a Pape-Dawson company

Addendum No. 2

To: All Plan Holders

Project: Taxiway Rehabilitation and Electrical Improvements

Airport: Texas Gulf Coast Regional Airport

KSA Project No.: 103006

Date: Wednesday, October 8, 2025

TxDOT CSJ No.: 2612ANGLE

The plans, specifications, and contract documents are modified as described below. All bidders shall acknowledge receipt of this and all other addenda on page 18 of 19 on the revised bid form titled **REVISED PER ADDENDUM NO. 2**. 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.

I. **Contract Document Revisions**

A. **Notice to Bidders**

TxDOT has changed the Disadvantage Business Enterprise (DBE) Goal from 7% to **0%**. With the DBE goal being reduced to 0%, submission of a DBE Participation Plan is not required.

B. **Bid Form**

Replace with the attached **Revised** Bid Form. Note that the award of bids will be based on the bid items and quantities listed in the revised bid form titled **REVISED PER ADDENDUM NO. 2**. Refer to TxDOT's website to acquire the revised bid form. Any variance in the bid submittals from the **Revised** Bid Form will result in the bid being disqualified.

II. **Plan Revisions**

A. Plan Sheet G03, Summary of Quantities – Bid Schedule No. 1

1. Replace with the attached Revised Plan Sheet G03, Summary of Quantities – Bid Schedule No. 1

B. Plan Sheet G04, Summary of Quantities – Bid Schedule No. 2

1. Replace with the attached Revised Plan Sheet G04, Summary of Quantities – Bid Schedule No. 2

C. Plan Sheet C002, Pavement Rehabilitation and Reconstruction Limits

1. Replace with the attached Revised Plan Sheet C002, Pavement Rehabilitation and Reconstruction Limits

D. Plan Sheet C011, Overall Phasing, Staging and Haul Routes

1. Replace with the attached Revised Plan Sheet C011, Overall Phasing, Staging and Haul Routes

E. Plan Sheet C020, Construction Safety Phasing Plan 1

1. Replace with the attached Revised Plan Sheet C020, Construction Safety Phasing Plan 1

F. Plan Sheet C021, Construction Safety Phasing Plan 2

1. Replace with the attached Revised Plan Sheet C021, Construction Safety Phasing Plan 2

G. Plan Sheet C030, Demolition and Milling Plan 1
    1. Replace with the attached Revised Plan Sheet C030, Demolition and Milling Plan 1
H. Plan Sheet C031, Demolition and Milling Plan 2
    1. Replace with the attached Revised Plan Sheet C031, Demolition and Milling Plan 2
I. Plan Sheet C050, Grading and Drainage 1
    1. Replace with the attached Revised Plan Sheet C050, Grading and Drainage 1
J. Plan Sheet C051, Grading and Drainage 2
    1. Replace with the attached Revised Plan Sheet C051, Grading and Drainage 2
K. Plan Sheet C054, Grading and Drainage 5
    1. Replace with the attached Revised Plan Sheet C054, Grading and Drainage 5
L. Plan Sheet C088, Pavement Details
    1. Replace with the attached Revised Plan Sheet C088, Pavement Details
M. Plan Sheet C109, Joint Details
    1. Replace with the attached Revised Plan Sheet C109, Joint Details
N. Plan Sheet C131, Airfield Electric Vault Civil Site Plan
    1. Replace with the attached Revised Plan Sheet C131, Airfield Electric Vault Civil Site Plan
O. Plan Sheet C132, Airfield Electrical Vault Civil Site Details 1
    1. Add the attached Plan Sheet C132, Airfield Electrical Vault Civil Site Details 1
P. Plan Sheet C133, Airfield Electrical Vault Civil Site Details 2
    1. Add the attached Plan Sheet C133, Airfield Electrical Vault Civil Site Details 2
Q. Plan Sheet C134, Airfield Electrical Vault Civil Site Details 3
    1. Add the attached Plan Sheet C134, Airfield Electrical Vault Civil Site Details 3
R. Plan Sheet ED101, Airfield Lighting Demolition Plan
    1. Replace with the attached Revised Plan Sheet ED101, Airfield Lighting Demolition Plan
S. Plan Sheet ED102, Airfield Lighting Demolition Plan
    1. Replace with the attached Revised Plan Sheet ED102, Airfield Lighting Demolition Plan
T. Plan Sheet ED103, Airfield Lighting Demolition Plan
    1. Replace with the attached Revised Plan Sheet ED103, Airfield Lighting Demolition Plan
U. Plan Sheet ED104, Airfield Lighting Demolition Plan
    1. Replace with the attached Revised Plan Sheet ED104, Airfield Lighting Demolition Plan
V. Plan Sheet ED105, Airfield Lighting Demolition Plan
    1. Replace with the attached Revised Plan Sheet ED105, Airfield Lighting Demolition Plan
W. Plan Sheet ED106, Airfield Lighting Demolition Plan
    1. Replace with the attached Revised Plan Sheet ED106, Airfield Lighting Demolition Plan

X. Plan Sheet ED107, Airfield Lighting Demolition Plan

1. Replace with the attached Revised Plan Sheet ED107, Airfield Lighting Demolition Plan

Y. Plan Sheet EL402, Airfield Lighting Demolition Plan

1. Replace with the attached Revised Plan Sheet EL402, Electrical Vault Plan

Z. Plan Sheet EL403, Airfield Lighting Demolition Plan

1. Replace with the attached Revised Plan Sheet EL403, Electrical Vault Plan

AA. Plan Sheet EL510, Airfield Lighting Demolition Plan

1. Replace with the attached Revised Plan Sheet EL510, Airfield Electrical Details

III. **Specification Revisions**

A. Item P-101, Preparation/Removal of Existing Pavements

1. Delete this item in its entirety and replace with the attached specification Item P-101, Preparation/Removal of Existing Pavements shown as “ADD.2: October 08, 2025” in the footer.

B. Item P-152, Excavation, Subgrade, and Embankment

1. Delete this item in its entirety and replace with the attached specification Item P-152, Excavation, Subgrade, and Embankment shown as “ADD.2: October 08, 2025” in the footer.

C. Item D-701, Pipe for Storm Drains and Culverts

1. Delete this item in its entirety and replace with the attached specification Item D-701, Pipe for Storm Drains and Culverts shown as “ADD.2: October 08, 2025” in the footer.

D. Item D-752, Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures

1. Delete this item in its entirety and replace with the attached specification Item D-752, Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures shown as “ADD.2: October 08, 2025” in the footer.

E. Item 260583, Wire Connections

1. Delete this item in its entirety and replace with the attached specification Item 260583, Wire Connections shown as “ADD.2: October 08, 2025” in the footer.

F. Item 262116, Service Entrance

1. Delete this item in its entirety and replace with the attached specification Item 262116, Service Entrance shown as “ADD.2: October 08, 2025” in the footer.

G. Item L-105, Alteration, Removal, Demolition

1. Delete this item in its entirety and replace with the attached specification Item L-105, Alteration, Removal, Demolition shown as “ADD.2: October 08, 2025” in the footer

H. Item L-109, Airport Transformer Vault and Vault Equipment

1. Delete this item in its entirety and replace with the attached specification Item L-109, Airport Transformer Vault and Vault Equipment shown as “ADD.2: October 08, 2025” in the footer.

I. Item L-130, Precision Approach Path Indicator System (PAPI)

1. Delete this item in its entirety and replace with the attached specification Item L-130, Precision Approach Path Indicator System (PAPI) shown as “ADD.2: October 08, 2025” in the footer.

J. Item L-16231, Package Engine Generator

1. Delete this item in its entirety and replace with the attached specification Item L-16231, Package Engine Generator shown as “ADD.2: October 08, 2025” in the footer.

K. Item D-705, Pipe Underdrains for Airports

1. Delete this item in its entirety.

L. Item KSA-100

1. Delete this item in its entirety.

M. Item 260800, Electrical Testing

1. Add this item in its entirety with the attached specification Item 260800, Electrical Testing shown as “ADD.2: October 08, 2025” in the footer.

N. Item 264130, Automatic Transfer Switches

1. Add this item in its entirety with the attached specification Item 264130, Automatic Transfer Switches shown as “ADD.2: October 08, 2025” in the footer.

IV. **Attachments**

A. Revised Plan Sheet G03, Summary of Quantities – Bid Schedule No. 1

B. Revised Plan Sheet G04, Summary of Quantities – Bid Schedule No. 2

C. Revised Plan Sheet C002, Pavement Rehabilitation and Reconstruction Limits

D. Revised Plan Sheet C011, Overall Phasing, Staging and Haul Routes

E. Revised Plan Sheet C020, Construction Safety Phasing Plan 1

F. Revised Plan Sheet C021, Construction Safety Phasing Plan 2

G. Revised Plan Sheet C030, Demolition and Milling Plan 1

H. Revised Plan Sheet C031, Demolition and Milling Plan 2

I. Revised Plan Sheet C050, Grading and Drainage 1

J. Revised Plan Sheet C051, Grading and Drainage 2

K. Revised Plan Sheet C054, Grading and Drainage 5

L. Revised Plan Sheet C088, Pavement Details

M. Revised Plan Sheet C109, Joint Details

N. Revised Plan Sheet C131, Airfield Electric Vault Civil Site Plan

O. Plan Sheet C132, Airfield Electrical Vault Civil Site Details 1

P. Plan Sheet C133, Airfield Electrical Vault Civil Site Details 2

Q. Plan Sheet C134, Airfield Electrical Vault Civil Site Details 3

R. Revised Plan Sheet ED101, Airfield Lighting Demolition Plan

S. Revised Plan Sheet ED102, Airfield Lighting Demolition Plan

T. Revised Plan Sheet ED103, Airfield Lighting Demolition Plan

U. Revised Plan Sheet ED104, Airfield Lighting Demolition Plan

V. Revised Plan Sheet ED105, Airfield Lighting Demolition Plan

W. Revised Plan Sheet ED106, Airfield Lighting Demolition Plan

X. Revised Plan Sheet ED107, Airfield Lighting Demolition Plan

Y. Revised Plan Sheet EL402, Electrical Vault Plan

Z. Revised Plan Sheet EL403, Electrical Vault Plan

AA. Revised Plan Sheet EL510, Airfield Electrical Details

BB. Revised Specification P-101, Preparation/Removal of Existing Pavements

CC. Revised Specification P-152, Excavation, Subgrade, and Embankment

DD. Revised Specification D-701, Pipe for Storm Drains and Culverts

EE. Revised Specification D-752, Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures

FF. Revised Specification 260583, Wire Connections

GG. Revised Specification 262116, Service Entrance

HH. Revised Specification L-105, Alteration, Removal, Demolition

II. Revised Specification L-109, Airport Transformer Vault and Vault Equipment

JJ. Revised Specification L-130, Precision Approach Path Indicator System (PAPI)

KK. Revised Specification L-16231, Package Engine Generator

LL. Specification 260800, Electrical Testing

MM. Specification 264130, Automatic Transfer Switches

NN. Contractor Questions

Addendum No. 2 Issued By:
KSA

Nathan T. Mikell, P.E.
Project Manager

TBPE Firm Registration No. F-1356

BID SCHEDULE NO. 1

(HMAC PAVEMENT SECTION FOR TAXIWAY A RECONSTRUCTION AND TAXIWAY B RELOCATION)

Item No.	Spec. No.	Description	Units	Estimated Quantities
Base Bid:				
1.01	C-100-14.1	Contractor Quality Control Program	LS	1
1.02	C-102-5.1	Installation and Removal of Silt Fence	LF	405
1.03	C-102-5.2	Rock Construction Exit	EA	3
1.04	C-102-5.3	Storm Water Pollution Prevention Plan	LS	1
1.05	C-105-8.1	Mobilization	LS	1
1.06	C-105-8.2	Traffic Control Devices and Personnel	LS	1
1.07	C-105-8.3	Temporary Relocated Runway 35 Threshold	LS	1
1.08	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	15,092
1.09	P-101-5.3	2.5" Asphalt Surface Course Removal	SY	2,800
1.10	P-101-5.4	1.5" Crushed Aggregate Base Course Removal	SY	2,800
1.11	P-101-5.5	Crack Repair	LF	35,000
1.12	P-101-5.6	1.5" - 2.0" Cold Milling	SY	38,990
1.13	P-101-5.8	SET Removal for 2 - 30" RCP	EA	2
1.14	P-101-5.10	30" RCP Removal	LF	620
1.15	P-152-4.1	Unclassified Excavation	CY	10,500
1.16	P-152-4.2	Offsite Borrow Excavation	CY	9,300
1.17	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	14,960
1.18	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	404
1.19	P-304-8.1	6" Cement-Treated Base Course	SY	14,520
1.20	P-401-8.1	4" Asphalt Surface Course	TON	2,865
1.21	P-401-8.2	2" Asphalt Surface Course (Overlay)	TON	4,390
1.22	P-401-8.3	4" Asphalt Surface Course (Overlay)	TON	630
1.23	P-401-8.4	Full Depth Pavement Repair	SY	1,000
1.24	P-403-8.1	5" Asphalt Stabilized Base Course	TON	3,820
1.25	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	3,630
1.26	P-620-5.2a	White Pavement Markings (Reflective)	SF	15,981
1.27	P-620-5.2b	Red Pavement Markings (Reflective)	SF	1,155
1.28	P-620-5.2c	Yellow Pavement Markings (Reflective)	SF	11,634
1.29	P-620-5.2d	Black Pavement Markings (Non-Reflective)	SF	27,821
1.30	P-620-5.3	Marking Removal	SF	4,660
1.31	P-620-5.4a	Phase 2 Temporary Markings (Non-Reflective)	SF	2,396
1.32	P-620-5.4b	Phase 3 Temporary Markings (Non-Reflective)	SF	3,853
1.33	P-620-5.4c	Phase 4 Temporary Markings (Non-Reflective)	SF	861
1.34	D-701-5.3	Class V 36" RCP, ASTM C76	LF	400
1.35	D-752-5.3	Safety End Treatment for 2 - 36" RCP (6:1 Slope, With Pipe Runners)	EA	2
1.36	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	23
1.37	T-904-5.1	Sodding	SY	13,826
1.38	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	13,665
1.39	L-103-5.1	Install New Beacon on New 50' Tip Down Pole, Including Foundation	EA	1
1.40	L-105-5.1	Remove No. 8 AWG, L-824C Cable in Duct	LF	5,200
1.41	L-105-5.2	Remove 2-inch Conduit (Including Cable)	LF	43,600
1.42	L-105-5.3	Remove Concrete Encased Duct in Earth (Including	LF	575
1.43	L-105-5.4	Remove and Dispose of Elevated Edge Light, Base Can to be Removed	EA	395
1.44	L-105-5.5	Remove and Dispose of Elevated Edge Light, Base Can to Remain	EA	8
1.45	L-105-5.6	Remove and Dispose of In-Pavement Edge Light, Base Can to be Removed	EA	1
1.46	L-105-5.7	Remove and Dispose of Airfield Sign and Foundation	EA	60
1.47	L-105-5.8	Remove Airfield Sign Foundation	EA	2
1.48	L-105-5.9	Remove and Dispose of Pull Can in Turf	EA	29
1.49	L-105-5.10	Remove and Dispose of 4-Box L-880 PAPI System and Associated Foundations	EA	2
1.50	L-105-5.11	Remove and Dispose of Primary Windcone and Foundation	EA	1
1.51	L-105-5.12	Remove and Dispose of Supplemental Wind Cone and Foundation	EA	2
1.52	L-105-5.13	Remove and Dispose of Beacon, Beacon Tower, and Foundation	EA	1
1.53	L-105-5.14	Work in Existing Airfield Lighting Vault Equipment	LS	1
1.54	L-107-5.1	Install New L-807(L) Wind Cone Including Tip Down Pole and Foundation	EA	3
1.55	L-108-5.1	No. 8 AWG, L-824C, Installed in Conduit	LF	76,550
1.56	L-108-5.2	No. 6 AWG Bare Counterpoise Wire, Installed in Conduit Trench	LF	58,610
1.57	L-108-5.3	Electrical Circuit (Wind Cone), 2#10 AWG, 1#10G, Installed in Conduit	LF	2,000
1.58	L-108-5.4	Electrical Circuit (Beacon), 2#12 AWG, 1#12G, Installed in Conduit	LF	125
1.59	L-108-5.5	Temporary Electrical Provisions	LS	1
1.60	L-109-5.1	Install New Vault Building And Equipment	LS	1
1.61	L-109-5.2	Install New 4kW L-829 Constant Current Regulator	EA	1
1.62	L-109-5.3	Install New 7.5kW L-829 Constant Current Regulator	EA	1
1.63	L-109-5.4	Install New 10kW L-829 Constant Current Regulator	EA	1
1.64	L-109-5.5	Install Salvaged 10kW L-828 Constant Current Regulator	EA	1
1.65	L-110-5.1	1-Way, 2" Sch. 40 PVC Conduit, Direct Buried in Turf	LF	44,500
1.66	L-110-5.2	2-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	3,725
1.67	L-110-5.3	2-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in Full Strength Pavement	LF	415
1.68	L-110-5.4	4-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	1,705
1.69	L-110-5.5	6-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	150
1.70	L-110-5.6	8-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	470
1.71	L-112-5.1	2-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	735
1.72	L-112-5.2	2-Way, 4" HDPE Conduit, Installed Via Directional Drill	LF	175
1.73	L-112-5.3	4-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	250
1.74	L-112-5.4	6-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	100
1.75	L-112-5.5	8-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	425
1.76	L-115-5.1	2-Way Junction Can Plaza (JCP)	EA	24
1.77	L-115-5.2	4-Way Junction Can Plaza (JCP)	EA	4
1.78	L-115-5.3	6-Way Junction Can Plaza (JCP)	EA	1
1.79	L-115-5.4	8-Way Junction Can Plaza (JCP)	EA	3
1.80	L-115-5.5	Install New Pull Can in Turf	EA	3
1.81	L-115-5.6	Install New Pull Box in Turf	EA	1
1.82	L-125-5.1	Install New L-861T(L) LED Elevated Taxiway Edge Light on New L-867B Base Can in Turf	EA	320
1.83	L-125-5.2	Install New L-861(L) Elevated Runway Edge Light on New L-867B Base Can in Turf	EA	70
1.84	L-125-5.3	Install New L-861E(L) Elevated Runway Threshold End Light on Existing Base Can	EA	8
1.85	L-125-5.4	Install New L-861E(L) Elevated Runway Threshold End Light on New L-867B Base Can in Turf	EA	8
1.86	L-125-5.5	Install New New L-867B Base Can with Blank Cover in	EA	3
1.87	L-125-5.6	Install New 1-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	12
1.88	L-125-5.7	Install New 2-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	24
1.89	L-125-5.8	Install New 3-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	20
1.90	L-125-5.9	Install New 1-MOD L-858(L) Size 4, Style 2 LED Guidance Sign on New Foundation	EA	6
1.91	L-125-5.11	Install New 4-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	2
1.92	L-130-5.1	Install New LED L-880(L) Style B PAPI System	EA	2
1.93	L-16231-5.1	Install New Backup Standby Generator System	LS	1
1.94	262416-5.1	Electrical Service Including Rack, Equipment, Maintenance Pad, and Utility Company Ducts	LS	1
1.95	SEE PLANS	6' Wrought Iron Fence With Mow Strip	LF	132
1.96	SEE PLANS	12' Manual Rolling Wrought Iron Gate	EA	1
1.97	SEE PLANS	Remove and Dispose of Existing Segmented Circle and Traffic Pattern Indicators	LS	1
1.98	SEE PLANS	Construct Segmented Circle Including Traffic Pattern Indicators	LS	1
1.99	SEE PLANS	Gravel Access Drive	SY	165
1.100	SEE PLANS	Remove Existing Concrete Curb	LF	12
1.101	SEE PLANS	6" Reinforced PCC	SY	43
1.102	SEE PLANS	12" Flexible Aggregate Base	SY	50
1.103	KSA-701	Solar Powered Green Taxiway Centerline Retroreflectors	EA	400

Item No.	Spec. No.	Description	Units	Estimated Quantities
Additive Alternate No. 1 - Installation of Runway End Identifier Lights (REILs) Runway 35:				
A1.01	L-125-5.10	Install New REIL UNIT	EA	1
Additive Alternate No. 2 - Upgraded Taxiway Fillet Geometry for Runway Connector Taxiways (E-HMAC and G-HMAC):				
A2.01	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	581
A2.02	P-152-4.1	Unclassified Excavation	CY	1,754
A2.03	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	4,208
A2.04	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	114
A2.05	P-304-8.1	6" Cement-Treated Base Course	SY	3,972
A2.06	P-401-8.1	4" Asphalt Surface Course	TON	684
A2.07	P-403-8.1	5" Asphalt Stabilized Base Course	TON	987
A2.08	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	993
A2.09	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	2
A2.10	T-904-5.1	Sodding	SY	2,329
A2.11	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	1,076
Additive Alternate No. 3 - Upgraded Taxiway Fillet Geometry for Apron Connector Taxiways (E1-PCC, F-PCC, G1-PCC and J-HMAC):				
A3.01	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	75
A3.02	P-101-5.2	Concrete Pavement Removal (Full Depth)	SY	1,053
A3.03	P-101-5.7	24" RCP SET Removal	EA	1
A3.04	P-101-5.8	SET Removal for 2 - 30" RCP	EA	1
A3.05	P-101-5.9	42" RCP SET Removal	EA	1
A3.06	P-101-5.11	Storm Sewer Junction Box Removal	EA	2
A3.07	P-152-4.1	Unclassified Excavation	CY	7,580
A3.08	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	7,369
A3.09	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	200
A3.10	P-304-8.1	6" Cement-Treated Base Course	SY	720
A3.11	P-304-8.2	8" Cement-Treated Base Course	SY	6,299
A3.12	P-401-8.1	4" Asphalt Surface Course	TON	123
A3.13	P-403-8.1	5" Asphalt Stabilized Base Course	TON	1,779
A3.14	P-501-8.1	12" Reinforced Portland Cement Concrete	SY	5,086
A3.15	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	1,755
A3.16	P-605-5.1	Joint Sealing Filler	LF	8,260
A3.17	D-701-5.1	24" Dia. ASTM C76, Class V RCP	LF	16
A3.18	D-701-5.2	30" Dia. ASTM C76, Class V RCP	LF	64
A3.19	D-701-5.4	42" Dia. ASTM C76, Class V RCP	LF	32
A3.20	D-751-5.1	Storm Sewer Junction Box	EA	2
A3.21	D-752-5.1	Safety End Treatment for 1 - 24" RCP (6:1 Slope, With Pipe Runners)	EA	1
A3.22	D-752-5.2	Safety End Treatment for 2 - 30" RCP (6:1 Slope, With Pipe Runners)	EA	1
A3.23	D-752-5.4	Safety End Treatment for 1 - 42" RCP (6:1 Slope, With Pipe Runners)	EA	1
A3.24	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	4
A3.25	T-904-5.1	Sodding	SY	3,468
A3.26	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	2,152
Additive Alternate No. 4 - Reconstruct Taxiway H:				
A4.01	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	350
A4.02	P-101-5.2	Concrete Pavement Removal (Full Depth)	SY	355
A4.03	P-152-4.1	Unclassified Excavation	CY	2,700
A4.04	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	2,604
A4.05	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	71
A4.06	P-304-8.2	8" Cement-Treated Base Course	SY	2,505
A4.07	P-403-8.1	5" Asphalt Stabilized Base Course	TON	780
A4.08	P-501-8.1	12" Reinforced Portland Cement Concrete	SY	2,111
A4.09	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	627
A4.10	P-605-5.1	Joint Sealing Filler	LF	2,861
A4.11	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	2
A4.12	T-904-5.1	Sodding	SY	985
A4.13	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	1,076

ADDENDUM #2 — 10/8/25

MARK | REVISION | DATE

SHEET NAME: SUMMARY OF QUANTITIES - BID SCHEDULE NO. 1

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 09/26/2025
KSA JOB NO.: 103006

103006 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)

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SEAL: STATE OF TEXAS — NATHAN T. MIKELL — 138406 — LICENSED PROFESSIONAL ENGINEER — 10/08/2025

TBPE Firm Registration No. F-1356

SHEET NO. G03

BID SCHEDULE NO. 2

(PCC PAVEMENT SECTION FOR TAXIWAY A RECONSTRUCTION AND TAXIWAY B RELOCATION)

Item No.	Spec. No.	Description	Units	Estimated Quantities
Base Bid:				
1.01	C-100-14.1	Contractor Quality Control Program	LS	1
1.02	C-102-5.1	Installation and Removal of Silt Fence	LF	405
1.03	C-102-5.2	Rock Construction Exit	EA	3
1.04	C-102-5.3	Storm Water Pollution Prevention Plan	LS	1
1.05	C-105-8.1	Mobilization	LS	1
1.06	C-105-8.2	Traffic Control Devices and Personnel	LS	1
1.07	C-105-8.3	Temporary Relocated Runway 35 Threshold	LS	1
1.08	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	15,092
1.09	P-101-5.3	2.5" Asphalt Surface Course Removal	SY	2,800
1.10	P-101-5.4	1.5" Crushed Aggregate Base Course Removal	SY	2,800
1.11	P-101-5.5	Crack Repair	LF	35,000
1.12	P-101-5.6	1.5" - 2.0" Cold Milling	SY	38,990
1.13	P-101-5.8	SET Removal for 2 - 30" RCP	EA	2
1.14	P-101-5.10	30" RCP Removal	LF	620
1.15	P-152-4.1	Unclassified Excavation	CY	12,400
1.16	P-152-4.2	Offsite Borrow Excavation	CY	8,000
1.17	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	14,960
1.18	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	404
1.19	P-304-8.2	8" Cement-Treated Base Course	SY	14,520
1.20	P-401-8.2	2" Asphalt Surface Course (Overlay)	TON	4,390
1.21	P-401-8.3	4" Asphalt Surface Course (Overlay)	TON	630
1.22	P-401-8.4	Full Depth Pavement Repair	SY	1,000
1.23	P-403-8.1	5" Asphalt Stabilized Base Course	TON	4,600
1.24	P-501-8.1	12" Reinforced Portland Cement Concrete	SY	12,733
1.25	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	3,630
1.26	P-605-5.1	Joint Sealing Filler	LF	16,245
1.27	P-620-5.2a	White Pavement Markings (Reflective)	SF	15,981
1.28	P-620-5.2b	Red Pavement Markings (Reflective)	SF	1,155
1.29	P-620-5.2c	Yellow Pavement Markings (Reflective)	SF	11,634
1.30	P-620-5.2d	Black Pavement Markings (Non-Reflective)	SF	27,821
1.31	P-620-5.3	Marking Removal	SF	4,660
1.32	P-620-5.4a	Phase 2 Temporary Markings (Non-Reflective)	SF	2,396
1.33	P-620-5.4b	Phase 3 Temporary Markings (Non-Reflective)	SF	3,853
1.34	P-620-5.4c	Phase 4 Temporary Markings (Non-Reflective)	SF	861
1.35	D-701-5.3	Class V 36" RCP, ASTM C76	LF	400
1.36	D-752-5.3	Safety End Treatment for 2 - 36" RCP (6:1 Slope, With Pipe Runners)	EA	2
1.37	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	23
1.38	T-904-5.1	Sodding	SY	13,826
1.39	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	13,665
1.40	L-103-5.1	Install New Beacon on New 50' Tip Down Pole, Including Foundation	EA	1
1.41	L-105-5.1	Remove No. 8 AWG, L-824C Cable in Duct	LF	5,200
1.42	L-105-5.2	Remove 2-inch Conduit (Including Cable)	LF	43,600
1.43	L-105-5.3	Remove Concrete Encased Duct in Earth (Including	LF	575
1.44	L-105-5.4	Remove and Dispose of Elevated Edge Light, Base Can to be Removed	EA	395
1.45	L-105-5.5	Remove and Dispose of Elevated Edge Light, Base Can to Remain	EA	8
1.46	L-105-5.6	Remove and Dispose of In-Pavement Edge Light, Base Can to be Removed	EA	1
1.47	L-105-5.7	Remove and Dispose of Airfield Sign and Foundation	EA	60
1.48	L-105-5.8	Remove Airfield Sign Foundation	EA	2
1.49	L-105-5.9	Remove and Dispose of Pull Can in Turf	EA	29
1.50	L-105-5.10	Remove and Dispose of 4-Box L-880 PAPI System and Associated Foundations	EA	2
1.51	L-105-5.11	Remove and Dispose of Primary Windcone and Foundation	EA	1
1.52	L-105-5.12	Remove and Dispose of Supplemental Wind Cone and Foundation	EA	2
1.53	L-105-5.13	Remove and Dispose of Beacon, Beacon Tower, and Foundation	EA	1
1.54	L-105-5.14	Work in Existing Airfield Lighting Vault Equipment	LS	1
1.55	L-107-5.1	Install New L-807(L) Wind Cone Including Tip Down Pole and Foundation	EA	3
1.56	L-108-5.1	No. 8 AWG, L-824C, Installed in Conduit	LF	76,550
1.57	L-108-5.2	No. 6 AWG Bare Counterpoise Wire, Installed in Conduit Trench	LF	58,610
1.58	L-108-5.3	Electrical Circuit (Wind Cone), 2#10 AWG, 1#10G, Installed in Conduit	LF	2,000
1.59	L-108-5.4	Electrical Circuit (Beacon), 2#12 AWG, 1#12G, Installed in Conduit	LF	125
1.60	L-108-5.5	Temporary Electrical Provisions	LS	1
1.61	L-109-5.1	Install New Vault Building And Equipment	LS	1
1.62	L-109-5.2	Install New 4kW L-829 Constant Current Regulator	EA	1
1.63	L-109-5.3	Install New 7.5kW L-829 Constant Current Regulator	EA	1
1.64	L-109-5.4	Install New 10kW L-829 Constant Current Regulator	EA	1
1.65	L-109-5.5	Install Salvaged 10kW L-828 Constant Current Regulator	EA	1
1.66	L-110-5.1	1-Way, 2" Sch. 40 PVC Conduit, Direct Buried in Turf	LF	44,500
1.67	L-110-5.2	2-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	3,725
1.68	L-110-5.3	2-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in Full Strength Pavement	LF	415
1.69	L-110-5.4	4-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	1,705
1.70	L-110-5.5	6-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	150
1.71	L-110-5.6	8-Way, 2" Sch. 40 PVC Conduit, Concrete Encased, in	LF	470
1.72	L-112-5.1	2-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	735
1.73	L-112-5.2	2-Way, 4" HDPE Conduit, Installed Via Directional Drill	LF	175
1.74	L-112-5.3	4-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	250
1.75	L-112-5.4	6-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	100
1.76	L-112-5.5	8-Way, 2" HDPE Conduit, Installed Via Directional Drill	LF	425
1.77	L-115-5.1	2-Way Junction Can Plaza (JCP)	EA	24
1.78	L-115-5.2	4-Way Junction Can Plaza (JCP)	EA	4
1.79	L-115-5.3	6-Way Junction Can Plaza (JCP)	EA	1
1.80	L-115-5.4	8-Way Junction Can Plaza (JCP)	EA	3
1.81	L-115-5.5	Install New Pull Can in Turf	EA	3
1.82	L-115-5.6	Install New Pull Box in Turf	EA	1
1.83	L-125-5.1	Install New L-861T(L) LED Elevated Taxiway Edge Light on New L-867B Base Can in Turf	EA	320
1.84	L-125-5.2	Install New L-861(L) Elevated Runway Edge Light on New L-867B Base Can in Turf	EA	70
1.85	L-125-5.3	Install New L-861E(L) Elevated Runway Threshold End Light on Existing Base Can	EA	8
1.86	L-125-5.4	Install New L-861E(L) Elevated Runway Threshold End Light on New L-867B Base Can in Turf	EA	8
1.87	L-125-5.5	Install New New L-867B Base Can with Blank Cover in	EA	3
1.88	L-125-5.6	Install New 1-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	12
1.89	L-125-5.7	Install New 2-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	24
1.90	L-125-5.8	Install New 3-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	20
1.91	L-125-5.9	Install New 1-MOD L-858(L) Size 4, Style 2 LED Guidance Sign on New Foundation	EA	6
1.92	L-125-5.11	Install New 4-MOD L-858(L) Size 2, Style 2 LED Guidance Sign on New Foundation	EA	2
1.93	L-130-5.1	Install New LED L-880(L) Style B PAPI System	EA	2
1.94	L-16231-5.1	Install New Backup Standby Generator System	LS	1
1.95	262416-5.1	Electrical Service Including Rack, Equipment, Maintenance Pad, and Utility Company Ducts	LS	1
1.96	SEE PLANS	6' Wrought Iron Fence With Mow Strip	LF	132
1.97	SEE PLANS	12' Manual Rolling Wrought Iron Gate	EA	1
1.98	SEE PLANS	Remove and Dispose of Existing Segmented Circle and Traffic Pattern Indicators	LS	1
1.99	SEE PLANS	Construct Segmented Circle Including Traffic Pattern	LS	1
1.100	SEE PLANS	Gravel Access Drive	SY	165
1.101	SEE PLANS	Remove Existing Concrete Curb	LF	12
1.102	SEE PLANS	6" Reinforced PCC	SY	43
1.103	SEE PLANS	12" Flexible Aggregate Base	SY	50
1.104	KSA-701	Solar Powered Green Taxiway Centerline Retroreflectors	EA	400

Item No.	Spec. No.	Description	Units	Estimated Quantities
Additive Alternate No. 1 - Installation of Runway End Identifier Lights (REILs) Runway 35:				
A1.01	L-125-5.10	Install New REIL UNIT	EA	1
Additive Alternate No. 2 - Upgraded Taxiway Fillet Geometry for Runway Connector Taxiways (E-HMAC and G-HMAC):				
A2.01	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	581
A2.02	P-152-4.1	Unclassified Excavation	CY	1,754
A2.03	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	4,208
A2.04	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	114
A2.05	P-304-8.1	6" Cement-Treated Base Course	SY	3,972
A2.06	P-401-8.1	4" Asphalt Surface Course	TON	684
A2.07	P-403-8.1	5" Asphalt Stabilized Base Course	TON	987
A2.08	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	993
A2.09	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	2
A2.10	T-904-5.1	Sodding	SY	2,329
A2.11	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	1,076
Additive Alternate No. 3 - Upgraded Taxiway Fillet Geometry for Apron Connector Taxiways (E1-PCC, F-PCC, G1-PCC and J-HMAC):				
A3.01	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	75
A3.02	P-101-5.2	Concrete Pavement Removal (Full Depth)	SY	1,053
A3.03	P-101-5.7	24" RCP SET Removal	EA	1
A3.04	P-101-5.8	SET Removal for 2 - 30" RCP	EA	1
A3.05	P-101-5.9	42" RCP SET Removal	EA	1
A3.06	P-101-5.11	Storm Sewer Junction Box Removal	EA	2
A3.07	P-152-4.1	Unclassified Excavation	CY	7,580
A3.08	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	7,369
A3.09	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	200
A3.10	P-304-8.1	6" Cement-Treated Base Course	SY	720
A3.11	P-304-8.2	8" Cement-Treated Base Course	SY	6,299
A3.12	P-401-8.1	4" Asphalt Surface Course	TON	123
A3.13	P-403-8.1	5" Asphalt Stabilized Base Course	TON	1,779
A3.14	P-501-8.1	12" Reinforced Portland Cement Concrete	SY	5,086
A3.15	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	1,755
A3.16	P-605-5.1	Joint Sealing Filler	LF	8,260
A3.17	D-701-5.1	24" Dia. ASTM C76, Class V RCP	LF	16
A3.18	D-701-5.2	30" Dia. ASTM C76, Class V RCP	LF	64
A3.19	D-701-5.4	42" Dia. ASTM C76, Class V RCP	LF	32
A3.20	D-751-5.1	Storm Sewer Junction Box	EA	2
A3.21	D-752-5.1	Safety End Treatment for 1 - 24" RCP (6:1 Slope, With Pipe Runners)	EA	1
A3.22	D-752-5.2	Safety End Treatment for 2 - 30" RCP (6:1 Slope, With Pipe Runners)	EA	1
A3.23	D-752-5.4	Safety End Treatment for 1 - 42" RCP (6:1 Slope, With Pipe Runners)	EA	1
A3.24	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	4
A3.25	T-904-5.1	Sodding	SY	3,468
A3.26	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	2,152
Additive Alternate No. 4 - Reconstruct Taxiway H:				
A4.01	P-101-5.1	Asphalt Pavement Removal (Full Depth)	SY	350
A4.02	P-101-5.2	Concrete Pavement Removal (Full Depth)	SY	355
A4.03	P-152-4.1	Unclassified Excavation	CY	2,700
A4.04	P-155-8.1	10" Lime Stabilized Subgrade (6% Lime)	SY	2,604
A4.05	P-155-8.2	Commercial Lime Slurry, Grade 2	TON	71
A4.06	P-304-8.2	8" Cement-Treated Base Course	SY	2,505
A4.07	P-403-8.1	5" Asphalt Stabilized Base Course	TON	780
A4.08	P-501-8.1	12" Reinforced Portland Cement Concrete	SY	2,111
A4.09	P-602-5.1	Emulsified Asphalt Prime Coat	GAL	627
A4.10	P-605-5.1	Joint Sealing Filler	LF	2,861
A4.11	T-901-5.1	Hydromulch, Seed & Fertilizer for Permanent Application	AC	2
A4.12	T-904-5.1	Sodding	SY	985
A4.13	T-905-5.1	Topsoil (Obtained on Site, Removed and Reinstalled)	CY	1,076

MARK	REVISION	DATE
2	ADDENDUM #2	10/8/25

SHEET NAME: SUMMARY OF QUANTITIES - BID SCHEDULE NO. 2

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

103006 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/06/2025
KSA JOB NO.: 103006

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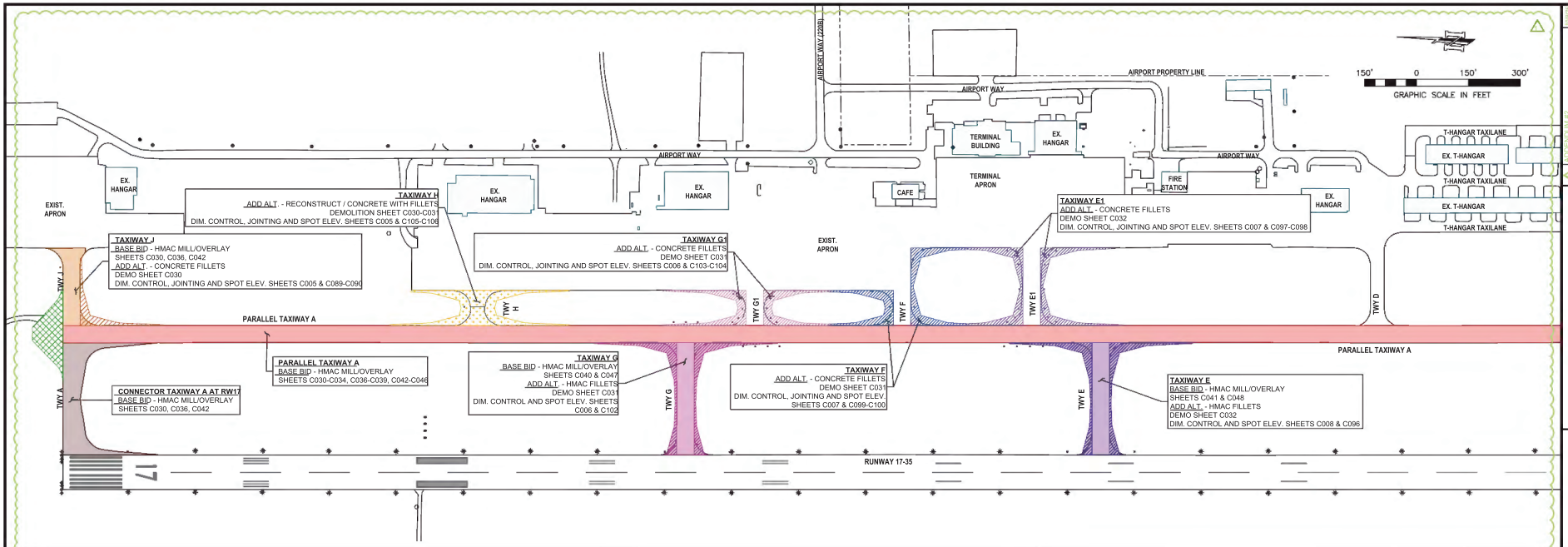
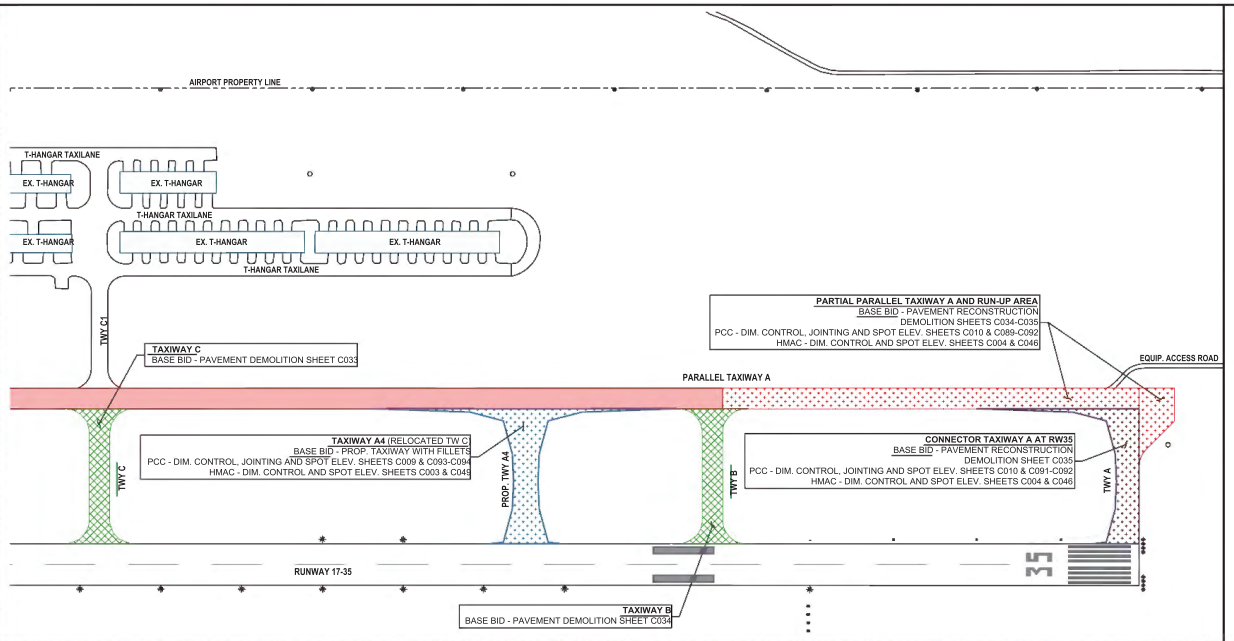
SEAL: STATE OF TEXAS, NATHAN T. MIKELL, 136406, LICENSED PROFESSIONAL ENGINEER, 10/08/2025

TBPE Firm Registration No. F-1356

SHEET NO. G04





PAVEMENT LOCATION	BASE BID	ADD. ALT.
PARALLEL TAXIWAY A REHABILITATION		
PARALLEL TAXIWAY A RECONSTRUCTION		
RUN-UP AREA		
TAXIWAY A AT RW 17 END		
TAXIWAY A AT RW 35 END		
PROPOSED TAXIWAY A4		
TAXIWAY E		
TAXIWAY E1		
TAXIWAY F		
TAXIWAY G		
TAXIWAY G1		
TAXIWAY H		
TAXIWAY J		
PAVEMENT REMOVAL		

NO.	REVISION	DATE
1	ADDENDUM #2	

SHEET NAME:
PAVEMENT REHABILITATION AND RECONSTRUCTION LIMITS

PROJECT NAME:
TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

DRAWN BY:	AJ
DESIGNED BY:	NM
LATEST REVISION	06/05/2025
KSA JOB NO.:	103006

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STATE OF TEXAS
NATHAN T. MIKELL
136408
LICENSED PROFESSIONAL ENGINEER
10/01/2025

SEAL:
TBPE Firm Registration No. F-1356

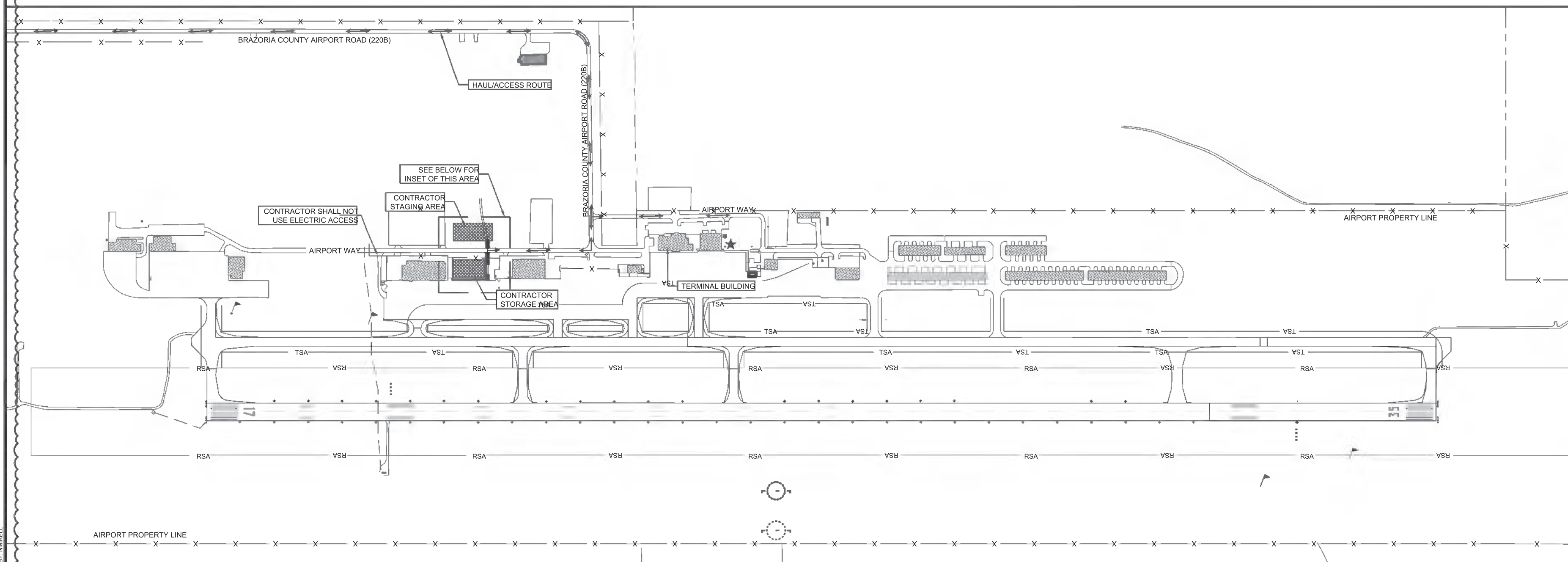
SHEET NO.
C002

103006 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)

I:\KSA.NET\GATEWAY\PROJECTS\103006\DOC\LO-PAVE_OVERVIEW.DWG | PAVE OVERVIEW | 6/25/2025 - 3:24 PM | LAST SAVED BY: NMIKELL

NOTE:
WORK INSIDE THE RSA SHALL BE DONE UNDER CLOSED RUNWAY CONDITIONS BETWEEN THE HOURS OF 7 PM TO 7 AM.

300' 0 300' 600'
GRAPHIC SCALE IN FEET

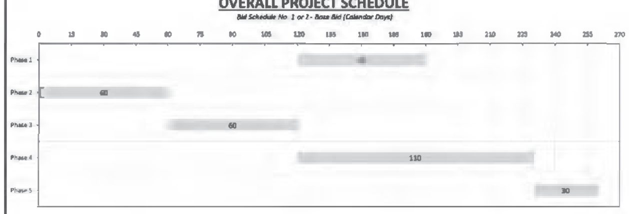


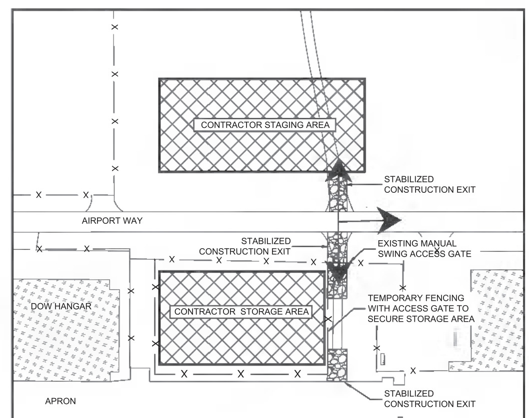
PHASING: CONTRACT TIME SCHEDULE					
PHASE #	BASE BID CALENDAR DAYS	ADD. ALT. 1 CALENDAR DAYS	ADD. ALT. 2 CALENDAR DAYS	ADD. ALT. 3 CALENDAR DAYS	ADD. ALT. 4 CALENDAR DAYS
1	60	0	0	0	0
2	60	0	15	30	15
3	60	0	15	15	0
4	110	0	0	0	0
5	30	0	0	0	0
TOTAL:	260	0	30	45	15

LEGEND

	EXISTING FEATURES
	PROP. PAVEMENT EDGE
	EXIST. BUILDING / STRUCTURES
TSA	TAXIWAY SAFETY AREA (TSA)
RSA	RUNWAY SAFETY AREA (RSA)
	LIGHTED BARRICADE LOCATIONS
	CONTRACTOR ACCESS ROUTE
	PHASING WORK AREA
	CONTRACTOR STABILIZED CONSTRUCTION ENTRANCE/EXIT
	CONTRACTOR STAGING AND STORAGE AREAS
	FLAGPERSON/ESCORT

OVERALL PROJECT SCHEDULE





CONTRACTOR STAGING AND STORAGE AREAS

MARK	REVISION	DATE
1	ADDENDUM #2	10/8/25

SHEET NAME:
OVERALL PHASING, STAGING AND HAUL ROUTES

PROJECT NAME:
TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/25/2025
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LICENSED PROFESSIONAL ENGINEER
10/08/2025

SEAL:
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SHEET NO.
C011

CONSTRUCTION SAFETY PHASING PLAN

TEXAS GULF COAST REGIONAL AIRPORT
BRAZORIA COUNTY

TEXAS GULF COAST REGIONAL AIRPORT
ANGLETON, TEXAS

TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS PROJECT

TxDOT CSJ No. 2612ANGLE
KSA Project No. 103006

ISSUED FOR BID

JUNE 2025

Prepared by:

KSA
a Pape-Dawson company
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TBPE Firm Registration No. F-1356

1) Coordination (Section 2.5)
   a. Meetings Before and During Project
      i. **Pre-Bid Meeting.** A pre-bid meeting will be held after advertisement and prior to bid opening to provide potential bidders with a description of the project. At this meeting, potential bidders will have the opportunity to ask questions regarding the project. A basic outline of topics to be covered at this meeting include:
         1. Project Overview
         2. Proposal Requirements
         3. Safety Plan Compliance
         4. Site Tour
         5. Questions and Answers
      ii. **Pre-Construction Meeting.** Prior to the start of any operation on the airfield, a pre-construction conference will be held. The purpose of the meeting is to review the work sequence schedule and safety, operational phasing, quality control/quality acceptance, and security procedures. Attendees will include the engineer, TxDOT Project Manager, RPR, MAT Laboratory, all contractor supervisory personnel, and the airport manager. A basic outline of topics to be covered at this meeting include:
         1. Project Overview
         2. Construction items
         3. Safety
         4. Labor Requirements
         5. Civil Rights Requirement
         6. Submittal of Payment Requests
      iii. **Construction Progress Meetings.** Construction Progress Meetings will be held on a weekly basis to address the following items:
         1. Operational Safety
         2. Construction Progress
         3. Construction Issues
         4. Administrative Issues
         5. NOTAMs
   b. **Scope or Schedule Changes.** Changes in the scope or schedule of the project may necessitate revisions to the construction safety phasing plan (CSPP). Revisions to the CSPP may require review and approval by the airport, engineer, or FAA.
   c. **Provisions for FAA Air Traffic Organization (ATO) Coordination.** Coordination with the FAA ATO will be directed through TxDOT as instructed to do so by TxDOT. Coordination will be made when scheduling airway facility shutdowns and/or restarts. The contractor shall coordinate with the engineer regarding specific requirements related to shutdowns and/or restarts.

2) Phasing (Section 2.6)
   a. Phase Elements
      i. The Phasing Plan can be seen on Sheets C011, C012, C013, C014, C015, C016, C017, C018 and C019.
      ii. The total duration of the base bid project is 260 calendar days. If all Additive Alternates are awarded the maximum duration of the project will be 350 calendar days. Refer to Table 1 for additional information.
      iii. There are 5 phases for this project. The work consists of Reconstruction a portion of Taxiway A pavement, removal of Taxiway B and Taxiway C, mill and overlay of all taxiway pavement not scheduled for reconstruction, replacement of runway edge lights and underground circuit, replacement of taxiway edge lights and underground circuit, replacement of Runway 17 and Runway 35 PAPI's, relocation of primary wind cone, relocation of Runway 17 supplemental wind cone, relocation of Runway 35 supplemental wind cone, installation of RDL's on Runway 17 and Runway 35, relocation of rotating beacon, and relocation of airfield electric vault.
         1. **Phase 1.** In Phase 1, the Contractor shall complete the following tasks:
            a. Demo existing runway electrical circuit within the RSA.
            b. Demo existing taxiway electrical circuit within the RSA.
            c. Install new runway electric components within the RSA.
            d. Install new taxiway electric components within the RSA.
         2. **Phase 2.** In Phase 2, the Contractor shall complete the following tasks:
            a. Mill and overlay of Taxiway A between Taxiway G and Runway 17.
            b. Mill and overlay of Taxiway J.
            c. Reconstruction of Taxiway H.
            d. Construction of Taxiway J fillet.
         3. **Phase 3.** In Phase 3, the Contractor shall complete the following tasks:
            a. Mill and overlay of Taxiway A between Taxiway G and Taxiway E1.
            b. Mill and overlay of Taxiway G.
            c. Construction of Taxiway G, G1 and F fillets.
            d. Mill and overlay of Taxiway A between Taxiway E1 and Taxiway B.
            e. Mill and overlay of Taxiway E.
            f. Construction of Taxiway E, and E1 fillets.
            g. Construction of Replacement Taxiway for Taxiway B & C

            h. Removal of Taxiway C.
         4. **Phase 4.** In Phase 4, the Contractor shall complete the following tasks:
            a. Temporary relocation of Runway 35 threshold.
            b. Reconstruction of Taxiway A pavement within RSA.
            c. Removal of temporarily relocated Runway 35 threshold
            d. Reconstruction of Taxiway A pavement between Runway 35 RSA and Taxiway B.
         5. **Phase 5.** In Phase 5, the Contractor shall complete the following tasks:
            a. Removal of Taxiway B.
   b. Construction Safety Drawings
      i. The construction safety and phasing drawings can be seen on the following Sheets:
         - General Notes, Sheet G05
         - Airport Layout Drawing, Sheet G06
         - Overall Phasing, Staging and Haul Routes, Sheet C011
         - Phasing Plan, Phase 1 of 5, Sheet C012
         - Phasing Plan, Phase 2 of 5, Sheet C013
         - Phasing Plan, Phase 3 of 5, Sheet C014
         - Phasing Plan, Phase 4 of 5, Sheet C015
         - Phasing Plan, Phase 5 of 5, Sheet C016
         - Temporary Marking Plan – Displaced Threshold, Sheet C017
         - Phasing Details 1, Sheet C018
         - Phasing Details 2, Sheet C019
         - Construction Safety Phasing Plan 1, Sheet C020
         - Construction Safety Phasing Plan 2, Sheet C021
      ii. **General Safety Notes.** Each phase has general phasing instructions that are described below:
         1. Prior to any construction activity, the Contractor shall, through the airport operator, give notice using the NOTAM system of proposed location, time, and date of construction commencement.
         2. The Contractor shall stake the active construction phase work area and protect stakes throughout the duration of the active construction phase.
         3. The Contractor shall install runway closure markings or temporary barricades at all closed locations as shown in the plans.
         4. After the work activities in the active construction phase are complete, the Contractor shall perform the following items before opening access to the limit of work area:
            a. Clean and remove any foreign object debris (FOD);

            b. Remove all temporary barricades;
            c. Remove phase limits of work area stakes;
            d. Remove all equipment, materials, machinery, and personnel from the work area;
            e. Obtain RPR and Airport Operations inspection approval;
            f. Coordinate cancellation of NOTAMS issued in the active construction phase; and
            g. All incidentals necessary to comply with the contract documents.

3) Area and Operations Affected by Construction Activity (Section 2.7)
   a. Identification of Affected Areas
      i. The tables below summarizes the areas and operations affected by construction:

Table 1: Area and Operation Affected by Construction Activity

Phase	Duration	Closure
1	60 Calendar Days	Work Hours: • 7 PM – 7 AM for work within the RSA, and all other work outside the RSA shall take place between daylight – dusk. Pavement Closures: ➢ Runway 17-35 between the hours of 7 PM – 7 AM.
2	Base Bid: 60 Calendar Days Add. Alt. 2: 15 Calendar Days Add. Alt. 3: 30 Calendar Days Add. Alt. 4: 15 Calendar Days	Work Hours: • 7 PM – 7 AM for work within the RSA, and all other work outside the RSA shall take place between daylight – dusk. Pavement Closures: ➢ Runway 17-35 between the hours of 7 PM – 7 AM, Taxiway J, Taxiway H, and a portion of Taxiway A.
3	Base Bid: 60 Calendar Days Add. Alt. 2: 15 Calendar Days Add. Alt. 3: 15 Calendar Days	Work Hours: • 7 PM – 7 AM for work within the RSA, and all other work outside the RSA shall take place between daylight – dusk. Pavement Closures: ➢ Runway 17-35 between the hours of 7 PM – 7 AM, Taxiway G, Taxiway G1, Taxiway F, and a portion of Taxiway A.
4	130 Calendar Days	Work Hours: • 7 PM – 7 AM for work within the RSA, 7 PM – 7 AM for work within Taxiway B TSA, and all other work outside the RSA shall take place between daylight – dusk. Pavement Closures: ➢ Runway 17-35 between the hours of 7 PM – 7 AM, Taxiway E, Taxiway E1, Taxiway D, Taxiway C1, Taxiway C, Taxiway B, and a portion of Taxiway A.

5	30 Calendar Days	Work Hours: • 7 PM – 7 AM for work within the RSA, and all other work outside the RSA shall take place between daylight – dusk. Pavement Closures: ➢ Runway 17-35 between the hours of 7 PM – 7 AM, and Taxiway B.

Table 2: Runway Safety and Object Free Areas

17-35	C-III	500 Feet	800 Feet

Table 3: Taxiway Safety and Object Free Areas

A	3	118 Feet	171 Feet
B	3	118 Feet	171 Feet
C	3	118 Feet	171 Feet
C1	2A	79 Feet	124 Feet
D	2A	79 Feet	124 Feet
E	3	118 Feet	171 Feet
E1	3	118 Feet	171 Feet
F	3	118 Feet	171 Feet
G	3	118 Feet	171 Feet
G1	3	118 Feet	171 Feet
H	3	118 Feet	171 Feet
J	3	118 Feet	171 Feet

4) Navigation Aid Protection (Section 2.8)
   a. The limits of the Contractor's construction will impact multiple navigational aids. In any instance where the Contractor's construction activities will impact navigational aids, the Contractor shall coordinate those activities with the RPR. The navigational aids that will be impacted during the course of this project are Runway 17 PAPI, Runway 35 PAPI, Primary Wind cone, Runway 17 Supplemental Wind Cone, Runway 35 Supplemental Wind Cone, RIL and Runway 17 MALSR.
5) Contractor Access (Section 2.9)
   a. The Contractor will have to install a temporary gate in the existing fence to access the work areas to minimize interference with Airport operations.

   b. The contractor shall keep the gates guarded at all times. The contractor must implement procedures to ensure that only authorized personnel and vehicles have access to the project site and ACA and to prohibit "piggybacking" behind authorized vehicles.
   c. Location of Stockpiles Construction Material.
      i. The Contractor shall have two staging areas.
      ii. Stockpile heights shall be restricted to 15 feet.
      iii. Stockpile materials that become a wildlife attractant or a FOD hazard shall be removed or relocated to a location acceptable to the Airport.
   d. Vehicle and Pedestrian Operations
      i. All personnel and contractor vehicles shall remain within the construction area, along the designated haul route, or within the limits of the staging, storage and stockpile areas.
      ii. All vehicles shall be identified with a flashing/rotating amber light, 3 foot by 3 foot square flag with 1 foot square orange and white checkered board pattern, and with company logos on both sides of the vehicle. Flashing / rotating amber lights shall be in operation during night operations, inclement weather and low-visibility conditions.
      iii. All construction site personnel shall wear high visibility warning garments at all times when working in the project area.
      iv. Access to the job site shall be through the designated route as shown on the plans.
      v. No vehicle shall be within the AOA unless identified as described herein and is monitoring appropriate radio frequency or under the escort of a vehicle monitoring the appropriate radio frequency.
      vi. It is the intent of the construction drawings to maximize interference to aircraft movement. In active portions of the AOA, the aircraft shall have the right-of-way.
      vii. During the performance of this project, the airport runways, taxiways, taxilanes, and aircraft parking aprons shall remain in use by aircraft to the maximum extent possible. Aircraft use of areas near the contractor's work site shall be controlled to minimize disturbance to the contractor's operations.
      viii. Construction equipment and vehicles shall not exceed 15 miles per hour within the AOA.
6) Wildlife Management (Section 2.10)
   a. **Trash.** All trash shall be removed from the construction site daily. Food scraps shall be disposed of in a closed container.
   b. **Standing Water.** Standing water shall be removed from the construction site within 24 hours.
   c. **Tall Grass.** The Contractor shall be responsible for maintaining the staging area and parking areas free from tall grass.
   d. **Fencing and Gates.** The contractor shall immediately report any damage to gates or fences to the airport. The contractor shall be responsible for repairs to any gates or fences caused by negligence by the contractor.

   e. **Disruption of Wildlife Habitat.** In the event of a wildlife encounter within the AOA, the contractor shall immediately contact the Airport.
7) Foreign Object Debris (Section 2.11)
   a. The contractor shall sweep/vacuum pavements adjacent to work and access areas frequently to keep pavement free of loose debris at all times. All closed pavement shall be inspected for FOD prior to opening.
8) Hazardous Material Management (Section 2.12)
   a. Unknown Vehicle Fueling. If ground vehicle fueling occurs within the construction area or staging area, fuel tanks shall not be topped off and absorbent material shall be readily available for small spills.
   b. Fuel spills or leaks shall be cleaned up immediately.
   c. The encounter of hazardous material is not anticipated, but if encountered, the contractor shall notify the Airport immediately of any potentially hazardous material.
9) Notification of Construction Activities (Section 2.13)
   a. **List of Responsible Representatives.** The contractor shall provide a list of all points of contact responsible for project execution. The list shall contain names, telephone numbers, and alternate contacts as required. Please see Table 4 for the list of point of contacts involved during construction.

Table 4: Point of Contacts

			Contact Info:
Texas Gulf Coast Regional Airport	Director of Aviation	Jeff Bilyeu	jbilyeu@brazoriacountytx.gov (979) 849-5755 (office)
Texas Gulf Coast Regional Airport	Airport Superintendent	Pete David	pdavid@brazoriacountytx.gov (979) 849-5755
KSA Engineers Inc.	Project Manager	Craig Phipps	cphipps@ksaeng.com (281) 494-3252 (office) (281) 224-3466 (cell)
KSA Engineers Inc.	Deputy Project Manager	Craig Clairmont	clairmont@ksaeng.com (281) 494-3252 (office) (832) 685-2137 (cell)
KSA Engineers Inc.	Project Engineer	Nathan Mikell	nmikell@ksaeng.com (281) 494-3252 (office) (832) 544-9281 (cell)

   b. **Notices to Airmen (NOTAMS).** The airport shall initiate NOTAMS related to construction activity as appropriate. The contractor shall coordinate closures a minimum of 72 hours in advance to provide for timely initiation of NOTAMs. The RPR will coordinate NOTAM requests with the Airport.

NO.	REVISION	DATE
1	ADDENDUM #2	10/8/25

CONSTRUCTION SAFETY PHASING PLAN 1

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/05/2025
KSA JOB NO.: 103006

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STATE OF TEXAS
NATHAN T. MIKELL
136406
LICENSED PROFESSIONAL ENGINEER
10/08/2025

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
C020

SHEET NAME:
PROJECT NAME:
103006 – TEXAS GULF COAST REGIONAL AIRPORT – TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS – ANGLETON, TEXAS (BRAZORIA COUNTY)

c. **Coordination with Aircraft Rescue and Fire Fighting (ARFF).** Coordination with the ARFF will be done by airport personnel.

d. **Emergency Notification Procedures.** In an emergency, the contractor shall call 911 immediately to initiate response. Notification to the Airport Manager shall occur immediately after this.

e. **Notification to the FAA.** The contractor shall ensure, through the Engineer that an aeronautical study is performed on all construction equipment through the appropriate FAA regional or district office prior to using such equipment on site.

10) Inspection Requirements (Section 2.14)

a. **Daily Inspections.** The contractor shall conduct daily inspections to ensure conformance with the CSPP.

b. **Final Inspections.** Closed areas shall be inspected by Airport Operations and the RPR prior to opening to aircraft operation.

11) Underground Utilities (Section 2.15)

a. The contractor shall verify and locate all utility lines prior to the start of work.

12) Penalties (Section 2.16)

a. Any monetary penalties assessed due to actions by the contractor personnel will be the responsibility of the contractor.

b. Penalties for non-compliance with airport safety procedures may include but are not limited to a warning, removal of driving privileges or loss of access to the AOA.

c. Penalties for violation of the safety plan is as follows:

i. 1st Occurrence: Verbal Warning

ii. 2nd Occurrence: Removal from Project

13) Special Conditions (Section 2.17)

a. In the event of an emergency (aircraft accident, security breach, etc.), the contractor shall suspend all construction activities and vacate the construction and staging area as required by the Airport.

14) Runway and Taxiway Visual Aids (Section 2.18)

a. **General.** The closure of airfield pavements shall be clearly delineated by low profile barricades to create a barrier between the aircraft, vehicle movements, construction activities/equipment, and construction area.

b. **Markings.** Markings shall be applied in Phase 2 and Phase 3.

c. **Lighting and Visual NAVAIDS.** The limits of the Contractor's construction activities shall not interfere with the Airport's lighting or visual NAVAIDS.

d. **Signage.** Temporary signage is not needed in this project.

15) Access Routes – Markings and Signage (Section 2.19)

a. Access to the job site shall be through the designated route as shown the plans.

i. Contractor shall access the site through either existing access gates or installed temporary access gates as shown in the phasing plans.

16) Hazard Marking, Lighting and Signage (Section 2.20)

a. Areas impacted by Construction Operations.

i. Contractor to stake the limits of the RSA, ROFA, TSA, and TOFA.

ii. At a minimum, hazard markings and lighting shall be provided to identify open excavation and stockpiled material.

b. All vehicles and equipment shall be identified flashing/rotating amber light or 3 foot by 3 foot square flag with 1 foot square orange and white checkered board pattern, and with company logos on both sides of the vehicle. Flashing / rotating amber lights shall be in operation during night operations, inclement weather and low-visibility conditions.

c. All construction site personnel shall wear high visibility warning garments at all times when working in the project area.

17) Protection Runway and Taxiway Areas, Zones and Surfaces (Section 2.21)

a. **Runway Safety Area (RSA).**

i. Construction activities will be taking place in the RSA. When construction activities are taking place within Runway 17-35 RSA, the Runway will be closed. Runway closure it's will be placed over the runway designators. Barricades shall be installed at the locations shown on the phasing plan sheets.

b. **Runway Object Free Area (ROFA).**

i. Construction activities will be taking place in the runway object free area. Stockpiles will not be allowed in the ROFA. At the end of the work day contractor shall remove all construction equipment out of the ROFA. Contractor shall be limited to the identified work area.

c. **Taxiway Safety Area (TSA).**

i. Construction activities will be taking place in the TSA. When construction activities are taking place in the TSA the affected taxiways will be closed. Barricades shall be installed at the locations shown on the phasing plan sheets to delineate the work area. Contractor shall be limited to the identified work area.

d. **Taxiway Object Free Area (TOFA).**

i. Construction activities will be taking place in the TOFA. Stockpiles will not be allowed in the TOFA. At the end of the work day contractor shall remove all construction equipment out of the TOFA. Contractor shall be limited to the identified work area.

e. **Obstacle Free Zone (OFZ).**

i. No construction activities will be taking place in the OFZ.

f. **Approach and Departure Surfaces.**

i. No construction activities will be taking place in the approach and departure surface areas.

18) Other Limitations on Construction (Section 2.23)

a. ProHibitions

i. Construction equipment exceeding a height of 20' is prohibited unless a 7460-1 determination letter is issued for taller equipment.

ii. The use of open flames is not allowed.

iii. The use of explosives is not allowed.

b. Restrictions – Refer to the general notes and the Airport for restrictions.

END OF CSPP

Effective Date: December 13, 2017 — ARP SOP No. 1.00

Checklist for FAA CSPP Review

Airport Name: Texas Gulf Coast Regional Airport — LOCID: LBX

Associated City: Angleton, Texas

Project No.: TxDOT CSJ No. 2812ANGLE

Project Name: Taxiway Rehabilitation and Electrical Improvements Project

F.1.1. AC 150/5370-2G

This checklist identifies the main elements and sub-elements established under Chapter 3 of Advisory Circular 150/5370-2G. Project Managers (PM) are encouraged to use this checklist as an aid when reviewing a Sponsor's CSPP for conformance to the safety standards. Because the PM's approval disapproval letter to OE/AAA represents the official FAA action, a completed checklist is not a required record the PM must sign or archive in the grant file.

CSPP Element	Element Addressed? Yes	No	N/A	Remarks
Coordination (Section 2.5)				
– Contractor Progress Meetings	✓			
– Addresses necessary actions when changes are proposed to CSPP	✓			
– Provisions for FAA ATO Coordination	✓			
Phasing (Section 2.6)				
– Phase Elements	✓			
– Construction Safety Drawings	✓			
Area and Operations Affected by Construction Activity (Section 2.7)				
– Identification of affected Areas	✓			
– Mitigation Affects	✓			
Navigation Aid Protection (Section 2.8)				
– Operational NAVAID Critical areas	✓			
Contractor Access (Section 2.9)				
– Location of Stockpiles Construction Material	✓			
– Vehicle and Pedestrian Operations	✓			
Wildlife Management (Section 2.10)				
– Trash	✓			
– Standing Water	✓			
– Tall Grass	✓			
– Feeding and Dates	✓			
– Disruption of Wildlife Habitat	✓			
Foreign Object Debris (Section 2.11)				
– FOD Control Measures	✓			
Hazardous Material Management (Section 2.12)				
– Hazardous Material Controls	✓			

1

ARP SOP No. 1.00 — Effective Date: December 13, 2017

CSPP Element	Element Addressed? Yes	No	N/A	Remarks
Notification of Construction Activities (Section 2.13)				
– List of Responsible Representatives	✓			
– NOTAMs	✓			
– Emergency Notification Procedures	✓			
– Coordination with ARFF	✓			
– Notification to the FAA (Part 77, NAVAIDs,...)	✓			
Inspection Requirements (Section 2.14)				
– Daily Inspections	✓			
– Final Inspections	✓			
Underground Utilities (Section 2.15)				
– Procedures for protecting underground utilities	✓			
Penalties (Section 2.16)				
– Penalty provisions for noncompliance with CSPP	✓			
Special Conditions (Section 2.17)				
– Conditions that may affect airport operations	✓			
Runway and Taxiway Visual Aids (Section 2.18)				
– General – Convey Clear Meaning; Secured from movement, Frangible	✓			
– Markings	✓			
– Lighting and Visual NAVAIDs	✓			
– Signage	✓			
Access Routes - Marking and Signage (Section 2.19)				
– Haul Road Demarcation	✓			
Hazard Marking, Lighting and Signage (Section 2.20)				
– Areas Impacted by Construction Operations	✓			
– Equipment	✓			
Work Zone Lighting for Nighttime Construction (Section 2.21)				
– Proper Illumination of Construction Area/Equipment	✓			
Protection Runway and Taxiway Areas, Zones and Surfaces (Section 2.22)				
– Runway Safety Area (RSA)	✓			
– Runway Object Free Area (ROFA)	✓			
– Taxiway Safety Area (TSA)	✓			
– Taxiway Object Free Area (TOFA)	✓			
– Obstacle Free Zone (OFZ)	✓			
– Approach and Departure Surfaces	✓			
Other Limitations on Construction (Section 2.23)				
– Prohibitions	✓			
– Restrictions	✓			

2

MARK	REVISION	DATE
1	ADDENDUM #2	10/6/25

CONSTRUCTION SAFETY PHASING PLAN 2

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

PROJECT NAME: 103006 – TEXAS GULF COAST REGIONAL AIRPORT – TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS – ANGLETON, TEXAS (BRAZORIA COUNTY)

SHEET NAME

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 10/06/2025
KSA JOB NO.: 103006

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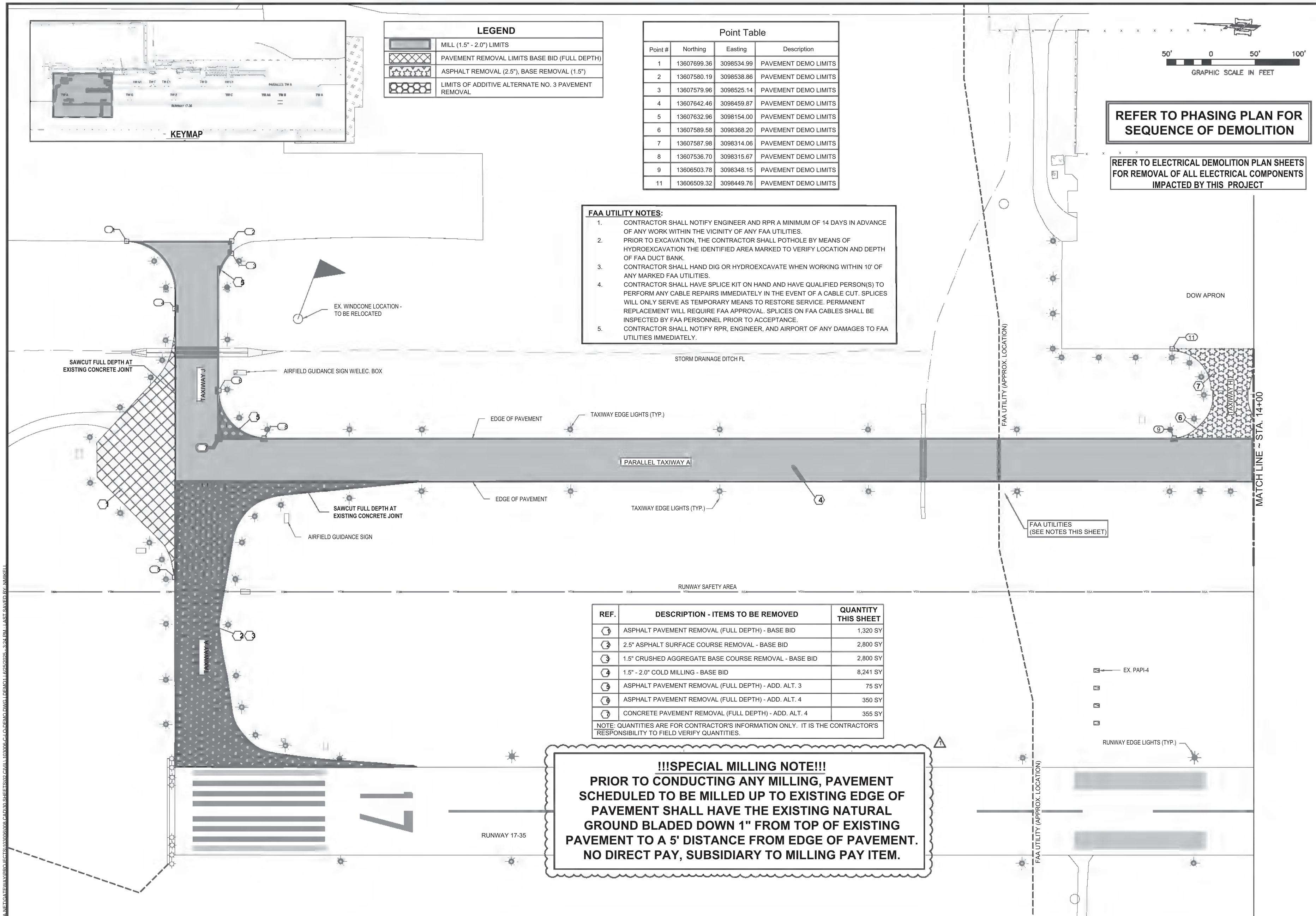
STATE OF TEXAS
NATHAN T. MIKELL
136406
LICENSED PROFESSIONAL ENGINEER
10/06/2025

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
C021



LEGEND

Symbol	Description
(gray fill)	MILL (1.5" - 2.0") LIMITS
(crosshatch)	PAVEMENT REMOVAL LIMITS BASE BID (FULL DEPTH)
(stars)	ASPHALT REMOVAL (2.5"), BASE REMOVAL (1.5")
(hexagons)	LIMITS OF ADDITIVE ALTERNATE NO. 3 PAVEMENT REMOVAL

Point Table

Point #	Northing	Easting	Description
1	13607699.36	3098534.99	PAVEMENT DEMO LIMITS
2	13607580.19	3098538.86	PAVEMENT DEMO LIMITS
3	13607579.96	3098525.14	PAVEMENT DEMO LIMITS
4	13607642.46	3098459.87	PAVEMENT DEMO LIMITS
5	13607632.96	3098154.00	PAVEMENT DEMO LIMITS
6	13607589.58	3098368.20	PAVEMENT DEMO LIMITS
7	13607587.98	3098314.06	PAVEMENT DEMO LIMITS
8	13607536.70	3098315.67	PAVEMENT DEMO LIMITS
9	13606503.78	3098348.15	PAVEMENT DEMO LIMITS
11	13606509.32	3098449.76	PAVEMENT DEMO LIMITS

REFER TO PHASING PLAN FOR SEQUENCE OF DEMOLITION

REFER TO ELECTRICAL DEMOLITION PLAN SHEETS FOR REMOVAL OF ALL ELECTRICAL COMPONENTS IMPACTED BY THIS PROJECT

FAA UTILITY NOTES:

1. CONTRACTOR SHALL NOTIFY ENGINEER AND RPR A MINIMUM OF 14 DAYS IN ADVANCE OF ANY WORK WITHIN THE VICINITY OF ANY FAA UTILITIES.
2. PRIOR TO EXCAVATION, THE CONTRACTOR SHALL POTHOLE BY MEANS OF HYDROEXCAVATION THE IDENTIFIED AREA MARKED TO VERIFY LOCATION AND DEPTH OF FAA DUCT BANK.
3. CONTRACTOR SHALL HAND DIG OR HYDROEXCAVATE WHEN WORKING WITHIN 10' OF ANY MARKED FAA UTILITIES.
4. CONTRACTOR SHALL HAVE SPLICE KIT ON HAND AND HAVE QUALIFIED PERSON(S) TO PERFORM ANY CABLE REPAIRS IMMEDIATELY IN THE EVENT OF A CABLE CUT. SPLICES WILL ONLY SERVE AS TEMPORARY MEANS TO RESTORE SERVICE. PERMANENT REPLACEMENT WILL REQUIRE FAA APPROVAL. SPLICES ON FAA CABLES SHALL BE INSPECTED BY FAA PERSONNEL PRIOR TO ACCEPTANCE.
5. CONTRACTOR SHALL NOTIFY RPR, ENGINEER, AND AIRPORT OF ANY DAMAGES TO FAA UTILITIES IMMEDIATELY.

REF.	DESCRIPTION - ITEMS TO BE REMOVED	QUANTITY THIS SHEET
1	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - BASE BID	1,320 SY
2	2.5" ASPHALT SURFACE COURSE REMOVAL - BASE BID	2,800 SY
3	1.5" CRUSHED AGGREGATE BASE COURSE REMOVAL - BASE BID	2,800 SY
4	1.5" - 2.0" COLD MILLING - BASE BID	8,241 SY
5	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 3	75 SY
6	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 4	350 SY
7	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 4	355 SY

NOTE: QUANTITIES ARE FOR CONTRACTOR'S INFORMATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY QUANTITIES.

!!!SPECIAL MILLING NOTE!!!
PRIOR TO CONDUCTING ANY MILLING, PAVEMENT SCHEDULED TO BE MILLED UP TO EXISTING EDGE OF PAVEMENT SHALL HAVE THE EXISTING NATURAL GROUND BLADED DOWN 1" FROM TOP OF EXISTING PAVEMENT TO A 5' DISTANCE FROM EDGE OF PAVEMENT. NO DIRECT PAY, SUBSIDIARY TO MILLING PAY ITEM.

MARK	REVISION	DATE
2	ADDENDUM #2	10/8/25

SHEET NAME: DEMOLITION AND MILLING PLAN 1

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/25/2025
KSA JOB NO.: 103006

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STATE OF TEXAS
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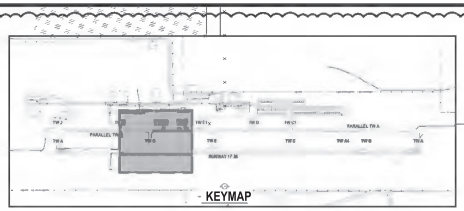
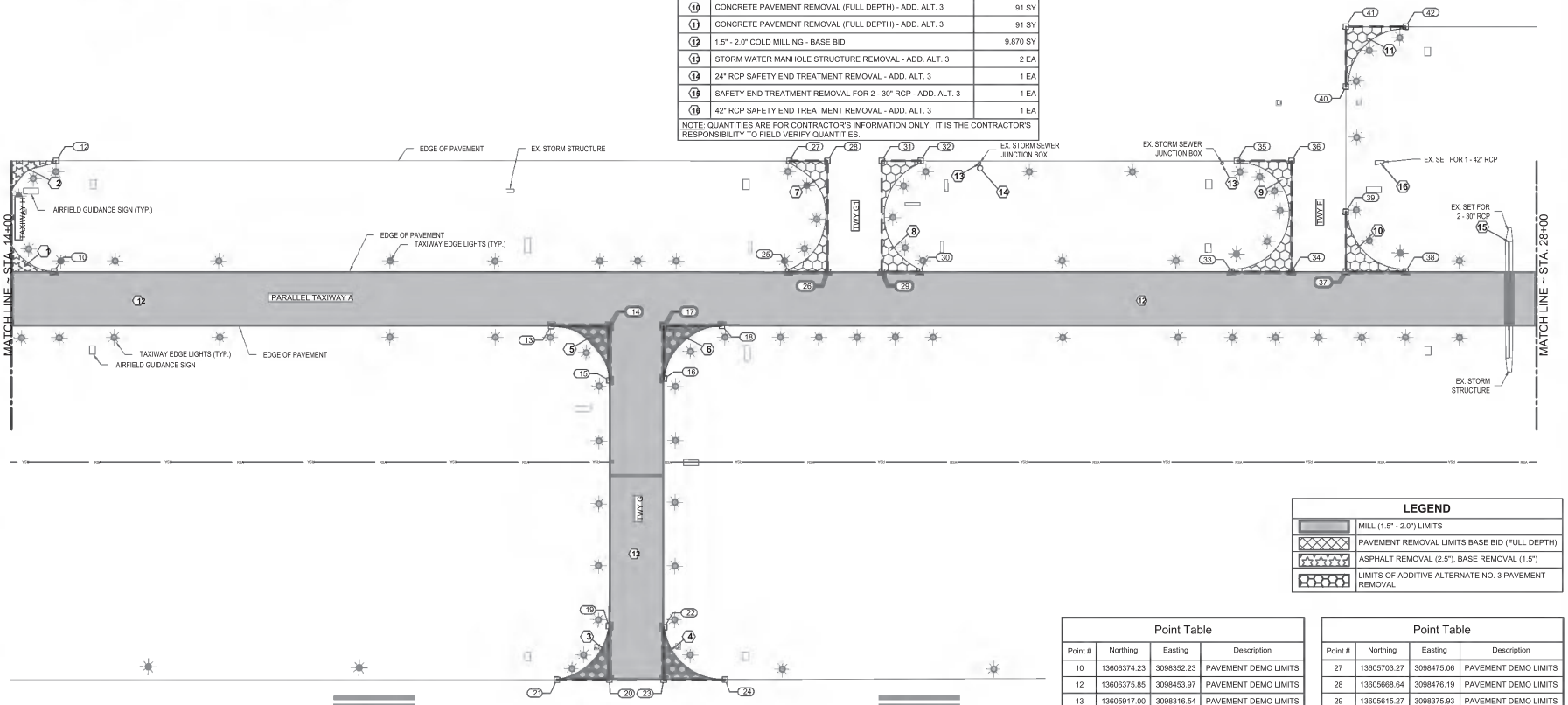
LICENSED PROFESSIONAL ENGINEER
10/08/2025

SEAL:
TBPE Firm Registration No. F-1356
SHEET NO.
C030



REF.	DESCRIPTION - ITEMS TO BE REMOVED	QUANTITY THIS SHEET
1	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 4	350 SY
2	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 4	355 SY
3	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 2	72 SY
4	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 2	72 SY
5	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 2	70 SY
6	ASPHALT PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 2	70 SY
7	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 3	133 SY
8	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 3	140 SY
9	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 3	162 SY
10	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 3	91 SY
11	CONCRETE PAVEMENT REMOVAL (FULL DEPTH) - ADD. ALT. 3	91 SY
12	1.5" - 2.0" COLD MILLING - BASE BID	9,870 SY
13	STORM WATER MANHOLE STRUCTURE REMOVAL - ADD. ALT. 3	2 EA
14	24" RCP SAFETY END TREATMENT REMOVAL - ADD. ALT. 3	1 EA
15	SAFETY END TREATMENT REMOVAL FOR 2 - 30" RCP - ADD. ALT. 3	1 EA
16	42" RCP SAFETY END TREATMENT REMOVAL - ADD. ALT. 3	1 EA

NOTE: QUANTITIES ARE FOR CONTRACTOR'S INFORMATION ONLY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY QUANTITIES.



LEGEND	
	MILL (1.5" - 2.0") LIMITS
	PAVEMENT REMOVAL LIMITS BASE BID (FULL DEPTH)
	ASPHALT REMOVAL (2.5"), BASE REMOVAL (1.5")
	LIMITS OF ADDITIVE ALTERNATE NO. 3 PAVEMENT REMOVAL

Point Table

Point #	Northing	Easting	Description
10	13606374.23	3098352.23	PAVEMENT DEMO LIMITS
12	13606375.85	3098453.97	PAVEMENT DEMO LIMITS
13	13605917.00	3098316.54	PAVEMENT DEMO LIMITS
14	13605863.66	3098318.20	PAVEMENT DEMO LIMITS
15	13605862.09	3098268.23	PAVEMENT DEMO LIMITS
16	13605812.11	3098271.43	PAVEMENT DEMO LIMITS
17	13605813.69	3098319.77	PAVEMENT DEMO LIMITS
18	13605760.44	3098321.65	PAVEMENT DEMO LIMITS
19	13605855.47	3098042.65	PAVEMENT DEMO LIMITS
20	13605853.44	3097993.39	PAVEMENT DEMO LIMITS
21	13605901.52	3097991.90	PAVEMENT DEMO LIMITS
22	13605804.79	3098043.15	PAVEMENT DEMO LIMITS
23	13605803.47	3097995.01	PAVEMENT DEMO LIMITS
24	13605747.36	3097996.88	PAVEMENT DEMO LIMITS
25	13605701.03	3098373.20	PAVEMENT DEMO LIMITS
26	13605665.24	3098374.34	PAVEMENT DEMO LIMITS

Point Table

Point #	Northing	Easting	Description
27	13605703.27	3098475.06	PAVEMENT DEMO LIMITS
28	13605668.64	3098476.19	PAVEMENT DEMO LIMITS
29	13605615.27	3098375.93	PAVEMENT DEMO LIMITS
30	13605580.70	3098377.04	PAVEMENT DEMO LIMITS
31	13605618.66	3098477.81	PAVEMENT DEMO LIMITS
32	13605582.87	3098478.98	PAVEMENT DEMO LIMITS
33	13605294.51	3098386.08	PAVEMENT DEMO LIMITS
34	13605239.42	3098387.81	PAVEMENT DEMO LIMITS
35	13605292.57	3098488.06	PAVEMENT DEMO LIMITS
36	13605242.62	3098489.63	PAVEMENT DEMO LIMITS
37	13605189.43	3098389.46	PAVEMENT DEMO LIMITS
38	13605134.54	3098391.20	PAVEMENT DEMO LIMITS
39	13605191.20	3098444.39	PAVEMENT DEMO LIMITS
40	13605194.79	3098559.38	PAVEMENT DEMO LIMITS
41	13605196.52	3098614.45	PAVEMENT DEMO LIMITS
42	13605141.58	3098616.18	PAVEMENT DEMO LIMITS

MARK	REVISION	DATE
1	ADDENDUM #2	10/8/25

DEMOLITION AND MILLING PLAN 2

SHEET NAME:

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

PROJECT NAME:

DRAWN BY:	AJ
DESIGNED BY:	NM
LATEST REVISION	06/09/2025
KSA JOB NO.:	103006

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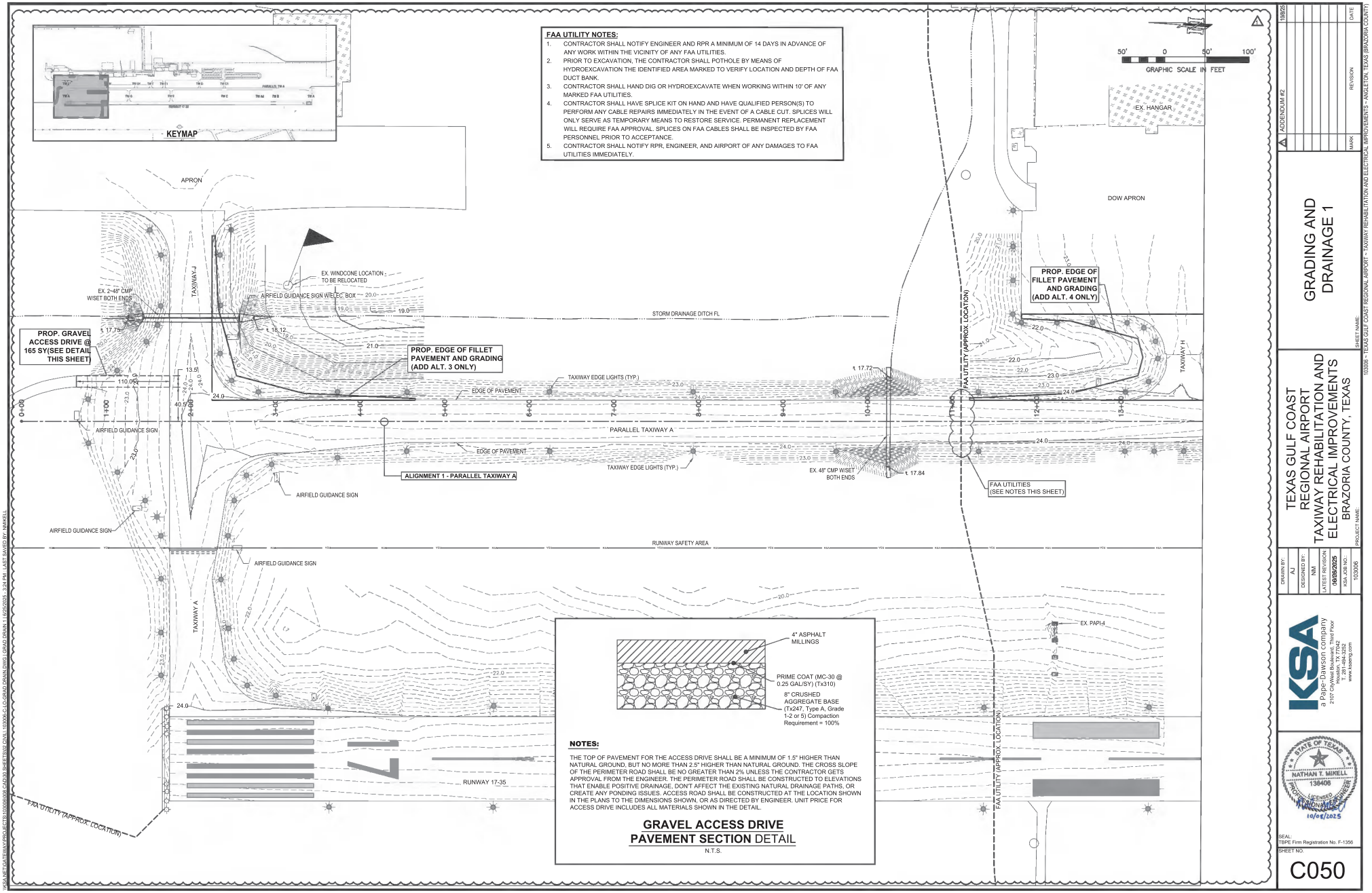
10/01/2025

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.

C031

103006 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)



MARK	REVISION	DATE
1	ADDENDUM #2	10/8/25

GRADING AND DRAINAGE 1

SHEET NAME:

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

PROJECT NAME:

103006 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)

DRAWN BY:	AJ
DESIGNED BY:	NM
LATEST REVISION	06/09/2025
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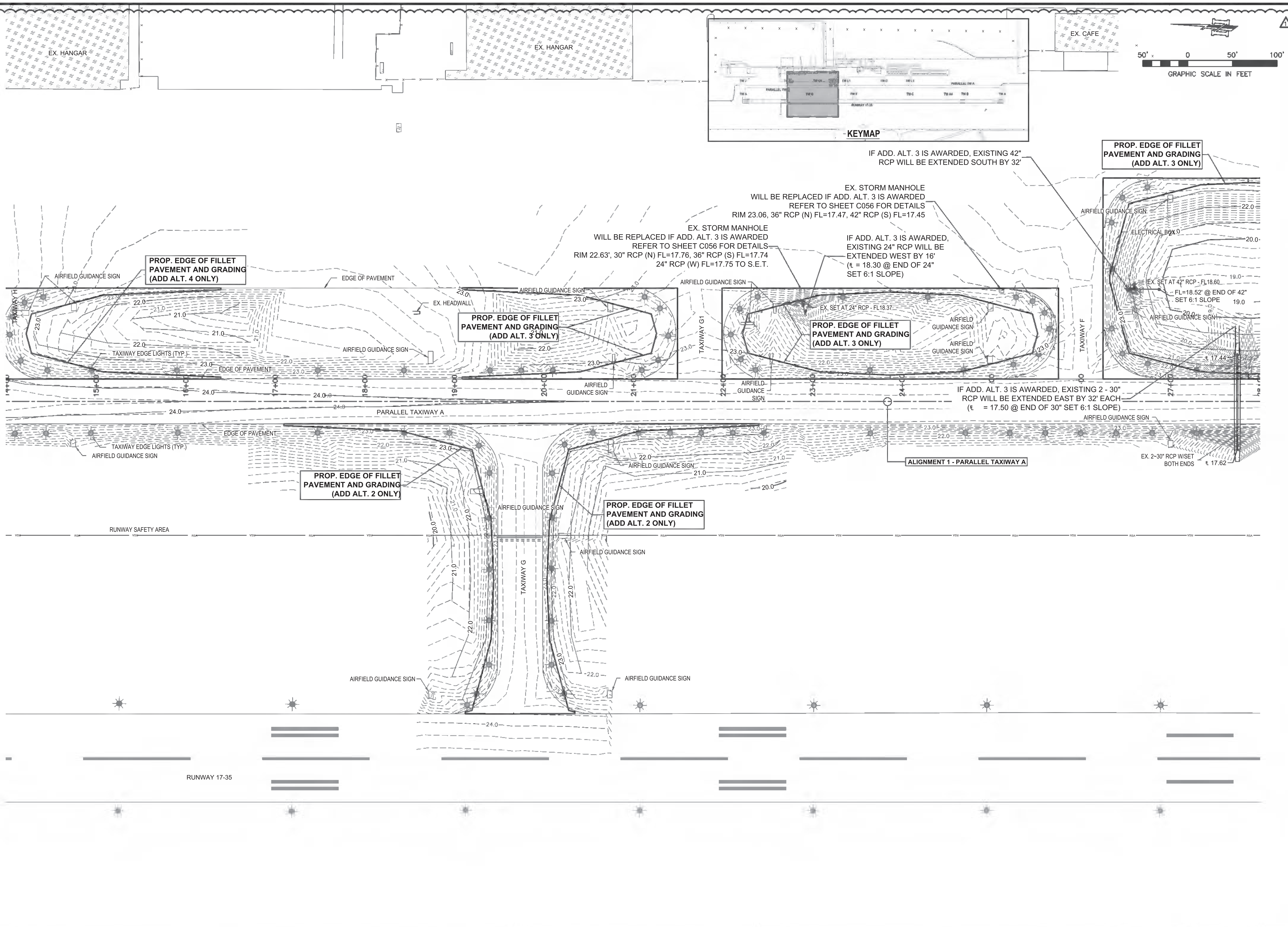
SHEET NO.
C050



MARK	REVISION	DATE
2	ADDENDUM #2	10/8/25

SHEET NAME:

GRADING AND DRAINAGE 2

PROJECT NAME:

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
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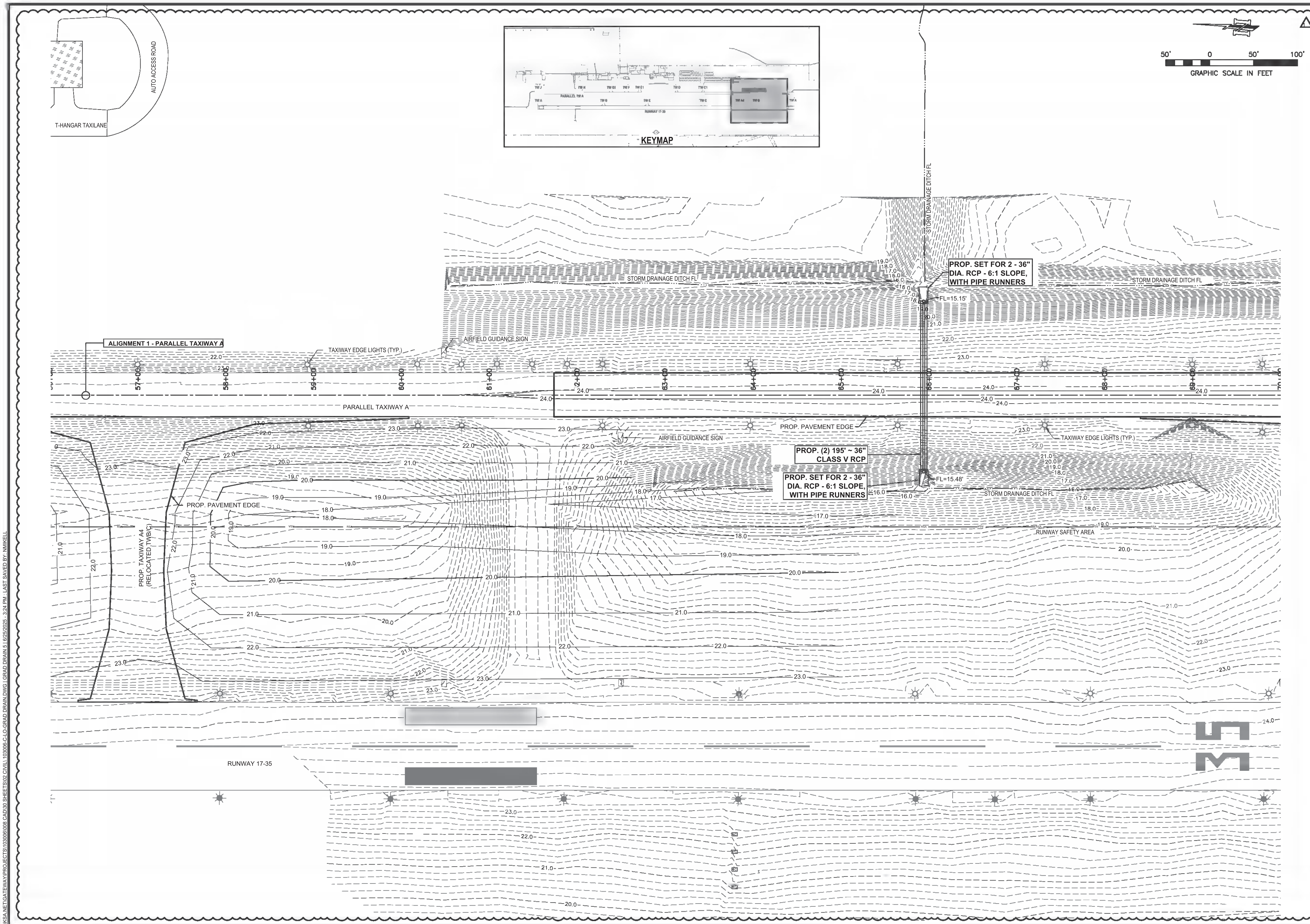
SHEET NO.
C051



TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

GRADING AND DRAINAGE 5

DRAWN BY:	AJ
DESIGNED BY:	NM
LATEST REVISION:	06/26/2025
KSA JOB NO.:	103006

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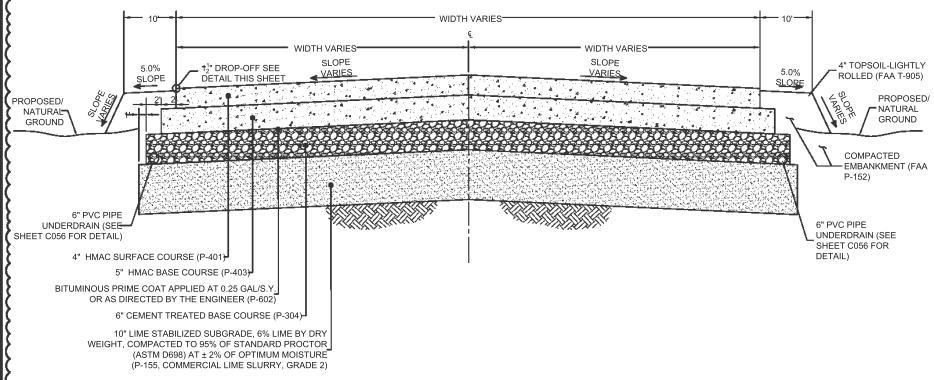
SHEET NO.
C054

MARK	REVISION	DATE
2	ADDENDUM #2	10/8/25

103006 ~ TEXAS GULF COAST REGIONAL AIRPORT ~ TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS ~ ANGLETON, TEXAS (BRAZORIA COUNTY)

\\KSA.NET\GATEWAY\PROJECTS\103006\008 CAD\30 SHEETS\02 CIVIL\ 103006-C-LO-GRAD DRAIN.DWG | GRAD DRAIN 5 | 6/25/2025 - 3:24 PM : LAST SAVED BY: NMIKELL

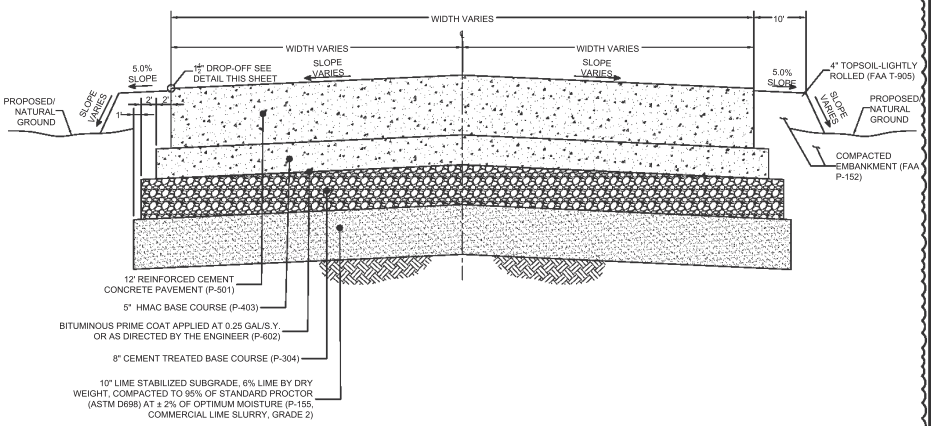


NOTES:

1. HMAC PAVEMENT SECTION SHALL BE USED ON BID SCHEDULE NO. 1 BASE BID PAVEMENT SCHEDULED FOR RECONSTRUCTION, ADDITIVE ALTERNATE NO. 2 FILLETS (TW E AND G) IF ALTERNATE IS AWARDED, AND ADDITIVE ALTERNATE NO. 3 FILLET FOR TW J IF ALTERNATE IS AWARDED.
2. SEE GRADING PLAN, AND PLAN AND PROFILE SHEETS FOR ADDITIONAL GRADING INFORMATION.
3. SEE HMAC SURFACE SPOT ELEVATION SHEETS (C042-C049) FOR PAVEMENT ELEVATIONS.

1 PROPOSED HMAC TAXIWAY PAVEMENT SECTION (BID SCHEDULE NO. 1)

N.T.S.

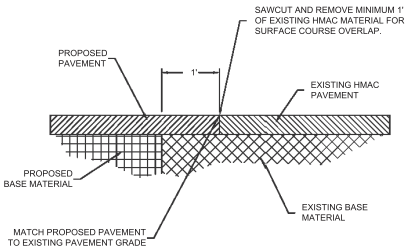


NOTES:

1. PCC PAVEMENT SECTION SHALL BE USED ON BID SCHEDULE NO. 2 BASE BID PAVEMENT SCHEDULED FOR RECONSTRUCTION, AND ADDITIVE ALTERNATE NO. 3 FILLETS FOR TW E1, F AND G1 IF ALTERNATE IS AWARDED.
2. SEE GRADING PLAN, AND PLAN AND PROFILE SHEETS FOR ADDITIONAL GRADING INFORMATION.
3. SEE JOINT LAYOUT PLAN FOR TAXIWAY PAVEMENT ELEVATIONS ON SHEET C30 - C32.

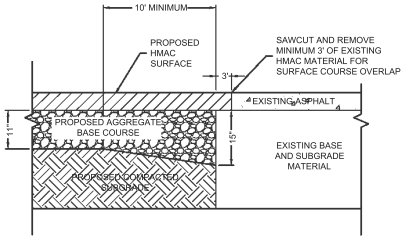
2 PROPOSED PCC TAXIWAY PAVEMENT SECTION (BID SCHEDULE NO. 2)

N.T.S.



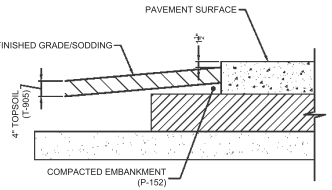
3 SAWCUT DETAIL

N.T.S.



4 PROPOSED HMA TO EXISTING HMA PAVEMENT TRANSITION DETAIL

N.T.S.

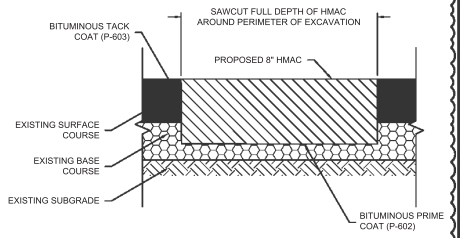


NOTES:

1. PROVIDE ½" DROP-OFF FROM TOP OF PAVEMENT TO ADJACENT FINISHED GRADE AT EDGE OF ALL PAVEMENT CONSTRUCTED IN THIS PROJECT.
2. SUFFICIENT TOPSOIL MAY NOT BE AVAILABLE ON THE AIRPORT SITE. THE CONTRACTOR SHALL SUPPLY TOPSOIL FROM OFF-SITE AS REQUIRED. TOPSOIL MUST MEET THE REQUIREMENTS OF T-905.
3. THE TOPSOIL SHALL BE LIGHTLY ROLLED INTO PLACE.
4. ALL TOPSOILED AREAS SHALL BE TREATED WITH SEED AND FERTILIZER IN ACCORDANCE WITH T-901.
5. UPON COMPLETION OF CONSTRUCTION, INSTALL SOD (T-904) ADJACENT TO THE EDGE OF PAVEMENT. REFER TO STORM WATER POLLUTION PREVENTION PLAN LAYOUT FOR EXTENTS OF SODDING.

5 PAVEMENT DROP-OFF DETAIL

N.T.S.



FULL-DEPTH PAVEMENT REAPIR NOTES:

1. PAYMENT FOR FULL-DEPTH PAVEMENT REPAIR SHALL BE BY THE NUMBER OF SQUARE YARDS OF PAVEMENT REPAIRED AND ACCEPTED BY THE ENGINEER. THERE WILL BE NO SEPARATE PAYMENT FOR THE INDIVIDUAL ITEMS OF CONSTRUCTION. FIELD VERIFY LOCATIONS OF FULL-DEPTH PAVEMENT REPAIR WITH ENGINEER.
2. MINIMUM REPAIR AREA WILL BE 4' X 4'
3. SAWCUTTING/REMOVAL OF AGGREGATE BASE, HMAC, BITUMINOUS PRIME COAT, SHALL BE CONSIDERED SUBSIDIARY TO THE FULL DEPTH PAVEMENT REPAIR ITEM.
4. PROPOSED HMAC 8" THICKNESS (MIN.) (P-401) (SUBSIDIARY TO FULL DEPTH PAVEMENT REPAIR ITEM).
5. COMPACT EXISTING GRANULAR AGGREGATE BASE COURSE TO 98% OF STANDARD PROCTOR @ ±2% MOISTURE (SUBSIDIARY TO FULL DEPTH PAVEMENT REPAIR ITEM).
6. BITUMINOUS TACK COAT (P-603) (SUBSIDIARY TO FULL DEPTH PAVEMENT REPAIR ITEM).
7. BITUMINOUS PRIME COAT (P-602) (SUBSIDIARY TO FULL DEPTH PAVEMENT REPAIR ITEM).

6 FULL-DEPTH PAVEMENT REPAIR DETAIL

N.T.S.

MARK	REVISION	DATE
2	ADDENDUM #2	10/2/25

PAVEMENT DETAILS

SHEET NAME

10306 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

PROJECT NAME

DRAWN BY:	AJ
DESIGNED BY:	NM
LATEST REVISION	10/06/2025
KSA JOB NO.	10306

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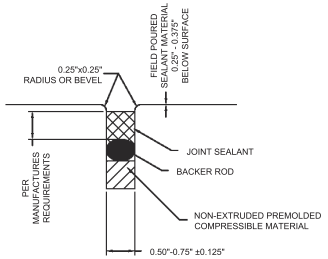
10/06/2025

SEAL:

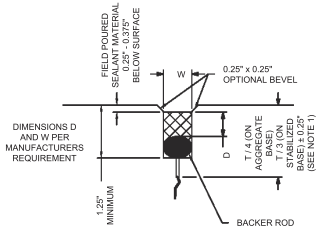
TBPE Firm Registration No. F-1356

SHEET NO.

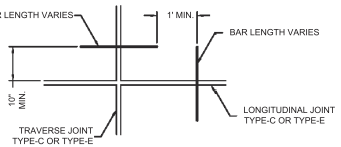
C088



DETAIL A - ISOLATION JOINT



DETAIL B - CONTRACTION JOINT (FIELD POURED)



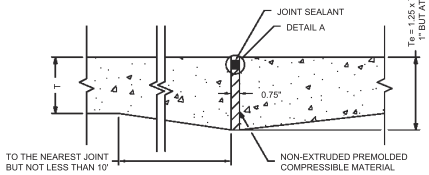
PLAN VIEW - POSITION OF DOWELS AT EDGE OF JOINT TYPE-C OR TYPE-E

RIGID PAVEMENT JOINT NOTES:

1. INITIAL SAW CUT 1/8 TO 1/5 (MINIMUM 1" WHEN USING EARLY ENTRY SAW.
2. FIELD POURED SEALANT RESERVOIR SIZED TO PROVIDE PROPER SHAPE FACTOR, DEPTH (D); WIDTH (W) BASE UPON SEALANT MANUFACTURER REQUIREMENTS. TYPICALLY HOT POUR SEALANTS REQUIRE A 1:1 SHAPE FACTOR AND SILICON SEALANTS A 1:2 SHAPE FACTOR, FOR INDIVIDUAL PROJECTS REFER TO SEALANT MANUFACTURER'S RECOMMENDATIONS.
3. HOLD ALL SEALANTS DOWN 3/8" ON GROOVED RW.
4. ALL JOINTS WHERE SEALANT IS APPLIED SHALL BE BEVELED AT THE TOP.

1 RIGID PAVEMENT JOINT DETAILS

N.T.S.

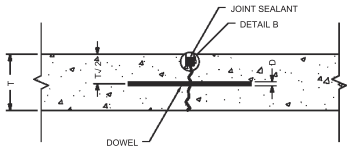


TYPE-A THICKENED EDGE ISOLATION JOINT NOTE:

GROOVE MUST BE FORMED BY SAWING

2 TYPE-A THICKENED EDGE ISOLATION JOINT DETAIL

N.T.S.

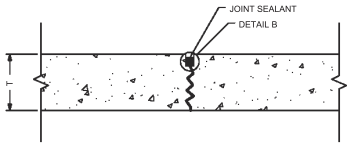


TYPE-C DOWELED CONTRACTION JOINT NOTE:

GROOVE MUST BE FORMED BY SAWING

3 TYPE-C DOWELED CONTRACTION JOINT DETAIL

N.T.S.

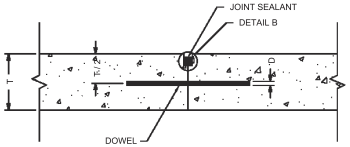


TYPE-D DUMMY CONTRACTION JOINT NOTE:

GROOVE MUST BE FORMED BY SAWING

4 TYPE-D DUMMY CONTRACTION JOINT DETAIL

N.T.S.

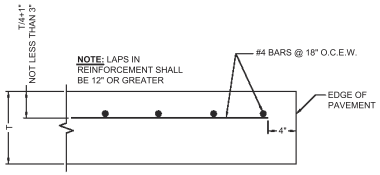


TYPE-E DOWELED CONSTRUCTION JOINT NOTE:

GROOVE MUST BE FORMED BY SAWING

5 TYPE-E DOWELED CONSTRUCTION JOINT DETAIL

N.T.S.



NOTE:
ALL PORTLAND CEMENT CONCRETE PAVEMENT TO BE REINFORCED.

6 STEEL REINFORCED CONCRETE PANELS

N.T.S.

DIMENSIONS AND SPACING OF STEEL DOWELS			
SLAB THICKNESS	DIAMETER	LENGTH	SPACING
~~5"-7"~~	~~3/4"~~	~~18 in.~~	~~12 in.~~
7.5"-12"	1"	18 in.	12 in.
~~12.5"-16"~~	~~1 1/4"~~	~~20 in.~~	~~15 in.~~
~~16.5"-20"~~	~~1 1/2"~~	~~20 in.~~	~~18 in.~~
~~20.5"-24"~~	~~2"~~	~~24 in.~~	~~18 in.~~

MAXIMUM JOINT SPACING (WITH STABILIZED SUBBASE)	
SLAB THICKNESS	JOINT SPACING
~~8"-10"~~	~~12'-6"~~
10.5"-13"	15'-0"
~~13.5"-16"~~	~~17'-6"~~
~~>16"~~	~~20'-0"~~

NOTES:

1. DOWEL BARS SHALL BE PLAIN STEEL BARS CONFORMING TO ASTM A615.
2. BEFORE DELIVERY TO THE CONSTRUCTION SITE, ALL DOWEL BARS SHALL BE EPOXY COATED PER ASTM A1078, WITH A CURED COATING THICKNESS GREATER THAN 10 MILS.
3. TIE BARS SHALL BE DEFORMED STEEL BARS CONFORMING TO ASTM A615. BARS DESIGNATED AS GRADE 60 IN ASTM A615 OR ASTM A706 SHALL BE USED FOR CONSTRUCTION REQUIRING BENT BARS.

7 PCC DOWEL BAR SIZE AND JOINT SPACING TABLES

N.T.S.

NO.	DATE	REVISION	MARK
2	10/25	ADDENDUM #2	

JOINT DETAILS

SHEET NAME

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

PROJECT NAME

10306 - TEXAS GULF COAST REGIONAL AIRPORT - TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS - ANGLETON, TEXAS (BRAZORIA COUNTY)

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 10/08/2025
KSA JOB NO: 10306

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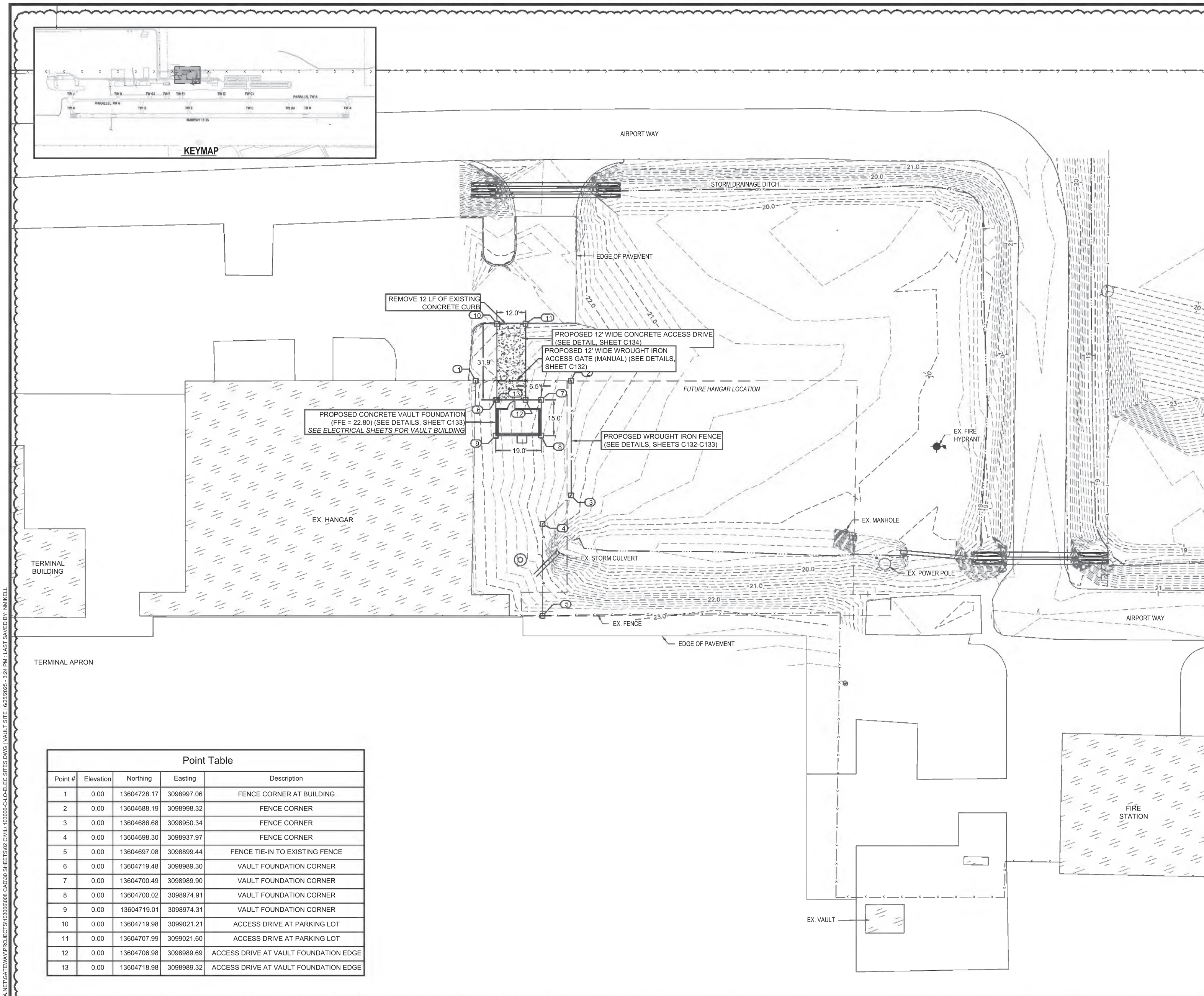
SHEET NO.
C109



Point Table

Point #	Elevation	Northing	Easting	Description
1	0.00	13604728.17	3098997.06	FENCE CORNER AT BUILDING
2	0.00	13604688.19	3098998.32	FENCE CORNER
3	0.00	13604686.68	3098950.34	FENCE CORNER
4	0.00	13604698.30	3098937.97	FENCE CORNER
5	0.00	13604697.08	3098899.44	FENCE TIE-IN TO EXISTING FENCE
6	0.00	13604719.48	3098989.30	VAULT FOUNDATION CORNER
7	0.00	13604700.49	3098989.90	VAULT FOUNDATION CORNER
8	0.00	13604700.02	3098974.91	VAULT FOUNDATION CORNER
9	0.00	13604719.01	3098974.31	VAULT FOUNDATION CORNER
10	0.00	13604719.98	3099021.21	ACCESS DRIVE AT PARKING LOT
11	0.00	13604707.99	3099021.60	ACCESS DRIVE AT PARKING LOT
12	0.00	13604706.98	3098989.69	ACCESS DRIVE AT VAULT FOUNDATION EDGE
13	0.00	13604718.98	3098989.32	ACCESS DRIVE AT VAULT FOUNDATION EDGE

MARK	REVISION	DATE
1	ADDENDUM #2	10/8/25

AIRFIELD ELECTRIC VAULT CIVIL SITE PLAN

SHEET NAME:

TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

PROJECT NAME:

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/09/2025
KSA JOB NO.: 103006

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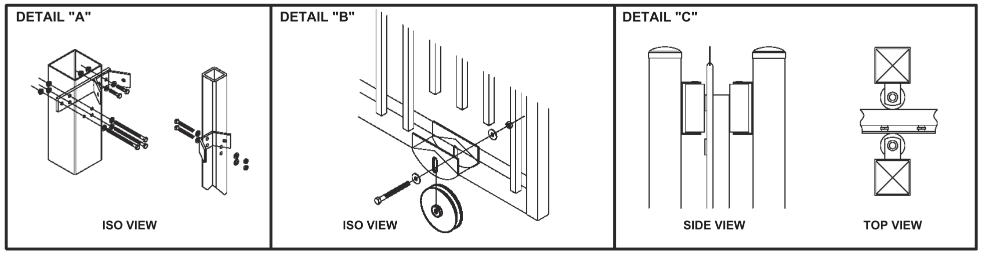
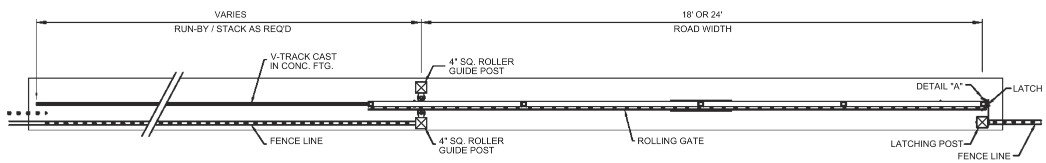
SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
C131

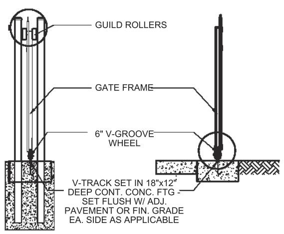




TOP VIEW - MANUAL WROUGHT IRON ROLLING GATE
(6' HEIGHT)
N.T.S.

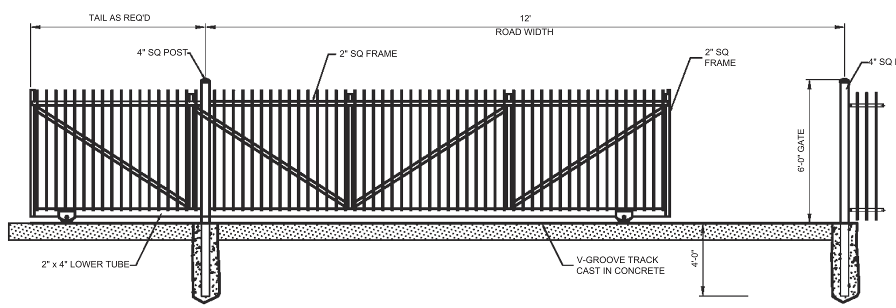
MANUAL CANTILEVER GATE NOTES:

1. CHARACTERISTICS ARE SHOWN FOR GENERAL INFORMATION. PRIOR TO SUBMITTING SHOP DRAWINGS, VERIFY & MATCH TO THE EXISTING AIRPORT ORNAMENTAL FENCE SYSTEM ALREADY INSTALLED.
2. ORNAMENTAL PICKETS: .75" SQUARE, MIN.
3. TOP RAILS, UPRIGHTS, & DIAGONAL BRACES: 2" SQ. X 11 GA.
4. BOTTOM RAIL: 2"x4"x11 GA., NOTCHED & PLATED FOR V-TRACK GUIDE WHEELS
5. ROLL GATE HARDWARE: KIT #PGKOD, OR AS RECOMMENDED BY THE MANF. FOR THE INSTALLATION.
6. COORDINATE TRAVEL DIRECTION OF GATE WITH SITE PLAN. MAY BE OPPOSITE HAND FROM THE VIEW SHOWN ABOVE.



GUIDE POSTS
N.T.S.

THRU GATE
N.T.S.



FRONT VIEW - MANUAL WROUGHT IRON ROLLING GATE
(6' HEIGHT)
N.T.S.

MARK	REVISION	DATE
2	ADDENDUM #2	10/8/25

SHEET NAME:
AIRFIELD ELECTRIC
VAULT CIVIL SITE
DETAILS 1

PROJECT NAME:
TEXAS GULF COAST
REGIONAL AIRPORT
TAXIWAY REHABILITATION AND
ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/26/2025
KSA JOB NO.: 103006

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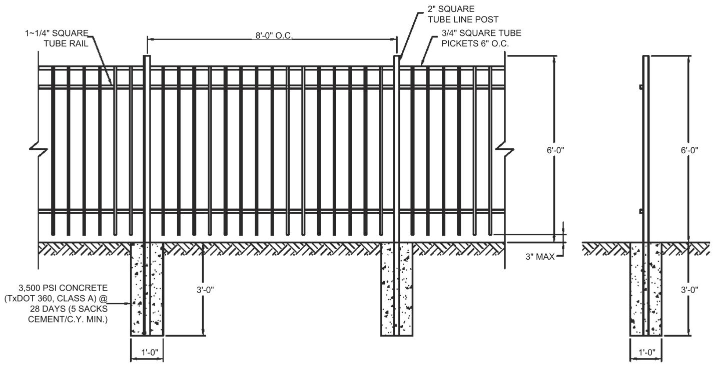
SEAL:
STATE OF TEXAS
NATHAN T. MIKELL
138408
LICENSED
PROFESSIONAL ENGINEER
10/08/2025
TBPE Firm Registration No. F-1356

SHEET NO.
C132



FRONT

SIDE

NOTES:

1. 6' WROUGHT IRON FENCE SHALL MATCH EX. AIRPORT FENCE IN APPEARANCE.
2. 6' WROUGHT IRON FENCE SHALL BE PRE-GALVANIZED, POWDER COATED PAINTED INDUSTRIAL BLACK.
3. ALL MATERIALS SHALL BE PRE-GALVANIZED.
4. ALL ANGLES IN FENCE ARE 90° UNLESS OTHERWISE NOTED.
5. FENCE CONTRACTOR SHALL PROVIDE 10-YEAR GUARANTEE ON POWDER COATING AGAINST CHIPPING, PEELING AND RUST.

1 WROUGHT IRON FENCE DETAIL

N.T.S.

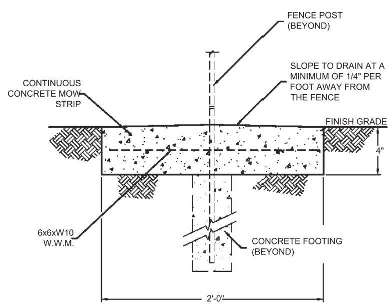
NOTES:

1. THE CONTRACTOR SHALL SPACE THE PROPOSED "AIRPORT PROPERTY NO TRESPASSING" SIGNS APPROXIMATELY 200-FEET APART AS DIRECTED BY THE PROJECT'S ENGINEER. THESE SIGNS SHALL BE SECURELY ATTACHED TO THE PROPOSED FENCING, AND INCLUDED WITHIN THIS PROJECT'S SCOPE OF WORK.
2. CONTRACTOR TO PROVIDE MANUFACTURER'S CUT SHEET FOR ENGINEER'S APPROVAL PRIOR TO ORDERING MATERIALS.
3. SIGNS SHALL BE INSTALLED ON EACH GATE OPENING.
4. SIGNS WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED SUBSIDIARY TO INSTALLATION OF FENCE.
5. APPROX. 2 SIGNS NEEDED

2 AIRPORT FENCE PROPERTY NO TRESPASSING SIGN

N.T.S.

SPACE NOT USED

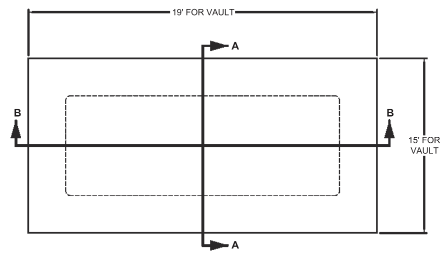


NOTES:

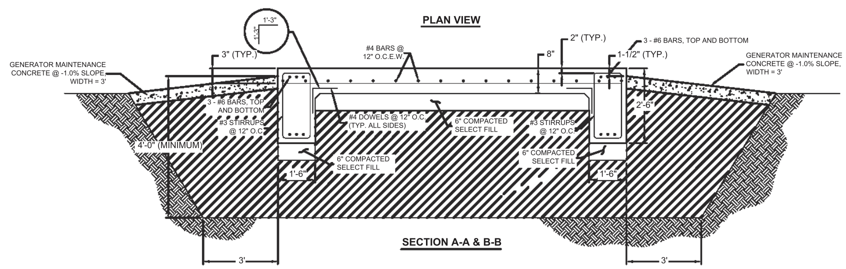
1. DUMMY JOINTS SHALL BE PLACED EVERY 5'.
2. DOWELED EXPANSION JOINTS SHALL BE PLACED EVERY 20'.
3. SEE GENERAL NOTES FOR CONCRETE REQUIREMENTS.
4. MINIMUM SUBGRADE COMPACTION SHALL BE 95% OF MINIMUM DENSITY.
5. FENCE POST IN CONCRETE FOOTING SHALL BE INSTALLED BEFORE MOW STRIP IS PLACED.
6. ALL CONCRETE SHALL BE P-610 AND HAVE A 28 DAY STRENGTH @ 3500 PSI.
7. NO SEPARATE PAY WHERE WATER CROSSING IS REQUIRED.
8. GATE POST SHALL BE AS SHOWN ON GATE DETAIL THIS SHEET.
9. GATE FRAME WORK SHALL BE AS SHOWN ON GATE DETAIL THIS SHEET.
10. ALL TUBULAR POST SHALL BE INSTALLED LEVEL, PLUMB, AND SQUARE.

3 CONCRETE MOW STRIP DETAIL

N.T.S.



PLAN VIEW



SECTION A-A & B-B

NOTES:

1. DIMENSIONS FOR GENERATOR FOUNDATION WILL BE PROVIDED ONCE A GENERATOR SUBMITTAL IS APPROVED.
2. CONTRACTOR SHALL OVER EXCAVATE MINIMUM OF 4'-0" BELOW EXISTING GRADE. PLACE SELECT FILL IN 6" LIFTS WITH COMPACTION EQUAL TO 95% STANDARD PROCTOR TO RESTORE GRADE BELOW GENERATOR FOUNDATION.
3. SELECT FILL SHALL BE FREE OF ORGANIC OR OTHER DELETERIOUS MATERIALS, HOMOGENOUS MIXTURES, HAVING A MAX. PARTICLE SIZE OF 3", HAVE LESS THAN 35 AND A PI BETWEEN 7 AND 15, CONSISTING OF SILTY-CLAYEY SANDS (SM-SC), LOW PLASTICITY CLAYS (CL), OR CLAYEY SANDS (SC) OR CLAYEY SAND (SC) OR TxDOT ITEM 247 FLEXIBLE BASE, TYPE A, GRADE 1-2 COMPACTED TO 100% OF MAXIMUM DRY DENSITY AS DETERMINED BY TEX-113-E AT OPTIMUM MOISTURE. SELECT FILL SHALL BE COMPACTED TO 95% STANDARD PROCTOR AT ±2% OPTIMUM MOISTURE.
4. IF SOFT SUBGRADE SOILS ARE ENCOUNTERED DURING CONSTRUCTION, THE CONTRACTOR SHALL USE 3" X 5" CRUSHED CONCRETE TO STABILIZE THE SUBGRADE PRIOR TO PLACING SELECT FILL. 3" X 5" CRUSHED CONCRETE SHALL NOT BE PAID FOR DIRECTLY, BUT WILL BE CONSIDERED SUBSIDIARY TO THE VARIOUS BID ITEMS.
5. CONCRETE SHALL HAVE A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 4,000 PSI, AND COMPLY WITH CLASS C TX421 SPECIFICATION.
6. REINFORCING STEEL ASTM A 615, GRADE 60. ALL BARS SECURELY HELD IN ACCURATE POSITION BY SUITABLE ACCESSORIES, TIE BARS, SUPPORT BARS, ETC.
7. MINIMUM CONCRETE COVER PROTECTION FOR REINFORCING BARS SHALL BE 2 INCHES: BOARD FORMED SIDES, 3 INCHES: EARTH FORMED SIDES, 3 INCHES: BOTTOM, 2 INCHES: TOP.
8. MOUNT GENERATOR TO FOUNDATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION. CONTRACTOR SHALL PROVIDE ANCHORING AND MOUNTING DETAIL IN ACCORDANCE WITH GENERATOR MANUFACTURER RECOMMENDATIONS FOR APPROVAL BY THE ENGINEER PRIOR TO CONSTRUCTION. CONTRACTOR SHALL ENSURE GENERATOR FOUNDATION PROVIDED IS COMPATIBLE WITH THE CHOSEN MANUFACTURERS ANCHORING AND MOUNTING PLAN PRIOR TO CONSTRUCTION. IF THE MANUFACTURERS ANCHORING AND MOUNTING PLAN IS NOT COMPATIBLE, THE CONTRACTOR SHALL SUBMIT AN ALTERNATE FOUNDATION DESIGNED BY A TEXAS PROFESSIONAL ENGINEER FOR APPROVAL PRIOR TO CONSTRUCTION. CONTRACTOR MAY SUBMIT ALTERNATE MANUFACTURER APPROVED FOUNDATION DESIGN FOR APPROVAL BY THE ENGINEER.

4 VAULT AND GENERATOR FOUNDATION DETAIL

N.T.S.

MARK	REVISION	DATE
2	ADDENDUM #2	10/8/25

SHEET NAME: AIRFIELD ELECTRIC VAULT CIVIL SITE DETAILS 2

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: AJ
DESIGNED BY: NM
LATEST REVISION: 06/09/2025
KSA JOB NO.: 103006

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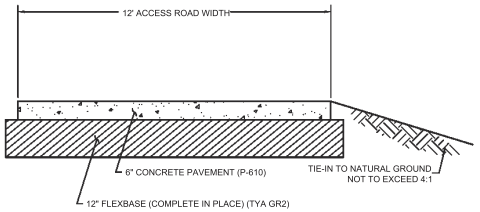
SEAL: STATE OF TEXAS NATHAN T. MIKELL 138408 LICENSED PROFESSIONAL ENGINEER 10/08/2025

TBPE Firm Registration No. F-1356

SHEET NO. C133



NOTES:

1. A 0.5 TO 1 INCH DROP FROM PAVED TO UNPAVED SURFACES IS RECOMMENDED.
2. A SLOPE OF 5% IS RECOMMENDED FOR A 10-FOOT WIDTH ADJACENT TO THE PAVEMENT EDGES TO PROMOTE DRAINAGE.
3. DUMMY CONSTRUCTION JOINTS SHALL BE INSTALLED EVERY 10' ALONG THE LENGTH OF THE ACCESS DRIVE.

1 **12' WIDE ACCESS ROAD**
N.T.S.

SPACE NOT USED

SPACE NOT USED

SPACE NOT USED

SPACE NOT USED

SPACE NOT USED

SPACE NOT USED

SPACE NOT USED

ADDENDUM #2 10/8/25

MARK	REVISION	DATE

AIRFIELD ELECTRIC
VAULT CIVIL SITE
DETAILS 3
SHEET NAME

TEXAS GULF COAST
REGIONAL AIRPORT
TAXIWAY REHABILITATION AND
ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS
PROJECT NAME

DRAWN BY:	AJ
DESIGNED BY:	NM
LATEST REVISION	10/08/2025
KSA JOB NO:	130906

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STATE OF TEXAS
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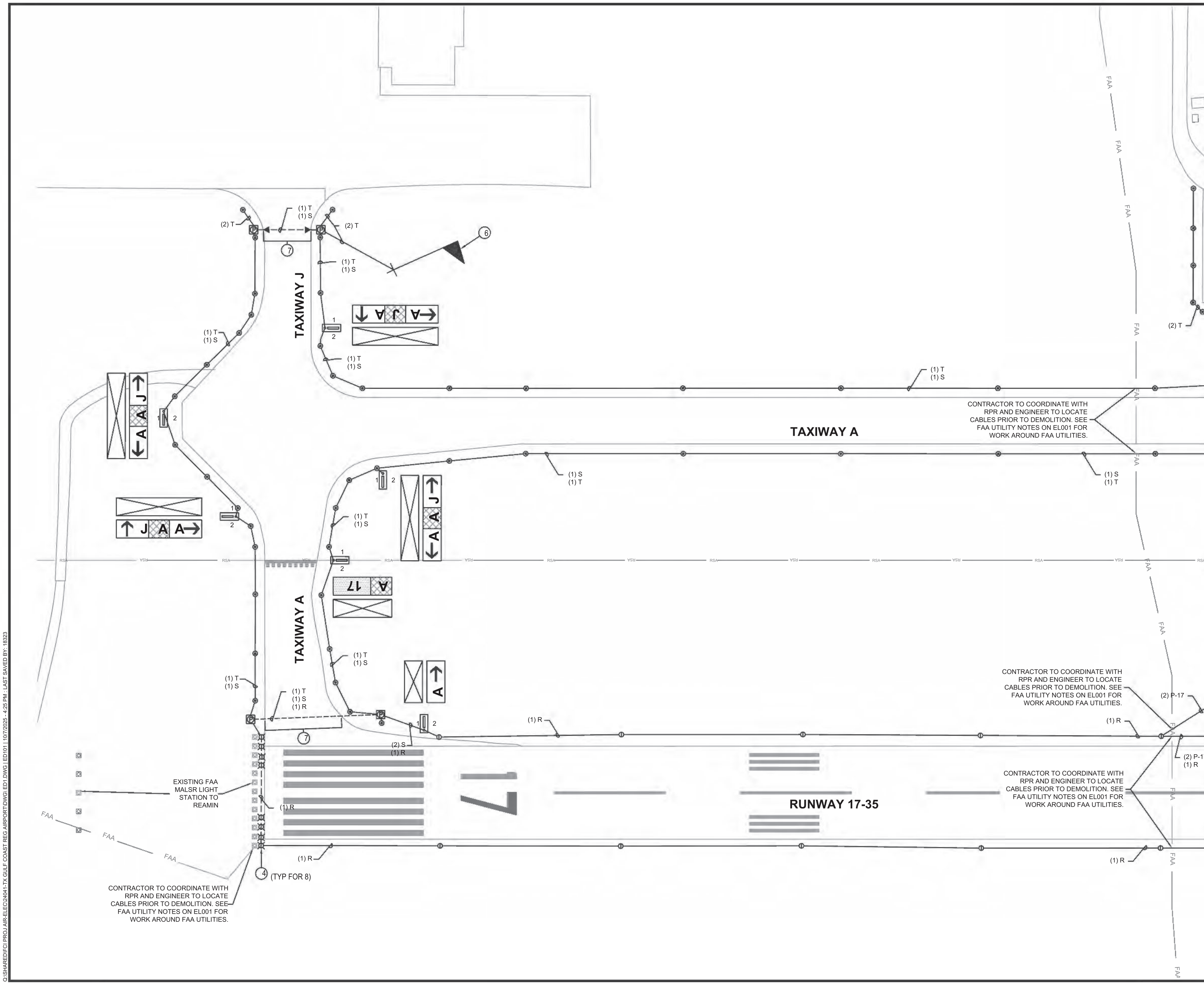
10/08/2025

SEAL:
TBPE Firm Registration No. F-1356

SHEET NO.
C134

130906 – TEXAS GULF COAST REGIONAL AIRPORT – TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS – ANGLETON, TEXAS (BRAZORIA COUNTY)



GRAPHIC SCALE IN FEET
50' 0 50' 100'

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET EL001 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EL1 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (ED1 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. CONDUIT NOTED FOR DEMOLITION MAY BE ABANDONED IN PLACE IN AREAS WHERE NO PROPOSED TRENCHING OPERATIONS ARE TAKING PLACE. NO ADDITIONAL TRENCHING IS REQUIRED FOR THE SOLE PURPOSE OF CONDUIT DEMOLITION.

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MARK	REVISION	DATE
2	ADDENDUM 2	10/08/25

SHEET NAME:
AIRFIELD LIGHTING DEMOLITION PLAN

PROJECT NAME:
TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY:	ALC
DESIGNED BY:	ALC
LATEST REVISION:	10/08/2025
KSA JOB NO.:	103006

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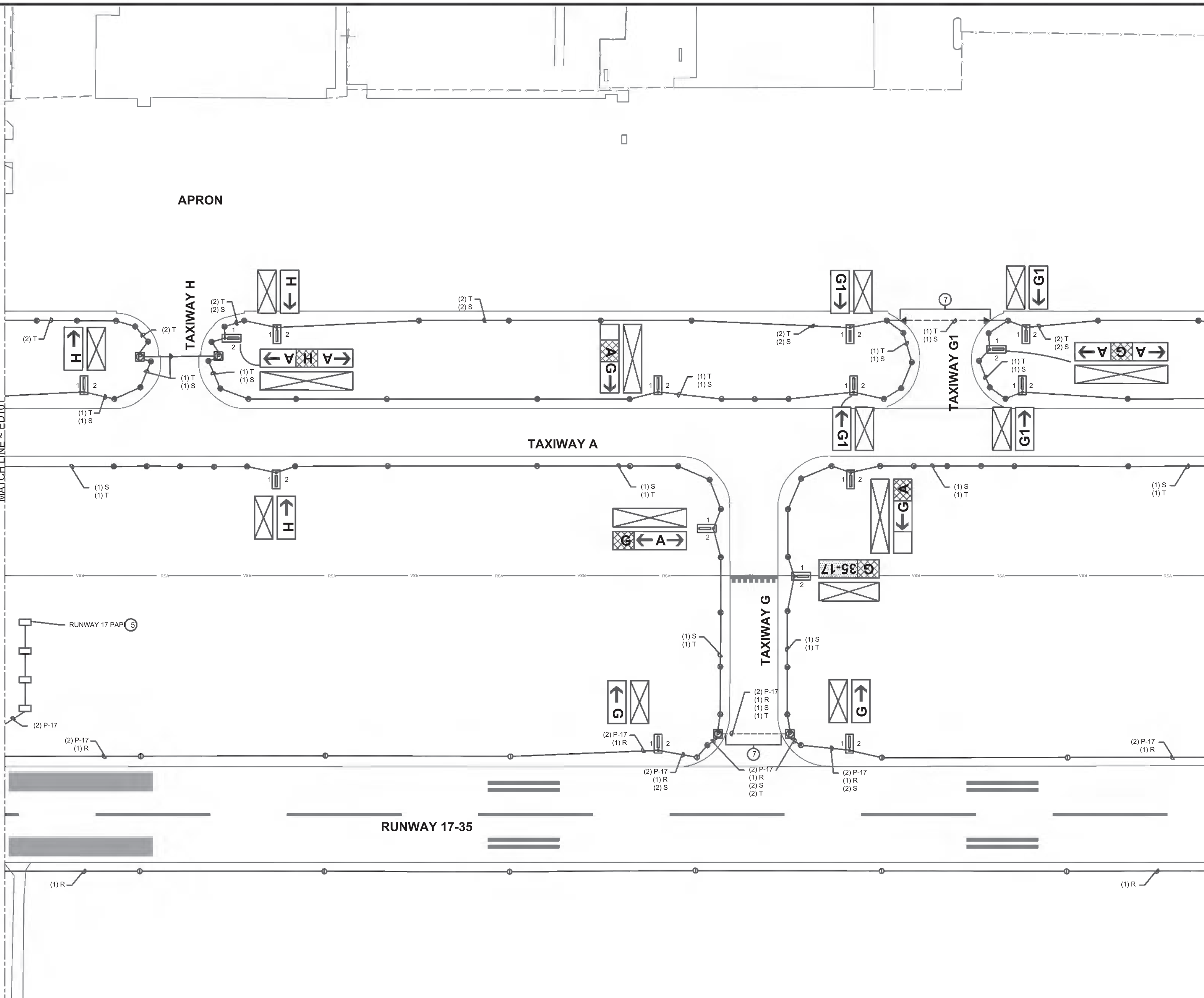
SEAL:
TBPE Firm Registration No. F-6864
SHEET NO.
ED101



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MARK	REVISION	DATE
2	ADDENDUM 2	10/08/25

SHEET NAME: AIRFIELD LIGHTING DEMOLITION PLAN

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

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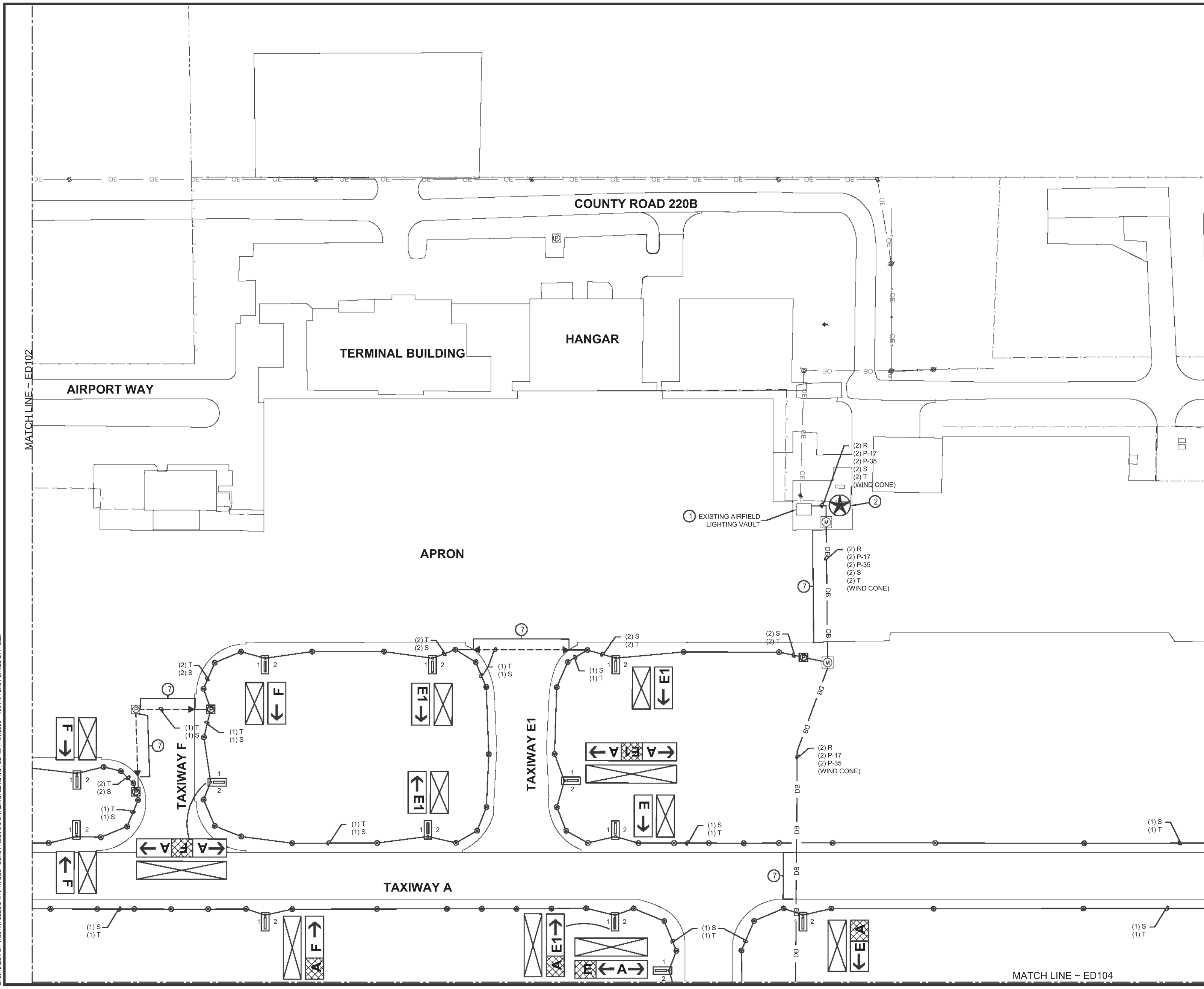
STATE OF TEXAS R. COLE FERGUSON 150146 LICENSED PROFESSIONAL ENGINEER 10/08/25

SEAL:
TBPE Firm Registration No. F-6864

SHEET NO.
ED102



50' 0 50' 100'
GRAPHIC SCALE IN FEET

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2	ADDENDUM 2	0/08/25

SHEET NAME:
AIRFIELD LIGHTING DEMOLITION PLAN

PROJECT NAME:
TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

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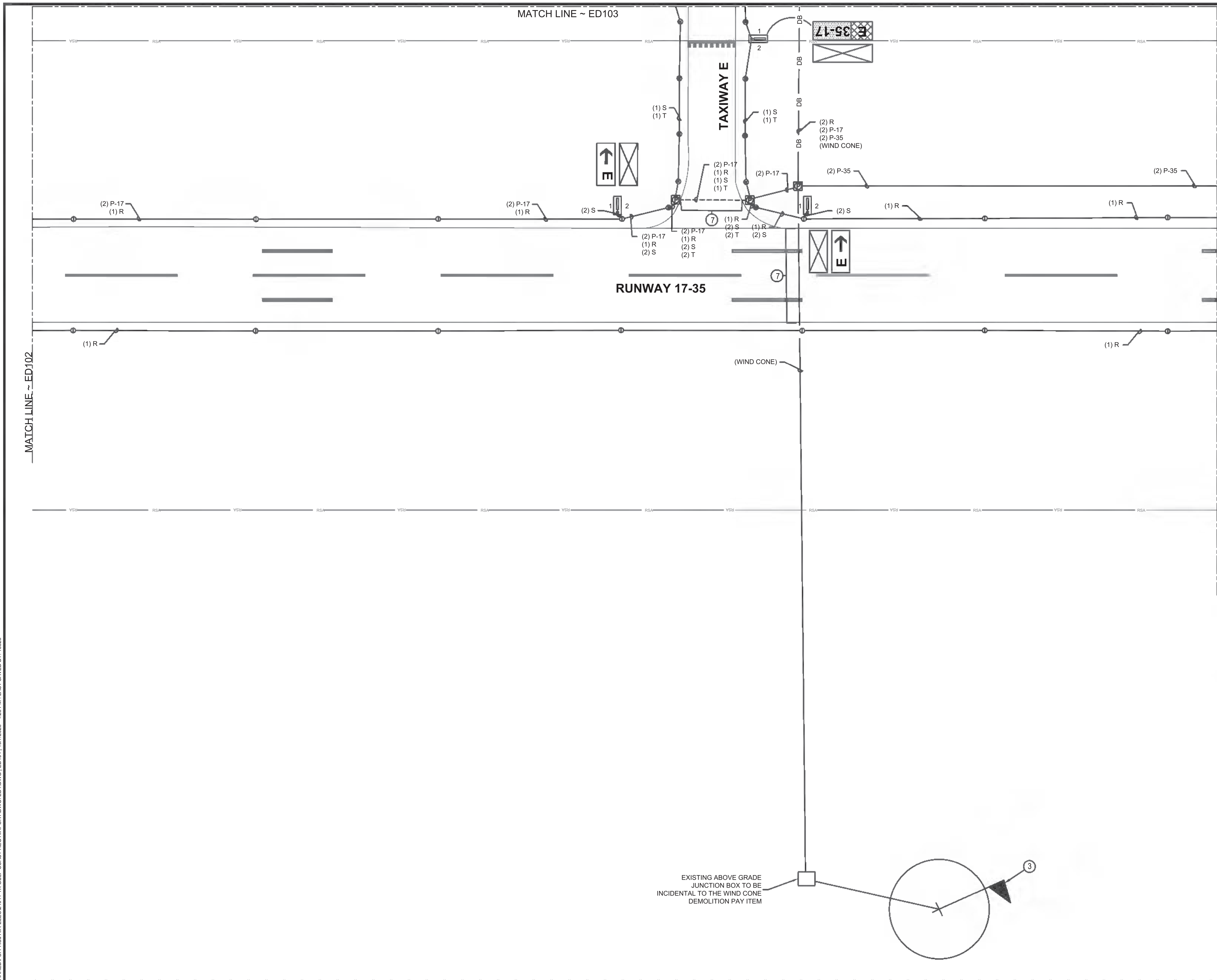
(281) 292-9222 Firm No. 6864

R. COLE FERGUSON
150146
LICENSED PROFESSIONAL ENGINEER
STATE OF TEXAS
10/08/25

SEAL:
TBPE Firm Registration No. F-6864
SHEET NO.
ED103



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MARK	REVISION	DATE
2	ADDENDUM 2	0/08/25

SHEET NAME:
AIRFIELD LIGHTING DEMOLITION PLAN

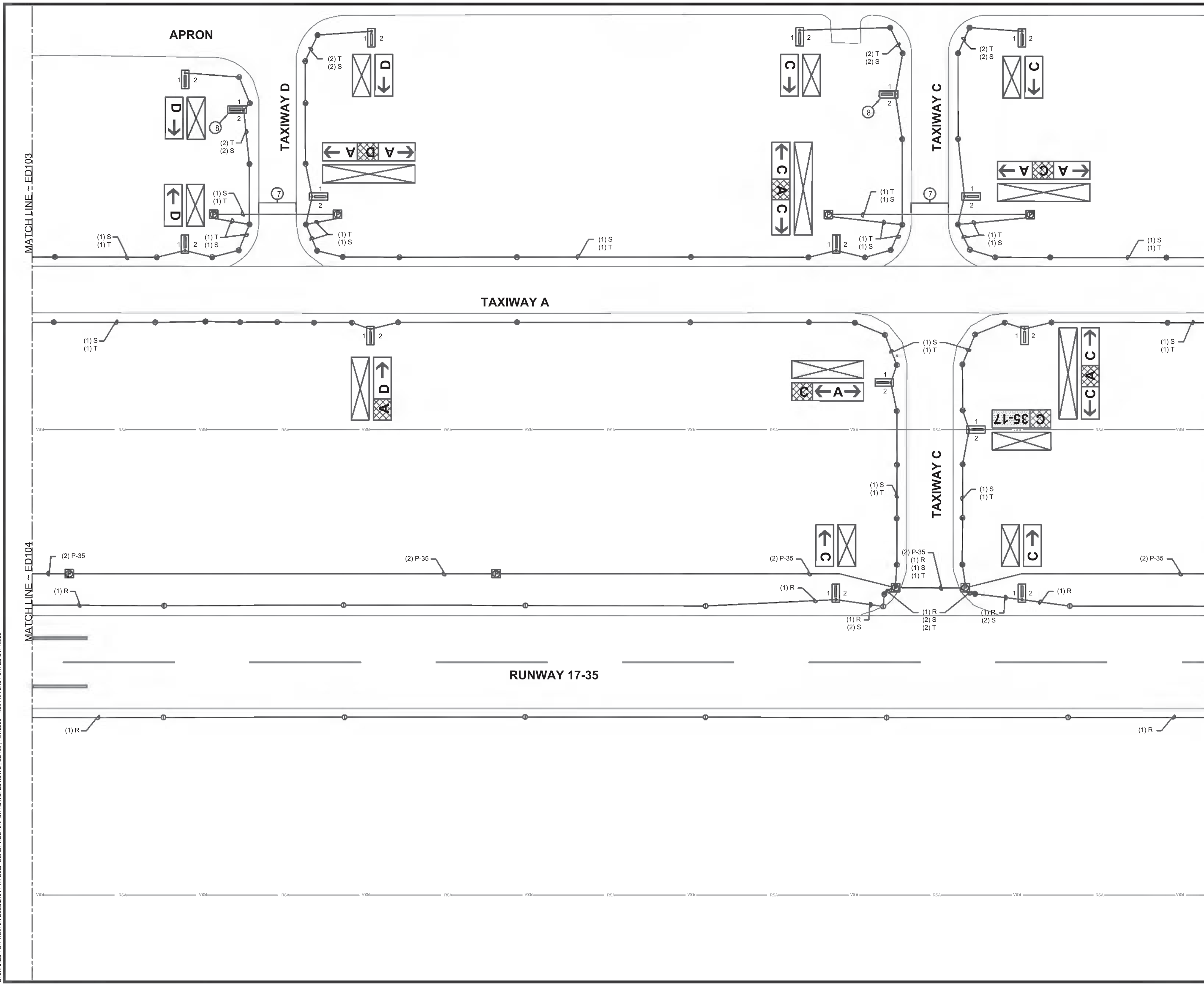
PROJECT NAME:
TEXAS GULF COAST REGIONAL AIRPORT
TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS
BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

Ferguson Consulting

SEAL: R. COLE FERGUSON 150146 LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS, 10/08/25
TBPE Firm Registration No. F-6864

SHEET NO.
ED104



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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. CONDUIT NOTED FOR DEMOLITION MAY BE ABANDONED IN PLACE IN AREAS WHERE NO PROPOSED TRENCHING OPERATIONS ARE TAKING PLACE. NO ADDITIONAL TRENCHING IS REQUIRED FOR THE SOLE PURPOSE OF CONDUIT DEMOLITION.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING VAULT TO BE MODIFIED. RE: 1/ EL401 FOR ENLARGED PLAN.
2. DEMOLISH EXISTING BEACON, POLE AND FOUNDATION, ALONG WITH ALL ASSOCIATED EQUIPMENT. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
3. EXISTING WIND CONE, FOUNDATION, SEGMENTED CIRCLE, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
4. EXISTING ELEVATED LIGHT FIXTURE AND ISOLATION TRANSFORMER TO BE REMOVED. BASE CAN TO REMAIN. BASE CAN TO BE COVERED AND PROTECTED FROM DIRT AND DEBRIS.
5. CONTRACTOR TO DEMOLISH EXISTING PAPI LIGHT UNITS ALONG WITH ALL ASSOCIATED EQUIPMENT AND FOUNDATIONS.
6. EXISTING SUPPLEMENTAL WIND CONE, FOUNDATION, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED.
7. EXISTING UNDERGROUND DUCT BANK OR CONDUIT BENEATH PAVEMENT TO BE ABANDONED IN PLACE. CONTRACTOR TO REMOVE ALL EXISTING CONDUCTORS.
8. EXISTING SIGN FOUNDATION AND L-867D BASE CAN TO BE DEMOLISHED ALONG WITH ALL ASSOCIATED EQUIPMENT.

MARK	REVISION	DATE
2	ADDENDUM 2	0/08/25

SHEET NAME: AIRFIELD LIGHTING DEMOLITION PLAN

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

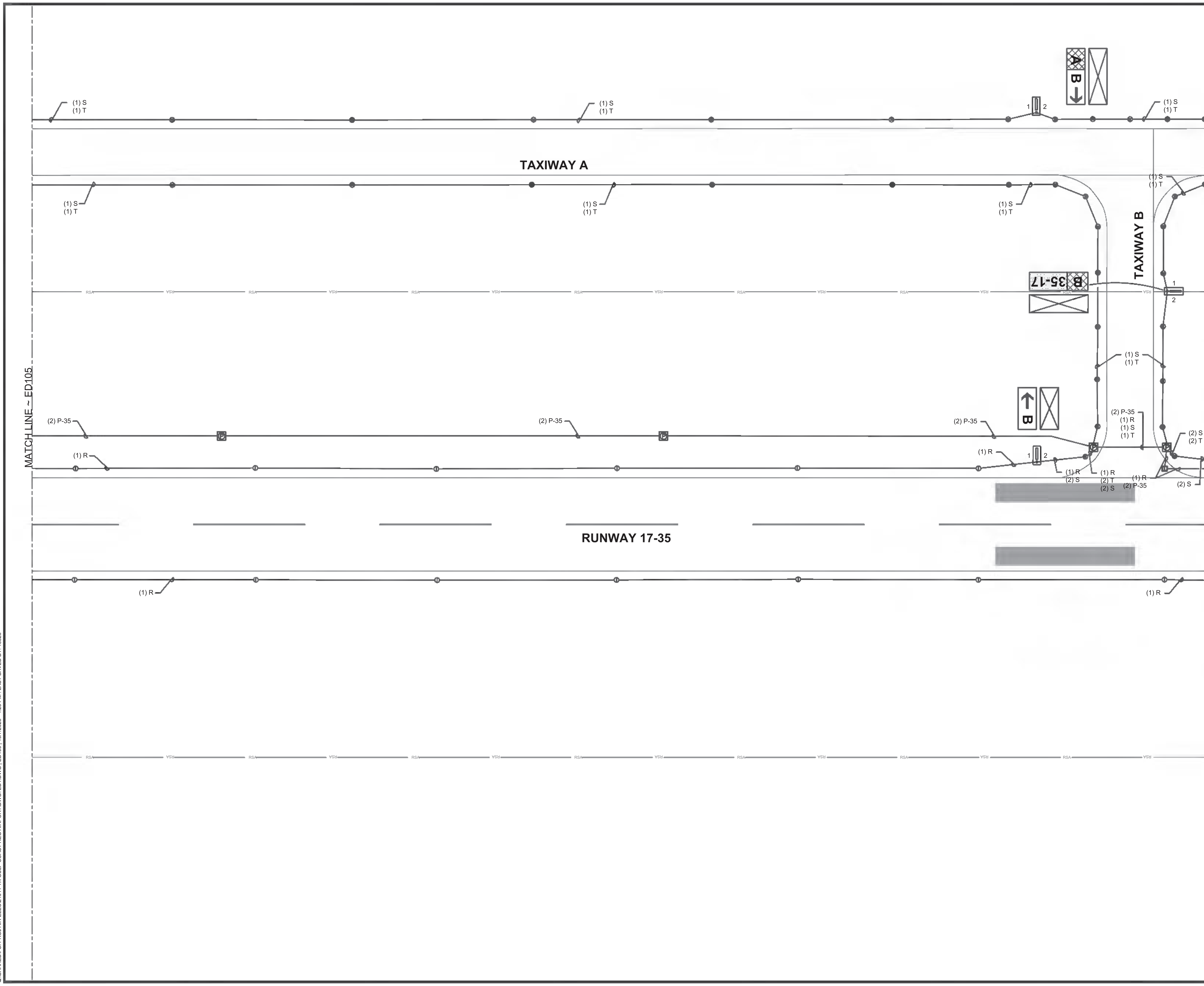
DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

Ferguson Consulting

SEAL: R. COLE FERGUSON 150146 LICENSED PROFESSIONAL ENGINEER, STATE OF TEXAS, 10/08/25

TBPE Firm Registration No. F-6864

SHEET NO. ED105



GRAPHIC SCALE IN FEET (50' 0 50' 100')

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET EL001 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EL1 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (ED1 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. CONDUIT NOTED FOR DEMOLITION MAY BE ABANDONED IN PLACE IN AREAS WHERE NO PROPOSED TRENCHING OPERATIONS ARE TAKING PLACE. NO ADDITIONAL TRENCHING IS REQUIRED FOR THE SOLE PURPOSE OF CONDUIT DEMOLITION.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING VAULT TO BE MODIFIED. RE: 1/ EL401 FOR ENLARGED PLAN.
2. DEMOLISH EXISTING BEACON, POLE AND FOUNDATION, ALONG WITH ALL ASSOCIATED EQUIPMENT. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
3. EXISTING WIND CONE, FOUNDATION, SEGMENTED CIRCLE, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
4. EXISTING ELEVATED LIGHT FIXTURE AND ISOLATION TRANSFORMER TO BE REMOVED. BASE CAN TO REMAIN. BASE CAN TO BE COVERED AND PROTECTED FROM DIRT AND DEBRIS.
5. CONTRACTOR TO DEMOLISH EXISTING PAPI LIGHT UNITS ALONG WITH ALL ASSOCIATED EQUIPMENT AND FOUNDATIONS.
6. EXISTING SUPPLEMENTAL WIND CONE, FOUNDATION, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED.
7. EXISTING UNDERGROUND DUCT BANK OR CONDUIT BENEATH PAVEMENT TO BE ABANDONED IN PLACE. CONTRACTOR TO REMOVE ALL EXISTING CONDUCTORS.
8. EXISTING SIGN FOUNDATION AND L-867D BASE CAN TO BE DEMOLISHED ALONG WITH ALL ASSOCIATED EQUIPMENT.

MARK	REVISION	DATE
2	ADDENDUM 2	10/08/25

SHEET NAME: AIRFIELD LIGHTING DEMOLITION PLAN

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

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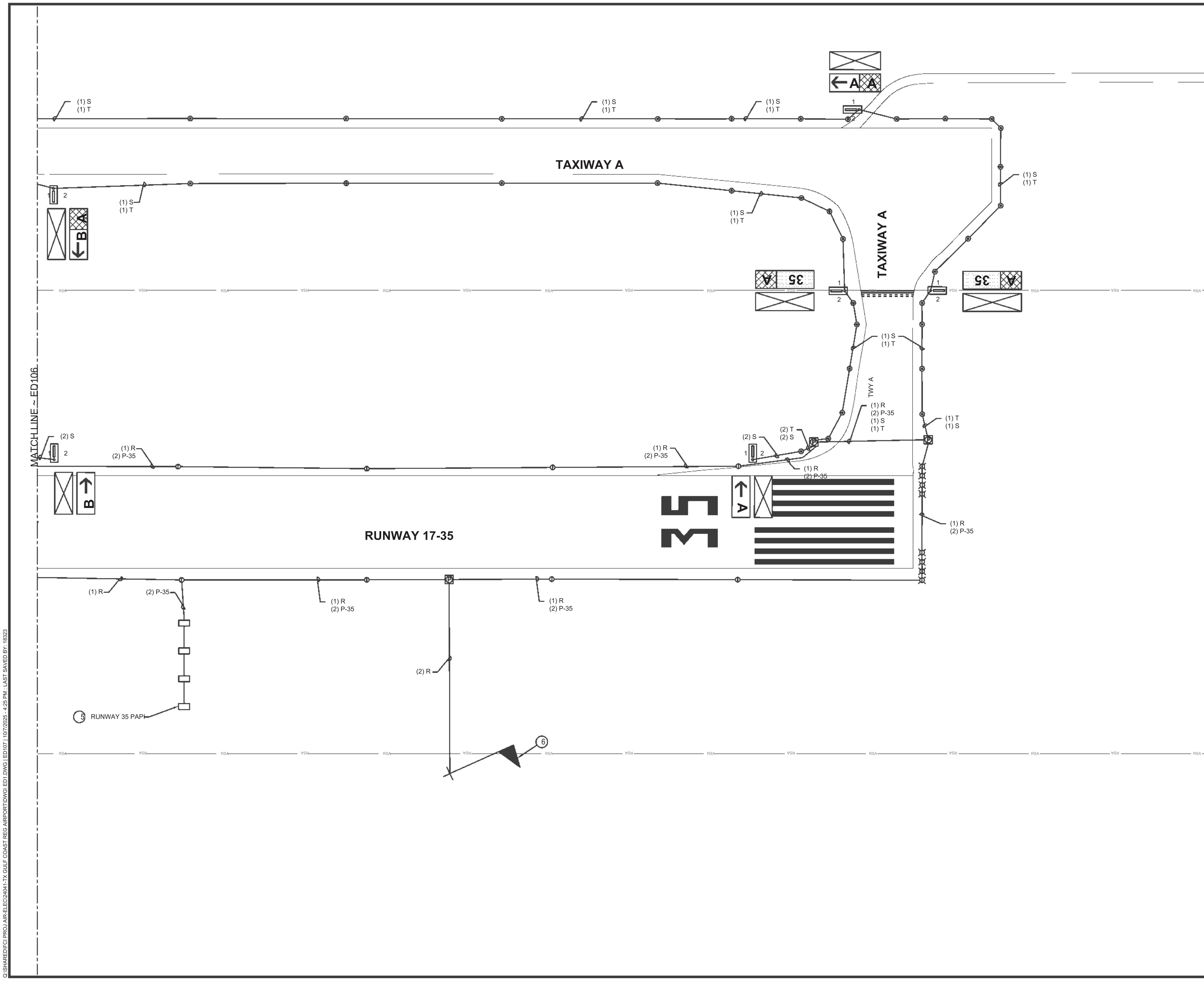
STATE OF TEXAS R. COLE FERGUSON 150146 LICENSED PROFESSIONAL ENGINEER 10/08/25

SEAL:
TBPE Firm Registration No. F-6864

SHEET NO.
ED106



50' 0 50' 100'
GRAPHIC SCALE IN FEET

GENERAL NOTES

1. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE DEMOLISHED OR MODIFIED, ALL ITEMS SHADED ARE EXISTING TO REMAIN. REFER TO SHEET EL001 FOR ELECTRICAL SYMBOL LEGEND.
2. REFER TO EL1 SERIES FOR PROPOSED AIRFIELD ELECTRICAL PLANS.
3. KEYED NOTES ARE TYPICAL FOR ALL SHEETS OF THIS SERIES (ED1 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. CONDUIT NOTED FOR DEMOLITION MAY BE ABANDONED IN PLACE IN AREAS WHERE NO PROPOSED TRENCHING OPERATIONS ARE TAKING PLACE. NO ADDITIONAL TRENCHING IS REQUIRED FOR THE SOLE PURPOSE OF CONDUIT DEMOLITION.

KEYED NOTES

1. EXISTING AIRFIELD LIGHTING VAULT TO BE MODIFIED. RE: 1/ EL401 FOR ENLARGED PLAN.
2. DEMOLISH EXISTING BEACON, POLE AND FOUNDATION, ALONG WITH ALL ASSOCIATED EQUIPMENT. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
3. EXISTING WIND CONE, FOUNDATION, SEGMENTED CIRCLE, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.
4. EXISTING ELEVATED LIGHT FIXTURE AND ISOLATION TRANSFORMER TO BE REMOVED. BASE CAN TO REMAIN. BASE CAN TO BE COVERED AND PROTECTED FROM DIRT AND DEBRIS.
5. CONTRACTOR TO DEMOLISH EXISTING PAPI LIGHT UNITS ALONG WITH ALL ASSOCIATED EQUIPMENT AND FOUNDATIONS.
6. EXISTING SUPPLEMENTAL WIND CONE, FOUNDATION, AND ALL ASSOCIATED EQUIPMENT TO BE DEMOLISHED.
7. EXISTING UNDERGROUND DUCT BANK OR CONDUIT BENEATH PAVEMENT TO BE ABANDONED IN PLACE. CONTRACTOR TO REMOVE ALL EXISTING CONDUCTORS.
8. EXISTING SIGN FOUNDATION AND L-867D BASE CAN TO BE DEMOLISHED ALONG WITH ALL ASSOCIATED EQUIPMENT.

MARK	REVISION	DATE
2	ADDENDUM 2	0/08/25

SHEET NAME:
AIRFIELD LIGHTING DEMOLITION PLAN

PROJECT NAME:
TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY:	ALC
DESIGNED BY:	ALC
LATEST REVISION:	10/08/2025
KSA JOB NO.:	103006

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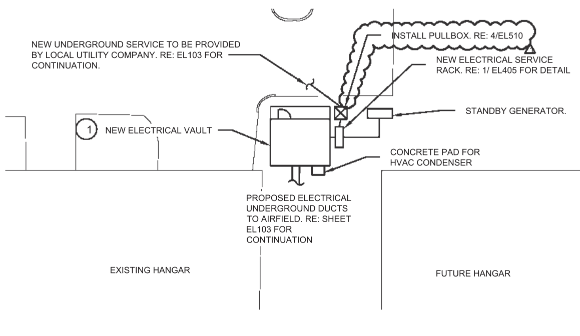
SEAL: STATE OF TEXAS R. COLE FERGUSON 150146 LICENSED PROFESSIONAL ENGINEER 10/08/25
TBPE Firm Registration No. F-6864

SHEET NO.
ED107



1 EL402 VAULT SITE PLAN
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 17' 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. COORDINATE PAINT COLOR WITH RPR, INTENTION IS TO MATCH EXISTING HANGAR COLOR. 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, 3-TON A/C WITH BUILT IN 3-TON HEATER, THERMOMETER, AND ALL INCIDENTALS COMPLETE AND IN PLACE.
2. INSTALL LOAD CENTER WITH TYPE 1 SURGE PROTECTION DEVICE.

UTILITY LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW	DEMAND KW
REGULATOR 1	1.77	1.77
REGULATOR 2	4.60	4.60
REGULATOR 3	9.58	9.58
BEACON	0.22	0.28
WIND CONE	0.1	0.13
HVAC	4.0	4.0
RECEPTACLES	1.1	2.2
LIGHTING	0.64	0.8
SUB-TOTAL LOAD	22.01	23.36

23.36 KVA / 831V = 28.1 A
100A SERVICE EXCEEDS NEC REQUIREMENTS

PROPOSED REGULATOR 1 (PAPI) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 1 'PAPI' (4KW)	
STYLE B L-880(L) (2 @ 630W/EA)	1.26
CABLE LOSS (17100' @ 3W/100LF)	0.51
SUB-TOTAL LOAD	1.77

4KVA REGULATOR EXCEEDS NEC REQUIREMENTS

PROPOSED REGULATOR 2 (RW 17-35) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 2 'RW 17-35' (7.5KW)	
LED RW LIGHTING (69 RWY EDGE LTG @ 21.5W/EA)	1.48
LED RW IN-PVMT LIGHTING (1 RWY EDGE LTG @ 78W/EA)	0.08
LED RW THSLD LIGHTING (16 RWY THSLD LTG @ 17.9W/EA)	0.29
SIGNS (LED)	1.67
SUPPLEMENTAL WIND CONE	0.07
CABLE LOSS (23115' @ 3W/100LF)	0.69
REIL (LED)	0.32
SUB-TOTAL LOAD	4.60

7.5KVA REGULATOR EXCEEDS NEC REQUIREMENTS

PROPOSED REGULATOR 3 (TAXIWAY) LOAD ANALYSIS

LOAD DESCRIPTION	PROPOSED KW
REGULATOR 3 'TAXIWAY' (10KW)	
LED TW LIGHTING (320 TWY EDGE LTG @ 15W/EA)	4.80
SIGNS (LED)	3.62
SUPPLEMENTAL WIND CONE	0.07
CABLE LOSS (36400' @ 3W/100LF)	1.09
SUB-TOTAL LOAD	9.58

10KW REGULATOR EXCEEDS NEC REQUIREMENTS

PANEL: HA

VOLTAGE: 277/480V 3 Ø 4 W AIC: — REMARKS: (2)
MAINS: 100 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*
1.5" C	2 #12	REG. 1, PAPI (4 KW)	0.89	20	1	2	40	0.0	REGULATOR 4 (15KW)	2 #8	1.5" C
—	#12G		0.89		3	4		0.0		1 #10G	-
1.5" C	2 # 10	REG. 2, RW 17-35 (7.5 KW)	2.3	30	5	6	70	3.33	XFMR 'TA'	2 #4	1.25" C
—	1 # 10G		2.3		7	8		3.33		1 #8G	-
1.5" C	2 # 10	REG. 3, TW (10 KW)	4.79	30	9	10	20		SPARE		
—	1 # 10G		4.79		11	12	20				
		SPARE		20	13	14	20				
				20	15	16			SPACE		
				20	17	18					
				20	19	20					
		SPACE			21	22					
					23	24					
					25	26		0.0	TVSS		
					27	28	50	0.0			
					29	30		0.0			

22.01	KVA CONNECTED LOAD
23.36	KVA DEMAND
28.1	AMPS DEMAND @ 480V

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

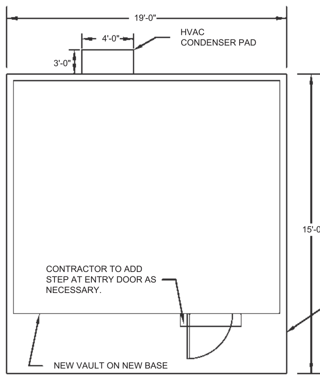
PANEL: LA

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

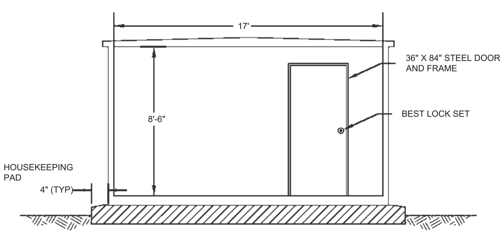
C*	WIRE*	LOAD DESCRIPTION	KVA	BKR.	CKT	CKT	BKR.	KVA	LOAD DESCRIPTION	WIRE*	C*
1" C	2 #8	HVAC (COOLING >HTG)	2.0	40	1	2	20	0.5	RADIO CONTROLLER		
—	#10G		2.0		3	4	20	0.1	WINDCONE	2 #10, #10G	2" C
		SPARE		30	5	6	20	0.64	INDOOR LIGHTING		
					7	8	20	0.22	BEACON		
		SPARE		20	9	10	20		SPARE		
		EXTERIOR LIGHT	0.1	20	11	12	20				
		RECEPTACLES	1.1	20	13	14	20				
		SPARE		20	15	16	20				
					17	18			SPACE		
		SPACE			19	20					
					21	22					
					23	24					
					25	26					
					27	28					
					29	30					

6.66	KVA CONNECTED LOAD
7.9	KVA DEMAND
32.92	AMPS DEMAND @ 240V

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



PLAN VIEW



PROFILE VIEW

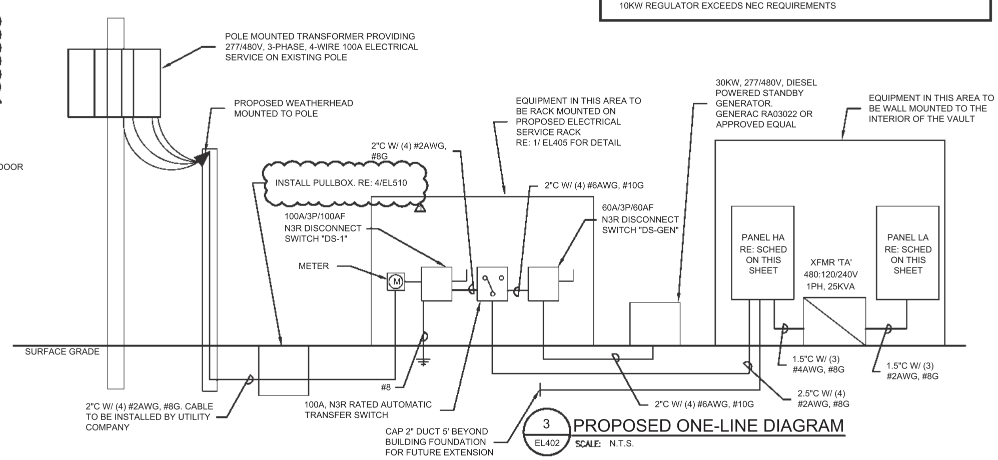
2 EL402 VAULT PLAN - FRONT ELEVATION
SCALE: N.T.S.

GENERAL NOTES

1. UTILITY COMPANY (CENTERPOINT) SHALL INSTALL TRANSFORMER, AND ALL WIRING BETWEEN TRANSFORMER AND WEATHER HEAD. CONTRACTOR IS REQUIRED TO INSTALL ALL OTHER EQUIPMENT AND CABLING. COORDINATE WORK WITH CENTERPOINT ENERGY.

NOTES

1. REFER TO CIVIL DETAILS FOR VAULT FOUNDATION PLAN.



3 EL402 PROPOSED ONE-LINE DIAGRAM
SCALE: N.T.S.

MARK	REVISION	DATE
2	ADDENDUM 2	10/08/25

SHEET NAME: ELECTRICAL VAULT PLAN

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

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SEAL: STATE OF TEXAS R. COLE FERGUSON 150146 LICENSED PROFESSIONAL ENGINEER 10/08/25
TBPE Firm Registration No. F-6864

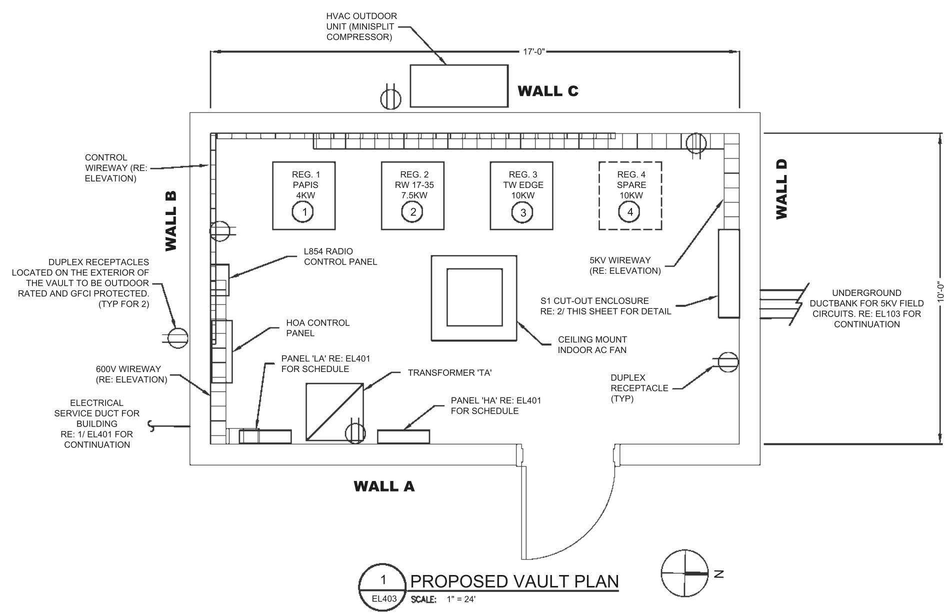
SHEET NO. EL402

GENERAL NOTES

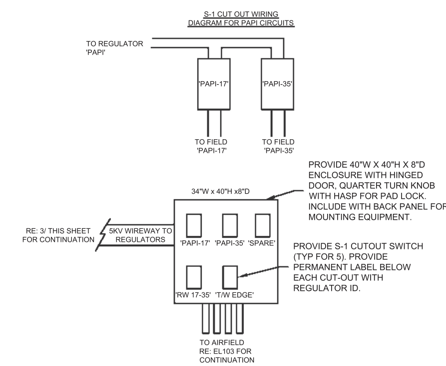
1. ALL NEW WIREWAYS TO INCLUDE HINGED COVERS. LABEL ALL WIREWAYS FOR USE AS NOTED.
2. ALL CONDUIT BELOW 6' AFF TO BE SCHED 80 PVC WITH PVC COADED RGS ELBOWS. ALL CONDUIT INSTALLED ABOVE 6' AFF MAY BE EMT. ALL CONNECTIONS TO REGULATOR TO USE LIQUID-TIGHT NON-METALLIC CONDUIT. ALL CONDUIT TO BE 1" UON.
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.
5. ALL ITEMS SHOWN IN HEAVY LINEWEIGHT ARE TO BE REMOVED, NEW OR MODIFIED AS NOTED. ALL ITEMS IN SHADED ARE EXISTING TO REMAIN.

KEYED NOTES

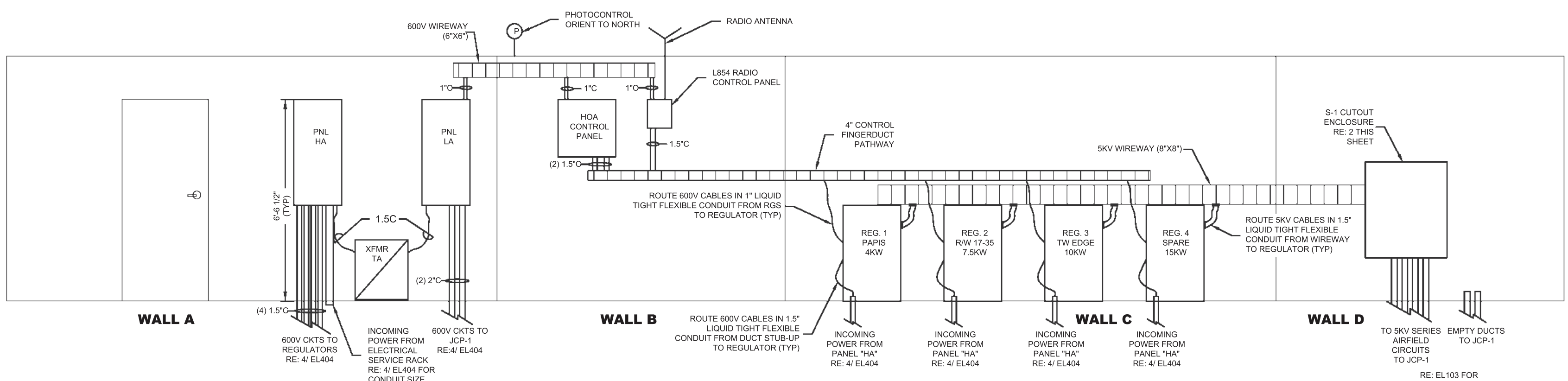
1. INSTALL NEW 4 KW, 480V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.
2. INSTALL NEW 7.5 KW, 480V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.
3. INSTALL NEW 10 KW, 480V, 3-STEP, FERRORESONANT TYPE L-829 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.
4. INSTALL SALVAGED 10 KW, 480V, 3-STEP, FERRORESONANT TYPE L-828 REGULATOR. INSTALL ASSOCIATED 5KV CABLES, 600V CABLES, CONTROL CABLES, AND PATHWAYS FOR CONNECTIVITY.



1 EL403 PROPOSED VAULT PLAN
SCALE: 1" = 24'



2 EL403 S-1 CUT OUT ENCLOSURE DETAIL
SCALE: N.T.S.



3 EL403 VAULT PLAN - WALL ELEVATION
SCALE: N.T.S.

MARK	REVISION	DATE
2	ADDENDUM 2	10/08/25

SHEET NAME: ELECTRICAL VAULT PLAN

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

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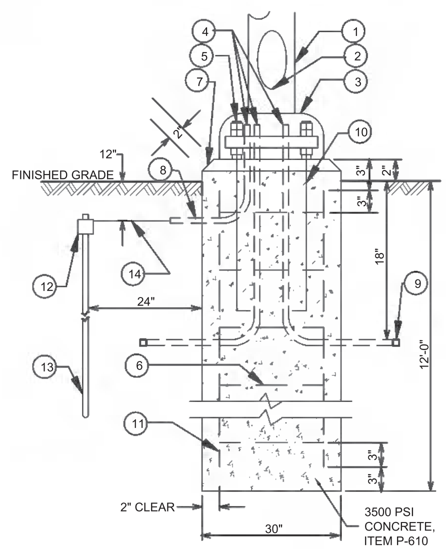
STATE OF TEXAS
R. COLE FERGUSON
150146
LICENSED
PROFESSIONAL ENGINEER
10/08/25

SEAL:
TBPE Firm Registration No. F-6864

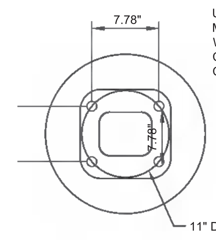
SHEET NO.
EL403



1 EL510 **BEACON POLE FOUNDATION DETAIL**
SCALE: N.T.S.

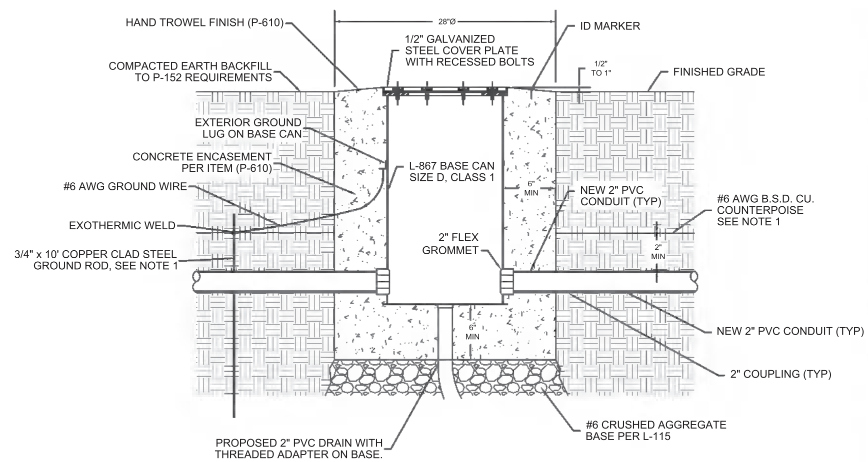
POLE BASE NOTES:

1. BEACON POLE. RE: SHEET EL508 FOR DETAILS.
2. WIRING ACCESS. PROVIDE INTERIOR GROUNDING LUG ACCESSIBLE FROM OPENING. PROVIDE STAINLESS STEEL COVER WITH STAINLESS STEEL SCREWS.
3. FULL BASE COVER: MATCH MATERIAL OF POLE, EXCEPT WHERE POLE IS CONCRETE, BASE COVER SHALL BE STAINLESS STEEL.
4. CONNECT CONDUITS TO GROUNDING LUG AND GROUNDING CONDUCTOR TO GROUND ROD.
5. PROVIDE BOTTOM NUT FOR LEVELING AND DOUBLE NUTS ON TOP.
6. NO. 4 STEEL REINFORCING TIES ON 12" CENTERS.
7. CHAMFER EDGES ON BASE.
8. 1" RIGID GALVANIZED CONDUIT.
9. RIGID GALVANIZED STEEL CONDUIT 12" PAST EDGE OF CONCRETE BASE. PROVIDE CONDUIT TO PVC DUCT ADAPTER. SEE PLANS FOR NUMBER REQUIRED.
10. GALVANIZED STEEL ANCHOR BOLTS, AS REQUIRED BY MANUFACTURER FURNISHING POLE. ANCHOR BOLTS SHALL BE SET VERTICAL.
11. EIGHT NO. 4 STEEL REINFORCING RODS.
12. THERMOWELD CONNECTOR.
13. 3/4" X 10'-0" COPPER CLAD GROUND ROD.
14. NO. 6 BARE STRANDED COPPER CLAD GROUND WIRE. CONNECT TO GROUND ROD, CONDUITS AND GROUNDING LUG.



USE APPROPRIATE MOUNTING BOLT PATTERN WITH TEMPLATE TO ENSURE CORRECT PLACEMENT IN CONCRETE.

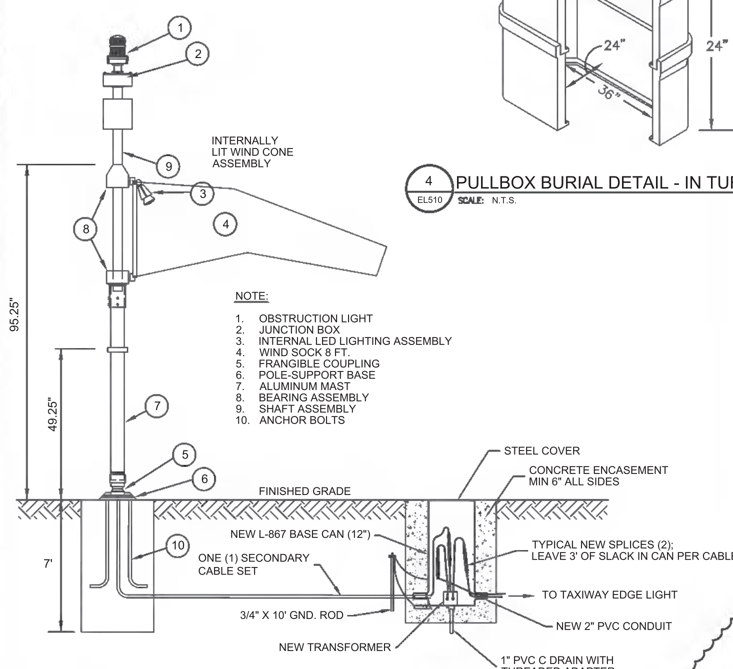
BASE MOUNTING DETAIL



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.

2 EL510 **L-867D PULLCAN IN TURF**
SCALE: N.T.S.



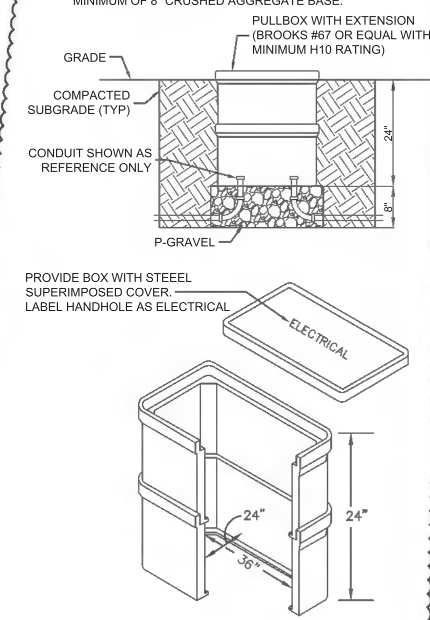
NOTE:

1. OBSTRUCTION LIGHT
2. JUNCTION BOX
3. INTERNAL LED LIGHTING ASSEMBLY
4. WIND SOCK 8 FT.
5. FRANGIBLE COUPLING
6. POLE-SUPPORT BASE
7. ALUMINUM MAST
8. BEARING ASSEMBLY
9. SHAFT ASSEMBLY
10. ANCHOR BOLTS

3 EL510 **L-806 SUPPLEMENTAL WINDCONE (LED)**
SCALE: N.T.S.

GENERAL PULLBOX NOTES

1. ALL STRUCTURES SHALL BE PLACE ON A MINIMUM OF 8" CRUSHED AGGREGATE BASE.



4 EL510 **PULLBOX BURIAL DETAIL - IN TURF**
SCALE: N.T.S.

MARK	REVISION	DATE
2	ADDENDUM 2	10/08/25

SHEET NAME: AIRFIELD ELECTRICAL DETAILS

PROJECT NAME: TEXAS GULF COAST REGIONAL AIRPORT TAXIWAY REHABILITATION AND ELECTRICAL IMPROVEMENTS BRAZORIA COUNTY, TEXAS

DRAWN BY: ALC
DESIGNED BY: ALC
LATEST REVISION: 10/08/2025
KSA JOB NO.: 103006

Ferguson Consulting
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STATE OF TEXAS
R. COLE FERGUSON
150146
LICENSED
PROFESSIONAL ENGINEER
10/08/25

SEAL:
TBPE Firm Registration No. F-6864

SHEET NO.
EL510

103006 ~ TEXAS GULF COAST REGIONAL AIRPORT ~ TAXIWAY PAVEMENT AND ELECTRICAL IMPROVEMENTS ~ ANGLETON, TEXAS (BRAZORIA COUNTY)

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Item P-101 Preparation/Removal of Existing Pavements

DESCRIPTION

101-1 This item shall consist of preparation of existing pavement surfaces for overlay, surface treatments, removal of existing pavement, and other miscellaneous items. The work shall be accomplished in accordance with these specifications and the applicable plans.

EQUIPMENT AND MATERIALS

101-2 All equipment and materials shall be specified here and in the following paragraphs or approved by the Engineer ~~Resident Project Representative (RPR)~~. The equipment shall not cause damage to the pavement to remain in place.

CONSTRUCTION

101-3.1 Removal of existing pavement.

The Contractor's removal operation shall be controlled to not damage adjacent pavement structure, and base material, cables, utility ducts, pipelines, or drainage structures which are to remain under the pavement.

a. Concrete pavement removal. Full depth saw cuts shall be made perpendicular to the slab surface. The Contractor shall saw through the full depth of the slab including any dowels at the joint, removing the pavement and installing new dowels as shown on the plans and per the specifications. Where the perimeter of the removal limits is not located on the joint and there are no dowels present, the perimeter shall be saw cut the full depth of the pavement. The pavement inside the saw cut shall be removed by methods which will not cause distress in the pavement which is to remain in place. If the material is to be wasted on the airport site, it shall be reduced to a maximum size of **[2"]**. Concrete slabs that are damaged by under breaking shall be repaired or removed and replaced as directed by the Engineer ~~RPR~~.

The edge of existing concrete pavement against which new pavement abuts shall be protected from damage at all times. Spall and underbreak repair shall be in accordance with the plans. Any ~~underlaying~~ underlying material that is to remain in place, shall be recompacted and/or replaced as shown on the plans. Adjacent areas damaged during repair shall be repaired or replaced at the Contractor's expense.

b. Asphalt pavement removal – NOT USED

c. Repair or removal of Base, Subbase, and/or Subgrade. All failed material including surface, base course, subbase course, and subgrade shall be removed and repaired as shown on the plans or as directed by the Engineer ~~RPR~~. Materials and methods of construction shall comply with the applicable sections of these specifications. Any damage caused by Contractor's removal process shall be repaired at the Contractor's expense.

101-3.2 Preparation of joints and cracks prior to overlay/surface treatment – Remove all vegetation and debris from cracks to a minimum depth of 1 inch (25 mm). If extensive vegetation exists, treat the specific area with a concentrated solution of a water-based herbicide approved by the Engineer ~~RPR~~. Fill all cracks greater than 1/4 inch (6 mm) wide) with a crack sealant **[** per ASTM D6690 **]**. The crack sealant, preparation, and application shall be compatible with the surface treatment/overlay to be used. To minimize contamination of the asphalt with the crack sealant, underfill the crack sealant a minimum of 1/8

inch (3 mm), not to exceed ¼ inch (6 mm). Any excess joint or crack sealer shall be removed from the pavement surface.

101-3.3 Removal of Foreign Substances/contaminates prior to [overlay or remarking]. Removal of foreign substances/contaminates from existing pavement that will affect the bond of the new treatment shall consist of removal of rubber, fuel spills, oil, crack sealer, at least 90% of paint, and other foreign substances from the surface of the pavement. Areas that require removal are designated on the plans and as directed by the Engineer ~~RPR~~ in the field during construction.

[high-pressure water **],[** rotary grinding **], or [** sandblasting **]** may be used. If chemicals are used, they shall comply with the state's environmental protection regulations. Removal methods used shall not cause major damage to the pavement, or to any structure or utility within or adjacent to the work area. Major damage is defined as changing the properties of the pavement, removal of asphalt causing the aggregate to ravel, or removing pavement over 1/8 inch (3 mm) deep. If it is deemed by the Engineer ~~RPR~~ that damage to the existing pavement is caused by operational error, such as permitting the application method to dwell in one location for too long, the Contractor shall repair the damaged area without compensation and as directed by the Engineer ~~RPR~~.

Removal of foreign substances shall not proceed until approved by the Engineer ~~RPR~~. Water used for high-pressure water equipment shall be provided by the Contractor at the Contractor's expense. No material shall be deposited on the pavement shoulders. All wastes shall be disposed of in areas indicated in this specification or shown on the plans.

Removal of foreign substances/contaminates for areas of pavement that have been milled and will be overlaid will not be paid for directly but shall be subsidiary to the pay items associated with milling or overlay. The only direct pay item associated with removal of foreign substances/contaminates relates to the removal of rubber from the runway pavement in areas that will be remarked.

101-3.4 Concrete spall or failed asphaltic concrete pavement repair.

a. Repair of concrete spalls in areas to be overlaid with asphalt. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the Engineer ~~RPR~~. The perimeter of the repair shall be saw cut a minimum of 2 inches (50 mm) outside the affected area and 2 inches (50 mm) deep. The deteriorated material shall be removed to a depth where the existing material is firm or cannot be easily removed with a geologist pick. The removed area shall be filled with asphalt mixture with aggregate sized appropriately for the depth of the patch. The material shall be compacted with equipment approved by the Engineer ~~RPR~~ until the material is dense and no movement or marks are visible. The material shall not be placed in lifts over 4 inches (100 mm) in depth. This method of repair applies only to pavement to be overlaid.

b. Asphalt pavement repair. The Contractor shall repair all spalled concrete as shown on the plans or as directed by the Engineer ~~RPR~~. The failed areas shall be removed as specified in paragraph 101-3.1b. All failed material including surface, base course, subbase course, and subgrade shall be removed. Materials and methods of construction shall comply with the applicable sections of these specifications.

101-3.5 Cold milling. Milling shall be performed with a power-operated milling machine or grinder, capable of producing a uniform finished surface. The milling machine or grinder shall operate without tearing or gouging the ~~underlaying~~ underlying surface. The milling machine or grinder shall be equipped with grade and slope controls, and a positive means of dust control. All millings shall be removed and disposed **[** off Airport property **]**. If the Contractor mills or grinds deeper or wider than the plans specify, the Contractor shall replace the material removed with new material at the Contractor's Expense.

a. Patching. The milling machine shall be capable of cutting a vertical edge without chipping or spalling the edges of the remaining pavement and it shall have a positive method of controlling the depth

of cut. ~~The RPR shall layout the area to be milled with a straightedge in increments of 1-foot (30 cm) widths.~~ The area to be milled shall cover only the failed area. Any excessive area that is milled because the Contractor doesn't have the appropriate milling machine, or areas that are damaged because of his negligence, shall be repaired by the Contractor at the Contractor's Expense.

b. Profiling, grade correction, or surface correction. The milling machine shall have a minimum width of **[** 7 **]** feet (**[** 2 **]** m) and it shall be equipped with electronic grade control devices that will cut the surface to the grade specified. The tolerances shall be maintained within +0 inch and -1/4 inch (+0 mm and -6mm) of the specified grade. The machine must cut vertical edges and have a positive method of dust control. The machine must have the ability to **[** remove the millings or cuttings from the pavement and load them into a truck **]**. All millings shall be removed and disposed of **[** off the airport **]**.

c. Clean-up. The Contractor shall sweep the milled surface daily and immediately after the milling until all residual materials are removed from the pavement surface. Prior to paving, the Contractor shall wet down the milled pavement and thoroughly sweep and/or blow the surface to remove loose residual material. Waste materials shall be collected and removed from the pavement surface and adjacent areas by sweeping or vacuuming. Waste materials shall be removed and disposed **[** off Airport property **]**.

101-3.6. Preparation of asphalt pavement surfaces prior to surface treatment. Existing asphalt pavements to be treated with a surface treatment shall be prepared as follows:

a. Patch asphalt pavement surfaces that have been softened by petroleum derivatives or have failed due to any other cause. Remove damaged pavement to the full depth of the damage and replace with new asphalt pavement similar to that of the existing pavement in accordance with paragraph 101-3.4b.

b. Repair joints and cracks in accordance with paragraph 101-3.2.

c. Remove oil or grease that has not penetrated the asphalt pavement by scrubbing with a detergent and washing thoroughly with clean water. After cleaning, treat these areas with an oil spot primer.

d. Clean pavement surface immediately prior to placing the surface treatment so that it is free of dust, dirt, grease, vegetation, oil or any type of objectionable surface film.

101-3.7 Maintenance. The Contractor shall perform all maintenance work necessary to keep the pavement in a satisfactory condition until the full section is complete and accepted by the Engineer ~~RPR~~. The surface shall be kept clean and free from foreign material. The pavement shall be properly drained at all times. If cleaning is necessary or if the pavement becomes disturbed, any work repairs necessary shall be performed at the Contractor's expense.

101-3.8 Preparation of Joints in Rigid Pavement prior to resealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the Engineer and RPR that the method used cleans the joint and does not damage the joint.

101-3.8.1 Removal of Existing Joint Sealant. All existing joint sealants will be removed by plowing or use of hand tools. Any remaining sealant and or debris will be removed by use of wire brushes or other tools as necessary. Resaw joints removing no more than 1/16 inch (2 mm) from each joint face. Immediately after sawing, flush out joint with water and other tools as necessary to completely remove the slurry.

101-3.8.2 Cleaning prior to sealing. Immediately before sealing, joints shall be cleaned by removing any remaining laitance and other foreign material. Allow sufficient time to dry out joints prior to sealing. Joint surfaces will be surface-dry prior to installation of sealant.

101-3.8.3 Joint sealant. Joint material and installation will be in accordance with **[** Item P-605 **]**.

101-3.9 Preparation of Cracks in Flexible Pavement prior to sealing. Prior to application of sealant material, clean and dry the joints of all scale, dirt, dust, old sealant, curing compound, moisture and other foreign matter. The Contractor shall demonstrate, in the presence of the Engineer and RPR that the method used cleans the cracks and does not damage the pavement.

101-3.9.1 Preparation of Crack. Widen crack with **[** router **] or [** random crack saw **]** by removing a minimum of 1/16 inch (2 mm) from each side of crack. Immediately before sealing, cracks will be blown out with a hot air lance combined with oil and water-free compressed air.

101-3.9.2 Removal of Existing Crack Sealant. Existing sealants will be removed by **[** routing **] or [** random crack saw **]**. Following **[** routing **]or [** sawing **]** any remaining debris will be removed by use of a hot lance combined with oil and water-free compressed air.

101-3.9.3 Crack Sealant. Crack sealant material and installation will be in accordance with **[** Item P-605 **]**.

101-3.9.4 Removal of Pipe and other Buried Structures.

a. Removal of Existing Pipe Material. [Remove the types of pipe as indicated on the plans. The pipe material shall be legally disposed of off-site in a timely manner following removal. Trenches shall be backfilled with material equal to or better in quality than adjacent embankment. Trenches under paved areas must be compacted to **[** 95% **]** of ASTM **[** D1557 **].**

b. Removal of Inlets/Manholes. [Where indicated on the plans or as directed by the Engineer ~~RPR~~, inlets and/or manholes shall be removed and legally disposed of off-site in a timely fashion after removal. Excavations after removal shall be backfilled with material equal or better in quality than adjacent embankment. When under paved areas must be compacted to **[** 95% **]** of ASTM **[** D1557 **]**, when outside of paved areas must be compacted to **[** 95% **]** of ASTM D698.

METHOD OF MEASUREMENT

101-4.1 Pavement removal. The unit of measurement for pavement removal shall be the number of square yards (square meters) removed by the Contractor. Any pavement removed outside the limits of removal because the pavement was damaged by negligence on the part of the Contractor shall not be included in the measurement for payment. No direct measurement or payment shall be made for saw cutting. Saw cutting shall be incidental to pavement removal. Dowel bar installation shall be incidental to pavement removal.

101-4.2 Joint and crack repair. The unit of measurement for joint and crack repair shall be the linear foot (meter) of joint.

101-4.3 Removal of Rubber. The unit of measurement for rubber removal shall be the square foot (meter). **Removal of foreign substances/contaminates for areas of pavement that have been milled and will be overlaid will not be paid for directly but shall be subsidiary to the pay items associated with milling or overlay. The only direct pay item associated with removal of foreign substances/contaminates relates to the removal of rubber from the runway pavement in areas that will be remarked. The removal of all other foreign substances/contaminates that are required will not be paid for directly but will be subsidiary to the item requiring it.**

101-4.6 Cold milling. The unit of measure for cold milling shall be **[1.5 – 2.0]** inches of milling per square yard (square meter). The location and average depth of the cold milling shall be as shown on the plans. If the initial cut

does not correct the condition, the Contractor shall re-mill the area and will be paid for the total depth of milling.

101-4.7 Removal of Pipe and other Buried Structures. The unit of measurement for removal of pipe and other buried structures will be **[** made at the contract unit price for each completed and accepted item. This price shall be full compensation for all labor, equipment, tools, and incidentals necessary to complete this item in accordance with paragraph 101-3.9.4.

BASIS OF PAYMENT

101-5.1 Payment. Payment shall be made at contract unit price for the unit of measurement as specified above. This price shall be full compensation for furnishing all materials and for all preparation, hauling, and placing of the material and for all labor, equipment, tools, and incidentals necessary to complete this item.

Item P-101-5.1 Asphalt Pavement Removal (Full Depth)	per square yard
Item P-101-5.2 Concrete Pavement Removal (Full Depth)	per square yard
Item P-101-5.3 2.5” Asphalt Surface Course Removal	per square yard
Item P-101-5.4 1.5” Crushed Aggregate Base Course Removal	per square yard
Item P-101-5.5 Crack Repair	per linear foot
Item P-101-5.6 1.5” – 2.0” Cold Milling	per square yard
Item P-101-5.7 24” RCP SET Removal	per each
Item P-101-5.8 SET Removal for 2 - 30” RCP	per each
Item P-101-5.9 42” RCP SET Removal	per each
Item P-101-5.10 30” RCP Removal	per linear foot
Item P-101-5.11 Storm Sewer Junction Box Removal	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 150/5380-6	Guidelines and Procedures for Maintenance of Airport Pavements.

ASTM International (ASTM)

ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements

END OF ITEM P-101

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Item P-152 Excavation, Subgrade, and Embankment

DESCRIPTION

152-1.1 This item covers excavation, disposal, placement, and compaction of all materials within the limits of the work required to construct safety areas, runways, taxiways, aprons, and intermediate areas as well as other areas for drainage, building construction, parking, or other purposes in accordance with these specifications and in conformity to the dimensions and typical sections shown on the plans.

152-1.2 Classification. All material excavated shall be classified as defined below:

a. Unclassified excavation. Unclassified excavation shall consist of the excavation and disposal of all material, regardless of its nature.

152-1.3 Unsuitable excavation. Unsuitable material shall be disposed in designated waste areas as shown on the plans. Materials containing vegetable or organic matter, such as muck, peat, organic silt, or sod shall be considered unsuitable for use in embankment construction. Material suitable for topsoil may be used on the embankment slope when approved by the Engineer ~~RPR~~.

CONSTRUCTION METHODS

152-2.1 General. Before beginning excavation, grading, and embankment operations in any area, the area shall be cleared or cleared and grubbed in accordance with Item P-151.

The suitability of material to be placed in embankments shall be subject to approval by the Engineer ~~RPR~~. All unsuitable material shall be disposed of in waste areas as shown on the plans. All waste areas shall be graded to allow positive drainage of the area and adjacent areas. The surface elevation of waste areas shall be specified on the plans or approved by the Engineer ~~RPR~~.

When the Contractor's excavating operations encounter artifacts of historical or archaeological significance, the operations shall be temporarily discontinued and the Engineer and RPR notified per Section 70, paragraph 70-20. At the direction of the Engineer ~~RPR~~, the Contractor shall excavate the site in such a manner as to preserve the artifacts encountered and allow for their removal. Such excavation will be paid for as extra work.

Areas outside the limits of the pavement areas where the top layer of soil has become compacted by hauling or other Contractor activities shall be scarified and disked to a depth of 4 inches (100 mm), to loosen and pulverize the soil. Stones or rock fragments larger than 4 inches (100 mm) in their greatest dimension will not be permitted in the top 6 inches (150 mm) of the subgrade.

If it is necessary to interrupt existing surface drainage, sewers or under-drainage, conduits, utilities, or similar underground structures, the Contractor shall be responsible for and shall take all necessary precautions to preserve them or provide temporary services. When such facilities are encountered, the Contractor shall notify the Engineer and RPR, who shall arrange for their removal if necessary. The Contractor, at their own expense, shall satisfactorily repair or pay the cost of all damage to such facilities or structures that may result from any of the Contractor's operations during the period of the contract.

a. Blasting. [Blasting shall not be allowed.]

152-2.2 Excavation. No excavation shall be started until the work has been staked out by the Contractor and the Engineer ~~RPR~~ has obtained from the Contractor, the survey notes of the elevations and measurements of the ground surface. The Contractor and Engineer ~~RPR~~ shall agree that the original ground lines shown on the original topographic mapping are accurate, or agree to any adjustments made to the original ground lines.

[Volumetric quantities were calculated by comparing DTM files of the applicable design surfaces and generating Triangle Volume Reports. Electronic copies of DTM files and a paper copy of the original topographic map will be issued to the successful bidder. **]**

All areas to be excavated shall be stripped of vegetation and topsoil. Topsoil shall be stockpiled for future use in areas designated on the plans or by the Engineer ~~RPR~~. All suitable excavated material shall be used in the formation of embankment, subgrade, or other purposes as shown on the plans. All unsuitable material shall be disposed of as shown on the plans.

The grade shall be maintained so that the surface is well drained at all times.

When the volume of the excavation exceeds that required to construct the embankments to the grades as indicated on the plans, the excess shall be used to grade the areas of ultimate development or disposed as directed by the Engineer ~~RPR~~. When the volume of excavation is not sufficient for constructing the embankments to the grades indicated, the deficiency shall be obtained from borrow areas.

a. Selective grading. When selective grading is indicated on the plans, the more suitable material designated by the Engineer ~~RPR~~ shall be used in constructing the embankment or in capping the pavement subgrade. If, at the time of excavation, it is not possible to place this material in its final location, it shall be stockpiled in approved areas until it can be placed. The more suitable material shall then be placed and compacted as specified. Selective grading shall be considered incidental to the work involved. The cost of stockpiling and placing the material shall be included in the various pay items of work involved.

b. Undercutting. Rock, shale, hardpan, loose rock, boulders, or other material unsatisfactory for safety areas, subgrades, roads, shoulders, or any areas intended for turf shall be excavated to a minimum depth of 12 inches (300 mm) below the subgrade or to the depth specified by the Engineer ~~RPR~~. Muck, peat, matted roots, or other yielding material, unsatisfactory for subgrade foundation, shall be removed to the depth specified. Unsuitable materials shall be **[** disposed off the airport. The cost is incidental to this item. **]** This excavated material shall be paid for at the contract unit price per cubic yard (per cubic meter) for **[** unclassified excavation **]**. The excavated area shall be backfilled with suitable material obtained from the grading operations or borrow areas and compacted to specified densities. The necessary backfill will constitute a part of the embankment. Where rock cuts are made, backfill with select material. Any pockets created in the rock surface shall be drained in accordance with the details shown on the plans. Undercutting will be paid as **[** unclassified excavation **]**.

c. Over-break. Over-break, including slides, is that portion of any material displaced or loosened beyond the finished work as planned or authorized by the Engineer ~~RPR~~. All over-break shall be graded or removed by the Contractor and disposed of as directed by the Engineer ~~RPR~~. The Engineer ~~RPR~~ shall determine if the displacement of such material was unavoidable and their own decision shall be final. Payment will not be made for the removal and disposal of over-break that the Engineer ~~RPR~~ determines as avoidable. Unavoidable over-break will be classified as "Unclassified Excavation."

d. Removal of utilities. The removal of existing structures and utilities required to permit the orderly progress of work will be accomplished **[** by the Contractor as indicated on the plans **]**. All existing foundations shall be excavated at least 2 feet (60 cm) below the top of subgrade or as indicated on the plans, and the material disposed of as directed by the Engineer ~~RPR~~. All foundations thus excavated shall be backfilled with suitable material and compacted as specified for embankment or as shown on the plans.

152-2.3 Borrow excavation. [There are no borrow sources within the boundaries of the airport property. The Contractor shall locate and obtain borrow sources, subject to the approval of the Engineer ~~RPR~~. The Contractor shall notify the Engineer and RPR at least [15] days prior to beginning the excavation so necessary measurements and tests can be made by the Engineer and RPR. All borrow pits shall be opened to expose the various strata of acceptable material to allow obtaining a uniform product. Borrow areas shall be drained and left in a neat, presentable condition with all slopes dressed uniformly. Borrow areas shall not create a hazardous wildlife attractant. Borrow material shall be of similar soil type as insitu material, a PI lower than 40, and be free of debris or organics]

152-2.4 Drainage excavation. Drainage excavation shall consist of excavating drainage ditches including intercepting, inlet, or outlet ditches; or other types as shown on the plans. The work shall be performed in sequence with the other construction. Ditches shall be constructed prior to starting adjacent excavation operations. All satisfactory material shall be placed in embankment fills; unsuitable material shall be placed in designated waste areas or as directed by the Engineer ~~RPR~~. All necessary work shall be performed true to final line, elevation, and cross-section. The Contractor shall maintain ditches constructed on the project to the required cross-section and shall keep them free of debris or obstructions until the project is accepted.

152-2.5 Preparation of cut areas or areas where existing pavement has been removed. In those areas on which a subbase or base course is to be placed, the top [12 inches (300 mm)] of subgrade shall be compacted to not less than [100 %] of maximum density for non-cohesive soils, and [95%] of maximum density for cohesive soils as determined by ASTM [D1557]. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

152-2.6 Preparation of embankment area. All sod and vegetative matter shall be removed from the surface upon which the embankment is to be placed. The cleared surface shall be broken up by plowing or scarifying to a minimum depth of 6 inches (150 mm) and shall then be compacted per paragraph 152-2.10.

Sloped surfaces steeper than one (1) vertical to four (4) horizontal shall be plowed, stepped, benched, or broken up so that the fill material will bond with the existing material. When the subgrade is part fill and part excavation or natural ground, the excavated or natural ground portion shall be scarified to a depth of 12 inches (300 mm) and compacted as specified for the adjacent fill.

No direct payment shall be made for the work performed under this section. The necessary clearing and grubbing and the quantity of excavation removed will be paid for under the respective items of work.

152-2.7 Control Strip. The first half-day of construction of subgrade and/or embankment shall be considered as a control strip for the Contractor to demonstrate, in the presence of the Engineer and RPR, that the materials, equipment, and construction processes meet the requirements of this specification. The sequence and manner of rolling necessary to obtain specified density requirements shall be determined. The maximum compacted thickness may be increased to a maximum of 12 inches (300 mm) upon the Contractor's demonstration that approved equipment and operations will uniformly compact the lift to the specified density. The Engineer and RPR must witness this demonstration and approve the lift thickness prior to full production.

Control strips that do not meet specification requirements shall be reworked, re-compacted, or removed and replaced at the Contractor's expense. Full operations shall not begin until the control strip has been accepted by the Engineer ~~RPR~~. The Contractor shall use the same equipment, materials, and construction methods for the remainder of construction, unless adjustments made by the Contractor are approved in advance by the Engineer ~~RPR~~.

152-2.8 Formation of embankments. The material shall be constructed in lifts as established in the control strip, but not less than 6 inches (150 mm) nor more than 12 inches (300 mm) of compacted thickness.

When more than one lift is required to establish the layer thickness shown on the plans, the construction procedure described here shall apply to each lift. No lift shall be covered by subsequent lifts until tests verify that compaction requirements have been met. The Contractor shall rework, re-compact and retest any material placed which does not meet the specifications.

The lifts shall be placed, to produce a soil structure as shown on the typical cross-section or as directed by the Engineer ~~RPR~~. Materials such as brush, hedge, roots, stumps, grass and other organic matter, shall not be incorporated or buried in the embankment.

Earthwork operations shall be suspended at any time when satisfactory results cannot be obtained due to rain, freezing, or other unsatisfactory weather conditions in the field. Frozen material shall not be placed in the embankment nor shall embankment be placed upon frozen material. Material shall not be placed on surfaces that are muddy, frozen, or contain frost. The Contractor shall drag, blade, or slope the embankment to provide surface drainage at all times.

The material in each lift shall be within ±2% of optimum moisture content before rolling to obtain the prescribed compaction. The material shall be moistened or aerated as necessary to achieve a uniform moisture content throughout the lift. Natural drying may be accelerated by blending in dry material or manipulation alone to increase the rate of evaporation.

The Contractor shall make the necessary corrections and adjustments in methods, materials or moisture content to achieve the specified embankment density.

The [Engineer] will take samples of excavated materials which will be used in embankment for testing and develop a Moisture-Density Relations of Soils Report (Proctor) in accordance with ASTM **[** D 1557 **] for the purposes of acceptance testing**. A new Proctor shall be developed for each soil type based on visual classification.

Density tests for acceptance testing will be taken by the [Engineer] for every **[** 1,000 **]** square yards of compacted embankment for each lift which is required to be compacted, or other appropriate frequencies as determined by the Engineer ~~RPR~~.

If the material has greater than 30% retained on the 3/4-inch (19.0 mm) sieve, follow AASHTO T-180 Annex Correction of maximum dry density and optimum moisture for oversized particles.

Rolling operations shall be continued until the embankment is compacted to not less than **[** 100% **]** of maximum density for non-cohesive soils, and **[** 95% **]** of maximum density for cohesive soils as determined by ASTM **[** D1557 **]**. Under all areas to be paved, the embankments shall be compacted to a depth of **[** 8" **]** and to a density of not less than **[** 100% **]** percent of the maximum density as determined by ASTM **[** D1557 **]**. As used in this specification, "non-cohesive" shall mean those soils having a plasticity index (PI) of less than 3 as determined by ASTM D4318.

On all areas outside of the pavement areas, no compaction will be required on the top **[** 4 inches (100 mm) **]** which shall be prepared for a seedbed in accordance with **[** Item T-901 **].**

The in-place field density shall be determined in accordance with [ASTM 6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in accordance with ASTM D6938.]. The [Engineer shall perform all density tests associated with acceptance testing]. If the specified density is not attained, the area represented by the test or as designated by the Engineer ~~RPR~~ shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

Compaction areas shall be kept separate, and no lift shall be covered by another lift until the proper density is obtained.

During construction of the embankment, the Contractor shall route all construction equipment evenly over the entire width of the embankment as each lift is placed. Lift placement shall begin in the deepest portion of the embankment fill. As placement progresses, the lifts shall be constructed approximately parallel to the finished pavement grade line.

When rock, concrete pavement, asphalt pavement, and other embankment material are excavated at approximately the same time as the subgrade, the material shall be incorporated into the outer portion of the embankment and the subgrade material shall be incorporated under the future paved areas. Stones, fragmentary rock, and recycled pavement larger than 4 inches (100 mm) in their greatest dimensions will not be allowed in the top 12 inches (300 mm) of the subgrade. Rockfill shall be brought up in lifts as specified or as directed by the Engineer ~~RPR~~ and the finer material shall be used to fill the voids forming a dense, compact mass. Rock, cement concrete pavement, asphalt pavement, and other embankment material shall not be disposed of except at places and in the manner designated on the plans or by the Engineer ~~RPR~~.

When the excavated material consists predominantly of rock fragments of such size that the material cannot be placed in lifts of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment as directed in lifts not exceeding 2 feet (60 cm) in thickness. Each lift shall be leveled and smoothed with suitable equipment by distribution of spalls and finer fragments of rock. The lift shall not be constructed above an elevation 4 feet (1.2 m) below the finished subgrade.

[There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items.]

152-2.9 Proof rolling. Proof rolling is not required on all projects. The purpose of proof rolling the subgrade is to identify any weak areas in the subgrade and not for compaction of the subgrade. **[** After compaction is completed, **]** the subgrade area shall be proof rolled with a **[[** 20 ton (18.1 metric ton) **] [[** 20 **]** ton Proof Roller with tires spaced not more than 32 inches (0.8 m) on-center with tires inflated to **[** 100/125/150 psi (0.689 MPa/0.861 MPa/1.034 MPa) **]]** in the presence of the Engineer and RPR. Apply a minimum of **[** 3 **]** coverages, or as specified by the Engineer ~~RPR~~, under pavement areas. A coverage is defined as the application of one tire print over the designated area. Soft areas of subgrade that deflect more than 1 inch (25 mm) or show permanent deformation greater than 1 inch (25 mm) shall be removed and replaced with suitable material or reworked to conform to the moisture content and compaction requirements in accordance with these specifications. Removal and replacement of soft areas is incidental to this item.

152-2.10 Compaction requirements. The subgrade under areas to be paved shall be compacted to a depth of **[** 12 inches (300 mm) **]** and to a density of not less than **[** 100 **]** percent of the maximum dry density as determined by ASTM **[** D1557 **].** The subgrade in areas outside the limits of the pavement areas shall be compacted to a depth of **[** 12 inches (300 mm) **]** and to a density of not less than **[** 95 **]** percent of the maximum density as determined by ASTM **[** D698 **].**

The material to be compacted shall be within ±2% of optimum moisture content before being rolled to obtain the prescribed compaction (except for expansive soils). When the material has greater than 30 percent retained on the ¾ inch (19.0 mm) sieve, follow the **[** methods in **[** ASTM D1557 **]** Tests for moisture content and compaction will be taken at a minimum of **[** 1,000 **]** S.Y. of subgrade. All quality assurance testing shall be done by **[** the Engineer. **]**

The in-place field density shall be determined in accordance with **[** ASTM D6938 using Procedure A, the direct transmission method, and ASTM D6938 shall be used to determine the moisture content of the material. The machine shall be calibrated in

accordance with ASTM D6938 within 12 months prior to its use on this contract. The gage shall be field standardized daily.]

Maximum density refers to maximum dry density at optimum moisture content unless otherwise specified.

If the specified density is not attained, the entire lot shall be reworked and/or re-compacted and additional random tests made. This procedure shall be followed until the specified density is reached.

All cut-and-fill slopes shall be uniformly dressed to the slope, cross-section, and alignment shown on the plans or as directed by the Engineer ~~RPR~~ and the finished subgrade shall be maintained.

152-2.11 Finishing and protection of subgrade. Finishing and protection of the subgrade is incidental to this item. Grading and compacting of the subgrade shall be performed so that it will drain readily. All low areas, holes or depressions in the subgrade shall be brought to grade. Scarifying, blading, rolling and other methods shall be performed to provide a thoroughly compacted subgrade shaped to the lines and grades shown on the plans. All ruts or rough places that develop in the completed subgrade shall be graded, re-compacted, and retested. The Contractor shall protect the subgrade from damage and limit hauling over the finished subgrade to only traffic essential for construction purposes.

The Contractor shall maintain the completed course in satisfactory condition throughout placement of subsequent layers. No subbase, base, or surface course shall be placed on the subgrade until the subgrade has been accepted by the Engineer ~~RPR~~.

152-2.12 Haul. All hauling will be considered a necessary and incidental part of the work. The Contractor shall include the cost in the contract unit price for the pay of items of work involved. No payment will be made separately or directly for hauling on any part of the work.

The Contractor's equipment shall not cause damage to any excavated surface, compacted lift or to the subgrade as a result of hauling operations. Any damage caused as a result of the Contractor's hauling operations shall be repaired at the Contractor's expense.

The Contractor shall be responsible for providing, maintaining and removing any haul roads or routes within or outside of the work area, and shall return the affected areas to their former condition, unless otherwise authorized in writing by the Owner. No separate payment will be made for any work or materials associated with providing, maintaining and removing haul roads or routes.

152-2.13 Surface Tolerances. In those areas on which a subbase or base course is to be placed, the surface shall be tested for smoothness and accuracy of grade and crown. Any portion lacking the required smoothness or failing in accuracy of grade or crown shall be scarified to a depth of at least 3 inches (75 mm), reshaped and re-compacted to grade until the required smoothness and accuracy are obtained and approved by the Engineer ~~RPR~~. The Contractor shall perform all final smoothness and grade checks in the presence of the Engineer and RPR. Any deviation in surface tolerances shall be corrected by the Contractor at the Contractor's expense.

a. Smoothness. The finished surface shall not vary more than +/- ½ inch (12 mm) when tested with a 12-foot (3.7-m) straightedge applied parallel with and at right angles to the centerline. The straightedge shall be moved continuously forward at half the length of the 12-foot (3.7-m) straightedge for the full length of each line on a 50-foot (15-m) grid.

b. Grade. The grade and crown shall be measured on a 50-foot (15-m) grid and shall be within +/- 0.05 feet (15 mm) of the specified grade.

On safety areas, turfed areas and other designated areas within the grading limits where no subbase or base is to placed, grade shall not vary more than 0.10 feet (30 mm) from specified grade. Any deviation in excess of this amount shall be corrected by loosening, adding or removing materials, and reshaping.

152-2.14 Topsoil. When topsoil is specified or required as shown on the plans or under Item T-905, it shall be salvaged from stripping or other grading operations. The topsoil shall meet the requirements of Item T-

905. If, at the time of excavation or stripping, the topsoil cannot be placed in its final section of finished construction, the material shall be stockpiled at approved locations. Stockpiles shall be located as shown on the plans and the approved CSPP, and shall not be placed on areas that subsequently will require any excavation or embankment fill. If, in the judgment of the Engineer ~~RPR~~, it is practical to place the salvaged topsoil at the time of excavation or stripping, the material shall be placed in its final position without stockpiling or further re-handling.

Upon completion of grading operations, stockpiled topsoil shall be handled and placed as shown on the plans and as required in Item T-905. Topsoil shall be paid for as provided in Item T-905. No direct payment will be made for topsoil under Item P-152.

METHOD OF MEASUREMENT

152-3.1 Measurement for payment specified by the cubic yard (cubic meter) shall be computed by the **[** the comparison of digital terrain model (DTM) surfaces **]** for computation of neat line design quantities **]**. The end area is that bound by the original ground line established by field cross-sections and the final theoretical pay line established by cross-sections shown on the plans, subject to verification by the Engineer ~~RPR~~.

152-3.2 [The quantity of **[** unclassified **]** excavation to be paid for shall be the number of cubic yards (cubic meters) measured in its original position. Measurement shall not include the quantity of materials excavated without authorization beyond normal slope lines, or the quantity of material used for purposes other than those directed. **]**

152-3.3 [The quantity of **[** offsite borrow **]** excavation to be paid for shall be the number of cubic yards (cubic meters) measured in its final position compacted. Measurement shall not include the quantity of materials installed beyond specified limits, or the quantity of material used for purposes other than those directed. **]**

BASIS OF PAYMENT

152-4.1 [Unclassified excavation and offsite borrow excavation **]** payment shall be made at the contract unit price per cubic yard (cubic meter). This price shall be full compensation for furnishing all materials, labor, equipment, tools, and incidentals necessary to complete the item.

Payment will be made under:

Item P-152-4.1	Unclassified Excavation - per cubic yard
Item P-152-4.2	Offsite Borrow Excavation – per cubic yard

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 Association of State Highway and Transportation Officials (AASHTO)

AASHTO T-180	Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method
ASTM D1557	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2700 kN-m/m^3))
ASTM D6938	Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

Advisory Circulars (AC)

AC 150/5370-2	Operational Safety on Airports During Construction Software

Software

FAARFIELD –	FAA Rigid and Flexible Iterative Elastic Layered Design

U.S. Department of Transportation

FAA RD-76-66	Design and Construction of Airport Pavements on Expansive Soils

END OF ITEM P-152

Item D-701 Pipe for Storm Drains and Culverts

DESCRIPTION

701-1.1 This item shall consist of the construction of pipe culverts and storm drains in accordance with these specifications and in reasonably close conformity with the lines and grades shown on the plans.

MATERIALS

701-2.1 Materials shall meet the requirements shown on the plans and specified below. Underground piping and components used in drainage systems for terminal and aircraft fueling ramp drainage shall be noncombustible and inert to fuel in accordance with National Fire Protection Association (NFPA) 415.

701-2.2 Pipe. The pipe shall be of the type called for on the plans or in the proposal and shall be in accordance with the following appropriate requirements:

ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe

701-2.3 Concrete – NOT USED

701-2.4 Rubber gaskets. **[** Rubber gaskets for rigid pipe shall conform to the requirements of ASTM C443. Rubber gaskets for PVC pipe, polyethylene, and polypropylene pipe shall conform to the requirements of ASTM F477. Rubber gaskets for zinc-coated steel pipe and precoated galvanized pipe shall conform to the requirements of ASTM D1056, for the "RE" closed cell grades. Rubber gaskets for steel reinforced thermoplastic ribbed pipe shall conform to the requirements of ASTM F477. **]**

701-2.5 Joint mortar – NOT USED

701-2.6 Joint fillers – NOT USED

701-2.7 Plastic gaskets – NOT USED

701-2.8. Controlled low-strength material (CLSM). **[** Controlled low-strength material shall conform to the requirements of Item P-153. When CLSM is used, all joints shall have gaskets. **]**

701-2.9 Precast box culverts. Manufactured in accordance with and conforming to ASTM C1433.

701-2.10 Precast concrete pipe. Precast concrete structures shall be furnished by a plant meeting National Precast Concrete Association Plant Certification Program or American Concrete Pipe Association QCast Plant Certification program.

CONSTRUCTION METHODS

701-3.1 Excavation. The width of the pipe trench shall be sufficient to permit satisfactory jointing of the pipe and thorough tamping of the bedding material under and around the pipe, but it shall not be less than the external diameter of the pipe plus 12 inches (300 mm) on each side. The trench walls shall be approximately vertical.

The Contractor shall comply with all current federal, state and local rules and regulations governing the safety of men and materials during the excavation, installation and backfilling operations. Specifically, the Contractor shall observe that all requirements of the Occupational Safety and Health Administration (OSHA) relating to excavations, trenching and shoring are strictly adhered to. The width of the trench shall be sufficient to permit satisfactorily jointing of the pipe and thorough compaction of the bedding material under the pipe and backfill material around the pipe, but it shall not be greater than the widths shown on the plans trench detail.

Where rock, hardpan, or other unyielding material is encountered, the Contractor shall remove it from below the foundation grade for a depth of at least 8 inch (200 mm) or 1/2 inch (12 mm) for each foot of fill over the top of the pipe (whichever is greater) but for no more than three-quarters of the nominal diameter of the pipe. The excavation below grade should be filled with granular material to form a uniform foundation.

Where a firm foundation is not encountered at the grade established, due to soft, spongy, or other unstable soil, the unstable soil shall be removed and replaced with approved granular material for the full trench width. The RPR shall determine the depth of removal necessary. The granular material shall be compacted to provide adequate support for the pipe.

The excavation for pipes placed in embankment fill shall not be made until the embankment has been completed to a height above the top of the pipe as shown on the plans.

701-3.2 Bedding. The bedding surface for the pipe shall provide a foundation of uniform density to support the pipe throughout its entire length.

a. Rigid pipe. The bedding for RCP shall conform to the details included in the plans. ~~The pipe bedding shall be constructed uniformly for the full length of the pipe barrel, as required on the plans. The maximum aggregate size shall be 1 in when the bedding thickness is less than 6 inches, and 1-1/2 in when the bedding thickness is greater than 6 inches. Bedding shall be loosely placed uncompacted material under the middle third of the pipe prior to placement of the pipe~~.

b. Flexible pipe. For flexible pipe, the bed shall be roughly shaped to fit the pipe, and a bedding blanket of sand or fine granular material shall be provided as follows:

Flexible Pipe Bedding

Pipe Corrugation Depth		Minimum Bedding Depth	
inch	**mm**	**inch**	**mm**
1/2	12	1	25
1	25	2	50
2	50	3	75
2-1/2	60	3-1/2	90

c. Other pipe materials. For PVC, polyethylene, polypropylene, or fiberglass pipe, the bedding material shall consist of coarse sands and gravels with a maximum particle size of 3/4 inches (19 mm). For pipes installed under paved areas, no more than 12% of the material shall pass the No. 200 (0.075 mm) sieve. For all other areas, no more than 50% of the material shall pass the No. 200 (0.075 mm) sieve. The bedding shall have a thickness of at least 6 inches (150 mm) below the bottom of the pipe and extend up around the pipe for a depth of not less than 50% of the pipe's vertical outside diameter.

701-3.3 Laying pipe. The pipe laying shall begin at the lowest point of the trench and proceed upgrade. The lower segment of the pipe shall be in contact with the bedding throughout its full length. Bell or groove ends of rigid pipes and outside circumferential laps of flexible pipes shall be placed facing upgrade.

Paved or partially lined pipe shall be placed so that the longitudinal center line of the paved segment coincides with the flow line.

Elliptical and elliptically reinforced concrete pipes shall be placed with the manufacturer's reference lines designating the top of the pipe within five degrees of a vertical plane through the longitudinal axis of the pipe.

701-3.4 Joining pipe. Joints shall be made with rubber gaskets.

Mortar joints shall be made with an excess of mortar to form a continuous bead around the outside of the pipe and shall be finished smooth on the inside. Molds or runners shall be used for grouted joints to retain the poured grout. Rubber ring gaskets shall be installed to form a flexible watertight seal.

a. Concrete pipe. Concrete pipe may be either bell and spigot or tongue and groove. Pipe sections at joints shall be fully seated and the inner surfaces flush and even. **[** Concrete pipe joints shall be sealed with rubber gaskets meeting ASTM C443 ~~when leak resistant joints are required~~. **]**

b. Metal pipe. Metal pipe shall be firmly joined by form-fitting bands conforming to the requirements of ASTM A760 for steel pipe and AASHTO M196 for aluminum pipe.

c. PVC, Polyethylene, or Polypropylene pipe. Joints for PVC, Polyethylene, or Polypropylene pipe shall conform to the requirements of ASTM D3212 when leak resistant joints are required. Joints for PVC and Polyethylene pipe shall conform to the requirements of AASHTO M304 when soil tight joints are required. Fittings for polyethylene pipe shall conform to the requirements of AASHTO M252 or ASTM M294. Fittings for polypropylene pipe shall conform to ASTM F2881, ASTM F2736, or ASTM F2764.

d. Fiberglass pipe – NOT USED

701-3.5 Embedment and Overfill. Pipes shall be inspected before any fill material is placed; any pipes found to be out of alignment, unduly settled, or damaged shall be removed and re-laid or replaced at the Contractor's expense.

701-3.5-1 Embedment Material Requirements

a. Concrete Pipe. Embedment material and compaction requirements shall be in accordance with the applicable Type of Standard Installation (Types 1, 2, 3, or 4) per ASTM C1479. If a concrete cradle or CLSM embedment material is used, it shall conform to the plan details.

b. Plastic and fiberglass Pipe. Embedment material shall meet the requirements of ASTM D3282, A-1, A-2-4, A-2-5, or A-3. Embedment material shall be free of organic material, stones larger than 1.5 inches in the greatest dimension, or frozen lumps. Embedment material shall extend to 12 inches above the top of the pipe.

c. Metal Pipe. Embedment material shall be granular as specified in the contract document and specifications, and shall be free of organic material, rock fragments larger than 1.5 inches in the greatest dimension and frozen lumps. As a minimum, backfill materials shall meet the requirements of ASTM D3282, A-1, A-2, or A-3. Embedment material shall extend to 12 inches above the top of the pipe.

701-3.5-2 Placement of Embedment Material

The embedment material shall be compacted in layers not exceeding 6 inches (150 mm) on each side of the pipe and shall be brought up one foot (30 cm) above the top of the pipe or to natural ground level, whichever is greater. Thoroughly compact the embedment material under the haunches of the pipe without displacing the pipe. Material shall be brought up evenly on each side of the pipe for the full length of the pipe.

When the top of the pipe is above the top of the trench, the embedment material shall be compacted in layers not exceeding 6 inches (150 mm) and shall be brought up evenly on each side of the pipe to one foot (30 cm) above the top of the pipe. All embedment material shall be compacted to a density required under Item P-152.

Concrete cradles and flowable fills, such as controlled low strength material (CLSM) or controlled density fill (CDF), may be used for embedment provided adequate flotation resistance can be achieved by restraints, weighing, or placement technique.

It shall be the Contractor's responsibility to protect installed pipes and culverts from damage due to construction equipment operations. The Contractor shall be responsible for installation of any extra strutting or backfill required to protect pipes from the construction equipment.

701-3.6 Overfill

Pipes shall be inspected before any overfill is in place. Any pipes found to be out of alignment, unduly settled, or damaged shall be removed and relaid or replaced at the Contractor's expense. Evaluation of any damage to RCP shall be evaluated based on AASHTO R73.

Overfill material shall be place and compacted in layers as required to achieve compaction to at least 95 percent standard proctor per **[** ASTM D1557 **]**. The soil shall contain no debris, organic matter, frozen material, or stones with a diameter greater than one half the thickness of the compacted layers being placed.

701-3.7 Inspection Requirements

An initial post installation inspection shall be performed by the Contractor no sooner than 30 days after completion of installation and final backfill. Clean or flush all lines prior to inspection.

Incorporate specific inspection requirements for the various types of pipes beneath the general inspection requirements.

[Reinforced concrete pipe shall be inspected, evaluated, and reported on in accordance with ASTM C1840, "Standard Practice for Inspection and Acceptance of Installed Reinforced Concrete Culvert, Storm Drain, and Storm Sewer Pipe." Any issues reported shall include still photo and video documentation. The zoom ratio shall be provided for all still or video images that document any issues of concern by the inspection firm. **]**

METHOD OF MEASUREMENT

701-4.1 The length of pipe shall be measured in linear feet (m) of pipe in place, completed, and accepted. It shall be measured along the centerline of the pipe from end or inside face of structure to the end or inside face of structure, whichever is applicable. The **[** 24", 30", 36" and 42" Class V RCP **]** shall be measured separately. All fittings shall be included in the footage as typical pipe sections in the pipe being measured.

BASIS OF PAYMENT

701-5.0 These prices shall fully compensate the Contractor for furnishing all materials and for all preparation, excavation, and installation of these materials; and for all labor, equipment, tools, and incidentals necessary to complete the item.

701-5.1 Payment will be made at the contract unit price per linear foot (meter) for **[** 24", 30", 36", and 42" Class V RCP **]**.

Payment will be made under:

Item 701-5.1	24” Dia. ASTM C76, Class V RCP per linear foot
Item 701-5.2	30” Dia. ASTM C76, Class V RCP per linear foot
Item 701-5.3	36” Dia. ASTM C76, Class V RCP per linear foot
Item 701-5.4	42” Dia. ASTM C76, Class V RCP per linear foot

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 Association of State Highway and Transportation Officials (AASHTO)

AASHTO M167	Standard Specification for Corrugated Steel Structural Plate, Zinc-Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M190	Standard Specification for Bituminous-Coated Corrugated Metal Culvert Pipe and Pipe Arches
AASHTO M196	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains
AASHTO M219	Standard Specification for Corrugated Aluminum Alloy Structural Plate for Field-Bolted Pipe, Pipe-Arches, and Arches
AASHTO M243	Standard Specification for Field Applied Coating of Corrugated Metal Structural Plate for Pipe, Pipe-Arches, and Arches
AASHTO M252	Standard Specification for Corrugated Polyethylene Drainage Pipe
AASHTO M294	Standard Specification for Corrugated Polyethylene Pipe, 300- to 1500-mm (12- to 60-in.) Diameter
AASHTO M304	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Wall Drain Pipe and Fittings Based on Controlled Inside Diameter
AASHTO MP20	Standard Specification for Steel Reinforced Polyethylene (PE) Ribbed Pipe, 300- to 900-mm (12- to 36-in.) Diameter

ASTM International (ASTM)

ASTM A760	Standard Specification for Corrugated Steel Pipe, Metallic Coated for Sewers and Drains
ASTM A761	Standard Specification for Corrugated Steel Structural Plate, Zinc Coated, for Field-Bolted Pipe, Pipe-Arches, and Arches
ASTM A762	Standard Specification for Corrugated Steel Pipe, Polymer Precoated for Sewers and Drains
ASTM A849	Standard Specification for Post-Applied Coatings, Pavings, and Linings for Corrugated Steel Sewer and Drainage Pipe
ASTM B745	Standard Specification for Corrugated Aluminum Pipe for Sewers and Drains

ASTM C14	Standard Specification for Nonreinforced Concrete Sewer, Storm Drain, and Culvert Pipe
ASTM C76	Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
ASTM C94	Standard Specification for Ready Mixed Concrete
ASTM C144	Standard Specification for Aggregate for Masonry Mortar
ASTM C150	Standard Specification for Portland Cement
ASTM C443	Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets
ASTM C506	Standard Specification for Reinforced Concrete Arch Culvert, Storm Drain, and Sewer Pipe
ASTM C507	Standard Specification for Reinforced Concrete Elliptical Culvert, Storm Drain and Sewer Pipe
ASTM C655	Standard Specification for Reinforced Concrete D-Load Culvert, Storm Drain and Sewer Pipe
ASTM C990	Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants
ASTM C1433	Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers
ASTM D1056	Standard Specification for Flexible Cellular Materials Sponge or Expanded Rubber
ASTM D3034	Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings
ASTM D3212	Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals
ASTM D3262	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Sewer Pipe
ASTM D3282	Standard Practice for Classification of Soils and Soil-Aggregate Mixtures for Highway Construction Purposes
ASTM D4161	Standard Specification for "Fiberglass" (Glass-Fiber Reinforced Thermosetting Resin) Pipe Joints Using Flexible Elastomeric Seals
ASTM D6690	Standard Specification for Joint and Crack Sealants, Hot Applied, for Concrete and Asphalt Pavements
ASTM F477	Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe
ASTM F667	Standard Specification for 3 through 24 in. Corrugated Polyethylene Pipe and Fittings
ASTM F714	Standard Specification for Polyethylene (PE) Plastic Pipe (DR PR) Based on Outside Diameter
ASTM F794	Standard Specification for Poly (Vinyl Chloride) (PVC) Profile Gravity Sewer Pipe & Fittings Based on Controlled Inside Diameter

ASTM F894	Standard Specification for Polyethylene (PE) Large Diameter Profile Wall Sewer and Drain Pipe
ASTM F949	Standard Specification for Poly (Vinyl Chloride) (PVC) Corrugated Sewer Pipe with a Smooth Interior and Fittings
ASTM F2435	Standard Specification for Steel Reinforced Polyethylene (PE) Corrugated Pipe
ASTM F2562	Specification for Steel Reinforced Thermoplastic Ribbed Pipe and Fittings for Non-Pressure Drainage and Sewerage
ASTM F2736	Standard Specification for 6 to 30 in. (152 to 762 mm) Polypropylene (PP) Corrugated Single Wall Pipe and Double Wall Pipe
ASTM F2764	Standard Specification for 30 to 60 in. (750 to 1500 mm) Polypropylene (PP) Triple Wall Pipe and Fittings for Non-Pressure Sanitary Sewer Applications
ASTM F2881	Standard Specification for 12 to 60 in. (300 to 1500 mm) Polypropylene (PP) Dual Wall Pipe and Fittings for Non-Pressure Storm Sewer Applications

National Fire Protection Association (NFPA)

NFPA 415	Standard on Airport Terminal Buildings, Fueling Ramp Drainage, and Loading Walkways

END ITEM D-701

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Item D-752 Concrete Culverts, Headwalls, and Miscellaneous Drainage Structures

DESCRIPTION

752-1.1 This item shall consist of [reinforced] concrete culverts, headwalls, and miscellaneous drainage structures constructed in accordance with these specifications, at the specified locations and conforming to the lines, grades, and dimensions shown on the plans or required by the RPR.

MATERIALS

752-2.1 Concrete. [Reinforced] concrete shall meet the requirements of Item P-610.

CONSTRUCTION METHODS

752-3.1 Unclassified excavation.

a. Trenches and foundation pits for structures or structure footings shall be excavated to the lines and grades and elevations shown on the plans. The excavation shall be of sufficient size to permit the placing of the full width and length of the structure or structure footings shown. The elevations of the bottoms of footings, as shown on the plans, shall be considered as approximate only; and the RPR may approve, in writing, changes in dimensions or elevations of footings necessary to secure a satisfactory foundation.

b. Boulders, logs, or any other objectionable material encountered in excavation shall be removed. All rock or 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 or crevices shall be cleaned out and grouted. All loose and disintegrated rock and thin strata shall be removed. When concrete will rest on a surface other than rock, the bottom of the excavation shall not be disturbed and excavation to final grade shall not be made until immediately before the concrete or reinforcing steel is placed.

c. The Contractor shall do all bracing, sheathing, or shoring necessary to perform and protect the excavation and the structure as required for safety or conformance to governing laws. The cost of bracing, sheathing, or shoring shall be included in the unit price bid for excavation.

d. All bracing, sheathing, or shoring shall be removed by the Contractor after the completion of the structure. Removal shall not disturb or damage the finished concrete. The cost of removal shall be included in the unit price bid for excavation.

e. After each excavation is completed, the Contractor shall notify the RPR. No concrete or reinforcing steel shall be placed until the RPR has approved the depth of the excavation and the character of the foundation material.

752-3.2 Backfilling.

a. After a structure has been completed, backfilling with approved material shall be accomplished by applying the fill in horizontal layers not to exceed 8 inches (200 mm) in loose depth, and compacted. The field density of the compacted material shall be at least 90% of the maximum density for cohesive soils and 95% of the maximum density for noncohesive soils. The maximum density shall be determined in accordance with ASTM D698. The field density shall be determined in accordance with ASTM D1556.

b. No backfilling shall be placed against any structure until approved by the RPR. For concrete, approval shall not be given until the concrete has been in place seven (7) days, or until tests establish that the concrete has attained sufficient strength to withstand any pressure created by the backfill or the placement methods.

c. Fill placed around concrete culverts shall be deposited on each side at the same time and to approximately the same elevation. All slopes bounding or within the areas to be backfilled shall be stepped or serrated to prevent wedge action against the structure.

d. Backfill will not be measured for direct payment. Performance of this work shall be considered as a subsidiary obligation of the Contractor, covered under the contract unit price for "unclassified excavation for structures."

752-3.3 Weep holes. Weep holes shall be constructed as shown on the plans.

752-3.4 Cleaning and restoration of site. After the backfill is completed, the Contractor shall dispose of all surplus material, dirt, and rubbish from the site. Surplus dirt may be deposited in embankment, shoulders, or as approved by the RPR. The Contractor shall restore all disturbed areas to their original condition. The Contractor shall remove all tools and equipment, leaving the entire site free, clear, and in good condition.

METHOD OF MEASUREMENT

752-4.1 Structures shall be measured per each, complete in place and accepted. No measurements or other allowances shall be made for **reinforcing streel, embedded items**, forms, false work, cofferdams, pumping, bracing, expansion joints, or finishing of the concrete.

BASIS OF PAYMENT

752-5.1 Payment will be made at the contract unit price per **each, lump sum** or cubic yard for the **item as shown below**.

These prices shall be full compensation for furnishing all materials and for all preparation, excavation, and placing the materials, and for all labor, equipment, tools, and incidentals necessary to complete the structure.

Payment will be made under:

Item D-752-5.1	Safety End Treatment for 1 ~ 24" Dia. RCP - 6:1 Slope, With Pipe Runners – per Each
Item D-752-5.2	Safety End Treatment for 2 ~ 30" Dia. RCP - 6:1 Slope, With Pipe Runners – per Each
Item D-752-5.3	Safety End Treatment for 2 ~ 36" Dia. RCP - 6:1 Slope, With Pipe Runners – per Each
Item D-752-5.4	Safety End Treatment for 1 ~ 42" Dia. RCP - 6:1 Slope, With Pipe Runners – 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.

ASTM International (ASTM)

ASTM D698	Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3 (600 kN-m/m^3))
ASTM D1556	Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

END OF ITEM D-752

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Section 260583 Wire Connections and Devices

260583-1.1 Section includes.

a. Furnish and install splicing and terminating devices.

260583-1.2 Related sections.

a. Section **L-108** ~~260519~~ – **Underground Power Cable for Airports** ~~Wire and Cable~~.

PRODUCTS

260583-2.1 Manufacturers.

a. Manufacturers include but are not limited to those listed. All proposed components and materials are subject to the approval of the engineer

b. Burndy Corp.

c. Dossert Manufacturing Corp.

d. Ideal Industries, Inc.

e. Ilsco Corp.

f. Minnesota Mining and Manufacturing Co.

g. Thomas & Betts Co., Inc.

260583-2.2 Materials.

a. Cable and wire connections for splicing or terminating shall be made with compression deforming type connectors. Connectors for cable sizes 250 kcmil and larger shall be the long barrel type for double indentation. Soldered connections will not be permitted. Twist-on insulated connectors may be used which are resistant to vibration and are used in the proper sizes.

b. Provide terminal connectors with hole sizes and spacing in accordance with NEMA standards. Provide terminal connectors with two holes in tongue for use on conductor sizes 250 kcmil and larger. Terminal connectors will not be required for connections to the circuit breakers in the lighting and/or receptacle panels.

c. Provide connections made with non-insulated connectors insulated with three layers of plastic tape, each layer being half lapped. Provide No. 33+ plastic tape.

EXECUTION

260583-3.1 Installation.

a. Provide electrical connections to equipment furnished under other contracts and furnish wiring, conduit, outlet boxes, and safety switches, as required. Verify locations, horsepower, and voltages of equipment prior to installation of feeders. If apparent conflict arises in power wiring, advise the project manager immediately for clarification.

b. Provide switches as required by national or local codes.

c. If the motor is integral to the equipment, isolate the entire piece of equipment with a short section of flexible metal conduit to prevent vibration and/or noise amplification to be transferred to the building structure.

d. If the motor is adjustable, install an additional length of flexible metal conduit at the motor.

e. Connect a ground wire from the conduit termination to the motor frame on the inside of flexible conduit. Use approved grounding lugs or clamps or the conduit connection.

f. Major equipment furnished under mechanical and other sections of specifications may require different rough-in requirements than those indicated on Drawings. Secure detailed drawings from source furnishing equipment to determine actual rough-in locations, conduit and conductor requirements to assure proper installation.

g. Before connecting any piece of equipment, verify the name plate data corresponds with information shown on Drawings. Discrepancies shall be called to attention of the project manager.

h. Change any feeders installed incorrectly as a result of not verifying equipment requirements, of equipment provided by others, prior to feeder installation.

METHOD OF MEASUREMENT AND PAYMENT

260583-4.1 There will be no separate measurement or payment on the work discussed in this section. All work will be considered incidental for the completion of the component of work to which it is related.

END OF SECTION 260583

Section 262116 Service Entrance

262116-1.1 Section includes.

a. Furnish and install electrical service entrance, including:

1. Arrangement with the power company for new underground electrical service consisting of one (1) utility transformer and associated switch for automatic switchover.

262116-1.2 Related sections.

a. Section 013000 – Allowances

b. Section ~~260543~~ **L-110** - Underground Duct Banks and Conduits

262116-1.3 System description.

a. System Voltage: ~~120/240~~ **277/480** volts, ~~single~~-**three** phase, ~~three~~-**four-**wire, 60 hertz.

b. Service Entrance: Underground.

262116-1.4 Quality assurance.

a. Install service entrance in accordance with power company's rules and regulations.

PRODUCTS

262116-2.1 Metering Equipment.

a. Coordinate with the power company and provide equipment, ductbank, conduits, manholes, grounding and equipment pads in accordance with power company directives.

EXECUTION

262116-3.1 Installation.

a. Make arrangements with the power company to obtain permanent and temporary electric service to the project.

b. Provide secondary service entrance conduits and wire from power company transformer to building service entrance equipment.

c. Provide primary service entrance ductbank and manholes as required by the utility company to extend service to the property site.

d. Coordinate with the utility company for easements, pads and clearances as required.

e. Provide conduit and wiring as directed by power company to remote location for meter.

METHOD OF MEASUREMENT AND PAYMENT

262116-4.1 Method of measurement.

a. Measurement for the Service Entrance shall include all work and materials installed complete including, but not limited to, the utility ductbank, utility manholes, utility equipment foundations, pads and grounding, permits, secondary feeders and associated terminations, labels and testing.

262116-4.2 Basis of payment.

a. There will no separate payment on the work discussed in this section. All work will be considered incidental for the completion of the component of the work to which it is related. There will be separate measurement and payment for the following items:

1. Separate measurement will be used for the secondary ductbank with payment following section L-110.

2. Separate payment will be made for the utility company fees for installing the primary conductors, equipment, etc. Payment will be made under Allowances following section 013000.

END OF SECTION 262116

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 counterpoise wire, ground rods, etc. is incidental to the work. 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. **Demolition of conduit or direct buried cables is limited to areas requiring excavation for construction of pavement or new utilities or associated infrastructure. It is not the intent of this item to provide additional excavation for the sole purpose of electrical infrastructure removal. Incidental to this item are all associated duct markers and ground rods. Where a conductor is no longer in use but cannot be demolished, the cable ends shall be tagged and labeled at each end and at all accessible areas of the cable. For 600V cables, measurement is for the complete circuit including all conductors.** Measurement for this item will be per linear foot, installed complete and accepted by the RPR.

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 RPR. 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 RPR 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 RPR. Measurement for this item will be per each, complete and accepted by the RPR.

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 RPR. 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 RPR.

105-4.5 This item provides for the demolition of existing electrical vault equipment and general electrical vault clean up. This item includes demolition of the existing vault equipment within the vault, as noted in the plans. This item additionally includes removal of any additional unused or spare equipment/ conduit due to the removal of constant current regulators as well as removal of all dirt and debris. Measurement for this item will be per each, complete and accepted by the RPR.

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. Measurement for this item will be per each, complete and accepted by the RPR. 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 RPR. 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 RPR. 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 Cable in Duct, per Linear Foot

Item L-105-5.2 Remove 2-inch Conduit (Including cable), per Linear Foot

Item L-105-5.3 Remove Concrete Encased Duct in Earth (Including Cable), per Linear Foot

Item L-105-5.4 Remove and Dispose of Elevated Edge Light, Base Can to be Removed, per Each

Item L-105-5.5 Remove and Dispose of Elevated Edge Light, Base Can to Remain, per Each

Item L-105-5.6 Remove and Dispose of In-Pavement Edge Light, Base Can to be Removed, per Each

Item L-105-5.7 Remove and Dispose of Airfield Sign and Foundation, per Each

Item L-105-5.8 Remove Airfield Sign Foundation, per Each

Item L-105-5.9 Remove and Dispose of Pull Can in Turf, per Each

Item L-105-5.10 Remove and Dispose of 4-Box L-880 PAPI System and Associated Foundations, per Each

Item L-105-5.11 Remove and Dispose of Primary Wind Cone, Segmented Circle, and Foundation, per Each

Item L-105-5.12 Remove and Dispose of Supplemental Wind Cone, per Each

Item L-105-5.13 Remove and Dispose of Beacon, Beacon Tower, and Foundation, per Each

Item L-105-5.14 Work in Existing Airfield lighting Vault Equipment, per Each

END OF ITEM L-105

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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 × 3 × 3/8 inch (100 × 75 × 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 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. Separate measurement shall be made for regulators and the associated 5KV cables.

109-7.2 This item provides for the procurement and installation of a new or salvaged 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 RPR. Measurement for this item will be per each, installed complete and accepted by the RPR.

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 RPR. This price shall be full compensation for furnishing all materials and for all preparation, labor, tools, equipment and incidentals necessary to complete this item.

Payment will be made under:

Item L-109-5.1	Install New Vault Building and Equipment, per Lump Sum
Item L-109-5.2	Install New 4kW L-82**9**~~8~~ Constant Current Regulator, per Each
Item L-109-5.3	Install New 7.5kW L-82**9**~~8~~ Constant Current Regulator, per Each
Item L-109-5.4	Install New 10kW L-82**9**~~8~~ Constant Current Regulator, per Each
Item L-109-5.5	Install Salvaged 10kW L-828 Constant Current Regulator, 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 150/5340-30	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

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Item L-130 Precision Approach Path Indicator System (PAPI)

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~~ **L-880**, 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 100^{th} 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. 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.

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.

In 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 +/- **I** inch of a horizontal plane. This horizontal plane shall be within+/- 1 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, nameplate, tether, 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.

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 L-880(L) Style ~~A~~**B** PAPI System – per Each

END OF ITEM L-130

Item L-16231 Packaged Engine Generator Systems

16231-1.1 Section Includes.

a. Packaged engine generator systems, including:

1. Packaged engine generator set.

2. Battery and charger.

3. Connection of cooling system to cooling tower.

4. Exhaust silencer and fittings.

5. Fuel lines, fittings, day tank and fuel pumps.

16231-1.2 Related Sections.

a. Section ~~16080~~ **260800** - Electrical Testing.

b. Section ~~16413~~ **264130** - Automatic Transfer Switches.

16231-1.3 References.

a. NEMA 250 - Enclosures for Electrical Equipment (1,000 Volts Maximum).

b. FAA-E-2204 - Diesel Engine Generator Sets, 10kW to 750kW.

c. ANSI/NEMA – MG-1

16231-1.4 System Description.

a. Provide engine generator system to provide source of continuous standby power.

b. System Capacity: As scheduled on Drawings at elevation of up to 1,000 feet above sea level and ambient temperature between 0 degree and 110 degrees F continuous rating.

c. Generator set and components must fit in available space indicated with proper clearance and operate with the free air space indicated.

d. Generator exhaust system to be stainless steel.

16231-1.5 Submittals.

a. Furnish shop drawings showing plan and elevation views with overall and interconnection point dimensions, fuel consumption rate curves at various loads, ventilation and combustion air requirements, and electrical diagrams including schematic and interconnection diagrams. Show actual layout and verify combustion air requirements and cooling water requirements.

b. Furnish product data showing dimensions, weights, ratings, interconnection points and internal wiring diagrams for engine, generator, control panel, battery, battery rack, battery charger, exhaust silencer, vibration isolators, day tank and remote annunciator. Submit computer analysis for generator loading, motor starting, critical speed and vibratory stress.

c. Furnish manufacturer's installation instructions.

d. Provide operation and maintenance manual. Furnish instructions for normal operation and emergency operation.

16231-1.6 Quality Assurance.

a. Manufacturer Qualifications: Company specializing in packaged engine generator system and with staff engineers factory trained by manufacturer of synchronizing switchgear.

b. Supplier Qualifications: Authorized distributor of engine generator manufacturer with staffed service facilities within 50 miles of project site.

16231-1.7 Maintenance Service.

a. Submit prospective contract for service and maintenance of packaged engine generator system for one year from date of substantial completion. Include a minimum of two visits at six month intervals exclusive of warranty work.

b. Do not include cost of maintenance service in bid. Maintenance agreement will be in a separate contract.

PRODUCTS

16231-2.1 Manufacturers.

a. Manufacturers include but are not limited to those listed. All proposed components and materials are subject to the approval of the engineer

1. Caterpillar.

2. Cummins.

3. Detroit Diesel.

4. Kohler.

16231-2.2 Engine.

a. Type: Liquid-cooled, diesel, turbo-charged internal combustion engine with pressure lubrication system. Converted automotive engine will not be acceptable.

b. Rating: Sufficient to operate continuously as standby power source at rated load at specified elevations and ambient limits with all accessories attached.

c. Fuel System: Appropriate for use of No.2 diesel fuel.

d. Engine Speed: Not more than 1,800 rotations per minute.

e. Governor: Isochronous type to maintain engine speed within 0.5 percent, steady state, no load to full load, with maximum speed change of plus or minus 2 percent and recovery to steady state within two seconds following sudden load changes of up to 50 percent maximum. Equip governor with means for manual operation and adjustment. Maintain frequency regulation within 0.25 percent for any steady-state condition.

f. Safety Devices: Engine shutdown on high water temperature, low oil pressure, overspeed, and engine overcrank. Limits as selected by manufacturer. Individual indicating lights for each function.

g. Engine Starting: DC starting system with positive engagement, number and voltage of starter motors in accordance with manufacturer's instructions. Include remote starting control circuit, with MANUAL-OFF-AUTO selector switch on engine-generator control panel. Provide a remote start/stop station and status indicator where shown on Drawings.

h. Engine Jacket Heater: Thermal circulation type water heater with integral thermostatic control, sized to maintain engine jacket water at 90 degrees F and suitable for operation on 120 volts AC, manually adjustable.

i. Engine Mounted Radiator: Air cooled radiator with blower type fan sized to maintain safe engine temperature in 110 degrees F ambient air with 50 percent ethylene glycol solution.

j. Engine Accessories:

1. Fuel filter, lube oil filter, intake air filter, fuel transfer pump, fuel priming pump, water pump.

2. Locate fuel filters in one accessible location ahead of injection pumps. Do not use screens or filters requiring cleaning or replacement in injection pump or injection valve assembly.

k. Mounting: Provide unit with suitable spring-type vibration isolators and mount on structural steel base with housekeeping pad.

16231-2.3 Generator.

a. Generator: ~~1~~**3** phase, 3 pole, reconnectable synchronous generator with brushless exciter and solid-state, transient-suppressed, full wave rectifier.

b. Rating: Deliver KW and voltage ratings as shown on Drawings for continuous primary power at 1,800 rotations per minute and 80 percent power factor.

c. Insulation: Class H.

d. Temperature Rise: 130 degrees C stand-by.

e. Enclosure: Open-drip proof, fully enclosed frame.

f. Voltage Regulation:

1. Include generator-mounted solid state exciter-regulator to match engine and generator characteristics, with voltage regulation plus or minus 2 percent from no load to full load at 0.8 power factor. Include manual controls to adjust voltage plus or minus 5 percent of rated voltage. Provide short circuit current support at 300 percent of rated current for up to ten seconds. Provide time-delayed overexcitation, overvoltage, and underfrequency protection in the exciter-regulator system.

2. Maximum instantaneous voltage dip of 12 percent on application of a load up to 100 percent of rated load. Recover to stable voltage within four seconds. Maximum voltage rise of 5 percent on 50 percent load decrease over a period of two seconds.

3. Provide capability of sustaining at least 250 percent of rated current for at least ten seconds under any possible phase-to-phase or phase-to-phase neutral short circuit condition.

g. Provide separate power and control termination boxes.

16231-2.4 Accessories.

a. Sub Base Day Tank: Mount double wall sub base day tank below the skid with interconnecting piping. Size tank for at least 48 hours of operation at full load. Include a transfer pump system and connect to tank.

1. Generator Base Tank Construction:

a) Generator base tank shall be a standard option with the generator, and constructed in accordance with Underwriters Laboratories Standard UL-142. The generator base tank shall also be constructed in accordance with Flammable and Combustible Liquids Code, NFPA 30; and The Standard for Installation and use of Stationary Combustible Engine and Gas Turbines, NFPA 37. Generator base tank shall be made of heavy gauge steel construction with continuous welded seams. Include reinforced steel box channel for generator support, with load rating of 5,000 lbs. per gen-set mounting hole location. Two full height gussets shall be provided at gen-set mounting holes. Tank interior shall be

coated with a permanent, rust inhibiting, two part epoxy. Tank shall be primed and finish painted outside.

2. Generator Base Tank Testing

a) Primary tank sections shall be pressurized at a minimum of 3 psi and leak tested to ensure integrity of generator base weld seams per UL-142 standards.

b) Secondary Containment basin shall be pressurized at 3 psi and leak-tested to ensure integrity of generator base weld seams per UL-142 standards.

3. Generator Base Tank Fittings

a) The generator base tank shall include the following fittings labeled with adhesive backed metal labels:

1) 1" NPT fuel return from engine fitting

2) ½" NPT minimum diptube for engine supply

3) 1¼" NPT minimum for normal vent, sized as appropriate

4) NPT connection for emergency vent, sized as appropriate

5) 2" NPT for manual fill

6) 1½" NPT for level gauge

7) 1" NPT basin drain (tank drain if single wall)

8) 1" NPT for low level float switch

9) 1¼" NPT fitting for leak detection float switch

10) 5" square inspection port below electrical controls

4. Fuel Level Gauge

a) The generator base tank shall include a direct-reading fuel level gauge.

5. Fuel Containment Basin

a) Generator base tank shall include a welded steel Secondary Containment basin, sized at a minimum of 110% of the tank capacity to prevent escape of fuel into the environment in the event of a tank leakage.

6. Leak Detection System

a) A fuel containment basin leak detector float switch shall be provided.

7. Generator Base Tank Venting

a) Normal Venting

1) Normal venting shall be sized at 1-1/4" NPT or larger in accordance with The American Petroleum Institute Standard No. 2000, for venting atmospheric and low pressure storage tanks. Tank shall be provided with atmospheric (normal) vent cap with screen.

b) Emergency Venting

1) The emergency vent NPT fitting shall be sized to accommodate the total capacity of both normal and emergency vents, and not less than that derived from NFPA 30, Table 2-8, based on wetted surface area of the tank (calculated based on 100% of primary tank). A UL Listed emergency pressure relief vent cap shall be furnished. The vent shall be pressure operated. Opening pressure shall be 0.5 psig; full opening pressure shall be 2.5 psig. Limits shall be marked on top of each vent.

2) A second UL Listed emergency vent fitting shall be provided for the interstitial space on Secondary Containment tanks.

8. Automatic Day Tank Level Controller

a) The control circuitry shall be designed and supplied as an engineered system by Engine & Compressor Accessories, or approved equal. The controller shall have replaceable relays or approved equal. The controller shall have independent float switches to provide multiple signals to the control circuitry.

b) Control Functions

1) "Press-to-Test" fill control momentary switch

2) Critical high fuel level (Pump/motor shutdown)

3) High fuel level

4) Low fuel level

5) Critical low level

6) Rupture basin alarm (Pump/motor shutdown)

7) Pump/motor control

c) Indication Functions

1) Pump Running

2) Critical high fuel level

3) High fuel level

4) Low fuel level

5) Critical low level

d) Outputs (one set of normally open and normally closed 10 amp @ 120 VAC relay contacts for remote annunciation.)

1) Critical high fuel level (Pump/motor shutdown)

2) High fuel level

3) Low fuel level

4) Critical low level

5) Rupture basin alarm (Pump/motor shutdown)

b. Weather Enclosure

1. The enclosure shall be constructed from high strength, aluminum and finish coated with powder baked paint for superior finish, durability, and appearance.

2. The enclosure must allow the generator set to operate at full load in an ambient temperature of 40 - 45°C with no additional derating of the electrical output.

3. Enclosures must be equipped with sufficient side and end doors to allow access for operation, inspection, and service of the unit and all options. Minimum requirements are two doors per side. When the generator set controller faces the rear of the generator set, an additional rear facing door is required. Access to the controller and main line circuit breaker must meet the requirements of the National Electric Code.

4. Doors must be hinged with stainless steel hinges and hardware and be removable, and equipped with lockable latches and panic bar, keyed alike.

5. The enclosure roof must be pitched to prevent accumulation of water.

6. The complete exhaust system shall be internal to the enclosure with external mounted silencer. The critical silencer shall be insulated with a tailpipe and rain cap.

c. Exhaust Silencer: Critical spark arresting type silencer, with muffler companion flanges and flexible stainless steel exhaust fitting, suitable for orientation, as indicated on the drawings, and sized in accordance with engine manufacturer's instructions. Provide screen and terminal adapter.

d. Batteries: Heavy-duty, diesel starting type lead-acid storage batteries, 200 ampere hours minimum capacity. Match battery voltage to starting system. Include necessary cables and clamps and rack. Mark and group batteries to provide full rated engine starting power at four hour discharge rates.

e. Battery Tray: Epoxy painted steel tray treated for electrolyte resistance, constructed to contain spillage of electrolyte.

f. Battery Charger: Current limiting type designed to float at 2.17 volts per cell, and equalize at 2.33 volts per cell. Include overload protection, full wave rectifier, DC voltmeter and ammeter and 120 volt AC fused input. Provide wall-mounted enclosure to meet NEMA 250, Type 1, requirements. Charging rate minimum of eight amperes with capacity to recharge battery unit within six hours.

g. Engine-Generator Control Panel: Type 1 generator mounted control panel enclosure with engine and generator controls and indicators. Include provision for padlock and the following equipment and features:

1. Frequency Meter: 45 to 65 hertz range, 3-1/2 inch dial.

2. AC Output Voltmeter: 3-1/2 inch dial, 2 percent accuracy, with phase selector switch.

3. AC Output Ammeter: 3-1/2 inch dial, 2 percent accuracy, with phase selector switch.

4. Output voltage adjustment.

5. Push-to-test indicator lamps, one each for low oil pressure, high water temperature, overspeed and overcrank.

6. Engine start/stop selector switch.

7. Engine running time meter.

8. Oil pressure gage.

9. Water temperature gage.

10. Auxiliary Relay: Three pole double throw, operates when engine runs, with contact terminals pre-wired single pole double throw contact to terminal strip.

11. Remote Alarm Contact: Prewired single pole double throw contact to terminal strip for remote alarm functions required by NFPA 99.

12. Remote start and stop interface for remote control by FAA.

h. Supply engine protective devices as follows:

1. Alarm system for high water temperature and/or low oil pressure.

2. Engine overspeed shutdown device.

3. Indicating light for use with the above protective systems.

i. Provide two (2) factory installed output circuit breakers. Install to maintain UL rating of engine generator.

16231-2.5 Fuel System.

a. Sub base day tank mounted below the skid.

EXECUTION

16231-3.1 Examination.

a. Verify that surfaces are ready to receive work and field dimensions are as shown on Drawings.

b. Verify that required utilities are available in proper location and ready for use.

c. Beginning of installation means installer accepts existing conditions.

16231-3.2 Installation.

a. Install in accordance with manufacturer's instructions and provide testing data.

b. Provide and turn over remote annunciator in building security command center as indicated and turn over to owner for future installation. Provide empty raceway for interconnecting wiring from vault to exterior stub-out. Extension and wiring by others.

c. Coordinate all work necessary for a complete working standby generating system, including fuel lines, fuel tanks, and piping.

d. Provide stainless steel exhaust duct.

e. ***M***ount generator with sub-base tank on minimum 8” h housekeeping pad with No. 2 rebar installed on 2’ centers. Housekeeping pad shall extend minimum 4” outside generator and tank edges.

16231-3.3 Field Quality Control.

a. Provide services of authorized manufacturer's technician to start, test, and adjust system for proper operations.

b. Provide services of factory trained and authorized technician to give Owner an eight-hour class in proper operation and maintenance of UN 175.

16231-3.4 Cleaning.

a. Clean engine and generator surfaces. Replace oil and fuel filters.

16231-3.5 Demonstration.

a. Provide system demonstration to A/E.

b. Simulate power outage by interrupting normal source and demonstrate that system operates to provide power, that all controls are operative, and that units operate satisfactorily in the event of interruption of normal power.

MEASUREMENT AND PAYMENT

16231-4.1 Method of Measurement.

a. Measurement for the Generator System shall include all work and materials required by this specification and plan details including, but not limited to, the generator set, controls, remote annunciator, exhaust system, weather enclosure with all accessories noted including load center, automatic transfer

switch, batteries and charger, fueling system, housekeeping pad, all piping and associated conduit, cables, emergency shutoff, pumps, silencer, leak detection system, exhaust, day tank, and fuel containment basin.

16231-4.2 Basis of Payment.

a. Payment for the packaged Generator System shall include all work and materials required by this specification and plan details. 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 in accordance with the provisions and intent of the plans and specifications.

Payment will be made under:

Install New Backup Standy Generator System - Per Lump Sum.

END OF ITEM L-16231

Section 260800 Electrical Testing

260800-1.1 Section includes.

a. Test electrical systems and equipment.

b. These tests are required to determine that the equipment involved may be safely energized and operated.

c. Perform tests by and under the supervision of fully experienced and qualified personnel. Advise each respective manufacturer's representative of tests on their equipment.

d. Record all test data.

e. Each section of Division 26 that has products or systems listed herein incorporate this section by reference and is incomplete without the required tests stated herein.

260800-1.2 References.

a. Manufacturer’s instruction manuals, drawings, and information applicable to the equipment and systems.

b. National Fire Protection Association (NFPA) 70B Recommended Practice for Electrical Equipment Maintenance.

c. NFPA 70 - National Electrical Code.

d. International Electrical Testing Association (NETA)

e. National Electrical Manufacturer’s Association (NEMA)

f. American Society for Testing and Materials (ASTM)

g. Institute of Electrical and Electronic Engineers (IEEE)

h. American National Standards Institute (ANSI)

i. Insulated Cable Engineers Association (ICEA)

j. National Electrical Safety Code (ANSI C2)

k. OSHA Part 1910, Sub-Part S-1910.308

l. NFPA 72 - National Fire Alarm Code,

m. NFPA 110 - Emergency and Standby Power Systems,

n. NFPA 111 Stored Electrical Energy Emergency and Standby Power Systems.

260800-1.3 Submittals.

a. Submit test report forms for review a minimum of 90 days prior to requesting a final review by the airport manager.

b. Furnish six individually bound copies of test data. Neatly type and arrange data. Include with the data the date tested, personnel present, weather conditions, nameplate record of test instrument and list all measurements taken, both prior to and after any corrections are made to the system. Record all failures and corrective action taken to remedy incorrect situation.

c. The project manager will retain one copy. Remaining copies will be returned to Contractor for inclusion in the operation and maintenance manuals.

PRODUCTS (NOT USED)

EXECUTION

260800-3.1 Preparation.

a. Furnish proposed test procedures, recording forms, list of personnel and test equipment for project manager review.

b. Follow recommended procedures for testing as published by test equipment manufacturer.

260800-3.2 Wire and cable.

a. Test insulation resistance of each main feeder and service after the installation is complete but before the connection is made to its source and point of termination.

b. Test insulation resistance using Biddle Megger or equivalent test instrument at a voltage not less than 1,000 volts DC. Measure resistance from phase-to-phase and phase-to-ground. In circuits where insulation test value is lower than 1 megohm, remove and replace conductor and retest.

c. Visually inspect connections of every branch circuit for tightness.

d. Insure that grounding conductor is electrically continuous.

e. Test branch circuits against grounds, shorts or other faults.

f. Inspect grounding and bonding system conductors and connections for tightness and proper installation.

g. Measure ground resistance from system neutral connection at service entrance to convenient ground reference point using suitable ground testing equipment.

h. Test the system for stray currents, ground shorts, etc. If stray currents, shorts, etc., are detected, eliminate or correct as required.

260800-3.3 Medium voltage shielded cable.

a. Factory Testing Standards

1. Perform factory tests to or better than AEIC standards, and record test data to:

a) Demonstrate dielectric strength of cable construction.

b) Demonstrate insulation coordination with standard system levels.

c) Demonstrate compatibility of cable components.

d) Demonstrate electrical stability of conducting insulation shield.

e) Demonstrate that cable is not subject to dielectric degradation caused by synergistic effects or voltage stress, temperature, water immersion and time.

f) Assure cable has suitable deformation resistance at emergency operating temperatures.

2. The Owner may elect to witness any tests or make inspection of the cable during the process of manufacturer, except for those processes of a confidential nature.

3. Do not ship cable unless all required tests have been completed and the results of tests show compliance with all requirements of these specifications.

4. Keep results of all tests listed in this specification on file by the vendor and available upon request. Furnish a certificate of compliance stating that all cable tested meets the test requirements. Clearly identify all test reports with material identification numbers to easily trace to the exact reel number.

b. Inspect exposed cable sections for physical damage. Verify that cable is connected according to drawings and that shield grounding, cable support and terminations are properly installed.

c. Perform DC high potential test of each conductor, with other conductors grounded, in accordance with NEMA WC8. Apply test voltage in accordance with manufacturer's recommendations to conductors in at least eight equal increments to maximum test voltage. Record leakage current at each increment, allowing for charging current decay. Hold maximum test voltage for ten minutes.

d. Record results of test in tabular form and in plots of current versus voltage for incremental voltage steps and current versus time (30 second intervals) at maximum voltage.

e. Replace all feeders which do not meet or exceed values recommended by manufacturer or 5 to 10 microamps leakage current per 1,000 feet, per phase at 37,500 volts DC, ends disconnected from switchgear.

f. There is no industry standard which specifies as a "test procedure." Acceptable procedures, although varying slightly in technique, have more or less been standardized as either a "withstand test" or a "time-leakage current test."

g. Before performing any DC overpotential tests, a review of the following points should be made:

1. All connected equipment must be disconnected from the test circuit, i.e., remove pothead taps, disconnect transformers, switch taps, motors, circuit breakers, etc. This will preclude damage to such equipment and will prevent test interruptions due to flashovers and/or trip-outs resulting from excessive leakage current.

2. Establish adequate clearance between the circuit test ends and ground and to other equipment not under test.

3. Ground all circuit conductors not under test with all cable shields including nearby equipment.

4. Consult termination manufacturer's for maximum test voltage recommendations and time limitations.

h. The direct current test voltage may be applied either slowly and continuously or in predetermined steps to the maximum prescribed value as accorded in applicable specifications.

1. Continuous Method: Apply test voltage at an approximate rise rate of 1 kV per second or 75 percent of the rated current output at the equipment whichever is less. With some DC equipment, it will be impossible to reach the maximum test voltage within a specific time due to the lack of sufficient charging current.

2. Step Method: Apply test voltage slowly in 5 to 7 increments of equal value, where feasible, to the maximum specified level. Allow sufficient time at each step for the leakage current to stabilize. Normally this requires only a few seconds unless cable circuits of high capacitance are involved. Record leakage current at each step.

i. Maintain the test voltage at the prescribed value for the time designated in applicable specifications. The following times are usually considered adequate:

1. Acceptance Testing: After installation and before the cable is placed in regular service, the specified test voltage shall be applied for 15 consecutive minutes.
2. Proof Testing: At any time during the period of guarantee, the cable circuit may be removed from service and tested at a reduced voltage (normally 65 percent of the original acceptance value) for five consecutive minutes.
3. Record the leakage current, in microamperes, at one minute intervals for the duration of the test time involved.

j. At the end of the test period, return the test set voltage control to zero. Allow the residual voltage on the circuit to decay to at least 20 percent of the test value before applying manual grounds. CAUTION: It should be recognized that DC charges on cable can build up to potentially dangerous levels if grounds are removed too quickly. Maintain solid grounds on the cable for four times the duration of the test whenever possible. On exceptionally long cable lengths, it may be necessary to increase the grounding time and might also be advantageous to maintain these grounds while reconnecting circuit components.

260800-3.4 Wiring devices.

a. Operate switches at least twice.

b. Test every convenience outlet with plug-in device for proper phasing and grounding.

c. Demonstrate operation of lighting circuits and lighting control systems.

260800-3.5 Electrical equipment.

a. Before Energization:

1. Visually inspect connections for tightness and correctness.
2. Verify proper fusing.

b. After Energization

1. Verify proper voltage with system operating at load conditions.
2. Verify proper operation.
3. Operate every circuit breaker, switch and contactor.
4. Modify tap settings on transformers as required.
5. Measure line amperes with system operating at load conditions.
6. Modify circuit breaker and relay settings as required.
7. Megger meter centers for opens, shorts and grounds.
8. Thermographic Tests:

a) With system operating at load conditions, perform thermographic test on distribution panelboards, lighting panelboards and equipment feeders using an infrared temperature scanning unit. Provide thermograph tests performed by General Electric Instrumentation Division.

b) Tighten or correct connections with higher temperatures than acceptable. After corrections have been made, perform thermograph test to confirm that problems have been corrected.

c. Operate all equipment and control systems through intended sequence. Record all data pertaining to system operation.

1. Contactors.
2. Starters.
3. Electrically operated circuit breakers.
4. Exercise each starter through entire operating sequence. Demonstrate that protective features such as phase failure, undervoltage and phase reversal are properly operating.
5. Rotating Equipment
   a) Verify proper voltage and phasing.
   b) Modify phasing as required for proper rotation.
   c) Measure line amperes (starting and running) and rpm.
   d) Demonstrate running of motors and operation of controls and interlocks.

260800-3.6 Ground fault.

a. Factory test switchboards at the manufacturer's factory prior to shipment as specified herein:

1. Furnish a ground fault protection system test for circuit testing and verification of the tripping of the ground fault relays at the factory location. Pass predetermined values of current through the relay sensors and measure the relay tripping time for each phase and the neutral sensor (if one is required). Compare the measured time-current relationships to the tri-characteristic curves for each relay. If the relay trips outside the range of values indicated on the curve, replace or recalibrate the relays. Include a polarity verification of the interconnection of the ground sensor circuits as a part of the test.
2. Have the proper voltages applied to their circuits and satisfactory operation demonstrated for additional auxiliary, pilot, control relays, electrically operated breakers, shunt-trip operated breakers, switches, etc.
3. Furnish in accordance with NEC Section 230-95(c), test results certified by the switchboard manufacturer. One reviewed copy to be available at the job site for review by the authorities having jurisdiction.
4. Upon completion of the factory ground fault protection system tests, the current and time adjustment on each relay are to be set on their minimum values.

b. After construction work is complete and prior to energizing of the switchboard(s), the ground fault protection system is to be field tested and reset to the manufacturer's recommended setting for both current and time by one of the following companies: General Electric Engineering and Service, or Westinghouse Engineering and Service.

1. The test procedure is to be similar to that specified for the factory test.
2. Notify Architect in writing at least two weeks prior to the day of the field test. Architect may witness the field test.
3. Furnish all field test results certified by the testing company listed hereinbefore.

260800-3.7 Low voltage metal enclosed switchgear.

a. Visually inspect bus structure to insure no foreign objects are present. Check tightness of all accessible bus joints to insure proper torque.

b. Measure insulation resistance of each bus section phase-to-phase and phase-to-ground with test voltage of 1,000 volts.

c. Check phase relationship of all main and tie breakers to insure that each phase is consistent throughout the structure.

d. Test and adjust all operating mechanisms to insure free movement.

e. Adjust all breaker trip and time delay settings to scheduled values.

260800-3.8 Secondary grounding.

a. Test service entrance ground resistance.

b. Provide additional made-electrodes if resistance is more than 3 ohms.

c. Test grounding system resistance within building at a minimum of four locations.

1. Assure system functions.

2. Assure system interfaces with other systems.

d. Test the system to determine that it is free from grounds, open and short circuits.

260800-3.9 Busway.

a. Visually inspect all connections for tightness and correctness.

b. Check access to all bus duct joints.

c. Inspect for proper bracing, suspension, alignment and enclosure ground.

d. Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA Table 10.12.

e. Test bus duct to ensure electrical continuity of bonding and grounding connections. Check phase-to-phase and phase-to-ground insulation resistance levels with a Biddle Megger or approved test instrument at a voltage of not less than 1,000 VDC and in accordance with NETA Table 10.1.

f. Measure and record the voltage and current in each feeder, and plug in bus duct after all connections have been made and the bus duct is under load.

g. Perform an overpotential test on each busway, phase-to-ground with phases not under test grounded, in accordance with the manufacturers published data and in accordance with NETA Table 10.17. The test voltage shall be applied for one minute.

h. Perform contact resistance test on each connection point of noninsulated busway. On insulated busway, measure resistance of assembled busway sections and compare values with adjacent phases.

i. Perform phasing test on each busway tie section energized by separate sources. Tests must be performed from their permanent sources.

260800-3.10 Packaged engine generator system.

a. Test generator and ATS in accordance with NFPA 110 , NETA 1999 Acceptance Testing Specifications for Electric Power Distribution Equipment and System, and regulatory requirements, including makeup and exhaust air damper functions and shall be developed by the contractor from a template provided by the Commissioning Authority.

b. Demonstrate operation of standby system with voltage check while the entire electrical system is operating at system full load condition to assure proper operation of generator, transfer switches, etc.

c. Simulate standby power conditions by operating main overcurrent devices to simulate a loss of main electrical power to the building.

d. Verify operation of all transfer switches and operation of all equipment on standby power. Check and adjust all delays and timing sequences.

e. Perform a full load test of the generator by applying a load bank to system equal to full load rating of generator for four hours.

f. Where building load is unavailable for testing or is less than full rated load of generator, provide resistive load bank connected into system to bring load up to full rating of generator.

g. During test, record the following at 20 minute intervals:

1. Kilowatts.

2. Amperes.

3. Voltage.

4. Coolant temperature.

5. Room temperature.

6. Frequency.

7. Oil pressure.

h. Test alarm and shutdown circuits by simulating conditions.

i. Test insulation resistance of generator field and exiter windings.

j. Based on vibration analysis, select vibration isolators and other dampening devices required to provide a smooth running installation.

260800-3.11 Dry type transformers, 600V and below.

a. Inspect all bolted electrical connections for high resistance by calibrated torque wrench method in accordance with manufacturers published data or NETA Table 10.12.

b. Perform resistance measurements through all bolted connections with a low-resistance ohmmeter in accordance with NETA Section 7.2.1.1.1.

c. Perform insulation resistance tests winding-to-winding and each winding-to-ground with test voltage in accordance with NETA Table 10.5.

d. Calculate polarization index.

e. Perform turns ratio tests at all tap positions.

f. Follow the inspection, testing and acceptance criteria for dry and wet transformers in the 1999 NETA Acceptance Testing Specifications for Electric Power Distribution Equipment and Systems.

260800-3.12 Fire alarm system.

a. Refer to section 13851 - Fire Alarm Systems and the following.

b. Test system in accordance with manufacturer's recommendations, and NFPA 72 and regulatory authority in presence of manufacturer's and Owner's representatives:

1. Perform a full point to point checkout and test of all enunciating devices and subsequent responses including verification of response at the fire alarm panel, including address verification, loss of power, off-site notifications, etc. and according to NFPA guidelines and all regulatory requirements.

2. Operate initiating devices.

3. Assure indicating devices operation.

4. Assure system functions.

5. Assure system interfaces with other systems.

c. Aest the system to determine that it is free from grounds, open and short circuits.

d. Testing will include other procedures to comply NFPA 72 and regulatory requirements, and shall be developed by the contractor from a template provided by the Commissioning Authority.

260800-3.13 Access control security system.

a. Refer to section 281300 - Electronic Access Control and the following.

b. Test system in accordance with manufacturer's recommendations in presence of manufacturer's and Owner's representatives:

1. Operate card reader devices.

2. Assure indicating devices operation.

3. Assure system functions.

4. Assure system interfaces with Door Holder and Fire Alarm System systems.

5. Follow City's Acceptance Testing Procedures.

c. Test the system to determine that it is free from grounds, open and short circuits.

260800-3.14 Closed circuit television (CCTV) system.

a. Refer to section 282300 - Closed Circuit Television (CCTV) Systems and the following.

b. Test system in accordance with manufacturer's recommendations in presence of manufacturer's and Owner's representatives:

1. Operate cameras.

2. Assure focus, visibility, camara aiming direction, etc. are to the satisfaction of the UTPD and owners representative.

3. Test digital recorder to assure proper recording and playback functions.

4. Assure system functions.

5. Assure system interfaces with the Access Control System systems.

6. Follow City's Acceptance Testing Procedures.

c. Test the system to determine that it is free from grounds, open and short circuits.

260800-3.15 Scheduled lighting controls.

a. Verify functionality and compliance with design intent. Verify proper operation of all control strategies, energy efficiency and self-diagnostics features by stepping through each sequence and documenting equipment and system performance, including scheduled on and off, unoccupied and manual modes, over-rides, lockouts and power failure. Verify time of day schedules and setpoints.

b. Utilize manual testing, and trending when available. The Contractor shall test all functions of all units and provide full documentation of testing. The Commissioning Authority will spot check 30% of the zones or at least four. If more than 10% or two zones fail, test another 10% sample. If the second sample fails the Contractor shall document retesting on all zones. If able to trend, trend all zones over a week period.

260800-3.16 Occupancy sensor lighting controls.

a. Verify functionality and compliance with design intent. Verify proper operation of all features including manual modes and over-rides.

b. Test all functions, including sensor sensitivity and time-to-OFF functions and ensure that sensor location is proper and won't be tripped inadvertently by other occupants and movements outdoors, etc.

c. Utilize manual test methods.

d. The Contractor shall test all functions of all units and provide full documentation of testing. The Commissioning Authority will spot check 10% of the sensors or six, whichever is greater. If more than 10% or two sensors fail, test another 10% sample. If the second sample fails the Contractor shall document retesting on all units.

e. Acceptance Criteria. Reasonable sensitivity, no inadvertent trips, lights go off within 15 seconds of design.

METHOD OF MEASUREMENT AND PAYMENT

260800-4.1 There will no separate measurement for payment on the work discussed in this section. All work will be considered incidental for the completion of the component of the work to which it is related.

END OF SECTION 260800

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Section 264130 Automatic Transfer Switches

264130-1.1 Section includes.

a. Furnish and install Automatic Transfer Switch including, but not limited to:

1. Transfer Switch

2. Switch Accessories

264130-1.2 Related sections.

a. Section 260580 - Supporting Devices.

b. Section 260530 - Maintenance Testing of Electrical Systems.

c. Section L-16231 - Packaged Engine Generator Systems.

264130-1.3 References.

a. UL 1008 - Automatic Transfer Switches.

b. AC 150/5340-30 - Design and Installation Details for Airport Visual Aids

c. FAA-E-2083 - Bypass Switch, Engine Generator.

264130-1.4 Submittals.

a. Submit product data.

b. Provide operation and maintenance manual.

264130-1.5 Quality assurance.

a. Regulatory Requirements:

1. Conform to applicable code for standby electrical systems.

2. Conform to UL 1008.

PRODUCTS

264130-2.1 Manufacturers.

a. Manufacturers include but are not limited to those listed. All proposed components and materials are subject to the approval of the engineer

b. ASCO.

c. Russelectric (Siemens).

d. Zenith (ABB).

e. Cummins

264130-2.2 Mechanically held transfer switch.

a. Configuration: Electrically-operated, mechanically-held transfer switch; dual-motor operated.

b. Service Entrance ratings adhering to all NEC codes and NFPA requirements.

c. Double-throw with simple over-center type linkage so that both sets of contacts move simultaneously.

d. Positively interlock, mechanically and electrically, the normal and emergency contacts to prevent simultaneous closing. Mechanically lock the switches without the use of hooks, latches, springs or semi-permanent magnets.

e. Provide separate arcing contacts for all poles. Molded case circuit breakers or contactors will not be acceptable. Provide brush type main contacts of silver alloy protected by arc barriers and arc quenchers.

f. Switches Rated 600 amperes above shall have segmented, blow-on construction for high withstand and close- on capability, and be protected by separate arcing contacts.

g. Equip transfer switch with permanently attached, safe, dead-front manual operator with same transfer speed as electrical operator to prevent flashovers.

h. Provide sturdily built operating mechanism of industrial type components which does not depend on critical electrical or mechanical adjustments. Use of miniature type limit switches and nonindustrial type components will not be acceptable.

i. Provide silver alloy contacts with a minimum rating of 10 amperes on all relays. Provide industrial type control that meet or exceed NEMA, IEEE, and FAA standards and are field adjustable and have front-accessible replaceable contacts.

j. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. Switches rated 600 amps and higher shall have front removable and replaceable contacts. All stationary and moveable contacts shall be replaceable without removing power conductors and/or bus bars.

k. Where neutral conductors are to be solidly connected as shown on the plans, a neutral conductor plate with fully rated AL-CU pressure connectors shall be provided.

l. Where neutral conductors must be switched as shown on the plans, the contactor shall be provided with fully rated switched neutral transfer contacts. Overlapping neutral contacts may be used as an alternative.

m. Ratings:

1. Voltage: 277/480 volt, 3 phase, 4 wire, 60 hertz.

2. Switched Poles: Four

3. Load Inrush Rating: Capable of transferring 600 percent rated current at 0.5 power factor between the 277/480 volt sources when sources are 120 degrees out of phase. Capable of closing on in-rush current equal to 20 times rating without excessive burning or welding of the contacts.

4. Continuous Rating: As scheduled.

5. Withstand Current Rating: 65,000 rms symmetrical amperes, when used with circuit breakers.

6. Size and rating as per drawings.

264130-2.3 Automatic sequence of operation.

a. Initiate Transfer of Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.

b. Monitor Before Transfer to Alternate Power Source: Frequency and voltage to be within acceptable limits.

c. Monitor normal source of power by use of voltage sensitive relays in each switch. Adjust relays to detect failure when any phase or leg drops below 70 percent of normal voltage and sense restoration when all phases or legs have returned to at least 90 percent of normal voltage.

d. Provide close differential (90 percent dropout and 95 percent pickup) relays on connected load which will prevent transfer of load to emergency source upon a voltage frequency drop until it has reached at least 90 percent of rated voltage and frequency.

e. Provide a solid state timer to signal the generator to start after an adjustable time delay of 0.5 to 6 seconds. Provide lockout relay to prevent transfer until the generating set has reached 90 percent of voltage rating and frequency.

f. Time Delay Before Transfer to Emergency Power: Provide adjustable time delay of 0 to 60 seconds on transfer to emergency.

g. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.

h. Time Delay Before Transfer to Normal Power: Provide an adjustable time delay on retransfer (0 to 25 minutes); factory set at 5 minutes, to assure a stable normal source before returning the load to the normal source. Include a bypass circuit switch to override time delay in the event of simultaneous failure of the emergency source and availability of a suitable normal source.

i. Time Delay on Retransfer: Provide an adjustable time delay between opening of emergency contacts and closing of normal contacts to allow motor loads to decay.

j. Time Delay on Engine Shutdown: Provide an adjustable time delay on retransfer to normal (0 to 5 minutes); factory set at 5 minutes.

k. Bypass-Isolation Switch

1. A two-way bypass-isolation switch shall provide manual bypass of the load to either source and permit isolation of the automatic transfer switch from all source and load power conductors. All main contacts shall be manually driven.

2. Power interconnections shall be silver-plated copper bus bar. The only field installed power connections shall be at the service and load terminals of the bypass-isolation switch. All control inter-wiring shall be provided with disconnect plugs.

3. Separate bypass and isolation handles shall be utilized to provide clear distinction between the functions. Handles shall be permanently affixed and operable without opening the enclosure door. Designs requiring insertion of loose operating handles or opening of the enclosure door to operate are not acceptable.

4. Bypass to the load-carrying source shall be accomplished with no interruption of power to the load (make before break contacts). Designs which disconnect the load when bypassing are not acceptable. The bypass handle shall have three operating modes: "Bypass to Normal," "Automatic," and "Bypass to Emergency." The operating speed of the bypass contacts shall be the same as the associated transfer switch and shall be independent of the speed at which the manual handle is operated. In the "Automatic" mode, the bypass contacts shall be out of the power circuit so that they will not be subjected to fault currents to which the system may be subjected.

5. The isolation handle shall provide three operating modes: "Closed," "Test," and "Open." The "Test" mode shall permit testing of the entire emergency power system, including the automatic transfer switch with no interruption of power to the load. The "Open" mode shall

completely isolate the automatic transfer switch from all source and load power conductors. When in the "Open" mode, it shall be possible to completely withdraw the automatic transfer switch for inspection or maintenance to conform to code requirements without removal of power conductors or the use of any tools.

6. When the isolation switch is in the "Test" or "Open" mode, the bypass switch shall function as a manual transfer switch.

7. Designs requiring operation of key interlocks for bypass isolation or ATS(s) which cannot be completely withdrawn when isolated are not acceptable.

l. Enclosure: Type 3R.

264130-2.4 Accessories.

a. Indicating Lights and Controllable Display with Keypad: Mount in cover of enclosure to indicate normal source available, alternate source available, switch position. A four line, 20 character LCD display and dynamic 4 button keypad shall be an integral part of the controller for viewing all available data and setting desired operational parameters.

b. Operational parameters shall also be available for viewing and limited control through the communications interface port. The following parameters shall only be adjustable via a password protected programming on the controller (dip switches shall not be acceptable):

1. Nominal line voltage and frequency

2. Single or three phase sensing

3. Operating parameter protection

4. Transfer operating mode configuration (Open transition, Closed transition, or Delayed transition)

c. Test Switch: Mount in cover of enclosure to simulate failure of normal source.

d. Return to Normal Switch: Mount in cover of enclosure to initiate manual transfer from alternate to normal source.

e. Auxiliary Contacts: One normally open; one normally closed for: transfer switch position, utility available and generator available.

f. Normal Source Monitor: Monitor each line of normal source voltage and frequency; initiate transfer when voltage drops below 85 percent or frequency varies more than 5 hertz from rated nominal value.

g. Alternate Source Monitor: Monitor alternate source voltage and frequency; inhibit transfer when voltage is below 85 percent or frequency varies more than 5 hertz from rated nominal voltage.

h. Provide a power monitoring system to measure (as a minimum) voltage, current, kW, kVAR and power factor. Provide with communication option for remote access.

i. Provide capability for remote control by the Air Traffic Control Tower (ATCT), through the Airfield Lighting Control and Monitoring System.

j. Use switchgear class wiring.

k. Provide maintenance bypass per the design drawings.

l. Provide monitoring, microprocessor shop drawing (MI Rated).

m. The generator controller shall be capable of performing the following:

n. The controller shall be capable of detecting a single phasing condition of a source, even though a voltage may be regenerated by the load. This condition shall be considered a failed source.

o. Time delays: Time delay setting shall be adjustable by the user as follows:

1. 0 to 10 seconds to override momentary normal source outages and delay all transfer and engine starting signals.

2. 0 to 60 minutes, for controlled timing of transfer of loads to emergency

3. 0 to 60 minutes on re-transfer to normal: This delay is automatically bypassed if the emergency source fails and the normal source is acceptable.

4. 0 to 60 minutes for shut down of engine generator for cool down

5. A time delay activated output signal shall also be provided to drive external relay(s) for selective load disconnect control. The controller shall be capable of controlling a maximum of 9 individual output time

6. delays to step loads on after a transfer occurs. Each output may be individually programmed for their own time delay of up to 60 minutes. Each sequence shall be independently programmed for

7. transferring from normal to emergency and transferring from emergency to normal.

8. The controller shall also include the following built-in time delays for the following operations:

a) 0 to 60 minute time delay on failure to acquire the acceptable electrical parameters from the emergency source

b) 0 to 60 minute time delay for a failure to synchronize on an in-phase operation.

c) 60 minute time delay for the load disconnect position for delayed transition operation.

p. The controller shall provide an internal engine exerciser allowing the user to program different exercise routines based on a calendar mode. For each routine, the user shall be able to:

1. Enable or disable the routine

2. Enable or disable transfer of the load during routine.

3. Set the start time, time of day, day of week, week of month (1 st, 2nd, 3rd, 4th, alternate or every)

4. Set the duration of the run.

5. At the end of the specified loaded exercise duration the switch shall transfer the load back to normal and run the generator for the specified cool down period. All loaded exercises shall be immediately ended and retransfer shall occur if the standby source fails. The next exercise period shall be displayed on the main screen with the type of exercise, time and date. The type of exercise and the time remaining shall be display when the exercise is active. It shall be possible of ending the exercise event with a single button push.

q. Self Diagnostics - The controller shall contain a diagnostic screen for the purpose of detecting system errors. This screen shall provide information on the status input signals to the controller which may be preventing load transfer commands from being completed.

r. Communications Interface - The controller shall be capable of interfacing, through a standard communications with a network of transfer switches and generators. It shall be able to be connected via an RS-485 serial communication (up to 4000 ft. direct connect or multi-drop configuration), an Ethernet

connectivity (over standard 10 base T Ethernet networks utilizing a RJ-45 port or remotely utilizing a dial-up modem). This module shall allow for seamless integration of existing or new communication transfer devices and generators. Monitoring software shall allow for the viewing, control and setup of parameters of the genset and transfer switch network through a standard personal computer utilizing current Microsoft operating systems. Separate and specific transfer switch software interfaces shall not be acceptable.

s. The transfer switch shall also be able to interface to 3rd party applications using Modbus RTU and Modbus TCP/IP open standard protocols utilizing Modbus register maps. Proprietary protocols shall not be acceptable.

EXECUTION

264130-3.1 Examination.

a. Verify that surfaces are ready to receive work.

b. Verify field measurements are as shown on Drawings.

c. Verify that required utilities are available, in proper location, and ready for use.

264130-3.2 Installation

a. Install in accordance with manufacturer's instructions.

b. Provide 4-inch concrete housekeeping pad with anchor bolts for floor mounted units. Bolt enclosure to pad plumb and square.

c. Provide time delay and auxiliary contacts to signal elevator controller prior to transfer in either direction.

METHOD OF MEASUREMENT AND PAYMENT

264130-4.1 Method of measurement.

a. A. Measurement for the Automatic Transfer Switch shall include all work and materials required by this specification and plan details including, but not limited to, the automatic transfer switches, enclosure, accessories, labels, testing, associated control conduit and cables.

264130-4.2 Basis of payment.

a. A. There will no separate payment on the work discussed in this section. All work will be considered incidental for the completion of the component of the work to which it is related. Payment for this section is incidental to the Package Engine Generator Line Item in Section L-16231.

END OF SECTION 264130

Contractor Questions
Addendum No. 2

To: All Plan Holders

Project: Taxiway Rehabilitation and Electrical Improvements

Airport: Texas Gulf Coast Regional Airport

KSA Project No.: 103006

Date: Wednesday October 08, 2025

Client Project No.: TxDOT CSJ No. 2612ANGLE

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1. Question: Per sheet C109 all PCCP is to be reinforced. Reinforcement details show #4 bars on 18" centers. Would welded wire fabric be acceptable as an alternative to rebar for reinforcement for panels?

   Response: No.

2. Question: Per sheet C109 Joint Details, each joint sealant calls out a detail either A or B. However there are 2 "Detail B" in the details, one for "Field Poured" and one for "Preformed Seal" however the joint details do not specify which is to be used. Please clarify when field poured or preformed is to be used in each instance.

   Response: Preformed seals are not allowed. Sealants will be field poured. Sheet C109 has been revised and reissued as part of this addendum.

3. Question: The phasing plans on sheets C012 thru C016 do not seem to line up with the phasing narratives on sheet C020. Please clarify the phasing and phasing limits for each phase.

   Response: Sheets C020 and C021 have been revised and are included with this addendum for information to coincide with information from sheets C012 through C016. For limits of phasing the phasing sheets C012 through C016 shall be referenced.

4. Question: In the prebid it was stated that the project duration for the base bid was 255 Calendar days, however sheet C020 specifies 330 Calendar Days. Please confirm the contract duration for the project.

   Response: The intent of the 330 Calendar Days listed on sheet C020 is for the maximum contract time (with all additive alternates awarded), which is actually 345 Calendar Days. This will be updated on the Issued for Construction Plans. However, the amount for the base bid, and any alternates, is as listed on the Bid Form.

5. Question: It was stated in the prebid but we would like to request a 1 week extension to the bid date due to the fact that October 9th is the same day as the TXDOT letting.

   Response: The bid opening date was modified via Addendum No. 1.

6. Question: The joint sealant for Type E Doweled Construction Joint calls out Detail C however there is no Detail C on the page. Please clarify the joint sealant for Detail C for the Type E Doweled Construction Joint.

   Response: The sealing of construction joints would be per Detail B field poured. Sheet C109 has been revised and reissued as part of this addendum.

7. Question: Bid schedule 1 has a bid item for Pipe underdrains of 4,086 LF. Can you confirm that if using bid schedule 2 there are no pipe underdrains?

   Response: The underdrains have been removed from the contract. The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

8. Question: Plan Sheet C054 in the drainage plans calls for a dual drainage line however in the notes is states "Prop.XX CMP". The bid item for this calls out 36" Class V RCP. Please confirm the size and material makeup of this drainage line. Please also provide the profile depths for this line.

   Response: Please refer to revised sheet C054 that has been revised to correct this callout. The revised sheet C054 is included with this addendum.

9. Question: Bid Alternate 3 calls for an additional 100 LF of 36" Class V RCP however we are unable to locate this on the plans. Please confirm the location and profiles for this bid item.

   Response: Please refer to the revised sheet C051 which is included in this addendum.

10. Question: Bid Alternate 3 also calls for 2 EA Storm Sewer Junction Boxes however no indication to size is specified. Please provide the details including dimensions for these junction boxes.

    Response: Details for the storm sewer structures are included on Sheet C056. Refer to revised sheet C051 for additional information of size of pipes coming into and out of those structures to assist with sizing the structure appropriately.

11. Question: Can you please confirm the backfill requirements for the SET's. The backfill specifications state to refer to the detail sheet in the plan set however we are unable to locate this detail sheet.

    Response: Backfill for SET's will be in accordance with the FAA P-152 specification.

12. Question: In the project manual there is an item KSA-100 Night work. In the basis of payment is states that this will be paid per lump sum for night work cost of personnel and equipment needed to conduct pavement work activities at night as specified in the phasing plan. However in the bid form there is not an item KSA-100, Please clarify how this is to be paid.

    Response: The KSA-100 specification is being removed from the contract documents as part of this addendum. The cost associated with night work will not be paid directly but will be subsidiary to the project.

13. Question: For the Full Depth Asphalt and Concrete pavement removals please clarify the pavement sections in these areas to know the depths of removal.

    Response: Please refer to the bore logs in the geotechnical investigation report that is included in Appendix A of the Contract Document and Specifications document. The geotechnical report includes bore logs that reflect existing pavement information. This represents the information we have available regarding the existing pavements.

14. Question: For bid schedule Number 2 item number 22 (P-403-8.1 on the bid form this item is calling out 6" asphalt stabilized base, however the plan sheets G04 as well as the typical sections sheet C088 are specifying this to be 5". Please clarify the thickness of the P-403 under the PCCP for bid schedule number 2. Same question applies to each of the ADD Alternates 2-4 (for both bid schedules). The bid form shows 6" however the plan sheets call out 5".

    Response: The thickness of the asphalt stabilized base course associated with the rigid pavement section is 5". The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

15. Question: Could HDPE pipe be used in lieu of RCP?

    Response: No.

16. Question: Bid Item 1.23 5" Asphalt Stabilized Base Course 3,820 SY. I believe this should be Tons instead of Square Yards correct?

    Response: The correct unit for Pay Item 1.23 in Bid Schedule No. 1 is "TON". The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

17. Question: Where is bid Item 1.22 Full depth pavement repair 1,000 SY located?

    Response: The 1,000 SY allocated for full depth pavement repair is an undistributed quantity. The intent of this item is to address any locations of soft spots that are identified during the milling operations for the pavements scheduled for milling and overlay. Refer to Detail 6 on Revised Sheet C088 included with this addendum for a detail related to full depth pavement repair.

18. Question: The alternate bid items have 6" Asphalt Stabilized Base items. The typical sections on sheet C088 only show the 5" Asphalt Stabilized Base. Please advise.

    Response: The appropriate thickness associated with the stabilized base course is 5". The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

19. Question: Can you please provide a detail for the fence (1.94) and gate (1.95)? It is not shown in the plans.

    Response: Refer to sheets C132 through C134 for the Airfield Electric Vault Civil Site Details, that have been added via this addendum for additional information.

20. Question: Where does the embankment pay for?

    Response: Please refer to the FAA P-152 specification, specifically section 2.8 Formation of Embankments which says "There will be no separate measurement of payment for compacted embankment. All costs incidental to placing in lifts, compacting, discing, watering, mixing, sloping, and other operations necessary for construction of embankments will be included in the contract price for excavation, borrow, or other items."

21. Question: Where is the 100 LF of 36" RCP and the storm structures for Alternate 3 located?

    Response: Please refer to the revised sheet C051 which is included in this addendum.

22. Question: Is the Contractor able to rely-on information provided in the bid package about site conditions in preparing its bid?

    Response: Yes, and any information gained from the site visit that followed the pre-bid meeting.

23. Question: Are the Owner's answers to questions pre-bid questions part of the Contract Documents?

    Response: The only answers to questions that become part of the Contract Documents are the answers included to contractor questions that were included in Addendum No. 1, and this Addendum.

24. Question: Please confirm that Contractor's review of the dimensions, elevations and quantities in the bid package is made in its capacity as a construction contractor (as opposed to a licensed design professional) and that as a construction contractor, Contractor is not liable for failing to discover design errors or omissions or ascertaining the project's design compliance with applicable laws or codes.

    Response: Please refer to the Texas Department of Transportation Aviation Division Construction Contract General Provisions, Volume February 2013 for the answer to your question. The Texas Department of Transportation Aviation Division Construction Contract General Provisions are part of the contract documents for this project.

25. Question: If the Contractor sustains a delay to the critical path because of a Force Majeure Event, will the Owner compensate the Contractor in time and extended general conditions?

    Response: Please refer to the Texas Department of Transportation Aviation Division Construction Contract General Provisions, Volume February 2013 for the answer to your question. The Texas Department of Transportation Aviation Division Construction Contract General Provisions are part of the contract documents for this project.

26. Question: If Contractor makes a successful claim for concealed or unknown site conditions, is the Contractor allowed both additional time and extended general conditions for the delays to the critical path?

    Response: Please refer to the Texas Department of Transportation Aviation Division Construction Contract General Provisions, Volume February 2013 for the answer to your question. The Texas Department of Transportation Aviation Division Construction Contract General Provisions are part of the contract documents for this project.

27. Question: If the Contractor suffers a delay to the critical path caused by a 3rd party, such as a delay caused by a utility relocation or other 3rd party delay, will the Owner compensate the Contractor in additional time and extended general conditions?

    Response: Please refer to the Texas Department of Transportation Aviation Division Construction Contract General Provisions, Volume February 2013 for the answer to your question. The Texas Department of Transportation Aviation Division Construction Contract General Provisions are part of the contract documents for this project.

28. Question: If the Contract suffers a delay to the critical path caused by the Owner, will the Owner compensate the Contractor is both additional time and extended general conditions.

    Response: Please refer to the Texas Department of Transportation Aviation Division Construction Contract General Provisions, Volume February 2013 for the answer to your question. The Texas Department of Transportation Aviation Division Construction Contract General Provisions are part of the contract documents for this project.

29. Question: There are several bid items for temporary pavement markings for each phase, however there is no removal item that covers these quantities. How are the temp pavement markings to be removed?

    Response: The temporary markings do not require removal. Other than the cleaning of the temporary markings from any debris or foreign substance prior to installation of permanent markings, the permanent markings will be applied atop the temporary markings.

30. Question: On the temporary threshold bid item it appears to call out for removal existing markings, placement of new temp markings and removal of those temp markings however I do not see anything called out for the replacement of the threshold back to original conditions. Am I missing something there or how is the restoration of the runway threshold to be paid?

    Response: The permanent markings are located on the Marking Plan sheets which are sheets C121 through C126. The reinstallation of the threshold bar, and other markings are outlined on the aforementioned sheets. The work covered on the aforementioned sheets are paid via the pay items associated with P-620-5.2a through P-620-5.2d. The intent of sheet C017 is to provide the quantities of marking installation/removal that are subsidiary to the pay associated with the "Temporary Relocated Runway 35 Threshold" pay item covered under C-105-8.3.

31. Question: On the bid form for Bid schedule 1 item 1.22 5" Asphalt Stabilized Base Course calls out a unit of SY and a quantity of 3820. However on the plan sheets this shows to be a unit of "Tons". Please confirm that the correct unit for this item is "Tons" and adjust accordingly.

    Response: The correct unit for Pay Item 1.23 in Bid Schedule No. 1 is "TON". The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

32. Question: With the DBE Goal being required to be submitted within 5 days of bid submission and assuming the department will not have made a decision on which of the add alternates will be included in the contract can you provide some clarity on how the percentages are to be calculated? Being that the department has the option to select none, any or all of the add alternates should DBE goals, commitments and percentages be calculated solely on the base bid at this point? Additionally, are we required to submit separate goals for each of the Bid Schedules?

    Response: Reference Item IA, Notice to Bidders, on the addendum cover letter.

33. Question: FAA Utility Notes 4 on plan sheet EL001, what type of cable splices kits and how many does the contractor need to keep on hand?

    Response: This will need to be coordinated with local FAA representative after bid has been awarded.

34. Question: FAA Utility Notes 4 on plan sheet EL001, what type of cable/s and how many feet of each type does the contractor need to keep on hand?

    Response: This will need to be coordinated with local FAA representative after bid has been awarded.

35. Question: Can you provide specification section 16413-Automatic Transfer Switches.

    Response: A specification for Automatic Transfer has been provided with Addendum 2, see 264130 – Automatic Transfer Switches.

36. Question: Can you provide specification section 16080-Electrcial Testing.

    Response: A specification for Electrical Testing has been provided with Addendum 2, see 260800 – Electrical Testing.

37. Question: On the phasing layout sheets C012 through C016 on the legend there is a marking for "flagperson", however there are no indications that the phases will require flaggers. Can you confirm that no airfield flagging will be required per the prescribed phasing layout plans?

    Response: Flaggers will be required to an extent during construction. The reason flaggers are not shown is that the number of flaggers will vary from contractor to contractor based on the plan a contractor develops to comply with the construction phasing plan requirements. Anytime a vehicle or personnel are moving inside the AOA, the vehicle or personnel shall either be escorted, where the escort has an aviation band radio, and or in conjunction with flaggers that are equipped with aviation band radios. Normally a combination of both flaggers and escorts are required to efficiently manage a contractor's vehicle traffic within the AOA.

38. Question: I just received an email from the AGC regarding an update to the TXDOT DBE program which stated in part "TxDOT will pause the use of DBE participation goals on all federally funded transportation projects included in construction lettings and PEPS postings, effective immediately.", Can you confirm that this would apply to this particular project or will the DBE goal and submission still be required? (I have attached the "DBE IFR Guidance" pdf referenced in the email I received for your reference).

    Response: Reference Item IA, Notice to Bidders, on the addendum cover letter.

39. Question: Sheet C058 at Taxiway J there is a callout for a "Proposed Gravel Access Drive See Detail Sheet X". I do not see a sheet X included in the plan set, could you please provide the detail referenced as well as an indication as to where this item is to be paid for?

    Response: Please refer to the revised Sheet C058 which is included in this Addendum.

40. Question: In the project manual section P152-2.3 "Borrow Excavation" it states that "Borrow areas are not required". In our preliminary takeoffs we are showing that although the qtys seem to balance, due to phasing and the phase specific construction activity sequencing provided on sheets C012 through C016 there will actually be areas where borrow is needed and then in later sections excess material hauled off. Due to this sequencing and borrow requirements please specify the parameters for borrow material to be used for the project.

    Response: Please refer to the revised P-152 specification and Revised Bid Form that are included in this Addendum.

41. Question: Specification Section L-16231-1.2 references a related spec section 16413 for the Automatic Transfer Switch. This section does not appear to be included with the bid documents. Please provide contractors with a copy of this specification.

    Response: A specification for Automatic Transfer has been provided with Addendum 2, see 261430 – Automatic Transfer Switches.

42. Question: Will the new standby generator require any control / monitoring connections to the airfield lighting control system and/or ATCT?

    Response: No, the new standby generator for the vault will not be connected to the airfield lighting control system.

43. Question: Bid Schedule No. 1, Items 1.61; 1.62 & 1.63 call for L-828 Constant Current Regulators. Bid Schedule No. 2, Items 1.61; 1.62 & 1.63 are calling for L-829 Constant Current Regulators. Is this a typo or is the contractor actually required to provide L-829 CCR's for Bid Schedule No. 2?

    Response: All new regulators being installed on the project, across both bid schedules, should be L-829 with Internal Resistance Monitoring (IRMS) capabilities.

44. Question: As it pertains to Item L-130-5.1 please indicate the Papi style and number of boxes needed? There are contradictory details amongst the bid form, plans, and specifications. The bid form is calling for 4 box voltage driven (Style A) system, the plans are calling for a 4 box current driven (Style B) system, The specification is calling for a 2 box current driven (Style B) system.

    Response: The PAPI system at both approaches will be L-880 (4 Box) Style B (Current Driven). This will be clarified in the plans, specs, and bid form with Addendum 2.

45. Question: As it pertains to Bid Schedule 2 Items L-109-5.2 through L-109-5.4, are the L-829 regulators to be equipped with Internal Resistance Monitoring (IRMS) capabilities?

    Response: All new regulators being installed on the project, across both bid schedules, should be L-829 with Internal Resistance Monitoring (IRMS) capabilities.

46. Question: Reference Drawing EL402, Detail 3: Is the contractor responsible for the installation of the new wooden power pole with 2" conduit riser, 2" underground raceway and junction structure?

    Response: Yes, the contractor will be responsible for the installation of the new pole for the weatherhead, 2” conduit riser, 2” pathway between the transformer pole and meter rack, and the installation of the junction structure.

47. Question: If the underground junction structure is to be furnished and installed by the contractor, please provide specifications for this box?

    Response: Refer to 4/EL510 for the detail for this structure. This structure will be furnished and installed by the contractor. Sheet EL510 has been revised and is included with this addendum.

48. Question: Can you provide specifications for 3-ton HVAC unit.

    Response: No additional specifications will be provided for the HVAC unit, there are performance specs for this unit on the contract drawings.

49. Question: Bid item 1.41 Remove 2- inch conduit (including cable). Is the intent to dig up 43,215 LF of 2-inch conduit?

    Response: No, this is not the intent, the language in the Measurement and Payment section for this work has been revised to reflect this. Excavation for the sole purpose of removing existing conduit noted for demolition is not required.

50. Question: Remove No. 8 AWG, L-824C Cable in duct. Is this to be salvaged to the airport or disposed by the electrical contractor?

    Response: Salvage conductor or dispose of it as directed by the engineer.

51. Question: Referring to bid items 1.94 and 1.95, where is this 160 LF of Wrought Iron Fencing to be installed? We cannot locate this on the plans.

    Response: Refer to sheets C132 through C134 for the Airfield Electric Vault Civil Site Details, that have been added via this addendum for additional information.

52. Question: Can an alternative TxDOT mix design be provided in-lieu of P-501? If the Schedule 1 Alternates are selected, we are looking at a total of 3594 CY of material if all the alternates are selected. This material is only being placed on the fillets/shoulders for Alternates 2 & 3 (1013 CY & 1877 CY respectively) and for the construction of Taxiway H for Alternate 4 (704 CY). With the location of this project, and the small quantities for the Schedule 1 Alternates, we are having a difficult time securing a supplier who is willing to produce the P-501 mix design.

    Response: No, there is no acceptable TxDOT mix design that can be used in lieu of P-501.

53. Question: The Temporary relocated runway 35 threshold marking page stipulates that the ground chevrons need to be many other optional things outside of just paint. Please clarify what the preferred material is? We would like to proceed with pricing and application utilizing preformed thermoplastic.

    Response: Thermoplastic material installation for these items is not allowed. Referring to detail 8 on sheet C019, note 3 states that "chevrons and the temporary threshold bar shall be prefabricated and made from a material such as; double layered snow fence, colored tarps/canvas, colored plastic, plywood, or similar material….".

54. Question: Assuming that we are water blasting everything for the pavement marking removal, is there a water source and the dumpsite access available at the facility, or will we need to find an outside source?

    Response: There is a water source onsite that the contractor can use, as long as a meter is obtained from the City of Angleton. Regarding dumpsite access, the contract documents require that any materials being removed shall be disposed of off airport property, according to any applicable laws and regulations.

55. Question: Please confirm that reflective pavement markings will require 2 passes, and the non reflective will only require 1 pass. We did not see any requirement stated in the specifications.

    Response: Permanent Markings require 2 passes in opposite directions. Temporary Markings require only 1 pass.

56. Question: Regarding the green lighted reflector (KSA-701), is there a spec hardware itself and the required mounting/adhesive for this reflector?

    Response: The installation of the reflectors on the pavement shall performed per manufacturers instructions.

57. Question: Bid item 1.49 in Schedule 1 has a quantity of 2 Lump Sum. Please clarify if this quantity is to be 2 EA or 1 LS. This also applies to bid item 1.49 in Schedule 2.

    Response: The appropriate unit for this pay item is "EA". The quantity for this pay item is 2. The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

58. Question: Bid item 1.55 in Schedule 1 has a quantity of 76,550 LS. Please confirm if this is to be measured by LF.

    Response: The correct unit for Pay Item 1.55 in Bid Schedule No. 1 is "LF". The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

59. Question: Bid Item 1.23, 5" Asphalt Stabilized Base Course, in Schedule 1 has a quantity of 3,820 SY. According to Specification P-403, this item is to be paid by the ton. Is this quantity/unit of measurement correct? Every other bid item that has stabilized base course is measured by tonnage on the bid form.

    Response: The correct unit for Pay Item 1.23 in Bid Schedule No. 1 is "TON". The Bid Form has been revised accordingly. The revised Bid Form is included in this addendum.

60. Question: On sheet C054 STA 66+00, there is a call out for "Proposed XX CMP w/SET Both Ends." Is this meant to be the 36" RCP? Just want to clarify that we are to price RCP as the bid form states, and not CMP. Sheet C062 has the same call out.

    Response: Please refer to revised sheet C054 that has been revised to correct this callout. The revised sheet C054 is included with this addendum.

61. Question: On sheet C054 STA 66+00, what is the depth/flow line of the proposed drainage pipe? Is the intent for the proposed RCP to be placed at the depth shown for the existing CMP on the profile view on sheet C062?.

    Response: Please refer to revised sheet C054 that has been revised to include flow line information. The revised sheet C054 is included with this addendum.

62. Question: Will TxDOT Item 276 material or another alternative material be accepted in lieu of P-304 for the Cement Treated Base? We are having a difficult time finding a supplier in the area who is willing to produce the P-304.

    Response: No.

63. Question: For detail 2/EL402, please specify what type of concrete to use for the vault building foundation.

    Response: The details associated with the vault foundation can be found on sheet C132 through C134 that are included with this addendum.

64. Question: For detail 2/EL402, please specify what type of rebar to use in the vault building foundation.

    Response: The details associated with the vault foundation can be found on sheet C132 through C134 that are included with this addendum.

65. Question: Please provide a Pull Box detail for Bid Item 1.81.

    Response: Please refer to detail 4 on the revised sheet EL510 included with this addendum.

66. Question: For detail 3/EL402, please verify who is providing the Junction Structure for the vault.

    Response: The junction structure for electrical service to the vault will be furnished and installed by the contractor.

67. Question: Per Addendum No. 1, Bid Item 1.90 will be revised to 1-MOD Size 4. Please confirm whether a new bid item will be added for the 4-MOD Size 4 signs shown on the plans, or if these are to be included under the revised Bid Item 1.90.

    Response: There are no 4-MOD Size 4 signs being installed on the project.

68. Question: If a 10’ x 17’ x 8’-6” mini vault structure is not available can a 10’ x 12’ x 8’-6” mini vault structure suffice?

    Response: No, the vault structure will need to be at least the size noted on the contract drawings in order to adequately house all proposed equipment.

69. Question: Please provide sectional details of the prefabricated vault and vault foundation.

    Response: The prefabricated vault structure details are outlind on sheet EL402. The details associated with the vault foundation can be found on sheet C132 through C134 that are included with this addendum.

70. Question: Please provide a pull can detail for bid item 1.80.

    Response: Please refer to detail 2 on sheet EL510.

71. Question: Can you verify the contract duration. When adding together the calendar days listed in the phasing plan I get 260 calendar days for the base bid.

    Response: The correct duration for the base bid is 260 calendar days. The bid form and Sheet C011 have been updated accordingly. If all alternates are awarded then the maximum contract duration is 350 calendar days.