Ferguson Consulting
Aviation Specialists for Electrical,
Telecommunications and Security Systems

TXDOT AVIATION STATEWIDE AIRPORT ELECTRICAL CONSTRUCTION PROJECT (AVSAE) - GROUP ALPHA
TxDOT CSJ No. 4222AVSAEA

ADDENDUM NO. 3

May 14, 2025

TO ALL PROSPECTIVE BIDDERS:

All bidders shall acknowledge receipt of this and all other addenda on page 7 of 8 of the Bid Form. **Failure to acknowledge receipt of an addendum may be cause for rejection of the bid.** This addendum becomes a part of the contract documents. All provisions of the original plans, specifications, and contract documents shall remain in full force and effect, except as modified by this addendum.

A. You are hereby notified of the following amendments to the Bid Form for the subject project.

   a) **A revised Bid Form will be provided along with this Addendum #3.**

B. You are hereby notified of the following amendments to the Contract Documents/Specifications for the subject project.

   a) **Bid Opening will take place at 2:00pm, Thursday 5/29/2025, at TxDOT**
   b) **Specification P-153 – Controlled Low Strength Material (CLSM) was included.**
   c) **Specification L-105 - Alteration, Removal, Demolition. Revised verbiage in the Measurement and Payment sections. Added two new line items under basis of payment.**
   d) **Specification L-107 - Wind Cones. This specification has been added in it's entirety.**
   e) **Specification L-109 – Xfrmer Vault and Vault Equipment. Revised verbiage in the Method of Measurement section.**
   f) **Specification L-110 – Underground Duct Banks and Conduit. Revised verbiage in the Method of Measurement section. Added two new line items under basis of payment.**
   g) **Specification L-115 – Manholes & Junction Structures. Revised verbiage for the line items under the Basis of Payment section.**
   h) **Specification L-125 – Install Airport Lighting Equipment. Revised verbiage for the line items under the Basis of Payment section as well as added a line item.**
   i) **Specification L-130 – PAPI. Revised verbiage in the Method of Measurement section.**

C. You are hereby notified of the following amendments to the Construction Plans for the subject project.

   a) **Sheet G0.2 – Summary of Quantities has been revised.**
   b) **Sheet G0.3 – Summary of Quantities has been revised.**
   c) **Sheet C0.7 – Vault and Wind Cone Details – Vault foundation detail has been included, and duplicated beacon details removed.**
   d) **Sheet E1.1 – Airfield Electrical Legend. Added new details.**

e) **Sheet E2.2 – General Airfield Electrical Details. Revised detail 1 to clarify ground rod material and drain line conduit.**
f) **Sheet E2.3 – General Airfield Electrical Details. Revised detail 5 to update duct bank size. Revised detail 6 to remove unnecessary callout.**
g) **Sheet E2.4 – General Airfield Electrical Details. Revised detail 3 to update JCP size.**
h) **Sheet E2.5 – General Airfield Electrical Details. Revised detail 1 to clarify directional drilling operation.**
i) **Sheet E2.7 – General Airfield Electrical Details. Added detail 4.**
j) **Sheet EE2.1 – Airfield Electrical layout Plan. Revised detail 1 to clarify light IDs.**
k) **Sheet EE2.2 – Airfield Electrical layout Plan. Revised detail 1 to clarify light IDs.**
l) **Sheet EE2.3 – Airfield Electrical layout Plan. Revised detail 1 to clarify light IDs.**
m) **Sheet EE4.1 – Electrical Vault Plan. Revised vault equipment demolition plan notes. Revised vault equipment proposed plan layout, wall elevations, and panel schedule.**
n) **Sheet EE4.2 – Electrical Vault Plan. Added details 2 and 3.**
o) **Sheet EE6.1 – Airfield Lighting Schedules. Revised Edge Light Fixture Schedule.**
p) **Sheet EG1.2 – Airfield Lighting Demolition Plan. Revised detail 1 to show full extent of demolition scope.**
q) **Sheet EG2.1 – Airfield Electrical layout Plan. Revised detail 1 to adjust Runway Threshold End Light layout and to revise light fixture IDs.**
r) **Sheet EG2.2 – Airfield Electrical layout Plan. Revised detail 1 to adjust light fixture IDs.**
s) **Sheet EG2.3 – Airfield Electrical layout Plan. Revised detail 1 to adjust Runway Threshold End Light layout and to revise light fixture IDs.**
t) **Sheet EG4.1 –Electrical Vault Plan. Revised details to clarify vault foundation plan, show doorstep, and update keyed note 1 for HVAC verbiage.**
u) **Sheet EG4.2 –Electrical Vault Plan. Revised details to update the proposed vault plan, wall elevations, and update panel schedule.**
v) **Sheet EG4.3 –Electrical Vault Plan. Revised details to update the vault power plan, vault grounding plan, and vault lighting plan.**
w) **Sheet EG6.1 – Airfield Lighting Schedules. Revised Edge Light Fixture Schedule.**
x) **Sheet EP1.1 – Airfield Electrical Demolition Plan. Revised detail 1 to clarify scope. Updated keyed notes.**
y) **Sheet EP1.2 – Airfield Electrical Demolition Plan. Revised detail 1 to update keyed notes.**
z) **Sheet EP1.3 – Airfield Electrical Demolition Plan. Revised detail 1 to update keyed notes.**
aa) **Sheet EP1.4 – Airfield Electrical Demolition Plan. Revised detail 1 to update keyed notes.**
bb) **Sheet EP1.5 – Airfield Electrical Demolition Plan. Revised detail 1 to clarify scope. Updated keyed notes.**
cc) **Sheet EP1.6 – Airfield Electrical Demolition Plan. Revised detail 1 to update keyed notes.**
dd) **Sheet EP1.7 – Airfield Electrical Demolition Plan. Revised detail 1 to update keyed notes.**
ee) **Sheet EP2.1 – Airfield Electrical Layout Plan. Revised detail 1 to add new light fixture.**
ff) **Sheet EP2.3 – Airfield Electrical Layout Plan. Revised detail 1 to clarify duct bank and JCP sizing.**
gg) **Sheet EP2.5 – Airfield Electrical Layout Plan. Revised detail 1 to add new light fixture. Updated sign legend IDs.**
hh) **Sheet EP3.1 – Airfield Electrical Dimension Plan. Revised detail 1 to add dimension for new light fixture.**

ii) **Sheet EP3.5 – Airfield Electrical Dimension Plan. Revised detail 1 to add dimension for new light fixture.**
jj) **Sheet EP4.1 –Electrical Vault Plan. Revised details to vault front elevation, vault foundation plan, show doorstep, and update keyed note 1 for HVAC verbiage.**
kk) **Sheet EP4.2 –Electrical Vault Plan. Revised details to update the proposed vault plan, wall elevations, and update panel schedule.**
ll) **Sheet EP4.3 –Electrical Vault Plan. Revised details to update the vault power plan, vault grounding plan, and vault lighting plan.**
mm) **Sheet EP6.1 – Airfield Lighting Schedules. Revised Runway Edge Light Fixture schedule.**
nn) **Sheet EP6.2 – Airfield Lighting Schedules. Revised JCP schedule. Revised sign S1-B number of modules.**
oo) **Sheet ER1.2 – Airfield Electrical Demolition Plan. Revised detail 1 to show updated scope.**
pp) **Sheet ER1.7 – Airfield Electrical Demolition Plan. Revised detail 1 to show updated scope and to update note for existing electrical rack.**
qq) **Sheet ER1.8 – Airfield Electrical Demolition Plan. Revised detail 1 to show updated scope.**
rr) **Sheet ER1.9 – Airfield Electrical Demolition Plan. Revised detail 1 to update note for existing electrical service.**
ss) **Sheet ER1.10 – Airfield Electrical Demolition Plan. Revised detail 1 to show existing circuits.**
tt) **Sheet ER1.11 – Airfield Electrical Demolition Plan. Revised detail 1 to show existing circuits.**
uu) **Sheet ER2.1 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10.**
vv) **Sheet ER2.2 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10. Updated homerun duct bank and JCP size.**
ww) **Sheet ER2.3 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10.**
xx) **Sheet ER2.4 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10. Updated homerun duct bank and JCP size.**
yy) **Sheet ER2.5 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10.**
zz) **Sheet ER2.6 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10.**
aaa) **Sheet ER2.7 – Airfield Electrical Layout Plan. Revised detail 1 to update scope at sign S-30A and S-30B. Updated keyed note 9 and added keyed note 10.**
bbb) **Sheet ER2.8 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts and update scope at sign S-31A and S-31B. Updated keyed note 9 and added keyed note 10.**
ccc) **Sheet ER2.9 – Airfield Electrical Layout Plan. Revised detail 1 to update keyed note 9 and add keyed note 10.**
ddd) **Sheet ER2.10 – Airfield Electrical Layout Plan. Revised detail 1 to update keyed note 9 and add keyed note 10.**
eee) **Sheet ER2.11 – Airfield Electrical Layout Plan. Revised detail 1 to update circuit callouts. Updated keyed note 9 and added keyed note 10. Updated duct bank and JCP sizes.**
fff) **Sheet ER6.1 –Airfield Lighting Schedules. Revised JCP schedule based on changes made to plans.**

ggg) Sheet ES1.1 – Airfield Electrical Demolition Plan. Revised detail 1 to clarify scope.

hhh) Sheet ES1.2 – Airfield Electrical Demolition Plan. Revised detail 1 to clarify scope.

iii) Sheet ES1.3 – Airfield Electrical Demolition Plan. Revised detail 1 to clarify scope.

jjj) Sheet ES2.1 – Airfield Lighting Layout Plan. Revised detail 1 to clarify scope.

kkk) Sheet ES2.2 – Airfield Lighting Layout Plan. Revised detail 1 to clarify scope.

lll) Sheet ES2.3 – Airfield Lighting Layout Plan. Revised detail 1 to clarify scope.

mmm) Sheet ES4.1 –Electrical Vault Plan. Revised details to clarify door replacement scope. Updated panel schedule.

nnn) Sheet ES6.1 –Airfield Lighting Schedules. Revised JCP schedule based on changes made to plans.

ooo) Sheet ET2.1 – Airfield Lighting Layout Plan. Revised detail 1 to clarify circuiting scope and isolation transformer replacement in existing sign.

ppp) Sheet ET2.3 – Airfield Lighting Layout Plan. Revised detail 1 to add a pullbox to wind cone conduit run.

qqq) Sheet ET2.5 – Airfield Lighting Layout Plan. Revised detail 1 to clarify isolation transformer replacement in existing sign.

rrr) Sheet ET4.1 – Electrical Vault Plan. Revised detail 1 to clarify service entrance scope. Revised keyed note 1 to clarify HVAC system requirements. Revised detail 2 to clarify vault exterior profile view and plan view. Updated detail 3 to clarify one line diagram callouts.

sss) Sheet ET4.2 – Electrical Vault Plan. Revised proposed vault equipment layout for entire sheet.

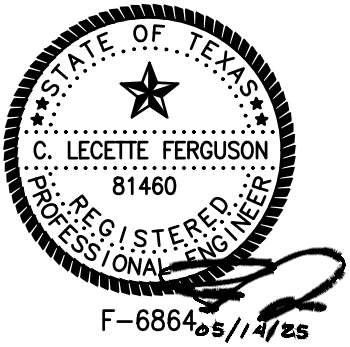
ttt) Sheet ET4.2 – Electrical Vault Plan. Revised proposed vault equipment layout for entire sheet.

uuu) Sheet ET6.1 –Airfield Lighting Schedules. Revised JCP schedule based on changes made to plans.

D. Responses to bidder questions are included with this addendum.

ADDENDUM NO. 3 ISSUED BY:

Ferguson Consulting, Inc.



C. Lecette Ferguson, P.E., R.C.D.D.
Airfield Electrical Engineer

TBPE Firm Registration No. 81460

TxDOT Statewide Electrical Group Alpha Bidder Questions

1. In the Pre-Bid it was stated that site investigation photos could be provided. Can you please provide those pictures?

   RESPONSE: Yes, linked below are those pictures. It should be noted, that these pictures are dated, and may not represent current conditions. Each contractor was encouraged to visit all airport sites at the pre-bid for current conditions. Weblink to pictures: https://fciengr.egnyte.com/fl/kO3wwuNg2M

2. How do we set up site visits?

   RESPONSE: Lochner is the primary point of contact between the Airports, Engineer and Contractor. As discussed in the Pre-Bid meeting, Lochner has prepared a List of Contacts that will be provided to the Contractor upon request. Contractors were encouraged to schedule site visits with the airports. Addendum #2 this list was provided to the contractors.

3. Would it be possible to get an update to page G0.3, Drawings Vol 1? This page on the bid schedule show the bid quantities for signs to each airport. Since the change to Palacios Municipal sign schedule (p EP6.2) that new signs listed will change the quantity numbers.

   RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

4. Bid Item 98 (L-125-5.16) has signs installed on existing pavement via coring. That implies to me that those signs will also require new basecans. Is that correct?

   RESPONSE: Yes, those signs installed on existing pavement via coring will require a new base can as well.

5. For Palacious Airport, Sheet EP1.1, bid item #33, Note 5 states removal of cable on the south side of the runway, but on the north side its does not have cable removal. Please verify if the north side needs cable removal.

   RESPONSE: Keyed note 5 has been added to the North side of the runway where applicable. Updated sheets have been provided as a part of this Addendum No. 3.

6. For Palacios Airport, the demo quantity of tw edge lights is 0, but there is a quantity of 20 in the plans that was found. Please verify demo quantity.

   RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

7. The plans for Rockport airport show to salvage the existing beacon which would be removal item 50 and install 31 however the bid item break down shows Rockport airport having a new beacon removal bid item 49 and install item 30. Please clarify if Rockport is to get a new beacon or to salvage existing beacon.

RESPONSE: The Rockport beacon should be salvaged and reinstalled on a new pole with a new foundation. A revised Summary of Quantities is provided with this Addendum No. 3.

8. For Rockport Airport, bid item #35, 7 were found, but there is a total of 8 in the summary of quantities. Please verify quantity.

   RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

9. For Rockport Airport, bid item #41 & 91, 40 were found, but there is a total of 32 in the summary of quantities. Please verify quantity.

   RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

10. For Rockport Airport, bid item #49, the bid item description states to install new, but the electrical page note it states to install salvage. Please verify work to be performed.

    RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

11. For Rockport Airport, bid item #55, there was a quantity of 81,952 LF found, but the summary of quantity total is 88,550 LF. Please verify quantity.

    RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

12. For Rockport Airport, bid item #59, there is a quantity of 1050 LF found, but the summary of quantity total is 2500 LF. Please verify quantity.

    RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

13. For Rockport Airport, bid item #66, there is a 0 quantity in the summary of quantities, but 145 LF were found on the electrical pages. Please verify quantity.

    RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

14. For Rockport Airport, bid item #69, 1550 LF was found in the electrical pages, but the summary of quantities total is 2145 LF. Please verify quantity.

    RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

15. For Rockport Airport, bid item #78, 16 were found, but the summary of quantities total is 15. Please verify quantity.

    RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

16. For Rockport Airport, bid item #79, 18 were found, but the summary of quantities total is 17. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

17. For Smithville Airport, bid item #45, 8 were found, and the summary of quantity total is 6. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

18. For Smithville Airport, bid item #68, 23 LF were found on the plans, but the summary of quantities total is 50 LF. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

19. For Terrell Airport, bid item #32, 3776 LF was found, and in the summary if quantities total is 2400 LF. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

20. For Terrell Airport, bid item #58, 1408 LF was found and in the summary of quantities total is 2000 LF. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

21. For Palacios Airport, bid item #46, 7 were found, but the summary of quantities total is 8. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

22. For Palacios Airport, bid item #82, 52 was found, but the summary of quantities total is 56. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

23. For Palacios Airport, bid item #94, 1 was found, but the summary of quantities total is 2. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

24. For Edna Airport, bid item #58, 3277 LF were found, but the summary of quantity is 1200 LF. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

25. For Edna Airport, bid item #78, 11 were found, but summary of quantities total is 9. Please verify today.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

26. For Gonzales Airport, bid item #82, 2 were found but the summary of quantities is 0. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

27. For Gonzales Airport, bid item #100, 1 was found but the summary of quantities is 0. Please verify quantities.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

28. For Palacios Airport, bid item #95, 2 was found, but the summary of quantities total is 1. Please verify quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

29. Please provide bore logs/soils report for all airports.

RESPONSE: No geotechnical investigation was performed for this project. No geotechnical reports will be provided.

30. For Rockport Airport, page ER2.2, the existing pavement southeast of the beacon on a new tip down pole, it does not call for the duct bank to be directionally drilled underneath the existing pavement. Please verify if directional drilling is needed or if a separate bid item will be provided.

RESPONSE: Contractor to open cut existing pavement for installation. Updated sheets have been provided as a part of Addendum 3. A revised Summary of Quantities is provided with this Addendum No. 3.

31. Specs for P-153 are not provided. Please provide P-153 spec.

RESPONSE: P-153 CLSM spec has been included in this addendum.

32. Who can service the ALCMS graphics at Palacios, Gonzales, & Terrell?

RESPONSE: There is no ALCMS at the three airport noted. See the updated Summary of Quantities

33. Specs are not provided for the vaults HVAC system for the new vaults. Can you please provide a spec for the HVAC units for the new vaults.

RESPONSE: It is a performance spec – the HVAC needs to meet the heating and cooling requirements noted.

34. For the Rockport Airport, we are having trouble finding a vendor to meet the P-610 spec. We located one vendor that has a value of 0.34% expansion at 16 days, F-ash calcium oxide is 20%, and total alkali content is 0.04. Whereas in the specs, it lists a calcium oxide content of less than 20% and a total alkali content less than 3%. Is this mixture acceptable? If not, is there an alternative spec for P-610 or a TXDOT spec that can suffice?

RESPONSE: TxDOT 360 specification will suffice for concrete meeting 4,000 psi.

35. For Terrell Airport, there is not a bid item for 2w-4" Directional Drilling, on page ET2.6. Please provide bid item with quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3. Refer to line item L-110-5.15 for this work.

36. For Smithville Airport, bid item #78, the summary of quantities total is 8, but the new addendum plans are showing a count of 9. Please verify this quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

37. For Smithville Airport, bid item #79, the summary of quantities total is 2, but the new addendum plans are showing a count of 1. Please verify this quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

38. For Smithville Airport, bid item #80, the summary of quantities total is 3, but the new addendum plans are showing a count of 4. Please verify this quantity.

RESPONSE: A revised Summary of Quantities is provided with this Addendum No. 3.

39. For Gonzales Airport, we're having issues finding a vendor for concrete. Do you know of any vendors who have serviced the airport before?

RESPONSE: A TxDOT 360 concrete may be used in lieu of P-610. Concrete must meet a compressive strength of 4,000 psi at 28-days.

40. In the existing Palacios vault room, there is ASOS equipment that is not called to be moved or relocated to the new vault; however, the plans show to feed the ASOS from the new vault. Please verify that it is not in this contract to relocate the existing ASOS equipment in the vault.

RESPONSE: The ASOS equipment is intended to be relocated to the new vault.

41. No soils report given in the bid docs, please provide soils report for each airport.

RESPONSE: No geotechnical investigation was conducted for this project. There is no soils report for this project.

42. For the airports getting new vault, please clarify who's responsible for coordination with the utility company for permitting process/fees?

RESPONSE: Coordination with the utility company and all applicable fees will be the responsibility of the contractor and will be paid for under line item L-110-5.15.

43. What utility company supplies power to each airport?

RESPONSE: Edna – Jackson Electric Cooperative/ Gonzales – Gexa Energy/ Palacios – Oncor Electric/ Rockport – American Electric Power Texas/ Smithville - Bluebonnet Electric Co-op/ Terrell – Oncor Electric

44. Please provide profile showing the thickness of the 13-31 Palacios Runway.

RESPONSE: No geotechnical investigation was conducted for this project. The thickness of the pavement is approximately +/- 9 inches according to the airport's recollection.

45. General: May bidders have more time to complete bids based on receipt of Addendum 3 covering questions?

RESPONSE: Bid Proposals will be received until 2:00 pm CST on Wednesday, May 21st, 2025.

46. Bid Item 64, L-109-5.4 - Manufacturers are indicating the existing L-890 ALCS cannot have graphics upgraded. Are bidders to furnish a replacement L-890 with correct graphics?

RESPONSE: The intent for the bidder is to update the existing graphic screen. If it is determined that the graphic screen cannot be updated, it will be addressed during construction.

47. Bid Item 92 - 95, L-125-5.10 through 5.13 - What guidance can be provided on determining which new sign installations will require a 1-inch Schedule 40 PVC drain exiting the light base terminating in a gravel bed sump beneath the foundation those that will require a 2-inch Schedule 40 PVC drain exiting the light base and terminating remotely in an existing drainage structure? There are not drawings included having the numbering series EL1.

RESPONSE: An updated detail has been included as part of Addendum 3.

48. C0.7 where are there required new segmented circles and under what item are they to paid? May bidders have a detail?

RESPONSE: There are no new segmented circles, only segmented circles to be repainted.

49. C0.7 segmented circle plan differs from the detail on E2.6. Please clarify, new segmented circles vs paint exiting and the required configuration vs the existing configuration.

RESPONSE: There are no new segmented circles, only segmented circles to be repainted.

50. E2.2 Sign Details show both cu clad ground rods and stainless-steel ground rods. Can bidders standardize on cu clad ground rods for the entire project?
RESPONSE: An updated detail has been included as part of Addendum 3.

51. E2.2 Are both ground rods at each sign to have the 6 in sleeve backfilled with grout, topped with P-606 or only the ground rod under the sign?

RESPONSE: Both ground rods at each sign are intended to have the 6” sleeve backfilled with grout and topped with P-606.

52. E2.3 Note 1 - counterpoise over duct bank. Are bidders to infer from this detail that counterpoise over concrete-encased duct banks detailed here is NOT to be paid for out of item 56, L-108-5.2? In addition, the detail does not show the counterpoise. Please clarify the requirement and the pay item for it.

RESPONSE: The duct bank details include the correct counterpoise installation for each respective duct bank size. The counterpoise wire shall be paid for under the line item L-108-5.2.

53. E2.3 JCP detail - counterpoise is shown attaching to light base ground lug and notation reads "welded to 17-5/8" top flange (Vega L-867D with 1/2" pavement dam 6324 with 1/2" pavement dam or approved equivalent" with an arrow pointing to the counterpoise. Please clarify the requirement.

RESPONSE: The JCP detail has been updated and the revised sheet has been included as a part of this Addendum 3.

54. EE5.2 (typ) Are there two be 2W2" Schedule 40 PVC Conduits between PAPI LHAs or one?

RESPONSE: There should be (2) 2” conduits between PAPI LHAs.

55. EE5.3 shows a 2-1/2 in x 6 ft air terminal on the beacon pole and C0.7 shows a 1/2 in x 8 ft air terminal on the new beacon poles (3 quantity) and please clarify which detail is correct and how many air terminals are required per beacon pole?

RESPONSE: Details H, I, and J have been removed from sheet C0.7 to clear up any discrepancies between beacon details.

56. Will there be an allowance for utility coordination and connections at Terrell?

Response: Yes, a pay item has been added for this infrastructure required. An allowance item has been added for the utility company expenses to install the feeder cables and transformer. This allowance shall not exceed $100,000.00.

BASE BID

ITEM NO.	SPEC.	ITEM DESCRIPTION	UNIT	QUANTITIES						QUANTITY TOTAL
				Edna	Gonzalez	Palacios	Rockport	Smithville	Terrell	
1	C-105-6.1	Mobilization - Edna	LS	1	0	0	0	0	0	1
2	C-105-6.2	Mobilization - Gonzales	LS	0	1	0	0	0	0	1
3	C-105-6.3	Mobilization - Palacios	LS	0	0	1	0	0	0	1
4	C-105-6.4	Mobilization - Rockport	LS	0	0	0	1	0	0	1
5	C-105-6.5	Mobilization - Smithville	LS	0	0	0	0	1	0	1
6	C-105-6.6	Mobilization - Terrell	LS	0	0	0	0	0	1	1
7	SS-1-1	Temporary Marking, Lighting and Barricades □ Edna	LS	1	0	0	0	0	0	1
8	SS-1-2	Temporary Marking, Lighting and Barricades □ Gonzales	LS	0	1	0	0	0	0	1
9	SS-1-3	Temporary Marking, Lighting and Barricades □ Palacios	LS	0	0	1	0	0	0	1
10	SS-1-4	Temporary Marking, Lighting and Barricades □ Rockport	LS	0	0	0	1	0	0	1
11	SS-1-5	Temporary Marking, Lighting and Barricades □ Smithville	LS	0	0	0	0	1	0	1
12	SS-1-6	Temporary Marking, Lighting and Barricades □ Terrell	LS	0	0	0	0	0	1	1
13	P-152-4.1d	Unclassified Excavation - Rockport	CY	0	0	0	20	0	0	20
14	P-152-4.1e	Unclassified Excavation - Smithville	CY	0	0	0	0	5	0	5
15	P-152-4.1f	Unclassified Excavation - Terrell	CY	0	0	0	0	0	25	25
16	P-152-4.2d	Embankment - Rockport	CY	0	0	0	350	0	0	350
17	P-152-4.2e	Embankment - Smithville	CY	0	0	0	0	100	0	100
18	P-152-4.2f	Embankment - Terrell	CY	0	0	0	0	0	5	5
19	P-620-5.1	Surface Preparation - Palacios	LS	0	0	1	0	0	0	1
20	P-620-5.2a	Reflectorized Pavement Marking - Palacios	SF	0	0	42,353	0	0	0	42,353
21	P-620-5.2b	Non-Reflectorized Pavement Marking - Palacios	SF	0	0	14,562	0	0	0	14,562
22	T-901-5.1a	Seeding - Edna	AC	1	0	0	0	0	0	1
23	T-901-5.1b	Seeding - Gonzales	AC	0	1	0	0	0	0	1
24	T-901-5.1c	Seeding - Palacios	AC	0	0	1	0	0	0	1
25	T-901-5.1d	Seeding - Rockport	AC	0	0	0	4	0	0	4
26	T-901-5.1e	Seeding - Smithville	AC	0	0	0	0	4	0	4
27	T-901-5.1f	Seeding - Terrell	AC	0	0	0	0	0	2	2
28	D-701-5.1	24 inch Class IV RCP	LF	0	0	0	40	55	0	95
29	D-701-5.2	RCP End Section	EA	0	0	0	2	2	0	4
30	L-103-5.1	Install New Beacon on New 50' Tip Down Pole, including Foundation	EA	1	0	1	0	1	0	3
31	L-103-5.2	Install Salvaged Beacon on New 50' Tip Down Pole, including Foundation	EA	0	1	0	1	0	0	2
32	L-105-5.1	Remove No. 8 AWG, L-824C in duct	LF	0	0	2,170	30,600	550	175	33,495
33	L-105-5.2	Remove 2-inch conduit including cable(s)	LF	0	350	15,110	1,800	0	0	17,260
34	L-105-5.3	Remove Existing Stake Mounted Elevated Taxiway Edge Light and associated brooks box	EA	0	4	0	43	0	0	47
35	L-105-5.4	Remove Existing Elevated Taxiway Edge Light and Base Can	EA	0	0	20	8	0	0	28
36	L-105-5.5	Remove Existing Elevated Taxiway Edge Light, Base Can to Remain	EA	0	0	0	40	0	0	40
37	L-105-5.6	Remove Existing Stake Mounted Elevated Runway Edge Light And Associated Brooks Box	EA	32	32	5	0	42	50	161
38	L-105-5.7	Remove Existing Elevated Runway Edge Light and Base Can	EA	0	0	46	0	0	0	46
39	L-105-5.8	Remove Existing Elevated Runway Edge Light, Base Can to Remain	EA	0	0	0	100	0	0	100
40	L-105-5.9	Remove Existing Stake Mounted Elevated Threshold End Light And Associated Brooks Box	EA	16	12	0	0	16	16	60
41	L-105-5.10	Remove Existing Elevated Threshold End Light, Base Can to Remain	EA	0	0	0	40	0	0	40
42	L-105-5.11	Remove Existing Elevated Threshold End Light and Base Can	EA	0	0	16	0	0	0	16
43	L-105-5.12	Remove Guidance Sign, Foundation to Remain	EA	0	0	0	17	0	0	17
44	L-105-5.13	Remove Guidance Sign and Foundation	EA	10	0	6	19	0	8	43
45	L-105-5.14	Remove Existing Manhole	EA	0	0	0	1	8	0	9
46	L-105-5.15	Remove Existing Pullbox	EA	0	4	17	15	3	7	46
47	L-105-5.16	Remove Existing Duct Marker	EA	0	0	0	0	0	8	8
48	L-105-5.17	Demolish Existing Electrical Vault Building and Equipment	EA	0	1	0	0	0	0	1
49	L-105-5.18	Remove Existing Wind Cone and Associated Foundation	EA	1	1	1	0	1	1	5
50	L-105-5.19	Remove Existing Beacon, Pole, and Foundation	EA	1	0	1	0	1	0	3
51	L-105-5.20	Remove Existing Beacon and Pole, Beacon to be Salvaged	EA	0	1	0	1	0	0	2
52	L-105-5.21	Remove Existing PAPI-2 Unit	EA	0	0	0	2	2	0	4
53	L-105-5.22	Remove Existing PAPI-4 Unit	EA	0	0	2	2	0	1	5
54	L-105-5.23	Remove Existing REIL Unit	EA	0	0	2	1	0	1	4
55	L-107-5.1	Install New L-807(L) LED Wind Cone Including Tip Down Pole	EA	1	1	1	0	1	1	5
56	L-107-5.2	Paint Existing Segmented Circle Around Wind Cone	LS	1	1	1	1	1	1	6
57	L-108-5.1	No.8 AWG, L-824C 5kV Cable, Installed in Conduit or Duct	LF	10,550	9,000	23,050	93,400	11,600	15,400	163,000
58	L-108-5.2	No. 6 AWG Bare Counterpoise Wire, Installed in Conduit Trench, Including Ground Rods	LF	12,200	10,825	15,425	23,615	14,350	18,800	95,215
59	L-108-5.3	Electrical Circuit (2) #8, #8G, Installed in Conduit or Duct	LF	0	2,500	0	0	3,500	3,750	9,750
60	L-108-5.4	Electrical Circuit (2) #10, #10G, Installed in Conduit or Duct	LF	3,800	0	1,000	0	0	2,000	6,800
61	L-108-5.5	Electrical Circuit (2) #12, #12G, Installed in Conduit or Duct	LF	950	1,115	2,125	2,450	1,725	0	8,365
62	L-108-5.6	Temporary Electrical Provisions	LS	0	0	0	1	0	0	1
63	L-109-5.1	Vault Equipment Modifications	LS	1	0	0	1	1	1	4
64	L-109-5.2	4kV Constant Current Regulator	EA	1	1	1	3	1	1	8
65	L-109-5.3	Install New Vault Building and Equipment	LS	0	1	1	0	0	1	3
66	L-109-5.4	ALCS Graphics Update	LS	0	0	0	1	0	0	1
67	L-110-5.1	Procure and Install 1-Way, 2" Sch. 40 PVC Conduit in Earth	LF	8,675	8,300	13,310	12,300	12,750	14,150	69,485
68	L-110-5.2	Procure and Install 1-Way, 2" Sch. 40 PVC Conduit in Existing Pavement VIA Saw Kerf	LF	0	0	1,650	0	0	0	1,650
69	L-110-5.3	Procure and Install 1-Way, 2" SDR 11 HDPE Conduit VIA Directional Drill	LF	0	0	1,250	0	0	0	1,250
70	L-110-5.4	Procure and Install 1-Way, 2" Sch. 40 PVC Conduit VIA Open Cut	LF	50	0	0	105	30	0	185

Lochner
12750 Merit Drive, St 570, Dallas, TX 75251
P 214.373.7873 | www.lwlochner.com
TBPE Firm Registration No. 10488

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

NO.	DATE	DESCRIPTION
1	05/14/2025	ADDEN 3

STATE OF TEXAS
CHRIS A. WHITFIELD
91216
LICENSED
PROFESSIONAL ENGINEER
05/14/2025

PROJECT NO. :	20616
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	SLS/HL
DRAWN BY :	VM/AB
DESIGNED BY :	AM/JDR

SUMMARY OF QUANTITIES

G0.2

BASE BID

ITEM NO.	SPEC.	ITEM DESCRIPTION	UNIT	QUANTITIES						QUANTITY TOTAL
				Edna	Gonzalez	Palacios	Rockport	Smithville	Terrell	
71	L-110-5.5	Procure and Install 2-Way, 2" Sch. 40 PVC Conduit, Concrete Encased in Earth	LF	1,975	1,750	225	1,800	100	2,200	8,050
72	L-110-5.6	Procure and Install 2-Way, 2" SDR 11 HDPE Conduit, Installed VIA Directional Drill	LF	400	100	200	775	165	75	1,715
73	L-110-5.7	Procure and Install 4-Way, 2" Sch. 40 PVC Conduit, Concrete Encased in Earth	LF	150	400	250	6,320	155	190	7,465
74	L-110-5.8	Procure and Install 4-Way, 2" SDR 11 HDPE Conduit, Installed VIA Directional Drill	LF	75	75	200	725	210	110	1,395
75	L-110-5.9	Procure and Install 6-Way, 2" Sch. 40 PVC Conduit, Concrete Encased in Earth	LF	425	75	875	0	350	750	2,475
76	L-110-5.10	Procure and Install 6-Way, 2" Sch. 40 PVC Conduit, Concrete Encased in Existing Pavement VIA Open Cut	LF	25	0	0	0	0	0	25
77	L-110-5.11	Procure and Install 6-Way, 2" SDR 11 HDPE Conduit, VIA Directional Drill	LF	0	0	100	0	200	65	365
78	L-110-5.12	Procure and Install 10-Way, 2" Sch. 40 PVC Conduit, Concrete Encased in Earth	LF	0	0	0	415	0	0	415
79	L-110-5.13	Procure and Install 10-Way, 2" SDR 11 HDPE Conduit, Concrete Encased VIA Open Cut	LF	0	0	0	40	0	0	40
80	L-110-5.14	Procure and Install 10-Way, 2" SDR 11 HDPE Conduit, VIA Directional Drill	LF	0	0	0	360	0	0	360
81	L-110-5.15	Procure and Install Utility Company Service entrance Infrastructure	LS	0	0	0	0	0	1	1
82	L-115-5.1	Install New 2 Way JCP incl Sump Drain	EA	11	4	3	15	5	13	51
83	L-115-5.2	Install New 4 Way JCP incl Sump Drain	EA	1	2	1	18	1	1	24
84	L-115-5.3	Install New 6 Way JCP incl Sump Drain	EA	3	1	3	0	4	3	14
85	L-115-5.4	Install New 10 Way JCP incl Sump Drain	EA	0	0	0	3	0	0	3
86	L-115-5.5	Install New L-867D Pull Can in Earth	EA	0	2	54	0	9	3	68
87	L-125-5.1	Install New L-861T(L) Elevated Taxiway Edge Light with New L867B Base Can in Earth	EA	0	0	16	92	0	0	108
88	L-125-5.2	Install New L-861T(L) Elevated Taxiway Edge Light in Existing Base Can	EA	0	0	0	27	0	0	27
89	L-125-5.3	Install Salvaged L-861T(L) Elevated Taxiway Edge Light in Existing Base Can	EA	0	0	0	3	0	0	3
90	L-125-5.4	Install New L-861T(L) Elevated Taxiway Edge Light with New L867B Base Can in Existing ~~Shoulder~~ Pavement	EA	0	0	6	8	0	0	14
91	L-125-5.5	Install New L-861(L) Elevated Runway Edge Light with New L867B Base Can in Earth	EA	33	32	0	0	39	50	154
92	L-125-5.6	Install New L-861(L) Elevated Runway Edge Light in Existing L867B Base Can	EA	0	0	0	100	0	0	100
93	L-125-5.7	Install New L-861(L) Elevated Runway Edge Light with New L867B Base Can in Existing ~~Shoulder~~ Pavement	EA	0	0	45	0	0	0	45
94	L-125-5.8	Install New L-850C(L) Inpavement Runway Edge Light with New L868B Base Can in Existing ~~Shoulder~~ Pavement	EA	0	0	2	0	0	0	2
95	L-125-5.9	Install New L-861E(L) Elevated Runway Threshold Light with New L867B Base Can in Earth	EA	16	12	16	0	16	16	76
96	L-125-5.10	Install New L-861E(L) Elevated Runway Threshold Light in Existing Base Can	EA	0	0	0	40	0	0	40
97	L-125-5.11	Install New Guidance Sign on New Sign Foundation, 1 Module	EA	8	2	0	0	0	8	18
98	L-125-5.12	Install New Guidance Sign on New Sign Foundation, 2 Module	EA	0	1	0	14	0	0	15
99	L-125-5.13	Install New Guidance Sign on New Sign Foundation, 3 Module	EA	2	0	3	10	0	0	15
100	L-125-5.14	Install New Guidance Sign on New Sign Foundation, 4 Module	EA	0	0	2	3	0	0	5
101	L-125-5.15	Install New Guidance Sign on Existing Sign Foundation, 1 Module	EA	0	0	0	16	0	0	16
102	L-125-5.16	Install New Guidance Sign on Existing Sign Foundation, 2 Module	EA	0	0	0	1	0	0	1
103	L-125-5.17	Install New Guidance Sign on Existing Pavemnt VIA Coring, 2 Module	EA	0	0	4	0	0	0	4
104	L-125-5.18	Install New Isolation Transformer and Connector Kit in Existing Sign/ Fixture	EA	0	0	0	0	5	5	10
105	L-125-5.19	Install New REIL Unit	EA	0	1	1	1	0	1	4
106	L-130-5.1	Install New LED 2-Box Papi System incl Flight Check	EA	2	2	0	0	2	0	6
107	L-130-5.2	Install New LED 4-Box Papi System incl Flight Check	EA	0	0	0	4	0	1	5
108		Utility Allowance NTE $100,000.00	ALLOW	0	0	0	0	0	1	1

ADD ALTERNATE 1

ITEM NO.	SPEC.	ITEM DESCRIPTION	UNIT	QUANTITIES						QUANTITY TOTAL
				Edna	Gonzalez	Palacios	Rockport	Smithville	Terrell	
109	L-125-5.18	Install New REIL Unit	EA	0	0	0	0	2	0	2

1

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

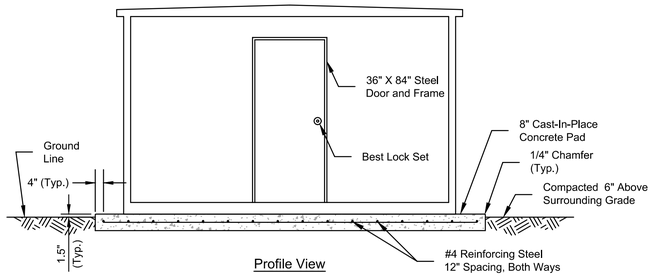
GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

NO.	DATE	DESCRIPTION
1	05/14/2025	ADDEN 3

PROJECT NO. :	20616
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	SLS/HL
DRAWN BY :	VM/AB
DESIGNED BY :	AM/JDR

SUMMARY OF QUANTITIES

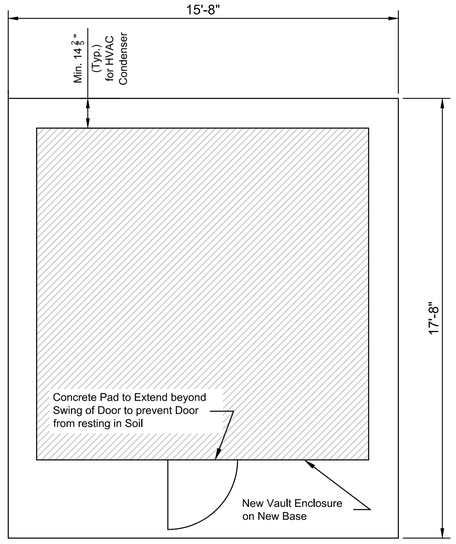
G0.3



Profile View

Vault Profile View Note:

1. Set Vault on 12" Compacted Caliche Base Material.
2. Grade Site to Drain Away from Vault Foundation.
3. Refer to Electrical Details for Stub-Outs Through Concrete Foundation.



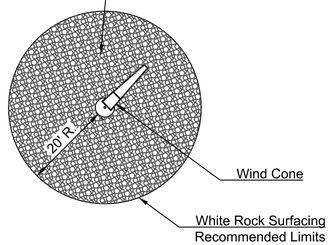
Plan View

Vault Plan View Notes:

1. Contractor to verify there will be no remaining active circuits on Load Center on the exterior of the Vault Structure prior to Demolition of Load Center and Vault Structure. Remove all cables back to source.
2. Subgrade at Bottom of Base to be Proof Rolled Prior to Installing Base Material.
3. Base to be Compacted to 95% Density Prior to Vault Building Installation.
4. Caliche Base to be TxDOT Item 247 Type A or B Class 1 or 2 as Approved by the Engineer.
5. Refer to Electrical Details for Stub-Outs Through Concrete Foundation.

E DETAIL — VAULT PLAN - FRONT ELEVATION
SCALE: N.T.S.

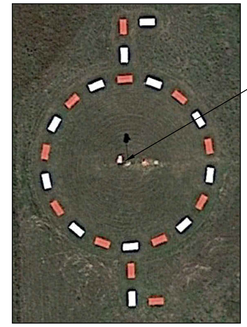
Grade Site to Drain Away from Wind Cone Foundation. Apply a Soil Sterilant to Prevent Vegetation Growth. Place a Geotextile Filter Fabric and Cover with a 4" Layer of White Rock Surfacing for a 20' Radius Around Wind Cone Base. Contractor Shall Furnish Certification on Fabric and Rock to the Engineer Prior to Installation for Approval.



Wind Cone Note:

1. Construction of the White Rock Surfacing Shall be Considered Subsidiary to Installation of the Segmented Circle.

G DETAIL — PRIMARY WIND CONE SITE PLAN
SCALE: N.T.S.



Segmented Circle Note:

1. Alternate segment to be painted, Aviation Orange No. 12197 and Aviation White No. 17875.

F DETAIL — SEGMENTED CIRCLE PLAN
SCALE: N.T.S.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

NO.	DATE	DESCRIPTION
1	05/14/2025	ADDEN 3

STATE OF TEXAS
CHRIS A. WHITFIELD
91216
LICENSED
PROFESSIONAL ENGINEER
05/14/2025

PROJECT NO. :	20616
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	SLS/HL
DRAWN BY :	VM/AB
DESIGNED BY :	AM/JDR

VAULT AND WIND CONE DETAILS

C0.7

AIRFIELD LIGHTING DEMOLITION LEGEND

- ELEVATED MIRL TO BE REMOVED
- R G ELEVATED THRESHOLD/END TO BE REMOVED
- ELEVATED TAXIWAY EDGE LIGHT TO REMAIN
- TAXIWAY EDGE LIGHT TO BE REMOVED
- SIGN TO REMAIN
- SIGN TO BE REMOVED
- TRANSITION POINT DEPICTING CONNECTION BETWEEN EXISTING CONDUIT AND CONDUIT TO BE REMOVED
- PULLBOX TO REMAIN
- PULLBOX TO BE REMOVED
- REIL LIGHT ASSEMBLY TO REMAIN
- REIL LIGHT ASSEMBLY TO BE REMOVED
- BEACON TO BE REMOVED
- MAN HOLE TO REMAIN
- MAN HOLE TO BE REMOVED
- EXISTING UTILITY SERVICE POLE TO REMAIN
- EXISTING SOLAR POWERED ELEVATED TAXIWAY EDGE LIGHT TO REMAIN

1

CONDUIT TO REMAIN, REMOVE AIRFIELD CABLES WITH BOLD/DARK CABLE CALLOUTS EXCEPT WHERE SHARED WITH CABLES TO REMAIN THEN ABANDON CABLES. AIRFIELD CABLES WITH SHADED/LIGHT CABLE CALLOUTS TO REMAIN

(2) TE
(2) RE

REMOVE/ABANDON CABLE(S):
(2) INDICATES 2 CABLES
'TN' DENOTES CIRCUIT ID

CABLE(S) TO REMAIN:
(2) INDICATES 2 CABLES
'R2' INDICATES CIRCUIT ID

DB — DUCTBANK AND CABLES TO BE REMOVED

1

DB — DUCTBANK TO REMAIN, REMOVE AIRFIELD CABLES FROM DUCTBANK WITH BOLD/DARK CABLE CALLOUTS WHERE INSTALLED IN SEPARATE CONDUIT. IF SHARED, ABANDON CABLES. AIRFIELD CABLES WITH SHADED/LIGHT CABLE CALLOUTS ARE EXISTING TO REMAIN

(2) TE
(2) RE

REMOVE CABLE(S):
(2) INDICATES 2 CABLES
'TN' DENOTES CIRCUIT ID

CABLE(S) TO REMAIN:
(2) INDICATES 2 CABLES
'R2' INDICATES CIRCUIT ID

OE — OVER HEAD POWER LINES TO REMAIN
OE — OVER HEAD UTILITY SERVICE LINES TO BE REMOVED

1

- CONDUIT AND CABLES SHOWN FOR REFERENCE ONLY
- CONDUIT AND CABLES TO BE REMOVED
- EXISTING DIRECT BURIED CABLES 5KV CABLES TO BE ABANDONED
- WIND CONE AND SEGMENTED CIRCLE TO REMAIN
- WIND CONE TO BE REMOVED AND SEGMENTED CIRCLE TO REMAIN

AIRFIELD LIGHTING NEW CONSTRUCTION LEGEND

- EXISTING ELEVATED TAXIWAY EDGE LIGHT TO REMAIN
- NEW ELEVATED TAXIWAY EDGE LIGHT
- PULLBOX TO REMAIN
- NEW L-867D PULL CAN IN TURF
- EXISTING SIGN TO REMAIN
- NEW SIGN
- NEW JUNCTION CAN PLAZA
- EXISTING CONDUIT AND CABLES SHOWN FOR REFERENCE ONLY
- NEW CONDUIT AND CABLES
- TRANSITION POINT DEPICTING CONNECTION BETWEEN EXISTING CONDUIT AND NEW ENCASED CONDUIT
- TRANSITION POINT DEPICTING CONNECTION BETWEEN CONDUIT INSTALLED IN TURF OR PROPOSED PAVEMENT AND CONDUIT INSTALLED VIA SAW KERF
- NEW REIL LIGHT ASSEMBLY
- NEW 2-BOX PAPI
- NEW 4-BOX PAPI
- NEW BEACON
- MAN HOLE TO REMAIN
- NEW MAN HOLE
- EXISTING SOLAR POWERED ELEVATED TAXIWAY EDGE LIGHT TO REMAIN

1

INSTALL AIRFIELD CABLES WITH BOLD/DARK CABLE CALLOUTS IN EXISTING CONDUIT. AIRFIELD CABLES WITH SHADED/LIGHT CABLE CALLOUTS TO REMAIN

(2) TE
(2) RE

INSTALL CABLE(S):
(2) INDICATES 2 CABLES
'TE' DENOTES CIRCUIT ID

CABLE(S) TO REMAIN:
(2) INDICATES 2 CABLES
'RE' INDICATES CIRCUIT ID

DB — INSTALL AIRFIELD CABLES WITH BOLD/DARK CABLE CALLOUTS IN PROPOSED ENCASED DUCTBANK. AIRFIELD CABLES WITH SHADED/LIGHT CABLE CALLOUTS ARE EXISTING TO REMAIN

(2) TE

NEW CABLE(S):
(2) INDICATES 2 CABLES
'TE' DENOTES CIRCUIT ID

- G R NEW ELEVATED RUNWAY THRESHOLD END LIGHT
- C A NEW ELEVATED RUNWAY EDGE LIGHT
- EXISTING UTILITY SERVICE POLE TO REMAIN

1

- 2 — INDICATES NUMBER OF DUCTS. SQUARE INDICATES 2" DUCTS.
- DB — PROPOSED CONCRETE ENCASED DUCTS. SIZE AND QUANTITY AS NOTED
- DB — PROPOSED DUCT BANK BORING
- PROPOSED CONDUIT INSTALLED VIA SAW KERF
- OE — OVER HEAD POWER LINES TO REMAIN
- OE — PROPOSED OVERHEAD UTILITY SERVICE LINES

1

- WIND CONE AND SEGMENTED CIRCLE TO REMAIN
- NEW WIND CONE AND SEGMENTED CIRCLE TO BE REPAINTED

GUIDANCE SIGN LEGEND - EXISTING

ACTUAL SIGN PLACEMENT ON AIRFIELD

S1 — SIGN NUMBER. REFER TO SIGNAGE SCHEDULE

E 18-36 — HOLD SHORT SIGN - WHITE SYMBOL, LETTER, OR NUMBER WITH RED BACKGROUND AND BLACK OUTLINE, DENOTED BY DOTTED HATCH PATTERN

E ← L → — DIRECTIONAL SIGN - BLACK INSCRIPTION ON YELLOW BACKGROUND, DENOTED BY NO HATCH PATTERN

LOCATION SIGN - YELLOW INSCRIPTION WITH YELLOW BORDER ON BLACK BACKGROUND, DENOTED BY DIAMOND HATCH PATTERN

GUIDANCE SIGN LEGEND

ACTUAL SIGN PLACEMENT ON AIRFIELD

S1 1 2 — SIGN NUMBER. REFER TO SIGNAGE SCHEDULE
1 DENOTES SIDE 1
2 DENOTES SIDE 2

E → — DIRECTIONAL SIGN - BLACK SYMBOL, LETTER, OR NUMBER WITH YELLOW BACKGROUND

E 14 — HOLD SHORT SIGN - WHITE SYMBOL, LETTER, OR NUMBER WITH RED BACKGROUND AND BLACK OUTLINE

LOCATION SIGN - YELLOW SYMBOL LETTER OR NUMBER WITH BLACK BACKGROUND AND YELLOW BORDER

BLANK PANEL

PRINT IN COLOR

Ferguson Consulting
Aviation Specialists for Electrical, Telecommunications and Security Systems
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

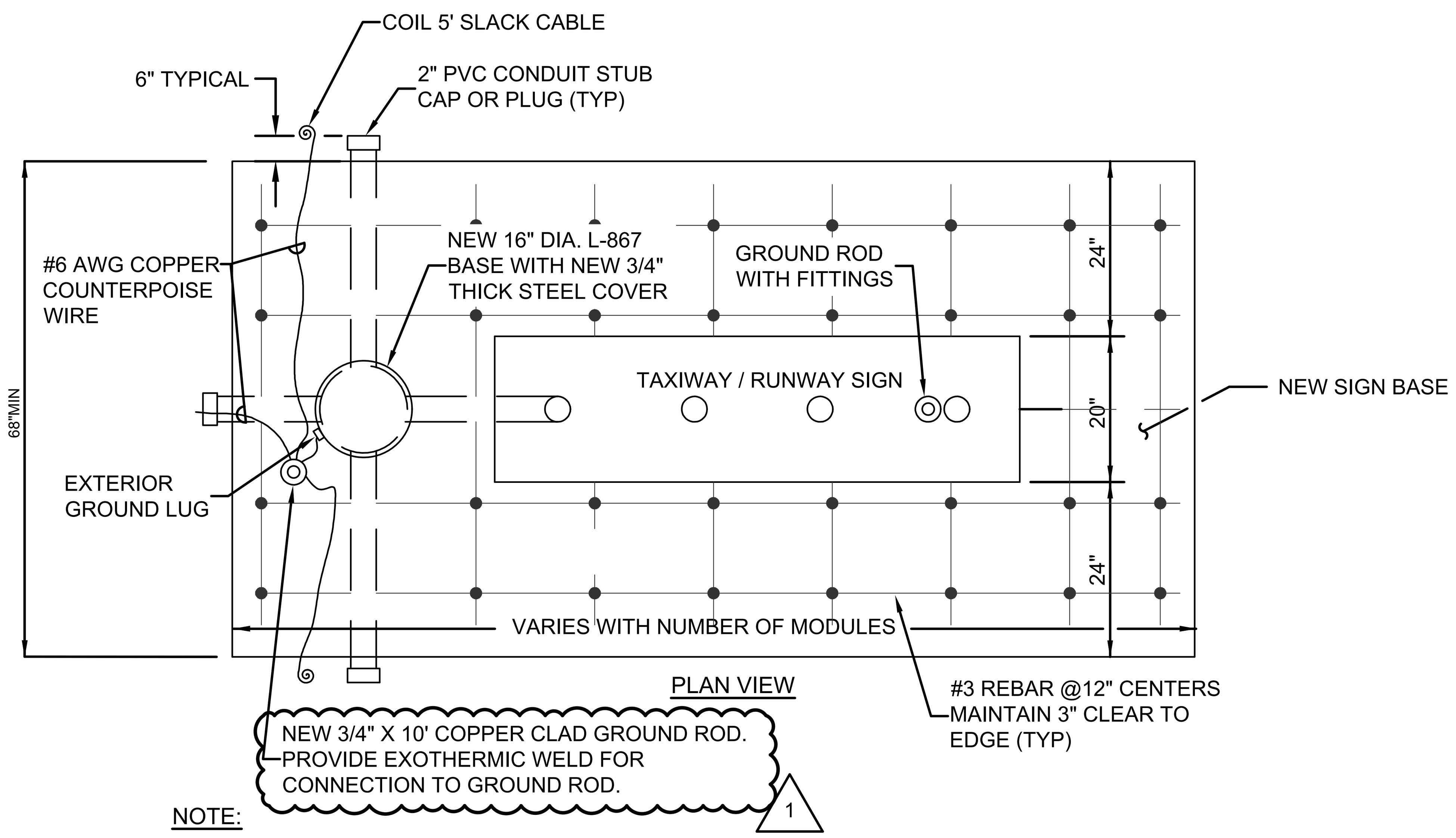
NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864 05/14/25

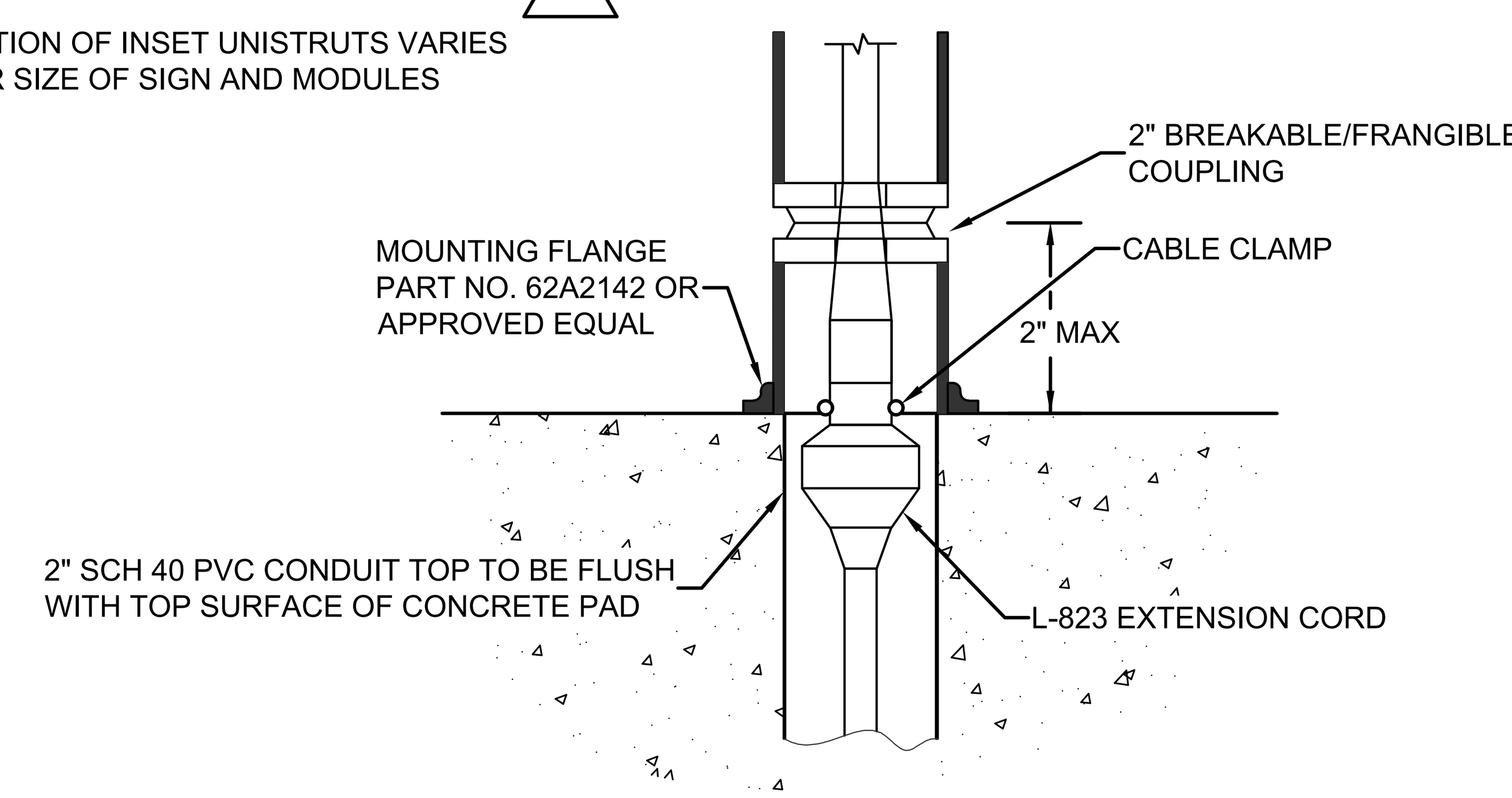
PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL SYMBOLS LEGEND

E1.1



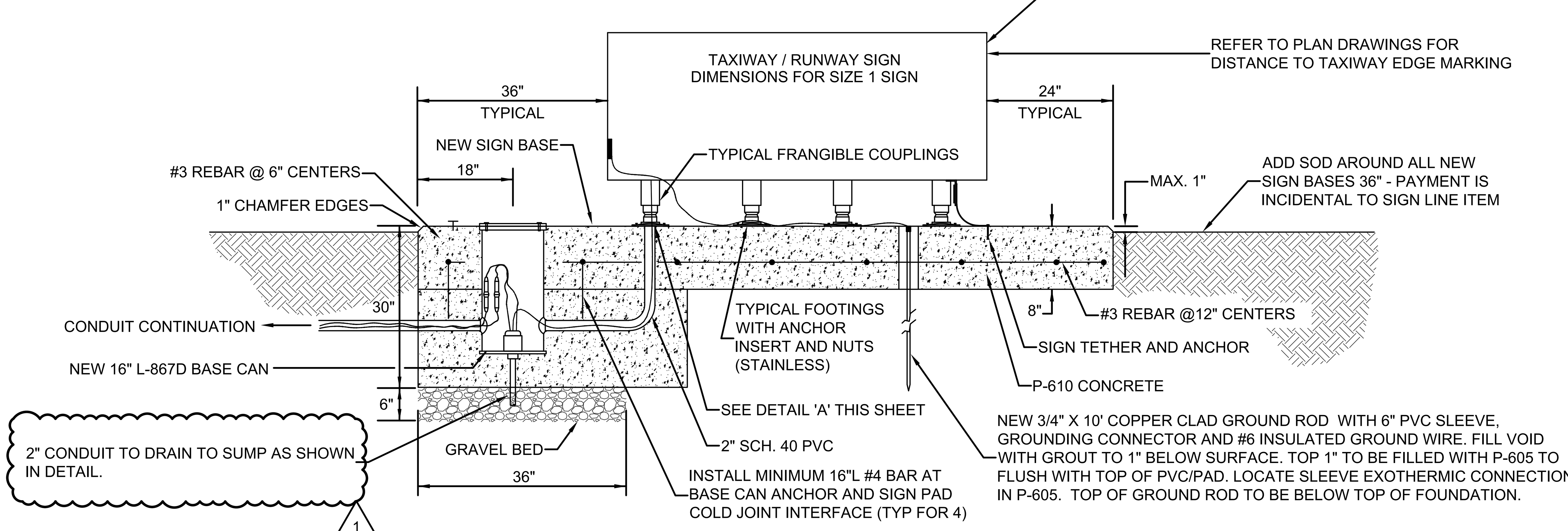
NOTE:
NUMBER AND LOCATION OF INSET UNISTRUTS VARIES ON MANUFACTURER SIZE OF SIGN AND MODULES



DETAIL 'A'

GENERAL SIGN NOTES

1. REFER TO PLAN DRAWING FOR SIGN NUMBERS, LEGEND, TYPE AND NUMBER OF MODULES.
2. REFER TO PLAN DRAWING FOR SIGN LOCATIONS.
3. ALL LETTERS AND SPACINGS OF NEW SIGNS TO BE PER AC 150/5345-44 LATEST REVISION.
4. ALL NEW SIGNS, SIGN MODULES AND ANY MODIFICATION TO AN EXISTING SIGN SHALL CONFORM TO AC 150/5340-18 AND 150/5345-44, LATEST EDITIONS AND SIGNAGE AND MARKING SUPPLEMENTS.
5. THE SIGNS SHALL BE FRANGIBLE, MEETING THE REQUIREMENTS OF AC 150/5345-44, LATEST REVISION.
6. THE DETAILS SHOWN IN THE PLANS PROVIDE THE MINIMUM REQUIREMENTS FOR SIGN INSTALLATIONS. THE CONTRACTOR SHALL USE STANDARDS APPLICABLE FOR THE PARTICULAR SIGN MANUFACTURER. THE BOLTING PATTERN, METHOD OF ANCHORING, ETC., SHALL BE PER SIGN MANUFACTURER'S RECOMMENDATIONS AND APPROVED BY THE OAR.
7. THE ACTUAL SIGN DIMENSIONS WILL VARY PER MANUFACTURER. THE BASE SIZE AS SHOWN SHALL BE ADJUSTED TO MATCH THE SIGN SUBMITTED. THE SUBMITTAL SHALL INCLUDE NEW BASE DIMENSIONS, LAYOUT, ETC.
8. FOR LOCATION AND ORIENTATION OF SIGNS AND FOUNDATIONS, SEE PLANS. THE LOCATION SHOWN ON THE PLANS IS THE PERPENDICULAR DISTANCE FROM THE DEFINED TAXIWAY EDGE, TO THE NEAR SIDE OF THE SIGN ON THE SIGN'S LONGITUDINAL CENTERLINE (SEE PLAN VIEW). ALL SIGNS SHALL BE INSTALLED WITH FIXTURE I.D. MARKERS.
9. ALL SIGNS SHALL BE ORIENTED SUCH THAT THE LONGITUDINAL CENTERLINE OF THE SIGN IS PERPENDICULAR TO THE RESPECTIVE RUNWAY OR TAXIWAY CENTERLINE, UNLESS NOTED OTHERWISE.
10. CONTRACTOR SHALL PROVIDE NEW CONCRETE FOUNDATION, BASE CAN, LAMPS, ISOLATION TRANSFORMER, GROUND ROD AND CONNECTORS, SIGN TAG, SIGN ID MARKER AND CONNECTIONS FOR ALL NEW GUIDANCE SIGNS.
11. SITE GRADING AT EACH SIGN IS ANTICIPATED. GRADING AND RESTORATION ARE INCIDENTAL TO THE SIGN LINE ITEM.
12. ALL CONCRETE SHALL COMPLY WITH P-610 SPECIFICATION. P-610 CONCRETE STEEL REINFORCEMENT SHALL BE TYPE ASTM A615 GRADE 60. ALL REINFORCEMENT SHALL HAVE A 2" MINIMUM CONCRETE COVER. REINFORCEMENTS MAY BE ADJUSTED TO MISS INTERFERENCES.
13. BACKFILL TO CONFORM TO P-152.
14. SODDING OF DISTURBED AREAS SHALL BE INCLUDED IN THE INDIVIDUAL SIGN PAY ITEM. EXCAVATION, GRADING, FILL ETC. FOR THE SIGNS IS INCIDENTAL TO THE SIGN PAY ITEM.
15. ALL AREAS FOR THE SUPPORT PLATES SHALL BE IN THE SAME HORIZONTAL PLANE. WHEN CAST INTEGRALLY WITH THE CONCRETE PAD, THE ANCHOR BOLTS SHALL BE A-36 STEEL, HOT DIP GALVANIZED.
16. BASE CAN SHALL BE ON SIDE OF SIGN CLOSEST TO THE POWER SOURCE.
17. APPLY ANTI-SEIZE OR APPROVED EQUAL TO ALL THREADED BOLTS AND CONNECTIONS.
18. SIGNS TO BE PLACED PLUMB AND LEVEL.
19. FRANGIBLE COUPLING SHALL BE LOCATED 1/2" MAX. ABOVE COVER. MANUFACTURER SHALL PROVIDE AT LEAST A 1/4" DIA OPENING OR EQUAL FOR DRAINAGE INTO L-867 BASE. COUPLING SHALL NOT BE SUPPLIED WITH WEEP HOLES TO THE OUTSIDE.
20. GROUND RODS SHALL BE 3/4" DIA. X 10'L COPPER CLAD ROD. EACH GROUND ROD SHALL BE TESTED PRIOR TO CONNECTION TO THE GROUND SYSTEM. THE EARTH RESISTANCE AT EACH ROD SHALL NOT EXCEED 25 OHMS. INSTALL ADDITIONAL RODS AS NEEDED TO ACHIEVE THE 25 OHM MAX RESISTANCE REQUIREMENT. 1
21. THE #6 AWG COPPER BONDING CONDUCTOR AND SIGN TETHER SHALL NOT BE ATTACHED AT THE SAME ANCHOR BOLT. AN APPROVED IRREVERSIBLE CRIMP SHALL BE USED TO CONNECT THE BONDING CONDUCTOR TO THE SIGN FLANGE AND SIGN.
22. USE #6 AWG COPPER COUNTERPOISE WITH TYPE THHW INSULATION WHEN INSTALLED IN CONCRETE. COUNTERPOISE TO BE CONNECTED TO GROUND ROD AT EACH SIGN. THIS CONTRACTOR SHALL VERIFY THAT THE 6" SLEEVE IS LARGE ENOUGH TO ACCOMMODATE THE EXOTHERMIC CONNECTION MOLD. THE TOP OF THE GROUND ROD SHALL BE ± 1" ABOVE THE PAD 1". THE GROUND ROD SHALL NOT BE DRIVEN AFTER THE EXOTHERMIC CONNECTION HAS BEEN MADE.
23. ALL SIGNS SHALL BE FURNISHED WITH TWO TETHERS PER SIGN. TETHERS SHALL BE 3/16" STAINLESS STEEL AIRCRAFT CABLE WITH A FORMED EYE ON BOTH ENDS. THE TETHER EYE SHALL BE ATTACHED TO THE SIGN AND BASE BY BEING SANDWICHED BETWEEN TWO STAINLESS STEEL FENDER WASHERS, WITH A 1/2" MINIMUM STAINLESS STEEL BOLT. THE TETHER SHALL BE OF SUFFICIENT LENGTH TO HAVE A MINIMUM OF 6" OF SLACK WHEN ATTACHED BETWEEN THE SIGN AND THE SIGN BASE. THE TETHERS AND BONDING CONDUCTORS SHALL BE OF SUFFICIENT LENGTH TO ALLOW THE FRANGIBLE COUPLINGS TO OPERATE WITHOUT RESTRICTIONS AND TO ALLOW THE POWER CABLE TO DISCONNECT IF THE SIGN FALLS OVER.
24. SIGNS SHALL BE SEALED AGAINST INFILTRATION BY WATER AND DIRT.
25. EACH SIGN SHALL BE FURNISHED WITH AN ON-OFF TOGGLE SWITCH WITH WEATHERPROOF COVER. THE SWITCH SHALL BE USED BY MAINTENANCE PERSONNEL TO DE-ENERGIZE THE SIGN SO MAINTENANCE WORK CAN BE PERFORMED. THE SWITCH SHALL BE PHYSICALLY AND ELECTRICALLY LOCATED IMMEDIATELY ADJACENT TO THE LOAD SIDE OF THE L-823 DISCONNECT PLUG. WHEN THE SWITCH IS IN THE OFF POSITION, THE SIGN SHALL BE ISOLATED FROM THE SERIES CIRCUIT AND THE SECONDARY OF THE L-830 ISOLATION TRANSFORMER SHALL BE SHORTED. THE WEATHERPROOF COVER SHALL PROVIDE PROTECTION FROM DRIVING RAIN, SNOW AND ICE, AND SHALL HAVE A SPRING OPERATED CLOSING DEVICE. THE WEATHERPROOF COVER SHALL ALSO PROVIDE PHYSICAL PROTECTION FOR THE SWITCH HANDLE.
26. LOCATE BASE CAN FOR SIGN ON SIDE NEAREST ORIGINATING CIRCUIT. IE: IF SIGN CIRCUIT ORIGINATES FROM JUNCTION CAN PLAZA IN ISLAND, LOCATE BASE CAN OUTBOARD OF SIGN. IF SIGN CIRCUIT ORIGINATES FROM EDGE CIRCUIT, LOCATE ON INBOARD SIDE OF SIGN.

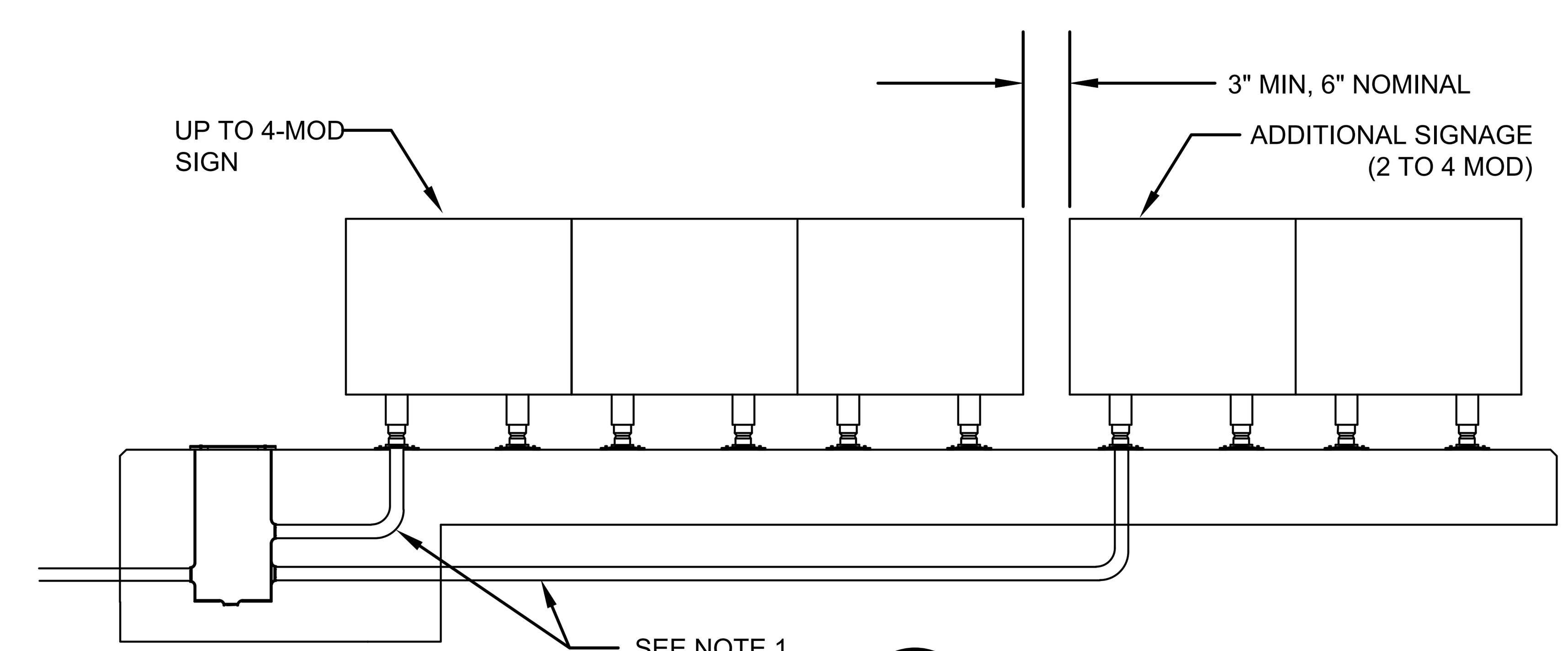


FRONT VIEW

1 E2.2 NEW SIGN AND BASE DETAIL
SCALE: N.T.S.

NOTES:

1. PROVIDE (2) SIGN POWER LEG CONDUITS WITH EXTENDER CABLES TO THE SIGN FROM THE L-867 BASE CAN WHEN MULTIPLE SIGNS ARE USED TO FORM A MULTIPLE SIGN ARRAY. NO SEPARATE PAYMENT SHALL BE MADE.



2 E2.2 SIGN ARRAY WITH MULTIPLE SIGNS
SCALE: N.T.S.

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Aviation Specialists for Electrical, Telecommunications and Security Systems
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

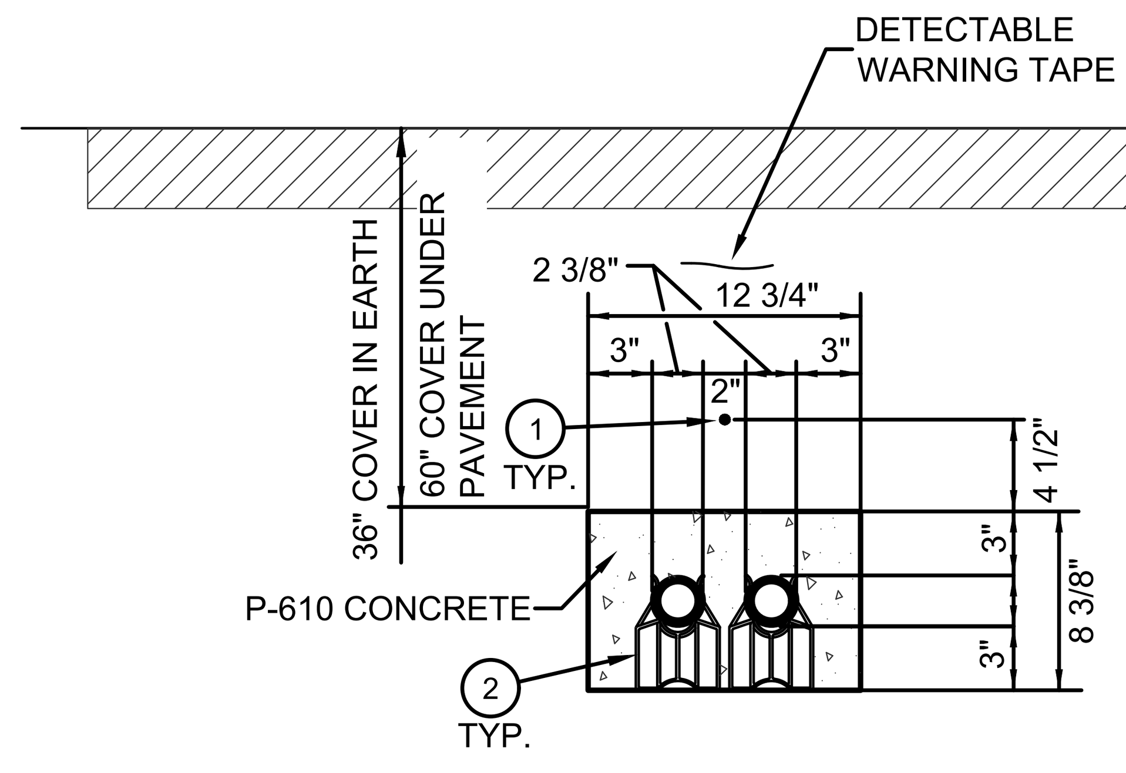
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/2025
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

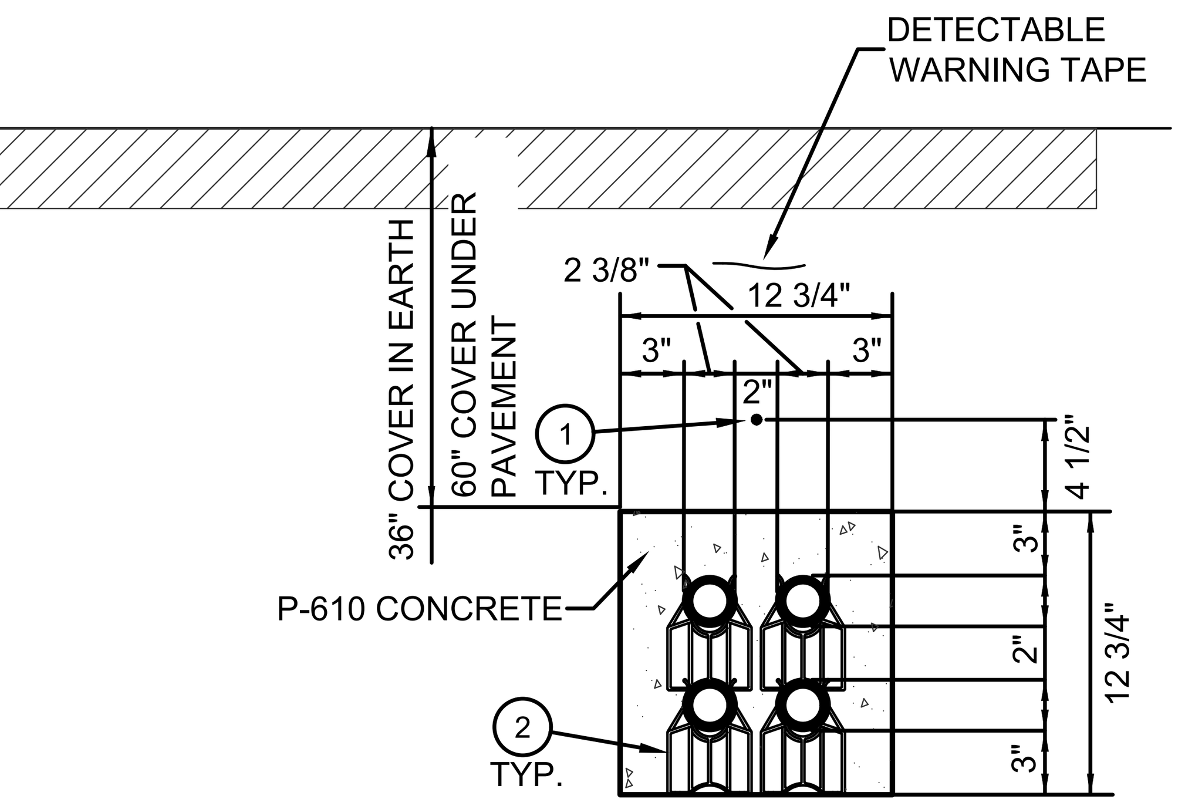
GENERAL AIRFIELD ELECTRICAL DETAILS

E2.2

FILE NAME: 26616 - 01 - GEN - ELECTRICAL DETAILS.dwg
PLOT DATE: 5/13/2025 6:00:54 PM, Austin Cote



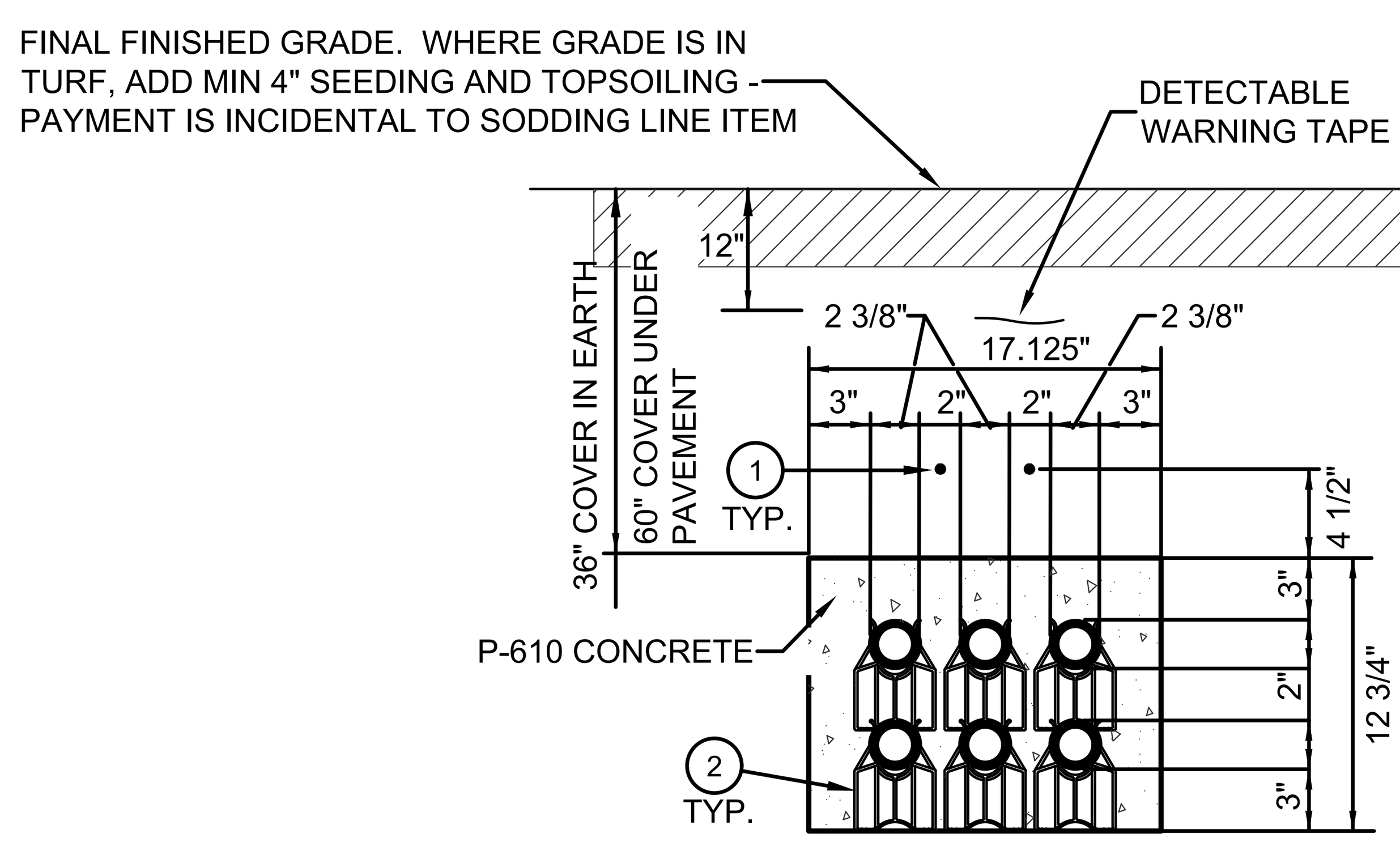
1 E2.3 2 WAY - 2" DUCT BANK
SCALE: N.T.S.



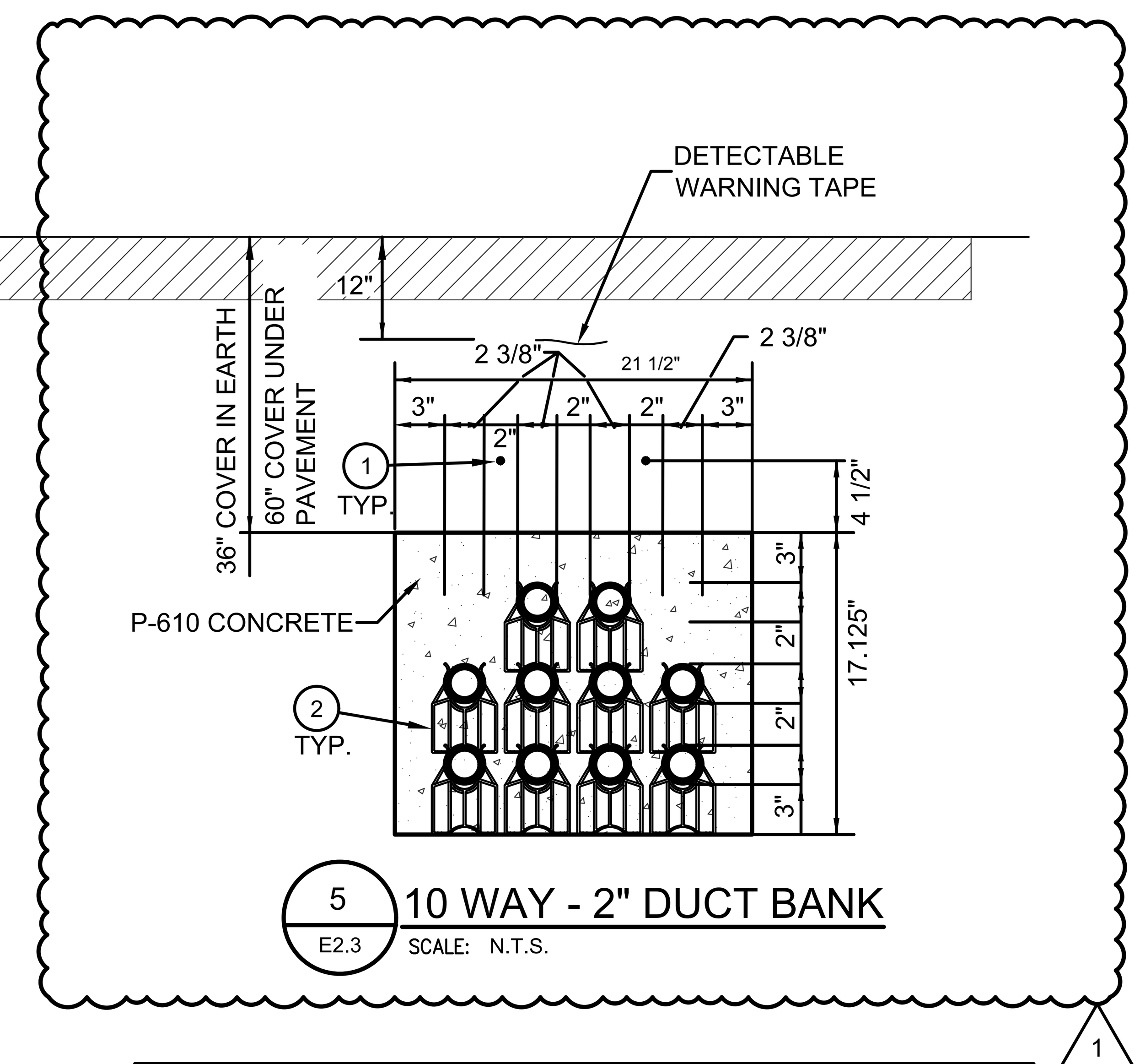
2 E2.3 4 WAY - 2" DUCT BANK
SCALE: N.T.S.

KEYED NOTES FOR DUCT SECTIONS

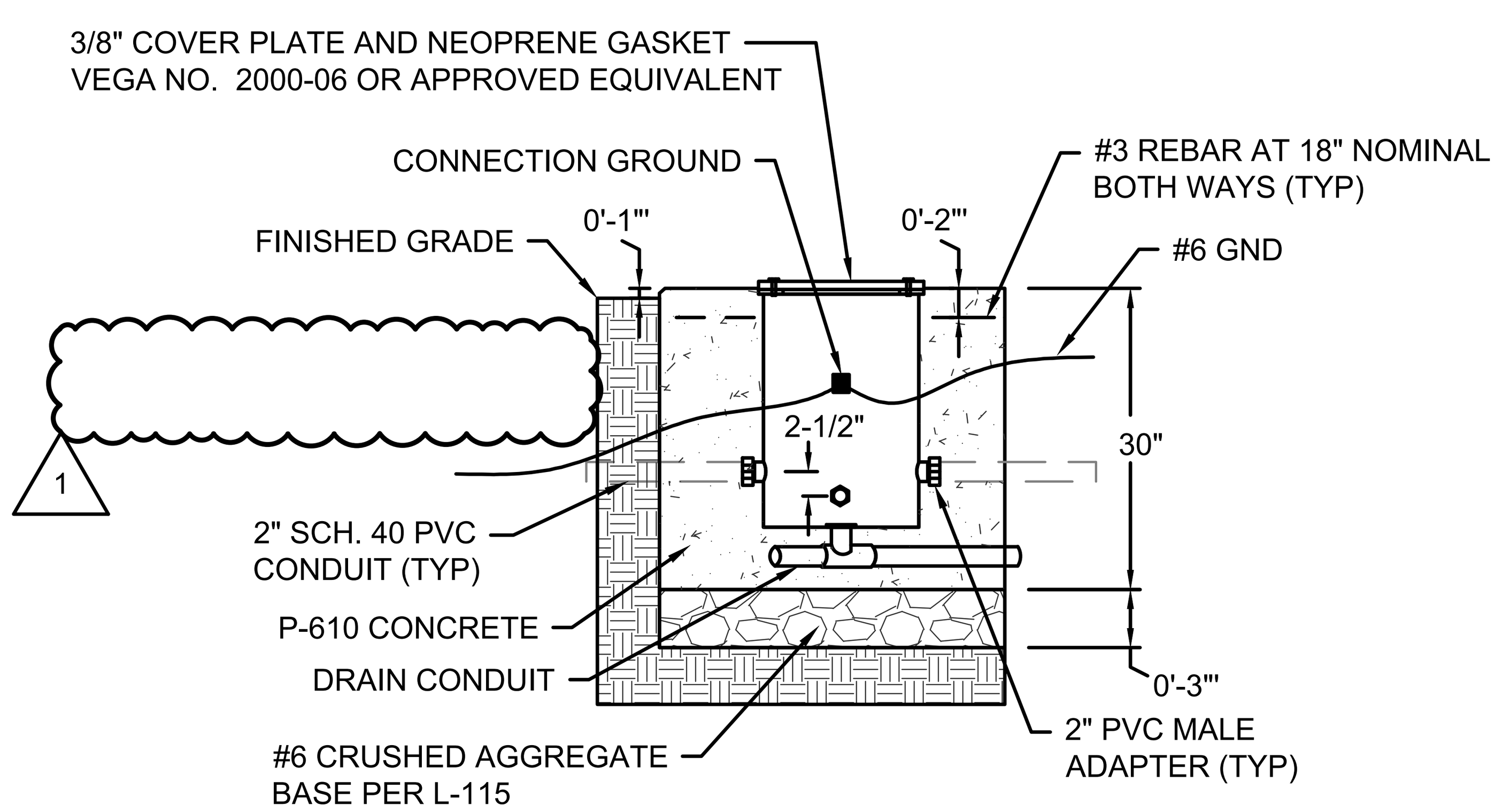
1. INSTALL #6 AWG BARE COPPER WIRE FOR COUNTERPOISE PROTECTION OF DUCTBANK AS REQUIRED PER FAA CRITERIA GIVING A 45 DEGREE CONE OF PROTECTION. PAYMENT FOR COUNTERPOISE IS INCIDENTAL TO THE DUCTBANK LINE ITEM.
2. INSTALL CONDUIT SPACERS EVERY 5'.



3 E2.3 6 WAY - 2" DUCT BANK
SCALE: N.T.S.

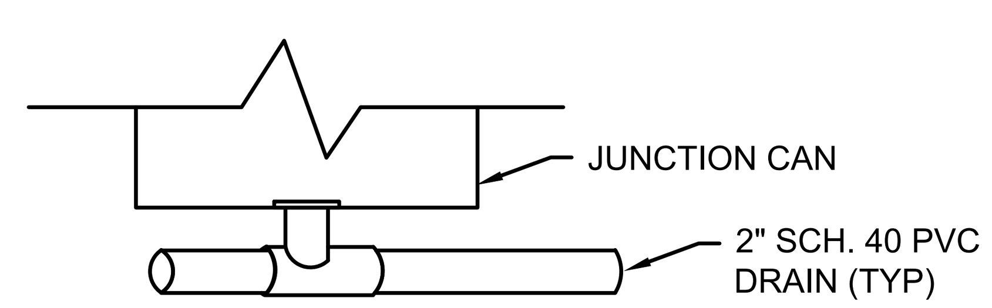


5 E2.3 10 WAY - 2" DUCT BANK
SCALE: N.T.S.



NOTE: EACH JUNCTION CAN HAS 4 HUBS. HUBS SHALL BE PLACED IN 2 LAYERS AND THE HUBS IN ONE LAYER SHALL BE 90 DEGREES FROM THE HUBS IN THE OTHER LAYER. EACH PAIR OF HUBS SHALL BE 180 DEGREES APART.

6 E2.3 SECTION DETAIL
SCALE: N.T.S.



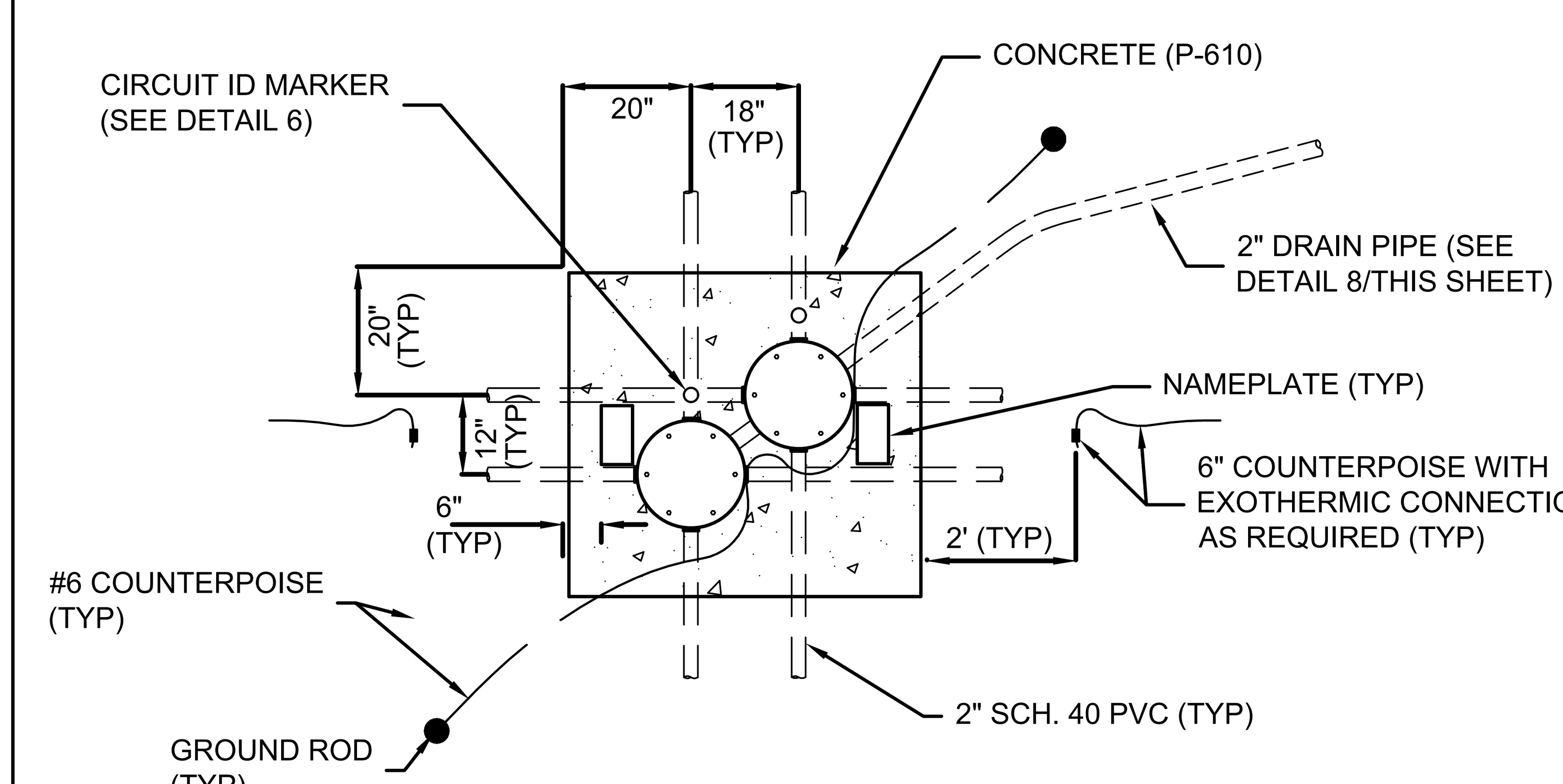
NOTES

1. SEE PROPOSED PLANS (8.2 SERIES) FOR LOCATION OF DRAIN CONDUIT TIE-INS.
2. INSTALL DRAIN CONDUITS AT A 1/8" SLOPE PER FOOT TOWARDS DRAINS
3. PENETRATE INLET WITH DRAIN CONDUIT ABOVE STORM SEWER PIPES WHERE POSSIBLE.
4. SEAL ENTRY AROUND DRAIN CONDUIT AT THE INLET WITH COMPATIBLE NON-SHRINK GROUT.
5. CONNECTION TO DRAINAGE PIPES AND STRUCTURES SHALL BE SUBSIDIARY TO THE DRAIN CONDUIT ITEM; NO SEPARATE PAYMENT WILL BE MADE FOR CONNECTIONS.

7 E2.3 DRAIN DETAIL FOR JCP
SCALE: N.T.S.

JUNCTION CAN PLAZA NOTES

1. CONDUITS WHICH ARE NOT USED IN THE PROJECT SHALL BE SAND ENCASED AND CAPPED 60" OUTSIDE OF PLAZA CONCRETE.
2. CONTRACTOR SHALL PROVIDE A 2" DIA. DOMED BRONZE ID MARKER AT EACH JUNCTION CAN AS SHOWN. MARKER SHALL BE STAMPED WITH UNIQUE IDENTIFIER AND ASSOCIATED CKT ID AS SHOWN ON PLANS. REFER TO DETAIL 1, THIS SHEET.
3. INSTALL GROUND RODS AND GROUND LOOP AT ALL JUNCTION CAN PLAZAS AS SHOWN. TWO GROUND RODS PER PLAZA LOCATED AT OPPOSITE CORNERS SHALL BE PROVIDED. COUNTERPOISE SHALL BE LOCATED NOMINALLY 12" BELOW EXISTING GRADE.
4. CONTRACTOR SHALL LABEL 2 ENDS OF EACH JUNCTION CAN PLAZA (JCP) BY IMPRESSING THE JCP IDENTIFICATION NUMBER INTO THE CONCRETE FOUNDATION. DURING PLACEMENT. LETTERS AND NUMBERS SHALL BE 4" IN HEIGHT, PROPORTIONAL IN WIDTH, AND HAVE A STROKE WIDTH OF 1/2" AND 1/4" DEPTH.
5. ALL JUNCTION CANS ARE L-867 TYPE D AND INCLUDE FOUR THREADED HUBS AT 90° ON CENTER AROUND CAN WITH HUBS AT 0° AND 180° AT 2.5" FROM BOTTOM AND HUBS AT 90° AND 270° AT 5" FROM BOTTOM. REFER TO DETAIL 3, THIS SHEET.



8 E2.3 2-WAY JUNCTION CAN PLAZA
SCALE: N.T.S.

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Aviation Specialists for Electrical, Telecommunications and Security Systems
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10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

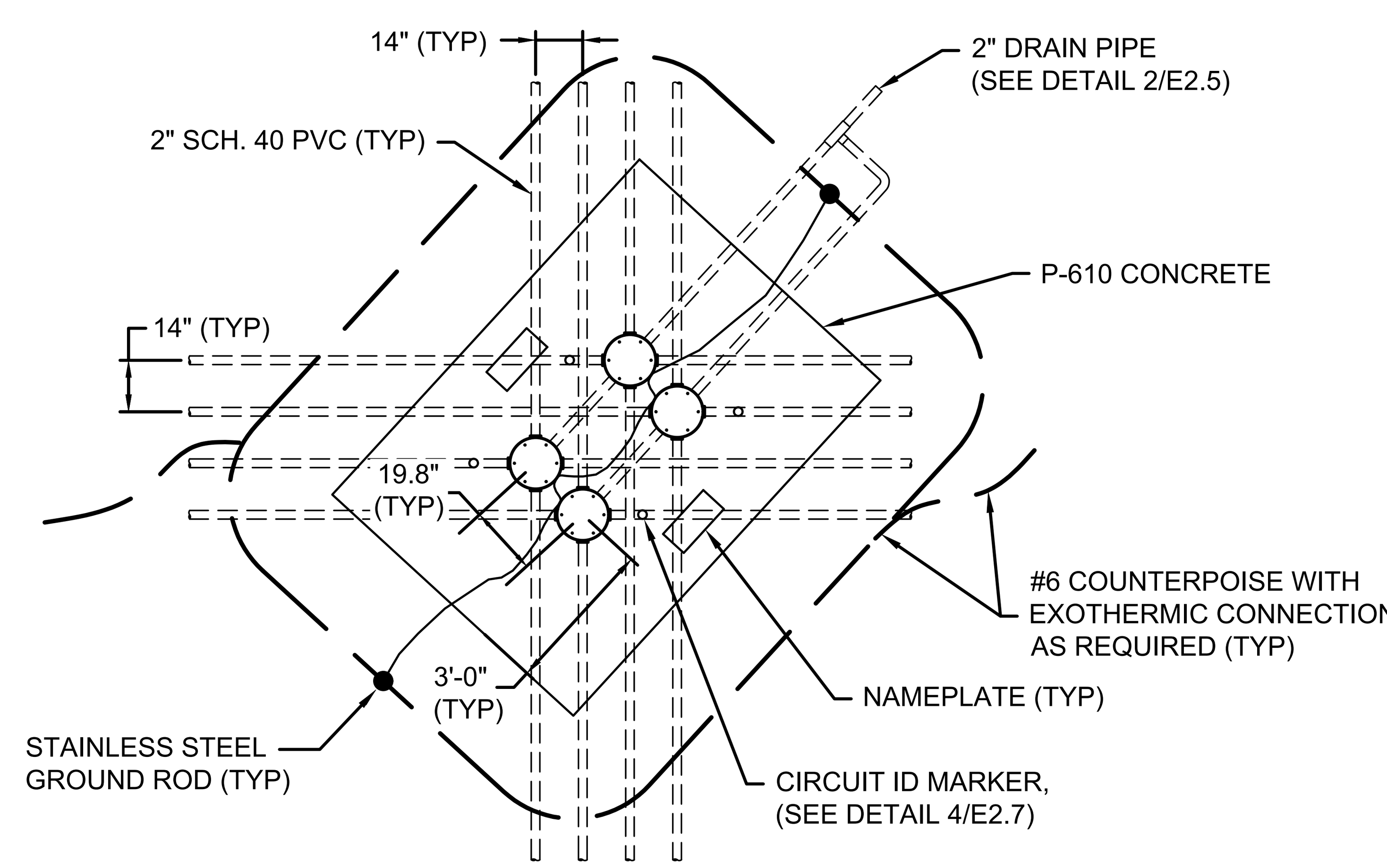
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

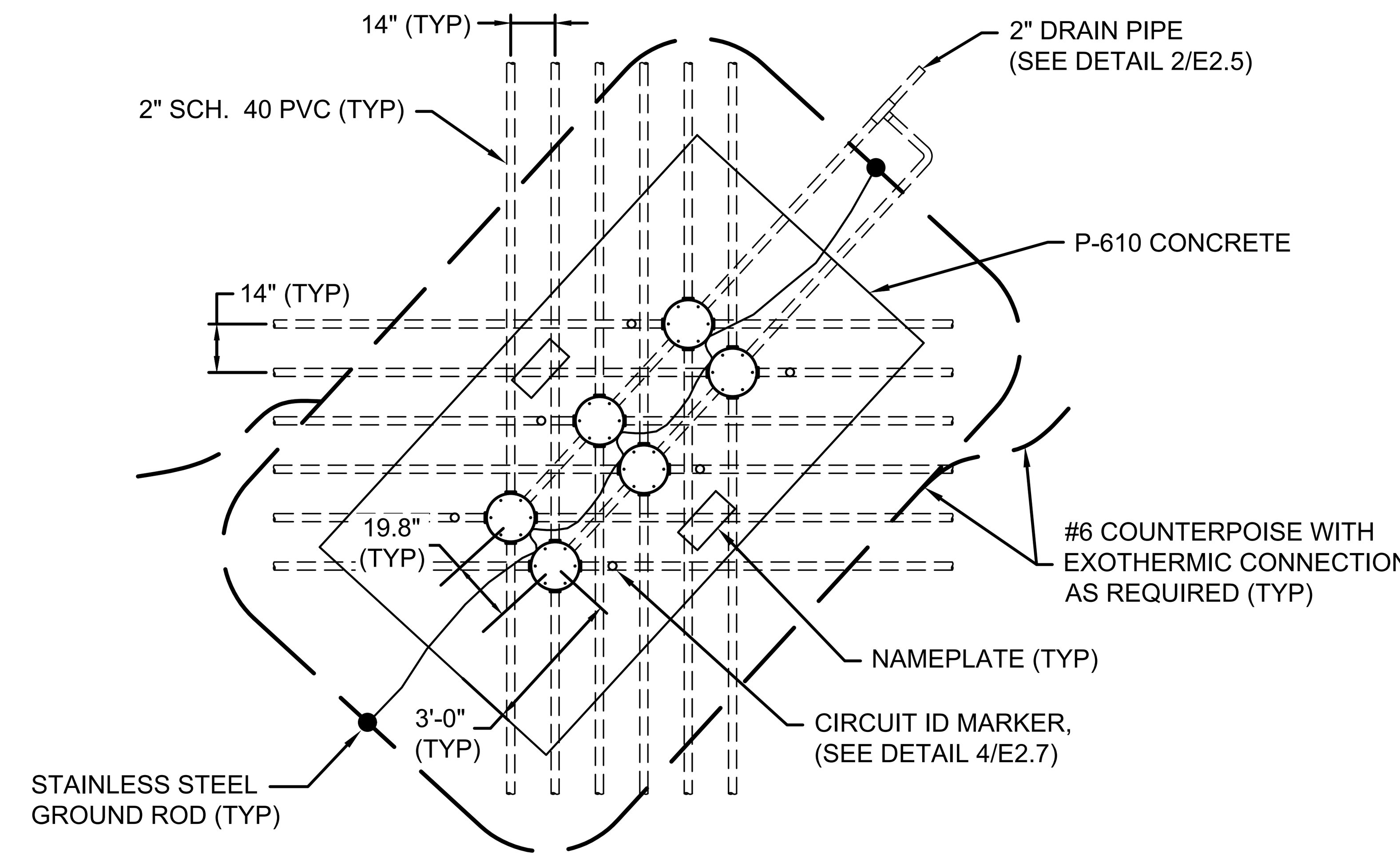
GENERAL AIRFIELD ELECTRICAL DETAILS

E2.3

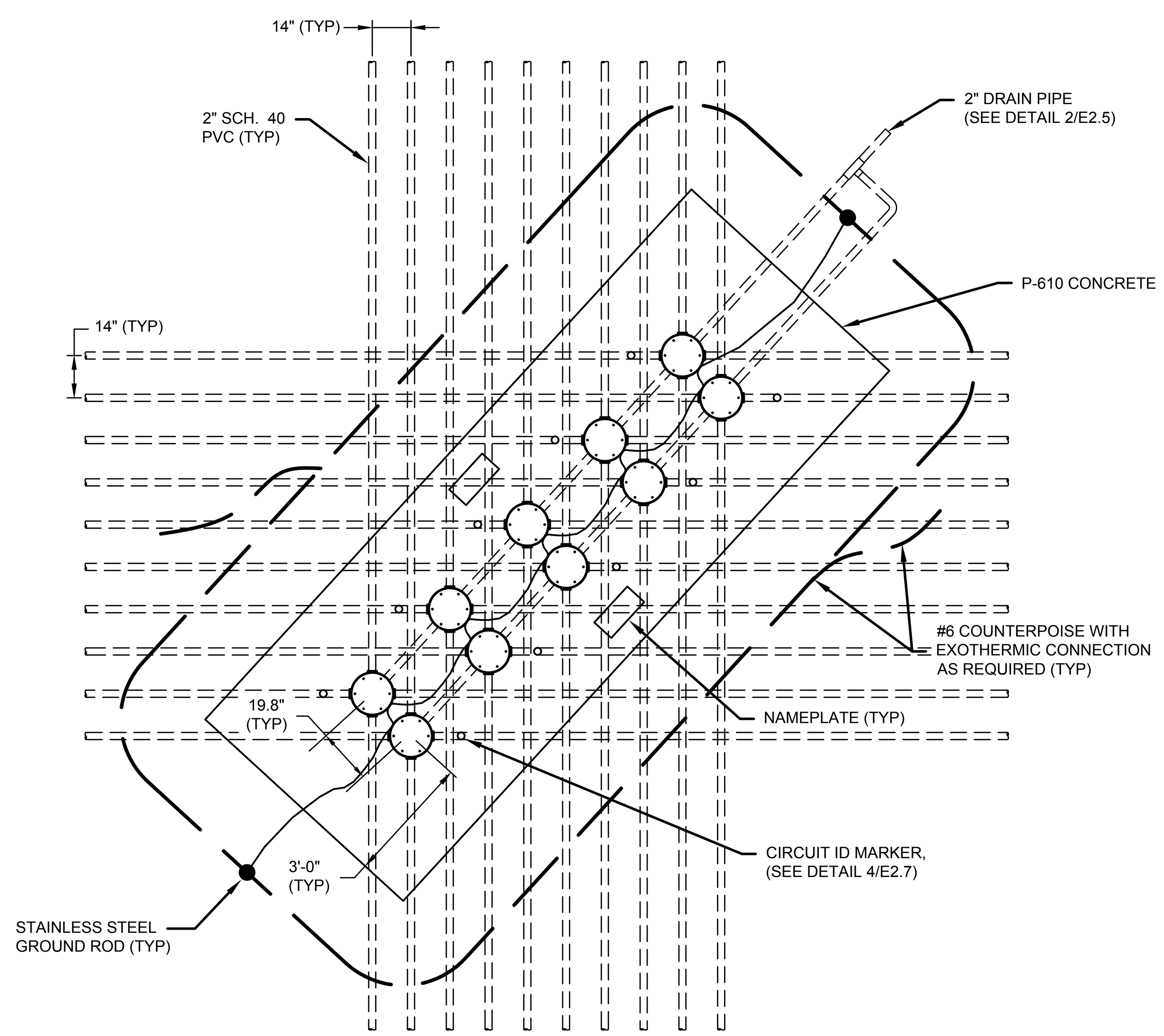
FILE NAME: 26016 - 01 - GEN - ELECTRICAL DETAILS.dwg
PLOT DATE: 5/13/2025 6:12:34 PM, Austin Cote



1 E2.4 4-WAY JUNCTION CAN PLAZA
SCALE: N.T.S.



2 E2.4 6-WAY JUNCTION CAN PLAZA
SCALE: N.T.S.



3 E2.4 10-WAY JUNCTION CAN PLAZA
SCALE: N.T.S.

1

JUNCTION CAN PLAZA NOTES

1. CONDUITS WHICH ARE NOT USED IN THE PROJECT SHALL BE SAND ENCASED AND CAPPED 60" OUTSIDE OF PLAZA CONCRETE.
2. CONTRACTOR SHALL PROVIDE A 2" DIA. DOMED BRONZE ID MARKER AT EACH JUNCTION CAN AS SHOWN. MARKER SHALL BE STAMPED WITH UNIQUE IDENTIFIER AND ASSOCIATED CKT ID AS SHOWN ON PLANS. REFER TO DETAIL 1, THIS SHEET.
3. INSTALL GROUND RODS AND GROUND LOOP AT ALL JUNCTION CAN PLAZAS AS SHOWN. TWO GROUND RODS PER PLAZA LOCATED AT OPPOSITE CORNERS SHALL BE PROVIDED. COUNTERPOISE SHALL BE LOCATED NOMINALLY 12" BELOW EXISTING GRADE.
4. CONTRACTOR SHALL LABEL 2 ENDS OF EACH JUNCTION CAN PLAZA (JCP) BY IMPRESSING THE JCP IDENTIFICATION NUMBER INTO THE CONCRETE FOUNDATION. DURING PLACEMENT. LETTERS AND NUMBERS SHALL BE 4" IN HEIGHT, PROPORTIONAL IN WIDTH, AND HAVE A STROKE WIDTH OF 1/2" AND 1/4" DEPTH.
5. ALL JUNCTION CANS ARE L-867 TYPE D AND INCLUDE FOUR THREADED HUBS AT 90° ON CENTER AROUND CAN WITH HUBS AT 0° AND 180° AT 2.5" FROM BOTTOM AND HUBS AT 90° AND 270° AT 5" FROM BOTTOM. REFER TO DETAIL 3, THIS SHEET.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

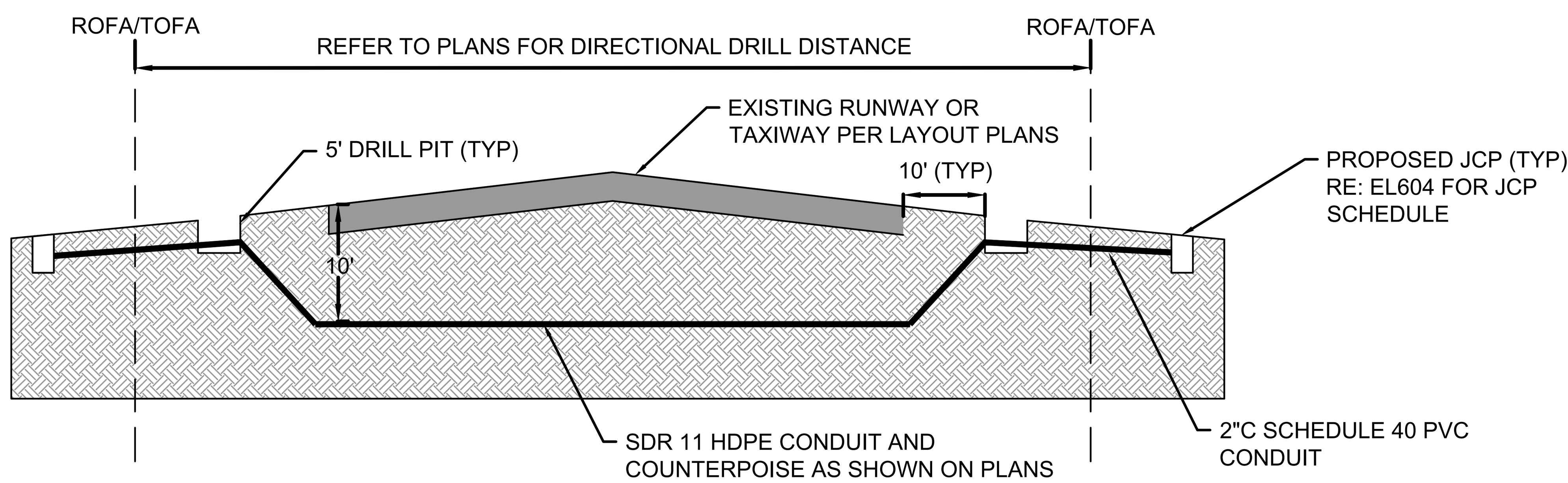
NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

GENERAL AIRFIELD ELECTRICAL DETAILS

E2.4

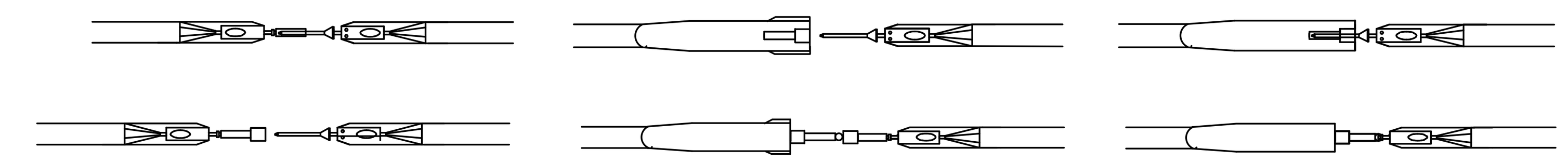


1 E2.5 DIRECTIONAL DRILLING DETAIL
SCALE: N.T.S.

NOTES

1. THE LAUNCHING AND RECEIVING PITS FOR THE DIRECTIONAL DRILL SHALL BE LOCATED 10' FROM THE PAVEMENT EDGE OR AS DIRECTED BY THE RPR.
2. SHOULD THE PAVEMENT BECOME DISTURBED IN ANY WAY, SUCH AS BUCKLING, CRACKING, SHIFTING, ETC., DURING THE COURSE OF DIRECTIONAL DRILLING, PULLING CONDUIT, ETC, THE CONTRACTOR SHALL IMMEDIATELY CEASE OPERATIONS AND NOTIFY AIRPORT OPERATIONS

1

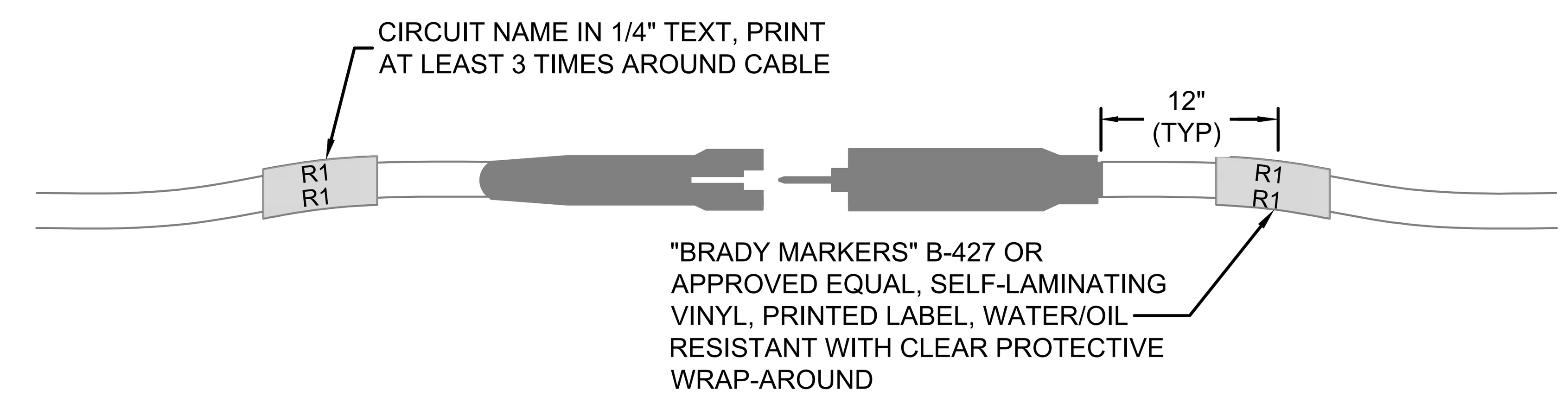


TYPE A
FOR SPLICES FOR USE AT JUNCTION OF HOMERUN WITH LOOP CIRCUIT

TYPE B
FOR SPLICES AT LIGHTS OR SIGNS

CONTRACTOR SHALL USE FAA APPROVED L-823 PRIMARY CONNECTOR KITS. CONNECTOR KITS SHALL BE MOLDED IN THERMOPLASTIC RUBBER AND PROVIDED WITH HEAT SHRINKABLE WATER SEAL TO MAKE WATER-TIGHT CONNECTIONS. CONNECTOR KITS SHALL HAVE EXTENDED STRAIN/BEND RELIEF, INTEGRALLY MOLDED O-RINGS AND ROLL OVER FLAPS

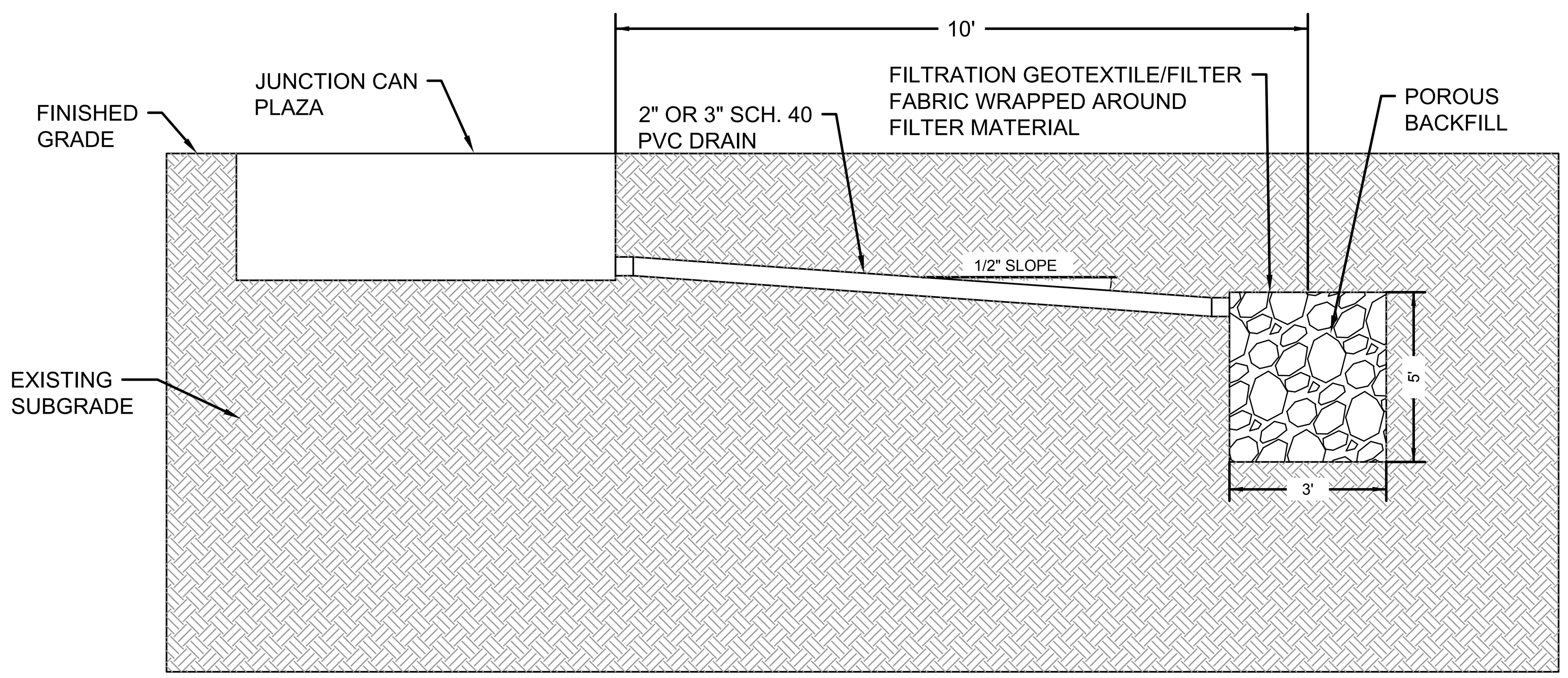
4 E2.5 CABLE SPLICE DETAIL
SCALE: N.T.S.



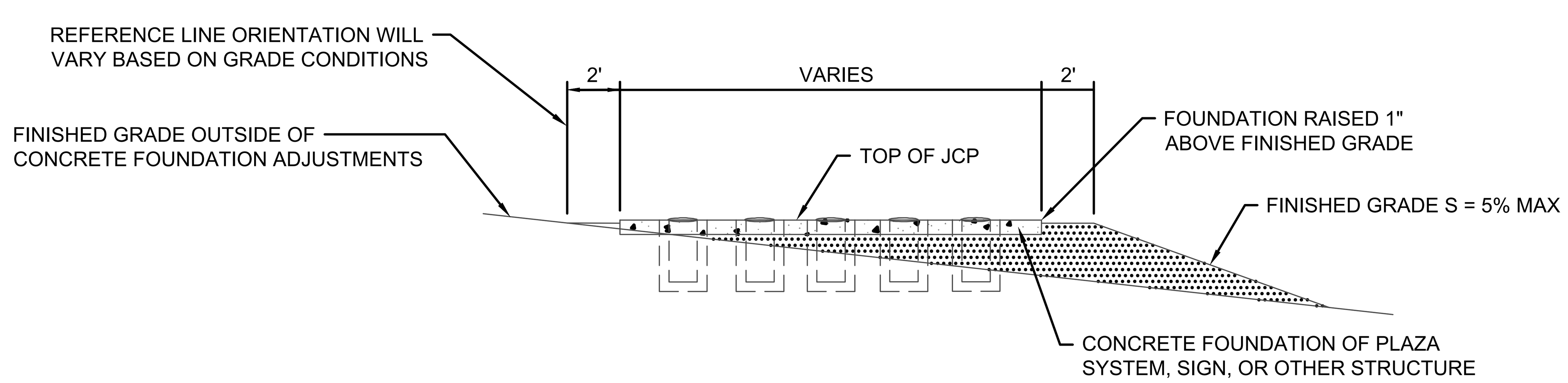
NOTES

PROVIDE WATERPROOF VINYL CIRCUIT IDENTIFICATION LABELS FOR ALL CIRCUITS AFFECTED BY THE PROJECT. INSTALL CIRCUIT IDENTIFICATION LABELS ON BOTH SIDES OF ALL SPLICE LOCATIONS, AT THE END OF ALL "BLACK" JACKETED CONDUCTORS, AND ON ALL AIRFIELD LIGHTING CABLES ENTERING OR EXITING HANDHOLES, MANHOLES, JUNCTION CAN PLAZAS, LIGHT BASES AND PULL BOXES. PROVIDE SEPARATE LABEL WITH UNIQUE IDENTIFICATION FOR EACH ADDITIONAL SPLICE LOCATION.

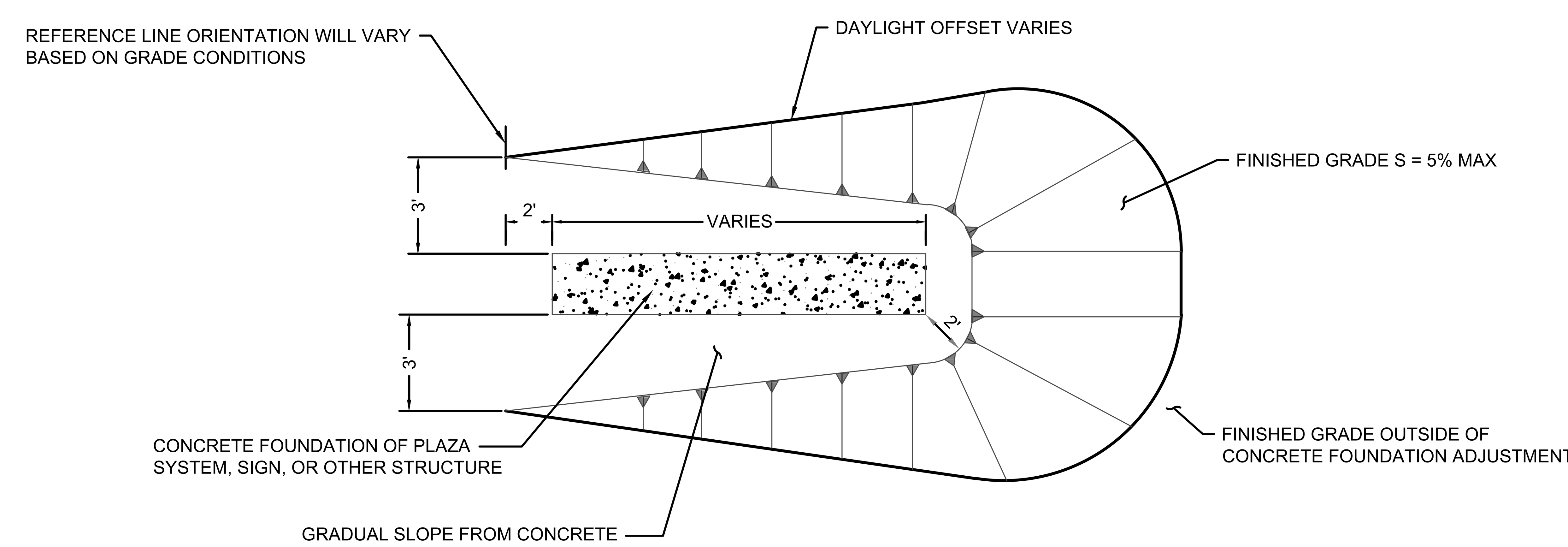
5 E2.5 CIRCUIT IDENTIFICATION LABEL DETAIL
SCALE: N.T.S.



2 E2.5 JCP SUMP DRAIN DETAIL
SCALE: N.T.S.



3 E2.5 JCP CONCRETE FOUNDATION GRADING AND FILL DETAIL
SCALE: N.T.S.



6 E2.5 JCP CONCRETE FOUNDATION GRADING AND FILL DETAIL - PLAN VIEW
SCALE: N.T.S.

..\d0184190\Ferguson - AVIATION (FULL INFO).png

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GROUP ALPHA
TXDOT CSJ NO. 4222AVSAE

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STATE OF TEXAS
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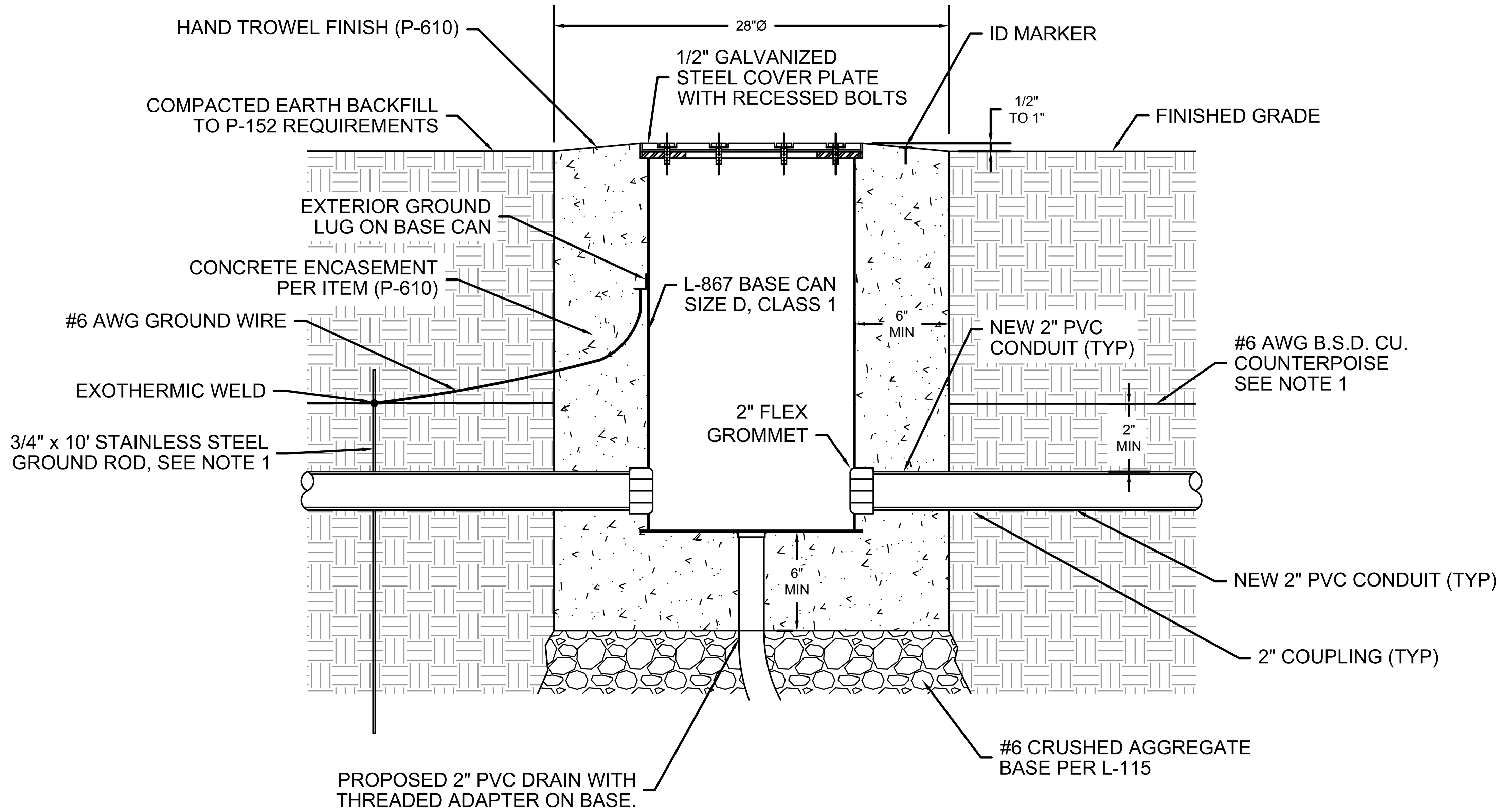
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/2025
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

GENERAL AIRFIELD ELECTRICAL DETAILS

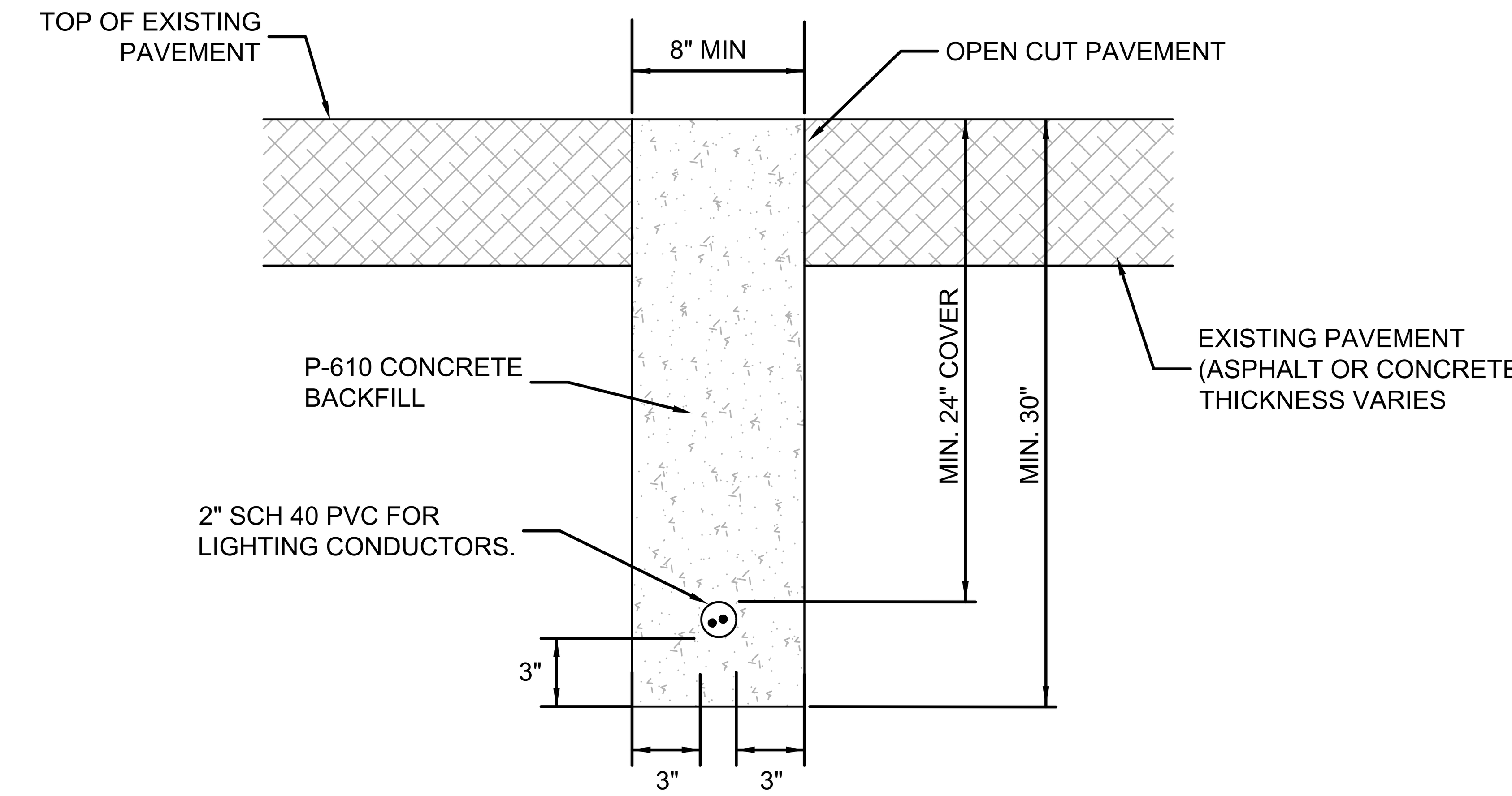
E2.5



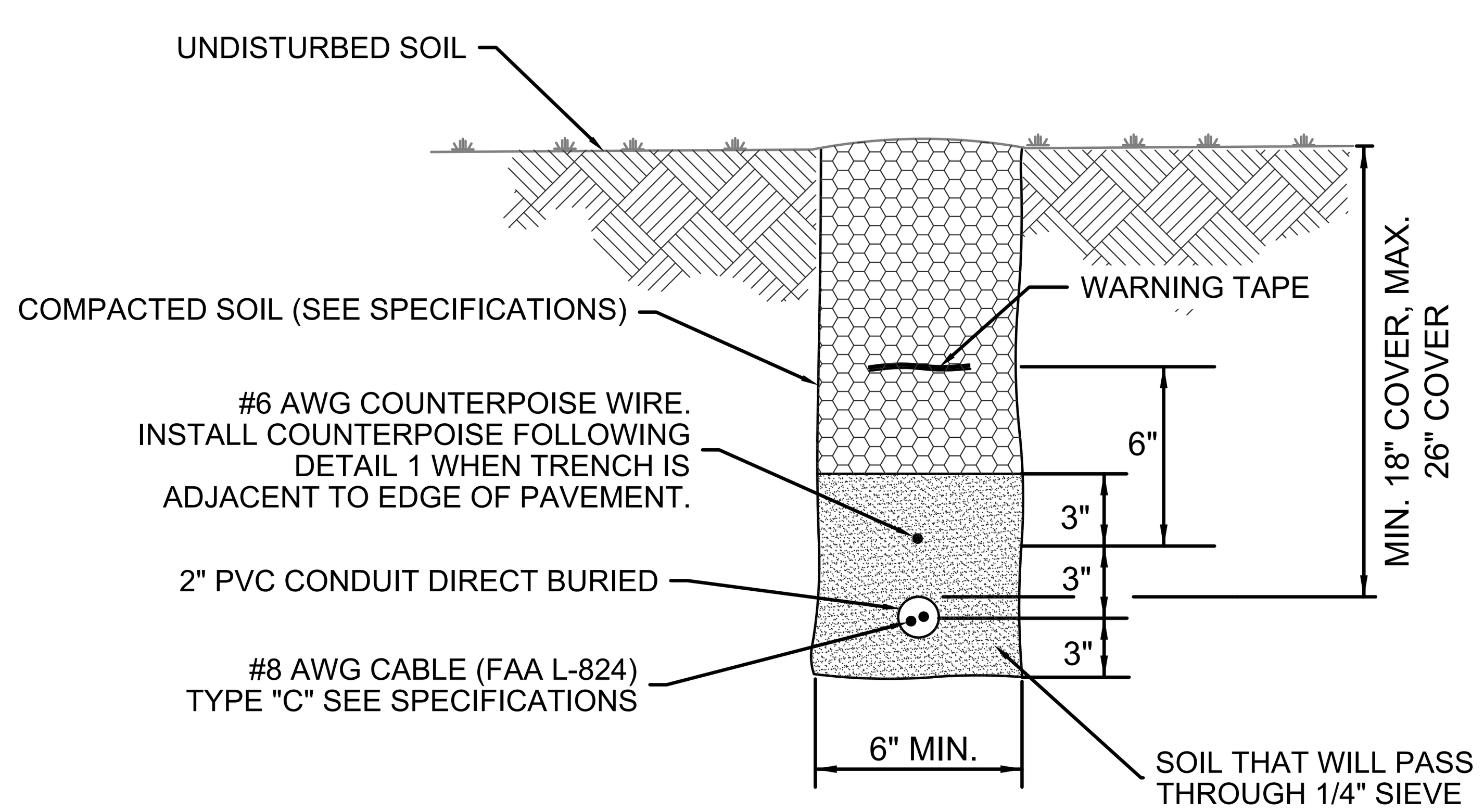
NOTE:

1. COUNTERPOISE IS TO BE CONNECTED TO GROUND ROD, DO NOT CONNECT COUNTERPOISE TO BASE CAN. LOCATE COUNTERPOISE AND GROUND ROD A MINIMUM OF 6" BEYOND CONCRETE ENCASEMENT.

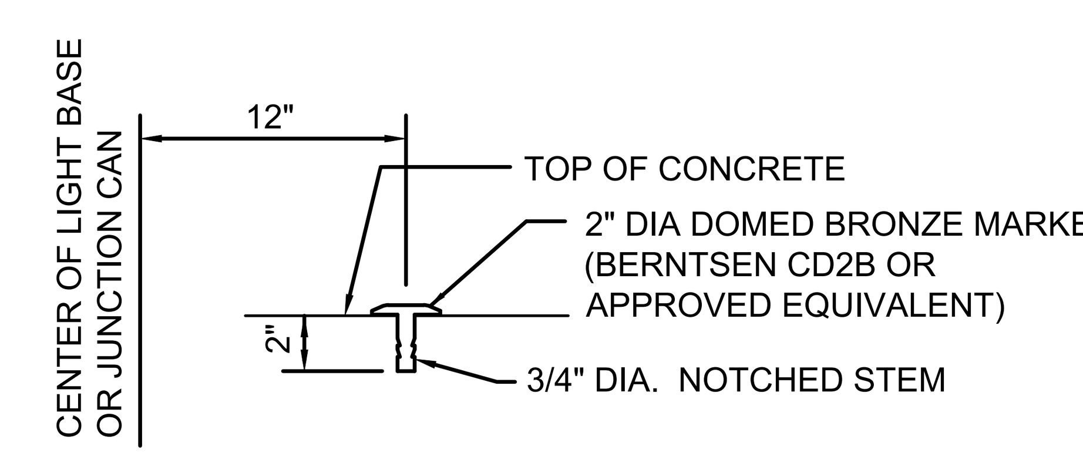
1 / E2.7 **L-867D PULLBOX IN TURF**
SCALE: N.T.S.



2 / E2.7 **OPEN-CUT EXISTING PAVEMENT, 1 WAY, 2"C**
SCALE: N.T.S.



3 / E2.7 **TYPICAL CONDUIT TRENCH DETAIL 1-WAY, 2"C DIRECT BURIED**
SCALE: N.T.S.



NOTES

1. IDENTIFICATION MUST BE STAMPED USING 3/4" FIGURES AND LETTERS UNIFORMLY SPACED ON THE BRONZE MARKER.
2. IDENTIFICATION MARKERS MUST BE UNIFORMLY INSTALLED ADJACENT TO RESPECTIVE BASE CANS.

4 / E2.7 **JUNCTION CAN ID MARKER**
SCALE: N.T.S.

1

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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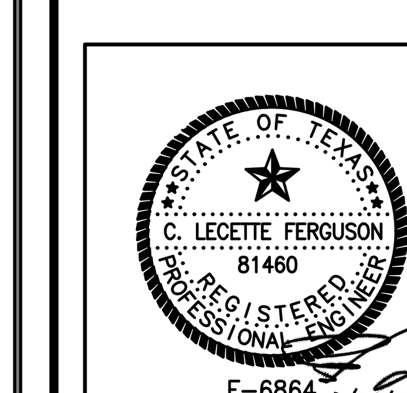
TXDOT CSJ NO. 4222AVSAE

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3



PROJECT NO.:	23062
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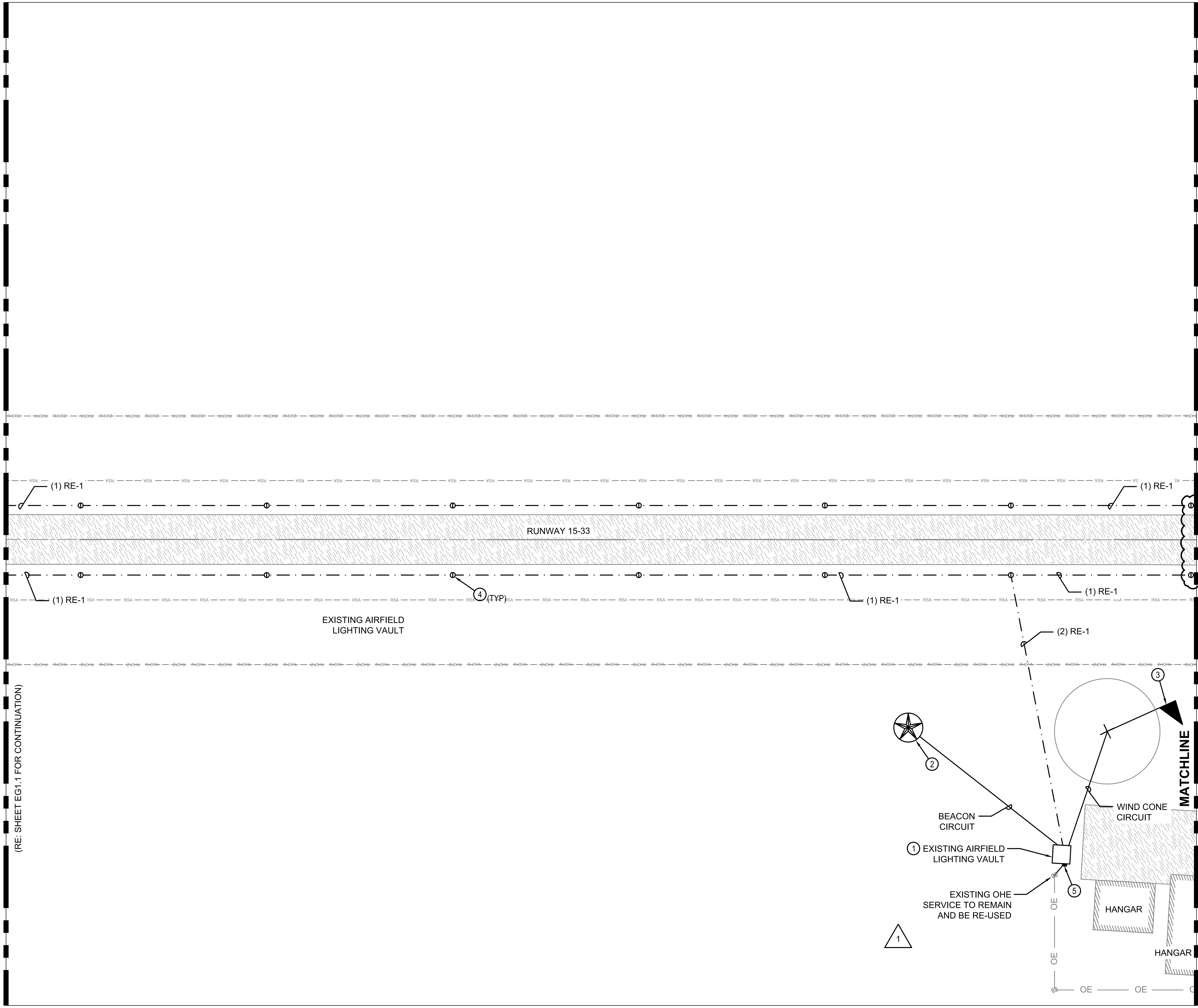
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

GENERAL AIRFIELD ELECTRICAL DETAILS

E2.7



GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EG2 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EG1 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
4. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104.
5. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.
6. DIRECT BURIED CABLES NOTED MARKED FOR DEMOLITION ARE TO BE ABANDONED IN PLACE. ONLY REMOVE ABANDONED CIRCUITS WHERE EXPOSED BY PROPOSED TRENCHING OPERATIONS. REMOVAL IN THIS INSTANCE WILL BE INCIDENTAL TO THE LINE ITEM ASSOCIATED WITH THE TRENCHING OPERATIONS.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING VAULT TO BE DEMOLISHED. ALL ASSOCIATED EQUIPMENT WITHIN TO BE REMOVED AND DISPOSED OF OR SALVAGED AT THE REQUEST OF THE OWNER. REFER TO EG4 SERIES FOR DETAILS.
2. SALVAGE EXISTING BEACON, POLE TO BE DEMOLISHED. CONTRACTOR TO REMOVE CONDUCTORS AND CONDUIT BACK TO AIRFIELD LIGHTING VAULT.
3. EXISTING WIND CONE AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED, SEGMENTED CIRCLE TO REMAIN. CONTRACTOR TO REMOVE CONDUCTORS AND CONDUIT BACK TO AIRFIELD LIGHTING VAULT.
4. REMOVE EXISTING STAKE MOUNTED EDGE LIGHT, ISOLATION TRANSFORMER AND ASSOCIATED BROOKS BOX.
5. REMOVE EXISTING OHE FEEDER TO VAULT STRUCTURE AND ASSOCIATED METER. COORDINATE ALL WORK WITH UTILITY COMPANY.

NORTH

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GONZALES MUNICIPAL AIRPORT
GONZALES, TX 78629

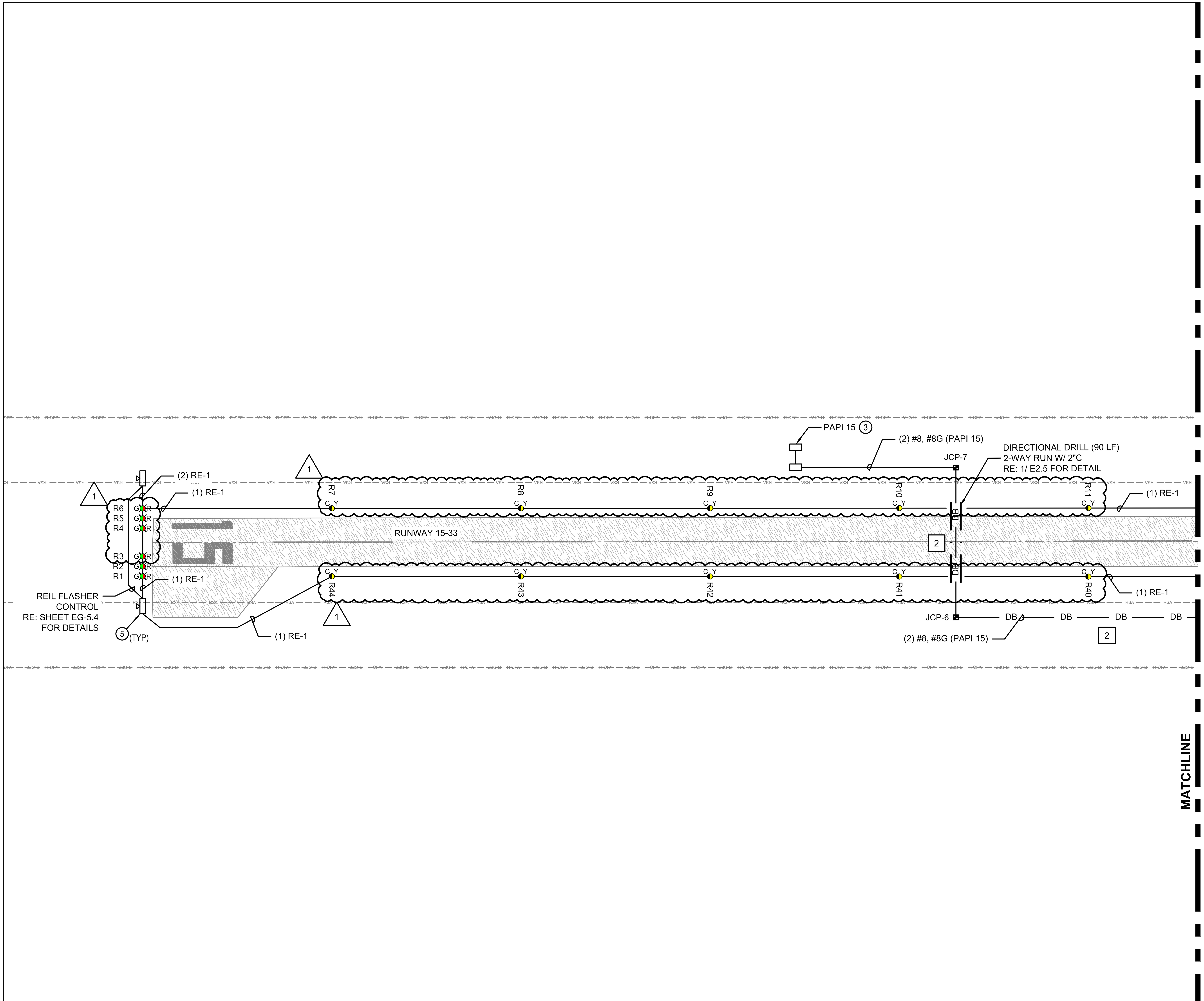
NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/25
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EG1.2



GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO EG1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO EG6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
5. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EG2 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
6. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

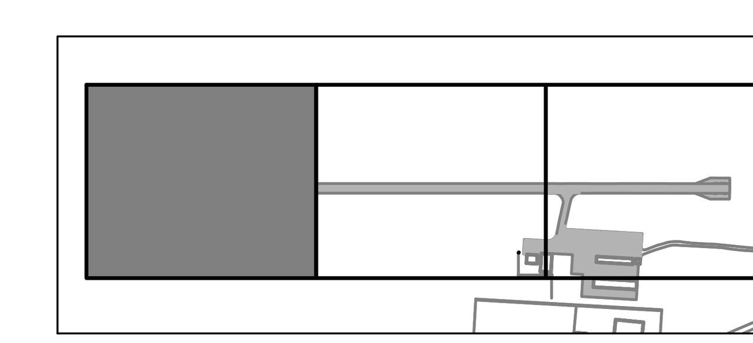
(1) CONTRACTOR TO INSTALL NEW AIRFIELD LIGHTING VAULT AND EQUIPMENT. REFER TO EG4 SERIES FOR DETAILS.

(2) INSTALL SALVAGED BEACON ON NEW TIP DOWN POLE. REFER TO EG5.4 FOR DETAIL.

(3) INSTALL NEW L-881(L) PAPI. REFER TO EG5 SERIES FOR DETAILS.

(4) INSTALL NEW LED WIND CONE ON NEW TIP DOWN POLE. REPAINT EXISTING SEGMENTED CIRCLE. REFER TO SHEET E2.6 FOR DETAILS.

(5) INSTALL NEW L-849E(L) REIL. REFER TO SHEET EG5.3 FOR DETAILS.



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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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GONZALES, TX 78629

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81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
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REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EG2.1

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
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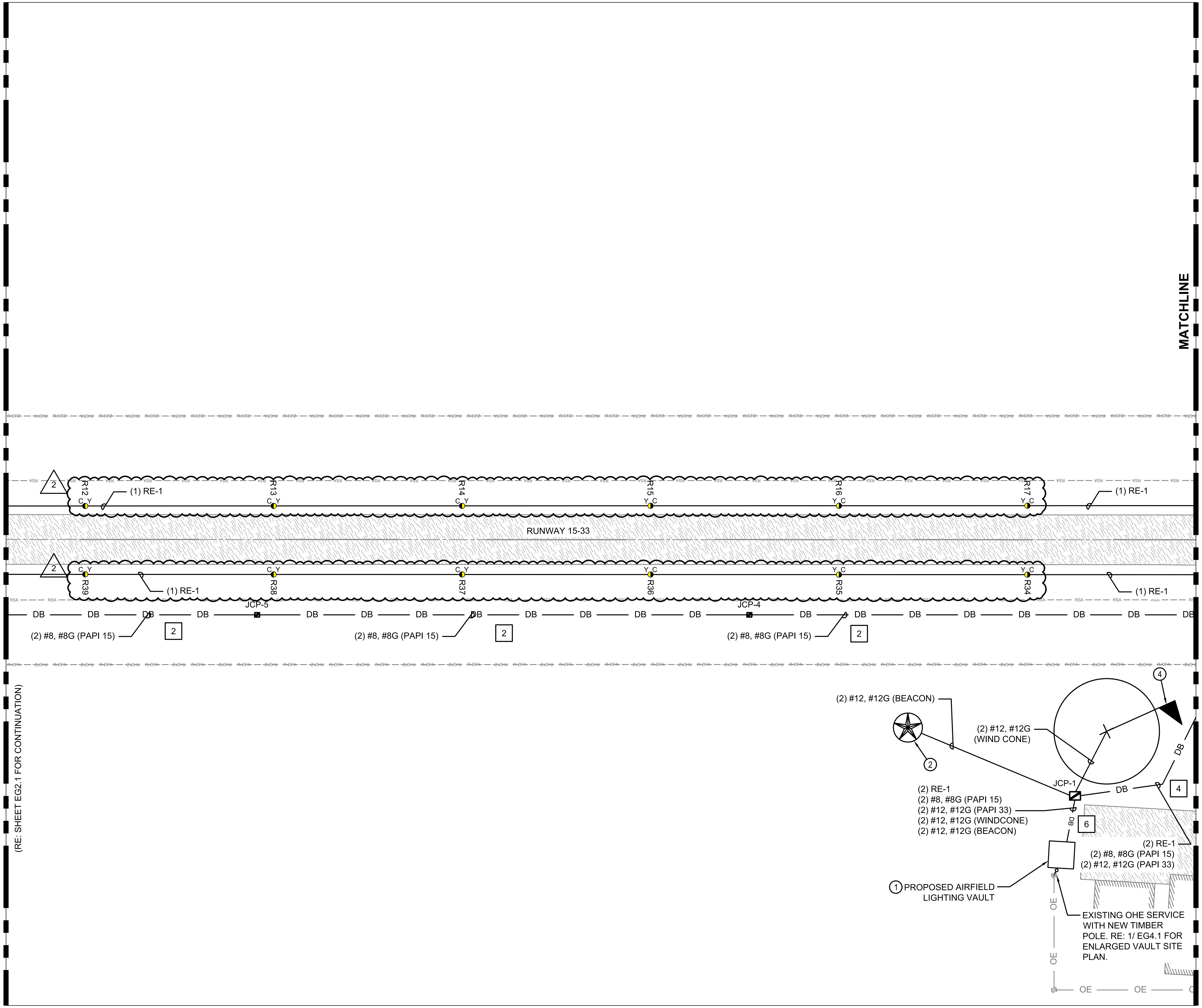
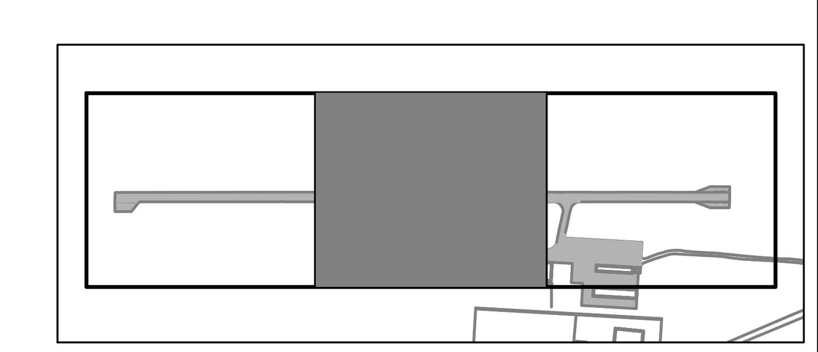
5. INSTALL NEW L-849E(L) REIL. REFER TO SHEET EG5.3 FOR DETAILS.





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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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F-6864 05/14/25

PROJECT NO.: 23062
DATE OF ISSUE: 03/07/25
REVIEWED BY: RCF
DRAWN BY: ALC
DESIGNED BY: RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EG2.2

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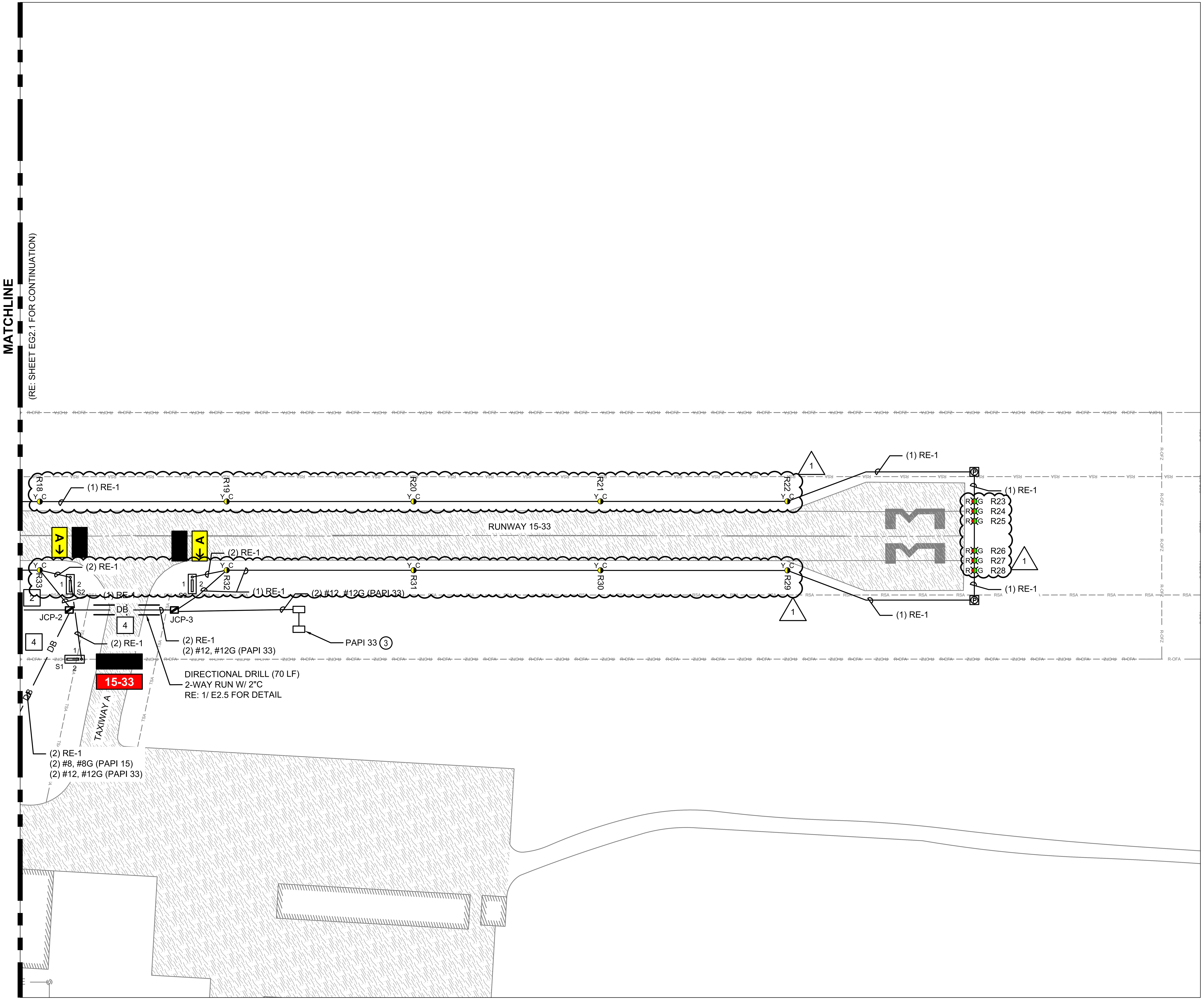
FILE NAME: 26614 T20 EG2.1.dwg
PLOT DATE: 5/13/2025 1:41:01 PM, Fred Rocha



GENERAL NOTES

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5. INSTALL NEW L-849E(L) REIL. REFER TO SHEET EG5.3 FOR DETAILS.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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GONZALES, TX 78629

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81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EG2.3

GENERAL NOTES

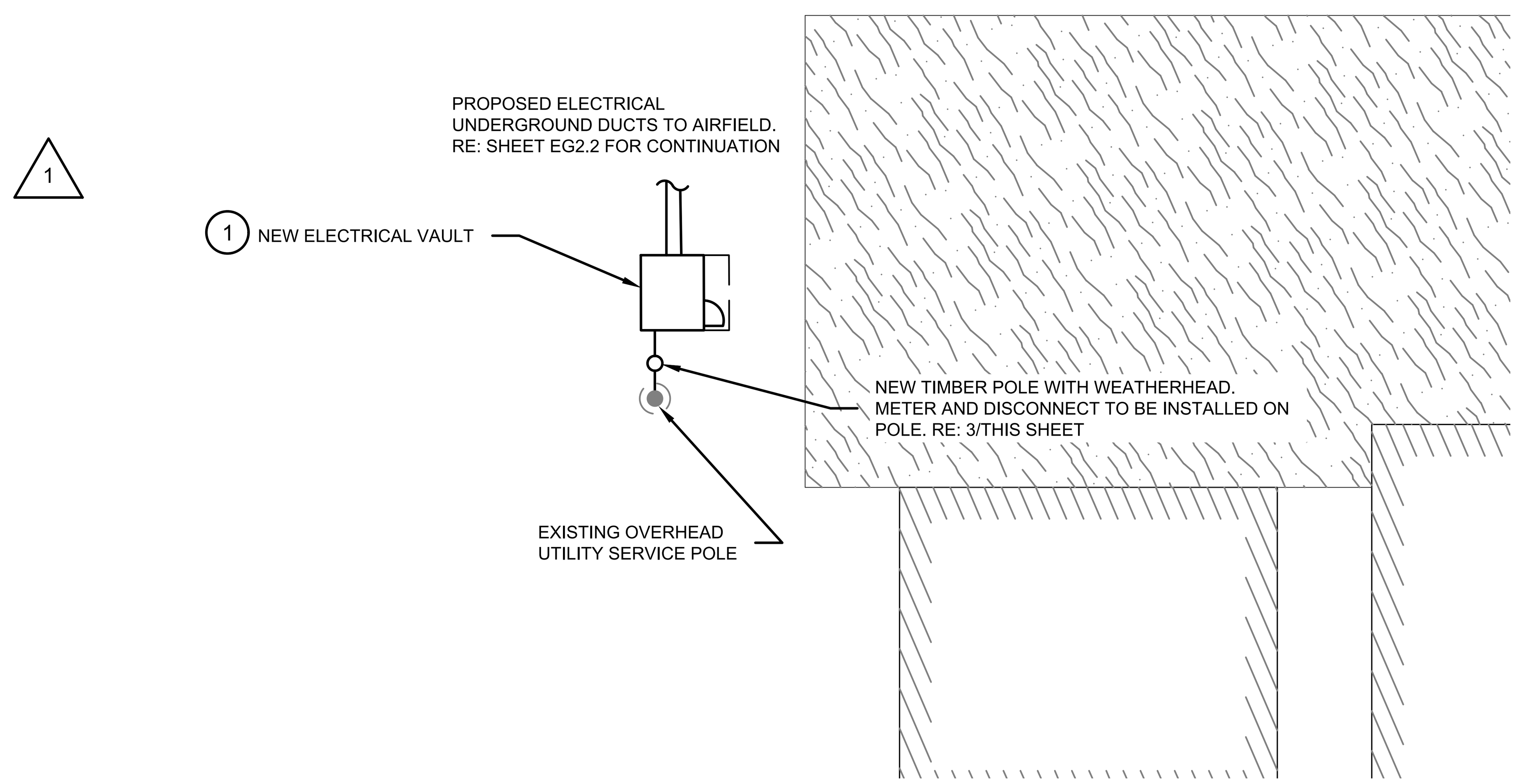
1. ALL ITEMS SHOWN IN HEAVY, SOLID LINEWEIGHT ARE NEW OR MODIFIED.
2. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT.
3. ALL WORK RELATING TO ELECTRICAL SERVICE TO BE COORDINATED WITH LOCAL UTILITY COMPANY.

KEYED NOTES

(1) FURNISH 10' X 12' X 8'-6" MIN VAULT STRUCTURE. PROVIDE STRUCTURE WITH UV RESISTANT FINISH CONSISTING OF HIGH GLOSS GEL-COAT OR 3-COATS OF EXTERIOR GRADE PAINT. STRUCTURE SHALL INCLUDE A 36"W X 7'H SOLID DOOR WITH KEY LOCK, WEATHER TRIM TO PREVENT INGRESS OF WATER, DUST OR OTHER FOREIGN PARTICLES. PROVIDE WITH MIN 250LB/SF FLOOR LOADING CAPACITY WITH COMMERCIAL GRADE VINYL TILE FINISH. PROVIDE SLOPED ROOF WITH 100LB/SF LOADING AND 220 FT-LB IMPACT RESISTANCE. ALL WALLS, FLOOR AND ROOF SHALL BE INSULATED. WALLS TO BE REINFORCED WITH 3/4" PLYWOOD FOR MOUNTING EQUIPMENT. ALL JOINTS SHALL BE AIR AND WATER-TIGHT. ALL HARDWARE SHALL BE STAINLESS STEEL. FURNISH COLOR SAMPLES FOR REVIEW. PRE-FABRICATED FIBERGLASS, PRE-CAST CONCRETE OR CONCRETE TILT-UP WALL CONSTRUCTION OR INSULATED METAL BUILDING ON SLAB IS AN APPROVED BUILDING TYPE. FURNISH VAULT WITH LIGHTS, RECEPTACLES, WALL SWITCH, 1-TON A/C UNIT WITH BUILT IN 1-TON HEATER, THERMOMETER, AND ALL INCIDENTALS COMPLETE AND IN PLACE.

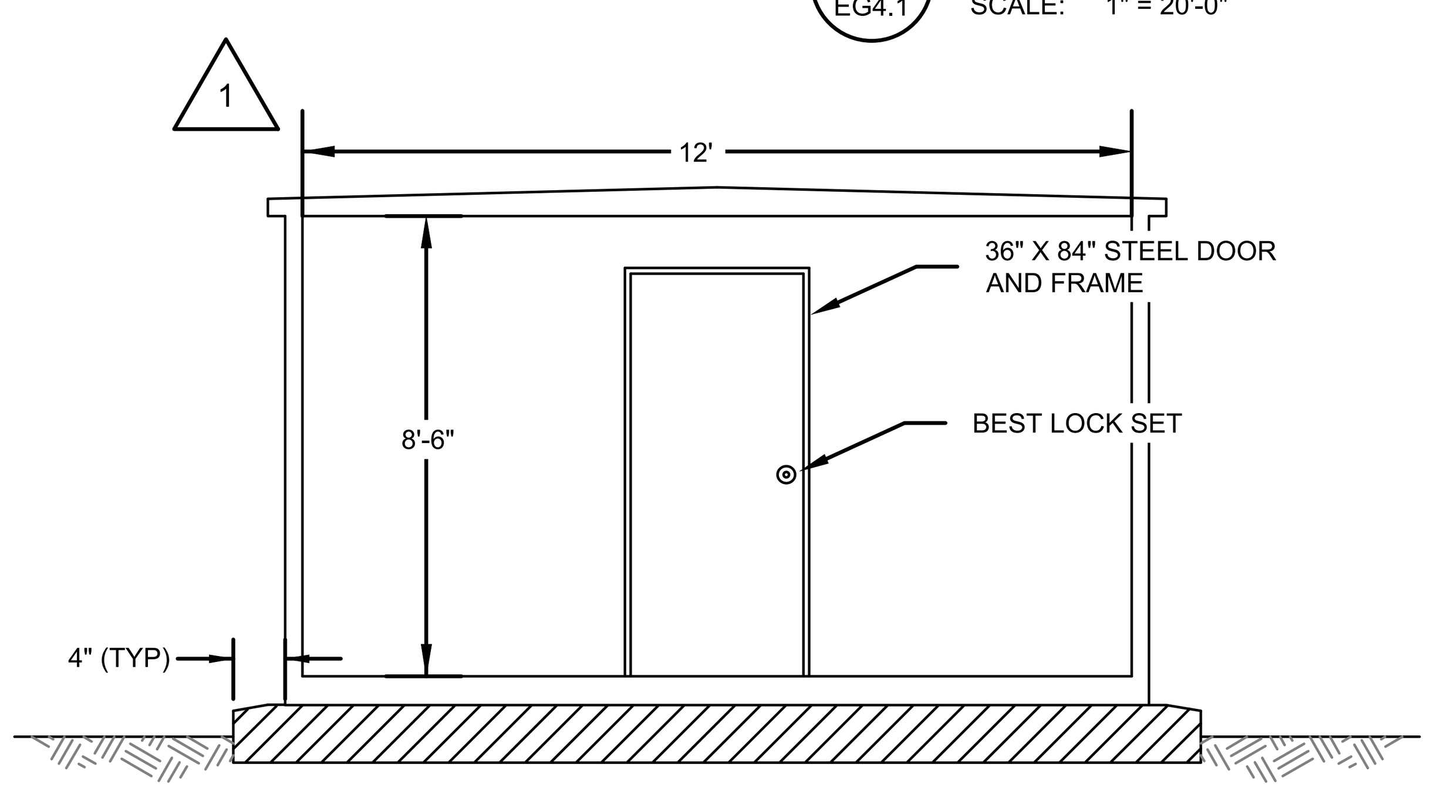
1

2



1 / EG4.1 **VAULT SITE PLAN**

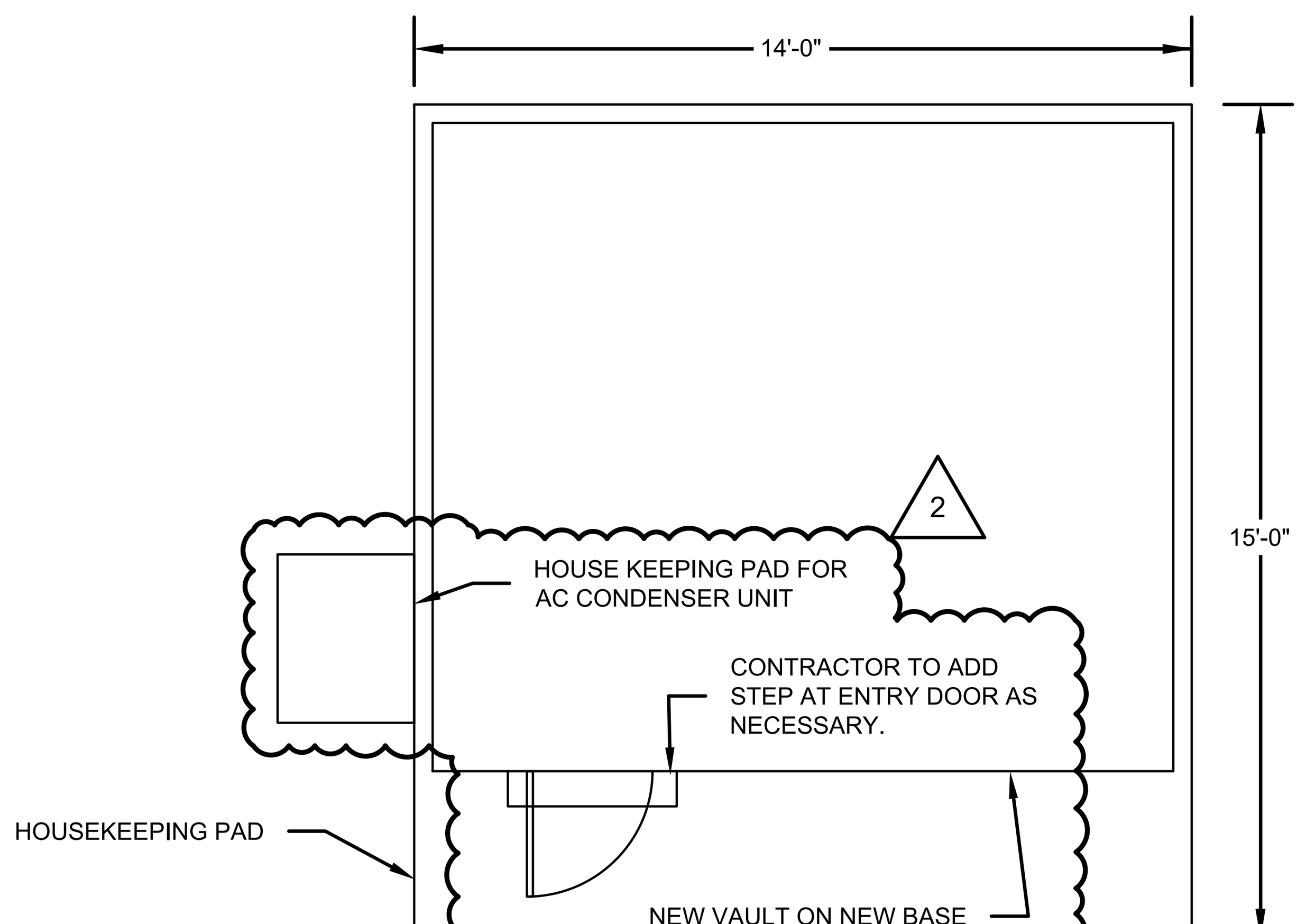
SCALE: 1" = 20'-0"



PROFILE VIEW

NOTES

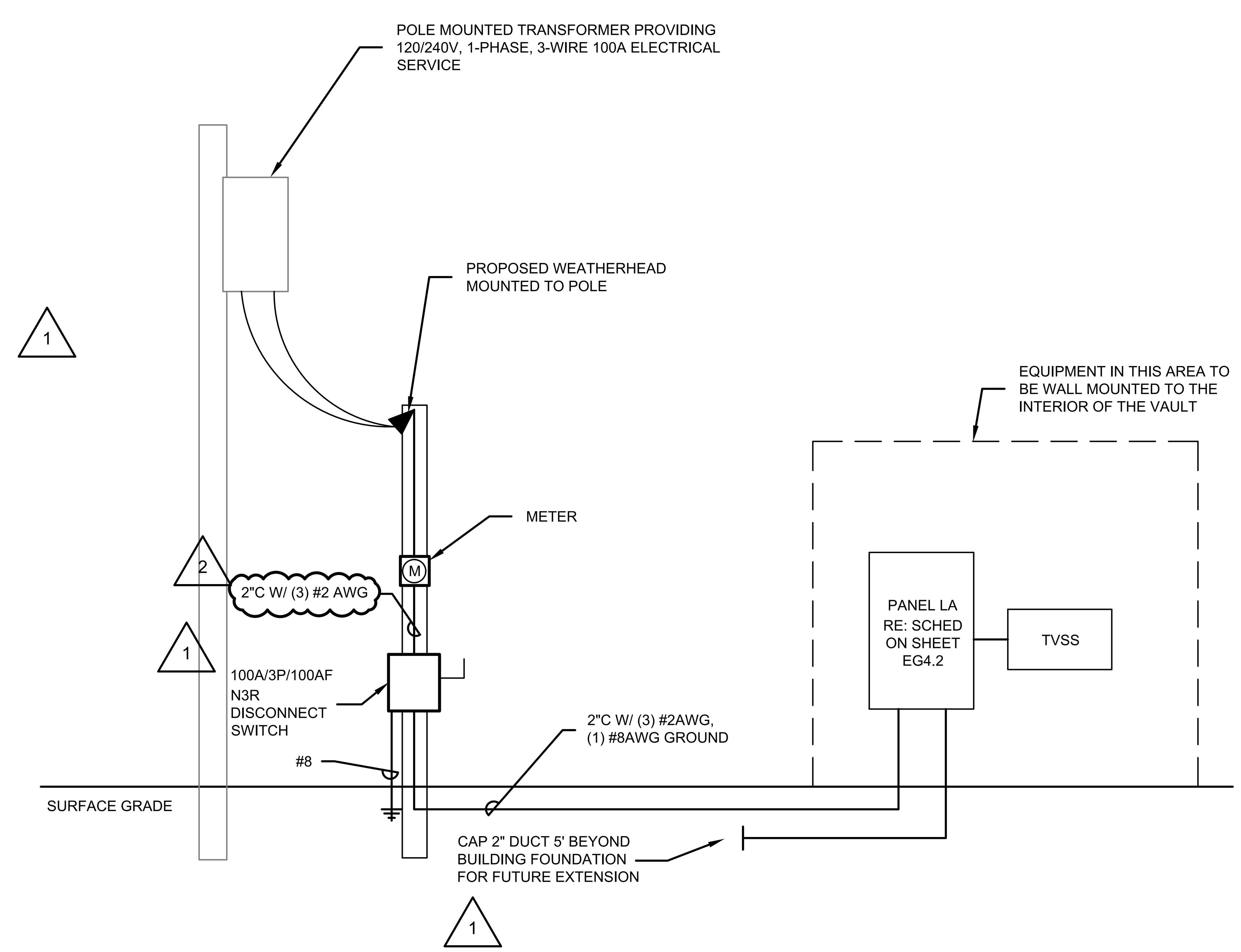
1. REFER TO CIVIL DETAILS FOR VAULT FOUNDATION PLAN.



PLAN VIEW

2 / EG4.1 **VAULT PLAN - FRONT ELEVATION**

SCALE: N.T.S.



3 / EG4.1 **PROPOSED ONE-LINE DIAGRAM**

SCALE: N.T.S.

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FILE NAME: 26016 T20 EG4.1.dwg

PLOT DATE: 5/13/2025 3:45:13 PM, Cole Ferguson

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GONZALES MUNICIPAL AIRPORT

GONZALES, TX 78629

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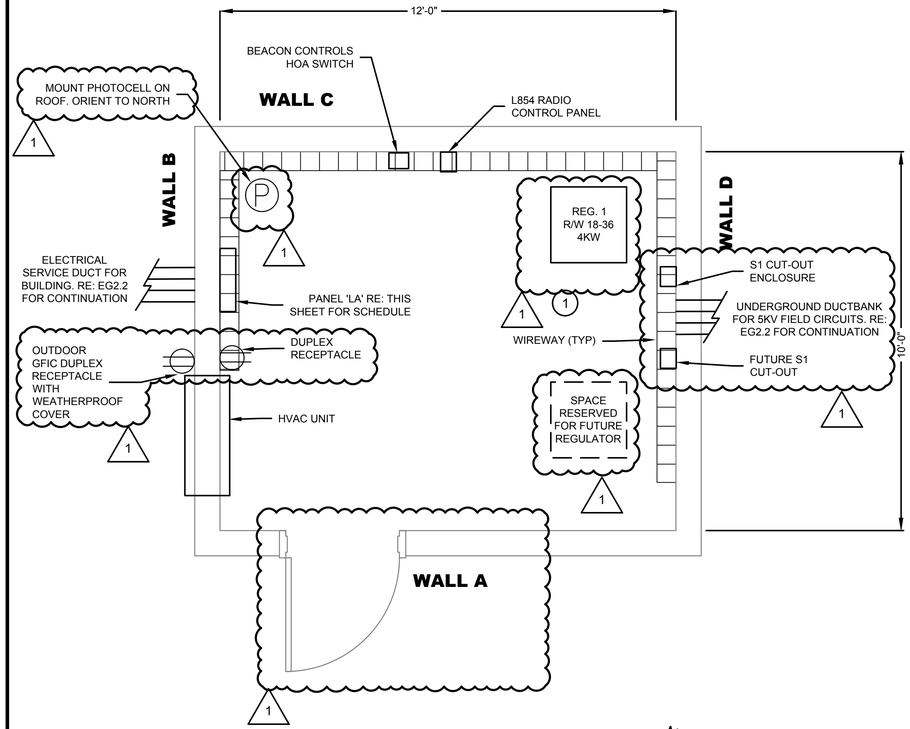
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/25
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

ELECTRICAL VAULT PLAN

EG4.1



1 / EG4.2 **PROPOSED VAULT PLAN**

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. ALL NEW WIREWAYS TO INCLUDE HINGED COVERS. LABEL ALL WIREWAYS FOR USE AS NOTED.
2. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT. ALL CONNECTIONS TO REGULATOR TO USE LIQUID-TIGHT NON-METALLIC CONDUIT. ALL CONDUIT TO BE 1" UON.
3. PROVIDE NAMEPLATE ON REGULATOR STATING REGULATOR ID, STEPS, VOLTAGE AND CIRCUIT ID.

KEYED NOTES

(1) INSTALL NEW 4 KW, 240V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.

(2) INSTALL LOAD CENTER WITH TYPE 1 SURGE PROTECTION DEVICE.

UTILITY LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW	DEMAND KW
REGULATOR 1	1.74	1.74
PAPI (RUNWAY 33 AND 15)	0.53	0.66
WIND CONE	0.06	0.08
BEACON	0.22	0.27
HVAC	1.5	1.5
LIGHTING	0.09	0.11
RECEPTACLE	0.18	0.36
RADIO CONTROLLER	.02	.02
SUB-TOTAL LOAD	4.33	4.74

4.74 KVA / 240V = 19.8 A

100A SERVICE EXCEEDS NEC REQUIREMENTS

PROPOSED REGULATOR 1 (RW 18-36) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 1 'RWY 17-35' (4KW)	
LED RW LIGHTING (32 RWY EDGE LTG @ 21.5W/EA)	0.69
LED RW THSLD LIGHTING (16 RWY THSLD LTG @ 17.9W/EA)	0.29
SIGNS (LED)	0.27
CABLE LOSS (12505' @ 3W/100LF)	0.26
SUB-TOTAL LOAD	1.74

4KVA REGULATOR EXCEEDS NEC REQUIREMENTS

PANEL: LA

VOLTAGE: 120/240V (1) | 1 * 3 W | AIC:

MAINS: 100 AMPS | ☐ MLO ☒ MCB | ☒ SURFACE ☐ FLUSH

LUGS: ☐ SUB - FEED ☐ FEED - THRU | ☒ NEMA 1 ☐ NEMA 3R

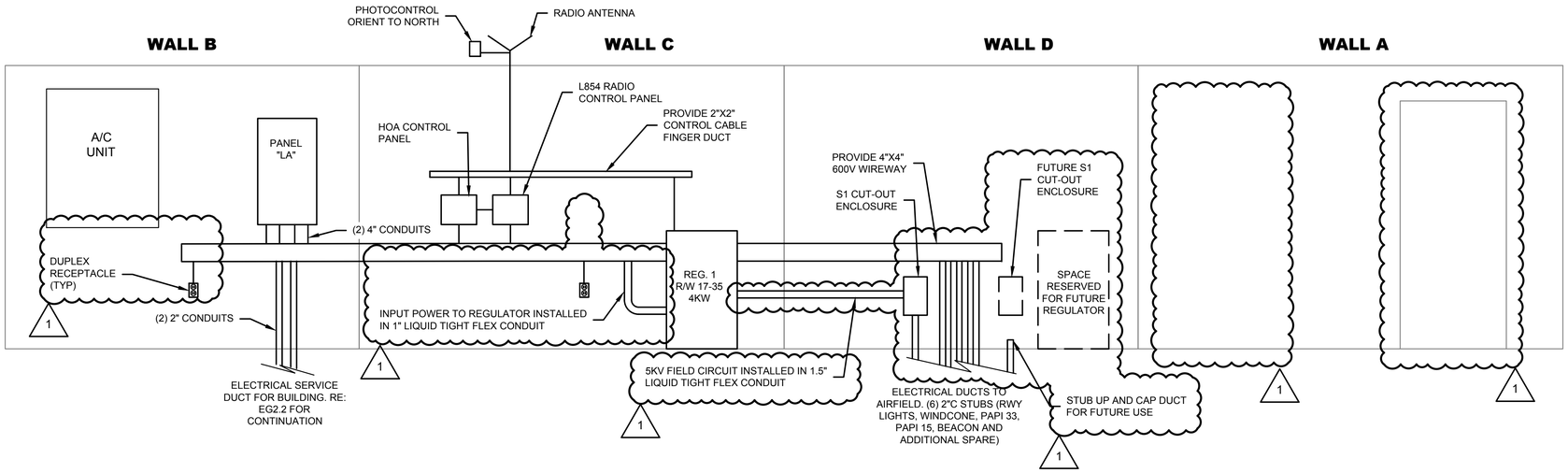
REMARKS: (2)

C"	WIRE*	LOAD DESCRIPTION	KVA	BKR.	CKT	CKT	BKR.	KVA	LOAD DESCRIPTION	WIRE*	C"
1" C	2 #10	REG. 1, RWY 18-36 (4 KW)	0.87	30	1	2	15	.02	RADIO CONTROLLER		
—	#10G		0.87		3	4	15	0.06	WINDCONE		2" C
2" C	2 # 8	RWY 15 PAPI	0.13	20	5	6	15	0.22	BEACON		2" C
—	1 # 8G		0.13		7	8	15	0.64	INDOOR LIGHTING		
2" C		RWY 33 PAPI	0.13	20	9	10	20		SPARE		
—			0.13		11	12			SPACE		
		RECEPT, AC, OUTDOOR LIGHT	1.56	20	13	14					
		SPARE		20	15	16					
		SPACE			17	18					
					19	20					
					21	22					
					23	24					

* ALL CABLING IS 2 #12, 1 #12G IN 1"C UNLESS NOTED OTHERWISE.

4.33	KVA CONNECTED LOAD
4.74	KVA DEMAND
19.76	AMPS DEMAND @ 240V

(1)



2 / EG4.2 **VAULT PLAN - WALL ELEVATION**

SCALE: N.T.S.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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GONZALES, TX 78629

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STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864

PROJECT NO. :	23062
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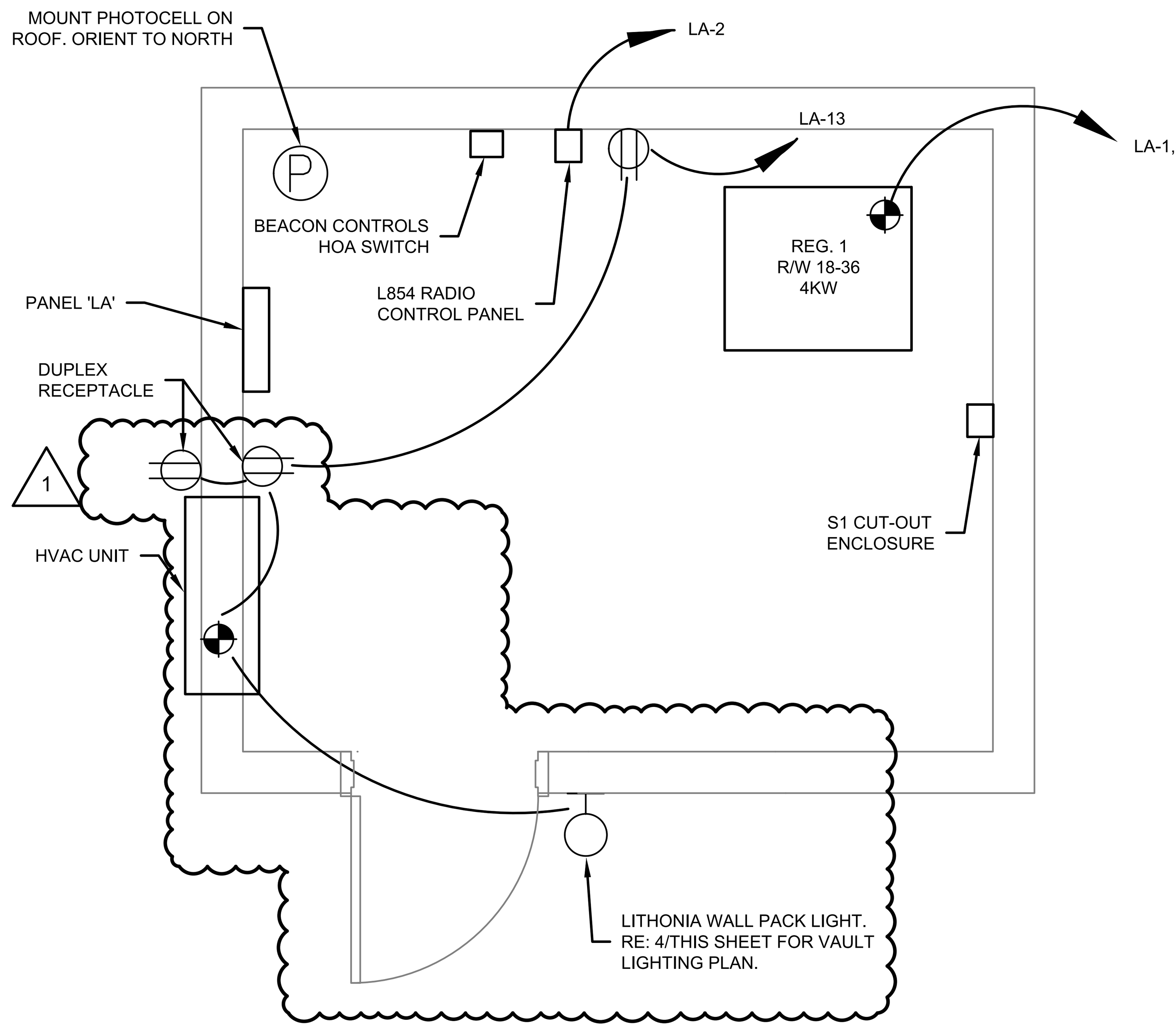
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

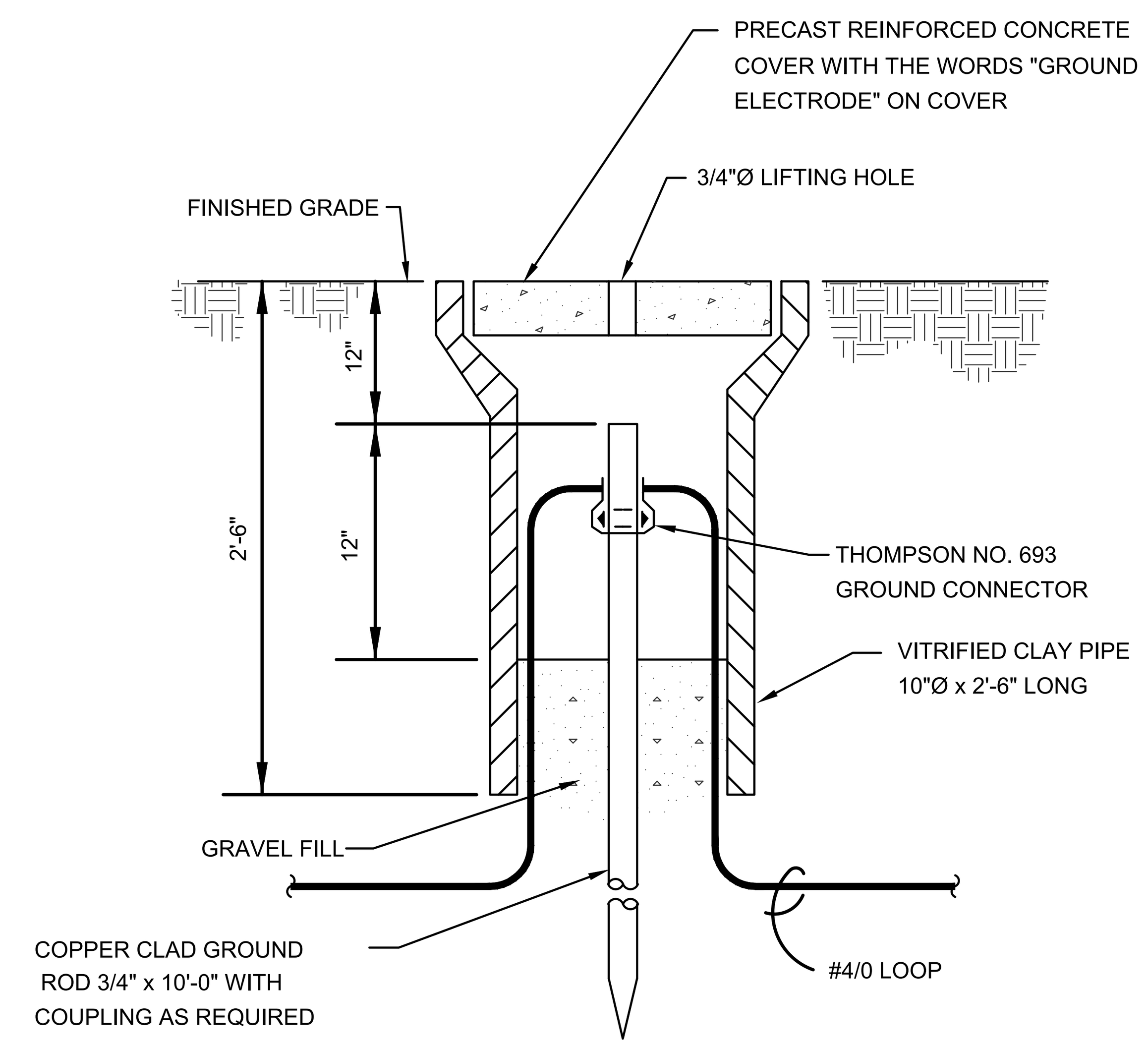
ELECTRICAL VAULT PLAN

EG4.2

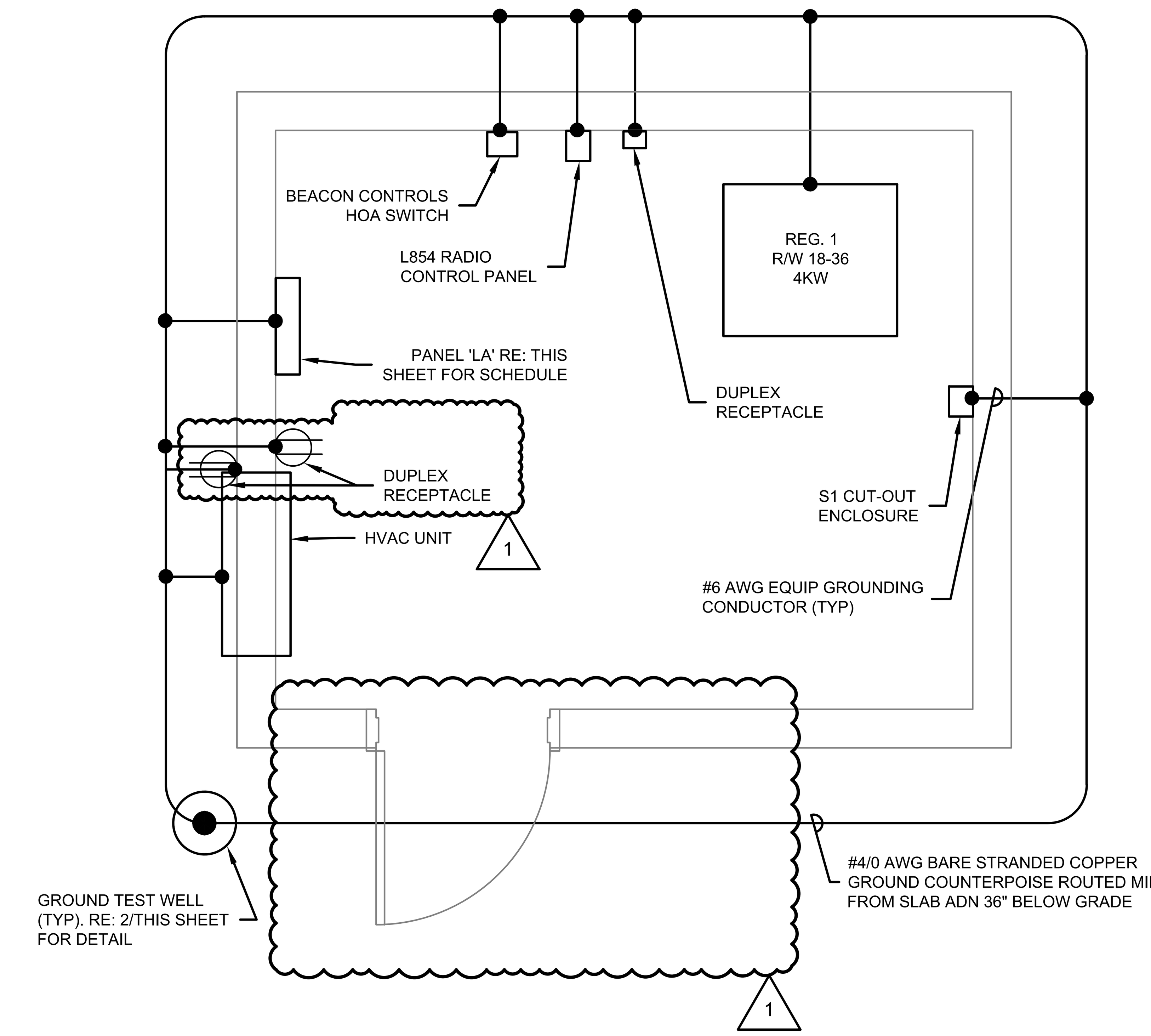
FILE PATH: C:\pw_working\bonner.pw-01\d0184125
FILE NAME: 26X18 T2E EG4.1.dwg
PLOT DATE: 5/13/2025 3:23:57 PM, Cole Ferguson



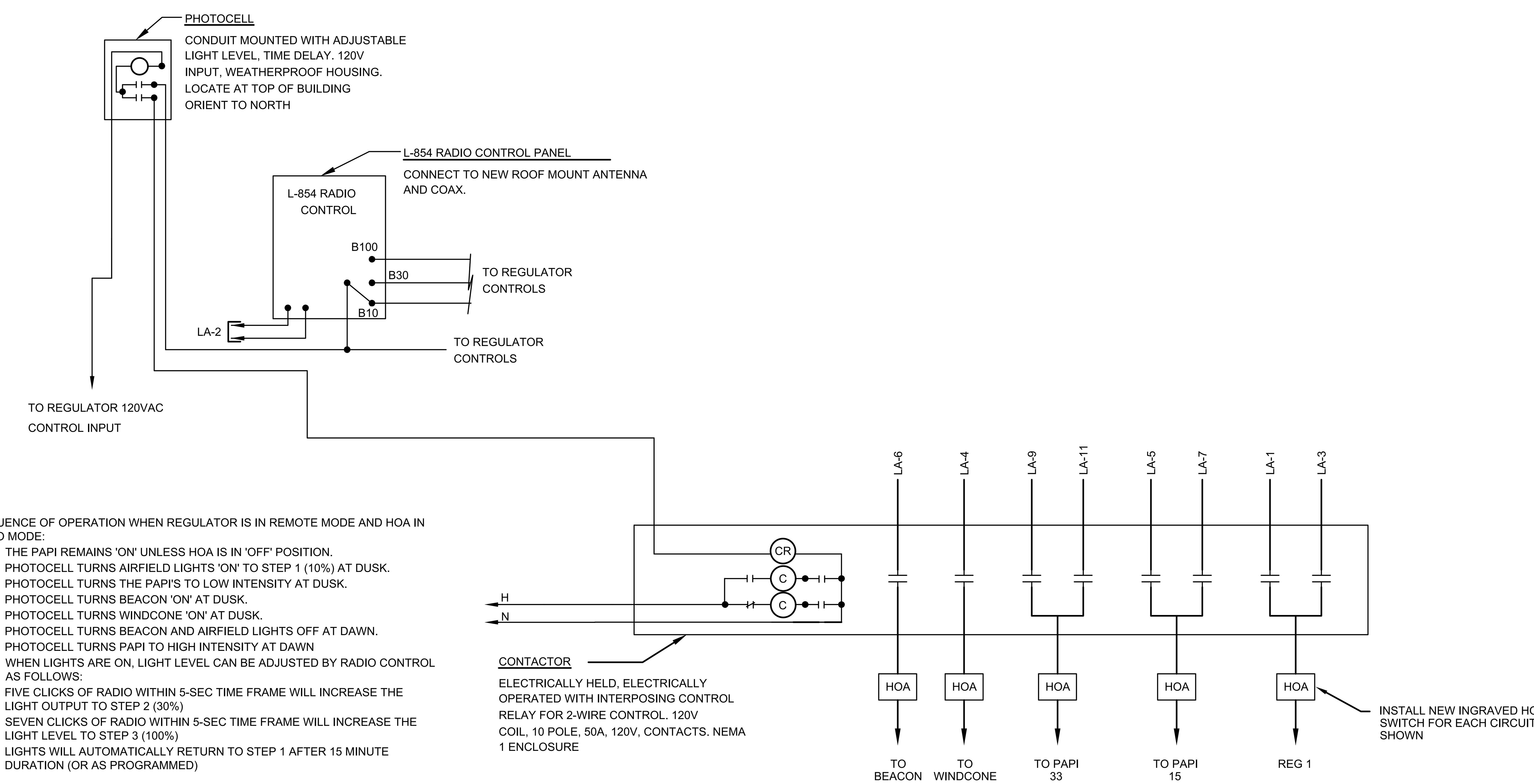
1 / EG4.3 **VAULT POWER PLAN**
SCALE: 1/2" = 1'-0"



2 / EG4.3 **GROUND TEST WELL**
SCALE:N.T.S.



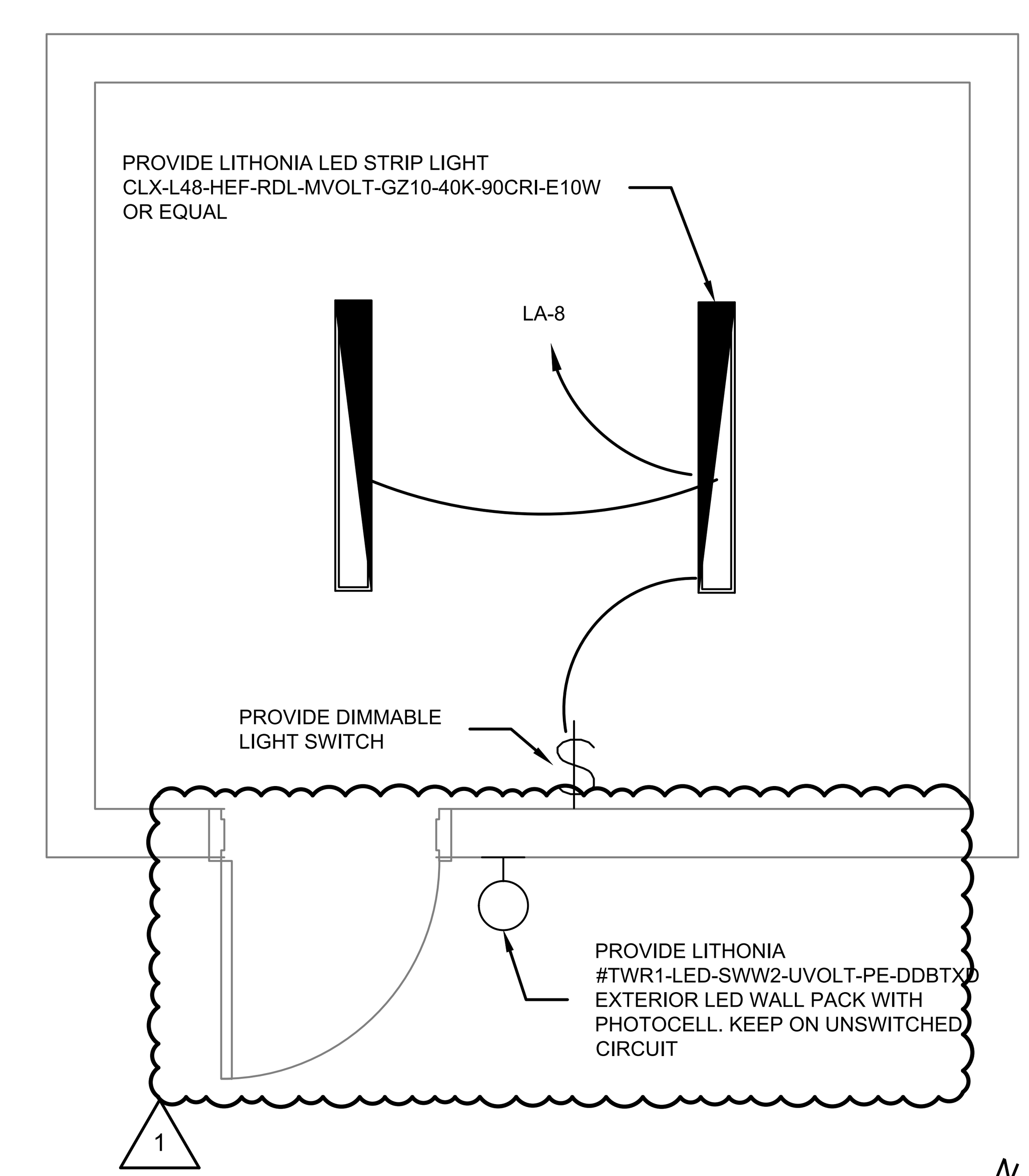
3 / EG4.3 **VAULT GROUNDING PLAN**
SCALE: 1/2" = 1'-0"



SEQUENCE OF OPERATION WHEN REGULATOR IS IN REMOTE MODE AND HOA IN AUTO MODE:

1. THE PAPI REMAINS 'ON' UNLESS HOA IS IN 'OFF' POSITION.
2. PHOTOCELL TURNS AIRFIELD LIGHTS 'ON' TO STEP 1 (10%) AT DUSK.
3. PHOTOCELL TURNS THE PAPI'S TO LOW INTENSITY AT DUSK.
4. PHOTOCELL TURNS BEACON 'ON' AT DUSK.
5. PHOTOCELL TURNS WINDCONE 'ON' AT DUSK.
6. PHOTOCELL TURNS BEACON AND AIRFIELD LIGHTS OFF AT DAWN.
7. PHOTOCELL TURNS PAPI TO HIGH INTENSITY AT DAWN
8. WHEN LIGHTS ARE ON, LIGHT LEVEL CAN BE ADJUSTED BY RADIO CONTROL AS FOLLOWS:
   FIVE CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT OUTPUT TO STEP 2 (30%)
   SEVEN CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT LEVEL TO STEP 3 (100%)
   LIGHTS WILL AUTOMATICALLY RETURN TO STEP 1 AFTER 15 MINUTE DURATION (OR AS PROGRAMMED)

5 / EG4.3 **LIGHTING CONTROLS DIAGRAM**
SCALE: N.T.S.



4 / EG4.3 **VAULT LIGHTING PLAN**
SCALE: 1/2" = 1'-0"

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DRAWN BY :	ALC
DESIGNED BY :	RCF

ELECTRICAL VAULT PLAN

EG4.3

GONZALES MUNICIPAL AIRPORT - EDGE LIGHT FIXTURES (RE1)

FIXTURE NUMBER	FAA TYPE	FAA BASE	LIGHT ORIENTATION	COLOR	NORTHING	EASTING	REGULATOR ID	CIRCUIT NAME	KEYNOTES
R1	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13744580.0316	2456121.5755	RE1	RE1	1
R2	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13744584.2634	2456130.6360	RE1	RE1	1
R3	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13744588.4951	2456139.6965	RE1	RE1	1
R4	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13744600.3671	2456165.1156	RE1	RE1	1
R5	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13744604.5988	2456174.1760	RE1	RE1	1
R6	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13744608.8306	2456183.2365	RE1	RE1	1
R7	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13744437.1656	2456263.4636	RE1	RE1	1
R8	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13744265.5006	2456343.6907	RE1	RE1	1
R9	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13744093.8356	2456423.9178	RE1	RE1	1
R10	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743922.1706	2456504.1449	RE1	RE1	1
R11	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743750.5057	2456584.3720	RE1	RE1	1
R12	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743578.8407	2456664.5991	RE1	RE1	1
R13	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743407.1757	2456744.8262	RE1	RE1	1
R14	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743235.5107	2456825.0534	RE1	RE1	1
R15	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13743063.8457	2456905.2805	RE1	RE1	1
R16	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742892.1808	2456985.5076	RE1	RE1	1
R17	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742720.5158	2457065.7347	RE1	RE1	1
R18	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742548.8508	2457145.9618	RE1	RE1	1
R19	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742377.1858	2457226.1889	RE1	RE1	1
R20	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742205.5208	2457306.4160	RE1	RE1	1
R21	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742033.8558	2457386.6431	RE1	RE1	1
R22	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13741862.1909	2457466.8702	RE1	RE1	1
R23	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13741690.5259	2457547.0973	RE1	RE1	1
R24	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13741686.2942	2457538.0368	RE1	RE1	1
R25	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13741682.0624	2457528.9763	RE1	RE1	1
R26	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13741669.3220	2457501.6979	RE1	RE1	1
R27	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13741665.0902	2457492.6373	RE1	RE1	1
R28	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13741660.8585	2457483.5769	RE1	RE1	1
R29	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13741832.5746	2457403.4592	RE1	RE1	1
R30	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742004.2907	2457323.3415	RE1	RE1	1
R31	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742176.0067	2457243.2238	RE1	RE1	1
R32	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742347.7228	2457163.1060	RE1	RE1	1
R33	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742519.4389	2457082.9883	RE1	RE1	1
R34	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742691.1549	2457002.8706	RE1	RE1	1
R35	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13742862.8710	2456922.7528	RE1	RE1	1
R36	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-YELLOW	13743034.5871	2456842.6351	RE1	RE1	1
R37	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743206.3031	2456762.5174	RE1	RE1	1
R38	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743378.0192	2456682.3996	RE1	RE1	1
R39	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743549.7352	2456602.2819	RE1	RE1	1
R40	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743721.4513	2456522.1642	RE1	RE1	1
R41	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13743893.1674	2456442.0465	RE1	RE1	1
R42	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13744064.8834	2456361.9287	RE1	RE1	1
R43	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13744236.5995	2456281.8110	RE1	RE1	1
R44	L-861(L)	L-867	BIDIRECTIONAL	YELLOW-CLEAR	13744408.3156	2456201.6933	RE1	RE1	1

1

JCP SCHEDULE

JCP TAG	SHEET NUMBER	NORTHING	EASTING	DUCTS	JCP DETAIL REFERENCE (DETAIL # / SHEET #)	NOTES
JCP-1	EG2.2	13742553.6179	2456821.5666	6	2/E2.4	NEW
JCP-2	EG2.3	13742475.2918	2457059.0461	4	1/E2.4	NEW
JCP-3	EG2.3	13742383.0856	2457102.1012	4	1/E2.4	NEW
JCP-4	EG2.2	13742927.3537	2456847.9587	2	9/E2.3	NEW
JCP-5	EG2.2	13743375.8667	2456638.5284	2	9/E2.3	NEW
JCP-6	EG2.1	13743824.3798	2456429.0981	2	9/E2.3	NEW
JCP-7	EG2.1	13743887.8435	2456565.0111	2	9/E2.3	NEW

GENERAL NOTES - LIGHTING

1. REFER TO EG2 SERIES FOR PROPOSED LIGHTING PLANS, THE EG3 SERIES FOR DIMENSIONS PLANS AND EG5 SERIES FOR DETAILS.
2. FIXTURES NORTHINGS AND EASTINGS HAVE BEEN PROVIDED FOR CONTRACTORS TO USE IN LOCATING NEW BASE CANS. HOWEVER THE CONTRACTOR MUST INSTALL ALL FIXTURES FOLLOWING THE DETAILS, WHERE NORTHINGS AND EASTINGS CONFLICT WITH DETAILS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR GUIDANCE. TYPICALLY, THE DETAILS SUPERSEDE NORTHINGS AND EASTINGS INFORMATION. IF MARKINGS ARE MODIFIED, THE NORTHINGS AND EASTINGS MAY NO LONGER BE ACCURATE.

KEYED NOTES - LIGHTING

(1) PROCURE AND INSTALL NEW ELEVATED FIXTURE (TYPE AS NOTED) ON NEW BASE CAN WITH NEW ISOLATION TRANSFORMER, CONNECTOR KIT, BOLTING HARDWARE, ETC FOR A COMPLETE ACCEPTED SYSTEM.

LIGHT FIXTURE ELECTRICAL INFORMATION:

FIXTURE TYPE	FAA TYPE	LAMP WATTAGE	ISOLATION TRANSFORMER
RUNWAY ELEVATED LED EDGE LIGHT	L-861(L)	12VA	L-830-16 (10/15W)
RUNWAY ELEVATED LED THRESHOLD END LIGHT	L-861E(L)	12VA	L-830-16 (10/15W)

PROPOSED FIELD TAGGING	PROPOSED SIGN LEGEND SIDE 1	PROPOSED SIGN LEGEND SIDE 2	FIELD CKT	SIGN DATA MODULES	SIGN DATA SIZE	SIGN DATA STYLE	SIGN DATA CLASS	ISOL XFMR (QTY) (AND SIZE) *	LOAD INFORMATION TYPE	LOAD INFORMATION VA	SHEET NUMBER	NORTHING	EASTING	NOTES
S1	15-33	[redacted]	RE1	2	1	2	1	100 W	LED	95	EG2.03	13742445.5067	2457017.8850	1
S2	A→	[redacted]	RE1	1	1	2	1	65 W	LED	85	EG2.03	13742487.1822	2457086.8854	1
S3	←A	[redacted]	RE1	1	1	2	1	65 W	LED	85	EG2.03	13742375.2787	2457139.4772	1

* NEW SIGN ISOLATION TRANSFORMER SIZE WILL VARY PER MANUFACTURER. SIZES LISTED ARE FOR SIGN MANUFACTURER - ADB. IF ALTERNATE MANUFACTURER IS USED, PROVIDE ISOLATION TRANSFORMER SIZE PER MANUFACTURER RECOMMENDATIONS. THE CONTRACTOR SHALL BARE ALL THE COSTS ASSOCIATED WITH ANY EQUIPMENT UPGRADES NECESSARY DUE TO THE CONTRACTOR'S PROPOSED EQUIPMENT POWER REQUIREMENTS EXCEEDING THE CONTRACT DESIGN LOADS.

GENERAL NOTES - SIGNAGE

1. REFER TO SIGN DETAILS ON E2.2. ALL SIGN BASE CANS ARE LOCATED ON INBOARD SIDE OF THE SIGN (SIDE NEAREST TO EDGE MARKING) UNLESS OTHERWISE NOTED.
2. NORTHINGS & EASTINGS REFER TO THE SIDE OF THE SIGN NEAREST TO EDGE OF PAVEMENT.

KEYED NOTES - SIGNAGE

(1) FURNISH AND INSTALL NEW SIGN ON NEW FOUNDATION FOLLOWING PLANS, DETAILS, AND SPECIFICATIONS. COORDINATE FIELD TAG ID WITH OPERATIONS.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

GONZALES MUNICIPAL AIRPORT
GONZALES, TX 78629

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

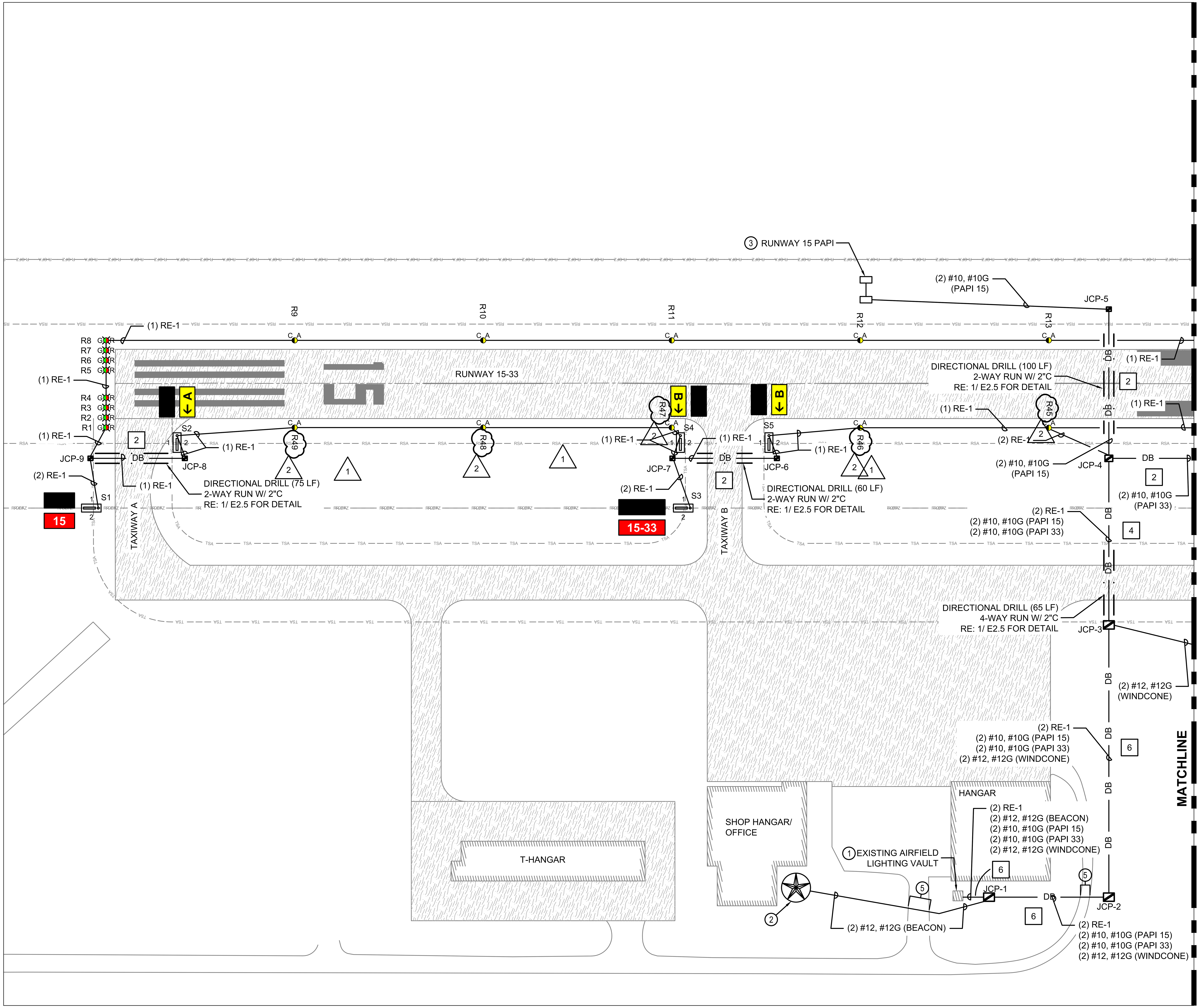
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864
05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING SCHEDULES

EG6.1

FILE PATH: C:\pw_working\bodmer.pw-01\d0194125
FILE NAME: 20615 T26 EG6.1.dwg
PLOT DATE: 5/13/2025 2:13:58 PM, Fred Rocha

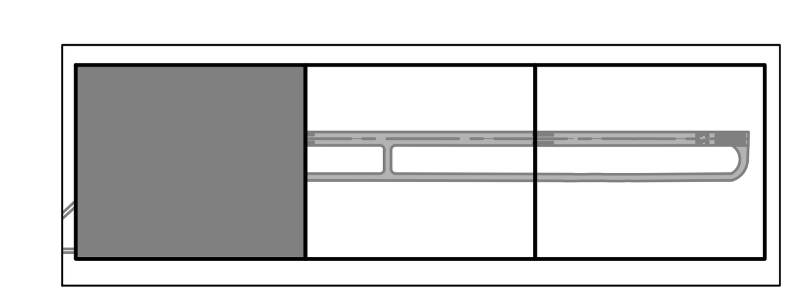


GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO EE1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO EE6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
5. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EE2 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
6. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING VAULT TO BE MODIFIED. REFER TO EE4 SERIES FOR DETAILS.
2. INSTALL NEW LED BEACON AND TIP DOWN POLE ON NEW FOUNDATION. REFER TO SHEET E5.3 FOR DETAIL.
3. INSTALL NEW L-881(L) PAPI. REFER TO EE5 SERIES FOR DETAILS.
4. INSTALL NEW WIND CONE AND TIP DOWN POLE. EXISTING SEGMENTED CIRCLE TO BE REPAINTED. REFER TO SHEET E2.6 FOR DETAILS.
5. OPEN CUT EXISTING PAVEMENT TO INSTALL PROPOSED CONDUIT. RE: 2/ E2.7 FOR DETAIL.



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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

JACKSON COUNTY AIRPORT-26R
GANADO, TX 77962

NO.	DATE	DESCRIPTION
1	05/2/25	ADDEN 2
2	05/14/25	ADDEN 3

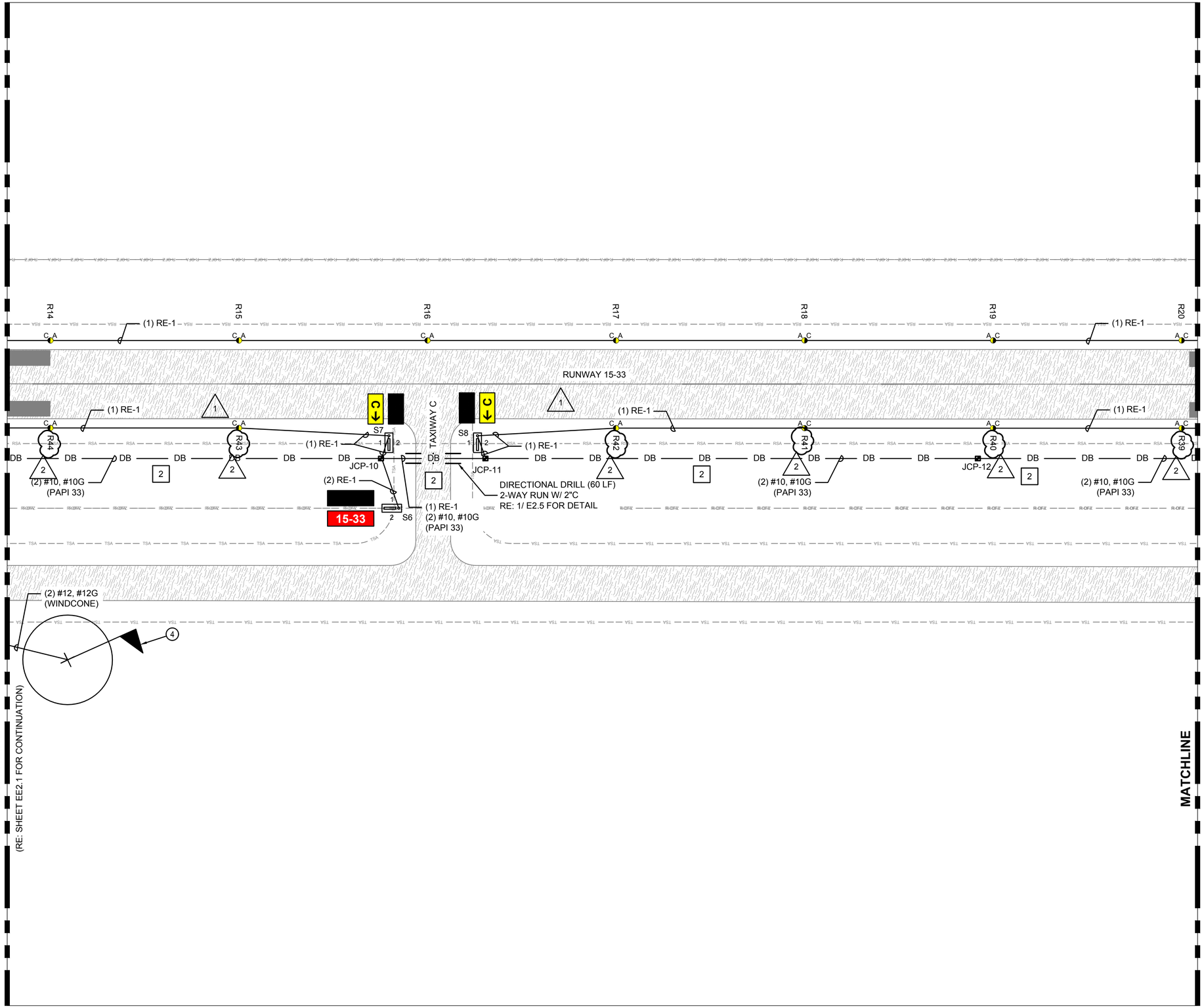
STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864 — 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EE2.1

PRINT IN COLOR



GENERAL NOTES

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KEYED NOTES

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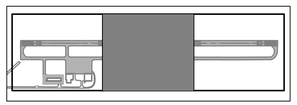
2. INSTALL NEW LED BEACON AND TIP DOWN POLE ON NEW FOUNDATION. REFER TO SHEET E5.3 FOR DETAIL.
3. INSTALL NEW L-881(L) PAPI. REFER TO EE5 SERIES FOR DETAILS.
4. INSTALL NEW WIND CONE AND TIP DOWN POLE. EXISTING SEGMENTED CIRCLE TO BE REPAINTED. REFER TO SHEET E2.6 FOR DETAILS.
5. OPEN CUT EXISTING PAVEMENT TO INSTALL PROPOSED CONDUIT. RE: 2/ E2.7 FOR DETAIL.



NORTH

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HORIZ SCALE IN FEET

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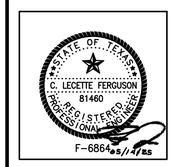
TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

JACKSON COUNTY AIRPORT-26R
GANADO, TX 77962

NO.	DATE	DESCRIPTION
1	05/2/25	ADDEN 2
2	05/14/25	ADDEN 3



PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EE2.2

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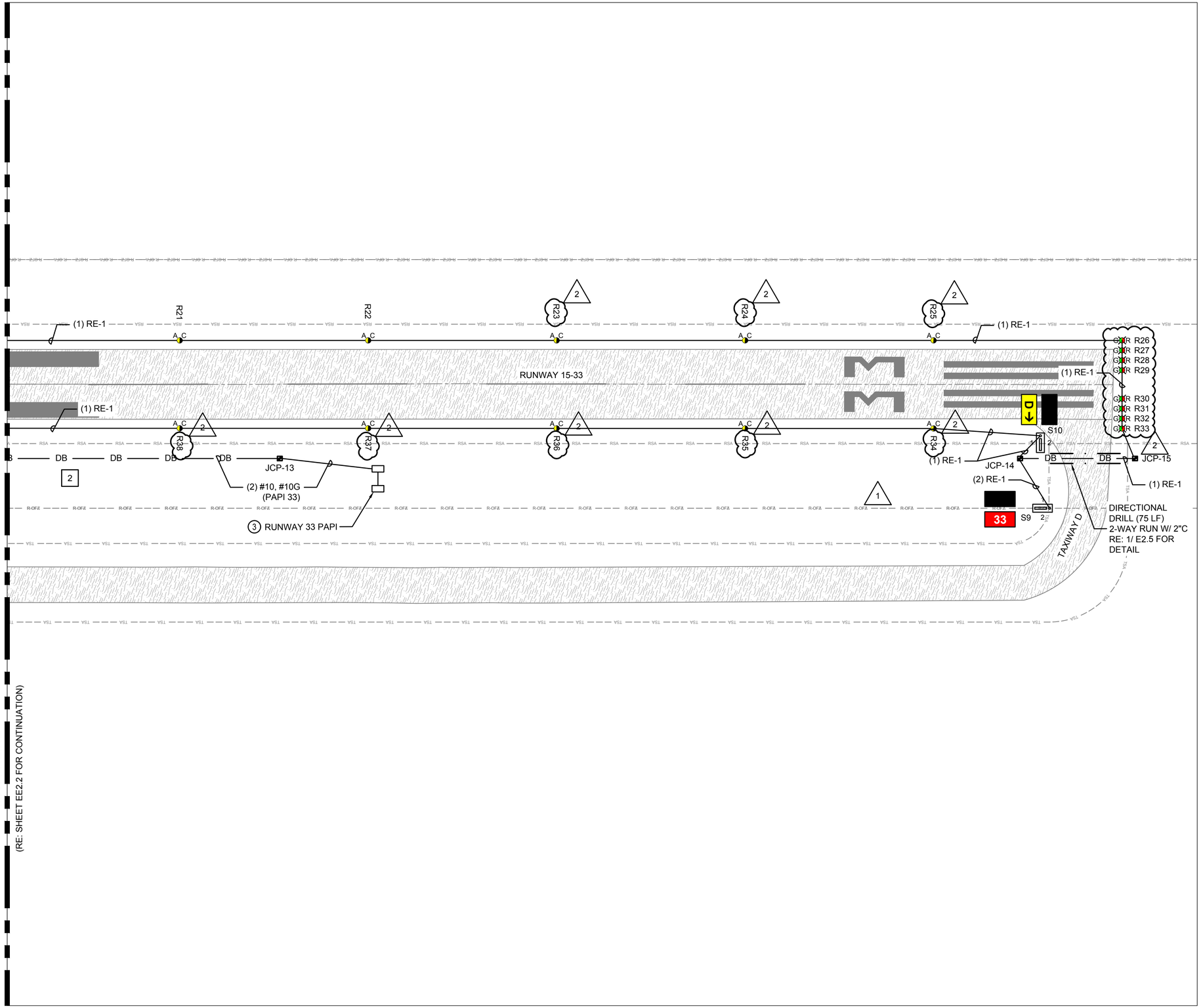

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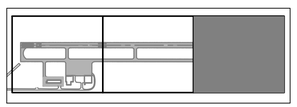

NORTH

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

JACKSON COUNTY AIRPORT-26R
GANADO, TX 77962

NO.	DATE	DESCRIPTION
1	05/2/25	ADDEN 2
2	05/14/25	ADDEN 3

C. LECITE FERGUSON
81480
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
F-6864

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EE2.3

FILE PATH: C:\pw_working\bodnar.pw-01\d0184156
FILE NAME: 26X18 26R EE2.1.dwg
PLOT DATE: 5/13/2025 2:09:51 PM, Luke T. Ferguson

GENERAL NOTES

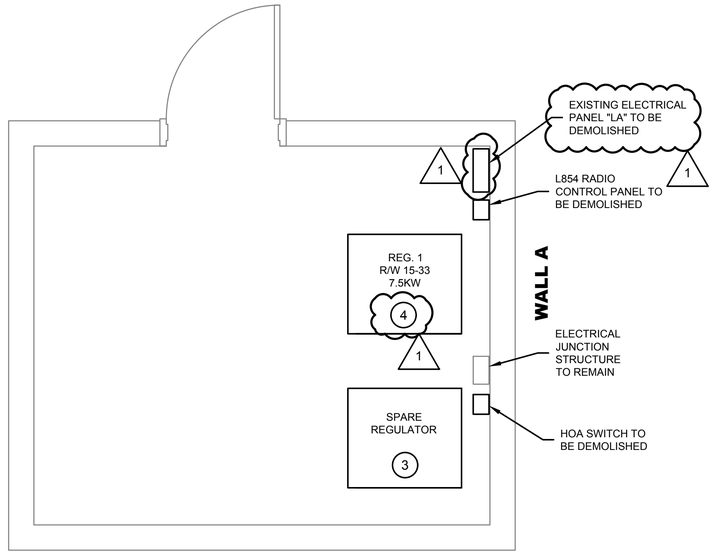
1. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT. ALL CONNECTIONS TO REGULATOR TO USE LIQUID-TIGHT NON-METALLIC CONDUIT. ALL CONDUIT TO BE 1" UON.
2. PROVIDE NAMEPLATE ON REGULATOR STATING REGULATOR ID, STEPS, VOLTAGE AND CIRCUIT ID.
3. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE TO BE REMOVED, NEW OR MODIFIED AS NOTED. ALL ITEMS IN SHADED ARE EXISTING TO REMAIN.
4. CONTRACTOR TO CLEAN INTERIOR OF EXISTING VAULT AS PART OF THIS WORK. THIS INCLUDES SWEEPING FLOORS AND REMOVING EXCESS OR UNUSED EQUIPMENT PER THE RPRS DIRECTION.

KEYED NOTES

1. INSTALL NEW 4 KW, 240V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.
2. INSTALL LOAD CENTER WITH TYPE 1 SURGE PROTECTION DEVICE.
3. REMOVE EXISTING REGULATOR IN ITS ENTIRETY INCLUDING 600V AND 5KV CONDUCTORS, S-1 CUTOUT SWITCH, AND ASSOCIATED EQUIPMENT.
4. EXISTING REGULATOR TO REMAIN AND BE RE-USED AS SPARE.
5. CONTRACTOR TO SEAL EXISTING LEAVEOUT VOIDS WITH WATERPROOF MATERIAL.

PROPOSED REGULATOR 1 (RW 15-33) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 1 'RWY 17-35' (4KW)	
LED RW LIGHTING (33 RWY EDGE LTG @ 21.5W/EA)	0.71
LED RW THSLD LIGHTING (16 RWY THSLD LTG @ 17.9W/EA)	0.29
SIGNS (LED)	0.87
CABLE LOSS (12505' @ 3W/100LF)	0.32
SUB-TOTAL LOAD	2.04
4KVA REGULATOR EXCEEDS NEC REQUIREMENTS	



VAULT EQUIPMENT DEMOLITION PLAN

1 / EE4.1 — SCALE: 1/2" = 1'-0"

PANEL: LA — VOLTAGE: 120/240V 1 * 3 W AIC: — MAINS: 100 AMPS ☐ MLO ☒ MCB ☒ SURFACE ☐ FLUSH — LUGS: ☐ SUB - FEED ☐ FEED - THRU ☒ NEMA 1 ☐ NEMA 3R — REMARKS: 2

C"	WIRE*	LOAD DESCRIPTION	KVA	BKR.	CKT	CKT	BKR.	KVA	LOAD DESCRIPTION	WIRE*	C"
		L-854 PILOT RADIO CONTROLLER	0.02	15	1	2	20	-	SPARE		
2" C		BEACON POWER	0.22	15	3	4	30	1.02	REG. 1, RWY 15-33 (4 KW)	2 #10	2" C
		RECEPTACLE	.18	20	5	6		1.02	↓	#10G	2" C
		VAULT LIGHTS	.03	20	7	8	15	0.06	WINDCONE POWER		2" C
2" C	2 # 10	RWY 15 PAPI	0.13	20	9	10	20	0.13	RWY 33 PAPI	2 # 10	2" C
—	1 # 10G	↓	0.13		11	12		0.13	↓	1 # 10G	—
		SPACE			13	14	30	-	REG. 2, SPARE (7.5 KW)	2 #10	2" C
		↓			15	16		-	↓	#10G	2" C
					17	18			SPACE		
					19	20			↓		

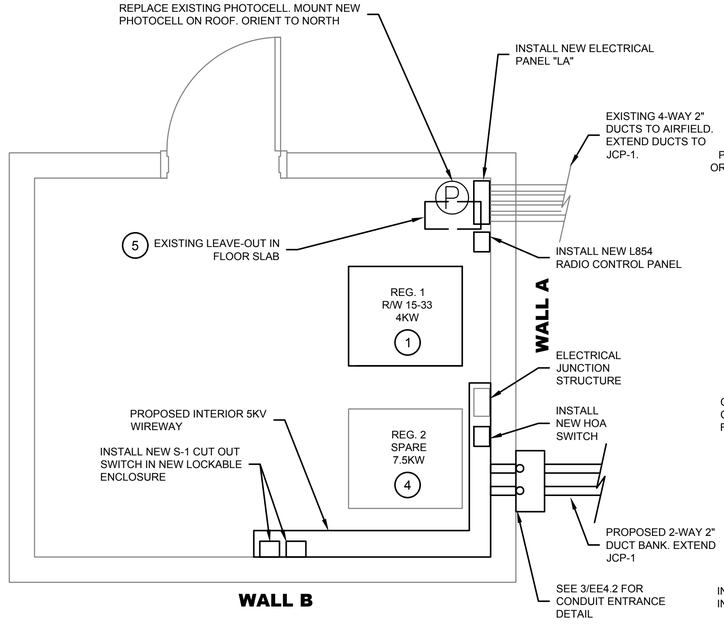
* ALL CABLING IS 2 #12, 1 #12G IN 1"C UNLESS NOTED OTHERWISE.

4.57	KVA CONNECTED LOAD
4.97	KVA DEMAND
20.75	AMPS DEMAND @ 240V

1

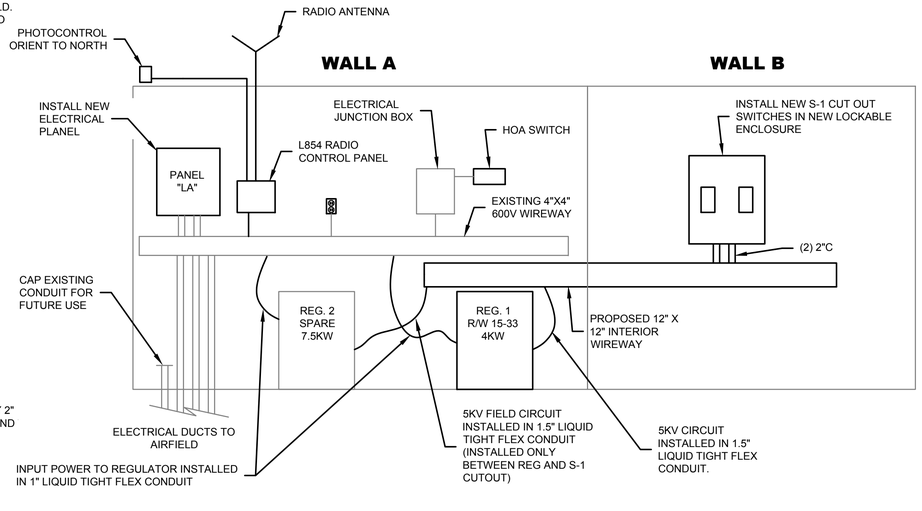
VAULT EQUIPMENT PROPOSED PLAN

2 / EE4.1 — SCALE: 1/2" = 1'-0"



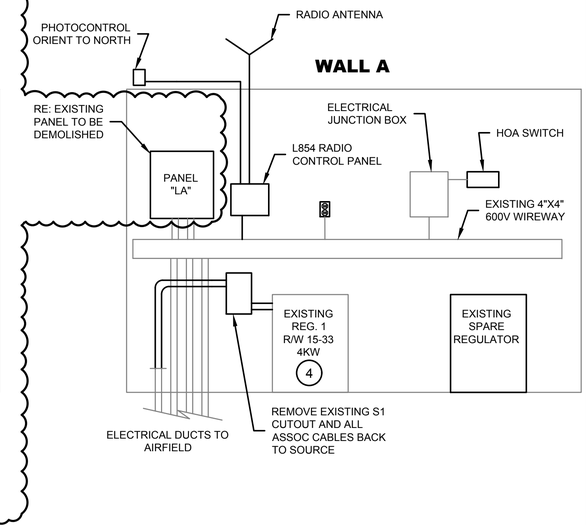
VAULT PLAN - PROPOSED WALL ELEVATION

3 / EE4.1 — SCALE: N.T.S.



VAULT PLAN - EXISTING WALL ELEVATION

4 / EE4.1 — SCALE: N.T.S.



1 REVISED SHEET

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

JACKSON COUNTY AIRPORT-26R
GANADO, TX 77962

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

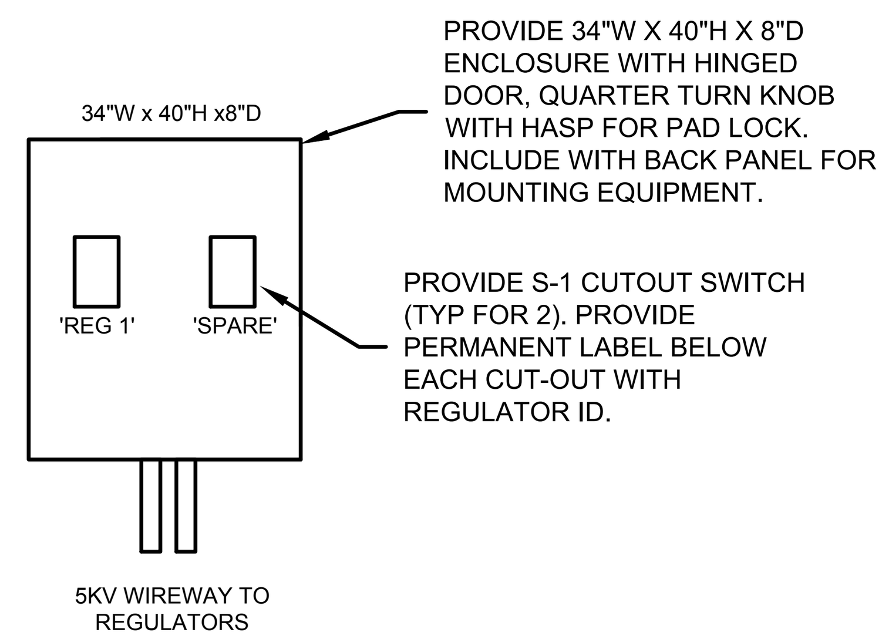
STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

ELECTRICAL VAULT PLAN

EE4.1

FILE PATH: C:\pw_working\bshrwr-pw-01\d0184156
FILE NAME: 20616 26R EE4.1.dwg
PLOT DATE: 3/13/2025 3:03:27 PM, Colin Ferguson

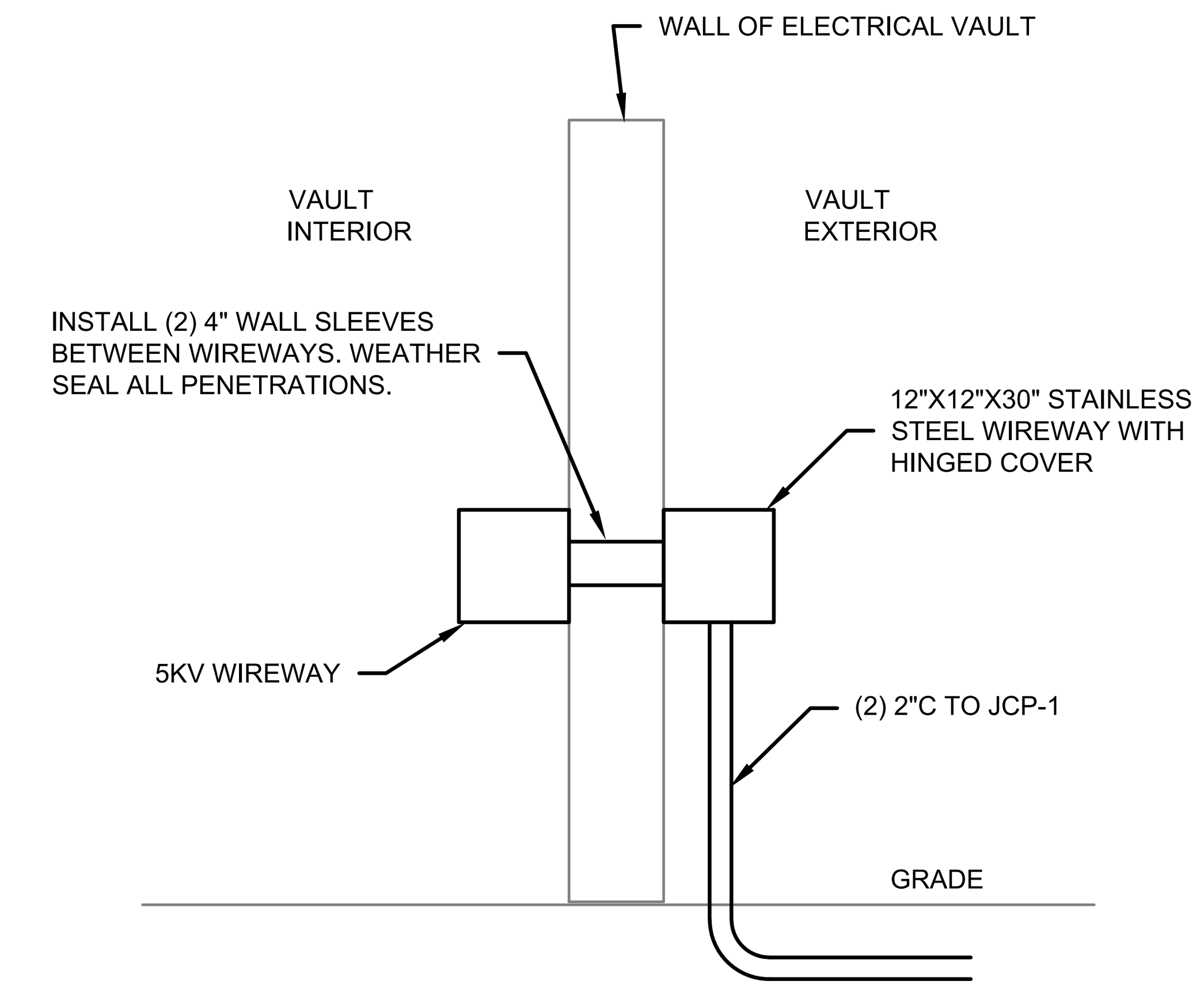


2
EE4.2

S-1 CUTOUT ENCLOSURE DETAIL

SCALE: N.T.S.

1

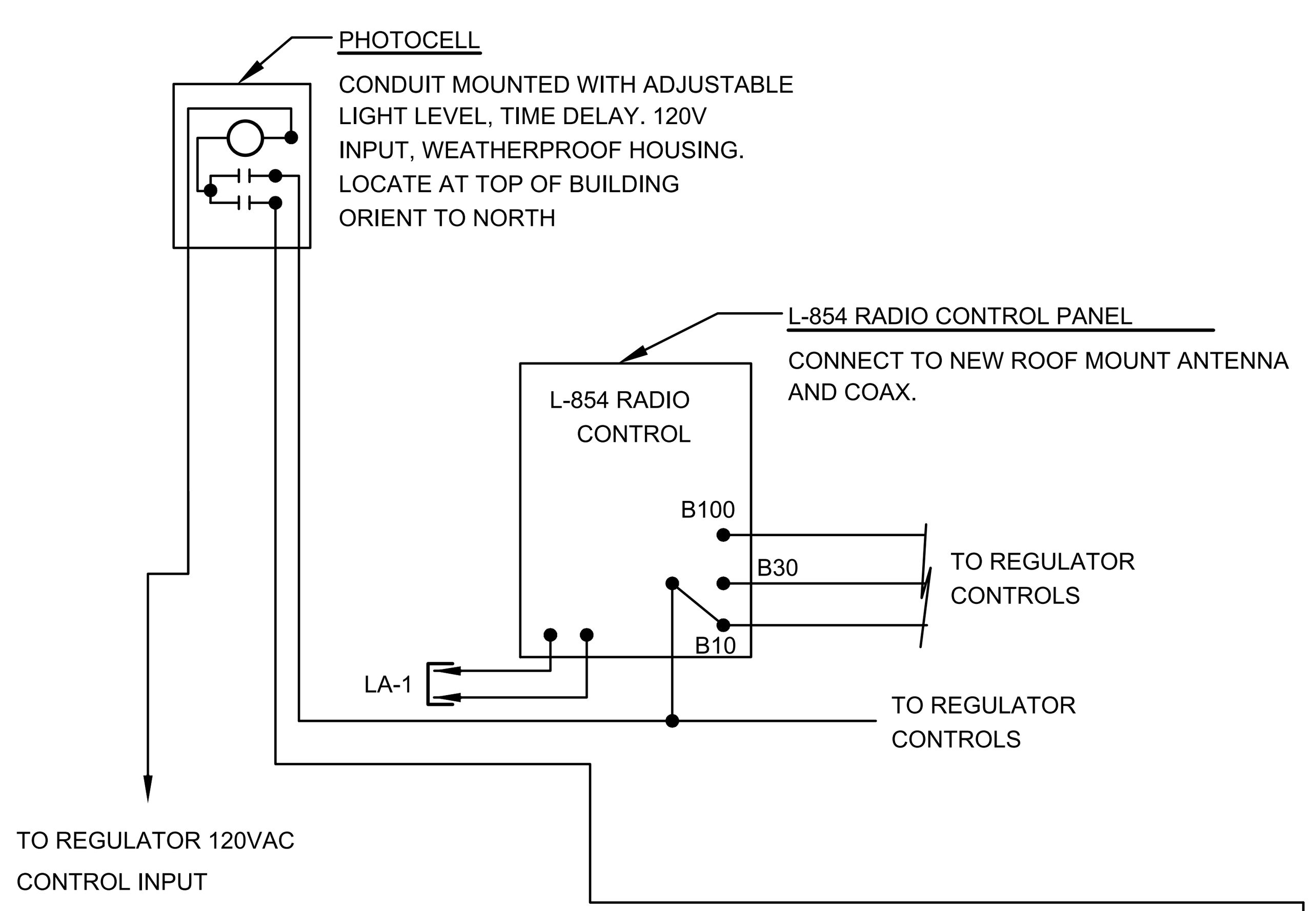


3
EE4.2

VAULT CONDUIT ENTRANCE DETAIL

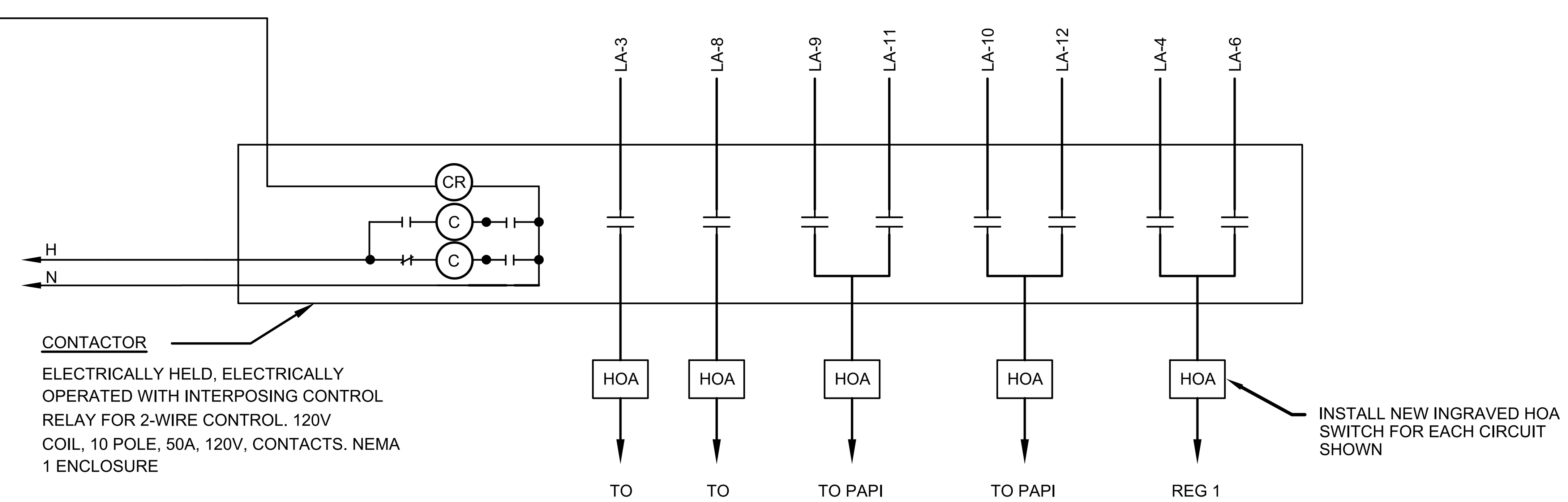
SCALE: N.T.S.

1



SEQUENCE OF OPERATION WHEN REGULATOR IS IN REMOTE MODE AND HOA IN AUTO MODE:

1. THE PAPI REMAINS 'ON' UNLESS HOA IS IN 'OFF' POSITION.
2. PHOTOCELL TURNS AIRFIELD LIGHTS 'ON' TO STEP 1 (10%) AT DUSK.
3. PHOTOCELL TURNS THE PAPI'S TO LOW INTENSITY AT DUSK.
4. PHOTOCELL TURNS BEACON 'ON' AT DUSK.
5. PHOTOCELL TURNS WINDCONE 'ON' AT DUSK.
6. PHOTOCELL TURNS BEACON AND AIRFIELD LIGHTS OFF AT DAWN.
7. PHOTOCELL TURNS PAPI TO HIGH INTENSITY AT DAWN
8. WHEN LIGHTS ARE ON, LIGHT LEVEL CAN BE ADJUSTED BY RADIO CONTROL AS FOLLOWS:
   FIVE CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT OUTPUT TO STEP 2 (30%)
   SEVEN CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT LEVEL TO STEP 3 (100%)
   LIGHTS WILL AUTOMATICALLY RETURN TO STEP 1 AFTER 15 MINUTE DURATION (OR AS PROGRAMMED)



1
EE4.2

LIGHTING CONTROLS DIAGRAM

SCALE: N.T.S.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

JACKSON COUNTY AIRPORT-26R
GANADO, TX 77962

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.: 23062
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ELECTRICAL VAULT PLAN

EE4.2

PLOT DATE: 5/13/2025 3:03:28 PM, Cole Ferguson
FILE NAME: 20616 26R EE4.1.dwg
FILE PATH: C:\pw_working\lochner-pw-01\d0184156

JACKSON COUNTY AIRPORT - EDGE LIGHT FIXTURES (RE1)

FIXTURE NUMBER	FAA TYPE	FAA BASE	LIGHT ORIENTATION	COLOR	NORTHING	EASTING	REGULATOR ID	CIRCUIT NAME	KEYNOTES
R1	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740415.3616	13557322.8684	RE1	RE1	1
R2	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740423.8852	13557328.0979	RE1	RE1	1
R3	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740432.4088	13557333.3274	RE1	RE1	1
R4	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740440.9325	13557338.5569	RE1	RE1	1
R5	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740464.4761	13557353.0016	RE1	RE1	1
R6	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740472.9997	13557358.2311	RE1	RE1	1
R7	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740481.5234	13557363.4606	RE1	RE1	1
R8	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2740490.0470	13557368.6901	RE1	RE1	1
R9	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740589.2099	13557207.1914	RE1	RE1	1
R10	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740688.3728	13557045.6927	RE1	RE1	1
R11	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740787.5357	13556884.1940	RE1	RE1	1
R12	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740886.6986	13556722.6953	RE1	RE1	1
R13	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740985.8615	13556561.1966	RE1	RE1	1
R14	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741085.0244	13556399.6979	RE1	RE1	1
R15	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741184.1873	13556238.1992	RE1	RE1	1
R16	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741283.3502	13556076.7005	RE1	RE1	1
R17	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741382.5131	13555915.2018	RE1	RE1	1
R18	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741481.6760	13555753.7030	RE1	RE1	1
R19	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741580.8389	13555592.2043	RE1	RE1	1
R20	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741680.0018	13555430.7056	RE1	RE1	1
R21	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741779.1647	13555269.2069	RE1	RE1	1
R22	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741878.3276	13555107.7082	RE1	RE1	1
R23	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741977.4905	13554946.2095	RE1	RE1	1
R24	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2742076.6534	13554784.7108	RE1	RE1	1
R25	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2742175.8163	13554623.2121	RE1	RE1	1
R26	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742274.9792	13554461.7134	RE1	RE1	1
R27	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742266.4555	13554456.4839	RE1	RE1	1
R28	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742257.9319	13554451.2544	RE1	RE1	1
R29	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742249.4083	13554446.0250	RE1	RE1	1
R30	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742224.9927	13554431.0453	RE1	RE1	1
R31	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742216.4690	13554425.8158	RE1	RE1	1
R32	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742207.9454	13554420.5863	RE1	RE1	1
R33	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	2742199.4218	13554415.3568	RE1	RE1	1
R34	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2742100.3073	13554576.8852	RE1	RE1	1
R35	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2742001.1928	13554738.4136	RE1	RE1	1
R36	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741902.0784	13554899.9421	RE1	RE1	1
R37	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741802.9639	13555061.4705	RE1	RE1	1
R38	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741703.8495	13555222.9989	RE1	RE1	1
R39	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741604.7350	13555384.5273	RE1	RE1	1
R40	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741505.6206	13555546.0557	RE1	RE1	1
R41	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	2741406.5061	13555707.5842	RE1	RE1	1
R42	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741307.3917	13555869.1126	RE1	RE1	1
R43	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741109.1627	13556192.1694	RE1	RE1	1
R44	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2741010.0483	13556353.6979	RE1	RE1	1
R45	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740910.9338	13556515.2263	RE1	RE1	1
R46	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740811.8194	13556676.7547	RE1	RE1	1
R47	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740712.7049	13556838.2831	RE1	RE1	1
R48	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740613.5905	13556999.8115	RE1	RE1	1
R49	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	2740514.4760	13557161.3400	RE1	RE1	1

1

JCP SCHEDULE

JCP TAG	SHEET NUMBER	NORTHING	EASTING	DUCTS	JCP DETAIL REFERENCE (DETAIL # / SHEET #)	NOTES
JCP-1	EE2.1	13556330.5877	2740470.4265	6	2/E2.4	
JCP-2	EE2.1	13556216.7342	2740540.3291	6	2/E2.4	
JCP-3	EE2.1	13556359.9688	2740773.6219	6	2/E2.4	
JCP-4	EE2.1	13556447.6085	2740916.3647	4	1/E2.4	
JCP-5	EE2.1	13556526.0919	2741044.1942	2	9/E2.3	
JCP-6	EE2.1	13556731.9865	2740741.7654	2	9/E2.3	
JCP-7	EE2.1	13556821.4671	2740686.8271	2	9/E2.3	
JCP-8	EE2.1	13557239.1849	2740430.3612	2	9/E2.3	
JCP-9	EE2.1	13557320.0019	2740380.7421	2	9/E2.3	
JCP-10	EE2.2	13556054.4904	2741157.7271	2	9/E2.3	
JCP-11	EE2.2	13555965.0098	2741212.6655	2	9/E2.3	
JCP-12	EE2.2	13555543.1727	2741471.6605	2	9/E2.3	
JCP-13	EE2.3	13555121.3355	2741730.6555	2	9/E2.3	
JCP-14	EE2.3	13554486.9986	2742120.1188	2	9/E2.3	
JCP-15	EE2.3	13554388.4678	2742180.6137	2	9/E2.3	

GENERAL NOTES - LIGHTING

1. REFER TO EE2 SERIES FOR PROPOSED LIGHTING PLANS, THE EE3 SERIES FOR DIMENSIONS PLANS AND EE5 SERIES FOR DETAILS.
2. FIXTURES NORTHINGS AND EASTINGS HAVE BEEN PROVIDED FOR CONTRACTORS TO USE IN LOCATING NEW BASE CANS. HOWEVER THE CONTRACTOR MUST INSTALL ALL FIXTURES FOLLOWING THE DETAILS, WHERE NORTHINGS AND EASTINGS CONFLICT WITH DETAILS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR GUIDANCE. TYPICALLY, THE DETAILS SUPERSEDE NORTHINGS AND EASTINGS INFORMATION. IF MARKINGS ARE MODIFIED, THE NORTHINGS AND EASTINGS MAY NO LONGER BE ACCURATE.

KEYED NOTES - LIGHTING

(1) PROCURE AND INSTALL NEW ELEVATED FIXTURE (TYPE AS NOTED) ON NEW BASE CAN WITH MAINTENANCE PAD WITH NEW ISOLATION TRANSFORMER, CONNECTOR KIT, BOLTING HARDWARE, ETC FOR A COMPLETE ACCEPTED SYSTEM.

LIGHT FIXTURE ELECTRICAL INFORMATION:

FIXTURE TYPE	FAA TYPE	LAMP WATTAGE	ISOLATION TRANSFORMER
RUNWAY ELEVATED LED EDGE LIGHT	L-861(L)	12VA	L-830-16 (10/15W)
RUNWAY ELEVATED LED THRESHOLD END LIGHT	L-861E(L)	12VA	L-830-16 (10/15W)

PROPOSED SIGN LEGEND

PROPOSED FIELD TAGGING	PROPOSED SIGN LEGEND SIDE 1		FIELD CKT	SIGN DATA MODULES	SIZE	STYLE	CLASS	ISOL XFMR (QTY) (AND SIZE) *	LOAD INFORMATION TYPE	VA	SHEET NUMBER	NORTHING	EASTING	NOTES
S1		15	RE1	1	1	2	1	65 W	LED	85	EE2.1	13557289.5798	2740340.7484	1
S2		← A	RE1	1	1	2	1	65 W	LED	85	EE2.1	13557256.3253	2740443.3065	1
S3		15-33	RE1	3	1	2	1	100 W	LED	95	EE2.1	13556782.5230	2740652.0656	1
S4	B →		RE1	1	1	2	1	65 W	LED	85	EE2.1	13556825.1140	2740708.0568	1
S5		← B	RE1	1	1	2	1	65 W	LED	85	EE2.1	13556749.2685	2740754.6236	1
S6		15-33	RE1	3	1	2	1	100 W	LED	95	EE2.2	13556015.5464	2741122.9657	1
S7	C →		RE1	1	1	2	1	65 W	LED	85	EE2.2	13556058.1373	2741178.9568	1
S8		← C	RE1	1	1	2	1	65 W	LED	85	EE2.2	13555982.2911	2741225.5224	1
S9		33	RE1	1	1	2	1	65 W	LED	85	EE2.3	13554438.0334	2742091.5100	1
S10	D →		RE1	1	1	2	1	65 W	LED	85	EE2.3	13554480.0373	2742147.8616	1

* NEW SIGN ISOLATION TRANSFORMER SIZE WILL VARY PER MANUFACTURER. SIZES LISTED ARE FOR SIGN MANUFACTURER - ADB. IF ALTERNATE MANUFACTURER IS USED, PROVIDE ISOLATION TRANSFORMER SIZE PER MANUFACTURER RECOMMENDATIONS. THE CONTRACTOR SHALL BARE ALL THE COSTS ASSOCIATED WITH ANY EQUIPMENT UPGRADES NECESSARY DUE TO THE CONTRACTOR'S PROPOSED EQUIPMENT POWER REQUIREMENTS EXCEEDING THE CONTRACT DESIGN LOADS.

GENERAL NOTES - SIGNAGE

1. REFER TO SIGN DETAILS ON E2.2. ALL SIGN BASE CANS ARE LOCATED ON INBOARD SIDE OF THE SIGN (SIDE NEAREST TO EDGE MARKING) UNLESS OTHERWISE NOTED.
2. NORTHINGS & EASTINGS REFER TO THE SIDE OF THE SIGN NEAREST TO EDGE OF PAVEMENT.

KEYED NOTES - SIGNAGE

(1) FURNISH AND INSTALL NEW SIGN ON NEW FOUNDATION FOLLOWING PLANS, DETAILS, AND SPECIFICATIONS. COORDINATE FIELD TAG ID WITH OPERATIONS.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

JACKSON COUNTY AIRPORT-26R
GANADO, TX 77962

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

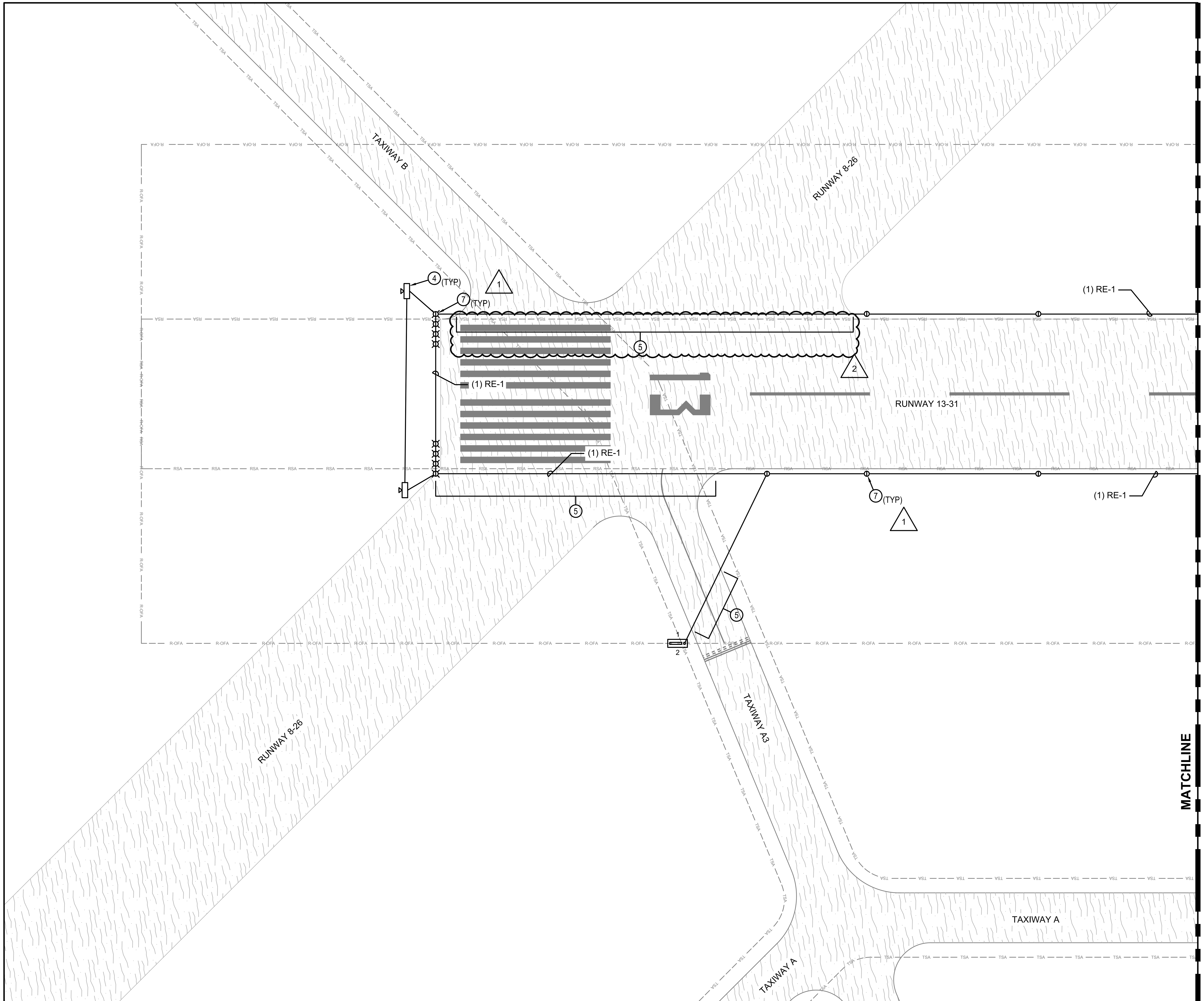
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. : 23062
DATE OF ISSUE : 03/07/25
REVIEWED BY : RCF
DRAWN BY : ALC
DESIGNED BY : RCF

AIRFIELD LIGHTING SCHEDULES

EE6.1

PLOT DATE: 5/13/2025 6:39:20 PM, Austin Cote
FILE NAME: 20616 26R EE6.1.dwg
FILE PATH: C:\pw_working\lochner-pw-01\d0184156



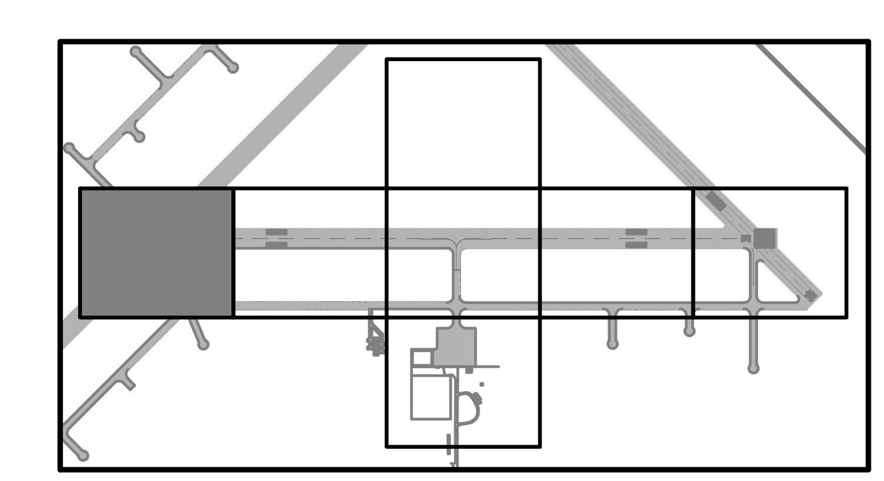
GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EP2 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EP1 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
4. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104.
5. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING EQUIPMENT WITHIN CLOSET OF FBO BUILDING TO BE REMOVED IN ITS ENTIRETY. DISPOSE OF OR SALVAGE EXISTING EQUIPMENT AND TURN OVER TO OWNER PER DIRECTION FROM RPR.
2. DEMOLISH EXISTING BEACON, BEACON POLE, AND FOUNDATION. CONTRACTOR TO REMOVE CONDUCTORS AND CONDUIT BACK TO AIRFIELD LIGHTING VAULT.
3. EXISTING WIND CONE, FOUNDATION, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED, SEGMENTED CIRCLE TO REMAIN. CONTRACTOR TO REMOVE CONDUCTORS AND CONDUIT BACK TO AIRFIELD LIGHTING VAULT.
4. REMOVE EXISTING REIL AND ALL ASSOCIATED EQUIPMENT AND FOUNDATIONS. CONDUCTORS TO BE REMOVED BACK TO SOURCE.
5. EXISTING UNDERGROUND DUCT BANK OR CONDUIT BENEATH PAVEMENT TO BE ABANDONED IN PLACE. CONTRACTOR TO REMOVE ALL EXISTING CONDUCTORS.
6. EXISTING ASOS EQUIPMENT TO REMAIN. CONTRACTOR TO FIELD VERIFY CIRCUIT ROUTE AND REMOVE POWER FEED CONDUCTORS BACK TO AIRFIELD LIGHTING VAULT.
7. REMOVE EXISTING ELEVATED LIGHT, ISOLATION TRANSFORMER, AND ASSOCIATED CONCRETE ENCASED BASE CAN.

2 1



NORTH

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HORIZ SCALE IN FEET

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)

3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

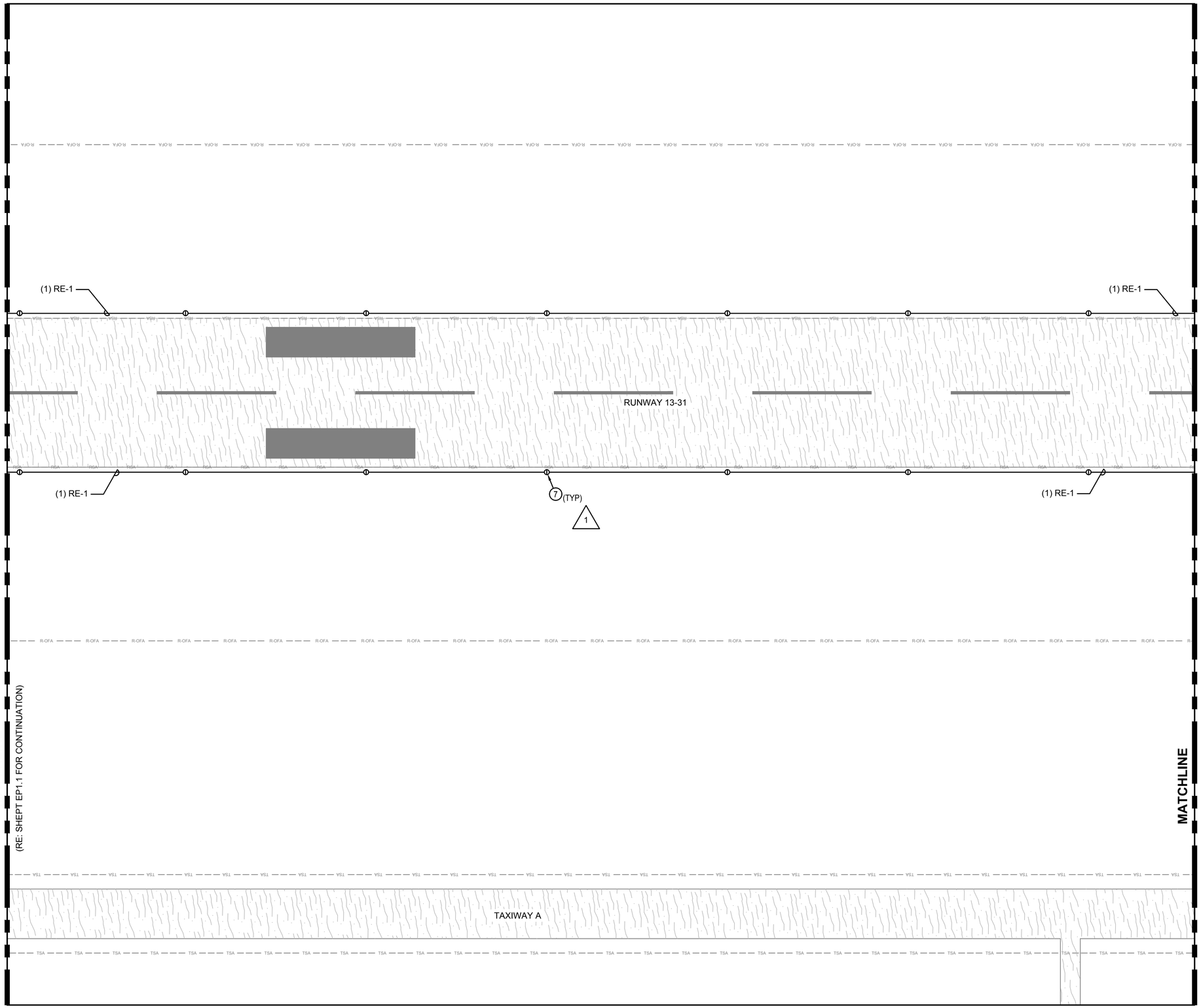
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. : 23062
DATE OF ISSUE : 03/07/25
REVIEWED BY : RCF
DRAWN BY : ALC
DESIGNED BY : RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.1

PLOT DATE: 5/13/2025 9:17:10 AM, Austin Cote
FILE NAME: 20616 PSX EP1.1.dwg
FILE PATH: C:\pw_working\lochner-pw-01\d0184174



GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EP2 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EP1 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
4. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104.
5. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING EQUIPMENT WITHIN CLOSET OF FBO BUILDING TO BE REMOVED IN ITS ENTIRETY. DISPOSE OF OR SALVAGE EXISTING EQUIPMENT AND TURN OVER TO OWNER PER DIRECTION FROM RPR.
2. DEMOLISH EXISTING BEACON, BEACON POLE, AND FOUNDATION. CONTRACTOR TO REMOVE CONDUCTORS AND CONDUIT BACK TO AIRFIELD LIGHTING VAULT.
3. EXISTING WIND CONE, FOUNDATION, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED, SEGMENTED CIRCLE TO REMAIN. CONTRACTOR TO REMOVE CONDUCTORS AND CONDUIT BACK TO AIRFIELD LIGHTING VAULT.
4. REMOVE EXISTING REIL AND ALL ASSOCIATED EQUIPMENT AND FOUNDATIONS. CONDUCTORS TO BE REMOVED BACK TO SOURCE.
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7. REMOVE EXISTING ELEVATED LIGHT, ISOLATION TRANSFORMER, AND ASSOCIATED CONCRETE ENCASED BASE CAN.

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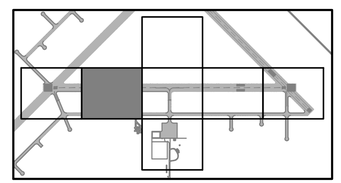

NORTH

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Ferguson Consulting Inc.
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The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

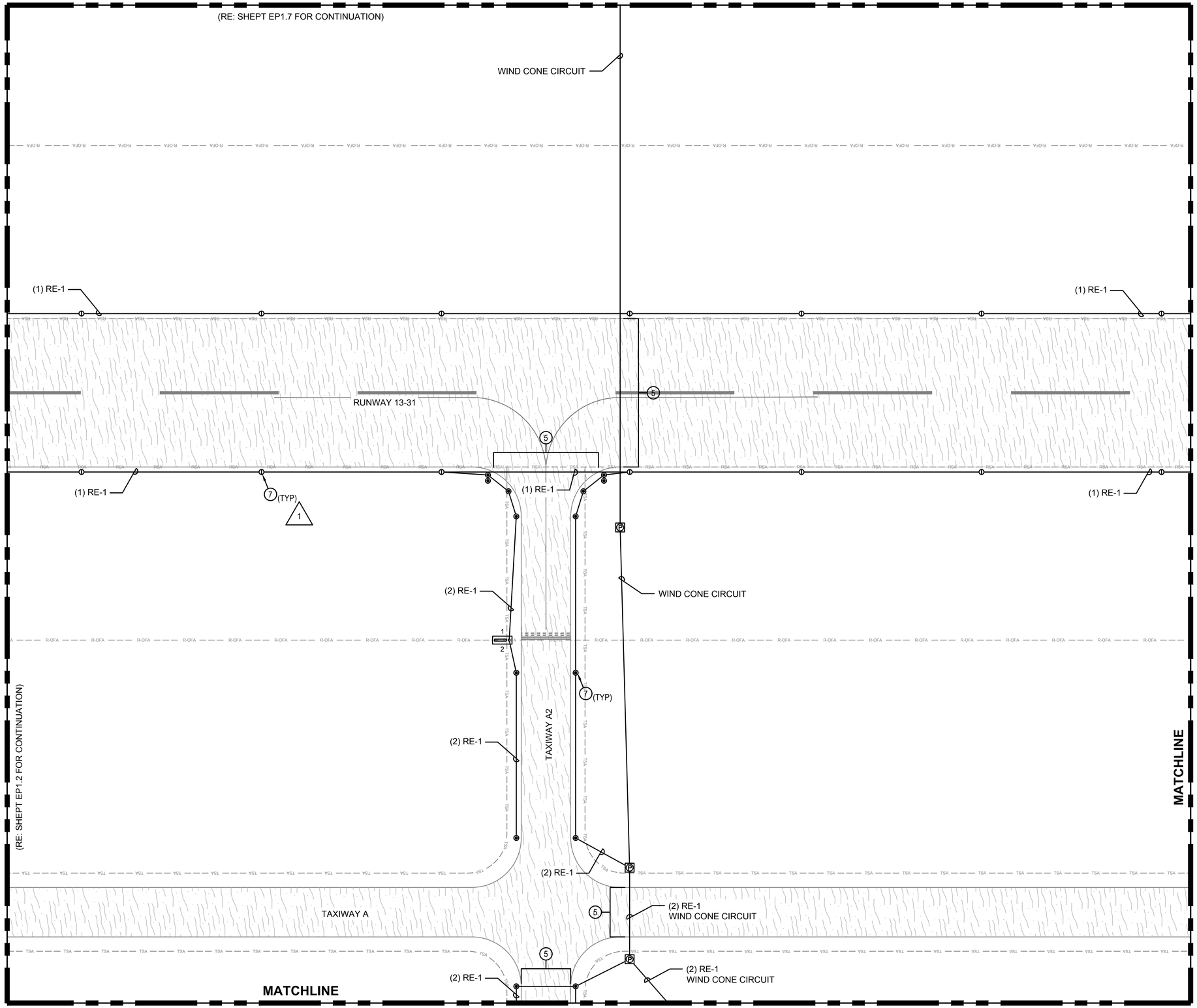
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864
05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.2

FILE PATH: C:\pw_working\dschnei-pw-01\d0184174
FILE NAME: 23616 PSX EP1.1.dwg
PLOT DATE: 5/15/2025 9:17:11 AM Austin Cote



GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EP2 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EP1 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
4. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104.
5. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

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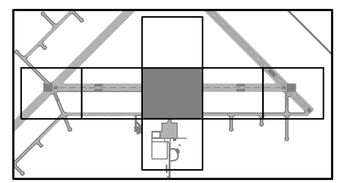

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

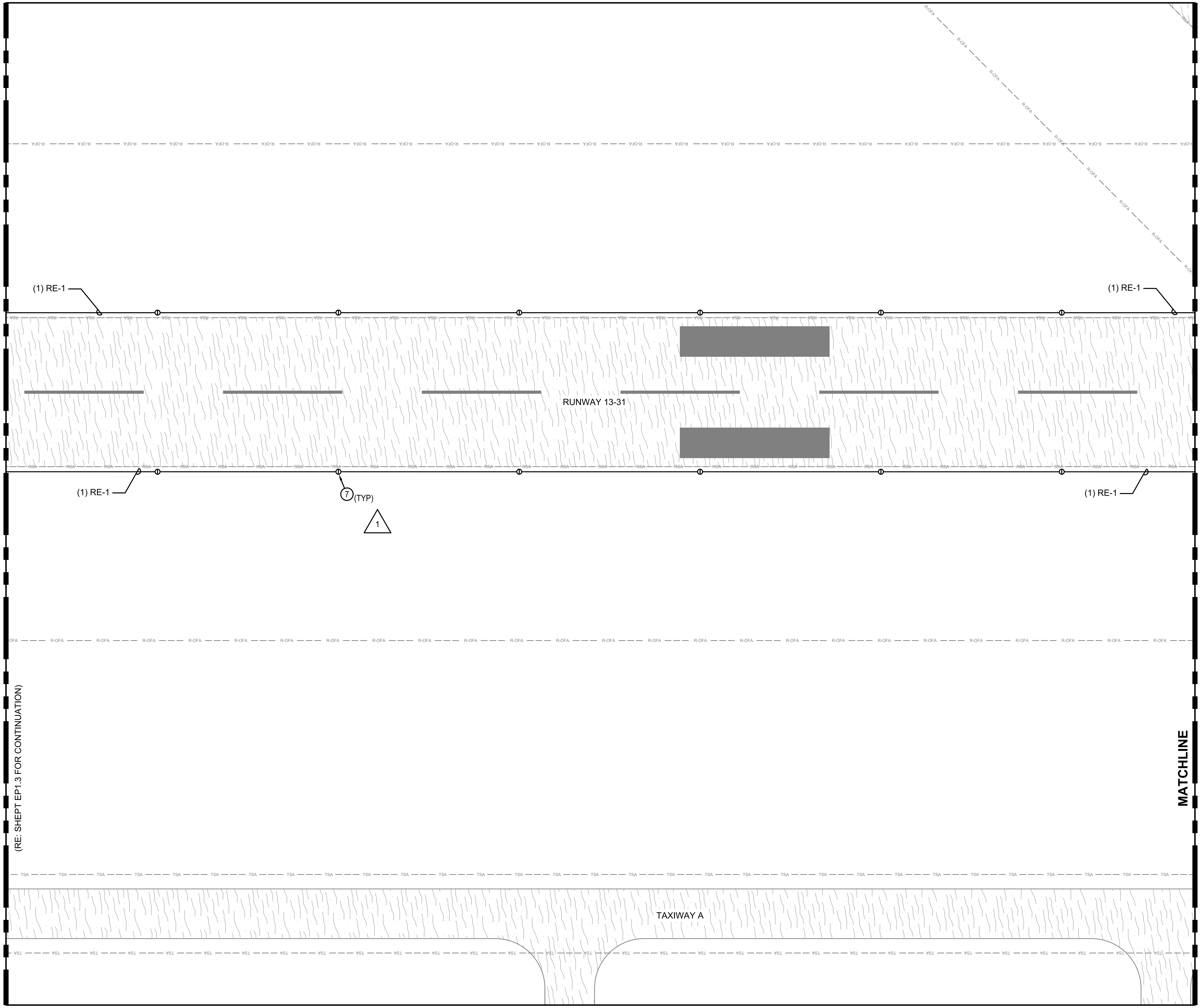
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864
05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.3

FILE PATH: C:\pw_working\dschnei-pw-01\d0184174
FILE NAME: 23616 PSX EP1.1.dwg
PLOT DATE: 5/15/2025 9:11:12 AM Austin Cole



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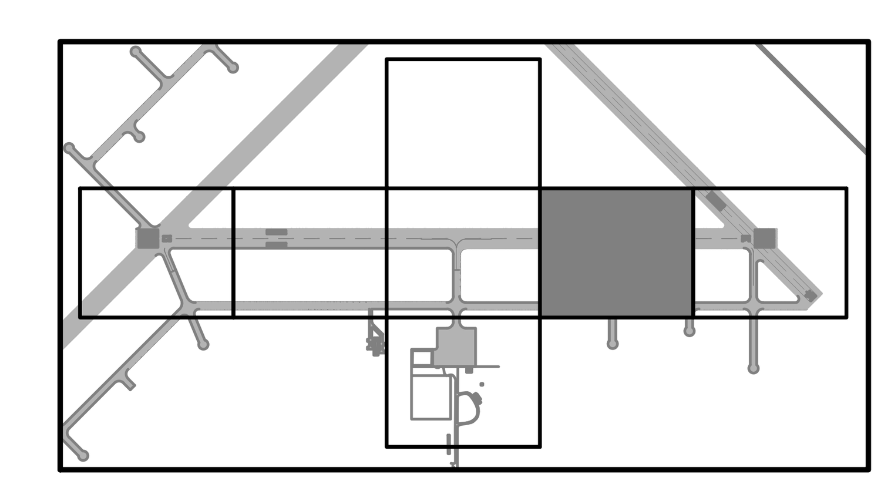

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
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2	05/14/25	ADDEN 3

STATE OF TEXAS
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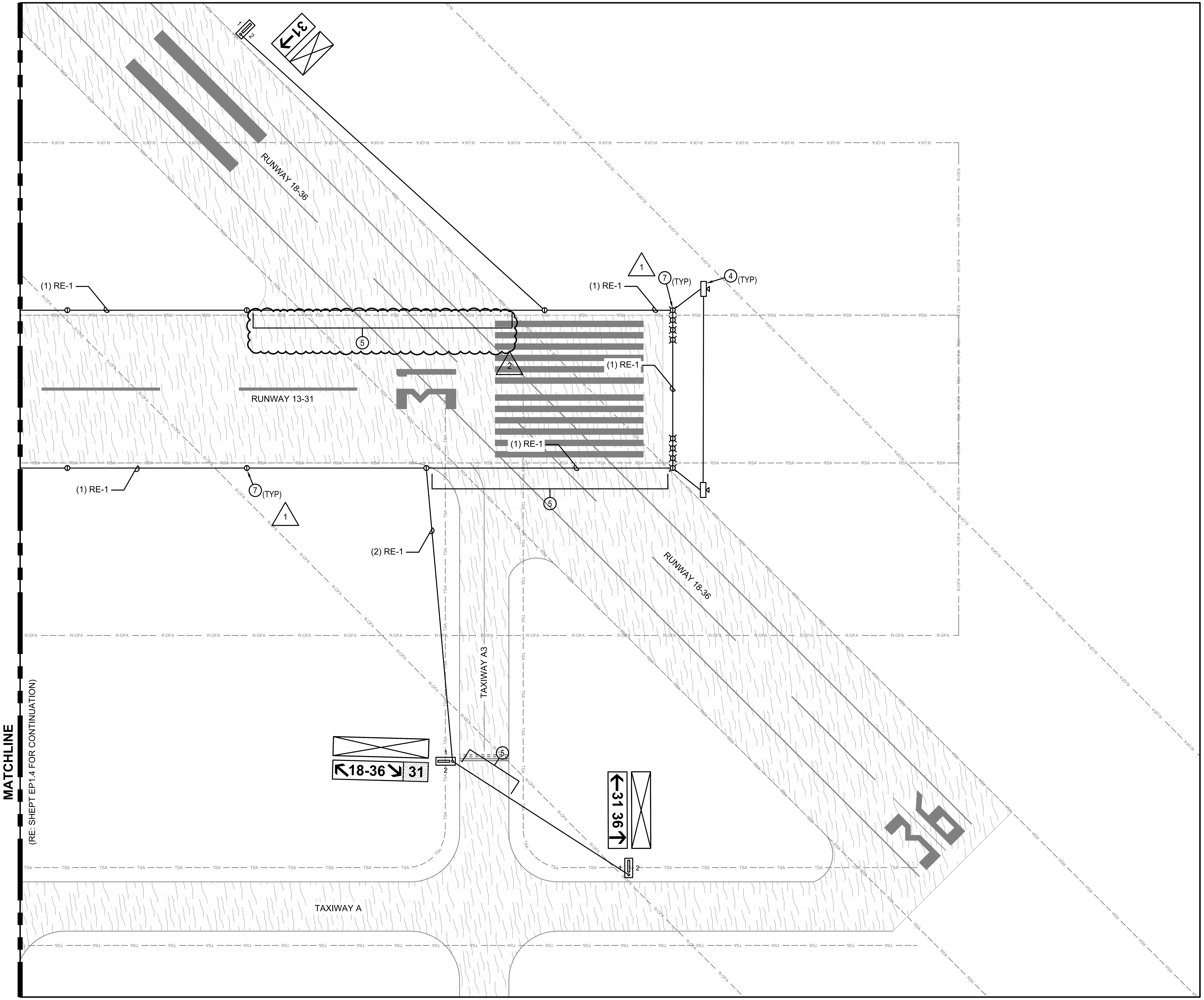
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.4



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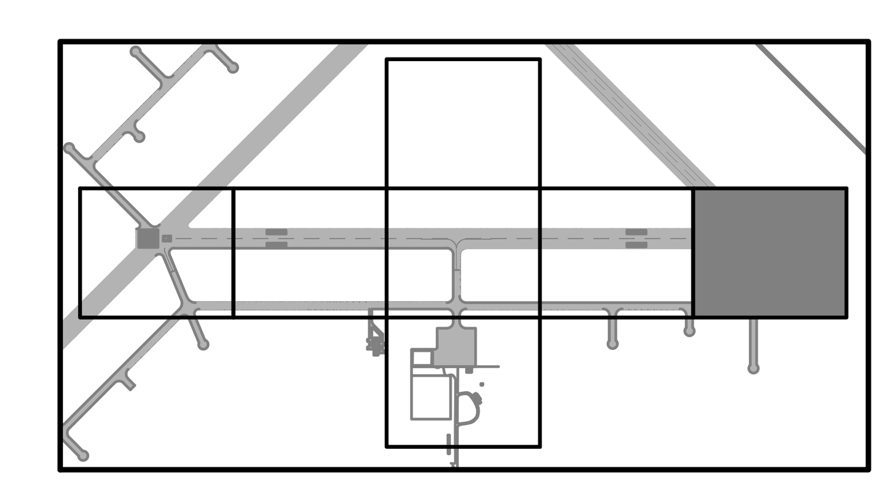

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)

3 R. B. TRULL BLVD, PALACIOS, TX 77465

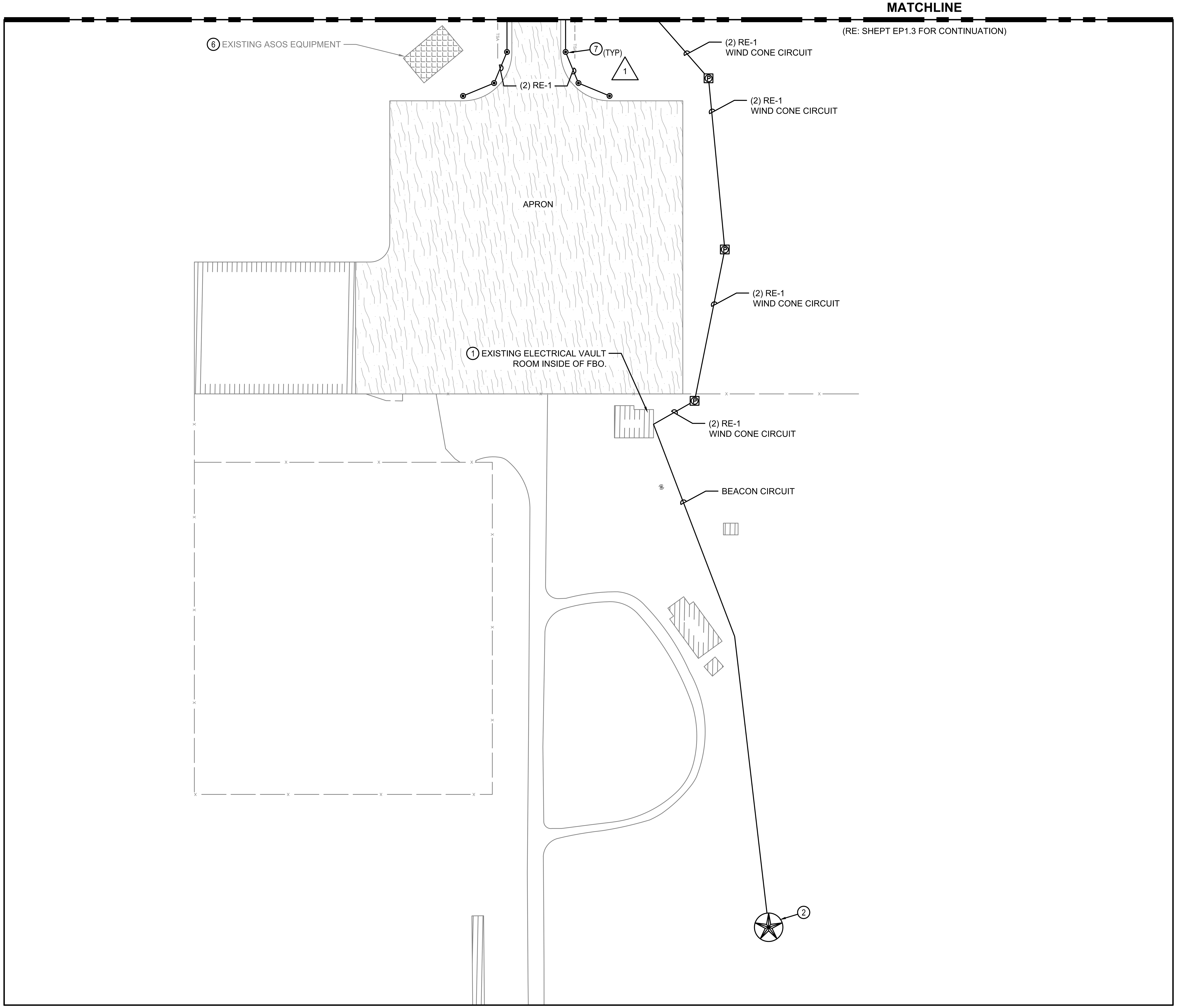
NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.5



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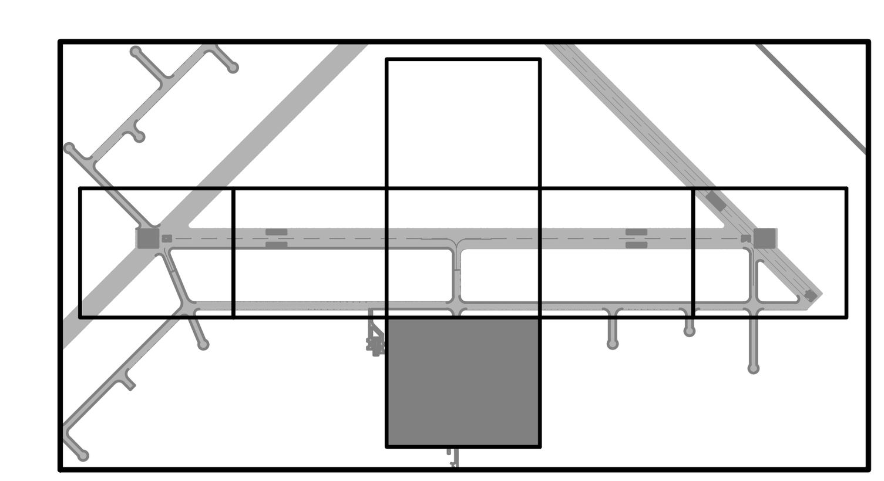

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The Woodlands, TX 77380
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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.6

PLOT DATE: 5/13/2025 9:17:14 AM, Austin Cote
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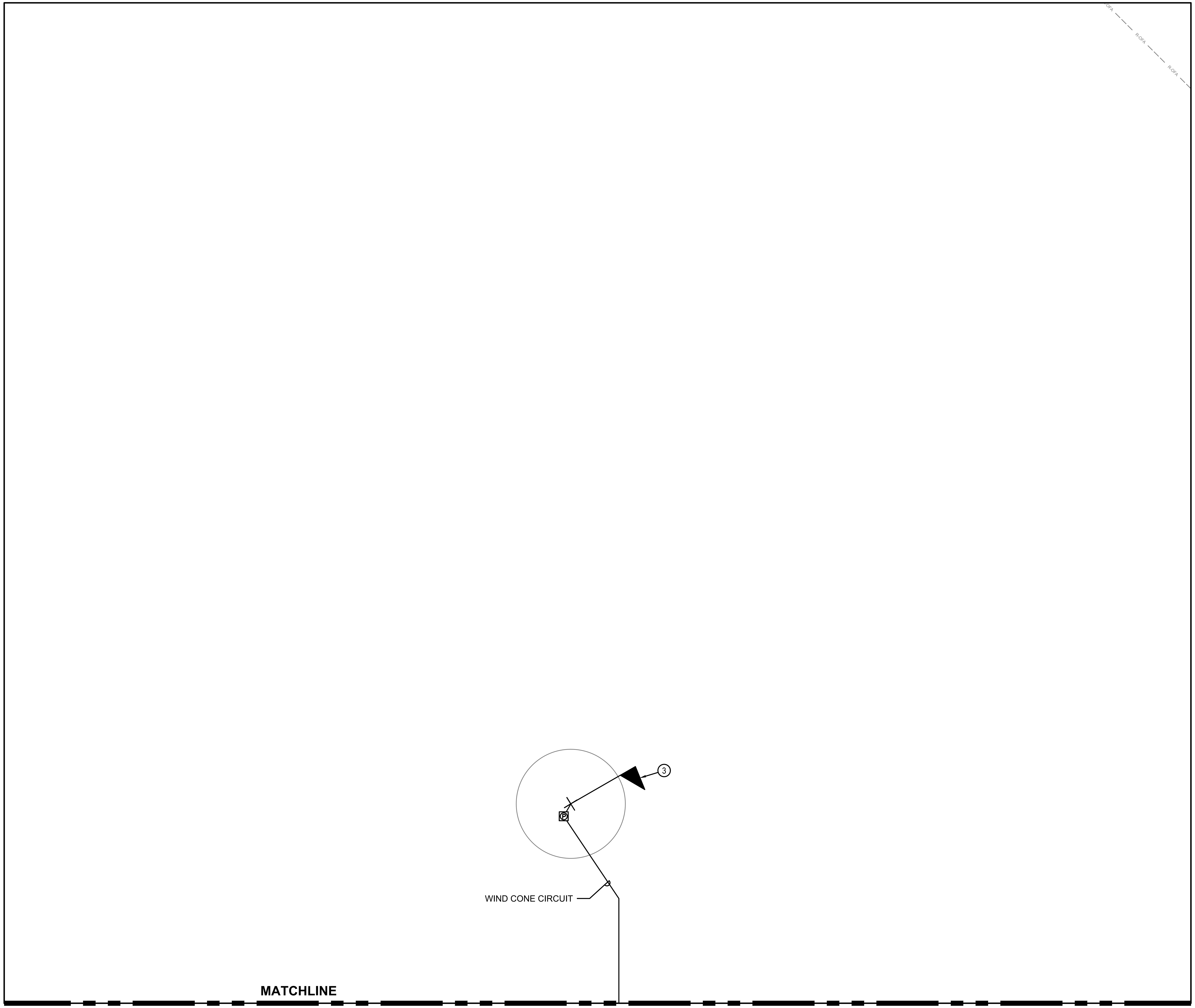

(RE: SHEPT EP1.3 FOR CONTINUATION)

GENERAL NOTES

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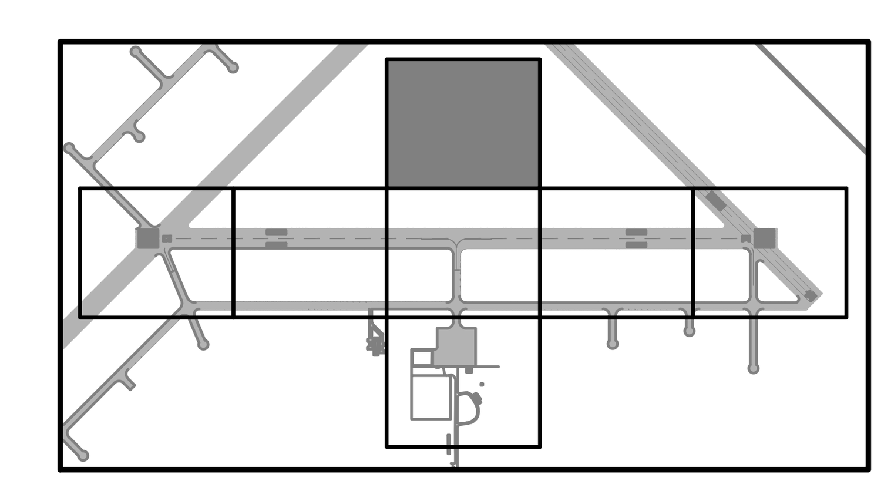

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/25
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DRAWN BY:	ALC
DESIGNED BY:	RCF

AIRFIELD LIGHTING DEMOLITION PLAN

EP1.7

PLOT DATE: 5/13/2025 9:17:15 AM, Austin Cote
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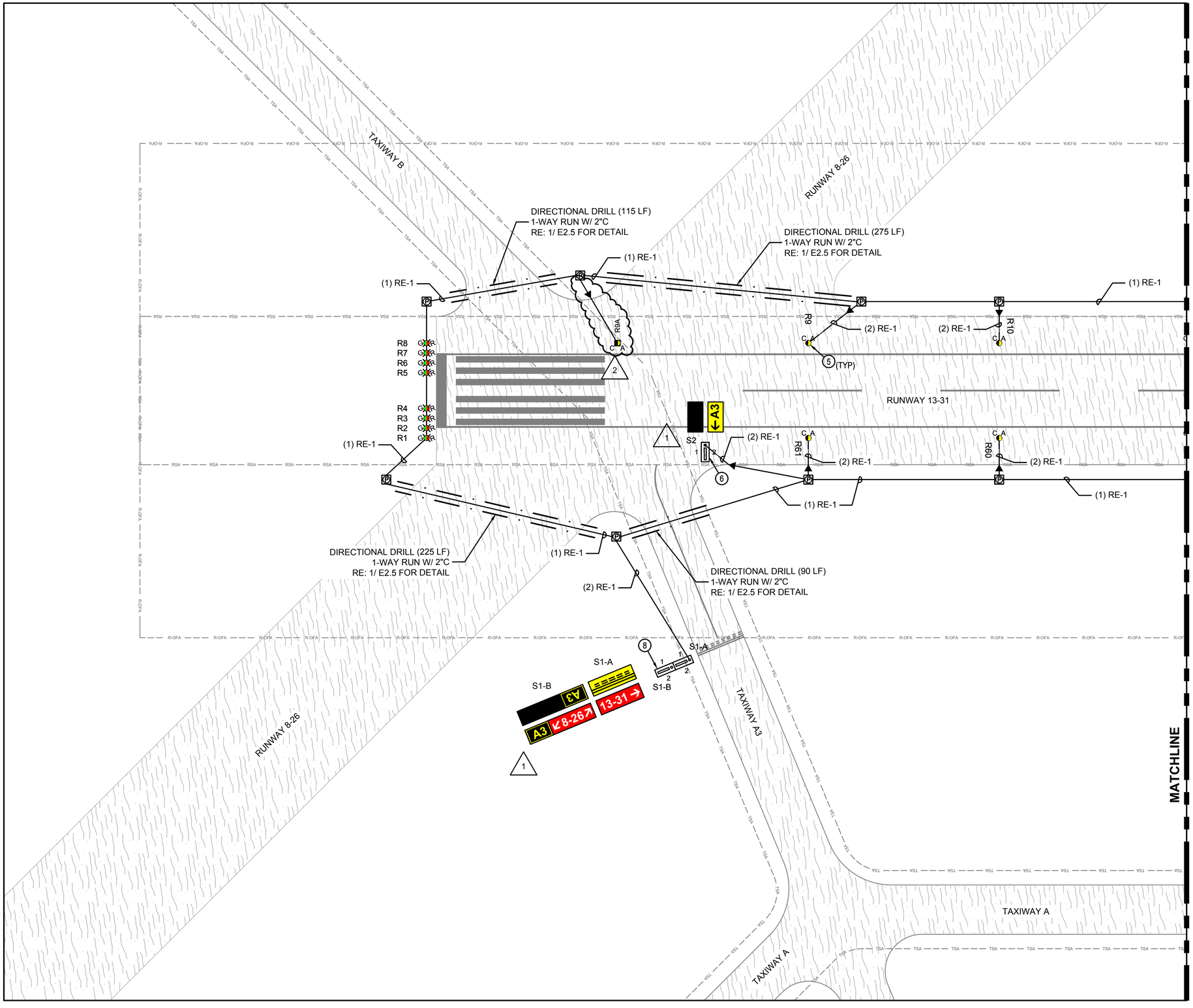

GENERAL NOTES

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2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO EP1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO EP6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
5. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EP2 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
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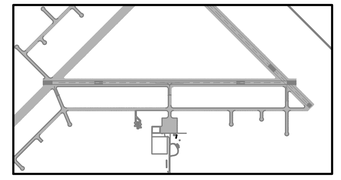
KEYED NOTES

1. CONTRACTOR TO INSTALL NEW AIRFIELD LIGHTING VAULT AND EQUIPMENT. REFER TO EP4 SERIES FOR DETAILS.
2. INSTALL NEW LED BEACON ON NEW TIP DOWN POLE. REFER TO EP5.3 FOR DETAIL.
3. INSTALL NEW LED WIND CONE ON NEW TIP DOWN POLE. REPAINT EXISTING SEGMENTED CIRCLE. REFER TO SHEET E2.6 FOR DETAILS.
4. INSTALL NEW L-849E(L) REIL. REFER TO SHEET EP5.4 FOR DETAILS.
5. INSTALL NEW LIGHT FIXTURE ON NEW L-867B BASE CAN IN EXISTING RUNWAY PAVEMENT. REFER TO SHEET EP5.1 FOR DETAILS.
6. NEW SIGN TO BE INSTALLED IN EXISTING PAVEMENT. REFER TO SHEET EP5.2 FOR DETAIL.
7. CONTRACTOR TO CONNECT NEW ASOS POWER FEED CIRCUIT TO EXISTING EQUIPMENT.
8. INSTALL TWO SEPARATE SIGNS ON TWO SEPARATE FOUNDATIONS TO COMPLETE THE LEGEND. SIGN "A" WILL BE THE SIGN CLOSEST TO THE EDGE OF PAVEMENT AND SIGN "B" WILL BE SET BEHIND IT. RE: 2/ E2.2 FOR DETAIL.



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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)

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AIRFIELD ELECTRICAL LAYOUT PLAN

EP2.1

FILE PATH: C:\pw_working\bother-pw-01\d0184174
FILE NAME: 20618 PSX EP2.1.dwg
PLOT DATE: 5/13/2025 3:47:04 PM, Fred Rocha

MATCHLINE

(RE: SHEPT EP2.7 FOR CONTINUATION)

(2) #12, #12G
(WIND CONE)

JCP-7

(1) RE-1

(2) RE-1

R18 R19 R20 R21 R22 R23

(TYP)

DIRECTIONAL DRILL (190 LF)
4-WAY RUN W/ 2"C
RE: 1/ E2.5 FOR DETAIL

RUNWAY 13-31

A2 A2

R52 R51 R50 R49 R48

T1 T2 T3 T4 T5 T6 T7 T8 T9 T10 T11 T20 T21 T22 T23 T24 T25 T26 T27 T28 T29 T30

S1 S2 S3 S4 S5

DB

JCP-1 JCP-2 JCP-3

A2 13-31

DIRECTIONAL DRILL (90 LF)
2-WAY RUN W/ 2"C
RE: 1/ E2.5 FOR DETAIL

TAXIWAY A2

TAXIWAY A

(2) RE-1
(2) #12, #12G (WIND CONE)

DIRECTIONAL DRILL (90 LF)
6-WAY RUN W/ 2"C
RE: 1/ E2.5 FOR DETAIL

(2) RE-1
(2) #10, #10G (ASOS)

(2) RE-1
(2) #12, #12G (WIND CONE)
(2) #10, #10G (ASOS)

MATCHLINE

(RE: SHEPT EP2.2 FOR CONTINUATION)

MATCHLINE

(RE: SHEPT EP2.4 FOR CONTINUATION)

MATCHLINE

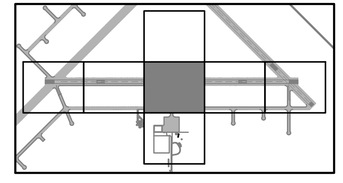
(RE: SHEPT EP2.6 FOR CONTINUATION)

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO EP1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO EP6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
5. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (EP2 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
6. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

1. CONTRACTOR TO INSTALL NEW AIRFIELD LIGHTING VAULT AND EQUIPMENT. REFER TO EP4 SERIES FOR DETAILS.
2. INSTALL NEW LED BEACON ON NEW TIP DOWN POLE. REFER TO EP5.3 FOR DETAIL.
3. INSTALL NEW LED WIND CONE ON NEW TIP DOWN POLE. REPAINT EXISTING SEGMENTED CIRCLE. REFER TO SHEET E2.6 FOR DETAILS.
4. INSTALL NEW L-849E(L) REIL. REFER TO SHEET EP5.4 FOR DETAILS.
5. INSTALL NEW LIGHT FIXTURE ON NEW L-867B BASE CAN IN EXISTING RUNWAY PAVEMENT. REFER TO SHEET EP5.1 FOR DETAILS.
6. NEW SIGN TO BE INSTALLED IN EXISTING PAVEMENT. REFER TO SHEET EP5.2 FOR DETAIL.
7. CONTRACTOR TO CONNECT NEW ASOS POWER FEED CIRCUIT TO EXISTING EQUIPMENT.
8. INSTALL TWO SEPARATE SIGNS ON TWO SEPARATE FOUNDATIONS TO COMPLETE THE LEGEND. SIGN "A" WILL BE THE SIGN CLOSEST TO THE EDGE OF PAVEMENT AND SIGN "B" WILL BE SET BEHIND IT. RE: 2/ E2.2 FOR DETAIL.



NORTH

0 25 50 100
HORIZ SCALE IN FEET

PRINT IN COLOR

Ferguson Consulting
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Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

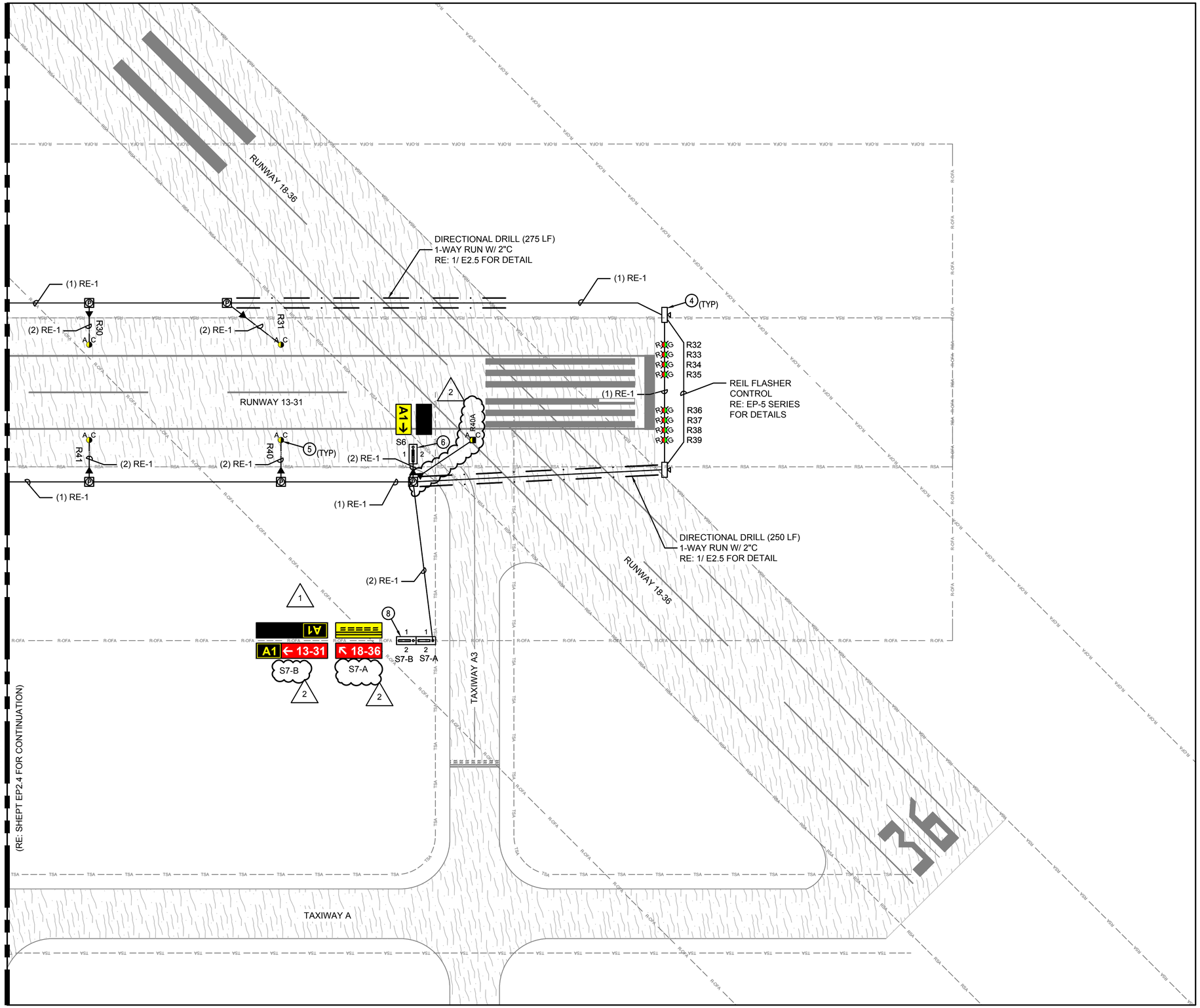
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

EP2.3

FILE PATH: C:\pw_working\jtolmer.pw-31\d0184174
FILE NAME: 20619 PSX EP2.1.dwg
PLOT DATE: 5/12/2025 8:17:31 AM, Austin Cole



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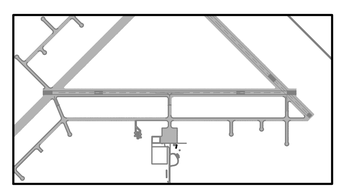

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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3 R. B. TRULL BLVD, PALACIOS, TX 77465

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STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864
05/14/25

PROJECT NO. :	23062
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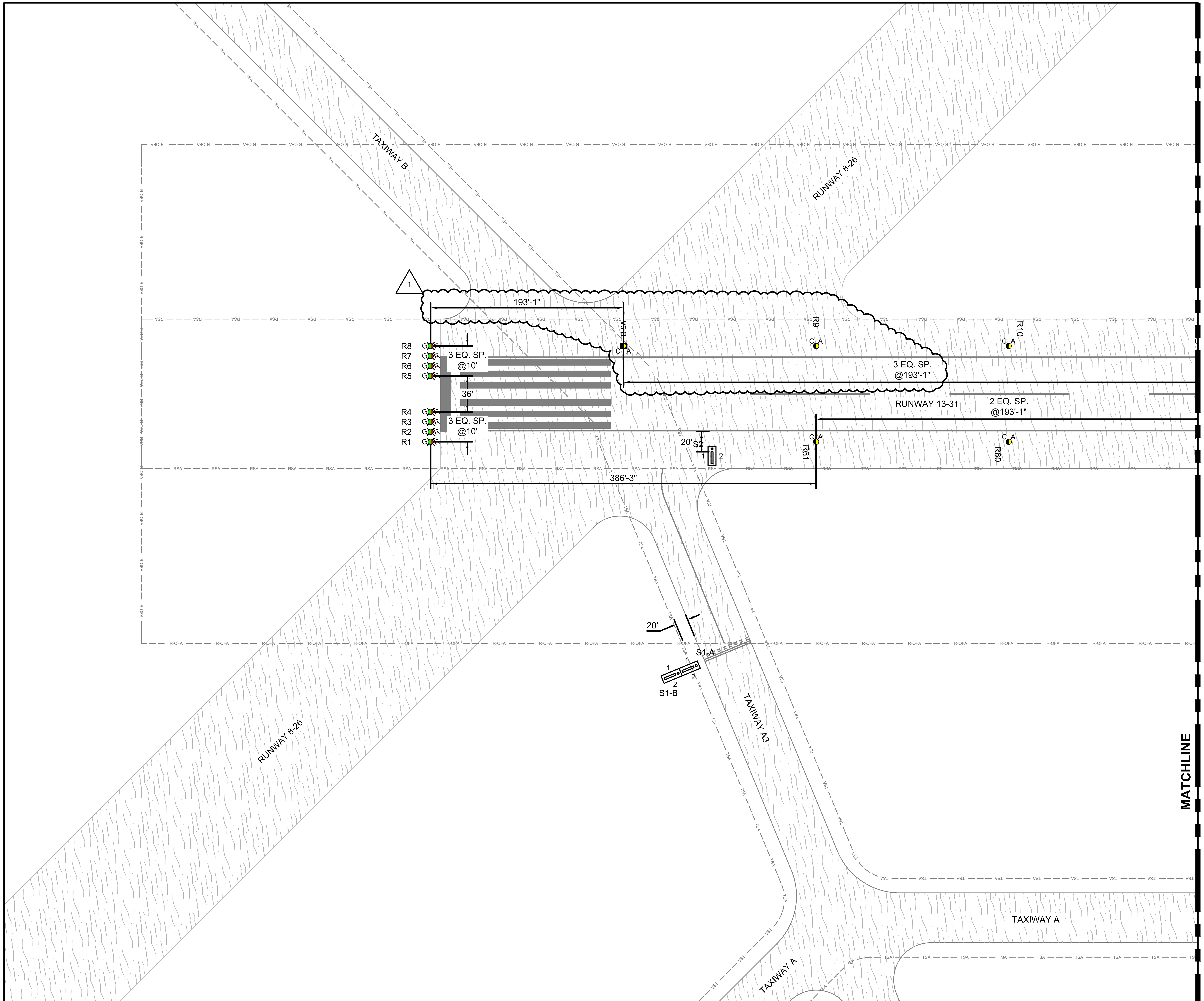
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

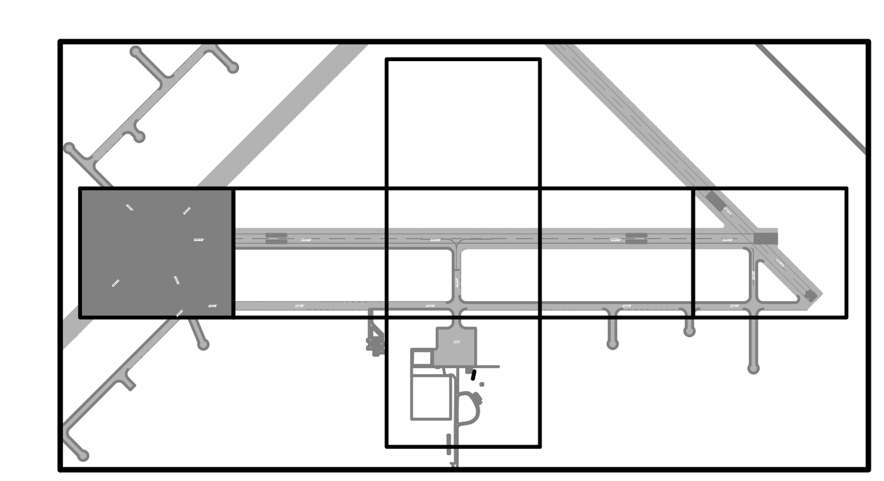
EP2.5

FILE PATH: C:\pw_working\bother-pw-01\d0184174
FILE NAME: 23616 PSX EP2.1.dwg
PLOT DATE: 5/13/2025 3:47:09 PM, Fred Rocha



GENERAL NOTES

1. REFER TO ER2 SERIES FOR FOR OVERALL LIGHTING LAYOUT PLANS.
2. ALL EDGE FIXTURES ARE 10' OFF EDGE OF PAVEMENT MARKING. ALL SIGNS ARE 20' OFF EDGE OF PAVEMENT MARKING. REFER TO E2 SERIES FOR DETAILS.
3. REFER TO THE LIGHT FIXTURES SCHEDULES IN THE ER6 SERIES FOR ADDITIONAL DIMENSIONS WHERE DIMENSION IS NOT SHOWN ON THE DRAWING.



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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION

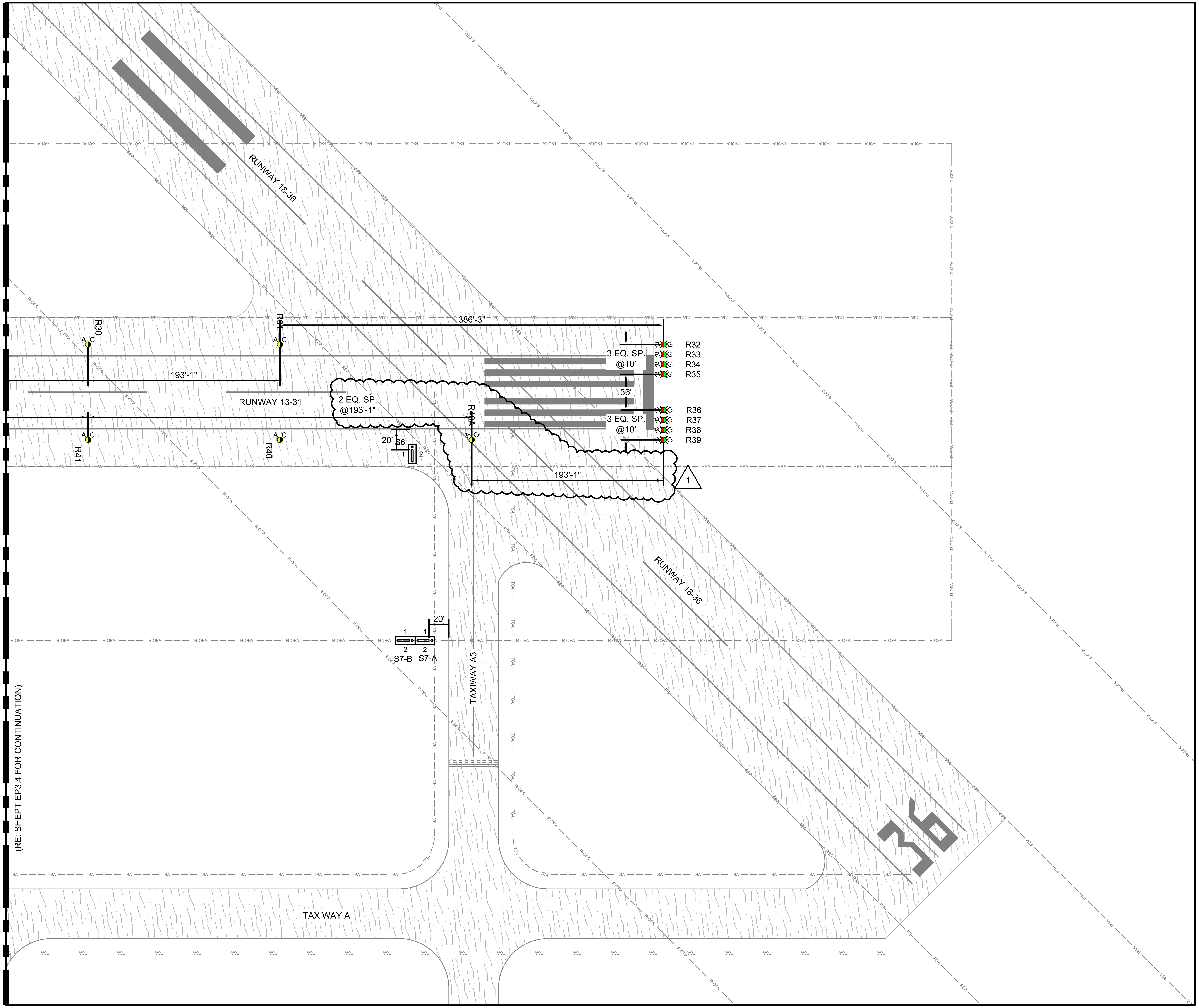
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/25
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

AIRFIELD ELECTRICAL DIMENSION PLAN

EP3.1

PLOT DATE: 5/13/2025 3:47:08 PM, Fred Rocha
FILE NAME: 26649 PSX EP3.1.dwg



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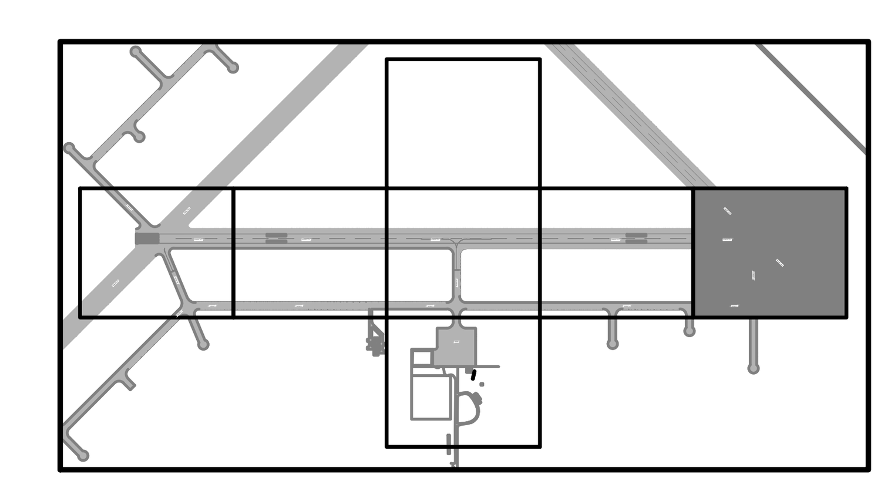

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
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STATE OF TEXAS
C. LECETTE FERGUSON
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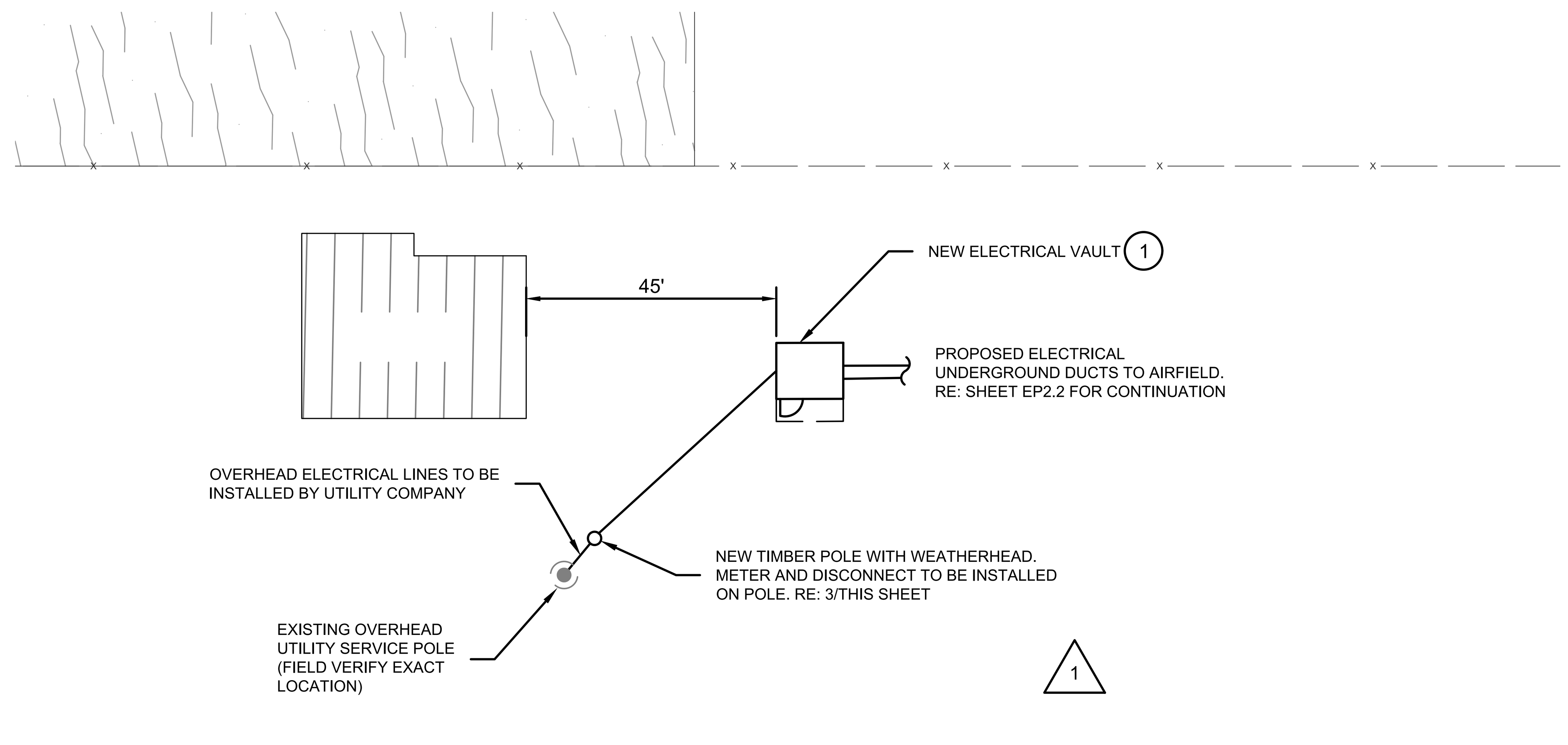
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

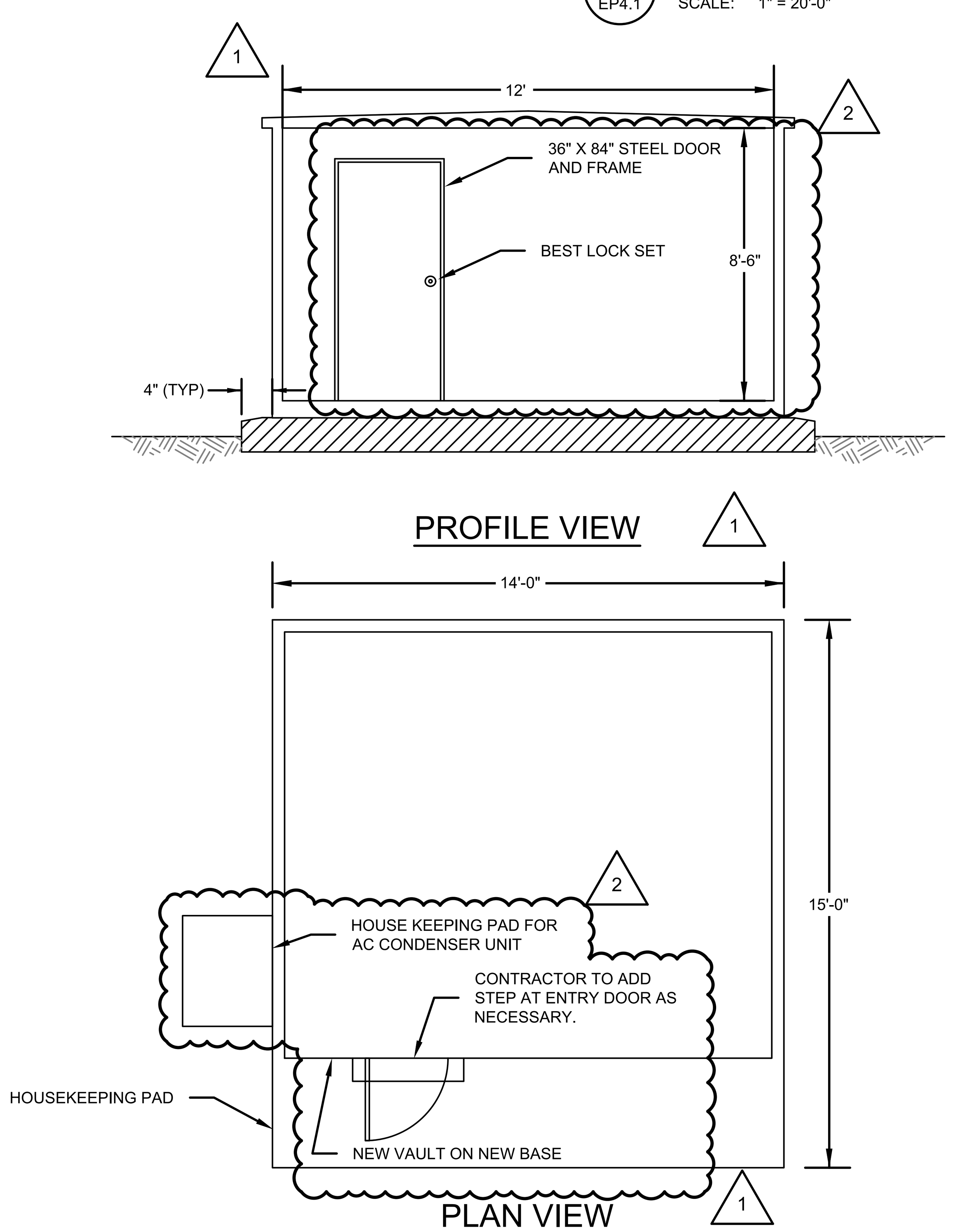
AIRFIELD ELECTRICAL DIMENSION PLAN

EP3.5



1 EP4.1 **VAULT SITE PLAN**

SCALE: 1" = 20'-0"

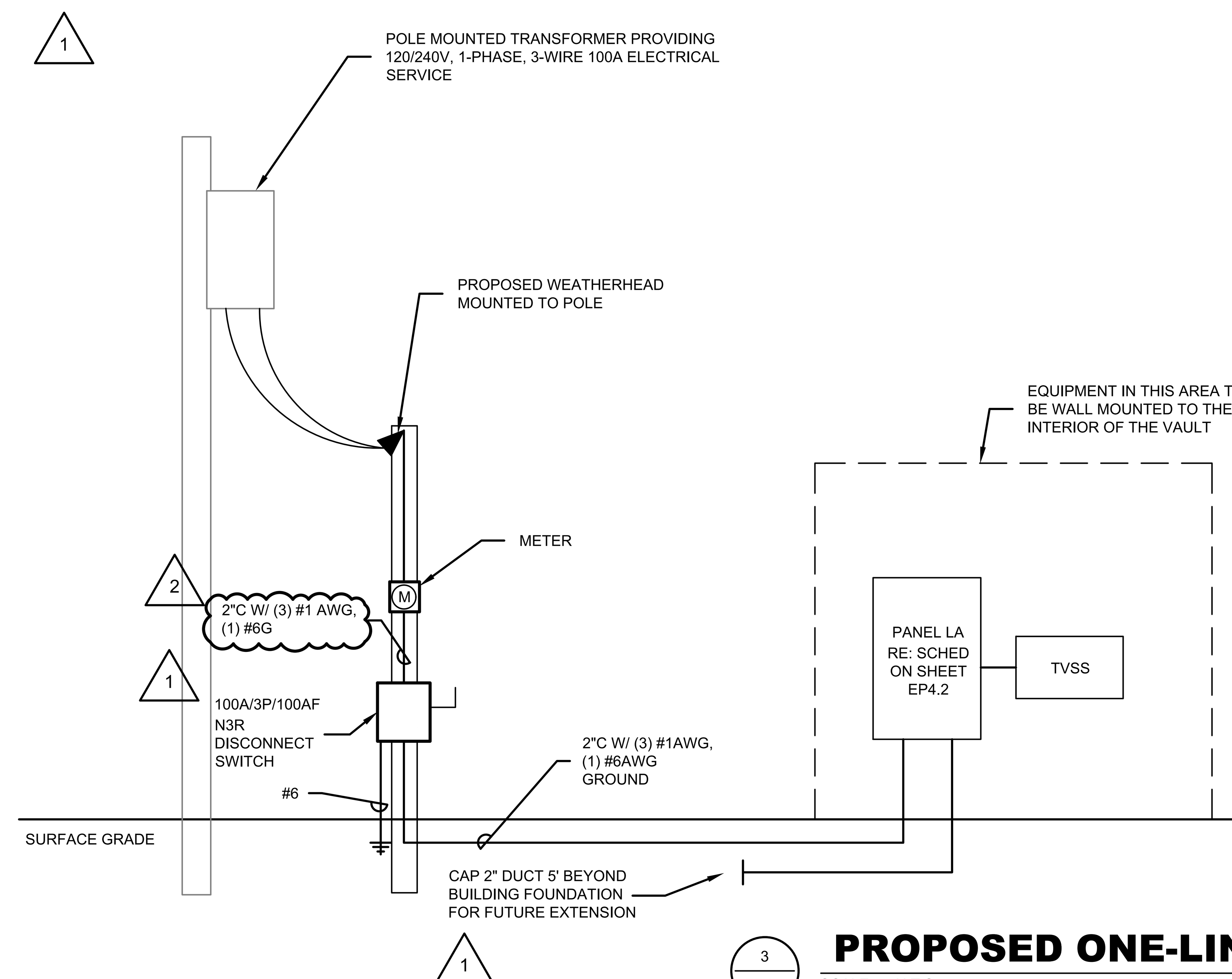


2 EP4.1 **VAULT PLAN - FRONT ELEVATION**

SCALE: N.T.S.

NOTES

1. REFER TO CIVIL DETAILS FOR VAULT FOUNDATION PLAN.



3 EP4.1 **PROPOSED ONE-LINE DIAGRAM**

SCALE: N.T.S.

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY, SOLID LINEWEIGHT ARE NEW OR MODIFIED.
2. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT.
3. ALL WORK RELATING TO ELECTRICAL SERVICE TO BE COORDINATED WITH LOCAL UTILITY COMPANY.

KEYED NOTES

1. FURNISH 10' X 12' X 8'-6" MIN VAULT STRUCTURE. PROVIDE STRUCTURE WITH UV RESISTANT FINISH CONSISTING OF HIGH GLOSS GEL-COAT OR 3-COATS OF EXTERIOR GRADE PAINT. STRUCTURE SHALL INCLUDE A 36"W X 7'H SOLID DOOR WITH KEY LOCK, WEATHER TRIM TO PREVENT INGRESS OF WATER, DUST OR OTHER FOREIGN PARTICLES. PROVIDE WITH MIN 250LB/SF FLOOR LOADING CAPACITY WITH COMMERCIAL GRADE VINYL TILE FINISH. PROVIDE SLOPED ROOF WITH 100LB/SF LOADING AND 220 FT-LB IMPACT RESISTANCE. ALL WALLS, FLOOR AND ROOF SHALL BE INSULATED. WALLS TO BE REINFORCED WITH 3/4" PLYWOOD FOR MOUNTING EQUIPMENT. ALL JOINTS SHALL BE AIR AND WATER-TIGHT. ALL HARDWARE SHALL BE STAINLESS STEEL. FURNISH COLOR SAMPLES FOR REVIEW. PRE-FABRICATED FIBERGLASS, PRE-CAST CONCRETE OR CONCRETE TILT-UP WALL CONSTRUCTION OR INSULATED METAL BUILDING ON SLAB IS AN APPROVED BUILDING TYPE. FURNISH VAULT WITH LIGHTS, RECEPTACLES, WALL SWITCH, 1-TON A/C WITH BUILT IN 1-TON HEATER, THERMOMETER AND ALL INCIDENTALS COMPLETE AND IN PLACE.

1 2

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)

3 R. B. TRULL BLVD, PALACIOS, TX 77465

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STATE OF TEXAS
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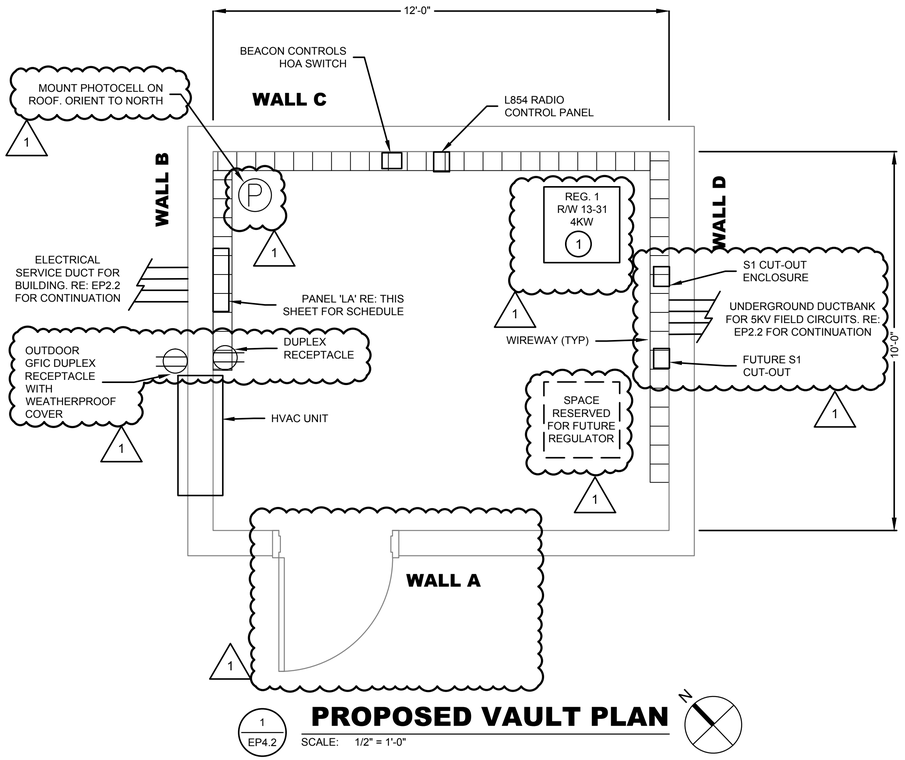
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/25
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

ELECTRICAL VAULT PLAN

EP4.1



1 / EP4.2

PROPOSED VAULT PLAN

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. ALL NEW WIREWAYS TO INCLUDE HINGED COVERS. LABEL ALL WIREWAYS FOR USE AS NOTED.
2. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT. ALL CONNECTIONS TO REGULATOR TO USE LIQUID-TIGHT NON-METALLIC CONDUIT. ALL CONDUIT TO BE 1" UON.
3. PROVIDE NAMEPLATE ON REGULATOR STATING REGULATOR ID, STEPS, VOLTAGE AND CIRCUIT ID.
4. PROVIDE LETTER SIZE LAMINATED AIRFIELD PLAN SHOWING RESPECTIVE REGULATOR CIRCUIT IN COLOR ON PLAN. FASTEN LAYOUT PLAN ON FRONT DOOR OF THE RESPECTIVE REGULATOR.

KEYED NOTES

(1) INSTALL NEW 4 KW, 240V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.

(2) INSTALL LOAD CENTER WITH TYPE 1 SURGE PROTECTION DEVICE.

PROPOSED REGULATOR 1 (RW 13-31) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 1 'RWY 13-31' (4KW)	
LED RW LIGHTING (45 RWY EDGE LTG @ 21.5W/EA)	0.97
LED RW THSLD LIGHTING (16 RWY THSLD LTG @ 17.9W/EA)	0.29
SIGNS (LED)	0.86
CABLE LOSS (12505' @ 3W/100LF)	0.67
SUB-TOTAL LOAD	3.52

4KVA REGULATOR EXCEEDS NEC REQUIREMENTS

UTILITY LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW	DEMAND KW
REGULATOR 1	3.52	3.52
ASOS (WORST CASE ESTIMATE)	9.6	9.6
WIND CONE	0.06	0.08
BEACON	0.22	0.27
HVAC	1.5	1.5
LIGHTING	0.09	0.11
RECEPTACLE	0.18	0.36
RADIO CONTROLLER	.02	.02
SUB-TOTAL LOAD	15.11	15.36

15.36 KVA / 240V = 64 A
100A SERVICE EXCEEDS NEC REQUIREMENTS

PANEL: LA

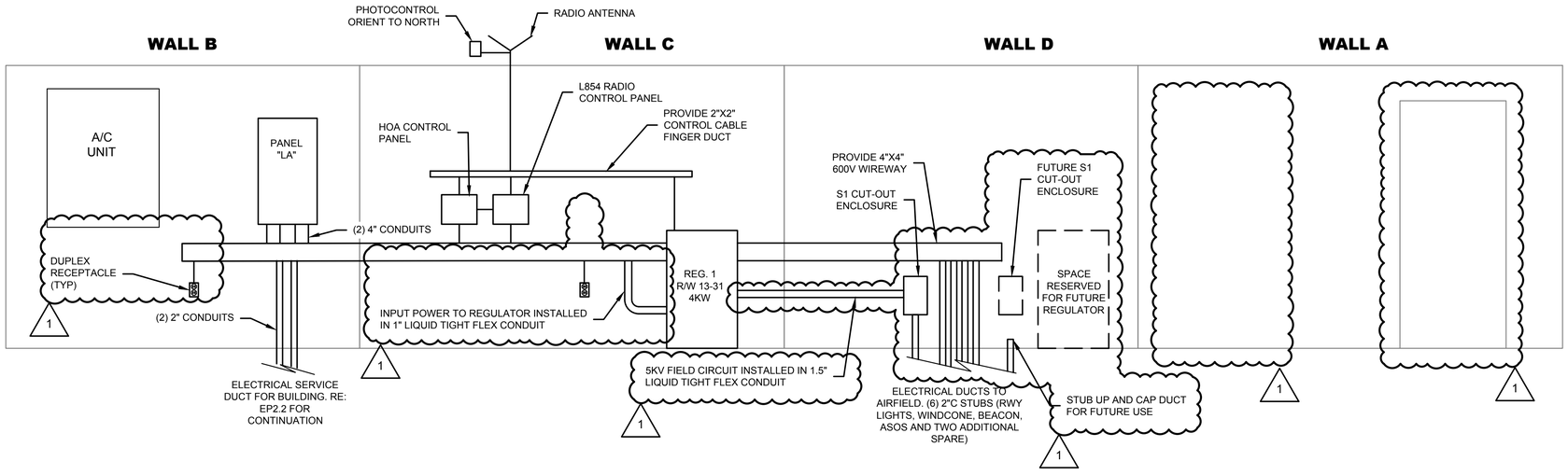
VOLTAGE: 120/240V (1) | 1 * | 3 W | AIC:
MAINS: 100 AMPS | ☐ MLO ☒ MCB | ☒ SURFACE ☐ FLUSH
LUGS: ☐ SUB - FEED | ☐ FEED - THRU | ☒ NEMA 1 ☐ NEMA 3R
REMARKS: (2)

C"	WIRE*	LOAD DESCRIPTION	KVA	BKR.	CKT	CKT	BKR.	KVA	LOAD DESCRIPTION	WIRE*	C"
1" C	2 #10	REG. 1, RWY 13-31 (4 KW)	1.76	30	1	2	15	.02	RADIO CONTROLLER		
—	#10G		1.76		3	4	15	0.06	WINDCONE		2" C
2" C	2 #10	ASOS	4.8	40	5	6	15	0.22	BEACON		2" C
—	#10G		4.8		7	8	15	0.64	INDOOR LIGHTING		
		SPARE	—	20	9	10	20		SPARE		
		SPARE	—	20	11	12			SPACE		
		RECEPT, AC, OUTDOOR LIGHT	1.56	20	13	14					
		SPARE		20	15	16					
		SPACE			17	18					
					19	20					
					21	22					
					23	24					

* ALL CABLING IS 2 #12, 1 #12G IN 1"C UNLESS NOTED OTHERWISE.

15.11	KVA CONNECTED LOAD
15.36	KVA DEMAND
64	AMPS DEMAND @ 240V

(1)



2 / EP4.2

VAULT PLAN - WALL ELEVATION

SCALE: N.T.S.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
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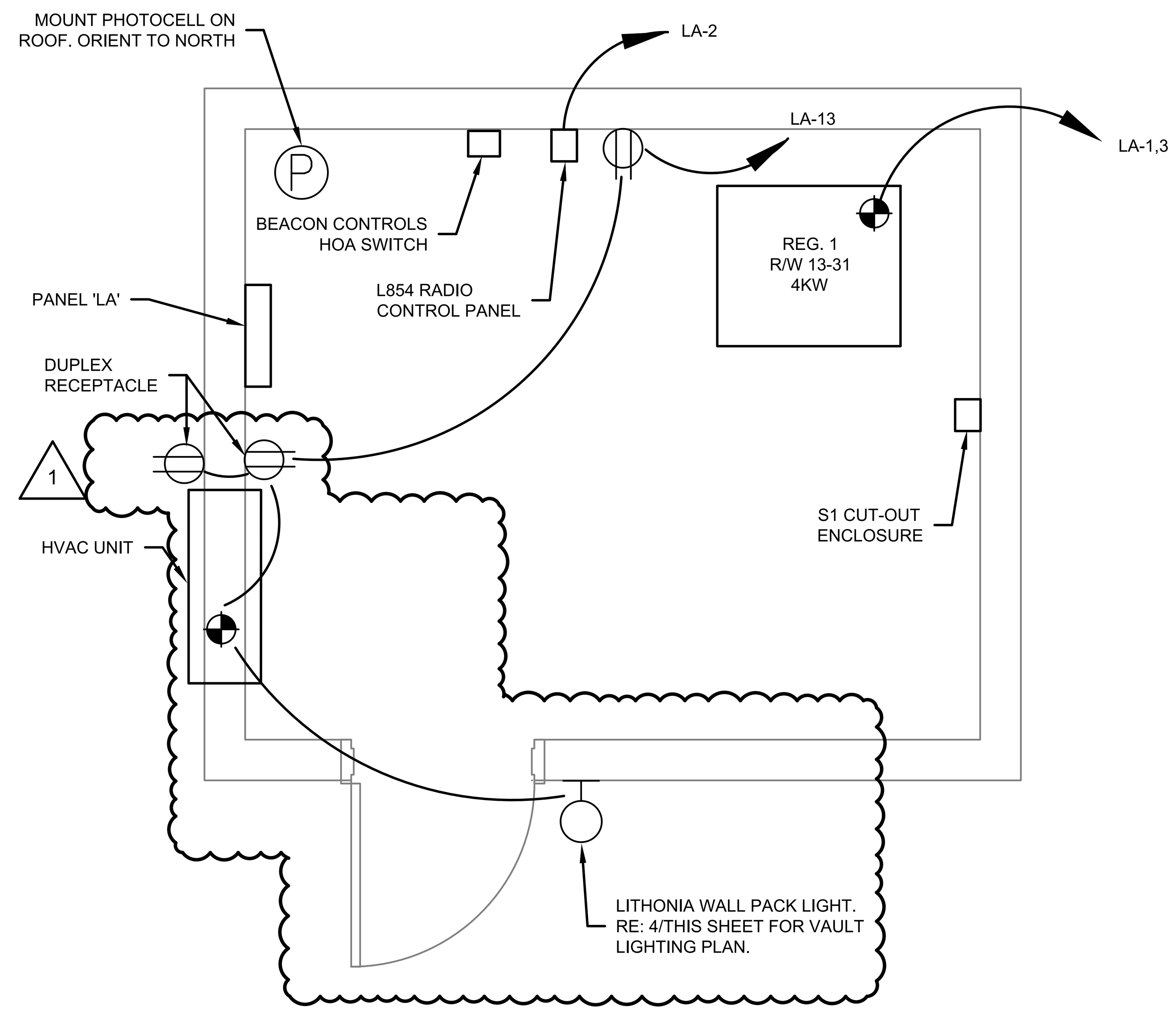
F-6864
05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

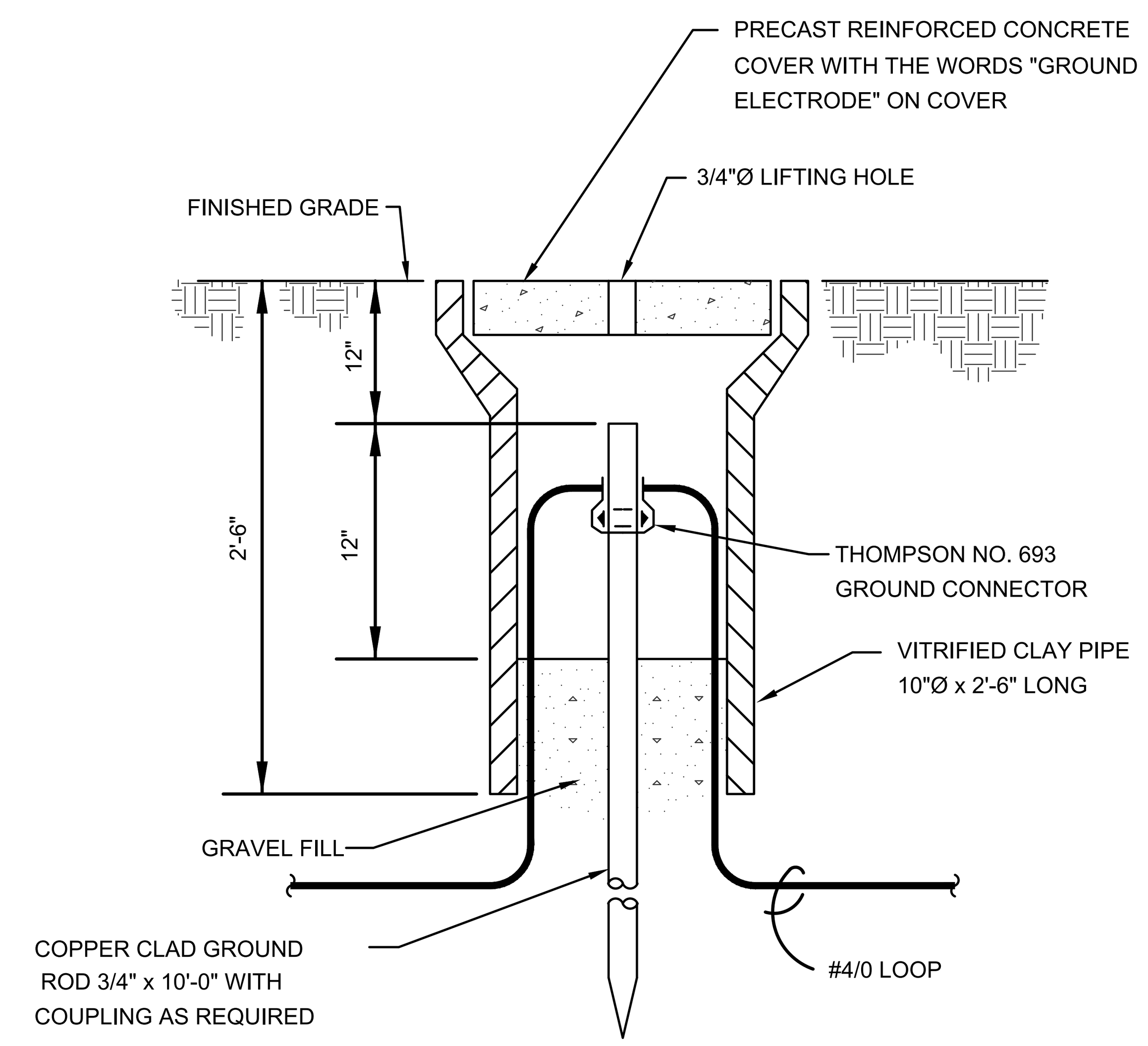
ELECTRICAL VAULT PLAN

EP4.2

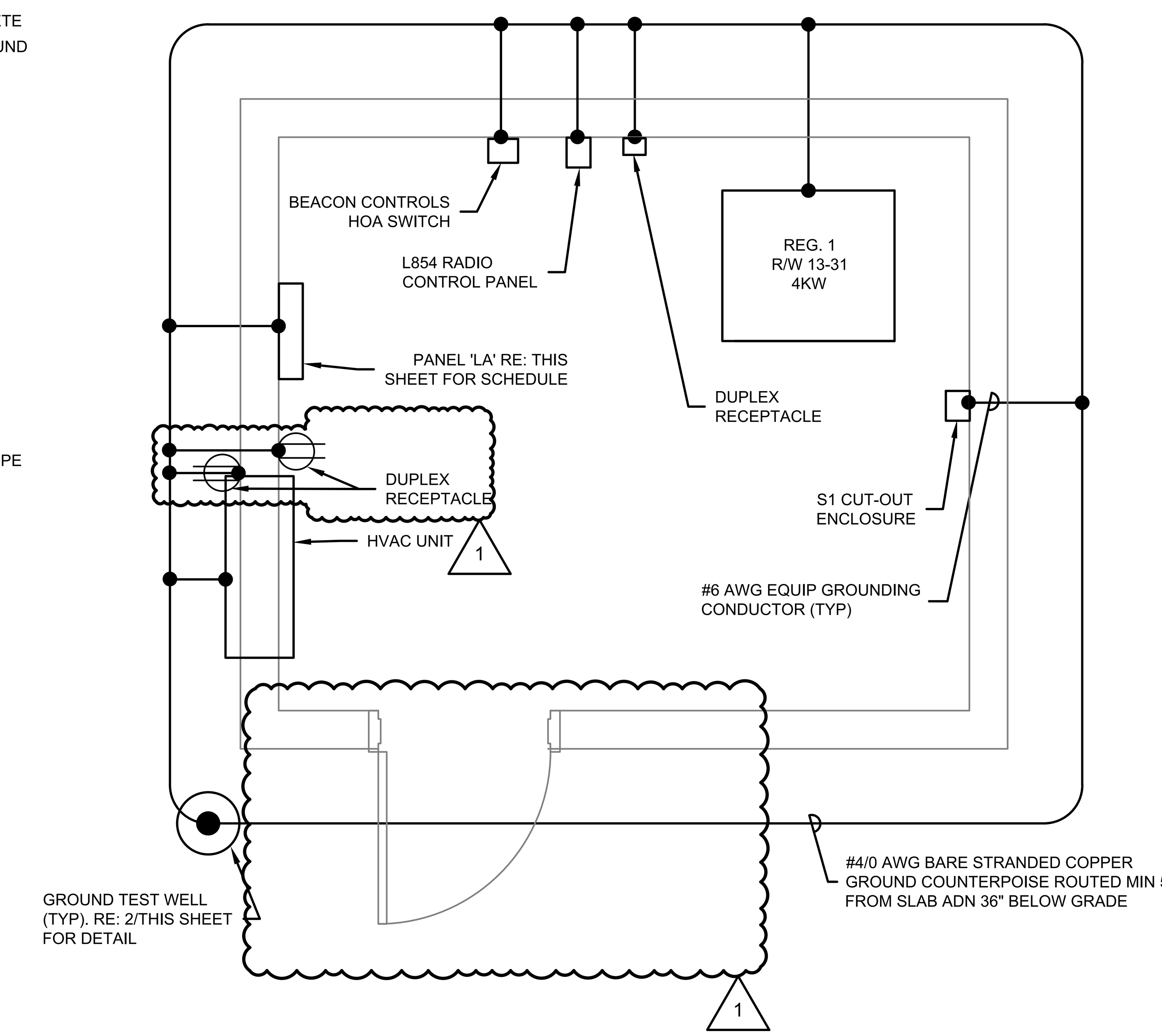
FILE PATH: C:\pw_working\bochner.pw-01\d0184174
FILE NAME: 26X18 PSX EP4.1.dwg
PLOT DATE: 5/13/2025 5:13:48 PM, Cole Ferguson



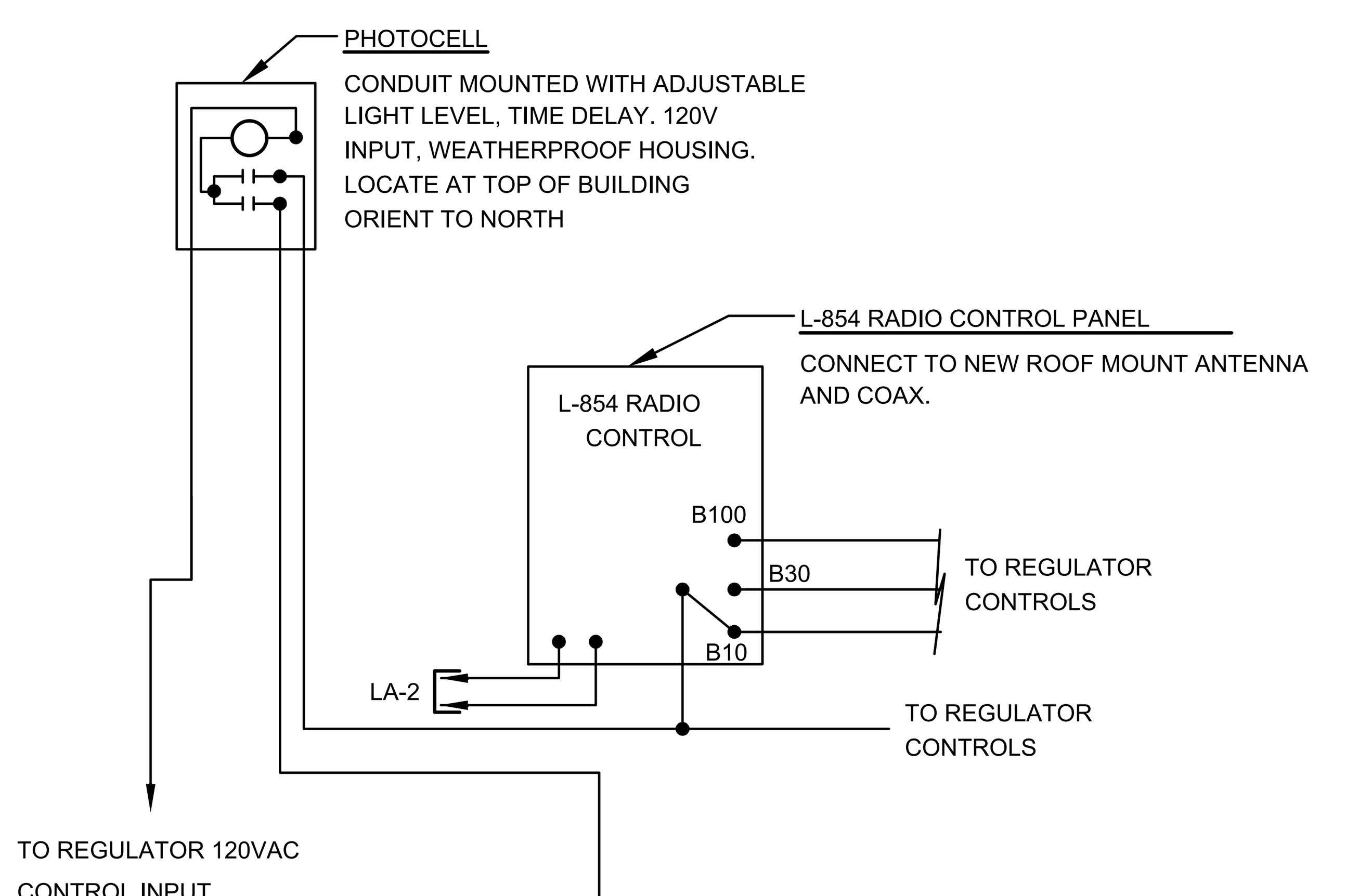
1
EP4.3
VAULT POWER PLAN
SCALE: 1/2" = 1'-0"



2
EP4.3
GROUND TEST WELL
SCALE:N.T.S.

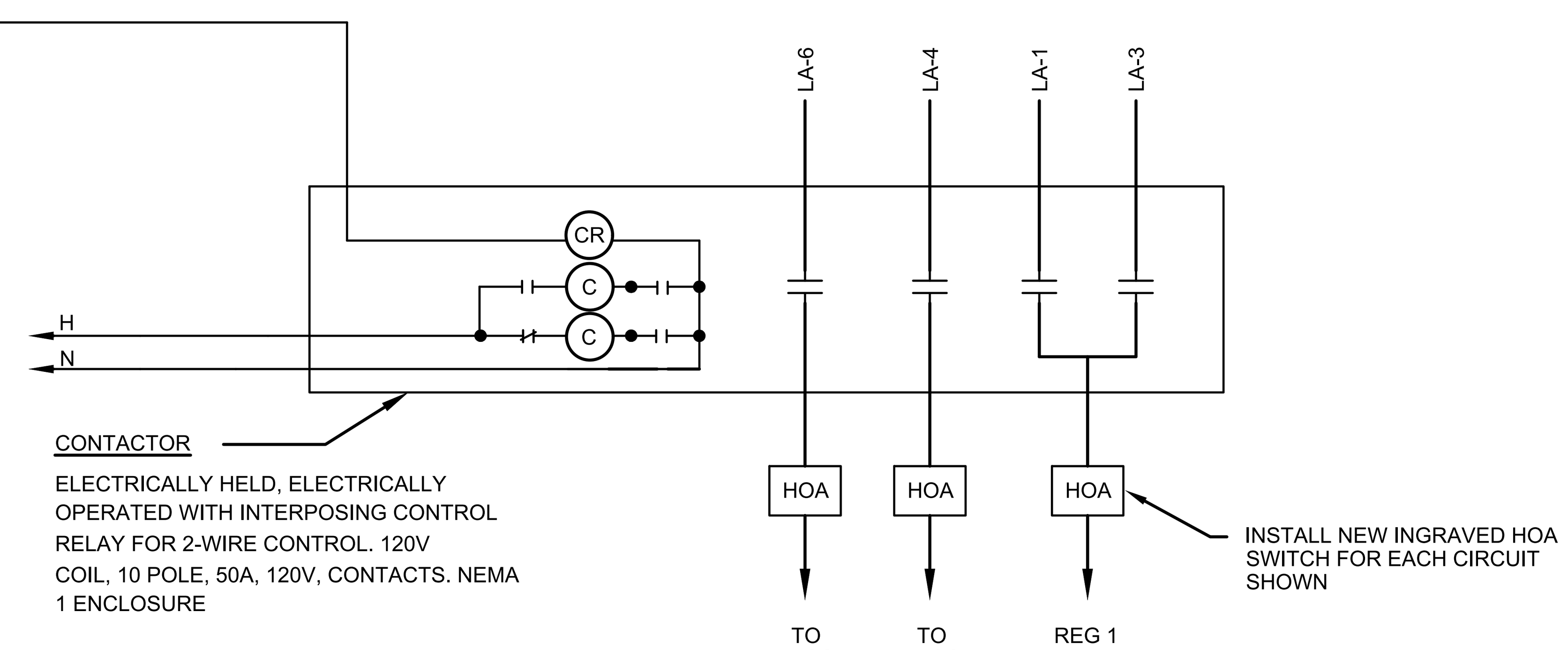


3
EP4.3
VAULT GROUNDING PLAN
SCALE: 1/2" = 1'-0"

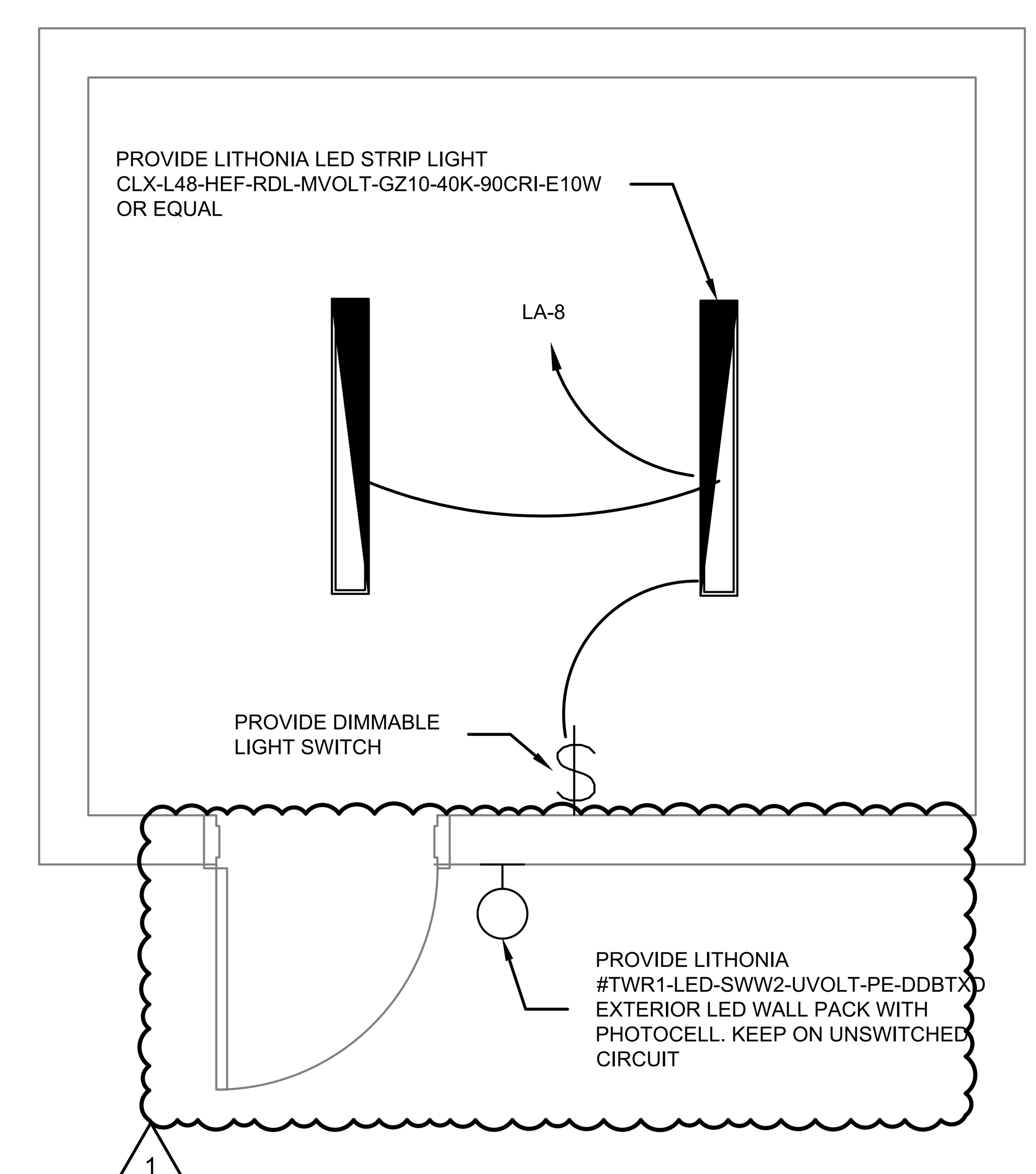


SEQUENCE OF OPERATION WHEN REGULATOR IS IN REMOTE MODE AND HOA IN AUTO MODE:

1. THE PAPI REMAINS 'ON' UNLESS HOA IS IN 'OFF' POSITION.
2. PHOTOCELL TURNS AIRFIELD LIGHTS 'ON' TO STEP 1 (10%) AT DUSK.
3. PHOTOCELL TURNS BEACON 'ON' AT DUSK.
4. PHOTOCELL TURNS WINDCONE 'ON' AT DUSK.
5. PHOTOCELL TURNS BEACON AND AIRFIELD LIGHTS OFF AT DAWN.
6. WHEN LIGHTS ARE ON, LIGHT LEVEL CAN BE ADJUSTED BY RADIO CONTROL AS FOLLOWS:
   FIVE CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT OUTPUT TO STEP 2 (30%)
   SEVEN CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT LEVEL TO STEP 3 (100%)
   LIGHTS WILL AUTOMATICALLY RETURN TO STEP 1 AFTER 15 MINUTE DURATION (OR AS PROGRAMMED)



5
EP4.3
LIGHTING CONTROLS DIAGRAM
SCALE: N.T.S.



4
EP4.3
VAULT LIGHTING PLAN
SCALE: 1/2" = 1'-0"

Ferguson Consulting
Aviation Specialists for Electrical, Telecommunications and Security Systems
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

ELECTRICAL VAULT PLAN

EP4.3

PLOT DATE: 5/13/2025 3:57:33 PM, Cole Ferguson
FILE NAME: 20616 PSX EP4.1.dwg
FILE PATH: C:\pw_working\lochner-pw-01\d0184174

PALACIOS MUNICIPAL - RUNWAY EDGE LIGHT FIXTURES (RE1)

FIXTURE NUMBER	FAA TYPE	FAA BASE	LIGHT ORIENTATION	COLOR	NORTHING	EASTING	REGULATOR ID	CIRCUIT NAME	KEYNOTES
R1	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459911.8127	2847342.0798	RE1	RE1	1
R2	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459919.0234	2847349.0084	RE1	RE1	1
R3	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459926.2342	2847355.9370	RE1	RE1	1
R4	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459933.4449	2847362.8656	RE1	RE1	1
R5	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459959.4035	2847387.8085	RE1	RE1	1
R6	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459966.6143	2847394.7371	RE1	RE1	1
R7	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459973.8250	2847401.6657	RE1	RE1	1
R8	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13459981.0357	2847408.5943	RE1	RE1	1
R9	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459713.4455	2847687.0811	RE1	RE1	1
R9A	L-850C(L)	L-868	BIDIRECTIONAL	AMBER-CLEAR	13459847.2406	2847547.8377	RE1	RE1	1
R10	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459579.6504	2847826.3246	RE1	RE1	1
R11	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459445.8554	2847965.5680	RE1	RE1	1
R12	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459312.0603	2848104.8114	RE1	RE1	1
R13	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459178.2652	2848244.0549	RE1	RE1	1
R14	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459044.4701	2848383.2983	RE1	RE1	1
R15	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458910.6750	2848522.5417	RE1	RE1	1
R16	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458776.8799	2848661.7851	RE1	RE1	1
R17	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458643.0848	2848801.0286	RE1	RE1	1
R18	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458509.2897	2848940.2720	RE1	RE1	1
R19	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458375.4946	2849079.5154	RE1	RE1	1
R20	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458241.6995	2849218.7589	RE1	RE1	1
R21	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458107.9044	2849358.0023	RE1	RE1	1
R22	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13457974.1093	2849497.2457	RE1	RE1	1
R23	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457840.3143	2849636.4891	RE1	RE1	1
R24	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457706.5192	2849775.7326	RE1	RE1	1
R25	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457572.7241	2849914.9760	RE1	RE1	1
R26	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457438.9290	2850054.2194	RE1	RE1	1
R27	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457305.1339	2850193.4628	RE1	RE1	1
R28	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457171.3388	2850332.7063	RE1	RE1	1
R29	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457037.5437	2850471.9497	RE1	RE1	1
R30	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13456903.7486	2850611.1931	RE1	RE1	1
R31	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13456769.9535	2850750.4366	RE1	RE1	1
R32	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456502.3633	2851028.9234	RE1	RE1	1
R33	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456495.1526	2851021.9948	RE1	RE1	1
R34	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456487.9419	2851015.0662	RE1	RE1	1
R35	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456480.7312	2851008.1377	RE1	RE1	1
R36	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456454.7725	2850983.1947	RE1	RE1	1
R37	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456447.5618	2850976.2661	RE1	RE1	1
R38	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456440.3511	2850969.3376	RE1	RE1	1
R39	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	13456433.1403	2850962.4090	RE1	RE1	1
R40	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13456700.7305	2850683.9221	RE1	RE1	1
R40A	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13456566.9354	2850823.1655	RE1	RE1	1
R41	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13456834.5256	2850544.6787	RE1	RE1	1
R42	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13456968.3207	2850405.4353	RE1	RE1	1
R43	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457102.1158	2850266.1918	RE1	RE1	1
R44	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457235.9109	2850126.9484	RE1	RE1	1
R45	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457369.7060	2849987.7050	RE1	RE1	1
R46	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457503.5011	2849848.4615	RE1	RE1	1
R47	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457637.2961	2849709.2181	RE1	RE1	1
R48	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	13457771.0912	2849569.9747	RE1	RE1	1
R49	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13457904.8863	2849430.7313	RE1	RE1	1
R50	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458038.6814	2849291.4878	RE1	RE1	1
R51	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458306.2716	2849013.0010	RE1	RE1	1
R52	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-CLEAR	13458440.0667	2848873.7575	RE1	RE1	1
R53	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458573.8618	2848734.5141	RE1	RE1	1
R54	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458707.6569	2848595.2707	RE1	RE1	1
R55	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458841.4520	2848456.0273	RE1	RE1	1
R56	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13458975.2471	2848316.7838	RE1	RE1	1
R57	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459109.0421	2848177.5404	RE1	RE1	1
R58	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459242.8372	2848038.2970	RE1	RE1	1
R59	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459376.6323	2847899.0535	RE1	RE1	1
R60	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459510.4274	2847759.8101	RE1	RE1	1
R61	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	13459644.2225	2847620.5667	RE1	RE1	1

PALACIOS MUNICIPAL - TAXIWAY EDGE LIGHT FIXTURES (RE1)

FIXTURE NUMBER	FAA TYPE	FAA BASE	LIGHT ORIENTATION	COLOR	NORTHING	EASTING	REGULATOR ID	CIRCUIT NAME	KEYNOTES
T1	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458226.0700	2849092.1387	RE1	RE1	1
T2	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458197.7660	2849103.0367	RE1	RE1	1
T3	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458167.5476	2849100.4421	RE1	RE1	1
T4	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458141.5158	2849084.8785	RE1	RE1	2
T5	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458018.7531	2848966.9193	RE1	RE1	2
T6	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457895.9904	2848848.9601	RE1	RE1	2
T7	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457883.7127	2848820.9152	RE1	RE1	2
T8	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457894.8618	2848792.4028	RE1	RE1	2
T9	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457855.2028	2848754.2955	RE1	RE1	2
T10	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457827.1579	2848766.5732	RE1	RE1	2
T11	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457798.6455	2848755.4241	RE1	RE1	2
T12	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457777.9146	2848735.5044	RE1	RE1	2
T13	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457757.1838	2848715.5847	RE1	RE1	2
T14	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457744.9061	2848687.5398	RE1	RE1	2
T15	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457756.0552	2848659.0274	RE1	RE1	2
T16	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457662.5193	2848756.3723	RE1	RE1	2
T17	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457690.5642	2848744.0946	RE1	RE1	2
T18	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457719.0765	2848755.2437	RE1	RE1	2
T19	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457739.8074	2848775.1634	RE1	RE1	2
T20	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457760.5382	2848795.0831	RE1	RE1	2
T21	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457772.8159	2848823.1280	RE1	RE1	2
T22	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457761.6668	2848851.6404	RE1	RE1	2
T23	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457801.3258	2848889.7477	RE1	RE1	2
T24	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457829.3707	2848877.4700	RE1	RE1	2
T25	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457857.8831	2848888.6191	RE1	RE1	2
T26	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13457980.6458	2849006.5783	RE1	RE1	2
T27	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458103.4085	2849124.5375	RE1	RE1	2
T28	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458119.9982	2849149.9278	RE1	RE1	1
T29	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458123.7963	2849180.0186	RE1	RE1	1
T30	L-851T(L)	L-867	OMNIDIRECTIONAL	BLUE	13458114.0360	2849208.7348	RE1	RE1	1

GENERAL NOTES - LIGHTING

1. REFER TO EP2 SERIES FOR PROPOSED LIGHTING PLANS, THE EP3 SERIES FOR DIMENSIONS PLANS AND EP5 SERIES FOR DETAILS.
2. FIXTURES NORTHINGS AND EASTINGS HAVE BEEN PROVIDED FOR CONTRACTORS TO USE IN LOCATING NEW BASE CANS. HOWEVER THE CONTRACTOR MUST INSTALL ALL FIXTURES FOLLOWING THE DETAILS, WHERE NORTHINGS AND EASTINGS CONFLICT WITH DETAILS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR GUIDANCE. TYPICALLY, THE DETAILS SUPERSEDE NORTHINGS AND EASTINGS INFORMATION. IF MARKINGS ARE MODIFIED, THE NORTHINGS AND EASTINGS MAY NO LONGER BE ACCURATE.

KEYED NOTES - LIGHTING

(1) PROCURE AND INSTALL NEW ELEVATED FIXTURE (TYPE AS NOTED) ON NEW BASE CAN IN EXISTING PAVEMENT WITH NEW ISOLATION TRANSFORMER, CONNECTOR KIT, BOLTING HARDWARE, ETC FOR A COMPLETE ACCEPTED SYSTEM.

(2) PROCURE AND INSTALL NEW ELEVATED FIXTURE (TYPE AS NOTED) ON NEW BASE CAN IN EARTH WITH NEW ISOLATION TRANSFORMER, CONNECTOR KIT, BOLTING HARDWARE, ETC FOR A COMPLETE ACCEPTED SYSTEM.

LIGHT FIXTURE ELECTRICAL INFORMATION:

FIXTURE TYPE	FAA TYPE	LAMP WATTAGE	ISOLATION TRANSFORMER
RUNWAY ELEVATED LED EDGE LIGHT	L-861(L)	12VA	L-830-16 (10/15W)
RUNWAY ELEVATED LED THRESHOLD END LIGHT	L-861E(L)	12VA	L-830-16 (10/15W)
TAXIWAY ELEVATED LED EDGE LIGHT	L-861T(L)	12VA	L-830-16 (10/15W)

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING SCHEDULES

EP6.1

PLOT DATE: 5/13/2025 3:46:29 PM, Fred Rocha
FILE NAME: 20616 PSX EP6.1.dwg
FILE PATH: C:\pw_working\lochner-pw-01\d0184174

JCP SCHEDULE

JCP TAG	SHEET NUMBER	NORTHING	EASTING	DUCTS	JCP DETAIL REFERENCE (DETAIL # / SHEET #)	NOTES
JCP-1	EP2.3	13458053.7644	2848962.5955	2	9/E2.3	
JCP-2	EP2.3	13457978.2356	2849041.2000	6	2/E2.4	
JCP-3	EP2.3	13457646.1903	2848932.8503	6	2/E2.4	
JCP-4	EP2.6	13457714.8999	2848788.1537	2	9/E2.3	
JCP-5	EP2.6	13457790.4216	2848709.5568	2	9/E2.3	
JCP-6	EP2.6	13457316.7555	2848616.3057	6	2/E2.4	
JCP-7	EP2.3	13458252.2242	2849304.5064	4	1/E2.4	

2

PROPOSED SIGN LEGEND

PROPOSED FIELD TAGGING	SIDE 1	SIDE 2	FIELD CKT	SIGN DATA: MODULES	SIGN DATA: SIZE	SIGN DATA: STYLE	SIGN DATA: CLASS	ISOL XFMR (QTY) (AND SIZE) *	LOAD INFORMATION: TYPE	LOAD INFORMATION: VA	SHEET NUMBER	NORTHING	EASTING	NOTES
S1-A	A3	A3 ↙ 8-26 ↗	RE1	4	1	2	1	100 W	LED	95	EP2.01	13459566.7130	2847375.8394	(1)
S1-B	[redacted]	13-31 →	RE1	3	1	2	1	100 W	LED	95	EP2.01	13459566.7130	2847375.8394	(1)
S2	[redacted]	← A3	RE1	2	1	2	1	100 W	LED	95	EP2.01	13221664.6562	2598572.7547	(2)
S3	A2	A2 13-31	RE1	3	1	2	1	100 W	LED	95	EP2.03	13222951.8933	2597010.1186	(1)
S4	A2 →	[redacted]	RE1	2	1	2	1	100 W	LED	95	EP2.03	13222785.4309	2596912.5744	(2)
S5	[redacted]	← A2	RE1	2	1	2	1	100 W	LED	95	EP2.03	13221970.6610	2597493.3482	(2)
S6	A1 →	[redacted]	RE1	2	1	2	1	100 W	LED	95	EP2.05	13221957.2738	2597935.2165	(2)
S7-A	A1	A1 ← 13-31	RE1	4	1	2	1	100 W	LED	95	EP2.05	13221993.7184	2597951.6316	(1)
S7-B	[redacted]	↖ 18-36 ↘	RE1	3	1	2	1	100 W	LED	95	EP2.05	13221993.7184	2597951.6316	(1)

1

2

1

GENERAL NOTES - SIGNAGE

1. REFER TO SIGN DETAILS ON EP5.2 AND E2.2. ALL SIGN BASE CANS ARE LOCATED ON INBOARD SIDE OF THE SIGN (SIDE NEAREST TO EDGE MARKING) UNLESS OTHERWISE NOTED.
2. NORTHINGS & EASTINGS REFER TO THE SIDE OF THE SIGN NEAREST TO EDGE OF PAVEMENT.

KEYED NOTES - SIGNAGE

(1) FURNISH AND INSTALL NEW SIGN ON NEW FOUNDATION FOLLOWING PLANS, DETAILS, AND SPECIFICATIONS. COORDINATE FIELD TAG ID WITH OPERATIONS.

(2) FUNISH AND INSTALL NEW SIGN ON EXISTING PAVEMENT FOLLOWING PLANS, DETAILS, AND SPECIFICATIONS. COORDINATE FIELD TAG ID WITH OPERATIONS.

FILE PATH: C:\pw_working\bodmer.pw-01\d0194174
FILE NAME: 23062 PSX EP6.1.dwg
PLOT DATE: 5/13/2025 3:48:55 PM, Fred Rocha

Ferguson Consulting
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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

PALACIOS MUNICIPAL AIRPORT (PSX)
3 R. B. TRULL BLVD, PALACIOS, TX 77465

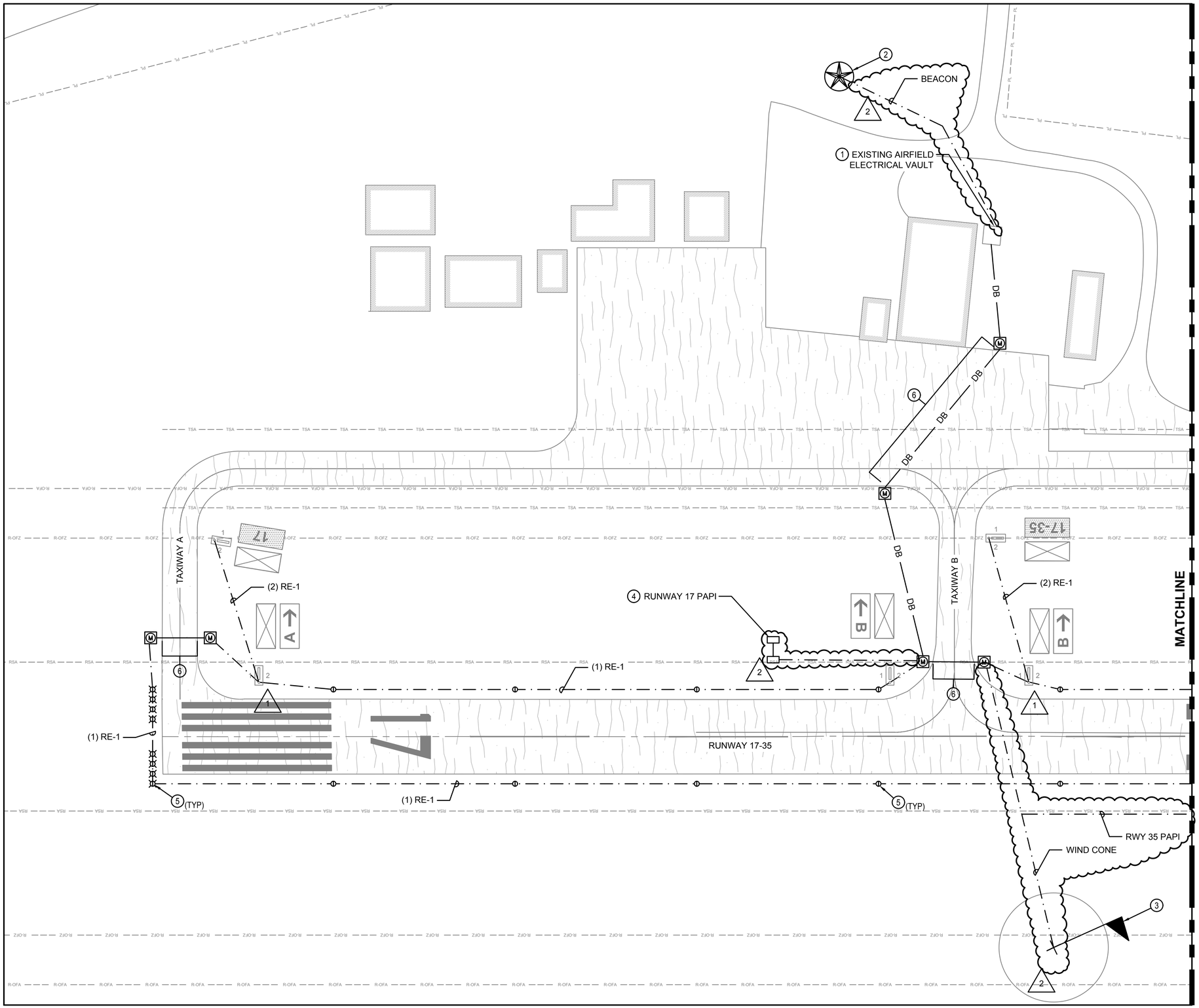
NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/25
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING SCHEDULES

EP6.2



GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO ES2 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (ES1 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
4. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104.
5. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.
6. DIRECT BURIED CABLES NOTED MARKED FOR DEMOLITION ARE TO BE ABANDONED IN PLACE. ONLY REMOVE ABANDONED CIRCUITS WHERE EXPOSED BY PROPOSED TRENCHING OPERATIONS. REMOVAL IN THIS INSTANCE WILL BE INCIDENTAL TO THE LINE ITEM ASSOCIATED WITH THE TRENCHING OPERATIONS.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING VAULT TO BE MODIFIED. REFER TO ES4 SERIES FOR DETAILS.
2. DEMOLISH EXISTING BEACON AND POLE ALONG WITH ALL ASSOCIATED EQUIPMENT INCLUDING FOUNDATION. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
3. EXISTING WIND CONE AND ALL ASSOCIATED EQUIPMENT INCLUDING FOUNDATION TO BE DEMOLISHED, SEGMENTED CIRCLE TO REMAIN. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
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5. REMOVE EXISTING STAKE MOUNTED EDGE LIGHT, ISOLATION TRANSFORMER, AND ASSOCIATED BROOKS BOX.
6. EXISTING UNDERGROUND DUCT BANK OR CONDUIT BENEATH PAVEMENT TO BE ABANDONED IN PLACE.

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The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

SMITHVILLE CRAWFORD MUNI (84R)

765 N W LOOP 230 SMITHVILLE, TEXAS

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

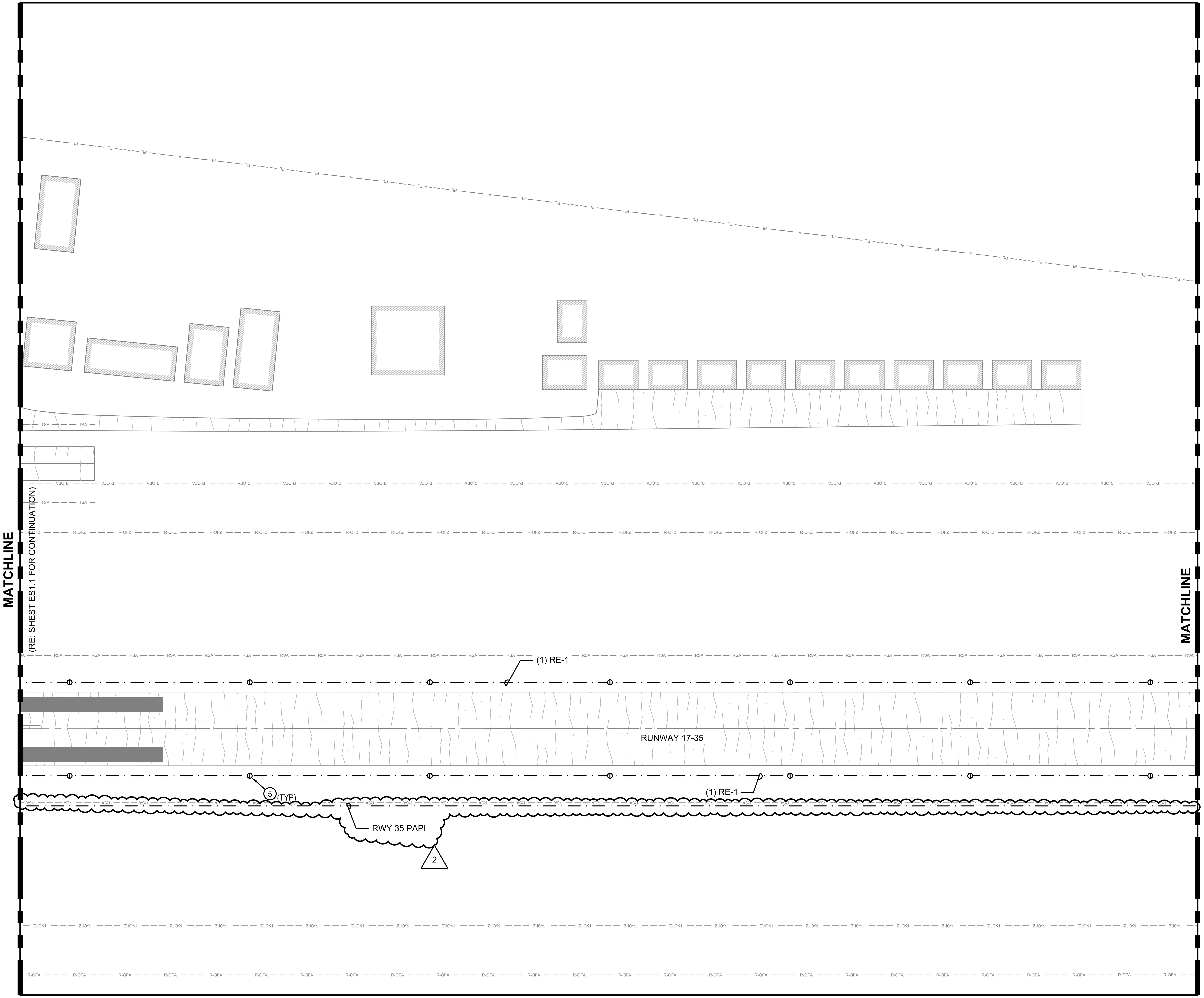
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING DEMOLITON PLAN

ES1.1

FILE PATH: C:\pw_working\bcotner.pw-01\d0184189
FILE NAME: 20618 84R ES1.1.dwg
PLOT DATE: 5/13/2025 12:47:46 PM, Austin Cole



GENERAL NOTES

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2. REFER TO ES2 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
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4. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104.
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6. DIRECT BURIED CABLES NOTED MARKED FOR DEMOLITION ARE TO BE ABANDONED IN PLACE. ONLY REMOVE ABANDONED CIRCUITS WHERE EXPOSED BY PROPOSED TRENCHING OPERATIONS. REMOVAL IN THIS INSTANCE WILL BE INCIDENTAL TO THE LINE ITEM ASSOCIATED WITH THE TRENCHING OPERATIONS.

KEYED NOTES

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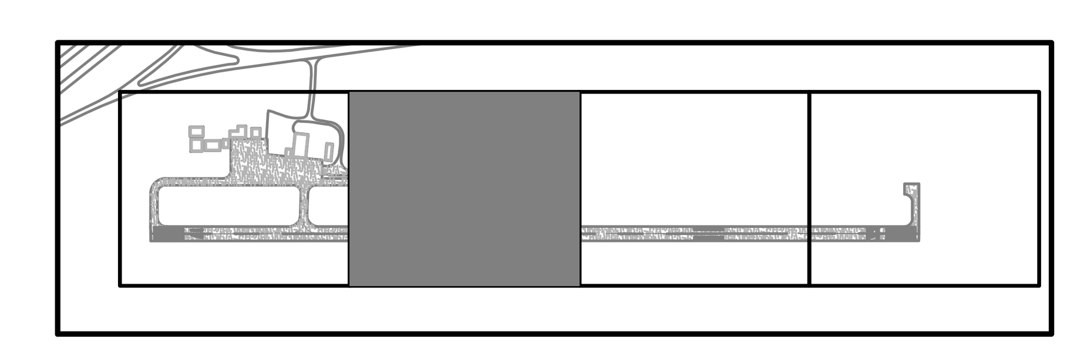

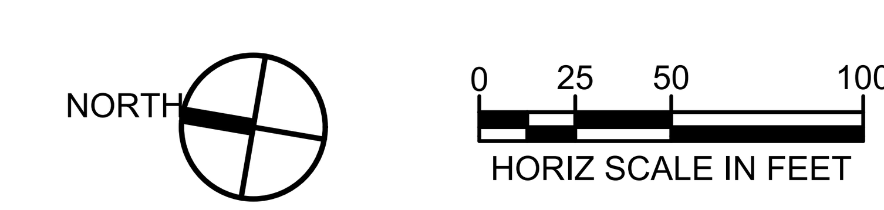

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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765 N W LOOP 230 SMITHVILLE, TEXAS

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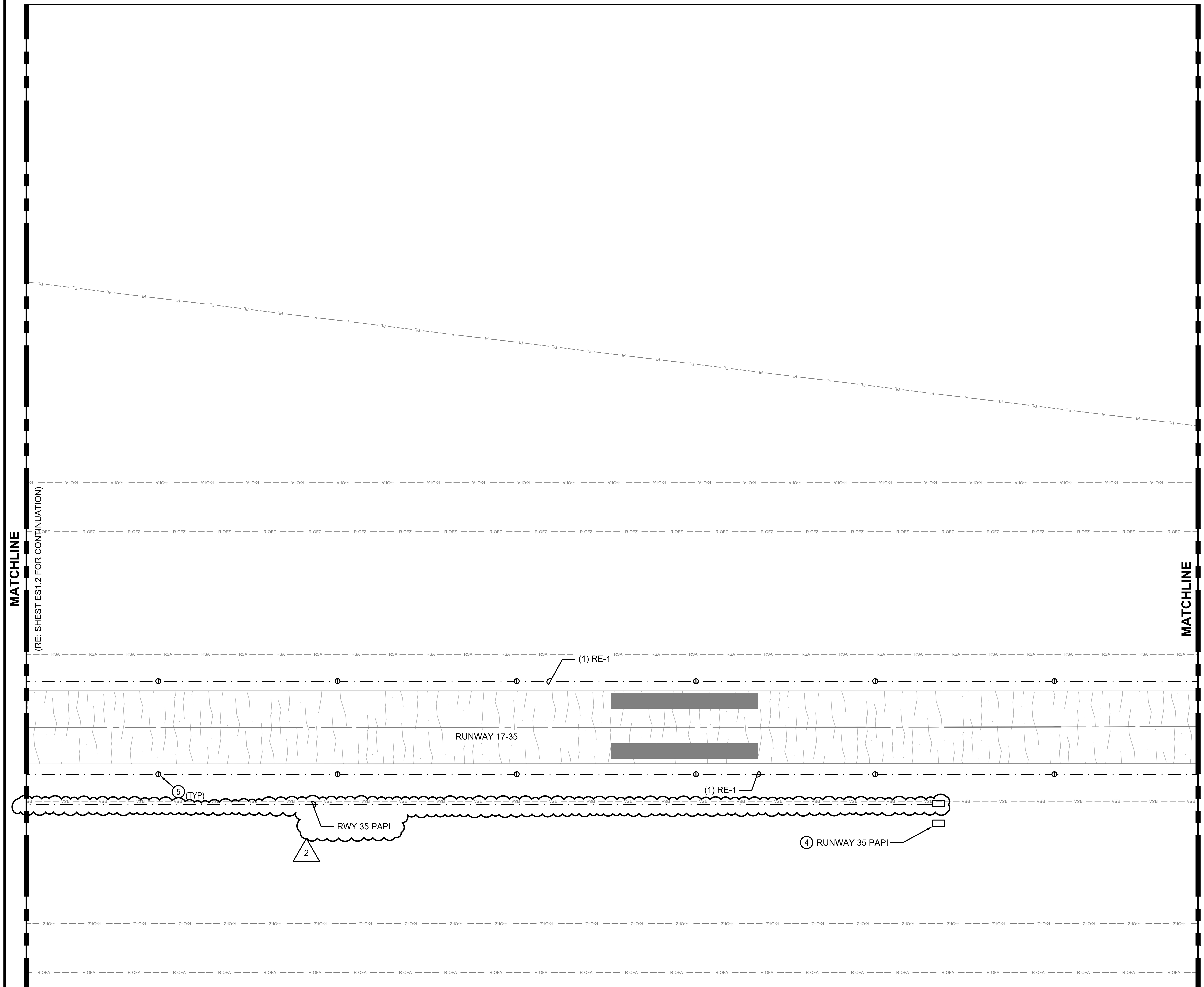
STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864

PROJECT NO.: 23062
DATE OF ISSUE: 03/07/2025
REVIEWED BY: RCF
DRAWN BY: ALC
DESIGNED BY: RCF

AIRFIELD LIGHTING DEMOLITON PLAN

ES1.2



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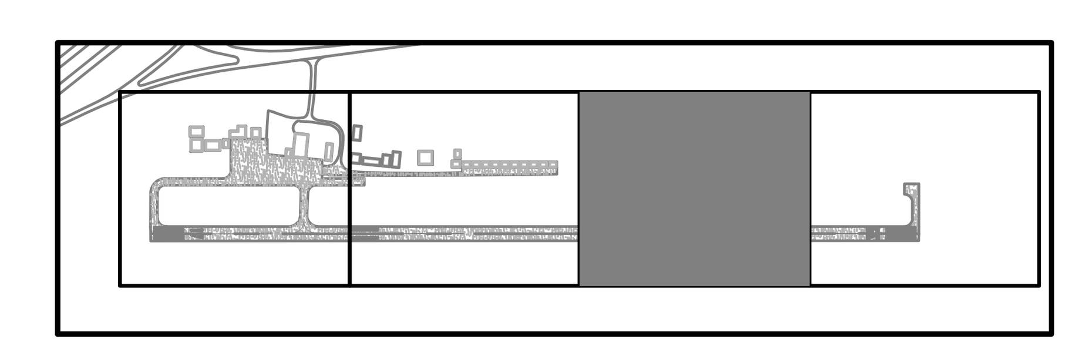

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765 N W LOOP 230 SMITHVILLE, TEXAS

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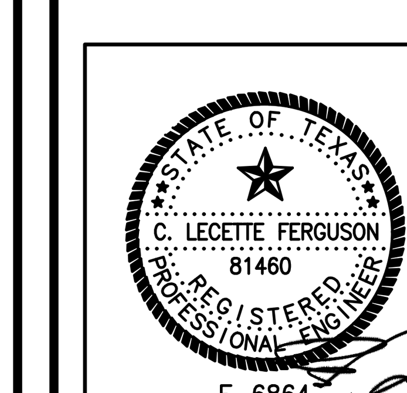

PROJECT NO. : 23062
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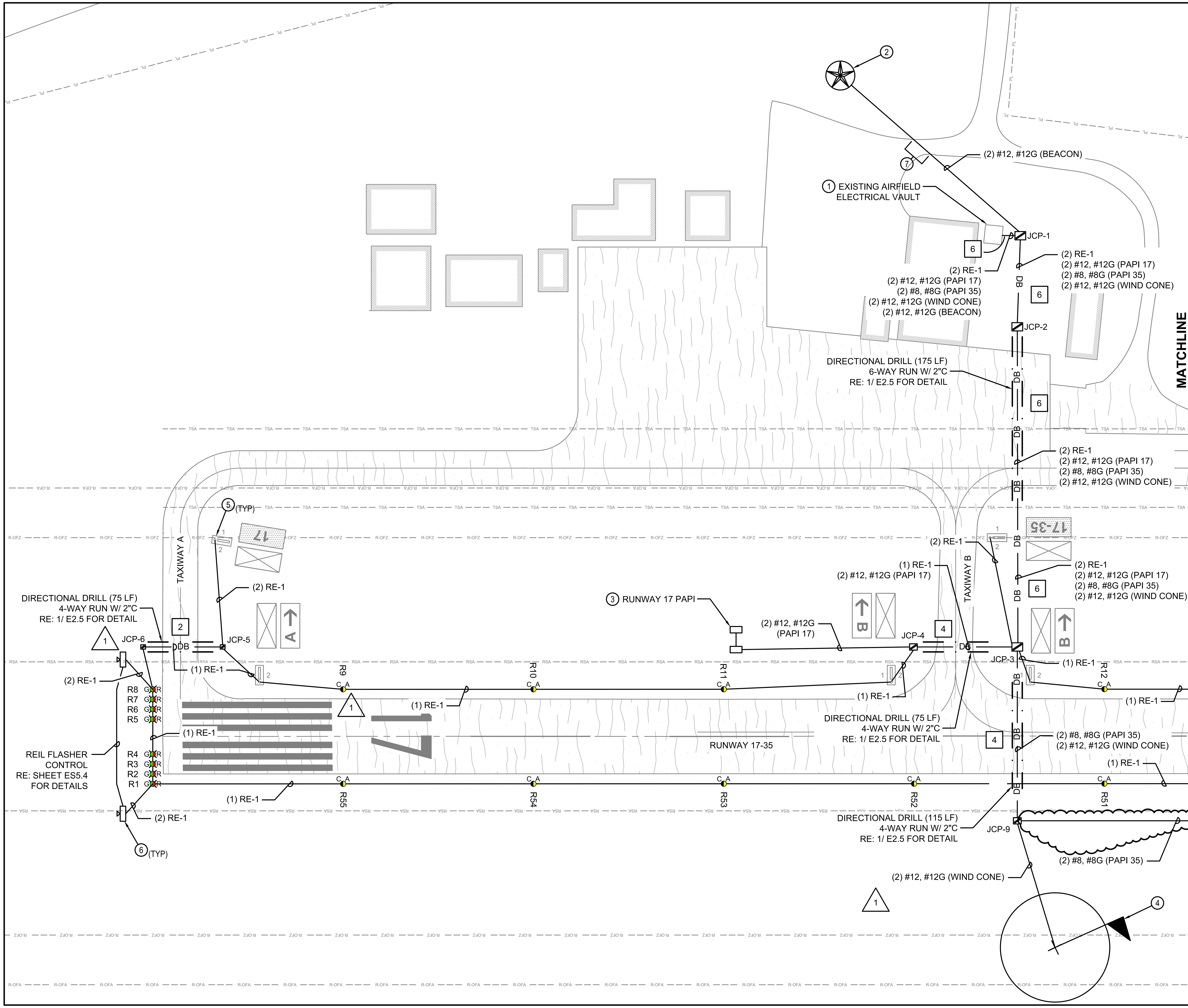
AIRFIELD LIGHTING DEMOLITON PLAN

ES1.3

FILE PATH: C:\pw_working\lochner-pw-01\d0184189
FILE NAME: 26614 84R ES1.1.dwg
PLOT DATE: 5/13/2025 12:47:48 PM, Austin Cote



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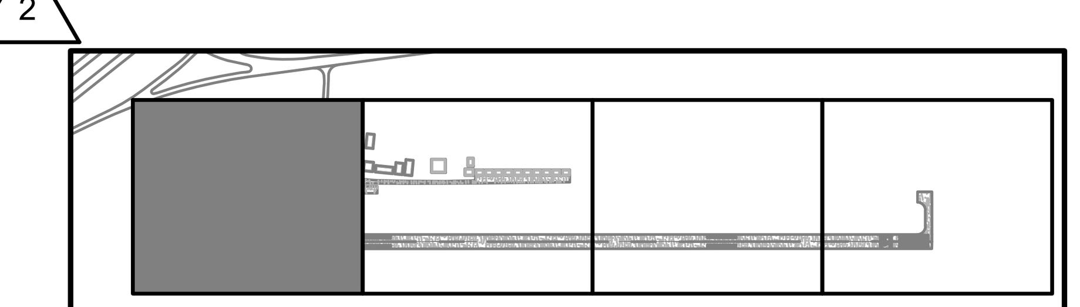

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STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
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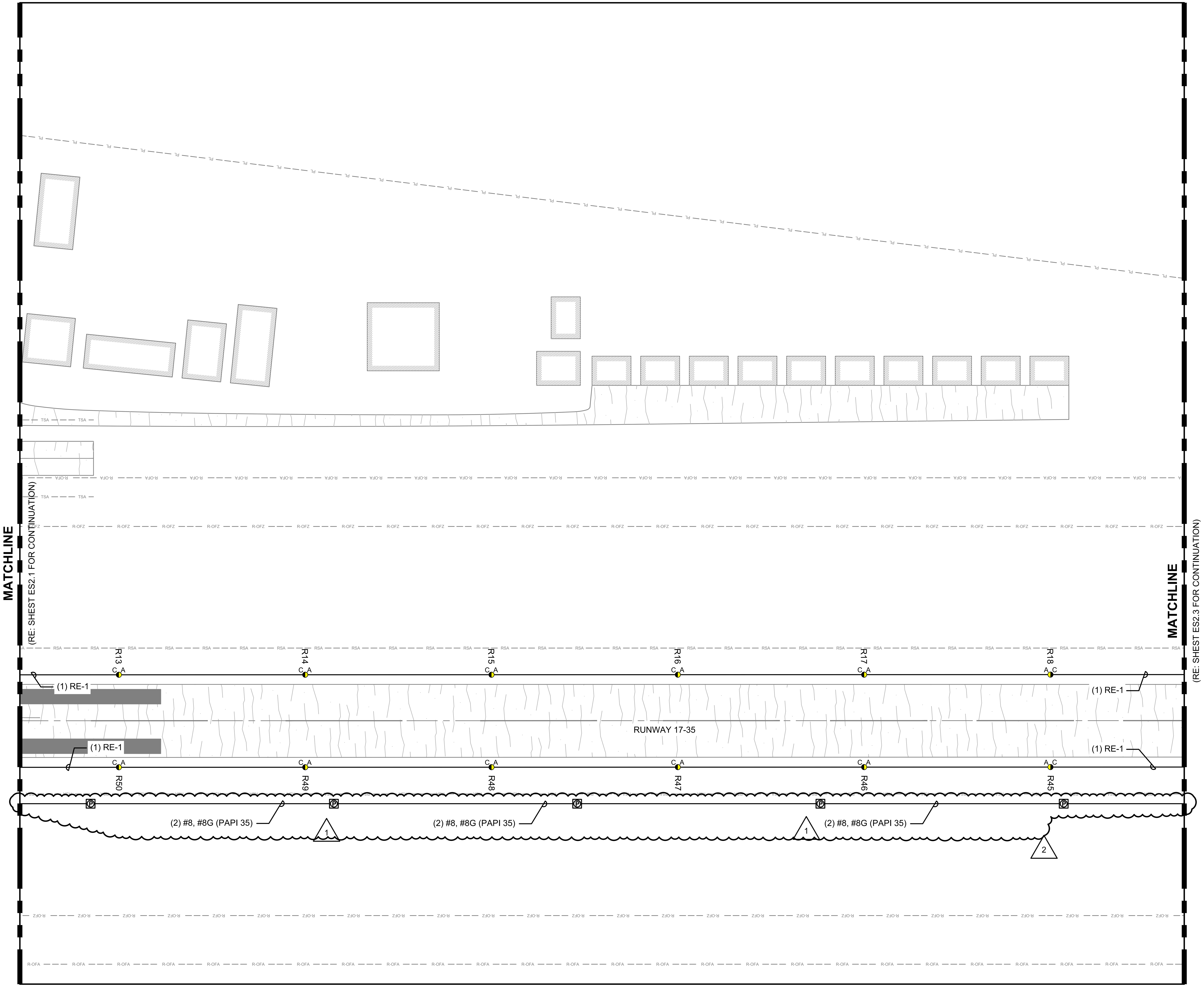
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING LAYOUT PLAN

ES2.1



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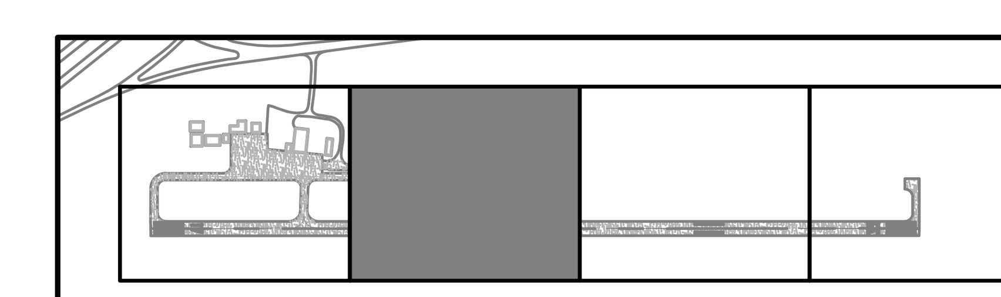

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

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AIRFIELD LIGHTING LAYOUT PLAN

ES2.2

FILE PATH:
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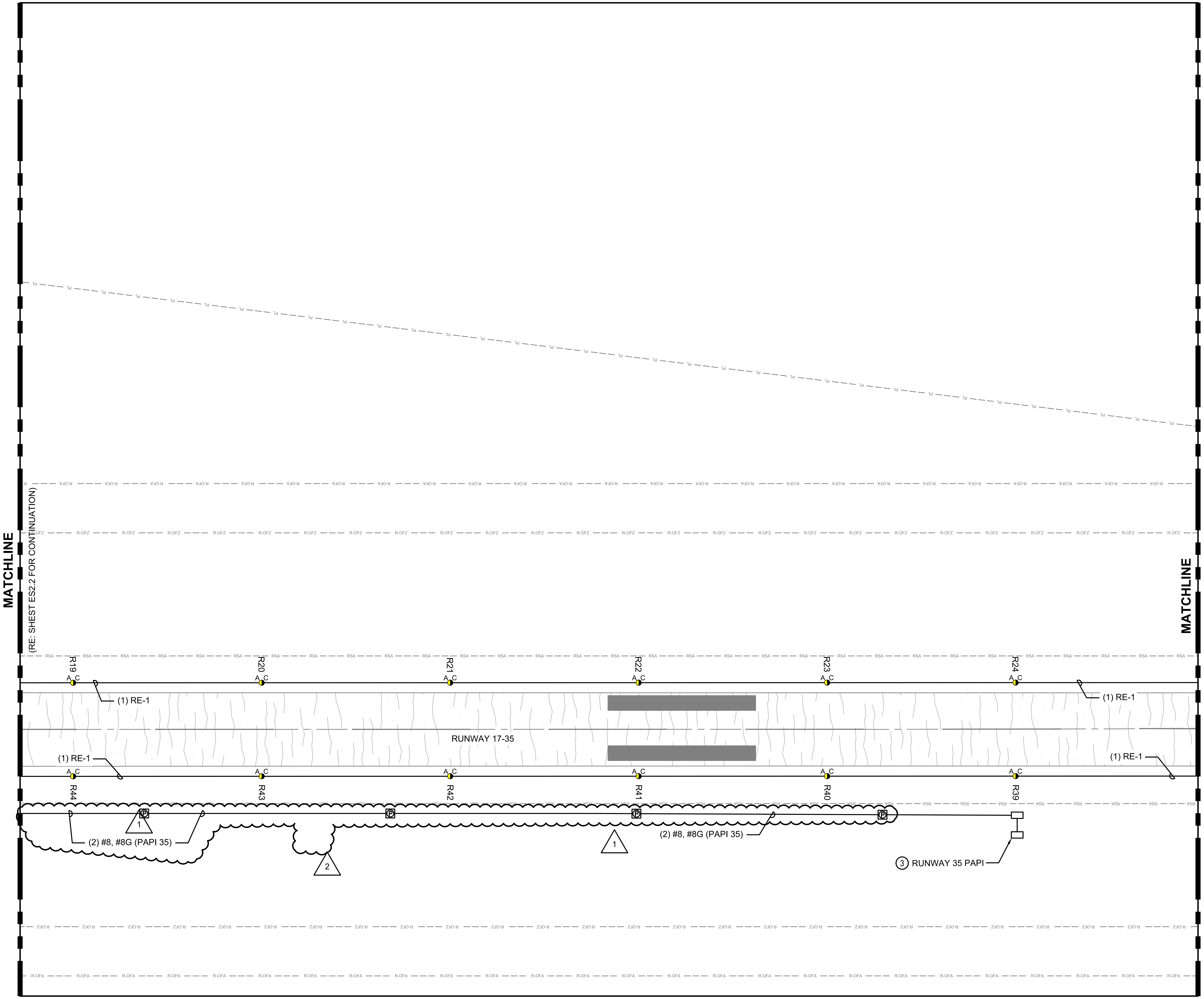
PLOT DATE: 5/13/2025 12:47:59 PM, Austin Cote



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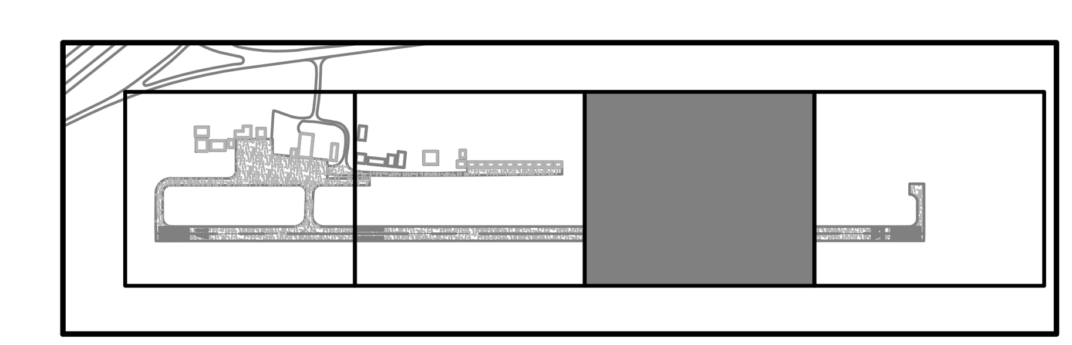

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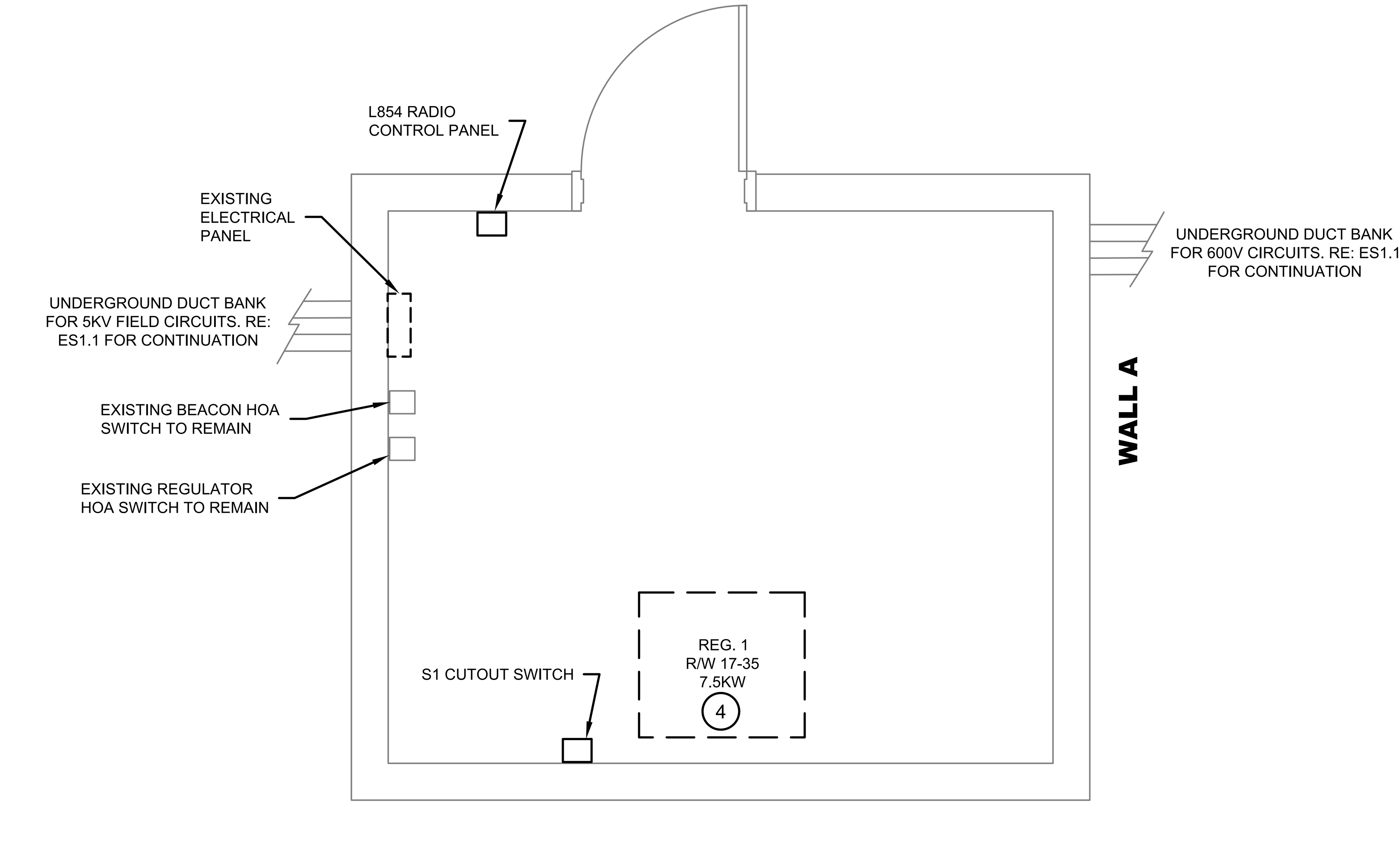
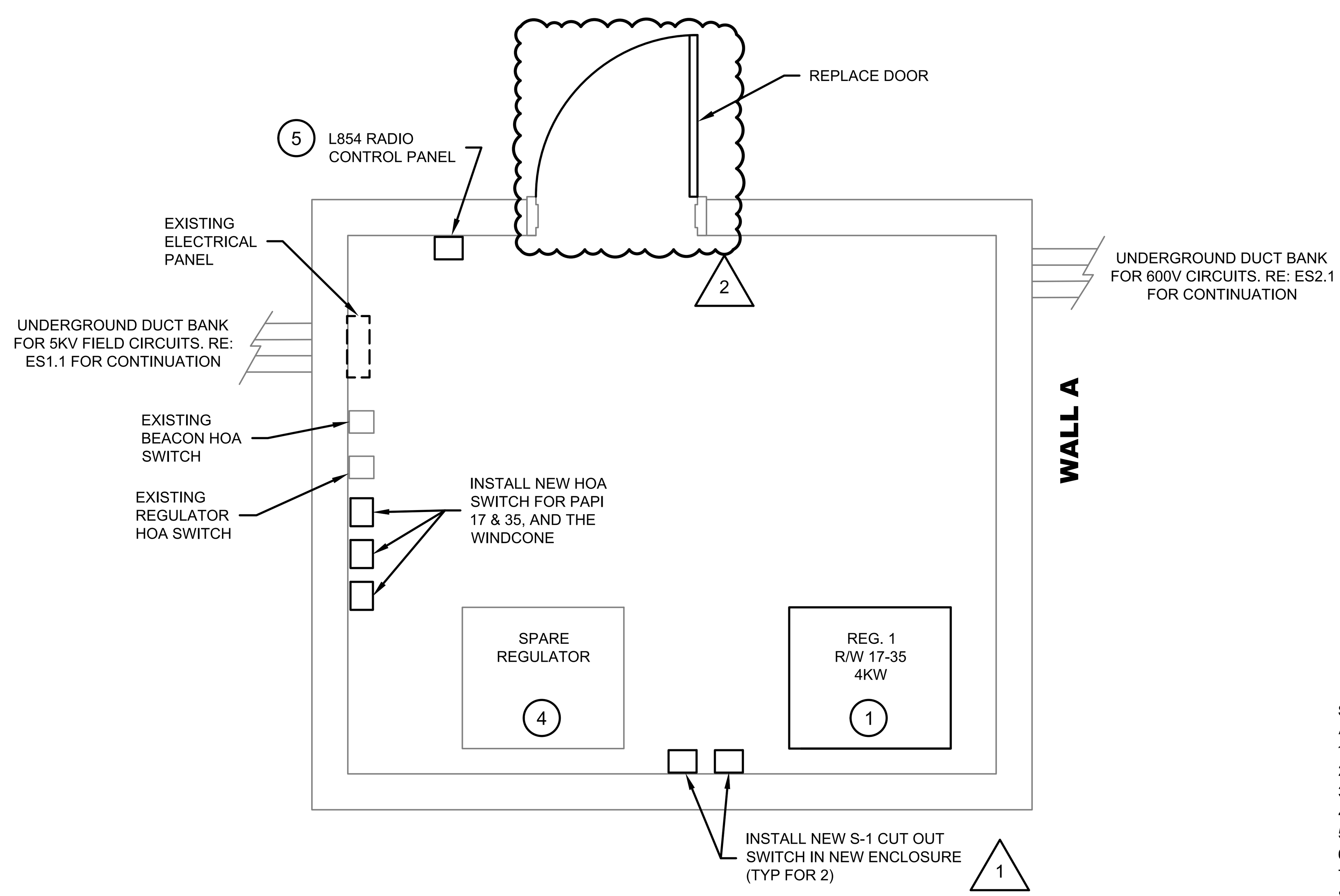
AIRFIELD LIGHTING LAYOUT PLAN

ES2.3



1 ES4.1 **VAULT EQUIPMENT DEMOLITION PLAN**

SCALE: 1/2" = 1'-0"



2 ES4.1 **VAULT EQUIPMENT PROPOSED PLAN**

SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT. ALL CONNECTIONS TO REGULATOR TO USE LIQUID-TIGHT NON-METALLIC CONDUIT. ALL CONDUIT TO BE 1" UON.
2. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE TO BE REMOVED, NEW OR MODIFIED AS NOTED. ALL ITEMS IN SHADED ARE EXISTING TO REMAIN. (1)
3. CONTRACTOR TO CLEAN INTERIOR OF EXISTING VAULT AS PART OF THIS WORK. THIS INCLUDES SWEEPING AND MOPPING FLOORS, WIPING DOWN ALL WALLS AND REMOVING EXCESS OR UNUSED EQUIPMENT PER THE RPRS DIRECTION.

KEYED NOTES

1. INSTALL NEW 4 KW, 240V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.
2. REPLACE BREAKERS NOTED WITH DARK TEXT ON EXISTING PANEL BOARD. NEW BREAKERS TO MATCH EXISTING PANEL BOARD AIC RATING.
3. REILS TO BE INSTALLED AT EACH RUNWAY APPROACH ONLY IN THE EVENT ADD ALTERNATE 1 IS APPROVED. (1)
4. SHIFT TO NEW LOCATION AS SHOWN. REVISE POWER AS REQUIRED. REPLACE EXISTING S1 CUT-OUT AT NEW LOCATION AS SHOWN. PROVIDE 5KV CABLE CONNECTION IN LIQUID-TIGHT CONDUIT FROM NEW S1 CUT-OUT TO NEW REGULATOR LOCATION. RECONNECT EXISTING HOA AND OTHER CONTROLS TO RELOCATED REGULATOR
5. REPLACE EXISTING L854 RADIO CONTROL PANEL. CONTRACTOR TO VERIFY RADIO CONTROL FREQUENCY WITH AIRPORT MANAGEMENT.

PROPOSED REGULATOR 1 (RW 17-35) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 1 'RWY 17-35' (4KW)	
LED RW LIGHTING (39 RWY EDGE LTG @ 21.5W/EA)	0.84
LED RW THSLD LIGHTING (16 RWY THSLD LTG @ 17.9W/EA)	0.29
SIGNS (LED)	0.43
CABLE LOSS (19100' @ 3W/100LF)	0.57
(3) REIL (RUNWAY 15 & 35 @ 322W/SYSTEM)	.64
SUB-TOTAL LOAD	2.78
4KVA REGULATOR EXCEEDS NEC REQUIREMENTS	

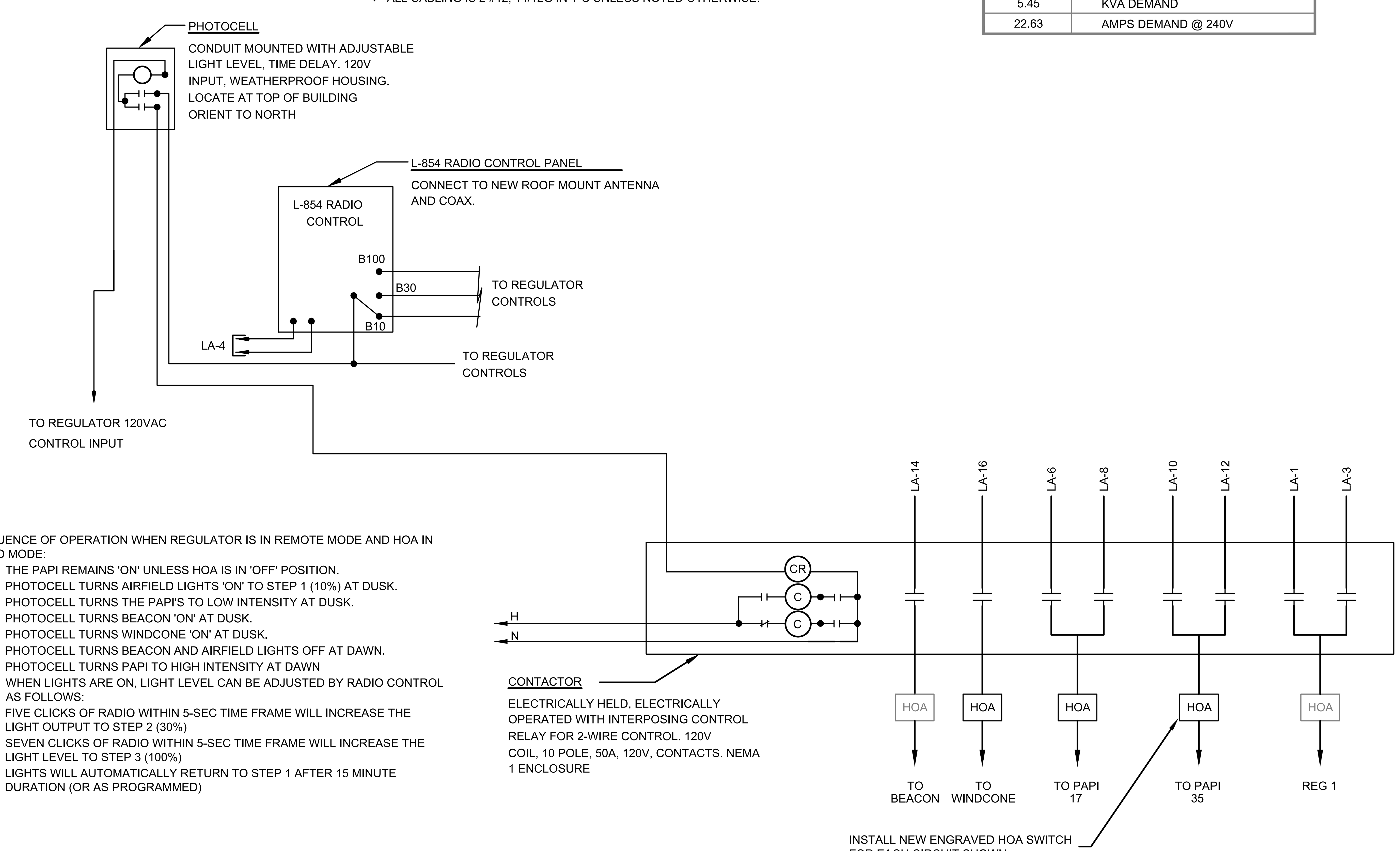
PANEL: LA

VOLTAGE: 120/240V, 1 * 3 W; AIC: ; REMARKS: (2)
MAINS: 150 AMPS ☐ MLO ☒ MCB; ☒ SURFACE ☐ FLUSH
LUGS: ☐ SUB - FEED ☐ FEED - THRU; ☒ NEMA 1 ☐ NEMA 3R

C"	WIRE*	LOAD DESCRIPTION	KVA	BKR.	CKT	CKT	BKR.	KVA	LOAD DESCRIPTION	WIRE*	C"
1" C	2 #8	REG. 2 SPARE REGULATOR (4KW)	-	50	1	2	15	0.21	LIGHTING AND RECEPTICLES		
—	1#10G		-		3	4	15	.02	L-854 PILOT RADIO CONTROLLER		2" C
1" C	2 #10	REG. 1 RWY 17-35 (4KW)	1.39	30	5	6	20/2	0.13	RUNWAY 17 PAPI	2 #12	2" C
—	1#10G		1.39		7	8		0.13		#12G	—
		SPARE		20	9	10	20/2	0.13	RUNWAY 35 PAPI	2 # 8	2" C
		SPARE		20	11	12		0.13		1 # 8G	—
		EMPTY			13	14	20/1	0.14	BEACON POWER		2" C
					15	16	15	0.06	WIND CONE		2" C
					17	18			EMPTY		
					19	20					

5.08	KVA CONNECTED LOAD
5.45	KVA DEMAND
22.63	AMPS DEMAND @ 240V

* ALL CABLING IS 2 #12, 1 #12G IN 1"C UNLESS NOTED OTHERWISE.



SEQUENCE OF OPERATION WHEN REGULATOR IS IN REMOTE MODE AND HOA IN AUTO MODE:

1. THE PAPI REMAINS 'ON' UNLESS HOA IS IN 'OFF' POSITION.
2. PHOTOCELL TURNS AIRFIELD LIGHTS 'ON' TO STEP 1 (10%) AT DUSK.
3. PHOTOCELL TURNS THE PAPI'S TO LOW INTENSITY AT DUSK.
4. PHOTOCELL TURNS BEACON 'ON' AT DUSK.
5. PHOTOCELL TURNS WINDCONE 'ON' AT DUSK.
6. PHOTOCELL TURNS BEACON AND AIRFIELD LIGHTS OFF AT DAWN.
7. PHOTOCELL TURNS PAPI TO HIGH INTENSITY AT DAWN
8. WHEN LIGHTS ARE ON, LIGHT LEVEL CAN BE ADJUSTED BY RADIO CONTROL AS FOLLOWS:
   FIVE CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT OUTPUT TO STEP 2 (30%)
   SEVEN CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT LEVEL TO STEP 3 (100%)
   LIGHTS WILL AUTOMATICALLY RETURN TO STEP 1 AFTER 15 MINUTE DURATION (OR AS PROGRAMMED)

Ferguson Consulting
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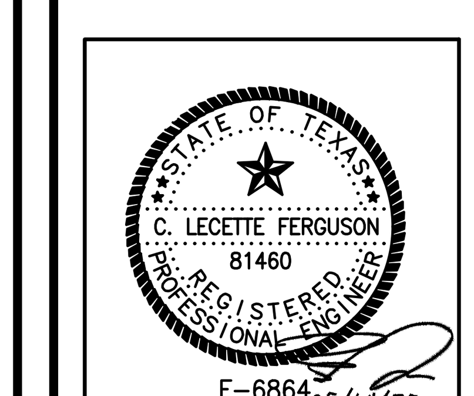
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

SMITHVILLE CRAWFORD MUNI (84R)
765 N W LOOP 230 SMITHVILLE, TEXAS

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3



PROJECT NO.: 23062
DATE OF ISSUE: 03/07/2025
REVIEWED BY: RCF
DRAWN BY: ALC
DESIGNED BY: RCF

ELECTRICAL VAULT PLAN

ES4.1

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FILE NAME: 26016 84R ES4.1.dwg
PLOT DATE: 5/13/2025 2:35:48 PM, Cole Ferguson

SMITHVILLE CRAWFORD MUNICIPLE - EDGE LIGHT FIXTURES (RE1)

FIXTURE NUMBER	FAA TYPE	FAA BASE	LIGHT ORIENTATION	COLOR	NORTHING	EASTING	REGULATOR ID	CIRCUIT NAME	KEYNOTES
R1	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990229.7192	3298110.4040	RE1	RE1	1
R2	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990231.4068	3298120.2605	RE1	RE1	1
R3	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990233.0944	3298130.1171	RE1	RE1	1
R4	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990234.7820	3298139.9737	RE1	RE1	1
R5	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990240.7110	3298174.6030	RE1	RE1	1
R6	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990242.3986	3298184.4596	RE1	RE1	1
R7	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990244.0862	3298194.3162	RE1	RE1	1
R8	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9990245.7738	3298204.1727	RE1	RE1	1
R9	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9990057.0524	3298236.5204	RE1	RE1	1
R10	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989868.3309	3298268.8681	RE1	RE1	1
R11	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989679.6095	3298301.2157	RE1	RE1	1
R12	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989302.1666	3298365.9110	RE1	RE1	1
R13	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989113.4451	3298398.2587	RE1	RE1	1
R14	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988924.7237	3298430.6063	RE1	RE1	1
R15	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988736.0022	3298462.9540	RE1	RE1	1
R16	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988547.2808	3298495.3016	RE1	RE1	1
R17	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988358.5594	3298527.6493	RE1	RE1	1
R18	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9988169.8379	3298559.9970	RE1	RE1	1
R19	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987981.1165	3298592.3446	RE1	RE1	1
R20	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987792.3950	3298624.6923	RE1	RE1	1
R21	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987603.6736	3298657.0399	RE1	RE1	1
R22	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987414.9521	3298689.3876	RE1	RE1	1
R23	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987226.2307	3298721.7352	RE1	RE1	1
R24	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987037.5092	3298754.0829	RE1	RE1	1
R25	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9986848.7878	3298786.4306	RE1	RE1	1
R26	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9986660.0663	3298818.7782	RE1	RE1	1
R27	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9986471.3449	3298851.1259	RE1	RE1	1
R28	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986282.6234	3298883.4735	RE1	RE1	1
R29	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986280.9359	3298873.6169	RE1	RE1	1
R30	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986279.2483	3298863.7604	RE1	RE1	1
R31	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986277.5607	3298853.9038	RE1	RE1	1
R32	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986271.6665	3298819.4780	RE1	RE1	1
R33	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986269.9789	3298809.6214	RE1	RE1	1
R34	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986268.2913	3298799.7648	RE1	RE1	1
R35	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	9986266.6037	3298789.9083	RE1	RE1	1
R36	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9986455.3235	3298757.5509	RE1	RE1	1
R37	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9986644.0433	3298725.1936	RE1	RE1	1
R38	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9986832.7631	3298692.8362	RE1	RE1	1
R39	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987021.4829	3298660.4789	RE1	RE1	1
R40	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987210.2027	3298628.1215	RE1	RE1	1
R41	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987398.9224	3298595.7642	RE1	RE1	1
R42	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987587.6422	3298563.4068	RE1	RE1	1
R43	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987776.3620	3298531.0495	RE1	RE1	1
R44	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9987965.0818	3298498.6921	RE1	RE1	1
R45	L-861(L)	L-867	BIDIRECTIONAL	CLEAR-AMBER	9988153.8016	3298466.3348	RE1	RE1	1
R46	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988342.5214	3298433.9774	RE1	RE1	1
R47	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988531.2412	3298401.6201	RE1	RE1	1
R48	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988719.9610	3298369.2627	RE1	RE1	1
R49	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9988908.6807	3298336.9054	RE1	RE1	1
R50	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989097.4005	3298304.5481	RE1	RE1	1
R51	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989286.1203	3298272.1907	RE1	RE1	1
R52	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989474.8401	3298239.8334	RE1	RE1	1
R53	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989663.5599	3298207.4760	RE1	RE1	1
R54	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9989852.2797	3298175.1187	RE1	RE1	1
R55	L-861(L)	L-867	BIDIRECTIONAL	AMBER-CLEAR	9990040.9995	3298142.7613	RE1	RE1	1

JCP SCHEDULE

JCP TAG	SHEET NUMBER	NORTHING	EASTING	DUCTS	JCP DETAIL REFERENCE (DETAIL # / SHEET #)	NOTES
JCP-1	ES2.1	9989462.5047	3298801.5646	6	2/E2.4	
JCP-2	ES2.1	9989450.0297	3298710.6978	6	2/E2.4	
JCP-3	ES2.1	9989395.6444	3298393.0531	6	2/E2.4	
JCP-4	ES2.1	9989498.6477	3298375.4180	4	1/E2.4	
JCP-5	ES2.1	9990183.6804	3298258.1351	2	9/E2.3	
JCP-6	ES2.1	9990262.5330	3298244.6349	2	9/E2.3	
JCP-7	ES2.4	9986359.1948	3298912.9167	2	9/E2.3	
JCP-8	ES2.4	9986280.3481	3298926.4159	2	9/E2.3	
JCP-9	ES2.1	9989366.1116	3298220.5630	4	1/E2.4	

2 1

LIGHT FIXTURE ELECTRICAL INFORMATION:

FIXTURE TYPE	FAA TYPE	LAMP WATTAGE	ISOLATION TRANSFORMER
RUNWAY ELEVATED LED EDGE LIGHT	L-861(L)	12VA	L-830-16 (10/15W)
RUNWAY ELEVATED LED THRESHOLD END LIGHT	L-861E(L)	12VA	L-830-16 (10/15W)

GENERAL NOTES - LIGHTING

1. REFER TO ES2 SERIES FOR PROPOSED LIGHTING PLANS, THE ES3 SERIES FOR DIMENSIONS PLANS AND ES5 SERIES FOR DETAILS.

2. FIXTURES NORTHINGS AND EASTINGS HAVE BEEN PROVIDED FOR CONTRACTORS TO USE IN LOCATING NEW BASE CANS. HOWEVER THE CONTRACTOR MUST INSTALL ALL FIXTURES FOLLOWING THE DETAILS, WHERE NORTHINGS AND EASTINGS CONFLICT WITH DETAILS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR GUIDANCE. TYPICALLY, THE DETTAILS SUPERSEDE NORTHINGS AND EASTINGS INFORMATION. IF MARKINGS ARE MODIFIED, THE NORTHINGS AND EASTINGS MAY NO LONGER BE ACCURATE.

3. DISPLAY LIGHT FIXTURE SCHEDULE PROVIDED BY ENGINEER INSIDE OF AIRFIELD LIGHTING VAULT ONCE PROJECT IS COMPLETE.

KEYED NOTES - LIGHTING

(1) PROCURE AND INSTALL NEW ELEVATED FIXTURE (TYPE AS NOTED) ON NEW BASE CAN WITH NEW ISOLATION TRANSFORMER, CONNECTOR KIT, BOLTING HARDWARE, ETC FOR A COMPLETE ACCEPTED SYSTEM.

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

SMITHVILLE CRAWFORD MUNI (84R)
765 N W LOOP 230 SMITHVILLE, TEXAS

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD LIGHTING SCHEDULES

ES6.1

PLOT DATE: 5/13/2025 2:41:40 PM, Fred Rocha
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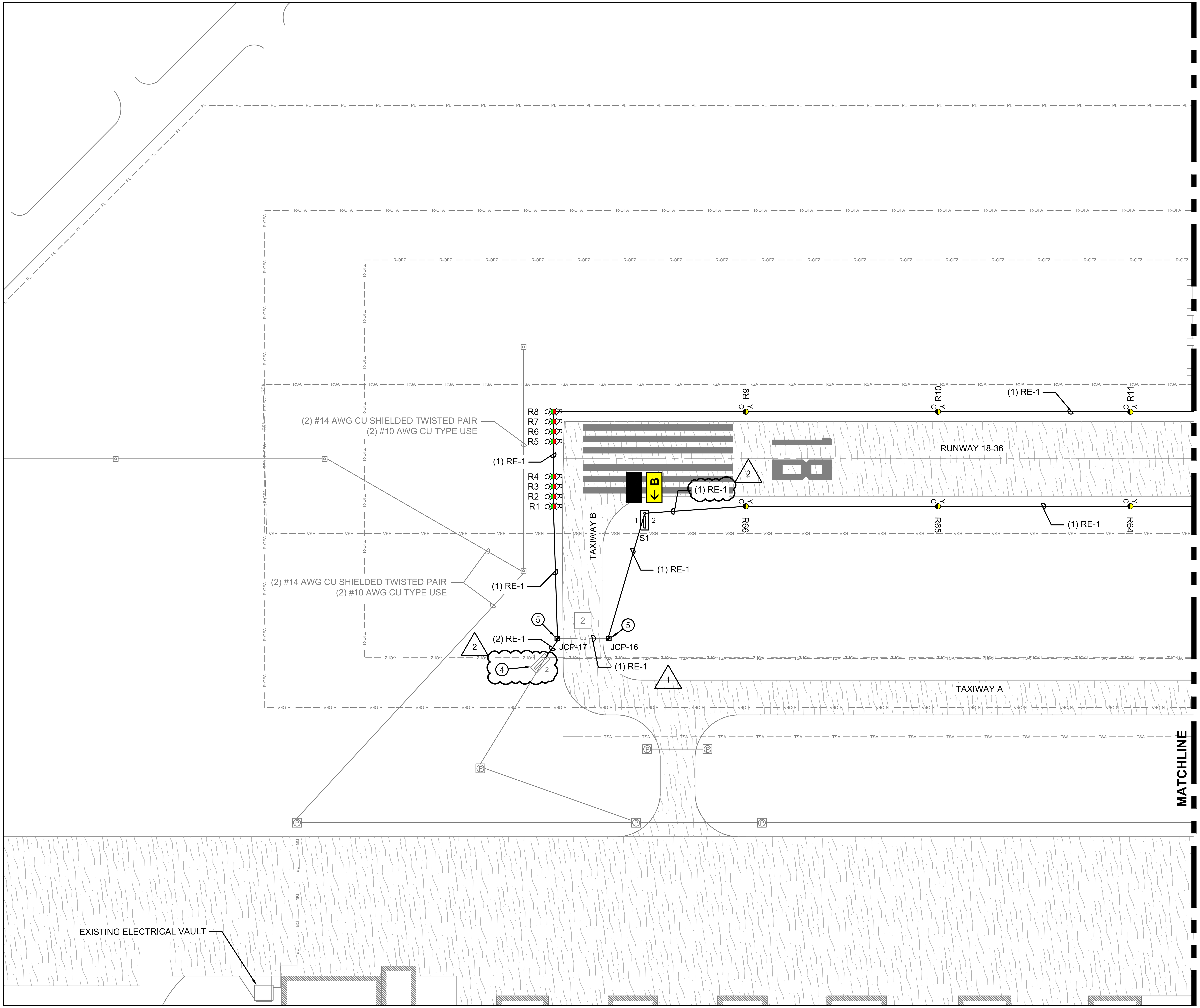
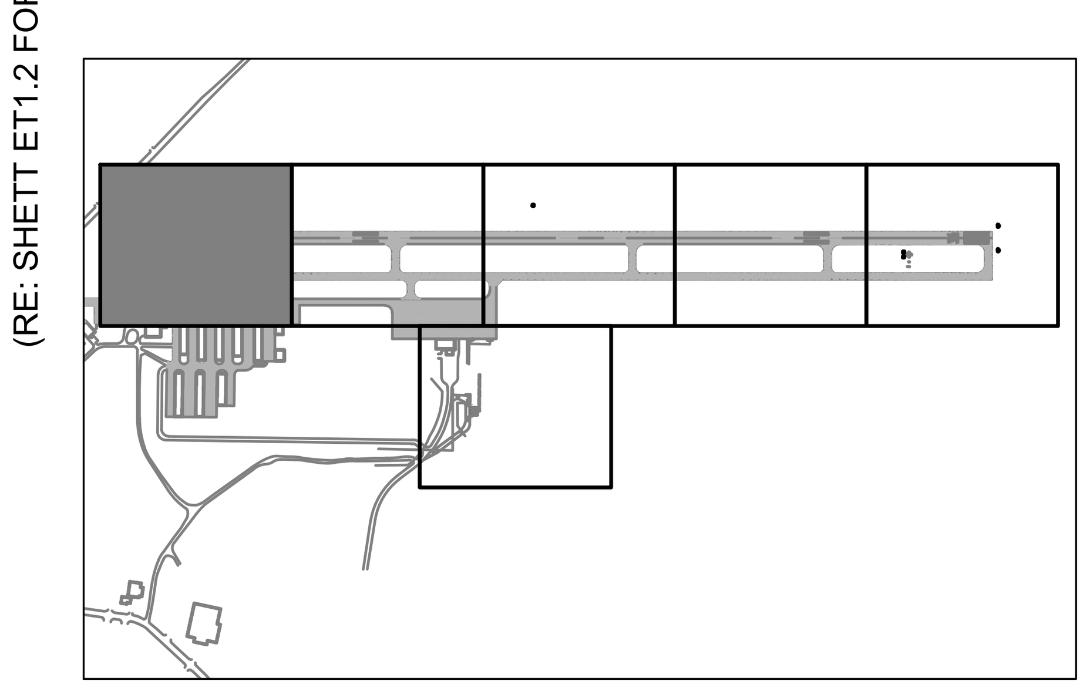


GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO ET1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO ET6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
5. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (ET2 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
6. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

1. INSTALL NEW L-880(L) PAPI. REFER TO ET5 SERIES FOR DETAILS.
2. INSTALL NEW WIND CONE AND TIP DOWN POLE. EXISTING SEGMENTED CIRCLE TO BE REPAINTED. REFER TO SHEET E2.6 FOR DETAILS.
3. INSTALL NEW AIRFIELD ELECTRICAL LIGHTING VAULT. REFER TO ET4 SERIES FOR ENLARGED PLAN AND DETAILS.
4. INSTALL NEW ISOLATION TRANSFORMER IN EXISTING SIGN.
5. INSTALL NEW 2-WAY JCP TO INTERCEPT EXISTING 2-WAY 2" DUCT CROSSING.
6. INSTALL NEW L-849E(L) REIL. REFER TO SHEET ET5.3 FOR DETAILS.



NORTH

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HORIZ SCALE IN FEET

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The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

TERRELL MUNICIPAL AIRPORT
400 BRITISH FLYING SCHOOL BLVD, TERRELL, TX 75160

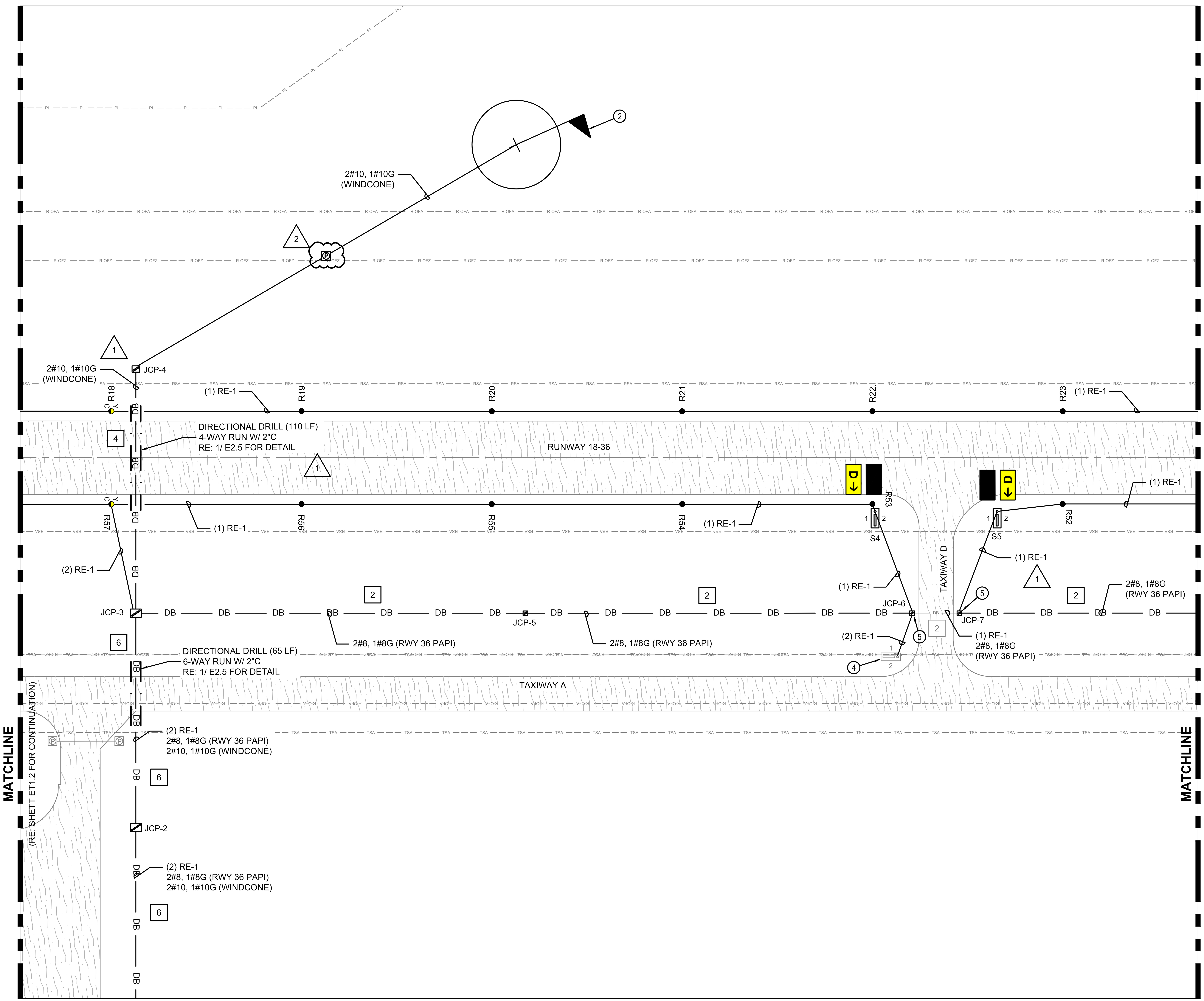
NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/2025
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

ET2.1

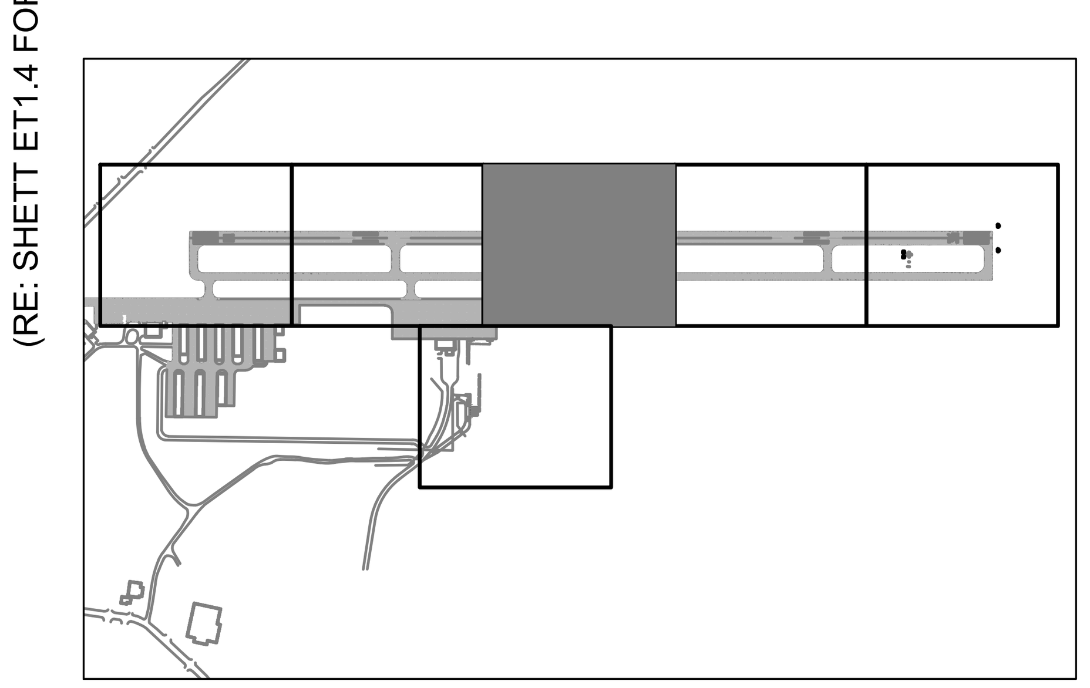


GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO ET1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO ET6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
5. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (ET2 SERIES). ALL LISTED KEYED NOTES FOR A PARTICULAR SHEET MAY NOT APPLY AND THEREFORE THE KEYED NOTE IDENTIFIER WILL NOT BE SHOWN ON THE PLAN PORTION OF THE SHEET.
6. EXISTING AIRFIELD CIRCUITS AND DUCT CROSSINGS HAVE BEEN TAKEN FROM AS-BUILT DOCUMENTATION. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ALL EXISTING CIRCUIT ROUTES PRIOR TO WORK.

KEYED NOTES

1. INSTALL NEW L-880(L) PAPI. REFER TO ET5 SERIES FOR DETAILS.
2. INSTALL NEW WIND CONE AND TIP DOWN POLE. EXISTING SEGMENTED CIRCLE TO BE REPAINTED. REFER TO SHEET E2.6 FOR DETAILS.
3. INSTALL NEW AIRFIELD ELECTRICAL LIGHTING VAULT. REFER TO ET4 SERIES FOR ENLARGED PLAN AND DETAILS.
4. INSTALL NEW ISOLATION TRANSFORMER IN EXISTING SIGN.
5. INSTALL NEW 2-WAY JCP TO INTERCEPT EXISTING 2-WAY 2" DUCT CROSSING.
6. INSTALL NEW L-849E(L) REIL. REFER TO SHEET ET5.3 FOR DETAILS.



NORTH

0 25 50 100
HORIZ SCALE IN FEET

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

TERRELL MUNICIPAL AIRPORT
400 BRITISH FLYING SCHOOL BLVD, TERRELL, TX 75160

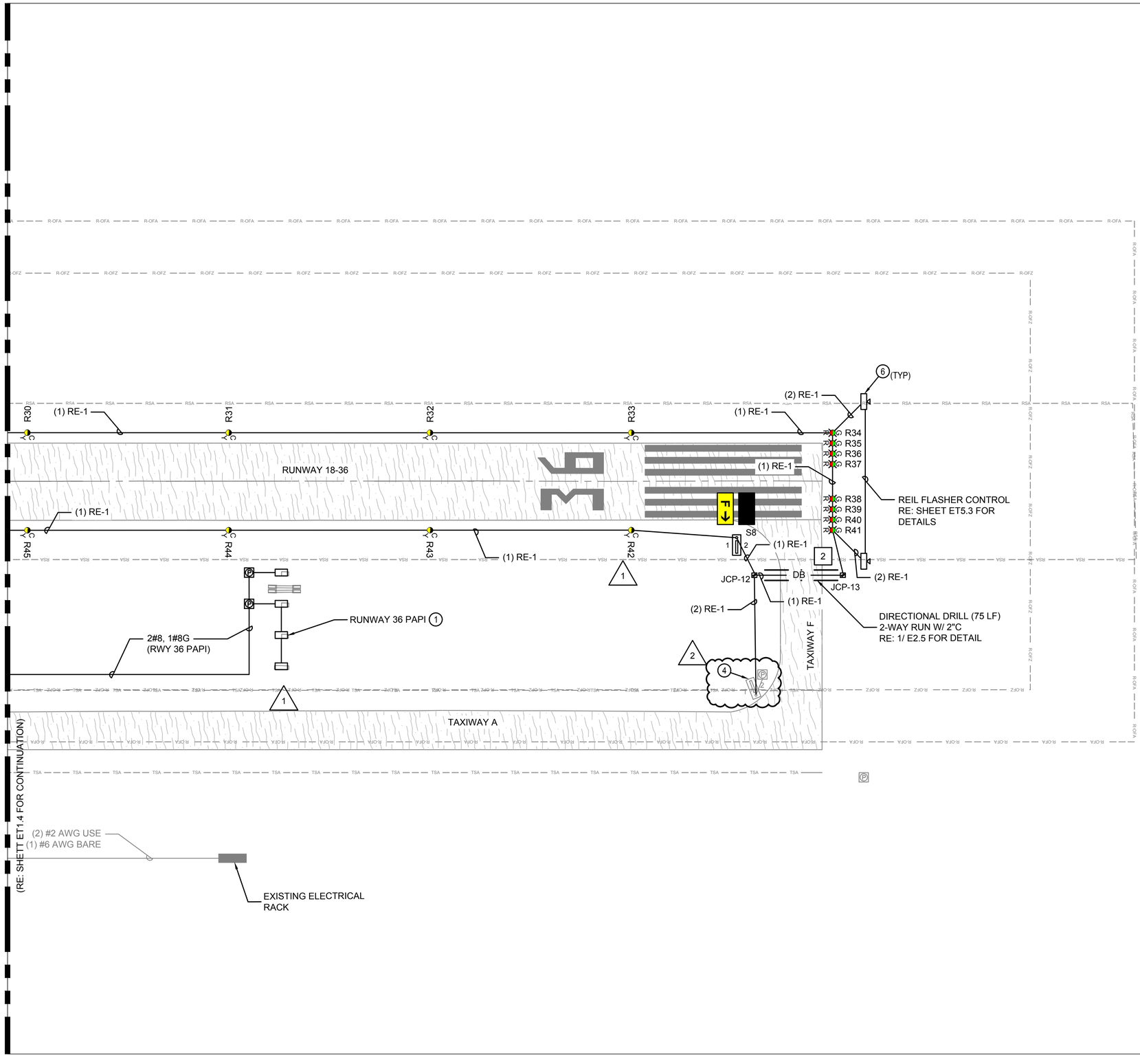
NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.:	23062
DATE OF ISSUE:	03/07/2025
REVIEWED BY:	RCF
DRAWN BY:	ALC
DESIGNED BY:	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

ET2.3



GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE NEW OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET E1.1 FOR ELECTRICAL SYMBOL LEGEND.
2. THE CONTRACTOR SHALL PROVIDE LOCK-OUT PROCEDURES PER NEC TO INSURE SAFETY OF PERSONNEL. REFER TO SECTION L-104
3. REFER TO ET1 SERIES FOR EXISTING AIRFIELD ELECTRICAL PLANS.
4. REFER TO ET6 SERIES FOR AIRFIELD LIGHTING AND SIGNAGE SCHEDULES.
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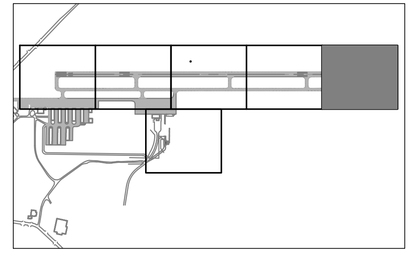
KEYED NOTES

1. INSTALL NEW L-880(L) PAPI. REFER TO ET5 SERIES FOR DETAILS.
2. INSTALL NEW WIND CONE AND TIP DOWN POLE. EXISTING SEGMENTED CIRCLE TO BE REPAINTED. REFER TO SHEET E2.6 FOR DETAILS.
3. INSTALL NEW AIRFIELD ELECTRICAL LIGHTING VAULT. REFER TO ET4 SERIES FOR ENLARGED PLAN AND DETAILS.
4. INSTALL NEW ISOLATION TRANSFORMER IN EXISTING SIGN.
5. INSTALL NEW 2-WAY JCP TO INTERCEPT EXISTING 2-WAY 2" DUCT CROSSING.
6. INSTALL NEW L-849E(L) REIL. REFER TO SHEET ET5.3 FOR DETAILS.



NORTH

0 25 50 100
HORIZ SCALE IN FEET

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TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

TERRELL MUNICIPAL AIRPORT
400 BRITISH FLYING SCHOOL BLVD. TERRELL, TX 75160

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

AIRFIELD ELECTRICAL LAYOUT PLAN

ET2.5

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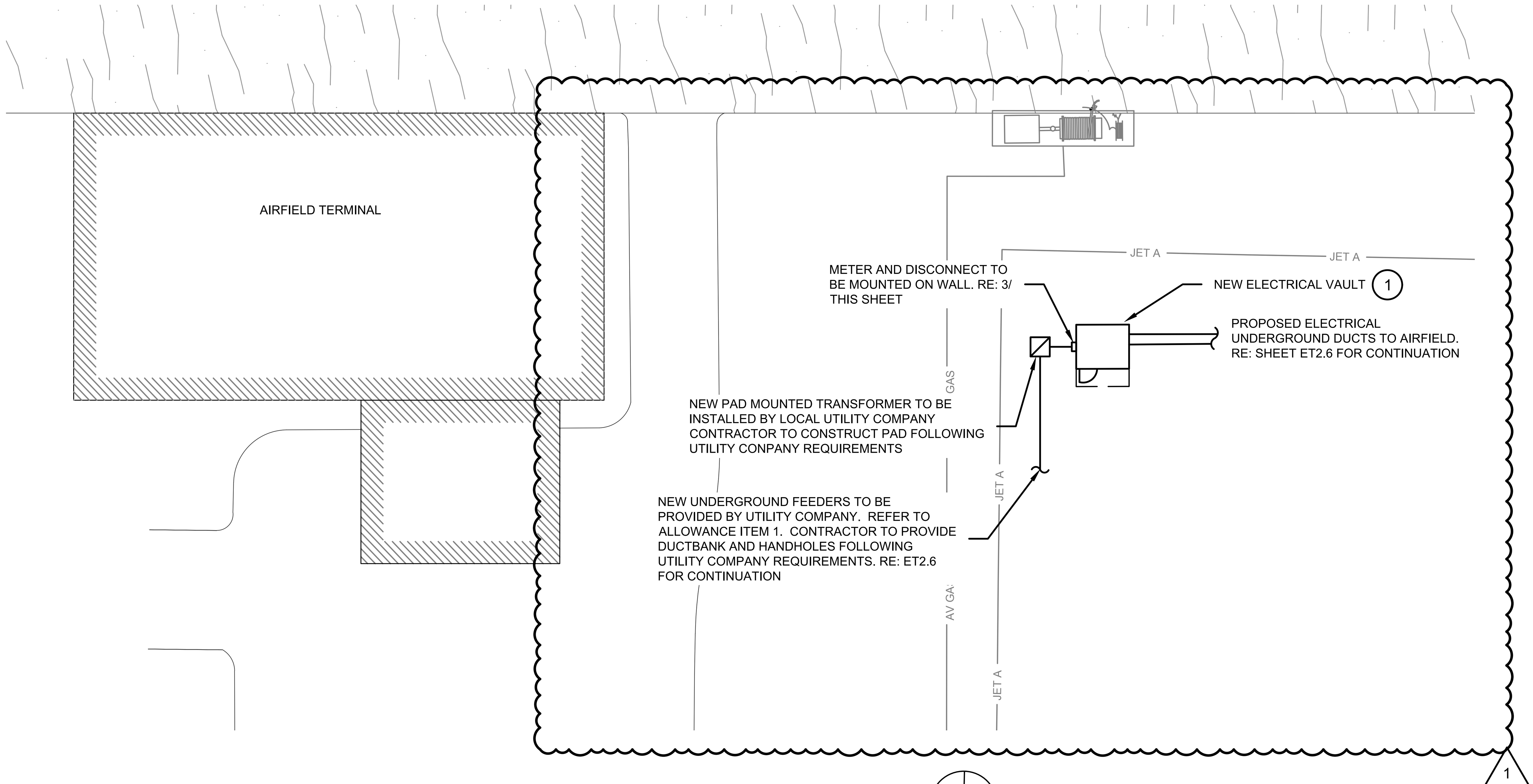


1 / ET4.1 **VAULT SITE PLAN**

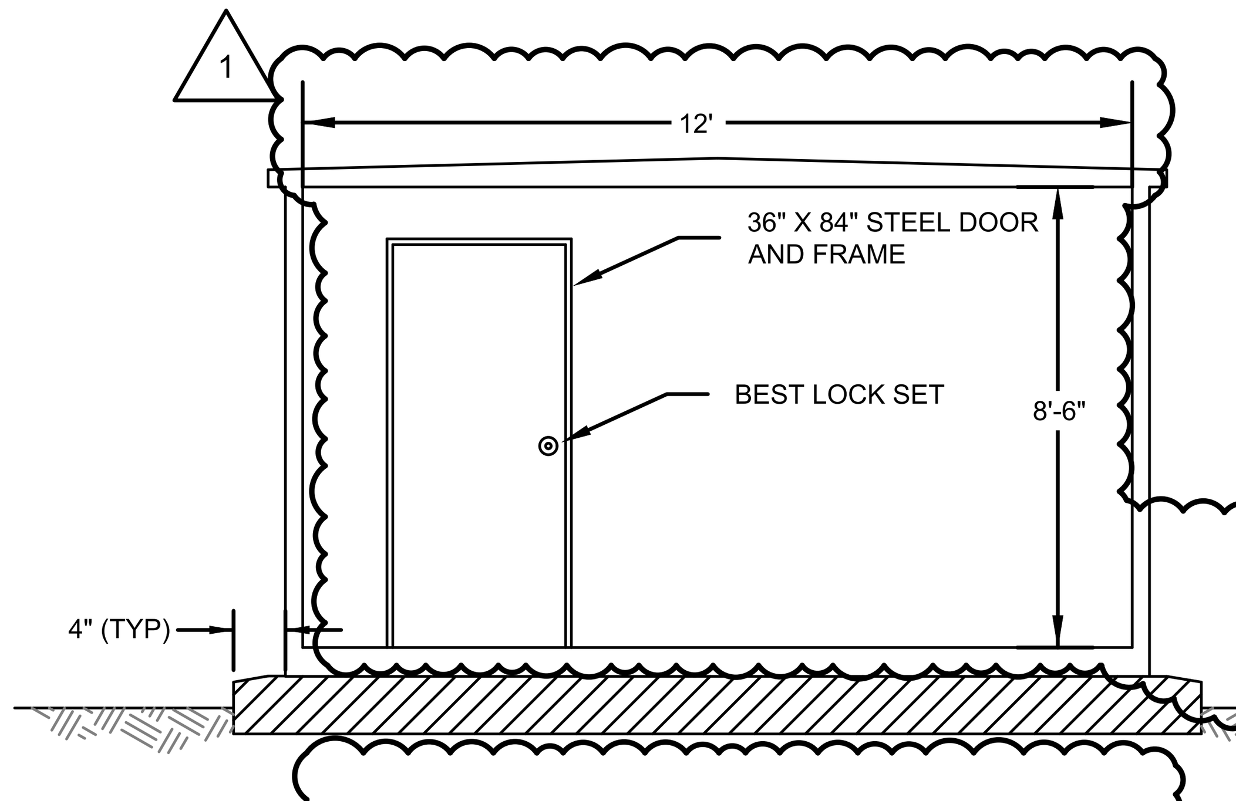
SCALE: 1" = 20'-0"

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY, SOLID LINEWEIGHT ARE NEW OR MODIFIED.
2. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT.
3. ALL WORK RELATING TO ELECTRICAL SERVICE TO BE COORDINATED WITH LOCAL UTILITY COMPANY.

KEYED NOTES

(1) FURNISH 10' X 12' X 8'-6" MIN VAULT STRUCTURE. PROVIDE STRUCTURE WITH UV RESISTANT FINISH CONSISTING OF HIGH GLOSS GEL-COAT OR 3-COATS OF EXTERIOR GRADE PAINT. STRUCTURE SHALL INCLUDE A 36"W X 7'H SOLID DOOR WITH KEY LOCK, WEATHER TRIM TO PREVENT INGRESS OF WATER, DUST OR OTHER FOREIGN PARTICLES. PROVIDE WITH MIN 250LB/SF FLOOR LOADING CAPACITY WITH COMMERCIAL GRADE VINYL TILE FINISH. PROVIDE SLOPED ROOF WITH 100LB/SF LOADING AND 220 FT-LB IMPACT RESISTANCE. ALL WALLS, FLOOR AND ROOF SHALL BE INSULATED. WALLS TO BE REINFORCED WITH 3/4" PLYWOOD FOR MOUNTING EQUIPMENT. ALL JOINTS SHALL BE AIR AND WATER-TIGHT. ALL HARDWARE SHALL BE STAINLESS STEEL. FURNISH COLOR SAMPLES FOR REVIEW. PRE-FABRICATED FIBERGLASS, PRE-CAST CONCRETE OR CONCRETE TILT-UP WALL CONSTRUCTION OR INSULATED METAL BUILDING ON SLAB IS AN APPROVED BUILDING TYPE. FURNISH VAULT WITH LIGHTS, RECEPTACLES, WALL SWITCH, 1-TON A/C UNIT WITH BUILT IN 1-TON HEATER, THERMOMETER, AND ALL INCIDENTALS COMPLETE AND IN PLACE. (1)

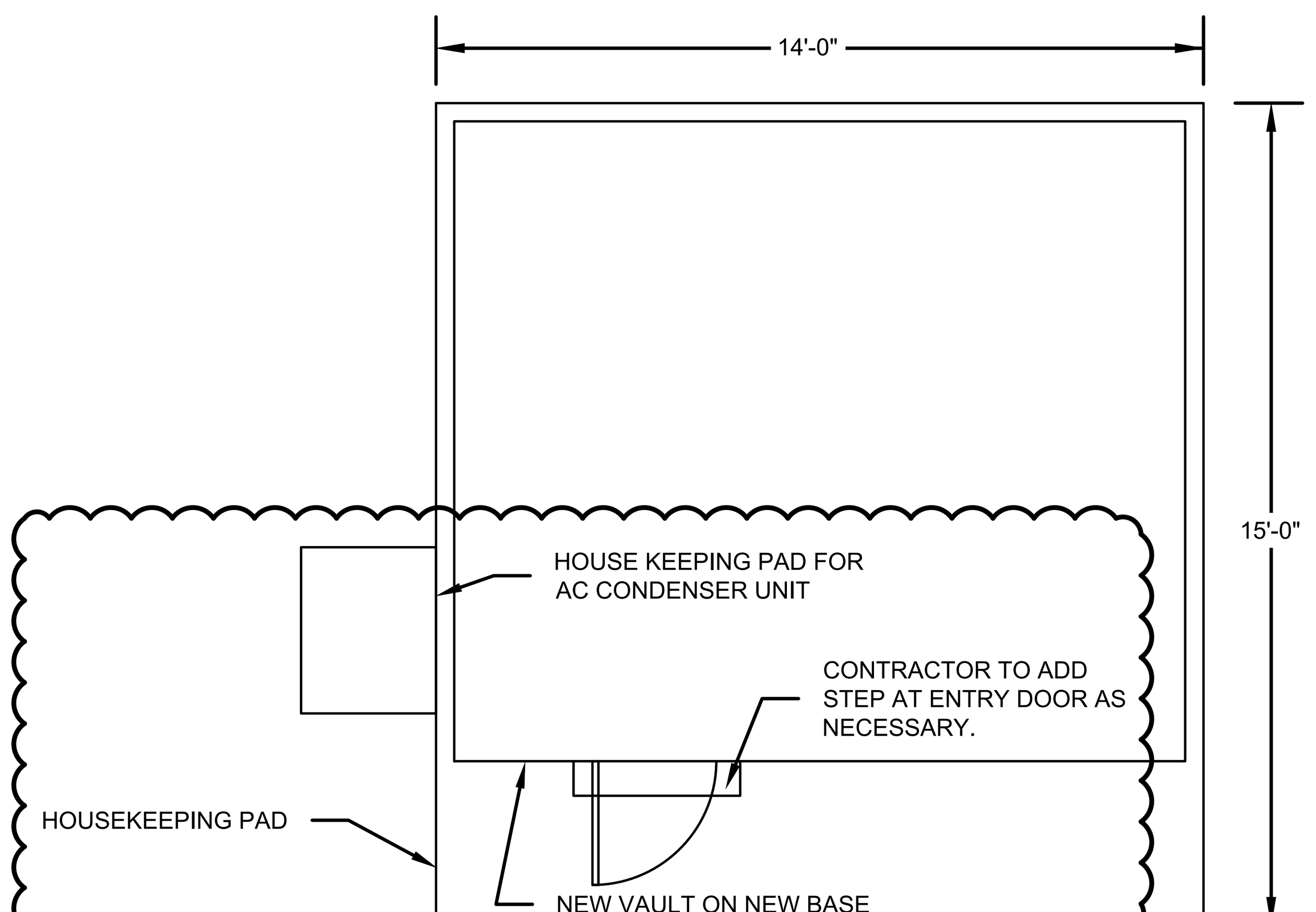


PROFILE VIEW

NOTES

1. REFER TO CIVIL DETAILS FOR VAULT FOUNDATION PLAN.

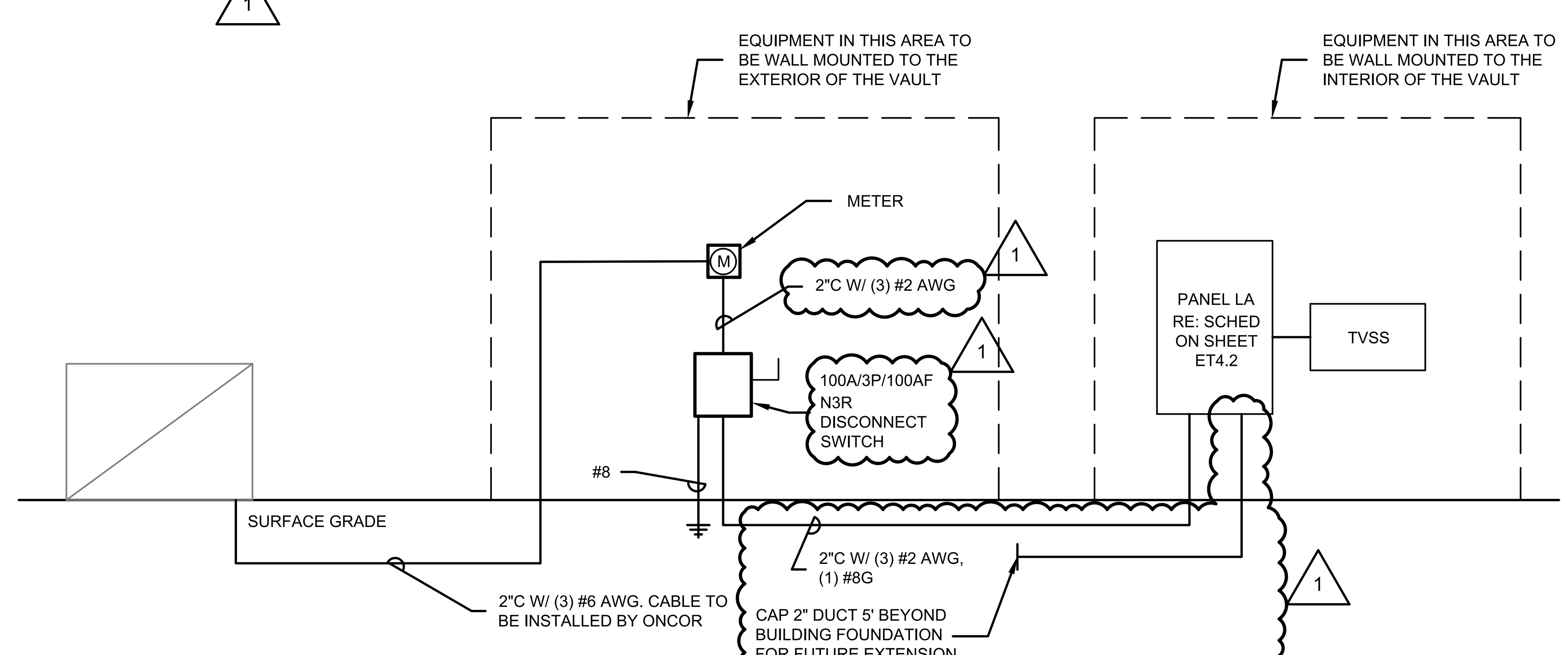
(1)



PLAN VIEW

2 / ET4.1 **VAULT PLAN - FRONT ELEVATION**

SCALE: N.T.S.



3 / ET4.1 **PROPOSED ONE-LINE DIAGRAM**

SCALE: N.T.S.

Ferguson Consulting
Aviation Specialists for Electrical, Telecommunications and Security Systems
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

TERRELL MUNICIPAL AIRPORT
400 BRITISH FLYING SCHOOL BLVD, TERRELL, TX 75160

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO. :	23062
DATE OF ISSUE :	03/07/2025
REVIEWED BY :	RCF
DRAWN BY :	ALC
DESIGNED BY :	RCF

ELECTRICAL VAULT PLAN

ET4.1

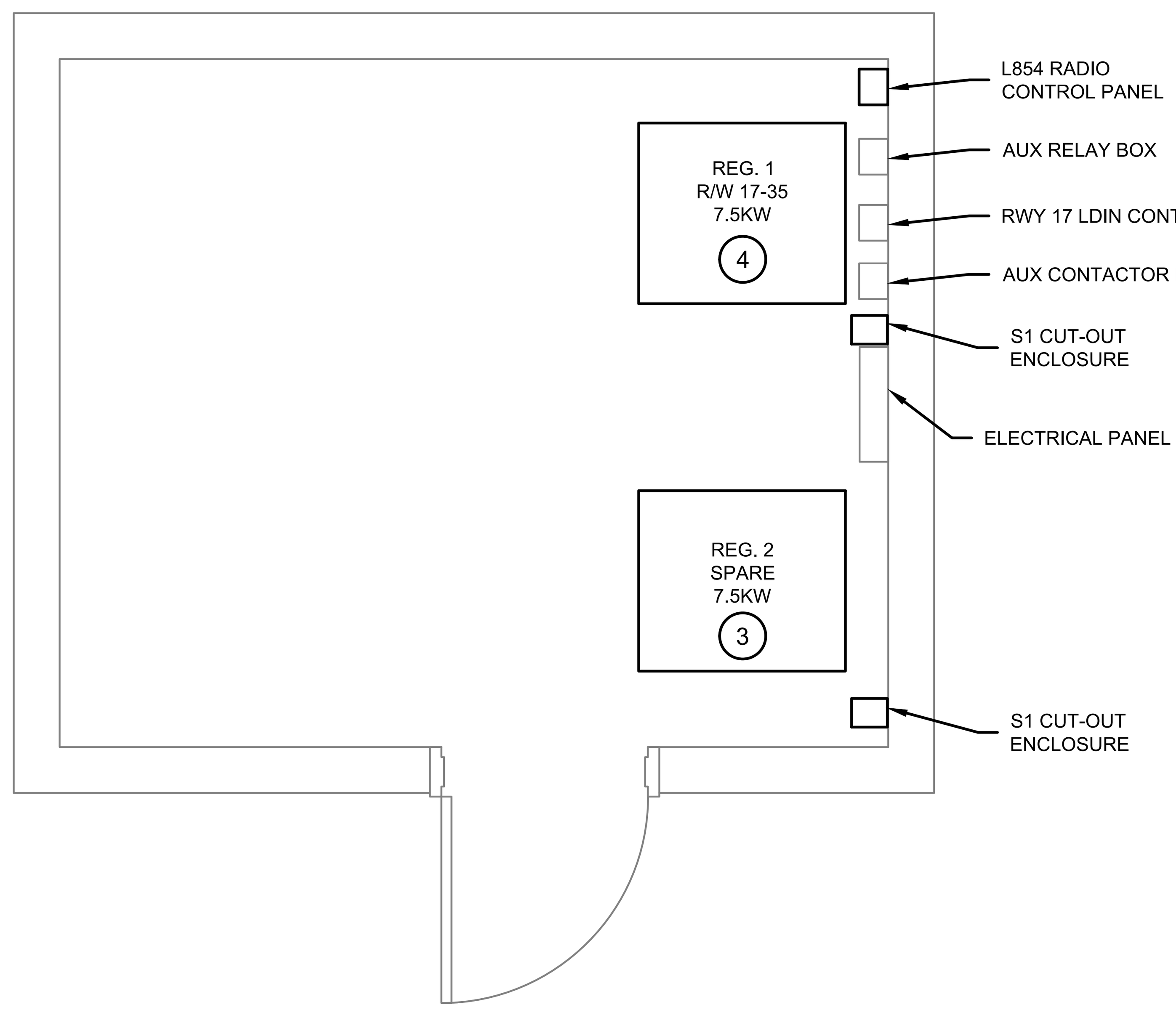
PLOT DATE: 5/13/2025 6:32:42 PM, Fred Rocha
FILE NAME: 20616 TRL ET4.1.dwg
FILE PATH: C:\pw_working\lochner-pw-01\d0184196

GENERAL NOTES

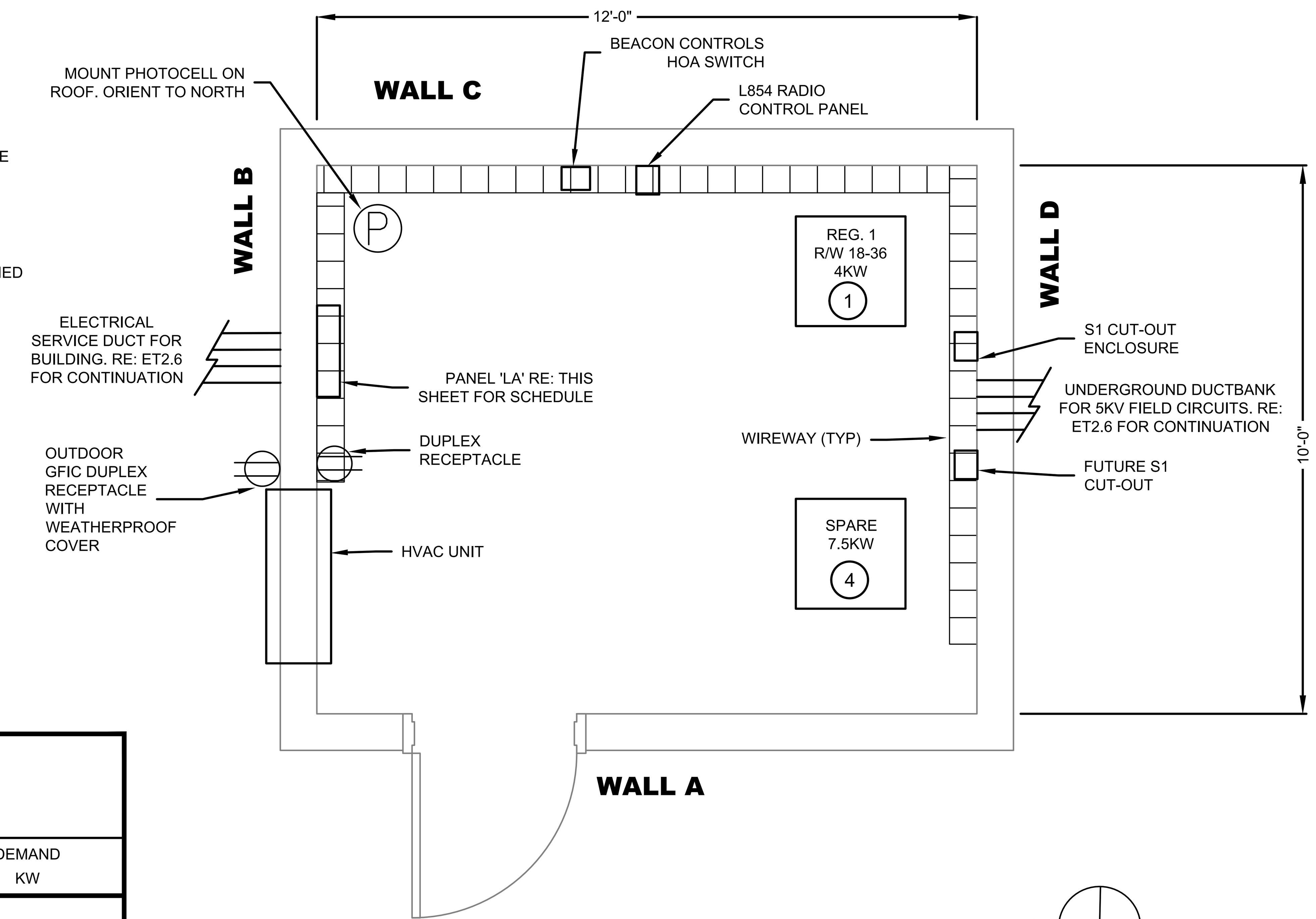
1. ALL NEW WIREWAYS TO INCLUDE HINGED COVERS. LABEL ALL WIREWAYS FOR USE AS NOTED.
2. ALL CONDUIT BELOW 6' AFF TO BE RGS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT. ALL CONNECTIONS TO REGULATOR TO USE LIQUID-TIGHT NON-METALLIC CONDUIT. ALL CONDUIT TO BE 1" UON.
3. PROVIDE NAMEPLATE ON REGULATOR STATING REGULATOR ID, STEPS, VOLTAGE AND CIRCUIT ID.
4. PROVIDE LETTER SIZE LAMINATED AIRFIELD PLAN SHOWING RESPECTIVE REGULATOR CIRCUIT IN COLOR ON PLAN (SIMILAR TO ALCS GRAPHIC DISPLAY). FASTEN LAYOUT PLAN ON FRONT DOOR OF THE RESPECTIVE REGULATOR.
5. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE TO BE REMOVED, NEW OR MODIFIED AS NOTED. ALL ITEMS IN SHADED ARE EXISTING TO REMAIN.
6. CONTRACTOR TO CLEAN INTERIOR OF EXISTING VAULT AS PART OF THIS WORK. THIS INCLUDES SWEEPING FLOORS AND REMOVING EXCESS OR UNUSED EQUIPMENT PER THE RPRS DIRECTION.

KEYED NOTES

1. INSTALL NEW 4 KW, 240V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.
2. INSTALL LOAD CENTER WITH TYPE 1 SURGE PROTECTION DEVICE.
3. REMOVE EXISTING REGULATOR IN ITS ENTIRETY INCLUDING 600V AND 5KV CONDUCTORS, S-1 CUTOUT SWITCH, AND ASSOCIATED EQUIPMENT.
4. EXISTING REGULATOR TO BE SALVAGED AND USED AS A SPARE.



1 / ET4.2 **VAULT DEMOLITION PLAN**
SCALE: 1/2" = 1'-0"



2 / ET4.2 **PROPOSED VAULT PLAN**
SCALE: 1/2" = 1'-0"

UTILITY LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW	DEMAND KW
REGULATOR 1	3.28	3.28
RUNWAY 36 PAPI	0.53	0.66
WIND CONE	0.06	0.08
HVAC	1.5	1.5
LIGHTING	0.12	0.15
SUB-TOTAL LOAD	5.49	5.67

5.67 KVA / 240V = 23.63 A
100A SERVICE EXCEEDS NEC REQUIREMENTS

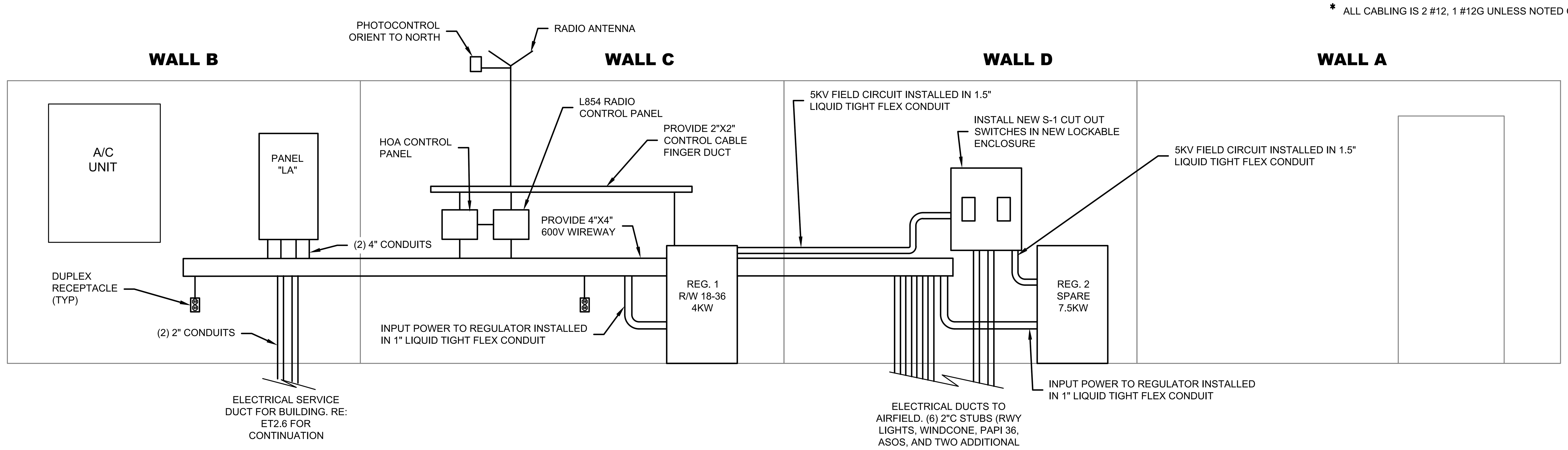
PANEL: LA

VOLTAGE: 120/240V | 1 * | 3 W | AIC:
MAINS: 100 AMPS | ☐ MLO ☒ MCB | ☒ SURFACE ☐ FLUSH
LUGS: ☐ SUB - FEED ☐ FEED - THRU | ☒ NEMA 1 ☐ NEMA 3R
REMARKS: 2

C"	WIRE*	LOAD DESCRIPTION	KVA	BKR.	CKT	CKT	BKR.	KVA	LOAD DESCRIPTION	WIRE*	C"
2" C	2 #10	REG. 1, RWY 18-36 (4 KW)	1.64	30	1	2	15	0.5	RADIO CONTROLLER		
—	#10G	↓	1.64		3	4	15	0.06	WINDCONE	2 #10, #10G	2" C
2" C	2 # 8	RWY 36 PAPI	0.26	20	5	6	15	0.64	INDOOR LIGHTING		
—	1 # 8G	↓	0.26		7	8	30		SPARE REG.	2 #10	2" C
		RECEPT, AC, OUTDOOR LIGHT	1.56	20	9	10			↓	#10G	
		SPARE		20	11	12	20		SPARE		
		SPACE			13	14			SPACE		
					15	16					
					17	18					
		↓			19	20			↓		

5.49	KVA CONNECTED LOAD
5.67	KVA DEMAND
23.63	AMPS DEMAND @ 240V

* ALL CABLING IS 2 #12, 1 #12G UNLESS NOTED OTHERWISE.



2 / ET4.2 **VAULT PLAN - WALL ELEVATION**
SCALE: N.T.S.

PROPOSED REGULATOR 1 (RW 18-36) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 1 'RWY 18-36' (4KW)	
LED RW LIGHTING (50 RWY EDGE LTG @ 21.5W/EA)	1.08
LED RW THSLD LIGHTING (16 RWY THSLD LTG @ 17.9W/EA)	0.29
SIGNS (LED)	1.16
CABLE LOSS (12505' @ 3W/100LF)	0.43
REIL (LED)	0.32
SUB-TOTAL LOAD	3.28

4KVA REGULATOR EXCEEDS NEC REQUIREMENTS

REVISED SHEET
1

Ferguson Consulting
Aviation Specialists for Electrical, Telecommunications and Security Systems
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

TERRELL MUNICIPAL AIRPORT
400 BRITISH FLYING SCHOOL BLVD, TERRELL, TX 75160

NO.	DATE	DESCRIPTION
1	05/14/25	ADDEN 3

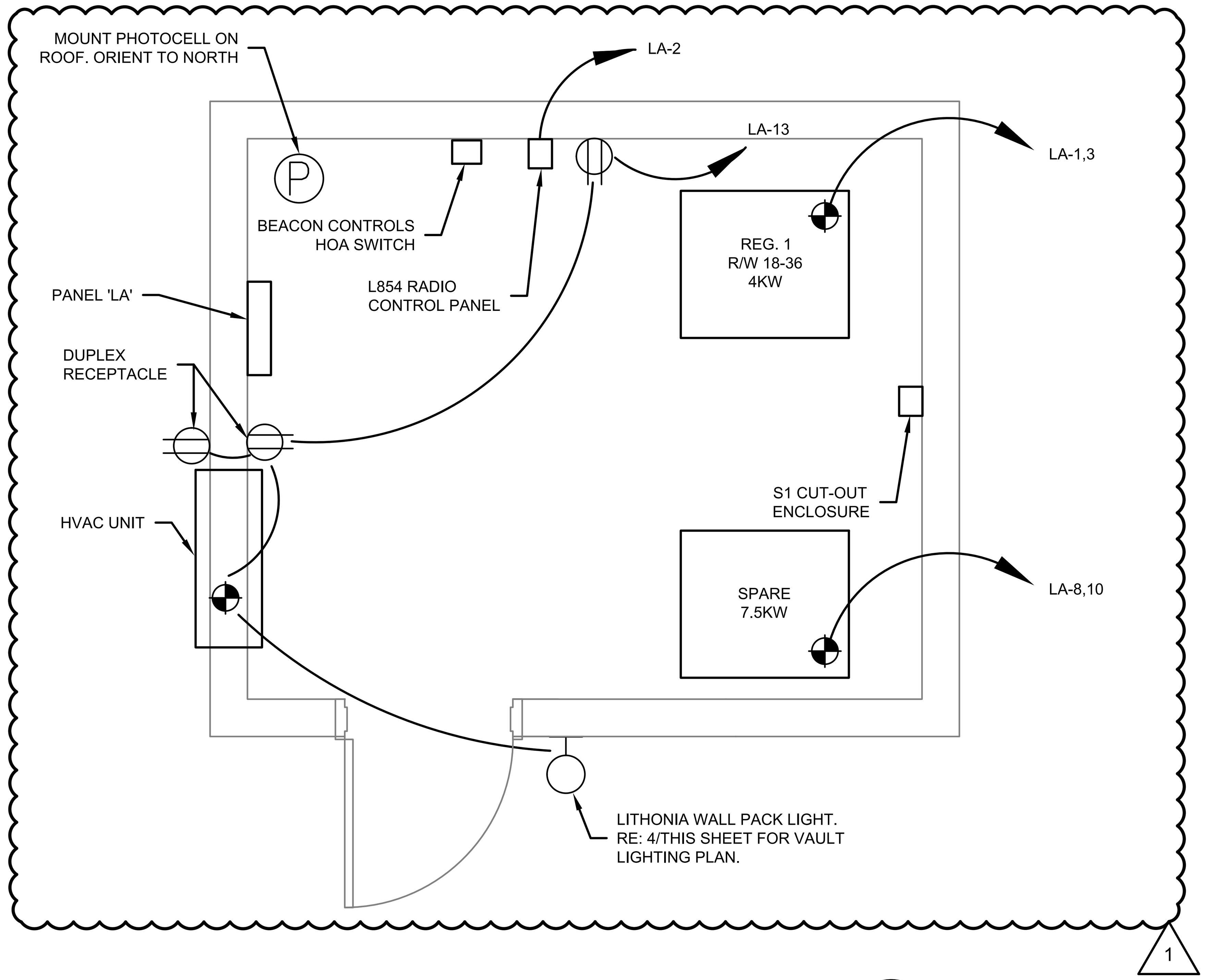
STATE OF TEXAS
C. LECETTE FERGUSON
81460
REGISTERED PROFESSIONAL ENGINEER
F-6864 05/14/25

PROJECT NO.: 23062
DATE OF ISSUE: 03/07/2025
REVIEWED BY: RCF
DRAWN BY: ALC
DESIGNED BY: RCF

ELECTRICAL VAULT PLAN

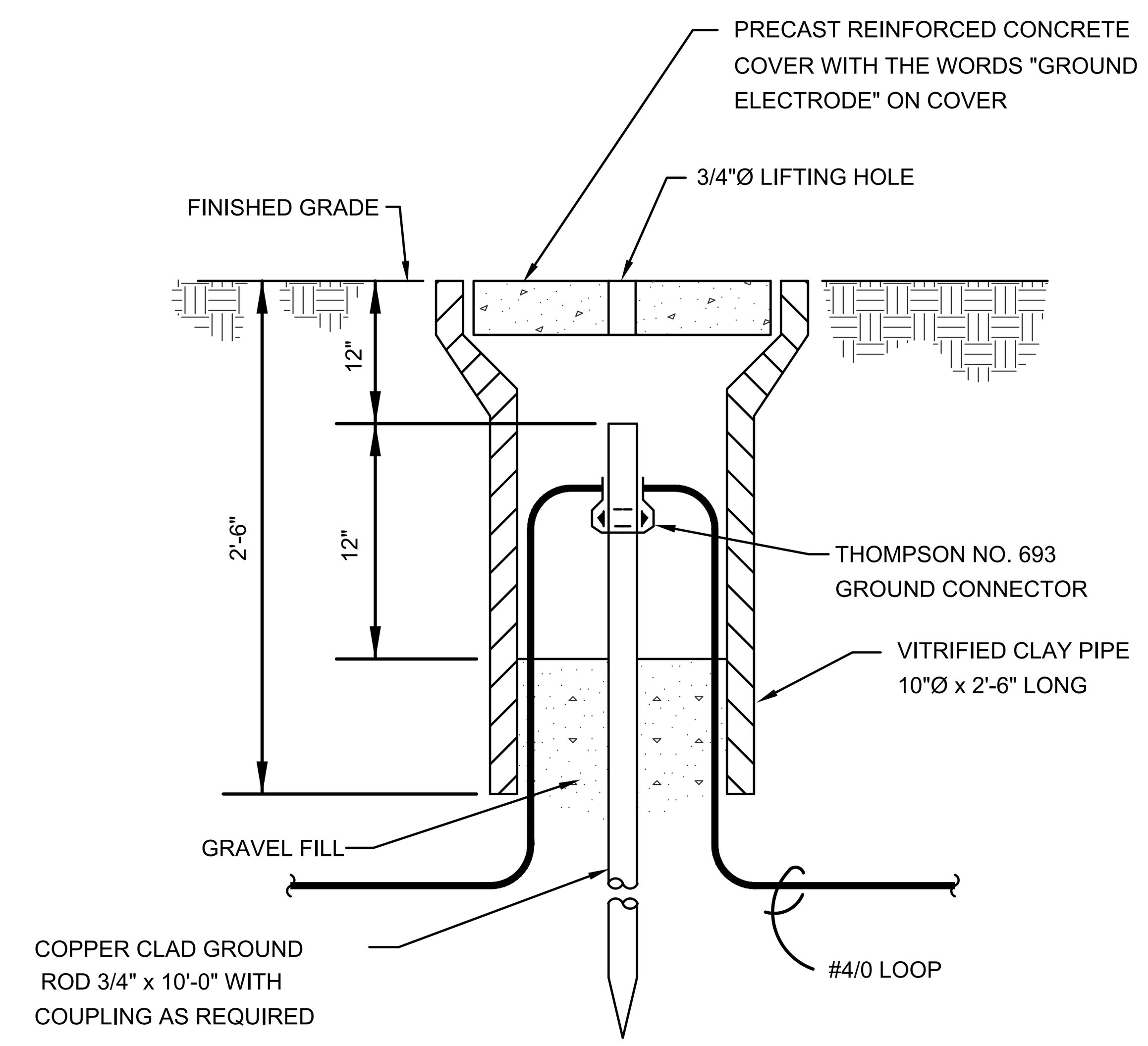
ET4.2

FILE PATH: C:\pw_working\lochner-pw-01\d0184195
FILE NAME: 29018 TRL ET4.1.dwg
PLOT DATE: 5/13/2025 5:21:05 PM, Cole Ferguson



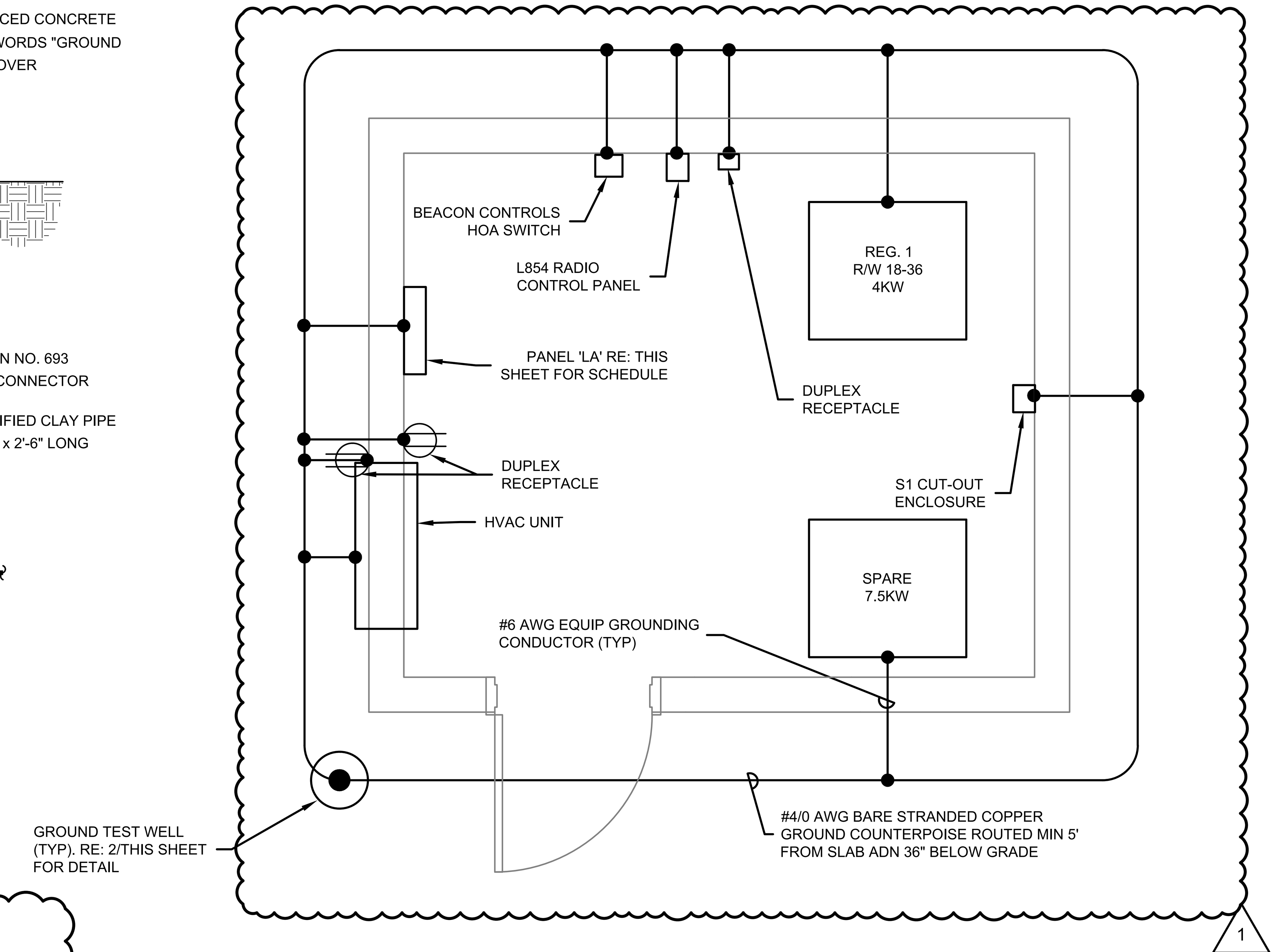
1 ET4.3 **VAULT POWER PLAN**

SCALE: 1/2" = 1'-0"



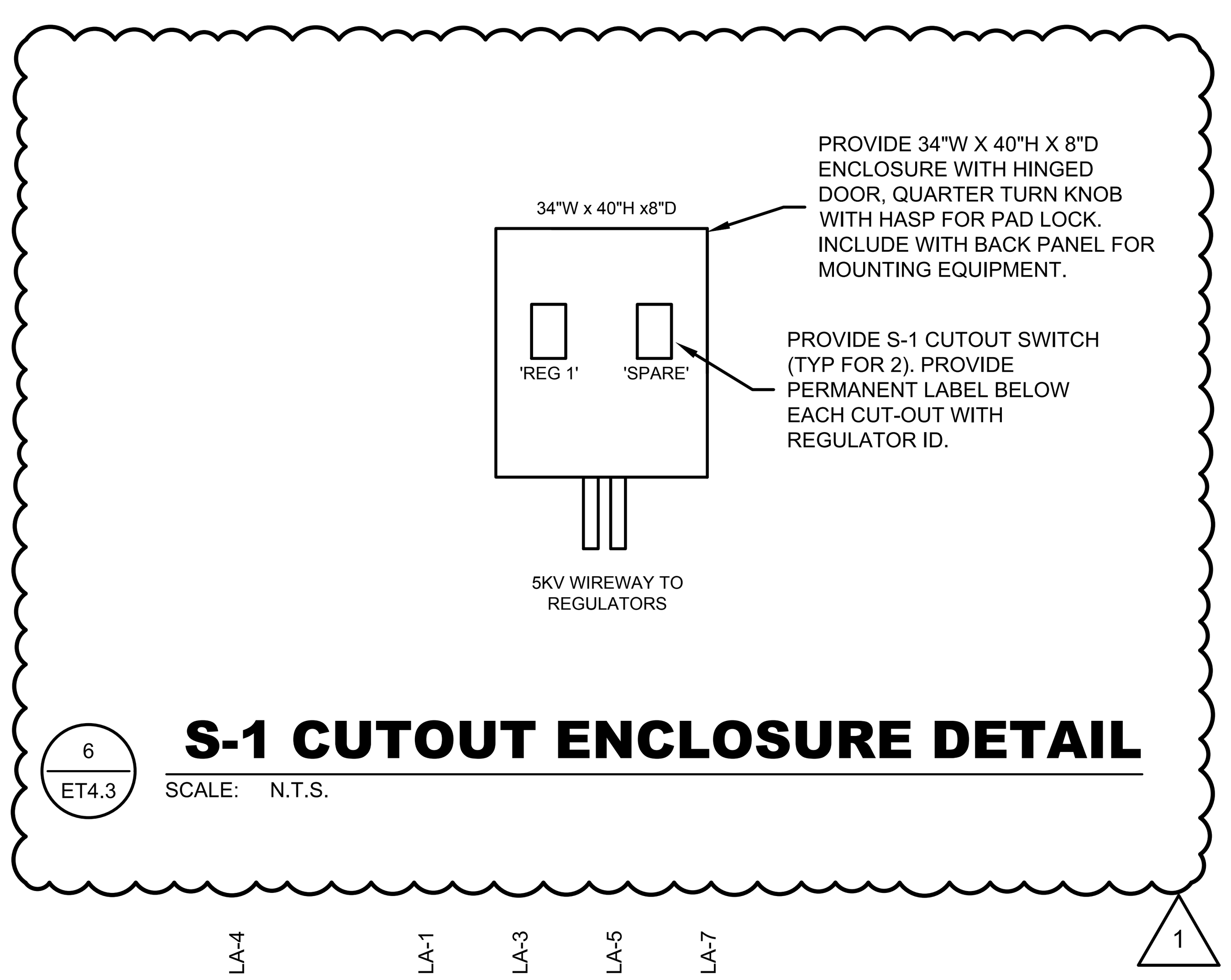
2 ET4.3 **GROUND TEST WELL**

SCALE:N.T.S.



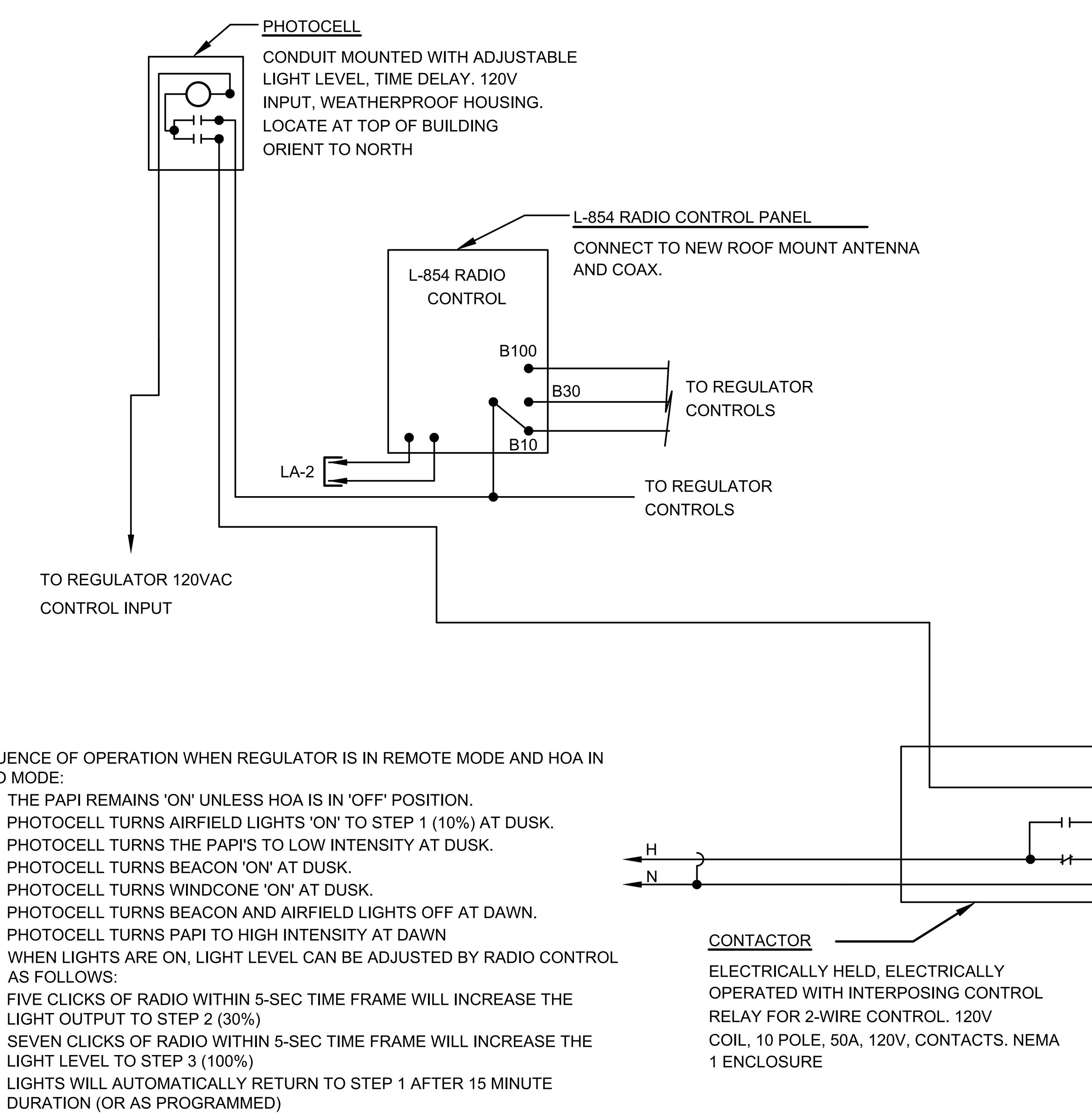
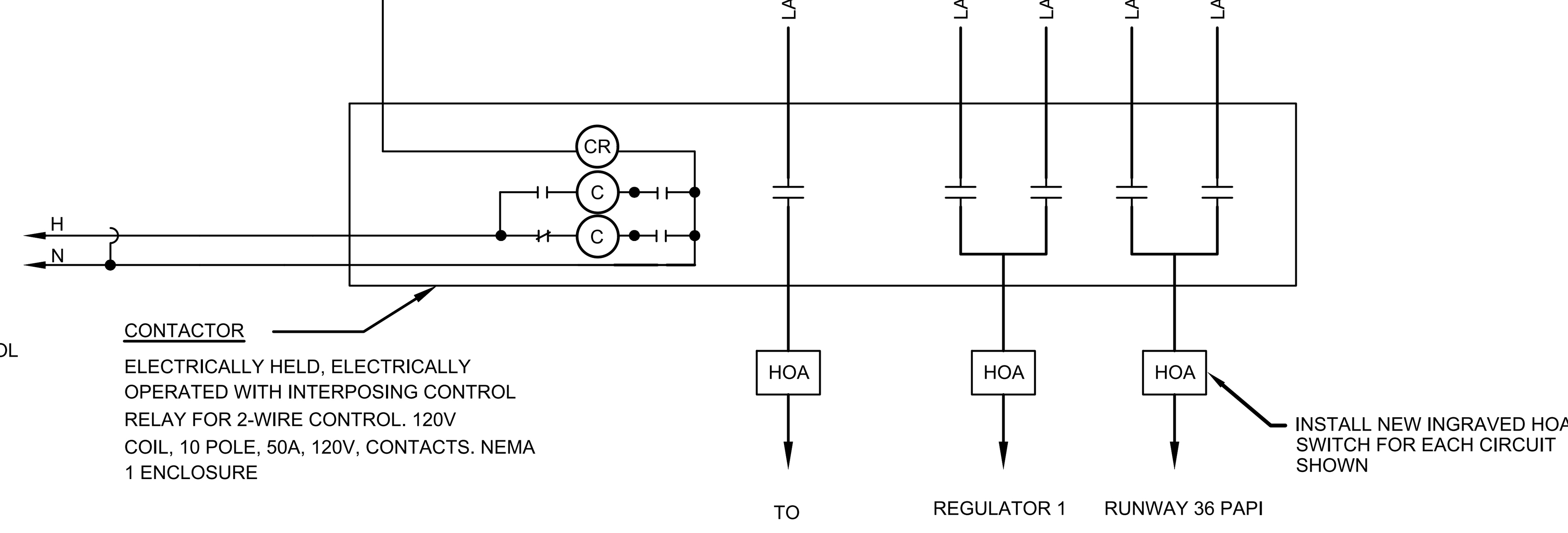
3 ET4.3 **VAULT GROUNDING PLAN**

SCALE: 1/2" = 1'-0"



6 ET4.3 **S-1 CUTOUT ENCLOSURE DETAIL**

SCALE: N.T.S.

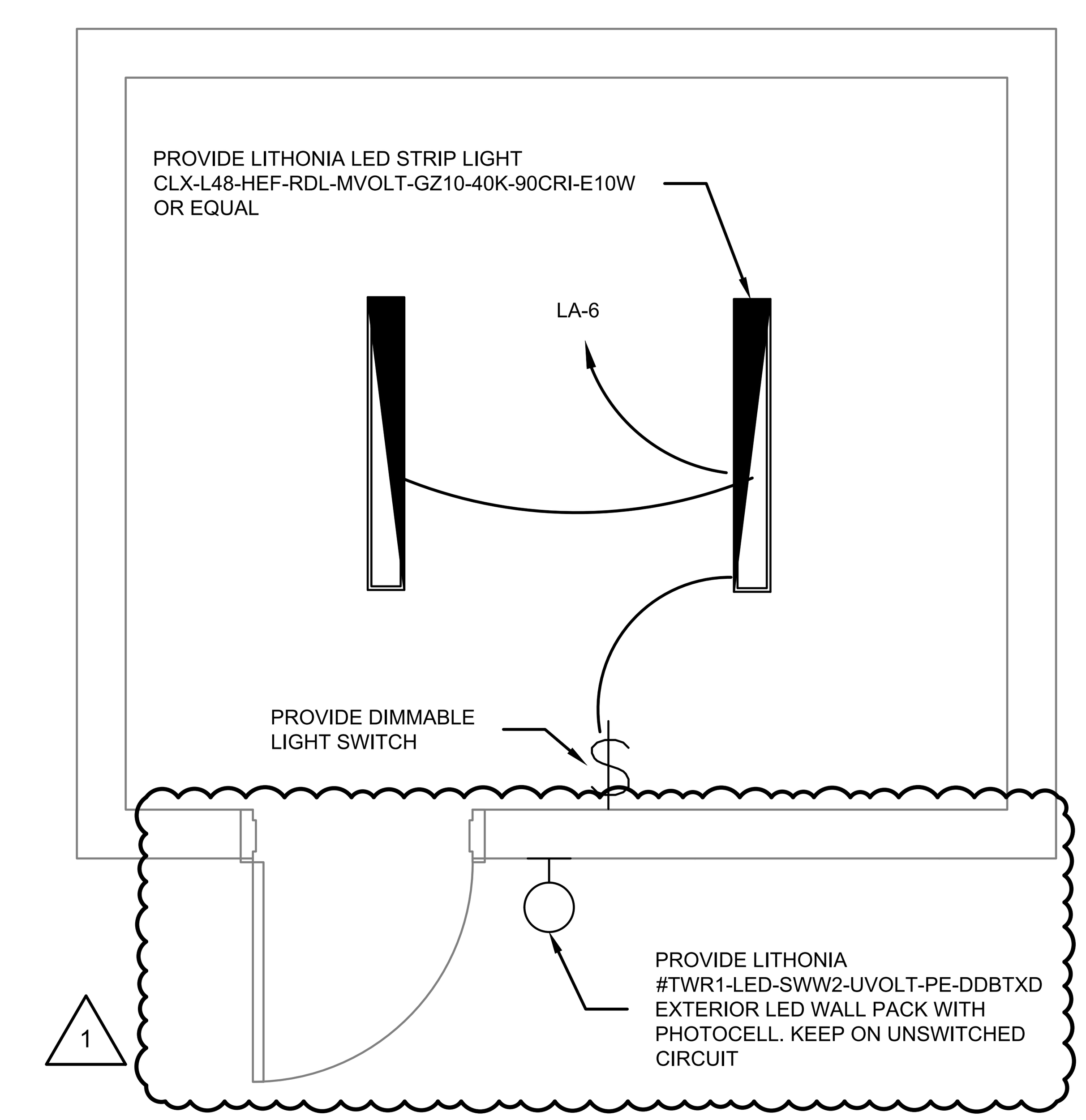



SEQUENCE OF OPERATION WHEN REGULATOR IS IN REMOTE MODE AND HOA IN AUTO MODE:

1. THE PAPI REMAINS 'ON' UNLESS HOA IS IN 'OFF' POSITION.
2. PHOTOCELL TURNS AIRFIELD LIGHTS 'ON' TO STEP 1 (10%) AT DUSK.
3. PHOTOCELL TURNS THE PAPI'S TO LOW INTENSITY AT DUSK.
4. PHOTOCELL TURNS BEACON 'ON' AT DUSK.
5. PHOTOCELL TURNS WINDCONE 'ON' AT DUSK.
6. PHOTOCELL TURNS BEACON AND AIRFIELD LIGHTS OFF AT DAWN.
7. PHOTOCELL TURNS PAPI TO HIGH INTENSITY AT DAWN
8. WHEN LIGHTS ARE ON, LIGHT LEVEL CAN BE ADJUSTED BY RADIO CONTROL AS FOLLOWS:
   FIVE CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT OUTPUT TO STEP 2 (30%)
   SEVEN CLICKS OF RADIO WITHIN 5-SEC TIME FRAME WILL INCREASE THE LIGHT LEVEL TO STEP 3 (100%)
   LIGHTS WILL AUTOMATICALLY RETURN TO STEP 1 AFTER 15 MINUTE DURATION (OR AS PROGRAMMED)

5 ET4.3 **LIGHTING CONTROLS DIAGRAM**

SCALE: N.T.S.



4 ET4.3 **VAULT LIGHTING PLAN**

SCALE: 1/2" = 1'-0"

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ELECTRICAL VAULT PLAN

ET4.3

FILE PATH: C:\pw_working\lochner-pw-01\d0184196
FILE NAME: 20616 TRL ET4.1.dwg
PLOT DATE: 5/13/2025 4:30:54 PM, Cole Ferguson

TERRELL MUNICIPLE - EDGE LIGHT FIXTURES (RE1)

FIXTURE NUMBER	FAA TYPE	FAA BASE	LIGHT ORIENTATION	COLOR	NORTHING	EASTING	REGULATOR ID	CIRCUIT NAME	KEYNOTES
R1	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950505.8482	2655128.1099	RE1	RE1	1
R2	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950506.0804	2655138.1072	RE1	RE1	1
R3	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950506.3126	2655148.1045	RE1	RE1	1
R4	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950506.5448	2655158.1018	RE1	RE1	1
R5	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950507.3627	2655193.3142	RE1	RE1	1
R6	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950507.5949	2655203.3115	RE1	RE1	1
R7	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950507.8271	2655213.3088	RE1	RE1	1
R8	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6950508.0593	2655223.3061	RE1	RE1	1
R9	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6950314.7978	2655227.7544	RE1	RE1	1
R10	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6950121.5363	2655232.2027	RE1	RE1	1
R11	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949928.2749	2655236.6524	RE1	RE1	1
R12	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949735.0134	2655241.0994	RE1	RE1	1
R13	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949541.7519	2655245.5490	RE1	RE1	1
R14	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949348.4904	2655249.9972	RE1	RE1	1
R15	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949155.2289	2655254.4443	RE1	RE1	1
R16	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6948961.9674	2655258.8927	RE1	RE1	1
R17	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6948768.7059	2655263.3410	RE1	RE1	1
R18	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6948575.4445	2655267.7893	RE1	RE1	1
R19	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6948382.1830	2655272.2385	RE1	RE1	1
R20	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6948188.9215	2655276.6859	RE1	RE1	1
R21	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6947995.6600	2655281.1350	RE1	RE1	1
R22.	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6947802.3985	2655285.5826	RE1	RE1	1
R23	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6947609.1370	2655290.0316	RE1	RE1	1
R24	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6947415.8755	2655294.4792	RE1	RE1	1
R25	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6947222.6141	2655298.9281	RE1	RE1	1
R26	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6947029.3526	2655303.3763	RE1	RE1	1
R27	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946836.0911	2655307.8246	RE1	RE1	1
R28	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946642.8296	2655312.2729	RE1	RE1	1
R29	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946449.5681	2655316.7208	RE1	RE1	1
R30	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946256.3066	2655321.1691	RE1	RE1	1
R31	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946063.0451	2655325.6175	RE1	RE1	1
R32	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6945869.7837	2655330.0659	RE1	RE1	1
R33	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6945676.5222	2655334.5142	RE1	RE1	1
R34	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945483.2607	2655338.9624	RE1	RE1	1
R35	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945483.0285	2655328.9651	RE1	RE1	1
R36	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945482.7963	2655318.9678	RE1	RE1	1
R37	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945482.5641	2655308.9705	RE1	RE1	1
R38	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945481.7883	2655275.5698	RE1	RE1	1
R39	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945481.5561	2655265.5725	RE1	RE1	1
R40	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945481.3239	2655255.5751	RE1	RE1	1
R41	L-861E(L)	L-867	BIDIRECTIONAL	GREEN-RED	6945481.0916	2655245.5778	RE1	RE1	1
R42	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6945674.3515	2655241.0598	RE1	RE1	1
R43	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6945867.6114	2655236.5418	RE1	RE1	1
R44	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946060.8713	2655232.0239	RE1	RE1	1
R45	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946254.1311	2655227.5059	RE1	RE1	1
R46	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946447.3910	2655222.9879	RE1	RE1	1
R47	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946640.6509	2655218.4699	RE1	RE1	1
R48	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6946833.9107	2655213.9519	RE1	RE1	1
R49	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6947027.1706	2655209.4339	RE1	RE1	1
R50	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6947220.4305	2655204.9159	RE1	RE1	1
R51	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6947413.6903	2655200.3979	RE1	RE1	1
R52	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6947606.9502	2655195.8799	RE1	RE1	1
R53	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6947800.2101	2655191.3619	RE1	RE1	1
R54	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6947993.4699	2655186.8439	RE1	RE1	1
R55	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6948186.7298	2655182.3259	RE1	RE1	1
R56	L-861(L)	L-867	BIDIRECTIONAL	WHITE-WHITE	6948379.9897	2655177.8079	RE1	RE1	1
R57	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6948573.2495	2655173.2899	RE1	RE1	1
R58	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6948766.5094	2655168.7719	RE1	RE1	1
R59	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6948959.7693	2655164.2539	RE1	RE1	1
R60	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949153.0291	2655159.7359	RE1	RE1	1
R61	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949346.2890	2655155.2179	RE1	RE1	1
R62	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949539.5489	2655150.6999	RE1	RE1	1
R63	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949732.8087	2655146.1819	RE1	RE1	1
R64	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6949926.0686	2655141.6639	RE1	RE1	1
R65	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6950119.3285	2655137.1459	RE1	RE1	1
R66	L-861(L)	L-867	BIDIRECTIONAL	WHITE-YELLOW	6950312.5883	2655132.6279	RE1	RE1	1

JCP SCHEDULE

JCP TAG	SHEET NUMBER	NORTHING (1)	EASTING	DUCTS	JCP DETAIL REFERENCE (DETAIL # / SHEET #)	NOTES
JCP-1	ET2.6	6948533.5098	2654539.5122	6	2/E2.4	
JCP-2	ET2.3	6948540.6000	2654845.4720	6	2/E2.4	
JCP-3	ET2.3	6948545.6415	2655063.1754	6 (1)	2/E2.4 (2)	
JCP-4	ET2.3	6948551.3918	2655311.1610	4	1/E2.4	
JCP-5	ET2.3	6948150.0187	2655072.3644	2	8/E2.3	
JCP-6	ET2.3	6947757.3952	2655081.4840	2	8/E2.3	
JCP-7	ET2.3	6947709.2742	2655082.6266	2	8/E2.3	
JCP-8	ET2.4	6947313.1355	2655091.8027	2	8/E2.3	
JCP-9	ET2.4	6946937.3066	2655100.5121	2	8/E2.3	
JCP-10	ET2.4	6946539.1496	2655082.3785	2	8/E2.3	
JCP-11	ET2.4	6946486.4547	2655083.6271	2	8/E2.3	
JCP-12	ET2.5	6945555.1608	2655200.5469	2	8/E2.3	
JCP-13	ET2.5	6945470.1836	2655202.5162	2	8/E2.3	
JCP-14	ET2.2	6949183.2751	2655028.3209	2	8/E2.3	
JCP-15	ET2.2	6949239.7192	2655026.9855	2	8/E2.3	
JCP-16	ET2.1	6950447.2327	2654996.4938	2	8/E2.3	
JCP-17	ET2.1	6950498.7088	2654995.2735	2	8/E2.3	

GENERAL NOTES - LIGHTING

1. REFER TO ET2 SERIES FOR PROPOSED LIGHTING PLANS, THE ET3 SERIES FOR DIMENSIONS PLANS AND ET5 SERIES FOR DETAILS.

2. FIXTURES NORTHINGS AND EASTINGS HAVE BEEN PROVIDED FOR CONTRACTORS TO USE IN LOCATING NEW BASE CANS. HOWEVER THE CONTRACTOR MUST INSTALL ALL FIXTURES FOLLOWING THE DETAILS, WHERE NORTHINGS AND EASTINGS CONFLICT WITH DETAILS, THE CONTRACTOR SHALL CONTACT THE ENGINEER FOR GUIDANCE. TYPICALLY, THE DETAILS SUPERSEDE NORTHINGS AND EASTINGS INFORMATION. IF MARKINGS ARE MODIFIED, THE NORTHINGS AND EASTINGS MAY NO LONGER BE ACCURATE.

KEYED NOTES - LIGHTING

(1) PROCURE AND INSTALL NEW ELEVATED FIXTURE (TYPE AS NOTED) ON NEW BASE CAN WITH NEW ISOLATION TRANSFORMER, CONNECTOR KIT, BOLTING HARDWARE, ETC FOR A COMPLETE ACCEPTED SYSTEM.

LIGHT FIXTURE ELECTRICAL INFORMATION:

FIXTURE TYPE	FAA TYPE	LAMP WATTAGE	ISOLATION TRANSFORMER
RUNWAY ELEVATED LED EDGE LIGHT	L-861(L)	12VA	L-830-16 (10/15W)
RUNWAY ELEVATED LED THRESHOLD END LIGHT	L-861E(L)	12VA	L-830-16 (10/15W)

PROPOSED SIGN LEGEND

PROPOSED FIELD TAGGING	SIDE 1	SIDE 2	FIELD CKT	SIGN DATA: MODULES	SIGN DATA: SIZE	SIGN DATA: STYLE	SIGN DATA: CLASS	ISOL XFMR (QTY) (AND SIZE) *	LOAD INFORMATION: TYPE	LOAD INFORMATION: VA	SHEET NUMBER	NORTHING	EASTING	NOTES
S1		← B	RE1	1	1	2	1	65 W	LED	85	ET2.01	6950413.8071	2655120.4621	1
S2	C →		RE1	1	1	2	1	65 W	LED	85	ET2.02	6949276.1125	2655146.8269	1
S3		← C	RE1	1	1	2	1	65 W	LED	85	ET2.02	6949152.1458	2655149.6996	1
S4	D →		RE1	1	1	2	1	65 W	LED	85	ET2.03	6947797.3092	2655181.0964	1
S5		← D	RE1	1	1	2	1	65 W	LED	85	ET2.03	6947673.3425	2655183.9692	1
S6	E →		RE1	1	1	2	1	65 W	LED	85	ET2.04	6946577.6366	2655209.3609	1
S7		← E	RE1	1	1	2	1	65 W	LED	85	ET2.04	6946453.6699	2655212.2337	1
S8	F →		RE1	1	1	2	1	65 W	LED	85	ET2.05	6945572.9214	2655233.2922	1

* NEW SIGN ISOLATION TRANSFORMER SIZE WILL VARY PER MANUFACTURER. SIZES LISTED ARE FOR SIGN MANUFACTURER - ADB. IF ALTERNATE MANUFACTURER IS USED, PROVIDE ISOLATION TRANSFORMER SIZE PER MANUFACTURER RECOMMENDATIONS. THE CONTRACTOR SHALL BARE ALL THE COSTS ASSOCIATED WITH ANY EQUIPMENT UPGRADES NECESSARY DUE TO THE CONTRACTOR'S PROPOSED EQUIPMENT POWER REQUIREMENTS EXCEEDING THE CONTRACT DESIGN LOADS.

GENERAL NOTES - SIGNAGE

1. REFER TO SIGN DETAILS ON E2.2. ALL SIGN BASE CANS ARE LOCATED ON INBOARD SIDE OF THE SIGN (SIDE NEAREST TO EDGE MARKING) UNLESS OTHERWISE NOTED.

2. NORTHINGS & EASTINGS REFER TO THE SIDE OF THE SIGN NEAREST TO EDGE OF PAVEMENT.

KEYED NOTES - SIGNAGE

(1) FURNISH AND INSTALL NEW SIGN ON NEW FOUNDATION FOLLOWING PLANS, DETAILS, AND SPECIFICATIONS. COORDINATE FIELD TAG ID WITH OPERATIONS.

Ferguson Consulting
Aviation Specialists for Electrical, Telecommunications and Security Systems
Ferguson Consulting Inc.
10200 Grogans Mill Rd. Ste. #420
The Woodlands, TX 77380
(281) 252-9232 Firm No. 6864

TXDOT ELECTRICAL STATEWIDE IMPROVEMENTS - GROUP A

TERRELL MUNICIPAL AIRPORT
400 BRITISH FLYING SCHOOL BLVD, TERRELL, TX 75160

NO.	DATE	DESCRIPTION
1	05/02/25	ADDEN 2
2	05/14/25	ADDEN 3

STATE OF TEXAS — C. LECETTE FERGUSON — 81460 — REGISTERED PROFESSIONAL ENGINEER — F-6864 05/14/25

PROJECT NO.: 23062
DATE OF ISSUE: 03/07/2025
REVIEWED BY: RCF
DRAWN BY: ALC
DESIGNED BY: RCF

AIRFIELD LIGHTING SCHEDULES

ET6.1

ITEM P-153

CONTROLLED LOW-STRENGTH MATERIAL (CLSM)

DESCRIPTION

153-1.1 This item shall consist of furnishing, transporting, and placing a controlled low-strength material (CLSM) as flowable backfill in trenches or at other locations shown on the plans or as directed by the Resident Project Representative (RPR).

MATERIALS

153-2.1 Materials.

a. Cement. Cement shall conform to the requirements of ASTM **C150** Type **I or II**.

b. Fly ash. Fly ash shall conform to ASTM C618, Class C or F.

c. Fine aggregate (sand). Fine aggregate shall conform to the requirements of ASTM C33 except for aggregate gradation. Any aggregate gradation which produces the specified performance characteristics of the CLSM and meets the following requirements, will be accepted.

Sieve Size	Percent Passing by weight
3/4 inch (19.0 mm)	100
No. 200 (75 µm)	0 - 12

d. Water. Water used in mixing or curing shall be from potable water sources. Other sources shall be tested in accordance with ASTM C1602 prior to use.

MIX DESIGN

153-3.1 Proportions. The Contractor shall submit, to the RPR, a mix design including the proportions and source of aggregate, fly ash, cement, water, and approved admixtures. No CLSM mixture shall be produced for payment until the RPR has given written approval of the proportions. The proportions shall be prepared by a laboratory and shall remain in effect for the duration of the project. The proportions shall establish a single percentage or weight for aggregate, fly ash, cement, water, and any admixtures proposed. Laboratory costs are incidental to this item.

a. Compressive strength. CLSM shall be designed to achieve a 28-day compressive strength of 100 to 200 psi (690 to 1379 kPa) when tested in accordance with ASTM D4832, with no significant strength gain after 28 days.

b. Consistency. Design CLSM to achieve a consistency that will produce an approximate 8-inch (200 mm) diameter circular-type spread without segregation. CLSM consistency shall be determined per ASTM D6103.

CONSTRUCTION METHODS

153-4.1 Placement.

a. Placement. CLSM may be placed by any reasonable means from the mixing unit into the space to be filled. Agitation is required during transportation and waiting time. Placement shall be performed so structures or pipes are not displaced from their final position and intrusion of CLSM into unwanted areas is avoided. The material shall be brought up uniformly to the fill line shown on the plans or as directed by the RPR. Each placement of CLSM shall be as continuous an operation as possible. If CLSM is placed in more than one lift, the base lift shall be free of surface water and loose foreign material prior to placement of the next lift.

b. Contractor Quality Control. The Contractor shall collect all batch tickets to verify the CLSM delivered to the project conforms to the mix design. The Contractor shall verify daily that the CLSM is consistent with 153-3.1a and 153-3.1b. Adjustments shall be made as necessary to the proportions and materials as needed. The Contractor shall provide all batch tickets to the RPR.

c. Limitations of placement. CLSM shall not be placed on frozen ground. Mixing and placing may begin when the air or ground temperature is at least 35°F (2°C) and rising. Mixing and placement shall stop when the air temperature is 40°F (4°C) and falling or when the anticipated air or ground temperature will be 35°F (2°C) or less in the 24-hour period following proposed placement. At the time of placement, CLSM shall have a temperature of at least 40°F (4°C).

153-4.2 Curing and protection

a. Curing. The air in contact with the CLSM shall be maintained at temperatures above freezing for a minimum of 72 hours. If the CLSM is subjected to temperatures below 32°F (0°C), the material may be rejected by the RPR if damage to the material is observed.

b. Protection. The CLSM shall not be subject to loads and shall remain undisturbed by construction activities for a period of 48 hours or until a compressive strength of 15 psi (105 kPa) is obtained. The Contractor shall be responsible for providing evidence to the RPR that the material has reached the desired strength. Acceptable evidence shall be based upon compressive tests made in accordance with paragraph 153-3.1a.

153-4.3 Quality Assurance (QA) Acceptance. CLSM QA acceptance shall be based upon batch tickets provided by the Contractor to the RPR to confirm that the delivered material conforms to the mix design.

METHOD OF MEASUREMENT

153-5.1 Measurement.

No separate measurement for payment shall be made for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

BASIS OF PAYMENT

153-6.1 Payment.

No payment will be made separately or directly for controlled low strength material (CLSM). CLSM shall be considered necessary and incidental to the work of this Contract.

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM International (ASTM)

ASTM C33	Standard Specification for Concrete Aggregates
ASTM C150	Standard Specification for Portland Cement
ASTM C618	Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
ASTM C595	Standard Specification for Blended Hydraulic Cements
ASTM C1602	Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete
ASTM D4832	Standard Test Method for Preparation and Testing of Controlled Low-Strength Material (CLSM) Test Cylinders
ASTM D6103	Flow Consistency of Controlled Low Strength Material (CLSM)

END OF ITEM P-153

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Item L-105 Alterations, Removal and Demolition

DESCRIPTION

105-1.1 Definitions.

a. Alterations shall mean any change or rearrangement in the component parts, including structural, mechanical, electrical systems, or internal or external arrangements of an existing structure.

b. Removal shall mean the dismantling of existing materials, components, equipment, and utilities. Removed items shall be handled, prepared for storage, transported to storage areas as specified.

c. Demolition shall mean the dismantling and disposal of existing materials, components, equipment, and utilities which cannot or will not be reused or which will have no salvage value, or which cannot be reused due to unrepairable damage caused by age, non-demolition related reasons, etc. All demolished items not designated to be turned over to the Airport shall be disposed of in a safe manner and at a location acceptable to the RPR.

d. All items to be turned over to the Airport shall be properly enclosed or boxed to protect the items from damage and transported by the Contractor to a location on the Airport property, designated by the Engineer and/or the RPR.

e. The installation and/or removal of lighting equipment may be critical to airport operations; therefore, the Contractor shall follow the work schedule established in the plans and specifications or as directed by the Engineer. The system shall be installed in accordance with the National Electrical Code and/or local code requirements.

f. The Contractor shall provide temporary wiring as required to reconnect existing circuits to provide guidance for aircraft to pass through the construction areas on those taxiways/runways which must remain open. The Contractor shall check all temporary circuits before dark each day to assure that they are operational. In the event of failure, the Contractor shall immediately take steps to restore operation. The cost of temporary and reconnected lighting shall be absorbed in the various work items.

105-1.2 Condition of existing facilities.

a. The Contractor shall verify the areas, conditions, and features necessary to tie into existing construction. This verification shall be done prior to submittal of shop drawings, fabrication or erection, construction or installation. The Contractor shall be responsible for the accurate tie-in of the new work to existing facilities.

b. Special attention is called to the fact that there may be piping, fixtures or other items in the existing systems which must be removed or relocated in order to perform the alteration work. All conduit, wiring, boxes, etc., that do not comply with these specifications shall be removed or corrected to comply with these specifications. All unused conduit not removed shall be identified and a pull line shall be installed. The work shall include all removal and relocation required for completion of the alterations and the new construction.

c. Whenever the scope of work requires connection to an existing circuit, the circuit's insulation resistance shall be tested, in the presence of the RPR and Engineer. The Contractor shall record the results on the forms included in these specifications. When the circuit is returned to its final condition, the circuit's insulation resistance shall be checked again in the presence of the RPR and Engineer. The Contractor shall record the results on the forms included in these specifications. The second reading shall be equal to or

greater than the first reading or the Contractor shall make the necessary repairs to the circuit to bring the second reading above the first reading. All repair costs including a complete replacement of the cable, if necessary, shall be borne by the Contractor. All test results shall be submitted in the Operation and Maintenance Manuals as described in Item L-106, Submittals, Record Documents and Maintenance Manuals.

d. Occupancy and use of existing facilities. The RPR will occupy and use the facilities within the areas of work during the entire construction period. The Contractor shall be required to plan and coordinate his activities in order to provide all necessary controls for the abatement of dust, noise, and inconvenience to the Airport personnel during all phases of the work.

e. Vacating occupied areas. The RPR will remove all portable items of furniture, equipment, and fixtures prior to the start of work.

f. Safety requirements. The Contractor shall conduct alterations and removal operations in a manner that will ensure the safety of persons in accordance with the requirements of CFR 29 PART 1926 and 1910.

105-1.3 Classification of removed/demolished items.

a. Existing materials and equipment indicated to be removed will be classified as "salvageable" and shall remain the property of the Airport or will be classified as "debris" and shall be disposed of legally off the airport.

b. Reusable salvaged items:

1. Salvaged materials and equipment shall be reused in the work as described on the contract drawings, unless noted otherwise.

2. Items classified as debris shall be legally disposed of off the airport property. The cost of such disposal shall be included in the cost of other items of work.

c. Retained salvaged items:

1. Salvaged materials and equipment to be retained by the Airport but not reused in the work shall be turned over to the RPR at a site at the facility to be determined by the RPR. Retained salvaged items shall be stored on Airport property where indicated by the RPR.

105-1.4 Temporary protection.

a. The Contractor shall provide and maintain the following requirements:

1. Protection of persons and property shall be provided throughout the progress of the work in accordance with these specifications.

2. Provide temporary enclosures and partitions prior to starting alterations and removal of work. Such items shall protect existing materials, equipment, and other remaining building or system components from damage by weather and construction operations.

3. Provide temporary enclosures to isolate space utilized by equipment during construction, from dirt, dust, noise, and unauthorized entry.

4. Provide temporary exits, entrances, and protected passages where work prevents the use of existing facilities.

5. Provide weathertight temporary enclosures over and around openings to be made in existing exterior construction prior to the start of work. The Contractor shall maintain such temporary enclosures until new construction will protect the interior of existing facilities from the elements.

6. Provide temporary exterior wall construction which will be designed and fabricated to resist an applied horizontal wind pressure of not less than 130 mph.

7. Provide temporary exterior roof construction which will be capable of supporting an applied vertical live load of not less than 200 psf, uniformly distributed over the entire roof area.

8. Design and fabricate temporary enclosures to maintain temperatures inside the existing facilities within a range of plus-or-minus 5 degrees F of normal operating conditions.

9. Provide temporary jet blast structures which will withstand the jet blast with a safety factor of 2.

PRODUCTS (Not Used)

EXECUTION

105-3.1 Disconnecting utilities. Prior to the start of work, the necessary utilities serving each area of alteration or removal will be shut off by the RPR and shall be disconnected and sealed by the Contractor, as required. Lockout/Tag/Try procedures shall be utilized.

105-3.2 Temporary utility services The Contractor shall install temporary utility services in satisfactory operating condition before disconnecting existing utilities. Such temporary services shall be maintained during the period of construction and removed only after new permanent services have been tested and are in operation.

105-3.3 Removal work.

a. The Contractor shall not disturb the existing construction beyond that indicated or necessary for installation of new work. Temporary shoring and bracing for support of building components to prevent settlement or other movement shall be as indicated and as required to protect the work.

b. The Contractor shall provide protective measures to control accumulation and migration of dust and dirt in all areas of work, particularly those adjacent to occupied areas. The Contractor shall remove dust, dirt, and debris from the areas of work daily.

105-3.4 Salvageable materials and equipment.

a. The Contractor shall remove all salvageable materials and equipment in a manner that will cause the least possible damage thereto. The equipment shall be properly supported during the removal operation to prevent damage. Removed items which are to be retained by the Airport shall be carefully handled, stored, and protected.

b. The Contractor shall provide identification tags on all items boxed or placed in containers, indicating the type, size, and quantity of materials.

105-3.5 Buildings and structures.

a. The Contractor shall perform removal operations in existing buildings as indicated and as otherwise required to complete the work.

b. Existing concrete shall be demolished, removed, and disposed of. Square, straight edges shall be provided where existing concrete adjoins new work and at other locations where indicated. Existing steel reinforcement shall be protected where indicated; otherwise, it shall be cut off flush with face of concrete.

c. The Contractor shall dismantle steel components at field connections and in a manner that will prevent bending or damage.

d. The use of flame-cutting torches will be permitted only when other methods of dismantling are not practical, and when approved in writing by the RPR and/or Engineer.

105-3.6 Electrical equipment and fixtures.

a. Wiring systems and components shall be salvaged. Loose items shall be boxed and tagged for identification.

b. All unused conduit not removed shall have a pull string installed and shall be noted on the record drawings.

c. Primary, secondary, control, communication, and signal circuits shall be disconnected at the point of attachment to their distribution system.

d. The Contractor shall remove and salvage electrical fixtures. Incandescent lamps, mercury-vapor lamps, and fluorescent lamps shall be salvaged, boxed and tagged for identification, and protected from breakage.

e. The Contractor shall remove and salvage switches, receptacles, fixtures, transformers, constant current regulators, meters, instruments, plates, circuit breakers, panelboards, outlet boxes, and similar items. These items shall be boxed, and tagged for identification according to type and size.

f. The Contractor shall remove and dispose of conductors and conduits not used in the finished work and shown to be demolished on the plans.

105-3.7 Demolition.

a. Demolition Operations:

1. Demolition operations shall be conducted to ensure the safe passage of persons to and from facilities occupied and used by the Airport and to prevent damage by falling debris or other cause to adjacent buildings, structures, and other facilities.

2. The sequence of operations shall be such that maximum protection from inclement weather will be provided for materials and equipment located in partially dismantled structures.

b. Maintaining Traffic

1. Demolition operations and removal of debris to disposal areas shall be conducted to ensure minimum interference with runways, taxiways, aprons, roads, streets, walks, and other facilities occupied and used by the Airport.

2. Streets, walks, runways, taxiways and other facilities occupied and used by the Airport shall not be closed or obstructed without written permission from the RPR.

c. Reference Standards Requirements

1. Demolition operations shall be conducted to ensure the safety of persons in accordance with ANSI A 10.6 Safety Requirements for Demolition.

2. Demolition shall be conducted in accordance with OSHA, State and local requirements.

105-3.8 Disposal of demolished materials.

a. General

1. The Contractor shall dispose of debris, rubbish, scrap, and other non-salvageable materials resulting from demolition operations. Demolished materials shall not be stored or disposed of on Airport property.

b. Removal from Airport Property

1. Materials classified as debris shall be transported from Airport property and legally disposed of at no additional cost to the Airport. Permits and fees for disposal shall be paid by the Contractor.

105-3.9 Alteration work.

a. General.

1. Cutting, patching, repairing, and other alteration work shall be done by tradesman skilled in the particular trade or work required.

2. Where required to patch or extend existing construction, or both, such alteration work shall match existing exposed surface materials in finish, color, texture, and pattern.

3. Salvaged items for reuse shall be as approved by the Engineer and RPR.

METHOD OF MEASUREMENT

105-4.1 This item provides for the removal and disposal of cable, conduit or concrete duct bank as described in the item description and identified in the drawings and specifications. Where this item pertains to removal of conduit or duct bank, removing all associated **cables or cable bundles,** counterpoise wire, ground rods, etc. is incidental to the work. **This item does not require any excavation for the sole purpose of the conduit demolition. It is assumed that the conduit will be demolished because it is located in the same trench where the new conduit pathway will be installed. In instances when that is not the case, only the cables will be removed and the conduit will be abandoned,** This item additionally includes restoration of the site, where required, including site grading to prohibit ponding and installation of vegetation in accordance with the specifications. Measurement for this item will be per linear foot, installed complete and accepted by the OAR.

105-4.2 This item provides for the removal of elevated edge lights and base cans as described in the line-item description and identified in the drawings and specifications. This item includes the salvaging or protecting of existing equipment as noted in the description and contract drawings, or as directed by the OAR. For elevated edge lights being removed, this includes removal of the light fixture, isolation transformer, connector kit, and ground connections. Where this item pertains to base cans being demolished, this item includes the removal of the base can, hubs, spacer rings, gaskets, bolting hardware, ground rod, foundations, and all other incidentals. Where there is a brooks box or small junction structure associated with a stake mounted edge light, this item includes the removal of that structure as well. All other equipment, devices, components, and materials not required by OAR must be removed and disposed of off-site by the Contractor. This item includes all materials, labor, preparation, incidentals and services required for full completion of this item to the satisfaction of the OAR. Measurement for this item will be per each, complete and accepted by the OAR.

105-4.3 This item provides for the removal of electrical junction structures and duct markers as described in the item description and identified in the drawings and specifications. This item includes all materials, labor, transportation incidentals and services required for the removal and disposal of existing electrical structures of the type noted and associated equipment, as shown on the plans. Measurement of this item will be per each, complete and accepted by the OAR. This includes the plugging or capping of all existing conduits entering the electrical structure that are not scheduled to be removed. Site restoration and grading area around structure removal are incidental to this item.

105-4.4 This item provides for the removal of guidance signs including foundations as described in the item description and identified in the drawings and specifications. This item includes removal of the sign panels, housing, foundation with L-867D base can, ground rods, ground connections, isolation transformers, tethers, anchors, etc. for the complete removal of the sign. This item additionally includes restoration of the site including, but not limited to, sodding, including site grading to prohibit ponding and installation of vegetation in accordance with the specifications. Measurement for this item will be per each, complete and accepted by the OAR.

105-4.5 This item provides for the demolition of an existing electrical vault. This item includes demolition of the existing vault structure and all associated equipment within the vault, including the vaults foundation. This item additionally includes restoration of the site including, but not limited to, sodding, including site grading to prohibit ponding and installation of vegetation in accordance with the specifications. **The demolition scope includes the disconnection and removal of all associated feeder cables and equipment attached to the electrical vault to the next point of termination beyond the vault limits. If there is a freestanding equipment rack serving the electrical vault, the removal of all abandoned equipment due to the vault demolition including the equipment rack in its entirety is incidental to this item.** Measurement for this item will be per each, complete and accepted by the OAR.

105-4.6 This item provides for the demolition of an existing miscellaneous airfield visual aid, including wind cones, beacons, PAPIs, and REILs. This item includes demolition of the entire structure including foundation and all associated components, as outlined on the contract drawings. Incidental to this item is demolition of power conductors for the associated piece of equipment, back to source and disconnecting from source. **Where the source equipment becomes abandoned, this item includes removal of the associated abandoned equipment. If there is a freestanding equipment rack supporting the equipment, the removal of the equipment rack if it becomes abandoned in its entirety is incidental to this item** Measurement for this item will be per each, complete and accepted by the OAR. Separate payment will be made for type of equipment.

BASIS OF PAYMENT

105-5.1 Payment for this item will be made at the contract unit price per linear foot, which constitutes full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, supervision, equipment, tools and incidentals necessary to complete this item. Backfilling voids is incidental and shall be per FAA Items P-152, Excavation, Subgrade, and Embankment and P-610, Concrete for Miscellaneous Structures. No separate payment will be made for disposal or backfilling voids per Item. Waste and unsuitable materials removed must be disposed of off-site by the Contractor in accordance with local laws and regulations. All other materials removed must be hauled separately to the EMMS, unless otherwise directed by the OAR. The cost of removing and disposing of the material will not constitute a pay item and will be considered incidental to removal.

105-5.2 Payment for this item will be made at the contract unit price per each, which constitutes full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, supervision, equipment, tools and incidentals necessary to complete this item. Backfilling voids is incidental and shall be per FAA Items P-152, Excavation, Subgrade, and Embankment and P-610, Concrete for Miscellaneous Structures. No separate payment will be made for disposal or backfilling voids per Item. Waste and unsuitable materials removed must be disposed of off-site by the Contractor in accordance with local laws and regulations. All other materials removed must be hauled separately to the EMMS, unless otherwise directed by the OAR. The cost of removing and disposing of the material will not constitute a pay item and will be considered incidental to removal.

Payment will be made under:

Item L-105-5.1	Remove No. 8 AWG, L-824C in Duct, per Linear Foot
Item L-105-5.2	Remove 2-inch Conduit ~~(~~Including cable**(s)**~~)~~, per Linear Foot
Item L-105-5.3	Remove Existing Stake Mounted Elevated Taxiway Edge Light **and associated brooks box**, per Each
Item L-105-5.4	Remove Existing Elevated Taxiway Edge Light and Base Can, per Each
Item L-105-5.5	Remove Existing Elevated Taxiway Edge Light, Base Can to Remain, per Each

Item L-105-5.6	Remove Existing Stake Mounted Elevated Runway Edge Light and Associated Brooks Box, per Each
Item L-105-5.7	Remove Existing Elevated Runway Edge Light and Base Can, per Each
Item L-105-5.8	Remove Existing Elevated Runway Edge Light, Base Can to Remain, Per Each
Item L-105-5.9	Remove Existing Stake Mounted Elevated Threshold End Light and Associated Brooks Box, per Each
Item L-105-5.10	Remove Existing Elevated Threshold End Light, Base Can to Remain, per Each
Item L-105-5.11	Remove Existing Elevated Threshold End Light and Base Can, per Each
Item L-105-5.12	Remove Guidance Sign, Foundation to Remain, per Each
Item L-105-5.13	Remove Guidance Sign and Foundation, per Each
Item L-105-5.14	Remove Existing Manhole, per Each
Item L-105-5.15	Remove Existing Pullbox, per Each
Item L-105-5.16	**Remove Existing Duct Marker, per Each**
Item L-105-5.16	Demolish Existing Electrical Vault Building and Equipment, per Each
Item L-105-5.17	Remove Existing Wind Cone and Associated Foundation, per Each
Item L-105-5.18	Remove Existing Beacon, Pole, and Foundation, per Each
Item L-105-5.19	Remove Existing Beacon and Pole, Beacon to be Salvaged, per Each
Item L-105-5.20	Remove Existing PAPI-**2** Unit, per Each
Item L-105-5.20	**Remove Existing PAPI-4 Unit, per Each**
Item L-105-5.21	Remove Existing REIL Unit, per Each

END OF ITEM L-105

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Item L-107 Airport Wind Cones

107-1.1 Description.

a. This item shall consist of furnishing and installing an airport wind cone per these specifications and per the dimensions, design, and details shown in the plans.

b. The work shall include the furnishing and installation of a support for mounting the wind cone, the specified wire, and a concrete foundation. The item shall also include all cable connections, conduit and conduit fittings, the furnishing and installation of all lamps, ground rod and ground connection, the testing of the installation, and all incidentals necessary to place the wind cone in operation as a completed unit to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

107-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (ACs) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials that comply with these specifications, at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the Contract Documents plans and specifications. The Contractor's submittals shall be in an electronic pdf file format tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

107-2.2 Wind Cones. The primary wind cone assembly shall be identified on the drawings.

107-2.3 Electrical Wire and Cable. Cable rated up to 5,000 volts in conduit shall conform to AC 150/5345-7, Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

107-2.4 Conduit. Rigid steel conduit and fittings shall conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242.

107-2.5 Plastic Conduit (for use below grade only). Plastic conduit and fittings shall be per the following:

a. UL 514B covers W-C-1094 - Conduit fittings all types, Classes 1 thru 3 and 6 thru 10

b. UL 514C covers W-C-1094 - all types, Class 5 junction box and cover in plastic (polyvinyl chloride (PVC))

c. UL 651 covers W-C-1094 - Rigid PVC Conduit, types I and II, Class 4

d. UL 651A covers W-C-1094 - Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4

e. Underwriters Laboratories Standard UL-651 shall be one of the following, as shown in the plans:

1. Type I–Schedule 40 PVC suitable for underground use either direct-buried or encased in concrete.

2. Type II–Schedule 40 PVC suitable for either above ground or underground use.

f. Plastic conduit adhesive shall be a solvent cement manufactured specifically for the purpose of gluing the type of plastic conduit and fitting.

107-2.6 Concrete. The concrete for foundations shall be proportioned, placed, and cured in accordance with Item P-610, Structural Portland Cement Concrete.

107-2.7 Paint

a. Priming paint for non-galvanized metal surfaces shall be a high solids alkyd primer compatible with the manufacturer's recommendations for the intermediate or topcoat.

b. Priming paint for galvanized metal surfaces shall be zinc dust-zinc oxide primer paint conforming to MIL-DTL-24441C/19B. Use MIL-24441 thinner per paint manufacturer's recommendations.

c. Orange paint for the body and the finish coats on metal and wood surfaces shall consist of a ready-mixed non-fading paint per Master Painter's Institute (MPI) Reference #9 (gloss). The color shall be per Federal Standards 595, International Orange, Number 12197.

d. White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the MPI, Reference #9, Exterior Alkyd, Gloss.

e. Priming paint for wood surfaces shall be mixed on the job by thinning the above specified aviation-orange or white paint by adding ½ pint (0.06 liter) of raw linseed oil to each gallon (liter).

CONSTRUCTION METHODS

107-3.1 Installation. The hinged support or hinged pole shall be installed on a concrete foundation as shown in the plans.

107-3.2 Support Pole Erection. The Contractor shall erect the pole on the foundation following the manufacturer's requirements and erection details. The pole shall be level and secure.

107-3.3 Electrical Connection. The Contractor shall furnish all labor and materials and shall make complete electrical connections per the wiring diagram furnished with the project plans. The electrical installation shall conform to the requirements of the latest edition of National Fire Protection Association, NFPA-70, National Electric Code.

Underground cable and duct for cable installation shall be installed in accordance with Item L-108, Underground Power Cables for Airports, and Item L-110, Airport Underground Electrical Duct Banks and Conduits in locations as shown on the plans.

107-4.1 Booster Transformer. If shown in plans or specified in job specifications, a booster transformer to compensate for voltage drop to the lamps shall be installed in a suitable weatherproof housing. The booster transformer shall be installed as indicated in the plans and described in the proposal. If the booster transformer is required for installation remotely from the windcone, it shall be incidental to the line item in which it is installed.

107-4.2 Ground Connection And Ground Rod. The Contractor shall furnish and install a ground rod, grounding cable, and ground clamps for grounding the "A" frame of the 12-foot (3.7-m) assembly or pipe support of the 8-foot (2.4-m) support near the base. The ground rod shall be of the type, diameter and length specified in Item L-108, Underground Power Cable for Airports. The ground rod shall be driven into the ground adjacent to the concrete foundation (minimum distance from foundation of 2 feet (60 cm)) so that the top is at least 6 inches (150 mm) below grade. The grounding cable shall consist of No. 6 American wire gauge (AWG) minimum stranded copper wire or larger and shall be firmly attached to the ground rod by exothermic welding. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. The other end of the grounding cable shall be securely attached to a leg of the frame or to the base of the pipe support with non-corrosive metal and shall be of substantial construction. The resistance to ground shall not exceed 25 ohms. If a single rod grounding electrode has a resistance to earth of over 25 ohms, then install one supplemental rod not less than 10 feet from the first rod. If desired resistance to ground levels are still not achieved, see FAA-STD-019 for guidance on the application of coke breeze.

107-4.3 Painting. Three coats of paint shall be applied (one prime, one body, and one finish) to all exposed material installed under this item except the fabric cone, obstruction light globe, and lamp reflectors. The wind cone assembly, if already painted upon receipt, shall be given one finish coat of paint in lieu of the three coats specified above. The paint shall be per MPI Reference #9 (gloss). The color shall be per Federal Standard 595, International Orange, Number 12197.

107-4.4 Light Sources. The Contractor shall furnish and install lamps per the manufacturer's instruction book.

107-4.5 Chain And Padlock.

a. The Contractor shall furnish and install a suitable operating chain for lowering and raising the hinged top section. The chain shall be attached to the pole support in a manner to prevent the light fixture assembly from striking the ground in the lowered position.

b. A padlock shall also be furnished by the Contractor on the 8-foot (2.4-m) wind cone for securing the hinged top section to the fixed lower section. Keys for the padlock shall be delivered to the RPR.

METHOD OF MEASUREMENT

107-5.1 The quantity to be paid shall be the number of primary wind cones installed as completed units in place, accepted, and ready for operation. This item includes the wind cone, pole base, foundation with

concrete pad, anchor bolts, LED light kit, LED obstruction Light, shaft assembly, bearing assembly, aluminum mast structure, grounding, frangible coupling, boxes and L-867 Base Can with Steel cover, isolation transformer, L-823 connector kit, concrete encasement, terminations, testing, labels and all incidentals for a complete working system. There is separate payment for various windcone sizes and for painting a segmented circle.

BASIS OF PAYMENT

107-6.1 Payment will be made at the contract unit price for each completed and accepted job. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete this item.

Payment will be made under:

Item L-107-5.1	Install New L-807(L) Primary Wind Cone Including Tip Down Pole, Foundation, and Segmented Circle, per Each
Item L-107-5.2	Paint Existing Segmented Circle around Windcone, Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-5	Segmented Circle Airport Marker System
AC 150/5340-30	Design and Installation Details for airport Visual Aids
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-27	Specification for Wind Cone Assemblies
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description

A-A-59544	Cable and Wire, Electrical (Power, Fixed Installation)

Federal Standard (FED STD)

FED STD 595	Colors Used in Government Procurement

Master Painter's Institute (MPI)

MPI Reference #9	Alkyd, Exterior, Gloss (MPI Gloss Level 6)

Mil Standard

MIL-DTL-24441C/19B	Paint, Epoxy-Polyamide, Zinc Primer, Formula 159, Type III

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit – Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings

UL Standard 651A Type EB and A Rigid PVC Conduit and HDPE Conduit

UL Standard 1242 Electrical Intermediate Metal Conduit - Steel

National Fire Protection Association (NFPA)

NFPA-70 National Electric Code (NEC)

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Item L-109 Airport Transformer Vault and Vault Equipment

DESCRIPTION

109-1.1 This item shall consist of the installation of a new constant current transformer within the existing electrical lighting vault, as well as updating the graphics of the existing ALCMS display servicing the airfield.

EQUIPMENT AND MATERIALS

109-2.1 General.

a. Airport lighting equipment and materials covered by advisory circulars (AC) shall be certified in AC 150/5345-53, Airport Lighting Equipment Certification Program (ALECP) and listed in the ALECP Addendum.

b. All other equipment and materials covered by other referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

c. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

d. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

e. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be provided in electronic pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

f. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

VAULT AND PREFABRICATED METAL HOUSING

109-3.1 Electrical vault building. The electrical vault building must comply with NEC Article 110.31, Enclosure for Electrical Installations, Item (A) Electrical Vaults. Construct the building of materials having adequate structural strength for the conditions and installed location, has a minimum fire rating of two or three hours as determined by the authority having jurisdiction (AHJ), and is bullet resistant to minimum UL 752 Level 4.

109-3.2 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

109-3.3 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

109-3.4 Reinforcing steel. Reinforcing steel bars shall be intermediate or structural grade deformed-type bars and shall be per ASTM A615.

109-3.5 Brick. Brick shall be per ASTM C62, Grade SW.

109-3.6 Rigid steel conduit. Rigid steel conduit and fittings shall be per Underwriters Laboratories Standards 6 and 514B.

109-3.7 Plastic Conduit and fittings. Plastic Conduit and fittings shall conform to the requirements of UL-651 and UL-654 schedule 40 polyvinyl chloride (PVC) suitable for use above or below ground.

109-3.8 Lighting. Vault or metal-housing light fixtures shall be of a vapor-proof type.

109-3.9 Outlets. Convenience outlets shall be heavy-duty duplex units designed for industrial service.

109-3.10 Switches. Vault or metal-housing light switches shall be single-pole switches.

109-3.11 Paint.

109-3.12 Priming paint for non-galvanized metal surfaces shall be a high solids alkyd primer compatible with the manufacturer's recommendations for the intermediate or topcoat.

109-3.13 White paint for body and finish coats on metal and wood surfaces shall be ready-mixed paint conforming to the Master Painter's Institute (MPI), Reference #9, Exterior Alkyd, Gloss.

109-3.14 Priming paint for wood surfaces shall be mixed on the job by thinning the specified white paint by adding 1/2 pint (0.24 liter) of raw linseed oil to each gallon (liter).

109-3.15 Paint for the floor, ceiling, and inside walls shall be per Porter Paint Company 69, 71, and 79 or equivalent. Walls and ceiling shall be light gray and the floor shall be medium gray.

109-3.16 The roof coating shall be hot asphalt material per ASTM D2823. Asbestos-free roof coating per ASTM D4479 may be substituted if required by local codes.

109-3.17 Ground bus. Ground bus shall be 1/8 × 3/4 inch (3 × 19 mm) minimum copper bus bar.

109-3.18 Square duct. Duct shall be square similar to that manufactured by the Square D Company (or equivalent), or the Trumbull Electric Manufacturing Company (or equivalent). The entire front of the duct on each section shall consist of hinged or removable cover for ready access to the interior. The cross-section of the duct shall be not less than 4 × 4 inch (100 × 100 mm) except where otherwise shown in the plans.

109-3.19 Ground rods. Ground rods shall be in accordance with Item L-108.

109-3.20 Vault prefabricated metal housing. The prefabricated metal housing shall be a commercially available unit.

109-3.21 FAA-approved equipment. Certain items of airport lighting equipment installed in vaults are covered by individual ACs listed below:

AC 150/5345-3	Specification for L-821, Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits.
AC 150/5345-49	Specification for L-854, Radio Control Equipment
AC 150/5345-56	Specification for L-890 Airport Lighting Control and Monitoring System (ALCMS)

109-3.22 Other electrical equipment. Distribution transformers, oil switches, cutouts, relays, terminal blocks, transfer relays, circuit breakers, and all other regularly used commercial items of electrical equipment not covered by FAA equipment specifications and ACs shall conform to the applicable rulings and standards of the Institute of Electrical and Electronic Engineers (IEEE) or the National Electrical Manufacturers Association (NEMA). When specified, test reports from a testing laboratory indicating that the equipment meets the specifications shall be supplied. In all cases, equipment shall be new and a first-grade product. This equipment shall be supplied in the quantities required for the specific project and shall incorporate the electrical and mechanical characteristics specified in the proposal and plans. Equipment selected and installed by the Contractor shall maintain the interrupting current rating of the existing systems or specified rating whichever is greater.

109-3.23 Wire. Wire (in conduit) rated up to 5,000 volts shall be per AC 150/5345-7, Specification for L-824 Underground Electrical Cables for Airport Lighting Circuits. For ratings up to 600 volts, moisture and heat resistant thermoplastic wire conforming to Commercial Item Description A-A-59544A Type THWN-2 shall be used. The wires shall be of the type, size, number of conductors, and voltage shown in the plans or in the proposal.

a. Control Circuits. Unless otherwise indicated on the plans, wire shall be not less than No. 12 American wire gauge (AWG) and shall be insulated for 600 volts. If telephone control cable is specified, No. 19 AWG telephone cable per ANSI/Insulated Cable Engineers Association (ICEA) S-85-625 specifications shall be used.

b. Power circuits.

1. 600 volts maximum – Wire shall be No. 6 AWG or larger and insulated for at least 600 volts.

2. 3,000 volts maximum – Wire shall be No. 6 AWG or larger and insulated for at least 3,000 volts.

3. Over 3,000 volts-Wire shall be No. 6 AWG or larger and insulated for at least the circuit voltage.

109-3.24 Short circuit / coordination / device evaluation / arc flash analysis. The Contractor shall, based upon the equipment provided, include as a part of the submittal process the electrical system "Short Circuit / Coordination / Device evaluation / Arc Flash Analysis". The analysis shall be performed by the equipment manufacturer and submitted in a written report. The analysis shall be signed and sealed by a registered professional Engineer from the state in which the project is located. The analysis shall comply with NFPA-70E and IEEE 1584.

The analysis will include: one line diagrams, short circuit analysis, coordination analysis, equipment evaluation, arc flash analysis and arc flash labels containing at a minimum, equipment name, voltage/current rating, available incident energy and flash protection boundary.

The selected firms field service Engineer shall perform data gathering for analysis completion and device settings, perform device setting as recommended by the analysis and will furnish and install the arc flash labels. The components worst case incident energy will be considered the available arc flash energy at that specific point in the system. Submit three written copies and one electronic copy of the report.

CONSTRUCTION METHODS

CONSTRUCTION OF VAULT AND PREFABRICATED METAL HOUSING

109-5.1 General. The Contractor shall construct the transformer vault or prefabricated metal housing at the location indicated in the plans. Vault construction shall be reinforced concrete, concrete masonry, or brick wall as specified. The metal housing shall be prefabricated equipment enclosure to be supplied in the size specified. The mounting pad or floor details, installation methods, and equipment placement are shown in the plans. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program.

The Contractor shall clear, grade, and seed the area around the vault or metal housing for a minimum distance of 10 feet (3 m) on all sides. The slope shall be not less than 1/2 inch per foot (12 mm per 0.3 m) away from the vault or metal housing in all directions.

The vault shall provide adequate protection against weather elements, including rain, wind-driven dust, snow, ice and excessive heat. The vault shall have sufficient filtered ventilation, to assure that the interior room temperatures and conditions do not exceed the recommended limits of the electrical equipment to be installed in the vault. The Contractor is responsible for contacting the manufacturer of the equipment to be installed to obtain environmental limitations of the equipment to be installed. Refer to the electrical vault detail plan sheets for construction requirements. The prefabricated building shall include roof, walls and floor in accordance with the details and these specifications.

109-5.2 Foundation and walls.

a. Reinforced concrete construction. The Contractor shall construct the foundation and walls per the details shown in the plans. Unless otherwise specified, internal ties shall be of the mechanical type so that when the forms are removed the ends of the ties shall be at least one inch (25 mm) beneath the concrete surface; the holes shall be plugged and finished to prevent discoloration. Reinforcing steel shall be placed, as shown in the drawings, and secured in position to prevent displacement during the concrete placement.

The external surfaces of the concrete shall be thoroughly worked during the placing operation to force all coarse aggregate from the surface. Thoroughly work the mortar against the forms to produce a smooth finish free from air pockets and honeycomb.

The surface film of all pointed surfaces shall be removed before setting occurs. As soon as the pointing has set sufficiently, the entire surface inside and outside of the vault shall be thoroughly wet with water and rubbed with a No. 16 carborundum stone, or equivalent quality abrasive, bringing the surface to a paste. All form marks and projections shall be removed. The surface produced shall be smooth and dense without pits or irregularities. The materials which have been ground into a paste during the rubbing process shall be spread or brushed uniformly over the entire surface (except the interior surfaces that are to be painted shall have all paste removed by washing before painting) and permitted to reset. Final

exterior finish shall be obtained by rubbing with No. 30 carborundum stone, or an equivalent quality abrasive. The surface shall be rubbed until the entire surface is smooth and uniform in color.

b. Brick and concrete construction. When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The outer edge of the foundation at the floor level shall be beveled 1-1/2 inches (38 mm) at 45 degrees. Brick walls shall be 8 inches (200 mm) thick, laid in running bond with every sixth course a header course. Brick shall be laid in cement mortar (one part masonry cement and 3 parts sand) with full mortar bed and shoved joints. All joints shall be completely filled with mortar, and facing brick shall be back-parged with mortar as work progresses. All joints shall be 3/8 inch (9 mm) thick, exterior joints tooled concave, and interior joints struck flush. Both interior and exterior brick surfaces shall be cleaned and nail holes, cracks and other defects filled with mortar. When specified, a nonfading mineral pigment mortar coloring shall be added to the mortar. Steel reinforcing bars, 3/8 inch (9 mm) in diameter and 12 inches (300 mm) long, shall be set vertically in the center of the brick wall on not more than 2 feet (60 cm) centers to project 2-1/2 inches (60 mm) into the concrete roof slab. Lintels for supporting the brickwork over doors, windows, and louvers shall consist of two $4 \times 3 \times 3/8$ inch ($100 \times 75 \times 9$ mm) steel angles. Lintels shall be painted with one coat of corrosion-inhibiting primer before installation, and all exposed parts shall be painted similar to doors and window sash after installation.

Window sills may be concrete poured in place or precast concrete as indicated in the plans. All exposed surfaces shall have a rubbed finish as specified under reinforced concrete construction. After completion, all interior and exterior faces of walls shall be scrubbed with a solution of muriatic acid and water in the proportions of not less than one part acid to 10 parts of water. All traces of efflorescence, loose mortar, and mortar stain shall be removed, and the walls washed down with clear water.

c. Concrete masonry construction. When this type of construction is specified, the foundation shall be concrete conforming to the details shown in the plans. The concrete masonry units shall be standard sizes and shapes and shall conform to ASTM C90 and shall include the closures, jambs, and other shapes required by the construction as shown in the plans. Standard construction practice shall be followed for this type of work including mortar, joints, reinforcing steel for extensions into roof slab, etc. Plaster for interior walls, if specified, shall be Portland cement plaster.

109-5.3 Roof. The roof shall be reinforced concrete as shown in the plans. Reinforcing steel shall be placed as shown in the drawing and secured in position to prevent displacement during the pouring of the concrete. The concrete shall be poured monolithically and shall be free of honeycombs and voids. The surface shall have a steel-troweled finish and shall be sloped as shown in the drawing. The underside of the roof slab shall be finished in the same manner as specified for walls.

One brush or mop coat of hot asphalt roof coating shall be applied to the top surface of the roof slab. The asphalt material shall be heated to within the range specified by the manufacturer and immediately applied to the roof. The finished coat shall be continuous over the roof surface and free from holidays and blisters. Smears and dribbles of asphalt on the roof edges and building walls shall be removed.

109-5.4 Floor. Construct building foundation in accordance with the details shown in the plans. The floor shall be reinforced concrete as shown in the drawings. When present, all sod, roots, refuse, and other perishable material shall be removed from the area under the floor to a depth of 8 inches (200 mm), unless a greater depth is specified in the invitation for bids. This area shall be backfilled with materials consisting of sand, cinders, gravel, or stone. Fill shall be placed in layers not to exceed 4 inches (100 mm) and shall be thoroughly compacted by tamping or rolling. A layer of building paper shall be placed over the fill prior to placing concrete. The floor surfaces shall have a steel-troweled finish. The floor shall be level unless a drain is specified, in which case the floor shall be pitched 1/4 inch (6 mm) per foot downward toward the drain. A 1/4-inch (6-mm) asphalt felt expansion joint shall be placed between floor and foundation walls. The floor shall be poured monolithically and shall be free of honeycombs and voids.

109-5.5 Floor drain. If shown in the plans, a floor drain and dry well shall be installed in the center of the floor of the equipment room. The dry well shall be excavated 4 × 4 feet (1.2 × 1.2 m) square and to a depth of 4 feet (1.2 m) below the finished floor elevation and shall be backfilled to the elevation of the underside of the floor with gravel - which shall all pass a 2-inch (50 mm) mesh sieve and shall all be retained on a 1/4-inch (6.3 mm) mesh sieve. The gravel backfill shall be placed in 6 inch (150 mm) maximum layers, and the entire surface of each layer shall be tamped either with a mechanical tamper or with a hand tamper weighing not less than 25 pounds (11 kg) and having a face area of not more than 36 square inches (232 square cm) nor less than 16 square inches (103 square cm). The drain inlet shall be set flush in the concrete floor. The drain shall have a clear opening of not less than 8 inches (200 mm) in diameter.

109-5.6 Conduits in floor and foundation. Conduits shall be installed in the floor and through the foundation walls per the details shown in the plans. All underground conduit shall be painted with an asphalt compound. Conduit shall be installed with a coupling or metal conduit adapter flush with the top of the floor. All incoming conduit shall be closed with a pipe plug to prevent the entrance of foreign material during construction. Space conduit entrances shall be left closed.

109-5.7 Doors. Doors shall be metal-clad fireproof Class A (three (3) hour rated) doors conforming to requirements of the National Electrical Code (NEC) and local electrical codes. Panic bar exit hardware shall be installed per NEC requirements. Refer to the new electrical vault detail plan sheets for construction requirements.

109-5.8 Painting. The floor, ceiling, and inside walls of concrete construction shall first be given a hardening treatment, after which the Contractor shall apply two coats of paint as specified below, except that interior face brick walls need not be painted. The hardening treatment shall consist of applying two coats of either a commercial floor hardener or a solution made by dissolving 2 pounds (0.9 kg) of magnesium fluorosilicate or zinc sulfate crystals in one gallon (liter) of water. Each coat shall be allowed to dry at least 48 hours before the next application. After the second treating coat has dried, the surfaces shall be brushed clean of all crystals and thoroughly washed with clear water. Paint for walls and ceiling shall be a light gray color approved by the RPR. The floor paint shall be a medium gray color approved by the RPR. Before painting, the surfaces shall be dry and clean. The first coat shall be thinned by adding 2/3-quart (0.63 liters) of spar varnish and 1/3-quart (0.31 liters) of turpentine to each gallon (liter) of paint. The second coat shall be applied without thinning. All doors, lintels, and windows shall be cleaned to remove any rust or foreign material and shall be given one body and one finish coat of white paint. Bare metal surfaces shall be given a prime coat of corrosion-inhibiting primer prior to the body and finish coats.

109-5.9 Lights and switches. The Contractor shall furnish and install a minimum of two duplex convenience outlets in the vault room. Where a control room is specified, at least two duplex outlets shall be installed.

INSTALLATION OF EQUIPMENT IN VAULT OR PREFABRICATED METAL HOUSING

109-6.1 General. The Contractor shall furnish, install, and connect all equipment, equipment accessories, conduit, cables, wires, buses, grounds, and support necessary to ensure a complete and operable electrical distribution center for the airport lighting system as specified herein and shown in the plans. When specified, an emergency power supply and transfer switch shall be provided and installed.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and local code agency having jurisdiction. All electrical work shall comply with the NEC and local code agency having jurisdiction including the separation of under 600V work from 5,000V work."

109-6.2 Power supply equipment. Transformers, regulators, booster transformers, and other power supply equipment items shall be furnished and installed at the location shown in the plans or as directed

by the RPR. The power supply equipment shall be set on steel "H" sections, "I" beams, channels, or concrete blocks to provide a minimum space of 1-1/2 inch (38 mm) between the equipment and the floor. The equipment shall be placed so as not to obstruct the oil-sampling plugs of the oil-filled units; and name-plates shall, so far as possible, not be obscured.

If specified in the plans and specifications, equipment for an alternate power source or an emergency power generator shall be furnished and installed. The alternate power supply installation shall include all equipment, accessories, an automatic changeover switch, and all necessary wiring and connections. The emergency power generator set shall be the size and type specified.

109-6.3 Switchgear and panels. Oil switches, fused cutouts, relays, transfer switches, panels, panel boards, and other similar items shall be furnished and installed at the location shown in the plans or as directed by the RPR. Wall or ceiling mounted items shall be attached to the wall or ceiling with galvanized bolts of not less than 3/8-inch (9 mm) diameter engaging metal expansion shields or anchors in masonry or concrete vaults.

109-6.4 Duct and conduit. The Contractor shall furnish and install square-type exposed metallic ducts with hinged covers for the control circuits in the vault. These shall be mounted along the walls behind all floor-mounted equipment and immediately below all wall-mounted equipment. The hinged covers shall be placed to open from the front side with the hinges at the front bottom.

Wall brackets for square ducts shall be installed at all joints 2 feet (60 cm) or more apart with intermediate brackets as specified. Conduit shall be used between square ducts and equipment or between different items of equipment when the equipment is designed for conduit connection. When the equipment is not designed for conduit connection, conductors shall enter the square-type control duct through insulating bushings in the duct or on the conduit risers.

109-6.5 Wiring and connections. The Contractor shall make all necessary electrical connections in the vault per the wiring diagrams furnished and as directed by the RPR. In wiring to the terminal blocks, the Contractor shall leave sufficient extra length on each control lead to make future changes in connections at the terminal block. This shall be accomplished by running each control lead the longest way around the box to the proper terminal. Leads shall be neatly laced in place.

109-6.6 Marking and labeling. All equipment, control wires, terminal blocks, etc., shall be tagged, marked, or labeled as specified below:

a. Wire identification. The Contractor shall furnish and install self-sticking wire labels or identifying tags on all control wires at the point where they connect to the control equipment or to the terminal blocks. Wire labels, if used, shall be of the self-sticking preprinted type and of the manufacturer's recommended size for the wire involved. Identification -markings designated in the plans shall be followed. Tags, if used, shall be of fiber not less than 3/4 inch (19 mm) in diameter and not less than 1/32 inch (1 mm) thick. Identification markings designated in the plans shall be stamped on tags by means of small tool dies. Each tag shall be securely tied to the proper wire by a nonmetallic cord.

b. Labels. The Contractor shall stencil identifying labels on the cases of regulators, breakers, and distribution and control relay cases with white oil paint as designated by the RPR. The letters and numerals shall be not less than one inch (25 mm) in height and shall be of proportionate width. The Contractor shall also mark the correct circuit designations per the wiring diagram on the terminal marking strips, which are a part of each terminal block.

METHOD OF MEASUREMENT

109-7.1 The Electrical Vault Modifications shall be measured per lump sum. This shall include the removal and disposal of all equipment noted on the contract documents, repair of the wall surface where equipment has been removed, new wireways and wireway modifications as noted on the plans, all interior

conduit and all 600V and low voltage control cabling, lighting controls modifications, radio antenna, photocell, radio control system, HOA switch, contactors, panelboard modifications as noted, installation of liquid-tight flexible conduit for the 5KV cables upon leaving the wireway for connection to the regulators, **installation for new ductbank ducts into the vault, S1 cut-out cabinet,** grounding, labels and all materials and incidentals required for a complete operational system. General cleaning of the equipment, walls, and floor of the existing vault structure is incidental to this item. Separate measurement shall be made for regulators and the associated S1 cut-out and 5KV cables.

109-7.2 This item provides for the procurement and installation of a new constant current regulator of the type and size shown, tested and accepted. This item also includes procurement and installation of all materials and labor for the installation of the new regulator with new 600V input power conductors, control cable connections and installation of 5kV cables and associated S1 Cut-out switch. This work includes, but is not limited to, associated conduit as required, labels, ground connection, regulator calibration, commissioning, and all incidentals required for a complete working system to the satisfaction of the OAR. Measurement for this item will be per each, installed complete and accepted by the OAR. **There is no separate measurement for L-828 vs L-829 regulator types.**

109-7.3 The new electrical vault shall be measured per lump sum. This shall include the vault building, size as noted on the contract drawings, including foundation, steps, construction access road with culvert, lightning protection, lights, switches, receptacles, AC unit, wireways, all interior conduit and all 600V and low voltage control cabling, S1 cut-out cabinet, lighting controls, antenna, photocell, radio control system, HOA switch, contactors, panelboard with circuit breakers and TVSS, disconnects, architectural trim and features, grounding, labels and all materials and incidentals required for a complete system. Also incidental to this item is the associated utility service including meter, disconnect switch, supporting hardware, grounding, exposed conduit, timber pole, weatherhead and other incidentals necessary for the service entrance including all associated utility company fees and permits. Separate measurement shall be made for regulators and the associated 5KV cables.

109-7.3 The ALCS Graphics Update shall be measured per lump sum. This item provides for the Airfield Lighting Control and Monitoring System (ALCMS) software update required to update the graphic screen for the circuit modifications, pavement modification, etc. This involves work at the Airfield Lighting Vault, graphic and software update, coordination with FAA personnel for preset buttons, calibration of the regulators for all impacted loads, new laminated circuit maps for each new or modified regulator and providing assistance to the manufacturer during commissioning of the overall system to ensure proper operation, complete and accepted.

BASIS OF PAYMENT

109-8.1 Payment will be made at the contract unit price for each completed and accepted vault or prefabricated metal housing equipment installation. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, and incidentals necessary to complete the item.

109-8.2 Payment shall be made at the contract unit price for each constant current regulator installed and accepted by the OAR. This price shall be full compensation for furnishing all materials and for all preparation, labor, tools, equipment and incidentals necessary to complete this item.

109-8.3 Payment for this item will be made at the contract unit price per lump sum as the work progresses, which constitutes full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, supervision, equipment, tools and incidentals necessary to complete this

item. No separate payment will be made for any additional software or equipment necessary to complete this item. The software programming and required ALCMS hardware will be procured by the Owner.

Payment will be made under:

Item L-109-5.1	Vault Equipment Modifications, per Lump Sum
Item L-109-5.2	4kV Constant Current Regulator, per Each
Item L-109-5.3	Install New Vault Building and Equipment, per Lump Sum
Item L-109-5.3	ALCMS Graphics Update, per Lump Sum

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-3	Specification for L-821, Panels for Remote Control of Airport Lighting
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-10	Specification for Constant Current Regulators and Regulator Monitors
AC 150/5345-13	Specification for L-841 Auxiliary Relay Cabinet Assembly for Pilot Control of Airport Lighting Circuits
AC 150/5345-49	Specification L-854, Radio Control Equipment;
AC 150/5345-53	Airport Lighting Equipment Certification Program

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/ICEA S-85-625	Standard for Telecommunications Cable Aircore, Polyolefin Insulated, Copper Conductor Technical Requirements

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM C62	Standard Specification for Building Brick (Solid Masonry Units Made from Clay or Shale)
ASTM C90	Standard Specification for Loadbearing Concrete Masonry Units
ASTM D2823	Standard Specification for Asphalt Roof Coatings, Asbestos Containing
ASTM D4479	Standard Specification for Asphalt Roof Coatings – Asbestos-Free

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)

Institute of Electrical and Electronic Engineers (IEEE)

IEEE 1584	Guide for Performing Arc-Flash Hazard Calculations

Master Painter's Institute (MPI)

MPI Reference #9	Alkyd, Exterior, Gloss (MPI Gloss Level 6)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit – Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)
NFPA-70E	Standard for Electrical Safety in the Workplace
NFPA-780	Standard for the Installation of Lightning Protection Systems

END OF ITEM L-109

Item L-110 Airport Underground Electrical Duct Banks and Conduits

DESCRIPTION

110-1.1 This item shall consist of underground electrical conduits and duct banks (single or multiple conduits encased in concrete or buried in sand) installed per this specification at the locations and per the dimensions, designs, and details shown on the plans. This item shall include furnishing and installing of all underground electrical duct banks and individual and multiple underground conduits. It shall also include all turfing trenching, backfilling, removal, and restoration of any paved or turfed areas; concrete encasement, mandrelling, pulling lines, duct markers, plugging of conduits, and the testing of the installation as a completed system ready for installation of cables per the plans and specifications. This item shall also include furnishing and installing conduits and all incidentals for providing positive drainage of the system. Verification of existing ducts is incidental to the pay items provided in this specification.

EQUIPMENT AND MATERIALS

110-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, that comply with these specifications, at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in project that accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

110-2.2 Steel conduit. Rigid galvanized steel (RGS) conduit and fittings shall be hot dipped galvanized inside and out and conform to the requirements of Underwriters Laboratories Standards 6, 514B, and 1242. All RGS conduits or RGS elbows installed below grade, in concrete, permanently wet locations or other similar environments shall be painted with a 10-mil thick coat of asphaltum sealer or shall have a factory-bonded polyvinyl chloride (PVC) cover. Any exposed galvanizing or steel shall be coated with 10 mils of asphaltum sealer. When using PVC coated RGS conduit, care shall be exercised not to damage the factory PVC coating. Damaged PVC coating shall be repaired per the manufacturer's written instructions. In lieu of PVC coated RGS, corrosion wrap tape shall be permitted to be used where RGS is in contact with direct earth.

110-2.3 Plastic conduit. Plastic conduit and fittings-shall conform to the following requirements:

UL 514B covers W-C-1094-Conduit fittings all types, classes 1 thru 3 and 6 thru 10.

UL 514C covers W-C-1094- all types, Class 5 junction box and cover in plastic (PVC).

UL 651 covers W-C-1094-Rigid PVC Conduit, types I and II, Class 4.

UL 651A covers W-C-1094-Rigid PVC Conduit and high-density polyethylene (HDPE) Conduit type III and Class 4.

Underwriters Laboratories Standards UL-651 and Article 352 of the current National Electrical Code shall be one of the following, as shown on the plans:

a. Type I–Schedule 40 and Schedule 80 PVC suitable for underground use either direct-buried or encased in concrete.

b. Type II–Schedule 40 PVC suitable for either above ground or underground use.

c. Type III – Schedule 80 PVC suitable for either above ground or underground use either direct-buried or encased in concrete.

d. Type III –HDPE pipe, minimum standard dimensional ratio (SDR) 11, suitable for placement with directional boring under pavement.

The type of solvent cement shall be as recommended by the conduit/fitting manufacturer.

110-2.4 Split conduit. Split conduit shall be pre-manufactured for the intended purpose and shall be made of steel or plastic.

110-2.5 Conduit spacers. Conduit spacers shall be prefabricated interlocking units manufactured for the intended purpose. They shall be of double wall construction made of high grade, high density polyethylene complete with interlocking cap and base pads. They shall be designed to accept No. 4 reinforcing bars installed vertically.

110-2.6 Concrete. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures.

110-2.7 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another RPR approved third party certification program. Precast concrete structures shall conform to ASTM C478.

110-2.8 Flowable backfill. Flowable material used to back fill conduit and duct bank trenches shall conform to the requirements of Item P-153, Controlled Low Strength Material.

110-2.9 Detectable warning tape. Plastic, detectable, American Public Works Association (APWA) red (electrical power lines, cables, conduit and lighting cable), orange (telephone/fiber optic cabling) with continuous legend magnetic tape shall be polyethylene film with a metallized foil core and shall be 3-6 inches (75-150 mm) wide. Detectable tape is incidental to the respective bid item.

CONSTRUCTION METHODS

110-3.1 General. The Contractor shall install underground duct banks and conduits at the approximate locations indicated on the plans. The RPR shall indicate specific locations as the work progresses, if required to differ from the plans. Duct banks and conduits shall be of the size, material, and type indicated on the plans or specifications. Where no size is indicated on the plans or in the specifications, conduits shall be not less than 2 inches (50 mm) inside diameter or comply with the National Electrical Code based on cable to be installed, whichever is larger. All duct bank and conduit lines shall be laid so as to grade toward access points and duct or conduit ends for drainage. Unless shown otherwise on the plans, grades shall be at least 3 inches (75 mm) per 100 feet (30 m). On runs where it is not practicable to maintain the grade all one way, the duct bank and conduit lines shall be graded from the center in both directions toward access points or conduit ends, with a drain into the storm drainage system. Pockets or traps where moisture may accumulate shall be avoided. Under pavement, the top of the duct bank shall not be less than 18 inches (0.5 m) below the subgrade; in other locations, the top of the duct bank or underground conduit shall be be not less than 18 inches (0.5 m) below finished grade.

The Contractor shall mandrel each individual conduit whether the conduit is direct-buried or part of a duct bank. An iron-shod mandrel, not more than 1/4 inch (6 mm) smaller than the bore of the conduit shall be pulled or pushed through each conduit. The mandrel shall have a leather or rubber gasket slightly larger than the conduit hole.

The Contractor shall swab out all conduits/ducts and clean base can, manhole, pull boxes, etc., interiors immediately prior to pulling cable. Once cleaned and swabbed the light bases, manholes, pull boxes, etc., and all accessible points of entry to the duct/conduit system shall be kept closed except when installing cables. Cleaning of ducts, base cans, manholes, etc., is incidental to the pay item of the item being cleaned. All raceway systems left open, after initial cleaning, for any reason shall be recleaned at the Contractor's expense. All accessible points shall be kept closed when not installing cable. The Contractor shall verify existing ducts proposed for use in this project as clear and open. The Contractor shall notify the RPR of any blockage in the existing ducts.

For pulling the permanent wiring, each individual conduit, whether the conduit is direct-buried or part of a duct bank, shall be provided with a 200-pound (90 kg) test polypropylene pull rope. The ends shall be secured and sufficient length shall be left in access points to prevent it from slipping back into the conduit. Where spare conduits are installed, as indicated on the plans, the open ends shall be plugged with removable tapered plugs, designed for this purpose.

All conduits shall be securely fastened in place during construction and shall be plugged to prevent contaminants from entering the conduits. Any conduit section having a defective joint shall not be installed. Ducts shall be supported and spaced apart using approved spacers at intervals not to exceed 5 feet (1.5 m).

Unless otherwise shown on the plans, concrete encased duct banks shall be used when crossing under pavements expected to carry aircraft loads, such as runways, taxiways, taxilanes, ramps and aprons. When under paved shoulders and other paved areas, conduit and duct banks shall be encased using flowable fill for protection.

All conduits within concrete encasement of the duct banks shall terminate with female ends for ease in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Where turf is well established and the sod can be removed, it shall be carefully stripped and properly stored.

Trenches for conduits and duct banks may be excavated manually or with mechanical trenching equipment unless in pavement, in which case they shall be excavated with mechanical trenching

equipment. Walls of trenches shall be essentially vertical so that a minimum of shoulder surface is disturbed. Blades of graders shall not be used to excavate the trench.

When rock is encountered, the rock shall be removed to a depth of at least 3 inches (75 mm) below the required conduit or duct bank depth and it shall be replaced with bedding material of earth or sand containing no mineral aggregate particles that would be retained on a 1/4-inch (6.3 mm) sieve. Flowable backfill may alternatively be used

Underground electrical warning (Caution) tape shall be installed in the trench above all underground duct banks and conduits in unpaved areas. Contractor shall submit a sample of the proposed warning tape for approval by the RPR. If not shown on the plans, the warning tape shall be located 6 inches above the duct/conduit or the counterpoise wire if present.

Joints in plastic conduit shall be prepared per the manufacturer's recommendations for the particular type of conduit. Plastic conduit shall be prepared by application of a plastic cleaner and brushing a plastic solvent on the outside of the conduit ends and on the inside of the couplings. The conduit fitting shall then be slipped together with a quick one-quarter turn twist to set the joint tightly. Where more than one conduit is placed in a single trench, or in duct banks, joints in the conduit shall be staggered a minimum of 2 feet (60 cm).

Changes in direction of runs exceeding 10 degrees, either vertical or horizontal, shall be accomplished using manufactured sweep bends.

Whether or not specifically indicated on the drawings, where the soil encountered at established duct bank grade is an unsuitable material, as determined by the RPR, the unsuitable material shall be removed per Item P-152 and replaced with suitable material. Additional duct bank supports shall be installed, as approved by the RPR.

All excavation shall be unclassified and shall be considered incidental to Item L-110. Dewatering necessary for duct installation, and erosion per federal, state, and local requirements is incidental to Item L-110.

Unless otherwise specified, excavated materials that are deemed by the RPR to be unsuitable for use in backfill or embankments shall be removed and disposed of offsite.

Any excess excavation shall be filled with suitable material approved by the RPR and compacted per Item P-152.

It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Where existing active cables) cross proposed installations, the Contractor shall ensure that these cables are adequately protected. Where crossings are unavoidable, no splices will be allowed in the existing cables, except as specified on the plans. Installation of new cable where such crossings must occur shall proceed as follows:

a. Existing cables shall be located manually. Unearthed cables shall be inspected to assure absolutely no damage has occurred

b. Trenching, etc., in cable areas shall then proceed with approval of the RPR, with care taken to minimize possible damage or disruption of existing cable, including careful backfilling in area of cable.

In the event that any previously identified cable is damaged during the course of construction, the Contractor shall be responsible for the complete repair.

110-3.2 Duct banks. Unless otherwise shown in the plans, duct banks shall be installed so that the top of the concrete envelope is not less than 18 inches (0.5 m) below the bottom of the base or stabilized base course layers where installed under runways, taxiways, aprons, or other paved areas, and not less than 18 inches (0.5 m) below finished grade where installed in unpaved areas.

Unless otherwise shown on the plans, duct banks under paved areas shall extend at least 3 feet (1 m) beyond the edges of the pavement or 3 feet (1 m) beyond any under drains that may be installed alongside the paved area. Trenches for duct banks shall be opened the complete length before concrete is placed so that if any obstructions are encountered, provisions can be made to avoid them. Unless otherwise shown on the plans, all duct banks shall be placed on a layer of concrete not less than 3 inches (75 mm) thick prior to its initial set. The Contractor shall space the conduits not less than 3 inches (75 mm) apart (measured from outside wall to outside wall). All such multiple conduits shall be placed using conduit spacers applicable to the type of conduit. As the conduit laying progresses, concrete shall be placed around and on top of the conduits not less than 3 inches (75 mm) thick unless otherwise shown on the plans. All conduits shall terminate with female ends for ease of access in current and future use. Install factory plugs in all unused ends. Do not cover the ends or plugs with concrete.

Conduits forming the duct bank shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth prior to placing the concrete encasement. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

When specified, the Contractor shall reinforce the bottom side and top of encasements with steel reinforcing mesh or fabric or other approved metal reinforcement. When directed, the Contractor shall supply additional supports where the ground is soft and boggy, where ducts cross under roadways, or where shown on the plans. Under such conditions, the complete duct structure shall be supported on reinforced concrete footings, piers, or piles located at approximately 5-foot (1.5-m) intervals.

All pavement surfaces that are to have ducts installed therein shall be neatly saw cut to form a vertical face. All excavation shall be included in the contract with price for the duct.

Install a plastic, detectable, color as noted, 3 to 6 inches (75 to 150 mm) wide tape, 8 inches (200 mm) minimum below grade above all underground conduit or duct lines not installed under pavement. Utilize the 3-inch (75-mm) wide tape only for single conduit runs. Utilize the 6-inch (150-mm) wide tape for multiple conduits and duct banks. For duct banks equal to or greater than 24 inches (600 mm) in width, utilize more than one tape for sufficient coverage and identification of the duct bank as required.

When existing cables are to be placed in split duct, encased in concrete, the cable shall be carefully located and exposed by hand tools. Prior to being placed in duct, the RPR shall be notified so that he may inspect the cable and determine that it is in good condition. Where required, split duct shall be installed as shown on the drawings or as required by the RPR.

110-3.3 Conduits without concrete encasement. Trenches for single-conduit lines shall be not less than 6 inches (150 mm) nor more than 12 inches (300 mm) wide. The trench for 2 or more conduits installed at the same level shall be proportionately wider. Trench bottoms for conduits without concrete encasement shall be made to conform accurately to grade so as to provide uniform support for the conduit along its entire length.

Unless otherwise shown on the plans, a layer of fine earth material, at least 4 inches (100 mm) thick (loose measurement) shall be placed in the bottom of the trench as bedding for the conduit. The bedding material shall consist of soft dirt, sand or other fine fill, and it shall contain no particles that would be retained on a 1/4-inch (6.3 mm) sieve. The bedding material shall be tamped until firm. Flowable backfill may alternatively be used.

Unless otherwise shown on plans, conduits shall be installed so that the tops of all conduits within the Airport's secured area where trespassing is prohibited are at least 18 inches (0.5 m) below the finished grade. Conduits outside the Airport's secured area shall be installed so that the tops of the conduits are at least 24 inches (60 cm) below the finished grade per National Electric Code (NEC), Table 300.5.

When two or more individual conduits intended to carry conductors of equivalent voltage insulation rating are installed in the same trench without concrete encasement, they shall be spaced not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and not less than 6 inches (150 mm) apart in a vertical direction. Where two or more individual conduits intended to carry conductors of differing voltage insulation rating are installed in the same trench without concrete encasement, they shall be placed not less than 3 inches (75 mm) apart (measured from outside wall to outside wall) in a horizontal direction and lot less than 6 inches (150 mm) apart in a vertical direction.

Trenches shall be opened the complete length between normal termination points before conduit is installed so that if any unforeseen obstructions are encountered, proper provisions can be made to avoid them.

Conduits shall be installed using conduit spacers. No. 4 reinforcing bars shall be driven vertically into the soil a minimum of 6 inches (150 mm) to anchor the assembly into the earth while backfilling. For this purpose, the spacers shall be fastened down with locking collars attached to the vertical bars. Spacers shall be installed at 5-foot (1.5-m) intervals. Spacers shall be in the proper sizes and configurations to fit the conduits. Locking collars and spacers shall be submitted to the RPR for review prior to use.

110-3.4 Markers. The location of each end and of each change of direction of conduits and duct banks shall be marked by a concrete slab marker 2 feet (60 cm) square and 4 - 6 inches (100 - 150 mm) thick extending approximately one inch (25 mm) above the surface. The markers shall also be located directly above the ends of all conduits or duct banks, except where they terminate in a junction/access structure or building. Each cable or duct run from a line of lights and signs to the equipment vault must be marked at approximately every 200 feet (61 m) along the cable or duct run, with an additional marker at each change of direction of cable or duct run.

The Contractor shall impress the word “DUCT” or “CONDUIT” on each marker slab. Impression of letters shall be done in a manner, approved by the RPR, for a neat, professional appearance. All letters and words must be neatly stenciled. After placement, all markers shall be given one coat of high-visibility orange paint, as approved by the RPR. The Contractor shall also impress on the slab the number and size of conduits beneath the marker along with all other necessary information as determined by the RPR. The letters shall be 4 inches (100 mm) high and 3 inches (75 mm) wide with width of stroke 1/2 inch (12 mm) and 1/4 inch (6 mm) deep or as large as the available space permits. Furnishing and installation of duct markers is incidental to the respective duct pay item.

110-3.5 Backfilling for conduits. For conduits, 8 inches (200 mm) of sand, soft earth, or other fine fill (loose measurement) shall be placed around the conduits ducts and carefully tamped around and over them with hand tampers. The remaining trench shall then be backfilled and compacted per Item P-152 except that material used for back fill shall be select material not larger than 4 inches (100 mm) in diameter.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during back filling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.6 Backfilling for duct banks. After the concrete has cured, the remaining trench shall be backfilled and compacted per Item P-152 “Excavation and Embankment” except that the material used for backfill shall be select material not larger than 4 inches (100 mm) in diameter. In addition to the requirements of Item P-152, where duct banks are installed under pavement, one moisture/density test per lift shall be made for each 250 linear feet (76 m) of duct bank or one work period’s construction, whichever is less.

Flowable backfill may alternatively be used.

Trenches shall not contain pools of water during backfilling operations.

The trench shall be completely backfilled and tamped level with the adjacent surface; except that, where sod is to be placed over the trench, the backfilling shall be stopped at a depth equal to the thickness of the sod to be used, with proper allowance for settlement.

Any excess excavated material shall be removed and disposed of per instructions issued by the RPR.

110-3.7 Restoration. Where sod has been removed, it shall be replaced as soon as possible after the backfilling is completed. All areas disturbed by the work shall be restored to its original condition. The restoration shall include sodding and topsoiling shown on the plans. The Contractor shall be held responsible for maintaining all disturbed surfaces and replacements until final acceptance. All restoration shall be considered incidental to the respective L-110 pay item. Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

METHOD OF MEASUREMENT

110-4.1 This item provides for the procurement and installation of conduit of the type and number shown in trench, along with associated materials, as identified in the drawings and specifications. This item includes excavation and backfill of trenches with designated material, including concrete encasement where specified. Also included are trench marking tape, terminations, couplings, end bells, conduit plugs, conduit transitions, conduit connection to light or sign base, termination at drainage structure, mandrelling, pulling lines, plugging of conduits, and the installation as a completed system ready for installation of cables per the plans and specifications to the satisfaction of the OAR. Incidental to this item is open cutting existing pavement for installation as required by line item description and the contract drawings. Also incidental to this item is directional drilling as required by line item description, including all equipment, labor, and excavation of launching and receiving pits. Excavations must be backfilled with material equal to or better in quality than adjacent embankment, unless otherwise shown in the drawings or directed by the OAR. Excavation of existing materials for installation and subsequent embankment must be completed in accordance with FAA Item P-152, Excavation, Subgrade, and Embankment. This item also includes furnishing and installing conduits and all incidentals for providing positive drainage of the system. Measurement for this item will be per linear foot, installed in duct or conduit complete and accepted by the OAR.

~~**110-4.1**~~**110-4.2 This item provides for the procurement and installation of the Utility Company Service Entrance Infrastructures, along with associated materials, as identified in the drawings and specifications. This item includes all duct banks, handholes, transformer pad including associated excavation and backfill of trenches with designated material, including concrete encasement where specified. Also included are trench marking tape, terminations, couplings, end bells, conduit plugs, conduit transitions, conduit connection to pulling lines, plugging of conduits, and the installation as a completed system ready for installation of cables per the utility company requirements and specifications to the satisfaction of the OAR. Incidental to this item is open cutting existing pavement or HDD installation as shown on the contract drawings. Also incidental to this item is coordination with the utility company. Excavation of existing materials for installation and subsequent embankment must be completed in accordance with FAA Item P-152, Excavation, Subgrade, and Embankment. Measurement for this item will be per Lump Sum, complete and accepted by the OAR**

BASIS OF PAYMENT

110-5.1 Payment for this item will be made at the contract unit price per linear foot, which constitutes full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, supervision, equipment, tools and incidentals necessary to complete this item. There will be no separate payment for excavation or embankment related to installation or any associated work. Excavation and embankment operations required for the installation or any associated work will instead be considered incidental to installation. Unsuitable materials removed must be disposed of off-site by the Contractor in accordance with local laws and regulations. All other materials removed must be hauled separately to the EMMS, unless otherwise directed by the OAR. The cost of removing and disposing of the material will not constitute a pay item and will be considered incidental to installation. This item does not include the installation of cable. There is no separate measurement for pipe color (gray or white).

Payment will be made under:

Item L-110-5.1	Procure and Install 1-Way, 2” Sch. 40 PVC Conduit in Earth, per Linear Foot
Item L-110-5.2	Procure and Install 1-Way, 2” Sch. 40 PVC Conduit in Existing Pavement VIA Saw Kerf, per Linear Foot
Item L-110-5.3	Procure and Install 1-Way, 2” SDR 11 HDPE Conduit VIA Directional Drill, per Linear Foot
Item L-110-5.4	Procure and Install 1-Way, 2” Sch. 40 PVC Conduit VIA Open Cut, per Linear Foot
Item L-110-5.5	Procure and Install 2-Way, Sch. 40 PVC Conduit, Concrete Encased in Earth, per Linear Foot
Item L-110-5.6	Procure and Install 2-Way, 2” SDR 11 HDPE Conduit, Installed VIA Direction Drill, per Linear Foot
Item L-110-5.7	Procure and Install 4-Way, 2” Sch. 40 PVC Conduit, Concrete Encased in Earth, per Linear Foot
Item L-110-5.8	Procure and Install 4-Way, 2” SDR 11 HDPE Conduit, Installed VIA Directional Drill, per Linear Foot
Item L-110-5.9	Procure and Install 6-Way, 2” Sch. 40 PVC Conduit, Concrete Encased in Earth, per Linear Foot
Item L-110-5.10	Procure and Install 6-Way, 2” Sch. 40 PVC Conduit, Concrete Encased in Existing Pavement VIA Open Cut, per Linear Foot
Item L-110-5.11	Procure and Install 6-Way, 2” SDR 11 HDPE Conduit, ~~Concrete Encased~~ Via Directional Drill, per Linear Foot
Item L-110-5.12	Procure and Install 10-Way, 2” Sch. 40 PVC Conduit, Concrete Encased in Earth, per Linear Foot
Item L-110-5.13	**Procure and Install 10-Way, 2” Sch 40 PVC Conduit, Concrete Encased VIA Open Cut, per Linear Foot**
Item L-110-5.1~~4~~3	Procure and Install 10-Way, 2” SDR 11 HDPE Conduit, ~~Concrete Encased~~ VIA Directional Drill, per Linear Foot
Item L-110-5.15	**Procure and Install Utility Company Service Entrance Infrastructure, per Lump Sum**

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circular (AC)

AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

ASTM International (ASTM)

ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

Underwriters Laboratories (UL)

UL Standard 6	Electrical Rigid Metal Conduit - Steel
UL Standard 514B	Conduit, Tubing, and Cable Fittings
UL Standard 514C	Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
UL Standard 1242	Electrical Intermediate Metal Conduit Steel
UL Standard 651	Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings
UL Standard 651A	Type EB and A Rigid PVC Conduit and HDPE Conduit

END OF ITEM L-110

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Item L-115 Electrical Manholes and Junction Structures

DESCRIPTION

115-1.1 This item shall consist of electrical manholes and junction structures (hand holes, pull boxes, junction cans, etc.) installed per this specification, at the indicated locations and conforming to the lines, grades and dimensions shown on the plans or as required by the RPR. This item shall include the installation of each electrical manhole and/or junction structures with all associated excavation, backfilling, sheeting and bracing, concrete, reinforcing steel, ladders, appurtenances, testing, dewatering and restoration of surfaces to the satisfaction of the RPR.

EQUIPMENT AND MATERIALS

115-2.1 General.

a. All equipment and materials covered by referenced specifications shall be subject to acceptance through manufacturer's certification of compliance with the applicable specification when so requested by the RPR.

b. Manufacturer's certifications shall not relieve the Contractor of the responsibility to provide materials per these specifications. Materials supplied and/or installed that do not comply with these specifications shall be removed (when directed by the RPR) and replaced with materials that comply with these specifications at the Contractor's cost.

c. All materials and equipment used to construct this item shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Submittal data shall be presented in a clear, precise and thorough manner. Original catalog sheets are preferred. Photocopies are acceptable provided they are as good a quality as the original. Clearly and boldly mark each copy to identify products or models applicable to this project. Indicate all optional equipment and delete any non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment to which they apply on each submittal sheet. Markings shall be made bold and clear with arrows or circles (highlighting is not acceptable). The Contractor is solely responsible for delays in the project that may accrue directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications**.** The Contractor's submittals shall be electronically submitted in pdf format, tabbed by specification section. The RPR reserves the right to reject any and all equipment, materials or procedures that do not meet the system design and the standards and codes, specified in this document.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from the date of final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

115-2.2 Concrete structures. Concrete shall be proportioned, placed, and cured per Item P-610, Concrete for Miscellaneous Structures. Cast-in-place concrete structures shall be as shown on the plans.

115-2.3 Precast concrete structures. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or another engineer approved third party certification program. Provide precast concrete structures where shown on the plans.

Precast concrete structures shall be an approved standard design of the manufacturer. Precast units shall have mortar or bitumastic sealer placed between all joints to make them watertight. The structure shall be designed to withstand 200,000 lb loads, unless otherwise shown on the plans. Openings or knockouts shall be provided in the structure as detailed on the plans. **Any structure within the defined runway, taxiway or apron safety area for which the structure is to be installed shall be aircraft rated. Any structure outside the runway, taxiway or apron safety area for which the structure is to be installed shall be HS-20 load rated.**

Threaded inserts and pulling eyes shall be cast in as shown on the plans.

If the Contractor chooses to propose a different structural design, signed and sealed shop drawings, design calculations, and other information requested by the RPR shall be submitted by the Contractor to allow for a full evaluation by the RPR. The RPR shall review per the process defined in the General Provisions.

115-2.4 Junction boxes. Junction boxes shall be L-867 Class 1 (non-load bearing) or L-868 Class 1 (load bearing) airport light bases that are encased in concrete. The light bases shall have a L-894 blank cover, gasket, and stainless steel hardware. All bolts, studs, nuts, lock washers, and other similar fasteners used for the light fixture assemblies must be fabricated from 316L (equivalent to EN 1.4404), 18-8, 410, or 416 stainless steel. If 18-8, 410, or 416 stainless steel is utilized it shall be passivated and be free from any discoloration. Covers shall be 3/8-inch (9-mm) thickness for L-867 and 3/4-inch (19-mm) thickness for L-868. All junction boxes shall be provided with both internal and external ground lugs.

115-2.5 Mortar. The mortar shall be composed of one part of cement and two parts of mortar sand, by volume. The cement shall be per the requirements in ASTM C150, Type I. The sand shall be per the requirements in ASTM C144. Hydrated lime may be added to the mixture of sand and cement in an amount not to exceed 15% of the weight of cement used. The hydrated lime shall meet the requirements of ASTM C206. Water shall be potable, reasonably clean and free of oil, salt, acid, alkali, sugar, vegetable, or other substances injurious to the finished product.

115-2.6 Concrete. All concrete used in structures shall conform to the requirements of Item P-610, Concrete for Miscellaneous Structures.

115-2.7 Frames and covers. The frames shall conform to one of the following requirements:

ASTM A48	Gray iron castings
ASTM A47	Malleable iron castings
ASTM A27	Steel castings
ASTM A283,	Grade D Structural steel for grates and frames
ASTM A536	Ductile iron castings
ASTM A897	Austempered ductile iron castings

All castings specified shall withstand a maximum tire pressure of **4,000** psi and maximum load of **200,000** lbs.

All castings or structural steel units shall conform to the dimensions shown on the plans and shall be designed to support the loadings specified.

Each frame and cover unit shall be provided with fastening members to prevent it from being dislodged by traffic, but which will allow easy removal for access to the structure.

All castings shall be thoroughly cleaned. After fabrication, structural steel units shall be galvanized to meet the requirements of ASTM A123.

Each cover shall have the word "ELECTRIC" or other approved designation cast on it. Each frame and cover shall be as shown on the plans or approved equivalent. No cable notches are required.

Each manhole shall be provided with a "DANGER -- PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" safety warning sign as detailed in the Contract Documents and in accordance with OSHA 1910.146 (c)(2).

115-2.8 Ladders. Ladders, if specified, shall be galvanized steel or as shown on the plans.

115-2.9 Reinforcing steel. All reinforcing steel shall be deformed bars of new billet steel meeting the requirements of ASTM A615, Grade 60.

115-2.10 Bedding/special backfill. Bedding or special backfill shall be as shown on the plans.

115-2.11 Flowable backfill. Flowable material used to backfill shall conform to the requirements of Item P-153, Controlled Low Strength Material.

115-2.12 Cable trays. Cable trays shall be plastic. Cable trays shall be located as shown on the plans.

115-2.13 Plastic conduit. Plastic conduit shall comply with Item L-110, Airport Underground Electrical Duct Banks and Conduits.

115-2.14 Conduit terminators. Conduit terminators shall be pre-manufactured for the specific purpose and sized as required or as shown on the plans.

115-2.15 Pulling-in irons. Pulling-in irons shall be manufactured with 7/8-inch (22 mm) diameter hot-dipped galvanized steel or stress-relieved carbon steel roping designed for concrete applications (7 strand, 1/2-inch (12 mm) diameter with an ultimate strength of 270,000 psi (1862 MPa)). Where stress-relieved carbon steel roping is used, a rustproof sleeve shall be installed at the hooking point and all exposed surfaces shall be encapsulated with a polyester coating to prevent corrosion.

115-2.16 Ground rods. Ground rods shall be one piece, stainless steel. The ground rods shall be of the length and diameter specified on the plans, but in no case shall they be less than 8 feet (2.4 m) long nor less than 5/8 inch (16 mm) in diameter.

CONSTRUCTION METHODS

115-3.1 Unclassified excavation. It is the Contractor's responsibility to locate existing utilities within the work area prior to excavation. Damage to utility lines, through lack of care in excavating, shall be repaired or replaced to the satisfaction of the RPR without additional expense to the Owner.

The Contractor shall perform excavation for structures and structure footings to the lines and grades or elevations shown on the plans or as staked by the RPR. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown.

All excavation shall be unclassified and shall be considered incidental to Item L-115. Dewatering necessary for structure installation and erosion per federal, state, and local requirements is incidental to Item L-115.

Boulders, logs and all other objectionable material encountered in excavation shall be removed. All rock and other hard foundation material shall be cleaned of all loose material and cut to a firm surface either level, stepped or serrated, as directed by the RPR. All seams, crevices, disintegrated rock and thin strata shall be removed. When concrete is to rest on a surface other than rock, special care shall be taken not to disturb the bottom of the excavation. Excavation to final grade shall not be made until just before the concrete or reinforcing is to be placed.

The Contractor shall provide all bracing, sheeting and shoring necessary to implement and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheeting and shoring shall be included in the unit price bid for the structure.

Unless otherwise provided, bracing, sheeting and shoring involved in the construction of this item shall be removed by the Contractor after the completion of the structure. Removal shall be effected in a manner that will not disturb or mar finished masonry. The cost of removal shall be included in the unit price bid for the structure.

After each excavation is completed, the Contractor shall notify the RPR. Structures shall be placed after the RPR has approved the depth of the excavation and the suitability of the foundation material.

Prior to installation the Contractor shall provide a minimum of 6 inches (150 mm) of sand or a material approved by the RPR as a suitable base to receive the structure. The base material shall be compacted and graded level and at proper elevation to receive the structure in proper relation to the conduit grade or ground cover requirements, as indicated on the plans.

115-3.2 Concrete structures. Concrete structures shall be built on prepared foundations conforming to the dimensions and form indicated on the plans. The concrete and construction methods shall conform to the requirements specified in Item P-610. Any reinforcement required shall be placed as indicated on the plans and shall be approved by the RPR before the concrete is placed.

115-3.3 Precast unit installations. Precast units shall be installed plumb and true. Joints shall be made watertight by use of sealant at each tongue-and-groove joint and at roof of manhole. Excess sealant shall be removed and severe surface projections on exterior of neck shall be removed.

115-3.4 Placement and treatment of castings, frames and fittings. All castings, frames and fittings shall be placed in the positions indicated on the Plans or as directed by the RPR and shall be set true to line and to correct elevation. If frames or fittings are to be set in concrete or cement mortar, all anchors or bolts shall be in place and position before the concrete or mortar is placed. The unit shall not be disturbed until the mortar or concrete has set.

Field connections shall be made with bolts, unless indicated otherwise. Welding will not be permitted unless shown otherwise on the approved shop drawings and written approval is granted by the casting manufacturer. Erection equipment shall be suitable and safe for the workman. Errors in shop fabrication or deformation resulting from handling and transportation that prevent the proper assembly and fitting of parts shall be reported immediately to the RPR and approval of the method of correction shall be obtained. Approved corrections shall be made at Contractor’s expense.

Anchor bolts and anchors shall be properly located and built into connection work. Bolts and anchors shall be preset by the use of templates or such other methods as may be required to locate the anchors and anchor bolts accurately.

Pulling-in irons shall be located opposite all conduit entrances into structures to provide a strong, convenient attachment for pulling-in blocks when installing cables. Pulling-in irons shall be set directly into the concrete walls of the structure.

115-3.5 Installation of ladders. Ladders shall be installed such that they may be removed if necessary. Mounting brackets shall be supplied top and bottom and shall be cast in place during fabrication of the structure or drilled and grouted in place after erection of the structure.

115-3.6 Removal of sheeting and bracing. In general, all sheeting and bracing used to support the sides of trenches or other open excavations shall be withdrawn as the trenches or other open excavations are being refilled. That portion of the sheeting extending below the top of a structure shall be withdrawn, unless otherwise directed, before more than 6 inches (150 mm) of material is placed above the top of the structure and before any bracing is removed. Voids left by the sheeting shall be carefully refilled with

selected material and rammed tight with tools especially adapted for the purpose or otherwise as may be approved.

The RPR may direct the Contractor to delay the removal of sheeting and bracing if, in his judgment, the installed work has not attained the necessary strength to permit placing of backfill.

115-3.7 Backfilling. After a structure has been completed, the area around it shall be backfilled in horizontal layers not to exceed 6 inches (150 mm) in thickness measured after compaction to the density requirements in Item P-152. Each layer shall be deposited all around the structure to approximately the same elevation. The top of the fill shall meet the elevation shown on the plans or as directed by the RPR.

Backfill shall not be placed against any structure until approval is given by the RPR. In the case of concrete, such approval shall not be given until tests made by the laboratory under supervision of the RPR establish that the concrete has attained sufficient strength to provide a factor of safety against damage or strain in withstanding any pressure created by the backfill or the methods used in placing it.

Where required, the RPR may direct the Contractor to add, at his own expense, sufficient water during compaction to assure a complete consolidation of the backfill. The Contractor shall be responsible for all damage or injury done to conduits, duct banks, structures, property or persons due to improper placing or compacting of backfill.

115-3.8 Connection of duct banks. To relieve stress of joint between concrete-encased duct banks and structure walls, reinforcement rods shall be placed in the structure wall and shall be formed and tied into duct bank reinforcement at the time the duct bank is installed.

115-3.9 Grounding. A ground rod shall be installed in the floor of all concrete structures so that the top of rod extends 6 inches (150 mm) above the floor. The ground rod shall be installed within one foot (30 cm) of a corner of the concrete structure. Ground rods shall be installed prior to casting the bottom slab. Where the soil condition does not permit driving the ground rod into the earth without damage to the ground rod, the Contractor shall drill a 4-inch (100 mm) diameter hole into the earth to receive the ground rod. The hole around the ground rod shall be filled throughout its length, below slab, with Portland cement grout. Ground rods shall be installed in precast bottom slab of structures by drilling a hole through bottom slab and installing the ground rod. Bottom slab penetration shall be sealed watertight with Portland cement grout around the ground rod.

A grounding bus of 4/0 bare stranded copper shall be exothermically bonded to the ground rod and loop the concrete structure walls. The ground bus shall be a minimum of one foot (30 cm) above the floor of the structure and separate from other cables. No. 2 American wire gauge (AWG) bare copper pigtails shall bond the grounding bus to all cable trays and other metal hardware within the concrete structure. Connections to the grounding bus shall be exothermic. If an exothermic weld is not possible, connections to the grounding bus shall be made by using connectors approved for direct burial in soil or concrete per UL 467. Hardware connections may be mechanical, using a lug designed for that purpose.

115-3.10 Cleanup and repair. After erection of all galvanized items, damaged areas shall be repaired by applying a liquid cold-galvanizing compound per MIL-P-21035. Surfaces shall be prepared and compound applied per the manufacturer’s recommendations.

Prior to acceptance, the entire structure shall be cleaned of all dirt and debris.

115-3.11 Restoration. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt and rubbish from the site. The Contractor shall restore all disturbed areas equivalent to or better than their original condition. All sodding, grading and restoration shall be considered incidental to the respective Item L-115 pay item.

The Contractor shall grade around structures as required to provide positive drainage away from the structure.

Areas with special surface treatment, such as roads, sidewalks, or other paved areas shall have backfill compacted to match surrounding areas, and surfaces shall be repaired using materials comparable to original materials.

Following restoration of all trenching near airport movement surfaces, the Contractor shall thoroughly visually inspect the area for foreign object debris (FOD), and remove any such FOD that is found. This FOD inspection and removal shall be considered incidental to the pay item of which it is a component part.

After all work is completed, the Contractor shall remove all tools and other equipment, leaving the entire site free, clear and in good condition.

115-3.12 Inspection. Prior to final approval, the electrical structures shall be thoroughly inspected for conformance with the plans and this specification. Any indication of defects in materials or workmanship shall be further investigated and corrected. The earth resistance to ground of each ground rod shall not exceed 25 ohms. Each ground rod shall be tested using the fall-of-potential ground impedance test per American National Standards Institute / Institute of Electrical and Electronic Engineers (ANSI/IEEE) Standard 81. This test shall be performed prior to establishing connections to other ground electrodes.

115-3.13 Manhole elevation adjustments. The Contractor shall adjust the tops of existing manholes in areas designated in the Contract Documents to the new elevations shown. The Contractor shall be responsible for determining the exact height adjustment required to raise or lower the top of each manhole to the new elevations. The existing top elevation of each manhole to be adjusted shall be determined in the field and subtracted/added from the proposed top elevation.

The Contractor shall remove/extend the existing top section or ring and cover on the manhole structure or manhole access. The Contractor shall install precast concrete sections or grade rings of the required dimensions to adjust the manhole top to the new proposed elevation or shall cut the existing manhole walls to shorten the existing structure, as required by final grades. The Contractor shall reinstall the manhole top section or ring and cover on top and check the new top elevation.

The Contractor shall construct a concrete slab around the top of adjusted structures located in graded areas that are not to be paved. The concrete slab shall conform to the dimensions shown on the plans.

115-3.14 Duct extension to existing ducts. Where existing concrete encased ducts are to be extended, the duct extension shall be concrete encased plastic conduit. The fittings to connect the ducts together shall be standard manufactured connectors designed and approved for the purpose. The duct extensions shall be installed according to the concrete encased duct detail and as shown on the plans.

METHOD OF MEASUREMENT

115-4.1 Measurement for this item will be per each, installed complete and accepted by the OAR. This item consists of the procurement of L-867D base cans with gasket, steel cover, bolting hardware, and associated materials and installation of the type of electrical structure noted, installed per the requirements of the drawings and specifications, at the indicated locations and conforming to the lines, grades and dimensions shown on the drawings or as required by the RPR. This item includes the installation of the quantity of structures noted with all associated excavation, backfilling, sheeting and bracing, concrete encasement, reinforcing steel, circuit ID markers, appurtenances, all required connections, labels, dewatering, #6 counterpoise wire, ground rod, ground cable, Cadweld, bituminous tar with test report and connections, and ID marker, and restoration of surfaces required, to the satisfaction of the RPR. Incidental to the installation of each Junction Can Plaza is the drainage for the structure, including all required drain conduit installation to a nearby structure, or a sump drain for the JCP, as identified in the contract drawings. Excavations must be backfilled with material equal to or better in quality than adjacent embankment, unless otherwise shown in the drawings or directed by the RPR. Excavation of existing

materials for structure installation and subsequent embankment must be completed in accordance with FAA Item P-152, Excavation, Subgrade, and Embankment. This item additionally includes restoration of the site including site grading to prohibit ponding.

BASIS OF PAYMENT

115-5.1 The accepted quantity of electrical junction can plazas and pull cans will be paid for at the Contract unit price per each, complete and in place. This price shall be full compensation for furnishing all materials and for all preparation, excavation, backfilling and placing of the materials, furnishing and installation of appurtenances and connections to duct banks and other structures as may be required to complete the item as shown on the plans and for all labor, equipment, tools and incidentals necessary to complete the structure.

Payment will be made under:

Item L-115-5.1	Install New 2 Way JCP **including Sump Drain**, per Each
Item L-115-5.2	Install New 4 Way JCP **including Sump Drain**, per Each
Item L-115-5.3	Install New 6 Way JCP **including Sump Drain**, per Each
Item L-115-5.4	Install New **10**~~8~~ Way JCP **including Sump Drain**, per Each
Item L-115-5.5	Install L-867D Pull Can in Earth, per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

American National Standards Institute / Insulated Cable Engineers Association (ANSI/ICEA)

ANSI/IEEE STD 81	IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

Advisory Circular (AC)

AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-53	Airport Lighting Equipment Certification Program

Commercial Item Description (CID)

A-A 59544	Cable and Wire, Electrical (Power, Fixed Installation)

ASTM International (ASTM)

ASTM A27	Standard Specification for Steel Castings, Carbon, for General Application
ASTM A47	Standard Specification for Ferritic Malleable Iron Castings

ASTM A48	Standard Specification for Gray Iron Castings
ASTM A123	Standard Specification for Zinc (Hot Dip Galvanized) Coatings on Iron and Steel Products
ASTM A283	Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
ASTM A536	Standard Specification for Ductile Iron Castings
ASTM A615	Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
ASTM A897	Standard Specification for Aus tempered Ductile Iron Castings
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C206	Standard Specification for Finishing Hydrated Lime

FAA Engineering Brief (EB)

EB #83	In Pavement Light Fixture Bolts

Mil Spec

MIL-P-21035	Paint High Zinc Dust Content, Galvanizing Repair

National Fire Protection Association (NFPA)

NFPA-70	National Electrical Code (NEC)

END OF ITEM L-115

Item L-125 Installation of Airport Lighting Systems

DESCRIPTION

125-1.1 This item shall consist of airport lighting systems furnished and installed in accordance with this specification, the referenced specifications, and the applicable advisory circulars (ACs). The systems shall be installed at the locations and in accordance with the dimensions, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

125-1.2 General.

Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR’s opinion, does not meet the system design and the standards and codes, specified herein.

All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least **[** twelve (12) months **]** from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

EQUIPMENT AND MATERIALS

125-2.1 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

125-2.2 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-108 Underground Power Cable for Airports.

125-2.3 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 23 and 88 respectively, as manufactured by 3M Company or an approved equal.

125-2.4 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

125-2.5 Retroreflective Markers. Retroreflective markers shall be type L-853 and shall conform to the requirements of AC 150/5345-39.

125-2.6 Runway and Taxiway Lights. Runway and taxiway lights shall conform to the requirements of AC 150/5345-46. Lamps shall be of size and type indicated, or as required by fixture manufacturer for each lighting fixture required under this contract. Filters shall be of colors conforming to the specification for the light concerned or to the standard referenced.

a. Refer to the contract documents for type of light, base and transformer including class, mode, style and option as appropriate for project.

b. See engineering FAA Engineering Brief No. 67 “Light Sources other than Incandescent and Xenon for Airport Lighting and Obstruction Lighting Fixtures for additional information on LED fixtures.

c. Refer to plan drawings for fixture installation details.

d. Fixture Hold Down Bolts. Fixture hold down bolts and installations shall adhere to the following requirements.

1. Bolts shall be all-thread, 18-8, Grade 2 Carbon Steel with Fluoropolymer Coating. Bolts shall be colored orange or pink.

2. Bolts information shall be submitted for approval of the Engineer. Submittal shall be specifically identified, at a minimum, the bolt material, dimensions and threading.

3. Bolt material shall be readily identifiable in the field by appropriate ASTM markings on the bolts or by having material identified on bolt packaging, as approved by the Engineer.

4. Normally, bolts are supplied with the bases, not the fixtures. However, the usual bolts supplied with the bases are too short to extend into base can. The Contractor shall install bolts long enough to extend 1 inch inside the rim of the can after proper installation to hold down fixtures. Bolts of appropriate length and type shall be ordered accordingly.

5. Lock washers shall be installed on each bolt as per fixture base manufacturer's recommendations. Appropriate lock washers are usually provided with bases.

e. Spacer Rings. Install as allowed by the FAA criteria.

f. Concrete. Concrete shall adhere to requirements of Item P-610. Reinforcing steel shall conform to provisions of Item P-610. Precast base cans are not approved for use.

g. Sealer Products. Products used shall conform to applicable requirements for Joint Sealing Filler. Submit materials with satisfactory adhesive and waterproofing qualities for approval of the Owners representative. The joint sealer shall be a 2-component, Polyurethane P-606 compliant sealant similar to Q-Seal 295 or equal.

h. Joints. Use joint sealing material across concrete pavement joints. Where conduit is being installed in saw cut trench in existing pavement, OZ Gedney Type DX Expansion Fitting shall be installed at intersection of conduit installation and existing concrete pavement expansion joints.

125-2.7 Runway and Taxiway Signs. Runway and Taxiway Guidance Signs should conform to the requirements of AC 150/5345-44.

a. Refer to the contract documents for sign type, size style class and mode.

b. The nameplate required by 150/5345-44, latest edition, shall be made of metal with the data stamped into the metal nameplate.

c. Provide 6 inch high, die cut labels for each sign, labels shall be reflective film, with pressure-sensitive adhesive backing, suitable for exterior applications. Labels shall be UV resistant. Labels shall be yellow for installation on black surface, black for installation on other surfaces. Text shall be: number and letter style; Helvetica medium, upper case, 6-inch height.

d. The quantity of sign modules is based on two (2) characters per module. Payment shall be made on the basis of a module consisting of two characters, regardless of the manufacturing methods or techniques.

125-2.8 Runway End Identifier Light (REIL). Not required.

125-2.9 Precision Approach Path Indicator (PAPI). Not required.

125-2.10 Circuit Selector Cabinet. Not required.

125-2.11 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be as noted on the contract documents and shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures

125-2.12 Isolation Transformers. Isolation Transformers shall be Type L-830, size as required for each installation. Transformer shall conform to AC 150/5345-47.

INSTALLATION

125-3.1 Installation. The Contractor shall furnish, install, connect and test all equipment, accessories, conduit, cables, wires, buses, grounds and support items necessary to ensure a complete and operable airport lighting system as specified here and shown in the plans.

The equipment installation and mounting shall comply with the requirements of the National Electrical Code and state and local code agencies having jurisdiction.

The Contractor shall install the specified equipment in accordance with the applicable advisory circulars and the details shown on the plans.

125-3.2 Testing. All lights shall be fully tested by continuous operation for not less than 24 hours as a completed system prior to acceptance. The test shall include operating the constant current regulator in each step not less than 10 times at the beginning and end of the 24-hour test. The fixtures shall illuminate properly during each portion of the test.

125-3.3 Shipping and Storage. Equipment shall be shipped in suitable packing material to prevent damage during shipping. Store and maintain equipment and materials in areas protected from weather and physical damage. Any equipment and materials, in the opinion of the RPR, damaged during construction or storage shall be replaced by the Contractor at no additional cost to the owner. Painted or galvanized surfaces that are damaged shall be repaired in accordance with the manufacturer's recommendations.

125-3.4 Elevated and In-pavement Lights. Water, debris, and other foreign substances shall be removed prior to installing fixture base and light.

A jig or holding device shall be used when installing each light fixture to ensure positioning to the proper elevation, alignment, level control, and azimuth control. Light fixtures shall be oriented with the light beams parallel to the runway or taxiway centerline and facing in the required direction. The outermost edge of fixture shall be level with the surrounding pavement. Surplus sealant or flexible embedding

material shall be removed. The holding device shall remain in place until sealant has reached its initial set.

a. Install and mount the products to comply with the requirements of the National Electric Code, Item L-111 and Item L-108.

b. General Cable Installation Requirements

1. The primary cable shall enter the light base and transformer housing as shown on the plans.

2. Primary cable slack shall be provided inside the light fixture base following Item L-108. In general, enough slack shall be left in the cable to permit installation aboveground of the connections between the primary cable and the isolation transformer primary leads. A similar length of primary cable slack shall be provided for any unconnected cable installed in a fixture base can.

3. The transformer secondary leads shall be connected to the lamp leads with a disconnecting plug and receptacle. The secondary connection shall not be taped; the cable connections to the insulating transformer's leads shall be made following Item L-108.

4. The connector joints in the primary circuit shall be wrapped with at least 3 layers of synthetic rubber tape and 2 layers of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint. Refer to section L-108.

5. Ends of cables shall be sealed with heat shrinkable tubing until the splice is made to prevent the entrance of moisture.

c. General Duct and Conduit Installation Requirements. Trenching, installation of ducts and conduits, concrete backfilling, trench backfilling, installation of duct markers and the type of material used shall conform to Item L-110.

d. General Light Fixture Base Installation Requirements.

1. Caution shall be exercised during light base installation to prevent the collection of foreign matter in products and on operating components. All installation residue shall be collected as installation progresses. As directed by Owners Representative, a cover shield shall be used to protect components from foreign matter during installation.

2. Fixture base shall be installed in existing reinforced concrete or asphalt pavements with connecting conduit as shown on the plans. Precast base cans are not approved for use.

3. Light bases shall be set level. Leveling jig shall be required as specified and as directed by the RPR. Turn leveling tool over to owner for spare parts.

4. Where fixtures bases are encased in concrete, use PVC coated rigid galvanized steel conduit for fixture connection through the encasement. Transition to PVC Schedule 40 outside of the encasement.

5. Install reinforcement in the concrete encasement consisting of No. 4 bar tie bar cage. Base can encasement shall be cast-in-place. Pre-cast base cans are not allowed.

6. Flexible, seal tight steel conduit shall not be used unless specifically approved by the RPR. If approved for use, a maximum length of two (2) feet of flexible, sealtight steel conduit can be installed at the connection point to fixture base cans, only where rigid conduit connections cannot be made. Any flexible, sealtight steel conduit bend radius shall meet the cable manufacturer's minimum bend radius requirements or shall meet bend radius requirements for rigid conduit. The more stringent requirement shall govern, as determined by the RPR.

7. Light or bases shall have 1, 2 or more 2-inch threaded metallic hubs for all required conduit entrances, or as indicated on the plans. Grommeted conduit entrances are strictly prohibited. The cable entrance hubs shall be oriented in the proper direction so as to align with the connecting conduit.

8. Stub-in conduit connections into existing light bases shall be Meyers Hub installation, where required on the plans and as noted on plan details.

9. Furnish base with a drain conduit connection as shown in contract drawings.

10. Furnish a light base ground consisting of a #6 AWG bare copper wire jumper bonded to the external ground lug on the base to a ground rod installed adjacent to the base.

11. Furnish a light fixture bonding conductor consisting of a (minimum 6-foot length) #6 AWG stranded copper wire rated for 600V with green XHHW insulation. Connect conductor from internal ground lug on base can to light fixture base plate following light fixture manufacturers recommendations.

12. When existing light fixtures are removed for the purpose of installing new conductors, lockwashers shall be re-installed using new hold down bolts.

13. Breakage of fixture hold down bolts normally and regularly occurs in the field during fixture removal or fixture installation. When breakage occurs, the Contractor shall adhere to the following requirements:

a) The Contractor shall submit a broken bolt removal process for approval of the OAR.

b) Submittal shall include information about the planned broken bolt removal process and jig required to effectively drill and tap broken bolts, when necessary.

c) Whenever encountered, broken bolts shall be removed.

d) Where drilling and tapping is required, a jig approved for use by the RPR shall be used.

e) All broken bolts shall be replaced with new hold down bolts. In the event that light fixture bases are permanently damaged in the course of removing broken bolts, the Contractor shall be held responsible for the immediate repair/replacement of the lighting base. Permanent damage includes drilling of holes which exceed the required 3/8 inch bolt diameter and/or any “off centered” impressions that penetrate the inner lip of the existing bolt holes.

f) Use of "helicoils" shall be strictly prohibited as a method of dealing with stripped bolt holes, unless specifically approved in extreme emergency conditions by the Owners Representative.

g) Light fixture bases to be used as junction boxes shall be installed at the approximate locations indicated in the plans, or as directed by the Owners Representative.

h) For elevated fixtures installed on standard L-867

1) Use 18-8 stainless steel bolts with 2-piece locking washer sets.

2) Provide material submittal of anti-seize compound to Engineer for approval prior to use.

3) Perform Bolt Clamping Force Test as noted in Section X-100 to determine required bolt torque.

i) For fixtures installed on stainless steel base cans or L-868 type galvanized steel base cans:

1) Use ceramic coated “orange” bolts, MCB Industries #L201-2416x1.75 or equal, with 2-piece locking washer sets.

2) Do NOT apply anti-seize compound.

3) Perform Bolt Clamping Force Test as noted in Section X-100 to determine required bolt torque.

j) For new fixtures installed on existing L-868 type base cans:

1) Remove existing bolts and install new ceramic coated “orange” bolts, MCB Industries #L201-2416x1.75 or equal, with 2-piece locking washer sets.

2) Do NOT apply anti-seize compound.

3) Perform Bolt Clamping Force Test as noted in Section X-100 to determine required bolt torque.

4) Provide new fixture ID following contract documents.

e. General Cable Installation Requirements

1. The primary cable shall enter the light base and transformer housing as shown on the plans.

2. Primary cable slack shall be provided inside the light fixture base following Item L-108. In general, enough slack shall be left in the cable to permit installation aboveground of the connections between the primary cable and the isolation transformer primary leads. A similar length of primary cable slack shall be provided for any unconnected cable installed in a fixture base can.

3. The transformer secondary leads shall be connected to the lamp leads with a disconnecting plug and receptacle. The secondary connection shall not be taped; the cable connections to the insulating transformer's leads shall be made following Item L-108.

4. The connector joints in the primary circuit shall be wrapped with at least 1 layer of synthetic rubber tape and 2 layers of plastic tape, one-half lapped, extending at least 1-1/2 inches on each side of the joint.

5. Ends of cables shall be sealed with heat shrinkable tubing until the splice is made to prevent the entrance of moisture.

f. Installing Light Fixtures at Existing Bases

1. At locations indicated on the plans, the Contractor shall install light fixtures at existing fixture bases. This shall include providing the following items, as required and directed by the RPR.

a) Remove and salvage existing base cover plates.

b) Refurbish and prepare the base flange with flange rings or spacer rings, as required and directed by the OAR, in order to properly install the specified light fixture.

c) Clean out and refurbish the interior of the bases, including conduits.

d) If no ground lug exists on the interior, provide new ground lug with ground strap following base manufacturer’s recommendations.

e) Install primary airfield lighting circuit cable or verify existing airfield light cable is properly installed.

f) Install fixture isolation transformers of proper specified rating and wattage.

g) Install specified fixtures.

h) Install concrete collar as shown on the contract documents.

g. An identification tag shall be installed with each light or sign as shown in the plans. Circuit identification tags identifying each circuit shall be attached to each circuit as shown in the plans. Refer to section L-108.

h. Dow Corning Compound III valve lubricant non-curing sealant or approved equal shall be used to seal between sections of base cans, spacer rings, adapter rings or fixtures.

i. Demolition and Salvage. At locations noted on plans, the following shall be required:

1. Existing light fixtures, bases, cables and other materials identified as salvageable by the RPR shall be removed. Salvageable materials shall be delivered to the owner's salvage area or disposed of as directed by the RPR.

125-3.5 Signs, base cans.

a. All signs, base cans, etc. shall be installed as shown in the plans or approved shop drawings and in accordance with the applicable FAA Advisory Circulars and manufacturers' recommendations. Survey instruments shall be used to position all items to insure precise orientation. Tolerances given in the FAA Advisory Circulars, these specifications, and the plans shall not be exceeded. Where no tolerance is given, no deviation is permitted. Items not installed in accordance with the FAA Advisory Circulars, these specifications and plans shall be removed and replaced by and at the expense of the Contractor.

b. Signs shall be oriented at 90 degrees to the direction of the taxing path from which it is viewed unless noted otherwise.

c. For all signs, the concrete pad shall extend to not less than eighteen (18) inches out from the edge of the sign all around. The concrete pad shall be a minimum of six (6) inches thick. The concrete pad shall be poured in place and rest on undisturbed soil. The pad shall be reinforced with steel bars formed and placed as indicated in the Plans. Exposed concrete surface shall be finished smooth with a steel trowel or rubbed to a smooth finish. All horizontal edges to be chamfered one (1) inch at 45 degrees.

d. During construction of the pad, the transformer base shall be adjusted and firmly held in place so that machined upper surface of base flange will be level within -2 degrees and not more than 1/4 inch above the surface of pad. All other bearing areas for additional flange supports shall be in the same horizontal plane as the transformer base flange.

e. The Contractor shall completely survey and stake out each areas signage layout prior to starting any installation. Should any irregularities occur in the layout, the RPR shall be notified immediately. The bid item price shall include the necessary surveyed layout for each item and the cost for any additional adjustment or resurvey of the location of the items due to the existing geometric conditions. The new signage installation shall be coordinated with and blend into the signage installation.

f. All loose material shall be removed from all excavations for electrical equipment, raceways, manholes, pads, etc. The bottom of the excavation shall be compacted to 95% compaction in accordance with ASTM D 1557 prior to the installation of the electrical item and backfill.

g. Assemble units and connect to the system in accordance with the manufacturer's recommendations and instructions.

h. An identification monument shall be installed with each fixture, sign, etc. as shown in the plans.

i. Provide three feet (3') of slack in each end of each cable in each base can. All connections shall be able to be made above ground.

j. Painted and galvanized surfaces that are damaged shall be repaired according to the manufacturer's recommendations, to the satisfaction of the RPR. Use cold galvanizing compound or to

repair galvanized surfaces. Obtain paint and primer, of same batch number, from the equipment manufacturer to repair painted surfaces.

k. All signs shall use an L-867D size Base Can shall be used.

l. Dewatering necessary to construct L-125 Items and related erosion and turbidity control shall be in accordance with federal, state, and local requirements and is incidental to its respective pay item as a part of L-125. The cost of all excavation regardless of type of material encountered, shall be included in the unit price bid for the L-125 Item.

METHOD OF MEASUREMENT

125-4.1 Measurement for this item will be per each, installed complete and accepted by the RPR. This item provides for the procurement and installation of a new elevated light of the type shown with new base can of the type shown in turf, existing pavement, or new shoulder pavement areas. This item includes installation of the light fixture with, lens, lamps, new L-867B base can with grade 2 carbon steel coated bolting hardware with CEC lock washers, nylon bushing, gasket, spacers, multi-hole adapter ring, connector kit, isolation transformer, heat shrinks, cable tags, light ID marker, concrete encasement with reinforcement, safety ground, stainless steel ground rod including all terminations, testing and all items necessary to complete installation. For installation in existing pavement, this item additionally includes coring the pavement to prepare a capture section for the can. Incidental to this item, if required, is the special height base can with bricks. Incidental to this item is the testing to determine the required bolt torque following section X-100 including, but not limited to, testing for determination of the K factor, mock-up of lighting assembly and all materials and tools necessary to conduct the test following EB-83A. Separate measurement will be made for various installation scenarios.

125-4.2 This item provides for the procurement and installation of a Size 1, L-858(L) airfield guidance sign, of the type and size shown on the drawings, and associated materials, as identified in the plans and specifications. This item includes procurement and installation of the new or salvaged sign structure with panels, lamps, isolation transformer, L-867D base can with steel cover, hubs, gasket, bolting hardware, sign, ID tag and marker, ground rod with test results, connector kit, tether, local on/off switch, cable tag with all testing, terminations and all incidentals required to provide a complete and operational system. In addition, this includes installation of concrete foundation with reinforcement bars. Where signs are installed on existing pavement, this includes cutting into the existing pavement as shown in the contract documents. Measurement for this item will be per each sign, installed complete and accepted by the OAR.

125-4.3 This item provides for the procurement and installation of a new isolation transformer in an existing light fixture or sign. Isolation transformer shall be sized as noted on contract drawings, and installed complete with all required connections, heat shrinking, cable ID markers, and all other components required for a complete and accepted system to the satisfaction of the OAR. Measurement for this item will be per each, installed complete and accepted by the OAR.

125-4.4 This item provides for the procurement and installation of a new style E, current driven LED REIL unit, complete and accepted by the OAR. Incidental to this item is the **master and slave units, L-867D** base can**s**, interconnecting conduit, isolation transformer, control cabling, foundation, and all other associated equipment required for a complete and accepted system. Measurement for this item will be per each, installed complete and accepted by the OAR.

BASIS OF PAYMENT

125-5.1 Payment for this item will be made at the contract unit price per each completed and accepted light assembly, which constitutes full compensation for furnishing all materials, for preparing and placing

these materials, and for all labor, supervision, equipment, tools and incidentals necessary to complete this item. Unsuitable materials removed must be disposed of off-site by the Contractor in accordance with local laws and regulations. All other materials removed must be hauled separately to the EMMS, unless otherwise directed by the OAR. The cost of removing and disposing of the material will not constitute a pay item and will be considered incidental to installation.

125-5.2 Payment for this item will be made at the contract unit price per each, which constitutes full compensation for furnishing all materials, for preparing and placing these materials, and for all labor, supervision, equipment, tools and incidentals necessary to complete this item. No separate payment will be made for the various size and type of signs installed.

Payment will be made under:

Item L-125-5.1	Install New L-861T(L) Elevated Taxiway Edge Light with New L867B Base Can in Earth, per Each
Item L-125-5.2	Install New L-861T(L) Elevated Taxiway Edge Light in Existing Base Can, per Each
Item L-125-5.3	Install Salvaged L-861T(L) Elevated Taxiway Edge Light in Existing Base Can, per Each
Item L-125-5.4	Install New L-861T(L) Elevated Taxiway Edge Light with New L867B Base Can in Existing ~~Shoulder~~ Pavement, per Each
Item L-125-5.5	Install New L-861(L) Elevated Runway Edge Light with New L867B Base Can in Earth, per Each
Item L-125-5.6	Install New L-861(L) Elevated Runway Edge Light in Existing L867B Base Can, Per Each
Item L-125-5.7	Install New L-861(L) Elevated Runway Edge Light with New L867B Base Can in Existing ~~Shoulder~~ Pavement, per Each
Item L-125-5.8	**Install New L-850C(L) Inpavement Runway Edge Light with New L867B Base Can in Existing Pavement, per Each**
Item L-125-5.**9**~~8~~	Install New L-861E(L) Elevated Runway Threshold Light with New L-867B Base Can in Earth, per Each
Item L-125-5.**10**~~9~~	Install New L-861E(L) Elevated Runway Threshold Light in Existing Base Can, per Each
Item L-125-5.1**1**~~0~~	Install New Guidance Sign on New Sign Foundation, 1 Module, per Each
Item L-125-5.1**2**~~1~~	Install New Guidance Sign on New Sign Foundation, 2 Module, per Each
Item L-125-5.12	Install New Guidance Sign on New Sign Foundation, 3 Module, per Each
Item L-125-5.13	Install New Guidance Sign on New Sign Foundation, 4 Module, per Each
Item L-125-5.14	Install New Guidance Sign on Existing Foundation, 1 Module, per Each
Item L-125-5.15	Install New Guidance Sign on Existing Foundation, 2 Module, per Each
Item L-125-5.16	Install New Guidance Sign on Existing Pavement VIA Coring, 2 Module, per Each

Item L-125-5.17	Install New Isolation Transformer and Connector Kit in Existing Sign/ Fixture, per Each
Item L-125-5.18	Install New REIL Unit, per Each

REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

Advisory Circulars (AC)

AC 150/5340-18	Standards for Airport Sign Systems
AC 150/5340-26	Maintenance of Airport Visual Aid Facilities
AC 150/5340-30	Design and Installation Details for Airport Visual Aids
AC 150/5345-5	Circuit Selector Switch
AC 150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26	Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-28	Precision Approach Path Indicator (PAPI) Systems
AC 150/5345-39	Specification for L-853, Runway and Taxiway Retroreflective Markers
AC 150/5345-42	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-44	Specification for Runway and Taxiway Signs
AC 150/5345-46	Specification for Runway and Taxiway Light Fixtures
AC 150/5345-47	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-51	Specification for Discharge-Type Flashing Light Equipment
AC 150/5345-53	Airport Lighting Equipment Certification Program

Engineering Brief (EB)

EB No. 67	Light Sources Other than Incandescent and Xenon for Airport and Obstruction Lighting Fixtures

END OF ITEM L-125

Item L-130 Precision Approach Path Indicator System (PAPI)

DESCRIPTION

130-1.1 General. This item shall consist of systems furnished and installed in accordance with this specification, any referenced specifications, and the applicable Federal Aviation Administration Advisory Circulars and orders. The systems and equipment shall be installed at the location and in accordance with the dimensions, layout, design, and details shown in the plans. This item shall include the furnishing of all equipment, materials, services, and incidentals necessary to place the systems in operation as completed units to the satisfaction of the RPR.

Following the construction, installation and commissioning of the equipment, the system shall be flight checked by the FAA.

130-1.2 Referenced materials. Additional details pe1taining to specific systems covered in this section are contained in the Federal Aviation Administration (FAA) Advisory Circulars (AC's), latest edition, listed below:

a.	150/5345-1	Approved Airport Equipment
b.	150/5345-7	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
c.	150/5345-26	FAA Specification for L-823 Plug and Receptacle, Cable Connectors
d.	150/5345-42	Specification for L-823 Plug and Receptacle, Cable Connectors
e.	150/5345-53	Airport Lighting Equipment Certification Program
f.	150/5370-2	Operational Safety on Airports During Construction
g.	150/5370-10	Standards for Specifying Construction of Airports
h.	I 50/5345-28D	Precision Approach Path Indicator (PAPI) Systems
i.	150/5345-51	Specification for Discharge-Type Flashing Light Equipment

The Contractor is responsible for obtaining and using the latest edition of the referenced FAA Advisory Circulars. This is not all inclusive but is offered as a convenience to the contractor.

130-1.3 Submittals. Shop drawings of each airfield lighting component, indicating FAA approval, shall be submitted to the Engineer for review and approval and be approved prior to ordering any material for this item. This submittal shall include the proposed method of installation for all airfield lighting components. The submittal shall include data on all component parts of the item or system and shall include the manufacturers list of recommended spare parts for one year's use. The data submitted shall be sufficient, in the opinion of the Engineer, to determine compliance with the contract documents. The Contractor's submittals shall be in accordance with Item L-106, Submittals, Record Documents and Maintenance Manuals.

130-1.4 Qualifications. The engineer reserves the right to reject any and all equipment, materials or procedures, which, in the Engineer's opinion, does not meet the system design and the standards and code, specified herein.

The term "Subcontractor" shall mean the specialty contractor as specified herein providing all the work of this section. The contractor shall be a Subcontractor or employ a Subcontractor to perform the work of this section.

The Subcontractor shall be fully responsible for the work of this section and shall provide all of the work of this section. The Subcontractor shall not delegate any work of this section to other Subcontractors without prior approval from the Engineer. Any such Subcontractors shall be fully bound by all the Contract documents and as specified herein.

130-1.5 Quality assurance. The Subcontractor shall have at least seven (7) years direct experience with devices, equipment, and systems of the type and scope specified herein. The Subcontractor shall be a business entity that is substantially engaged in the work of this section and has successfully done so for the past three consecutive years at a minimum. The Subcontractor shall as part of the foregoing business have a fully staffed, parts stocked, equipped maintenance and repair facility.

The supervisor of the work of this section shall have at least five (5) years direct professional experience with devices, equipment, system installations of the type and scope specified herein.

All personnel engaged in the installation of this section have at least three (3) years direct experience with devices, equipment, and system installations of the type and scope specified herein.

The subcontract shall submit the following:

a. A list of at least five (5) successful installations comparable in scope and complexity to that specified herein.

b. Proof that the firm is regularly engaged in the business of designing, installing, and servicing systems of the type specified herein.

c. Verification (names and biographies) of the firm's design, installation, service, and maintenance personnel and facilities with a maintained stock of service parts showing competence.

d. A list of all test equipment as specified below showing manufacturer, model number, all installed options, and dates of last calibration.

EQUIPMENT AND MATERIALS

130-2.1 General.

a. Airport lighting equipment and materials covered by Federal Aviation Administration (FAA) specifications shall be certified under the Airport Lighting Equipment Certification Program in accordance with AC 150/5345-53, current version. FAA certified airfield lighting shall be compatible with each other to perform in compliance with FAA criteria and the intended operation. If the Contractor provides equipment that does not performs as intended because of incompatibility with the system, the Contractor assumes all costs to correct the system for to operate properly.

b. Manufacturer's certifications shall not relieve the Contractor of their responsibility to provide materials in accordance with these specifications and acceptable to the RPR. Materials supplied and/or installed that do not comply with these specifications shall be removed, when directed by the RPR and replaced with materials, which do comply with these specifications, at the sole cost of the Contractor.

c. All materials and equipment used shall be submitted to the RPR for approval prior to ordering the equipment. Submittals consisting of marked catalog sheets or shop drawings shall be provided. Clearly mark each copy to identify pertinent products or models applicable to this project. Indicate all optional equipment and delete non-pertinent data. Submittals for components of electrical equipment and systems shall identify the equipment for which they apply on each submittal sheet. Markings shall be clearly made

with arrows or circles (highlighting is not acceptable). The Contractor shall be responsible for delays in the project accruing directly or indirectly from late submissions or resubmissions of submittals.

d. The data submitted shall be sufficient, in the opinion of the RPR, to determine compliance with the plans and specifications. The Contractor's submittals shall be submitted in electronic PDF format, tabbed by specification section. The RPR reserves the right to reject any or all equipment, materials or procedures, which, in the RPR's opinion, does not meet the system design and the standards and codes, specified herein.

e. All equipment and materials furnished and installed under this section shall be guaranteed against defects in materials and workmanship for a period of at least twelve (12) months from final acceptance by the Owner. The defective materials and/or equipment shall be repaired or replaced, at the Owner's discretion, with no additional cost to the Owner.

f. All LED light fixtures, with the exception of obstruction lighting (AC 150/5345-43) must be warranted by the manufacturer for a minimum of 4 years after date of installation inclusive of all electronics. Obstruction lighting warranty is set by the individual manufacturer.

130-2.2 Conduit/Duct. Conduit shall conform to Specification Item L-110 Airport Underground Electrical Duct Banks and Conduits.

130-2.3 Cable and Counterpoise. Cable and Counterpoise shall conform to Item L-l08 Underground Power Cable for Airports.

130-2.4 Tape. Rubber and plastic electrical tapes shall be Scotch Electrical Tape Numbers 130C and 88 respectively, as manufactured by 3M Company or an approved equal.

130-2.5 Cable Connections. Cable Connections shall conform to Item L-108 Installation of Underground Cable for Airports.

130-2.6 Concrete. Concrete for backfill shall comply with Specification P-610, Structural Portland Cement Concrete and have a maximum size coarse aggregate of 1-inch and shall have a 28-day comprehensive strength of not less than 4,000 psi and increasing with age **or as noted on the Plans**.

130-2.7 Heat shrink kit. Heat shrinkage tubing with integral sealant for waterproofing L-823 connectors shall be Sigmaform Corporation Type APL, or Raychem Corporation Type ADL, or Crouse Hinds Type HSK or approved equivalent.

130-2.8 Reinforcing steel. All reinforcing steel shall be ASTM A 615, Grade 60.

130-2.9 Bolting hardware. All airfield bolting hardware shall be stainless steel and shall meet FAA requirements. All bolts ¼-inch and larger shall be hex head type. All bolts smaller than ¼-inch trade size shall be recessed alien type. All bolted connections shall utilize an anti-rotational locking type device. The base can cover and fixture mounting bolts shall extend through the base can mounting flange into the base can be minimum of 0.5-inches. The bolts shall have enough thread length so they do not shoulder out before the fixture is securely tightened.

130-2.10 Anti-seize compound. The anti-seize compound shall be Ideal "Noalox" or approved equivalent. Use GE-RTV-118 non-curing sealant to seal between sections of base cans, spacer rings, adaptor rings or fixtures.

130-2.11 Fillers and adhesives. Joint sealing filler shall comply with Specification P-605, Joint Sealing Filler and adhesive compounds shall comply with Specification P-606, Adhesive Compounds, Two-Component, For Sealing Wire and Lights and Pavement. The P-605 and P-606 compounds shall be formulated so they are compatible with the pavement type with which they are to be used.

130-2.12 Strain relief connectors. Strain relief connectors shall be Liquid Tight Thomas & Betts 2500 series with WMG-PG wire mesh cable grip or approved equivalent.

130-2.13 Identification markers. Fixture, manhole and sign identification markers shall be brass bench markers by Surv-Kap of Tucson, Arizona model number M/M-82 with flat top or approved equivalent.

130-2.14 Precision approach path indicator (PAPI). The light units for the PAPI shall meet the requirements of AC 150/5345-28, Type L-881, Style B, Class II

a. Photometric Requirements. Each light unit shall have two lamps and shall provide a beam of light split horizontally to produce white light in the top sector and red light in the bottom sector. When viewed by an observer at a distance of 1000 feet (300m), the transition from red light to white light shall occur within an angle of 3 minutes of arc at the beam center and within an angle of 5 minutes of arc at the beam edges. The light colors shall be aviation white and aviation red. The lamps shall have a minimum rated life of 1000 hours in this application and shall achieve full intensity with 10 seconds after a cold start.

b. Light Unit Construction. Each light unit shall be designed so that dynamic loading due to wind, or static loading due to snow, will not cause the light pattern to be displaced. The weight of each light unit shall not exceed 100 pounds and shall be no higher than 40 inches when installed at the minimum mounting height. The light unit shall have an overhang or other means to inhibit rain or snow from reaching the optical lens.

c. Mounting Provisions. The light units shall have a minimum of three mounting legs which shall be adjustable to permit leveling where one side of the unit is installed up to 1 inch higher or lower than the opposite side. The legs shall consist of mounting and adjusting hardware, 2-inch rigid galvanized steel (RGS) (furnished by CONTRACTOR), frangible couplings conforming to FAA standards, and flanges suitable for mounting on a concrete pad. The adjusting hardware shall be designed to prevent any displacement of the optical system due to vibration.

d. Aiming. Conform aiming per FAA and manufacturer requirement. Provide aiming tools to Airport after testing.

e. Tilt Switch. A tilt switch system shall be provided which de-energizes all the lamps in the system when the optical pattern of one light unit is inadvertently lowered between 1/4 and 1/2 degree or raised between 1/2 and **l** degree with respect to the preset aiming angle.

f. Leads. All wiring shall be introduced into the light units through leads fitted with factor-molded plugs.

g. Shorting Device. A lamp bypass device, which provides a short circuit around a burned-out lamp, shall be provided.

h. Style A System. The PAPI units shall operate on a voltage driven 215 to 265 VAC, 60Hz circuit. The power and control master shall be built into the PAPI's primary housing, a separate primary control unit is not allowed.

i. Style B System. The PAPI units shall operate on a current driven, 6.6A circuit.

j. System Control. A photoelectric control shall be provided to switch the system to full intensity for day and reduced intensity at night. The day mode shall be activated when the illumination on the photocell 1ises to 50-60 foot-candles, and the night mode shall be activated when the illumination drops to 25-35 foot- candles.

k. Spare Parts. For each 2-Box PAPI installed, the contractor shall supply two (2) spare lamps for future use.

l. Nameplate. After commissioning the PAPI unit, provide 3-layer engraved phenolic nameplates on each box inside noting the box aiming angle to 100th of a degree. Minimum font height is ½".

130-2.15 Light Base and Transformer Housings. Light Base and Transformer Housings should conform to the requirements of AC 150/5345-42. Light bases shall be Type L-867 or L-868 as indicated on the plans.

Class lA, Size B shall be provided as indicated or as required to accommodate the fixture or device installed thereon. Base plates, cover plates, and adapter plates shall be provided to accommodate various sizes of fixtures.

130-2.16 Furnish all elevated edge lights installed in new shoulder pavement with telescoping base cans. Furnish all elevated edge lights installed in earth or existing shoulder pavement with one-piece base can.

130-2.17 Isolation Transformers. Isolation Transformers shall be Type L-830 size as required for each installation. Transformer shall conform to AC 150/5345-47.

130-2.18 Delivery, storage and handling. Ship materials and equipment disassembled only to the extent necessary for reasons of shipping limitations, handling facilities, and to avoid damage during shipment. Maintain materials and equipment in new condition. This shall include the use of heat lamps, suitable coverings, indoor storage, etc. to properly protect the equipment and materials. Any equipment or materials, in the opinion of the Owner or Engineer, damaged during construction or storage periods shall be replaced by and at the expense of the Contractor.

CONSTRUCTION METHODS

130-3.1 Installation. All equipment shall be installed as shown in the plans or approved shop drawings and in accordance with the applicable FAA Advisory Circulars and manufacturers' recommendations. Survey instruments shall be used to position all items to insure precise orientation. Tolerances given in the FAA Advisory Circulars, these specifications, and the plans shall not be exceeded. Where no tolerance is given, no deviation is permitted. lterns not installed in accordance with the FAA Advisory Circulars, these specifications and plans shall be removed and replaced by and at the expense of the Contractor.

The Contractor shall install all equipment in accordance with manufacturer's recommendations and per FAA standards. All work shall be performed in a neat and workmanlike manner and shall conform to all applicable local, state and federal building codes. The installation of all PAPI equipment shall be tested as the completion of work and test reports shall be provided.

All loose material shall be removed from all excavations for electrical equipment, raceways, manholes, pads, etc. The bottom of the excavation shall be compacted to 95% compaction in accordance with ASTM D 1557 prior to the installation of the electrical item and backfill.

1n new or existing pavement all conduits, duct banks, counterpoise, base cans, etc. shall be installed prior to the placement of the final lift of pavement.

An identification tag shall be installed with each piece of equipment as shown in the plans. Brass circuit identification tags identifying each circuit shall be attached to each circuit as shown in the plans.

Painted and galvanized surfaces that are damaged shall be repaired according to the manufacturer's recommendations, to the satisfaction of the Owner and Engineer. Use LPS-1G cold galvanizing compound or approved equivalent to repair galvanized surfaces. Obtain paint and primer, of same batch number, from the equipment manufacturer to repair painted surfaces.

GE RTV-118 non-curing sealant or approved equivalent shall be used to seal between sections of base cans, spacer rings, adapter rings or fixtures.

All threaded portions of frangible couplings, etc., shall be coated with Ideal "Noalox" compound or approved equivalent before being assembled.

Dewatering necessary to construct items and related erosion and turbidity control shall be in accordance with federal, state, and local requirements and is incidental to its respective pay item as a part of L-130. The cost of all excavation regardless of type of material encountered shall be included in the unit price bid for this item.

130-3.2 Precision approach path indicator.

a. Workmanship. The equipment shall be fabricated in accordance with the highest quality workmanship. All wiring shall be neatly run and laced. All sharp edges and burrs shall be removed. Painted surfaces shall be free from runs, blotches and scratches.

b. Instruction Book. Furnish to RPR four (4) copies of instruction books with each system. The instruction books shall contain the following information, at a minimum, complete system schematic and wiring diagram showing all components cross-referenced to the parts list, complete parts list with ratings and characteristics for each pait including manufacturers name and model number, installation instructions including aiming and calibration, maintenance instructions, troubleshooting and operating instructions.

c. Operating Instruction, Factory Startup and Trouble Shooting. PAPI manufacturer shall provide the personnel designated by the RPR with a minimum of four (4) hours of instruction regarding aiming, maintenance, and repair of the PAPI assemblies. Factory-authorized personnel shall provide startup and initial aiming.

d. Qualification Requirements. Qualification standards as detailed in 150/5345-28, Precision Approach Path Indicator (PAPI), shall have been met and approval obtained as required and equipment shall be listed in AC 150/5345-53, Airport Lighting Equipment Certification Program.

e. Production Tests. The manufacturer shall have submitted for RPR approval a test procedure to verify the light output and aiming device accuracy for each production unit. After RPR approval, these tests shall be used on all production units.

f. Field Inspection.

1. Prior to placing any concrete in forms, the reinforcing and formwork will be inspected. Any discrepancies found shall be corrected by CONTRACTOR at its expense.

2. After foundations have been constructed and have reached adequate set, trenches and excavations shall be backfilled. Backfill shall be placed on both sides of foundations at the same time and both sides tamped prior to placing of the next layer of material. Special care shall be taken to prevent any uneven wedging action against the structure. Placement of backfill shall be in 6-inch layers. Base material under concrete bases shall be 12 inches of 3/4 inch aggregate base compacted to 90% in accordance with ASTM 0-1557.

g. Siting Dimensions and Tolerances.

1. Distance from Runway Edge. The inboard light unit shall be 50 feet from the runway edge, or as scheduled on the drawings.

2. Separation between Light Units. The PAPI units shall have a lateral separation of 20 feet as detailed on the drawings.

3. Azimuthal Aiming. Each light unit shall be aimed outward into the approach zone on a line parallel to the runway centerline within a tolerance of+/- I /2 degree.

4. Mounting Height Tolerances. The beam centers of all light units shall be within +/- **l** inch of a horizontal plane. This horizontal plane shall be within+/- l foot (0.3m) of the elevation of the runway centerline at the intercept point of the visual glide path with the runway.

5. Tolerance Along Line Perpendicular to Runway. The front face of each light unit in a bar shall be located on a line perpendicular to the runway centerline within+/- 6 inches.

h. FAA Flight Inspection.

1. The PAPI's are required to be flight checked by the FAA. This will typically occur after the contractor has completed work and demobilized from the project site.

2. The contractor is required to be present during the inspection time frame as furnished by the FAA. The contractor will need to have a qualified person present who can make PAPI aiming modifications. In addition, the person must have a radio to be able to communication with the FAA flight inspector during the inspection.

i. Quality Assurance - Inspection. RPR will inspect all work specified in this section before acceptance of the work. Operational test burn of PAPI units for a minimum of thirty (30) minutes is required.

j. Commissioning Notice To Airmen (NOTAM). The Flight Service Station (FFS) which has jurisdiction over the airport where the PAPI is installed shall be notified when the system is ready to be commissioned. The following items shall be reported in writing to RPR in order to notify FSS.

1. Airport name and location.

2. Runway number and location of PAPI (left or right side of runway).

3. Type of PAPI (2-box).

4. Glide slope angle.

5. Threshold crossing height.

6. Date of commissioning.

k. Provide permanent 3-layer engraved phenolic nameplate on each PAPI box indicating the aiming angle to 100th of a degree.

METHOD OF MEASUREMENT

130-4.1 The number of PAPI locations including qualified representative at FAA Flight Check installed to be paid for shall be measured per each per location, installed and accepted by the Engineer. This item will include— light units with baffle, concrete foundation with L-867D, 24" D base can with galvanized steel cover plate with hub, gasket, L-830 Isolation transformer, L-823 connector, SS bolting hardware, ground rod with test report, **engraved aiming angle** nameplate, tether, **power and control unit**~~controller~~ (if required), spare parts, maintenance and aiming tools, instruction manuals and photocell and all incidentals required to provide a complete and operational system. In addition, this item will include the contractors time to be present with aiming tools during the flight inspection on the date as provided by the FAA which may include short notice. **Separate measurement will be made for PAPI size. There is no separate measurement for PAPI power type.**

BASIS OF PAYMENT

130-5.1 Payment will be made at the lump sum price for the item completed in accordance with the plans and specifications that is installed by the Contractor and accepted by the Engineer. This price shall be full compensation for furnishing all materials and for all preparation, assembly, and installation of these materials, and for all labor, equipment, tools, incidentals, and appurtenances necessary to complete these items.

If any of the following bid items are not included in the bid, the quantity is hereby specified as zero.

Payment will be made under:

Item L-130-5.1	Install New LED 2-Box PAPI System incl Flight Check – per Each
Item L-130-5.2	Install New LED 4-Box PAPI System incl Flight Check – per Each

END OF ITEM L-130