Miller Dunwiddie

20 October 2021

Kaci Nowicki
Short Elliott Hendrickson, Inc.
3535 Vadnais Center Drive
Saint Paul, MN 55110-5196

Re: Technical Memorandum
Terminal Master Plan – Gates 1 & 4 Fleet Changes
SEH, Inc./Duluth Airport Authority
Duluth, Minnesota
Project No.: DLH2101

Dear Ms. Nowicki,

This project and memorandum support the master planning phase for the passenger terminal at Duluth International Airport (DLH). The master plan addresses topics identified by the Duluth Airport Authority (DAA) directly related to terminal capacity and operations of the Gate Hold area.

A. PLANNING GOALS AND ASSESSMENTS

1. Gates 1 & 4 – reviewing Gates 1 & 4 for overall layout considering increased demand from larger aircraft fleet use. Recommendations and planning option will be developed with key focus on the following:
   a. Gate Hold Capacity
      i. Existing
      ii. Future Demand
   b. Seating configuration and podium access/relationship
      i. Reviewing Gate Holds (1-4) for inefficiencies as a whole.
      ii. Review how to redistribute seating more evenly between gates.
   c. Cueing
      i. Review cueing at Gates 2 and 3 for possible reductions.
      ii. Review cueing criteria.

2. New Air service
   a. Sun Country – 737-8 (180 to 190 seats) at Gates 1 and 4
   b. 2 flights per week to Phoenix Sky Harbor (PHX) and Ft Meyers (RSW)
   c. Flights turn late afternoon/early evening – this may change seasonally
   d. DLH standard for gate hold seating capacity is 100%.
      i. Provide information with reduced seating capacities for review.
   e. Current gate hold capacity is acceptable for now but as air traffic returns to 2019 levels there may not be enough capacity.

3. Future Aircraft forecasting
   a. Assessing impacts to the Gate holds with increased capacities with replacing the CRJ200 with an EMB-175 or CRJ900.

B. EXISTING GATE HOLD CONDITIONS

1. Overall Gate Hold (see Existing Gate Hold Exhibit below)
   a. Gates 1-4
   b. Current SF = 7,790
      i. Circulation square footage is not included with the Gate Hold SF.
   c. Current Gate Hold Seating Capacity = 391
   d. Current Fleet Mix = CRJ200 and CRJ900
      i. Passenger Load = 210-280 (assumed aircraft utilization = 75-100%)

Figure 1 - Existing Gate Hold Exhibit:

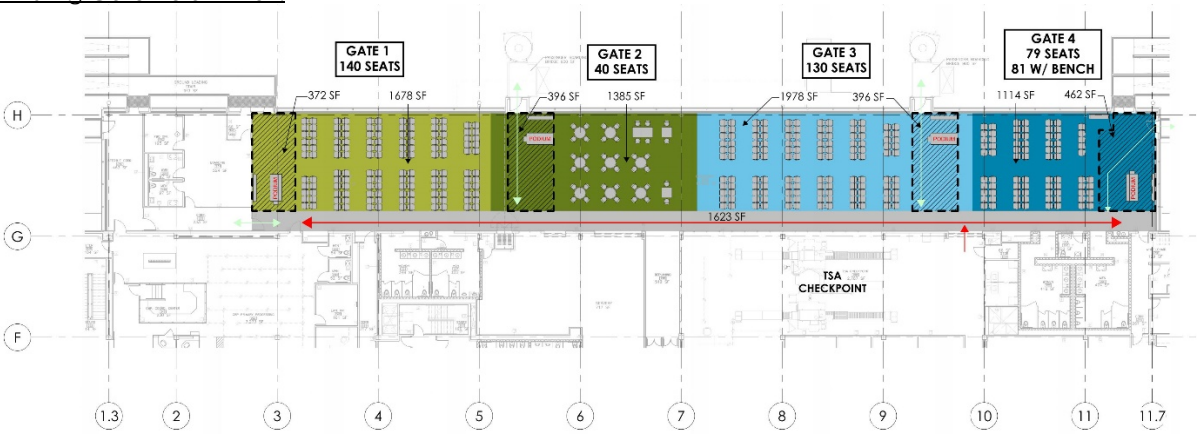
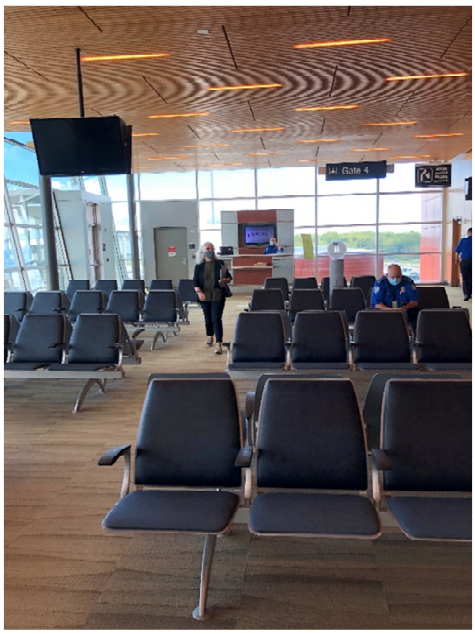


Table 1 - Current Gate Hold Data Spreadsheet Exhibit:

	Existing Gate Hold Capacity			
Gate No.	Seat Count	Gatehold Area (SF)	Cueing/ Egress (SF)	Total
1	140	1,687	372	2,059
2	40	1,385	396	1,781
3	130	1,978	396	2,374
4	81	1,114	462	1,576
Total Gatehold Seating	391			
Sub Total (SF)		6,164	1,626	
Gateholds 1-4 SF Totals				**7,790**

Photos - Gates 1 & 4 respectively



C. ASSESSMENT AND RECOMMENDATIONS

1. Square footage (SF) Criteria (See Table 2 - Gate Hold Reconfigured Seat Capacity and Square Footage Comparison)
   a. 15 SF per seated passenger
   b. 10 SF per standing passenger
   c. 100% capacity assumes 80% of passengers are seated and 20% are standing.
   d. The same assumption as defined with item "1.c" above is applied to the 80% and 75% capacity calculations.

2. Seating configuration and podium access/relationship
   a. See Figure 2 - Gate Hold Redistribution Exhibit below.
   b. Review SF criteria for podiums and egress.
   c. Currently, Gate 3 has an overabundance of seating compared to the aircraft capacity needed.
      1) Relocation of the Gate 3 podium and backwall, to the left of the Boarding Bridge would allow for more capacity for Gate 4.
   d. The redistribution of the current Gate hold seating configuration would allow for more balanced seating between the gate holds.
3. Cueing
   a. Reductions to the cueing area at Gates 2 and 3 would aid in the increasing of required seating and maximizing efficiencies between the gate holds.
   b. Increasing the cueing areas at Gates 1 and 4 accordingly, based on larger aircraft capacities.

Figure 2 – Option 1: Gate Hold Redistribution Exhibit:

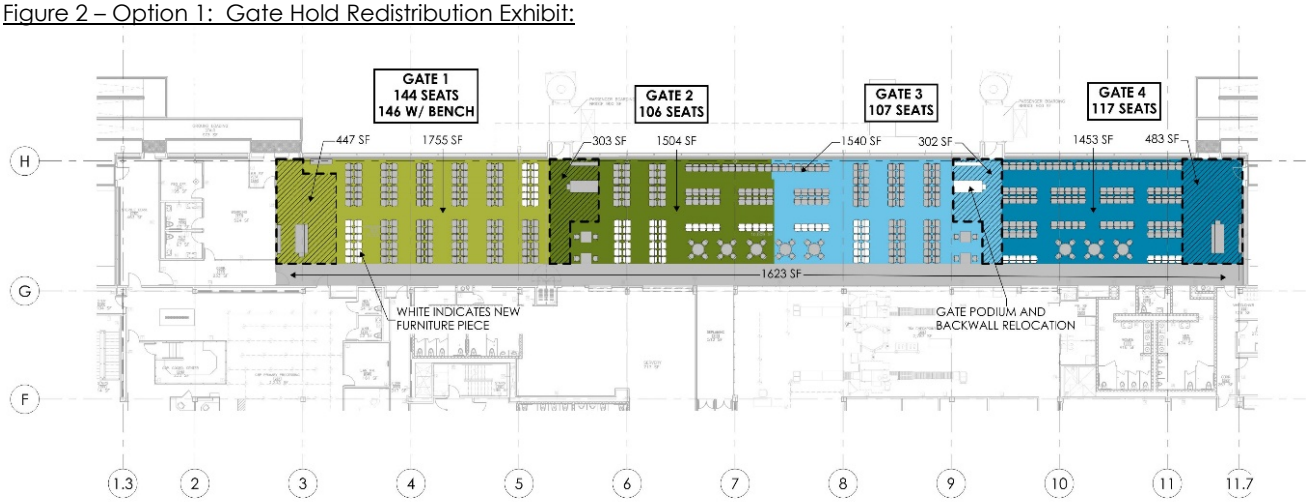


Table 2 - Gate hold Reconfigured Seat Capacity and Square Footage Comparison:

	Existing Gate Hold Capacity				Reconfigured Gate Hold Capacity			
Gate No.	Seat Count	Gatehold Area (SF)	Cueing/ Egress (SF)	Total	Seat Count	Gatehold Area (SF)	Cueing/ Egress (SF)	Total
1	140	1,687	372	2,059	146	1,755	447	2,202
2	40	1,385	396	1,781	106	1,504	303	1,807
3	130	1,978	396	2,374	107	1,540	302	1,842
4	81	1,114	462	1,576	117	1,453	483	1,936
Total Gatehold Seating	391				476			
Sub Total (SF)		6,164	1,626			6,252	1,535	
Gateholds 1-4 SF Totals				**7,790**				**7,787**

4. Redistribution Exhibit and SF Comparison
   a. With the redistribution of seating and relocation of the Gate 3 podium, there is a potential of gaining **151 seats.**
   b. See Aircraft Seating Capacity Study (see attachment A) compared with the Gate Hold Reconfiguration Seat Capacity and SF Comparison
      1) Lists the aircraft fleet (including the 737-800) with capacity information. The future aircraft fleet is also defined, as per the Master Plan.
      2) Per the current study, 100% capacity with the increased aircraft fleet, requires:
         a) Seats = 508
         b) Gate hold SF = 7,112
         c) Podium, Cueing and Egress SF ~ 1535
         d) Total Future SF (100%) = **8,647**
         e) **Since the 100% capacity Total is greater that the existing Gate Hold SF (7,790), this would trigger a future expansion.**
      3) The Aircraft Seating Capacity Study provides passenger seating and standing values for 80% and 75% capacities.
      4) Gate Holds 1-4 SF totals, do not include the area required for the podiums, cueing and egress.

D. FUTURE PLANNING CRITERIA

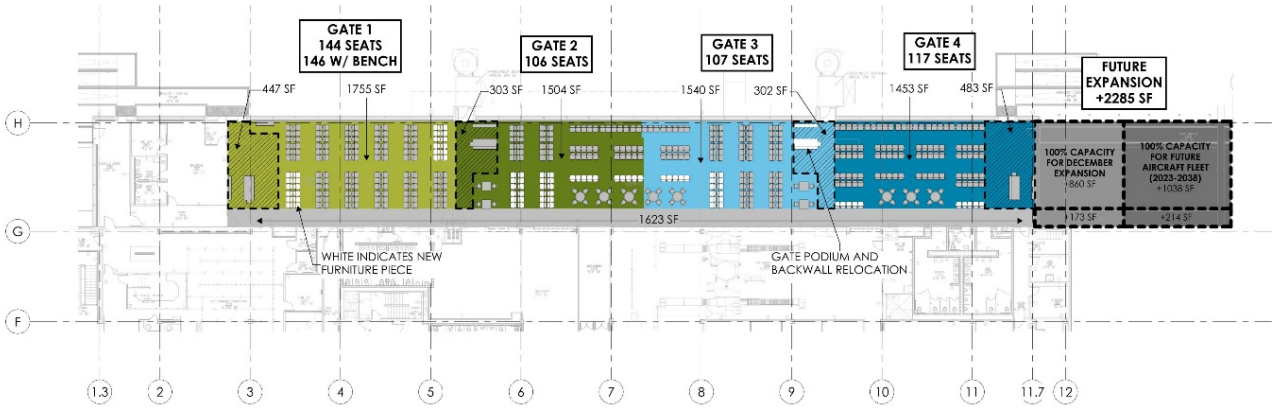
1. Future Aircraft Seating Capacity (see attachment A)
   a. Future Fleet Mix = 737-800 (2), EMB-175 and CRJ900
   b. Future Seating Capacity at 100% = 582 passengers
      1) Gate hold SF = 8,148
      2) Podium, Cueing and Egress SF ~ 1535
      3) Total Future SF (100%) = **9,683**

c. Future Seating Capacity (80%) = 466 passengers
   1) Gate hold SF = 6,518
   2) Podium, Cueing and Egress SF ~ 1535
   3) Total Future SF (80%) = **8,053**

d. Future Seating Capacity (75%) = 437 passengers
   1) Gate hold SF = 6,111
   2) Podium, Cueing and Egress SF ~ 1535
   3) Total Future SF (75%) = **7,646**

e. **Since the 100% and 80% future capacity Totals are greater than the existing gate hold SF (7,790), this would trigger a future expansion.**

Figure 3 – Option 2: Future Gate hold Exhibit



SUMMARY:

1. Option 1 - Gate Hold Redistribution
   a. Upon reviewing the aircraft fleet capacity currently, with the seating and the Gate 3 podium changes highlighted with this option, the existing gate hold footprint efficiencies will help DLH for the next 2-3 years.
   b. This is contingent on the passenger capacity being less than 100%.

2. Option 2 – Future Gate Hold Exhibit
   a. If the 100% passenger capacity is preferred/required, then plans for an expansion would be necessary sooner.
   b. Otherwise, expansion plans sould be considered for future aircraft fleet mixes.

Note: this report does not addressed restrictions due to the pandemic with reduced aircraft capacities, social distancing/additional space, contactless process, and/or barrier protocols.

Sincerely,

Miller Dunwiddie

Gregory S. Hulne | AIA, NCARB, LEED® AP
Principal | Architect

C: Alicia Skow, Miller Dunwiddie

Enclosed: Attachment A - Aircraft Seating Capacity Study, Current and Future.

Attachment A

10/20/2021

Current Aircraft Seating Capacity Study

							Gate Hold Capacity (Note 2)														
		No. of seats		Capacity (note 1)			100% Capacity (SF)					80% Capacity (SF)					75% Capacity (SF)				
							Seating (80%)		Standing (20%)		Total SF	Seating (80%)		Standing (20%)		Total SF	Seating (80%)		Standing (20%)		Total SF
Gate No.	**Current Aircraft**	min.	max.	100%	80%	75%	No. of seats	Seating SF	standing passengers (20%)	Standing SF		No. of seats	Seating SF	standing passengers (20%)	Standing SF		No. of seats	Seating SF	standing passengers (20%)	Standing SF	
1	737-800	160	184	184	147	138	147	2,208	37	368	2,576	118	1,766	29	294	2,061	110	1,656	28	276	1,932
2	CRJ200		50	50	40	38	40	600	10	100	700	32	480	8	80	560	30	450	8	75	525
3	CRJ900		90	90	72	68	72	1,080	18	180	1,260	58	864	14	144	1,008	54	810	14	135	945
4	737-800	160	184	184	147	138	147	2,208	37	368	2,576	118	1,766	29	294	2,061	110	1,656	28	276	1,932
	Total Passengers			**508**	**406**	**381**	406		102			325		81			305		76		
	SubTotal (SF)							6,096		1,016			4,877		813			4,572		762	
	Gateholds 1-4 SF Totals										**7,112**					**5,690**					**5,334**

Note 1 Maximum seating value used in calculations
Note 2 - SF value do not include SF for Podium/Cueing/Egress

Future Aircraft Seating Capacity Study

							Gate Hold Capacity (Note 2)														
		No. of seats		Capacity (note 1)			100% Capacity (SF)					80% Capacity (SF)					75% Capacity (SF)				
							Seating (80%)		Standing (20%)		Total SF	Seating (80%)		Standing (20%)		Total SF	Seating (80%)		Standing (20%)		Total SF
Gate No.	**Future Aircraft (2023-38)**	min.	max.	100%	80%	75%	No. of seats	Seating SF	standing passengers (20%)	Standing SF		No. of seats	Seating SF	standing passengers (20%)	Standing SF		No. of seats	Seating SF	standing passengers (20%)	Standing SF	
1	737-800	160	184	184	147	138	147	2,208	37	368	2,576	118	1,766	29	294	2,061	110	1,656	28	276	1,932
2	EMB-175	100	124	124	99	93	99	1,488	25	248	1,736	79	1,190	20	198	1,389	74	1,116	19	186	1,302
3	CRJ900		90	90	72	68	72	1,080	18	180	1,260	58	864	14	144	1,008	54	810	14	135	945
4	737-800 (note 2)	160	184	184	147	138	147	2,208	37	368	2,576	118	1,766	29	294	2,061	110	1,656	28	276	1,932
	Total Passengers			**582**	**466**	**437**	466		116			372		93			349		87		
	SubTotal							6,984		1,164			5,587		931			5,238		873	
	Future Gateholds 1-4 SF Totals										**8,148**					**6,518**					**6,111**

Note 1 Maximum seating value used in calculations
Note 2 - assuming future A319/320 on occasion
Note 3 - SF value do not include SF for Podium/Cueing/Egress

Additional Aircraft Considerations/Criteria

	A-319/320	110	160	160	128	83	128	1,536	32	320	1,856	102	1,536	26	256	1,792	66	990	17	165	1,155
	CRJ-700	63	78	78	62	59	62	749	16	156	905	50	749	12	125	874	47	702	12	117	819
	EMB-175	100	124	124	99	93	99	1,190	25	248	1,438	79	1,190	20	198	1,389	74	1,116	19	186	1,302
	Total Passengers			**362**	**290**	**234**															