PRE-FINAL ENGINEER'S DESIGN REPORT

PMGAA Runway 12R-30L Reconstruction

PMGAA Project No.: 1072
PMGAA Solicitation No.: 2023-022-IFB
FAA Project No.: 3-04-0078-057-2022
ADOT Grant No.: TBD
Dibble Project No.: 1020023.2303

Taxiway H Demolition and Taxiway B2 Construction

PMGAA Project No.: 741
PMGAA Solicitation No.: 2023-022-IFB
ADOT Grant No.: TBD
Kimley-Horn Project No.: 091134047

Prepared For: Phoenix-Mesa Gateway Airport Authority

April 26, 2023

DIBBLE

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Prepared For:
Phoenix-Mesa Gateway Airport Authority
6033 S Sossaman Rd, Mesa, AZ 85212

April 26, 2023

Jared Bass, PE
Vice President, Sr. Project Manager
Dibble

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List of Exhibits

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Appendices

1. GENERAL PROJECT INFORMATION

The Phoenix-Mesa Gateway Airport (PMGAA or Airport) requested that Dibble provide design and bid phase services for the *Runway '12R-30L' Reconstruction* project. The *Runway '12R-30L' Reconstruction* project includes Base Bid, Additive Alternate Bid 1, and Additive Alternate Bid 2 to accommodate the anticipated 2023 funding, (federal, state and local). Base Bid (Schedule I) includes reconstructing approximately 1,690-feet of Runway '12R-30L' pavement between Taxiway 'B3' and Taxiway 'L'. Additive Alternate Bid 1 (Schedule II) includes reconstructing approximately 1,365-feet of Runway '12R-30L' pavement between 660-feet north of Taxiway 'K' and the south edge of Taxiway 'B3'. Additive Alternate Bid 2 (Schedule III) includes reconstructing approximately 4,200-feet of Runway '12R-30L' pavement between the Runway '12R' reconstructed threshold and a location 660-feet north of Taxiway 'K'.

PMGAA has also requested that the *Taxiway 'H' Demolition and Taxiway 'B2' Construction* project, (design provided by Kimley-Horn), be included as a separate bid schedule –(Schedule IV) with Additive Alternate 2. The *Taxiway 'H' Demolition and Taxiway 'B2' Construction* project, (i.e. relocation of Taxiway 'H'), is anticipating State and Local funding in 2023.

Reference **Exhibits C1-C4 –** *Project Site Plans (Base Bid, Additive Alternate 1, Additive Alternate 2, and Relocation of TW 'H')* for the location of these projects on the airfield.

1.1 Airport Description

The Phoenix-Mesa Gateway Airport (PMGAA) is located within the city of Mesa, Maricopa County, Arizona. PMGAA is owned and operated by a joint-powers airport authority formed by agreement between the City of Mesa, City of Phoenix, Town of Gilbert, Town of Queen Creek, City of Apache Junction, and the Gila River Indian Community, pursuant to Arizona Revised Statutes Title 28, Chapter 25, Article 8. The airport covers an area of approximately 4.61 square miles.

The airfield consists of three northwest-southeast parallel runways (Runways '12R-30L' on the west, '12C-30C' in the center, and '12L-30R' on the east); northeast-southwest cross-taxiways 'G', 'H', 'K', B3, 'L', 'M' (non-operational), 'N', and 'P'; diagonal taxiway 'V'; high-speed taxiways 'C2' and 'C4'; and northwest-southeast parallel taxiways 'A', 'B', and 'C' connecting the north and south airfields. Reference **Exhibit A** – *Airport Layout Plan* and **Exhibit B –** *Airport Site Plan* for the location of these airfield features.

Runway '12R-30L', PMGAA's longest runway, is 10,401-feet long and 150-feet wide. Runway '12R-30L' is primarily utilized for commercial service aircraft operations. Runway '12R' has a right-hand traffic pattern and Runway '30L' has a left-hand traffic pattern. The Runway '12R' threshold was reconstructed in 2015 and the Runway '30L' threshold was reconstructed in 2014.

The Taxiway 'B2' bid schedule, (Taxiway 'H' Relocation), will demolish existing pavements that are failing and to correct geometry issues, (i.e. direct access from an apron to a runway), while maintaining operational use of the overall taxiway system. To mitigate these issues, it has been determined that a portion of the existing Taxiway 'H' (between Taxiway 'B' and Runway '12R-30L') should be relocated 500-feet southeast to a new location and be renamed to Taxiway 'B2'.

SPONSOR APPROVAL & REVISIONS

J. BRIAN O'NEILL, EXECUTIVE DIRECTOR/CEO		DATE
NO.	DESCRIPTION	DATE

NOTES

1. THIS DRAWING REFLECTS PLANNING STANDARDS SPECIFIC TO THIS AIRPORT, AND IS NOT A PRODUCT OF DETAILED ENGINEERING DESIGN ANALYSIS. IT IS NOT INTENDED TO BE USED FOR CONSTRUCTION DOCUMENTATION OR NAVIGATION.
2. LAT/LON COORDINATES NAD83. RUNWAY ELEVATION NAVD88.
3. (N) 15' ADDED TO PUBLIC ROADWAY ELEVATIONS AND 10' ADDED TO PRIVATE ROADWAY ELEVATIONS TO DETERMINE PART 77 CLEARANCES.
4. AIRPORT LAYOUT PLAN INCORPORATES AN FAA APPROVED AIRPORT GEOGRAPHIC INFORMATION SURVEY FROM MAY 2018, A 2018 OBSTRUCTION SURVEY, AND FAA APPROVED NOISE CONTOURS FROM THE 2017 LAND USE STUDY.
5. AERIAL PHOTOGRAPHY ACQUIRED BY MARTINEZ GEOSPATIAL (MAY 10, 2018). AGIS DATA PROVIDED BY MARTINEZ GEOSPATIAL (SURVEY MAY 2, 2018).
6. RUNWAY DECLARED DISTANCES FROM AIRPORT FACILITIES DIRECTORY.
7. ALP PREPARED USING DESIGN CRITERIA FROM FAA ADVISORY CIRCULARS 150/5300-13A CHANGE 1, AIRPORT DESIGN, FAA STANDARD OPERATING PROCEDURES 2.0 & 3.0 FOR PART 77 OF THE FEDERAL AVIATION REGULATIONS (FAR), SAFE, EFFICIENT USE, AND PRESERVATION OF THE NAVIGABLE AIRSPACE.
8. CRITICAL DESIGN AIRCRAFT AND RUNWAY DESIGN CODE DETERMINED THROUGH OPERATION RECORDS AND FORECASTS. RUNWAY DESIGN STANDARDS AND AIRCRAFT SPECIFICATION DATA SOURCE: FAA ADVISORY CIRCULAR 150/5300-13A (CHANGE 1), AIRPORT DESIGN, APPENDIX 1.
9. MAGNETIC DECLINATION SOURCE: NATIONAL GEOPHYSICAL DATA CENTER, JULY 2019.

FAA APPROVAL

NOTES

10. EXISTING APPROACH MINIMUMS, APPROACH CATEGORY AND DEPARTURE PROCEDURES BASED ON PUBLISHED APPROACH PLATES.
11. BUILDING RESTRICTION LINE (BRL) VARIES IN SETBACK FROM RUNWAY AND ALLOWABLE BUILDING HEIGHTS. THE BRL IS DETERMINED BASED ON PART 77, ROFA, TOFA, RVZ, TERPS AND PHYSICAL FEATURES. THE ALLOWABLE HEIGHT IS PROVIDED ON THE PLAN AT VARIOUS LOCATIONS.

FACILITY LEGEND

NO.	DESCRIPTION	TOP ELEVATION
1	HANGAR/OFFICE	EL. 1383.4
2	HANGAR/OFFICE	EL. 1382.3
3	HANGAR/OFFICE	EL. 1382.3
4	FIRE SUPPRESSION SYSTEM	EL. 1355.1
5	T-HANGAR	EL. 1365.7
6	T-HANGAR	EL. 1361.0
7	T-HANGAR	EL. 1359.4
8	HANGAR/OFFICE	EL. 1376.0
9	HANGAR/OFFICE	EL. 1377.9
10	HANGAR/OFFICE	EL. 1383.3
11	HANGAR/OFFICE	EL. 1382.9
12	GENERAL AVIATION CENTER (FBO/OFFICES)	EL. 1365.2
13	BUILDING (GAZEBO)	EL. 1358.1
14	AIRPORT ADMINISTRATION OFFICE BUILDING	EL. 1369.3
15	HANGAR/OFFICE	EL. 1378.5
16	COMPASS PAD	EL. 1365.0
17	TERMINAL BUILDING	EL. 1366.5
18	OFFICE BUILDING	EL. 1379.9
19	OFFICE BUILDING	EL. 1380.2
20	OFFICE BUILDING	EL. 1378.9
21	TERMINAL BUILDING	EL. 1371.6
22	HANGAR #24 (TO BE REMOVED)	EL. 1366.7
23	OFFICE BUILDING	EL. 1369.5
24	HANGAR	EL. 1383.7
25	TERMINAL ANNEX (TO BE REPLACED)	EL. 1365.6
26	HANGAR	EL. 1379.6
27	HANGAR (TO BE REPLACED)	EL. 1391.3
28	LINE SERVICES BUILDING	EL. 1392.2
29	OFFICE BUILDING	EL. 1391.1
30	OFFICE BUILDING	EL. 1358.9
31	INDUSTRIAL BUILDING	EL. 1363.9
32	OFFICE BUILDING	EL. 1379.7
33	CAR WASH AREA	EL. 1373.5
34	OFFICE BUILDING	EL. 1359.9
35	OFFICE BUILDING	EL. 1375.1
36	FUEL FARM	EL. 1360.6
37	OFFICE BUILDING	EL. 1360.6
38	OFFICE BUILDING	EL. 1375.5
39	BUILDING	EL. 1380.6
40	ARFF	EL. 1401.6
41	BUILDING	EL. 1368.1
42	OFFICE BUILDING	EL. 1383.1
43	OFFICE BUILDING	EL. 1375.6
44	BUILDING	EL. 1381.3
45	OFFICE BUILDING	EL. 1378.8
46	OFFICE BUILDING	EL. 1374.5
47	HANGAR/OFFICE	EL. 1406.9
48	BUILDING	EL. 1382.4
49	SHADE	EL. 1362.9
50	OFFICE BUILDING	EL. 1372.5
51	FIRE SUPPRESSION SYSTEM	EL. 1361.7
52	COMMUNICATIONS VAULT	EL. 1360.0
53	OFFICE BUILDING	EL. 1370.4
54	ATCT/AIRPORT BEACON	EL. 1474.3
55	BUILDING	EL. 1364.5
56	FIRE SUPPRESSION SYSTEM	EL. 1386.3
57	BUILDING (REMOVE/RELOCATE OFF AIRPORT)	EL. 1376.5
58	EAST LIGHTING VAULT (TO BE RELOCATED)	EL. 1385.3
59	ASR-8 (TO BE RELOCATED)	EL. 1381.5
60	BUILDING (TO BE REMOVED)	EL. 1386.7
61	BUILDING (TO BE REMOVED)	EL. 1387.6
62	BUILDING (TO BE REMOVED)	EL. 1390.0
63	BUILDING (TO BE REMOVED)	EL. 1391.7
64	BUILDING (TO BE REMOVED)	EL. 1395.7
65	BUNKER (TO BE REMOVED)	EL. 1401.8
66	RTR BUILDING (TO BE RELOCATED)	EL. 1392.7
67	TVOR	EL. 1400.9
68	ILS GLIDE SLOPE	EL. 1385.0
69	HANGAR/MANUFACTURING/OFFICE	EL. 1368.0' EST.
70	HUSH HOUSE	EL. 1370.1'
71	WEST LIGHTING VAULT	EL. 1374.6'
72	BUILDING (TO BE REMOVED)	EL. 1377.1'
73	BUILDING (TO BE REMOVED)	EL. 1403.5'
F1	FUTURE PASSENGER TERMINAL	
F2	FUTURE AIR TRAFFIC CONTROL TOWER	
F3	FUTURE BUILDING	
F4	FUTURE T-HANGAR	

10° 8' E ± 0° 20' changing by 0° 5' W per year (July 2019)

0 660 1320

DRAWING LEGEND

	EXISTING	FUTURE
AIRPORT PROPERTY LINE		N/A
AVIGATION EASEMENT		N/A
AIRPORT BUILDINGS		
AIRFIELD PAVEMENT		
AIRFIELD PAVEMENT TO BE REMOVED	N/A	
PAVED ROADS		
RUNWAY PROTECTION ZONE	RPZ	RPZ
GLIDE PATH QUALIFICATION SURFACE		N/A
PART 77 APPROACH SURFACE	77	77
THRESHOLD SITING SURFACE	TSS	TSS
BUILDING RESTRICTION LINE	BRL	BRL
RUNWAY OBSTACLE FREE ZONE	OFZ	OFZ
INNER APPROACH OBSTACLE FREE ZONE	IAOFZ	N/A
PRECISION OBSTACLE FREE ZONE		N/A
RADAR CRITICAL AREAS		N/A
GLIDE SLOPE CRITICAL AREA	GSCA	N/A
LOCALIZER CRITICAL AREA	LCA	N/A
RUNWAY SAFETY AREA	RSA	RSA
RUNWAY OBJECT FREE AREA	ROFA	ROFA
TAXIWAY OBJECT FREE AREA	TOFA	TOFA
AIRPORT SECURITY FENCE (8' HEIGHT)		
APRON/TAXIWAY/TAXILANE MARKING		
AIRPORT BEACON		N/A
LIGHTED WIND CONE & SEGMENTED CIRCLE		N/A
WIND CONE		N/A
PRECISION APPROACH PATH INDICATOR (PAPI)		N/A
RUNWAY END IDENTIFIER LIGHTS (REIL)		N/A
AIRPORT REFERENCE POINT (ARP)		
AIRPORT SURVEY CONTROL STATIONS		N/A
FUTURE DEVELOPMENT AREAS		

Mead & Hunt

Mead and Hunt, Inc.
8800 East Raintree Drive,
Suite 285
Scottsdale, AZ 85260
phone: 480-718-1896
meadhunt.com

Phoenix-Mesa Gateway Airport

PHOENIX-MESA GATEWAY AIRPORT
AIRPORT LAYOUT PLAN

5835 S SOSSMAN RD
MESA, AZ 85212

ISSUED

NOT FOR CONSTRUCTION

M&H NO.:	2327700-171799.01
DATE:	MARCH 2020
DESIGNED BY:	M&H
DRAWN BY:	JWB
CHECKED BY:	BJM

DO NOT SCALE DRAWINGS

SHEET CONTENTS

FUTURE AIRPORT LAYOUT PLAN

EXHIBIT A

\\CORP.MEADHUNT.COM\SHAREDFOLDERS\ENTP\2327700\171799.01\TECH\CAD\AIRPORTLAYOUTPLAN\AIRPORT LAYOUT DRAWING.DWG
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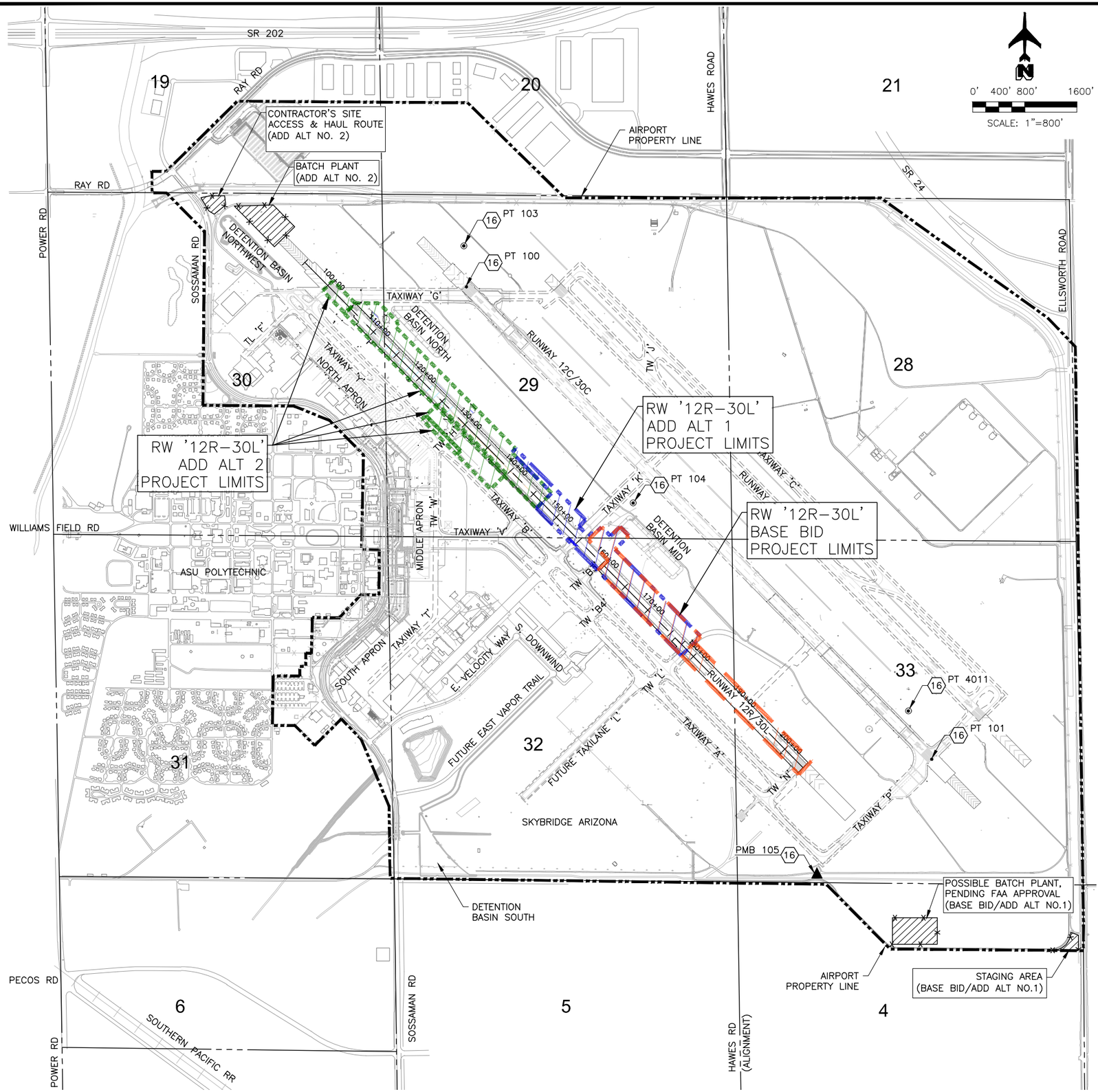


REFERENCE NOTES

16 REFER TO SURVEY CONTROL PLAN SHT G1-1.7

LEGEND

- BASE BID SCHEDULE I PROJECT LIMITS
- ADD ALT 1 SCHEDULE II PROJECT LIMITS
- ADD ALT 2 SCHEDULE III PROJECT LIMITS

REV	DATE	DESCRIPTION

DIBBLE

PRELIMINARY SUBMITTAL

95%

NOT FOR CONSTRUCTION OR RECORDING

DATE:	3/30/2023
DESIGNED BY:	CMR
DRAWN BY:	DSO
REVIEWED BY:	MJB/KLS

FILE NAME: 20223_2303-G1-1_X-GNRL_BB

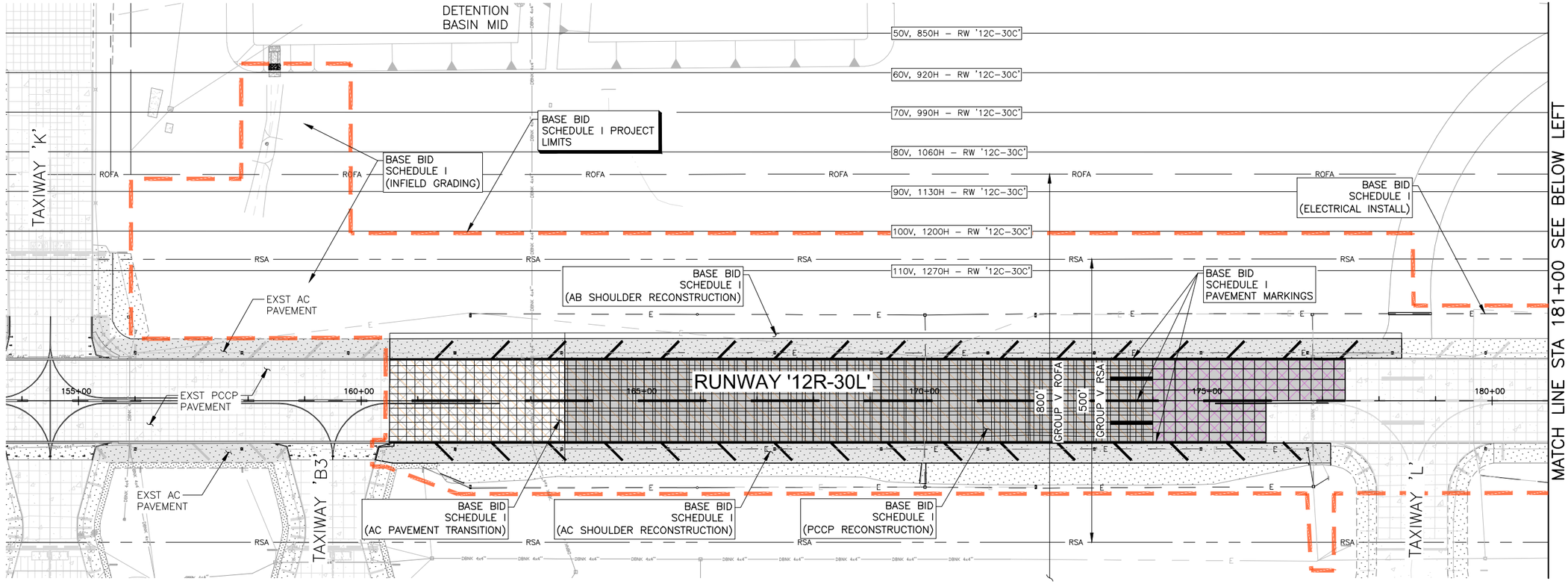
Phoenix-Mesa Gateway Airport

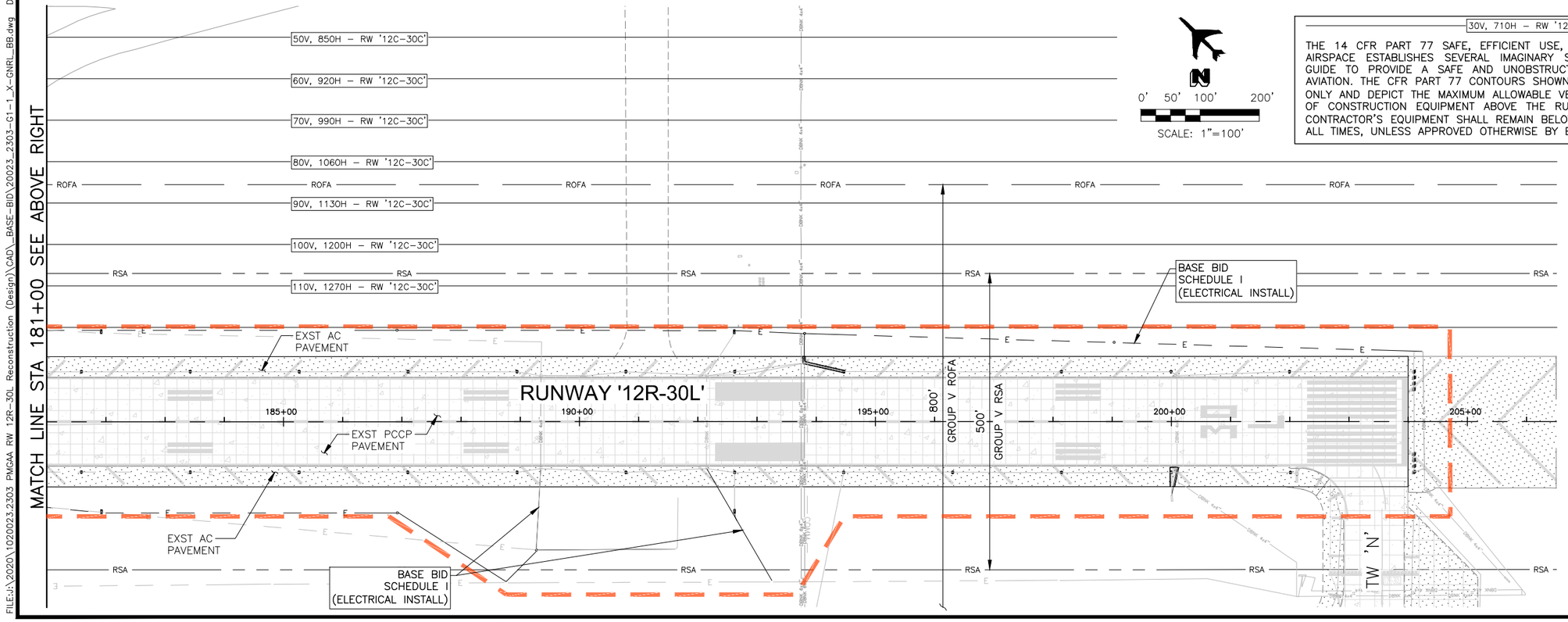
RUNWAY '12R-30L' RECONSTRUCTION OVERALL

AIRPORT SITE PLAN

EXHIBIT

B





30V, 710H – RW '12L–30R'

THE 14 CFR PART 77 SAFE, EFFICIENT USE, AND PRESERVATION OF NAVIGABLE AIRSPACE ESTABLISHES SEVERAL IMAGINARY SURFACES THAT ARE USED AS A GUIDE TO PROVIDE A SAFE AND UNOBSTRUCTED OPERATING ENVIRONMENT FOR AVIATION. THE CFR PART 77 CONTOURS SHOWN ARE FOR INFORMATION PURPOSES ONLY AND DEPICT THE MAXIMUM ALLOWABLE VERTICAL HEIGHT (IN FEET, LABEL V) OF CONSTRUCTION EQUIPMENT ABOVE THE RUNWAY CENTERLINE ELEVATION. THE CONTRACTOR'S EQUIPMENT SHALL REMAIN BELOW ALL CFR PART 77 SURFACES AT ALL TIMES, UNLESS APPROVED OTHERWISE BY ENGINEER.

LEGEND

BASE BID SCHEDULE I PROJECT LIMITS

REV	DATE	DESCRIPTION

DIBBLE

PRELIMINARY SUBMITTAL

95%

NOT FOR CONSTRUCTION OR RECORDING

DATE:	3/30/2023
DESIGNED BY:	CMR
DRAWN BY:	DSO
REVIEWED BY:	MJB/KLS
FILE NAME:	20023_2303-G1-1_X-GNRL_BB

Phoenix-Mesa Gateway Airport

RUNWAY '12R-30L' RECONSTRUCTION BASE BID

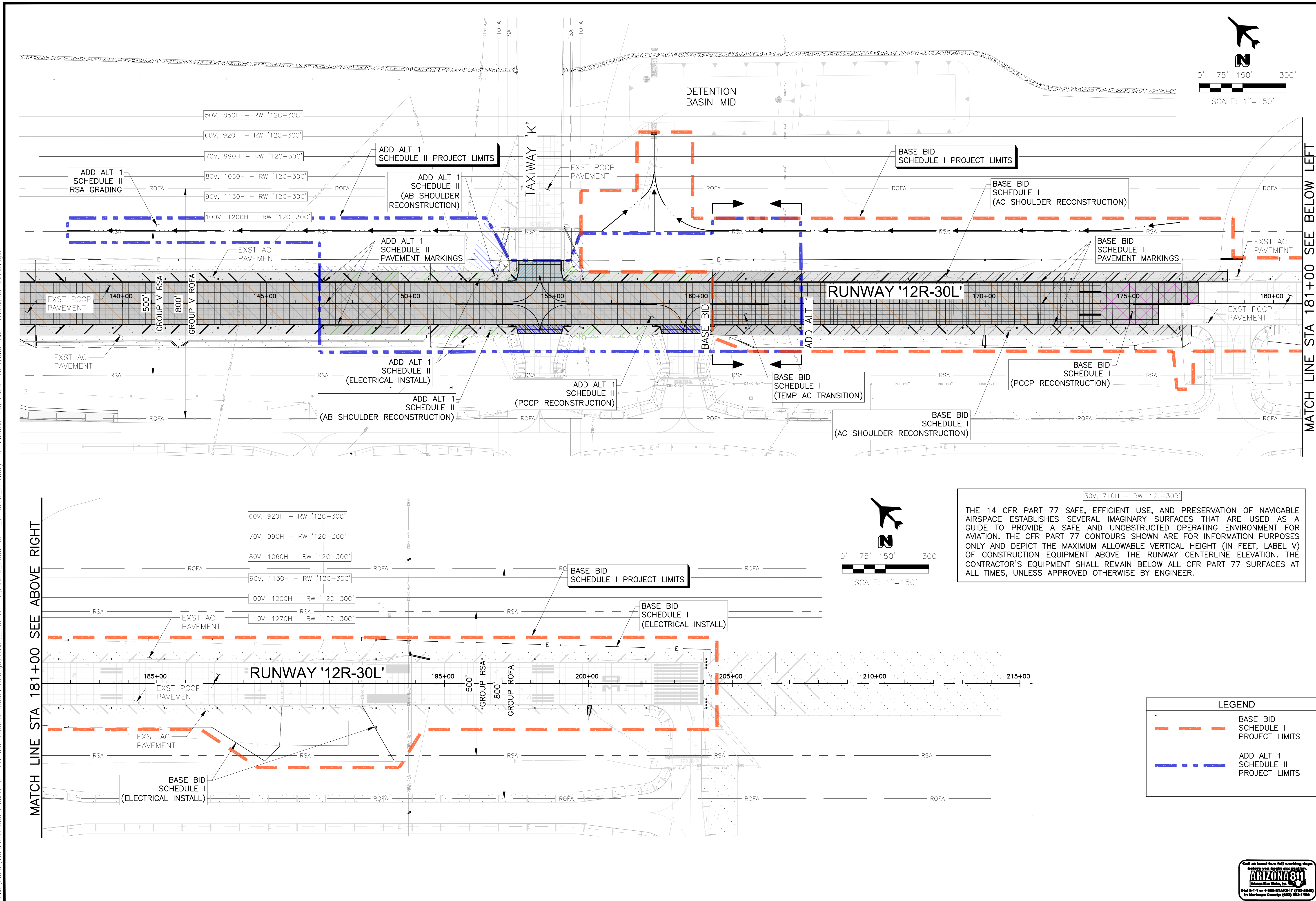
(SCH I) PROJECT SITE PLAN

EXHIBIT

C1

Call at least two full working days before you dig. ARIZONA 811

FILE:J:\2020\1020023.2303 PMGAA RW 12R-30L Reconstruction (Design)\CAD_BASE-BID\20023_2303-G1-1_X-GNRL_BB.dwg DATE:March 28, 2023 TIME:10:34 AM BY:michael swearingen



30V, 710H – RW '12L-30R'

THE 14 CFR PART 77 SAFE, EFFICIENT USE, AND PRESERVATION OF NAVIGABLE AIRSPACE ESTABLISHES SEVERAL IMAGINARY SURFACES THAT ARE USED AS A GUIDE TO PROVIDE A SAFE AND UNOBSTRUCTED OPERATING ENVIRONMENT FOR AVIATION. THE CFR PART 77 CONTOURS SHOWN ARE FOR INFORMATION PURPOSES ONLY AND DEPICT THE MAXIMUM ALLOWABLE VERTICAL HEIGHT (IN FEET, LABEL V) OF CONSTRUCTION EQUIPMENT ABOVE THE RUNWAY CENTERLINE ELEVATION. THE CONTRACTOR'S EQUIPMENT SHALL REMAIN BELOW ALL CFR PART 77 SURFACES AT ALL TIMES, UNLESS APPROVED OTHERWISE BY ENGINEER.

LEGEND

- BASE BID SCHEDULE I PROJECT LIMITS
- ADD ALT 1 SCHEDULE II PROJECT LIMITS

REV	DATE	DESCRIPTION

DIBBLE

PRELIMINARY SUBMITTAL

95%

NOT FOR CONSTRUCTION OR RECORDING

DATE: 3/30/2023
DESIGNED BY: CMR
DRAWN BY: DSO
REVIEWED BY: MJB/KLS
FILE NAME: 20023_2303-G2-1_X-GNRL_AA1

Phoenix-Mesa Gateway Airport

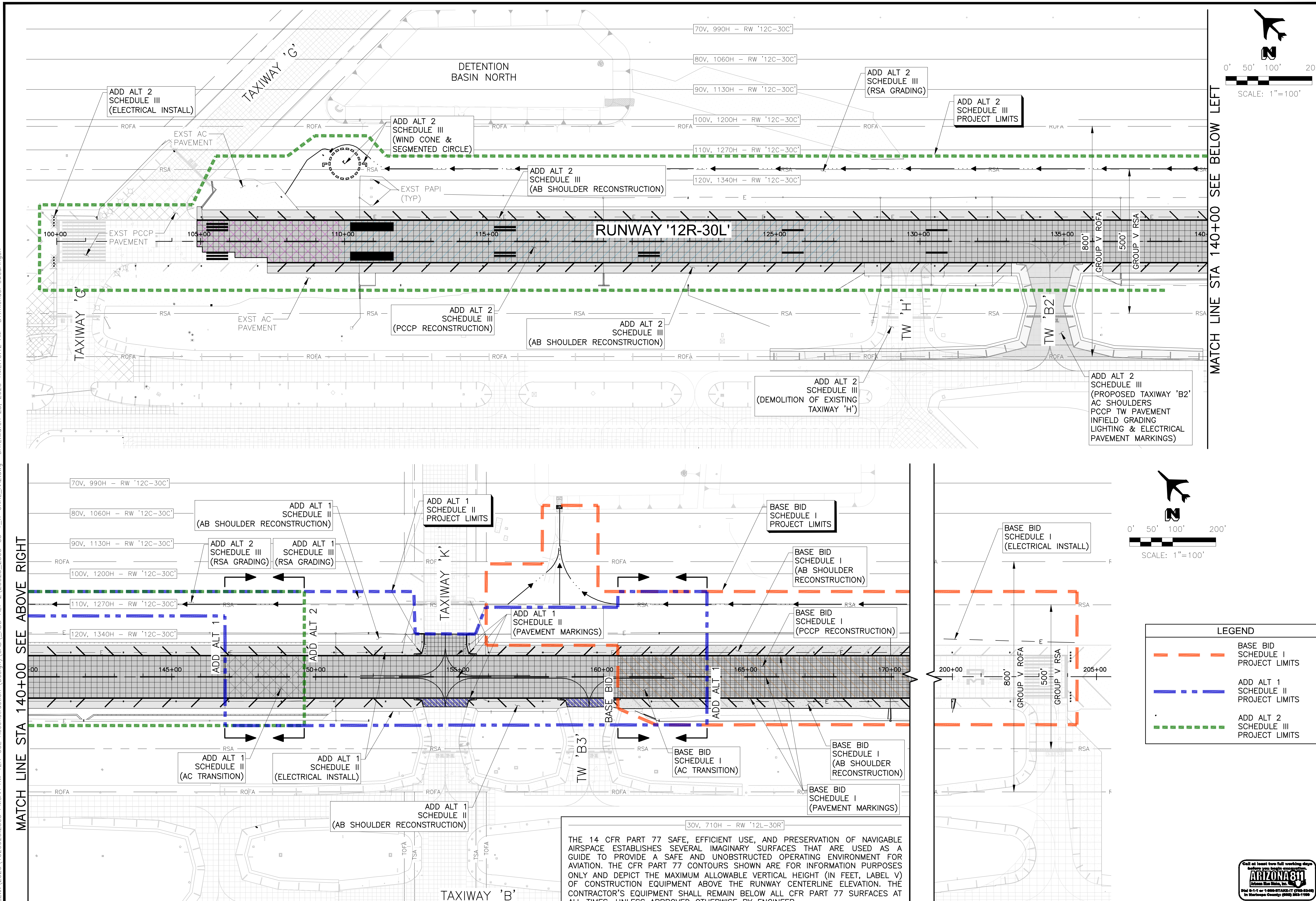
RUNWAY '12R-30L' RECONSTRUCTION
ADD ALT 1
(SCH II) PROJECT SITE PLAN

EXHIBIT

C2

Call at least two full working days before you begin excavation. ARIZONA811 Arizona Blue Stake, Inc. Dial 8-1-1 or 1-800-STAKE-IT (782-5348) In Maricopa County: (602) 263-1100

FILE:J:\2020\1020023.2303 PMGAA RW 12R-30L Reconstruction (Design)\CAD_ADD-ALT-1\20023_2303-G2-1_X-GNRL_AA1.dwg DATE:March 28, 2023 TIME:10:32 AM BY:michael swearingen



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REV | DATE | DESCRIPTION

DIBBLE

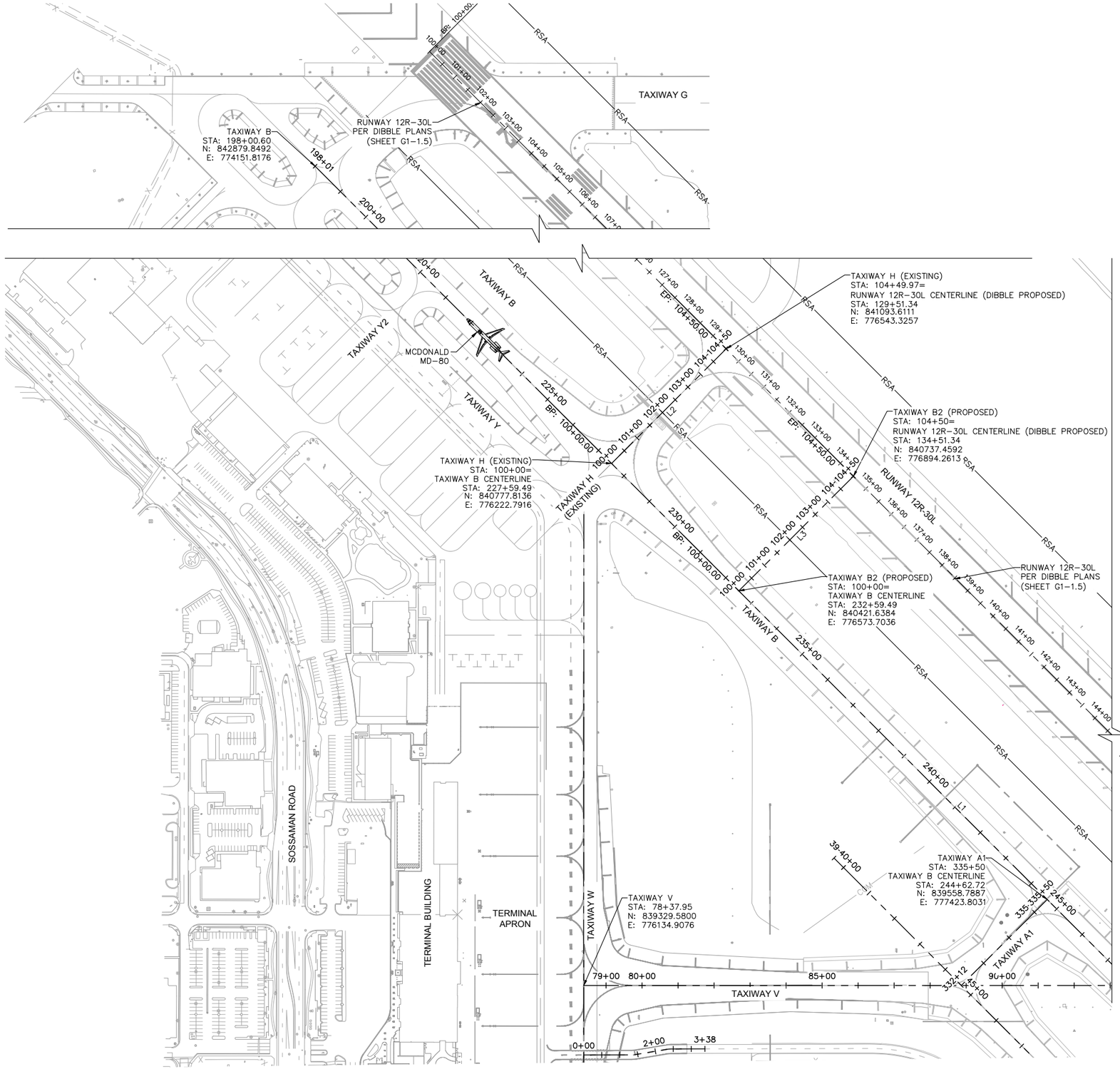
PRELIMINARY SUBMITTAL
95%
NOT FOR CONSTRUCTION OR RECORDING

DATE: 3/30/2023
DESIGNED BY: CMR
DRAWN BY: DSO
REVIEWED BY: MJB/KLS
FILE NAME: 20023_2303-G3-1_X-GNRL_AA2

Phoenix-Mesa Gateway Airport

RUNWAY '12R-30L' RECONSTRUCTION
ADD ALT 2
(SCH III) PROJECT SITE PLAN

EXHIBIT
C3



LINE TABLE		
LINE	LENGTH	BEARING
L1	11398.63	S44°34'24.71"E
L2	450.00	N45°25'35.29"E
L3	450.00	S45°25'35.29"W

Call at least two full working days before you begin excavation.
ARIZONA 811
Arizona Blue Stake, Inc.
Dial 8-1-1 or 1-600-STAKE-IT (782-5348)
In Maricopa County (602) 263-1100

NO.	REVISION	BY	DATE

FIRM'S NAME

Kimley»Horn

KIMLEY-HORN AND ASSOCIATES, INC.
1001 W Southern Ave, Suite 131
Mesa, Arizona 85210 (480) 207-2666

FIRM'S SEAL

95% SUBMITTAL
FOR REVIEW ONLY
NOT FOR CONSTRUCTION
Kimley»Horn
ENGINEER JARRETT MOORE
PE NO. 61804 DATE 3/23

SCALE
Horiz. 1"=150'
Vert. N/A

Date 3/17/2023
Designed by JMM
Drawn by RAB
Checked by JMM
Approved by SHR

Phoenix-Mesa Gateway Airport

PHOENIX-MESA GATEWAY AIRPORT AUTHORITY
5835 SOUTH SOSSAMAN ROAD
MESA, ARIZONA 85212
(480) 988-7600
www.phxmesagateway.org

PROJECT NAME

PHOENIX-MESA GATEWAY AIRPORT
TAXIWAY B2 (TAXIWAY H RELOCATION)

(SCH II) ALIGNMENT DEFINITION PLAN

EXHIBIT

C4

1.2 Scope of Work

The *Runway '12R-30L' Reconstruction* project includes the reconstruction of the 7,255-foot portion of Runway '12R-30L' between the previously reconstructed thresholds. In addition to the need of new runway concrete pavement, the intent of this project is to also fix the non-standard transverse and longitudinal grades within the runway pavement and non-standard grades within the Runway Safety Area (RSA). This project will also include the following items:

Reconstruction of a 532-feet of Runway '12R' and 340-feet of Runway '30L' thresholds. This is because the existing transverse / longitudinal slopes in these areas also need to be adjusted to meet FAA standards.

Reconstruction of 35-foot wide runway shoulders with a new AC pavement section within the PCCP reconstruction limits.

Re-grading of infield areas with modifications to existing drainage infrastructure.

Runway lighting and signage improvements including replacement of all Distance Remaining Signs.

New runway pavement markings within the limits of the reconstructed PCCP.

This project also includes the demolition of Taxiway 'H' and construction of new Taxiway 'B2' located between Runway '12R-30L' and Taxiway 'B'. This work includes installing new taxiway signs, taxiway edge lights, and drainage infrastructure. This portion of the project was previously designed by Kimley-Horn (KH) in 2020. KH has re-designed this portion of the project as a subconsultant on the Dibble team to be consistent with the Runway '12R-30L' design.

Refer to **Exhibits C1-C4** – *Project Site Plans.*

The design for the runway reconstruction was completed as if it could be reconstructed during a single construction period. However, due to the unknown nature of the available funding to complete the work as part of a single bid award, this project includes a Base Bid, Additive Alternate Bid 1, and Additive Alternate Bid 2. Depending on funding availability, the project award could be one of three scenarios.

1. Base Bid Only
2. Base Bid + Additive Alternate Bid 1
3. Base Bid + Additive Alternate Bid 1 + Additive Alternate Bid 2

The scope details for each bid schedule are identified below:

Base Bid - Bid Schedule I (Runway '12R'-30L' Reconstruction) – includes reconstructing approximately 1,690-feet of Runway '12R-30L' pavement between Taxiway 'B3' and Taxiway 'L'. This portion of the project will include reconstruction of approximately 340-feet of the previously reconstructed Runway '30L' threshold; reconstruction of the runway shoulders; installation of new airfield lighting conduit, cable, and runway edge light base cans, replacement of the Distance Remaining Signs south of Taxiway 'B3'; infield grading and drainage improvements; and new pavement markings within the pavement reconstruction limits.

The major work elements for Schedule I are identified below. Reference **Appendix F** for detailed quantities and costs.

- 28,160 square yards of reconstructed PCCP runway pavement
- 13,145 square yards of reconstructed AC shoulder pavement
- Placement of new runway markings
- New runway edge light cable and conduit
- Replacement of runway edge light base cans
- 8 new LED distance remaining signs

Additive Alternate Bid 1 – Bid Schedule II (Runway '12R'-30L' Reconstruction) – includes reconstructing approximately 1,365-feet of Runway '12R-30L' pavement between 660-feet north of Taxiway 'K' and the south edge of Taxiway 'B3'. This portion of the project will include reconstruction of the runway shoulders; installation of new airfield lighting conduit, cable, and runway edge light base cans, replacement of the Distance Remaining Signs within the Schedule II runway pavement reconstruction limits; infield grading and drainage improvements; and new pavement markings within the pavement reconstruction limits. Further, on the west side of the runway at Taxiways 'K' and 'B3', 30-feet of temporary AC pavement will be removed and reconstructed with PCCP to tie into the new edge of runway elevations.

The major work elements for Schedule II are identified below. Reference **Appendix F** for detailed quantities and costs.

22,750 square yards of reconstructed PCCP runway pavement
10,615 square yards of reconstructed AC shoulder pavement
Placement of new runway markings
New runway edge light cable and conduit
Replacement of runway edge light base cans
4 new LED distance remaining signs

Additive Alternate 2 for this project is divided into two bid schedules as detailed below.

Additive Alternate Bid 2 - Bid Schedule III (Runway '12R'-30L' Reconstruction) – includes reconstructing approximately 4,200-feet of Runway '12R-30L' pavement between the Runway '12R' reconstructed threshold and a location 660-feet north of Taxiway 'K'. This portion of the project will also include reconstruction of approximately 532-feet of the previously reconstructed Runway '12R' threshold; reconstruction of the runway shoulders; installation of new airfield lighting conduit, cable, and runway edge light base cans, replacement of the Distance Remaining Signs; infield grading and drainage improvements; and new pavement markings within the pavement reconstruction limits.

The major work elements for Schedule III are identified below. Reference **Appendix F** for detailed quantities and costs.

70,000 square yards of reconstructed PCCP runway pavement
36,665 square yards of reconstructed AC shoulder pavement
Placement of new runway markings
New runway edge light cable and conduit
Replacement of runway edge light base cans
8 new LED distance remaining signs
New LED Runway Edge lights for the entire runway

Additive Alternate Bid 2 – Bid Schedule IV (Taxiway 'H' Demolition and Taxiway 'B2' Construction) – includes the demolition of Taxiway 'H' and construction of new Taxiway 'B2'. This portion of the project was designed and bid by Kimley-Horn as part of a previous project and is being packaged with Additive Alternate Bid 2 of the Runway Reconstruction project. The major work elements, with approximate quantities, for Schedule IV are identified on the following page.

6,520 square yards of PCCP removal
15,910 square yards of AC pavement removal
6,710 square yards of new PCCP taxiway pavement
6,900 square yards of new AC shoulder pavement
6,500 square feet of taxiway markings
3,850 linear feet of new taxiway edge light conduit
30 new taxiway edge lights

Refer to **Exhibits C1-C4** – *Project Site Plans.*

1.3 ADOT Eligible Items

It is anticipated that all work and material required for this project will be fully eligible to receive ADOT and FAA grant funding.

1.4 Unique and Unusual Project Items

1.4.1 Multiple Bid Alternatives and Bid Schedules

Available funding to complete this project in 2023 is unknown, therefore the reconstruction of Runway '12R-30L' and the demolition of Taxiway 'H'/construction of Taxiway 'B2' will be bid with a Base Bid and two Additive Alternate Bids including 4 bid schedules. The runway reconstruction is covered by bid Schedules I through III and the Taxiway 'H' demolition/Taxiway 'B2' Construction is Schedule IV.

Depending on funding availability after bids are received, the project award could be one of three scenarios.

1. Base Bid Only (Schedule I)
2. Base Bid (Schedule I) + Additive Alternate Bid 1 (Schedule II)
3. Base Bid (Schedule I) + Additive Alternate Bid 1 (Schedule II)+ Additive Alternate Bid 2 (Schedules III & IV)

1.4.2 Segmented Circle, Wind Cone, and PAPIs

There is an existing segmented circle and lighted wind cone (supplemental) at the northeast end of Runway '12R', located within Additive Alternate 2 – Schedule III project limits, that will be impacted by proposed finished grades. The proposed design grades accommodate FAA standard slopes within the Runway Safety Area (RSA). The existing segmented circle and lighted wind cone will be removed and replaced/installed at the new finished grades. The new concrete segment pads will be painted white to match the existing condition.

Similarly, the existing 4-box PAPI system on the northeast side of Runway '12R', located within the Additive Alternate 2 – Schedule III project limits, will also be impacted by changing grades. The proposed design includes removing and salvaging the existing PAPI units (originally installed by PMGAA Operations and Maintenance staff) and constructing new concrete foundations in the same location at the new grade elevations. The existing PAPI fixtures will be re-installed on the new concrete foundations at new box height elevations to align with the new runway centerline elevation perpendicular to the PAPI location. A PAPI Siting evaluation was completed in compliance with FAA Advisory Circular 150/5340-30J *Design and Installation Details for Airport Visual Aids* and additional information can be found in section 8 of this report.

1.4.3 Pavement Transition Section Designs

This project includes various sections of runway pavement that are considered transition areas.

The southernmost transition area is the south end of the project area that ties into the Runway '30L' threshold which was reconstructed in 2014. The original design transitioned transvers slopes to tie into the existing non-standard surface slopes. The Runway '30L' threshold was constructed with 16-inches of PCCP on 6-inches of AC on 6-inches ABC on 8-inches of LTSG. To fix the non-standard transvers slopes and construct a consistent pavement structural section as part of this project, approximately 300 feet of the previously reconstructed section of the Runway '30L' threshold will be completely reconstructed with this project's pavement structural section to maintain consistency and improve constructability for the Contractor.

The next transition area is the approximately 300-foot long asphalt transition section of runway on the north end of the Base Bid (Schedule I) project limits. The design for Base Bid transition section includes constructing 11-inches of AC on variable thickness (6-inches to 16.5-inches) CTB on 8-inches of LTSG. This asphalt transition section will be constructed in the event only the Base Bid is awarded. If that is the case, the LTSG will be installed at the permanent elevations for the future reconstruction of that section of Runway when additional funding becomes available.

The third transition area is the approximately 275-foot asphalt section of runway on the north end of the Additive Alternate 1 (Schedule II) project limits. The design for Additive Alternate 1 (Schedule II) asphalt transition includes constructing 11-inches of AC on variable thickness (6-inches to 16.5-inches) CTB on 8-inches of LTSG. This asphalt transition section will be constructed in the event that only the Base Bid and Additive Alternate Bid 1 are awarded. If that is the case, the LTSG will be installed at the permanent elevations for the future reconstruction of that section of Runway when additional funding becomes available.

The last, northernmost transition area is the north end of Additive Alternate 2 (Schedule III) project limits which reconstructs approximately 532 linear feet of the Runway '12R' threshold, reconstructed in 2015. The original design transitioned a crowned section of pavement to a single cross slope section in order to match back into existing pavement elevations. This section of pavement was constructed with 16.5-inches of PCCP on 6-inches of CTB on 8-inches of LTSG. This project will remove the existing 16.5-inches of PCCP and will place variable depth CTB on the existing CTB at the necessary slopes and elevations needed to pave the new 16-inch section of PCCP to meet the designed surface elevations with a crowned pavement section. This approach reduces the amount of "throw-away" work from the Runway '12R' Threshold project.

1.4.4 Connector Taxiway Tie-Ins

This project raises the centerline profile of the runway by approximately 12-inches and requires reconstruction of three connector taxiway tie-ins, Taxiway 'K' on the east and west side of the runway and Taxiway 'B3' on the west side of the runway. The west connection of Taxiway 'K' and Taxiway 'B3' were reconstructed in 2020 with PCCP. The designs included a 30-foot wide section of temporary AC pavement at the intersection with Runway '12R-30L'. These 30-foot wide sections of temporary AC pavement were constructed with the understanding that the Runway '12R-30L' reconstruction project would reconstruct them as part of the runway reconstruction. Therefore, this project will maintain the existing isolation joint between the existing PCCP and AC on Taxiways 'K' and 'B3' and will replace the AC with the runway PCCP pavement structural section, matching the runway jointing pattern.

Additionally, in order to maintain the correct runway cross slopes and tie into Taxiway 'K' on the east side of the runway, 75-feet of the taxiway will be reconstructed. Existing Taxiway 'K' is approximately 150-feet wide which is twice the width of a standard TDG 5 taxiway. In order to match into the existing taxiway width and meet FAA geometry standards to the fullest extent possible, the fillet design connection with the runway matches the TDG 5 requirements until it matches in with the 150-foot width of the existing taxiway. Therefore, when Taxiway 'K' is reconstructed the 30-feet closest to the runway can remain in place. An additional benefit of this geometry change is the relocation of the Taxiway 'K' edge lights so that they are no more than 10-feet from the taxiway edge of pavement. Currently the taxiway edge lights for Taxiway 'K' at the east runway intersection are approximately 15-feet from the edge of pavement which is non-standard.

1.5 History of Existing Conditions

1.5.1 Runway '12R-30L'

The pavement section between the reconstructed thresholds (approx. 6,385-feet) dates back to 1958 and has reached the end of its useful life. The Runway '12R' threshold is approximately 1,000-feet in length and was reconstructed in 2015. The Runway '30L' threshold is approximately 3,018-feet in length and was reconstructed in 2014. The existing pavement between the threshold areas has significant patching and is

continually needing localized repairs due to pavement distress and insufficient pavement and subgrade strength. Additionally, recent pavement inspections by the Dibble Team would generally put the Pavement Condition Index (PCI) below 55, requiring a full reconstruction as the next appropriate step in improving the pavement and subgrade strength.

There are mainly three different existing pavement sections along Runway '12R-30L'. The pavement sections are listed below including the layer thicknesses for Asphalt Concrete (AC), Portland Cement Concrete Pavement (PCCP), Aggregate Base Course (ABC), Cement-Treated Base (CTB) and Lime-Treated Subgrade (LTSG):

Runway '12R' Threshold (1,000-feet): 16.5-inches PCCP on 6-inches CTB on 8-inches LTSG
Runway '30L' Threshold (3,018-feet): 16-inches PCCP on 6-inches AC on 6-inches ABC on 8-inches LTSG
The section between thresholds (6,385-feet): combination of approx. 11-inches PCCP on native clay and a "sandwich" pavement section consisting of approximately 9-inches PCCP on varying depth AC or native materials on approx. 7-inches PCCP

Boring logs from the cores taken on the PCCP portion of the runway in August 2022 show the variations in the existing pavement thicknesses along the length of the runway. Refer to **Appendix B** – *Pavement Engineering Report*.

The existing pavement markings on Runway '12R-30L' are identified as precision instrument. The runway has medium-intensity runway lights. Further, the runway has 35-foot-wide AC pavement shoulders, with additional very old, raveled pavement beyond the shoulders. Past projects have shown that the runway shoulders have a cement or lime-treated subgrade along with a slurry back-fill material used to fill voids left by old runway edge light vaults. Four-box Precision Approach Path Indicators (PAPIs) are on the left side of each runway end. Both runway ends have 1,000-foot AC pavement overruns.

Exhibits C1, C2, and C3 show the location of the major work elements.

1.5.2 Taxiway 'H' and 'B2'

The existing concrete pavement on Taxiway 'H', located between Runway '12R-30L' and Taxiway 'B', was inspected in early 2017 and was found to have a PCI Value of 47. A PCI value of 47 falls in the "Poor" category of the PCI Rating Scale. The existing taxiway concrete was cored and found to be approximately 11.5-inches thick at the test location. This taxiway was originally constructed in 1968 and has had no major maintenance or rehabilitation improvements since its construction.

Since its inspection in 2017, the existing Taxiway 'H' pavement has continued to deteriorate and is now in need of reconstruction. Furthermore, this taxiway also has an existing alignment that provides direct access from the general aviation apron to Runway '12R-30L', which is no longer permitted per FAA design standards. It was determined that while mitigating the existing failing pavement, this project would also mitigate the existing "direct access" issue. Thus, existing Taxiway 'H' (between Taxiway 'B' and Runway '12R-30L') will be removed and relocated approximately 500-feet to the southeast. **Exhibit C4** shows the location of this portion of the project and the main elements of work.

Since this project would result in converting the existing Taxiway 'H' into two distinctly different taxiway alignments, it was determined that the new taxiway segment (located 500-feet to the southeast of the existing Taxiway 'H') should have its own new taxiway name. As part of a previous project, Kimley-Horn performed a "Taxiway Nomenclature Analysis" of the existing taxiway network's naming convention, and through this analysis provided the Airport with recommendations for renaming the Airport's taxiways to be more consistent with the FAA's preferred naming convention. As a result of this analysis, it was determined that the proposed relocated portion the existing Taxiway 'H' would be named "Taxiway B2."

In addition to geometric improvements, the site drainage will also be altered by this project. Existing drainage issues exist in this area due to flat infield grading, and improved site grading to promote positive drainage will be necessary. One of the existing drainage structures will be altered, and a new drainage inlet will be installed at the new project low point (south of the proposed Taxiway 'B2') to meet drainage requirements. The installation of temporary and permanent pavement markings will be done to meet phasing and final requirements. Edge lighting improvements will be made for this project area, and electrical circuits will be reconfigured to match the modified taxiway geometries. **Exhibit C4** shows the location of these main elements of work.

1.6 Topographic Survey and Control

All survey and base mapping for the project was prepared in accordance with the applicable FAA Advisory Circulars, specifically FAA AC 150/5300-18B, *General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards*.

The survey performed was a topographic survey only, based on existing established Primary and Secondary Airport Control Data Points (PACs and SACs). No new permanent control was established with this project by the engineer. The survey included horizontal and vertical locations of existing pavements, facilities, utilities, and manhole invert elevations affected by this project. Topographic features included existing PCCP joints, specifically all joints that will be tied into along the perimeter of the project. Cross sections were taken at 100-foot internals with additional grade shots 25-feet outside of the planned construction limits to confirm the landform beyond the project limits.

Dibble used the existing Wilcox FAA Datum control (established May 2007, NAVD 88, US Survey Foot) to facilitate the topographic survey effort. Global Positioning Systems (GPS) and conventional and differential leveling were used to establish required temporary control. All topographic features were located with an accuracy of 0.05-feet (±), and a confidence rating of 95% in accordance with FAA AC 150/5300-18B.

A new overall CAD basemap was created after the 2022 Dibble survey was completed and processed. This CAD basemap was shared with other team members (KH and CR) for them to use for their portions of the project. For the Taxiway 'H' Relocation project (Kimley-Horn plans) they will have a separate survey control sheet for their plans. The contractor will be given both survey control sheets as well as a station equation to align all the work.

2. PHOTOGRAPHS

Photographs of the existing conditions of the project area are included in **Appendix A –** *Project Photos*.

3. LISTING OF APPLICABLE AIP STANDARDS

3.1 List of AIP Advisory Circulars

The airfield standards and specifications used in the design and coordination of this project are shown in **Table 1** (on the following page).

Table 1 – Airfield Standards and Specifications

AC Number	Release Date	AC Title
AC 150/5300-13B	03-31-2022	Airport Design
AC 150/5300-18B	02-24-2014-Change 1	General Guidance and Specifications for Submission of Aeronautical Surveys to NGS: Field Data Collection and Geographic Information System (GIS) Standards
AC 150/5320-6G	06-07-2021	Airport Pavement Design and Evaluation
AC 150/5335-5D	04-29-2022	Standardized Method of Reporting Airport Pavement Strength – PCR
AC 150/5340-1M	05-10-2019	Standards for Airport Markings
AC 150/5340-18G	05-10-2019	Standards for Airport Sign Systems
AC 150/5340-30J	02-12-2018	Design and Installation Details for Airport Visual Aids
AC 150/5345-7F	08-19-2013	Specification for L-824 Underground Electrical Cable for Airport Lighting Circuits
AC 150/5345-26E	12-16-2021	FAA Specification for L-823 Plug and Receptacle, Cable Connectors
AC 150/5345-42J	09-12-2019	Specification for Airport Light Bases, Transformer Housings, Junction Boxes, and Accessories
AC 150/5345-47C	07-22-2011	Specification for Series to Series Isolation Transformers for Airport Lighting Systems
AC 150/5345-53D	09-26-2012	Airport Lighting Equipment Certification Program Addendum (Published Monthly and Listing Approved Suppliers)
AC 150/5370-2G	12-13-2017	Operational Safety on Airports During Construction
AC 150/5370-10H	12-21-2018	Standard Specifications for Construction of Airports
AC 150/5380-6C	10-10-2014	Guidelines and Procedures for Maintenance of Airport Pavements

3.2 Critical Design Standards

3.2.1 Technical Specifications

The contract technical specifications for the Runway '12R-30L' Reconstruction project were prepared using the most recent edition of FAA AC 150/5370-10H, *Standard Specifications for Construction of Airports*, supplemented with additional provisions from the Maricopa Association of Governments (MAG) as appropriate for items that are not covered by FAA standard specifications.

The list of technical specifications used on this project are listed in **Table 2** (on the next page).

Table 2 – Technical Specifications

Item Number	Title
C-100	Contractor Quality Control Program (CQCP)
C-102	Temporary Air and Water Pollution, Soil Erosion, and Siltation Control
C-105	Mobilization
C-110	Method of Estimating Percentage of Material within Specification Limits (PWL)
P-101	Preparation/Removal of Existing Pavements
P-152	Excavation, Subgrade, and Embankment
P-153	Controlled Low-Strength Material (CLSM)
P-154	Subbase Course
P-155	Lime-Treated Subgrade
P-208	Aggregate Base Course
P-209	Crushed Aggregate Base Course
P-304	Cement-Treated Aggregate Base Course (CTB)
P-401	Asphalt Mix Pavement
P-403	Asphalt Mix Pavements (Leveling, Base or Surface Course)
P-501	Cement Concrete Pavement
P-603	Emulsified Asphalt Tack Coat
P-604	Compression Joint Seals for Concrete Pavements
P-605	Joint Sealants for Pavements
P-606	Adhesive Compounds, Two-Component for Sealing Wire and Lights in Pavement
P-610	Concrete for Miscellaneous Structures
P-608	Emulsified Asphalt Seal Coat
P-620	Runway and Taxiway Marking
D-701	Pipe for Storm Drains and Culverts
D-751	Manholes, Catch Basins, Inlets and Inspection Holes
L-100	Electrical General Requirements
L-108	Underground Power Cable for Airports
L-110	Airport Underground Electrical Duct Banks and Conduits
L-115	Electrical Manholes and Junction Structures
L-125	Installation of Airport Lighting Systems

3.2.2 Design Aircraft

Table 3 (on the following page) provides the design aircraft for the identified Airport Reference Code (ARC) and Runway Design Code (RDC), in accordance with the most recent approved Airport Layout Plan (ALP) and Master Plan, (reference **Exhibit A**). The runway and taxiway design standards will meet the criteria for D-V aircraft.

Table 3 – Design Aircraft

Area	Existing Airport Reference Code (ARC) and Design Aircraft	Ultimate Airport Reference Code (ARC) and Design Aircraft
Runway '12R-30L'	D-V (Boeing 747-400)	D-V (Airbus A320)

3.2.3 Standard Dimensional Values

The standard runway and taxiway dimensional values for the project are shown in **Table 4** (below).

Table 4 – Standard Dimensional Values

Pavement / Facility	Runway '12R-30L' (feet)	Taxiways 'B' 'B2', 'B3' 'G', 'H' 'K', 'L' and 'N' (feet)
Runway Obstacle Free Zone (ROFZ)	400	-
Runway Safety Area (RSA)	500	-
Runway Object Free Area (ROFA)	800	-
Runway Width	150	-
Runway Shoulder Width	35	-
Runway Primary Surface	1,000	
Taxiway Safety Area (TSA)	-	214
Taxiway Object Free Area (TOFA)	-	285
Taxiway Width	-	75
Taxiway Shoulder Width	-	30

3.2.4 Geometric Values for Runways and Taxiways

This project is designed to be compliant with the current ALP and Master Plan, (reference **Exhibit A**), as well as in accordance with *FAA AC 150/5300-13B, Airport Design*, and the standards list in Section 3.1 above.

3.2.5 Surface Gradients – Transverse Slopes

Runway and Taxiway grades are designed to meet the requirements established for D-V aircraft. Within the project limits, the designed surface gradients follow the criteria in FAA AC 150/5300-13B, *Airport Design*, which is summarized in **Table 5** (below).

The designed transverse grades for the Runway '12R-3L' reconstruction creates a crowned profile with transverse slopes ranging from 1.0% to 1.50%. The separation of the project into three bid alternatives (Base Bid, Additive Alternate 1, and Additive Alternate 2) requires the design of two asphalt transition sections which will transition the new runway profile and cross slopes into the existing grades. If only the Base Bid is awarded, an approximate 300-linear foot asphalt transition section will be constructed at the north end of the Base Bid project limits. If only the Base Bid and Additive Alternate 1 are awarded, an approximate 275-linear foot asphalt transition section will be constructed at the north end of the Additive Alternate Bid 1 project limits.

Taxiway 'B2' grades are designed to meet the requirements established for D-V aircraft. Within the project limits the designed surface gradients follow the criteria in FAA AC 150/5300-13B, *Airport Design*, which is summarized in **Table 5** (below).

Table 5 – Surface Gradients

Pavement / Facility	Longitudinal Grade			Transverse Grade		
	Exist.	Standard	Design	Exist.	Standard	Design
Runway '12R-30L'	Varies	Max 1.50%	0.28-0.46%[1]	0.00 – 1.50%	1.00 – 1.50%	1.00 – 1.50%
Shoulder Pavement	Varies	N/A	0.28-0.46%[1]	0.36 - 1.80%	1.50 – 5.00%	1.50 – 3.20%
Proposed Taxiway 'B2'	Varies	Max 1.50%	Varies	0.50 – 1.50%	1.00 – 1.50%	0.50 – 1.00%
Proposed Taxiway 'B2'Shoulder Pavement	Varies	N/A	Varies	0.50 - 3.00%	1.00 – 5.00%	1.50 – 3.00%

[1] The longitudinal slopes along the runway were decreased in areas of connecting taxiways.

The designed transverse grades for the proposed Taxiway 'B2' construction maintains a constant slope section (aka shed section) profile with consistent 1.00-1.50% transverse slopes near the middle portion of the proposed taxiway and grades transition/vary (while still providing positive drainage) through the taper sections of the taxiway as they tie-into the existing Taxiway 'B' pavements to the southwest, and the proposed Runway '12R-30L' pavements to the northeast.

3.2.6 Longitudinal Grades for Proposed Pavement Areas

The existing Runway '12R-30L' centerline alignment maintains a longitudinal slope of approximately 0.28% with pavement that slopes transversely in a single direction between Taxiway 'G' and Taxiway 'K'. South of Taxiway 'K' the runway transverse slopes transition to a crowned section with non-standard cross slopes. To create a crowned pavement surface with the least amount of disturbance to the surrounding areas and meet FAA standard cross slopes, the overall centerline elevation will be raised by approximately 12-inches. The ultimate design longitudinal slopes for the runway range from approximately 0.28% to 0.46%. Certain sections have decreased longitudinal slopes in areas of connecting taxiways, (i.e. Taxiway 'B2'), to provide for a smooth longitudinal transition to/from the connector taxiways. The transition AC pavement sections have increased slopes (approx. 0.64% for Schedule I and 0.57% for Schedule II) as a temporary condition to tie back into existing runway.

The Taxiway 'B2' centerline alignment has a varying profile with longitudinal slopes that range from -1.10% (at the southwest tie-in location at the edge of existing Taxiway 'B') to +1.08% (at the northeast tie-in location at the edge of proposed Runway '12R-30L'). Taxiway 'B2' utilizes a 120-foot vertical curve at its low point, and longitudinal grade breaks at each end that do not exceed the FAA's allowable maximum of 0.40% (without use of a vertical curve).

The Taxiway 'K' longitudinal slopes approaching Runway '12R-30L' on both sides will be modified to accommodate the runway transverse slopes (1.0% - 1.5% allowable). These longitudinal grade break adjustments along Taxiway 'K' are taking place as close to the intersection as possible to reduce the area of reconstruction required on Taxiway 'K'. There are two reasons for this approach: the west portion of Taxiway 'K' will be reconstructed in the near future and the east portion was recently reconstructed with a temporary AC pavement section that was planned to be removed and replaced with this runway reconstruction project. Furthermore, FAA AC 150/5300-13B, Section 4.14.1.1.3.d (page 4-50) states: *Where a taxiway intersects a runway or taxiway crown, adjust longitudinal grades as necessary to provide smooth transition over the pavement section.*

4. CONSIDERATIONS FOR AIRPORT OPERATIONAL SAFETY

Contractor activities during construction are required to conform to the requirements of FAA AC 150/5370-2G, *Operational Safety on Airports During Construction* and the phasing plan for the project. The phasing plan sets forth requirements to control the areas of the Contractor's operations and is included as an attachment to the Construction Specifications.

A Construction Safety and Phasing Plan (CSPP) is required to ensure that appropriate safety provisions are provided to the Contractor for construction, including protection of safety areas and required communication and coordination protocols. Proper implementation of the construction phasing schedule and the CSPP eliminates or minimizes potential conflicts between construction and airport operations. The CSPP specific to this project, along with the 7460 Construction Site Plan, will be submitted to the FAA OE-AAA website following its approval by PMGAA and the FAA ADO office.

The Contractor will be required to prepare and submit a Safety Plan Compliance Document (SPCD) prior to commencing construction to demonstrate an understanding of the safety requirements and intended approach to compliance with the CSPP.

The Contractor will be required to light and mark all equipment for proper visibility, and restrictions will be placed on equipment heights to protect all relevant airspace surfaces where applicable. The Contractor will be responsible for construction work safety.

4.1 Proposed Phasing and Sequencing

The construction phasing limits for this project are dependent on the bid award. The construction phasing was developed based on several factors: contractor and aircraft safety, impact to aircraft traffic and airport operations, temporary taxiway and runway closure duration, constructability, construction costs, and coordination with PMGAA Operations staff.

The Contractor will be responsible to submit their own *Safety Plan Compliance Document* (SPCD) and detailed Barricade Plans at the Pre-Construction Meeting for review and approval by the Resident Engineer and Airport. The Contractor will have a total of 90 calendar days to reach substantial completion for the Base Bid work (Schedule I), 120 calendar days to reach substantial completion for the Base Bid and Additive Alternate Bid 1 work (Schedule I & II), and if Additive Alternate Bid 2 (Schedules III & IV) is awarded, the Contractor will have an additional 180 calendar days to reach substantial completion. Following substantial

completion, the Contractor will have a total of 7 calendar days to reach final completion for all work and sub-phases.

Detailed phase descriptions are provided on the following page.

Base Bid (Schedule I) Phase 1: 90 Calendar Days Total

If only the Base Bid is awarded the project will include the reconstruction of approx. 1,690-feet of Runway '12R-30L'. All work will take place during a single construction phase. Runway '12R-30L' will be closed from just south of Taxiway 'K' to the end of Runway '30L'. For the entire duration of the phase aircraft traffic will be diverted onto and off of the Runway at Taxiway 'K'. A lighted "X" will be placed on the Runway '30L' runway designation marking to signal the runway closure to arriving aircraft. Runway '12R-30L' will remain open between the Runway '12R' end and Taxiway 'K' to permit short-field landings on Runway '12R' and short-field departures from Taxiway 'K'. Barricades will be installed across Runway '12R-30L' approx. 300-feet south of Taxiway 'K' to ensure a clear Extended Runway Safety Area for short-field arrivals on Runway '12R'. Additionally, temporary Runway End Lights will be installed on the south side of Taxiway 'K'. These lights and the runway edge lights north of Taxiway 'K' will be powered by the Taxiway 'K' lighting system to allow for nighttime operations.

Base Bid + Additive Alternate Bid 1 (Schedules I & II) Phase 1: 120 Calendar Days Total

If the Base Bid and Additive Alternate Bid 1 are both awarded the project will include the reconstruction of approx. 3,055-feet of Runway '12R-30L'. All work will take place during a single construction phase. Runway '12R-30L' will be closed from approximate 640-feet south of Taxiway 'H' to the end of Runway '30L'. For the entire duration of the phase aircraft traffic will be diverted onto and off of the Runway at Taxiway 'H'. A lighted "X" will be placed on the Runway '30L' runway designation marking to signal the Runway closure to arriving aircraft. Runway '12R-30L' will remain open between the Runway '12R' end and Taxiway 'H' to permit short-field landings on Runway '12R' and short-field departures from Taxiway 'H'. Barricades will be installed across Runway '12R-30L' approx. 650-feet south of Taxiway 'H' to ensure a clear Extended Runway Safety Area for short-field arrivals on Runway '12R'. Additionally, temporary Runway End Lights will be installed on the south side of Taxiway 'H'. These lights and the runway edge lights for the open section of the runway will be powered by the Taxiway 'G' lighting circuit to allow for nighttime operations.

Base Bid + Additive Alternate Bid 1 + Additive Alternate Bid 2 (Schedules I -IV)

If all bid schedules are awarded construction will take place in two construction phases. Phase 1 work will be completed as detailed above for the combination of Schedules I & II totaling 120 calendar days. Phase 2 work will be completed as detailed below.

Additive Alternate Bid 2 (Schedules III & IV) Phase 2:

Phase 2A - 180 Calendar Days Total

Phase 2A work involves the reconstruction of approx. 4,200-feet of Runway '12R', the removal of existing connector Taxiway 'H', and construction of new connector Taxiway 'B2'. This work will be completed as part of a single partial closure of Runway '12R-30L'. Runway '12R-30L' will be closed from just north of Taxiway 'K' to just south of Taxiway 'G' to allow Taxiway 'G' to remain open for the duration of phase 2 except for as described herein. During Phase 2A aircraft traffic will be diverted onto and off of the Runway at Taxiway 'K'. A lighted "X" will be placed north of the Runway '12R' threshold (within the limits of the blast pad) to signal the Runway closure to arriving aircraft. Runway '12R-30L' will remain

open between the Runway '30L' end and Taxiway 'K' to permit short-field landings on Runway '30L' and short-field departures from Taxiway 'K'. Barricades will be installed across Runway '12R-30L' approx. 500-feet north of Taxiway 'K' to ensure a clear Extended Runway Safety Area for short-field arrivals on Runway '30L'. Additionally, temporary Runway End Lights will be installed on the north side of Taxiway 'K'. These lights will be powered by the runway lighting system to allow for nighttime operations.

Phase 2B – 21 Calendar Days (concurrent with Phase 2A)

Phase 2B includes the following elements:

Partial demolition of Taxiway 'H' (within the Taxiway 'B' ADG IV TOFA)
Infield grading (within the Taxiway 'B' ADG IV TOFA)
Construction of Taxiway 'B' shoulder (AC)
Installation of Taxiway 'B' edge lights
Updated Taxiway 'Y3' signage

Phase 2C – Completed in 150 Calendar Days (concurrent with Phase 2A)

Phase 2C includes the following elements:

Remaining demolition of Taxiway 'H'
Full construction of Taxiway 'B2' including new drainage infrastructure
All electrical, signage, and pavement marking

Phase 2D – 10 Calendar Days (Nighttime Only – concurrent with Phase 2A)

Phase 2D includes the following:

Replacement of airfield lighting cable within the Taxiway 'G' / Runway '12R-30L' intersection

At the end of phase 2 a full runway closure for a single night will be required in order to install the new LED runway edge lights for the entire runway.

Refer to **Appendix B** – *Construction Phasing Plans* for airfield closures, aircraft detours and movements, and barricade locations. As shown in **Appendix B**, low profile barricades will be placed at:

Base Bid Phase 1 – Runway '12R-30L' south of Taxiway 'K' and Taxiway connectors 'B3', 'L', and 'N' east of Taxiway 'B'

Base Bid + Additive Alternate Bid 1 Phase 1 – Runway '12R-30L' north of Taxiway 'K' and Taxiway connectors 'K', 'B3', 'L', and 'N' east of Taxiway 'B'

Phase 2A – Runway '12R-30L' south of Taxiway 'G', entrance to Taxiway 'H' from TW 'B', north of Taxiway 'K' (These barricades will remain in place for the duration of construction) Each sub-phase is identified below with additional barricade placements.

Phase 2B – Taxiway 'B' (south of Taxiway 'Y2', north of Taxiway 'A1') and across Taxiway 'Y3' west of Taxiway 'B'

Phase 2C – Taxiway 'B' (south of Taxiway 'Y3' and north of Taxiway 'A1')

Phase 2D– Taxiway 'G' (east of Taxiway 'B' and west of Runway '12C-30C' threshold)

4.2 Work Procedures within RSA and TSA

If only the Base Bid is awarded, Runway '12R-30L' will be shortened for the duration of construction to approx. 5,520 feet and will only be open between Taxiway 'G' and Taxiway 'K'. Only arrivals and departures on this shortened portion of the Runway will be allowed and limited to Group II aircraft or smaller. All aircraft movement will be managed by the FAA Contract Tower (FCT).

If the Base Bid and Additive Alternate Bid 1 are awarded, Runway '12R-30L' will be shortened for the duration of construction to approx. 3,245-feet and will only be open between Taxiway 'G' and Taxiway 'H'. Only arrivals and departures on this shortened portion of the Runway will be allowed and limited to Group I aircraft or smaller. All aircraft movement will be managed by the FCT.

If the Base Bid, Additive Alternate Bid 1, and Additive Alternate Bid 2 are all awarded construction will take place during two phases. For Phase 1, Runway '12R-30L' will be shortened as described above for the Base Bid and Additive Alternate Bid 1 scenario. For Phase 2, Runway '12R-30L' will be shortened to approx. 5,034 feet and will only be open between Taxiway 'K' and Taxiway 'N'. Only arrivals and departures on this shortened portion of the Runway will be allowed and limited to Group II aircraft or smaller. All aircraft movement will be managed by the FCT.

4.3 Haul Routes and Staging Areas

If the Base Bid only is awarded or if the Base Bid and Additive Alternate 1 are awarded, then during construction the staging area will be located inside a fenced area adjacent to Gate 3 off South Ellsworth Road. The contractor will be required to install new security fence and relocate Gate 3 to allow for better traffic flow and safety. The haul route begins on South Ellsworth Road with airport access through Gate 3. The haul route will continue north along an existing service road towards Taxiway 'P'. The haul route will continue northwest along an existing service road towards the south end of Runway '12R-30L'. From there, construction vehicles will enter Runway '30L' for daily construction activities.

If the Base Bid, Additive Alternate Bid 1, and Additive Alternate Bid 2 are all awarded, then during Phase 2 construction the staging area will be located inside a fenced area by Gate 80/81(V), east of South Sossaman Road and south of an existing drainage channel. The haul route begins on South Sossaman Road with airport access through Gate 80/81(V). The haul route will continue through Gate 80/81(V) along an existing service road heading southeast towards Taxiways 'E' and 'G'. From there, construction vehicles will enter Runway '12R' for daily construction activities for Phase 2D. Alternatively for Phases 2A, 2B, and 2C, construction vehicles will cross Taxiway 'G' and continue along an existing service road towards the Runway '12R-30L' across from existing Taxiway 'H'.

4.4 Impacts to Approach Procedures

The Runway '12R' PAPIs for the Runway '12R' approach will be out of service during construction, while Runway '12R' is closed for approaches during Additive Alternate 2 construction. During Additive Alternate 2 construction, the portion of Runway '12R-30L' south of the Additive Alternate 2 construction limits will be used temporarily for short departure/arrival operations with a temporary Landing Distance Available (LDA) and Takeoff Distance Available (TODA) of 5,034 feet.

The PAPIs for the Runway '30L' approach will be out of service during Base Bid construction or Base Bid and Additive Alternate 1 construction while Runway '30L' is closed for approaches. If Base Bid only is awarded, then during construction, the portion of Runway '12R-30L' north of the Base Bid construction limits will be used temporarily for short departure/arrival operations. The temporary LDA and TODA is approx. 5,520 feet for arrival/departure operations. If the Base Bid and Additive Alternate Bid 1 are awarded, then during construction, the portion of Runway '12R-30L' north of the Additive Alternate 1 construction limits will be used temporarily for short departure/arrival operations. The temporary LDA and TODA is approx. 3,247 feet for arrival/departure operations.

4.5 Impacts to FAA-Owned NAVAIDs

No impacts to FAA owned Navigational Aids (NAVAIDs) are expected, other than the temporary downtime associated with the runway closures.

4.6 Impacts to Existing Service Roads and ARFF Roads

This project will have minimal impact on aircraft rescue and firefighting (ARFF) access routes. During Additive Alternate 1 (Schedule II) Phase 1, Taxiway 'K' will be closed to ARFF use; alternate ARFF routes will be coordinated by the airport during the closure of the taxiway. The Contractor will be directed to maintain the alternate access routes and all other existing routes that may be used by ARFF vehicles within the Airfield Operations Area (AOA) at all times.

4.7 Notification to the FAA

All proposed construction activities that affect operations at PMGAA will be immediately relayed to all Airport users and the FAA by way of meetings, advisories, a Notice of Air Missions (NOTAM), and the filing of FAA Form 7460-1, Notice of Proposed Construction or Alteration as appropriate (minimum of 60 days prior to the proposed construction).

4.8 Impacts to Taxiways and Runways

The taxiway and runway closures during Base Bid (Phase 1) construction include:

Phase 1 (Schedule I only):

Runway '12R-30L' closed south or the Taxiway 'B3' TOFA
Taxiway 'B3' closed between Taxiway 'B' and Runway '12R-30L'
Taxiway 'L' closed between Taxiway 'B' and Runway '12R-30L'
Taxiway 'N' closed between Taxiway 'B' and Runway '12R-30L'

The taxiway and runway closures during Base Bid and Additive Alternate Bid 1 (Phase 1) construction include:

Phase 1 (Schedules I and II):

Runway '12R-30L' closed south of Taxiway 'H'
Taxiway 'K' closed between Taxiway 'B' and Runway '12C-30C'
Taxiway 'B3' closed between Taxiway 'B' and Runway '12R-30L'
Taxiway 'L' closed between Taxiway 'B' and Runway '12R-30L'
Taxiway 'N' closed between Taxiway 'B' and Runway '12R-30L'

The taxiway and runway closures during Additive Alternate 2 (Phase 2) construction include:

Phase 2A (Schedules III and IV):

Runway '12R-30L' from north of Taxiway 'K' to the south edge of Taxiway 'G' TOFA (ADG IV)
Taxiway 'H' from Taxiway 'W'/'Y' intersection to Runway '12R-30L'

Phase 2B (concurrent with Phase 2A):

Taxiway 'B' at south edge of Taxiway 'Y2' TOFA
Taxiway 'B' at north edge of Taxiway 'A1' TOFA
Taxiway 'H' from Taxiway 'W'/'Y' intersection to Runway '12R-30L'
Taxiway 'Y3' from Taxiway 'W'/'Y' intersection to west Taxiway 'B' TOFA
Runway '12R-30L' from the from north of Taxiway 'K' to the south edge of Taxiway 'G' TOFA (ADG IV)

Phase 2C (concurrent with Phase 2A):

Taxiway 'H' north of Taxiway 'W'/'Y' intersection to Runway '12R-30L'
Runway '12R-30L' from the from north of Taxiway 'K' to the south edge of Taxiway 'G' TOFA (ADG IV)
Taxiway 'B' at south edge of Taxiway 'Y3' TOFA
Taxiway 'B' at north edge of Taxiway 'A1' TOFA

Phases 2D (concurrent with Phase 2A – nighttime):

Taxiway 'G' at south edge of Runway '12C-30C' RSA
Taxiway 'G' at north edge of Taxiway 'B' TOFA
Taxiway 'H' north of Taxiway 'W'/'Y' intersection to Runway '12R-30L'
Runway '12R-30L' from the from north of Taxiway 'K' to the south edge of Taxiway 'G' TOFA (ADG IV)

5. PAVEMENT DESIGN

5.1 Geotechnical Report

5.1.1 Soil Investigation

Terracon conducted on-site geotechnical investigations in August 2022 with lab investigations following the on-site activities. The goal of these activities was to gather existing runway pavement depths and subsurface soil samples and determine the existing conditions of the runway pavement area. This information provides the basis of design for the new pavement structural sections required for this project. The analysis used data from the subsurface investigations, laboratory testing of site soils, and the FAA's pavement design criteria. Analysis of the investigations, pavement design alternatives, and recommendations are provided in **Appendix B** – *Pavement Engineering Report*.

5.1.2 Soil Characteristics and Properties

All borings for this project were taken from under concrete cement cores along Runway '12R-30L' between the thresholds and advanced to 11 feet below the surface. A total of 20 borings were collected as part of the field exploration. The material below the existing concrete surface consists of the following:

Boring B-01 to B-07, B-13 to B-15, B-17, B-19, and B-20:
generally medium stiff to hard sandy lean clay with moisture contents ranging from 6.0% to 21.3%.
Boring B-08 to B-12, B-16, and B-18:
generally medium stiff to hard/loose to very dense silty clayey sand and silty clay with sand with moisture contents ranging from 6.0% to 25.3%.

Groundwater was not observed in any of the borings. A full soils analysis can be obtained in **Appendix B** – *Pavement Engineering Report*.

5.2 Aircraft Fleet Mix

The fleet mix data shown in **Table 6** (below and on the following page) was created based on past and present data available on aircraft and the estimated/projected number of annual operations, including data from the Airport Master Plan.

Table 6 – Aircraft Fleet Mix

Aircraft Type	FAARFIELD Aircraft	ARC	Wingspan (feet)	Length (feet)	Maximum Take-off Weight (lbs.)	Airport Total Ops/Year
Commercial Aircraft Operations						
Airbus	A319-100	C-III	111.88	111.02	168,653	2,555
Airbus	A320-200	C-III	111.88	123.27	171,961	7,665
Boeing	767-300	C-IV	156.08	180.25	412,000	500
Boeing	737-800	D-III	112.58	129.5	174,200	624
Boeing	747-400	D-V	213	231.85	875,000	208
General Aviation Aircraft Operations						
Cessna	172/180	A-I	36.08	27.17	2,550	90,000
Beech King Air	C90/200/B300	B-I	46	40	11,800	90,000
Premier	390	B-I	44.5	46	12,500	10,000
Falcon	10	B-I	43	45	16,000	300
Hawker	800/850XP	B-II	51	51	28,000	25,000
Falcon	20/50/200/ 900/2000	B-II	54	56	41,000	15,000
Lear	23/24/31/ 35/45	C-I	40	49	18,000	25,000
Challenger	300/600/ BD100	C-II	64	68	43,000	12,000
Embraer	135BJ	C-II	69	87	22,500	5,000
Global Express	Global Express	C-III	94	99	99,500	5,000
General Aviation Aircraft Operations						
Lear	60	D-I	44	59	23,500	100
Gulfstream	II/III/IV	D-II	78	88	72,000	5,300
Gulfstream	V	D-III	94	96	90,500	200
Military Aircraft Operations						
Fighting Falcon	F-16	D-I	32.67	49.42	37,500	100
C-130	C-130	C-IV	133	98	155,000	150
C-17	C-17	D-IV	170	174	580,000	25

5.3 Pavement Design Alternatives

Dibble and Terracon analyzed rigid (PCCP) and flexible (AC) structural pavement section alternatives using the geotechnical data (**Appendix C**), aircraft fleet mix data (**Table 6**), guidance presented in FAA AC 150/5320-6G, *Airport Pavement Design and Evaluation*, and the FAA computer program FAARFIELD (v 2.0.7). The pavement sections were designed for a 20-year pavement life expectancy. The FAARFIELD pavement design results are included in **Appendix C** – *FAARFIELD Pavement Design Output Data*.

After review of the pavement design data and consideration of pavement section alternative results, Terracon and Dibble determined the most effective, 20-year design life pavement sections, shown in **Table 7** below. Consideration of construction cost, constructability, coordination with PMGAA, and FAA design standards were used to determine the most effective sections for this project.

Table 7 – Recommended Pavement Structural Sections

Pavement Area	Material Thickness (inches)						
	P-501 (PCCP)	P-401 (AC)	P-403 (AC)	P-304 (CTB)	P-209 (ABC)	P-154 (Subbase)	P-155 (LTSG)
RW '12R-30L' - PCCP	16			6			8
TW 'K' and 'B2' - PCCP	16			6			8
RW Transition Section - AC		4	7	Varies[1] 6" – 11"			8
RW Shoulder			4		8	10[2]	8

[1] Variable depth CTB will be placed so that future PCCP can be constructed without having to reconstruct the CTB and LTSG layers.
[2] Aggregate depth in pavement section was increased for constructability and material depth consistency with the Runway pavement section (i.e. 22-inch depth to top of LTSG).

Rigid Pavement Design:

The rigid pavement design (runway and taxiway PCCP) was developed using the most recent version of FAA FAARFIELD pavements design program, (v. 2.0.7). The pavement design utilized the data in the aircraft fleet mix (**Table 6**) and the existing field conditions contained in the pavement design report (**Appendix B**). The pavement design was also developed to meet the criteria in FAA AC 150/5320-6G, Chapter 3, *Pavement Design*, more specifically Section 3.16 *Rigid Pavement Design*. The following sections were referenced for consideration of the chosen pavement section alternative:

> Section 3.13.1 (and Figure 3-3): The FAA recommends uniform full width pavement sections, with each pavement layer constructed a uniform thickness for the full width of the pavement. See Figure 1-1 and Figure 3-3.
> Section 3.16.1.1: Rigid pavements for airports are composed of concrete placed on a granular or stabilized base course supported on a compacted subgrade.
> Section 3.16.3.2: Stabilized base is required for base under pavements designed to serve aircraft over 100,000 pounds.
> Section 3.16.3.3: Subbase under stabilized base must exhibit a CBR > 35. The material under the stabilized base needs to provide a stable platform for the construction of the stabilized base layer.
> Section 3.16.3.4: The following materials are acceptable for use under rigid pavements: stabilized base (P-401, P-403, P-307, P-306, P-304, P-220).
> Section 3.16.3.5: Avoid producing a "sandwich section", in which one or more pervious granular layers is located between two impervious layers. This is to prevent trapping water in the granular layer, which could result in a loss of pavement strength and performance.

Typically, rigid pavement sections consist of PCCP on a stabilized base on crushed aggregate base course material on a compacted subgrade. However, the existing subgrade under Runway '12R-30L' is very poor and the resulting CBR values are very low. This causes rigid pavement section design depths to be increased, which increases construction costs. The use of hydrated lime for soil stabilization significantly increases the subgrade CBR values, reduces the overall required pavement section depths, has a high level of constructability, and is overall more cost effective.

When constructing a rigid pavement section, (i.e. PCCP), with a lime-treated stabilized base, the top and bottom of the pavement section are considered impervious. Per FAA AC 150/5320-6G, Chapter 3, *Pavement Design*, Section 3.16.3.5, FAA requires that sandwich layers (i.e. pervious layers between impervious layers) be avoided. Therefore, a rigid pavement section was created to meet all the other applicable FAA standards while removing the "pervious" aggregate base material.

The recommended rigid pavement section for runway and taxiway structural pavement is 16-inches PCCP (P-501) on 6-inches CTB (P-304) on 8-inches LTSG (P-155). This section meets all the criteria as stated herein.

Lime-Treated Subgrade:
Three CBR specimens were prepared at 3%, 5% and 7%, respectively, of hydrated lime per dry unit weight of soil. Each specimen was compacted to 95% of the standard proctor (ASTM D 698) maximum dry density. A standard proctor was prepared at a lime content of 5% which resulted in a maximum dry density of 106.8 pounds per cubic foot (pcf) at 17.4% optimum moisture content. The CBR test results relative to the percent hydrated lime are presented below:

3% Hydrated Lime = 15.8 CBR
5% Hydrated Lime = 37.9 CBR
7% Hydrated Lime = 48.3 CBR

FAA AC 150/5320-6G, Chapter 3, *Pavement Design*, Section 3.16.3.3 states the following: "*Subbase under stabilized base must exhibit a CBR > 35. The material under the stabilized base needs to provide a stable platform for the construction of the stabilized base layer*." Therefore, the lime-treated subgrade under the stabilized base in our proposed runway and taxiway structural pavement section must have a minimum 35 CBR value.

To meet this criterion, the minimum percent hydrated lime must be approx. 5% to create an equivalent, required subbase CBR of 35. Typically lime-treated subgrade (LTSG) designs are 2% greater than the minimum required to achieve an average condition. This design approach accounts for potential variability in placement and material types. This means to plan for an average CBR of 37.9 with 5% lime content, the recommended design includes 7% lime content to account for the conditions which may bring the soil below a CBR value of 37.9.

AC Runway Transition Pavement:
The north end of the Base Bid (Schedule I) project limits includes a transition area that is approximately 300-feet long. The proposed pavement section is 4-inches AC (P-401) on 7-inches AC (P-403) on 6- to 16.5-inches CTB (P-304) on 8-inches LTSG (P-155). This asphalt transition section will be constructed in the event only the Base Bid is awarded. If that is the case, the LTSG will be installed at the permanent elevations for the future reconstruction of that section of Runway when additional funding becomes available.

The north end of the Additive Alternate 1 (Schedule II) project limits includes a transition area that is approximately 275-feet long. The design for Additive Alternate 1 (Schedule II) asphalt transition includes constructing 11-inches of AC on variable thickness (6-inches to 16.5-inches) CTB on 8-inches of LTSG. This asphalt transition section will be constructed in the event that only the Base Bid and Additive Alternate Bid 1 are awarded. If that is the case, the LTSG will be installed at the permanent elevations for the future reconstruction of that section of Runway when additional funding becomes available.

The northernmost transition area is the north end of Additive Alternate 2 (Schedule III) project limits which reconstructs approximately 532 linear feet of the Runway '12R' threshold, reconstructed in 2015. The original design transitioned a crowned section of pavement to a single cross slope section to match back into existing pavement elevations. This section of pavement was constructed with 16.5-inches of PCCP on 6-inches of CTB on 8-inches of LTSG. This project will remove the existing 16.5-inches of PCCP and will place variable depth CTB on the existing CTB at the necessary slopes and elevations needed to pave the new 16-inch section of PCCP to meet the designed surface elevations with a crowned pavement section. This approach reduces the amount of "throw-away" work from the Runway '12R' Threshold project.

AC Runway Shoulders Pavement:
FAA AC 150/5320-6G, *Airport Pavement Design and Evaluation*, specifically Chapter 6 *Pavement Design for Shoulders* and Table 6-1 *Minimum Shoulder Pavement Layer Thickness*, and FAA FAARFIELD pavements design program, (v. 2.0.7), was used and referenced for the shoulder pavement design on this project. The shoulder pavement design accommodates a total of 15 passes of the most demanding, aircraft (**Table 6**, 747-400). FAA Technical Specification P-403 further states: *Surface course may also be specified but only for those pavements designed to accommodate aircraft of gross weights less than or equal to 30,000 pounds or for surface course of shoulders, blast pads, service roads, etc.* Also, recent discussions with Airport personnel determined the existing shoulders throughout the length of the runway have some sort of stabilized subgrade material (lime or cement).

Based on the information proposed in this section/report, the runway shoulder pavement section is 4-inches AC (P-403) on 8-inches ABC (P-209) on 10-inches ABC (P-145) on 8-inches LTSG (P-155).

Asphalt Performance Grade Determination:
The performance grade (PG) evaluation considered the weather conditions and traffic to determine the appropriate asphalt binder for this project. This was accomplished using the LTPPBind Online software provided by the Federal Highway Administration (FHWA). This software uses historical temperature data from weather stations near the project and considers aircraft speed and weights to establish a recommended PG binder grade of AC. The software output was compared to the binders that were indicated to be locally available to determine the recommended binder selection for the project. The LTPPBind Online software recommended a PG 70-10 which is a very common binder in the area.

FAA Specification P-401 – Asphalt Mix Pavement recommends increasing the asphalt binder on the high temperature end two grades for aircraft with gross weight more than 100,000 lbs. This "grade bump" would result in a PG 82-10 binder, which is not currently available. A more commonly used and available binder is PG 76-16 and has been used in the past with good performance. Therefore, due to the limited area of runway pavement required only in the transition areas between the reconstructed PCCP and existing asphalt, PG 76-16 is the recommended binder for the P-401 asphalt paving on the runway.

No grade bumps are required for runway shoulders; therefore, PG 70-10 is the recommended binder for the P-403 asphalt paving on the shoulders as well as for the 7-inches of P-403 stabilized base within the Base Bid and Additive Alternate 1 asphalt transition pavement structural sections. The contractor will be provided the option to use PG 76-16 in the shoulder AC specification (P-403) for mix design consistency and potential cost savings.

5.3.1 Life-Cycle Analysis and Justification

A life-cycle cost analysis was not completed for this project. The scope of this project is to replace existing PCCP on Runway '12R-30L' with a new PCCP structural section and reconstruct portions of existing runway AC shoulders to correct non-compliant transverse slopes and accommodate the grade changes associated with the runway reconstruction.

5.4 ACR/PCR Evaluation

The FAA's FAARFIELD software, (v. 2.0.7), includes a built-in feature for determining the Aircraft Condition Rating (ACR) and Pavement Condition Rating (PCR) values for new pavement designs using aircraft fleet mix details and the proposed pavement sections. The full ACR/PCR report can be found in **Appendix C** – *FAARFIELD Pavement Design Output Data*.

Table 8 – ACR and PCR Data in **Table 8** (on the following page), provides the ACR and PCR output data from FAARFIELD.

Table 8 – ACR and PCR Data

FAARFIELD Critical Aircraft	ACR[1]	PCR[1]
Boeing 747-400	683.5	750.9

[1] These values are specific to this design project. Any change to the pavement design or fleet mix would void these values.

5.5 Material Availability and Capacity to Deliver

All materials required for this project are anticipated to be available; however, materials may be limited with longer than usual lead times at the time of construction.

5.6 Subgrade Stabilization

The existing subgrade material has moderate swell potential, based on the testing completed as part of the soil investigations. To mitigate the swell potential and provide stable subgrade soils for the pavement structural section, the subgrade will be lime treated with a minimum lime content of 7% of the dry unit weight of the soil. During construction, a test strip will be required to confirm the lime treatment mix design. It is recommended to compact the LTSG to 95% of the maximum density as established using ASTM D 698.

5.7 Pavement Design and Recommendation

5.7.1 FAARFIELD Program Results

Dibble and Terracon analyzed rigid (PCCP) and flexible (AC) structural pavement section alternatives using the geotechnical data (**Appendix B**), aircraft fleet mix data (**Table 6**), guidance presented in FAA AC 150/5320-6G, *Airport Pavement Design and Evaluation*, and the FAA computer program FAARFIELD (v 2.0.7). The pavement sections were designed for a 20-year pavement life expectancy. The FAARFIELD pavement design results are included in **Appendix C** – *FAARFIELD Pavement Design Output Data*.

After review of the pavement design data and consideration of pavement section alternative results, Terracon and Dibble determined the most effective, 20-year design life pavement sections, shown in **Table 7**. Consideration of construction cost, constructability, coordination with PMGAA, and FAA design standards were taken to determine the most effective sections for this project.

6. DRAINAGE DESIGN

The Runway '12R-30L' Reconstruction project will maintain the majority of the existing drainage conditions and flows. The existing runway grades north of Taxiway 'K' drain runoff from the east side of the runway to the west with a basin boundary on the east side of the runway full strength pavement. In this area the runway reconstruction project shifts this basin boundary to the centerline of the runway, (i.e. new crowned

section). This change to the drainage basin area between Runway '12R-30L', Runway 12C-30C, Taxiway 'G', and Taxiway 'K' increases the drainage area by 10 acres, an approximately 7% increase which is considered negligible. Further much of the infield area adject to the runway shoulder pavement is currently a deteriorated asphalt material which is considered mostly impervious. At the completion of the project the area will have a soil surface which will increase runoff infiltration in the area. The combination of both increasing the impervious area while also increasing the area considered to pervious results in minimal if any impact to the volume of rainfall runoff, therefore no formal drainage analysis was completed as part of this project.

The pavement surface will be graded to FAA standards to ensure runoff can occur to the same extent or improved from the existing condition. This project will not add any additional impervious surfaces to the airfield, while increasing some of the impervious areas, resulting in little to no change to the existing expected runoff after storm events.

The existing ground on the east side of the runway is relatively flat and does not meet current FAA standards for RSA slopes. Therefore, the new RSA grading design requires the construction of a new swale in order to meet RSA slope standards and match into existing grades. North of Taxiway 'K' the swale directs water to existing catch basins near the segmented circle. South of Taxiway 'K' the swale directs runoff to the mid-field retention basin. South of Taxiway 'K' the design results in lowering the RSA elevation up to 1-foot in some areas. The mid-field basin and it's subbasins just south of Taxiway 'K' were designed to contain a 100-year storm. The 100-year storm contour for the subbasin closest to the runway and Taxiway 'K' intersection (9N-4) is 1355.5. The new shoulder and RSA design results in the 1355.5 contour elevation at just off the runway and taxiway shoulder pavement edge at the Taxiway 'K' / Runway '12R-30L' intersection. The grading changes in this area require the reconstruction of a concrete spillway which allows runoff to enter the mid-field basin. Refer to **Appendix D** for excerpts from the 2013 Detention Basin Mid Memorandum.

7. AIRFIELD LIGHTING AND SIGNAGE

7.1 Condition of Existing Systems

The existing Runway '12R-30L' edge and threshold lighting consist of medium intensity incandescent quartz runway lights on L-867 base cans with 30/45Watt series isolation transformers and L-867 bases with #8, L-824 cable. The existing runway edge lighting circuit is fed by a 6.6Amp, 5-Step, 15kW CCR, R1. The runway also consists of a mandatory signs circuit, R1S, fed by a 15kW CCR that feeds the hold position signs, runway distance remaining (RDR) signs and runway exit signs, portions of which are installed in the runway edge lighting conduit.

Segments of runway edge lighting (R1) and runway sign circuit (R1S) conduits also contain the north PAPI circuit, PPN. Segments of runway edge conduit at existing taxiway connector were also found to contain RGL and taxiway edge lighting circuits.

Runway distance remaining signs are located on both sides of the runway, at the maximum 75 feet perpendicular distance for size 4. They are very aged and have deteriorated fiberglass sign housings on deteriorated concrete foundations with remote L-867C (15") diameter transformer housings. Segments of existing conduit were found to be thin wall PVC.

Existing hold position and runway exit signs consist of various manufacturers of various ages from connecting taxiway projects and are proposed to remain.

7.2 Proposed Lighting Types and Location

The design will conform to FAA AC's 150/5340-18G, *Standards for Airport Sign Systems* and 150/5340-30J, *Design and Installation Details for Airport Visual Aids*.

Base Bid of runway reconstruction consists of removal and temporary storage of 30L elevated edge lighting fixtures, located in the southern half of runway affected by full strength and partial shoulder pavement reconstruction. The existing medium intensity runway edge lights (MIRLs) will be reinstalled on new or existing bases with new hardware, gaskets, and lamps. Base bid will also replace the runway distance remaining (RDR) signs south of Taxiway 'K' on new concrete foundations. New Runway edge lighting (R1) and sign circuit (R1S) home run cables will be replaced back to west Airfield Lighting Vault building and reconnected to existing Constant Current Regulators (CCRs). New underground infrastructure for southern portion of the runway is designed to provide circuit separation for R1, R1S and PAPI circuits to remove segments of the runway signs and PAPI circuits that are routed through the edge lighting conduit and light bases.

Temporary threshold lighting will be placed south of Taxiway 'K' to facilitate use of north end of runway for small aircraft arrivals and departures during pavement and electrical reconstruction associated with Base Bid.

Additive Alternate 1 of runway reconstruction consists of electrical improvements to runway edge lighting and Taxiway 'K' fillets on east side of 12R/30L at the Taxiway 'K' area. Existing fixtures will be reinstalled on new L-867 bases within shoulder reconstruction limits and new conduits and a Taxiway 'K' duct bank crossing will be part of the underground electrical reconstruction efforts to provide circuit separation where multiple circuits are collocated in the existing runway and taxiway edge conduits.

The temporary threshold lights are to be relocated to the northern third of the runway to facilitate use of north end of runway for small aircraft arrivals and departures during pavement and electrical reconstruction associated with Additive Alternate 1.

Additive Alternate 2 of runway reconstruction consists of removal of 12R elevated edge and threshold lighting fixtures, located in the north half of runway affected by full strength and partial shoulder pavement reconstruction. New LED runway distance remaining (RDR) signs will be specified on new concrete sign bases, north of Taxiway 'V' and 'K'. Additive Alternate 2 will include a cutover to replace the existing incandescent MIRLs with new LED runway edge lights and 10/15Watt isolation transformers. New LED L-804(L) elevated runway guard lights (ERGLs) with on/off switches are being specified to replace the existing fixtures at Taxiway 'G'.

The existing Runway 12R L-806, incandescent supplemental wind cone is being proposed for replacement with a new L-806(L) LED size 1 wind cone with LED obstruction light on new concrete foundation with new L-867B, isolation transformer housing, due to significant grading and elevation changes. The new wind cone will also be reconnected to Runway circuit R1, with new L-824 5kV lighting cable.

The existing L-880, 4-Box, current driven (Style B) PAPI will be removed and safely stored with existing concrete foundations removed as part of the infield grading modifications. The existing PAPIs will be specified for reinstallation on new concrete foundations with new L-867 isolation transformer housings, new transformers, lamps and new leg hardware to re-aim and flight-test the modified PAPI.

7.3 Temporary Lighting

The Airport has proposed to use the runway for daytime operations for small aircraft during construction as follows:

Base Bid (Schedule I)

- Allow ‘30L’ short field departures from Taxiway ‘K’
- Allow ‘12R’ Arrivals – depart runway at Taxiway ‘K’
    - Temporary runway end lights will be installed on the south Taxiway ‘K’ TOFA
    - All runway lights and signs north of Taxiway ‘K’ will be maintained via jumpers at Taxiway ‘K’

Additive Alternate 1 (Schedule II)

- Allow ‘30L’ short field departures from Taxiway ‘H’
- Allow ‘12R’ Arrivals – depart runway at Taxiway ‘H’
  Temporary runway end lights will be installed on north side of the extended Runway End Safety Area located north of the Add Alt 1 project limits
  All runway lights and signs north of Taxiway ‘K’ will be maintained via jumpers at Taxiway ‘K’

Additive Alternate 2 (Schedule III) - Phase 2A

- Allow ‘12R’ short field departures from Taxiway ‘K’
- Allow ‘30L’ Arrivals – depart runway at Taxiway ‘K’
  Temporary runway end lights will be installed on the north Taxiway ‘K’ TOFA
  All runway lights and signs south of Taxiway ‘K’ will be maintained via jumpers at Taxiway ‘K’

7.4 Duct Banks and Conduit

Runway ‘12R-30L’

CR Engineers verified four existing 4-inch duct banks to be located at various locations crossing the runway at 30-inch to 48-inch depths. The proposed duct banks will be protected in place where possible or relocated to an increased depth where existing concrete encasement conflicts with LTSG or if protrudes into the full-strength PCCP section. Additionally, CRE proposes to remove the existing military style concrete hand holes located at the edge of PCC runway pavement, within shoulder reconstruction limits, and extend selected duct banks to the runway distance remaining signs alignment with new, aircraft rated concrete hand holes. A new one 2-inch conduit for distance remaining signs will be designed between the new hand holes to provide circuit separation and alternate paths for circuit routing options.

The Runway ‘12R’ PAPI (PPN) circuit is being proposed to relocate to the existing four 4-inch RGL duct bank to correct collocation with the runway sign circuit through the infields, between connecting taxiways.

One existing 2-inch edge lighting conduit will be replaced in segments where shoulder pavement reconstruction is required. In other locations, it will be protected in place and slurry encased with CLSM in accordance with P-153. Additional 2-inch conduits will be designed to provide circuit separation and correct multiple collocated cables where limits of pavement reconstruction and existing conditions permit.

New L-824 Type C airfield lighting cable will be specified for R1, R1S, and segments of the PAPI north and south circuits, as required by construction phasing.

Taxiway ‘H’ Relocation

Segments of the Airport wide power duct banks will be replaced within the limits of new construction or demolition. The conductors and new routing are shown on the plans.

Duct banks for airfield lighting power (constant current) will match the size and configuration of the existing ducts. The typical configuration within the project limits is four four-inch conduits.

7.5 Electrical Circuit Load

No additional lighting or signage loads are proposed for construction. A slight reduction of load to the Runway '12R-30L' sign circuit (R1S), 15kW CCR will result from replacing the eighteen (18) existing fluorescent Distance Remaining Signs with new LED Runway Distance Remaining Signs at 85Volt Amps each. The existing runway sign circuit is operating at 3390 VA with an insulation resistance reading of 8.7 Meg-Ohms.

Additive Alternate 2 will include a load reduction to the existing runway edge lighting circuit (R1), 15kW CCR, when the new LED runway MIRLs are installed. The existing medium intensity runway edge lighting circuit is operating at 10010 VA with an insulation resistance reading of 13.4 Meg-Ohms. The new L-861(L) LED Medium Intensity Runway Lights with 10/15Watt isolation transformers will reduce the load to 3898 Volt-Amps.

8. NAVAIDS

8.1 List and Ownership

All NAVAIDs are currently owned and maintained by PMGAA and include six sets of 4-box PAPIs, segmented circle and wind cone, ILS, very high frequency omni-directional range (VOR), and tactical air navigation system (TACAN).

8.2 FAA-Owned NAVAIDs

There are no FAA owned NAVAIDS at PMGAA.

8.3 Design Calculations

This existing 4-box PAPI system on the northeast side of Runway 12R, (Additive Alternate Bid 2 project limits), will be impacted by changing finished infield grades. The existing condition and box height of the PAPI system was evaluated and compared with the new runway centerline elevations. This project includes removing and salvaging the existing PAPI fixtures and constructing new concrete PAPI foundations in the same location at the new finished grade elevations.

The PAPI fixture locations were analyzed in accordance with the equations and criteria found in AC 150/5340-30J, *Design & Installation Details for Airport Visual Aids*, and the most recent FAA Airport Facilities Data Information Form (VGSI Form). It should be noted that there is a discrepancy in the PAPI location calculation guidelines between AC 150/5340-30J and the VGSI Form. The AC requires the Lowest On-Course Angle to be used for the calculation, however, the VGSI Form requires the On-Glide Path Angle (or Glide Slope Angle (GSA)), which is typically 3°, and specifically states not to use the Lowest On-Course Angle. Calculating the GSA in this manner allows aircraft to approach each runway end along a 3° GSA and cross at exactly 60 feet above the threshold at each runway end, as currently published in the FAA database.

The Threshold Crossing Height (TCH) was calculated using the new runway centerline elevations at the RW '12R' threshold and at the Runway Reference Point (RRP), which is the location of the PAPIs perpendicular to the Runway centerline. The calculation showed minimal change to the TCH (60' published vs. 60.4' calculated), therefore no change will be needed to the published Airport data.

The proposed changes will not have any measurable effect on the published Threshold Crossing Height or the Visual Glide Angle identified on the Airport Master Record. These calculations are included in **Appendix G** – *PAPI Siting Calculations*. Runway '12R-30L' PAPI data is included in **Table 9** on the next page.

Table 9 – Runway '12R-30L' PAPI Data

Parameter	RW '12R'
Threshold Crossing Height (TCH)	60'
Guide Slope Angle (GSA)	3°
Elevation of the Runway Threshold	1,341.20'
Elevation of Runway Centerline at RRP	1,344.26'
Distance from Threshold to PAPI (D)	1,093.07

Notes:
RRP = Runway Reference Point (perpendicular location of PAPI to Runway Centerline)

9. PAVEMENT MARKING

All pavement markings on this project are designed to meet the criteria of FAA AC 150/5340-1M, *Standards for Airport Markings*. The specifications of the pavement markings were coordinated with PMGAA Operations' preferences and adhere to the FAA standards.

The project includes application of new runway edge markings, runway centerline markings, runway aiming point markings, runway touchdown zone markings, and runway shoulder markings within the concrete reconstruction limits as well as lead-off markings on new runway pavement at the Taxiway 'B2', 'K', and 'B3' intersections with Runway '12R-30L'

All runway edge and centerline markings will be marked as 3-foot-wide white striping (with 6-inch black outline on PCCP only). All runway shoulder will be marked with 3-foot-wide white striping. All runway touchdown zone marking will be marked with 6-foot-wide white striping (with 6-inch black outline on PCCP only). All runway aiming point markings will be marked with 30-foot-wide white striping (with 6-inch black outline on PCCP only).

All taxiway centerlines will be marked with 6-inch-wide yellow striping (with 6-inch black outline on PCCP only). All taxiway edge markings will be marked with two 6-inch-wide yellow striping spaced 6 inches apart and placed 6 inches away from the pavement edge (6-inch-wide black marking will be placed on both sides and in between the two 6-inch yellow markings on PCCP only). All surface painted holding position signs will consist of a red background with 12-foot white letters/numbers, and a 6-inch black outline (per the details in the plans). All Taxiway shoulder markings will be marked with 3-foot-wide yellow striping.

The application of glass beads will be required for all white and yellow pavement markings. Glass beads are not required for black pavement marking.

10. ENVIRONMENTAL CONSIDERATIONS

10.1 Storm Water Management

The Contractor will be required to implement erosion and sedimentation control requirements and prepare a Storm Water Pollution Prevention Plan (SWPPP), which complies with the regulations of the Environmental Protection Agency (EPA), Arizona Department of Environmental Quality (ADEQ), Maricopa County, and the pollution prevention requirements of the Airport's existing overall SWPPP (whichever may be applicable).

10.2 Permits

The Contractor will be required to obtain all permits for construction as required by Maricopa County, and the State regulatory agency, and ADEQ. The Runway '12R-30L' reconstruction project are outside known limits of the archeological zone

10.3 Status of Category Exclusion (CATEX)

An environmental categorical exclusion (CATEX) document was prepared for this project and submitted to the FAA for review on August 1, 2022. The FAA issued a CATEX determination on March 29, 2023, and is included in **Appendix E** – *FAA CATEX Decision*.

11. UTILITY LINES IN WORK AREA

11.1 Existing

Dibble submitted the 30% design plans to all known utility agencies as identified in **Table 10** (below). Furthermore, Dibble coordinated with PMGAA staff to identify all known utilities on the plans. Lastly, the Dibble team performed a site visit to confirm as much as possible from a visual walk at the beginning of the project. All information gathered from these efforts are included in the plans.

Prior to construction, the Contractor is responsible for confirming the location of any utility lines affected as part of this project.

11.2 Impacts of Design

There are several airfield electrical and communication lines that cross under Runway '12R-30L'. All duct banks will be protected in place.

11.3 Underground Utility Owner Contacts

Utility owner contacts are shown in **Table 10**.

Table 10 – Utility Contact Information

Utility	Contact	Phone
Century Link (Lumen)	USIC Dispatch Center	800-778-9140
Southwest Gas	Gene Florez	480-730-3841
Salt River Project	SRP Blue Stake	602-236-8026
Cox Communications	Cheryl Butts	623-328-4104

11.4 Underground Utility Investigation

The Contractor is responsible for any damage done to public or private property and shall be repaired at the Contractor's expense. The construction drawings depict approximate locations of airfield utilities and some underground duct banks that could interfere with the proposed pavement structural sections. All underground duct banks are intended to be protected in place.

Location of any underground public utilities may be field verified by calling the Blue Stake Center telephone number "Arizona 811". The Contractor is required by the Blue Stake Center to call at least two working days before digging. Additional requirements on the Contractor are provided in Section 50.02 – *Existing Utilities* in the special provisions for more information.

12. MISCELLANEOUS WORK ITEMS

There are no additional miscellaneous work items as part of this project.

13. MODIFICATIONS TO AIP CONSTRUCTION STANDARDS

No modifications to AIP Construction Standards are anticipated for the project.

14. DBE PARTICIPATION

14.1 Program Status

The Airport submitted its triennial program update for the FFY of 2021, 2022, and 2023 on July 14, 2020, and submitted an update to that program on October 26, 2021. The program is currently under review.

14.2 Current Year

The Airport is currently in year three of the overall 3-year goal.

14.3 Project-Specific Goal

The Airport does not have a project or contract goal. The program is race/gender neutral; therefore, the Airport will rely on race and general neutral means to obtain its overall program goal.

15. PROJECT SCHEDULE

Table 11 details the design development schedule for this project.

Table 11 – Project Schedule

Milestone	Actual	Proposed
Design & Engineering Phase		
NTP	9/20/2022	
30% Design Review/Approval	Jan 2023	
95% Design Review/Approval	March 2023	March 2023
100% Design Review/Approval	April 2023	April 2023
Bidding Phase		
Issue Invitation for Bids		April 27, 2023
Submit Bid Tab for Review/Approval		June 2023
*The schedule of items below are dependent on the timing of the FAA Grants.		
Award Construction Contract		July 2023
Issue NOA		July 2023
Construction Phase (pending award of bids)		Aug 2023 – April 2024
Final Inspection		May 2024
Submit Final Construction Documents		June 2024

16. ESTIMATE OF PROBABLE CONSTRUCITON COST

Dibble developed the Engineer's Opinion of Probable Construction Costs (EOPCCs) using costs from similar projects most recently bid within the Phoenix region and are based on the 95% construction documents. The overall 95% Estimated Quantities and EOPCCs are located in **Appendix F** – *95% Engineer's Opinion of Probable Construction Costs (EOPCC)*.

17. PRELIMINARY PROJECT BUDGET

Specific project budgets for each of the proposed projects can be found in **Tables 12, 13, 14** and **15**. The project budgets summarize all expected project costs including construction, construction administrative, and Sponsor costs.

Table 12 – Base Bid (Bid Schedule I) Estimated Project Budget

Item	FAA (91.06%)	ADOT (4.47%)	PMGAA (4.47%)	Total*
Construction Estimate	$7,538,775	$370,067	$370,067	$8,278,909
Construction Administration	$318,710	$15,645	$15,645	$350,000
Sponsor Administration	$136,590	$6,705	$6,705	$150,000
Total Project Costs	$7,994,075	$392,417	$392,417	$8,778,909

**** Total Project costs do not include MRZ credit***

Table 13 – Additive Alternate Bid 1 (Bid Schedule II) Estimated Project Budget

Item	FAA (91.06%)	ADOT (4.47%)	PMGAA (4.47%)	Total*
Construction Estimate	$6,113,684	$300,112	$300,112	$6,713,907
Construction Administration	$182,120	$8,940	$8,940	$200,000
Sponsor Administration	$45,530	$2,235	$2,235	$50,000
Total Project Costs	$6,341,334	$311,287	$311,287	$6,963,907

**** Total Project costs do not include MRZ credit***

Table 14 – Additive Alternate Bid 2 (Bid Schedule III) Estimated Project Budget

Item	FAA (91.06%)	ADOT (4.47%)	PMGAA (4.47%)	Total*
Construction Estimate	$15,521,966	$761,950	$761,950	$17,045,867
Construction Administration	$682,950	$33,525	$33,525	$750,000
Sponsor Administration	$273,180	$13,410	$13,410	$300,000
Total Project Costs	$16,614,686	$808,885	$808,885	$18,095,867

**** Total Project costs do not include MRZ credit***

Table 15 – Additive Alternate Bid 2 (Bid Schedule IV) Estimated Project Budget

Item	ADOT (90%)	PMGAA (10%)	Total*
Construction Estimate	$3,011,451	$334,606	$3,346,057
Construction Administration Estimate	$180,687	$20,076	$200,763
Sponsor Administration Estimate	$150,573	$16,730	$167,303
Estimated Total Project Costs	$3,342,711	$371,412	$3,714,123

**** Total Project costs do not include MRZ credit***

18. PRE-DESIGN MEETING MINUTES

A scoping kick-off meeting was held on July 25th, 2022. The meeting minutes can be found in **Appendix H** – *Design Kickoff Meeting Minutes*. In January 2023, PMGAA and Dibble held a 30% Submittal review meeting to discuss any changes needed moving forward with the 95% submittal. It was determined at that time, due to anticipated funding, that the project would be changed from a Phase 1/Phase 2 approach to a multiple bid alternative approach (as presented in the Final/100% Submittal).

Appendix A Project Photos

Photo 1 – End of RW '30L' Threshold Reconstruction

Photo 2 – RW Shoulder Pavement North of TW 'L' (West Side of RW)

Photo 3 – RW Shoulder Pavement North of TW 'L' (East Side of RW)

Photo 4 – Deteriorated RW Shoulder Pavement (East Side of RW)

Photo 5 – Interface of RW Shoulder Pavement and deteriorated AC

Photo 6 – Large Crack in RW Shoulder Pavement

Photo 7 – TW 'B3' Intersection with RW '12R-30L'

Photo 8 – TW 'K' Intersection with RW '12R-30L' (West Side)

Photo 9 – TW 'K' Intersection with RW '12R-30L' (East Side)

Photo 10 – RW '12R-30L' Looking North

Photo 11 – Existing RW shoulder Pavement Paving Lane Looking South

Photo 12 – RW '12R-30L' Concrete Patching

Photo 13 – Existing TW 'H' Intersection with RW '12R-30L'

Photo 16 – RW '12R' PAPIs in Deteriorated AC Pavement

Photo 14 – Infield Area between RW '12R-30L' and RW '12C-30C'

Photo 17 – Segmented Circle and Wind Cone

Photo 15 – Storm Drain Trench Crossing RW '12R-30L'

Photo 18 – RW '12R' Four Box PAPIs

Photo 19 – End of RW '12R' Threshold Reconstruction

Photo 20 – TW 'G' Intersection with RW '12R-30L'

Photo 21 – Existing Distance Remaining Sign

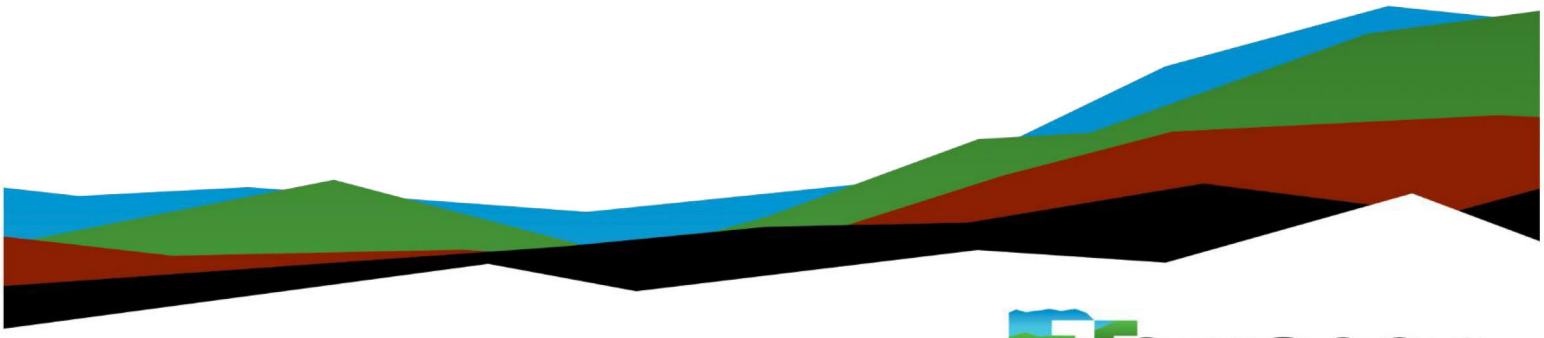
Appendix B Pavement Engineering Report

PMGAA Runway 12R-30L Reconstruction

November 18, 2022 | Terracon Project No. 65225198

Prepared for:

Dibble & Associates Consulting Engineers, Inc.
2696 South Colorado Blvd, Suite 330
Phoenix, Arizona



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November 18, 2022

Dibble & Associates Consulting Engineers, Inc.
2696 South Colorado
Phoenix, Arizona

Attn: Ms. Carmen Rose
P: (602) 957-1155
E: carmen.rose@dibblecorp.com

Re: Pavement Engineering Report
PMGAA Runway 12R-30L Reconstruction
6033 South Sossaman Road
Mesa, Arizona
Terracon Project No. 65225198

Dear Ms. Rose:

We have completed the scope of Pavement Engineering services for the above referenced project in general accordance with Terracon Proposal No. P65225198 dated June 27, 2022. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning pavements and material specifications for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Kirk D. Jackson, P.E.
Project Engineer

Joseph A. Phillips, P.E.
Sr. Materials Engineer / Principal

Table of Contents

Attachments

Note: This report was originally delivered in a web-based format. **Blue Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the Terracon logo will bring you back to this page. For more interactive features, please view your project online at **client.terracon.com**.

Refer to each individual Attachment for a listing of contents.

Introduction

This report presents the results of our subsurface exploration and Pavement Engineering services performed for the proposed Runway 12R-30L Reconstruction to be located at the Phoenix-Mesa Gateway Airport at 6033 South Sossaman Road in Mesa, Arizona. The purpose of these services was to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Pavement design and construction
- Material specifications

The pavement engineering Scope of Services for this project included the advancement of test borings, laboratory testing, engineering analysis, and preparation of this report.

Drawings showing the site and boring locations are shown on the **Site Location** and **Exploration Plan**, respectively. The results of the laboratory testing performed on soil samples obtained from the site during our field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

Project Description

Our initial understanding of the project was provided in our proposal and was discussed during project planning. A period of collaboration has transpired since the project was initiated, and our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Our project understanding is based on the following information provided to Terracon via email by Dibble: ■ Geotechnical Scoping Exhibit identified as "Phoenix-Mesa Gateway Airport RW 12R-30L Reconstruction" by Dibble dated July 18, 2022. ■ Phone and email correspondence with you on July 19, 2022. ■ The aircraft fleet mix will be the same as was provided to Terracon for the recent Runway 12C-30C project for this airport.
Project Description	We understand the proposed project will consist of the reconstruction of approximately 6,300 feet of Runway 12R-30L within the bounds shown on the above referenced scoping exhibit provided by Dibble.
Proposed Pavement Structures	We understand the new pavement will consist of rigid pavements in the runway. We also understand temporary asphalt pavement recommendations are requested for some portions of the project, and 5-year and 20-year alternatives are requested for these temporary pavements at your request. We understand the subgrade will be chemically stabilized with lime.
Pavements	Runway pavements borings were sampled and tested in general accordance with FAA AC 150/5320-6G, assuming the gross weight of the aircraft will be greater than 100,000 lbs.

Terracon should be notified if any of the above information is inconsistent with the planned construction, as modifications to our recommendations may be necessary.

Site Conditions

The following description of site conditions is derived from our site visit in association with the field exploration.

Item	Description
Parcel Information	The project is located at the Phoenix-Mesa Gateway Airport, 6033 S Sossaman Road in Mesa, Arizona. The proposed improvements include the reconstruction of Runway 12R-30L. See **Site Location**
Existing Improvements	The site is an existing airport with portland cement concrete (PCC) apron, taxiway, and runway pavements. The site also includes site features typical of airports such as taxiway signs, lighting, parked aircraft and associated support vehicles such as fuel trucks, tugs and luggage transports.
Current Ground Cover	The existing aprons, taxiways and runways are constructed primarily of portland cement concrete (PCC) pavements. In-field and retention areas are sparsely vegetated.
Existing Topography	The site is relatively flat.

Geotechnical Characterization

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization forms the basis of our pavement design calculations and evaluation of site preparation and pavement support. Conditions encountered at each exploration point are indicated on the individual logs. Detailed explanation of the exploration and laboratory testing can be found in the **Exploration and Testing Procedures** section. The individual logs can be found in the **Exploration Results** section.

Of particular interest to this project is the thickness of the existing concrete pavement structures. For convenience, Terracon has summarized the existing pavement thicknesses along the Runway 12R-30L profile.

Thickness of Existing Pavement Structure (inches)

Boring	Portland Cement Concrete	Intermediate Layer		Portland Cement Concrete	Total Thickness
		Aggregate Base Course	Asphalt		
B-01	9	7	--	5	21
B-02	8 1/2	7	--	6	21 1/2
B-03	8 1/2	7	--	5	20 1/2
B-04	8 1/2	5 1/2	--	6	20
B-05	8	5	--	5 1/2	18 1/2
B-06	9	3	--	6 1/2	18 1/2
B-07	9 1/4	--	3 1/2	6	18 3/4
B-08	9	--	5	6	20
B-09	9 1/2	--	3	5 1/2	18
B-10	9	--	3	6	18
B-11	8 3/4	--	3	5 1/2	17 1/4
B-12	9	--	2	6	17
B-13	8	--	2 1/2	5 1/2	16
B-14	9 1/2	--	1/2	6 1/2	16 1/2
B-15	8 1/2	--	1	6	15 1/2
B-16	14	--	1	--	15
B-17	8 1/2	--	2	6 1/2	17
B-18	8	--	2	7 1/2	17 1/2
B-19	17	--	--	--	17
B-20	8 1/2	--	2	6 3/4	17 1/4

As part of our analyses, we identified the following subgrade layers within the subsurface profile.

Borings	Depth Below Ground Surface to Bottom of Layer (ft)	Description	Consistency / Relative Density	Dry Unit Weight (pcf)	Moisture Content (%)
B-01 to B-07,	11 (maximum depth explored)	Generally Sandy Lean Clay (CL)	Generally Medium Stiff to Hard with	95.5 to 119.2 (Avg. 106.2)	6.0 to 21.3 (Avg. 13.9)

Borings	Depth Below Ground Surface to Bottom of Layer (ft)	Description	Consistency / Relative Density	Dry Unit Weight (pcf)	Moisture Content (%)
B-13 to B-15, B-17, B-19, and B-20			increasing consistency with depth[1]		
B-08 to B-12, B-16, and B-18	11 (maximum depth explored)	Generally Silty Clayey Sand (SC-SM) and Silty Clay with Sand (CL-ML)	Generally Medium Stiff to Hard /Loose to Very Dense with increasing consistency / relative density with depth[2]	91.8 to 118.8 (Avg. 104.3)	6.0 to 25.3 (Avg. 14.4)

1. Soft subgrade was identified in Boring B-11 and B-18 from 1 to 5 feet.
2. Very loose soils were identified in Boring B-12 from 1 to 5 feet.

Groundwater was not observed in the remaining borings while drilling, or for the short duration the borings could remain open. Based on information obtained from the Arizona Department of Water Resources – Groundwater Data website (https://gisweb.azwater.gov/waterresourcedata/GWSI.aspx), the depth to regional groundwater was measured 12/09/2020 to be approximately 194.1 feet below the ground surface (approximate elevation of 1130.9 feet above mean sea level) at an Arizona Department of Water Resources (ADWR) monitored well site (Local I.D. D-01-07 30CBC) located approximately 1 1/2 miles west of the site.

Groundwater level fluctuations occur due to seasonal variations in the amount of rainfall, runoff and other factors not evident at the time the borings were performed. Therefore, groundwater levels during construction or at other times in the life of the structure may be higher or lower than the levels indicated on the boring logs. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project. Considering the historical depth to groundwater as reported on the ADWR website, we do not anticipate the groundwater level will influence the construction or performance of the pavement.

Corrosivity

The table below lists the results of laboratory soluble sulfate, soluble chloride, electrical resistivity, and pH testing. The values may be used to estimate potential corrosive characteristics of the on-site soils with respect to contact with the various underground materials which will be used for project construction.

Corrosivity Test Results Summary

Boring	Sample Depth (feet)	Soil Description	Soluble Sulfate (ppm)	Soluble Chloride (ppm)	Electrical Resistivity (Ω-cm)	pH
Blend of Boring B-02 through B-07	0 - 5	Sandy Lean Clay (CL)	3	14	2,483	9.1
B-08	0 - 5	Silty Clayey Sand (SC-SM)	2	8	3,154	9.2
B-18	0 - 5	Sandy Silty Clay (CL-ML)	3	5	3,959	9.3

Results of soluble sulfate testing can be classified in accordance with ACI 318 – Building Code Requirements for Structural Concrete. Numerous sources are available to characterize corrosion potential to buried metals using the parameters above. ANSI/AWWA is commonly used for ductile iron, while threshold values for evaluating the effect on steel can be specific to the buried feature (e.g., piling, culverts, welded wire reinforcement, etc.) or agency for which the work is performed. Imported fill materials may have significantly different properties than the site materials noted above and should be evaluated if expected to be in contact with metals used for construction. Consultation with a NACE certified corrosion professional is recommended for buried metals on the site.

Airfield Pavements

Pavement designs for the airfield pavements for this project were conducted in accordance with the procedures outlined in the Federal Aviation Administration (FAA) Advisory Circular (AC) 150/5320-6G Airport Pavement Design and Evaluation, AC 150/55370-10H Standard Specifications for Construction of Airports, and Appendix G of AC 150/5320-5D Design of Subsurface Pavement Drainage Systems. Current FAA practice for design of pavements is based on the use of the FAA computer program FAARFIELD, which performs layered elastic-based structural analysis to calculate design thicknesses for airfield pavements. Airfield pavement thickness design is influenced by the subgrade soil support characteristics, the traffic loading, as well as other environmental factors such as the proximity to groundwater and the depth of frost penetration. The following sections outline the design parameters used in the development of our recommended pavement layer thicknesses and provides our recommendations for pavement layer material selection.

Subgrade Support Characteristics

Subgrade support characteristics for pavement design were based on the results of the **Geotechnical Characterization** and **Exploration Results**, the requirements for design of airfield pavements in AC 150/5320-6G Airport Pavement Design and Evaluation and the requirements for subsurface pavement drainage systems in AC 150/5320-5D Design of Subsurface Pavement Drainage Systems.

One of the most important subgrade design parameters is the subgrade strength or modulus of subgrade reaction. The subgrade strength was estimated from the results of laboratory moisture, density and California Bearing Ratio (CBR) tests on samples of the subgrade soil and from the results of the Dynamic Cone Penetrometer (DCP) field tests as presented in the **Exploration Results**. Our recommended design subgrade CBR represents the in-situ soils at the moisture and density values determined from our exploration and laboratory testing, as opposed to selecting a compacted subgrade CBR. This is because our recommendations will include lime-treatment, and the subgrade soils beneath the lime-treated layer will not be moisture conditioned and recompacted.

For design of the pavement above the stabilized subgrade, Terracon estimated the effective modulus of subgrade reaction, k, at the surface of the stabilized subgrade using the procedures in the American Association of State Highway and Transportation Officials (AASHTO) Guide for Design of Pavement Structures (1993) Chapter II Section 3.2.1. The modulus of each individual layer was correlated from CBR test results. The parameters in the following table were used as the design modulus of subgrade reaction at the surface of the lime stabilized subgrade.

Effective Modulus of Subgrade Reaction Parameters
AASHTO Guide for Design of Pavement Structures Chapter II Section 3.2.1

Parameter	Value
Thickness of Stabilized Subgrade	8 inches
Roadbed Soil Resilient Modulus	3,750 psi (CBR 2.5)
Stabilized Subgrade Elastic Modulus	19,556 psi (K = 212 pci)

Terracon determined the effective modulus of subgrade reaction at the top of the mechanically stabilized subgrade is 212 pounds per cubic inch (pci). Using the correlations in FAARFIELD, this correlates to a subgrade modulus of 19,556 psi. Terracon used a design subgrade modulus of 212 pci in FAARFIELD for the rigid pavement designs, and a design subgrade CBR of 6.7 for the flexible pavement designs, which represents the effective strength of the existing subgrade soils with 8 inches of lime treated subgrade.

Incidentally, the CBR tests also provide results for determining the swell potential of the subgrade soil. The following table lists the results of the swell potential based on the laboratory CBR testing of the subgrade soils.

Summary of Laboratory CBR Swell Results

Test/Sample Location	Moisture Content at Compaction	Dry Density (pcf)	Swell
Blend of Borings B-02 Through B-07 up to 5 feet deep	12.1%	106.8	1.18%
	12.7%	112.3	2.04%
	12.5%	118.6	0.66%
Boring B-08 @ 2 – 5	8.7%	119.0	0.00%
	8.5%	125.9	0.00%
Boring B-18 @ 2 – 5	14.8%	106.0	0.00%
	14.9%	111.4	0.00%
	15.4%	117.6	0.00%

A summary of the subgrade design parameters used for the design of the subsurface drainage layer thicknesses is listed in the following table:

Summary of Pavement Subgrade Parameters for Design

Subgrade Parameter	Value
Unified Soil Classification System	Sandy Lean Clay (CL)
Plasticity Index	Max PI 32 at Boring B-04
Percent Fines Passing the No. 200 Sieve	25 to 82 (average 61)
Cohesive or Non-Cohesive Designation	Cohesive[1]
Frost Group	FG-3/FG-4[2]

Summary of Pavement Subgrade Parameters for Design

Subgrade Parameter	Value
Dry Density	92 pcf to 119 pcf (average 106 pcf)
Moisture Content	6.0% to 25.3% (average 14.1%)
Specific Gravity	2.65[3]
Estimated Permeability	<20 ft/day[4]

1. Based on the plasticity index and AC 150/5320-6F Section 3.9.3
2. Based on the USCS Classification and Table 2-2 Soil Frost Groups of AC 150/5320-6F Section 2.7
3. Assumed based on the USCS Classification and local experience
4. Estimated based on Figure G-3 of Appendix G of AC 150/5320-5D

Aircraft Traffic

The following table summarizes our understanding of the aircraft information and loading for the runway pavement areas on the project as provided to us by Dibble:

Design Aircraft Fleet Mix for Runway 12R-30L

Aircraft Type	Max Take-off Weight (lbs.)	Total Ops./Year
Airbus A319-100 (Allegiant)	168,853	2,555
Airbus A320-200 (Allegiant)	171,961	7,665
Boeing 767-300 (Sky Bridge)	412,000	500
Boeing 737-800 (West Jet)	174,000	624
Boeing 747-400 (Sky Bridge)	875,000	208
Cessna 172/180	2,550	90,000
Beech King Air C90/200/B300	11,800	90,000
Premier 390	12,500	10,000
Falcon 10	16,000	300
Hawker 800/850XP	28,000	25,000
Falcon 20/50/200/900/2000	41,000	15,000
Lear 23/24/31/35/45	18,000	25,000
Challenger 300/600/BD100	43,000	12,000
Embraer 135BJ	22,500	5,000
Global Express	99,500	5,000
Lear 60	23,500	100
Gulfstream II/III/IV	72,000	5,300

Design Aircraft Fleet Mix for Runway 12R-30L

Aircraft Type	Max Take-off Weight (lbs.)	Total Ops./Year
Gulfstream V	90,500	200
F-16 Fighting Falcon	37,500	100
C-130	155,000	150
C-17	580,000	25

The design vehicle loading and annual departures are based on information provided to Terracon by Dibble for the design. The traffic arrivals and departures should be confirmed prior to implementing the design thickness recommendations included in this report. Based on our understanding of the aircraft traffic loading, the maximum pavement load is greater than 100,000 pounds.

Other Pavement Design Considerations

Structural thickness is not the only consideration for airfield pavement design. Pavement performance can be negatively influenced throughout the design life of the pavement by many factors such as subgrade swelling, frost heave, poor subgrade drainage, or inadequate material properties. The following sections provide a summary of the design considerations specific to this project based on the recommendations by the FAA publications cited herein.

Subgrade Swell Potential

Swelling soils are clayey soils which have the potential for volume change caused by variations in the moisture content of the subgrade. Swelling subgrade soils can cause differential heaving of the pavement surface leading to roughness and cracking. Pavement design strategies to address swelling subgrade soils depend primarily on two criteria: the swell potential of the soil type and the potential for moisture fluctuations. Based on the **Exploration Results** the subgrade soils for this project exhibit a low swell potential but a high potential for moisture fluctuation.

Swelling soils can be addressed by removal and replacement, stabilization or modified compaction specifications. For this project, we recommend the subgrade soil be lime-treated to address the subgrade swell potential based on our exploration and Table 3-1 of AC 150/5320-6F.

Frost Considerations

The detrimental effects of frost action on pavement may include non-uniform heave and a loss of soil strength during the spring-thaw period. The AC 150/5320-6G provides three methods for designing pavements for frost action: Complete Frost Protection (CFP), Limited Subgrade Frost Penetration, and Reduced Subgrade Strength (RSS). The depth of frost penetration for this project was estimated using the pavement design program PCASE using the following parameters as recommended in AC 150/5320-6G:

Frost Design Parameters for Pavement Design

Parameter	Value
Data From Weather Station	Tempe ASU
Air Freezing Index	0
Mean Annual Temperature	70.34 °F
Length of Frost Season	0

We anticipate the effect of frost penetration is negligible on the performance of the pavement.

Pavement Thickness Design Recommendation

Based on the subgrade support characteristics, aircraft traffic, the requirements of AC 150/5320-6G Airport Pavement Design and Evaluation and provided the recommendations in the Specifications Recommendations section are followed, the recommended pavement design alternative layer thicknesses are listed in the following table. Detailed FAARFIELD file outputs are attached to this report in the **Support Information** section.

PMGAA Runway 12R-30L Reconstruction
Pavement Design Alternative Recommended Thicknesses (inches)

Pavement Layer	Specification Item [2]	Alternative A	Alternative B	Alternative C
Surface Course	P-501 Cement Concrete Pavement	15½	15	15½
Stabilized Base Course	P-304 Cement Treated Base Course	6	--	--
	P-306 Lean Concrete Base Course	--	6	--
	P-403 Asphalt Mix Pavement Base Course	--	--	5

PMGAA Runway 12R-30L Reconstruction
Pavement Design Alternative Recommended Thicknesses (inches)

Pavement Layer	Specification Item [2]	Alternative A	Alternative B	Alternative C
Aggregate Base Course	P-209 Crushed Aggregate Base Course	--	--	6
Stabilized Subgrade	P-155 Lime Treated Subgrade	8	8	8
Total Pavement Thickness [1]		**29½**	**29**	**34½**

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Refer to the Specifications Recommendations section of this report for material specification requirements for each individual specification item.

PMGAA Flexible Transition on Runway 12R-30L
Pavement Design Alternative Recommended Thicknesses (inches)

Pavement Layer	Specification Item [2]	5 Year Design Life	20 Year Design Life
Surface Course	P-401 Asphalt Mix Surface Course	4	4
Stabilized Base Course	P-403 Asphalt Mix Pavement Base Course	5.5	7
	P-304 Cement Treated Base Course	6	6
Stabilized Subgrade	P-155 Lime Treated Subgrade	8	8
Total Pavement Thickness [1]		**23½**	**25**

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Refer to the Specifications Recommendations section of this report for material specification requirements for each individual specification item.

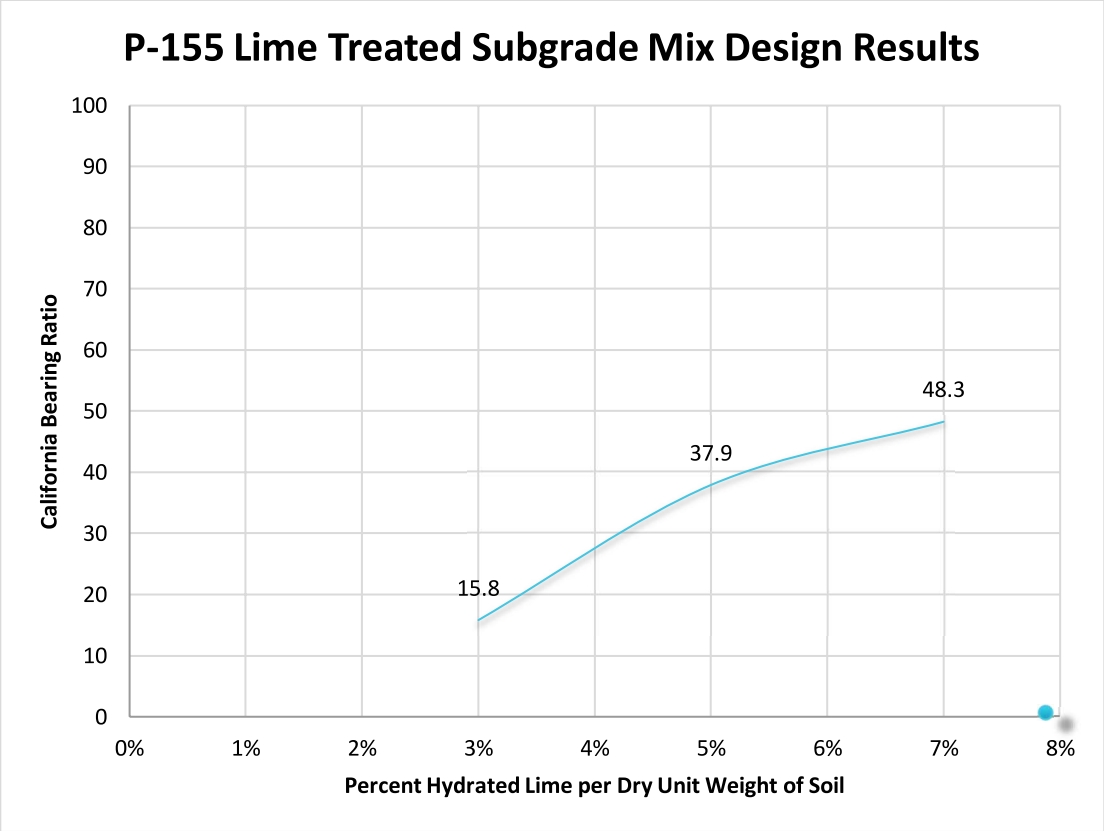
Lime Treated Subgrade Mix Design

Terracon performed a mix design for P-155 Lime Treated Subgrade to determine a minimum lime content for the project specifications. The testing was performed in the

Terracon Tempe laboratory using subgrade samples collected as part of our subsurface investigation and Type S hydrated lime from Lhoist.

The mix design was prepared using soils blended from Borings B-02 through B-07. The mellowing time at which the plasticity index of the subgrade was reduced to below 10 and the liquid limit reduced to below 30 was determined in the laboratory. The results of the mellowing period testing indicated that at 3 percent hydrated lime at 24 hours, the lime treated subgrade was non-plastic. Terracon recommends a minimum 24 hours of mellowing after initial blending of the hydrated lime, and before re-blending and final recompaction. If quick lime is used, Terracon should be consulted to determine if the 24 hour mellowing period is adequate.

A standard proctor was prepared at a lime content of 5 percent which resulted in a maximum dry density of 106.8 pcf at 17.4% optimum moisture content. Three CBR specimens were prepared at 3, 5 and 7 percent, respectively, of hydrated lime per dry unit weight of soil. Each specimen was compacted to 95 percent of the standard proctor maximum dry density. The CBR test results relative to the percent hydrated lime are presented in the following graph. More detailed results of the laboratory testing are attached to this report as **Laboratory Test Results**.



Terracon recommends a minimum 3.0% of hydrated lime per dry unit weight of soil. If quick lime is used, the lime content should be a minimum of 2.3% of quick lime per dry unit weight of soil. The lime treated subgrade should be prepared in accordance with our recommendations in the **Specification Recommendations** section of this report.

Specification Recommendations

The recommendations in AC 150/5320-6G provide guidance as to the selection of the pavement material layers to be included in the pavement design. In accordance with that guidance, the following four pavement layers may be required: stabilized subgrade, base course and/or stabilized base course, and surface course. The following table summarizes the specification items found in AC 150/5370-10H which were utilized in the pavement design alternatives presented in the **Airfield Pavements** section.

Summary of Pavement Specification Items

Material Use	AC 150/5370-10H Specification Item
Surface Course	P-501 Cement Concrete Pavement
Stabilized Base Course	P-304 Cement Treated Aggregate Base Course
	P-306 Lean Concrete Base Course
	P-403 Asphalt Mix Pavement Base Course
Aggregate Base Course	P-209 Crushed Aggregate Base Course
Stabilized Subgrade	P-155 Lime Treated Subgrade
Subgrade	P-152 Excavation, Subgrade and Embankment

The pavement design recommendations in this report assume the materials and construction practices used are compliant with the recommended specifications as outlined in AC 150/5370-10H. The following sections provide our recommendations relative to the specifications of pavement materials.

P-155 Lime Treated Subgrade

Subgrade stabilization is one of the approved methods used to address moderate swell potential soils such as the case for this project, and to develop a stable working platform for construction. A common practice of subgrade stabilization is chemical stabilization using lime such as described in Item P-155 Lime-Treated Subgrade of AC 150/5370-10H.

The construction of the lime treated subgrade should be compliant with the requirements of the FAA AC 150/5370-10H Item P-155 Lime Treated Subgrade. The minimum lime content should be as described in the **Lime Treated Subgrade Mix Design** section of

this report. The initial mixing of the soil and lime should have a mellowing time of at least 24 hours prior to final mixing and compaction as required in specification section P-155-6.3a. The lime treated subgrade should be compacted to 95 percent of ASTM D698. Terracon should be retained to provide construction observation and testing of the lime treated subgrade. Acceptance testing should be conducted at a frequency of once per 1000 square yards of lime treated subgrade but not less than four tests per day of production. Acceptance testing should include field density testing of the compacted lime treated subgrade in general accordance with ASTM D6938 or ASTM D1556. Acceptance testing should also include thickness determination of the lime treated subgrade. The minimum thickness of the lime treated subgrade is presented in the Pavement Thickness Design Recommendations section of this report.

After lime treatment, the subgrade should be proof rolled with a tandem axle dump truck loaded to the legal limit. The subgrade should be proof rolled with a minimum of two coverages, and areas of weak or unstable subgrade should be identified. Such areas should be over excavated, and replaced with a minimum of 30 inches of P-209 Crushed Aggregate Base Course.

P-209 Crushed Aggregate Base Course

Based on the guidance in AC 150/5320-6G, and our understanding that the maximum aircraft load will exceed 100,000 lbs, the aggregate base course should consist of P-209 Crushed Aggregate Base Course. The P-209 Crushed Aggregate Base Course should be compacted to a minimum of 100 percent of ASTM D1557. The thickness and density of the P-209 Crushed Aggregate Base Course should be tested at a minimum frequency of 1 test per 1,200 square yards.

P-304 Cement Treated Base Course

The P-304 Cement Treated Base Course (CTB) should only be used beneath P-501 Cement Concrete Pavement in runway pavements. The cement content of the CTB should be determined by a mix design per ASTM D1633 targeting a 7-day compressive strength between 300 pounds per square inch minimum and 600 pounds per square inch. Gradations that meet locally available aggregate similar to P-209 gradation may be acceptable. The cement should conform to ASTM C150 Type I, II or V. The pavement alternatives which include CTB in this report only include CTB placed beneath P-501 Cement Concrete Pavement Surface Course, therefore only white-pigmented, liquid membrane-forming compound should be used. A bond breaker should be applied in accordance with P-304-5.12. Wet-dry or freeze-thaw laboratory testing of the P-304 CTB is not necessary based on our exploration and laboratory testing, and our experience with the local subgrade soils. The CTB should be compacted to a minimum of 98 percent of the

density determined in accordance with ASTM D558. The thickness and density of the CTB should be tested at a minimum frequency of 1 test per 1,200 square yards.

P-306 Lean Concrete Base Course

The lean concrete base course should meet the requirements of AC 150/5370-10H Item P-306 Lean Concrete Base Course. The lean concrete base course should utilize the Gradation A option of P-306, or other acceptable locally available aggregate, provided the strength requirements are met. The mix design should target a 7-day compressive strength between 500 and 800 psi, prepared and tested in accordance with ASTM C192 and C39, respectively. Air entrainment will not necessarily be required based on the elevation of the project. The use of a bond breaker between the P-501 Cement Concrete Pavement and the P-306 Lean Concrete Base Course is required, and either a Choke Stone or Fabric as described in section 306-3.8 and 306-5.14 of AC150/5370-10H would be appropriate for this application. Samples for compressive strength and thickness should be obtained at a minimum of 1 test per 1,200 square yards of placement.

P-403 Asphalt Mix Pavement Base Course

The asphalt stabilized base course should meet the requirements of P-403 Asphalt Mix Pavement Base Course. When used as a stabilized base course, the asphalt should be composed of materials meeting the requirements of Item P-403 Asphalt Mix Pavement Base Course. The fine aggregate should have a maximum natural sand content of 15 percent and a minimum sand equivalent of 45.

Terracon considered the weather conditions and traffic to determine the appropriate asphalt binder for this project. This was accomplished using the LTPPBind Online software provided by the Federal Highway Administration (FHWA). This software utilizes historical temperature data from weather stations near the project and considers aircraft speed and weights to establish a recommended Performance Graded (PG) binder grade of asphalt concrete. Terracon then compared the software output to the binders that were indicated to be locally available to determine the recommended binder selection for the project. The asphalt binder should conform to ASTM D6373 Performance Grade PG 70-10.

The mix design should be conducted in accordance with ASTM D6926 Standard Practice for Preparation of Asphalt Mixture Specimens Using Marshall Apparatus. The number of Marshall hammer blows used in design should be 75 blows. Recycled asphalt pavement (RAP) may be incorporated into the asphalt base course when used as a stabilized base as long as the resulting reclaimed mix meets all requirements that are specified for virgin mixtures. The tensile strength ratio should be a minimum of 80. The results of AASHTO T340 Asphalt Pavement Analyzer (APA) testing at 250 psi hose pressure, at 64°C, at 4,000 passes should have a rut depth of less than 10 mm.

The asphalt aggregate should meet the following requirements:

P-403 Asphalt Mix Pavement Base Course Material Specifications

Specification	Specification	
	Minimum	Maximum
1"	100	--
¾"	90	100
½"	68	88
3/8"	60	82
No. 4	45	67
No. 8	32	54
No. 16	22	44
No. 30	15	35
No. 50	9	25
No. 100	6	18
No. 200	3	6
Asphalt percent by total weight of mixture	4.5	7.0
Voids in Mineral Aggregate (VMA	14	--

The minimum lift thickness should be 3 inches. The maximum rut depth at 4,000 passes in the Asphalt Pavement Analyzer (APA) test should be less than 10 mm. We recommend that full production should not begin until an acceptable control strip has been constructed and accepted. The use of a material transfer device (MTV) is required for this project.

For this project, the P-403 Asphalt Mix Pavement Surface Course may be used in lieu of the P-403 Asphalt Mix Pavement Base Course.

P-501 Cement Concrete Pavement

Portland Cement Concrete (PCC) should be constructed in accordance with Item P-501 Cement Concrete. The maximum coarse aggregate size should be 1 ½ inches. Cement should conform to the requirements of ASTM C150 Type I, II or V. Concrete should be proportioned to achieve a 28-day flexural strength that meets or exceeds the acceptance criteria contained in paragraph 501-6.6 for a flexural strength of 620 psi per ASTM C78. The minimum cementitious material (cement plus fly ash, or slag cement) shall be 470 pounds per cubic yard. The use of air entraining admixtures is not required for this project.

Joints in the PCC pavements should be designed based on the criteria outlined in Section 3.16 of FAA AC 150/5230-6G. Based on the recommended design thickness of the PCC

pavements as outlined in this report, the maximum joint spacing for the PCC pavements outlined above should be 17.5 feet based on Table 3-7 of FAA AC 150/5230-6G.

Construction joints should meet the requirements for Type E joints according to Section 3.16 of AC 150/5230-6G.

Based on the requirements of Table 3-5 of FAA AC 150/5230-6G, Type C Doweled Contraction Joints and Type D Dummy contraction joints should be used as appropriate in the design of the new pavements on the project. Joint Details in Section 3.16.9 should be specified for construction and contraction joints.

Based on the requirements of Table 3-6 of FAA AC 150/5230-6G the dowels should meet the requirements in the following table:

Dimensions and Spacing of Dowels for Runway 12R-30L

Pavement Section	Diameter	Length	Spacing
P-501	1 ¼ inches	20 inches	15 inches

We recommend that the dowels be placed and epoxy grouted in drill holes in any existing slabs and that the painted and oiled end of the dowel bar be placed in the new PCC pavement. These same joint details should be specified for any other construction joints used in the new PCC pavements.

General Comments

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly effect excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety and cost estimating including excavation support and dewatering requirements/design are the responsibility of others. Construction and site development have the potential to affect adjacent properties. Such impacts can include damages due to vibration, modification of groundwater/surface water flow during construction, foundation movement due to undermining or subsidence from excavation, as well as noise or air quality concerns. Evaluation of these items on nearby properties are commonly associated with contractor means and methods and are not addressed in this report. The owner and contractor should consider a preconstruction/precondition survey of surrounding development. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

Attachments

Exploration and Testing Procedures

Field Exploration

Number of Borings	Approximate Boring Depth (feet)	Location
20	11	Runway 12R-30L Reconstruction

Boring Layout and Elevations: Unless otherwise noted, Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained by interpolation from Google Earth Pro. If a more precise elevations and boring layout are desired, we recommend borings be surveyed following completion of fieldwork.

Subsurface Exploration Procedures: Prior to advancing the borings, the pavements were cored. We advanced the borings with a truck-mounted rotary drill rig using continuous flight hollow-stem augers. Four samples were obtained in the upper 10 feet of each boring. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. A 3-inch O.D. split-barrel sampling spoon with 2.5-inch I.D. ring lined sampler was used for sampling in the upper 10 feet. Ring-lined, split-barrel sampling procedures are similar to standard split spoon sampling procedure; however, blow counts are typically recorded for 6-inch intervals for a total of 12 inches of penetration. No groundwater was observed in any of the borings. For safety purposes, all borings were backfilled with auger cuttings mixed with cement after their completion. Pavements were patched by grouting and/or epoxying the PCC core back into place.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Other Testing: Dynamic Cone Penetrometer (DCP) testing was completed at each boring location in general accordance with ASTM D6951 utilizing a Kessler Dual-Mass hammer. The results of the DCP penetration and correlations to in-situ California Bearing Ratio are presented in the **Exploration Results** section.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- California Bearing Ratio 3-Point (ASTM D1883)
- Compaction Characteristics of Soil (ASTM D1557)
- Moisture and Density (ASTM D2937)
- Particle Size Analysis: Gradation 3" to #200 (ASTM C136/C117)
- pH and Minimum Resistivity (ARIZ 236)
- Plasticity Index of Soils, Dry (ASTM D4318)
- Sieve and Hydrometer: 3" Minus w/Specific Gravity (ASTM D7928)
- Soluble Sulfates (ARIZ 733)

Soluble sulfates present in subgrade soils can negatively impact the strength of the lime treated subgrade and introduce expansion potential. The subgrade soil sampled for this project was tested for the presence of soluble sulfates in general accordance with Arizona Test Method 733b.

The results of the CBR tests were used to confirm the design assumption that the lime treated subgrade had a CBR of at least 10.

The laboratory testing program included examination of soil samples by an engineer. Based on the material's texture and plasticity, we described and classified the soil samples in accordance with the Unified Soil Classification System.

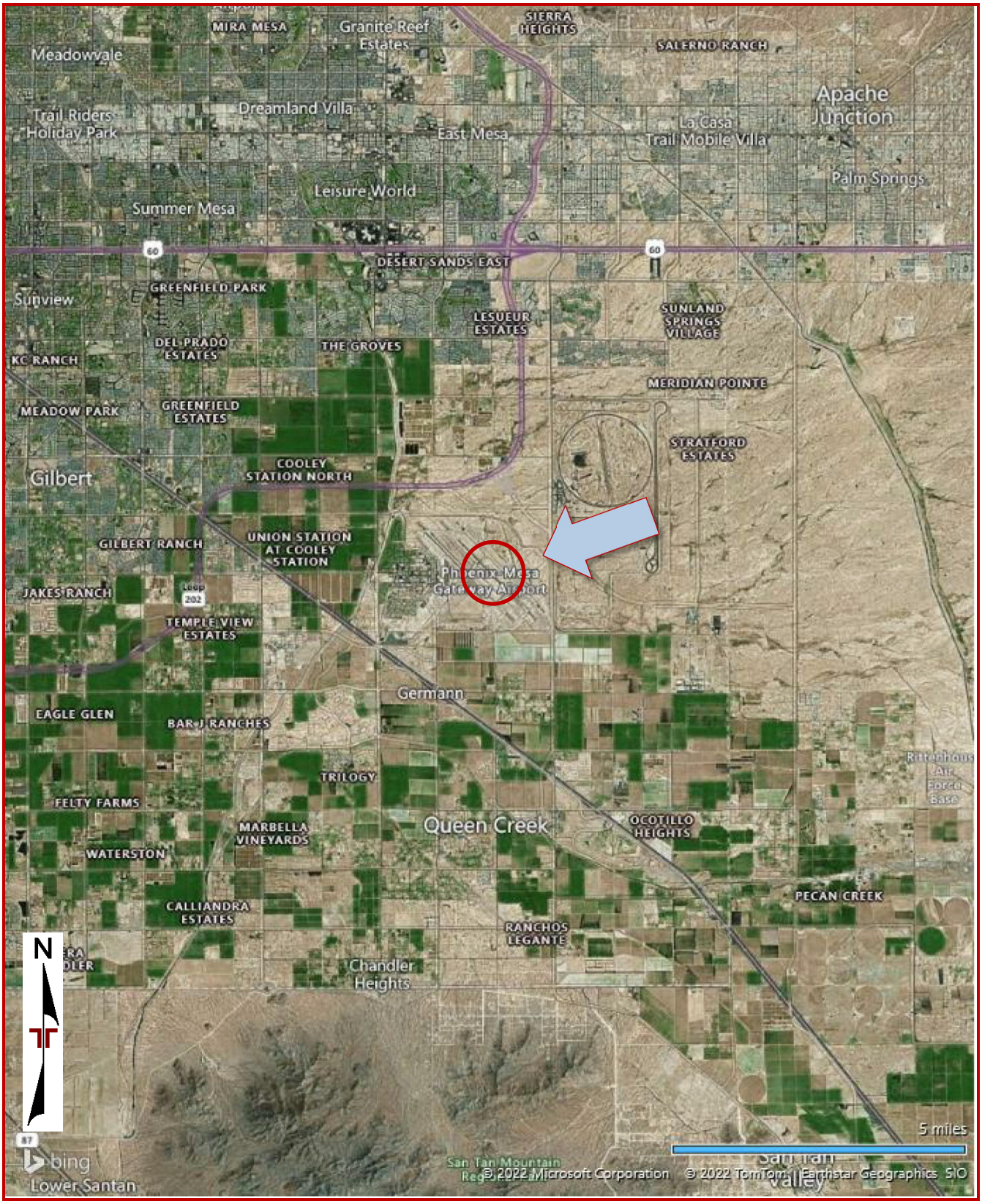
Site Location and Exploration Plans

Contents:

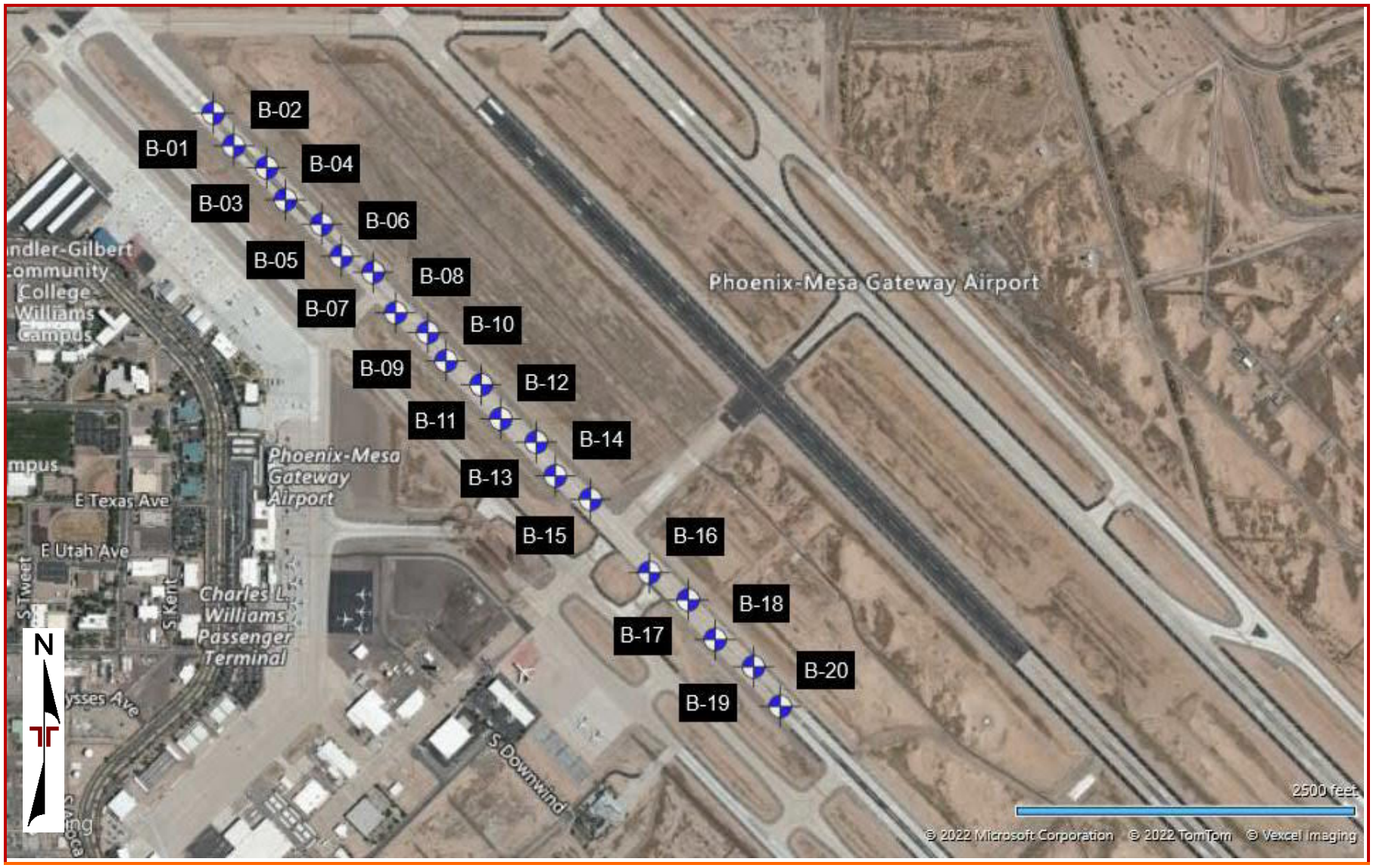
Site Location Plan
Exploration Plan

Note: All attachments are one page unless noted above.

Site Location



Exploration Plan



Exploration and Laboratory Results

Contents:

Note: All attachments are one page unless noted above.

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-01

Location: See Exploration Plan

Latitude: 33.3154° Longitude: -111.6701°

Depth (Ft.)	Graphic Log	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.0	**CONCRETE**, 9" PCC							
0.8	**AGGREGATE BASE COURSE**, 7" ABC with +3" aggregate							
1.3	**CONCRETE**, 5" PCC							
1.8	**LEAN CLAY WITH SAND (CL)**, fine to medium grained, low to medium plasticity, brown, medium stiff			4-5	15.7	110		
5	stiff			8-6	16.2	112	33-16-17	
10	hard			29-50	8.2	107		
11.0	***Boring Terminated at 11 Feet***							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-02

Location: See Exploration Plan

Latitude: 33.3148° Longitude: -111.6696°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8.5" PCC								
	1.3	**AGGREGATE BASE COURSE**, 7" ABC w/ +3" Aggregate								
	1.8	**CONCRETE**, 6" PCC								
		SANDY LEAN CLAY (CL), coarse to medium grained, medium plasticity, light brown to brown, medium stiff				4-4	15.8	114		
		very stiff	5			7-14	18.3	106	40-18-22	59
		hard	10			18-50	11.2	110		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-03

Location: See Exploration Plan

Latitude: 33.3143° Longitude: -111.6688°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8.5" PCC								
	1.3	**AGGREGATE BASE COURSE**, 7" ABC w/ +3" Aggregate								
	1.7	**CONCRETE**, 5" PCC								
		SANDY LEAN CLAY (CL), fine to medium grained, low plasticity, light brown to tan, medium stiff				3-5				
		stiff	5			7-5	9.2	119	42-19-23	
		hard	10			33-50	8.5	101		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-04

Location: See Exploration Plan

Latitude: 33.3137° Longitude: -111.6684°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8.5" PCC								
	1.2	**AGGREGATE BASE COURSE**, 5.5" ABC w/ +3" Aggregate								
	1.7	**CONCRETE**, 6" PCC								
		SANDY FAT CLAY (CH), fine to medium grained, medium to high plasticity, light brown, medium stiff				5-4	13.1	116		
		stiff	5			8-16	16.8	96	50-18-32	64
		hard	10			50	14.6	101		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-05

Location: See Exploration Plan

Latitude: 33.3132° Longitude: -111.6675°

Graphic Log	Depth (Ft.)	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8" PCC								
	1.1	**AGGREGATE BASE COURSE**, 5" ABC w/ +3" Aggregate								
	1.5	**CONCRETE**, 5.5" PCC								
		LEAN CLAY WITH SAND (CL), fine to medium grained, low plasticity, light brown, stiff				6-4	13.5	115	48-18-30	
			5			9-14	12.4	109		
		hard	10			20-50	8.9	103		
	11.0									
		Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-06

Location: See Exploration Plan

Latitude: 33.3126° Longitude: -111.6670°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.8	**CONCRETE**, 9" PCC								
	1.0	**AGGREGATE BASE COURSE**, 3" ABC w/ +3" Aggregate								
	1.5	**CONCRETE**, 6.5" PCC								
		SANDY LEAN CLAY (CL), fine to medium grained, medium plasticity, light brown, medium stiff				3-3	18.6	101		
		very stiff	5			10-17	13.8	114	41-19-22	51
		hard	10			38-50	6.0	109		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-07

Location: See Exploration Plan

Latitude: 33.3122° Longitude: -111.6663°

Graphic Log	Depth (Ft.)	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.8	**CONCRETE**, 9.25" PCC								
	1.1	**ASPHALT**, 3.5" Asphalt								
	1.6	**CONCRETE**, 6" PCC								
		SANDY FAT CLAY (CH), fine to medium grained, low plasticity, light brown to tan, medium stiff				3-5	16.1	109		
		very stiff	5			8-21	15.9	109	51-21-30	
		hard	10			21-24	11.9	104		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-10-2022

Boring Completed
08-10-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-08

Location: See Exploration Plan

Latitude: 33.3114° Longitude: -111.6657°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.8	**CONCRETE**, 9" PCC								
	1.2	**ASPHALT**, 5" Asphalt								
	1.7	**CONCRETE**, 6" PCC								
		SILTY CLAYEY SAND (SC-SM), fine to medium grained, low plasticity, brown, loose				3-4	12.1	108		
			5			5-5	9.2	117	25-19-6	39
		very dense	10			50	14.0	94		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-09

Location: See Exploration Plan

Latitude: 33.3110° Longitude: -111.6650°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.8	**CONCRETE**, 9.5" PCC								
	1.0	**ASPHALT**, 3" Asphalt								
	1.5	**CONCRETE**, 5.5" PCC								
		SILTY CLAYEY SAND (SC-SM), fine to medium grained, medium plasticity, light brown, loose				3-4	14.2	105		
		medium dense	5			10-17	15.8	118	42-17-25	
		very dense	10			50	12.6	98		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-10

Location: See Exploration Plan

Latitude: 33.3104° Longitude: -111.6645°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.8	**CONCRETE**, 9" PCC								
	1.0	**ASPHALT**, 3" Asphalt								
	1.5	**CONCRETE**, 6" PCC								
		SILTY CLAY WITH SAND (CL-ML), fine to medium grained, low plasticity, light brown, medium stiff				4-5	16.0	105		
		stiff	5			7-10	13.0	106	25-19-6	72
		hard	10			28-50	13.4	95		
	11.0									
		Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-11

Location: See Exploration Plan

Latitude: 33.3100° Longitude: -111.6637°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8.75" PCC								
	1.0	**ASPHALT**, 3" Asphalt								
	1.4	**CONCRETE**, 5.5" PCC								
		SILTY CLAY WITH SAND (CL-ML), fine to medium grained, medium plasticity, brown, soft								
						2-2	13.5	104		
		stiff	5			4-8	12.9	111	28-18-10	
		hard	10			35-50	6.0	100		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-12

Location: See Exploration Plan

Latitude: 33.3093° Longitude: -111.6632°

Depth (Ft.)	Graphic Log	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.8		**CONCRETE**, 9" PCC								
0.9		**ASPHALT**, 2" Asphalt								
1.4		**CONCRETE**, 6" PCC								
		SILTY CLAYEY SAND (SC-SM), trace gravel, fine to coarse grained, low plasticity, light brown to brown, very loose				2-4	15.4	106		
		loose	5			5-4	17.0	106	23-16-7	35
		very dense	10			27-50	14.1	104		
11.0		***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-13

Location: See Exploration Plan

Latitude: 33.3088° Longitude: -111.6623°

Depth (Ft.)	Graphic Log	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.7	**CONCRETE**, 8" PCC							
0.9	**ASPHALT**, 2.5" Asphalt							
1.3	**CONCRETE**, 5.5" PCC							
	LEAN CLAY WITH SAND (CL), trace gravel, fine to coarse grained, medium plasticity, dark brown, medium stiff			2-3	20.7	96		
5	stiff			6-11	20.6	96	32-15-17	
10	hard			34-50	8.7	114		
11.0	***Boring Terminated at 11 Feet***							

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-14

Location: See Exploration Plan

Latitude: 33.3081° Longitude: -111.6619°

Depth (Ft.)	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.8	**CONCRETE**, 9.5" PCC								
0.8	**ASPHALT**, 0.5" Asphalt								
	CONCRETE, 6.5" PCC								
1.4	**LEAN CLAY WITH SAND (CL)**, fine to medium grained, medium plasticity, light brown to brown, medium stiff								
					3-5	17.6	104		
	very stiff	5			13-28	12.4	113	32-19-13	82
	hard	10			14-50	10.8	106		
11.0									
	Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-15

Location: See Exploration Plan

Latitude: 33.3077° Longitude: -111.6610°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8.5" PCC								
	0.8	**ASPHALT**, 1" Asphalt								
	1.3	**CONCRETE**, 6" PCC								
		SANDY LEAN CLAY (CL), fine to medium grained, medium plasticity, light brown, medium stiff								
						2-3	21.3	99		
		very stiff	5			3-17	15.1	105	41-18-23	
			10			12-17	11.1	103		
	11.0									
		Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-09-2022

Boring Completed
08-09-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-16

Location: See Exploration Plan

Latitude: 33.3062° Longitude: -111.6596°

Graphic Log	Depth (Ft.)	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
		CONCRETE, 14" PCC								
	1.2									
	1.3	**ASPHALT**, 1" Asphalt Rubber								
		SILTY CLAY WITH SAND (CL-ML), fine to medium grained, low plasticity, brown, medium stiff				3-3	25.3	92		
		very stiff	5			11-18	11.6	115	25-18-7	72
		stiff	10			19-33	15.0	97		
	11.0									
		Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-08-2022

Boring Completed
08-08-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-17

Location: See Exploration Plan

Latitude: 33.3056° Longitude: -111.6587°

Depth (Ft.)	Graphic Log	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
0.7		**CONCRETE**, 8.5" PCC								
0.9		**ASPHALT**, 2" Asphalt								
		CONCRETE, 6.5" PCC								
1.4		**SANDY LEAN CLAY (CL)**, fine to medium grained, medium plasticity, brown, medium stiff				2-4	21.1	97		
		very stiff	5			11-17	14.0	112	34-16-18	
			10			10-31	12.2	105		
11.0		***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-08-2022

Boring Completed
08-08-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-18

Location: See Exploration Plan

Latitude: 33.3048° Longitude: -111.6580°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8" PCC								
	0.8	**ASPHALT**, 2" Asphalt **CONCRETE**, 7.5" PCC								
	1.5	**SANDY SILTY CLAY (CL-ML)**, fine to medium grained, low plasticity, light brown, soft				1-2	24.9	92		
		hard	5			14-33	13.4	119	24-17-7	63
			10			18-50	12.5	98		
	11.0	***Boring Terminated at 11 Feet***								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-08-2022

Boring Completed
08-08-2022

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-19

Location: See Exploration Plan

Latitude: 33.3043° Longitude: -111.6571°

Graphic Log	Depth (Ft.)	Material Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
		CONCRETE, 17" PCC								
	1.4									
		LEAN CLAY (CL), fine grained, medium plasticity, brown, medium stiff				4-4	13.4	109		
			5			4-4	14.1	111	32-17-15	
		stiff	10			9-8	14.1	96		
	11.0									
		Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Notes

Advancement Method

Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-08-2022

Boring Completed
08-08-2022

Phoenix-Mesa Gateway Runway 12R-30L
Reconstruction
6033 S Sossaman Rd | Mesa, AZ
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Boring Log No. B-20

Location: See Exploration Plan

Latitude: 33.3035° Longitude: -111.6564°

Graphic Log	Depth (Ft.)	Description	Depth (Ft.)	Water Level Observations	Sample Type	Field Test Results	Water Content (%)	Dry Unit Weight (pcf)	Atterberg Limits LL-PL-PI	Percent Fines
	0.7	**CONCRETE**, 8.5" PCC								
	0.9	**ASPHALT**, 2" Asphalt								
		CONCRETE, 6.75" PCC								
	1.4	**SANDY LEAN CLAY (CL)**, fine to medium grained, low plasticity, dark brown, medium stiff								
						3-3	12.1	101		
			5			2-6	12.2	101	26-17-9	69
		very stiff	10			21-19	10.6	102		
	11.0									
		Boring Terminated at 11 Feet								

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Water Level Observations

Drill Rig
772

Hammer Type
Automatic

Driller

Logged by

Boring Started
08-08-2022

Boring Completed
08-08-2022

Notes

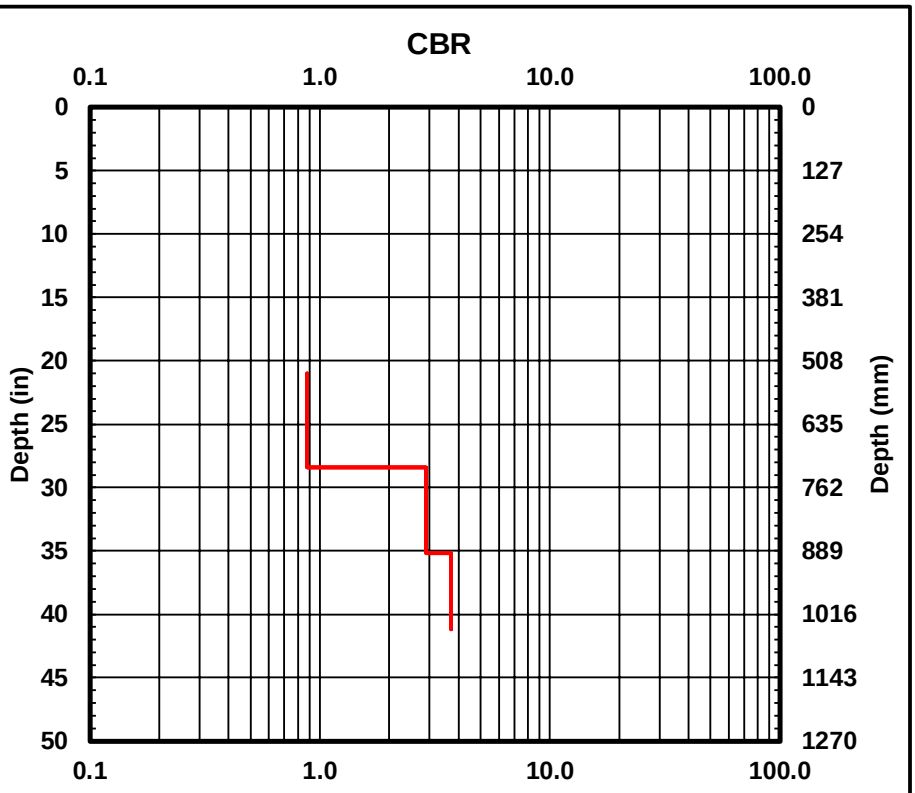
Advancement Method

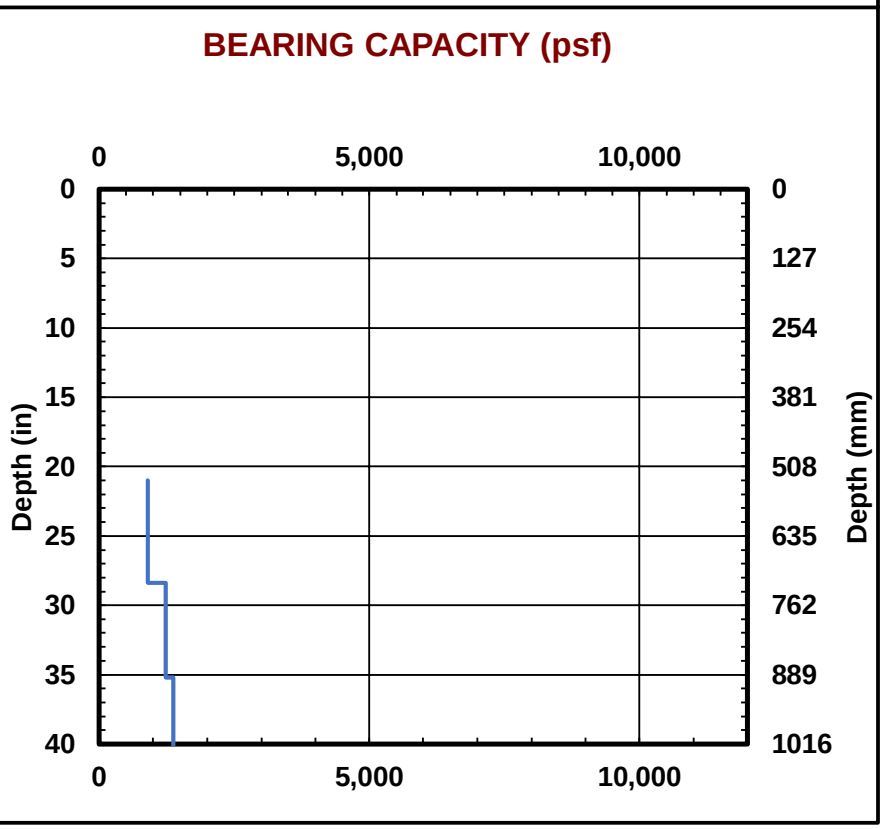
Abandonment Method
Boring backfilled with Auger Cuttings
Surface capped with concrete

DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-1	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	21

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	152	0
3	340	188
5	513	361
5	665	513

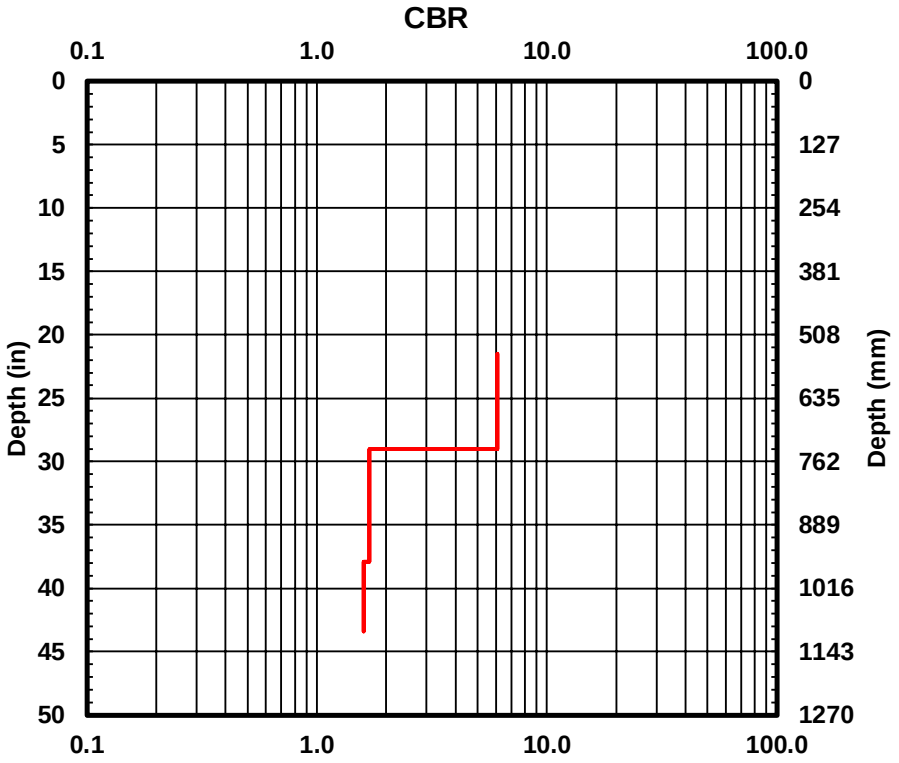


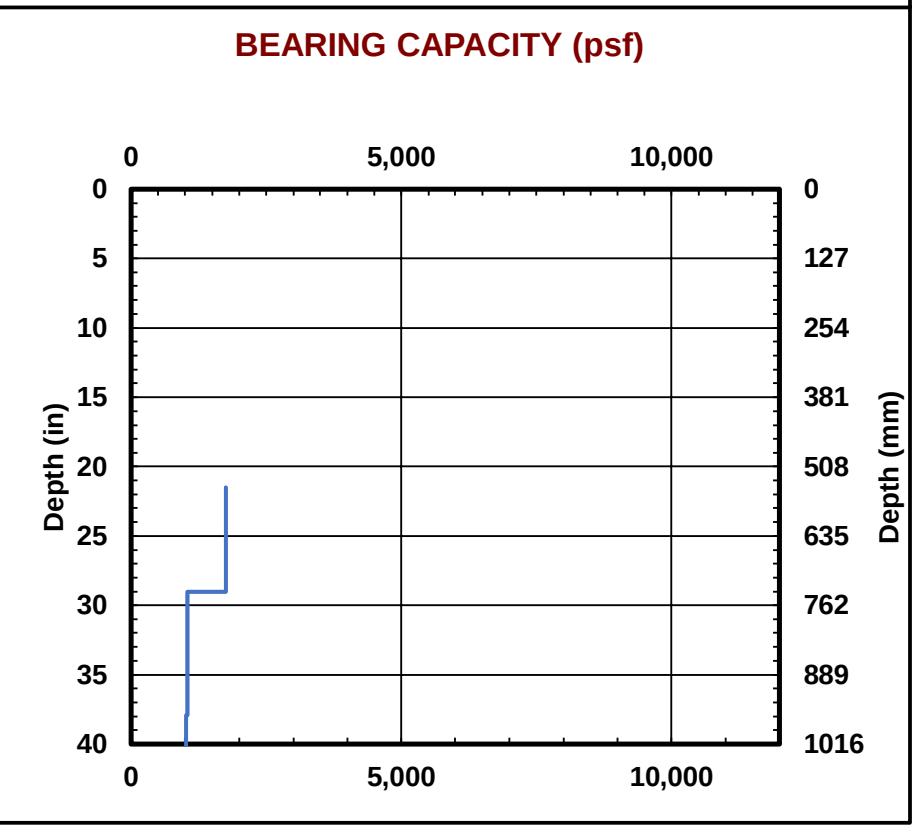


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-2	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	21 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	150	0
8	340	191
5	566	417
3	706	556

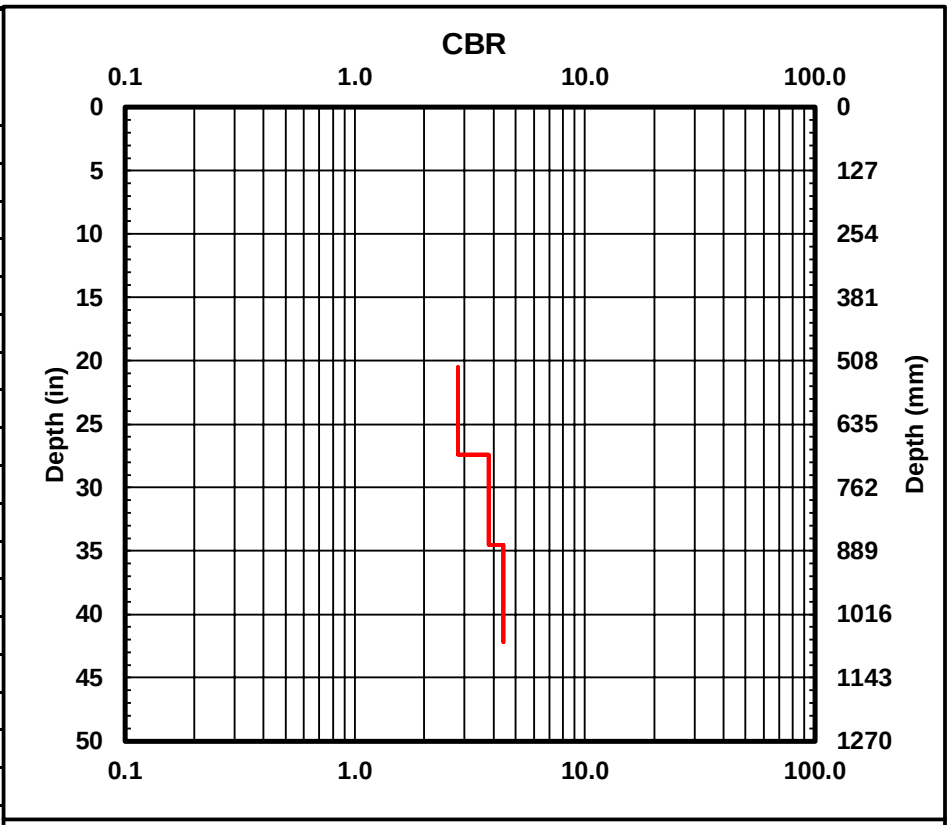


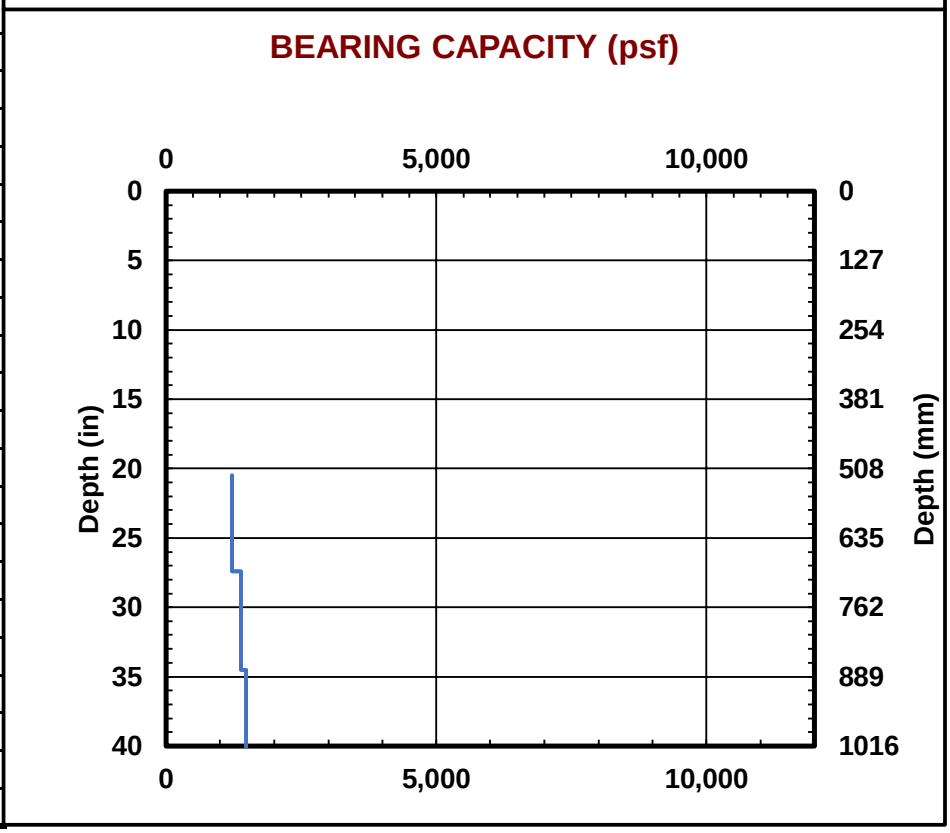


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-3	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	20 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	165	0
5	340	175
6	521	356
5	660	495
2	716	551

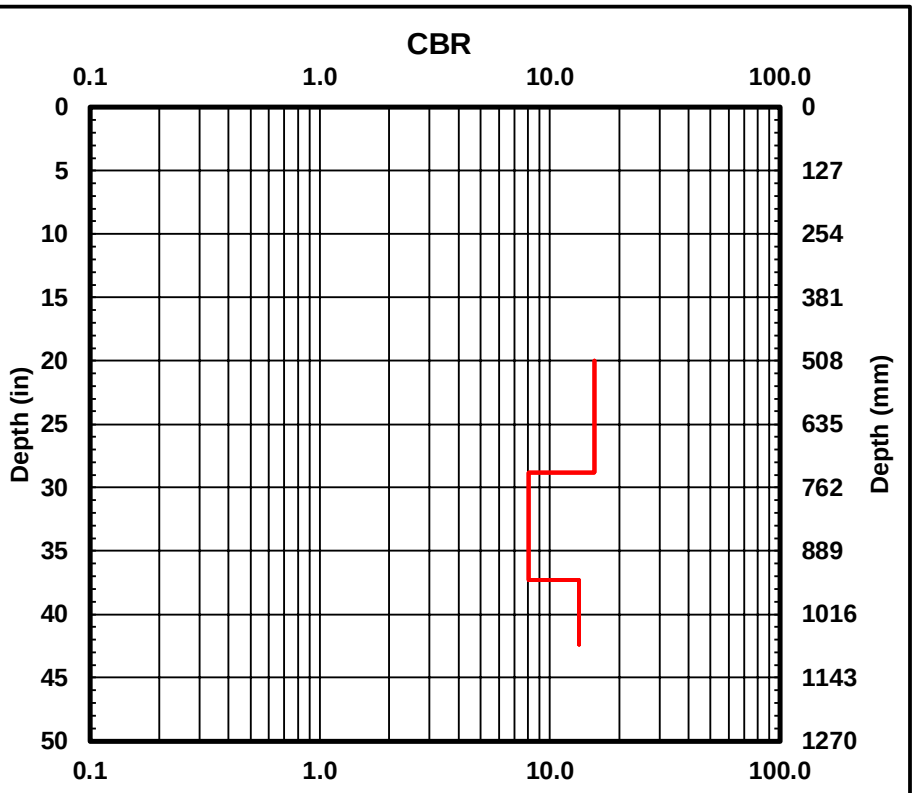


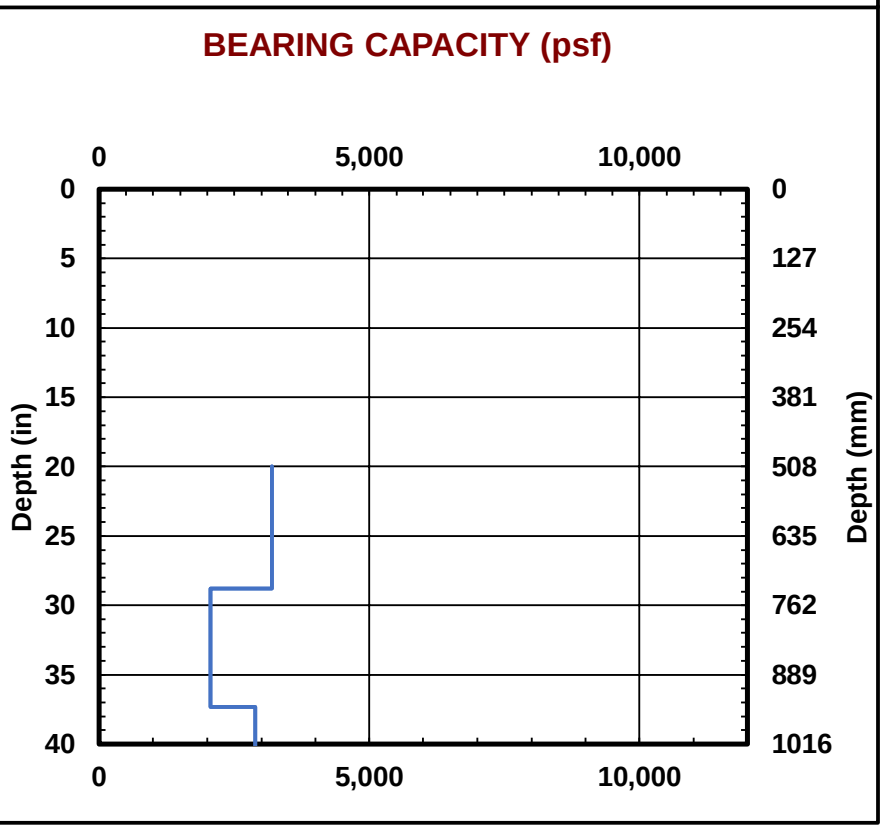


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-4	Subgrade Soil Type:	CH
Date:	8/8/2022	PCC Thickness (in):	20

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	107	0
10	330	224
5	546	439
5	676	569

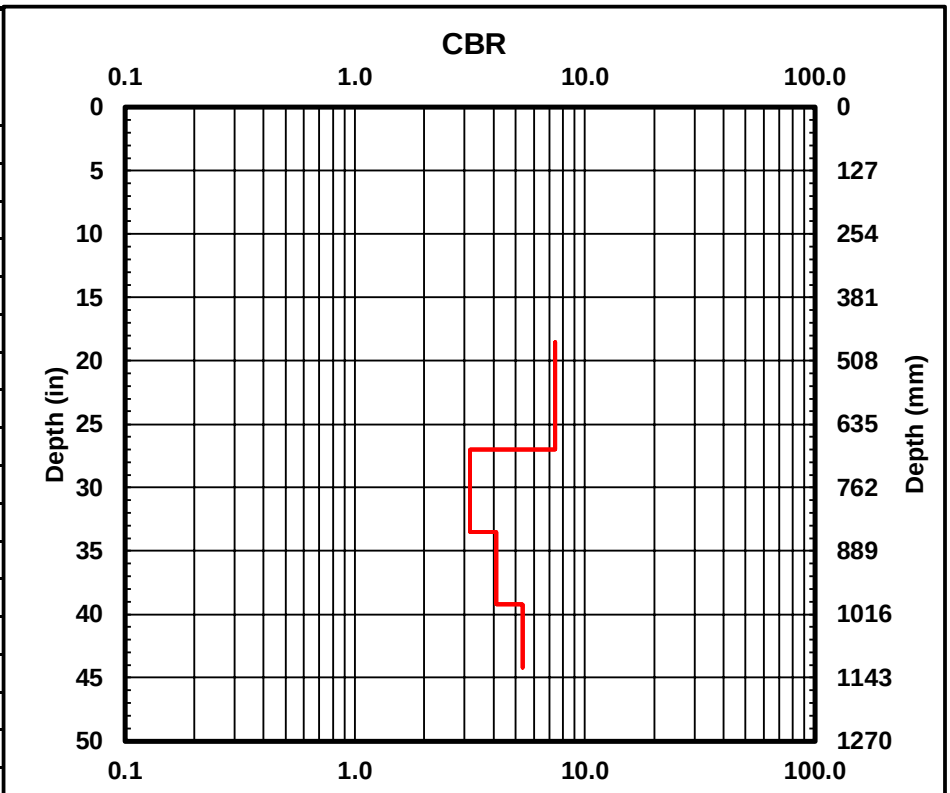


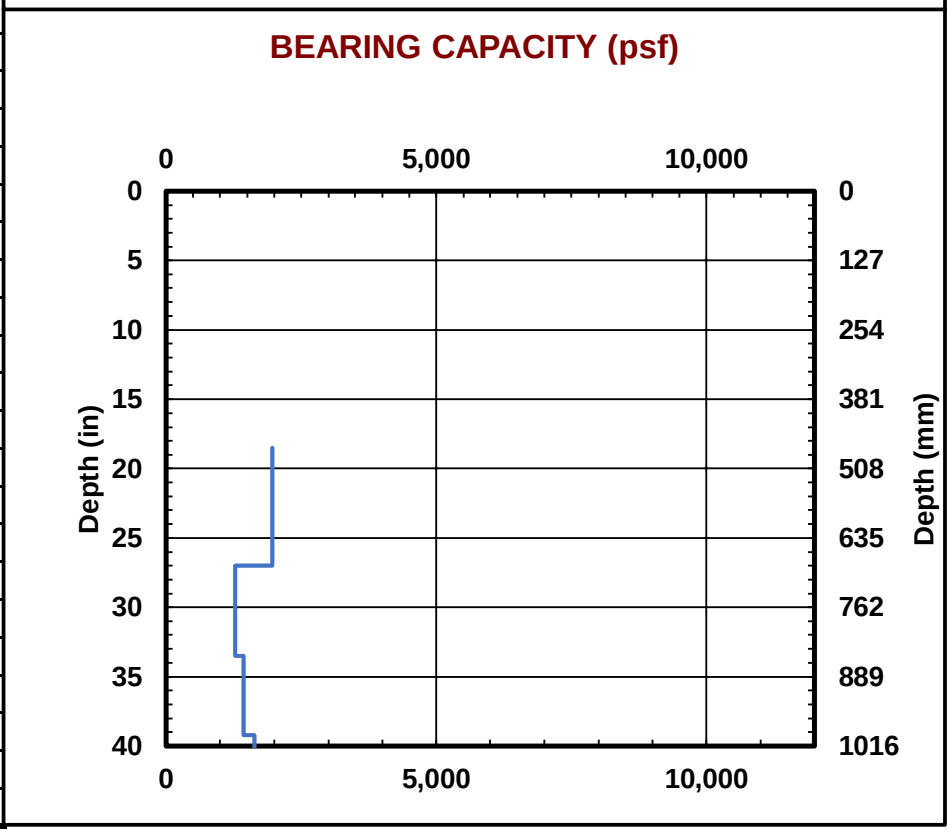


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-5	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	18 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	104	0
10	320	216
5	485	381
5	630	526
5	757	653

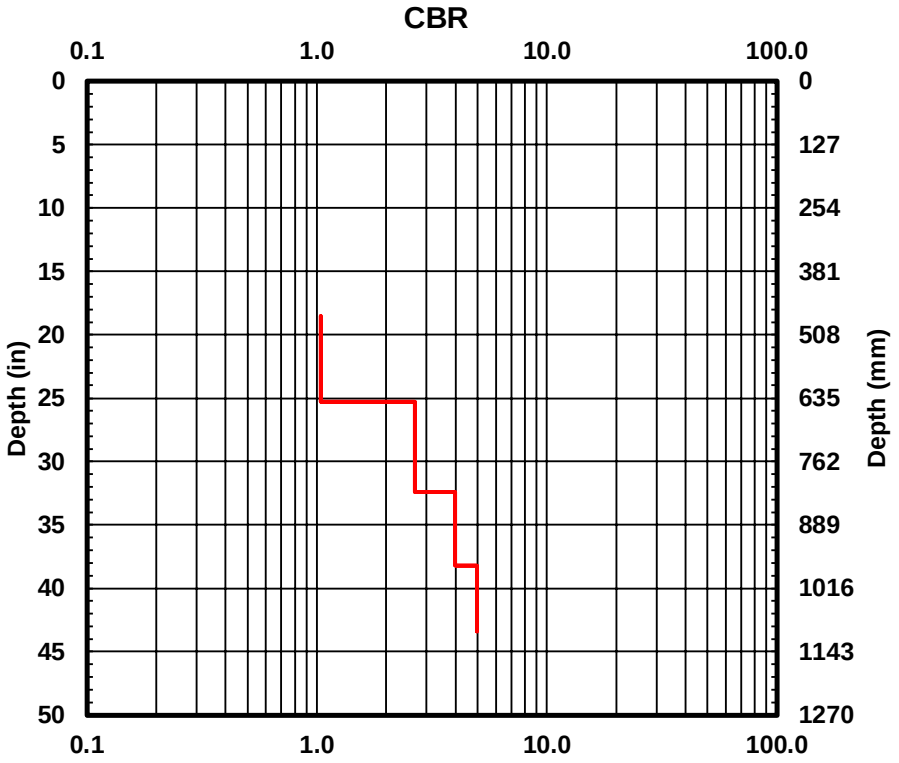


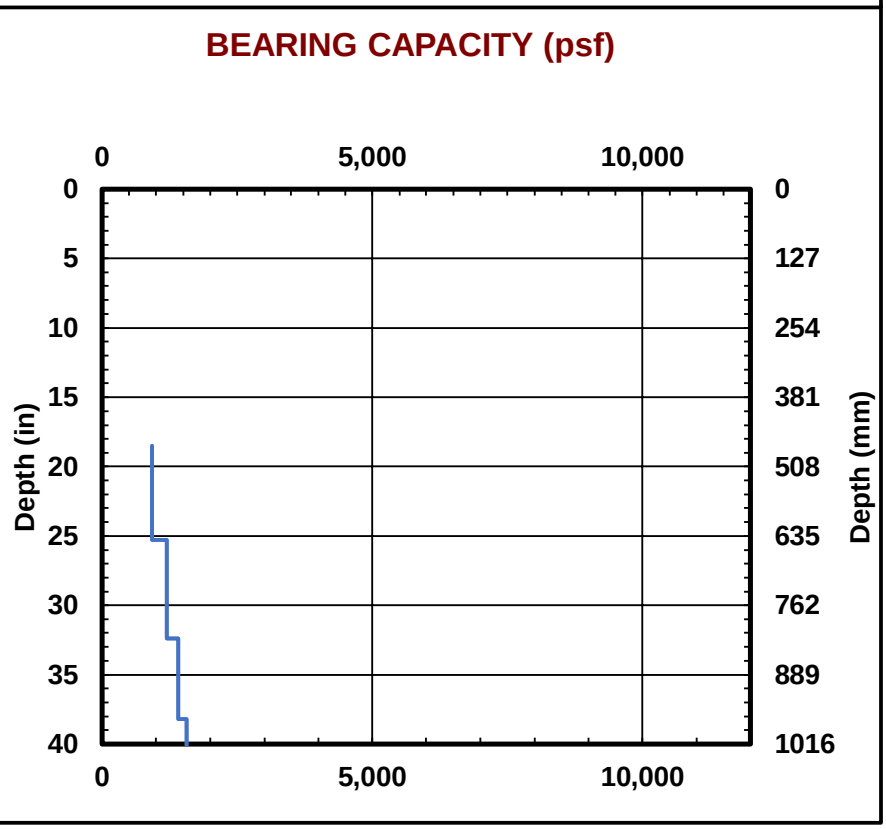


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-6	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	18 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	117	0
3	290	173
5	470	353
5	617	500
5	749	632

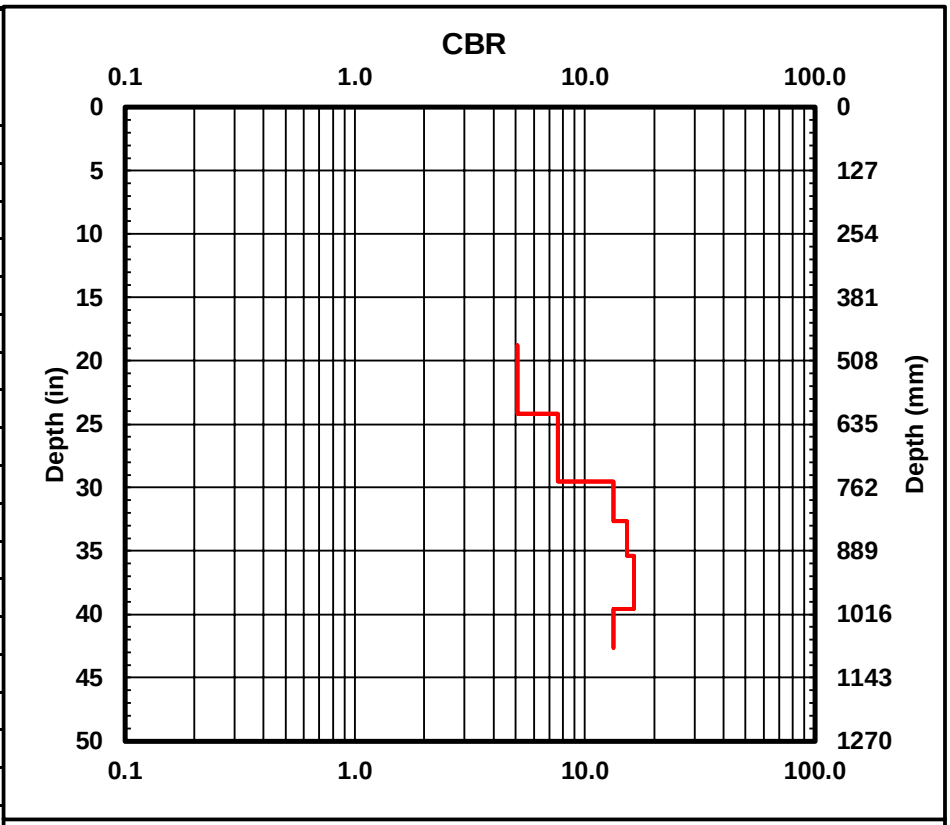


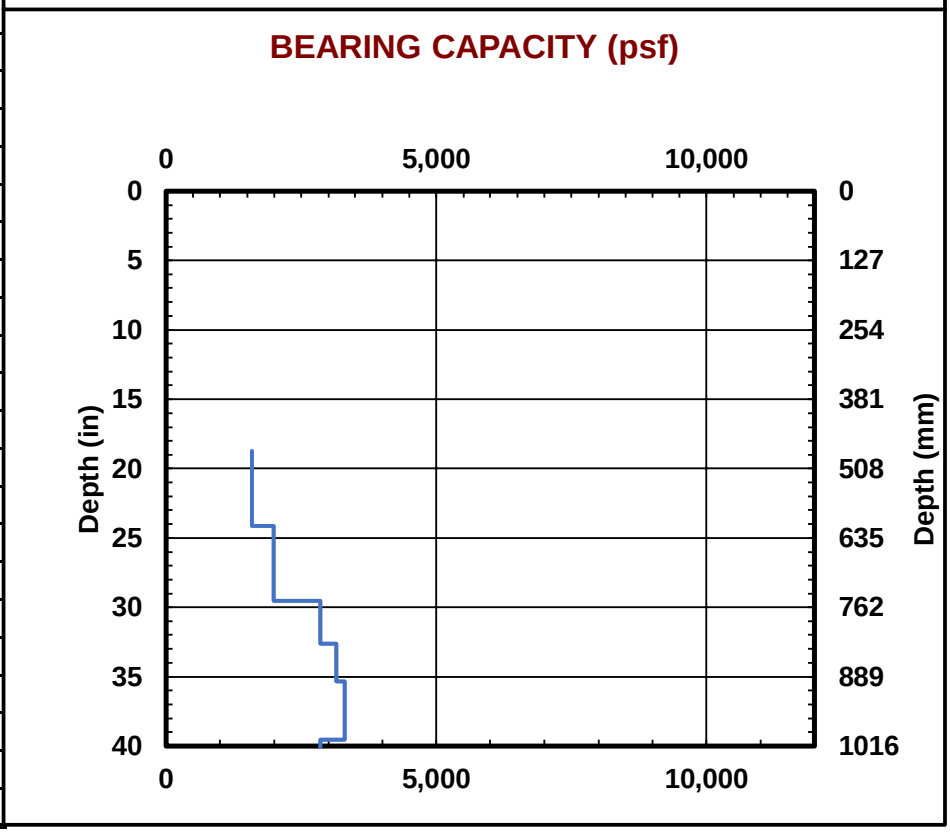


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-7	Subgrade Soil Type:	CH
Date:	8/8/2022	PCC Thickness (in):	18 3/4

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	157	0
2	295	137
3	432	274
3	511	353
3	579	422
5	686	528
3	765	607

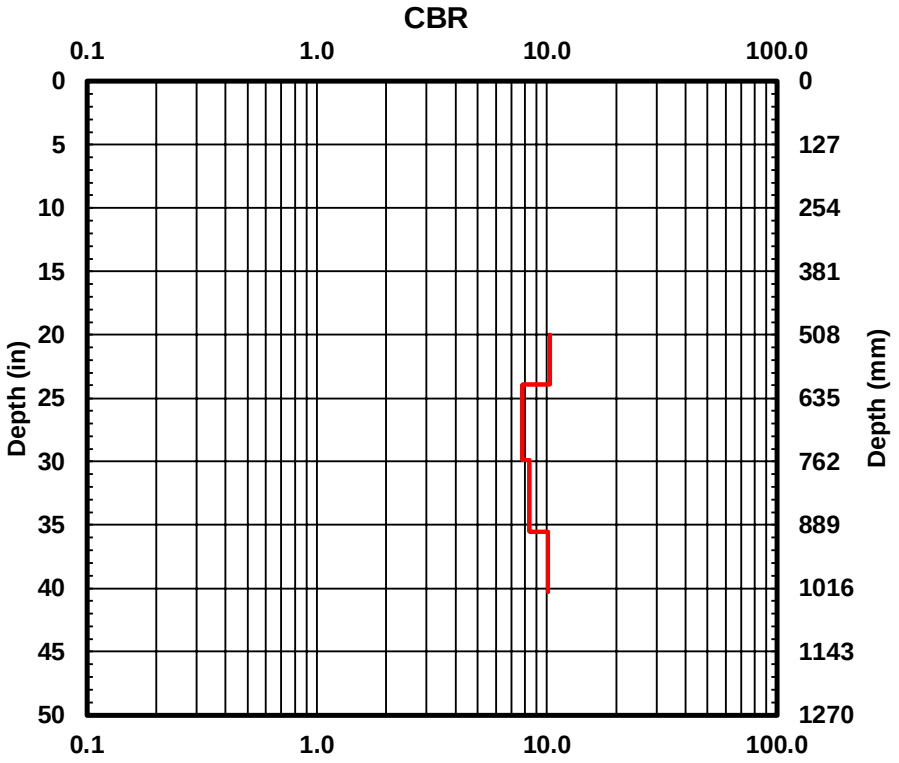


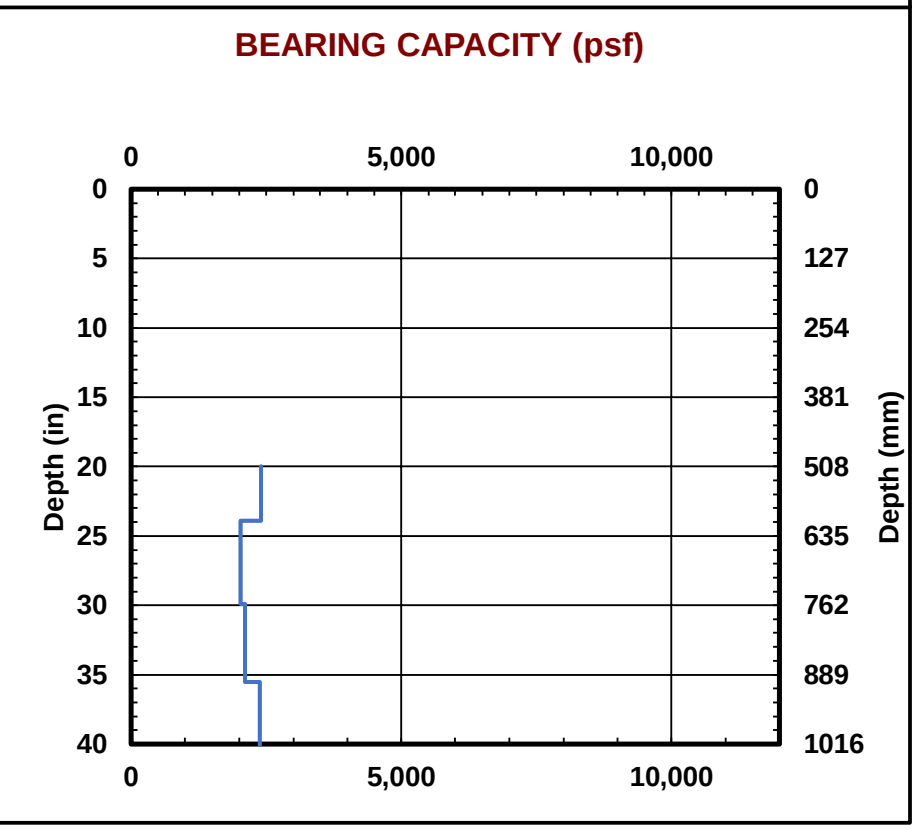


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-8	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	20

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	119	0
5	218	99
6	371	251
6	514	394
6	635	516

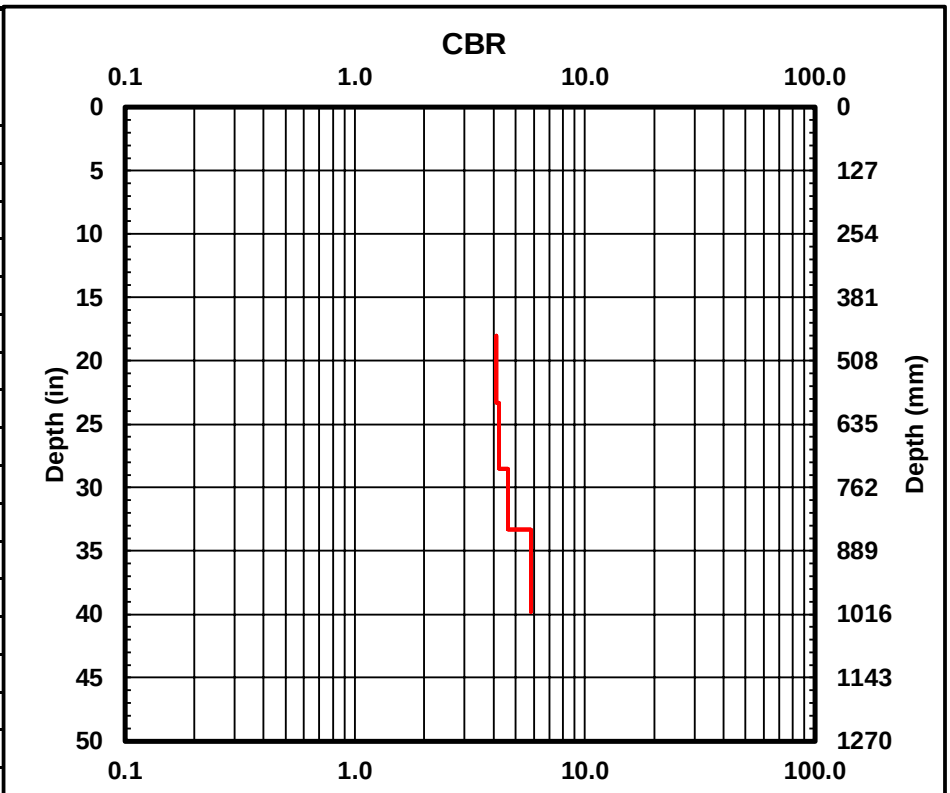


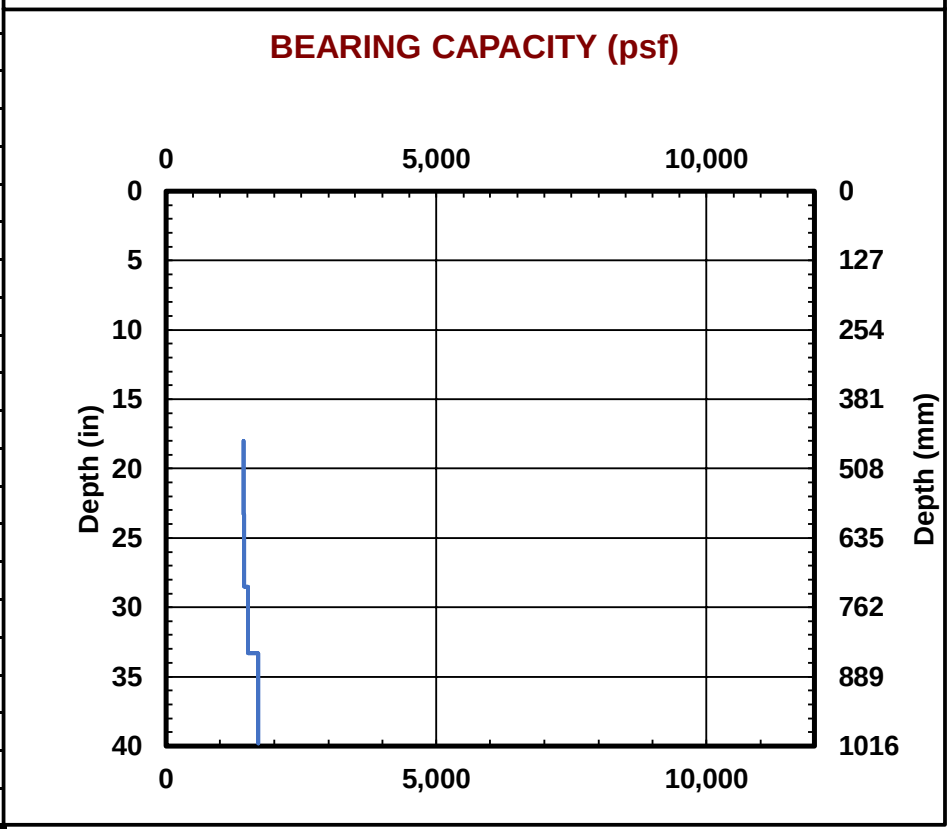


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-9	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	18

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	114	0
3	249	135
3	381	267
3	503	389
5	668	554

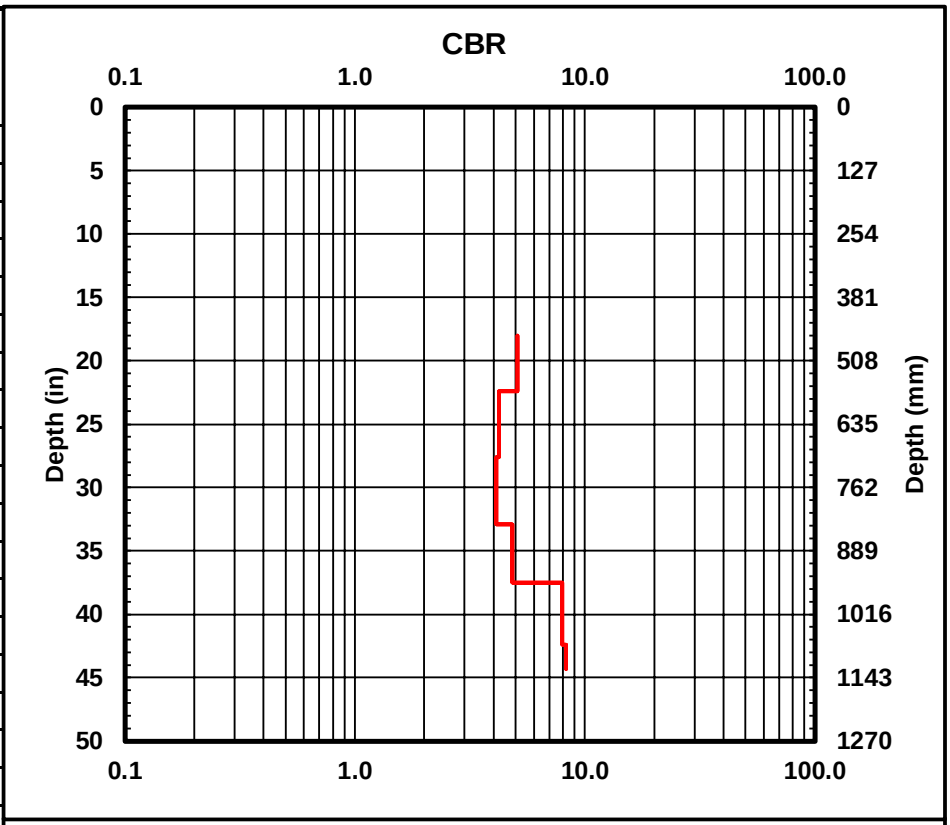


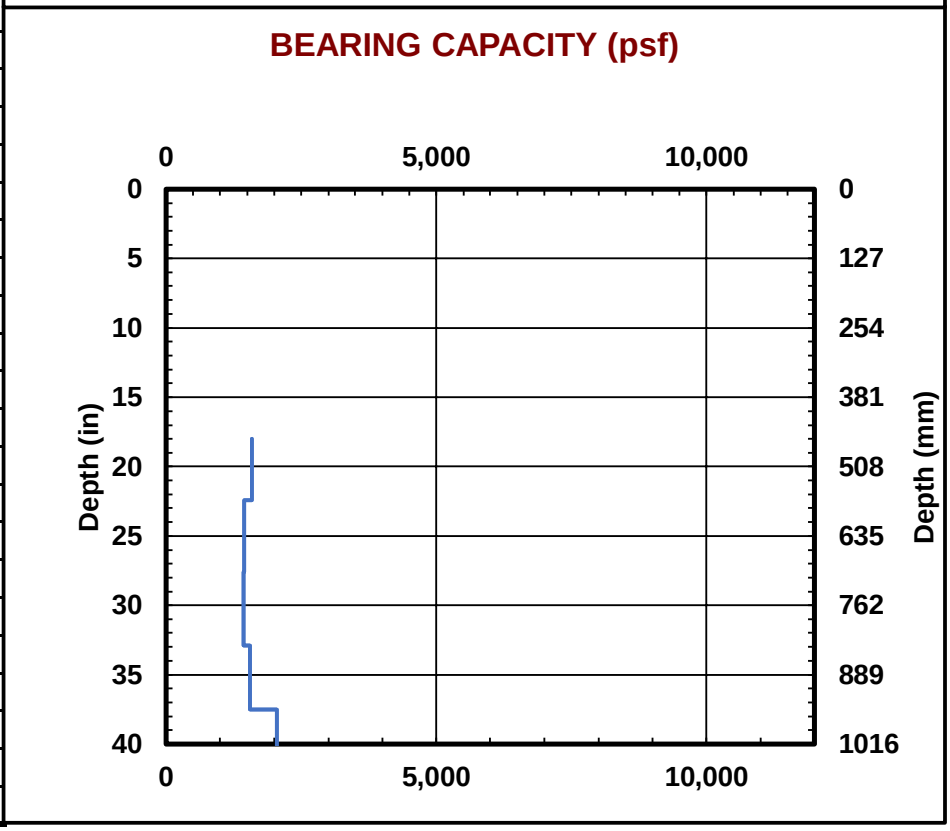


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-10	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	18

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	145	0
3	257	112
3	389	244
3	523	378
3	640	495
5	765	620
2	813	668

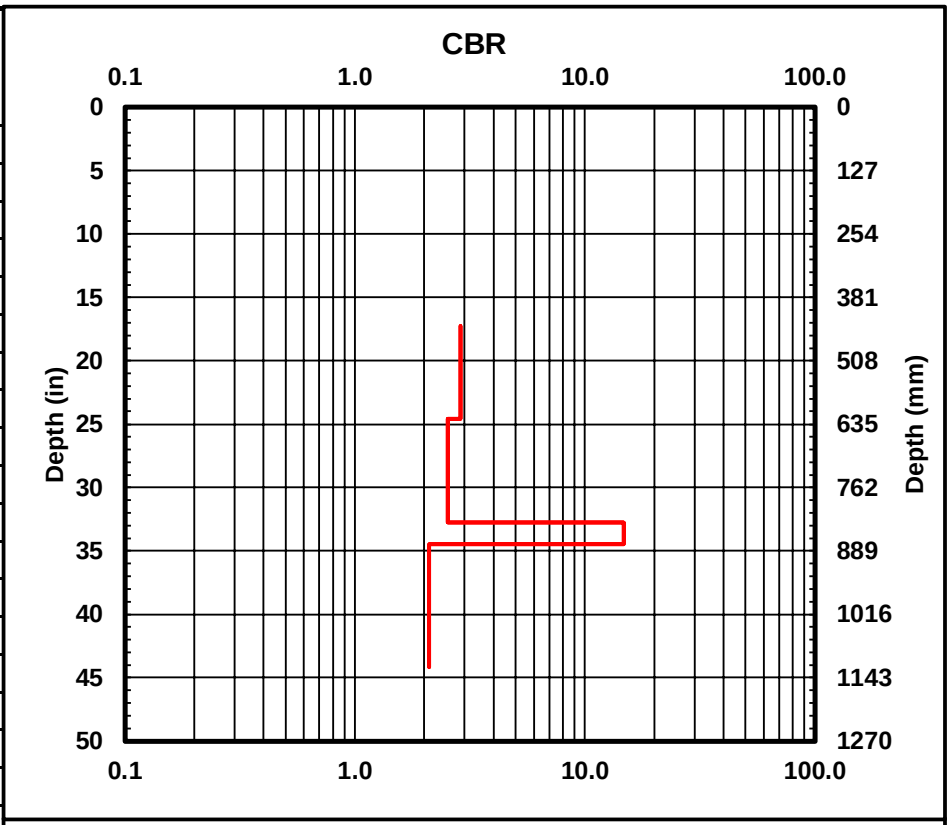


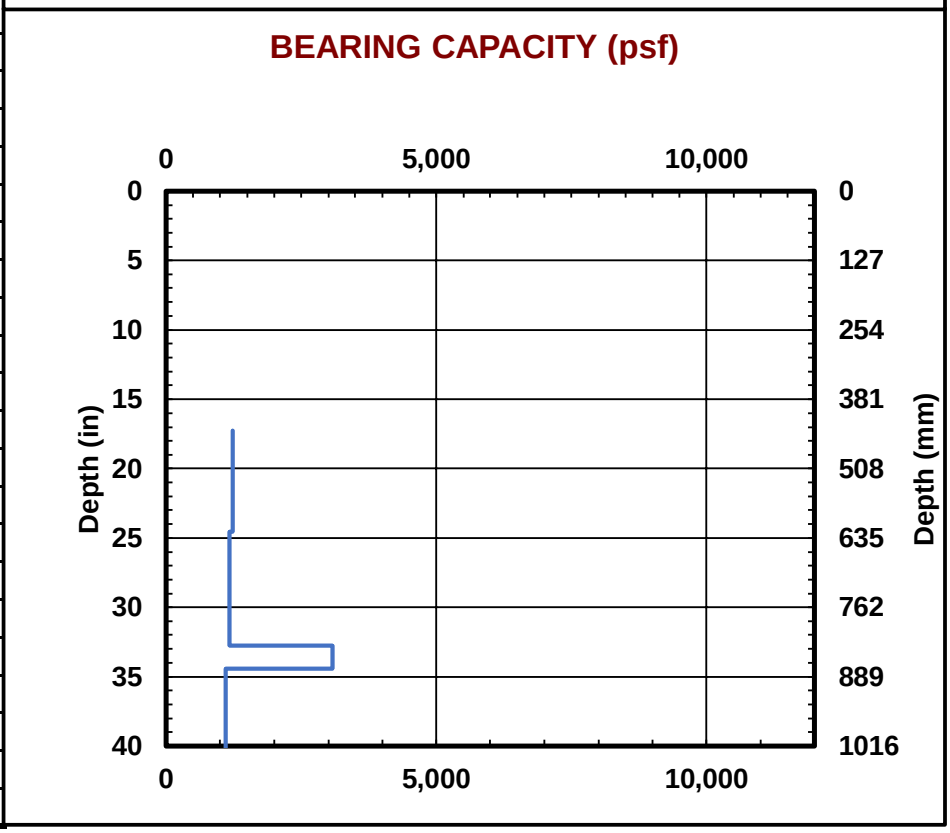


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-11	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	17 1/4

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	122	0
3	307	185
3	516	394
3	559	437
3	805	683

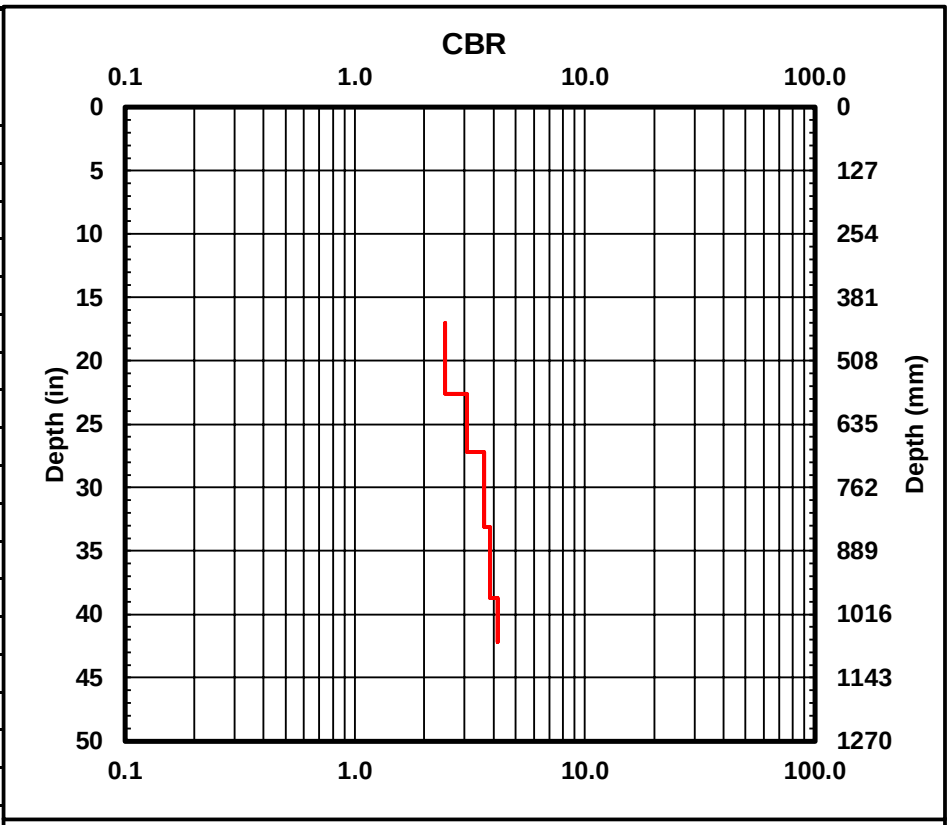


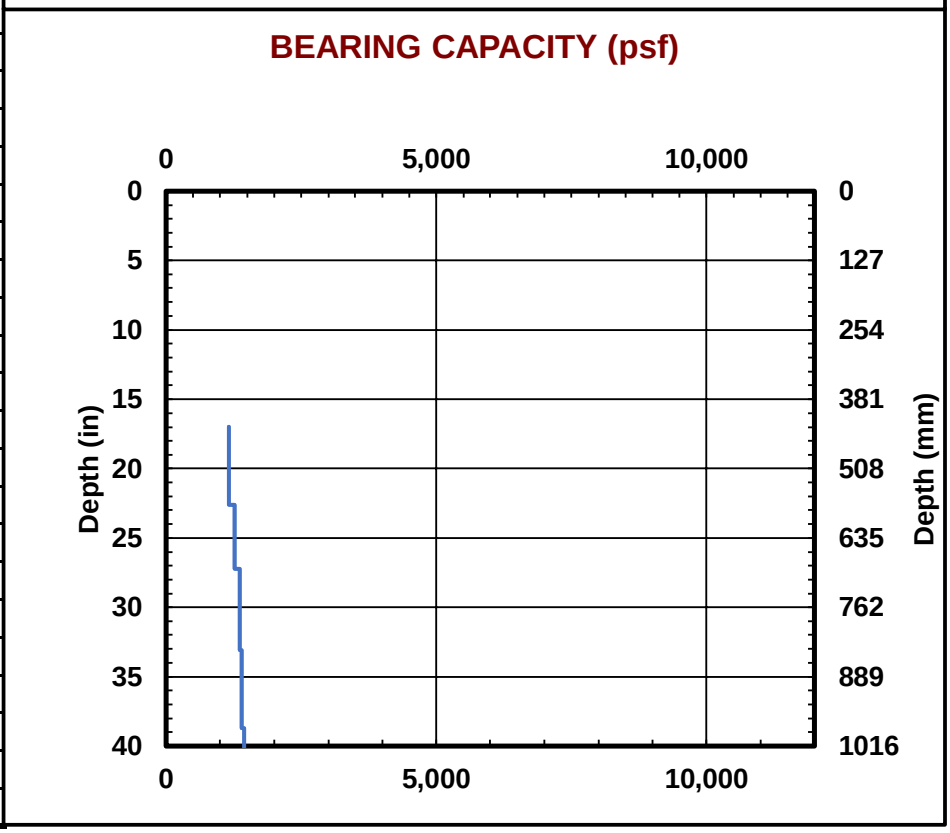


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-12	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	17

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	137	0
2	279	142
2	396	259
3	546	409
3	688	551
2	777	640

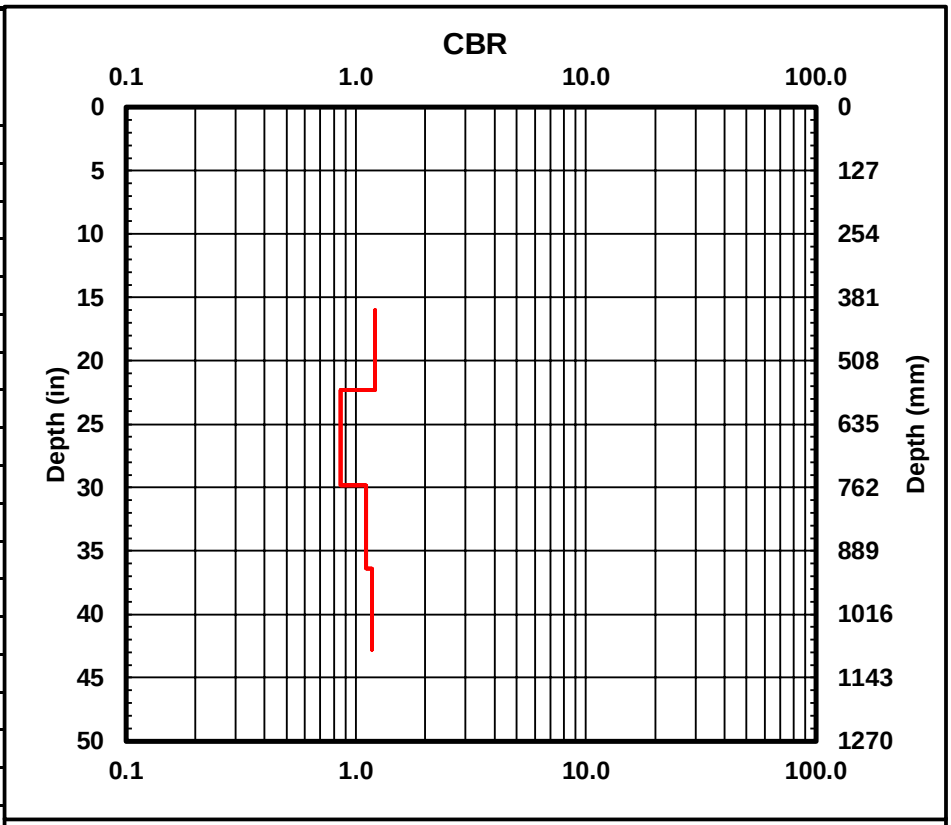


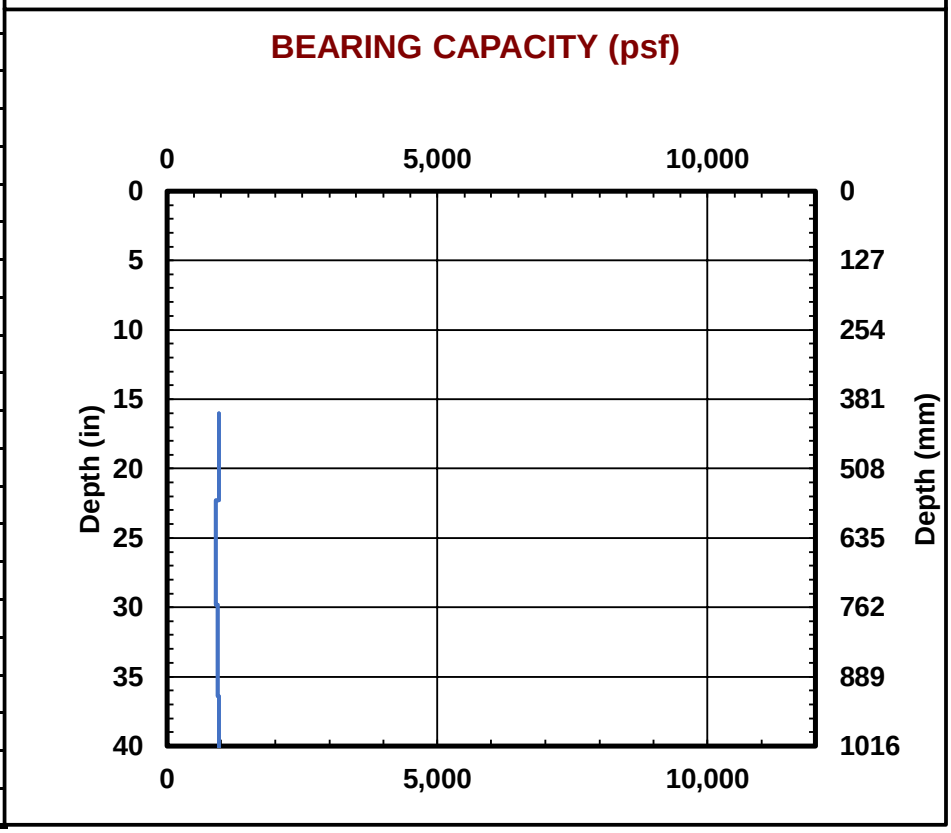


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-13	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	16

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	132	0
3	292	160
3	483	351
3	650	518
3	813	681

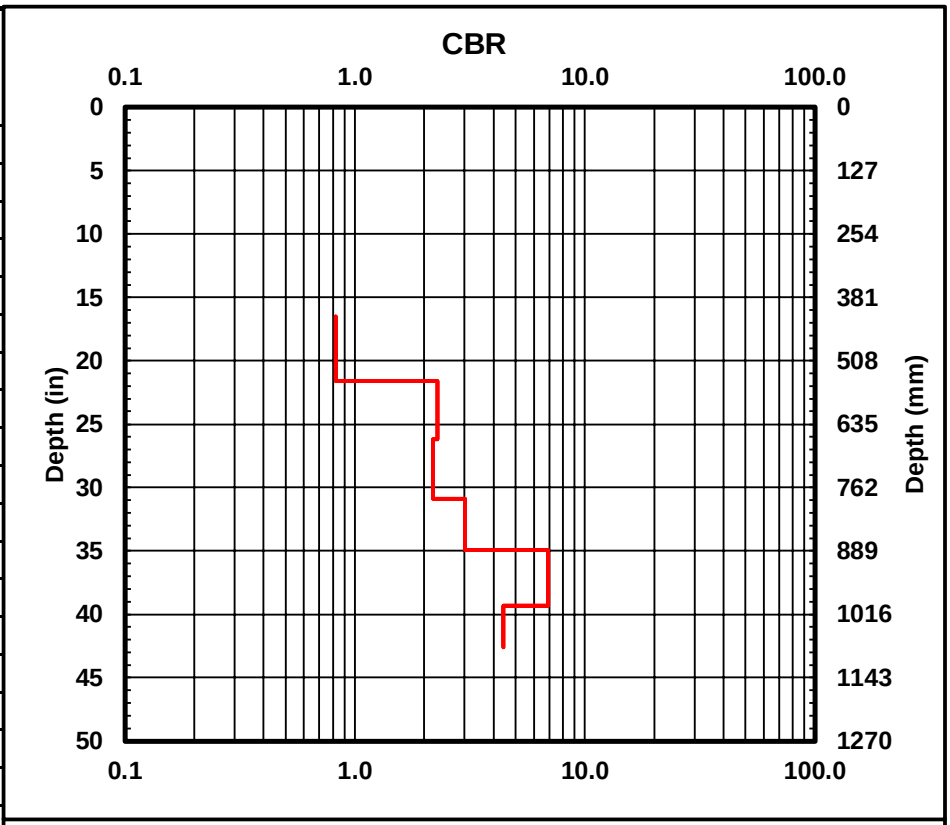


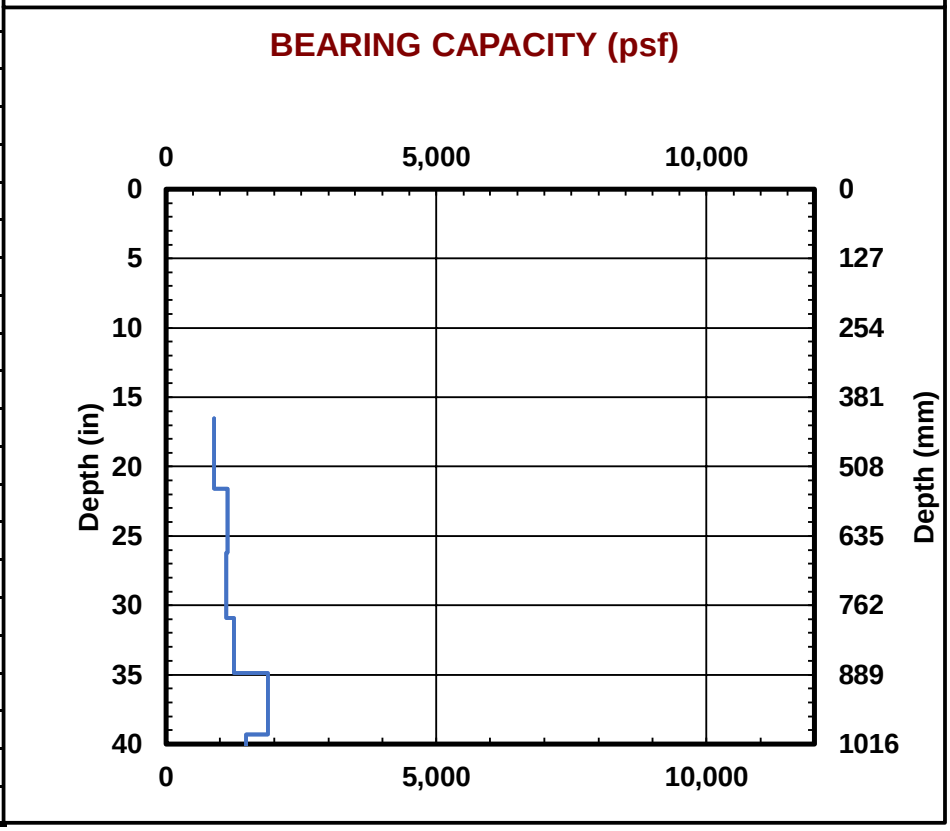


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-14	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	16 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	137	0
2	267	130
3	384	246
3	503	366
3	605	467
5	716	579
3	800	663

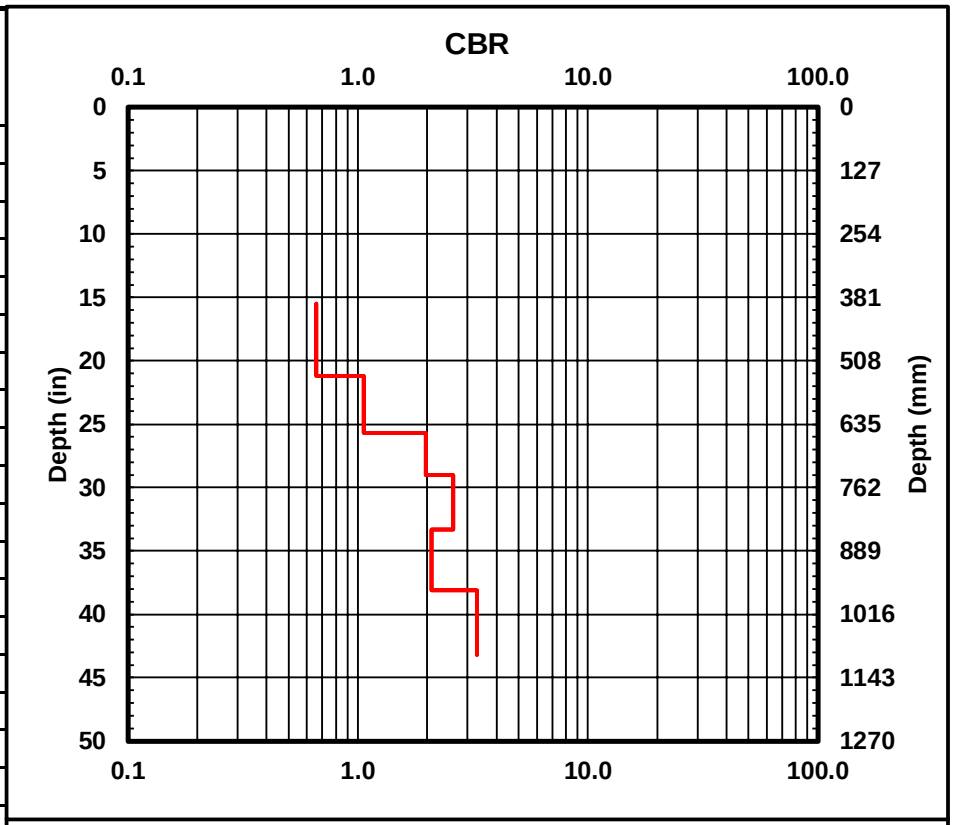


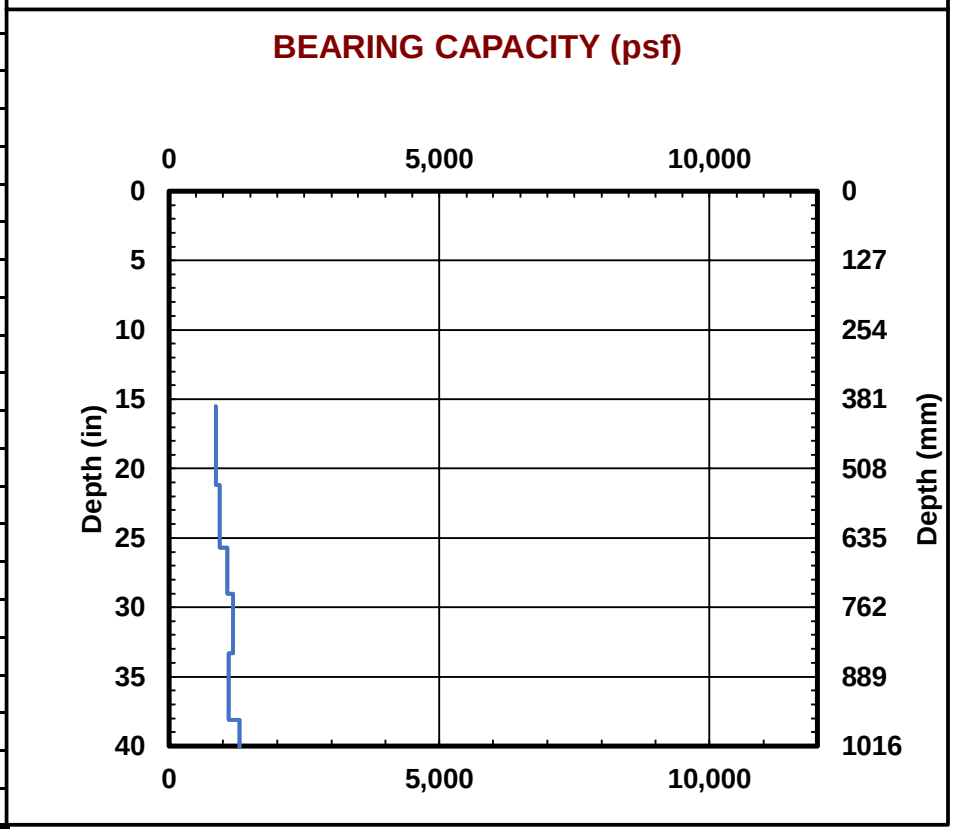


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-15	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	15 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	117	0
2	262	145
2	376	259
2	460	343
3	569	452
3	691	574
4	820	704

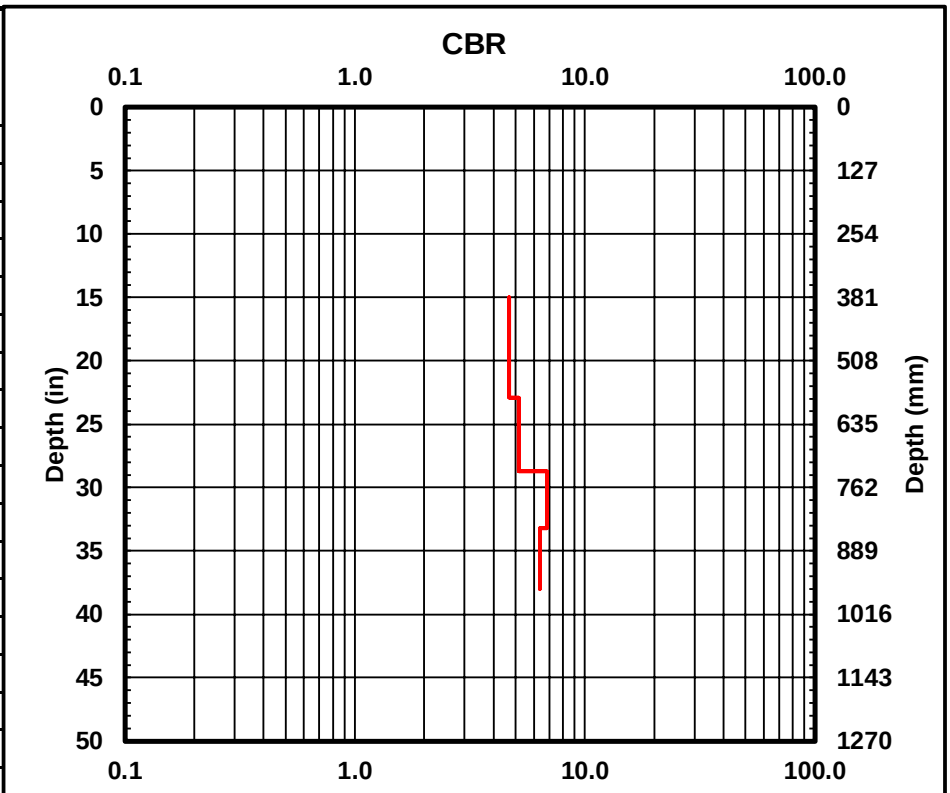


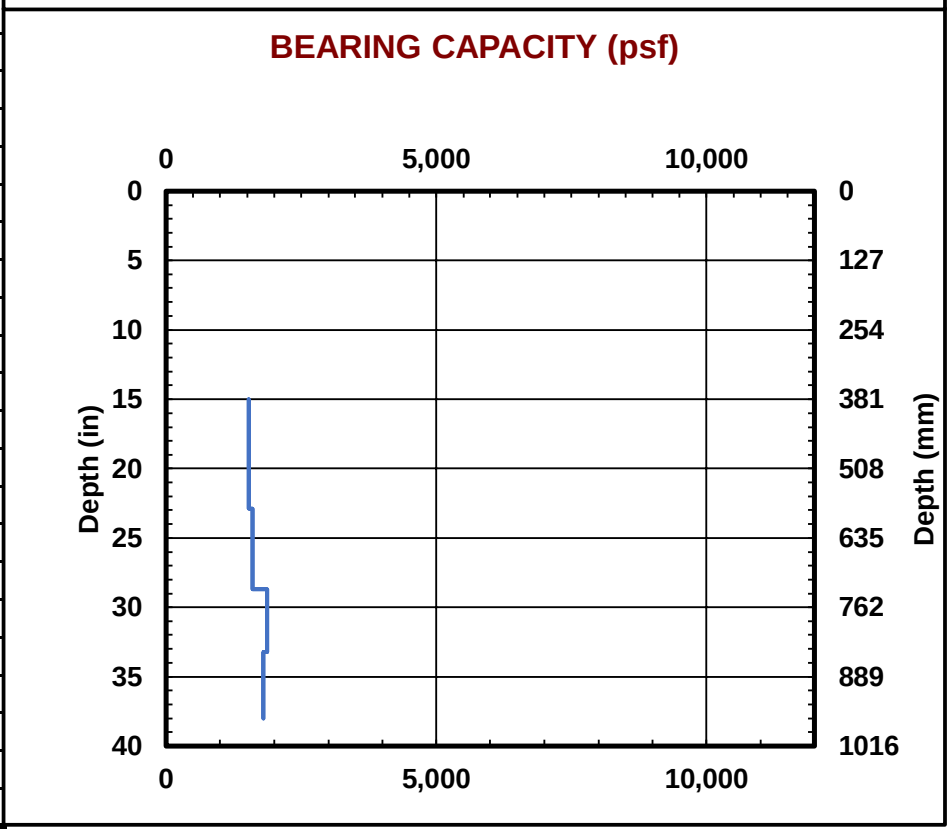


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-16	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	15

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	173	0
5	373	201
4	521	348
4	635	462
4	757	584

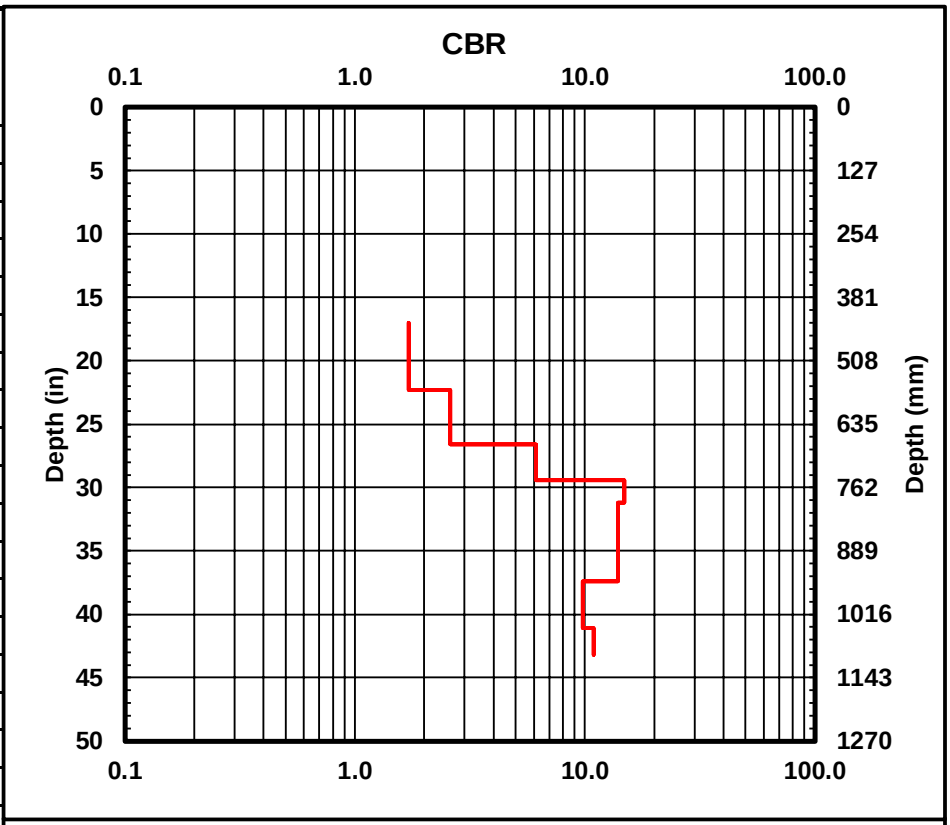


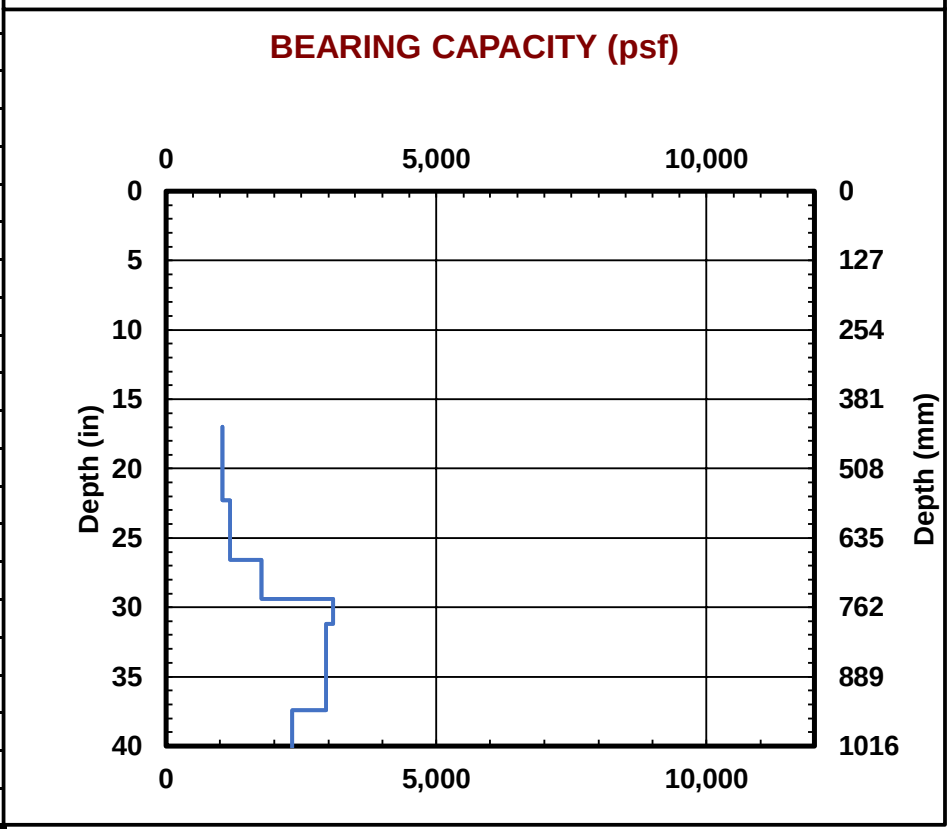


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-17	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	17

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	145	0
3	279	135
3	389	244
3	460	315
3	505	361
5	584	439
5	663	518
5	757	612
3	810	665

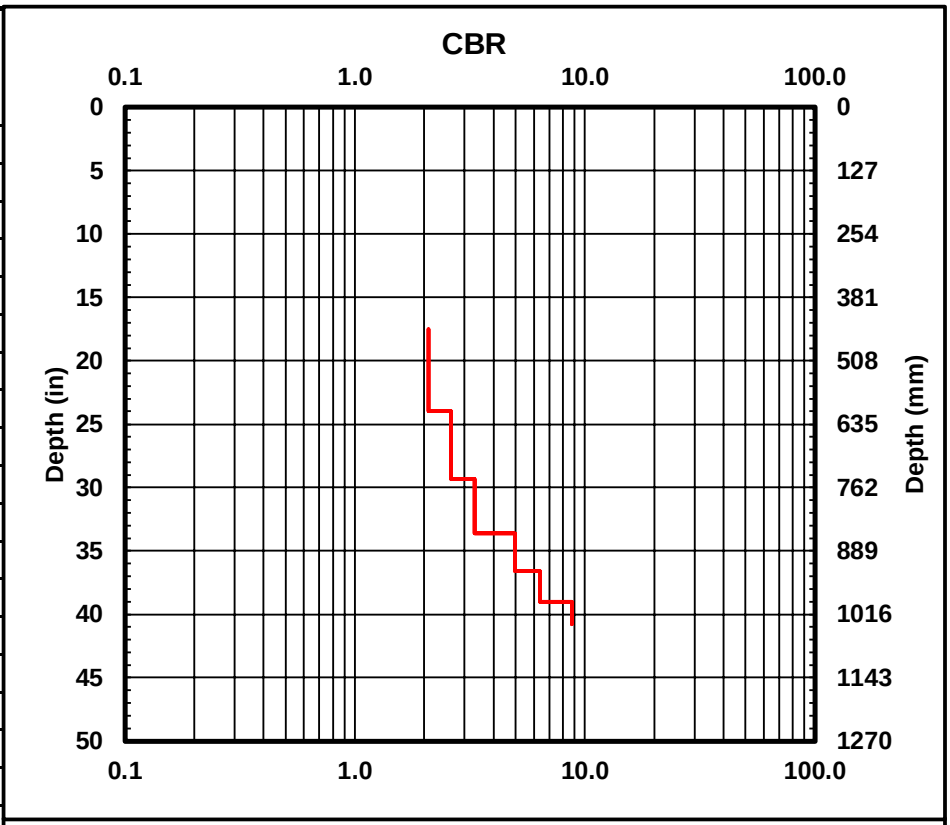


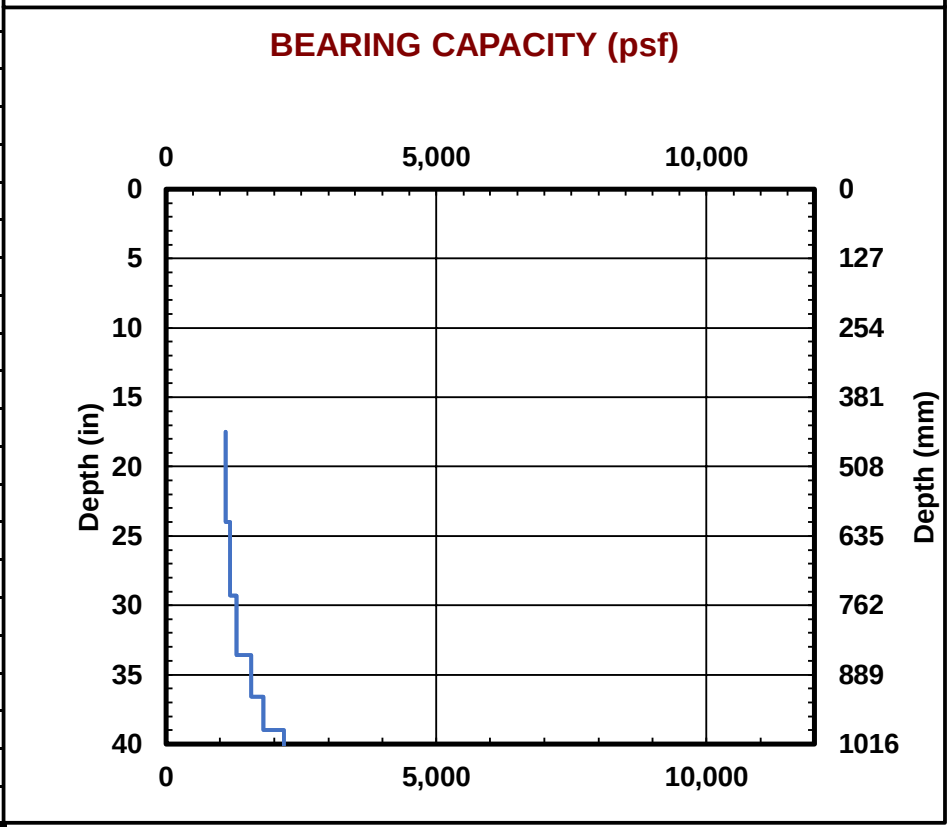


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-18	Subgrade Soil Type:	Other (Not CL or CH)
Date:	8/8/2022	PCC Thickness (in):	17 1/2

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	145	0
2	310	165
2	445	300
2	554	409
2	630	485
2	691	546
2	737	592

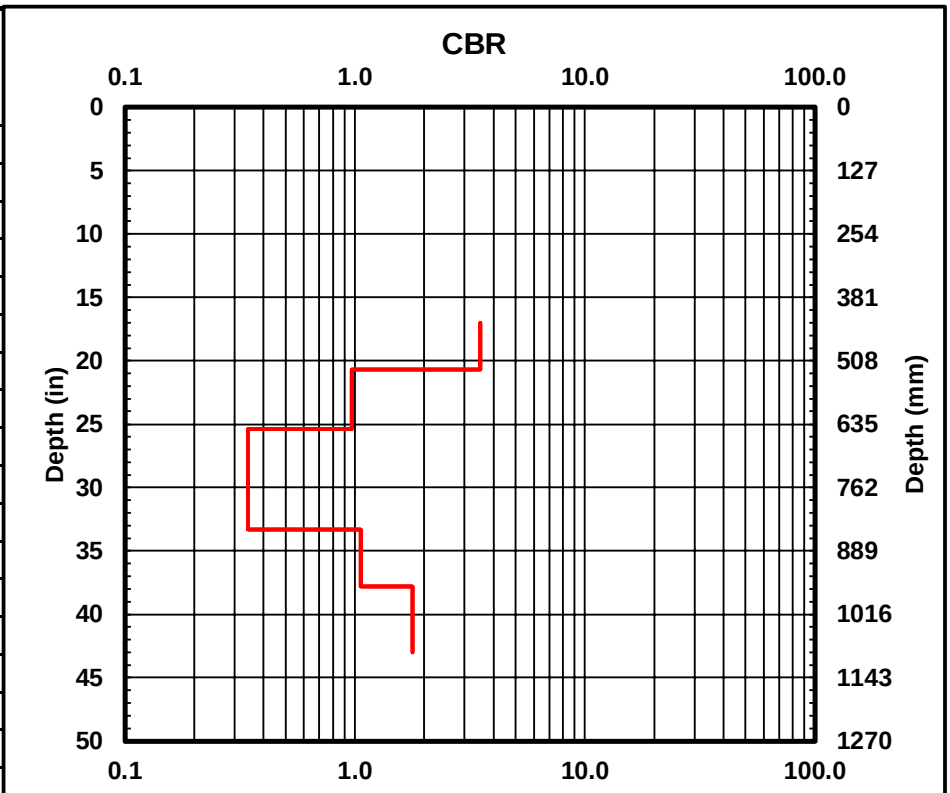


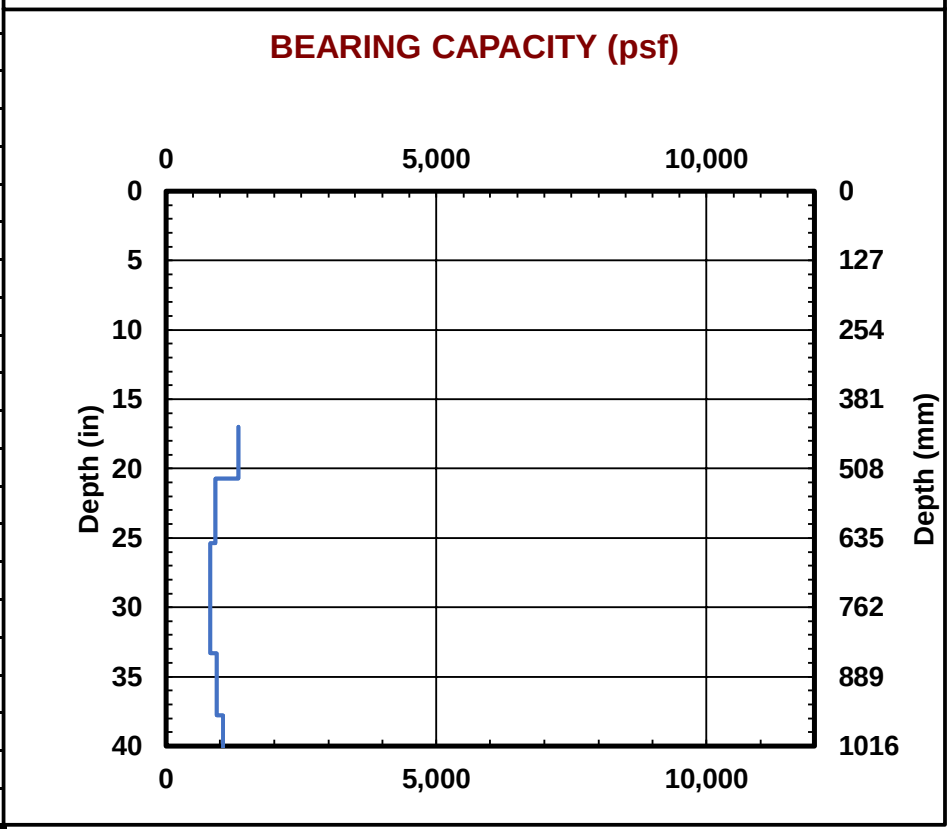


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-19	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	17

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	112	0
3	206	94
2	325	213
2	526	414
2	640	528
3	772	660

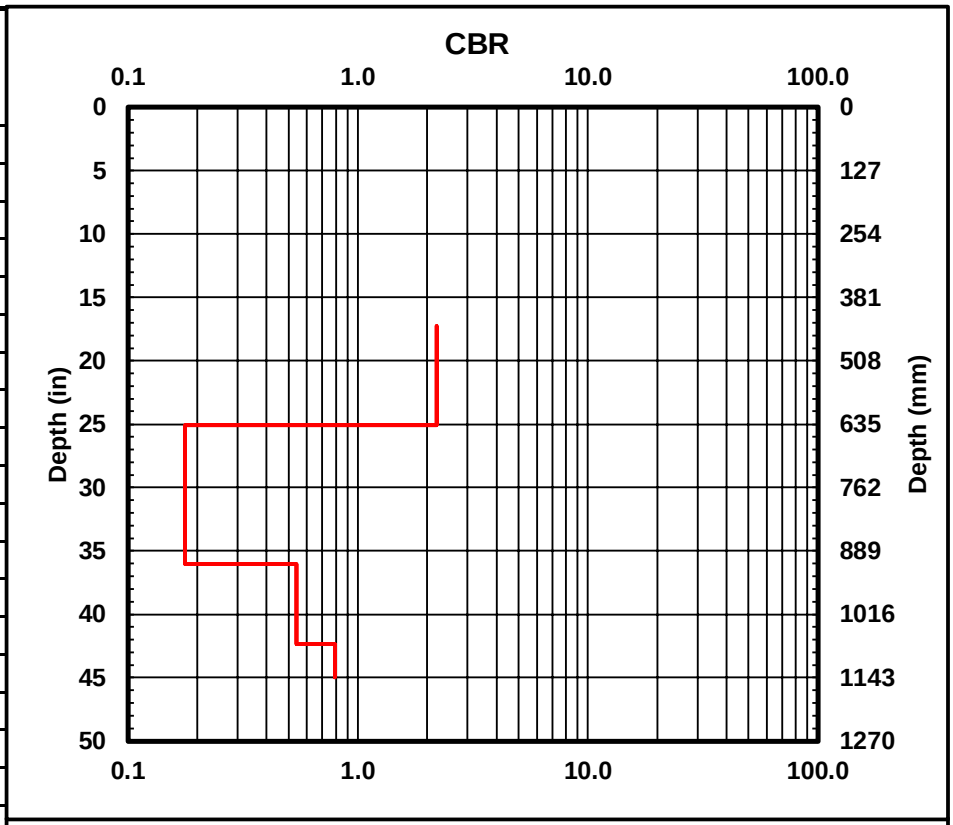


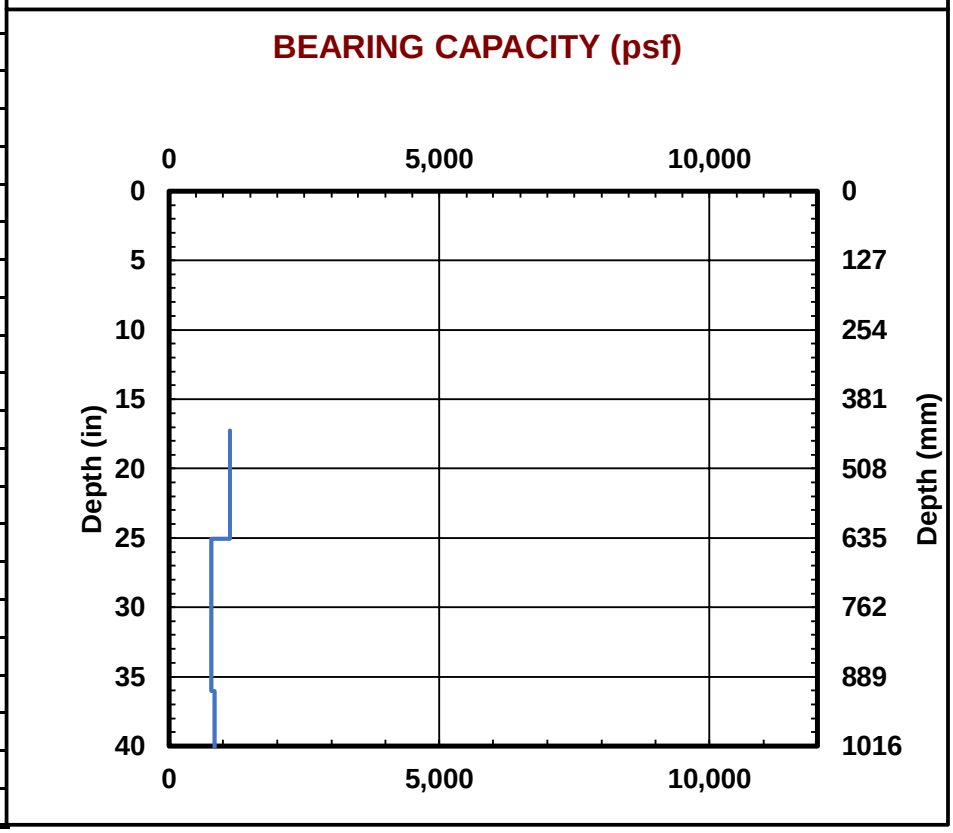


DYNAMIC CONE PENETROMETER RESULTS

Project:	65225198	Hammer Type:	Dual Mass (17.6 lbs)
Location:	B-20	Subgrade Soil Type:	CL
Date:	8/8/2022	PCC Thickness (in):	17 1/4

No. of Blows	Reading (mm)	Cum. Pen. (mm)
0	117	0
5	315	198
2	594	478
2	754	638
1	820	704



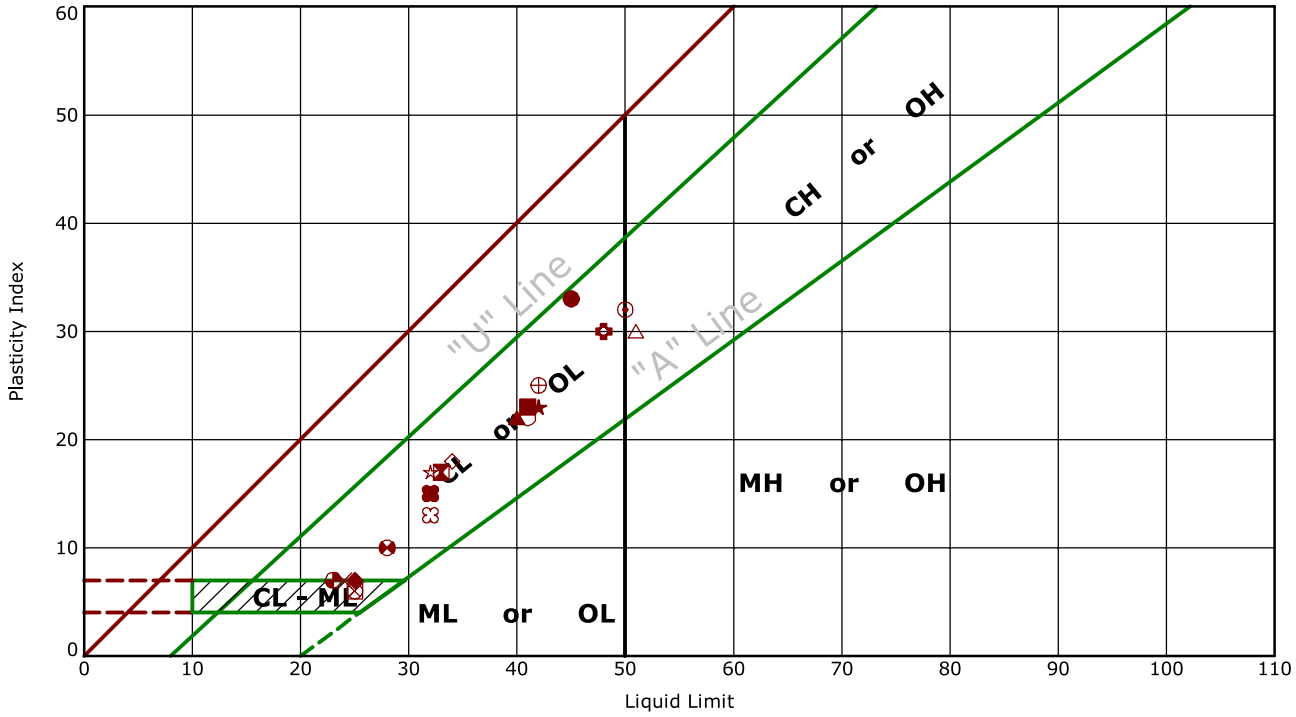


Phoenix-Mesa Gateway Runway 12R-30L
6033 S Sossaman Rd | Mesa, AZ
Reconstruction
Terracon Project No. 65225198

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

Atterberg Limit Results

ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	Blended	0 - 5	45	12	33			
⊠	B-01	2 - 10	33	16	17			
▲	B-02	2 - 10	40	18	22	58.5	CL	SANDY LEAN CLAY
★	B-03	2 - 10	42	19	23			
⊙	B-04	2 - 10	50	18	32	64.2	CH	SANDY FAT CLAY
✿	B-05	2 - 10	48	18	30			
○	B-06	2 - 10	41	19	22	51.1	CL	SANDY LEAN CLAY
△	B-07	2 - 10	51	21	30			
⊗	B-08	2 - 10	25	19	6	39.0	SC-SM	SILTY, CLAYEY SAND
⊕	B-09	2 - 10	42	17	25			
□	B-10	2 - 10	25	19	6	71.7	CL-ML	SILTY CLAY with SAND
⊛	B-11	2 - 10	28	18	10			
◒	B-12	2 - 10	23	16	7	35.4	SC-SM	SILTY, CLAYEY SAND
☆	B-13	2 - 10	32	15	17			
⊠	B-14	2 - 10	32	19	13	82.1	CL	LEAN CLAY with SAND
■	B-15	2 - 10	41	18	23			
◆	B-16	2 - 10	25	18	7	71.7	CL-ML	SILTY CLAY with SAND
◇	B-17	2 - 10	34	16	18			
╳	B-18	2 - 10	24	17	7	63.1	CL-ML	SANDY SILTY CLAY
❀	B-19	2 - 10	32	17	15			

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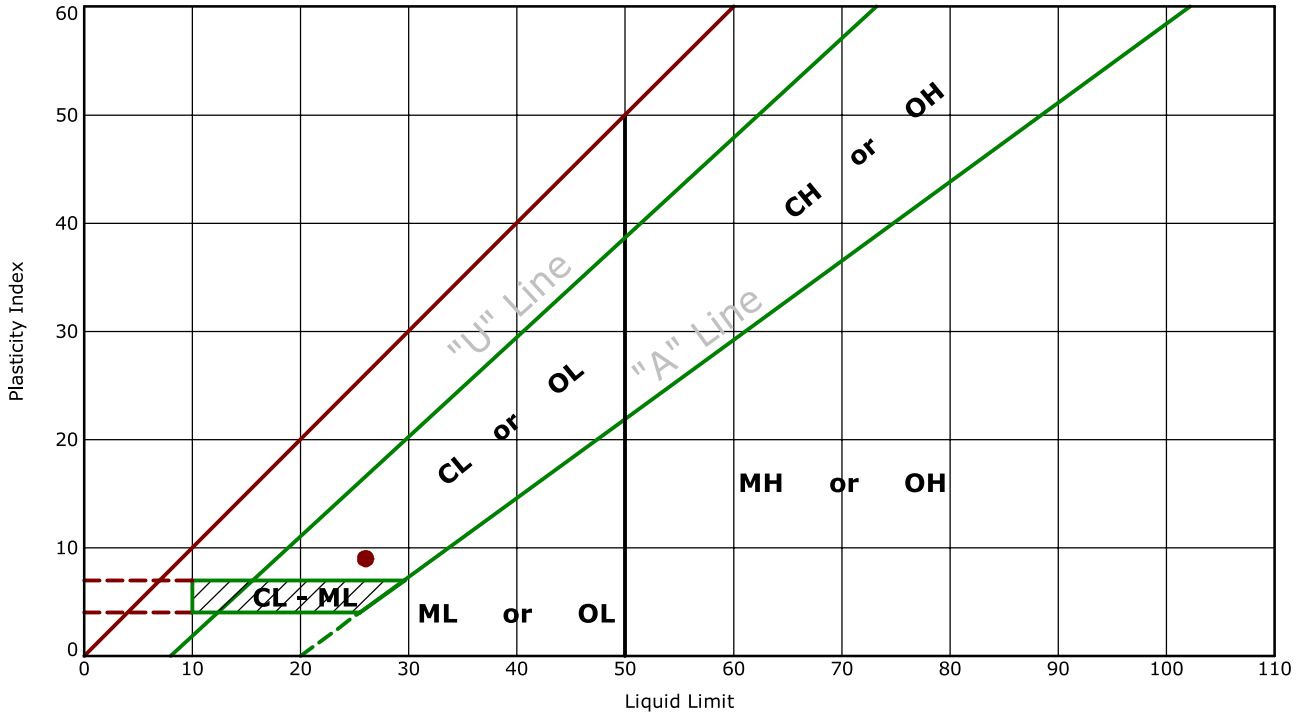
Atterberg Limit Results

ASTM D4318



	Boring ID	Depth (Ft)	LL	PL	PI	Fines	USCS	Description
●	B-20	2 - 10	26	17	9	69.1	CL	SANDY LEAN CLAY

Phoenix-Mesa Gateway Runway 12R-30L
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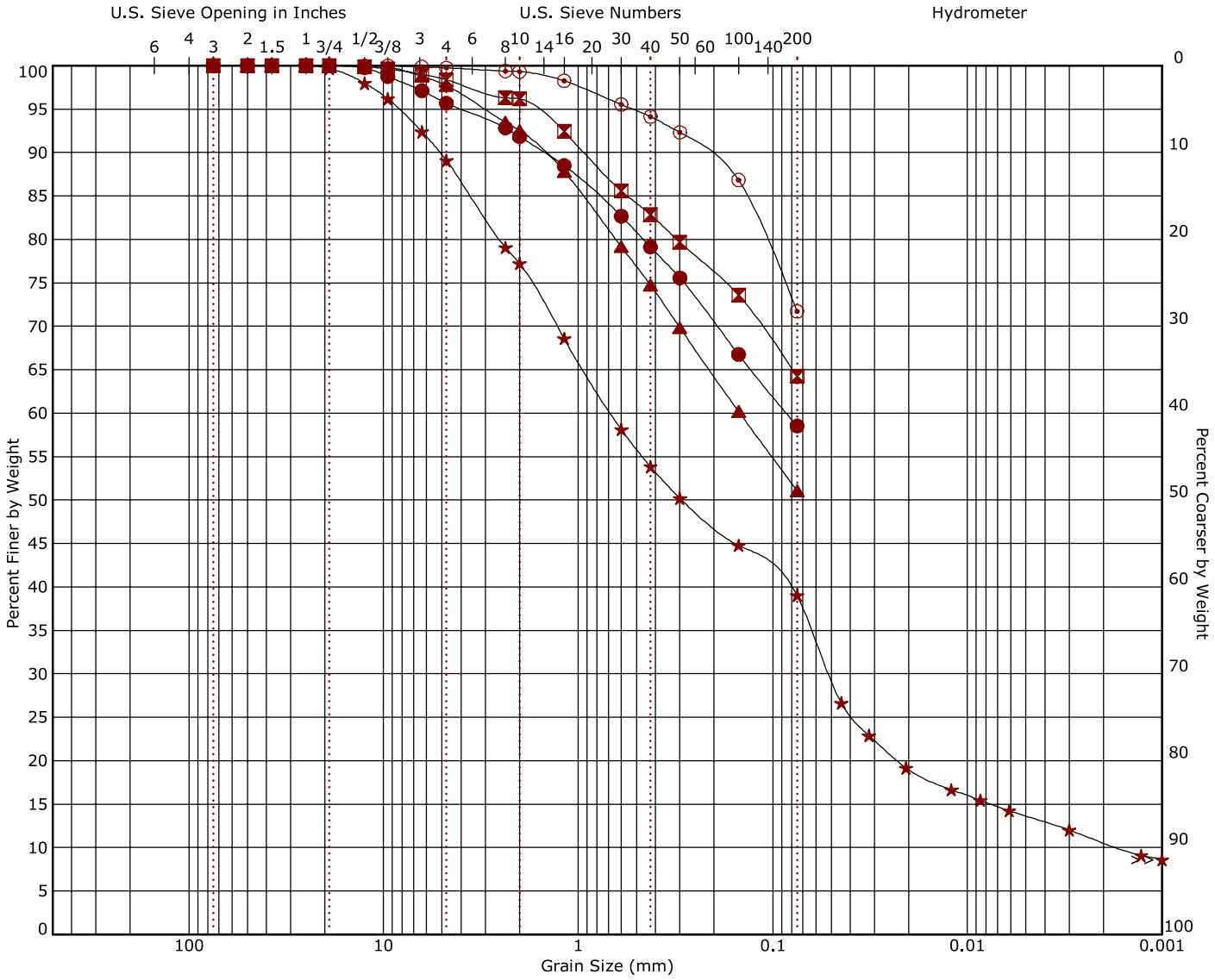
Grain Size Distribution

ASTM D422 / ASTM C136



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	B-02	2 - 10	SANDY LEAN CLAY	CL	40	18	22		
⊠	B-04	2 - 10	SANDY FAT CLAY	CH	50	18	32		
▲	B-06	2 - 10	SANDY LEAN CLAY	CL	41	19	22		
★	B-08	2 - 10	SILTY, CLAYEY SAND	SC-SM	25	19	6	2.33	406.38
⊙	B-10	2 - 10	SILTY CLAY with SAND	CL-ML	25	19	6		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-02	2 - 10	75	0.085			0.0	4.3	37.1	58.5		
⊠	B-04	2 - 10	75				0.0	1.6	34.1	64.2		
▲	B-06	2 - 10	75	0.148			0.0	2.3	46.6	51.1		
★	B-08	2 - 10	75	0.677	0.051	0.002	0.0	10.9	50.1		25.4	13.6
⊙	B-10	2 - 10	75				0.0	0.3	28.0	71.7		

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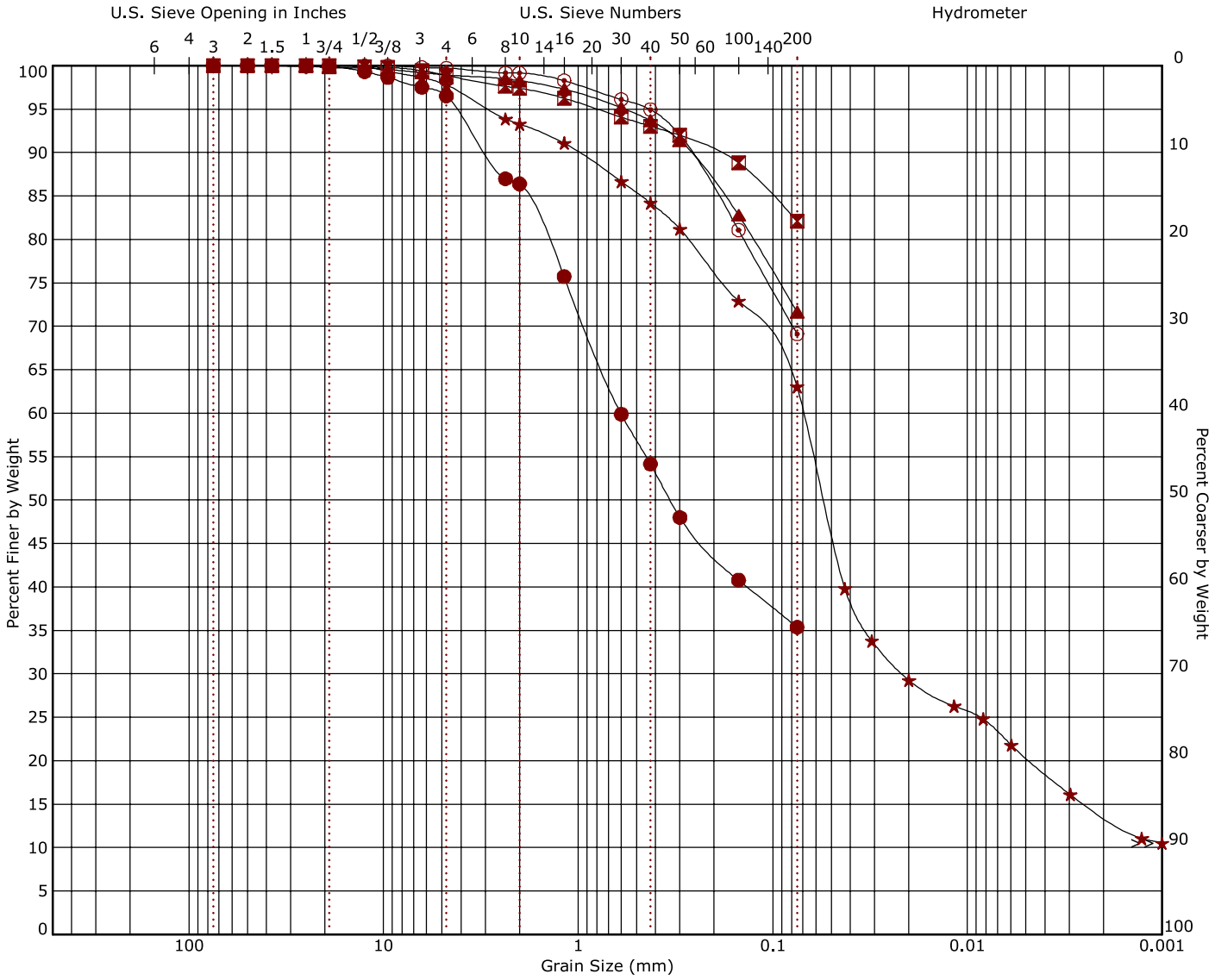
Tempe, AZ

Grain Size Distribution

ASTM D422 / ASTM C136



Cobbles	Gravel		Sand			Silt or Clay
	coarse	fine	coarse	medium	fine	

Boring ID		Depth (Ft)	Description	USCS	LL	PL	PI	Cc	Cu
●	B-12	2 - 10	SILTY, CLAYEY SAND	SC-SM	23	16	7		
⊠	B-14	2 - 10	LEAN CLAY with SAND	CL	32	19	13		
▲	B-16	2 - 10	SILTY CLAY with SAND	CL-ML	25	18	7		
★	B-18	2 - 10	SANDY SILTY CLAY	CL-ML	24	17	7		
⊙	B-20	2 - 10	SANDY LEAN CLAY	CL	26	17	9		

Boring ID		Depth (Ft)	D_{100}	D_{60}	D_{30}	D_{10}	%Cobbles	%Gravel	%Sand	%Fines	%Silt	%Clay
●	B-12	2 - 10	75	0.603			0.0	3.5	61.1	35.4		
⊠	B-14	2 - 10	75				0.0	1.1	16.8	82.1		
▲	B-16	2 - 10	75				0.0	1.1	27.3	71.7		
★	B-18	2 - 10	75	0.07	0.021		0.0	2.2	34.7		42.7	20.4
⊙	B-20	2 - 10	75				0.0	0.3	30.6	69.1		

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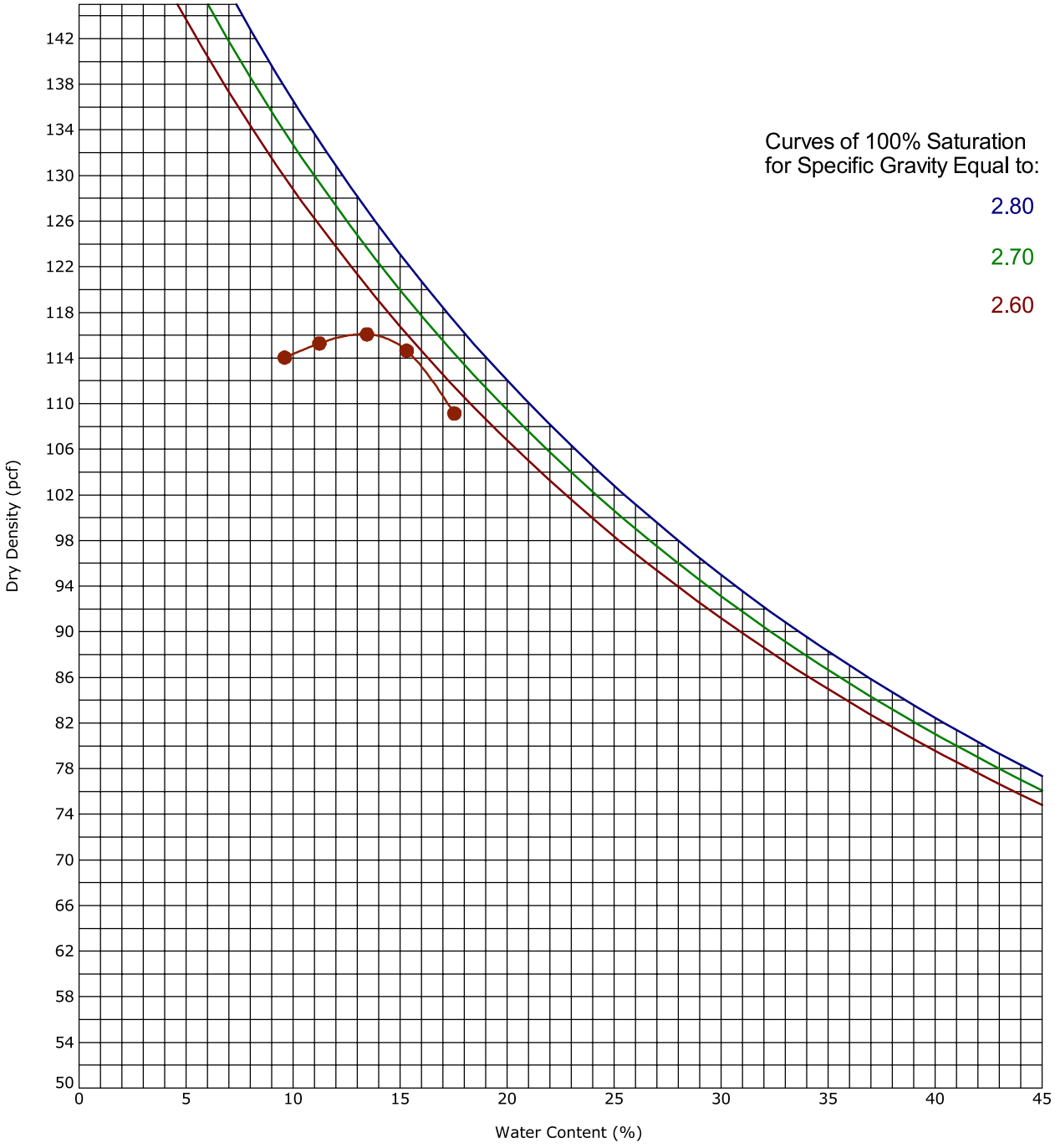
Moisture-Density Relationship

ASTM D698/D1557



Boring ID	Depth (Ft)	Description of Materials
Blended	0 - 5	

Fines (%)	Fraction >19mm size (%)	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
		45	12	33	ASTM D1557 Method C	116.1	13.2

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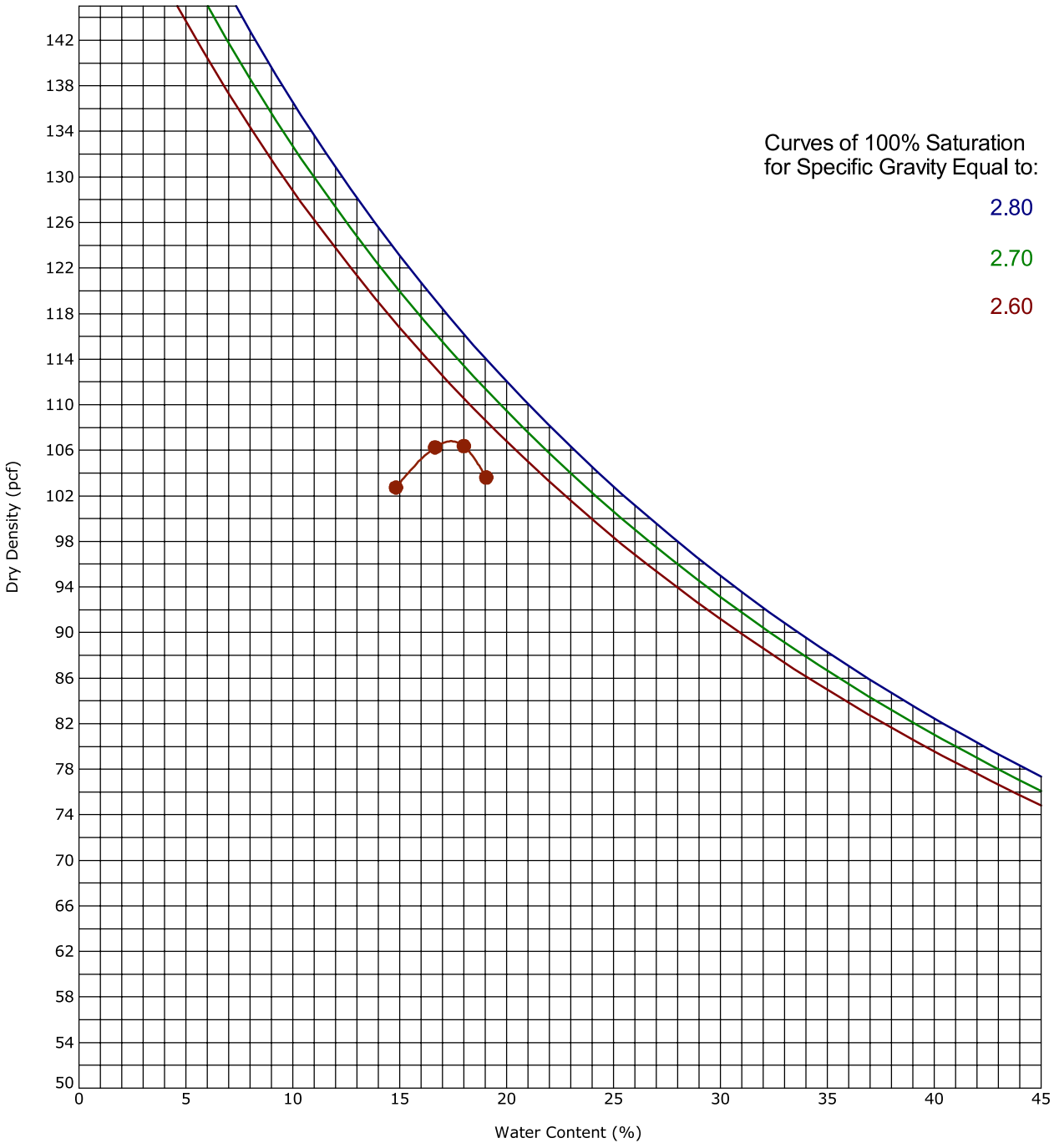
Moisture-Density Relationship

ASTM D698/D1557



Boring ID	Depth (Ft)	Description of Materials
Blended Lime	0 - 0	

Fines (%)	Fraction >19mm size (%)	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
					ASTM D1557 Method C	106.8	17.4

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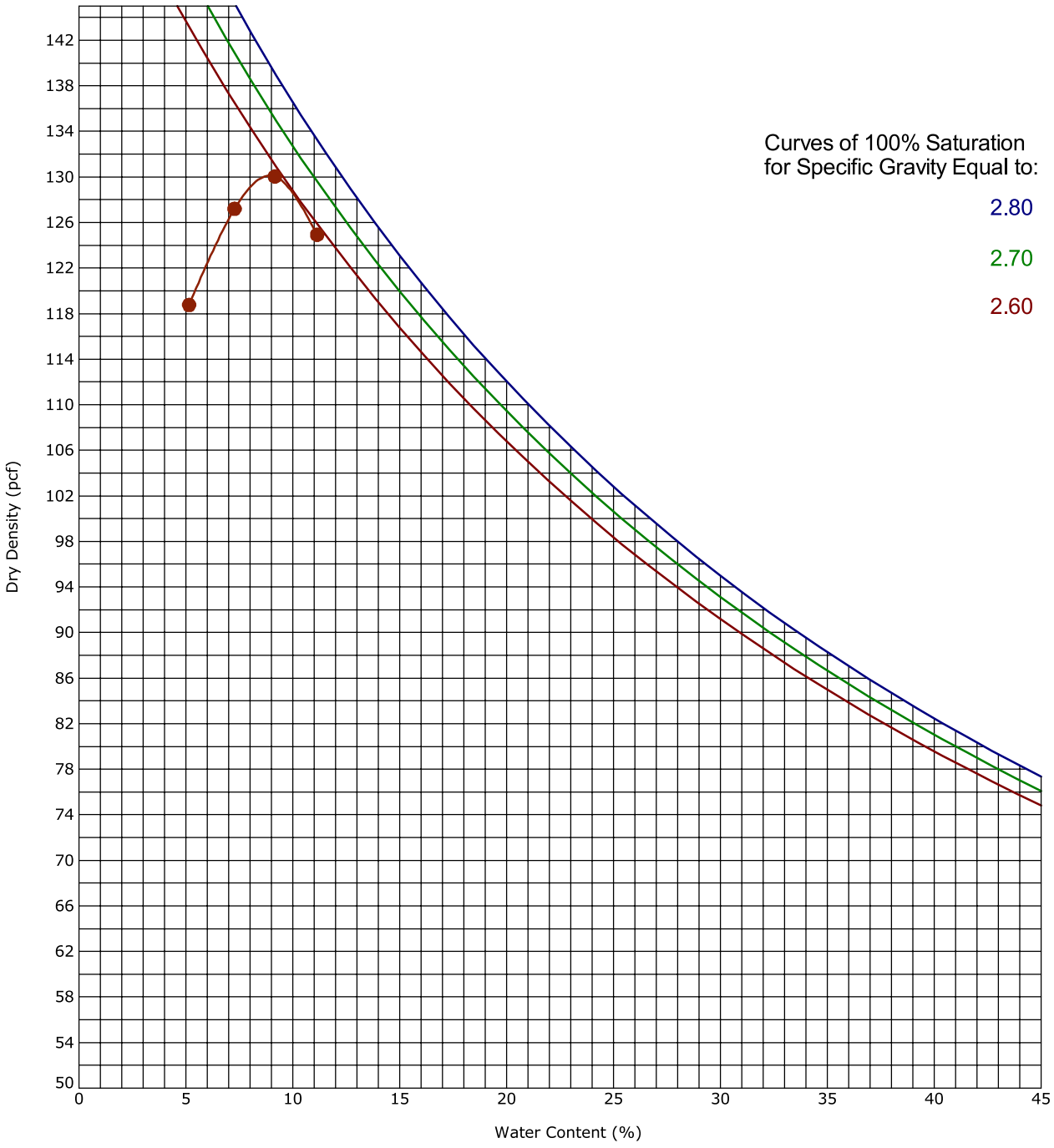
Moisture-Density Relationship

ASTM D698/D1557



Boring ID	Depth (Ft)	Description of Materials
B-08	2 - 10	SILTY, CLAYEY SAND(SC-SM)

Fines (%)	Fraction >19mm size (%)	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
39	61	25	19	6	ASTM D1557 Method C	130.1	9.0

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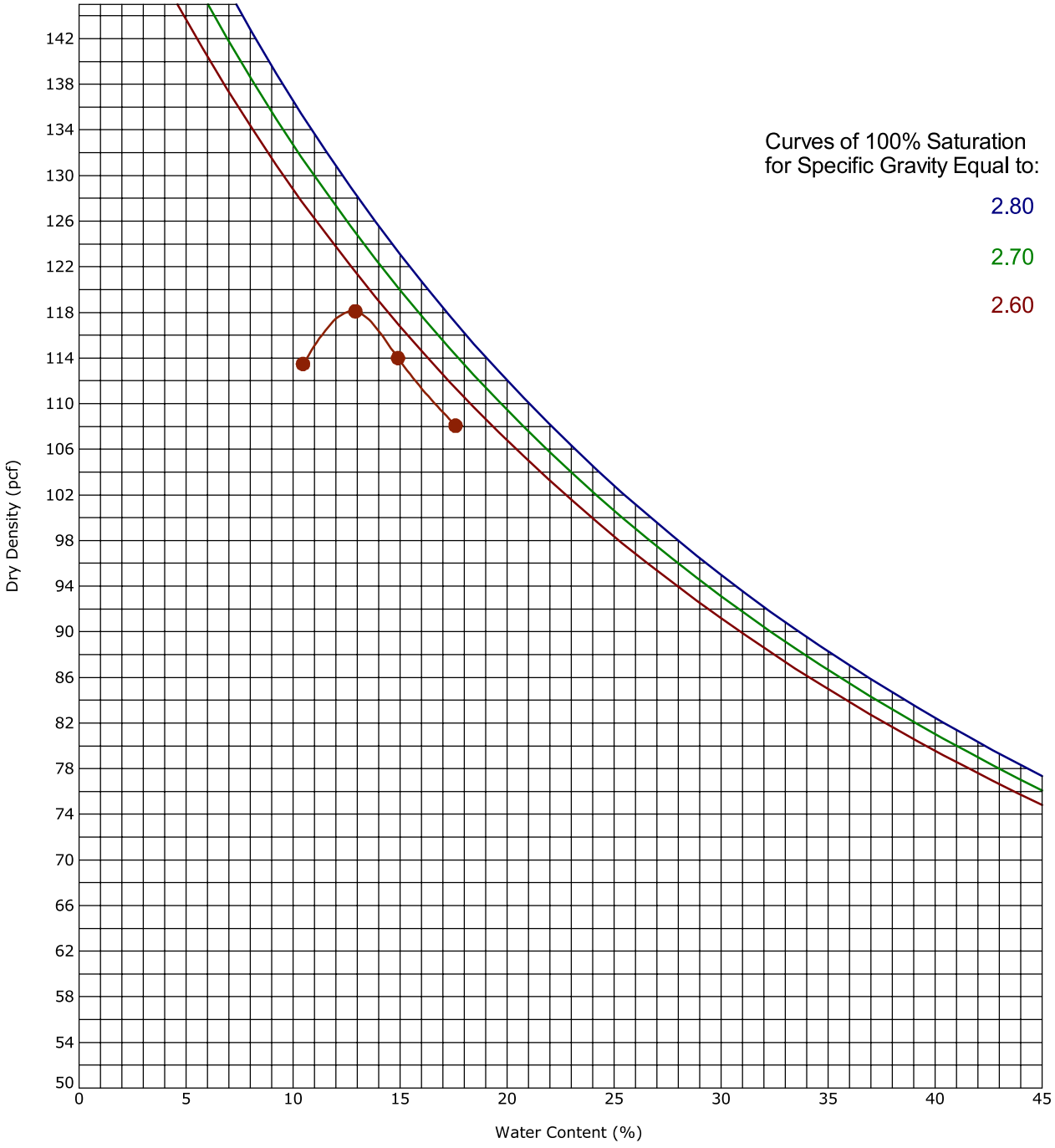
Moisture-Density Relationship

ASTM D698/D1557



Boring ID	Depth (Ft)	Description of Materials
B-18	2 - 10	SANDY SILTY CLAY(CL-ML)

Fines (%)	Fraction >19mm size (%)	LL	PL	PI	Test Method	Maximum Dry Density (pcf)	Optimum Water Content (%)
63	37	24	17	7	ASTM D1557 Method C	118.1	12.8

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Terracon Project No. 65225198

Terracon
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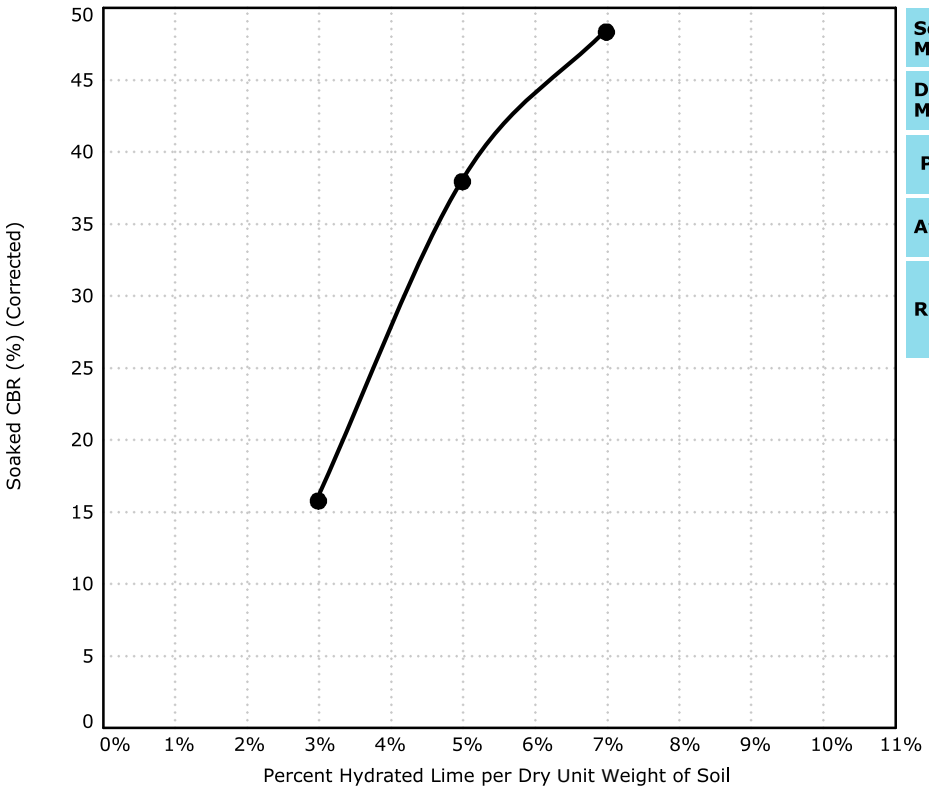
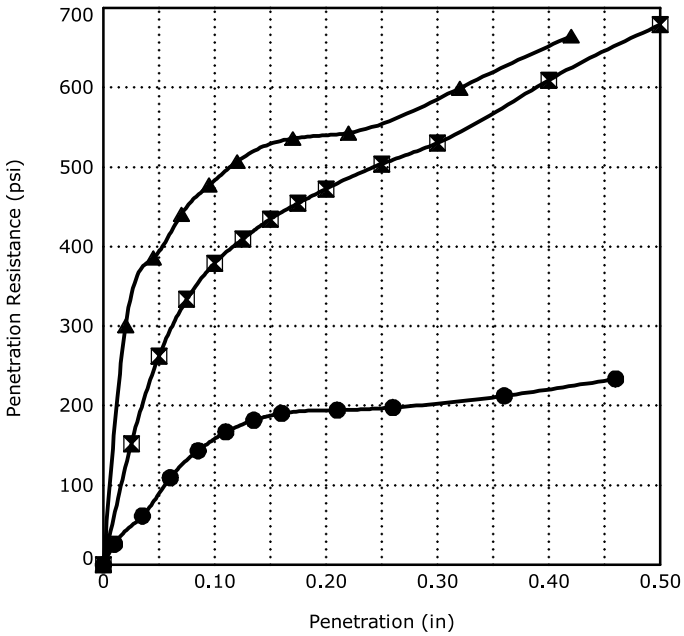
California Bearing Ratio

ASTM D1883-07[2]



Source of Material	Blend of Bulk Samples from Borings B-2 through B-7 from 0 to 5 feet
Description of Material	Lime Treated Clayey Subgrade 3%, 5% and 7% Hydrated Lime
Percent Fines	
Atterberg Limits	LL / NV PL / NP PI / NP
Remarks:	Lime content is percent hydrated lime per dry unit weight of soil



Sample No.	3	5	7
Sample Condition	Soaked		
Compaction Method	ASTM 1557C		
Maximum Dry Density, (pcf)	106.8	106.8	106.8
Optimum Moisture Content, (%)	17.4	17.4	17.4
Dry Density before Soaking, (pcf)	108.50	109.01	108.64
Moisture Content, (%)			
After Compaction			17.5
Top 1" After Soaking			19.6
Surcharge, (lbs)	10.00	10.00	10.00
Swell, (%)	0.44	0.29	3.51
Bearing Ratio, (%)	15.8	37.9	48.3

CBR @ 3% Hydrated Lime	16
CBR @ 5% Hydrated Lime	38
CBR @ 7% Hydrated Lime	48

Phoenix-Mesa Gateway Runway 12R-30L Reconstruction
6033 S Sossaman Rd | Mesa, AZ
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Terracon
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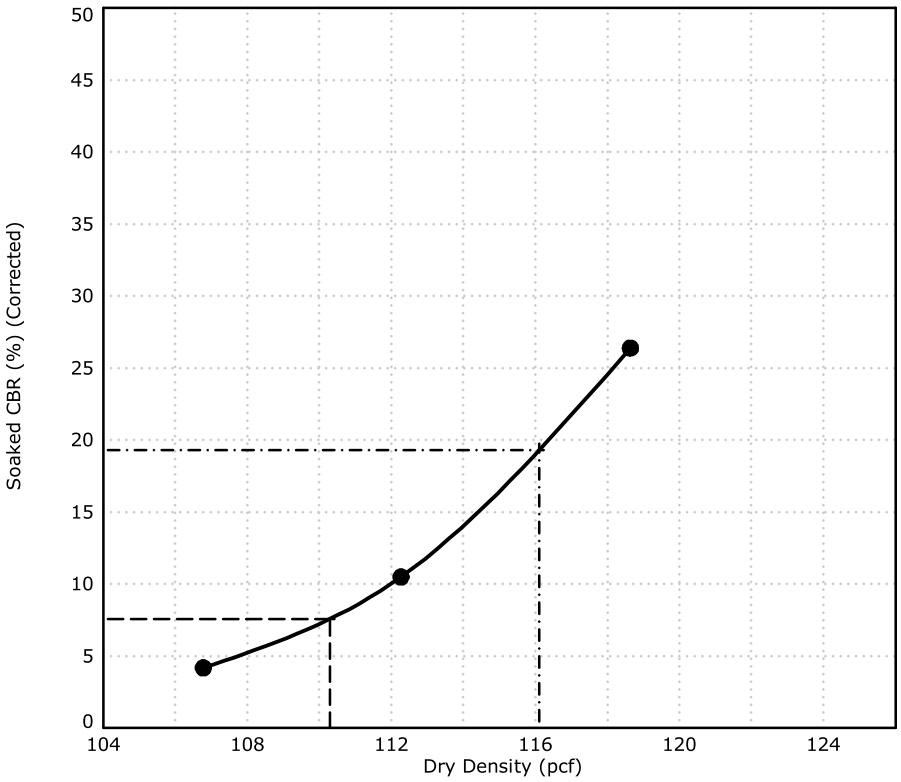
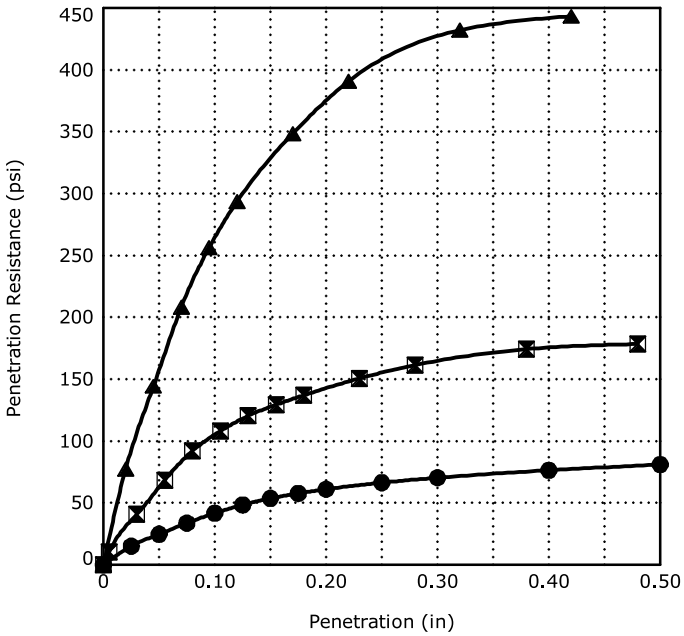
Tempe, AZ

California Bearing Ratio

ASTM D1883-07[2]



Source of Material	Blend of Bulk Samples from Borings B-2 through B-7 from 0 to 5 feet
Description of Material	Generally Sandy Lean to Fat Clay with varying amounts of Sand
Percent Fines	
Atterberg Limits	LL 45 PL 12 PI 33
Remarks:	This sample was not treated with hydrated lime



Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	ASTM 1557C		
Maximum Dry Density, (pcf)	116.1	116.1	116.1
Optimum Moisture Content, (%)	13.2	13.2	13.2
Dry Density before Soaking, (pcf)	106.78	112.27	118.64
Moisture Content, (%)			
After Compaction	12.1	12.7	12.5
Top 1" After Soaking	22	18.2	14.6
Surcharge, (lbs)	10.00	10.00	10.00
Swell, (%)	1.18	2.04	0.66
Bearing Ratio, (%)	4.2	10.5	26.4

Dry Density @ 90% 104.5 pcf
Dry Density @ 95% 110.3 pcf
Dry Density @ 100% 116.1 pcf

CBR @ 90% Density 4.2
CBR @ 95% Density 7.6
CBR @ 100% Density 19.3

Phoenix-Mesa Gateway Runway 12R-30L Reconstruction
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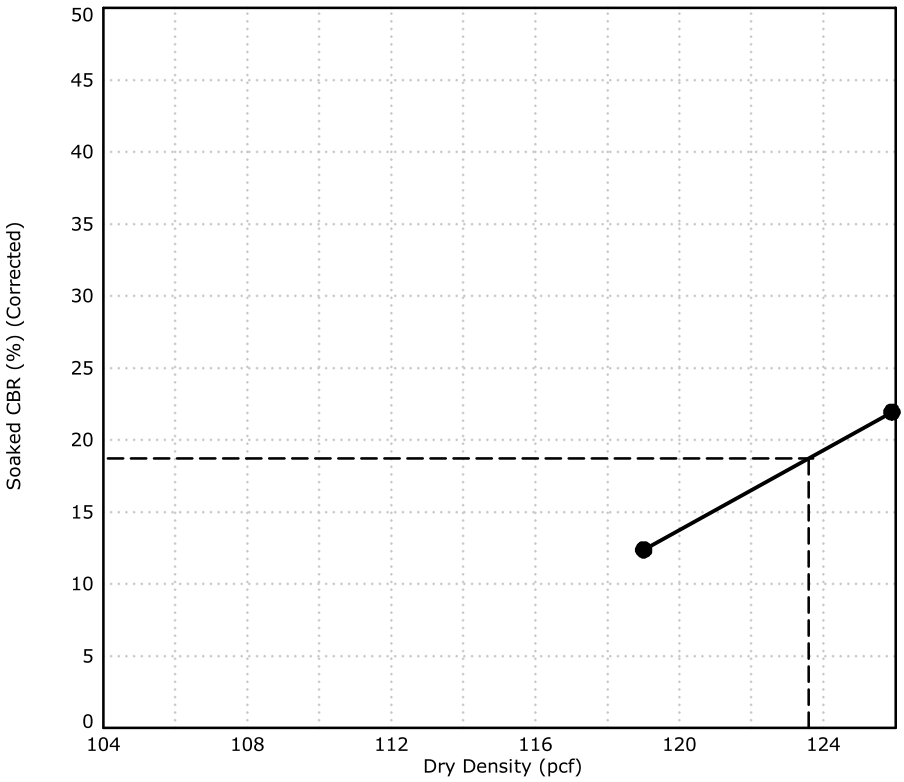
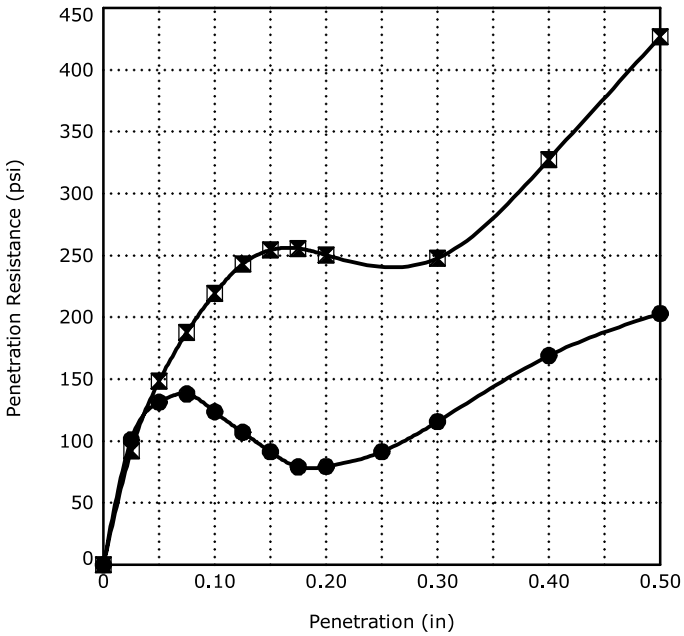
California Bearing Ratio

ASTM D1883-07[2]



Source of Material	B-08 2.0
Description of Material	SILTY, CLAYEY SAND(SC-SM)
Percent Fines	39.0
Atterberg Limits	LL 25 / PL 19 / PI 6
Remarks:	



Sample No.	1	2	
Sample Condition	Soaked		
Compaction Method	ASTM 1557C		
Maximum Dry Density, (pcf)	130.1	130.1	
Optimum Moisture Content, (%)	9	9	
Dry Density before Soaking, (pcf)	119.01	125.90	
Moisture Content, (%)			
After Compaction	8.7	8.5	9.9
Top 1" After Soaking	8.8	11.4	9.8
Surcharge, (lbs)	10.00	10.00	
Swell, (%)	0.00	0.00	
Bearing Ratio, (%)	12.4	21.9	

Dry Density @ 90% 117.1 pcf
Dry Density @ 95% 123.6 pcf
Dry Density @ 100% 130.1 pcf

CBR @ 90% Density _____
CBR @ 95% Density 18.7
CBR @ 100% Density _____

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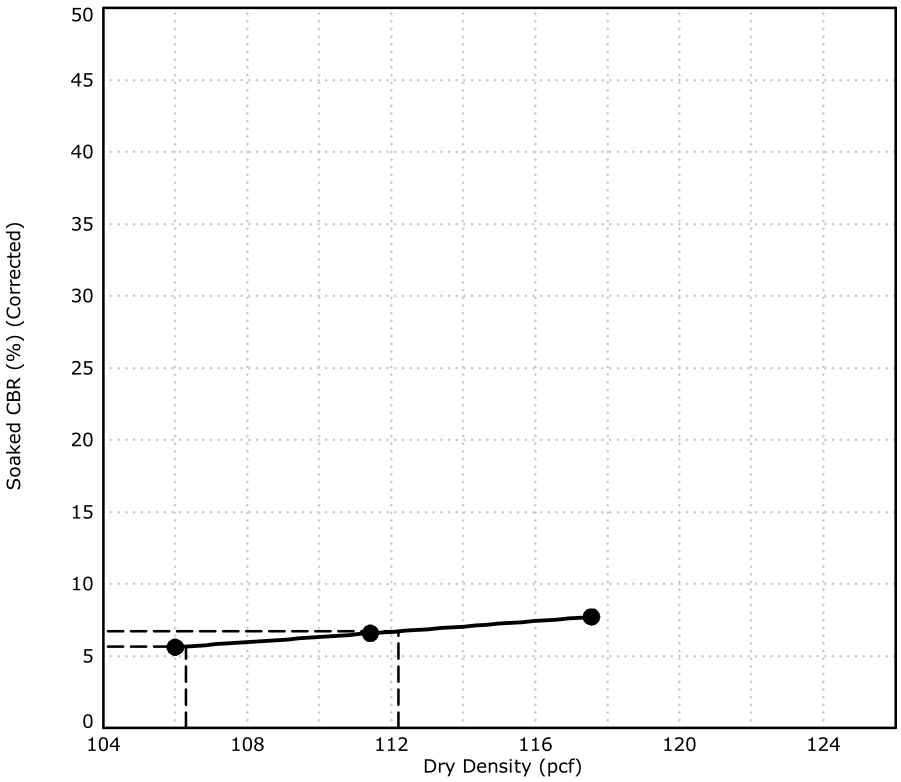
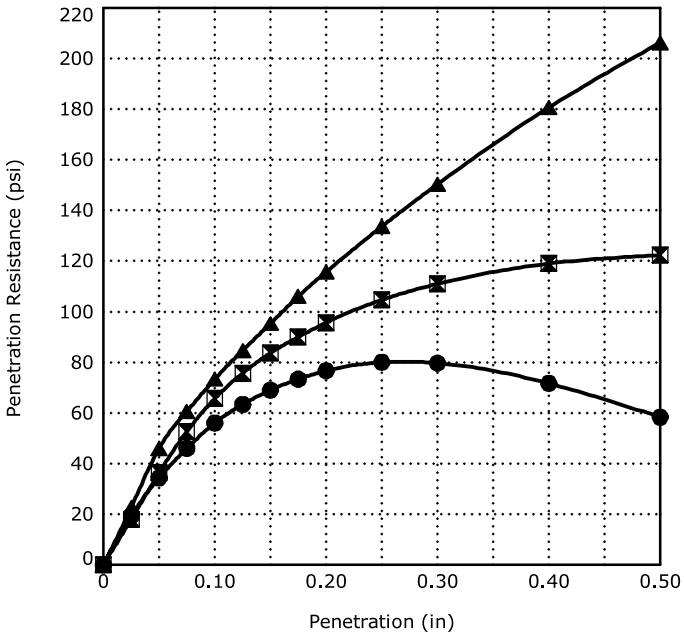
California Bearing Ratio

ASTM D1883-07[2]



Source of Material	B-18 2.0
Description of Material	SANDY SILTY CLAY(CL-ML)
Percent Fines	63.1
Atterberg Limits	LL 24 / PL 17 / PI 7
Remarks:	



Sample No.	1	2	3
Sample Condition	Soaked		
Compaction Method	ASTM 1557C		
Maximum Dry Density, (pcf)	118.1	118.1	118.1
Optimum Moisture Content, (%)	12.8	12.8	12.8
Dry Density before Soaking, (pcf)	106.00	111.42	117.56
Moisture Content, (%)			
After Compaction	14.8	14.9	15.4
Top 1" After Soaking	15.7	15.1	14.8
Surcharge, (lbs)	10.00	10.00	10.00
Swell, (%)	0.00	0.00	0.00
Bearing Ratio, (%)	5.1	6.4	7.7

Dry Density @ 90% 106.3 pcf
Dry Density @ 95% 112.2 pcf
Dry Density @ 100% 118.1 pcf

CBR @ 90% Density 5.7
CBR @ 95% Density 6.7
CBR @ 100% Density 7.7

MOTZZ LABORATORY, INC.

Report: 943864
Reported: 9/28/2022
Received: 9/27/2022
PO: 65225198

Laboratory Analysis Report

Terracon
Kirk Jackson
4685 S. Ash Ave
Suite H4

Project: 65225198

Lab Number	Sample ID
943864-1	B-18 (2-10')

Test Parameter

Test	*Method*	*Result*	*Units*
pH (ARIZ 236e)	ARIZ 236e	9.2	SU
Minimum Resistivity	ARIZ 236e	3154	ohm-cm
Sulfate	ARIZ 733b	2	ppm
Chloride	ARIZ 736b	8	ppm

Lab Number	Sample ID
943864-2	B-8 (2-10')

Test Parameter

Test	*Method*	*Result*	*Units*
pH (ARIZ 236e)	ARIZ 236e	9.3	SU
Minimum Resistivity	ARIZ 236e	3959	ohm-cm
Sulfate	ARIZ 733b	3	ppm
Chloride	ARIZ 736b	5	ppm

MOTZZ LABORATORY, INC.

Report: 944214
Reported: 10/31/2022
Received: 10/26/2022
PO: 65225198

Laboratory Analysis Report

Terracon
Kirk Jackson
4685 S. Ash Ave
Suite H4

Project: 65225198

Lab Number	Sample ID
944214-1	Auger Blend (B-02 - B-07)

Test Parameter

Test	*Method*	*Result*	*Units*
pH (ARIZ 236e)	ARIZ 236e	9.1	SU
Minimum Resistivity	ARIZ 236e	2483	ohm-cm
Sulfate	ARIZ 733b	3	ppm
Chloride	ARIZ 736b	14	ppm

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
Blended	0.0 - 5.0					45	12	33										
B-01	2.0 - 10.0	CL				33	16	17										
B-01	2.0 - 3.0	CL	110	16														1, 2
B-01	5.0 - 6.0	CL	112	16														1, 2
B-01	10.0 - 11.0	CL	107	8														1, 2
B-02	2.0 - 10.0	CL			59	40	18	22										
B-02	2.0 - 3.0	CL	114	16														1, 2
B-02	5.0 - 6.0	CL	106	18														1, 2
B-02	10.0 - 11.0	CL	110	11														1, 2
B-03	2.0 - 10.0	CL				42	19	23										
B-03	5.0 - 6.0	CL	119	9														1, 2
B-03	10.0 - 11.0	CL	101	9														1, 2
B-04	2.0 - 10.0	CH			64	50	18	32										
B-04	2.0 - 3.0	CH	116	13														1, 2
B-04	5.0 - 6.0	CH	96	17														1, 2
B-04	10.0 - 11.0	CH	101	15														1, 2
B-05	2.0 - 10.0	CL				48	18	30										
B-05	2.0 - 3.0	CL	115	14														1, 2
B-05	5.0 - 6.0	CL	109	12														1, 2
B-05	10.0 - 11.0	CL	103	9														1, 2
B-06	2.0 - 10.0	CL			51	41	19	22										
B-06	2.0 - 3.0	CL	101	19														1, 2
B-06	5.0 - 6.0	CL	114	14														1, 2
B-06	10.0 - 11.0	CL	109	6														1, 2
B-07	2.0 - 10.0	CH				51	21	30										

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: Phoenix-Mesa Gateway Runway 12R-30L Reconstruction

SITE: 6033 S Sossaman Rd
Mesa, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ
PH. 480-897-8200 FAX. 480-897-1133

PROJECT NUMBER: 65225198

CLIENT: Dibble & Associates Consulting Engineers Inc
Denver, CO

EXHIBIT: B-1

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
B-07	2.0 - 3.0	CH	109	16														1, 2
B-07	5.0 - 6.0	CH	109	16														1, 2
B-07	10.0 - 11.0	CH	104	12														1, 2
B-08	2.0 - 10.0	SC-SM			39	25	19	6						9.2	3154	2	8	
B-08	2.0 - 3.0	SC-SM	108	12														1, 2
B-08	5.0 - 6.0	SC-SM	117	9														1, 2
B-08	10.0 - 11.0	SC-SM	94	14														1, 2
B-09	2.0 - 10.0	SC-SM				42	17	25										
B-09	2.0 - 3.0	SC-SM	105	14														1, 2
B-09	5.0 - 6.0	SC-SM	118	16														1, 2
B-09	10.0 - 11.0	SC-SM	98	13														1, 2
B-10	2.0 - 10.0	CL-ML			72	25	19	6										
B-10	2.0 - 3.0	CL-ML	105	16														1, 2
B-10	5.0 - 6.0	CL-ML	106	13														1, 2
B-10	10.0 - 11.0	CL-ML	95	13														1, 2
B-11	2.0 - 10.0	CL-ML				28	18	10										
B-11	2.0 - 3.0	CL-ML	104	13														1, 2
B-11	5.0 - 6.0	CL-ML	111	13														1, 2
B-11	10.0 - 11.0	CL-ML	100	6														1, 2
B-12	2.0 - 10.0	SC-SM			35	23	16	7										
B-12	2.0 - 3.0	SC-SM	106	15														1, 2
B-12	5.0 - 6.0	SC-SM	106	17														1, 2
B-12	10.0 - 11.0	SC-SM	104	14														1, 2
B-13	2.0 - 10.0	CL				32	15	17										
B-13	2.0 - 3.0	CL	96	21														1, 2

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: Phoenix-Mesa Gateway Runway 12R-30L Reconstruction

SITE: 6033 S Sossaman Rd
Mesa, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ
PH. 480-897-8200 FAX. 480-897-1133

PROJECT NUMBER: 65225198

CLIENT: Dibble & Associates Consulting Engineers Inc
Denver, CO

EXHIBIT: B-2

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
B-13	5.0 - 6.0	CL	96	21														1, 2
B-13	10.0 - 11.0	CL	114	9														1, 2
B-14	2.0 - 10.0	CL			82	32	19	13										
B-14	2.0 - 3.0	CL	104	18														1, 2
B-14	5.0 - 6.0	CL	113	12														1, 2
B-14	10.0 - 11.0	CL	106	11														1, 2
B-15	2.0 - 10.0	CL				41	18	23										
B-15	2.0 - 3.0	CL	99	21														1, 2
B-15	5.0 - 6.0	CL	105	15														1, 2
B-15	10.0 - 11.0	CL	103	11														1, 2
B-16	2.0 - 10.0	CL-ML			72	25	18	7										
B-16	2.0 - 3.0	CL-ML	92	25														1, 2
B-16	5.0 - 6.0	CL-ML	115	12														1, 2
B-16	10.0 - 11.0	CL-ML	97	15														1, 2
B-17	2.0 - 10.0	CL				34	16	18										
B-17	2.0 - 3.0	CL	97	21														1, 2
B-17	5.0 - 6.0	CL	112	14														1, 2
B-17	10.0 - 11.0	CL	105	12														1, 2
B-18	2.0 - 10.0	CL-ML			63	24	17	7						9.3	3959	3	5	
B-18	2.0 - 3.0	CL-ML	92	25														1, 2
B-18	5.0 - 6.0	CL-ML	119	13														1, 2
B-18	10.0 - 11.0	CL-ML	98	12														1, 2
B-19	2.0 - 10.0	CL				32	17	15										
B-19	2.0 - 3.0	CL	109	13														1, 2
B-19	5.0 - 6.0	CL	111	14														1, 2

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: Phoenix-Mesa Gateway Runway 12R-30L Reconstruction

SITE: 6033 S Sossaman Rd
Mesa, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ
PH. 480-897-8200 FAX. 480-897-1133

PROJECT NUMBER: 65225198

CLIENT: Dibble & Associates Consulting Engineers Inc
Denver, CO

EXHIBIT: B-3

SUMMARY OF LABORATORY RESULTS

Borehole No.	Depth (ft.)	USCS Soil Class.	In-Situ Properties		Classification				Expansion Testing					Corrosivity				Remarks
			Dry Density (pcf)	Water Content (%)	Passing #200 Sieve (%)	Atterberg Limits			Dry Density (pcf)	Water Content (%)	Surcharge (psf)	Expansion (%)	Expansion Index EI_{50}	pH	Resistivity (ohm-cm)	Sulfates (ppm)	Chlorides (ppm)	
						LL	PL	PI										
B-19	10.0 - 11.0	CL	96	14														1, 2
B-20	2.0 - 10.0	CL			69	26	17	9										
B-20	2.0 - 3.0	CL	101	12														1, 2
B-20	5.0 - 6.0	CL	101	12														1, 2
B-20	10.0 - 11.0	CL	102	11														1, 2

REMARKS

1. Dry Density and/or moisture determined from one or more rings of a multi-ring sample.
2. Visual Classification.
3. Submerged to approximate saturation.
4. Expansion Index in accordance with ASTM D4829-95.
5. Air-Dried Sample

PROJECT: Phoenix-Mesa Gateway Runway 12R-30L Reconstruction

SITE: 6033 S Sossaman Rd
Mesa, AZ

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ
PH. 480-897-8200 FAX. 480-897-1133

PROJECT NUMBER: 65225198

CLIENT: Dibble & Associates Consulting Engineers Inc
Denver, CO

EXHIBIT: B-4

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

Terracon
4685 S Ash Ave, Ste H-4
Tempe, AZ

General Notes

Sampling	Water Level	Field Tests
 Auger Cuttings Ring Sampler	Water Initially Encountered Water Level After a Specified Period of Time Water Level After a Specified Period of Time Cave In Encountered Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	N Standard Penetration Test Resistance (Blows/Ft.) (HP) Hand Penetrometer (T) Torvane (DCP) Dynamic Cone Penetrometer UC Unconfined Compressive Strength (PID) Photo-Ionization Detector (OVA) Organic Vapor Analyzer

Descriptive Soil Classicification

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

Location And Elevation Notes

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

Strength Terms

Relative Density of Coarse-Grained Soils (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance			Consistency of Fine-Grained Soils (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance			
Relative Density	**Standard Penetration or N-Value (Blows/Ft.)**	**Ring Sampler (Blows/Ft.)**	**Consistency**	**Unconfined Compressive Strength Qu (tsf)**	**Standard Penetration or N-Value (Blows/Ft.)**	**Ring Sampler (Blows/Ft.)**
Very Loose	0 - 3	0 - 5	Very Soft	less than 0.25	0 - 1	< 3
Loose	4 - 9	6 - 14	Soft	0.25 to 0.50	2 - 4	3 - 5
Medium Dense	10 - 29	15 - 46	Medium Stiff	0.50 to 1.00	4 - 8	6 - 10
Dense	30 - 50	47 - 79	Stiff	1.00 to 2.00	8 - 15	11 - 18
Very Dense	> 50	> 80	Very Stiff	2.00 to 4.00	15 - 30	19 - 36
			Hard	> 4.00	> 30	> 36

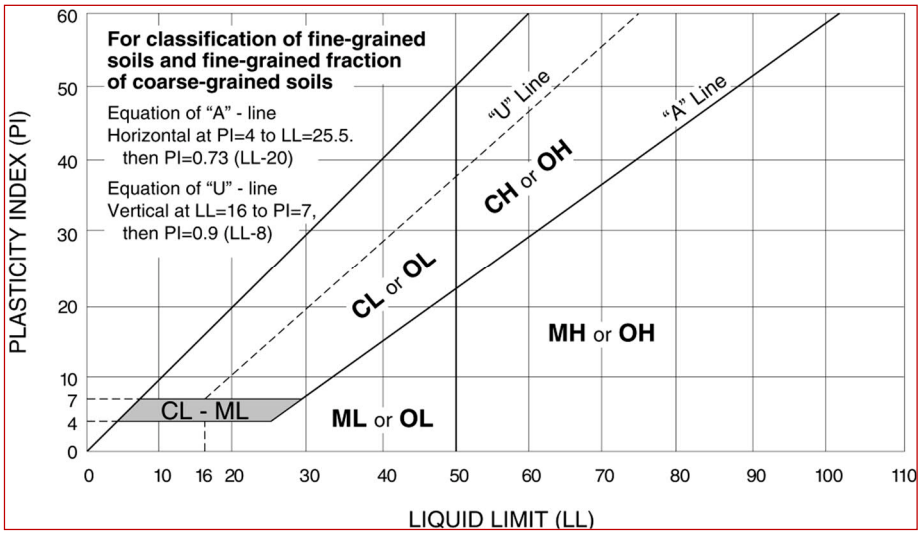
Relevance of Exploration and Laboratory Test Results

Exploration/field results and/or laboratory test data contained within this document are intended for application to the project as described in this document. Use of such exploration/field results and/or laboratory test data should not be used independently of this document.

Unified Soil Classification System

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]				Soil Classification	
				Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 4 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	Cu≥4 and 1≤Cc≤3 [E]	GW	Well-graded gravel [F]
			Cu<4 and/or [Cc<1 or Cc>3.0] [E]	GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH	GM	Silty gravel [F, G, H]
			Fines classify as CL or CH	GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	Cu≥6 and 1≤Cc≤3 [E]	SW	Well-graded sand [I]
			Cu<6 and/or [Cc<1 or Cc>3.0] [E]	SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH	SM	Silty sand [G, H, I]
			Fines classify as CL or CH	SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots above "A" line [J]	CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]	ML	Silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OL	Organic clay [K, L, M, N]
					Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line	CH	Fat clay [K, L, M]
			PI plots below "A" line	MH	Elastic silt [K, L, M]
		Organic:	$\frac{LL\ oven\ dried}{LL\ not\ dried} < 0.75$	OH	Organic clay [K, L, M, P]
					Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor			PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.
[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.
[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.
[E] $Cu = D_{60}/D_{10}$ $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
[F] If soil contains ≥ 15% sand, add "with sand" to group name.
[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H] If fines are organic, add "with organic fines" to group name.
[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.
[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.
[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.
[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N] PI ≥ 4 and plots on or above "A" line.
[O] PI < 4 or plots below "A" line.
[P] PI plots on or above "A" line.
[Q] PI plots below "A" line.



Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on CTB on LTSG

Analysis Type: New Rigid

Last Run: Thickness Design 2022-11-08 16:07:30

Design Life = 20 Years

Total thickness to the top of the subgrade = 21.2in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-501 PCC Surface	15.2	4000000	0.15	650.0
2	P-304 Cement Treated Base	6.0	500000	0.2	0
3	Subgrade	0	19556	0.4	0

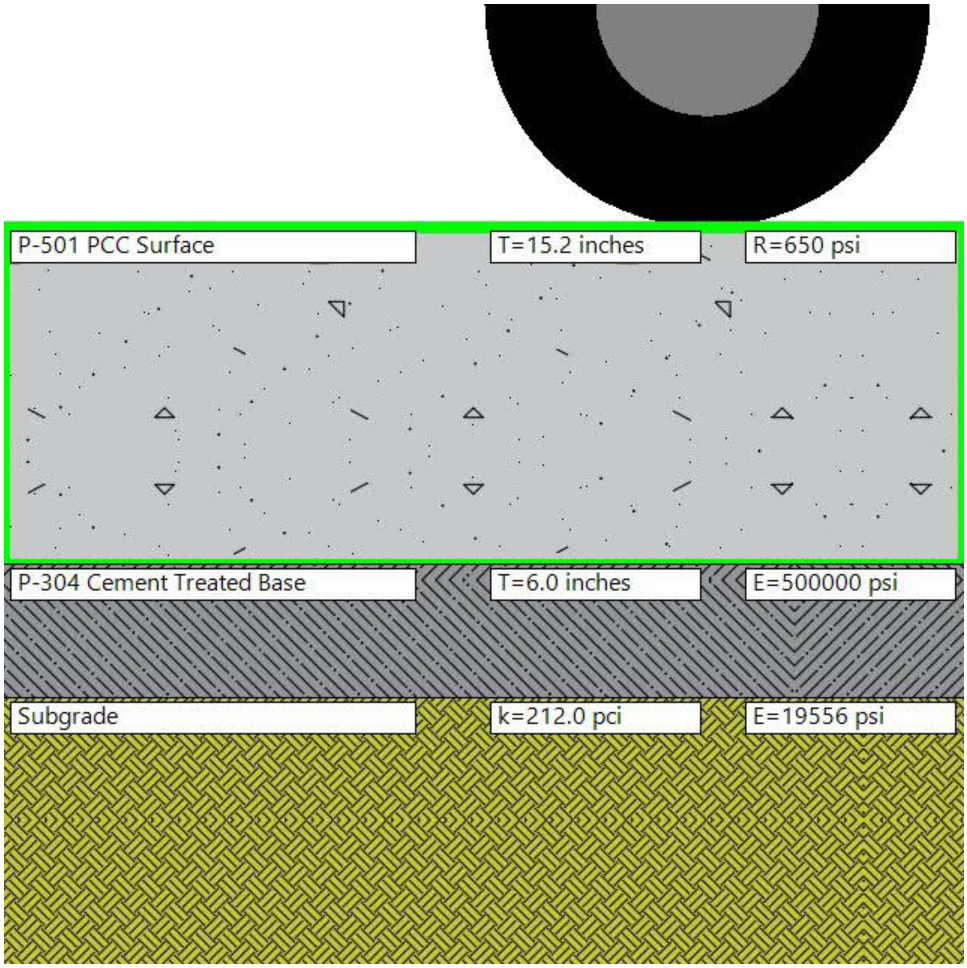
Airplane Information

No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	A319-100 std	168653	2555	0
2	A320-200 opt	171961	7665	0
3	B767-300	412000	500	0
4	B737-800	174200	624	0
5	B747-400	875000	208	0
6	B747-400 Belly	875000	208	0
7	Cessna 172 Skyhawk	2550	90000	0
8	Beechcraft King Air C90	11800	90000	0
9	Premier 390 (UDA)	12500	10000	0
10	Dassault Falcon 10 (UDA)	16000	300	0
11	Hawker-800/800XP	28000	25000	0
12	Dassault Falcon 900B/C	41000	15000	0
13	Learjet 35/36/35A/36A	18000	25000	0
14	Bombardier CL-604/605	43000	12000	0
15	ERJ-135	25265	5000	0
16	Global Express (UDA)	99500	5000	0
17	LearJet 60 (UDA)	23500	100	0
18	Gulfstream-G-IV	72000	5300	0
19	Gulfstream G-V/G500/G550	90500	200	0
20	F-16C	37500	100	0
21	C-130	155000	150	0
22	C-17A	580000	25	0

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	A319-100 std	0.12	0.12	3.68
2	A320-200 opt	0.59	0.59	3.67
3	B767-300	0.15	0.20	3.86
4	B737-800	0.06	0.10	3.53
5	B747-400	0.05	0.21	3.47
6	B747-400 Belly	0.03	0.21	3.47
7	Cessna 172 Skyhawk	0.00	0.00	8.68
8	Beechcraft King Air C90	0.00	0.00	4.81
9	Premier 390 (UDA)	0.00	0.00	4.81
10	Dassault Falcon 10 (UDA)	0.00	0.00	4.81
11	Hawker-800/800XP	0.00	0.00	6.29
12	Dassault Falcon 900B/C	0.00	0.00	5.12
13	Learjet 35/36/35A/36A	0.00	0.00	8.68
14	Bombardier CL-604/605	0.00	0.00	4.99
15	ERJ-135	0.00	0.00	5.19
16	Global Express (UDA)	0.00	0.00	5.19
17	LearJet 60 (UDA)	0.00	0.00	5.19
18	Gulfstream-G-IV	0.00	0.00	4.53
19	Gulfstream G-V/G500/G550	0.00	0.00	4.23
20	F-16C	0.00	0.00	4.44
21	C-130	0.00	0.00	4.67
22	C-17A	0.00	0.00	1.31

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=15.2 inches
R=650 psi
P-304 Cement Treated Base
T=6.0 inches
E=500000 psi
Subgrade
k=212.0 pci
E=19556 psi

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on Lean Concrete

Analysis Type: New Rigid

Last Run: Thickness Design 2022-11-08 16:32:29

Design Life = 20 Years

Total thickness to the top of the subgrade = 21.0in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-501 PCC Surface	15.0	4000000	0.15	650.0
2	P-306 Lean Concrete	6.0	700000	0.2	0
3	Subgrade	0	19556	0.4	0

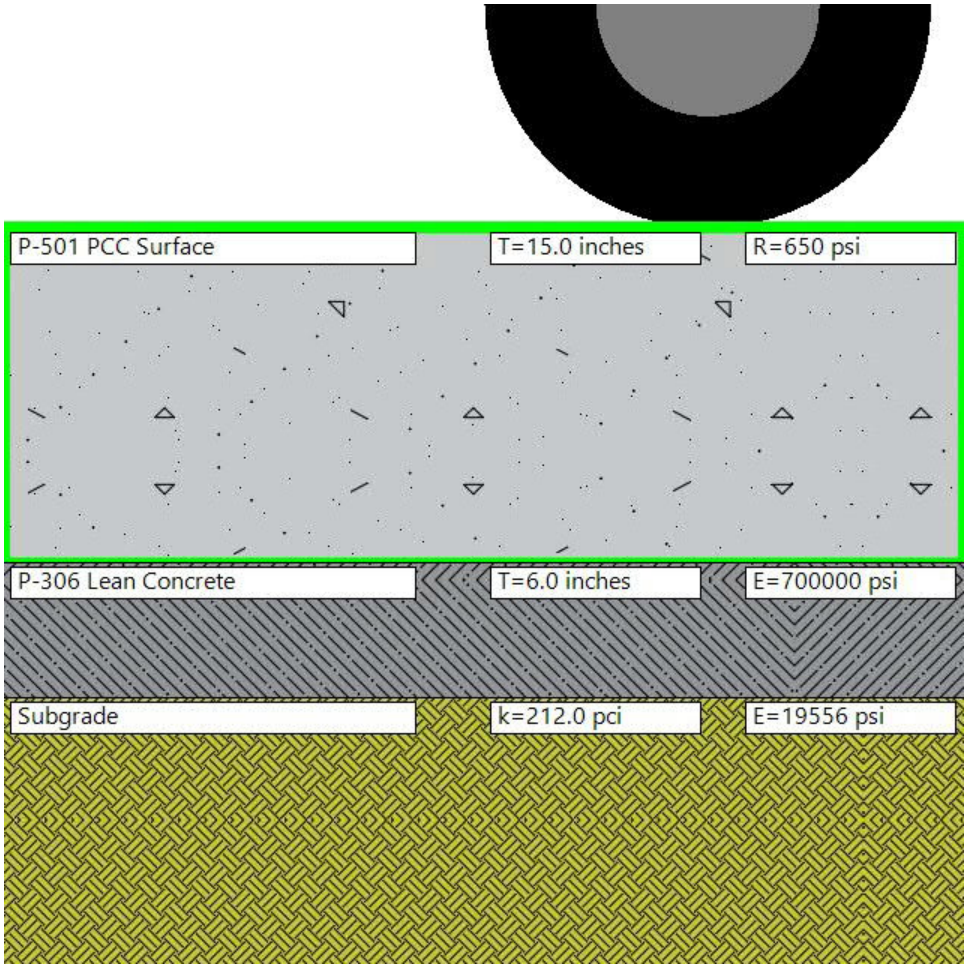
Airplane Information

No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	A319-100 std	168653	2555	0
2	A320-200 opt	171961	7665	0
3	B767-300	412000	500	0
4	B737-800	174200	624	0
5	B747-400	875000	208	0
6	B747-400 Belly	875000	208	0
7	Cessna 172 Skyhawk	2550	90000	0
8	Beechcraft King Air C90	11800	90000	0
9	Premier 390 (UDA)	12500	10000	0
10	Dassault Falcon 10 (UDA)	16000	300	0
11	Hawker-800/800XP	28000	25000	0
12	Dassault Falcon 900B/C	41000	15000	0
13	Learjet 35/36/35A/36A	18000	25000	0
14	Bombardier CL-604/605	43000	12000	0
15	ERJ-135	25265	5000	0
16	Global Express (UDA)	99500	5000	0
17	LearJet 60 (UDA)	23500	100	0
18	Gulfstream-G-IV	72000	5300	0
19	Gulfstream G-V/G500/G550	90500	200	0
20	F-16C	37500	100	0
21	C-130	155000	150	0
22	C-17A	580000	25	0

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	A319-100 std	0.11	0.11	3.68
2	A320-200 opt	0.55	0.57	3.67
3	B767-300	0.19	0.22	3.86
4	B737-800	0.04	0.09	3.53
5	B747-400	0.09	0.23	3.47
6	B747-400 Belly	0.02	0.23	3.47
7	Cessna 172 Skyhawk	0.00	0.00	8.68
8	Beechcraft King Air C90	0.00	0.00	4.81
9	Premier 390 (UDA)	0.00	0.00	4.81
10	Dassault Falcon 10 (UDA)	0.00	0.00	4.81
11	Hawker-800/800XP	0.00	0.00	6.29
12	Dassault Falcon 900B/C	0.00	0.00	5.12
13	Learjet 35/36/35A/36A	0.00	0.00	8.68
14	Bombardier CL-604/605	0.00	0.00	4.99
15	ERJ-135	0.00	0.00	5.19
16	Global Express (UDA)	0.00	0.00	5.19
17	LearJet 60 (UDA)	0.00	0.00	5.19
18	Gulfstream-G-IV	0.00	0.00	4.53
19	Gulfstream G-V/G500/G550	0.00	0.00	4.23
20	F-16C	0.00	0.00	4.44
21	C-130	0.00	0.00	4.67
22	C-17A	0.00	0.00	1.31

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=15.0 inches
R=650 psi
P-306 Lean Concrete
T=6.0 inches
E=700000 psi
Subgrade
k=212.0 pci
E=19556 psi

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on HMA

Analysis Type: New Rigid

Last Run: Thickness Design 2022-11-08 17:52:54

Design Life = 20 Years

Total thickness to the top of the subgrade = 26.2in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-501 PCC Surface	15.2	4000000	0.15	650.0
2	P-401/P-403 HMA Stabilized	5.0	400000	0.35	0
3	P-209 Crushed Aggregate	6.0	49040	0.35	0
4	Subgrade	0	19556	0.4	0

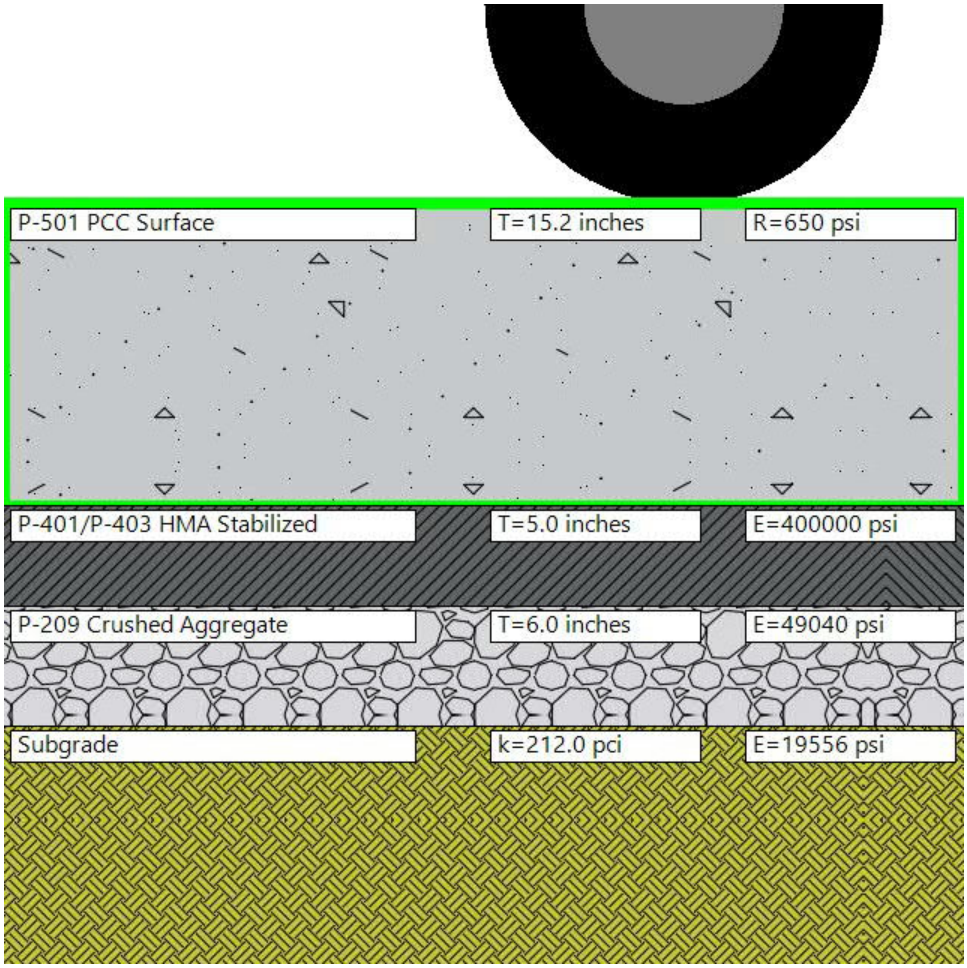
Airplane Information

No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	A319-100 std	168653	2555	0
2	A320-200 opt	171961	7665	0
3	B767-300	412000	500	0
4	B737-800	174200	624	0
5	B747-400	875000	208	0
6	B747-400 Belly	875000	208	0
7	Cessna 172 Skyhawk	2550	90000	0
8	Beechcraft King Air C90	11800	90000	0
9	Premier 390 (UDA)	12500	10000	0
10	Dassault Falcon 10 (UDA)	16000	300	0
11	Hawker-800/800XP	28000	25000	0
12	Dassault Falcon 900B/C	41000	15000	0
13	Learjet 35/36/35A/36A	18000	25000	0
14	Bombardier CL-604/605	43000	12000	0
15	ERJ-135	25265	5000	0
16	Global Express (UDA)	99500	5000	0
17	LearJet 60 (UDA)	23500	100	0
18	Gulfstream-G-IV	72000	5300	0
19	Gulfstream G-V/G500/G550	90500	200	0
20	F-16C	37500	100	0
21	C-130	155000	150	0
22	C-17A	580000	25	0

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	A319-100 std	0.13	0.13	3.68
2	A320-200 opt	0.63	0.63	3.67
3	B767-300	0.11	0.15	3.86
4	B737-800	0.06	0.10	3.53
5	B747-400	0.04	0.17	3.47
6	B747-400 Belly	0.03	0.17	3.47
7	Cessna 172 Skyhawk	0.00	0.00	8.68
8	Beechcraft King Air C90	0.00	0.00	4.81
9	Premier 390 (UDA)	0.00	0.00	4.81
10	Dassault Falcon 10 (UDA)	0.00	0.00	4.81
11	Hawker-800/800XP	0.00	0.00	6.29
12	Dassault Falcon 900B/C	0.00	0.00	5.12
13	Learjet 35/36/35A/36A	0.00	0.00	8.68
14	Bombardier CL-604/605	0.00	0.00	4.99
15	ERJ-135	0.00	0.00	5.19
16	Global Express (UDA)	0.00	0.00	5.19
17	LearJet 60 (UDA)	0.00	0.00	5.19
18	Gulfstream-G-IV	0.00	0.00	4.53
19	Gulfstream G-V/G500/G550	0.00	0.00	4.23
20	F-16C	0.00	0.00	4.44
21	C-130	0.00	0.00	4.67
22	C-17A	0.00	0.00	1.31

User Is responsible For checking frost protection requirements.


P-501 PCC Surface
T=15.2 inches
R=650 psi
P-401/P-403 HMA Stabilized
T=5.0 inches
E=400000 psi
P-209 Crushed Aggregate
T=6.0 inches
E=49040 psi
Subgrade
k=212.0 pci
E=19556 psi

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Flexible Transition 5 year

Analysis Type: New Flexible

Last Run: Thickness Design 2022-11-09 13:36:54

Design Life = 5 Years

Total thickness to the top of the subgrade = 15.5in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-401/P-403 HMA Surface	4.0	200000	0.35	0
2	P-401/P-403 HMA Stabilized	5.5	400000	0.35	0
3	P-304 Cement Treated Base	6.0	500000	0.2	0
4	Subgrade	0	10050	0.35	0

Airplane Information

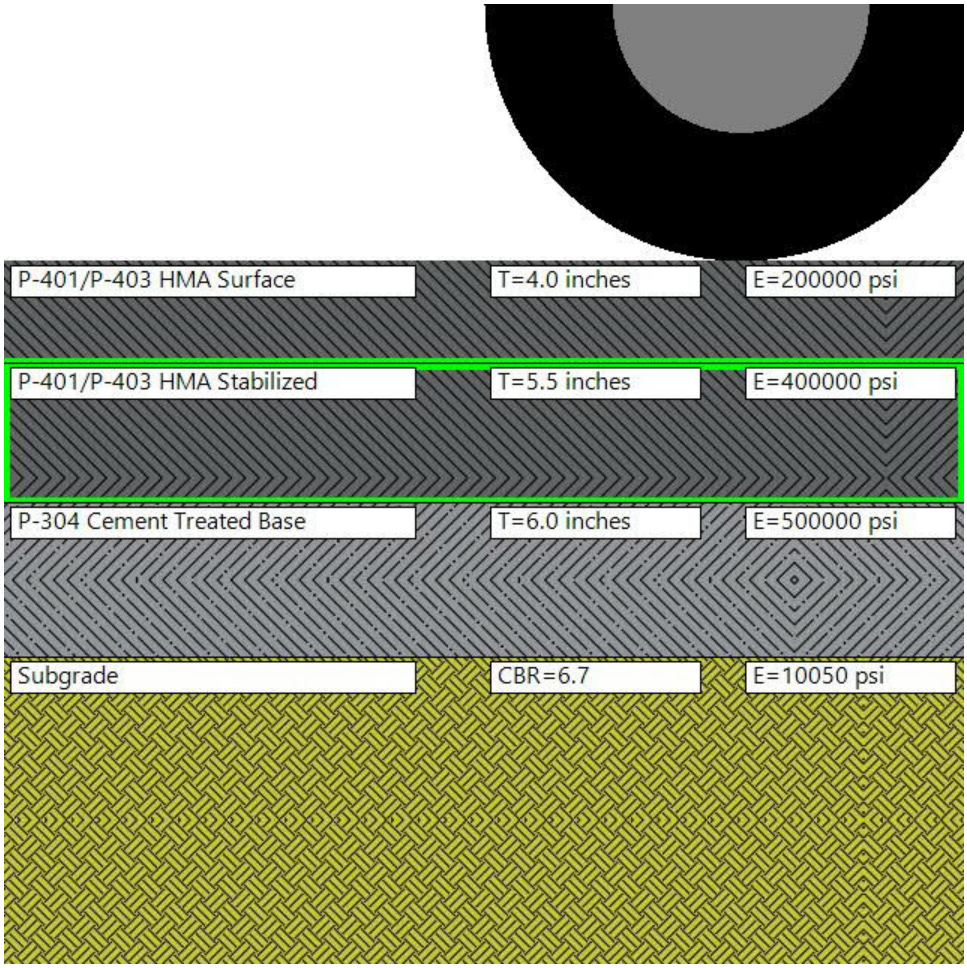
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	A319-100 std	168653	2555	0
2	A320-200 opt	171961	7665	0
3	B767-300	412000	500	0
4	B737-800	174200	624	0
5	B747-400	875000	208	0
6	B747-400 Belly	875000	208	0
7	Cessna 172 Skyhawk	2550	90000	0
8	Beechcraft King Air C90	11800	90000	0
9	Premier 390 (UDA)	12500	10000	0
10	Dassault Falcon 10 (UDA)	16000	300	0
11	Hawker-800/800XP	28000	25000	0
12	Dassault Falcon 900B/C	41000	15000	0
13	Learjet 35/36/35A/36A	18000	25000	0
14	Bombardier CL-604/605	43000	12000	0
15	ERJ-135	25265	5000	0
16	Global Express (UDA)	99500	5000	0
17	LearJet 60 (UDA)	23500	100	0
18	Gulfstream-G-IV	72000	5300	0
19	Gulfstream G-V/G500/G550	90500	200	0
20	F-16C	37500	100	0
21	C-130	155000	150	0
22	C-17A	580000	25	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	A319-100 std	0.00	0.00	0
2	A320-200 opt	0.00	0.00	0
3	B767-300	0.00	0.00	0
4	B737-800	0.00	0.00	0
5	B747-400	0.00	0.00	0
6	B747-400 Belly	0.00	0.00	0
7	Cessna 172 Skyhawk	0.00	0.00	0
8	Beechcraft King Air C90	0.00	0.00	0
9	Premier 390 (UDA)	0.00	0.00	0
10	Dassault Falcon 10 (UDA)	0.00	0.00	0
11	Hawker-800/800XP	0.00	0.00	0
12	Dassault Falcon 900B/C	0.00	0.00	0
13	Learjet 35/36/35A/36A	0.00	0.00	0
14	Bombardier CL-604/605	0.00	0.00	0
15	ERJ-135	0.00	0.00	0
16	Global Express (UDA)	0.00	0.00	0
17	LearJet 60 (UDA)	0.00	0.00	0
18	Gulfstream-G-IV	0.00	0.00	0
19	Gulfstream G-V/G500/G550	0.00	0.00	0
20	F-16C	0.00	0.00	0
21	C-130	0.00	0.00	0
22	C-17A	0.00	0.00	0

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200000 psi
P-401/P-403 HMA Stabilized
T=5.5 inches
E=400000 psi
P-304 Cement Treated Base
T=6.0 inches
E=500000 psi
Subgrade
CBR=6.7
E=10050 psi

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Flexible Transition 20 year

Analysis Type: New Flexible

Last Run: Thickness Design 2022-11-09 13:11:56

Design Life = 20 Years

Total thickness to the top of the subgrade = 16.7in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-401/P-403 HMA Surface	4.0	200000	0.35	0
2	P-401/P-403 HMA Stabilized	6.7	400000	0.35	0
3	P-304 Cement Treated Base	6.0	500000	0.2	0
4	Subgrade	0	10050	0.35	0

Airplane Information

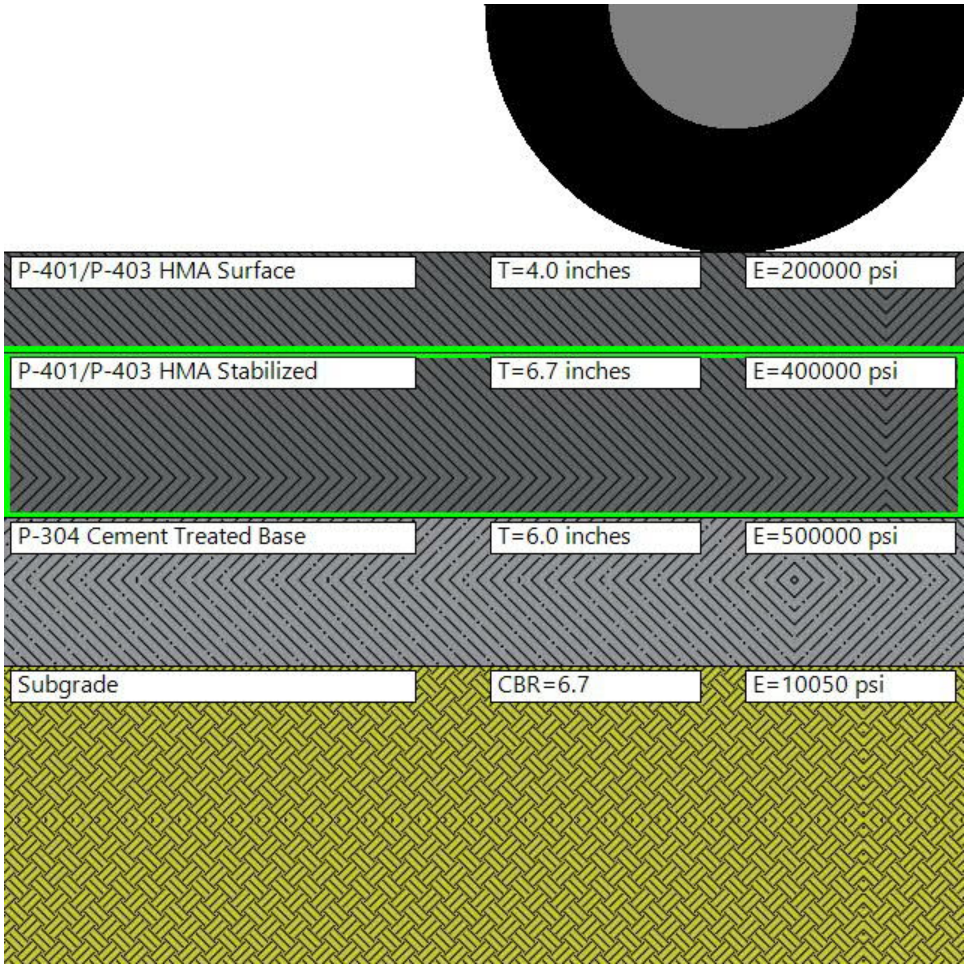
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	A319-100 std	168653	2555	0
2	A320-200 opt	171961	7665	0
3	B767-300	412000	500	0
4	B737-800	174200	624	0
5	B747-400	875000	208	0
6	B747-400 Belly	875000	208	0
7	Cessna 172 Skyhawk	2550	90000	0
8	Beechcraft King Air C90	11800	90000	0
9	Premier 390 (UDA)	12500	10000	0
10	Dassault Falcon 10 (UDA)	16000	300	0
11	Hawker-800/800XP	28000	25000	0
12	Dassault Falcon 900B/C	41000	15000	0
13	Learjet 35/36/35A/36A	18000	25000	0
14	Bombardier CL-604/605	43000	12000	0
15	ERJ-135	25265	5000	0
16	Global Express (UDA)	99500	5000	0
17	LearJet 60 (UDA)	23500	100	0
18	Gulfstream-G-IV	72000	5300	0
19	Gulfstream G-V/G500/G550	90500	200	0
20	F-16C	37500	100	0
21	C-130	155000	150	0
22	C-17A	580000	25	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	A319-100 std	0.00	0.00	1.61
2	A320-200 opt	0.00	0.01	1.6
3	B767-300	0.57	0.61	1.72
4	B737-800	0.00	0.00	1.56
5	B747-400	0.44	0.47	1.63
6	B747-400 Belly	0.00	0.47	1.64
7	Cessna 172 Skyhawk	0.00	0.00	3.61
8	Beechcraft King Air C90	0.00	0.00	3.2
9	Premier 390 (UDA)	0.00	0.00	3.2
10	Dassault Falcon 10 (UDA)	0.00	0.00	3.2
11	Hawker-800/800XP	0.00	0.00	2.25
12	Dassault Falcon 900B/C	0.00	0.00	2.13
13	Learjet 35/36/35A/36A	0.00	0.00	2.4
14	Bombardier CL-604/605	0.00	0.00	2.07
15	ERJ-135	0.00	0.00	1.94
16	Global Express (UDA)	0.00	0.00	1.94
17	LearJet 60 (UDA)	0.00	0.00	1.94
18	Gulfstream-G-IV	0.00	0.00	2
19	Gulfstream G-V/G500/G550	0.00	0.00	1.87
20	F-16C	0.00	0.00	3.1
21	C-130	0.00	0.00	2.42
22	C-17A	0.01	0.01	1.3

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200000 psi
P-401/P-403 HMA Stabilized
T=6.7 inches
E=400000 psi
P-304 Cement Treated Base
T=6.0 inches
E=500000 psi
Subgrade
CBR=6.7
E=10050 psi

4685 S. Ash Avenue Ste. H-4
Tempe, Arizona 85282
P (480) 897-8200
Terracon.com

December 19, 2022

Dibble & Associates Consulting Engineers, Inc.
2696 South Colorado
Phoenix, Arizona

Attn: Ms. Carmen Rose
P: (602) 957-1155
E: carmen.rose@dibblecorp.com

Re: Pavement Engineering Report, Addendum 1
PMGAA Runway 12R-30L Reconstruction
6033 South Sossaman Road
Mesa, Arizona
Terracon Project No. 65225198

Dear Ms. Rose:

At your request, Terracon Consultants, Inc. (Terracon) has prepared this addendum to the Pavement Engineering Report for the PMGAA Runway 12R-30L Reconstruction project. The original Pavement Engineering Report was prepared on November 18, 2022. The purpose of this addendum is to provide recommendations relative to the Pavement Condition Rating (PCR) of Runway 12R-30L as it is proposed to be built, as well as to provide recommendations for asphalt pavement on the shoulders of Runway 12R-30L.

The following sections are to be added to the original report.

Airfield Pavements

Pavement Thickness Design Recommendation – Runway Shoulders

Terracon prepared pavement design analysis for runway shoulders using the subgrade and material parameters from our original report. We understand the specified lime content for the lime stabilized subgrade will be 5 percent hydrated lime per dry unit weight of soil. Based on that specification recommendation, we have determined the minimum thickness of the asphalt shoulders based on a minimum effective subgrade modulus of 17,500 psi (CBR 11.7) as shown in the following table.

PMGAA Flexible Shoulder on Runway 12R-30L
Pavement Design Recommended Thicknesses (inches)

Pavement Layer	Specification Item [2]	Runway 12R-30L Shoulder
Surface Course	P-401 Asphalt Mix Surface Course	4
Base Course	P-209 Crushed Aggregate Base Course	8
Subbase Course	P-154 Subbase Course	10
Stabilized Subgrade	P-155 Lime Treated Subgrade	8
Total Pavement Thickness [1]		**30**

1. The individual and total material thickness values presented herein represent minimum thickness values, not averages.
2. Refer to the Specifications Recommendations section of this report for material specification requirements for each individual specification item.

Airport Pavement Strength (PCR) for Runway 12R-30L

Terracon performed preliminary analysis of the Airport Pavement Strength (PCR) of the proposed pavement section using the Technical Evaluation method in general accordance with AC 150/5335-5D Standardized Method of Reporting Airport Pavement Strength – PCR. The analysis was conducted using the Federal Aviation Administration's FAARFIELD 2.0.7 software. The aircraft traffic fleet used in the PCR analysis was the same as shown in our original report for this same runway. The analysis assumes the construction of the proposed pavement section will be in accordance with AC 150/5370-10H Standard Specifications for Construction of Airports, and our Pavement Engineering Report recommendations. Based on these assumptions, the preliminary PCR of Runway 12R-30L after construction is anticipated to be as shown in the following table for the respective pavement alternatives:

Runway 12R – 30L
Airport Pavement Strength (PCR) - by Technical Evaluation

Pavement Alternative	PCR
Alternative A: Rigid on CTB on LTSG	751/R/B/W/T
Alternative B: Rigid on Lean Concrete on LTSG	712/R/B/W/T
Alternative C: Rigid on HMA on ABC on LTSG	746/R/B/W/T

The final PCR should be confirmed after construction. The results of the PCR analysis are included in the **Supporting Information** section.

Specification Recommendations

The original report contains the pavement materials specification recommendations applicable to this addendum with the exception of the P401 Surface Asphalt mixtures. Those materials should be specified as described below.

P-401 Asphalt Mix Pavement Surface Course

P-401 Asphalt is presented only for use as a surface course on the Runway 12R-30L shoulders. The asphalt surface course should be composed of materials meeting the requirements of Item P-401 Asphalt Mix Pavement Surface Course. The fine aggregate should have a maximum natural sand content of 15 percent and a minimum sand equivalent of 45.

Terracon considered the weather conditions and traffic to determine the appropriate asphalt binder for this project. This was accomplished using the LTPPBind Online software provided by the Federal Highway Administration (FHWA). This software utilizes historical temperature data from weather stations near the project and considers aircraft speed and weights to establish a recommended Performance Graded (PG) binder grade of asphalt concrete. Terracon then compared the software output to the binders that were indicated to be locally available to determine the recommended binder selection for the project. The

asphalt binder should conform to ASTM D6373 Performance Grade PG 76-16. The elastic recovery should be a minimum of 75 percent.

The mix design should be conducted in accordance with ASTM D6926 Standard Practice for Preparation of Asphalt Mixture Specimens Using Marshall Apparatus. The number of Marshall hammer blows used in design should be 75 blows. Recycled asphalt pavement (RAP) should not be incorporated into the asphalt surface course. The tensile strength ratio should be a minimum of 80. The results of AASHTO T340 Asphalt Pavement Analyzer (APA) testing at 250 psi hose pressure, at 64°C, at 4,000 passes should have a rut depth of less than 10 mm.

The asphalt aggregate should meet the following requirements:

Sieve Size	Percentage by Weight Passing	
	Minimum	Maximum
¾"	100	--
½"	90	100
3/8"	72	88
No. 4	53	73
No. 8	38	60
No. 16	26	48
No. 30	18	38
No. 50	11	27
No. 100	6	18
No. 200	3	6
Asphalt percent by total weight of mixture	5.0	7.5
Voids in Mineral Aggregate (VMA	15	--

We recommend that full production should not begin until an acceptable control strip has been constructed and accepted.

Closure

The recommendations in our original pavement engineering report remain applicable. This addendum should be attached to the original pavement engineering report.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,

Terracon

Kirk D. Jackson, P.E.
Project Engineer

Joseph A. Phillips, P.E.
Sr. Materials Engineer / Principal

Supporting Information

Contents:

Note: All attachments are one page unless noted above.

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on Lean Concrete

This file name = PCR Results Rigid 2022-12-12 11:35:17

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Rigid on HMA in job file: PMGAA Runway 12R-30L.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =19556psi (Subgrade Category is B(17k))

Evaluation Pavement Thickness = 21.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.524

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight	Tire Pressure psi	Annual Departure	20 Years Coverage
1	A319-100 std	168653	92.60	205.5	2555	14920
2	A320-200 opt	171961	92.80	207.9	7665	41200
3	B767-300	412000	92.40	228.2	500	2763
4	B737-800	174200	93.56	203.4	624	3504
5	B747-400	875000	46.66	199.5	208	1188
6	B747-400 Belly	875000	46.66	199.5	208	1185
7	Cessna 172 Skyhawk	2550	95.00	49.8	90000	207009
8	Beechcraft King Air C90	11800	95.00	70.5	90000	412390
9	Premier 390 (UDA)	12500	47.50	69.0	10000	47151
10	Dassault Falcon 10 (UDA)	16000	47.50	208.0	300	1599
11	Hawker-800/800XP	28000	95.00	134.4	25000	79261
12	Dassault Falcon 900B/C	41000	95.00	130.7	15000	55689
13	Learjet 35/36/35A/36A	18000	95.00	171.0	25000	57623
14	Bombardier CL-604/605	43000	95.00	129.4	12000	45467
15	ERJ-135	25265	95.00	80.4	5000	14949
16	Global Express (UDA)	99500	47.50	189.0	5000	29539
17	LearJet 60 (UDA)	23500	47.50	201.0	100	288
18	Gulfstream-G-IV	72000	95.00	177.6	5300	22932
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	200	944
20	F-16C	37500	95.00	190.6	100	424
21	C-130	155000	95.00	105.0	150	642
22	C-17A	580000	95.00	136.8	25	381

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft	ACR Thick at max. MGW (in.)	PCR//R/B
1	B747-400	697	899904	15.28	712.4

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight on Main Gear	Tire Pressure psi	ACR Thick (in.) (B)	ACR//R/B
1	A319-100 std	168653	92.60	205.5	12.4	467.7
2	A320-200 opt	171961	92.80	207.9	12.8	499.2
3	B767-300	412000	92.40	228.2	14.2	617.2
4	B737-800	174200	93.56	203.4	13.1	522.9
5	B747-400	875000	93.32	199.5	15	683.5
7	Cessna 172 Skyhawk	2550	95.00	49.8	2	6.3
8	Beechcraft King Air C90	11800	95.00	70.5	2.7	24.7
9	Premier 390 (UDA)	12500	47.5	69.0	2.8	26.5
10	Dassault Falcon 10 (UDA)	16000	47.5	208.0	3.2	35.1
11	Hawker-800/800XP	28000	95.00	134.4	4.9	77.5
12	Dassault Falcon 900B/C	41000	95.00	130.7	6.3	123.2
13	Learjet 35/36/35A/36A	18000	95.00	171.0	3.9	50.1
14	Bombardier CL-604/605	43000	95.00	129.4	6.3	127
15	ERJ-135	25265	95.00	80.4	4.3	59.6
16	Global Express (UDA)	99500	47.5	189.0	10.2	318.1
17	LearJet 60 (UDA)	23500	47.5	201.0	4.1	54.5
18	Gulfstream-G-IV	72000	95.00	177.6	8.9	242.8
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	9.9	301.1
20	F-16C	37500	95.00	190.6	7.2	161.2
21	C-130	155000	95.00	105.0	10	305.3
22	C-17A	580000	95.00	136.8	13.6	567

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on HMA

This file name = PCR Results Rigid 2022-12-12 11:44:50

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Rigid on HMA in job file: PMGAA Runway 12R-30L.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =19556psi (Subgrade Category is B(17k))

Evaluation Pavement Thickness = 26.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.246

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight	Tire Pressure psi	Annual Departure	20 Years Coverage
1	A319-100 std	168653	92.60	205.5	2555	14920
2	A320-200 opt	171961	92.80	207.9	7665	41200
3	B767-300	412000	92.40	228.2	500	2763
4	B737-800	174200	93.56	203.4	624	3504
5	B747-400	875000	46.66	199.5	208	1188
6	B747-400 Belly	875000	46.66	199.5	208	1185
7	Cessna 172 Skyhawk	2550	95.00	49.8	90000	207009
8	Beechcraft King Air C90	11800	95.00	70.5	90000	412390
9	Premier 390 (UDA)	12500	47.50	69.0	10000	47151
10	Dassault Falcon 10 (UDA)	16000	47.50	208.0	300	1599
11	Hawker-800/800XP	28000	95.00	134.4	25000	79261
12	Dassault Falcon 900B/C	41000	95.00	130.7	15000	55689
13	Learjet 35/36/35A/36A	18000	95.00	171.0	25000	57623
14	Bombardier CL-604/605	43000	95.00	129.4	12000	45467
15	ERJ-135	25265	95.00	80.4	5000	14949
16	Global Express (UDA)	99500	47.50	189.0	5000	29539
17	LearJet 60 (UDA)	23500	47.50	201.0	100	288
18	Gulfstream-G-IV	72000	95.00	177.6	5300	22932
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	200	944
20	F-16C	37500	95.00	190.6	100	424
21	C-130	155000	95.00	105.0	150	642
22	C-17A	580000	95.00	136.8	25	381

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft	ACR Thick at max. MGW (in.)	PCR//R/B
1	B747-400	873	928533	15.64	746.5

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight on Main Gear	Tire Pressure psi	ACR Thick (in.) (B)	ACR//R/B
1	A319-100 std	168653	92.60	205.5	12.4	467.7
2	A320-200 opt	171961	92.80	207.9	12.8	499.2
3	B767-300	412000	92.40	228.2	14.2	617.2
4	B737-800	174200	93.56	203.4	13.1	522.9
5	B747-400	875000	93.32	199.5	15	683.5
7	Cessna 172 Skyhawk	2550	95.00	49.8	2	6.3
8	Beechcraft King Air C90	11800	95.00	70.5	2.7	24.7
9	Premier 390 (UDA)	12500	47.5	69.0	2.8	26.5
10	Dassault Falcon 10 (UDA)	16000	47.5	208.0	3.2	35.1
11	Hawker-800/800XP	28000	95.00	134.4	4.9	77.5
12	Dassault Falcon 900B/C	41000	95.00	130.7	6.3	123.2
13	Learjet 35/36/35A/36A	18000	95.00	171.0	3.9	50.1
14	Bombardier CL-604/605	43000	95.00	129.4	6.3	127
15	ERJ-135	25265	95.00	80.4	4.3	59.6
16	Global Express (UDA)	99500	47.5	189.0	10.2	318.1
17	LearJet 60 (UDA)	23500	47.5	201.0	4.1	54.5
18	Gulfstream-G-IV	72000	95.00	177.6	8.9	242.8
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	9.9	301.1
20	F-16C	37500	95.00	190.6	7.2	161.2
21	C-130	155000	95.00	105.0	10	305.3
22	C-17A	580000	95.00	136.8	13.6	567

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on CTB on LTSG

This file name = PCR Results Rigid 2022-12-12 11:12:29

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Rigid on HMA in job file: PMGAA Runway 12R-30L.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =19556psi (Subgrade Category is B(17k))

Evaluation Pavement Thickness = 21.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.226

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight	Tire Pressure psi	Annual Departure	20 Years Coverage
1	A319-100 std	168653	92.60	205.5	2555	14920
2	A320-200 opt	171961	92.80	207.9	7665	41200
3	B767-300	412000	92.40	228.2	500	2763
4	B737-800	174200	93.56	203.4	624	3504
5	B747-400	875000	46.66	199.5	208	1188
6	B747-400 Belly	875000	46.66	199.5	208	1185
7	Cessna 172 Skyhawk	2550	95.00	49.8	90000	207009
8	Beechcraft King Air C90	11800	95.00	70.5	90000	412390
9	Premier 390 (UDA)	12500	47.50	69.0	10000	47151
10	Dassault Falcon 10 (UDA)	16000	47.50	208.0	300	1599
11	Hawker-800/800XP	28000	95.00	134.4	25000	79261
12	Dassault Falcon 900B/C	41000	95.00	130.7	15000	55689
13	Learjet 35/36/35A/36A	18000	95.00	171.0	25000	57623
14	Bombardier CL-604/605	43000	95.00	129.4	12000	45467
15	ERJ-135	25265	95.00	80.4	5000	14949
16	Global Express (UDA)	99500	47.50	189.0	5000	29539
17	LearJet 60 (UDA)	23500	47.50	201.0	100	288
18	Gulfstream-G-IV	72000	95.00	177.6	5300	22932
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	200	944
20	F-16C	37500	95.00	190.6	100	424
21	C-130	155000	95.00	105.0	150	642
22	C-17A	580000	95.00	136.8	25	381

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft	ACR Thick at max. MGW (in.)	PCR//R/B
1	B747-400	669	932223	15.69	750.9

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight on Main Gear	Tire Pressure psi	ACR Thick (in.) (B)	ACR//R/B
1	A319-100 std	168653	92.60	205.5	12.4	467.7
2	A320-200 opt	171961	92.80	207.9	12.8	499.2
3	B767-300	412000	92.40	228.2	14.2	617.2
4	B737-800	174200	93.56	203.4	13.1	522.9
5	B747-400	875000	93.32	199.5	15	683.5
7	Cessna 172 Skyhawk	2550	95.00	49.8	2	6.3
8	Beechcraft King Air C90	11800	95.00	70.5	2.7	24.7
9	Premier 390 (UDA)	12500	47.5	69.0	2.8	26.5
10	Dassault Falcon 10 (UDA)	16000	47.5	208.0	3.2	35.1
11	Hawker-800/800XP	28000	95.00	134.4	4.9	77.5
12	Dassault Falcon 900B/C	41000	95.00	130.7	6.3	123.2
13	Learjet 35/36/35A/36A	18000	95.00	171.0	3.9	50.1
14	Bombardier CL-604/605	43000	95.00	129.4	6.3	127
15	ERJ-135	25265	95.00	80.4	4.3	59.6
16	Global Express (UDA)	99500	47.5	189.0	10.2	318.1
17	LearJet 60 (UDA)	23500	47.5	201.0	4.1	54.5
18	Gulfstream-G-IV	72000	95.00	177.6	8.9	242.8
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	9.9	301.1
20	F-16C	37500	95.00	190.6	7.2	161.2
21	C-130	155000	95.00	105.0	10	305.3
22	C-17A	580000	95.00	136.8	13.6	567

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Shoulder Flexible LTSG

Analysis Type: HMA on Aggregate

Last Run: Life Analysis 2022-12-19 15:28:25

Calculated Life = 271.3 Years

Total thickness to the top of the subgrade = 22.0in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-401/P-403 HMA Surface	4.0	200000	0.35	0
2	P-209 Crushed Aggregate	8.0	60605	0.35	0
3	P-154 Uncrushed Aggregate	10.0	23157	0.35	0
4	Subgrade	0	19500	0.35	0

Airplane Information

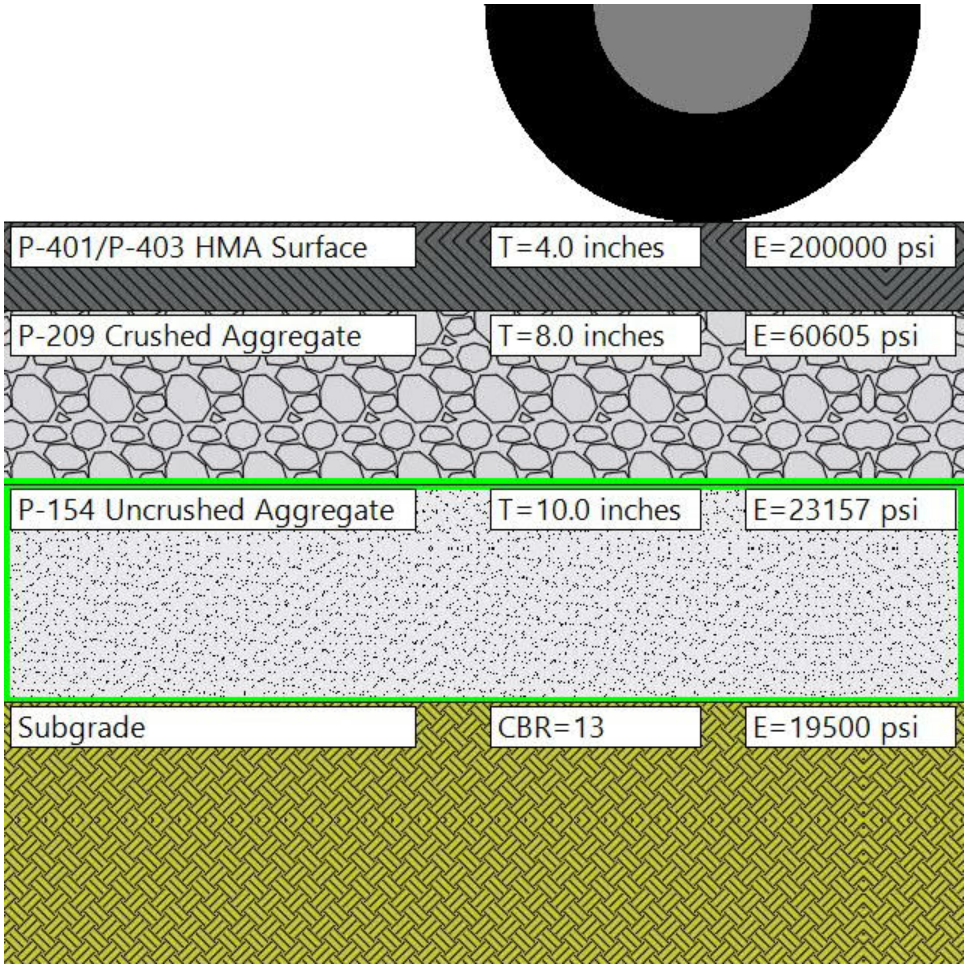
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	B747-400	877000	15	0
2	B747-400 Belly	877000	15	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	B747-400	0.07	0.07	1.4
2	B747-400 Belly	0.00	0.07	1.41

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200000 psi
P-209 Crushed Aggregate
T=8.0 inches
E=60605 psi
P-154 Uncrushed Aggregate
T=10.0 inches
E=23157 psi
Subgrade
CBR=13
E=19500 psi

ACS SERVICES LLC

ENGINEERING DESIGN • MATERIAL TESTING • CONSTRUCTION INSPECTION
DBE - SBE - WBE

REPORT OF GEOTECHNICAL INVESTIGATION

PHOENIX MESA GATEWAY AIRPORT
TAXIWAY H RELOCATION
5835 SOUTH SOSSAMAN ROAD
MESA, ARIZONA 85212
ACS PROJECT NO. 2001179

PREPARED FOR:

Mr. Jarrett Moore, P.E.
KIMLEY HORN
1001 West Southern Avenue, Suite 131
Mesa, AZ 85210

PREPARED BY:

ACS Services LLC
2235 West Broadway Road
Mesa, Arizona 85202

Phone: 480-968-0190
www.acsservicesllc.com

June 4, 2020

ACS

Table of Contents

Appendices

ACS SERVICES LLC

ENGINEERING DESIGN • MATERIAL TESTING • CONSTRUCTION INSPECTION

DBE - SBE - WBE

June 4, 2020 Project 2001179

Mr. Jarrett Moore, P.E.
KIMLEY HORN
1001 West Southern Avenue, Suite 131
Mesa, AZ 85210

RE: GEOTECHNICAL INVESTIGATION REPORT
PHOENIX MESA GATEWAY AIRPORT
TAXIWAY H RELOCATION
5835 SOUTH SOSSAMAN ROAD
MESA, ARIZONA 85212

Dear Jarrett:

Transmitted herewith is a copy of the final report of the pavement evaluation and subsurface soil investigation on the above-mentioned project. The services performed provide an evaluation at selected locations and of the subsurface soil conditions. As an additional service, this firm may review the project plans for conformance to the intent of this report.

This firm possesses the capability to provide testing and inspection services during the course of construction. Such quality control/assurance activities may include, but are not limited to, compaction testing as related subgrade. aggregate base course and asphaltic concrete, concrete sampling and testing, and asphaltic concrete sampling and testing. Please notify this firm if a proposal for such services is desired.

Should any questions arise concerning the content of this report, please feel free to contact this office at your earliest convenience.

Respectfully submitted,

ACS SERVICES LLC

Andrew Jamrogiewicz, P.E.
Geotechnical and Materials Testing Engineer

cc: (1) Addressee via email (pdf copy)

SCOPE

This report is submitted following a geotechnical investigation conducted by this firm for the **TAXIWAY H RELOCATION** project for Phoenix Mesa Gateway Airport, located at 5835 South Sossaman Road, in Mesa, Arizona 85212. The objectives of the investigation were to evaluate the existing conditions, determine the physical characteristics of the soil underlying the area where the existing Taxiway H is located along with the area where the proposal relocation is to be constructed, and to provide recommendations for a pavement structural section. The recommendations contained in this report do not address the presence or removal of contaminants from the site soils.

SUBSURFACE SOILS FIELD INVESTIGATION

On the night of March 3, 2020 through the morning of March 4, 2020 this firm advanced three (3) exploratory test borings (6-inch continuous flight auger) for examination of the underlying subsurface soil profile to a depth of 10.0 feet below the existing grade. One of the test borings was advanced through the existing Taxiway H concrete. The other two test borings were located in the area proposed for the relocation of Taxiway H. The boring locations were determined by Kimley Horn, and are shown on Figure 2 in Appendix A. The subsurface soils encountered were examined, visually classified and wherever applicable, sampled. The sample locations are noted on the laboratory test reports that are included in Appendix C of this report. Refer to the Boring Logs in Appendix B for a detailed description of the existing pavement section and subsurface soil conditions at the specified locations.

LABORATORY TESTING

Representative samples obtained during the field investigation were subjected to the following laboratory analyses:

Test	Sample(s)	Purpose
Sieve Analysis and Atterberg Limits	Bulk native subsurface soils (4)	Soil classification
Ring Density	Ring sample subsurface soils (3)	In-place density and moisture
CBR with Modified Proctor	Bulk native subsurface soils (2)	Pavement design
Proctor - Modified	Bulk native subsurface soils (2)	Pavement design

Refer to Appendix C of this report and the following summary table for the results of the laboratory testing.

Sample ID	% Passing #4	% Passing #200	PI	% Moisture Content	USCS Soil Classification
B-1 @ 0'-4'	82	39.3	5	9.5	SM-SC
B-1 @ 4'-10'	97	54.9	10	11.7	CL
B-2 @ 0'-4'	92	53.2	9	9.5	CL
B-3 @ 0'-4'	97	63.0	15	13.0	CL

EXISTING PAVEMENT SECTION

Based on the visual observations made at the site and a review of the field investigation and laboratory test results, the following observations are made regarding the existing pavement conditions:

Existing Concrete and ABC

The existing concrete in Taxiway H is approximately 11.5 inches thick at the location cored. There was no amount of ABC observed below the concrete. The location of the proposed relocation is in an area that has native soil and no concrete, asphalt, or ABC present.

Subgrade Soil

Based on the subgrade soil testing, the subgrade soils are primarily low plasticity clays and have a low to moderate PI in the range to 5 to 15 and high percentage of fines passing the No. 200 sieve, ranging from 39.3 to 63.0 percent. The moisture contents ranged from 9.5 percent to 13.0 percent. Generally native soils with a moisture content in this range would be considered damp to moist. Based on the results of the field testing (SPT) and visual soils classification the soils on site are generally consistent and range from a loose to medium dense state.

PAVEMENT DESIGN SUMMARY

The design provided in this report assumes that the subgrade for taxiway areas is being prepared in accordance with FAA Standard P-152. Due to the anticipated aircraft loading conditions, any site preparation below aircraft pavement should be compacted to the specified percent compaction of the maximum dry density determined by ASTM D-1557 (Modified proctor) test method.

It is our understanding of the current FAA Advisory Circular 150/5320-6F that a stabilized base is required for the very heavy aircraft that will be using Taxiway H. Section 3.6 addresses the need for Stabilized Base Course. As paragraph 3.6.2 states, superior performance is achieved by providing a stabilized base course and that long term performance gains should be considered before making substitutions to eliminate stabilized base.

Based on the laboratory testing, C.B.R. values ranging from 13.4 to 16.8 were obtained when compacted to 95% of maximum dry density of a modified proctor. Using the recommendations provided in the FAA Airport Pavement Design and Evaluation Advisory Circular No. 150/5320-

6F, the average value of the laboratory results should be reduced to account for potential soil variations.

The new PCCP pavement section was designed using procedures outlined in FAA Advisory Circular AC 150/5320-6F and the FAA provided computer program FAARFIELD v1.42. This design is based on the assumption that the controlling subgrade will consist of the compacted native soils materials meeting the requirements presented herein. Pavement designs are based on the Preliminary Fleet Mix Summary provided by Kimley Horn and is summarized in the following table:

Aircraft Type	Max. Take-off Weight (lbs)	Average Annual Departures
DC-10	583,000	16
DC-8	350,000	288
B-767	413,000	1,822
B-757	256,000	2,209
A-320	163,000	8,837
B737-400/MD-80	150,500	3,645
MD-80, 82, 83, 87	161,000	5,695
CRJ-900	82,500	2,734
CRJ-700	72,500	911
Twin Turboprop	9,850	1,175
Business Jet (Stage 2)	15,500	172
Business Jet (Stage 3)	18,000	9,039
Light Single-Fixed	2,350	71,816
Light Single-Var.	3,600	71,816
Light Twin	5,400	38,843
Twin Truboprop	9,850	8,172
Lear-25	15,000	4
Lear-35	18,000	6,694
Canadair Challenger 600	40,400	6,679
Gulfstream IV	73,200	3,319
Boeing 737-300/BBJ	124,500	669
C-17	585,000	502
KC-135	322,500	790
C-130	155,000	106
Single Engine Attack Jet	42,300	1,106
C-12	12,500	2,494
T-38	12,500	3,392

The FAARFIELD software did not have every specific aircraft listed above, however, generic equivalent entries were available within the software such that the overall representation of the fleet mix is accurate and acceptable. A C.B.R. value of 14 was selected for the analysis and design of the new pavement. A modulus of subgrade reaction (k) of 224 pci for PCCP design based on correlations presented in Advisory Circular No. 150/5320-6F.

Rigid Pavement Structural Section (Taxiway)

Pavement Layer	Thickness (inches)
PCC Surface (P-501)	15.0 inches
Stabilized Base Course* (P-401 / P-403)	5.0 inches
Aggregate Base (P-209 / P-219)	8.0 inches
Compacted Subgrade (P-152)	8.0 inches
Total Thickness to Top of Subgrade	28.0 inches

Notes:
- Section minimums according to FAARFIELD and Advisory Circular No. 150/5320-6F
- A 28 day flexural strength of 650 psi was used for design

Portland Cement Concrete Pavement must meet the FAA Standard Specifications P-501. It must have a minimum 28 day flexural strength of 650 psi (90 day design strength of 715 psi). Type II low alkali cement is acceptable. A minimum cement content of 564 pounds per cubic yard and a maximum water/cement ration of 0.45 are recommended. Aggregate must be tested for alkali silica reaction (ASR). In order to mitigate ASR Type F fly ash may be used as a direct (1:1) replacement of up to 25 percent of the cement, according to state and municipal standards. Additional fly ash may be added (without further reduction in cement content) to provide additional protection against ASR should the supplier have an aggregate issue. This is the only recommended if approved by PMGAA, and provided the strength gain characteristics are attained based on approved mix designs.

Attention must be paid to using low slump concrete and proper curing to reduce curling. No structural reinforcement is necessary. Joint design and spacing should be in accordance with FAA recommendations. Panels should be divided in as nearly square patterns as possible with width to length ratios not exceeding 1.25. Joint spacing should not exceed 20 feet. Joint sealant meeting FAA requirements is recommended. Dowel bars are recommended at all joints in accordance with FAA guidelines. Tie bars are recommended in the last two sets of joints adjacent to unsupported edges to reduce the potential for the joint opening. Dowel bars will also be required where new pavement ties into the existing concrete pavement.

Shoulder Pavement Design

The pavement design for the shoulder areas was determined by following Chapter 6 in the FAA AC No. 150/5320-6F. Per the procedure outlined, the most demanding airplane (MDA) needs to be determined. Then the minimum pavement section required is based upon a total of 15 departures by that MDA (one departure per year for a design period of 15 years). The analysis is performed per each individual aircraft within the fleet mix at a time. The aircraft requiring the

thickest pavement section is then labeled as the MDA. The determination was made that the C-17 is the MDA and requires the following shoulder pavement section:

Pavement Layer	Thickness (inches)
Asphalt Surface (P-401)	4.0 inches
Aggregate Base (P-209)	8.0 inches
Compacted Subgrade (P-152)	8.0 inches
Total Thickness to Top of Subgrade	12.0 inches

An option that can be considered for the shoulder pavement section would be to substitute three inches of aggregate base for one inch of asphalt surface. Therefore, the following would also be considered an acceptable shoulder pavement section:

Pavement Layer	Thickness (inches)
Asphalt Surface (P-401)	5.0 inches
Aggregate Base (P-209)	5.0 inches
Compacted Subgrade (P-152)	8.0 inches
Total Thickness to Top of Subgrade	10.0 inches

SITE PREPARATION

It is recommended that all deleterious matter be removed from the proposed taxiway pavement area at the commencement of site grading activities. Any existing foundation elements should be removed in their entirety along with soil disturbed by this activity.

Prior to placement of new aggregate base, the exposed subgrade soils should be prepared in accordance with the FAA Standard for P-152. The soils should be scarified to a depth of 8 inches, moisture conditioned between 3 percent below to 1 percent above optimum and compacted to at least 95 percent of the maximum dry density as determined by a modified proctor (ASTM D-1557). Increase the depth of subgrade soil treatment in the event that isolated deeper soft soils are encountered.

EXCAVATING CONDITIONS

Conventional excavating equipment may be utilized to excavate the site soils to a depth of 10 feet at the locations of borings No hard stratum was encountered above a depth of 10 feet.

Caving conditions may be encountered for trench excavations to a depth of 10 feet due to the relatively low in-place densities of the soils at the locations of the borings.

Excavations greater than 4.0 feet should be sloped or braced as required to provide personnel safety and satisfy local safety code regulations.

CONSTRUCTION OBSERVATION

ACS Services LLC should be retained to provide documentation that the recommendations set forth are met. These include but are not limited to documentation of site clearing activities, verification of subgrade suitability and compaction for pavement areas, inspection, sampling and testing of base materials for pavement support, sampling and testing of concrete for PCCP, and inspection, sampling, and testing of asphaltic concrete.

LIMITATIONS

Since our investigation is based upon review of background data, the site materials observed, selected laboratory testing and engineering analysis, the conclusions and recommendations are professional opinions. Our professional services have been performed using that degree and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities. These opinions have been derived in accordance with current standards of practice and no other warranty, express or implied, is made.

This report is not intended as a bidding document, and any contractor reviewing this report must draw his own conclusions regarding specific construction techniques to be used on this project.

The scope of services carried out by **ACS Services LLC** does not include an evaluation pertaining to environmental issues. If these services are required by the lender, we would be most pleased to discuss the varying degrees of environmental site assessments.

The materials encountered on the subject site and utilized in our laboratory analysis are believed to be representative of the total area; however, soil and rock materials do vary in character between points of investigation. The recommendations contained in this report are based on the assumption that the soil conditions do not deviate appreciably from those disclosed by the investigation. Should unusual material or conditions be encountered during construction, the soil engineer must be notified so that he may make supplemental recommendations if they should be required.

This report is issued with the understanding that it is the responsibility of the owner to see that its provisions are carried out or brought to the attention of those concerned. In the event that any changes of the proposed project are planned, the conclusions and recommendations contained in this report shall be reviewed and the report shall be modified or supplemented as necessary.

June 4, 2020
Project 2001179 – Taxiway H Relocation
5835 South Sossaman Road
Mesa, Arizona 85212

DEFINITION OF TERMINOLOGY

Allowable Soil Bearing Capacity	The recommended maximum contact stress developed at the interface of the foundation element and the supporting material.
Aggregate Base Course (ABC)	A sand and gravel mixture of specified gradation, used for slab and pavement support.
Backfill	A specified material placed and compacted in a confined area.
Base Course	A layer of specified material placed on a subgrade or subbase.
Base Course Grade	Top of base course.
Bench	A horizontal surface in a sloped deposit.
Caisson	A concrete foundation element cased in a circular excavation, which may have an enlarged base. Sometimes referred to as a cast-in-place pier.
Concrete Slabs-on-Grade	A concrete surface layer cast directly upon a base, subbase, or subgrade.
Controlled Compacted Fill	Engineered Fill. Specific material placed and compacted to specified density and/or moisture conditions under observation of a representative of a soil engineer.
Differential Settlement	Unequal settlement between or within foundation elements of a structure.
Existing Fill	Materials deposited through the action of man prior to exploration of the site.
Expansive Potential	The potential of a soil to increase in volume due to the absorption of moisture.
Fill	Materials deposited by the action of man.
Finish Grade	The final grade created as a part of the project.
Heave	Upward movement due to expansion or frost action.
Native Grade	The naturally occurring ground surface.
Native Soil	Naturally occurring on-site soil.
Overexcavate	Lateral extent of subexcavation.
Rock	A natural aggregate of mineral grains connected by strong and permanent cohesive forces. Usually requires drilling, wedging, blasting, or other methods of extraordinary force for excavation.
Scarify	To mechanically loosen soil or break down the existing soil structure.
Settlement	Downward movement of the soil mass and structure due to vertical loading.
Soil	Any unconsolidated material composed of disintegrated vegetable or mineral matter, which can be separated by gentle mechanical means, such as agitation in water.
Strip	To remove from present location.
Subbase	A layer of specified material between the subgrade and base course.
Subexcavate	Vertical zone of soil removal and recompaction required for adequate foundation or slab support
Subgrade	Prepared native soil surface.

APPENDIX A

NORTH
N.T.S.

PROJECT NUMBER: 2001179

FIGURE 1

ACS SERVICES LLC
2235 W BROADWAY RD
MESA, ARIZONA 85202
(480) 968-0190
(480) 968-0156 FAX
WWW.ACSSERVICESLLC.COM

VICINITY MAP

Taxiway H Relocation
6033 S Sossaman Road
Mesa, AZ. 85212

NORTH
N.T.S.

PROJECT NUMBER: 2001179

FIGURE 2

ACS SERVICES LLC

2235 W BROADWAY RD
MESA, ARIZONA 85202
(480) 968-0190
(480) 968-0156 FAX
WWW.ACSSERVICESLLC.COM

SITE PLAN & APPROXIMATE BORING LOCATIONS

Taxiway H Relocation
6033 S Sossaman Road
Mesa, AZ. 85212

APPENDIX B

ACS Services LLC

BORING B-1

For: Kimley Horn
Project: Taxiway H Relocation
Location: 6033 S. Sossaman Road
Mesa, AZ

Date: 3/4/2020 **Project No.** 2001179
Type of Boring: 6.625-inch HS Auger
Field Engineer: Geoffrey Matthew, EIT
Location: See Site Plan

Depth (Feet)	Blows per 6"	Moisture %	Dry Density (PCF)	USCS Soil Class	Remarks: Ring sample obtained from 1.5 to 2.0 feet Description of Subsurface Conditions
1	4 7	9.5		SM-SC	Brown silty-clayey SAND with gravel, loose, slightly damp, PI of 5
2	1 3	9.5		SM-SC	Brown silty-clayey SAND with gravel, loose slightly damp, PI of 5
3	3 6				
4	5 5				
5		11.7		CL	Brown sandy CLAY, stiff, slightly damp, PI of 10
6					
7					
8					
9					
10					
11					Terminated boring at 10.0 feet
12					
13					
14					
15					
16					
17					

ACS Services LLC

BORING B-2

For: Kimley Horn
Project: Taxiway H Relocation
Location: 6033 S. Sossaman Road
Mesa, AZ

Date: 3/4/2020 **Project No.** 2001179
Type of Boring: 6.625-inch HS Auger
Field Engineer: Geoffrey Matthew, EIT
Location: See Site Plan

Remarks: Ring sample obtained from 1.5 to 2.0 feet

Depth (Feet)	Blows per 6"	Moisture %	Dry Density (PCF)	USCS Soil Class	Description of Subsurface Conditions
1	4 3	13.0		CL	Brown sandy CLAY trace gravel, loose, slightly damp, PI of 15
2	3 4				
3	2 3				
4	3 4	13.0		CL	Brown sandy CLAY trace gravel, loose slightly damp, PI of 15
5				SC	Brown clayey SAND, stiff, slightly damp, low PI
6					
7					
8					
9					
10					
11					Terminated boring at 10.0 feet
12					
13					
14					
15					
16					
17					

ACS Services LLC

BORING B-3

For: Kimley Horn
Project: Taxiway H Relocation
Location: 6033 S. Sossaman Road
Mesa, AZ

Date: 3/4/2020 **Project No.** 2001179
Type of Boring: 6.625-inch HS Auger
Field Engineer: Geoffrey Matthew, EIT
Location: See Site Plan

Remarks: Ring sample obtained from 1.5 to 2.0 feet

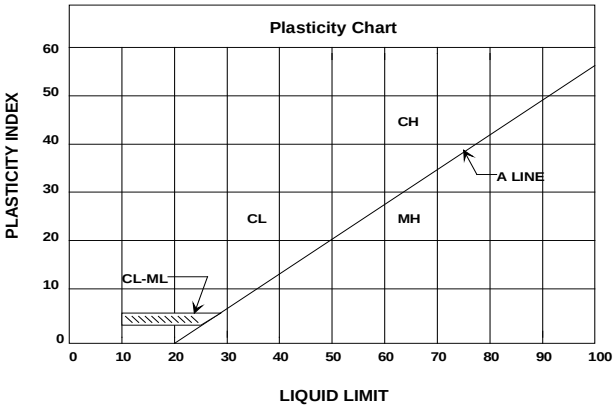
Depth (Feet)	Blows per 6"	Moisture %	Dry Density (PCF)	USCS Soil Class	Description of Subsurface Conditions
1		13.0		CL	Brown sandy CLAY, loose, slightly damp, PI of 15
2					
3					
4		13.0		CL	Brown sandy CLAY, loose, damp, PI of 15
5	3 7			SC	Brown clayey SAND, stiff, slightly damp, low PI
6					
7					
8					
9					
10					
11					Terminated boring at 10.0 feet
12					
13					
14					
15					
16					
17					

June 4, 2020
Project 2001179 – Taxiway H Relocation
5835 South Sossaman Road
Mesa, Arizona 85212

LEGEND

Major Divisions				Group Symbol	Typical Names
Coarse-Grained Soils (Less than 50% passes No. 200 sieve)	Gravels (50% or less or coarse fraction passes No. 4 sieve)	Clean Gravels (Less than 5% passes No. 200 sieve)		GW	Well graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures.
				GP	Poorly graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures.
		Gravels with Fines (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on Plasticity Chart.	GM	Silty gravels, gravel-sand-silt mixtures.
			Limits plots above "A" line & hatched zone on Plasticity Chart.	GC	Clayey gravels, gravel-sand-clay mixtures.
	Sands (More than 50% of coarse fraction passes No. 4 sieve)	Clean Sands (Less than 5% passes No. 200 sieve)		SW	Well graded sands, gravelly sands.
				SP	Poorly graded sands, gravelly sands.
		Sands with Fines (More than 12% passes No. 200 sieve)	Limits plots below "A" line & hatched zone on Plasticity Chart.	SM	Silty sands, sand-silt mixtures.
			Limits plots above "A" line & hatched zone on Plasticity Chart.	SC	Clayey sands, sand-clay mixtures.
Fine-Grained Soils (50% or more passes No. 200 sieve)	Silts-Plot below "A" line & hatched zone on Plasticity Chart	Silts of Low Plasticity (Liquid Limit Less Than 50)		ML	Inorganic silts, clayey silts with slight plasticity.
		Silts of High Plasticity (Liquid Limit More Than 50)		MH	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts.
	Clays-Plot above "A" line & hatched zone on Plasticity Chart	Clays of Low Plasticity (Liquid Limit Less Than 50)		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		Clays of High Plasticity (Liquid Limit More Than 50)		CH	Inorganic clays of high plasticity, fat clays, sandy clays of high plasticity.

Note: Coarse grained soils with between 5% & 12% passing the No. 200 sieve and fine grained soils with limits plotting in the hatched zone on the Plasticity Chart to have double symbol.



DEFINITIONS OF SOIL FRACTIONS

SOIL COMPONENT	PARTICLE SIZE RANGE
Cobbles	Above 3 in.
Gravel	3 in. to No. 4 sieve
Coarse gravel	3 in. to 3/4 in.
Fine gravel	3/4 in. to No. 4 sieve
Sand	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Fines (silt or clay)	Below No. 200 sieve

June 4, 2020
Project 2001179 – Taxiway H Relocation
5835 South Sossaman Road
Mesa, Arizona 85212

TEST DRILLING EQUIPMENT & PROCEDURES

Drilling Equipment

ACS SERVICES llc. uses a CME-45 drill-rig capable of auger drilling to depths of 50 feet in southwestern soils. The drill is truck-mounted for rapid, low cost mobilization to the jobsite and on the jobsite. Drilling through soil or softer rock is performed with 6.625 inch O.D. hollow-stem auger. Carbide insert teeth are normally used on the auger bits so they can often penetrate rock or very strongly cemented soils that require blasting or very heavy equipment for excavation. The operation of well-maintained equipment by an experienced crew allows ACS SERVICES LLC to complete drilling jobs to a depth of 50 feet with minimum downtime and maximum efficiency.

Sampling Procedures

Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 procedure. In many cases, 2 inch O.D., $1^3/_8$-inch I.D. samplers are used to obtain the standard penetration resistance. Undisturbed" samples of firmer soils are often obtained with 3 inch O.D. samplers lined with 2.42 inch I.D. brass rings. The driving energy is generally recorded as a number of blows of a 140-pound hammer, utilizing a 30-inch free fall drop, per foot of penetration. However, in stratified soils, driving resistance is sometimes recorded in 2 or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. These values are expressed in blows per foot on the logs. Undisturbed sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing from auger cuttings.

Continuous Penetration Tests

Continuous penetration tests are performed by driving a 2-inch O.D. blunt nosed penetrometer adjacent to or in the bottom of test borings. The penetrometer is attached to $1^5/_8$-inch O.D. drill rods to provide clearance and thus minimize side friction so that penetration values are as nearly as possible a measure of end resistance. Penetration values are recorded as the number of blows of a 140 pound hammer, utilizing a 30 inch drop required to advance the penetrometer in one foot increments or less.

Boring Records

Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487) with appropriate group symbols being shown on the logs.

APPENDIX C

ACS Services LLC

Laboratory Soil Test Results

ACS PROJECT #	2001179	Material Type:	Native
ACS Lab #	20-1926-8	Supplier:	
Client:	Kimley Horn	Sample Date:	3/4/2020
Project Name:	Taxiway H Relocation	Sampled By:	Geoffrey Matthew, EIT
Project Address:	6033 S. Sossaman Road	Test Date:	3/24/2020
Project City	Mesa, AZ	Tested By:	Fernando Montero
Sample Location:	B - 1 @ 0.0'-4.0'	Reviewed By:	Julian Ruiz

Sieve Analysis (ASTM C-139 / AASHTO T-27)

Sieve Size	% Retained	% Passed	Specs
6"	0	100	
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	3	97	
3/4"	2	95	
1/2"	5	90	
3/8"	3	88	
1/4"	3	84	
#4	2	82	
#8	5	77	
#10	1	76	
#16	5	71	
#30	7	64	
#40	4	60	
#50	4	56	
#100	8	47	
#200	8	39.3	

Liquid Limit (AASHTO T-89)	22
Plastic Limit (AASHTO T-90)	17
Plasticity Index (AASHTO T-90)	5
Moisture Content (AASHTO T-255)	9.5
Fractured Faces (ARIZ 212)	
Soluble Salts (ARIZ 237)	
USCS Soil Classification	SM-SC

Andrew Jamrogiewicz
Project Manager

Andrew Jamrogiewicz
Signature

ACS Services LLC

Laboratory Soil Test Results

ACS PROJECT #	2001179	Material Type:	Native
ACS Lab #	20-1926-1	Supplier:	
Client:	Kimley Horn	Sample Date:	3/4/2020
Project Name:	Taxiway H Relocation	Sampled By:	Geoffrey Matthew, EIT
Project Address:	6033 S. Sossaman Road	Test Date:	3/24/2020
Project City	Mesa, AZ	Tested By:	Fernando Montero
Sample Location:	B - 1 @ 4.0'-10.0'	Reviewed By:	Julian Ruiz

Sieve Analysis (ASTM C-139 / AASHTO T-27)

Sieve Size	% Retained	% Passed	Specs
6"	0	100	
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	0	100	
3/4"	0	100	
1/2"	0	100	
3/8"	0	99	
1/4"	1	98	
#4	1	97	
#8	3	94	
#10	1	93	
#16	4	89	
#30	7	82	
#40	4	78	
#50	5	73	
#100	9	64	
#200	9	54.9	

Liquid Limit (AASHTO T-89)	27
Plastic Limit (AASHTO T-90)	17
Plasticity Index (AASHTO T-90)	10
Moisture Content (AASHTO T-255)	11.7
Fractured Faces (ARIZ 212)	
Soluble Salts (ARIZ 237)	
USCS Soil Classification	CL

Andrew Jamrogiewicz
Project Manager

Andrew Jamrogiewicz
Signature

ACS Services LLC

Laboratory Soil Test Results

ACS PROJECT #	2001179	Material Type:	Native
ACS Lab #	20-1926-2	Supplier:	
Client:	Kimley Horn	Sample Date:	3/4/2020
Project Name:	Taxiway H Relocation	Sampled By:	Geoffrey Matthew, EIT
Project Address:	6033 S. Sossaman Road	Test Date:	3/24/2020
Project City	Mesa, AZ	Tested By:	Fernando Montero
Sample Location:	B - 2 @ 0.0'-4.0'	Reviewed By:	Julian Ruiz

Sieve Analysis (ASTM C-139 / AASHTO T-27)

Sieve Size	% Retained	% Passed	Specs
6"	0	100	
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	0	100	
3/4"	1	99	
1/2"	2	97	
3/8"	1	96	
1/4"	3	94	
#4	2	92	
#8	4	88	
#10	1	87	
#16	5	82	
#30	7	75	
#40	4	71	
#50	3	68	
#100	7	61	
#200	8	53.2	

Liquid Limit (AASHTO T-89)	25
Plastic Limit (AASHTO T-90)	16
Plasticity Index (AASHTO T-90)	9
Moisture Content (AASHTO T-255)	9.5
Fractured Faces (ARIZ 212)	
Soluble Salts (ARIZ 237)	
USCS Soil Classification	CL

Andrew Jamrogiewicz
Project Manager

Andrew Jamrogiewicz
Signature

ACS Services LLC

Laboratory Soil Test Results

ACS PROJECT #	2001179	Material Type:	Native
ACS Lab #	20-1926-4	Supplier:	
Client:	Kimley Horn	Sample Date:	3/4/2020
Project Name:	Taxiway H Relocation	Sampled By:	Geoffrey Matthew, EIT
Project Address:	6033 S. Sossaman Road	Test Date:	3/24/2020
Project City	Mesa, AZ	Tested By:	Fernando Montero
Sample Location:	B - 3 @ 0.0'-4.0'	Reviewed By:	Julian Ruiz

Sieve Analysis (ASTM C-139 / AASHTO T-27)

Sieve Size	% Retained	% Passed	Specs
6"	0	100	
3"	0	100	
2 1/2"	0	100	
2"	0	100	
1 1/2"	0	100	
1"	0	100	
3/4"	0	100	
1/2"	0	99	
3/8"	0	99	
1/4"	1	98	
#4	1	97	
#8	2	95	
#10	1	95	
#16	3	91	
#30	6	86	
#40	3	82	
#50	3	79	
#100	7	72	
#200	9	63.0	

Liquid Limit (AASHTO T-89)	31
Plastic Limit (AASHTO T-90)	16
Plasticity Index (AASHTO T-90)	15
Moisture Content (AASHTO T-255)	13.0
Fractured Faces (ARIZ 212)	
Soluble Salts (ARIZ 237)	
USCS Soil Classification	CL

Andrew Jamrogiewicz
Project Manager

Andrew Jamrogiewicz
Signature

ACS Services LLC

Job #	2001179	**Material Type**	Native
Lab #	20-1926	**Extraction Date**	3/4/2020
Client:	Kimley Horn	**Extracted By:**	Geoff Matthew
Project Name:	Taxiway H Relocation	**Laboratory Test Date:**	4/1/2020
Project Address:	6033 S. Sossaman Road	**Laboratory Tested By:**	Austin Portillo
Project City:	Mesa, AZ	**Reviewed By:**	Andrew Jamrogiewicz, P.E.
Material Source:	See Below		

Density of Soil in Place by the Drive-Cylinder Method (ASTM D2937)

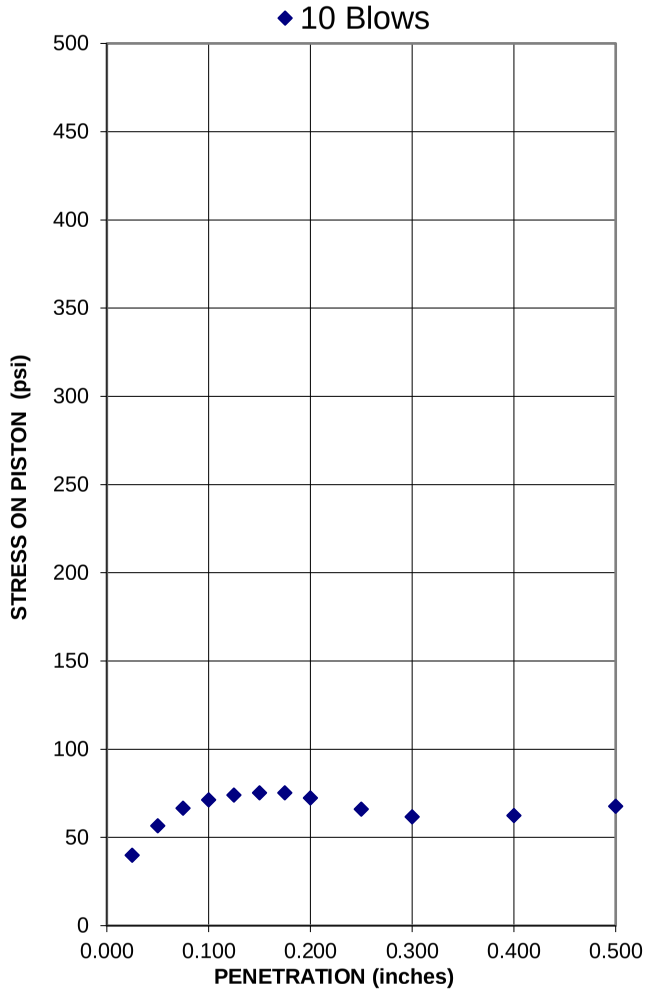
Boring Location	Wet Wt. (g)	Moisture Dry Wt. (g)	**Moist. Content**	# Of Rings	Wet Wt'+ Rings (g)	Wt.of Rings (g)	**Dry Density (pcf)**
B-1 @ 2.0' - 3.0'	982.1	869.3	**13.0%**	5	982.1	220.8	**111.6**
B-2 @ 3.0' - 4.0'	1175.5	1083.1	**8.5%**	6	1175.5	267.6	**115.4**
B-3 @ 4.0' - 5.0'	1128.8	1006.7	**12.1%**	6	1128.8	264.5	**106.4**

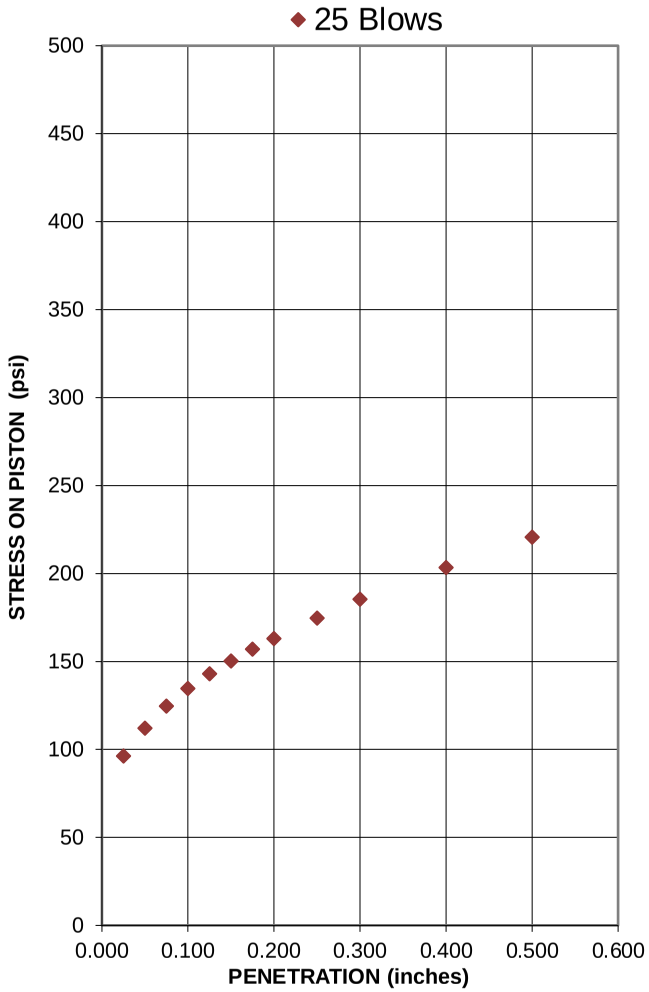
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

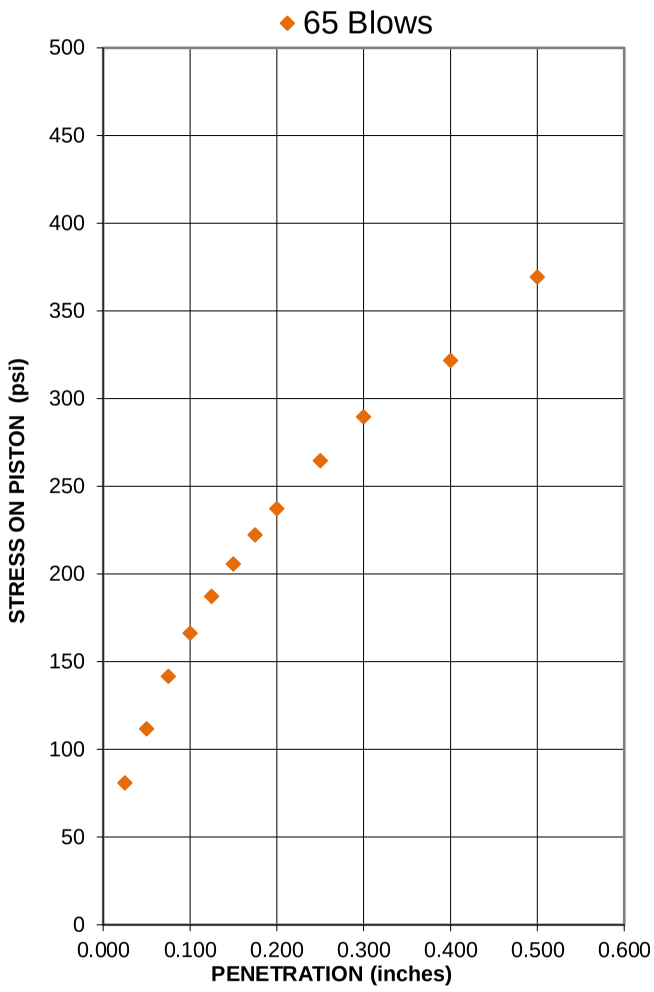
Terracon

PROJECT:	ACS Project # 2001179 Taxiway H Relocation	**JOB NO:**	65201093
LOCATION:	Mesa, AZ	**WORK ORDER NO:**	65201093.0001
MATERIAL:	Sandy Clay	**LAB NO:**	20-1926-8
SAMPLE SOURCE:	Lab ID# 20-19	**DATE SAMPLED:**	4/3/20

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak		After Soak	
							Dry Density	Moisture %	Dry Density	Moisture %
Point 1	10	90.6	ASTM D1557	10	Soak	0.00	115.4	10.2	110.0	20.0
Point 2	25	95.1	ASTM D1557	10	Soak	0.00	121.0	10.9	117.6	16.3
Point 3	65	100.0	ASTM D1557	10	Soak	0.00	127.3	10.6	125.3	13.6







REVIEWED BY _____

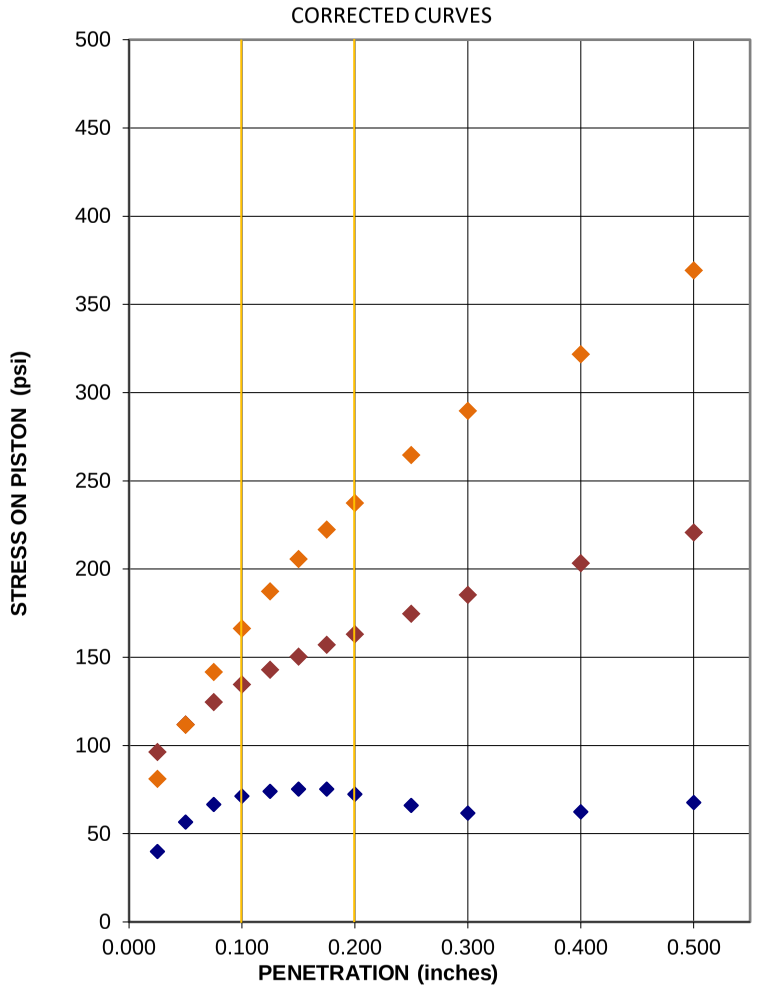
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

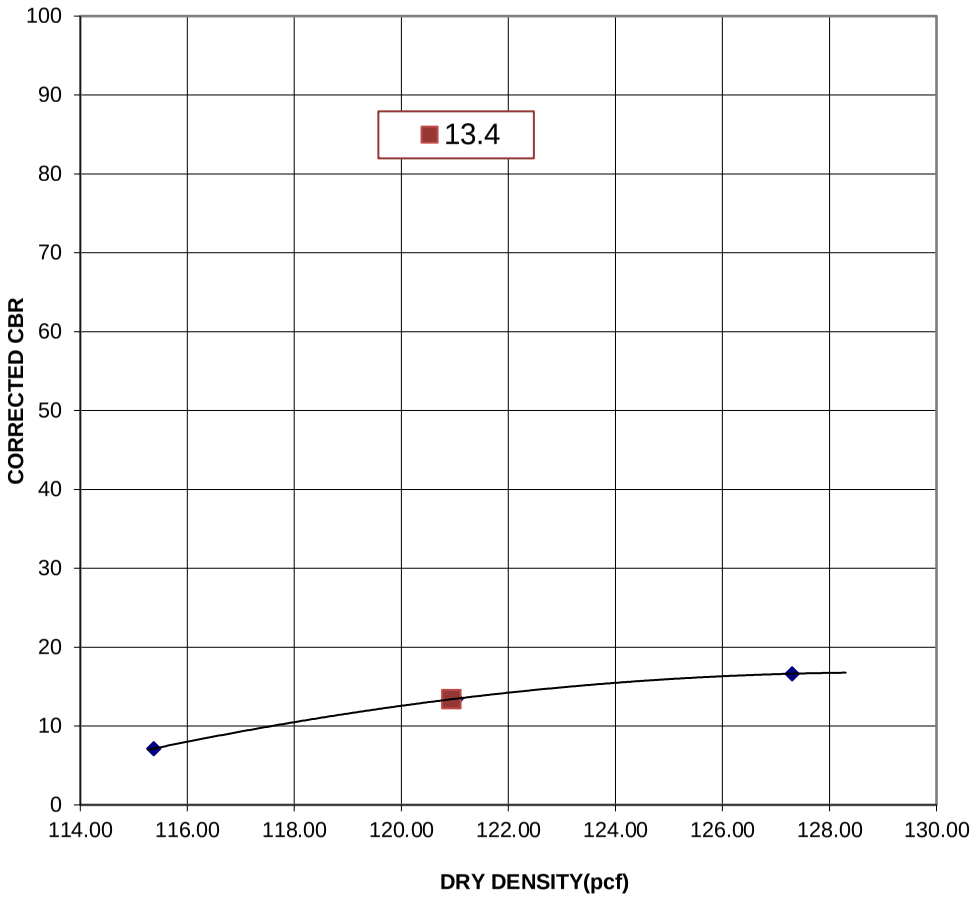
Terracon

PROJECT:	ACS Project # 2001179 Taxiway H Relocation	**JOB NO:**	65201093
LOCATION:	Mesa, AZ	**WORK ORDER NO:**	65201093.0001
MATERIAL:	Sandy Clay	**LAB NO:**	20-1926-8
SAMPLE SOURCE:	Lab ID# 20-19	**DATE SAMPLED:**	4/3/20

	Correction Factor		Corrected CBR		
	0.1"	0.2"	0.1"	0.2"	CBR
Point 1	0.00	0.00	7.1	4.8	7.1
Point 2	0.00	0.00	13.5	10.9	13.5
Point 3	0.00	0.00	16.6	15.8	16.6

ASTM D1557				95% COMPACTION CBR
Moisture	Dry Density (pcf)			
%	100%	95%	90%	13.4
10.4	127.3	120.9	114.6	





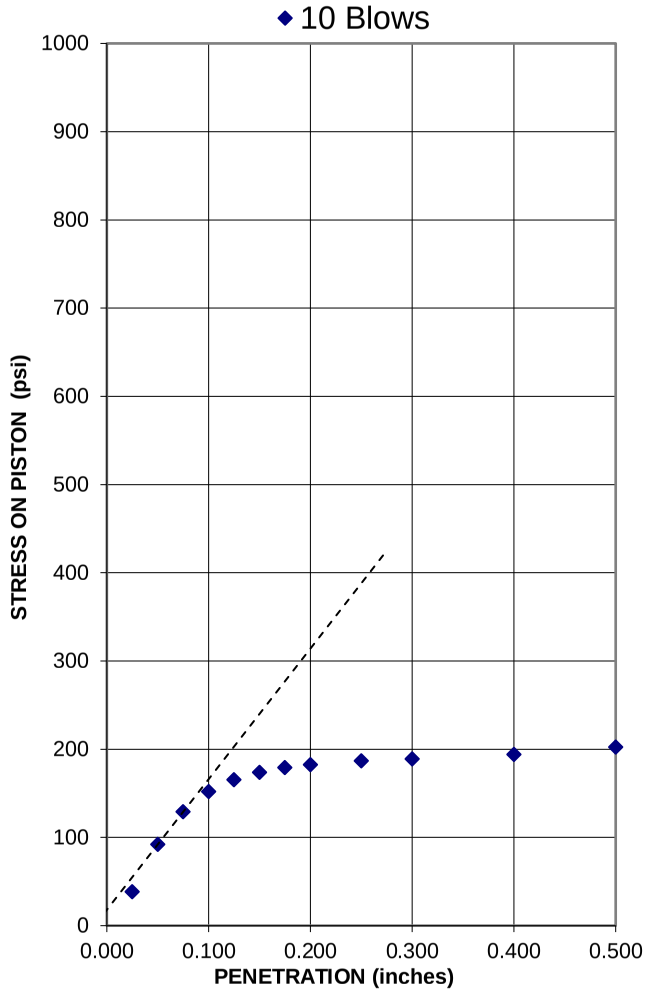
REVIEWED BY _____

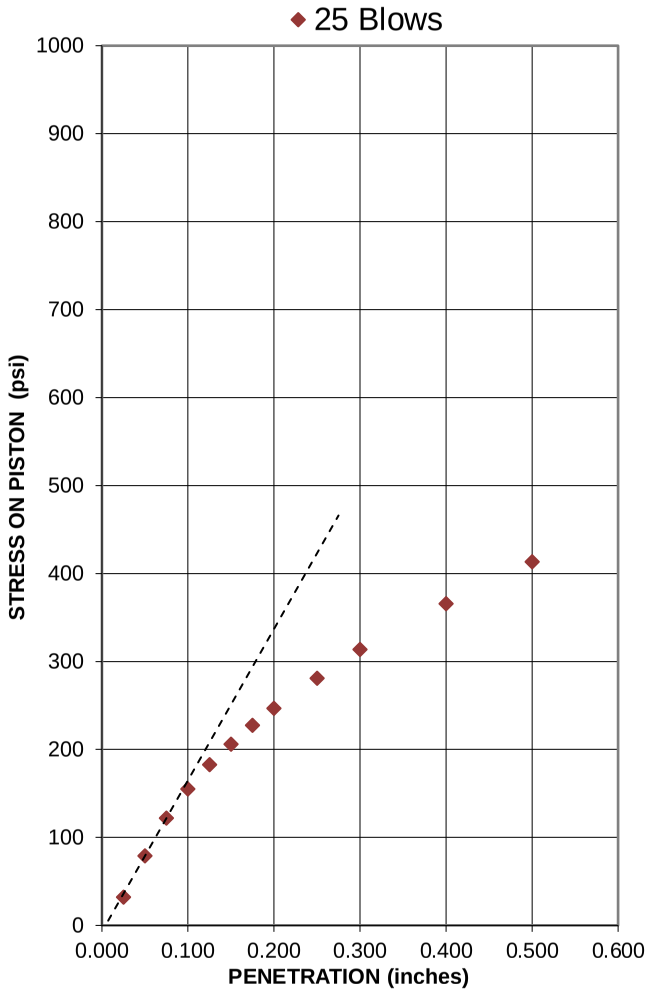
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

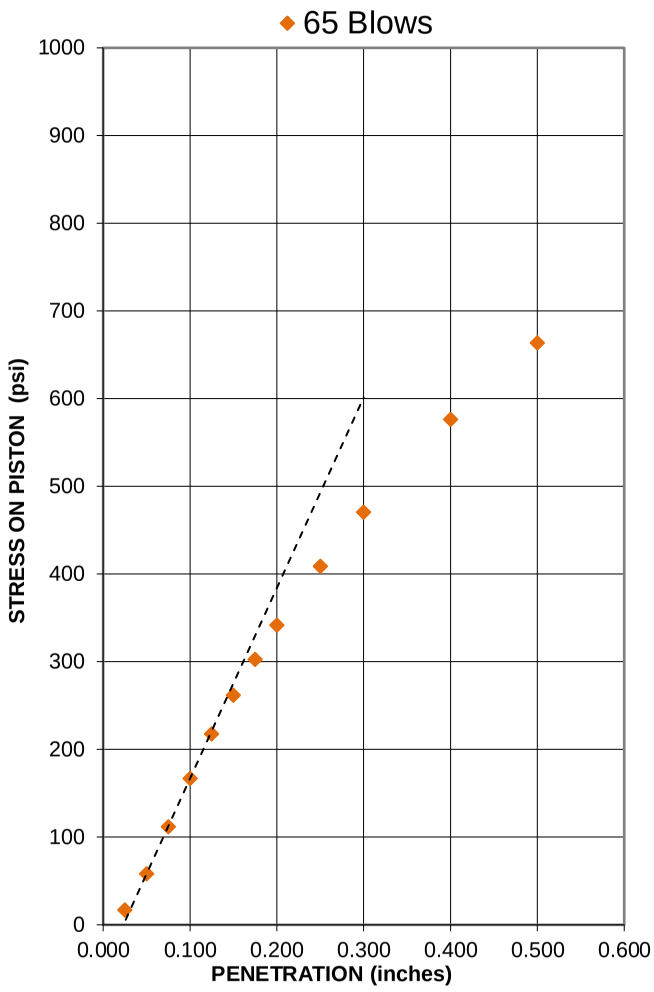
Terracon

PROJECT:	ACS Project # 2001179 Taxiway H Relocation	**JOB NO:**	65201093
LOCATION:	Mesa, AZ	**WORK ORDER NO:**	65201093.0001
MATERIAL:	Sandy Clay	**LAB NO:**	20-1926-1
SAMPLE SOURCE:	Lab ID# 20-19	**DATE SAMPLED:**	4/3/20

	Blows per Lift	Compaction %	Compaction Method	Surcharge Weight (Lb.)	Sample Condition	Percent Swell	Before Soak		After Soak	
							Dry Density	Moisture %	Dry Density	Moisture %
Point 1	10	91.4	ASTM D1557	10	Soak	0.00	115.8	11.2	111.7	18.2
Point 2	25	96.6	ASTM D1557	10	Soak	0.00	122.4	11.1	118.1	16.5
Point 3	65	100.0	ASTM D1557	10	Soak	0.00	126.7	10.3	122.6	14.9







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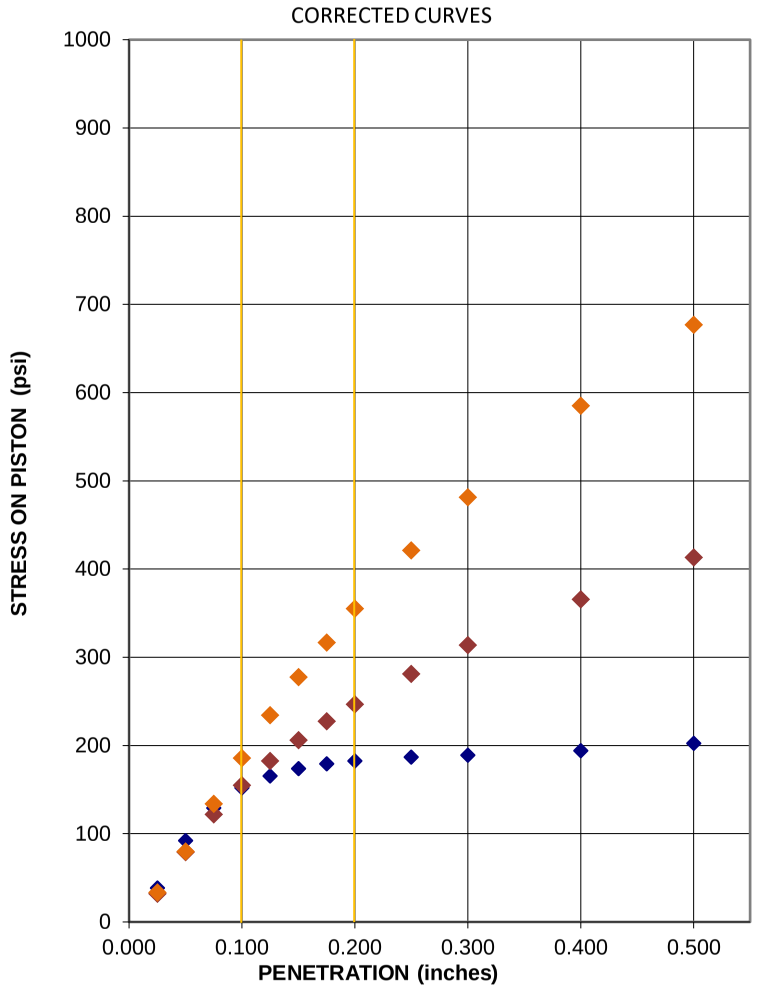
CBR(CALIFORNIA BEARING RATIO) OF LABORATORY-COMPACTED SOILS
ASTM D1883 (SOAKED)

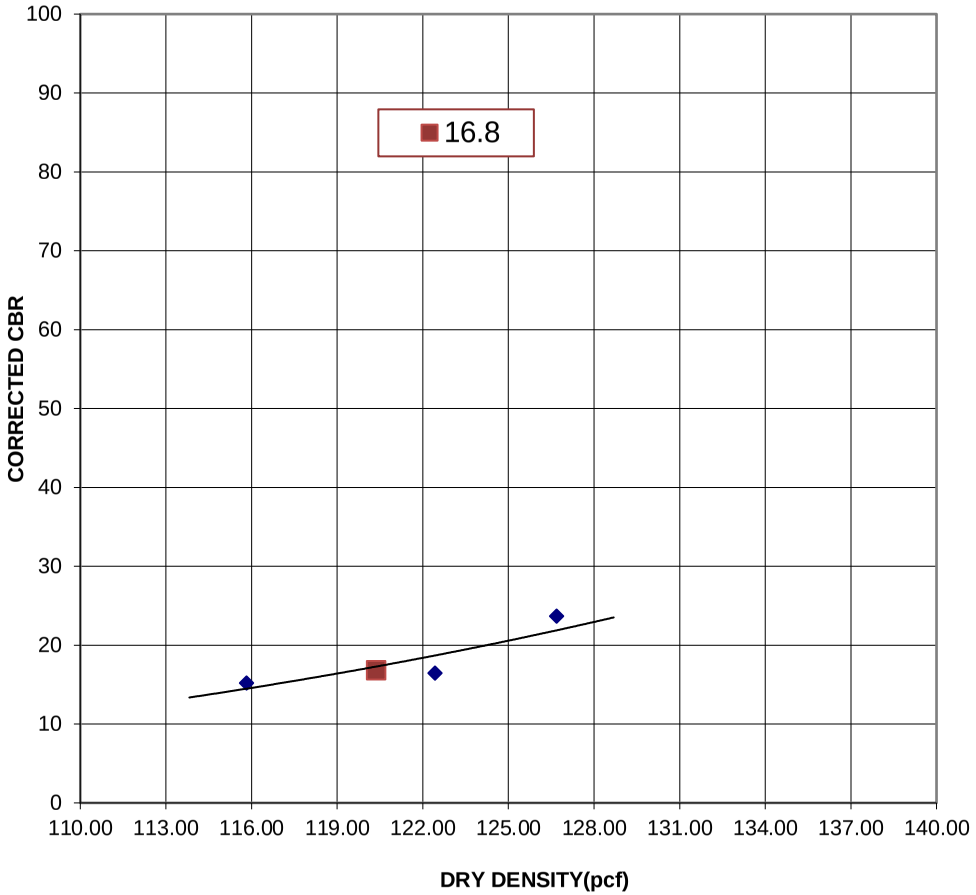
Terracon

PROJECT:	ACS Project # 2001179 Taxiway H Relocation	**JOB NO:**	65201093
LOCATION:	Mesa, AZ	**WORK ORDER NO:**	65201093.0001
MATERIAL:	Sandy Clay	**LAB NO:**	20-1926-1
SAMPLE SOURCE:	Lab ID# 20-19	**DATE SAMPLED:**	4/3/20

	Correction Factor		Corrected CBR		
	0.1"	0.2"	0.1"	0.2"	CBR
Point 1	0.00	0.00	15.2	12.2	15.2
Point 2	0.00	0.00	15.5	16.4	16.4
Point 3	0.01	0.01	18.6	23.7	23.7

ASTM D1557				95% COMPACTION CBR
Moisture	Dry Density (pcf)			
%	100%	95%	90%	16.8
7.9	126.7	120.4	114.0	





REVIEWED BY _____

ACS Services LLC

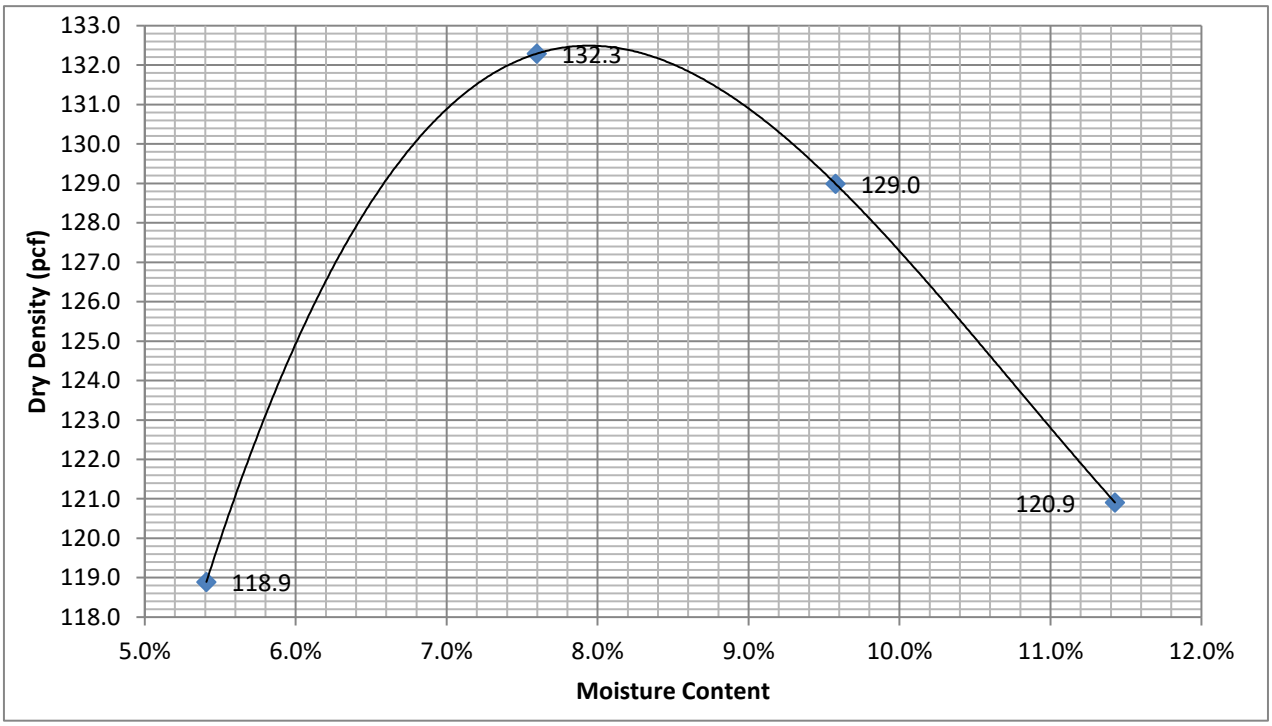
Maximum Dry Density & Optimum Moisture
☑ AASHTO T-99 / ☐ AASHTO T-180

ACS Project #	2001179	Material Type:	Native
ACS Lab #	20-1926-3	Material Supplier:	
Client Name:	Kimley Horn	Sample Date:	3/4/2020
Project Name:	Taxiway H Relocation	Sampled By:	Geoffrey Matthew, EIT
Project Address:	6033 S. Sossman Road	Date Tested:	3/17/2020
Project City:	Mesa, AZ	Tested By:	Angelo Garcia
		Reviewed By:	Julian Ruiz

Sample Location: B - 2 @ 4.0' - 10.0'

Dry Density	118.9	132.3	129.0	120.9
Moisture Content	5.4%	7.6%	9.6%	11.4%

Uncorrected Dry Density	132.5	Uncorrected Moisture Content	7.9
% Rock	0	% Passing	100
Rock Corrected Dry Density	**132.5**	Rock Corrected Moisture Content	**7.9**



Gene Hansen
Project Manager

ACS Services LLC

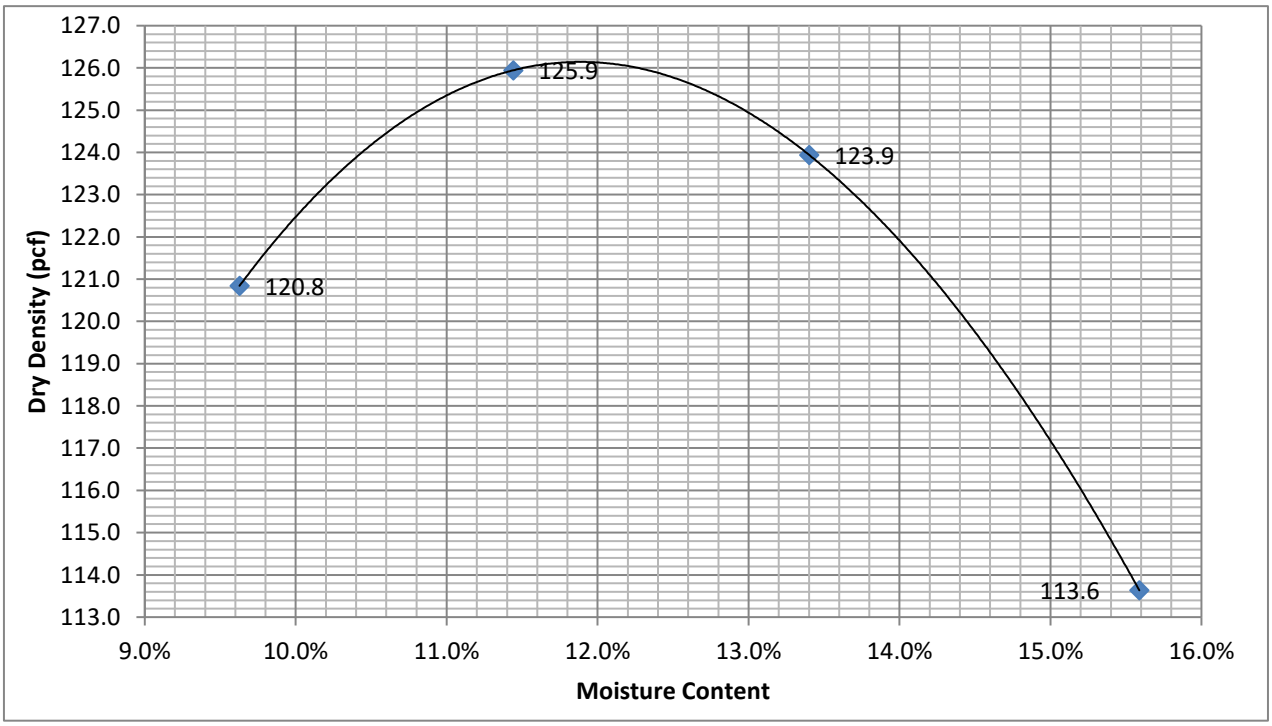
Maximum Dry Density & Optimum Moisture
☑ AASHTO T-99 / ☐ AASHTO T-180

ACS Project #	2001179	Material Type:	Native
ACS Lab #	20-1926-4	Material Supplier:	
Client Name:	Kimley Horn	Sample Date:	3/4/2020
Project Name:	Taxiway H Relocation	Sampled By:	Geoffrey Matthew, EIT
Project Address:	6033 S. Sossman Road	Date Tested:	3/17/2020
Project City:	Mesa, AZ	Tested By:	Angelo Garcia
		Reviewed By:	Julian Ruiz

Sample Location: B - 3 @ 0.0' - 4.0'

Dry Density	120.8	125.9	123.9	113.6
Moisture Content	9.6%	11.4%	13.4%	15.6%

Uncorrected Dry Density	126.1	Uncorrected Moisture Content	11.9
% Rock	0	% Passing	100
Rock Corrected Dry Density	**126.1**	Rock Corrected Moisture Content	**11.9**



Gene Hansen
Project Manager

APPENDIX D

FAARFIELD

FAARFIELD v 1.42 - Airport Pavement Design

Section NewRigid01 in Job PMGAA_Taxiway_H.

Working directory is C:\Users\User\Documents\FAARFIELD\

The structure is New Rigid.

Design Life = 20 years.

A design for this section was completed on 06/04/20 at 09:04:40.

Pavement Structure Information by Layer, Top First

No.	Type	Thickness in	Modulus psi	Poisson's Ratio	Strength R,psi
1	PCC Surface	14.99	4,000,000	0.15	650
2	P-401/ P-403 St (flex)	5.00	400,000	0.35	0
3	P-209 Cr Ag	8.00	56,553	0.35	0
4	Subgrade	0.00	20,991	0.40	0

Total thickness to the top of the subgrade = 27.99 in

Airplane Information

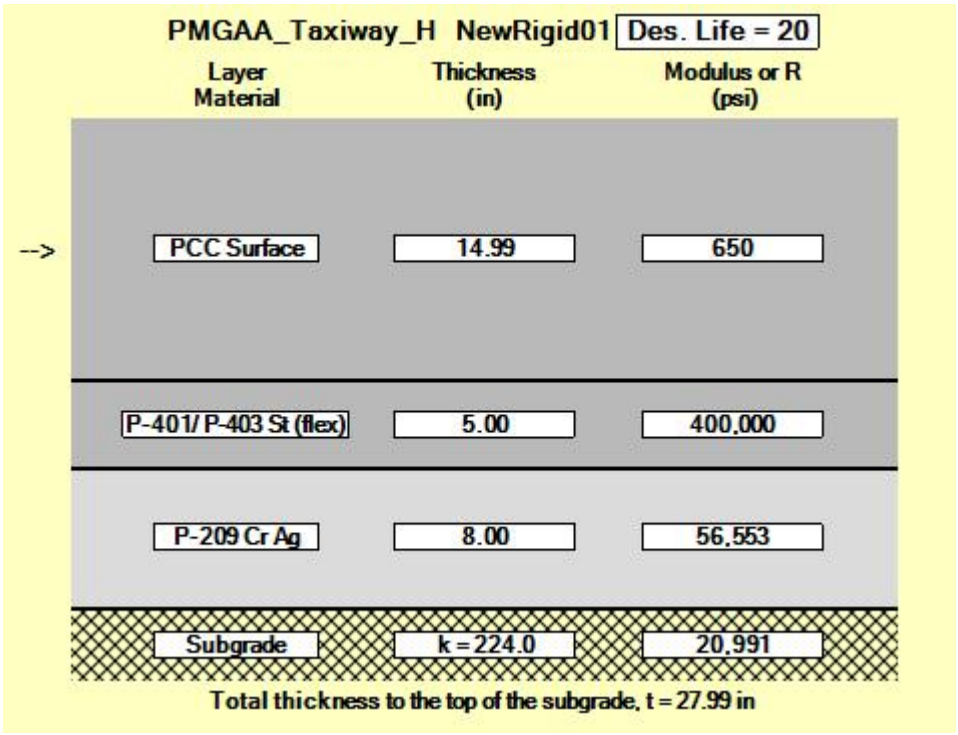
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	DC10-30/40	583,000	16	0.00
2	DC10-30/40 Belly	583,000	16	0.00
3	DC8-63/73	358,000	288	0.00
4	B767-300 ER	413,000	1,822	0.00
5	B757-200	256,000	2,209	0.00
6	A320-200 Twin std	162,922	8,837	0.00
7	B737-400	150,500	3,645	0.00
8	MD83	161,000	5,695	0.00
9	RegionalJet-700	72,500	3,645	0.00
10	Single Wheel 2	2,000	71,816	0.00
11	Single Wheel 5	5,000	71,816	0.00
12	Single Wheel 10	10,000	8,172	0.00
13	Learjet-35A/65A	18,000	6,698	0.00
14	Challenger-CL-604	48,200	6,679	0.00
15	Gulfstream-G-IV	75,000	3,319	0.00
16	B737-300	140,000	669	0.00
17	C-17A	585,000	502	0.00
18	C-141	345,000	790	0.00
19	C-130	155,000	106	0.00
20	F-16C	42,300	1,106	0.00
21	Single Wheel 10	10,000	1,175	0.00
22	Single Wheel 5	5,000	38,843	0.00
23	D-15	15,000	172	0.00
24	D-20	20,000	9,039	0.00
25	D-15	15,000	2,494	0.00

26	S-12.5	12,500	3,392	0.00

Additional Airplane Information

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	DC10-30/40	0.00	0.00	0.00
2	DC10-30/40 Belly	0.00	0.00	0.00
3	DC8-63/73	0.00	0.00	0.00
4	B767-300 ER	0.00	0.00	0.00
5	B757-200	0.00	0.00	0.00
6	A320-200 Twin std	0.00	0.00	0.00
7	B737-400	0.00	0.00	0.00
8	MD83	0.00	0.00	0.00
9	RegionalJet-700	0.00	0.00	0.00
10	Single Wheel 2	0.00	0.00	0.00
11	Single Wheel 5	0.00	0.00	0.00
12	Single Wheel 10	0.00	0.00	0.00
13	Learjet-35A/65A	0.00	0.00	0.00
14	Challenger-CL-604	0.00	0.00	0.00
15	Gulfstream-G-IV	0.00	0.00	0.00
16	B737-300	0.00	0.00	0.00
17	C-17A	0.00	0.00	0.00
18	C-141	0.00	0.00	0.00
19	C-130	0.00	0.00	0.00
20	F-16C	0.00	0.00	0.00
21	Single Wheel 10	0.00	0.00	0.00
22	Single Wheel 5	0.00	0.00	0.00
23	D-15	0.00	0.00	0.00
24	D-20	0.00	0.00	0.00
25	D-15	0.00	0.00	0.00
26	S-12.5	0.00	0.00	0.00

User is responsible for checking frost protection requirements.


PMGAA_Taxiway_H NewRigid01
Des. Life = 20
Layer Material
Thickness (in)
Modulus or R (psi)
-->
PCC Surface
14.99
650
P-401/ P-403 St (flex)
5.00
400,000
P-209 Cr Ag
8.00
56,553
Subgrade
k = 224.0
20,991
Total thickness to the top of the subgrade, t = 27.99 in

Appendix C FAARFIELD Pavement Design Output Data

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on CTB on LTSG

This file name = PCR Results Rigid 2022-12-12 11:12:29

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Rigid on HMA in job file: PMGAA Runway 12R-30L.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =19556psi (Subgrade Category is B(17k))

Evaluation Pavement Thickness = 21.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.226

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight	Tire Pressure psi	Annual Departure	20 Years Coverage
1	A319-100 std	168653	92.60	205.5	2555	14920
2	A320-200 opt	171961	92.80	207.9	7665	41200
3	B767-300	412000	92.40	228.2	500	2763
4	B737-800	174200	93.56	203.4	624	3504
5	B747-400	875000	46.66	199.5	208	1188
6	B747-400 Belly	875000	46.66	199.5	208	1185
7	Cessna 172 Skyhawk	2550	95.00	49.8	90000	207009
8	Beechcraft King Air C90	11800	95.00	70.5	90000	412390
9	Premier 390 (UDA)	12500	47.50	69.0	10000	47151
10	Dassault Falcon 10 (UDA)	16000	47.50	208.0	300	1599
11	Hawker-800/800XP	28000	95.00	134.4	25000	79261
12	Dassault Falcon 900B/C	41000	95.00	130.7	15000	55689
13	Learjet 35/36/35A/36A	18000	95.00	171.0	25000	57623
14	Bombardier CL-604/605	43000	95.00	129.4	12000	45467
15	ERJ-135	25265	95.00	80.4	5000	14949
16	Global Express (UDA)	99500	47.50	189.0	5000	29539
17	LearJet 60 (UDA)	23500	47.50	201.0	100	288
18	Gulfstream-G-IV	72000	95.00	177.6	5300	22932
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	200	944
20	F-16C	37500	95.00	190.6	100	424
21	C-130	155000	95.00	105.0	150	642
22	C-17A	580000	95.00	136.8	25	381

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft	ACR Thick at max. MGW (in.)	PCR//R/B
1	B747-400	669	932223	15.69	750.9

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight on Main Gear	Tire Pressure psi	ACR Thick (in.) (B)	ACR//R/B
1	A319-100 std	168653	92.60	205.5	12.4	467.7
2	A320-200 opt	171961	92.80	207.9	12.8	499.2
3	B767-300	412000	92.40	228.2	14.2	617.2
4	B737-800	174200	93.56	203.4	13.1	522.9
5	B747-400	875000	93.32	199.5	15	683.5
7	Cessna 172 Skyhawk	2550	95.00	49.8	2	6.3
8	Beechcraft King Air C90	11800	95.00	70.5	2.7	24.7
9	Premier 390 (UDA)	12500	47.5	69.0	2.8	26.5
10	Dassault Falcon 10 (UDA)	16000	47.5	208.0	3.2	35.1
11	Hawker-800/800XP	28000	95.00	134.4	4.9	77.5
12	Dassault Falcon 900B/C	41000	95.00	130.7	6.3	123.2
13	Learjet 35/36/35A/36A	18000	95.00	171.0	3.9	50.1
14	Bombardier CL-604/605	43000	95.00	129.4	6.3	127
15	ERJ-135	25265	95.00	80.4	4.3	59.6
16	Global Express (UDA)	99500	47.5	189.0	10.2	318.1
17	LearJet 60 (UDA)	23500	47.5	201.0	4.1	54.5
18	Gulfstream-G-IV	72000	95.00	177.6	8.9	242.8
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	9.9	301.1
20	F-16C	37500	95.00	190.6	7.2	161.2
21	C-130	155000	95.00	105.0	10	305.3
22	C-17A	580000	95.00	136.8	13.6	567

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on HMA

This file name = PCR Results Rigid 2022-12-12 11:44:50

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Rigid on HMA in job file: PMGAA Runway 12R-30L.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =19556psi (Subgrade Category is B(17k))

Evaluation Pavement Thickness = 26.5 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.246

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight	Tire Pressure psi	Annual Departure	20 Years Coverage
1	A319-100 std	168653	92.60	205.5	2555	14920
2	A320-200 opt	171961	92.80	207.9	7665	41200
3	B767-300	412000	92.40	228.2	500	2763
4	B737-800	174200	93.56	203.4	624	3504
5	B747-400	875000	46.66	199.5	208	1188
6	B747-400 Belly	875000	46.66	199.5	208	1185
7	Cessna 172 Skyhawk	2550	95.00	49.8	90000	207009
8	Beechcraft King Air C90	11800	95.00	70.5	90000	412390
9	Premier 390 (UDA)	12500	47.50	69.0	10000	47151
10	Dassault Falcon 10 (UDA)	16000	47.50	208.0	300	1599
11	Hawker-800/800XP	28000	95.00	134.4	25000	79261
12	Dassault Falcon 900B/C	41000	95.00	130.7	15000	55689
13	Learjet 35/36/35A/36A	18000	95.00	171.0	25000	57623
14	Bombardier CL-604/605	43000	95.00	129.4	12000	45467
15	ERJ-135	25265	95.00	80.4	5000	14949
16	Global Express (UDA)	99500	47.50	189.0	5000	29539
17	LearJet 60 (UDA)	23500	47.50	201.0	100	288
18	Gulfstream-G-IV	72000	95.00	177.6	5300	22932
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	200	944
20	F-16C	37500	95.00	190.6	100	424
21	C-130	155000	95.00	105.0	150	642
22	C-17A	580000	95.00	136.8	25	381

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft	ACR Thick at max. MGW (in.)	PCR//R/B
1	B747-400	873	928533	15.64	746.5

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight on Main Gear	Tire Pressure psi	ACR Thick (in.) (B)	ACR//R/B
1	A319-100 std	168653	92.60	205.5	12.4	467.7
2	A320-200 opt	171961	92.80	207.9	12.8	499.2
3	B767-300	412000	92.40	228.2	14.2	617.2
4	B737-800	174200	93.56	203.4	13.1	522.9
5	B747-400	875000	93.32	199.5	15	683.5
7	Cessna 172 Skyhawk	2550	95.00	49.8	2	6.3
8	Beechcraft King Air C90	11800	95.00	70.5	2.7	24.7
9	Premier 390 (UDA)	12500	47.5	69.0	2.8	26.5
10	Dassault Falcon 10 (UDA)	16000	47.5	208.0	3.2	35.1
11	Hawker-800/800XP	28000	95.00	134.4	4.9	77.5
12	Dassault Falcon 900B/C	41000	95.00	130.7	6.3	123.2
13	Learjet 35/36/35A/36A	18000	95.00	171.0	3.9	50.1
14	Bombardier CL-604/605	43000	95.00	129.4	6.3	127
15	ERJ-135	25265	95.00	80.4	4.3	59.6
16	Global Express (UDA)	99500	47.5	189.0	10.2	318.1
17	LearJet 60 (UDA)	23500	47.5	201.0	4.1	54.5
18	Gulfstream-G-IV	72000	95.00	177.6	8.9	242.8
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	9.9	301.1
20	F-16C	37500	95.00	190.6	7.2	161.2
21	C-130	155000	95.00	105.0	10	305.3
22	C-17A	580000	95.00	136.8	13.6	567

Federal Aviation Administration FAARFIELD 2.0 PCR Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Rigid on Lean Concrete

This file name = PCR Results Rigid 2022-12-12 11:35:17

Evaluation pavement type is rigid and design program is FAARFIELD.

Section name: Rigid on HMA in job file: PMGAA Runway 12R-30L.JOB.xml

Units = US Customary

Analysis Type: New Rigid

Subgrade Modulus =19556psi (Subgrade Category is B(17k))

Evaluation Pavement Thickness = 21.0 in.

Pass to Traffic Cycle (PtoTC) Ratio = 1.00

Maximum number of wheels per gear = 6

CDF = 0.524

Results Table 1. Input Traffic Data

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight	Tire Pressure psi	Annual Departure	20 Years Coverage
1	A319-100 std	168653	92.60	205.5	2555	14920
2	A320-200 opt	171961	92.80	207.9	7665	41200
3	B767-300	412000	92.40	228.2	500	2763
4	B737-800	174200	93.56	203.4	624	3504
5	B747-400	875000	46.66	199.5	208	1188
6	B747-400 Belly	875000	46.66	199.5	208	1185
7	Cessna 172 Skyhawk	2550	95.00	49.8	90000	207009
8	Beechcraft King Air C90	11800	95.00	70.5	90000	412390
9	Premier 390 (UDA)	12500	47.50	69.0	10000	47151
10	Dassault Falcon 10 (UDA)	16000	47.50	208.0	300	1599
11	Hawker-800/800XP	28000	95.00	134.4	25000	79261
12	Dassault Falcon 900B/C	41000	95.00	130.7	15000	55689
13	Learjet 35/36/35A/36A	18000	95.00	171.0	25000	57623
14	Bombardier CL-604/605	43000	95.00	129.4	12000	45467
15	ERJ-135	25265	95.00	80.4	5000	14949
16	Global Express (UDA)	99500	47.50	189.0	5000	29539
17	LearJet 60 (UDA)	23500	47.50	201.0	100	288
18	Gulfstream-G-IV	72000	95.00	177.6	5300	22932
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	200	944
20	F-16C	37500	95.00	190.6	100	424
21	C-130	155000	95.00	105.0	150	642
22	C-17A	580000	95.00	136.8	25	381

Results Table 2. PCR Value

No.	Aircraft Name	Critical aircraft Total equiv. departures	Max allowable Gross Weight of critical aircraft	ACR Thick at max. MGW (in.)	PCR//R/B
1	B747-400	697	899904	15.28	712.4

Results Table 3. New Rigid ACR at Indicated Gross Weight and Strength

No.	Aircraft Name	Gross Weight lbs	Percent Gross Weight on Main Gear	Tire Pressure psi	ACR Thick (in.) (B)	ACR//R/B
1	A319-100 std	168653	92.60	205.5	12.4	467.7
2	A320-200 opt	171961	92.80	207.9	12.8	499.2
3	B767-300	412000	92.40	228.2	14.2	617.2
4	B737-800	174200	93.56	203.4	13.1	522.9
5	B747-400	875000	93.32	199.5	15	683.5
7	Cessna 172 Skyhawk	2550	95.00	49.8	2	6.3
8	Beechcraft King Air C90	11800	95.00	70.5	2.7	24.7
9	Premier 390 (UDA)	12500	47.5	69.0	2.8	26.5
10	Dassault Falcon 10 (UDA)	16000	47.5	208.0	3.2	35.1
11	Hawker-800/800XP	28000	95.00	134.4	4.9	77.5
12	Dassault Falcon 900B/C	41000	95.00	130.7	6.3	123.2
13	Learjet 35/36/35A/36A	18000	95.00	171.0	3.9	50.1
14	Bombardier CL-604/605	43000	95.00	129.4	6.3	127
15	ERJ-135	25265	95.00	80.4	4.3	59.6
16	Global Express (UDA)	99500	47.5	189.0	10.2	318.1
17	LearJet 60 (UDA)	23500	47.5	201.0	4.1	54.5
18	Gulfstream-G-IV	72000	95.00	177.6	8.9	242.8
19	Gulfstream G-V/G500/G550	90500	95.00	187.2	9.9	301.1
20	F-16C	37500	95.00	190.6	7.2	161.2
21	C-130	155000	95.00	105.0	10	305.3
22	C-17A	580000	95.00	136.8	13.6	567

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Shoulder AC on ABC on LTSG

Analysis Type: HMA on Aggregate

Last Run: Thickness Design 2022-12-01 13:28:56

Design Life = 20 Years

Total thickness to the top of the subgrade = 16.6in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-401/P-403 HMA Surface	4.0	200000	0.35	0
2	P-209 Crushed Aggregate	12.6	61217	0.35	0
3	Subgrade	0	19556	0.35	0

Airplane Information

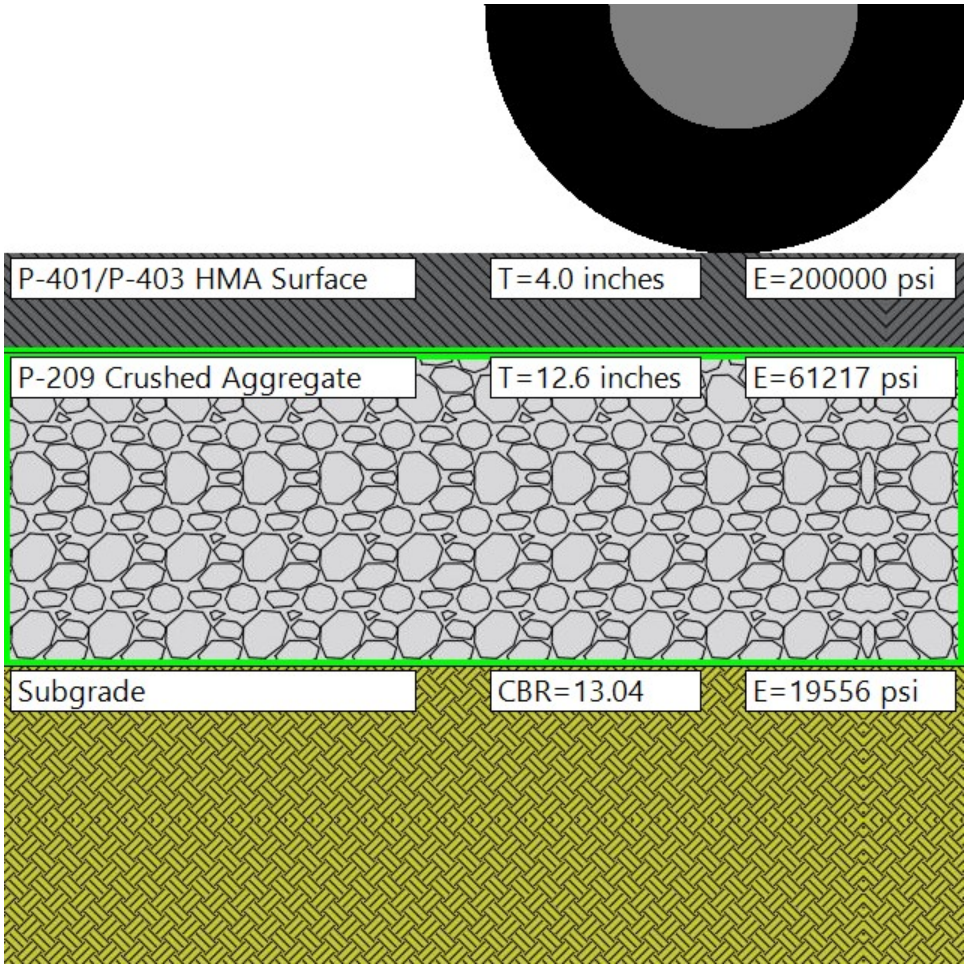
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	B767-300	412000	15	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	B767-300	1.00	1.00	1.73

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200000 psi
P-209 Crushed Aggregate
T=12.6 inches
E=61217 psi
Subgrade
CBR=13.04
E=19556 psi

Federal Aviation Administration FAARFIELD 2.0 Section Report

FAARFIELD 2.0.7 (Build 09/14/2021)

Job Name: PMGAA Runway 12R-30L

Section: Shoulder AC on ABC

Analysis Type: HMA on Aggregate

Last Run: Thickness Design 2022-12-01 13:36:59

Design Life = 20 Years

Total thickness to the top of the subgrade = 49.7in.

Pavement Structure Information by Layer

No.	Type	Thickness in.	Modulus psi	Poisson's Ratio	Strength R psi
1	P-401/P-403 HMA Surface	4.0	200000	0.35	0
2	P-209 Crushed Aggregate	8.9	63018	0.35	0
3	P-154 Uncrushed Aggregate	36.8	17045	0.35	0
4	Subgrade	0	3750	0.35	0

Airplane Information

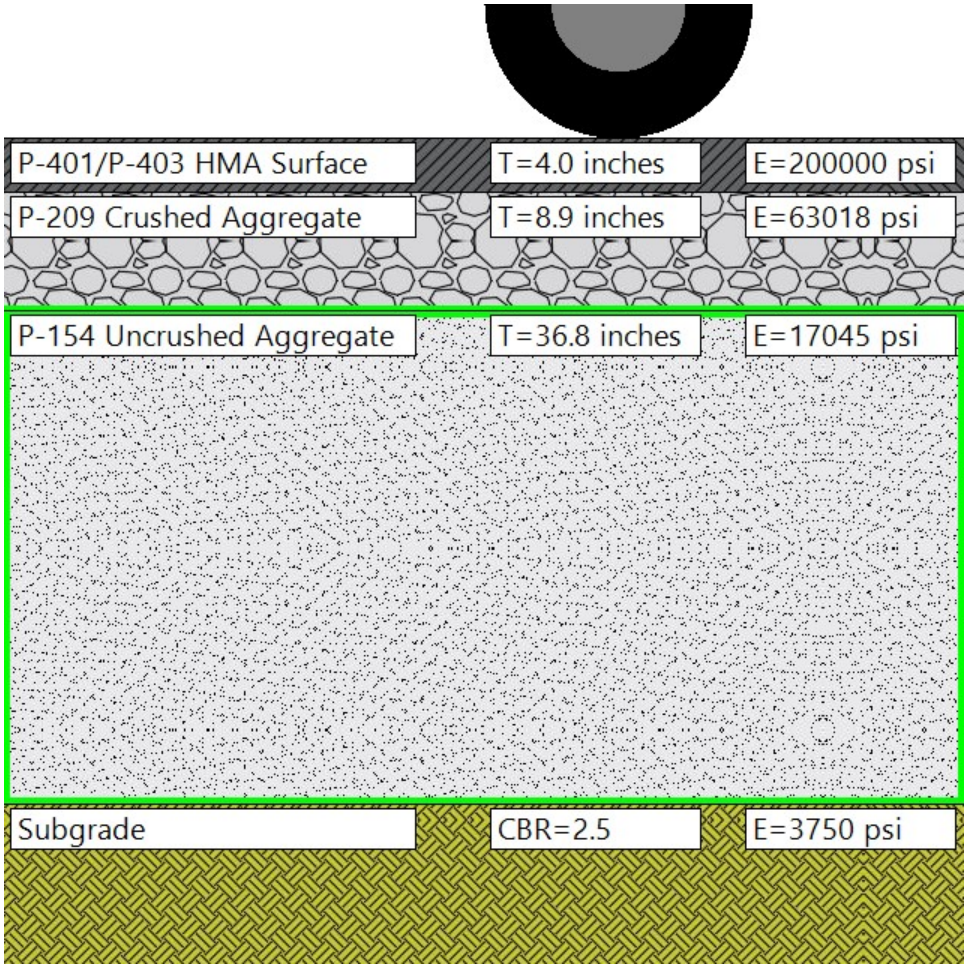
No.	Name	Gross Wt. lbs	Annual Departures	% Annual Growth
1	B767-300	412000	15	0

Additional Airplane Information

Subgrade CDF

No.	Name	CDF Contribution	CDF Max for Airplane	P/C Ratio
1	B767-300	1.02	1.02	1.08

User Is responsible For checking frost protection requirements.


P-401/P-403 HMA Surface
T=4.0 inches
E=200000 psi
P-209 Crushed Aggregate
T=8.9 inches
E=63018 psi
P-154 Uncrushed Aggregate
T=36.8 inches
E=17045 psi
Subgrade
CBR=2.5
E=3750 psi

Appendix D Detention Basin Mid Memorandum Excerpts

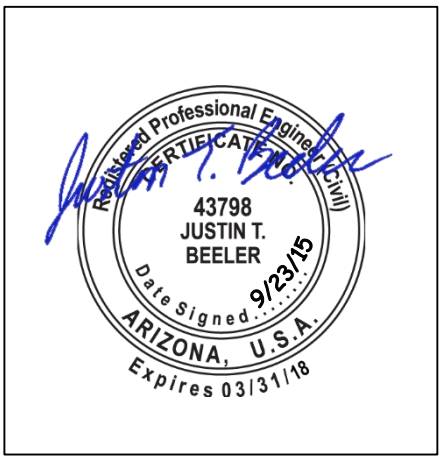
Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020-4669
P 602.957.1155
F 602.957.2838

Memorandum

To:	Mr. Tony Steeneck	Date:	October 21, 2013
			Revised: September 23, 2015
Copy:	Ken Snyder, P.E.	Client Project:	CIP No. 505
From:	Justin Beeler, P.E., CFM	Project No:	101232.1602
Subject:	Phoenix-Mesa Gateway Airport *Detention Basin Mid*: Technical Drainage Memorandum		

This Technical Drainage Memorandum was prepared to support the Phoenix-Mesa Gateway Airport *Detention Basin Mid – Airfield Drainage Improvements* project.



Due to funding constraints, this project has been split into three phases:

1. *Detention Basin Mid Phase I*, recently completed in 2014, included the north half of the ultimate basin and a single 24-inch outfall pipe to Detention Basin North. This project met the initial goal of complying with FAA drainage design standards (5 and 10-year storms), and prevents infield runoff from crossing the critical Taxiway Kilo/Runway 12R-30L intersection.

2. *Detention Basin Mid Phase II* (this project) will construct the south half of the ultimate basin, and will meet the intent of the *Airport Drainage Master Plan* and the requirements of the Flood Control District of Maricopa County (FCDMC) by detaining runoff from the 100-year, 2-hour storm, and preventing runoff in excess of that allowable from reaching the Powerline Floodway. The existing 24-inch outfall pipe installed in Phase I is adequate to drain both the Phase I and the Phase II basins.

3. *Detention Basin Mid Phase III* is comprised of the storm runoff collection and outfall piping system between the inboard and center runway, north of Taxiway Kilo. This phase is only necessary if the master-planned system of parallel taxiways and connector taxiways in this area are constructed, and can be built concurrently with those taxiway project(s)."

This drainage memo is being resubmitted to document the Phase 1 plans and the proposed design for Phase 2. However, at the time of this memo, design plans have only been prepared for the Phase 1 and 2. An additional drainage memo may be necessary to incorporate any changes in the final Phase 3 design.

The initial design proposed that the Detention Basin Mid be constructed as two basins connected by an equalizer pipe. The Phase 1 design constructed the northern basin along with a single 24-inch outfall pipe to convey only the discharge from this basin. This Phase 2 will construct the second basin to the south. Phase 3 will add additional outfall pipes to convey the runoff from the infield areas between Detention Basin Mid and Detention Basin North. See **Figure B1**.

Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020-4669
P 602.957.1155
F 602.957.2838

provided here for use after the Phase 1 improvements due to a constructed berm and 18" drain pipe and this volume is accounted for within the hydrology model. The ultimate basin configuration for the DMIDS basin which will be constructed in Phase 2 is then represented in the Phase 2 hydrology model. The lower half of the watershed (subbasins 9N-3 & 9N-4) will be captured and stored in the northern half of the basin site, defined in the HEC-1 model as "DMIDN".

There are two HEC-1 models prepared to model the Phase 1 and Phase 2 conditions. The Phase 1 model will include the constructed northern basin (DMIDN) and will account for some storage where the future southern basin will be located (DMIDS). The Phase 2 model will include the addition of the ultimate south basin (DMIDS) configuration. The HEC-1 models developed for this study indicate that the combined total runoff volume from subbasins 9N-1 through 9N-4 will have a 100-Year, 6-Hour runoff volume of 19.08 ac-ft. The larger of the two proposed basin sites, DMIDS, will have a provided storage volume of 14.12 ac-ft and the northern basin site, DMIDN, will have a maximum storage volume of 7.99 ac-ft for a combined storage volume of 22.11 ac-ft. Basin DMIDS will drain into DMIDN through an 18" pipe which will then drain through a 24" pipe to Detention Basin North. The discharge rate from the basin will vary depending on the water depth in the basin. A drain time calculation for Phase 2 is estimated using an estimated volume amount along with the associated discharge rate for each 1-foot section of depth in the basin. The combined drain time for both basins is calculated to be approximately 22.8 hours. Drain time calculations are included in **Appendix B3**.

Figure B2 also shows a portion of the 2001 *Airport Master Drainage Plan* drainage map and the original subbasin boundaries which were used for this analysis. The parameters used in the HEC-1 calculations are included on **Table 2** and **Table 3**. Supporting documentation from the DDMSW and HEC-1 programs are also attached with this memo in **Appendix B2** & **B3**.

Table 2 - HEC-1 Subbasin Parameters

Subbasin ID	Area (sq.mi.)	Upstream Elevation (ft)	Downstream Elevation (ft)	Length (mi.)	Slope (ft/mi)	Time-Area	100 Yr TOC (hrs)	100 Yr Vel (ft/s)	100 Yr R (hrs)
9N-1	0.068	1372	1359	0.559	23.3	Urban	0.504	1.63	0.504
9N-2	0.079	1369	1359	0.574	17.4	Urban	0.561	1.49	0.528
9N-3	0.021	1364.5	1358	0.202	32.2	Urban	0.279	1.05	0.224
9N-4	0.026	1359	1355.5	0.160	21.9	Urban	0.309	0.76	0.185
10N	0.215	1361	1345	0.781	20.5	Urban	0.591	1.94	0.407
11N	0.069	1356	1346	0.463	21.6	Urban	0.456	1.48	0.381
12N	0.043	1345	1340	0.313	16.0	Urban	0.371	1.23	0.290
13NI	0.018	1351	1345	0.251	23.9	Urban	0.271	1.35	0.283

Dibble Engineering

7500 North Dreamy Draw Drive, Suite 200
Phoenix, Arizona 85020-4669
P 602.957.1155
F 602.957.2838

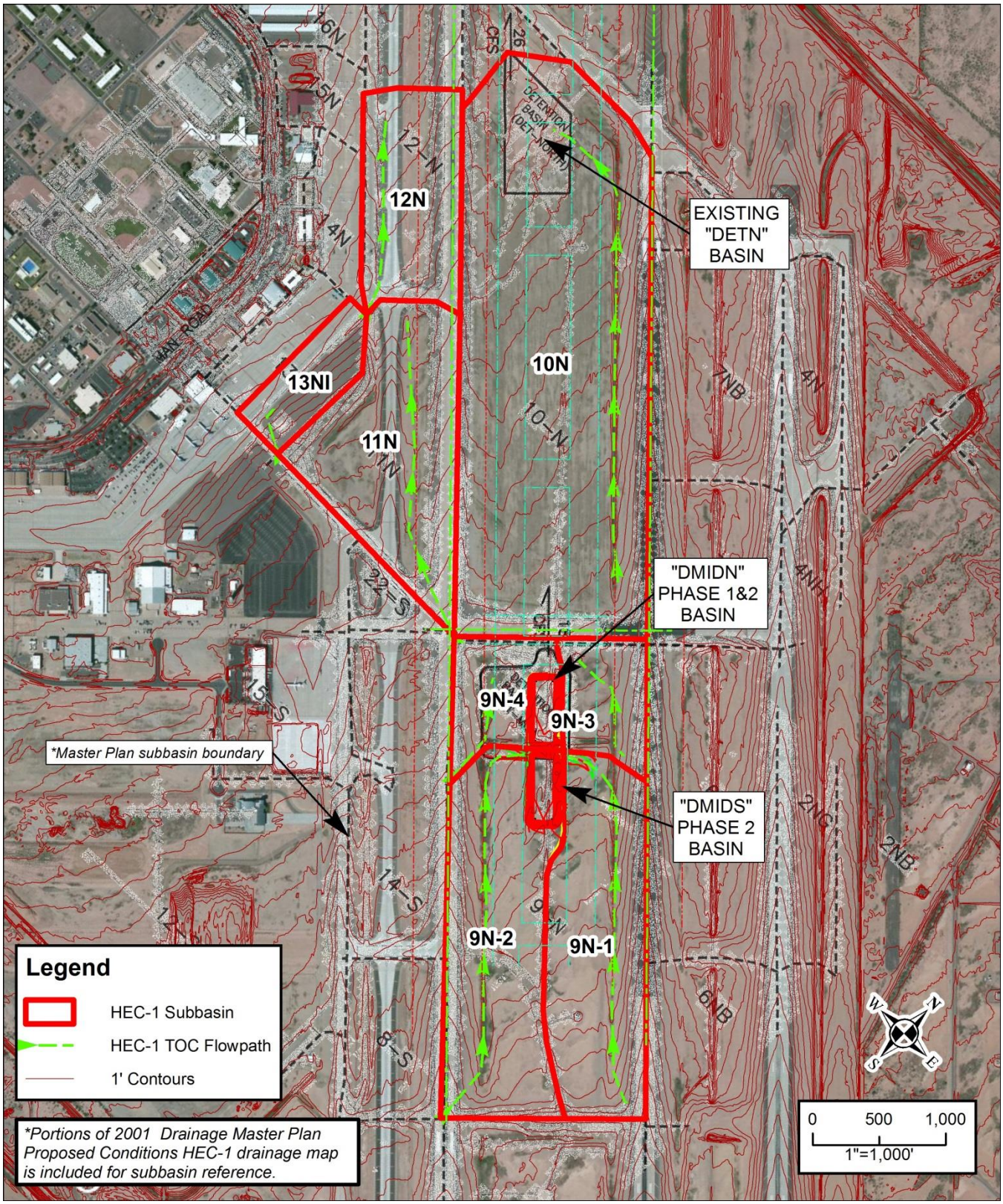


Figure B2 – HEC-1 Drainage Map

Appendix E FAA CATEX Decision

U.S. Department
of Transportation
Federal Aviation Administration

Western-Pacific Region
Airports Division
Phoenix Airports District Office

3800 N. Central Avenue
Suite 1025, 10th Floor
Phoenix, AZ 85012

March 29, 2023

VIA EMAIL (cdacosta@gatewayairport.com)

Mr. Carl D'Acosta, M.S.
Environmental and Safety Coordinator
Phoenix-Mesa Gateway Airport
5835 South Sossaman Road
Mesa, AZ 85212

Subject: Phoenix-Mesa Gateway Airport (IWA) – Proposed Airport Improvement Program Grant for Reconstructing Three Sections of Runway 12R/30L – Categorical Exclusion Decision

Dear Mr. D'Acosta:

The Federal Aviation Administration reviewed the environmental and planning documents dated August 1, 2022 that you submitted for a proposed Airport Improvement Program (AIP) grant at Phoenix-Mesa Gateway Airport located in Maricopa County, Arizona. The proposed grant project entails reconstructing Sections 20, 30, and 40 of Runway 12R/30L pavement.

On March 29, 2023, the FAA found that this proposed grant project was categorically excluded, per FAA Order 1050.1F Paragraph 5-6.4e, from further National Environmental Policy Act review; this is not a notice of final project approval or funding availability. Enclosed for your files is a copy of the completed FAA decision page from the Documented CATEX form and a copy of the State Historic Preservation Officer's concurrence letter dated March 28, 2023.

Looking ahead, if you modify the project's scope, contact me to determine if additional environmental review is needed before proceeding. If you discover unplanned impacts to protected resources (e.g., archaeological sites, listed species) during implementation, then follow the discovery procedures included in your submittal. If you didn't include such procedures, then contact me for direction.

If you have AIP-related questions, please contact Planner Kyler Erhard at (602) 792-1073 or kyler.erhard@faa.gov. If you have environmental planning questions, please contact me at (602) 792-1066 or matthew.h.bilsbarrow@faa.gov.

Sincerely,

Matthew H. Bilsbarrow, RPA
Environmental Planner

Enclosures

cc. (w/enclosures):
Kyler Erhard (Kyler.Erhard@faa.gov)
Tim Morrison (Tim.Morrison@faa.gov)

FAA Decision

Having reviewed the above information, it is the FAA's decision that the proposed project (s) or development warrants environmental processing as indicated below.

Name of Airport, LOC ID, and location:
Phoenix-Mesa Gateway Airport (IWA), 5835 South Sossaman Road, Mesa, Arizona

Project Title:
Runway 12R/30L Sections 20, 30, and 40 Reconstruction

☒ No further NEPA review required. Project is categorically excluded per (cite applicable 1050.1.F CATEX that applies: **5-6.4e**)

☐..An Environmental Assessment (EA) is required.

☐..An Environmental Impact Statement (EIS) is required.

☐..The following additional documentation is necessary for FAA to perform a complete environmental evaluation of the proposed project.

Name: **Matthew Bilsbarrow** Title: **Environmental Planner**

Responsible FAA Official

Signature: MATTHEW H BILSBARROW Digitally signed by MATTHEW H BILSBARROW Date: 2023.03.29 11:26:00 -07'00' Date: **3/29/2023**

Findings:

1) **The FAA found "no adverse effect" for this undertaking on 3/3/23 per Section 106 of the National Historic Preservation Act. The Arizona State Historic Preservation Officer concurred with this finding on 3/28/23 (SHPO-2023-0295 168115).**
2) **The FAA finds that this action doesn't significantly or uniquely effect American Indian tribes. Therefore, consultation isn't required per FAA Order 1210.20 Paragraph 7.b.2.**
3) **The FAA finds "no effect" per Section 7 of the Endangered Species Act.**
4) **The FAA finds that this action and its reasonable alternatives wouldn't occur in the base floodplain, and further floodplain analysis isn't needed.**

SHPO-2023-0295 (168115) Rec: 03-3-23

U.S. Department of Transportation
Federal Aviation Administration

Western-Pacific Region
Airports Division
Phoenix Airports District Office

3800 N. Central Avenue
Suite 1025, 10th Floor
Phoenix, AZ 85012

March 3, 2023

VIA EMAIL (azshpo@azstateparks.gov)

Ms. Kathryn Leonard
State Historic Preservation Officer
Arizona State Parks
1110 West Washington Street, Suite 100
Phoenix, AZ 85007

Subject: Proposed Airport Improvement Program Grant for Reconstructing Three Sections of Runway 12R/30L at Phoenix-Mesa Gateway Airport, Mesa, Arizona

Dear Ms. Leonard:

The Federal Aviation Administration (FAA), in coordination with the Phoenix-Mesa Gateway Airport Authority (PMGAA), considered the effects on cultural resources of reconstructing three sections of Runway 12R/30L at Phoenix-Mesa Gateway Airport (Airport) as required by Section 106 of the National Historic Preservation Act. The FAA combined multiple steps in the process per 36 CFR § 800.3(g) and seeks your agreement to continue to do so for this type of undertaking. The FAA found that this undertaking would result in **no adverse effect**. We've provided this documentation for your concurrence.

Description of the Undertaking

The FAA proposes to respond to a grant application for the design and reconstruction of three sections (i.e., Sections 20, 30, and 40) of Runway 12R/30L as per our mission to ensure a safe and efficient aerospace system. PMGAA plans to remove three sections of the existing runway pavement, which are in poor condition, and re-install up to 111,100 square yards of concrete (Enclosure 1). In total, the three runway sections measure 6,660 feet long by 150 feet wide with 35-foot-wide paved shoulders on either side. Excavations would be less than three feet deep, as measured from the existing ground surface. They plan to grade unpaved areas adjacent to the shoulders as little as possible to match the existing slope. Grading would be less than six inches deep. They would re-paint runway markings and replace runway lights and navigation signs using existing foundations and electrical connections.

PMGAA's construction contractor would use backhoes, dump trucks, excavators, front-end loaders, milling machines, and water trucks to accomplish the work. They would drive on existing paved and unpaved access roads (aka haul routes) in their current condition to reach work areas. They would store equipment and materials in two flat, graded dirt areas up to seven acres in size. Both areas were used during previous construction projects (Enclosure 1).

PMGAA plans to phase the work as funding becomes available. They would start at the north end and work south. The first phase could start in the summer of 2023 and the second in fall of 2024; both phases would take seven month to complete. Most work would occur during daylight hours. Some nighttime work, such as concrete cutting, would occur.

The Airport is located at 6033 South Sossaman Road in Mesa, Arizona. The work would occur within portions of Sections 29, 30, and 32 in Township 1 South, Range 7 East on the Gila and Salt River Baseline and Meridian. The corresponding topographic map is called Higley.

Area of Potential Effects Delineation

The area of potential effects (APE) is shown in Enclosure 1. The APE for ground disturbance (aka direct APE) is 500 feet wide and centered on the runway's centerline. The APE for visual and noise impacts (aka indirect APE) is 2,000 feet wide, which is where construction activities on an active airfield would be noticeable to an on-the-ground observer.

Resource Identification Methods and Results

PGMAA checked their records regarding cultural resources. The Airport, which was once part of Williams Air Force Base, was inventoried for archaeological, architectural, and historical resources during the base closure process between 1990 and 1998. Williams Air Force Base was evaluated as a district during the base closure process and was determined ineligible for inclusion in the National Register of Historic Places (Register) due to a lack of integrity, per historian Bill Collins. The map titled *Historic Properties and Archaeological Sites* and dated August 2022, shows that only one resource (i.e., AZ U:10:69 ASM) intersects the current undertaking (Enclosure 2).

The FAA didn't conduct any new fieldwork because most of the surface within the direct APE is paved. New evidence about cultural resources is unlikely to be present.

The FAA isn't consulting with Indian tribes regarding this undertaking, because it doesn't meet the threshold for doing so per FAA Order 1210.20 titled *American Indian and Alaska Native Tribal Consultation Policy and Procedures*, dated January 28, 2004. The undertaking would not significantly or uniquely effect tribes.

Resource Evaluations

The FAA finds that the previous Register eligibility determination for Site AZ U:10:69 (ASM) is still valid, because we don't have new information to the contrary. Site AZ U:10:69 (ASM), also known as AZ U:10:127 (ASM), is a 452-acre, multicomponent archaeological site containing artifacts and features associated with prehistoric-period Hohokam, protohistoric-period O'odham, and historic-period Euro-American cultures. It is listed in the Register under Criterion D (Information Potential), and it has yielded important information.

Effect Finding

The FAA finds that the undertaking would have **no adverse effect** to historic properties. The undertaking wouldn't physically change Site AZ U:10:69 (ASM). For example, the pavement removal and installation work would avoid the site by 1,500 feet. While construction equipment would drive on existing access roads across the site, road work isn't planned; the construction contractor would use the roads in their current condition. The undertaking wouldn't change the site's setting, because airfield activities would be the same before and after the construction work.

Looking Ahead

If previously unreported cultural resources are encountered during ground-disturbing activities, PMGAA's project manager would cease work within 100 feet of the discovery. PMGAA would contact the FAA and follow the discovery procedures listed in Section IV.D of the PMGAA's agreement with Arizona State Parks & Trails titled *State Historic Preservation Requirements for Airfield Maintenance and Utility Repairs* dated July 31, 2017. The FAA and PMGAA would contact your office, and Tribes, as appropriate. PMGAA wouldn't resume work in this area until FAA approves it.

Please concur with our APE delineation, identification efforts, resource evaluations, and effect finding. If you have any questions, please contact me at (602) 792-1066 or email matthew.h.bilsbarrow@faa.gov.

Sincerely,

MATTHEW H BILSBARROW

Digitally signed by MATTHEW H BILSBARROW
Date: 2023.03.03 10:46:53 -07'00'

Matthew H. Bilsbarrow, RPA
Environmental Planner

2 Enclosures

cc. (w/ Enclosure 1):
Carl D'Acosta (cdacosta@gatewayairport.com)
Kyler Erhard (Kyler.Erhard@faa.gov)
Tim Morrison (Tim.Morrison@faa.gov)
Taylor Neal (Taylor.N.Neal@faa.gov)

Concur, no adverse effect.

Caroline Klebacha, M.A.
State Historic Preservation Office
March 28, 2023

Appendix F 100% Engineer's Opinion of Probable Construction Cost

DIBBLE

Phoenix-Mesa Gateway Airport

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - BASE BID (SCHEDULE I)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
CIVIL						
1	SP 50.02.1	Location of Underground Utilities (Schedule I)	8	EA	$ 400.00	$ 3,200.00
2	SP 50.07.1	Underground Utility Removal (Schedule I)	600	LF	$ 30.00	$ 18,000.00
3	SP 60.04.1	Airfield Safety and Security (Schedule I)	1	LS	$ 200,000.00	$ 200,000.00
4	SP 80.01.1	Rip Rap with Filter Fabric (D50=9-inches, 24-Inch Depth)	111	SY	$ 250.00	$ 27,750.00
5	SP 80.02.1	Concrete Spillway	1	LS	$ 1,500.00	$ 1,500.00
6	C-100-14.1	Contractor Quality Control Program (CQCP) (Schedule I)	1	LS	$ 200,000.00	$ 200,000.00
7	C-102-5.1	Storm Water Pollution Prevention Plan (Schedule I)	1	LS	$ 85,000.00	$ 85,000.00
8	C-105-6.1	Mobilization (Schedule I)	1	LS	$ 350,000.00	$ 350,000.00
9	P-101-5.1	Sawcut Pavement Section (±) 9" PCCP, 2" AC, 7" PCCP	300	LF	$ 20.00	$ 6,000.00
10	P-101-5.2	Remove Pavement Section PCCP (±) 9" PCCP, 2" AC, 7" PCCP	22,490	SY	$ 45.00	$ 1,012,050.00
11	P-101-5.3	Sawcut PCCP (±) 16" Depth	580	LF	$ 15.00	$ 8,700.00
12	P-101-5.4	Remove PCCP Section (±) 16" PCCP, 6" AC	4,505	SY	$ 45.00	$ 202,725.00
13	P-101-5.6	Sawcut AC Pavement (±) 4" Depth	2,124	LF	$ 3.00	$ 6,372.00
14	P-101-5.7	Remove AC Pavement (±) 4" Depth	13,617	SY	$ 5.00	$ 68,085.00
15	P-101-5.8	Sawcut Concrete Drainage Spillway (±) 3" Depth	20	LF	$ 20.00	$ 400.00
16	P-101-5.9	Remove Concrete Drainage Spillway (±) 3" Depth	50	SY	$ 20.00	$ 1,000.00
17	P-101-5.10	Sawcut AC Pavement (2" to 3" Depth)	119	LF	$ 3.00	$ 357.00
18	P-101-5.11	Remove AC Pavement (2" to 3" Depth)	65	SY	$ 5.00	$ 325.00
19	P-152-4.1	Unclassified Excavation	1	LS	$ 145,000.00	$ 145,000.00
20	P-152-4.2	Over-Excavation & Replacement of Unsuitable Materials, Backfill & Compaction	4,048	CY	$ 30.00	$ 121,440.00
21	P-154-5.1	Subbase Course (10-Inch Depth)	13,482	SY	$ 15.00	$ 202,230.00
22	P-155-8.1	Lime-Treated Subgrade (8-Inch Depth)	40,480	SY	$ 12.00	$ 485,760.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - BASE BID (SCHEDULE I)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
23	P-208-5.1	Aggregate Base Course - Stabilized Shoulder (4-Inch Depth)	2,115	SY	$ 25.00	$ 52,875.00
24	P-209-5.1	Aggregate Base Course (8-Inch Depth)	13,482	SY	$ 22.00	$ 296,604.00
25	P-304-8.1	Cement-Treated Base Course (6-Inch Depth)	21,839	SY	$ 18.00	$ 393,102.00
26	P-304-8.2	Cement-Treated Base Course (Variable Depth, 6-Inches to 16.5-Inches)	5,159	SY	$ 40.00	$ 206,360.00
27	P-401-8.1	Runway Transition AC Surface Course (4-Inch Depth)	5,159	SY	$ 38.00	$ 196,042.00
28	P-403-8.1	Runway Shoulder AC Surface Course (4-Inch Depth)	13,482	SY	$ 28.00	$ 377,496.00
29	P-403-8.2	Runway Transition AC Base Course (7-Inch Depth)	5,159	SY	$ 80.00	$ 412,720.00
30	P-501-8.1	Runway PCCP (16-Inch Depth)	21,839	SY	$ 110.00	$ 2,402,290.00
31	P-603-5.1	Emulsified Asphalt Tack Coat	10,318	SY	$ 0.60	$ 6,190.80
32	P-604-6.1 or P-605-5.1	Preformed Elastomeric or Silicone Seal (1/2-Inch Joint)	19,068	LF	$ 4.00	$ 76,272.00
33	P-605-5.2	AC/AC or AC/PCCP Seal (3/8-Inch Joint)	3,945	LF	$ 2.00	$ 7,890.00
34	P-620-5.1	Pavement Markings 100% Application (White)	14,550	SF	$ 1.25	$ 18,187.50
35	P-620-5.2	Pavement Markings 100% Application (Yellow)	5,261	SF	$ 2.00	$ 10,522.00
					Civil Subtotal	**$ 7,602,445.30**
		ELECTRICAL				
36	L-100-6.2	Remove and Salvage Elevated Edge Light and Isolation Transformer, Remove Base Can	17	EA	$ 420.00	$ 7,140.00
37	L-100-6.3	Remove and Salvage Existing Runway Distance Remaining Sign and Isolation Transformer, Remove Concrete Sign Base	8	EA	$ 900.00	$ 7,200.00
38	L-100-6.4	Remove Existing Light Base / Junction Can	3	EA	$ 420.00	$ 1,260.00
39	L-100-6.5	Excavate and Remove Existing 4'x4'x5' Concrete Hand Hole	4	EA	$ 9,000.00	$ 36,000.00
40	L-100-6.6	Remove Existing Conductor, Conduit to Remain	10,020	LF	$ 1.20	$ 12,024.00
41	L-100-6.7	Excavate and Remove Existing Conduit and Conductor	7,800	LF	$ 9.60	$ 74,880.00
42	L-100-6.8	Excavate and Remove Existing Concrete Encased 4x4 Duct Bank (If Required - Utility Relocation Item)	600	LF	$ 24.00	$ 14,400.00
43	L-100-6.10	Temporary Airfield Lighting Cable Jumpers	1	LS	$ 12,000.00	$ 12,000.00
44	L-100-6.12	Excavate and Remove Existing Concrete Encased Duct Bank	30	LF	$ 24.00	$ 720.00
45	L-108-6.1	L-824, Type C, 1/C #8 AWG, 5kV Cable	19,730	LF	$ 2.40	$ 47,352.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - BASE BID (SCHEDULE I)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
46	L-108-6.2	L-824, Type C, 2/C #8 AWG, 5kV Cable	9,920	LF	$ 3.60	$ 35,712.00
47	L-110-6.1	Single-way, 1-2" Conduit, Slurry Encased	10,350	LF	$ 21.60	$ 223,560.00
48	L-110-6.2	Single-way, 1-2" Conduit, Slurry Encased - Retrofit in Existing Asphalt	210	LF	$ 30.00	$ 6,300.00
49	L-110-6.3	Multiple-way, 2-2" Conduit, Slurry Encased	150	LF	$ 33.60	$ 5,040.00
50	L-110-6.5	Multiple-way, 4-4" Conduit, Slurry Encased	410	LF	$ 57.60	$ 23,616.00
51	L-110-6.6	Multiple-way, 4-4" Conduit, Slurry Encased - Retrofit in Existing Asphalt	50	LF	$ 66.00	$ 3,300.00
52	L-110-6.8	Multiple-way, 4-4" Conduit, Concrete Encased - (If Required - Utility Relocation Item)	600	LF	$ 66.00	$ 39,600.00
53	L-115-6.1	New 4'x4'x4' Aircraft Rated Handhole and Hatch w/ Spring Assited Opening	2	EA	$ 18,600.00	$ 37,200.00
54	L-115-6.2	New L-867E (24" DIA) Junction Can w/ Blank Cover	7	EA	$ 2,400.00	$ 16,800.00
55	L-125-6.1	Install Existing L-861 Runway Edge/Threshold Light and Isolation Transformer on Existing L-867 Base with New Bolts, Gasket and Lamp	2	EA	$ 480.00	$ 960.00
56	L-125-6.2	Install Existing Runway Edge/Threshold Light and Isolation Transformer on New L-867 Base with New Bolts, Gasket and Lamp	15	EA	$ 1,560.00	$ 23,400.00
57	L-125-6.3	New Size 4, L-858B(L) Runway Distance Remaining Sign and Isolation Transformer on New Concrete Sign Base	8	EA	$ 4,200.00	$ 33,600.00
58	L-125-6.4	Install Temporary LED L-861E(L) Runway Threshold Lights (11), Isolation Transformers and Cable Jumpers	1	EA	$ 14,400.00	$ 14,400.00
					Electrical Subtotal	**$ 676,464.00**
					CONSTRUCTION TOTAL	**$ 8,278,909.30**
					CA FEE	$ 350,000.00
					ADMINISTRATION FEE	$ 150,000.00
					MRZ Credit (5.395%)	($446,647.16)
					PROJECT TOTAL	**$ 8,332,262.14**

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.1 (SCHEDULE II)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
		CIVIL				
1	SP 80.01.1	**(DEDUCT)** Rip Rap with Filter Fabric (D50=9-inches, 24-Inch Depth)	(111)	SY	$ 250.00	($27,750.00)
2	SP 80.02.1	**(DEDUCT)** Concrete Spillway	(1)	LS	$ 1,500.00	($1,500.00)
3	P-101-5.1	**(DEDUCT)** Sawcut Pavement Section (±) 9" PCCP, 2" AC, 7" PCCP	(300)	LF	$ 20.00	($6,000.00)
4	P-101-5.2	**(DEDUCT)** Remove Pavement Section PCCP (±) 9" PCCP, 2" AC, 7" PCCP	(9,156)	SY	$ 45.00	($412,020.00)
5	P-101-5.6	**(DEDUCT)** Sawcut AC Pavement (±) 4" Depth	(665)	LF	$ 3.00	($1,995.00)
6	P-101-5.7	**(DEDUCT)** Remove AC Pavement (±) 4" Depth	(4,312)	SY	$ 5.00	($21,560.00)
7	P-101-5.8	**(DEDUCT)** Sawcut Concrete Drainage Spillway (±) 3" Depth	(20)	LF	$ 20.00	($400.00)
8	P-101-5.9	**(DEDUCT)** Remove Concrete Drainage Spillway (±) 3" Depth	(50)	SY	$ 20.00	($1,000.00)
9	P-101-5.10	**(DEDUCT)** Sawcut AC Pavement (2" to 3" Depth)	(45)	LF	$ 3.00	($135.00)
10	P-101-5.11	**(DEDUCT)** Remove AC Pavement (2" to 3" Depth)	(27)	SY	$ 5.00	($135.00)
11	P-154-5.1	**(DEDUCT)** Subbase Course (10-Inch Depth)	(4,325)	SY	$ 15.00	($64,875.00)
12	P-155-8.1	**(DEDUCT)** Lime-Treated Subgrade (8-Inch Depth)	(13,484)	SY	$ 12.00	($161,808.00)
13	P-208-5.1	**(DEDUCT)** Aggregate Base Course - Stabilized Shoulder (4-Inch Depth)	(642)	SY	$ 25.00	($16,038.75)
14	P-209-5.1	**(DEDUCT)** Aggregate Base Course (8-Inch Depth)	(4,325)	SY	$ 22.00	($95,150.00)
15	P-304-8.1	**(DEDUCT)** Cement-Treated Base Course (6-Inch Depth)	(4,000)	SY	$ 18.00	($72,000.00)
16	P-304-8.2	**(DEDUCT)** Cement-Treated Base Course (Variable Depth, 6-Inches to 16.5-Inches)	(5,159)	SY	$ 40.00	($206,360.00)
17	P-401-8.1	**(DEDUCT)** Runway Transition AC Surface Course (4-Inch Depth)	(5,159)	SY	$ 38.00	($196,042.00)
18	P-403-8.1	**(DEDUCT)** Runway Shoulder AC Surface Course (4-Inch Depth)	(4,325)	SY	$ 28.00	($121,100.00)
19	P-403-8.2	**(DEDUCT)** Runway Temporary AC Base Course (7-Inch Depth)	(5,159)	SY	$ 80.00	($412,720.00)
20	P-501-8.1	**(DEDUCT)** Runway PCCP (16-Inch Depth)	(4,000)	SY	$ 110.00	($440,000.00)
21	P-603-5.1	**(DEDUCT)** Emulsified Asphalt Tack Coat	(10,318)	SY	$ 0.60	($6,190.80)
22	SP 50.02.2	Location of Underground Utilities (Schedule II)	6	EA	$ 400.00	$ 2,400.00
23	SP 50.07.2	Underground Utility Removal (Schedule II)	400	LF	$ 30.00	$ 12,000.00
24	SP 60.04.2	Airfield Safety and Security (Schedule II)	1	LS	$ 200,000.00	$ 200,000.00
25	SP 80.01.01	Rip Rap with Filter Fabric (D50=9-inches, 24-Inch Depth)	112	SY	$ 250.00	$ 28,000.00
26	SP 80.02.01	Concrete Spillway	1	LS	$ 1,500.00	$ 1,500.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.1 (SCHEDULE II)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
27	C-100-14.2	Contractor Quality Control Program (CQCP) (Schedule II)	1	LS	$ 150,000.00	$ 150,000.00
28	C-102-5.2	Storm Water Pollution Prevention Plan (Schedule II)	1	LS	$ 45,000.00	$ 45,000.00
29	C-105-6.2	Mobilization (Schedule II)	1	LS	$ 325,000.00	$ 325,000.00
30	P-101-5.1	Sawcut Pavement Section (±) 9" PCCP, 2" AC, 7" PCCP	300	LF	$ 20.00	$ 6,000.00
31	P-101-5.2	Remove Pavement Section PCCP (±) 9" PCCP, 2" AC, 7" PCCP	31,826	SY	$ 40.00	$ 1,273,040.00
32	P-101-5.5	Remove Shoulder Stabilization (±) 4" Depth	614	SY	$ 5.00	$ 3,070.00
33	P-101-5.6	Sawcut AC Pavement (±) 4" Depth	1,366	LF	$ 3.00	$ 4,098.00
34	P-101-5.7	Remove AC Pavement (±) 4" Depth	13,107	SY	$ 5.00	$ 65,535.00
35	P-101-5.8	Sawcut Concrete Drainage Spillway (±) 3" Depth	20	LF	$ 20.00	$ 400.00
36	P-101-5.9	Remove Concrete Drainage Spillway (±) 3" Depth	50	SY	$ 20.00	$ 1,000.00
37	P-101-5.10	Sawcut AC Pavement (2" to 3" Depth)	470	LF	$ 3.00	$ 1,410.00
38	P-101-5.11	Remove AC Pavement (2" to 3" Depth)	3,594	SY	$ 5.00	$ 17,970.00
39	P-101-5.12	Sawcut PCCP (9" to 11" Depth)	300	LF	$ 15.00	$ 4,500.00
40	P-101-5.13	Remove PCCP (9" to 11" Depth)	1,489	SY	$ 25.00	$ 37,225.00
41	P-101-5.21	Sawcut AC Pavement (14" Depth)	300	LF	$ 22.00	$ 6,600.00
42	P-101-5.22	Remove AC Pavement (14" Depth)	1,154	SY	$ 30.00	$ 34,620.00
43	P-152-4.1	Unclassified Excavation	1	LS	$ 160,000.00	$ 160,000.00
44	P-152-4.2	Over-Excavation & Replacement of Unsuitable Materials, Backfill & Compaction	4,752	CY	$ 30.00	$ 142,560.00
45	P-154-5.1	Subbase Course (10-Inch Depth)	13,178	SY	$ 15.00	$ 197,670.00
46	P-155-8.1	Lime-Treated Subgrade (8-Inch Depth)	47,520	SY	$ 12.00	$ 570,240.00
47	P-208-5.1	Aggregate Base course - Stabilized Shoulder (4-Inch Depth)	2,715	SY	$ 25.00	$ 67,875.00
48	P-209-5.1	Aggregate Base Course (8-Inch Depth)	13,178	SY	$ 22.00	$ 289,916.00
49	P-304-8.1	Cement-Treated Base Course (6-Inch Depth)	29,759	SY	$ 18.00	$ 535,662.00
50	P-304-8.2	Cement-Treated Base Course (Variable Depth, 6-Inches to 16.5-Inches)	4,583	SY	$ 40.00	$ 183,320.00
51	P-401-8.1	Runway Transition AC Surface Course (4-Inch Depth)	4,583	SY	$ 38.00	$ 174,154.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.1 (SCHEDULE II)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
52	P-403-8.1	Runway Shoulder AC Surface Course (4-Inch Depth)	13,178	SY	$ 28.00	$ 368,984.00
53	P-403-8.2	Runway Transition AC Base Course (7-Inch Depth)	4,583	SY	$ 80.00	$ 366,640.00
54	P-501-8.1	Runway PCCP (16-Inch Depth)	27,334	SY	$ 110.00	$ 3,006,740.00
55	P-501-8.2	Taxiway PCCP (16-Inch Depth)	2,425	SY	$ 110.00	$ 266,750.00
56	P-603-5.1	Emulsified Asphalt Tack Coat	9,166	SY	$ 0.60	$ 5,499.60
57	P-604-6.1 or P-605-5.1	Preformed Elastomeric or Silicone Seal (1/2-Inch Joint)	23,155	LF	$ 4.00	$ 92,620.00
58	P-604-6.2	Preformed Elastomeric Seal (1-3/4-Inch Joint)	521	LF	$ 25.00	$ 13,025.00
59	P-605-5.2	AC/AC or AC/PCCP Seal (3/8-Inch Joint)	2,630	LF	$ 2.00	$ 5,260.00
60	P-620-5.1	Pavement Markings 100% Application (White)	11,249	SF	$ 1.25	$ 14,061.25
61	P-620-5.2	Pavement Markings 100% Application (Yellow)	5,465	SF	$ 2.00	$ 10,930.00
					Civil Subtotal	**$6,426,495.30**
		ELECTRICAL				
62	L-100-6.1	Remove and Salvage Elevated Edge / Threshold Light and Isolation Transformer, Base Can to Remain, Install Plywood Cover	4	EA	$ 360.00	$ 1,440.00
63	L-100-6.2	Remove and Salvage Elevated Runway / Taxiway Edge Light and Isolation Transformer, Remove Base Can	24	EA	$ 420.00	$ 10,080.00
64	L-100-6.5	Excavate and Remove Existing 4'x4'x5' Concrete Hand Hole	2	EA	$ 9,000.00	$ 18,000.00
65	L-100-6.6	Remove Existing Conductor, Conduit to Remain	1,580	LF	$ 1.20	$ 1,896.00
66	L-100-6.7	Excavate and Remove Existing Conduit and Conductor	3,570	LF	$ 9.60	$ 34,272.00
67	L-100-6.10	Temporary Airfield Lighting Cable Jumpers	1	LS	$ 12,000.00	$ 12,000.00
68	L-100-6.12	Excavate and Remove Existing Concrete Encased Duct Bank	275	LF	$ 24.00	$ 6,600.00
69	L-108-6.1	L-824, Type C, 1/C #8 AWG, 5kV Cable	5,430	LF	$ 2.40	$ 13,032.00
70	L-108-6.2	L-824, Type C, 2/C #8 AWG, 5kV Cable	1,180	LF	$ 3.60	$ 4,248.00
71	L-110-6.1	Single-way, 1-2" Conduit, Slurry Encased	3,070	LF	$ 21.60	$ 66,312.00
72	L-110-6.2	Single-way, 1-2" Conduit, Slurry Encased - Retrofit in Existing Asphalt	560	LF	$ 30.00	$ 16,800.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.1 (SCHEDULE II)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
73	L-110-6.5	Multiple-way, 4-4" Conduit, Slurry Encased	195	LF	$ 57.60	$ 11,232.00
74	L-110-6.6	Multiple-way, 4-4" Conduit, Slurry Encased - Retrofit in Existing Asphalt	110	LF	$ 66.00	$ 7,260.00
75	L-110-6.7	Multiple-way, 4-4" Conduit, Concrete Encased	280	LF	$ 66.00	$ 18,480.00
76	L-115-6.1	New 4'x4'x4' Aircraft Rated Handhole and Hatch w/ Spring Assited Opening	2	EA	$ 18,600.00	$ 37,200.00
77	L-125-6.1	Install Existing L-861 Runway Edge/Threshold Light and Isolation Transformer on Existing L-867 Base with New Bolts, Gasket and Lamp	4	EA	$ 480.00	$ 1,920.00
78	L-125-6.2	Install Existing Runway Edge/Threshold Light and Isolation Transformer on New L-867 Base with New Bolts, Gasket and Lamp	14	EA	$ 1,560.00	$ 21,840.00
79	L-125-6.10	Install Existing Taxiway Edge Light and Isolation Transformer on New L-867 Base with New Bolts, Gasket and Lamp	10	EA	$ 480.00	$ 4,800.00
					Electrical Subtotal	**$ 287,412.00**
					CONSTRUCTION TOTAL	**$ 6,713,907.30**
					CA FEE	$ 200,000.00
					ADMINISTRATION FEE	$ 50,000.00
					MRZ Credit (5.395%)	($362,215.30)
					PROJECT TOTAL	**$ 6,601,692.00**

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.2 (SCHEDULE III)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
		CIVIL				
1	P-101-5.1	**(DEDUCT)** Sawcut Pavement Section (±) 9" PCCP, 2" AC, 7" PCCP	(300)	LF	$ 20.00	($6,000.00)
2	P-101-5.2	**(DEDUCT)** Remove Pavement Section PCCP (±) 9" PCCP, 2" AC, 7" PCCP	(15,165)	SY	$ 40.00	($606,600.00)
3	P-101-5.5	**(DEDUCT)** Remove Shoulder Stabilization (±) 4-Inch Depth	(347)	SY	$ 5.00	($1,735.00)
4	P-101-5.6	**(DEDUCT)** Sawcut AC Pavement (±) 4" Depth	(760)	LF	$ 3.00	($2,280.00)
5	P-101-5.7	**(DEDUCT)** Remove AC Pavement (±) 4" Depth	(6,054)	SY	$ 5.00	($30,270.00)
6	P-101-5.10	**(DEDUCT)** Sawcut AC Pavement (2" to 3" Depth)	(425)	LF	$ 3.00	($1,275.00)
7	P-101-5.11	**(DEDUCT)** Remove AC Pavement (2" to 3" Depth)	(3,389)	SY	$ 5.00	($16,945.00)
8	P-101-5.12	**(DEDUCT)** Sawcut PCCP (9" to 11" Depth)	(300)	LF	$ 15.00	($4,500.00)
9	P-101-5.13	**(DEDUCT)** Remove PCCP (9" to 11" Depth)	(1,489)	SY	$ 25.00	($37,225.00)
10	P-101-5.21	**(DEDUCT)** Sawcut AC Pavement (14" Depth)	(150)	LF	$ 22.00	($3,300.00)
11	P-101-5.22	**(DEDUCT)** Remove AC Pavement (14" Depth)	(608)	SY	$ 30.00	($18,240.00)
12	P-154-5.1	**(DEDUCT)** Subbase Course (10-Inch Depth)	(6,061)	SY	$ 15.00	($90,915.00)
13	P-155-8.1	**(DEDUCT)** Lime-Treated Subgrade (8-Inch Depth)	(21,311)	SY	$ 12.00	($255,732.00)
14	P-208-5.1	**(DEDUCT)** Aggregate Base course - Stabilized Shoulder (4-Inch Depth)	(1,208)	SY	$ 25.00	($30,200.00)
15	P-209-5.1	**(DEDUCT)** Aggregate Base Course (8-Inch Depth)	(6,061)	SY	$ 22.00	($133,342.00)
16	P-304-8.1	**(DEDUCT)** Cement-Treated Base Course (6-Inch Depth)	(10,667)	SY	$ 18.00	($192,006.00)
17	P-304-8.2	**(DEDUCT)** Cement-Treated Base Course (Variable Depth, 6-Inches to 16.5-Inches)	(4,583)	SY	$ 40.00	($183,320.00)
18	P-401-8.1	**(DEDUCT)** Runway Transition AC Surface Course (4-Inch Depth)	(4,583)	SY	$ 38.00	($174,154.00)
19	P-403-8.1	**(DEDUCT)** Runway Shoulder AC Surface Course (4-Inch Depth)	(6,061)	SY	$ 28.00	($169,708.00)
20	P-403-8.2	**(DEDUCT)** Runway Temporary AC Base Course (7-Inch Depth)	(4,583)	SY	$ 80.00	($366,640.00)
21	P-501-8.1	**(DEDUCT)** Runway PCCP (16-Inch Depth)	(10,667)	SY	$ 110.00	($1,173,370.00)

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.2 (SCHEDULE III)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
22	P-603-5.1	**(DEDUCT)** Emulsified Asphalt Tack Coat	(9,166)	SY	$ 0.60	($5,499.60)
23	SP 50.02.3	Location of Underground Utilities (Schedule III)	10	EA	$ 400.00	$ 4,000.00
24	SP 50.07.3	Underground Utility Removal (Schedule III)	800	LF	$ 30.00	$ 24,000.00
25	SP 60.04.3	Airfield Safety and Security (Schedule III)	1	LS	$ 400,000.00	$ 400,000.00
26	SP 80.03.1	PAPI Concrete Pads	1	LS	$ 4,000.00	$ 4,000.00
27	SP 80.04.1	Segmented Circle Marker System	1	LS	$ 12,000.00	$ 12,000.00
28	C-100-14.3	Contractor Quality Control Program (CQCP) (Schedule III)	1	LS	$ 425,000.00	$ 425,000.00
29	C-102-5.3	Storm Water Pollution Prevention Plan (Schedule III)	1	LS	$ 100,000.00	$ 100,000.00
30	C-105-6.3	Mobilization (Schedule III)	1	LS	$ 700,000.00	$ 700,000.00
31	P-101-5.2	Remove Pavement Section PCCP (±) 9" PCCP, 2" AC, 7" PCCP	15,165	SY	$ 45.00	$ 682,425.00
32	P-101-5.3	Sawcut PCCP (±) 16" Depth	790	LF	$ 15.00	$ 11,850.00
33	P-101-5.5	Remove Shoulder Stabilization (±) 4" Depth	347	SY	$ 5.00	$ 1,735.00
34	P-101-5.6	Sawcut AC Pavement (±) 4" Depth	4,767	LF	$ 3.00	$ 14,301.00
35	P-101-5.7	Remove AC Pavement (±) 4" Depth	35,695	SY	$ 5.00	$ 178,475.00
36	P-101-5.10	Sawcut AC Pavement (2" to 3" Depth)	3,871	LF	$ 5.00	$ 19,355.00
37	P-101-5.11	Remove AC Pavement (2" to 3" Depth)	20,291	SY	$ 5.00	$ 101,455.00
38	P-101-5.12	Sawcut PCCP (9" to 11" Depth)	300	LF	$ 10.00	$ 3,000.00
39	P-101-5.13	Remove PCCP (9" to 11" Depth)	1,489	SY	$ 25.00	$ 37,225.00
40	P-101-5.15	Remove PCCP (±) 16.5" Depth	7,526	SY	$ 40.00	$ 301,040.00
41	P-101-5.16	Remove PCCP (±) 9" PCCP, 6" ABC, 6" PCCP	28,881	SY	$ 45.00	$ 1,299,645.00
42	P-101-5.17	Remove PCCP (±) 9" PCCP, 3" AC, 6" PCCP	32,620	SY	$ 45.00	$ 1,467,900.00
43	P-101-5.18	Remove and Dispose of Segmented Circle Concrete Pads	20	EA	$ 250.00	$ 5,000.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.2 (SCHEDULE III)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
44	P-101-5.21	Sawcut AC Pavement (14" Depth)	150	LF	$ 15.00	$ 2,250.00
45	P-101-5.22	Remove AC Pavement (14" Depth)	608	SY	$ 15.00	$ 9,120.00
46	P-152-4.1	Unclassified Excavation	1	LS	$ 560,000.00	$ 560,000.00
47	P-152-4.2	Over-Excavation & Replacement of Unsuitable Materials, Backfill & Compaction	12,100	CY	$ 40.00	$ 483,988.00
48	P-154-5.1	Subbase Course (10-Inch Depth)	36,606	SY	$ 15.00	$ 549,090.00
49	P-155-8.1	Lime-Treated Subgrade (8-Inch Depth)	112,939	SY	$ 8.00	$ 903,512.00
50	P-208-5.1	Aggregate Base Course - Stabilized Shoulder (4-Inch Depth)	7,332	SY	$ 25.00	$ 183,300.00
51	P-209-5.1	Aggregate Base Course (8-Inch Depth)	36,606	SY	$ 20.00	$ 732,120.00
52	P-304-8.1	Cement-Treated Base Course (6-Inch Depth)	76,333	SY	$ 12.00	$ 915,996.00
53	P-304-8.3	Cement-Treated Base Course (Variable Depth, 3-Inches to 13-Inches)	8,058	SY	$ 40.00	$ 322,320.00
54	P-403-8.1	Runway Shoulder AC Surface Course (4-Inch Depth)	36,606	SY	$ 22.00	$ 805,332.00
55	P-501-8.1	Runway PCCP (16-Inch Depth)	84,391	SY	$ 90.00	$ 7,595,190.00
56	P-604-6.1 or P-605-5.1	Preformed Elastomeric or Silicone Seal (1/2-Inch Joint)	64,521	LF	$ 4.00	$ 258,084.00
57	P-605-5.2	AC/AC or AC/PCCP Seal (3/8-Inch Joint)	7,545	LF	$ 2.00	$ 15,090.00
58	P-620-5.1	Pavement Markings 100% Application (White)	52,937	SF	$ 1.25	$ 66,171.25
59	P-620-5.2	Pavement Markings 100% Application (Yellow)	10,566	SF	$ 2.00	$ 21,132.00
					Civil Subtotal	**$15,711,844.65**
		ELECTRICAL				
60	L-100-6.1	Remove and Salvage Elevated Edge / Threshold Light and Isolation Transformer, Base Can to Remain	78	EA	$ 360.00	$ 28,080.00
61	L-100-6.2	Remove and Salvage Elevated Runway / Taxiway Edge Light and Isolation Transformer, Remove Base Can	40	EA	$ 420.00	$ 16,800.00
62	L-100-6.3	Remove and Salvage Existing Runway Distance Remaining Sign and Isolation Transformer, Remove Concrete Sign Base	10	EA	$ 900.00	$ 9,000.00
63	L-100-6.4	Remove Existing Light Base / Junction Can	3	EA	$ 420.00	$ 1,260.00
64	L-100-6.5	Excavate and Remove Existing 4'x4'x5' Concrete Hand Hole	10	EA	$ 9,000.00	$ 90,000.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.2 (SCHEDULE III)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
65	L-100-6.6	Remove Existing Conductor, Conduit to Remain	4,415	LF	$ 1.20	$ 5,298.00
66	L-100-6.7	Excavate and Remove Existing Conduit and Conductor	13,675	LF	$ 9.60	$ 131,280.00
67	L-100-6.8	Excavate and Remove Existing Concrete Encased 4x4 Duct Bank (If Required - Utility Relocation Item)	750	LF	$ 24.00	$ 18,000.00
68	L-100-6.9	Remove and Salvage Existing L-880B PAPI, Remove Concrete Foundation	4	EA	$ 300.00	$ 1,200.00
69	L-100-6.10	Temporary Airfield Lighting Cable Jumpers	1	LS	$ 12,000.00	$ 12,000.00
70	L-100-6.11	Remove and Salvage Existing Wind Cone, Remove Existing Foundation	1	EA	$ 600.00	$ 600.00
71	L-100-6.13	Remove and Salvage Elevated Runway Guard Light and Isolation Transformer, Base Can to Remain	4	EA	$ 360.00	$ 1,440.00
72	L-107-5.1	New Internally Lighted L-806(L) LED Windcone and Isolation Transformer with Obstruction Light on New Foundation	1	EA	$ 8,100.00	$ 8,100.00
73	L-108-6.1	L-824, Type C, 1/C #8 AWG, 5kV Cable	19,450	LF	$ 2.40	$ 46,680.00
74	L-108-6.2	L-824, Type C, 2/C #8 AWG, 5kV Cable	8,390	LF	$ 3.60	$ 30,204.00
75	L-110-6.1	Single-way, 1-2" Conduit, Slurry Encased	14,760	LF	$ 21.60	$ 318,816.00
76	L-110-6.2	Single-way, 1-2" Conduit, Slurry Encased - Retrofit in Existing Asphalt	460	LF	$ 30.00	$ 13,800.00
77	L-110-6.3	Multiple-way, 2-2" Conduit, Slurry Encased	450	LF	$ 33.60	$ 15,120.00
78	L-110-6.4	Multiple-way, 2-2" Conduit, Slurry Encased - Retrofit in Existing Asphalt	175	LF	$ 42.00	$ 7,350.00
79	L-110-6.5	Multiple-way, 4-4" Conduit, Slurry Encased	365	LF	$ 57.60	$ 21,024.00
80	L-110-6.6	Multiple-way, 4-4" Conduit, Slurry Encased - Retrofit in Existing Asphalt	575	LF	$ 66.00	$ 37,950.00
81	L-110-6.7	Multiple-way, 4-4" Conduit, Concrete Encased	160	LF	$ 66.00	$ 10,560.00
82	L-110-6.8	Multiple-way, 4-4" Conduit, Concrete Encased - (If Required - Contingency Item)	750	LF	$ 66.00	$ 49,500.00
83	L-115-6.1	New 4'x4'x4' Aircraft Rated Handhole and Hatch w/ Spring Assited Opening	12	EA	$ 18,600.00	$ 223,200.00
84	L-115-6.2	New L-867E (24" DIA) Junction Can w/ Blank Cover	4	EA	$ 2,400.00	$ 9,600.00

PHOENIX-MESA GATEWAY AIRPORT
RUNWAY 12R-30L RECONSTRUCTION - ADD ALT No.2 (SCHEDULE III)
100% ENGINEER'S OPINION OF PROBABLE CONSTRUCTION COST

LINE No.	ITEM No.	DESCRIPTION	APPROX. QTTY.	UNIT	UNIT PRICE	AMOUNT
85	L-125-6.3	New Size 4, L-858B(L) Runway Distance Remaining Sign and Isolation Transformer on New Concrete Sign Base	10	EA	$ 4,200.00	$ 42,000.00
86	L-125-6.4	Re-Install Temporary LED (L-861E(L) Runway Threshold Lights (11), Isolation Transformers and Cable Jumpers	1	EA	$ 3,000.00	$ 3,000.00
87	L-125-6.5	New L-804(L) LED Elevated RGL and Isolation Transformer on Existing L-867 Base Can	4	EA	$ 4,200.00	$ 16,800.00
88	L-125-6.6	Install Existing L-880B PAPI on New Concrete Foundation with New Isolation Transformer and New Lamps	4	EA	$ 5,400.00	$ 21,600.00
89	L-125-6.7	Install New LED L-861(L) Runway Edge Light and Isolation Transformer on Existing L-867 Base with New Bolts and Gasket	62	EA	$ 900.00	$ 55,800.00
90	L-125-6.8	Install New LED L-861E(L) Runway Threshold Light (R/G) and Isolation Transformer on Existing L-867 Base with New Bolts and Gasket	16	EA	$ 960.00	$ 15,360.00
91	L-125-6.9	Install New LED L-861(L) Runway Edge Light and Isolation Transformer on New L-867 Base	41	EA	$ 1,560.00	$ 63,960.00
92	L-125-6.11	New LED L-861(L) Runway Edge Light and Isolation Transformer with Stems and Frangible Couplings (Spares)	10	EA	$ 780.00	$ 7,800.00
93	L-125-6.12	New LED L-861E(L) Runway Threshold Light (R/G) and Isolation Transformer with Stems and Frangible Couplings (Spares)	1	EA	$ 840.00	$ 840.00
					Electrical Subtotal	**$ 1,334,022.00**
					CONSTRUCTION TOTAL	**$ 17,045,866.65**
					CA FEE	$ 750,000.00
					ADMINISTRATION FEE	$ 300,000.00
					MRZ Credit (5.395%)	($919,624.51)
					PROJECT TOTAL	**$ 17,176,242.14**

PHX MESA GATEWAY AIRPORT
Taxiway B2 (Taxiway H Relocation)
DATE: April 26, 2023

Kimley»Horn

100% SUBMITTAL (SCHEDULE IV) - ENGINEER'S ESTIMATE

Item	Specification Number	Bid Item Description	Quantity	Unit	Engineer's Estimate Unit Price	Engineer's Estimate Amount
1	SP-50.02.4	Location of Underground Utilities (Schedule IV)	10	EA	$ 550.00	$ 5,500.00
2	SP-60.04.4	Airfield Safety and Security (Schedule IV)	1	LS	$ 100,000.00	$ 100,000.00
3	C-100-14.4	Contractor Quality Control Program (CQCP) (Schedule IV)	1	LS	$ 50,000.00	$ 50,000.00
4	C-102-5.4	Storm Water Pollution Prevention Plan (Schedule IV)	1	LS	$ 25,000.00	$ 25,000.00
5	C-105-6.4	Mobilization (Schedule IV)	1	LS	$ 155,000.00	$ 155,000.00
6	P-101-5.3	Sawcut PCCP (±) 16-Inch Depth	1,130	LF	$ 10.00	$ 11,300.00
	P-101-5.4	Remove PCCP Section (±) 16" PCCP, 6" AC	2,720	SY	$ 25.00	$ 68,000.00
7	P-101-5.6	Sawcut AC Pavement (±) 4-Inch Depth	260	LF	$ 5.00	$ 1,300.00
8	P-101-5.7	Remove AC Pavement (±) 4-Inch Depth	13,170	SY	$ 5.00	$ 65,850.00
9	P-101-5.14	Remove PCCP (±) 16-Inch Depth	3,790	SY	$ 20.00	$ 75,800.00
10	P-101-5.19	Sawcut Pavement Section (16" PCCP, 6" AC)	740	LF	$ 12.00	$ 8,880.00
11	P-101-5.20	Removal of Pipe and Other Buried Structures	1	LS	$ 25,000.00	$ 25,000.00
12	P-152-4.1	Unclassified Excavation	1	LS	$ 285,000.00	$ 285,000.00
13	P-152-4.2	Over-Excavation & Replacement of Unsuitable Materials, Backfill & Compaction	2,500	CY	$ 35.00	$ 87,500.00
14	P-154-5.1	Subbase Course (10-Inch Depth)	6,900	SY	$ 18.00	$ 124,200.00
15	P-155-8.1	Lime-Treated Subgrade (8-Inch Depth)	14,520	SY	$ 5.50	$ 79,860.00
16	P-208-5.1	Aggregate Base Course, Stabilized Shoulder (4-Inch Depth)	2,150	SY	$ 9.00	$ 19,350.00
17	P-209-5.1	Aggregate Base Course (8-Inch Depth)	6,900	SY	$ 20.00	$ 138,000.00
18	P-304-8.1	Cement-Treated Base Course (6-Inch Depth)	1,270	SY	$ 30.00	$ 38,100.00
19	P-403-8.3	Taxiway Shoulder AC Surface Course (4-Inch Depth)	6,900	SY	$ 30.00	$ 207,000.00
20	P-501-8.2	Taxiway PCCP (16-Inch Depth)	6,710	SY	$ 105.00	$ 704,550.00
21	P-603-5.1	Emulsified Asphalt Tack Coat	3	TON	$ 950.00	$ 2,850.00
22	P-604-6.1 or P-605-5.1	Preformed Elastomeric or Silicone Seal (1/2 Inch Joint)	6,500	LF	$ 7.00	$ 45,500.00
23	P-604-6.2	Preformed Elastomeric Seal (1-3/4 Inch Joint)	320	LF	$ 35.00	$ 11,200.00
24	P-605-5.2	AC/AC or AC/PCCP Seal (3/8-Inch Joint)	2,210	LF	$ 4.50	$ 9,945.00
25	P-620-5.2	Pavement Markings 100% Application (Yellow)	6,500	SF	$ 2.50	$ 16,250.00
26	P-620-5.3	Non-Reflective Black Pavement Markings (Schedule IV)	7,550	SF	$ 2.50	$ 18,875.00
27	P-620-5.4	Reflective Surface Painted Holding Position Signs	890	SF	$ 5.00	$ 4,450.00
28	P-620-5.5	Pavement Marking Obliteration	9,130	SF	$ 2.00	$ 18,260.00
29	P-620-5.6	Reflective White Vehicle Service Road Pavement Markings	4,780	SF	$ 2.00	$ 9,560.00
30	D-701-5.1	24-inch Concrete Pipe RGRCP, Class V	30	LF	$ 350.00	$ 10,500.00
31	D-751-5.1	Storm Drain Inlet, Aircraft Rated	1	EA	$ 30,000.00	$ 30,000.00
32	D-751-5.2	Storm Drain Inlet Adjustment Lid, Aircraft Rated	1	EA	$ 18,000.00	$ 18,000.00
33	D-751-5.3	Adjust Existing Handhole/Manhole Lid	2	EA	$ 2,500.00	$ 5,000.00
34	L-100-6.2	Remove and Salvage Elevated Edge Light and Isolation Transformer, Remove Base Can	28	EA	$ 50.00	$ 1,400.00
35	L-100-6.7	Excavate and Remove Existing Conduit and Conductor	3,700	LF	$ 5.00	$ 18,500.00
36	L-100-6.8	Excavate and Remove Existing Concrete Encased 4x4 Duct Bank (If Required - Utility Relocation Item)	1,000	LF	$ 8.00	$ 8,000.00
37	L-100-6.10	Temporary Airfield Lighting Cable Jumpers	1	LS	$ 20,000.00	$ 20,000.00
38	L-100-7.1	Remove and salvage existing sign and isolation transformer, remove concrete sign base	6	EA	$ 5,000.00	$ 30,000.00
39	L-100-7.2	Remove and salvage existing 4'x4'x5' concrete hand hole	2	EA	$ 3,000.00	$ 6,000.00
40	L-108-6.1	L-824, Type C, 1/C #8 AWG, 5kV Cable	4,250	LF	$ 2.50	$ 10,625.00
41	L-108-6.2	L-824, Type C, 2/C #8 AWG, 5kV Cable	550	LF	$ 5.00	$ 2,750.00
42	L-110-6.1	Single-way, 1-2" Conduit, Slurry Encased	3,850	LF	$ 20.00	$ 77,000.00
43	L-110-6.2	Single-way, 1-2" Conduit, Slurry Encased - Retrofit in Existing Asphalt	65	LF	$ 80.00	$ 5,200.00
44	L-110-6.5	Multiple-way, 4-4" Conduit, Slurry Encased	700	LF	$ 70.00	$ 49,000.00
45	L-110-6.7	Multiple-way, 4-4" Conduit, Concrete Encased	250	LF	$ 140.00	$ 35,000.00

46	L-110-7.1	Single-way, 1-2" Conduit, Concrete Encased	500	LF	$ 40.00	$ 20,000.00
47	L-115-7.1	Relocated Concrete Aircraft Load Rated Electrical Handhole	1	EA	$ 3,000.00	$ 3,000.00
48	L-125-6.2	Install Existing Runway Edge/Threshold Light and Isolation Transformer on New L-867 Base with New Bolts, Gasket and Lamp – Per Each	3	EA	$ 1,200.00	$ 3,600.00
49	L-125-7.1	New Size "B" L-867 Base Can for Any New, Reinstalled or Future Fixture in New Paved Shoulder	32	EA	$ 1,200.00	$ 38,400.00
50	L-125-7.2	New L-804 Elevated Runway Guard Light with New Isolation Transformer and New Hardware	2	EA	$ 1,000.00	$ 2,000.00
51	L-125-7.3	New L-861T(L) Taxiway Edge Light with New Isolation Transformer and Hardware, Installed	30	EA	$ 650.00	$ 19,500.00
52	L-125-7.4	New Size 3, 2-Module Guidance Sign with New Isolation Transformer, Hardware and New Concrete Foundation	2	EA	$ 6,800.00	$ 13,600.00
53	L-125-7.5	New Size 3, 3-Module Guidance Sign with New Isolation Transformer, Hardware and New Concrete Foundation	3	EA	$ 7,000.00	$ 21,000.00
54	L-125-7.6	New Size 3, 4-Module Guidance Sign with New Isolation Transformer, Hardware and New Concrete Foundation	1	EA	$ 8,500.00	$ 8,500.00
55	L-125-7.7	New Size 3, 3-Module + 2-Module Guidance Sign with New Isolation Transformer, Hardware and New Concrete Foundation	1	EA	$ 14,000.00	$ 14,000.00
56	L-125-7.8	New Size 3, 3-Module + 3-Module Guidance Sign with New Isolation Transformer, Hardware and New Concrete Foundation	1	EA	$ 14,500.00	$ 14,500.00
57	L-125-7.9	New Size 3 1-Module Panel Installed in Existing Sign	5	EA	$ 500.00	$ 2,500.00

Note: The Consultant has no control over the cost of labor, materials, equipment, or over the Contractor's methods of determining prices or over competitive bidding or market conditions. Opinions of probable costs provided herein are based on the information known to Consultant at this time and represent only the Consultant's judgment as a design professional familiar with the construction industry. The Consultant cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from its opinions of probable costs.

Construction Sub-Total	$ 2,899,655.00
Contingency 10%	$ 289,965.50
Sales Tax 5.3950%	$ 156,436.39
Construction Total	**$ 3,346,056.89**
Construction Admin (6%)	$ 200,763.41
PMGAA Admin (5%)	$ 167,302.84
TOTAL AMOUNT	**$ 3,714,123.14**

Appendix G PAPI Siting Calculations

PMGAA - PAPI Calcs

Runway 12R End

Existing vs Proposed Conditions

- 4-Box PAPI
- Visual Glide Angle

  $\varphi = 3.00 \text{ deg } (FAA\ Datasheet)$

- Threshold Crossing Height

  $TCH = 60.0 \text{ ft } (FAA\ Datasheet)$

- Threshold to RRP Distance

  $D = \mathbf{1093.07\ ft}\ (Proposed) \approx 1092 \text{ ft } (FAA\ Datasheet)$

- Threshold Elevation

  $e_1 = \mathbf{1341.2} \text{ ft } (FAA\ Datasheet)$

- Runway Reference Point (RRP) Elevation

  $e_2 = \mathbf{1344.26\ ft}\ (Proposed) \neq 1343.3 \text{ ft } (FAA\ Datasheet)$

- Percent slope of runway

  $S = (e_1 - e_2) \div \mathrm{D} = \mathbf{-0.28}\%\ (Proposed) \approx -0.19\%\ (Existing)$

- ~~Angle of Lowest On-Course Signal~~

  Use VGSI On-Glidepath Angle for FAA Flight Check requirements

  $\theta = \varphi$

- Proposed Threshold to RRP Distance

  $$d = \frac{\mathrm{TCH}}{(\tan\theta + S)} = \mathbf{1085.34\ ft}\ (Proposed)$$

- Proposed Threshold Crossing Height

  $\mathrm{TCH} = d\ (\tan\theta + S) = \mathbf{60.4\ ft}\ (Proposed)\ \approx 60 \text{ ft } (FAA\ Datasheet)$

Data Effective: **01/26/2023 - 02/23/2023**

IWA (KIWA)

PHOENIX-MESA GATEWAY

PHOENIX , AZ - UNITED STATES

All Summary Operations Communications NAVAIDS Weather RWY 12C/30C RWY 12L/30R RWY 12R/30L Heliports Charts Contacts Remarks

Summary

Latitude/Longitude	33-18-28.166 N / 111-39-19.653 W
Elevation	1384.1 FT
Variation	13 E 1980
From city	20 miles SE of PHOENIX, AZ
ARTCC	ZAB
Section chart	PHOENIX
Time Zone	UTC-7

View active NOTAMS

OPERATIONS

Airport Status	Operational
Minimum Operational Network	Yes
Facility use	Open to the public
Control Tower	Airport traffic control tower
Tower Hours	0500-2400
Apch/Dep Hours	
FSS	PRESCOTT FSS (PRC) Toll Free: 1-800-WX-BRIEF
NOTAMs Facility	IWA (PHOENIX-MESA GATEWAY)
Attendance	Continuous
Wind Indicator	Yes
Segmented Circle	Yes
Lights	SEE RMK FOR REIL RWY 12L & 30R CTC ATCT. AFTER ATCT CLSD, ARPT LGTS REMAIN ON.
Beacon	WG SS-SR
Landing Fee	Yes NO LDG FEE FOR US GOV OWNED, NON-REVENUE AND FLIGHT TRAINING ACFT UP TO 12,500 LBS.
Fuel	100LL, A
Fire and Rescue	ARFF Index I C
Int'l Operations	Not a Landing Rights Airport Not an Airport of Entry

COMMUNICATIONS

UNICOM:	None	
CTAF:	120.6 MHz	
ATIS:	133.5 MHz	0500-0000 (MST)
RADAR SERVICE:	Approach / Departure	
RADAR TYPE:	ASR-8	0600-2200
GATEWAY CLERANCE DELIVERY:	135.05 MHz	CD/P
GATEWAY EMERGENCY:	121.5 MHz	EMERG
	243 MHz	EMERG
GATEWAY GROUND:	128.25 MHz	GND/P
	275.8 MHz	GND/P
GATEWAY TOWER:	120.6 MHz	LCL/P
	289.4 MHz	LCL/P
Other - (BLYTHE STAR):	124.1 MHz	BLYTHE STAR
Other - (DSERT STAR):	120.7 MHz	DSERT STAR
Other - (HUUTY STAR):	124.9 MHz	HUUTY STAR
	353.8 MHz	HUUTY STAR
Other - (JCOBS STAR):	120.7 MHz	JCOBS STAR
	239 MHz	JCOBS STAR
PHOENIX APPROACH/DEPARTURE:	124.9 MHz	APCH/P DEP/P
	353.8 MHz	APCH/P DEP/P

Remarks:

- ATCT OPERATED BY SERCO MGT SERVICES.

NAVAIDS

ILS/DME:

Rwy End	Type	ID	Frequency	Channel	Remarks
Rwy 30C	LOC/GS	I-IWA	110.15 MHz		• ILS CLASSIFICATION CODE IE. • LOC UNUSABLE BYD 25 DEGS LEFT AND RIGHT OF CRS. • ILS UNMONITORED 0500-1200L.

NAVAIDS:

Type	ID	Name	Frequency	Hours	Distance	Bearing	Remarks
VORTAC	IWA	WILLIE	113.3 MHz	24 Hours	0.3 nm	324.2°	• OPERATIONAL RESTRICTED • VOR UNUSBL 300-320 BYD 25 NM BLW 7500 FT; 320-300 BYD 20 NM BLW 7500 FT. • TACAN AZM UNUSBL 020-055 BYD 30 NM BLW 12000 FT; 150-195 BYD 20 NM BLW 7500 FT. • DME UNUSBL 020-055 BYD 30 NM BLW 12000 FT; 150-195 BYD 20 NM BLW 7500 FT.
VORTAC	PXR	PHOENIX	115.6 MHz	24 Hours	17.5 nm	115.4°	• OPERATIONAL RESTRICTED • VOR UNUSBL 000-015 BYD 33 NM BLW 11000 FT; 015-034 BYD 33 NM BLW 10000 FT; 090-100 BYD 15 NM BLW 8000 FT; 185-190 BYD 30 NM BLW 8000 FT; 185-190 BYD 38 NM BLW 9000 FT; 190-230 BYD 20 NM BLW 10000 FT; 345-000 BYD 33 NM BLW 10000 FT; 345-034 BYD 20 NM BLW 8000 FT; 345-034 BYD 10 NM BLW 6000 FT. • TACAN AZM UNUSBL 000-015 BYD 33 NM BLW 11000 FT; 015-034 BYD 33 NM BLW 10000 FT; 090-100 BYD 15 NM BLW 8000 FT; 185-190 BYD 38 NM BLW 9000 FT; 185-190 BYD 30 NM BLW 8000 FT; 190-230 BYD 20 NM BLW 10000 FT; 345-000 BYD 33 NM BLW 11000 FT; 345-034 BYD 20 NM BLW 8000 FT; 345-034 BYD 10 NM BLW 6000 FT. • DME UNUSBL 000-015 BYD 33 NM BLW 11000 FT; 015-034 BYD 33 NM BLW 10000 FT; 090-100 BYD 15 NM BLW 8000 FT; 185-190 BYD 38 NM BLW 9000 FT; 185-190 BYD 30 NM BLW 8000 FT; 190-230 BYD 20 NM BLW 10000 FT; 215-315; 345-000 BYD 33 NM BLW 11000 FT; 345-034 BYD 20 NM BLW 8000 FT; 345-034 BYD 10 NM BLW 6000 FT.
VOT	PHX	PHOENIX	109 MHz	24 Hours	19.3 nm	113.3°	• OPERATIONAL IFR

TACAN	LUF	LUKE	113 MHz	17 UNMON WHEN LUKE AFB ATCT CLSD.	38.9 nm	110.6°	• OPERATIONAL RESTRICTED • TAC AZM UNUSBL 242-262 BYD 16 NM BLW 13000 FT; 262-272 BYD 15 NM; 272-297 BYD 16 NM BLW 13000 FT. • NO-NOTAM MP: 0600-1230Z SUN, WED. • DME UNUSBL 242-262 BYD 16 NM BLW 13000 FT; 272-297 BYD 16 NM BLW 13000 FT.
DME	PAN	PAYSON	116.35 MHz	24 Hours	58.9 nm	195.8°	• OPERATIONAL RESTRICTED • DME UNUSBL 005T-075T BYD 26 NM BLW 13000 FT; 203T-239T BYD 30 NM BLW 13000 FT; 311T-004T BYD 30 NM BLW 16000 FT.

WEATHER

ID	Type	Frequency	Phone	Distance	Remarks
IWA	WX AWOS-3	133.5 MHz	480-988-9428	0.7 nm	• AWOS IS AVAILABLE FROM 0000-0500 (MST) ON 133.5, OR 24 HRS VIA PHONE: 480-988-9428.
CHD	WX AWOS-3PT		480-814-9952	8.1 nm	
FFZ	WX ASOS		480-641-4111	10.0 nm	
PHX	WX ASOS		602-231-8557	18.9 nm	
CGZ	WX AWOS-3PT	132.175 MHz	520-836-3392	21.9 nm	

RUNWAY 12C/30C

Dimensions	10201 ft. x 150 ft.
Surface Type	ASPH-CONC
Surface Condition	GOOD
Treatment	
Runway Edge Lights	High Intensity
PCN	26/R/D/W/T
Single Wheel	55,000 lbs
Double Wheel	95,000 lbs
Double Tandem	185,000 lbs
Dual Double Tandem	550,000 lbs

Base End: 12C

True Alignment	136°
Traffic Pattern	Left
Markings	Precision instrument
Markings Condition	Good
Latitude	33-19-3.4065 N
Longitude	111-39-57.3227 W
Elevation	1347.7 ft.
Threshold Crossing Height	50 ft. AGL
Visual Glide Path Angle	3°
Visual Slope Indicator	4-light PAPI on left
Runway End Identifier Lights	No
TDZE	1358.5 ft.
TORA	10201 ft.
TODA	10201 ft.
ASDA	10201 ft.
LDA	10201 ft.

Reciprocal End: 30C

True Alignment	316°
Traffic Pattern	
Markings	Precision instrument
Markings Condition	Good
Latitude	33-17-51.3375 N
Longitude	111-38-33.19 W
Elevation	1380.5 ft.
Threshold Crossing Height	49 ft. AGL
Visual Glide Path Angle	3°
Visual Slope Indicator	4-light PAPI on left
Runway End Identifier Lights	No
TDZE	1380.5 ft.
TORA	10201 ft.
TODA	10201 ft.
ASDA	10201 ft.
LDA	10201 ft.

RUNWAY 12L/30R

Dimensions	9300 ft. x 150 ft.
Surface Type	CONC
Surface Condition	GOOD
Treatment	
Runway Edge Lights	High Intensity
PCN	88/R/C/W/T
Single Wheel	75,000 lbs
Double Wheel	210,000 lbs
Double Tandem	590,000 lbs
Dual Double Tandem	850,000 lbs

Base End: 12L

True Alignment	136°
Traffic Pattern	Left
Markings	Precision instrument
Markings Condition	Good
Latitude	33-19-3.3231 N
Longitude	111-39-40.7259 W
Elevation	1356.3 ft.
Threshold Crossing Height	74 ft. AGL
Visual Glide Path Angle	3°
Visual Slope Indicator	4-light PAPI on left
Runway End Identifier Lights	Yes
TDZE	1365 ft.
TORA	9300 ft.
TODA	9300 ft.
ASDA	9300 ft.
LDA	9300 ft.

Reciprocal End: 30R

True Alignment	316°

Traffic Pattern	Right
Markings	Precision instrument
Markings Condition	Good
Latitude	33-17-57.6149 N
Longitude	111-38-24.0256 W
Elevation	1384.1 ft.
Threshold Crossing Height	75 ft. AGL
Visual Glide Path Angle	3°
Visual Slope Indicator	4-light PAPI on left
Runway End Identifier Lights	Yes
TDZE	1384.1 ft.
TORA	9300 ft.
TODA	9300 ft.
ASDA	9300 ft.
LDA	9300 ft.

RUNWAY 12R/30L

Dimensions	10401 ft. x 150 ft.
Surface Type	CONC
Surface Condition	GOOD
Treatment	
Runway Edge Lights	Medium Intensity
PCN	71/R/C/W/T
Single Wheel	55,000 lbs
Double Wheel	95,000 lbs
Double Tandem	185,000 lbs
Dual Double Tandem	550,000 lbs

Base End: 12R

True Alignment	136°
Traffic Pattern	Right
Markings	Precision instrument
Markings Condition	Good
Latitude	33-19-3.6168 N
Longitude	111-40-22.3251 W
Elevation	1341.2 ft.
Threshold Crossing Height	60 ft. AGL
Visual Glide Path Angle	3°
Visual Slope Indicator	4-light PAPI on left
Centerline Lights	
Runway End Identifier Lights	No
TDZE	1348.8 ft.
TORA	10401 ft.
TODA	10401 ft.
ASDA	10401 ft.
LDA	10401 ft.

Reciprocal End: 30L

True Alignment	316°
Traffic Pattern	Left

Markings	Precision instrument
Markings Condition	Good
Latitude	33-17-50.1444 N
Longitude	111-38-56.529 W
Elevation	1374.2 ft.
Threshold Crossing Height	60 ft. AGL
Visual Glide Path Angle	3°
Visual Slope Indicator	4-light PAPI on left
Centerline Lights	no
Runway End Identifier Lights	No
TDZE	1374.2 ft.
TORA	10401 ft.
TODA	10401 ft.
ASDA	10401 ft.
LDA	10401 ft.

HELIPORTS

None

CHARTS

Chart data valid from 0901Z 01/26/23 to 0901Z 02/23/23.

AIRPORT DIAGRAM for IWA

Minimums

ALTERNATE MINIMUMS
DIVERSE VECTOR AREA
TAKEOFF MINIMUMS

Standard Terminal Arrival (STAR) Charts

ARLIN FOUR
BLYTHE FIVE
DSERT TWO (RNAV)
DSERT TWO (RNAV), CONT.1
HUUTY ONE (RNAV)
SUNSS EIGHT

Departure Procedure (DP) Charts

BNYRD SIX (RNAV)
FTHLS SIX (RNAV)
IZZZO SEVEN (RNAV)
JUDTH SEVEN (RNAV)
KATMN SIX (RNAV)
LALUZ SIX (RNAV)
MAYSA SEVEN (RNAV)
SNOBL SIX (RNAV)
YOTES SIX (RNAV)

Instrument Approach Procedure (IAP) Charts

ILS OR LOC RWY 30C
RNAV (GPS) RWY 12C
RNAV (GPS) RWY 12R
RNAV (GPS) RWY 30L
RNAV (GPS) RWY 30R
RNAV (GPS) Y RWY 30C
RNAV (RNP) Z RWY 30C
VOR OR TACAN RWY 30C

Obstacle Departure Procedures (ODP) Charts

PHOENIX ONE (OBSTACLE)

CONTACTS

OWNER

PHX MESA GATEWAY AIRPORT AUTHORITY
5835 S. SOSSAMAN RD
MESA, AZ 85212-0919
UNITED STATES
Phone: (480) 988-7570

MANAGER

J. BRIAN O'NEILL
PHX-MESA GATEWAY AIRPORT AUTHORITY

5835 S. SOSSAMAN ROAD
MESA, AZ 85212-0919
UNITED STATES
Phone: (480) 988-7708

REMARKS

- OCNL WILDLIFE INVOF ARPT.
- VOLUNTARY NOISE ABATEMENT PROCEDURES IN EFFECT. AVOID LOW OVERFLIGHT OF NOISE SENSITIVE AREAS SURROUNDING AIRPORT. FOR NOISE ABATEMENT INFO CTC AIRPORT (480) 988-7637.
- BE ALERT FOR CROP DUSTING ACTIVITY INVOF ARPT.
- BE ALERT FOR CROP DUSTING ACTIVITY AT OR BELOW 2000 FEET MSL BETWEEN 2 AND 3 MILES ON APCH FOR RWY 30R, RWY 30L AND RWY 30C.
- TWY W BETWEEN TWY H AND TWY V RSTD TO ACFT WITH WING SPAN LESS THAN 135 FT TWY W BETWEEN TWY T AND TWY V RSTRD TO ACFT WITH WING SPAN LESS THAN 118 FT.
- TWY Y RSTD TO ACFT WITH WINGSPAN LESS THAN 79 FT.
- 7 FT CHAIN LINK FENCE ON SOUTHERN PORTION OF MIDDLE RAMP.
- LARGE/HEAVY ACFT TAXI WITH INBOARD ENGINES ONLY.
- TWY T ACCESSIBLE FOR ACFT WITH WINGSPAN BETWEEN 119 FT AND 170 FT WITH WING WALKERS FROM TWY W SOUTH OF TWY V.
- ALL NON-EMERG ACFT OPS OF AV-8 MODEL ACFT, ALL VARIATIONS, LIMITED TO RWY 12L/30R.
- 24-HR PRIOR PERMISSION REQ FOR UNSCHEDULED AIR CARRIER OPS WITH MORE THAN 30 PASSENGER SEATS, CALL ARPT OPS.
- FOR CD WHEN ATCT CLSD, CTC PHOENIX APCH AT 602-306-2565.
- SPORTS FIELD LIGHTING EAST OF RWY 30R APPROACH.

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIRPORT MASTER RECORD

PRINT DATE: 2/1/2023
AFD EFF 01/26/2023
FORM APPROVED OMB 2120-0015

> 1 ASSOC CITY:	PHOENIX	4 STATE: AZ	LOC ID: IWA	FAA SITE NR:	00753.*A
> 2 AIRPORT NAME:	PHOENIX-MESA GATEWAY		5 COUNTY: MARICOPA AZ		
3 CBD TO AIRPORT (NM):	20 SE	6 REGION/ADO: AWP/PHX	7 SECT AERO CHT: PHOENIX		

GENERAL

10 OWNERSHIP:	PUBLIC
> 11 OWNER:	PHX MESA GATEWAY AIRPORT AUTHORITY
> 12 ADDRESS:	5835 S. SOSSAMAN RD MESA, AZ 85212-0919
> 13 PHONE NR:	(480) 988-7570
> 14 MANAGER:	J. BRIAN O'NEILL
> 15 ADDRESS:	PHX-MESA GATEWAY AIRPORT AUTHORITY, 5835 MESA, AZ 85212-0919
> 16 PHONE NR:	(480) 988-7708
> 17 ATTENDANCE SCHEDULE:	

ALL	ALL	ALL

18 AIRPORT USE:	PUBLIC
19 ARPT LAT:	33-18-28.1660N ESTIMATED
20 ARPT LONG:	111-39-19.6530W
21 ARPT ELEV:	1384.1 SURVEYED
22 ACREAGE:	3,020
> 23 RIGHT TRAFFIC:	30R, 12R
> 24 NON-COMM LANDING:	YES
25 NPIAS/FED AGREEMENTS:	N
> 26 FAR 139 INDEX:	I C S 03/1999

SERVICES

> 70 FUEL:	100LL A
> 71 AIRFRAME RPRS:	MINOR
> 72 PWR PLANT RPRS:	
> 73 BOTTLE OXYGEN:	HIGH/LOW
> 74 BULK OXYGEN:	
75 TSNT STORAGE:	HGR, TIE
76 OTHER SERVICES:	AMB, CARGO, CHTR, INSTR, RNTL

FACILITIES

> 80 ARPT BCN:	WG
> 81 ARPT LGT SKED :	SEE RMK
BCN LGT SKED:	SS-SR
> 82 UNICOM:	
> 83 WIND INDICATOR:	YES
84 SEGMENTED CIRCLE:	YES
85 CONTROL TWR:	YES
86 FSS:	PRESCOTT
87 FSS ON ARPT:	NO
88 FSS PHONE NR:	
89 TOLL FREE NR:	1-800-WX-BRIEF

BASED AIRCRAFT

90 SINGLE ENG:	66
91 MULTI ENG:	16
92 JET:	27
93 HELICOPTERS:	21
TOTAL:	130
94 GLIDERS:	0
95 MILITARY:	0
96 ULTRA-LIGHT:	0

OPERATIONS

100 AIR CARRIER:	14,098
102 AIR TAXI:	44,333
103 G A LOCAL:	158,632
104 G A ITNRNT:	51,669
105 MILITARY:	4,940
TOTAL:	273,672
OPERATIONS FOR 12 MONTHS ENDING:	10/31/2021

RUNWAY DATA

	12C/30C	12L/30R	12R/30L	
> 30 RUNWAY INDENT:	10,201	9,300	10,401	
> 31 LENGTH:	150	150	150	
> 32 WIDTH:	ASPH-CONC-G	CONC-G	CONC-G	
> 33 SURF TYPE-COND:				
> 34 SURF TREATMENT:				
35 GROSS WT: S	55.0	75.0	55.0	
36 (IN THSDS) D	95.0	210.0	95.0	
37 2D	185.0	590.0	185.0	
38 2D/2D2	550.0	850.0	550.0	
> 39 PCN:	26 /R/D/W/T	88 /R/C/W/T	71 /R/C/W/T	

LIGHTING/APCH AIDS

> 40 EDGE INTENSITY:	HIGH	HIGH	MED	
> 42 RWY MARK TYPE-COND:	PIR - G / PIR - G	PIR - G / PIR - G	PIR - G / PIR - G	- / -
> 43 VGSI:	P4L / P4L	P4L / P4L	P4L / P4L	/
44 THR COSSING HGT.:	50 / 49	74 / 75	60 / 60	/
45 VISUAL GLIDE ANGLE:	3.00 / 3.00	3.00 / 3.00	3.00 / 3.00	/
> 46 CNTRLN-TDZ:	- / -	- / -	- / N -	- / -
> 47 RVR-RVV:	- / -	- / -	- / -	- / -
> 48 REIL:	/	Y / Y	/	/
> 49 APCH LIGHTS:	/	/	/	/

OBSTRUCTION DATA

50 FAR 77 CATEGORY	C / PIR	B(V) / B(V)	C / C	/
> 51 DISPLACED THR:	/	/	/	/
> 52 CTLG OBSTN:	/	/	/	/
> 53 OBSTN MARKED/LGTD:	/	/	/	/
> 54 HGT ABOVE RWY END:	/	/	/	/
> 55 DIST FROM RWY END:	/	/	/	/
> 56 CNTRLN OFFSET:	/	/	/	/
57 OBSTN CLNC SLOPE:	50:1 / 50:1	50:1 / 50:1	50:1 / 50:1	/
58 CLOSE-IN OBSTN:	N / N	N / N	N / N	/

DECLARED DISTANCES

> 60 TAKE OFF RUN AVBL (TORA):	10,201 / 10,201	9,300 / 9,300	10,401 / 10,401	/
> 61 TAKE OFF DIST AVBL (TODA):	10,201 / 10,201	9,300 / 9,300	10,401 / 10,401	/
> 62 ACLT STOP DIST AVBL (ASDA):	10,201 / 10,201	9,300 / 9,300	10,401 / 10,401	/
> 63 LNDG DIST AVBL (LDA):	10,201 / 10,201	9,300 / 9,300	10,401 / 10,401	/

(>) ARPT MGR PLEASE ADVISE FSS IN ITEM 86 WHEN CHANGES OCCUR TO ITEMS PRECEDED BY >

> 110 REMARKS

A 024	NO LDG FEE FOR US GOV OWNED, NON-REVENUE AND FLIGHT TRAINING ACFT UP TO 12,500 LBS.
A 031	RWY 12C/30C RWY 12C FIRST 1000 FT CONC, RWY 30C FIRST 3500 FT CONC, REMAINING CENTER PORTION ASPH.
A 070	FUEL AVBL 24 HRS CTC 480-988-7700 OR 129.875.
A 081	FOR REIL RWY 12L & 30R CTC ATCT. AFTER ATCT CLSD, ARPT LGTS REMAIN ON.
A 110-008	OCNL WILDLIFE INVOF ARPT.
A 110-023	VOLUNTARY NOISE ABATEMENT PROCEDURES IN EFFECT. AVOID LOW OVERFLIGHT OF NOISE SENSITIVE AREAS SURROUNDING AIRPORT. FOR NOISE ABATEMENT INFO CTC AIRPORT (480) 988-7637.
A 110-025	BE ALERT FOR CROP DUSTING ACTIVITY INVOF ARPT.
A 110-026	BE ALERT FOR CROP DUSTING ACTIVITY AT OR BELOW 2000 FEET MSL BETWEEN 2 AND 3 MILES ON APCH FOR RWY 30R, RWY 30L AND RWY 30C.
A 110-027	TWY W BETWEEN TWY H AND TWY V RSTD TO ACFT WITH WING SPAN LESS THAN 135 FT TWY W BETWEEN TWY T AND TWY V RSTRD TO ACFT WITH WING SPAN LESS THAN 118 FT.
A 110-028	TWY Y RSTD TO ACFT WITH WINGSPAN LESS THAN 79 FT.
A 110-029	7 FT CHAIN LINK FENCE ON SOUTHERN PORTION OF MIDDLE RAMP.
A 110-030	LARGE/HEAVY ACFT TAXI WITH INBOARD ENGINES ONLY.

111 INSPECTOR: (F) 112 LAST INSP: 12/01/2021 113 LAST INFO REQ:

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

AIRPORT MASTER RECORD

PRINT DATE: 2/1/2023
AFD EFF 01/26/2023
FORM APPROVED OMB 2120-0015

> 1 ASSOC CITY: ***CONTINUED*** 4 STATE: AZ LOC ID: IWA FAA SITE NR: 00753.*A
> 2 AIRPORT NAME: 5 COUNTY:
3 CBD TO AIRPORT (NM): 6 REGION/ADO: AWP/PHX 7 SECT AERO CHT:

GENERAL

10 OWNERSHIP:
> 11 OWNER:
> 12 ADDRESS:

> 13 PHONE NR:
> 14 MANAGER:
> 15 ADDRESS:

> 16 PHONE NR:
> 17 ATTENDANCE SCHEDULE:

18 AIRPORT USE:
19 ARPT LAT:
20 ARPT LONG:
21 ARPT ELEV:
22 ACREAGE:
> 23 RIGHT TRAFFIC:
> 24 NON-COMM LANDING:

25 NPIAS/FED AGREEMENTS:
> 26 FAR 139 INDEX:

SERVICES

> 70 FUEL:

> 71 AIRFRAME RPRS:
> 72 PWR PLANT RPRS:
> 73 BOTTLE OXYGEN:
> 74 BULK OXYGEN:
75 TSNT STORAGE:
76 OTHER SERVICES:

FACILITIES

> 80 ARPT BCN:
> 81 ARPT LGT SKED :
BCN LGT SKED:
> 82 UNICOM:
> 83 WIND INDICATOR:
84 SEGMENTED CIRCLE:
85 CONTROL TWR:
86 FSS:
87 FSS ON ARPT:

88 FSS PHONE NR:
89 TOLL FREE NR:

BASED AIRCRAFT

90 SINGLE ENG:
91 MULTI ENG:
92 JET:
93 HELICOPTERS:
TOTAL:

94 GLIDERS:
95 MILITARY:
96 ULTRA-LIGHT:

OPERATIONS

100 AIR CARRIER:
102 AIR TAXI:
103 G A LOCAL:
104 G A ITNRNT:
105 MILITARY:
TOTAL:

OPERATIONS FOR
12 MONTHS
ENDING:

RUNWAY DATA

> 30 RUNWAY INDENT:				
> 31 LENGTH:				
> 32 WIDTH:				
> 33 SURF TYPE-COND:				
> 34 SURF TREATMENT:				
35 GROSS WT:	S			
36 (IN THSDS)	D			
37	2D			
38	2D/2D2			
> 39 PCN:				

LIGHTING/APCH AIDS

> 40 EDGE INTENSITY:				
> 42 RWY MARK TYPE-COND:	- / -	- / -	- / -	- / -
> 43 VGSI:	/	/	/	/
44 THR COSSING HGT.:	/	/	/	/
45 VISUAL GLIDE ANGLE:	/	/	/	/
> 46 CNTRLN-TDZ:	- / -	- / -	- / -	- / -
> 47 RVR-RVV:	- / -	- / -	- / -	- / -
> 48 REIL:	/	/	/	/
> 49 APCH LIGHTS:	/	/	/	/

OBSTRUCTION DATA

50 FAR 77 CATEGORY	/	/	/	/
> 51 DISPLACED THR:	/	/	/	/
> 52 CTLG OBSTN:	/	/	/	/
> 53 OBSTN MARKED/LGTD:	/	/	/	/
> 54 HGT ABOVE RWY END:	/	/	/	/
> 55 DIST FROM RWY END:	/	/	/	/
> 56 CNTRLN OFFSET:	/	/	/	/
57 OBSTN CLNC SLOPE:	/	/	/	/
58 CLOSE-IN OBSTN:	/	/	/	/

DECLARED DISTANCES

> 60 TAKE OFF RUN AVBL (TORA):	/	/	/	/
> 61 TAKE OFF DIST AVBL (TODA):	/	/	/	/
> 62 ACLT STOP DIST AVBL (ASDA):	/	/	/	/
> 63 LNDG DIST AVBL (LDA):	/	/	/	/

(>) ARPT MGR PLEASE ADVISE FSS IN ITEM 86 WHEN CHANGES OCCUR TO ITEMS PRECEDED BY >

> 110 REMARKS

A 110-033 TWY T ACCESSIBLE FOR ACFT WITH WINGSPAN BETWEEN 119 FT AND 170 FT WITH WING WALKERS FROM TWY W SOUTH OF TWY V.
A 110-034 ALL NON-EMERG ACFT OPS OF AV-8 MODEL ACFT, ALL VARIATIONS, LIMITED TO RWY 12L/30R.
A 110-035 24-HR PRIOR PERMISSION REQ FOR UNSCHEDULED AIR CARRIER OPS WITH MORE THAN 30 PASSENGER SEATS, CALL ARPT OPS.
A 110-038 FOR CD WHEN ATCT CLSD, CTC PHOENIX APCH AT 602-306-2565.
A 110-039 SPORTS FIELD LIGHTING EAST OF RWY 30R APPROACH.

111 INSPECTOR: (F) 112 LAST INSP: 12/01/2021 113 LAST INFO REQ:

Airport Details for KIWA - ACTIVE

Chart Date: 08/13/2020

PHOENIX-MESA GATEWAY

PHOENIX

AL #: 74

State:	ARIZONA	Magnetic Variation/Year:	E13/1980	Weather Station:	YES
Country:	UNITED STATES	Site Nbr:	00753	Control Tower:	YES
Category:	AERODROME ONLY	Data Source:	THIRD_PARTY 05/02/2018	THIRD_PARTY	
FAR Part 139:	YES	Owner:	STATE	Use:	CIVIL
Reimbursable Agreement:				Military Type:	

Coordinates		**Office**		**Local Auto Weather**	
Latitutde:	N 33° 18' 28.1660"	Flight Inspection:	SAC	Weather Source:	AWOS
Longitude:	W 111° 39' 19.6530"	Procedure Development:	120	Type:	3
Field Elevation:	1384.1	Region Code:	WP	Frequency:	133.500
Ellipsoid Elevation:	1286.6 S	Service Area:	CNTL	WMSCR:	Y
Horizontal Datum:	NAD83	OCC Code:	POCC	Phone number	(480)988-9428
Vertical Datum:	NAVD88	International:	NO		

CONTACTS

Contact Role	Last Name	First Name	Phone Number	E-mail	Remark
OWNER			(480)988-7600		

ALTIMETERS

Type	Primary	Airport ID	Field Alt Source	Latitude	Longitude	Operational Timing
L	YES	KIWA	AWOS	N 33° 18' 02.9228"	W 111° 38' 37.4846"	FULL-TIME
R	NO	KPHX	ASOS	N 33° 25' 40.1606"	W 112° 00' 13.1305"	FULL-TIME

ALTIMETER COMMENTS

RUNWAYS

12L (A) 30R (A) 12R (A) 30L (A) 12C (A) 30C (A)

Rpt Date: 06:30:06 02/02/2023
Rpt User: dso

RUNWAY DETAIL

Landing Strip

Chart Date: 08/13/2020 | Publication Status: A | Pseudo Rwy: NO
Surface: CONC GOOD | Width: 150 | Physical Length: 9300

Rwy Number: 12L

KIWA12L

Use Category: RUNWAY ONLY
Chart Date: 08/13/2020 Pub. Status: A
Data Source: THIRD_PARTY 05/02/2018
Markings: PIR-G

Threshold

Latitude:	N 33° 19' 03.3231"
Longitude:	W 111° 39' 40.7259"
Elevation:	1356.3
Ellipsoid Elev:	1258.8 S
Ellipsoid Elev Meters:	383.7 M
Ellipsoid Elev Model:	NAVD88
Horz. Datum:	NAD83
Vert. Datum:	NAVD88

Displaced Threshold

Latitude:	
Longitude:	
Elevation:	
Ellipsoid Elev:	
Ellipsoid Elev Meters:	
Ellipsoid Elev Model:	
Horz. Datum:	UNKNOWN
Vert. Datum:	UNKNOWN

VGSI Lights

VGSI Lights Type:	PAPI-4L
Owner:	STATE
Pilot Cntl Freq:	
Th Cross Ht:	73.9
High Angle:	
Com. Date:	08/23/2011
Com. Angle:	3.00
DWB Elev:	
DWB Thres:	
Ref Pt Lat:	N 33° 18' 53.8700"
Ref Pt Long:	W 111° 39' 29.6890"
Ref Pt Elev:	1360.0
Ref Pt Thres:	1338
Height Group:	

Lights

Config	Len	Owner	Mil Type	Com Dt	Pilot Cntrl
REIL		STATE			
HIRL		STATE			

Landing Length:	9300
FI RWY Length:	9300
FI RWY Height:	1384.1
Tdz Elevation:	1365.0
True Bearing:	135.569
Ft Disp Th:	
Gradient:	0.3%
RVRTouchdown:	
MidPoint:	
Rollout:	
Rail:	NO
OIS Data Source:	VG 05/02/2018 THIRD_PARTY
Assoc. Fac.:	

Rwy Number: 30R

KIWA30R

Use Category: RUNWAY ONLY
Chart Date: 08/13/2020 Pub. Status: A
Data Source: THIRD_PARTY 05/02/2018
Markings: PIR-G

Threshold

Latitude:	N 33° 17' 57.6149"
Longitude:	W 111° 38' 24.0256"
Elevation:	1384.1
Ellipsoid Elev:	1286.6 S
Ellipsoid Elev Meters:	392.2 M
Ellipsoid Elev Model:	NAVD88
Horz. Datum:	NAD83
Vert. Datum:	NAVD88

Displaced Threshold

Latitude:	
Longitude:	
Elevation:	
Ellipsoid Elev:	
Ellipsoid Elev Meters:	
Ellipsoid Elev Model:	
Horz. Datum:	UNKNOWN
Vert. Datum:	UNKNOWN

VGSI Lights

VGSI Lights Type:	PAPI-4L
Owner:	STATE
Pilot Cntl Freq:	
Th Cross Ht:	75.3
High Angle:	
Com. Date:	08/23/2011
Com. Angle:	3.00
DWB Elev:	
DWB Thres:	
Ref Pt Lat:	N 33° 18' 08.1860"
Ref Pt Long:	W 111° 38' 36.3620"
Ref Pt Elev:	1379.5
Ref Pt Thres:	1496
Height Group:	

Lights

Config	Len	Owner	Mil Type	Com Dt	Pilot Cntrl
REIL		STATE			
HIRL		STATE			

Landing Length:	9300
FI RWY Length:	9300
FI RWY Height:	1356.3
Tdz Elevation:	1384.1
True Bearing:	315.581
Ft Disp Th:	
Gradient:	-0.3%
RVRTouchdown:	
MidPoint:	
Rollout:	
Rail:	NO
OIS Data Source:	VG 05/02/2018 THIRD_PARTY
Assoc. Fac.:	

RUNWAY LANDING STRIP COMMENTS

RUNWAY 12L COMMENTS

RUNWAY 30R COMMENTS

RUNWAY DETAIL

Landing Strip

Chart Date: 08/13/2020 | Publication Status: A | Pseudo Rwy: NO
Surface: CONC GOOD | Width: 150 | Physical Length: 10401

Rwy Number: 12R

KIWA12R

Use Category: RUNWAY ONLY
Chart Date: 08/13/2020 Pub. Status: A
Data Source: THIRD_PARTY 05/02/2018
Markings: PIR-G

Threshold

Latitude:	N 33° 19' 03.6168"
Longitude:	W 111° 40' 22.3251"
Elevation:	1341.2
Ellipsoid Elev:	1243.5 S
Ellipsoid Elev Meters:	379.0 M
Ellipsoid Elev Model:	NAVD88
Horz. Datum:	NAD83
Vert. Datum:	NAVD88

Rwy Number: 30L

KIWA30L

Use Category: RUNWAY ONLY
Chart Date: 08/13/2020 Pub. Status: A
Data Source: THIRD_PARTY 05/02/2018
Markings: PIR-G

Threshold

Latitude:	N 33° 17' 50.1444"
Longitude:	W 111° 38' 56.5290"
Elevation:	1374.2
Ellipsoid Elev:	1276.6 S
Ellipsoid Elev Meters:	389.1 M
Ellipsoid Elev Model:	NAVD88
Horz. Datum:	NAD83
Vert. Datum:	NAVD88

VGSI Lights

VGSI Lights Type:	PAPI-4L
Owner:	STATE
Pilot Cntl Freq:	
Th Cross Ht:	60.0
High Angle:	
Com. Date:	04/24/2012
Com. Angle:	3.00
DWB Elev:	
DWB Thres:	
Ref Pt Lat:	N 33° 18' 55.9030"
Ref Pt Long:	W 111° 40' 13.3150"
Ref Pt Elev:	1343.3
Ref Pt Thres:	1092
Height Group:	

Lights

Config	Len	Owner	Mil Type	Com Dt	Pilot Cntrl
MIRL		STATE			

Displaced Threshold

Latitude:	
Longitude:	
Elevation:	
Ellipsoid Elev:	
Ellipsoid Elev Meters:	
Ellipsoid Elev Model:	
Horz. Datum:	UNKNOWN
Vert. Datum:	UNKNOWN

Landing Length:	10401
Fl RWY Length:	10401
Fl RWY Height:	1374.2
Tdz Elevation:	1348.8
True Bearing:	135.557
Ft Disp Th:	
Gradient:	0.3%
RVRTouchdown:	
MidPoint:	
Rollout:	
Rail:	NO
OIS Data Source:	VG 05/02/2018 THIRD_PARTY
Assoc. Fac.:	

VGSI Lights

VGSI Lights Type:	PAPI-4L
Owner:	STATE
Pilot Cntl Freq:	
Th Cross Ht:	60.0
High Angle:	
Com. Date:	04/24/2012
Com. Angle:	3.00
DWB Elev:	
DWB Thres:	
Ref Pt Lat:	N 33° 17' 58.8700"
Ref Pt Long:	W 111° 39' 06.7150"
Ref Pt Elev:	1369.9
Ref Pt Thres:	1235
Height Group:	

Lights

Config	Len	Owner	Mil Type	Com Dt	Pilot Cntrl
MIRL		STATE			

Displaced Threshold

Latitude:	
Longitude:	
Elevation:	
Ellipsoid Elev:	
Ellipsoid Elev Meters:	
Ellipsoid Elev Model:	
Horz. Datum:	UNKNOWN
Vert. Datum:	UNKNOWN

Landing Length:	10401
Fl RWY Length:	10401
Fl RWY Height:	1341.2
Tdz Elevation:	1374.2
True Bearing:	315.57
Ft Disp Th:	
Gradient:	-0.3%
RVRTouchdown:	
MidPoint:	
Rollout:	
Rail:	NO
OIS Data Source:	VG 05/02/2018 THIRD_PARTY
Assoc. Fac.:	

RUNWAY LANDING STRIP COMMENTS

RUNWAY 12R COMMENTS

RUNWAY 30L COMMENTS

RUNWAY DETAIL

Landing Strip

Chart Date: 08/13/2020	Publication Status: A	Pseudo Rwy: NO
Surface: CONC_ASPH GOOD	Width: 150	Physical Length: 10201

Rwy Number: 12C

Use Category: RUNWAY ONLY
Chart Date: 08/13/2020 Pub. Status: A
Data Source: THIRD_PARTY 05/02/2018
Markings: PIR-G

Threshold

Latitude:	N 33° 19' 03.4065"
Longitude:	W 111° 39' 57.3227"
Elevation:	1347.7
Ellipsoid Elev:	1250.2 S
Ellipsoid Elev Meters:	381.1 M
Ellipsoid Elev Model:	NAVD88
Horz. Datum:	NAD83
Vert. Datum:	NAVD88

Displaced Threshold

Latitude:	
Longitude:	
Elevation:	
Ellipsoid Elev:	
Ellipsoid Elev Meters:	
Ellipsoid Elev Model:	
Horz. Datum:	UNKNOWN
Vert. Datum:	UNKNOWN

Landing Length:	10201
Fl RWY Length:	10201

KIWA12C

VGSI Lights

VGSI Lights Type:	PAPI-4L
Owner:	STATE
Pilot Cntl Freq:	
Th Cross Ht:	50.0
High Angle:	
Com. Date:	10/06/2005
Com. Angle:	3.00
DWB Elev:	
DWB Thres:	
Ref Pt Lat:	N 33° 18' 57.1330"
Ref Pt Long:	W 111° 39' 49.9970"
Ref Pt Elev:	1351.4
Ref Pt Thres:	888
Height Group:	

Lights

Config	Len	Owner	Mil Type	Com Dt	Pilot Cntrl
HIRL		STATE			

Rwy Number: 30C

Use Category: RUNWAY ONLY
Chart Date: 08/13/2020 Pub. Status: A
Data Source: THIRD_PARTY 05/02/2018
Markings: PIR-G

Threshold

Latitude:	N 33° 17' 51.3375"
Longitude:	W 111° 38' 33.1900"
Elevation:	1380.5
Ellipsoid Elev:	1283.0 S
Ellipsoid Elev Meters:	391.1 M
Ellipsoid Elev Model:	NAVD88
Horz. Datum:	NAD83
Vert. Datum:	NAVD88

Displaced Threshold

Latitude:	
Longitude:	
Elevation:	
Ellipsoid Elev:	
Ellipsoid Elev Meters:	
Ellipsoid Elev Model:	
Horz. Datum:	UNKNOWN
Vert. Datum:	UNKNOWN

Landing Length:	10201
Fl RWY Length:	10201

KIWA30C

VGSI Lights

VGSI Lights Type:	PAPI-4L
Owner:	STATE
Pilot Cntl Freq:	
Th Cross Ht:	49.4
High Angle:	
Com. Date:	09/21/2005
Com. Angle:	3.00
DWB Elev:	
DWB Thres:	
Ref Pt Lat:	N 33° 17' 58.4030"
Ref Pt Long:	W 111° 38' 41.4360"
Ref Pt Elev:	1377.0
Ref Pt Thres:	1000
Height Group:	

Lights

Config	Len	Owner	Mil Type	Com Dt	Pilot Cntrl
HIRL		STATE			

Rpt Date: 06:30:06 02/02/2023
Rpt User: dso

Fl RWY Height:	1380.5	Fl RWY Height:	1347.7
Tdz Elevation:	1358.5	Tdz Elevation:	1380.5
True Bearing:	135.566	True Bearing:	315.579
Ft Disp Th:		Ft Disp Th:	
Gradient:	0.3%	Gradient:	-0.3%
RVRTouchdown:		RVRTouchdown:	
MidPoint:		MidPoint:	
Rollout:		Rollout:	
Rail:	NO	Rail:	NO
OIS Data Source:	VG 05/02/2018 THIRD_PARTY	OIS Data Source:	VG 05/02/2018 THIRD_PARTY
Assoc. Fac.:		Assoc. Fac.:	IWA ILS (A)

RUNWAY LANDING STRIP COMMENTS

RUNWAY 12C COMMENTS

RUNWAY 30C COMMENTS

Rpt Date: 06:30:06 02/02/2023
Rpt User: dso

COMMENTS

Topic	Priority	Date	Remark
NFDD	1	06/30/2004	HIRL RWY 12L/30R ADDED PER NFDD #118 DTD 06/18/04.
LIGHTS	2	01/04/2012	RWY 12R/30L PAPI DATA ADDED PER NEW VGSI DATA PROVIDED BY MGA OPS/MAINTENANCE SUPV EMAIL DATED 01/03/2012.
LIGHTS	3	01/04/2012	OWNER: PHOENIX-MESA GATEWAY AIRPORT.
SURVEY	4	07/13/2017	THIRD PARTY SURVEY DATED 03/31/2012. NAVAIDS INCLUDED: IWA ASR, IWA ILS, CHD NDB, IWA VORTAC.
CHANGE	5	07/13/2017	AIRPORT ID PROPOSED TO CHG FROM IWA TO AZM DUE TO POSSIBLE CONFLICT WITH ANOTHER LOCID. HOWEVER, NOT CONFIRMED FROM ARPT MGMT. WILL STANDBY UNTIL MORE DETAILS EMERGE.
SURVEY	6	02/20/2020	VG SURVEY DATA ENTERED, DATED: 5-2-2018. INCLUDES: IWA ILS, CHD NDB, IWA ASR, IWA VORTAC.
NOTE	7	04/09/2020	EMAIL FROM IFP GROUP, KIWA SURVEY DATA CHANGING FROM 5-21-2020 -TO- 8-13-2020 CYCLE.

PROCEDURES

Nav Ident	Nav Type	Description	FAS	Amendment	Type	Magnetic Variance/Year
IWA	ILS	ILS OR LOC RWY 30C	1489 / POWER POLE / N33°16'39.50" / W111°37'03.60"	3C	CIVIL	E13/1980
		RNAV (GPS) RWY 12C	1409 / RAMP LIGHT POLE / N33°18'38.03" / W111°40'09.54"	1C	CIVIL	E13/1980
		RNAV (GPS) RWY 12R		1D	CIVIL	E13/1980
		RNAV (GPS) RWY 30L	1434 / TREE / N33°16'46.33" / W111°38'05.46"	1D	CIVIL	E13/1980
			1444 / TREE / N33°16'28.40" / W111°34'28.98"			
		RNAV (GPS) RWY 30R	1486 / POLE / N33°16'39.52" / W111°37'03.30"	ORGA	CIVIL	E13/1980
		RNAV (GPS) Y RWY 30C	1489 / POWERLINE / N33°16'39.50" / W111°37'03.60"	1C	CIVIL	E13/1980
		RNAV (RNP) Z RWY 30C		ORGB	CIVIL	E13/1980
IWA	VORTAC	VOR OR TACAN RWY 30C	1489 / POWER POLE / N33°16'39.50" / W111°37'03.60"	2C	CIVIL	E13/1980
		TAKEOFF MINIMUMS AND OBSTACLE DP		2	CIVIL	

ASSOCIATED MONITORS

ASSOCIATED DGPS

Appendix H Design Kick-Off Meeting Minutes

Design Scoping Meeting Minutes

Monday, July 25th @ 2:30 pm

1. Project Description

a. Full Name: PMGAA Runway 12R-30L Reconstruction and Relocation of Taxiway H (Future TW B3)

b. Short Name: PMGAA RW 12R-30L Reconstruction

c. Location: RW 12R-30L (includes work at TW's H/B3, K, B4)

d. Design Funding: PMGAA (FAA and ADOT reimbursement)

e. Anticipated Construction Funding: FAA (AIP/BIL/AIG), ADOT, and PMGAA

f. Pre-Design Estimated Construction Cost: See attached project cost estimate

g. Project Numbers:

i. PMGAA CIP No. 1072

ii. PMGAA AOS No./Task No..... 20B-2302

iii. Dibble Project No. 1020023.2302

iv. ADOT Grant No. ..... TBD

v. FAA Grant No. ..... TBD

2. Design Team

a. PMGAA

i. Bob Draper — Engineering & Facilities Director

ii. Tony Steeneck — Project Manager

iii. Carl D'Acosta — Environmental and Safety Coordinator

iv. Ron King — Airport Superintendent

b. Dibble

i. Jared Bass — Project Manager

ii. Ken Snyder — Quality Manager

iii. Carmen Rose — Project Engineer

iv. Darin Oakeley — Designer

c. Subconsultants

i. Dibble — Survey

ii. Terracon — Geotech (Kirk Jackson)

iii. CR Engineers — Electrical (Shane Woodard)

iv. Environmental — PMGAA – CATEX in progress. It will be submitted at the end of August

3. General Project Information

a. **RW 12R-30L History:**

i. Existing RW 12R-30L Pavement Section:

1. RW 12R Threshold:
    a. Prior to 2015 Reconstruction: +/- 11-inches PCCP on native (sandy clay)
    b. Post 2015 Reconstruction: 16.5-inches PCCP on 6-inches CTB on 8-inches LTSG
2. RW 30L Threshold:
    a. Prior to 2015 Reconstruction: 9-1/2 to 11-1/2 inches PCCP on native (sandy clay)
    b. Post 2015 Reconstruction: 16-inches PCCP on 6-inches AC on 6-inches ABC on 8-inches LTSG
    c. Project limits include the removal of a pavement "sandwich section" (Northern part of 30L threshold), 9-inches PCCP on 2-inches AC on 7-inches PCCP)
3. RW 12R-30L (between reconstructed thresholds)
    a. RW Sandwich Section: need to determine the limits of the PCCP/AC/PCCP or fill material/PCCP between thresholds.
    b. ADOT APMS Data (between constructed sections):
        i. 2017 PCI: 68
        ii. 2023 PCI (Projected): 64
    c. Approx. 200 feet of sandwich section (northern part of 30L threshold) – 9-inches PCCP on 2-inches AC on 7-inches PCCP
    d. TW K and B4 Temporary AC Pavement Section: 14-inches AC on 8-13.5-inches ABC.

ii. Taxiways H, B3, K, and B4

1. TW H (to be demo'ed): 11.5-inches on clay
2. TW B3 (ACS design, proposed): 15-inches PCCP on 5-inches AC on 8-inches ABC on 8-inches P-152
    a. Dibble would like to propose a different pavement section
        i. Dibble Pavement Section ~ $115/SY
        ii. Kimley-Horn Pavement Section ~ $178/SY
    b. Dibble to evaluate cost/benefit of bringing on Kimley-Horn to complete the re-design work for the TW H/B3 portion of the project and will provide a recommendation to PMGAA
3. TW K and B4:
    a. 50' wide temp AC Pavement: 5-inches AC on 9-inches AC on 8-13.5-inches ABC on 8-inches P-152
    b. PCCP Pavement: 15.5-inches PCCP on 6-inches AC on 6-inches ABC on 8-inches P-152

b. **Project Scope and Limits:**

i. Base Bid and Ad Alt No. 1 (Schedules I and III): Reconstruct RW 12R-30L between reconstructed thresholds

1. Assuming there will either be multiple types of grants (AIP and/or BIL) and/or the FAA will ask to have this project broken into multiple phases
2. RW 12R Threshold: need to reconstruct approx. 500' to meet longitudinal and transverse FAA standards.
3. RW 30L Threshold: need to reconstruct approx. 220' to meet longitudinal and transverse FAA standards.
4. Reconstruct 35' wide runway shoulders including all new conduit and runway lights within the reconstruction limits
    a. Runway edge lights outside of the runway reconstruction limits will be replaced with LED HIRLs in existing base cans.
    b. All new lighting cable will be installed for the runway lighting circuit
5. Replace Distance Remaining signs including new cable and conduit
    a. Design will evaluate the need for new sign bases and location of distance remaining signs
6. Grading outside of the new 35' shoulders will be completed as needed to match existing grades
    a. Could include placement of ABC adjacent to the shoulder pavement
    b. Removal of deteriorated AC pavement that is wider than the standard shoulder width

ii. Base Bid (Schedule II): incorporate demolition of TW H (existing) and construction of TW B3 (proposed) as a separate schedule for the project. This will allow for the project to be funded with a separate ADOT grant.

1. Dibble will work on options for the best ways to incorporate the Kimley-Horn design files:
    a. Construction Phasing & CSPP
    b. Technical Specifications
    c. Merging grading files
2. Option 1: have Dibble "own" the design from a liability perspective. This would require Dibble to build time into the scope to check and confirm the design has been completed to the latest FAA standards, make sure the design is aligned with the projects horizontal control and update the grading design.
    a. Bob suggested making a note on the plans stating that the design was completed by others to reduce the scope needed to update the design.
3. Option 2: Dibble brings Kimley-Horn on as a sub-consultant to update their construction drawings sheets that will be plugged into the construction plan set allowing them to "own" the design from a liability perspective.
    a. Anticipated edits needed by Kimley Horn
        i. Remove the asphalt pavement temp pavement transition
        ii. Match design into the proposed runway grades

iii. Update the pavement structural section to match the section planned for runway pavement reconstruction

c. **Proposed Pavement Design:**

i. PCN Needed (Rigid Pavement): PCN/ACN has been replaced with the PCR/ACR system

1. From the Master Plan:
   a. 747-400: ACN = 88
   b. 747-300: ACN = 65
2. A320:
   a. MTOW = 172,000 lbs
   b. Subgrade A (k=150): ACN = 40
   c. Subgrade B (k=80): ACN = 43
   d. Subgrade C (k=40): ACN = 45
   e. K value = $28.6926 \times CBR^{.7788}$
   f. Lime-Treated Subgrade = approx. 10 – 20 CBR (k = 172 to 296)
3. Proposed Design ACN: 91
   a. Based on the pavement section of 16-inches PCCP on 6-inches CTB on 12-inches LTSG the PCN should yield a value of 91

4. Anticipated Design Schedule: (See attached for bar chart)

i. Scope and Fee Development and Negotiations (Site Investigations): 7/14 - 7/26
ii. Scope and Fee Development and Negotiations (Design & Bid Phase Services): 7/25 - 8/26
iii. Geotechnical, Survey, and Site Investigations: 8/8 – 8/12
iv. Design and Bid Phase Services Contract and NTP: 9/20/22 (Sept Board Meeting)
v. 30% Submittal: 1/5/23
vi. Client Review (FAA, ADOT, PMGAA): 1/9/23 – 1/23/23
vii. 95% (Pre-Bid) Submittal: 3/2/23
viii. Client Review (FAA, ADOT, PMGAA): 3/6/23 – 3/20/23
ix. 100% Submittal (Bid Set): 4/6/23
x. Bid Phase: approx. 4/17/23 – 5/15/23
xi. Letter of Recommendation to FAA: 5/16/23
   1. 120 Calendar Day Hold: 9/13/23

5. Site Investigations: Occurs Aug 8-12, 2022

a. **Survey Discussion & Questions:**

i. Additional points requested by PMGAA (see exhibit)
ii. All pavement markings will be picked-up south of TW G OFA.
iii. Both RW end points, PMGAA to escort for the RW 12R end point

iv. Survey within TW K TOFA needs to be performed first and prior to 0600

b. **Geotechnical Discussion & Questions:**

i. No cores within TW K OFA

ii. Be prepared for "sandwich section", middle portion will be AC, PCCP, and/or native fill

iii. Must have each core/bore backfilled and replaced with non-shrink grout before the RW is opened each night after the day closures

iv. Proposing to complete 6 cores per day starting south of TW K

v. Airport will mark duct bank locations on the pavement so that bores/cores do not damage existing utilities

c. **Electrical & Civil Site Investigations:**

i. Dibble will develop exhibit which shows all areas that need to be investigated on each day of the runway closure.

ii. Airport operations will provide the necessary escorts and are requesting that the work take place in generally the same areas each day.

6. Design Phase

a. **Scope Questions**:

i. Reconstruction of RW 12R-30L (between previously reconstructed RW thresholds)

ii. Runway Shoulders

1. Reconstruct runway shoulders full width within the runway reconstruction limits – 35' wide
2. Crack Seal and Seal Coat remaining runway shoulders to a width of 35'

iii. Place aggregate base outside RW Shoulders → Yes

iv. RSA grading – only if needed to match into existing grades

v. Runway Electrical:

1. Upgrade to LED → yes
2. All new cable
3. In areas where the runway shoulders will be reconstructed – all new conduit and base cans will be installed
4. In areas where the shoulder pavement will remain in place LED lights will be placed on existing cans
5. Need to find out from CR if the CCR needs to be downsized for the LED circuit
6. All new distance remaining signs with new cable and conduit
7. The on runway exit sign that will be replaced will be for TW B3

b. **Submittals:**
   i. 30%:
      1. Plans
      2. Draft Engineer's Design Report
      3. Draft CSPP and 7460-1 Exhibit (FAA OE/AAA)
      4. Draft Contract Docs and Tech Specs
      5. Cost Estimate
   ii. Final CSPP, 7460-1 Exhibit (FAA OE/AAA), & SRM Panel
   iii. 95% (Pre-Bid Submittal):
      1. Pre-final Plans
      2. Pre-final Contract Docs and Tech Specs
      3. Final Engineer's Design Report
      4. Cost Estimate
   iv. 100% (Bid Docs):
      1. Plans
      2. Contract Docs and Tech Specs
      3. Cost Estimate

c. **Deliverables (Direct Costs – 5-hard copies):**
   i. 30%:
      1. Plans: (1/2 size)
      2. Contract Docs and Tech Specs:
      3. Report:
      4. Draft CSPP:
   ii. Final CSPP
   iii. 95%:
      1. Plans: (1/2 size)
      2. Contract Docs and Tech Specs:
   iv. 100% (Bid Docs):
      1. Plans: (1/2 size)
      2. Report:
      3. Contract Docs and Tech Specs:

d. **Meetings and Site Visits (monthly progress meetings combined with submittal meetings where possible):**
   i. 30% Review and Site Visit (week of Aug 8th)
   ii. 95% Review and Site Visit (can we close RW again for plans-in-hand walk?)

iii. Stakeholder Meetings: needed? → No

iv. SRM: do you want Dibble to attend and participate?

1. Yes – Dibble to include an allowance to use Garver to run the SRM Panel/Mtg

7. Bid Phase

a. **General:**

i. Respond to Contractor's Questions

ii. Issue Addenda (as needed)

b. **Pre-Bid Meeting:**

i. Develop Agenda

ii. Attend and assist in the Meeting

iii. Develop meeting minutes

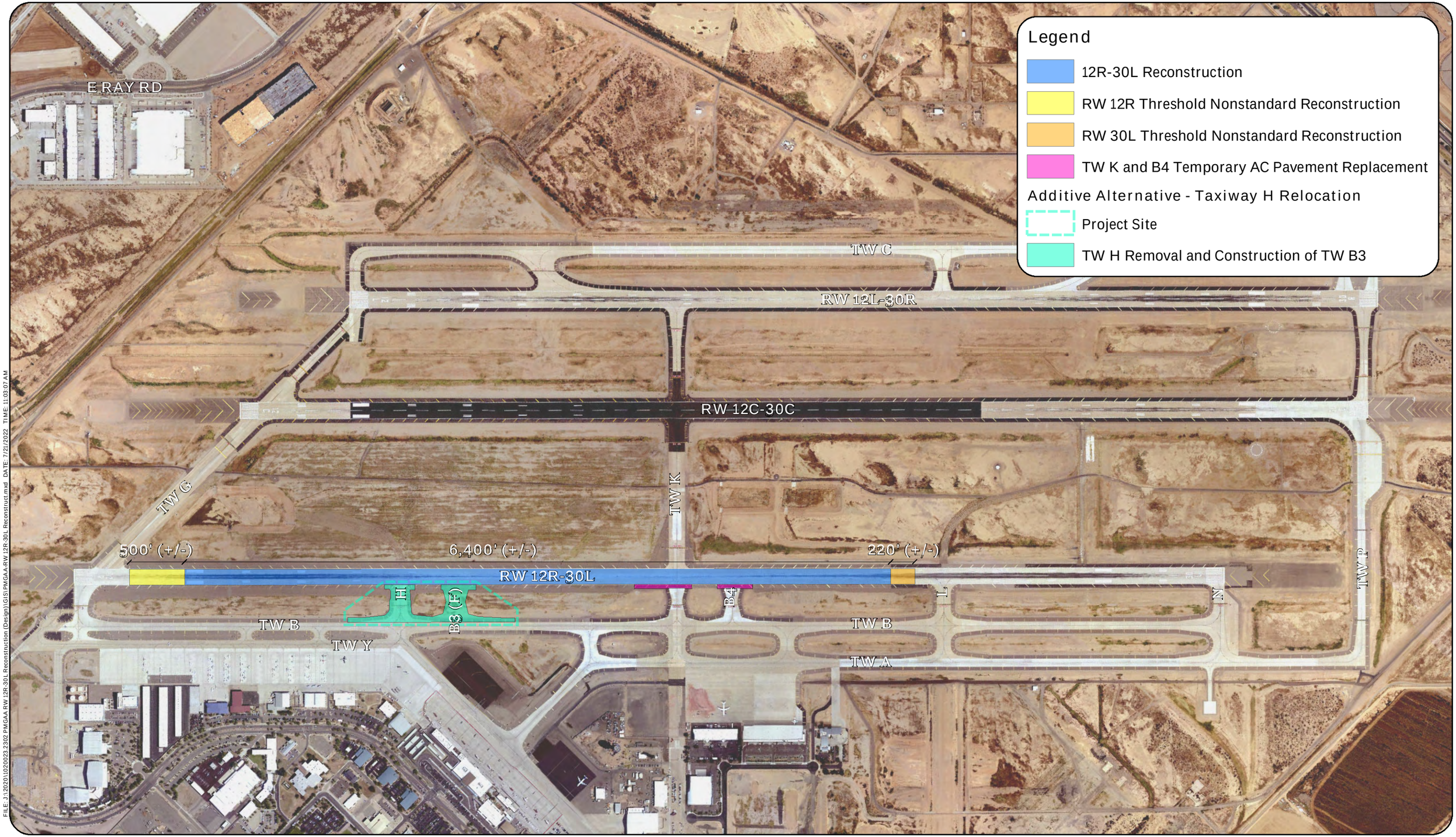
c. **Bid Submittal:**

i. Bid Tab evaluation

ii. Prepare Letter of Recommendation

8. Construction Phase

a. Not included with this proposal.



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Phoenix-Mesa Gateway Airport

PHOENIX-MESA GATEWAY AIRPORT
RW 12R-30L
RECONSTRUCTION

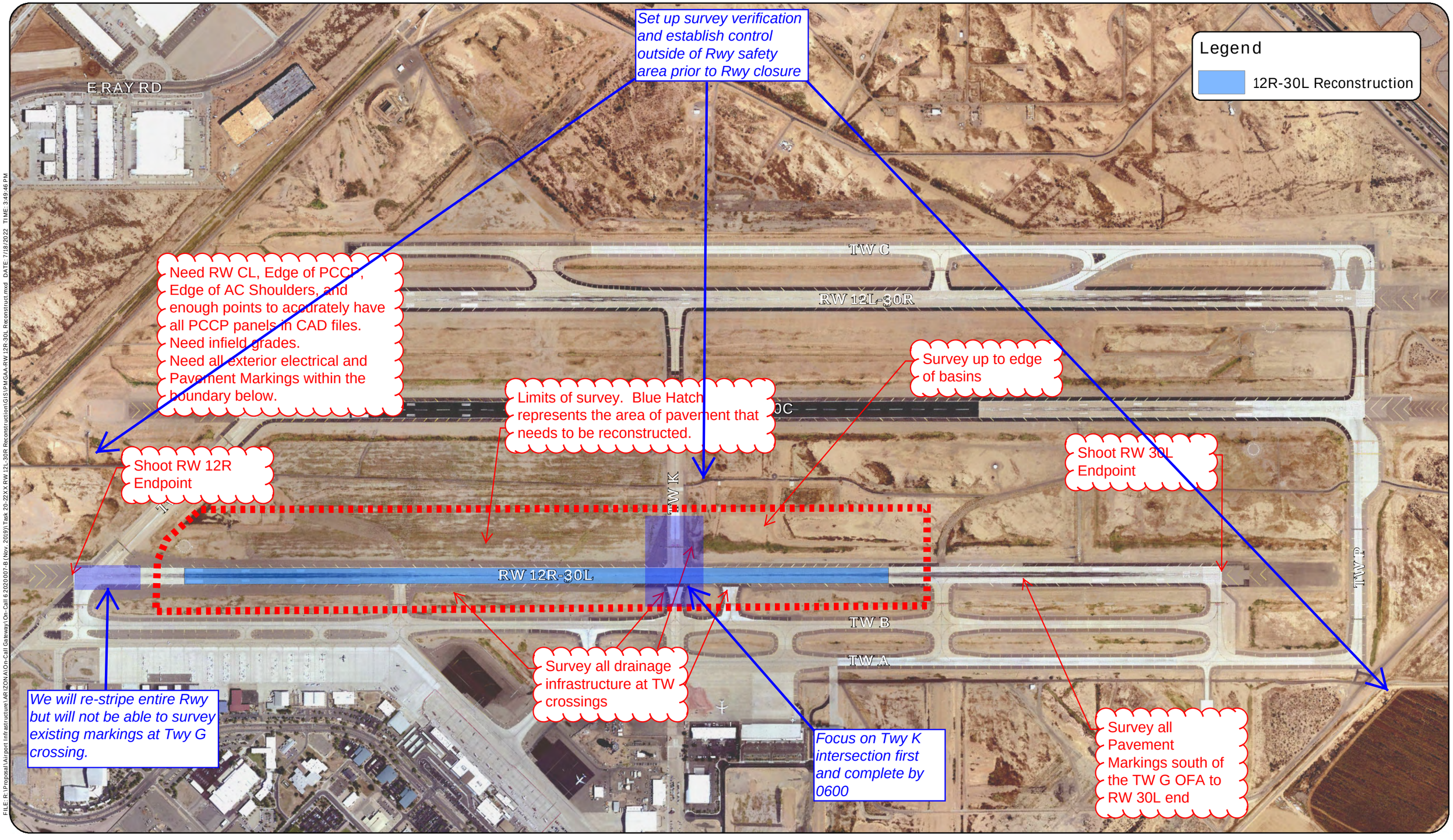
0 400 800 FT

Date: 7/21/2022

DIBBLE

PHOENIX-MESA GATEWAY AIRPORT
RW 12R-30L RECONSTRUCT
PRELIMINARY COST ESTIMATE

LINE No.	DESCRIPTION	APPROX. QTY.	UNIT	UNIT PRICE	AMOUNT
	RW 12R-30L CIVIL				
1	Contractor's Quality Control	1	LS	$600,000.00	$600,000.00
2	Mobilization	1	LS	$1,600,000.00	$1,600,000.00
3	SWPPP	1	LS	$250,000.00	$250,000.00
4	Airfield Safety and Security	1	LS	$450,000.00	$450,000.00
5	Sawcut PCCP (Full Depth)	600	SY	$12.00	$7,200.00
6	Sawcut AC Shoulders (10-12-Inch Depth)	14,366	SY	$8.00	$114,928.00
7	Remove PCCP (7,108' x 150', 10-12-Inch Depth)	118,467	SY	$28.00	$3,317,076.00
8	Remove AC Shoulders (35' Width, 4-inch Depth)	55,285	SY	$6.00	$331,710.00
9	Unclassified Excavation (based on raised profile)	57,040	CY	$20.00	$1,140,800.00
10	Over-Excavation and Replacement of Unsuitable Materials, Backfill and Compaction	3,675	CY	$30.00	$110,250.00
11	Lime Treated Subgrade (12-inch Depth)	173,752	SY	$13.00	$2,258,776.00
12	Cement Treated Base Course (6-inch Depth)	118,467	SY	$22.00	$2,606,274.00
13	PCCP (16-Inch Depth)	118,467	SY	$105.00	$12,439,035.00
14	AC Shoulders (35' Width, 9-Inch Depth)	27,988	TON	$145.00	$4,058,260.00
15	Preformed or Silicone Sealer (Joints)	55,285	LF	$4.00	$221,140.00
16	Pavement Marking (entire RW)	180,000	SF	$1.50	$270,000.00
				Civil Subtotal	$29,775,449.00
	RW 12R-30L ELECTRICAL				
17	Airfield Electrical	1	LS	$900,000.00	$900,000.00
				Electrical Subtotal	$900,000.00
	TW H and B3				
18	Demolition of TW H and Construction of TW B3	1	LS	$3,600,000.00	$3,600,000.00
				Electrical Subtotal	$3,600,000.00
				CONSTRUCTION SUBTOTAL	***$34,275,449.00***
				Est. Unknown Pre-Design Items	$450,000.00
				CONSTRUCTION TOTAL	**$34,725,449.00**
				Est. Design Fee	$1,400,000.00
				Est. Admin Costs	$750,000.00
				Est. Construction Management Fee	$1,250,000.00
				EST. PROJECT TOTAL	**$38,125,449.00**



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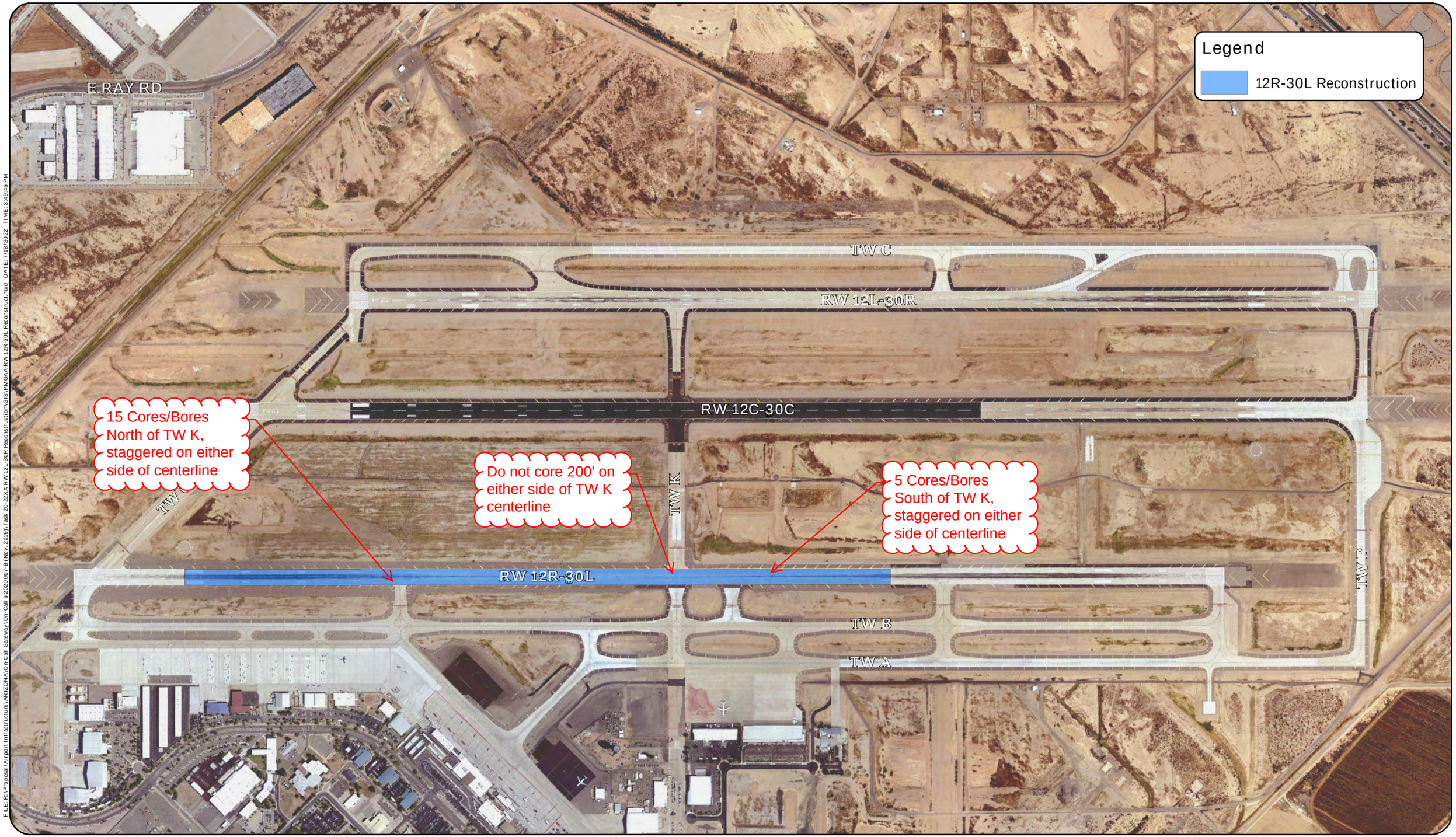
Phoenix-Mesa Gateway Airport

PHOENIX-MESA GATEWAY AIRPORT
RW 12R-30L
RECONSTRUCTION

0 400 800 FT

Date: 7/18/2022

DIBBLE



Phoenix-Mesa Gateway Airport

PHOENIX-MESA GATEWAY AIRPORT
RW 12R-30L
RECONSTRUCTION

0 400 800 FT

Date: 7/18/2022

DIBBLE