FINAL

INDUSTRIAL WAREHOUSING

IN THE SCAG REGION

TASK 3.2 Freight Stakeholder Interview Report

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technical report

Southern California Association of Governments
Industrial Warehousing Study

Task 3.2 Freight Stakeholder Interview Report

prepared for

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Executive Summary

The level of demand for cargo handling facility space (distribution centers and Third-Party Logistics (3PL) warehouses) is impacted by how beneficial cargo owners[1] (BCO) adapt their supply chain strategies to deal with ever-evolving international trade and transportation trends, while trying to increase market share, improve customer service level, and increase profitability. The dynamics are complex. Interviewing stakeholders yielded important insights about how the industrial warehousing landscape in the SCAG region might change in the near and longer term.

Interviews of key freight stakeholders were conducted for this study to:

- Shed light on the distribution center characteristics and operating strategies that BCO employ, specifically in Southern California;
- Describe how their 3PL warehouse operators partner in this effort;
- Confirm that the conclusions drawn from the historical and emerging trends research performed in Task 3.1 were as accurate as possible; and
- Provide guidance on the assignment of baseline values of the Southern California Association of Governments (SCAG) region warehousing supply/demand forecasting model parameters.

Separate detailed questionnaires were created for the BCOs and 3PLs. Interviews were conducted with three BCOs, two 3PLs, and an executive of the National Retail Federation, an advocacy group for retailers. A discussion with a prominent commercial real estate developer augmented those BCO and 3PL interviews.

Primary Conclusions and Implications of Stakeholder Interviews

Specific insights and implications from these stakeholder interviews are listed below:

- BCOs seek to mitigate the risk of business interruption. Due to the recent longshore labor dispute at West Coast ports, many BCOs have concluded that East and Gulf Coast gateways might provide more reliable service. As a result, these BCOs have shifted some cargo from San Pedro Bay (SPB) Ports. The Journal of Commerce reported that the container volume in April 2015 at the Ports of Los Angeles and Long Beach increased 1 percent from April 2014. In contrast, Port of Savannah volume grew 26 percent. "West Coast market share of total U.S. containerized trade in the first four months of the year dropped to 49 percent from 54 percent, compared to the same period in 2014."[2] It is difficult to predict how much additional import volume might shift

[1] A beneficial cargo owner (BCO) is the company that owns the products and bears responsible for transportation decisions. A BCO can be an importer, exporter, or domestic manufacturer.

[2] "Shippers Returning to the West Coast? Not Yet," *The Journal of Commerce*, June 1, 2015.

from SPB ports to other gateways in the foreseeable future, as well as what portion of containers may eventually find their way back to SPB ports if the ports are able to operate more efficiently and the risk of ILWU labor actions is diminished. This is reinforced by the fact that an estimated 40 percent of the cargo coming through the Ports of Los Angeles and Long Beach are not destined for the local market and can easily flow through other port gateways.[3] Import volume influences demand for distribution centers and 3PL warehouses, so demand for industrial warehouse space in the SCAG region may be depressed to some degree as a result of SPB ports' loss of cargo to other gateways.

- Depending upon their import volume and supply chain strategies, BCOs operate import distribution centers and smaller regional distribution centers (RDC) in the SCAG region. A portion of the BCOs contract with 3PLs to transload or crossdock cargo near the SPB ports prior to moving that cargo to their import distribution centers or RDCs. This results in multiple stops for the same cargo, leading to increased demand for warehouse space in the region. This represents multiple stops in the warehouse supply/demand forecasting model accounts for this "multiple stop" activity.

- BCO distribution centers of various sizes are dispersed across the SCAG region. For the purposes of this report, a "mega" distribution center is one in excess of 750,000 square feet. Because these facilities require more land, most of these mega distribution centers are located in the Inland Empire and in northern Los Angeles County.

- Outsourcing logistics services to 3PLs continues to be a prevalent strategy of BCOs. About 72 percent of BCOs surveyed in 2014 said they intended to increase their use of outsourced logistics services, up slightly from the average reported in recent years in the same study series; whereas, 78 percent of 3PL respondents expected to experience an increase in outsourcing among their BCO customers.[4] Besides the New York/New Jersey area, the SCAG region likely has the highest concentration of 3PLs in the country, with the majority of domestic and international players in the industry being represented. Because BCOs outsource services to 3PLs primarily on import cargo, and, to a lesser degree, on exports and domestic cargo, 3PLs require warehouses near the SPB ports with easy access to rail ramps and interstate highways. The cargo mix and types of services desired are not expected to change dramatically in the near future; thus, this geographical requirement for 3PL warehouses will remain paramount.

- Facility functionality dictates size and configuration of industrial warehouses. Approximately 50,000 square feet or less typically are adequate for a 3PL trans-load/crossdock building. A large yard for container parking and truck maneuvering is essential, and the ideal shape is rectangular, with numerous dock doors on each long side. Since transload/crossdock cargo turns over typically in less than 24 hours, minimal racking and relatively low ceilings will continue to be common characteristics.

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[3] "California Ports Could Lose Discretionary Cargo, up to 40 percent in 2014," Kristopher Hanson, *South East Shipping News*, October 8, 2010.

[4] "2014 18th Annual Third-Party Logistics Study – The State of Logistics Outsourcing," Cap Gemini, https://www.capgemini.com/resource-file-access/resource/pdf/3pl_study_report_web_version.pdf.

3PL multipurpose[5] warehouses are larger – usually under approximately 500,000 square feet, and often much smaller. These buildings require ceilings of 30 feet or higher for carton racking because cargo is stored longer, compared to a transload/crossdock building, but fewer dock doors are needed. Although rectangular is the most efficient configuration in which to work, 3PLs do manage to operate in irregular shaped buildings. Though cargo volumes fluctuate between peak and slack seasons, 3PLs prefer buildings with little excess capacity.

- BCOs assign a higher value to properties with acceptable amounts of yard space and numerous dock doors that are well located in the SCAG region with efficient access to the SPB ports. They are willing to pay higher lease rates for these prime facilities.
- The majority of cargo handling facilities in many near-port cities in the SCAG region (i.e., South Bay) are functionally obsolete in terms of their physical layouts and small size of yards, but continue to be desired by BCOs and 3PLs because of their proximity to the SPB ports.
- As more development of all types occurs across the SCAG region, fewer parcels are available for cargo handling facilities that are situated at a distance from "sensitive receptors," such as schools and residences; hence, conflicts between commercial uses and the sensitive receptors will increase in the future.
- In-fill locations within the SCAG region near the SPB ports will probably be usable for smaller buildings, primarily for transload/crossdocking, as long as sufficient yard space is available. Operations that require larger buildings will likely be forced out to the Inland Empire or northern fringes of the SCAG region.
- Today, 3PLs largely rely on manual methods for cargo handling, but increasingly are willing to invest in software and equipment to automate their processes, just as BCOs are doing. The primary goal of warehouse automation may not be to dramatically reduce building size requirements and workforce levels, but rather, improve the efficiency and accuracy of processes and accelerate throughput rates. Thus, warehouse automation may not, in itself, reduce overall warehouse space demand in the SCAG region.
- The majority of 3PLs operate 24/7 as do many BCOs using mega distribution centers and even smaller facilities, so it is important that local government regulations are supportive of these schedules.
- Mega distribution centers and 3PL warehouses will continue to be heavy truck traffic generators, regardless of location and types of services performed. A large variety of trucks frequent these facilities, including trucks hauling international containers, domestic 53-foot containers or trailers, less-than-trailer (LTL) loads, and Integrator (UPS and FedEx) delivery vans. Local roads around these facilities can become congested, so local government policies and transportation projects can have direct impacts on these facilities.

[5] Multipurpose warehouses typically perform diverse operations, including storage, pick-and-pack for outbound distribution, crossdocking and transloading international and domestic imports and exports, and value-added services (VAS) to get merchandise ready for sale in stores (see Table 2.1 on page 14 for more about VAS).

BASELINE VALUES OF SUPPLY/DEMAND FORECASTING MODEL PARAMETERS

From studying BCO and 3PL operations in the SCAG region, it can be concluded that the baseline values of parameters set in the supply/demand forecasting model make sense. The parameters were derived from the Modified Avison-Young Formula.[6] Only minor adjustments were suggested and the reasons for such refinement in values are explained in the section Influence of Stakeholder Interviews on Assigning Model Parameter Values below in this report.

[6] Modified Avison-Young Formula parameters include W = Warehouse space needed to accommodate container volumes in cargo subcategory, L = Loaded local TEUs per year for particular cargo subcategory, f = Percentage of loaded local TEUs needing warehouse space, r = Percent of loaded local cargo with origin or destination in SCAG region, m = Percentage of cargo moved twice within the region, n = Percentage of cargo moved three times within the region, d = Weighted average cargo capacity of TEU, e = Efficiency of container, u1 = Warehouse cubic space utilization ratio used for cargo at full capacity, u2 = Average percentage capacity utilization annually, t = Turnover of cargo in warehouse per year, and h = Ceiling height in feet used for cargo storage. The formula is W = L * f * r * ((l+m) + (2*n) * d * e * (l/u1*u2*t*h)).

1.0 Freight Stakeholder Interviews

The Freight Stakeholder Interview portion of the project work was designed to illustrate the patterns of use by beneficial cargo owners[7] (BCO) and Third-Party Logistics (3PL) warehouse operators of industrial warehouses in the Southern California Association of Governments (SCAG) region and validate the findings of the historical and emerging trends research in Task 3.1. It also informed how the consulting team assigned base values to the parameters in the supply/demand forecasting model.

1.1 Task Methodology

In July 2014, the consulting team compiled a list of 42 BCOs and 21 3PLs to be interviewed (see list in Exhibit 1), and created separate in-depth survey guides for each stakeholder type comprised of quantitative and qualitative questions (see questionnaires in Exhibit 2). These were vetted and approved by SCAG. Up to eight attempts were made to each company for which we were able to identify an appropriate contact to persuade him/her to participate in the study. We completed interviews with two BCOs and two 3PLs. Three other BCOs were subsequently added to the list, but also declined to participate. The low participation rate can be attributed to three primary factors:

1. The company policies of many stakeholders prohibit disclosure of proprietary information such as requested in the questionnaires.
2. Since the summer of 2014, stakeholders focused on managing cargo flows under difficult circumstances created by the protracted labor contract negotiations between the International Longshore and Warehouse Union (ILWU) and Pacific Maritime Association (PMA), divesture by ocean carriers of their chassis and complexity of implementing alternate solutions for provision of chassis, deployment of additional mega vessels in the U.S.-Asia trade, bunching of vessel arrivals at San Pedro Bay (SPB) marine terminals, ongoing congestion at those marine terminals, and other factors. Being interviewed for this project was not a priority.
3. Stakeholders did not see that participation in the study would benefit their companies, and therefore, were reluctant to invest their time.

To supplement the information collected from the BCOs and 3PLs, the project team conducted three additional interviews with: 1) an executive of one of the largest BCOs in the U.S. who spoke from a general importer perspective; 2) an executive of National Retail Federation; and 3) executives from a large, well-respected commercial warehouse real estate developer. The insights captured during these discussions can be found in the Summary of Findings of BCO Interviews section and in the Industrial Warehousing Landscape from a Commercial Real Estate Developer Perspective section, respectively.

[7] A beneficial cargo owner (BCO) is the company that owns the products and bears responsible for transportation decisions. A BCO can be an importer, exporter, or domestic manufacturer.

In spite of the limited participation of BCOs and 3PLs, some important themes and implications for the SCAG region can be gleaned from the interviews, as discussed below.

In addition, the findings of the stakeholder interviews were used to determine whether the baseline values of the supply/demand forecasting model were reasonable, and if not, how they might be adjusted. (See section – Influence of Stakeholder Interviews on Assigning Model Parameter Values.)

Summary of Findings of BCO Interviews

Interviews were conducted with ASICS America Corporation and BMW of North America, LLC. Because the information collected was not substantial enough to draw general conclusions about the industrial warehousing landscape and BCO supply chain practices in Southern California, and because it would be impossible to keep the information confidential since only two BCOs were interviewed using the survey instrument, no summary of these interviews will be presented in this report, rather the information collected was used as background information.

However, the team was able to have two additional discussions that provided valuable insights about BCO supply chains and distribution center operations. The first was with one of the most prominent and respected American supply chain executives *(Executive)* in the international trade and logistics industry who worked for one of the consistently ranked top five companies in The Journal of Commerce Top 100 Importers list and who currently works for another top five company. Under the condition of anonymity, he spoke freely of the supply chain strategies of both companies specifically, as well as in general terms about how other importers are approaching their businesses. The second was with an executive of the National Retail Federation.[8]

Executive spoke of how in 2002, to reduce the risk of business interruption, many BCOs of all sizes shifted a portion of their imports from West Coast ports to East and Gulf Coast ports after the PMA marine terminal owners locked out the ILWU when a new contract could not be timely negotiated. After 10 days of a cessation in maritime operations at the 29 West Coast ports, former President George Bush invoked the Taft-Hartley Act to resolve the dispute.

Though the PMA did not lock out ILWU workers during the most recent contract negotiation, which lasted nine months from the expiration of the 2008 contract on June 30, 2014, until a tentative contract was concluded on April 3, 2015, near gridlock occurred at the SPB marine terminals. At the worst time in February, 30 vessels were at anchor outside the Ports of Los Angeles and Long Beach waiting to be stevedored. Marine terminal throughput was drastically reduced at the major West Coast ports (Los Angeles, Long Beach, Oakland, Tacoma, and Seattle), as ILWU workers engaged in slow down tactics, which compromised vessel, yard, and terminal gate operations. BCOs, 3PLs, and drayage companies were economically impacted, and this spilled over to the entire national economy. A tentative contract was drafted only after President Obama sent the U.S. Labor and Transportation

[8] The National Retail Federation is the world's largest retail trade association, representing discount and department stores, home goods and specialty stores, Main Street merchants, grocers, wholesalers, chain restaurants and Internet retailers from the United States and more than 45 countries. https://nrf.com/who-we-are/our-mission.

secretaries to intervene. In late May, ILWU rank and file and PMA members ratified the new contract.

Although East and Gulf Coast ports are not immune to longshore labor issues, the inherent nature of the coast-wise structure of the ILWU makes the West Coast more vulnerable to a shutdown of all ports under ILWU jurisdiction, and hence, greater potential damage to the national economy. For over a decade, BCOs have been diversifying their usage of ports in multiple regions to mitigate the risk of business interruption from longshore labor issues, as well as other situations beyond their anticipation or control. It took several years after the 2002 port lock out for West Coast port volumes to regain their footing. As economic conditions improved and imports volumes bounced back after the 2008 global downturn, East and Gulf Coast ports have steadily increased their share of total imports and exports. As evidenced by import cargo statistics published in trade magazines like the Journal of Commerce, BCOs who diverted cargo to East and Gulf Coast ports in the last half of 2014 and early 2015 to keep their supply chains fluid began returning some volume to West Coast gateways during the summer of 2015 as the peak import season started to ramp up. However, BCOs will likely keep their port diversification strategies in place.

Executive expressed that he and a wide group of his peers believe the ILWU should never again be allowed to hold American businesses "hostage" because the negative economic impacts to the nation are far too great. He and a number of executives from major U.S. firms traveled to Washington, D.C. in February 2015 to advocate for a formal restructuring of West Coast maritime labor contract negotiations. These companies consider that the ILWU has too much power since all 29 West Coast ports fall under ILWU jurisdiction, and therefore, during contract disputes, operations on the entire West Coast can be affected. Many in the international trade and logistics industry support bringing the ILWU under the Railway Labor Act of 1926, which governs labor contracts of railroads and the airlines, or altering the contract process in another way to ensure supply chain disruptions are minimized. Stakeholders want to see the ILWU and PMA work more cooperatively during contract negotiations and recognize that their actions directly impacts the health of the U.S. economy.

Whether a restructuring and decentralization of ILWU control over West Coast ports will be Federally legislated remains to be seen. Absent a solution being identified and implemented, BCOs are not watching and waiting. During the nine-month long contract negotiation period, many BCOs reallocated cargo to East and Gulf Coast ports, and some are even locating new distribution centers nearby. Prior to the protracted contract negotiations, *Executive's* company was importing 50 percent of its Asia volume through West Coast ports. Now that figure is down to 40 percent, with Savannah, Houston, Charleston, Norfolk, Jacksonville, and Prince Rupert, British Columbia capturing the reallocated volume. He indicated his company's shift away from West Coast ports will be permanent. Though the supply chain pattern of each BCO is unique, we conjecture that many other BCOs have and will follow suit. Moreover, the volume of Executive's company represents a sizable portion of total U.S. imports, so a 10-percent shift is impactful to overall volumes through SPB ports.

Statistics support that this shift away from West Coast ports is not simply a temporary strategy. "In some ways, the West Coast loss of market share in 2014 to 2015 is an extension of the loss of share that began in the disastrous 2002 ILWU-PMA contract

negotiations. National retailers learned a lesson then, and began immediately to develop large import distribution centers along the East Coast. With that logistical infrastructure in place 12 years later, importers were able to divert cargo from the West Coast with relative ease when the labor problems developed. Therefore, the West Coast's loss of market share has actually been occurring slowly but surely for the past 12 years. According to statistics from PIERS, the West Coast's share of total U.S. container trade has declined from 50.5 percent in 2000 to 47.2 percent in 2014. On a percentage basis, the decline appears to be small, but it translated to a loss of 1 million 20-foot laden containers in 2014."[9]

Additional research revealed that to support BCO demand, in early 2015, a number of ocean carriers introduced additional services to the East and Gulf Coasts, which is another indication of the value BCOs are now placing on having alternatives to West Coast gateways.

As reinforcement to *Executive's* comments, Dollar General, ranked 30th on the Journal of Commerce Top 100 Importers list for 2014, is just one more example of current BCO thinking. Protracted West Coast port delays will push Dollar General to shift more import cargo to the East Coast as its bicoastal strategy allows the company to have several options to import Asian goods. Dollar General has figured out better ways to move its cargo that do not involve the West Coast. The company estimates that some of the cargo shift will be permanent. It feeds waterborne imports to its 12 regional distribution centers through import centers in Southern California and near Savannah, Georgia. Most of the company's nearly 12,000 retail stores are in the eastern one-half of the U.S.[10]

The National Retail Federation executive explained the primary issues currently top of mind for retailers as they operate their distribution centers, particularly in Southern California.

- Holding of buffer stock. Many BCOs implemented just-in-time (JIT) supply chain practices that minimized cycle time (order placement to delivery to store or customer). In the past two years, this model has been hindered by port congestion, adoption of slow steaming by ocean carriers, and other factors beyond BCO control. This has forced BCOs to add days and weeks to cycle time and increase the levels of inventory in their systems to prevent stock-outs that result in loss of revenue and customer dissatisfaction. Holding excess inventory as a buffer is costly, uses up distribution center capacity, and reduces cargo turnover in distribution centers. Yet, this is becoming common practice since BCOs view this as preferable to being caught with short or no supplies of products in demand. The segment of BCOs whose distribution centers are running at full capacity are trying to figure out how to operate more efficiently before transitioning to larger buildings.
- The evolution of omnichannel retailing. The emerging omnichannel retailing trend is causing BCOs to reevaluate their supply chain strategies, distribution center operations, and order fulfillment methods; and most have not yet solidified their strategies. Certain ones are experimenting with Internet order pickup from stores. Some BCOs for which Internet orders comprise a sizable portion of overall sales have

[9] "Shift in Traffic from West to East and Gulf Coast Ports Could Be Permanent," Bill Mongelluzzo, The Journal of Commerce Online, March 27, 2015.

[10] "Dollar General: West Coast Losses Will Be Lasting," Joseph Bonney, The Journal of Commerce, March 4, 2015.

opened large e-commerce fulfillment centers that cater to distributing orders placed on the Internet to the homes and businesses of consumers. These have installed automated equipment that efficiently handle single items, as opposed to cartons. Smaller BCOs continue to process Internet orders in the same multipurpose distribution centers that replenish store inventories. Because of the wide variability in BCO policies, procedures, and products, it is likely that multiple methodologies for handling e-commerce orders will be adopted rather than a predominant strategy across the retail industry. This will result in disparity in size and location of distribution centers and how those distribution centers are configured and used.

- The regulatory environment. BCOs are challenged with operating in an environment of increasing regulations – regional, state, and national – and these external factors are driving changes in BCO supply chains. For example:
  - About 10 years ago, to stave off imposition of state legislation regulating truck movement, international marine terminal operators at the Ports of Los Angeles and Long Beach formed a nonprofit company called PierPass to mitigate air pollution, reduce congestion, and improve safety. This occurred with the tacit support of BCOs, motor carriers and 3PLs that believed industry could design effective solutions that achieved government goals without being overly burdensome to companies engaged in international trade. These terminal operators established five new off-peak shifts weekly, which are financed through collection of a Traffic Mitigation Fee (TMF) assessed on most containers moved during peak hours (Monday through Friday, 3:00 a.m. to 6:00 p.m.). PierPass prompted many BCOs to have their motor carriers perform drayage during the night to avoid the TMF, necessitating a transition to 24/7 operations in their distribution centers. In April 2015, Total Peak gate moves were 362,155 (55 percent) and Total OffPeak/Exempt gate moves were 297,593 (45 percent),[11] which indicates PierPass has been effective in moving trucks off-roads and highways in Southern California during peak travel times. However, as trade and congestion at the Ports have increased, PierPass needs to be revisited to determine a better operation in today's environment.
  - The Ports of Los Angeles and Long Beach recently established a Supply Chain Optimization Group comprising all stakeholders, including BCOs, to figure out how to reduce road and port congestion, and move containers between the Ports and distribution centers in a more efficient, environmentally friendly way. PierPass 2.0 is being discussed, though it is unclear how it will unfold. The group's findings and recommendations will have a bearing on how distribution centers in Southern California operate in the future. It is clear that more BCOs are operating their distribution centers in Southern California on a 24/7/365 basis than ever before, and this practice is likely to permeate further in the region as regulations become more stringent.
  - Sustainability issues affect motor carriers, ports, marine terminals, BCOs, and their 3PL partners. As the California Air Resources Board (CARB) imposes new regulations to improve air quality, BCOs will be forced to adopt strategies to make

[11] http://www.pierpass.org/monthly-newsletters/pierpass-may-news-and-updates-2/.

their supply chains greener, though what this will mean for warehouse sector is unclear.

This executive recommended two actions that SCAG could consider:

1. BCOs would like public agencies in the SCAG region to be cognizant of how regulations (i.e., safety, motor carrier hours of service, pollution mitigation, etc.) can stunt the growth of commerce and reduce BCO efficiencies. Public agencies should work more closely with industry to understand potential impacts on the business community prior to regulating; regulations may sound good on paper, but in the real world could really hamper BCO profitability and prompt them to shift operations elsewhere. BCOs really are paying attention to issues like sustainability and road congestion, and want to act in partnership with communities to solve them. They are sensitive to the communities in which they operate and want to stay there.
2. Public agencies can increase their understanding of how complex supply chains are. Solutions and strategies might work well from the government perspective and have a neutral impact on a certain segment of BCOs, but be onerous for others. There is no such thing as one type of BCO; they vary in size and the products they sell range from time sensitive/high value to base commodities, and this influences their operating characteristics.

Connection between BCOs and Historical and Emerging Supply Chain Trends

BCOs directly affect and are impacted in a variety of ways by several of the supply chain trends that were studied in Task 3.1. Interviewing the BCOs reinforced and augmented project research. Table 1.1 illustrates key influences and impacts.

Table 1.1 Summary of Interplay between BCOs and Supply Chain Trends

Trend	Impacts
Mega Distribution Centers	Only the largest BCOs operate mega distribution centers in excess of 750,000 square feet, and these are located primarily in the Inland Empire and north Los Angeles County, where large land parcels are available. For a variety of reasons, BCOs will continue to find locating mega distribution centers in the SCAG region desirable for the foreseeable future. However, there will be an upward limit on the actual number of mega distribution centers that the region supports in the future because the universe of potential users extends only to the largest BCOs.
Distribution Center Location	The decision about where to locate distribution centers and how many to operate is driven by many factors, including the supply chain strategies BCOs employ, import volume, customer locations, types of goods handled, delivery frequency requirements, price of land, regulatory environment, etc. Some BCOs decentralize by having multiple, small distribution centers; often in the four corners of the U.S.; whereas, others centralize operations in one or two large buildings. Some large BCOs have several big import distribution centers, as well as many smaller RDCs. The fact that the SCAG region is a magnet for distribution centers is not likely to change, though demand for

Trend	Impacts
	space may fluctuate in the future as a result of unpredictable and uncontrollable events and factors that will impact BCO supply chain strategies.
Value-Added Services (VAS)	VAS is primarily done to get merchandise shelf-ready for sale. VAS can include operations such as resorting and repacking items into new cartons (i.e., four size 8, eight size 10, six size 12 in one carton, etc.); barcode and ticket application; insertion of hangers in garments; kitting multiple items into one package (i.e., cell phone, case, charger, and earbuds); and merchandise quality control inspection. Though many VAS activities are performed at foreign factories, certain BCOs prefer VAS to be done closer to market in U.S. 3PL warehouses. BCOs typically pay 3PLs to perform most VAS, rather than consume their own staff resources and distribution center space. But other BCOs perform VAS in their own distribution centers. The frequency and type of VAS depends upon BCO supply chain strategies and, thus, it is difficult to predict how VAS volume in the SCAG region will fluctuate in the future. It is unlikely that an increase in VAS will generate additional demand for distribution center space.
Information Technology (IT) in Cargo Handling Facilities	IT enables more efficient and accurate cargo put-away, inventory visibility, and order picking and shipping. Technology including Warehouse Management Systems (WMS), Warehouse Control Systems (WCS), voice activation systems, and radio frequency identification (RFID) tag and barcode scanners and handheld readers (gladiators) are becoming commonplace in distribution centers. Higher skilled workers are needed to use such technology. IT promotes handling more cargo in the same amount of physical space, so this trend might indicate a slightly reduced need for distribution center space in the SCAG region in the future.
Multimodal Logistics Centers	BCOs locate distribution centers in multimodal logistics centers to: • Benefit from proximity to 3PL warehouses, rail ramps, interstates, and large population centers; • Occupy modern buildings with configurations that are preferred, including large yards unlike functionally obsolete distribution centers in portions of the SCAG region such as the South Bay; and • Achieve lower lease rates compared to near-port properties. Two multimodal logistics centers are being developed in the SCAG region – Global Access in Victorville and Hillwood Alliance California in San Bernardino. Both have a mix of 3PL, BCO, and ancillary services tenants. Highland Fairview Corporation has a 41.6 million-square-foot parcel for warehouse development in Moreno Valley. The new 1.82 million-square foot Skechers distribution center is the first building on the site. If approved by the city council, possibly in 2016, it would be the nation's largest master-planned warehouse complex. The huge land parcel pushes such centers to the fringes of Los Angeles. Because operating in a multimodal logistics center is desired by only a small segment of 3PLs and BCOs, it is not likely that the SCAG region can support many more. Citizens are vigorously protesting Highland Fairview, which is forecasted to generate 14,600 to 29,000 truck trips a day.a

Trend	Impacts
Near-shoring and Reshoring	As BCOs seek to produce closer to the U.S. market and reduce total cycle time (design, order, produce, ship) and transportation costs, experts project that more BCOs will near-shore a portion of their manufacturing to Mexico. This will increase the need for 3PL warehouses near the California-Mexico border to handle southbound production inputs and northbound finished goods. Demand for 3PL warehouses in the border region should be strong if near-shoring becomes a more permanent trend. The trend of reshoring manufacturing to the U.S. also is expected to gain speed, and domestic and export cargo will be processed in BCO manufacturing facilities and 3PL warehouses throughout the SCAG region as a result.
Warehouse Automation	BCOs have steadily embraced automation (i.e., carton conveyors and sorters, storage rack put-away and picking machinery, etc.) in their distribution centers, enabling them to handle cargo more efficiently and with fewer errors. Automated equipment enhances cargo throughput, but also takes up lots of physical space, so the future net effect in actual space demand for distribution centers in the SCAG region could be neutral.
Retail Order Fulfilment	The way BCOs fulfill orders to stores, customers, and individual consumers is being transformed as Internet sales increase as a percentage of overall sales. Most BCOs have not solidified their strategies at this point in time. Only the largest such as Amazon, Walmart, and Home Depot operate stand-alone omnichannel fulfilment centers for Internet orders. The balance of BCOs fulfill Internet orders in existing multipurpose distribution centers, though some like Macy's are experimenting with Internet order pick-up at stores. In certain cases, 3PLs distribute orders to stores, customers, and consumers on behalf of their BCO customers and will likely continue to do so. It is difficult to predict how distribution center space requirements in the SCAG region might change in the near to midterm as a result of this trend since BCO strategies are in flux.
Compressed Time for Order Fulfillment	Consumers have grown accustomed to short delivery windows promised by Amazon and other large retailers. The point in time has been reached where consumers expect orders placed on the Internet to be delivered more quickly than ever before, often within one day of order placement. This presents BCOs with a challenge of how to fulfill e-commerce orders rapidly and without errors, while remaining profitable when free shipping is often offered. Amazon and Google are experimenting with delivering small orders via drone technology, but the Federal Aviation Administration (FAA) has yet to publish regulations that would authorize and dictate how drones could be used for such commercial purposes. In a few large cities, Amazon offers same day delivery by bicycle and automobile, and is setting up small, unmanned storage lockers in the city core where consumers can retrieve their packages whenever they desire 24/7. The trend of shortened time for order fulfillment will likely have a negligible impact on the need for distribution center space in the SCAG region.

[a] "Moreno Valley: Developer Touts Proposed Warehousing Mega Project," Imran Ghori, The Press-Enterprise, October 22, 2014.

Primary Conclusions and Implications of BCO Interviews

- It is difficult to predict the actual number of containers that might shift from SPB ports to other gateways in the foreseeable future, as well as what portion of that volume may eventually find its way back to SPB ports if the ports are able to demonstrate to BCOs that they can operate more efficiently, and the risk of ILWU labor actions has been mitigated. A sizable portion of the import cargo the SPB ports handle is considered discretionary since it not for the local market, so it can enter the U.S. through alternate gateways. It can be assumed that East and Gulf Coast ports and Prince Rupert, British Columbia will continue to be beneficiaries as BCOs act to protect supply chain efficiency and bottom line profitability. Import volume directly influences demand for distribution centers and 3PL warehouses, so requirements for industrial warehouse space in the SCAG region will be affected to some degree as a result of SPB ports' loss of cargo to other gateways.
- Research indicates that BCOs are increasingly implementing a bicoastal strategy by establishing distribution centers in alternate gateways to mitigate the risk of business interruption in Southern California, which means a shift of some discretionary cargo from SPB ports to other gateways will be solidified. Demand for distribution center space in the SCAG region will lessen over time as a result, but it is difficult to predict the amount.
- Depending upon their import volume and supply chain strategies, BCOs operate various types of facilities across the SCAG region, including import distribution centers and RDCs.
- In the SCAG region, BCO distribution centers vary in size. Even though most BCOs desire buildings that are in close proximity to SPB ports, mega distribution centers in excess of 750,000 square feet are concentrated in the Inland Empire where large land parcels are available.
- Conditions and events beyond the control of BCOs have caused them to lengthen their cycle times and add buffer stock in their inventories to reduce the risk of being caught without products in demand. This excess inventory takes up space in distribution centers and lengthens the turnover rate. As distribution centers reach capacity, BCOs must figure out how to operate more efficiently or transition to larger facilities, thereby, increasing demand for industrial warehousing space in the SCAG region.
- Omnichannel retailing is evolving, and BCO strategies for fulfilling orders from various channels (i.e., store, Internet, catalog, call center, etc.) are in flux. In the "retailing of the future" environment, BCOs will use multipurpose distribution centers, stand-alone e-commerce fulfillment centers, retail stores, mini-urban distribution centers, unmanned storage lockers, bicycle couriers, and other methodologies to deliver orders to customers. Distribution center location and use depend upon the supply chain strategies of each BCO, and there is no "one size fits all" model.
- Local, state, and national regulations are impacting freight mobility and the ability of BCOs to operate their transportation and distribution activities in a cost-effective and efficient manner. Municipalities in the SCAG region can negatively affect BCOs through land use policies, zoning, restrictions on distribution center operations, and regulations related to sustainability (i.e., air pollution). Policy-makers can learn more about the

intricacies of BCO supply chains and consider impacts prior to implementing restrictions.

Summary of Findings of 3PL Interviews

Interviews with two 3PLs – Damco Distribution Services, the logistics subsidiary of Maersk Line, and Yusen Logistics, the logistics arm of NYK Line – both among the top logistics service providers operating in the Southern California market, as well as globally – yielded valuable insights, even though the information collected was limited. Important characteristics of their warehouses and operations are highlighted below. To preserve confidentiality, the 3PLs are referenced as 3PL 1 and 3PL 2. The interview summary can be found in Exhibit 3.

Profile of 3PL Warehouses

Within the SCAG region, one of the 3PLs operates three warehouses in a campus setting and the other operates six; all nine are located in Long Beach, Carson, South Gate, and Jurupa Valley. Considering the type of business in which these 3PLs engage, it makes sense that their facilities are located in fairly close proximity to the SPB ports, Southern California rail yards, and interstate highways. Crossdock and transloading of imports and exports is performed in one of 3PL 1's rectangular buildings that is 58,000 square feet. One square warehouse consisting of 85,000 square feet is strictly for order fulfillment for manufacturers, retailers, and individual e-commerce customers. A 568,000-square foot multipurpose warehouse, square in shape, handles crossdocking and transloading of imports and exports along with order fulfillment. All six multipurpose warehouses of 3PL 2 provide crossdock, transload, and import distribution services, with the aggregate area being 1.3 million square feet. The average size is 239,000 square feet.

3PL 1's campus has 1,800 parking spaces, including 288 at dock doors. There are 2,040 parking spaces in 3PL 2's six facilities, with an average of 458 spaces in five and 640 in one. The crossdock/transload facilities of 3PL 1 each have 140 dock doors, and the fulfillment center has 8. Five of 3PL 2's facilities average 36 doors, and the last has 271.

About 80 percent of 3PL 1's fulfillment center's space are racked. Racking in the other eight buildings ranges from zero to 40 percent. Ceiling height in one crossdock/transload facility is 22 feet; it is from 30 to 36 feet in the other eight warehouses. 3PL 1 has a high volume of space available for storage in its buildings as opposed to empty space – from 86 to 94 percent; whereas, 3PL 2 has an average of 40 percent.

Aggregate count of permanent employees in these nine facilities ranges from 525 to 675, depending upon the season; temporary workers fluctuate from 800 to 1,000 during low and peak seasons. All nine facilities are customs bonded, and two are designated Free Trade Zones.

Profile of 3PL Operations

Approximately 60 percent of 3PL 1's inbound cargo are considered international port related (arriving via ports), 20 percent are cross-border trade with Mexico being shipped via truck or rail, and 20 percent are purely domestic (via truck or rail). 3PL 2's profile is much different – 95 percent of inbound cargo are international via ports; the remaining 5 percent

are cross-border with Mexico, and this company rarely handles any domestic inbound. The complexion of outbound cargo differs as well between the two warehouse operators. The outbound cargo that 3PL 1 handles is destined to local, regional, national, and international markets; all of 3PL 2's outbound cargo moves to U.S. destinations. About 35 percent of 3PL 1's outbound cargo are international via ports, 15 percent are cross-border with Mexico (via truck or rail), and 60 percent are purely to domestic destinations moving by truck or rail. In contrast, nearly 100 percent of 3PL 2's outbound cargo move to downstream RDCs or other distribution centers across the U.S.

All nine warehouses operate on a 24/7 schedule, and therefore, generate a great deal of truck traffic in and out. Warehouse Management Systems (WMS) to control and provide visibility of inventory include Infor, Provia, and Manhattan WMOS. Radio Frequency Identification (RFID) tags are used for inventory control, and also for yard management of containers in three of the facilities. WhereNet and an internally developed software system are used to manage yard operations.

A wide variety of goods are stored and processed in the nine facilities, including consumer goods ultimately being sold through retail channels, apparel, electronics, footwear, general department store merchandise, food products, and manufactured goods and raw materials. Next to no hazardous materials are handled. The primary services offered by these two 3PLs include crossdocking and transloading; VAS such as kitting, repackaging, remarking, relabeling, and pick and pack; order fulfillment; import distribution; and drayage.

3PL 1's average cargo turnover rate in its transload warehouse is eight hours. Cargo turns over 4 to 12 times a year, depending upon the customer in its fulfillment center. Since both transloading and order fulfillment occurs in the 585,000-square foot multipurpose warehouse, turnover rates vary for different parts of the building (i.e., eight hours for transload cargo; 4 to 12 times a year for order fulfillment cargo), making it difficult to estimate the overall average turnover rate in this warehouse. 3PL 1's facilities are running at full capacity. July to December are peak months for 3PL 1 when capacity utilization is more than 100 percent. In fact, this company rents another 65,000-square foot building nearby for transloading during peak. During nonpeak months, utilization is 100 percent. In 3PL 2's six multipurpose warehouses, the turnover rate averages six days, and annual throughput capacity is approximately 120,000 containers 3PL 2 runs at 95-percent capacity in peak season and 80 percent during the slack season.

Many large BCOs have automated operations by installing large carton put-away and retrieval systems and material handling sortation equipment. To date, 3PLs have not adopted such capital-intensive automated equipment as readily as BCOs, though some 3PLs are investing in automation as their finances permit because they understand the value of automation. This is occurring primarily in multipurpose warehouses and fulfillment centers with higher ceilings and more space as opposed to transload warehouses. Currently, operations in the nine facilities of these two 3PLs tend to be relatively manual. Forklift clamps and cardboard slipsheets typically are used, instead of pallets to reduce storage space requirements and costs. Hand-held RFID devices like gladiators are prevalent to speed up put-away of inbound merchandise and outbound order picking, improve worker productivity, and reduce errors.

Carton conveyors are manual (gravity-fed rather than fully automated) in eight of the nine warehouses; only one has an automated material handling sortation system for cargo put-

away and order picking; and in the past three years, conveyor technology and speed have been improved there. However, automation in this building has not reduced square footage requirements because complicated sortation, which would require many man-hours can be completed quickly with a sorter, but the sortation system takes up lots of vertical and horizontal space. As to be expected, automation has improved productivity, which has enabled the company to do more with the same number of workers. The other 3PL intends to implement voice recognition tools within the next three years, and is contemplating implementation of an automatic sortation system for transloading cargo.

Cargo handling methods vary by type of operation. Transloading is a simple, straight-forward operation. Typically, the forklift driver retrieves pallets or group of floor-loaded cartons from the ocean container positioned on the inbound side of the warehouse and deposits them in the dock staging area. A worker verifies the inventory, either by performing a manual tally against the packing list/container manifest or by reading carton information with a barcode scanner or RFID gladiator. These cartons are left in the dock staging area or transferred to a nearby section of the warehouse till they are ready to be combined with cartons from previously de-vanned international ocean containers or domestic trucks and loaded in an outbound domestic 53-foot truck or rail container. When all the cargo for the outbound order has been unloaded and accounted for, workers build pallet quantities either on pallets or slipsheets[12] according to the outbound order by using manually propelled pallet jacks. Workers move the slipsheets or pallets by pallet jacks to an area where the forklift driver can easily retrieve and load the cartons in the domestic equipment that is positioned at one of the outbound dock doors on the opposite side of the building from the inbound side. The entire process usually takes less than two days, and often only one day.

Order fulfillment in a 3PL warehouse is more complicated than transloading, with more steps, and can involve greater automation. Operations include unloading cargo from the ocean container or domestic truck by forklift or by hand; entering cargo into warehouse inventory using barcode technology or manual tallies and data entry; transferring cartons for storage to racks or another section of the floor by forklift, pallet jack or via a material handling sortation system; pulling orders by carton or individual piece using picking sheets or barcode scanning equipment; building the outbound order on slipsheets, pallets, or in totes (buckets); and staging the outbound order on the floor in front of the outbound dock door for loading by the motor carrier or Integrator delivery van driver. Cargo can stay in the warehouse for days, weeks, or months, depending upon the customer's requirements.

Approximately 60 percent of inbound cargo to 3PL 1's facilities move by truck and 40 percent by rail; outbound is one-half truck and one-half rail. About 85 percent of 3PL 2's inbound cargo/trailers move via intermodal rail and 15 percent by pure truck; outbound is 75 percent intermodal rail and 25 percent truck. Rail cargo is drayed from or to local rail ramps because neither 3PL has an active rail siding on the property.

In the past three years, one 3PL has encountered more retailers requesting transloading that never used this service in the past, but the mix of products has not changed. The other 3PL advised that the only real noticeable change is decreased carton size, which enables

[12] See this link for a video on the use of slipsheets with a push-pull attachment: https://www.youtube.com/watch?v=Mt_eEK2Da3Y. Slipsheets often are a viable alternative to pallets because pallets are heavier, more costly, and more difficult to dispose of.

more cartons to fit inside each container. The result is that workers must do more sorting, which increases processing time.

Connection between 3PLs and Historical and Emerging Supply Chain Trends

3PLs directly affect and are impacted in a variety of ways by several of the supply chain trends that were studied in Task 3.1. Interviewing the 3PLs added substance to the project research findings. Table 1.2 illustrates key influences and impacts.

Table 1.2 Summary of Interplay between 3PLs and Supply Chain Trends

Trend	Impacts
Transloading and Crossdocking	This is one of the primary services the majority of 3PLs perform in major U.S. gateway ports at which ocean carriers offer first port calls, where interstate highway and intermodal rail access are easy, domestic 53-foot equipment is abundant, and train schedules are frequent. The Ports of Los Angeles and Long Beach draw a high percentage of U.S. import cargo to be transloaded or crossdocked. Because of the time-sensitive nature of the products handled, these transload/crossdock warehouses are concentrated in near-port cities within the SCAG region. 3PLs transload, and crossdock cargo in stand-alone warehouses dedicated to that purpose, but some conduct these activities in warehouses in which storage, distribution, and other services are performed. Ideally, buildings are rectangular with numerous dock doors on each of the long sides and large yards for storing trucks and containers. Though many of the warehouses 3PLs use for this purpose in near-port cities in the SCAG region have less than preferred layouts, which complicates operations, they continue to be leased because location trumps configuration for such time-sensitive operations. Transloading/crossdocking volume has steadily grown to approximately 40 percent of all imports moving through the Ports of Los Angeles and Long Beach. It is likely the majority of these transload/crossdock warehouses are running close to capacity. As more BCOs request this service, if capacity is unavailable in existing warehouses, 3PLs will be forced to operate more efficiently or work longer hours, or seek out additional flex space or transition to larger facilities if capacity is not available in existing facilities. The challenge will be finding suitable parcels close enough to the Ports for such specific operations.
VAS	Though many VAS activities are performed at foreign factories, certain BCOs prefer VAS to be done closer to market in U.S. 3PL warehouses. BCOs typically pay 3PLs to perform most VAS rather than consume their own staff resources and distribution center space. VAS can be simple or complex and are chiefly designed to prepare products for sale. VAS is performed in storage and distribution warehouses, and much less often in transload/crossdock warehouses; therefore, VAS is occurring throughout the SCAG region, and this pattern is unlikely to change. The frequency and type of VAS depend upon BCO supply chain strategies and, thus, it is difficult to predict whether VAS volume in the SCAG region will vary in the

Trend	Impacts
	future. Regardless, demand for warehouse space in the SCAG region should not rise as a result of an increase in VAS.
Vendor-Managed Inventory (VMI)	Chiefly for financial reasons, certain BCOs chose not to immediately take possession of specific products from some of their vendors, but rather, require the vendors to retain liability and possession of this VMI inventory until the BCO requests them for production or sale. Vendors, in turn, contract their 3PL partners to store and distribute VMI products to the BCOs per the BCO's allocation orders. VMI inventory typically is housed along with products for other customers; or if sizable enough, the 3PL dedicates an entire warehouse for one vendor's VMI inventory, a situation that is much less likely. VMI inventory is stored across the SCAG region. Even if VMI volume increases over time, this trend will not have a substantial impact on industrial warehousing demand in the SCAG region.
IT in Cargo Handling Facilities	IT provides positive Return-on-Investment (ROI) in 3PL warehouses by enabling more efficient and accurate cargo put-away, inventory visibility, and order picking and shipping. Technology including WMS, WCS, voice activation systems, and RFID tag and barcode scanners and hand-held readers (gladiators) are becoming commonplace. Higher skilled workers are needed to use such technology. IT promotes handling more cargo in the same amount of physical space, so this trend might indicate a slightly reduced need for warehouse space in the SCAG region in the future.
Multimodal Logistics Centers	3PLs locate storage and distribution operations in multimodal logistics centers to: Benefit from proximity to BCO distribution centers, rail ramps, interstates, and large population centers; Occupy modern buildings with configurations that are preferred including large yards unlike functionally obsolete warehouses in portions of the SCAG region such as the South Bay; and Achieve lower lease rates compared to near-port properties. Two multimodal logistics centers are being developed in the SCAG region – Global Access in Victorville and Hillwood Alliance California in San Bernardino. Both have a mix of 3PL, BCO, and ancillary services tenants. The developer of Highland Fairview Corporate Park in Moreno Valley, a proposed 41.6 million-square-foot multimodal logistics center, is seeking approval by the city council. The huge land parcel requirement pushes such centers to the fringes of Los Angeles. Because operating in a multimodal logistics center is desired by only a small portion of 3PLs and BCOs, it is not likely that the SCAG region can support many more.
Near-Shoring and Reshoring	3PLs facilitate near-shoring to Mexico by operating warehouses near the California-Mexico border for southbound production inputs and northbound finished goods, and reshoring by processing domestic and export cargo in warehouses throughout the SCAG region. It is forecasted that near-shoring and reshoring will increase somewhat as more BCOs seek to produce closer to the U.S. market and reduce total cycle time (design, order, produce, ship) and transportation costs. Demand for 3PL warehouses in the border region should be strong if near-shoring becomes a more permanent trend.

Trend	Impacts
Warehouse Automation	Though 3PLs have been slower to adopt automation than BCOs, automated equipment (i.e., carton conveyors and sorters, storage rack put-away and picking machinery, etc.) is becoming more common in their warehouses, enabling them to handle cargo more efficiently and with fewer errors. Automated equipment is most helpful in storage and distribution operations, and can aid in faster processing of transload and crossdock cargo. Automated equipment enhances cargo throughput, but also takes up lots of physical space, so the future net effect in actual 3PL warehouse space demand in the SCAG region could be neutral.
Retail Order Fulfilment	The way BCOs fulfill orders to stores, customers, and individual consumers is being transformed as Internet sales increase as a percentage of overall sales. Most BCOs have not solidified their strategies at this point in time. Only the largest BCOs, such as Amazon, Wal-Mart, and Home Depot, operate stand-alone omnichannel fulfilment centers for Internet orders. The balance of BCOs fulfill Internet orders in existing multipurpose distribution centers, though some like Macy's are experimenting with Internet order pick-up at stores. In certain cases, 3PLs distribute orders to stores, customers, and consumers on behalf of their BCO customers; and will likely continue to be strategic partners in this activity. It is difficult to predict how 3PL warehouse space requirements in the SCAG region might change in the future as a result of this trend since BCO strategies are in flux.

Primary Conclusions and Implications of 3PL Interviews

From the information gleaned from the interviews with 3PLs, a number of conclusions can be drawn about 3PL segment of the logistics industry:

- Because customer demand for services is focused primarily on imports and, to a lesser degree, on exports, 3PLs require facilities in fairly close proximity to the SPB ports with easy access to rail ramps and interstate highways. The composition of the freight and types of services are unlikely to change dramatically in the foreseeable future; thus, this geographical requirement will remain very important.
- Size and configuration of buildings will vary based on the use. Approximately 50,000 square feet or less typically are adequate for a transload/crossdock building. A large yard for container parking and truck maneuvering is essential, and the ideal shape is rectangular, with numerous dock doors on each long side. Since cargo turns over typically in less than 24 hours, minimal racking and relatively low ceilings will continue to be common characteristics. Multipurpose warehouses and fulfillment centers are larger – usually under approximately 500,000 square feet, and often much smaller. These buildings require ceilings of 30 feet or higher for carton racking, because cargo is stored longer compared to a transload/crossdock building, but fewer dock doors are needed. Although rectangular is the most efficient configuration in which to work, 3PLs can manage their operations in irregular shaped buildings. Even though cargo volumes might fluctuate between peak and slack seasons, to promote profitability, 3PLs prefer buildings with little excess capacity.

- In-fill locations within the SCAG region near the SPB ports will probably be attractive for smaller buildings, primarily for transload/crossdocking, as long as sufficient yard space is available. Operations that require larger buildings will likely be forced out to the Inland Empire or northern fringes of the SCAG region.
- Today, 3PLs rely on largely manual methods for cargo handling, but increasingly are willing to invest in software and equipment to automate their processes. Since technology can be expensive, 3PLs carefully evaluate the ROI before implementation and may not be quick adopters compared with BCOs. The goal of automation may not necessarily be to dramatically reduce building size requirements and workforce levels, but rather, improve the efficiency of processes and accelerate throughput rates.
- The majority of 3PLs operate 24/7, so it is important that local government regulations are supportive of these schedules.
- 3PL facilities will continue to be generators of heavy truck traffic, regardless of location and types of services performed. Trucks haul international containers, domestic 53-foot containers or trailers, and less-than-trailer (LTL) loads. Integrator delivery vans also frequent these facilities, particularly multipurpose warehouses and fulfillment centers.

Industrial Warehousing Landscape from a Commercial Real Estate Developer Perspective

The consulting team had the opportunity to interview seven executives of a prominent commercial real estate developer *(Company)* who provided valuable insights about the industrial warehousing market in Southern California. This information augments many of the points discussed in Task 3.1 Trends in Supply Chain Strategies and the interviews with the BCOs and 3PLs. The interview highlights can be found below, followed by several conclusions and implications.

Company's distribution center clients are looking for different kinds of characteristics in facilities than in the past. The most desired characteristics are:

- *Company's* clients apply more value to properties with acceptable amounts of yard space and higher door quantity that are well located with efficient access to the SPB ports. Having many dock doors facilitates cargo throughput, both inbound and outbound. The criteria for sizable yards to support truck and container storage are partially due to longer periods of time when containers are stored at distribution centers as a result of retrieving or dropping off containers during off-peak hours at SPB ports, so BCOs can avoid the PierPass fee. *Company's* clients are more willing to pay for excess land to store containers than in the past.
- Clear height, the number of potential pallet positions and Early Suppression Fast Response (ESFR) fire sprinkler systems also are characteristics that *Company's* clients value depending on the customers they intend to serve in *Company's* buildings.
- Larger buildings, more racking, and greater automation are less important criteria.

Company executives estimated that the size of warehouses in the Inland Empire average 400,000 to 500,000 square feet; those in near-port areas average 100,000 to 150,000 square feet. Warehouses of different sizes can be found everywhere across Southern

California, because residential development has proliferated in areas that traditionally had been more industrial-focused.

The South Bay, with its proximity to the SPB ports, remains very desirable to BCOs. *Company's* clients typically are willing to pay the higher rents associated with occupying South Bay properties. The Inland Empire also is extremely desirable to *Company's* clients. Those clients find value in the slightly lower rent per square foot and larger building inventory that is available in the Inland Empire versus that found in closer in submarkets. The high desert works for a small subset of users that typically seek lower-priced land for specialized developments. While its demand is slightly improving, it trails the South Bay and Inland Empire still by a long shot.

Proximity to sensitive receptors – residential or schools – and the threat of other use restrictions imposed by municipalities are reasons why a client may avoid a property, provided that other choices are available to them. Due to the scarcity of industrial-zoned land throughout Southern California, combined with the high demand for modern industrial warehouse facilities, some commercial real estate developers will build industrial facilities adjacent to or in very close proximity to residential or other incompatible uses.

Approximately 10 percent of *Company's* industrial warehousing portfolio comprise nonport-related warehousing, typically legacy manufacturers that cannot relocate (i.e., aerospace and metal products manufacturers with buildings in the 50,000- to 60,000-square foot range); those that have amortized their capital probably have already moved out of the region. About 90 percent of Company's square footage are port-related warehousing. The executives indicated they consider cargo to be "international" even after being transloaded in Los Angeles into 53-foot domestic containers and trailers for onward movement to U.S. inland destinations.

Ceiling height averages 33 feet in the Inland Empire. In the South Bay, ceiling height is generally 27 feet. In the South Bay, BCOs are less likely to use an entire building's cube. They typically rack a smaller portion of a building than Company sees in the Inland Empire. BCOs in near-port areas often do not utilize the entire cube height of the building because of the types of activities being performed, such as prepacking and repacking outbound orders, handling returned goods, and other VAS; all of which require more floor space, not high cube. Moreover, transloading at 3PL warehouses is more prevalent in the South Bay, and freight often does not reside inside a building at all. It merely moves from a port container to a 53-foot domestic trailer or container at the door.

Average size of office space in Southern California warehouses is 5,000 square feet on the first floor, and the second floor is often left open for later conversion into office space or other uses. Most BCOs have developed all 10,000 square feet. The executives estimated that 16 percent of a typical warehouse are dedicated to office space.

The executives commented on several characteristics of the industrial warehousing market, and some factors impacting BCO decision-making in locating distribution centers and how they are configured.

- Proximity to SPB ports currently is trumping optimal physical configuration of warehouses. *Company* is seeing the highest demand for warehouses in the South Bay and other near-port areas (i.e., Commerce, Vernon, etc.), even though these buildings were designed in the 1960s for manufacturing and are antiquated in terms of efficient

cargo handling necessitated by current supply chain strategies. Next highest demand is for facilities in the Inland Empire where newer building designs can be found.

- Obsolescence in the entire warehouse market is hard to estimate. Occupancy in the South Bay is running at 90 percent, even though many buildings might be considered functionally obsolete. *Company* is seeing in-fill development in the South Bay, where old buildings are knocked down to be replaced by modern facilities. *Company* and BCOs are reluctant to invest in improvements to functionally obsolete buildings unless the risk is low and adequate payoff is projected. South Bay buildings are typically not long and narrow, and parking surrounds the building rather than the yard being large. The most important criteria now required by BCOs and 3PLs are for yards with lots of swing room for trucks, efficient building dimensions (rectangular with numerous doors on the long sides), and plenty of container storage, in that order, so technically, a sizable portion of the market is functionally obsolescent. Santa Fe Springs, Vernon, Cerritos, Commerce, etc. have low vacancy rates – three percent – but because they are close to the SPB ports, BCOs lease them, even though they are not operationally ideal.
- At peak prior to the global recession of 2008, more imports flowed through SPB ports compared to the present time, which fed demand for warehouse space. Import volume is on the rise, which is contributing to the low vacancy rate in Southern California buildings.
- SPB ports are major drivers of warehouse demand. Statistically in last 10 years, loaded import volume to occupied square feet in warehouses is low in Los Angeles, which is different from other U.S. markets. Company looks at key statistics when determining when and where to build, and port activity is the most closely watched statistic. The Los Angeles warehouse market is the "temporary closet" for the U.S. Demand for warehouse space will continue in Southern California because it is such a big pipe and offers so much flexibility in how, when, and where BCOs move their imports.
- The length of time goods are stored in warehouses is based on many variables – seasonality, price point, etc. BCOs shift supply chain strategies constantly, so warehouse demand is difficult to project.
- There is often vacancy within warehouses (more capacity than is being used at a given time).
- Most truck traffic is being generated in buildings larger than 50,000 square feet.

Interest in stand-alone e-commerce fulfillment centers is increasing, and the topic is frequently discussed in many forums. E-commerce retailers and electronic goods manufacturers that sell to retailers have been part of *Company's* portfolio for the past 15 years, so the concept of e-commerce is not new. The executives indicated just very large BCOs that are highly capitalized – Home Depot, Wal-Mart, and Amazon – can operate stand-alone e-commerce facilities. They need very large footprints of 1,000,000 square feet or more; and these buildings can mostly be found in the Inland Empire. *Company* does a lot of speculative development, but does not build spec buildings designed for e-commerce applications without having a tenant committed. *Company's* properties are adaptable to accommodate the e-commerce use, but *Company* has settled on a strategy to build for the broader market, leaving room to modify a property to meet the

needs of a specialized user. Omnichannel retailing is a new distribution strategy, so many things are unknown about how this will impact the warehouse market.

Company has a little export cargo in its portfolio, including hay, wastepaper, and scrap metal, which is often stored outside.

Company has little Mexico-origin cargo in its warehouses. The executives indicated 2/3 of cross-border cargo from Mexico goes to the U.S. Southeast and Northeast because of the high population centers, rather than to Southern California. Cargo moves via truck and rail; often it is trucked to truck hubs in the Southeast, and then railed to final market.

Primary Conclusions and Implications of Real Estate Developer Interview

From the insights provided by the commercial real estate developer, the following conclusions and implications can be drawn:

- A key driver of distribution center location is proximity to SPB ports, as many BCOs are willing to lease older, functionally obsolete facilities that are not optimal in configuration, size, or yard space. Top priority characteristics are numerous dock doors and large yards with plenty of swing room to enable truck maneuvering. Buildings in these near-port cities typically are under 200,000 square feet.
- In contrast, the Inland Empire is attractive to BCOs requiring very large footprints in the 500,000 to 1,000,000-square foot range and functionally modern designs where longer-term storage and distribution activities are performed.
- Because the SPB ports are magnets for international imports, warehouse space for port-related cargo in Southern California is in demand. However, the region also is a manufacturing center, so demand for space to hold domestic, nonport-related cargo and local exports also is strong and will continue to be so.
- Residential development has proliferated across Los Angeles, even in areas that previously were industrial. This has created incompatible uses and conflicts between warehouse operations and sensitive receptors (i.e., schools and homes). These conflicts will increase as fewer ideal sites are available, and warehouses are constructed in infill parcels. How municipalities will address these conflicts remains unknown, but certainly, some cities will be more business-friendly than others.
- E-commerce fulfillment centers will continue to be developed for only the largest retailers and concentrate in the Inland Empire or North Los Angeles where large plots are available.

Influence of Stakeholder Interviews on Assigning Model Parameter Values

The consulting team used information collected during the stakeholder interviews to validate and refine assumptions and base values of data parameters in the supply/demand forecasting model. It can be concluded that the stakeholder interviews demonstrated, for the most part, that the base values initially selected are reasonable.

Table 1.3 explains, based on the stakeholder interviews, how warehouse characteristics and functions might impact the parameters in different ways and suggests that certain base values might need to be adjusted slightly in the model. There are cases in which impacts

in one value might seem to contradict impacts in another value, but this does not, on its own, invalidate either. The table is simply a way to look at and evaluate the information collected in the interviews against the base parameters.

Table 1.3 Impacts Affecting Supply/Demand Forecasting Model Parameters – Avison-Young Formula: W = L * f * r * ((l+m) + (2*n) * d * e * (l/u1*u2*t*h))

Avison-Young Formula Value	Cargo Type	Type of Impact
u2 (average % capacity utilization annually)	Port-related crossdock transload Port-related non-crossdock transload	(For the purposes of this table, cargo that BCOs crossdock in their own distribution centers is not considered.) 3PLs perform transloading and crossdocking in both stand-alone warehouses dedicated to that activity, as well as in multipurpose warehouses. The 3PLs interviewed operate their warehouses in the SCAG region near or over capacity during peak import months and near capacity in the slack season. Although the majority of port-related cargo to be crossdocked is turned quickly, some of this cargo is held longer for a variety of reasons, which uses up capacity. Value u2 should consider this longer cargo dwell time. Extrapolating, 3PLs may not have much flex capacity to accommodate forecasted import growth, a portion of which will be crossdock or transloaded, and will seek additional warehouse space or transition to larger facilities for crossdock/transload activities. The high utilization rate of the 3PLs interviewed for the study can indicate that a value in the range of 0.75 to 0.80 may be more realistic than a base value of 0.75. That would indicate higher demand for warehouse space in the near to midterm from some of the larger players in the market. Assuming a value higher than that may not be reasonable in light of the limited sample and different operating profiles of small and mid-size 3PLs in the region that might not operate their crossdock or transload warehouses at such a high capacity.
t (turnover of cargo in warehouse per year)	Port-related crossdock transload	Cargo turnover in crossdock warehouses is typically less than one day. One 3PL interviewed turns cargo in eight hours and operates 24/7. This might indicate that a base value of 300 is too low; 315 might be more realistic in crossdock warehouses. This value is calculated by considering that all cargo in the warehouse is brought in and shipped out in one day. We know that some crossdock cargo comes in and is stored for a short period

Avison-Young Formula Value	Cargo Type	Type of Impact
		of time till other cargo arrives with which it needs to be combined to make an outbound order. Also, the warehouse may not be open on holidays or certain weekends in the slow season. Hence, 365 days is not a plausible figure for value t and 315 may be more credible. If they achieve higher turnover, 3PLs should, theoretically, be able to handle more cargo in the same amount of space. This would especially be true in a warehouse using some automated cargo handling equipment. Higher turnover indicates reduced warehouse space demand.
t (turnover of cargo in warehouse per year)	Local import	BCOs and 3PLs handle local import cargo in their distribution centers and warehouses. Annual cargo turnover varies based on BCO supply chain strategies. One 3PL interviewed turns cargo for each of its BCO customers from 4 to 12 times annually in its multipurpose warehouses; the other 3PLs average turnover rate in its multipurpose warehouses is six days because its BCO customers typically do not require long-term storage. Considering this information, the value of 12 may be too low; 14 may be more reasonable. A value of 14 means that taking the various storage needs of all BCOs as an estimated aggregate, the warehouse fully empties all cargo 14 times a year.

1.2 GENERAL CONCLUSIONS

Level of demand for cargo handling facility space, both distribution centers of various types and uses and 3PL warehouses, in the SCAG region is impacted by how BCOs adapt their supply chain strategies to deal with ever-evolving international trade and transportation trends and conditions and events beyond their control, while trying to capture more market share, improve customer satisfaction, and improve profitability. The dynamics are complex. Interviewing stakeholders yielded important insights about how the industrial warehousing landscape in the SCAG region might change in the near and longer term, and how policies and actions of municipalities in the SCAG region can impact commerce. The insights and information provided by the stakeholders enabled the consultants to better evaluate the values to assign to parameters in the supply/demand forecasting model.

Exhibit 1. List of Interviewees

Interview Completed	Declined to Participate
Did not respond to interview request	
Company	**Industry**
APL Logistics	3PL
Ability Tri-Modal	3PL
CH Robinson	3PL
Cal Cartage	3PL
CEVA Logistics	3PL
Con-Way Freight	3PL
Damco Distribution Services	3PL
Expeditors	3PL
Hub Group	3PL
Kuehne + Nagel	3PL
Pacer	3PL
Panther Expedited Services	3PL
Performance Team	3PL
Port Logistics Group	3PL
Ryder CRSA Logistics	3PL
St. George Warehouse	3PL
Schneider Logistics	3PL
Swift	3PL
Universal Warehouse	3PL
Werner Global Logistics	3PL
Yusen Logistics	3PL
3M	BCO
Acco Brands	BCO
Ace Hardware	BCO
Amazon.com	BCO
Ashley Furniture	BCO
Asics Tiger	BCO

Interview Completed	Declined to Participate
Did not respond to interview request	
Company	**Industry**
BCBG Maxazria Group	BCO
BMW	BCO
Bed Bath & Beyond	BCO
Bumble Bee Foods	BCO
Cardinal Health	BCO
Chico's	BCO
Denso	BCO
ExxonMobil Chemical	BCO
Family Dollar Stores	BCO
Heineken USA	BCO
Herbalife	BCO
Honda	BCO
Ikea	BCO
Lowe's	BCO
Macy's	BCO
Mattel	BCO
Michaels Stores	BCO
Nestle USA	BCO
Netgear	BCO
Nordstrom	BCO
Office Depot	BCO
Pacific Sunware	BCO
Panasonic	BCO
Petsmart	BCO
REI	BCO
Red Bull North America	BCO
Rite Aid	BCO
Safeway	BCO
Samsung	BCO
Sony	BCO
Target	BCO

Interview Completed	Declined to Participate
Did not respond to interview request	
Company	**Industry**
The Home Depot	BCO
TJX Companies	BCO
Toyota	BCO
Tyson Fresh Meats	BCO
Voxx International	BCO
Walgreens Co	BCO
Williams-Sonoma, Inc.	BCO
Yamaha Motor Corp	BCO

Exhibit 2. BCO and 3PL Interview Guides

	A	B	C	D
1	**Industrial Warehousing in the Southern California Association of Governments (SCAG) Region**			
2	**Beneficial Cargo Owner Questionnaire**			
3				
4	Company:			
5	Interviewee:			
6	E-mail:			
7	Phone:			
8	Interview Date:			
9				
10	**A**	**General Information**	**Response**	
11	**A1**	Number of owned or leased U.S. cargo handling facilities (CHF) which include distribution centers (DC), rapid replenishment centers (RRC), and other types (specify number by type)		
12	**A2**	Location(s) of CHF(s) in the SCAG region - Los Angeles, Orange, Ventura, San Bernardino, Riverside, and Imperial counties (specify addresses)		
13	**A3**	Number of permanent CHF employees in the six-county SCAG region		
14	**A4**	Average number of temporary CHF employees in the six-county SCAG region		

	A	B	C	D
15	**A5**	Which, if any, of your CHFs are co-located with or adjacent to a light or heavy manufacturing operation? (specify address)		
16	**A6**	Do you use any 3PL warehouse operators in the SCAG region? If so, which one(s)? (specify name and address) For what types of activities (i.e. transloading, cross-docking, value-added services, vendor-managed inventory, etc.)?		
17	**A7**	If you do not currently use a 3PL warehouse operator in the SCAG region, do you expect to use one in the next three years? If so, for what types of activities?		
18	**A8**	If your company operates stores in California, how many are there currently? Are there plans to increase that number in the next three years? If so, by how many?		
19	**A9**	Do you expect your product sourcing pattern to change substantially in the next three years? (yes/no) If so, how will it shift (i.e. near-sourcing to Mexico)?		

	A	B	C	D
20	**A10**	If you export components and parts for assembly to foreign countries, will your export pattern change in the next three years? (yes/no) If so, how will it shift (i.e. increased exports to Mexico)?		
21	**A11**	Does your company import raw materials or components through the ports of Los Angeles or Long Beach, then move those products to Mexico via truck or rail for final assembly, and then back across the California-Mexico border into a California DC for distribution?		
22	**A12**	If your company expects to increase imports or exports through San Pedro Bay ports during the next three years, what do you estimate the annual percentage increase might be? What will drive that increase?		
23	**A13**	Does your company intend to expand its cargo handling facility footprint in California in the next three years? (yes/no; specify type of facility and potential city location)		

	A	B	C	D
25	**B**	**Facility Profile (for each facility listed in row 12)**	**Cargo Handling Facility #1**	**Cargo Handling Facility #2**
26	**B1**	Facility type (i.e. DC for port-related cargo - imports, exports, or both; cross-dock transload; noncross-dock transload; import local, nontransload; nonport-related domestic product; RRC; e-commerce fulfillment; cold storage; bulk to container transfer; other specialty CHF, etc.)		
27	**B2**	Square footage of facility		
28	**B3**	Building shape (i.e. rectangle, square, other)		
29	**B4**	Square footage of yard for parking containers and trailers		
30	**B5**	Number of parking spaces for containers and trailers		
31	**B6**	Number of dock level unloading/loading doors		
32	**B7**	Number of ground level loading ramps		
33	**B8**	Rail siding (yes/no)		
34	**B9**	Railroad performing rail switching		
35	**B10**	Distance in miles from rail ramp (specify		
36	**B11**	Facility ceiling height (feet)		
37	**B12**	Percent of facility's interior that is racked (percent of total interior cubic footage of facility)		

	A	B	C	D
38	**B13**	Percent of facility's interior available for cargo storage/handling as opposed to empty space (in terms of cubic feet)		
39	**B14**	Customs bonded warehouse (yes/no)		
40	**B15**	Free Trade Zone (yes/no)		
41				
42	**C**	**Operational Profile (for each facility listed in row 12)**	**Cargo Handling Facility #1**	**Cargo Handling Facility #2**
43	**C1**	Cargo handled in 2013 (FEUs, cbms and pounds)		
44	**C2**	Key customers served (own stores, other retailers, manufacturers, individual consumers, etc.)		
45	**C3**	Primary products handled		
46	**C4**	Percent of cargo handled comprised of hazardous commodities		
47	**C5**	Geographical service area for inbound and outbound shipments (i.e. local, regional, national, international, cross-border with Mexico)		
48	**C6**	Hours of operation (specify hours by day)		
49	**C7**	Type of Warehouse Management System (WMS)		
50	**C8**	RFID inventory control (yes/no)		
51	**C9**	Type of Yard Management System (YMS)		

	A	B	C	D
52	**C10**	Primary types of activities performed (storage, cross-dock, value-added services, store replenishment, order fulfillment, etc.)		
53	**C11**	Average cargo turnover rate (in days)		
54	**C12**	Annual capacity (cbms or pounds) at current turnover rate		
55	**C13**	Average annual percent facility capacity utilization during peak seasons (specify peak months)		
56	**C14**	Average annual percent facility capacity utilization during non-peak seasons (specify non-peak months)		
57	**C15**	Types of specialized cargo handling equipment (i.e. specialty forklifts, garment-on-hanger, etc.)		
58	**C16**	Carton conveyors (yes/no)		
59	**C17**	Automated material handling sortation system for product put-away and picking (yes/no)		
60	**C18**	Other types of automation or robotics, if any		
61	**C19**	Use of hand held RFID devices such as gladiators (yes/no)		
62	**C20**	Use of voice recognition system (yes/no)		

	A	B	C	D
63	**C21**	Have you increased the level of automation in the past three years? If so, how?		
64	**C22**	For same amount of cargo flow, does automation reduce square footage requirements? If so, by what percent?		
65	**C23**	If you increased automation, how has this impacted the labor force? For example, have you added back office personnel to handle IT, or decreased employees at the shelf level, or increased employees at the final processing area, or experienced some other impact or shift?		
66	**C24**	Do you plan to increase the level of automation over the next three years? (yes/no) If so, in what ways?		
67	**C25**	What percentage of outbound shipments move by truck, rail, ocean, and by integrators (UPS and FedEx)? What variables or factors do you consider when selecting a particular mode?		
68	**C26**	In the past three years, what changes have you made to your operations, facility configuration or service portfolio as a result of evolving customer requests and requirements?		

	A	B	C	D
69	**C27**	In the past three years, has the composition of the products you handle in your CHF changed dramatically? If so, how?		
70	**C28**	If you sell the individual consumers on the Internet, how do you generally fulfill these orders (i.e. from a specialized dedicated fulfillment facility, a traditional DC, your retail stores, a 3PL warehouse, a combination, or other method)?		
71	**C29**	Do you anticipate changing the method of Internet order fulfillment in the next three years? If so, how?		
72	**C30**	If you do not have a dedicated Internet order fulfillment facility now, do you intend to build or lease one in the next three years? If so, where?		

	A	B	C	D
74	D	**General Questions**		
75	D1	Do you anticipate making any changes in your supply chain in the next three years that could impact your warehousing requirements in the SCAG region? (yes/no) If yes, what might these be?		
76	D2	What specific port, rail, or highway infrastructure investments would you like to see the State of California, SCAG, the cities in which you operate your facilities, the ports of Los Angeles and Long Beach, or railroads serving Southern California make to reduce your company's operating costs and/or increase its operating efficiency and make the SCAG region a more hospitable place to do business?		
77	D3	Do you have other suggestions or feedback for SCAG, the cities in which you operate your facilities, or SCAG's partner agencies?		

	A	B
1	**Industrial Warehousing in the Southern California Association of Governments (SCAG) Region**	
2	**Warehouse Operator Questionnaire**	
3		
4	Company	
5	Interviewee	
6	E-mail	
7	Phone	
8	Interview Date	
9		
10	**General Information**	
11	Number of U.S. cargo handling facilities	
12	2013 revenue from warehouse operations	
13	Number of U.S. employees	
14	Number of permanent employees in six-county SCAG region (LA, OR, VEN, SB, RIV, IMP counties)	
15	Average number of temporary employees in the six-county SCAG region	
16	Location(s) of cargo handling facility(ies) in the SCAG region (specify addresses)	
17		

	A	B
18	**Facility Profile (for each facility listed in row 16)**	
19	Facility type (i.e. general warehouse for port-related cargo - imports, exports, or both; cross-dock transload; noncross-dock transload; import local, nontransload; nonport-related domestic product; e-commerce fulfillment; cold storage; vendor managed inventory; other specialty warehouse, etc.)	
20	Square footage of facility	
21	Building shape (i.e. rectangle, square, other)	
22	Square footage of yard for parking containers and trailers	
23	Number of parking spaces for containers and trailers	
24	Number of dock level unloading/loading doors	
25	Number of ground level loading ramps	
26	Rail siding (yes/no)	
27	Railroad performing rail switching	
28	Facility ceiling height (feet)	
29	Percent of facility's interior that is racked (in cubic feet)	
30	Percent of facility's interior available for cargo storage/handling as opposed to empty space (in terms of cubic feet)	
31	Distance in miles from rail ramp (specify rail ramp used)	
32	Customs bonded warehouse (yes/no)	
33	Free Trade Zone (yes/no)	
34	Geographical service area for inbound and outbound shipments (i.e. local, regional, national, international, cross-border with Mexico)	
35		

	A	B
36	**Operational Profile**	
37	Cargo handled in 2013 (cbms and pounds)	
38	Percent of inbound cargo that is international (via ports), cross-border with Mexico (via truck or rail), and purely domestic (via truck or rail)	
39	Percent of outbound cargo that is international (via ports), cross-border with Mexico (via truck or rail), and purely domestic (via truck or rail)	
40	Hours of operation (specify hours by day)	
41	Type of Warehouse Management System (WMS)	
42	RFID inventory control (yes/no)	
43	Type of Yard Management System (YMS)	
44	Key customers	
45	Primary products handled	
46	Percent of cargo handled comprised of hazardous commodities	
47	Primary types of services offered	
48	Average cargo turnover rate (in days)	
49	Annual capacity (cbms or pounds) at current turnover rate	
50	Average annual percent facility capacity utilization during peak seasons (specify peak months)	
51	Average annual percent facility capacity utilization during non-peak seasons (specify non-peak months)	

	A	B
52	Types of specialized cargo handling equipment (i.e. specialty forklifts)	
53	Carton conveyors (yes/no)	
54	Automated material handling sortation system for product put-away and picking (yes/no)	
55	Other types of automation or robotics, if any	
56	Use of hand held RFID devices such as gladiators (yes/no)	
57	Use of voice recognition system (yes/no)	
58	Have you increased the level of automation in the past three years? If so, how?	
59	For same amount of cargo flow, does automation reduce square footage requirements? If so, by what percent?	
60	If you increased automation, how has this impacted the labor force? For example, have you added back office personnel to handle IT, or decreased employees at the shelf level, or increased employees at the final processing area, or experienced some other impact or shift?	
61	Do you plan to increase the level of automation over the next three years? (yes/no) If so, in what ways?	
62	What percentage of inbound shipments move by truck? What percentage move by rail?	
63	What percentage of outbound shipments move by truck? What percentage move by rail?	

	A	B
64	In the past three years, what changes have you made to your operations, facility configuration or service portfolio as a result of evolving customer requests and requirements?	
65	In the past three years, has the composition of the products you handle changed dramatically? If so, how?	

Exhibit 3. Results of 3PL Interviews

	A	B	C	D	E
1	**Industrial Warehousing in the Southern California Association of Governments (SCAG) Region**				
2	**Warehouse Operator Questionnaire**				
3					
4	Companies Interviewed	Damco Distribution Services and Yusen Logistics (division of NYK Group)			
5					
6	**General Information**	**3PL #1 Facility #1**	**3PL #1 Facility #2**	**3PL #1 Facility #3**	**3PL #2 Facilities**
7	Number of U.S. cargo handling facilities	warehouse division has 19 facilities (3M sq ft) and airfreight division has 25 facilities			21 facilities
8	Number of U.S. employees	5,000			400
9	Number of permanent employees in six-county SCAG region (LA, OR, VEN, SB, RIV, IMP counties)	350 - 500 depending upon the season			175
10	Average number of temporary employees in the six-county SCAG region	350 - 500 depending upon the season			500
11	Locations of cargo handling facilities in the SCAG region	three facilities in campus located in Long Beach 90810			six facilities located in Carson 90745, Long Beach 90810, Southgate 90220, and Jurupa Valley 91752
12					
13	**Facility Profile (for each facility listed in row 16)**	**3PL #1 Facility #1**	**3PL #1 Facility #2**	**3PL #1 Facility #3**	**3PL #2 Facilities**
14	Facility type (i.e. general warehouse for port-related cargo - imports, exports, or both; cross-dock transload; noncross-dock transload; import local, nontransload; nonport-related domestic product; e-commerce fulfillment; cold storage; vendor managed inventory; other specialty warehouse, etc.)	cross-dock transload of imports and exports	order fulfillment for manufacturers, retailers, and individual e-commerce customers	cross-dock transload of imports and exports, and order fulfillment	all facilities provide cross-dock, transload and import distribution
15	Square footage of facility	58,000 sq. ft.	85,000 sq. ft.	568,000 sq. ft.	1.3M sq. ft. in total; average 239,000 sq. ft.
16	Building shape (i.e. rectangle, square, other)	rectangular	square	square	rectangular
17	Square footage of yard for parking containers and trailers	Campus is comprised of 65 acres			51 acres in total
18	Number of parking spaces for containers and trailers	Campus has 1,800 (includes 288 parking spaces at doors)			2040; 458 spaces average in five facilities and 640 in one
19	Number of dock level unloading/loading doors	140	8	140	417 total; average of 36 doors in five facilities and 271 doors in one
20	Number of ground level loading ramps	2	2	2	9

	A	B	C	D	E
21	Rail siding (yes/no)	Rail line comes straight through the campus's yard, but is not used by company since company doesn't have a rail siding.			No
22	Facility ceiling height (feet)	22	30	30	36
23	Percent of facility's interior that is racked (in cubic feet)	0%	80%	40%	20%
24	Percent of facility's interior available for cargo storage/handling as opposed to empty space (in terms of cubic feet)	50,000 sq ft	80,000 sq ft	500,000 sq ft	40%
25	Distance in miles from rail ramp (specify rail ramp used)	Outbound intermodal cargo is routed by customer, so company does not get involved.			On average 20 miles or less
26	Customs bonded warehouse (yes/no)	yes	yes	yes	yes
27	Free Trade Zone (yes/no)	no	no	yes	yes one facility is a FTZ
28	Geographical service area for outbound shipments (i.e. local, regional, national, international, cross-border with Mexico)	local, regional, national, and international	local, regional, national, and international	local, regional, national, and international	national
29					
30	Operational Profile				
31	Cargo handled in 2013 (cbms and pounds)	15M cubic meters for all three facilities			100,000 containers
32	Percent of inbound cargo that is international (via ports), cross-border with Mexico (via truck or rail), and purely domestic (via truck or rail)	Percent of inbound cargo that is international (via ports) 60%, cross-border with Mexico (via truck or rail) 20%, and purely domestic (via truck or rail) 20%			95% of inbound cargo is international via ports; the remaining 5% is cross-border with Mexico. Currently it is rare if company handles any domestic inbound.
33	Percent of outbound cargo that is international (via ports), cross-border with Mexico (via truck or rail), and purely domestic (via truck or rail)	Percent of outbound cargo that is international (via ports) 35%, cross-border with Mexico (via truck or rail) 15%, and purely domestic (via truck or rail) 60%			Nearly 100% of outbound cargo is domestic going to downstream regional DCs or warehouse locations. Company has a few shipments per week that are loaded ocean containers going to Hawaii regional DCs.
34	Hours of operation (specify hours by day)	24/7; but only two shifts on Sundays during slack season			24/7
35	Type of Warehouse Management System (WMS)	Infor	Provia	Infor and Provia	Manhattan WMOS
36	RFID inventory control (yes/no)	RFID tags are applied to containers for yard management.			yes
37	Type of Yard Management System (YMS)	WhereNet			In house system
38	Key customers	largest companies in the world			retail 80% and consumer packaged goods 20%

	A	B	C	D	E
39	Primary products handled	retail products, apparel, electronics, footwear, general department store merchandise, food products, and manufactured goods and raw materials	electronics and general department store merchandise	retail products, apparel, electronics, footwear, general department store merchandise, food products, and manufactured goods and raw materials	all consumer goods ultimately being sold through retail channels
40	Percent of cargo handled comprised of hazardous commodities	N/A	N/A	N/A	Less than 1%
41	Primary types of services offered	transloading	kitting, repackaging, remarking, relabeling, pick and pack, and order fulfillment	transloading, kitting, repackaging, remarking, relabeling, pick and pack, and order fulfillment	cross-dock, transload, import distribution and drayage
42	Average cargo turnover rate (in days)	8 hours	from 4 to 12 times/year depending upon the customer	8 hours for transloading; from 4 to 12 times/year depending upon the customer for order fulfillment	6 days
43	Annual capacity (cbms or pounds) at current turnover rate	Facility is working to capacity	Facility is working to capacity	Facility is working to capacity	120,000 containers
44	Average annual percent facility capacity utilization during peak seasons (specify peak months)	above 100%; from July through December company rents another 65,000 sq. ft. buidling close to its campus for transloading	100% July through December	above 100% July through December	95% at capacity in peak season
45	Average annual percent facility capacity utilization during non-peak seasons (specify non-peak months)	100% January through June	100% January through June	100% January through June	Approximately 80%
46	Types of specialized cargo handling equipment (i.e. specialty forklifts)	forklift clamps and cardboard slipsheets instead of pallets	forklift clamps and cardboard slipsheets instead of pallets	forklift clamps and cardboard slipsheets instead of pallets	some heavy weight containers on the trucking side of the business requiring tri-axle chassis and 4 axle trucks along with specialized permits
47	Carton conveyors (yes/no)	manual conveyors	manual conveyors	manual conveyors	yes in one facility
48	Automated material handling sortation system for product put-away and picking (yes/no)	no	no	no	no
49	Other types of automation or robotics, if any	no	no	no	no
50	Use of hand held RFID devices such as gladiators (yes/no)	yes	yes	yes	yes

	A	B	C	D	E
51	Use of voice recognition system (yes/no)	designing and developing now to be operational in 2015	designing and developing now to be operational in 2015	designing and developing now to be operational in 2015	no
52	Have you increased the level of automation in the past three years? If so, how?	no	no	no	yes with improved conveyor technology and speed in one facility
53	For same amount of cargo flow, does automation reduce square footage requirements? If so, by what percent?	N/A	N/A	N/A	no -- main reasoning is complicated sortation which would require many man hours can be completed very quickly with sorter
54	If you increased automation, how has this impacted the labor force? For example, have you added back office personnel to handle IT, or decreased employees at the shelf level, or increased employees at the final processing area, or experienced some other impact or shift?	N/A	N/A	N/A	Automation has improved productivity allowing company to do more with the same amount of labor.
55	Do you plan to increase the level of automation over the next three years? (yes/no) If so, in what ways?	Yes, voice recognition will be implemented, and company is contemplating an automatic sortation system for transloading.	Yes, voice recognition will be implemented.	Yes, voice recognition will be implemented, and company is contemplating an automatic sortation system for transloading.	Not decided yet and certainly not during peak season
56	What percentage of inbound shipments move by truck? What percentage move by rail?	60% truck, 40% rail	60% truck, 40% rail	60% truck, 40% rail	85% of inbound cargo/trailers move via intermodal rail; 15% moves via pure truck
57	What percentage of outbound shipments move by truck? What percentage move by rail?	50% truck, 50% rail	50% truck, 50% rail	50% truck, 50% rail	75% intermodal rail; 25% truck

	A	B	C	D	E
58	In the past three years, what changes have you made to your operations, facility configuration or service portfolio as a result of evolving customer requests and requirements?	Some customers now have company merging imports with domestic cargo to maximize loadability of containers. Some retailers have implemented a Stow-flow process whereby some cargo is imported early and allocated to and stored in company's transload facility for a period of time; then all or some of that product is pulled for transloading at a later date.	Retailers are holding less inventory in their regional DCs and stores so they want smaller orders fulfilled more frequently than in the past.		Improved the Manhattan WMOS technology, radio frequency equipment speed, and improved the automated facility with increased conveyor speed
59	In the past three years, has the composition of the products you handle changed dramatically? If so, how?	More retailers are doing transloading that never did transloading in the past.	Product mix hasn't changed.	Product mix hasn't changed.	The only real noticable change is small box size meaning more boxes inside each container, which requires more sorting.

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