

CONSTRUCTION PLANS

FOR

CARMI MUNICIPAL AIRPORT

CARMI, WHITE COUNTY, ILLINOIS

REPLACE MIRLS, MITLS, VADIS, REILS, BEACON & VAULT

SCOPE OF WORK

BASE BID: THIS WORK SHALL CONSIST OF THE REMOVAL AND REPLACEMENT OF THE MEDIUM INTENSITY LIGHTING SYSTEMS ON RUNWAY 18-36 AND THE PARALLEL TAXIWAY TO RUNWAY 18 - 36 BETWEEN TAXIWAY A1 AND TAXIWAY A2. INCLUDED WITH THIS WORK WILL BE REPLACEMENT OF THE VASI SYSTEMS ON BOTH RUNWAY APPROACHES, REPLACEMENT OF THE AIRPORT ROTATING BEACON WITH A REFURBISHED UNIT, AND ADDITION OF OBSTRUCTION LIGHTS ON THE EXISTING AIRPORT ROTATING BEACON TOWER. ALSO INCLUDED SHALL BE THE INSTALLATION OF A NEW AIRPORT ELECTRICAL VAULT WITH ASSOCIATED HANDHOLES, DUCTS AND CABLING AND REMOVAL OF THE EXISTING AIRPORT ELECTRICAL VAULT.

ADDITIVE ALTERNATE NO. 1: INSTALLATION OF A LIGHTED L-807 PRIMARY WIND CONE.

COVERING
ELECTRICAL DESIGN

PLANS PREPARED BY:

HANSON
Hanson Professional Services Inc.
ELECTRICAL ENGINEER

Submitted by *Kevin N. Lightfoot* ENG'R
Date Submitted 6-22-2010

Lics. Exp. Date NOVEMBER 30, 2011

HANSON
Hanson Professional Services Inc.

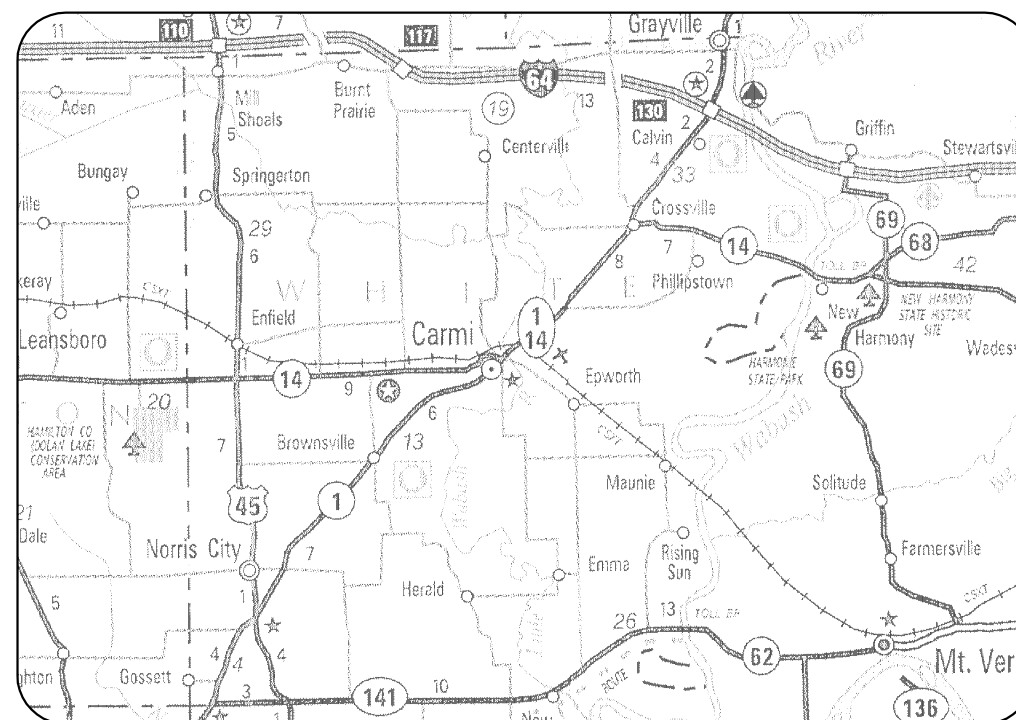
Submitted by *Jeffery S. Litherland* ENG'R
Date Submitted 6-21-10

Lics. Exp. Date NOVEMBER 30, 2011

CITY OF CARMI, ILLINOIS

Approved *David Fort* MAYOR
Date June 17, 2010

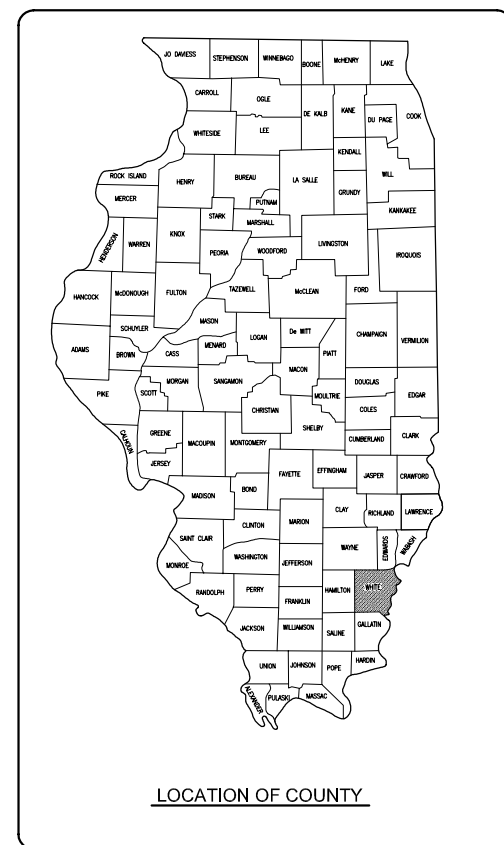
Approved *Ron Pittman* CLERK
Date 6-17-10



LOCATION

ILL. PROJ.: CUL-3972
A.I.P. PROJ.: 3-17-0109-B8

LATITUDE: 38° 05' 23"
LONGITUDE: 88° 07' 23"
ELEVATION: 385.0' M.S.L.
DATE: JUNE 24, 2010



REVISION									
DATE									
CARMI MUNICIPAL AIRPORT CARMI, ILLINOIS									
Hanson Proj. No. 09A0158D	Filname: R-001CVR.DWG	Scale: NOT TO SCALE	Date: 06/24/10	LAYOUT: KNL 04/21/10	DRAWN: CWS 04/21/10	REVIEWED: JSL/KNL 06/09/10	IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8		
HANSON Hanson Professional Services Inc. 1525 South Sixth Street Springfield, Illinois 62703-2886 Ph: (217) 788-2450 Fax: (217) 788-2503 www.hanson-inc.com Offices Nationwide									
REPLACE MIRLS, MITLS, VADIS, REILS, BEACON & VAULT					COVER SHEET				
1									
1 of 44 sheets									

REVISION	DATE

**CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS**

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

SUMMARY OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITIES	AS BUILT QUANTITIES
AR101580	REFURBISH 36" BEACON	L.S.	1	
AR108158	1/C #8 5 KV UG CABLE IN UD	L.F.	17,900	
AR108656	3/C #6 600V UG CABLE IN UD	L.F.	6,800	
AR109110	ERECT PRE-FABRICATED VAULT	L.S.	1	
AR109200	INSTALL ELECTRICAL EQUIPMENT	L.S.	1	
AR109901	REMOVE ELECTRICAL VAULT	L.S.	1	
AR109924	REPLACE ELECTRICAL SERVICES	L.S.	1	
AR110014	4" DIRECTIONAL BORE	L.F.	1,095	
AR110610	ELECTRICAL HANDHOLE	EA.	4	
AR125410	MITL-STAKE MOUNTED	EA.	42	
AR125415	MITL-BASE MOUNTED	EA.	6	
AR125505	MIRL-STAKE MOUNTED	EA.	34	
AR125510	MIRL-BASE MOUNTED	EA.	8	
AR125540	MI THRESHOLD LIGHT STAKE MTD	EA.	8	
AR125610	REILS	PAIR	1	
AR125620	ABBREVIATED PAPI (L-881 SYSTEM)	EA.	2	
AR125901	REMOVE STAKE MOUNTED LIGHT	EA.	88	
AR125902	REMOVE BASE MOUNTED LIGHT	EA.	14	
AR125907	REMOVE REILS	PAIR	1	
AR125909	REMOVE VASI	EACH	2	
AR150510	ENGINEER'S FIELD OFFICE	L.S.	1	
AR150520	MOBILIZATION	L.S.	1	
AR800503	ENHANCED THRESHOLD LIGHT STAKE MT	EACH	7	
AR800504	ENHANCED THRESHOLD LIGHT BASE MTD	EACH	1	
AR800590	4/C #6 600V UG CABLE IN UD	L.F.	370	
AR800591	UPGRADE AIRPORT ROTATING BEACON	L.S.	1	

SUMMARY OF QUANTITIES - ADDITIVE ALTERNATE NO. 1

ITEM NO.	DESCRIPTION	UNIT	TOTAL QUANTITIES	AS BUILT QUANTITIES
AS107812	L-807 WC-12' INTERNALLY LIT	EACH	1	
AS108656	3/C#6 600V UG CABLE IN UD	L.F.	100	
AS125565	SPLICE CAN	EACH	1	

INDEX TO SHEETS

SHEET NO.	DESCRIPTION
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5	EXISTING LIGHTING PLAN STA. 29+00 TO STA. 43+00
6	EXISTING LIGHTING PLAN STA. 43+00 TO STA. 55+00
7	EXISTING LIGHTING PLAN STA. 55+00 TO STA. 59+00
8	EXISTING LIGHTING PLAN TERMINAL AREA
9	EXISTING LIGHTING PLAN ENLARGED VAULT AREA
10	PROPOSED LIGHTING PLAN STA. 17+00 TO STA. 28+50
11	PROPOSED LIGHTING PLAN STA. 28+50 TO STA. 42+50
12	PROPOSED LIGHTING PLAN STA. 42+50 TO STA. 55+00
13	PROPOSED LIGHTING PLAN STA. 55+00 TO STA. 59+00
14	PROPOSED LIGHTING PLAN TERMINAL AREA
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17	PROPOSED PAPI DETAILS AND NOTES RUNWAY END 36
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Hanson Proj. No. 09A01580	File Name R-002FLP.DWG	Scale NOT TO SCALE	Date 06/24/10
LAYOUT	KNL	06/09/10	
DRAWN	CWS	06/09/10	
REVIEWED	KNL/JSL	06/09/10	

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**REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT**

SUMMARY OF QUANTITIES
AND
INDEX TO SHEETS

JUN 24, 2010 9:44 AM HARR01115
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SCOPE OF WORK

BASE BID: THIS WORK SHALL CONSIST OF THE REMOVAL AND REPLACEMENT OF THE MEDIUM INTENSITY LIGHTING SYSTEMS ON RUNWAY 18-36 AND THE PARALLEL TAXIWAY TO RUNWAY 18 - 36 BETWEEN TAXIWAY A1 AND TAXIWAY A2. INCLUDED WITH THIS WORK WILL BE REPLACEMENT OF THE VASI SYSTEMS ON BOTH RUNWAY APPROACHES, REPLACEMENT OF THE AIRPORT ROTATING BEACON WITH A REFURBISHED UNIT, AND ADDITION OF OBSTRUCTION LIGHTS ON THE EXISTING AIRPORT ROTATING BEACON TOWER. ALSO INCLUDED SHALL BE THE INSTALLATION OF A NEW AIRPORT ELECTRICAL VAULT WITH ASSOCIATED HANDHOLES, DUCTS AND CABLING AND REMOVAL OF THE EXISTING AIRPORT ELECTRICAL VAULT.

ADDITIVE ALTERNATE NO. 1: INSTALLATION OF A LIGHTED L-807 PRIMARY WIND CONE.

AIRPORT SECURITY NOTE

AIRPORT SECURITY WILL BE MAINTAINED AT ALL TIMES. THE CONTRACTOR SHALL ENSURE THAT THE ELECTRIC GATE HAS CLOSED EACH TIME THAT IT IS USED.

HEIGHT OF CONSTRUCTION EQUIPMENT

THE MAXIMUM ANTICIPATED HEIGHT OF THE CONSTRUCTION EQUIPMENT WILL BE 65 FEET WHICH IS EXPECTED TO BE A CRANE TO REPLACE THE BEACON. THE MAXIMUM ANTICIPATED HEIGHT OF THE CONSTRUCTION EQUIPMENT AT ALL OTHER LOCATIONS WILL BE 25 FEET, WHICH IS EXPECTED TO BE A CONCRETE TRUCK OR A LINE TRUCK.

HAUL ROUTE AND VEHICLE PARKING

THE CONTRACTOR WILL USE THE EXISTING AIRPORT ENTRANCE ROAD AS HIS ACCESS TO THE CONSTRUCTION SITE. THE CONTRACTOR'S EMPLOYEES WILL PARK THEIR PERSONNEL VEHICLES IN THE AIRPORT PARKING LOT. ONLY CONTRACTOR VEHICLES WILL BE ALLOWED ONTO THE AIRFIELD. THE CONTRACTOR WILL BE ALLOWED A PROPOSED EQUIPMENT PARKING AND MATERIAL STORAGE AREA THAT WILL BE 50' X 150'. THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN THE PROPOSED EQUIPMENT PARKING AND MATERIAL STORAGE AREA THROUGHOUT THE COURSE OF THE PROJECT. ANY AREAS DAMAGED OUTSIDE OF THIS AREA WILL BE REPAIRED BY THE CONTRACTOR AND AT THE CONTRACTOR'S OWN EXPENSE. AT THE CONCLUSION OF THE PROJECT THE CONTRACTOR WILL GRADE, FERTILIZE, SEED AND MULCH THE EQUIPMENT PARKING AND MATERIAL STORAGE AREA AS NEEDED TO RESTORE IT TO ITS ORIGINAL STATE. RESTORATION OF THE EQUIPMENT PARKING AND MATERIAL STORAGE AREA WILL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

BARRICADES AND TRAFFIC CONES

IT WILL BE THE CONTRACTOR'S RESPONSIBILITY TO PLACE AND MAINTAIN BARRICADES AND TRAFFIC CONES AS DIRECTED BY THE AIRPORT MANAGER. THE BARRICADES WILL BE EQUIPPED WITH RED FLASHING OR RED STEADY-BURN LIGHTS AND 20" SQUARE ORANGE FLAGS. THE BARRICADES, THEIR MAINTENANCE, PLACEMENT AND REMOVAL WILL BE CONSIDERED AS AN INCIDENTAL ITEM TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

UTILITY NOTE

THE LOCATION, SIZE, AND TYPE OF MATERIAL OF EXISTING UNDERGROUND AND/OR ABOVEGROUND UTILITIES INDICATED ON THE PLANS ARE NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY WHATSOEVER IN RESPECT TO THE ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION. THERE IS NO GUARANTEE, EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED IN THE CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES OF HIS OPERATIONAL PLANS AND SHALL OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULE OF THE COMPANIES FOR REMOVAL OR ADJUSTMENT WHERE REQUIRED. IN THE EVENT AN UNEXPECTED UTILITY INTERFERENCE IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY COMPANY OF JURISDICTION. THE OWNER'S REPRESENTATIVE AND/OR THE RESIDENT ENGINEER SHALL ALSO BE IMMEDIATELY NOTIFIED. ANY DAMAGE TO SUCH MAINS AND SERVICES SHALL BE RESTORED TO SERVICE AT ONCE AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT. ALL UTILITY CABLES AND LINES SHALL BE LOCATED BY THE RESPECTIVE UTILITY.

CONTACT JULIE (JOINT UTILITY LOCATION INFORMATION FOR EXCAVATORS) FOR UTILITY INFORMATION, PHONE: 1-800-892-0123. CONTACT THE FAA (FEDERAL AVIATION ADMINISTRATION) FOR ASSISTANCE IN LOCATING FAA CABLES AND UTILITIES. LOCATION OF FAA POWER, CONTROL, AND COMMUNICATION CABLES SHALL BE COORDINATED WITH AND/OR LOCATED BY THE FAA. ALSO CONTACT AIRPORT DIRECTOR/MANAGER AND AIRPORT PERSONNEL FOR ASSISTANCE IN LOCATING UNDERGROUND AIRPORT CABLES AND/OR UTILITIES. ALSO COORDINATE WORK WITH ALL ABOVEGROUND UTILITIES.

TRANSMISSION PIPELINE EASEMENT

THERE IS A PETROLEUM TRANSMISSION PIPELINE EASEMENT THAT TRAVERSES THE AIRPORT AND IS WITHIN THE WORK AREAS. THIS EASEMENT IS JOINTLY CONTROLLED BY 2 COMPANIES: ENTERPRISE ENERGY AND SPECTRA ENERGY. THE CONTRACTOR WILL BE REQUIRED TO COORDINATE ANY WORK WITHIN THE PIPELINE RIGHT OF WAY WITH THESE TWO COMPANIES. THE COORDINATION, IMPACT TO THE PROJECT AND SCHEDULING OF WORK WILL BE CONSIDERED AS AN INCIDENTAL ITEM TO THE CONTRACT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

EROSION CONTROL

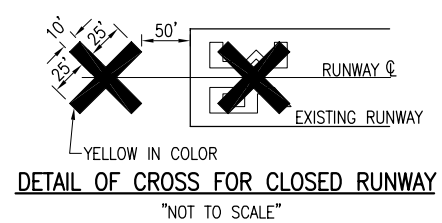
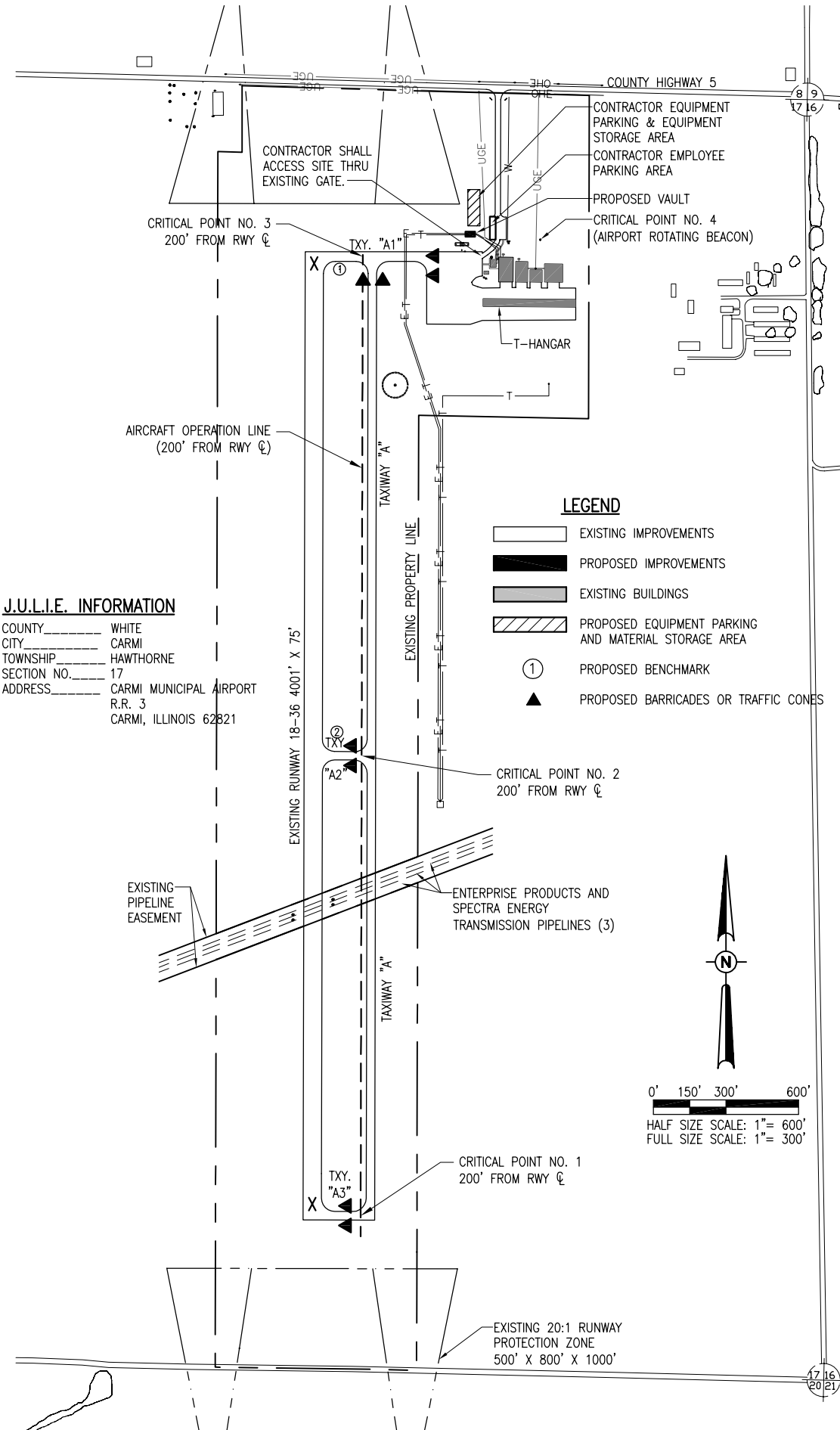
THIS PROJECT WILL NOT DISTURB MORE THAN 1 ACRE OF LAND, THEREFORE A N.P.D.E.S. PERMIT WILL NOT BE REQUIRED.

MATERIAL CERTIFICATION

COMPLETED WORK CANNOT BE PLACED ON A CONSTRUCTION REPORT UNTIL ALL MATERIAL CERTIFICATIONS FOR THAT PAY ITEM HAVE BEEN RECEIVED, REVIEWED AND ACCEPTED BY THE RESIDENT ENGINEER.

CERTIFIED PAYROLLS

THE RESIDENT ENGINEER CANNOT FORWARD CONSTRUCTION REPORTS TO THE ILLINOIS DIVISION OF AERONAUTICS FOR PROCESSING UNTIL ALL CERTIFIED PAYROLLS FOR THE PERIOD HAVE BEEN RECEIVED.



NOTE:

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 AIRPORT MANAGER. THE CROSSES WILL BE PLACED OVER THE NUMERALS AND SECURED IN A MANNER APPROVED BY THE MANAGER. THE PROPOSED CROSSES WILL BE PLACED EACH DAY 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. NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

PROPOSED SAFETY PLAN

GENERAL - THE CARMI MUNICIPAL AIRPORT IS COMPRISED OF ONE RUNWAY. THE PROPOSED CONSTRUCTION WILL REQUIRE RUNWAY 18-36 TO BE CLOSED DURING THE WEEK WHILE WORKING WITHIN 200' OF THE RUNWAY CENTERLINE. DURING THOSE TIMES, AT THE END OF CONSTRUCTION ACTIVITIES ON EACH FRIDAY, THE CONTRACTOR WILL RE-OPEN THE RUNWAY. PRIOR TO RE-OPENING THE RUNWAY THE CONTRACTOR WILL ENSURE THERE ARE NO OPEN HOLES OR PILES OF EARTH, AGGREGATE OR OTHER MATERIAL WITHIN THE RUNWAY SAFETY AREA (75' FROM RUNWAY CENTERLINE). ON WEEKENDS, THE RUNWAY WILL BE OPEN FOR DAYTIME OPERATIONS ONLY, THEREFORE NO LIGHTING CIRCUITS WILL BE REQUIRED TO BE OPERATIONAL. ALL WORK INCLUDED IN OPENING AND CLOSING THE RUNWAY WILL BE CONSIDERED INCIDENTAL TO THE PROJECT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED. ANY WORK WITHIN 66 FT. OF A TAXIWAY CENTERLINE WILL REQUIRE CLOSURE OF THAT TAXIWAY. BARRICADES SHALL BE PLACED ON THE TAXIWAY TO PREVENT ACCESS TO WORK AREAS.

IDENTIFICATION - WHEN THE CONTRACTORS VEHICLES AND EQUIPMENT ARE ON THE AIRPORT THEY SHALL BE PROPERLY MARKED WITH THREE (3') FOOT SQUARE CHECKERED FLAGS (INTERNATIONAL ORANGE AND WHITE). THE CONTRACTOR WILL ALSO PROVIDE WORKERS WITH SOME TYPE OF TAG OR GARMENT TO IDENTIFY THE PERSON AS BEING PART OF THE CONSTRUCTION CREW.

RADIO CONTROL - THE CONTRACTOR WILL BE REQUIRED TO BE IN TWO-WAY RADIO CONTACT (122.80 MHz.) WITH THE AIRPORT UNICOM. THIS WILL KEEP THE CONTRACTOR IN CONSTANT CONTACT WITH THE CARMI MUNICIPAL AIRPORT AND ENABLE THE AIRPORT TO IMMEDIATELY CONTACT THE CONTRACTOR IN CASE OF AN AERONAUTIC EMERGENCY THAT WOULD REQUIRE ACTION BY THE CONTRACTOR AND/OR HIS PERSONNEL. THE CONTRACTOR SHALL PROVIDE HIS OWNS RADIO(S) FOR THIS PURPOSE.

150-ENGINEER'S FIELD OFFICE NOTES

THE PROPOSED ENGINEER'S FIELD OFFICE WILL BE FURNISHED, MAINTAINED, AND REMOVED IN ACCORDANCE WITH ITEM AR150510 "ENGINEER'S FIELD OFFICE" AS STATED IN THE STANDARD SPECIFICATIONS FOR CONSTRUCTION OF AIRPORTS, ADOPTED NOVEMBER 2, 2009.

THE LOCATION OF THE PROPOSED ENGINEER'S FIELD OFFICE WILL BE DETERMINED AT THE PRE-CONSTRUCTION MEETING.

THE ENGINEERING FIRM WILL MAKE PAYMENT FOR ALL LONG DISTANCE TELEPHONE CALLS IN EXCESS OF ONE HUNDRED DOLLARS (\$100.00) PER MONTH.

THE CONTRACTOR WILL FURNISH A CELL PHONE TO THE RESIDENT ENGINEER FOR HIS EXCLUSIVE USE FOR THE DURATION OF THIS PROJECT. THE RESIDENT ENGINEER WILL USE THIS PHONE FOR PROJECT BUSINESS ONLY. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL CHARGES ASSOCIATED WITH THIS CELL PHONE.

THE PROPOSED ENGINEER'S FIELD OFFICE WILL BE PAID FOR UNDER ITEMS: AR150510 ENGINEER'S FIELD OFFICE ____ 1 L.S.

CRITICAL POINT DATA

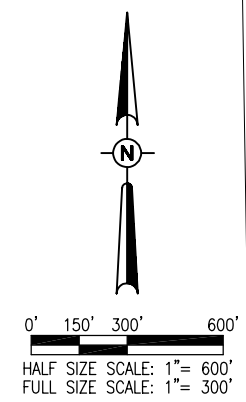
NO. 1 LATITUDE: 38° 05' 02.5064" LONGITUDE: 88° 07' 20.6095" ELEVATION: 382.25' M.S.L.	NO. 3 LATITUDE: 38° 05' 41.6890" LONGITUDE: 88° 07' 20.3881" ELEVATION: 387.17' M.S.L.
NO. 2 LATITUDE: 38° 05' 21.2972" LONGITUDE: 88° 07' 20.5033" ELEVATION: 383.43' M.S.L.	NO. 4 LATITUDE: 38° 05' 42.3582" LONGITUDE: 88° 07' 11.2107" ELEVATION: 382.5' M.S.L. CRANE ELEVATION: 447.5' M.S.L.

BENCHMARK DATA

NO.	DESCRIPTION	NORTHING	EASTING	ELEV.
1	NGS MONUMENT - "CARPORT" BRASS TABLET	520,060.525	1,004,877.664	385.58
2	NGS MONUMENT - "CARPORT AZ MK" BRASS TABLET	518,123.439	1,004,864.984	382.61

J.U.L.I.E. INFORMATION
 COUNTY _____ WHITE
 CITY _____ CARMIL
 TOWNSHIP _____ HAWTHORNE
 SECTION NO. _____ 17
 ADDRESS _____ CARMIL MUNICIPAL AIRPORT
 R.R. 3
 CARMIL, ILLINOIS 62821

- LEGEND**
- EXISTING IMPROVEMENTS
 - PROPOSED IMPROVEMENTS
 - EXISTING BUILDINGS
 - PROPOSED EQUIPMENT PARKING AND MATERIAL STORAGE AREA
 - PROPOSED BENCHMARK
 - PROPOSED BARRICADES OR TRAFFIC CONES



REVISION	DATE

**CARMIL MUNICIPAL AIRPORT
CARMIL, ILLINOIS**

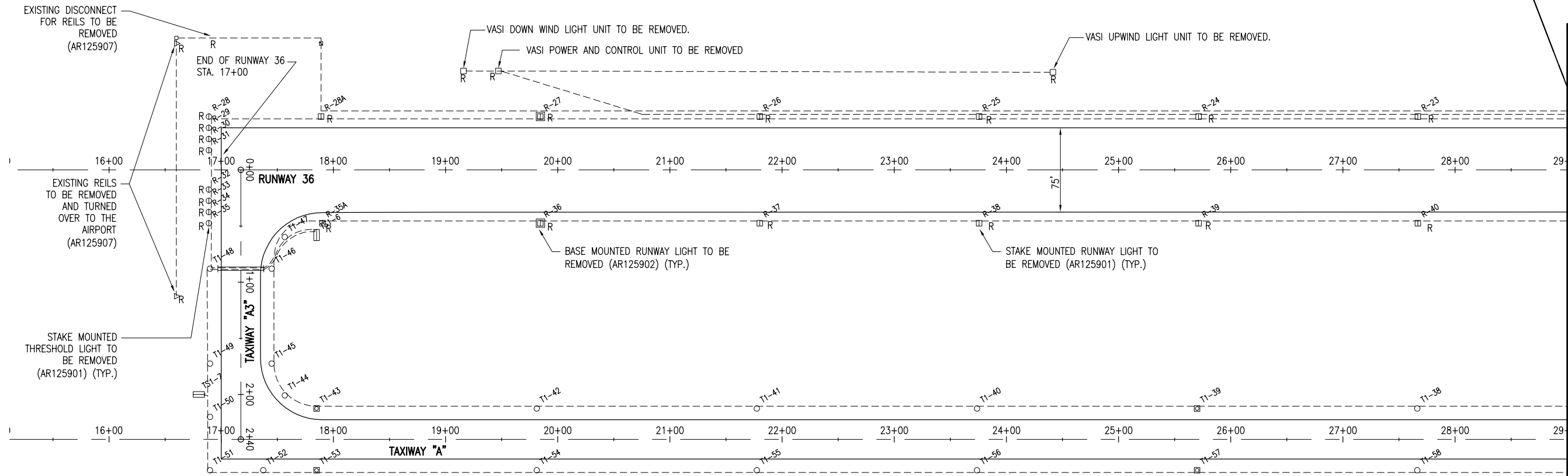
IL PROJ.: CUL-3972
A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D Filename R-0035FY.DWG Scale 1" = 300' Date 06/24/10	KNL 06/09/10 CWS 06/09/10 JSL 06/09/10
LAYOUT	REVIEWED
DRAWN	

HANSON
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REPLACE MIRLS, MITLS,
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BEACON & VAULT

PROPOSED SAFETY PLAN



LIGHT REMOVAL NOTES

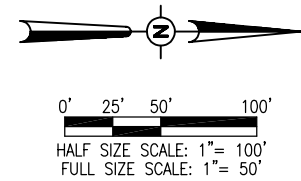
- ALL WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT DIRECTOR / MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
- ALL EXISTING RUNWAY LIGHTS AND TAXIWAY LIGHTS THAT ARE DESIGNATED FOR REMOVAL SHALL BE REMOVED. THE LIGHTS AND THEIR ISOLATING TRANSFORMER SHALL BE TURNED OVER TO THE AIRPORT MANAGER. THE CONCRETE LIGHT BASES SHALL BE REMOVED AND DISPOSED OF LEGALLY OFF THE AIRPORT SITE.
- THE HOLE LEFT FROM THE LIGHT OF BASE REMOVAL SHALL BE FILLED IN WITH EARTH AND COMPACTED TO PREVENT FUTURE SETTLEMENT. THESE DISTURBED AREAS SHALL BE FERTILIZED AND SEEDED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- THE EXISTING AIRFIELD LIGHTING CABLES WILL BE ABANDONED IN PLACE UNLESS IT CONFLICTS WITH THE INSTALLATION OF A PROPOSED LIGHT OR CABLE, THEN IT SHALL BE REMOVED AT NO ADDITIONAL COST TO THE CONTRACT.
- REMOVAL OF THE EXISTING LIGHTS, AND ISOLATING TRANSFORMERS WILL BE PAID FOR UNDER ITEMS:
AR125901 "REMOVE STAKE MOUNTED LIGHT" PER EACH
AR125902 "REMOVE BASE MOUNTED LIGHT" PER EACH
- POWER FOR REIL SYSTEM SHALL BE DISCONNECTED AT THE RESPECTIVE POWER SOURCE PRIOR TO REMOVING THE REILS.
- REMOVAL OF REILS WILL BE PAID FOR UNDER ITEM:
AR125907 "REMOVE REILS" PER PAIR.
- TAXI GUIDANCE SIGNS SHALL REMAIN & BE RECONNECTED TO THE NEW TAXIWAY LIGHTING CIRCUITS AS DETAILED HEREIN. CONNECTIONS TO EXISTING TAXI GUIDANCE SIGNS SHALL BE INCIDENTAL TO THE INSTALLATION OF ITEM AR108158 - 1/C #8 5KV UG CABLE IN UNIT DUCT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED

VASI REMOVAL NOTES

- ALL WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT DIRECTOR / MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
- THE EXISTING VASI AND POWER & CONTROL UNITS SHOWN TO BE REMOVED ARE TO BE UNBOLTED, REMOVED AND TURNED OVER TO THE AIRPORT MANAGER.
- THE EXISTING VASI CONCRETE BASES ARE TO BE REMOVED TO THEIR FULL DEPTH AND DISPOSED OF OFF THE AIRPORT SITE.
- THE HOLES LEFT FROM THE REMOVAL OF VASI BASES AND POWER & CONTROL UNITS SHALL BE FILLED IN WITH EARTH AND COMPACTED TO PREVENT FUTURE SETTLEMENT. THE DISTURBED AREAS SHALL BE FERTILIZED AND SEEDED IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS.
- THE EXISTING VASI CABLES WILL BE ABANDONED IN PLACE UNLESS IT CONFLICTS WITH THE INSTALLATION OF A PROPOSED LIGHT OF CABLE, THEN IT SHALL BE REMOVED AT NO ADDITIONAL COST TO THE CONTRACT.
- AN EXISTING VASI UNIT CONSISTS OF THE DOWNWIND VASI, UPWIND VASI AND VASI POWER & CONTROL UNIT.
- REMOVAL OF THE EXISTING VASI UNITS WILL BE PAID FOR UNDER ITEM:
AR125909 "REMOVE VASI" PER EACH
QUANTITY OF VASI UNITS TO BE REMOVED -----2 EACH.

LEGEND

- EXISTING PAVEMENT
- EXISTING BUILDING
- EXISTING ELECTRICAL DUCT
- EXISTING ELECTRICAL CABLE
- EXISTING REIL (TO BE REMOVED)
- EXISTING STAKE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)
- EXISTING BASE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)
- EXISTING STAKE MOUNTED RUNWAY LIGHT (TO BE REMOVED)
- EXISTING BASE MOUNTED RUNWAY LIGHT (TO BE REMOVED)
- EXISTING STAKE MOUNTED THRESHOLD LIGHT (TO BE REMOVED)
- EXISTING TAXI GUIDANCE SIGN
- EXISTING STAKE MOUNTED TAXIWAY LIGHT
- EXISTING BASE MOUNTED TAXIWAY LIGHT
- EXISTING FENCE
- AIRPORT PROPERTY LINE



REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name R-164 ELE.DWG	Scale 1"=50'	Date 06/24/10
LAYOUT	KNL	06/05/10	
DRAWN	CWS	06/05/10	
REVIEWED	JSL	06/11/10	

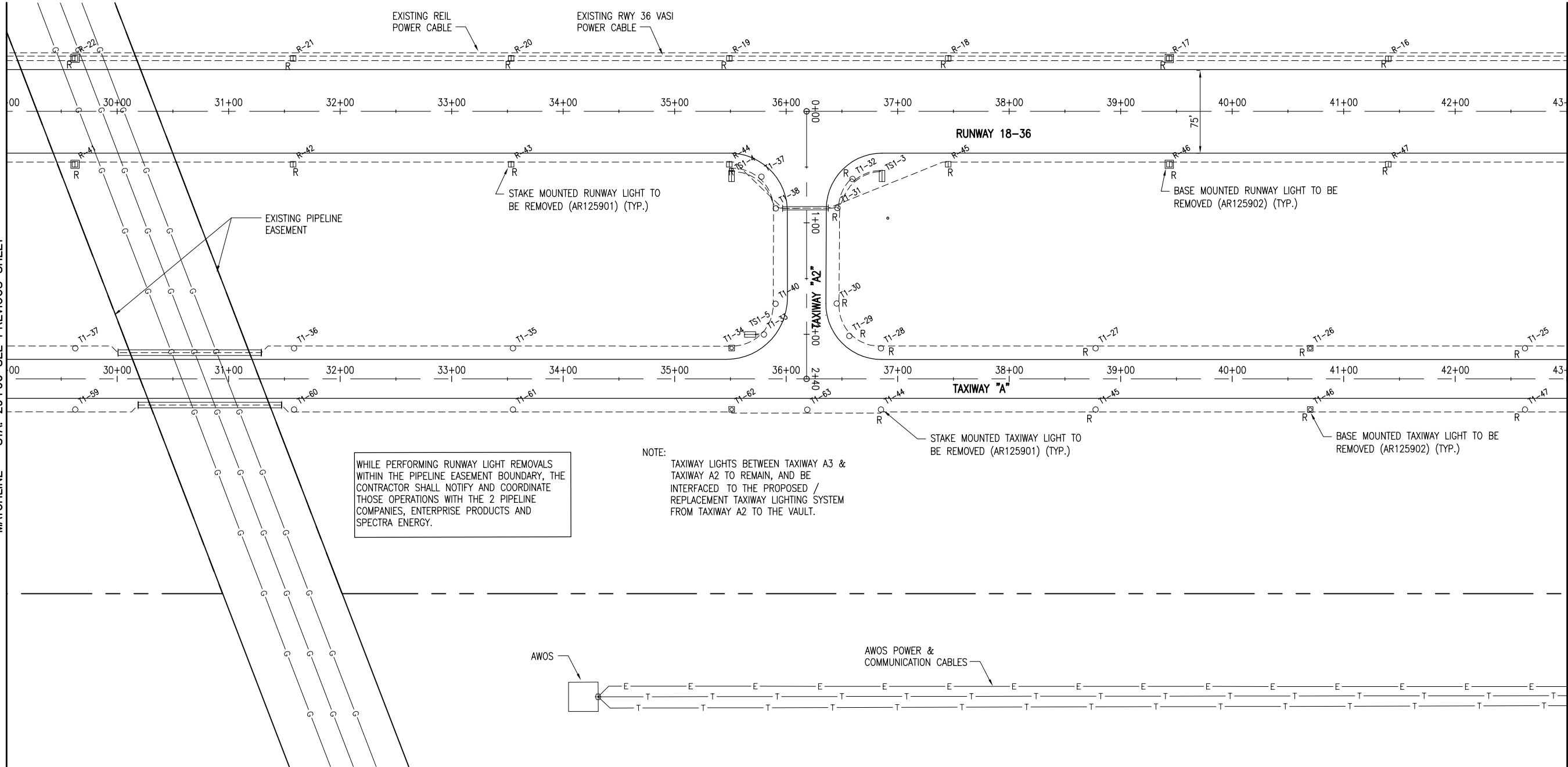
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REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT
EXISTING LIGHTING PLAN
STA. 17+00 TO STA. 29+00

JUN 24, 2010 9:44 AM HARR01115
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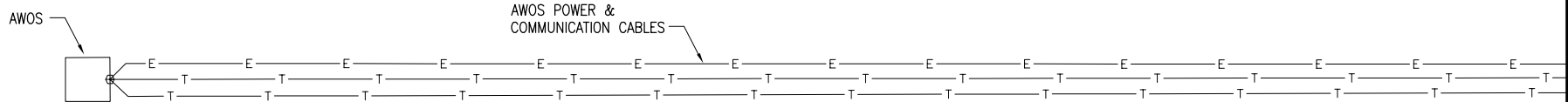
MATCHLINE - STA. 29+00 SEE PREVIOUS SHEET

MATCHLINE - STA. 43+00 SEE NEXT SHEET



WHILE PERFORMING RUNWAY LIGHT REMOVALS WITHIN THE PIPELINE EASEMENT BOUNDARY, THE CONTRACTOR SHALL NOTIFY AND COORDINATE THOSE OPERATIONS WITH THE 2 PIPELINE COMPANIES, ENTERPRISE PRODUCTS AND SPECTRA ENERGY.

NOTE: TAXIWAY LIGHTS BETWEEN TAXIWAY A3 & TAXIWAY A2 TO REMAIN, AND BE INTERFACED TO THE PROPOSED / REPLACEMENT TAXIWAY LIGHTING SYSTEM FROM TAXIWAY A2 TO THE VAULT.

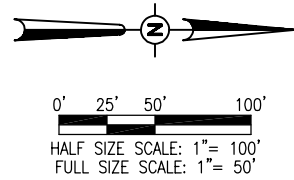


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LEGEND

- EXISTING PAVEMENT
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- EXISTING ELECTRICAL DUCT
- EXISTING ELECTRICAL CABLE
- EXISTING REIL (TO BE REMOVED)
- EXISTING STAKE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)
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- EXISTING TAXI GUIDANCE SIGN
- EXISTING STAKE MOUNTED TAXIWAY LIGHT
- EXISTING BASE MOUNTED TAXIWAY LIGHT
- EXISTING FENCE
- EXISTING GAS LINE
- EXISTING TELEPHONE/COMMUNICATION LINE
- EXISTING ELECTRICAL LINE
- AIRPORT PROPERTY LINE



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REVISION	
DATE	

**CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS**

IL. PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

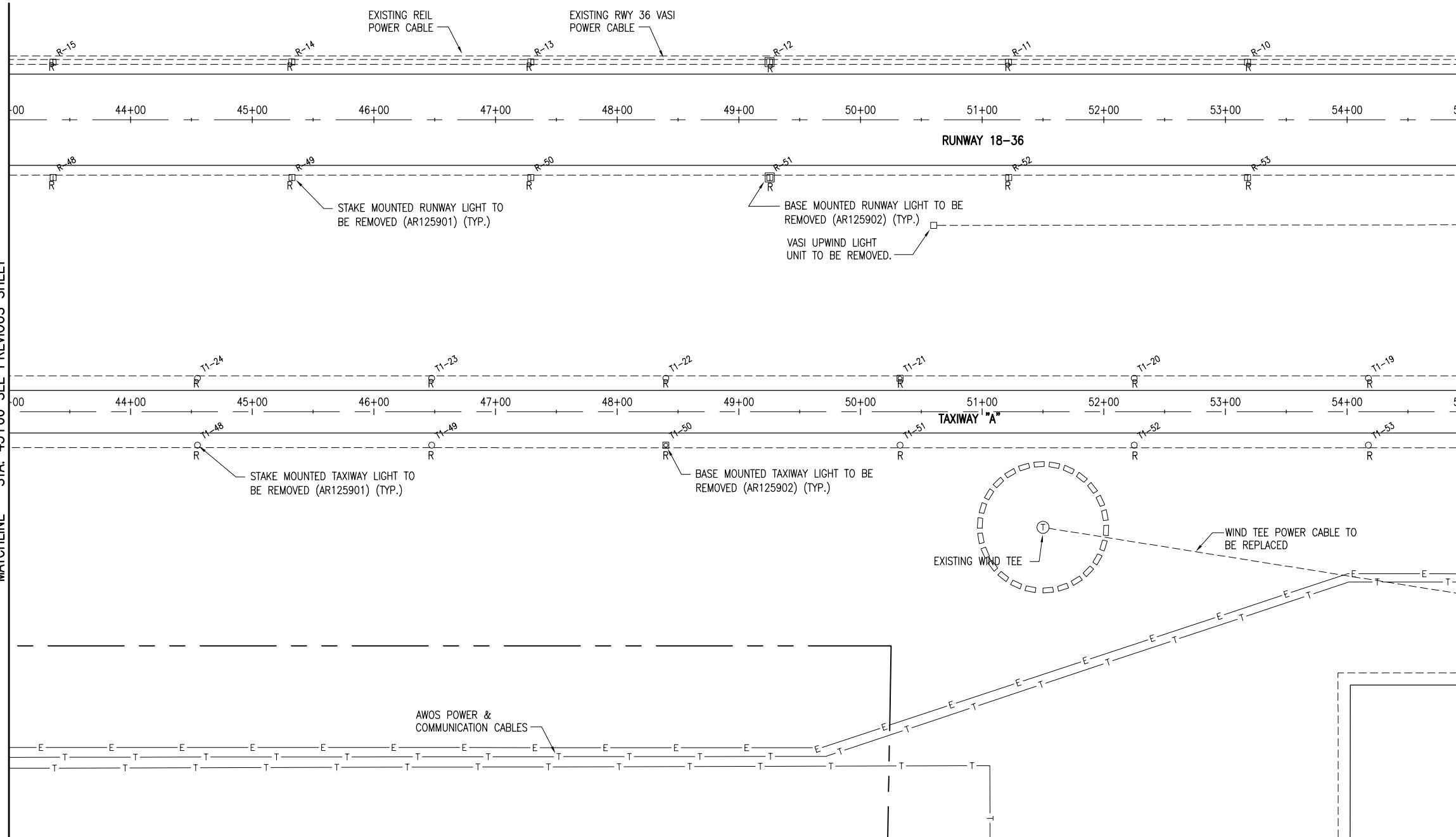
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EXISTING LIGHTING PLAN
STA. 29+00 TO STA. 43+00

MATCHLINE - STA. 43+00 SEE PREVIOUS SHEET

MATCHLINE - STA. 55+00 SEE NEXT SHEET

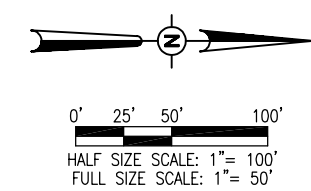


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LEGEND

	EXISTING PAVEMENT		EXISTING TAXI GUIDANCE SIGN
	EXISTING BUILDING		EXISTING STAKE MOUNTED TAXIWAY LIGHT
	EXISTING ELECTRICAL DUCT		EXISTING BASE MOUNTED TAXIWAY LIGHT
	EXISTING ELECTRICAL CABLE		EXISTING FENCE
	EXISTING REIL (TO BE REMOVED)		EXISTING GAS LINE
	EXISTING STAKE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)		EXISTING TELEPHONE/COMMUNICATION LINE
	EXISTING BASE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)		EXISTING ELECTRICAL LINE
	EXISTING STAKE MOUNTED RUNWAY LIGHT (TO BE REMOVED)		AIRPORT PROPERTY LINE
	EXISTING BASE MOUNTED RUNWAY LIGHT (TO BE REMOVED)		
	EXISTING STAKE MOUNTED THRESHOLD LIGHT (TO BE REMOVED)		



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REVISION
DATE

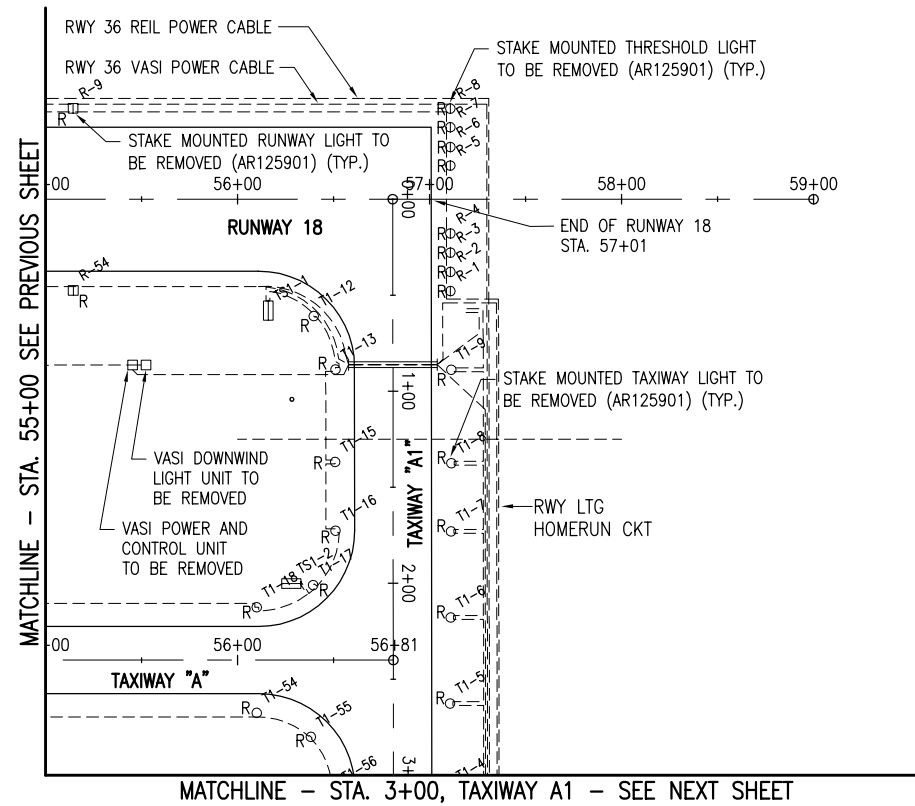
**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL. PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name R-164_ELE.DWG	Scale 1"=50'	Date 06/24/10
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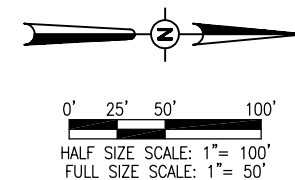
REPLACE MIRLS, MITLS,
 VADIS, REILS,
 BEACON & VAULT
 EXISTING LIGHTING PLAN
 STA. 43+00 TO STA. 55+00



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REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

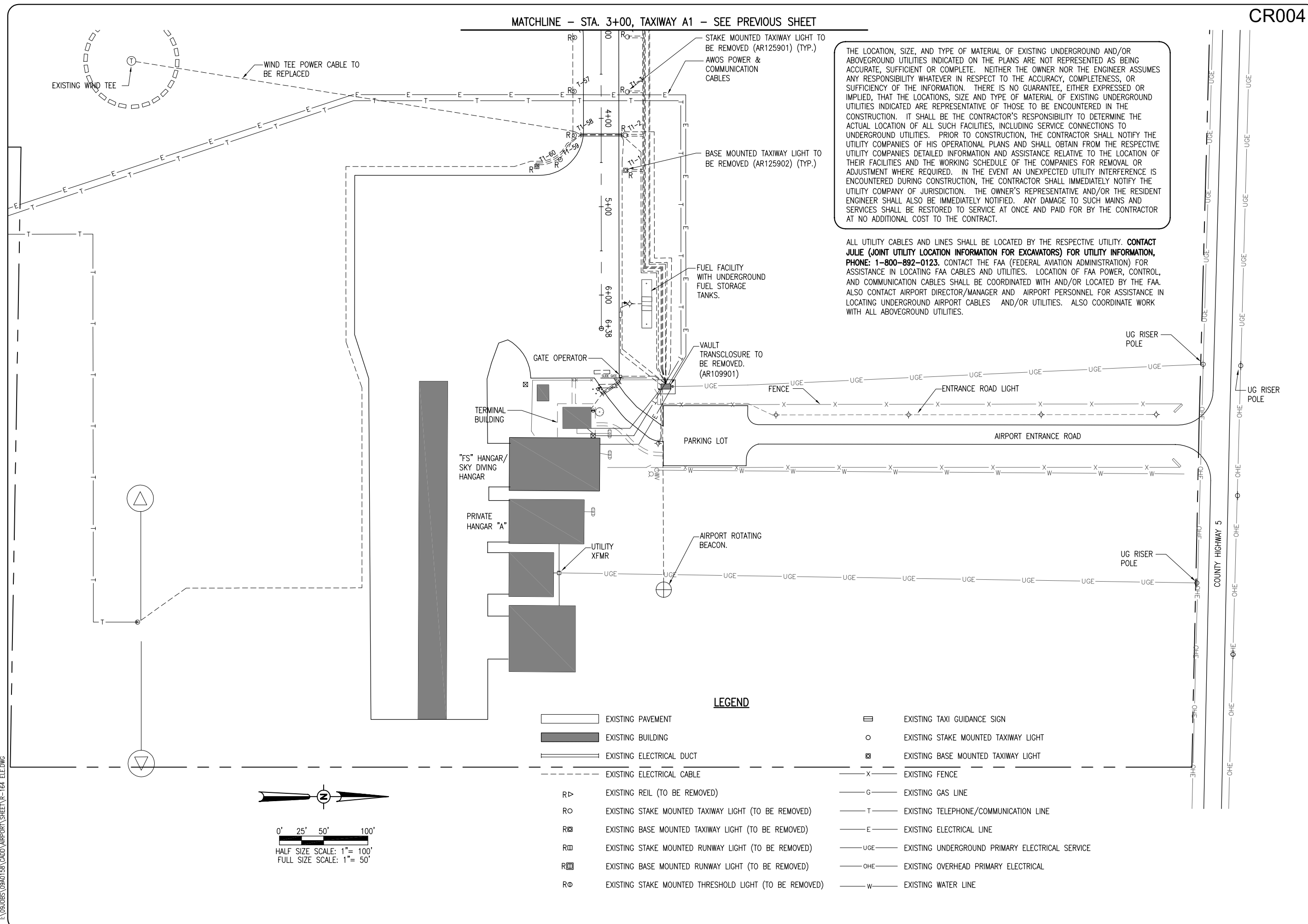
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BEACON & VAULT**

EXISTING LIGHTING PLAN
 STA. 55+00 TO STA. 59+00

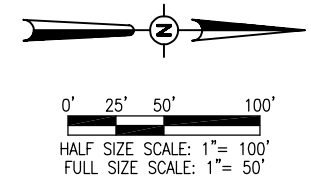


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	EXISTING ELECTRICAL DUCT		EXISTING BASE MOUNTED TAXIWAY LIGHT
	EXISTING ELECTRICAL CABLE		EXISTING FENCE
	EXISTING REIL (TO BE REMOVED)		EXISTING GAS LINE
	EXISTING STAKE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)		EXISTING TELEPHONE/COMMUNICATION LINE
	EXISTING BASE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)		EXISTING ELECTRICAL LINE
	EXISTING STAKE MOUNTED RUNWAY LIGHT (TO BE REMOVED)		EXISTING UNDERGROUND PRIMARY ELECTRICAL SERVICE
	EXISTING BASE MOUNTED RUNWAY LIGHT (TO BE REMOVED)		EXISTING OVERHEAD PRIMARY ELECTRICAL
	EXISTING STAKE MOUNTED THRESHOLD LIGHT (TO BE REMOVED)		EXISTING WATER LINE



REVISION	DATE

**CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS**

IL. PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name R-164 ELE.DWG	Scale 1"=50'	Date 06/24/10
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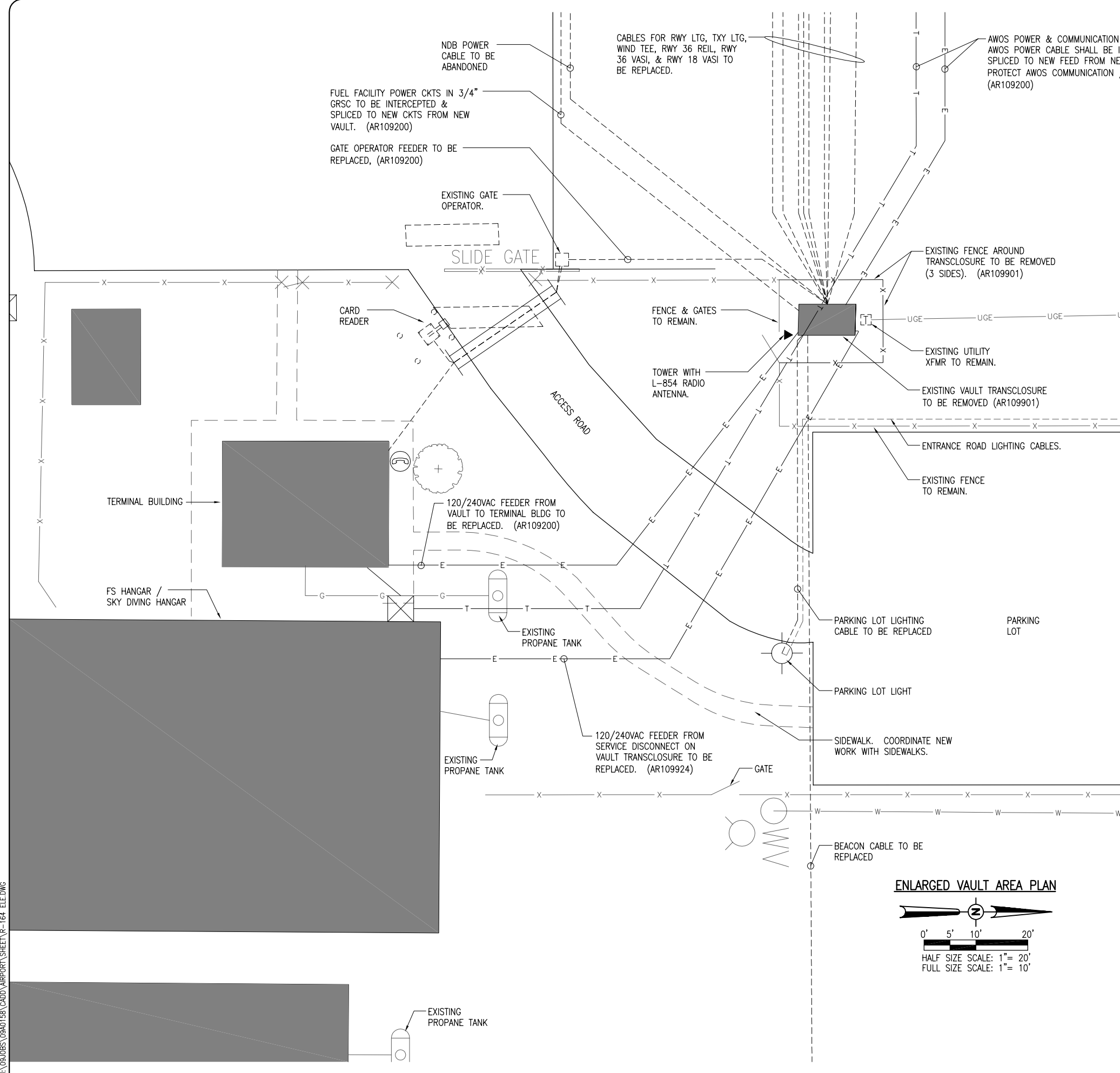
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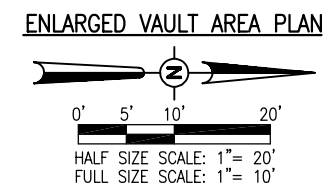
EXISTING LIGHTING PLAN
TERMINAL AREA

JUN 24, 2010 9:44 AM HARR01115
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JUN 24, 2010 10:21 AM HARR01115
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- LEGEND**
- [White Box] EXISTING PAVEMENT
 - [Grey Box] EXISTING BUILDING
 - [Double Line] EXISTING ELECTRICAL DUCT
 - [Dashed Line] EXISTING ELECTRICAL CABLE
 - R▷ EXISTING REIL (TO BE REMOVED)
 - RO EXISTING STAKE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)
 - R◻ EXISTING BASE MOUNTED TAXIWAY LIGHT (TO BE REMOVED)
 - R◻ EXISTING STAKE MOUNTED RUNWAY LIGHT (TO BE REMOVED)
 - R◻ EXISTING BASE MOUNTED RUNWAY LIGHT (TO BE REMOVED)
 - R◊ EXISTING STAKE MOUNTED THRESHOLD LIGHT (TO BE REMOVED)
 - [Square with X] EXISTING TAXI GUIDANCE SIGN
 - EXISTING STAKE MOUNTED TAXIWAY LIGHT
 - ◻ EXISTING BASE MOUNTED TAXIWAY LIGHT
 - X- EXISTING FENCE
 - G- EXISTING GAS LINE
 - T- EXISTING TELEPHONE/COMMUNICATION LINE
 - E- EXISTING ELECTRICAL LINE
 - UGE- EXISTING UNDERGROUND PRIMARY ELECTRICAL SERVICE
 - OHE- EXISTING OVERHEAD PRIMARY ELECTRICAL
 - W- EXISTING WATER LINE



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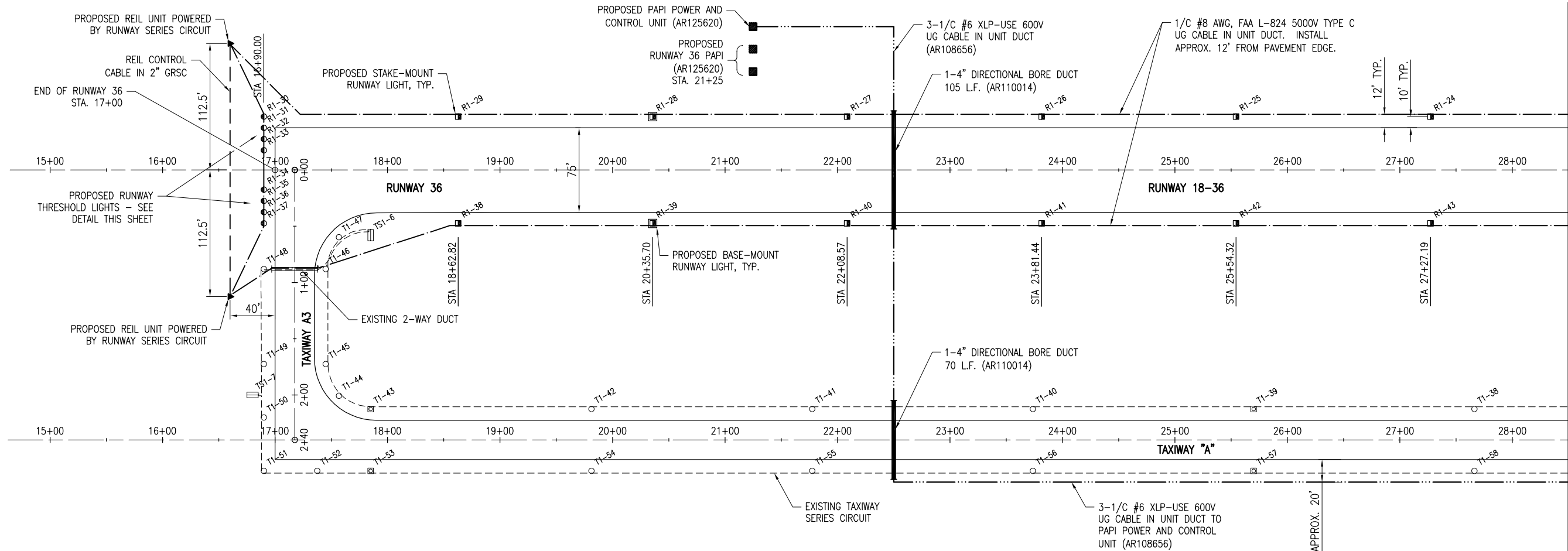
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ENLARGED VAULT AREA



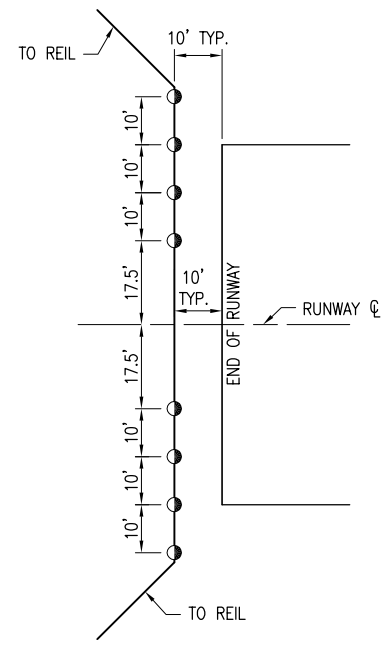
MATCHLINE - STA. 28+50 SEE NEXT SHEET

DUCT NOTES

1. THE CONTRACTOR WILL INSTALL THE PROPOSED DUCTS AT THE LOCATIONS SHOWN ON THE PROPOSED LIGHTING PLAN AND IN ACCORDANCE WITH THE DETAILS AND SPECIFICATIONS.
2. THE CONTRACTOR WILL REPAIR THE DISTURBED AREAS TO THEIR ORIGINAL STATE AND SEEDED IN ACCORDANCE WITH THE SPECIFICATIONS.
3. THE PROPOSED DUCTS INSTALLED BY DIRECTIONAL BORING WILL BE PAID FOR UNDER ITEM:
AR110014 "4" DIRECTIONAL BORE" PER L.F.
4. DUCTS INSTALLED BETWEEN THE NEW VAULT AND THE HANDHOLES NEAR OR IN THE AREA OF THE VAULT WILL BE INCIDENTAL TO ITEM AR109200, INSTALL ELECTRICAL EQUIPMENT, PER LUMP SUM.

LIGHTING NOTES

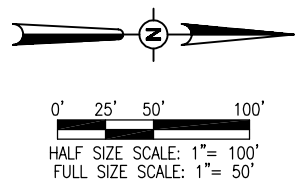
1. ALL PROPOSED RUNWAY, THRESHOLD & TAXIWAY LIGHTS WILL BE PLACED 10' FROM THE PAVEMENT EDGE UNLESS SHOWN OTHERWISE.
2. ALL PROPOSED RUNWAY, THRESHOLD & TAXIWAY LIGHTS WILL BE CONSTRUCTED AT THE LOCATIONS SHOWN ON THE PROPOSED LIGHTING PLANS AND IN ACCORDANCE WITH THE DETAILS AND THE SPECIFICATIONS.
3. ALL PROPOSED RUNWAY & TAXIWAY LIGHTING CABLES WILL BE PLACED 12' FROM THE PAVEMENT EDGE UNLESS SHOWN OTHERWISE. ALL CABLES WILL BE PLACED A MINIMUM OF 18" BELOW FINISH GRADE.
4. THE PROPOSED RUNWAY & TAXIWAY LIGHTING CABLE SHALL BE 1/C, #8 AWG, FAA L-824, 5000 VOLT. TYPE C UNDERGROUND CABLE IN UNIT DUCT.
5. IN AREAS WHERE THERE IS A CONGESTION OF CABLES OR WHERE THE PROPOSED CABLE CROSSES AN EXISTING CABLE, THE PROPOSED CABLE WILL BE TRENCHED INTO PLACE. ALL OTHER LOCATIONS THE PROPOSED CABLE MAY BE EITHER TRENCHED OR PLOWED INTO PLACE. TRENCHING AND/OR PLOWING WILL BE CONSIDERED INCIDENTAL TO THE PROPOSED CABLES AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.
6. THE PROPOSED LIGHTS WILL BE FITTED WITH LENSES IN ACCORDANCE WITH THE SPECIFICATIONS AND THE LIGHT LENS SCHEDULE ON SHEET 11.
7. ALL PROPOSED RUNWAY, THRESHOLD & TAXIWAY LIGHTS WILL BE TAGGED IN ACCORDANCE WITH THE LIGHT NUMBERS SHOWN ON THE PLANS.



PROPOSED RUNWAY END 36 THRESHOLD LIGHT DETAIL
NOT TO SCALE

LEGEND

- EXISTING PAVEMENT
- EXISTING BUILDING
- PROPOSED ELECTRICAL DUCT
- EXISTING ELECTRICAL DUCT
- EXISTING ELECTRICAL CABLE
- PROPOSED 1/C #8 AWG, FAA L-824, 5000 VOLT TYPE C UNDERGROUND CABLE IN UNIT DUCT
- PROPOSED 3-1/C #6 XLP-USE 600V UG CABLE IN UNIT DUCT
- PROPOSED 4-1/C #6 XLP-USE 600V UG CABLE IN UNIT DUCT
- PROPOSED ELECTRICAL CABLE
- PROPOSED STAKE MOUNTED TAXIWAY LIGHT
- PROPOSED BASE MOUNTED TAXIWAY LIGHT
- PROPOSED STAKE MOUNTED RUNWAY LIGHT
- PROPOSED BASE MOUNTED RUNWAY LIGHT
- PROPOSED STAKE MOUNTED THRESHOLD LIGHT
- PROPOSED BASE MOUNTED THRESHOLD LIGHT
- PROPOSED REIL
- EXISTING TAXI GUIDANCE SIGN
- EXISTING STAKE MOUNTED TAXIWAY LIGHT
- EXISTING BASE MOUNTED TAXIWAY LIGHT
- PROPOSED ELECTRICAL HANDHOLE
- PROPOSED SPLICE CAN



REVISION	DATE

CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	06/04/10
Filename: R-171ELE.DWG	MLH
Scale: 1"=50'	MLH
Date: 06/24/10	REVIEWED
	JSL/KNL
	06/10/10

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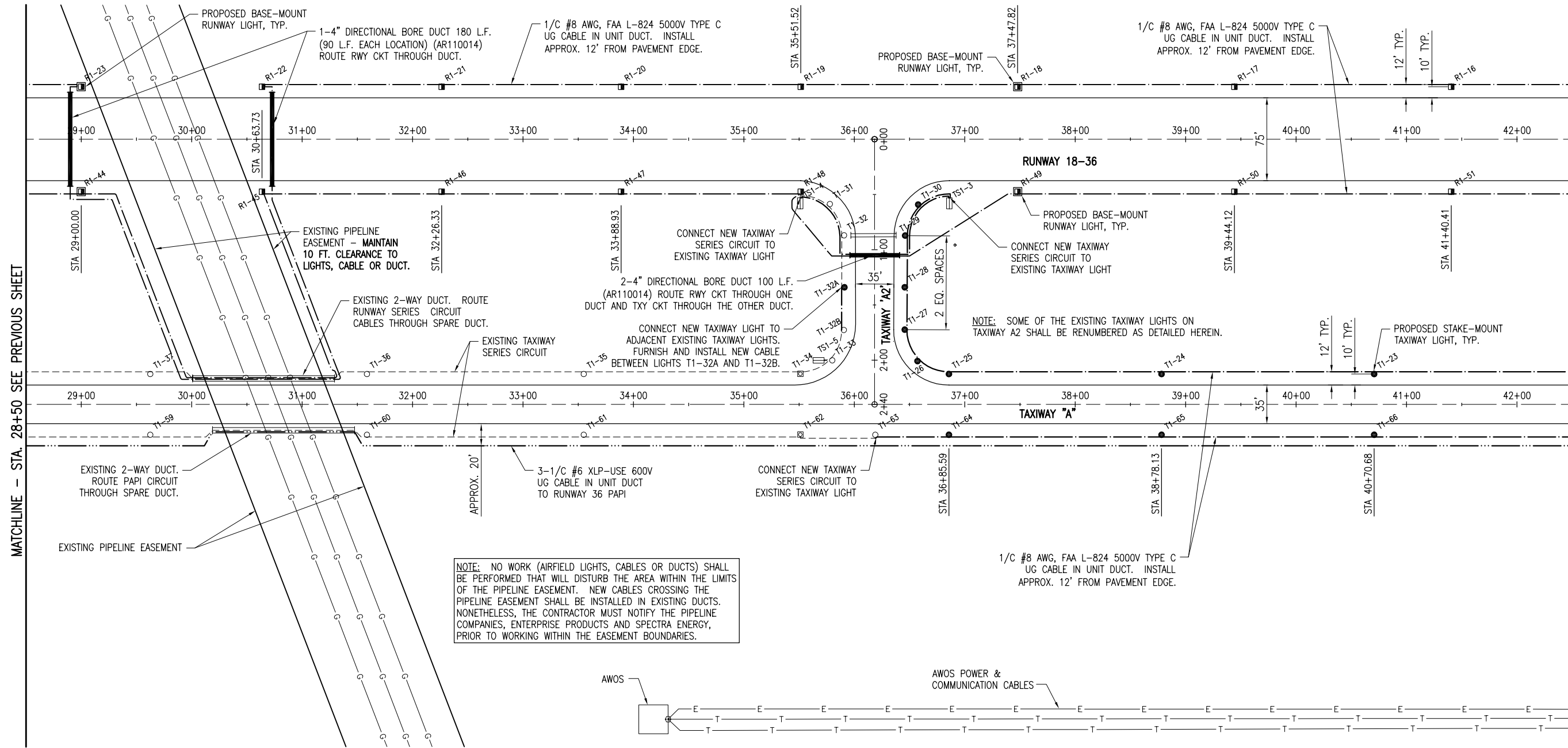
REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT

PROPOSED LIGHTING PLAN
STA. 17+00 TO STA. 28+50

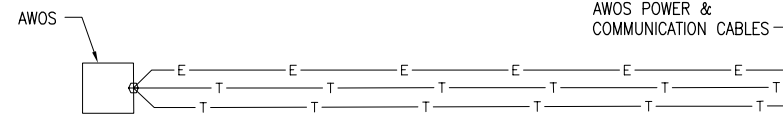
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MATCHLINE - STA. 28+50 SEE PREVIOUS SHEET

MATCHLINE - STA. 42+50 SEE NEXT SHEET

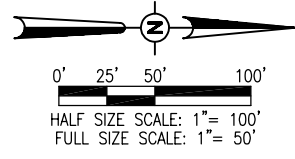


NOTE: NO WORK (AIRFIELD LIGHTS, CABLES OR DUCTS) SHALL BE PERFORMED THAT WILL DISTURB THE AREA WITHIN THE LIMITS OF THE PIPELINE EASEMENT. NEW CABLES CROSSING THE PIPELINE EASEMENT SHALL BE INSTALLED IN EXISTING DUCTS. NONETHELESS, THE CONTRACTOR MUST NOTIFY THE PIPELINE COMPANIES, ENTERPRISE PRODUCTS AND SPECTRA ENERGY, PRIOR TO WORKING WITHIN THE EASEMENT BOUNDARIES.



LEGEND

- EXISTING PAVEMENT
- EXISTING BUILDING
- PROPOSED ELECTRICAL DUCT
- EXISTING ELECTRICAL DUCT
- EXISTING ELECTRICAL CABLE
- PROPOSED 1/8 AWG, FAA L-824, 5000 VOLT TYPE C UNDERGROUND CABLE IN UNIT DUCT
- PROPOSED 3-1/8 XLP-USE 600V UG CABLE IN UNIT DUCT
- PROPOSED 4-1/8 XLP-USE 600V UG CABLE IN UNIT DUCT
- PROPOSED ELECTRICAL CABLE
- PROPOSED STAKE MOUNTED TAXIWAY LIGHT
- PROPOSED BASE MOUNTED TAXIWAY LIGHT
- PROPOSED STAKE MOUNTED RUNWAY LIGHT
- PROPOSED BASE MOUNTED RUNWAY LIGHT
- PROPOSED STAKE MOUNTED THRESHOLD LIGHT
- PROPOSED BASE MOUNTED THRESHOLD LIGHT
- PROPOSED REIL
- EXISTING TAXI GUIDANCE SIGN
- EXISTING STAKE MOUNTED TAXIWAY LIGHT
- EXISTING BASE MOUNTED TAXIWAY LIGHT
- PROPOSED ELECTRICAL HANDHOLE
- PROPOSED SPLICE CAN
- EXISTING FENCE
- EXISTING GAS LINE
- EXISTING TELEPHONE/COMMUNICATION LINE
- EXISTING ELECTRICAL LINE



THE LOCATION, SIZE, AND TYPE OF MATERIAL OF EXISTING UNDERGROUND AND/OR ABOVEGROUND UTILITIES INDICATED ON THE PLANS ARE NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY WHATEVER IN RESPECT TO THE ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION. THERE IS NO GUARANTEE, EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED IN THE CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES OF HIS OPERATIONAL PLANS AND SHALL OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULE OF THE COMPANIES FOR REMOVAL OR ADJUSTMENT WHERE REQUIRED. IN THE EVENT AN UNEXPECTED UTILITY INTERFERENCE IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY COMPANY OF JURISDICTION. THE OWNER'S REPRESENTATIVE AND/OR THE RESIDENT ENGINEER SHALL ALSO BE IMMEDIATELY NOTIFIED. ANY DAMAGE TO SUCH MAINS AND SERVICES SHALL BE RESTORED TO SERVICE AT ONCE AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT.

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LIGHT LENS SCHEDULE		
LIGHT NUMBERS	LENS	ORIENTATION
R1-1 TO R1-8	RED/GREEN	RED SIDE FACING SOUTH (TOWARDS THRESHOLD)
R1-9 TO R1-18	CLEAR WHITE/AMBER	AMBER SIDE FACING SOUTH
R1-19 TO R1-29	CLEAR WHITE	---
R1-30 TO R1-37	RED/GREEN	RED SIDE FACING NORTH (TOWARDS THRESHOLD)
R1-38 TO R1-48	CLEAR WHITE	---
R1-49 TO R1-58	CLEAR WHITE/AMBER	AMBER SIDE FACING SOUTH
T1-1 TO T1-30	BLUE	---
T1-32A	BLUE	---
T1-64 TO T1-80	BLUE	---

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REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL. PROJ.: CUL-3972 A.I.P.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	06/04/10
Filename: R-171ELE.DWG	MLH
Scale: 1"=50'	MLH
Date: 06/24/10	06/10/10
LAYOUT	REVIEWED
DRAWN	JSL/KNL

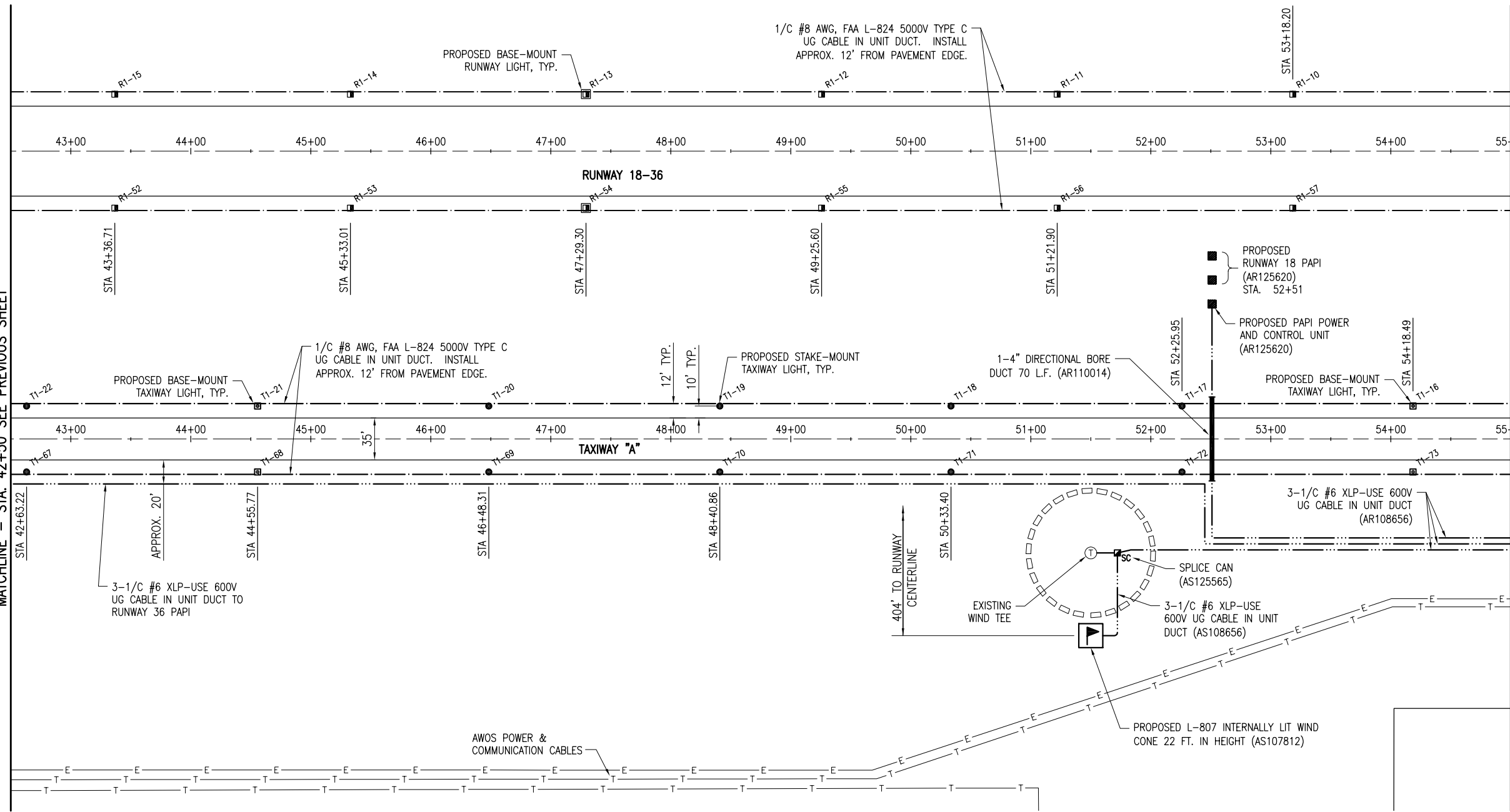
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www.hanson-inc.com
Offices Nationwide

REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT

PROPOSED LIGHTING PLAN
STA. 28+50 TO STA. 42+50

MATCHLINE - STA. 42+50 SEE PREVIOUS SHEET

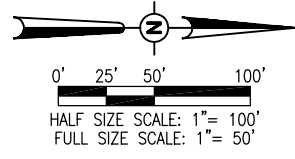
MATCHLINE - STA. 55+00 SEE NEXT SHEET



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- LEGEND**
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 - PROPOSED SPLICE CAN
 - EXISTING FENCE
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 - EXISTING ELECTRICAL LINE



REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL. PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

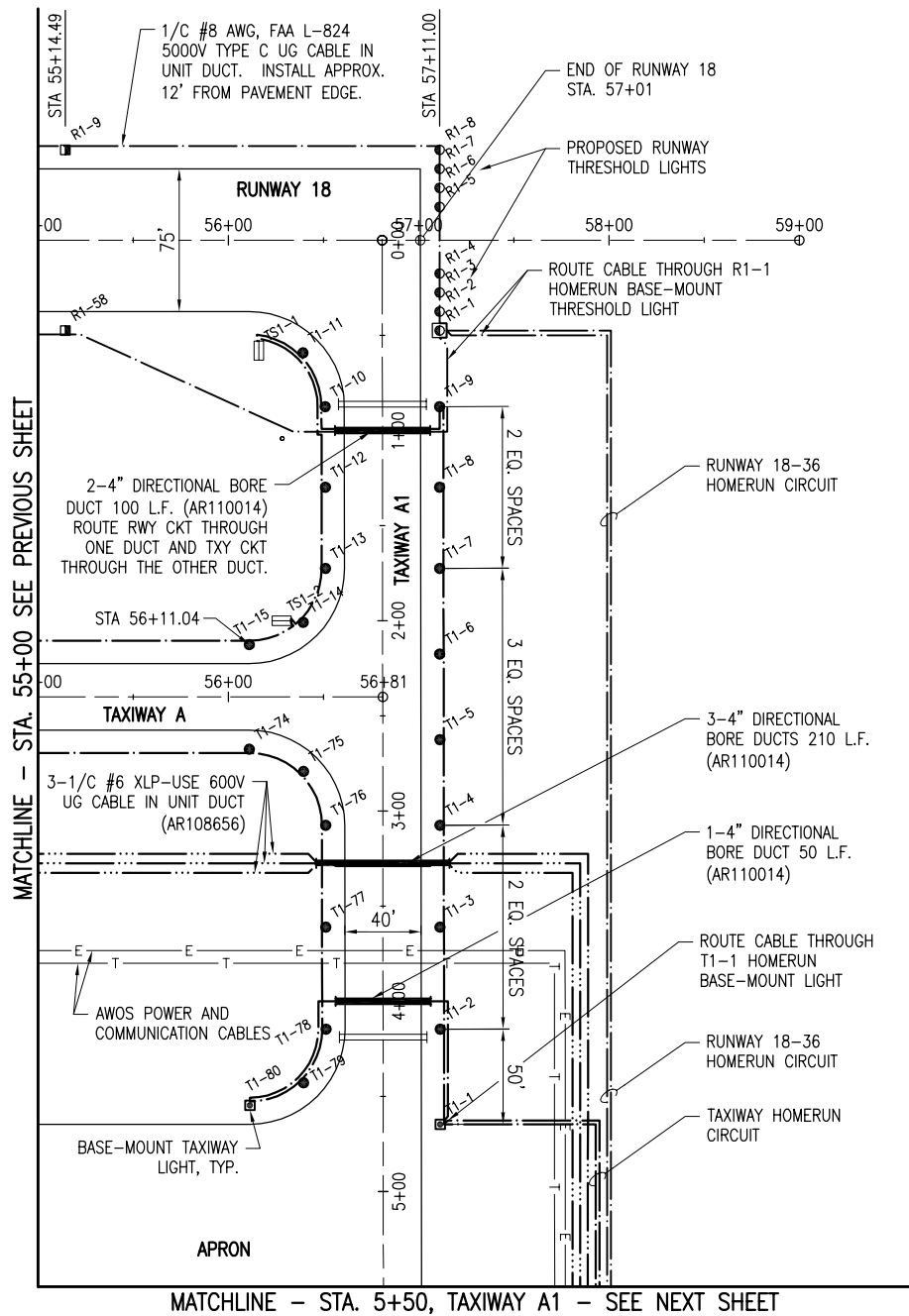
DATE	BY	REVIEWED
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PROPOSED LIGHTING PLAN
STA. 42+50 TO STA. 55+00

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MATCHLINE - STA. 55+00 SEE PREVIOUS SHEET

MATCHLINE - STA. 5+50, TAXIWAY A1 - SEE NEXT SHEET

LIGHT FIXTURE LOCATION SCHEDULE			
NO.	LOCATION	NORTHING	EASTING
R1-1	RUNWAY 18-36	520143.33	1044821.12
R1-2	RUNWAY 18-36	520143.35	1044811.12
R1-3	RUNWAY 18-36	520143.37	1044801.12
R1-4	RUNWAY 18-36	520143.39	1044791.12
R1-5	RUNWAY 18-36	520143.47	1044756.12
R1-6	RUNWAY 18-36	520143.49	1044746.12
R1-7	RUNWAY 18-36	520143.51	1044736.12
R1-8	RUNWAY 18-36	520143.53	1044726.12
R1-9	RUNWAY 18-36	519947.03	1044725.69
R1-10	RUNWAY 18-36	519750.73	1044725.26
R1-11	RUNWAY 18-36	519554.43	1044724.83
R1-12	RUNWAY 18-36	519358.14	1044724.40
R1-13	RUNWAY 18-36	519161.84	1044723.97
R1-14	RUNWAY 18-36	518965.54	1044723.54
R1-15	RUNWAY 18-36	518769.25	1044723.11
R1-16	RUNWAY 18-36	518572.95	1044722.68
R1-17	RUNWAY 18-36	518376.65	1044722.26
R1-18	RUNWAY 18-36	518180.36	1044721.83
R1-19	RUNWAY 18-36	517984.06	1044721.40
R1-20	RUNWAY 18-36	517821.47	1044721.04
R1-21	RUNWAY 18-36	517658.87	1044720.69
R1-22	RUNWAY 18-36	517496.28	1044720.33
R1-23	RUNWAY 18-36	517332.61	1044719.97
R1-24	RUNWAY 18-36	517159.73	1044719.59
R1-25	RUNWAY 18-36	516986.86	1044719.22
R1-26	RUNWAY 18-36	516813.99	1044718.84
R1-27	RUNWAY 18-36	516641.11	1044718.46
R1-28	RUNWAY 18-36	516468.24	1044718.08
R1-29	RUNWAY 18-36	516295.37	1044717.71
R1-30	RUNWAY 18-36	516122.55	1044717.33
R1-31	RUNWAY 18-36	516122.52	1044727.33
R1-32	RUNWAY 18-36	516122.50	1044737.33
R1-33	RUNWAY 18-36	516122.48	1044747.33
R1-34	RUNWAY 18-36	516122.40	1044782.33
R1-35	RUNWAY 18-36	516122.38	1044792.33
R1-36	RUNWAY 18-36	516122.36	1044802.33
R1-37	RUNWAY 18-36	516122.34	1044812.33

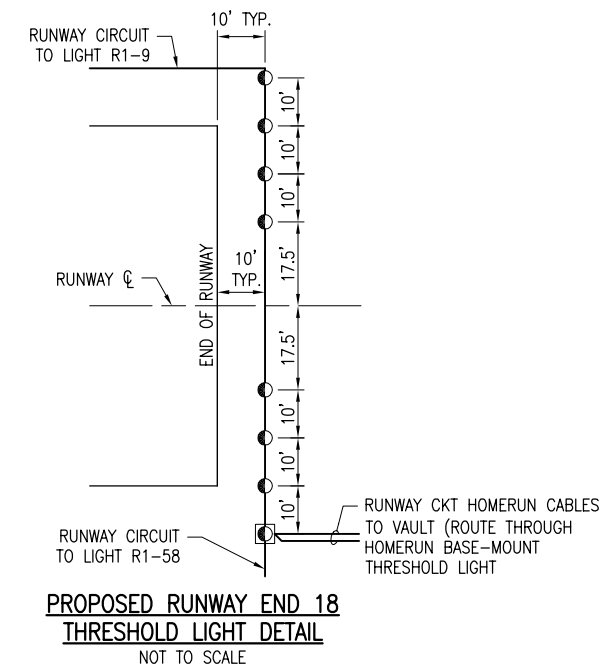
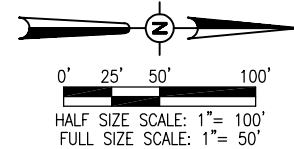
LIGHT FIXTURE LOCATION SCHEDULE			
NO.	LOCATION	NORTHING	EASTING
R1-38	RUNWAY 18-36	516295.16	1044812.71
R1-39	RUNWAY 18-36	516468.03	1044813.08
R1-40	RUNWAY 18-36	516640.91	1044813.46
R1-41	RUNWAY 18-36	516813.78	1044813.84
R1-42	RUNWAY 18-36	516986.65	1044814.22
R1-43	RUNWAY 18-36	517159.53	1044814.59
R1-44	RUNWAY 18-36	517332.33	1044814.97
R1-45	RUNWAY 18-36	517496.07	1044815.33
R1-46	RUNWAY 18-36	517658.66	1044815.69
R1-47	RUNWAY 18-36	517821.26	1044816.04
R1-48	RUNWAY 18-36	517983.85	1044816.40
R1-49	RUNWAY 18-36	518180.15	1044816.83
R1-50	RUNWAY 18-36	518376.45	1044817.26
R1-51	RUNWAY 18-36	518572.74	1044817.68
R1-52	RUNWAY 18-36	518769.04	1044818.11
R1-53	RUNWAY 18-36	518965.34	1044818.54
R1-54	RUNWAY 18-36	519161.63	1044818.97
R1-55	RUNWAY 18-36	519357.93	1044819.40
R1-56	RUNWAY 18-36	519554.23	1044819.83
R1-57	RUNWAY 18-36	519750.52	1044820.26
R1-58	RUNWAY 18-36	519946.82	1044820.69
T1-1	TAXIWAY A1	520142.72	1045238.21
T1-2	TAXIWAY A1	520142.83	1045188.16
T1-3	TAXIWAY A1	520142.89	1045134.60
T1-4	TAXIWAY A1	520142.94	1045081.03
T1-5	TAXIWAY A1	520142.99	1045036.04
T1-6	TAXIWAY A1	520143.04	1044991.06
T1-7	TAXIWAY A1	520143.09	1044946.07
T1-8	TAXIWAY A1	520143.11	1044903.43
T1-9	TAXIWAY A1	520143.18	1044861.07
T1-10	TAXIWAY A1	520083.18	1044860.94
T1-11	TAXIWAY A1	520071.51	1044832.66
T1-12	TAXIWAY A1	520083.11	1044903.30
T1-13	TAXIWAY A/A1	520083.09	1044945.94
T1-14	TAXIWAY A/A1	520071.33	1044974.23
T1-15	TAXIWAY A/A1	520043.00	1044985.90
T1-16	TAXIWAY A	519850.46	1044985.48

LIGHT FIXTURE LOCATION SCHEDULE			
NO.	LOCATION	NORTHING	EASTING
T1-17	TAXIWAY A	519657.91	1044985.06
T1-18	TAXIWAY A	519465.37	1044984.64
T1-19	TAXIWAY A	519272.82	1044984.22
T1-20	TAXIWAY A	519080.28	1044983.80
T1-21	TAXIWAY A	518887.74	1044983.37
T1-22	TAXIWAY A	518695.19	1044982.95
T1-23	TAXIWAY A	518502.65	1044982.53
T1-24	TAXIWAY A	518310.10	1044982.11
T1-25	TAXIWAY A/A2	518117.56	1044981.69
T1-26	TAXIWAY A/A2	518089.23	1044969.89
T1-27	TAXIWAY A/A2	518077.65	1044941.45
T1-28	TAXIWAY A2	518077.77	1044903.06
T1-29	TAXIWAY A2	518078.26	1044856.37
T1-30	TAXIWAY A2	518090.11	1044828.24
T1-32A	TAXIWAY A2	518023.20	1044903.00
T1-64	TAXIWAY A	518117.44	1045036.69
T1-65	TAXIWAY A	518309.98	1045037.11
T1-66	TAXIWAY A	518502.53	1045037.53
T1-67	TAXIWAY A	518695.07	1045037.95
T1-68	TAXIWAY A	518887.62	1045038.37
T1-69	TAXIWAY A	519080.16	1045038.80
T1-70	TAXIWAY A	519272.70	1045039.22
T1-71	TAXIWAY A	519465.25	1045039.64
T1-72	TAXIWAY A	519657.79	1045040.06
T1-73	TAXIWAY A	519850.34	1045040.48
T1-74	TAXIWAY A/A1	520042.88	1045040.90
T1-75	TAXIWAY A/A1	520071.28	1045052.62
T1-76	TAXIWAY A/A1	520082.94	1045080.90
T1-77	TAXIWAY A1	520082.89	1045134.46
T1-78	TAXIWAY A1	520082.83	1045188.03
T1-79	TAXIWAY A1	520071.07	1045216.32
T1-80	TAXIWAY A1	520042.74	1045227.99

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- LEGEND**
- EXISTING PAVEMENT
 - EXISTING BUILDING
 - PROPOSED ELECTRICAL DUCT
 - EXISTING ELECTRICAL DUCT
 - PROPOSED 1/8 AWG, FAA L-824, 5000 VOLT TYPE C UNDERGROUND CABLE IN UNIT DUCT
 - PROPOSED 3-1/8 XLP-USE 600V UG CABLE IN UNIT DUCT
 - PROPOSED 4-1/8 XLP-USE 600V UG CABLE IN UNIT DUCT
 - PROPOSED STAKE MOUNTED TAXIWAY LIGHT
 - PROPOSED BASE MOUNTED TAXIWAY LIGHT
 - PROPOSED STAKE MOUNTED RUNWAY LIGHT
 - PROPOSED BASE MOUNTED RUNWAY LIGHT
 - PROPOSED STAKE MOUNTED THRESHOLD LIGHT
 - PROPOSED BASE MOUNTED THRESHOLD LIGHT
 - PROPOSED REIL
 - EXISTING TAXI GUIDANCE SIGN
 - EXISTING STAKE MOUNTED TAXIWAY LIGHT
 - EXISTING BASE MOUNTED TAXIWAY LIGHT
 - PROPOSED ELECTRICAL HANDHOLE
 - PROPOSED SPLICE CAN
 - EXISTING FENCE
 - EXISTING GAS LINE
 - EXISTING TELEPHONE/COMMUNICATION LINE
 - EXISTING ELECTRICAL LINE



**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

REVISION
DATE

Hanson Proj. No. 09A0158D
Filename R-171ELE.DWG
Scale 1"=50'
Date 06/24/10

LAYOUT	MLH	06/04/10
DRAWN	MLH	06/04/10
REVIEWED	JSL/KYL	06/10/10

IL PROJ.: CUL-3972
A.I.P. PROJ.: 3-17-0109-B8

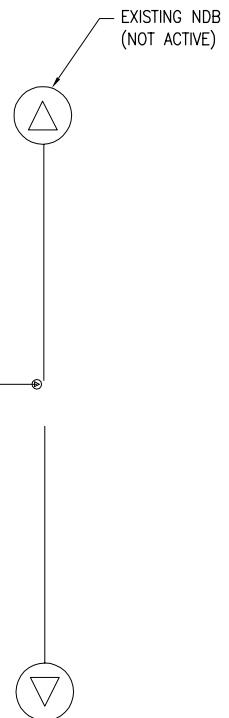
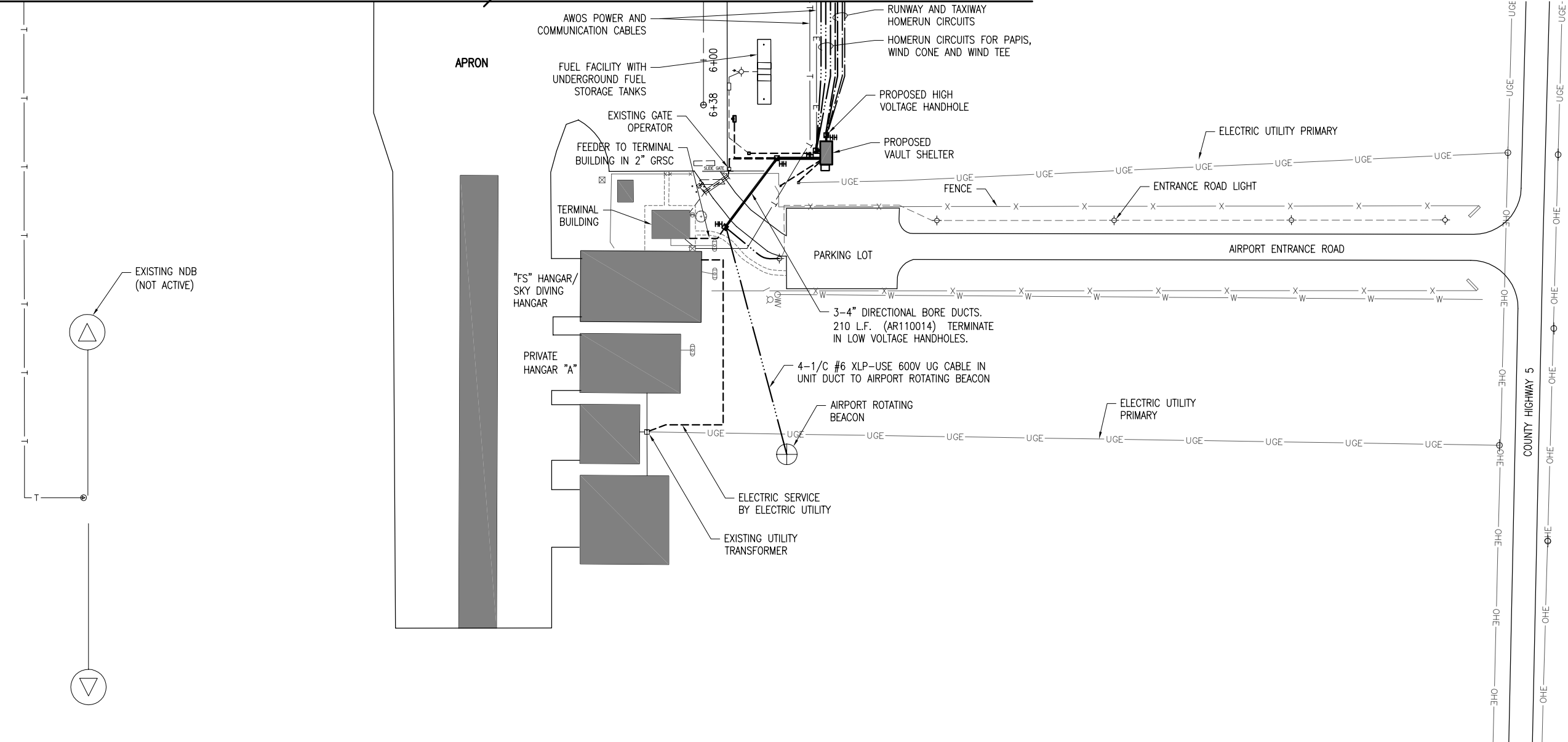
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VADIS, REILS,
BEACON & VAULT

PROPOSED LIGHTING PLAN
STA. 55+00 TO STA. 59+00

13

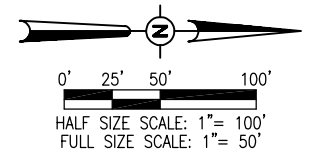
13 of 44 sheets



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- LEGEND**
- EXISTING PAVEMENT
 - EXISTING BUILDING
 - PROPOSED ELECTRICAL DUCT
 - EXISTING ELECTRICAL DUCT
 - EXISTING ELECTRICAL CABLE
 - PROPOSED 1/C #8 AWG, FAA L-824, 5000 VOLT TYPE C UNDERGROUND CABLE IN UNIT DUCT
 - PROPOSED 3-1/C #6 XLP-USE 600V UG CABLE IN UNIT DUCT
 - PROPOSED 4-1/C #6 XLP-USE 600V UG CABLE IN UNIT DUCT
 - PROPOSED ELECTRICAL CABLE
 - PROPOSED STAKE MOUNTED TAXIWAY LIGHT
 - PROPOSED BASE MOUNTED TAXIWAY LIGHT
 - PROPOSED STAKE MOUNTED RUNWAY LIGHT
 - PROPOSED BASE MOUNTED RUNWAY LIGHT
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 - EXISTING TAXI GUIDANCE SIGN
 - EXISTING STAKE MOUNTED TAXIWAY LIGHT
 - EXISTING BASE MOUNTED TAXIWAY LIGHT
 - PROPOSED ELECTRICAL HANDHOLE
 - PROPOSED SPLICE CAN
 - EXISTING FENCE
 - EXISTING GAS LINE
 - EXISTING TELEPHONE/COMMUNICATION LINE
 - EXISTING WATERLINE
 - EXISTING ELECTRICAL LINE
 - EXISTING UNDERGROUND PRIMARY ELECTRICAL SERVICE
 - EXISTING OVERHEAD PRIMARY ELECTRICAL SERVICE



REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL. PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	06/04/10
Filename: R-17ELE.DWG	MLH
Scale: 1"=50'	MLH
Date: 06/24/10	USL/KNL
LAYOUT	06/10/10
DRAWN	
REVIEWED	

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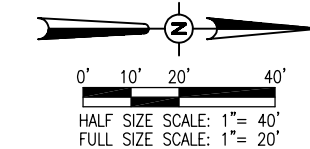
REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT

PROPOSED LIGHTING PLAN
TERMINAL AREA

JUN 24, 2010 9:45 AM HARR01115
I:\09\005\09A0158\000\AIRPORT\SHEET\R-17ELE.DWG

LEGEND

- EXISTING PAVEMENT
- EXISTING BUILDING
- PROPOSED ELECTRICAL DUCT
- EXISTING ELECTRICAL DUCT
- EXISTING ELECTRIC CABLE
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- EXISTING UNDERGROUND PRIMARY ELECTRICAL SERVICE

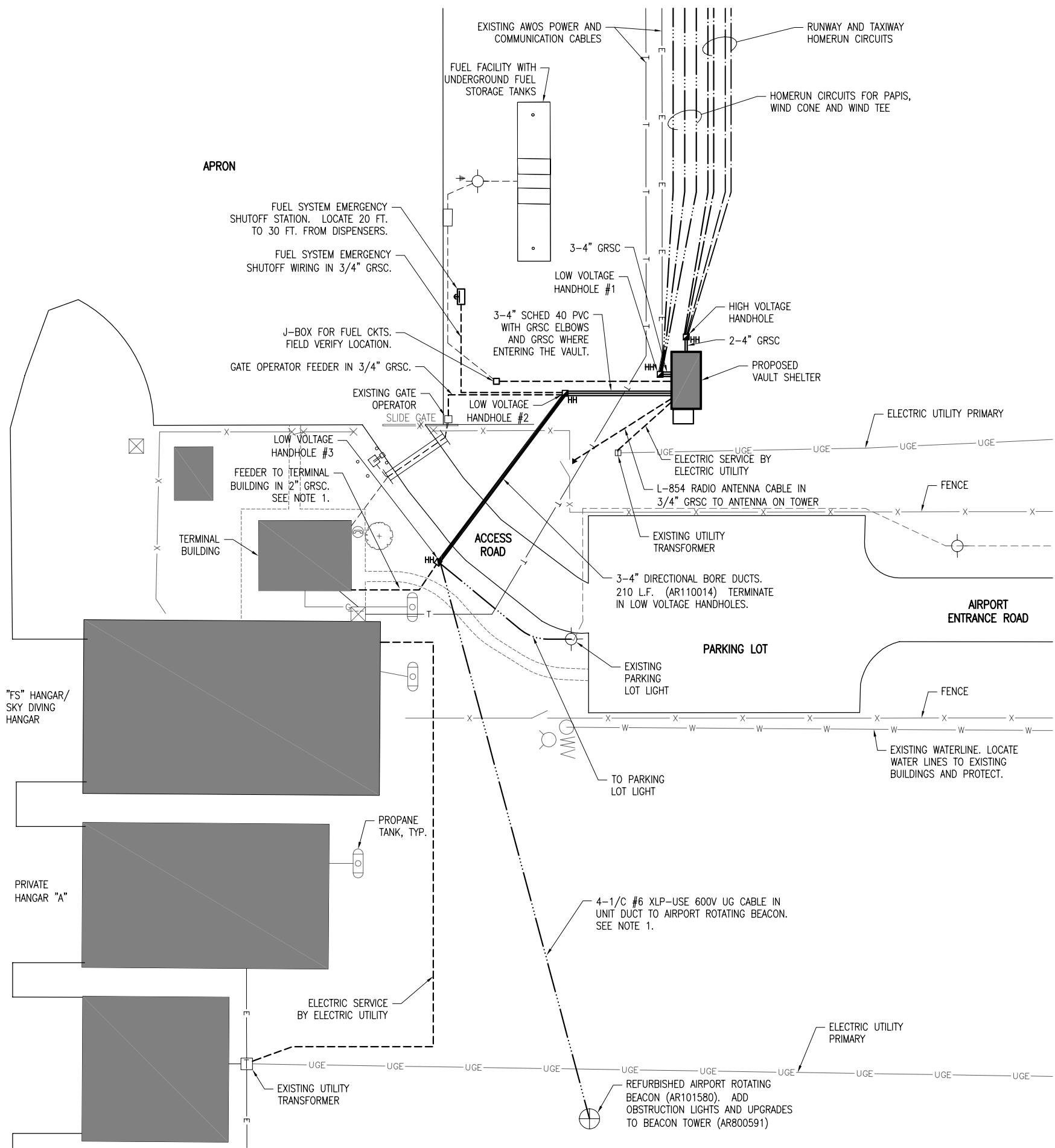


NOTES

1. COORDINATE DUCT AND CABLE INSTALLATIONS WITH EXISTING FENCING, PAVEMENTS, SIDEWALKS, AND UTILITIES. RESTORE SIDEWALKS WHERE DISTURBED.

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REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

A.I.P. PROJ.: 3-17-0109-B8
IL PROJ.: CUL-3972

Hanson Proj. No. 09A0158D	06/04/10
Filename R-17ZELE.DWG	MLH
Scale 1"=20'	MLH
Date 06/24/10	06/10/10
LAYOUT	REVIEWED
DRAWN	JSL/KYL

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BEACON & VAULT

PROPOSED LIGHTING PLAN
ENLARGED VAULT AREA

REVISION	DATE

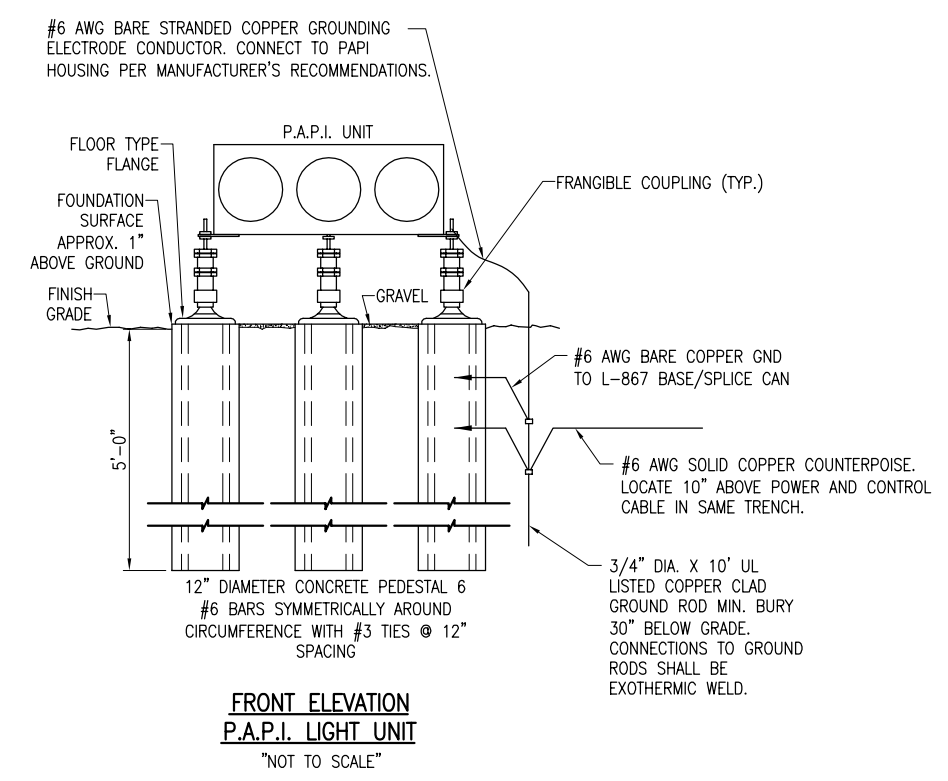
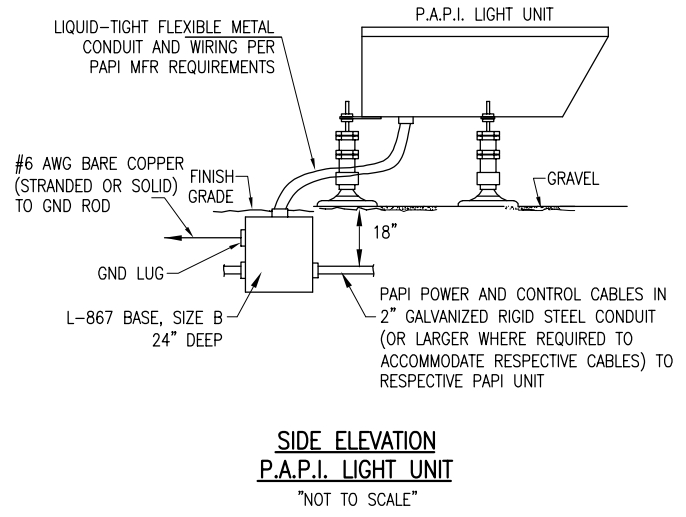
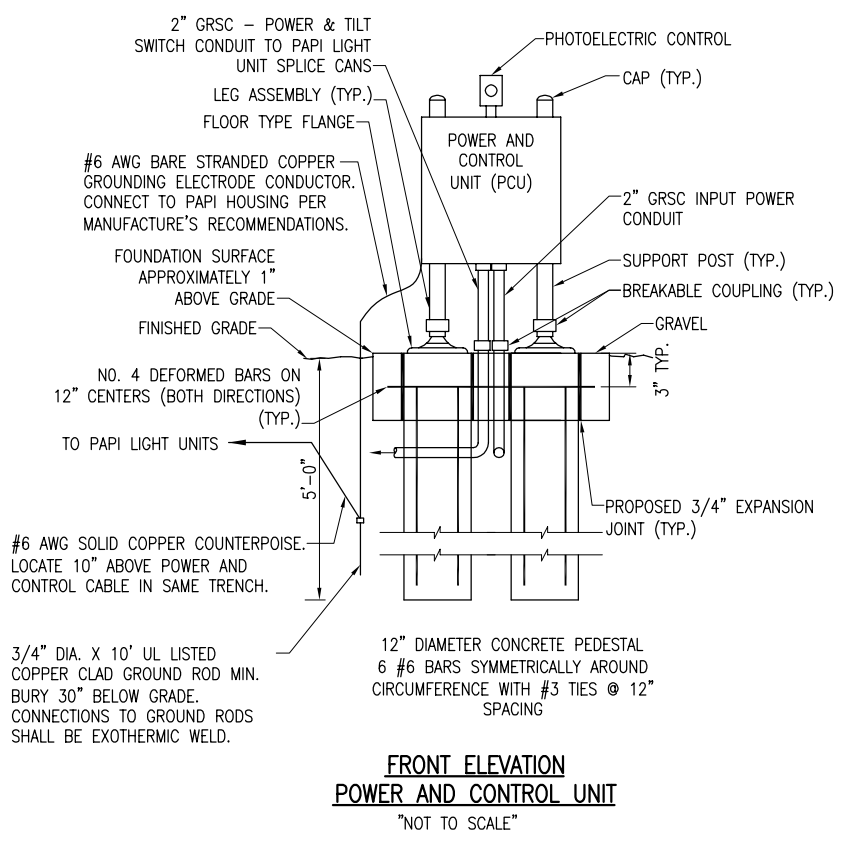
**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	Scale	06/24/10
Filename R-545ELE.DWG	NOT TO SCALE	06/10/10
Date	06/24/10	06/10/10
LAYOUT	CAH	JSL
DRAWN	CAH	JSL
REVIEWED	JSL	06/11/10

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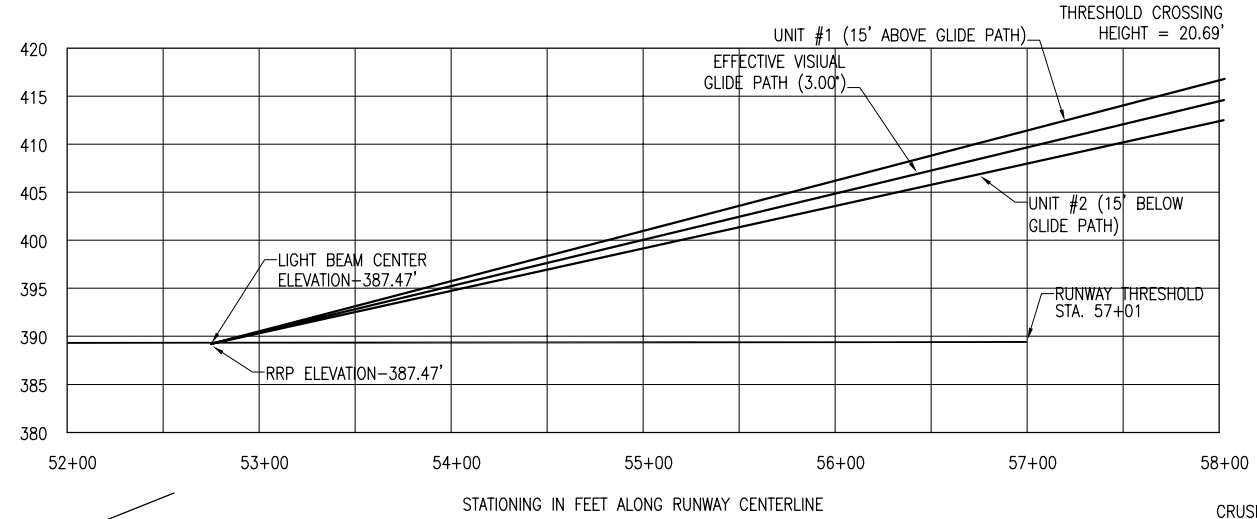
REPLACE MIRLS, MITLS,
 VADIS, REILS,
 BEACON & VAULT
 PROPOSED PAPI
 DETAILS AND NOTES
 RUNWAY END 18



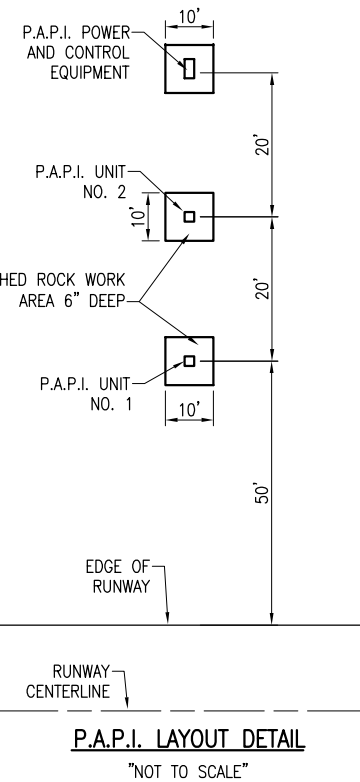
P.A.P.I. NOTES

- THE PROPOSED PRECISION APPROACH PATH INDICATOR (PAPI) SYSTEM WILL BE PLACED AT THE LOCATION SHOWN ON SHEET NO. 12.
- THE PROPOSED CONCRETE PEDESTALS WILL BE AS DETAILED ON THIS SHEET. THE NUMBER OF PEDESTALS CONSTRUCTED FOR EACH PAPI UNIT WILL DEPEND ON THE UNIT SELECTED BY THE CONTRACTOR FOR INSTALLATION.
- SIX (6") INCHES OF GRAVEL ON TOP OF BLACK PLASTIC WILL BE PLACED UNDER EACH PAPI UNIT TO HALT VEGETATION GROWTH.
- EACH PAPI UNIT WILL BE CONSTRUCTED SUCH THAT THE BEAM CENTERS WILL BE WITHIN ±1" OF ELEVATION 387.47'.
- THE PROPOSED POWER CABLE TO THE PAPI SYSTEM WILL BE 3-1/C NO. 6, 600V., TYPE XLP-USE UNDERGROUND CABLE IN 1-1/4" UNIT DUCT. THIS CABLE WILL BE TRENCHED IN PLACE AT A MINIMUM DEPTH OF 18" BELOW FINISH GRADE.
- THE PAPI INSTALLATION WILL BE PAID FOR UNDER ITEM: AR125620 ABBREVIATED PAPI (L-881 SYSTEM) PER EACH.
- THE POWER CABLE WILL BE PAID FOR UNDER ITEM: AR108656 3/C #6 600V UG. CABLE IN UD PER LIN. FT.

THRESHOLD CROSSING HEIGHT (T) IS CALCULATED ON THE LOWEST ON PATH ANGLE OF 2'45'

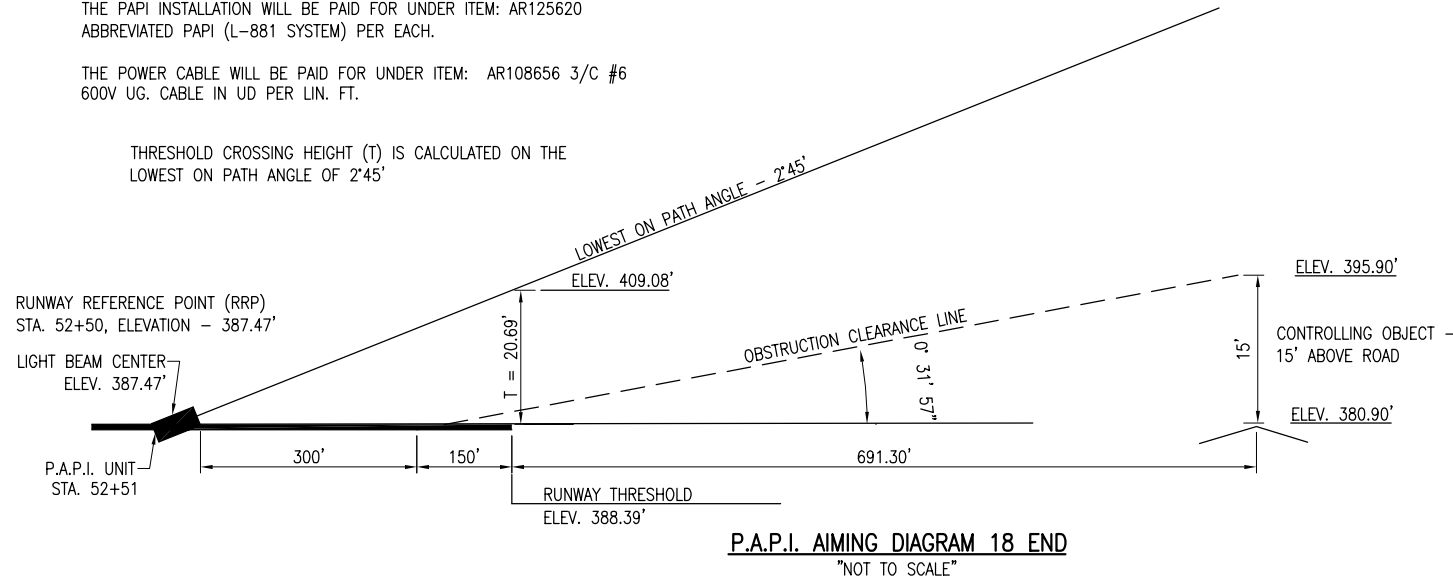


RUNWAY CENTERLINE PROFILE



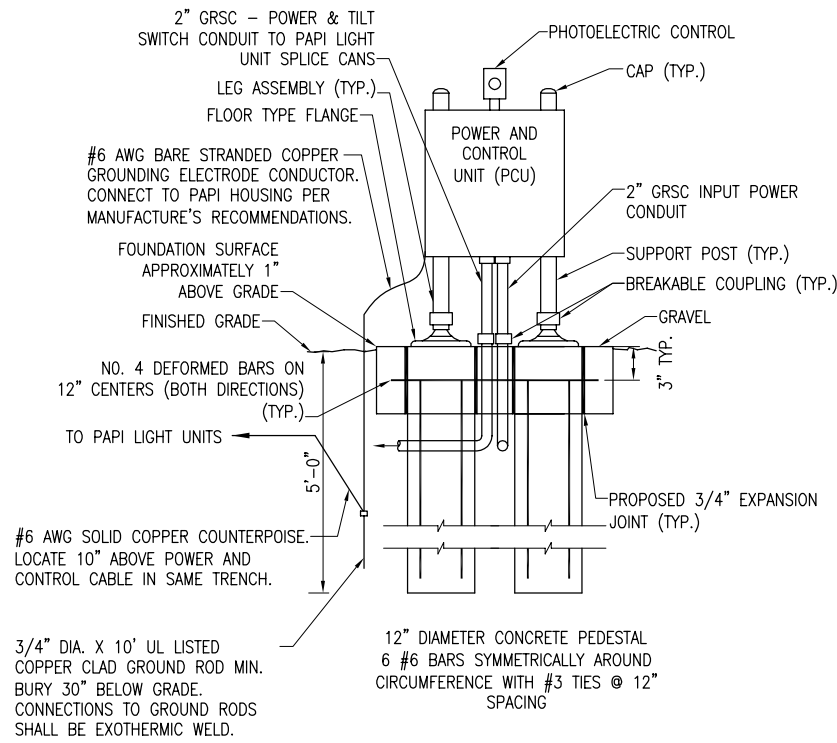
P.A.P.I. LAYOUT DETAIL

	P.A.P.I. UNIT #1	P.A.P.I. UNIT #2	P AND C UNIT
DISTANCE FROM RUNWAY C	87.5'	107.5'	127.5'
AIMING ANGLE	3'15"	2'45"	N/A
APPROXIMATE GROUND ELEVATION	382.6'	382.2'	381.8'
P.A.P.I. UNIT APERTURE ELEVATION	387.47'	387.47'	N/A

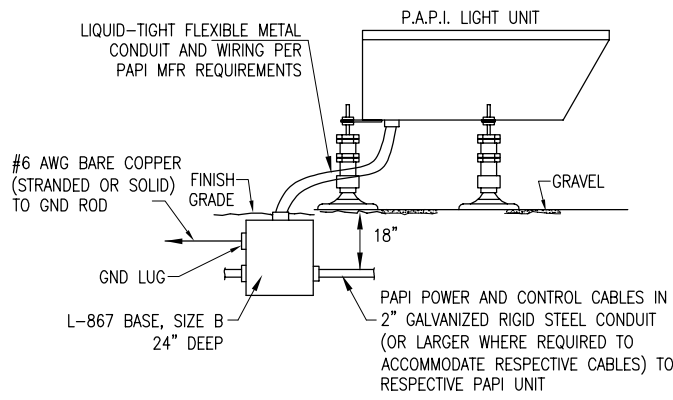


P.A.P.I. AIMING DIAGRAM 18 END

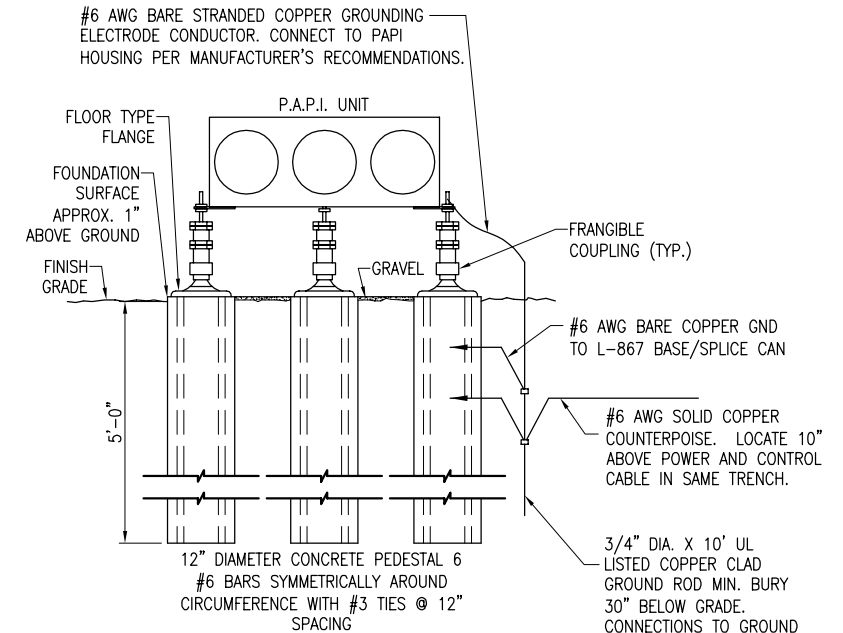
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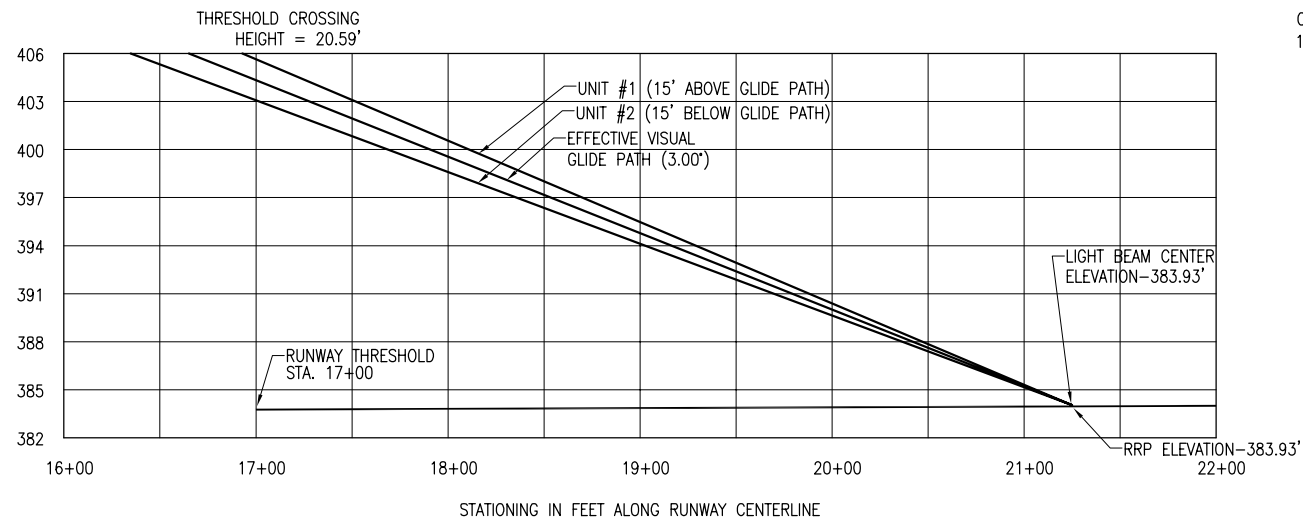
**FRONT ELEVATION
POWER AND CONTROL UNIT**
"NOT TO SCALE"



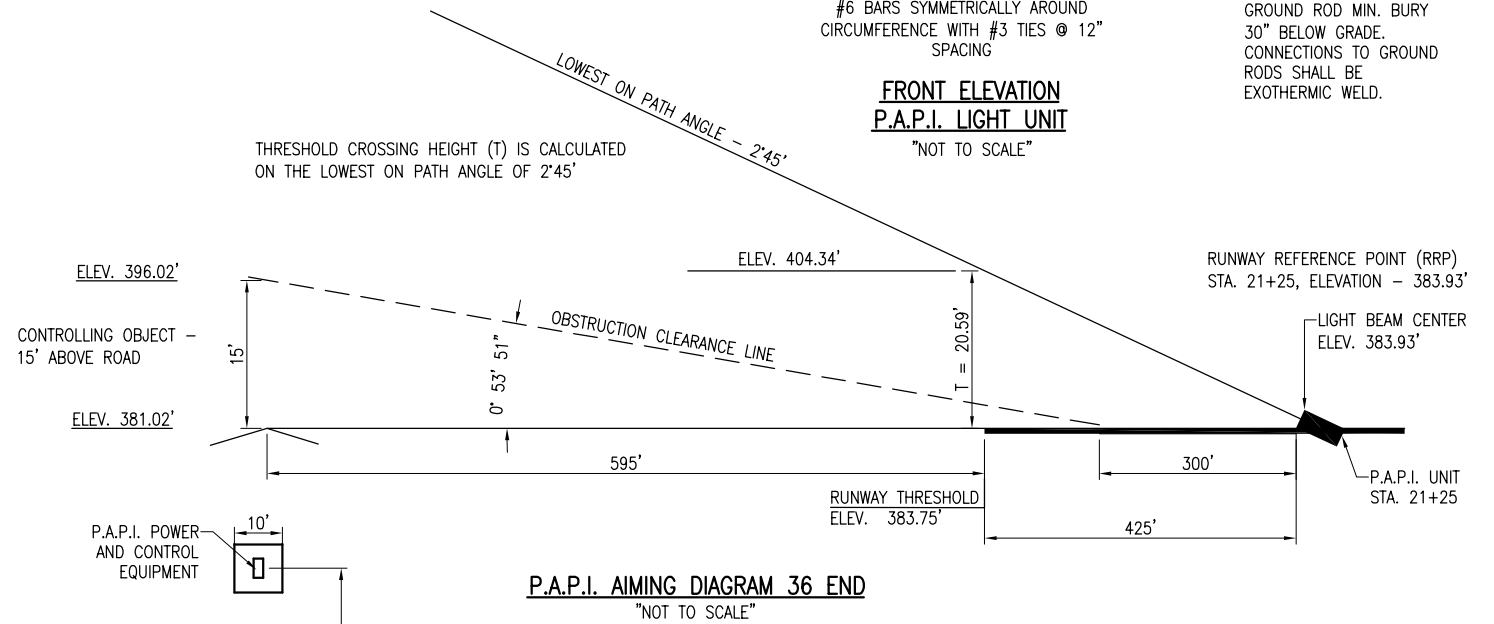
**SIDE ELEVATION
P.A.P.I. LIGHT UNIT**
"NOT TO SCALE"



**FRONT ELEVATION
P.A.P.I. LIGHT UNIT**
"NOT TO SCALE"



RUNWAY CENTERLINE PROFILE



P.A.P.I. AIMING DIAGRAM 36 END
"NOT TO SCALE"

P.A.P.I. NOTES

THE PROPOSED PRECISION APPROACH PATH INDICATOR (PAPI) SYSTEM WILL BE PLACED AT THE LOCATION SHOWN ON SHEET NO. 10.

THE PROPOSED CONCRETE PEDESTALS WILL BE AS DETAILED ON THIS SHEET. THE NUMBER OF PEDESTALS CONSTRUCTED FOR EACH PAPI UNIT WILL DEPEND ON THE UNIT SELECTED BY THE CONTRACTOR FOR INSTALLATION.

SIX (6") INCHES OF GRAVEL ON TOP OF BLACK PLASTIC WILL BE PLACED UNDER EACH PAPI UNIT TO HALT VEGETATION GROWTH.

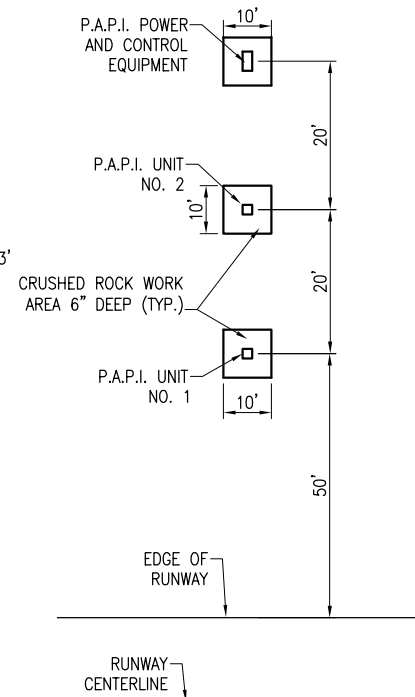
EACH PAPI UNIT WILL BE CONSTRUCTED SUCH THAT THE BEAM CENTERS WILL BE WITHIN ±1" OF ELEVATION 383.93.

THE PROPOSED POWER CABLE TO THE PAPI SYSTEM WILL BE 3-1/4" NO. 6, 600V., TYPE XLP-USE UNDERGROUND CABLE IN 1-1/4" UNIT DUCT. THIS CABLE WILL BE PLOWED OR TRENCHED IN PLACE AT A MINIMUM DEPTH OF 18" BELOW FINISH GRADE.

THE PAPI INSTALLATION WILL BE PAID FOR UNDER ITEM: AR125620 ABBREVIATED PAPI (L-881 SYSTEM) PER EACH.

THE POWER CABLE WILL BE PAID FOR UNDER ITEM: AR108656 3/C #6 600V UG. CABLE IN UD PER LIN. FT.

TO PROVIDE ADDITIONAL SNOW DEPTH, THE CENTER OF THE LIGHT BEAM WILL BE SET ONE FOOT ABOVE THE RUNWAY CENTERLINE ELEVATION AT THE RUNWAY REFERENCE POINT.



P.A.P.I. LAYOUT DETAIL
"NOT TO SCALE"

PAPI DATA-RUNWAY END 36			
	P.A.P.I. UNIT #1	P.A.P.I. UNIT #2	P AND C UNIT
DISTANCE FROM RUNWAY C	87.5'	107.5'	127.5'
AIMING ANGLE	3°15'	2°45'	N/A
APPROXIMATE GROUND ELEVATION	378.8'	377.9'	377.7'
P.A.P.I. UNIT APERTURE ELEVATION	383.93'	383.93'	N/A

REVISION	DATE

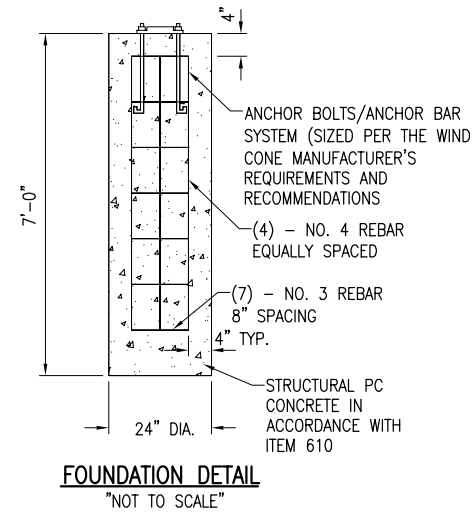
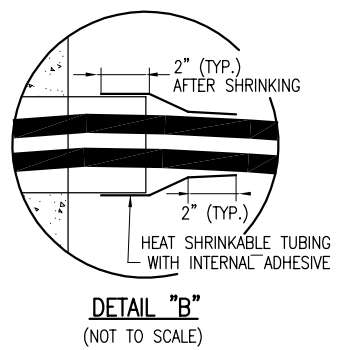
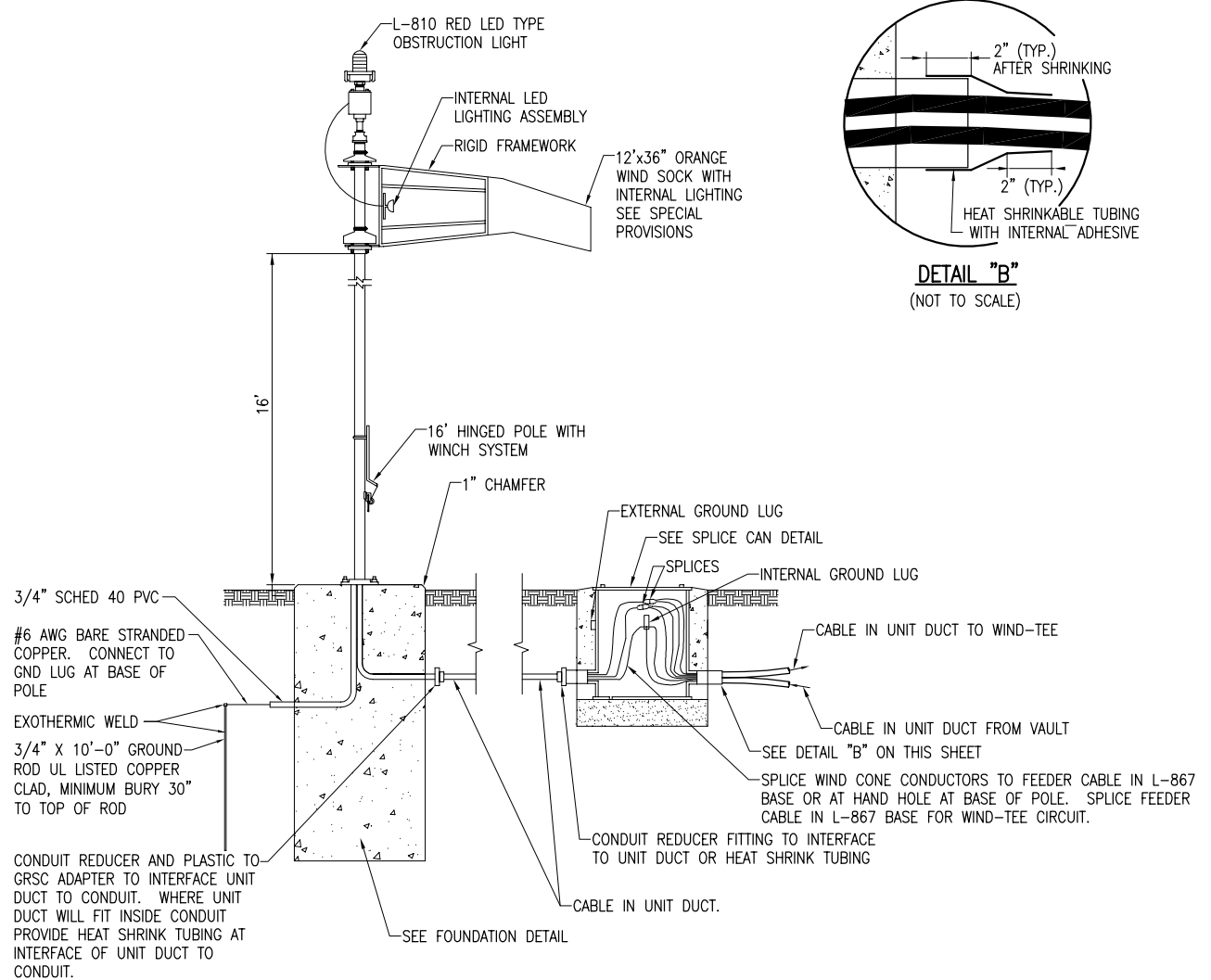
**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name R-544ELE.DWG	Scale NOT TO SCALE	Date 06/24/10
LAYOUT	CAH	05/03/10	05/05/10
DRAWN	CAH	05/05/10	05/05/10
REVIEWED	KNL/JSL	06/11/10	06/11/10

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REPLACE MIRLS, MITLS,
VADIS, REILS,
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PROPOSED PAPI
DETAILS AND NOTES
RUNWAY END 36

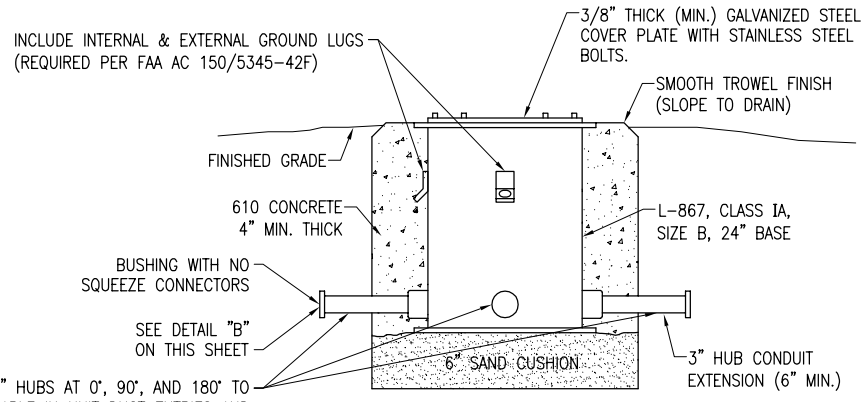


INTERNALLY LIGHTED L-807 WIND CONE
"NOT TO SCALE"

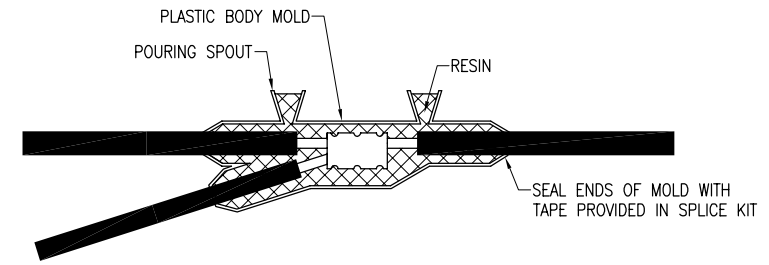
NOTES

1. WIND CONE SHALL BE FAA APPROVED L-807, STYLE 1B INTERNAL LED (LIGHT EMITTING DIODE) LIGHTED, SIZE 2 WITH ORANGE WIND SOCK, 120 VAC, & WITH L-810 RED LED TYPE OBSTRUCTION LIGHT, SEE SPECIAL PROVISION SPECS.
2. L-807 WIND CONE 12' INTERNALLY LIT WILL BE PAID FOR UNDER ITEM AS107812.
3. SPLICE CAN WILL BE PAID FOR SEPARATELY UNDER ITEM AS125565.
4. REBAR SHALL BE MANUFACTURED FROM DOMESTIC STEEL.

ITEM AS107812 L-807 WC-12' INTERNALLY LIT IS UNDER ADDITIVE ALTERNATE NO. 1.



SPLICE CAN DETAIL FOR WIND CONE/WIND-TEE
(NOT TO SCALE)



UNDERGROUND TAP SPLICE

FOR TAP SPLICES IN LOW VOLTAGE (600V) CABLE. SPLICES SHALL BE RATED AND LISTED SUITABLE FOR DIRECT BURIAL LOCATIONS. FOR SPLICES UP TO #2 AWG CONDUCTOR, SPLICES SHALL BE 3M SCOTCHCAST 82-B1 POWER CABLE TAP SPLICE KIT OR APPROVED EQUAL.

REVISION	DATE

CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS

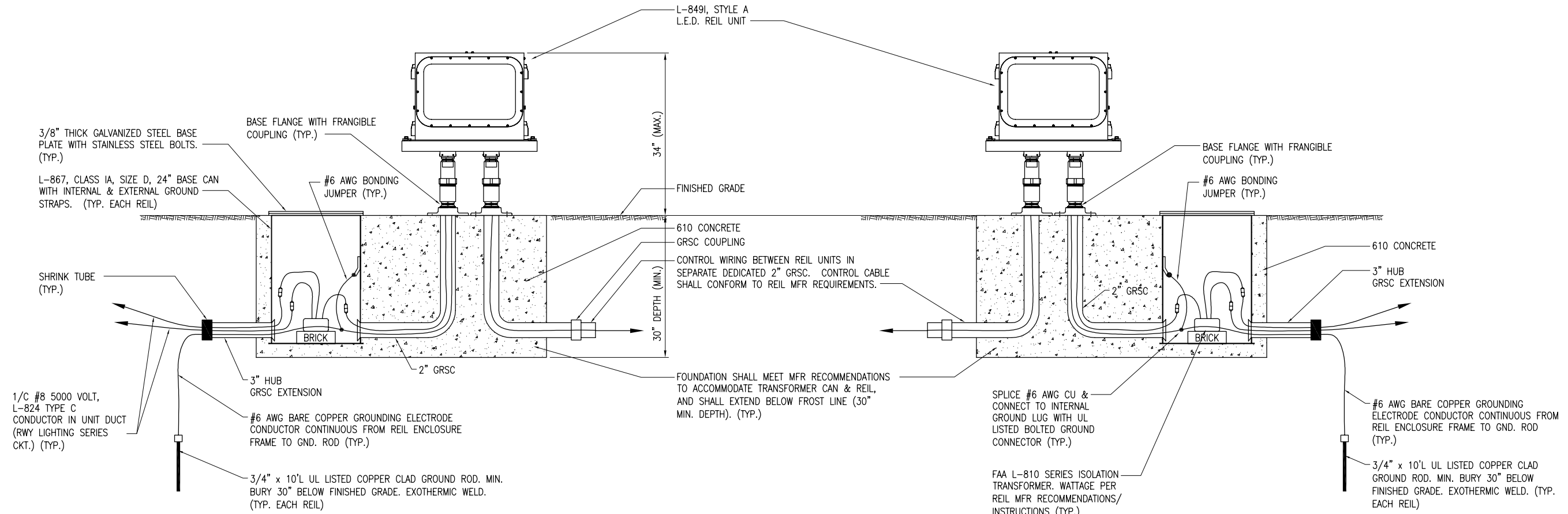
IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name E-016.DWG	Scale AS SHOWN	Date 06/24/10
LAYOUT	KNL	02/08/10	02/12/10
DRAWN	MLH	02/12/10	03/16/10
REVIEWED	KNL/RAW	03/16/10	

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VADIS, REILS,
BEACON & VAULT

L-807 WIND CONE DETAIL



REIL INSTALLATION DETAIL
NOT TO SCALE

REIL NOTES

- SEE SPECIAL PROVISION SPECS ITEM AR125610 REILS FOR ADDITIONAL REQUIREMENTS ON REILS.
- REILS SHALL BE AIMED AT ANGLE 10 DEGREES VERTICALLY AND TOED OUT 15 DEGREES FROM THE LINE PARALLEL TO THE RUNWAY CENTERLINE.
- REILS WILL BE PAID FOR UNDER ITEM AR125610 REILS PER PAIR.
- ANY AND ALL TRENCHES AND DISTURBED AREAS WILL BE BACKFILLED AND RESTORED TO A SMOOTH GRADE AND SEEDED TO THE SATISFACTION OF THE ENGINEER. ALL TRENCH SETTLEMENT SHALL BE CORRECTED FOR A PERIOD OF ONE YEAR. RESTORATION, GRADING, SEEDING, AND MULCHING OF AREAS DISTURBED DURING THE REIL INSTALLATION AND ASSOCIATED CABLE WILL BE INCIDENTAL TO ITEM AR125610 REILS.
- GROUNDING FOR REILS.** GROUNDING FOR REILS SHALL CONFORM TO THE RESPECTIVE REIL MANUFACTURER'S INSTALLATION INSTRUCTIONS, AS DETAILED ON THE PLANS, AND AS SPECIFIED HEREIN. FURNISH AND INSTALL A 3/4-INCH DIAMETER BY 10-FOOT LONG COPPER CLAD GROUND ROD AT EACH REIL UNIT. GROUND RODS SHALL BE BURIED 30" MINIMUM BELOW GRADE. BOND EACH REIL UNIT HOUSING AND THE REIL BASE CAN TO THE RESPECTIVE GROUND ROD IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS WITH A #6 AWG BARE SOLID OR STRANDED (PER REIL MANUFACTURER REQUIREMENTS) COPPER GROUNDING ELECTRODE CONDUCTOR. ALL CONNECTIONS TO GROUND RODS SHALL BE EXOTHERMIC WELD AS MANUFACTURED BY CADWELD, THERMOWELD, OR ULTRAWELD. CONNECTIONS TO REIL UNIT FRAMES SHALL BE AS RECOMMENDED BY THE MANUFACTURER OR WITH UL LISTED GROUNDING CONNECTORS. CONNECT TO THE BASE / TRANSFORMER CAN SHALL BE WITH UL LISTED BOLTED CONNECTOR OR ONE-HOLE COMPRESSION LUG & 3/8" STAINLESS STEEL BOLTS, NUTS, & WASHERS.

REVISION	DATE

**CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS**

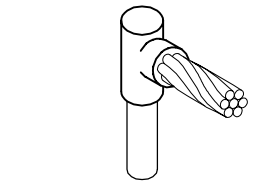
IL. PROJ.: CUL-5972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name E-502.DWG	Scale NOT TO SCALE	Date 06/24/10
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DRAWN	CMS	06/02/10	06/09/10
REVIEWED	KNL/JSL	06/09/10	

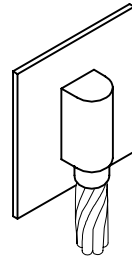
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REPLACE MRLS, MITLS,
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BEACON & VAULT
REIL INSTALLATION
DETAIL

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CABLE TO GROUND ROD

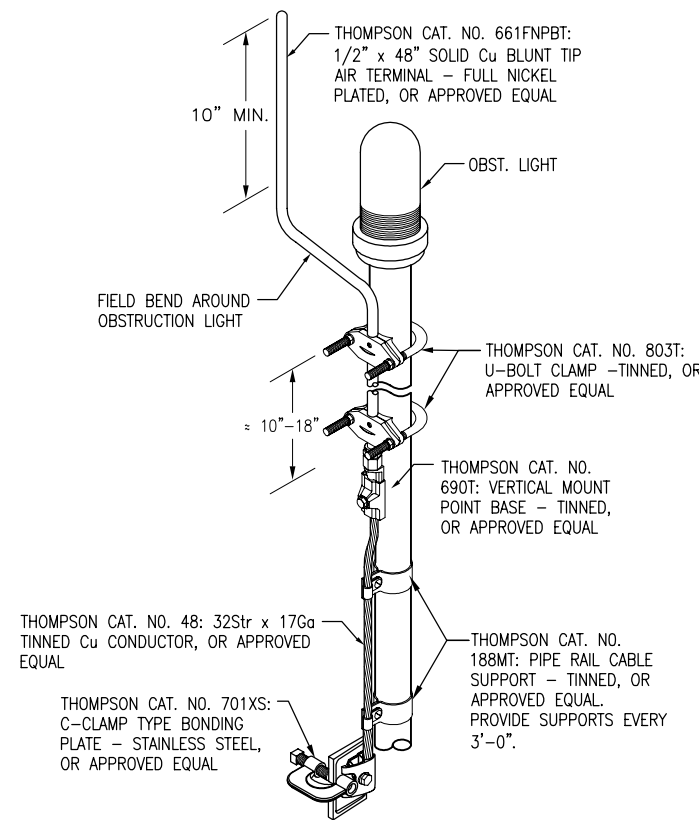


CABLE TO SURFACE

DETAIL NOTES

- EXOTHERMIC WELDS SHALL BE CADWELD AS MANUFACTURED BY ERICO PRODUCTS, SOLON, OHIO, ULTRAWELD AS MANUFACTURED BY HARGER LIGHTNING PROTECTION & GROUNDING EQUIPMENT, GRAYSLAKE, IL, OR THERMOWELD AS MANUFACTURED BY CONTINENTAL INDUSTRIES, TULSA, OKLAHOMA. VERIFY PROPER SIZES, MOLDS, TYPES, AND REQUIREMENTS FOR THE RESPECTIVE APPLICATION WITH THE MANUFACTURER, AND INSTALL PER THEIR DIRECTIONS.
- FOR APPLICATIONS TO GALVANIZED STEEL OR PAINTED STEEL, REMOVE GALVANIZING AND/OR PAINT & CLEAN THE SURFACE TO EXPOSE BARE STEEL BEFORE MAKING EXOTHERMIC WELD CONNECTION.
- VERIFY EXOTHERMIC MOLDS ARE SUITABLE FOR USE WITH THE RESPECTIVE TYPE (SOLID OR STRANDED) & SIZE CONDUCTOR.

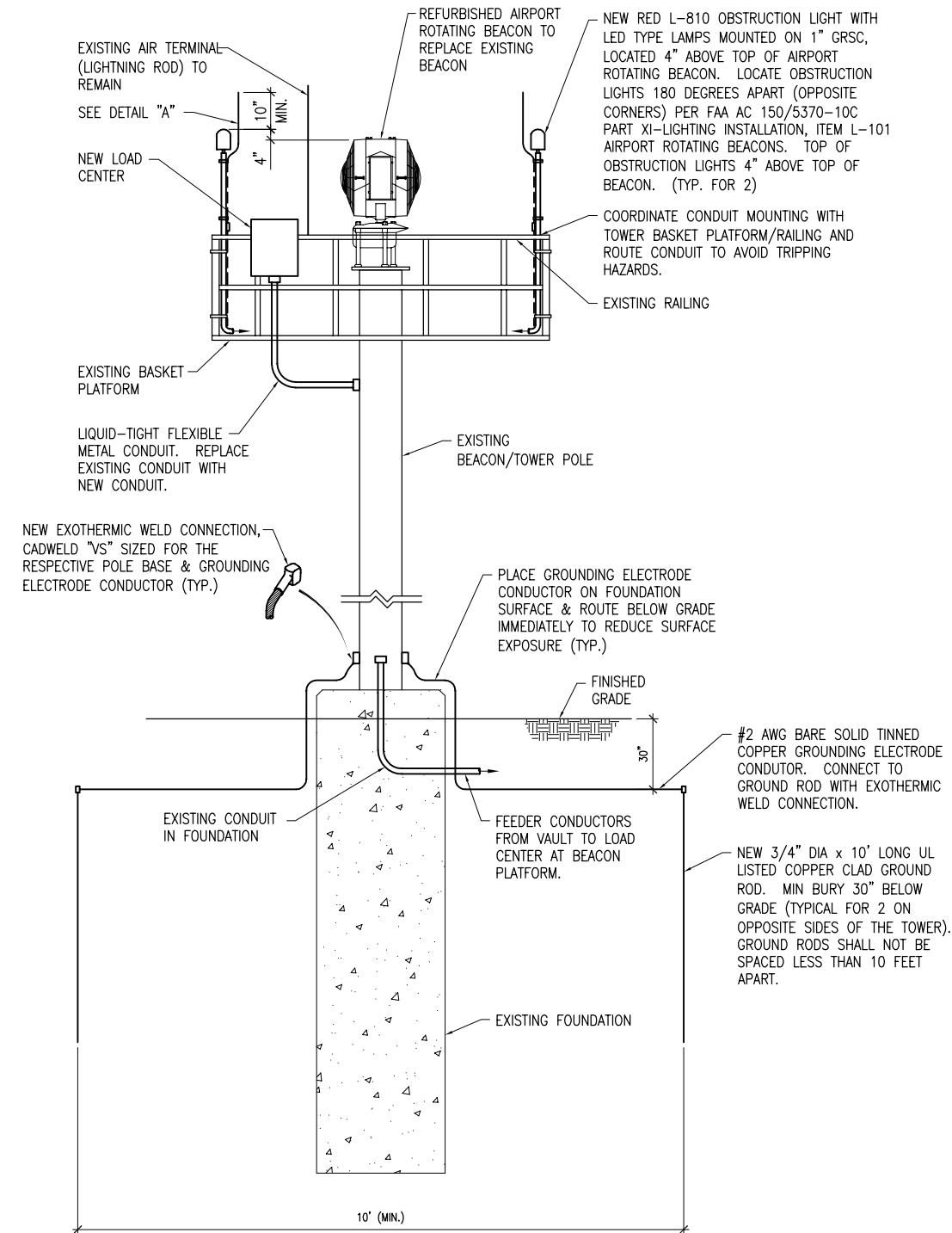
EXOTHERMIC WELD DETAILS



DETAIL A
NTS

NOTES

- REFERENCES TO THOMPSON ARE THOMPSON LIGHTNING PROTECTION INC., 901 SIBLEY MEMORIAL HWY, ST. PAUL, MN 55188, PHONE: 651-455-7661, 800-777-1230, FAX: 651-455-2545.
- VERIFY LIGHTNING PROTECTION COMPONENTS AND CATALOG NUMBERS WITH THE RESPECTIVE LIGHTNING PROTECTION EQUIPMENT MANUFACTURER.



LIGHTNING PROTECTION DETAIL FOR AIRPORT ROTATING BEACON
NTS

REMOVAL & REPLACEMENT OF EXISTING AIRPORT ROTATING BEACON WILL BE PAID FOR UNDER ITEM AR101580 REFURBISH 36" BEACON PER EACH. ALL OTHER WORK SHOWN ON THIS SHEET SHALL BE PAID FOR UNDER ITEM AR800591 - UPGRADE AIRPORT ROTATING BEACON - PER L.S.

AIRPORT ROTATING BEACON LOAD CENTER SCHEDULE		
CKT #	DUTY	SIZE
1	SURGE PROTECTOR (PHASE A)	30A 1P
2	SURGE PROTECTOR (PHASE B)	30A 1P
3	AIRPORT ROTATING BEACON	15A 1P
4	OBSTRUCTION LIGHTS	15A 1P
5	BLANK	
6	BLANK	

GND S/N

100 AMP, 120/240 VAC, 1 PHASE, 3 WIRE, 6 CIRCUIT LOAD CENTER WITH MAIN LUGS IN A NEMA 3R RAIN PROOF ENCLOSURE, SQUARE D CAT. NO. Q0612L100RBCU WITH EQUIPMENT GROUND BAR KIT OR APPROVED EQUAL.

NOTES

- INCLUDE EQUIPT GROUND BAR KIT.
- ALL BREAKERS SHALL HAVE 10,000 AIC RATING AT 120/240 VAC.
- PHASE "A" SHALL BE SWITCHED THROUGH A LIGHTING CONTACTOR AT THE VAULT. PHASE "B" SHALL BE UNSWITCHED.
- INCLUDE ENGRAVED PHENOLIC LEGEND PLATE LABELED ARB PANEL, 120/240 VAC, 1PH, 3W, FED FROM VAULT.
- SURGE PROTECTORS SHALL BE SUITABLE FOR 120VAC, 1PH, 2W PLUS GROUND, 30KA (MINIMUM) SURGE CURRENT RATING, JOSLYN MODEL 1260-21 OR LIGHTING PROTECTION CORP. MODEL LPC 11765-132, OR APPROVED EQUAL. FURNISH & INSTALL TWO SURGE PROTECTORS (ONE FOR EACH PHASE).
- LOAD CENTER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.

REVISION	DATE

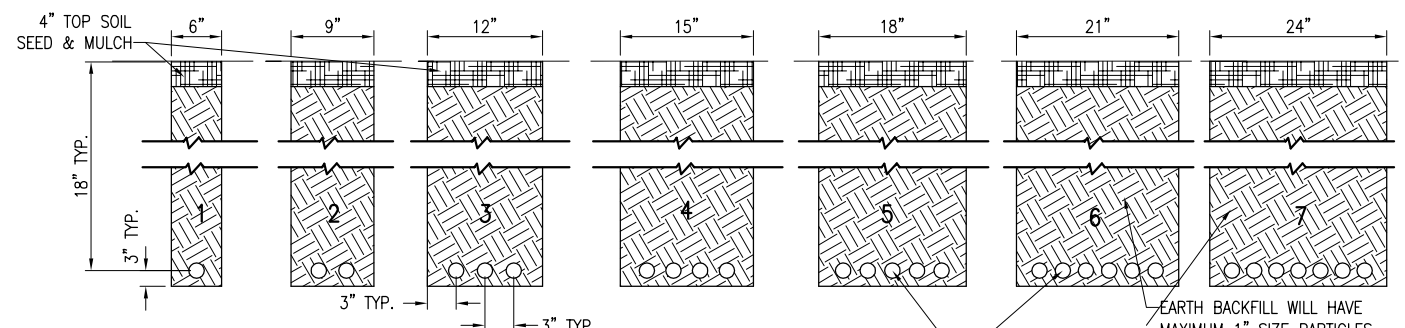
CARMI MUNICIPAL AIRPORT CARMI, ILLINOIS

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A01580	File Name: E-501.DWG	Scale: NOT TO SCALE	Date: 06/24/10
LAYOUT	KNL	05/17/10	
DRAWN	CWS	05/17/10	
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REPLACE MIRLS, MITLS, VADIS, REILS, BEACON & VAULT LIGHTNING PROTECTION DETAILS FOR BEACON



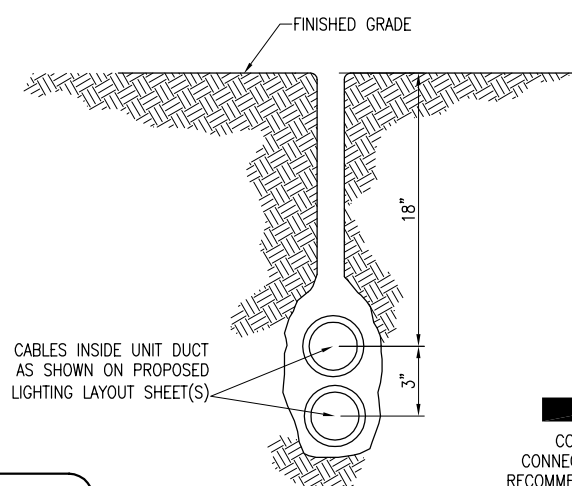
NOTES:
DETAIL NUMBERS INDICATE NO. OF CABLES.

TRENCHES WITH MORE THAN SEVEN CABLES SHALL BE INCREASED 3" IN WIDTH FOR EACH ADDITIONAL CABLE; IF SPECIFIED ON PLANS TWO PARALLEL TRENCHES MAY BE CONSTRUCTED.

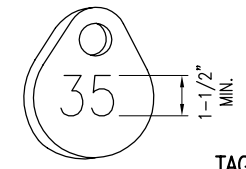
DEPTH OF TRENCHES SHALL BE AS SHOWN ABOVE UNLESS OTHERWISE SPECIFIED ON THE PLANS.

ALL DISTURBED SURFACES SHALL BE RESTORED TO THEIR ORIGINAL CONDITION. COST IS INCIDENTAL TO TRENCH.

EARTH BACKFILL WILL HAVE MAXIMUM 1" SIZE PARTICLES AND WILL BE PLACED IN TWO LIFTS AS APPROXIMATELY SHOWN (TYPICAL FOR ALL TRENCHES)

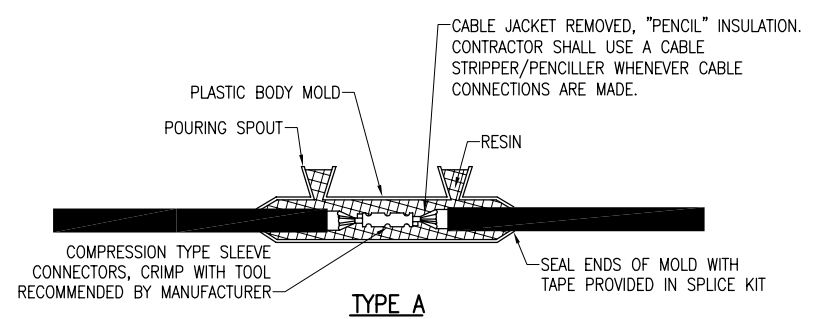


PLOWED CABLE
(NOT TO SCALE)



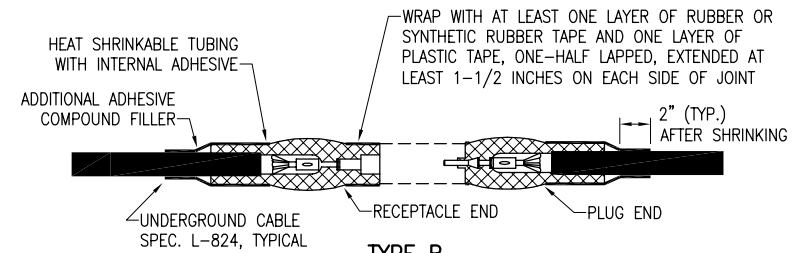
TAG DETAIL
(NOT TO SCALE)

NOTE:
AFFIX NON-CORROSIVE TAG TO FIXTURE FACING RUNWAY WITH SET SCREW, WIRE TIE, OR METAL BAND. NUMERALS SHALL BE ENGRAVED FOR PERMANENT READABILITY.



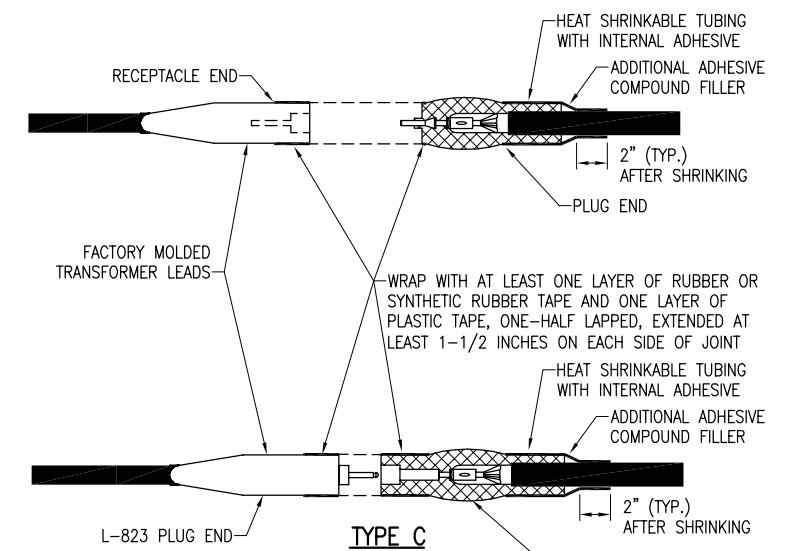
TYPE A

FOR SPLICES IN LOW VOLTAGE CABLE (600V) HOMERUNS FOR EXTENSIONS TO EXISTING LOW VOLTAGE CABLES ONLY



TYPE B

FOR SPLICES AT JUNCTION OF HOMERUN WITH LOOP CIRCUIT AND FOR SPLICES IN HOMERUNS TO EXISTING CABLES



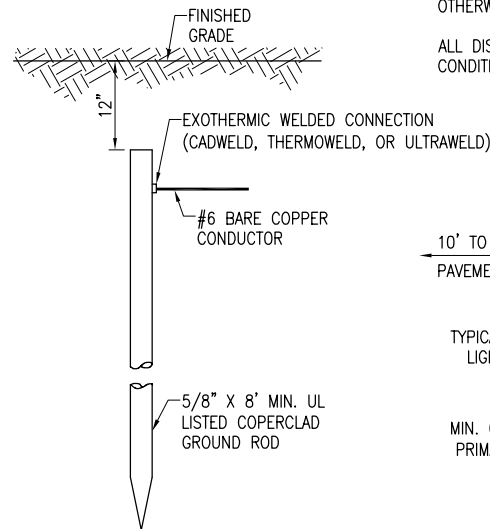
TYPE C

FOR SPLICES AT RUNWAY AND TAXIWAY LIGHTS

NOTES:
SEE PROPOSED LIGHTING LAYOUT SHEET(S) FOR SPLICE TYPE.

INSIDE DIAMETER OF CONNECTOR SHALL PROPERLY MATCH THE OUTSIDE DIAMETER OF CABLE.

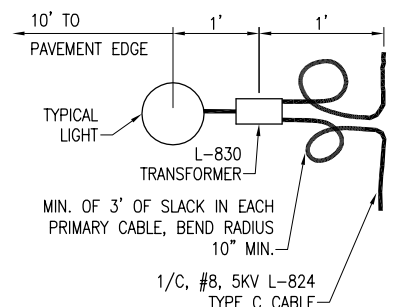
CABLE SPLICES
(NOT TO SCALE)



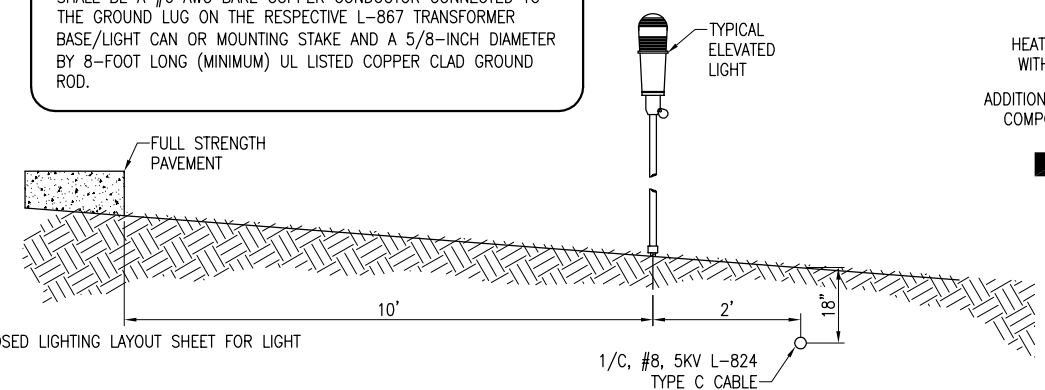
CABLE TRENCHES
(NOT TO SCALE)

PER FAA AC 150/5340-300 DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS, A SAFETY GROUND MUST BE INSTALLED AT EACH LIGHT FIXTURE. A SAFETY GROUND SHALL BE INSTALLED AT EACH STAKE MOUNTED LIGHT AND EACH TRANSFORMER BASE/LIGHT CAN ASSOCIATED WITH RUNWAY LIGHTS, TAXIWAY LIGHTS, AND LIGHTED TAXI GUIDANCE SIGNS. THE SAFETY GROUND SHALL BE A #6 AWG BARE COPPER CONDUCTOR CONNECTED TO THE GROUND LUG ON THE RESPECTIVE L-867 TRANSFORMER BASE/LIGHT CAN OR MOUNTING STAKE AND A 5/8-INCH DIAMETER BY 8-FOOT LONG (MINIMUM) UL LISTED COPPER CLAD GROUND ROD.

NOTES:
SEE PROPOSED LIGHTING LAYOUT SHEET FOR LIGHT LOCATIONS.



PLAN VIEW



PROFILE VIEW

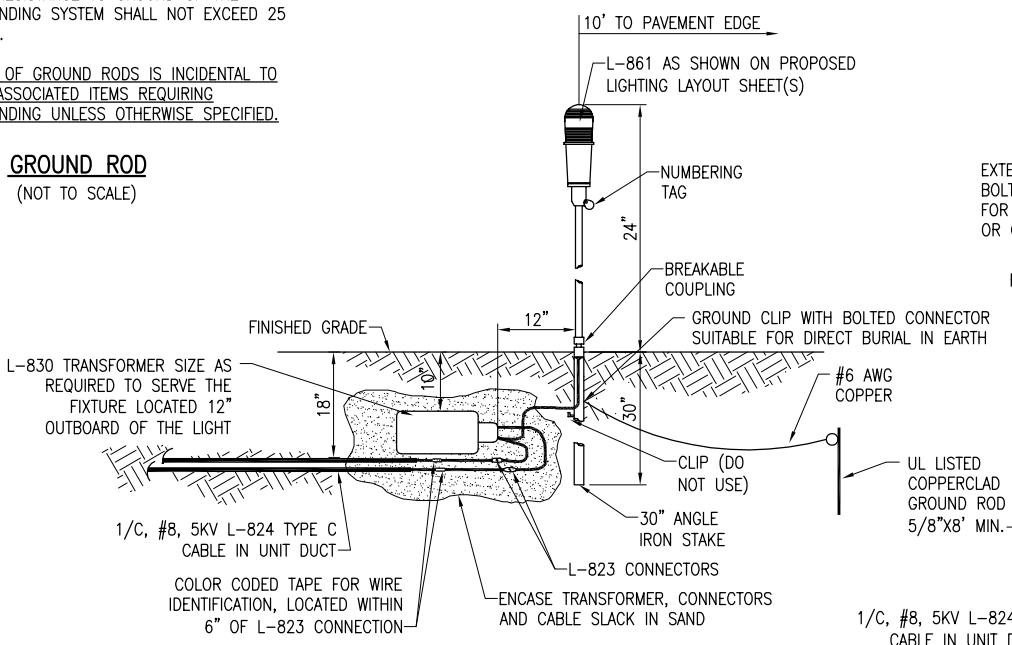
LIGHT AND CABLE INSTALLATION DETAIL
(NOT TO SCALE)

NOTES:
TYPE AND MINIMUM NUMBER OF GROUND RODS SHALL BE AS SPECIFIED ON THE PLAN.

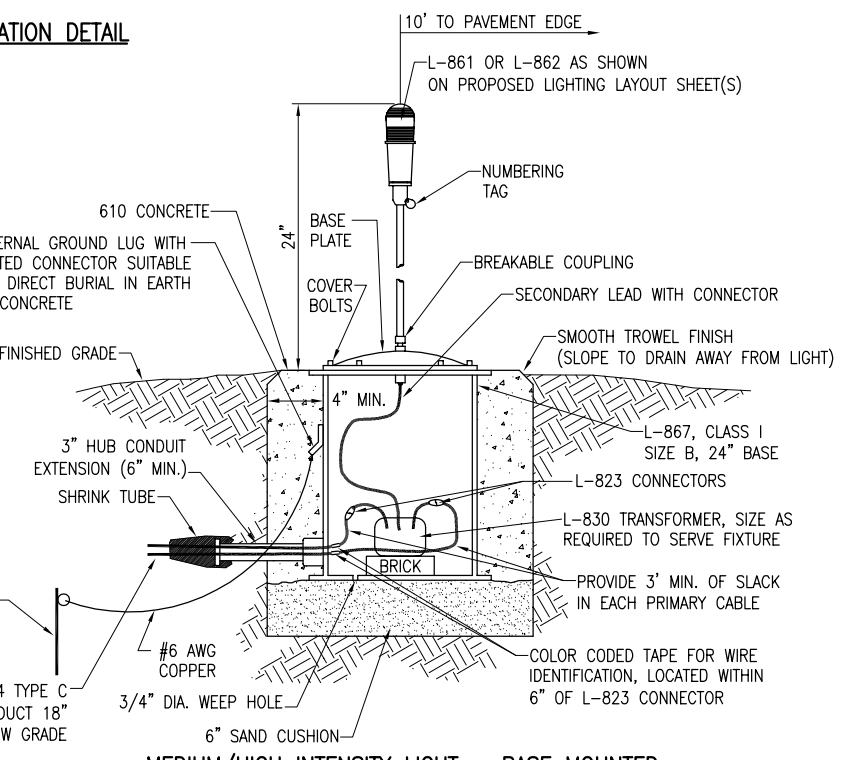
THE RESISTANCE TO GROUND OF THE GROUNDING SYSTEM SHALL NOT EXCEED 25 OHMS.

COST OF GROUND RODS IS INCIDENTAL TO THE ASSOCIATED ITEMS REQUIRING GROUNDING UNLESS OTHERWISE SPECIFIED.

GROUND ROD
(NOT TO SCALE)



MEDIUM INTENSITY LIGHT - STAKE MOUNTED
(NOT TO SCALE)



MEDIUM/HIGH INTENSITY LIGHT - BASE MOUNTED
(NOT TO SCALE)

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CARMI, ILLINOIS

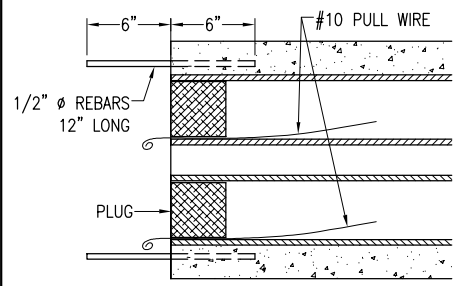
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Hanson Proj. No.	09A0158D	FILENAME	R-542ELE.DWG
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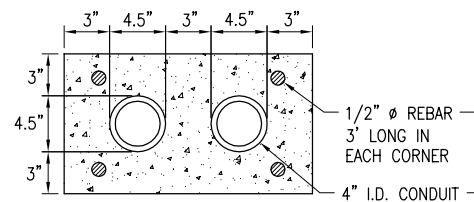
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ELECTRICAL DETAILS
SHEET 1

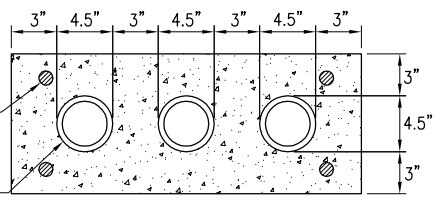
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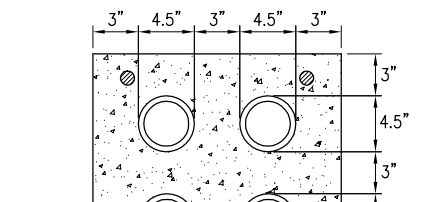
TYPICAL SECTION
(NOT TO SCALE)



2-DUCT BANK
(NOT TO SCALE)



3-DUCT BANK
(NOT TO SCALE)



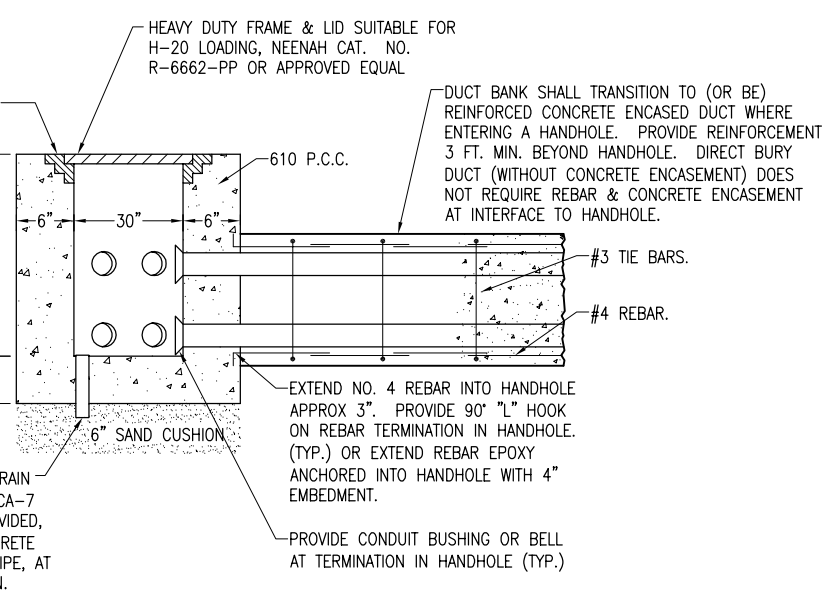
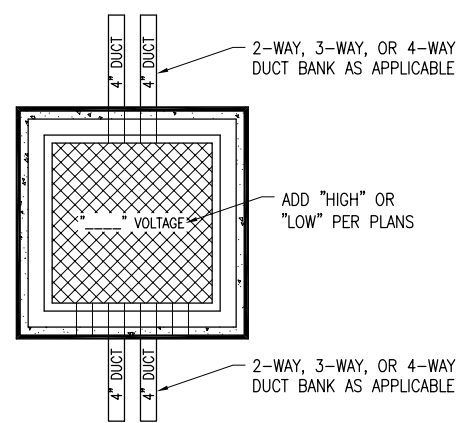
4-DUCT BANK
(NOT TO SCALE)

DUCT BANK NOTES:

1. ALL DIMENSION ARE MINIMUM.
2. INCLUDE DUCT SPACERS AS MANUFACTURED BY UNDERGROUND DEVICES INC., TO MAINTAIN PROPER SEPARATION OF CONDUITS.
3. REBAR IS REQUIRED TO ACCOMMODATE FUTURE DUCT EXTENSIONS & INTERFACE AT DUCT BANK TERMINATIONS. CONCRETE ENCASED DUCT BANKS TERMINATING IN HANDHOLES REQUIRE REBAR AT TERMINATIONS.
4. CONDUITS FOR CONCRETE ENCASED DUCT SHALL BE SCHEDULE 40 PVC CONFORMING TO ITEM 110.
5. MINIMUM DEPTH OF TOP OF DUCT ENCASEMENT SHALL BE 18" BELOW FINISHED GRADE.
6. HIGH VOLTAGE AND LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME RACEWAY, CONDUIT, DUCT, HANDHOLE, OR MANHOLE.
7. HOMERUN CABLES FOR A RESPECTIVE CIRCUIT SHALL BE INSTALLED IN THE SAME RACEWAY OR DUCT.
8. DUCT INTERFACE TO HANDHOLES OR MANHOLES WILL BE CONSIDERED INCIDENTAL TO THE RESPECTIVE DUCT PAY ITEM.

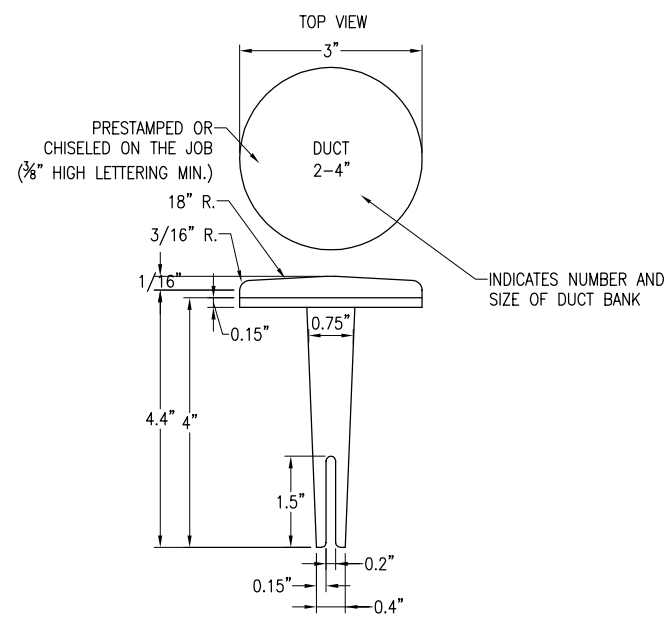
CABLE & DUCT MARKER NOTES:

1. THE COST OF ALL TURF AND PAVEMENT DUCT MARKERS SHALL BE INCIDENTAL TO THE DUCT. THE COST OF ALL CABLE MARKERS SHALL BE INCIDENTAL TO THE CABLE.
2. BITUMINOUS PAVEMENT DUCT MARKER AND CONCRETE DUCT MARKER TO BE PROVIDED AT EACH END OF EACH DUCT AS SHOWN ON THE LOCATION PLAN. FOR CONCRETE PAVEMENT, THE LETTER "D" SHALL BE IMPRESSED IN THE PAVEMENT INSTEAD OF THE MARKER. THE LETTER SHALL BE FORMED AS DESCRIBED IN NOTE 4.
3. CABLE MARKERS SHALL BE PLACED AT CHANGES OF DIRECTION AND APPROXIMATELY EVERY 200' ALONG CABLE RUNS.
4. CONCRETE CABLE MARKERS AND DUCT MARKERS SHALL HAVE LETTERS 4" HIGH, 3" WIDE WITH WIDTH OF STROKE 1/2" AND 1/4" DEEP. ALL LETTERS, NUMBERS AND ARROWS TO BE IMPRESSED.



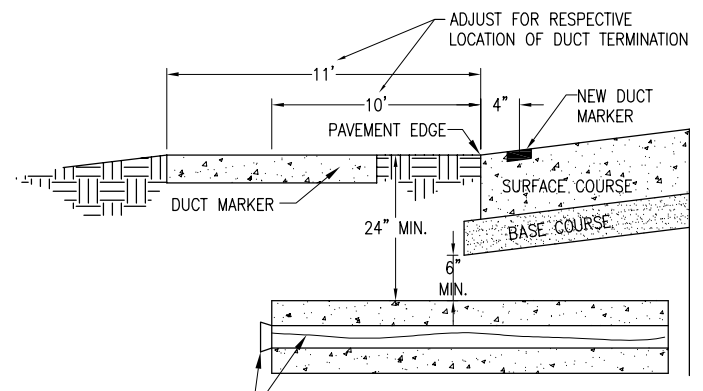
- NOTES:**
1. LIDS FOR LOW VOLTAGE HANDHOLES SHALL BE LABELED "LOW VOLTAGE". LIDS FOR HIGH VOLTAGE HANDHOLES SHALL BE LABELED "HIGH VOLTAGE". COORDINATE LETTERING WITH MFR.
 2. HANDHOLES MAY BE CAST IN PLACE OR PRECAST. PRECAST MANUFACTURERS MUST BE ON IDOT (ILLINOIS DEPT. OF TRANSPORTATION) APPROVED LIST OF CERTIFIED PRECAST CONCRETE PRODUCERS.
 3. HANDHOLES WILL BE PAID FOR UNDER ITEM AR110610 ELECTRICAL HANDHOLE PER EACH. SEE SPECIAL PROVISIONS.
 4. ALL CORING, INTERFACE, AND LABOR ASSOCIATED WITH CONDUIT, DUCT, CABLE IN UNIT DUCT, AND / OR CABLE ENTRIES WILL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE HANDHOLE AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.

ELECTRICAL HANDHOLE
(NOT TO SCALE)

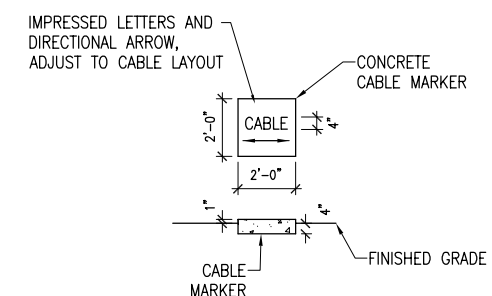


BITUMINOUS PAVEMENT DUCT MARKERS
(NOT TO SCALE)

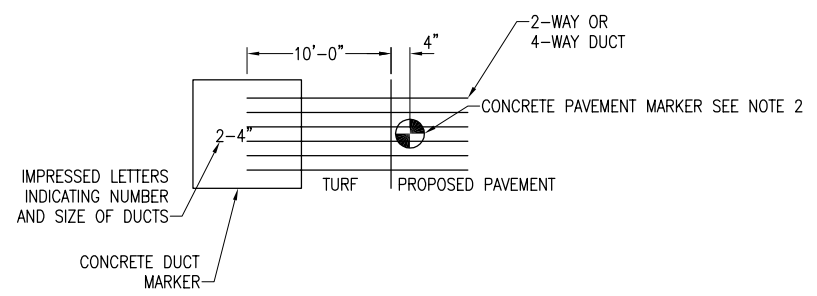
NOTE:
TOP OF MARKER SHALL BE FLUSH WITH FINISHED PAVEMENT SURFACE. MARKER MAY BE INSTALLED IN A DRILLED HOLE AND SECURED WITH EPOXY GLUE.



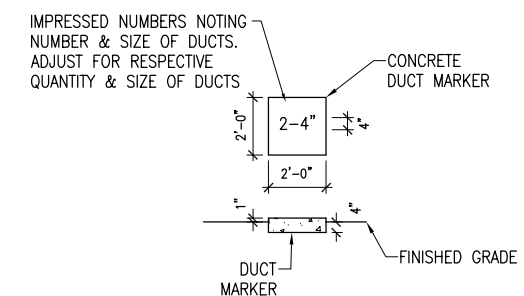
UNDERGROUND ELECTRICAL DUCT
(NOT TO SCALE)



TURF CABLE MARKERS
(NOT TO SCALE)



DUCT MARKER DETAIL
(NOT TO SCALE)



TURF DUCT MARKERS
(NOT TO SCALE)

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CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS

A.I.P. PROJ.: 3-17-0109-B8
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ELECTRICAL DETAILS
SHEET 2

GENERAL NOTES

1. ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 70 - NATIONAL ELECTRICAL CODE (NEC) MOST CURRENT ISSUE IN FORCE, THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES, AND REQUIREMENTS IN FORCE. ANY INSTALLATIONS WHICH VOID THE U.L. LISTING, ETL LISTING (OR OTHER THIRD PARTY LISTING) AND/OR THE MANUFACTURER'S WARRANTY OF A DEVICE WILL NOT BE PERMITTED.
2. CONTRACTOR SHALL KEEP A COPY OF THE LATEST NEC IN FORCE ON SITE AT ALL TIMES DURING CONSTRUCTION FOR USE AS A REFERENCE.
3. CONTRACTOR SHALL COORDINATE WORK AND ANY POWER OUTAGES AND/OR SHUT DOWN OF SYSTEMS WITH THE RESPECTIVE FACILITY OWNER PERSONNEL AND THE AIRPORT MANAGER/DIRECTOR. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
4. 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 THE 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 OR DIFFERENT MANUFACTURER) THAT IS COMPATIBLE WITH THE REMAINDER OF THE AIRPORT LIGHTING SYSTEM.
5. IN CASE THE CONTRACTOR ELECTS TO FURNISH AND INSTALL AIRPORT LIGHTING EQUIPMENT REQUIRING ADDITIONAL WIRING, TRANSFORMERS, ADAPTORS, MOUNTINGS, ETC., TO THOSE SHOWN ON THE DRAWINGS AND/OR LISTED IN THE SPECIFICATION, ANY COST FOR THESE ITEMS SHALL BE INCIDENTAL TO THE EQUIPMENT COST.
6. THE CONTRACTOR INSTALLED EQUIPMENT (INCLUDING FAA APPROVED) SHALL NOT GENERATE ANY ELECTROMAGNETIC INTERFERENCE IN THE EXISTING AND/OR NEW COMMUNICATIONS, WEATHER, AIR NAVIGATION, AND AIR TRAFFIC CONTROL EQUIPMENT. ANY EQUIPMENT GENERATING SUCH INTERFERENCE SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST WITH THE EQUIPMENT MEETING THE APPLICABLE SPECIFICATIONS AND NOT GENERATING ANY INTERFERENCE.
7. WHEN A SPECIFIC TYPE, STYLE, CLASS, ETC. OF FAA APPROVED EQUIPMENT IS SPECIFIED ONLY THAT TYPE, STYLE, CLASS, WILL BE ACCEPTABLE, EVEN THOUGH EQUIPMENT OF OTHER TYPES STYLES, CLASSES, ETC. MAY BE APPROVED.
8. ANY AND ALL INSTRUCTIONS FROM THE ENGINEER TO THE CONTRACTOR REGARDING CHANGES IN OR DEVIATIONS FROM THE PLANS AND SPECIFICATIONS SHALL BE IN WRITING WITH COPIES SENT TO THE AIRPORT SPONSOR AND THE FAA FIELD OFFICE (ADO/AFO). THE CONTRACTOR SHALL NOT ACCEPT ANY VERBAL INSTRUCTIONS FROM THE RESIDENT ENGINEER REGARDING ANY CHANGES FROM THE PLANS AND SPECIFICATIONS.
9. A MINIMUM OF THREE COPIES OF THE INSTRUCTION BOOK SHALL BE SUPPLIED WITH EACH DIFFERENT TYPE OF EQUIPMENT. THE BOOKS DESCRIBING A MORE SOPHISTICATED TYPE OF EQUIPMENT, SUCH AS REGULATORS, PAPI, REIL, ETC. AS A MINIMUM SHALL CONTAIN THE FOLLOWING:
 - A. A DETAILED DESCRIPTION OF THE OVERALL EQUIPMENT AND ITS INDIVIDUAL COMPONENTS.
 - B. THEORY OF OPERATION INCLUDING THE FUNCTION OF EACH COMPONENT.
 - C. INSTALLATION INSTRUCTION.
 - D. START-UP INSTRUCTIONS.
 - E. PREVENTATIVE MAINTENANCE REQUIREMENTS.
 - F. CHART FOR TROUBLE-SHOOTING.
 - G. COMPLETE POWER AND CONTROL DETAILED WIRING DIAGRAM(S), SHOWING EACH CONDUCTOR/CONNECTION/COMPONENT - "BLACK" BOXES ARE NOT ACCEPTABLE. THE DIAGRAM OF THE NARRATIVE SHALL SHOW VOLTAGE/CURRENTS/WAVE SHAPES AT STRATEGIC LOCATIONS TO BE USED WHEN CHECKING AND/OR TROUBLE-SHOOTING THE EQUIPMENT. WHEN THE EQUIPMENT HAS SEVERAL MODES OF OPERATION, SUCH AS SEVERAL BRIGHTNESS STEPS, THESE PARAMETERS SHALL BE INDICATED FOR ALL DIFFERENT MODES.
 - H. PARTS LIST WHICH WILL INCLUDE ALL MAJOR AND MINOR COMPONENTS SUCH AS RESISTORS, DIODES, ETC. IT SHALL INCLUDE A COMPLETE NOMENCLATURE OF EACH COMPONENT AND, IF APPLICABLE, THE NAME OF ITS MANUFACTURER AND THE CATALOG NUMBER.
 - I. SAFETY INSTRUCTIONS.

POWER AND CONTROL NOTES

1. PROVIDE LEGEND PLATES FOR ALL ELECTRICAL EQUIPMENT TO IDENTIFY FUNCTION, CIRCUIT VOLTAGE AND PHASE. WHERE THE EQUIPMENT CONTAINS FUSES, ALSO IDENTIFY THE FUSE OR FUSE LINK AMPERE RATING. WHERE THE EQUIPMENT DOES NOT HAVE SUFFICIENT AREA TO INSTALL LEGEND PLATES, THE LEGEND PLATES SHALL BE INSTALLED ON THE WALL NEXT TO THE UNIT. LEGEND PLATES SHALL BE WEATHERPROOF ENGRAVED PLASTIC OR PHENOLIC MATERIAL, 1/4" HIGH BLACK LETTERS ON A WHITE BACKGROUND UNLESS NOTED OTHERWISE. SECURE WITH WEATHERPROOF ADHESIVE AND MACHINE SCREWS. FURNISH ADDITIONAL LEGEND PLATES WHERE REQUIRED BY CODE, FOR ADDITIONAL EQUIPMENT, AS DETAILED HEREIN ON THE PLANS, AND AS NOTED IN THE SPECIAL PROVISION SPECIFICATIONS.
2. 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 PHASE CONDUCTORS ON 120/240VAC SINGLE-PHASE, THREE WIRE SYSTEMS AND BLACK, ORANGE (FOR HIGH LEG) AND BLUE SHALL BE USED FOR PHASE CONDUCTORS ON 240/120VAC THREE-PHASE, FOUR WIRE SYSTEMS. NEUTRAL CONDUCTORS, SIZE NO. 6 AWG OR SMALLER, SHALL BE IDENTIFIED BY A CONTINUOUS WHITE OR NATURAL GRAY OUTER FINISH ALONG ITS ENTIRE LENGTH. NEUTRAL CONDUCTORS LARGER THAN NO. 6 AWG 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. INSULATED GROUND CONDUCTORS SHALL HAVE GREEN COLORED INSULATION FOR ALL CONDUCTOR SIZES (AWG OR KCMIL).
3. 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.
4. IN CONTROL WIRING THE SAME COLOR SHALL BE USED THROUGHOUT THE SYSTEM FOR THE SAME FUNCTION, SUCH AS 10%, 30%, 100% BRIGHTNESS CONTROL, ETC.
5. LOW VOLTAGE (600 V.) AND HIGH VOLTAGE (5000 V.) CONDUCTORS SHALL BE INSTALLED IN SEPARATE WIREWAYS.
6. NEATLY LACE WIRING IN DISTRIBUTION PANELS, WIREWAYS, SWITCHES AND JUNCTION/PULL BOXES.
7. THE MINIMUM SIZE OF PULL/JUNCTION BOXES, REGARDLESS OF THE QUANTITY AND SIZE OF THE CONDUCTORS SHOWN, SHALL BE AS FOLLOWS:
 - A. IN STRAIGHT PULLS THE LENGTH OF THE BOX SHALL NOT BE LESS THAN EIGHT TIMES THE TRADE DIAMETER OF THE LARGER CONDUIT. THE TOTAL AREA (INCLUDING THE CONDUIT CROSS-SECTIONAL AREA) OF A BOX END SHALL BE AT LEAST 3 TIMES GREATER THAN THE TOTAL TRADE CROSS-SECTIONAL AREA OF THE CONDUITS TERMINATING AT THE END.
 - B. IN ANGLE PULLS OR 'U' PULLS THE DISTANCE BETWEEN EACH CONDUIT ENTRY INSIDE THE BOX AND THE OPPOSITE WALL OF THE BOX SHALL NOT BE LESS THAN SIX (6) TIMES THE TRADE DIAMETER OF THE LARGEST CONDUIT. THIS DISTANCE SHALL BE INCREASED FOR ADDITIONAL ENTRIES BY THE AMOUNT OF THE SUM OF THE DIAMETERS OF ALL OTHER CONDUIT ENTRIES ON THE SAME WALL AS THE BOX. THE DISTANCE BETWEEN CONDUIT ENTRIES ENCLOSING THE SAME CONDUCTOR SHALL NOT BE LESS THAN SIX TIMES THE TRADE DIAMETER OF THE LARGEST CONDUIT.
8. A RUN OF CONDUIT BETWEEN TERMINATIONS AT EQUIPMENT ENCLOSURES, SQUARE DUCTS AND PULL/JUNCTION BOXES, SHALL NOT CONTAIN MORE THAN THE EQUIVALENT OF FOUR QUARTER BENDS (360 DEGREES TOTAL), INCLUDING THOSE BENDS LOCATED IMMEDIATELY AT THE TERMINATIONS, CAST, CONDUIT TYPE OUTLETS SHALL NOT BE TREATED AS PULL/JUNCTION BOXES.
9. EQUIPMENT CABINETS SHALL NOT BE USED AS PULL/JUNCTION BOXES. ONLY WIRING TERMINATING AT THE EQUIPMENT SHALL BE BROUGHT INTO THESE ENCLOSURES.
10. SPLICES AND JUNCTION POINTS SHALL BE PERMITTED ONLY IN JUNCTION BOXES, DUCTS EQUIPPED WITH REMOVABLE COVERS, AND AT EASILY ACCESSIBLE LOCATIONS.
11. CIRCUIT BREAKERS IN POWER DISTRIBUTION PANEL(S) SHALL BE THERMAL-MAGNETIC MOLDED CASE, PERMANENT TRIP WITH 100 AMPERE, MINIMUM FRAME.
12. DUAL LUGS SHALL BE USED WHERE TWO (2) WIRES, SIZE NO. 6 OR LARGER, ARE TO BE CONNECTED TO THE SAME TERMINAL.
13. ALL INTERIOR WALL MOUNTED EQUIPMENT ENCLOSURES SHALL BE MOUNTED ON HOT DIPPED GALVANIZED STEEL STRUT SUPPORT, OR STAINLESS STEEL STRUT SUPPORT, WITH CORROSION RESISTANT HARDWARE.
14. SUPPORT FOR EXTERIOR MOUNTED EQUIPMENT SHALL USE HOT DIPPED GALVANIZED STEEL STRUT SUPPORT OR STAINLESS STEEL STRUT SUPPORT WITH STAINLESS STEEL HARDWARE. PROVIDE ZINC RICH PAINT APPLIED TO FIELD CUTS OF GALVANIZED STEEL SUPPORT TO MINIMIZE THE POTENTIAL FOR CORROSION PER THE RESPECTIVE STRUT SUPPORT MANUFACTURER'S RECOMMENDATIONS.

15. CONDUITS FOR ELECTRIC SERVICE ENTRANCE AND FEEDERS SHALL BE AS DETAILED HEREIN ON THE PLANS. WHERE GALVANIZED RIGID STEEL CONDUIT IS SPECIFIED IT SHALL HAVE THREADED FITTINGS. SET SCREW TYPE FITTINGS WILL NOT BE ACCEPTABLE. CONDUITS FOR UNDERGROUND APPLICATIONS SHALL BE AS DETAILED HEREIN. CONDUITS FOR GROUNDING ELECTRODE CONDUCTORS OR INDIVIDUAL GROUNDING CONDUCTORS SHALL BE SCHEDULE 40 OR SCHEDULE 80 PVC.
16. PROVIDE LIQUID TIGHT FLEXIBLE METAL CONDUIT AT CONNECTIONS TO EQUIPMENT SUBJECT TO VIBRATION OR WHERE FLEXIBILITY IS REQUIRED. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6, SUITABLE FOR GROUNDING, SUNLIGHT RESISTANT, AND RESISTANT TO OIL, GASOLINE, AND GREASE. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO MOTORS, TRANSFORMERS, & CONSTANT CURRENT REGULATORS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. DO NOT INSTALL LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS NOT UL LISTED. CONFIRM LIQUID-TIGHT FLEXIBLE METAL CONDUIT BEARS THE UL LABEL PRIOR TO INSTALLING IT.
17. UNLESS OTHERWISE SHOWN, ALL EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES WITH THE LINES OF THE STRUCTURE.
18. ALL STEEL CONDUITS, FITTINGS, NUTS, BOLTS, ETC. SHALL BE GALVANIZED.
19. USE CONDUIT BUSHINGS AT EACH CONDUIT TERMINATION. WHERE NO. 4 AWG OR LARGER UNDERGROUND WIRE IS INSTALLED, USE INSULATED BUSHINGS.
20. USE DOUBLE LOCK NUTS AT EACH CONDUIT TERMINATION.
21. WRAP ALL PRIMARY AND SECONDARY POWER TRANSFORMER CONNECTIONS WITH SUFFICIENT LAYERS OF INSULATING TAPE (3M SCOTCH 23 ALL-VOLTAGE SPLICING TAPE, 3M SCOTCH 130C LINERLESS RUBBER SPLICING TAPE, OR APPROVED EQUAL) AND COVER WITH VINYL ELECTRICAL TAPE (3M SCOTCH 88 VINYL ELECTRICAL TAPE OR APPROVED EQUAL) FOR FULL VALUE OF CABLE INSULATION VOLTAGE.
22. UNLESS OTHERWISE NOTED, ALL SINGLE CONDUCTOR CONTROL WIRING SHALL BE NO. 12 AWG. COPPER MINIMUM.
23. THE FOLLOWING SHALL APPLY TO RELAY/CONTACTOR PANELS/ENCLOSURES:
 - A. FOR INTERIOR LOCATIONS ALL COMPONENTS SHALL BE MOUNTED IN NEMA 12 (DUST TIGHT) ENCLOSURE(S) WITH VERTICALLY HINGED COVERS. FOR EXTERIOR/OUTDOOR LOCATIONS ALL COMPONENTS SHALL BE MOUNTED IN NEMA 4X STAINLESS STEEL ENCLOSURE(S) WITH VERTICALLY HINGED COVERS. ALL CONDUIT ENTRIES INTO NEMA 4, 4X ENCLOSURES SHALL HAVE NEMA 4 HUBS LISTED SUITABLE FOR THE RESPECTIVE ENCLOSURE TO MAINTAIN THE NEMA 4, 4X RATING OF THE ENCLOSURE.
 - B. THE ENCLOSURE(S) SHALL HAVE AMPLE SPACE FOR THE CIRCUIT COMPONENTS, TERMINAL BLOCKS AND INCOMING AND INTERNAL WIRING.
 - C. ALL CONTROL CONDUCTOR TERMINATIONS SHALL BE OF THE OPEN-EYE CONNECTOR/SCREW TYPE. SOLDERED CLOSED-EYE TERMINATIONS, OR TERMINATIONS WITHOUT CONNECTORS ARE NOT ACCEPTABLE.
 - D. WHEN THE ENCLOSURE COVER IS OPENED, ALL CIRCUIT COMPONENTS, WIRING AND TERMINALS SHALL BE EXPOSED AND ACCESSIBLE WITHOUT REMOVAL OF ANY PANELS, COVERS, ETC., EXCEPT THOSE COVERING HIGH VOLTAGE COMPONENTS.
 - E. ACCESS TO, OR REMOVAL OF A CIRCUIT COMPONENT OR TERMINAL BLOCK WILL NOT REQUIRE THE REMOVAL OF ANY OTHER CIRCUIT COMPONENT OR TERMINAL BLOCK.
 - F. EACH CIRCUIT COMPONENT SHALL BE CLEARLY IDENTIFIED INDICATING ITS CORRESPONDING NUMBER SHOWN ON THE DRAWINGS AND ITS FUNCTION.
 - G. A COMPLETE WIRING DIAGRAM SHALL BE MOUNTED ON THE INSIDE OF THE COVER. THE DIAGRAM SHALL REPRESENT EACH CONDUCTOR BY A SEPARATE LINE.
 - H. THE DIAGRAM SHALL IDENTIFY EACH CIRCUIT COMPONENT AN NUMBERING AND COLOR OF EACH TERMINAL CONDUCTOR AND TERMINAL.
 - I. ALL WIRING SHALL BE NEATLY TRAINED AND LACED.
 - J. MINIMUM WIRE SIZE SHALL BE NO. 12 AWG.
24. FURNISH & INSTALL A WEATHERPROOF WARNING LABEL FOR EACH METER SOCKET, SERVICE DISCONNECT, SAFETY SWITCH, CUTOUT, PANELBOARD, & CONTROL PANEL TO WARN PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS, PER THE REQUIREMENTS OF NEC 110.16 "FLASH PROTECTION".

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DATE	

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

I.L. PROJ.: CUL-3972
A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name: E-002.DWG	Scale: NONE	Date: 06/24/10
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ELECTRICAL NOTES
SHEET 1

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AIRFIELD LIGHTING NOTES

1. UNLESS OTHERWISE NOTED, ALL UNDERGROUND AIRFIELD LIGHTING SERIES CIRCUIT CONDUCTORS WHETHER DEB OR IN DUCT/CONDUIT SHALL BE FAA APPROVED 5000 VOLT L-824 TYPE. ALL UNDERGROUND FIELD POWER LOW VOLTAGE (600 VOLT & BELOW) CIRCUIT CONDUCTORS WHETHER DEB OR IN DUCT/CONDUIT SHALL BE UL LISTED 600 VOLT, TYPE XLP-USE-2 COPPER CONDUCTORS. CONDUCTOR SIZES SHALL BE AS SPECIFIED, HEREIN.
2. NO COMPONENTS OF PRIMARY CIRCUIT SUCH AS CABLE, CONNECTORS AND TRANSFORMERS SHALL BE BROUGHT ABOVE GROUND AT EDGE LIGHTS, SIGNS, REIL, PAPI, ETC.
3. THERE SHALL BE NO EXPOSED POWER/CONTROL CABLES BETWEEN THE POINT WHERE THEY LEAVE THE UNDERGROUND (DEB OR L-867 BASES) AND WHERE THEY ENTER THE EQUIPMENT (SUCH AS TAXIWAY SIGNS, PAPI, REIL, ETC.) ENCLOSURES. THESE CABLES SHALL BE ENCLOSED IN RIGID CONDUIT OR IN FLEXIBLE, WATERTIGHT CONDUIT WITH BREAKABLE COUPLING(S) AT THE GRADE OR THE HOUSING COVER, AS SHOWN IN APPLICABLE DETAILS.
4. THE JOINTS OF THE 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 1-1/2 INCHES ON EACH SIDE OF THE JOINT, AS SHOWN ON SHEET NO. 9.
5. THE CABLE ENTRANCE INTO THE FIELD-ATTACHED L-823 CONNECTORS SHALL BE ENCLOSED BY A HEAT-SHRINKABLE TUBING WITH CONTINUOUS INTERNAL ADHESIVE, AS SHOWN ON SHEET NO. 9.
6. L-823 TYPE II, TWO-CONDUCTOR SECONDARY CONNECTORS SHALL BE CLASS 'A' (FACTORY MOLDED).
7. THERE SHALL BE NO SPLICES IN THE SECONDARY CABLE(S) WITHIN THE STEMS OF A RUNWAY/TAXIWAY EDGE/THRESHOLD LIGHTING FIXTURE AND THE WIREWAYS LEADING TO TAXIWAY SIGNS AND PAPI/REIL EQUIPMENT.
8. ELECTRICAL INSULATING GREASE SHALL BE APPLIED WITHIN THE L-823, SECONDARY, TWO CONDUCTOR CONNECTORS TO PREVENT WATER ENTRANCE. THESE CONNECTORS SHALL NOT BE TAPED.
9. DEB ISOLATION TRANSFORMERS SHALL BE BURIED AT A DEPTH OF TEN (10") INCHES ON A LINE CROSSING THE LIGHT AND PERPENDICULAR TO THE RUNWAY/TAXIWAY CENTERLINE AT A LOCATION TWELVE (12") INCHES FROM THE LIGHT OPPOSITE FROM THE RUNWAY/TAXIWAY.
10. A SLACK OF THREE (3') FEET, MINIMUM, SHALL BE PROVIDED IN THE PRIMARY CABLE AT EACH TRANSFORMER/CONNECTOR TERMINATION. AT STAKE-MOUNTED LIGHTS, THE SLACK SHALL BE LOOSELY COILED IMMEDIATELY BELOW THE ISOLATION TRANSFORMER.
11. DIRECTION OF PRIMARY CABLES SHALL BE IDENTIFIED BY COLOR CODING AS FOLLOWS: WHEN FACING LIGHT WITH BACK TO PAVEMENT, CABLE TO THE LEFT IS CODED RED AND CABLE TO RIGHT IS CODED BLUE. THIS APPLIES TO STAKE MOUNTED LIGHTS AND BASE MOUNTED LIGHTS WHERE THE BASE HAS ONLY ONE ENTRANCE.
12. L-867 BASES SHALL BE SIZE B, 24" DEEP, CLASS I, UNLESS OTHERWISE NOTED.
13. BASE MOUNTED BREAKABLE COUPLINGS SHALL NOT HAVE WEEP HOLES TO THE OUTSIDE. PLUGGED UP HOLES SHALL NOT BE ACCEPTABLE. IT SHALL BE A 1/4" DIAMETER, MINIMUM, OR EQUIVALENT OPENING FOR DRAINAGE FROM THE SPACE AROUND THE SECONDARY CONNECTOR INTO THE L-867 BASE.
14. THE ELEVATION OF THE BREAKABLE COUPLING GROOVE SHALL NOT EXCEED 1-1/2" ABOVE THE EDGE OF THE COVER IN CASE OF BASE MOUNTED COUPLINGS, OR THE TOP OF THE STAKE IN CASE OF STAKE MOUNTED COUPLINGS.
15. WHERE THE BREAKABLE COUPLING IS NOT AN INTEGRAL PART OF THE LIGHT FIXTURE STEM OR MOUNTING LEG, A BEAD OF SILICON SEAL SHALL BE APPLIED COMPLETELY AROUND LIGHT STEM OR WIREWAY AT BREAKABLE COUPLING TO PROVIDE A WATERTIGHT SEAL.
16. TOPS OF THE STAKES SUPPORTING LIGHT FIXTURES SHALL BE FLUSH WITH THE SURROUNDING GRADE.
17. PLASTIC LIGHTING FIXTURE COMPONENTS, SUCH AS LAMP HEADS, STEMS, BREAKABLE COUPLINGS, BASE COVERS, BRACKETS, STAKES, SHALL NOT BE ACCEPTABLE.
18. THE TOLERANCE FOR THE HEIGHT OF RUNWAY/TAXIWAY EDGE LIGHTS SHALL BE: ONE (1) INCH. IN CASE OF STAKE MOUNTED LIGHTS, THE SPECIFIED LIGHTING FIXTURE HEIGHT SHALL BE MEASURED BETWEEN THE TOP OF THE STAKE AND THE TOP OF THE LENS. IN CASE OF BASE MOUNTED LIGHTS, THE SPECIFIED LIGHTING FIXTURE HEIGHT SHALL BE MEASURED BETWEEN THE TOP OF THE BASE FLANGE AND THE TOP OF THE LENS, THUS INCLUDING THE BASE COVER, THE FRANGIBLE COUPLING, THE STEM, THE LAMP HOUSING AND THE LENS.
19. THE TOLERANCE FOR THE LATERAL SPACING (LIGHT LANE TO RUNWAY/TAXIWAY CENTERLINE) OF RUNWAY/TAXIWAY EDGE LIGHTS SHALL BE ONE (1) INCH. THIS ALSO APPLIES AT INTERSECTIONS TO LATERAL SPACING BETWEEN LIGHTS OF A RUNWAY/TAXIWAY AND THE INTERSECTING RUNWAY/TAXIWAY.

20. ENTRANCES INTO L-867 BASES SHALL HAVE CONDUIT COUPLINGS OR REDUCERS TO INTERFACE UNIT DUCT/CONDUIT TO L-867 BASE HUBS, OR SHALL BE SEALED WITH HEAT SHRINK AS SHOWN IN DETAIL "B" ON SHEET NO. 8.
21. GALVANIZED/PAINTED EQUIPMENT/COMPONENT SURFACES SHALL NOT BE DAMAGED BY DRILLING, FILING, ETC. DRAIN HOLES IN METAL TRANSFORMER HOUSINGS SHALL BE MADE BEFORE GALVANIZING.
22. EDGE LIGHT NUMBERING TAGS SHALL BE FACING THE PAVEMENT.
23. CABLE/SPLICE/DUCT MARKERS SHALL BE PRECAST CONCRETE OF THE SIZE SHOWN. LETTERS/NUMBERS/ARROWS FOR THE LEGEND TO BE IMPRESSED INTO THE TOPS OF THE MARKERS SHALL BE PRE-ASSEMBLED AND SECURED IN THE MOLD BEFORE THE CONCRETE IS POURED. LEGEND INSCRIBED BY HAND IN WET CONCRETE SHALL NOT BE ACCEPTABLE.
24. ALL UNDERGROUND CABLE RUNS SHALL BE IDENTIFIED BY CABLE MARKERS AT 200 FEET MAXIMUM SPACING, WITH AN ADDITIONAL MARKER AT EACH CHANGE OF DIRECTION OF THE CABLE RUN. CABLE MARKERS SHALL BE INSTALLED IMMEDIATELY ABOVE THE CABLES.
25. THERE SHALL BE NO SPLICES BETWEEN THE ISOLATION TRANSFORMERS. L-823 CONNECTORS ARE ALLOWED AT TRANSFORMER CONNECTIONS ONLY, UNLESS OTHERWISE SHOWN.
26. APPLY AN OXIDE INHIBITING, ANTI-SEIZING COMPOUND TO ALL SCREWS, NUTS AND BREAKAGE COUPLING THREADS.
27. LOCATIONS OF ENDS OF ALL UNDERGROUND DUCTS SHALL BE IDENTIFIED BY DUCT MARKERS.
28. WHERE A PARALLEL, CONSTANT VOLTAGE PAPI SYSTEM IS PROVIDED, THE "T" SPLICES SHALL BE OF THE CAST TYPE.
29. CONCRETE USED FOR SLABS, FOOTINGS, BACKFILL AROUND TRANSFORMER HOUSINGS, MARKINGS, ETC. SHALL BE 3500 PSI, AIR-ENTRAINED.
30. ALL POWER AND CONTROL CABLES IN MAN/HAND HOLES SHALL BE TAGGED. USE EMBOSSED COPPER STRIPS TO BE ATTACHED AT BOTH ENDS TO THE CABLE BY THE USE OF PLASTIC STRAPS. MINIMUM OF TWO TAGS SHALL BE PROVIDED ON EACH CABLE IN A MAN/HAND HOLE-ONE AT THE CABLE ENTRANCE AND ONE AT THE CABLE EXIT.
31. THE LOCATION, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND AND/OR ABOVEGROUND UTILITIES INDICATED ON THE PLANS IS NOT REPRESENTED AS BEING ACCURATE, SUFFICIENT OR COMPLETE. NEITHER THE OWNER NOR THE ENGINEER ASSUMES ANY RESPONSIBILITY WHATEVER IN RESPECT TO ACCURACY, COMPLETENESS, OR SUFFICIENCY OF THE INFORMATION. THERE IS NO GUARANTEE EITHER EXPRESSED OR IMPLIED, THAT THE LOCATIONS, SIZE AND TYPE OF MATERIAL OF EXISTING UNDERGROUND UTILITIES INDICATED ARE REPRESENTATIVE OF THOSE TO BE ENCOUNTERED IN THE CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DETERMINE THE ACTUAL LOCATION OF ALL SUCH FACILITIES, INCLUDING SERVICE CONNECTIONS TO UNDERGROUND UTILITIES. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES OF HIS OPERATIONAL PLANS AND SHALL OBTAIN FROM THE RESPECTIVE UTILITY COMPANIES DETAILED INFORMATION AND ASSISTANCE RELATIVE TO THE LOCATION OF THEIR FACILITIES AND THE WORKING SCHEDULE OF THE COMPANIES FOR REMOVAL OR ADJUSTMENT WHERE REQUIRED. IN THE EVENT AN UNEXPECTED UTILITY INTERFERENCE IS ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE UTILITY COMPANY OF JURISDICTION. THE OWNER'S REPRESENTATIVE AND/OR THE RESIDENT ENGINEER SHALL ALSO BE IMMEDIATELY NOTIFIED. ANY DAMAGE TO SUCH MAINS AND SERVICES SHALL BE RESTORED TO SERVICE AT ONCE AND PAID FOR BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CONTRACT. ALL UTILITY CABLES AND LINES SHALL BE LOCATED BY THE RESPECTIVE UTILITY. **CONTACT JULIE (JOINT UTILITY LOCATION INFORMATION FOR EXCAVATORS) FOR UTILITY INFORMATION, PHONE: 1-800-892-0123.** CONTACT THE FAA (FEDERAL AVIATION ADMINISTRATION) FOR ASSISTANCE IN LOCATING FAA CABLES AND UTILITIES. LOCATION OF FAA POWER, CONTROL AND COMMUNICATION CABLES SHALL BE COORDINATED WITH AND/OR LOCATED BY THE FAA. ALSO CONTACT AIRPORT DIRECTOR/MANAGER AND AIRPORT PERSONNEL FOR ASSISTANCE IN LOCATING UNDERGROUND AIRPORT CABLES AND/OR UTILITIES. ALSO COORDINATE WORK WITH ALL ABOVE GROUND UTILITIES.
32. WHEN PREPARING CABLE FOR SPLICES, THE CONTRACTOR SHALL USE A CABLE STRIPPER/PENCILLER WHENEVER CABLE CONNECTIONS ARE MADE.

GROUNDING NOTES FOR AIRFIELD LIGHTING

1. GROUNDING FOR RUNWAY LIGHTS, TAXIWAY LIGHTS, AND LIGHTED TAXI GUIDANCE SIGNS SHALL BE AS DETAILED ON THE PLANS AND AS SPECIFIED HEREIN. PER FAA AC 150/5340-30D DESIGN AND INSTALLATION DETAILS FOR AIRPORT VISUAL AIDS, CHAPTER 12, PART 12.6; A SAFETY GROUND MUST BE INSTALLED AT EACH LIGHT FIXTURE. THE PURPOSE OF THE SAFETY GROUND IS TO PROTECT PERSONNEL FROM POSSIBLE CONTACT WITH AN ENERGIZED LIGHT BASE OR MOUNTING STAKE AS THE RESULT OF A SHORTED CABLE OR ISOLATION TRANSFORMER. A SAFETY GROUND SHALL BE INSTALLED AT EACH TRANSFORMER BASE/LIGHT CAN ASSOCIATED WITH RUNWAY LIGHTS, TAXIWAY LIGHTS, AND LIGHTED TAXI GUIDANCE SIGNS. A SAFETY GROUND SHALL ALSO BE INSTALLED AT EACH STAKE MOUNTED LIGHT FIXTURE. THE SAFETY GROUND SHALL BE A #6 AWG BARE COPPER CONDUCTOR CONNECTED TO THE GROUND LUG ON THE RESPECTIVE L-867 TRANSFORMER BASE/LIGHT CAN OR MOUNTING STAKE AND A 5/8-INCH DIAMETER BY 8-FOOT LONG (MINIMUM) UL LISTED COPPER CLAD GROUND ROD. CONNECTIONS TO GROUND LUGS ON THE L-867 TRANSFORMER BASE/LIGHT CAN OR MOUNTING STAKE SHALL BE WITH A UL LISTED GROUNDING CONNECTOR. CONNECTIONS TO GROUND RODS SHALL BE MADE WITH EXOTHERMIC WELD TYPE CONNECTORS, CADWELD BY ERICO PRODUCTS, INC., SOLON, OHIO, (PHONE: 800-248-9353), THERMOWELD BY CONTINENTAL INDUSTRIES, INC., TULSA, OKLAHOMA (PHONE: 918-663-1440) OR ULTRAWELD BY HARGER, GRAYSLAKE, ILLINOIS (PHONE: 800-842-7437). EXOTHERMIC WELD CONNECTIONS SHALL BE INSTALLED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S DIRECTIONS USING MOLDS AS REQUIRED FOR EACH RESPECTIVE APPLICATION. BOLTED CONNECTIONS WILL NOT BE PERMITTED AT GROUND RODS. TOP OF GROUND RODS SHALL BE BURIED 12 INCHES MINIMUM BELOW GRADE, UNLESS SPECIFIED OTHERWISE HEREIN, FOR RESPECTIVE APPLICATIONS.
2. CLEAN ALL METAL SURFACES BEFORE MAKING GROUND CONNECTIONS. METALLIC SURFACES TO BE JOINED SHALL BE PREPARED BY THE REMOVAL OF ALL NON-CONDUCTIVE MATERIAL PER 2008 NATIONAL ELECTRICAL CODE ARTICLE 250-12.
3. PER FAA 150/5340-30D THE RESISTANCE TO GROUND OF THE RESPECTIVE MOUNTING STAKE OR LIGHT BASE (WITH GROUND ROD CONNECTED) MUST BE 25 OHMS OR LESS.

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**CARMi MUNICIPAL AIRPORT
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REPLACE MIRLS, MITLS,
 VADIS, REILS,
 BEACON & VAULT
 ELECTRICAL NOTES
 SHEET 2

ELECTRICAL LEGEND - ONE-LINE DIAGRAM	
	CABLE TERMINATOR/LUG
	TRANSFORMER
	DISCONNECT SWITCH
	FUSIBLE DISCONNECT SWITCH
	CIRCUIT BREAKER
	THERMAL MAGNETIC CIRCUIT BREAKER
	FUSE
	TRANSIENT VOLTAGE SURGE SUPPRESSOR OR SURGE PROTECTOR DEVICE
	GROUND - GROUND ROD, GROUNDING ELECTRODE, OR AT EARTH POTENTIAL
	INDICATING LIGHT
	MOTOR
	LOAD, MOTOR, # = HORSEPOWER
	ELECTRIC UTILITY METER BASE
	JUNCTION BOX WITH SPLICE
	EQUIPMENT, XXX = DEVICE DESCRIPTION
	GROUND BUS OR TERMINAL
	NEUTRAL BUS
	PANELBOARD WITH MAIN LUGS
	PANELBOARD WITH MAIN BREAKER
	FUSE PANEL WITH MAIN FUSE PULLOUT
	DUPLEX RECEPTACLE 120V SINGLE PHASE GROUNDING TYPE
	CONTROL STATION
	TRANSFER SWITCH
	ENGINE GENERATOR SET

ELECTRICAL LEGEND - SCHEMATIC	
	NORMALLY OPEN (N.O.) CONTACT
	NORMALLY CLOSED (N.C.) CONTACT
	STARTER COIL, * = STARTER NUMBER
	OVERLOAD RELAY CONTACT
	CONTROL RELAY, * = CONTROL RELAY NUMBER
	RELAY, * = RELAY NUMBER
	TOGGLE SWITCH / 2 POSITION SWITCH
	2-POSITION SELECTOR SWITCH
	3-POSITION SELECTOR SWITCH (H-O-A SHOWN)
	2 POLE DISCONNECT SWITCH
	3 POLE DISCONNECT SWITCH
	PHOTOCELL
	TERMINAL BLOCK, * = TERMINAL NUMBER
	DEVICE TERMINAL, * = DEVICE TERMINAL NUMBER
	INTERNAL PANEL WIRING
	FIELD WIRING
	FUSE
	GROUND BUS OR TERMINAL
	NEUTRAL BUS
	GROUND, GROUND ROD, GROUND BUS
	INDUSTRIAL CONTROL RELAY OR LIGHTING CONTACTOR
	S1 CUTOUT HANDLE REMOVED
	S1 CUTOUT HANDLE INSERTED
	N.O. THERMAL SWITCH
	N.C. THERMAL SWITCH
	L-830 SERIES ISOLATION TRANSFORMER

ELECTRICAL ABBREVIATIONS	
A.F.F.	ABOVE FINISHED FLOOR
A, AMP	AMPERES
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CR	CONTROL RELAY
CU	COPPER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
EM	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
EP	EXPLOSION PROOF
ES	EMERGENCY STOP
ETL	INTERTEK - ELECTRICAL TESTING LABS
ETM	ELAPSE TIME METER
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GRSC	GALVANIZED RIGID STEEL CONDUIT
HID	HIGH INTENSITY DISCHARGE
HOA	HAND OFF AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
J	JUNCTION BOX
KVA	KILOVOLT AMPERE(S)
KW	KILOWATTS
LC	LIGHTING CONTACTOR
LTFMC	LIQUID TIGHT FLEXIBLE METAL CONDUIT (UL LISTED)
LTG	LIGHTING
LP	LIGHTING PANEL
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCM	THOUSAND CIRCUAR MIL
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MH	METAL HALIDE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
NEC	NATIONAL ELECTRICAL CODE (NFPA 70)
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OHE	OVERHEAD ELECTRIC
OL	OVERLOAD

ELECTRICAL ABBREVIATIONS (CONTINUED)	
PB	PULL BOX
PC	PHOTO CELL
PDB	POWER DISTRIBUTION BLOCK
PNL	PANEL
RCPT	RECEPTACLE
R	RELAY
S	STARTER
SPD	SURGE PROTECTION DEVICE
SPST	SINGLE POLE SINGLE THROW
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
UL	UNDERWRITER'S LABORATORIES
V	VOLTS
W/	WITH
W/O	WITHOUT
WP	WEATHER PROOF
XFER	TRANSFER
XFMR	TRANSFORMER

AIRPORT EQUIPMENT/FACILITY ABBREVIATIONS	
ASOS	AUTOMATED SURFACE OBSERVING SYSTEM
ATCT	AIR TRAFFIC CONTROL TOWER
AWOS	AUTOMATED WEATHER OBSERVING SYSTEM
CCR	CONSTANT CURRENT REGULATOR
DME	DISTANCE MEASURING EQUIPMENT
FAR	FEDERAL AVIATION REGULATION
GS	GLIDE SLOPE FACILITY
HIRL	HIGH INTENSITY RUNWAY LIGHT
ILS	INSTRUMENT LANDING SYSTEM
IM	INNER MARKER
LIR	LOW IMPACT-RESISTANT
LOC	LOCALIZER FACILITY
MALS	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RUNWAY ALIGNMENT INDICATING LIGHTS
MIRL	MEDIUM INTENSITY RUNWAY LIGHT
MITL	MEDIUM INTENSITY TAXIWAY LIGHT
NDB	NON-DIRECTIONAL BEACON
PAPI	PRECISION APPROACH PATH INDICATOR
PLASI	PULSE LIGHT APPROACH SLOPE INDICATOR
RAIL	RUNWAY ALIGNMENT INDICATING LIGHTS
REIL	RUNWAY END IDENTIFIER LIGHT
RVR	RUNWAY VISUAL RANGE
VADI	VISUAL APPROACH DESCENT INDICATOR
VASI	VISUAL APPROACH SLOPE INDICATOR
VOR	VERY HIGH FREQUENCY OMNIDIRECTIONAL RANGE FACILITY
WC	WIND CONE

NOTES:

- ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 70 - NATIONAL ELECTRICAL CODE (NEC) MOST CURRENT ISSUE IN FORCE, THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES, AND REQUIREMENTS IN FORCE. ANY INSTALLATIONS WHICH VOID THE U.L. LISTING, ETL LISTING (OR OTHER THIRD PARTY LISTING) AND/OR THE MANUFACTURER'S WARRANTY OF A DEVICE WILL NOT BE PERMITTED.
- ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
- COLOR CODE PHASE AND NEUTRAL CONDUCTOR INSULATION FOR NO. 6 AWG OR SMALLER. PROVIDE COLORED INSULATION OR COLORED MARKING TAPE FOR PHASE AND NEUTRAL CONDUCTORS FOR NO. 4 AWG AND LARGER. INSULATED GROUND CONDUCTORS SHALL HAVE GREEN COLORED INSULATION FOR ALL CONDUCTOR AWG AND/OR KCMIL TO COMPLY WITH NEC 250.119. NEUTRAL CONDUCTORS SHALL HAVE WHITE COLORED INSULATION FOR NO. 6 AWG AND SMALLER TO MEET THE REQUIREMENTS OF NEC 200.6. STANDARD COLORS FOR POWER WIRING AND BRANCH CIRCUITS SHALL BE AS FOLLOWS:

120/240 VAC, 1 PHASE, 3 WIRE

PHASE A	BLACK
PHASE B	RED
NEUTRAL	WHITE
GROUND	GREEN
- SEE RESPECTIVE SITE PLANS FOR SITE LEGEND INFORMATION.
- LTFMC DENOTES LIQUID TIGHT FLEXIBLE METAL CONDUIT UL LISTED, SUNLIGHT RESISTANT, & SUITABLE FOR GROUNDING. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LTFMC THAT IS NOT UL LISTED.

CONFIRM LTFMC BEARS THE UL LABEL PRIOR TO INSTALLATION.

REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

A.I.P. PROJ.: 3-17-0109-B8
IL PROJ.: CUL-3972

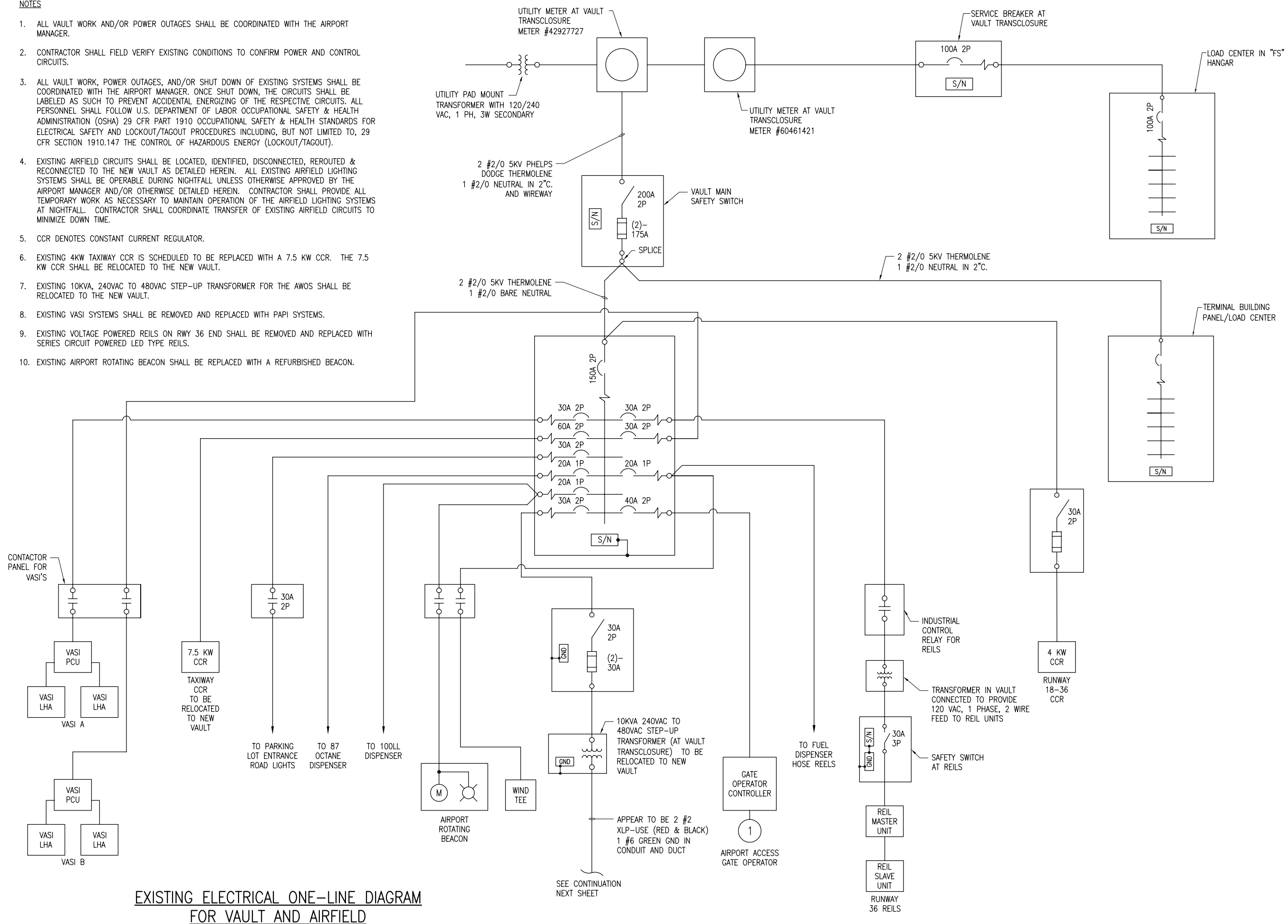
Hanson Proj. No.	09A0158D
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LAYOUT	KNL 06/05/2010
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REVIEWED	KNL/JSL 06/09/2010

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REPLACE MIRLS, MITLS, VADIS, REILS, BEACON & VAULT ELECTRICAL LEGEND AND ABBREVIATIONS

NOTES

1. ALL VAULT WORK AND/OR POWER OUTAGES SHALL BE COORDINATED WITH THE AIRPORT MANAGER.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS TO CONFIRM POWER AND CONTROL CIRCUITS.
3. ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
4. EXISTING AIRFIELD CIRCUITS SHALL BE LOCATED, IDENTIFIED, DISCONNECTED, REROUTED & RECONNECTED TO THE NEW VAULT AS DETAILED HEREIN. ALL EXISTING AIRFIELD LIGHTING SYSTEMS SHALL BE OPERABLE DURING NIGHTFALL UNLESS OTHERWISE APPROVED BY THE AIRPORT MANAGER AND/OR OTHERWISE DETAILED HEREIN. CONTRACTOR SHALL PROVIDE ALL TEMPORARY WORK AS NECESSARY TO MAINTAIN OPERATION OF THE AIRFIELD LIGHTING SYSTEMS AT NIGHTFALL. CONTRACTOR SHALL COORDINATE TRANSFER OF EXISTING AIRFIELD CIRCUITS TO MINIMIZE DOWN TIME.
5. CCR DENOTES CONSTANT CURRENT REGULATOR.
6. EXISTING 4KW TAXIWAY CCR IS SCHEDULED TO BE REPLACED WITH A 7.5 KW CCR. THE 7.5 KW CCR SHALL BE RELOCATED TO THE NEW VAULT.
7. EXISTING 10KVA, 240VAC TO 480VAC STEP-UP TRANSFORMER FOR THE AWOS SHALL BE RELOCATED TO THE NEW VAULT.
8. EXISTING VASI SYSTEMS SHALL BE REMOVED AND REPLACED WITH PAPI SYSTEMS.
9. EXISTING VOLTAGE POWERED REILS ON RWY 36 END SHALL BE REMOVED AND REPLACED WITH SERIES CIRCUIT POWERED LED TYPE REILS.
10. EXISTING AIRPORT ROTATING BEACON SHALL BE REPLACED WITH A REFURBISHED BEACON.



EXISTING ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD

REVISION	DATE

CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS

IL PROJ.: CUL-3972
 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No.	09A0158D
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REPLACE MRLS, MITLS, VADIS, REILS, BEACON & VAULT
 EXISTING ELECTRICAL ONE-LINE FOR VAULT AND AIRFIELD (SHEET 1)

JUN 24, 2010 9:46 AM HARR01115
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NOTES

1. ALL VAULT WORK AND/OR POWER OUTAGES SHALL BE COORDINATED WITH THE AIRPORT MANAGER.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS TO CONFIRM POWER AND CONTROL CIRCUITS.
3. ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
4. EXISTING AIRFIELD CIRCUITS SHALL BE LOCATED, IDENTIFIED, DISCONNECTED, REROUTED & RECONNECTED TO THE NEW VAULT AS DETAILED HEREIN. ALL EXISTING AIRFIELD LIGHTING SYSTEMS SHALL BE OPERABLE DURING NIGHTFALL UNLESS OTHERWISE APPROVED BY THE AIRPORT MANAGER AND/OR OTHERWISE DETAILED HEREIN. CONTRACTOR SHALL PROVIDE ALL TEMPORARY WORK AS NECESSARY TO MAINTAIN OPERATION OF THE AIRFIELD LIGHTING SYSTEMS AT NIGHTFALL. CONTRACTOR SHALL COORDINATE TRANSFER OF EXISTING AIRFIELD CIRCUITS TO MINIMIZE DOWN TIME.

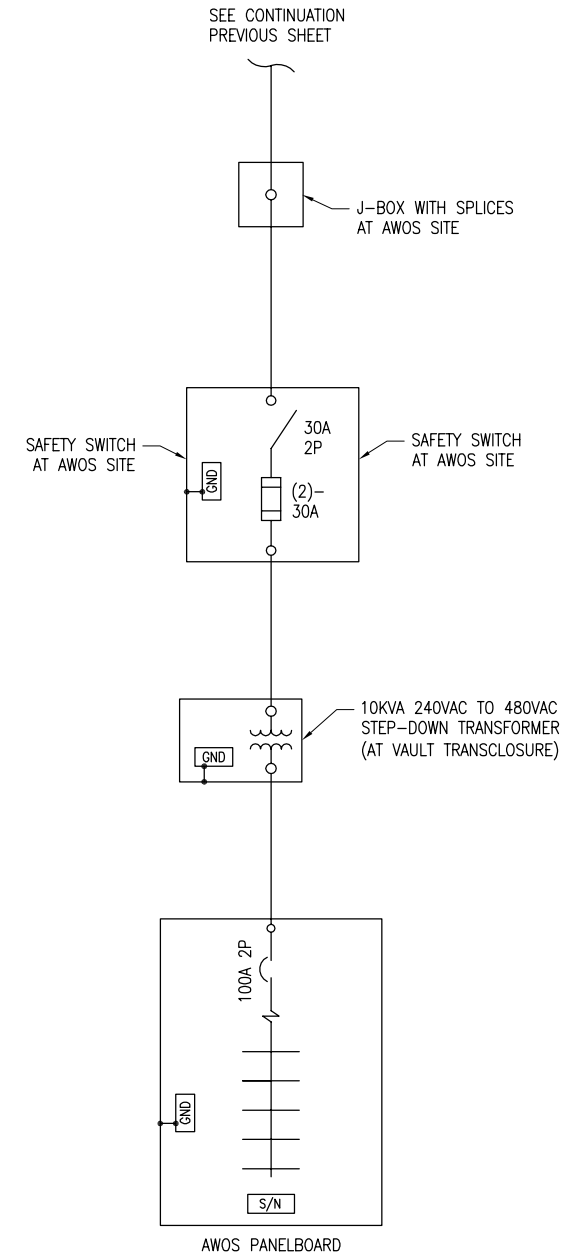
EXISTING VAULT LOAD CENTER						
CKT #	DUTY	SIZE		SIZE	DUTY	CKT #
1	VASI A	30A 2P		30A 2P	REIL	2
3						4
5	TAXIWAY CCR	60A 2P		30A 2P	VASI B	6
7						8
9	ENTRANCE ROAD LIGHTS	30A 2P		20A 1P	L-854 RADIO	10
11				20A 1P	(2 CKTS UNKNOWN)	12
13	87 OCTANE	20A 1P		20A 1P	ENT. RD LTG CONTACTOR PHOTOCELL	14
15	BEACON & 100 LL	20A 1P		20A 1P	HOSE REEL & WIND TEE	16
17	AWOS	30A 2P		30A 1P	(UNKNOWN)	18
19					BLANK	20
21	FEEDER TO	60A 2P		40A 2P	GATE OPERATOR	22
23	CONSTRUCTION TRAILER					24
25	BLANK				BLANK	26
27	BLANK				BLANK	28
29	BLANK				BLANK	30

S/N GND

150 AMP MAIN BKR CUTLER HAMMER, CLASS CTL PANELBOARD ISSUE NO. 7400, CUTLER HAMMER 120/240 VAC, 1PH 3W

NOTES

1. FIELD VERIFY TO CONFIRM EXISTING CIRCUITS.



EXISTING ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD (CONTINUED)

REVISION	DATE

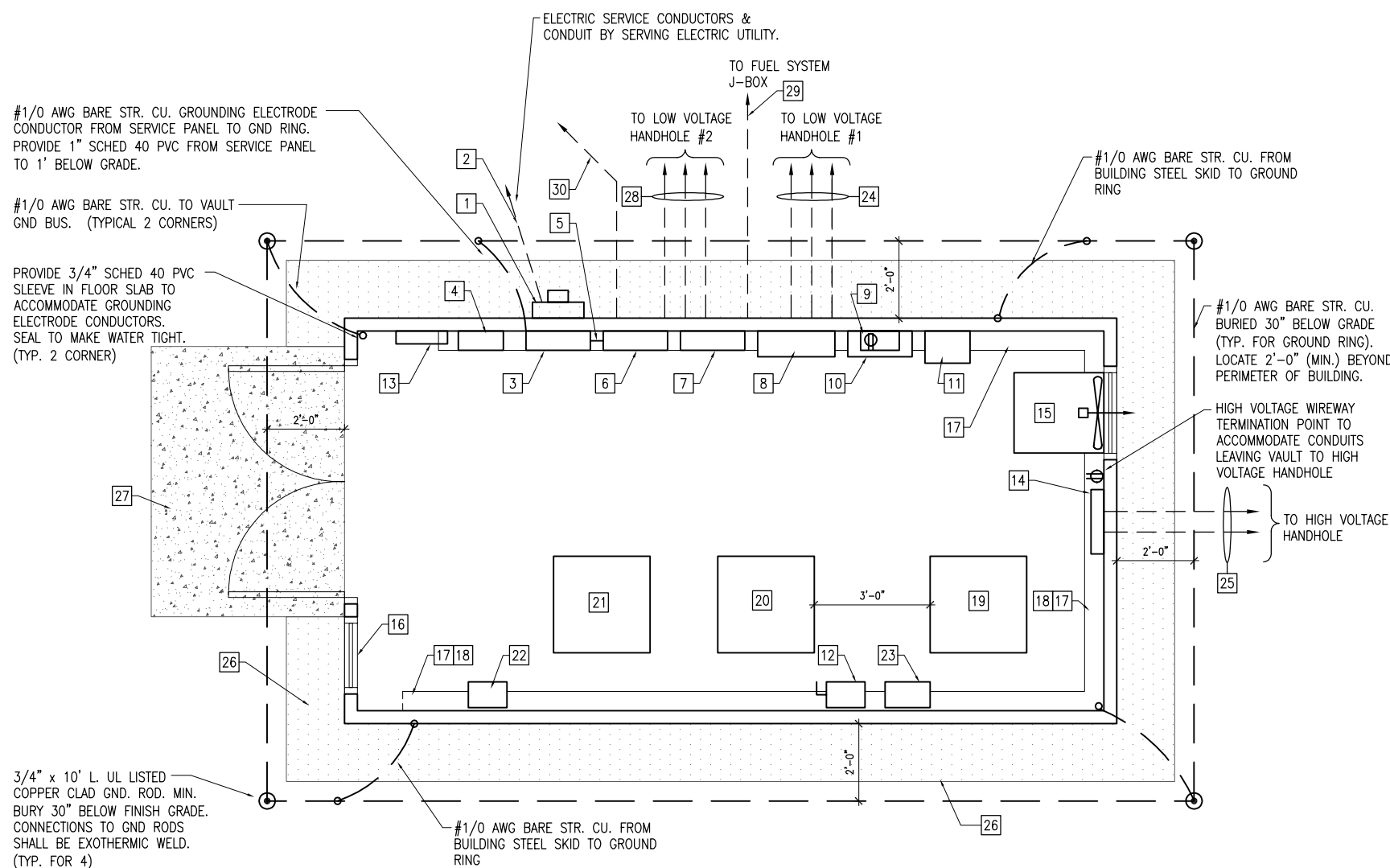
**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

A.I.P. PROJ.: 3-17-0109-B8
IL. PROJ.: CUL-3972

Hanson Proj. No. 09A0158D	File Name: E-601.DWG	Scale: NONE	Date: 06/24/10
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REPLACE MRLS, MITLS,
VADIS, REILS,
BEACON & VAULT
EXISTING ELECTRICAL
ONE-LINE FOR VAULT AND
AIRFIELD (SHEET 2)



VAULT ELECTRICAL EQUIPMENT PLAN
 SCALE 1/2"=1'-0"
 1 0 2 4 FEET

GENERAL NOTES

- SEE "NEW VAULT ELECTRICAL ONE LINE DIAGRAM" FOR LOW VOLTAGE INPUT POWER WIRING REQUIREMENTS TO CCR'S (CONSTANT CURRENT REGULATORS). SEE "HIGH VOLTAGE WIRING SCHEMATIC" FOR CCR OUTPUT WIRING REQUIREMENTS. SEE "AIRFIELD LIGHTING WIRING SCHEMATIC" FOR CCR CONTROL WIRING REQUIREMENTS. PROVIDE 5 FEET MINIMUM CLEAR WORKING SPACE IN FRONT OF EACH CCR AND EACH SERIES PLUG CUTOUT.
- CONSTANT CURRENT REGULATORS AND THEIR RESPECTIVE SERIES PLUG CUTOUTS SHALL BE CLEARLY LABELED TO IDENTIFY THE RESPECTIVE REGULATOR DESIGNATION, RUNWAY OR TAXIWAY SERVED, POWER SOURCE OR CIRCUIT, AND VOLTAGE SYSTEM.
- SEE ELEVATION VIEWS FOR ADDITIONAL INFORMATION ON PROPOSED EQUIPMENT LAYOUTS.
- COORDINATE CONDUIT & SLEEVE ENTRANCES THROUGH FLOOR SLAB AND WALLS.

KEYED NOTES

- ELECTRIC UTILITY METER WITH SUPPORT HARDWARE PER SERVING ELECTRIC UTILITY COMPANY REQUIREMENTS.
- UTILITY SERVICE CONDUCTORS IN CONDUIT FROM UTILITY TRANSFORMER TO METER BASE BY UTILITY. CONTRACTOR SHALL FURNISH & INSTALL SERVICE CONDUCTORS & CONDUIT FROM METER BASE TO SERVICE PANEL. SEE "NEW VAULT ELECTRICAL ONE LINE DIAGRAM".
- SERVICE PANEL A, SEE PANEL A SCHEDULE.
- AC SURGE PROTECTOR/TVSS, SEE "NEW VAULT ELECTRICAL ONE LINE DIAGRAM."
- 2 #1/0 THWN, 1 #1/0 THWN NEUTRAL, 1 #4 GND IN 2" GRSC FROM SERVICE PANEL A TO PANEL B.
- PANEL B, SEE PANEL B SCHEDULE.
- FUEL SYSTEM PANEL C, SEE PANEL C SCHEDULE
- LIGHTING CONTACTOR PANEL. SEE AIRFIELD LIGHTING WIRING SCHEMATIC AND LIGHTING CONTACTOR PANEL DETAIL.
- L-854 RADIO CONTROL UNIT. EXTEND RADIO ANTENNA CABLE AND MOUNT ANTENNA ON THE EXISTING TOWER FOR PROPER OPERATION.
- RADIO RELAY INTERFACE PANEL WITH PHOTOCELL BYPASS SWITCH FOR AIRFIELD LIGHTING SYSTEM. SEE AIRFIELD LIGHTING WIRING SCHEMATIC FOR WIRING REQUIREMENTS. MOUNT PHOTOCELL ON ROOF. FIELD VERIFY LOCATION FOR PROPER CONTROL AND OPERATION.
- RELOCATED STEP-UP TRANSFORMER FOR AWOS
- 100AMP, 240VAC, 2P DOUBLE THROW NOT FUSIBLE SAFETY SWITCH FOR CCR'S.
- ELECTRIC WALL HEATER EH-1, 3000 WATT, 240 VAC, 1 PHASE, SUITABLE FOR SURFACE MOUNTING WITH INTEGRAL THERMOSTAT, Q-MARK MODEL CWH3407, OR EQUAL. HEATER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, & THE "BUY AMERICAN ACT"
- ELECTRIC WALL HEATER EH-2 2000 WATT, 240 VAC, 1 PHASE, SUITABLE FOR SURFACE MOUNTING WITH INTEGRAL THERMOSTAT, Q-MARK MODEL CWH3404 OR APPROVED EQUAL. HEATER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, & "BUY AMERICAN ACT". BOTTOM OF HEATER SHALL BE 3" (MIN.) ABOVE THE UPPER ELECTRICAL WIREWAY. COORDINATE WITH CCR INSTALLATION & FAN INSTALLATION. LOCATE HEATER ON WALL SUCH THAT IT IS NOT DIRECTLY BEHIND CCR.
- EXHAUST FAN EF-1, 2000 CFM AT .25" STATIC PRESSURE WITH 1/3 HP, 120 VAC MOTOR, COOK MODEL 18S10D, OR APPROVED EQUAL. INCLUDE WALL HOUSING WITH GUARD, GRAVITY BACK DRAFT DAMPER, ALUMINUM WEATHER-HOOD PAINTED TO MATCH BUILDING EXTERIOR, STAINLESS STEEL INSECT SCREEN, AND FRACTIONAL HP ELECTRICAL DISCONNECT. INSTALL FAN AS HIGH AS POSSIBLE. PROVIDE 120 VAC THERMOSTAT, AT 48" AFF. SEE EXHAUST FAN CONTROL SCHEMATIC FOR WIRING REQUIREMENTS. FAN SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, & THE "BUY AMERICAN ACT".
- INTAKE LOUVER L-1, 24" WIDE BY 48" HIGH INTAKE LOUVER WITH STAINLESS INSECT SCREEN. 120 VAC MOTORIZED DAMPER DWITH LIMIT SWITCH, KYNAR FINISH MATCHING BUILDING EXTERIOR, RUSKIN MODEL ELF375DX, OR APPROVED EQUAL. SEE EXHAUST FAN CONTROL SCHEMATIC FOR WIRING REQUIREMENTS. LOUVER / DAMPER SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT, & THE "BUY AMERICAN ACT".
- 6" BY 6" LOW VOLTAGE WIREWAY. LABEL "LOW VOLTAGE" EVERY 4 FEET. INSTALL ABOVE HIGH VOLTAGE WIREWAY.
- 6" BY 6" HIGH VOLTAGE WIREWAY. LABEL "HIGH VOLTAGE" EVERY 4 FEET. INSTALL BELOW LOW VOLTAGE WIREWAY.
- RUNWAY 18-36 CONSTANT CURRENT REGULATOR. SEE GENERAL NOTE 1.
- BACKUP/SPARE CONSTANT CURRENT REGULATOR FOR RUNWAY 18-36. SEE GENERAL NOTE 1.
- TAXIWAY CONSTANT CURRENT REGULATOR. SEE GENERAL NOTE 1.
- SERIES PLUG CUTOUT TYPE S-1 WITH ENCLOSURE. SEE GENERAL NOTES 1 AND 2.
- TRANSFER PAIR SERIES PLUG CUTOUTS (TYPE S-1) WITH ENCLOSURE, FOR RUNWAY 18-36. SEE GENERAL NOTES 1 & 2.
- 3-4" GRSC FROM LOW VOLTAGE WIREWAY TO LOW VOLTAGE HANDHOLE #1
- 2-4" GRSC FROM HIGH VOLTAGE WIREWAY TO HIGH VOLTAGE HANDHOLE.
- VEGETATION BARRIER CONSISTING OF A MIN. 3" PEA GRAVEL SURFACE OVER FILTER OR LANDSCAPING FABRIC. PROPOSED SURFACE TREATMENT WILL COVER ENTIRE AREA BENEATH VAULT STRUCTURE AS WELL AS 18" AROUND THE PERIMETER OF THE BUILDING EDGE. THE STONE AND FABRIC AS WELL AS ANY EQUIPMENT AND LABOR REQUIRED TO COMPLETE THIS TASK WILL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE PROPOSED ELECTRICAL VAULT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.
- ENTRANCE PAD CONSTRUCTED OF 6" CONCRETE SLAB W/6X6-W5XW5 WELDED WIRE FABRIC ON A COMPACTED SUBGRADE. MINIMUM DIMENSIONS OF PAD WILL BE 7'Wx5'Dx6"H, SLOPED AT A MIN. OF 0.5"/FT AWAY FROM THE VAULT ENTRANCE. PCC USED TO CONSTRUCT THE PAD WILL CONFORM TO ITEM 610. ALL MATERIALS, LABOR AND EQUIPMENT USED TO CONSTRUCT THE PAD INCLUDING ANY GRADING REQUIRED WILL BE CONSIDERED INCIDENTAL TO THE CONSTRUCTION OF THE PROPOSED ELECTRICAL VAULT AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED.
- 3-4" SCHEDULE 40 PVC DUCTS WITH 3-4" GRSC ELBOWS AT VAULT FROM LOW VOLTAGE WIREWAY TO LOW VOLTAGE HANDHOLE #2
- FUEL SYSTEM CIRCUITS IN 1" GRSC TO JUNCTION / SPLICE BOX.
- RADIO RECEIVER ANTENNA CABLE IN 3/4" GRSC TO ANTENNA ON TOWER. PROVIDE ADEQUATE RADIO CABLE LENGTH TO AVOID SPLICES.

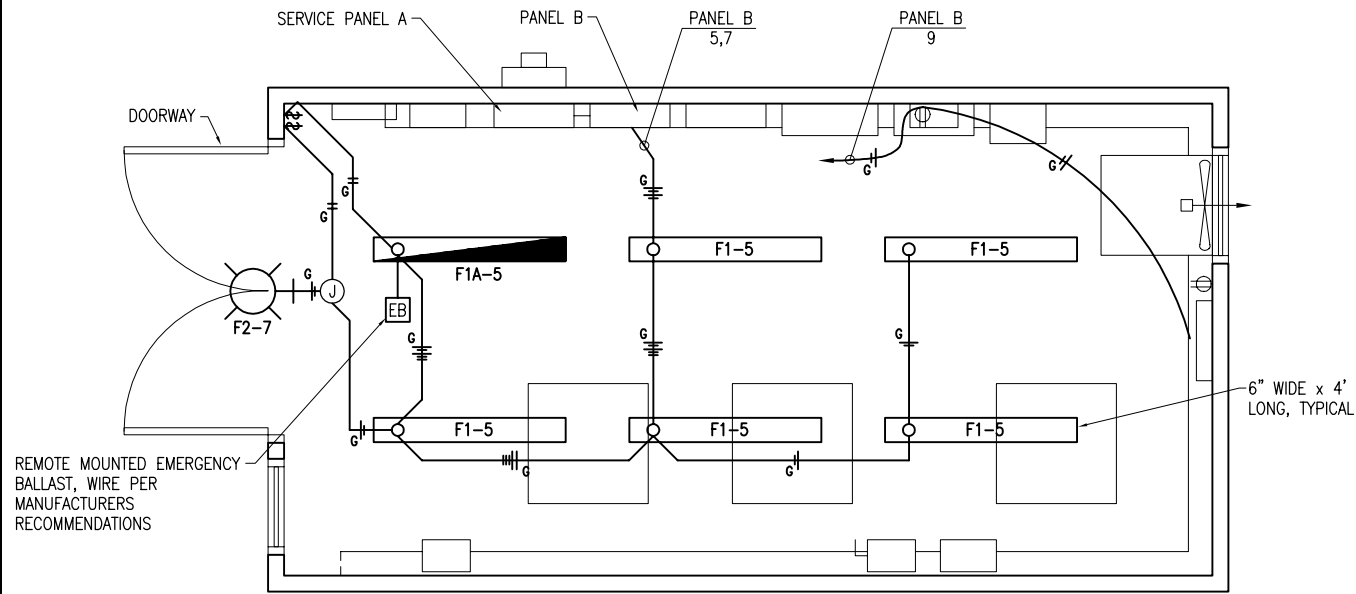
REVISION	DATE

**CARMI MUNICIPAL AIRPORT
 CARMI, ILLINOIS**
 I.L. PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No. 09A0158D	File Name: EP-101.DWG	Scale: AS SHOWN	Date: 06/24/10
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REPLACE MIRLS, MITLS,
 VADIS, REILS,
 BEACON & VAULT
 PROPOSED AIRPORT
 VAULT
 EQUIPMENT PLAN



REMOTE MOUNTED EMERGENCY BALLAST, WIRE PER MANUFACTURERS RECOMMENDATIONS



VAULT LIGHTING & RECEPTACLE PLAN

SCALE 1/2"=1'-0"
 1 0 2 4 FEET

LIGHTING FIXTURE SCHEDULE						
FIXT. TYPE	DESCRIPTION	MANUFACTURER & CATALOG NO.	LAMPS/WATTS	VOLTS	MOUNTING	REMARKS
F1	4 FT. WET LOCATION LISTED ENCLOSED AND GASKETED INDUSTRIAL FLUORESCENT LIGHT FIXTURE, IMPACT RESISTANT, UV RESISTANT REINFORCED POLYESTER FIBERGLASS HOUSING, HIGH IMPACT ACRYLIC DIFFUSER, RAPID START COLD WEATHER 0 DEG. F. ELECTRONIC BALLAST WITH LESS THAN OR EQUAL TO 10% THD.	LITHONIA: DMW-2-32-AR-120-CW-GEB10RS-WLF-USBOM	2-32W T8 4100K 59 TOTAL INPUT WATTS	120	SURFACE TO HARD CEILING	PROVIDE WET LOCATION FITTINGS INSTALLED IN TOP OF FIXTURE.
F1A	SAME AS F1 EXCEPT PROVIDE AN EMERGENCY BALLAST CAPABLE OF OPERATING 2 LAMPS FOR 90 MINUTES AT 1100-1400 TOTAL LUMENS, BODINE #B50ST. NOTE BALLAST WILL HAVE TO BE REMOTE MOUNTED NEAR FIXTURE AS INDICATED ON THE PLANS.	LITHONIA: DMW-2-32-AR-120-CW-GEB10RS-WLF-USBOM	2-32W T8 4100K 59 TOTAL INPUT WATTS	120	SURFACE TO HARD CEILING	PROVIDE WET LOCATION FITTINGS INSTALLED IN TOP OF FIXTURE.
F2	COMPACT FLUORESCENT WALL-PAK, ONE PIECE INJECTION MOLDED UV STABILIZED POLYCARBONATE HOUSING, HIGH PERFORMANCE SPECULAR ANODIZED SEGMENTED REFLECTOR, ONE PIECE HIGH TEMPERATURE SILICONE GASKET, MEDIUM BRONZE FINISH, HIGH POWERFACTOR ELECTRONIC BALLAST WITH LESS THAN OR EQUAL TO 10% THD, UL LISTED FOR WET LOCATIONS, FUSED.	LITHONIA: TWA-42TRT-120-SF-CR-DMB-LPI-USBOM	1-42W TRT 4100K 47 TOTAL INPUT WATTS	120	SURFACE TO WALL ABOVE EXTERIOR DOOR APPROXIMATELY 4 INCHES ABOVE TOP OF DOOR FRAME.	CONNECT TO WALL SWITCH LOCATED ON THE INSIDE OF THE BUILDING.

NOTES

- 15 AMP & 20 AMP BRANCH CIRCUITS FOR LIGHTING & RECEPTACLES SHALL USE #12 AWG THWN (MIN.).
- LIGHT FIXTURES SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWINGS SUBMITTAL.

REVISION	DATE

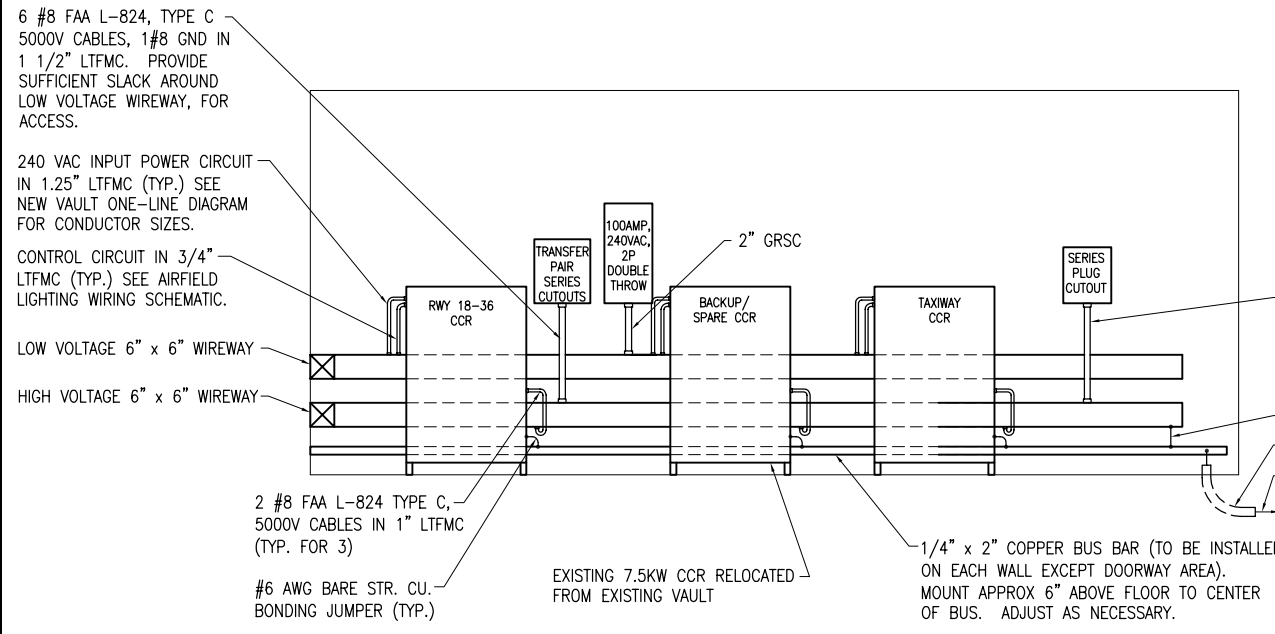
**CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS**

IL PROJ.: CUL-5972 A.I.P. PROJ.: 3-17-0109-B8

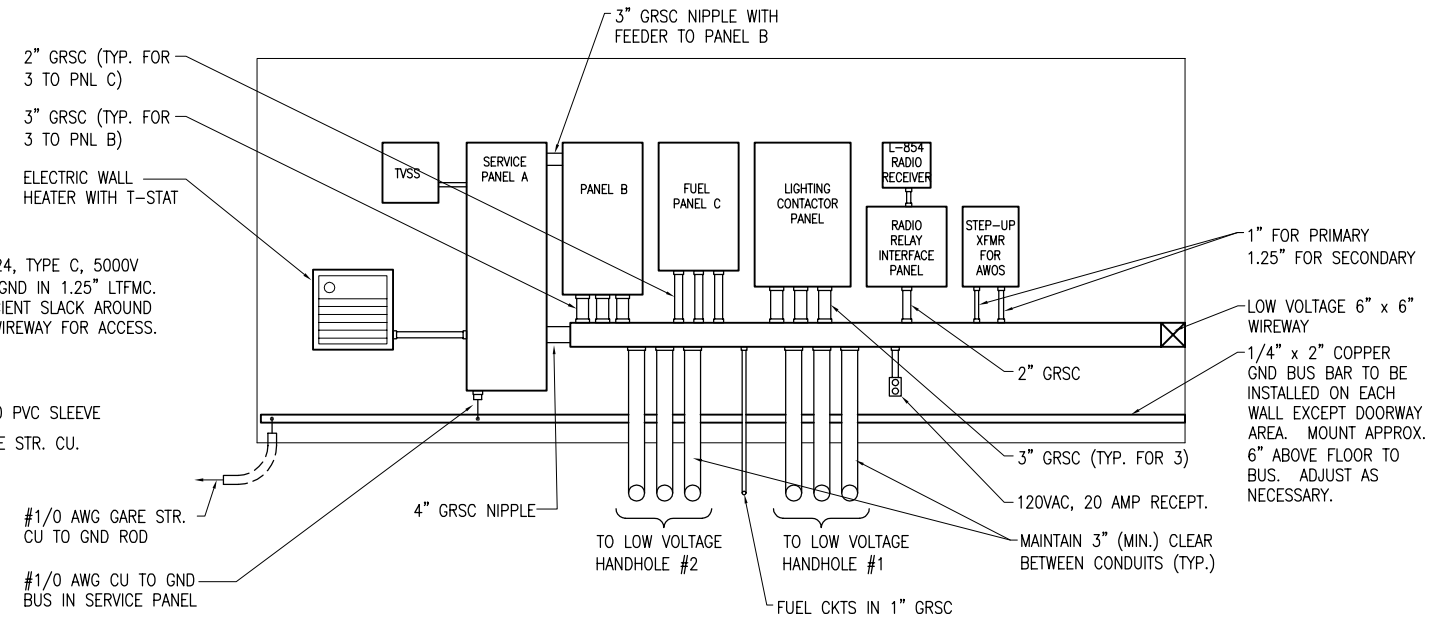
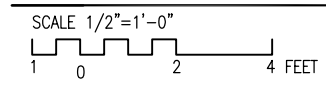
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DRAWN	CWS	06/02/10	
REVIEWED	JSL/KNL	06/09/10	

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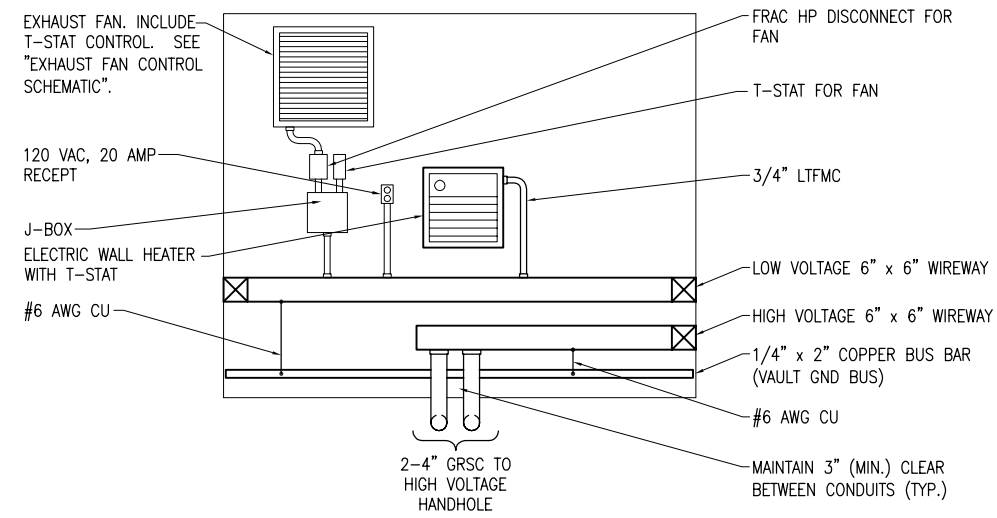
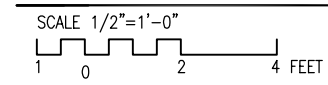
REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT
VAULT LIGHTING AND
RECEPTACLE PLAN



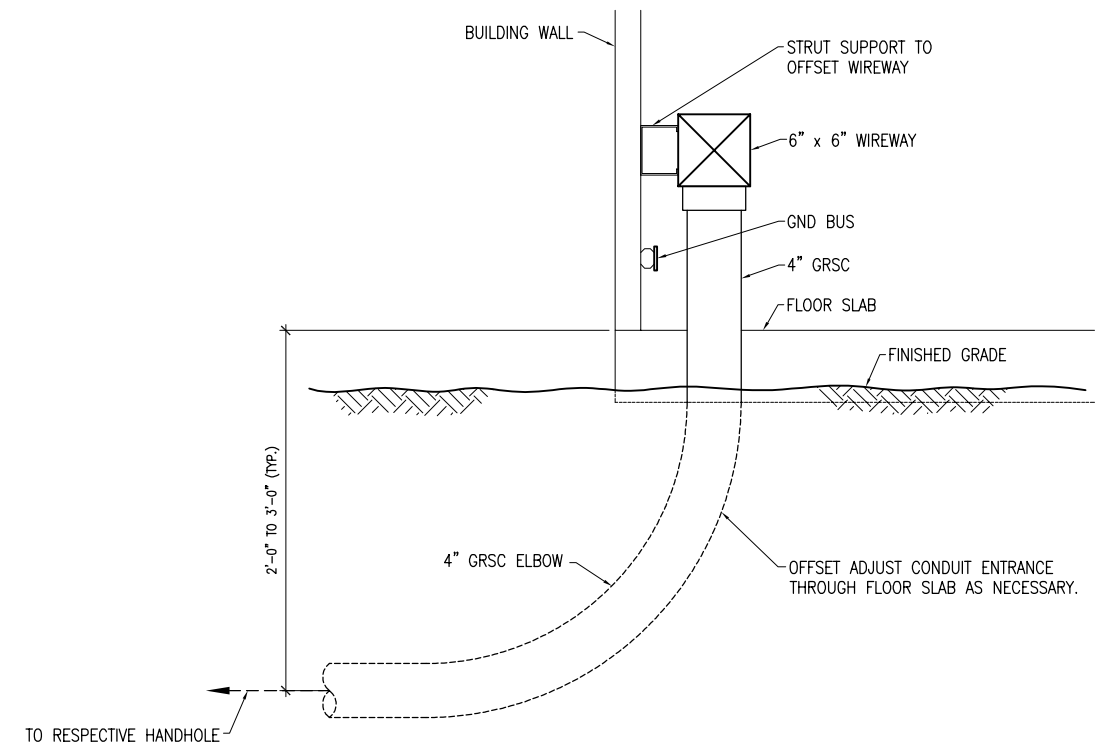
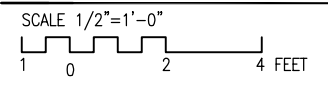
VAULT NORTH WALL ELEVATION



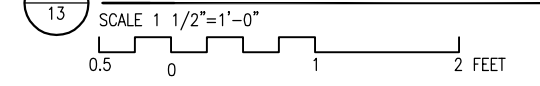
VAULT SOUTH WALL ELEVATION



VAULT EAST WALL ELEVATION



CONDUIT ENTRANCE DETAIL



REVISION	DATE

**CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS**

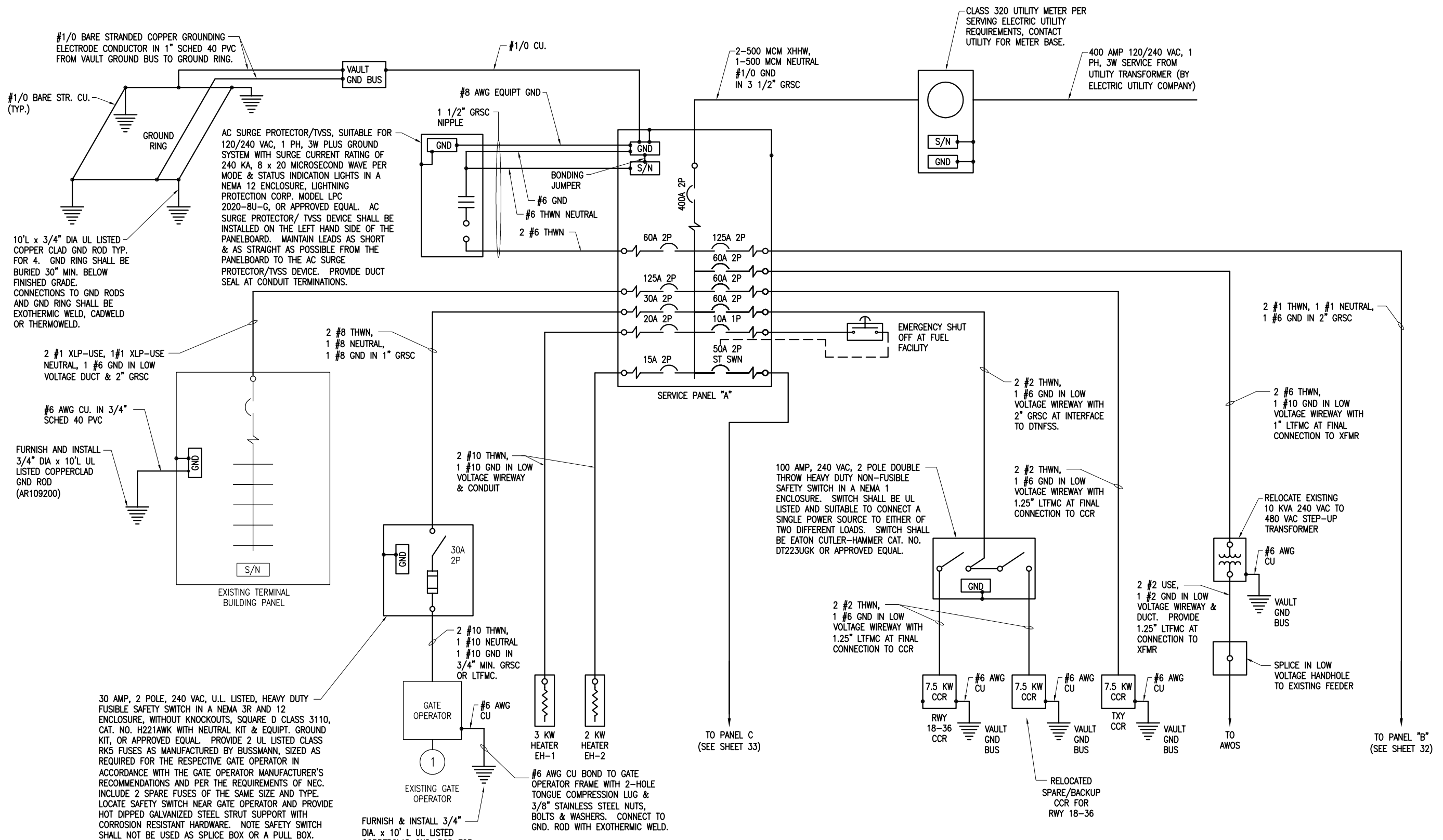
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PROPOSED AIRPORT
VAULT
WALL ELEVATIONS

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PROPOSED ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD

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CARMI MUNICIPAL AIRPORT CARMI, ILLINOIS

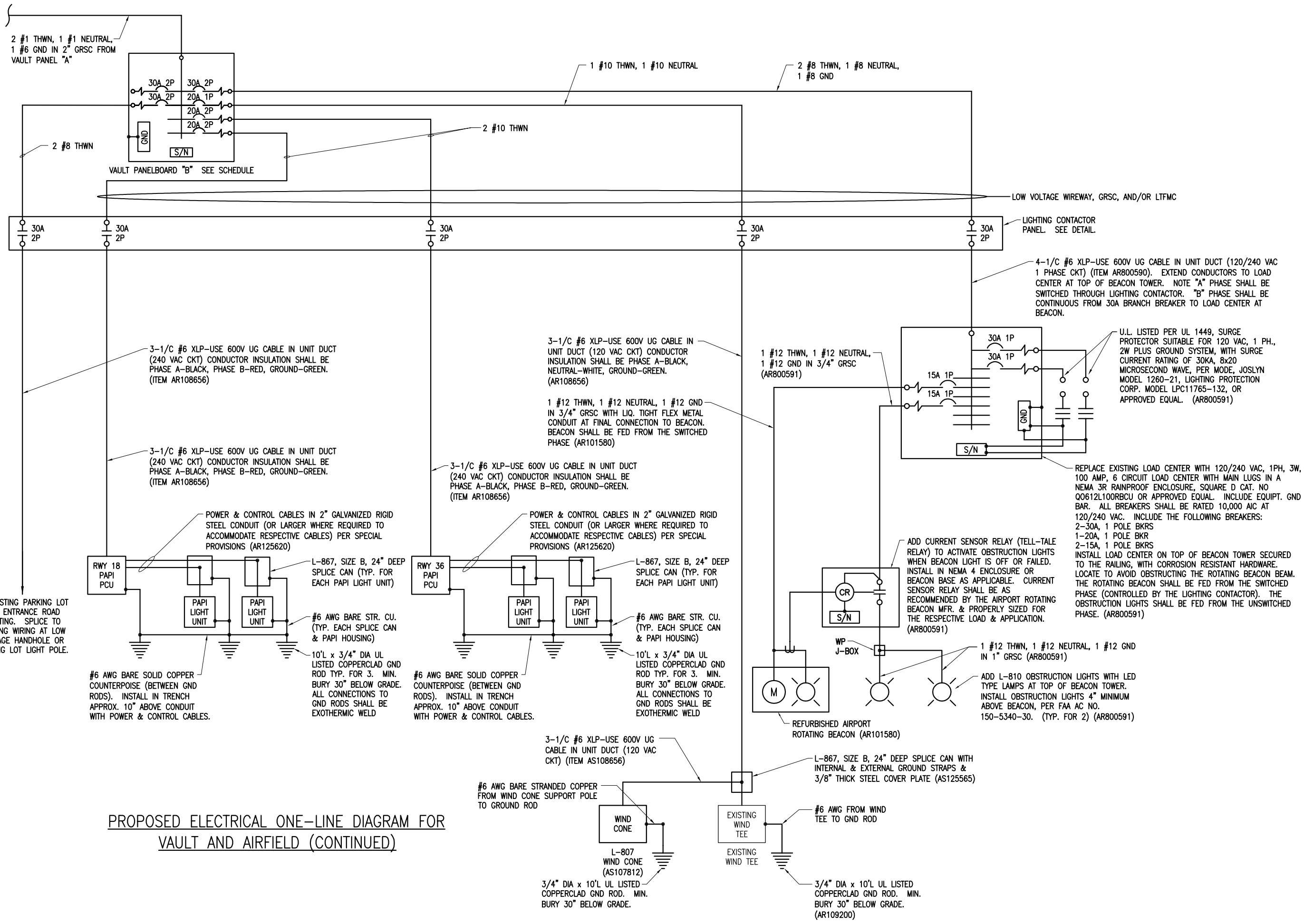
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Date	06/24/10
LAYOUT	KNL 05/17/10
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REVIEWED	KNL/JSL 06/09/10

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 PROPOSED ELECTRICAL ONE-LINE FOR VAULT AND AIRFIELD (SHEET 1)

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PROPOSED ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD (CONTINUED)

REVISION	DATE

CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS

IL. PROJ.: CUL-3972 A.I.P.: 3-17-0109-B8

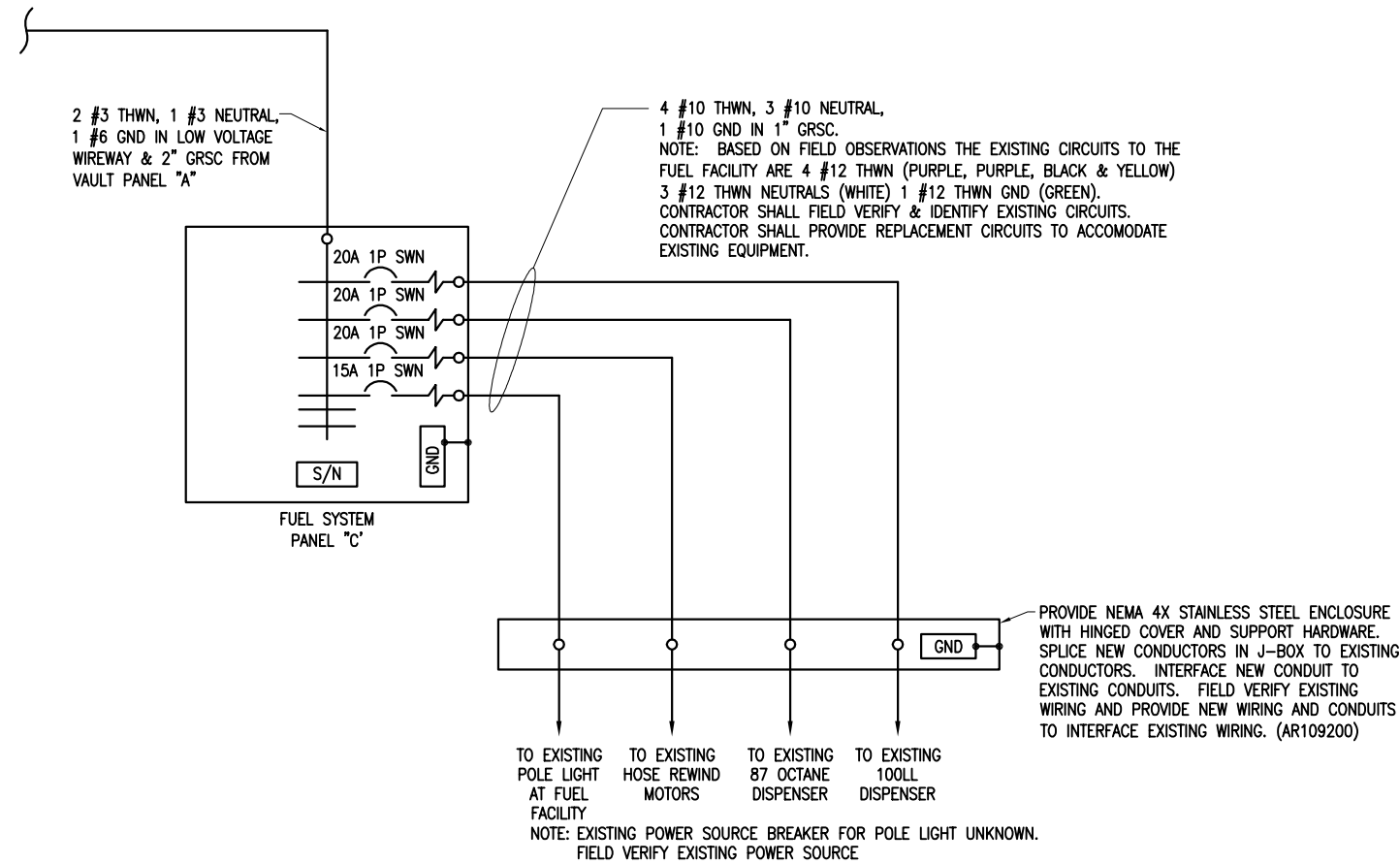
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LAYOUT KNL	05/17/10		
DRAWN MLH	05/20/10		
REVIEWED KNL/JSL	06/09/10		

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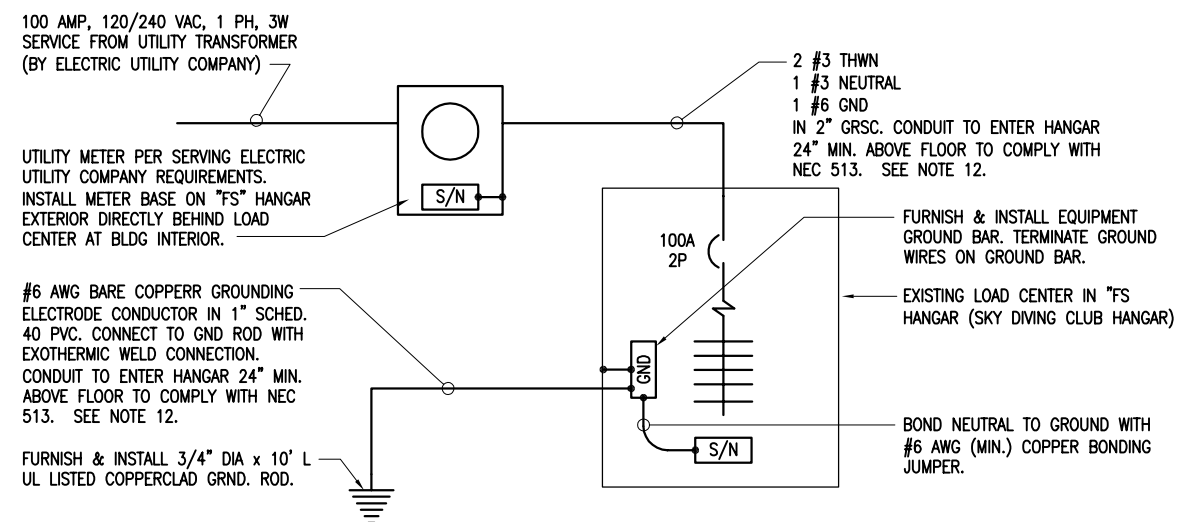
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PROPOSED ELECTRICAL ONE-LINE FOR VAULT AND AIRFIELD (SHEET 2)

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PROPOSED ELECTRICAL ONE-LINE DIAGRAM FOR VAULT AND AIRFIELD (CONTINUED)



PROPOSED ELECTRICAL ONE-LINE DIAGRAM FOR "FS" HANGAR

NOTES

- ALL VAULT WORK, POWER OUTAGES, AND/OR SHUT DOWN OF EXISTING SYSTEMS SHALL BE COORDINATED WITH THE AIRPORT MANAGER. ONCE SHUT DOWN, THE CIRCUITS SHALL BE LABELED AS SUCH TO PREVENT ACCIDENTAL ENERGIZING OF THE RESPECTIVE CIRCUITS. ALL PERSONNEL SHALL FOLLOW U.S. DEPARTMENT OF LABOR OCCUPATIONAL SAFETY & HEALTH ADMINISTRATION (OSHA) 29 CFR PART 1910 OCCUPATIONAL SAFETY & HEALTH STANDARDS FOR ELECTRICAL SAFETY AND LOCKOUT/TAGOUT PROCEDURES INCLUDING, BUT NOT LIMITED TO, 29 CFR SECTION 1910.147 THE CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT).
- ALL ELECTRICAL EQUIPMENT SHALL BE INSTALLED IN CONFORMANCE WITH NFPA 70 – NATIONAL ELECTRICAL CODE (NEC) MOST CURRENT ISSUE IN FORCE, THE RESPECTIVE EQUIPMENT MANUFACTURER'S DIRECTIONS AND ALL OTHER APPLICABLE LOCAL CODES, LAWS, ORDINANCES AND REQUIREMENTS IN FORCE. ANY INSTALLATIONS WHICH VOID THE U.L. LISTING, ETL LISTING, (OR OTHER THIRD PARTY LISTING) AND/OR THE MANUFACTURER'S WARRANTY OF A DEVICE WILL NOT BE PERMITTED.
- ALL EQUIPMENT NOT LABELED AS EXISTING IS NEW.
- BEACON FEEDER SHALL HAVE COLOR CODED INSULATION AS FOLLOWS:

120/240 VAC CIRCUITS	
PHASE A	BLACK
PHASE B	RED OR BLACK WITH RED TAPE
NEUTRAL	WHITE
GROUND	GREEN
- PROVIDE NEMA 4 HUBS FOR ALL CONDUIT ENTRIES INTO NEMA 4 RATED ENCLOSURES. PROVIDE NEMA 4 HUBS FOR ALL CONDUIT ENTRIES INTO THE NEMA 3R LOAD CENTER ENCLOSURE.
- INSTALL OBSTRUCTION LIGHTING ON AIRPORT ROTATING BEACON TOWER IN CONFORMANCE WITH FAA AC NO. 150/5340-30 AND FAA AC NO. 150/5370-10, ITEM L-101, INSTALLATION OF AIRPORT ROTATING BEACONS.
- ALL CONDUCTORS/WIRING SHALL BE COPPER.
- CONTRACTOR SHALL CONFIRM POWER REQUIREMENTS WITH THE ACTUAL NAMEPLATE ON EACH CONSTANT CURRENT REGULATOR (OR OTHER RESPECTIVE EQUIPMENT) AND ADJUST CIRCUIT BREAKER, WIRE SIZES & CONDUIT SIZES TO CONFORM WITH NEC & MANUFACTURER'S RECOMMENDATIONS WHERE APPLICABLE. WIRE SIZES SHOWN ON THE PLANS ARE MINIMUM.
- HIGH VOLTAGE & LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME WIREWAY, CONDUIT, HANDHOLE, JUNCTION BOX, OR RACEWAY.
- LTFMC DENOTES LIQUID TIGHT FLEXIBLE METAL CONDUIT UL LISTED, SUNLIGHT RESISTANT, & SUITABLE FOR GROUNDING. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LTFMC THAT IS NOT UL LISTED. CONFIRM LTFMC BEARS THE UL LABEL PRIOR TO INSTALLATION.
- ELECTRIC SERVICE WORK FOR "FS" HANGAR WILL BE PAID FOR UNDER ITEM AR109924 REPLACE ELECTRIC SERVICES PER LUMP SUM.
- PER NEC 513 THE ENTIRE AREA OF THE HANGAR INCLUDING ANY ADJACENT AND COMMUNICATION AREAS NOT SUITABLY CUT OFF FROM THE HANGAR, SHALL BE CLASSIFIED AS A CLASS 1, DIVISION 2 HAZARDOUS LOCATION UP TO A LEVEL 18 INCHES ABOVE THE FLOOR. PER NEC 513.3(C) "VICINITY OF AIRCRAFT", THE AREA WITHIN 5 FT. HORIZONTALLY FROM AIRCRAFT POWER PLANTS OR AIRCRAFT FUEL TANKS SHALL BE CLASSIFIED AS A CLASS 1, DIVISION 2 LOCATION THAT SHALL EXTEND UPWARD FROM THE FLOOR TO A LEVEL 5 FT. ABOVE THE UPPER SURFACE OF WINGS AND OF ENGINE ENCLOSURES. ALL ELECTRICAL INSTALLATIONS IN CLASSIFIED HAZARDOUS LOCATIONS SHALL BE AVOIDED UNLESS SPECIFICALLY APPROVED FOR SUCH LOCATIONS AND INSTALLED IN CONFORMANCE WITH NEC 500, 501 AND 513 AS WELL AS OTHER APPLICABLE CODES AND REQUIREMENTS.

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DATE	

CARMi MUNICIPAL AIRPORT
CARMi, ILLINOIS

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

Hanson Proj. No.	09A0158D	DATE	06/24/10
Filename	E-602.DWG	LAYOUT	KNL 05/17/10
Scale	NONE	DRAWN	MLH 05/20/10
Date	06/24/10	REVIEWED	KNL/JSL 06/09/10

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PROPOSED ELECTRICAL
ONE-LINE FOR VAULT AND
AIRFIELD (SHEET 3)

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DATE	

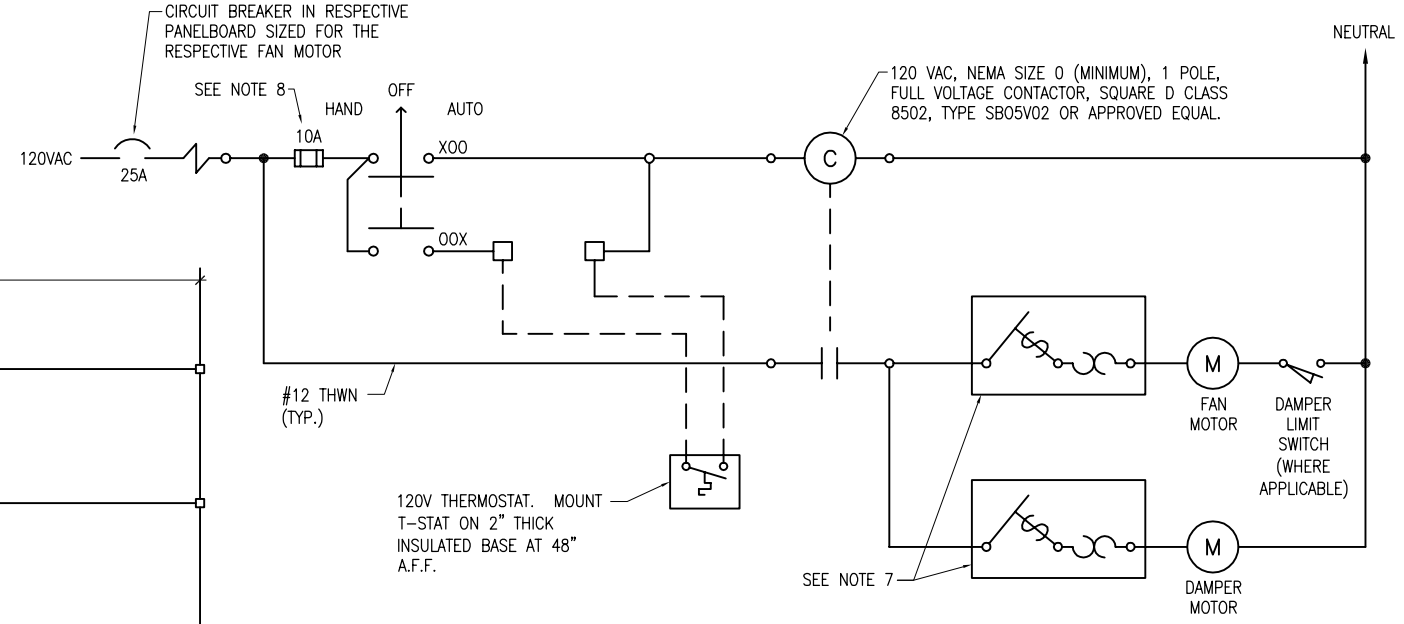
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CARMi, ILLINOIS

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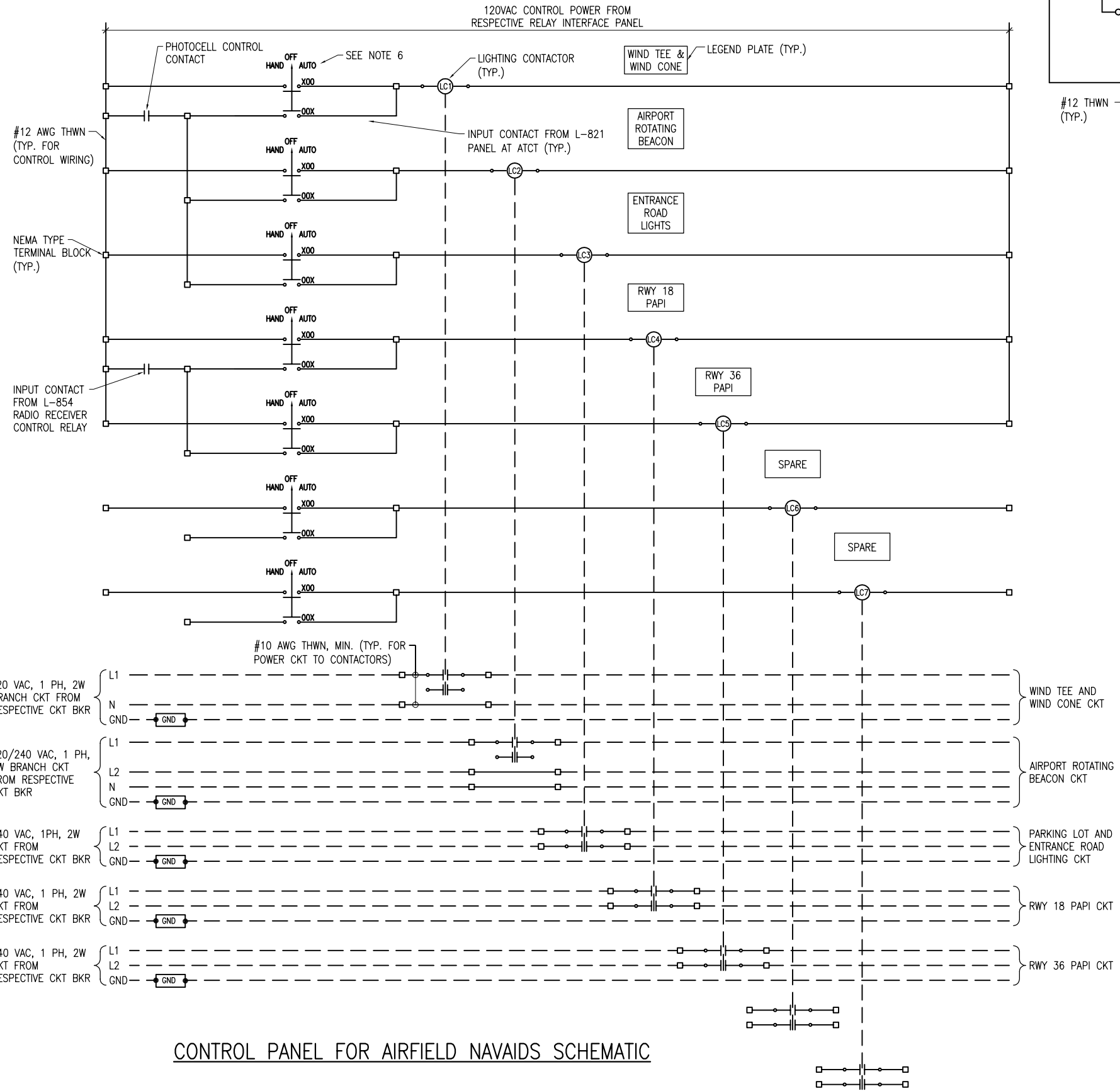
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LIGHTING CONTACTOR
SCHEMATIC



EXHAUST FAN CONTROL SCHEMATIC

- NOTES
- 15 AMP & 20 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #10 AWG COPPER THWN FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR/RELAY PANEL. 25 AMP AND 30 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #8 AWG COPPER THWN (MIN.) FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR/RELAY PANEL.
 - INPUT CONTROL CIRCUITS SHALL BE #12 AWG COPPER THWN.
 - FOR 120 VAC BRANCH CIRCUITS THE NEUTRAL CONDUCTOR SHALL NOT BE SWITCHED THROUGH THE RELAY CONTACTS. USE TERMINAL BLOCKS TO TRANSITION FROM VAULT BRANCH CIRCUIT WIRING TO FIELD WIRING.
 - THE AIRPORT ROTATING BEACON CIRCUIT SHALL HAVE PHASE "A" SWITCHED THROUGH THE LIGHTING CONTACTOR. PHASE "B" SHALL BE UNSWITCHED FROM THE POWER SOURCE TO THE LOAD CENTER AT THE AIRPORT ROTATING BEACON.
 - PROVIDE #10 AWG COPPER BONDING JUMPER FROM PANEL ENCLOSURE FRAME TO ENCLOSURE DOOR.
 - PROVIDE 3-POSITION MAINTAINED CONTACT "HAND-OFF-AUTO" SELECTOR SWITCH FOR EACH LIGHTING CONTACTOR & MOUNT ON LIGHTING CONTACTOR PANEL ENCLOSURE DOOR. SELECTOR SWITCH SHALL BE SQUARE D CLASS 9001, TYPE KS43FBH13, OR APPROVED EQUAL. INCLUDE LEGEND PLATE TO IDENTIFY THE DEVICE CONTROLLED (EX: "WIND CONE" OR "AIRPORT ROTATING BEACON").
 - PROVIDE FRACTIONAL HORSEPOWER MOTOR MANUAL STARTER, SQUARE D MANUAL STARTER WITH HANDLE/GUARD/LOCK OFF, IN NEMA 4 ENCLOSURE CLASS 2510, TYPE FG5 OR APPROVED EQUAL FOR FAN MOTOR & DAMPER MOTOR. INCLUDE MELTING ALLOY TYPE THERMAL OVERLOADS SIZED AS REQUIRED TO PROTECT THE RESPECTIVE MOTOR. 120 VAC MOTORS SHALL HAVE SINGLE POLE STARTERS.
 - FUSING FOR CONTROL WIRING SHALL BE 10 AMP, 600 VAC, BUSSMANN CATALOG FNQ-R-10, OR APPROVED EQUAL, WITH FUSE BLOCKS, WITH BOX LUG TERMINALS, SIZED AS REQUIRED FOR THE RESPECTIVE APPLICATION. INCLUDE HARDWARE FOR MOUNTING. PROVIDE ONE BOX (5 MINIMUM QUANTITY) OF EACH TYPE AND SIZE OF FUSE, UPON COMPLETION OF THE JOB FOR USE AS SPARES.



CONTROL PANEL FOR AIRFIELD NAVAIDS SCHEMATIC

REVISION	DATE

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CARMi, ILLINOIS**

A.I.P. PROJ.: 3-17-0109-B8
IL PROJ.: CUL-3972

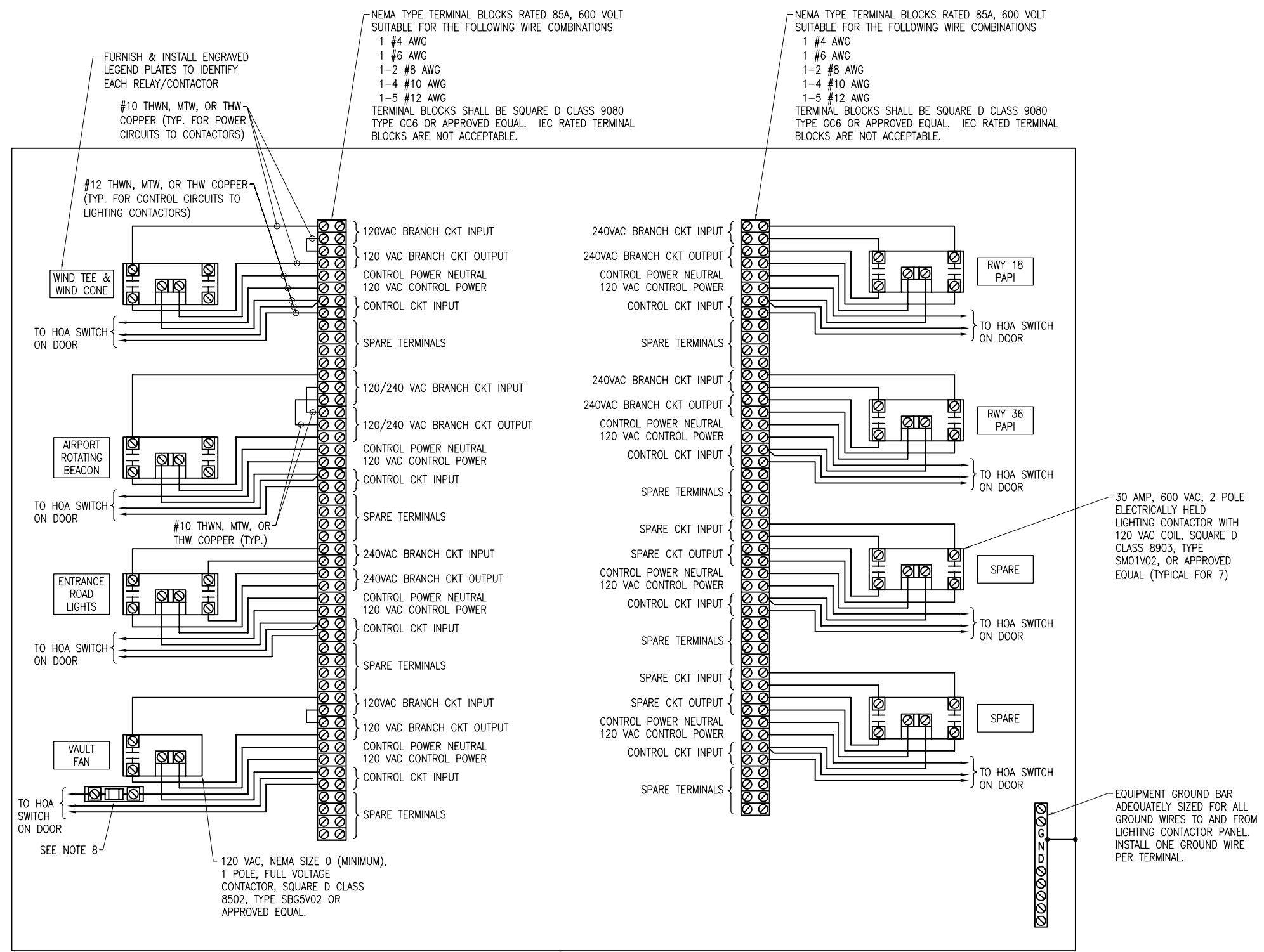
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LIGHTING CONTACTOR
PANEL DETAIL

NOTES

- 15 AMP & 20 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #10 AWG COPPER THWN FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR PANEL. 30 AMP INPUT POWER/BRANCH CIRCUITS SHALL BE #8 AWG COPPER THWN (MIN.) FROM THE RESPECTIVE POWER SOURCE TO THE LIGHTING CONTACTOR PANEL.
- INPUT CONTROL CIRCUITS SHALL BE #12 AWG COPPER THWN.
- FOR 120 VAC BRANCH CIRCUITS THE NEUTRAL CONDUCTOR SHALL NOT BE SWITCHED THROUGH THE RELAY CONTACTS. USE TERMINAL BLOCKS TO TRANSITION FROM VAULT BRANCH CIRCUIT WIRING TO FIELD WIRING.
- THE AIRPORT ROTATING BEACON CIRCUIT SHALL HAVE PHASE "A" SWITCHED THROUGH THE LIGHTING CONTACTOR. PHASE "B" SHALL BE UNSWITCHED FROM THE POWER SOURCE TO THE LOAD CENTER AT THE AIRPORT ROTATING BEACON.
- PROVIDE #10 AWG COPPER BONDING JUMPER FROM PANEL ENCLOSURE FRAME TO ENCLOSURE DOOR.
- PROVIDE 3-POSITION MAINTAINED CONTACT "HAND-OFF-AUTO" SELECTOR SWITCH FOR EACH LIGHTING CONTACTOR & MOUNT ON LIGHTING CONTACTOR PANEL ENCLOSURE DOOR. SELECTOR SWITCH SHALL BE SQUARE D CLASS 9001, TYPE KS43FBH13, OR APPROVED EQUAL. INCLUDE LEGEND PLATE TO IDENTIFY THE DEVICE CONTROLLED (EX: "WIND CONE" OR "AIRPORT ROTATING BEACON").
- SEE "LIGHTING CONTACTOR SCHEMATIC" AND "EXHAUST FAN CONTROL SCHEMATIC" FOR ADDITIONAL INFORMATION ON WIRING.
- FUSING FOR FAN CIRCUIT CONTROL WIRING SHALL BE 10 AMP, 600 VAC, BUSSMANN CATALOG FNQ-R-10, OR APPROVED EQUAL, WITH FUSE BLOCKS, WITH BOX LUG TERMINALS, SIZED AS REQUIRED FOR THE RESPECTIVE APPLICATION. INCLUDE HARDWARE FOR MOUNTING. PROVIDE ONE BOX (5 MINIMUM QUANTITY) OF EACH TYPE AND SIZE OF FUSE, UPON COMPLETION OF THE JOB FOR USE AS SPARES.
- INCLUDE LEGEND PLATE LABELED "NOTICE: CONTACTORS HAVE REMOTE LOCATED CONTROLS AND MAY ACTIVATE AT ANY TIME".
- 120/240 VAC PHASE "A" CONDUCTORS SHALL HAVE BLACK COLORED INSULATION. 120/240 VAC PHASE "B" CONDUCTORS SHALL HAVE RED COLORED INSULATION. NEUTRAL CONDUCTORS SHALL HAVE WHITE COLORED INSULATION. INSULATED EQUIPMENT GROUND WIRES SHALL HAVE GREEN COLORED INSULATION.
- CONTROL PANEL FOR AIRFIELD NAVAIDS & VAULT FAN SHALL BE MANUFACTURED BY A UL 508 INDUSTRIAL CONTROL PANEL BUILDER OR AN FAA APPROVED L-821 PANEL BUILDER, AND SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT AND THE "BUY AMERICAN ACT". GUS BERTHOLD ELECTRIC (1900 WEST CARROLL AVENUE, CHICAGO, IL 60612, PHONE: 312-243-5767) IS AN APPROVED UL 508 INDUSTRIAL CONTROL PANEL BUILDER.



CONTROL PANEL FOR AIRFIELD NAVAIDS AND VAULT FAN

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CARMI, ILLINOIS

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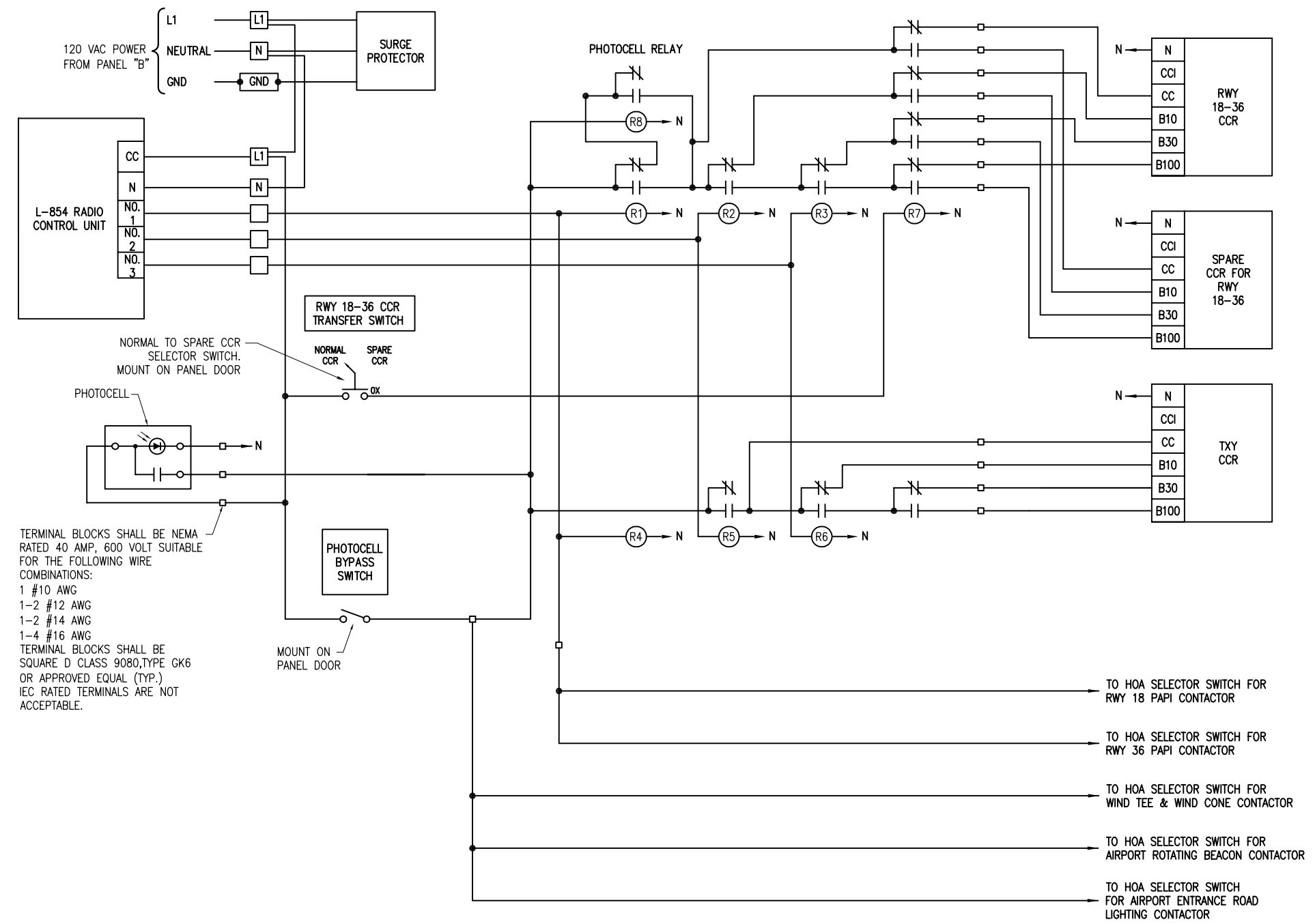
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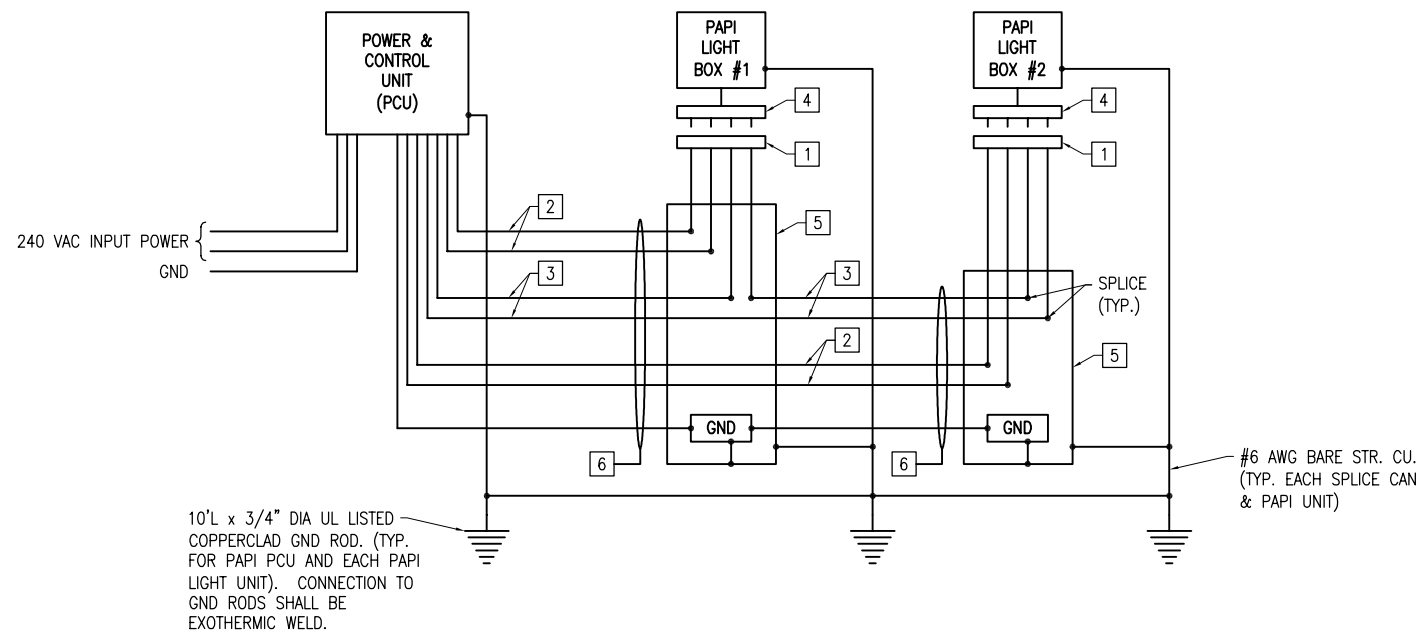
AIRFIELD LIGHTING CONTROL
WIRING SCHEMATIC

- NOTES:**
- RELAY INTERFACE CONTROL PANEL SHALL BE MANUFACTURED BY AN FAA APPROVED L-821 PANEL BUILDER OR A UL 508 INDUSTRIAL CONTROL PANEL BUILDER, AND SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENT AND THE "BUY AMERICAN ACT".
 - PANEL SHALL BE IN A NEMA 12 ENCLOSURE WITH HINGED COVER. DRILL HOLE IN BOTTOM OF ENCLOSURE TO ALLOW CONDENSATION TO ESCAPE.
 - EXTERNAL CONTROL CABLE SHALL BE NO. 12 AWG COPPER, 600 VOLT CABLE. ALL PANEL INTERIOR CONTROL CABLE SHALL BE MINIMUM 16 AWG, COPPER, 600 VOLT CABLE.
 - IN THE AUTOMATIC MODE OF OPERATION THE RUNWAY 18-36 CONSTANT CURRENT REGULATORS (PRIMARY UNIT & SPARE UNIT) SHALL BE CONTROLLED BY THE PHOTOCELL & THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:
PHOTOCELL - 10% BRIGHTNESS & ACTIVATE RADIO CONTROL
5 CLICKS - 30% BRIGHTNESS
7 CLICKS - 100% BRIGHTNESS
 - IN THE AUTOMATIC MODE OF OPERATION THE TAXIWAY CIRCUIT WILL BE CONTROLLED BY THE PHOTOCELL & THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:
PHOTOCELL -ACTIVATE RADIO CONTROL
3 CLICKS -10% BRIGHTNESS
5 CLICKS -30% BRIGHTNESS
7 CLICKS -100% BRIGHTNESS
 - IN THE AUTOMATIC MODE OF OPERATION THE WIND TEE, WIND CONE, AIRPORT ROTATING BEACON & AIRPORT ENTRANCE ROAD SHALL BE ACTIVATED BY THE PHOTOCELL OR PHOTOCELL BYPASS SWITCH.
 - IN THE AUTOMATIC MODE OF OPERATION THE RWY 18-36 PAPI'S WILL BE CONTROLLED BY THE L-854 RADIO CONTROL UNIT IN THE FOLLOWING MANNER:
3 CLICKS - ON
5 CLICKS - REMAIN ON
7 CLICKS - REMAIN ON.
 - EQUIPMENT GROUND WIRES SHALL BE INCLUDED WITH EACH BRANCH CIRCUIT & EACH CONTROL CIRCUIT.
 - INCLUDE PHOTOCELL BYPASS SWITCH.
 - SURGE PROTECTOR SHALL BE UL LISTED PER UL 1449, SUITABLE FOR 120 VAC, 1PH, 2 WIRE PLUS GROUND SYSTEM WITH SURGE CURRENT RATING OF 40 KA (MIN.), 8x20 MICROSECOND WAVE, AND STATUS INDICATION LIGHTS IN A WEATHERPROOF HOUSING, JOSLYN MODEL 1260-21, OR APPROVED EQUAL. MAINTAIN LEADS AS SHORT & AS STRAIGHT AS POSSIBLE. INCLUDE MOUNTING BRACKET.
 - INCLUDE EQUIPMENT GROUND BAR, ILSCO D167-12 OR EQUAL.
 - CONTROL RELAYS SHALL HAVE 10 AMP CONTACT RATINGS AT 240 VAC WITH 120 VAC COILS. PROVIDE 3 SPARE RELAYS FOR EACH TYPE USED IN THE RELAY INTERFACE PANEL.
 - COLOR CODING FOR THE CONTROL WIRING TO EACH CONSTANT CURRENT REGULATOR SHALL BE CONSISTENT FOR ALL REGULATORS. COLOR CODING SHALL BE AS FOLLOWS:
CC -RED
10% -ORANGE
30% -YELLOW
100% -BLUE
NEUTRAL -WHITE
EQUIPT. GND -GREEN
ALSO TAG THE CONTROL WIRES WITH THE RESPECTIVE DESIGNATION (CC, 10%, 30%, 100%)
 - "N" DESIGNATES NEUTRAL CONNECTION OR NEUTRAL CONDUCTOR.



TERMINAL BLOCKS SHALL BE NEMA RATED 40 AMP, 600 VOLT SUITABLE FOR THE FOLLOWING WIRE COMBINATIONS:
1 #10 AWG
1-2 #12 AWG
1-2 #14 AWG
1-4 #16 AWG
TERMINAL BLOCKS SHALL BE SQUARE D CLASS 9080, TYPE GK6 OR APPROVED EQUAL (TYP.)
IEC RATED TERMINALS ARE NOT ACCEPTABLE.

AIRFIELD LIGHTING CONTROL WIRING SCHEMATIC



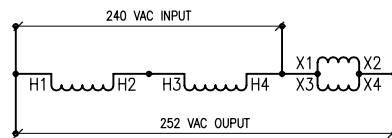
PAPI FIELD WIRING CONNECTIONS
(FOR CROUSE-HINDS 881A3A-1 PAPI)

NOTES

1. PAPI FIELD WIRING CONNECTION DIAGRAM IS BASED ON A CROUSE-HINDS PART NO 881A3A-1, L-881 STYLE A (VOLTAGE POWERED) PAPI WITH 3 LAMPS PER LIGHT BOX, & INFORMATION PROVIDED BY CROUSE-HINDS FIELD SERVICE SUPPORT CENTER. WIRING REQUIREMENTS VARY FOR DIFFERENT PAPI MANUFACTURERS AND DIFFERENT PAPI MODEL NUMBERS BY THE SAME MANUFACTURER. CONTRACTOR SHALL CONFIRM WIRING REQUIREMENTS WITH THE RESPECTIVE PAPI MANUFACTURER AND ADJUST TO MEET MANUFACTURER INSTRUCTIONS AND RECOMMENDATIONS. POWER WIRING REQUIREMENTS SHOWN ARE MINIMUM, FOR THE RESPECTIVE PAPI SYSTEM.
2. INCLUDE #8 AWG COPPER (MINIMUM) EQUIPMENT GROUND WIRE IN CONDUIT WITH POWER & CONTROL WIRING BETWEEN THE POWER & CONTROL UNIT & THE PAPI LIGHT BOXES.
3. CONDUIT BETWEEN PAPI PCU AND SPLICE CANS AT PAPI LIGHT UNITS SHALL BE GALVANIZED RIGID STEEL CONDUIT.

KEYED NOTES

- 1 CONSOLIDATING HARNESS, 4 #14 AWG LEADS AS FURNISHED OR REQUIRED BY PAPI MFR.
- 2 OUTGOING POWER FEED FROM POWER & CONTROL UNIT TO THE TWO PAPI LIGHT BOXES (#1 & #2), #8 AWG XLP-USE OR THWN (MIN.)
- 3 TILT SWITCH WIRING #14 AWG XLP-USE OR THWN (MIN.) CONFIRM WIRING WITH PAPI MFR & ADJUST AS APPLICABLE.
- 4 PLUG WITH CABLE ASSEMBLY AS FURNISHED OR REQUIRED BY PAPI MFR.
- 5 L-867, CLASS IA, SIZE B (MINIMUM), 24" DEEP SPLICE CAN. INCLUDE INTERNAL AND EXTERNAL GROUND STRAPS.
- 6 2" MINIMUM GALVANIZED RIGID STEEL CONDUIT BETWEEN PAPI PCU AND L-867 SPLICE CANS AT PAPI LIGHT UNITS.



NOTES:

1. WIRING DIAGRAM SHOWN IS TYPICAL FOR MULTIPLE 120 x 240 VAC PRIMARY, 12/24 VAC SECONDARY BUCK-BOOST TRANSFORMERS FROM VARIOUS MANUFACTURERS. WIRING MIGHT VARY BETWEEN DIFFERENT MANUFACTURERS. CONFIRM WIRING WITH RESPECTIVE TRANSFORMER MFR.
2. PROVIDE BOOST TRANSFORMER AT VAULT WHERE VOLTAGE DROP FROM VAULT TO RESPECTIVE PAPI POWER AND CONTROL UNIT EXCEEDS 5% (12 VOLTS FOR 240 VAC NOMINAL SUPPLY). BOOST TRANSFORMER IS NOT REQUIRED WHERE PAPI PCU HAS INPUT POWER TRANSFORMER TAP ADJUSTMENTS SUITABLE FOR RESPECTIVE INPUT VOLTAGE AND CABLE LOSSES.
3. BOOST TRANSFORMERS SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE "BUY AMERICAN ACT".

240 VAC TO 252 VAC BOOST TRANSFORMER CONNECTION DIAGRAM
120 x 240 VAC PRIMARY, 12/24 VAC SECONDARY TRANSFORMER

REVISION	DATE

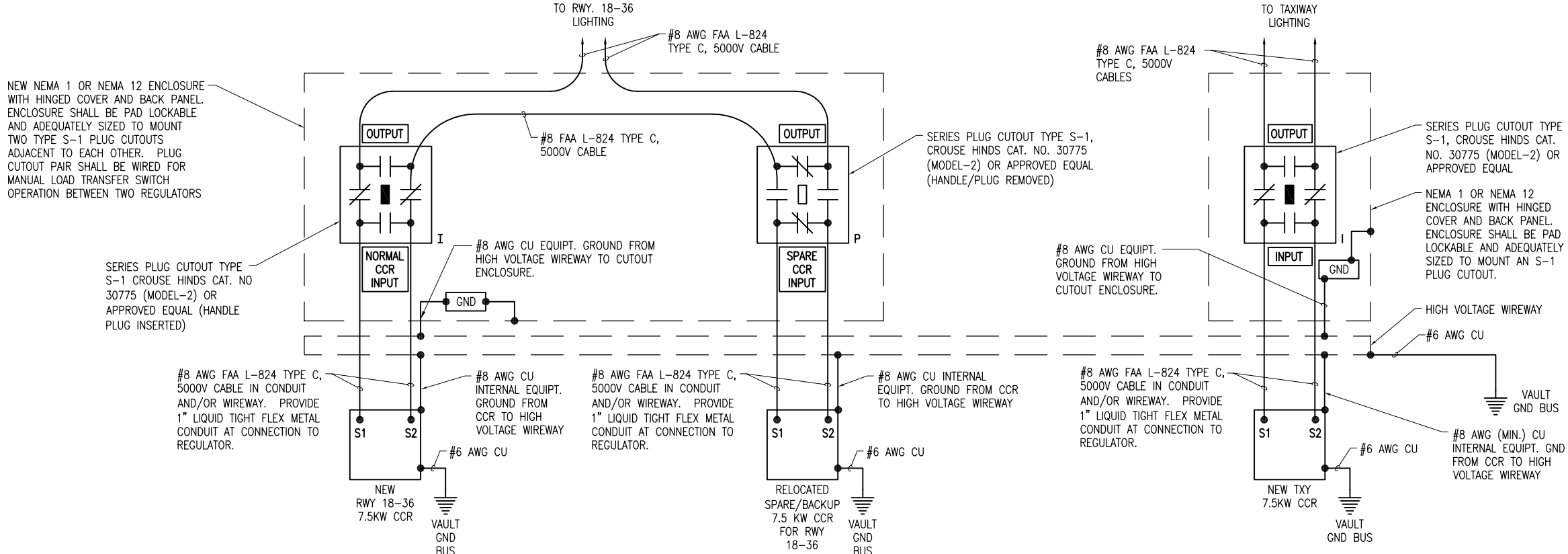
CARMI MUNICIPAL AIRPORT
CARMI, ILLINOIS

A.I.P. PROJ.: 3-17-0109-B8
IL PROJ.: CUL-3972

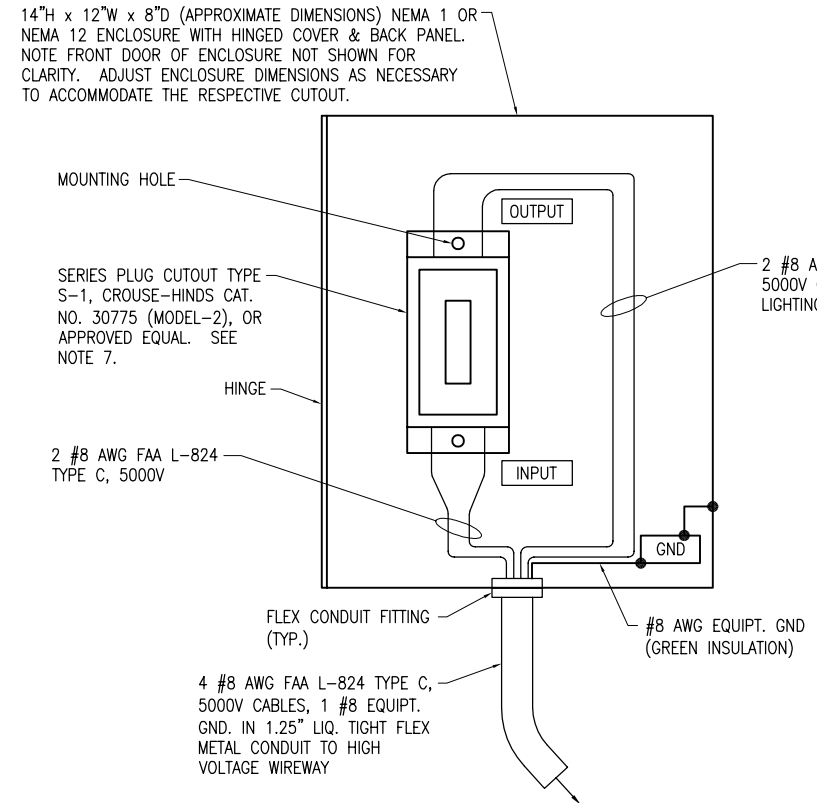
Hanson Proj. No. 09A0158D	File Name E-023.DWG	Scale NONE	Date 06/24/10
LAYOUT	KNL	CNS	06/03/10
DRAWN	KNL	CNS	06/03/10
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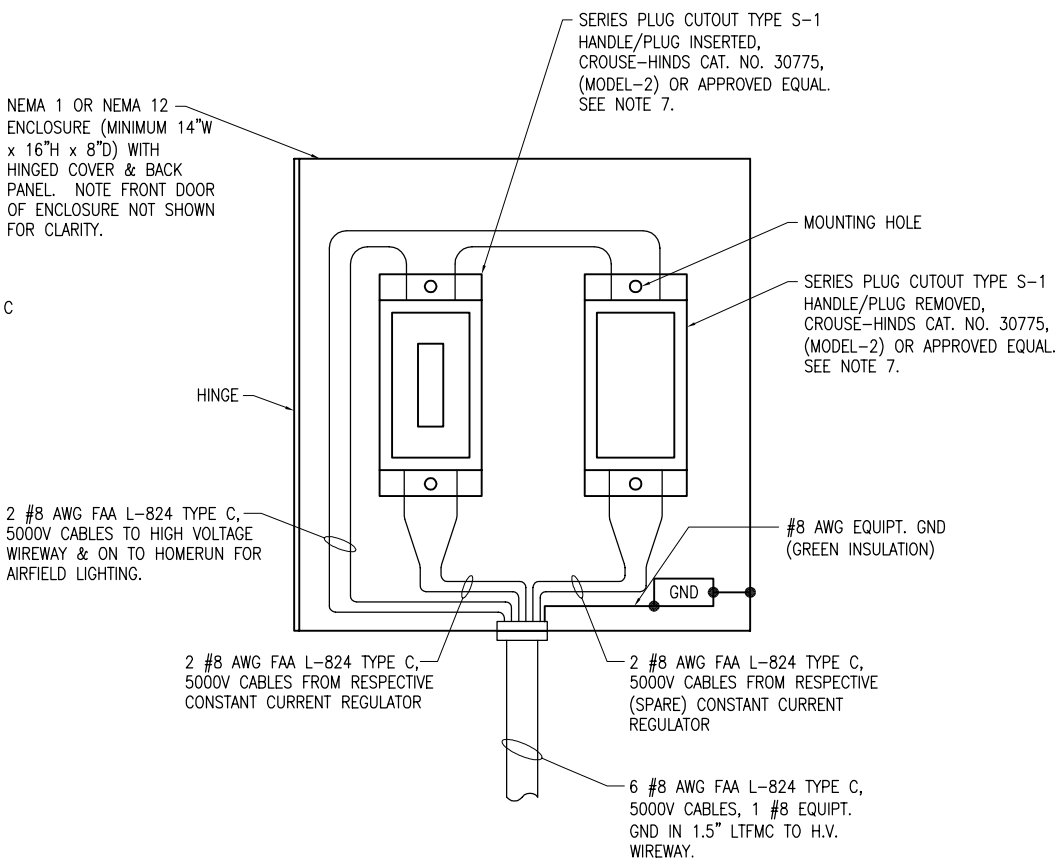
REPLACE MRLS, MITLS,
VADIS, REILS,
BEACON & VAULT
PAPI FIELD WIRING
CONNECTIONS



HIGH VOLTAGE WIRING SCHEMATIC



SERIES PLUG CUTOUT MOUNTING DETAIL FOR TAXIWAY CIRCUIT
NOT TO SCALE



SERIES PLUG CUTOUT MOUNTING DETAIL FOR RUNWAY CIRCUIT
NOT TO SCALE

- NOTES**
1. PROVIDE PHENOLIC ENGRAVED LEGEND PLATES FOR EACH CONSTANT CURRENT REGULATOR (EXISTING & NEW) NOTING THE RUNWAY AND/OR TAXIWAY SERVED.
 2. EACH PLUG CUTOUT CABINET SHALL BE FURNISHED WITH A PHENOLIC ENGRAVED LEGEND PLATE THAT IDENTIFIES THE RESPECTIVE RUNWAY OR TAXIWAY CIRCUIT OR REGULATOR. INCLUDE AN ADDITIONAL LEGEND PLATE LABELED "CAUTION OPERATE CUTOUTS WITH CCR SHUT OFF".
 3. PROVIDE PHENOLIC ENGRAVED LEGEND PLATES FOR THE CUTOUTS TO IDENTIFY THE RESPECTIVE REGULATOR OUTPUT CONNECTION AND THE RESPECTIVE CIRCUIT LOAD CONNECTION.
 4. BOND REGULATOR FRAME TO VAULT GROUND BUS WITH A DEDICATED #6 AWG BONDING JUMPER.
 5. PROVIDE ADEQUATE WORKING SPACE IN FRONT OF EACH CUTOUT ENCLOSURE TO MEET NEC CLEARANCE REQUIREMENTS.
 6. LIQUID TIGHT FLEXIBLE METAL CONDUIT AND ASSOCIATED FITTINGS SHALL BE U.L. LISTED TO MEET THE REQUIREMENTS OF NEC 350.6, SUITABLE FOR GROUNDING AND SUNLIGHT RESISTANT. LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS USED FOR FLEXIBILITY (INCLUDING CONNECTIONS TO CCR'S & TRANSFORMERS) SHALL REQUIRE AN EXTERNAL BONDING JUMPER OR INTERNAL EQUIPMENT GROUNDING CONDUCTOR PER NEC 350.60. EXTERNAL BONDING JUMPERS USED WITH CCR INSTALLATIONS SHALL BE #6 AWG COPPER (MINIMUM). DO NOT INSTALL LIQUID TIGHT FLEXIBLE METAL CONDUIT THAT IS NOT UL LISTED. CONFIRM LIQUID TIGHT FLEXIBLE METAL CONDUIT BEARS THE UL LABEL PRIOR TO INSTALLING IT.
 7. CROUSE-HINDS CAT. NO. 30771, (MODEL-3) SERIES PLUG CUTOUTS ARE NOT ACCEPTABLE, BECAUSE THE HANDLE IS NOT REMOVABLE. ADB SIEMENS SCO SERIES CUTOUTS ARE NOT ACCEPTABLE BECAUSE THEY DO NOT FUNCTION THE SAME AS THE CROUSE-HINDS 30775 CUTOUT. AIRPORT LIGHTING CO. PART NO. S1 CUTOUTS ARE NOT ACCEPTABLE BECAUSE THEY HAVE BEEN OBSERVED TO NOT FUNCTION THE SAME AS THE CROUSE-HINDS 30775 CUTOUT WHEN THE HANDLE IS REMOVED, AND THE MFR DOES NOT RECOMMEND OPERATION OF THE CUTOUT WITH THE HANDLE REMOVED. OTHER CUTOUTS THAT DO NOT FUNCTION THE SAME AS CROUSE-HINDS CAT. NO. 30775 (MODEL-2) ARE NOT ACCEPTABLE.
 8. HIGH VOLTAGE & LOW VOLTAGE CIRCUITS SHALL NOT BE INSTALLED IN THE SAME WIREWAY.

- LEGEND**
- "I" DENOTES PLUG CUTOUT WITH PLUG INSERTED
 - "P" DENOTES PLUG CUTOUT WITH PLUG PULLED
 - "CCR" DENOTES CONSTANT CURRENT REGULATOR

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Hanson Proj. No. 09A0158D	File Name: E-607.DWG	Scale: NONE	Date: 06/24/10
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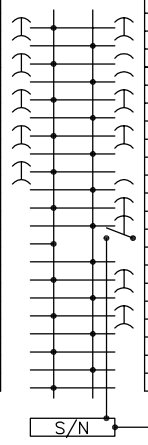
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HIGH VOLTAGE
WIRING SCHEMATIC

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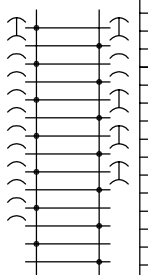
VAULT SERVICE PANEL "A" SCHEDULE			
CKT #	DUTY	SIZE	CKT #
1	TRANSIENT VOLTAGE SURGE SUPPRESSOR	60A 2P	2
3	---	---	4
5	TERMINAL BLDG FEEDER	125A 2P	6
7	---	---	8
9	GATE OPERATOR	30A 2P	10
11	---	---	12
13	HEATER #1	20A 2P	14
15	---	---	16
17	HEATER #2	15A 2P	18
19	---	---	20
21	BLANK	---	22
23	BLANK	---	24
25	BLANK	---	26
27	BLANK	---	28
29	BLANK	---	30
31	BLANK	---	32
33	BLANK	---	34
35	BLANK	---	36
37	BLANK	---	38
39	BLANK	---	40
41	BLANK	---	42



400 AMP, 120/240 VAC, 1 PHASE, 3 WIRE, 42 CIRCUIT PANELBOARD WITH 400 AMP, 2 POLE MAIN BREAKER WITH 22,000 AIC AT 240 VAC IN A NEMA 1 ENCLOSURE, UL LISTED SUITABLE FOR SERVICE ENTRANCE. INCLUDE SEPERATE COPPER GROUND BAR KIT. ALL FEEDER AND BRANCH BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC RATING AT 120/240 VAC. PANELBOARD SHALL BE SQUARE D NQ TYPE OR APPROVED EQUAL.

- NOTES**
- PANELBOARD BUSSES SHALL BE COPPER. NEUTRAL SHALL BE COPPER. EQUIPMENT GROUND BAR SHALL BE COPPER.
 - ALL BRANCH CIRCUIT & FEEDER BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC AT 120/240 VAC.
 - INCLUDE ENGRAVED, PHENOLIC OR PLASTIC LEGEND PLATE LABELED "VAULT SERVICE PANEL A, 120/240 VAC, 1PH, 3W". INCLUDE ADDITIONAL LEGEND PLATE FOR THE MAIN BREAKER LABELED "SERVICE DISCONNECT".
 - PANELBOARD SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.
 - SWN INDICATES BRANCH BREAKER WITH SWITCHED NEUTRAL FEATURE.
 - ST INDICATES BREAKER WITH SHUNT TRIP FEATURE.

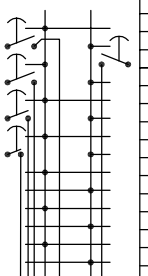
PANEL "B" SCHEDULE			
CKT #	DUTY	SIZE	CKT #
1	PARKING LOT & ENTRANCE	30A 2P	2
3	ROAD LIGHTS	---	4
5	VAULT INTERIOR LIGHTING	15A 1P	6
7	VAULT EXTERIOR LIGHTING	15A 1P	8
9	VAULT RECEPTACLE	20A 1P	10
11	RADIO RECEIVER & CONTROL	15A 1P	12
13	VAULT FAN	20A 1P	14
15	SPARE	20A 1P	16
17	SPARE	20A 1P	18
19	SPARE	20A 1P	20
21	SPARE	15A 1P	22
23	SPARE	15A 1P	24
25	BLANK	---	26
27	BLANK	---	28
29	BLANK	---	30



225 AMP, 120/240 VAC, 1 PHASE, 3 WIRE, 30 CIRCUIT PANELBOARD WITH MAIN LUGS IN A NEMA 1 ENCLOSURE. INCLUDE SEPERATE GROUND BAR KIT. ALL BRANCH BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC RATING AT 120/240 VAC. PANELBOARD SHALL BE SQUARE D TYPE NQ OR APPROVED EQUAL.

- NOTES**
- PANELBOARD BUSSES SHALL BE COPPER. NEUTRAL SHALL BE COPPER. EQUIPT. GROUND BAR SHALL BE COPPER.
 - ALL BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC AT 120/240 VAC.
 - PROVIDE LEGEND PLATE FOR PANELBOARD LABELED "PANEL B, 120/240 VAC, 1PH, 3W, FED FROM SERVICE PANEL A".
 - CIRCUIT BREAKERS AND WIRING SHALL BE SIZED FOR THE ACTUAL EQUIPMENT FURNISHED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S RECOMMENDATION AND NEC. CONTRACTOR SHALL ADJUST CIRCUIT BREAKER SIZES & WIRING WHERE APPLICABLE TO CONFORM WITH MFR RECOMMENDATIONS AND NEC.
 - PANELBOARD SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.

FUEL SYSTEM PANEL "C" SCHEDULE			
CKT #	DUTY	SIZE	CKT #
1	87 OCTANE DISPENSER	20A 1P	2
3	---	SWN	4
5	100 LL DISPENSER	20A 1P	6
7	---	SWN	8
9	HOSE REWIND MOTORS	20A 1P	10
11	---	SWN	12
13	SPARE	20A 1P	14
15	---	SWN	16
17	BLANK	---	18
19	BLANK	---	20
21	BLANK	---	22
23	BLANK	---	24
25	BLANK	---	26
27	BLANK	---	28
29	BLANK	---	30



100 AMP, 120/240 VAC, 1 PHASE, 3 WIRE, 30 CIRCUIT PANELBOARD WITH MAIN LUGS IN A NEMA 1 ENCLOSURE. INCLUDE SEPERATE GROUND BAR KIT. ALL BRANCH BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC RATING AT 120/240 VAC. PANELBOARD SHALL BE SQUARE D TYPE NQ OR APPROVED EQUAL.

- NOTES**
- PANELBOARD BUSSES SHALL BE COPPER. NEUTRAL SHALL BE COPPER. EQUIPT. GROUND BAR SHALL BE COPPER.
 - ALL BREAKERS SHALL BE BOLT-ON TYPE WITH 10,000 AIC AT 120/240 VAC.
 - PROVIDE LEGEND PLATE FOR PANELBOARD LABELED "FUEL SYSTEM PANEL C, 120/240 VAC, 1PH, 3W, FED FROM SERVICE PANEL A".
 - CIRCUIT BREAKERS AND WIRING SHALL BE SIZED FOR THE ACTUAL EQUIPMENT FURNISHED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S RECOMMENDATION AND NEC. CONTRACTOR SHALL ADJUST CIRCUIT BREAKER SIZES & WIRING WHERE APPLICABLE TO CONFORM WITH MFR RECOMMENDATIONS AND NEC.
 - PANELBOARD SHALL BE MANUFACTURED IN THE UNITED STATES TO COMPLY WITH THE AIRPORT IMPROVEMENT PROGRAM BUY AMERICAN REQUIREMENTS. PROVIDE CERTIFICATION OF MANUFACTURE IN THE UNITED STATES WITH SHOP DRAWING SUBMITTAL.
 - SWN INDICATES BRANCH BREAKER WITH SWITCHED NEUTRAL FEATURE.

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CARMi, ILLINOIS**

IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

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PANELBOARD SCHEDULES

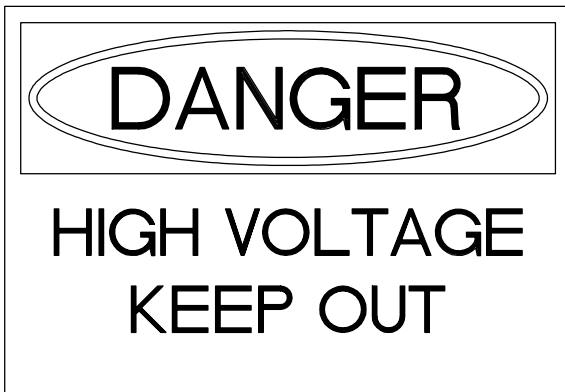
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LEGEND PLATE SCHEDULE	
DEVICE	LABEL
SERVICE BREAKER FOR FS HANGAR (IN LOAD CENTER)	SERVICE DISCONNECT FOR FS HGR 120/240VAC, 1PH, 3W
VAULT PANELBOARD "A"	SERVICE PANEL "A" 120/240 VAC, 1 PH, 3W FED FROM SERVICE DISCONNECT
MAIN BREAKER IN VAULT PANEL A	SERVICE DISCONNECT
PANELBOARD B IN VAULT	PANEL B 120/240 VAC, 1 PH, 3W FED FROM PANEL A
FUEL SYSTEM PANELBOARD C IN VAULT	FUEL SYSTEM PANEL C 120/240 VAC, 1 PH, 3W
RUNWAY 18-36 CCR	RUNWAY 18-36
SPARE RUNWAY 18-36 CCR	SPARE FOR RUNWAY 18-36
TAXIWAY CCR	TAXIWAY A
CUTOUT ENCLOSURE FOR RUNWAY 18-36	RUNWAY 18-36 CUTOUT
EACH CUTOUT ENCLOSURE (2 LEGEND PLATES)	CAUTION OPERATE CUTOUTS WITH CCR SHUT OFF
NORMAL CUTOUT INPUT SIDE CONNECTION FOR RUNWAY 18-36	NORMAL CCR INPUT
SPARE CUTOUT INPUT SIDE CONNECTION FOR RUNWAY 18-36	SPARE CCR INPUT
CUTOUT ENCLOSURE FOR TAXIWAY "A"	TAXIWAY A CUTOUT
TAXIWAY CUTOUT INPUT SIDE CONNECTION	INPUT
EACH CUTOUT (RUNWAY & TAXIWAY) OUTPUT SIDE CONNECTION (3 LEGEND PLATES)	OUTPUT

LEGEND PLATE SCHEDULE CONTINUED	
DEVICE	LABEL
RADIO RELAY INTERFACE PANEL	RADIO RELAY INTERFACE PANEL
MANUAL TRANSFER SWITCH FOR RUNWAY 18-36 NORMAL CCR AND SPARE/BACKUP CCR	TRANSFER SWITCH FOR RUNWAY 18-36 CONSTANT CURRENT REGULATORS
MANUAL TRANSFER SWITCH FOR RUNWAY 18-36 NORMAL CCR AND SPARE/BACKUP CCR - NORMAL SWITCH POSITION	NORMAL CCR
MANUAL TRANSFER SWITCH FOR RUNWAY 18-36 NORMAL CCR AND SPARE/BACKUP CCR - BACKUP SWITCH POSITION	SPARE/BACKUP CCR
CONTROL PANEL FOR AIRFIELD NAVAIDS AND VAULT FAN	CONTACTOR PANEL FOR AIRFIELD NAVAIDS, ENTRANCE ROAD LIGHTS & VAULT FAN
CONTACTOR PANEL FOR AIRFIELD NAVAIDS AND VAULT FAN	NOTICE CONTACTORS HAVE REMOTE LOCATED CONTROLS AND MAY ACTIVATE AT ANY TIME
LOW VOLTAGE WIREWAY (PROVIDE 4 LEGEND PLATES 1/2" HIGH BLACK LETTERS WHITE BACKGROUND)	LOW VOLTAGE
HIGH VOLTAGE WIREWAY (PROVIDE 4 LEGEND PLATES 1/2" HIGH BLACK LETTERS WHITE BACKGROUND)	HIGH VOLTAGE
VAULT GROUND BUS (PROVIDE 4 LEGEND PLATES 1/2" HIGH WHITE LETTERS GREEN BACKGROUND; INSTALL ABOVE OR BELOW GROUND BUS)	VAULT GROUND BUS
GATE OPERATOR DISCONNECT	GATE OPERATOR 240 VAC FED FROM VAULT
GROUNDING ELECTRODE CONDUCTORS TERMINATED ON VAULT GROUND BUS. (PROVIDE 3 LEGEND PLATES & SECURE TO CONDUCTORS WITH NYLON STRING OR CABLE TIES)	DO NOT DISCONNECT

NOTE: LEGEND PLATES SHALL BE WEATHERPROOF ENGRAVED PLASTIC OR PHENOLIC MATERIAL, 1/4" HIGH BLACK LETTERS ON A WHITE BACKGROUND UNLESS NOTED OTHERWISE. SECURE WITH WEATHERPROOF ADHESIVE AND MACHINE SCREWS. FURNISH ADDITIONAL LEGEND PLATES WHERE REQUIRED BY CODE, FOR ADDITIONAL EQUIPMENT, AS DETAILED HEREIN ON THE PLANS, AND AS NOTED IN THE SPECIAL PROVISION SPECIFICATIONS.

FURNISH & INSTALL A WEATHERPROOF WARNING LABEL FOR EACH SAFETY SWITCH, PANELBOARD, LOAD CENTER, CUTOUT, & CONTROL PANEL TO WARN PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS, PER THE REQUIREMENTS OF NEC 110.16 "FLASH PROTECTION". LABELS SHALL BE HAZARD COMMUNICATION SYSTEMS, LLC (190 OLD MILFORD RD., BOX 1174, MILFORD, PA 18337, PHONE: 1-877-748-0244) PART NO. H6010-9VWHBJ OR APPROVED EQUAL.



PROVIDE WARNING SIGN ON VAULT EXTERIOR DOORS LABELED "DANGER - HIGH VOLTAGE - KEEP OUT" PER THE REQUIREMENTS OF NEC 110.34 (C).

- DIRECTIONS TO TRANSFER RUNWAY 18-36 LIGHTING FROM NORMAL CCR TO SPARE/BACKUP CCR.
- SHUT OFF INPUT POWER (CIRCUIT BREAKER) TO BOTH RWY 18-36 CCR'S & TURN CCR SELECTOR SWITCHES TO OFF.
 - OPERATE MANUAL TRANSFER SWITCH FOR RWY 18-36 AND MOVE HANDLE FROM "NORMAL" POSITION TO "SPARE/BACKUP" POSITION.
 - PULL CUTOUT HANDLE FROM NORMAL CCR UNIT & INSERT INTO SPARE CCR CUTOUT.
 - GO TO RADIO RELAY INTERFACE PANEL & TURN "RWY 18-36 CCR TRANSFER" SELECTOR SWITCH FROM "NORMAL" TO "SPARE" POSITION.
 - TURN ON INPUT POWER (CIRCUIT BREAKER) TO SPARE RWY 18-36 CCR.
 - TURN SELECTOR SWITCH ON SPARE CCR TO "REMOTE" POSITION.

PROVIDE PLACARD OR LEGEND PLATE FOR RUNWAY CONSTANT CURRENT REGULATOR PAIR AS NOTED ABOVE: LETTERING TO BE MIN. 1/4" HIGH, BLACK ON WHITE BACKGROUND. LOCATE PLACARD ABOVE OR ADJACENT TO CUTOUT ENCLOSURE FOR RUNWAY.

CCR TRANSFER PROCEDURE PLACARD DETAIL

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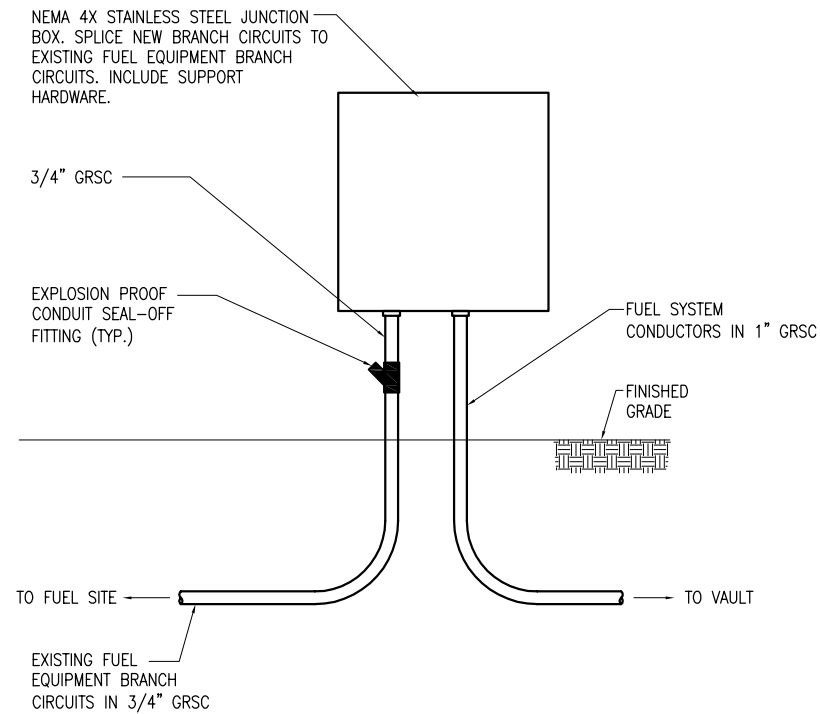
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REPLACE MIRLS, MITLS,
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LEGEND PLATE SCHEDULES



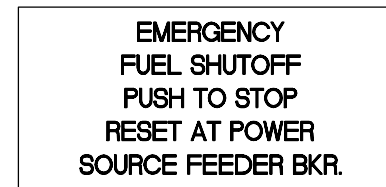
NOTE: JUNCTION BOX SHALL NOT BE LOCATED WITHIN A CLASSIFIED HAZARDOUS LOCATION UNLESS IT IS UL LISTED OR FM APPROVED AS NEMA 7 SUITABLE FOR CLASS I, DIVISION 1, GROUP D LOCATION, LOCATE JUNCTION BOX MORE THAN 20 FEET FROM DISPENSERS & TANKS TO KEEP CLEAR OF CLASSIFIED HAZARDOUS LOCATION.

FUEL SYSTEM JUNCTION BOX DETAIL

NOT TO SCALE

CONDUIT SEAL OFF NOTES:

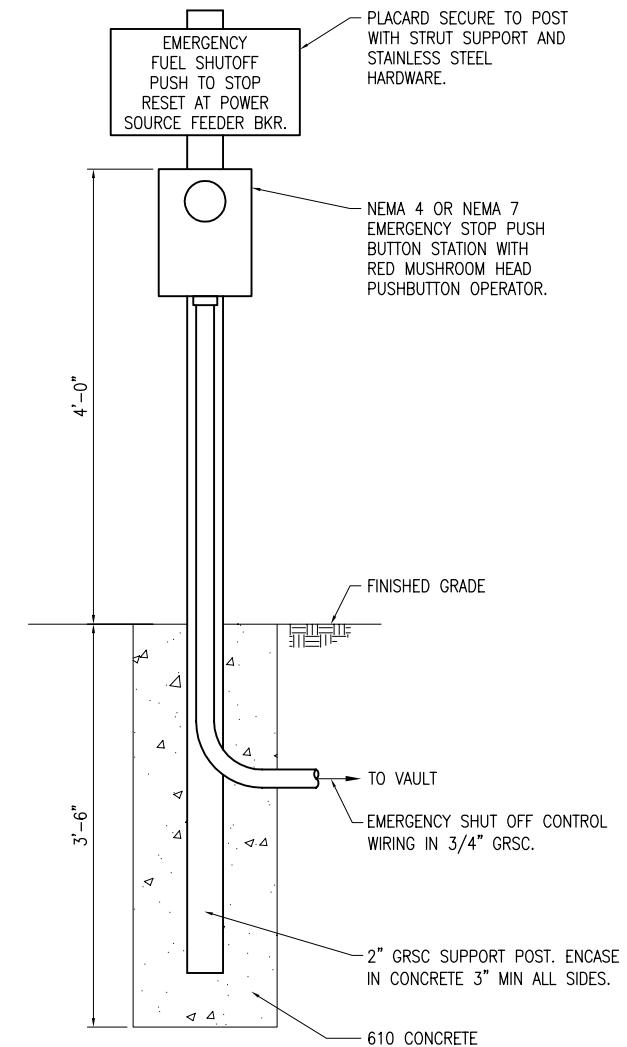
- CONDUIT SEAL OFF FITTINGS SHALL BE UL LISTED OR FM APPROVED SUITABLE FOR CLASS I, DIV. 1, GROUP D LOCATION. PER UL STANDARD 886 & NEC 501.15(C)(6), THE CROSS-SECTIONAL AREA OF THE CONDUCTORS PERMITTED IN A SEAL SHALL NOT EXCEED 25 PERCENT OF THE CROSS-SECTIONAL AREA OF A RIGID METAL CONDUIT OF THE SAME TRADE SIZE UNLESS IT IS SPECIFICALLY IDENTIFIED FOR A HIGHER PERCENTAGE OF FILL.
- CONDUIT SEAL OFF FITTINGS ARE REQUIRED FOR ALL CONDUITS EMERGING FROM GRADE AT THE FUEL TANK & DISPENSER SITES IN CLASS I, DIVISION 1 OR 2, GROUP D LOCATIONS, AND SHALL BE THE FIRST FITTING AFTER THE CONDUIT EMERGES FROM GRADE.
- CONDUIT SEAL OFF FITTINGS ARE REQUIRED FOR EACH CONDUIT RUN ENTERING AN ENCLOSURE (LOCATED IN A HAZARDOUS AREA) FOR SWITCHES, CIRCUIT BREAKERS, FUSES, RELAYS, RESISTORS OR OTHER APPARATUS WHICH MAY PRODUCE ARCS, SPARKS, OR HIGH TEMPERATURES, (WITHIN 18" FROM SUCH ENCL). FACTORY SEALED DEVICES DO NOT REQUIRE CONDUIT SEALS IF CONDUIT ENTERING SUCH DEVICE IS 1 1/2" OR SMALLER.
- CONDUIT SEAL OFF FITTINGS ARE REQUIRED FOR ALL CONDUITS EMERGING FROM GRADE IN A NON-HAZARDOUS LOCATION THAT ARE TO OR FROM A CLASSIFIED HAZARDOUS LOCATION (FUEL TANK & DISPENSER SITE) AND SHALL BE THE FIRST AFTER THE CONDUIT EMERGES FROM GRADE.



PROVIDE PLACARD WITH 2" MIN. HIGH RED LETTERING ON WHITE BACKGROUND TO COMPLY WITH NFPA 407. PROVIDE PLACARD FOR EACH EMERGENCY SHUTOFF STATION.

EMERGENCY FUEL SHUTOFF PLACARD DETAIL

NOT TO SCALE



EMERGENCY FUEL SHUTOFF STATION DETAIL

NOT TO SCALE

NOTES

- PROVIDE EMERGENCY FUEL SHUT OFF STATION IN NEMA 7 FACTORY SEALED ENCLOSURE OR NEMA 4 STAINLESS STEEL ENCLOSURE WITH 2" GRSC SUPPORT POST OR STAINLESS STEEL SUPPORT HARDWARE & PLACARD PER NFPA 407 AT FUEL DISPENSER SITE. LOCATE 20 FT. TO 30 FT FROM DISPENSERS, IN SITE OF DISPENSERS.

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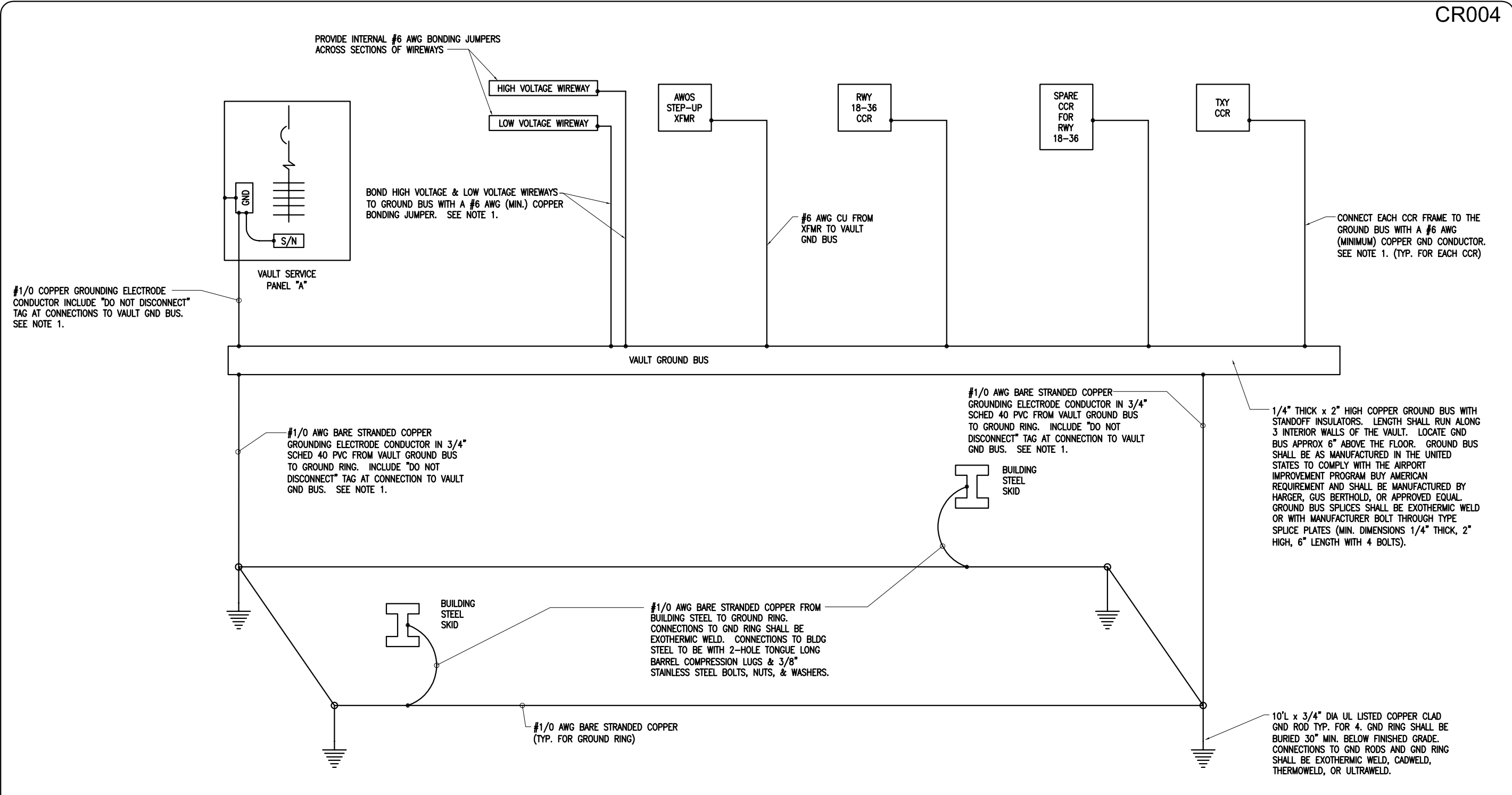
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REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT
FUEL SYSTEM
DETAILS



VAULT GROUND BUS RISER

NOTES

1. CONNECTIONS TO GROUND BUS BAR SHALL BE WITH 2-HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE BUS BAR.
2. ALL INSULATED GROUND WIRES SHALL HAVE GREEN COLORED INSULATION FOR ALL CONDUCTOR AWG AND KCMIL.
3. ALL WORK SHOWN ON THIS SHEET SHALL BE PAID FOR UNDER ITEM AR109200 "INSTALL ELECTRICAL EQUIPMENT" PER LUMP SUM.

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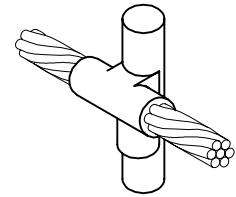
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IL PROJ.: CUL-3972 A.I.P. PROJ.: 3-17-0109-B8

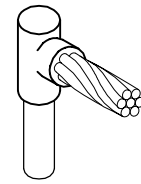
Hanson Proj. No.	09A0158D
Filename	E-610.DWG
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Date	06/24/10
LAYOUT	KNL 06/07/10
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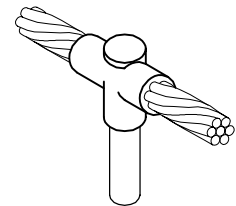
REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT
VAULT
GROUND BUS
RISER



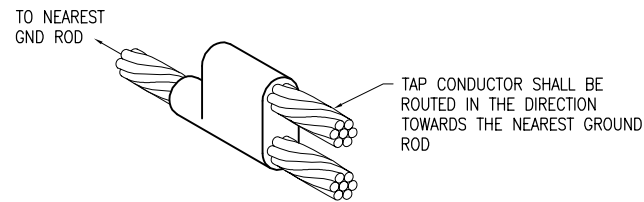
CABLE TO GROUND ROD



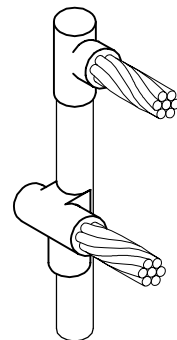
CABLE TO GROUND ROD



CABLE TO GROUND ROD



CABLE TO CABLE HORIZONTAL PARALLEL TAP

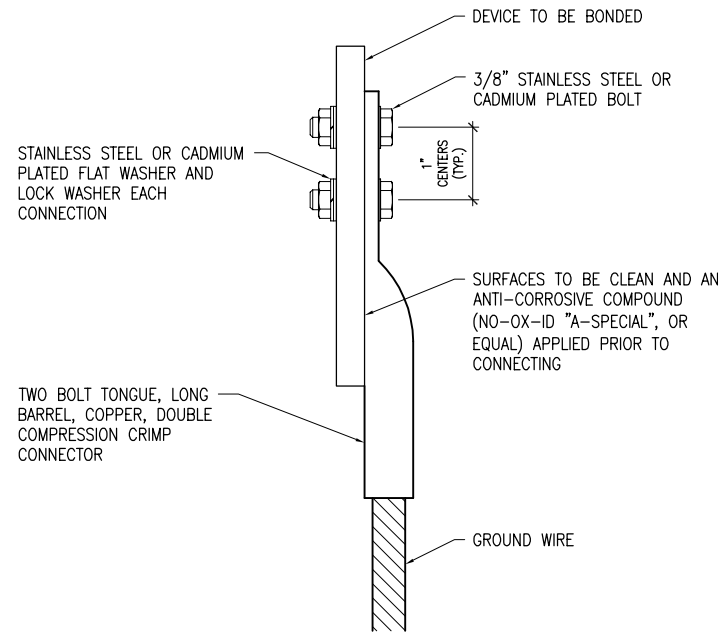


CABLES TO GROUND ROD

DETAIL NOTES

1. ALL BELOW GRADE CONNECTIONS TO GROUND RODS & GROUND RING CONDUCTORS SHALL BE EXOTHERMIC WELD TYPE CONNECTIONS. EXOTHERMIC WELDS SHALL BE CADWELD AS MANUFACTURED BY ERICO PRODUCTS, SOLON, OHIO, ULTRAWELD AS MANUFACTURED BY HARGER LIGHTNING PROTECTION & GROUNDING EQUIPMENT, GRAYSLAKE, IL, OR THERMOWELD AS MANUFACTURED BY CONTINENTAL INDUSTRIES, TULSA, OKLAHOMA. VERIFY PROPER SIZES, MOLDS, TYPES, AND REQUIREMENTS FOR THE RESPECTIVE APPLICATION WITH THE MANUFACTURER, AND INSTALL PER THEIR DIRECTIONS.
2. FOR APPLICATIONS TO GALVANIZED STEEL OR PAINTED STEEL, REMOVE GALVANIZING AND/OR PAINT & CLEAN THE SURFACE TO EXPOSE BARE STEEL BEFORE MAKING EXOTHERMIC WELD CONNECTION.
3. INDIVIDUAL GROUNDING ELECTRODE CONDUCTORS SHALL NOT BE INSTALLED IN METAL CONDUIT. INSTALL GROUNDING ELECTRODE CONDUCTORS IN SCHED 40 PVC CONDUIT AS REQUIRED IN FOUNDATIONS, FOR PROTECTION, WHERE ENTERING ENCLOSURES, ETC. WHERE PLASTIC CONDUIT IS USED FOR INDIVIDUAL GROUND WIRES, DO NOT COMPLETELY ENCIRCLE THE CONDUIT WITH FERROUS AND/OR MAGNETIC MATERIALS. WHERE METAL CLAMPS ARE INSTALLED USE NYLON BOLTS, NUTS, WASHERS, & SPACERS TO INTERRUPT A COMPLETE METALLIC PATH FROM ENCIRCLING THE CONDUIT.

EXOTHERMIC WELD DETAILS

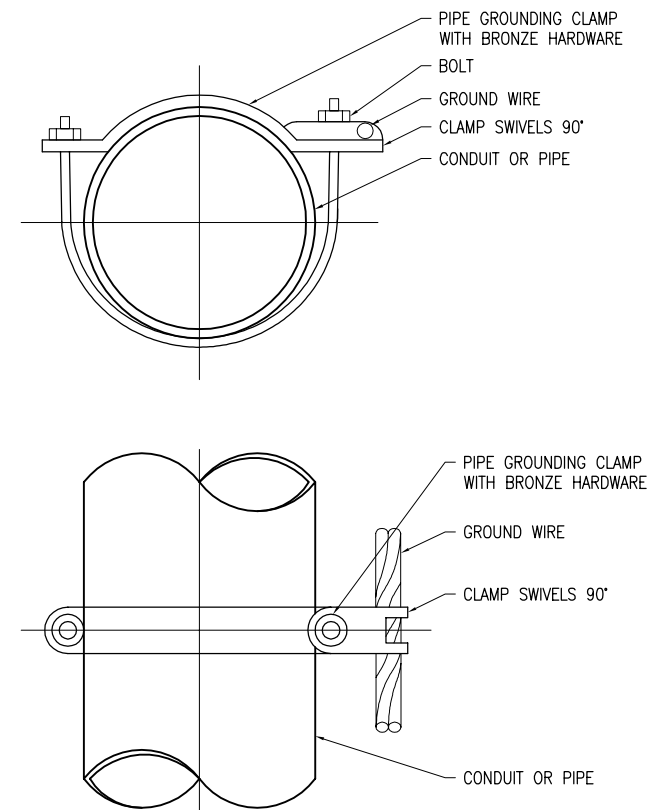


2 HOLE LONG BARREL COMPRESSION LUG TABLE			
WIRE SIZE	BURNDY CAT. NO.	THOMAS & BETTS CAT. NO.	PENN-UNION CAT. NO.
#8 AWG STRANDED	YA8C-2TC38	256-30695-1157	BBLU-8D-2TC38
#6 AWG SOLID	YA8C-2TC38 OR YGA6C-2TC38E2G1		
#6 AWG STRANDED	YA6C-2TC38	256-30695-1158	BBLU-6D-2TC38
#4 AWG STRANDED	YA4C-2TC38	256-30695-1159	BBLU-4D-2TC38
#2 AWG STRANDED	YA2C-2TC38	256-30695-1160	BBLU-2D-2TC38
#2 AWG SOLID	YA3C-2TC38	256-30695-1160	BBLU-3D-2TC38
#1/0 AWG STRANDED	YA25-2TC38	256-30695-1162	BBLU-1/0D-2TC38
#2/0 AWG STRANDED	YA26-2TC38	256-30695-1116	BBLU-2/0D-2TC38
#3/0 AWG STRANDED	YA27-2TC38	54816BE	BBLU-3/0D-2TC38
#4/0 AWG STRANDED	YA28-2TC38	256-30695-1117	BBLU-4/0D-2TC38

NOTES

1. ALL CONNECTIONS TO GROUND BUS BAR SHALL BE WITH 2 HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE BUS BAR.
2. GROUND WIRE CONNECTIONS TO EQUIPMENT SHALL BE WITH 2 HOLE TONGUE LONG BARREL COMPRESSION LUGS BOLTED TO THE DEVICE OR WITH THE RESPECTIVE EQUIPT MANUFACTURER'S LUG OR TERMINAL WHERE APPLICABLE.
3. GROUNDING ELECTRODE CONDUCTORS, BONDING JUMPERS, & INDIVIDUAL GROUND WIRES SHALL NOT BE INSTALLED IN METAL CONDUIT. WHERE PLASTIC CONDUIT IS USED FOR INDIVIDUAL GROUND WIRES, DO NOT COMPLETELY ENCIRCLE THE CONDUIT WITH FERROUS AND/OR MAGNETIC MATERIALS. WHERE METAL CLAMPS ARE INSTALLED USE NYLON BOLTS, NUTS, WASHERS, & SPACERS TO INTERRUPT A COMPLETE METALLIC APTH FROM ENCIRCLING THE CONDUIT.
4. ALL CONNECTIONS SHALL BE COATED WITH A CORROSION PREVENTATIVE COMPOUND (SANCHEM INC. NO-OX-ID "A-SPECIAL", BURNDY PENETROX E, OR EQUAL) BEFORE JOINING. ALL COPPER BUS BARS SHALL BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION. CLEAN SURFACES, OF RESPECTIVE DEVICES TO BE BONDED, TO BARE METAL, PER NEC 250-12.

GROUNDING LUG CONNECTION DETAIL



PIPE GROUNDING CLAMP TABLE	
BURNDY CAT. NO.	PIPE SIZE
GAR3902-BU	1/2" - 1"
GAR3903-BU	1 1/4" - 2"
GAR3904-BU	2 1/2" - 3 1/2"
GAR3905-BU	4" - 5"
GAR3906-BU	6"

NOTES

1. PIPE GROUNDING CLAMPS SHALL HAVE BRONZE HARDWARE, BE CORROSION RESISTANT, SUITABLE FOR DIRECT BURIAL IN EARTH OR CONCRETE, & UL467 LISTED.

PIPE/CONDUIT GROUNDING CLAMP DETAIL

REVISION	DATE

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CARMi, ILLINOIS**

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Hanson Proj. No. 09A0158D	File Name E-027.DWG	Scale NOT TO SCALE	Date 06/24/10	LAYOUT KNL	05/03/10
				DRAWN MLH	05/05/10
				REVIEWED KNL/JSL	06/09/10

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REPLACE MIRLS, MITLS,
VADIS, REILS,
BEACON & VAULT

GROUNDING DETAILS

GROUNDING NOTES

1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL GROUNDING AS MAY BE NECESSARY OR REQUIRED TO MAKE A COMPLETE GROUNDING SYSTEM AS REQUIRED BY THE LATEST NATIONAL ELECTRICAL CODE (NFPA 70) IN FORCE AND FAA-STD-019e (LIGHTNING AND SURGE PROTECTION, GROUNDING, BONDING, AND SHIELDING REQUIREMENTS FOR FACILITIES AND ELECTRONIC EQUIPMENT). THE RELIABILITY OF THE GROUNDING SYSTEM IS DEPENDENT ON CAREFUL, PROPER INSTALLATION AND CHOICE OF MATERIALS. IMPROPER PREPARATION OF SURFACES TO BE JOINED TO MAKE AN ELECTRICAL PATH, LOOSE JOINTS OR CORROSION CAN INTRODUCE IMPEDANCE THAT WILL SERIOUSLY IMPAIR THE ABILITY OF THE GROUND PATH TO PROTECT PERSONNEL AND EQUIPMENT AND TO ABSORB TRANSIENTS THAT CAN CAUSE NOISE IN COMMUNICATIONS CIRCUITS. THE FOLLOWING FUNCTIONS ARE PARTICULARLY IMPORTANT TO ENSURE A RELIABLE GROUND SYSTEM:
2. FURNISH AND INSTALL GROUND RODS AS DETAILED HEREIN. GROUND RODS FOR AIRFIELD LIGHTING (RUNWAY LIGHTING, TAXIWAY LIGHTING, TAXI GUIDANCE SIGNS, & DISTANCE REMAINING SIGNS) SHALL BE MINIMUM 5/8-IN. DIAMETER BY 8-FT LONG, UL-LISTED COPPER CLAD WITH 10-MIL MINIMUM COPPER COATING. GROUND RODS FOR OTHER APPLICATIONS SHALL BE MINIMUM 3/4-IN. DIAMETER BY 10-FT LONG, UL-LISTED, COPPER CLAD WITH 10-MIL MINIMUM COPPER COATING. GROUND RODS SHALL BE SPACED OR AS DETAILED ON THE RESPECTIVE PLANS, AND IN NO CASE SPACED LESS THAN ONE ROD LENGTH APART. ALL CONNECTIONS TO GROUND RODS AND THE GROUND RING SHALL BE MADE WITH EXOTHERMIC WELD TYPE CONNECTORS, CADWELD BY ERICO PRODUCTS, INC., SOLON, OHIO, (PHONE 1-800-248-9353), THERMOWELD BY CONTINENTAL INDUSTRIES, INC., TULSA, OKLAHOMA (PHONE 918-663-1440) OR ULTRAWELD BY HARGER, GRAYSLAKE, ILLINOIS (PHONE 1-800-842-7437). EXOTHERMIC WELD CONNECTIONS SHALL BE INSTALLED IN CONFORMANCE WITH THE RESPECTIVE MANUFACTURER'S DIRECTIONS USING MOLDS AS REQUIRED FOR EACH RESPECTIVE APPLICATION. BOLTED CONNECTIONS WILL NOT BE PERMITTED AT GROUND RODS OR AT BURIED GROUNDING ELECTRODE CONDUCTORS.
3. CONTRACTOR SHALL TEST EACH MADE ELECTRODE GROUND ROD/GROUND FIELD/GROUND RING WITH AN INSTRUMENT SPECIFICALLY DESIGNED FOR TESTING GROUND FIELD SYSTEMS. IF GROUND RESISTANCE EXCEEDS 10 OHMS, CONTACT THE ENGINEER FOR FURTHER DIRECTION. COPIES OF GROUND FIELD TEST RESULTS SHALL BE FURNISHED TO THE RESIDENT ENGINEER, UPON REQUEST, FOR REVIEW AND RECORD PURPOSES.
4. ALL PRODUCTS ASSOCIATED WITH THE GROUNDING SYSTEM SHALL BE UL-LISTED AND LABELED.
5. ALL BOLTED OR MECHANICAL CONNECTIONS SHALL BE COATED WITH A CORROSION PREVENTATIVE COMPOUND BEFORE JOINING, SANCHEM INC. "NO-OX-ID "A-SPECIAL" COMPOUND, BURNDY PENETROX E, OR EQUAL.
6. METALLIC SURFACES TO BE JOINED SHALL BE PREPARED BY THE REMOVAL OF ALL NON-CONDUCTIVE MATERIAL, PER 2008 NATIONAL ELECTRICAL CODE ARTICLE 250-12. ALL COPPER BUS BARS MUST BE CLEANED PRIOR TO MAKING CONNECTIONS TO REMOVE SURFACE OXIDATION.
7. METALLIC RACEWAY FITTINGS SHALL BE MADE UP TIGHT TO PROVIDE A PERMANENT LOW IMPEDANCE PATH FOR ALL CIRCUITS. METAL CONDUIT TERMINATIONS IN ENCLOSURES SHALL BE BONDED TO THE ENCLOSURE WITH UL-LISTED FITTINGS SUITABLE FOR GROUNDING. PROVIDE GROUNDING BUSHINGS WITH BONDING JUMPERS FOR ALL METAL CONDUITS ENTERING SERVICE EQUIPMENT (METER BASE, CT CABINET, MAIN SERVICE BREAKER ENCLOSURE, ETC.). PROVIDE GROUNDING BUSHINGS WITH BONDING JUMPERS FOR ALL METAL CONDUITS ENTERING AN ENCLOSURE THROUGH CONCENTRIC OR ECCENTRIC KNOCKOUTS THAT ARE PUNCHED OR OTHERWISE FORMED SO AS TO IMPAIR THE ELECTRICAL CONNECTION TO GROUND. STANDARD LOCKNUTS OR BUSHINGS SHALL NOT BE THE SOLE MEANS FOR BONDING WHERE A CONDUIT ENTERS AN ENCLOSURE THROUGH A CONCENTRIC OR ECCENTRIC KNOCKOUT
8. ALL CONNECTIONS, LOCATED ABOVE GRADE, BETWEEN THE DIFFERENT TYPES OF GROUNDING CONDUCTORS SHALL BE MADE USING UL-LISTED DOUBLE COMPRESSION CRIMP TYPE CONNECTORS OR UL-LISTED BOLTED GROUND CONNECTORS. FOR GROUND CONNECTIONS TO ENCLOSURES, CASES AND FRAMES OF ELECTRICAL EQUIPMENT NOT SUPPLIED WITH GROUND LUGS THE CONTRACTOR SHALL DRILL REQUIRED HOLES FOR MOUNTING A BOLTED GROUND CONNECTOR. ALL BOLTED GROUND CONNECTORS SHALL BE BURNDY, THOMAS AND BETTS, OR EQUAL. TIGHTEN CONNECTIONS TO COMPLY WITH TIGHTENING TORQUES IN UL STANDARD 486A TO ASSURE PERMANENT AND EFFECTIVE GROUNDING.
9. ALL METAL EQUIPMENT ENCLOSURES, CONDUITS, CABINETS, BOXES, RECEPTACLES, MOTORS, ETC. SHALL BE BONDED TO THE RESPECTIVE GROUNDING SYSTEM.
10. PROVIDE ALL BOXES FOR PROPOSED OUTLETS, SWITCHES, CIRCUIT BREAKERS, ETC. WITH GROUNDING SCREWS. PROVIDE ALL PANELBOARD, SWITCHGEAR, ETC., ENCLOSURES WITH GROUNDING BARS WITH INDIVIDUAL SCREWS, LUGS, CLAMPS, ETC., FOR EACH OF THE GROUNDING CONDUCTORS THAT ENTER THEIR RESPECTIVE ENCLOSURES.
11. EACH NEW FEEDER CIRCUIT AND/OR BRANCH CIRCUIT SHALL INCLUDE AN EQUIPMENT GROUND WIRE. METAL RACEWAY OR CONDUIT SHALL NOT MEET THIS REQUIREMENT. THE EQUIPMENT GROUND WIRE FROM EQUIPMENT SHALL NOT BE SMALLER THAN ALLOWED BY 2008 NEC TABLE 250-122 "MINIMUM SIZE CONDUCTORS OR GROUNDING RACEWAY AND EQUIPMENT." WHEN CONDUCTORS ARE ADJUSTED IN SIZE TO COMPENSATE FOR VOLTAGE DROP, EQUIPMENT-GROUNDING CONDUCTORS SHALL BE ADJUSTED PROPORTIONATELY ACCORDING TO CIRCULAR MIL AREA. ALL EQUIPMENT GROUND WIRES SHALL BE COPPER, EITHER BARE OR INSULATED GREEN IN COLOR. WHERE THE EQUIPMENT GROUNDING CONDUCTORS ARE INSULATED, THEY SHALL BE IDENTIFIED BY THE COLOR GREEN, AND SHALL BE THE SAME INSULATION TYPE AS THE PHASE CONDUCTORS.
12. ALL EXTERIOR METAL CONDUIT, WHERE NOT ELECTRICALLY CONTINUOUS BECAUSE OF MANHOLES, HANDHOLES, NON-METALLIC JUNCTION BOXES, ETC., SHALL BE BONDED TO ALL OTHER METAL CONDUIT IN THE RESPECTIVE DUCT RUN, AND AT EACH END, WITH A COPPER-BONDING JUMPER SIZED IN CONFORMANCE WITH 2008 NEC 250-102. WHERE METAL CONDUITS TERMINATE IN AN ENCLOSURE (SUCH AS A MOTOR CONTROL CENTER, SWITCHBOARD, ETC) WHERE THERE IS NOT ELECTRICAL CONTINUITY WITH THE CONDUIT AND THE RESPECTIVE ENCLOSURE, PROVIDE A BONDING JUMPER FROM THE RESPECTIVE ENCLOSURE GROUND BUS TO THE CONDUIT SIZED PER 2008 NEC 250-102.
13. IT IS THE INTENT OF THIS SPECIFICATION THAT ALL MOTOR FRAMES, PUMP BASES ELECTRICAL EQUIPMENT ENCLOSURES, PANEL HOUSINGS, CONDUITS, BOXES, ETC. HAVE A CONTINUOUS COPPER WIRE GROUND CONNECTION AND SHALL BE POSITIVELY BONDED TO THE RESPECTIVE GROUNDING SYSTEM. CONDUIT CONNECTORS WILL NOT BE CONSIDERED AS ADEQUATE GROUNDING.
14. PROVIDE A POSITIVE GROUND BOND FOR ALL OUTLET BOXES, ELECTRICAL EQUIPMENT ENCLOSURES, GROUNDING RECEPTACLES, TOGGLE SWITCHES, ETC. INSTALL A GROUNDING CONDUCTOR IN ALL WIRE AND CABLE RACEWAYS. GROUND CONDUCTOR TO HAVE 600-VOLT INSULATION AND BE IDENTIFIED BY A CONTINUOUS GREEN COLOR COATING. THEY SHALL BE USED SOLELY FOR GROUNDING PURPOSES AND BE ENTIRELY SEPARATE FROM WHITE GROUNDED NEUTRAL CONDUCTOR, EXCEPT AT SUPPLY SIDE OF SERVICE DISCONNECTING MEANS, WHERE GROUNDING AND NEUTRAL SYSTEMS ARE TO BE CONNECTED TO SERVICE GROUND.
15. EACH AND ALL GROUNDED CASED AND METAL PARTS ASSOCIATED WITH ELECTRICAL EQUIPMENT SHALL BE TESTED FOR CONTINUITY OF CONNECTION WITH GROUND BUS SYSTEM BY CONTRACTOR IN PRESENCE OF OWNER'S REPRESENTATIVE.
16. ALL CONNECTIONS BETWEEN THE DIFFERENT TYPES OF GROUNDING CONDUCTORS ABOVE GRADE SHALL BE MADE USING BOLTED GROUND CONNECTORS. GROUND LUGS SHALL BE PROVIDED IN ALL ENCLOSURES AND WIRING TERMINATION JUNCTION BOXES. EQUIPMENT GROUNDS AND GROUNDING CONDUCTOR SHALL BE CONNECTED TO THESE GROUND LUGS. FOR GROUND CONNECTIONS TO ENCLOSURES, CASES AND FRAMES OF ELECTRICAL EQUIPMENT NOT SUPPLIED WITH GROUND LUGS THE CONTRACTOR SHALL DRILL REQUIRED HOLES FOR MOUNTING A BOLTED GROUND CONNECTOR. ALL BOLTED GROUND CONNECTORS SHALL BE BURNDY, OR EQUAL.
17. BOND ALL NONCURRENT-CARRYING PARTS OF METAL EQUIPMENT TO GROUND SYSTEM.
18. BUILDING STRUCTURAL STEEL SYSTEM SHALL BE BONDED TO ELECTRICAL GROUND SYSTEM.
19. INSTALL GROUNDING ELECTRODE CONDUCTORS, LIGHTNING PROTECTION DOWN CONDUCTORS AND SEPARATE GROUND CONDUCTORS IN SCHEDULE 40 OR SCHEDULE 80 PVC CONDUIT OR EXPOSED WHERE ACCEPTABLE TO LOCAL CODES. WHERE GROUNDING ELECTRODE CONDUCTORS, LIGHTNING PROTECTION DOWN CONDUCTORS OR INDIVIDUAL GROUND CONDUCTORS ARE RUN IN PVC CONDUIT, DO NOT COMPLETELY ENIRCLE CONDUIT WITH FERROUS AND/OR MAGNETIC MATERIALS. USE NON-METALLIC REINFORCED FIBERGLASS STRUT SUPPORT. WHERE METAL CONDUIT CLAMPS ARE INSTALLED, USE NYLON BOLTS, NUTS, WASHERS AND SPACERS TO INTERRUPT A COMPLETE METALLIC PATH FROM ENCIRCLING THE CONDUIT. THIS IS REQUIRED TO AVOID GIRDLING OF GROUND CONDUCTORS. GIRDLING OF A GROUND CONDUCTOR IS THE RESULT OF PLACING THE CONDUCTOR IN A RING OF MAGNETIC MATERIAL. THIS RING COULD BE A METALLIC CONDUIT, U-BOLT OR STRUT SUPPORT PIPE CLAMP, OR OTHER SUPPORT HARDWARE. THE RESULT OF GIRDLING GROUND CONDUCTORS SIGNIFICANTLY INCREASES THE INDUCTIVE IMPEDANCE OF THE GROUND CONDUCTOR. INDUCTIVE AND CAPACITIVE IMPEDANCE IS A TYPE OF RESISTANCE THAT OPPOSES THE FLOW OF ALTERNATING CURRENT. ANY INCREASE IN THE IMPEDANCE OF A GROUND CONDUCTOR REDUCES ITS ABILITY TO EFFECTIVELY MITIGATE RADIO FREQUENCY NOISE IN THE GROUND SYSTEM. THE CONDITION WHERE A GROUND CONDUCTOR IS GIRDLED DURING A LIGHTNING STRIKE RESULTS IN PHENOMENA KNOWN AS SURGE IMPEDANCE LOADING. SURGE IMPEDANCE LOADING IS A RESULT OF VOLTAGE AND CURRENT REACHING 500,000 VOLTS AND 10,000 AMPS FOR A SHORT DURATION. GIRDLING FURTHER INCREASES THE IMPEDANCE AT LIGHTNING FREQUENCIES OF 100 KILOHERTZ TO 100 MEGAHERTZ. AT THESE POWER AND FREQUENCY LEVELS ANY INCREASE IN THE IMPEDANCE OF THE GROUND CONDUCTOR MUST BE CONTROLLED. DURING LIGHTNING DISCHARGE CONDITIONS A LOW INDUCTIVE IMPEDANCE PATH IS MORE IMPORTANT THAN A LOW DC RESISTANCE PATH.
20. IF LOCAL CODES DICTATE THAT INDIVIDUAL GROUNDING CONDUCTORS MUST BE RUN IN METAL CONDUIT OR RACEWAY, THEN THE CONDUIT OR RACEWAY MUST BE BONDED AT EACH END OF THE RUN WITH A BONDING JUMPER SIZED EQUAL TO THE INDIVIDUAL GROUNDING CONDUCTOR OR AS REQUIRED BY 2008 NEC 250-102. NOTE THIS DOES NOT APPLY TO AC EQUIPMENT GROUNDING CONDUCTORS RUN WITH AC CIRCUITS.
21. WHERE A CONFLICT IS DETERMINED WITH RESPECT TO GROUNDING REQUIREMENTS PER MANUFACTURER INSTALLATION INSTRUCTIONS, NEC, AND/OR THE CONTRACT DOCUMENTS, CONTACT THE RESIDENT ENGINEER OR PROJECT ENGINEER FOR FURTHER DIRECTIONS.

REVISION	
DATE	

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REPLACE MRLS, MITLS,
VADIS, REILS,
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GROUNDING NOTES

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