

**PRELIMINARY DESIGN OF AIRFIELD COMPONENTS (25%)
ESTIMATE OF PROBABLE CONSTRUCTION COST**

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Exhibit 1: Preliminary Design of Airfield Components (25%) – Estimate of Probable Construction Cost – Sub-package Area Plan

Attachment 1: Preliminary Design of Airfield Components (25%) – Estimate of Probable Construction Cost

PRELIMINARY DESIGN OF AIRFIELD COMPONENTS (25%)
ESTIMATE OF PROBABLE CONSTRUCTION COST

1. INTRODUCTION

The Tucson Airport Authority (TAA) has embarked on an Environmental Impact Statement (EIS) Phase II for the proposed Airfield Safety Enhancement Project at Tucson International Airport (TUS). This report provides the prime consultant, Landrum & Brown (L&B), with an Estimate of Probable Construction Cost based on the *Preliminary Design of Airfield Components (25%)* submitted by TYLI on February 9, 2018.

2. SCOPE OF ESTIMATE

The Estimate of Probable Construction Cost includes the following tasks and products:

- Calculate quantity take-offs from *Preliminary Design of Airfield Components (25%)* by TYLI dated February 9, 2018
- Provide a project work area plan defining sub-package breakdown
- Develop construction line items based on *FAA AC 150/5370-10D Standards for Specifying Construction of Airports*
- Establish unit prices reflective of TUS local market using TAA provided bid tabs
- Provide a total construction cost with a design contingency (15%), phasing/temporary construction contingency (5%), and allowance for hazardous materials (5%)
- Include program environmental costs including noise mitigation, Pima pineapple cactus mitigation, biological resource mitigation, and EDDA update.

3. SUBPACKAGE BREAKOUT

The airfield construction package is broken into nine (9) sub-package areas.

**Proposed Airfield Safety Enhancement Project
EIS Phase II**

- Area 1 – Demolish existing Taxiway A2 and part of A1. Construct new Taxiways A1, A2, and F
- Area 2 – Construct Taxiway E with south side Taxiways E1, E3, E11, and E13; construct all north side connectors from Taxiway E to RSA of Runway 13R-31L including A3, A5, E2, E4, E6, and E8; rehabilitate Taxiway C in segment E1 to E3 and segment E11 to E13
- Area 3 – Demolish existing Runway 11R-29L, connectors to RSA of Runway 11L-29R, and 6,000 LF of AOA fencing. Construct Runway 13R-31L, Taxiway H and north side connectors to RSA of Runway 11L-29R plus 7,000 LF of new AOA fencing from former ECM site east to East Hughes Access Road. Include Runway 31L REILS and Runway 13R-31L PAPIs.
- Area 4 – Demolish existing Taxiway A5 and A6. Construct new Taxiway A5
- Area 5 – Demolish A7 and short connector from Taxiway A to Terminal Apron; construct new Taxiway A8 from Taxiway A to Runway 11L-29R. Construct new Taxiway A8 from Taxiway A to Terminal Apron. The demolition of existing Taxiways A9 and A10 is by others.
- Area 6 – Demolish Taxiway A15 and construct new Taxiway A14. The demolition of A14 is by others.
- Area 7 – Construct new Taxiway A15
- Area 8 – Demolish existing Runway 11L-29R south side connectors from runway edge of pavement to RSA. Construct taxiway connectors from renamed Runway 13L-31R RSA south to RSA including A3, A5, A8, A11, A13 A14, A15 and A17; construct new Runway 13L glide slope, new Runway 13L-31R PAPIs and new 13L MALSR.

4. ASSUMPTIONS USED IN PREPARING ESTIMATE

- Breakout all airfield lighting, signage and drainage into sub-package areas; the final sequence of construction may shift costs among the sub-package areas.
- Land, appraisal, and title reports will be done by others and are not in estimate

**Proposed Airfield Safety Enhancement Project
EIS Phase II**

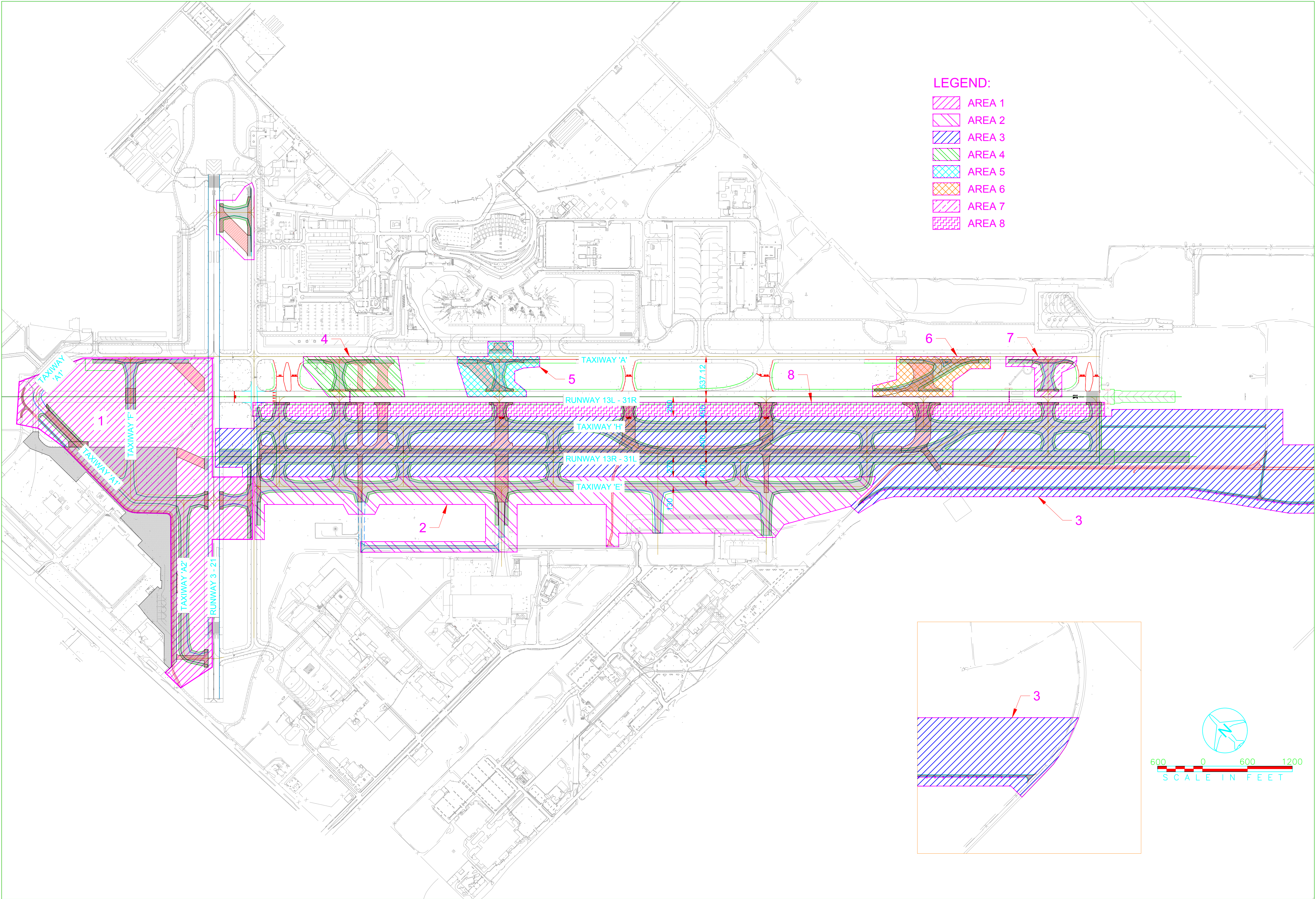
- BAK-12/14 modifications will be done by others and are not in estimate
- The construction of Arm/De-arm pad is done by others and is not in the estimate
- Taxiway D2 will be done by others and is not in estimate
- Install a new taxiway and service road on the existing aircraft ramp along the alignment of proposed Taxiway A1 and A2
- Airfield signage quantities are based on the *TIA Runway and Taxiway Signage and Markings* plan dated 3/14/2018 as provided by TAA. New airfield signage located outside of the original project limits are listed under the Airfield Renaming and Markings heading.
- The airfield signage unit cost assumes new assemblies and an average multi-panel unit cost of \$10,000 per each
- TAA will change the nomenclature of Runways 11L-29R and 11R-29L to Runways 13L-31R and 13R-31L, plus Runway 3-21 to 5-23.
- Demolition of structures cost based on the survey provided by TAA and Goggle Earth aerial observations
- The Demolition of ECM line item cost was obtained from the *Demolition of Earth-Covered Magazines – Preliminary Quantity Cost Estimate* by TYLin dated January 15, 2018. This estimate also includes the installation of 2,300 LF of new security fence
- ECM Replacement cost was provided by TAA at a lump sum \$5.8 million
- Program Environmental Costs provided by L&B
 - Noise Mitigation
 - o Soft costs including testing for eligibility, outreach and customer service, construction administration, post testing, and final reporting for \$1,000,000

**Proposed Airfield Safety Enhancement Project
EIS Phase II**

- o Sound Insulation Hard Costs - \$40,000 per unit for 49 units equals a total of \$1,960,000. Assumes all units would be eligible for sound insulation with an interior noise level at DNL 45 dB or above. No acquisition costs are provided for the 20 mobile homes potentially impacted as any potential offers from the Airport would depend upon local appraised values.
- Pima Pineapple Cactus (PPC) Mitigation
 - o Conservation Banking- Cost per credit is \$5,500 at the Palo Alto Conservation Bank. Estimated total for 24 acres =\$132,000
 - o PCC Transplant - \$31,048
 - o PCC Post-Transplant Monitoring - \$29,460
 - o Preserved In-Place PCC Monitoring - \$3,750
- Other Biological Resource Mitigation
 - o NPPO Surveys - \$33,318
 - o WBO burrow surveys prior to construction disturbance - \$22,068
 - o MBTA surveys - \$17,620
 - o Environmental awareness training, in particular for WBO, bird nesting, tortoise, and PPC - \$7,730
- Update the EDDA and Conduct Surveys on 12 ECMs
 - o Phase I EDDA Update - \$4,204
 - o Asbestos survey - \$12,069
 - o Lead based paint survey - \$5,361

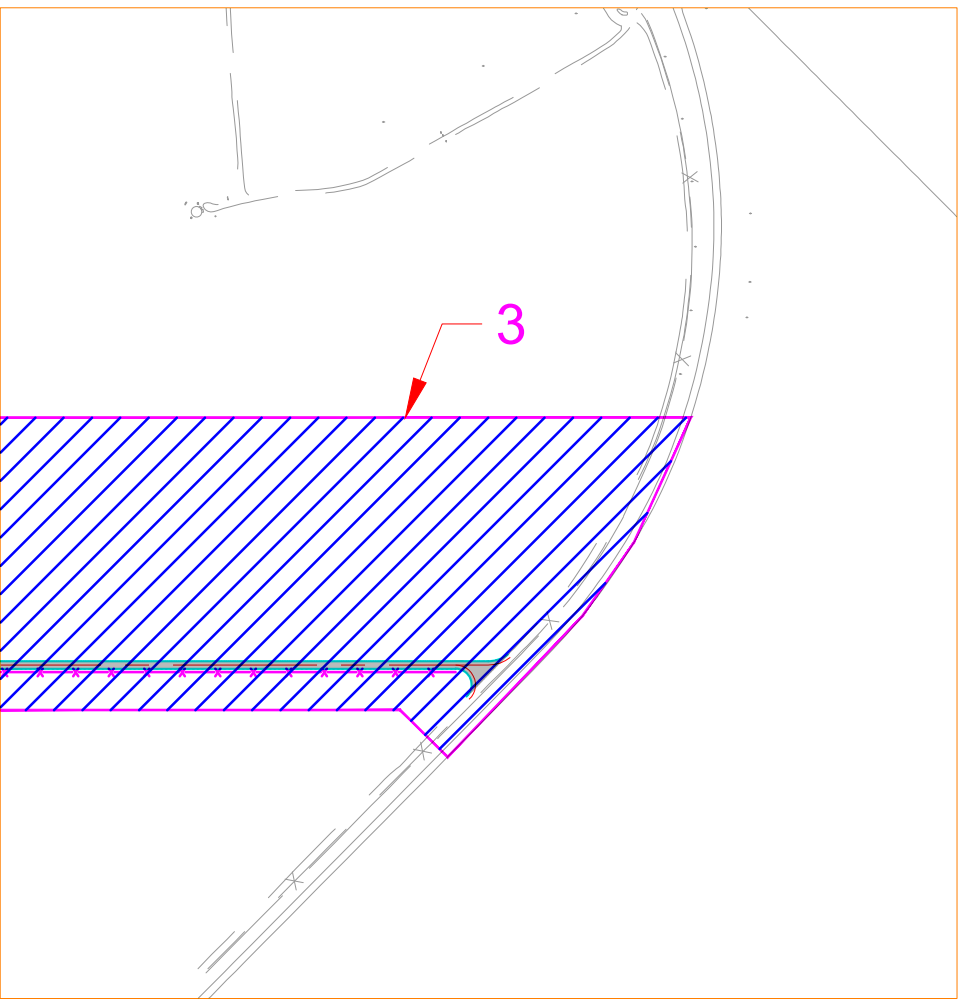
**Proposed Airfield Safety Enhancement Project
EIS Phase II**

- Mobilization costs are estimated a 3.0% of construction subtotal cost
- General Condition costs are estimated at 3.0% of construction subtotal cost
- P-156 Temporary Air and Water Pollution, soil Erosion, and Siltation Control Costs are estimated at 1.0% of the construction subtotal cost
- References to north and south in this report are based on plan view and not magnetic heading



LEGEND:

- AREA 1
- AREA 2
- AREA 3
- AREA 4
- AREA 5
- AREA 6
- AREA 7
- AREA 8



PLANS PREPARED BY:
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SEAL

NO.	REVISIONS / SUBMISSIONS	DATE

TUCSON
AIRPORT AUTHORITY
TUCSON INTERNATIONAL AIRPORT RYAN AIRFIELD
TUS EIS PHASE II - 25% AIRFIELD DESIGN

DESIGNED BY: R.H.
DRAWN BY: R.H.
CHECKED BY: A.O.C.
DATE: 02-08-2018
SCALE: AS INDICATED
TAA PROJ.#
10112255 EIS

SHEET OVERVIEW TITLE
**ESTIMATE OF PROBABLE
CONSTRUCTION COST
SUB-PACKAGE AREA PLAN**

SHEET REFERENCE NUMBER:
EXHIBIT 1
SHEET XX OF 83

(REMOVED TAXIWAY A-2 AND TAXIWAY A-8 IN AREA A-5; ADJUSTED DRAINAGE ITEMS;
T.Y. LIN INTERNATIONAL, INC. 8-2-2018

SUBTOTAL	\$ 1,677,071.94	\$ 6,006,000.00	\$ 1,577,941.98	\$ 2,440,000.00	\$ 2,361,741.92	\$ 1,020,524.67	\$ 1,564,600.00	\$ -	\$ 2,852,400.00	\$ 4,408,628.40	\$ 11,295,377.92	\$ 992,100.00	\$ -
FIELD REPLY/DESIGN CONTRACTORS/CONTRACTORS	\$ 114,203.16	\$ 930,000.00	\$ 3,365,799.00	\$ 212,000.00	\$ 3,454,257.21	\$ 12,330,378.00	\$ 2,750,000.00	\$ -	\$ 39,680.13	\$ 211,294.46	\$ 148,815.65	\$ 21,233,774.90	\$ -
MANUFACTURING CONTRACTORS/CONTRACTORS	\$ 88,310.35	\$ 312,000.00	\$ 788,759.00	\$ -	\$ 1,418,065.74	\$ 4,024,226.52	\$ 85,250.00	\$ -	\$ 18,620.04	\$ 70,435.40	\$ 58,525.57	\$ 48,665.20	\$ 7,737,604.94
ALLOWANCE FOR INDETERMINATE MATERIALS/ SUPPLIES	\$ -	\$ -	\$ 788,599.75	\$ -	\$ 788,599.75	\$ 2,732,500.00	\$ 2,732,500.00	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
ALLOWANCE FOR CONTRACTORS MATERIALS/ SUPPLIES	\$ 1,452,536.34	\$ 7,527,500.00	\$ 1,743,193.72	\$ 2,675,000.00	\$ 2,765,143.40	\$ 13,050,555.94	\$ 1,230,752.44	\$ -	\$ 3,250,501.27	\$ 1,760,787.92	\$ 13,970,824.31	\$ 1,240,130.00	\$ 18,737,428.19

ENVIRONMENTAL COSTS SUBTOTAL	\$	3,147,128.00
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