FINAL

INDUSTRIAL WAREHOUSING

IN THE SCAG REGION

TASK 2. Inventory of Warehousing Facilities

APRIL 2018

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technical memorandum

Southern California Association of Governments Industrial Warehousing Study

Task 2. Inventory of Warehouse Facilities

prepared for

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Table of Contents

List of Tables

List of Figures

Executive Summary

Warehousing is a critical component of Southern California's goods movement system. Warehousing in Southern California began to develop in Los Angeles County during World War II, but expanded between 1970 and 2000 to the remaining five counties of the Southern California Association of Governments (SCAG) region. Distribution activities in Riverside and San Bernardino Counties have continued to grow and evolve since 2000, primarily due to the availability of land.

This technical memorandum presents information on the inventory and trends at the regional, county, and 43 defined submarket area levels. At the end of 2014, Southern California had a total supply of about 34,000 warehouse properties occupying a total of 1.18 billion square feet of space. In addition, there is additional developable warehouse building area of about 338 million square feet.

About 50 percent of the existing buildings are in Los Angeles County, and about 24 percent are in San Bernardino County. Although the supply of rentable building area rose by 15.8 percent between 2004 and 2014, the year-end vacancy rate has come down from 4.4 percent in 2004 to 4.1 percent in 2014, indicating a simultaneous high growth in demand. The vacancy rate peaked at 8.2 percent in 2009 due to a global economic recession.

This technical memorandum discusses the trends, such as the end-of-quarter lease rates, average building size in square feet of newly constructed buildings to identify the differences among counties in the SCAG region and among various user markets.

There is a variety of ways to classify warehouses. For example, the operator type, building use, and various functional uses of space provide useful classification information. Separating warehousing into functional use-based categories helps us to understand underlying trends, build more accurate forecasts, and analyze strategies and policies.

1.0 Background and Purpose

This section provides a background to the topic of warehousing through: 1) setting the regional goods movement system context, 2) explaining the general importance of warehousing to the goods movement system, 3) describing the typical functions of a warehouse, and 4) discussing national trends in industrial real-estate markets. This section also discusses the various purposes of this technical memorandum.

1.1 Southern California and Its Goods Movement System

Southern California is home to a complex goods movement system comprised of major ports, intermodal rail yards, warehouses, and transloading facilities, which are connected to an extensive network of highways and railroad lines. (See Figure 1.1). With a regional gross product of nearly $820 billion, the Southern California Association of Governments (SCAG) region represents the 16th largest economy in the world, and goods movement-dependent industries[1] make up about 35 percent of this total.[2] Supply chains have varied service and cost tradeoffs depending on the commodity's value and time-sensitivity and other factors, and involve many players, including beneficial cargo owners (BCO), ocean carriers, logistic service providers, and railroads.

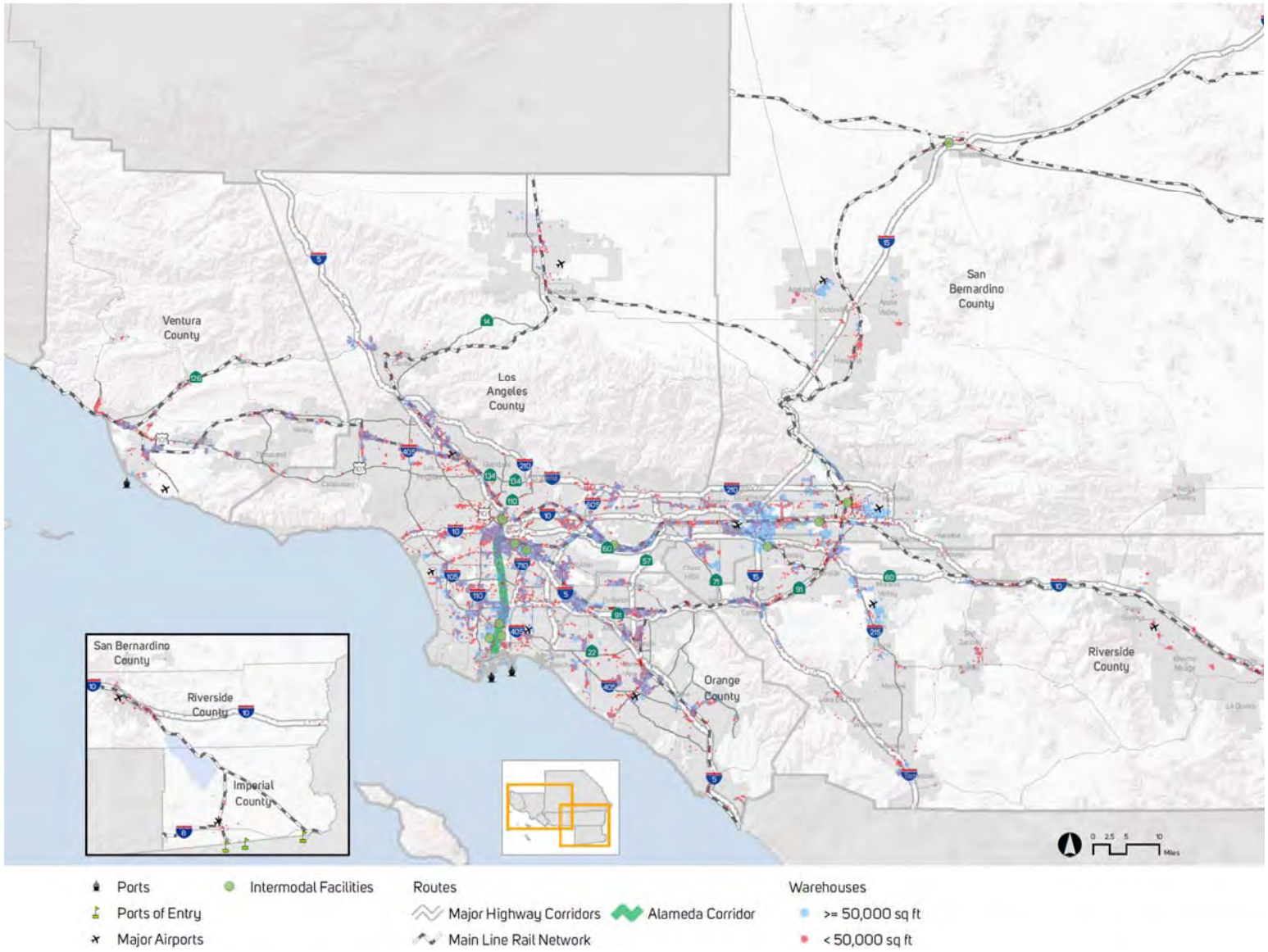
The SCAG region hosts one of the largest clusters of logistics centers in North America, especially warehouses and distribution facilities.[3] The goods movement system in the SCAG region includes the Ports of Los Angeles and Long Beach, also called San Pedro Bay ports. Together, these Ports handled over 14 million containers in twenty-foot equivalent units (TEU) in 2014, which is ranked first in the nation with about 40 percent of the nation's total import container trade. The market served by the seaports is far-reaching with support from a national goods movement truck system and intermodal rail system. The Los Angeles International Airport and Ontario International Airport also make an important contribution to the goods movement trade of high-valued, time-sensitive commodities. The trade volume through Port of Hueneme in Ventura County and land ports of entry in Imperial County also contribute considerable goods movement activities throughout the region. The regional goods movement truck system and the "last mile" connection roadways help the regional goods-movement dependent industries to connect to the domestic and international trade channels.

[1] Goods movement-dependent industries include manufacturing, wholesale trade, retail trade, construction, transportation and warehousing, and other goods producing sectors.

[2] http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_GoodsMovement.pdf.

[3] http://scagrtpscs.net/Documents/2016/final/f2016RTPSCS_GoodsMovement.pdf.

Figure 1.1 Map of Goods Movement System in the SCAG Region



Source: SCAG, CoStar Property® Data Product.

1.2 General Importance of Warehouses in the Goods Movement System

Industrial warehouses play important roles of consolidating transported shipments from the ports, the airports, and a multitude of manufacturers and deconsolidating of shipments to many interim users and end consumers; and act as a storage buffer to avoid disruptions in the supply chains and to meet surges in goods demand.

In addition to storing goods, warehouses also are functioning as locations where value-added services, such as packaging and labeling are performed, which were traditionally part of manufacturing activity. Some of the facilities provide specialized functions (e.g., "transloading" or "cross-docking," as described in Section 3.3) or handle specialized cargo (e.g., products under temperature control).

1.3 Typical Performance Functions of Warehouses

Industrial warehouses can vary in their physical, operational, and inventory characteristics. Physical characteristics can include:

- Building area;
- Floor area ratio;[4]
- Building height;
- Number of loading docks;
- Office space;
- Number of parking spaces outside the building; and
- Layout and configuration of storage space (number of storage lanes, width of aisles, rack height) inside the building.

The physical characteristics inside the building determine the "theoretical storage capacity" for warehouse, which can typically range between 22 to 27 percent of the building's cubic capacity.[5] Generally, multitenant and shorter buildings have a lower percentage of cubic space for storage due to a fixed minimum office space and clearance space requirements.

The "utilization" of the warehouse theoretical storage capacity, or the "working storage capacity" typically ranges between 60 to 90 percent of the theoretical storage capacity.[6] It is dependent on operational characteristics, including labor productivity, use of information technology (IT) systems and use of automated equipment, and dynamics in layout and configuration of storage space. Generally, when the cost per unit storage space is high or the labor to handle the storage and retrieval activities is relatively less expensive, or the

[4] Floor area ratio is the ratio of building area to land or site area in which the building is located.

[5] http://www.warehousecoach.com/images/Storage_Space_Utilization.pdf (last accessed on April 20, 2015).

[6] http://www.inventoryops.com/articles/warehouse_capacity.htm (last accessed on April 20, 2015).

storage and retrieval activities are highly automated or modernized (e.g., guidance systems, man-up turret trucks[7]), a warehouse has a greater amount of rack type storage than floor type storage and narrower aisle spaces. This results in a higher percentage utilization of available cubic storage space.

"Working throughput" is the rate at which cargo enters or leaves a warehouse facility. The conversion factor between the working storage capacity and working throughput is called the cargo turnaround time (or days that cargo is in inventory). Cargo turnaround can vary widely ranging from one day to several months in a year and is dependent on the inventory characteristics, such as:

- Inventory costs (e.g., unit storage costs in Los Angeles County are higher than in Imperial County, and beneficial cargo owners (BCO) aim to minimize the storage costs).
- Cargo demand (e.g., consumer goods distribution centers for Walmart on average may have a lower cargo turnaround time than a construction parts distribution center for Caterpillar).
- Cargo type (e.g., perishable goods on average have shorter cargo turnaround times than durable goods).
- Functional use type of warehouse (e.g., "cross-docking" activity has a much shorter cargo turnaround time than "general purpose" warehousing (See Section 3.3 for more details.).

Sometimes, the physical characteristics outside the building, such as number of loading docks, container/trailer/truck parking spaces, etc. and management of their operations, can constrain the cargo turnaround times, and hence lower the warehouse working throughput.

Turnover rate is an alternate unit, measured as times per year, used to convert working storage capacity directly to warehouse working throughput. It is the inverse of cargo turnaround time.

1.4 National Trends in Industrial Space

The health of the global economies is directly related to businesses' ability to fulfill demand for goods and services by operating effective supply chains, including industrial space. Globally, the world economies, including the U.S., have recovered slowly, but steadily from the 2008-2009 global recession. The performance of key metrics of the U.S. economy at the end of 2014 are as follows:[8]

- Real gross domestic product (GDP) – the value of the production of goods and services in the U.S., adjusted for price changes – increased at an annual rate of 2.2 percent in the fourth quarter of 2014, compared with an increase of 5.0 percent in the third quarter of 2014.

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[7] http://www.inventoryops.com/Aisle%20Width.htm (last accessed on April 20, 2015).

[8] U.S. Bureau of Economic Analysis, National Income and Product Accounts– Gross Domestic Product: Fourth Quarter and Annual 2014 (Second Estimate), released on February 27, 2015. Available at: https://www.bea.gov/newsreleases/national/gdp/gdpnewsrelease.htm (last accessed on April 20, 2015).

- Real nonresidential fixed investment increased 4.8 percent in the fourth quarter of 2014, compared with an increase of 8.9 percent in the third quarter of 2014.
- Unemployment rate fell to a post-recession low of 5.6 percent at 2014 year-end. It peaked at about 10 percent during the 2008-2009 recession.
- The labor force participation rate, which is defined as the civilian noninstitutional population 16 and over working or looking for work as a percentage of total population, is another indicator. This stands at a decade low of 62.7 percent.[9]

The deceleration in real GDP growth in the fourth quarter of 2014 primarily reflected an upturn in imports, a downturn in Federal government spending, and decelerations in nonresidential fixed investment and in exports. Among those employed, there is a high share of part-time positions and lower-paying jobs. One of the reasons for the fall in the labor force participation rate is aging population.

In 2014, global economies, such as Brazil, China, Europe, India, Japan, and Mexico, have performed weaker than expected. While in China the growth in real GDP slowed down compared to 2013, the growth in remaining economies showed slight improvements over 2013. China still remains the fastest growing economy in the world at 7.0 percent.

Under the current global economic conditions, BCOs attempt to cut cost and time from their supply chains; thus, the role of warehousing is evolving. Value-added services within the third-party logistics providers (3PL) warehouses now include making products shelf ready, which was traditionally a function of retailing. Consumers are expecting quicker (even "same-day") delivery, preferably without an increase in the cost of shipping, which is mainly enabled by retail fulfillment centers (as described in Section 3.3 of this technical memorandum).

A national economic overview report[10] of industrial space (or real estate markets), which includes warehousing space, indicates that vacancy for the top 50 markets across the country gradually fell from 8.0 percent at 2013 year-end to 7.2 percent at 2014 year-end. Although development of industrial spaces has restarted over a large scale after the recession, it has lagged behind demand. The reasons for the lag include higher land prices, rising construction costs, competition with other land uses (residential/commercial mixed-use projects) in mature markets, and conservative bank loan policies. Large bulk distribution users made the largest contribution to net absorption[11] in 2014. Demand was especially high from e-retailers exploring to open regional fulfillment centers to reduce shipping times and increase customer service. According to this report, gains in efficiency offered by higher ceiling clearance and enhanced fire suppression systems offset higher rents for first-generation industrial space. The second-generation industrial space also had a strong backfill. The average asking lease rate steadily rose over 2014 and stood at $5.50 per square foot per annum at 2014 year-end. Tenants are more willing to make long-term

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[9] U.S. Department of Labor, Bureau of Labor Statistics, Labor force statistics from the Current Population Survey – Labor Force Participation Rate, available at: http://data.bls.gov/timeseries/LNS11300000 (last accessed on April 20, 2015).

[10] Lee & Associates, The Lee Industrial Brief, Closing 2014 with a Glance to 2015, Quarter 4, 2014.

[11] Net absorption is the net change in occupied space between two time periods, typically computed over a quarter or over a year.

commitments to lock in today's rents. Secondary markets in the nation also benefit from the competition for warehousing space in major metropolitan areas, both in terms of a pricing boost and attracting yield-chasing investors.

1.5 Purposes of this Technical Memorandum

There are two main purposes of this Memorandum:

1. Update the inventory of warehouse space from 2008 to 2014; and
2. Describe alternative methods of classifying warehouse space.

The 2013 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy (or the 2013 SCAG CRGMPIS) included a 2008 warehousing space inventory[12] of the SCAG region. It showed the locations of large warehouse buildings (>= 50,000 square feet) and potential spaces. As shown in Figure 1.1, they are spread all across the SCAG region, and many were located around downtown Los Angeles and the Inland Empire (a Riverside-San Bernardino-Ontario metropolitan area). The 2008 inventory included warehouse buildings that are larger than 50,000 square feet only, given their operational significance and implications to the regional transportation systems. The purpose of Section 2.0 of this technical memorandum is to update the warehouse buildings inventory for the SCAG region to include existing warehouses of all sizes using the most recent and comprehensive data available. Details are provided on the existing baseline inventory for markets and submarkets of the SCAG region. In addition, comparisons are made to the 2008 warehousing space inventory and 2012 land parcels with the warehouse buildings to verify some space-related measurements. This section also discusses the historical trends of warehouse building inventory in terms of total building area (supply), occupied space (demand), and other relevant characteristics in an attempt to distinguish the trends in the SCAG region's markets from the national trends.

It is impossible to collect information on all of the physical and operational characteristics of the existing warehouse inventory for the SCAG region due to proprietary nature of this information. The purpose of Section 3.0 of this technical memorandum is to describe an ideal functional use-based warehousing classification system, and discuss characteristics and their historical trends for classes that are practically identifiable for the SCAG region.

[12] Originally part of SCAG, Comprehensive Regional Goods Movement Plan and Implementation Strategy: Industrial Space in Southern California: Future Supply and Demand for Warehousing and Intermodal Facilities (Task 5 Report), June, 2010.

2.0 Existing Total Inventory of Warehouses, Comparisons and Historical Trends

This chapter describes the CoStar Property® data product and analysis methods used in updating the locations and attributes of warehouse buildings inventory for the Southern California Association of Governments (SCAG) region to the year 2014. The data is summarized at various geographical levels, including: 1) the SCAG region as a whole; 2) the six counties constituting this region, namely, Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura; and 3) 43 submarket areas[13] (see Figure 2.1). The summaries are presented in tabulated format for the market areas and in map format for the submarket areas. The tabulated format of data supporting the submarket area maps is included in the appendix to this technical memorandum.

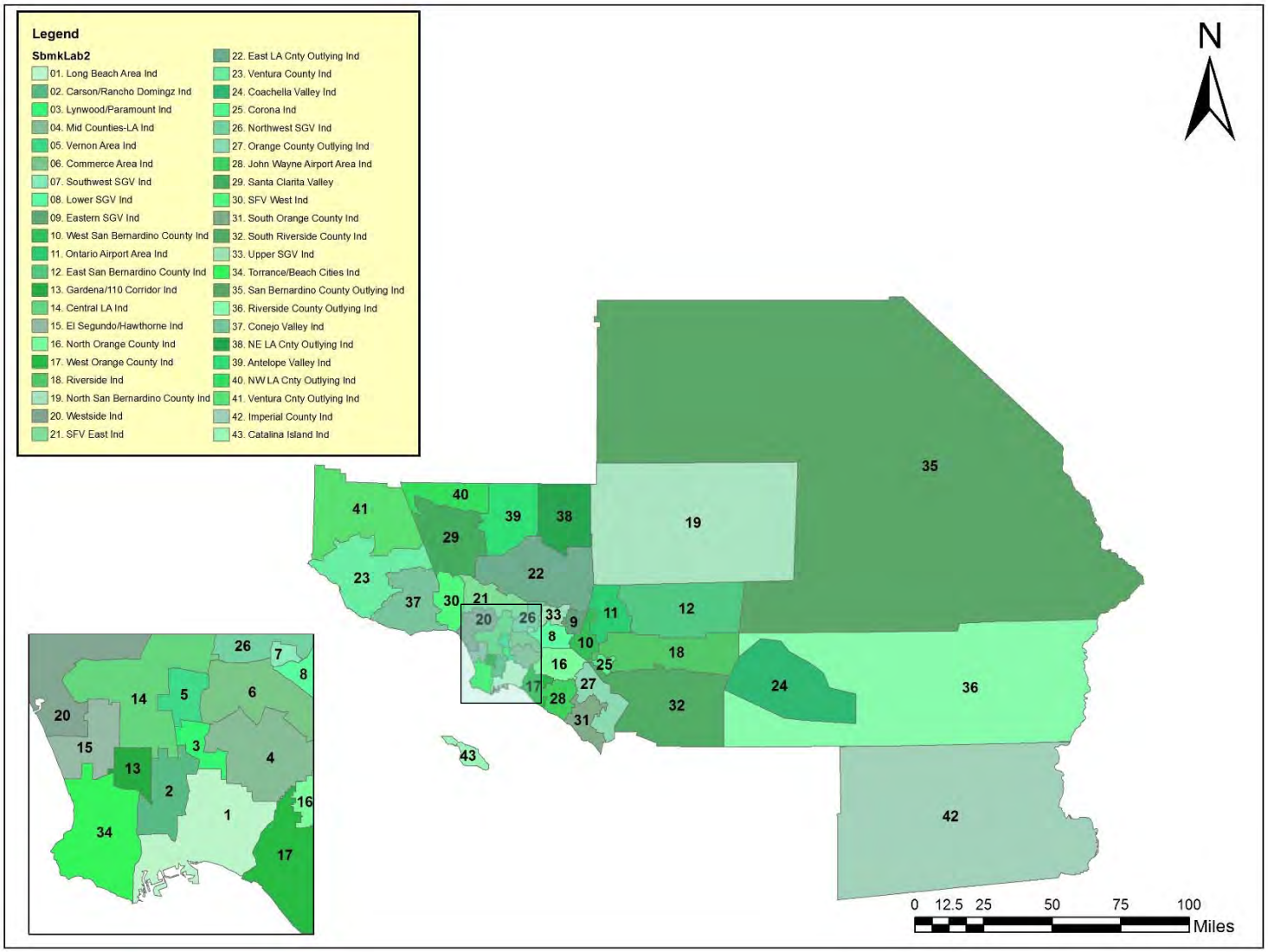
The submarket area-level information on existing baseline total building area (supply) and occupied space (demand) not only provides a higher geographical granularity to the inventory than counties, but also forms a basis for allocation of the region's supply and demand forecasts, in a subsequent task of this study.

This chapter describes comparisons made for the updated 2014 inventory, in terms of location and/or some space-related measurements, to the 2008 warehousing space inventory for the SCAG region included in the 2013 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy (CRGMPIS), which was built only for building size greater than or equal to 50,000 square feet. These comparisons were meant to broadly verify the quality of CoStar Property® data product, but were not sufficient to adjust or improve the quality of the updated 2014 inventory.

The CoStar Property® data product lacked comprehensive information on developable building area for future warehousing in the year 2014, so a combination of data sources, including the CoStar Property® data product, 2008 SCAG undeveloped lands and developable building area for future warehousing facilities and 2012 SCAG parcel-level land uses data were used to estimate the developable building area for future warehousing by submarket area in the year 2014. This chapter describes the data and shows the methodology and results of this estimation.

[13] Submarket area definitions are based on the CoStar data that was the primary data in creating the existing (2014) warehousing inventory. About 33 of the 43 submarket areas are "submarket cluster" areas in the Counties of Imperial, Los Angeles, Orange, and Ventura; and the remaining 10 are "submarket" areas in Riverside and San Bernardino Counties, as "submarket cluster" areas in these counties were too large to be useful.

Figure 2.1 Submarket Areas in the SCAG Region



Source: CoStar Data – Submarket Area Maps; ESRI's Geographical Information System (GIS) data layers; Cambridge Systematics' Development of Submarket Area GIS data layer, March 2015.

Lastly, this chapter also identifies the historical trends in inventory attributes for counties or market areas in the SCAG region, including year-end total building area, year-end total occupied space, quarterly vacancy, end-of-quarter total number of buildings newly constructed, and end-of-quarter total number of buildings leased. The trends discussion distinguishes the SCAG region's trends from the national trends described in Section 1.4 of this Memorandum, and compares the trends across the SCAG region's counties or markets. There are likely some local variations in the trends in inventory attributes within the submarket areas, but are not captured in this technical memorandum; these may be investigated on an as-needed basis during the forecasting task.

The existing and historical trends information in this chapter is focused on the total inventory, while the trends information on particular user markets is discussed in the Chapter 3 of this technical memorandum.

2.1 Data and Methods

2.2.1 CoStar Property Data Product

The updated warehouse buildings inventory for the SCAG region is based on CoStar Property® data.[14] CoStar is a commercial vendor for a nationally searchable tool for commercial and industrial real estate property information. CoStar researches and develops commercial and industrial property location information and attributes across the nation, including physical dimensions; a limited amount of operational characteristics; five-point building rating; and additionally, current available space, new construction, and lease/sale history. The data product of CoStar Property® is popular among several owners and investors, appraisers and valuation professionals, lenders, retailers and corporations, real estate brokers and brokerage firms, and other professionals. For these reasons, the CoStar Property® data product was considered to be highly relevant and useful to creating an inventory of warehouse buildings. It should be noted that one of the limitations of the CoStar Property® data is that the data only represents commercial/rental properties. As such, if a property is owned and operated by a same entity and is not leased, the property is likely not included in the CoStar Property® data.

The data product also contains some data on lands for industrial uses; however, it is far less comprehensive than the warehouse buildings data; hence, the data on lands for industrial uses was not used. However, a summation of the building area that was delivered from the year 2009 Quarter 1 to the year 2014 Quarter 4, based on the CoStar® Property data product, was used in this study, along with other data to estimate developable building area for future warehousing in the year 2014, as discussed in the methods section (Section 2.1.3).

Industrial warehouse buildings were identified from the CoStar Property® data product by selecting all building sizes with an "Industrial" property type and the following secondary types: "Warehouse," "Distribution," "Truck Terminal," "Refrigeration/Cold Storage," as defined below:

[14] http://www.costar.com/products/costar-property.

1. Warehouse. This is a secondary type of industrial building that is typically 25,000 square feet or greater in size, box shape, with one loading dock for every 15,000 square feet of rentable building area (RBA). Typically, this building type has up to 20 percent office area with clear heights of 22 feet or greater. Site coverage is typically up to 50 percent.
2. Distribution. This is a secondary type of industrial building that is typically large, both single and multitenant, and used for the warehousing and distribution of inventory. This building type typically has 200,000 square feet or more, with clear heights 28 feet plus, up to 5 percent office space, and the balance being warehouse/storage space. The building type also typically has one loading door for every 10,000 square feet of RBA and site coverage up to 40 percent. These buildings are often cross-docked with trailer parking.
3. Truck Terminal. This is a secondary type of industrial building that varies from 25,000 to 150,000 square feet; and they typically are very narrow (approximately 60 to 80 feet wide). This building type typically has site coverage up to 30 percent with office areas up to 10 percent. The building is lined along the outside (usually opposite sides) with cross-docks, usually one loading dock for every 3,000 square feet of RBA. These buildings are material/freight transfer points for trucking companies or distribution companies like UPS or FedEx.
4. Refrigeration/Cold Storage. This is a secondary type of industrial building that is 25,000 square feet or greater of RBA with one loading dock for every 15,000 square feet of RBA. This building type typically has up to 50 percent site coverage and office area up to 20 percent, and must have refrigeration (cold storage or freezer space for food products that require temperature control) and cross-docks.

The above secondary types of industrial properties best qualify as warehouses as the square footage dedicated to storage activities tends to be high relative to the total property area. Although CoStar has a few other secondary types of "Industrial" properties, such as manufacturing facilities, food-processing facilities, service stations, and showrooms that may have storage and/or distribution, the square footage that is dedicated to storage activities tends to be low relative to the total property area. This storage area is additionally available only to the businesses operating these industrial properties. Hence, the storage areas under secondary "Industrial" property types other than those shown above are not considered further in this study.

Data from the CoStar Property® data product was downloaded in two main formats:

1. 2004-2014 (historical) quarterly data download represent the end-of-the-quarter data summary for a collection of warehousing properties in the SCAG region that satisfy a user query. This dataset includes new properties whose construction completed during the quarter, while it excludes properties that were demolished or changed in their use during the quarter, thereby, providing the total number of existing buildings at the end of each quarter, as well as at the end of each year. In this technical memorandum, the 2014 End of Quarter 4 inventory of warehouses was used to create a summary and year-end trends of inventory attributes for the entire SCAG region and at each county level. The 2014 End of Quarter 4 inventory data also was used to compare the existing conditions to that of the 2008 study data.

The user queries were set to collect data on one county in the region and one secondary type of industrial property at a time. Data on all warehousing properties was collected in this manner. The download includes data on the total number of buildings, total building area, total vacant building area, total area of buildings built in the quarter, total area of buildings leased in the quarter, and average lease rate of Triple Net or "NNN"[15] type lease buildings leased in the quarter.

Because historical quarterly data was not downloaded at submarket area level, additional dataset was downloaded from CoStar in November 2014 that includes the submarket-level information. The description of the November 2014 data and its use are elaborated next.

2. A November 2014 data download contains warehouse property data for all such properties in the SCAG region at each building level and submarket level. Because the regional warehousing space needs forecast model requires an ability to allocate supply and demand at the submarket level, the November 2014 downloaded data was used as the basis for the model.

   In this technical memorandum, the November 2014 data download was used to create location maps and a summary of inventory attributes for submarket areas. However, due to the number of days remaining between the time the data was downloaded and the End of Quarter 4, 2014, there is a slight difference in the total number of building in the two datasets. The number of warehousing properties in the CoStar's November 2014 data is 33,738. This is slightly different from 34,304, the number of warehousing properties at 2014 End of Quarter 4 in the CoStar's 2004-2014 historical quarterly data download. The percentage difference between the totals for inventory attributes in the two sets of downloaded data is less than 1 percent; hence, in the context of existing inventory, the two datasets are considered to be practically the same, and both are used in this technical memorandum to complement in the temporal and spatial detail.

   The download includes data on the geographical coordinates, building status, rentable building area, occupied space, vacant and available space,[16] land area (same as site area), county, city, market, submarket cluster, submarket area, etc., as of November 2014. The building status falls under the following five categories: 1) existing, 2) under construction, 3) under renovation, 4) proposed, and 5) demolished. Only the "existing" buildings in the downloaded data were considered.

Except for creating some large-scale[17] location maps, all other property-specific data was suppressed in this Memorandum and inventory attributes were aggregated to submarket area level and county level to keep data confidentiality as per agreement signed between SCAG and CoStar, and between the Consultants and CoStar.

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[15] According to CoStar's glossary: Triple Net (NNN) is a lease type in which the tenant is responsible for all expenses associated with its proportional share of occupancy of the building.

[16] Occasionally, the vacant portion of a building may not be available for immediate occupation for reasons, such as repairs and maintenance, painting, renovation, owner's discretion, etc.

[17] Large-scale refers to a map scale at which the street on which a property is located is very difficult to identify.

2.1.2 Other Data

2008 SCAG Warehousing Space Inventory

Dr. John Husing and Cambridge Systematics developed a 2008 warehousing space inventory of the SCAG region (mentioned earlier in Section 1.5 of this Memorandum) as part of the 2013 SCAG CRGMPIS. The inventory was assembled using the 2008 county assessors' data, brokerage data and methods that involved a series of data manipulation steps.[18] The inventory was available in Geographical Information System (GIS) format. This data includes locations and the building area of large warehouse buildings (>= 50,000 square feet), of which, some were occupied warehouse locations and some were available[19] warehouse locations. This 2008 inventory was compared to the 2014 inventory based on the CoStar® Property data product.

2012 SCAG Parcel-Level Existing Land Uses Data

SCAG provided a geographic information system (GIS)-based 2012 parcel-level existing land use data. This data contains parcel area and its existing land use codes falling under the categories of residential use, commercial use, industrial use, military use, vacant, etc. The vacant or undeveloped parcels in this data were not assigned any particular future developable land use code. The area of existing industrial land use parcels was combined with other data in this study to estimate developable building area in the year 2014 for future warehousing use as discussed in the methods section (Section 2.1.3).

2012 SCAG Parcel-Level General Plan Land Use Data

SCAG provided a GIS-based 2012 parcel-level planned land use data. The planned land uses are derived from general land use plans for cities and unincorporated areas in the SCAG region, which reassign land use codes for existing occupied parcels, as well as newly assign particular land use codes to existing vacant parcels under the categories of residential use, commercial use, industrial use, military use, etc. The area of planned industrial land use parcels (both reassigned and newly assigned) was combined with other data in this study to estimate developable building area for future warehousing in the year 2014, as discussed in the methods section (Section 2.1.3).

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[18] Cambridge Systematics, Inc., and Economics & Politics, Inc., *Industrial Space in Southern California: Future Supply and Demand for Warehousing and Intermodal Facilities* (Task 5 Report), prepared for SCAG, June 2010.

[19] In the 2013 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy, available space means vacant space or about to be vacant (i.e., current tenants are leaving).

2.1.3 Methods

Data Analysis Methods

The following types of GIS and spreadsheet-based analysis methods were used with the data described in Sections 2.1.1 and 2.1.2 of this technical memorandum to:

- Generate a regional locations map for the existing inventory. The geographical coordinates available in the CoStar's November 2014 data download were used to generate a GIS-based existing warehouse buildings location map.
- Generate a county-level inventory attributes table and trends charts for existing inventory. From the CoStar's 2004-2014 (historical) quarterly data download, the 2014 year-end data was used to generate the existing inventory attributes summary for the SCAG region and its six counties, and information for all quarters was used to develop trends information in the inventory attributes, also for the SCAG region and its counties.
- Generate a submarket area-level inventory attributes maps and table for existing inventory. Using picture format map files of the submarkets from CoStar, a GIS-based submarket areas data set was created to a reasonable accuracy. The GIS-based CoStar existing warehouse location data was then spatially joined with the GIS-based submarket areas data to develop maps of existing inventory attributes by submarket area.
- Generate a submarket area-level inventory attributes map and table for existing developable building area for future warehousing. As part of the 2013 SCAG CRGMPIS, Dr. John Husing and Cambridge Systematics developed information on undeveloped lands and developable building area for future warehousing facilities by city or unincorporated area in the SCAG region. The square footage of undeveloped lands was estimated by comparing land zoned as industrial in the year 2008 to the footprint of buildings on the property, and Dr. Husing assumed the vacant lots where new warehousing and distribution facilities could be built. The warehouse building areas were estimated under a general floor area assumption of 0.55. The 2013 SCAG CRGMPIS, thus, identified 339 million square feet of undeveloped land suitable to warehouse buildings in the SCAG region, or a total of 186 million square feet of building space.

  In this study, the estimate for developable warehouse building area was revised using more recent land uses data and a modified method with steps as follows:

  1. The 2012 SCAG existing land uses data provided area of parcels with existing industrial land uses, while the 2012 SCAG general plan land use data provided area of parcels with planned industrial land uses. The difference between total planned industrial land area and total existing industrial land area for the SCAG region was estimated as the total developable industrial land area, which is calculated to be about 2,569 million square feet.
  2. The existing inventory of warehouse building area, based on CoStar's November 2014 data download, was used to estimate percentage of total existing land area that is occupied by warehouse buildings. The 2012 SCAG existing land uses data,

when combined with the 2014 CoStar's inventory, showed that the existing warehousing land area in the SCAG region is about 30.7 percent of the existing industrial land area in the SCAG region, and the existing warehousing building area in the SCAG region is about 13.2 percent of the existing industrial land area in the SCAG region. The same percentage share of 13.2 percent was applied to total developable industrial land area in the SCAG region to estimate total developable warehouse building area in the SCAG region, which is calculated to be about 338 million square feet. This is 152 million square feet or 82 percent higher over the previous estimate in the 2013 SCAG CRGMPIS.

3. The regional total developable warehouse building area is assigned to submarket areas with only a positive change in industrial land area (planned minus existing). Submarket areas with a nonpositive change in industrial land area are considered to be not suited for new warehouse developments. An exception is made for Imperial County industrial area, where although the change in industrial land area is not positive, new warehouse developments are allowed to meet rise in U.S.-Mexico border crossing-related warehousing demand beyond available capacity. The share assigned to each submarket area is derived in two substeps: a) developable warehouse building area is independently calculated for submarket area based on its change in industrial area, percentage of industrial lands occupied by warehouse buildings, and average warehouse building floor area ratio; and b) the submarket area-level estimates for developable warehouse building area are adjusted, such that their sum matches the regional total estimate in the previous step. The estimates for the submarket areas are shown in Section 2.3.

Data Comparison Methods

The following types of GIS and spreadsheet-based data comparison methods were used with the warehousing and land use-related data described in the *Data* subsection of this technical memorandum:

- **Partially compare regional locations for existing inventory with past inventory.** The regional locations map for existing inventory, based on CoStar's November 2014 data download, was visually compared to the 2008 SCAG warehousing space inventory for general similarities in the locations of warehousing building clusters. As the 2008 inventory only contained buildings of sizes greater than or equal to 50,000 square feet, the comparison made was partial.

- **Partially compare county-level inventory attributes table for existing inventory with past inventory.** The county-level inventory attributes for existing inventory, based on CoStar's November 2014 data download, were compared to the 2008 SCAG warehousing space inventory for general quality of the 2014 inventory and consistency with the 2008 inventory. Again, the 2008 inventory only contained buildings of sizes greater than or equal to 50,000 square feet; thus, the comparison made was partial.

  The methods used to generate the 2008 and 2014 inventories, including the selection of buildings and enhancement to the inventory attribute information, are very different for the two inventories. The absolute measures, such as total building area, total occupied space, and total vacant space, are likely to differ between the inventories. So, the intent of the comparison is not to determine absolute changes in the inventory

attributes between 2008 and 2014. However, the comparison observes the order of magnitude of the differences in the inventory attributes by county, and the changes in percentages (percent occupied or percent vacant) and factors (average floor area ratio and average building size) for inventory attributes within a county.

2.2 Existing Industrial Warehouse Buildings Total Inventory and Comparisons

This subsection provides information on existing locations and inventory attributes, such as total number of buildings, total building area, total occupied space, vacancy, average floor area ratio, and average building size that was developed using the CoStar Property® data product and comparisons made to other data.

2.2.1 Existing Locations in the SCAG Region

Figure 2.2 shows the locations of about 34,000 existing warehouse buildings in the SCAG region (with an estimated total building area of about 1.18 billion square feet based on the CoStar's November 2014 data download.

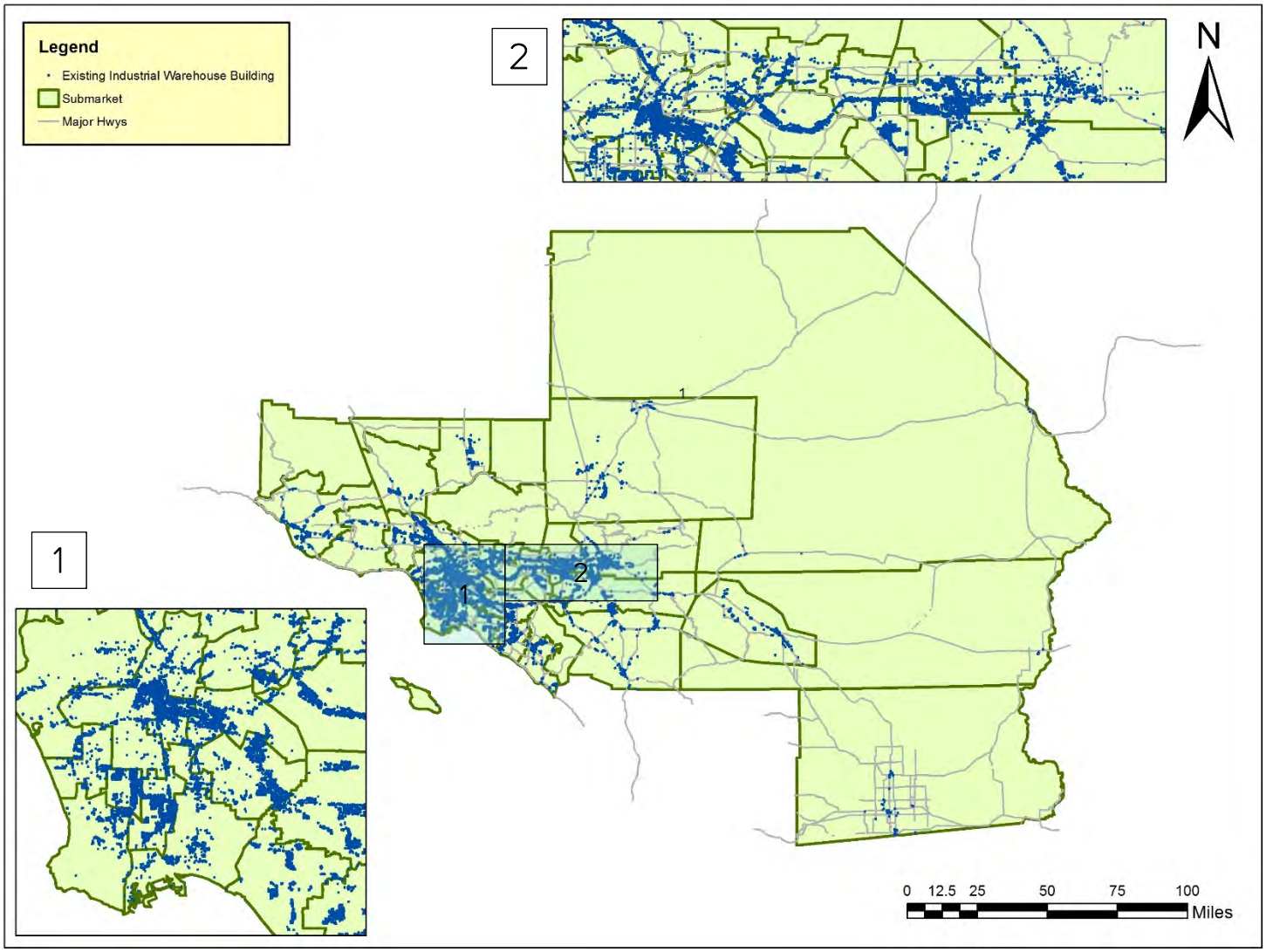
Based on the location distribution of buildings, the density of warehouse properties is very high in Los Angeles County, Orange County, and western parts of San Bernardino and Riverside Counties (particularly, west of Interstate 215). There are relatively fewer number of warehouse properties in other parts of the SCAG region.

Comparisons of Locations for Buildings of Sizes Greater than or Equal to 50,000 Square Feet

Figure 2.3 shows a comparison of locations of the existing warehouse buildings to that of buildings in the 2008 warehousing space inventory. However, as the 2008 inventory only included buildings of sizes greater than or equal to 50,000 square feet, a limited comparison was made.

The comparison shows that the building clusters generally are in the same locations on both maps. In order to quantify the differences, comparisons of the inventory attributes are made in the next subsection.

Figure 2.2 Locations of Existing Industrial Warehouse Buildings in the SCAG Region, All Building Sizes and All Secondary Types, 2014



Source: CoStar Property® Data Product – November 2014 Data Download; and ESRI's GIS data layers.

2.2.2 Existing Total Inventory Attributes for Counties in the SCAG Region

Table 2.1 presents the attributes of the existing warehouse buildings total inventory, using the CoStar's 2014 year-end data, by county in the SCAG region and the region as a whole. The number of properties is slightly higher than the CoStar's November 2014 data download due to the number of buildings that was delivered between the day the data was downloaded in November and December 31, 2014; however, the percentage difference in the total building area is less than a 1-percent, and represents minor changes in the inventory occurring between November and December 2014. So, for practical reasons the data sets can be considered the same. Key observations based on this inventory are:

- The SCAG region consists of **34,304 warehouse buildings** with **1,185,490,354 square feet of estimated total building area (supply)** and **1,136,423,252 square feet of estimated total occupied space (demand)**.
- Los Angeles County makes up 49.4 percent of the total building area, followed by San Bernardino County (25.1 percent), Orange County (11.8 percent), Riverside County (10.4 percent), Ventura County (3.0 percent), and Imperial County (0.2 percent).
- Similarly, Los Angeles County makes up 50.1 percent of the total occupied space, followed by San Bernardino County (24.7 percent), Orange County (11.8 percent), Riverside County (10.3 percent), Ventura County (3.0 percent), and Imperial County (0.1 percent).
- The **vacancy of warehousing space in the SCAG region is only about 4.1 percent overall**, which is substantially lower than the national vacancy of (general) industrial space, which is 7.2 percent. The vacancy of warehousing space starts as low as 2.9 percent in Los Angeles County.
- The average floor area ratio (FAR) is 0.43 for the SCAG region overall. The highest average FAR is in Los Angeles County (about 0.47), and the lowest is in Imperial County (about 0.27). This is likely due to the relative availability and cost of land.
- The average building size is about 35,000 square feet for the SCAG region overall. The largest average building size is in San Bernardino County (about 60,000 square feet); and the lowest is in Ventura County (about 19,000 square feet). This is due to the presence of a large number of "big box" (building size >100,000 square feet) distribution facilities in Inland Empire and their contribution to the total building area.

Table 2.1 Total Inventory Attributes for Existing Industrial Warehouse Buildings in the Counties of the SCAG Region, All Building Sizes and All Secondary Types, 2014

County	Number of Buildings	Percentage Share of Total Buildings	Rentable Building Area (Square Feet)	Percentage Share of Total Building Area	Total Occupied Space (Square Feet)	Percent Occupied	Percentage Share of Total Occupied Space	Total Vacant Space (Square Feet)	Percent Vacant	Percentage Share of Total Vacant Space	Average Floor Area Ratio[a,b]	Average Building Size (Square Feet)
Imperial	85	0.20%	1,965,324	0.20%	1,506,683	76.70%	0.10%	458,641	23.30%	0.90%	0.27	23,121
Los Angeles	19,092	55.70%	586,099,464	49.40%	568,958,384	97.10%	50.10%	17,141,080	2.90%	34.90%	0.47	30,699
Orange	5,257	15.30%	139,894,058	11.80%	134,440,969	96.10%	11.80%	5,453,089	3.90%	11.10%	0.38	26,611
Riverside	3,043	8.90%	123,724,095	10.40%	116,588,283	94.20%	10.30%	7,135,812	5.80%	14.50%	0.38	40,659
San Bernardino	4,999	14.60%	297,759,236	25.10%	280,317,848	94.10%	24.70%	17,441,388	5.90%	35.50%	0.41	59,564
Ventura	1,828	5.30%	36,048,177	3.00%	34,611,085	96.00%	3.00%	1,437,092	4.00%	2.90%	0.35	19,720
SCAG Region	34,304	100.00%	1,185,490,354	100 .00%	1,136,423,252	95.90%	100.00%	49,067,102	4.10%	100.00%	0.43	34,558

[a] This was estimated using CoStar Property Data Product – November 2014 Data Download.

[b] This was estimated with data on only 30,647 properties with a reasonable land area data (properties with no land area data or estimated floor area ratios lower than 0.1 were not included in the average floor area calculation).

Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download for all columns, except Average Floor Area Ratio.

Comparisons of Inventory Attributes for Buildings of Sizes Greater than or Equal to 50,000 Square Feet

Table 2.2 shows a comparison of inventory attributes of the existing warehouse buildings to that of buildings in the 2008 warehousing space inventory. However, as the 2008 inventory only included buildings of sizes greater than or equal to 50,000 square feet, a limited comparison was made. The 2014 data used for this comparison is the November 2014 download data, not the End of Year 2014 data based on the quarterly reports, as it allows to filter the facilities larger than 50,000 square feet.

Generally, it is expected that the inventory size (the number of warehouse buildings and their total building area) would increase between 2008 and 2014 in the SCAG region and all its counties, especially since 2008 was a global recession year, and both the national economy and Southern California's economy have gained momentum since the 2008-2009 recession. However, the comparison shows that:

- Although the number of buildings in the SCAG region in the 2014 inventory is 4.3 percent higher than the 2008 inventory, the changes in the number of buildings in some counties in the SCAG region are negative.
- In terms of the total building area, the 2014 inventory for the SCAG region is nearly 10.5 percent lower than the 2008 inventory, and the changes in the total building area in some counties in the SCAG region are negative.
- Both of the above comparisons indicate that the changes between the 2008 inventory and the 2014 inventory are not consistent with the expectation for the SCAG region and the counties in the SCAG region. Imperial County is noted in particular as a large exception in the comparisons, where the inventory in 2014 is a fraction of the inventory in 2008. These point to a possible difference in terms of the buildings that are included and the buildings that are excluded in the 2008 and 2014 inventories. This is not to say that there is not a significant overlap of the buildings included in both inventories. The similarity of the inventories was demonstrated by the location comparison (see Figure 2.3). However, the dissimilarities of the two inventories make it difficult to compare the supply of warehousing space in 2008 versus 2014.
- However, comparisons of some other inventory attributes, including vacancy and average size of buildings, are as expected. The vacancy in the 2008 inventory was high (17.2 percent for the SCAG region), but dropped to a much lower value (3.9 percent for the SCAG region) in the 2014 inventory. The average size of buildings generally is similar between the 2008 inventory and the 2014 inventory.

To assess historical trends in warehousing supply and demand, the CoStar Property® data product was used. The trends are discussed in a later subsection of Section 2.2 of this technical memorandum.

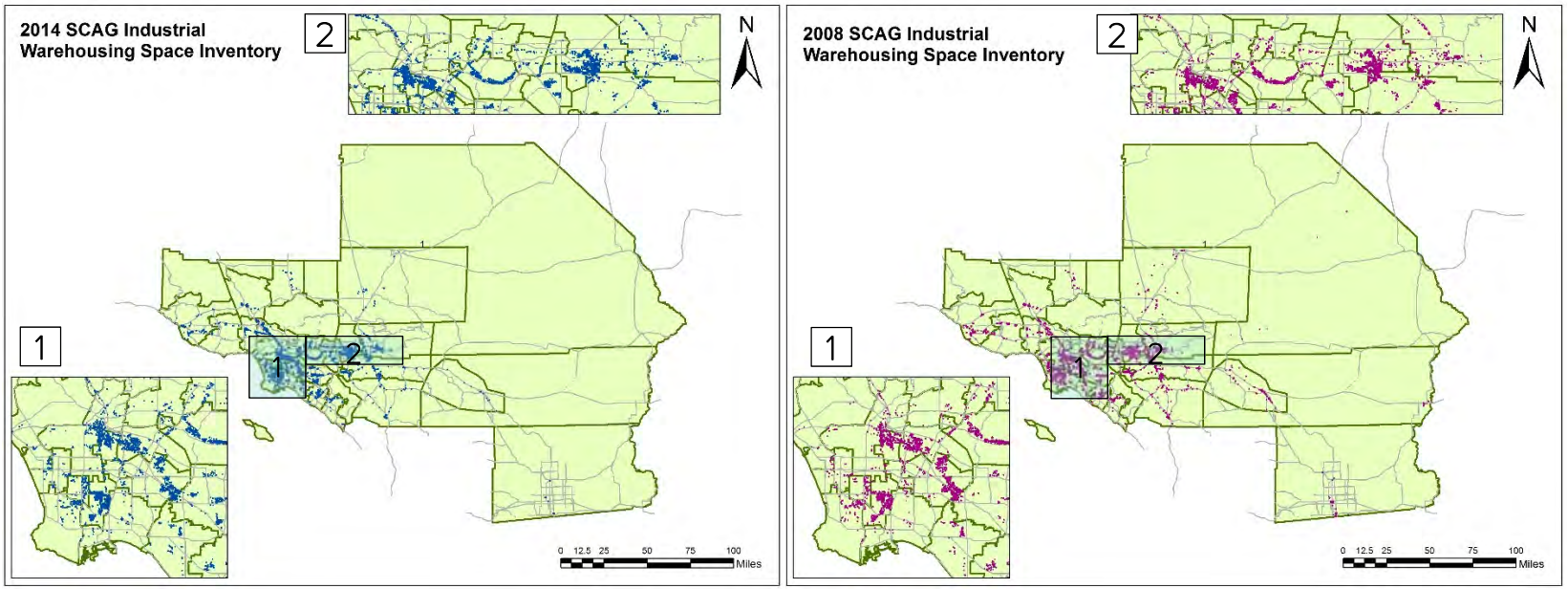
Table 2.2 Total Inventory Attributes for Industrial Warehouse Buildings in the SCAG Region, 2014 versus 2008, Building Size >=50,000 Square Feet

County	Number of Buildings	Percentage Share of Total Buildings	Rentable Building Area (Square Feet)	Percentage Share of Total Building Area	Total Occupied Space (Square Feet)	Percent Occupied	Percentage Share of Total Occupied Space	Total Vacant Space (Square Feet)	Percent Vacant	Percentage Share of Total Vacant Space	Average Floor Area Ratio[a]	Average Building Size (Square Feet)
2014 Inventory												
Imperial	12	0.20%	959,112	0.10%	717,143	74.80%	0.10%	241,969	25.20%	0.80%	0.28	79,926
Los Angeles	2,748	56.10%	339,385,053	45.30%	330,229,979	97.30%	45.90%	9,155,074	2.70%	31.10%	0.49	123,503
Orange	552	11.30%	67,868,977	9.10%	65,438,372	96.40%	9.10%	2,430,605	3.60%	8.30%	0.41	122,951
Riverside	417	8.50%	88,144,009	11.80%	84,381,225	95.70%	11.70%	3,762,784	4.30%	12.80%	0.41	211,377
San Bernardino	1,039	21.20%	238,742,788	31.90%	225,552,025	94.50%	31.30%	13,190,763	5.50%	44.80%	0.43	229,781
Ventura	130	2.70%	14,332,643	1.90%	13,688,612	95.50%	1.90%	644,031	4.50%	2.20%	0.4	110,251
SCAG Region	4,898	100.00%	749,432,582	100.00%	720,007,356	96.10%	100.00%	29,425,226	3.90%	100.00%	0.45	153,008
2008 Inventory												
Imperial	47	1.00%	8,348,430	1.00%	7,273,270	87.10%	1.00%	1,075,160	12.90%	0.70%	0.64	177,626
Los Angeles	2,350	50.10%	350,985,826	41.90%	310,696,717	88.50%	44.80%	40,289,109	11.50%	28.00%	0.64	149,356
Orange	459	9.80%	47,604,604	5.70%	34,488,034	72.40%	5.00%	13,116,570	27.60%	9.10%	0.46	103,714
Riverside	613	13.10%	169,379,061	20.20%	136,421,050	80.50%	19.70%	32,958,011	19.50%	22.90%	0.61	276,312
San Bernardino	865	18.40%	218,033,297	26.00%	164,716,871	75.50%	23.70%	53,316,426	24.50%	37.10%	0.48	252,062
Ventura	361	7.70%	43,338,550	5.20%	40,246,918	92.90%	5.80%	3,091,632	7.10%	2.10%	0.61	120,051
SCAG Region	4,695	100.00%	837,689,768	100.00%	693,842,860	82.80%	100.00%	143,846,908	17.20%	100.00%	0.57	176,848

[a] Average Floor Area Ratio for 2014 was estimated with data on only 4,777 properties with a reasonable land area data (properties with no land area data or estimated floor area ratios lower than 0.1 were not included in the average floor area calculation).

Sources: 2014 data from CoStar Property® Data Product – November 2014 Data Download; and 2008 data from 2013 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy.

Figure 2.3 Comparison of Locations of Industrial Warehouse Buildings in the SCAG Region, 2014 versus 2008, Building Size >=50,000 Square Feet



Source: CoStar Property® Data Product – November 2014 Data Download; 2013 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy; and ESRI's GIS data layers.

2.2.3 Existing Total Inventory Attributes for Submarket Areas in the SCAG Region

A series of maps was developed at submarket area level in the SCAG region to indicate information on existing total inventory attributes. Appendix A documents the same information in a tabulated format. The map information enables not only a higher geographical granularity and distribution information of the existing inventory, but also forms a basis for allocation of the region's supply and demand forecasts in a subsequent task of this study. The total inventory at submarket level was developed from the CoStar's November 2014 data download.

Total Number of Buildings

Figure 2.4 shows the distribution of the total number of existing buildings by submarket area. Industrial submarket areas with over 1,000 warehouse buildings include Central Los Angeles, Mid-Counties Los Angeles, San Fernando Valley, Lower San Gabriel Valley, West San Bernardino, Ontario Airport Area, North Orange County, John Wayne Airport Area, Riverside City, and Ventura County.

Total Rentable Building Area

Figure 2.5 shows the distribution of the existing total rentable building area by submarket area. Ontario Airport Area is the highest in terms of total building area with over 100 million square feet. The total building area for the warehousing submarket areas of Central Los Angeles, Mid-Counties Los Angeles, Carson/Rancho Dominguez, Commerce, San Fernando Valley, Lower San Gabriel Valley, West San Bernardino, East San Bernardino, and Riverside City ranges between 50 million to 100 million square feet. The total building area in other submarket areas is lower than 50 million square feet.

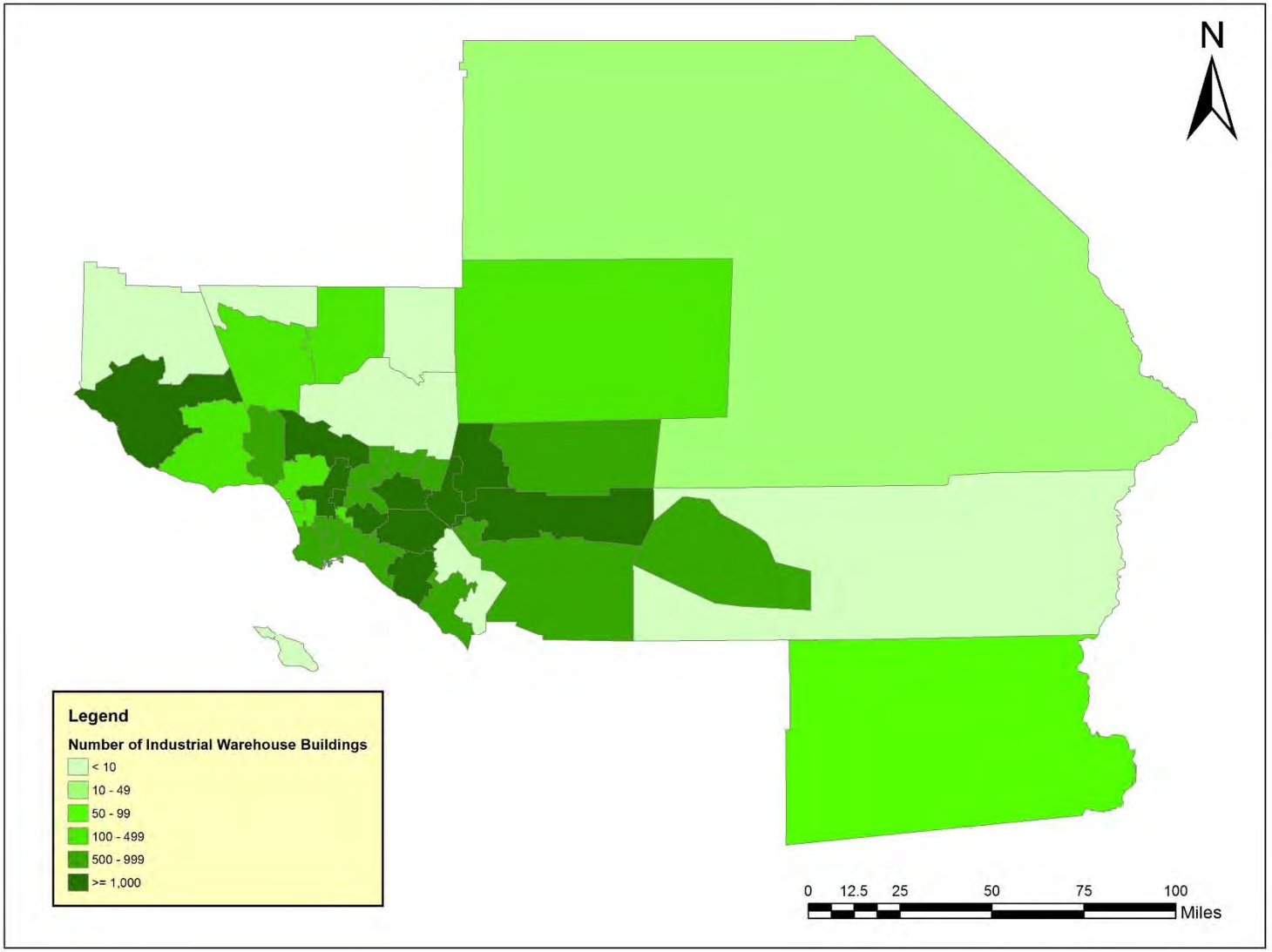
Total Occupied Space

Based on Figure 2.6, the distribution of the existing total occupied space by submarket area follows a very similar distribution as the total rentable building area.

Vacancy

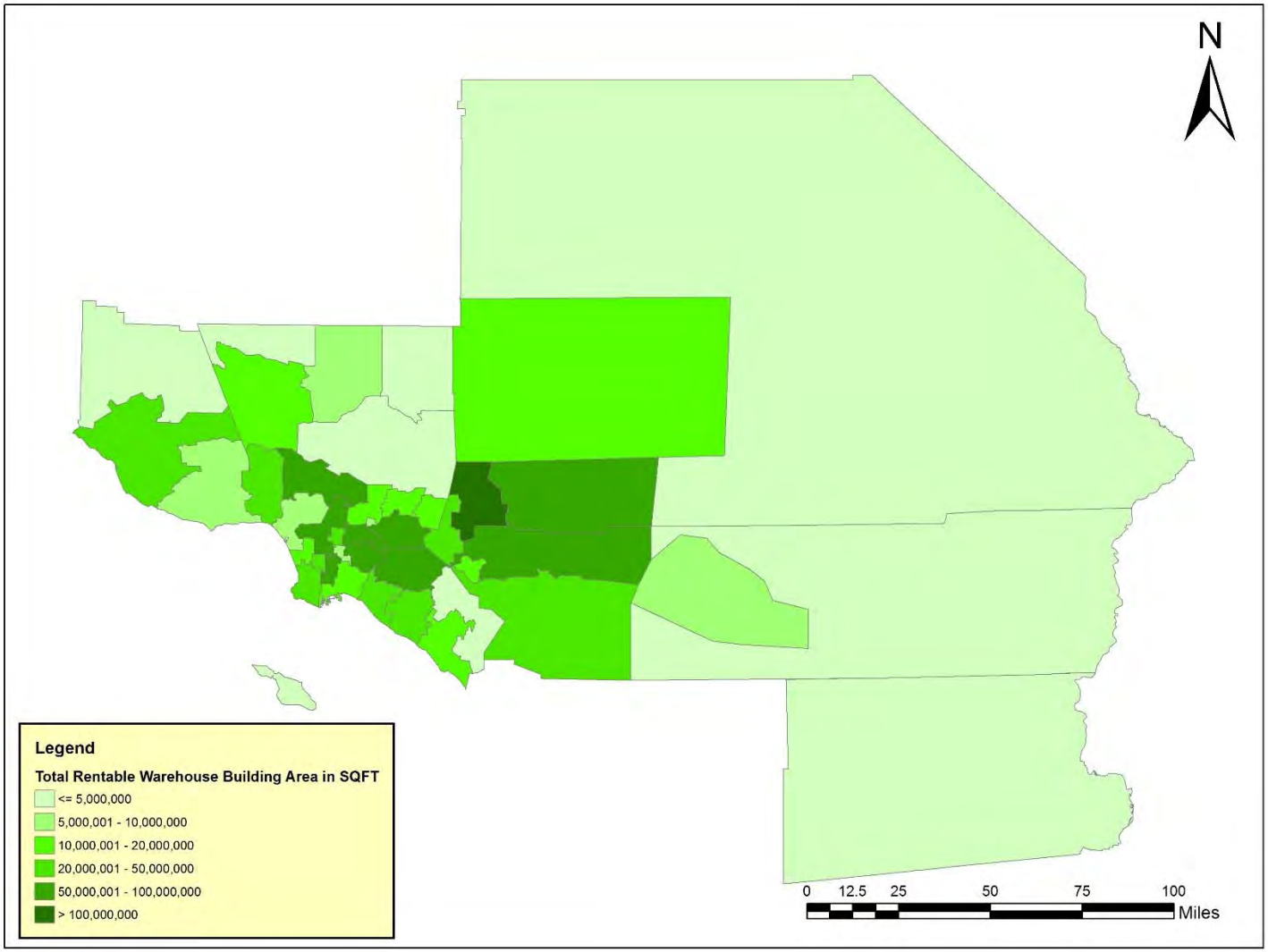
A majority of the SCAG region submarket areas has a vacancy of less than or equal to 5 percent (Figure 2.7). The warehousing submarket areas of South Riverside County, Corona, North San Bernardino, San Bernardino County Outlying Area, Ontario Airport Area, and Imperial County currently are locations with vacancy higher than 5 percent.

Figure 2.4 Existing Total Number of Industrial Warehouse Buildings by Submarket Area in the SCAG Region All Building Sizes and All Secondary Types, 2014



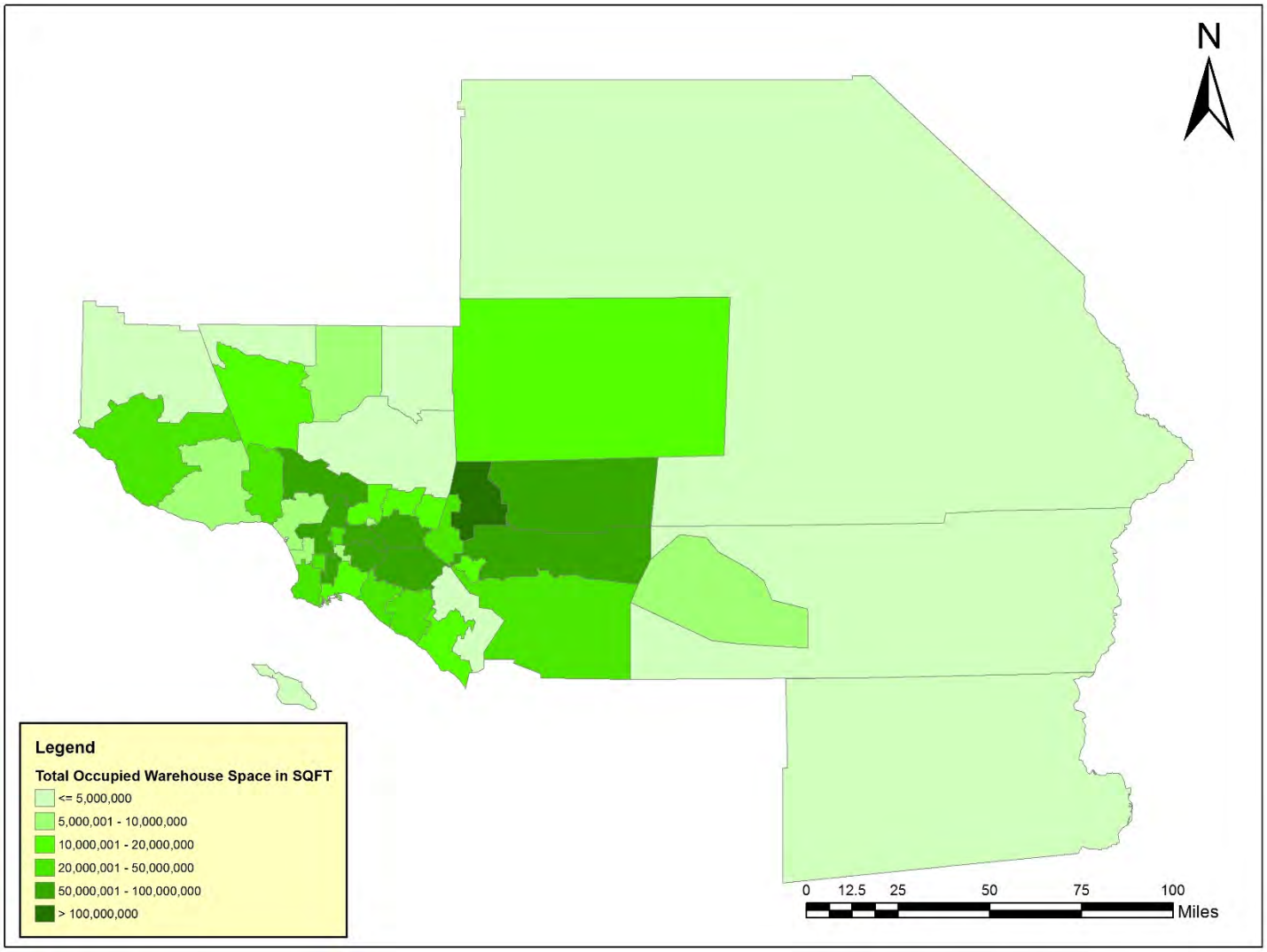
Source: CoStar Property® Data Product – November 2014 Data Download.

Figure 2.5 Existing Total Rentable Building Area of Industrial Warehouse Buildings in Square Feet by Submarket Area in the SCAG Region, All Building Sizes and All Secondary Types, 2014



Source: CoStar Property® Data Product – November 2014 Data Download.

Figure 2.6 Existing Total Occupied Space of Industrial Warehouse Buildings in Square Feet by Submarket Area in the SCAG Region, All Building Sizes and All Secondary Types, 2014



Source: CoStar Property® Data Product – November 2014 Data Download.

2.2.4 Average Floor Area Ratio

A majority of the SCAG region submarket areas has an average floor area ratio between 0.3 and 0.5 (Figure 2.8). The warehousing submarket areas of Central Los Angeles and Vernon Area have average floor area ratios lower than 0.3, while the warehousing submarket areas of North San Bernardino County, San Bernardino County Outlying Area, Corona, and Imperial County have average floor area ratios higher than 0.5.

Average Building Size

In terms of existing average building size, the warehousing submarket areas of Carson/ Rancho Dominguez, Commerce, Lower San Gabriel Valley, West and East San Bernardino and Riverside have buildings with an average size of more than 50,000 square feet, while all other warehousing submarket areas have buildings with an average size less than or equal to 50,000 square feet (Figure 2.9).

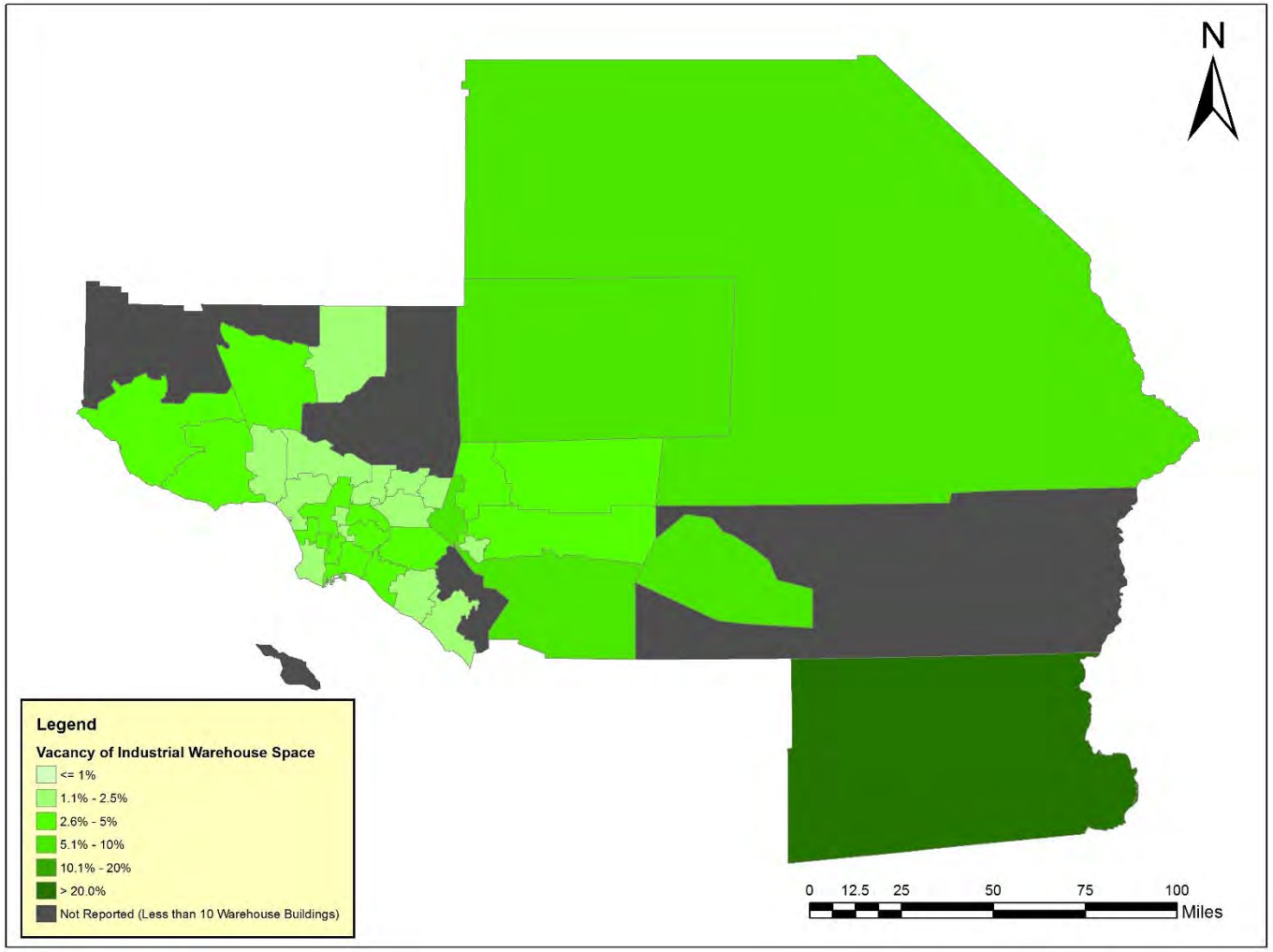
Historical Trends in the Total Inventory Attributes for the SCAG Region and its Six Counties

Figures 2.10 to 2.16 show historical trends in the inventory attributes of warehousing buildings in the SCAG region and its six counties that were developed using the 2004-2014 (historical) quarterly data download. They are described below.

Total Number of Buildings, Rentable Building Area, Occupied Space, and Vacancy in the SCAG Region

According to the data for the SCAG region (see Figure 2.10), there were 32,595 warehousing buildings at the end of 2004 with a total rentable building area of 1,024,063,370 square feet. In contrast, at the end of 2014, there were 34,304 warehousing buildings with a total rentable building area of 1,185,490,252 square feet. Thus, between 2004 and 2014, there has been a 5.2-percent growth in the number of warehousing buildings, and 15.8-percent growth in the total building area. This reflects the trend in increasing building size. Meanwhile, the total occupied space has increased by 16.1 percent. The vacancy rate was 4.4 percent in 2004. It peaked at 8.2 percent in 2009, but has gradually declined to 4.1 percent in 2014. Similar trends charts for the counties in the SCAG region are included in the appendix.

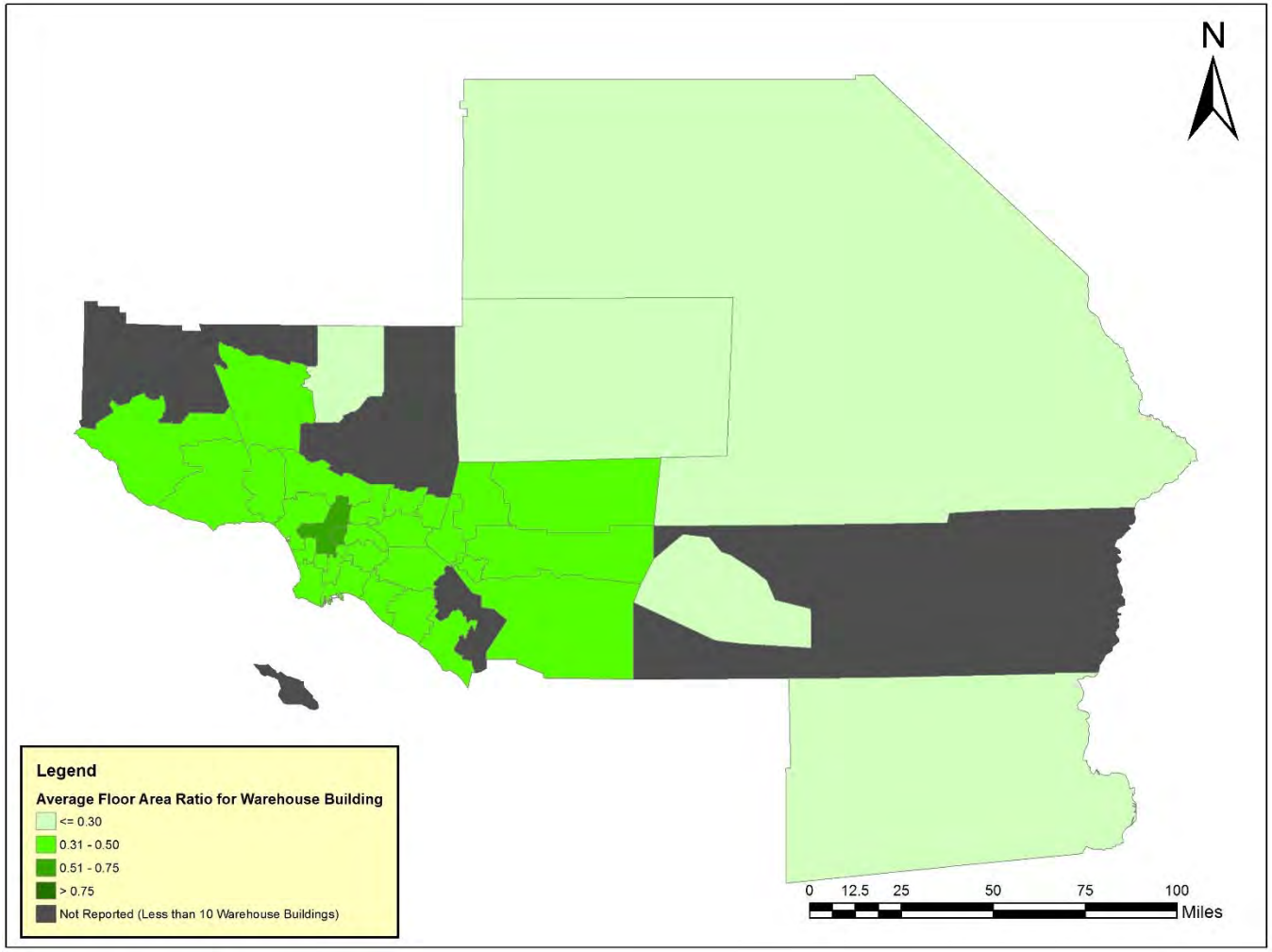
Figure 2.7 Existing Vacancy of Industrial Warehouse Buildings as Percentage of Total Rentable Building Area by Submarket Area in the SCAG Region, All Building Sizes and All Secondary Types, 2014



Source: CoStar Property® Data Product – November 2014 Data Download.

Note: Vacancy is not reported for counties less than 10 warehouse buildings.

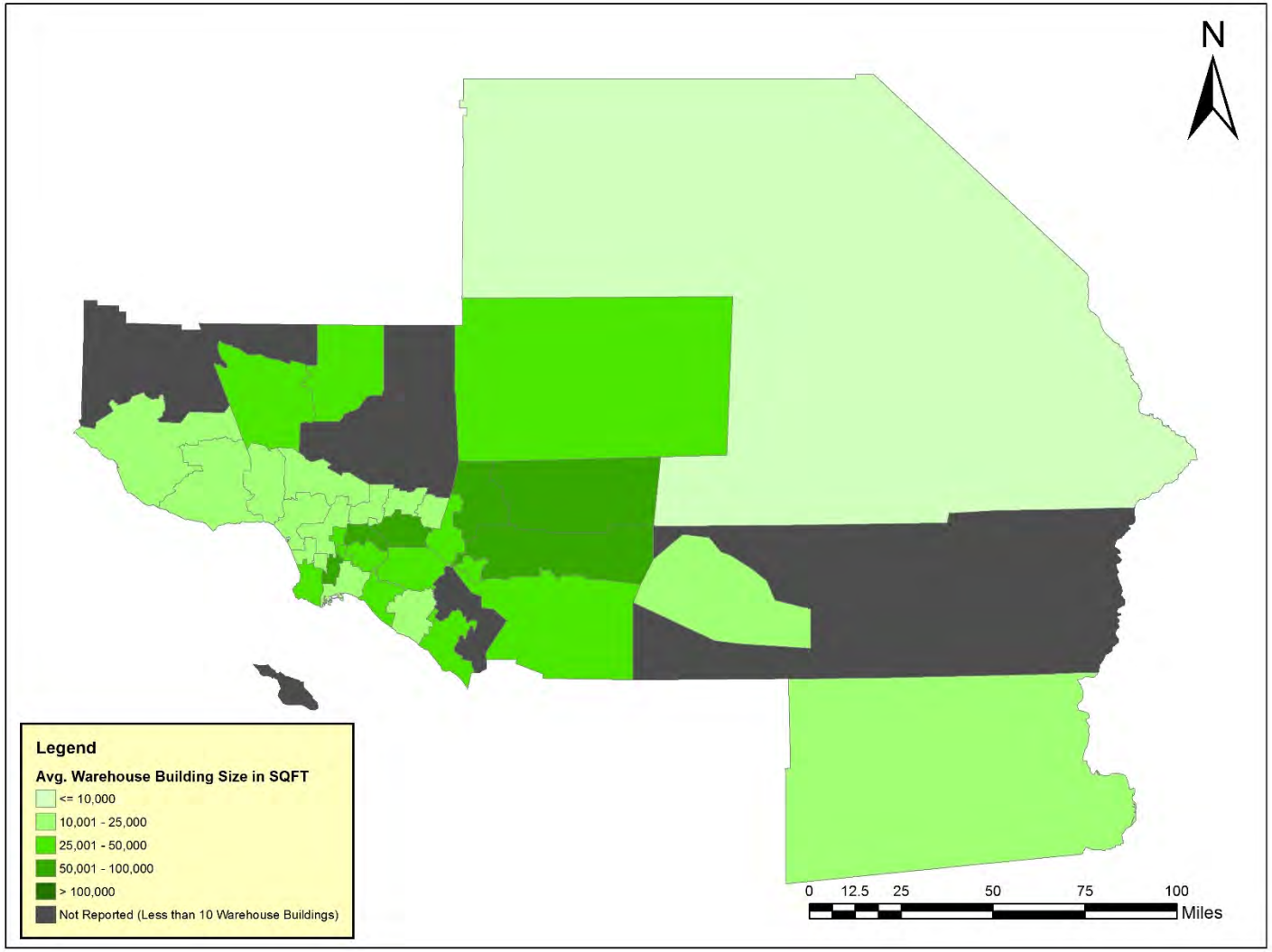
Figure 2.8 Existing Average Floor Area Ratio of Industrial Warehouse Buildings by Submarket Area in the SCAG Region, All Building Sizes and All Secondary Types, 2014



Source: CoStar Property® Data Product – November 2014 Data Download.

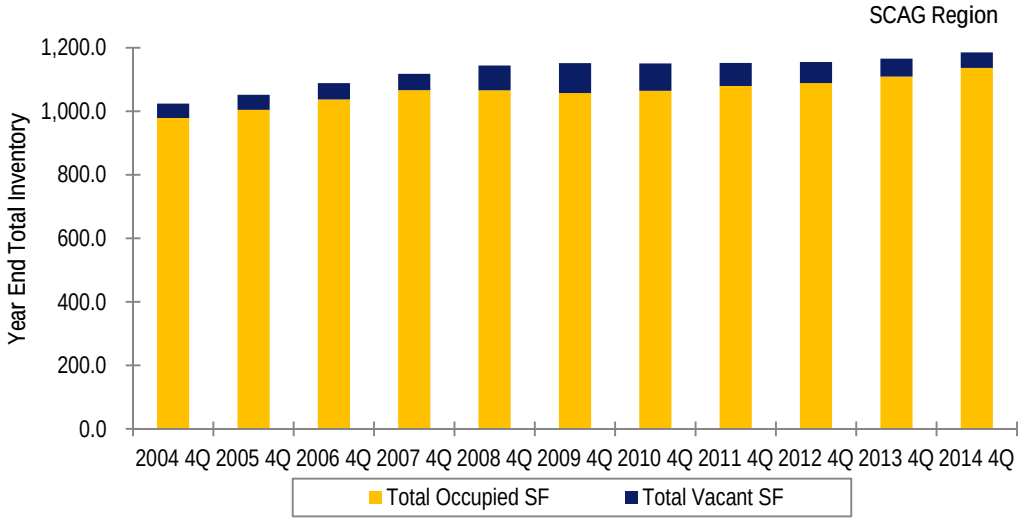
Note: Average Floor Area Ratio was estimated with data on only 30,600+ properties with a reasonable land area data (properties with no land area data, or estimated floor area ratios lower than 0.1 were not included in the average floor area calculation).

Figure 2.9 Existing Average Building Size of Industrial Warehouse Buildings in Square Feet by Submarket Area in the SCAG Region, All Building Sizes and All Secondary Types, 2014



Source: CoStar Property® Data Product – November 2014 Data Download.

Figure 2.10 Historical Year-End Trends in Total Warehousing Inventory – Rentable Building Area, Occupied Space and Vacant Space – SCAG Region, 2004 to 2014
Millions of Square Feet



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Net Absorption in the SCAG Region

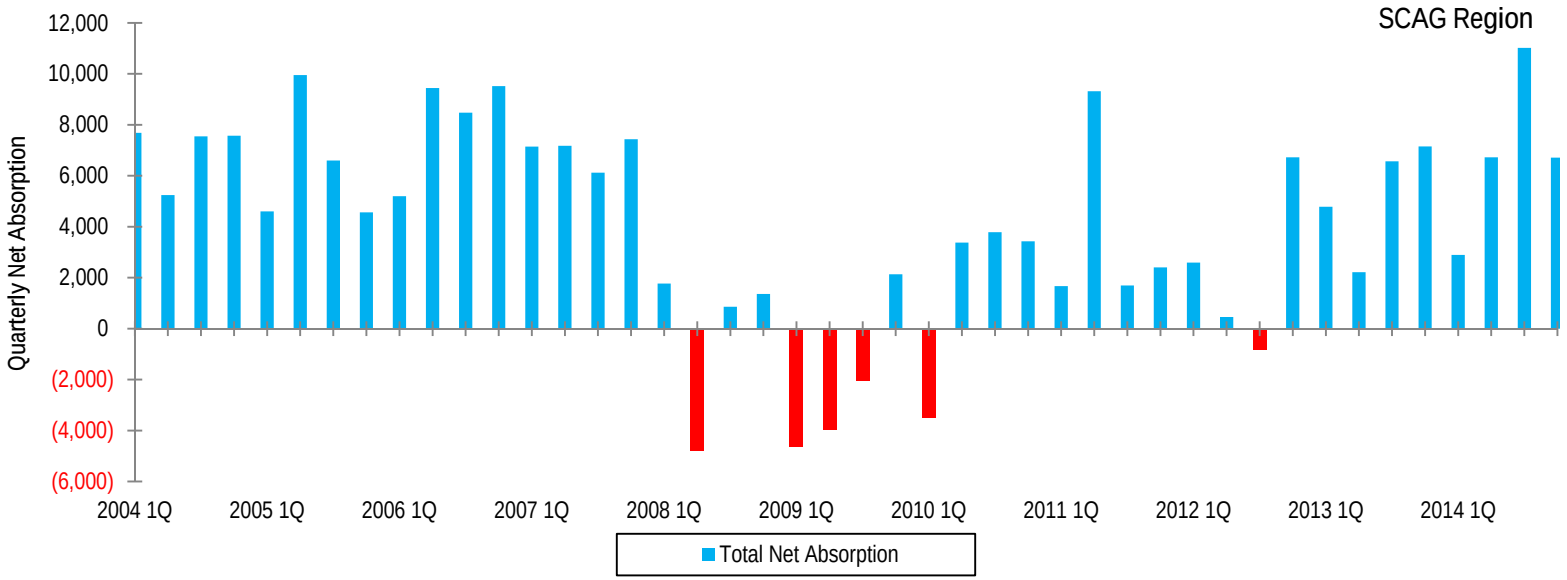
Figure 2.11 shows the quarterly trends in net absorption of warehousing space during the period 2004-2014 for the SCAG region. Quarterly net absorption is the difference in total occupied space in consecutive quarters. The figure shows some fluctuations in the net absorption. The 2008-2009 global recession, a slow recovery following the recession and fluctuations in fuel prices, in particular, have resulted in net negative absorption in the second quarter of 2008, the first three quarters in 2009, the first quarter in 2010 and the third quarter of 2012. Similar trends charts for the counties in the SCAG region are included in the appendix.

Newly Leased and Delivered Space in the SCAG Region

Figure 2.12 shows the quarterly trends in warehousing space that is newly leased and newly delivered (or built or constructed) in a quarter during the period 2004-2014 for the SCAG region. Prior to the recession, the quarterly newly leased space and newly delivered space were nearly at par. However, after the recession, the newly delivered space (or added supply) has lagged behind newly leased space (indicative of added demand). This lag could likely be due to a rise in real estate development costs in urban and rural areas of Southern California, industrial decisions in response to a slow economic recovery, and the desires of some beneficial cargo owners (BCO) to operate in a fewer, but larger buildings. If this trend were to continue, then the SCAG region would likely face a shortage in warehouse space. Similar trends charts for the counties in the SCAG region are included in the appendix.

Figure 2.11 Historical Quarterly Trends in Net Absorption of Warehousing Space in the SCAG Region, 2004 to 2014

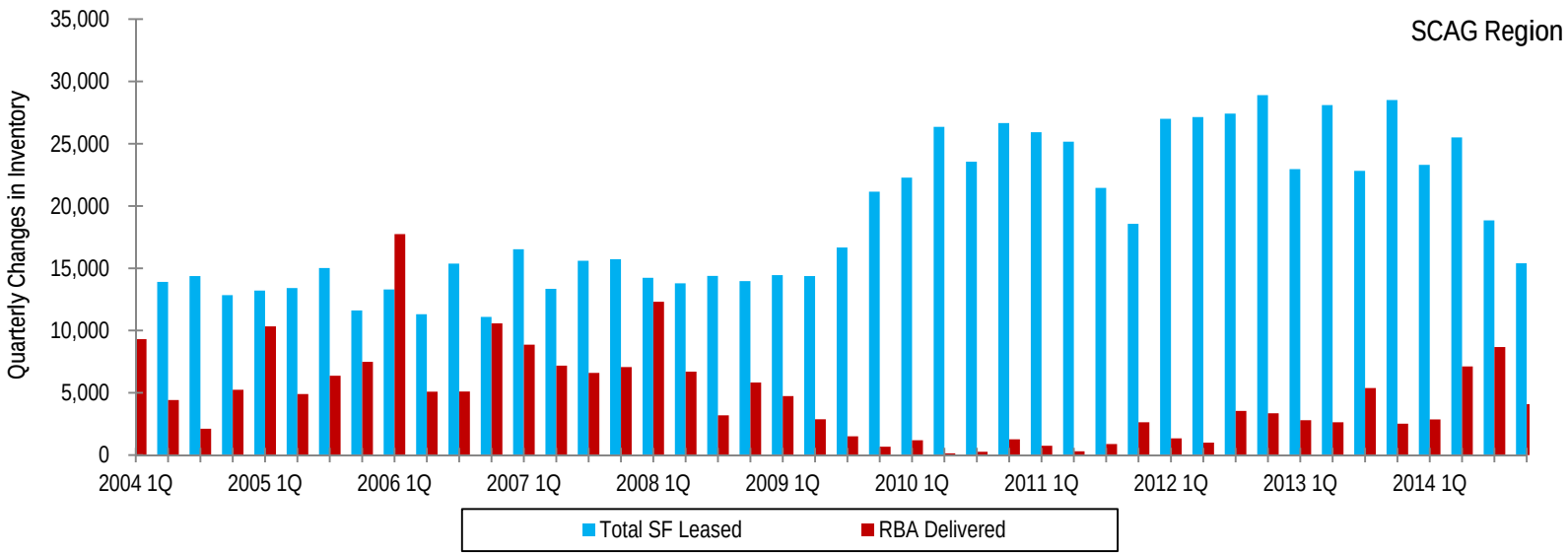
Thousands of Square Feet



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Figure 2.12 Historical Quarterly Trends in Leased and Delivered (or Constructed) Warehousing Space in the SCAG Region, 2004 to 2014

Thousands of Square Feet



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Total Number of Buildings, Rentable Building Area, Occupied Space, and Vacancy in the Counties of the SCAG Region

Figure 2.13 shows the year-end number of warehouse buildings during the period 2004-2014 by county in the SCAG region. Riverside and San Bernardino Counties are showing the highest percentage increases over 2004-2014 in the building count of about 25.2 percent and 17.1 percent, respectively, while the remaining counties in the SCAG region have less than a 5-percent increase in the building count. Referring to Figure 2.14, in the 2004-2014 period, the total rentable building area increased in Riverside and San Bernardino Counties by about 64.0 percent and 46.4 percent, respectively, while the remaining counties in the SCAG region increased by less than 5 percent in the total rentable building area. The rate of increase in Riverside and San Bernardino Counties was high prior to the recession, flattened for the period of 2008-2012, and has started to rise again. According to CoStar, this trend indicates speculative development.[20]

Between 2004 and 2014, the year-end total occupied space increased in Riverside and San Bernardino Counties by about 60.9 percent and 47.3 percent, respectively, while the remaining counties in the SCAG region increased by less than 6 percent in the total occupied space.

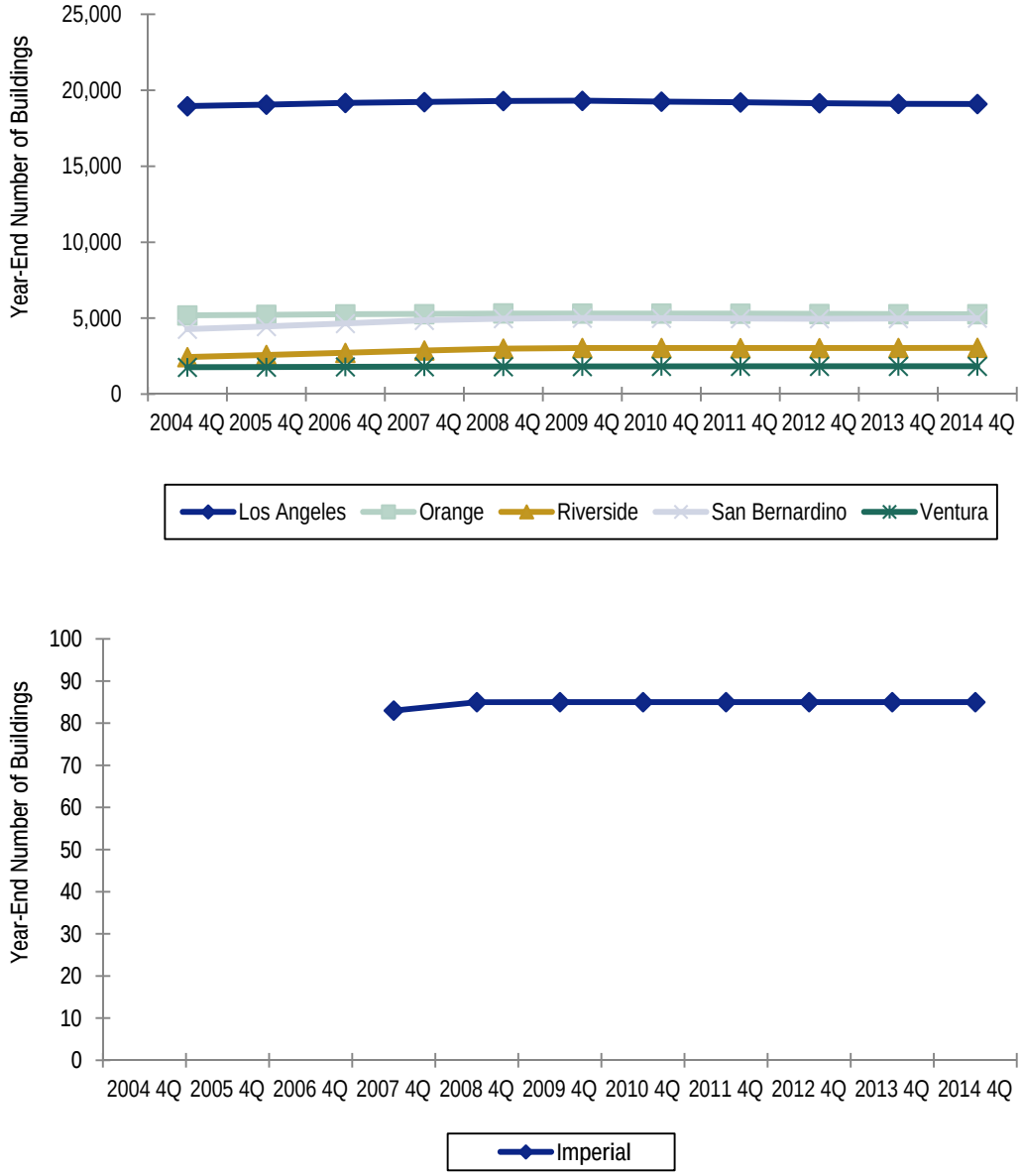
Figure 2.15 shows the 2004-2014 trends of the warehousing vacancy by county in the SCAG region. As shown in the figure, the vacancy rate in Imperial County reached a sudden peak in 2009, dropped in 2010, but began to rise again in 2011 through 2013. For other counties, the vacancy rate declined in recent years. After Imperial County, Riverside and San Bernardino Counties faced the highest vacancies of about 15.0 percent and 12.5 percent, respectively, during the 2008-2009 recession.

Average Building Size

Figure 2.16 shows the 2004-2014 trends of the average size of a warehouse building by county. As shown in the figure, while the average size of the building increased in Riverside and San Bernardino Counties by about 31.0 percent and 25.0 percent, respectively, it decreased in Orange County and Ventura County by a small percentage (less than 2 percent) value. The increase in Los Angeles County was less than 2 percent.

[20] CoStar News, *With Demand Increasing, Developers Warming Up to Spec Warehouse*, Article by Randall Drummer, December 4, 2013. Available at: http://www.costar.com/News/Article/With-Demand-Increasing-Developers-Warming-Up-to-Spec-Warehouse/155022 (last accessed on April 20, 2015).

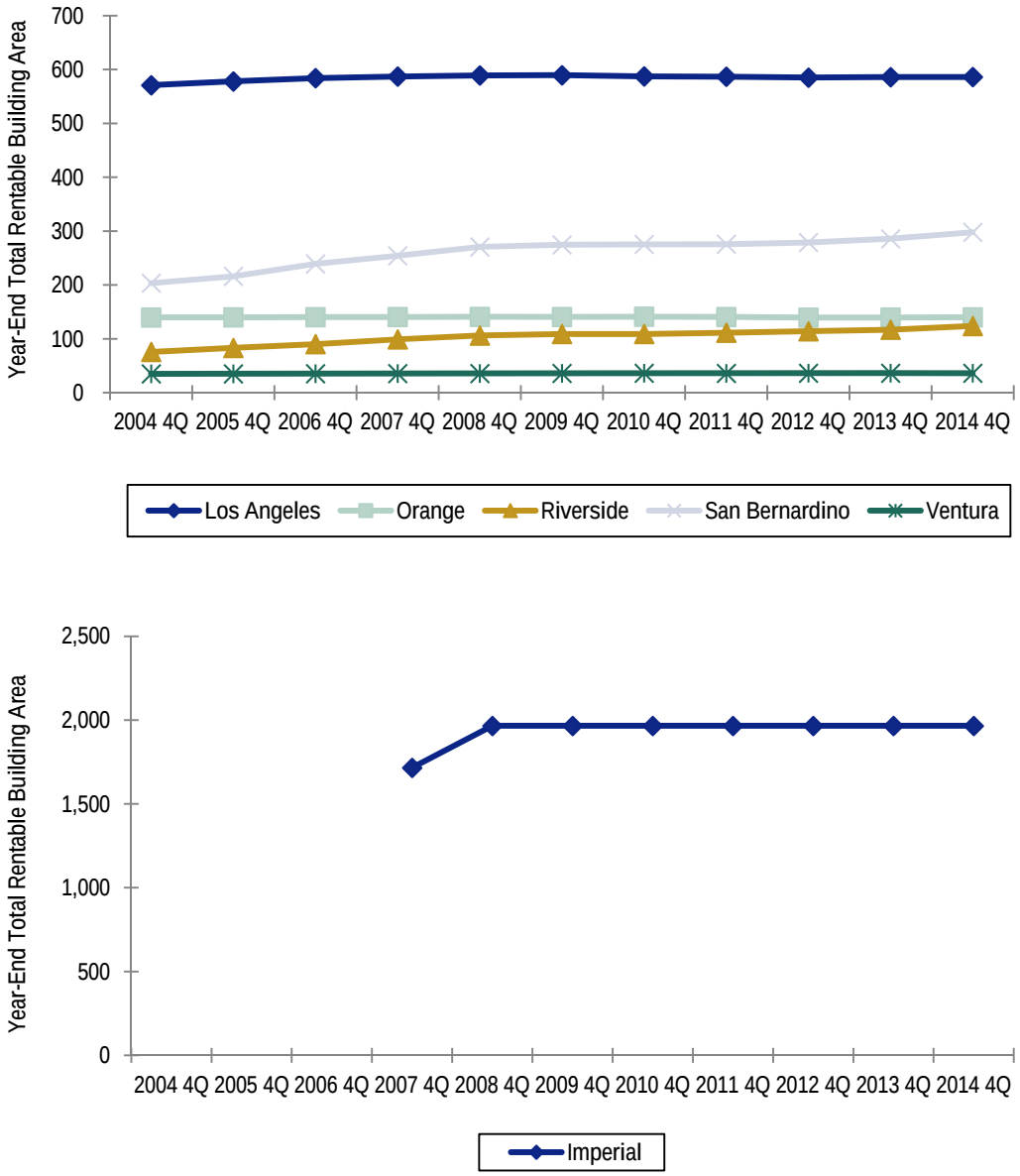
Figure 2.13 Historical Year-End Trends in Total Warehousing Inventory – Number of Buildings – Counties in the SCAG Region, 2004 to 2014



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

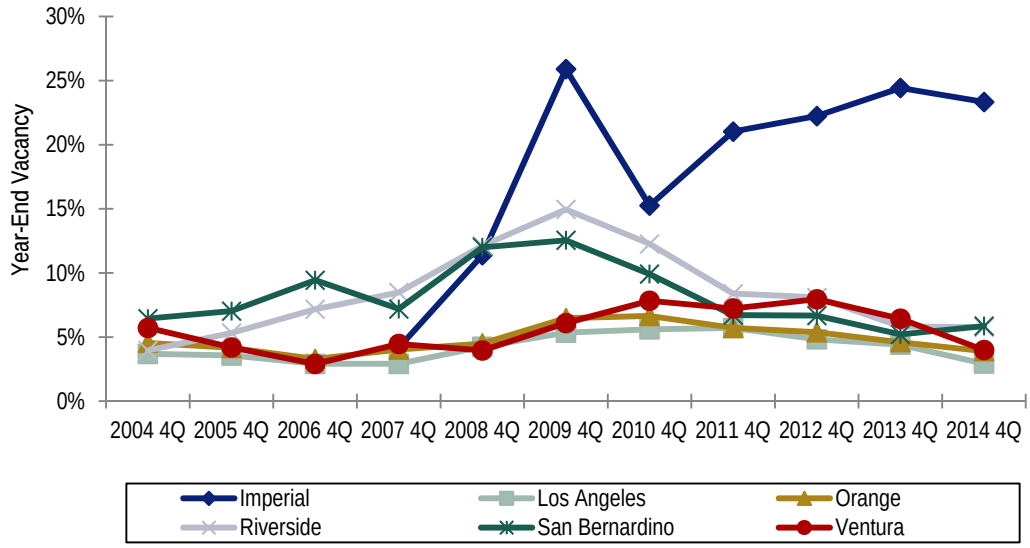
Figure 2.14 Historical Year-End Trends in Total Warehousing Inventory – Rentable Building Area – Counties in the SCAG Region, 2004 to 2014

Thousands of Square Feet



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Figure 2.15 Historical Year-End Trends in Total Warehousing Inventory – Vacancy – Counties in the SCAG Region, 2004 to 2014

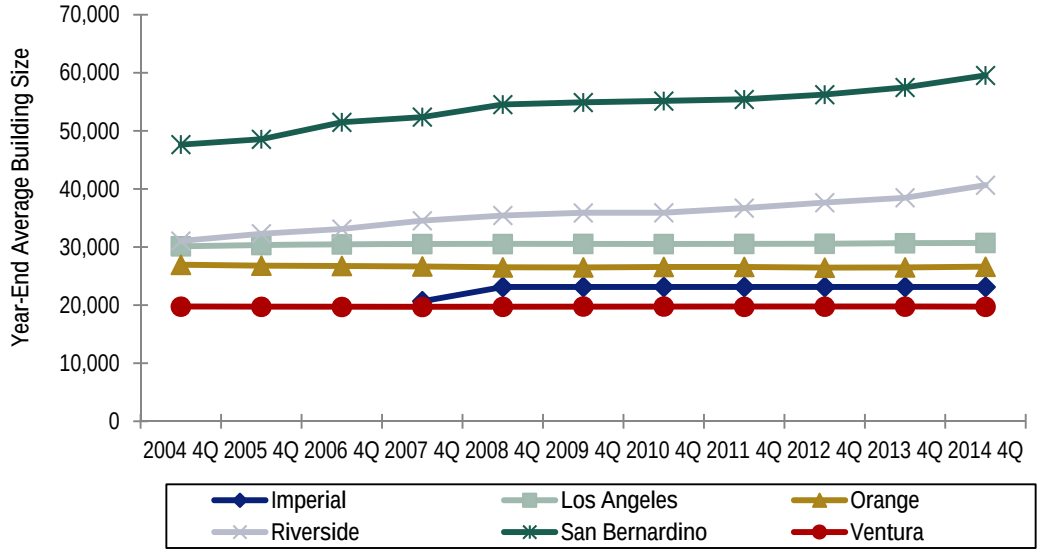


Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Note: Imperial County data is missing for the period from 2004 4Q to 2006 4Q.

Figure 2.16 Historical Year-End Trends in Total Warehousing Inventory – Average Building Size – Counties in the SCAG Region, 2004 to 2014

Square Feet



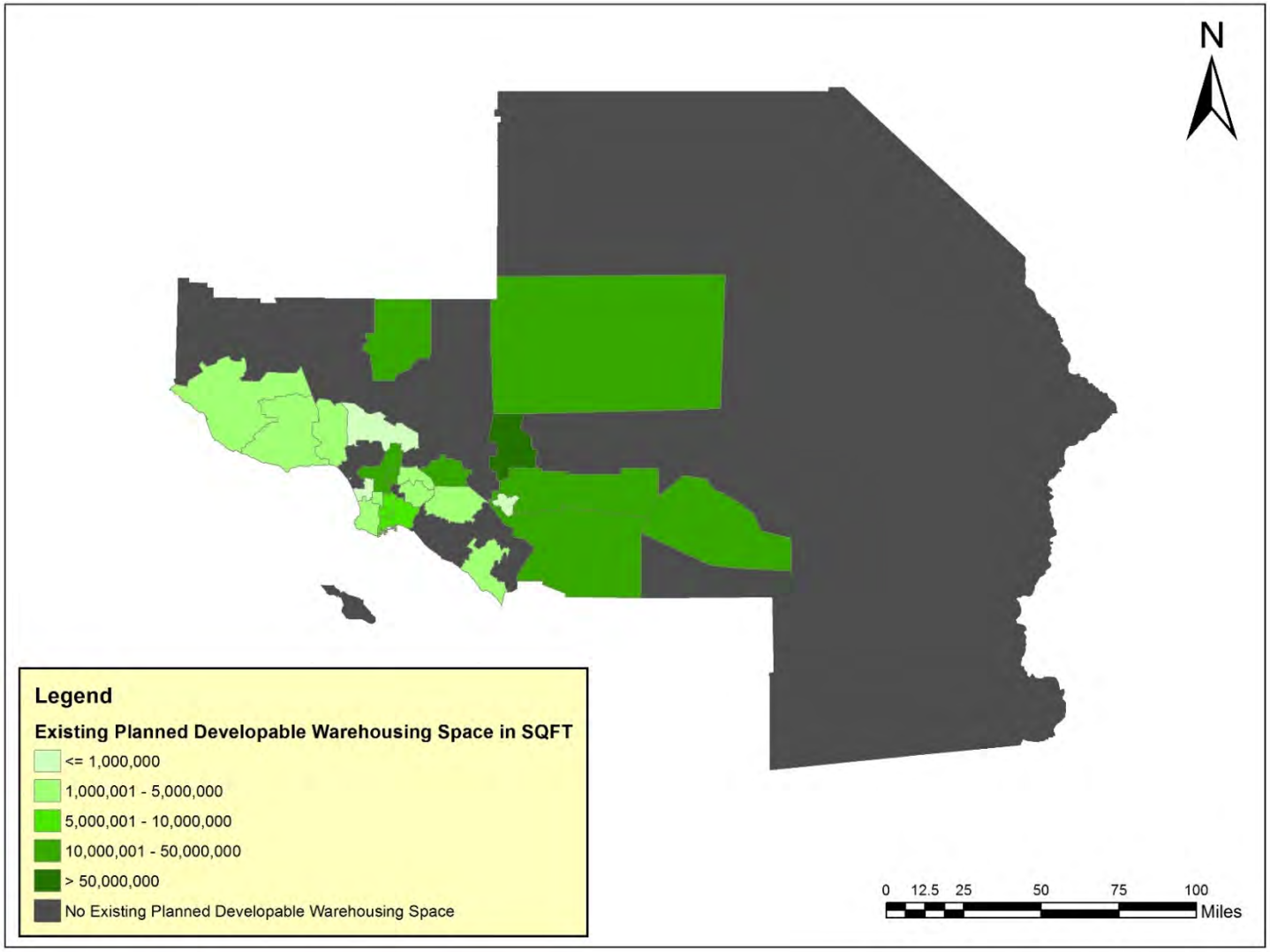
Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Note: Imperial County data is missing for the period from 2004 4Q to 2006 4Q.

2.3 Existing Developable Warehouse Building Area

Figure 2.17 shows the 2014 developable building areas for warehousing at submarket area level (see Table A.2 in the appendix of this data). The land available for warehousing development was identified through 2012 SCAG parcel-level land use data and 2012 SCAG General Plan land use data. The analysis indicates that, under rising costs of development and limited expansion opportunities for industrial uses in the urban core, the most likely development locations include: 1) Ontario Airport and North San Bernardino industrial areas in San Bernardino County; 2) Riverside, Coachella Valley, and South Riverside industrial areas in Riverside County; and 3) Antelope Valley, Lower San Gabriel Valley, Central Los Angeles and Vernon industrial areas in Los Angeles County.

Figure 2.17 Developable Warehouse Building Area in Square Feet by Submarket Area in the SCAG Region, 2014



Sources: 2012 SCAG Parcel-Level Existing Land Use Data; 2012 SCAG Parcel-Level General Land Use Plan Data; and CoStar Property® Data Product – November 2014 Data Download.

3.0 Classification of Industrial Warehouse Space and Historical Trends

In Section 2.0, the geographical distribution of the total warehouse space inventory was discussed. Classification of warehousing space is also important in terms of understanding user markets and demand for the space, such as port-related general-purpose warehouse, cross-dock facility, beneficial cargo owners (BCO)-operated distribution center, etc., for the following reasons:

- To better explain the trends in the location and inventory attributes of warehouse buildings. The requirements of user markets of warehousing space vary in terms of site dimensions, distances to market and inventory characteristics (cargo turnaround time or days in inventory, stage in the supply chain, etc.);
- To develop more accurate warehousing space demand forecasts. The growth factors for different user markets and their geographical allocation can be estimated differently; and
- To develop better policies and strategies to address traffic impacts. A policy or strategy could be developed to address issues associated with a specific user market.

Although there are other existing warehouse classification systems that are not strictly user-based, such as Commercial Real Estate Classification and U.S. Customs and Border Protection Warehouse Classification, as described in the appendix, these are less useful to meet the above purposes.

A classification system for warehousing space user markets should ideally be comprehensive and easy to understand. A practical classification system is one that also is well-supported by data.

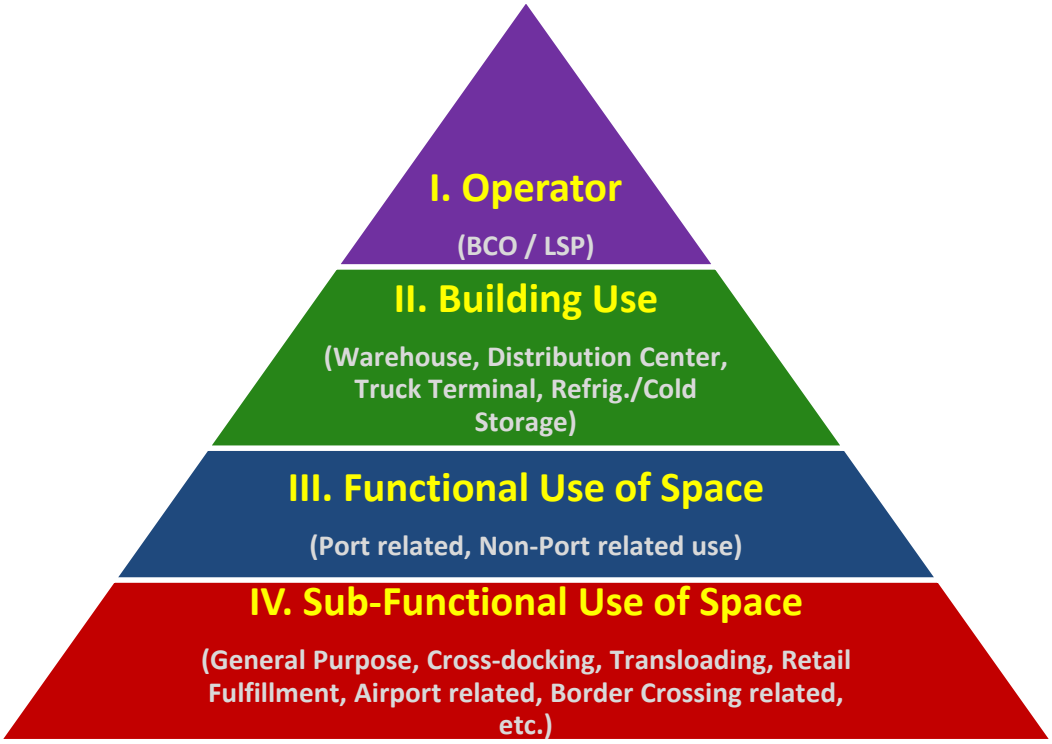
In this section, we present the following information:

1. Definition of an "ideal" warehousing space user market classification system;
2. Descriptions of "practical" user market classes and their distinct physical and operational characteristics;
3. Descriptions of support data, information, and assumptions used to develop existing inventory of "practical" user market classes; and
4. A discussion of trends in warehouse building locations and inventory attributes for CoStar-based user market classes for the SCAG region, counties and submarket areas in the SCAG region.

3.1 "Ideal" Warehousing Space User Market Classification System

Based on the Consultants' understanding, an ideal user markets classification system for warehousing space is one similar to that shown in Figure 3.1.

Figure 3.1 An "Ideal" Warehousing Space User Markets Classification System



3.1.1 Tier I – Operator

At the highest tier (Tier I), warehousing space can be classified by operator of the warehouse buildings, namely, BCOs (manufacturers/exporters or importers or distributors) or logistics service providers (LSP), including third-party logistics providers (3PL), motor carriers and ocean carriers). BCOs outsource logistics to LSPs mainly for the following reasons: 1) lower variable costs by making operations more efficient, 2) increase focus on core competencies (product manufacturing and retail marketing to customers), and 3) reduce risks of asset-based fixed costs under changing market conditions. Whether serving a single BCO or multiple BCOs, the inventory characteristics of the facilities managed by LSPs generally are dynamic and complex, as the LSPs do not have full information on the inventory management-related decision-making of the BCOs. Generally, LSPs serving multiple BCOs tend to have a lower variability in stock levels than LSPs serving a single BCO.

The 19th Annual 3PL Study survey of 2015,[21] which included 770 respondents, and 67 percent of them from North America, found that 67 percent of the BCOs outsourced warehousing, and 30 percent of the BCOs outsourced cross-docking. In terms of expenditure, 36 percent of the warehouse operations spend are managed by 3PLs. Although insourcing also is returning among the surveyed BCOs, the pace of increase in outsourcing is higher. The volume and trends of use of 3PLs in Southern California can be expected to be similar to that revealed in the survey for North America, while motor carriers and ocean carriers also play a support role in outsourcing in this region.

3.1.2 Tier II – Building Use

The next tier (Tier II) of the classification system is associated with the use type of the building as a whole. Similar to the CoStar Property® Data Product definitions for warehouse building secondary types, namely, "Warehouse," "Distribution," "Truck Terminal," and "Refrigeration/Cold Storage," the warehouse buildings can be categorized based on their predominant total space use. Although the physical characteristics of the buildings do matter, the differences between categories in this tier stem mainly from the broad operational and inventory characteristics. This also relates to the operator type (that is Tier I differences), single or shared (multitenant) operations, type of cargo handled (perishability/durability), and the days cargo is in the inventory.

3.1.3 Tier III – Functional Use of Space

The classification system lower than the secondary types (Tier III), particularly in the context of Southern California, can take the shape of identifying the business focus of the operator; namely, whether the stored cargo is port-related (handled/processed at San Pedro Bay Ports) or not port-related (not handled/processed at San Pedro Bay ports). The reason for dividing the user markets into these functional use categories are as follows:

- As described in Section 1.1, the San Pedro Bay ports make significant contribution to the goods movement in Southern California. The existing quantity of goods handled (in container lifts and TEUs) at the ports is well-understood. The ports also develop forecasts for future quantity of goods that are likely to be handled.
- The distance to the port is a primary factor that drives the use of warehousing space that is port-related. There is no such definite dependence for nonport-related use. The lower lease rates and availability of larger and/or modernized spaces in Inland Empire area of Southern California are secondary factors that also influence location decisions for port-related uses. This can result in a spread of port-related uses to areas outside Los Angeles County.

It is further noted that there is not necessarily a one-to-one relationship between the warehousing building and the functional use. It is common that the operator who is making warehouse building space available to port-related use also would make it available to nonport-related use; the reason is that the port- related use has peaks in demand (see Figure 3.2), which could potentially be leveled with some nonport-related uses. On the

[21] Capgemini Consulting, Penn State University, Penske Logistics and Korn/Ferry International, *The 19th Annual 3PL Study*, 2015. Available at: http://www.3plstudy.com/downloads/download-3rd-party-logistics-study/ (last accessed on April 20, 2015).

other hand, it may be common for the operator of warehouse building to have nonport-related uses.

To store/handle port related cargo or any international cargo (e.g., airport or border crossing trade) for that matter, the operator can apply for a customs bond to reduce clearance times and delay payment of duties for imports up to five years from the date of importation.

In concurrence with this study, SCAG also has commissioned HDR Decision Economics (HDR) to conduct the Goods Movement Border Crossing Study and Analysis – Phase II, which is aimed to assess mobility of commerce at California-Baja California border, and to develop freight planning strategies to address long-term trade and transportation infrastructure needs in the border region. The border crossing study provides data on the total truck movements at Mexicali and Tijuana border-crossings by direction of movement, and their origin-destination pattern. Using a time-series analysis of historical border-crossing freight flows and using a statistical model relating the freight flows to socioeconomic variables, HDR made forecasts for truck movements under three scenarios: 1) baseline, 2) low demand, and 3) high demand. Particular border-crossing infrastructure improvements were assumed under each of these forecast scenarios, which affect both the total and origin-destination pattern of truck movements. The border-crossing study data helps approximate border-crossing-related uses of warehouse space and isolate them from other port-related and nonport-related uses of warehouse space. Further discussion on the use of the border-crossing study data and assumptions needed to estimate border-crossing-related warehouse space estimation will be located in Task 4 technical memorandum.

3.1.4 Tier IV – Subfunctional Use of Space

An even lower hierarchical level for user markets can be specific port-related functional use, such as transload and cross-dock; or specific nonport-related use, such as international border crossing trade and domestic goods distribution. The knowledge of demand and/or physical, operational or inventory parameters for subfunctional uses enables the policy-maker to develop alternate forecasts or analyze alternate scenarios.

3.1.5 Applicability of CoStar Property® Data Product to Classification

Regarding applying the CoStar Property® Data Product for classification, there is direct information in the data product to classify warehousing space in the SCAG region based on Tier II user markets of the above described system. However, there is no direct information available in the data product to classify warehousing space into user markets in the first, the third, and the fourth tiers of the classification system. Instead, CoStar Property® Data Product can provide complete location information, many physical characteristics, and a few operational characteristics of warehouse buildings, which can only suggest suitability of a warehousing space for particular functional uses. For example, warehouse buildings that have a high ratio of number of loading docks to building floor area are suitable for high-throughput operations, such as cross-docking or transloading. Warehouses close to the ports are likely to have a higher percentage share of space-hours devoted to port-related uses than the warehouses located far from the ports. In the absence of any other data, the Tier II user markets identified by CoStar provide a reasonable approach to understanding

the diversity in the existing inventory, and to obtain better explanation of the historical trends of inventory attributes than in Section 2.2 of this technical memorandum.

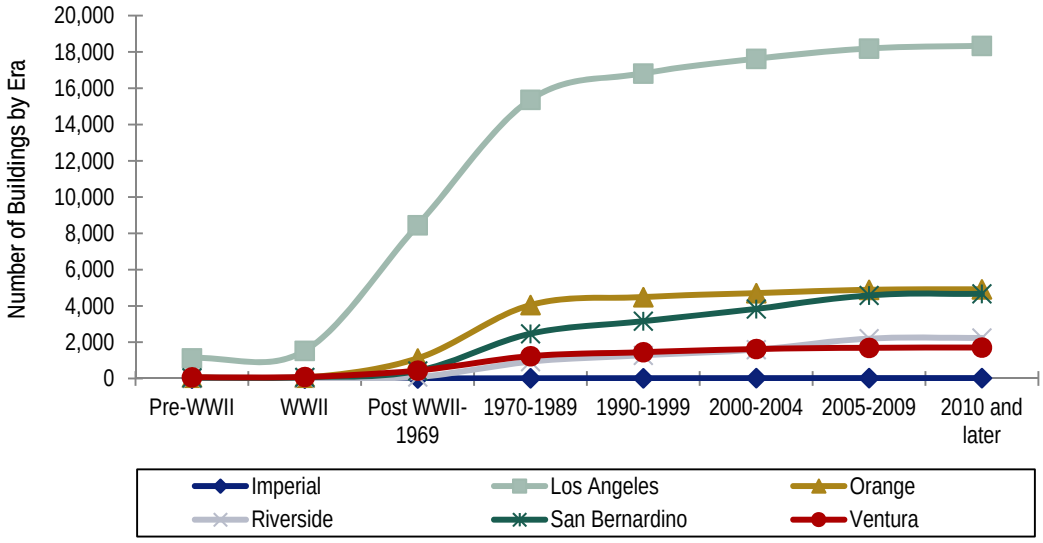
3.2 Diversity in Warehousing Space and Historical Trends in CoStar User Markets

The existing warehousing buildings inventory in the SCAG region is diverse. Because they were built over many years, they show a high variability in the physical characteristics (e.g., building shape, building area, ceiling height, allocation to storage, number and location of loading docks or doors, number of parking spots, etc.) and operational characteristics (e.g., stacking arrangement, use of information technology (IT) systems, use of automated equipment, etc.). Thus, their performance and traffic impacts can vary widely.

3.2.1 Existing Building Age Diversity

Figures 3.2 and 3.3 show that many of the early warehouses (that still exist) in the SCAG region were built in Los Angeles County, and the county remains the dominant location for warehousing. Orange County was the next to follow. San Bernardino and Ventura Counties then followed, and Riverside County was the last to grow. Imperial County remains a small contributor to the warehousing space in the SCAG region even today.

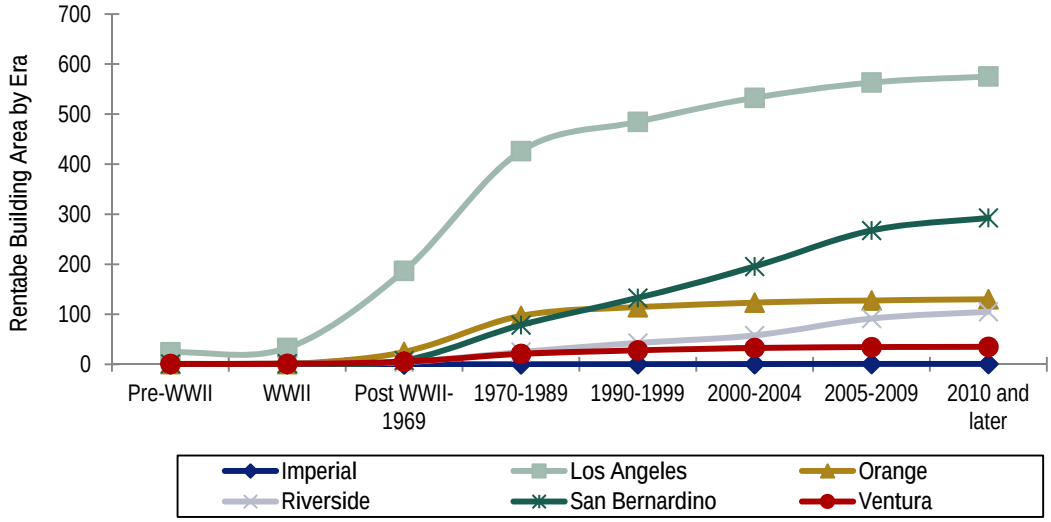
Figure 3.2 Existing Number of Industrial Warehouse Buildings by Era of Construction in the SCAG Region, 2014



Source: CoStar Property® Data Product – November 2014 Data Download.

Note: There are about 5 percent of total number of properties with unknown age of building in the data that are not shown in the graph above. The number of properties in Imperial County is nonzero; it is very small compared to the number of properties in the other counties.

Figure 3.3 Existing Rentable Building Area of Industrial Warehouse Buildings by Era of Construction in the SCAG Region, 2014
Millions of Square Feet



Source: CoStar Property® Data Product – November 2014 Data Download.

Note: There are about 3% of total rentable building area with unknown age of building in the data that are not shown in the graph above. The rentable building area in Imperial County is nonzero, it is very small compared to the rentable building area in the other counties.

The fastest growth in terms of total building area occurred in Los Angeles County between World War II and 1990; whereas, the growth in San Bernardino County started around 1970, continued rapidly till pre-2008-2009 recession, and has slowed down since then. Riverside County also started growing in the 1970s, and is still continuing to grow rapidly, even after the recession. Orange and Ventura Counties also grew till 1990, but after that, there has been little growth in terms of the total building area.

While some of the older buildings were abandoned or the space was converted to other land uses, others underwent renovation while keeping them safe and operational. Based on CoStar Property® Data Product, it was seen that both the average building area and the average ceiling height have been increasing with newer construction. Older buildings that cannot be expanded or allowed to increase in height are at a disadvantage compared to newer buildings.

3.2.2 CoStar User Market Inventory and Historical Trends for the SCAG Region and its Six Counties

This subsection shows the breakdown of CoStar user markets – namely, warehouse, distribution, refrigeration/cold storage, and truck terminal – buildings in the SCAG region, and also the historical trends in their inventory attributes in the SCAG region. The information was developed using the 2004-2014 (historical) quarterly data download. The appendix includes summaries. They are described below.

Number of Buildings, Rentable Building Area, and Vacancy by CoStar User Market

Table 3.1 shows a summary of the number of buildings, rentable building area, and vacancy by CoStar user market in the SCAG region. Both in terms of number of buildings and rentable building area, warehouse type buildings dominate and distantly followed by distribution type buildings.

The vacancy for the user markets varies between 3.6 percent (for refrigeration/cold storage) to 5.5 percent (distribution) between the CoStar user markets. Truck terminals have a low average floor area ratio. This is likely due to the need for a large amount of truck parking space. As expected, distribution type buildings have the largest average building size for large-scale storing/handling operations.

Figures 3.4 and 3.5 show the historical trends in the inventory attributes. There is growth in warehouse and distribution user markets over the past decade, while there is nearly no growth in the other two user markets. As seen in the appendix, the growth in the warehouse and distribution user markets over the past decade is mainly concentrated in Riverside and San Bernardino Counties.

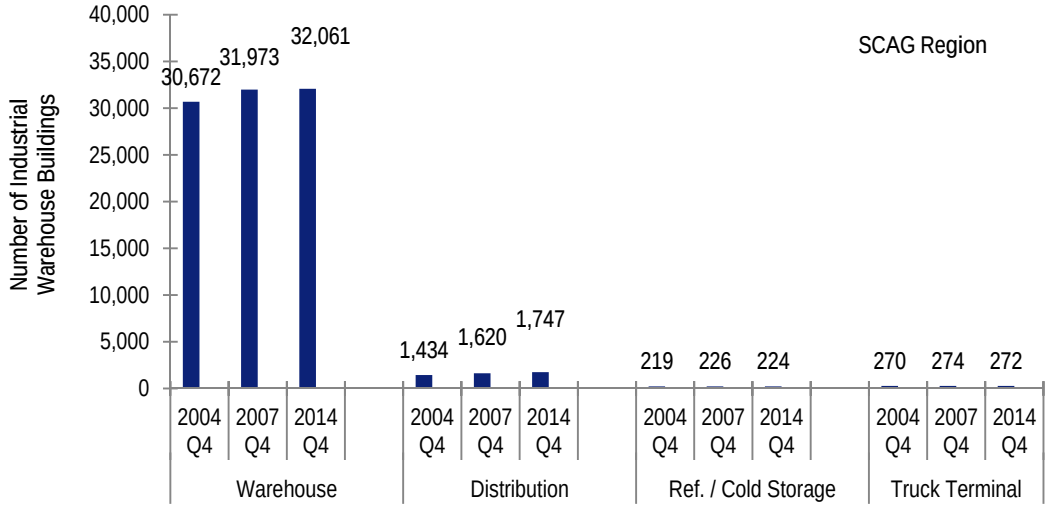
Table 3.1 Inventory Attributes for Existing Industrial Warehouse Buildings by CoStar User Market of the SCAG Region All Building Sizes and All Secondary Types, 2014

CoStar User Market	Number of Buildings	Percentage Share of Total Buildings	Rentable Building Area (Square Feet)	Percentage Share of Total Building Area	Total Occupied Space (Square Feet)	Percent Occupied	Percentage Share of Total Occupied Space	Total Vacant Space (Square Feet)	Percent Vacant	Percentage Share of Total Vacant Space	Average Floor Area Ratio[a]	Average Building Size (Square Feet)
Warehouse	32,061	93.46%	892,476,671	75.28%	859,174,087	96.27%	75.60%	33,302,584	3.73%	67.87%	0.43	27,837
Distribution	1,747	5.09%	269,094,150	22.70%	254,281,199	94.50%	22.38%	14,812,951	5.50%	30.19%	0.44	154,032
Refrigeration/ Cold Storage	224	0.65%	13,615,335	1.15%	13,132,074	96.45%	1.16%	483,261	3.55%	0.98%	0.47	60,783
Truck Terminal	272	0.79%	10,304,198	0.87%	9,835,892	95.46%	0.87%	468,306	4.54%	0.95%	0.22	37,883
All User Markets	34,304	100.00%	1,185,490,354	100.00%	1,136,423,252	95.86%	100.00%	49,067,102	4.14%	100.00%	0.43	34,558

[a] Average floor area ratio was estimated using CoStar Property Data Product – November 2014 Data Download.

Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download for all columns, except Average Floor Area Ratio.

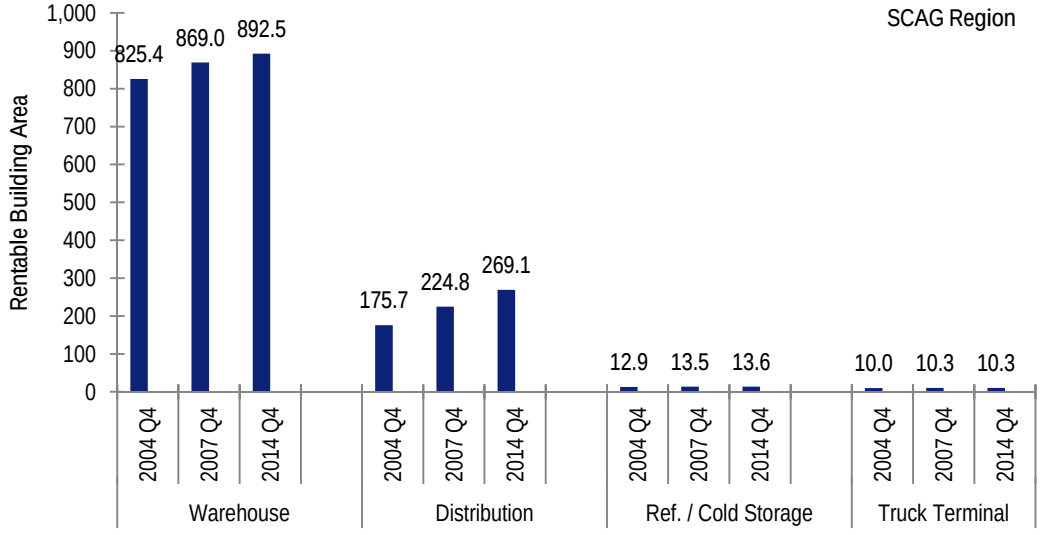
Figure 3.4 Historical Year-End Trends in CoStar User Market Warehousing Inventory – Number of Buildings – SCAG Region, 2004 to 2014



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Figure 3.5 Historical Year-End Trends in CoStar User Market Warehousing Inventory – Rentable Building Area – SCAG Region, 2004 to 2014

Millions of Square Feet



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Average Sizes of Buildings Delivered or Under Construction by CoStar User Market

Not only are the warehouse and distribution centers growing in number, but also the average building size for these two categories is increasing, as shown in Figure 3.6. In this figure, 2010 Quarter 1 and 2011 Quarter 4 showed the largest average size of buildings delivered. In 2010 Quarter 1, Dr. Pepper Snapple made a $150 million investment in the 2010 Quarter 1 on a new 850,000-square-foot facility over 57 acres in Victorville, California.[22] On the other hand, in Quarter 4 of 2011, multiple constructions contributed to the high average size of buildings delivered. These include Watson Land Company completed construction of a 616,542-square-foot property in Redlands, which was leased to IDS Group U.S. Limited. Similarly, Toyo Tires leased 766,000 square feet of space in Ontario; furniture retailer Living Spaces grabbed a 796,000-square-foot property in Rialto; and Harbor Freight Tools signed for a 779,000-square-foot area in Moreno Valley.

Average Lease Rates by CoStar User Market

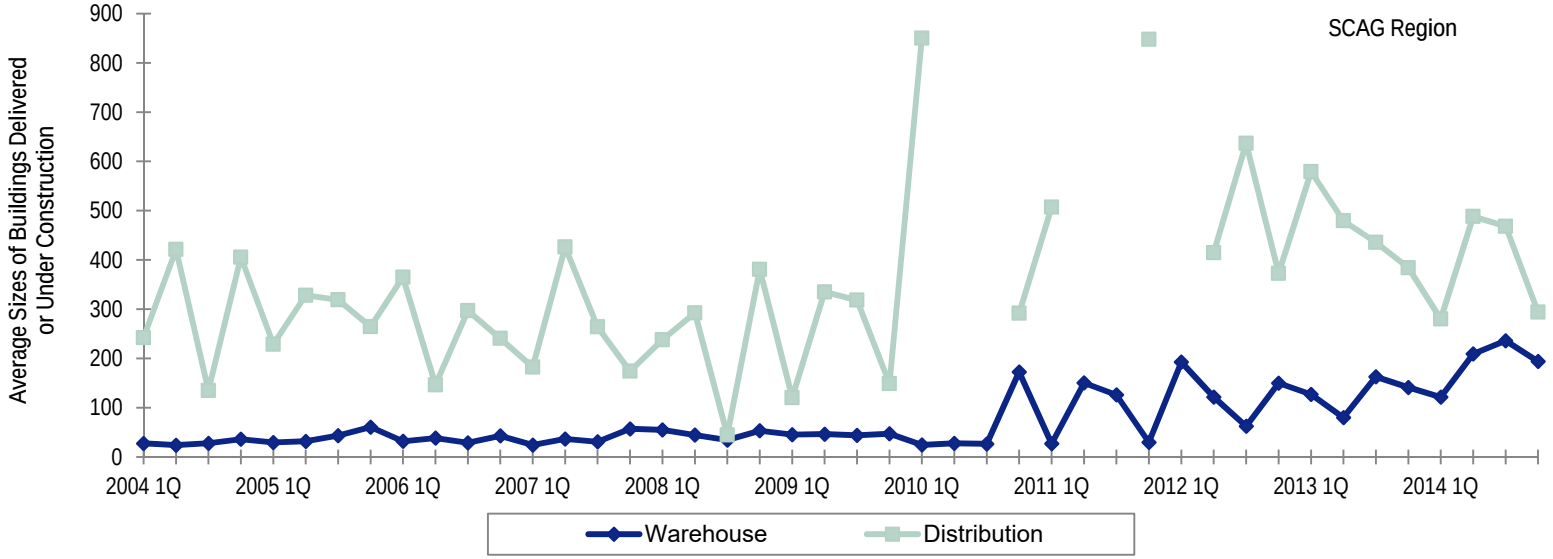
Lease rates for a "NNN"[23] type lease generally vary by location and facility type. Comparing the lease rates in Los Angeles County with Riverside and San Bernardino Counties, it is noted that refrigeration/cold storage user markets in Los Angeles County have higher lease rates than warehouse and distribution user markets. The lease rates for truck terminals are highly volatile. The lease existing rates of warehouses and distribution centers are between 30 t0 50 percent higher in Los Angeles County than in the other counties.

[22] Elizabeth Fuhrman, *Moving production closer to consumers*, article in Beverage Industry, May 2010.

[23] Based on http://www.investopedia.com/terms/n/netnetnet.asp (last accessed on April 20, 2015): "NNN" or Triple-net is a type of lease agreement that designates the lessee (the tenant) as being solely responsible for all of the costs relating to the asset being leased in addition to the rent fee applied under the lease. The structure of this type of lease requires the lessee to pay for net real estate taxes on the leased asset, net building insurance, and net common area maintenance.

Figure 3.6 Historical Trends in Warehouse and Distribution Type CoStar User Markets, Average Sizes in Square Feet for Delivered or Under Construction Buildings – SCAG Region, 2004 to 2014

Thousands of Square Feet



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

Figure 3.7 Historical Trends in CoStar User Market Types – Average Lease Rate for "NNN" Type Lease Los Angeles County versus Riverside County versus San Bernardino County, 2004 to 2014

Dollar per Square Foot

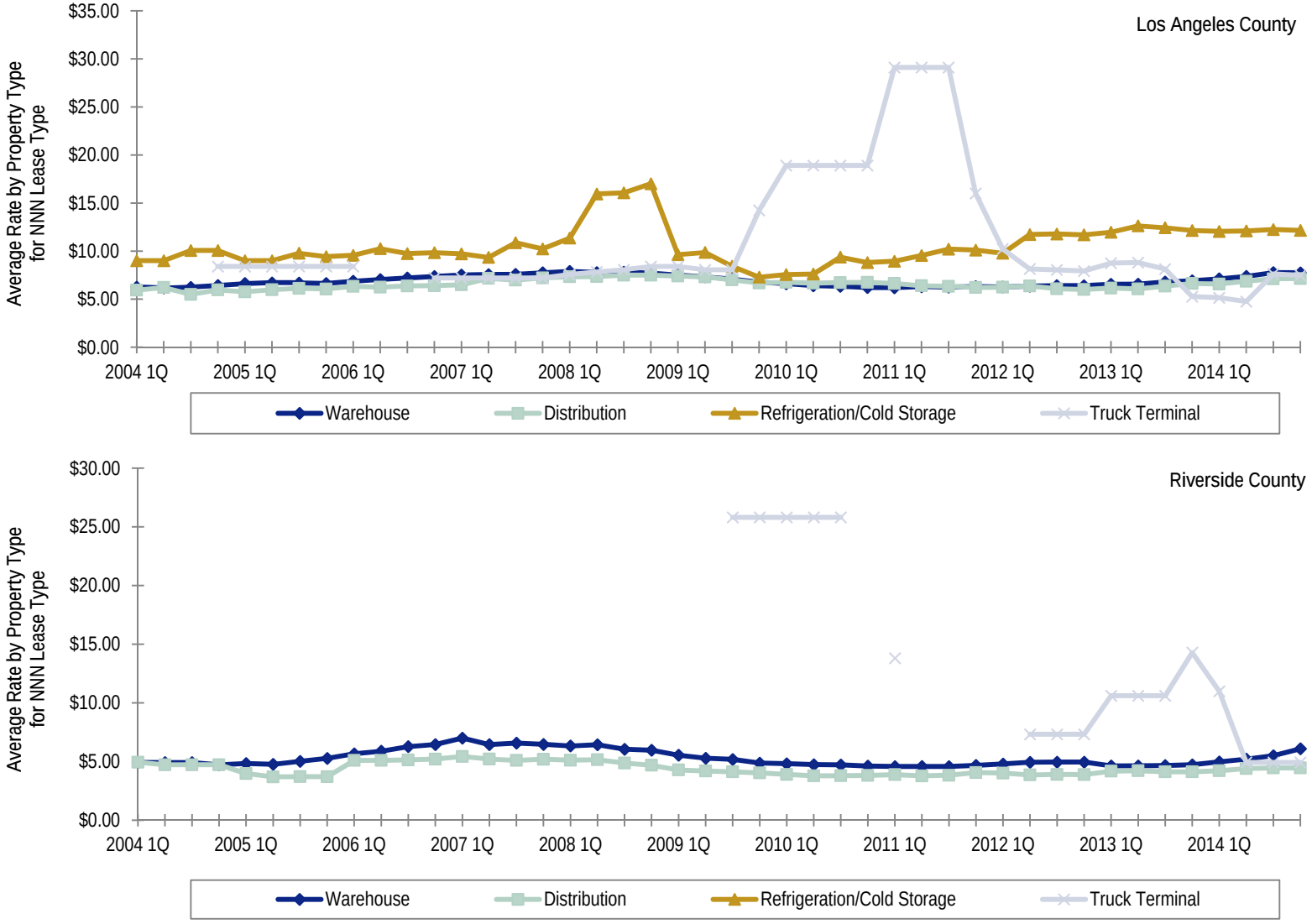
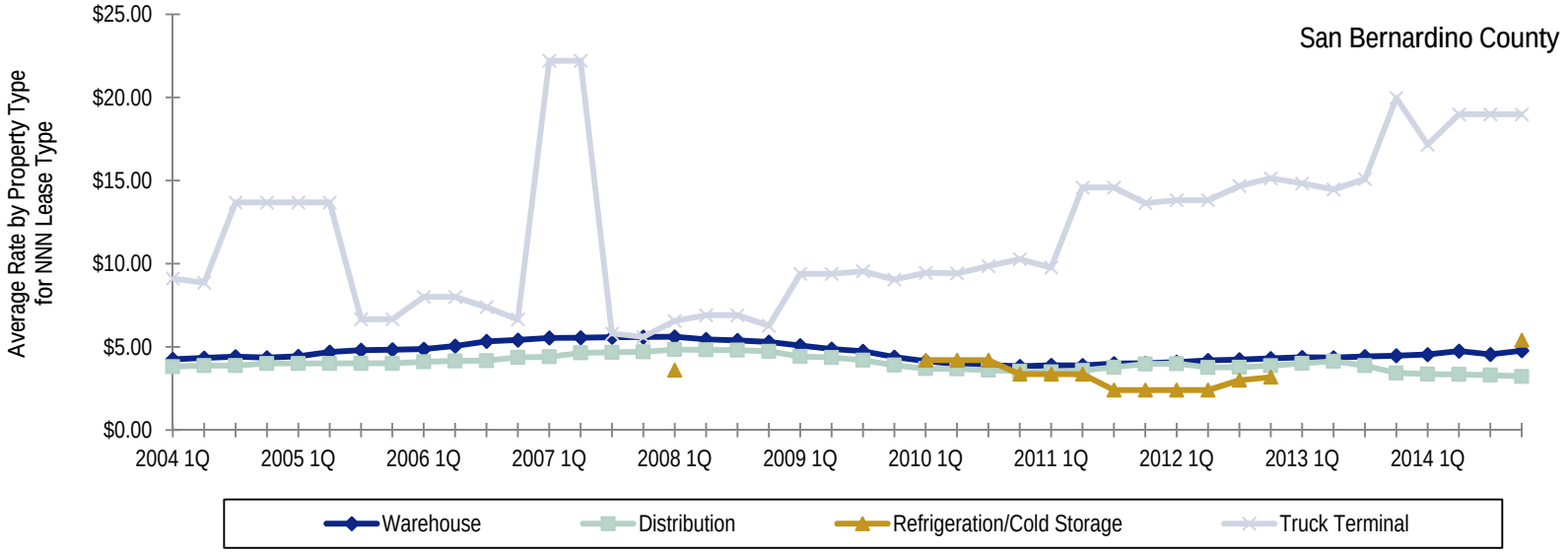


Figure 3.7 Historical Trends in CoStar User Market Types – Average Lease Rate for "NNN" Type Lease (continued)
Los Angeles County versus Riverside County versus San Bernardino County, 2004 to 2014
Dollar per Square Foot



Source: CoStar Property® Data Product – 2004-2014 (Historical) Quarterly Data Download.

3.3 "PRACTICAL" USER MARKETS AND OTHER DATA

As stated earlier, the CoStar Property® Data Product is useful for classifying buildings based on their general purpose, but is not as helpful in identifying the shares of functional uses of space to achieve the purpose of this study, such as port-related and nonport-related; and subfunctional uses of space, such as transloading, cross-docking, and retail fulfillment. Other types of data and assumptions are, therefore, needed to estimate such user market shares.

Some "practical" user markets are being considered for forecasting and scenario analysis. These represent simplifications of the "ideal" classification system based on available data and assumptions; however, they also work along with the data on CoStar user markets.

Table 3.2 provides a brief summary of the typical physical and operational attributes of the "practical" user markets. They are described in more detail in the paragraphs below.

3.3.1 General Purpose Warehouse

LSPs operate General Purpose Warehouses (GPW) that serve a number of clients, and offer a range of services, which can include storage; Value-Added Services (VAS) like barcode application and scanning, ticketing and labeling, carton repacking, etc.; and outbound order processing. GPWs are probably the oldest form of outsourced cargo-handling operation.

GPWs generally are less than 50,000 square feet; have medium-height ceilings; some carton racks; and a limited number of doors. Warehouse Management Systems (WMS) are common to manage inventory, but cargo-handling equipment usually is not sophisticated. Forklifts are the workhorses. Some buildings have gravity flow conveyors positioned at the tail of the containers, so cartons can be moved easily to the dock staging area, where workers place them on pallets. Some GPWs provide temperature-control capability for containers and trailers. The GPWs can be used to store both port-related[24] and nonport-related products. It generally is difficult to distinguish which among these two is a dominant cargo type. Port-related import products include internationally manufactured, or processed goods, such as textiles and apparel, footwear, electronics, and home and office supplies. On the other hand, port-related export and nonport-related domestic products include domestically manufactured; harvested or processed goods, such as chemicals, minerals, pharmaceuticals, and agricultural; and other food products.

[24] "Port-related" are goods that are either imported or exported through the San Pedro Bay ports located in the SCAG region.

Table 3.2 Typical Physical and Operational Characteristics by "Practical" User Market Class in the SCAG Region

Attribute	Description of Typical Attribute by "Practical" User Market Class							
	NPRGPW	PRGPW	TF Likely	CDF Likely	TTLTL	GDC	RFC Likely	RCSF
Building location[a]	Not Specific	Not Specific	Depends on Proximity to Ports	Depends on Proximity to Ports	Not Specific	Depends on Proximity to Market	Depends on Land Availability	Depends on Proximity to Market
Typical Building area	25,000 to 50,000 sq. ft.	25,000 to 50,000 sq. ft.	Same as Typical Warehouses (>25,000 sq. ft.)	Same as Typical Warehouses (>25,000 sq. ft.)	25,000 to 150,000 sq. ft.	50,000 sq. ft. to 500,000 sq. ft.	500,000 to 1,000,000 sq. ft.	Same as Typical Warehouses (>25,000 sq. ft.)
Building Width	Not Specific	Not Specific	Long and Narrow	Long and Narrow	Long and Narrow	Not Specific	Not Specific	Not Specific
Typical building ceiling height	> 22 ft.	> 22 ft.	< 25 ft.	< 25 ft.	< 25 ft.	> 28 ft.	> 40 ft.	> 22 ft.
Site coverage	50%	50%	50%	50%	30%	40%	40%	50%
Office space as percentage of building area	20%	20%	20%	20%	10%	5%	5%	20%
Use of IT systems and automated equipment	Low	Low	Moderate	Moderate	Moderate	High	High	Moderate
Number of loading docks/doors relative to the building area	1 per 15,000 sq. ft. of RBA	1 per 15,000 sq. ft. of RBA	1 per 15,000 sq. ft. of RBA	1 per 15,000 sq. ft. of RBA	1 per 3,000 sq. ft. of RBA	1 per 10,000 sq. ft. of RBA	1 per 10,000 sq. ft. of RBA	1 per 15,000 sq. ft. of RBA
Cargo turnaround time	Varies	Varies	Up to 1 week	1-2 days	Up to 1 week	Varies	Up to 1 week	Up to 1 week
Adjacent land use	Varies	Commercial/ Industrial	Varies	Commercial/ Industrial	Commercial/ Industrial	Commercial/ Industrial	Commercial/ Industrial	Varies

[a] All warehouse owners have a general preference for low-cost sites, and all warehouse operators have a general preference to be located at transportation nodes – near freeway interchanges, rail yards, etc. Direct rail access needs can vary depending on the commodity types handled. Key: NPRGPW – Nonport-related General Purpose Warehouse, PRGPW – Port-related General Purpose Warehouse, TF – Transload Facility, CDF – Cross-dock Facility, TTLTL – Truck Terminal for Less-than-Truckload Trucks, GDC – General Distribution Center, RFC – Retail Fulfillment Center, and RCS – Refrigeration/Cold Storage Facility.

Sources: CoStar Property® Data, 2012 Counties Assessors Data, 2012 SCAG Parcel-Level Existing Land Use Data, 2012 SCAG Parcel-Level General Land Use Plan Data, 2014 Gateway Cities Industrial Warehouse Data, I 710 EIR, Published journal and online articles, and Cambridge Systematics' Analysis.

Some LSPs that are known to handle port-related cargo include independent 3PLs (i.e., Cal Cartage, TTSI Inc., Performance Team, Ability Trimodal, etc.); international 3PLs that offer warehousing, ocean and airfreight forwarding, and customs brokerage (Expeditors, Panalpina, CEVA Logistics, Kuehne + Nagel, etc.); or the logistics subsidiaries of ocean carriers (APL Logistics, Damco, Yusen Logistics, etc.).

The GPWs that cater to predominantly port-related products are located near the San Pedro Bay ports, while other GPWs are located in population centers or in more rural areas that have good highways and rail connections. In particular, easy access to interstate highways is critical. Some of the GPWs have rail siding with rail switching performed by mainline or short line railroads.

Other Data and Assumptions Needed to Derive Supply and Demand

In calculating supply and demand for general purpose warehouse, the demand and supply for other user markets, such as cross-dock and transload markets, would be first estimated. The remaining balance will be treated as the supply and demand for general purpose warehouse. So, no other data is required.

3.3.2 Transload Facility

A transload facility is a special purpose port-related warehouse, mainly used for import products. Transloading is a supply chain strategy, in which an LSP transfers the contents of approximately three import marine containers into two domestic 53-foot rail or truck containers at a warehouse near a U.S. gateway port for onward movement to an inland destination like Chicago, Illinois, or Memphis, Tennessee. This does not imply that the contents are transferred on a one-to-one basis from the import containers to the domestic ones. Rather, cargo from the marine containers is dispersed in various ways across the outbound domestic containers, depending upon the BCO's specified allocation, and sometimes merged with import or domestic products that have been in storage. This process converts the shipment from an international intermodal move under control of the ocean carrier on a through bill of lading to final U.S. destination into a domestic rail or domestic truck move controlled by the BCO and arranged by the BCO's nominated motor carrier or intermodal marketing company (IMC), such as JB Hunt, Pacer, Hub Group, and Schneider National.

Importers utilize transloading to reduce the per-unit cost of inland transportation, because of the higher load factors of 53-foot domestic rail and truck containers relative to the typical size of ocean containers, which are of the sizes 20, 40, and 45-feet. But more importantly, the BCO can postpone the decision about allocation to a particular distribution center or store, which mitigates the risk of unsold merchandise, item stock-outs, and other inventory problems that drive up operating costs and reduce profits. If the BCO desires, the LSP can perform VAS, such as preparing products for the store shelf, or merging import products with domestic products into one outbound container (merge-in-transit).

Transload facilities typically are low-ceiling buildings that are narrow and rectangular in shape with numerous doors on each long side. One wall is designated for inbound containers, and the opposite side for outbound loads. This configuration facilitates the quick and efficient movement of the forklift from the inbound door, to the holding or storage area,

and then to the outbound door. Transload facilities also have large yards with numerous parking spaces to accommodate trucks and containers. The presence of both ocean containers and domestic containers/trailers generally is noticeable on aerial photos of such facilities.

However, the term "transloading" in the freight industry is not reserved just for imported containers. It also can refer to the process of transferring bulk or packaged (break-bulk) goods from domestic rail or truck equipment into ocean containers for export.

Other Data and Assumptions Needed to Derive Supply and Demand

As part of a 2012 I-710 Draft Environmental Impact Report (DEIR) study, a special investigation was conducted to identify facilities where transloading is likely taking place. Using aerial photographs in Google Maps, buildings were identified at which both ocean containers and domestic containers/trailers were present. The process for identifying "transload-likely" facilities was not perfect, and may be subject to error.

Data also will be needed for the port throughput and transload share of the throughput. Further assumptions are needed to convert the port throughput to storage demand. For this purpose, a model structure similar to the "Avison-Young" methodology that was used in the 2013 SCAG Comprehensive Regional Goods Movement Plan and Implementation Strategy (CRGMPIS) was adopted.

3.3.3 Cross-Dock Transload Facility

A cross-dock facility is a special type of transload facility. Cross-docking imports involves cargo being transferred from an inbound ocean container to outbound rail or truck containers within less than 24 hours. Cross-docking is particularly important for time-sensitive products. Since cross-docking takes place immediately after a container arrives from the ports, no temporary storage space is necessary. Similar to transloading, importers use cross-dock facilities to minimize inland transportation costs, and to postpone inventory allocation decisions. VAS are rarely performed at cross-dock facilities because of the short timeframe that the cargo remains in the facility. Certain larger importers perform cross-docking in their own distribution centers, but more often, this operation is outsourced to LSPs.

Cross-dock facilities have similar physical characteristics as transload facilities. Because of high throughput, cross-docks that are targeted to import market can be successful in locations with high-priced real estate that typically is very close to large gateway ports, such as Los Angeles and Long Beach. Cross-dock and transload facilities generate higher truck trips when compared to traditional warehouses primarily used for storage, so their impacts on the road network can be substantial.

Other Data and Assumptions Needed to Derive Supply and Demand

The study assumes that "transload likely" facilities that are located very near to the ports act as "cross-dock likely" facilities. So, no other data is required.

3.3.4 Truck Terminal for Less-Than-Truckload Trucks

Truck terminal is a special purpose warehouse used mainly for domestic products in small order quantities and operated by motor carriers. Motor carriers (JB Hunt, Schneider, CH Robinson, etc.) handling less-than-truckload (LTL) shipments need facilities, in which to transfer these shipments from one truck to another. These LTL Freight Stations (LTLFS) tend to be small, since cargo is not stored for long periods, with lots of doors and truck parking spots.

Due to small order quantities, LTLFS involve a great deal of sorting and segregation of inbound cargo to make one outbound LTL truck. Each truck contains orders destined to multiple customers within a fairly limited geographical area, as opposed to a full truckload filled with cargo destined to one customer. LTL trucks make multiple stops, akin to a milk run. LTLFS tend to be fairly small, narrow, and long with numerous doors to quickly and efficiently process cargo through the facility.

Other Data and Assumptions Needed

The user market will be identified directly using existing CoStar user market classes. So, no other data is required.

3.3.5 General Purpose Distribution Center

Distribution centers (DC) are types of warehouses operated by BCOs or outsourced to LSPs to manage storage and distribution of inventory. Unlike transload centers, which are often located near large gateway ports, DCs are positioned strategically across the country to maximize network effects to serve the maximum range of customers in a geographical area, while keeping on-time delivery at the lowest possible transport cost. Variable that influence logistics network design include: 1) all products handled at the DC; 2) customer locations; 3) demand for each product by customer location; 4) transportation rates; 5) warehousing costs; 6) shipment sizes by product; 7) order patterns by frequency, size, season, and content; 8) order processing costs; and 9) customer service goals. Products that are time sensitive or have narrower delivery windows tend to require more DCs positioned near population centers. The factors driving DC distribution center placement and quantity in a BCO's distribution network are discussed further in the Task 3 technical memorandum of this study.

DCs range from 50,000 square feet to 500,000 square feet, depending upon the cargo volume and unique supply chain characteristics of each BCO. Older DCs have low-to-moderate ceiling heights, while more modern ones often have over 30-foot high ceilings. Numerous doors are positioned strategically around the building. There are staging areas on the dock edges for inbound cargo and outbound cargo, and often racks to stack pallets of cartons or individual cartons. Larger BCOs willing to invest capital install WMS to manage and track inventory and orders; and some automated cargo-handling equipment like carton conveyors and sorters, and hand-held and or wearable barcode readers.

Other Data and Assumptions Needed to Derive Supply and Demand

In calculating supply and demand for general purpose DC, the demand and supply for other user markets, such as retail fulfillment centers (RFC), and transload facilities, would be first

estimated. The remaining balance will be treated as the supply and demand for general purpose DC. So, no other data is required.

3.3.6 Retail Fulfillment Center

Retail Fulfillment Centers (RFC) are special-purpose DCs that constitute a growing share of the total market for cargo-handling facilities. These facilities have become more common in the supply chains of large retailers during the past five years, particularly as brick and mortar retailers followed the examples set by major retailers; whereas, previously, fulfillment was accomplished in DCs. In addition, on-line grocers in California also are adopting the RFC model.[25]

While DCs primarily replenish store stock and ship to other retailers, RFCs specialize in processing individual consumer orders placed through catalogs and on the Internet, while also replenishing store inventory from the stock on hand and serving other retail customers. They typically are larger than 500,000 square feet. Since they must be able to handle the movement of not only cartons and pallets, but individual items, RFCs tend to utilize automated pick and pack technology and automated cargo-handling equipment like sortation systems that can accommodate individual items and master cartons. For this reason, they require high vertical clearance; that is, ceilings of at least 40 feet.[26]

Other terminology often is used to describe how orders placed on the Internet are processed in cargo-handling facilities. E-commerce warehouse is one such term, used in lieu of RFCs. The term omni-channel retail fulfillment often is used to describe what retailers do, particularly with respect to Internet orders. But for the purposes of this study, it refers to a retailer fulfilling orders from the most opportune location – a DC, RFC, store, or LSP warehouse. It is not synonymous with RFC activities alone. The concept of omni-channel retail fulfillment is discussed in greater detail in the Task 3 Memorandum of this Study.

Other Data and Assumptions Needed to Derive Supply and Demand

This user market is hard to identify. Retail fulfillment centers are expected to have high amounts of auto parking relative to the building area due to heavy employment. The tenant information for distribution center type facilities is used to identify retail fulfillment centers and other "mega" distribution centers.

[25] http://www.utsandiego.com/news/2014/jul/29/amazon-fresh-grocery-delivery-expands-san-diego/ (last accessed on September 16, 2014).

[26] http://www.joc.com/international-logistics/distribution-centers/wal-mart-latest-tap-indiana-e-commerce-hub_20140702.html (last accessed on September 16, 2014).

A. Appendix

A.1 Detailed Existing Warehousing Total Inventory for Submarket Areas in the SCAG Region

Table A.1 presents the attributes of the existing warehouse buildings total inventory for submarket areas in the Southern California Association of Governments (SCAG) region. This data is meant to support information presented in Figures 2.4 to 2.9 in Section 2.2 of this study.

Table A.2 shows the attributes of the existing developable building areas for submarket areas in the SCAG region. This data is meant to support information presented in Figures 2.18 to 2.20 in Section 2.2 of this technical memorandum.

Table A.1 Inventory Attributes for Existing Industrial Warehouse Buildings by Submarket Area, All Building Sizes and All Secondary Types, 2014

Sbmkt No.	Submarket Area Name	Number of Buildings	Rentable Building Area (Square Feet)	Total Occupied Space (Square Feet)	Percent Vacant	Average Floor Area Ratio[a]	Average Building Size (Square Feet)
1	Long Beach Area Ind	834	16,086,309	15,430,667	4.08%	0.45	19,288
2	Carson/Rancho Domingz Ind	852	59,553,683	58,062,727	2.50%	0.46	69,899
3	Lynwood/Paramount Ind	285	8,298,627	8,213,442	1.03%	0.43	29,118
4	Mid Counties-LA Ind	1,355	60,530,433	58,490,963	3.37%	0.43	44,672
5	Vernon Area Ind	1,202	48,162,174	47,417,750	1.55%	0.58	40,068
6	Commerce Area Ind	956	53,799,570	52,348,617	2.70%	0.50	56,276
7	Southwest SGV Ind	562	6,403,146	6,338,941	1.00%	0.44	11,393
8	Lower SGV Ind	1,167	65,173,618	63,736,782	2.20%	0.45	55,847
9	Eastern SGV Ind	779	19,172,198	18,836,082	1.75%	0.39	24,611
10	West San Bernardino County Ind	1,268	44,228,288	41,387,746	6.42%	0.43	34,880
11	Ontario Airport Area Ind	2,382	166,914,718	159,545,048	4.42%	0.43	70,073
12	East San Bernardino County Ind	934	72,855,412	69,334,528	4.83%	0.40	78,004
13	Gardena/110 Corridor Ind	892	21,408,901	20,658,636	3.50%	0.45	24,001
14	Central LA Ind	2,687	55,761,758	54,367,178	2.50%	0.73	20,752
15	El Segundo/Hawthorne Ind	414	10,228,922	9,894,988	3.26%	0.45	24,708
16	North Orange County Ind	2,284	65,824,165	63,802,765	3.07%	0.40	28,820
17	West Orange County Ind	831	21,436,825	20,847,407	2.75%	0.43	25,796
18	Riverside Ind	1,127	75,535,439	72,429,678	4.11%	0.40	67,023
19	North San Bernardino County Ind	398	12,376,711	11,208,165	9.44%	0.25	31,097
20	Westside Ind	444	8,546,019	8,335,011	2.47%	0.49	19,248
21	SFV East Ind	2,896	56,200,512	54,897,046	2.32%	0.46	19,406
22	East LA Cnty Outlying Ind	2	22,355	16,855	Not Reported	Not Reported	Not Reported
23	Ventura County Ind	1,427	26,657,714	25,676,271	3.68%	0.35	18,681
24	Coachella Valley Ind	592	7,404,656	6,742,425	8.94%	0.29	12,508

Sbmkt No.	Submarket Area Name	Number of Buildings	Rentable Building Area (Square Feet)	Total Occupied Space (Square Feet)	Percent Vacant	Average Floor Area Ratio[a]	Average Building Size (Square Feet)
25	Corona Ind	579	16,146,016	15,899,043	1.53%	0.41	27,886
26	Northwest SGV Ind	637	11,624,962	11,366,601	2.22%	0.39	18,250
27	Orange County Outlying Ind	1	239,983	239,983	Not Reported	Not Reported	Not Reported
28	John Wayne Airport Area Ind	1,555	36,886,366	35,993,849	2.42%	0.37	23,721
29	Santa Clarita Valley Ind	304	11,839,005	11,537,336	2.55%	0.36	38,944
30	SFV West Ind	860	20,764,069	20,515,904	1.20%	0.45	24,144
31	South Orange County Ind	576	14,609,761	14,322,739	1.96%	0.33	25,364
32	South Riverside County Ind	735	23,222,692	22,015,245	5.20%	0.37	31,595
33	Upper SGV Ind	700	16,239,979	15,988,423	1.55%	0.41	23,200
34	Torrance/Beach Cities Ind	526	22,873,030	22,401,661	2.06%	0.44	43,485
35	San Bernardino County Outlying Ind	18	116,638	106,036	9.09%	0.20	6,480
36	Riverside County Outlying Ind	8	112,039	112,039	Not Reported	Not Reported	Not Reported
37	Conejo Valley Ind	419	9,675,564	9,208,705	4.83%	0.33	23,092
38	NE LA Cnty Outlying Ind	0	0	0	Not Reported	Not Reported	Not Reported
39	Antelope Valley Ind	164	5,275,997	5,165,834	2.09%	0.30	32,171
40	NW LA Cnty Outlying Ind	0	0	0	Not Reported	Not Reported	Not Reported
41	Ventura Cnty Outlying Ind	0	0	0	Not Reported	Not Reported	Not Reported
42	Imperial County Ind	85	1,965,324	1,539,683	21.66%	0.26	23,121
43	Catalina Island Ind	1	2,160	2,160	Not Reported	Not Reported	Not Reported
Total		**33,738**	**1,174,175,73**	**1,134,434,959**	**3.38%**	**0.43**	**34,803**

[a] Average floor area ratio was estimated with data only on 30,600+ properties with a reasonable land area data (properties with no land area data or estimated floor area ratios lower than 0.1 were not included in the average floor area calculation). Values "Not Reported" when number of buildings is less than 10.

Source: CoStar Property® Data Product – November 2014 Data Download.

Table A.2 Estimated Developable Warehouse Building Area in Square Feet by Submarket Area in the SCAG Region, 2014

Sbmkt No.	Submarket Area Name	Estimate 2014 Developable Building Area in Square Feet	Percent of Total Estimate Developable Building Area in Square Feet
1	Long Beach Area Ind	6,975,211	2.1%
2	Carson/Rancho Domingz Ind	8,571,730	2.5%
3	Lynwood/Paramount Ind	0	0.0%
4	Mid Counties-LA Ind	2,459,679	0.7%
5	Vernon Area Ind	11,531,945	3.4%
6	Commerce Area Ind	1,681,064	0.5%
7	Southwest SGV Ind	0	0.0%
8	Lower SGV Ind	24,589,753	7.3%
9	Eastern SGV Ind	0	0.0%
10	West San Bernardino County Ind	0	0.0%
11	Ontario Airport Area Ind	93,197,434	27.5%
12	East San Bernardino County Ind	0	0.0%
13	Gardena/110 Corridor Ind	3,379,884	1.0%
14	Central LA Ind	13,294,021	3.9%
15	El Segundo/Hawthorne Ind	586,602	0.2%
16	North Orange County Ind	4,039,665	1.2%
17	West Orange County Ind	0	0.0%
18	Riverside Ind	47,288,520	14.0%
19	North San Bernardino County Ind	26,004,013	7.7%
20	Westside Ind	0	0.0%
21	SFV East Ind	655,140	0.2%
22	East LA Cnty Outlying Ind	0	0.0%
23	Ventura County Ind	4,600,372	1.4%
24	Coachella Valley Ind	24,355,837	7.2%
25	Corona Ind	746,053	0.2%
26	Northwest SGV Ind	0	0.0%
27	Orange County Outlying Ind	0	0.0%
28	John Wayne Airport Area Ind	0	0.0%
29	Santa Clarita Valley Ind	0	0.0%
30	SFV West Ind	3,925,436	1.2%

Sbmkt No.	Submarket Area Name	Estimate 2014 Developable Building Area in Square Feet	Percent of Total Estimate Developable Building Area in Square Feet
31	South Orange County Ind	3,653,387	1.1%
32	South Riverside County Ind	11,184,414	3.3%
33	Upper SGV Ind	0	0.0%
34	Torrance/Beach Cities Ind	1,487,901	0.4%
35	San Bernardino County Outlying Ind	0	0.0%
36	Riverside County Outlying Ind	0	0.0%
37	Conejo Valley Ind	2,180,042	0.6%
38	NE LA Cnty Outlying Ind	0	0.0%
39	Antelope Valley Ind	41,983,736	12.4%
40	NW LA Cnty Outlying Ind	0	0.0%
41	Ventura Cnty Outlying Ind	0	0.0%
42	Imperial County Ind	0	0.0%
43	Catalina Island Ind	0	0.0%
Total		338,371,838	100.0%

Source: 2012 SCAG Parcel-Level Existing Land Use Data; 2012 SCAG Parcel-Level General Land Use Plan Data; CoStar Property® Data Product – November 2014 Data Download.

A.2 Detailed Historical Trends in Warehousing Total Inventory for Counties in the SCAG Region

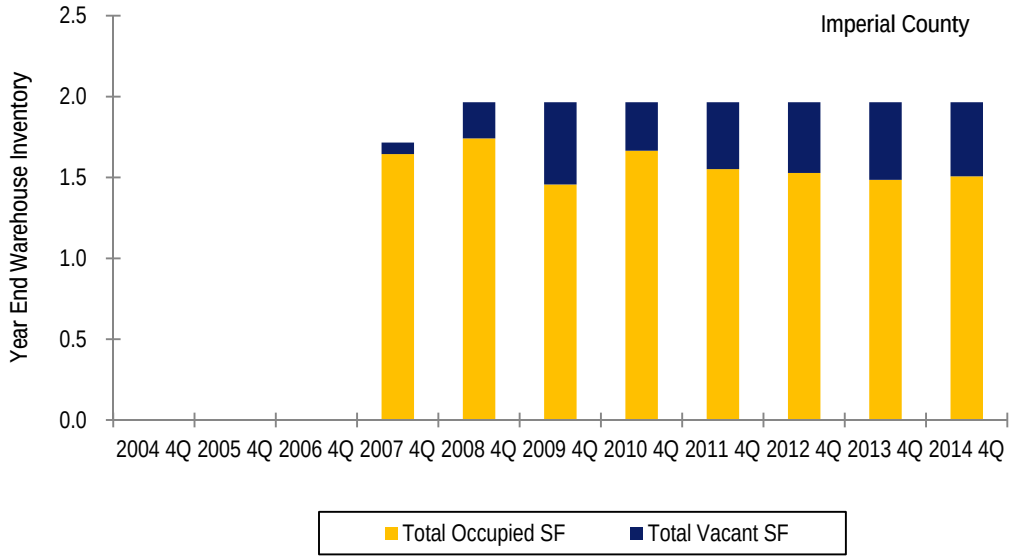
Figures A.1 to A.3 provide the trends in attributes of the existing warehouse buildings total inventory, using the CoStar's 2004 to 2014 (historical) quarterly data download, by county in the SCAG region. This data is meant to support information presented in Figures 2.10 to 2.16 in Section 2.2 of this technical memorandum.

Generally speaking, changes in net absorption, rate of new deliveries, and rate of renewal of leases represent the outputs that depend on a variety of inputs, such as the state of U.S. economy; age and size of warehouse inventory; suitability of existing property to emerging business models (build to suit distribution centers, fulfillment centers, etc.); land use plan and policy constraints to new construction/expansion/improvement; relative rents; proximity to market; levels of roadway congestion; and, in some cases, access to rail service. These inputs vary from county to county in the SCAG region; hence, there are differences in the observed outputs.

In particular, Imperial, Riverside, and San Bernardino Counties share common traits of larger land parcels, newer buildings, lower rents, lower competition from other land uses, and lesser congestion on roadways than the average for the SCAG region, which results in mostly positive changes in net absorption, high rates of new deliveries and lease renewals. On the other hand, Los Angeles, Orange, and Ventura Counties have the opposite traits.

In spite of the higher rent, proximity to San Pedro Bay ports makes Los Angeles County still the first choice for a majority of port-related businesses. Despite the low rent, due to large distances to markets, except to industries located south of the U.S.-Mexico border crossing, Imperial County may have opportunities that are different from that of Riverside and San Bernardino Counties.

Figure A.1 Historical Year-End Trends in Total Warehousing Inventory – Rentable Building Area, Occupied Space, and Vacant Space – County in the SCAG Region, 2004 to 2014
Millions of Square Feet



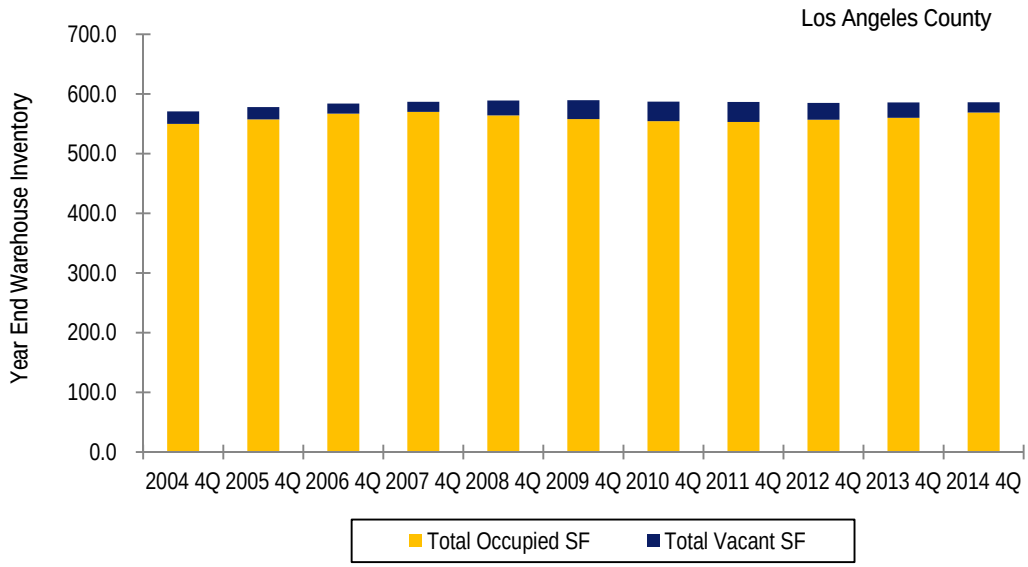


Figure A.1 Historical Year-End Trends in Total Warehousing Inventory – Rentable Building Area, Occupied Space, and Vacant Space – County in the SCAG Region, 2004 to 2014 (continued)
Millions of Square Feet

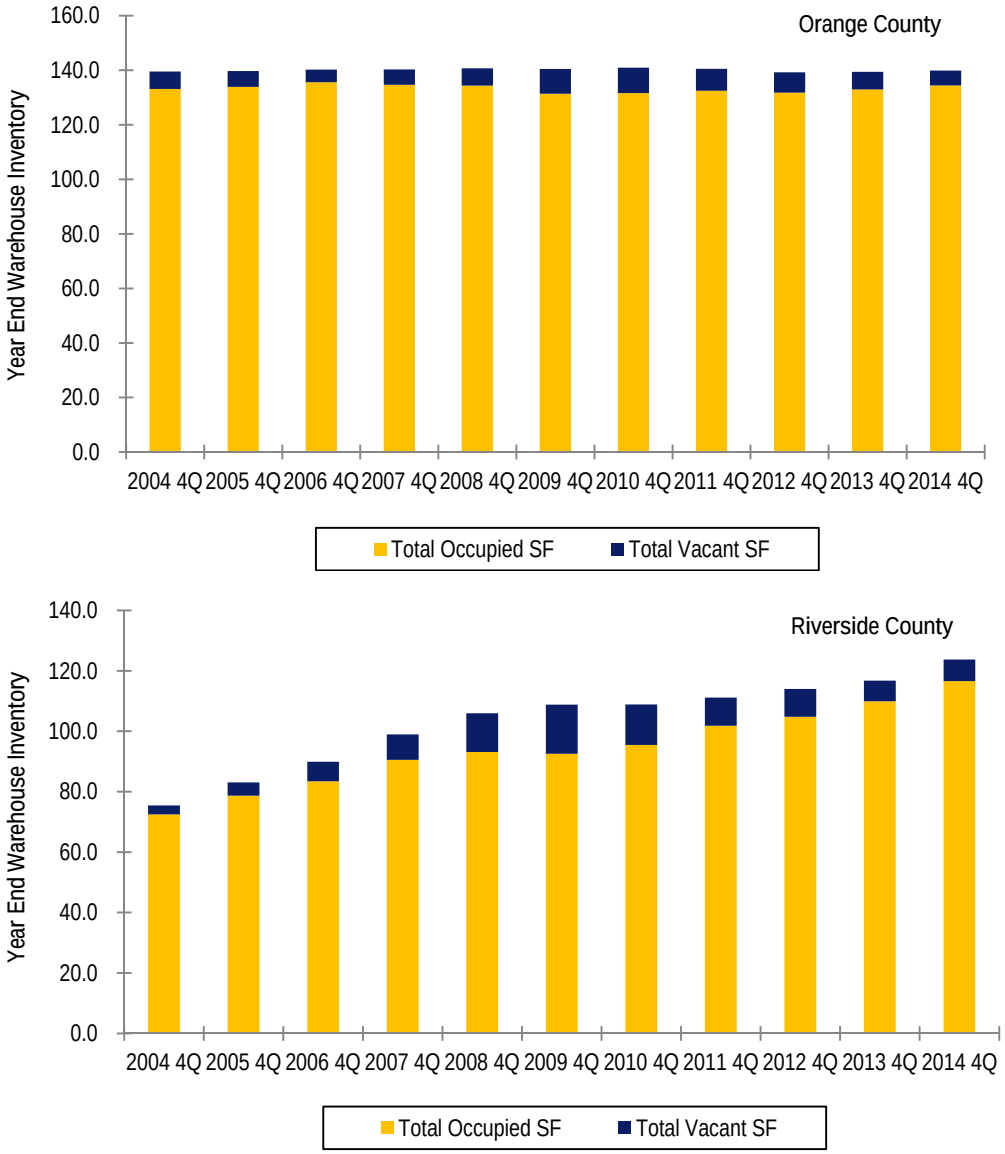


Figure A.1 Historical Year-End Trends in Total Warehousing Inventory – Rentable Building Area, Occupied Space and Vacant Space – County in the SCAG Region, 2004 to 2014 (continued)
Millions of Square Feet

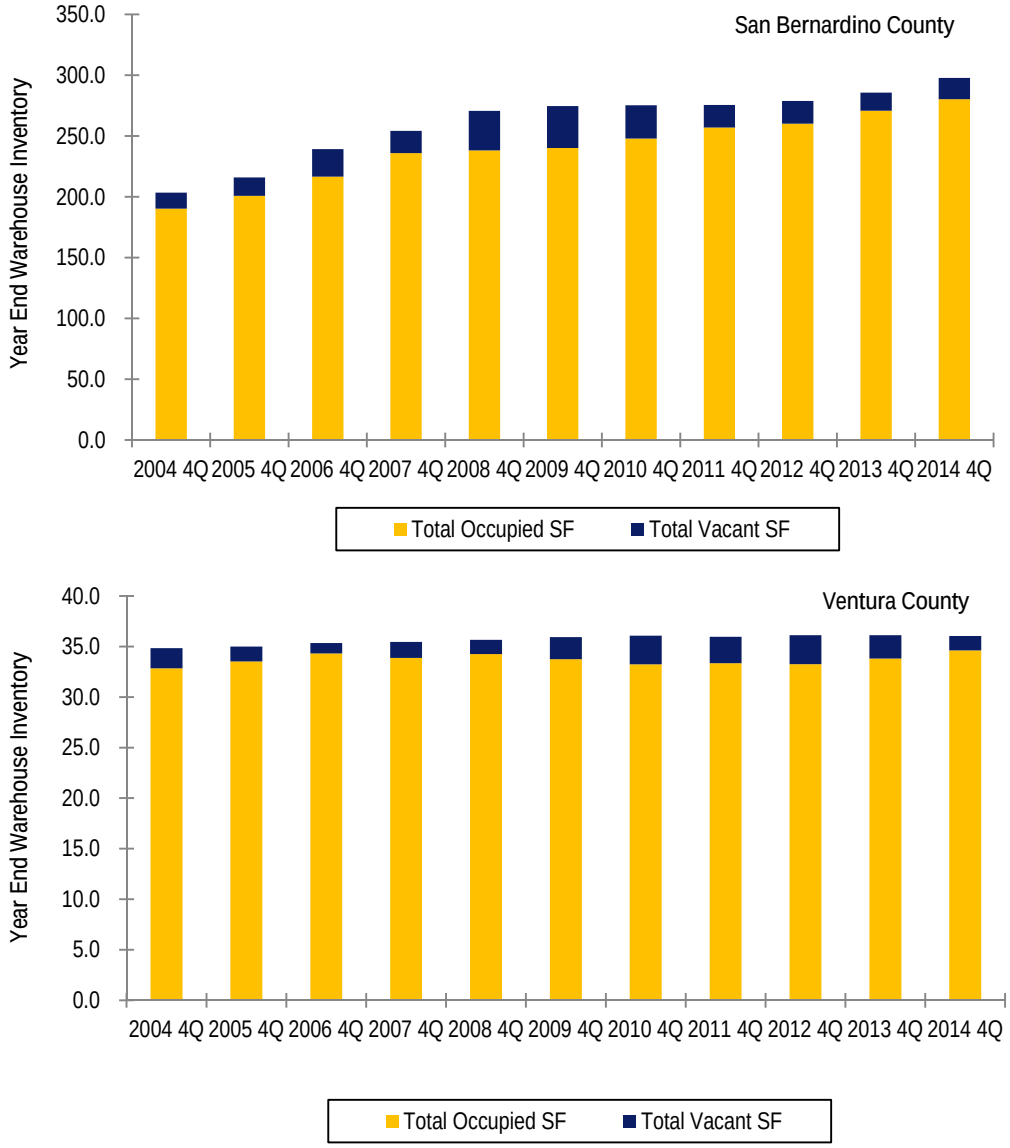
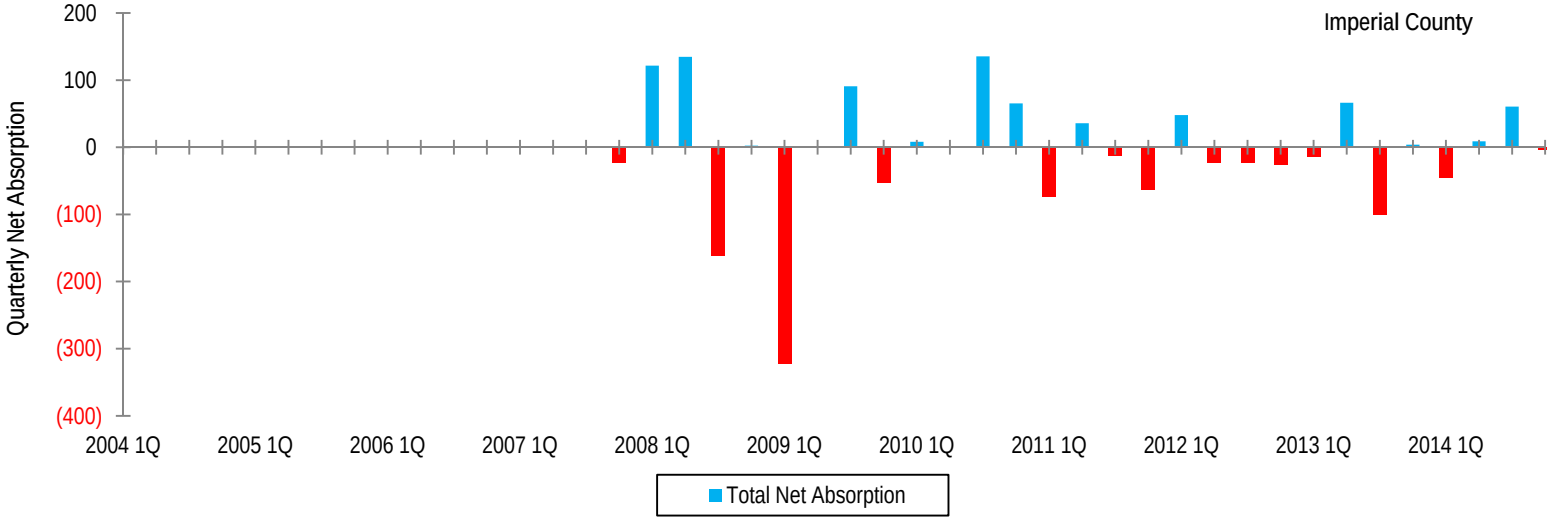


Figure A.2 Historical Quarterly Trends in Net Absorption of Warehousing Space by County in the SCAG Region 2004 to 2014

Thousands of Square Feet



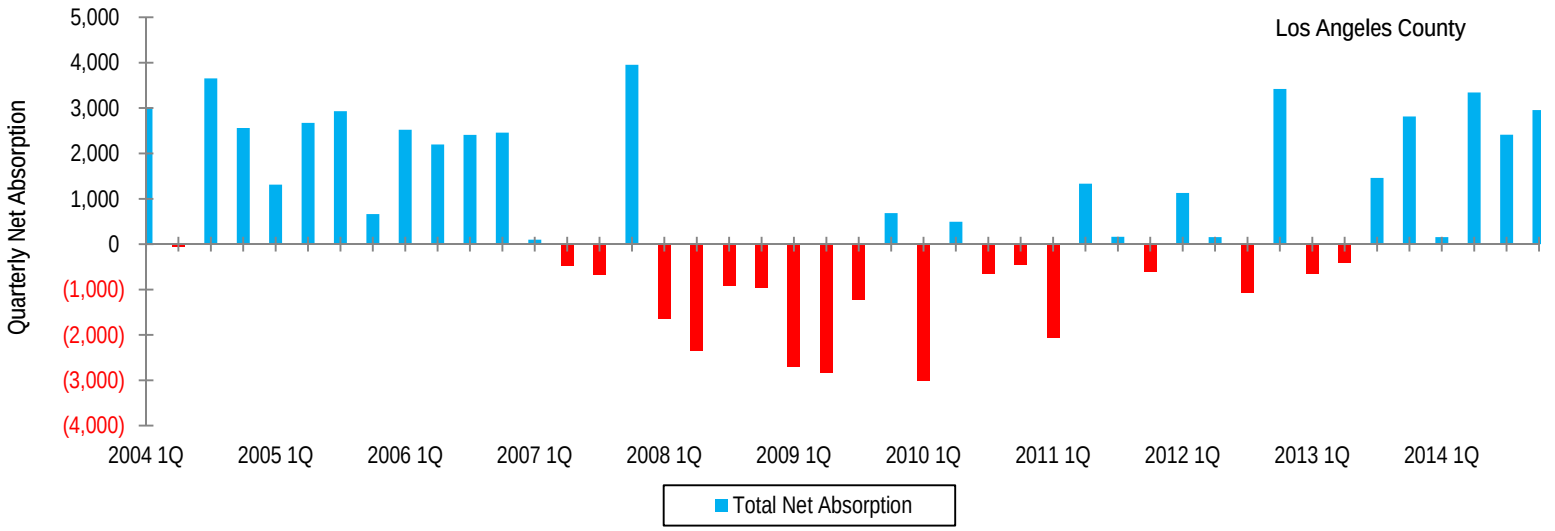
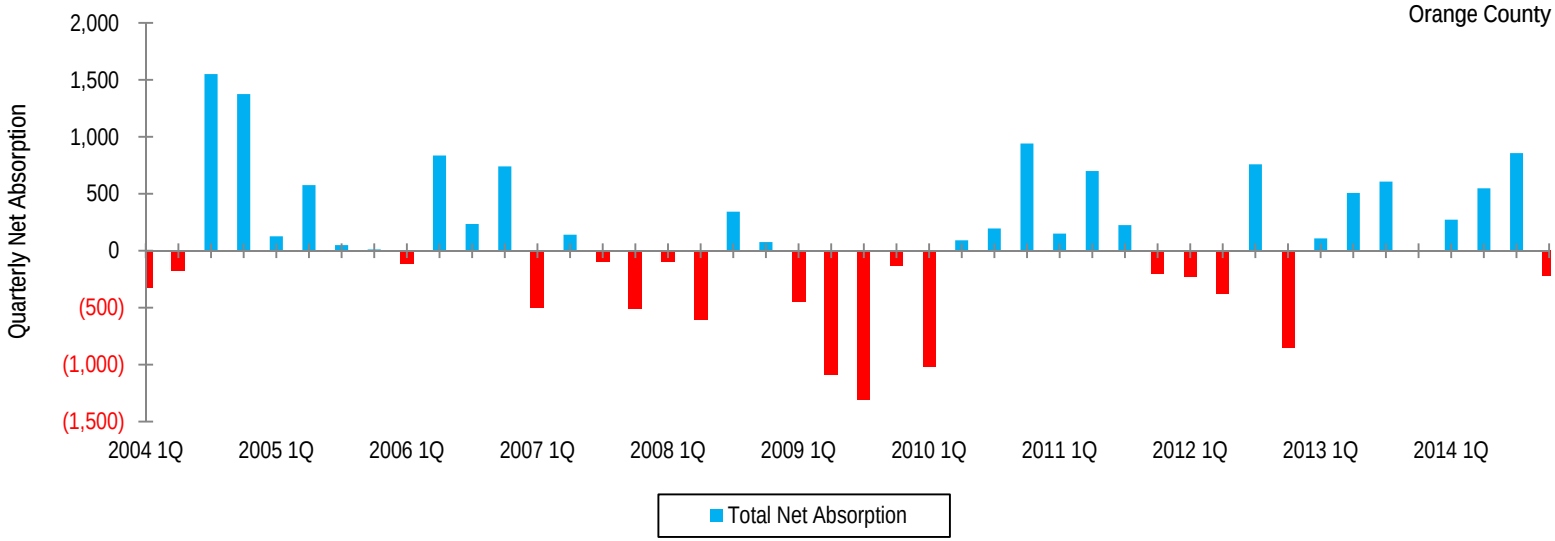


Figure A.2 Historical Quarterly Trends in Net Absorption of Warehousing Space by County in the SCAG Region 2004 to 2014 (continued)
Thousands of Square Feet



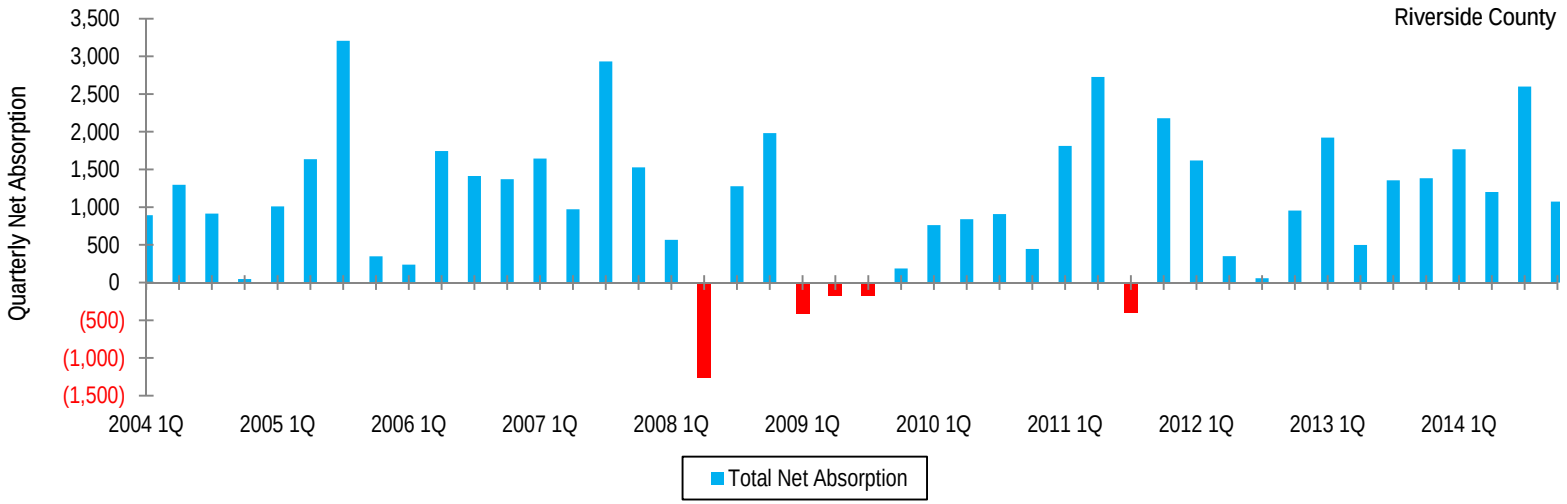
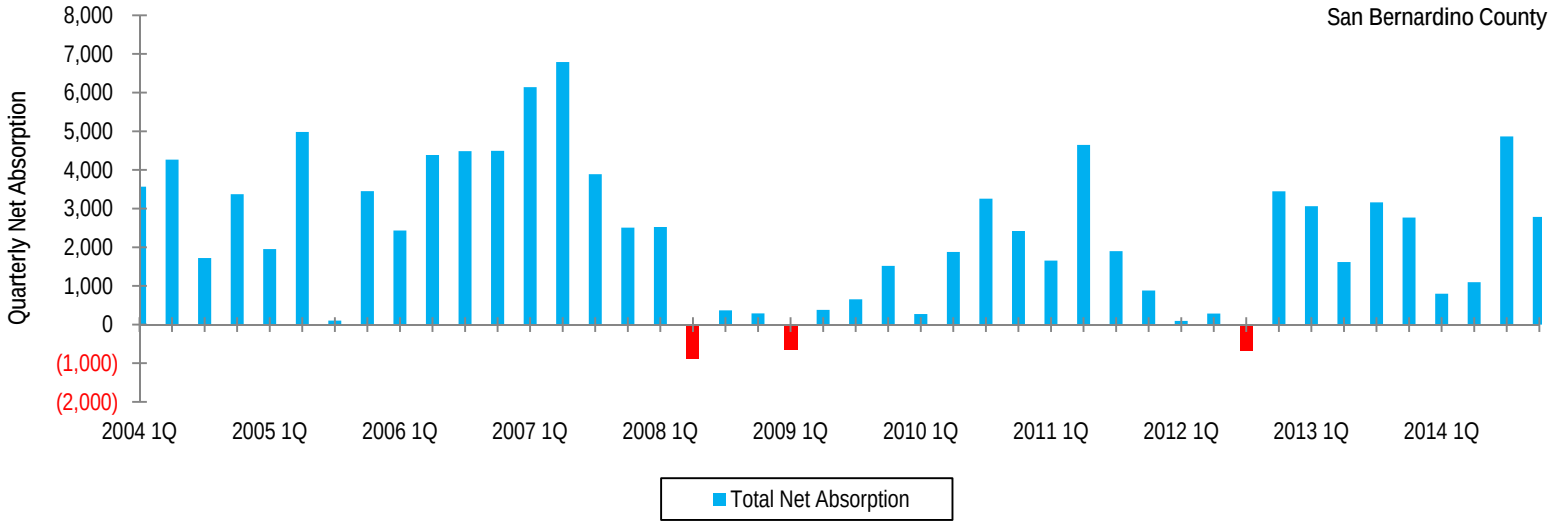


Figure A.2 Historical Quarterly Trends in Net Absorption of Warehousing Space by County in the SCAG Region 2004 to 2014 (continued)
Thousands of Square Feet



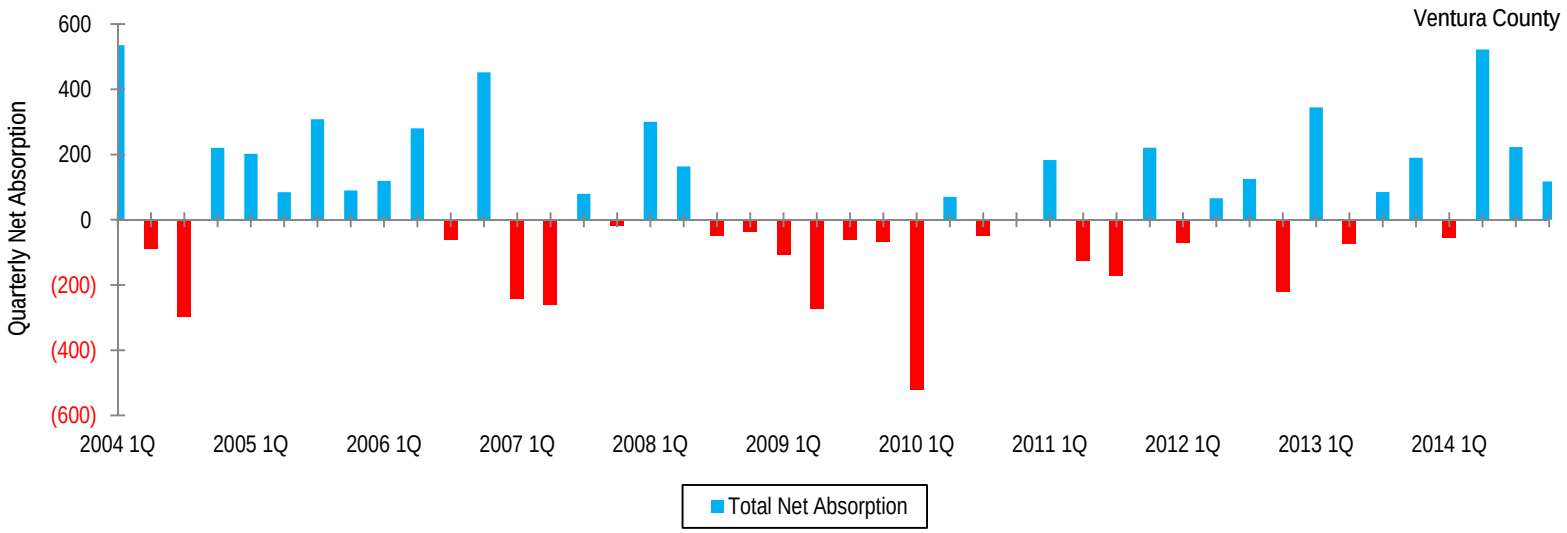


Figure A.3 Historical Quarterly Trends in Leased and Delivered (or Constructed) Warehousing Space by County in the SCAG Region, 2004 to 2014
Thousands of Square Feet

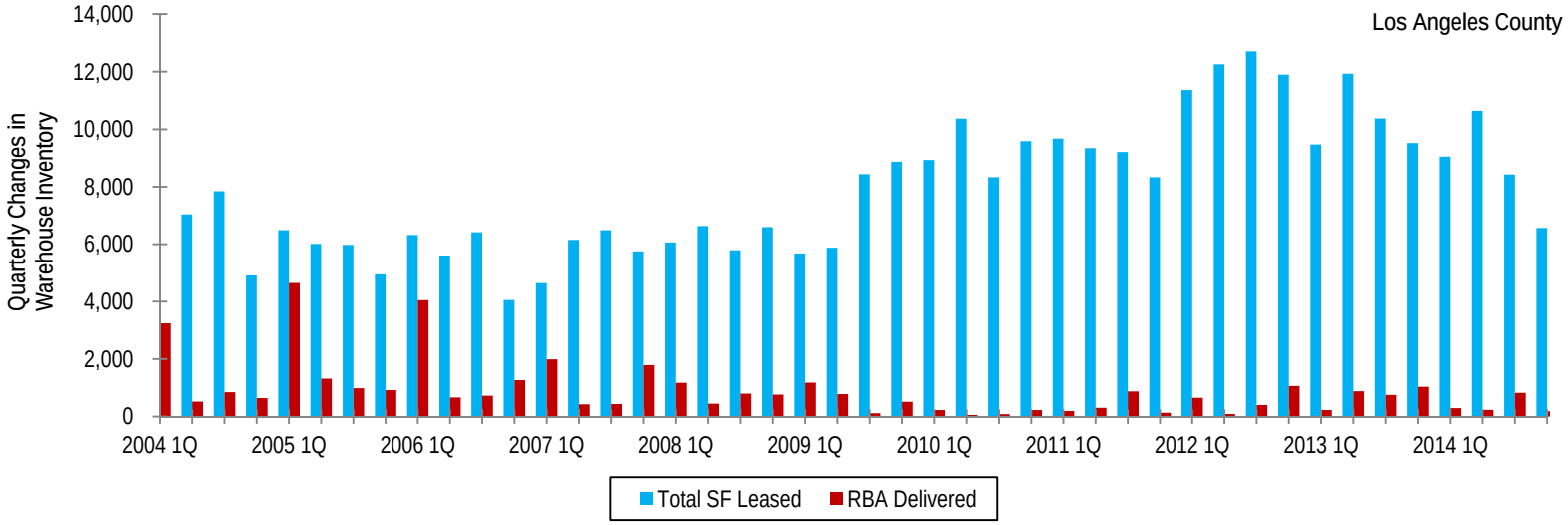
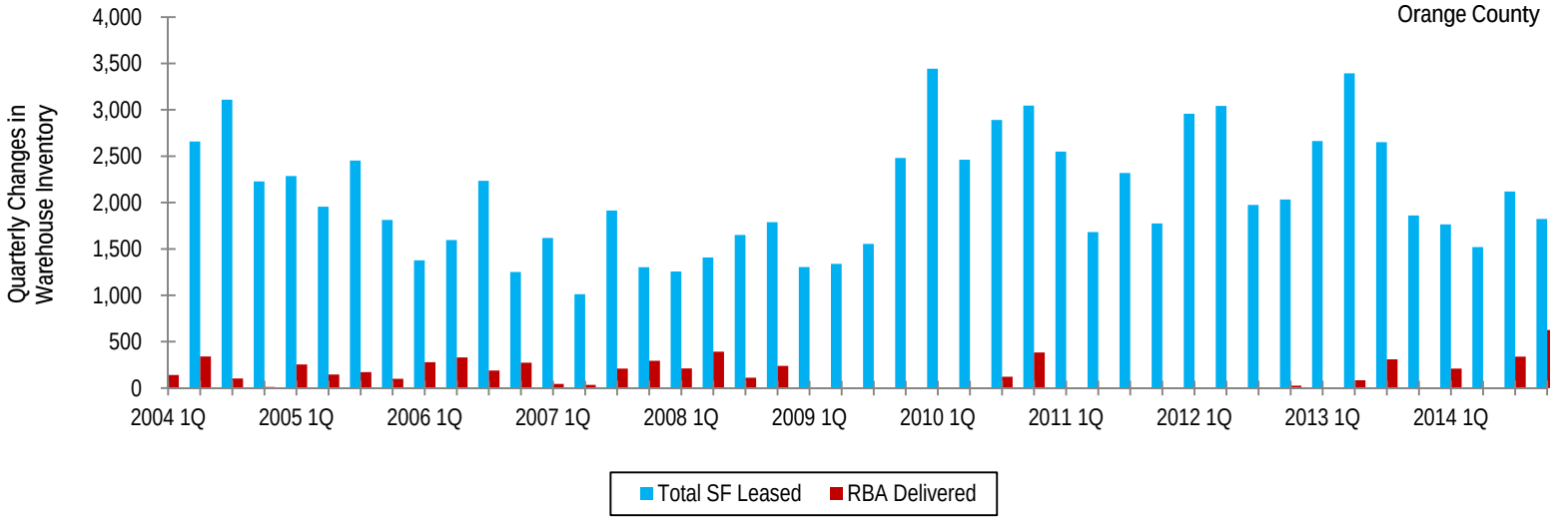


Figure A.3 Historical Quarterly Trends in Leased and Delivered (or Constructed) Warehousing Space by County in the SCAG Region, 2004 to 2014 (continued)
Thousands of Square Feet



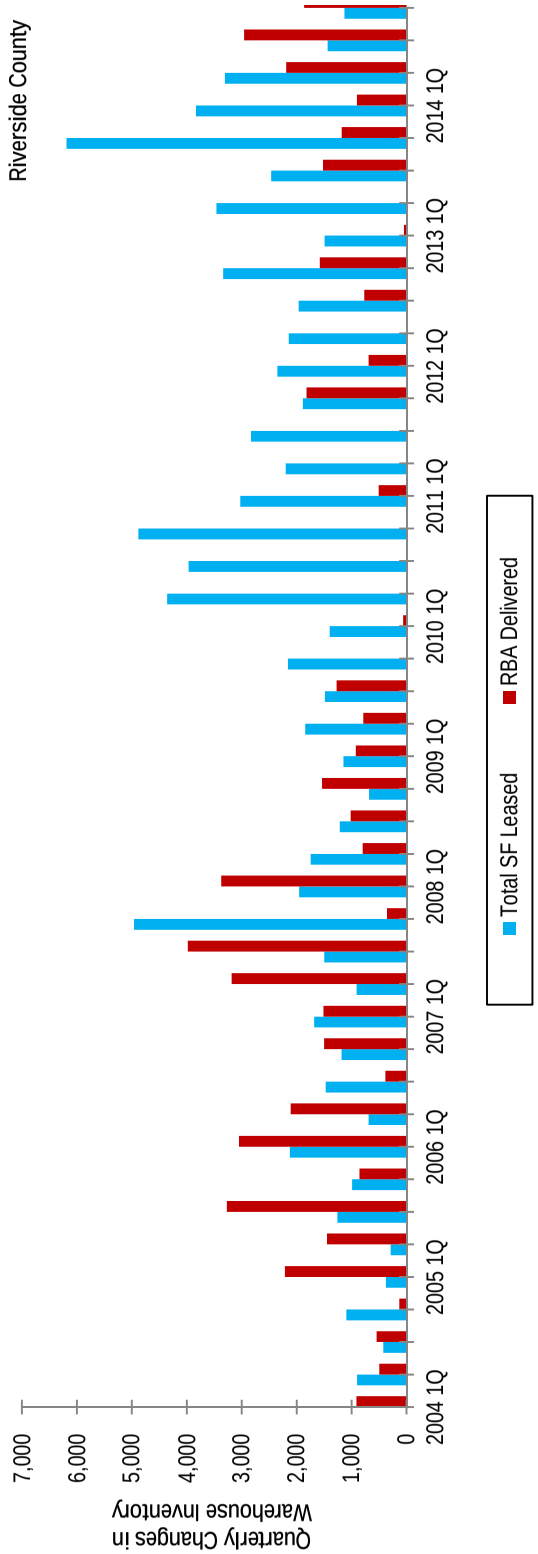
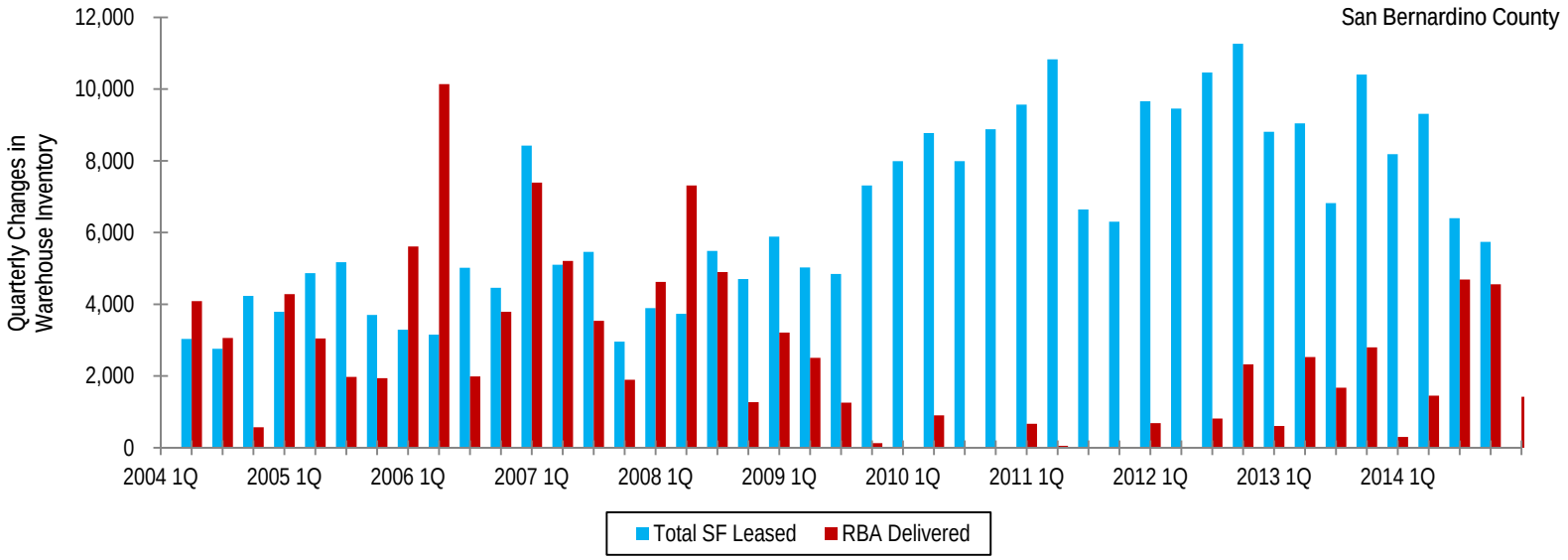
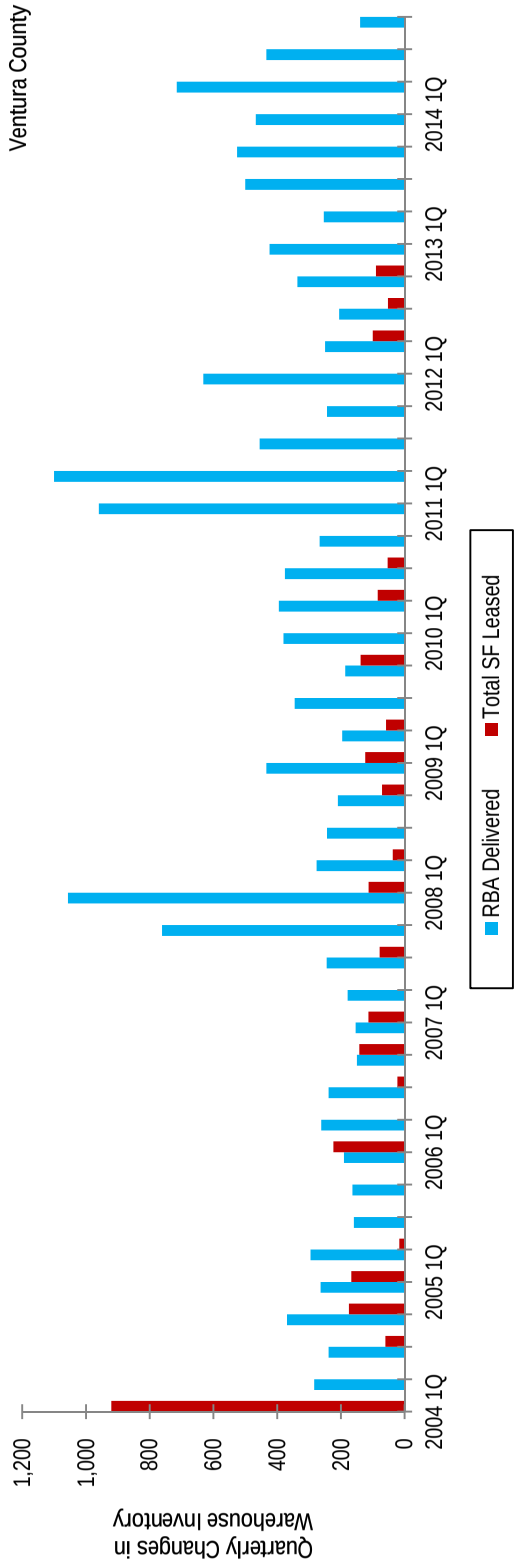

Riverside County
Quarterly Changes in Warehouse Inventory
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2004 1Q
2005 1Q
2006 1Q
2007 1Q
2008 1Q
2009 1Q
2010 1Q
2011 1Q
2012 1Q
2013 1Q
2014 1Q
Total SF Leased
RBA Delivered

Figure A.3 Historical Quarterly Trends in Leased and De livered (or Constructed) Warehousing Space by County in the SCAG Region, 2004 to 2014 (continued)

Thousands of Square Feet




Ventura County
Quarterly Changes in Warehouse Inventory
1,200
1,000
800
600
400
200
0
2004 1Q
2005 1Q
2006 1Q
2007 1Q
2008 1Q
2009 1Q
2010 1Q
2011 1Q
2012 1Q
2013 1Q
2014 1Q
RBA Delivered
Total SF Leased

A.3 Other Industrial Warehouse Classification Systems

Commercial Real Estate Classification

The real estate market uses a subjective rating type class system to categorize commercial buildings based on the age, amenities, aesthetics, and general infrastructure of buildings into three types: Class A, Class B, and Class C. This provides a strong basis for the potential rent and sale value of the building.[27]

The key limitation of this classification is that it is mainly intended for office use, and it does not relate to an industrial tenant/occupant and their use of the building for cargo handling. However, from a site access and amenities standpoint, the classification gives an indication about the relative attractiveness of the available space to potential tenants or buyers, including those who are industry-related.

U.S. Customs and Border Protection Warehouse Classification

Importers with their own distribution centers and retail fulfillment centers (as described later in this technical memorandum), and third-party logistics (3PL) operating cargo-handling facilities may participate in the U.S. Bureau of Customs and Border Protection's Customs-Trade Partnership against Terrorism (C-TPAT) program under the category of Importers and 3PL Providers, respectively. This program was established after 9/11 to strengthen America's borders by enlisting companies involved in international trade to tighten security in their own supply chains.

Bonded warehouses must receive special certification from U.S. Bureau of Customs and Border Protection. According to U.S. Bureau of Customs and Border Protection's bonded warehouse manual,[28] there are 11 different types or classes of bonded warehouses that are certified and authorized in these regulations (19 Code of Federal Regulations 19.1), depending upon the ownership and nature of operations performed. The different classes are subject to different treatment pursuant to the U.S. Customs Regulations and Customs issuances.

Although this classification is based on ownership, as well as use of the building, the key limitation is that the classification applies only to a subset of warehouses that are designated for import purposes. Also, U.S. Bureau of Customs and Border Protection's bonded warehouse manual states that a bonded warehouse may be designated as more than one class, indicating that the classification may not produce a unique classification of the warehouse buildings. Moreover, a company may bond only a portion of its cargo-handling facility, rather than the entire building, which complicates classification for the purposes of this study.

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[27] http://realestate.about.com/od/commercialbizbasics/a/space_classes.htm (last accessed on September 16, 2014).

[28] http://nemo.cbp.gov/ot/bonded_warehouse.pdf (last accessed on September 16, 2014).

A.4 Detailed Historical Trends in CoStar Market wise Inventory for Counties in the SCAG Region

Figure A.4 provides the trends in rentable building area of the CoStar market existing warehouse buildings using the CoStar's 2004 to 2014 (historical) quarterly data download by county in the SCAG region. This data is meant to support information presented in Figure 3.5 in Section 3.2 of this technical memorandum.

Figure A.4 Historical Year-End Trends in CoStar Market wise Warehousing Inventory – Rentable Building Area in Square Feet – County in the SCAG Region, 2004 to 2014
Thousands of Square Feet

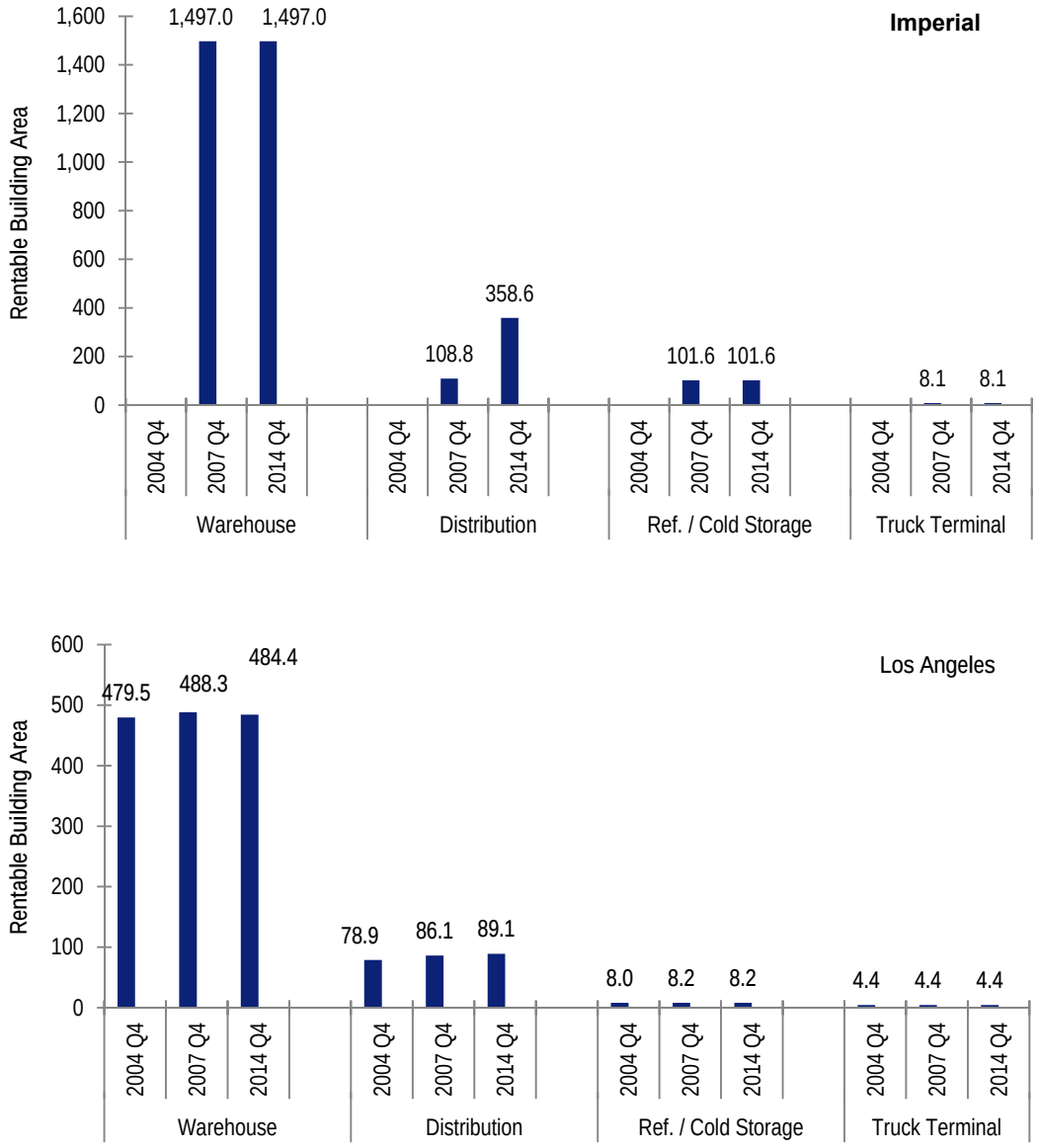


Figure A.4 Historical Year-End Trends in CoStar Market wise Warehousing Inventory – Rentable Building Area in Square Feet – County in the SCAG Region, 2004 to 2014 (continued)
Thousands of Square Feet

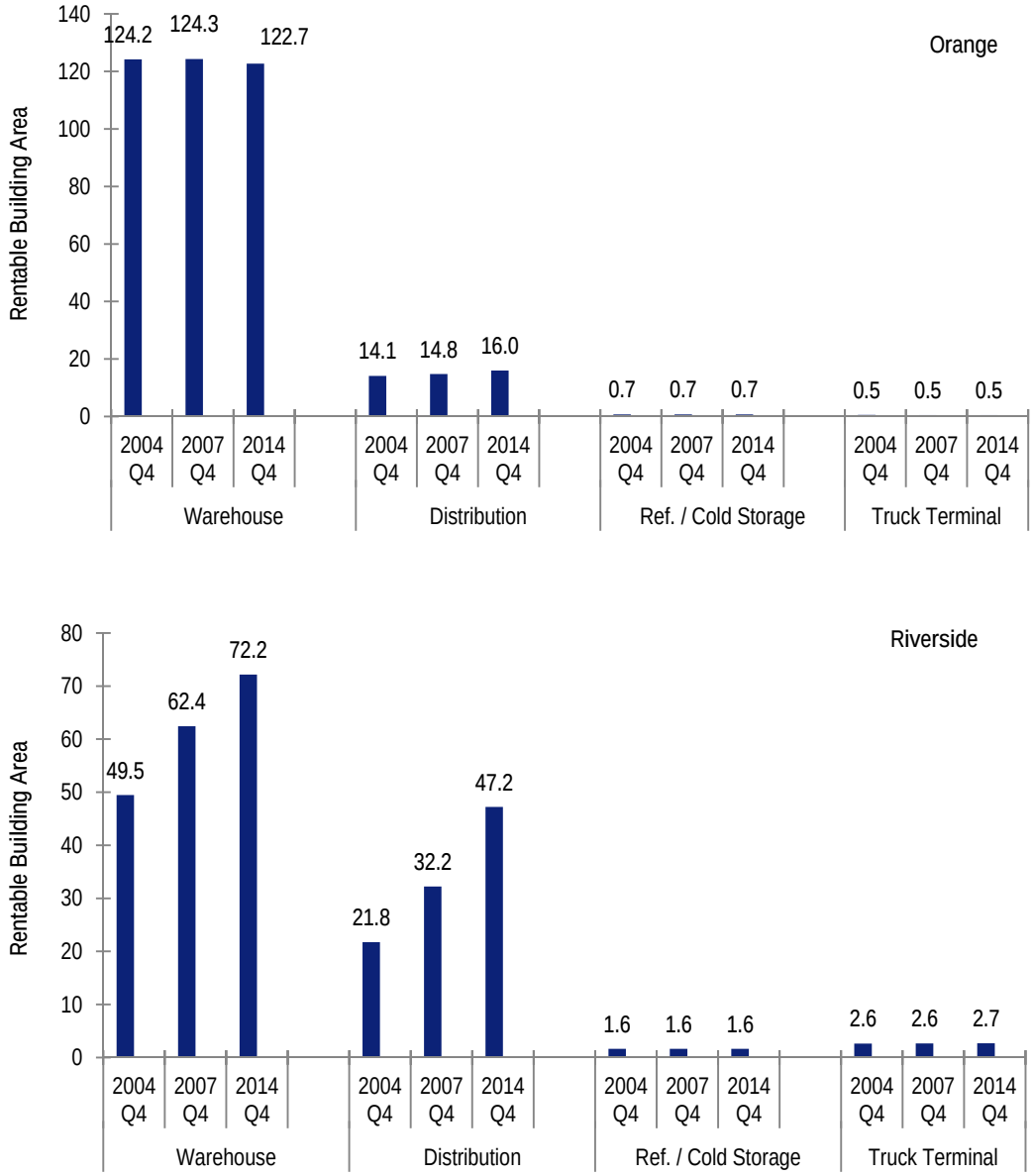
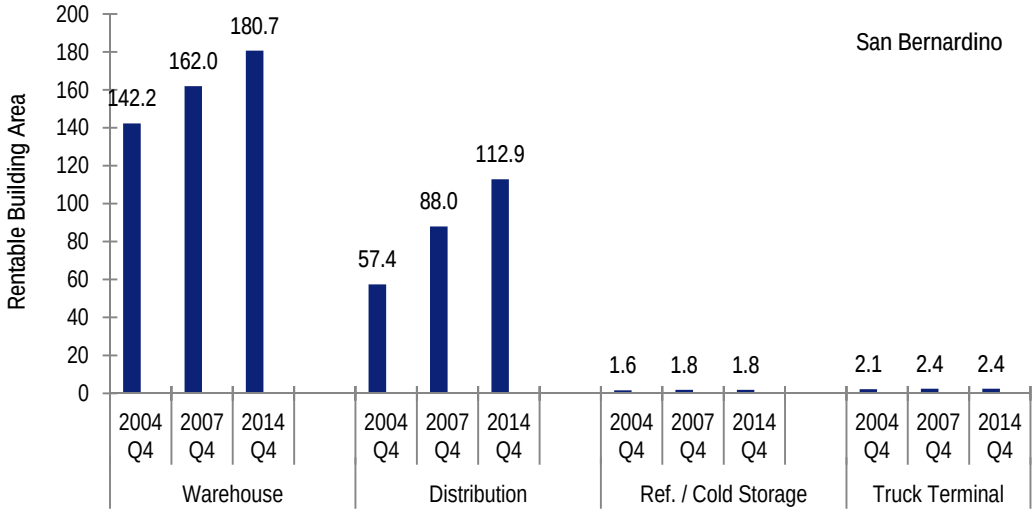
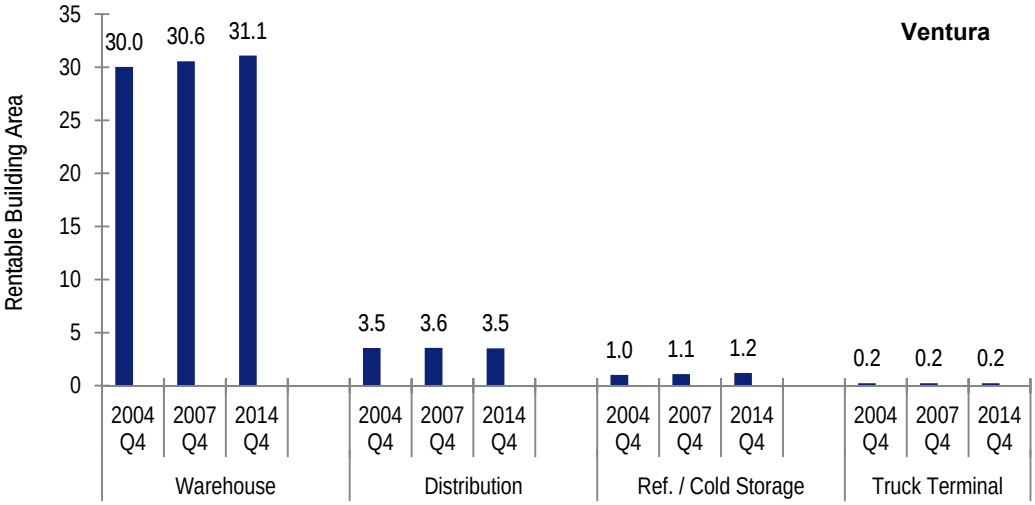


Figure A.4 Historical Year -End Trends in CoStar Market wise Warehousing Inventory – Rentable Building Area in Square Feet – County in the SCAG Region, 2004 to 2014 (continued)

Thousands of Square Feet





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