



Runway Length Justification and Runway Siting Case Study: Chamberlain Municipal Airport Master Plan

South Dakota Airport Conference

March 11, 2020



Building a Better World for All of Us®

Chamberlain Municipal Airport



The City understood the airport had demanding users



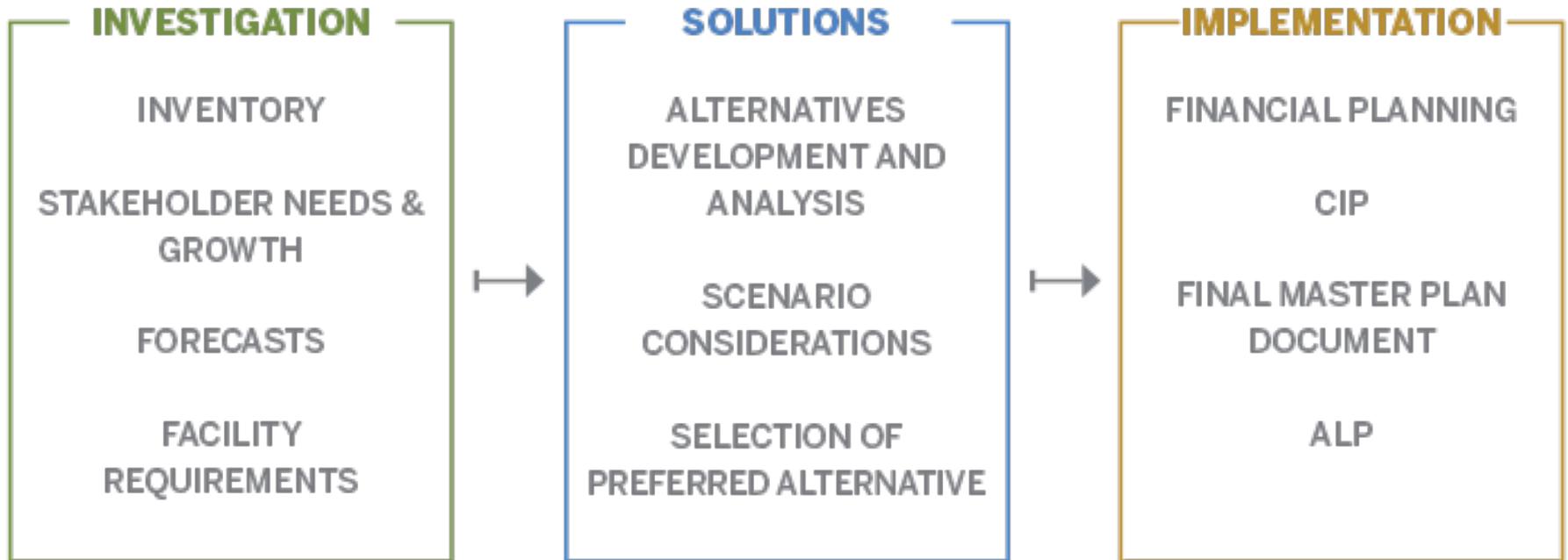
The City also knew there was an undocumented need



Challenges - what were we trying to solve?

- Does the airport meet the needs of users, including seasonal pheasant hunting traffic?
 - Runway needs?
 - Taxiway needs?
- If not, what needs to be improved?
- What is the best alternative to meet the demonstrated needs?

Master Plan Process



Runway Needs & Project Justification



IFR flight plan & hunting data



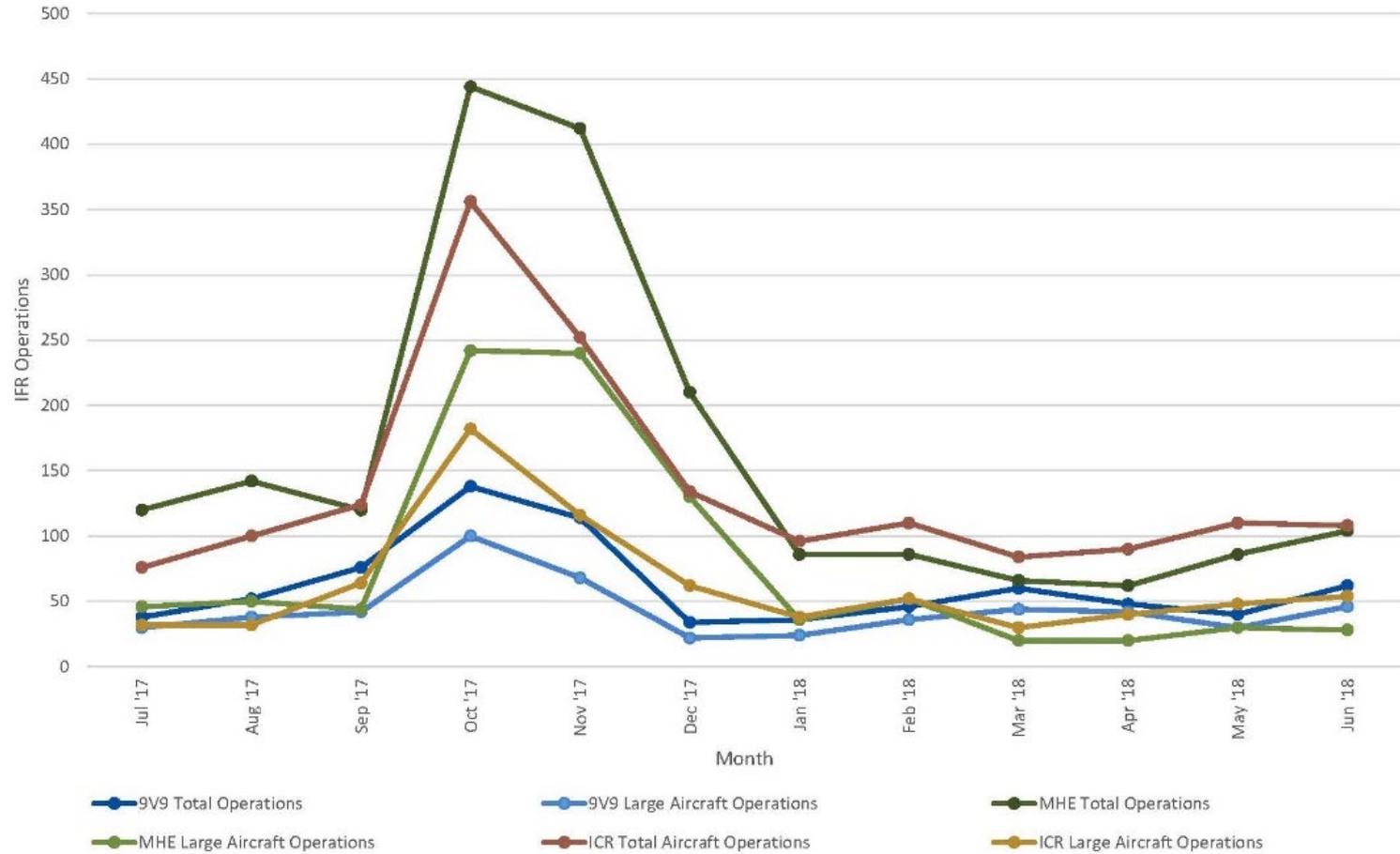
User surveys



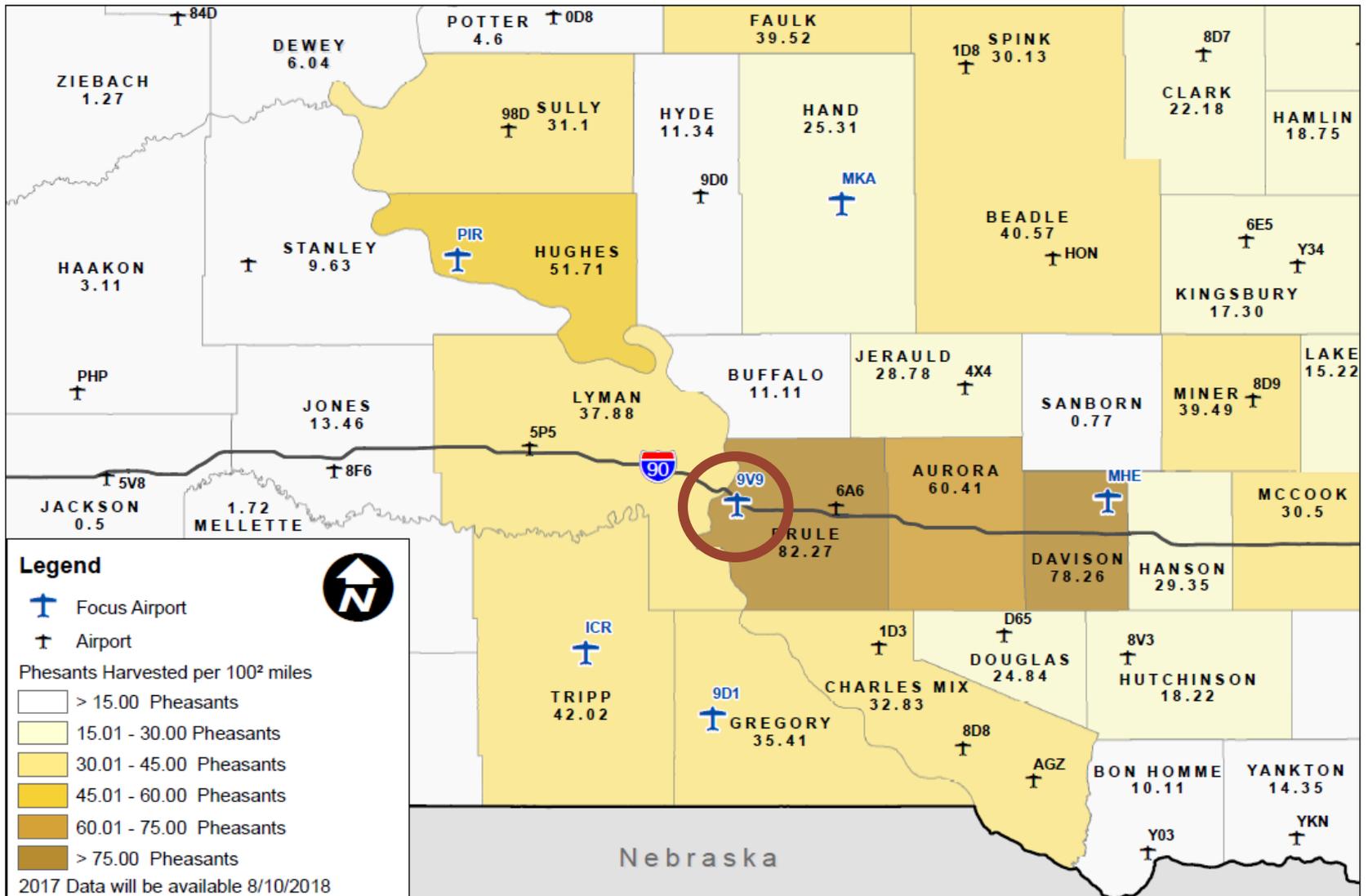
Stakeholder meetings

Goal: Data driven approach, supported by qualitative input

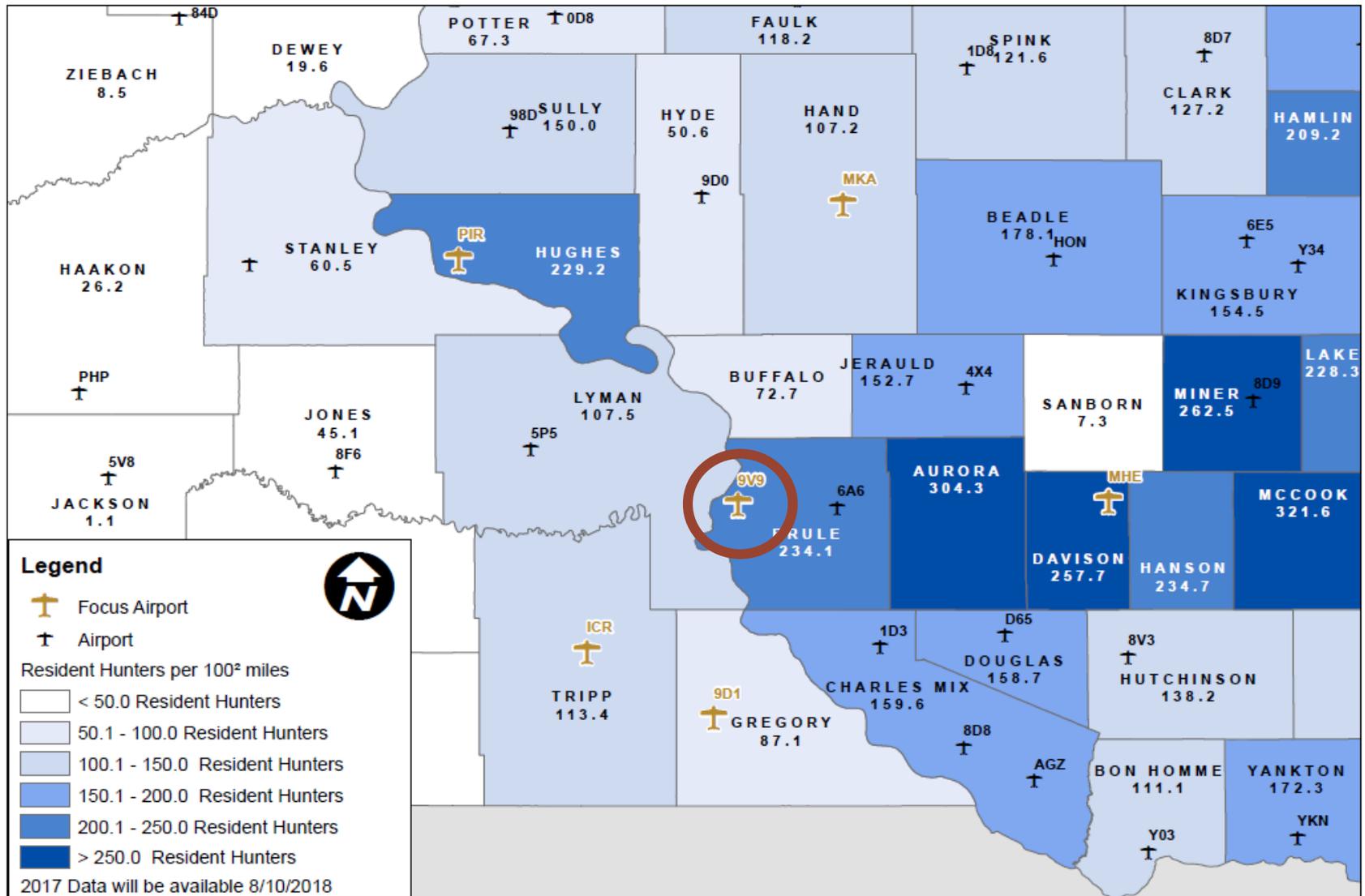
Large Aircraft Airport Use – 2017 IFR Data



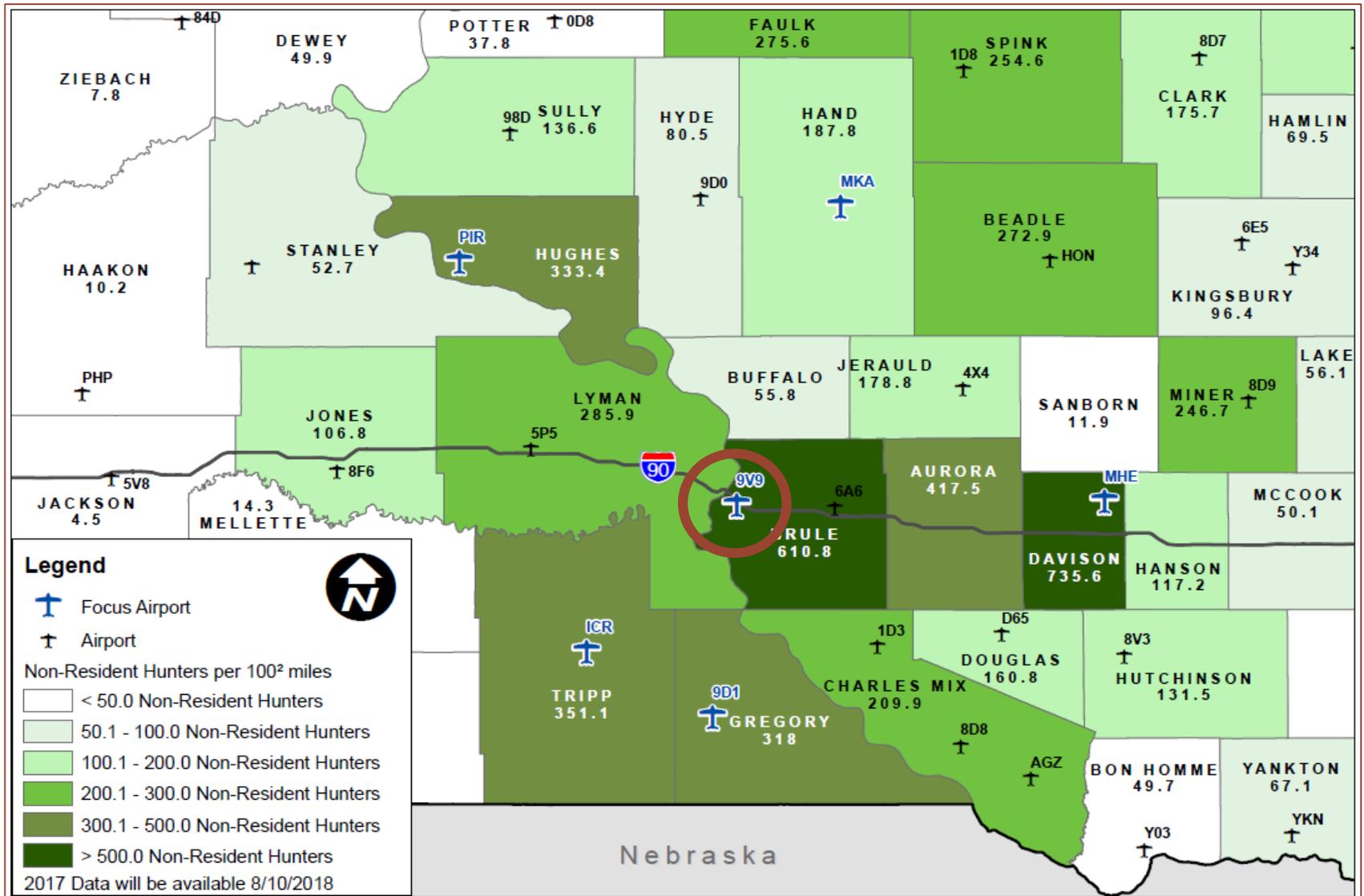
Pheasants Harvested



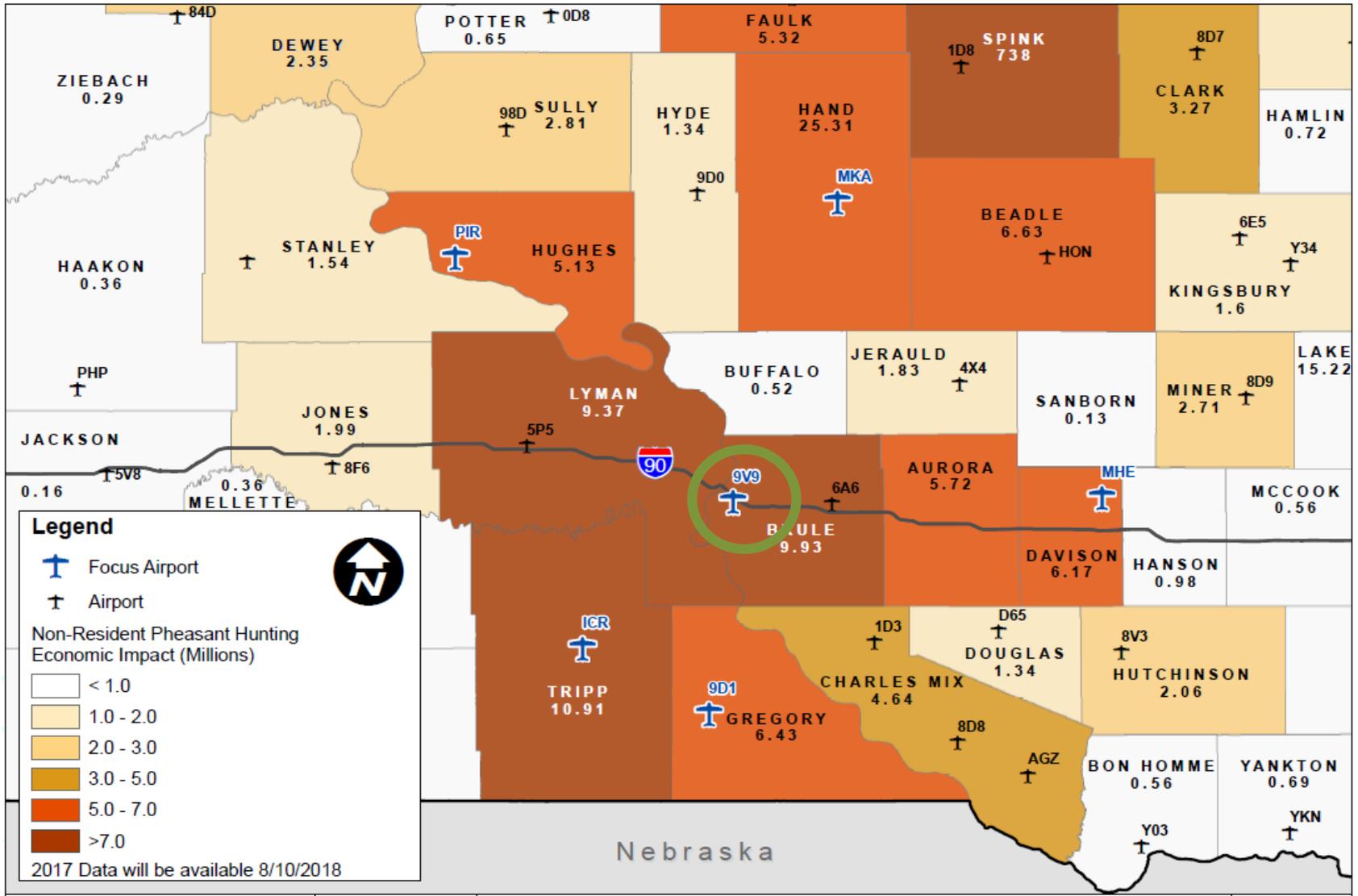
Resident Hunters



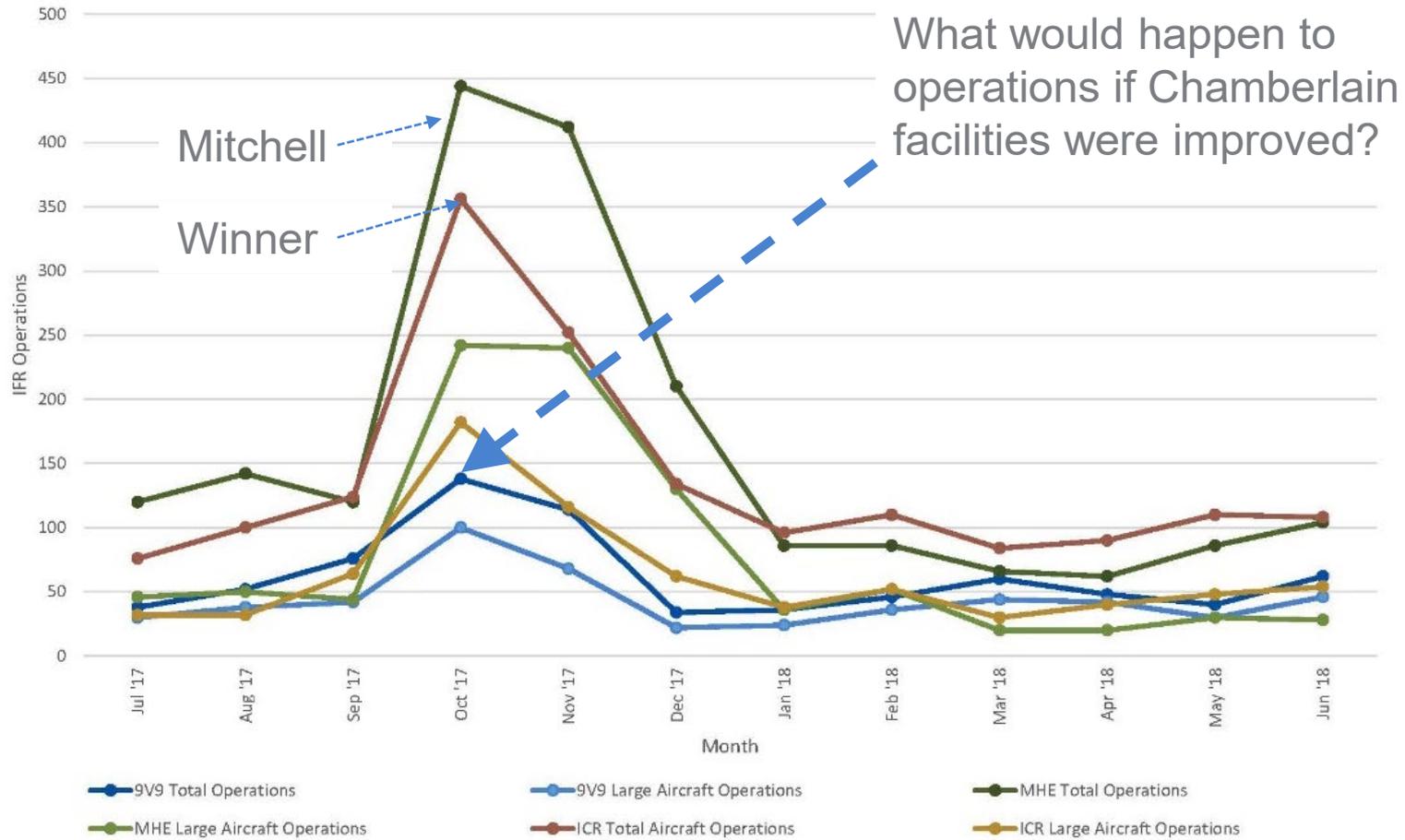
Non-Resident Hunters



Non-Resident Economic Impact



Comparative analysis



Project Justification

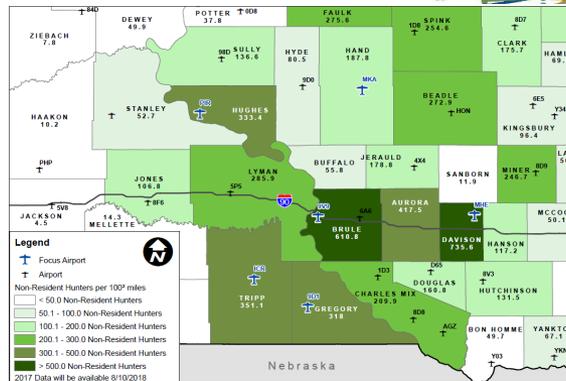
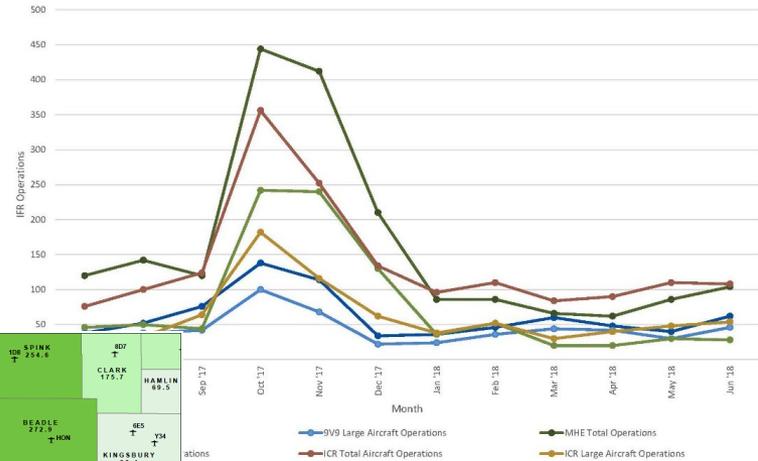


IFR flight plan data Chamberlain & comparative analysis

TFMSC Report (Airport)

From 01/2016 To 12/2016 | Airport=9V9

#	Aircraft	Departures	Arrivals	Total Operations	Average Departure Seats	Average Arrival Seats
1	- 1 - unknown	2	0	2	0	0
2	AEST - Piper Aero Star	2	2	4	8	4
3	B350 - Beech Super King Air 350	2	2	4	12	6
4	B36T - Allison 36 Turbine Bonanza	1	1	2	6	6
5	BE20 - Beech 200 Super King	186	194	380	930	5
6	BE33 - Beech Bonanza 33	0	1	1	0	5
7	BE36 - Beech Bonanza 36	2	2	4	8	4
8	BE40 - Raytheon/Beech Beechjet 400/T-1	1	2	3	5	10
9	BE58 - Beech 58	2	2	4	8	4
10	BE90 - Beech King Air 90	1	0	1	15	0
11	BE9L - Beech King Air 90	37	38	75	6	228
12	C150 - Cessna 150	1				
13	C172 - Cessna Skyhawk 172/Cutlass	2				
14	C180 - Cessna 180	1				
15	C182 - Cessna Skylane 182	2				
16	C25A - Cessna Citation CJ2	1				
17	C25B - Cessna Citation CJ3	2				
18	C25C - Cessna Citation CJ4	1				
19	C340 - Cessna 340	1				
20	C414 - Cessna Chancellor 414	4				
21	C421 - Cessna Golden Eagle 421	3				
22	C425 - Cessna 425 Corsair	1	28			



Project Justification



Stakeholder meetings

What are you doing now,
what would you do differently?



Runway Needs & Project Justification



IFR flight plan & hunting data



User surveys



Stakeholder meetings

Goal: Data driven approach, supported by qualitative input

Critical Aircraft

- Existing:

B-II Small (<12,500 lbs)

- King Air 200
- 759 existing operations



- Future:

B-II Large (>12,500 lbs)

- Cessna Citation II/Bravo
- 505 large aircraft operations by 2023 (B-II and C-II)



What Runway Length Does a B-II Large Aircraft Need?

AC 150/5325-4B – Runway Length Requirements for Airport Design

- **Small aircraft (Chapter 2)**
 - Less than 10 passenger seats
 - 10 or more passenger seats
- **Large aircraft up to 60,000 MTOW (Chapter 3)**
 - 75% of fleet *at 60% useful load*
 - Turbo Prop: 4,900 feet
 - Jet: 5,500 feet
 - 75% of fleet at 90% useful load
 - 90% of fleet – 60% of 90% useful load
- **Large aircraft >60,000lbs MTOW and RJs (Chapter 4)**

Project Justification Keys to Success



Look under all the rocks



Be creative in you research



Tell your story and tell it well

Other key airport needs

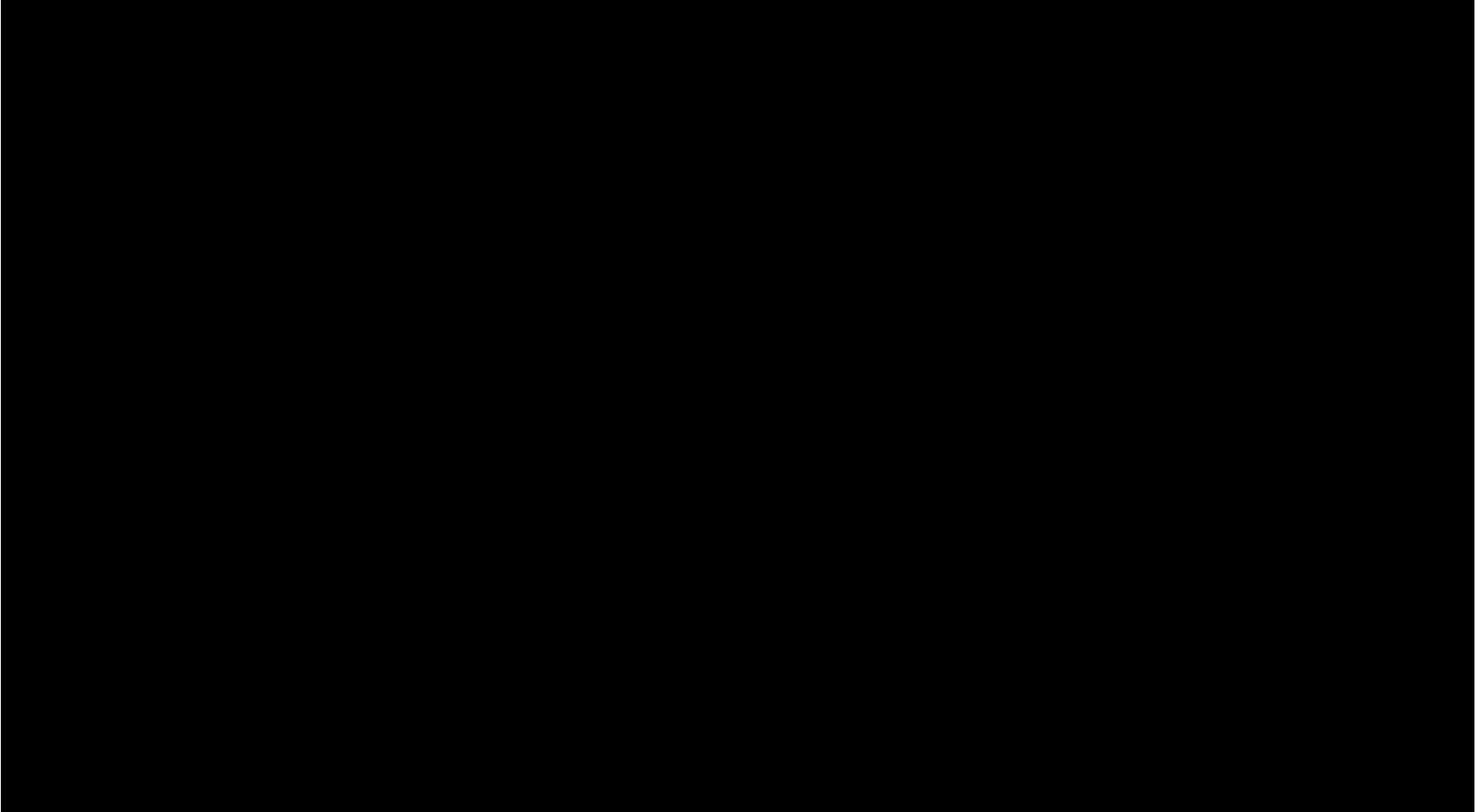
- Pavement rehabilitation



Other key airport needs

- Pavement rehabilitation
- Parallel taxiway





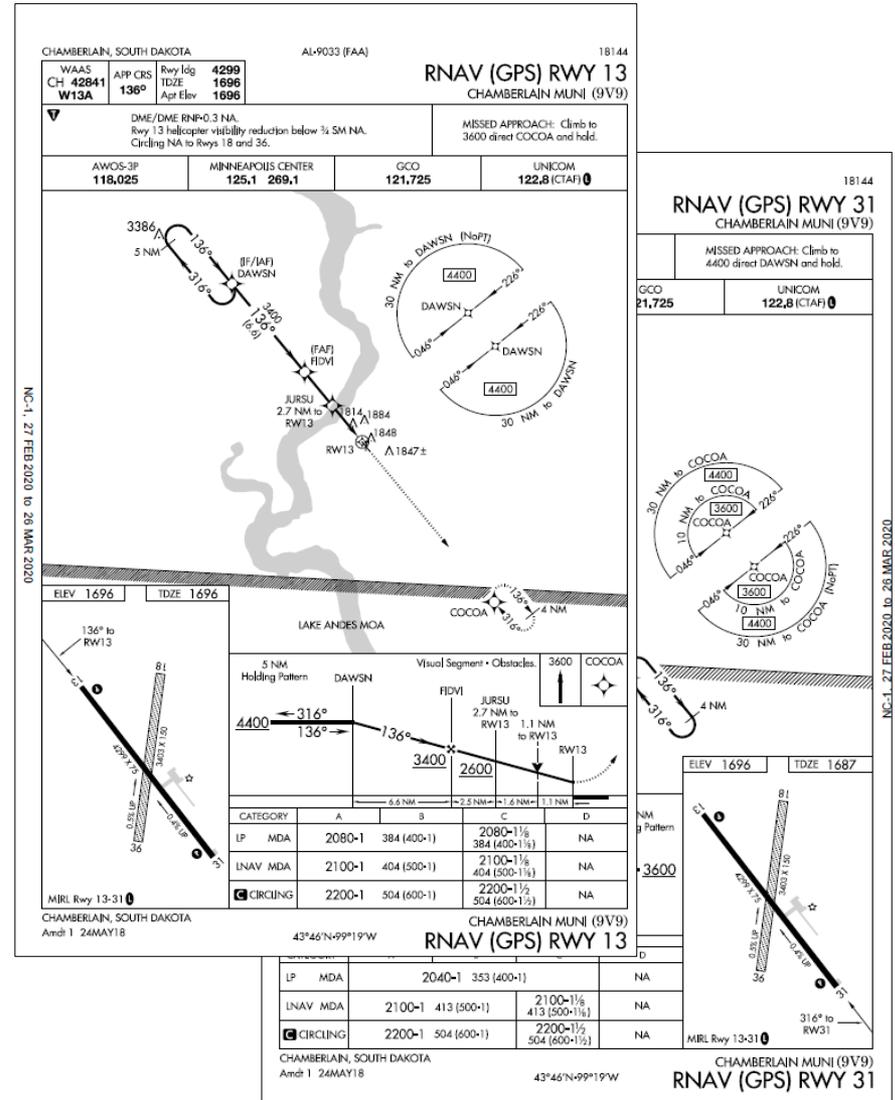
Other key airport needs

- Pavement rehabilitation
- Parallel taxiway
- Taxiway geometry improvements



Other key airport needs

- Pavement rehabilitation
- Parallel taxiway
- Taxiway geometry improvements
- Instrument approach improvements



Other key airport needs

- Pavement rehabilitation
- Parallel taxiway
- Taxiway geometry improvements
- Instrument approach improvements
- Terminal building improvements



Runway Alternatives Analysis Goals



Meet the purpose and need



Minimize environmental impacts



Minimize project costs and be financially feasible



Consider stakeholder input and impacts to stakeholders

Airport Layout Plan

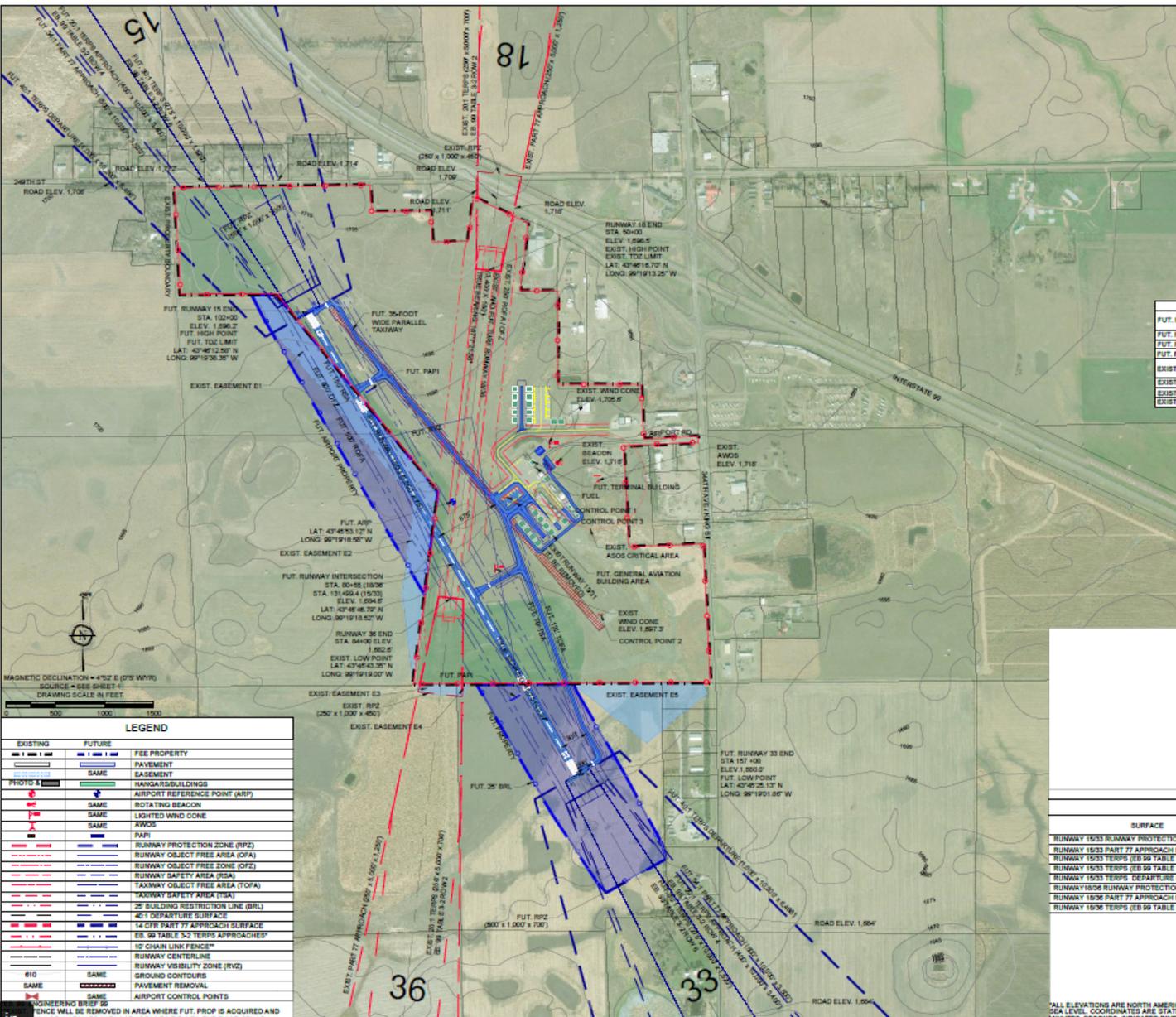


CHAPEL HILL MUNICIPAL AIRPORT
AIRPORT LAYOUT PLAN
CHAPEL HILL, NC

DATE: 11/20/19
BY: [Signature]
CHECKED BY: [Signature]
SCALE: AS SHOWN

PROJECT NO: 18-011
DATE: 11/20/19
BY: [Signature]
CHECKED BY: [Signature]
SCALE: AS SHOWN

SHEET TITLE: FUTURE AIRPORT LAYOUT PLAN
SHEET NO: 3



EXISTING / FUTURE RUNWAY DATA TABLE		
	RUNWAY 15/33	RUNWAY 18/36
RUNWAY DESIGN CODE	B-E	B-E
APPROACH REFERENCE CODE	B-E	B-E
DEPARTURE REFERENCE CODE	B-E	B-E
RUNWAY TYPE	OTHER THAN UTILITY	UTILITY
VISIBILITY MINIMUMS	VISUAL	VISUAL
PAVEMENT STRENGTH	20,000 LBS/CM	NONE
PAVEMENT MATERIAL	ASPHALT	GRAVEL
RUNWAY EFFECTIVE GRADIENT	0.3%	0.4%
WIND COVERAGE (33 FEET)		
ALL WEATHER	87.25%	84.17%
	87.25%	84.25%
RUNWAY LENGTH & WIDTH	5,500' x 75'	3,500' x 150'
RUNWAY END ELEVATION	RW 15: 1,596.2' RW 33: 1,600.0'	RW 18: 1,598.0' RW 36: 1,600.0'
RUNWAY END STATION	RW 15: 102+00 RW 33: 34+00	RW 18: 50+00 RW 36: 34+00
RUNWAY LIGHTING	NONE	NONE
RUNWAY MARKINGS	NON-PRECISION	WHITE COLORED
14 OR MORE FT APPROACH CAT. / VISUAL CUES (AS REQUIRED)	RW 15: 34' RW 33: 20'	RW 18: 20' RW 36: 20'
RUNWAY APPROACH MINIMUMS	RW 15: 1,815.0' RW 33: 1,815.0'	RW 18: 1,815.0' RW 36: 1,815.0'
AERONAUTICAL SURVEY REQUIRED	VERTICALLY GRADED	N/A
RUNWAY DEPARTURE SURFACE	YES	N/A
RUNWAY APPROACH TYPE	NON-PRECISION	VISUAL
RUNWAY VISUAL INSTRUMENT AIDS	4-BOX PAPI	N/A
VERTICAL AIRCRAFT	CESSNA CITATION I	CESSNA I/II
ROC	30'	30'
APPROACH SPEED	113 KNOTS	84 KNOTS
WINGSPAN	53' 5"	35' 5"
TAIL HEIGHT	14.00'	12.50'
RUNWAY STRENGTH	14,000 LBS	12,500 LBS

RUNWAY SAFETY/PROTECTION AREAS		
FUT. RUNWAY 15/33	WIDTH	LENGTH BEYOND RUNWAY ENDS
FUT. RUNWAY SAFETY AREA (RSA)	150'	300'
FUT. RUNWAY OBSTACLE FREE ZONE (OFZ)	400'	200'
FUT. RUNWAY OBJECT FREE AREA (OFA)	500'	300'
EXIST. & U/LT. RUNWAY 18/36	WIDTH	LENGTH BEYOND RUNWAY ENDS
EXIST. RUNWAY SAFETY AREA (RSA)	120'	240'
EXIST. RUNWAY OBSTACLE FREE ZONE (OFZ)	250'	200'
EXIST. RUNWAY OBJECT FREE AREA (OFA)	250'	240'

TOUCHDOWN ZONE (TDZ) LIMITS			
RUNWAY	TDZ LIMITS	STATION LOCATION	ELEVATION
15	102+00 TO 132+00	150+00	1,600.2'
18	50+00 TO 80+00	170+00	1,598.0'
36	34+00 TO 64+00	50+00	1,600.0'
		34+00	1,598.0'

DECLARED DISTANCES				
RUNWAY	TORA	LODA	ASDA	LDA
15	5,500'	5,500'	5,500'	5,500'
33	5,500'	5,500'	5,500'	5,500'
18	3,400'	3,400'	3,400'	3,400'
36	3,400'	3,400'	3,400'	3,400'

AIRPORT COORDINATES			
ITEM	EXISTING	FUTURE	
AIRPORT REFERENCE POINT (ARR)	LAT: 43°48'53.12" N LONG: 99°19'18.50" W	LAT: 43°48'53.12" N LONG: 99°19'18.50" W	
RUNWAY 15	LAT: 43°48'12.50" N LONG: 99°19'28.25" W	LAT: 43°48'12.50" N LONG: 99°19'28.25" W	
RUNWAY 33	LAT: 43°48'25.17" N LONG: 99°19'01.98" W	LAT: 43°48'25.17" N LONG: 99°19'01.98" W	
RUNWAY 18	LAT: 43°48'13.25" N LONG: 99°19'13.25" W	LAT: 43°48'13.25" N LONG: 99°19'13.25" W	
RUNWAY 36	LAT: 43°48'25.17" N LONG: 99°19'01.98" W	LAT: 43°48'25.17" N LONG: 99°19'01.98" W	

EXISTING AND FUTURE TAXIWAY DATA TABLE		
TAXIWAY	EXISTING	FUTURE
TAXIWAY WIDTH	75'	75'
TAXIWAY SAFETY AREA WIDTH	75'	75'
TAXIWAY OBJECT FREE AREA WIDTH	131'	131'
TAXIWAY LIGHTING	NONE	MTL

THRESHOLD SITING SURFACE OBJECT PENETRATION		
KEY	DESCRIPTION	PENETRATION
NO	NO THRESHOLD SITING SURFACE OBJECT PENETRATIONS	ELEVATION

OBSTACLE FREE ZONE (OFZ) OBJECT PENETRATION		
KEY	DESCRIPTION	PENETRATION
NO	NO OBSTACLE FREE ZONE OBJECT PENETRATIONS	ELEVATION

MODIFICATIONS TO AIRPORT DESIGN STANDARDS		
APPROVAL DATE (CASE NUMBER)	MODIFICATION	DESCRIPTION
1/20/2019 (18-011)	RUNWAY END PROTECTION AREAS	

RUNWAY END PROTECTION AREAS						
SURFACE	EXISTING			FUTURE		
	BASE	LENGTH	OUTER WIDTH	BASE	LENGTH	OUTER WIDTH
RUNWAY 15/33 RUNWAY PROTECTION ZONE (RPZ)	-	-	-	500'	1,500'	700'
RUNWAY 15/33 PART 77 APPROACH SURFACE	-	-	-	400'	10,000'	3,500'
RUNWAY 15/33 TERPS (EB 99 TABLE 3-2, ROW 4)	-	-	-	400'	10,000'	3,400'
RUNWAY 15/33 TERPS (EB 99 TABLE 3-2, ROW 6)	-	-	-	275'	10,000'	1,500'
RUNWAY 15/33 TERPS DEPARTURE SURFACE	-	-	-	1,200'	15,200'	8,000'
RUNWAY 18/36 RUNWAY PROTECTION ZONE (RPZ)	250'	1,000'	450'	SAME	SAME	SAME
RUNWAY 18/36 PART 77 APPROACH SURFACE	250'	5,000'	1,350'	SAME	SAME	SAME
RUNWAY 18/36 TERPS (EB 99 TABLE 3-2, ROW 2)	250'	5,000'	700'	SAME	SAME	SAME

AIRPORT CONTROL POINTS		
ITEM	EXISTING	
CONTROL POINT 1	LAT: 43°48'53.12" N LONG: 99°19'11.25" W	
CONTROL POINT 2	LAT: 43°48'14.98" N LONG: 99°18'53.32" W	
CONTROL POINT 3	LAT: 43°48'57" N LONG: 99°19'17" W	

LEGEND	
[Symbol]	FREE PROPERTY
[Symbol]	PAVEMENT
[Symbol]	EASEMENT
[Symbol]	HANGAR BUILDINGS
[Symbol]	AIRPORT REFERENCE POINT (ARR)
[Symbol]	ROTATING BEACON
[Symbol]	LIGHTED WIND CONE
[Symbol]	PAPI
[Symbol]	RUNWAY PROTECTION ZONE (RPZ)
[Symbol]	RUNWAY OBJECT FREE AREA (OFA)
[Symbol]	RUNWAY SAFETY AREA (RSA)
[Symbol]	TAXIWAY OBJECT FREE AREA (TOFA)
[Symbol]	TAXIWAY SAFETY AREA (TSA)
[Symbol]	2F BUILDING RESTRICTION LINE (BRL)
[Symbol]	40' DEPARTURE SURFACE
[Symbol]	14 CFR PART 77 APPROACH SURFACE
[Symbol]	EB 99 TABLE 3-2 TERPS APPROACHES
[Symbol]	1/2 CHAIN LINK FENCE
[Symbol]	RUNWAY CENTERLINE
[Symbol]	RUNWAY VISIBILITY ZONE (RVZ)
[Symbol]	GROUND CONTOURS
[Symbol]	PAVEMENT REMOVAL
[Symbol]	AIRPORT CONTROL POINTS

ENGINEERING BRIEF 36
FENCE WILL BE REMOVED IN AREA WHERE FUT. PROP. IS ACQUIRED AND WILL BE INSTALLED IN THOSE AREAS TO BE TIED INTO THE EXIST. FENCE.

ALL ELEVATIONS ARE NORTH AMERICAN VERTICAL DATUM 1988 IN FEET ABOVE MEAN SEA LEVEL. COORDINATES ARE STATE PLANE NORTH AMERICAN DATUM 1983 IN DEGREES, MINUTES, DECIMALS. INDICATED DIMENSIONS ARE IN FEET.

Next steps

-  Continuous stakeholder involvement
-  2020 – Environmental Assessment
 - Purpose & need *Complete*
 - Alternatives analysis *Complete*
-  Land acquisition & project design
-  Construction

Yes, planning takes time and money, but....

If you don't do comprehensive planning



Your timing will be off



You won't compete for the money

Questions?

