

Item No.

7b

Meeting Date

January 13, 2015

SUSTAINABLE AIRPORT MASTER PLAN (SAMP)

Update: January 13, 2015

- **Overview**
- **Airport Economic Engine**
- **SEA Activity Forecast**
- **Forecast Implications/Challenges**
- **Development Constraints**
- **2034 Planning Goals & Facility Requirements**
- **Challenges, Options, & Next Steps**
 - Airfield
 - Terminal
 - Landside
- **Planning Schedule**
- **Challenges/Anticipated Actions (*Near-Term*)**
- **Sustainability**
- **Public Outreach Strategy**

- **Rapid growth and a constrained operational footprint requires strategic land use planning and future Commission policy decisions to provide needed capacity**
- **Gaining clarity regarding implications of projected growth in passengers and operations – and the necessary facility changes**
- **Developing and evaluating options to meet facility requirements**
- **Will need to utilize properties beyond those now a part of the airfield and terminal complex.**
- **The optimal airport layout – maintaining airfield capacity and adding terminal capacity – will require relocation of existing facilities**
- **Understanding these tradeoffs and the repercussions of balancing needs will be a next step**

- **Sea-Tac serves as critical regional and national asset**
 - More than 170,000 jobs attributable to airport activity
 - \$6.1 billion in total personal income
 - \$16.3 billion in business revenue
- **Growth in air service supports regional economic activity**
 - Each new international flight generates an estimated \$75 million annually in direct and indirect economic impact to the region
 - Keeping freight moving supports local and regional businesses
- **Connects region to the global economy**
- **Creates new jobs in local communities**
 - Aeronautical jobs – airlines, airline contractors, flight kitchens, aircraft maintenance
 - Airport and visitor jobs – dining/retail, hotels, parking
 - Construction jobs

Drivers of domestic and international passenger activity

- **Domestic originating passenger demand has strong historic correlation with key economic indicators**
 - Inflation-adjusted airfares projected to decline long-term
 - PSRC forecast: per capita income growth in Puget Sound region higher than national average
- **Domestic connecting passenger growth tied to airport's ongoing role as hub for Alaska Airlines, and development of Seattle as a Delta Air Lines domestic connecting hub and international gateway**
- **International originating passenger demand supported by Seattle economic profile and airline business plans**
 - Location of global business communities
 - Proximity to Asia
- **International connecting passenger activity driven by continued development of Airport as gateway for Delta and foreign-flag airlines.**

Passengers and operations

- **Rapid growth in recent years**
 - Passengers: up 4.7% in 2013 & 7.5% in 2014
 - Aircraft operations: up 2.5% in 2013 & 6.9% in 2014
- **Airport traffic will grow by 28.5 million annual passengers (MAP) and 190,000 aircraft operations in next 20 years**
 - 66 million annual passengers (up from 37.5 million in 2014)
 - 540,000 annual operations (up from 350,000 in 2014)

Airfield

- **36% more aircraft on the airfield during peak hours**
 - 2014 peak hour: 88 operations
 - 2034 peak hour: 120 operations
 - Operational delays begin at 90 operations per hour today
- **Airfield impact**
 - Efficiency exponentially decreases as the airfield reaches and exceeds capacity
 - Severe congestion along taxiway in front of terminal caused by departures queue and push back from gates
 - Departing aircraft significantly delayed due to runway crossings by arriving aircraft
 - Departures delays compounded by shift to larger aircraft

Terminal

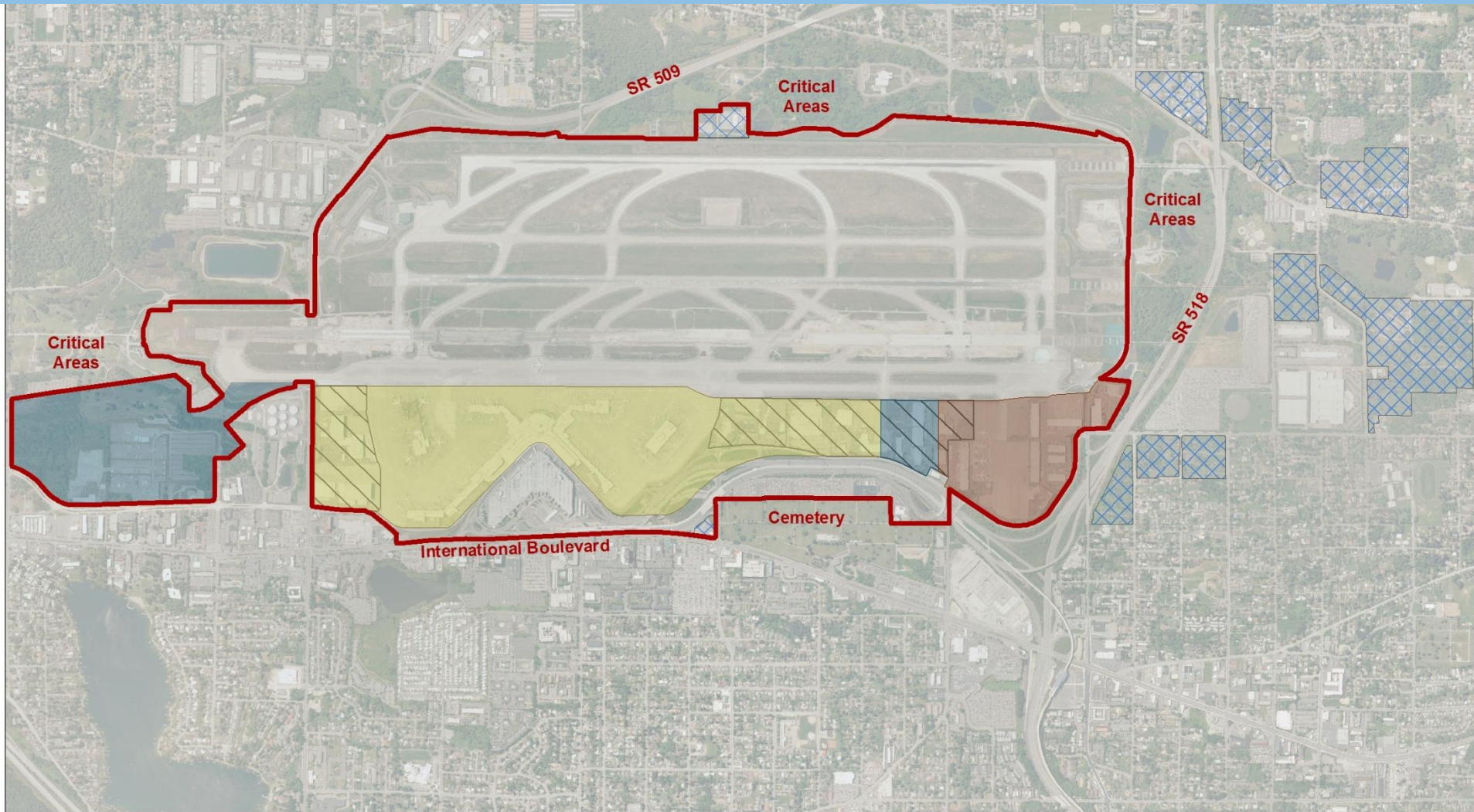
- **58% more departing passengers in the terminal during peak hours**
 - 2014 peak hour: 5,180 passengers
 - 2034 peak hour: 8,170 passengers
- **70% more arriving passengers in the terminal during peak hours**
 - 2014 peak hour: 5,040 passengers
 - 2034 peak hour: 8,550 passengers
- **Terminal impact**
 - Check-in: processing has become increasingly efficient, but significant expansion of bag drop positions will be required
 - Security screening: current configuration of checkpoints is inefficient and future passenger loads will likely exceed capacity
 - Baggage claim: at or near capacity today – increased loads will cause congestion at claim devices and a low level of customer service

Landside

- **42% more vehicles on Upper Drive during morning peak**
 - 2014 peak hour: 1,240 vehicles
 - 2034 peak hour: 1,760 vehicles
- **61% more vehicles on Lower Drive during evening peak**
 - 2014 peak hour: 1,170 vehicles
 - 2034 peak hour: 1,880 vehicles
- **Landside impact**
 - Upper drive sidewalk congestion creates a low level of service today – passenger safety and access to the terminal will be severely compromised in 2034 without improvements
 - Traffic accessing terminal drives backs-up to control tower and occasionally onto SR 518 today – roadways will gridlock by 2034 without significant capital improvements

Development Constraints

Environmental, airspace, and land use constraints severely limit expansion options



- Terminal
- Cargo
- Displaced Facilities
- Off-airport Development Areas
- Areas to Accomodate Displaced Facilities

Future Airport Land Uses
DRAFT - Preliminary Concepts
Development Constraints

SHEET 1 of 5

Port of Seattle
Prepared By: Aviation Planning
Date: November 20 14

1,500 750 0 1,500 Feet

Airport Comparison

- No US airport handles comparable passenger volumes with as small an operational footprint as SEA

2013 Airport PAX rank	Airport name	Airport code	2013 PAX	Developed Acreage	PAX/acre
14	Seattle-Tacoma	SEA	34,800,000	1,500	23,200
7	San Francisco	SFO	44,900,000	2,000	22,450
13	Newark	EWR	35,000,000	1,700	20,590
19	Boston	BOS	30,200,000	1,600	18,880
9	Las Vegas	LAS	40,900,000	2,400	17,040

Land Allocation

- **Western operational boundary of airfield is 16R-34L** (*no 4th runway*)
- **Three runways are needed in 2034** (*cannot push terminal edge west*)
- **No terminal facilities west of 16R/34L** (*topography, wetlands*)
- **Limited footprint requires prioritization of land uses and complex phasing plan. Functional priorities for property allocation:**
 - Passenger terminal
 - Airfield
 - Landside
 - Cargo
 - Airline support
 - Airport support
 - General aviation

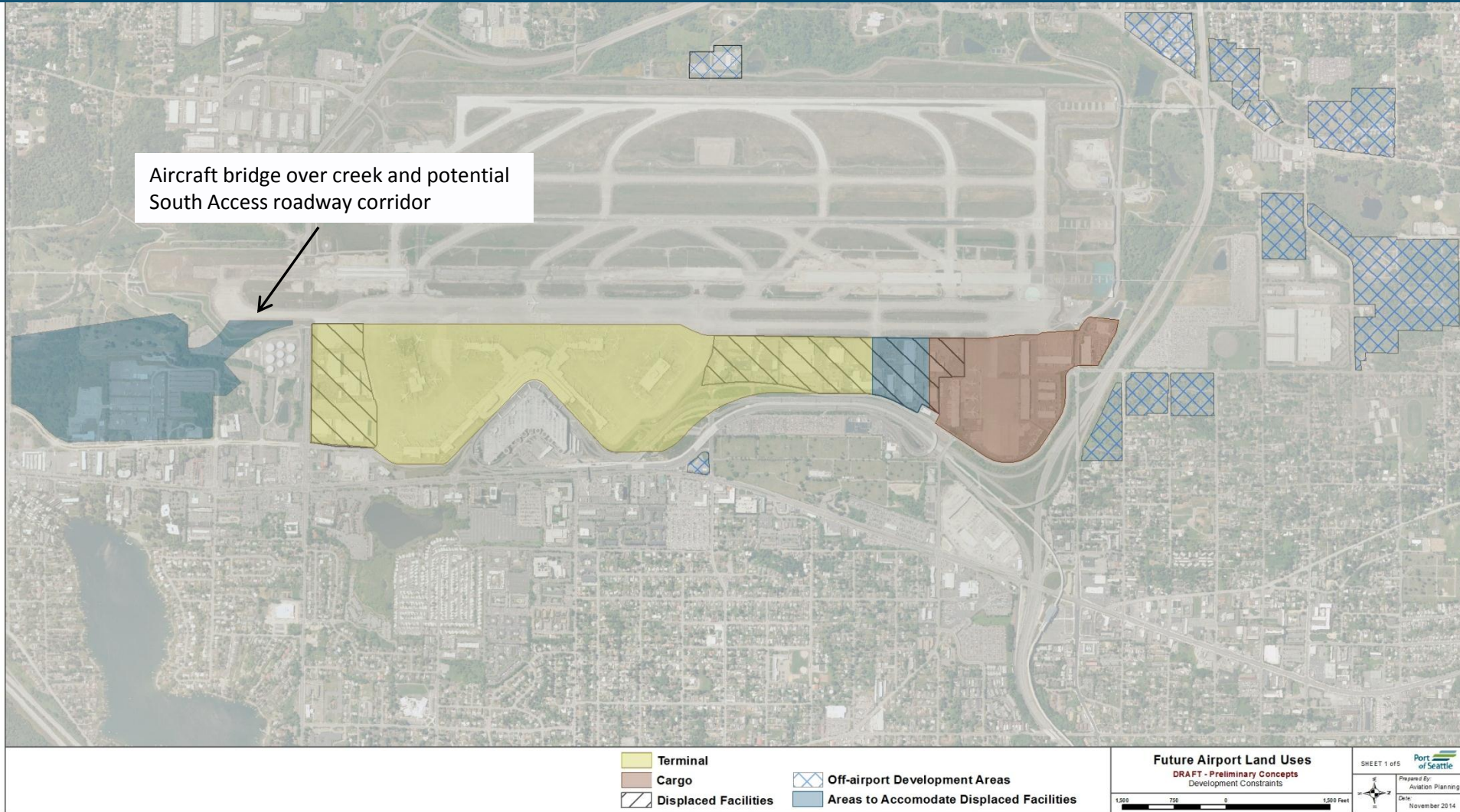
- **Gates**
 - Accommodate all planned, peak hour activity at aircraft parking positions with direct terminal access (*no remote busing operations*)
- **Minimum Connect Time (MCT)** (*people & baggage*)
 - 60 minute MCT with 20-year SAMP improvements
- **Dining and Retail**
 - Adequate concessions and amenities space to optimize revenue and meet customer expectations
- **Cargo**
 - Sufficient warehouse and hardstand facilities to meet demand
- **Roadways**
 - Reliable terminal access with minimal delay
- **Parking -- TBD**

- **35 additional aircraft parking positions with direct terminal access – after eight new gates at NSAT** (*“gates”*)
 - Providing gates will drive overall airport plan, toppling dominoes airport wide
- **International Arrival Facility-connected gates**
 - 27 international widebody gates (*vs 11 in 2014 & 18 in 2019*)
 - Planned 2,200 passengers per hour IAF capacity meets need
- **400,000-500,000 total square feet of cargo warehouse** (*based on SAMP forecasted growth*)
 - Warehouse space will need to be consolidated and potentially mechanized to accommodate projected growth
 - Currently assessing ramp space requirements
 - Analyzing potential to accommodate Century Agenda growth

- **Airport access roadways, terminal drives and parking**
- **Terminal**
 - Check-in – Expanded current terminal or additional terminal?
 - Security screening
 - Holdrooms
 - Dining & retail
 - Baggage systems
- **Campus-wide “Automated People Mover” (APM)** *(RCF to terminal; between terminals; terminal(s) to remote concourses)*
- **Airline support**
 - Aircraft maintenance & Ground Run-up Enclosure (GRE)
- **Airport support**
 - Airport Rescue and Firefighting station (ARFF)
 - Ground Service Equipment (GSE) maintenance

Challenges

- Additional airfield connected land required to meet demand



Challenges

- **Accommodate 120 peak hour operations** (*up from 88 - with no airfield expansion*)
- **Increase airfield efficiency to make full use of three runway system**
 - Minimize runway crossings
 - Reduce congestion on Taxiway B and improve access to/from south end gates in north flow
- **Other factors that impact airfield capacity**
 - Closely spaced runways require staggered arrivals
 - Interactions with Boeing Field create departure and arrival delays

Options

■ End-around taxiways

- 70% of operations (all Group III) could avoid crossing departures runways
- Minor reduction in take-off weight for large, long-haul international flights
- Center runway could become primary departure runway – significant increase in efficiency/capacity

■ Taxiway A extension

- Doubles queuing capacity
- Provides a bypass on south end taxiway system
- Improves access to/from south end gates



Next Steps

- **Alternatives analysis** (*detailed modeling will determine efficiency benefits of airfield improvements*)
 - Further develop potential capital and operational fixes
 - Airfield and terminal ramp modeling
 - Feasibility and cost/benefit
- **Coordination with FAA**



Challenges

- **Aircraft parking positions with direct terminal access (“gates”)**
 - Provide 35 additional gates
 - Expand terminal in manner that:
 - Will be operationally efficient
 - Will connect widebody gates to IAF with good customer service
 - Can be phased with least disruption to existing facilities
- **Remain Over Night (RON) aircraft parking positions**
 - Locate required RON north and south of the expanded terminal to minimize operational impacts of towing
- **Passenger processing capacity**
 - Can we support 35 additional gates with a single, expanded terminal?
 - Or is a second terminal needed to supporting new gates to north?
 - How do we connect passengers between new concourses and terminal(s)?

Options

- **Expansion is needed north and south to provide additional gates**
- **Early decisions:**
 - Concourse A extension or additional south satellite, and
 - Piers north of existing terminal or North Satellite extension
- **Based on decision above, then decide:**
 - Expand current terminal and/or build additional terminal to the north

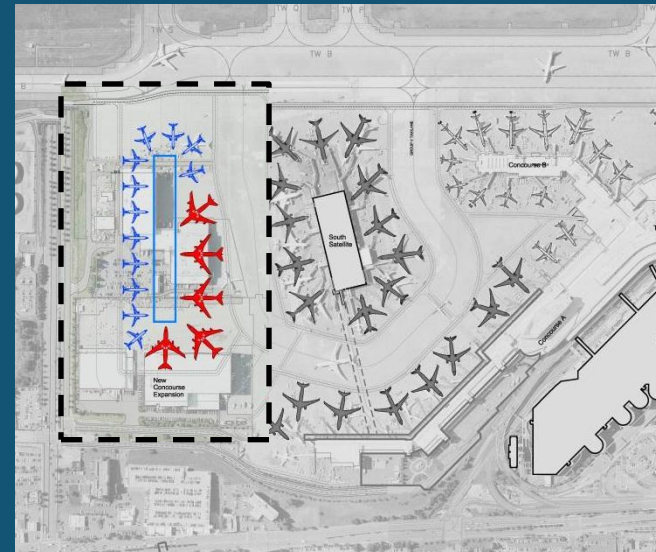
Concourse A Extension

- **Pros**
 - Meets international gate requirement
 - Widebody gate connection to IAF through Concourse appears better
 - Does not require lidding over S 188th ST
 - Dual taxilanes between new gates and SSAT
- **Cons**
 - Yields fewer gates



Additional South Satellite

- **Pros**
 - Meets international gate requirement
 - Yields more gates
- **Cons**
 - Difficult widebody gates connection to IAF
 - Requires lidding over S 188th ST
 - Single taxilane between new gates and SSAT

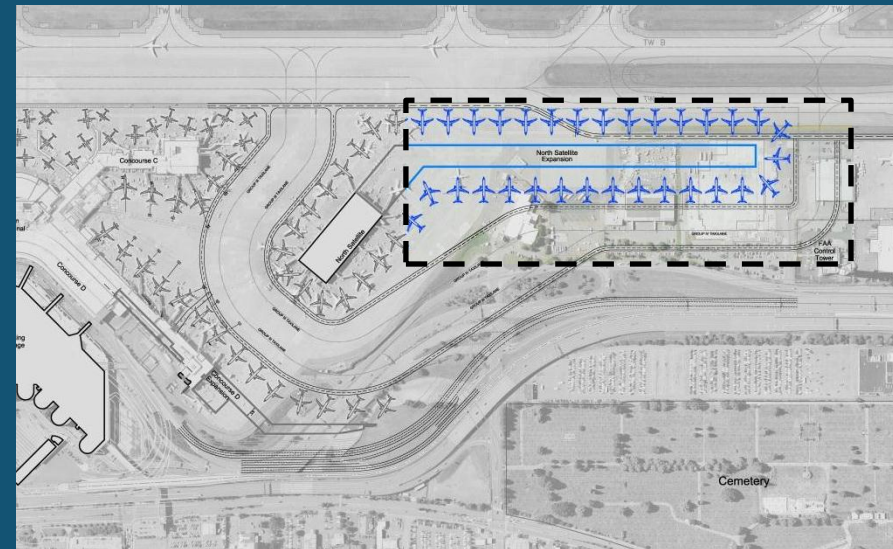


North Piers

- **Pros**
 - Meets domestic gate requirement
 - Straightforward opportunity for second terminal *(if required)*
 - May not require relocation of southbound lanes of North Airport Expressway *(if no second terminal)*
 - Can more easily phase gates additions
 - Easier to accommodate widebody aircraft
- **Cons**
 - Challenge connecting passengers to the north

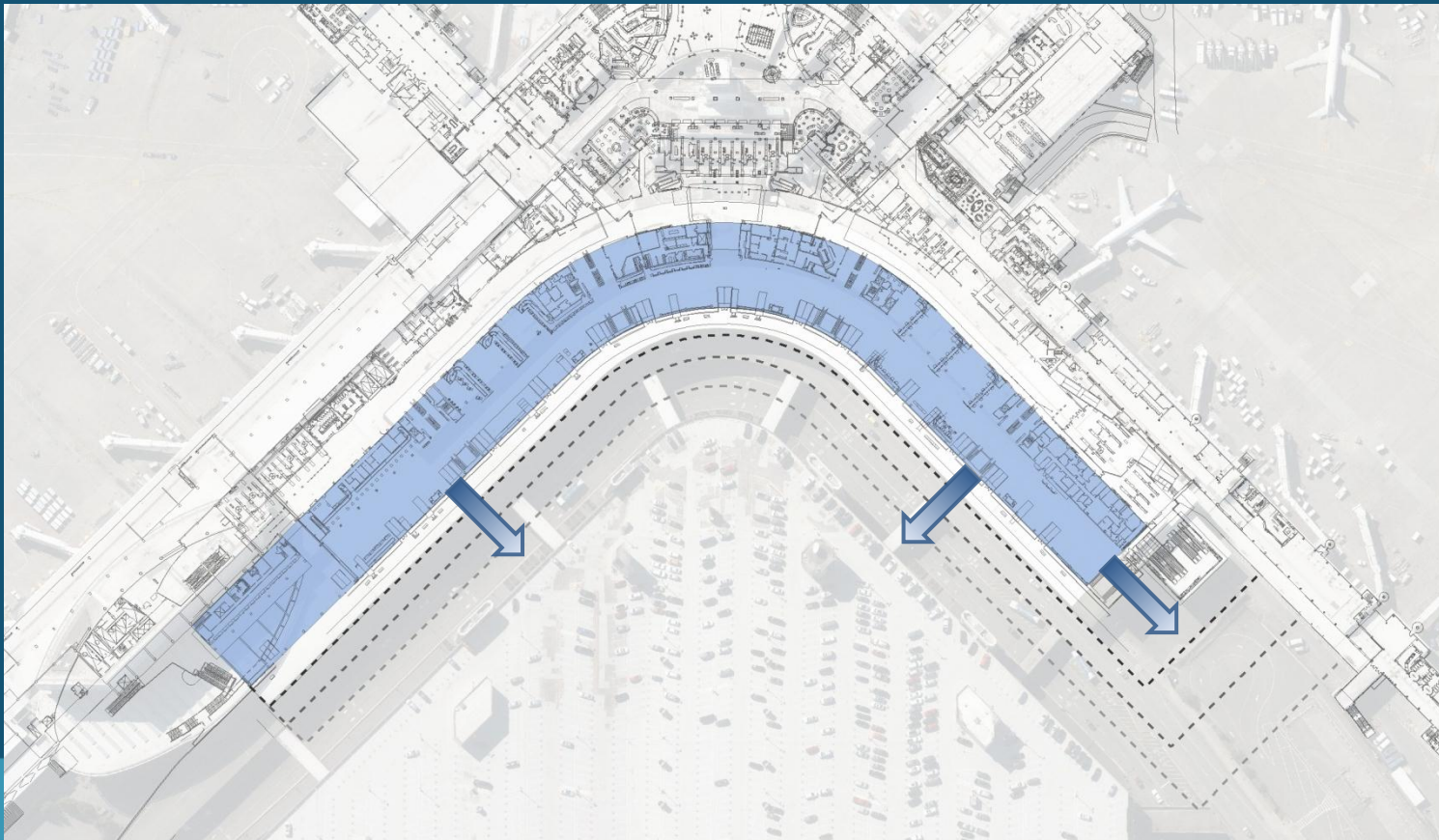
North Satellite Extension

- **Pros**
 - Meets domestic gate requirement
- **Cons**
 - Pushback onto taxiway impacts operations
 - Limited opportunity for second terminal if required
 - Requires relocation of southbound lanes of the North Airport Expressway (NAE)
 - Gate phasing has more impact to existing facilities
 - Limited ability to accommodate widebody aircraft
 - Challenge connecting passengers to the north



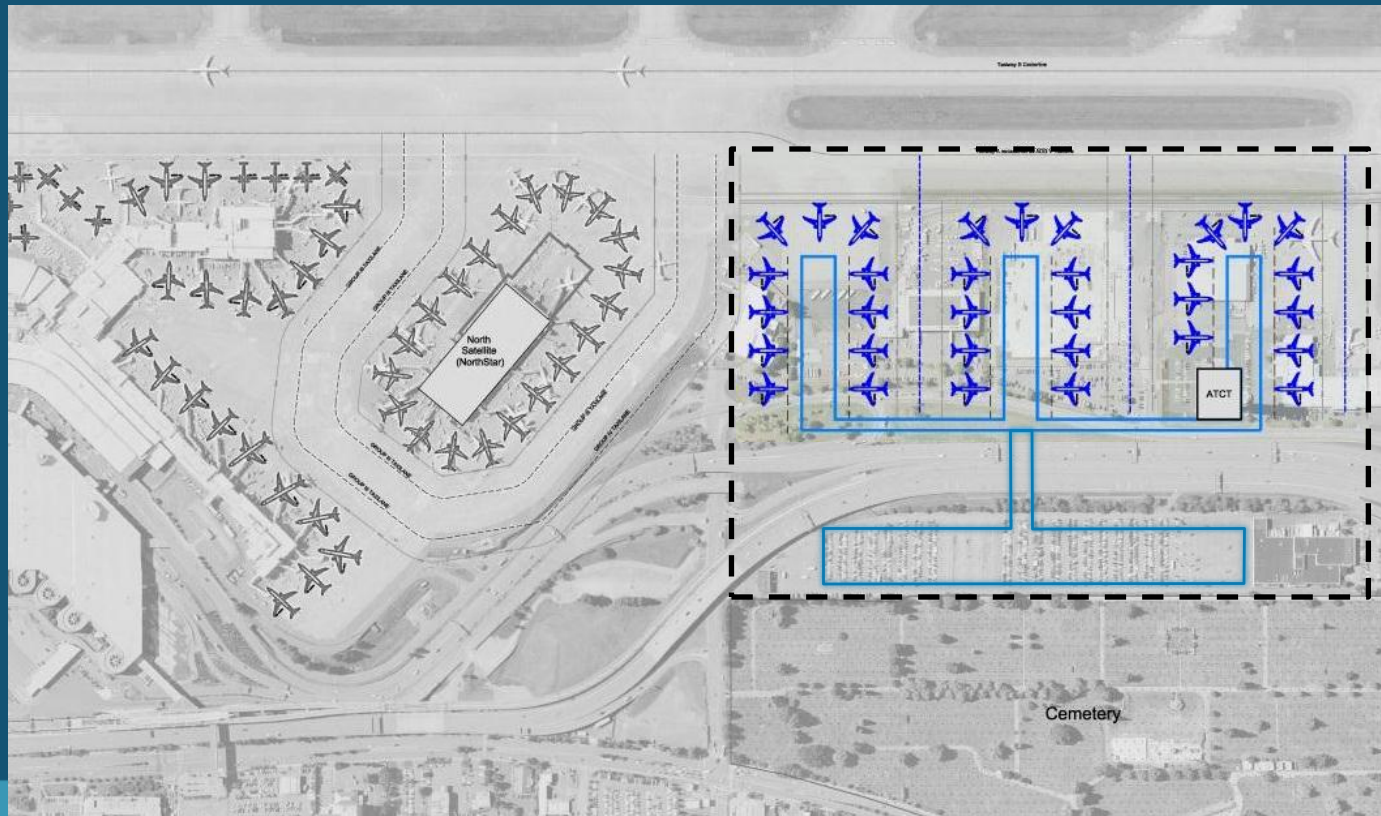
Options – Main Terminal Expansion

- **Expand Main Terminal to the east and north**
 - Expand check-in lobby to the east and north
 - Link screening check-points to APM access to remote gates
 - Expand bag claim to the north



Options - Additional Terminal to the North

- **Construct second terminal to support north gates**
 - Connect existing terminal and north terminal with APM
 - Provide landside access, curb, and parking
 - Provide pedestrian connection to gates over/under North Airport Expressway



Next Steps

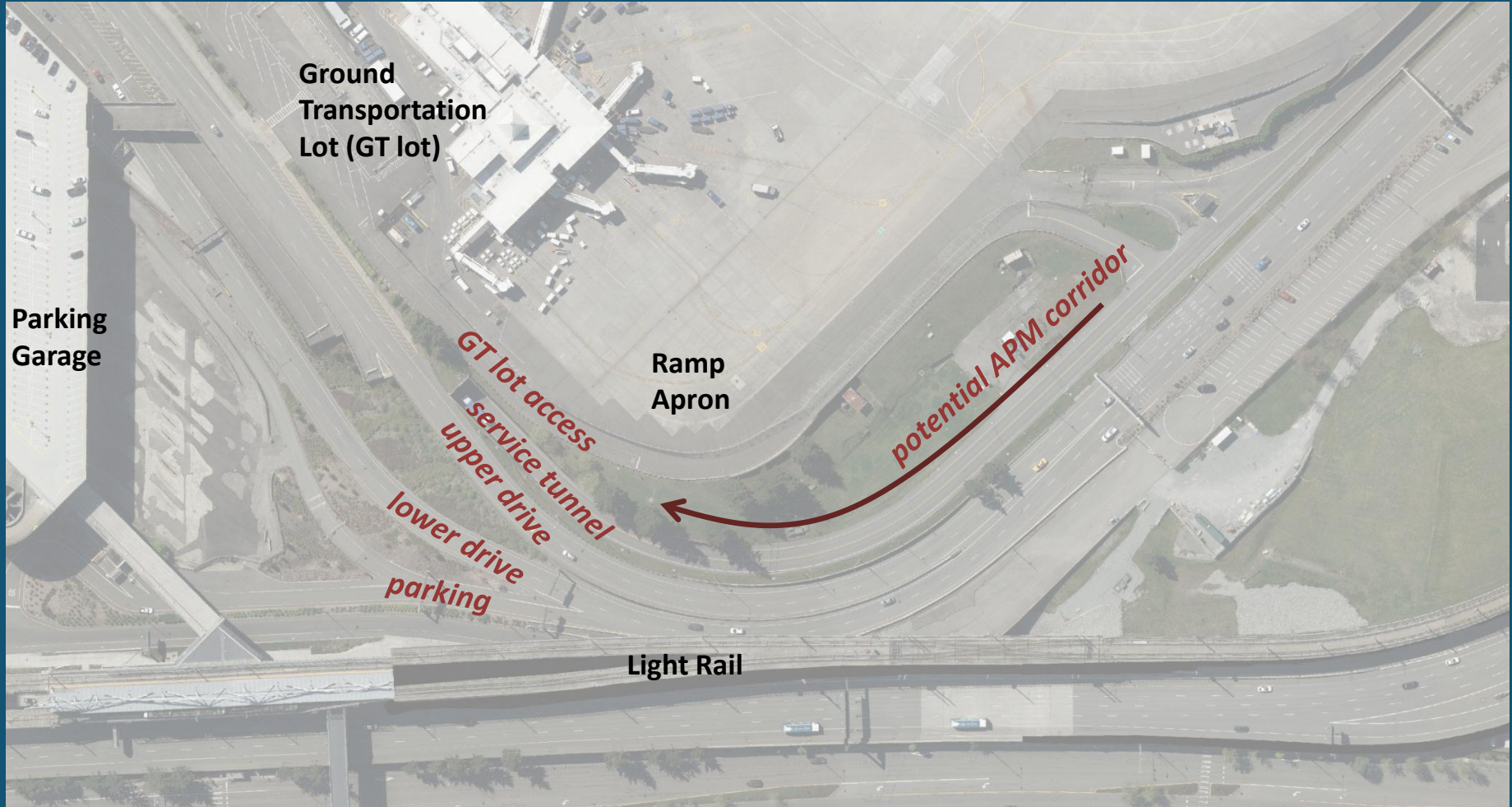
- **Detailed analysis of expansion options**
 - Cost/benefit of south and north expansion options
 - Cost/benefit and feasibility of terminal expansion to the east/north
 - Capacity analysis to determine if second terminal is needed
- **Incorporate non-terminal functions into overall terminal plan**
- **Coordinate terminal-related facilities planning**
 - Check-in/Bag drop
 - Curbside
 - Security screening
 - Automated People Mover (APM)
 - Baggage systems
 - Holdrooms; Dining & retail; vertical circulation
- **Airfield and terminal ramp modeling**

Challenges

- **Upper and Lower Drive expansion difficult**
 - Expensive
 - Construction impacts on operations
- **Expressway access to parking / Upper/Lower Drives exceedingly narrow**
- **Regional roadways outside of direct Port control**
 - SR 509 extension has been delayed for decades
 - Phasing of South Access needs to be modeled and evaluated
- **RCF bus traffic contributes to congestion accessing the drives**
 - Anticipated eventual automated people mover when build RCF

Challenges

- All traffic accessing the airport funnels through a bottleneck on the North Airport Expressway (NAE)

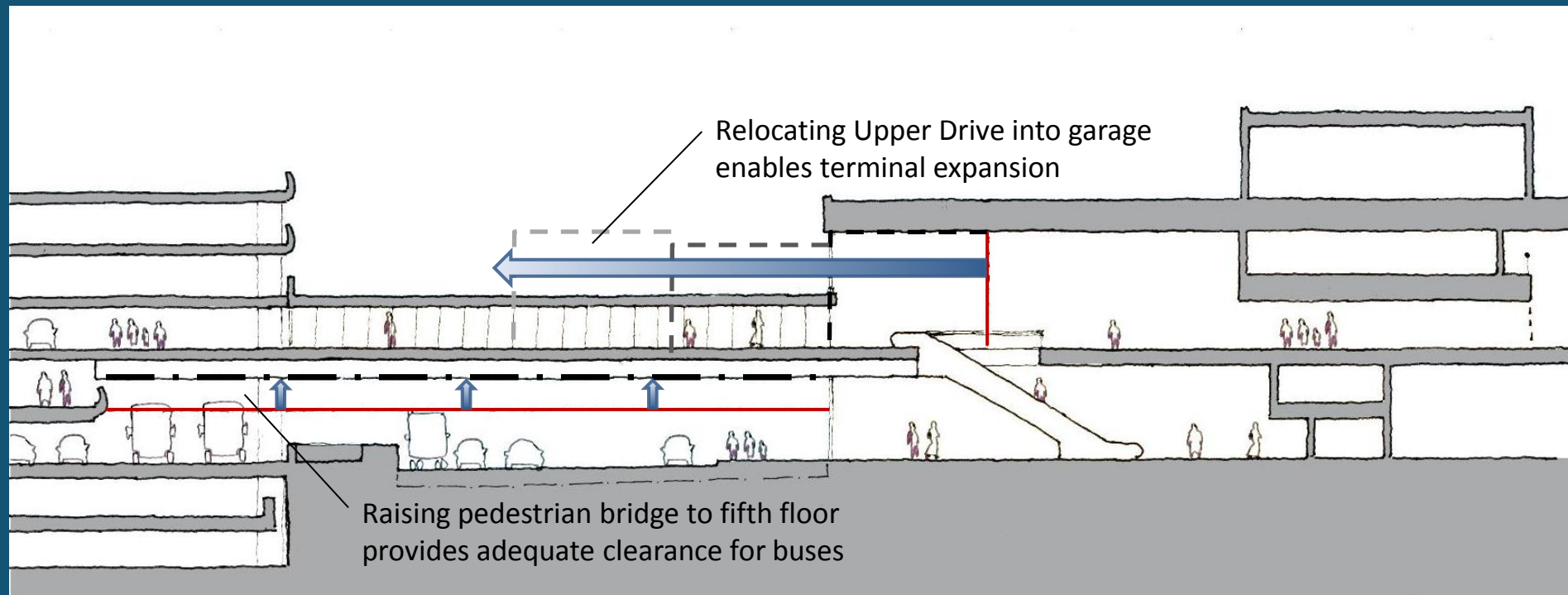


Options - Upper Drive Expansion

- **Widen Upper Drive**
- **Add 3rd lane to Upper and Lower Drive access**
- **Potentially divert demand to alternate drop-off locations**
- **Complex interaction with terminal expansion options**

Options - Upper Drive in Parking Garage

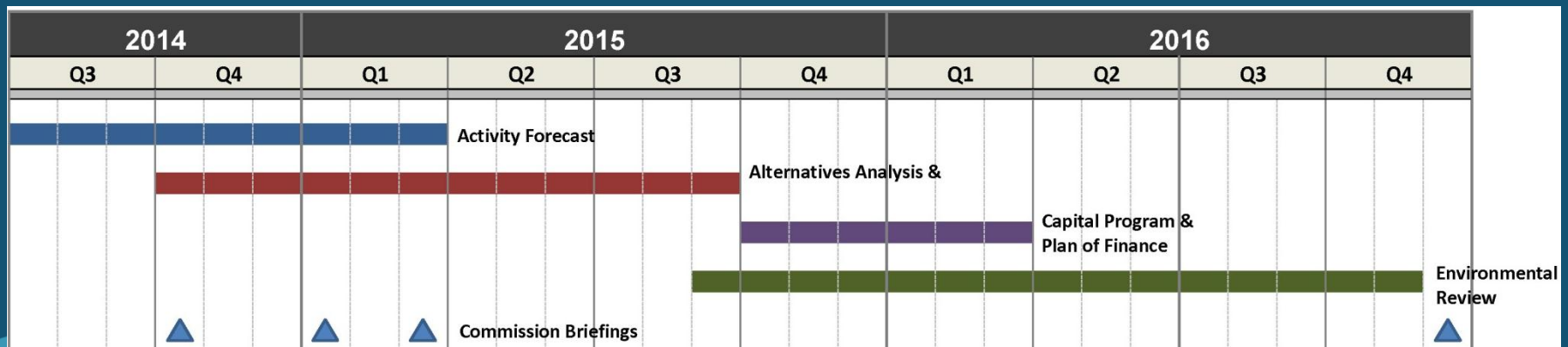
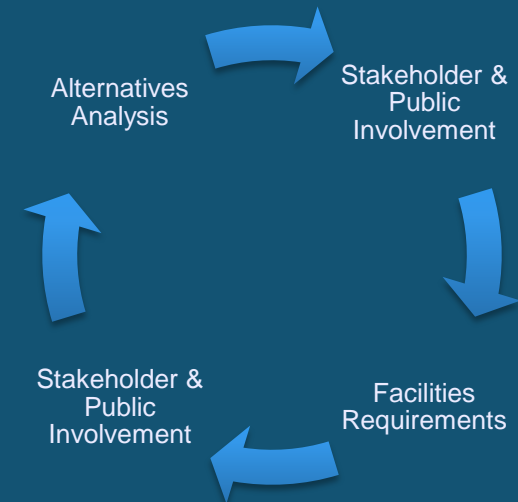
- **Relocate Upper Drive into garage**
 - Enables expansion of main terminal to the east
 - Provides additional clearance on 3rd floor ground transportation curb for buses
 - Provides opportunities for APM connection to main terminal



Next Steps

- **Critical and organic interaction between possible terminal expansion and curb/garage options**
- **Continue refining curbside relocation/expansion alternatives**
 - Feasibility of required modifications to curbs and garage
 - Cost/benefit
- **Landside modeling**
 - Drives capacity/demand analysis
 - Connections to regional roadway system
- **Integration of opportunities, costs, and impacts of terminal and landside options**

- **Activity forecast** (completed Q3 2014 – in FAA review Q1 2015)
- **Alternatives analysis & plan development** (Q4 2014 – Q3 2015)
 - Iterative process, finalizing facility requirements and developing preferred development alternative
 - Commission engagement at key decision points
 - Constructability assessment
 - Phased implementation plan
 - Planning level cost estimates
- **Program plan of finance** (Q4 2015 – Q1 2016)
- **Environmental review** (Q3 2015 – Q4 2016)



Near-Term

■ Challenges

- Shortage of gates over the next 5 to 10 years
- Where/when to build interim remote gate lobby?
- Additional gate capacity will be needed soon after completion of IAF & NorthSTAR
- Check-in processing becoming increasingly efficient, but nearly all existing positions will be utilized in 2015
- Security screening rates have increased with implementation of PreCheck, but current configuration of checkpoints is inefficient

■ Anticipated actions prior to completion of SAMP environmental

- Remote hardstand operations and busing starting in 2016
- Potentially construct interim remote gate lobby
- Expand check-in and reconfigure security checkpoint in zone 7
- Provide additional bag drop on promenade level in zone 6

▪ **Draft Strategy for a Sustainable Sea-Tac (S3)**

- Builds on our Environmental Strategy Plan 2009 – 2014
- Includes sustainability objectives, social responsibility and economic sustainability
- Commission briefing February 10th
- Draft strategy Spring 2015

▪ **S3 integration into SAMP**

- S3 objectives and initiatives evaluated throughout the SAMP process to ensure that capital development is planned in the most sustainable manner possible
 - Environmental sustainability objectives used as part of screening criteria in evaluating concepts
 - Environmental sustainability objectives will be evaluated extensively in proposed new buildings and renovations of existing buildings
 - Final, long-term plan will include management initiatives (in addition to capital improvements) to ensure airport meet its sustainability goals and objectives in future years

▪ Public outreach planning

- Phase I: Series of meetings with local officials and stakeholders
- Phase II: Conduct 3 public outreach & comment meetings
 - 1st Public Meeting (February-March 2015): SAMP process, goals, forecast, and development concepts
 - 2nd Public Meeting (Spring 2015): Preliminary development alternatives
 - 3rd Public Meeting (Summer 2015): Preferred development alternative