

CONSTRUCTION PLANS FOR BENTON MUNICIPAL AIRPORT

INSTALL REIL'S AND PAPI ON RUNWAY 18/36

PROJECT SCOPE:

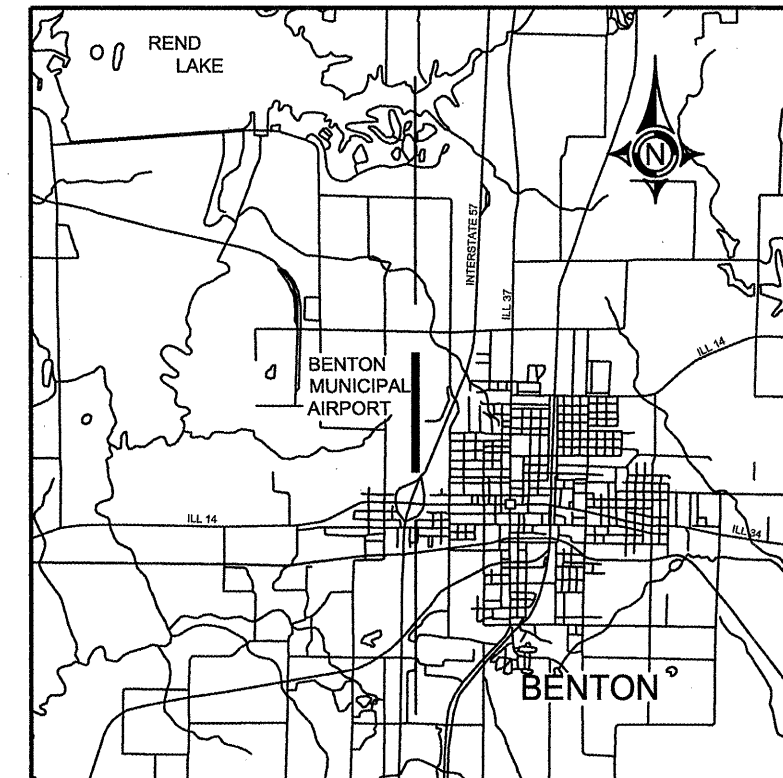
CONSTRUCTION OF ONE 4-BOX PAPI SYSTEM,
TWO REIL SYSTEMS AND ASSOCIATED WIRING.

ILLINOIS PROJECT NUMBER: H96-3754

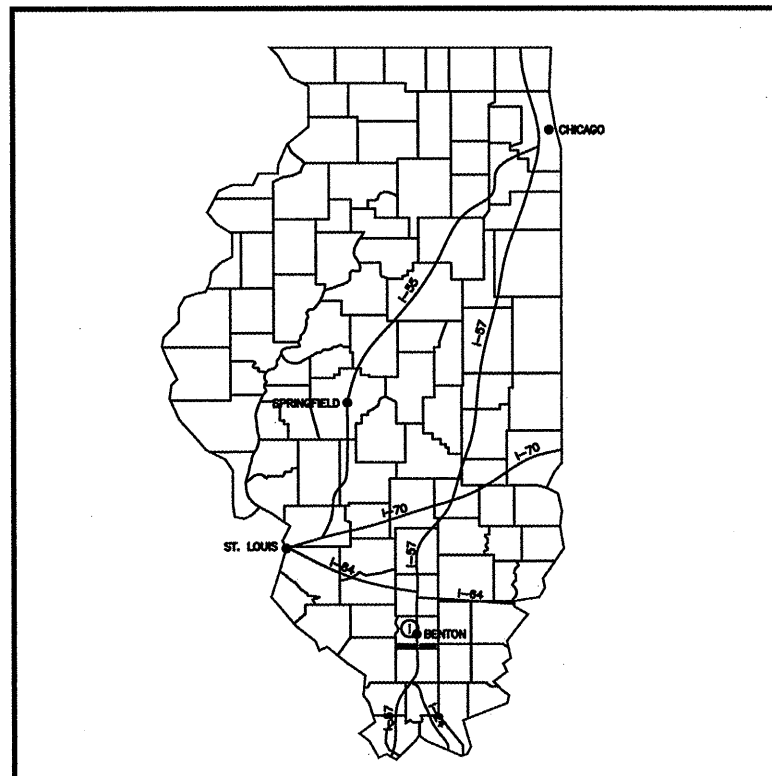
AIP PROJECT NUMBER: 3-17-0005-B11

BENTON, ILLINOIS

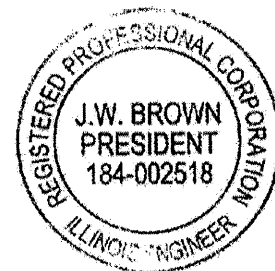
DATE: MAY 9, 2008



VICINITY MAP



LOCATION MAP



BROWN AND ROBERTS, INC
CONSULTING ENGINEERS
PRESIDENT


SUBMITTED BY *J.W. Brown*
J.W. BROWN, AS PRESIDENT

DATE SUBMITTED MAY 9, 2008

LISC. NUMBER 184-002518

LISC. EXP. DATE APRIL 30, 2009

PLANS PREPARED BY:



BROWN AND ROBERTS, INC.
1 WEST RIDGE ROAD
HARRISBURG, IL. 62946
(618) 252-8111

BENTON MUNICIPAL AIRPORT
CHAIRMAN

APPROVED BY *Michael J. Bryant*
MICHAEL J. BRYANT, CHAIRMAN

DATE MAY 9, 2008

SUMMARY OF QUANTITIES

<u>ITEM NO.</u>	<u>DESCRIPTION</u>	<u>UNIT</u>	<u>QUANTITY</u>
AR152410	UNCLASSIFIED EXCAVATION	C.Y.	100
AR108254	4/C #6 600 V UG CABLE IN UD	L.F.	1,800
AR108255	4/C #2 600 V UG CABLE IN UD	L.F.	3,500
AR108651	3/C #1 600 V UG CABLE IN UD	L.F.	2,500
AR109410	VAULT WIRING	L.S.	1
AR110313	3" STEEL DUCT, JACKED	L.F.	50
AR125610	REILS	PAIR	2
AR125615	PAPI (L-880 SYSTEM)	EA.	1
AR901525	SEEDING	L.S.	1

INDEX TO SHEETS

<u>SHEET NO.</u>	<u>DESCRIPTION</u>
1	COVER SHEET
2	SUMMARY OF QUANTITIES
3	RUNWAY SAFETY PLAN
4	EXISTING SITE & CONSTRUCTION PLAN
5 - 6	ELECTRICAL PLAN
7 - 11	ELECTRICAL DETAILS

BN012

SCOPE OF WORK

THE PROJECT SCOPE CONSISTS OF THE CONSTRUCTION OF ONE 4-BOX PAPI SYSTEM, TWO REIL SYSTEMS AND ASSOCIATED WIRING.

PROPOSED SAFETY PLAN

GENERAL- THE BENTON MUNICIPAL AIRPORT CURRENTLY HAS A PAVED NORTH-SOUTH RUNWAY (4000-FT BY 75-FT).

PROJECT CONSTRUCTION SHALL BE STAGED TO MINIMIZE THE FREQUENCY OF CLOSURES OF THE EXISTING RUNWAY.

CONTRACTOR'S RESPONSIBILITIES

IDENTIFICATION- THE CONTRACTOR'S VEHICLES AND EQUIPMENT SHALL BE PROPERLY MARKED WITH 3-FOOT SQUARE INTERNATIONAL ORANGE AND WHITE CHECKERED FLAGS ANYTIME THEY ARE ON AIRPORT PROPERTY.

THE CONTRACTOR AND HIS EMPLOYEES SHALL BE RESTRICTED TO THE WORK AREA.

EQUIPMENT PARKING AND STORAGE- THE CONTRACTOR'S EQUIPMENT PARKING, STORAGE, AND EMPLOYEE PARKING WILL BE AT THE LOCATION SHOWN ON THIS SHEET. ONLY CONTRACTOR VEHICLES AND EQUIPMENT REQUIRED FOR CONSTRUCTION WILL BE ALLOWED OUTSIDE THIS AREA.

BARRICADES AND TRAFFIC CONES- IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PLACE AND MAINTAIN BARRICADES AND TRAFFIC CONES AS REQUIRED AND AS DIRECTED BY THE RESIDENT ENGINEER. BARRICADES, THEIR MAINTENANCE, PLACEMENT, AND REMOVAL WILL BE CONSIDERED AS AN INCIDENTAL ITEM TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

THE CONTRACTOR WILL NOT BE ALLOWED ON ANY AIRPORT PAVEMENT. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPAIRING ANY DAMAGE TO EXISTING PAVEMENTS CAUSED BY HIS PERSONNEL OR EQUIPMENT.

HAUL ROUTE AND EQUIPMENT PARKING

THE CONTRACTOR WILL USE THE DESIGNATED HAUL ROUTE AND EQUIPMENT PARKING AREA SHOWN ON THIS SAFETY PLAN. THE PROPOSED EQUIPMENT PARKING AREA WILL BE APPROXIMATELY 100-FT BY 200-FT. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN THE PROPOSED HAUL ROUTE AND PARKING AREA THROUGHOUT THE COURSE OF THE PROJECT. AT THE CONCLUSION OF THE PROJECT, ALL AREAS DISTURBED WILL BE RESTORED AS NEEDED TO ITS ORIGINAL STATE. RESTORATION OF THE HAUL ROUTE AND EQUIPMENT PARKING AREA WILL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

UTILITY NOTE

THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITY COMPANIES AND ORGANIZATIONS THAT HAVE LINES OR CONDUITS IN THE PROPOSED WORK AREA. ALL LINES AND CONDUITS SHALL BE LOCATED AND IDENTIFIED FOR DEPTH BEFORE ANY EXCAVATION BEGINS. THE CONTRACTOR SHALL CALL JULIE (1-800-892-0123) TO ACCOMPLISH THESE REQUIREMENTS. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING ALL NON-JULIE UTILITIES LOCATED WITHIN THE PROPOSED CONSTRUCTION LIMITS. THESE UTILITIES ARE TO BE LOCATED PRIOR TO THE START OF CONSTRUCTION.

J.U.L.I.E. INFORMATION

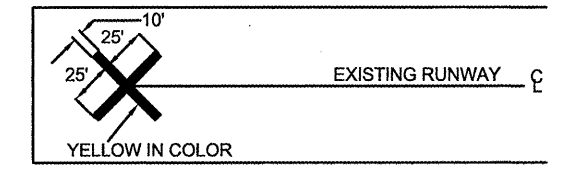
COUNTY.....FRANKLIN
 CITY.....BENTON
 TOWNSHIP.....BROWNING
 SECTION NO.....12 & 13
 NEAREST MAJOR ROAD INTERSECTION...RT 37 PETROFF RD.
 AIRPORT ADDRESS.....BENTON MUNICIPAL AIRPORT
 P.O. BOX 158
 BENTON, IL. 62812

AIRPORT SECURITY

AIRPORT SECURITY WILL BE MAINTAINED AT ALL TIMES. THE PROPOSED HAUL ROUTE SHOWN ON THIS SAFETY PLAN IS THE ONLY ACCESS CONTRACTOR EQUIPMENT AND PERSONNEL WILL BE ALLOWED TO USE. THE CONTRACTOR SHALL PROVIDE BARRICADES AT THIS ACCESS AND ENSURE THE BARRICADES ARE IN PLACE AT THE END OF EACH WORKING DAY.

AIRCRAFT OPERATIONAL AREA

THE CONTRACTOR, HIS EMPLOYEES, OR ANY EQUIPMENT WILL NOT PROCEED WITH ANY WORK WITHIN THE AIRCRAFT OPERATIONAL AREA WITHOUT FIRST CLOSING THE RUNWAY.



DETAIL OF CROSS FOR CLOSED RUNWAY

"NOT TO SCALE"

NOTE:

THE COST OF CONSTRUCTING, PLACING, MAINTAINING, AND REMOVING CROSSES WILL BE CONSIDERED INCIDENTAL TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED. THE CROSSES WILL BE YELLOW IN COLOR AND SHALL BE MADE OF A SUITABLE MATERIAL AS APPROVED BY THE RESIDENT ENGINEER. THE CROSSES WILL BE PLACED AT THE ENDS OF THE RUNWAY AND SECURED IN A MANNER APPROVED BY THE RESIDENT ENGINEER. THE PROPOSED CROSSES WILL BE PLACED WHEN THE RUNWAY IS CLOSED AND REMOVED WHEN THE RUNWAY IS RE-OPENED. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE PLACEMENT AND REMOVAL OF THE CROSSES AT NO ADDITIONAL COST TO THE CONTRACT.

RUNWAY CLOSURE PROCEDURES:

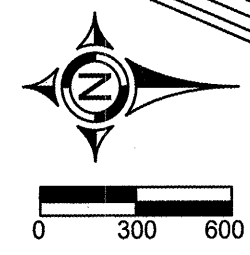
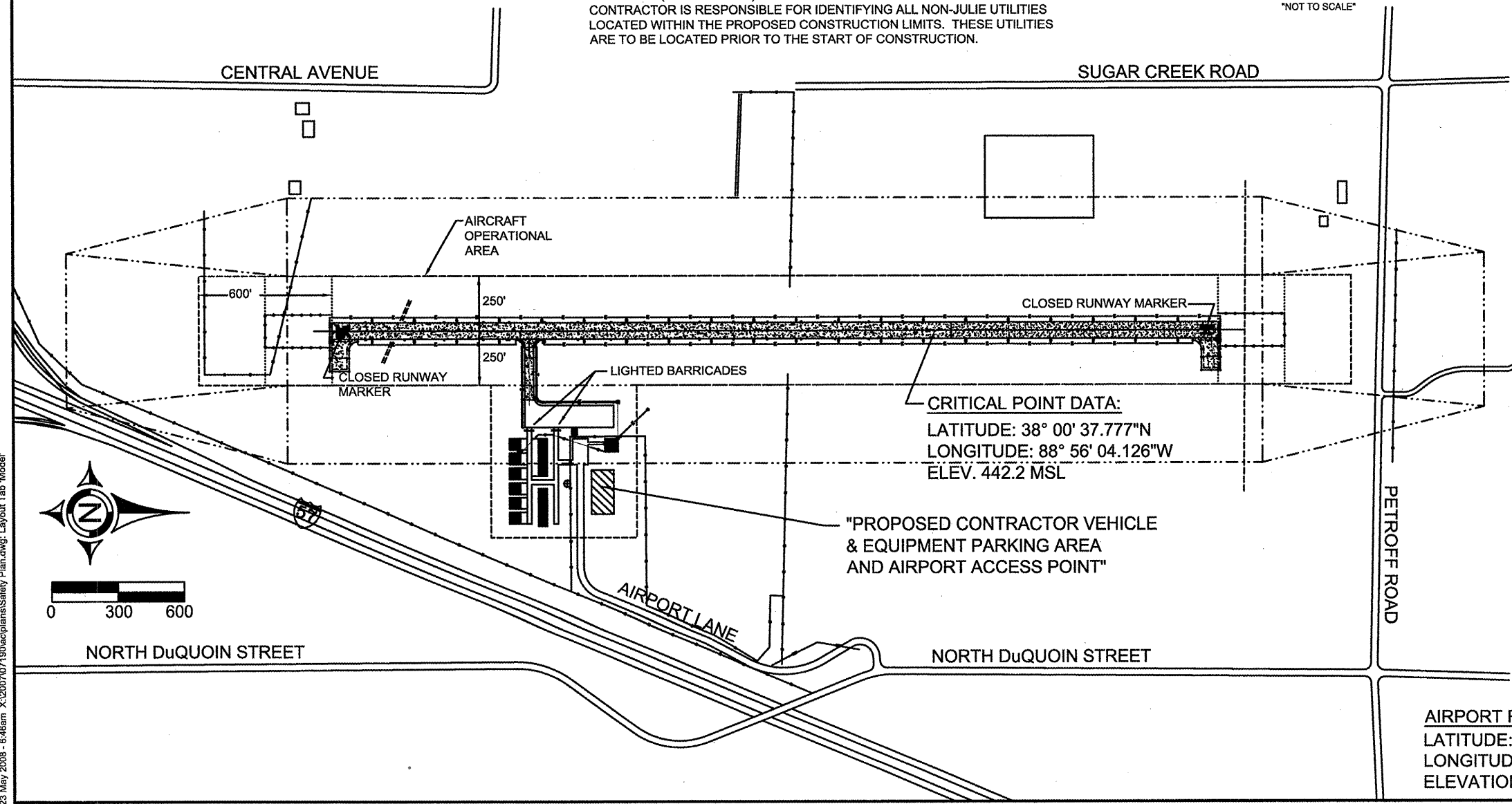
- * CONTACT THE AIRPORT MANAGER OR HIS ASSIGNED REPRESENTATIVE.
- * ISSUANCE OF NOTAM BY THE AIRPORT MANAGER OR HIS ASSIGNED REPRESENTATIVE.
- * PLACEMENT OF CROSSES (SEE DETAIL THIS SHEET).
- * PLACEMENT OF LIGHTED BARRICADES. ONLY AT THE TIME THAT ALL OF THE ABOVE ARE COMPLETED MAY ANY CONSTRUCTION OPERATIONS WITHIN 250-FT OF THE AFFECTED RUNWAY CENTERLINE AND WITHIN 600 FT OF THE RUNWAY END BEGIN.
- * RUNWAY LIGHTS SHALL BE DISABLED

RUNWAY RE-OPENING PROCEDURES:

- * REMOVE CROSSES.
- * REMOVE LIGHTED BARRICADES.
- * NOTIFY THE AIRPORT MANAGER OR HIS REPRESENTATIVE TO CANCEL THE NOTAM.
- * CANCELLATION OF THE NOTAM. A CLOSED RUNWAY WILL NOT BE RE-OPENED UNTIL ALL EQUIPMENT AND WORK ARE FURTHER THAN 200 FT. FROM THE AFFECTED RUNWAY CENTERLINE
- * RUNWAY LIGHTS SHALL BE REACTIVATED.

HEIGHT OF CONSTRUCTION EQUIPMENT

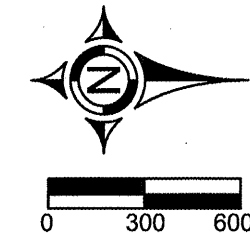
THE MAXIMUM ANTICIPATED HEIGHT OF THE CONSTRUCTION EQUIPMENT IS 20 FEET.



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AIRPORT REFERENCE POINT:
 LATITUDE: 38° 00' 24.334"N
 LONGITUDE: 88° 56' 03.910"LN
 ELEVATION: 444 MSL

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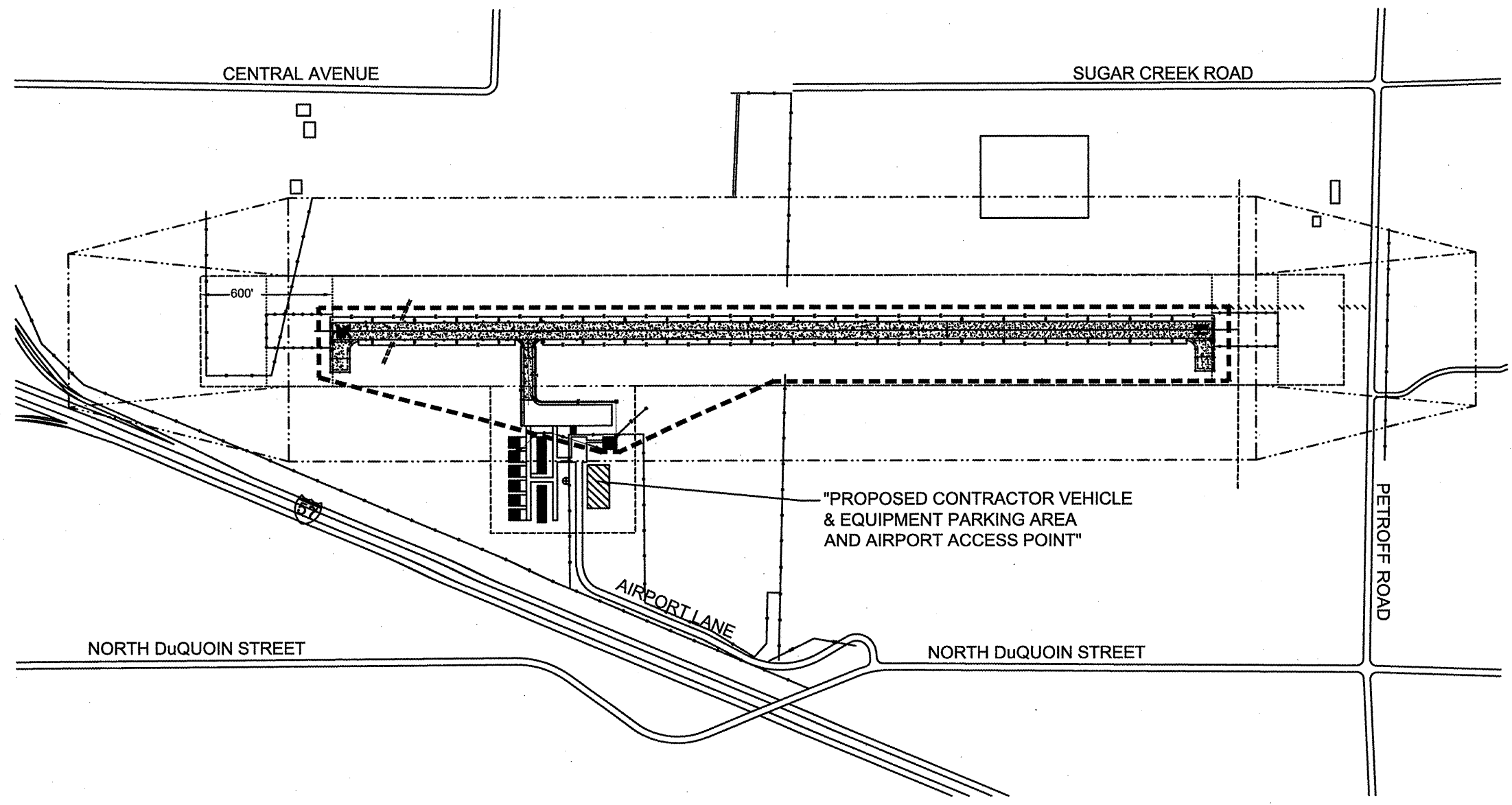


COORDINATE DATA				
NO	DESCRIPTION	NORTHING	EASTING	ELEV.
1	NGS POINT	489859.94	810945.20	440.16
2	NGS POINT	488030.31	810964.74	437.37
3	C STA 29+00	489809.14	811052.77	
4	C STA 46+00	491509.10	811042.15	

NOTES: 1. THE PROJECT CONSISTS OF THE CONSTRUCTION OF ONE 4-BOX PAPI SYSTEM, TWO REIL SYSTEMS, AND ASSOCIATED WIRING.

LEGEND

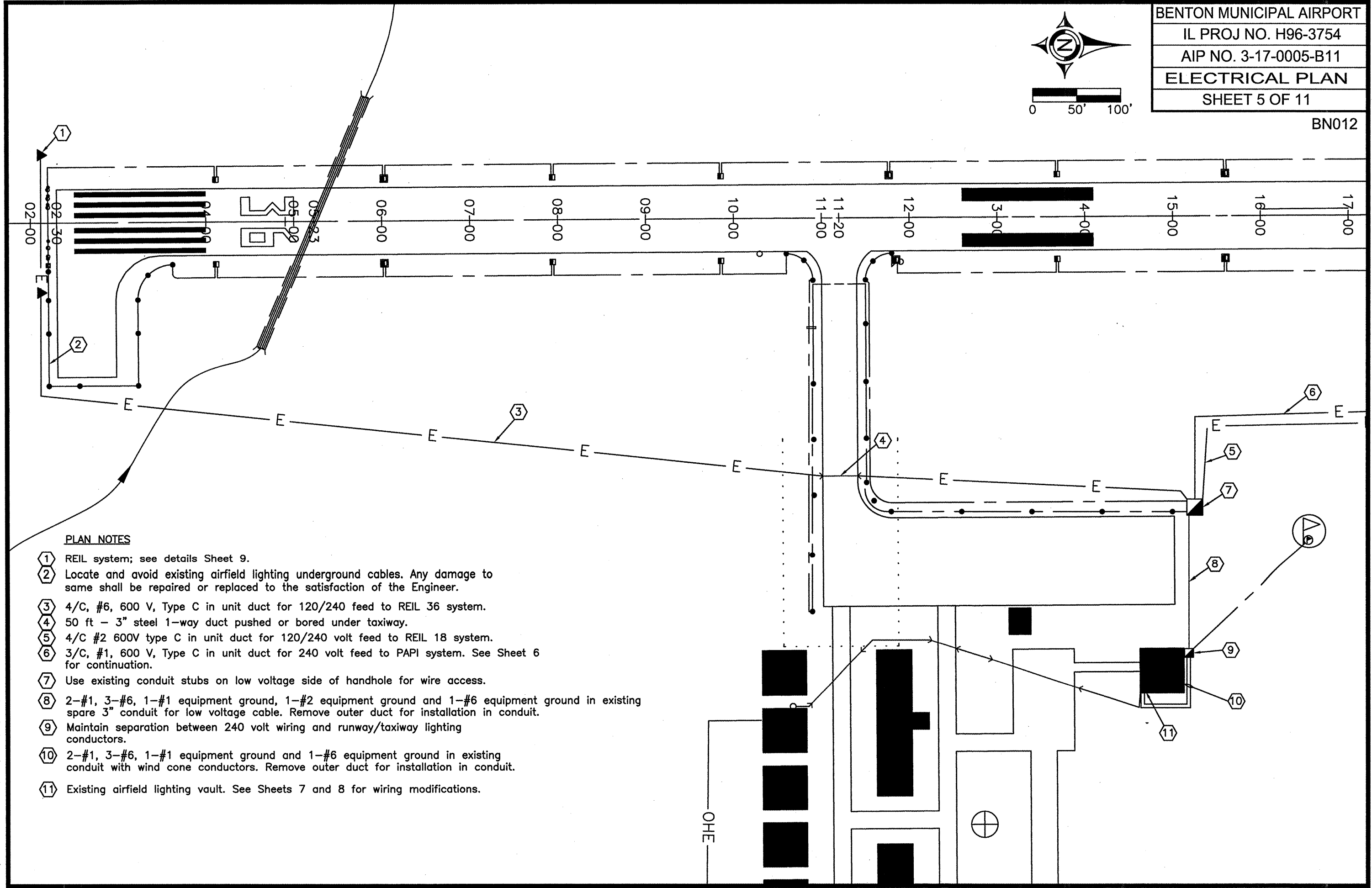
CONSTRUCTION LIMITS - - - - -





BENTON MUNICIPAL AIRPORT
 IL PROJ NO. H96-3754
 AIP NO. 3-17-0005-B11
 ELECTRICAL PLAN
 SHEET 5 OF 11

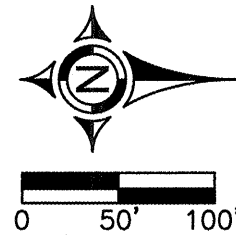
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PLAN NOTES

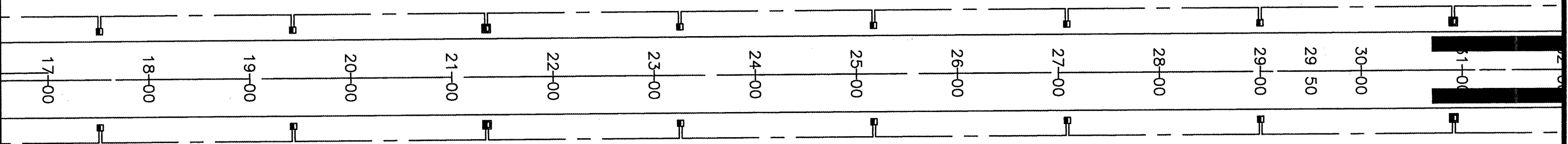
- ① REIL system; see details Sheet 9.
- ② Locate and avoid existing airfield lighting underground cables. Any damage to same shall be repaired or replaced to the satisfaction of the Engineer.
- ③ 4/C, #6, 600 V, Type C in unit duct for 120/240 feed to REIL 36 system.
- ④ 50 ft - 3" steel 1-way duct pushed or bored under taxiway.
- ⑤ 4/C #2 600V type C in unit duct for 120/240 volt feed to REIL 18 system.
- ⑥ 3/C, #1, 600 V, Type C in unit duct for 240 volt feed to PAPI system. See Sheet 6 for continuation.
- ⑦ Use existing conduit stubs on low voltage side of handhole for wire access.
- ⑧ 2-#1, 3-#6, 1-#1 equipment ground, 1-#2 equipment ground and 1-#6 equipment ground in existing spare 3" conduit for low voltage cable. Remove outer duct for installation in conduit.
- ⑨ Maintain separation between 240 volt wiring and runway/taxiway lighting conductors.
- ⑩ 2-#1, 3-#6, 1-#1 equipment ground and 1-#6 equipment ground in existing conduit with wind cone conductors. Remove outer duct for installation in conduit.
- ⑪ Existing airfield lighting vault. See Sheets 7 and 8 for wiring modifications.

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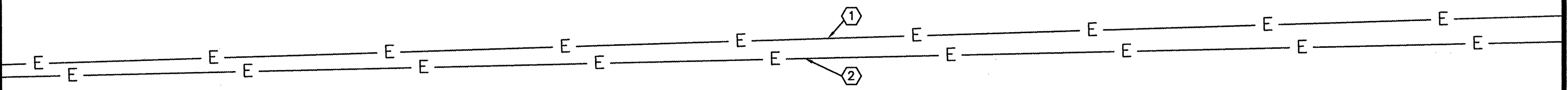
BENTON MUNICIPAL AIRPORT
 IL PROJ NO. H96-3754
 AIP NO. 3-17-0005-B11
ELECTRICAL PLAN
 SHEET 6 OF 11

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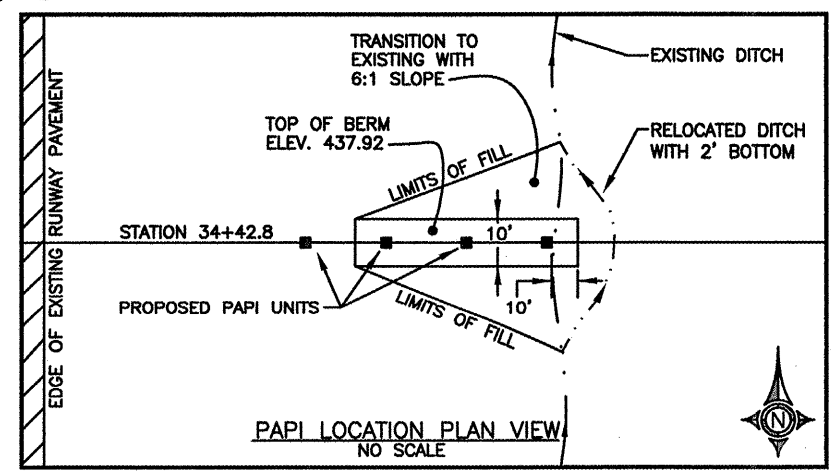
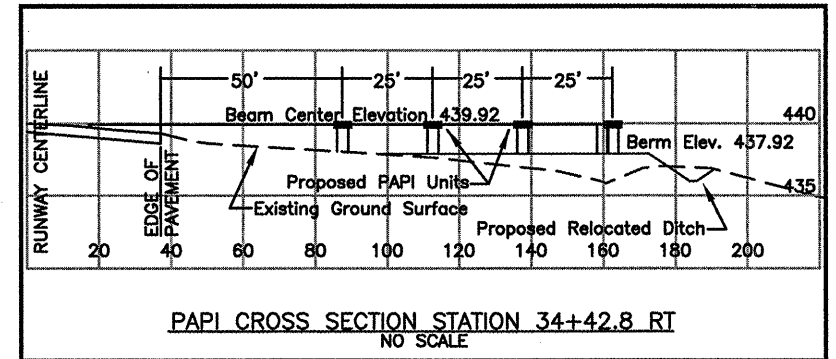
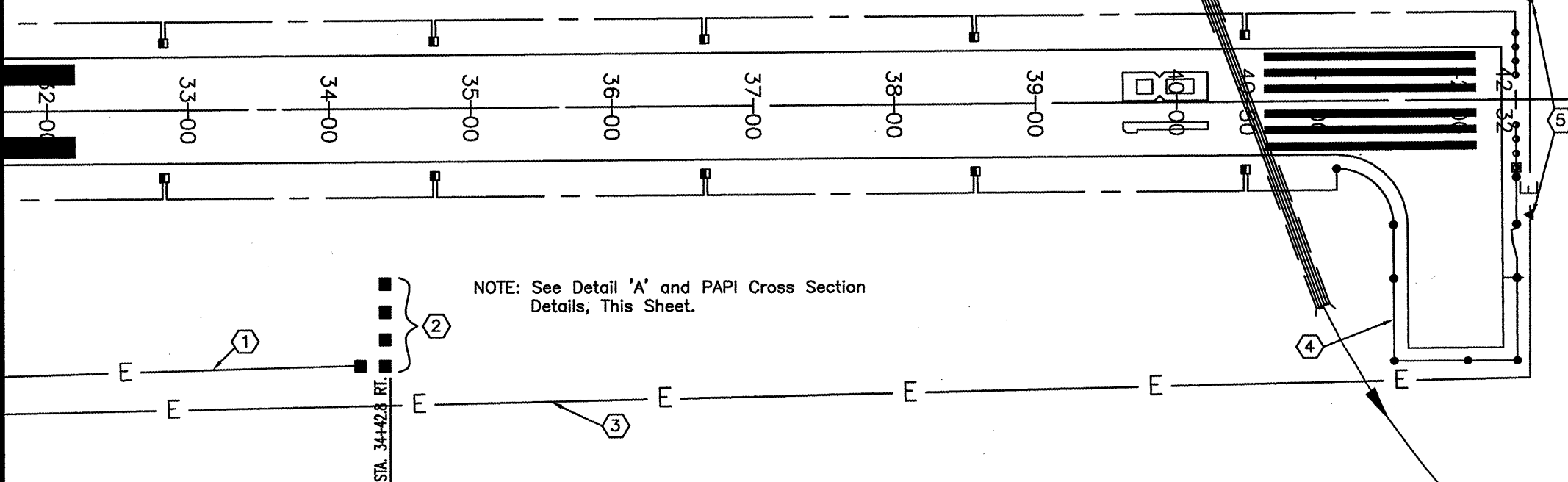
PLAN NOTES

- ① 3/C #1, 600 V, Type C in unit duct for 240 volt feed to PAPI system. See below for continuation.
- ② 4/C #2, 600V type C in unit duct for 120/240 volt feed to REIL 18 system.



PLAN NOTES

- ① 3/C #1, 600 V, Type C in unit duct for 240 volt feed to PAPI system. See Sheet 5 for continuation.
- ② PAPI system; see details, Sheet 6.
- ③ 4/C #2, 600V type C in unit duct for 120/240 volt feed to REIL 18 system.
- ④ Locate and avoid existing airfield lighting underground cables. Any damage to same shall be repaired or replaced to the satisfaction of the Engineer.
- ⑤ REIL system; see details Sheet 9.

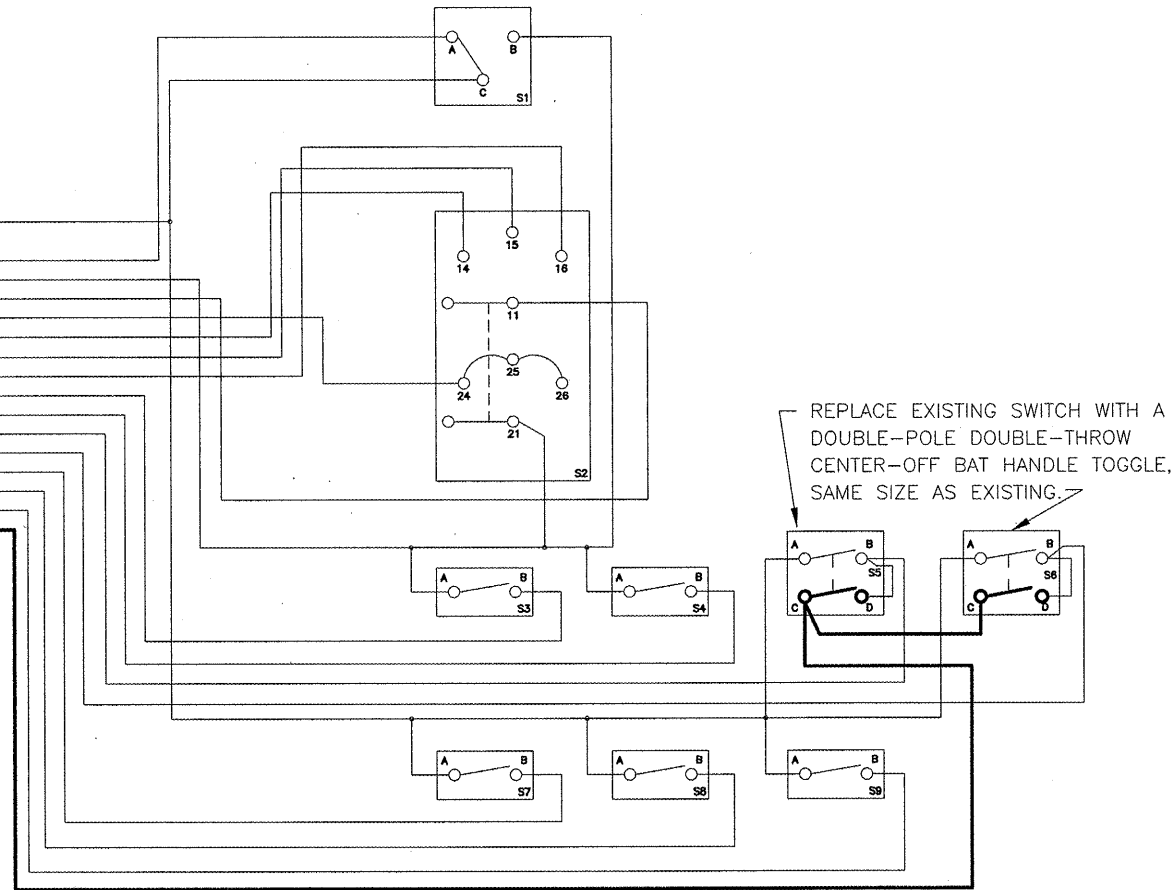


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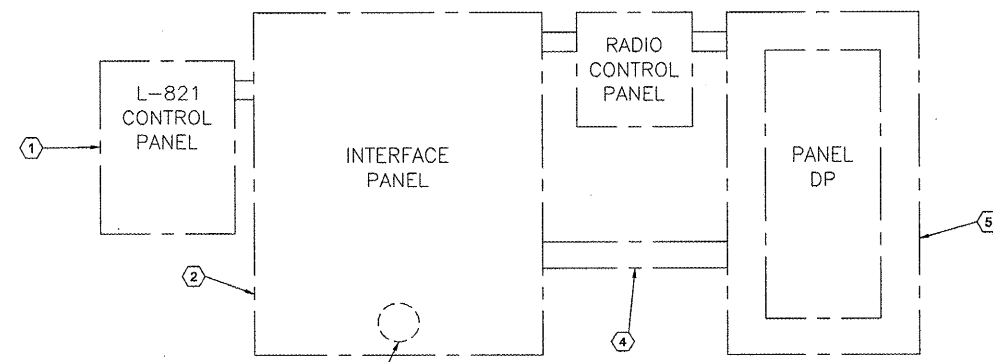
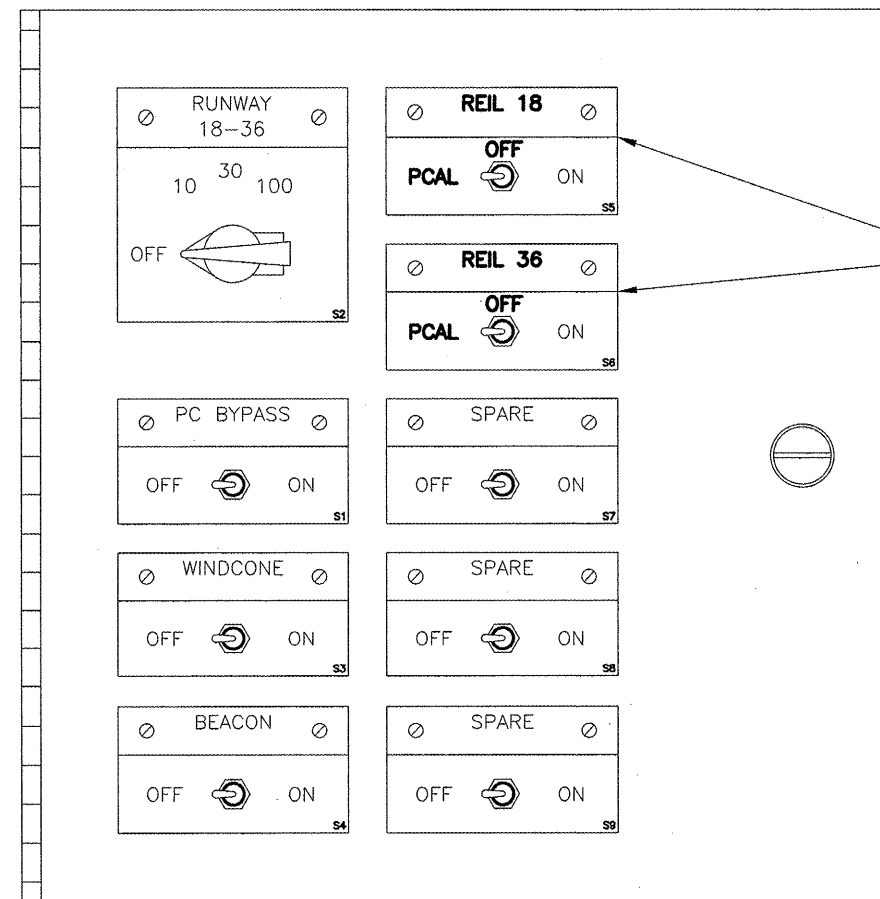
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TB1

120VAC	1	120V
NEUTRAL	2	N
TP PC	3	S1-A
FROM PC	4	S3-A
BRIGHT	5	S2-11
CC	6	S2-24
B10	7	S2-14
B30	8	S2-15
B100	9	S2-16
WINDCONE	10	S3-B
BEACON	11	S4-B
REIL 18	12	S5-B
REIL 36	13	S6-B
SPARE	14	S7-B
SPARE	15	S8-B
SPARE	16	S8-B
TB3-4	17	S5-C
	18	
	19	
	20	



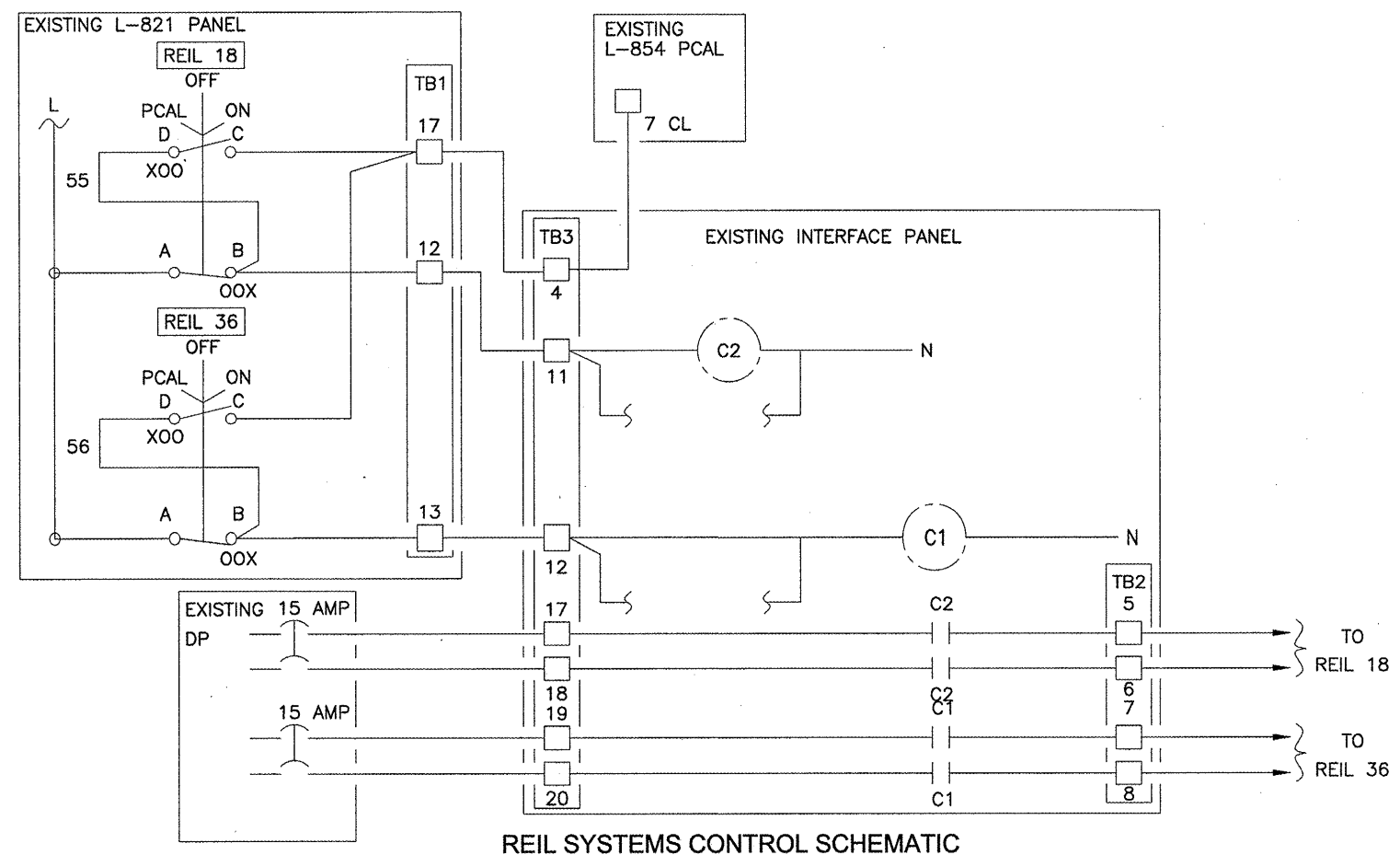
MODIFICATIONS TO
 L-821 CONTROL PANEL



DETAIL - EXISTING FIELD LIGHTING POWER
 & CONTROL EQUIPMENT

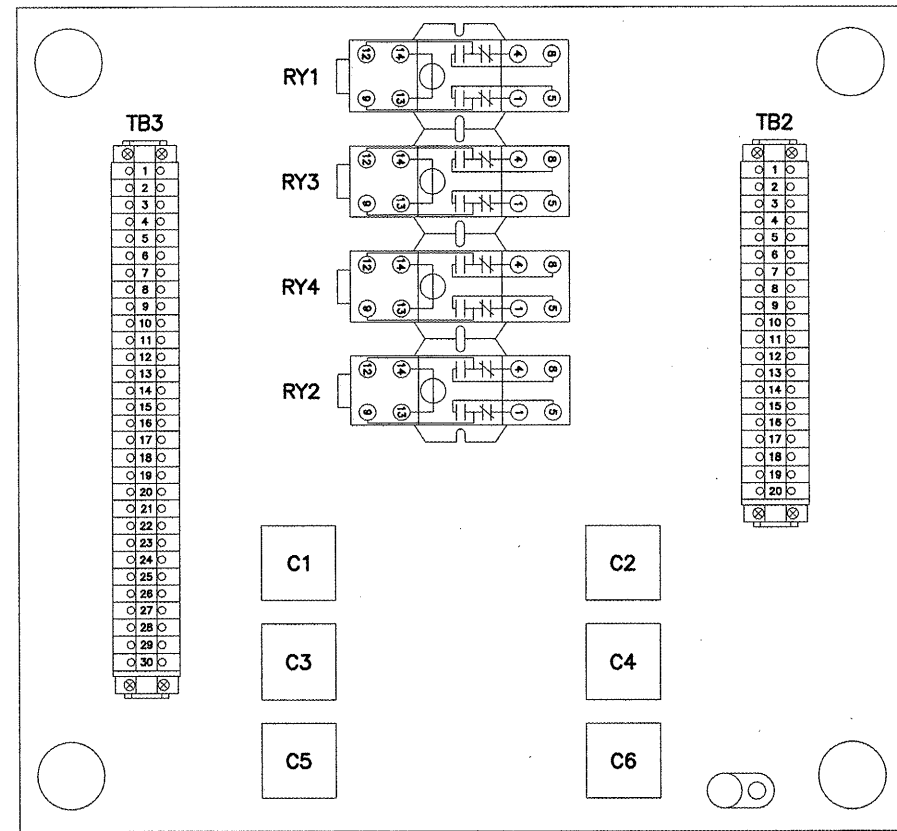
DETAIL NOTES:

- ① Existing airfield lighting control panel. See wiring diagrams.
- ② Existing interface panel. See wiring diagrams.
- ③ Existing 3" conduit to handhole. Route proposed field lighting conductors through this conduit.
- ④ Existing 2" conduit for power feeds. Route proposed PAPI feed wiring through this conduit to Panel DP.
- ⑤ Existing 120/240 volt panelboard DP. Connect PAPI feed wiring to an existing 2-pole 15 amp circuit breaker in this panel. Relabel panel directory accordingly for new PAPI & REIL systems.



REIL SYSTEMS CONTROL SCHEMATIC

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EXISTING INTERFACE PANEL INTERIOR LAYOUT
 NO SCALE

LEGEND

- EXISTING WIRING
- PROPOSED WIRING
- //// EXISTING INTERNAL WIRING TO BE REMOVED

NOTE: UPDATE WIRING DIAGRAM & PROVIDE LAMINATED COPY ON INSIDE OF PANEL DOOR.

TB3	
LINE - DP2	1 RY1-12
LB21 - TB1-4 - PE	2 RY1-13
5 CL - FROM LBS4	3 RY3-13
7 CL - FROM LBS4	4 RY4-13
NEUTRAL	5 N
TB1-5 - BRIGHT	6 RY1-9
TB1-6 - CC	7 RY3-9
TB1-7 - 810	8 RY3-1
TB1-8 - 830	9 RY4-1
TB1-9 - 8100	10 RY4-5
TB1-12 - S5	11 RY2-1
TB1-13 - S6	12 RY2-4
TB1-14 - S7	13 C3-C1
TB1-15 - S8	14 C4-C1
TB1-10 - WINDCONE	15 C5-C1
TB1-11 - BEACON	16 C6-C1
DP26	17 C2-L2
DP26	18 C2-L1
DP22	19 C1-L2
DP22	20 C1-L1
DP25	21 C3-L2
DP25	22 C3-L1
DP29	23 C4-L2
DP29	24 C4-L1
DP15	25 C5-L1
DP17	26 C6-L1
	27
	28
	29
	30

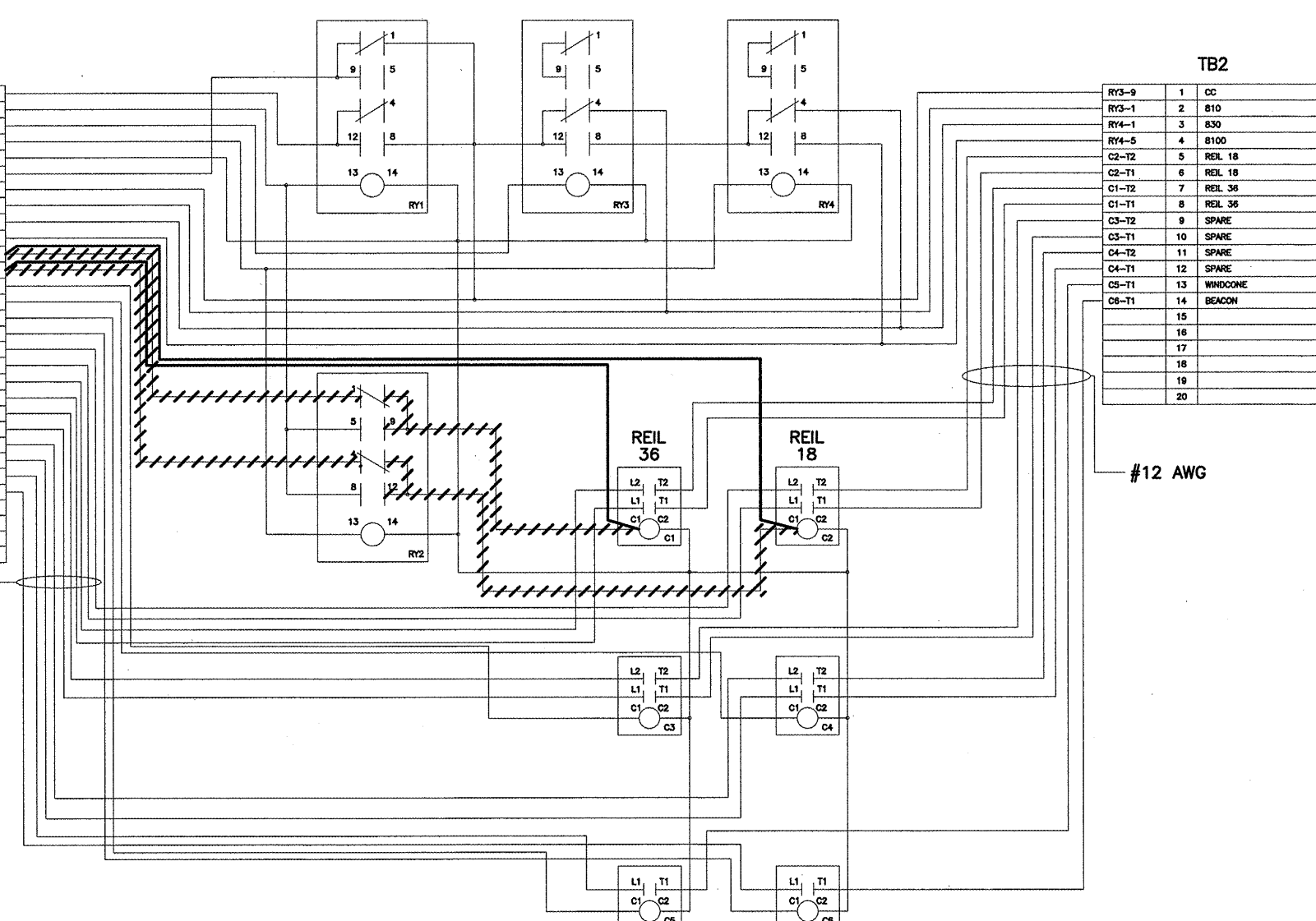
TB2	
RY3-9	1 CC
RY3-1	2 810
RY4-1	3 830
RY4-5	4 8100
C2-T2	5 REIL 18
C2-T1	6 REIL 18
C1-T2	7 REIL 36
C1-T1	8 REIL 36
C3-T2	9 SPARE
C3-T1	10 SPARE
C4-T2	11 SPARE
C4-T1	12 SPARE
C5-T1	13 WINDCONE
C6-T1	14 BEACON
	15
	16
	17
	18
	19
	20

REIL 18
 REIL 36

#12 AWG

#12 AWG

FIELD WIRING TO REIL 36 & 18



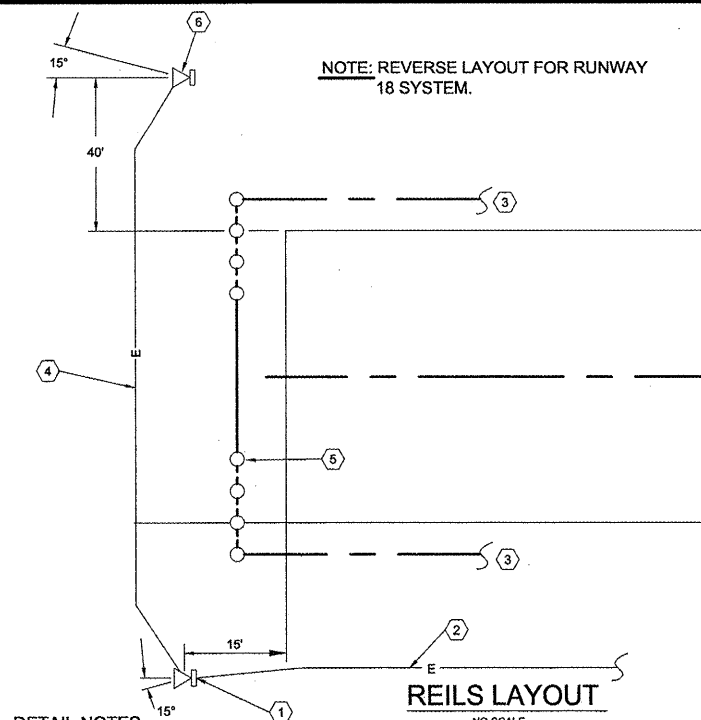
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PAPI - RUNWAY 18			
STATION	OFFSET	AIMING ANGLE	BEAM CENTER ELEVATION
34+42.8	87.5' RT	3° 30'	439.92
34+42.8	112.5' RT	3° 10'	439.92
34+42.8	137.5' RT	2° 50'	439.92
34+42.8	162.5' RT	2° 30'	439.92

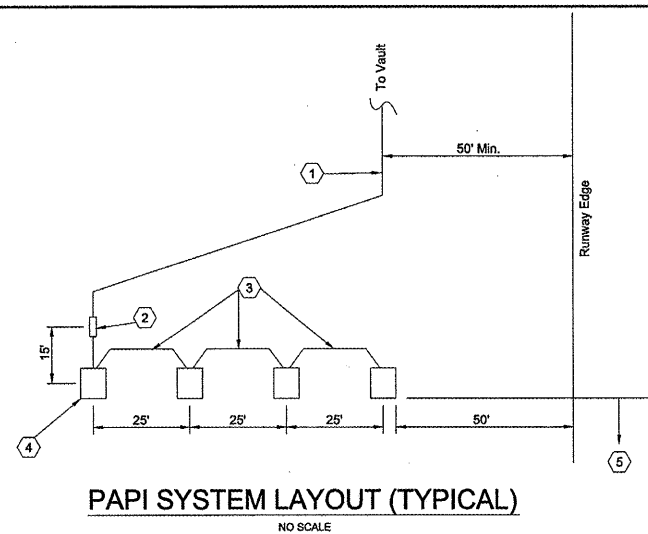
REIL - RUNWAY 18	
STATION	OFFSET
42+72	77.5' LT
42+72	77.5' RT

REIL - RUNWAY 36	
STATION	OFFSET
-2+70	77.5' LT
-2+70	77.5' RT

PAPI & REIL LOCATION AND ELEVATION CHART

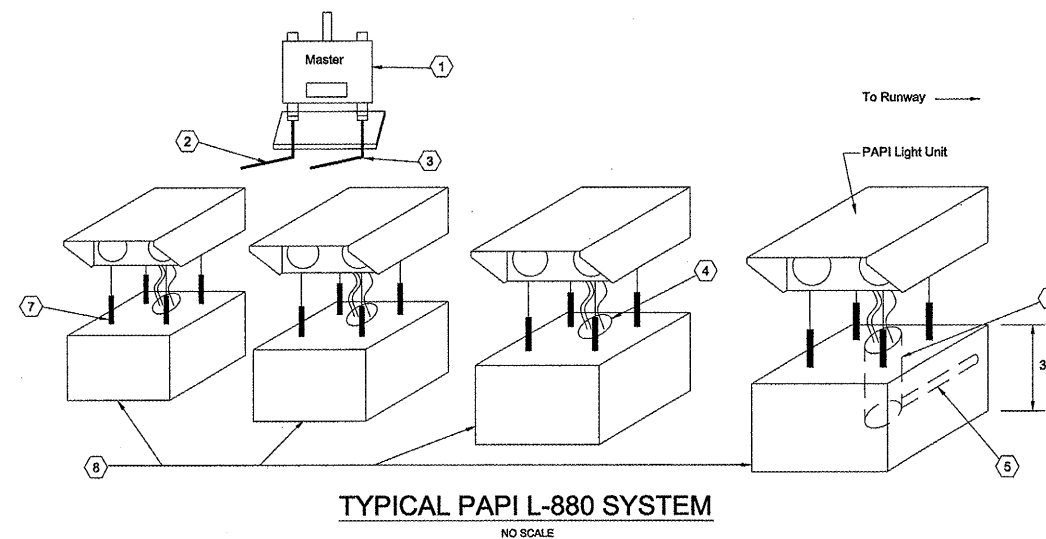


- DETAIL NOTES:**
- REIL master unit. For master and slave units, the vertical aiming angle shall be 10 degrees above horizontal, and angled away from the runway centerline as shown.
 - See Site Plans for wire feeds.
 - Existing runway lighting circuit. Locate and avoid damaging.
 - Interconnect wiring between master and slave units shall be per system manufacturer's requirements, and shall be considered incidental to this item. All power wiring shall be 600 volt rated, Type C for direct burial installations. Provide a minimum of two spare conductors between units.
 - Existing threshold lights. Locate and avoid underground wiring.
 - REIL slave unit.



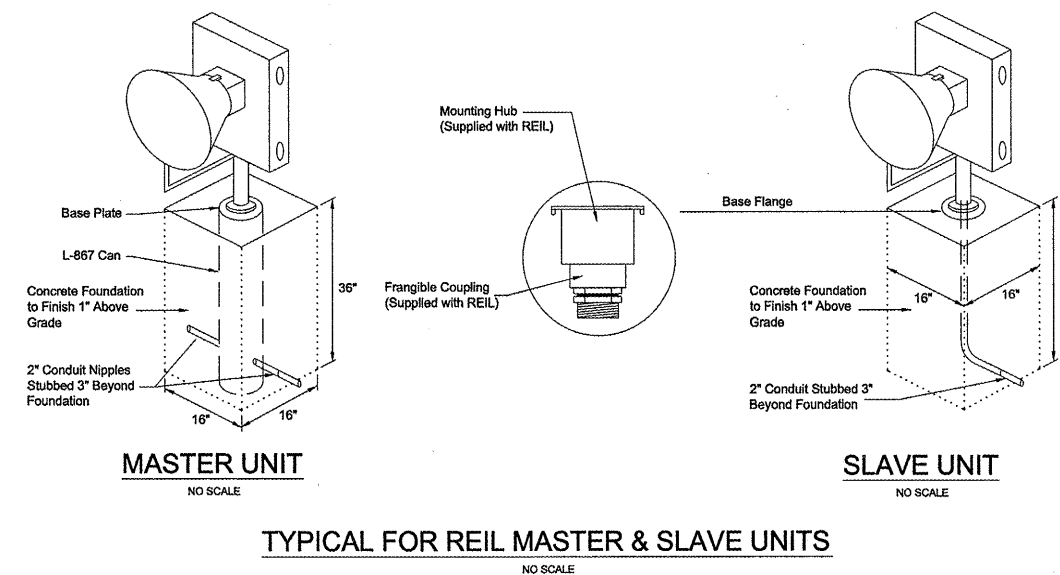
PAPI SYSTEM LAYOUT (TYPICAL)
NO SCALE

- DETAIL NOTES:**
- See Site Plans for circuit routing to vault and conductor sizes.
 - Master Power & Control Unit. See detail, This Sheet.
 - Interconnect wiring in trench as required by system manufacturer.
 - Typical four-box layout. See chart, this sheet for exact elevation to light beam center for each box.
 - See Site Plans for exact dimensions from runway threshold.



TYPICAL PAPI L-880 SYSTEM
NO SCALE

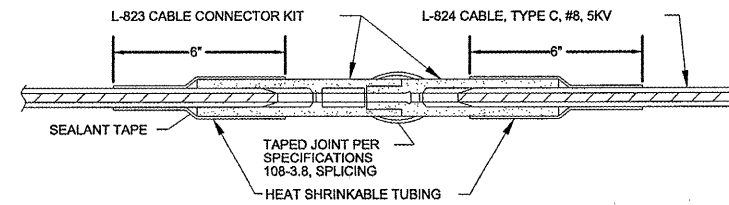
- DETAIL NOTES:**
- Master power and control unit. Concrete foundation requirements shall be same as Note 8.
 - 240 volt AC power wiring in trench from vault.
 - Power and control wiring in trench as required by manufacturer.
 - Provide frangible couplings and L-823 connectors for all wire entrances into base plate hubs.
 - Typical 2" conduit stubbed 3" beyond outside edge of foundation for wiring.
 - Typical L-867, style D can with base plate; location per manufacturer's requirements. Base flanges shall be fastened to the foundation with 1/2" x 6" galvanized anchor bolts, washers and nuts; quantity per flange shall be per manufacturer's requirements.
 - Concrete foundations shall extend 1 ft beyond edge of light box units, and shall finish 1" above the highest surrounding grade with edges beveled or chamfered. Center the unit on the foundation.



MASTER UNIT
NO SCALE

SLAVE UNIT
NO SCALE

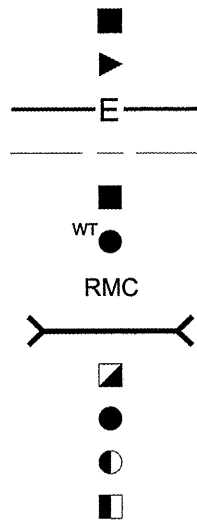
TYPICAL FOR REIL MASTER & SLAVE UNITS
NO SCALE



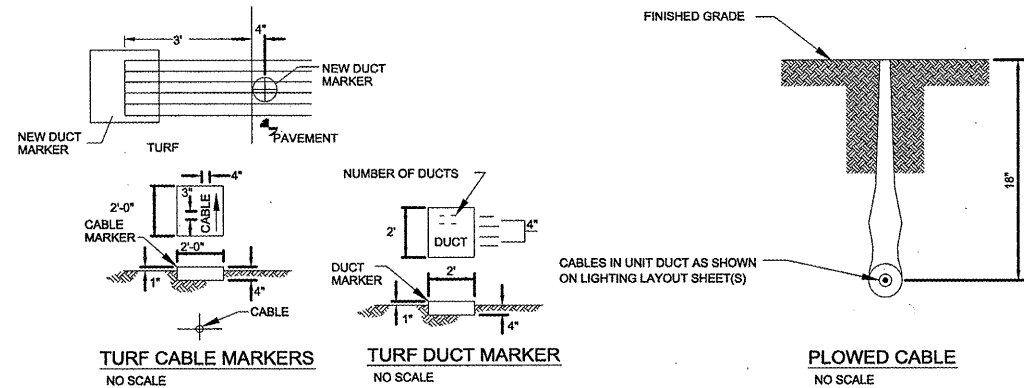
DETAIL - CABLE SPLICING
 NO SCALE

CABLE SPLICING NOTES:

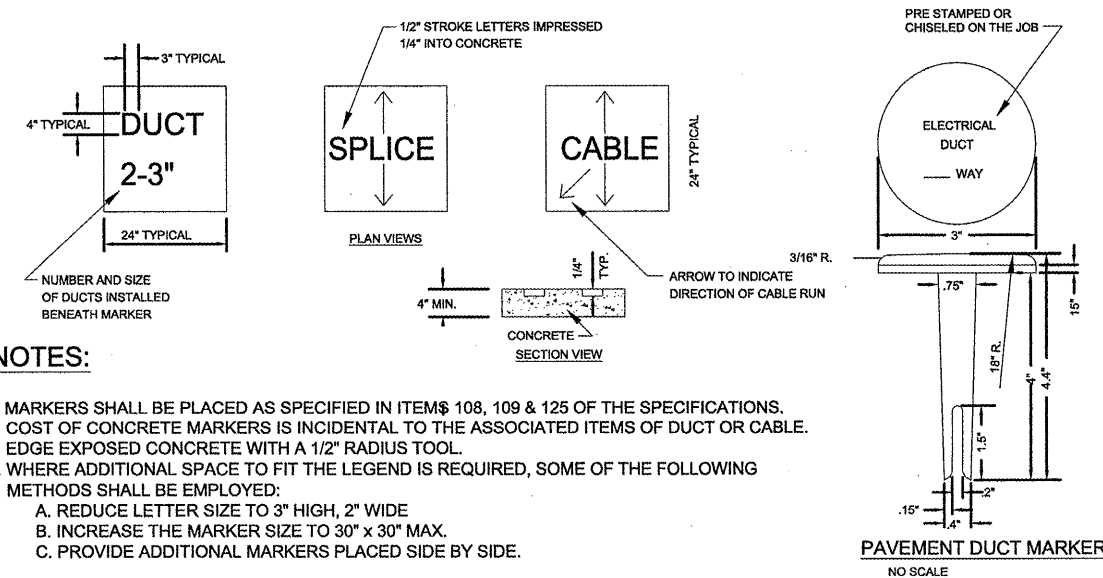
- HEAT-SHRINKABLE TUBING WILL NOT BE REQUIRED FOR ISOLATION TRANSFORMER PRIMARY CONNECTORS WHICH ARE MOLDED ON TO THE CABLE LEADS AT THE FACTORY.
- THE SEALANT TAPE AROUND THE CONNECTOR SHALL BE WATER INSOLUBLE, MAINTAINING ELASTICITY OVER A WIDE RANGE OF TEMPERATURE, AND SHALL BE RAYCHEM NO. S-1011 OR APPROVED EQUAL.
- HEAT-SHRINKABLE TUBING SHALL HAVE MINIMUM EXPANDED ID. OF 1.200", MAXIMUM RECOVERED ID. OF .300", MINIMUM EXPANDED WALL THICKNESS OF .04", NOMINAL RECOVERY WALL THICKNESS OF 0.17", A MASTIC WATER SEALANT COATING APPLIED ON THE INSIDE, AND SHALL BE RAYCHEM NO. WCS-300-6-S OR APPROVED EQUAL.
- MINIMUM LENGTH OF THE HEAT-SHRINKABLE TUBING SHALL BE 6".
- CLEAN THE CABLE INSULATION BEFORE APPLYING THE TUBING WITH A SOLVENT SPECIFIED BY THE TUBING MANUFACTURER.
- TO HEAT THE TUBING, USE PROPANE TORCH, OR ELECTRIC HEATER RECOMMENDED BY THE TUBING MANUFACTURER.
- BEGIN HEATING THE TUBING AT THE CENTER, GO COMPLETELY AROUND, THEN MOVE TOWARD THE ENDS.
- CONTINUE HEATING THE TUBING UNTIL IT SHRINKS COMPLETELY AND THE SEALANT IS BEING SQUEEZED OUT AT BOTH ENDS.
- IF THERE IS ANY NOTICEABLE HEAT DAMAGE TO THE CABLE OR THE TUBING, THE CONNECTION, INCLUDING THE DAMAGED PORTION, WILL BE REMOVED AND ANOTHER CONNECTION MADE.
- ALLOW THE CONNECTION TO COOL BEFORE HANDLING.
- INSTALL THE CONNECTIONS WITHOUT BENDING THEM.
- THE CONTRACTOR SHALL TRAIN THE AIRPORT MAINTENANCE PERSONNEL IN THE EMPLOYMENT OF CABLE CONNECTION WITH HEAT-SHRINKABLE TUBING. THE INSTRUCTION SHALL INCLUDE AT LEAST TWO ASSEMBLIES AND DISASSEMBLIES FOR SUCH CONNECTIONS.
- AFTER COMPLETION OF THE CONSTRUCTION, THE CONTRACTOR SHALL TRANSFER ONE OF THE HEATER UNITS TO THE AIRPORT MANAGER. IT SHALL BECOME THE PROPERTY OF THE AIRPORT.



- ELECTRICAL PLAN LEGEND**
- PROPOSED PAPI SYSTEM COMPONENT
 - PROPOSED REIL MASTER OR SLAVE UNIT
 - PROPOSED UNDERGROUND ELECTRICAL
 - EXISTING UNDERGROUND ELECTRICAL
 - EXISTING VASI COMPONENT
 - EXISTING WIND TEE
 - RIGID METAL CONDUIT, SCHEDULE 40 STEEL
 - RMC PUSHED OR BORED UNDER PAVEMENT
 - EXISTING HANDHOLE
 - EXISTING MITL
 - EXISTING MITHL
 - EXISTING MIRL



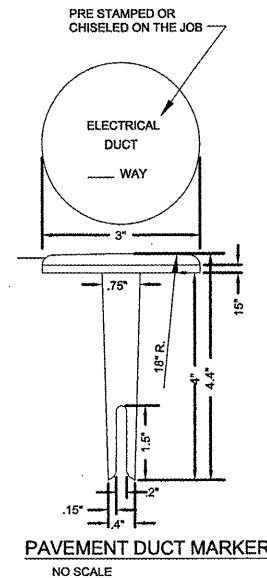
TURF CABLE MARKERS NO SCALE
 TURF DUCT MARKER NO SCALE
 PLOWED CABLE NO SCALE



CABLE AND DUCT MARKERS
 NO SCALE

NOTES:

- MARKERS SHALL BE PLACED AS SPECIFIED IN ITEMS 108, 109 & 125 OF THE SPECIFICATIONS.
- COST OF CONCRETE MARKERS IS INCIDENTAL TO THE ASSOCIATED ITEMS OF DUCT OR CABLE.
- EDGE EXPOSED CONCRETE WITH A 1/2" RADIUS TOOL.
- WHERE ADDITIONAL SPACE TO FIT THE LEGEND IS REQUIRED, SOME OF THE FOLLOWING METHODS SHALL BE EMPLOYED:
 - REDUCE LETTER SIZE TO 3" HIGH, 2" WIDE
 - INCREASE THE MARKER SIZE TO 30" x 30" MAX.
 - PROVIDE ADDITIONAL MARKERS PLACED SIDE BY SIDE.



PAVEMENT DUCT MARKER
 NO SCALE

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GENERAL ELECTRICAL NOTES:

1. THE ELECTRICAL INSTALLATION, AS A MINIMUM, SHALL MEET THE NATIONAL ELECTRICAL CODE AND LOCAL REGULATIONS.
2. IN LIEU OF STENCILING, CONTRACTOR SHALL FURNISH AND INSTALL PLASTIC LAMINATED ENGRAVED LEGEND PLATES SECURELY FASTENED TO EQUIPMENT WITH TAPPING OR MACHINE SCREWS. LEGEND PLATES SHALL BE 1/2" HIGH BLACK LETTERS ON WHITE BACKGROUND.
3. COLOR CODE ALL PHASE WIRING BY THE USE OF COLORED WIRE, INSULATION AND/OR COLORED TAPE. WHERE TAPE IS USED, THE WIRE INSULATION SHALL BE BLACK. BLACK AND RED SHALL BE USED FOR SINGLE PHASE, THREE WIRE SYSTEMS, AND BLACK, RED AND BLUE SHALL BE USED FOR THREE PHASE SYSTEMS. NEUTRAL CONDUCTOR SIZE NO. 6 AWG OR SMALLER SHALL BE IDENTIFIED BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH. NEUTRAL CONDUCTORS SIZE LARGER THAN NO. 6 SHALL BE IDENTIFIED EITHER BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH OR BY THE USE OF WHITE TAPE AT ITS TERMINATIONS AND INSIDE ACCESSIBLE WIREWAYS.
4. ALL BRANCH CIRCUIT CONDUCTORS CONNECTED TO A PARTICULAR PHASE SHALL BE IDENTIFIED WITH THE SAME COLOR. THE COLOR CODING SHALL BE EXTENDED TO THE POINT OF UTILIZATION.
5. NEATLY LACE WIRING IN DISTRIBUTION PANELS, SWITCHES AND JUNCTION/PULL BOXES.
6. GROUND ALL NONCURRENT-CARRYING METAL PARTS OF ELECTRICAL EQUIPMENT BY USING INSULATED COPPER WIRE TO BE RUN INSIDE CABINETS AND IN CONDUITS TOGETHER WITH OTHER WIRES.
7. ALL GROUND CONNECTIONS TO BUSSES, PANEL, ETC., SHALL BE MADE WITH PRESSURE TYPE SOLDERLESS LUG CLAMPS. SOLDERED OR BOLT & WASHER TYPE CONNECTIONS ARE NOT ACCEPTABLE. CLEAN ALL METAL SURFACES BEFORE MAKING GROUND CONNECTIONS. CONNECTIONS TO GROUND RODS & GROUND RING SHALL BE MADE WITH EXOTHERMIC WELDING PROCESS.
8. RIGID STEEL CONDUIT SHALL BE USED THROUGHOUT THE INSTALLATION UNLESS OTHERWISE SPECIFIED. ALL STEEL CONDUITS, & FITTINGS SHALL BE GALVANIZED.
9. FOR INDOOR LOCATIONS EQUIPMENT SUPPORT STRUCTURES, CHANNEL OR STRUT, INCLUDING FASTENING HARDWARE, SHALL BE GALVANIZED. FOR OUTDOOR LOCATIONS EQUIPMENT SUPPORT STRUCTURES, CHANNEL OR STRUT, INCLUDING FASTENING HARDWARE, SHALL BE 316 STAINLESS STEEL.
10. USE DUAL LUGS WHERE TWO WIRES SIZE NO. 6 OR LARGER ARE TO BE CONNECTED TO THE SAME TERMINAL.
11. USE INSULATED CONDUIT BUSHING AT EACH CONDUIT TERMINATION.
12. USE DOUBLE LOCK NUTS AT EACH CONDUIT TERMINATION.
13. UNLESS OTHERWISE SHOWN, ALL EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES WITH THE LINES OF THE STRUCTURE.
14. LABEL BOTH ENDS OF ALL CONTROL CONDUCTORS TO IDENTIFY TERMINAL NUMBER AND CIRCUIT, SUCH LABELING SHALL BE DONE AT ALL TERMINALS AND SPLICES.
15. UNLESS OTHERWISE NOTED, ALL SINGLE CONTROL CONDUCTORS SHALL BE NO. 12 AWG, THHN, STRANDED COPPER, EXTENSIONS TO EXISTING CONTROL CONDUCTORS SHALL BE THE SAME COLOR AS EXISTING.
16. BOTH ENDS OF EACH CONTROL CONDUCTOR SHALL BE TERMINATED AT A TERMINAL BLOCK. THE TERMINAL BLOCKS SHALL BE OF PROPER RATING AND SIZE AND THEY SHALL BE LOCATED IN EQUIPMENT ENCLOSURES OR SPECIAL TERMINAL CABINETS.
17. BOTH ENDS OF ALL CONTROL CONDUCTORS SHALL BE IDENTIFIED AS TO THE CIRCUIT TERMINAL BLOCK, AND TERMINAL NUMBER. ONLY SHRINKABLE PERMANENT LABELS SHALL BE USED.
18. A SEPARATE AND CONTINUOUS NEUTRAL CONDUCTOR SHALL BE INSTALLED AND CONNECTED FOR EACH CIRCUIT IN THE POWER PANEL(S) FROM THE NEUTRAL BAR TO EACH POWER/CONTROL CIRCUIT.
19. SPLICES AND JUNCTION POINTS SHALL BE PERMITTED ONLY IN JUNCTION BOXES, DUCTS EQUIPPED WITH REMOVABLE COVERS AND AT EASILY ACCESSIBLE LOCATIONS.
20. UNLESS OTHERWISE NOTED, ALL UNDERGROUND FIELD POWER MULTIPLE AND SERIES CIRCUIT CONDUCTORS SHALL BE FAA APPROVED L-824, TYPE C INSULATION. VOLTAGE AND SIZE SHALL BE AS SPECIFIED.
21. THE JOINT OF THE PRIMARY L-823 PRIMARY CONNECTORS SHALL BE WRAPPED WITH AT LEAST ONE LAYER OF RUBBER OR SYNTHETIC RUBBER TAPE AND ONE LAYER OF PLASTIC TAPE. ONE-HALF LAPPED. EXTENDING AT LEAST 1 INCH ON EACH SIDE OF THE JOINT. HEAT-SHRINK TUBING SHALL BE APPLIED WHERE CABLE ENTERS BACK OF CONNECTOR. SEE DETAIL DRAWING.
22. THE ID OF THE PRIMARY L-823 FIELD ATTACHED CONNECTORS SHALL MATCH THE CABLE OD TO PROVIDE A WATERTIGHT CABLE ENTRANCE.
23. ALL POWER AND CONTROL CIRCUIT CONDUCTORS SHALL BE COPPER. ALUMINUM SHALL NOT BE ACCEPTED. THIS INCLUDES WIRE, CABLE, BUSSES, TERMINALS, SWITCH/PANEL COMPONENTS, ETC.
24. CABLE/SPLICE/DUCT MARKERS SHALL BE PRECAST CONCRETE OF SIZE SHOWN. LETTER/NUMBERS FOR THE LEGEND TO BE IMPRESSED INTO TOPS OF THE MARKERS SHALL BE PREASSEMBLED AND SECURED IN MOLD BEFORE CONCRETE IS POURED. LEGEND INSCRIBED BY HAND IN WET CONCRETE SHALL NOT BE ACCEPTABLE.
25. THE CONTRACTOR SHALL ASCERTAIN THAT ALL LIGHTING SYSTEM COMPONENTS FURNISHED BY HIM (INCLUDING FAA APPROVED EQUIPMENT) ARE COMPATIBLE IN ALL RESPECTS WITH EACH OTHER AND REMAINDER OF THE NEW/EXISTING SYSTEM. ANY NONCOMPATIBLE COMPONENTS FURNISHED BY THIS CONTRACTOR SHALL BE REPLACED BY HIM AT NO ADDITIONAL COST TO THE AIRPORT SPONSOR WITH A SIMILAR UNIT, APPROVED BY THE ENGINEER (DIFFERENT MODEL OF DIFFERENT MANUFACTURER) THAT IS COMPATIBLE WITH THE REMAINDER OF THE AIRPORT LIGHTING SYSTEM.
26. IN CASE THE CONTRACTOR SELECTS TO FURNISH AND INSTALL AIRPORT LIGHTING EQUIPMENT REQUIRING ADDITIONAL WIRING, TRANSFORMERS, ADAPTERS, MOUNTINGS, ETC., TO THOSE SHOWN ON THE DRAWINGS AND/OR LISTED IN THE SPECIFICATIONS, ANY COST FOR THESE ITEMS SHALL BE INCIDENTAL TO THE EQUIPMENT COST.
27. THE CONTRACTOR INSTALLED EQUIPMENT (INCLUDING FAA APPROVED) SHALL NOT GENERATE ANY ELECTROMAGNETIC INTERFERENCE IN THE EXISTING AND/OR NEW COMMUNICATIONS, WEATHER, AND AIR TRAFFIC CONTROL EQUIPMENT. ANY EQUIPMENT GENERATING SUCH INTERFERENCE SHALL BE REPLACED BY THE CONTRACTOR, AT NO ADDITIONAL COST, BY EQUIPMENT MEETING THE APPLICABLE SPECIFICATIONS AND NOT GENERATING ANY INTERFERENCE.
28. ALL EXISTING LIGHTS REMOVED UNDER THIS CONTRACT SHALL BE CONTRACTOR SALVAGE.
29. WHERE EXISTING SIGNS AND FOUNDATIONS ARE TO BE REMOVED, THE AREA SHALL BE BACKFILLED WITH EARTH TO THE ORIGINAL GRADE, COMPACTED AND SEEDED. SUCH REMOVAL SHALL BECOME CONTRACTOR SALVAGE UNLESS NOTED OTHERWISE.
30. CONTRACTOR SHALL LOCATE EXISTING UNDERGROUND CIRCUITS, GAS OR WATER LINES WITH A PORTABLE CABLE OR PIPE LOCATOR WHERE POSSIBLE TO AVOID DAMAGE TO EXISTING UTILITIES TO BE RETAINED. EXCAVATING REQUIRED IN CONGESTED AREAS CONTAINING OTHER UTILITIES SHALL BE DONE BY HAND. ANY SUCH WIRING DAMAGED DURING CONSTRUCTION SHALL BE REPAIRED IMMEDIATELY AFTER DISCOVERY AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED. ALL UNDERGROUND SPLICES SHALL BE INSPECTED BY THE ENGINEER PRIOR TO BACKFILLING TRENCHES.
31. SHOP DRAWINGS SHALL BE REQUIRED FOR ALL PROPOSED LIGHTING EQUIPMENT INCLUDING CABLE, CABLE CONNECTIONS, TRANSFORMERS, L-867 BASES, PAPI & REIL SYSTEMS, & ALL EQUIPMENT ITEMS DESCRIBED UNDER SPECIFICATIONS ITEM 109, OR SHOWN ON THE PLANS.