

Focused Dialogue

Airfield Design 101

ASE Current Condition

Non-Standard Conditions

Airfield Noise and Emissions

Airspace Update

Airfield Design 101



Airfield Design 101

I. Public Use Airports Subject to FAA Design Standards

- Safety
- Consistency across national network
- Preservation of public investment

II. Guiding Documents

- Advisory Circulars
- Orders
- Technical Guidance

III. AC 150/5300-13A, Airport Design

- Airfield geometric and grading standards

Airfield Design 101

I. Runway Safety and Object Free Areas

- Aircraft approach speed – Aircraft Approach Category (AAC)
- Aircraft wingspan – Airplane Design Group (ADG)

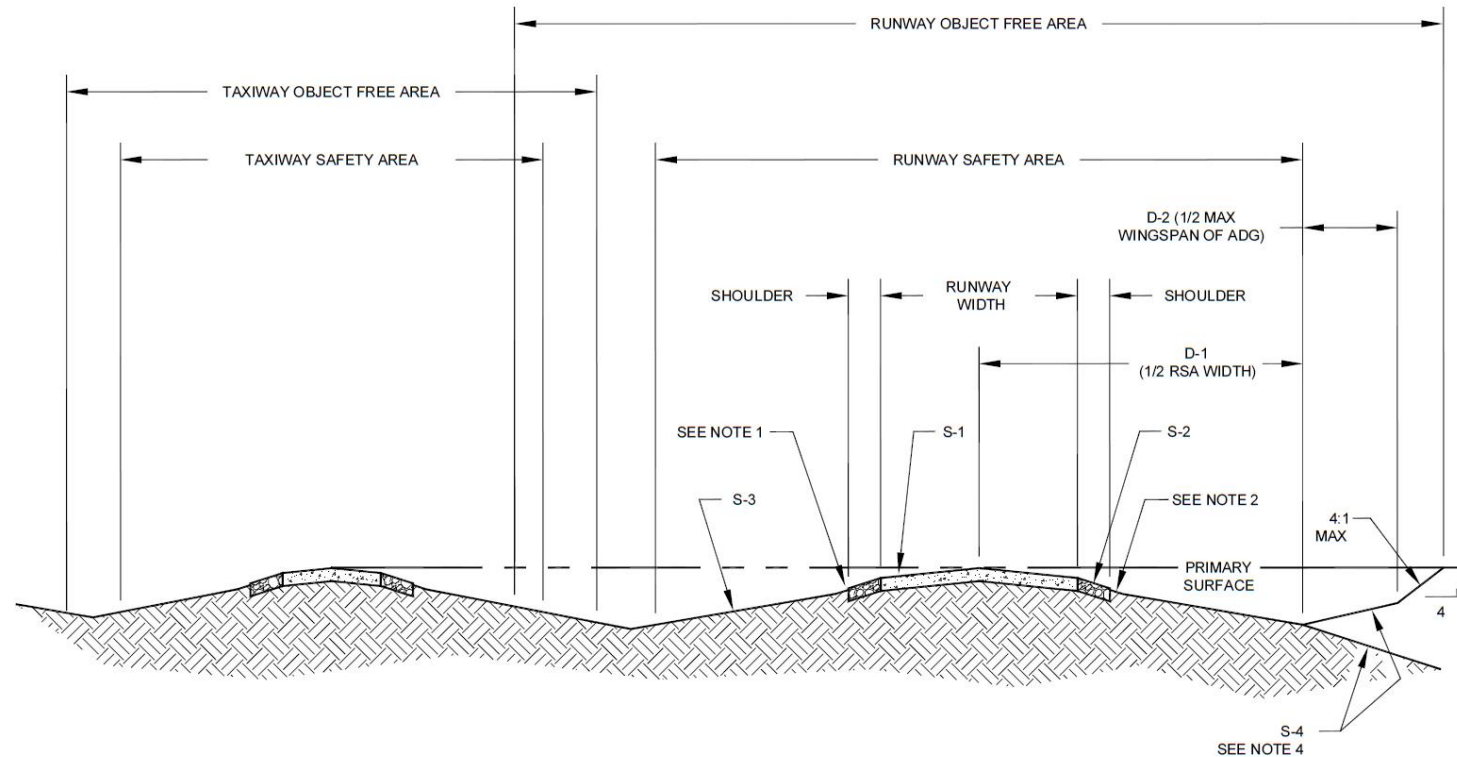
II. Runway to Taxiway Separation

- Runway centerline to taxiway centerline
- Runway centerline to holding aircraft
- Runway centerline to parked aircraft

III. Taxiway Safety and Object Free Areas

- Aircraft wingspan – Airplane Design Group (ADG)

RSA, ROFA, TSA and TOFA

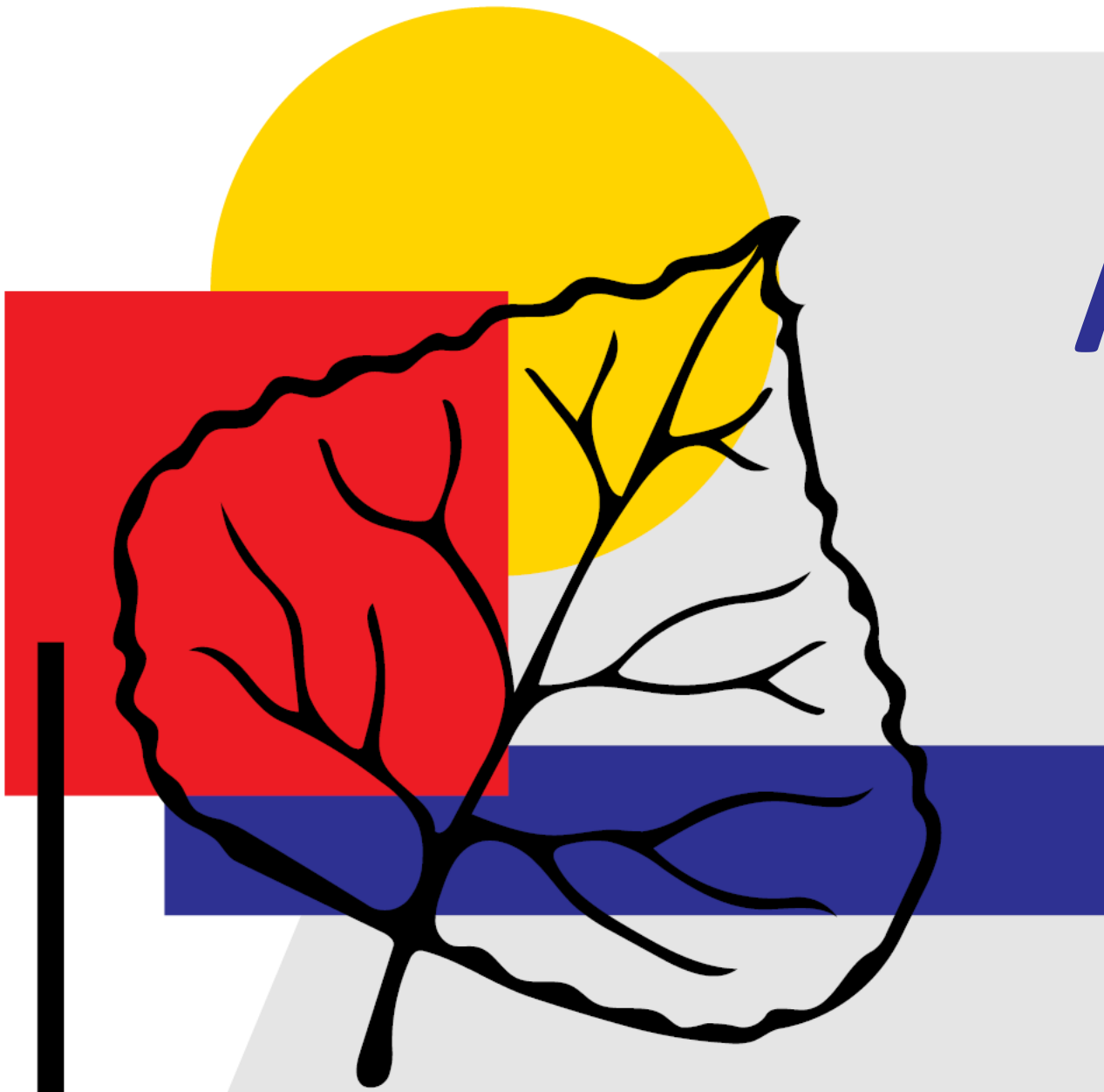


NOTES:

1. CONSTRUCT A 1.5 IN [4 cm] DROP BETWEEN PAVED AND UNPAVED SURFACES.
2. MAINTAIN A -5.0 % GRADE FOR 10 FEET OF UNPAVED SURFACE ADJACENT TO THE PAVED SURFACE.
3. S-2 APPLIES WHEN SHOULDERS ARE PROVIDED.
4. S-4 SHOULD BE 0% OR NEGATIVE (UNLIMITED) TO THE EDGE OF THE RUNWAY OFA IF PRACTICABLE. ALLOWABLE POSITIVE SLOPE BASED ON AIRPLANE DESIGN GROUP.
5. REFER TO FIGURE 4-33 FOR TAXIWAY TRANSVERSE GRADES.

APPROACH CATEGORY	A & B	C, D, AND E
S-1	1.0% TO 2.0%	1.0% TO 1.5%
S-2 (≥ S-1)	1.5% TO 5.0%	1.5% TO 5.0%
S-3	1.5% TO 5.0%	1.5% TO 3.0%

ADG	I	II	III	IV	V	VI
D-1	D-1 IS 1/2 OF C (RUNWAY SAFETY AREA WIDTH). SEE INTERACTIVE TABLE 3-5.					
D-2	25	40	59	86	107	131
S-4 (MAXIMUM)	8:1		10:1		16:1	



ASE Airfield Current Condition

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I. Modified Runway Design Code, D-III

II. Geometric Modifications of Standards

- Runway to taxiway separation = 320' vs. 400'
 - 95' wingspan restriction
- Runway to aircraft hold line = 272.5' vs. 329'
- Runway object free area
 - Taxiway A North
 - West side of runway
- Taxiway object free area, east side = 76.5' vs. 96'
 - 95' wingspan restriction

III. Grading Modifications of Standards

- Runway safety area – drainage swales within RSA and grades that slope toward runway
- Runway object free area – west side of runway

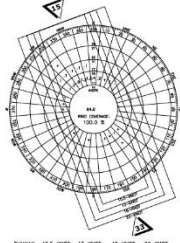
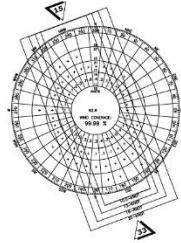
ASE Airfield Current Condition


IV. Temporary vs. Permanent Modifications of Standards

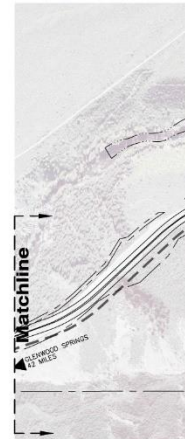
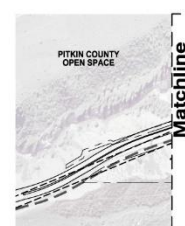
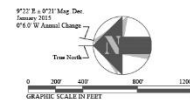
- 13 Modifications of Standards listed on ALP
- 5 to be corrected with EA scoped project
- 8 to remain – runway, taxiway and apron surface gradients

V. Non-Standard Conditions Evaluation (Kimley-Horn)

- 14 additional non-standard conditions identified
- Multiple locations of the 27 results in 85 non-standard issues



AIRPORT DATA		MONUMENT LOCATIONS				
AIRPORT ELEVATION (MGL)	EXISTING 785.9' 785.9'	NUMBER	DESIGNATION	PID	LATITUDE	LONGITUDE
AIRPORT REFERENCE POINT (ARP) 	14,519.17 (17.16°N 104,519.17 (17.16°N)	MONUMENT #1	ASE ARP 2	AS 7588	LAT 39°13'28.41"N	LONG 106°58'08.77"W
AIRPORT REFERENCE CODE	0-0-0 SAME	MONUMENT #2	SACS ASE D	A 5942	LAT 39°13'45.56"N	LONG 106°58'20.20"W
CRITICAL AIRPORT	0-0-0 TO BE DETERMINED	MONUMENT #3	SACS ASE E	A 5943	LAT 39°13'25.99"N	LONG 106°58'58.49"W
NPAS CATEGORY	PRIMARY (CODE 3000) SAME	MONUMENT #4	PACS ASE G	AS G	LAT 39°13'21.90"N	LONG 106°58'06.99"W
NPAS CATEGORY	0-0-0 SAME					
AIRPORT TERMINAL NAME	VOL LAR SAME					



DECLARED DISTANCES		
ITEM	RUNWAY 15	RUNWAY 33
	EXISTING/FUTURE	EXISTING/FUTURE
TAKE-OFF RUN AVAILABLE (TORA)	7,000'	8,000'
TAKE-OFF DISTANCE AVAILABLE (TODA)	7,000'	8,000'
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	7,000'	8,000'
LANDING DISTANCE AVAILABLE (LDA)	7,000'	7,000'

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FAA APPROVAL

CONDITIONALLY APPROVED

Letter to letter dated: _____

**FEDERAL AVIATION ADMINISTRATION
DENVER AIRPORTS DISTRICT OFFICE**

NO. _____

TAXIWAY DATA	EXISTING	FUTURE
TAXIWAY/TAXILANE WIDTH	50	SAME
TAXIWAY EDGE SAFETY MARGIN	10'	SAME
TAXIWAY SHOULDER WIDTH	20'	SAME
TAXIWAY OBJECT FREE AREA (TOFA)	169	185
	TW A-93' ROW SIDE	
	TW A-76' APRON SIDE	
TAXILANE OBJECT FREE AREA (TOFA)	152	SAME
TAXIWAY/TAXILANE SAFETY AREA	115'	SAME

BUILDING		YES	NO	DATE
1.	TERMINAL BUILDING (TO BE REMOVED)			7/28/75
2.	CONTROL TOWER (CONTAINING CAR FLOOR)			7/28/75
3.	TERMINAL (TO BE REMOVED)			7/27/75
4.	TRUCK STOP			7/24/75
5.	RENTAL CAR FACILITIES (TO BE REMOVED)			7/25/75
6.	FUEL FACILITY (EXPAND & RECONSTRUCT)			7/24/75
7.	ROAD SIDEWAYS (TO BE REMOVED)			7/28/75
8.	AIRPORT OPERATIONS CENTER (ACT) TO BE REMOVED			7/27/74
9.	ROAD SIDEWAYS (TO BE IMPROVED)			7/24/75
10.	GROUND MAINT. EQUIP. BLDG. (TO BE REMOVED)			7/24/75
11.	TRUCK HANGAR			7/25/74
A.	FUTURE RENTAL CAR FACILITY			7/28/75
B.	FUTURE AIRPORT TERMINAL			7/27/75
C.	FUTURE AIRPORT BUFFER AREA			

(1) - ESTIMATED TOP LEVELS (2) - EXISTING FROM OBSTRUCTION CHART TOP WALL
 (3) - AND REMAINS FURNISHED TO THE EXTENT OF TOP OF GRADE AND BGL
 (4) - REMAINS WILL BE PLACED ON THE EXISTING GRADE

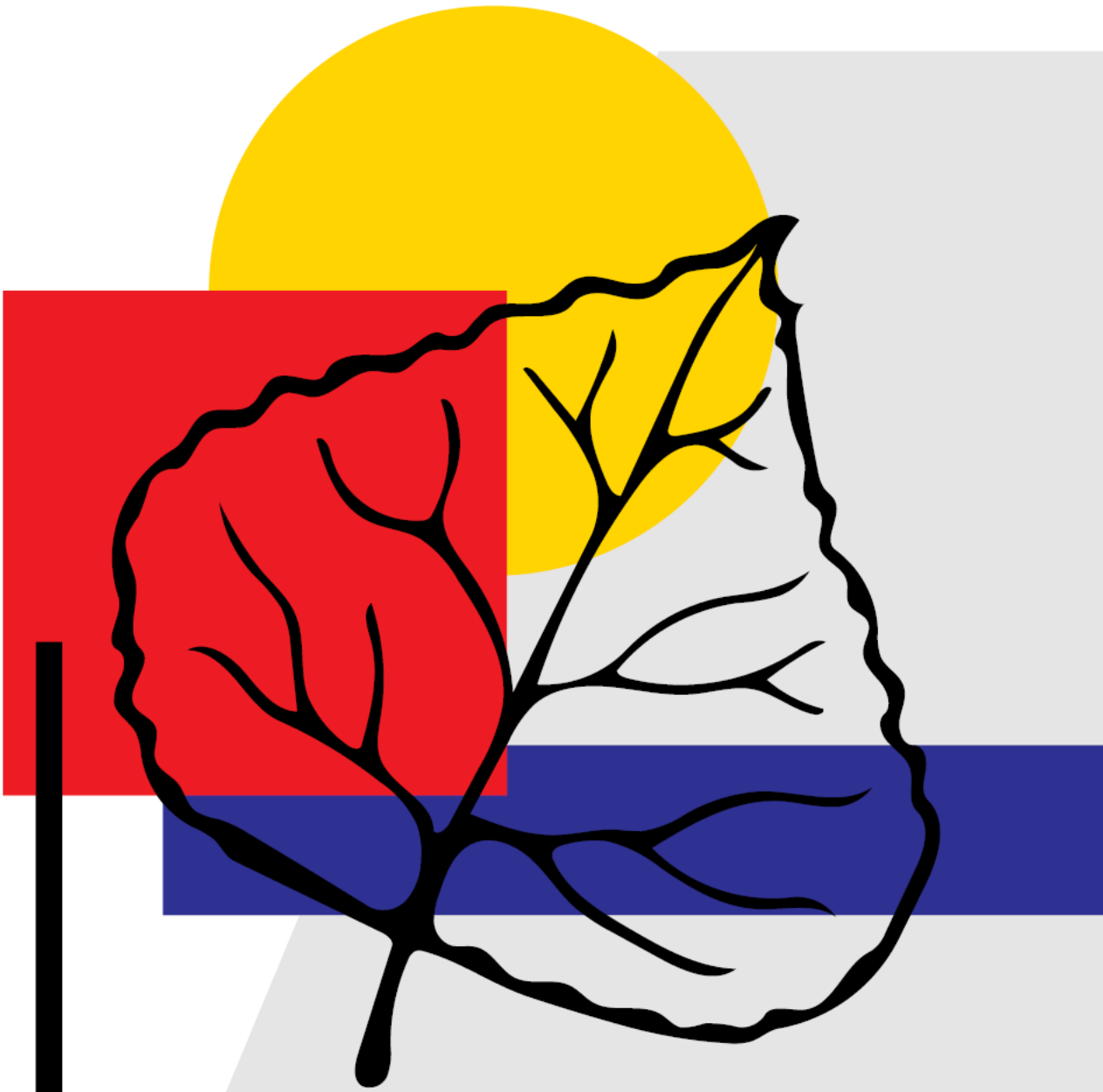
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MODIFICATION OF STANDARDS					
NO.	DESCRIPTION	STANDARD	EXISTING	DISPOSITION	APPROVED
1	RUNWAY CENTERLINE SIDE STRIP	1.5% MAXIMUM 4% MINIMUM	0% OVERALL VALUES ARE 1.7%	SAME AS EXISTING	AUG. 6, 1995 90-000-090-173-NOA
2	SEPARATION STANDARDS RUNWAY CENTERLINE TO CENTERLINE **	400 FEET	320 FEET	WILL BE REVISED W/ RANNEY STUDY	97-00N-178-NOA
3	SEPARATION STANDARDS RUNWAY CENTERLINE TO PARALLEL TAXIWAY ** (PARALLEL TAXIWAY X)	180 FEET	160 FEET TAXIWAY CENTERLINE TO PARALLEL TAXIWAY **	WILL BE REVISED W/ RANNEY STUDY	97-00N-178-NOA
4	TAXIWAY HOLDS FROM CENTERLINE TO CENTERLINE	328 FEET	272.5 FEET	WILL BE REVISED W/ RANNEY STUDY	
5	RUNWAY GRIOT AREA (FIDUCIAL AREA) TO TAXIWAY TO TAXIWAY TO TAXIWAY TO TAXIWAY	PRECEDENCE OBJECTS NOT TYPED IN FUNCTION	TRUCKS AND EQUIPMENT TO BE TYPED IN FUNCTION TO BE TYPED IN FUNCTION TO BE TYPED IN FUNCTION	TRUCKS TO BE REMOVED FORCED FOR THE FUNCTION TO BE TYPED IN FUNCTION TO BE TYPED IN FUNCTION	AUG. 7, 1995 90-000-090-173-NOA
6	PARALLEL TAXIWAY TO TAXIWAY	TAXIWAY CENTERLINE TO TAXIWAY TO TAXIWAY TO TAXIWAY	45% TAXIWAY TO TAXIWAY TO TAXIWAY TO TAXIWAY	SAME AS EXISTING	JUN. 25, 2003 2003-000-24-NOA
7	PARALLEL TAXIWAY TO TAXIWAY	TAXIWAY CENTERLINE TO TAXIWAY TO TAXIWAY TO TAXIWAY	45% TAXIWAY TO TAXIWAY TO TAXIWAY TO TAXIWAY	SAME AS EXISTING	AUG. 22, 2003 2003-000-24-NOA
8	TAXIWAY LAYOUT TO TAXIWAY	40% BETWEEN TAXIWAY TO TAXIWAY	45% TAXIWAY TO TAXIWAY TO TAXIWAY	SAME AS EXISTING	AUG. 22, 2003 2003-000-24-NOA
9	SEPARATION STANDARDS RUNWAY CENTERLINE TO TAXIWAY	370 TO 500 FEET	2 FEET	SAME AS EXISTING	AUG. 22, 2003 2003-000-24-NOA
10	SEPARATION STANDARDS RUNWAY CENTERLINE TO TAXIWAY	500 FEET	483 FEET (470 TO 483 SEP PLUS TRAIL)	SAME AS EXISTING	AUG. 13, 2006 2006-000-113-NOA
11	WEST SIDE RUNWAY SAFETY AREA	1.5 TO 3.0 PERCENT	2 PERCENT	SAME AS EXISTING	2006-000-113-NOA
12	RUNWAY SAFETY AREA TAXIWAY SAFETY AREA	MINIMUM OF 1.0 TO 1.5 PERCENT	1.0 PERCENT	SAME AS EXISTING	SEPTE. 14, 2006 2006-000-113-NOA

SPONSOR APPROVAL SIGNATURE	
APPROVED	DATE
FILE	

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ASE Non-Standard Conditions



ASE Non-Standard Conditions

I. EA Project – Airfield Standardization

II. Critical Elements

- Runway/taxiway separation
 - Move runway, taxiway or both
 - Primary constraints – Owl Creek Road and Taxiway A9
 - Primary impacts – AOC and east side development
- Runway safety area and object free area grading
 - Both sides of runway
- Taxiway A object free area – apron side
- Terminal apron grading – slope away from terminal (fire code)

III. Other Considerations

- FBO facilities – lease expires in 2023
- Air Traffic Control Tower – Age and best location
- Potential westside development
- Property east of Highway 82

ASE Non-Standard Conditions

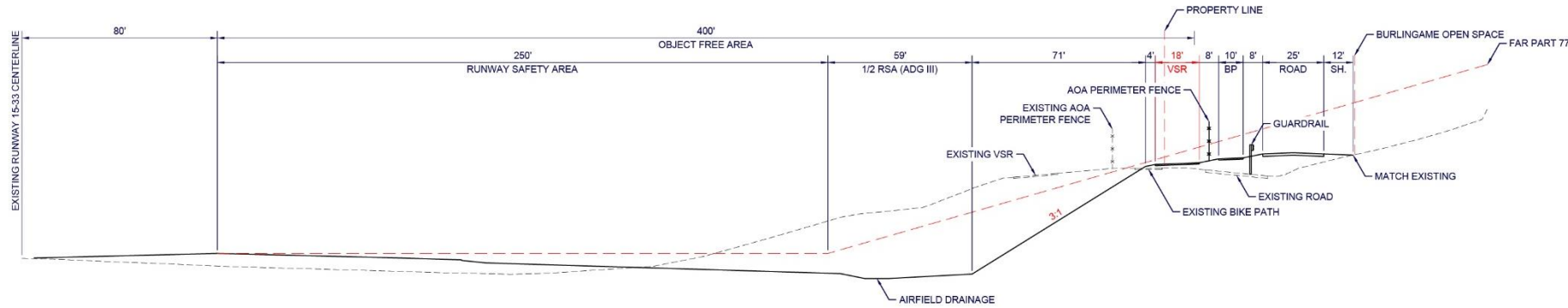
IV. Runway to Taxiway Separation

- Owl Creek Road – Avoid impacts to open space
- Taxiway A9 – Improve line of sight (hot spot)
- AOC impacts

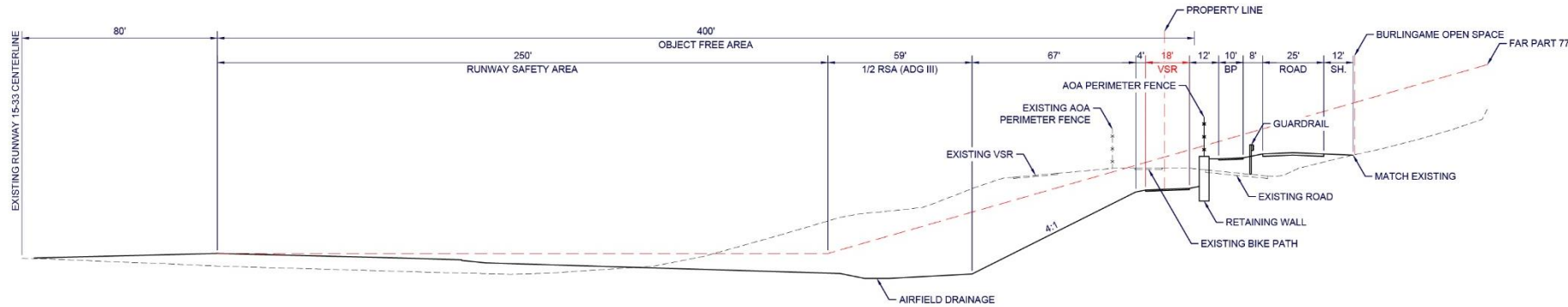
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Owl Creek Road

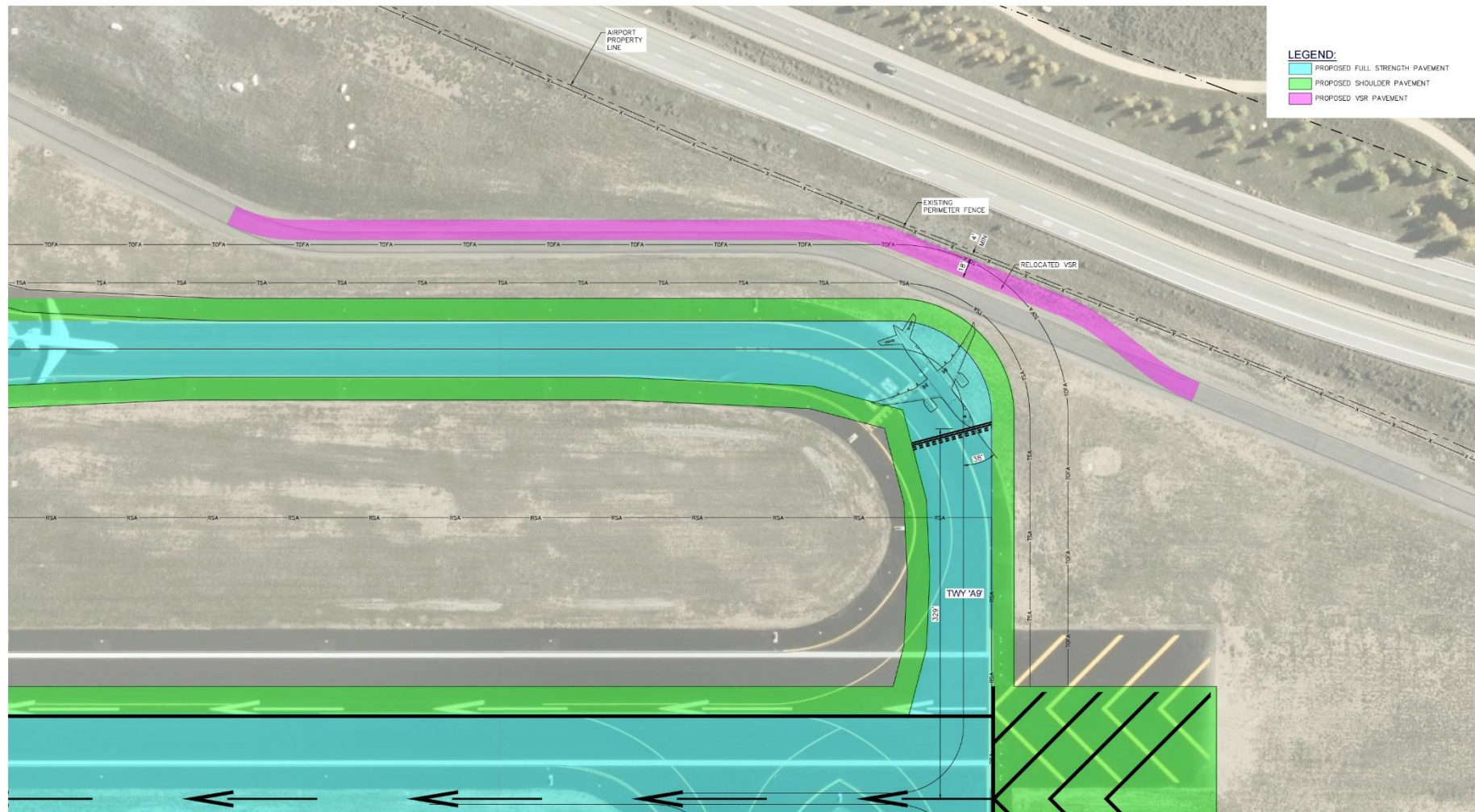


80' RUNWAY SHIFT TO WEST
VSR WITHIN OFA AND MODIFIED SLOPE TO AVOID BURLINGAME OPEN SPACE



RUNWAY SHIFT 80' WEST
VSR WITHIN OFA AND RETAINING WALL TO AVOID BURLINGAME OPEN SPACE

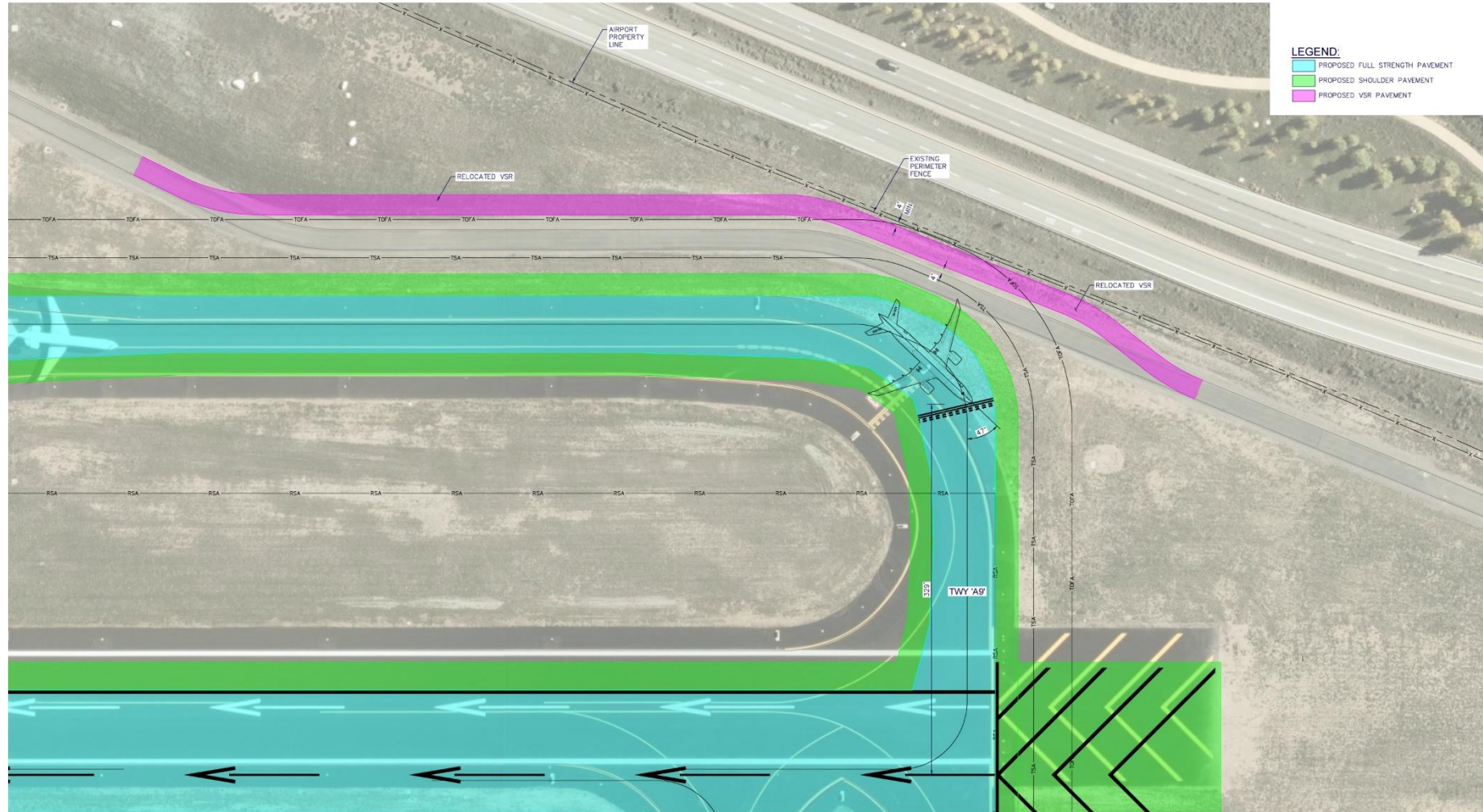
Taxiway A9 – Runway 80' West



SCALE IN FEET

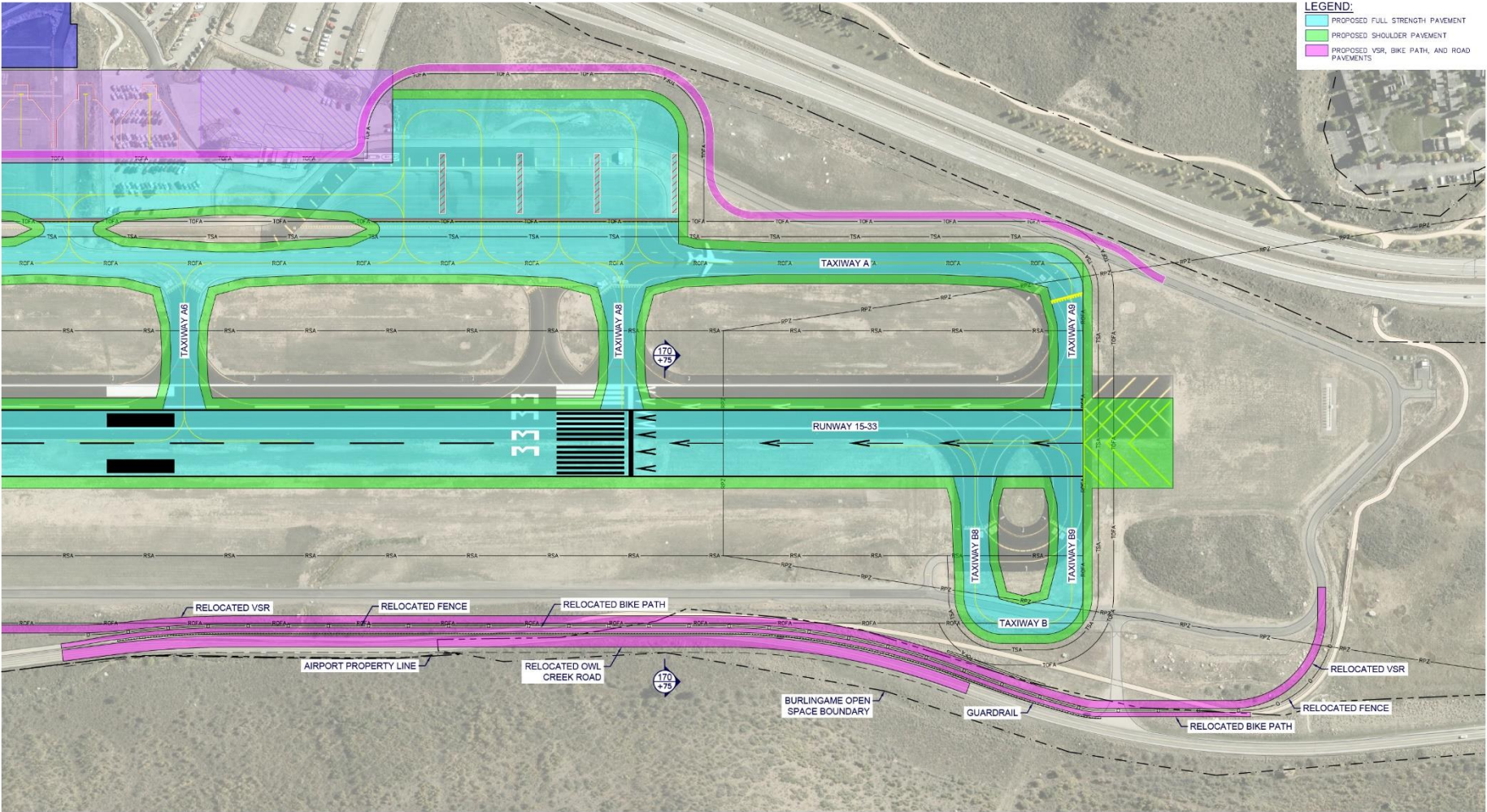
RUNWAY SHIFT 80' WEST - TAXIWAY 'A9'
STANDARD TAXIWAY GEOMETRY

Taxiway A9 – Runway 60' West



RUNWAY SHIFT 60' WEST - TAXIWAY 'A9'
NON-STANDARD TAXIWAY GEOMETRY

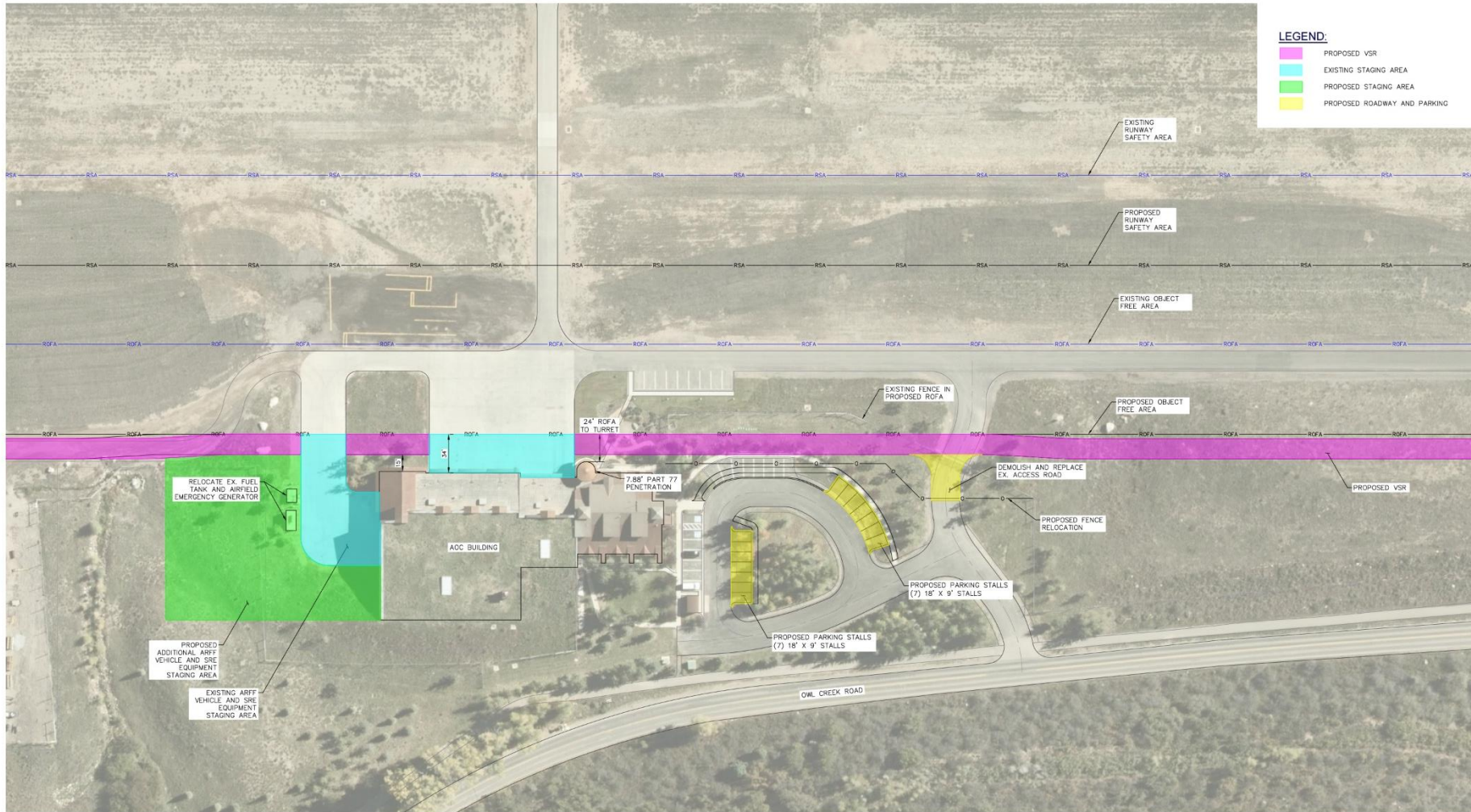
Runway Shift 80' West



SCALE IN FEET

RUNWAY SHIFT 80' WEST

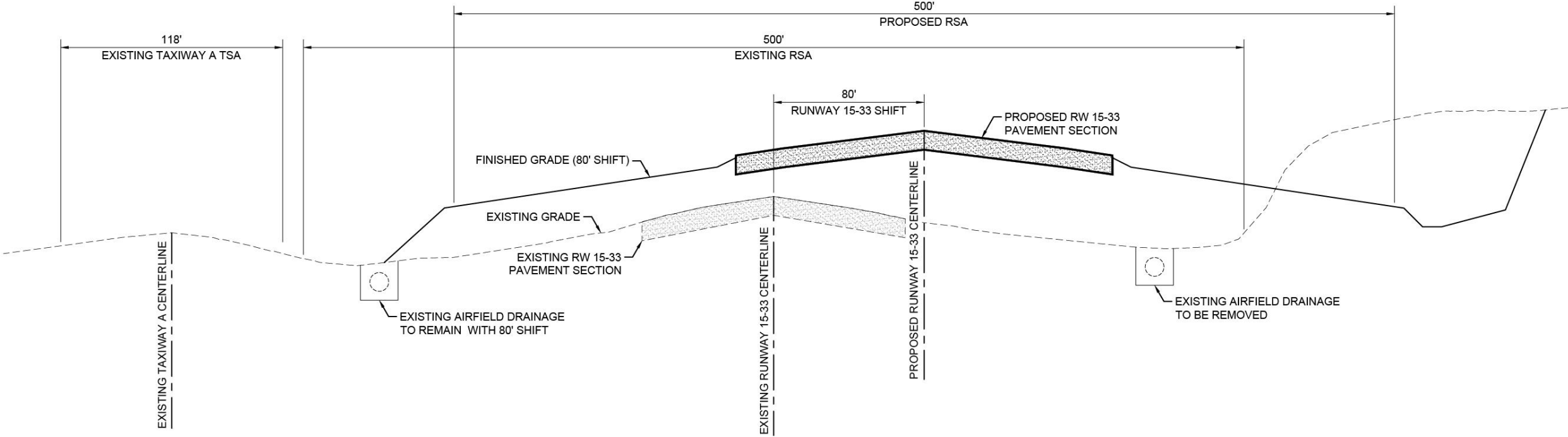
AOC – Runway 80' West



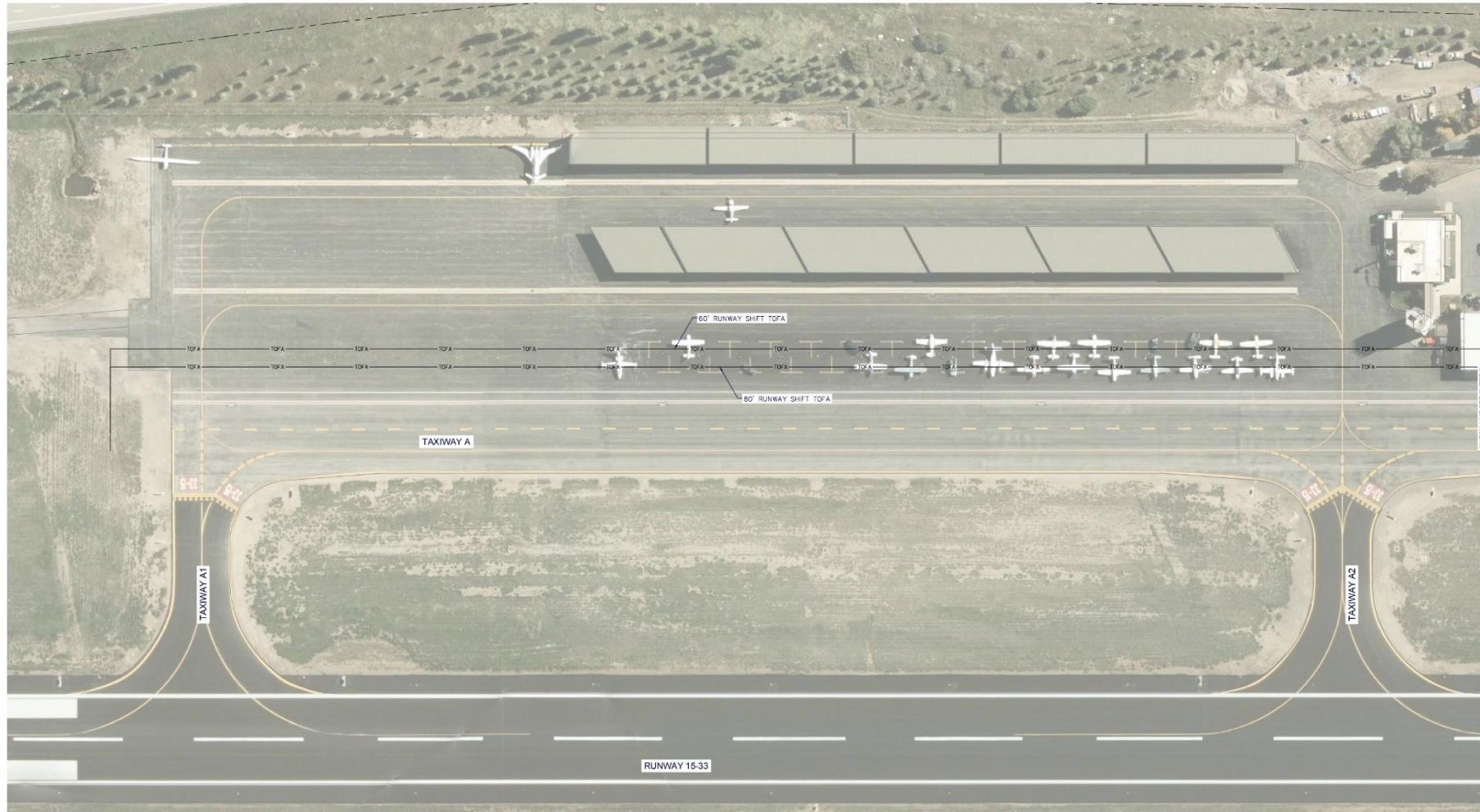
40 0 40 80
SCALE IN FEET

AIRPORT OPERATIONS CENTER (AOC)
RUNWAY SHIFT 80' WEST IMPACTS

RSA Drainage and Grading



Taxiway A East Side TOFA



SCALE IN FEET
0 50 100

RUNWAY SHIFT 80' AND 60' WEST - TOFA IMPACTS

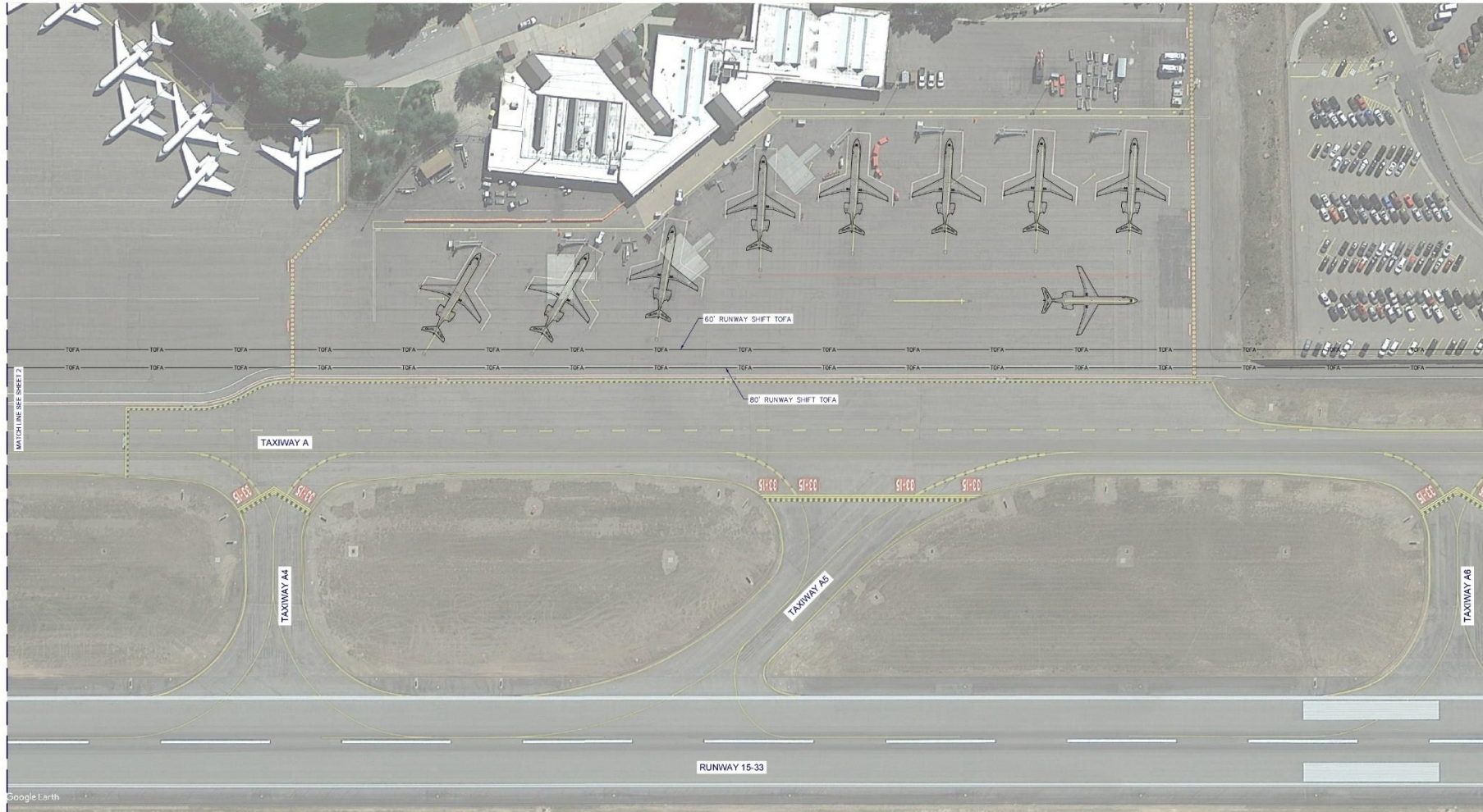
Taxiway A East Side TOFA



50 0 50 100
SCALE IN FEET

RUNWAY SHIFT 80' AND 60' WEST - TOFA IMPACTS

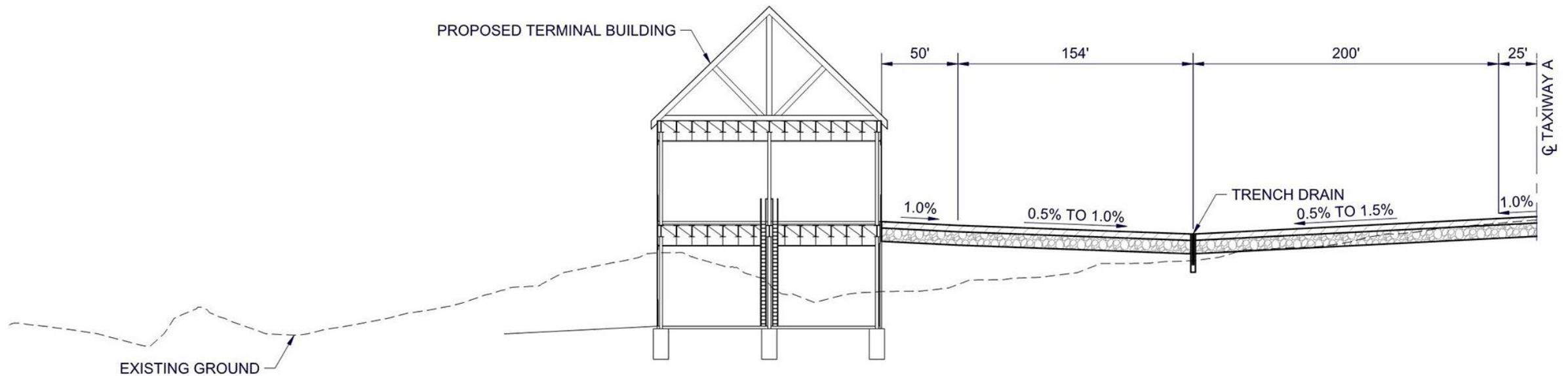
Taxiway A East Side TOFA



50 0 50 100
SCALE IN FEET

RUNWAY SHIFT 80' AND 60' WEST - TOFA IMPACTS

Terminal Apron - Grades



TERMINAL APRON PROPOSED GRADING

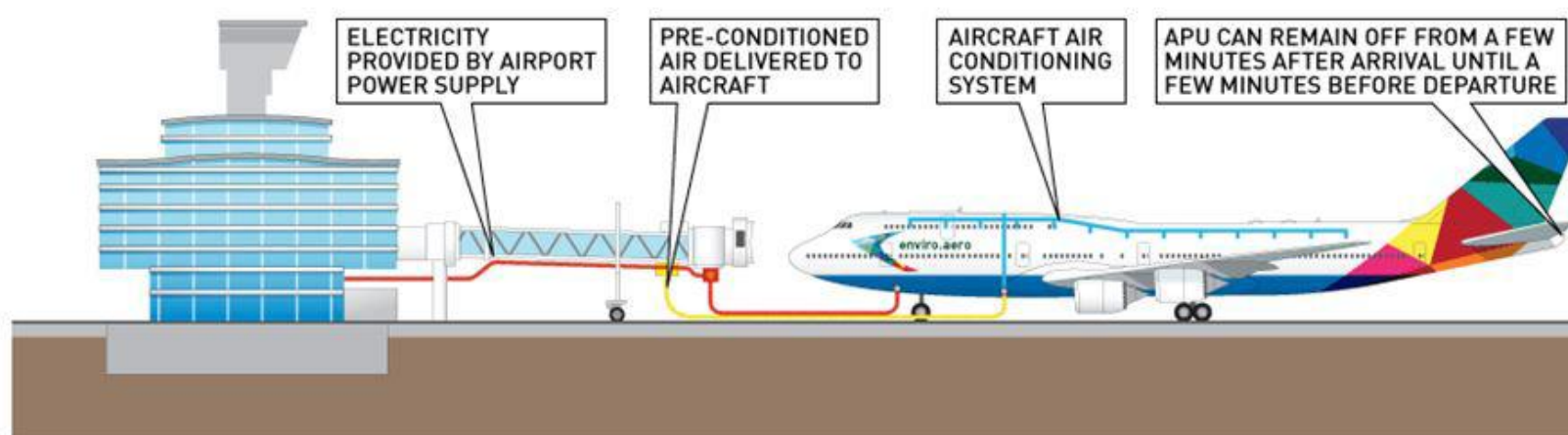
Airfield Noise and Emissions



Airfield Noise

I. Potential Noise Reduction Measures

- Electrified GSE and GPUs
- Wired power and pre-conditioned air (no APU)
- Encourage use of newer and quieter aircraft engines
- Geothermal heated terminal apron pavement – less plowing
- Landscaping berms
- Sustainable design and construction practices



Airfield Emissions

I. Potential Emissions Reduction Measures

- Electrified GSE and GPUs
- Wired power and pre-conditioned air (no APU)
- LED lighting
- Solar
 - *Covered auto parking and hangars*
 - *PV panel arrays*



Airfield Emissions

I. Potential Emissions Reduction Measures (cont.)

- Geothermal heated terminal apron pavement
- Encourage use of newer and quieter aircraft engines
- Geothermal heated terminal apron pavement – fewer plow ops