | NATIONAL FIRE PROTECTION ASSOCIATION |
| NTS | NOT TO SCALE |
| OSHA | OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION |
| RGS | RIGID GALVANIZED STEEL |
| SP | SPARE |
| TYP | TYPICAL |
| UON | UNLESS OTHERWISE NOTED |
| UG | UNDERGROUND |
| UL | UNDERWRITERS LABORATORIES, INC. |
| V | VOLT |
| VA | VOLT AMPERE |
| W | WIRE |
| WP | WEATHERPROOF |

GENERAL NOTES

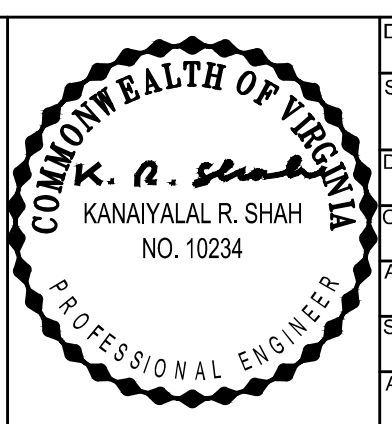
- ALL ELECTRICAL WORK IS NEW UON, AND SHALL BE INSTALLED IN ACCORDANCE W/ THE LATEST EDITION OF THE NEC, NESC, NFPA, OSHA AND LOCAL CODES AND ORDINANCES. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY ELECTRICAL EQUIPMENT AND CONNECTIONS REQUIRED FOR A COMPLETE, FUNCTIONAL ELECTRICAL SYSTEM.
- WHERE SUMP PUMP EQUIPMENT IS DEMOLISHED, REMOVE ASSOCIATED BRANCH CIRCUITRY, FEEDER AND RACEWAY BACK TO SOURCE WHICH IS DEFINED AS PANEL, SWITCHBOARD OR SWITCHGEAR, FROM WHICH THE CIRCUIT IS SERVED. MAINTAIN CIRCUIT CONTINUITY FOR ALL ELECTRICAL EQUIPMENT, DEVICES AND CIRCUITS TO REMAIN.
- REMOVE ALL HARDWARE UTILIZED FOR SUPPORT OF DEMOLISHED ELECTRICAL EQUIPMENT AND WIRING INDICATED ON SHEET ELO7.8, INCLUDING BUT NOT LIMITED TO CHANNELS, INSERTS, STUDS, THREADED RODS, HANGERS, STRAPS, CLAMPS, ETC. IN ADDITION, REMOVE ALL UNUSED OR ABANDONED ELECTRICAL RACEWAY, WIRES, DEVICES, ETC. WITHIN THE MANHOLES INCLUDED IN THIS PROJECT, UON.
- THE CONTRACTOR SHALL REMOVE ALL DEMOLISHED MATERIALS FROM MWA PROPERTY AND PROPERLY DISPOSE OF OR RECYCLE THE MATERIALS.
- DO NOT DISTURB ANY WIRING WHOSE ORIGIN, FUNCTION OR UTILITY ARE UNKNOWN WITHOUT PRIOR APPROVAL FROM THE COTR. FIELD VERIFY ALL CIRCUITS BEING IMPACTED PRIOR TO START OF WORK.
- THE CONTRACTOR SHALL PERFORM WORK IN CONFINED SPACE(S) IN ACCORDANCE WITH OSHA REQUIREMENTS.
- THE BUTTERFLY DIAGRAMS ON SHEETS ELO7.1 THROUGH ELO7.7 DEPICT THE EXISTING CONDITIONS WITH RESPECT TO CABLE ROUTING, DEADBREAK JUNCTION BARS, DEADBREAK CABLE TERMINATIONS AND CABLE RACK ASSEMBLIES. THE CABLING TO BE REPLACED IS SHOWN IN BOLD LINE WEIGHT. THE DRAWINGS SHOW THE DUCTS OCCUPIED BY THE EXISTING CABLES TO BE REMOVED, WHICH ARE SHOWN HATCHED. THE UNHATCHED BOLD LINES SHOW THE DUCTS TO BE OCCUPIED BY THE NEW CABLES. THE NEW CABLES SHALL BE ROUTED AND RACKED AS INDICATED ON DETAILS 2 AND 3 ON SHEET ELO7.9. THE MANHOLE ACCESSORIES; INCLUDING CABLE RACKS, CHANNELS, DEADBREAK JUNCTION BARS AND GROUNDING; ARE SHOWN IN LIGHT LINE WEIGHT EVEN THOUGH THERE MAY BE NEW WORK ASSOCIATED WITH THESE ITEMS. REFER TO SHEET ELO7.8 FOR EXTENT OF REPAIR AND REHABILITATION WORK IN THE MANHOLES.
- THE CONTRACTOR SHALL PUMP WATER FROM THE DUCTBANK SYSTEM MANHOLES AS REQUIRED FOR CONSTRUCTION ACTIVITIES. WHEN A MANHOLE CONTAINS WATER, THE WATER WILL BE REQUIRED TO PUMPED OUT OF THE MANHOLE PRIOR TO ENTRY AND WORK. IF THE WATER WITHIN A MANHOLE HAS NO VISIBLE SHEEN OR FUEL ODOR, THE WATER CAN BE PUMPED TO GRADE. IF THE WATER WITHIN A MANHOLE DOES HAVE VISIBLE SHEEN AND/OR FUEL ODOR, THE WATER WILL BE CONSIDERED CONTAMINATED AND MUST BE PUMPED INTO A TANK TRUCK AND DISPOSED OF AS REQUIRED BY ALL EPA AND VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY REGULATIONS.
- THE CONTRACTOR SHALL RETAIN SERVICES OF QUALIFIED MWA APPROVED UNDERGROUND UTILITY LOCATOR TO LOCATE ALL UNDERGROUND UTILITIES IN THE VICINITY OF THE NEW DUCTBANK PRIOR TO PROVIDING DUCTBANK BETWEEN MANHOLES 6EP2-3 AND 6EP2-4 AND 7EP1-1 AND 7EP1-2.

SEQUENCE OF WORK

- PERFORM DUCTBANK REPLACEMENT TO TWO DAMAGED DUCTBANK SECTIONS.
- TEST MANHOLE GROUNDING SYSTEM IN ACCORDANCE WITH SPECIFICATION SECTION 260526 PRIOR TO STARTING NEW WORK TO DETERMINE IF NEW OR ADDITIONAL GROUND RODS ARE REQUIRED.
- CLEAN MANHOLES AND PERFORM MANHOLE REPAIRS AND UPGRADES INDICATED EXCEPT FOR RE-MOUNTING OF THE DEADBREAK JUNCTION BARS. INITIAL CLEANING SHALL REMOVE ALL MUD, MUCK, SAND, GRAVEL, DIRT AND DEBRIS TO PROVIDE CLEAN WORK AREA.
- INSTALL THE NEW CABLES FOR PN1 IN THE SPARE DUCTS.
- TERMINATE THE NEW CABLES WITH SEPARABLE CONNECTORS.
- TEST THE NEW CABLES.
- DE-ENERGIZE EXISTING CIRCUIT PN1.
- DISCONNECT ELBOWS OF EXISTING CIRCUIT PN1 FROM DEADBREAK JUNCTION BARS OR SEPARABLE SPLICES. REMOVE CABLES FROM RACKS.
- REMOVE DEADBREAK JUNCTION BARS FROM WALL MOUNTED CHANNELS, REMOVE CHANNELS AND MOUNT DEADBREAK JUNCTION BARS DIRECTLY TO CONCRETE MANHOLE WALL.
- TIE NEW CABLES TO CABLE RACKS AND CONNECT NEW ELBOWS OF NEW CIRCUIT PN1 TO THE DEADBREAK JUNCTION BARS.
- CONNECT GROUNDING CONDUCTORS AND SHIELD CONDUCTORS OF NEW FEEDERS TO THE NEW GROUNDING SYSTEM. TEST GROUNDING SYSTEM IN ACCORDANCE WITH SPECIFICATION SECTION 260526.
- TEST RECONNECTED SYSTEM AT A MAINTENANCE TEST VOLTAGE OF 5KV. COORDINATE WITH MWA ELECTRIC SHOP FOR TEST PROCEDURES.
- RE-ENERGIZE CIRCUIT PN1.
- REMOVE OLD CABLES FROM DUCTBANK AND MANHOLES.
- REPEAT STEPS 4 THROUGH 14 FOR CIRCUIT PN2.
- PERFORM FINAL CLEANING OF MANHOLES TO REMOVE CONSTRUCTION DEBRIS.

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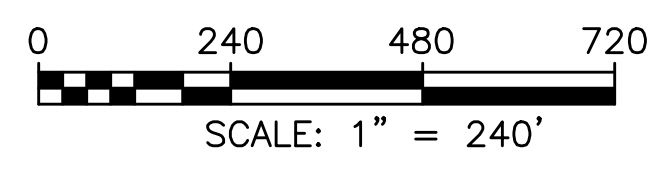
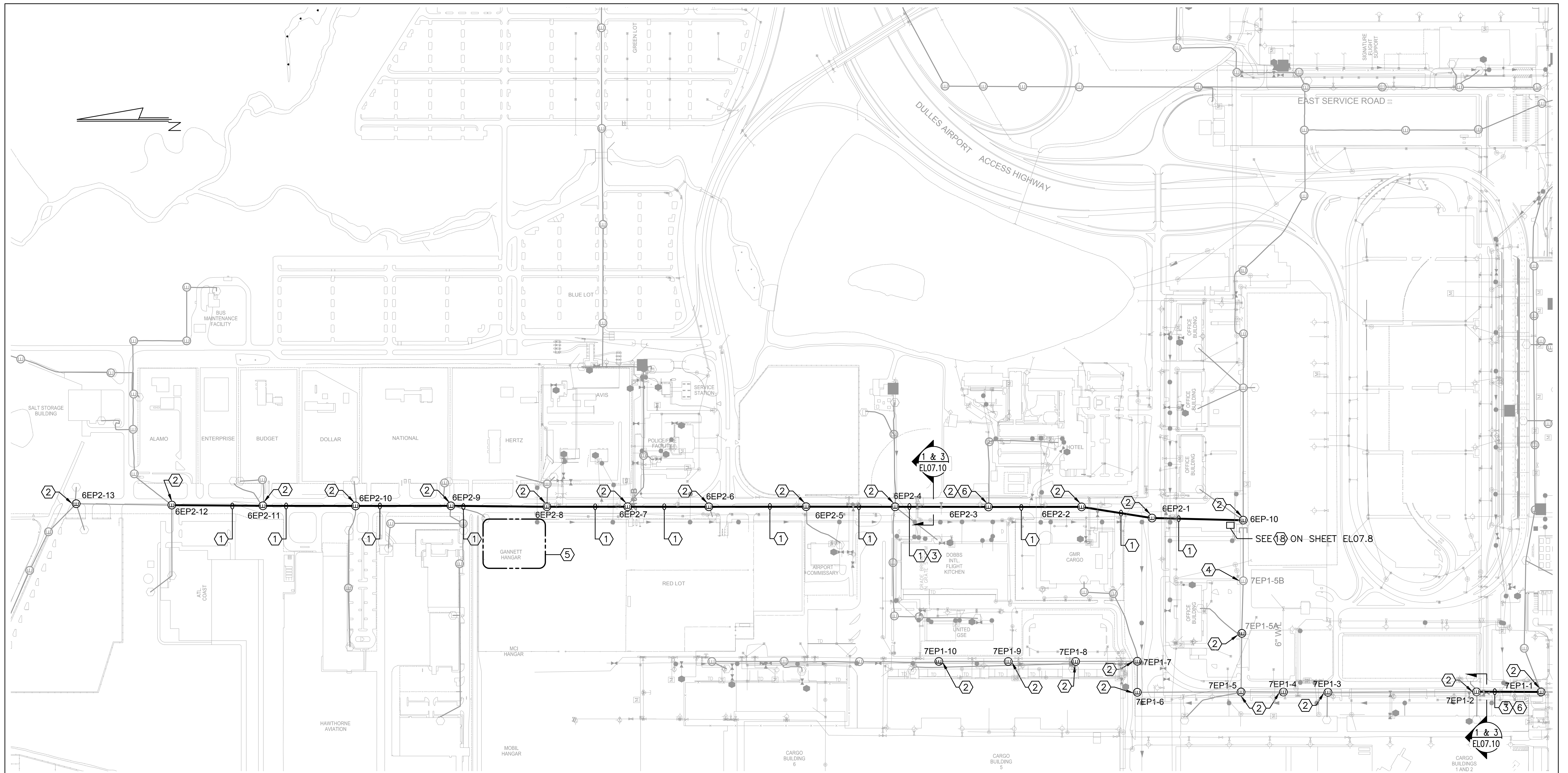


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| ACCEPTED | LWC |
| SUBMITTED | DRH |
| APPROVED | FDH |

METROPOLITAN WASHINGTON AIRPORTS AUTHORITY

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| UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C. | PROJECT IDENTIFIER | IL1204 |
| | SHEET NAME | EL00.1 |
| SYMBOLS, ABBREVIATIONS, GENERAL NOTES AND SEQUENCE OF WORK | VOLUME NUMBER | 1 of 1 |
| | SHEET NUMBER | 3 of 14 |



NOTE

1. SEE EL00.1 FOR SEQUENCE OF WORK.

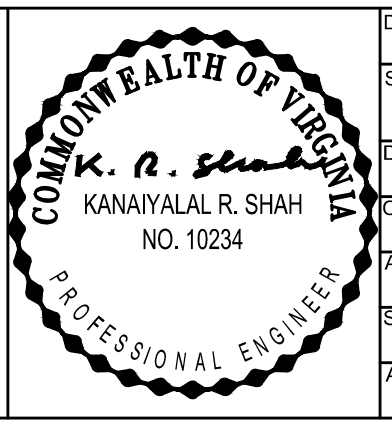
DRAWING NOTES

- ① PROVIDE NEW CABLES TO REPLACE EXISTING CABLES FOR CIRCUITS PN1 AND PN2. 3 - 500 kcmil + 1 - #4/0 AWG GROUND PER CIRCUIT.
- ② FOR CABLE DETAILS, MANHOLE REPAIRS AND MANHOLE ACCESSORIES SEE MANHOLE BUTTERFLY DIAGRAMS ON DRAWINGS EL07.1 THROUGH EL07.7, REPAIR MATRIX AND NOTES ON EL07.8 AND DETAILS ON EL07.9 AND EL07.10.
- ③ PROVIDE NEW 4 WAY, 5" DIAMETER CONCRETE ENCASED DUCTBANK TO REPLACE THE EXISTING BROKEN OR COLLAPSED DUCTBANKS. SEE EL07.10 FOR DETAILS. PREFERABLY, THE NEW DUCTBANK SHALL BE INSTALLED ABOVE THE EXISTING DUCTBANK TO REDUCE THE CHANCE OF INTERFERENCE WITH EXISTING UTILITIES AND SUBSURFACE ROCKS. CARE MUST BE TAKEN TO AVOID FURTHER DAMAGE TO THE EXISTING BROKEN OR COLLAPSED DUCTBANK. PRIOR TO COMMENCING WORK TO REPLACE THE DUCTBANK, IDENTIFY ALL EXISTING UTILITIES IN PROXIMITY TO THE DUCTBANK EXCAVATION AND CONFIGURE THE ROUTING OF DUCTBANK ACCORDINGLY.
- ④ NO WORK IN THIS MANHOLE.
- ⑤ PROJECT LAYDOWN AREA. SEE SPECIFICATION 015000 FOR FURTHER INFORMATION.
- ⑥ THERE ARE SEVERAL UNDERGROUND UTILITIES IN THE VICINITY OF THE NEW DUCTBANKS, INCLUDING BUT NOT LIMITED TO GAS, WATER, STORM DRAIN AND SANITARY SEWER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING EXISTING UTILITIES AND AVOIDING DAMAGE TO ALL EXISTING UTILITIES DURING EXCAVATION FOR THE NEW DUCTBANK.

| LEGEND | |
|--------|------------------|
| (M) | MANHOLE LOCATION |

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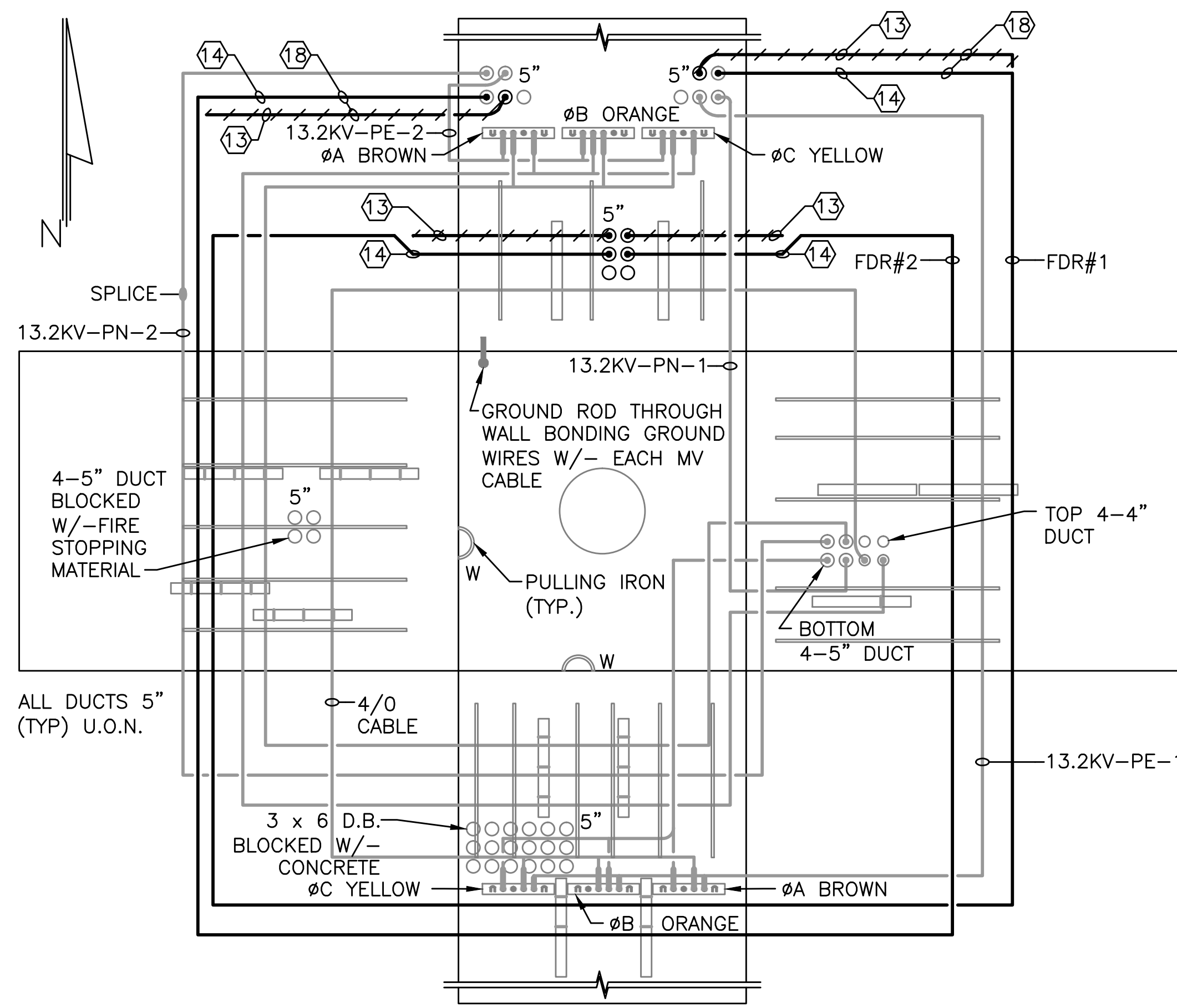


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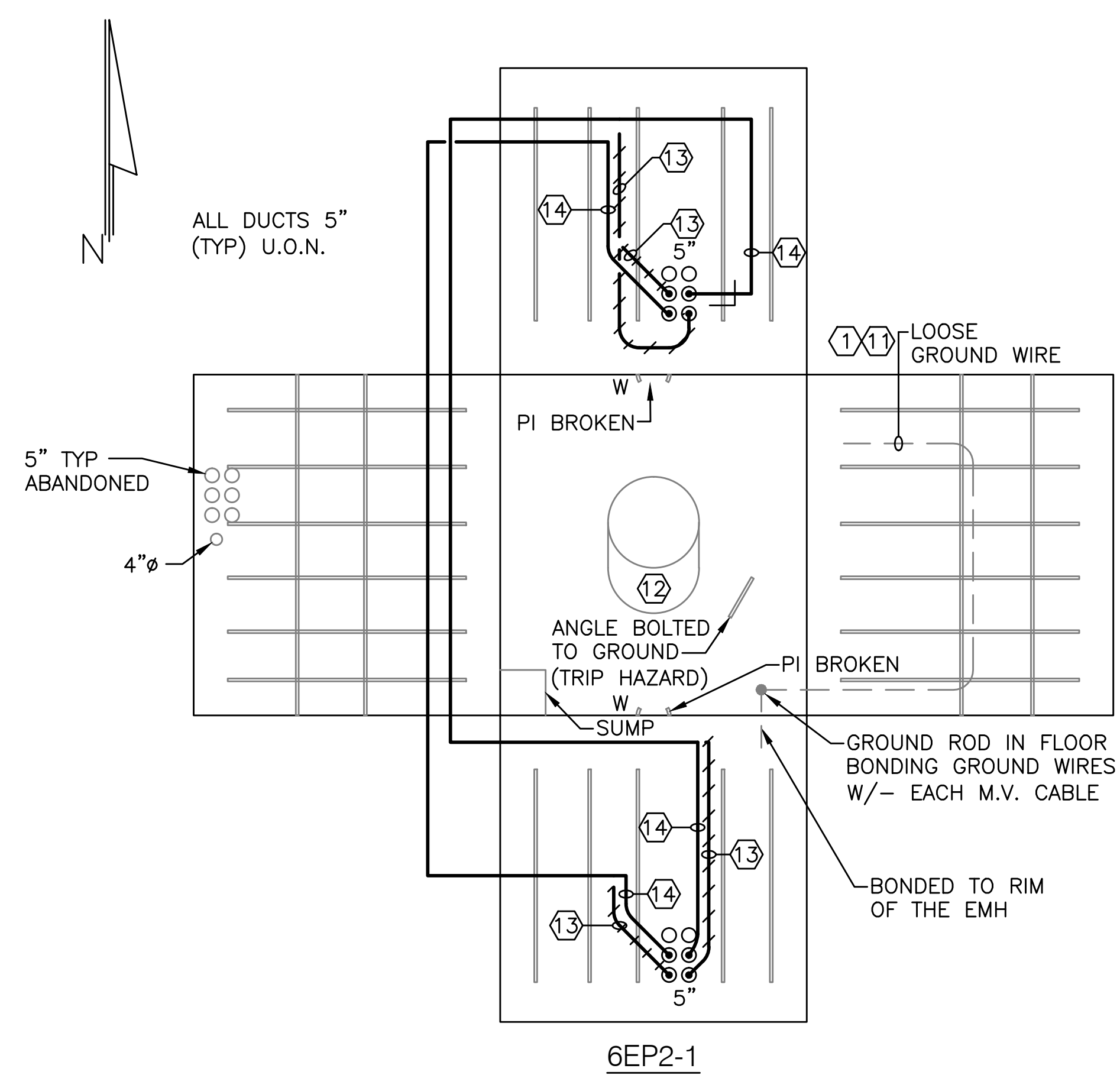
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 WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C.

SITE PLAN EXISTING AND NEW WORK

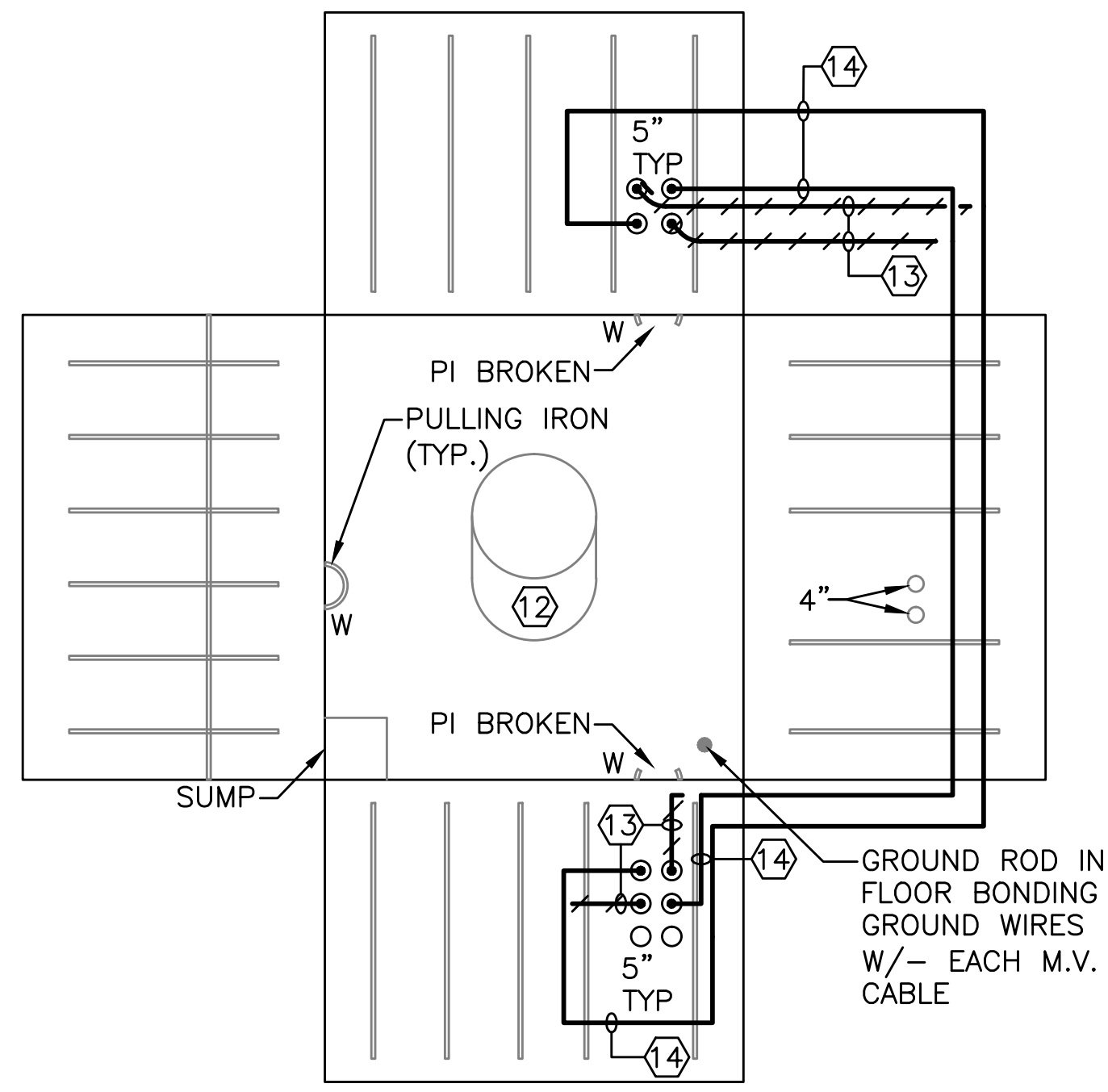
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| SHEET NAME | EL01.1 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 4 of 14 |



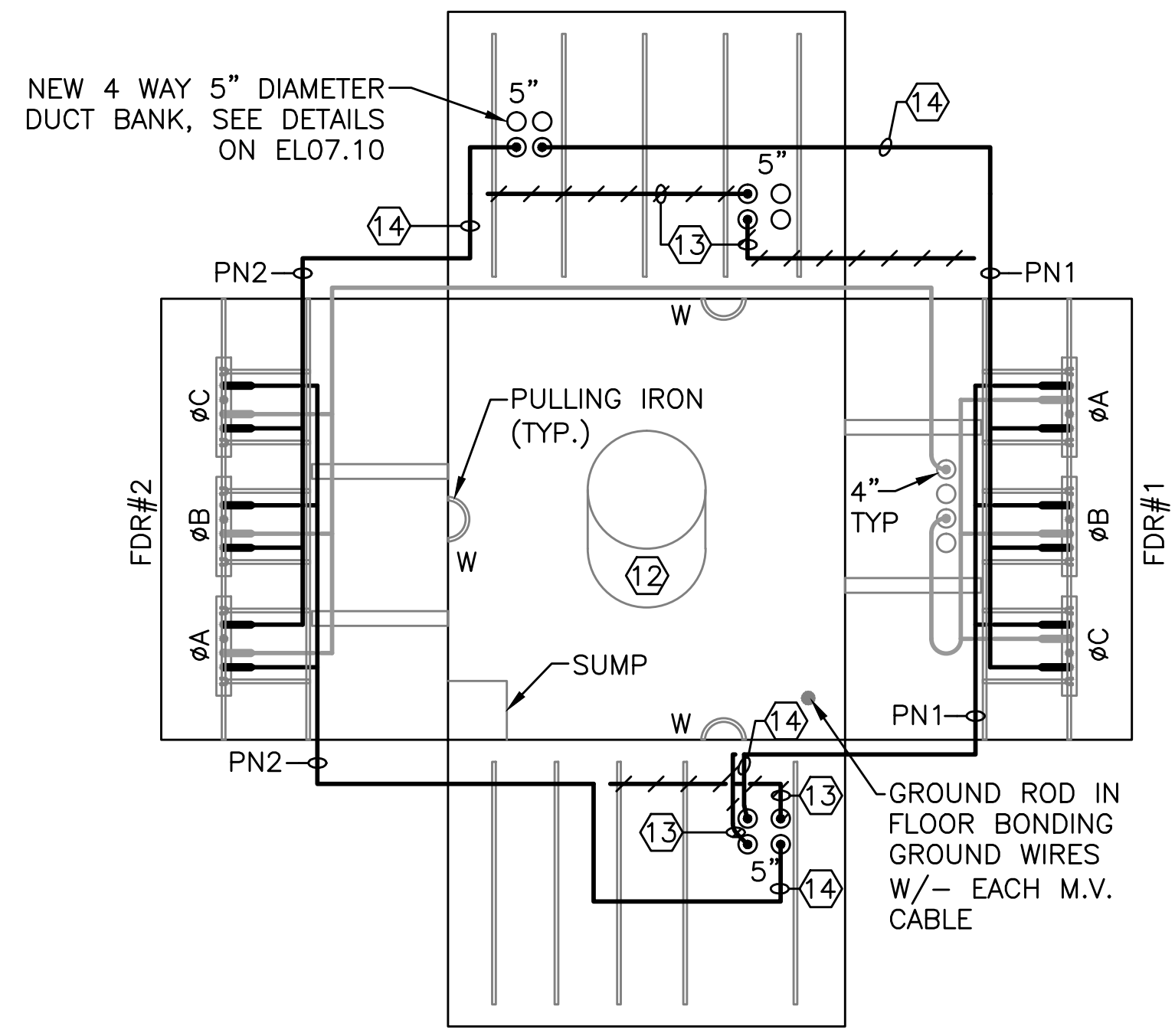
6EP-10



6EP2-1



6EP2-2



6EP2-3

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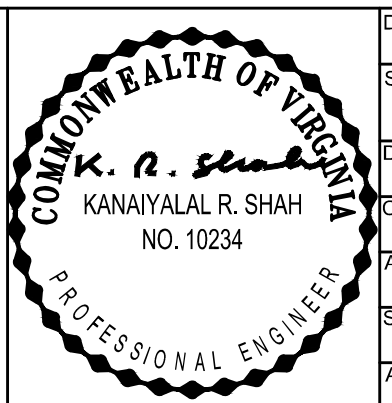
- SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

- BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- OBLONG OPENING IN CEILING OF MANHOLE FOR EASY ACCESS.
- EXISTING 15KV CABLE TO BE REPLACED BY NEW CABLE. NOTE 14
- NEW 15KV CABLE TO REPLACE EXISTING CABLE. NOTE: ON THIS DRAWING, CABLE ROUTING IS SHOWN DIAGRAMMATICALLY, AND IS NOT THE ACTUAL ROUTE. SEE DETAILS 2 AND 3 ON SHEET EL07.9 FOR INFORMATION ON ACTUAL CABLE ROUTE TO BE PROVIDED.
- REPLACE THE EXISTING CABLES TO THE EXISTING PAD MOUNTED SWITCH LOCATED ADJACENT TO MANHOLE 6EP10 WITH NEW CABLES AND NEW TERMINATIONS.

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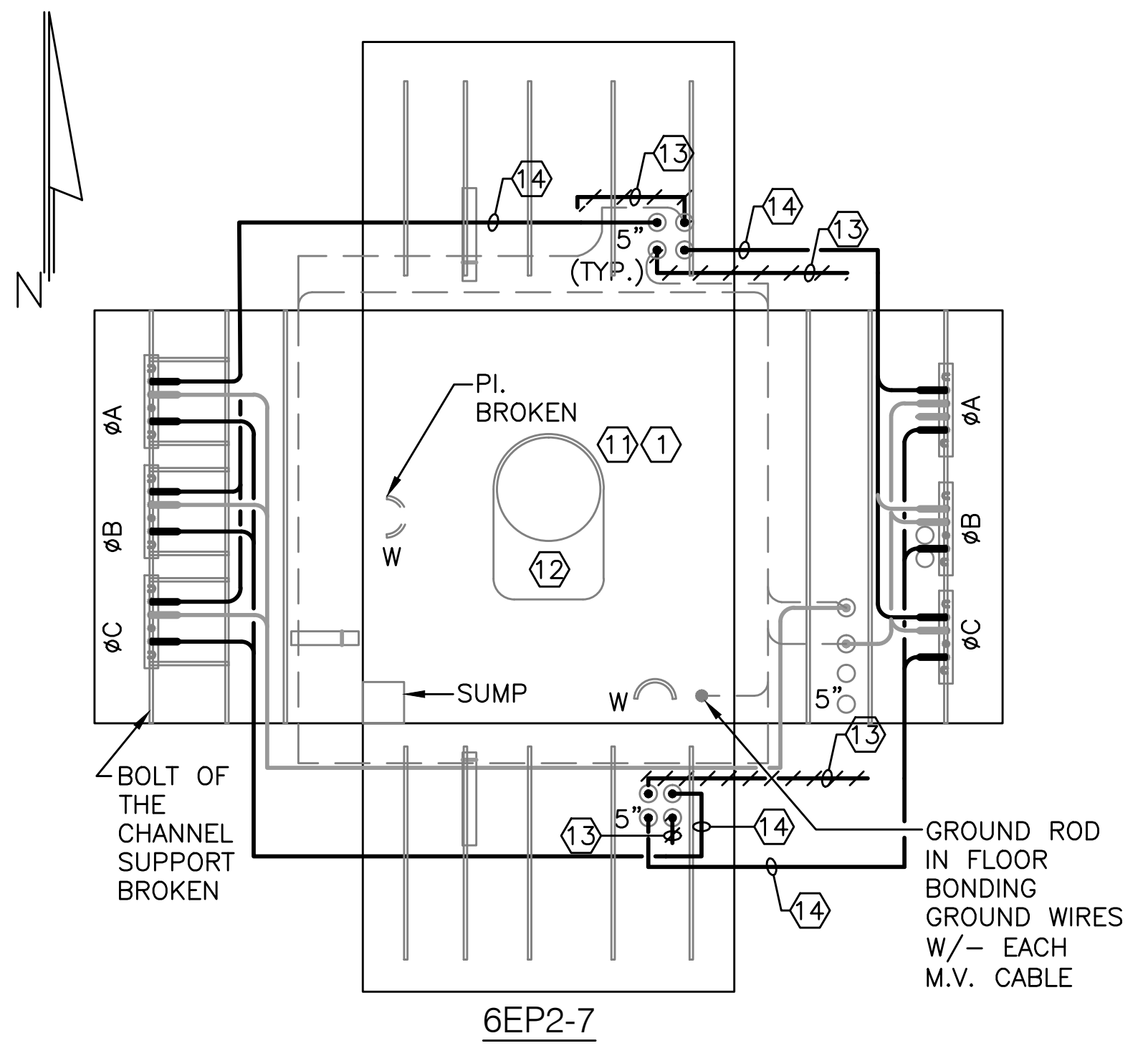
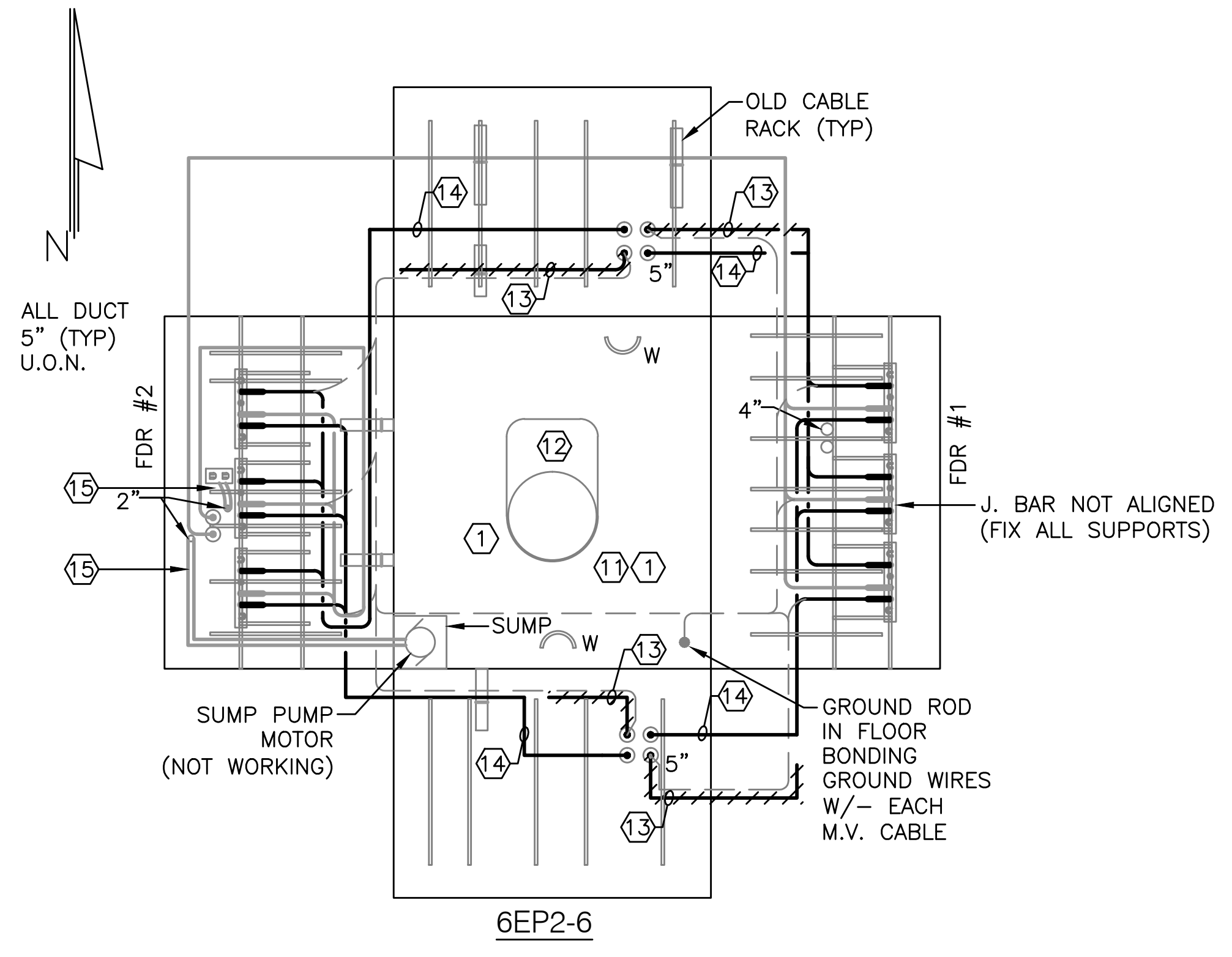
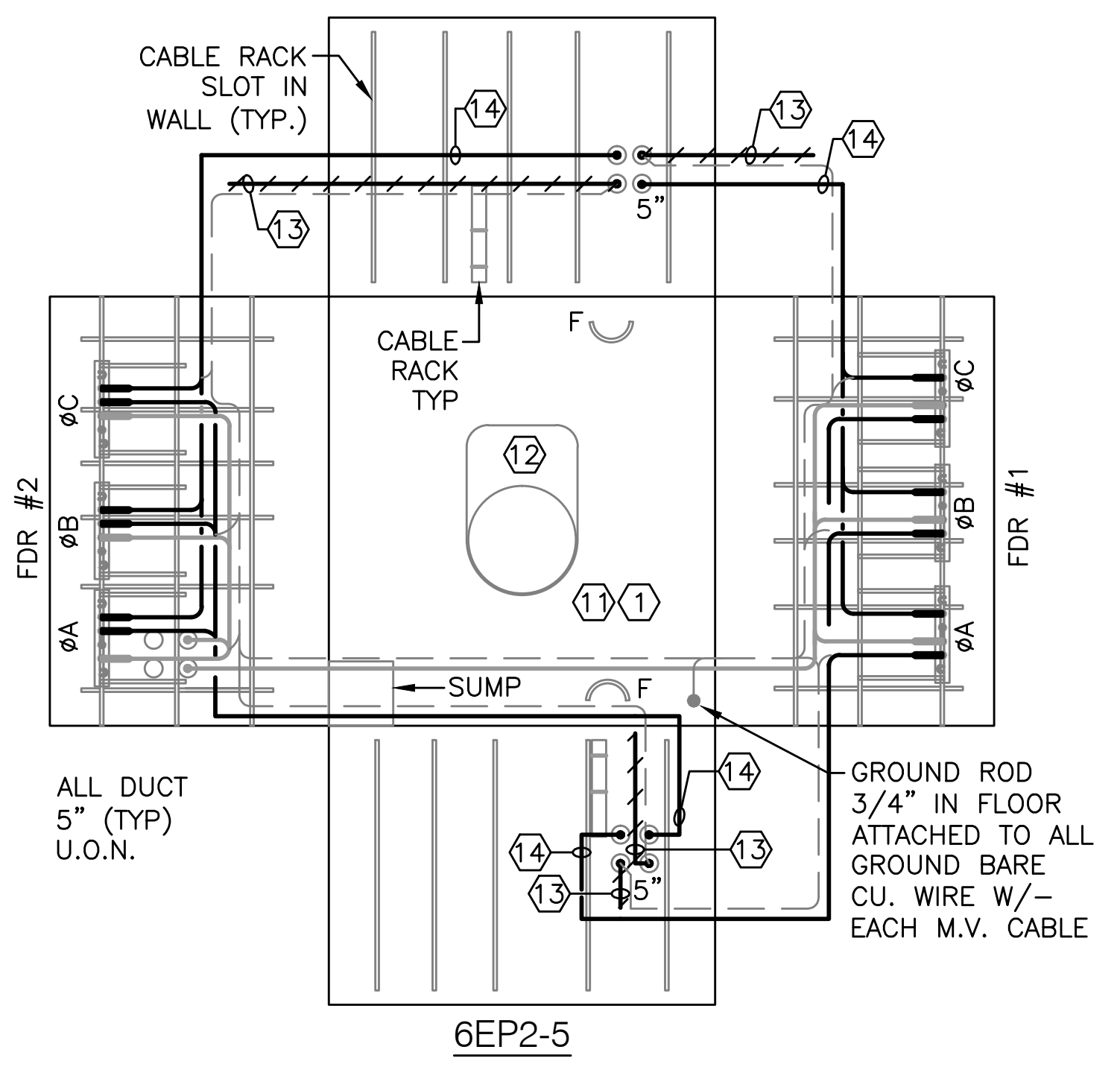
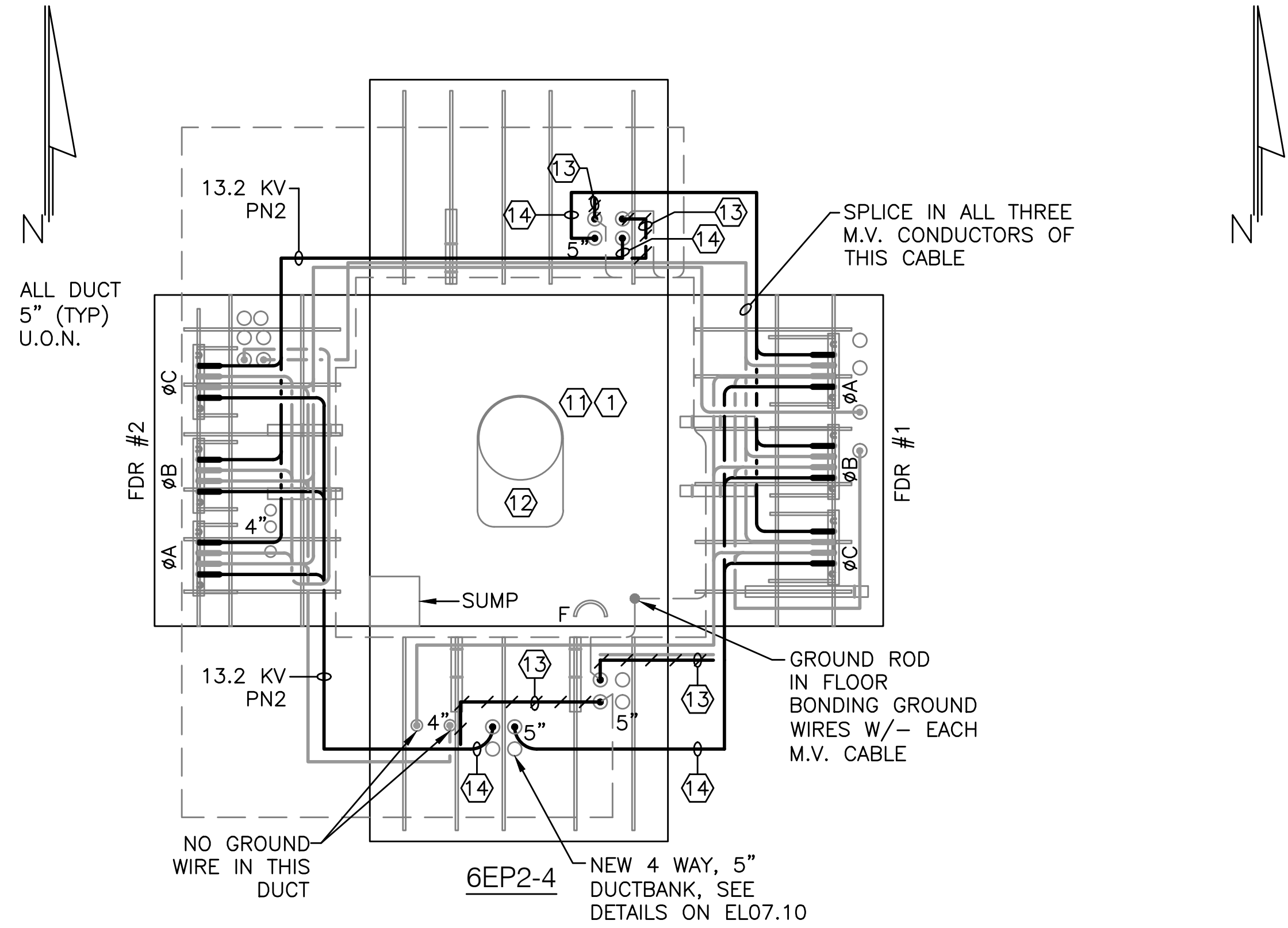
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UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT
 WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C.
MANHOLE BUTTERFLY DRAWINGS
6EP-10, 6EP2-1 TO 6EP2-3
EXISTING, DEMOLITION AND NEW WORK

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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | EL07.1 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 5 of 14 |



NOTES

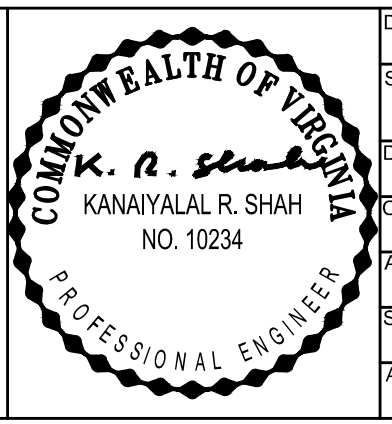
- 1. SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

- ① BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- ①① GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- ② OBLONG OPENING IN CEILING OF MANHOLE FOR EASY ACCESS.
- ⑬ EXISTING 15KV CABLE TO BE REPLACED BY NEW CABLE. NOTE ⑭
- ⑭ NEW 15KV CABLE TO REPLACE EXISTING CABLE. NOTE: ON THIS DRAWING, CABLE ROUTING IS SHOWN DIAGRAMMATICALLY, AND IS NOT THE ACTUAL ROUTE. SEE DETAILS 2 AND 3 ON SHEET EL07.9 FOR INFORMATION ON ACTUAL CABLE ROUTE TO BE PROVIDED.
- ⑮ SUMP PUMP AND ASSOCIATED BOXES, WIRING, DEVICES AND PIPING TO BE REMOVED.

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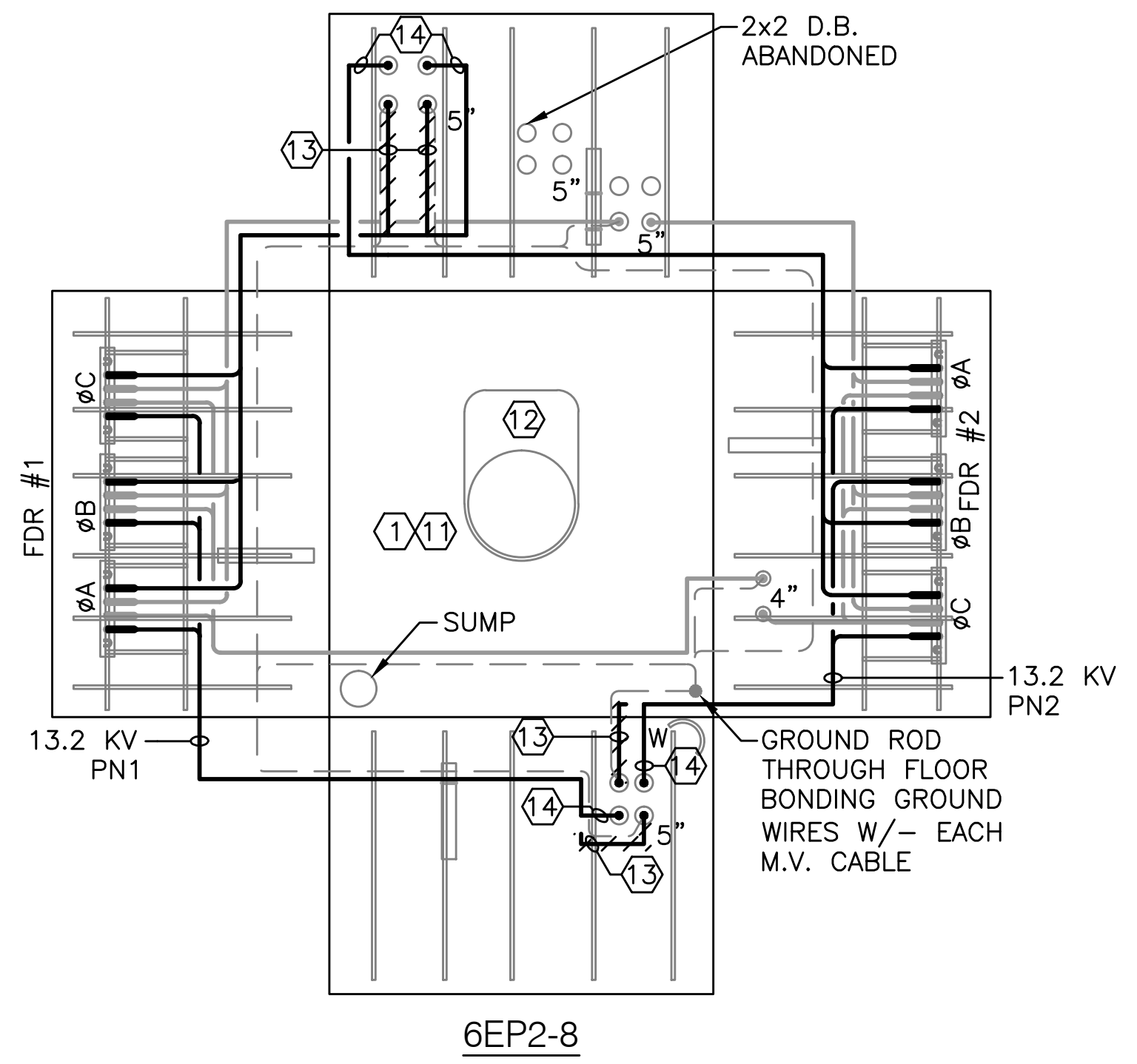


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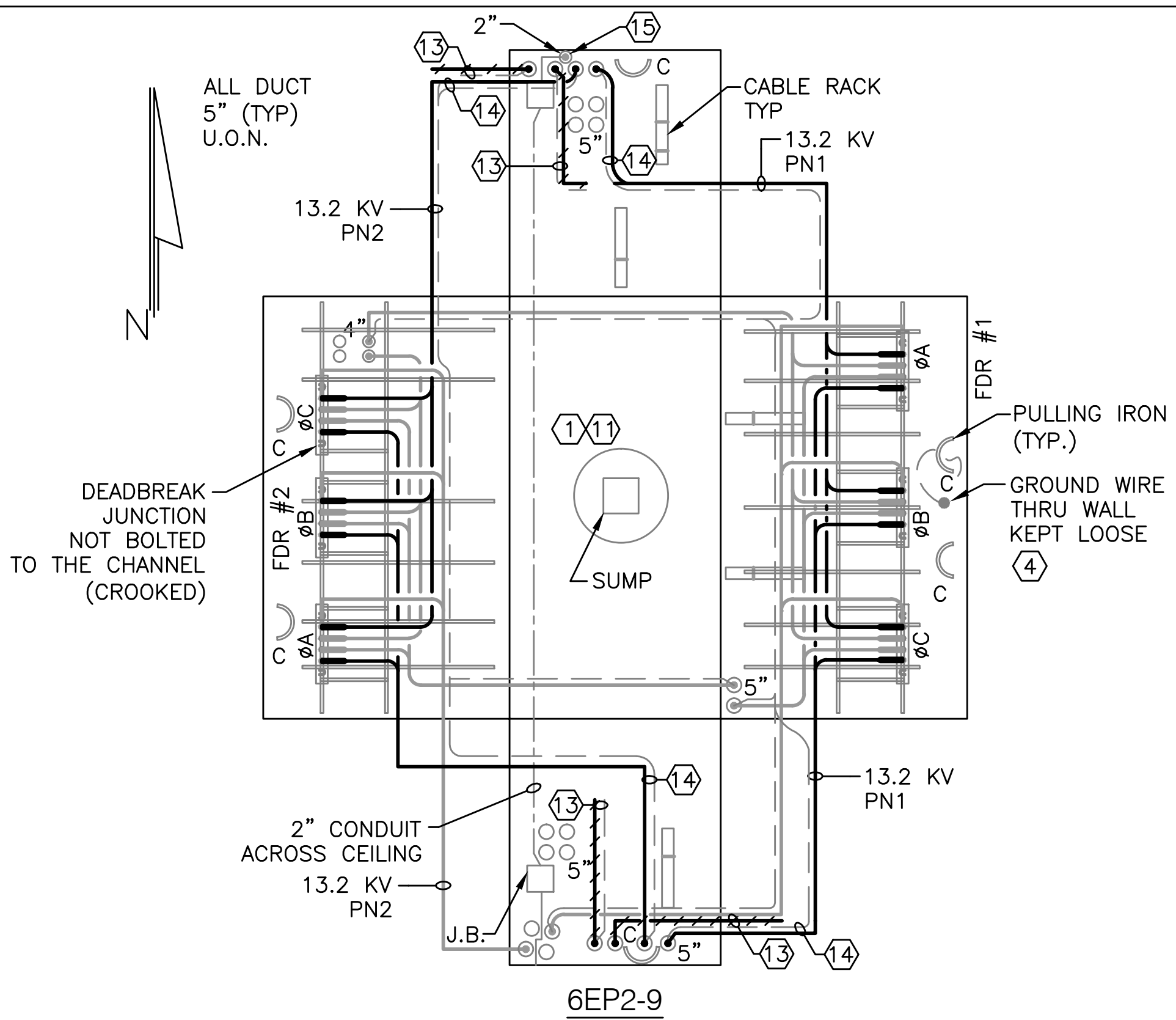


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| UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C. | PROJECT IDENTIFIER | IL1204 |
| | SHEET NAME | EL07.2 |
| MANHOLE BUTTERFLY DRAWINGS 6EP2-4 TO 6EP2-7 EXISTING, DEMOLITION AND NEW WORK | VOLUME NUMBER | 1 of 1 |
| | SHEET NUMBER | 6 of 14 |



6EP2-8



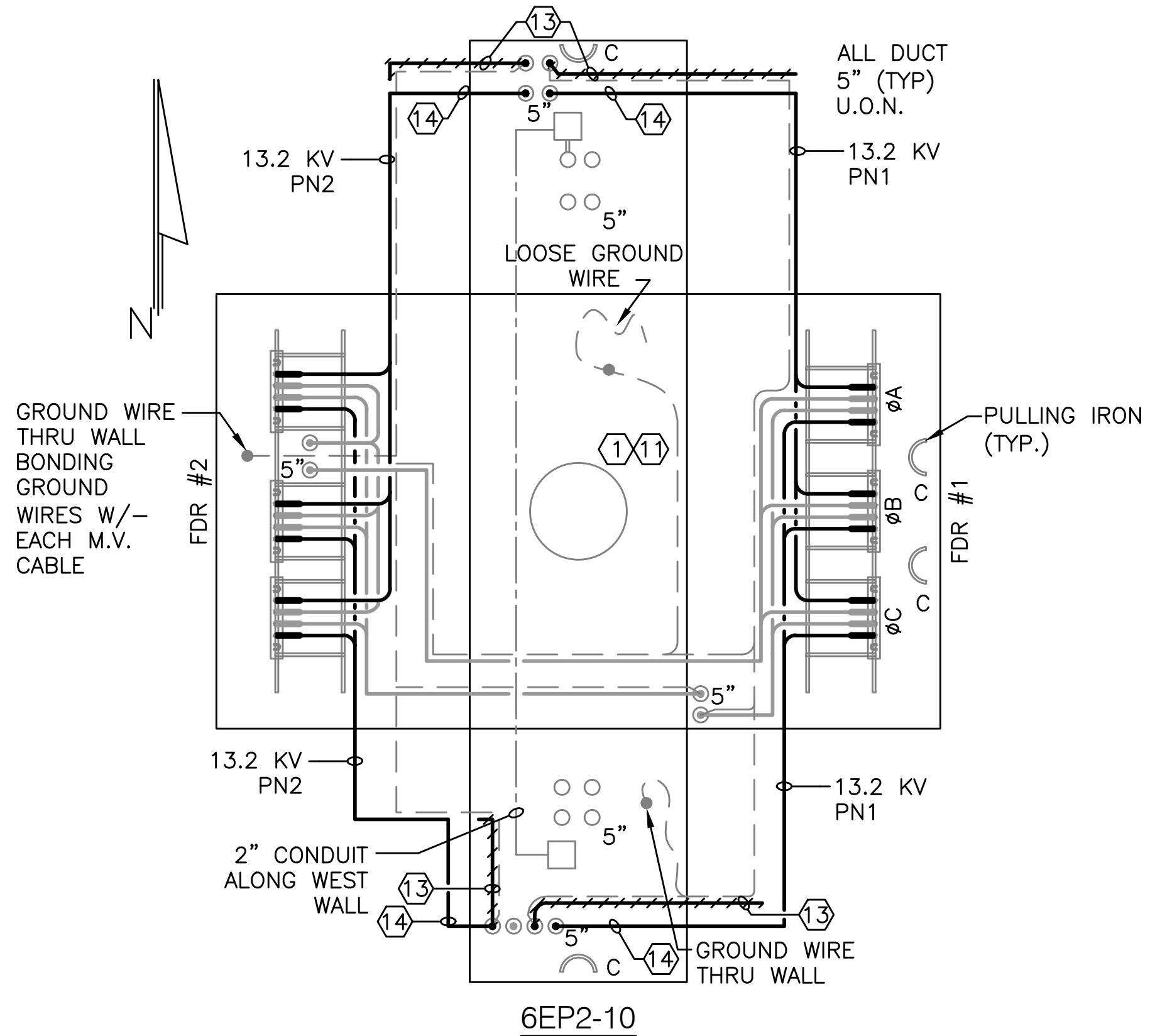
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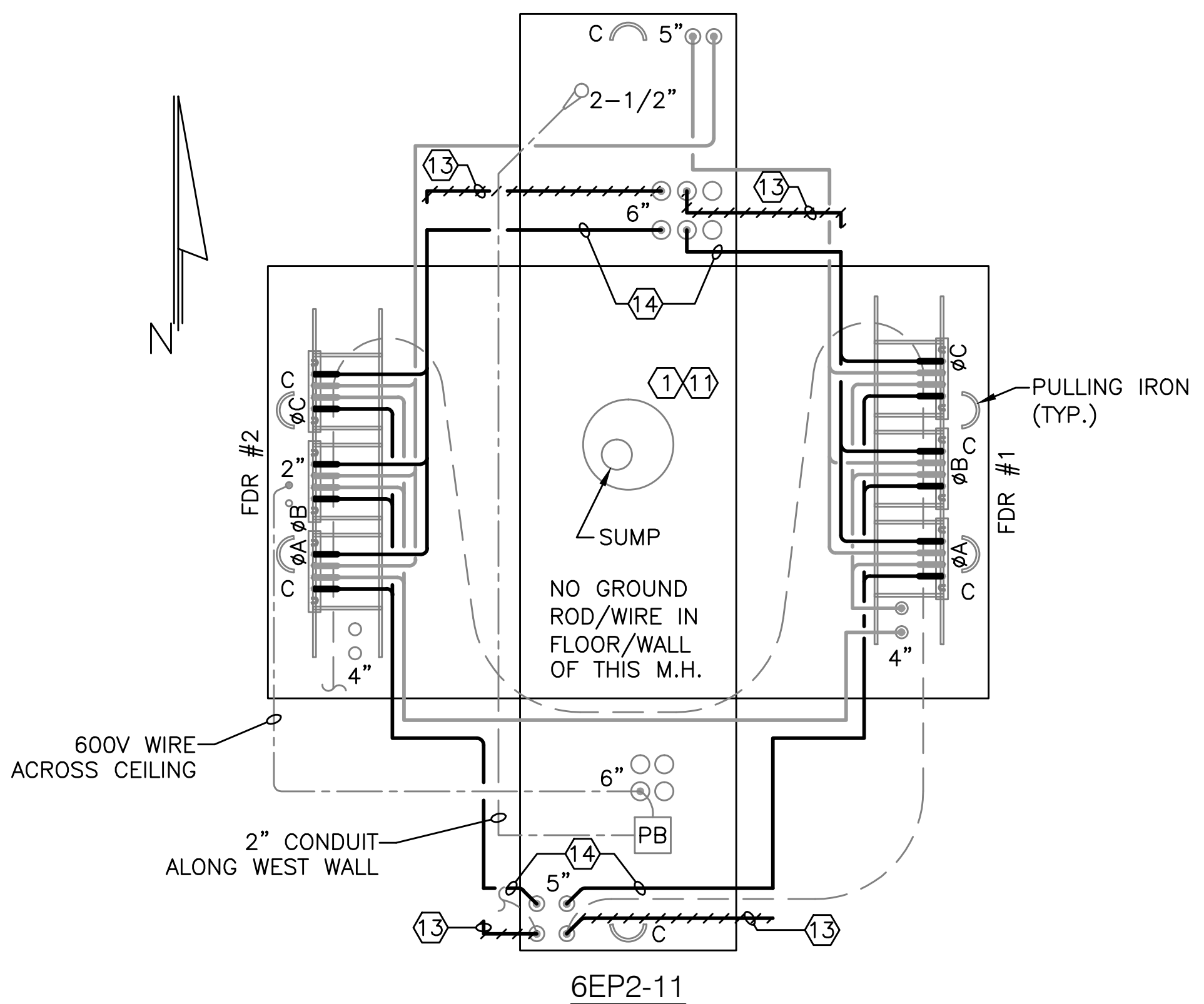
- 1. SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

- ① BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- ④ REMOVE UNUSED POWER, COMMUNICATION AND GROUND CONDUCTORS.
- ①① GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- ② OBLONG OPENING IN CEILING OF MANHOLE FOR EASY ACCESS.
- ⑬ EXISTING 15KV CABLE TO BE REPLACED BY NEW CABLE. NOTE ⑭
- ⑭ NEW 15KV CABLE TO REPLACE EXISTING CABLE. NOTE: ON THIS DRAWING, CABLE ROUTING IS SHOWN DIAGRAMMATICALLY, AND IS NOT THE ACTUAL ROUTE. SEE DETAILS 2 AND 3 ON SHEET EL07.9 FOR INFORMATION ON ACTUAL CABLE ROUTE TO BE PROVIDED.
- ⑮ SUMP PUMP AND ASSOCIATED BOXES, WIRING, DEVICES AND PIPING TO BE REMOVED.



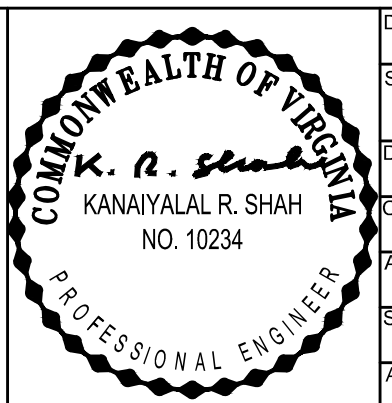
6EP2-10



6EP2-11

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| DATE | AUGUST 17, 2012 |
| SCALE | NOT TO SCALE |
| DESIGNED | RL |
| CHECKED | KRS |
| DRAWN | AMC |
| ACCEPTED | LWC |
| SUBMITTED | DRH |
| APPROVED | FDH |



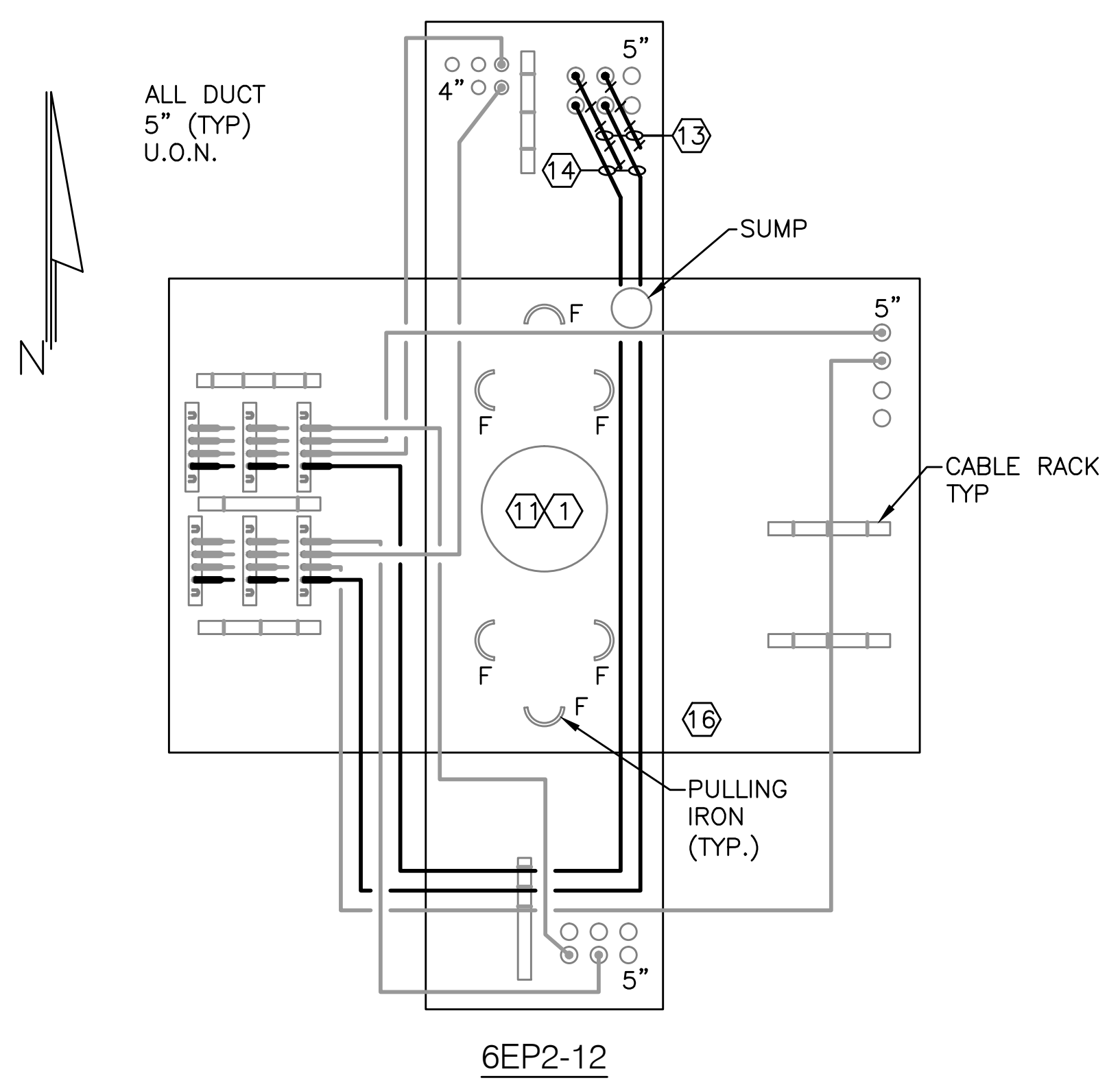
METROPOLITAN WASHINGTON AIRPORTS AUTHORITY

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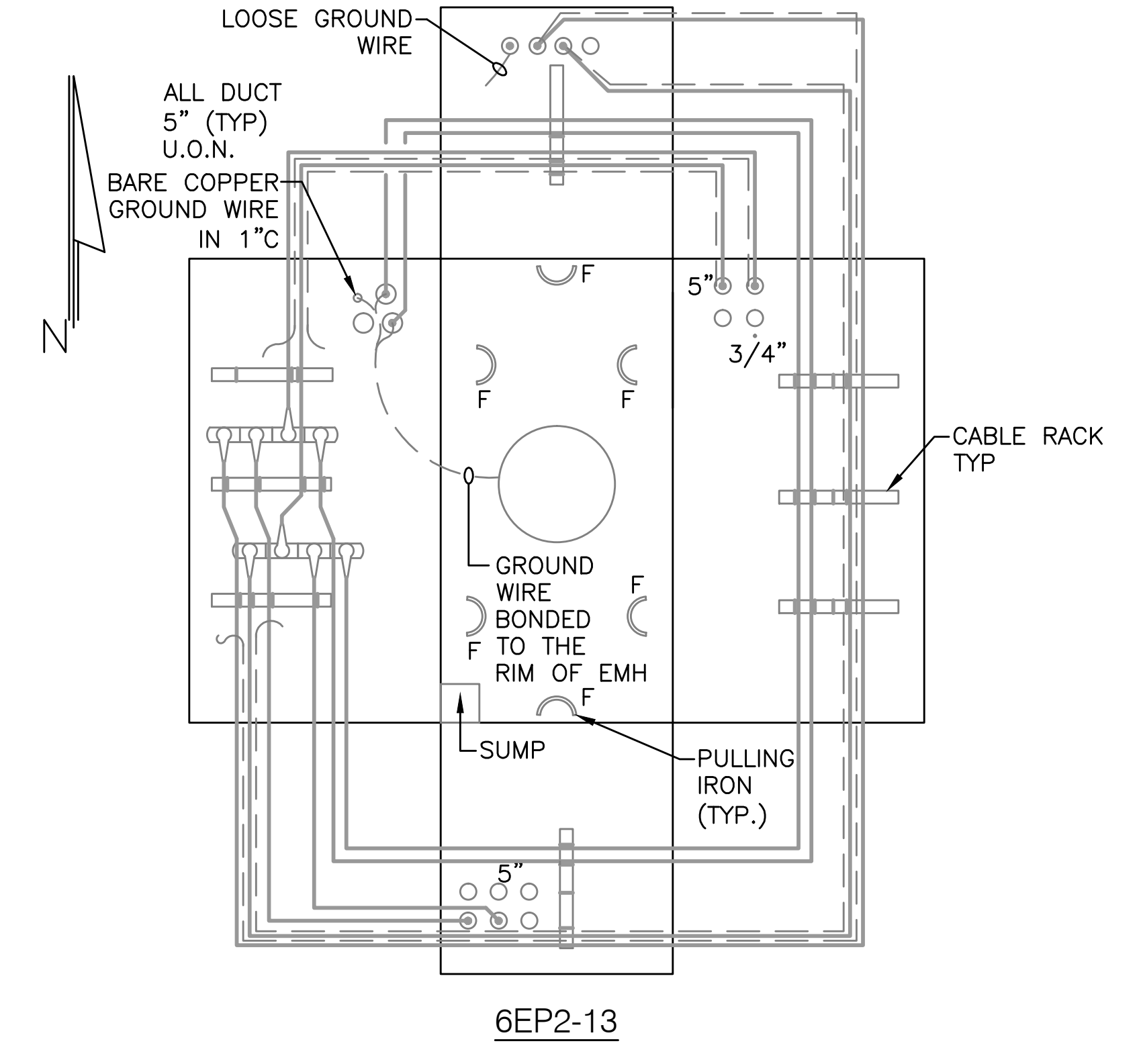
UNDERGROUND DUCTBANK
 REHABILITATION AND ELECTRICAL
 FEEDER REPLACEMENT
 WASHINGTON DULLES INTERNATIONAL AIRPORT
 WASHINGTON, D.C.

**MANHOLE BUTTERFLY DRAWINGS
 6EP2-8 TO 6EP2-11
 EXISTING, DEMOLITION AND NEW WORK**

| | |
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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | EL07.3 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 7 of 14 |



6EP2-12



6EP2-13

NOTES

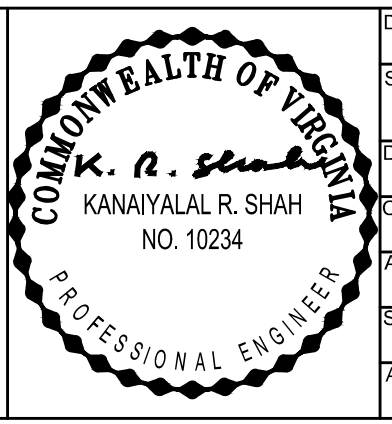
- SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

- BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- EXISTING 15KV CABLE TO BE REPLACED BY NEW CABLE. NOTE 14
- NEW 15KV CABLE TO REPLACE EXISTING CABLE. NOTE: ON THIS DRAWING, CABLE ROUTING IS SHOWN DIAGRAMMATICALLY, AND IS NOT THE ACTUAL ROUTE. SEE DETAILS 2 AND 3 ON SHEET EL07.9 FOR INFORMATION ON ACTUAL CABLE ROUTE TO BE PROVIDED.
- NO GROUND ROD OR GROUND WIRE IN THIS MANHOLE.

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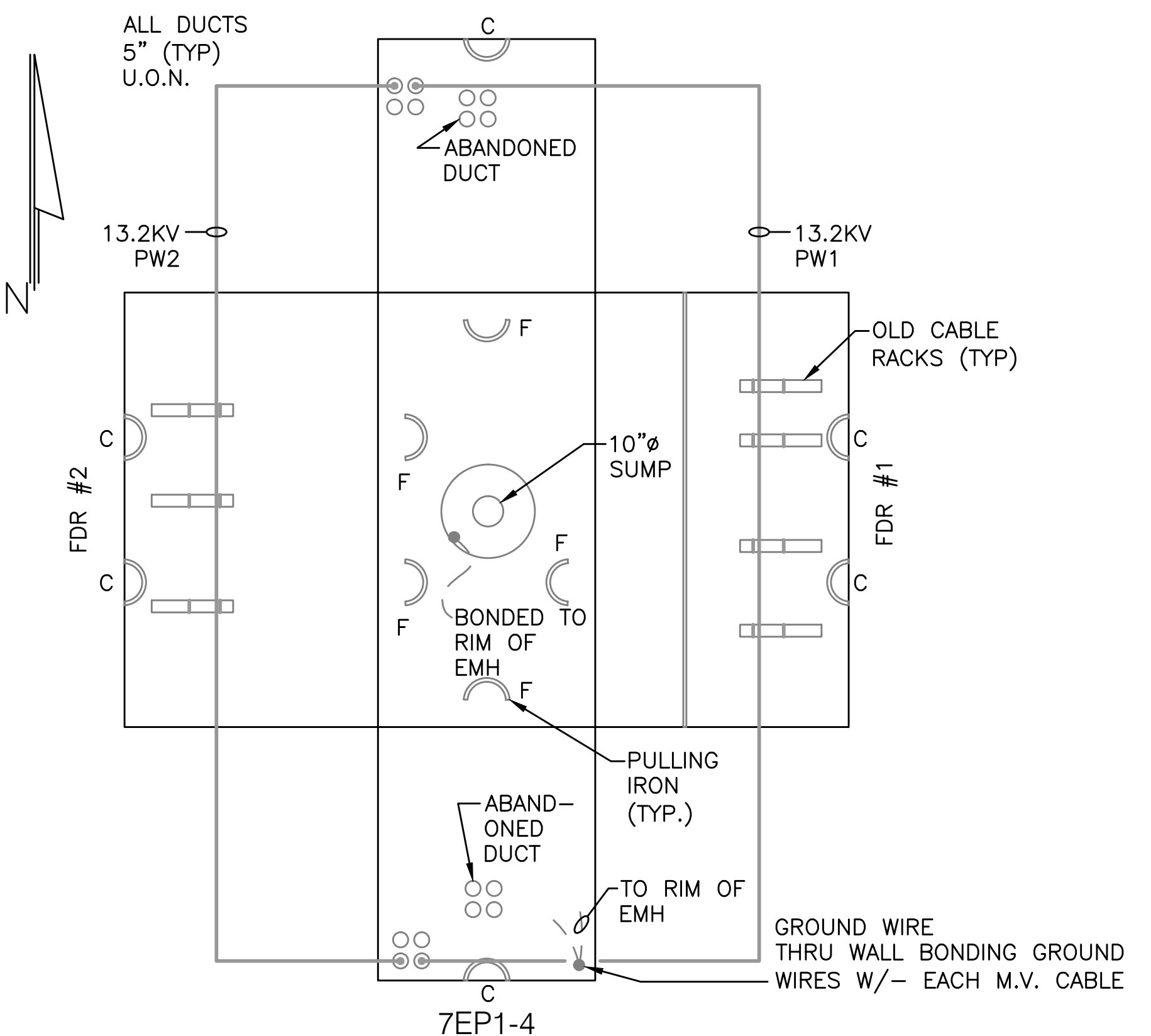
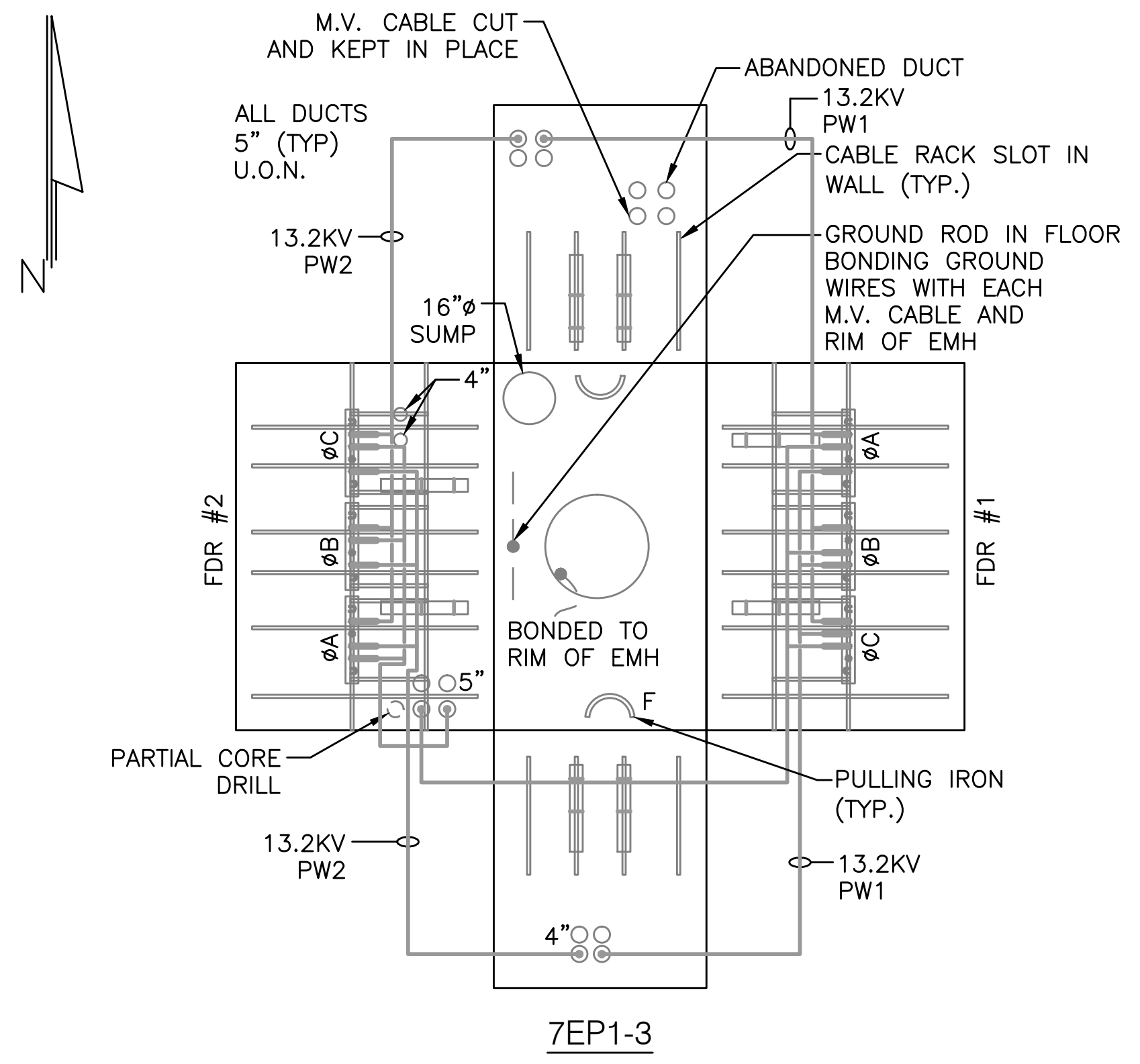
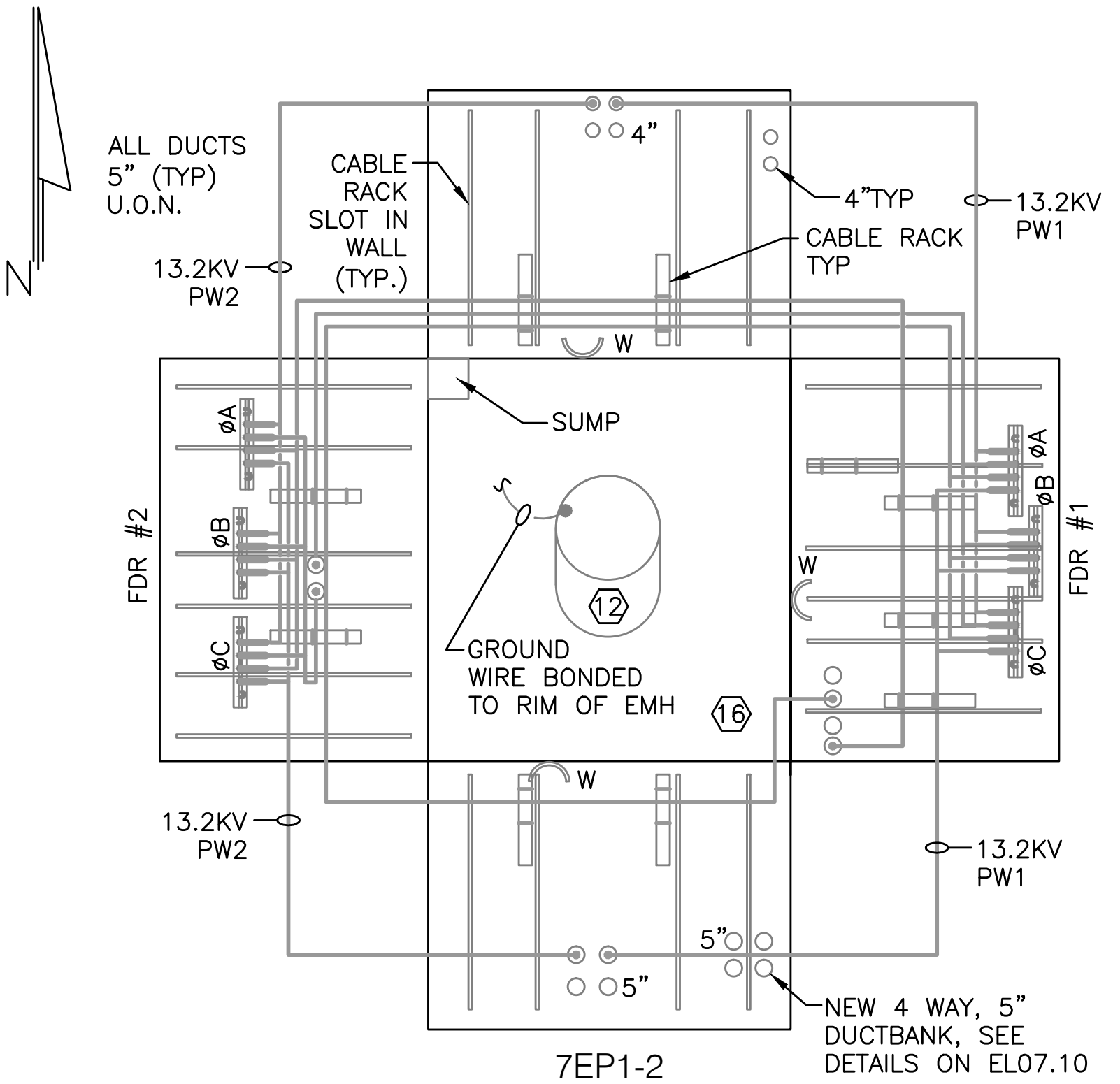
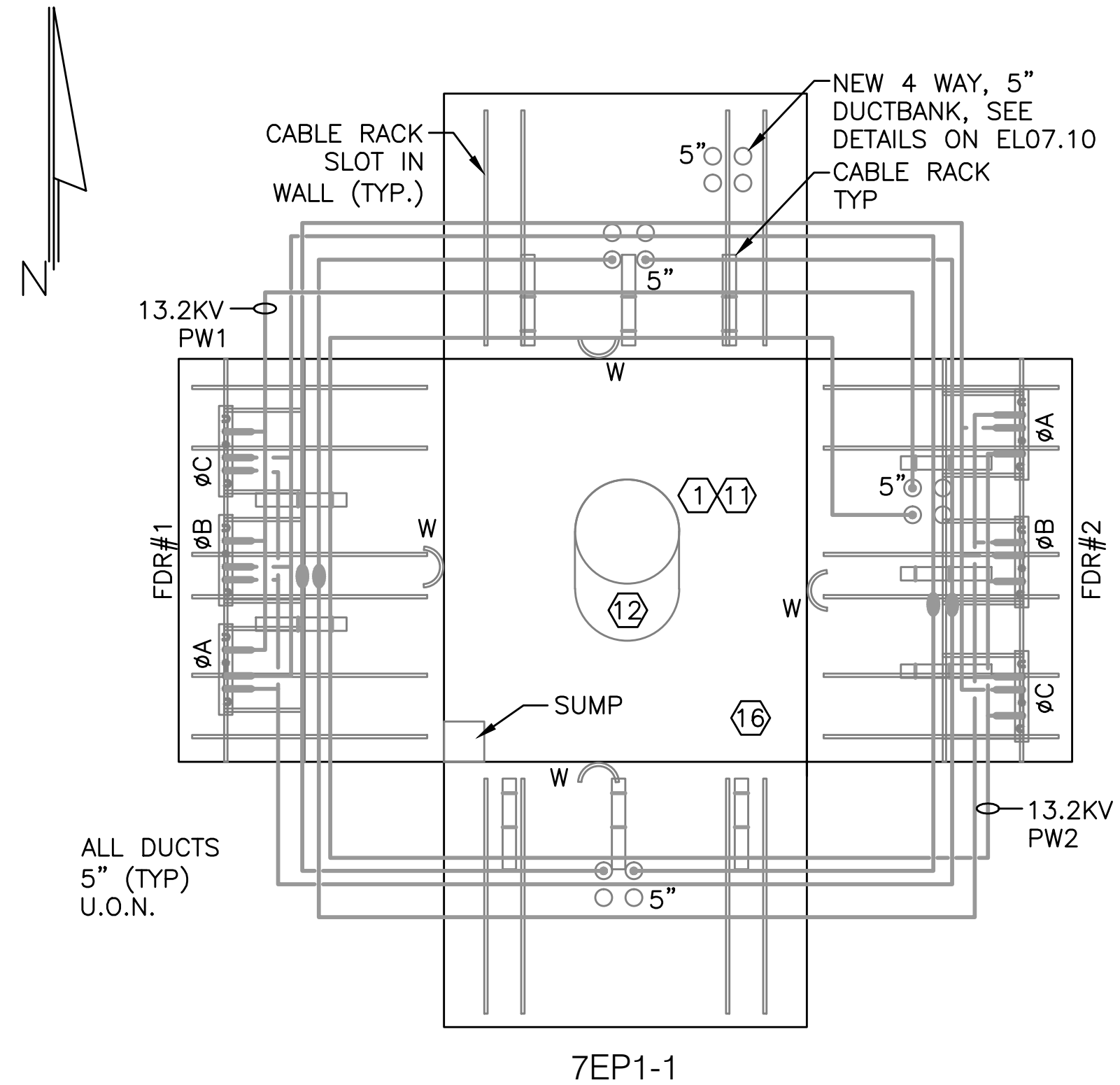
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 WASHINGTON DULLES INTERNATIONAL AIRPORT
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MANHOLE BUTTERFLY DRAWINGS
6EP2-12 TO 6EP2-13
EXISTING, DEMOLITION AND NEW WORK

| | |
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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | EL07.4 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 8 of 14 |



NOTES

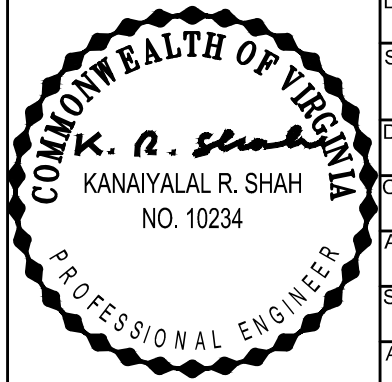
- 1. SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

- ① BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- ①① GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- ①② OBLONG OPENING IN CEILING OF MANHOLE FOR EASY ACCESS.
- ①⑥ NO GROUND ROD OR GROUND WIRE IN THIS MANHOLE.

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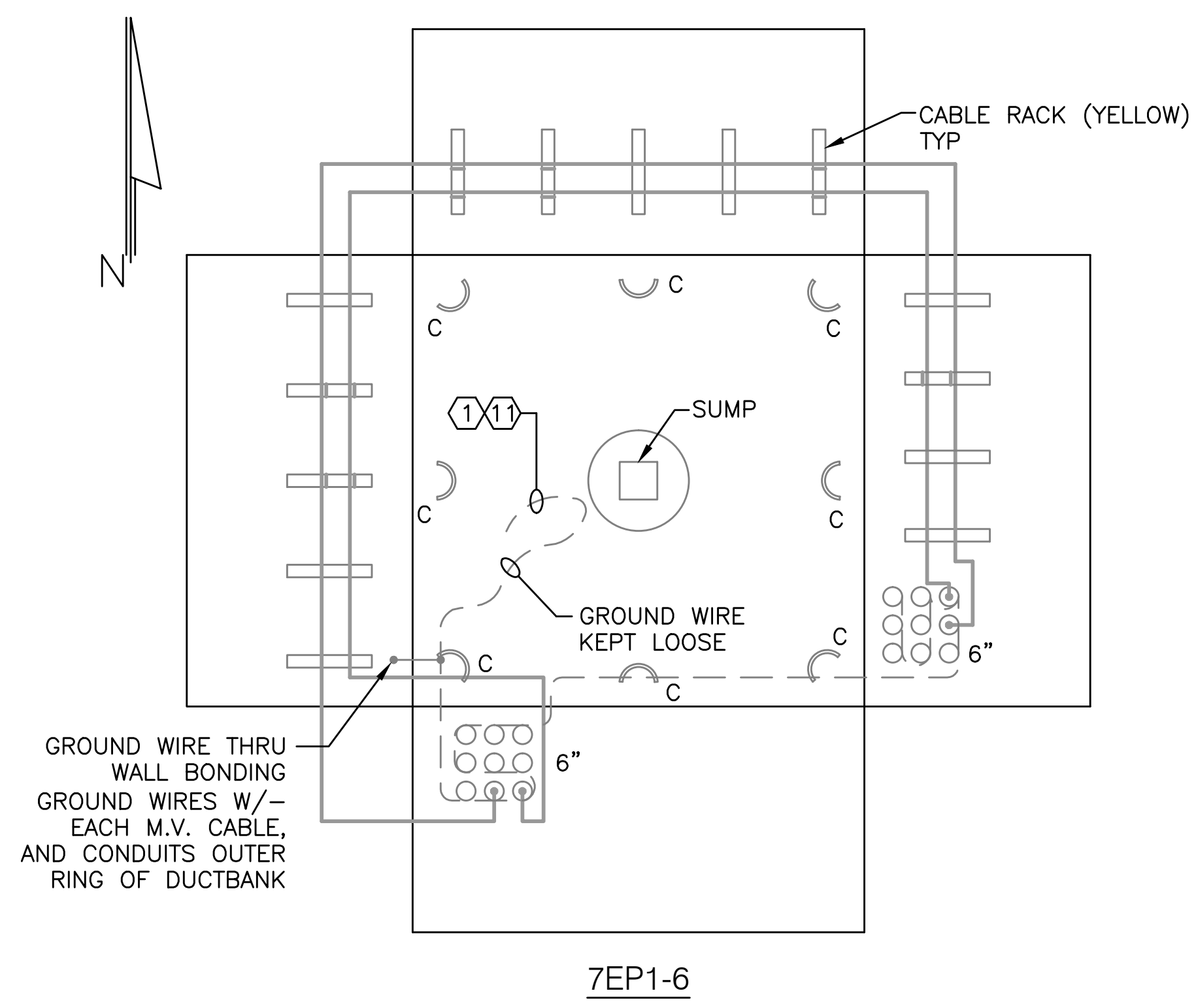
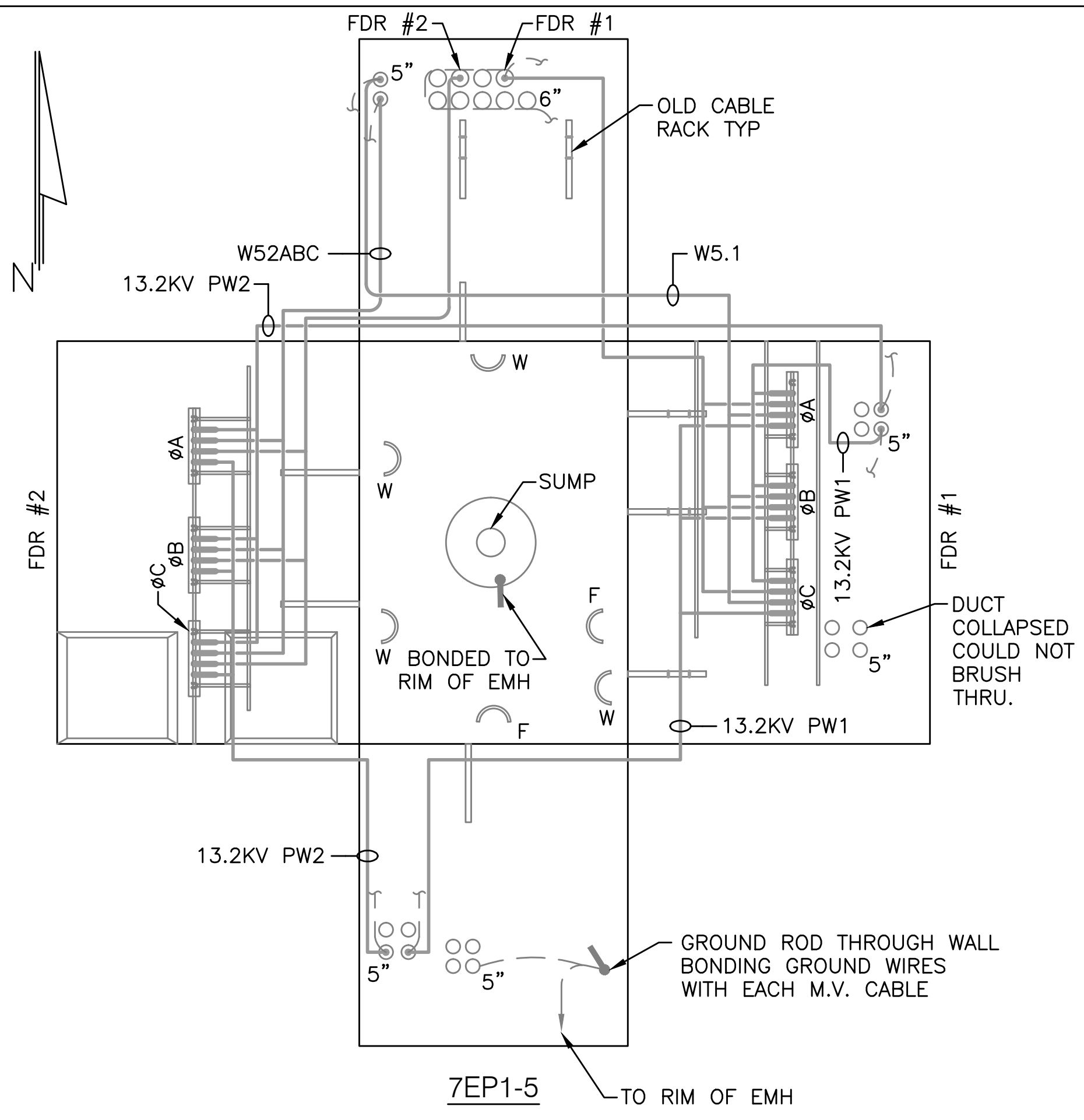


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| UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C. | PROJECT IDENTIFIER | IL1204 |
| | SHEET NAME | EL07.5 |
| MANHOLE BUTTERFLY DRAWINGS 7EP1-1 TO 7EP1-4 EXISTING, DEMOLITION AND NEW WORK | VOLUME NUMBER | 1 of 1 |
| | SHEET NUMBER | 9 of 14 |

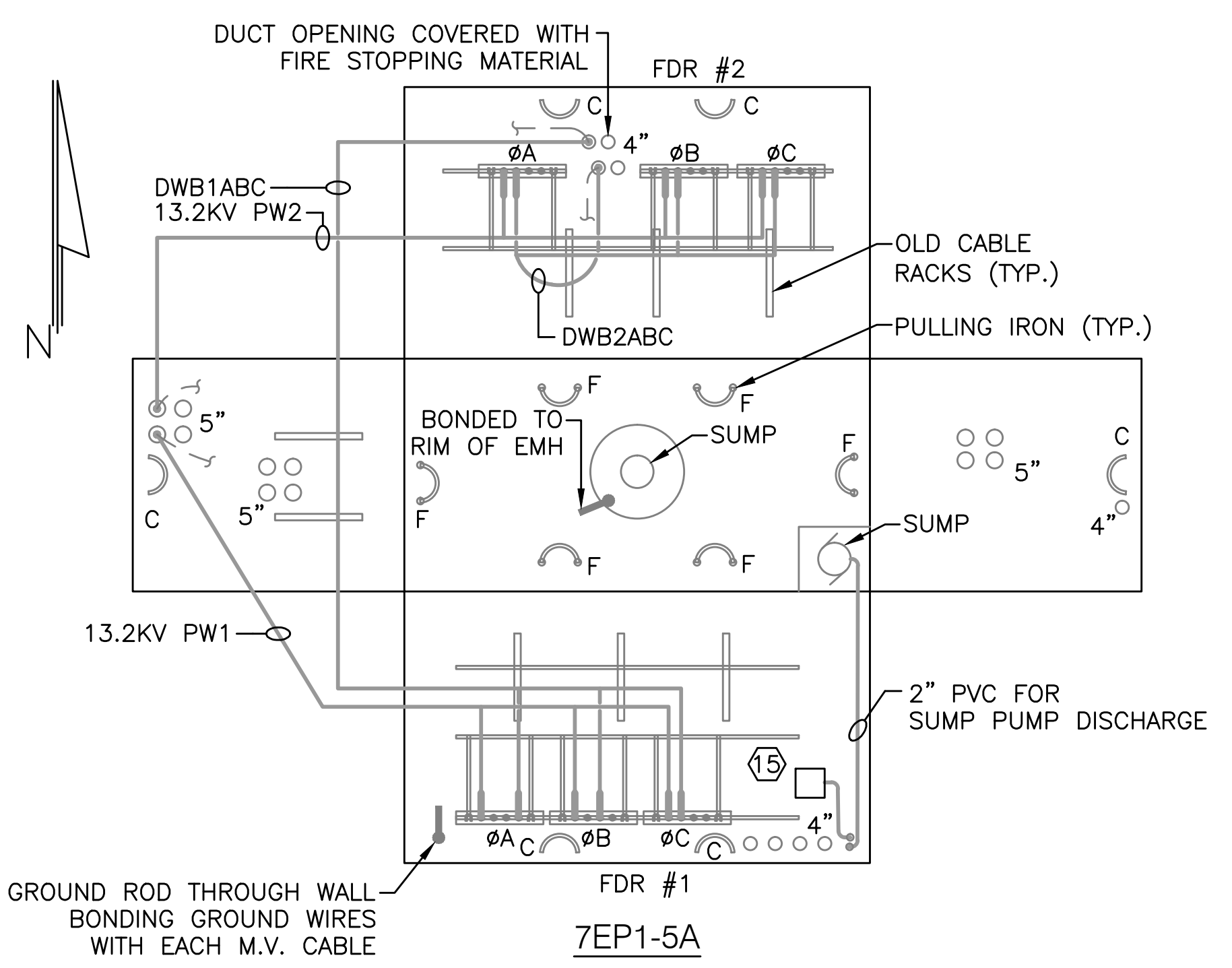


NOTES

- SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

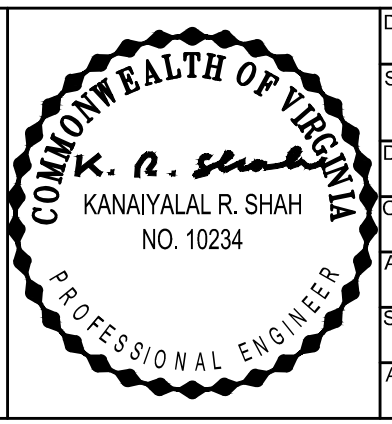
DRAWING NOTES

- BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- SUMP PUMP AND ASSOCIATED BOXES, WIRING, DEVICES AND PIPING TO BE REMOVED.



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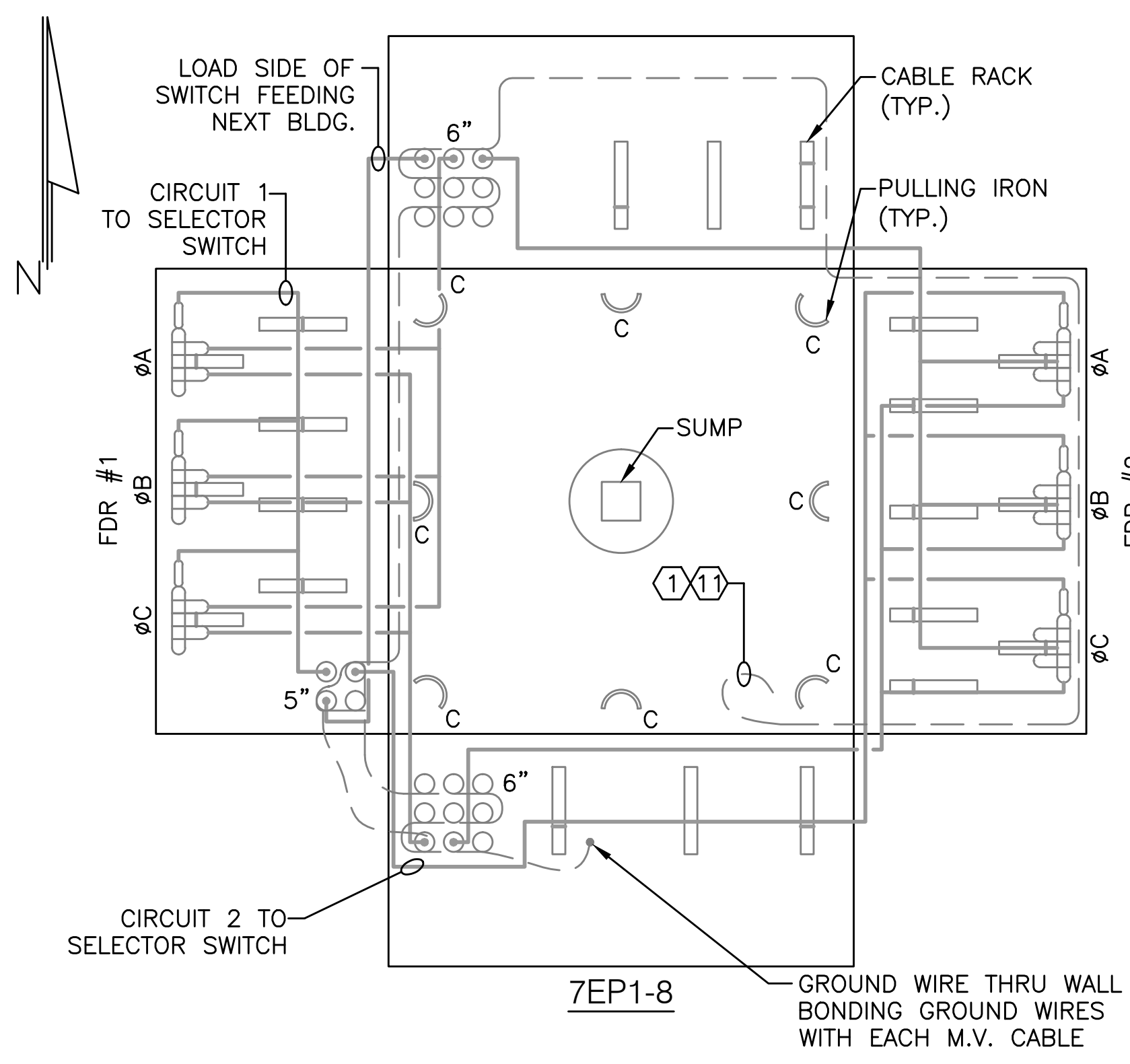
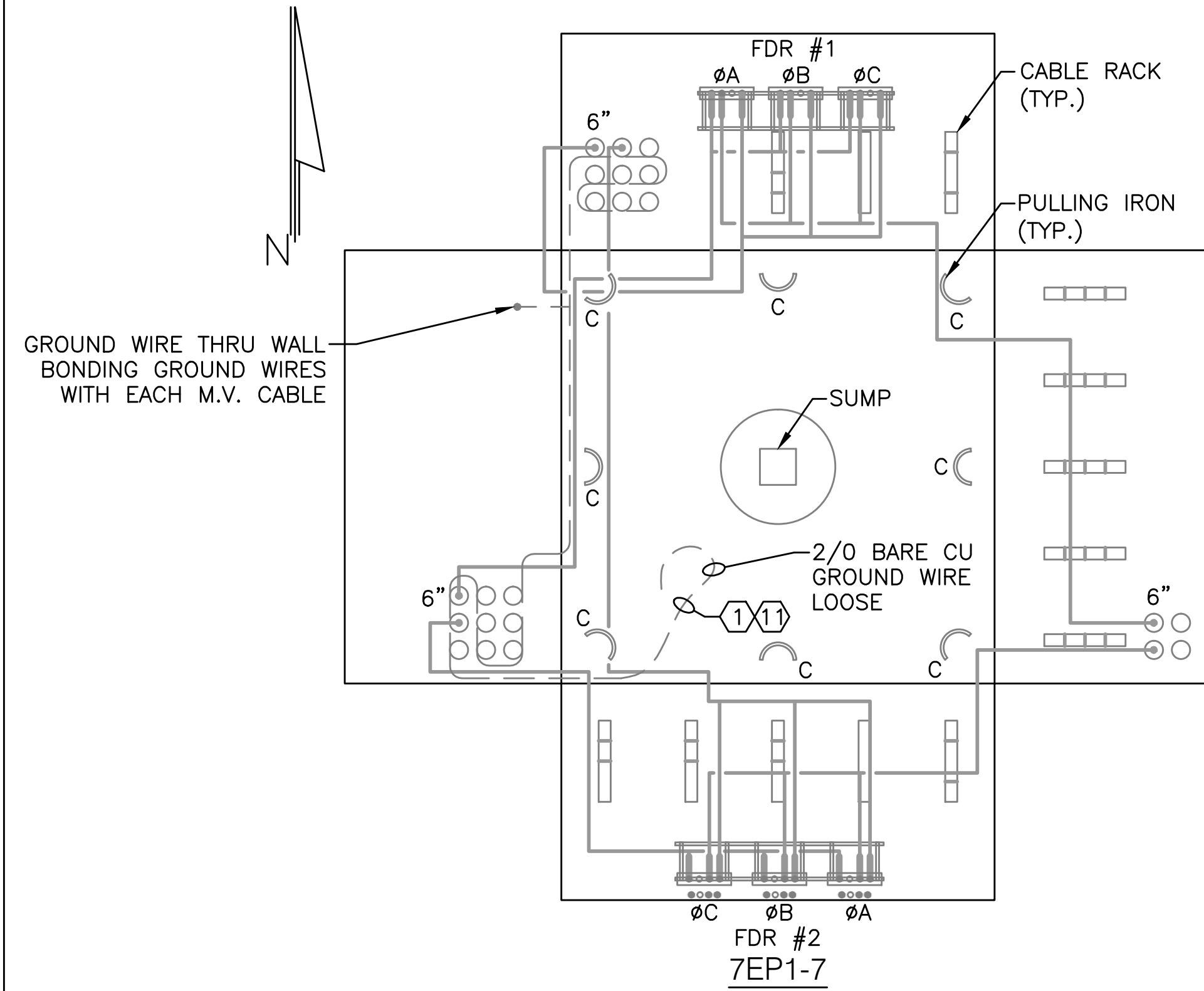
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UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT
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MANHOLE BUTTERFLY DRAWINGS
7EP1-5, 7EP1-5A AND 7EP1-6
EXISTING, DEMOLITION AND NEW WORK

| | |
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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | EL07.6 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 10 of 14 |

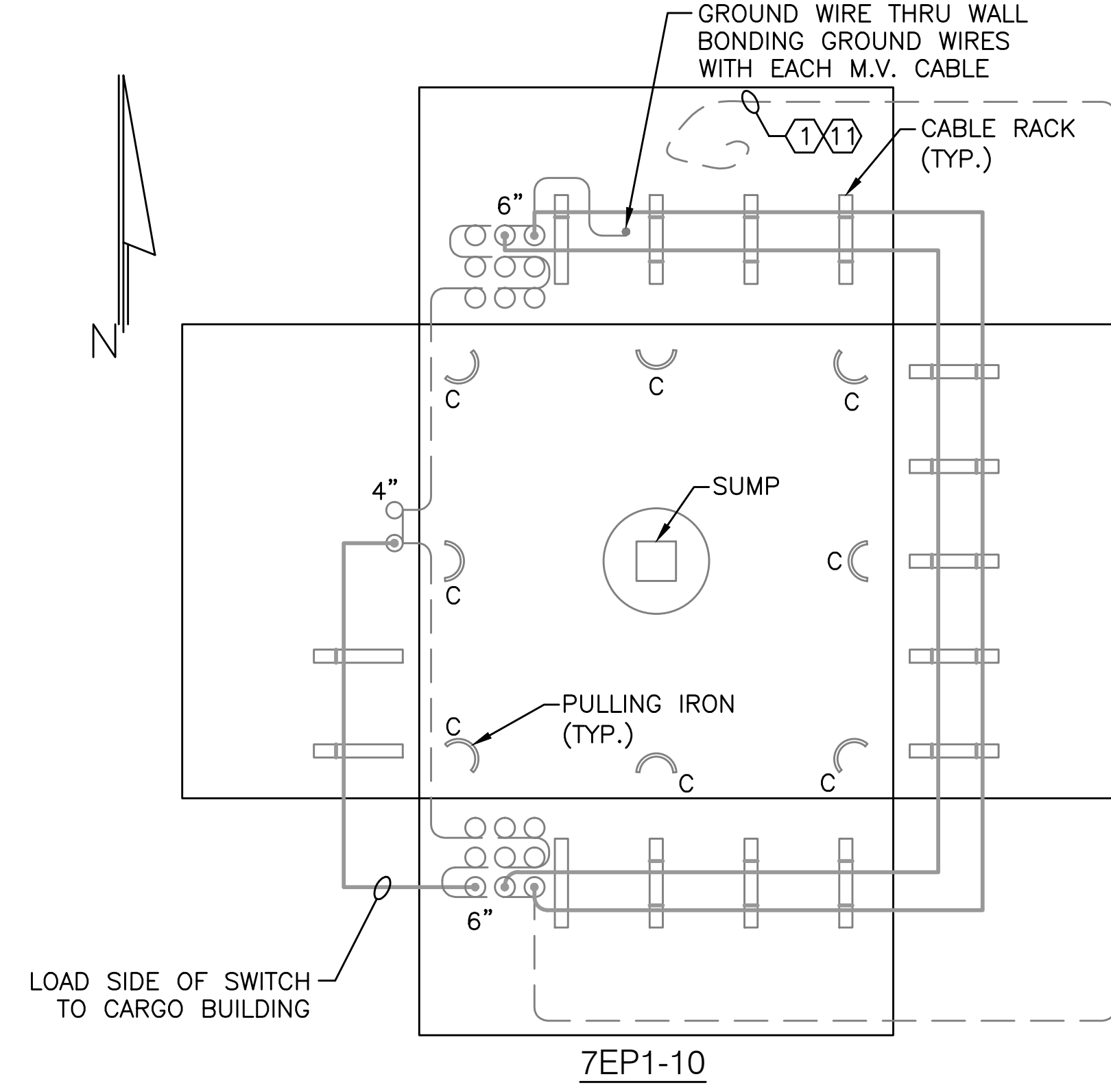
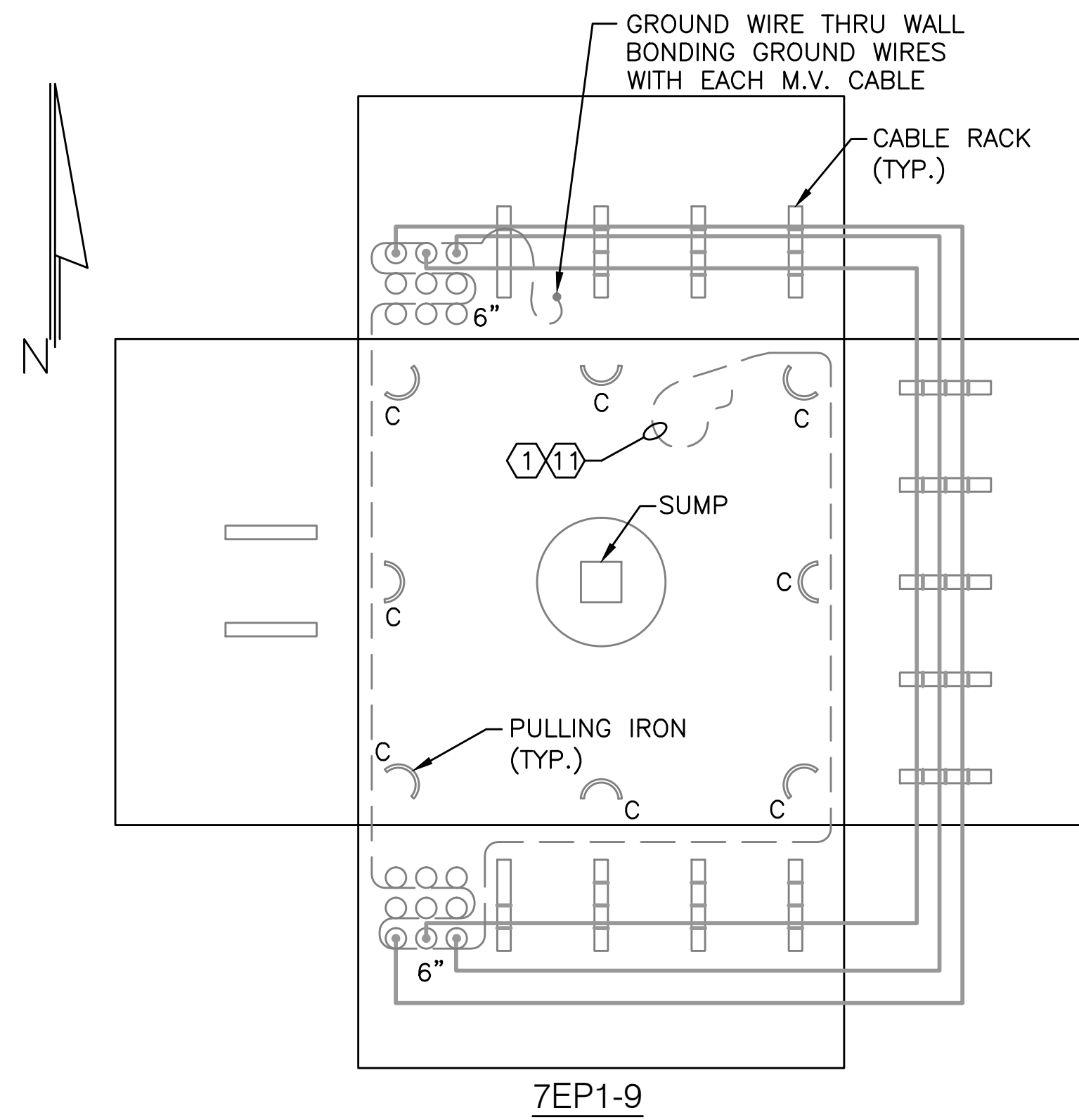


NOTES

- SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

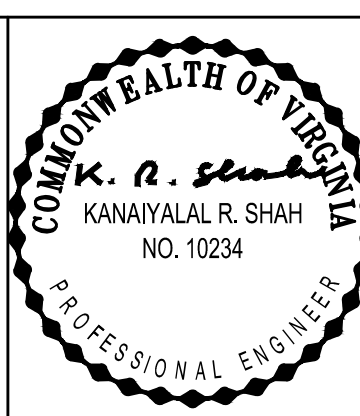
DRAWING NOTES

- ① BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- ① GROUND WIRE NOT TIED TO MANHOLE COVER RIM.



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UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT
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MANHOLE BUTTERFLY DRAWINGS 7EP1-7 TO 7EP1-10
EXISTING, DEMOLITION AND NEW WORK

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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | EL07.7 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 11 of 14 |

MANHOLE REPAIR MATRIX

| MANHOLE | METALLIC STANCHIONS & ARMS | DISLODGED STANCHION | BROKEN ARMS | MISSING ARMS | DEADBREAK JUNCTION BAR MOUNTED ON CHANNEL | DEADBREAK JUNCTION BARS | GROUNDING | EXISTING SUMP PUMP | UNUSED WIRING IN MANHOLE | CLEANING |
|---------|----------------------------|---------------------|-------------|--------------|---|-------------------------|-----------|--------------------|--------------------------|----------|
| 6EP-10 | ⑧ | | | | | | ⑦ | | | ⑩ |
| 6EP2-1 | ⑧ | | | | | | ①⑦ | ③ | | ⑩ |
| 6EP2-2 | ⑧ | | | | | | ⑦ | | | ⑩ |
| 6EP2-3 | ⑧ | | | | ⑥(QTY 6) | | ⑦ | | | ⑩ |
| 6EP2-4 | ⑧ | | | | ⑥(QTY 6) | ⑨(QTY 6) | ①⑦ | | | ⑩ |
| 6EP2-5 | ⑧ | | | | ⑥(QTY 6) | | ①⑦ | ③ | | ⑩ |
| 6EP2-6 | ⑧ | | | | ⑥(QTY 6) | | ①⑦ | ③ | | ⑩ |
| 6EP2-7 | ⑧ | | | | ⑥(QTY 6) | | ①⑦ | | | ⑩ |
| 6EP2-8 | ⑧ | | | | ⑥(QTY 6) | | ①⑦ | | | ⑩ |
| 6EP2-9 | ⑧ | | | | ⑥(QTY 6) | ⑨(QTY 6) | ①⑦ | | | ⑩ |
| 6EP2-10 | ⑧ | | | | ⑥(QTY 6) | | ①⑦ | | | ⑩ |
| 6EP2-11 | ⑧ | | | | ⑥(QTY 6) | | ①⑦ | | ④ | ⑩ |
| 6EP2-12 | | | | | | | ①⑦ | | | ⑩ |
| 6EP2-13 | | ⑤(QTY 1) | | | | ⑩(QTY 6) | ⑦ | | ④ | ⑩ |
| 7EP1-1 | | | | | | | ①⑦ | | | ⑩ |
| 7EP1-2 | ⑧ | | | | | | ⑦ | | | ⑩ |
| 7EP1-3 | ⑧ | | | | | | ⑦ | | ④ | ⑩ |
| 7EP1-4 | ⑧ | | | | | | ⑦ | | | ⑩ |
| 7EP1-5 | ⑧ | | | | ⑥(QTY 6) | | ⑦ | | | ⑩ |
| 7EP1-5A | ⑧ | | | | ⑥(QTY 6) | | ⑦ | ③ | | ⑩ |
| 7EP1-5B | | | | | | | | | | ⑩ |
| 7EP1-6 | | | ②(QTY 3) | ②(QTY 3) | | | ①⑦ | | | ⑩ |
| 7EP1-7 | | | | ②(QTY 3) | | | ①⑦ | | ④ | ⑩ |
| 7EP1-8 | | | | ②(QTY 5) | | ⑩(QTY 6) | ①⑦ | | | ⑩ |
| 7EP1-9 | | | ②(QTY 1) | | | | ①⑦ | | | ⑩ |
| 7EP1-10 | | | | | | | ①⑦ | | | ⑩ |

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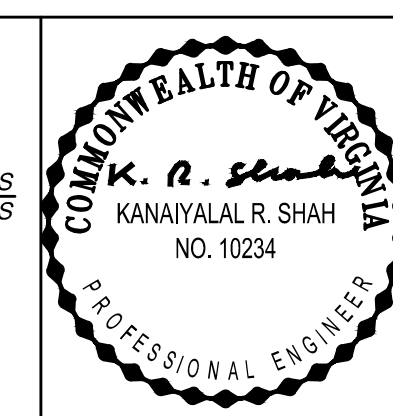
- SEE DRAWINGS ELO7.9 AND ELO7.10 FOR DETAILS.

DRAWING NOTES

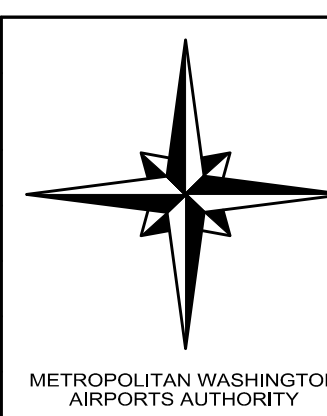
- BOND METALLIC RIM OF MANHOLE COVER TO MANHOLE GROUNDING SYSTEM.
- REPLACE BROKEN OR MISSING CABLE RACK ARMS.
- REMOVE EXISTING SUMP PUMP, INCLUDING ASSOCIATED WIRING, DEVICES AND DISCHARGE PIPING.
- REMOVE UNUSED POWER, COMMUNICATION AND GROUND CONDUCTORS.
- SECURELY MOUNT CABLE RACK STANCHION TO MANHOLE WALL.
- REMOVE DEADBREAK JUNCTION BARS FROM CHANNEL, REMOVE CHANNEL AND MOUNT DEADBREAK JUNCTION BARS DIRECTLY TO CONCRETE MANHOLE WALL. SEE DETAIL 1 ON SHEET ELO7.9
- PROVIDE NEW GROUNDING SYSTEM FOR MANHOLE AS INDICATED IN DETAIL 3 ON SHEET ELO7.9 PROPERLY RACK AND SECURE GROUNDING CONDUCTORS. REMOVE UNUSED AND EXCESSIVELY LONG GROUNDING CONDUCTORS. TEST GROUNDING SYSTEM IN ACCORDANCE WITH SPECIFICATIONS. PROVIDE NEW OR ADDITIONAL GROUND RODS AS REQUIRED.
- REMOVE EXISTING METALLIC CABLE RACK ARMS AND STANCHIONS. PROVIDE NEW NON-METALLIC CABLE RACK ARMS AND STANCHIONS AS INDICATED IN DETAIL 2 ON SHEET ELO7.9
- REPLACE EXISTING 4 POSITION DEADBREAK JUNCTION BARS WITH NEW 6 POSITION DEADBREAK JUNCTION BARS TO ACCOMMODATE FIVE SETS OF CABLES IN THIS MANHOLE.
- PROVIDE NEW 4 POSITION DEADBREAK JUNCTION BARS TO REPLACE EXISTING DEADBREAK OR DEADBREAK T-BODIES. MOUNT AS INDICATED IN DETAIL 1 ON SHEET ELO7.9
- GROUND WIRE NOT TIED TO MANHOLE COVER RIM.
- OBLONG OPENING IN CEILING OF MANHOLE FOR EASY ACCESS.
- EXISTING 15KV CABLE TO BE REPLACED BY NEW CABLE. NOTE ⑭
- NEW 15KV CABLE TO REPLACE EXISTING CABLE. NOTE: ON THIS DRAWING, CABLE ROUTING IS SHOWN DIAGRAMMATICALLY, AND IS NOT THE ACTUAL ROUTE. SEE DETAILS 2 AND 3 ON SHEET ELO7.9 FOR INFORMATION ON ACTUAL CABLE ROUTE TO BE PROVIDED.
- SUMP PUMP AND ASSOCIATED BOXES, WIRING, DEVICES AND PIPING TO BE REMOVED.
- NO GROUND ROD OR GROUND WIRE IN THIS MANHOLE.
- CLEAR MANHOLE OF MUD, MUCK, SAND, GRAVEL, DIRT AND DEBRIS PRIOR TO PERFORMING WORK. AT COMPLETION OF WORK TO BE PERFORMED UNDER THIS PROJECT, CLEAN MANHOLES OF ALL CONSTRUCTION DIRT AND DEBRIS. USE SHOP VACUUM FOR FINAL CLEANING.
- REPLACE THE EXISTING CABLES TO THE EXISTING PAD MOUNTED SWITCH LOCATED ADJACENT TO MANHOLE 6EP10 WITH NEW CABLES AND NEW TERMINATIONS.

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UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT
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MANHOLE REPAIR MATRIX DEMOLITION, NEW WORK AND DRAWING NOTES

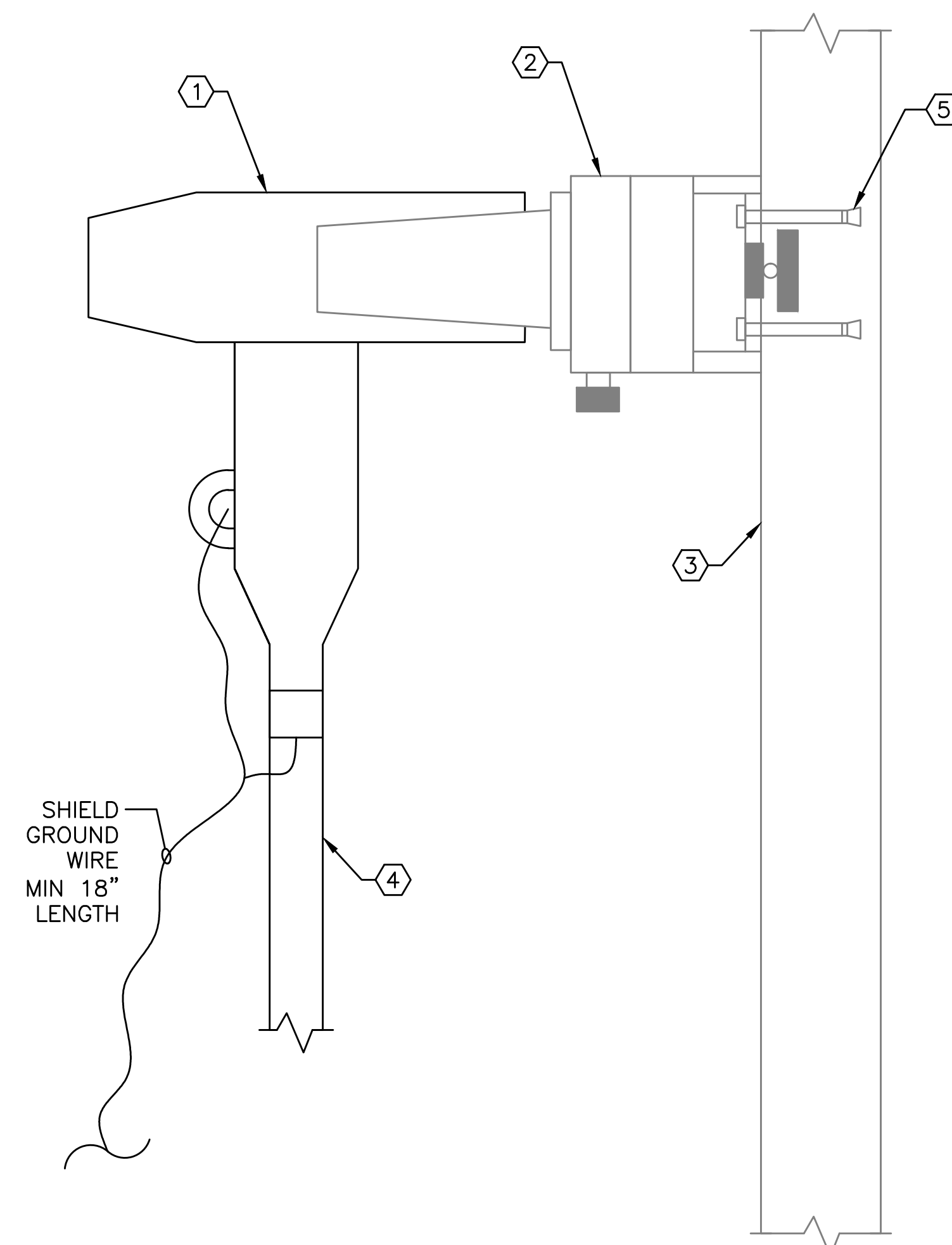
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| PROJECT IDENTIFIER | IL1204 |
| SHEET NAME | ELO7.8 |
| VOLUME NUMBER | 1 of 1 |
| SHEET NUMBER | 12 of 14 |

NOTES

- SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

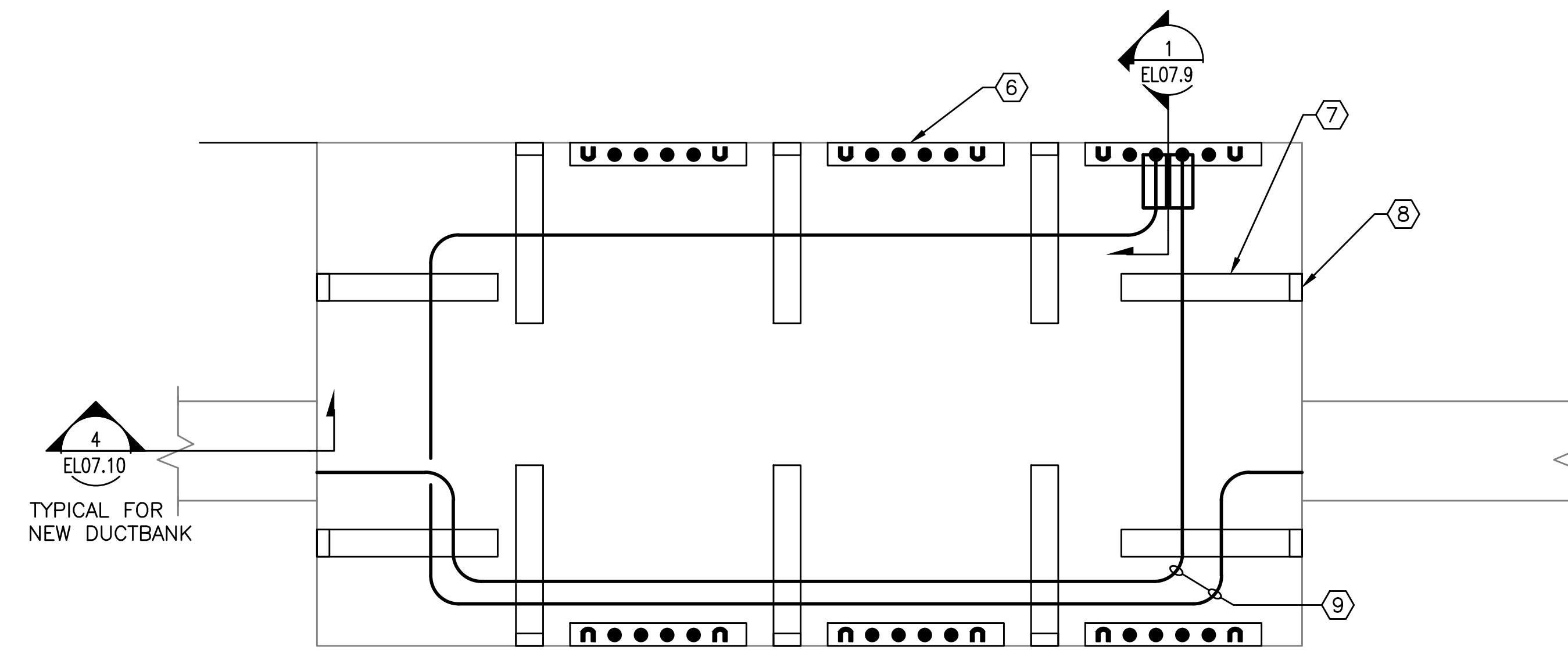
- NEW 600A SEPARABLE CONNECTOR.
- NEW OR EXISTING DEADBREAK JUNCTION BAR.
- EXISTING MANHOLE INSIDE WALL.
- NEW CABLE, 15KV.
- EXISTING DEADBREAK JUNCTION TO BE REMOVED FROM EXISTING MOUNTING ON CHANNEL AND MOUNTED DIRECTLY TO CONCRETE MANHOLE WALL USING FOUR 1/4" QUICK BOLT TYPE ANCHORS.
- DEADBREAK JUNCTION BARS.
- RACK ARM UNDERGROUND DEVICES MODEL RA14, 14" LONG ARM. PROVIDE ONE UNDERGROUND DEVICES MODEL HPL ARM LOCK PER ARM. PROVIDE A MINIMUM OF TWO ARMS PER 36" STANCHION, 40 ARMS PER MANHOLE.
- STANCHION UNDERGROUND DEVICES MODEL CR36-B, 36" LONG STANCHION, TYPICAL FOR TWO AT EACH LOCATION. MOUNT WITH A MINIMUM OF THREE UNDERGROUND DEVICES MODEL FSRM-12 ANCHORS PER 36" SECTION.
- TYPICAL CABLE ROUTING. LOOP CABLE AROUND MANHOLE IN LONGEST PATH FROM DUCTBANK ENTRY TO CONNECTION POINT.
- COPPER GROUND ROD 3/4" DIAMETER & 10' LONG.
- EXOTHERMIC WELD.
- 4/0 AWG GROUND CONDUCTOR.
- GROUND BAR, 1/4" x 4" x 18", COPPER MOUNTED ON ISOLATORS. MOUNT TO MANHOLE WALL WITH FOUR 1/4" QUICK BOLT TYPE ANCHORS.
- HI PRESS CONNECTION.
- DEADBREAK JUNCTION BARS.
- SEPARABLE CONNECTOR.
- PN1 FEEDER ON BOTTOM RACK IN MANHOLE.
- PN2 FEEDER ON 2ND RACK FROM BOTTOM IN MANHOLE.
- FEEDER COUNTINUING AROUND MANHOLE TO DEADBREAK JUNCTION BAR ON OPPOSITE WALL.
- PROVIDE PAINTED, STENCILED LETTERING IDENTIFYING DEADBREAK JUNCTION BARS BY FEEDER NUMBER AND PHASE LETTER ON MANHOLE WALL ABOVE JUNCTION BARS. REMOVE OR COVER OVER EXISTING IDENTIFICATION INFORMATION ON MANHOLE WALLS.



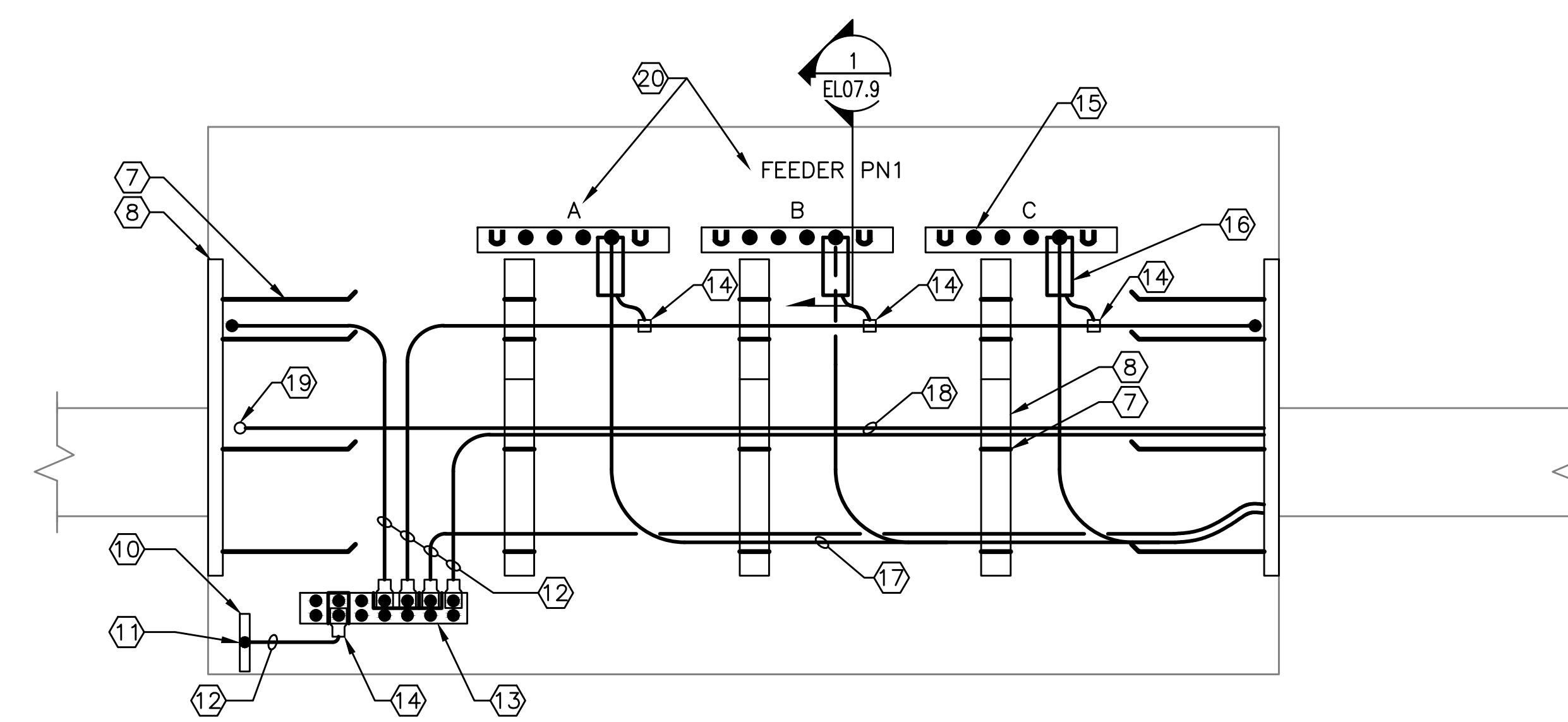
1 CABLE TERMINATION DETAIL
EL07.9 SCALE: NOT TO SCALE

NOTES FOR CABLE TERMINATION DETAIL:

- CONNECT CABLE AND CONNECTOR SHIELD WIRES TO 4/0 MANHOLE GROUND.
- SOME MANHOLES DO NOT HAVE WALL MOUNTED DEADBREAK JUNCTION BARS. FOR THESE MANHOLES, PROVIDE NEW DEADBREAK JUNCTION BARS AND CONNECT SEPARABLE CONNECTORS TO NEW DEADBREAK JUNCTION BARS. SEE MANHOLE REPAIR MATRIX AND NOTES ON SHEET EL07.8
- PROTECT NEW AND EXISTING-TO-REMAIN CABLE TERMINATIONS AND DEADBREAK JUNCTION BARS FROM MOISTURE DURING REPAIR, REHABILITATION AND CABLE REPLACEMENT. CABLES SHALL BE COVERED WITH INSULATED PROTECTIVE CAPS OF THE SAME MANUFACTURER AS THE SEPARABLE CONNECTOR AND THE DEADBREAK JUNCTION INTERFACES SHALL BE COVERED WITH INSULATED PROTECTIVE CAPS OF THE SAME MANUFACTURER AS THE JUNCTIONS.



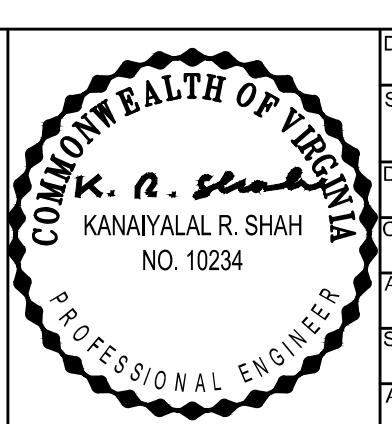
2 MANHOLE DETAIL - PLAN VIEW
EL07.9 SCALE: NOT TO SCALE



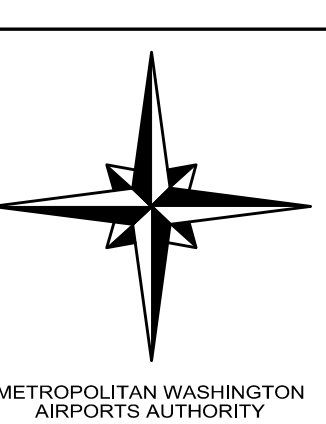
3 MANHOLE DETAIL - ELEVATION
EL07.9 SCALE: NOT TO SCALE

| NO. | REVISION | DATE |
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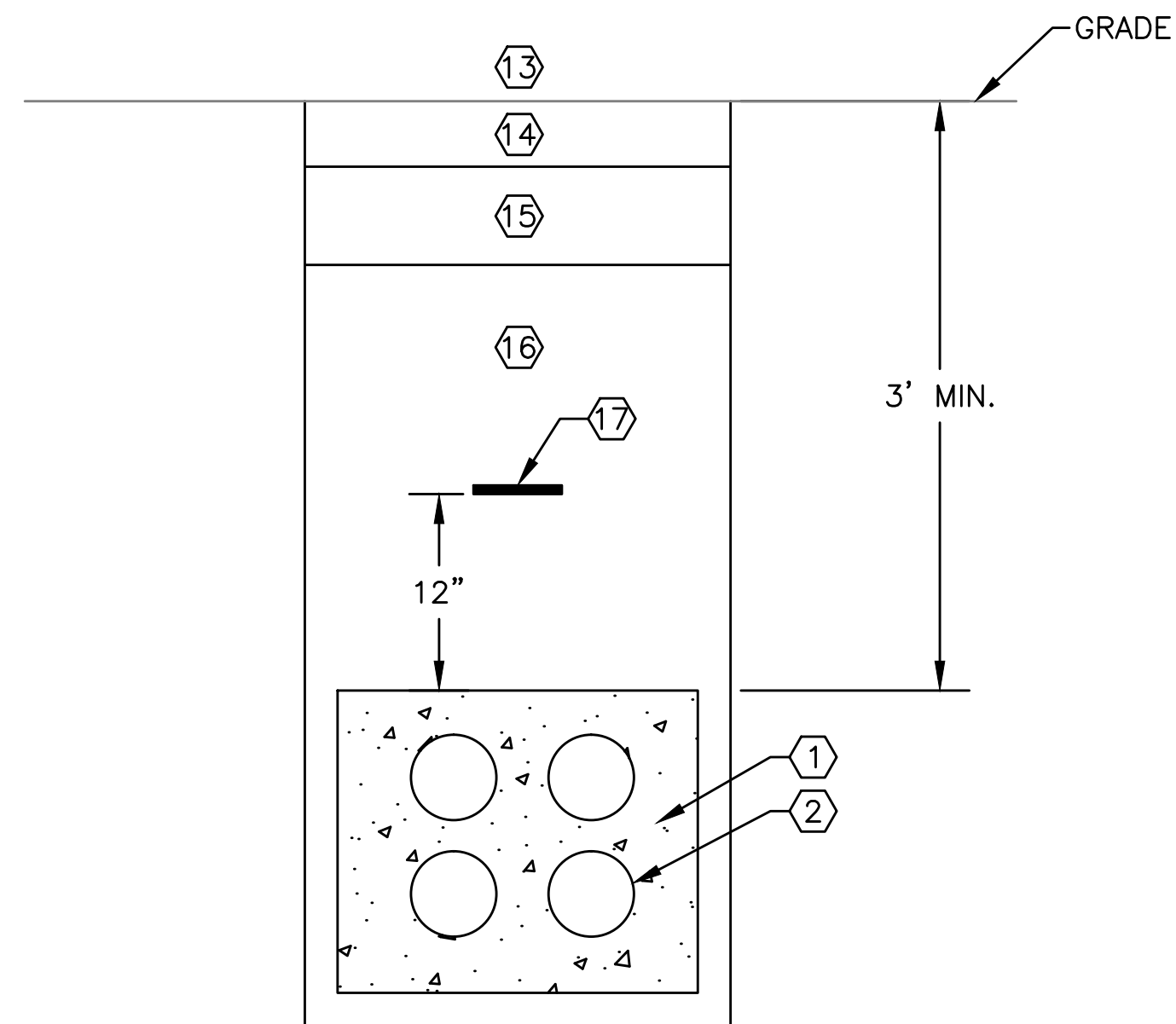
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| DATE | AUGUST 17, 2012 |
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| DESIGNED | RL |
| CHECKED | KRS |
| ACCEPTED | LWC |
| SUBMITTED | DRH |
| APPROVED | FDH |



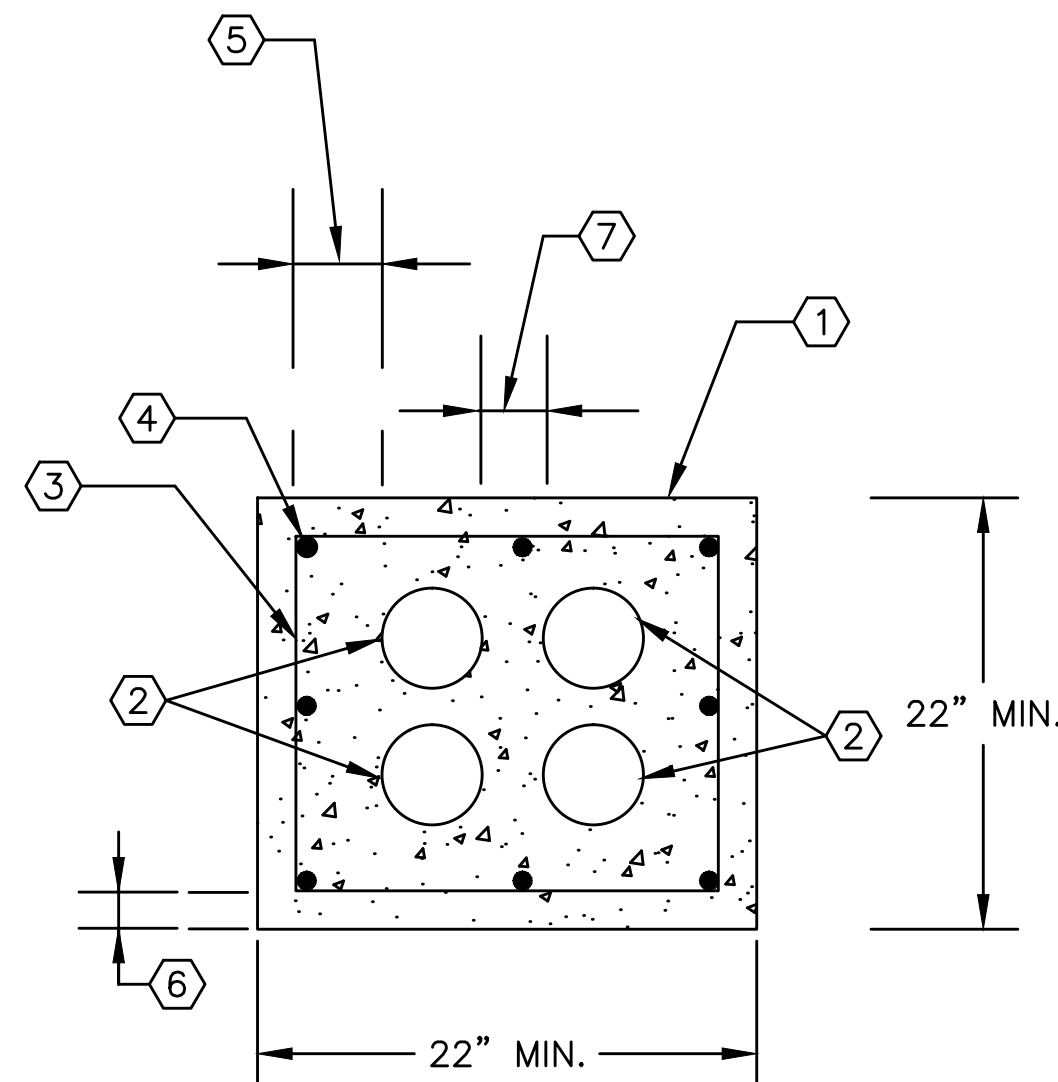
METROPOLITAN WASHINGTON AIRPORTS AUTHORITY

OFFICE OF ENGINEERING
DESIGN DEPARTMENT

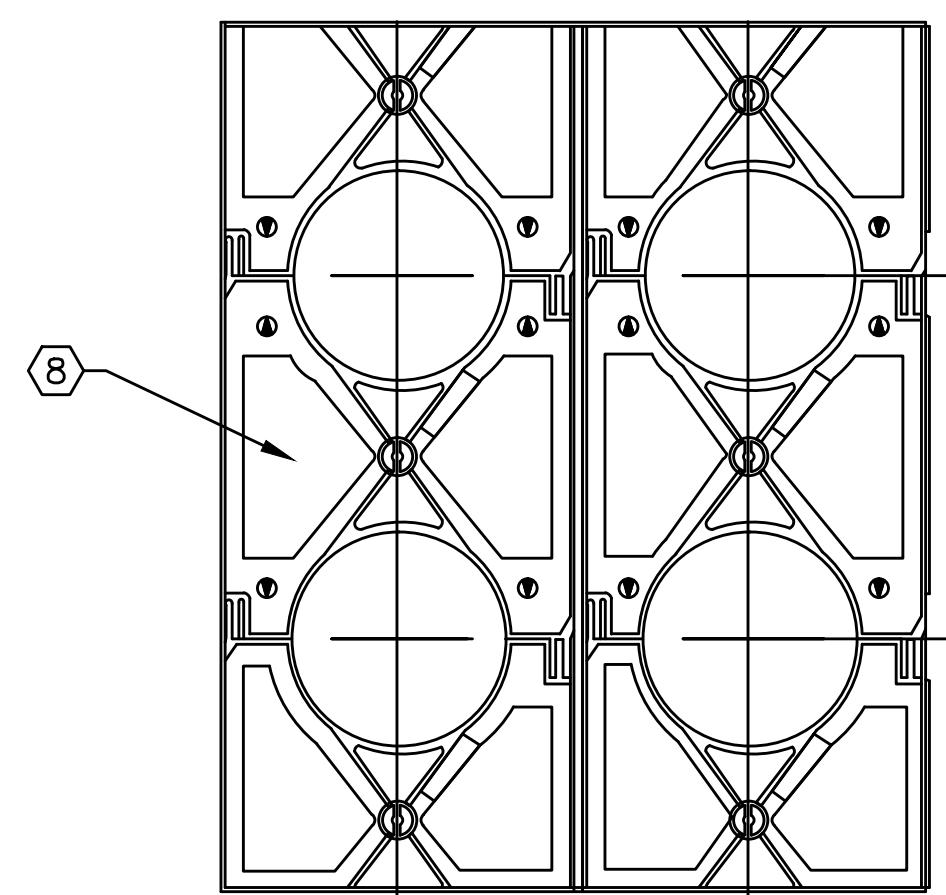
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| UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C. | PROJECT IDENTIFIER IL1204 |
| | SHEET NAME EL07.9 |
| NEW CABLE INSTALLATION AND MANHOLE ACCESSORIES DETAILS | VOLUME NUMBER 1 of 1 |
| | SHEET NUMBER 13 of 14 |



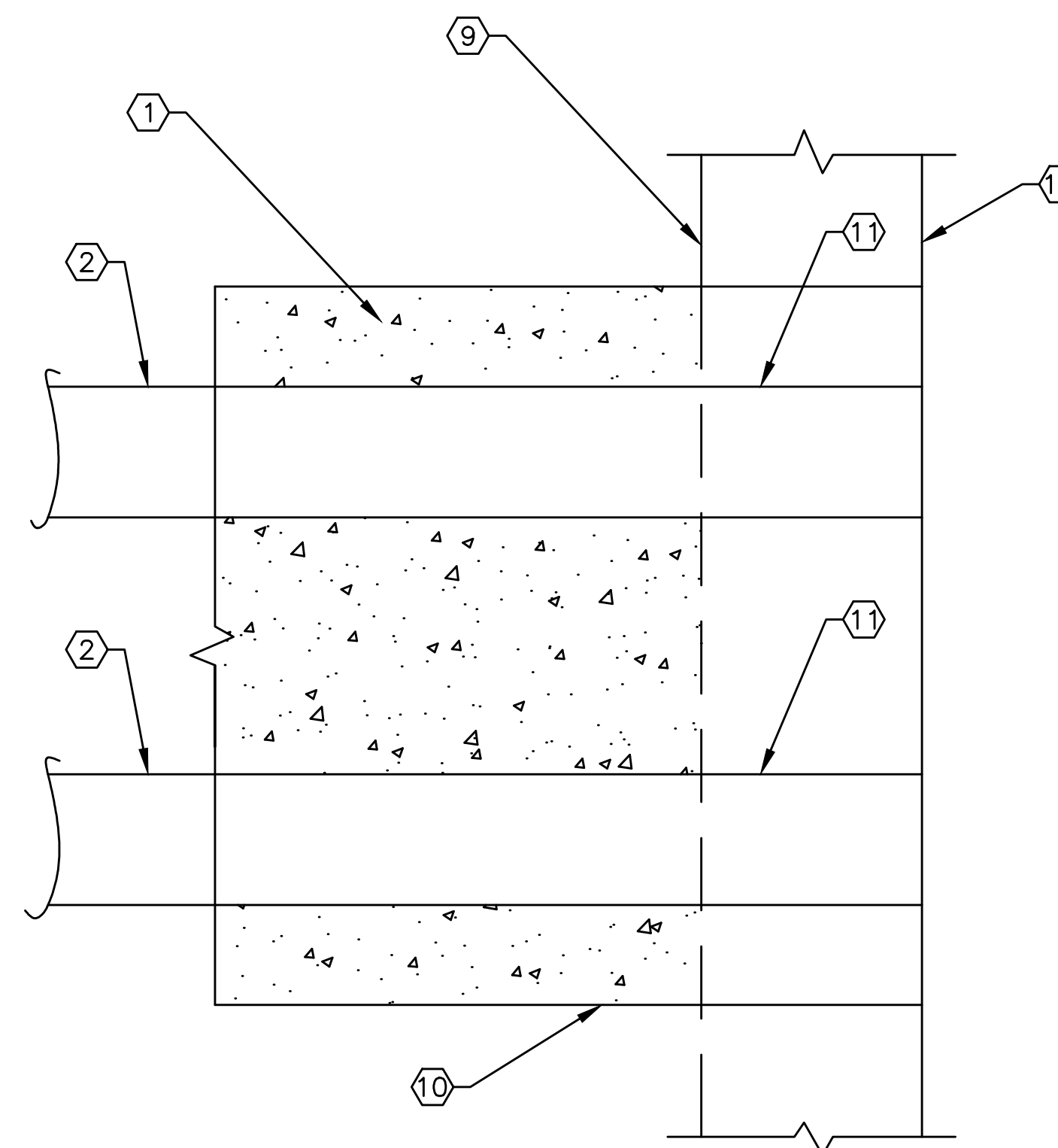
1 DUCTBANK TRENCH
 ELO7.10 SCALE: NOT TO SCALE



3 DUCTBANK CROSS SECTION
 ELO7.10 SCALE: NOT TO SCALE



2 3" SEPARATION DUCT SPACER (TYP.)
 ELO7.10 SCALE: NOT TO SCALE



4 CONDUIT MANHOLE ENTRANCE
 ELO7.10 SCALE: NOT TO SCALE

NOTES

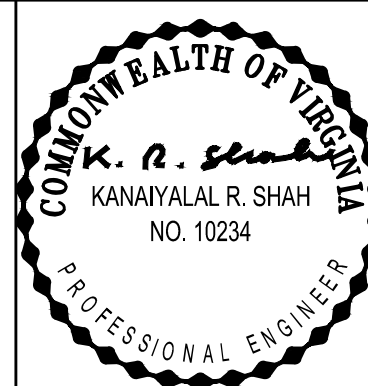
- SEE DRAWING EL00.1 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND SEQUENCE OF WORK.

DRAWING NOTES

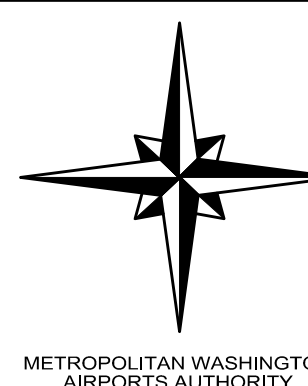
- CONCRETE.
- 5" PVC CONDUITS.
- FABRIC STRAPS 12" C/C.
- #5 REINFORCING ROD TYPICAL.
- 1-1/2" MINIMUM ENCASMENT ALL AROUND.
- 1-1/2" MINIMUM ALL AROUND.
- 3" MINIMUM BETWEEN CONDUITS TYPICAL.
- USE 3" SEPARATION DUCT SPACER AS REQUIRED.
- OUTSIDE WALL OF MANHOLE.
- CONCRETE ENCASED DUCT BANK.
- CORE DRILL THROUGH EXISTING MANHOLE WALL.
- INSIDE WALL OF MANHOLE.
- GRASS FOR DUCTBANK BETWEEN MANHOLES 6EP2-3 AND 6EP2-4.
- 4" ASPHALT PAVING FOR DUCTBANK BETWEEN 7EP1-1 AND 7EP1-2.
- 6" CONCRETE SUBBASE FOR DUCTBANK BETWEEN MANHOLES 7EP1-1 AND 7EP1-2.
- COMPACTED FILL DIRT RECLAIMED FROM EXCAVATION.
- WARNING TAPE.

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| UNDERGROUND DUCTBANK REHABILITATION AND ELECTRICAL FEEDER REPLACEMENT WASHINGTON DULLES INTERNATIONAL AIRPORT WASHINGTON, D.C. | PROJECT IDENTIFIER IL1204 |
| | SHEET NAME EL07.10 |
| DUCTBANK REPLACEMENT DETAILS | VOLUME NUMBER 1 of 1 |
| | SHEET NUMBER 14 of 14 |