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Appendix E

International Terminal Building Arrivals Level Study

This appendix documents the planning study for the ITB Main Terminal Arrivals Level improvements including the inventory of existing facilities, an analysis of future facility requirements, a description of each alternative, identification of the advantages and disadvantages, and a summary of how the alternatives compare to the facility requirements. The results of this analysis were incorporated into the ADP process.

E.1 Inventory

The ITB Main Terminal Arrivals Level facilities consist primarily of the U.S. Customs and Border Protection (CBP) processing areas and administrative offices, international and domestic baggage claim, and the Arrivals Hall. Table E.1-1 provides an inventory of the ITB processing facilities that were evaluated.

<table>
<thead>
<tr>
<th>TABLE E.1-1</th>
<th>International Terminal Building Main Terminal Arrivals Level Inventory</th>
</tr>
</thead>
<tbody>
<tr>
<td>COMPONENT</td>
<td>B/A A</td>
</tr>
<tr>
<td>U.S. CBP Primary Processing</td>
<td>Counters 19</td>
</tr>
<tr>
<td>APC Kiosks</td>
<td>32</td>
</tr>
<tr>
<td>Baggage Claim Devices</td>
<td>International 4</td>
</tr>
<tr>
<td>Domestic</td>
<td>2</td>
</tr>
<tr>
<td>U.S. CBP Secondary Processing</td>
<td>Counters 12</td>
</tr>
</tbody>
</table>

Notes: CBP = Customs and Border Protection  
APC = Automated Passport Control  
Sources: SFO Bureau of Planning and Environmental Affairs; Landrum & Brown, Inc., May 2016

The ITB Main Terminal Arrivals Level, depicted on Exhibit E.1-1, is the primary processing point for international arrivals. The key functions provided on the Arrivals Level of the Main Terminal include:

- CBP international arrivals processing and support space
- International and domestic baggage claim
- Arrivals Hall
- Airline recheck counters
- Ground transportation services on arrivals roadways and curbsides
- Access to Garages A and G
E.2  Planning Parameters and Facility Requirements

Planning parameters and facility requirements guide the development of alternatives for the ITB Arrivals Level improvements. The planning parameters identify the conceptual goals of the ITB redevelopment and the facility requirements identify the capacity needed to accommodate the forecast growth in passenger traffic.

E.2.1  Planning Parameters

The conceptual goals of the ITB redevelopment analysis reflect the relevant components of *The Principles of R.E.A.C.H.* and the ideas identified during the ITB Visioning Charrette and other stakeholder meetings.

To organize and prioritize the ITB redevelopment goals, components were ranked into categories:

1. **Required**: These components would provide adequate capacity for future growth and meet the minimum business or customer service performance objectives of SFO management.
2. **Highly desirable**: These components would enhance SFO’s competitive position among North American gateway airports and significantly increase non-airline revenue generation.
3. **Complementary**: These components would enhance the guest experience at SFO by creating unique experiences and should be incorporated where opportunities exist.
4. **Operational improvement**: These components would increase operational efficiency or provide the necessary infrastructure to increase operational flexibility. Operational improvements are “nice to have” but are not necessary to meet the functional requirements.

Table E.2-1 identifies the category for each of the key ITB redevelopment components.

**TABLE E.2-1 | ITB MAIN TERMINAL ARRIVALS LEVEL REDEVELOPMENT COMPONENTS**

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>CATEGORY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase primary processing capacity</td>
<td>Required</td>
</tr>
<tr>
<td>Expand international baggage claim as necessary to meet requirements</td>
<td>Required</td>
</tr>
<tr>
<td>Expand domestic baggage claim as necessary to meet requirements</td>
<td>Required</td>
</tr>
<tr>
<td>Upgrade the BHS to meet future demand and establish flexible and redundant distribution of baggage between B/As A and G systems</td>
<td>Required</td>
</tr>
<tr>
<td>Improve baggage recheck operations</td>
<td>Highly Desirable/ Operational Improvement</td>
</tr>
<tr>
<td>Enhance the international-to-domestic connecting passenger experience</td>
<td>Highly Desirable</td>
</tr>
<tr>
<td>Improve preclearance to domestic connections</td>
<td>Highly Desirable</td>
</tr>
<tr>
<td>Improve wayfinding from T1 and T3 to B/As A and G</td>
<td>Highly Desirable</td>
</tr>
<tr>
<td>Improve wayfinding to and from the parking garages and ground transportation</td>
<td>Highly Desirable</td>
</tr>
<tr>
<td>Improve visibility and the passenger experience in domestic baggage claim</td>
<td>Highly Desirable</td>
</tr>
<tr>
<td>Optimize Smarte Carte placement</td>
<td>Highly Desirable</td>
</tr>
</tbody>
</table>


---

E.2.2  Facility Requirements

Facility requirements were established for each planning activity level (2018, 2023, Base Constrained, and High Constrained) of the SFO ADP Forecast. It was assumed that B/A H is the recommended alternative for future gate expansion. Planning standards from recent terminal studies at SFO and industry-standard planning metrics from IATA and Airport Cooperative Research Program (ACRP) Report 25, *Airport Passenger Terminal Planning and Design* were used in the facility requirements development.

For components where level of service is a factor in the facility requirements, the IATA Optimal Level of Service was used. This level of service provides sufficient space to accommodate necessary functions in a comfortable environment with “acceptable” processing and waiting times. SFO policies and guidelines, including *The Principles of R.E.A.C.H.* and concession revenue performance targets, were incorporated into the facility requirements.

As discussed in Chapter 4 Section 4.3.2, T1 and T3 will include swing gates capable of accommodating international arrivals. As all international arriving passengers must be processed in the U.S. CBP facilities located in the ITB, international flights forecast to use these gates are included in the ITB facility requirements.

**TABLE E.2-2 | ITB PEAK HOUR ARRIVING PASSENGER DEMAND**

<table>
<thead>
<tr>
<th>PASSENGER TYPE</th>
<th>2018</th>
<th>2023</th>
<th>BASE CONstrained</th>
<th>HIGH CONstrained</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERNATIONAL</td>
<td>2,711</td>
<td>3,213</td>
<td>4,139</td>
<td>4,537</td>
</tr>
<tr>
<td>DOMESTIC</td>
<td>438</td>
<td>508</td>
<td>689</td>
<td>720</td>
</tr>
</tbody>
</table>


---

The U.S. CBP facility requirements are based on the CBP Airport Technical Design Standards (ATDS) issued in June 2012. This document identifies all CBP spatial requirements based on the projected numbers of peak hour arriving passengers. The ATDS does not account for processing efficiencies associated with recent initiatives, such as Automated Passport Control (APC) and Mobile Passport Control (MPC), which have been implemented at many U.S. gateway airports, including SFO. As APC and MPC use increases and becomes available to passengers with visitor visas, the overall spatial requirements will be reduced as a result of a faster processing rate. The ATDS does not account for actual CBP officer staffing limitations. The space requirements generated using the ATDS are conservative, providing sufficient space and processing area to implement new processing initiatives that would reduce staffing demand.

The peak hour arriving passenger count for each of the planning activity levels is provided in Table E.2-3. Peak hour arriving passenger counts are organized by boarding area because the CBP primary and secondary processing areas are separate. The corresponding CBP facility requirements are provided in Table E.2-4.

<table>
<thead>
<tr>
<th>TABLE E.2-3</th>
<th>ITB Peak Hour International Arriving Passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOARDING AREA</td>
<td>2018</td>
</tr>
<tr>
<td>A</td>
<td>1,588</td>
</tr>
<tr>
<td>G</td>
<td>1,690</td>
</tr>
</tbody>
</table>

Notes: Boarding Area A includes passengers on international flights arriving at the future T1 swing gates. Boarding Area G includes passengers on international flights arriving at the future T3 swing gates and Boarding Area H.


<table>
<thead>
<tr>
<th>TABLE E.2-4</th>
<th>ITB U.S. CBP Facility Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACILITY</td>
<td>BOARDING AREA</td>
</tr>
<tr>
<td>Primary Processing</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>booths</td>
</tr>
<tr>
<td>G</td>
<td>booths</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Secondary Processing</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>square feet</td>
</tr>
<tr>
<td>G</td>
<td>square feet</td>
</tr>
<tr>
<td>Secondary Operations</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>square feet</td>
</tr>
<tr>
<td>G</td>
<td>square feet</td>
</tr>
<tr>
<td>U.S. CBP Administration</td>
<td>N/A</td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
</tr>
<tr>
<td>TOTAL GROSS AREA</td>
<td></td>
</tr>
</tbody>
</table>

Notes: 1 Secondary Operations space is included in Secondary Processing under existing conditions. 2 A net-to-gross area factor of 30 percent was applied to Secondary Processing and Administration areas.


This section documents the alternatives analysis for the ITB Main Terminal Arrivals Level improvements including a description of each alternative, identification of its advantages and disadvantages, and a summary of how the alternatives compare to the facility requirements.
E.3.1 Alternative 1

Alternative 1, illustrated in Exhibit E.3-1, consists of a reconfigured CBP Secondary Processing facility, allowing for the B/A A and B/A G international baggage claim halls to be connected, an international baggage claim expansion within the Main Terminal, and concessions expansions in the Arrivals Hall.

Alternative 1 consists of the following improvements, as shown in Exhibit E.3-2:

- Combining the international baggage claim halls by reconfiguring CBP Secondary Processing to provide a corridor between the two halls. Separate exits for connecting and terminating passengers would be maintained.
- Expanding CBP Primary Processing for both boarding areas.
- Extending four of the existing international baggage claim devices.
- Installing two new international baggage claim devices in the area currently occupied by CBP and airline offices.
- Reconfiguring the airline recheck areas to provide adequate circulation to the new CBP Secondary Processing areas.
- Retaining two out of three existing domestic baggage claims.
As illustrated in Exhibit E.3-3, passenger flows for this alternative remain unchanged with the exception of the corridor linking the two international baggage claim halls.

Alternative 1 provides sufficient international and domestic baggage claim capacity. However, the disadvantages of Alternative 1 include the following:

- Expanding the international baggage claim hall displaces CBP and airline support offices that must be relocated to other areas of the ITB.
- The existing domestic baggage claim devices do not have sufficient capacity for ADG VI aircraft arriving from preclearance locations and the area for the domestic baggage claim is insufficient for widebody aircraft. This issue could be resolved by using the domestic baggage claim devices in T2 or T3 for any widebody domestic or precleared arrivals in B/As A or G, respectively.

E.3.2 Alternative 2

Alternative 2, illustrated in Exhibit E.3-4, consists of a grand stairway connecting the Departures and Arrivals Levels, a reconfigured CBP Secondary Processing to allow for pre-security connections between the front and back of the Main Terminal, an expanded international baggage claim within the Main Terminal, and a new domestic baggage claim near Gate G91.

The Main Terminal Arrivals Level consists of the following improvements, as shown in Exhibit E.3-5:

- Expanding CBP Primary Processing for both boarding areas to meet the facility requirements.
- Reconfiguring CBP Secondary Processing to provide a pre-security corridor between the front and back of the Main Terminal. This design allows for either separate or combined exits for connecting and terminating passengers.
- Extending four of the existing international baggage claim devices to meet the facility requirements for claim frontage.
- Relocating the airline recheck counters into a building expansion to allow for the new pre-security corridor.
- Installing two new international baggage claim devices in the area currently occupied by CBP and airline offices.
- Constructing a new domestic baggage claim hall near Gate G91, allowing the three existing domestic baggage claim devices to be converted to international use.
The passenger flows for this area, illustrated in Exhibit E.3-6, would change substantially because the vertical circulation cores near the T1 and T3 connectors would be removed. Pre-security connecting passengers would use the new corridor to reach the Departures Level. International arriving passengers would generally take the existing route except for passengers who are connecting to domestic flights departing from the ITB. Those passengers would re-check their bags at the back of the building, then turn around and use the grand stairway to reach the SSCP on the Departures Level or continue across the non-secure connectors toward Terminals 1 and 3. Domestic passengers needing to claim checked baggage would access the new domestic baggage claim hall via either the new arrivals corridor or the existing Arrivals Hall.
The advantages of Alternative 2 include the following:

- The new domestic baggage claim hall provides sufficient baggage claim capacity.
- The expanded meeters and greeters area in the Arrivals Hall provides additional space for circulation and concessions.
- The grand stairway provides visual connectivity between the Arrivals and Departures Levels and allows international-to-domestic connecting passengers to enter the Departures Level near the consolidated SSCP.

The disadvantages of Alternative 2 include the following:

- Because the international baggage claim halls remain split, they do not provide sufficient baggage claim frontage for either boarding area.
- Expanding the international baggage claim hall displaces CBP and airline support offices that must be relocated to other areas of the ITB.
- The new domestic baggage claim hall is located near Gate G91 and would increase the walking distance and complicate the wayfinding for domestic and precleared passengers arriving at B/A A. This issue could be resolved by using the domestic baggage claim devices in T1 for these flights.

Alternative 3, illustrated in EXHIBIT E.3-7, consists of a reconfigured CBP Secondary Processing area and a new domestic baggage claim near Gate G91.

The Main Terminal Arrivals Level consists of the following improvements, as shown in EXHIBIT E.3-8:

- Combining the international baggage claim halls by reconfiguring the CBP Secondary Processing to provide a corridor. Separate exits for connecting and SFO-bound passengers would be maintained.
- Expanding the CBP Primary Processing for both boarding areas.
- Extending four of the existing international baggage claim devices.
- Repositioning the airline recheck counters to provide adequate circulation to the new CBP Secondary Processing areas.
- Constructing a new domestic baggage claim hall near Gate G91, allowing the three existing domestic baggage claim devices to be converted to international baggage claim use.

In addition, this alternative preserves the ability for a building expansion to accommodate the relocation of CBP administrative support spaces. The advantages of Alternative 3 include the following:

- Utilization of the existing ITB baggage claim devices for international flights minimizes displacement of CBP and airline support offices.
- The new domestic baggage claim hall provides sufficient baggage claim capacity.
- Separate exits are maintained for connecting and terminating international arriving passengers.

The primary disadvantage of Alternative 3 is that the new domestic baggage claim hall is located near Gate G91 and would increase the walking distance and complicate the wayfinding for domestic and precleared passengers arriving at B/A A. This issue could be resolved by using the domestic baggage claim devices in T1 for these flights.
The revised passenger flows for this area, illustrated in Exhibit E.3-9, remain relatively unchanged with the exception of the corridor linking the two international baggage claim halls. Domestic and precleared passengers arriving at B/A A would be directed to the baggage claim at T1. Domestic and precleared passengers arriving at B/A G would be directed to the new domestic baggage claim hall, although United Airlines could continue to use the T3 baggage claim for domestic and precleared passengers.


E.4 Evaluation

The primary focus of the evaluation process was to assess the ability of each alternative to satisfy the ITB Main Terminal Arrivals Level improvements objectives. The set of alternatives were compared against the existing condition as well as each other through a screening and evaluation process that considered the following evaluation criteria:

- International Baggage Claim Capacity: provides sufficient international baggage claim capacity to meet long-term demand at the Base Constrained demand level.
- Domestic Baggage Claim Capacity: provides sufficient domestic baggage claim capacity to meet long-term demand at the Base Constrained demand level.
- Minimal Displacement of Offices: requires minimal, if any, relocation of CBP or airport administration offices.
- Domestic Baggage Claim Walking Distances: maintains or improves the walking distance from B/As A and G to the domestic baggage claim.
- Enhanced Arrivals Hall: improves the guest experience in the Arrivals Hall by creating additional space for meeters and greeters and concessions.

The evaluation screening of alternatives, illustrated in TABLE E.4-1, used a three-tiered color-code to rate each alternative against the evaluation criteria. A summary for each rating explains the benefits and impacts of each alternative. The color codes used in the evaluation matrix are as follows:

- ● Exceeds Objectives
- ○ Meets Objectives
- ◐ Maintains Existing / Does Not Meet Objectives

This evaluation resulted in the identification of a recommended alternative. The symbols used for that evaluation are:

- ✓ Selected Alternative
- × Eliminated Alternative

The primary differences between the three alternatives are the location of the baggage claim devices and the connectivity between the B/As A and G baggage claim halls. Alternatives 1 and 2 require that new international baggage claim devices be installed in the area currently occupied by CBP and airline support spaces, which would have to be relocated elsewhere in the ITB. Alternative 3 utilizes all of the existing ITB baggage claim devices for international baggage claim. Alternatives 1 and 3 provide a connection between the g/As A and G baggage claim halls by reconfiguring CBP Secondary Processing while Alternative 2 maintains separate baggage claim halls. The existing layout and Alternative 2 do not meet the international baggage claim capacity requirements.

Alternative 3 was selected as the recommended alternative because it provides the necessary international baggage claim capacity while maintaining the current passenger flow and minimizing displacement of CBP and airline support spaces. It maintains the opportunity for a building expansion to provide additional enhancements, such as a dedicated security checkpoint for connecting passengers.
E.5  Key Benefits of the Recommended Alternative

The recommended ITB Main Terminal Arrivals Level Alternative, Alternative 3, is a balanced solution that provides the following key benefits:

- The modifications will improve the guest experience and provide flexibility of airline gate allocation between gates on B/As A and G of the ITB.
- Reconfiguration of CBP Secondary Processing allows for cross-utilization of the baggage claim halls.
- Converting the three existing domestic baggage claim devices to international baggage claim will minimize the impact to existing CBP and Airport offices.
- The new domestic baggage claim hall near Gate G91 will include claim devices sized for multiple precleared narrowbody or widebody arrivals.

E.6  Open Issues for Programming and Conceptual Design

During the alternatives development phase and confirmation of the recommended alternative, a number of issues were identified that must be addressed in a detailed programming and conceptual design phase. In some cases, the costs and benefits must be analyzed further to determine the appropriate solution. Below is a brief description of each of the open issues for programming and conceptual design.

Perform simulation analyses of CBP Primary Processing to confirm long-term facility requirements.

The facility requirements for the CBP Primary Processing area are based on current design standards, which do not account for recent initiatives such as Automated Passport Control, Mobile Passport Control, and Global Entry, all of which have substantially improved processing capacity. Simulation analyses should test existing, new, and future CBP Primary and Secondary Processing procedures and confirm the facility requirements for each of the planning activity levels.

The simulation analyses will validate the potential need for the building expansion identified as part of the recommended alternative.

Perform detailed space programming for the CBP Administrative spaces.

The CBP design guidelines have changed substantially since the opening of the ITB and generally require less administrative and support space due to the consolidation of multiple agencies. New design guidelines, anticipated for release in 2016, may further change the requirements.

Several improvements on the Arrivals Level would displace CBP administrative and support spaces. The potential building expansion on the Arrivals Level to accommodate these spaces would require a detailed programming effort to determine to what extent the expansion is necessary (if at all).