ISSN: 2643-6876

Current Trends in Civil & Structural Engineering

DOI: 10.33552/CTCSE.2026.12.000791

Iris Publishers

Mini Review

Reconsidering Big-Box Retail Parking Requirements in Florida in the Age of Online Shopping and Home Delivery

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Received Date: August 12, 2026

Published Date: August 19, 2026

Abstract

Minimum parking requirements for big-box retail and shopping-center sites are commonly based on fixed ratios tied to floor area. These requirements can produce large surface parking lots even when actual parking demand is lower than the required supply. Excessive parking can result in inefficient land use, expanded paved areas, increased impervious surface, and commercial site designs that may not reflect current shopping behavior. This mini review examines literature relevant to reducing excessive minimum parking requirements for big-box retail and shopping-center sites, with Florida identified as the geographic focus for future data collection. National and international literature is used as the methodological and theoretical foundation. The reviewed studies support parking counts, utilization analysis, code evaluation, e-commerce travel-behavior analysis, and separation of customer parking from delivery/loading activity. The literature shows that parking reduction should not be assumed simply because online shopping and home delivery have increased. Instead, parking reduction must be supported by observed field data showing that current code requirements exceed actual peak demand. The review identifies a need for a demand-based and context-sensitive framework that connects observed parking occupancy, required parking supply, e-commerce-related activity, delivery/loading demand, and land-use context. Such a framework can support reduced minimum parking ratios, parking maximums, shared parking, site-specific parking studies, or statistical modelling tools where observed demand is lower than current requirements.

Keywords: Big-box Retail; Parking Requirements; Parking Utilization; E-Commerce; Home Delivery; Florida

Introduction

Minimum parking requirements remain an important issue in transportation planning, land development regulation, and commercial site design. For big-box retail and shopping-center sites, parking requirements are often calculated through fixed ratios based on building floor area or gross leasable area. These ratios are intended to ensure that enough parking is available for customers and employees; however, the literature shows that fixed parking ratios may not always match actual demand.

This issue is especially important under contemporary retail conditions. Online shopping, home delivery, curb side pickup, on line-order pickup, and delivery-based fulfilment are now part of retail activity. These changes may reduce some customer shopping trips, but they may also create pickup, delivery, loading, and freight-related activity. Therefore, e-commerce should not be treated as automatic evidence that parking can be reduced. Instead, it should be evaluated together with observed parking occupancy, delivery/loading activity, local code requirements, and development context.

The purpose of this mini review is to synthesize literature that supports an evidence-based approach to evaluating parking re-

quirements for big-box retail and shopping-center sites that supports an evidence-based approach to evaluating parking requirements for big-box retail and shopping-center sites. The research focus is Florida, but the literature includes studies from other states and countries because the methodological problem is broader than one geographic area. The central position is that parking reduction must be evidence-based and context-sensitive. Reduced parking requirements should be supported only where observed data show that current code requirements exceed actual peak demand.

Discussion

Parking Demand, Parking Utilization, and Shopping-Center Field Counts

A major group of studies supports the use of observed parking counts, hourly accumulation, peak occupancy, and utilization analysis. These studies are important because they show that parking standards can be evaluated using actual field data instead of relying only on fixed minimum ratios.

Voorhees and Crow (1966) [21] studied parking requirements for shopping centers based on research conducted for the Urban Land Institute. Their study examined parking demand at 270 shopping centers in the United States and Canada. They reported that parking standards depend on factors such as parking habits, trading area, mode of travel, and the presence of nonretail uses. For shopping centers with little walk-in or transit trade, they found that 5.5 spaces per 1,000 square feet of gross leasable area would accommodate customer and employee demand on all but the three highest days of the year, with allowance for parking maneuvering.

The Highway Research Board (1971) [22] provided broader guidance on parking principles, including parking characteristics, zoning, parking studies, location and design, parking operation, and curb parking. This source supports the need to treat parking as both a transportation and land-use issue involving demand factors, zoning review, design, and continuing evaluation.

Stein (1991) [1] studied neighborhood and community shopping centers in Fairfax County, Virginia. The study collected weekday and Saturday parking data during June, October, and December at more than 30 centers and included more than 2,000 hourly observations. Stein found that 4.0 spaces per 1,000 square feet of gross leasable area would serve almost all centers studied, except where restaurant space exceeded 15 percent of gross leasable area. This study is important because it demonstrates the use of field counts, hourly accumulation, tenant characteristics, and peak-demand analysis for ordinance review. The Monroe County Department of Planning and Development (2007) [2] used field observations to evaluate parking demand by land use, including shopping centers with big-box anchors. The report developed a parking-demand equation based on observed peak occupied spaces. This study is relevant because it shows how observed parking counts can be used to develop a statistical relationship between land use and parking demand.

Eckart (2019) [3] examined retail parking utilization in Mercer County, New Jersey and focused on whether retail parking was oversupplied. This study supports the importance of utilization analysis because a site may provide a large parking supply while only a portion of that supply is used. Smith (2013) [24] examined 13 neighbourhood shopping centres near Santa Clara Valley Transportation Authority light rail stations in San Jose, California. All surveyed centers were below the 85 percent utilization threshold during both December and February surveys. Smith found that the centers were required by the city to oversupply parking and that holiday parking demand was not substantially higher for most surveyed centers. Together, these studies show that field counts, hourly accumulation, peak occupancy, utilization rates, shopping-center size, tenant mix, and statistical comparison between observed demand and required supply are necessary for evaluating whether minimum parking requirements are excessive.

Parking Standards, Minimum Parking Requirements, and Code Review

A second group of literature focuses on parking standards, minimum parking requirements, local governmental agencies' code review, and the assumptions behind required parking ratios. This literature is important because required parking ratios may be based on generalized assumptions rather than actual site conditions.

Shoup (1997) [28] argued that the empirical base for minimum parking requirements is weak because many requirements are based on peak parking demand at sites with free parking, ample supply, and little or no transit service. Shoup (2002) [4] also criticized the apparent precision of parking-generation estimates and questioned the use of generalized rates as if they are exact or universally applicable. Shoup (1999b) [14] argued that minimum parking requirements can create planning and economic problems when they require parking supply without sufficient attention to actual demand, pricing, and local conditions. Shoup (1999a) [13] discussed in-lieu parking programs as an alternative to rigid on-site parking requirements.

Davidson and Dolnick (2002) [5] addressed parking standards in the American Planning Association's Planning Advisory Service report. Their work supports the need for code review because parking regulations affect land use, transportation, development design, and local planning outcomes. Willson (1995) [25] found that suburban parking requirements in Southern California office developments caused parking to be oversupplied, shielded automobile commuters from the economic cost of parking, increased automobile commuting, reduced building density and land value, and produced automobile-oriented urban design. Willson (2000) [26] showed that parking requirements are often shaped by traffic mitigation concerns, spillover parking, and risk avoidance. Willson (2005) [27] further showed that parking policy should be coordinated with development context, travel behavior, pricing, and transportation objectives. Mukhija and Shoup (2006) [29] argued that local off-street parking requirements often emphasize quantity over quality. They identified strategies such as deregulating or limiting the number of parking spaces, improving parking location, improving surface-lot design, improving parking-structure design, and improving residential garage design. Barter (2011) [30] and

Barter (2012) [31] showed that off-street parking requirements vary widely across jurisdictions and that parking policy can conflict with broader transportation and urban-development conditions.

McCahill et al. (2014) [37] examined parking in six urban business districts between 1960 and 2000 and found that minimum parking requirements can require costly infrastructure and substantial land commitments. Sohoni and Lee (2024) [38] studied parking reform in Champaign, Illinois and found that on-site parking construction in deregulated zones decreased from 108 percent of earlier requirements to 46 percent. Sohoni and Lee (2026) [39] examined parking reform in nine U.S. cities and found that policy effects were shaped by market demand and the existing policy environment, with greater reductions in urban core or transit districts and limited effects in car-oriented, low-density settings.

This literature supports a research approach that reviews local governmental agencies' code requirements, identifies required parking ratios, compares required supply with observed utilization, and examines whether code mechanisms exist for reduced parking, shared parking, in-lieu parking, parking maximums, parking-reduction procedures, or site-specific parking studies.

Land-Use Context, Shared Parking, and Parking Management

Parking demand should not be evaluated only by building floor area. The literature also shows that parking demand varies by development context, density, walkability, shared-parking opportunities, parking pricing, transit access, roadway function, and existing parking stock.

Ewing et al. (2017) [11] examined trip and parking generation at five transit-oriented developments in the United States. Although not focused on big-box retail, the study shows that parking demand can differ from conventional expectations when development context changes. Abbott and Bigazzi (2017) [12] examined shared parking in a dense urban neighbourhood and showed that underused parking supply can be identified and that shared parking can reduce the need for separate dedicated parking areas where land uses have different peak periods.

Marshall et al. (2008) [23] reassessed on-street parking in relation to parking demand, pedestrian environment, land use, vehicle speed, and safety. Weinberger (2012) [32] found a relationship between guaranteed residential parking and a greater propensity to drive in New York City. Weinberger and Karlin-Resnick (2015) [33] examined 27 mixed-use districts in the United States and found that parking was oversupplied by 65 percent on average when using a sufficient-supply standard that would leave 15 percent of spaces open.

McCahill and Garrick (2010) [34] compared Hartford, Connecticut and Cambridge, Massachusetts between 1960 and 2007 and connected differences in automobile commuting to parking policy, parking provision, and urban environment. McCahill and Garrick (2012) [35] found that each 10 percentage-point increase in automobile commute share was associated with more parking per 1,000 people and lower population density. McCahill et al. (2016) [36] found that increased parking provision was associated with increased automobile mode share.

These studies support context-sensitive analysis. Big-box retail and shopping-center sites should be classified by development setting, such as suburban, urban, rural, mixed-use, standalone big-box, or shopping-center anchor conditions, before parking-reduction conclusions are drawn.

E-Commerce, Home Delivery, and Shopping-Trip Behavior

The e-commerce literature is important because it helps explain possible changes in retail travel behavior, but it does not directly prove that big-box parking spaces should be reduced. Cao (2009) [15] reviewed empirical studies on e-shopping, spatial attributes, and personal travel. Cao (2012) [16] examined the relationship between e-shopping and store shopping in the shopping process for search goods. Choo et al. (2007) [17] showed that transportation and communications may be substitutes, complements, or neither.

Spurlock et al. (2020) [6] found that deliveries substituted for 12 percent of vehicle shopping trips on average and supplemented trips for 9 percent of purchases. This finding is important because it shows that home delivery can replace some trips but can also add activity. Kim and Wang (2024) [7] examined shopping trips and deliveries using 2009 and 2017 National Household Travel Survey data and found that behavioral shifts differ by income level and urban size. Giuliano et al. (2022) [8] examined shopping, purchasing, and receiving goods in e-commerce and discussed substitution, complementarity, and neutral effects, as well as delivery choice, pickup points, and parcel lockers.

Le et al. (2022) [40] systematically reviewed 42 empirical studies and found more evidence that online shopping substitutes for shopping travel, but also found conflicting evidence of substitution, complementarity, modification, and neutrality. Lee et al. (2017) [41] found that online shopping was associated with higher in-store shopping rates after controlling for demographic variables and attitudes. Barua et al. (2023) [42] modeled household online shopping demand in the United States using National Household Travel Survey data and machine-learning methods.

Javadinasr et al. (2021) [43] found an expected rise in grocery and non-grocery online shopping after the pandemic. Liu et al. (2022) [44] modeled weekly home-delivery frequencies in Toronto and found that socioeconomic factors, online grocery membership, age, gender composition, number of workers, and land-use factors influenced home-delivery demand. Castañ o-Herrera et al. (2025) [45] found that e-commerce mobility effects depend on spatial context and shopper behavior. Shi et al. (2022) [46] distinguished online searching from online purchasing and explained that online searches may generate more or longer physical store trips, while online purchases may substitute for store trips and increase delivery demand. Overall, the e-commerce literature supports studying customer trip behavior, but it does not directly establish a parking-space reduction ratio. It supports treating online shopping and home delivery as measurable variables that may influence parking demand.

Delivery, Loading, Freight Activity, and Parking Demand

Delivery and freight activity must be separated from customer parking demand. This is important because e-commerce may reduce some customer trips while increasing pickup, loading, delivery, or freight activity.

Ramirez-Rios et al. (2023) [9] developed a simulation model for on-street parking demand related to freight, service activity, and e-commerce deliveries in U.S. cities. Chen et al. (2017) [10] studied residential delivery parking regulations and behavior in New York City and showed that delivery activity can create parking and loading issues that may not be fully addressed by existing regulations. Allen et al. (2018) [18] connected e-commerce with last-mile light goods vehicle activity in London. De Oliveira et al. (2017) [19] studied automated delivery stations for e-commerce deliveries, and Durand and Gonzalez-Feliu (2012) [20] discussed urban logistics and e-grocery distribution scenarios.

McDonald and Yuan (2021) [47] reviewed freight loading-space provision in the United States and found significant variation in off-street loading requirements across large cities. They also found that on-street loading spaces are often important supplements to off-street spaces but are frequently provided in an ad hoc manner. McDonald et al. (2021) [48] found that freight-loading requirements vary widely across cities, that off-street requirements are more common for larger businesses, and that on-street loading requirements are less likely to be codified. Amaya et al. (2023) [49] found that delivery drivers' parking choices are affected by search time, walking time, and parking cost, with drivers first preferring legal available spaces and then double parking. Kalahasthi et al. (2022) modeled truck arrivals and parking durations for freight loading zones and found that arrivals vary by day, month, and time, while durations depend on activity type, vehicle type, and vehicle size.

These studies show that delivery/loading activity should be analyzed separately from customer parking occupancy. Delivery vehicles, pickup activity, loading zones, dwell time, search time, walking distance, and curb-space availability are operational variables that differ from customer parking demand.

Research Gap

The reviewed literature provides a foundation for studying big-box retail and shopping-center parking requirements, parking utilization, minimum parking standards, land-use context, e-commerce travel behavior, and delivery/loading activity. However, it does not provide a direct parking-reduction model for contemporary big-box retail and shopping-center sites that combines observed parking occupancy, code-required parking supply, online shopping, home delivery, curbside pickup, delivery/loading activity, and development context.

The central research gap is the absence of an evidence-based framework that connects observed parking demand, code-required parking supply, e-commerce-related activity, delivery/loading needs, and land-use context into a statistical modeling tool for testing whether current requirements exceed actual observed demand.

Conclusion

The literature supports a demand-based approach to evaluating minimum parking requirements for big-box retail and shopping-center sites. Parking-count and utilization studies provide the strongest methodological foundation because they show how observed occupancy, peak demand, hourly accumulation, and utilization rates can be used to evaluate whether required parking exceeds actual demand. Parking-code and parking-policy studies show that minimum parking requirements are often shaped by generalized assumptions, risk avoidance, spillover concerns, pricing conditions, and development context.

The e-commerce literature shows that online shopping and home delivery may substitute for some trips, complement other trips, modify travel behavior, or have neutral effects. Therefore, online shopping should not be used as automatic proof that parking spaces should be reduced. The delivery and logistics literature also shows that delivery/loading activity should be measured separately from customer parking demand because freight, curbside pickup, online-order pickup, and last-mile delivery create different operational needs.

The main conclusion is that parking reduction for big-box retail and shopping-center sites must be evidence-based and context-sensitive. A defensible approach should include local governmental agencies' code review, site classification, field parking occupancy counts, e-commerce and delivery/loading observation, parking utilization analysis, and statistical modeling. This approach can support reduced minimum parking ratios, parking maximums, shared parking, site-specific parking studies, or reallocation of excess parking areas where observed demand is lower than current requirements.

Acknowledgements

None.

Conflict of Interest

The authors declare no conflict of interest.

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