ADAMS COUNTY
COLORADO
BOARD OF COUNTY COMMISSIONERS

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STUDY SESSION AGENDA
TUESDAY
February 8, 2022

ALL TIMES LISTED ON THIS AGENDA ARE SUBJECT TO CHANGE

11:45 A.M.	**ATTENDEE(S):**	**Heidi Miller / Kathleen Rush, GovHR**
	ITEM:	**County Manager Recruitment**
12:15 P.M.	**ATTEDNEE(S):**	**Alisha Reis**
	ITEM:	**Administrative Item Review / Commissioners Communication**
12:45 P.M.	**ATTENDEE(S):**	**Eliza Schultz / Elisabeth Rosen / Alan Morse**
	ITEM:	**State Lobbyists Update**
1:15 P.M.	**ATTENDEE(S):**	**Brian Gulliver, Kimley-Horn / Jeff Kloska**
	ITEM:	**Colorado Air and Space Port (CASP) Master Plan Presentation**
2:15 P.M.	**ATTENDEE(S):**	**Matt Rivera / Paolo Diaz**
	ITEM:	**MOU Regional Housing and Homelessness Effort**

(AND SUCH OTHER MATTERS OF PUBLIC BUSINESS WHICH MAY ARISE)

*****AGENDA IS SUBJECT TO CHANGE*****

ADAMS COUNTY
COLORADO

STUDY SESSION ITEM SUMMARY

DATE OF STUDY SESSION: Feb. 8, 2022
SUBJECT: CASP Spaceport Master Plan
OFFICE/DEPARTMENT: CASP
CONTACT: Jeff Kloska
FINACIAL IMPACT: N/A
SUPPORT/RESOURCES REQUEST: None
DIRECTION NEEDED: Adoption of Plan
RECOMMENDED ACTION: Adoption

<u>DISCUSSION POINTS</u>:

- Kimley-Horn will present the final version of the aerospace master plan for Colorado Air and Space Port.

COLORADO AIR AND SPACE PORT
SPACEPORT MASTER PLAN

Board of County Commissioners Briefing

2/22/2022

COLORADO AIR AND SPACE PORT

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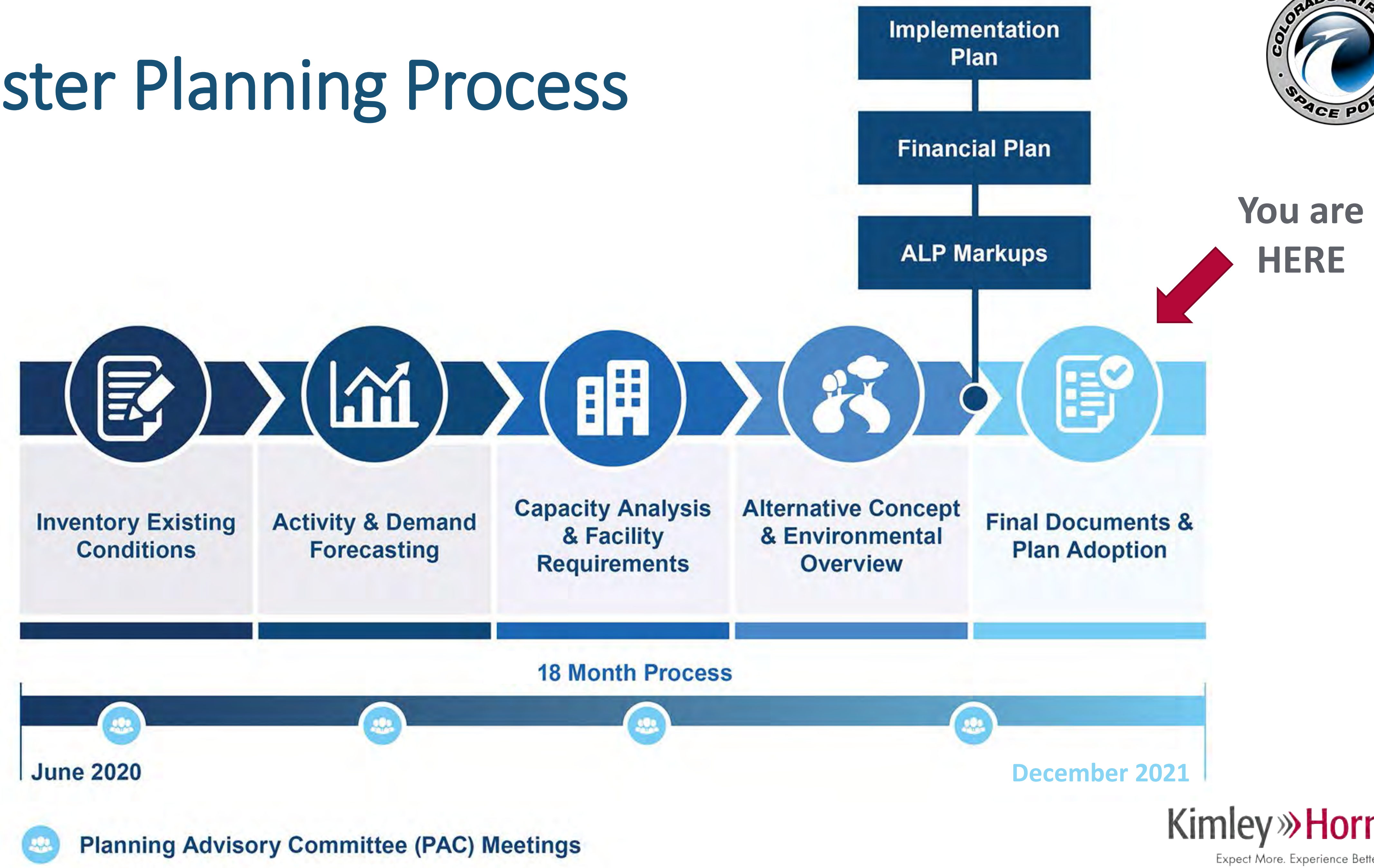
Expect More. Experience Better.

Master Planning Process



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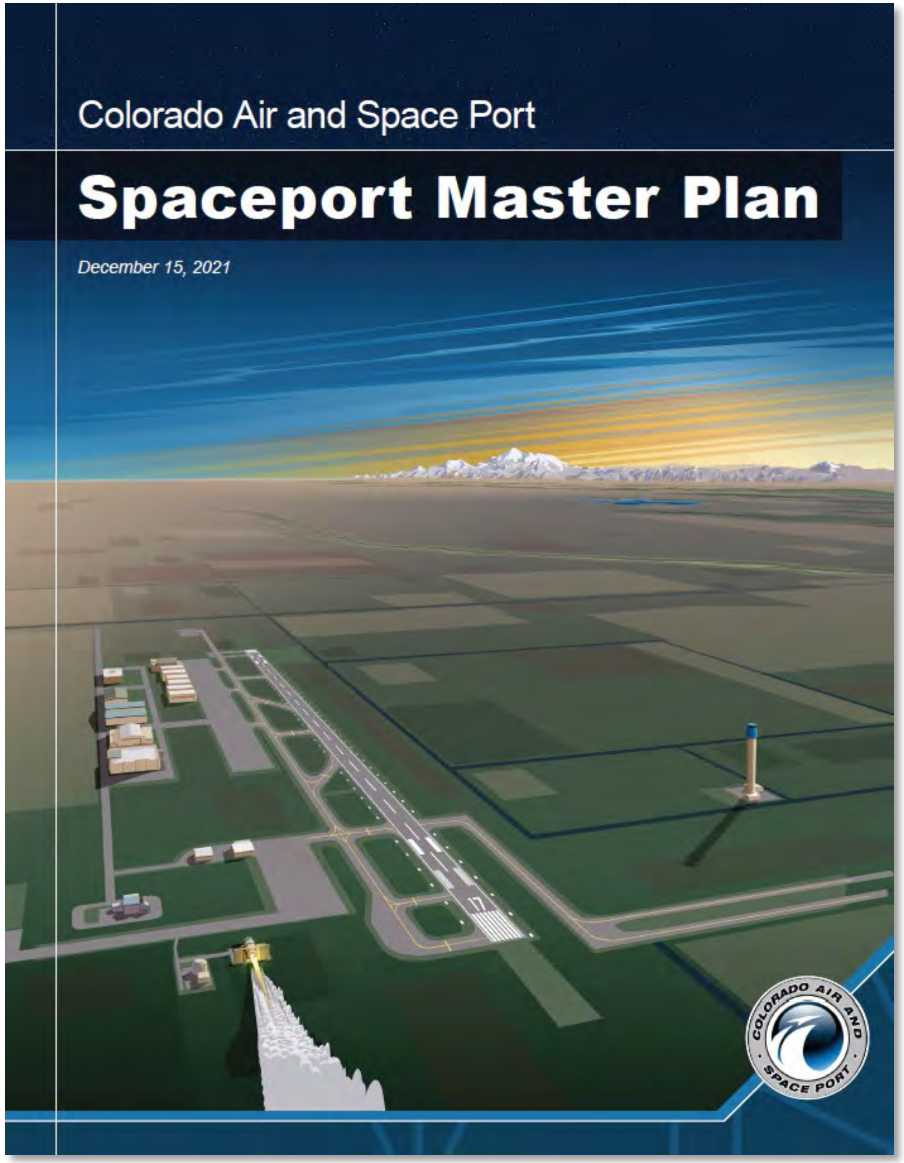
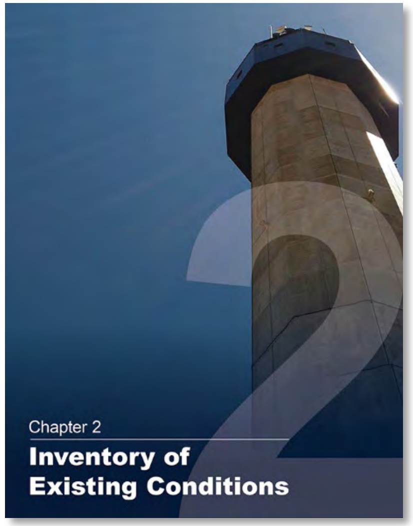
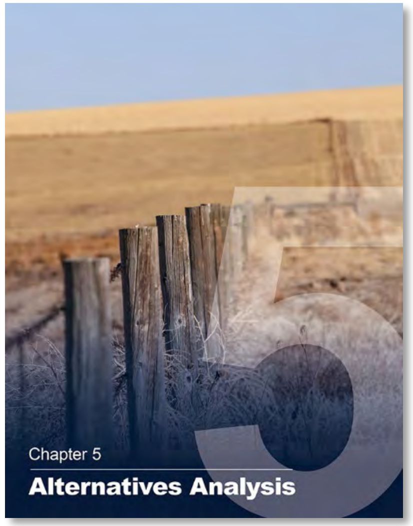
Spaceport Master Plan Report







Chapter 1

Introduction

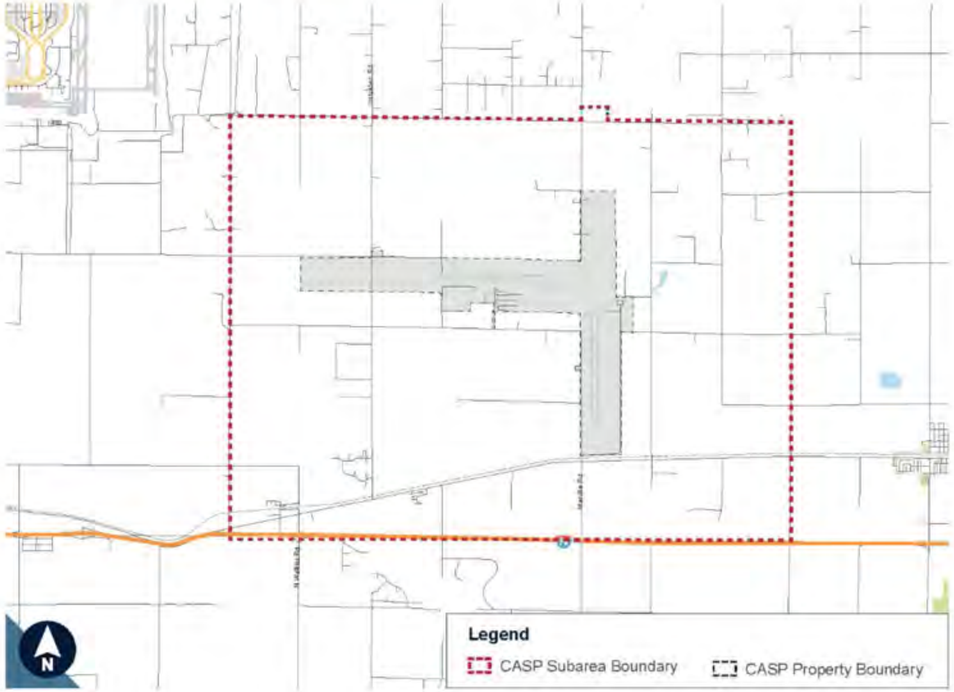
Kimley»Horn

Purpose of the Spaceport Master Plan

The purpose of a Spaceport Master Plan is to supplement existing airport master planning documents with spaceport specific elements. The goal of an traditional Airport Master Plan is to provide the framework needed to guide future airport development that will cost-effectively satisfy aviation demand, while considering potential environmental and socioeconomic impacts. While CASP updates its Airport Master Plan on regular intervals, the focus of that plan is primarily on aviation infrastructure and aviation forecasts. The Airport Master Planning guidance documents from the FAA do not currently recognize commercial space transportation infrastructure needs and forecasts in the planning process.

The goal of the Spaceport Master Plan process is to bridge the gaps between the Airport Master Planning process and the unique needs of a commercial spaceport. The Spaceport Master Plan will evaluate the existing inventory conditions of the spaceport infrastructure with a space transportation market forecast to identify near-term and long- term infrastructure needs. The result of the Spaceport Master Plan will be an implementation plan for different planning horizons.

Figure 1-2. Colorado Air and Space Port Area



Source: Adams County

Support for Commercial Launch Vehicles

In addition to normal aviation operations, the current site operator license and Programmatic Environmental Assessment (PEA) provide the framework for CASP to support the proposed operations of licensed horizontal takeoff and horizontal landing (HTHL) suborbital reusable launch vehicles (RLVs). At present there are a broad range of HTHL RLVs in various stages of development. While a more detailed market assessment will be provided in **Chapter 3**, this section will focus on the vehicle type included in the site operator license.

CASP is currently licensed to support Concept X RLVs. A Concept X RLV is a manned winged aircraft that utilizes both jet engines and rocket engines. A Concept X RLV departs from a runway under jet power, similar to other jet powered aircraft. Under jet power the Concept X RLV travels to its designated launch operating area and prepares for rocket ignition. Once in the operating area, the Concept X RLV can ignite its rocket engine(s) and begins a steep climb for the suborbital portion of flight. Once the engine burn is complete, the vehicle coasts in a parabolic trajectory, reaching its apogee before returning to Earth. While in parabolic flight, pilots and participant can experience approximately 4 minutes of microgravity. During the return to Earth, the Concept X RLV falls in a ballistic trajectory until aerodynamic control is regained and the jet engines can be restarted. The Concept X RLV returns to CASP to completes its mission with runway landing.

While other launch and reentry vehicles types may also be compatible with CASP, currently only the Concept X RLV is included in the site operate license. In the future additional vehicles such as the Concept Y RLV, Concept Z RLV, reentry vehicles, and high-altitude balloons could be evaluated to determine if they can safely operate from CASP.

Figure 1-4. Concept Vehicle Category included in LSOL

Figure 1-5. Concept Vehicles Categories in Development

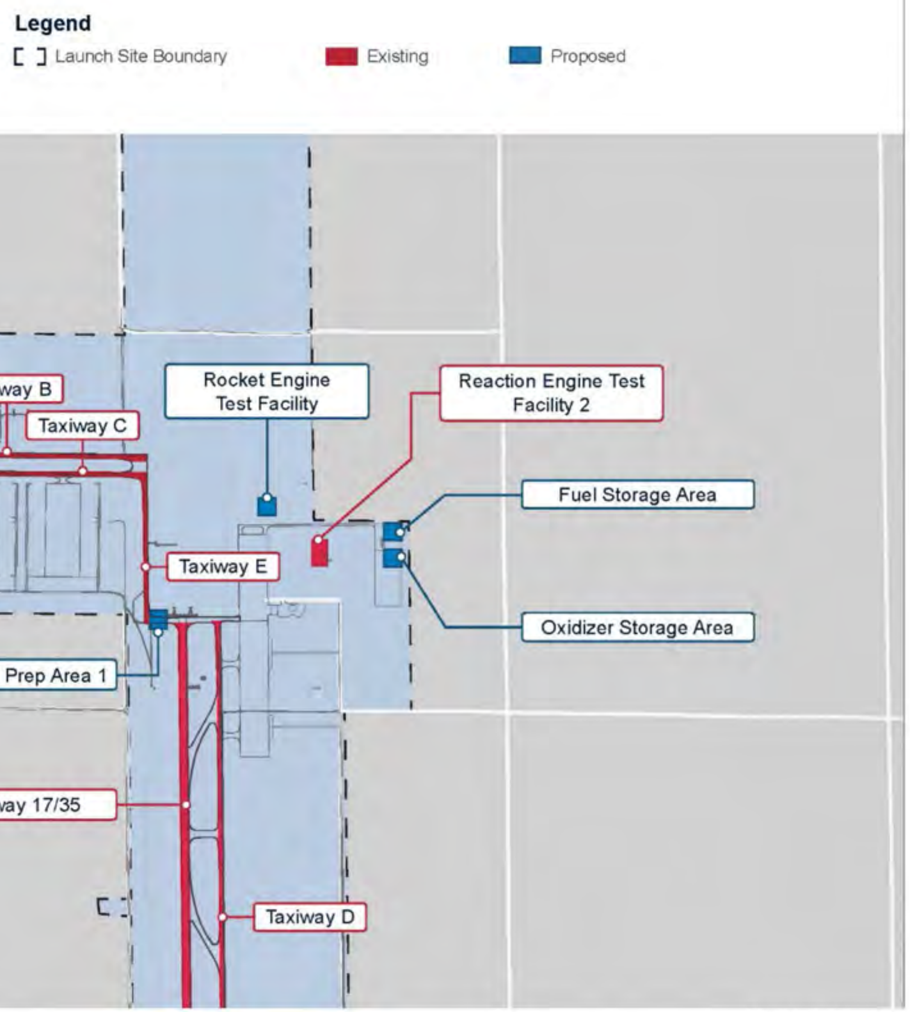
Chapter 2

Inventory of Existing Conditions

INVENTORY OF EXISTING CONDITIONS

The existing aviation infrastructure that has been designated for proposed spaceport operations can provide limited capabilities in the near-term, however special use dedicated facilities will eventually be needed for expanded operations. The inventory of existing conditions for aviation infrastructure at the Air and Space Port has been extensively documented in the 2019 Airport Master Plan [1]. This Spaceport Master Plan focuses exclusively on spaceport related existing conditions, which include spaceport infrastructure, launch operating areas, aviation/aerospace activities, environmental conditions, and land use and socioeconomic conditions.

Figure 2-1. Existing and Proposed Spaceport Infrastructure



Source: Kimley-Horn

Runways

The most crucial piece of infrastructure at a spaceport that supports horizontal takeoff horizontal landing (HTHL) operations is the runway. While runway requirements vary by launch vehicle manufacturer and altitude, runways 10,000 ft and longer are commonly preferred. Generally, the minimum runway length recommended for supporting HTHL operations is 8,000 feet. **Figure 2-3** presents a high-level correlation between the percent of HTHL space planes potentially supported by a facility relative to a facility's runway length. The maximum existing runway length at CASP is 8,000 feet, which is capable of supporting about a third of HTHL vehicles currently in development.

CASP has two existing runways: Runway 8/26 and Runway 17/35. Both Runway 8/26 and Runway 17/35 are 8,000 feet long by 100 feet wide asphalt runways and each is equipped with a full-length parallel taxiway.

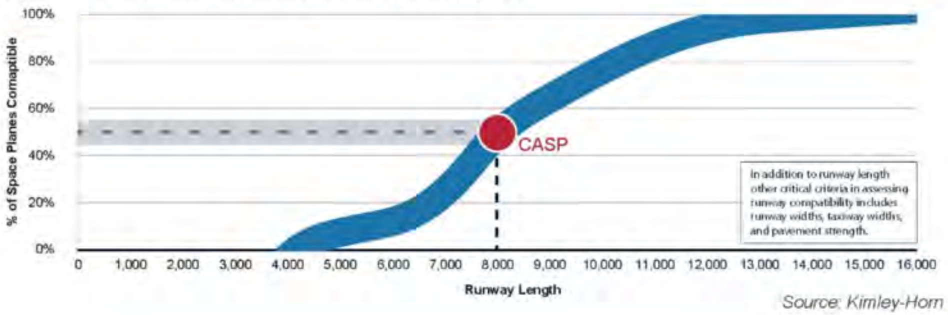
As identified in the 2019 Airport Master Plan, CASP has allocated land to extend and widen both runways. Runway 8/26 is planned to be extended 2,000 feet to the west for an ultimate length of 10,000 feet and widened symmetrically for an ultimate width of 150 feet. Runway 17/35 is planned to be extended 4,000 feet to the north for an ultimate length of 12,000 feet and widened symmetrically for an ultimate width of 150 feet. Additional characteristics for Runway 8/26 and Runway 17/35 are presented in **Table 1-1. Existing Runway Characteristics** [1]. In support of launch operations, departures on either Runway 8 or Runway 17 are preferred. For additional information on the runways at CASP, reference the 2019 Airport Master Plan [1].

**According to a 2009 pavement evaluation study, actual pavement strengths for Runways 8/26 and 17/35 are nearly twice the published values.*

Table 2-1. Existing Runway Characteristics [1]

Element	Runway Data
Runway 8/26	
Dimensions	8,000' x 100'
Runway Markings	Precision-Instrument
Runway Surface Type	Asphalt
Runway End Elevations	5,453.4' / 5,488.1'
Visual Slope Indicator	PAPI-2L / PAPI-2L
Effective Gradient	0.4%
Published Pavement Strength*	28,000 lbs. Single Wheel (SW) 40,000 lbs. Dual Wheel (DW)
Pavement Condition	Excellent (PCI = 86-100)
Runway Design Code	C-II
Critical Aircraft	Bombardier Challenger CL604
Runway 17/35	
Dimensions	8,000' x 100'
Runway Markings	Precision-Instrument
Runway Surface Type	Asphalt
Runway End Elevations	5,476.5' / 5,515.2'
Visual Slope Indicator	PAPI-4L / PAPI-4L
Effective Gradient	0.04%
Published Pavement Strength*	34,000 lbs. SW 75,000 lbs. DW
Pavement Condition	Fair (PCI = 56-70)
Runway Design Code	C-II
Critical Aircraft	Bombardier Challenger CL604

Figure 2-3. Space Plane Compatibility Based on Runway Length



Source: Kimley-Horn

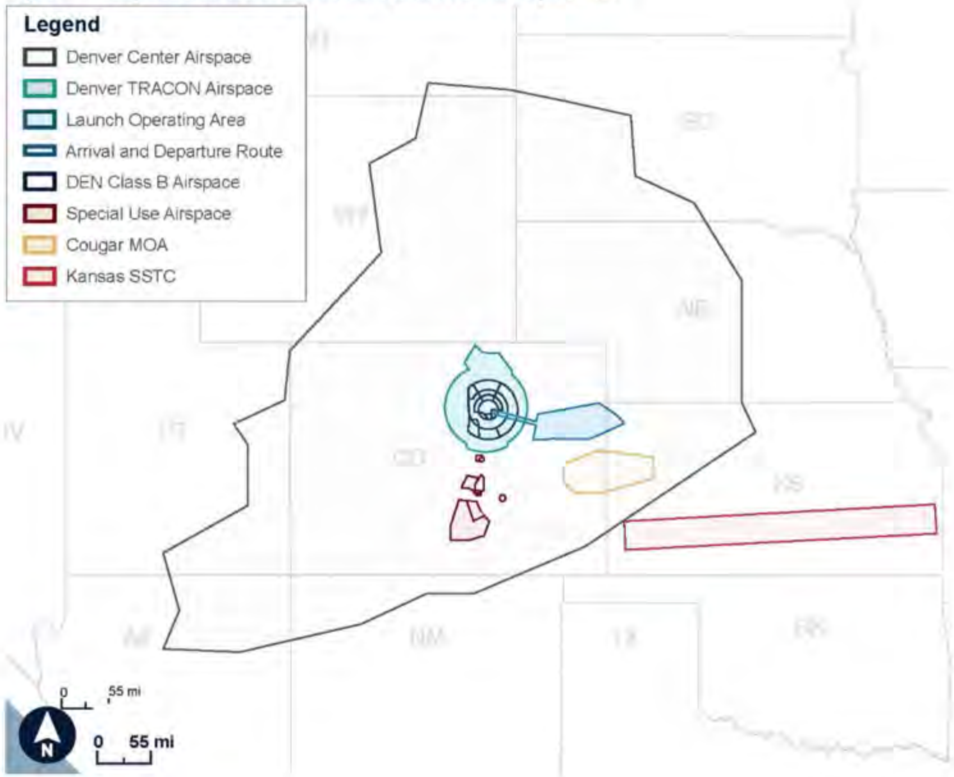
Airspace Structure

The airspace structure in and around CASP is within the Denver ARTCC (Denver Center) airspace, as shown in **Figure 2-7**. CASP sits directly below a shelf of Class B airspace that encompasses the region around DEN. Air traffic within the Class B airspace is coordinated to minimize potential operational interactions between airports. A proposed launch operating area exists to the southeast of CASP.

Launch operations originating from CASP are planned to depart east from Runway 8 or west from Runway 17 to minimize potential conflicts due to runway centerline crossings and to provide direct access to the launch operating area.

In December 2020 Kansas Department of Transportation signed an agreement with FAA to establish a Supersonic Transportation Corridor (SSTC) that would enable testing of aircraft up to Mach 3.

Figure 2-7. Airspace Structure in and around Colorado Air and Space Port



Source: Colorado Air and Space Port, Kimley-Horn

Chapter 3

Spaceport Activity Forecast

Figure 3-1. Launch, Reentry and Support System

Vehicle Description		Carrier Aircraft	Estimated Development Progress: Preliminary → Operational 1	2	3	4	5	Status
X	RocketPlane XP	None	■	■				Canceled
X	Airbus Defence and Space SpacePlane	None	■					On Hold
X	Bristol Ascender	None	■					Active
X	PD Aerospace Spaceplane's	None	■					Active
X	SABRE Development Vehicle	None	■					Active
X	Reaction Engines Skylon	None	■					Active
Y	XCOR Lynx	None	■	■	■			Canceled
Y	Dawn Aerospace Mk-II Aurora	None	■	■	■			Active
Y	Dawn Aerospace Mk-III	None	■					Active
Z	Northrop Gumman Pegasus XL	L-1011	■	■	■	■	■	Active
Z	Coleman Aerospace	C-17	■	■	■	■	■	Active
Z	Coleman Aerospace	C-130	■	■	■	■	■	Active
Z	Virgin Orbit LauncherOne	B747-400	■	■	■	■	■	Active
Z	Virgin Galactic SpaceShipTwo	WhiteKnightTwo	■	■	■	■		Active
Z	Stratolaunch Talon-A	Roc	■	■	■	■		Active
Z	Generation Orbit X-60A	NASA C-20A	■	■	■			Active
Z	Aevum	Ravn X	■	■				Active
Z	Bristol Spacecab	Custom	■					Active
Z	Bristol Spacebus	Custom	■					Active
Z	Orbital Access Orbital 500R	MD-11	■					Active
Z	S3 SOAR Spaceplane	A300	■					Canceled
Reentry Vehicle	Boeing X-37B	Vertical Rocket	■	■	■	■	■	Active
Reentry Vehicle	Sierra Space Dream Chaser	Vertical Rocket	■	■	■	■		Active
Support Vehicle	Zero-G (727-200)	None	■	■	■	■	■	Active
Support Vehicle	Super Guppy	None	■	■	■	■	■	Active
Support Vehicle	**F-104 Starfighter**	None	■	■	■	■	■	Active
Super Sonic	Boom XB-1	None	■	■	■	■		Active
Super Sonic	Aerion AS2	None	■	■				Canceled
Super Sonic	Spike S-512	None	■	■				Active
Super Sonic	Boom Overture	None	■					Active
Balloon	World View Stratolite	Balloon	■	■	■	■	■	Active
Balloon	Space Perspectives Neptune	Balloon	■	■	■			Active
VTVL	Masten Xodiac	None	■	■	■	■	■	Active
VTVL	Blue Origin New Shephard	None	■	■	■	■	■	Active
VTVL	SpaceX Starship	None	■	■				Active
VTVL	New Frontier Aerospace	None	■					Active

Source: Kimley-Horn

CASP Addressable Market

The numbers above are for the overall suborbital RLV market, but CASP is only a portion of this market. CASP is not suitable for suborbital vertical launch systems which Bryce estimates to be about half of the market in the near- to mid-term. CASP is also not currently licensed for Concept Z-type horizontal suborbital systems, but CASP could get the appropriate FAA license modifications. These Concept Z-type flights are expected to be approximately half of the market through 2030. Their long-term share of the market will depend on factors discussed above and the potential, though unlikely, entrance of other vehicles into the market (potentially including Concept X-type horizontal launch vehicles that could operate at CASP).

Although Virgin Galactic could operate out of CASP with the appropriate license modifications, it is still unlikely that the company would operate a significant number of launches out of CASP. Under its current lease terms at Spaceport America, Virgin Galactic must operate a minimum number of flights there and at least 75% of total flights. Based on the company's own estimates, Bryce states Virgin Galactic will not operate enough flights to exceed the lease minimum during the term of the lease through 2028. In addition, Bryce points out that memoranda of understanding to operate in Italy and the United Arab Emirates indicates that expansion outside of Spaceport America will likely be focused internationally rather than on other US spaceports.

A summary of the forecast for the total number of licensed, permitted, and testing operations, spaceflight participants, and vehicles based at CASP are shown in **Table 3-5**.

Table 3-5. Summary of CASP Licensed, Permitted, and Testing Operation

Operations	Prior to 2021	2021-2025	2026-2030	2031-2040	Remarks
Licensed Launches and Reentry of HTHL Suborbital RLVs	0	0	0	15-50	Operations of Licensed Launch Systems at CASP is unlikely within the next 10 years. Developmental operations could include taxiway/runway maneuvers, test flights of aviation systems, or drop/glide tests. Reentry vehicle operations, such as for a future Saber Development Vehicle, could potentially occur at CASP.
Licensed Reentry of Reentry Vehicles	0	0	0	0-5	
Licensed Orbital Air-Launch	0	0	0	0	
Development Operations of HTHL RLVs	0	0-10	0-10	0-20	Partnership with PD Aerospace could result in initial development operations in the near-term and mid-term. Partnership with NFA could result in up to 300 low thrust engine tests and low-altitude hover tests in the near-term. Reaction Engines has recently completed aerospace testing at its test facility at CASP.
Engine Tests / Low Altitude VTVL	2	50-300	50-200	100-400	
Space Support Vehicles or Supersonic Aircraft Operations	0	0-10	0-60	20-120	Missions conducted by supersonic aircraft or space support vehicles have the potential to operate from CASP.
Summary	**Prior to 2021**	**2021-2025**	**2026-2030**	**2031-2040**	**Remarks**
Total Operations	0	50-320	50-230	135-595	Mix of licensed, permitted, and test activities
Total Spaceflight Participants	0	0-60	0-60	0-300	Assume up to 6 spaceflight participants per vehicle. An FAA AST license is required for commercial operations to carry spaceflight participants. An Experimental Permit enables testing of vehicles, but commercial operations are not authorized. Space Support Vehicles, such as Zero-G can support training programs for spaceflight participants.
Total Based Aerospace Vehicles	0	1-2	2-3	3+	PD Aerospace and NFA are likely operators at CASP

Source: Bryce Space and Technology, Kimley-Horn

Chapter 4

Facility Requirements

Table 4-5. Runway Compatibility Assessment

Vehicle Description		Existing / Future: 8/26 and 17/35 (8,000 ft x 100 ft) L / W	Ultimate: 8 / 26 (10,000 ft x 150 ft) L / W	Ultimate: 17 / 35 (12,000 ft x 150 ft) L / W
X	RocketPlane XP	Potentially Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
X	Airbus Defence and Space Spaceplane	Potentially Compatible / Compatible	Potentially Compatible / Compatible	Compatible / Compatible
X	Bristol Ascender	Potentially Compatible / Compatible	Potentially Compatible / Compatible	Compatible / Compatible
X	PD Aerospace X06	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
X	PD Aerospace X07	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
X	PD Aerospace X08	Potentially Compatible / Compatible	Potentially Compatible / Compatible	Compatible / Compatible
X	SABRE Development Vehicle	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
X	Reaction Engines Skylon	Not Compatible / Potentially Compatible	Not Compatible / Potentially Compatible	Not Compatible / Potentially Compatible
Y	XCOR Lynx	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Y	Dawn Aerospace Mk-II Aurora	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Y	Dawn Aerospace Mk-III	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Z	Northrop Grumman Stargazer (L-1011)	Potentially Compatible / Potentially Compatible	Compatible / Compatible	Compatible / Compatible
Z	Coleman Aerospace (C-17)	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Z	Coleman Aerospace (C-130)	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Z	Virgin Orbit Cosmic Girl (747-400)	Not Compatible / Not Compatible	Potentially Compatible / Potentially Compatible	Compatible / Compatible
Z	Virgin Galactic WhiteKnightTwo	Potentially Compatible / Potentially Compatible	Potentially Compatible / Potentially Compatible	Compatible / Compatible
Z	Stratolaunch	Not Compatible / Not Compatible	Not Compatible / Not Compatible	Compatible / Not Compatible
Z	Generation Orbit Gulfstream (C-20A)	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Z	Aevum RavnX	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Z	Bristol Spacecab	Potentially Compatible / Potentially Compatible	Potentially Compatible / Compatible	Compatible / Compatible
Z	Bristol Spacebus	Not Compatible / Not Compatible	Not Compatible / Potentially Compatible	Potentially Compatible / Potentially Compatible
Z	Orbital Access (MD-11)	Not Compatible / Not Compatible	Compatible / Compatible	Compatible / Compatible
Z	Swiss Space Systems (A300)	Potentially Compatible / Not Compatible	Compatible / Compatible	Compatible / Compatible
Reentry Vehicle	Boeing X-37B	Not Compatible / Compatible	Potentially Compatible / Compatible	Compatible / Compatible
Reentry Vehicle	Sierra Space Dream Chaser	Not Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Support Vehicle	Zero-G (727-200)	Potentially Compatible / Potentially Compatible	Compatible / Compatible	Compatible / Compatible
Support Vehicle	Super Guppy	Not Compatible / Potentially Compatible	Compatible / Compatible	Compatible / Compatible
Support Vehicle	Starfighter (F-104)	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Super Sonic	Boom XB-1	Potentially Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Super Sonic	Aerion AS2	Potentially Compatible / Not Compatible	Compatible / Compatible	Compatible / Compatible
Super Sonic	Spike S-512	Compatible / Compatible	Compatible / Compatible	Compatible / Compatible
Super Sonic	Boom Overture	Not Compatible / Compatible	Compatible / Compatible	Compatible / Compatible

OTC = Off the Chart — *Compatible* — *Potentially Compatible* — *Not Compatible*

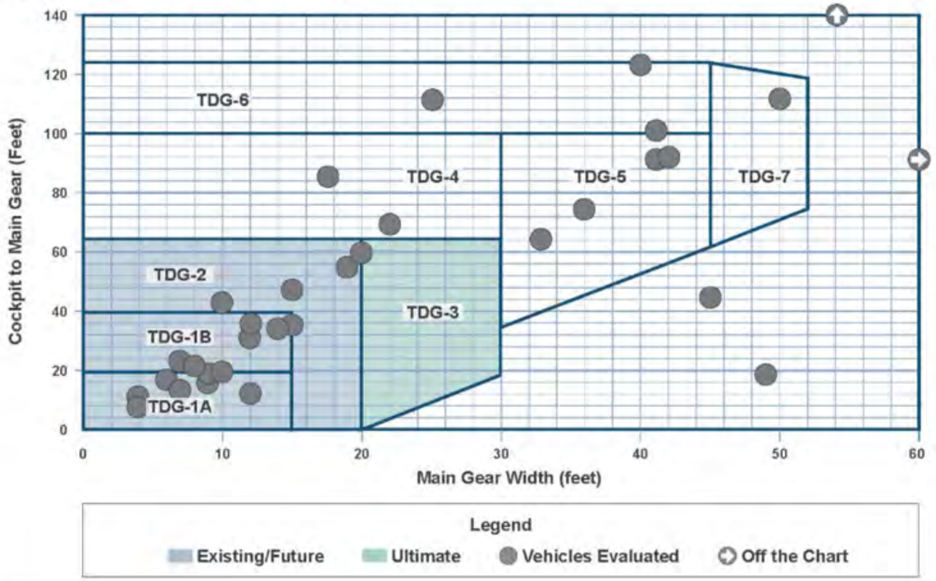
Source: Kimley-Horn

Taxiways

While the existing taxiways at CASP are 50 ft wide, they are operationally rated to the TDG-2 standard, which only require 35 ft of width. The existing taxiways can support TDG-1A/B and TDG-2 aircraft. These aircraft have a maximum Main Gear Width (MGW), which is distance from the outer edge to outer edge of the widest set of main gear tires, of 20 ft and make up between 50%-60% of the vehicles evaluated as part of this spaceport master plan.

At the current ADG of II and the ultimate ADG of IV, CASP meets the ADG criteria of approximately 55% and 95%, respectively, of the vehicles evaluated in this master plan. It may be possible to support larger vehicles on the existing taxiways, but it is recommended that the systems be evaluated on a case-by-case basis as unique considerations may be required for wingtip clearance, turning, and pavement strength.

Figure 4-5. Compatible Vehicle TDG Chart



Source: Kimley-Horn

Taxiway Assessment

A stoplight evaluation was conducted for the taxiway assessment. It should be noted that High-Altitude Balloons and VTVL vehicles were not included in the evaluation, as their operations are not dependent on taxiway characteristics.

The results of the evaluation are presented in **Table 4-6**. While increasing CASP's ADG from II to IV provides an increase in ADG compatibility from 55% to 95%, the modest increase in TDG from 2 to 3 only increases the TDG compatibility from 50% to 55%. To achieve a 90% TDG compatibility, a TDG of 7 would be required. Taxiway improvements would not be necessary for the entire airfield and may be strategically located to support spaceport infrastructure needs.

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Facility Requirements Summary

As shown in **Table 4-11** the current configuration and infrastructure at CASP can support about 50% of the vehicle systems evaluated in this master plan. It is important to note that a transition from the existing configuration to the future configuration does not increase the compatibility of CASP. In addition, improvements to the ultimate configuration would only increase CASPs compatibility by about 5% unless the TDG was also increased to 7, which would result in a compatibility of approximately 90%. Vehicle compatibility is listed in **Table 4-12** and CASP infrastructure recommendations are provided in **Table 4-13**.

Table 4-11. Vehicle System Compatibility

Configuration	Compatibility	Runway Length	Runway Width	ADG	TDG	Hangar (sqft)
Existing / Future	35%	8,000	100	I	1B	< 10,000
	40%	8,000	100	II	1B	10,000 – 20,000
	45%	8,000	100	II	1B	10,000 – 20,000
	50%	8,000	100	II	2	10,000 – 20,000
Ultimate	55%	9,000	100	II	3	20,000 – 40,000
Ultimate + TDG 5	60%	9,000	150	III	4	20,000 – 40,000
	65%	10,000	150	IV	5	20,000 – 40,000
	70%	10,000	150	IV	5	20,000 – 40,000
	75%	10,000	150	IV	5	20,000 – 40,000
Ultimate + TDG 7	80%	12,000	150	IV	6	40,000 – 60,000
	85%	12,000	150	IV	6	40,000 – 60,000
	90%	12,000	150	IV	7	40,000 – 60,000
Custom	95%	12,000	150	IV	OTC	40,000 – 60,000
	100%	16,500	200	V	OTC	> 100,000

Source: Kimley-Horn

Kimley»Horn

Table 4-13. CASP Infrastructure Recommendations

Infrastructure	Near-Term	Mid-Term	Long-Term
Runways	Existing	Existing	Existing 8/26 Ultimate 17/35 12,000 ft x 150 ft
Taxiways	Existing	Existing	Existing 8/26 Ultimate ADG with TDG 7 for 17/35.
Aprons	Existing	Construct Dedicated 100' x100' concrete mission preparation area with 1,250 ft PAD	Construct Dedicated 300' x 300' concrete Mission Preparation Area with 1,250 ft PAD
Vehicle Processing Facility	One 20,000 sqft hangar	One Additional 20,000 sqft hangar	One 60,000 sqft hangar
Payload Processing Facility	None / User provided	1,000 sqft modular cleanroom	Additional 1,000 sqft modular cleanroom Or 10,000 to 30,000 sqft standalone PPF
Mission Control Center	1,000 to 2,500 sqft	1,000 to 2,500 sqft	5,000 to 10,000 sqft
Propellant Storage	Temporary storage on existing aprons	Temporary storage on existing aprons	Temporary storage on existing aprons
Incubator Space	1 company 2,500 - 5,000 sqft	2 companies 5,000 – 10,000 sqft	4+ companies 10,000 sqft to 20,000+ sqft
Mobile Engine Test Site	300 ft x 300 ft Test Area with 350 ft PAD	300 ft x 300 ft Test Area with 1,250 ft PAD	300 ft x 300 ft Test Area with 1,250 ft PAD
VTVL Test Site	300 ft x 300 ft Test Area with 460 ft PAD	300 ft x 300 ft Test Area with 1,250 ft PAD	One to Two 300 ft x 300 ft Test Areas with 1,250 ft PAD with connected operational flight corridor.
Fixed Engine Test Site	300 ft x 300 ft Test Area with 350 ft PAD	300 ft x 300 ft Test Area with 1,250 ft PAD	One to three 1-acre Test Areas with 1,250 ft PAD
Balloon Launch	700 ft x 50 ft Apron	700 ft x 50 ft Apron	700 ft x 50 ft Apron

Source: Kimley-Horn

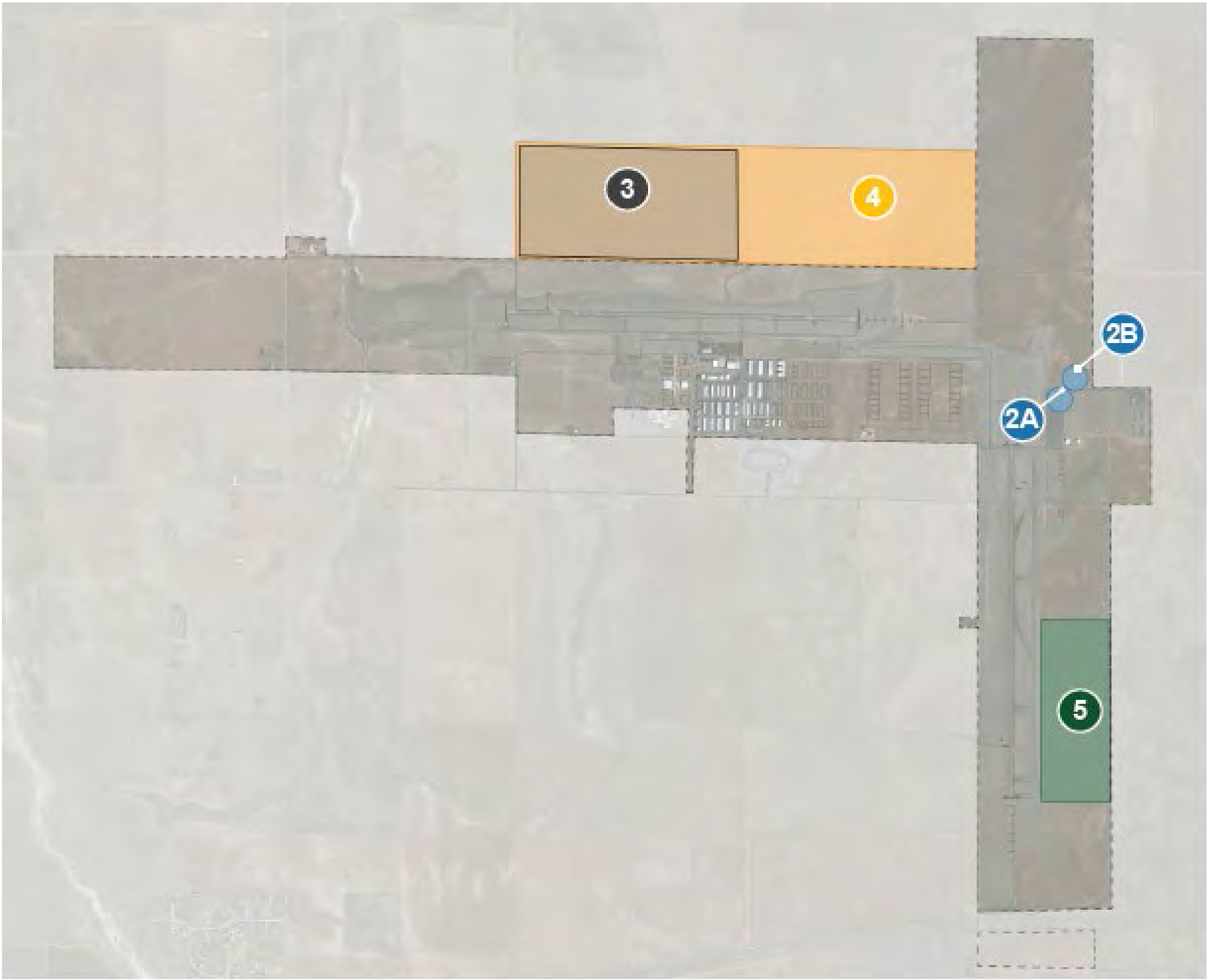
The existing facilities are capable of supporting about 50% of the launch, reentry, and support systems analyzed in this master plan. Due to the limited number of licensed launch systems that are compatible with CASP, near-term R&D, testing, and manufacturing should be prioritized at CASP. Strategic long-term infrastructure improvements such as a runway extension, pavement strengthening, taxiway modifications, apron expansions, test area development, and hangar development can increase the facility compatibility to around 90% and provide the necessary facilities for a wide range of aerospace tenants and programs.

5

Chapter 5

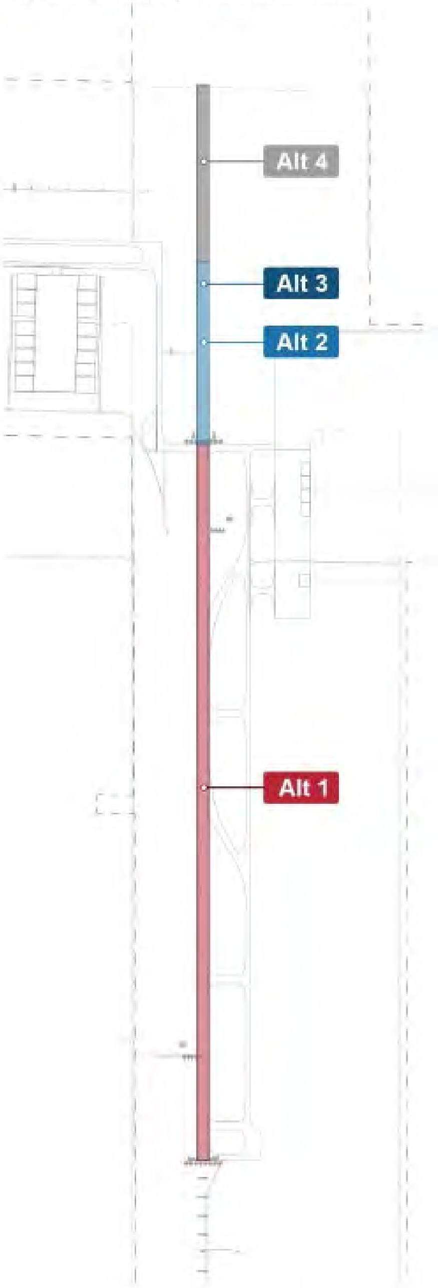
Alternatives

Alternatives Analysis



Source: Kimley-Horn

Figure 5-2. Runway 17/35 Alternatives



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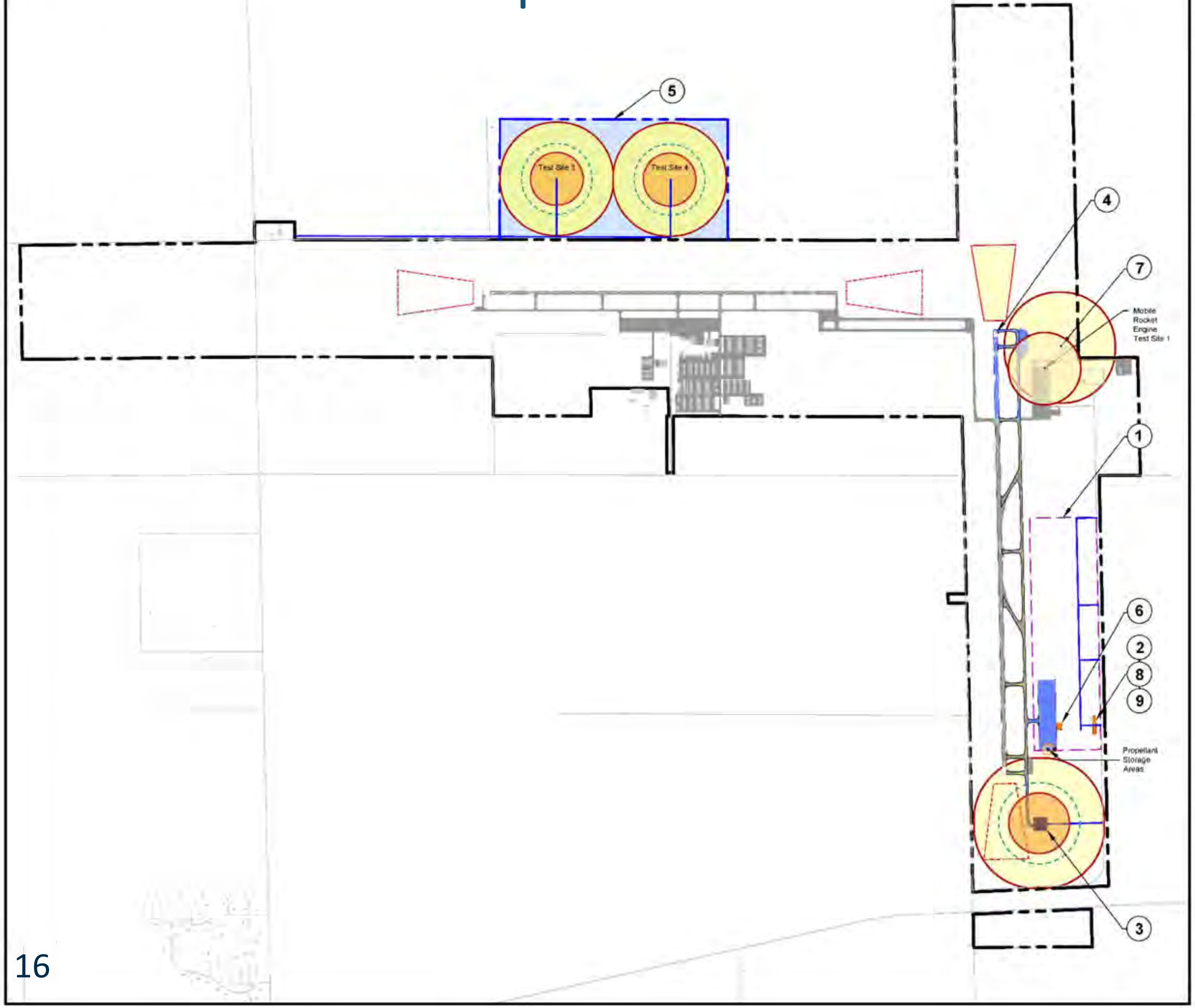
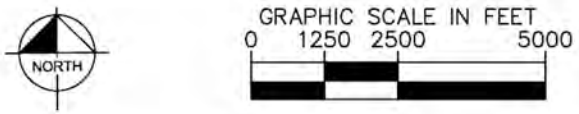
Recommended Development Plan



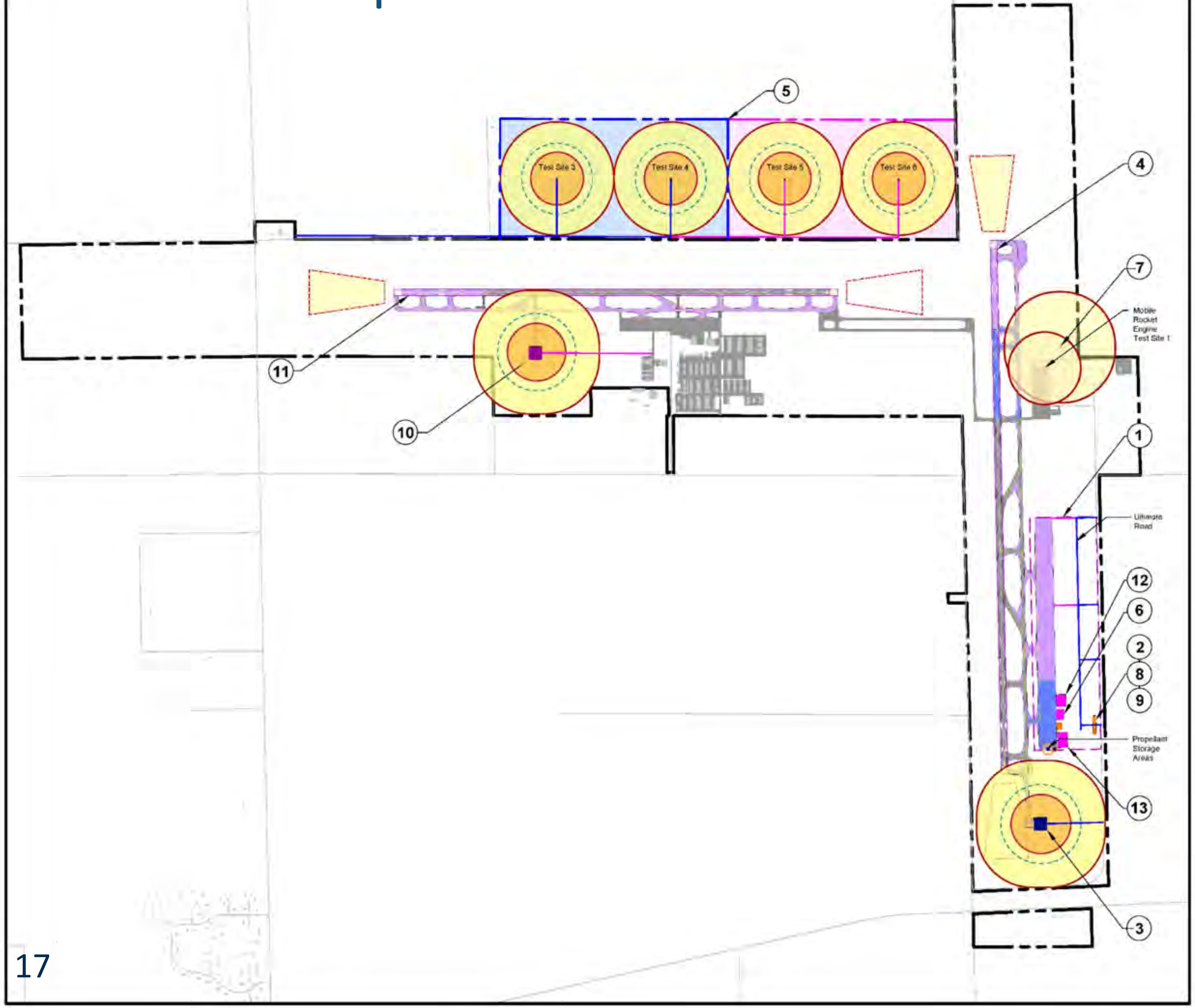
Recommended Development Plan

Legend		
Item	**Existing**	**Future**
Property Line		
Roadways		
Aerospace Development Area	N/A	
Public Area Distance	N/A	
Public Traffic Route Distance	N/A	
Incompatable Intraline Distance	N/A	
Test Area	N/A	
Runway Protection Zone (RPZ)		
Structure		
Airfield Pavement		
Concrete Pad	N/A	

Project List	
Number	**Project**
1	Aerospace Development Area (includes propellant storage areas)
2	Multi-use Facility
3	Mission Preparation Area #1
4	Runway 17/35 Extension and Taxiway D Improvements
5	Test Area (Outside Existing Airport Property)
6	Vehicle Processing and Integration Facility
7	Rocket Engine Test Site 2
8	Payload Processing Facility
9	Mission Control Center



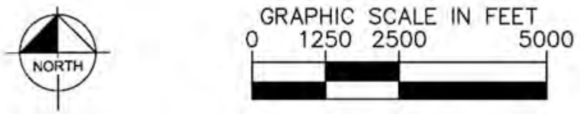
Ultimate Development Plan



Ultimate Development Plan

Legend			
Item	Existing	Future	Ultimate
Property Line			
Roadways			
Aerospace Development Area	N/A		No Change
Public Area Distance	N/A		No Change
Public Traffic Route Distance	N/A		No Change
Incompatable Intraline Distance	N/A		No Change
Test Area	N/A		
Runway Protection Zone (RPZ)		N/A	
Structure			
Airfield Pavement			
Concrete Pad	N/A		

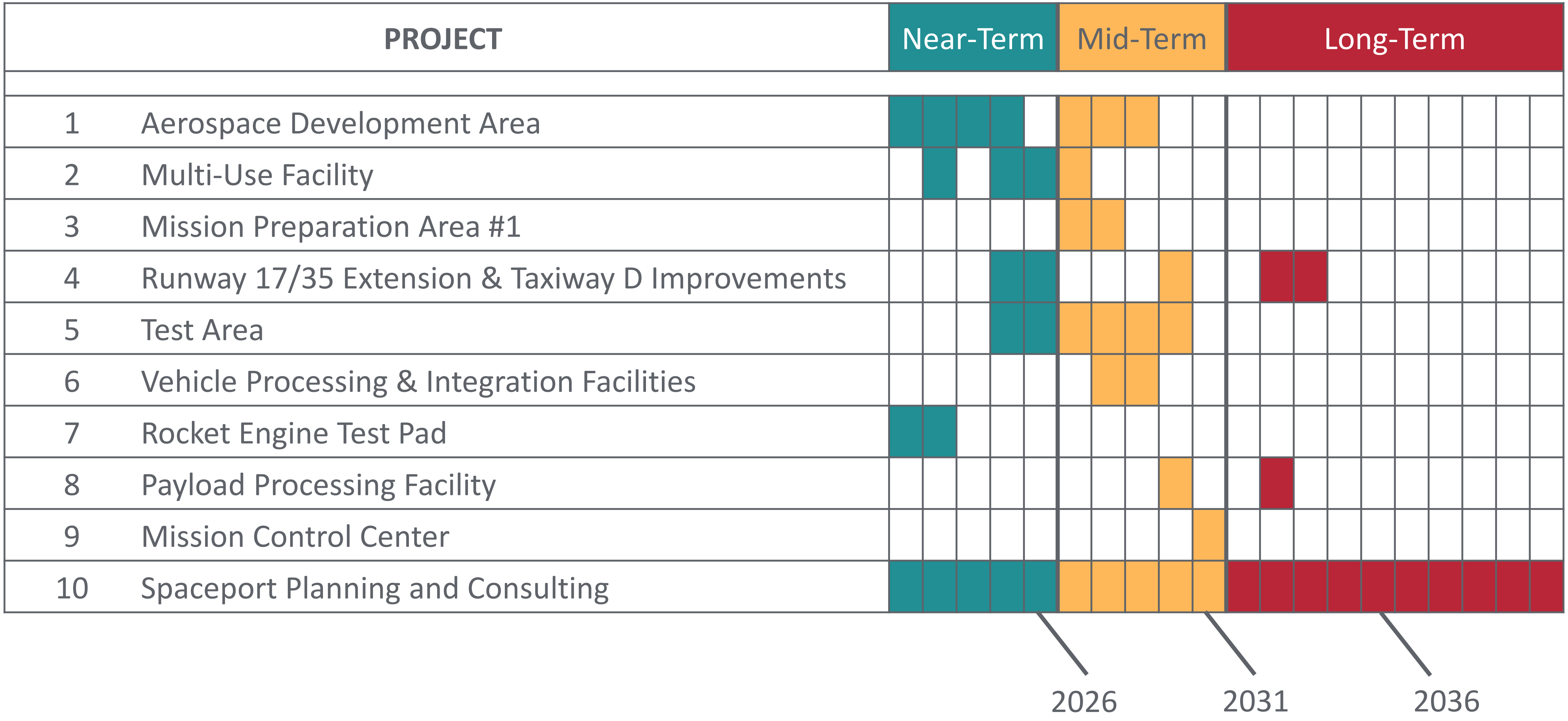
Project List	
Number	Project
1	Aerospace Development Area (includes propellant storage areas)
2	Multi-use Facility
3	Mission Preparation Area #1
4	Runway 17/35 Extension and Taxiway D Improvements
5	Test Area (Outside Existing Airport Property)
6	Vehicle Processing and Integration Facility (1 hangar)
7	Rocket Engine Test Site 2
8	Payload Processing Facility
9	Mission Control Center
10	Mission Preparation Area #2
11	Runway 8/26 Extension and Taxiway A Improvements
12	Vehicle Processing and Integration Facility (2 hangars)
13	Terminal Facility



Chapter 6

Implementation Plan

RDP Project Phasing



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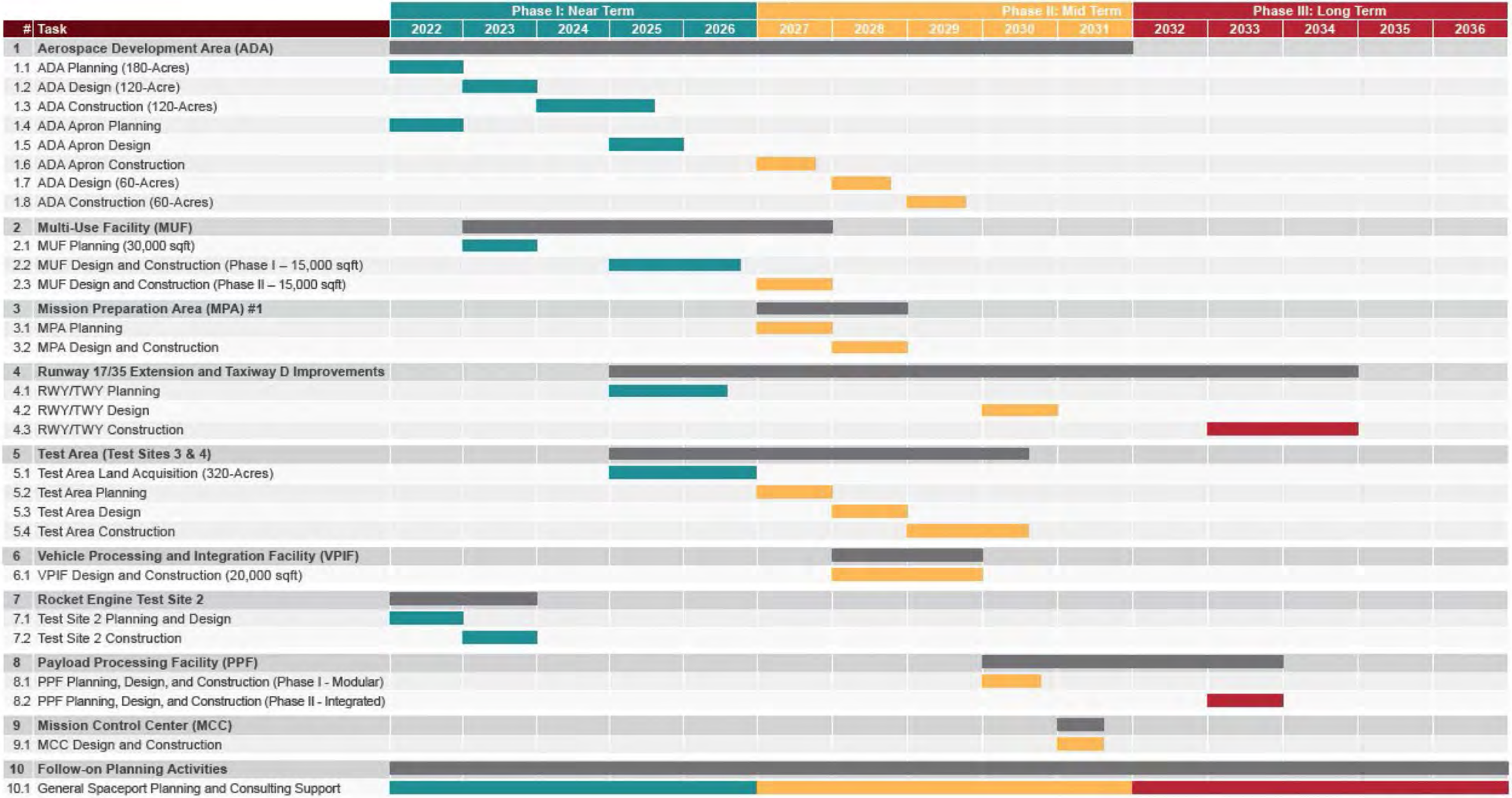

Source: Kimley-Horn

RDP Project Phasing

Near-Term 2022-2026	Mid-Term 2027-2031	Long-Term 2032-2041
• 120-Acre Aerospace Development Area (Phase I) • Rocket Engine Test Site • Multi-Use Facility (Phase I) • General Planning	• 60-Acre Aerospace Development Area (Phase II) • Mission Preparation Area • Aerospace Development Apron • Test Area • Vehicle Processing and Integration Facility • Multi-Use Facility (Phase II) • Payload Processing Facility • Mission Control Center	• Runway 17/35 Extension • Taxiway D Improvements • Payload Processing Facility
Total $43M	**Total $103M**	**Total $ 17M**

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RDP Project Phasing (Near-Term)

2022	2023	2024	2025	2026
• **Aerospace Development Area** (Planning) • **Apron** (Planning) • **Rocket Engine Test Pad** (Planning/Design)	• **Aerospace Development Area** (Design) • **Multi-Use Facility** (Planning) • **Rocket Engine Test Pad** (Construction)	• **Aerospace Development Area** (Construction)	• **Apron** (Design) • **Multi-Use Facility** (Design/ Construction) • **RWY/TWY** (Planning) • **Test Area** (Land Acquisition)	• **RWY/TWY (Cont.)** (Planning) • **Test Area (Cont.)** (Land Acquisition)
Total $ 680K	**Total $ 2.6M**	**Total $ 26M**	**Total $ 13M**	**Total $ 200K**

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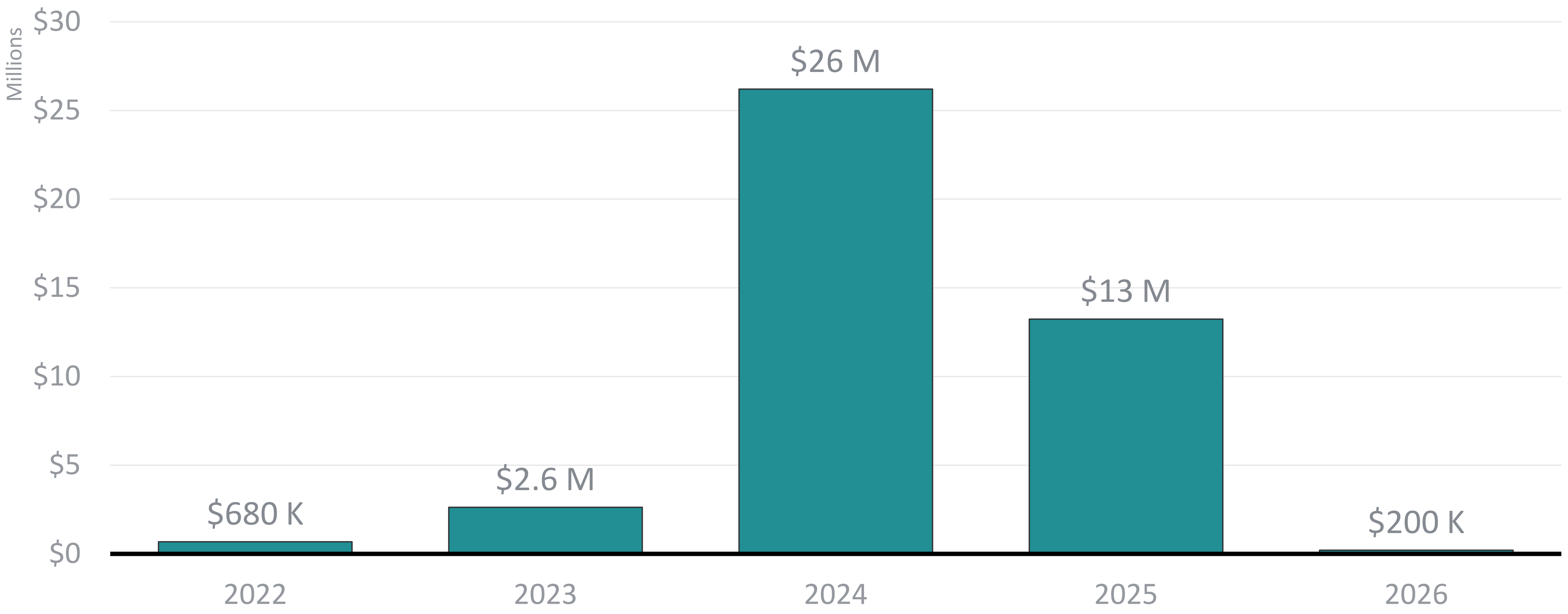
Near-Term Capital Expenses (2022-2026)



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Supplemental Funding

- FAA AIP Grants
- FAA STIM Grants
- FAA State Apportionments
- Other Federal Initiatives
- US EDA Grants
- CDOT Grants
- State Infrastructure Bank (SIB) Loans
- Public Private Partnerships (P3)

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Table 6-4. Funding Source Compatibility

		Federal			State	
		FAA AIP⁺	FAA AST‡	US EDA Grant	CDOT Aviation Grant Program	SIB Program
1	**Aerospace Development Area (ADA)**					
1.1	ADA Planning (180-Acres)	✖	Red	Green→		
1.2	ADA Design (120-Acre)	✖	Green	Green	Orange	Green
1.3	ADA Construction (120-Acres)	✖	Green	Green	Orange	Green
1.4	ADA Apron Planning	✖	Green	Red	Orange	Green
1.5	ADA Apron Design	✖	Green	Orange	Orange	Green
1.6	ADA Apron Construction	✖	Green	Orange	Orange	Green
1.7	ADA Design (60-Acres)	✖	Green	Green	Orange	Green
1.8	ADA Construction (60-Acres)	✖	Green	Green	Orange	Green
2	**Multi-Use Facility (MUF)**					
2.1	MUF Planning (30,000 sqft)	✖	Red	Red	✖	✖
2.2	MUF Design and Construction (Phase I – 15,000 sqft)	✖	Red	Orange	✖	✖
2.3	MUF Design and Construction (Phase II – 15,000 sqft)	✖	Red	Orange	✖	✖
3	**Mission Preparation Area (MPA) #1**					
3.1	MPA Planning	✖	Green	Red	Red	Red
3.2	MPA Design and Construction	✖	Green	Red	Red	Red
4	**Runway 17/35 Extension and Taxiway D Improvements**					
4.1	RWY/TWY Planning	✖	Green	Red	Orange	Orange
4.2	RWY/TWY Design	✖	Green	Orange	Orange	Orange
4.3	RWY/TWY Construction	✖	Green	Orange	Orange	Orange
5	**Test Area (Test Sites 3 & 4)**					
5.1	Test Area Land Acquisition (320-Acres)	✖	Green	✖	Red	Orange
5.2	Test Area Planning	✖	Green	Red	Red	Orange
5.3	Test Area Design	✖	Green	Green	Red	Orange
5.4	Test Area Construction	✖	Green	Green	Red	Orange
6	**Vehicle Processing and Integration Facility (VPIF)**					
6.1	VPIF Planning, Design and Construction (20,000 sqft)	✖	Green	Green	Red	Red
7	**Rocket Engine Test Site 2**					
7.1	Test Site 2 Planning and Design	✖	Green	Orange	Red	Red
7.2	Test Site 2 Construction	✖	Green	Orange	Red	Red
8	**Payload Processing Facility (PPF)**					
8.1	PPF Planning, Design and Construction	✖	Green	Red	✖	✖
9	**Mission Control Center (MCC)**					
9.1	MCC Planning, Design & Construction	✖	Green	Red	✖	✖

✖ Project is ineligible for funding under existing program

Red: Project is unlikely to be eligible for funding under existing program

Orange: Project is potentially eligible for funding under existing program

Green: Project is likely eligible for funding under existing program

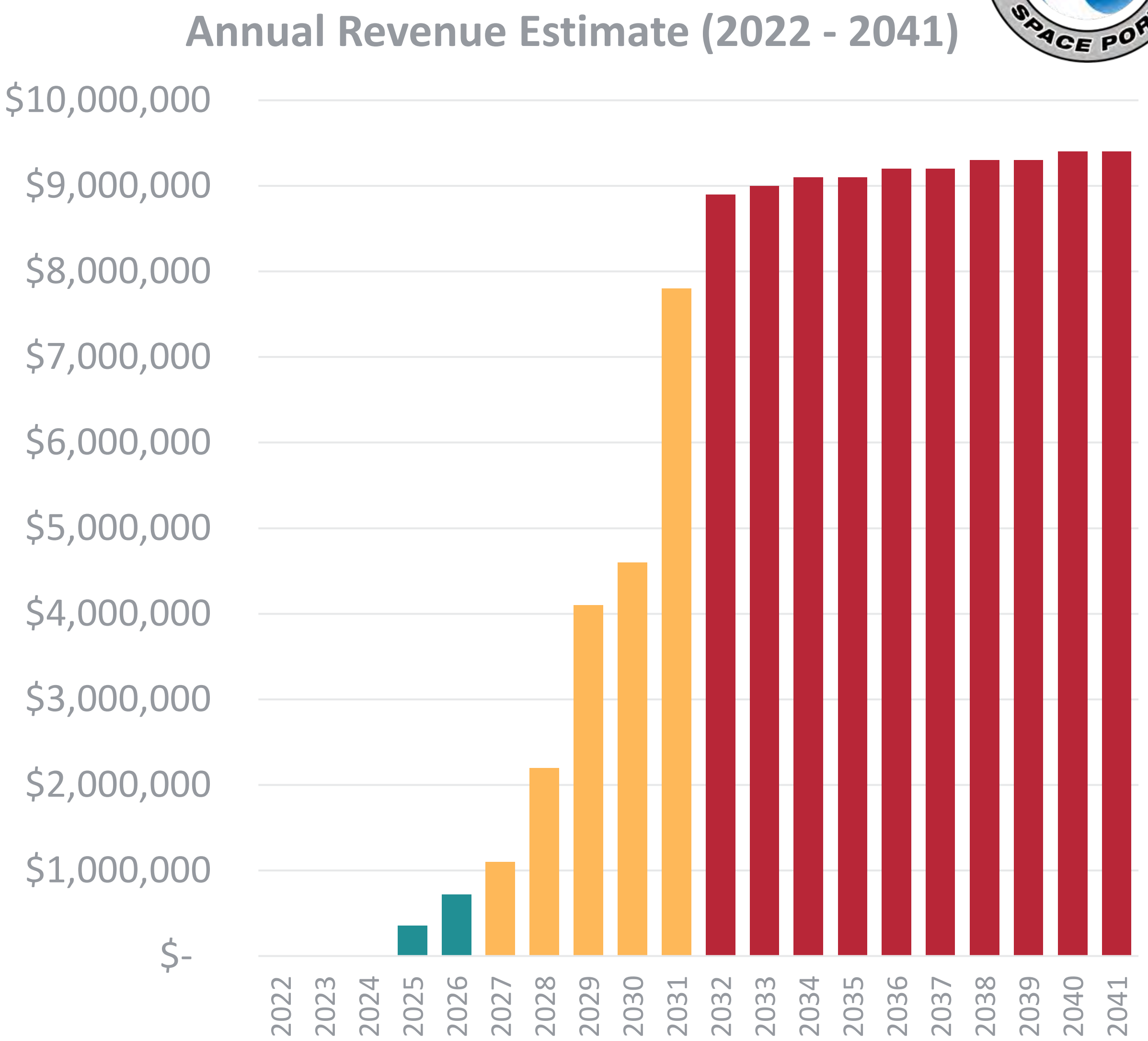
⁺ And State Apportionment

‡ Program unfunded since 2012

Source: BRPH, Kimley-Horn

111

Revenue Analysis



Revenue Sources

- Aerospace Development Area
- Vehicle Processing Facility
- Test Areas
- Multi-Use Facility
- Aerospace Apron
- Rocket Engine Test Site

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Spaceport Cash Flow (2022 – 2041)

• Net Operating Cash Flow:	+ $102M
• Anticipated Grant Funding:	+ $22M
• Net Capital Expenditure:	- $162M
• Total	- $38M

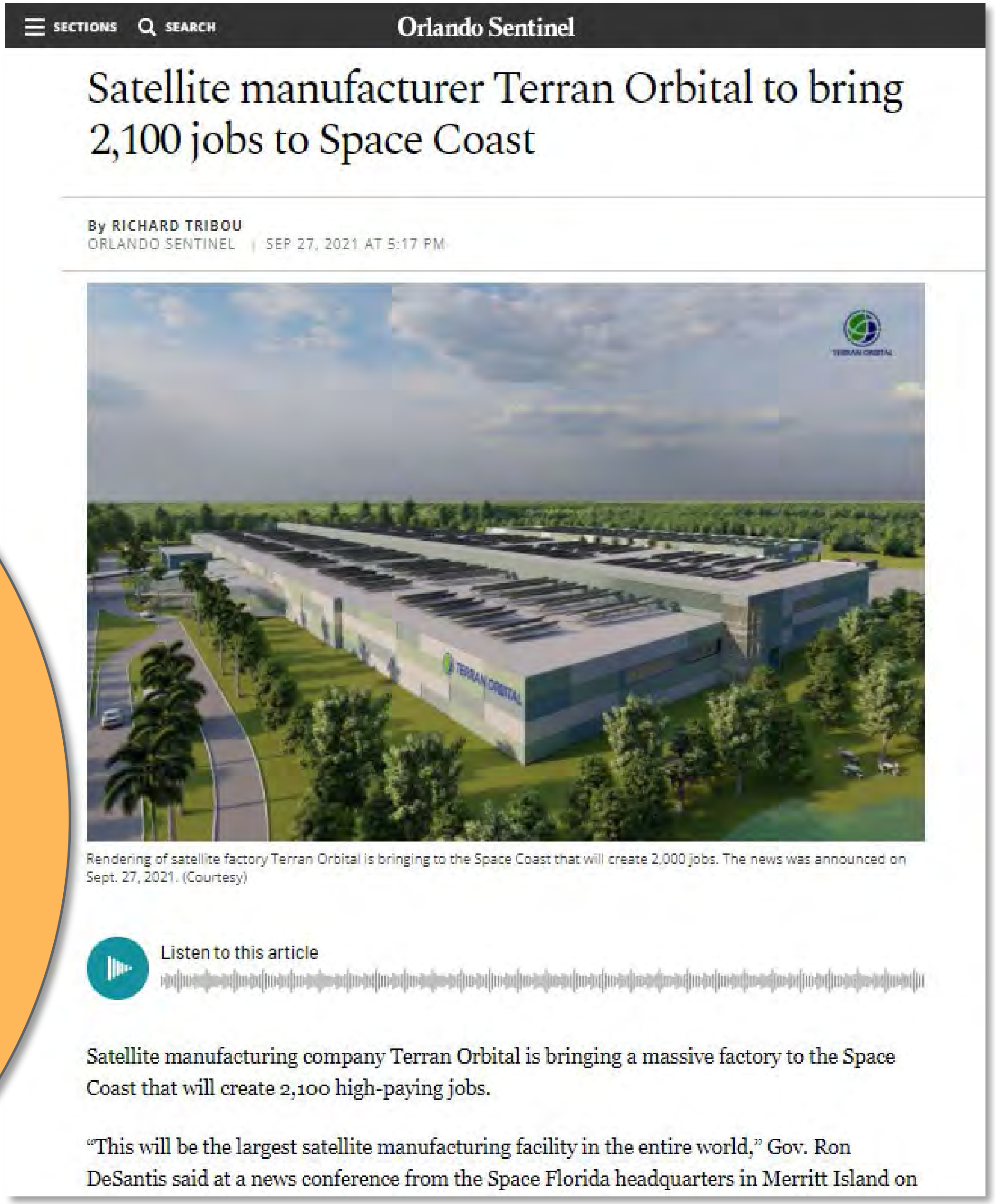
Considerations to reduce capital expenditures:

- Leverage other aeronautical / aviation developments
- Minimize Runway Extension / Taxiway Modification
- Reduce Aerospace Apron Size
- Reduce Mission Preparation Area

Additional Impacts

1,500+
Permanent Direct Jobs

4,300+
Indirect Jobs
Subarea


SECTIONS SEARCH **Orlando Sentinel**

Satellite manufacturer Terran Orbital to bring 2,100 jobs to Space Coast

By RICHARD TRIBOU
ORLANDO SENTINEL | SEP 27, 2021 AT 5:17 PM

Rendering of satellite factory Terran Orbital is bringing to the Space Coast that will create 2,000 jobs. The news was announced on Sept. 27, 2021. (Courtesy)

Listen to this article

Satellite manufacturing company Terran Orbital is bringing a massive factory to the Space Coast that will create 2,100 high-paying jobs.

"This will be the largest satellite manufacturing facility in the entire world," Gov. Ron DeSantis said at a news conference from the Space Florida headquarters in Merritt Island on

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Houston Spaceport

menu abc13 WATCH LIVE

SPACE

Houston Spaceport groundbreaking launches 120,000-square-foot Collins Aerospace campus

By Nick Natario

Tuesday, June 8, 2021

HOUSTON, Texas (KTRK) -- The Houston Spaceport is taking the next step in solidifying itself as a major player in American private space flight with a groundbreaking of a 120,000-square-foot complex that includes the city's first "spaceflight incubator."

Above all, jobs are being added to the city. Arturo Machuca, general manager of Houston Spaceport, told ABC13 content partner **Community Impact Newspaper** that both companies are expected to bring 1,400 to 1,500 jobs within the first phase of the spaceport.

For the city overall, the involvement of Collins, **Axiom** and others at the Houston Spaceport is considered a game-changer, according to the mayor.

"We are leveraging Houston's many advantages, including our dynamic workforce, to fuel the future of aerospace - a potentially trillion-dollar, 21st-century commercial space economy," Turner said last month.

The city has already committed investments into its spaceflight pursuits. Collins Aerospace is getting $25.6 million in financing from Houston Airports for its capital improvements for the company's existing facility in Houston.

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Next Steps

1. Allocate $700k in Funding 2022 Spaceport Projects

2. Begin Planning for Aerospace Development Area

3. Begin Planning and Design for Rocket Engine Test Site 2

4. Select General Spaceport Planning Consultant

5. License Renewal and Additional Planning

COLORADO AIR AND SPACE PORT SPACEPORT MASTER PLAN

Board of County Commissioners Briefing

2/8/2022

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STUDY SESSION ITEM SUMMARY

DATE OF STUDY SESSION: 02/08/2022
SUBJECT: MOU Regional Housing & Homelessness Effort
OFFICE/DEPARTMENT: Community Safety and Well-Being
CONTACT: Matt Rivera
FINACIAL IMPACT: None
SUPPORT/RESOURCES REQUEST: None
DIRECTION NEEDED: None
RECOMMENDED ACTION: 1) BoCC will discuss the importance of regional collaboration with elected officials from county and municipal partners, and champion the execution of a formal MOU. 2) BoCC will support hosting a regional convening of elected officials and executive administrators to move discussions towards execution.

DISCUSSION POINTS:

- Regional housing and homelessness meetings update (partners, progress, and action items)
- Regional MOU key goals, intent, and next steps
- Regional discussions culminating in large convening