

Introduction to Logistics Facilities & the New England Market, 2022

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In New England's current commercial development market, logistics facilities are being proposed and constructed in large cities and small towns throughout Massachusetts and the broader region.

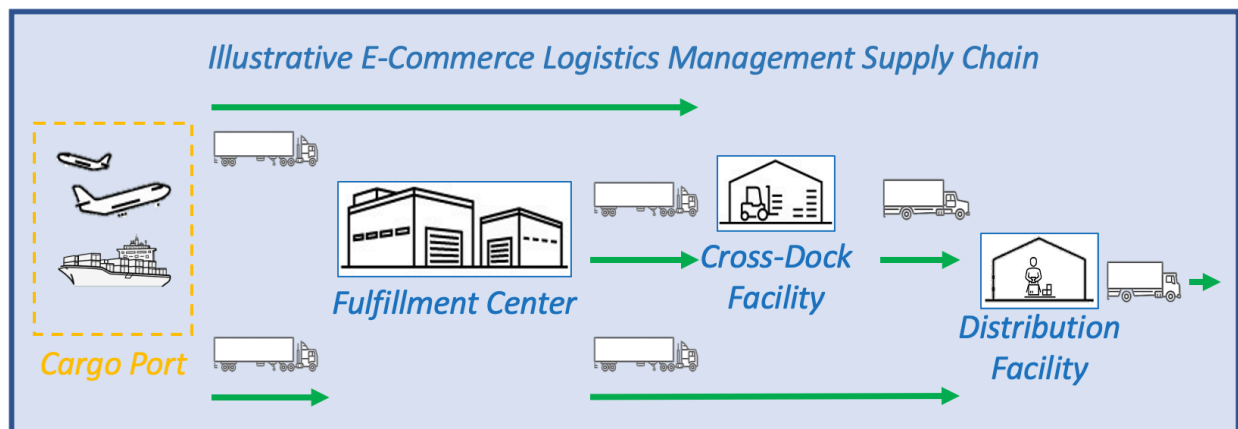
Even after a decade of breakneck growth in Greater Boston's total warehouse space (including logistics facilities), developers seeking to meet end-user demand in the B2C (business-to-consumer) e-commerce market continue to look for opportunities virtually wherever sufficient and adequate land can be assembled, ideally near regional roadways or other freight transportation resources.

This introduction to logistics facilities aims to provide relevant background and context for understanding this distinct market segment and product type. After a brief overview of the e-commerce supply chain, it describes the facility types most commonly being proposed in this market, followed by identification of certain common siting- and permitting-related challenges, which are likely tempered by the continuing strong demand in Greater Boston and throughout New England.

Commercial Supply Chain

Modern commercial supply chain management depends on logistics facilities of varied types to serve the full range of contemporary essential functions, including inventory storage, distribution, delivery, and returns.

Logistics facilities differ from conventional warehouses in their operating norms for storing and processing goods, providing freight transportation, cross-dock handling, order fulfillment, and other services.



Whether integrated into a network or existing independently, each logistics facility type also differs from each of the others in its dedicated purpose and specific functionality, prototypical size and headcount, optimal configuration, parking and loading requirements, and expected traffic impacts.

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Commercial supply chain management for B2C e-commerce demands strategic location of logistics facilities in relation to the regional transportation system, other logistics facilities with complementary or coordinated functions, and end-use destinations.

Facility Types

Logistics facilities of all types are operated to move ordered inventory in and out – whether with intervening storage and specialized handling, or not – in a consistent flow, all driving to minimize time from customer order to front-door delivery.

Despite varying nomenclature and sometimes intermixed operating models, logistics facilities (other than cold storage facilities, which have specialized functionality and distinctive characteristics) are generally typed as follows:

Fulfillment Centers



there are two principal types of *Fulfillment Centers*:

- at *Sortation Fulfillment Centers*, non-bulky goods (e.g., books, toys, housewares) are delivered on pallets, and then picked, packed, and shipped in response to customer orders; especially if incorporating robotics, this type of fulfillment center can be built more compactly than other types, by increasing square footage in additional floors; if not incorporating robotics, this type of fulfillment system tends to be more labor-intensive than other facility types
- at *Non-sortation Fulfillment Centers*, bulky or large goods (e.g., patio furniture, outdoor equipment, or rugs) are held and prepared for shipping or pick-up or third-party delivery in response to customer orders; this type of fulfillment center typically requires substantial storage and handling areas, given the challenge from irregularly shaped and otherwise unwieldy goods.

Cross-Dock Facilities



at *Cross-Dock Facilities*, goods are unloaded after arrival from a cargo port or regional fulfillment center, sorted, and reloaded for transport to distribution facilities or third-party delivery to other destinations; although commonly smaller in building size than most fulfillment centers, cross-dock facilities require particular configurations: typically I-shaped for those with fewer than 150 doors, and optimally T-shaped for those between 150 and 200 doors and X-shaped for those with more than 200 doors.

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Distribution (or Delivery) Facilities



at *Distribution (or Delivery) Facilities*, orders are prepared for ‘last-mile’ delivery to customers; these facilities tend to be located closest to population centers, and (characterized as a “parcel hub” by transportation engineers) generate the most vehicle trips on a square foot basis, given dispersed delivery requirements, with most outbound trips by small vans.

For all four of these facility types, prototypes will likely be refined as specialized technology continues to evolve for further improved efficiency in the handling and delivery of goods.

Common Siting and Permitting Issues

As noted, certain building configurations (and sizes) can help optimize operations. This may limit whether a particular site can, given its size, shape or other (environmental, topographic, *etc.*) constraints, accommodate a particular facility type, including those strategically located on or near adequate regional roadways.

Even if the building footprint (and adequate parking, loading, and related site plan elements) can be fit within a site, one recurrent permitting issue arises from the norms for allowed building height under zoning. Reflecting traditional warehouse specifications, many ordinances and bylaws set maximum industrial building heights at 35 feet. This is insufficient to accommodate commercially reasonable interior clear heights expectations for modern logistics facilities of 50 feet (or potentially more for [multi-story] robotics fulfillment centers) in overall height.

Despite the categorical prohibitions, municipalities tend to allow the increased height, especially if the building is set back or screened from most public (especially residential) views. Given the substantial, positive impact these projects have on the local property tax base (from building improvements and racking systems and other taxable fixtures and equipment) and labor force (and their own local spending, whether as residents or otherwise), these allowances may be reasonable to expect not just from planning boards and zoning boards of appeal under a special permit or variance, but also through rezoning by a city council or even an open or representative town meeting.

That all said, the most substantial challenge for permitting many logistics facilities is conducting a clear and convincing traffic generation analysis and proposing adequate and appropriate mitigation measures to direct or manage the inevitable truck and employee traffic and its impacts.

This challenge begins with a need to explain logistics facilities, not just as different from conventional warehouses (with distinct trip generation profiles), but also from one type

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to another. The differences in facility operations affect traffic characteristics, including their spatial and temporal trip distribution.

As for development of all types, traffic impact analysis for logistics facilities begins with the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*. Following a study funded by the South Coast Air Quality Management District [of California] (SCAQMD) and the National Association of Industrial and Office Properties (NAIOP), ITE established five distinct Land Use Categories for so-called "High-Cube Warehouses," which are defined as:

- typically at least 200,000 sf GFA and with a ceiling height of 24 ft or more
- used primarily for the storage and/or consolidation of manufactured goods
- typically with a high level of on-site automation and logistics management

These five categories (those described above, plus specialty cold storage facilities [typically for food products] not addressed here) exhibit vehicle trip generation characteristics distinctly different from the conventional Warehousing use.

Land Use Code (LUC)	Use		Average Daily Vehicle Trips*	
			All	Trucks
150	Warehousing		1,740	600
154		Transload & Short-Term Storage	1,400	220
155	High-Cube Warehouse	Fulfillment Center (Sort)	3,220	95
		Fulfillment Center (Non-Sort)	1,810	230
156		Parcel Hub	4,630	580

**for purposes of analysis, assumes warehouse structure of 1,000,000 sf GFA*

As can be seen, Sortation Fulfillment Centers generate about 15% of the truck traffic of conventional Warehouses. That said, the labor-intensive operations (absent robotics) can generate about three times the non-truck trips. Notably, the Parcel Hub use (*i.e.*, the 'last mile' Distribution Facility) generates nearly as many truck trips as a comparably sized Warehouse, and over two and a half times as many total trips.

The New England Market

The B2C e-commerce market has continued to grow nationally, even if the consumer demand during the peak of the pandemic may have receded somewhat. This has led to a corresponding increase in the demand for logistics facilities throughout New England (which remains one of the nation's most vibrant consumer markets).

Before the growth of modern logistics management, New England was principally served by mid-Atlantic warehouse storage (especially near the New York/New Jersey

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Port) that transported goods to localized in-store inventory and order fulfillment. The existing warehouses throughout New England were generally considered obsolete for current market demands, at least without substantial redevelopment, renovation, or retrofitting.

As with other property markets, the core of the New England market for logistics facilities remains Greater Boston. About half of that market's total existing inventory for all warehouse types, including logistics facilities, lies along Route I-495, with another quarter along Route 128. There has been consistent increase in inventory over the last decade, with net positive absorption ranging from 1 million to 5 million sf annually. Current vacancy and rent rates suggest the market will continue to drive demand for more new logistics facilities, especially along the region's radial roadways – Routes 3, 24, I-95S, US 1S, I-90, 2, US 3, I-93, US 1N, and I-95N), for the foreseeable future.

It is true that this growth can be hampered by the challenge of finding adequately sized and appropriately configured sites (as well as our notoriously challenging permitting processes). With vacant developable land rare along the key roadway corridors, developers have turned to redevelopment of other land assemblies, including obsolete warehouses, depleted materials extraction sites, abandoned fairgrounds and racetracks, and under-utilized golf courses. These opportunities will likely continue (and maybe even expand to displace other, less economic uses) given the seemingly permanent shift to B2C e-commerce and the enduring demand for logistics facilities serving Greater Boston and New England.
