Executive Summary

The executive summary provides a brief summary of the master plan for Oakland International Airport (OAK). It has the following sections:

Background and Overview

Background

The Port of Oakland executed various settlement agreements with the surrounding communities in which the Port agreed to prepare a 20-year master plan for Oakland International Airport in accordance with Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5070-6A, Airport Master Plans. The Port's Aviation Planning and Development staff prepared the master plan, with assistance from specialized consultants for graphics, airfield simulation, aircraft noise analysis, and administration.

Stakeholder Advisory Committee Process

The central process for conducting the master plan was a series of meetings with a Stakeholder Advisory Committee. The role of the Stakeholder Advisory Committee was to (1) advise Port staff on long-range, high-level planning issues at OAK, (2) provide input on master plan technical issues, and (3) identify potential impacts early-on in the planning process. The Stakeholder Advisory Committee consisted of representatives (community members and/or staff) from the cities of Alameda, San Leandro, and Oakland, San Leandro Unified School District, Alameda County, and Airport users, including fixed base operators, passenger and cargo airlines, the Port's Airline Liaison Office, and flight training / light general aviation aircraft operators. Each member of the Stakeholder Advisory Committee had formal representation in the formulation of the master plan and all members were given the opportunity to participate in development and consideration of objectives, alternatives, evaluations, etc. Some members of the Stakeholder Advisory Committee performed independent technical work to verify master plan analyses and draw their own conclusions, including preparation of simulations, spreadsheet analyses, and use of outside consultants for peer review. Committee meetings were scheduled every one to two months and were structured around master plan technical elements and topics. There were 11 Stakeholder Advisory Committee meetings (June 2004 through December 2005).

Overview

This master plan for OAK is a concept-level planning and feasibility study that identifies potential near-term projects (5-year timeframe) and provides long-term (20-year) on-Airport general land-use guidance. It has been prepared in accordance with the Federal Aviation Administration (FAA) Advisory Circular (AC) No. 150/5070-6A, Airport Master Plans. The following bullets provide a high-level overview of the results of the master plan:

- The primary products of the master plan are near-term (2010 to 2012) and long-term (2025) Airport land-use maps (see Chapter 8 and Figures 8.1, 8.2, and 8.3).
- The primary focus of the master plan is on potential near-term projects (2010 to 2012) and accommodating forecast airline passenger activity in the near-term.
- Projects are not proposed to accommodate long-term (2025) forecasts, which are speculative and not reasonably foreseeable at this time. Further, the long-term, unconstrained airline passenger forecasts are not likely to be realized due to limitations on South Field (air carrier) runway capacity (i.e., a new runway is not proposed in this master plan).
- Air cargo growth is focused on existing air cargo tenants; a low-growth air cargo forecast is recommended as the Port intends to de-emphasize marketing new air cargo airlines and service.

Summary of Aviation Activity Forecasts

One of the first steps in preparing an airport master plan is to forecast unconstrained future aviation activity. Unconstrained forecasts are not constrained by any assumptions about the availability (or lack of availability) of existing and/or future Airport facilities, such as aircraft gates or runways. In other words, these forecasts represent the "natural" activity that would occur at OAK, absent any constraints on the availability of facilities. As noted throughout the master plan, the unconstrained forecast of airline passengers in 2025 is likely not achievable without an additional air carrier runway, which is not recommended in this master plan.

Summary of Unconstrained Aviation Activity Forecasts — **Table E.1**

		2004 (Existing)	2010	2025
Airline Passengers				
Million Annual Passengers (MAP)		14.1	18	30[1]
Daily Operations[2]		430	542	n/a
Air Cargo				
Million Annual Tons (MAT)		0.7	0.9	1.5
Daily Operations[2]		156	164	n/a
General Aviation				
Daily Operations	Helicopter	7	97[3]	n/a
	Jet	45	55	n/a
	Piston	284	266	n/a
	Turboprop	16	16	n/a
Total Daily Operations[2]		**938**	**1,140**	**n/a**

(1) Unconstrained, could not be accommodated without additional runway facilities, which are not recommended in this master plan; **(2)** An operation is a take-off or landing; **(3)** In 2004, a new helicopter flight training school opened at OAK North Field. The school is ramping up training classes and flight operations through 2006. During this period, the number of helicopter operations is anticipated to grow from between 2,000 to 4,000 to just over 34,000 annual operations. After this ramp-up period, it is anticipated that helicopter operations would grow 1% annually (no additional helicopter flight training schools are anticipated at OAK North Field). Most of the helicopter training flights are conducted over Airport property; **n/a** — not available (the number of aircraft operations in 2025 cannot be predicted with reliability and is dependent on many future variables).

Estimating constrained airline passenger demand for 2025 (e.g., given capacity limitations of the existing South Field runway) is difficult and dependent on many future variables. Constrained airline passenger forecasts are dependent on many factors, including the types of airplanes the airlines choose to fly (i.e., fleet mix and the number of seats per airplane), assumed taxiway and other airfield improvements, amount of delay that the airlines and airline passengers are willing to tolerate, air travel market constraints, air traffic control rules and procedures, required aircraft-to-aircraft separations due to wake vortices, etc., all of which are likely to change between now and 2025. Table E.1 summarizes the unconstrained master plan forecasts.

Potential Airline Passenger Development

Based on the forecasts of airline passenger and passenger airline operations, it was estimated that the Airport will need between 46 and 50 total aircraft gates (between 17 and 21 gates more than the current 24 gates plus those 5 under construction) to accommodate passenger demand in the 2010 to 2012 timeframe at a reasonable level of service (e.g., with less crowding in holdrooms, the ability to take facilities out of service to allow for routine cleaning and maintenance, etc.). From a level of service perspective, 46 to 50 total aircraft gates results in between 6 to 6.5 departures per gate per day, and 37,000 to 42,000 passengers per gate in the peak month (August). This compares to 8.9 daily departures per gate per day in August 2004 (from 24 gates), and 56,500 passengers per gate in August 2004. The national average is about 5.5 departures per gate per day.

Three possible areas at South Field were considered for the near-term potential future terminal development described above. The three areas include (1) the Central Basin (west of the FedEx Metroplex and north of Taxiway W), (2) the existing terminal area and Oakland Maintenance Center site, and (3) east of Terminal 2 in San Francisco Bay. Thirteen potential general terminal development concepts were considered in these three areas. For each concept, the following planning considerations were discussed:

- Runway access / taxiways
- Remote aircraft parking area
- Landside access roads, wayfinding, curbside length, parking (area and revenue)
- Walking distances
- Environmental constraints
- Constructability (existing facilities must remain operational)
- Total project cost (including replacement facilities)
- Other considerations specific to a particular concept

Based on the planning considerations and input from the Stakeholder Advisory Committee, it is recommended that the area designated for potential future terminal development at OAK be located in the existing terminal area and Oakland Maintenance Center site. This area is (1) less challenging environmentally, (2) more likely to be financially affordable, and (3) farthest from residences in both Alameda and San Leandro. Some of the Stakeholder Advisory Committee representatives are concerned about any future development at OAK. Other representatives indicated that mitigation measures need to be explored to offset potential environmental effects associated with existing and future aircraft operations. The representatives from the City of San Leandro indicated that terminal development in this area should be kept as far south as possible to discourage passenger airlines from using runways at North Field. Port staff explained that terminal development located anywhere in the existing terminal area and Oakland Maintenance Center site would not likely change the airlines use of the runways at OAK. However, all such concerns will continue to be considered as the Port performs more detailed planning and evaluation of potential future development. Also, input and recommendations provided by members of the Stakeholder Advisory Committee on potential future terminal development should not necessarily be considered implicit endorsement of future terminal expansion.

Potential Air Cargo Development

Various areas on the Airport were evaluated for potential future air cargo development. The master plan recommends accommodating the lowest forecast of air cargo activity, rather than an aggressive forecast that would require a significant amount of new development. Instead, only a modest amount of additional on-Airport area would be needed to accommodate future air cargo growth, and this area would likely be needed adjacent to existing air cargo facilities. Although several areas were examined, including the Central Basin and North Field, the recommended areas to be designated for potential future development to accommodate growth in air cargo are (1) north of the existing FedEx Metroplex, south of Ron Cowan Parkway (to allow a modest expansion of the Metroplex) and (2) the now abandoned Oakland Maintenance Center site, which could be used for replacement air cargo facilities. The Stakeholder Advisory Committee generally agreed that the Port should consider only the lowest amount of air cargo growth (essentially modest growth of existing air cargo tenants).

Potential General Aviation Development

Except for flight training schools, it was determined that there is not a strong link between general aviation aircraft operations and the number of general aviation aircraft based at OAK. Various areas (mostly at North Field) were evaluated for potential future general aviation development. In 2010, it is estimated that an additional 3 to 7 acres would be required to base jets and turboprops at OAK, and an additional 9 to 15 acres would be required to base piston airplanes and helicopters at OAK. The area anticipated to be needed to base additional piston airplanes and helicopters is for hangars to park private airplanes, not aircraft associated with flight schools. Today, there is one flight school at North Field that trains students to fly helicopters. There are also two smaller flying clubs / businesses that offer flight instruction in small, piston airplanes.

While a specific development plan is not proposed, it is recommended that the area designated for potential new general aviation development (primarily hangars and aircraft aprons) occur at North Field, either in currently undeveloped sites (such as adjacent to Hangar 10 or off Harbor Bay Parkway) or through the redevelopment of existing general aviation facilities at North Field, subject to market interest and conditions. This type of development is well-suited for a third-party developer (where the Port leases the land to a developer who then constructs and manages the aircraft hangars). The Stakeholder Advisory Committee provided comments, but did not recommend any changes to potential general aviation development.

Potential Airfield Development

The airfield (taxiways and runways) was simulated using the 2010 operations forecasts. The major airfield simulation assumptions were as follows (note: these potential projects are not designed or proposed for approval, but were assumed as hypothetical projects for purposes of modeling the airfield):

- A new 21-gate unit terminal (for 50 total gates) would be constructed parallel to and east of Taxiway B (north of Taxiway T).
- The cargo building (now housing UPS and belly cargo) would be relocated to the northern part of the Oakland Maintenance Center site.
- A new taxiway parallel to and east of Taxiway B would be constructed.

The simulation showed that in 2010, there would be about 20 minutes of queue delay per aircraft, on average, accessing Runway 29 during the morning departures peak from about 7 AM to 9 AM. The average queue delay per aircraft was less than 10 minutes for the remainder of the day. In August 2005, the average queue delay per aircraft was less than 10 minutes during the morning departures peak, with only occasional queue delays averaging less than a few minutes each for the remainder of the day.

Twenty minutes of delay per aircraft in the morning departures peak in 2010 is not desirable, so two airfield improvements were tested using the simulation model:

- Taxiway access improvements to Runway 29
- A new high-speed taxiway exit off Runway 29

The taxiway access improvements would provide additional queuing space and allow air traffic control to sequence departures more efficiently. The new high-speed taxiway exit would allow landing aircraft to exit the runway sooner, allowing departing aircraft to take-off sooner. With these two improvements, there would be about 10 minutes of queue delay per aircraft, on average, accessing Runway 29 during the morning departures peak. These two airfield improvements are not considered runway capacity improvements; rather, they reduce the number of peak-hour flights that would spill over (be delayed) into the following hour.

Although these airfield improvements would not be required in 2010 (with a new 21-gate unit terminal), they would allow the airfield to operate more efficiently, reducing delay during the morning departures peak and continuing to provide benefits beyond 2010.

Beyond 2010, Runway 11-29 will continue to experience increases in delay (although less if the two improvements above are implemented), as the morning departures peak continues longer into the morning and during other peak activity periods. Detailed simulation analyses

were not performed beyond 2010; however, it is anticipated that delay on Runway 11-29 will increase so as to warrant additional runway capacity at South Field between 2015 and 2025. Any potential new runway at South Field would have considerable environmental issues associated with filling wetlands and San Francisco Bay, as well as financial issues (e.g., several billion dollars). Therefore, it is recommended that the Port not pursue a new South Field runway at this time due to environmental and financial constraints. However, it is recommended that the Port work with its regional partners (e.g., the Regional Airport Planning Committee) to continue discussions about the future demand and capacity of runways at Bay Area airports and possible alternatives. Providing additional runway capacity for the Bay Area should be discussed and decided by the entire region. For example, other options for providing additional Bay Area runway capacity could include air service development at other regional or military airports.

The Stakeholder Advisory Committee discussion about new runway capacity at South Field was mixed. Most members preferred not to discuss the need for new runway capacity in the long-term; others saw some potential aircraft noise reduction with the outboard runway options (south of existing Runway 11-29).

The master plan examined new taxiways to provide an additional connection between North Field and South Field (e.g., a new taxiway parallel to existing Taxiway B). Currently, Taxiway B can become congested with aircraft taxiing northbound (e.g., a FedEx aircraft that landed on Runway 29 taxiing to the Metroplex) versus other aircraft taxiing southbound (e.g., a corporate jet complying with the Port's voluntary noise abatement procedures, which asks that corporate jets (and large turboprops) depart on Runway 29 at South Field, instead of using one of the runways at North Field where they typically park). The Alameda representatives on the Stakeholder Advisory Committee were interested in studying this additional taxiway in order to keep access to South Field as convenient as possible for corporate jets (and large turboprops) so that they continue to comply with the Port's voluntary noise abatement procedures (today, about 98% of these aircraft comply). Based on measured taxi distances and estimated taxi times, as well as the airfield simulation described above, it was demonstrated that a taxiway parallel to Taxiway B on South Field (e.g., between Taxiways T and B2) would resolve most of the Taxiway B congestion and head-to-head taxi issues. Continuing this taxiway to North Field would not be required in the 2010 to 2012 timeframe.

In addition to taxiway and runway considerations, the master plan examined the need for remote (off-gate, on-Airport) remain overnight (RON) aircraft parking apron. In February 2005, there were approximately 26 acres of apron dedicated to RON aircraft parking, of which 21 acres was in use on any given night. After the Terminal 2 renovation / extension project is complete, there will be approximately 33 acres of apron dedicated to RON aircraft parking, of which 23 to 26 acres is anticipated to be required on any given night. In the 2010 to 2012 timeframe, it is estimated that between 23 and 46 acres (total) would be required. By 2025, it is estimated that between 33 and 68 acres (total) could be required (unconstrained). These estimates are not constrained by any assumptions about the availability (or lack of availability) of existing and/or future Airport facilities, such as terminal buildings, taxiways, and runways. That is, these estimates represent the "natural" amount of remote RON aircraft parking that would need to be accommodated at OAK, absent any constraints on the availability of terminal buildings, runway capacity, etc.

Airline-Related Support Facilities

Airline-related support facilities include belly cargo, provisioning and catering, fuel load rack, ground service equipment (GSE) maintenance facility, GSE storage and GSE parking areas, ground runup enclosure (GRE), airport rescue and firefighting (ARFF) station, triturators, and fuel storage. Potential areas on the Airport for these types of facilities were evaluated. Many airline-related support facilities should be located close to the terminal complex. However, the terminal area is already quite congested and will likely be more so in the future if a new terminal is proposed and approved in this area (north of Terminal 1, south of Ron Cowan Parkway, and east of Taxiway B). Some airline-related support facilities are currently located on the Airport, and new or replacement facilities may only be required if the existing facilities are displaced by another (presumably higher and better) use.

Airport Ground Access

The need for future airport ground access improvements was analyzed. Essentially, with the completion of the Airport Roadway Project, which rebuilt 98th Avenue and Airport Drive (up to Neil Armstrong Way) and the recent start of construction on the new terminal loop roadway and curbside project, the Airport's primary roadway system is well situated to accommodate forecast airline passenger, air cargo, and general aviation ground access needs. Areas to accommodate future airline passenger and employee parking were also evaluated. Generally, airline passenger and employee parking should be located as close to the terminal complex as possible. However, the terminal area is already quite congested and will likely be more so in the future. Areas around the existing terminal complex should be considered for future airline passenger and employee parking (to the extent that they are available). The upland area of the Central Basin, south of Ron Cowan Parkway, near Harbor Bay Parkway, could be considered to meet additional demand for future airline passenger and employee parking because of this location's good roadway access to/from the terminal complex and the availability of a large, upland area.

Environmental Considerations

Potential environmental opportunities and constraints associated with future growth at the Airport were evaluated, both in terms of footprint or site environmental considerations associated with new facilities (such as a potential new terminal building), and operational environmental considerations associated with increased aviation activity (i.e., more airline passengers, more air cargo weight, more flights, etc.). It is important to note that throughout the master planning process, Port staff considered environmental issues at a screening-level (identifying key environmental benefits and constraints). Because this master plan is a concept-level planning and feasibility study, it does not provide details on development plans, engineering feasibility, or environmental constraints that would be needed before the Port could decide whether to proceed with any particular project.

The environmental consideration that was studied in some detail in the master plan is aircraft noise. The aircraft noise analysis looked at both single aircraft overflight noise contours (called Single Event Noise Exposure Level or SENEL) and time-weighted cumulative noise contours (called the Community Noise Equivalent Level or CNEL). Overall, there will be more aircraft operations in 2010 than 2004, going from approximately 586 daily air carrier (passenger and cargo airline) operations in 2004 to approximately 706 daily air carrier operations anticipated in 2010 (a 20% increase), which translates to more single aircraft overflight noise events. However, the Port anticipates a decrease in the number of operations of the noisiest aircraft, the Boeing 727, going from 16 daily operations in 2004 to an anticipated 6 daily operations in 2010, with only 2 departures at night (compared to 4 on average in 2004). This anticipated decrease is due to FedEx's slow phase-out of its older and noisier Boeing 727 aircraft. Because of the reduction in Boeing 727 operations, especially at night, the forecast CNEL contours to the northwest of the Airport (adjacent to the City of Alameda) are smaller than the existing CNEL contours.

Members of the Stakeholder Advisory Committee requested that the Port investigate community-requested environmental projects in the master plan. The Port and Stakeholder Advisory Committee studied a barrier to block noise from aircraft on the ground (taxi and take-off roll, except low-frequency noise) that affects residents in the Neptune Drive neighborhood in San Leandro. The noise barrier could be constructed on the Airport or in the back yards of the homes on the west side of Neptune Drive. Although such a noise barrier would provide some noise relief to residents along the west side of Neptune Drive (especially if it were to be constructed in their back yards), the residents indicated that they did not want a noise barrier constructed in their back yards, and it was determined that the best solution is to continue with the residential sound insulation program already underway in San Leandro, based on input from the Neptune Drive neighbors and the San Leandro members of the Stakeholder Advisory Committee.

The Alameda representatives on the Stakeholder Advisory Committee requested that the Port conduct a follow-on study to the master plan to investigate why some corporate jets (less than 2%) choose not to comply with the Port's voluntary noise abatement procedures, which requests that they taxi to and depart from South Field instead of North Field (during west plan, except those that can depart on Runway 33).

Finally, both the Alameda and San Leandro representatives on the Stakeholder Advisory Committee requested that the Port, in association with these cities, conduct an Airport ground traffic study to determine the amount of traffic to/from the Airport, including trucks, that uses local streets in these cities.

Financial Plan

A financial plan was prepared to evaluate the feasibility of funding the projects recommended for further analysis in the master plan, including a potential third terminal (east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway), a new high-speed exit taxiway (off Runway 29), and Runway 29 taxiway access improvements. The analysis assumed that Passenger Facility Charges (PFCs) and Airport Improvement Program (AIP) grants would be used to fund a majority of the costs associated with implementing these projects. PFCs would be bonded for 30 years, and there would be a small incremental increase in airline rates and charges. The basic idea is to keep the costs that the airlines pay at a reasonable level to keep the Airport attractive to low-fare and other airlines. The financial plan suggests that these master plan projects are affordable, given certain assumptions in the analysis, which are subject to change in the future. Further, the financial plan does not consider Port-wide financial issues; it is focused solely on Airport capital projects and potential revenues. Closer to implementation of projects, the Port will need to conduct more thorough analyses on the financial feasibility of these and other Port projects from a Port-wide capital and funding perspective based on then updated financial information.

Land-Use Maps and Recommended Studies

Three land-use maps were prepared: (1) existing on-Airport land uses (e.g., airfield, passenger facilities, cargo, airline-related support, general aviation, aviation-related business, recreation, and undesignated uses), (2) near-term on-Airport land uses (2010 to 2012 timeframe), and (3) long-term on-Airport land uses (2025). These three graphics are the heart of the master plan. The primary new land-use designation in the 2010 to 2012 timeframe

is a passenger facilities area east of Taxiway B, north of existing Terminal 1, and south of Ron Cowan Parkway. If a new terminal project is proposed and approved in this area, the Oakland Maintenance Center (OMC) site would be redeveloped to support the new terminal land-use area to the south by accommodating replacement air cargo facilities, potential airline provisioning and GSE maintenance facilities, and remain overnight (RON) aircraft parking and/or airline passenger / employee vehicle parking. At North Field, the new land uses are for general aviation aircraft parking ramps and/or hangars.

The primary new land-use designation in the 2025 time-frame is additional passenger facilities at South Field, mostly to accommodate additional airline passenger / employee vehicle parking and RON aircraft parking, and additional general aviation land-use designation at North Field. A new runway at South Field (parallel to Runway 11-29) and additional aircraft gates are not shown on the long-term land-use map (2025) because such a runway is not recommended for further study and development due to environmental and financial considerations.

Finally, it is recommended that Port staff and the Stakeholder Advisory Committee continue to work together on the following projects and studies:

- Continue to study a potential Runway 29 aircraft noise barrier, on-Airport, which would provide some aircraft noise reduction for the homes on the west side of Neptune Drive in the City of San Leandro under certain, limited conditions, or other methods to reduce the effects of aircraft noise in the community (including the City of Alameda), and continue to work with the City of San Leandro on their residential sound insulation program, which is currently underway.
- Conduct a study to investigate why some corporate jets (less than 2%) choose not to comply with the Port's voluntary noise abatement procedures, which requests that they taxi to and depart from South Field instead of North Field (except those that can depart on Runway 33).
- Conduct an Airport ground traffic study (work with the cities of Alameda, San Leandro, and Oakland to develop a study to determine the amount of traffic to/from the Airport, including trucks, that uses local streets in these cities).
- Continue the Stakeholder Advisory Committee after the master plan, with a new name, so that the Port's Planning and Development staff can continue to meet, annually or semi-annually, with community stakeholders and Airport-users to provide updates on various projects and Airport activity, as well as receive input.