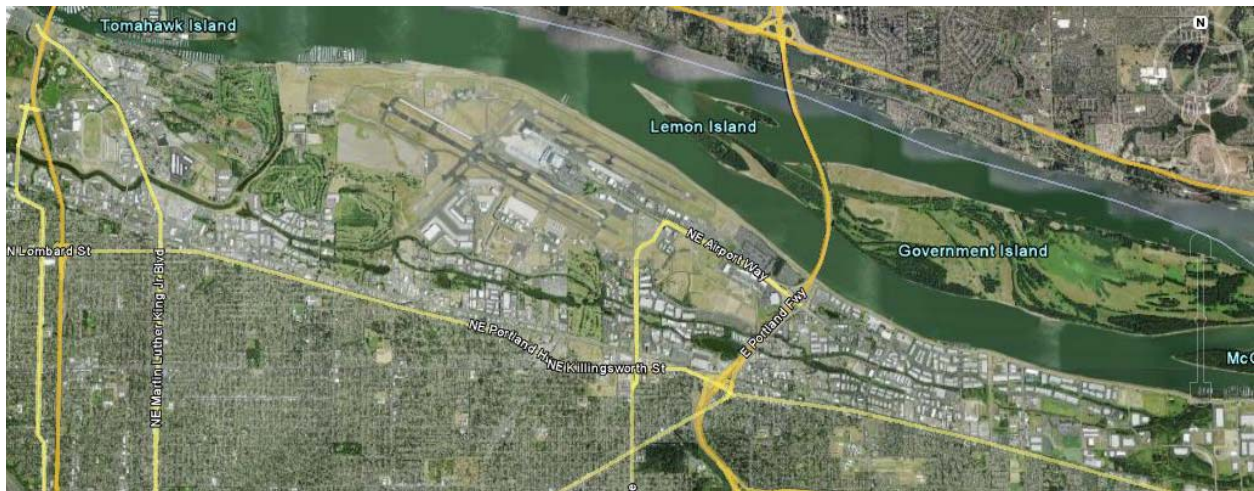




PORTLAND AIRPORT FUTURES: ECONOMIC DEVELOPMENT INVENTORY



Prepared for:

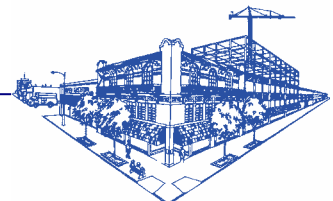
City of Portland Bureau of Planning & Sustainability

Port of Portland

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EXECUTIVE SUMMARY

This economic development inventory of activities that are dependent on or related to operations of the Portland International Airport (PDX) is intended to serve as a background resource for the *Airport Futures* planning process currently underway by the City and Port of Portland. What follows is a brief summary of primary report observations and findings.

What's There Today? As of 2007, PDX served 14.65 million travelers – as the 34th busiest airport in the U.S. Less immediately visible is that PDX also handles air freight exports, valued at nearly \$100 billion in 2007 – with computer and electronic manufacturing accounting for the majority of both export and import valuation. Other notable observations:

- As of 2006, the *Airport Futures planning area* had more than 200 identified firms with employment of more than 10,300.
- A larger *economic development study area* – extending from the I-5 freeway to 185th Street (north of Columbia/Sandy Boulevard) accounts for just under 1,600 firms and more than 41,800 jobs.
- The *largest single industry sector* in the study area is transportation and warehousing (with over 10,000 jobs), followed by manufacturing and wholesale trade.
- The *average wage* per job is just under \$38,700 – about 9% below the average wage of \$42,600 for all employment in the 7-county metro area.
- The full economic development study area covers approximately 8,600 acres – with the Port of Portland as the largest single owner, followed by the City of Portland, then four golf courses. Leased properties (both on and off-airport) account for about 1,016 acres – of which 568 acres are within business and industrial parks.
- Within this study area, there is still a significant inventory of up to as much as 3,380 acres that remains *vacant or lesser improved* – totaling about 39% of the land base of the entire area. This inventory consists of vacant Port and other land ownerships, four existing golf courses and lesser improved properties (based on relatively low existing values of improvements compared to land valuation).

Study Area Market Potential. As part of this economic development inventory, the experience of *other potentially comparable airports* has been reviewed. This review has been conducted from several perspectives including the relationship between the airport and surrounding business and industrial activity.

Five airports were identified as potential case studies – SeaTac, Kansas City and Detroit in the U.S. and Amsterdam and Hong Kong internationally. The U.S. case studies cover a range of land constrained and unconstrained airports – with Detroit moving to the aerotropolis (or airport city) model pioneered in Europe and Asia.

A series of *stakeholder interviews* were also conducted with a representative cross-section of business interests both in the study area and elsewhere in the Portland metro area. While some businesses (ranging from airport hotels to freight forwarders) are clearly dependent on PDX, other businesses throughout the study area have made decisions to locate in the Columbia

Corridor for reasons less related to the airport – including good highway access and availability of large, competitively price industrial sites or modern business and industrial park space.

Based on the quantitative and qualitative research conducted for this inventory, the following assessment has been made of current PDX-related *strengths, weaknesses, opportunities and threats* (or SWOT). Both short and longer term, the sustainability of PDX airport passenger and cargo functions is reliant on continued economic development of the greater metro area.

Because Portland is considered as a small to medium-sized hub in the national and international business and trade community, the region and state need to maintain a robust economic development strategy to attract and maintain business at a level that will support the passenger and air cargo service the area now enjoys. Without such a strategy, maintaining high levels of air service to PDX is at serious risk.

Strengths	Weaknesses
<ul style="list-style-type: none"> • Quality reputation of PDX 	<ul style="list-style-type: none"> • PDX not a hub airport
<ul style="list-style-type: none"> • Multi-modal access available from PDX and Columbia Corridor 	<ul style="list-style-type: none"> • Regional transportation congestion
<ul style="list-style-type: none"> • Large land base of study area surrounding PDX 	<ul style="list-style-type: none"> • Limited shovel-ready site availability
Opportunities	Threats
<ul style="list-style-type: none"> • Strengthened gateway air service 	<ul style="list-style-type: none"> • Current risk to existing air service
<ul style="list-style-type: none"> • Enhanced Pacific NW distribution role 	<ul style="list-style-type: none"> • Global pathway consolidation
<ul style="list-style-type: none"> • Mixed industrial-office-commercial aerotropolis (airport city) 	<ul style="list-style-type: none"> • Commercial development displacing a traditional industrial focus

Site & Infrastructure Needs. Key strategic opportunities represented by this assessment can be summarized to include:

- **For Existing Business:** Opportunities are for improved access via Cornfoot/Alderwood to provide better internal circulation to existing industries between the I-205 area and Columbia Boulevard plus initial planning for long-term redevelopment of older and lesser improved properties extending from the I-205 corridor west to I-5.
- **For Prospective Business:** Suggested by this report is the potential of moving toward an aerotropolis concept with greater intensity of airport logistics, office and destination hospitality functions between PDX and I-205 – coupled with more focused planning to secure improved study area-wide industrial development capacity via build-out of vacant and lesser improved land including selected redevelopment opportunities.
- **Both Existing & Prospective Business:** Identified as priorities are improved internal east-west study area transportation access plus improvements to freeway (I-5/205/84) interchange access.

Concluding Observations. This economic development inventory demonstrates that the Portland International Airport (PDX) is vital to the economic competitiveness of this metro region. More specifically, PDX influences a study area surrounding the airport that is home to a diverse array of airport-dependent, related and non-related businesses. However, this economic development study area does not yet appear to be performing to its economic potential.

For this size of metro region, PDX offers extraordinary strengths of quality reputation, multi-modal access and large industrial land base extending both west and east of the airport. Prospective paths of opportunity include an enhanced Pacific Northwest NW distribution role and/or mixed industrial-office-commercial aerotropolis role.

Commonly cited infrastructure and site needs include improved internal east-west access plus improved freeway interchange access. Left unresolved, local and regional transportation issues can be expected to affect business location and expansion decisions. Redevelopment of older properties west of PDX can be coupled with potential for added development of remaining, suitable vacant properties, both east and west of I-205.

Looking to the future:

- Substantial *opportunities* are available to strengthen the linkage between the economic vitality of the Portland metro area and sustained performance of PDX. A major catalyst in moving Portland to the next level as an increasingly significant global player centers on conceptualization and implementation of an aerotropolis or airport city concept that also serves to reinforce this region's vision for livability and sustainability.
- *Requirements* relate largely to the ability for Airport Futures planning to be woven into the fabric of City and Metro regional objectives. An added need is for continued if not increased attention to local and regional transportation accessibility.

In sum, the PDX role as business catalyst for the metro region can be expected to take on even greater prominence in the years to come. The airport's pivotal role for metro area economic vitality becomes more apparent with recovery from the current recession and ongoing restructuring for competitive advantage in an ever more globalized economic environment.

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I. INTRODUCTION

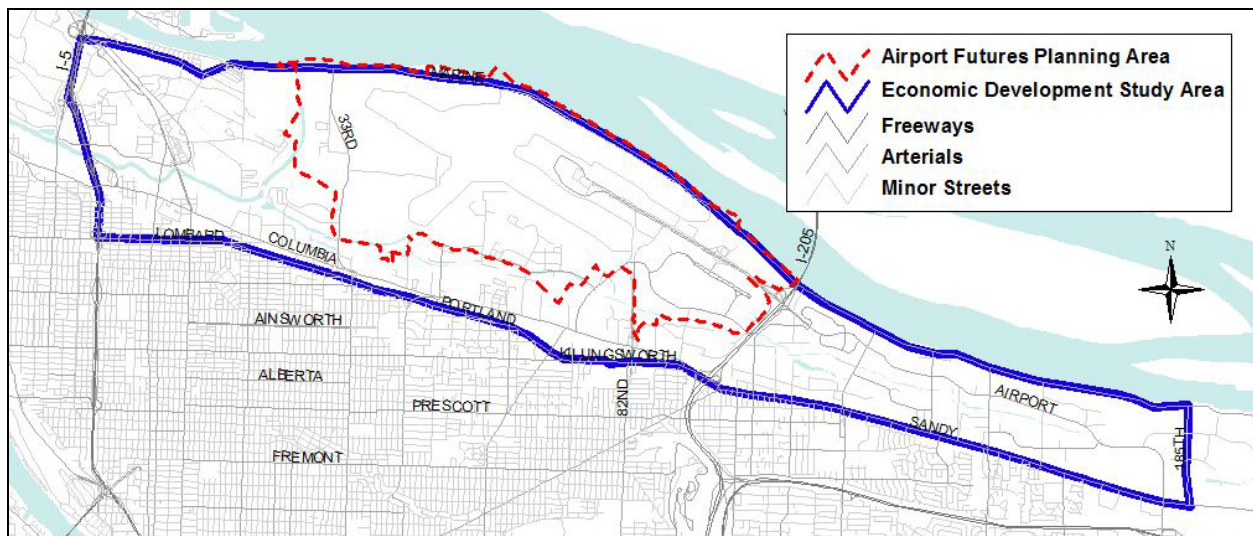
This report provides an economic development inventory of activities that are dependent on or related to operations of the Portland International Airport (PDX). The inventory is intended to serve as a background resource for the *Airport Futures* planning process currently underway.

PROJECT BACKGROUND

The City of Portland and Port of Portland are collaboratively engaged in the *Airport Futures* process to create an integrated long-range development plan for PDX. By spring 2010, the Port will update the airport master plan and the City will create a land use plan recognizing the roles that PDX plays in the region's economy while managing City infrastructure and livability.

Study Area Definition. For purposes of this analysis, the economic development study area being evaluated covers an area situated generally between the Interstate 5 freeway on the west, NE 185th Avenue on the east, NE Marine Drive to the North and NE Sandy/Lombard to the south. This study area comprises a geography larger than what is being evaluated by the *Airport Futures* planning area alone – as depicted by the following map.

Figure 1. Airport Futures and Economic Development Study Areas



Source: Bureau of Planning & Sustainability, Port of Portland, Metro RLIS Lite, and E. D. Hovee & Company.

Airport-Dependent & Related Uses. This integrated long-range *Airport Futures* planning process for the Portland International Airport (PDX) encompasses other Port and vicinity area non-Port properties in the Columbia Corridor. Both for Port and non-Port properties, a pivotal question is the extent to which future development can or should be more airport-dependent and/or airport-related.

This distinction is intended to differentiate businesses that benefit from the airport based on the need for or benefit from access to PDX at different levels. For purposes of this analysis:

- *Airport-dependent* means a need for direct access to the airfield (as for air carriers, cargo operators, freight forwarders, U.S. postal and military facilities, and aircraft maintenance) – essentially operating “inside the fence.”
- *Aircraft-related* uses locate near the airport often to support aircraft dependent uses (as with supplier chain cluster activity) or rely on airport generated activity for customers (as with hotels and off-airport parking).

Economic Development Inventory Purpose. This economic development inventory is aimed to facilitate this understanding of current and prospective market opportunities by:

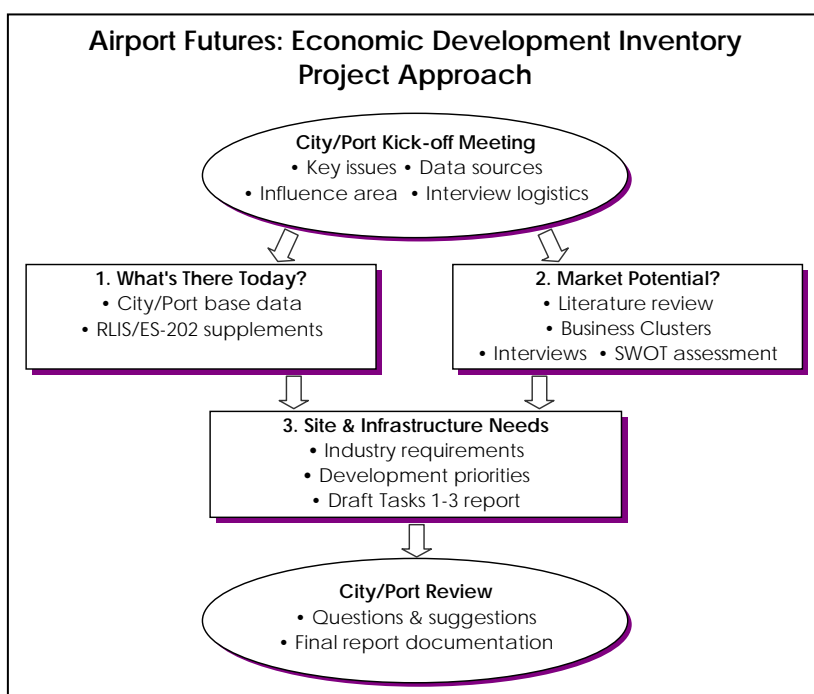
- Conducting background research to document existing business and land use conditions for the industrial and commercial activities in the portion of the Columbia Corridor most directly influenced by PDX.¹
- Drawing on experience of other potentially comparable airports combined with perspectives of knowledgeable local players to inform the discussion of prospective airport-dependent/related business development.
- Providing objective, candid assessments of current and prospective business needs – especially for uses that could strengthen the competitive position of PDX as a driver of economic activity for the entire metro area, as well as for the immediate study area.
- Presenting results in a manner deemed useful for subsequent City/Port planning – including information suitable for broader stakeholder and/or public discussion.

STUDY APPROACH

The approach taken to conduct this analysis is illustrated by the chart below. Three primary questions are addressed by this economic development inventory:

- What’s there today?
- What is the study area’s market potential for airport-dependent and related business development?
- What are the site and infrastructure needs of airport-dependent/related and other industrial and employment development?

During the course of this research assignment, the consultant team has met with City and Port representatives at key project checkpoints – both



for background information and substantive review of interim work products. Preliminary inventory analysis and findings also were reviewed with the Airport Futures Planning Advisory Group.

REPORT ORGANIZATION

The remainder of this economic development report is organized to cover these primary questions:

What's There Today?
Study Area Market Potential
Site & Infrastructure Needs

Accompanying this report are appendices. *Appendix A* provides supplemental data tables. *Appendix B* contains more detailed information regarding the literature review and case study research assessment conducted with this inventory process. *Appendix C* identifies persons interviewed with this economic development study process.

II. WHAT'S THERE TODAY?

As a first step in this inventory process, information has been compiled for:

- Airport activity – passenger travel/demographics & value of freight commodities
- Business & employment patterns – by type, size, and recent investments
- Current property ownership & lease patterns
- Underdeveloped and lesser improved land

Business and land inventory information has been compiled for the larger economic development study area – including but extending beyond the *Airport Futures* planning geography.

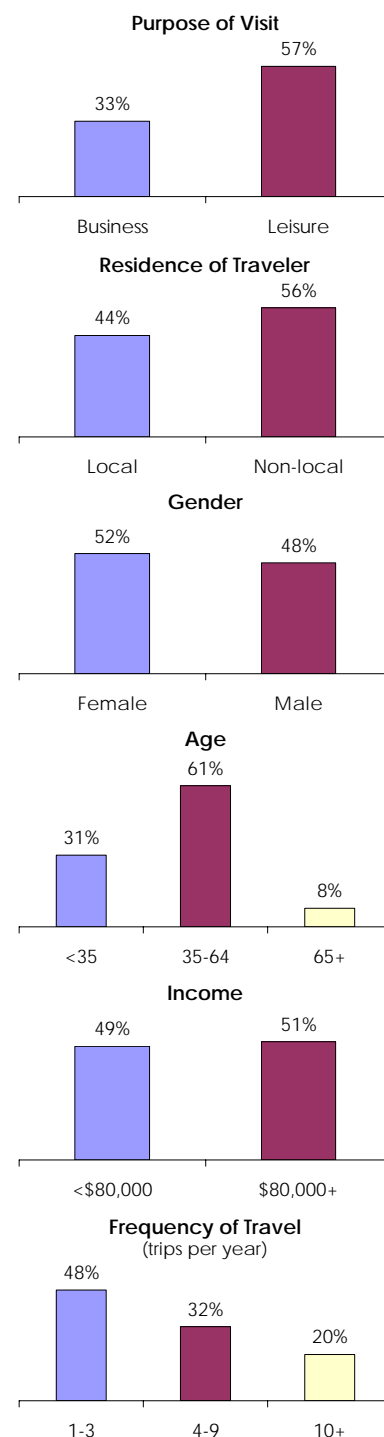
AIRPORT ACTIVITY

This economic development inventory begins with a brief review of activity at the airport itself. Both passenger traffic and air freight activities are important for the airport and for the overall economic vitality of the Portland metro area.

Passenger Traffic. As of 2007, Portland International Airport (PDX) served an estimated 14.65 million passengers – as the 34th busiest airport in the U.S. (in the nation's 23rd largest and 21st fastest growing metro area).² Passenger travel demographics and behavior indicate that:

- The majority of air travel to Portland is for leisure (vacation or visiting family/friends) – with business travel accounting for about one-third (33%) of passenger activity. This makes PDX highly dependent on seasonal and cyclical fluctuations of leisure travel demand.
- The majority of travelers are non-local, a slight majority are female, and over 60% are in the 35-64 age grouping. Not surprisingly, this age profile is consistent with a majority of travelers (51%) having household incomes of \$80,000+ per year.
- The majority of passengers traveling to or from PDX use private vehicle, about one in five rent a car and roughly equivalent proportions (6-7% each) use light rail or airport shuttle.
- Close to half (48%) take 1-3 trips annually; about 20% travel 10+ times per year.

Figure 2. Passenger Demographics



Source: Port of Portland.

Air Freight Activity. Less immediately visible but of great importance to the metro area is the volume and value of air freight passing through PDX:

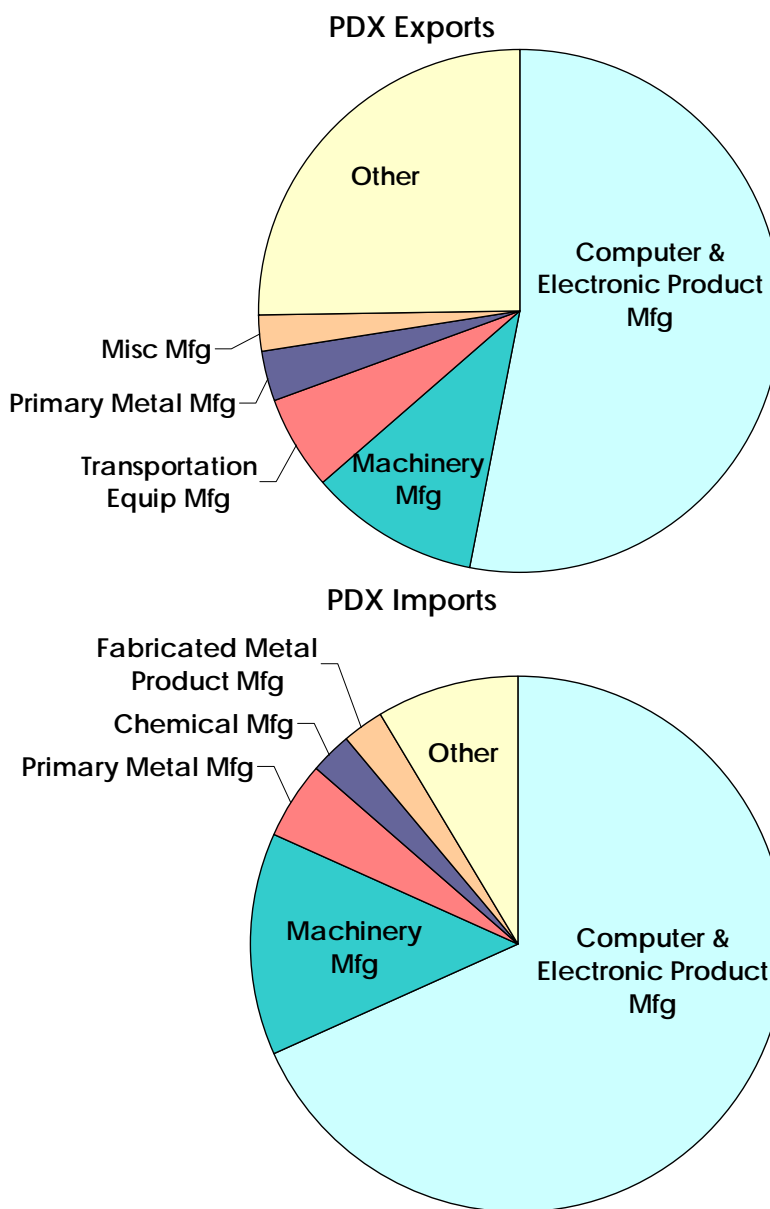
PDX Air Exports:

- As of 2007, air freight exports from PDX totaled 519 million kilograms with a value of \$97.8 billion.
- Computer and electronic products represent the #1 commodity exported (valued at nearly \$52 billion). Other major exports are machinery, transport equipment, and primary metals. By weight, machinery and parts account for about one-quarter of tonnage.
- Top customers of products exported from PDX were China (\$25 billion), followed by Germany, Japan, the Philippines, and Italy. For all five top customer countries, computer and electronic products are the top commodity exported from PDX.

PDX Air Imports:

- Imports from PDX totaled an estimated \$78.6 billion as of 2007 – but with greater weight of product than exports at 743 million kilograms.
- As with exports, the #1 imported commodity was computer and electronic products – followed by machinery, primary metals, chemicals, and fabricated metal products.
- Top suppliers of imports through PDX were Japan (\$25 billion), followed by Malaysia, China, Germany, and Taiwan.

Figure 3. Distribution of PDX Exports & Imports by Commodity Value (2007)



Source: U.S. Department of Commerce.
Data is for the Columbia-Snake Customs District.

Taken together, this export/import information demonstrates the extent to which PDX is linked to the Pacific Rim as well as to high-tech countries in Europe such as Germany and Italy. By far and away, the computer and electronic manufacturing industry (including semiconductors) is the most heavily oriented to international trade through PDX air freight. By value, technology related shipments account for over half (53%) of PDX exports and an even higher 68% of products imported through Portland International Airport. This information serves as a foundation for much of the remainder of this inventory analysis and as a springboard for identifying current and future economic development opportunities.

BUSINESS & EMPLOYMENT PATTERNS

Covered by this analysis is a review of employment patterns and industry concentration for the Airport Futures Planning Area and for the larger Economic Development Study Area. This is followed by identification of major individual employers within the larger study area.

Airport Futures Planning Area Employment & Payrolls. As of 2006, the Airport Futures Planning Area had more than 200 identified firms with employment of more than 10,300.

Figure 4. Airport Futures Study Area Employment & Payrolls (2006)

NAICS*	Industry	Firms	Jobs	Average Firm Size	Average Payroll/Job	LQ**
11	Agriculture, forestry, fishing & hunting	1	*	*	*	0.01
21	Mining	NA	NA	NA	NA	NA
22	Utilities	NA	NA	NA	NA	NA
23	Construction	5	55	11	\$55,192	0.09
31-33	Manufacturing	3	*	*	*	0.02
42	Wholesale trade	13	442	34	\$53,421	0.75
44-45	Retail trade	23	245	11	\$17,603	0.22
48-49	Transportation & warehousing	71	6,195	87	\$37,841	17.85
51	Information	2	*	*	*	0.02
52	Finance & insurance	6	33	5	\$34,504	0.07
53	Real estate & rental & leasing	16	683	43	\$20,105	3.56
54	Professional & technical services	13	262	20	\$43,283	0.51
55	Management of companies & enterprises	5	21	4	\$69,540	0.09
56	Administrative & waste services	10	115	12	\$27,407	0.18
61	Educational services	NA	NA	NA	NA	NA
62	Health care & social assistance	2	*	*	*	0.12
71	Arts, entertainment, & recreation	2	*	*	*	1.17
72	Accommodation & food services	22	966	44	\$21,042	1.18
81	Other services, except public administration	9	72	8	\$28,104	0.18
92	Public Administration	5	895	179	\$31,731	0.66
99	NOT ELSEWHERE CLASSIFIED	NA	NA	NA	NA	NA
	Total	208	10,310	50	\$34,604	

Notes: * NAICS is the abbreviation for the North American Industry Classification System.

** LQ denotes "location quotient" as a measure of industry concentration. An LQ over 1.00 indicates high industry concentration for the airport economic development study area compared to the metro area.

Source: Oregon Employment Department, Metro and E. D. Hovee & Company, LLC.

As noted, the more immediate Airport Futures Planning Area covers the airport and the area in the immediate vicinity of the airport. Other observations are that:

- The 10,300 jobs in the planning area at and adjoining the airport represents about one-quarter (25%) the total employment of the larger economic development study area.
- With nearly 6,200 jobs, transportation and warehousing accounts for the majority (60%) share of all jobs in the immediate Airport Futures planning area. As indicated by the statistical measure known as LQ (or location quotient), the sector with the highest *industry concentration* is transportation and warehousing – with a concentration of jobs (as a proportion of total regional employment) nearly 18 times that of the entire Portland metro region.
- The next largest (though substantially smaller) categories of study area employment are accommodations and food services (less than 1,000 jobs), public administration (900), and rental/leasing companies (less than 700).
- The typical firm in the planning area has 50 employees – a figure that is more than triple the average firm size of the metro region.
- Average wage within the planning area most proximate to PDX is just over \$34,600 per worker – reflecting wage levels about 81% of the entire metro area.

Economic Development Study Area Employment & Payrolls. The larger study area encompasses Columbia Corridor geography extending from the I-5 freeway east past Portland International Airport to 185th Avenue. As of 2006, this larger economic development study area had just under 1,600 firms with employment totaling more than 41,800.

The more than 41,800 jobs in the economic development study area comprise just over 4% of the total covered employment base of just over 1 million jobs in the 7-county Portland metro area:

- The largest single industry sector represented in the study area is transportation and warehousing. With over 10,000 jobs, much of this sector is clearly linked to airport activity – with more than 60% of the jobs in this sector located in the Airport Futures planning area immediately surrounding the airport property.
- Other major employment sectors within the study area include manufacturing (more than 7,300 jobs), followed by wholesale trade (at 5,100).
- Lesser counts but still significant sources of study area employment are found with retail trade, construction, accommodation and food services, and administrative and waste services – each in the range of 2,000-4,000 jobs.
- The typical airport study area firm has 26 employees – somewhat above the region-wide average of 15 employees per firm.
- Average wage per job is nearly \$38,700 – about 9% below the average wage of \$42,600 for all employment in the 7-county metro area. This somewhat lower average wage appears to be due to a higher proportion of non-professional job sectors. Also noted is that some sectors with high concentrations of study area employment – as with manufacturing and wholesale trade – tend to comprise firms that pay less per worker (on

average) than manufacturers and wholesalers located elsewhere in the Portland metro area.

Within the study area, the highest paying job sectors are information (at nearly \$55,900), and management of companies and enterprises (\$54,800) – followed by wholesale trade, professional and technical services, transportation and warehousing, and manufacturing (all with average pay above \$40,000).

Figure 5. Economic Development Study Area Employment & Payrolls (2006)

NAICS	Industry	Firms	Jobs	Average Firm Size	Average Payroll/Job	LQ
11	Agriculture, forestry, fishing & hunting	3	*	*	*	0.05
21	Mining	NA	NA	NA	NA	NA
22	Utilities	2	*	*	*	0.83
23	Construction	139	2,835	20	\$51,076	1.10
31-33	Manufacturing	199	7,311	37	\$40,206	1.40
42	Wholesale trade	312	5,137	16	\$47,679	2.15
44-45	Retail trade	175	3,626	21	\$30,819	0.82
48-49	Transportation & warehousing	213	10,093	47	\$41,252	7.17
51	Information	17	399	23	\$55,878	0.40
52	Finance & insurance	27	330	12	\$33,754	0.18
53	Real estate & rental & leasing	67	1,318	20	\$25,267	1.70
54	Professional & technical services	70	858	12	\$43,565	0.41
55	Management of companies & enterprises	18	568	32	\$54,748	0.62
56	Administrative & waste services	73	2,417	33	\$30,344	0.95
61	Educational services	16	240	15	\$36,651	0.34
62	Health care & social assistance	21	608	29	\$39,995	0.14
71	Arts, entertainment, & recreation	11	453	41	\$21,983	0.81
72	Accommodation & food services	96	2,538	26	\$17,992	0.76
81	Other services, except public administration	116	1,131	10	\$37,036	0.72
92	Public Administration	8	1,833	229	\$31,439	0.33
99	NOT ELSEWHERE CLASSIFIED	4	*	*	*	0.19
Total		1,587	41,810	26	\$38,693	

Note: LQ is location quotient (or degree of employment concentration) compared to the entire 7-county Portland metro area. NA is indicated where no jobs were reported for the industry sector. An asterisk (*) is indicated where employment and wage data is not shown to avoid disclosure of data pertinent to an individual employer. See Appendix for comparable employment and payroll information covering the entire 7-county Portland metro area.

Source: Oregon Employment Department, Metro and E. D. Hovee & Company, LLC.

Sectors of Comparative Advantage. Location quotients represent a measure of industry concentration or comparative advantage. Industry sectors with location quotients (LQs) of *more than 1.00* have concentrations of employment in the study area exceeding metro area representation. In contrast, industry sectors with LQs of *less than 1.00* are underrepresented in the economic development study area relative to the entire metro area.

For the economic development study area, the industry sector with the highest location quotient of employment compared to the entire metro area is transportation and warehousing – with LQ

more than seven times the concentration of employment activity as occurs throughout the metro area. Other industry sectors with relatively high LQs (ranging from 10% above to more than double that of the metro region) are wholesale trade, followed by rental/leasing, manufacturing, and construction. Not surprisingly, the study area is underrepresented with most service sector employment activities.

Largest Study Area Employers. Horizon Air is the one identified employer in the economic development study area with more than 1,000 employees. Of three employers each having between 500-999 jobs, two are public agencies and the other is a Portland-based non-profit organization.

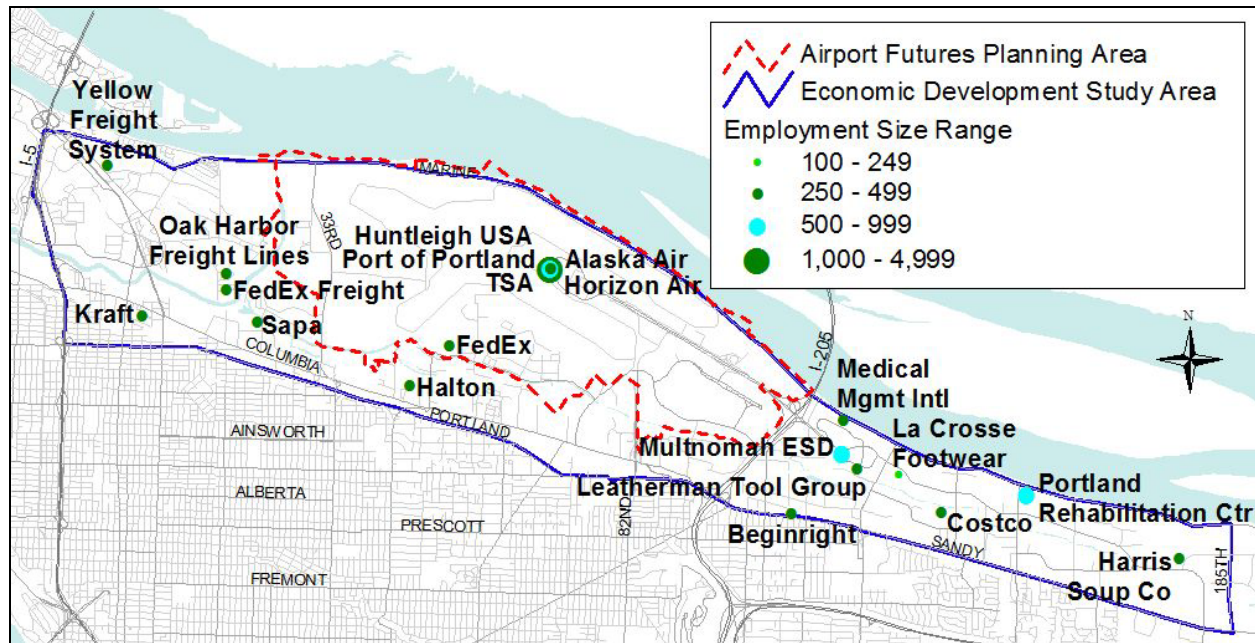
There are 15 study area firms identified at the size level of 250-499 jobs – with a correspondingly greater diversity of business mix also indicated. This tier of firms includes three organizations that could be viewed as directly airport-dependent plus four industrial (manufacturing/wholesale) firms, five freight-related firms, two service providers, and a large retailer. There are another approximately 66 firms located in the economic development study area with between 100-249 employees per firm.

Figure 6. Largest Study Area Employers (2006)

Firm Name	Industry Sector
<i>1,000 - 4,999 Jobs:</i>	
Horizon Air	Transportation - Scheduled Passenger Air Transport
<i>500 - 999 Jobs:</i>	
Multnomah Education Service District	Public Administration - Administration of Education Programs
Portland Habilitation Center Inc	Administrative & Waste Services – Janitorial
Transportation Security Administration	Public Administration - Regulation & Administration of Transportation Programs
<i>250 - 499 Jobs:</i>	
Alaska Airlines Inc	Transportation - Scheduled Passenger Air Transport
Sapa Inc	Manufacturing - Aluminum Extruded Product
Medical Management International	Management of Companies & Enterprises
Costco Wholesale Corporation	Retail - Warehouse Clubs & Supercenters
Port of Portland	Transportation - Other Airport Operations
Kraft Foods Manufacturing West Inc	Manufacturing - Cookie & Cracker
Leatherman Tool Group Inc	Manufacturing - Hand & Edge Tool
The Halton Company	Wholesale - Construction/Mining Machinery & Equipment
Beginright, Inc.	Administrative & Waste Services – Temporary Help
FedEx Freight West Inc	Transportation - Long-Distance General Freight Trucking
Yellow Freight System, Inc.	Transportation - Long-Distance General Freight Trucking
Harris Soup Company Inc.	Manufacturing - Specialty Canning
FedEx	Transport & Warehousing - Couriers & Express Delivery Services
Huntleigh USA Corporation	Transportation - Other Airport Operations
Oak Harbor Freight Lines, Inc.	Transportation - Long-Distance General Freight Trucking

Source: Oregon Employment Department, Metro and E. D. Hovee & Company, LLC.

Figure 7. Major PDX Airport & Area Employer Locations (2006)



Source: Oregon Employment Department, Metro and E. D. Hovee & Company, LLC.

Of the largest employers, organizations that are clearly *airport-dependent* include Horizon Air, TSA, Alaska Airlines, the Port of Portland, and FedEx. Businesses such as trucking or freight forwarding companies often are *airport-related* (for a substantial portion of their business). Other businesses also may benefit from airport proximity, but to a degree not as readily determined.

CURRENT PROPERTY OWNERSHIP & LEASE PATTERNS

Major ownership patterns are identified for the Airport Futures planning area and then for the entire economic development study area. This is followed by discussion of major leased properties.

Airport Futures Land Ownership. Of the 3,876 acres within the immediate Airport Futures planning area, 3,264 acres (or 86% of the total) are owned directly by the Port of Portland. The three largest private owners are golf courses, together comprising 310 acres. The next largest area owners are the State of Oregon and City of Portland – accounting for a combined total of 78 acres.

Figure 8. Major Property Ownerships - Airport Futures Planning Area

Property Owner	Owner Type	Acres*
Port of Portland	Public	3,264
Broadmoor Inc	Private	140
Riverside Golf & Country Club	Private	90
Colwood Ltd Partnership et al	Private	80
State of Oregon	Public	43
City of Portland	Public	35
Copart of Washington Inc	Private	25
Ace Auto Parts	Private	16
SPII LLC	Private	10
Oregon Food Bank Inc	Public	9
Subtotal Private Acreage		362
Subtotal Public Acreage		3,351
Subtotal Acreage (10 Largest Owners)		3,713
Total Acreage (All Ownerships)		3,776

* Note: Indicated with this chart are total combined acreages for property owners – with acreage calculated only if located in the *Airport Futures Planning Area*. Some property owners have added acreage (both contiguous and separately located) within the larger economic development study area not reflected by these Figure 8 calculations. Combined acreages for the larger study area are shown by Figure 9 below.

Source: Metro RLIS. Data is as of 2008.

Economic Development Study Area Land Ownership. The full economic development study area covers approximately 8,600 acres – about 2.3 times the land area encompassed directly by the subset Airport Futures planning area. The Port comprises the largest single ownership of this larger area as well, followed by the City of Portland with close to 600 acres.

Figure 9. Major Property Ownerships - Economic Development Study Area

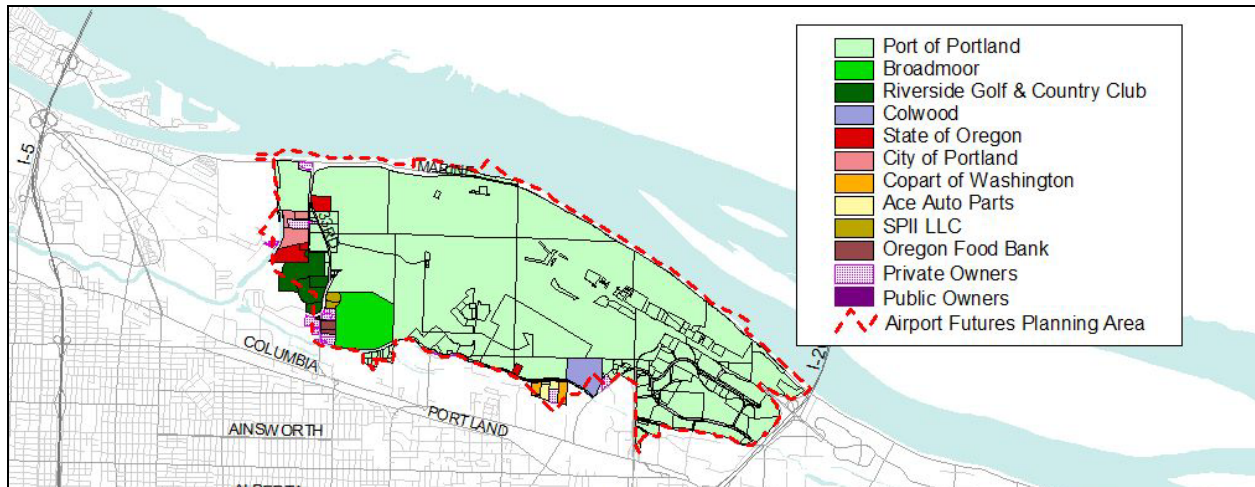
Property Owner	Owner Type	Acres
Port of Portland	Public	3,250
City of Portland	Public	591
Colwood Ltd Partnership et al	Private	213
Columbia Edgewater Country Club	Private	181
Broadmoor Inc	Private	178
Riverside Golf & Country Club	Private	134
Diane Nikkila et al	Private	115
Prologis	Private	109
Owens-Brockway Glass	Private	91
Hayden Meadows	Private	70
Subtotal Private Acreage		1,092
Subtotal Public Acreage		3,841
Subtotal Acreage (10 Largest Owners)		4,933
Total Acreage (All Ownerships)		8,583

Source: Metro RLIS. Data is as of 2008.

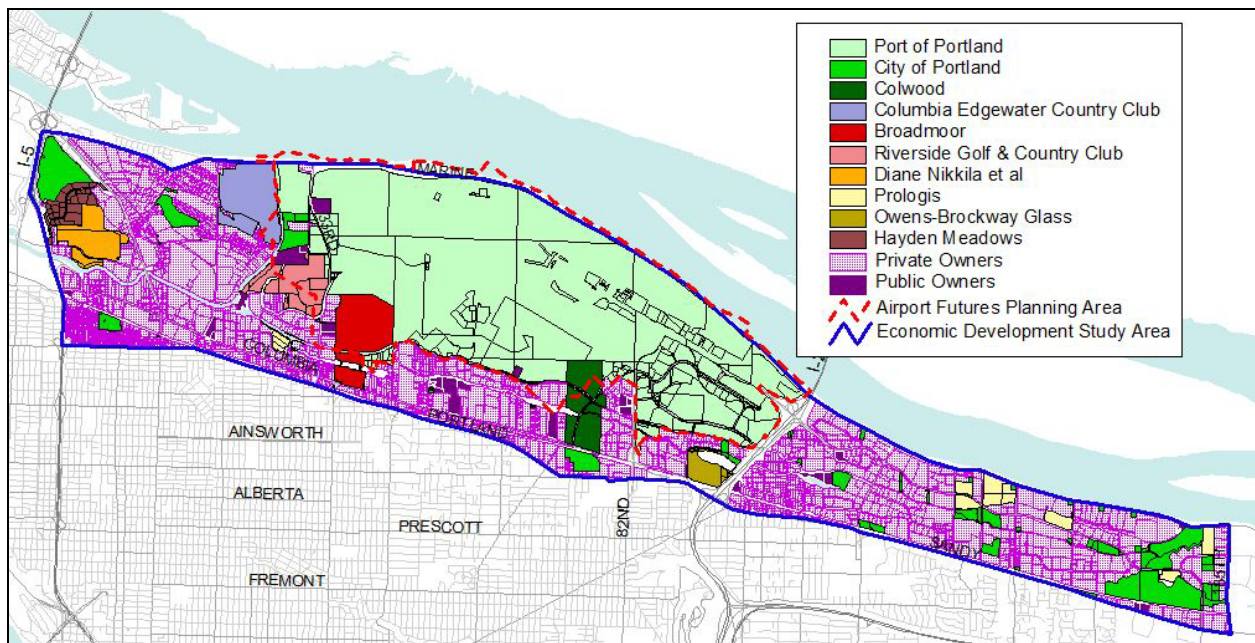
For the full study area, the next four largest property owners are four private golf courses – together accounting for 706 acres or 8% of property ownerships throughout the study area. Taken together, the 10 largest public and private owners constitute about 57% of property in the economic development study area.

Figure 10. Ownerships Mapped

Airport Futures Top 10 Major Property Owners



Economic Development Study Area Top 10 Major Property Owners



Source: Metro RLIS.

Pattern & Intensity of Development. How the full study area has been developed to date can be statistically measured and evaluated in several ways as indicated by the chart on the next page.

Figure 11. Property Valuation (2008)

	Acres	# of Parcels	Avg Parcel Size	Land Value/SF of Land Area	Total Value/SF of Building Area	FAR
<i>Commercial</i>						
0-5 acres	103	241	0.43	\$17.30	\$156.57	0.32
5-10 acres	24	3	8.14	\$15.08	\$162.64	0.20
10-20 acres	NA	NA	NA	NA	NA	NA
20-40 acres	NA	NA	NA	NA	NA	NA
40+ acres	NA	NA	NA	NA	NA	NA
Subtotal	127	244	0.52	\$16.83	\$157.59	0.29
<i>Industrial</i>						
0-5 acres	2,008	1,777	1.13	\$6.77	\$89.02	0.28
5-10 acres	981	143	6.86	\$5.88	\$88.75	0.26
10-20 acres	954	71	13.43	\$6.00	\$78.81	0.22
20-40 acres	500	19	26.32	\$5.27	\$226.00	0.05
40+ acres	2,849	25	113.97	\$5.43	\$231.42	0.05
Subtotal	7,292	2,035	3.58	\$5.92	\$91.08	0.23
Total	7,419	2,279	3.26	\$6.09	\$93.91	0.23

Source: Metro RLIS.

From the measures used, the following overall observations are noted:

- Out of 7,419 industrial and commercial acres inventoried, the vast majority of land area (98%) is indicated for by *industrial* with 2% for *commercial* use.
- *Parcel sizes* average ½ acre for commercial uses and just over 3½ acres for industrial use. No commercial parcels are indicated as exceeding 10 acres in size while 115 parcels are at this size or larger with industrial sites (including 25 properties of 40+ acres).
- *Assessed land values* average more than \$16.80 per square foot for commercial property compared to just over \$5.90 for industrial property.
- *Total assessed valuation of land and improvements* per square foot of building area averages about \$158 per square foot for commercial space and an indicated \$91 for industrial. However, the industrial property averages may be skewed somewhat by relatively large airport related parcels, many of which have minimal building improvements (but at relatively high values per square foot for what are often highly specialized uses).
- Finally, *floor area ratios (FARs)* can be useful as a means to assess the relationship between building area and site area. Commercial properties have an average FAR indicated at 0.29 (meaning that building square footage approximates 29% of site area). Industrial properties are developed at a somewhat lower average FAR of 0.23 across the entire study area (but with lower FARs to about 0.05 for 20+ acre special use parcels).

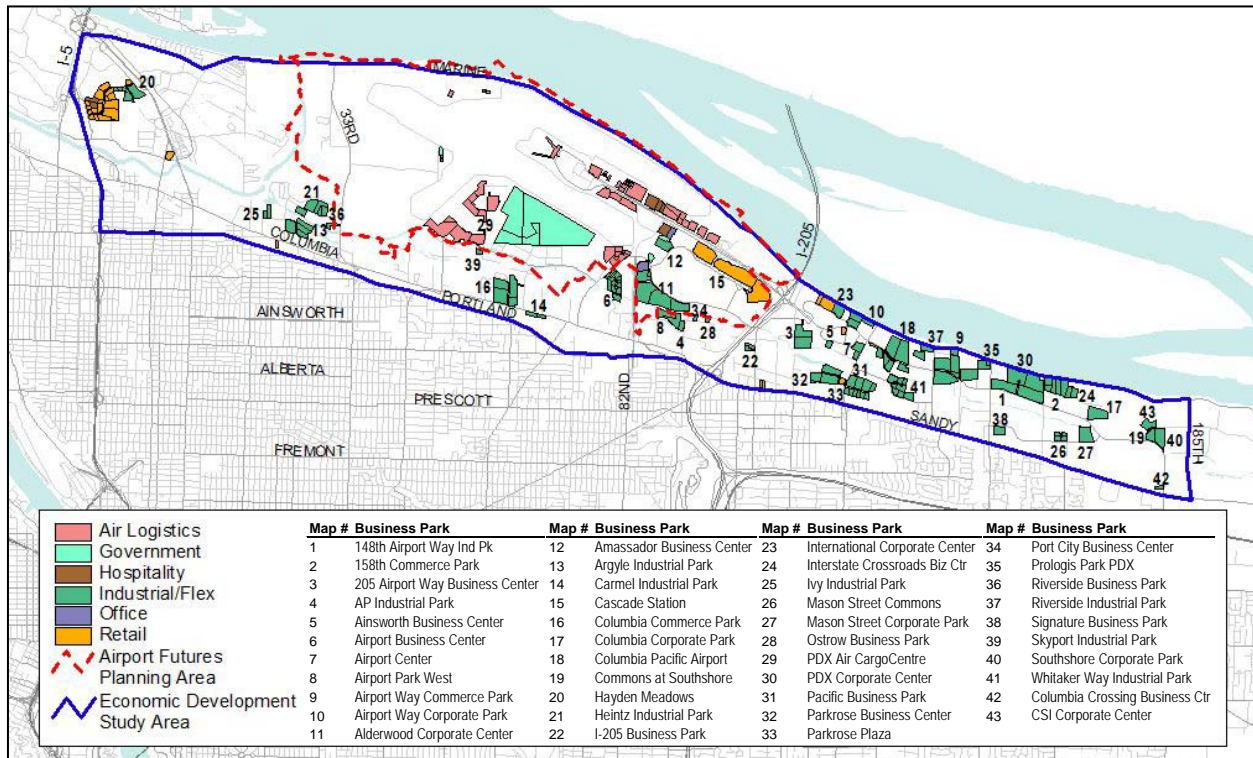
This overall review indicates that properties in the economic development study area are primarily comprised of industrial and related (including airport) uses at relatively high value. Intensity of development is somewhat on the low side both for commercial and industrial uses (even after the larger and typically airport-related properties are excluded) compared to other areas of the city and metro region. This is attributable, in part, to the needs of the airport and

other related transportation-logistics firms for large sites with significant land devoted to functions ranging from runways to truck maneuvering and storage.

Leased Properties. A significant portion of both the immediate Airport Futures and larger economic development study area consists of properties that are leased to individual business users. As identified by the following map, these properties include:

- Lessees on Port property – covering a number of air logistics, industrial, retail, hospitality and public agency tenants (both in and outside the fence).
- Off-airport property – primarily comprising industrial and business park (or industrial/flex) properties with more limited retail development; the bulk of leased space is situated east of the I-205 freeway.

Figure 12. Major Leased Properties (Single & Multi-Tenant)



Source: Metro RLIS, FCS Consulting, City of Portland, Port of Portland, and E. D. Hovee & Company, LLC.

Leased properties (both on and off-airport) account for about 1,016 acres. The 43 leased business and industrial park properties specifically listed with this map encompass a total land area of 568 acres – accounting for an estimated 8.1 million square feet of building area for industrial, flex and office uses. The industrial/flex space portion totals 7.7 million square feet, representing 4% of all industrial/flex commercial real estate product in the 7-county metro area.

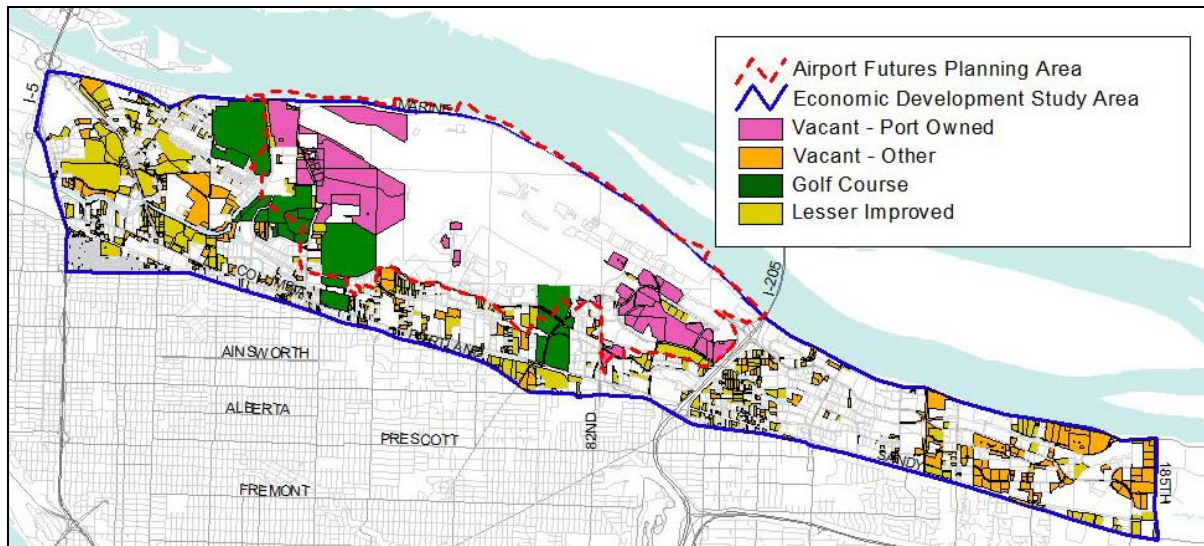
Leased retail use totals about 1.3 million square feet followed by air logistics facilities at 1.1 million square feet. Office, hospitality, and government facilities on leased land represent an added 713,000 square feet.

UNDEVELOPED & LESSER IMPROVED LAND

While Columbia Corridor development has occurred at a rapid pace in recent years, there is still a relatively significant inventory of approximately 3,380 acres that remains undeveloped or lesser improved (based on the ratio of improvements to land valuation). This acreage represents 39% of the land base of the entire economic development study area.

While not all of this land will prove to be suitable or available for development, the sites indicated represent the primary potential resources for which future year development opportunities might be considered.

Figure 13. Undeveloped & Lesser Improved Sites



Note: Vacant land *excludes* Port of Portland identified mitigation sites. Lesser improved lands are defined as sites with assessed improvements value of less than 50% of land value. All sites inventoried are at least 0.2 acres in size, consistent with recent inventory work conducted by FCS Consulting for the tri-county region for Metro. Vacant/lesser improved determinations are made based on tax parcels and do not necessarily reflect valuation characteristics for entire holdings of any particular property owner. Sites for which the majority of the property is determined unbuildable are not included in the inventory.

Source: E. D. Hovee & Company, LLC from FCS Consulting, draft updated vacant land inventory conducted for Metro in 2009, with input from City of Portland and Port of Portland, and Metro RLIS.

As illustrated by the map above, these vacant and lesser improved properties can be divided into four categories:

- Approximately 702 acres are indicated as *vacant and owned by the Port of Portland*. This includes properties which may be considered as “strategic reserve,” to be retained in Port ownership for future expanded operations.³ However, some of these properties may prove suitable on at least an interim lease basis (for up to a 50+/- time period). This would be long enough to amortize an industrial or commercial real estate building investment.
- An estimated 585 acres (covering 188 parcels) are indicated as *vacant with other (primarily private) ownerships*. No single tax lot parcels of 25+ acres are identified but there are 10 vacant parcels in the 11-25 acre size range.

- Another 707 acres are represented by ownerships of *four existing golf courses* in the economic development study area. Some of these properties (or portions thereof) may be considered for economic development in the future; however, Comprehensive Plan and resulting changes from current Open Space designations would be required for most of this property.
- An estimated 1,387 acres (608 parcels) are indicated as relatively *lesser improved* – meaning sites with tax assessed valuations of improvements that are less than 50% of assessed land valuation. This includes two properties of 50+ acres. Some of these sites may become future sources of redevelopment activity, including opportunity for conversion to uses at greater site utilization and/or valuation.

Figure 14. Study Area Undeveloped & Lesser Improved Land Inventory

		Vacant Port Owned	Vacant Other	Golf Course	Lesser Improved*	Total
.2 to 1 ac.	parcels	2	34	5	374	415
	acres	2	18	2	192	214
1 to 3 ac.	parcels	7	92	3	133	235
	acres	14	157	5	225	401
3 to 11 ac.	parcels	18	52	5	81	156
	acres	118	246	40	437	841
11 to 25 ac.	parcels	7	10	3	14	34
	acres	135	164	61	262	622
25 to 50 ac.	parcels	4	0	5	4	13
	acres	161	0	200	140	501
50 to 100 ac.	parcels	3	0	2	2	7
	acres	272	0	101	131	504
Over 100 ac.	parcels	0	0	2	0	2
	acres	0	0	297	0	297
Total	Parcels**	41	188	25	608	862
(over .2 ac.)	acres	702	585	707	1,387	3,380

Notes: * Lesser improved lands are sites with assessed improvements value of less than 50% of land value.

** Parcels are based on individual tax lots which may be contiguous but are not identified in this analysis, meaning opportunities for larger acreage assemblages than may be apparent with the size classifications indicated.

Source: E. D. Hovee & Company, LLC from FCS Consulting, draft updated vacant land inventory conducted for Metro in 2009, with input from City of Portland and Port of Portland, and Metro RLIS.

A key challenge for the future is the determination of which portions of this vacant and lesser improved inventory is most suitable for new development and/or redevelopment. While property specific decisions will be made based on market demand and interests of each individual property owner, they may be influenced by public policy related to land use, infrastructure and/or development incentives. These opportunities are considered further with discussion of market potential and then added consideration of site/infrastructure needs in the report sections which now follow.

III. STUDY AREA MARKET POTENTIAL

This phase of the economic development inventory is intended to address the study area's prospective market potential for airport-dependent and airport-related business development. This evaluation of market potential is organized to cover:

- Selected case study research including literature review of experiences from other cities regarding airport-dependent and airport-related economic development.
- Identification of airport-dependent and airport-related businesses and related supply-chain clusters that are either present or good targets for PDX.
- Selected interviews with a representative cross-section of 15 area businesses that have direct or indirect linkages to PDX activities.
- Characterization of the strengths, weaknesses, opportunities and threats (or SWOT) for airport-dependent and related businesses in the study area.

These market observations serve as the basis for subsequent assessment of site and infrastructure needs for airport-dependent/related and other industrial and employment development that should be leveraged by PDX now and in the future.

CASE STUDY REVIEW

As part of this economic development inventory, Bonnie Gee Yosick^{llc} conducted a literature survey related to airport-dependent and airport-related development. This survey involved a broad scan of national and international experiences. Also covered are criteria applied in selecting the case studies together with some brief background on the development experiences of other airports not selected as case studies.

The Airport City (aka Aerotropolis/Airfront). For most of recorded human history, cities have developed around marine waterways and ports. In the 19th century, cities and businesses grew up around the railways; for much of the 20th century, motorways drove development. But in the 21st century and increasingly in recent years, a new question has emerged: *can cities orient toward airports?*

Many of the aerotropolis projects have been built in Asia and Europe at major airports which are much newer than throughout much of North America, with many located on large greenfield sites surrounded by considerable developable land. As a result, planners and developers are able to fully leverage airports' new role as multimodal, multifunctional commercial development engines attracting businesses and shaping land use miles away.

The urban core of the geographically expansive aerotropolis is the airport city. The airport itself serves as a region-wide multimodal transportation and commercial nexus.

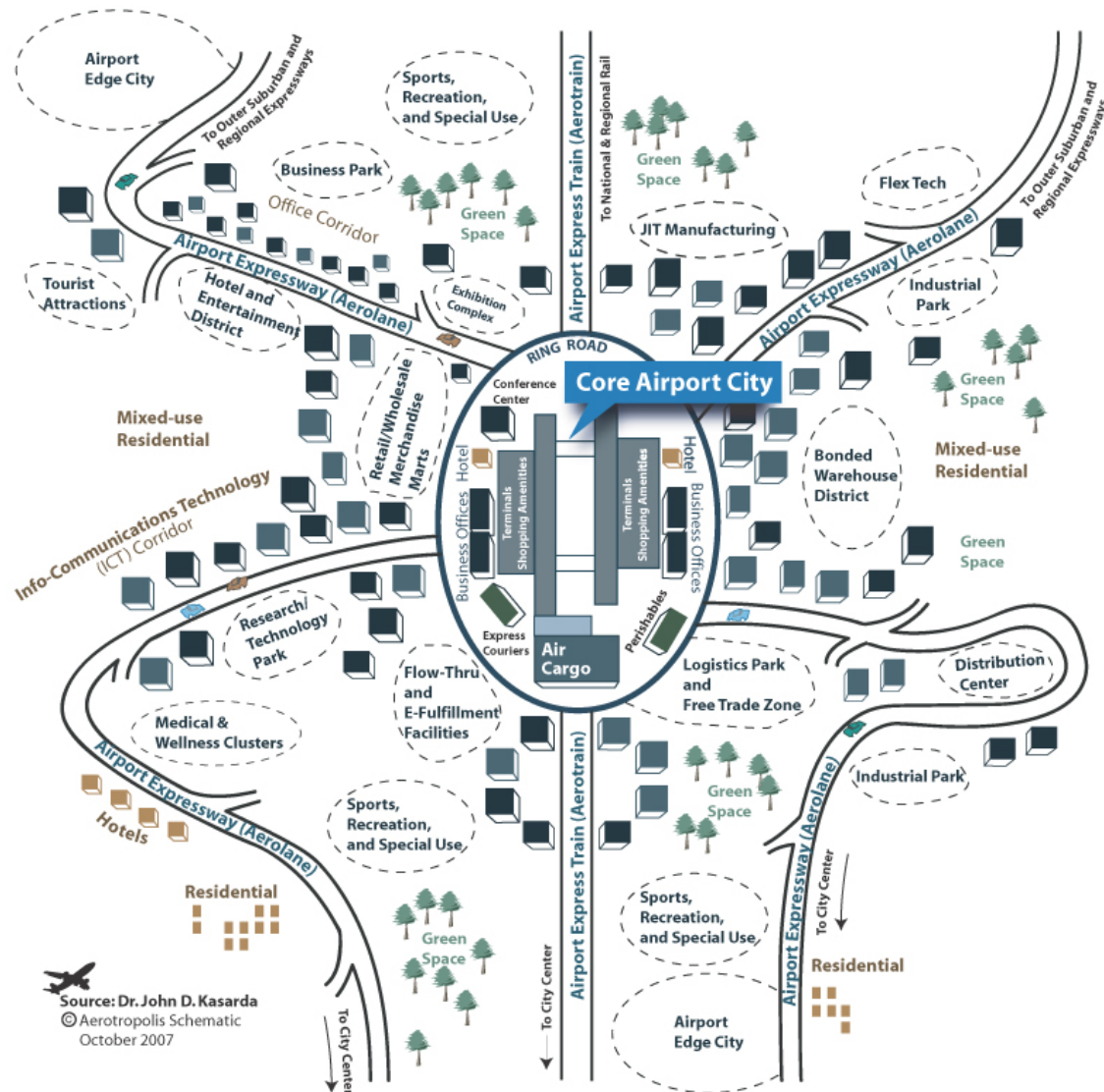
Airport-linked business and logistics parks, information and communications technology complexes, retail, hotel and entertainment centers, and mixed-use and other developments are forming along airport transportation corridors for 20 miles or more. In effect, the aerotropolis

consists of an airport city core and extensive outlying corridors and clusters of aviation-oriented businesses and their associated residential developments.

The commercial, industrial, and transportation facilities and services intrinsically tied to the airport – also referred to collectively as “the airfront” – are playing an increasingly important role in shaping urban and regional growth patterns. In some metropolitan areas, the airport and its adjacent commercial districts contain more employees and more income-generating economic activity than traditional downtowns or suburban office and industrial parks.

One version of this aerotropolis concept is provided by the following illustrative graphic.

Figure 15. Airport City / Aerotropolis Concept Illustrated



Note: This concept drawing is intended for illustrative purposes only. The concept can be adapted to particular market opportunities, planning and policy priorities specific to each individual metro area in which the airport city concept is developed.

Source: Dr. John Kasarda, from web site <http://www.aerotropolis.com/aerotropolisSchematic.html>.

The following basic requirements have been identified for an aerotropolis or airport district from a planning and regulatory perspective:⁴

- Good regional highway and transit access to link the district with other regional centers.
- Room for expansion, both in terms of the airport infrastructure itself and the availability of commercial and industrial land.
- A district-wide comprehensive plan or overlay that provides for organized land use, environmental, and transportation systems.
- An economic development and marketing strategy that defines the district and provides tools to attract and retain private investment.
- A governance framework that facilitates communication between public agencies and private industry.
- A shared sense of responsibility and purpose. This is often the most difficult requirement because airports, planning agencies, and economic interest groups typically see themselves as separate institutions with their own unique structure, mission, and view of the world.

PDX Airport City Fit. As is further depicted by the case studies that follow, PDX offers some features that appear to fit well with the aerotropolis or airport city concept, most notably including:

- Current multi-modal access (air, freeway, light rail, rail, nearby marine terminals).
- Large land base with remaining development potential (both near PDX/I-205 and throughout the larger economic development study area).
- Presence of institutional capacity with the resources to effect significant change (including the Port of Portland, City of Portland, major private property owners and Columbia Corridor Association).

Unlike some aerotropolis locations, a major limitation is that much of the best property in proximity to PDX can no longer be considered as a greenfield site. Rather, prime property is already committed to other uses, some of which may not be readily converted to better fit the aerotropolis concept. Some uses such as residential development also would not be expected with a direct airport city concept at PDX, due to presence of existing nearby residential areas and conflicts that added residential would represent if developed in closer proximity to the airport.

A second limitation is that, while the key institutional interests can be readily identified, there is not yet a common strategic or policy agenda and organizational impetus toward adopting and implementing an airport city concept. Once agreement on a common vision and agenda is reached, there will also need to be agreement on an appropriate lead implementation structure – whether through existing institutional capacity or creation of some form of new airport city lead entity.

Literature Review & Case Study Selection. The airport experiences of different cities can vary as much as the cities themselves. Consequently, this economic development inventory project seeks to draw lessons from a range of experiences which might be most applicable to the

development environment surrounding PDX. The following criteria in the selection of case studies:

- Reasonably comparable scale in terms of passenger, cargo, and operations volume
- Comparable urban-scale context
- Opportunity for multimodal freight capacity
- Economic development linkage between airport operations and vicinity area job creation
- Some diversity of experience and possible application for PDX
- Inclusion of airport city and international experience

Comparative Airport Rankings. To better assess the scale of the potential case studies, other airports' passenger, cargo, and operations' volumes also were compared, first using an industry size ranking, and then using a data table prepared from detailed airport statistics. The airport size ranking is from Airports Council International-North America (ACI-NA) website:⁵

- According to the ACI-NA 2007 ranking of North American airports, Portland ranks 34th in terms of passenger volume, 24th in terms of cargo volume, and 39th in terms of airport operations.
- By comparison, the Census Bureau ranks Portland as the 28th largest incorporated city in terms of population, and the Portland-Vancouver-Salem Combined Metropolitan Statistical Area (CMSA) the 23rd largest metropolitan area in the U.S.

The Top 60 ACI-NA rankings by passenger, cargo, and operations volume are attached with Appendix A to this report. The relatively higher ranking of PDX in terms of cargo volume than passenger volume supports the airport's role in the regional economy to allow efficient freight movement – for high value, low weight/volume shipments. The relatively lower rank of PDX in terms of operations movements also suggests a prevalence of larger aircraft at the airport.

Detailed results of the preliminary literature review is provided by Appendix B to this report. Based on preliminary research of the airports and their adjacent districts together with subsequent discussions with City and Port staff, several airports were selected for more in-depth case study review. Provided below is more detailed information focused on development opportunities around three North American Airports – Seattle-Tacoma, Kansas City, and Detroit – and two International Airports – Amsterdam's Schiphol and the Hong Kong International Airport.

Seattle-Tacoma International Airport. With about 2,500 acres, the Sea-Tac airport is one of the nation's smallest international airports in terms of land area. After years of controversy over proposals to build a third runway, airport officials have been working with neighboring communities and regional organizations such as the Puget Sound Regional Council (PSRC) to redevelop nearby properties for uses ranging from residential to commercial and industrial.

The Port of Seattle has joined with the cities of Burien, Des Moines, and SeaTac to develop a coherent and coordinated economic development strategy for the airport area. The process – the

New Economic Strategy Triangle (NEST) – is intended to help jurisdictions make economic development decisions jointly, efficiently, and with a long-term perspective.

The NEST process is led by the regional economic development district, which recently merged its staff with PSRC. The Sea-Tac airport is designated as an urban growth center in the regional council's growth management plan.

The City of SeaTac (in which the airport property is located) is encouraging higher density, mixed-use development adjacent to the airport, including the creation of a downtown just across Highway 99 from the terminal. SeaTac's planned town center area will soon be served by light rail transit, with the first station in nearby Tukwila opening in July, and the downtown SeaTac station scheduled to open in December of this year.

Based on work conducted by E.D. Hovee & Company, LLC in 2004, four overall business clusters were identified as being of current or prospective importance to the SeaTac community – *hospitality, air logistics, corporate office and mixed-use*. These four clusters were targeted specifically to capitalize on the SeaTac advantage for business investment and development:

- **Air Logistics.** This cluster of business activities is located in SeaTac because of the Seattle-Tacoma International Airport. Air logistics firms generally offer family-wage job potential, the opportunity to bolster the airport's competitive advantage, and to both complement and leverage Port investments.

The recent multi-jurisdiction NEST market analysis indicates that, because of its relatively urban location, SeaTac has a smaller land base than many comparable airports in the U.S. While the inventory of industrial space today is adequate on a regional basis, the supply of sites with close proximity to the airport may be constrained. Users desiring airport proximity have demonstrated a preference for paying less for space in the Kent Valley which is nearby and readily accessible by freeway. While some demand is anticipated for on-airport cargo facilities, off-airport demand is expected to constitute an even larger market.

Specific components of an air logistics cluster that build on the competitive strengths of the Puget Sound region include aerospace, electronics, perishable foods, software, biotechnology, and medical devices. The Port of Seattle has participated with the City of Des Moines to issue an RFP for a 90-acre parcel.⁶ The adjoining City of Burien also is conducting some master planning for nearby opportunity sites, and the Port has hired an employee dedicated to developing airport-adjacent properties.

- **Hospitality.** This cluster of interrelated travel-oriented business activities often serves as the most recognizable business image associated with an airport. Hospitality businesses also represent a major source of revenue to local governments. At SeaTac, the objective is to strengthen and diversify the existing business cluster – encouraging longer stays and a more value-added experience while in SeaTac.

The NEST market analysis indicated that the current lodging market regionally and in Seattle's southside area has been highly cyclical, affected by the events of 9/11 with subsequent recovery and more recently affected by the current recession. However, periods of economic downturn can also be a good time to prioritize diversification,

upgrading and expansion of the venues available for dining, retail and entertainment – to better serve SeaTac’s existing hospitality businesses.

Retail and dining demand have remained relatively strong through the economic downturn and current recovery, with relatively low vacancies. Future development in the SeaTac area is intended to support both the hospitality and mixed-use clusters. Given the strong competitive presence of other southside retail areas (notably the Southcenter regional shopping mall), further market testing and business target refinement has occurred through a business contact process. This has also served to inform development proposals in conjunction with extension of light rail to the airport.

Surface parking lots for airport travelers represent another substantial business activity and property use along the International Boulevard corridor. A City priority expressed through the City Center Plan is “the encouragement of structured parking to accommodate the demand for park-&-fly.” While some initial projects have moved in this direction, it remains uncertain whether demand is viewed as sufficiently stable and parking rates high enough to justify the cost of constructing structured parking and associated debt service expense repaid over a multi-year period. The advantage to property owners of such development is the opportunity to free up the remainder of a site for other related, non-parking development.

- **Corporate Office.** Though SeaTac has two distinctive office towers located across from the main airport terminal and a major corporate headquarters with Alaska Airlines, SeaTac is not known as a major office center in the Puget Sound region. Because office market activity has been dispersed across the South Seattle/King County market, no dominant southside office center has yet emerged.

The case has been made that the SeaTac area represents perhaps the best single opportunity to create the next major office and corporate corridor after downtown Seattle and Bellevue. This case is predicated on workforce access via proximity to major freeways and planned light rail together with opportunity for global mobility via an international airport. However, relatively high vacancy rates (especially with the current recession) together with a weaker development image in South Seattle have limited the opportunities to pursue corporate office development at least near term.

- **Mixed-Use.** Hospitality, air logistics and corporate office all are defined primarily by the types of businesses that fit within each cluster. Mixed-use can mean complementary businesses operating in close proximity to each other – often in the same development. However, mixed-use also is defined, in part, by the levels of urban density and design forms that are suggested. For some locations and projects, mixed-use offers the potential to combine residential and employment activities.

The NEST market study identifies the nature of the market opportunity for two key elements of mixed-use – retail and residential. Demographic research indicates that about one-quarter of current SeaTac residents demonstrate a lifestyle profile that is typically supportive of higher density, urban, owner product.

This relatively young demographic would potentially support mixed-use development (as illustrated by the chart on the following page). Owner products that might be considered as part of a mixed-use development program include condominiums, townhomes (offering fee ownership) and possibly an introductory mix of work/live units. The City is

currently pursuing mixed use development concepts in conjunction with light rail stations as service is extended to the SeaTac Airport.

Kansas City International Airport. KCI utilizes only about 3,500 acres of its 11,000-acre footprint, but is attempting to substantially improve that utilization rate. While developed amid rolling farmland northwest of Kansas City (a metro area comparable in population to Portland-Vancouver), the airport has increasingly found itself in the path of development.

In October of 2008, Kansas City government officials were joined by representatives of the Trammell Crow Company to break ground on a \$15 million infrastructure project to serve the 800-acre KCI Intermodal Business Centre being developed by Trammell Crow, who are also responsible for a large cargo operation at the Dallas/Ft. Worth airport:

- The first phase of the planned business and industrial park involves site infrastructure, (roads and utilities) and a 180-acre site at the southeast corner of the airport near the American Airlines overhaul base where Trammell Crow plans to build four buildings totaling about 1.8 million square feet.
- This initial phase includes a planned 494,000-square-foot distribution center to which Trammell Crow will seek to attract air cargo facilities, logistics firms, distribution facilities, light manufacturing and commercial office tenants though no tenants have yet been identified.
- The marketing search has slowed dramatically in recent months because of the overall weak economy and uncertainty in the credit markets. However, construction on Phase I infrastructure is expected to be complete by summer, 2009.
- Plans for Phase II include an extension of infrastructure to another 400 acres of contiguous land, including more than 4,000 linear feet of frontage along the main runways. Long-term plans call for a mix of commercial, retail and other development.
- In March 2009, it was announced that Smith Electric Vehicles will assemble electric trucks in the 80,000 square foot portion of a 480,000 square foot building formerly used by American Airlines for aircraft engine maintenance. The facility is planned to employ 120 workers by 2010.

Other competing cities – including Dallas, Memphis and Denver – also have been attracting private development to public land, which can be challenging when developers can only lease rather than own the property. To address this challenge, the Missouri State Legislature has passed legislation changing the property-tax laws so that developers would not be liable for property tax on buildings built on Port property in Kansas City.⁷

Once the financials for the project demonstrated a positive business case, Trammell Crow's management was drawn to Kansas City's central location, viewing it as a natural distribution hub, as the airport property benefits not only from air service but also the confluence of nearby interstate freeways offering both north-south and east-west access. From the city's perspective, developing the airport property is intended to provide an alternative revenue source that would better enable the city to keep landing fees low for airlines.⁸

In 2007, the Kansas City Council approved a 30-year lease with the KCI Motorsports Park to develop 300 acres west of the airport for a racing facility.⁹ Additionally, KCI has a due diligence agreement with a Las Vegas company for creation of a large equipment “expo” on 200 acres.¹⁰ Another interim use being explored is the possibility of a wind farm on the western side of the airport property, which is currently not served by electricity.

To guide future development, the Kansas City Aviation, City Planning and Development Departments are now working on a KCI Area Land Use and Development Plan. This planning effort is designed to determine a future vision for the KCI Area that establishes a balance among the interests and needs of residents and businesses, and develop strategies to make that vision a reality. The plan was in final draft stage as of February 2009.

Detroit Region Aerotropolis Initiative. Detroit has an estimated 25,000 acres of woods and open fields surrounding its main airport, a major hub for Northwest Airlines. Just seven miles to the west – a straight shot along I-94 – is a second, smaller airport, Willow Run, catering to the chartered cargo and corporate jets of what have been the Big Three domestic automakers and their assorted suppliers.

If one were to link the airfields with the highway, and with mass transit stretching to downtown Detroit, the spine for an aerotropolis would be in place. In effect, this aerotropolis concept is being pursued as a *bold economic development initiative* to restore competitiveness to a region still reeling from the continued downsizing and financial perils facing the U.S. auto industry.

With guidance from the internationally recognized airport consultant John Kasarda, three teams of University of Michigan architecture students have prepared master plans including full-fledged logistics hubs around Willow Run:

- The project team has concluded that the aerotropolis could prove instrumental to stem the massive brain drain from local universities and the entire Detroit region. The aerotropolis is also intended to anchor a new city, with up to 100,000 new residents in Wayne County’s western suburbs.
- Wayne County now has a memorandum of understanding (MOU) to further study the aerotropolis concept, building from existing industries including autoparts outfits such as Visteon, Magna, and Century Automotive. Many auto components are lightweight and digital, making them easily shippable by air. These companies are also responsible for non-employment uses, including Visteon Village which is home to some 3,000 auto-parts workers.
- Another thousand acres are planned to become the Entertainment Center, a Magna-supported proposed development, including hotels, a casino, a performing-arts center, retail, and a horse-racing track.

As of March 2009, five of the nine local governments invited to join the Detroit Region Aerotropolis Initiative had committed local funds to support the effort. Once all the communities are signed up, the Aerotropolis partnership will ask the Legislature for a package of development incentives. As of April, five municipalities were agreed to join the proposed state-authorized intergovernmental Aerotropolis Development Corporation.¹¹

Development incentives proposed are expected to include a range of bills to be introduced in the Legislature intended to create a coordinated approach to economic development, employing a range of tools that include full tax abatements under the Renaissance Zone and MEGA acts; tax increment districts resembling "Smart Zones" under the Local Development Financing Act; and traditional and personal property tax abatements. The granting of tax incentives would be coordinated through an Aerotropolis Development Corporation, which would be created by an agreement between participating local governments. Consensus on major provisions of an agreement has already been reached.¹²

Amsterdam's Schiphol Airport and Schiphol Group. With about 58,000 people employed at Amsterdam's airport, its passenger terminal – offering a mix of shopping, dining, and entertainment arcades – doubles as a major suburban shopping center accessible both to air travelers and the general public. Reportedly, Amsterdam residents as well as travelers regularly shop and relax in the airport's public section, especially on Sundays and at night when most in-city stores are closed.

Across from Schiphol's passenger terminal is the World Trade Center with conference facilities, two five-star hotels, and the regional headquarters of major employers including Thomson-CFS and Unilever. Nearby and clustered along the A4 and A9 motorways linking the airport to downtown Amsterdam are financial and consulting firms which serve the aviation industry and an assortment of industries that make extensive use of the airport – with strong emphasis on telecommunications, logistics, and distribution.

In effect, the airport and its immediate area serves as a multimodal transportation and commercial nexus. Property situated near the airport commands premium office rental prices for the Amsterdam area, even above rental rates in Amsterdam's central business district.

Schiphol Group's activities are not limited to Amsterdam. Schiphol develops airports based on the Airport City concept and develops, manages, and invests in commercial property at and around airports and modal transport hubs – both in Europe and Asia. It specializes in this niche market – the field of commercial real estate in combination with the complexity of airports and airport processes. The real estate subsidiary of the Schiphol Group develops commercial real estate in accordance with the Schiphol Group's *Airport City formula*.

In addition to managing airports, Schiphol Group also operates elements of the Airport City formula at airports including:

- **Stockholm Arlanda Airport, Sweden.** In November 2003, Schiphol Group and the Swedish Civil Aviation Administration [Luftfartverket] established a joint venture agreement – the Arlanda Schiphol Development Company AB – responsible for the management of the commercial facilities in the Swedish airport's North Terminal (Terminal 5), which handles the majority of air traffic to international destinations. In April 2005, these activities were expanded to include the management of all commercial facilities in all the other terminals of Stockholm Arlanda Airport, as well as in SkyCity; the central shopping centre open to the public and the airport railway station.

- **Soekarno-Hatta International Airport, Jakarta, Indonesia.** Schiphol Group and PT Angkasa Pura II (PTAPII) entered into a joint venture, Angkasa Pura Schiphol (APS), in 1994 to provide management and management advice for non-aviation related services and products to improve the commercial facilities and services at the airport. In 2002, Schiphol Group and PTAPII expanded the activities of APS and to intensify their strategic cooperation to include the media marketing of Terminal 1 and Terminal 2.
- **Guangzhou Baiyun International Airport, China.** Schiphol Group and Guangzhou Baiyun International Airport signed a contract in 2008 for the development of commercial activities at the airport in Guangzhou, in which Schiphol Group will advise Guangzhou in the further development of commercial activities, particularly in the area of (operational) management of commercial activities such as retail and bar and restaurant facilities.
- **Malpensa Real Estate, Milan Malpensa Airport.** Through the medium of the joint venture Malpensa Real Estate, Schiphol Real Estate is working together with local authorities and Italian landowners to develop real estate at and around Milan Malpensa Airport. The first project developed is Avioport Logistics Park, a logistics park adjacent to Malpensa Airport consisting of four industrial buildings (52,000 m²) and three modern office buildings (12,000 m²). Two of these industrial buildings (13,000 m² and 12,000 m²) and one office building (4,000 m²) have already been completed and leased.
- **Tradeport Hong Kong.** Tradeport Logistics Centre is a logistics center at Hong Kong International Airport focusing on integrated one-stop-shop logistics services with a total area of over 70,000 m² divided over four floors. The first phase of over 30,000 m² has already been completed and will house ABX Logistics, FedEx and DHL Danzas.

Hong Kong International Airport. HKIA is repeatedly cited as one of the world's exemplary airport cities and is an aerotropolis in evolution. Its 2,700-acre site was first created in the mid-1990s by leveling two small islands and reclaiming land from the sea. The airport opened in July 1998 with a total project cost of US\$20 billion, including a 21-mile multilane expressway and modern express train to both Kowloon and Hong Kong Island.

HKIA's 5.9 million-square-foot terminal contains 150 retail stores. Airport core property also houses the largest hotel in Hong Kong (the 1,100-room Regal Chek Lap Kok Hotel), a New Town housing 45,000 airport workers and their families, office buildings, a shopping mall, and major logistics facilities.

Three commercial districts adjacent to HKIA's terminal and runways are well along in development. The 74-acre South Commercial District is composed of logistics facilities, including the world's largest stand-alone air-cargo and air-express facility and a 1.49 million-square-foot mixed-use freight-forwarding warehousing and office complex. DHL will soon open its Asia air express hub in this zone as well. The 24.7-acre East Commercial District is being developed as an office park targeted to regional corporate offices and air travel-intensive professionals

The 141-acre North Commercial District is the Airport City's *signature development zone*, known as SkyCity. The 1.07 million-square-foot site is adjacent to the passenger terminal and served by the airport express train. SkyCity's first phase opened in 2006 with SkyPlaza, a

multipurpose commercial complex connected to the passenger terminal and the airport express train station with a 322,500-square-foot retail center and Class A office space, including the Airport Authority Headquarters (HKIA Tower).

SkyCity's first phase development also includes a 1.07 million-square-foot international AsiaWorld-Expo (AWE) exhibition center with full-time trade rep offices, a China cross-boundary ferry terminal, and a nine-hole golf course. Future phases will consist of a business park, hotels, and leisure and entertainment facilities.

SkyCity will become connected to southern coastal China through high-speed turbo jet ferries to the economically booming Pearl River Delta. HKIA is quickly becoming a quadramodal (air, highway, rail, sea) transportation and commercial nexus of a broader aerotropolis encompassing 26 million people from Hong Kong to southern coastal China.

SUPPLY CHAIN LINKAGES

In conjunction with the literature review, a more detailed quantitative assessment of supply chain linkages related to airports – and PDX specifically – has been conducted. This assessment is consistent with target industry or cluster analysis which focuses on the linkage or interdependence between businesses, industries and clusters.

A comprehensive cluster analysis can be used to highlight industries' use of shared or similar technology or similar skillsets for the workforce. This linkage analysis specifically focuses on two elements typically employed during a more comprehensive cluster assessment: a) the buyer and supplier relationships to the Air Transportation industry, and b) the Location Quotients of industries within the Portland Metro region. Detailed data tables from a nationally recognized economic input-output model (IMPLAN) used with this analysis are identified for each of these linkage items with Appendix A to this report.¹³

Buyers of Air Transportation Services. Nearly all IMPLAN's detailed industry sectors purchase air transportation services to some degree, as do households and institutions. Industrial intermediate demand across all industries accounts for just under 45% of all air transportation demand. The balance of the demand is considered final demand from households and government institutions:

- Not surprisingly, the largest industrial “customer” of air transportation services in the Portland metro area is the wholesale trade industry, accounting for nearly 8 percent of all industrially-generated air transportation output. Wholesale trade includes distribution centers that serve industry sectors ranging from major retailers to suppliers of parts for auto and equipment dealers.
- The next two largest users are software publishers and other computer related services. In fact, five of the 10 largest users are in the software, semiconductor, and computer-related fields (a figure consistent with Port of Portland air cargo data).

Suppliers to Air Transportation Industry. To provide air transportation services to the region's industries, households, and institutions, the air transportation sector purchases intermediate goods and services from 135 of IMPLAN's identified 440 industry sectors.

Of the top 30 suppliers (by gross value of goods and/or services provided) to the air transportation industry relevant to the region:

- The largest supplier to industries providing air transportation are traveler-service type industries, including #1 scenic and sightseeing transportation, #2 food services and drinking places, and #4 travel agencies. The #3 supplier to industries providing air transportation is commercial and industrial machinery and equipment. Taken together, these top four categories of suppliers account for nearly 58% of the value of goods and services supplied to the PDX air transportation industry.
- Many of the industries represented in the list of major suppliers are not well represented in this metro region. For example, petroleum refineries are the number one supplier to the air transportation industry in terms of the value of goods or services provided; however, that industry does not have significant operations in the Portland Metro region, so much of the economic benefit of those purchases leak outside the region.
- A related and somewhat surprising observation is how low other transport modes rank. For example, transport by truck is ranked as a #15 supplier, by water #19, and by rail as #29 – indicating some but relatively low levels of intermodal activity also involving air transport.

Location Quotients of Air Transportation. A final step in this linkage analysis has been to evaluate the comparative advantage (via location quotients or LQs) for all industries in the Portland-Vancouver-Beaverton MSA and Multnomah County. In both cases, the frame of reference is to the entire U.S.

The most noted observation is that the study area and Multnomah County have relatively higher LQs than the Portland Metro region for the transportation and warehousing industries in general and air transportation specifically. This is due to the role of Multnomah County as the region's center for major transportation functions in the Portland metro area – much of which is centered on the air, marine and rail facilities in and near to the Port of Portland.

STAKEHOLDER INTERVIEW RESEARCH

Literature review and case study research are useful to provide a global context for consideration of airport-related economic development opportunities. This outside view is now supplied by an inside view, based on perspectives gained from interviews with key local stakeholders.

As part of this economic development inventory, 15 interviews were conducted both in and outside the study area with a cross-section of airport-dependent and airport-related businesses, major employers in the area and growth-oriented organizations. A listing of those interviewed is provided as Appendix C to this report.

While not intended to provide a statistically valid sample, this form of research has proven useful to obtain a range of perspectives regarding PDX airport operations, linkages to existing businesses, and prospective economic development opportunities. Interview results are summarized by discussion topic.

Profile of Firms & Organizations Interviewed. As indicated by the contact listing with Appendix C, interviews included contacts with both long-time and newer Columbia Corridor companies, major air travel and air freight users outside the immediate study area, transportation/freight companies, regional visitor hospitality and convention activity, real estate development interests and public economic development agency representation including the Port of Portland.

Relationship of Firm Location / Investment to PDX Airport Proximity. Some businesses are clearly dependent on PDX access and proximity. Examples (located outside the airport proper) include airport area hotel and freight forwarding businesses. A freight-related business describes particular airport dependence for firms needing to ship “fragile, high value products.”

A variety of other business activities in this region also are definitely airport related. Examples range from the business and industrial parks in the Columbia Corridor (especially east of I-205) to other regional businesses with major export activity (including the high tech community with a strong presence in Washington County as well as elsewhere in the region).

For airport related activities, it generally appears that few site location or business investment decisions have been made solely based on airport proximity. A high tech representative noted that airport access and services are “a consideration but down the list” among business location factors.

However, with some industries (including high tech firms), future expansions may hinge (at least in part) on air freight capabilities relative to alternative locations elsewhere in the U.S. or globally. Issues of local and surface regional congestion may similarly affect business location and expansion decisions.

A number of firms (including some major employers) are located in the study area for reasons largely unrelated to airport proximity and access. These businesses range from equipment and parts distribution (as along Columbia Boulevard) to some trucking companies to area manufacturers and much of the business occupancy in the study area’s business and industrial parks.

One transportation firm located in the study area indicates that they are not involved with any air freight activity at present. Another firm with a major Columbia Corridor distribution center indicates that air freight activity is limited “only to rush products for those willing to pay a premium to the manufacturer.”

For many of these Columbia Corridor businesses, key factors favoring location in this area include:

- Proximity to the region’s three major interstate freeways
- Availability of reasonably priced industrial and commercial land with relatively modern building space
- Access to a large work force – extending to Clark and Clackamas Counties as well as the East Portland/Multnomah County population base

Advantages of a PDX Airport / Area Location. Key benefits of importance to study area and other Portland area businesses of the airport are cited by those interviewed as including ease of getting in and out of the airport, overall airport reputation and availability of direct international flights to Asia and Europe (especially valued by business travelers), and airport location in a setting offer multi-modal capabilities (for air freight operations).

PDX offers advantages for air carriers and airport-related businesses of being well positioned to serve the Pacific Rim. As one interviewee for this inventory study stated, “the Port is very integrated, very multi-modal,” referring to the combination of Port air, marine, and land development including new Troutdale distribution service capabilities.

The representative of a firm that has considerable business sales/marketing travel describes PDX as doing a “great job” for the size of the airport in securing international service. Portland is described as the “smallest U.S. city for the international service we have.”

An economic development representative compliments PDX for being “really responsive.” A real estate firm comments on a “phenomenal airport and spectacular AirTrans center” – benefitting both passenger and air freight from PDX.

From the perspective of businesses located throughout the economic development study area, other important advantages have included the availability of large industrial sites with development of modern “state of the art” and clean business park product. Much of this business investment activity tracing back to the 1980s can be attributed to the catalyst role resulting from construction of Airport Way.

Constructed east from the airport, Airport Way was extended across I-205. Perhaps more than any other factor, this transportation infrastructure investment has served to open up industrial development further east to 185th and also provides an added direct connection to the I-84 freeway.

One economic development representative cited air freight service as a “potent tool” for attraction of new business investment – for attraction of new firms and for existing businesses. Hotels ranging from those at the airport to downtown properties (including the proposed convention center hotel) are “all about air travel.”¹⁴ A hospitality operator suggests that people travel to Portland “for the city.”

Another economic developer suggested that push to globalization will continue through the economic downturn and beyond – with the major drivers now becoming concentration of business activity and fast-turn around capability. In this view, scale of community size and connectivity are vital – “you’ve got to have it all.” A high performance airport is essential to global connectivity. For the size of the region, Oregon and PDX are doing a “fabulous job.”

Disadvantages of a PDX Airport / Area Location. From a business perspective, disadvantages relate to lack of sufficient metro region size to justify more international flights (including the ongoing challenge of retaining what is now in place). In a world where “direct flights are everything,” routes that involve one or two stops diminish this region’s potential as a “global player.”

Portland's perceived status as a "second tier" city and Pacific Northwest location also means more limited air freight capacity. This affects, for example, those firms with size or volumes of shipments requiring main deck capability from air cargo craft.

The representative of one company commented on the disadvantage of being a "west coast company with east coast clientele." A hospitality interest cites the limited number of direct flight options to the east coast as limiting Portland metro business development options – as for headquarter companies and financial service firms.

Several interviewees cited the importance of the "logistics of cost." One international firm described Portland as an "expensive city" with high cost travel – but offset by being an "inexpensive city" to stay and conduct business.

Internal access within the Columbia Corridor (especially east-west access) is also identified repeatedly as a frustration both for freight and customer/worker movement. Columbia/Sandy Boulevards are slow and confusing (or in the words of one interviewee "tough" for effective freight transportation).

Marine Drive has been de-emphasized as a travel corridor; one transportation firm uses Marine Drive only for shipments to I-5 but not as a connector to I-205 or I-84. East-west highway corridors of Marine Drive and Columbia/Sandy are situated at both the northern and southern edges of the study area but are both affected by difficult accesses to I-5 and I-205 (especially during peak hour conditions).

I-205 is viewed as an increasingly viable freight alternative to I-5 for north bound freight. I-205 south is viewed as more of a "secondary route," with many shipments still moving down the Banfield (I-84) freeway and then to I-5. The recent closure of a bridge on Vancouver Avenue has affected internal freight transportation connections, especially for firms situated west of PDX.

Even more locally, access to the AirTrans cargo facility is described as a disadvantage due to the relatively under-improved nature of Cornfoot Road for industrial traffic. However, recent improvement of Alderwood Road has improved internal circulation near the airport area and offers an alternative route to Airport Way across I-205. Also noted as a positive step is the upgrade of 47th Avenue.

Regional roadway congestion is of greater concern than in the past – for worker commutes and freight access. A freight company indicates that it plans for twice the time in delivery service and pickup.

For high tech firms in Washington County, growing regional congestion is cited as an increasing concern affecting both business travel and air freight. For most but not all firms, the primary concern appears to be with out-bound rather than in-bound freight.

Guaranteeing air freight shipment arrival in time at the airport for next day delivery to the customer can require business cut-off pick-up times ranging from as early as 2:30-5:00 pm (depending on firm location and freight carrier). Early pick-up times limit vendor ability to respond to last minute orders or emergency shipments (both high tech and biomedical). For a

firm that relies on just-in-time inventory via air, a missed connection or late arrival can mean that “machines sit idle,” resulting in lost production.

Lack of main deck capacity which allows for greater capacity (and larger cargoes) has led at least one firm to truck over 90% of its product to Los Angeles for air freight service from LAX. A freight company located in the airport study area indicates that it does not do as much main deck freight service today as in the past.

The primary non-transportation disadvantage associated with doing business near the airport is indicated as the maturing of some of the older industrial product and a growing shortage of ready-to-build (or shovel-ready) industrial sites. Remaining sites tend to have “issues” – including wetland and environmental issues and/or challenging transportation access.

Older industrial parcels are cited by one interviewee as being too deep and narrow. Building and site needs for competitive distribution space are changing toward buildings that offer more clear height space with larger truck courts and loading dock doors.¹⁵

Business Expansion & Investment Planning. Not surprisingly, the current economic environment makes this a relatively difficult time to be talking about potential business expansion or new investment. Business and industrial parks are now experiencing increased vacancy, meaning that the next cycle of renewed development may now be several years out once economic recovery begins to take hold.

However, some firms are looking to expand – both in and outside the study area. At least some of the near-term expansion opportunities appear to be linked to industry consolidations as some businesses take on customers served by other businesses that are closing or dramatically scaling back operations locally or globally. Other opportunities can be linked to continued interest in green technologies (such as solar) and surprising strength of at least some of the region’s high tech businesses through this economic downturn.

One interviewee cited a “remarkable buzz about Portland despite being a second tier city.” Portland is on its “way up as an emerging market.” Another noted that “Portland attracts a young population and design element.” In this view, a key question is how this region can continue to “grow the creative and technical community?”

Availability of air service options and quality of the airport experience are part of the assessment of Portland’s attractiveness to young, mobile residents and visitors. For example, diversification of airport area lodging is described as an asset to serving creative class travelers – as with the recently completed A-Loft hotel at Cascade Station.

A strategy for Port and airport-related development around business clusters would not be based around traditional industry (SIC) definitions but around combinations of business activity. One example cited is the combination of visual display technology with comic book and design activity. Another example is the opportunity for Oregon “clean tech” – including solar, wind, wave, geothermal, batteries, transport and biomass.

Full build-out of retail, hospitality and office centers like Cascade Station are seen as dependent on attraction of new “demand generators” to the Columbia Corridor. The commitment of the Port to consolidated offices and the FBI building are seen as positive steps; the Fed Ex commitment to Troutdale represents another important step for the entire Corridor; securing postal service investment could become yet another.

Within the airport economic development study area, having space on site or access to land for expansion becomes a potentially critical determinant of whether opportunities for new business activity can occur within this region. Several interviewees cited large land holdings in the Columbia Corridor as a major long-term asset for their business. One indicated the preferred size as 50+ acres for cost-effective business park development, though in the Portland market this firm is adapting to much smaller sites in the 10 acre range.

An economic developer expressed disappointment that Oregon’s “Big Look” process “can’t move the ball.” Needed are 50-100 acre sites, ready-to-go. Also viewed favorably is the potential for more “hot office” to be located in closer proximity to a magnet as is represented by PDX.

Supply-Chain & Customer Relationships. Of particular interest with this study has been the identification of business-to-business relationships that can be linked to PDX activity. Traded sector businesses that serve markets beyond the Portland metro area currently appear to be reasonably satisfied by existing supply chain and customer relationships – both in and outside the metro area.

Few specific opportunities for business recruitment as a means to meet existing supply-chain gaps were identified by those interviewed. Comments received were focused more on the prospective opportunities that global economic restructuring may have on specific industry segments as stronger companies pick up the pieces from those who have lesser resources to survive the current recession.

For example, some distribution firms may find the chance to pick up market share, expand product lines and/or serve new geographic territory depending on the shakeout of competitors regionally or beyond. As another example, a major study area manufacturer is poised for substantial expansion even as others in the industry contract or shut down.

Priorities for Public Policy & Investment. Priorities suggested by those interviewed relate primarily to study area transportation and expanded regional air infrastructure including:

Study Area Infrastructure:

- Improved east-west access – possibly including renovation of the Columbia/Sandy corridor and Alderwood-Cornfoot circulation in immediate vicinity of the airport. As one interviewee indicated, what is needed is a “good arterial alternative to Airport Way.”
- Improved industrial interchange access – from Columbia Boulevard and/or Marine Drive to I-5 / I-205.
- Better access to I-84 – without having to travel to the east end of the Columbia Corridor (at 185th Avenue).

- Completion of the Columbia River Crossing (I-5 Bridge replacement) – seen by some as vital for freight relief for the I-5 crossing but by others as a less significant change especially for firms east of PDX and for those concerned with the on-going challenges of accessing the freeway system. As suggested by one interviewee, “the bridge is ok, getting to the bridge is not.”
- Long-term redevelopment of the lesser improved properties west of the airport (from 33rd west to the I-5 corridor).

Regional Air Infrastructure:

- Improved air freight options for high tech firms in Washington County (including suggestions for a heavier runway, introduction of direct air freight service from Hillsboro, and/or attraction of freight/drop ship consolidator – as may be found viable for the Port and/or appropriate air cargo providers).¹⁶
- Improved options for main deck air cargo service – whether directly served or otherwise accessed from the Portland metro area.
- Review of possible limited air passenger commuter service options from Hillsboro – as to SeaTac, the Bay Area and/or Los Angeles

Beginning with the creation of the Columbia South Shore Urban Renewal Area, the City of Portland has been able to make substantial investments for economic development – starting with Airport Way and leading to more recent funding support for MAX light rail, Cascade Station and Riverside Parkway development. However, future City/PDC funding may be more challenging as the URA has reached its maximum indebtedness limit and is expiring in 2012.

SUMMARY SWOT ASSESSMENT

Based on the results of data research, associated inventories, interviews and case studies, it is possible to compile a preliminary assessment of PDX Airport Futures strengths, weaknesses, opportunities and threats (or SWOT) for the economic development study area. Strengths and weaknesses are a reflection of recent conditions and current conditions. By comparison, opportunities and threats are forward-looking to future conditions – whether shaped by events internal or external to the Portland metro area.

Strengths & Weaknesses. Strengths can be described as current assets of the study area for business and economic development – representing *building blocks* for future opportunities. Weaknesses are issues or liabilities which, if not addressed, could undermine future prospects for improved economic contributions of PDX and businesses throughout the study area.

The most distinctive *strength* of PDX lies in its reputation both nationally and internationally. While airports are usually not viewed as the destination but rather as a pass-thru on-the-way to the destination, the quality of the airport experience sets a tone that also reinforces the reputation of the entire Portland region as a similarly distinctive place to visit and conduct business.

In addition to offering domestic service to other major U.S. markets, PDX is a hub for regional airlines serving Oregon and the western U.S. Portland currently offers direct international service

to Europe (Frankfurt and Amsterdam) on one to Asia (Tokyo) – as well as flights (direct and connecting) to Canada and Mexico.

For the larger economic development study area surrounding the airport, primary strengths of this location are to be found in opportunities for multi-modal access – centered on PDX but reinforced by proximity to all of the region’s interstate freeways, MAX light rail, freight rail and marine terminal facilities. An asset which the Columbia Corridor capitalized on over the last 2-3 decades has been the ready availability of large development parcels as well as building space.

Figure 16. Current PDX-Related Strengths & Weaknesses

Strengths	Weaknesses
<ul style="list-style-type: none"> • Quality reputation of PDX (“voted best in the U.S. three years running”)¹⁷ 	<ul style="list-style-type: none"> • PDX not a hub airport (offering the diverse international connections of a <i>global pathway</i> region)
<ul style="list-style-type: none"> • Multi-modal access available from PDX and Columbia Corridor (Airport Way, I-205, I-5, I-84 plus direct MAX service & proximity to rail + Port of Portland marine terminals @ Rivergate) 	<ul style="list-style-type: none"> • Regional transportation congestion (of particular concern for travelers and high tech firm firms in Washington County but with high tech still the #1 source of Portland area air freight imports / exports)
<ul style="list-style-type: none"> • Large land base of study area surrounding PDX (with major property holdings, remaining vacant / lesser improved sites & further aggregation potential) 	<ul style="list-style-type: none"> • Limited shovel-ready site availability (due to existing land commitments, land use / environmental constraints & obsolescence of older industrial properties)

Source: E. D. Hovee & Company, LLC, based on interview and other information compiled for this PDX *Airport Futures* economic development inventory.

Weaknesses represent the flip side of the strengths noted. PDX offers a great airport experience, but does not offer the diverse international connections of a *global pathway* region. A recent *Emerging Trends in Real Estate 2009* report by Urban Land Institute and Price Waterhouse Coopers describes global pathway markets as “favored 24-hour cities” – including Washington D. C., San Francisco, New York, Los Angeles, Boston and Seattle. These cities are expected to “hold value better and bounce back more quickly” from the economic downturn because both local and offshore investors gravitate to business and cultural centers “linked directly to Asia and Europe commercial capitals.”

Second-tier markets like Portland can expect to experience continuing challenges with airline flight cutbacks, making business travel more difficult and expensive. While Seattle is noted as the #1 market in the U.S. for 2009 for commercial real estate (amid a decidedly weak field), ULI comments that “Portland prospers in Seattle’s shadow, but increasingly plays second fiddle.” A question for the future is whether this region would be better positioned to align itself with Seattle or San Francisco as regional partners or to chart its own course as a non-traditional player in a still globalizing market.

Benefits of multi-modal access have been dampened over time by increased regional congestion. Drive times for workers and freight have essentially doubled, with an easy cross-region commute

no longer an automatic given. This is a special concern for high tech companies and workers in Washington County – who are the most removed from PDX. Yet high-tech represents the dominant source of air freight imports and exports in the Portland market. A question for the future is whether this liability becomes substantial enough to affect decisions regarding future business investment and/or expansion.

Another attribute that is now shifting from asset to liability relates to availability of large industrial sites and modern business park space. When Airport Way was constructed as a result of urban renewal district creation in the 1980s, most of the Columbia Corridor (east of PDX) was as yet undeveloped. The Corridor has become an increasingly a mature business area, with remaining properties affected by greater constraints to development.

And business park buildings that were “state of the art” 20 years ago are now less well adapted to current business and transportation requirements. Some interviewees express optimism in the hope that “decaying manufacturing” sites may begin to redevelop over the next 20 years – including some conversion to office space with higher density of employment.

However, Portland industrial land is not viewed by others as being expensive enough to warrant substantial re-development. For example, one interviewee indicated that the value of industrial land would have to more than double (to more than \$20 per square foot) before this becomes viewed as a viable option.¹⁸

Opportunities & Threats. Looking to the future, PDX and the surrounding study area appears to be faced with three distinct *opportunities*. First is the opportunity (with economic recovery) to position Portland for future added domestic and air service.

International destinations markets that could prove viable in the future for direct flights include Toronto and re-introduction of flights directly to Mexico together with long-term potential for consideration of direct service to overseas markets such as London, Shanghai, and/or Hong Kong. Added air cargo opportunities for discussion could include such items as a network carrier to Asia, re-introduction of similar service to Europe and/or possibly direct air cargo to Miami (as gateway to Latin America).

A second opportunity is to enhance the Columbia Corridor as the “go to” location for regional distribution – whether for businesses reliant on air freight or located nearby to capitalize on freeway proximity. This opportunity is strengthened to the extent that increased fuel costs serve to drive a trend toward distribution deconsolidation, with more distribution facilities located in second tier metro markets. As developable vacant land diminishes, greater emphasis might be placed on increased utilization of existing property and redevelopment of older sites

A third opportunity is represented by the concept of reconfiguring PDX as an aerotropolis (or airport city) – placing more emphasis on a broader mix of hospitality, retail destination and office center uses as well as the logistics, distribution, and manufacturing functions for which the Columbia Corridor is now known. Expanded high wage service sector employment opportunities are most distinctly represented at least near term by relocation of Port offices and construction of federal facilities near the airport.

The aerotropolis function also appears consistent with Metro and City of Portland objectives for an increasingly urbanized region with increased intensity of employment activity. This concept also would tend to support higher land values and job density in proximity to PDX.

A challenge is the lack of a lead economic development entity to serve as a champion for such a forward-looking initiative yet to be fully realized in the U.S. The question raised by one interviewee who is intrigued by the aerotropolis concept, but asks: “Who pulls that together?”

Figure 17. Prospective PDX-Related Opportunities & Threats

Opportunities	Threats
<ul style="list-style-type: none"> • Strengthened gateway air service (with more direct flights domestically & internationally) 	<ul style="list-style-type: none"> • Current risk to existing air service (short term due to the economic downturn; long-term need for economic development)
<ul style="list-style-type: none"> • Enhanced Pacific NW distribution role (especially with potential deconsolidation of distribution industry with more localized facilities for reduced fuel efficiency) 	<ul style="list-style-type: none"> • Global pathway consolidation (leaving second tier metro areas including PDX with reduced role in a restructured global economy)
<ul style="list-style-type: none"> • Mixed industrial-office-commercial aerotropolis (as an even more significant regional employment center for corporate office + destination retail as well as distribution, logistics & manufacturing) 	<ul style="list-style-type: none"> • Commercial development displacing a traditional industrial focus (especially if distribution, logistics & manufacturing uses are priced out by commercial uses supporting higher rents / land values as is allowed with EG zoning)

Source: E. D. Hovee & Company, LLC, based on interview and other information compiled for this PDX *Airport Futures* economic development inventory.

Potential *threats* are of three types – each serving as possible offset to an identified opportunity. The first threat noted is the potential loss of existing service, a concern currently being faced at PDX as well as other airports due to the economic downturn and resulting rapid decline in travel demand. A key emphasis of Port activity is to encourage carriers to maintain existing service (though with possible reductions in frequency when necessary).

Longer term, what is described as “an absolute key to sustainability” of airport passenger and cargo functions is continued economic development of the greater metro area. Because Portland is considered as a small to medium sized hub in the national and international business and trade community, the region and state need to maintain a robust economic development strategy to attract and maintain business at a level that will support the passenger and air cargo service the area now enjoys. Without such a strategy, maintaining high levels of air service to PDX is at serious risk.

A second threat is related to the first but addresses broader and more global market forces external to the Portland metro area. This is the threat that global pathway consolidation will lead to even more emphasis on first tier metro areas and hub airports as the preferred choice for business investment with continued consolidation of related logistics and distribution functions among just a handful of metro areas across the U.S.

Specifically noted is that the concept of freight deconsolidation has both supporters and detractors. Of those interviewed, a major equipment distributor would like to see a parts depot in Portland rather than Denver. The PDX area could become more of a “mini-hub,” especially if fuel prices again increase as the economic recovery takes hold.

While one real estate development firm indicates that the Pacific Northwest will always be a bit of a U.S. anomaly for of “network optimization” for distribution, further deconsolidation of distribution centers seems unlikely as the transportation system has already largely factored in fuel as one of its most significant cost inputs. In this view, the primary opportunities for more warehouse / distribution activity will occur largely from “organic growth” of the Portland metro area.

A third and final threat centers on the risk that successful realization of a greater mix of employment uses could begin to squeeze out the traded sector industrial uses that have been the hallmark of Columbia Corridor vitality over the last 2-3 decades. Unlike other industrial sanctuary areas in the City of Portland, the potential for added commercial use already exists with EG zoning that allows for flex space and commercial use along with industrial activity. While this concern might be mitigated if non-industrial uses are confined to the highest value locations in closest proximity to PDX and I-205, the risk is greater to the extent that alternative equally attractive industrial site locations cannot be provided elsewhere in the Portland metro region.

A related issue is the question of whether commercial development functions (as for an airport city concept) are best accommodated immediately adjacent to PDX or at a nearby existing major regional center node such as Gateway. With access both to I-205 and I-84 plus multi-directional MAX light rail capabilities, an aspirational vision for a Gateway regional center could encompass many of the use components of an aerotropolis concept.

Key elements of a regional center vision for Gateway could include office development together with major hospitality and retail functions. However, perceived distance from the airport and fragmented nature of existing ownerships and development patterns would serve to make implementation of this concept more challenging than directly at PDX.

As this discussion illustrates, decisions made as part of the Airport Futures planning process should be seen as integrally linked to broader regional discussions regarding both industrial and commercial lands availability and development readiness. The ability to provide additional inventory for industrial uses (especially transportation logistics and distribution) that have been accommodated close to the PDX airport would make it more readily possible to shift some portion of the area between PDX and I-205.

In effect, a broader regional strategy could allow the transition to more of a mixed employment aerotropolis concept without undermining regional industrial competitiveness. And it is clear that planning for PDX Airport Futures could benefit from coordination of the most viable opportunities for Gateway that also would support the broader aerotropolis function – ranging from medical/wellness to flex tech and incubator business opportunities.

IV. SITE & INFRASTRUCTURE NEEDS

This phase of this economic development inventory addresses site and infrastructure needs of airport-dependent/related and other industrial and employment development – both for existing and prospective businesses. This evaluation of site and infrastructure needs covers the range of site size, infrastructure and other site features anticipated as needed for different types of businesses with varied degrees of airport linkages.

Based on the inventory work completed for this report, a preliminary assessment is also made of existing site and infrastructure conditions in the study area. This assessment is conducted from two perspectives:

- *Existing industry requirements* – based on review of information for existing businesses in the PDX influence area combined with prospective requirements reflecting comparable airport developments elsewhere in the U.S. and globally.
- Forward-looking assessment of key development priorities for *prospective airport-dependent and related industries* – as potential targets to strengthen the PDX competitive position and leverage added traded sector economic development opportunities, creating new globally connected sources of income and jobs for the Portland metro area.

EXISTING & PROSPECTIVE INDUSTRY NEEDS

Key strategic opportunities represented by this assessment can be summarized to include:

- ***For Existing Business:*** Improved access via Cornfoot/Alderwood to provide better internal access to existing industries between the I-205 area and Columbia Boulevard – plus initial planning for long-term redevelopment of older and lesser improved properties extending from the I-205 corridor west to I-5.
- ***For Prospective Business:*** Moving toward an Aerotropolis concept with greater intensity of airport logistics, office and destination hospitality functions between PDX and I-205 – coupled with more focused planning to secure added study-area wide industrial development capacity via build-out of vacant and lesser improved land plus selected redevelopment opportunities.
- ***Both Existing & Prospective Business:*** Improved east-west study area transportation access – together with improved (I-5/I-205/I-84) freeway interchange accesses.

SUMMARY SITE & INFRASTRUCTURE NEEDS

A more detailed site and infrastructure need matrix building on these strategic themes is presented by the chart on the following page. For existing and prospective industries, needs are differentiated between airport dependent, related, non-related study area and Metro-wide needs.

Figure 18. Summary PDX Related Site & Infrastructure Needs Matrix

Type of Industry	Site Needs	Infrastructure Needs
Existing Industry:		
Airport Dependent (inside the fence)	<ul style="list-style-type: none"> Hold strategic reserve lands east of 33rd Avenue for added air dependent users (as for air cargo) + airport expansion Otherwise little change in mix of use 	<ul style="list-style-type: none"> None specifically identified with this economic development inventory study (covered with other <i>PDX Airport Futures</i> planning)
Study Area Business Related to PDX	<ul style="list-style-type: none"> Long-term densification of air cargo & commercial uses fronting Airport Way (especially west of I-205) 	<ul style="list-style-type: none"> Road improvements to AirTrans cargo shipment area (e.g. Cornfoot)
Study Area Non-Related Business	<ul style="list-style-type: none"> Eventual reconfiguration / modernization of existing logistics & distribution functions (especially west of PDX and close-in to I-205) Potential long-term site consolidation & redevelopment for older properties in immediate vicinity of PDX & I-205 	<ul style="list-style-type: none"> Improved east-west internal Columbia Corridor access (both sides of PDX) Improved industrial freeway interchange accesses (I-5, 205, 84) Reduction in freight traffic congestion (e.g. CRC Crossing) Long-term redevelopment of older & lesser improved properties
Rest of Metro Related Business	<ul style="list-style-type: none"> None identified as directly related to PDX 	<ul style="list-style-type: none"> Improved <i>just in time</i> access for air travel & cargo (especially for Washington County) Improved options for main deck cargo service (from PDX)
Prospective Industry:		
Airport Dependent (inside the fence)	<ul style="list-style-type: none"> More on-site commercial retail & office/conferencing outside security (for travelers & others as could occur with an aerotropolis concept) Interim release of selected strategic reserve properties for development on up to 50-year lease availability 	<ul style="list-style-type: none"> None specifically identified with this assessment, except as related to air passenger and cargo volume growth Potential indirect need to serve an expanded air cargo market as with high tech or other Portland metro industry growth
Study Area Business Related to PDX	<ul style="list-style-type: none"> Broader mix & higher density of employment in the vicinity of the I-205 interchange & PDX (with more diverse lodging, destination retail & professional / financial firms oriented to global markets) Added large site industrial land capacity (including consideration of golf-course employment reuse) 	<ul style="list-style-type: none"> Golf course purchase, infrastructure & real estate development – for airport dependent use (as with Colwood / Broadmoor) or related business development (also possibly including Riverside and/or Columbia-Edgewater) Improved east-west street corridor & freeway interchange access
Study Area Non-Related Business	<ul style="list-style-type: none"> Added capacity for next wave of distribution & logistics functions with large (20-50+ acre) site capability Clarification of development potential with remaining vacant sites (especially those w/natural resource functions) 	<ul style="list-style-type: none"> The <i>next Airport Way</i> – as impetus to a post-recession wave of major Columbia Corridor reinvestment & development Consideration of master redevelopment plus street/utility infrastructure master plan for properties west of PDX to I-5
Rest of Metro Related Uses	<ul style="list-style-type: none"> Potential for more high tech in closer proximity to PDX (OR or WA side) 	<ul style="list-style-type: none"> Maintenance & expansion of U.S. city direct service + Asia / Europe flights

Source: E. D. Hovee & Company, LLC. Preliminary draft and subject to revision.

V. ECONOMIC DEVELOPMENT INVENTORY CONCLUSIONS

This final section of the economic development inventory report covers a brief summary review of PDX-related opportunities and requirements followed by concluding observations.

SUMMARY OPPORTUNITIES & REQUIREMENTS

For this inventory report, information has been drawn from identification of existing conditions followed by market and resulting SWOT assessments together with more focused evaluation of site and infrastructure needs. A summary listing of key opportunities and requirements is outlined by the following chart – for airport dependent activities, study area businesses related to PDX, non-related business, and rest of Metro region related business activity.

Figure 19. Summary PDX Related Opportunities & Requirements

Type of Industry	Opportunities	Requirements
<i>Existing & Prospective Industry:</i>		
Airport Dependent (inside the fence)	<ul style="list-style-type: none"> Keyed to resurgent growth of passenger travel & air cargo volume 	<ul style="list-style-type: none"> Integrally linked to economic recovery & longer term economic development strategy for Portland metro region
Study Area Business Related to PDX	<ul style="list-style-type: none"> Best chance via implementation of aerotropolis / Airport City concept @ PDX & I-205 nexus (logistics / just in time distribution, corporate office, hospitality / conferencing & destination retail) 	<ul style="list-style-type: none"> Gateway regional center link – for flex tech business incubator & medical wellness opportunity Critical need to identify the <i>go to</i> aerotropolis implementer
Study Area Non- Related Business	<ul style="list-style-type: none"> Continued strong partnerships with recognized multi-tenant business park development firms User-driven manufacturing & distribution expansion / recruitment Redevelopment of lesser improved sites (e.g. west of airport to I-5) 	<ul style="list-style-type: none"> Strengthened Columbia Corridor industrial sanctuary wrapped around the PDX aerotropolis core between the airport & I-205 interchange Improved internal transportation circulation & ability to deliver competitive industrial sites
Rest of Metro Related Business	<ul style="list-style-type: none"> Building business clusters dependent on export & import of time sensitive / high value products 	<ul style="list-style-type: none"> Improved regional transportation access to PDX (passenger & freight) Enhanced air service options for high tech regionally Green / sustainability strategy for PDX airport & Columbia Corridor

As depicted by this matrix chart, there appear to be substantial *opportunities* to strengthen the linkage between the economic vitality of the Portland metro area and sustained performance of the PDX airport. A catalyst integral to moving Portland to the next level as an increasingly significant global player centers on conceptualization and implementation of an aerotropolis or airport city concept that can serve to reinforce this region's vision for livability and sustainability. *Requirements* relate to the need for the Airport Futures plan to be woven into the fabric of City and Metro regional objectives – together with continued if not increased attention to local and regional transportation accessibility.

CONCLUDING OBSERVATIONS

This economic development inventory report was initiated with the goal of providing an initial review of activities that are dependent on or related to operations of the Portland International Airport (PDX) – as a background resource for the *Airport Futures* planning process currently underway by the City of Portland and Port of Portland:

- ***What's There Today?*** What we have found is an airport that is vital to the on-going economic competitiveness of this metro area and more specifically to the economic development study area – extending from I-5 to NE 185th Street along the Columbia River. This corridor is home to a diverse array of airport dependent, related and non-related businesses. However, the PDX airport economic development study area does not yet appear to be performing to its economic potential – whether measured in terms of land utilization, jobs, wage levels and leveraging of other economic activity throughout the Portland metro region.
- ***What's the Study Area Market Potential?*** For a metro region of its size, PDX offers extraordinary strengths of quality reputation, multi-modal access and large industrial land base extending both west and east of the airport. Potential paths of opportunity include an enhanced Pacific Northwest NW distribution role and/or mixed industrial-office-commercial aerotropolis role. However, these opportunities are at least partially offset by potential threats of global pathway consolidation and/or potential loss of the current Columbia Corridor traded sector focus on firms that serve markets and bring new wealth in from outside the Portland metro area.

Continued initiative for expansion of the metro area's existing business base and visible recruitment success is important not just for new air service but to maintain the level of service that PDX already offers. These opportunities are perhaps best catalyzed by regional consideration and shaping of an aerotropolis concept tailored to this region's economic opportunities and needs – as well as integrated into the fabric of broader City of Portland and metro area objectives for growth, livability and sustainability.

- ***What are Site & Infrastructure Needs for Existing & Prospective Business?*** Common themes include needs for improved internal east-west access plus improved freeway interchange access. Redevelopment of older properties represents a potentially emerging need for areas west of PDX and the I-205 corridor. East of I-205, there is still potential for added employment land development predicated on transportation improvements and resolution of environmental issues – including wetlands and drainage issues together with associated setback and buffer requirements.

Taken together, the answers to these three questions suggest great opportunity for the PDX airport area to enhance its economic vitality and to contribute a distinctive *competitive edge* for Portland metro area business investment and job creation. This role as regional business catalyst can be expected to take on even greater prominence in years to come – with economic recovery from the current recession and ongoing restructuring for competitive advantage in an ever more globalized economic environment.

APPENDIX A. SUPPLEMENTAL DATA TABLES

Figure 20. Portland Traveler Demographics & Behavior

Purpose of visit:	
Business	33%
Leisure*	57%
Residence of traveler:	
Local**	44%
Non-local	56%
Gender:	
Female	52%
Male	48%
Age:	
Less than 25	13%
25-34	18%
35-44	19%
45-54	23%
55-64	19%
65-74	7%
75-100	1%
Income:	
Less than \$20,000	8%
\$20,000-39,999	11%
\$40,000-59,999	15%
\$60,000-79,999	15%
\$80,000-99,999	12%
\$100,000-119,999	12%
\$120,000-149,999	9%
\$150,000+	18%
Transportation mode to/from PDX:	
Private vehicle - dropped off	37%
Private vehicle - parked	19%
Rental car	19%
Light rail	6.6%
Hotel shuttle	6%
Taxi	4%
Off-site parking lot shuttle	3%
Other off-site shuttle (Airporter)	3%
Limo/town car	2%
Charter/tour bus	0.4%
Frequency of travel:	
1-3 trips	48%
4-6 trips	25%
7-9 trips	7%
10+ trips	20%

Notes: * Leisure includes vacation or visiting family/friends.

** Local indicates residence in the Portland/Vancouver metro area.

Source: Port of Portland.

Figure 21. Portland Airport Statistics (2007)

PDX Exports: Country by Value

Partner Country	Air Exports By Value (USD)	Air Exports by Wgt (KGS)	Top Partner Commodity	Air Exports By Value (USD)	Air Exports by Wgt (KGS)
CHINA	\$25,145,700,803	83,425,893	Computer and Electronic Product Manufacturing	\$20,500,696,935	23,587,740
GERMANY	\$10,300,632,338	65,596,792	Computer and Electronic Product Manufacturing	\$4,912,730,640	21,405,105
JAPAN	\$8,698,478,205	93,045,636	Computer and Electronic Product Manufacturing	\$4,636,664,955	10,332,630
PHILIPPINES	\$7,022,727,089	839,241	Computer and Electronic Product Manufacturing	\$6,972,278,985	599,040
ITALY	\$3,417,461,098	21,691,205	Computer and Electronic Product Manufacturing	\$1,669,655,745	10,188,945
Other	\$43,188,439,506	254,445,419			
Grand Total	\$97,773,439,039	519,044,186		\$38,692,027,260	66,113,460

PDX Exports: Commodities by Value

Commodity	Air Exports By Value (USD)	Air Exports by Wgt (KGS)	Top Partner Commodity	Air Exports By Value (USD)	Air Exports by Wgt (KGS)
Computer and Electronic Product Manufacturing	\$51,753,185,235	117,881,730	CHINA	\$20,500,696,935	23,587,740
Machinery Manufacturing	\$10,306,617,370	103,260,500	HUNGARY	\$2,032,469,740	22,664,180
Transportation Equipment Manufacturing	\$5,873,595,680	10,830,656	CHINA	\$1,439,879,196	2,981,515
Primary Metal Manufacturing	\$2,927,676,627	22,117,819	JAPAN	\$2,346,823,559	13,727,948
Miscellaneous Manufacturing	\$2,316,359,820	6,776,336	GERMANY	\$2,036,879,310	1,293,836
Other	\$24,596,004,307	253,567,388			
Grand Total	\$97,773,439,039	519,044,186		\$28,356,748,740	64,255,219

PDX Imports: Country by Value

Partner Country	Air Imports By Value (USD)	Air Imports By Wgt (KGS)	Top Partner Commodity	Air Imports By Value (USD)	Air Imports by Wgt (KGS)
JAPAN	\$25,301,373,350	184,737,294	Computer and Electronic Product Manufacturing	\$16,921,091,790	38,285,775
MALAYSIA	\$17,538,386,462	55,220,608	Computer and Electronic Product Manufacturing	\$17,093,846,295	44,189,190
CHINA	\$6,781,599,542	142,865,994	Computer and Electronic Product Manufacturing	\$5,180,006,340	67,389,255
GERMANY	\$6,349,107,556	67,851,499	Computer and Electronic Product Manufacturing	\$2,546,252,010	15,439,275
TAIWAN	\$2,958,317,015	31,386,466	Computer and Electronic Product Manufacturing	\$2,212,311,375	19,142,685
Other	\$19,680,043,551	260,925,899			
Grand Total	\$78,608,827,476	742,987,760		\$43,953,507,810	184,446,180

PDX Imports: Commodities by Value

Commodity	Air Imports By Value (USD)	Air Imports By Wgt (KGS)	Top Partner Country	Air Imports By Value (USD)	Air Imports by Wgt (KGS)
Computer and Electronic Product Manufacturing	\$53,610,827,625	261,501,615	MALAYSIA	\$17,093,846,295	44,189,190
Machinery Manufacturing	\$10,492,923,910	140,379,960	JAPAN	\$4,205,403,300	54,560,310
Primary Metal Manufacturing	\$3,737,170,582	38,409,784	GERMANY	\$2,343,622,648	17,988,791
Chemical Manufacturing	\$2,097,670,424	34,344,549	JAPAN	\$1,042,749,775	16,810,280
Fabricated Metal Product Manufacturing	\$1,889,454,002	78,099,019	JAPAN	\$871,495,197	39,675,792
Other	\$6,780,780,933	190,252,833			
Grand Total	\$78,608,827,476	742,987,760		\$25,557,117,215	173,224,363

Note: Data for the Columbia/Snake River Customs District.

Source: Port of Portland.

Figure 22. Portland MSA Business & Employment by NAICS (2006)

NAICS	Industry	Firms	Jobs	Avg Firm Size	Avg Payroll/Job
11	Agriculture, forestry, fishing & hunting	843	13,966	17	\$23,985
21	Mining	35	598	17	\$51,462
22	Utilities	44	2,248	51	\$78,069
23	Construction	8,085	61,962	8	\$45,956
31-33	Manufacturing	3,424	126,061	37	\$56,580
42	Wholesale trade	5,807	57,588	10	\$63,713
44-45	Retail trade	6,474	106,546	16	\$26,463
48-49	Transportation & warehousing	1,580	33,910	21	\$39,999
51	Information	1,268	23,905	19	\$64,323
52	Finance & insurance	3,748	43,816	12	\$62,405
53	Real estate & rental & leasing	3,389	18,730	6	\$37,485
54	Professional & technical services	7,563	50,308	7	\$60,901
55	Management of companies & enterprises	510	22,022	43	\$75,660
56	Administrative & waste services	3,491	61,027	17	\$26,243
61	Educational services	846	17,030	20	\$29,443
62	Health care & social assistance	5,605	101,375	18	\$41,663
71	Arts, entertainment, & recreation	802	13,555	17	\$24,487
72	Accommodation & food services	4,640	80,316	17	\$15,678
81	Other services, except public administration	9,302	38,070	4	\$28,066
92	Public Administration	1,273	133,195	105	\$43,579
99	NOT ELSEWHERE CLASSIFIED	329	757	2	\$47,842
	Total	69,040	1,007,241	15	\$42,596

Source: Oregon Employment Department.

Figure 23. American Airport Passenger Volume Rankings (2007)

RANK	CITY (AIRPORT CODE)	TOTAL PASSENGERS	% CHG
1	ATLANTA (ATL)	89,379,287	5.3
2	CHICAGO O'HARE (ORD)	76,177,855	(0.1)
3	LOS ANGELES (LAX)	61,896,075	1.4
4	DALLAS/FT WORTH (DFW)	59,786,476	(0.7)
5	DENVER (DEN)	49,863,352	5.4
6	NEW YORK (JFK)	47,716,941	11.9
7	LAS VEGAS (LAS)	46,961,011	3.2
8	HOUSTON (IAH)	42,998,040	1.1
9	PHOENIX (PHX)	42,184,515	1.8
10	ORLANDO (MCO)	36,480,416	5.3
11	NEWARK (EWR)	36,367,240	2.1
12	DETROIT (DTW)	35,983,478	0.0
13	SAN FRANCISCO (SFO)	35,792,707	6.6
14	MINNEAPOLIS (MSP)	35,157,322	(1.3)
15	MIAMI (MIA)	33,740,416	3.7
16	CHARLOTTE (CLT)	33,165,688	11.7
17	PHILADELPHIA (PHL)	32,211,439	1.4
18	TORONTO (YYZ)	31,452,848	2.1
19	SEATTLE (SEA)	31,296,628	4.3
20	BOSTON (BOS)	28,102,455	1.4
21	NEW YORK (LGA)	25,026,267	(3.0)
22	WASHINGTON DULLES (IAD)	24,525,487	7.5
23	FORT LAUDERDALE (FLL)	22,681,903	6.1
24	SALT LAKE CITY (SLC)	22,045,333	2.3
25	BALTIMORE/WASHINGTON (BWI)	21,498,091	1.5
26	CHICAGO (MDW)	19,378,855	2.7
27	TAMPA (TPA)	19,154,957	1.5
28	WASHINGTON REAGAN (DCA)	18,670,924	0.7
29	SAN DIEGO (SAN)	18,336,761	4.9
30	VANCOUVER (YVR)	17,710,239	3.4
31	CINCINNATI (CVG)	15,736,220	(3.1)
32	ST LOUIS (STL)	15,384,557	1.2
33	OAKLAND (OAK)	14,846,832	1.0
34	PORTLAND (PDX)	14,654,222	4.3
35	MONTREAL (YUL)	12,407,934	8.5
36	CALGARY (YYC)	12,257,865	8.7
37	KANSAS CITY (MCI)	12,000,997	6.8
38	CLEVELAND (CLE)	11,459,390	1.2
39	MEMPHIS (MEM)	11,290,477	1.0
40	SACRAMENTO (SMF)	10,748,982	3.7
41	SAN JOSE (SJC)	10,658,389	(0.5)
42	RALEIGH-DURHAM (RDU)	10,219,138	6.3
43	SANTA ANA (SNA)	9,979,699	3.8
44	NASHVILLE (BNA)	9,876,524	2.2
45	PITTSBURGH (PIT)	9,822,588	(1.6)

RANK	CITY (AIRPORT CODE)	TOTAL PASSENGERS	% CHG
46	AUSTIN (AUS)	8,885,391	7.6
47	HOUSTON (HOU)	8,819,521	3.2
48	INDIANAPOLIS (IND)	8,271,632	2.3
49	SAN ANTONIO (SAT)	8,033,314	0.0
50	FORT MYERS (RSW)	8,029,204	5.1
51	DALLAS (DAL)	7,953,385	15.7
52	COLUMBUS (CMH)	7,726,421	14.7
53	MILWAUKEE (MKE)	7,713,144	5.7
54	NEW ORLEANS (MSY)	7,525,533	20.8
55	ONTARIO (ONT)	7,207,150	2.2
56	WEST PALM BEACH (PBI)	6,967,277	2.8
57	ALBUQUERQUE (ABQ)	6,727,384	3.6
58	HARTFORD/SPRINGFIELD (BDL)	6,519,181	(5.6)
59	JACKSONVILLE (JAX)	6,319,016	6.3
60	EDMONTON (YEG)	6,065,117	16.3

Source: Airports Council International-North America (ACI-NA).

Figure 24. American Air Cargo Volume Rankings (2007)

RANK	CITY (AIRPORT CODE)	TOTAL CARGO (metric tonnes)	% CHG
1	MEMPHIS (MEM)	3,840,491	4.0
2	ANCHORAGE (ANC)**	2,825,511	0.6
3	LOUISVILLE (SDF)	2,078,947	4.8
4	MIAMI (MIA)	1,922,985	5.0
5	LOS ANGELES (LAX)	1,884,317	(1.2)
6	NEW YORK (JFK)	1,607,050	(1.9)
7	CHICAGO O'HARE (ORD)	1,533,606	(1.6)
8	INDIANAPOLIS (IND)	998,675	1.1
9	NEWARK (EWR)	963,794	(0.6)
10	DALLAS/FT WORTH (DFW)	724,140	(4.1)
11	ATLANTA (ATL)	720,209	(3.5)
12	OAKLAND (OAK)	647,594	(3.1)
13	SAN FRANCISCO (SFO)	562,933	(5.4)
14	PHILADELPHIA (PHL)	543,357	2.1
15	TORONTO (YYZ)	504,608	(1.1)
16	ONTARIO (ONT)	483,309	(2.3)
17	HOUSTON (IAH)	409,193	0.0
18	TOLEDO (TOL)	361,867	2.4
19	WASHINGTON DULLES (IAD)	358,527	2.2
20	SEATTLE (SEA)	319,013	(6.7)
21	BOSTON (BOS)	298,536	(8.1)
22	DENVER (DEN)	267,294	(5.2)
23	MINNEAPOLIS (MSP)	257,394	(6.4)
24	PORTLAND (PDX)	254,754	(1.8)
25	PHOENIX (PHX)	251,925	(12.2)
26	FORTH WORTH (AFW)	236,875	(5.4)
27	DETROIT (DTW)	233,034	8.7
28	VANCOUVER (YVR)	225,412	1.2
29	ORLANDO (MCO)	183,070	5.9
30	SALT LAKE CITY (SLC)	177,710	(2.0)
31	HARTFORD/SPRINGFIELD (BDL)	162,929	(3.3)
32	WINNIPEG (YWG)	155,988	3.7
33	SAN DIEGO (SAN)	140,304	(25.6)
34	FORT LAUDERDALE (FLL)	137,219	(7.4)
35	CALGARY (YYC)	134,250	5.5
36	KANSAS CITY (MCI)	127,767	(5.3)
37	SAN ANTONIO (SAT)	124,390	(0.7)
38	CHARLOTTE (CLT)	122,149	(17.7)
39	BALTIMORE/WASHINGTON (BWI)	115,402	(6.9)
40	RALEIGH-DURHAM (RDU)	107,485	1.5
41	COLUMBIA (CAE)	105,629	8.8
42	COLUMBUS (LCK)	100,009	(12.1)
43	LINCOLN (LNK)	99,123	5.6

RANK	CITY (AIRPORT CODE)	TOTAL CARGO (metric tonnes)	% CHG
44	TAMPA (TPA)	98,018	(10.2)
45	AUSTIN (AUS)	95,587	(8.3)
46	DES MOINES (DSM)	91,391	(1.8)
47	LAS VEGAS (LAS)	91,205	(10.0)
48	MILWAUKEE (MKE)	88,237	(13.4)
49	MANCHESTER (MHT)	87,747	9.7
50	CLEVELAND (CLE)	86,690	(6.1)
51	OMAHA (OMA)	85,967	0.5
52	PITTSBURGH (PIT)	84,266	(0.5)
53	ST LOUIS (STL)	83,251	(2.7)
54	SAN JOSE (SJC)	82,927	(9.5)
55	HUNTSVILLE (HSV)	79,307	14.2
56	SACRAMENTO (SMF)	79,117	16.9
57	JACKSONVILLE (JAX)	75,499	(4.2)
58	EL PASO (ELP)	74,963	(2.5)
59	SACRAMENTO (MHR)	74,631	21.6
60	FORT WAYNE (FWA)	74,071	(36.7)

Source: Airports Council International-North America (ACI-NA).

Figure 25. American Airport Total Operations Rankings (2007)

RANK	CITY (AIRPORT CODE)	TOTAL OPERATIONS	% CHG
1	ATLANTA (ATL)	994,346	1.8
2	CHICAGO O'HARE (ORD)	926,973	(3.3)
3	DALLAS/FT WORTH (DFW)	685,491	(2.0)
4	LOS ANGELES (LAX)	680,954	3.7
5	DENVER (DEN)	614,065	2.8
6	LAS VEGAS (LAS)	609,472	(1.6)
7	HOUSTON (IAH)	603,656	0.2
8	PHOENIX (PHX)	539,211	(1.3)
9	CHARLOTTE (CLT)	522,541	2.5
10	PHILADELPHIA (PHL)	499,653	(3.1)
11	DETROIT (DTW)	467,230	(3.0)
12	MINNEAPOLIS (MSP)	452,972	(4.6)
13	NEW YORK (JFK)	446,348	17.2
14	NEWARK (EWR)	435,691	(2.0)
15	TORONTO (YYZ)	425,500	1.8
16	SALT LAKE CITY (SLC)	422,010	0.1
17	BOSTON (BOS)	399,537	(1.6)
18	LONG BEACH (LGB)	398,433	7.8
19	NEW YORK (LGA)	391,872	(2.1)
20	MIAMI (MIA)	386,058	0.4
21	WASHINGTON DULLES (IAD)	382,939	0.9
22	SAN FRANCISCO (SFO)	379,500	5.7
23	PHOENIX (DVT)	378,349	(6.9)
24	MEMPHIS (MEM)	374,989	(2.6)
25	LOS ANGELES (VNY)	374,464	(5.2)
26	ORLANDO (MCO)	360,075	2.8
27	SEATTLE (SEA)	347,046	2.1
28	OAKLAND (OAK)	342,024	3.5
29	SANTA ANA (SNA)	331,452	(4.5)
30	VANCOUVER (YVR)	328,563	1.9
31	CINCINNATI (CVG)	328,059	(5.1)
32	FORT LAUDERDALE (FLL)	307,975	3.7
33	CHICAGO (MDW)	304,657	2.0
34	BALTIMORE/WASHINGTON (BWI)	296,872	(2.9)
35	PHOENIX (AZA)	296,686	5.7
36	SANFORD (SFB)	294,781	(7.6)
37	ANCHORAGE (ANC)	276,209	(1.4)
38	WASHINGTON REAGAN (DCA)	275,433	(0.4)
39	PORTLAND (PDX)	264,518	1.5
40	TAMPA (TPA)	258,349	0.5
41	TUCSON (TUS)	257,191	(4.9)
42	ST LOUIS (STL)	254,302	(6.7)

RANK	CITY (AIRPORT CODE)	TOTAL OPERATIONS	% CHG
43	RALEIGH-DURHAM (RDU)	252,708	3.1
44	CALGARY (YYC)	250,532	3.2
45	CLEVELAND (CLE)	244,719	(2.1)
46	DALLAS (DAL)	244,609	(1.7)
47	HOUSTON (HOU)	232,976	(0.7)
48	SAN DIEGO (SAN)	227,329	2.9
49	DAYTONA BEACH (DAB)	225,622	(21.6)
50	MONTREAL (YUL)	222,871	4.4
51	LAS VEGAS (VGT)	219,693	(4.4)
52	SAN ANTONIO (SAT)	219,437	0.2
53	AUSTIN (AUS)	214,440	2.5
54	NASHVILLE (BNA)	213,185	(1.6)
55	PITTSBURGH (PIT)	209,303	(11.0)
56	INDIANAPOLIS (IND)	203,136	(5.0)
57	MILWAUKEE (MKE)	200,205	(1.1)
58	KANSAS CITY (MCI)	194,969	9.2
59	ALBUQUERQUE (ABQ)	191,050	(0.8)
60	GOODYEAR (GYR)	188,015	18.1

Source: Airports Council International-North America (ACI-NA).

Figure 26. Buyers of Air Transportation Services, Ranked by Value

Rank	IMPLAN Industry Code	Description	Percent of all Intermediate Commodity Demand
1	319	Wholesale trade businesses	7.7%
2	373	Other computer related services, including facilities mgmt	3.4%
3	345	Software publishers	3.3%
4	369	Architectural, engineering & related services	2.7%
5	352	Data processing, hosting, ISP, web search portal	2.6%
6	413	Food services & drinking places	2.5%
7	372	Computer systems design services	2.4%
8	243	Semiconductor & related device manufacturing	2.4%
9	355	Nondepository credit intermediation & related activities	2.2%
10	34	Construct new nonresidential commercial & health care structures	2.0%
11	351	Telecommunications	1.9%
12	427	US Postal Service	1.9%
13	394	Offices of physicians, dentists & other health practitioners	1.9%
14	335	Transport by truck	1.8%
15	356	Securities, commodity contracts, investments & related activities	1.8%
16	382	Employment services	1.7%
17	367	Legal services	1.5%
18	374	Management, scientific & technical consulting services	1.5%
19	386	Business support services	1.4%
20	253	Electricity & signal testing instruments manufacturing	1.4%
21	368	Accounting, tax preparation, bookkeeping & payroll services	1.3%
22	37	Construct new residential permanent site single & multi-fam bldg	1.3%
23	377	Advertising & related services	1.3%
24	360	Real estate establishments	1.3%
25	354	Monetary authorities & depository credit intermediation	1.2%
26	358	Insurance agencies, brokerages & related activities	1.1%
27	365	Commercial & industrial machinery & equipment rental & leasing	1.1%
28	209	Semiconductor machinery manufacturing	1.0%
29	390	Waste management & remediation services	1.0%
30	389	Other support services	0.9%

Source: IMPLAN and Bonnie Gee Yosick, LLC.

**Figure 27. Suppliers to the Air Transportation Industry
(Ranked by Gross Value of Goods/Services Supplied)**

Gross Input Rank	Commodity Code	Description	Percentage of Gross Inputs
1	115	Petroleum refineries	38.2%
2	338	Scenic and sightseeing transportation and sup	12.6%
3	433	* Not an industry (Used and secondhand goods)	7.0%
4	365	Commercial and industrial machinery and equip	6.9%
5	413	Food services and drinking places	6.1%
6	383	Travel arrangement and reservation services	5.6%
7	360	Real estate establishments	3.9%
8	357	Insurance carriers	2.9%
9	351	Telecommunications	1.9%
10	319	Wholesale trade businesses	1.9%
11	284	Aircraft manufacturing	1.8%
12	286	Other aircraft parts and auxiliary equipment	1.7%
13	377	Advertising and related services	1.5%
14	195	Machine shops	1.2%
15	381	Management of companies and enterprises	0.8%
16	367	Legal services	0.8%
17	337	Transport by pipeline	0.7%
18	354	Monetary authorities and depository credit in	0.7%
19	335	Transport by truck	0.5%
20	356	Securities, commodity contracts, investments & related activities	0.3%
21	334	Transport by water	0.2%
22	388	Services to buildings and dwellings	0.2%
23	368	Accounting, tax preparation, bookkeeping & payroll services	0.2%
24	380	All other miscellaneous professional, scientific & technical svcs	0.2%
25	197	Coating, engraving, heat treating and allied activities	0.2%
26	31	Electric power generation, transmission & distribution	0.1%
27	373	Other computer related services, including facilities mgmt	0.1%
28	369	Architectural, engineering & related services	0.1%
29	285	Aircraft engine and engine parts manufacturing	0.1%
30	372	Computer systems design services	0.1%

Source: IMPLAN and Bonnie Gee Yosick, LLC.

**Figure 28. Suppliers to the Air Transportation Industry,
(Ranked by Value of Goods/Services Supplied Regionally)**

Gross Input Rank	Regional Input Rank	Commodity Code	Description	% of Regional Inputs
2	1	338	Scenic and sightseeing transportation and supplies	21.8%
5	2	413	Food services and drinking places	13.5%
4	3	365	Commercial and industrial machinery and equip	12.9%
6	4	383	Travel arrangement and reservation services	9.6%
7	5	360	Real estate establishments	6.8%
1	6	115	Petroleum refineries	4.9%
10	7	319	Wholesale trade businesses	4.6%
8	8	357	Insurance carriers	4.5%
12	9	286	Other aircraft parts and auxiliary equipment	3.1%
13	10	377	Advertising and related services	2.8%
9	11	351	Telecommunications	2.5%
16	12	367	Legal services	1.6%
15	13	381	Management of companies and enterprises	1.5%
11	14	284	Aircraft manufacturing	1.3%
19	15	335	Transport by truck	1.2%
14	16	195	Machine shops	0.9%
18	17	354	Monetary authorities and depository credit	0.7%
3	18	433	* Not an industry (Used and secondhand goods)	0.7%
21	19	334	Transport by water	0.5%
20	20	356	Securities (commodity contracts, investments)	0.4%
22	21	388	Services to buildings and dwellings	0.4%
23	22	368	Accounting (tax preparation, bookkeeping)	0.4%
24	23	380	All other miscellaneous professional & scientific	0.3%
26	24	31	Electric power generation & transmission	0.3%
31	25	416	Electronic and precision equipment repair	0.2%
27	26	373	Other computer related services	0.2%
28	27	369	Architectural- engineering & related services	0.2%
30	28	372	Computer systems design services	0.2%
33	29	333	Transport by rail	0.2%
37	30	39	Maint & repair construct of nonresident structures	0.2%

Source: IMPLAN and Bonnie Gee Yosick, LLC.

Figure 29. Location Quotients (2007)

Industry	Portland-Vancouver-Beaverton, OR-WA MSA	Multnomah County, Oregon
Base Industry: Total, all industries (LQ)	1.00	1.00
NAICS 11 Agriculture, forestry, fishing and hunting	1.53	ND
NAICS 21 Mining, quarrying, and oil and gas extraction	0.18	ND
NAICS 22 Utilities	ND	0.86
NAICS 23 Construction	1.08	0.86
NAICS 31-33 Manufacturing	1.16	0.81
NAICS 42 Wholesale trade	ND	1.19
NAICS 44-45 Retail trade	0.9	0.79
NAICS 48-49 Transportation and warehousing	1.02	1.49
NAICS 51 Information	1.05	1.15
NAICS 52 Finance and insurance	0.92	1.1
NAICS 53 Real estate and rental and leasing	1.11	1.29
NAICS 54 Professional and technical services	ND	1.06
NAICS 55 Management of companies and enterprises	ND	2.35
NAICS 56 Administrative and waste services	0.92	0.9
NAICS 61 Educational services	ND	1.22
NAICS 62 Health care and social assistance	ND	0.96
NAICS 71 Arts, entertainment, and recreation	0.92	0.98
NAICS 72 Accommodation and food services	0.94	1.05
NAICS 81 Other services, except public administration	1.13	1.25
NAICS 99 Unclassified	0.21	0.21

Notes:

(ND) Not Disclosable

Location Quotient: Ratio of analysis-industry employment in the analysis area to base-industry employment in the analysis area divided by the ratio of analysis-industry employment in the base area to base-industry employment in the base area.

Source: Bureau of Labor Statistics. Calculated from Quarterly Census of Employment and Wages.

Figure 30. Location Quotients (2007)

Location Quotients calculated from Quarterly Census of Employment and Wages Data, 2007 NAICS Code 481 through 488.

Industry	Portland-Vancouver-Beaverton, OR-WA MSA	Multnomah County, Oregon
Base Industry: Total, all industries (LQ)	1.00	1.00
NAICS 481 Air transportation	1.04	2.2
NAICS 482 Rail transportation	NC	NC
NAICS 483 Water transportation	1.64	ND
NAICS 484 Truck transportation	ND	1.22
NAICS 485 Transit and ground passenger transportation	0.84	1
NAICS 486 Pipeline transportation	NC	NC
NAICS 487 Scenic and sightseeing transportation	0.68	ND
NAICS 488 Support activities for transportation	ND	2.15

Notes:

(ND) Not Disclosable

(NC) Not Calculable, the data does not exist or it is zero

Location Quotient: Ratio of analysis-industry employment in the analysis area to base-industry employment in the analysis area divided by the ratio of analysis-industry employment in the base area to base-industry employment in the base area.

Source: Bureau of Labor Statistics. Calculated from Quarterly Census of Employment and Wages.

APPENDIX B. LITERATURE REVIEW & CASE STUDY RESEARCH

The case study research for this Airport Futures economic development inventory began with a broad literature survey of national and international experiences. This survey included a review of the planning, fiscal, and development environments related to airport-adjacent development, identification of selection criteria for the case studies, and descriptions of airport areas considered for the case studies.

THE PLANNING PERSPECTIVE – THE AEROTROPOLIS & THE AIRFRONT

In the 21st century and increasingly in recent years, a new question emerges: *can cities orient toward airports?*

With new emphasis on just-in-time manufacturing, airports are becoming a new form of “center.” The concept of making airports the new center of cities, focusing warehouses, retailers, and manufacturing operations around them is what John Kasarda, a professor of entrepreneurship at the University of North Carolina, calls the “aerotropolis.” Kasarda sees the aerotropolis as key to competitive agility. Kasarda argues that connecting the city and surrounding countryside to the rest of the world improves residents’ lives by bringing manufacturing jobs and helping farmers and fishermen connect to export markets.

Most of aerotropolis examples have been built in Asia where major airports are much newer than most in North America, with many located on large greenfield sites surrounded by considerable developable land. As a result, planners and developers are able to fully leverage airports’ new role as multimodal, multifunctional commercial development engines attracting businesses and shaping land use miles away. In addition to incorporating shopping mall concepts into passenger terminals and developing logistics facilities near runways, airports are working with developers to place hotels, office and retail complexes, conference and exhibition centers, free-trade zones, and time-sensitive manufacturing facilities on their property.

The urban core of the geographically expansive aerotropolis is the *airport city*. With the airport itself serving as a region-wide multimodal transportation and commercial nexus, airport-linked business and logistics parks, information and communications technology complexes, retail, hotel and entertainment centers, and mixed-use and other developments are forming along airport transportation corridors for 20 miles or more. The aerotropolis consists of an airport city core and extensive outlying corridors and clusters of aviation-oriented businesses and their associated residential developments.

Kasarda believes the most striking illustration of the airport city – aerotropolis relationship is Hong Kong International Airport. With its air, highway and express train connectivity complemented by fast-ferry service and a new bridge to southern coastal China, Hong Kong’s Sky City is positioning itself as the quadramodal commercial core of an expansive aerotropolis encompassing 26 million people.

The commercial, industrial, and transportation facilities and services intrinsically tied to the airport – referred to collectively as “the airfront” – are playing an increasingly important role in shaping urban and regional growth patterns. In some metropolitan areas, the airport and its

adjacent commercial districts contain more employees and more income-generating economic activity than traditional downtowns or suburban office parks.

Historically, planning efforts have tended to focus more on impacts, particularly airport noise and land use compatibility. However, in response to this new emerging role for airports, the American Planning Association's Transportation Planning Division has established an "Airports in the Region" committee which attempts to address broader policy questions:

- How the airfront fits into regional land use and transportation needs and environmental and economic goals, and
- What strategies would ensure the most efficient use of land and the wisest infrastructure investments to support those goals.

From a planning and development perspective, there are intrinsic advantages to being in the "neighborhood" of an airport. Shipping, cargo, and transit companies minimize their need for ground transportation, supported by burgeoning international trade as suggested by census data which show shipments by air have been increasing several times more rapidly than shipments using other forms of transportation.

THE FISCAL ENVIRONMENT

Many airports today receive greater percentages of their revenues from non-aeronautical sources than from aeronautical sources (e.g., landing fees, gate leases, passenger service charges). These non-aeronautical revenues have become pivotal to airports meeting their facility modernization and infrastructure expansion needs, along with their being cost-competitive in attracting and retaining airlines.

Based on historic benchmarks from International Civil Aviation Organization (ICAO) airport financial data, Airports Council International (ACI) has estimated that non-aeronautical revenues constituted approximately 30 percent of total airport revenues in 1990. ACI's economic surveys have shown that non-aeronautical revenues rose to 46 percent in 1995, to 51 percent in 2000, and to a record 54 percent last year. For some large airports, such as Atlanta's Hartsfield-Jackson International Airport, non-aeronautical revenues now exceed 60 percent of their total revenues. Airport retail and, in particular, parking have become huge cash cows.

THE DEVELOPMENT ENVIRONMENT

While the regulatory framework is an important part of creating the airport neighborhood, there are other challenges related to creating the successful airfront from a development perspective. Two primary challenges with airport-adjacent development in North America are the limited amount of land (and limited parcel size) available for new development, and the age of the existing structures. These factors have created an opportunity for developers who renovate older warehousing space into transportation facilities which can take advantage of the facilities' location.

The demand for airport space goes well beyond shipping and transportation facilities. Many manufacturers prefer space near airports because logistically it is easy to import parts, assemble them, and then export the completed product with minimal internal transportation.

Security and ease of access to transportation and freeways are big attractions for airport-adjacent projects. For example, the 250,000-square-foot Dupont Centre, situated two blocks east of John Wayne Airport in Orange County, is home to a range of service companies, law firms, mortgage companies, and accounting firms. When employees of these firms have to travel, “They have the advantage of being only two minutes to the airport, allowing them to get in and out of Orange County with great ease.”

Another example is provided by the Van Nuys Airport in the heart of Los Angeles’s San Fernando Valley – one of the busiest municipal airports for smaller planes – many of them converted 707s owned by celebrities. Buildings at the 350,000-square-foot Nearon Van Nuys Industrial Center – at the Van Nuys Airport – sell for a 10 to 20 premium over other projects in the area.

POTENTIAL CASE STUDIES CONSIDERED

Some background information is presented below for a range of airports considered as potential case studies. This list is divided between North American and International airport facilities.

North American Airports Considered

Profiled are a mix of traditional North American airports – both on the west coast and elsewhere – together with several non-traditional operations which may have a more explicit economic development purpose extending beyond passenger service.

Paine Field, Everett, Washington. While Everett’s Paine Field has no regularly commercial flights, Planning magazine cites Paine Field, the Snohomish County Airport located in Everett, as a successful example linking aviation, economic development, land use and transportation planning.

Originally constructed in 1936 as a Works Project Administration (WPA) project, Paine Field was initially envisioned as one of ten “super airports” around the country. Those plans were interrupted first by World War II and then the Korean War, when the airfield was used first by the Army and then later the Air Force.

By 1966, the military presence was no longer necessary, the airport was redirected to develop into an industrial base, and the Boeing Company was searching for a space for a new B-747 assembly plant, locating just north of Paine Field, with some operations on-site. Other aerospace businesses followed, including Aviation Technical Services (formerly BF Goodrich Aerospace), the largest aerospace repair facility in North America. Today, there are about 55 onsite businesses adjacent to the airport, which provide about 40,000 jobs.

Dulles. According to ULI, “when Washington Dulles International Airport opened in 1962 in rural Virginia, it was considered a white elephant; but it has spawned a high-tech corridor and now sits in the fastest-growing county in the United States.” Time magazine called Fairfax

County "one of the great economic success stories of our time." The Fairfax County Economic Development Authority tallied up 102 employers and 9,102 jobs created in 2007.

Most of the firms announcing new jobs are with information technology or professional services companies, two sectors that drive the Fairfax County economy. Many of these developments are housed in business parks and communities within a few miles of Washington Dulles International Airport, including Volkswagen of America in Herndon, and Perot Systems in Fairfax, and American Systems in Chantilly.

Dallas-Fort Worth/Alliance Texas. Dallas/Fort Worth is already the fourth-largest industrial market in the United States, and its location as a major highway and rail crossroads is conducive to the development of logistics hubs. As cargo containers arrive by ship from Asia, primarily in Long Beach and Los Angeles, they are loaded onto rail and transferred to trucks at an intermodal facility.

Because of limited land at ports like Long Beach and Los Angeles, inland ports are created in mid-continent locations to allow for transfer to trucks and distribution to population centers further east. Logistics hubs contain intermodal facilities for the train-to-truck transfer, and typically a substantial amount of distribution warehousing is developed nearby. The advantage for users is the efficiency and corresponding lower cost, due to proximity to the intermodal facility, of transferring goods from train to truck and then to a nearby distribution warehouse to await delivery to the final destination, be it a store or elsewhere.

During the late 1980s, the family of Ross Perot, Sr., the wealthy Texan and future presidential candidate, began to acquire land on speculation in the suburbs north of Fort Worth. The land was purchased in part for its proximity to transportation, including Dallas/Fort Worth International Airport (which had been open for just over ten years at the time), as well as Interstate 35. The landholdings have since been developed into AllianceTexas, one of the largest logistics hubs in the country.

San Diego. With the busiest single-runway airport in the country, stakeholders of San Diego's airport have long been divided about the best plan for the airport: a) build a new commercial airport, most likely 18 miles north to Miramar, or b) expanding the existing Lindbergh Field with the hopes of acquiring adjacent military-owned properties.

At this time, an Environmental Impact Statement (EIR) has been approved for improvements to the existing airport, which should be implemented by 2012. One concern about the benefit of this airport's experience is the lack of vacant or developable land.

Chicago's Midway Airport. Late in 2008, a private consortium led by Citigroup (CII) landed a \$2.5 billion deal from the City of Chicago for control of Midway Airport. The Midway Investment and Development Corp., known as Midco received a 99-year lease, pending Federal Aviation Administration approval, to operate the 85-year-old airport located on the southwest side of the city.

Midway, once the busiest airport in the world, lost much of its status in the early 1960s following the construction of O'Hare International Airport across town. In 2007, Midway had an operating

loss of \$46.5 million on revenue of \$197 million – including operating income, investment income and grants. Nonetheless, it had positive cash flow of \$53.6 million in 2007.

However, even today Midway offers room for growth by expanding travel service to more destinations and by boosting income from parking and retail concessions.¹⁹ According to the Chicago Tribune, “Midway’s status as the area’s economic engine is revered by nearly all of its Southwest Side neighbors.” While there is concern about noise and traffic congestion, Midway’s residential neighbors support the airport’s expansion and renovation program. Not only do these improvements mean more jobs, they create higher property values as more airport and airline employees look for houses near their jobs.

Chicago Mayor Richard M. Daley also recognizes the pivotal economic development role that this airport plays for the region, noting: “Midway represents the largest public construction project in the state, creating 50,000 permanent jobs in the Chicago region and bringing in \$3.6 billion in economic activity over the next 14 years. The region’s economy is closely tied to Midway’s continuing success.”

Mesa, Arizona. In 1940 Mesa had just 7,000 inhabitants, but then the city’s population roughly doubled in each of the next five decades. It now contains almost half a million people and has sprawled into a metropolis centered around the similarly fast-growing city of Phoenix. With twice the size of Washington, DC, and a population greater than Cleveland or Miami, Mesa was an extreme example of sunbelt growth which has since been at least temporarily halted by foreclosure and the credit crunch.

Mesa's Gateway airport, a former military site with three runways, currently sees only a few commercial flights, many of them charters heading for Las Vegas. Arizona's main hub is Phoenix-Sky Harbour airport, 28 miles to the west.

But assuming that central Arizona resumes its rapid growth, another airport will be needed. The city plans to build a big new passenger terminal and hopes to create a high-tech job cluster that will draw part of its labor force and some of its ideas from a polytechnic university that is already next to the airport.

Rather than dictating uses for neighborhoods, Mesa's planners are following a form-based code, based on the appearance of buildings. Desired is a mixture of uses in one street, and allow for change (so a warehouse might eventually be converted into apartments).

Oakland. In 2000, the Port of Oakland approved the sale of a 1.3 acre site within the Oakland Airport Business Park, including a 9,000-square-foot building, to Key Source International which supplies high-end, custom keyboards to the Airline, Point of Sale industries and financial markets worldwide. From its new home in Oakland KSI will serve such customers as Continental Airlines, Southwest Airlines, Bloomberg Financial News, Radio Shack, Qantas Airways, Men's Warehouse, Australian Stock Exchange and many more Fortune 1000 companies across the world.

The Port of Oakland's Commercial Real Estate Division has been in the process of implementing a previously adopted Restructuring and Development Plan which calls for the sale of certain

parcels of land located in the Oakland Airport Business Park. The purpose of the sale is to assist in funding some of the Port's waterfront projects. "We are very excited to welcome Key Source International to the growing high tech hub in the Hegenberger corridor. They will be joining Zhong and Rainin Instruments, two new companies that have recently located in the Oakland Airport Business Park," said David Kramer, President of the Board of Port Commissioners.

Oakland International Airport covers an area of over 2,500 acres including 1,100 acres of commercial, industrial, recreational, and 950 acres of underdeveloped land.

Airports Outside of North America

Our initial reconnaissance also takes the experience of several airports outside the U.S. While the scale is significantly larger than PDX, they merit consideration because of their incorporation of the airport-city and aerotropolis concepts to a greater degree than has yet been seen in the U.S.

Thailand's Suvarnabhumi ("New Bangkok" International Airport). Bangkok's new gateway airport has been in the planning and development stage for 45 years. Located approximately 20 miles east of Bangkok's downtown, this \$4 billion (US) project opened in 2006.

Suvarnabhumi is well situated for commercial development, flanked on either side by Bangkok's two major expressways that connect the sprawling metropolis to Thailand's rapidly developing Eastern Seaboard Industrial Zone, 18.6 miles further east. Along with cargo and logistics facilities, numerous airport property commercial projects are planned, including an international business center, an international conference and exhibition center, office buildings, hotels, a hospital, restaurants, and shopping facilities.

Development planning has not stopped at the airport's boundaries. In 2003, a Suvarnabhumi aerotropolis master plan was completed under the direction of Thailand's National Economic and Social Development Board. The plan is meant to guide commercial, industrial, infrastructure, and residential development over a 25,000-acre zone surrounding the airport. It calls for greenways, canals, financial and commercial centers, logistics and time-sensitive industry complexes, hotel and entertainment districts, shopping malls, as well as large, mixed-use residential development and airport-centric new towns to house the more than 1 million additional residents expected over the next 15 to 20 years.

Beijing Capital Airport City. Capital Airport City has a total planning area of 10.75 million square feet composed of a 6.45 million-square-foot airport operating zone, a commercial and residential zone, and an airport free-trade zone. These zones are encircled by a large ring road tying them together and connecting to expressways to Beijing city center and to other north China cities. A third runway and terminal were completed in 2007 and 2008, in time for the Beijing Olympics.

This extraordinarily expansive development is being promoted as one city with three areas, encompassing eight functions. The airport operating area will house aeronautical operations, international air logistics activities, and aviation business activities:

- The Capital Airport Free Trade Zone will contain high-tech and other time-sensitive manufacturing and distribution facilities.
- The commercial and residential zone will be made up of international business and finance education and research, housing, and recreation, tourism, and leisure activities.

Capital Airport City is forecasted to house 300,000 to 400,000 residents. On-site employment is anticipated to range from 200,000 to 400,000, predicated on the commercial mix of facilities at buildout. Development will be led by the Beijing government and China Capital Airport Holdings in partnership with private sector participants and foreign investors.

Incheon: Korea's Winged City. At South Korea's new Incheon International Airport's core is Winged City, a quadramodal complex being developed with all the features of a modern metropolitan center: retail areas, office blocks, logistics and manufacturing facilities, multimedia and information and communications technology (ICT) functions, tourism and leisure activities, a conference and exhibition center, as well as a mixed-use new town. An elaborate expressway, a bridge, and under-construction rail infrastructure connect the airport to Seoul (33 miles to the north) and to nearby islands, the latter forming an integrated commercial and residential complex.

The airport property (15.4 square miles) is considerably larger than most in Asia. Opened in March 2001, Incheon was immediately among Asia's major airports in terms of cargo volume (ranked number 5 in cargo volume in 2007) though it was not among the top 30 airports in terms of passenger volume.

Incheon's current master plan (with a 15-year horizon) has commercial and residential development evolving through three phases, creating an ever-broadening and deepening urban expanse. The first phase (already complete) is an Airport Support Community consisting of airport-related industries (primarily logistics), commercial services, and housing for airport-area employees and their families, which total 100,000.

The second phase (in process as of 2004) involves expanding both spatially and functionally the Airport Support Community while transforming it into an international business city. A 40.75-acre international business center composed of four office complexes, a shopping mall, a convention and exhibition facility, and two five-star hotels. An additional 245-acre commercial project under development is the Airport Free Zone, an international logistics and manufacturing zone.

Kuala Lumpur International Airport. Kuala Lumpur International Airport (KLIA) is a massive airport (24,700 acres) located in Sepang, about 31 miles south of Kuala Lumpur. It opened in June 1998 at a cost of US\$4 billion.

KLIA was designed to provide the aviation foundation for Malaysia's Multimedia Super Corridor (MSC), a high-tech government, commercial, education, and residential zone about the size of the City of Chicago. Promoted internationally as the information and communications technology center of Asia, MSC contains two new cities, Putrajaya (the relocated government capital) and Cyberjaya (Cyber City), each of which is to house about 250,000 residents.

With competing Singapore Changi International Airport to the south and Bangkok International Airport to the north, KLIA has not grown as rapidly as initially envisioned, despite incentives to airlines to locate or expand there. Nevertheless, airport operator Malaysia Airports Holding Bhd (MAHB) has proceeded with plans to develop an airport city on its expansive site.

Long-term, KLIA has the land and long-term strategic location to evolve into a successful airport city. Its challenge is to put in place a revised commercial land use plan with functions that better leverage KLIA's aeronautical infrastructure and bring in private sector developers who understand how to do this, especially on the expansive airport property.

Singapore Changi International Airport. Singapore Changi, opened in 1981 12.4 miles from downtown Singapore. The Civil Aviation Authority of Singapore (CAAS) has invested continuously to upgrade its two terminals and establish them as commercial and leisure nodes of a relatively compact Changi Airport City. A third terminal, costing US\$1.8 billion, opened in late 2007.

The limited amount of land surrounding Changi's 2,964-acre airport property has constrained landside commercial development. Connectivity to downtown Singapore has therefore been enhanced by a newly opened subway line that transfers travelers to the airport in about 20 minutes and a beautified tropical expressway with taxi service between the airport and the downtown.

In 2001, CAAS along with Singapore's economic development board and the local government authority created a 64-acre Free Trade Zone with direct airfield access. Known as Airport Logistics Park of Singapore (ALPS), the zone is being developed to house value-adding third-party logistics providers, firms involved in assembling high-tech products, and e-commerce fulfillment.

Manchester Airport. The Manchester Airport Group's development arm announced in March of 2009 that the Airport Groups was purchasing 30 acres from property giant Burford Group on the outskirts of the airport, in an effort described by John Atkins, managing director of the airport group's development arm, as representing the "last piece in the jigsaw" as it would be combined with the adjoining 30-acre Manchester Business Park - owned by the city council - to form the hub of the Airport City scheme.

The Airport City concept is planned to include manufacturing, conference facilities, shops and entertainment amenities, with details to emerge with future master planning efforts. The deal with Burford is expected to be completed in April of 2009. The development potential could represent around 5,000 jobs overall, as the Airport City vision takes shape over the next 10 to 15 years.

SUMMARY OF CASE STUDIES COMPLETED

Airport districts considered as case studies included ten North American and seven international airport areas. Key characteristics of the case study airports considered are summarized in the table below. *Note:* the airports selected for more in-depth case study research are highlighted in **bold-face** type.

Figure 31. Summary Comparison of Potential Case Studies

Airport	Volume	Issues
North American Airports Considered		
Paine Field	NA	Originally constructed in 1936, various branches of the military operated this airfield until mid-1960s when the airport was redirected to develop into an industrial base, and Boeing located a B-747 assembly plant north of Paine Field, with some operations on-site. Other aerospace businesses followed, including Aviation Technical Services (formerly BF Goodrich Aerospace), the largest aerospace repair facility in North America. Today, there are about 55 onsite businesses adjacent to the airport, which provide about 40,000 jobs.
Seattle-Tacoma	Somewhat larger than PDX	With about 2,500 acres, Sea-Tac is one of the nation's smallest international airports in terms of land area and currently the 19th busiest North American airport in terms of passenger volume. After years of battling over proposals to build a third runway, airport officials have been working with neighboring communities and the Puget Sound Regional Council to redevelop nearby properties from residential to industrial and manufacturing uses under a new initiative--the New Economic Strategy Triangle (NEST) -- but with considerable airport-related warehouse/distribution .in the nearby Kent Valley.
Dulles	Somewhat larger than PDX	Dulles is credited in part with spawning a high-tech corridor and helping to stimulate the fastest-growing county in the United States. The Fairfax County Economic Development Authority tallied up 102 employers and 9,102 jobs created in 2007, many in the information technology or professional services clusters.
Dallas-Ft. Worth/AllianceTexas	Significantly larger than PDX	During the late 1980s, the family of Ross Perot began to acquire land on speculation in the suburbs north of Fort Worth. The land was purchased in part for its proximity to transportation, including Dallas/Fort Worth International Airport (which had been open for just over ten years at the time). The landholdings have since been developed into AllianceTexas, one of the largest logistics hubs in the country.
Kansas City	Comparable	An RFP was issued in October 2005 for prospective development partners for the 640-acre KCI Business Park, located on the airfield. Approximately 3,000 acres of the nearly 11,000-acre site have already been developed with airline- and aircraft-related businesses, such as air cargo as well as an American Airlines aircraft maintenance facility, though airport personnel report a desire to expand uses beyond traditional airport-related businesses. The site is in the southeast corner of the airport and has multiple runway access.
San Diego	Comparable	The busiest single-runway airport in the country, this airport is currently undergoing limited improvements to its 661-acre site, three miles from downtown San Diego. One concern about the benefit of this airport's experience and comparability to PDX is the lack of vacant or developable land.
Midway	Comparable (but with much less cargo volume)	Currently undergoing privatization process, this airport enjoys wide support from adjacent property owners for its expansion and renovation efforts. However, cargo volume through this airport is small, which may signal limited industrial-related development (at least to date).
Mesa, Arizona	Significantly smaller than PDX	Mesa's Gateway airport, a former military site with three runways, currently sees only a few commercial flights, and reported just over 5,500 passenger enplanements and 4,500 deplanements in 2007. Arizona's main commercial hub is Phoenix-Sky Harbour airport, 28 miles to the west. But assuming that central Arizona resumes its rapid growth, the City has planned for Mesa to accommodate growing demand for air travel. The city plans to build a big new passenger terminal and hopes to create a high-tech job cluster that will draw part of its labor force and some of its ideas from a polytechnic university that is already next to the airport.
Detroit	Somewhat larger than PDX	25,000 acres of woods and open fields surrounding its main airport, and a nearby (7 miles on a freeway) second, smaller airport which caters to the chartered cargo and corporate jets of the Big Three automakers and their assorted suppliers. Wayne County now has a MOU to further study the aerotropolis concept, building off of existing industries including possible auto parts firms, such as Visteon, Magna, and Century Automotive.
Oakland	Comparable	With 2,500 acres including 1,100 acres of commercial, industrial, recreational, and 950 acres of underdeveloped land, the Port of Oakland approved the sale of a 1.3 acre site within the Oakland Airport Business Park to Key Source International which supplies high-end, custom keyboards to the Airline, Point of Sale industries and financial markets worldwide, including Continental Airlines, Southwest Airlines, Bloomberg Financial News, Radio Shack, Qantas

Airport	Volume	Issues
		Airways, Men's Warehouse, and the Australian Stock Exchange.
Tampa	Comparable	Limited literature available. Though widely credited for installing the first people-mover walkway, information related to land use and development around the airport has been elusive.
Sacramento	Comparable	Limited literature available.
Vancouver BC**	Comparable	Limited literature available. Though widely recognized as a well-run airport, the only articles about airport-adjacent development are dated.
International Airports considered		
Amsterdam's Schiphol	Significantly larger than PDX	About 58,000 people work at Amsterdam's airport, with a mix of shopping, dining, and entertainment arcades accessible both to air travelers and the general public. Nearby land uses include the World Trade Center with conference facilities, two five-star hotels, the regional headquarters of major employers, including Thomson-CFS and Unilever, financial and consulting firms serving the aviation industry, and an assortment of airport-related industries, such as telecommunications, logistics, and distribution. Property near the airport commands premium office rental prices for the Amsterdam area, even above those in Amsterdam's central business district.
Thailand's Suvarnabhumi	Significantly larger than PDX	Located approximately 20 miles east of Bangkok's downtown, this US\$4 billion project opened in 2006 after 45 years of planning and development. Suvarnabhumi is flanked on either side by Bangkok's two major expressways that connect the sprawling metropolis to Thailand's rapidly developing Eastern Seaboard Industrial Zone, 18.6 miles further east. Along with cargo and logistics facilities, numerous airport property commercial projects are planned, including an international business center, an international conference and exhibition center, office buildings, hotels, a hospital, restaurants, shopping facilities, as well as large, mixed-use residential development and airport-centric new towns to house the more than 1 million additional residents expected over the next 15 to 20 years.
Hong Kong International Airport	Significantly larger than PDX	This 2,700-acre airport was created in the mid-1990s by leveling two small islands and reclaiming land from the sea. The airport opened in July 1998 with a total project cost of US\$20 billion, including a 21-mile multilane expressway and modern express train to both Kowloon and Hong Kong Island. Its 5.9 million-square-foot terminal contains 150 stores. Airport core property also houses the largest hotel in Hong Kong (the 1,100-room Regal Chek Lap Kok Hotel), a New Town housing 45,000 airport workers and their families, office buildings, a shopping mall, and major logistics facilities. Three commercial districts adjacent to HKIA's terminal and runways are well along in development. The 74-acre South Commercial District is composed of logistics facilities, including the world's largest stand-alone air-cargo and air-express facility and a 1.49 million-square-foot mixed-use freight-forwarding warehousing and office complex. The 24.7-acre East Commercial District is being developed as an office park targeted to regional corporate offices and air travel-intensive professionals. The 141-acre North Commercial District is the Airport City's signature development zone, known as SkyCity with a multipurpose commercial complex connected to the passenger terminal and the airport express train station that will include a 322,500-square-foot retail center and Class A office space with a total gross floor area of another 322,500 square feet.
Beijing Capital Airport City	Significantly larger than PDX	Capital Airport City has a total planning area of 10.75 million square feet composed of a 6.45 million-square-foot airport operating zone, a commercial and residential zone, and an airport free-trade zone. These zones are encircled by a large ring road tying them together and connecting to expressways to Beijing city center and to other north China cities. A third runway and terminal were completed in 2007 and 2008, in time for the Beijing Olympics.
Incheon: Korea's Winged City	Somewhat larger than PDX	The airport property totals 15.4 square miles--considerably larger than most airport sites, even other Asian airport cities. Opened in March 2001, Incheon was immediately among Asia's major airports in terms of cargo (ranked #5 in the world in 2007) though passenger volume was not in the top 30 that year. Its current master plan (with a 15-year horizon) has commercial and residential development evolving through three phases. The first phase (already complete) is an Airport Support Community consisting of airport-related industries (primarily logistics), commercial services, and housing for airport-area employees and their families. A 40.75-acre international business center

Airport	Volume	Issues
		composed of four office complexes, a shopping mall, a convention and exhibition facility, and two five-star hotels. An additional 245-acre commercial project under development is the Airport Free Zone, an international logistics and manufacturing zone.
Kuala Lumpur International Airport	Somewhat larger than PDX	Kuala Lumpur International Airport (KLIA) is a massive airport (24,700 acres) located in Sepang, about 31 miles south of Kuala Lumpur. It opened in June 1998 at a cost of US\$4 billion. With competing Singapore Changi International Airport to the south and Bangkok International Airport to the north, KLIA has not grown as rapidly as initially envisioned, with 26,938,970 passengers and 677,446 metric tons of cargo in 2007.
Singapore Changi International Airport	Somewhat larger than PDX	Singapore Changi, opened in 1981 12.4 miles from downtown Singapore. The limited amount of land surrounding Changi's 2,964-acre airport property has constrained landside commercial development though connectivity to downtown Singapore is good with a newly opened subway line that transfers travelers to the airport in about 20 minutes and an expressway with taxi service between the airport and the downtown. In 2001, CAAS along with Singapore's economic development board and the local government authority created a 64-acre Free Trade Zone with direct airfield access.

Airport volume was compared to PDX's passenger volume of 14.7 million passengers:

Comparable: 10 million to 20 million passengers

Somewhat larger: 20 million to 40 million passengers

Significantly larger: More than 40 million passengers

APPENDIX C. INTERVIEW CONTACTS

A total of 15 interviews were conducted as part of this economic development inventory. As indicated by the following listing, 27 persons were involved as some interviews involved multiple participants.²⁰

Most interviews were conducted in person, with some by phone. Interviews were conducted on a confidential basis, with comments received not attributed to specific individuals. The time and interest of all participants is gratefully acknowledged.

Figure 32. Economic Development Inventory Interview Participants

Participant Name(s)	Firm / Organization
Mike Burke	Adidas
Don Ossey	Capacity Commercial Group
Nancy Olson & Rafael Saakyan	Cascade Microtech
John Southgate	City of Hillsboro
Howard Larson	Colliers International
Steve Siegfried & David Thiel	FEI Company
Barry Starkman	Genentech
Mark Fahey	Halton Company
Lee Johnson	Jet Delivery Systems, Inc.
Bruce Leonard	Market Transport, Inc.
David Woolson	Metropolitan Exposition-Recreation Commission
Bruce Laird	Oregon Economic & Community Development Department
David Ziekle	Port of Portland
Bruce Allen	Portland Development Commission
Alex Vulic	Pro Logis
Dan O'Halloran	Radisys
Chris Culp	Sapa Profiles, Inc.
Randall Thayer	Sheraton Hotel
Kim Kuehne & Greg Ones	SolarWorld
Pete Lehmann	Sun Microsystems
Steve Anderson	Tonkin Distribution Center
Donna Ragan & Jim Smith	TriQuint Semiconductor, Inc.

END NOTES

- ¹ Information for this report has been compiled from sources generally deemed to be reliable. However, the accuracy of information obtained from third party sources is not guaranteed; data and related information is also subject to change without notice.

The observations and findings provided with this report are those of the authors. They should not be construed as representing the opinions of any other parties prior to their express approval of the contents, whether in whole or part.
- ² Relative population rankings are from the U.S. Census Bureau for metropolitan statistical areas (MSAs), as of 2008. Fastest growth is indicated from 2000-2008, in terms of absolute numerical change.
- ³ Potential strategic reserve properties are identified as part of the Airport Futures Master Plan Update *Atlas - Selected Figures from Technical Memorandum No. 1 – Inventory of Existing Conditions*, prepared by Jacobs Consultancy for the Port of Portland, September 2008.
- ⁴ Source of this requirements listing is *Planning* magazine. These basic requirements were identified in the context of airport settings that are largely built out (specifically Sea-Tac and Paine Field in Everett), but could conceivably apply to airports in new greenfield areas as well.
- ⁵ Airports Council International is a consortium of airport operators and aviation-related businesses divided into five global regions, of which the North American region is the largest.
- ⁶ Though a developer was selected through that RFP process, the recent economic downturn caused the successful bidder to pull out. Nonetheless, this well-located 90-acre parcel – relatively well-served and environmentally unencumbered – represents a strong opportunity for the district for the next real estate and economic cycle.
- ⁷ The challenge of lease only airport area land is noted by City Manager Wayne Cauthen. The Missouri legislation sets the building's tax assessment at the fair market value minus the cost of erecting the building on city-owned land. Several school districts protested the tax break, citing their inability to generate tax revenue for the additional students that the developments would attract.
- ⁸ KCI is also actively seeking other revenue-generating interim uses for portions of its 11,000 acres. Since about year 2000, the port has been leasing about 6,500 acres as farmland. Many of the farming operations were designed to include the presence of cows and other livestock to minimize the encroachment of deer, birds, and other wildlife into the airfield area.
- ⁹ With “no buildings to move...[it's] exactly what the FAA wants to see airports doing to increase their revenue potential while saving space for future development,” according to Mark VanLoh, K.C. Aviation Department Director. However, due to the archeological discovery of a cemetery on the site and concurrent softening of the financial markets, this potential use is now on hold.
- ¹⁰ Like a business such as Halton near PDX, the operation would allow for representatives of companies to fly into Kansas City, and see and try the large-scale equipment which is not easily shipped. When the purchase decision is made, perhaps a mechanic team is sent for training as well.
- ¹¹ As of April 2009, two counties are expected to sign onto the Aerotropolis Development Corporation when state legislative action is taken related to tax incentives and other tools for development corporation formation, expected later this year. Two other municipalities (the City of Romulus and Huron Township) are still considering whether to join.
- ¹² According to research by the Detroit aerotropolis planning team, such incentive packages are required to attract this type of development. Specifically cited is the example of Kentucky providing several rounds of very generous incentives to attract the United Parcel Service (UPS) to that state and expand its operations.
- ¹³ IMPLAN is the trade name of an economic model (meaning “impact analysis for planning”) originally developed through the University of Minnesota and now a private data provider. The buyer and supplier

relationships to the air transportation industry can be analyzed using IMPLAN input-output model. The relationships among industries is captured and represented as the intermediate inputs of the Air Transportation Industry and the industries for which Air Transportation is an intermediate input. This analysis uses IMPLAN's 2007 dataset and defines the region as the four-county region, including Multnomah, Washington, and Clackamas counties in Oregon, and Clark County in Washington.

- ¹⁴ A recent October 2008 report titled *Economic and Fiscal Impact Analysis* was completed for the Metropolitan Exposition Recreation Commission (MERC) by Crossroads Consulting Services. The analysis concludes that the MERC facilities (Oregon Convention Center, Portland Center for the Performing Arts and Expo Center) generate nearly \$535 million in direct plus indirect and induced spending for the metro area each year, with total employment impact of an estimated 5,810 full time equivalent (FTE) jobs.
- ¹⁵ Whereas 22 foot and then 26 foot clear height represented the industry standard for warehouse/distribution space, more users are now looking for 32 feet. In the mid-west, the new standard for large distribution center (DC) space is in the range of 36 feet.
- ¹⁶ A Port-sponsored *Hillsboro Airport Master Plan* addresses concludes that: "There is only a limited opportunity for air cargo services at Hillsboro Airport. This is viewed as a function of the "structure of the air cargo industry and type of aircraft for air cargo services." Added observations are that the airport currently does not have the pavement strength, the runway length or the on-airport space for sorting/handling/transfer facilities to serve the large aircraft typically used by integrated all-cargo carriers.
- ¹⁷ Source of voting is *Conde Nast Traveler*, as cited by Port of Portland web site <http://www.portofportland.com/>, April 2009.
- ¹⁸ In the view of this interviewee, the current value of industrial land in the Columbia Corridor is in the range of \$7.50 per square foot.
- ¹⁹ Last spring CII (the owner of Midway Airport), acquired half of Vancouver Airport Services (acronym YVRAS), which operates 18 airports, including the biggest in Chile, Cyprus and the Bahamas. YVRAS's other owner, the Vancouver Airport Authority, operates Vancouver International Airport.
- ²⁰ An interview session with Washington County high technology firms involved twelve participants from eight companies.