

NEAR-TERM TERMINAL CAPACITY ANALYSIS

AIRPORT COMMISSION

AUGUST 14, 2017



1. Forecast Review (with 14 MAP High Case)
2. Gate Requirements and Aircraft Parking Analysis
3. Terminal Capacity Enhancement
4. Landside Capacity Enhancement
5. Going Forward

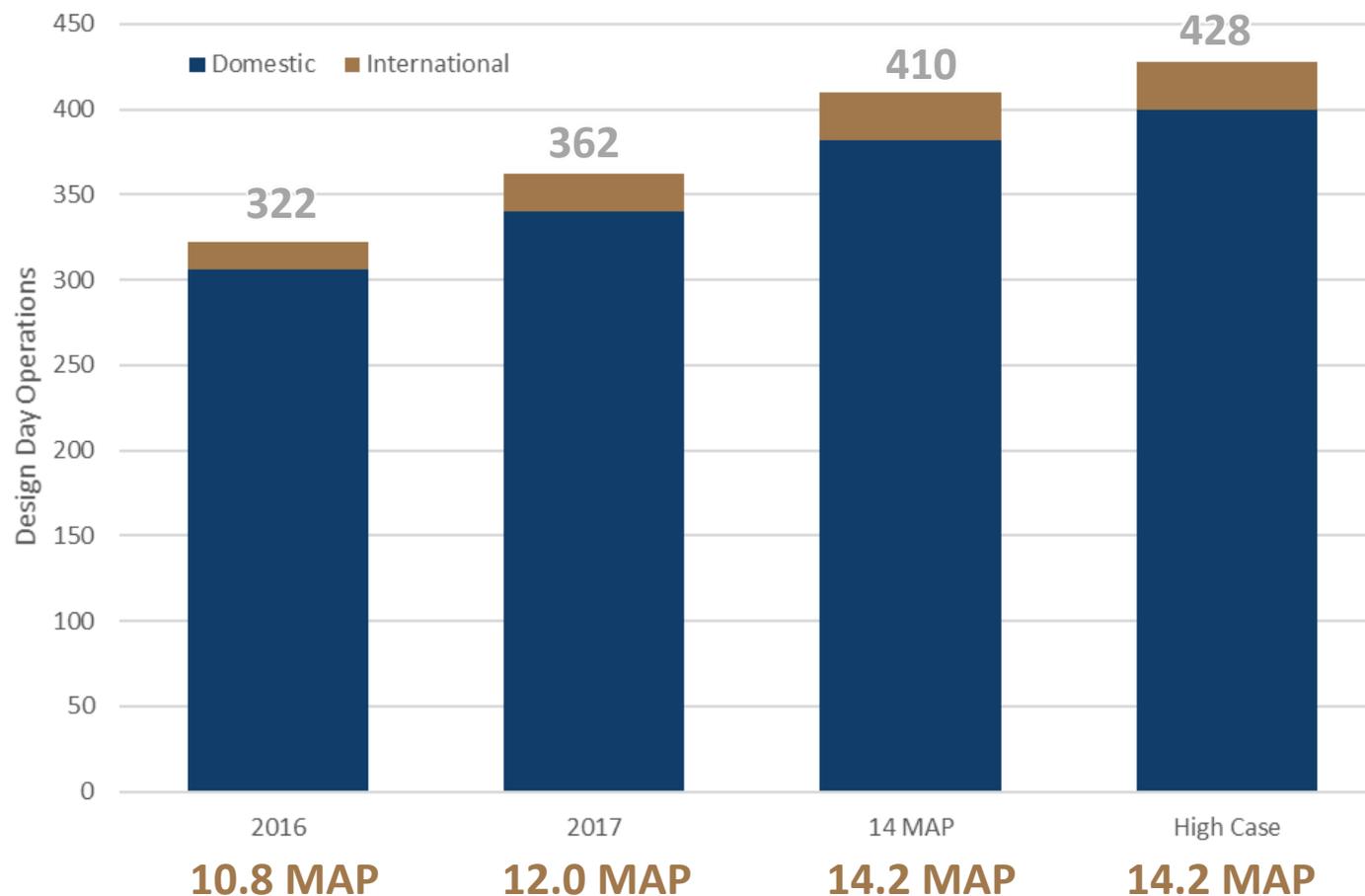
14 MAP BASE AND HIGH CASE FORECAST

Summary



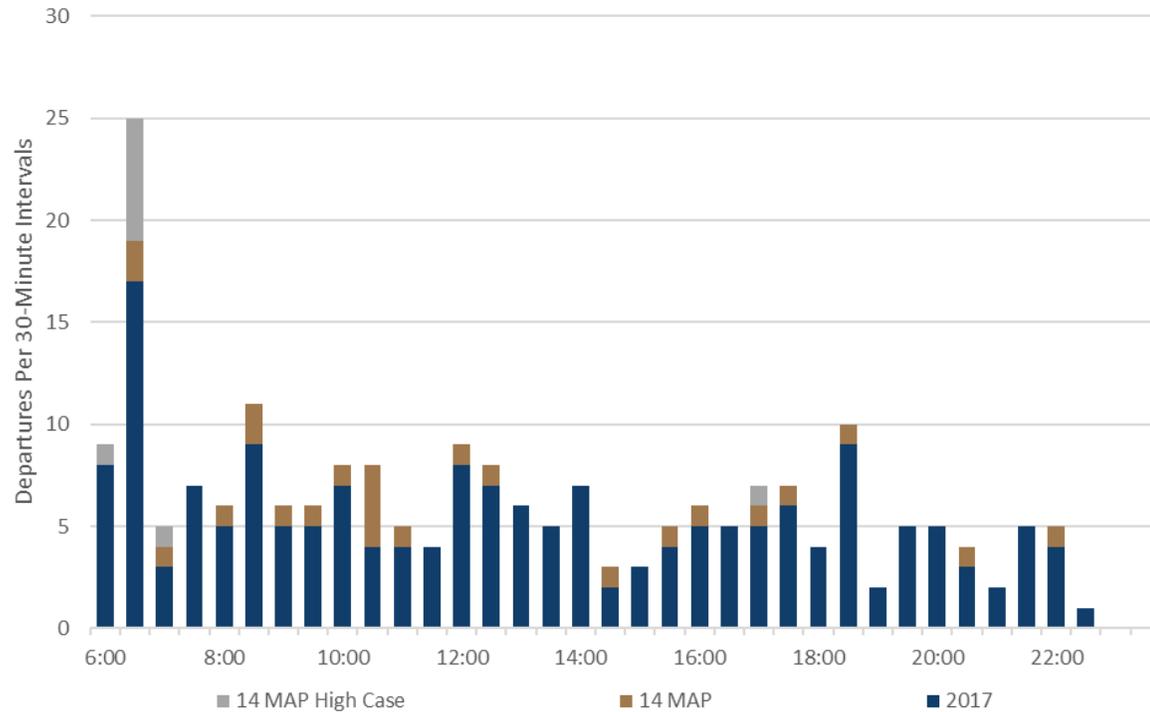
INCREASE IN DESIGN DAY OPERATIONS

- In order to reach 14 MAP, there will need to be between **88** and **106** operations added in the design day from 2016.

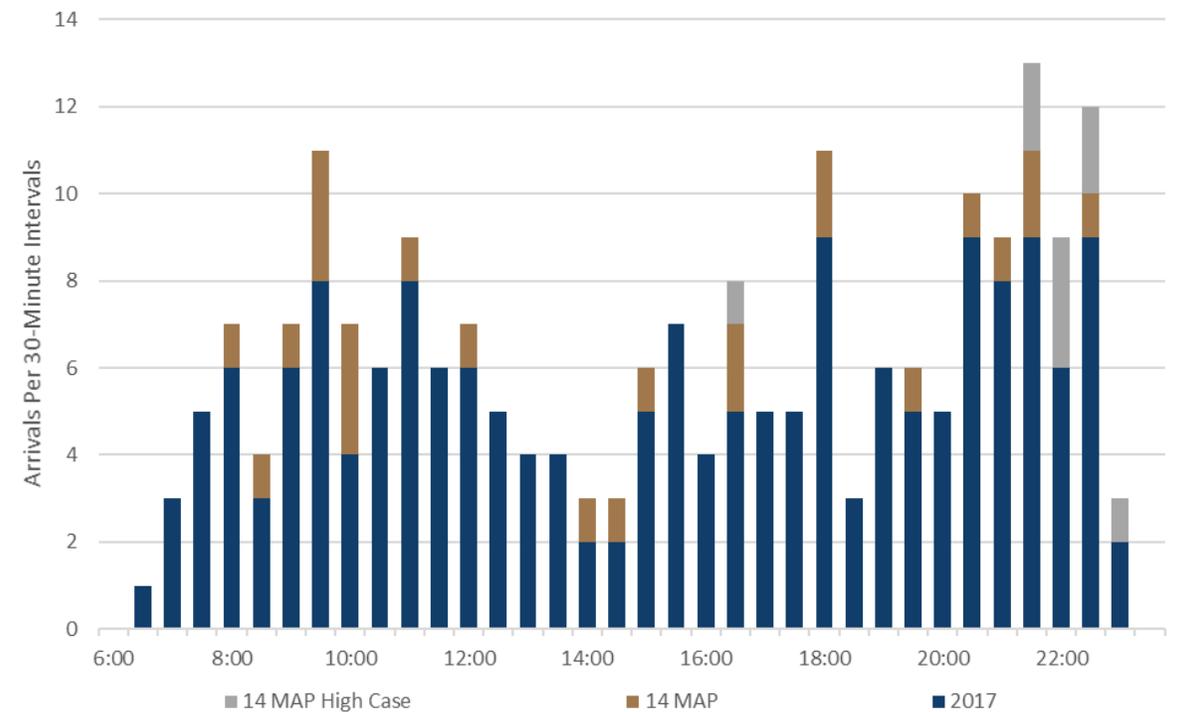


BANKING STRUCTURE 14 MAP VS HIGH CASE

DEPARTURES



ARRIVALS



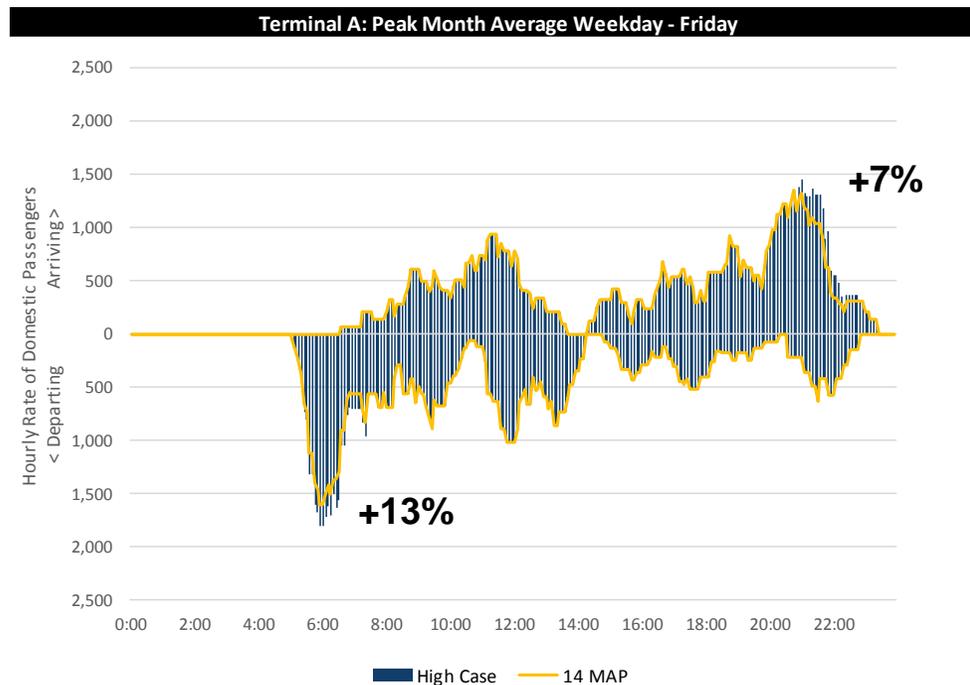
Year/Scenario	Morning Departures (06:00 – 07:59)
2016	26
2017	35
14 MAP	38
14 MAP High Case	46

PEAK HOUR DOMESTIC PASSENGERS

- Terminal B has a higher increase in domestic passenger peaks (14 MAP vs High Case) due to Alaska and Southwest operations

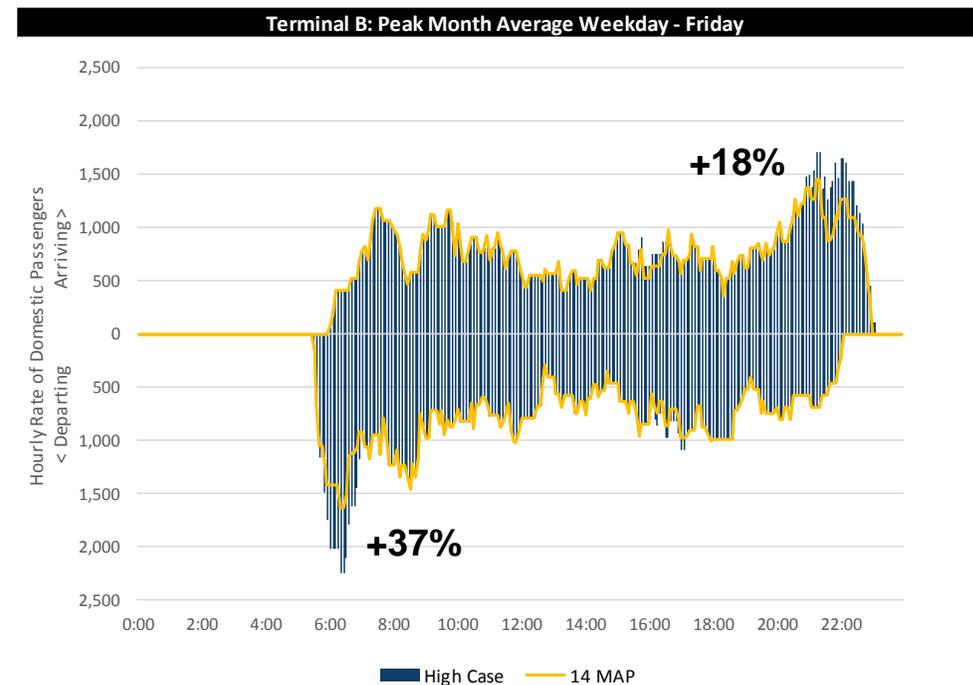
Terminal A Peaks

14 MAP = 1,361 ARR; 1,604 DEP
High Case = 1,458 ARR; 1,808 DEP



Terminal B Peaks

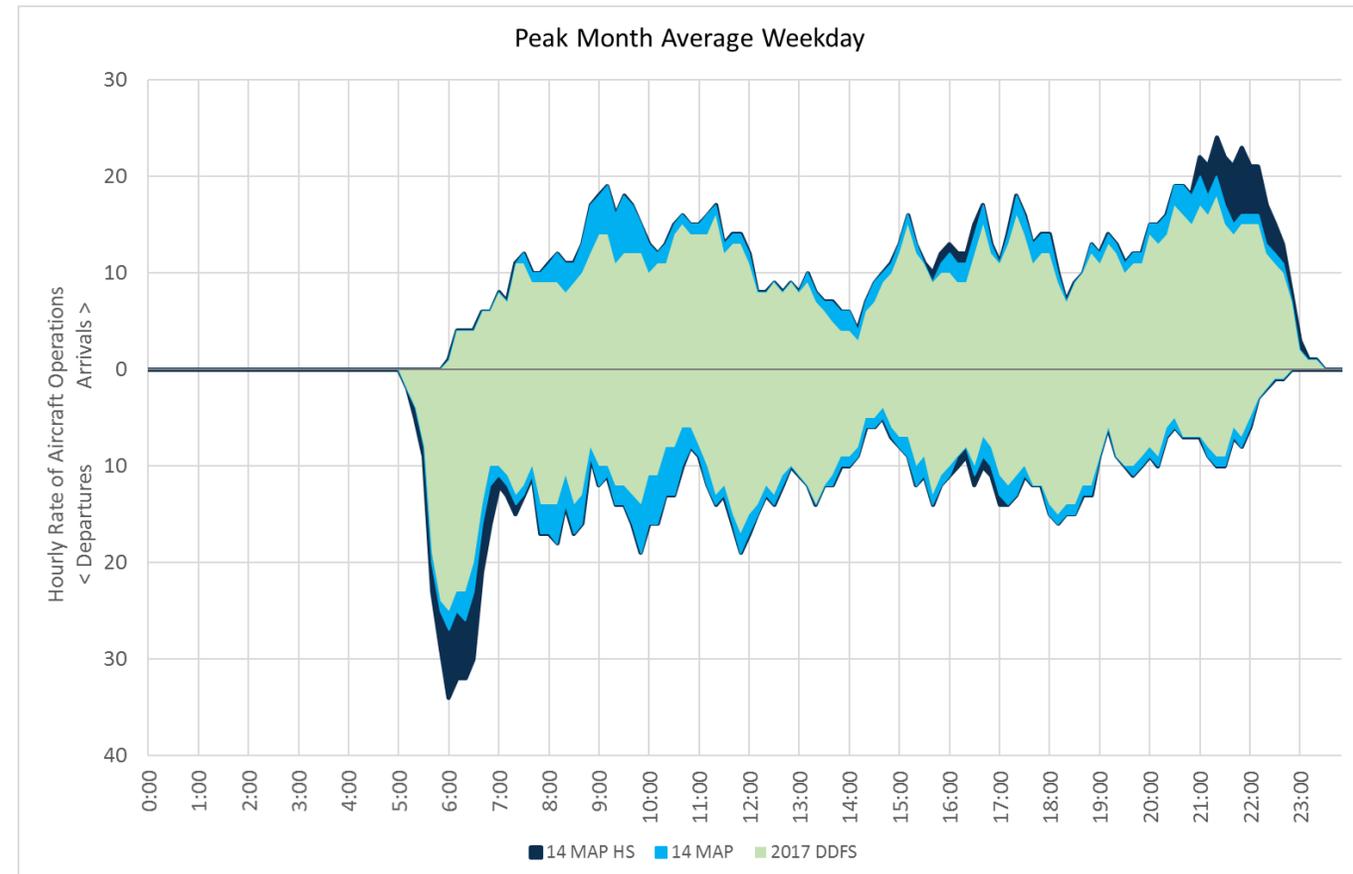
14 MAP = 1,450 ARR; 1,637 DEP
High Case = 1,718 ARR; 2,247 DEP



GATE REQUIREMENTS AND AIRCRAFT PARKING ANALYSIS



- Developed gate requirements for three demand levels – 2017, 14MAP, 14MAP High
 - Chart presents rolling-hour comparison
- Multiple airline-to-gate allocation scenarios were considered for each demand level
- Each scenario gated 100 times with scheduled time variation
 - Planning based on 85th percentile to provide robust solution



GATE REQUIREMENT RESULTS

- Examined 8 scenarios (2017 thru 14 MAP High) with various airline gate assignments
 - Determined number of remote operations and RON requirements for each demand level
 - Only minor variations between scenarios

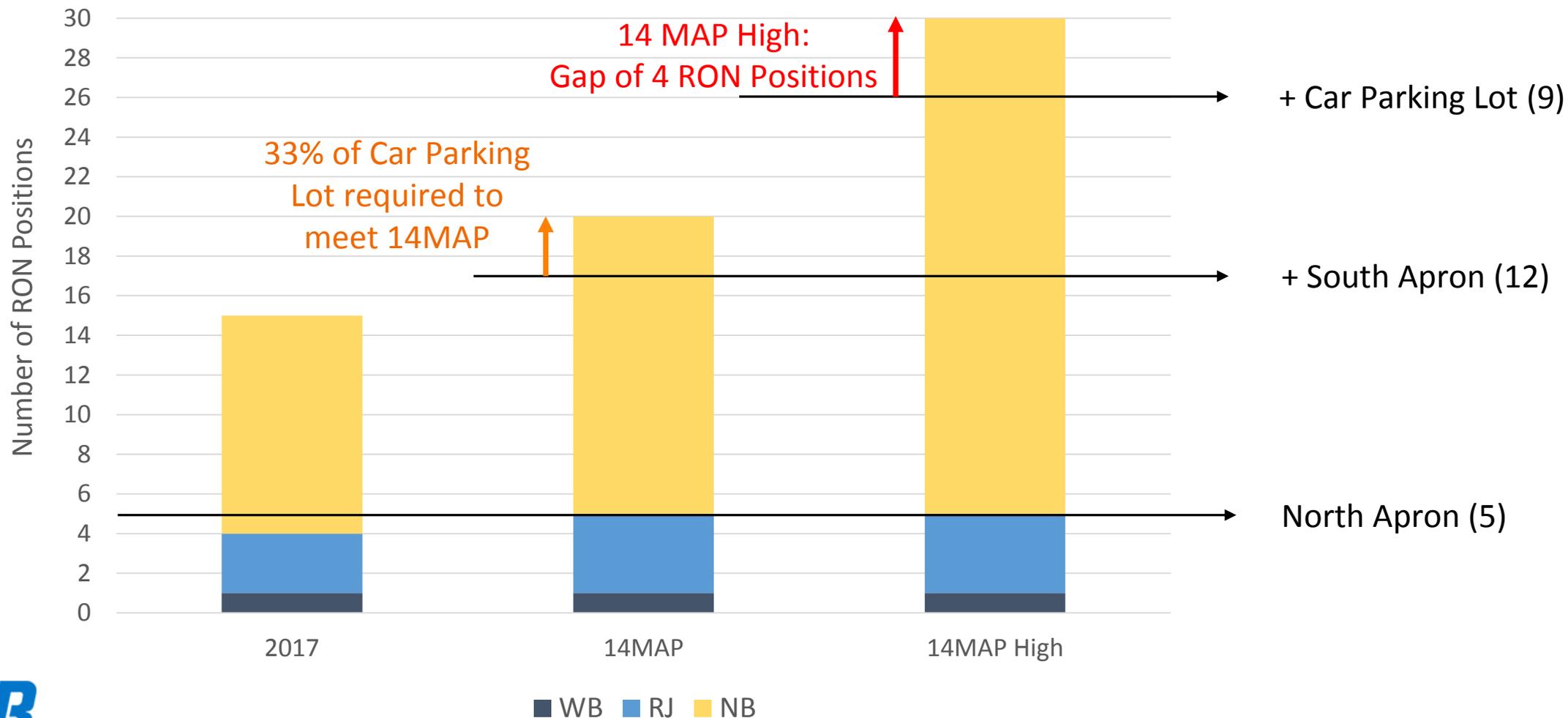
		2017	14MAP	14MAP High
Remote Bus Gate Requirements	North	2NB	2NB	2NB
	South	-	2NB	4NB + 2RJ
RON Requirements		1WB + 11NB + 3RJ	1WB + 15NB + 4RJ	1WB + 25NB + 4RJ
(Existing RON positions = 12)		15	20	30

WB = Widebody; NB = Narrowbody; RJ = Regional Jet

- In most cases, remote bussing gates only have 1-3 operations per day
 - Arrivals and departures counted separately
- Bussing gate requirements may be reduced by adjusting scheduled arrival/departure times of new flights, but could increase number of remote operations on some remote gates

REQUIREMENT VS. CAPACITY

- Even with conversion of car parking lot to aircraft parking, still short up to 4 RON positions at 14 Map High Scenario



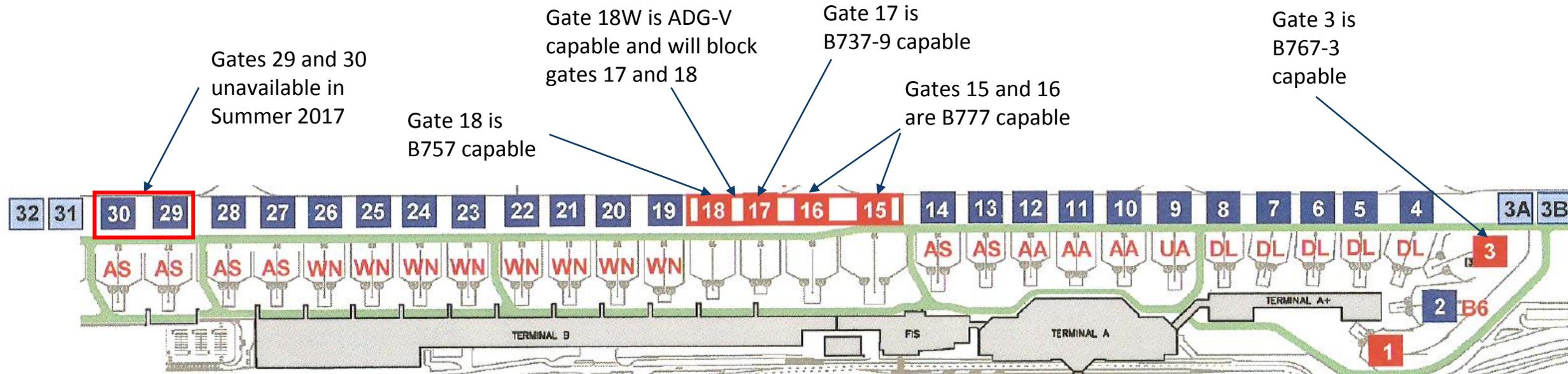
- 14 MAP High Demand indicates gap of 4 RON positions
- RON requirement could be accommodated using a combination of:
 - Parking in the west airfield
 - Demand management
 - Operational strategies
- Most RON positions only used for 1 turn flight a day
- Inability to provide 4 RON positions could result in the loss of about 4 turn flight operations per day

GAP ANALYSIS ASSUMPTIONS / PARAMETERS

- IATA Optimum Level of Service (formerly LOS C) parameters used as basis for capacity analysis
 - Airports operating at or slightly above capacity typically experience Suboptimum LOS during the peak periods
- Professional judgement based on L&B experience used where passenger or operating characteristics were not available

Terminal Component	Assumptions / Parameters	Source(s)
Ticketing Counters	Preferential and common-use airlines assigned counters based on lease agreement	SJC
Security Checkpoint	160 passengers per hour per lane blended (standard and Pre✓ lanes); 10.8 square feet per person in queue	L&B experience, IATA
Baggage Screening	720 bags per hour per EDS; 1 additional EDS required for N+1 redundancy	L&B experience, TSA
Baggage Make-up	3-4 carts per NB; 7-8 carts per WB based on peak 2-hour departures; 12 feet of frontage per cart or container	L&B experience
Holdrooms	Based on max aircraft capacity of gate: 3,300 SF for WB (B787-9); 2,400 SF for NB (B737-MAX9)	IATA
Concessions	7.0 square feet per 1,000 enplaned passenger (primarily domestic O&D airport)	L&B experience
Baggage Claim – DOM	1.5 linear feet of claim frontage per peak 20-minute deplaning passenger; 60% of passengers check bags	L&B experience
Baggage Claim – INT	2.0 linear feet of claim frontage per claiming passenger; 90% of passengers check bags	L&B experience
CBP Processing	Based on CBP ATDS guidelines per peak hour passengers; 400 in 2017, 600 for 14 MAP	CBP ATDS
Arrivals Hall	.3 meeters/greeters per passenger; 20.5 square feet per person; 20% additional area for seating	IATA, L&B experience

GATE ALLOCATION ASSUMPTIONS



- Gate usage assumptions:

- Preferred-use airlines use their preferred gates
- Common-use carriers and international arrivals are given first priority on common-use gates
- Preferred-use airlines can use common-use gates if they cannot fit on their preferred gates
- Common-use gate usage based on location of airline's preferential-use gates
- Since AC does not need FIS-capable gate, always assigned to Gate 1
- 12 remote positions available - 5 in the North Apron and 7 in the South Apron

TERMINAL CAPACITY GAP ANALYSIS SUMMARY

KEY CAPACITY ISSUES:

- Terminal A
 - Baggage Make-up
 - Holdrooms
 - Bag Claim Area
- Terminal B
 - Ticket Counters
 - Baggage Make-up
 - SSCP Lanes
 - Bag Claim Frontage
 - Bag Claim Area

TERMINAL A

Element	Existing	2017	14 MAP	HIGH
Ticketing/Check-in	60	56*	60*	64*
Air Canada	4	6	6	6
Air China	8	8	8	8
American Airlines	10	14	14	16
Hawaiian Airlines	4	6	6	6
Jet Blue	4	4	4	4
United Airlines	6	4	4	6
Volaris	6	6	6	6
Delta Air Lines	6	12	12	12
All Nippon Airways	6	8	8	8
Aeromexico	-	6	6	6
New INT 1	-	-	8	8
New INT 2	-	-	8	8
New INT 3	-	-	6	6
Baggage Screening	4	3	3	3
Baggage Make-up	542	528	600	720
SSCP – Lanes	8	7	8	9
SSCP – Queue Area	4,820	3,000	3,500	3,900
Concessions - Secure	17,600	16,800	21,700	21,700
Holdrooms**	34,060	45,900	45,900	45,900
Bag Claim – Frontage	460	410	460	500
Bag Claim – Area	14,000	14,300	16,000	17,500

TERMINAL B

Element	Existing	2017	14 MAP	HIGH
Ticketing/Check-in	40	48*	48*	58*
Alaska Airlines	10	14	14	16
British Airways	8	8	8	8
Lufthansa	8	8	8	8
Southwest Airlines	14	18	18	26
Hainan Airlines	6	8	8	8
Baggage Screening	4	3	3	4
Baggage Make-up	720	708	768	948
SSCP – Lanes	8	7	8	11
SSCP – Queue Area	5,500	3,200	3,500	5,000
Concessions - Secure	29,900	25,200	28,000	28,000
Holdrooms**	48,315	33,600	38,400	45,600
Bag Claim – Frontage	537	590	640	765
Bag Claim – Area	17,600	17,800	19,000	23,000

Notes:

* Numbers shown bold are included in peak ticket counter position requirements due to the timing of the flights.

** Includes remote bus gate holdrooms

- Capacity Meets or Exceeds Demand, Optimum LOS
- Demand Exceeds Capacity, Optimum/SubOptimum LOS
- Demand Substantially Exceeds Capacity, SubOptimum LOS

CAPACITY GAP ANALYSIS – CBP FACILITIES (“FIS”)

- Most components of the CBP facilities are **suboptimum** for 2017 and 14 MAP
 - Passport Check queue area is significantly undersized
 - Claim devices are undersized (target: 250-300 LF each for widebody aircraft)
 - Exit Control area is undersized
 - Arrivals Hall is undersized for 14 MAP

Element	Existing	2017	14 MAP
Primary Processing			
Officer Positions	10	8	12
Queueing	2,450	3,760	5,640
Secondary Processing			
Secondary Queueing	500	500	750
Secondary Inspection	1	1	1
Exit Control			
Exit Podium	150	180	180
International Bag Claim			
Claim Devices ¹	2	2	2
Claim Frontage	337	420	460
Arrivals Hall			
Arrivals Hall ²	2,070	1,700	2,400

Notes:

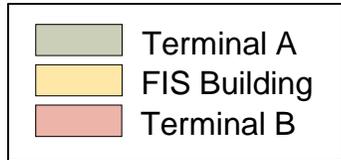
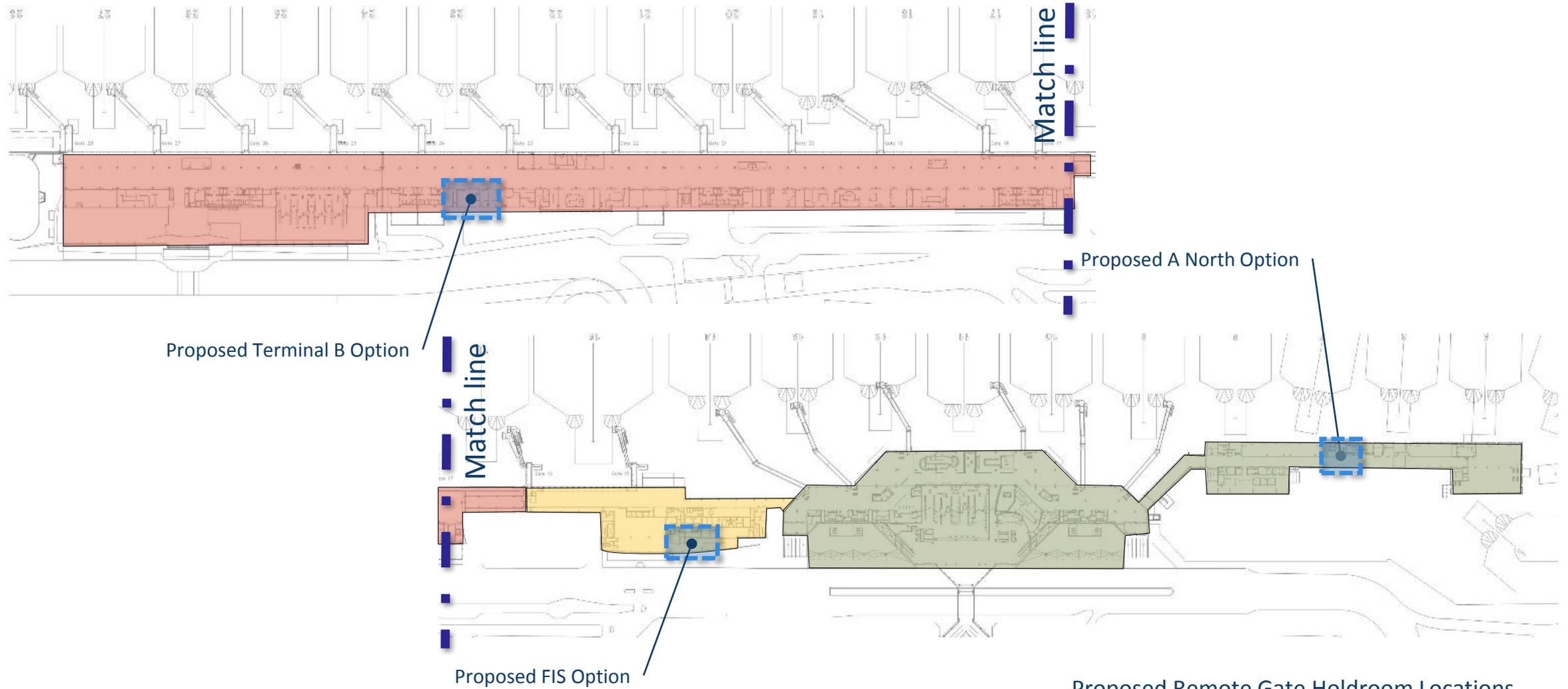
1. Includes the new flat plate international bag claim device.
2. Includes new arrivals hall expansion.

- Capacity Meets or Exceeds Demand, Optimum LOS
- Demand Slightly Exceeds Capacity, Optimum/SubOptimum LOS
- Demand Substantially Exceeds Capacity, SubOptimum LOS

TERMINAL CAPACITY ENHANCEMENT OPTIONS



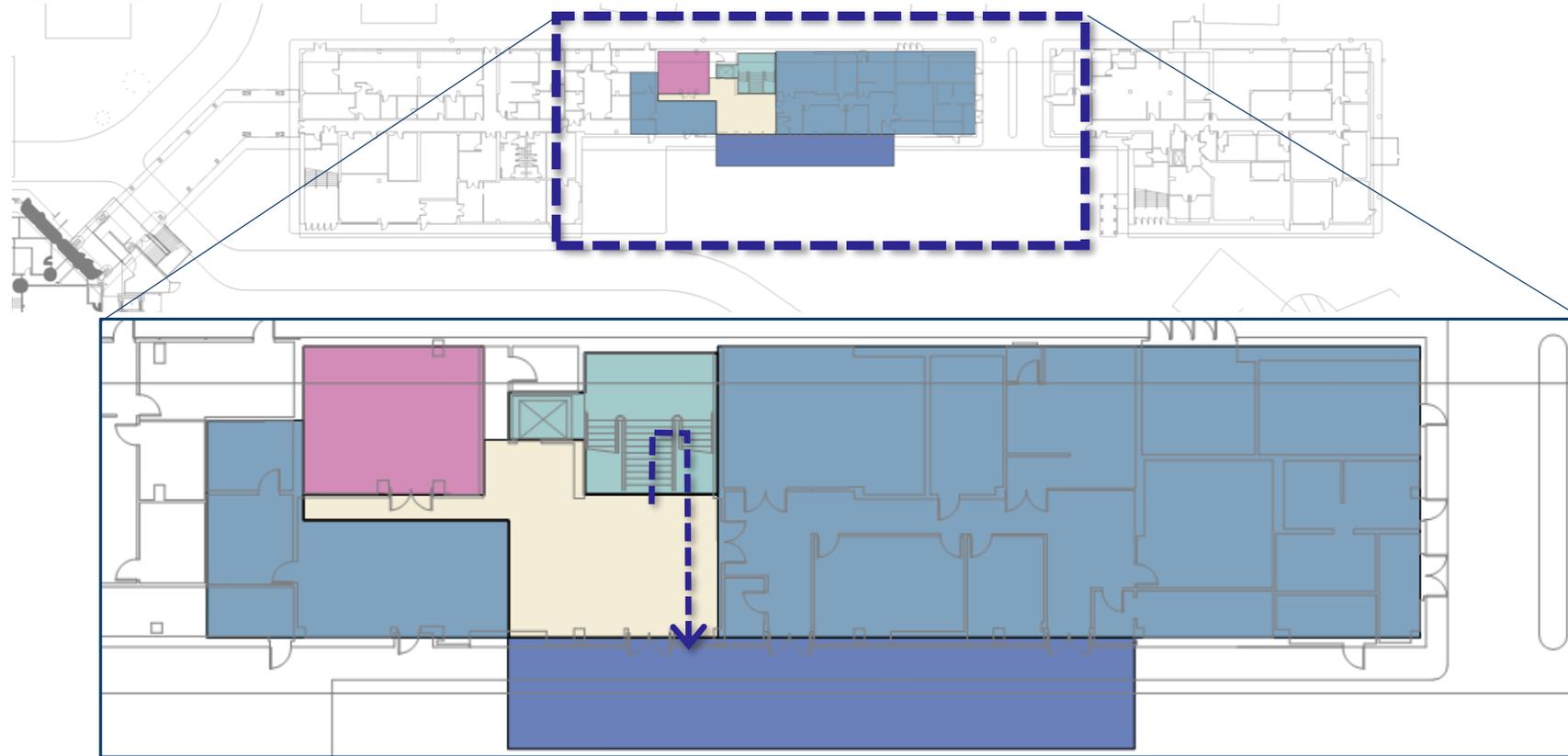
REMOTE GATE HOLDROOMS – LOCATIONS



Proposed Remote Gate Holdroom Locations

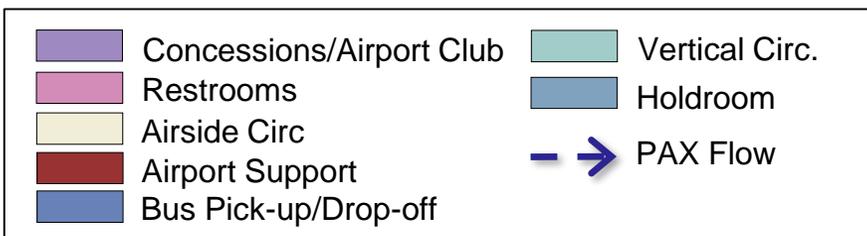
Level 2 shown for reference

REMOTE GATE HOLDROOMS – A NORTH

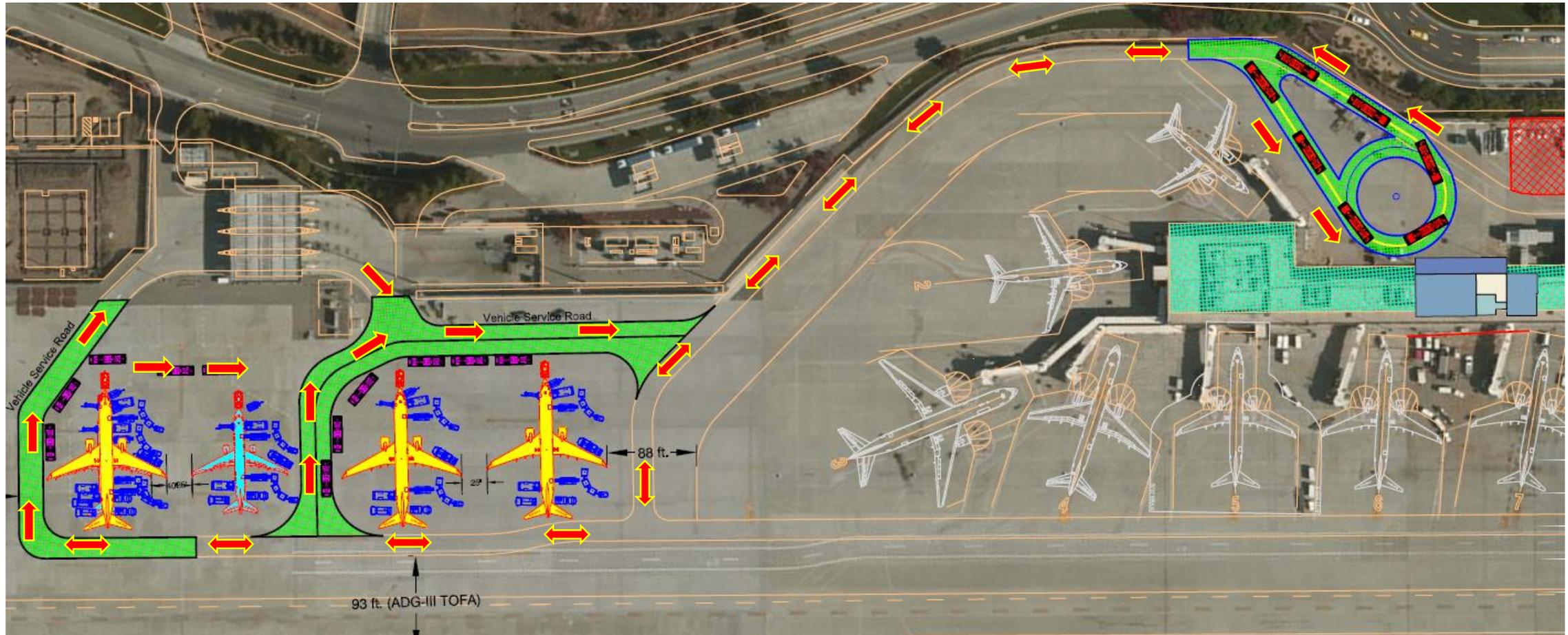


- Convert Support Space to Holdroom
- Public Restroom needed on Level 1
- Holdroom Area ~5,100 s.f.
- Accommodates: 2 Narrowbodies or 1 Widebody

Level 1

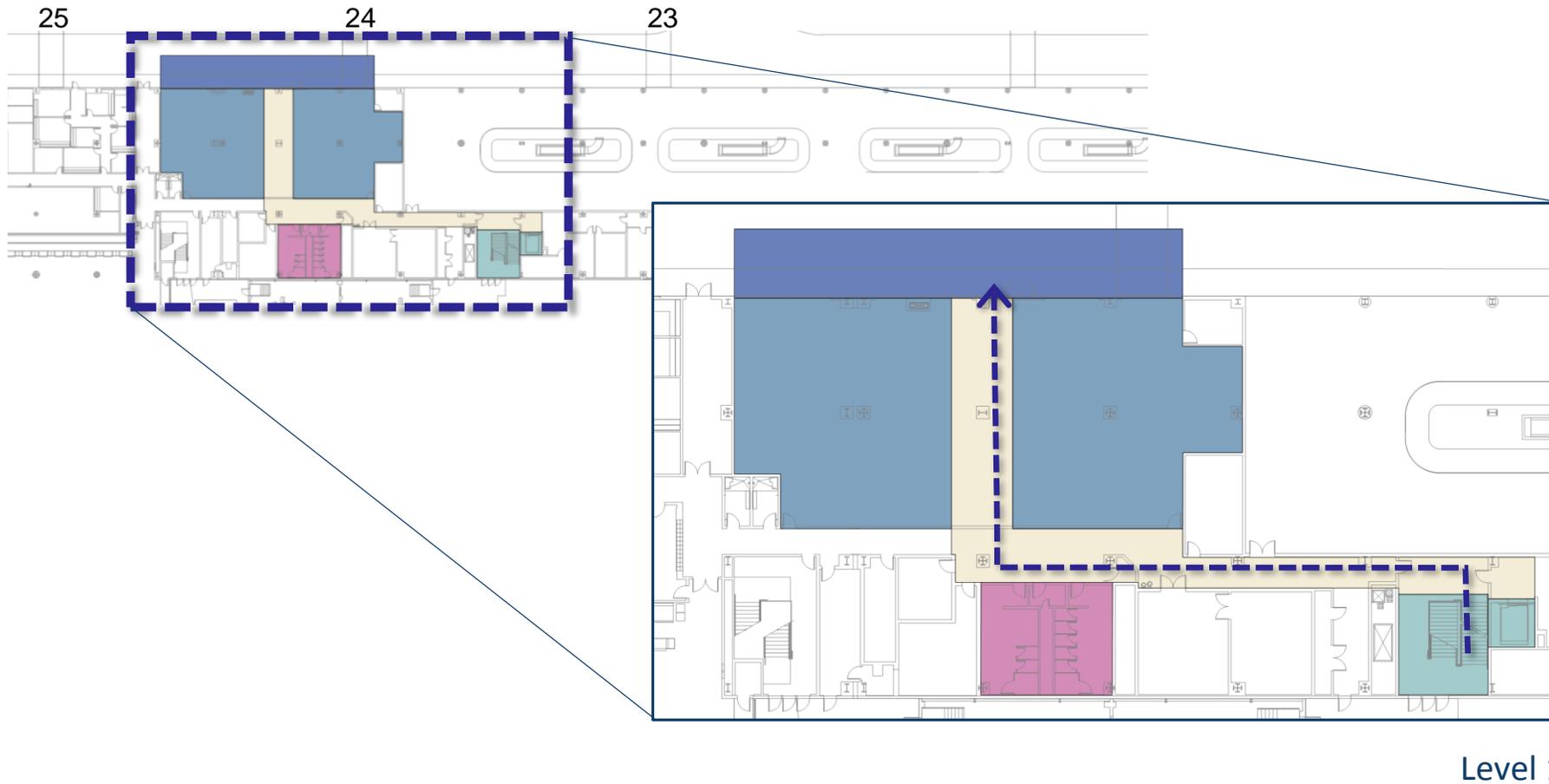


A NORTH PASSENGER BUSSING OPERATION

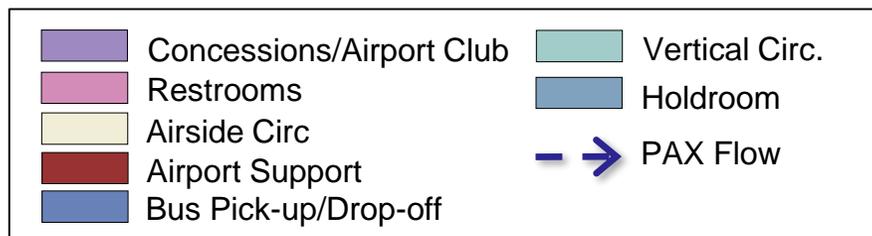


- Passenger buses would follow the vehicle service road (VSR) from the bus loading area to the remote gates (travel distance to farthest remote gate approximately 0.35 miles)
- Additional VSR road striping to be added at the remote gates
- Vehicle ingress/egress to the aircraft fuel truck refueling facility accounted for

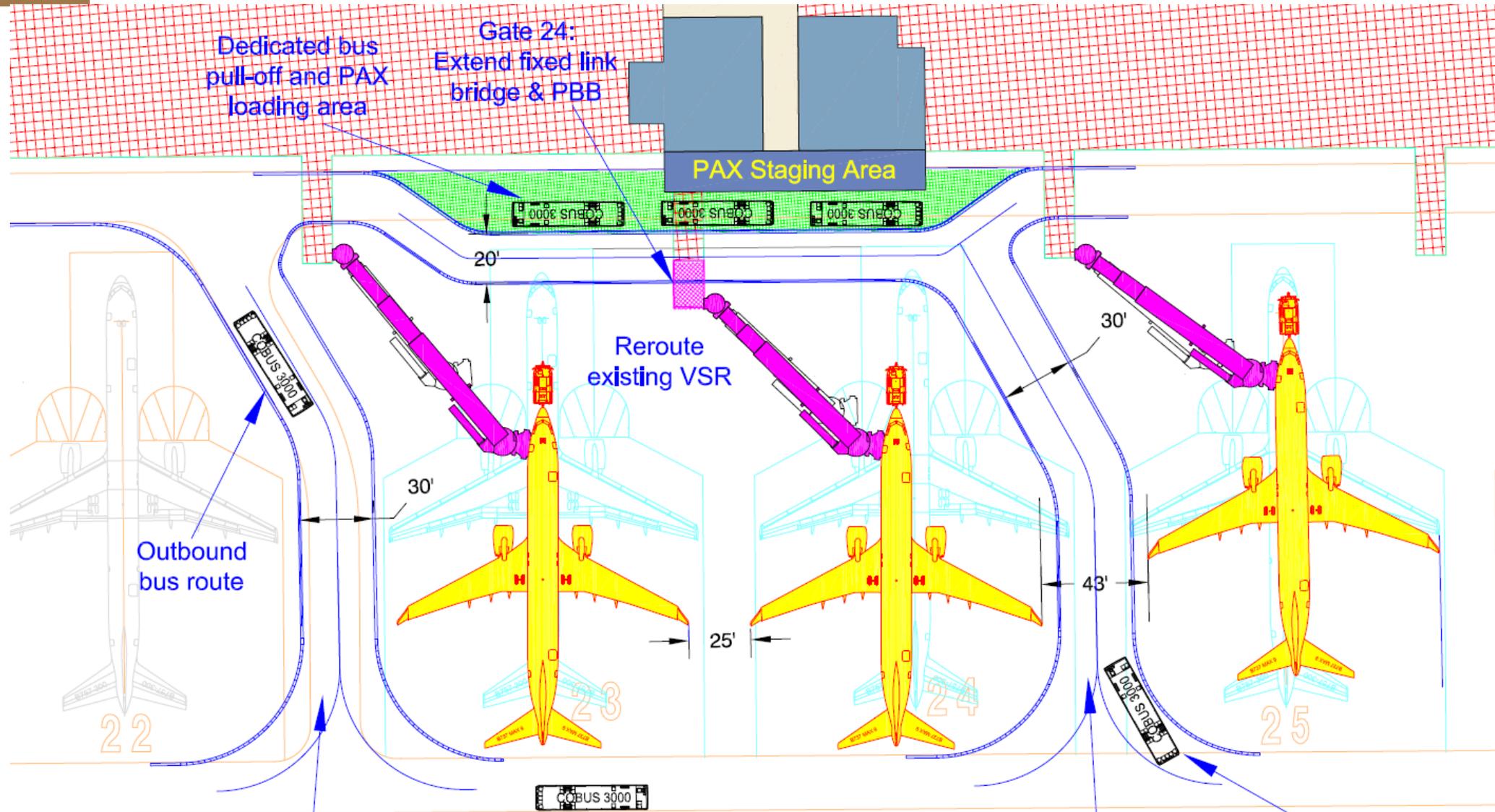
REMOTE GATE HOLDROOMS – TERMINAL B



- Convert support space into Remote Holdrooms
- Holdroom Area ~5,170 s.f.
- Accommodates: 2 NB
- Bus operations a major challenge



TERMINAL B PASSENGER BUSSING OPERATION



Modify existing VSR
(base width of 30-feet)

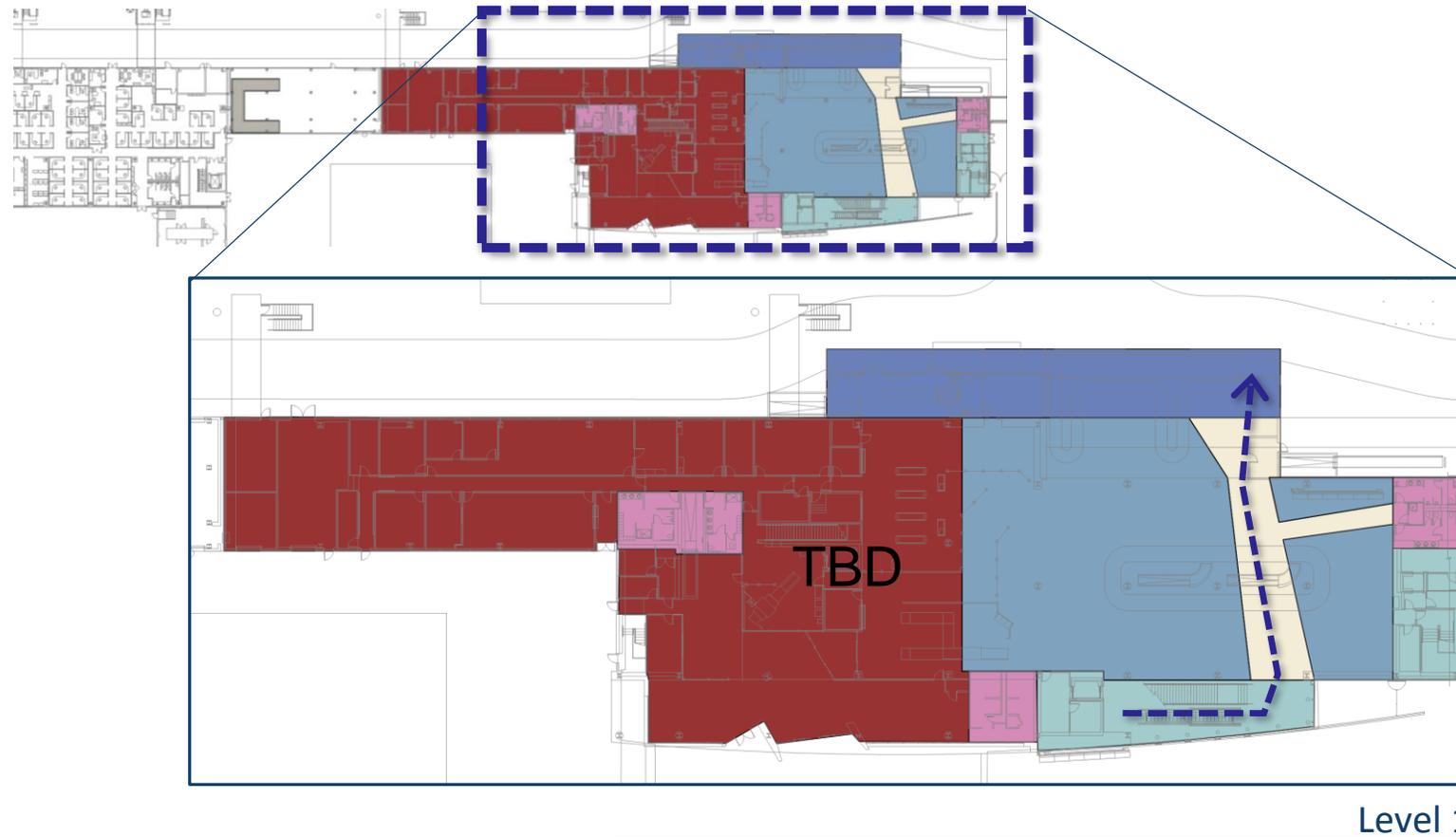
Downgauge Gates 23, 24 & 25 from
B757-200 to B737 MAX 9 aircraft

New 30-foot
wide VSR

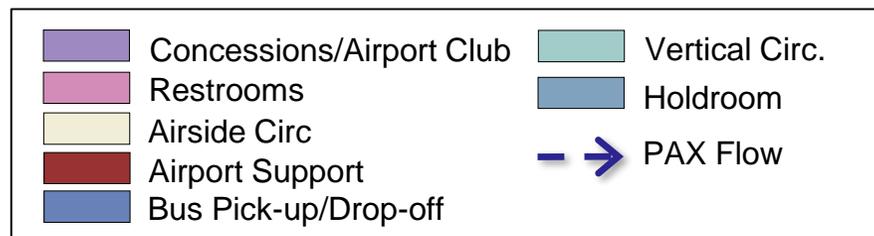
Inbound
bus route



REMOTE HOLDROOMS - CONVERT FIS

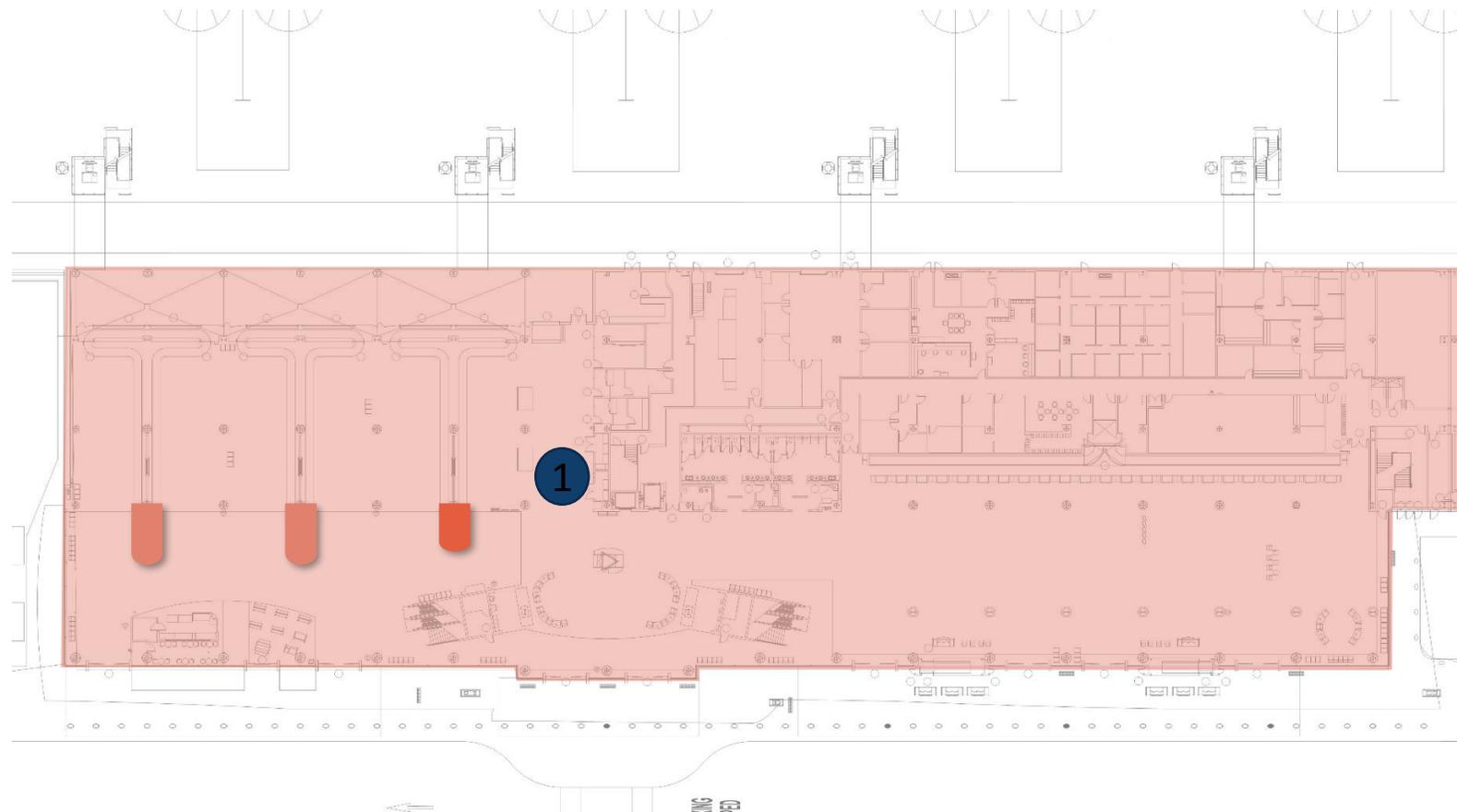


- Reallocate vacated CBP area into Remote Holdrooms & Support Space for Airport
- Hold Room Area ~12,000 s.f.
- Accommodates: 5 NB



TERMINAL B BAG CLAIM

- Expand existing claim devices
 - 103 linear feet of additional claim frontage required
- Additional claim devices required for High Scenario
 - Likely to be included in TB Phase 2



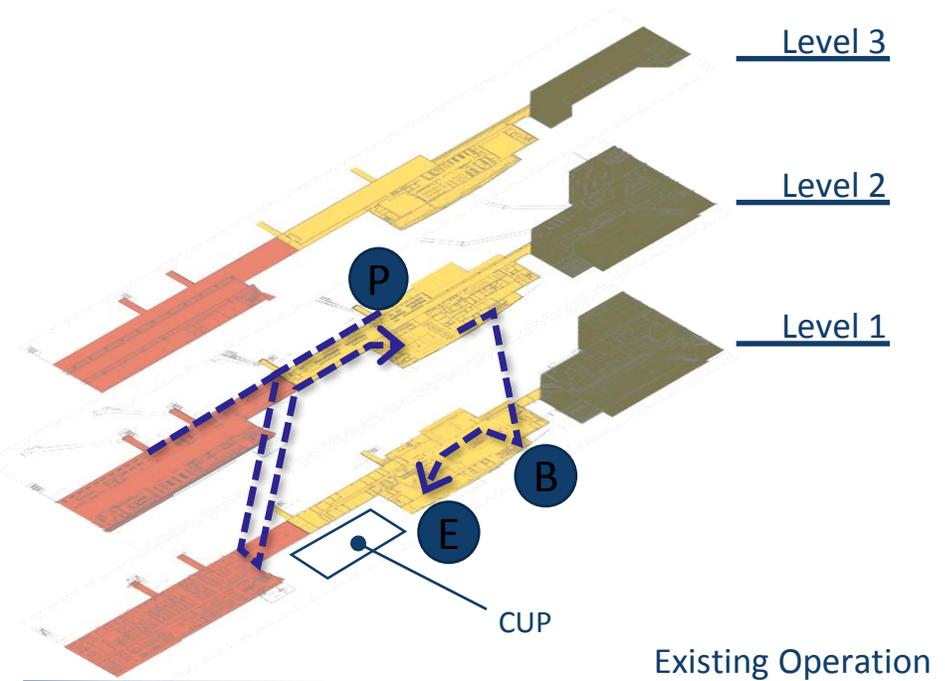
1 Total net gain of 84 feet of frontage

	Terminal B
	+32 LF Bag Claim Device
	+20 LF Bag Claim Device

TERMINAL CAPACITY ENHANCEMENT OPTIONS

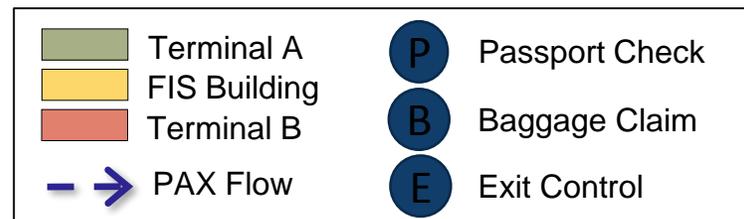
CBP Facilities



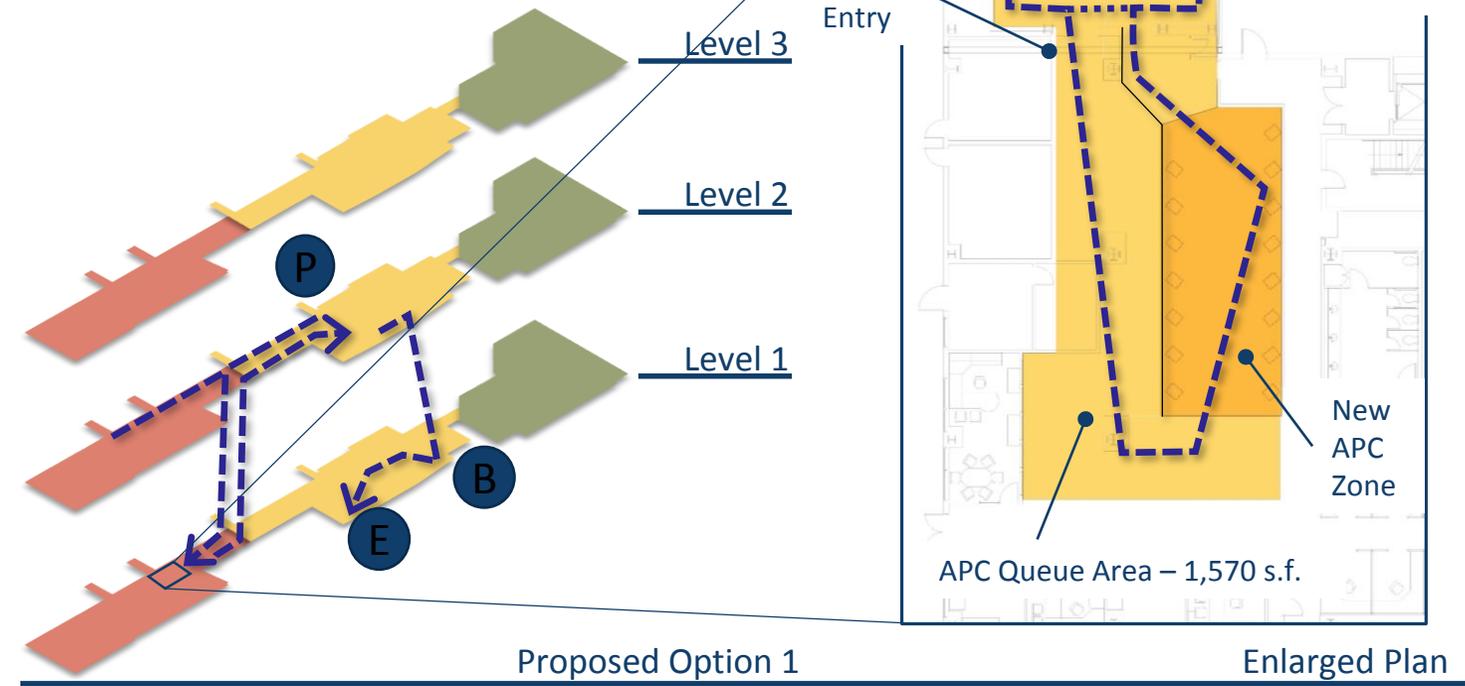
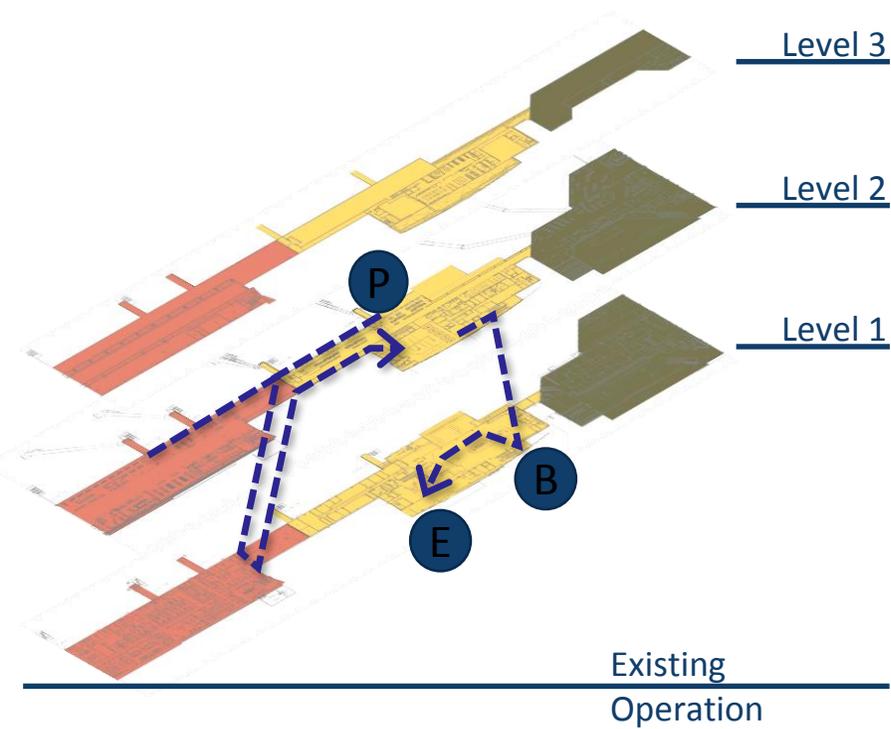


Key Issues:

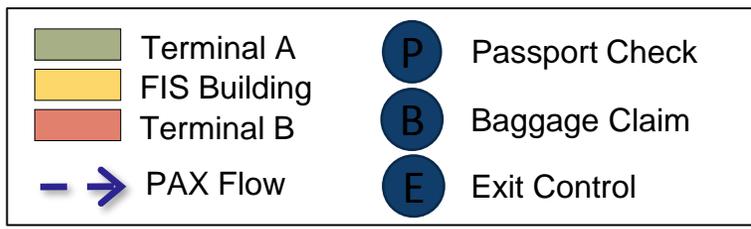
- Insufficient capacity for 2017+
- Gate dependencies limit flexibility
- Limited expansion ability



OPTION 1 – ENHANCED APC

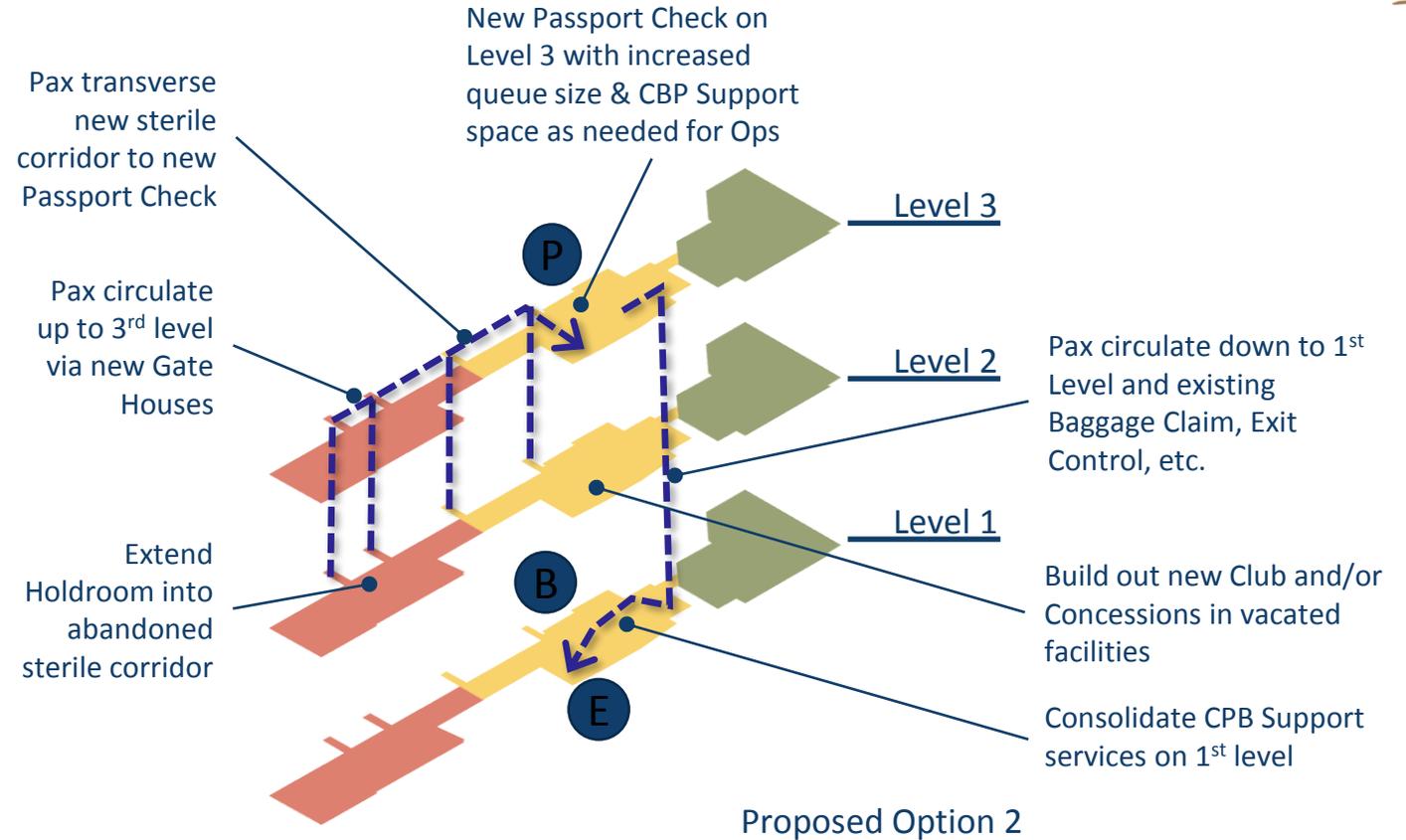
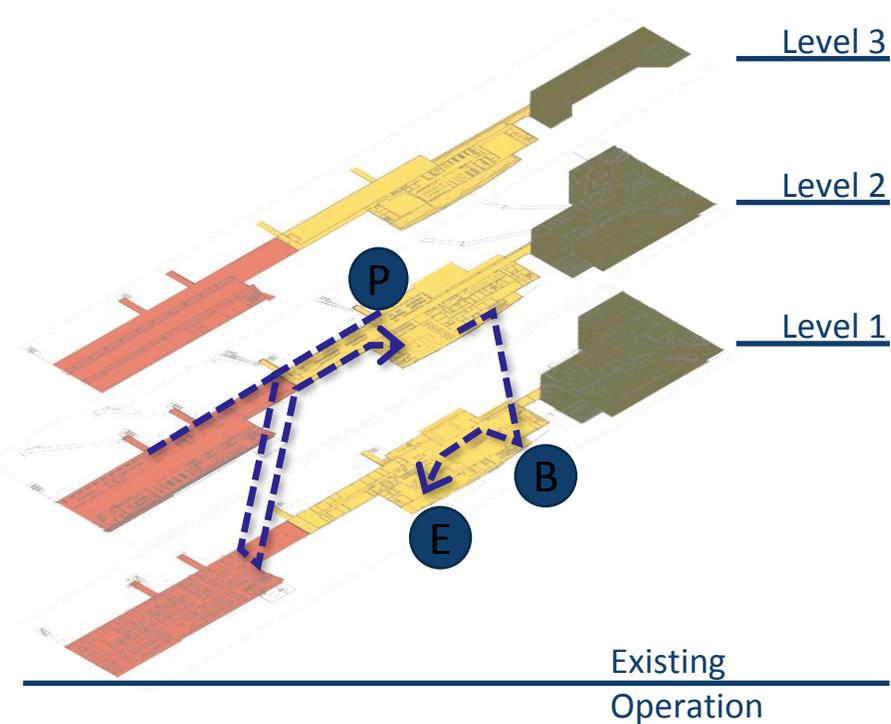


Reduce overall queue and wait time by increasing process times with the use of new expanded APC zone.

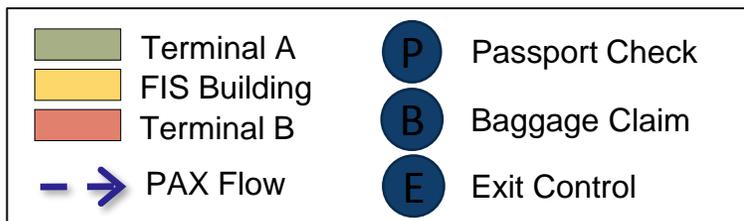


- Displaces Airport Administration offices in Terminal B
- Not a long-term solution but could be part of an interim improvement

OPTION 2 – RELOCATE PASSPORT CHECK

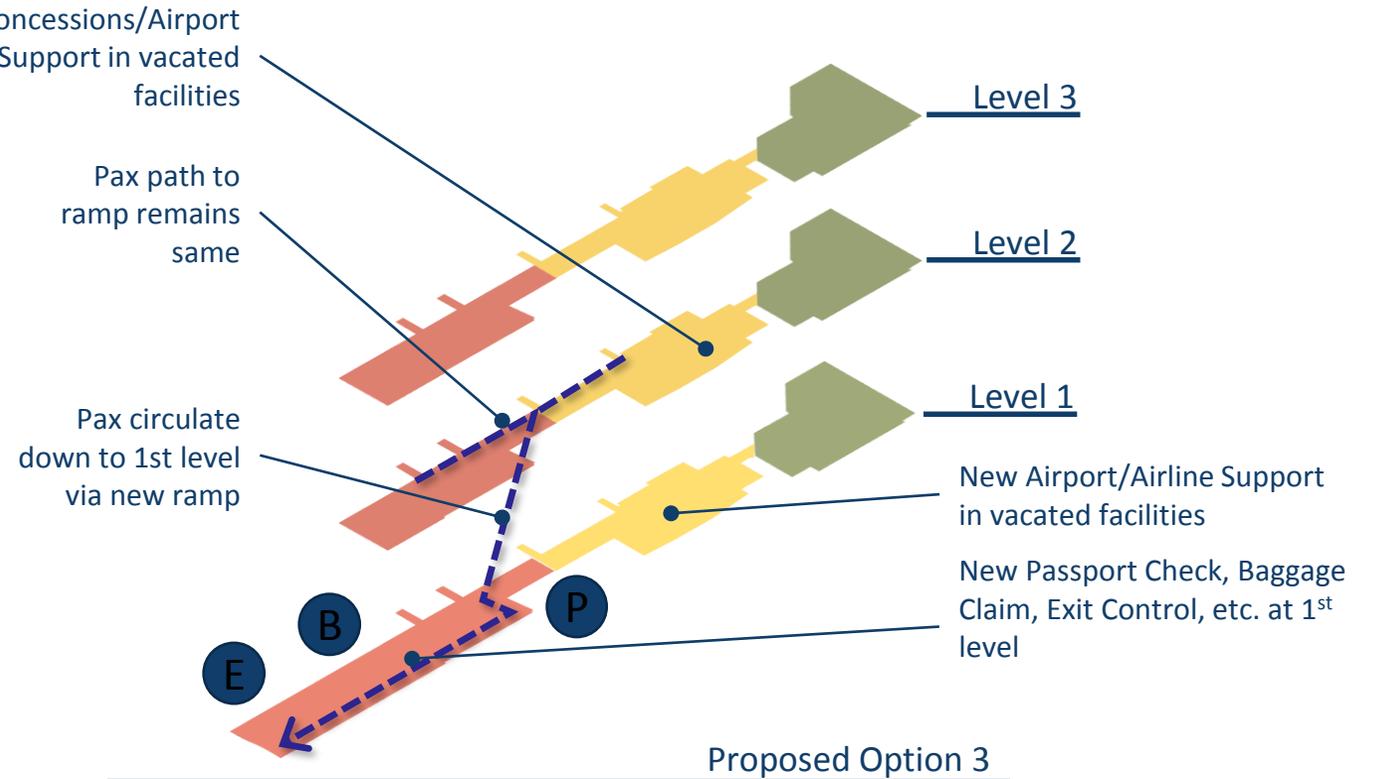
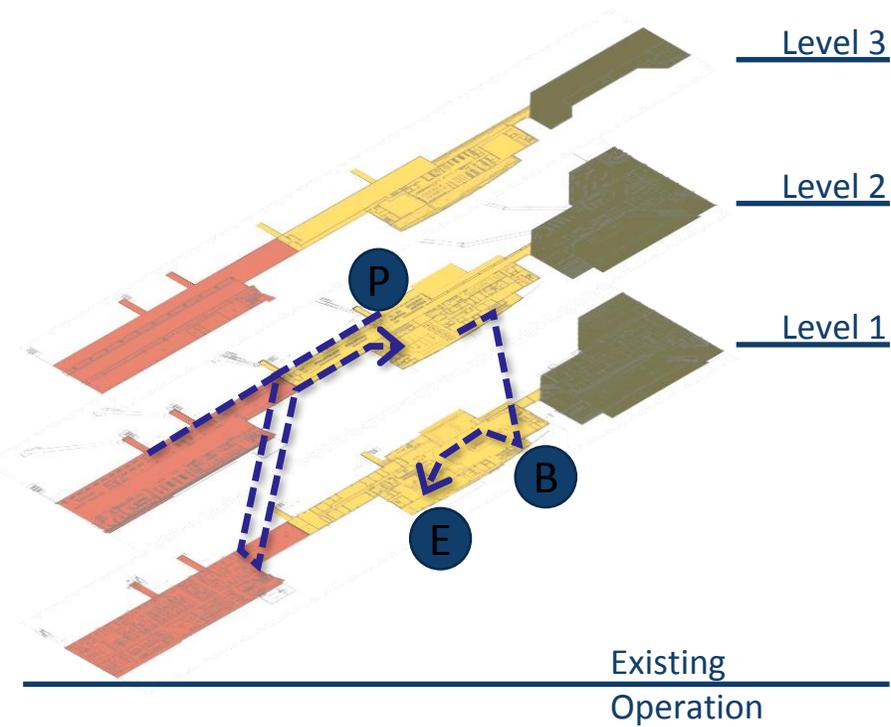


Relocate Passport Check to Level 3 and increase queue size.



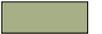
- Not a long-term solution, does not address Baggage Claim or Exit Control
- Implementation phasing likely a major challenge
- Displaces The Club at SJC (relocate to Level 2?)

OPTION 3 – RELOCATE CBP



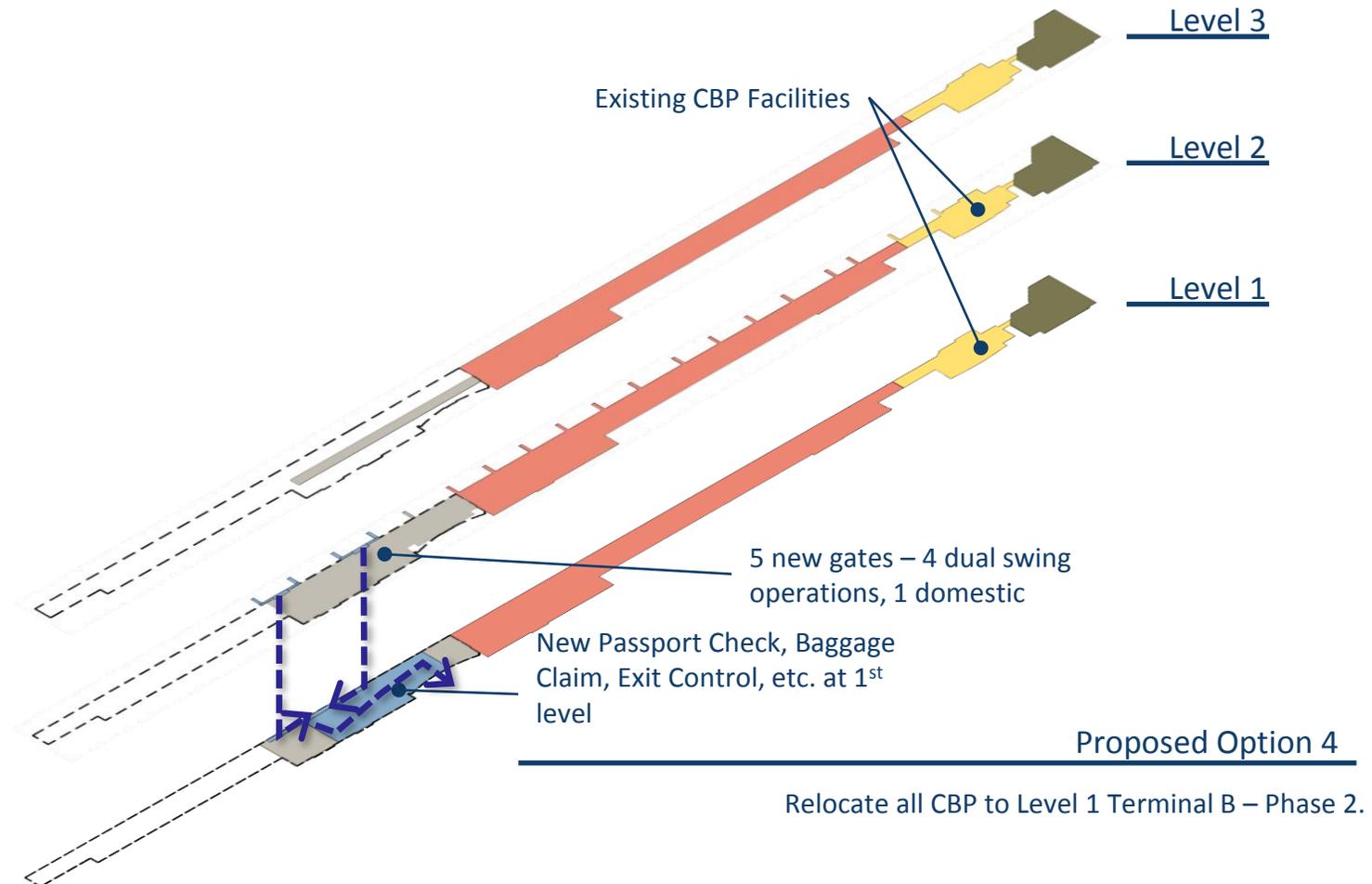
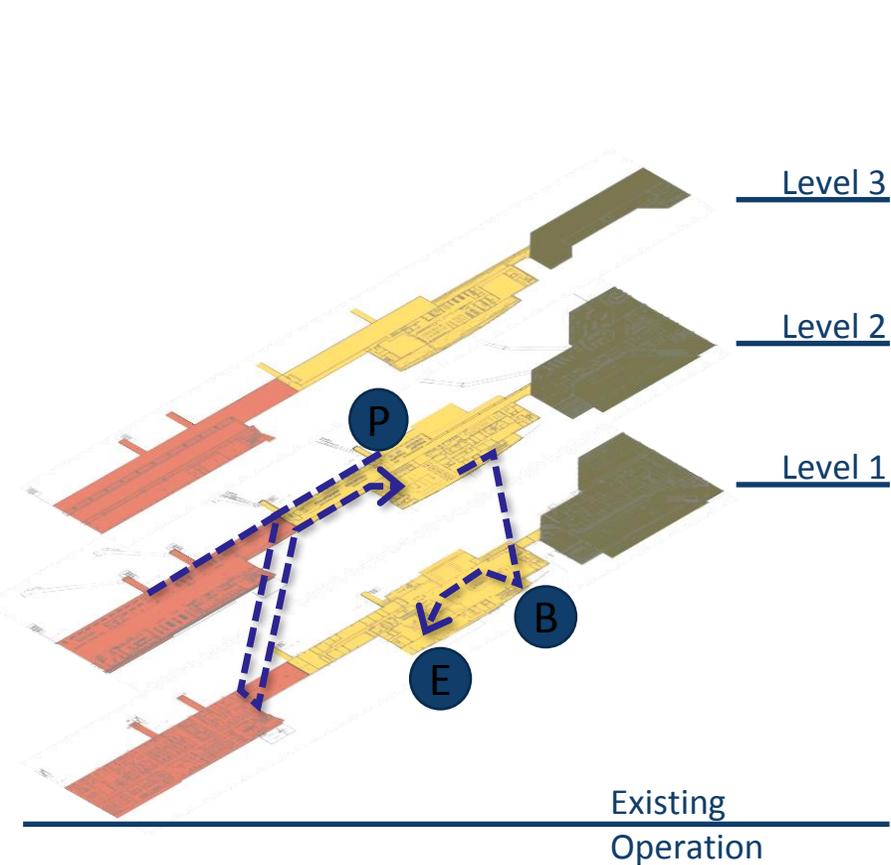
Relocate all CBP to Level 1 Terminal B.



	Terminal A		Passport Check
	FIS Building		Baggage Claim
	Terminal B		Exit Control
	PAX Flow		

- Potential long-term solution
- Displaces nearly all Airport Administration offices
- Curbside access a major issue

OPTION 4 – RELOCATE CBP – TB PH. 2



	Terminal B CBP		Terminal A		Passport Check
	Terminal B Ph. 2		FIS Building		Baggage Claim
	Terminal B Future		Terminal B		Exit Control
	PAX Flow				

- Potential long-term solution
- Long-term expansion
- Implementation time a key issue

CBP – COMPARISON OF OPTIONS

Key Metric	Option 1 Enhanced APC	Option 2 Relocate Passport Check	Option 3 Relocate CBP	Option 4 New CBP in TB PH 2
Capacity Enhancement	Improved Passport Check Processing	Passport Check meets 14 MAP requirements	Meets 14 MAP requirements	Meets 14 MAP requirements
APC Zone	Yes	No (insufficient space)	Yes	Yes
Vertical Transitions	No change – down 1, up 1, down 1	Up 1, down 2	Down 1	Down 1
Implementation Considerations	Relocation of Airport Offices	Floor elevation differences between buildings, Phasing, Expanding 3 rd floor onto existing roofs	Phasing, Relocation of Airport Offices	Part of Terminal B Phase 2
Benefits	Increased processing capacity without additional CBP staff, Additional queue area	Eliminate gate dependencies, Integrate ACP and Passport Check	Ideal CBP configuration	Ideal CBP configuration, Long-term expansion capability, No impact to existing space
Challenges	Relocating Airport Offices, Does not address Bag Claim or Exit Control	Does not address Bag Claim or Exit Control, Potential loss of revenue space (Club at SJC), Complex implementation	Relocating Airport Offices, Curbside access, Connection to TA and TB	May require interim improvements at existing CBP due to construction time for Terminal B Phase 2

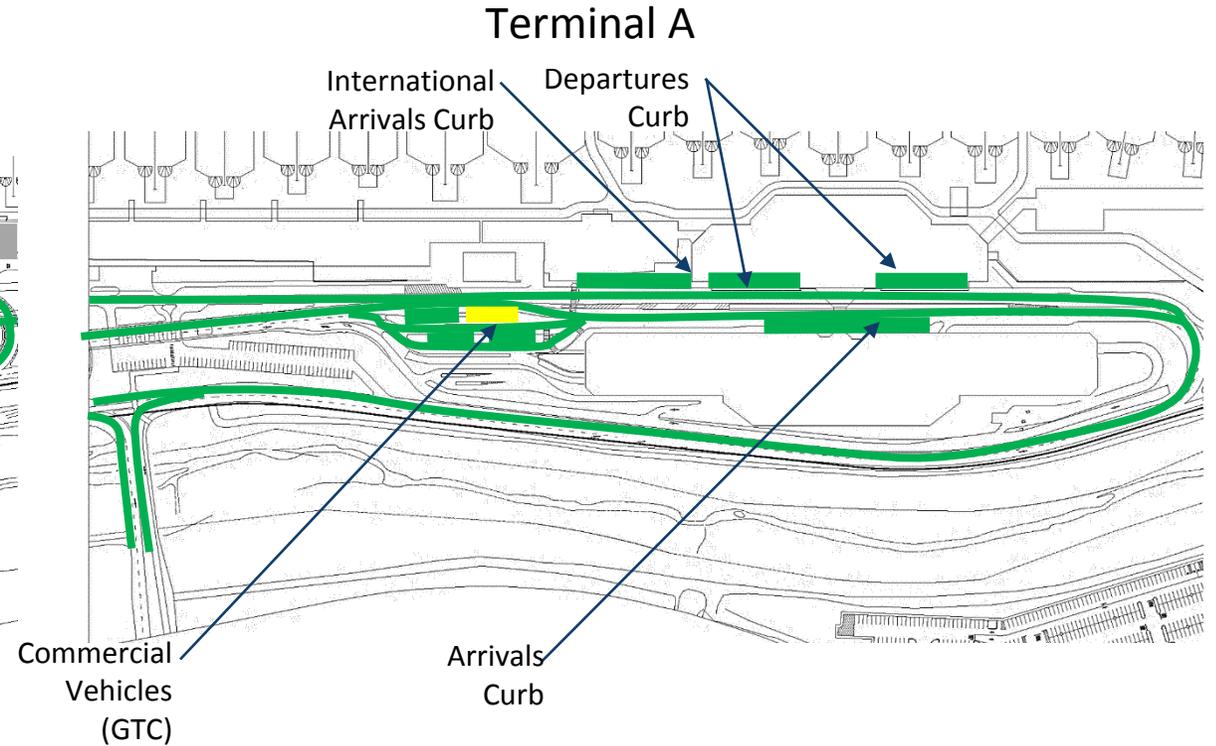
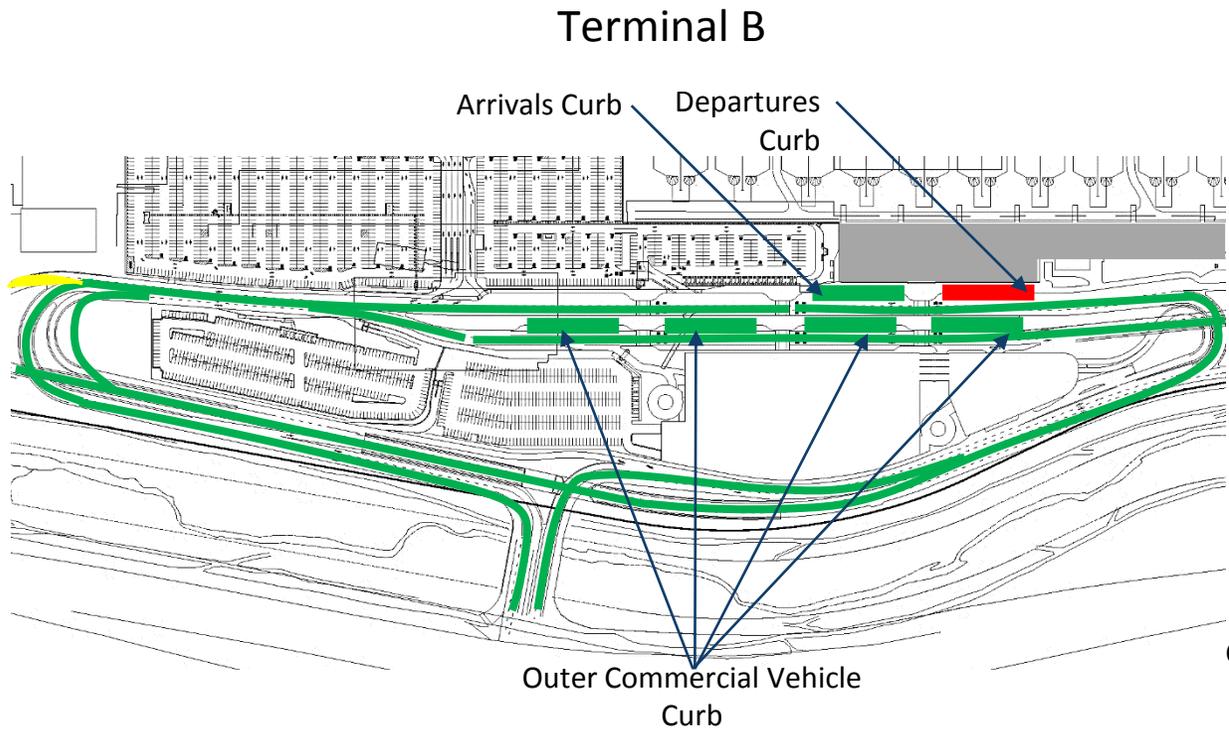
- Departures processing capacity at Terminals A & B is capable of accommodating 14 MAP
 - Enforcement of lease agreement is required for ticket counter allocation
 - Southwest and Alaska to maintain their current ticket counter allocation
- Terminal B baggage claim frontage and claim hall area is less than required but will accommodate 14 MAP at reduced levels of service during the peak periods
- CBP Passport Check and International baggage claim capacity are below the target requirements for 14 MAP
 - Enlargement of the Passport Check queue area and increased processing capacity are necessary for 14 MAP

LANDSIDE CAPACITY ENHANCEMENT

Gap Analysis and Capacity Enhancement Options

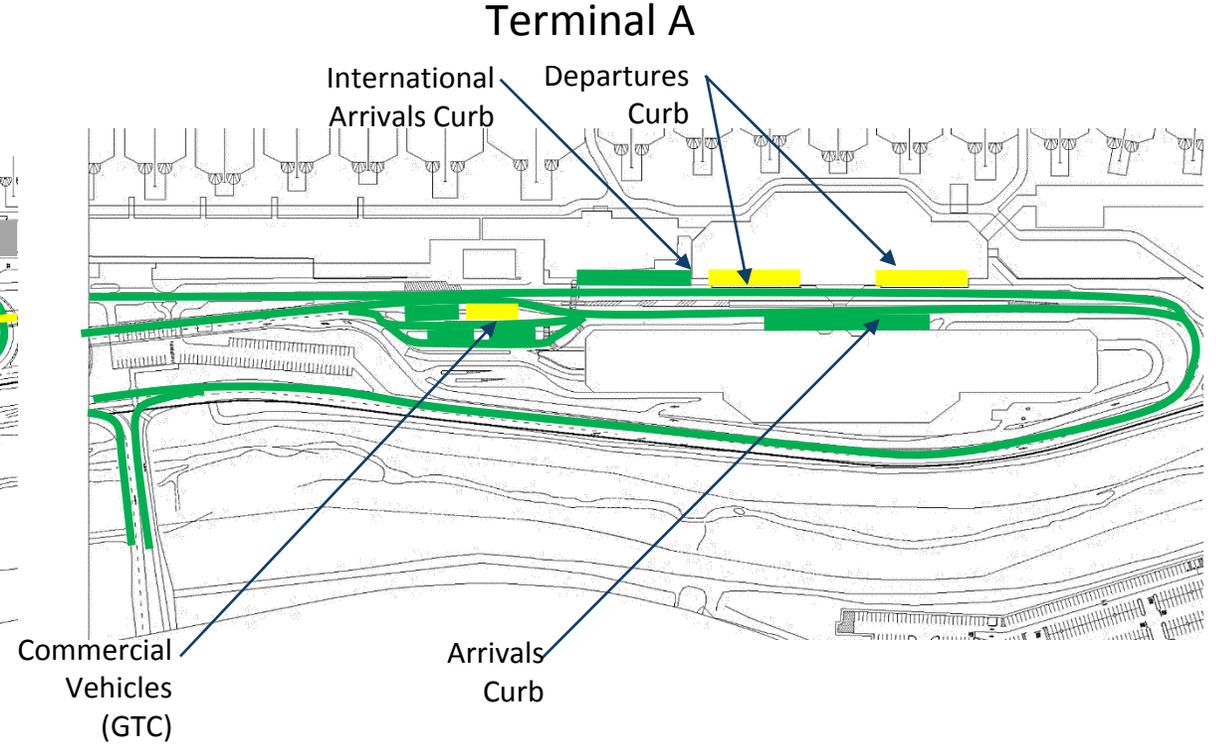
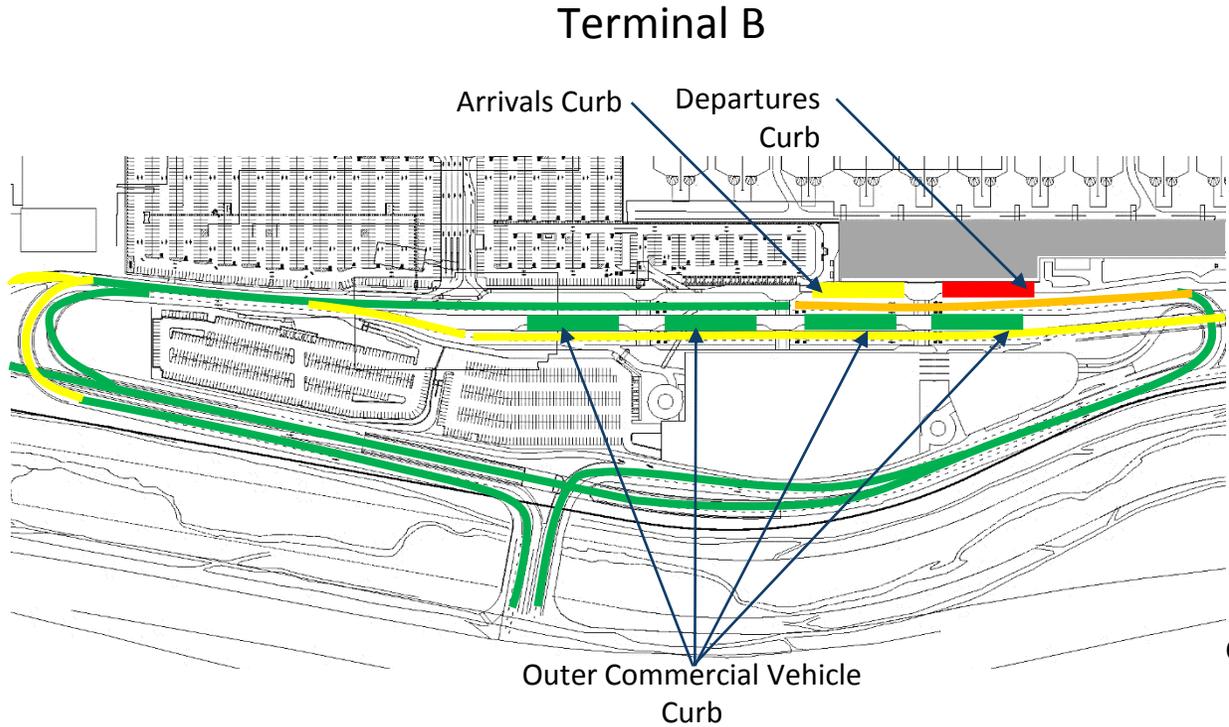


LANDSIDE LOS – 2017 DESIGN DAY



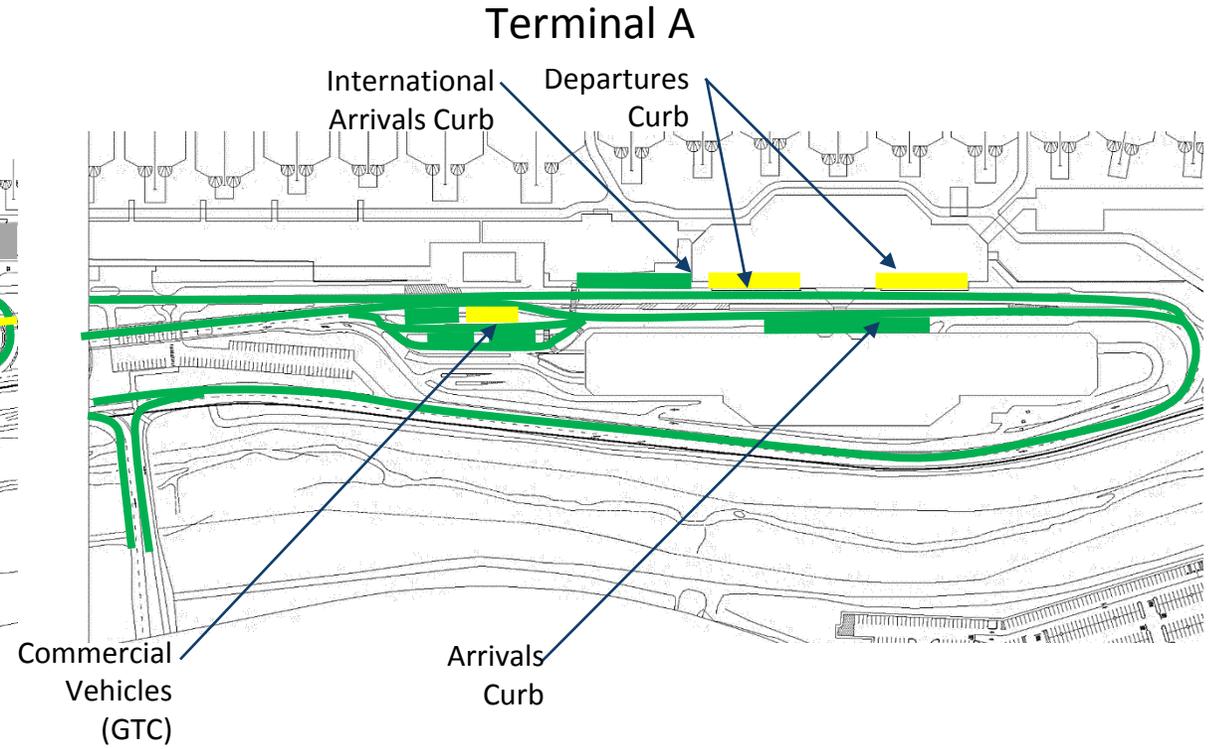
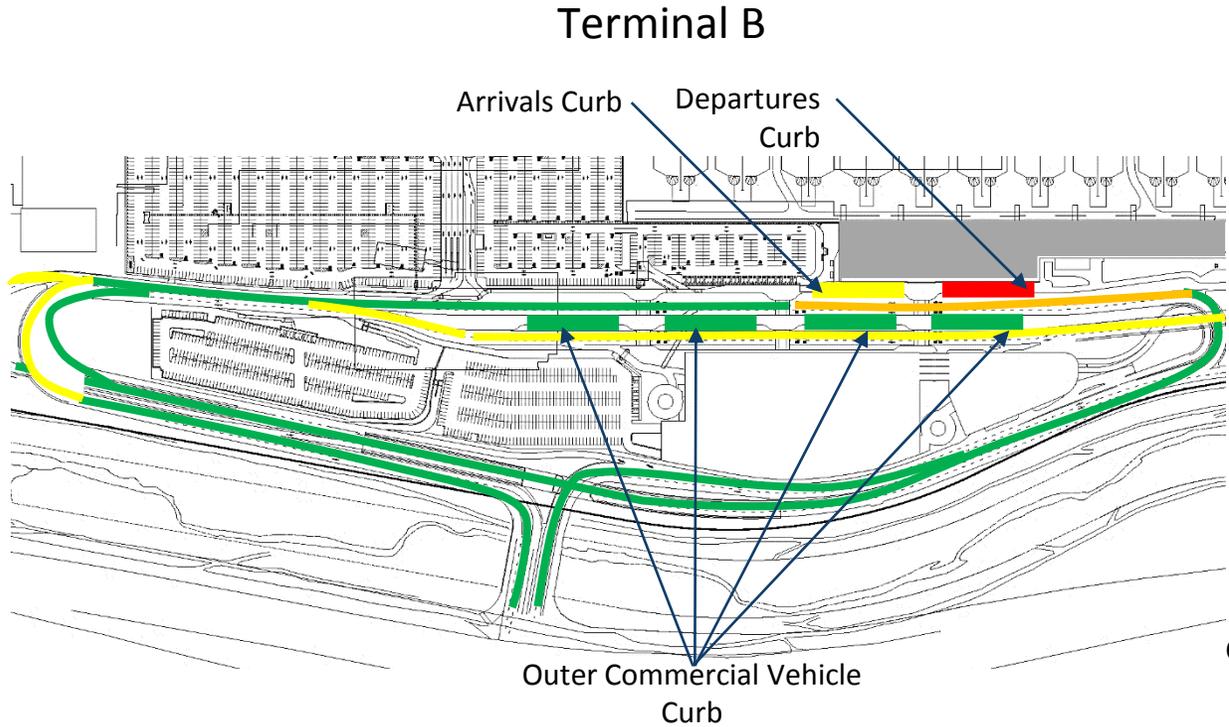
- LOS 'A', 'B' or 'C' Good
- LOS 'D' Fair
- LOS 'E' Congested
- LOS 'F' Failure

LANDSIDE LOS – 14 MAP



- LOS 'A', 'B' or 'C' Good
- LOS 'D' Fair
- LOS 'E' Congested
- LOS 'F' Failure

LANDSIDE LOS – 14 MAP HIGH

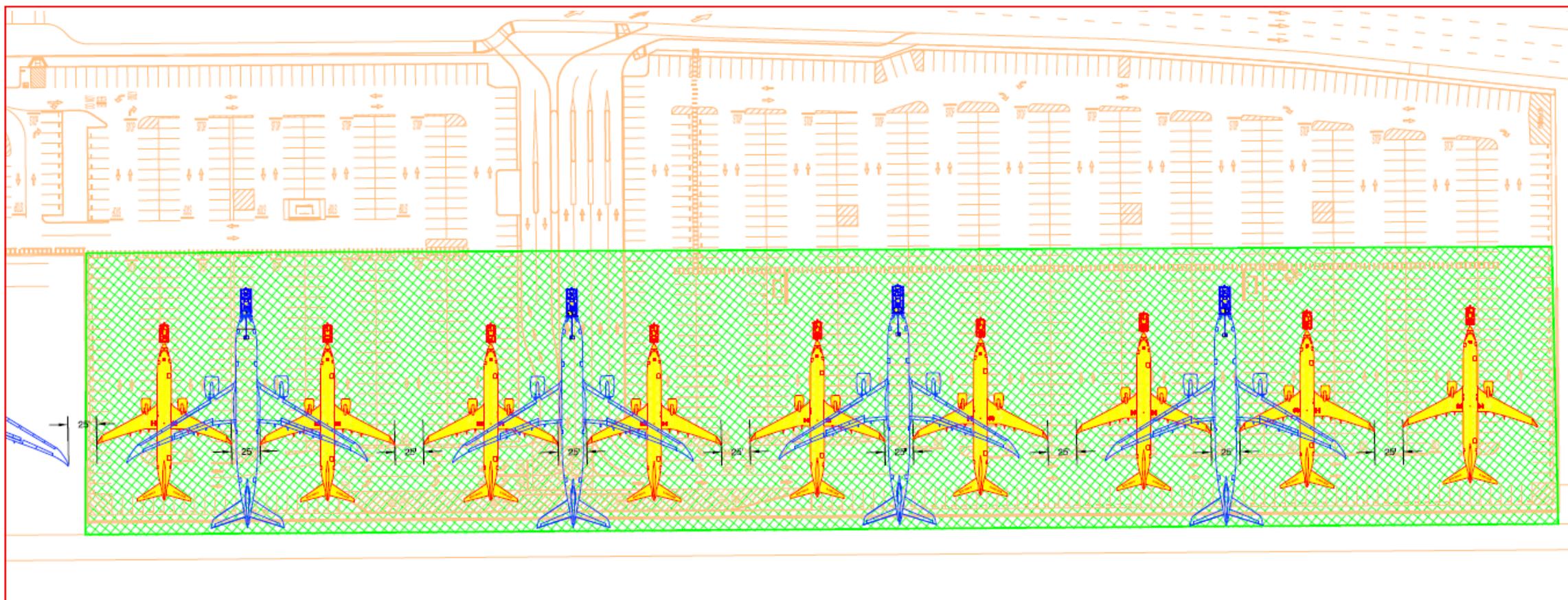


- LOS 'A', 'B' or 'C' Good
- LOS 'D' Fair
- LOS 'E' Congested
- LOS 'F' Failure

GOING FORWARD

- Refine capacity enhancement scenario(s)
- Prepare Operational Strategy
- Prepare Capital Project Strategy

SURFACE PARKING LOT CONVERSION



- South Parking Lot can be converted into:
 - 9 B737-MAX9 positions or 4 A330-800 NEO aircraft
 - Widebody/MARS parking capability
 - An estimated 800-850 surface parking positions would be lost