TRANSPORT OHIO

Ohio Truck Parking Study

Ohio Department of Transportation

About Transport Ohio

The objective of Transport Ohio is to build on past efforts, including the prior Transport Ohio Plan, Ohio State Rail Plan, Ohio Maritime Strategy, Access Ohio 2045 and others, and close information gaps to develop:

A federally-compliant plan that provides a clear understanding of the multimodal freight system, how industries use the system and the system needs, issues and opportunities so ODOT can make better-informed policy and investment decisions throughout Ohio.

Transport Ohio plan development will include: stakeholder involvement and education, freight needs analysis, a truck parking study, identification of freight-benefitting projects, a freight investment plan – all documented and summarized in the final Transport Ohio Plan.

About the Ohio Truck Parking Study

This study report is the compilation of the data analysis, stakeholder input and previous truck parking working papers that synthesizes needs and opportunities to improve truck parking in Ohio.

Acknowledgments

The CPCS Team acknowledges and is thankful for the input of those consulted in the development of this Working Paper, as well as the guidance and input of representatives from ODOT and their study partners.

Opinions

Unless otherwise indicated, the opinions herein are those of the authors and do not necessarily reflect the views of ODOT.

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Acronyms and Abbreviations

Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
ATCMTD	Advanced Transportation and Congestion Management Technologies Deployment
AO45	Access Ohio 2045
ATRI	American Transportation Research Institute
BUILD	Better Utilizing Investments to Leverage Development
CAV	Connected and Autonomous Vehicles
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CMV	Commercial Motor Vehicle
DERA	Diesel Emissions Reduction Act
DMS	Dynamic Message Signs
DOT	Department of Transportation
EB	Eastbound
EPA	U.S. Environmental Protection Agency
EV	Electric Vehicle
FAST Act	Fixing America's Surface Transportation Act
FHWA	Federal Highway Administration
HOS	Hours of Service
HRD	Highway Research and Development
HSIP	Highway Safety Improvement Program
INFRA	Infrastructure for Rebuilding America
ITS	Intelligent Transportation Systems
LCV	Longer Combination Vehicles
MAASTO	Mid America Association of State Transportation Officials
MAP-21	Moving Ahead for Progress in the 21st Century Act

MPO	Metropolitan Planning Organization
NHS	National Highway System
NHFN	National Highway Freight Network
NHFP	National Highway Freight Program
NHPP	National Highway Performance Program
NIMBY	Not In My Backyard
NMFN	National Multimodal Freight Network
NSC	National Safety Council
ODOT	Ohio Department of Transportation
OOIDA	Owner-Operator Independent Drivers Association
OSHP	Ohio State Highway Patrol
P3	Public-Private Partnership
PDO	Property Damage Only
PHFS	Primary Highway Freight System
RAISE	Rebuilding American Infrastructure with Sustainability and Equity
ROW	Right-of-Way
RTPO	Regional Transportation Planning Organization
SFS	Strategic Freight System
STBG	Surface Transportation Block Grant Program
STP	Surface Transportation Program
TIDP	Technology and Innovation Deployment Program
TIGER	Transportation Investment Generating Economic Recovery
TPIMS	Truck Parking Information Management System
US	United States
WB	Westbound

1 About the Ohio Truck Parking Study

The safe and efficient movement of freight throughout Ohio requires a combination of factors, including truck drivers having access to safe and available truck parking. Truck drivers, particularly long-haul carriers, count on truck parking to provide a location where they can:

- Get the rest they need: Truck drivers need a location where they can get the rest they need to safely operate the vehicle and comply with Federal Hours of Service (HOS) regulations.
- Stage for pick-up and delivery: Truck parking locations provide drivers with a place where they can wait in advance of pick-up and delivery appointments (staging). Staging is a direct result of shippers and receivers only allowing truck drivers on-site during specific pick-up and delivery windows, penalties for late delivery and congested roadways.

Surveys of truck drivers in 2015 and 2019 by the Federal Highway Administration (FHWA) for Jason's Law demonstrates that truck parking is both a frequent and national issue. Specifically, the 2019 Jason's Law Survey found that 75% of truck drivers encountered problems finding truck parking one or more times per week. Only 5% of truck drivers responding to the 2019 Jason's Law Survey reported that they rarely or never have problems finding truck parking.[1]

What are HOS Regulations?

HOS regulations specify the maximum amount of time that truck drivers can be on-duty, driving and the minimum amount of time they are required to be off-duty. With some exceptions, HOS regulations apply to most truck drivers and set the following operating limits and break requirements:

Operating

- *On-Duty Maximum:* 14 hours on-duty.
- Drive Time Maximum: 11 hours of drive time.
- *60/70-Hour Rule:* Drivers cannot drive more than 60 hours in seven days or 70 hours in eight days. At least 34 consecutive hours off-duty resets this rule.

Breaks

- *30-Minute Break:* One 30-minute, non-driving period is required to drive beyond eight consecutive hours of drive time.
- *10-Hours Off-Duty:* 10-hours off-duty is required to use the maximum on-duty and drive time.
- *Sleeper Berth:* Allows drivers to split the 10 hour off-duty requirement into two periods, with one at least seven hours, the other at least two hours and the total equaling 10 hours.

In 2020, truck drivers identified truck parking as the top issue affecting the trucking industry.[2]

Jason's Law: The Story of Jason Rivenburg

On March 5, 2009, truck driver Jason Rivenburg arrived at his delivery destination early. Since the distribution center was not open for deliveries and did not allow trucks to park onsite, Jason parked in a nearby abandoned gas station. While he rested, a burglar broke into the truck, stole seven dollars and fatally shot Jason. Jason left behind his wife and their three children. In the wake of Jason's death, his wife, Hope Rivenburg, worked to bring attention to the national truck parking problem. Her efforts led to the inclusion of Jason's Law under the Moving Ahead for Progress in the 21st Century Act (MAP-21).

Ohio Truck Parking Study

As part of Transport Ohio, the Ohio Department of Transportation (ODOT) conducted a statewide truck parking study to understand and convey the importance of truck parking to safety, the economy and supply chains in Ohio.

Objective

The objective of the Ohio Truck Parking Study (the Study) was to inventory the supply, assess the demand and utilization of truck parking statewide, and identify truck parking needs. After highlighting the imbalances in truck parking supply and demand, truck parking needs were prioritized and potential solutions identified. Each solution presents an opportunity for intervention by ODOT and/or partnerships with local government stakeholders.

Day in the Life: A Trucker's Perspective

Could you complete your work if you had to face the same obstacles that truck drivers encounter? You might think my single largest day-to-day concern would be weather, traffic or expensive maintenance, but unquestionably my largest day-to-day concern was where I was going to park at night. The lack of safe parking locations throughout the country, particularly near large cities and large industrial areas, leads to trucker drivers commonly parking 30 to 50 miles away from their destination. Consequently, the truck driver ends up wasting precious time in the morning, likely stuck in rush hour traffic, needlessly burning fuel, all to just make it to a shipper or receiver.

Load planning is key for truck drivers, but there were far too many times when I started my day with a perfectly realistic plan, only to have it fall apart at the hands of others. I have experienced delays where my time at the facility stretched beyond four hours to pick up a single steel coil. These delays not only change the plan for the day but can lead to dire consequences, as was the case for Jason Rivenburg and Michael Boeglin. Both lost their lives while parking for the night (one in a very rural location, the other in a large city). I parked overnight in the exact same spot as Michael Boeglin in the past and fortunately that occasion did not cost me my life.

These delays and lack of truck parking in some areas have real-world impacts. When I was asked if I wanted to haul a load out of an area with no truck parking or a facility where I was frequently delayed, I emphatically said no, not unless it paid a very significant premium rate. Several times I was paid a very handsome premium price. This is no doubt because myself, and many other drivers, are not willing to deal with the hassle of having no reasonable place to park.

Trucker drivers cannot predict the future, a truck driver may start the day not knowing when or where they can safely get to bed for the night, or if they will even have access to a restroom. New drivers do not know which shippers and receivers allow parking on-site or where safe unmarked parking locations may be found and drivers who run irregular routes may never develop such knowledge. The ultimate lesson is this: not addressing the truck parking problem is creating a climate where it is costlier to conduct business, and where truckers know they may end up in an unsafe situation.[3]

2 Why does truck parking matter to Ohio?

Truck parking is critical to the safe and efficient movement of freight. Specifically, inadequate truck parking leads to economic and social costs for truck drivers and the general public. In addition, truck drivers often face a choice between three options when they are in an area with inadequate truck parking (Figure 1).

FIGURE 1: IMPACTS OF INADEQUATE TRUCK PARKING

Truck Driver Option	Impact
Truck driver stops early	• **Economic:** lost drive time, reduced economic efficiency
Truck driver parks in undesignated location	• **Economic:** citations add to the cost of doing business • **Safety:** reduced safety for truck driver and other roadway users • **Infrastructure:** damage to roadway and ramp shoulders • **Quality of Life:** increased noise and emissions impacts, and associated environmental costs from idling trucks
Driver exceeds HOS looking for truck parking	• **Economic:** citations add to the cost of doing business • **Safety:** reduced safety for truck drivers and other roadway users • **Quality of Life:** increased noise and emissions impacts, and associated environmental costs from additional miles spent looking for truck parking

Source: CPCS

Each of the options in Figure 1 has negative impacts on the truck driver and society, through lost drive time, reduced safety, damaged infrastructure and a decrease in quality of life. The following section details these impacts, as well as how these impacts relate to the goals developed during Ohio's long-range transportation plan — Access Ohio 2045 (AO45).

Inadequate truck parking, or a lack of information about available truck parking, negatively impacts the economy, safety, infrastructure and quality of life in Ohio.

Economy

When truck drivers have a difficult time finding truck parking, they encounter economic costs such as the fuel consumed and lost drive time as they search for truck parking. Meanwhile, if drivers stop driving early in order to secure parking, they lose drive time, impacting their wages and transportation costs. A 2018 survey of 5,400 truck drivers found that 48% of drivers reported spending an hour or more per day trying to find truck parking, which translates to an annual cost of $5,000 to $6,000.[4] Similarly, there are economic costs in the form of citations and increased insurance costs to driving beyond HOS or parking in an undesignated location, adding to the cost of doing business.

Safety

The imbalance in truck parking space supply and demand can create important safety issues for the truck drivers as well as the public. Insufficient sleep results in decreased alertness and a reduction in driver response time. Research has shown that breaks at specific intervals can increase a drivers' alertness by reducing the monotony of the task.[5] However, if fatigued truck drivers are unable to find a safe parking spot for rest, they may continue to drive or choose to park at remote, insecure areas and/or undesignated locations. All of these situations pose serious safety and security risks to truck drivers and other road users.

Truck Parking-Related Crashes

The connection between truck parking and safety is demonstrated through an analysis of crashes with trucks parked at undesignated locations and crashes that occur due to fatigued driving.

Crashes related to Commercial Motor Vehicles (CMV) parked in undesignated areas were primarily clustered at or near urban areas, in particular Cincinnati, Columbus, Cleveland and Akron, where daily truck volumes are generally higher.

From 2015 to 2019, over 460 truck crashes happened due to fatigued driving, leading to six deaths, 50 serious injuries and more than 400 minor or possible injuries.

Fatigue-related truck crashes are spread along all major highways in Ohio, with clusters in urban areas. The five-year, truck-involved crashes associated with undesignated truck parking or fatigued driving in Ohio has a social cost of $46 million due to loss of life, loss of productivity, medical costs, legal and court costs, emergency service and insurance costs, congestion costs and property damage.[6]

Undesignated Truck Parking Proves Deadly[7]
On Wednesday, March 20, 2019, Michael Vosburg pulled his tractor-trailer over to park on the left side of a rest area entrance ramp on I-75 north in Ohio. Sleeping in his truck, Vosburg awoke to an impact – a vehicle had rear-ended his trailer. An SUV driven by Fei Ni rear-ended Vosburg's truck, and Fei Ni died as a result of the crash.

From 2015 to 2019, Ohio had 106 crashes involving a truck parked in an undesignated area, leading to five deaths, 11 serious injuries and 36 minor or possible injuries.[8]

Infrastructure

Insufficient truck parking leads to infrastructure damage on roadway shoulders, on/off ramps, local roadways and passenger vehicle parking locations that are not designed for long-term truck parking. The time spent searching for truck parking also results in added truck volumes on local and other roadways.

AO45 Goal: *Preservation*

Quality of Life

Insufficient truck parking also has negative quality of life impacts on truck drivers and the public.

A 2018 survey of truck drivers found that 85% of drivers cited parking as the top cause of stress at work.[9] The time spent searching for truck parking also results in additional emissions on local and other roadways. Similarly, truck idling in urban areas or on local roadways contributes to air and noise pollution in local communities. This creates conflict with local communities, local and regional environmental goals, and could create a barrier to truck parking expansion.

AO45 Goal: *Quality of Life*

AO45 Goal: *Stewardship*

Local Pushback to Truck Parking[10]

Some communities are unreceptive to new or expanded truck parking facilities in their local area. Communities may have a negative perception of truck parking or are unaware of the important role that truck parking has in the local economies and the safe and efficient movement of freight. During one recent town council meeting in Ohio, the topic of undesignated truck parking was discussed. One council member focused on the need for the council to find a solution that allows truck drivers to legally park overnight. However, this was met with responses from other council members noting, "I don't care what they do, that's their issue to deal with," and another council member stating council, "isn't here to babysit [truck drivers], these are grown men."

3 Where are we now?

Ohio's Truck Parking Inventory

Truck drivers use different types of designated truck parking lots/spaces such as truck stops and rest areas to get the rest they need and meet their personal and operational needs. In addition to designated truck parking spaces, trucks also park at other less formal truck parking locations, such as restaurants, parking lots at retail businesses and other vacant lots. These less formal locations range from spaces provided by large companies, such as McDonald's, to gravel lots. For the purposes of this study, truck stops and rest areas were the focus of the inventory because the other less formal truck parking locations are subject to change as truck parking is not core to the business. Figure 2 and Figure 3 are examples of the variety of truck parking designs and sizes in Ohio.

FIGURE 2: PUBLIC TRUCK PARKING LOCATION – PARALLEL PARKING DESIGN

Source: Imagery ©2021 Maxar Technologies, State of Ohio/OSIP, Map data © 2021

FIGURE 3: PUBLIC TRUCK PARKING LOCATION – MAHONING VALLEY SERVICE PLAZA ON THE OHIO TURNPIKE

Source: Imagery ©2021 Maxar Technologies, State of Ohio/OSIP, USDA Farm Service Agency, Map data © 2021

Ohio's public and private truck parking inventory includes 14,212 spaces at 273 truck parking locations.

Truck Parking Inventory Analysis

Truck parking locations were identified using the following sources:

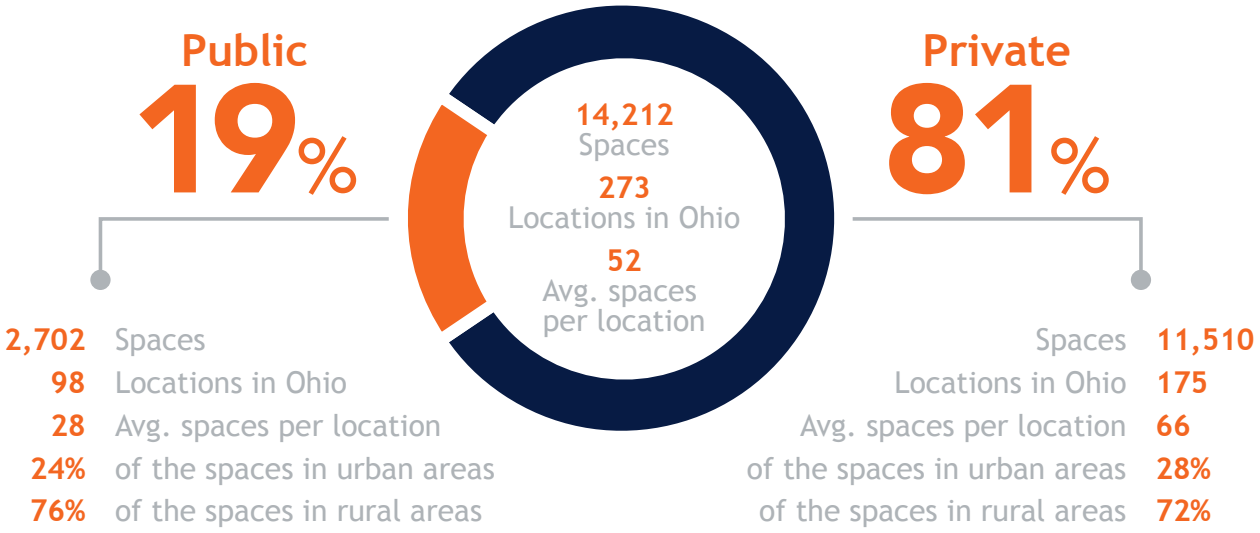
- Public truck parking was identified using public data from ODOT on the location and number of spaces, paired with crowdsourced truck parking data from Trucker Path.
- Private truck parking was identified using Trucker Path data and public data from large national private truck stops: Love's, TA/Petro and Pilot/Flying J.

Each truck parking location was reviewed, and the number of truck parking spaces was validated, except for Love's, TA/Petro and Pilot/Flying J locations, which provide a downloadable list of facilities, including the number of truck parking spaces at each location. The validation process included a satellite count of the number of truck parking spaces and defining designated truck parking areas.

What is Trucker Path?
Trucker Path is a smartphone application used by nearly 1 million truck drivers to find and provide information about the availability of public and private truck parking spaces. Information collected and provided by Trucker Path includes truck parking location, parking status, location amenities and directions, among other information.

As Figure 4 shows, of the 14,212 truck parking locations in Ohio, about 19% are provided at public facilities (over 2,700 parking spaces) and 81 percent are provided at private locations (11,510 parking spaces). About three-quarters of the public and private truck parking spaces in Ohio are located in rural areas.

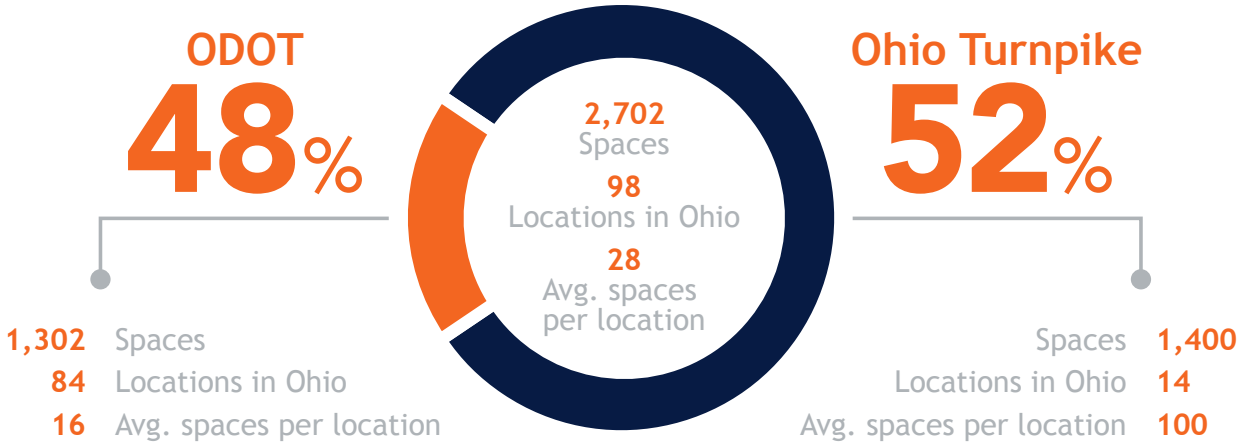
FIGURE 4: TRUCK PARKING SPACES IN OHIO



Public Truck Parking Locations

Of the 98 public truck parking locations in Ohio, a little over half of all spaces are provided at 14 locations managed by the Ohio Turnpike. The Ohio Turnpike locations are larger facilities, providing 100 truck parking spaces on average and offering commercial amenities, including fuel and restaurants. Additionally, service plazas on the Ohio Turnpike also provide a limited number of longer truck parking spaces for Longer Combination Vehicles (LCV). In contrast to the Turnpike locations, ODOT rest areas offer a more limited set of amenities. All of ODOT's rest areas offer restrooms and lighting around the truck parking spaces (Figure 5). Additionally, most of ODOT's rest areas have vending machines.[11]

FIGURE 5: PUBLIC TRUCK PARKING LOCATIONS



Public truck parking locations are heavily concentrated along the interstate system in Ohio, with 2,225 (82.3%) spaces and 57 (58.2%) locations along interstates. This includes the Ohio Turnpike. Outside of the interstate system, there are 361 (13.4%) spaces and 31 (31.6%) locations along US highways, and 116 (4.3%) spaces and 10 (10.2%) locations along state routes.

Private Truck Parking Locations

Truck parking is provided by the private sector at 175 locations with 11,510 spaces. Compared to the public sector, private truck parking locations provide about 4.3 truck parking spaces for each public space and about 1.8 times as many truck parking locations.

Almost 72% of private truck parking spaces are located at a Pilot/Flying J, TA/Petro, or Love's truck stop.

The amenities offered at private truck parking locations vary substantially. For example, full-service truck stops provide restaurants, laundry service, truck scales, repair shops, and showers. Conversely, other truck parking locations offer limited or no amenities on site.

FIGURE 6: DISTRIBUTION OF TRUCK PARKING SPACES BY OWNER

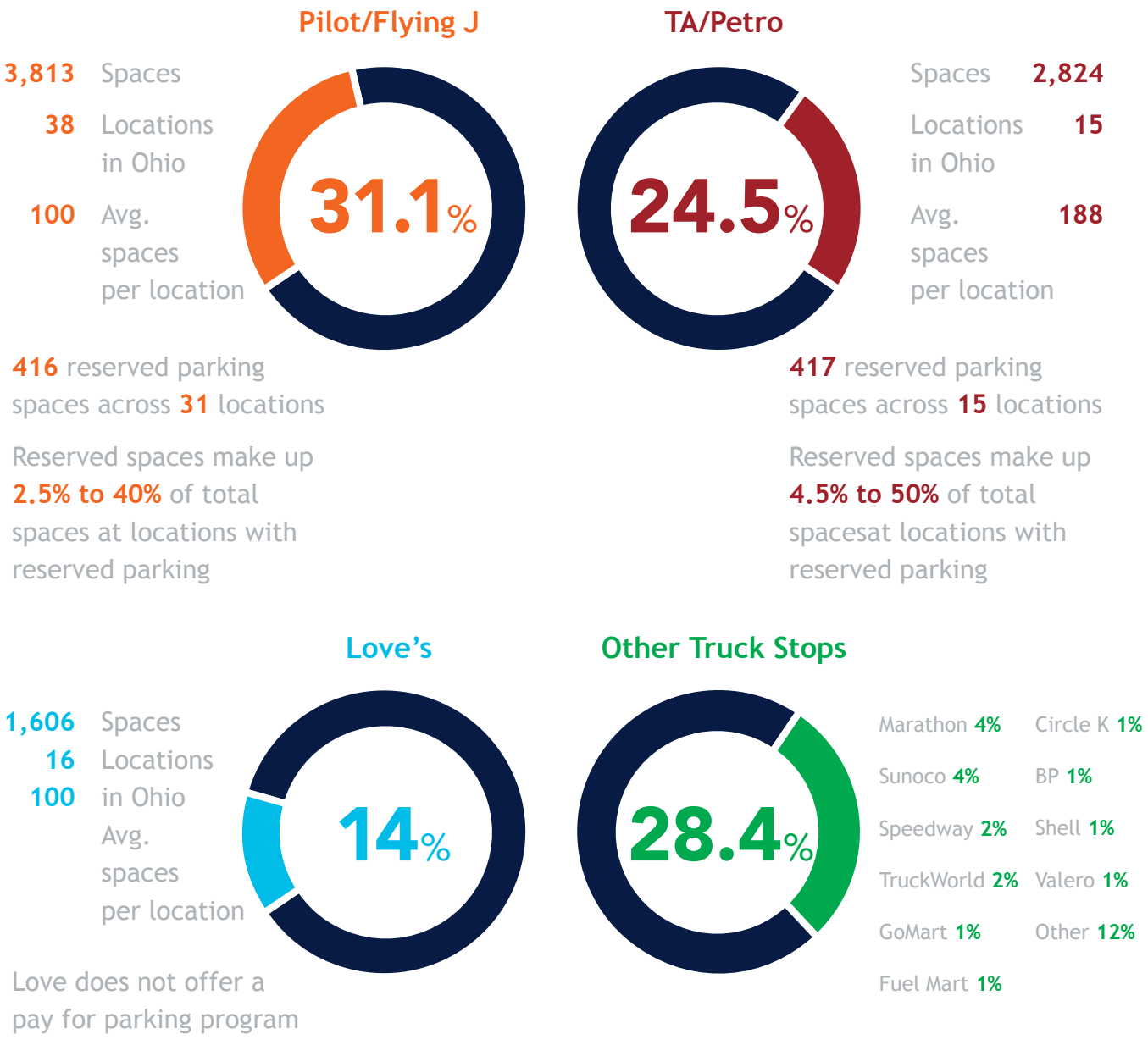
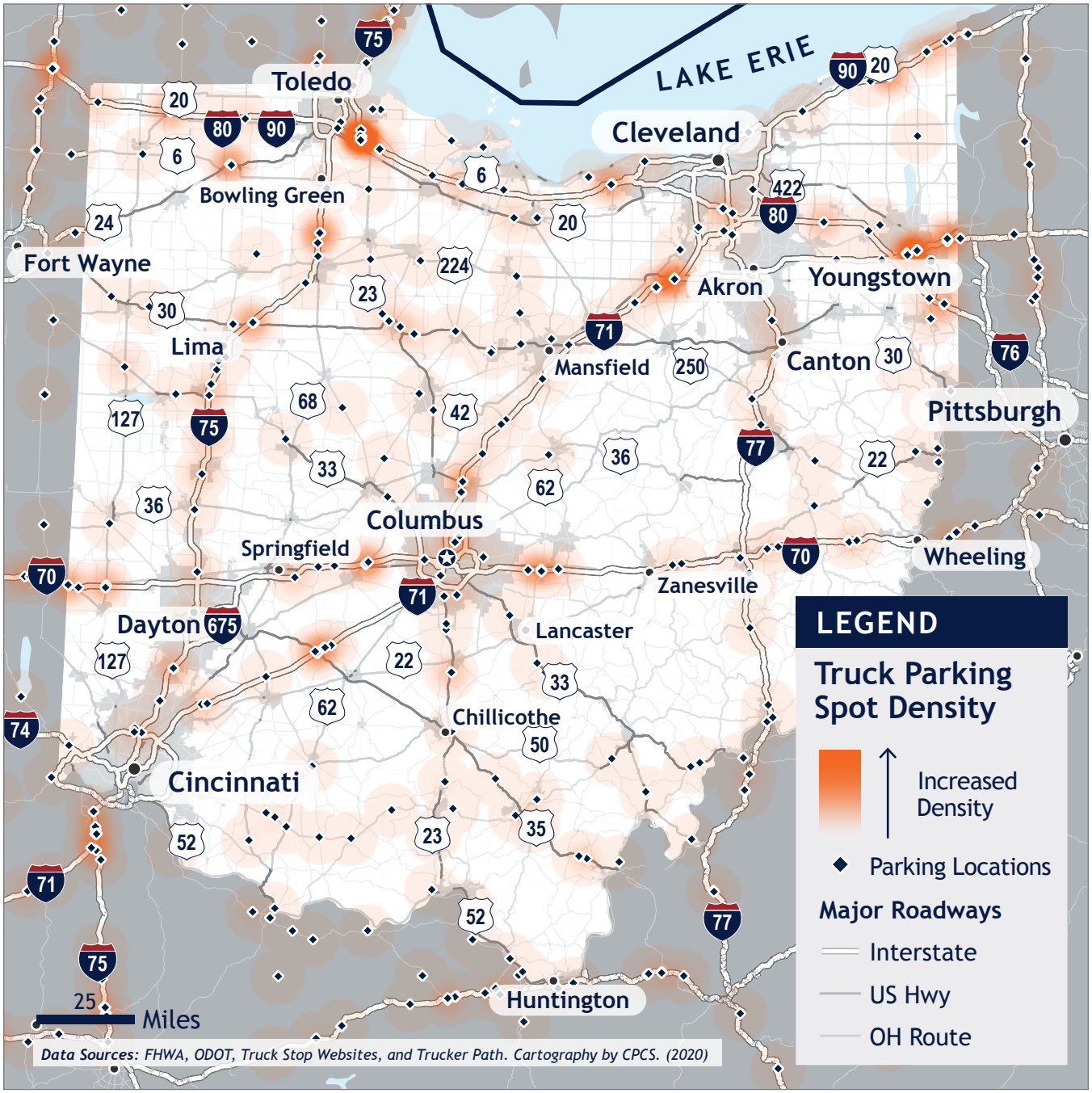


Figure 7 shows the location of public and private truck parking facilities and the concentration of truck parking spaces throughout the state. As expected, more spaces are provided along major corridors such as I-70 near Columbus and north of Dayton, I-71 near Akron, I-76 east of Youngstown and I-80 near Toledo.

FIGURE 7: PUBLIC AND PRIVATE TRUCK PARKING LOCATION AND SPACE DENSITY

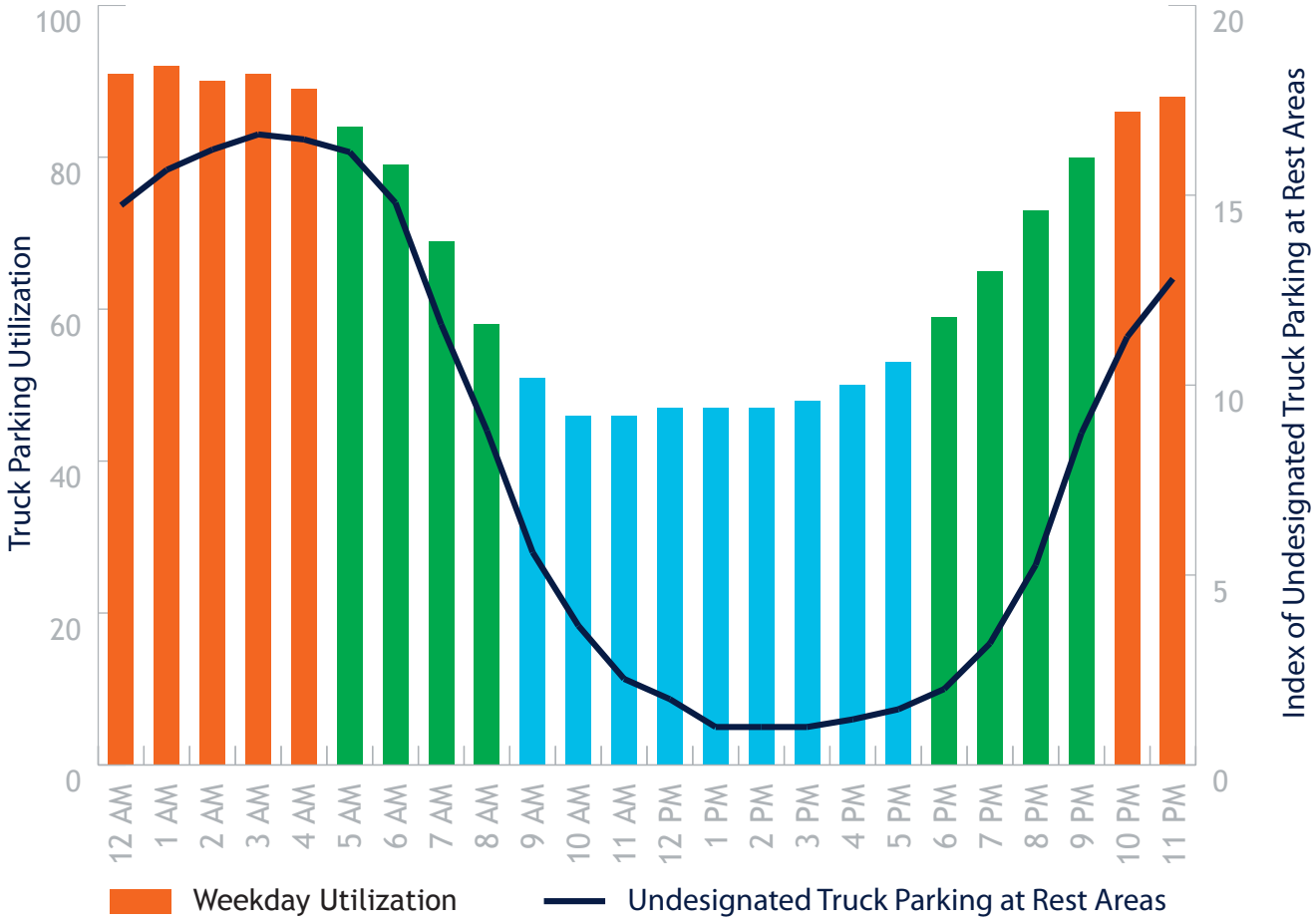


Ohio's Truck Parking Demand and Shortages

Ohio's Truck Parking Utilization

Truck parking utilization refers to the number of trucks parked at a truck parking location relative to the number of spaces at that location. Figure 8 displays the utilization of public and private truck parking facilities in Ohio and an index of undesignated truck parking occurring at rest areas by the hour of day according to the INRIX truck GPS data.[12] Utilization is lowest in the late morning to early evening, after which truck parking facilities begin to fill as drivers stop for their overnight rest breaks. The peak utilization for truck parking is in the early morning, with statewide utilization being highest from 1–2 a.m. The index of undesignated parking occurring at rest areas mirrors the utilization rates, demonstrating when truck drivers are encountering full rest areas and are therefore parking in undesignated locations.

FIGURE 8: TRUCK PARKING UTILIZATION



Source: CPCS analysis and modeling of ODOT TPIMS, INRIX, and Trucker Path data, 2019.

According to a 2018 survey, an estimated 58% of drivers indicate they would not pay any amount out of pocket for parking.[13]

The analysis of truck parking utilization was developed using about 1.6 billion truck GPS waypoints, 4 million truck stop events and about 2 million Truck Parking Information Management System (TPIMS) time periods, in total. ODOT's TPIMS uses sensors to identify the number of trucks parked at equipped rest areas. The study leveraged the TPIMS data with Trucker Path and INRIX data to model truck parking utilization. Figure 9 displays the corridor-level utilization of public and private truck parking facilities from 12–1 a.m., with areas of low utilization (50% and below) to high utilization (100% and above) through a continuum from green (low utilization) to yellow (medium utilization) to red (high utilization).

In general, truck parking is most difficult to find along freight corridors and near urban areas. The truck parking that is available in urban areas is a mix of paid parking and relatively small facilities. The lower relative utilization of paid truck parking reflects that truck drivers generally avoid paid truck parking.

FIGURE 9: TRUCK PARKING UTILIZATION FROM 12-1 AM

Undesignated Truck Parking

Undesignated truck parking refers to unmarked locations where trucks park and is the most noticeable indicator of a truck parking issue. The utilization of truck parking facilities provides insight into where there is available truck parking and where truck parking is difficult to find, but adding undesignated truck parking provides insight into the magnitude of unmet truck parking demand.

To identify undesignated truck parking clusters in Ohio, four months of INRIX truck GPS data was used to identify the locations where trucks stopped for more than 30 minutes. About four million stops were identified during the four months (February, May, August and October). Using the inventory of truck parking locations, approximately 828,000 stops were parked in designated truck parking areas and 44,000 were parked in undesignated areas. The remaining 3.1 million stops required additional classification because it included trucks parked at shippers/receivers, truck terminals, along roadways, etc.

Buffers were created around Ohio's roadways that varied based on the type of roadway and if it was in a rural or urban area. These buffers were used to identify undesignated truck parking that was occurring in areas that were outside of defined truck parking spaces. Stops along roadways and in other undesignated areas were clustered and reviewed to remove misclassified stops.

More than 100 clusters of undesignated truck parking locations were identified in Ohio. Overall, clusters of undesignated truck parking were categorized as occurring at ODOT rest areas, near truck stops, along on/off ramps, on last-mile roadways and in urban areas. As shown in Figure 10, each type of undesignated truck parking poses different impacts to drivers and the public.

FIGURE 10: UNDESIGNATED PARKING TYPES AND IMPACTS

Type	Associated Impacts
On/off-ramp shoulders: Undesignated truck parking using on/off ramps.	• Safety hazards for truck drivers and other roadway users. – Trucks parked on shoulders are large, fixed objects susceptible to collision by other roadway users and may also block sight distance for other roadway users. – Trucks re-entering the traffic stream from the shoulder pose a safety risk due to the high-speed differential. – Drivers are at increased risk of victimization and theft. • On/off-ramp infrastructure is not built to withstand long-term heavy truck parking, resulting in decreased service life.
Last-mile: Undesignated truck parking occurring on local roadways – notably last-mile connectors leading to freight generators – in industrial and non-industrial areas.	• Slower speeds and lower traffic volumes on local roadways pose less of a safety hazard compared to heavily traffic corridors and on/off-ramps. • Trucks may impede traffic, block roadways and/or park on nearby busy roads. • Quality of life issues for truck drivers and nearby residents due to pollution and noise caused by idling trucks. • Local roadway infrastructure is not built to withstand long-term heavy truck parking, resulting in decreased service life.
Near Truck Stop: Undesignated truck parking occurring near private truck stops but not on-site. Likely due to lack of capacity.	• Safety concerns are similar to undesignated parking on last-mile corridors (see last-mile above) due to lower speeds and traffic volumes. • Local roadway infrastructure not built to withstand long-term heavy truck parking, resulting in decreased service life.
Urban Areas: Undesignated truck parking occurring in urban areas. Parking is less concentrated and is difficult to differentiate from deliveries due to limited space for trucks to park in concentrated numbers.	• Safety, quality of life and infrastructure impacts similar to undesignated parking on last-mile corridors (see last-mile above) due to lower speeds, lower traffic volumes and other location characteristics.

Source: CPCS analysis, 2021.

4 What are Ohio's key truck parking issues and needs?

Summary of Ohio's Truck Parking Issues and Needs

In addition to the adverse safety, infrastructure, quality of life and economic issues that result from inadequate truck parking, Ohio stakeholders cited the following top truck parking trends, needs and challenges in the state.

Trends

Increasing truck traffic and supply chain trends: Increasing trucking volumes, further pushed by the acceleration of e-commerce, cause more demand for truck parking. Supply chain trends, such as just-in-time delivery, require deliveries during specific appointment times. Drivers may face penalties if they are delayed and are often not allowed on-site at a shipper or receive before their appointment. Together these trends result in drivers staging near freight facilities as they wait for their appointment window. Despite this increased demand for truck parking along long-haul routes and staging, truck parking supply is not growing at the same pace. These trends are further complicated by variability caused by congestion, loading/unloading and weather delays, affecting the distance a driver can cover in their allowed HOS. Increased variability makes trip planning less certain and increases the stress drivers feel when nearing the end of the HOS.

Needs

Need for truck parking for HOS breaks and staging: Undesignated parking occurring near truck parking facilities at capacity suggests there is an insufficient amount of truck parking in a given area. Trucks parked in undesignated areas for longer periods of time (7+ hours) suggest a truck parking capacity issue for drivers trying to find a place to take long HOS breaks. Trucks parked in undesignated areas for less than 7 hours and in urban areas or near freight generators suggest a truck parking capacity issue for drivers waiting for shipper/receiver appointments (staging). Truck drivers often need space to stage, since many shippers/receivers do not allow trucks to park on-site early. Truck parking must be provided at locations with high demand – along existing key freight corridors and near freight-generating facilities, particularly in and near urban areas. Adding truck parking to address excess demand in urban areas is further challenged by the high price of land and land-use conflicts in urban areas.

Need for truck parking infrastructure that accommodates existing truck sizes: Many truck parking locations are not designed to handle the length and width of today's trucks. At these locations, longer trucks with wider loads have difficulty maneuvering in and out of truck parking facilities and spaces. Without sufficient space, truck drivers may be forced to drive over curbs or through undesignated areas. Several public truck parking locations also provide parallel truck parking spaces, which are more difficult to park in compared to diagonal parking spaces.

Ohio Truck Parking Workshop

ODOT, in collaboration with FHWA, hosted a three-day Truck Parking Workshop in March 2021 to obtain public and private stakeholder feedback on truck parking in Ohio. Over 40 stakeholders representing state and local transportation, planning and economic development agencies, as well as the trucking industry, participated in the workshop. During the three sessions, stakeholders provided input on Ohio's most pressing truck parking issues and needs, and feedback for advancing effective solutions. After the workshop, the project team followed up with several stakeholders to conduct in-depth consultations on Ohio's truck parking issues, needs and opportunities. These stakeholder inputs informed the development of the issues, needs and solutions identified in the Ohio Truck Parking Study.

Need for improved access to amenities: Truck drivers, particularly those on long-haul routes that require overnight parking stays, require basic amenities, notably lighting, security, restrooms, showers, food options and trash cans. However, these amenities are not available at all truck parking locations, particularly those not developed with overnight truck parking needs in mind. Access to restrooms is particularly important at both overnight and staging locations, as shipper/receivers may not allow truck drivers to use their facilities. Amenity issues have been exacerbated by the COVID-19 pandemic. As some facilities closed, many drivers were unable to access restrooms and other basic amenities, with limited information about which facilities were open. Additionally, as new trucking technologies emerge, truck parking facilities will need to consider providing additional amenities, such as alternative fuel/electric charging stations and idle reduction technologies.

Need for accessible, accurate, reliable and up-to-date parking information for truck drivers: Undesignated parking occurring near truck parking facilities with availability suggests there is an information gap between actual truck parking availability and truck drivers' knowledge of truck parking availability. This may be due to a lack of available information itself, driver knowledge about available information sources or information that is provided in a way that is not useful to drivers. For truck parking information to positively impact decisions, it must be accurate and easily accessible by truck drivers.

There are many mechanisms for disseminating truck parking information, including static and dynamic signs, websites, smartphone applications and in-cab technologies. However, signage may not be visible in the dark or certain weather conditions, and smartphone applications may pose distracted driving risks. Further, certain technologies may not be used and/or accessible by all truck drivers. For instance, older truck drivers may be less likely to use smartphone applications, or certain in-cab technologies may only be available to select trucks or with a paid subscription.

When information is readily available to drivers, it must be accurate, reliable and up-to-date in order to be useful. Several stakeholders noted that the availability information shown on ODOT's TPIMS was inaccurate at times. Stakeholders also noted that information about truck parking availability is only useful when available spaces exist and when useful location information – such as mileage or exit number – is provided. Additionally, TPIMS does not cover all public truck parking locations and does not include private truck stops, which comprise about 81% of truck parking spaces in Ohio.

Need for truck parking information at the regional and local levels: Stakeholders in Ohio noted a lack of truck parking information and data on truck parking demand, utilization, issues, needs and areas of opportunity at the regional and local levels. There is also a lack of widespread awareness among local stakeholders about the link between truck parking and local economic development. Meanwhile, there is limited understanding – from both local agencies and the private sector – on the role of local agencies in addressing truck parking issues.

Challenges

Negative perception of truck parking and land-use conflicts: The public often has a negative perception of truck parking, posing challenges to new truck parking facilities, truck parking expansion and even existing truck parking facilities. There is a general lack of awareness on the importance of safe and secure truck parking to local economic development and daily personal consumption. Communities may also be concerned about truck idling and associated noise/air emissions, as well as real or perceived safety impacts. These community concerns, in addition to residential development opposition, pose challenges to the expansion of truck parking. Education on the importance of truck parking to supply chains, as well as developing goodwill between the truck drivers and communities, may help alleviate these conflicts and concerns.

Insufficient funding: The cost of truck parking solutions varies based on the type and scale of the solution. Costs are generally highest for capital investments in capacity and/or information. In addition to capital costs, projects require ongoing operations and maintenance, which require long-term funding commitments. However, there is limited federal and state funding available for truck parking projects and programs; currently, no truck parking-dedicated funding exists at either level. While public-private partnerships serve as a funding option, they require significant coordination.

Lack of clear ownership of and leadership for truck parking issues: Public and private sectors have a stake in and responsibility to improve truck parking, but the role of the public and private sectors in addressing truck parking needs is unclear at times. A truck parking champion can facilitate the public and private collaboration necessary to develop and implement effective truck parking solutions. A champion can also align truck parking issues and needs with other interests to push truck parking solutions along.

Federal policies restricting the provision of services on interstates: Federal legislation does not allow for the commercialization services on the Interstate right-of-way, restricting the provision of amenities at Interstate truck rest areas. This is a barrier to the public sector expansion of rest area services and locations.

Prioritizing the Locations of Undesignated Truck Parking

Prioritizing truck parking issues ensures that ODOT's investments are targeted to address Ohio's truck parking needs. Additionally, the prioritization step enables ODOT to identify the overarching issues in the top areas of concern and match them with effective solutions. The truck parking issue prioritization process builds upon the undesignated truck parking clusters identified in the previous steps and ranks the issues by applying the following prioritization criteria:

- **Safety Impacts:** Measured by calculating a crash severity score for each cluster to highlight the crash risk associated with undesignated truck parking and fatigued driving. The crash severity score is the product of crash frequency and the social cost at each severity level, relative to the property damage only (PDO) crash cost.[14]
- **Capacity Shortage:** Assessed based on the number of undesignated trucks at each cluster and the total undesignated stop duration. Both of these measures directly resulted from the truck GPS data analysis described in the previous chapter and highlight the excess demand for truck parking in specific areas.
- **Supporting Ohio's Economy:** Based on whether undesignated truck parking clusters are located on or adjacent to a major national/statewide freight corridor or a National Highway system (NHS) intermodal connector are flagged as they carry a large portion of goods moved from, to, within and through Ohio. The proximity of undesignated parking clusters to corridors highlights the impacts of truck parking issues on the state and national economy.

As part of Transport Ohio, ODOT is designating the state's multimodal Strategic Freight System:

- **National freight corridors:** designated according to FHWA's Primary Highway Freight System (PHFS).
- **State freight corridors:** based on the existing designation, supplemented by current truck volumes.
- **Intermodal connectors (non-PHFS):** designated according to FHWA intermodal connectors for freight.

The truck parking issue prioritization criteria were developed to align with the statewide transportation goals allowing ODOT to identify and invest in the projects, policies and programs to address truck parking needs along with improving the state's transportation system. In particular, the truck parking issue prioritization criteria are directly linked to the safety, system preservation, economic competitiveness and efficiency and reliability goals that guided the development of AO45.

After applying the above criteria, undesignated truck parking clusters that received a high rank in the prioritization criteria and are located in close proximity to one another are grouped to form a mega-cluster. This approach accounts for the effects of improvements at one issue location on others located nearby and enables identification of corridor or regional-level truck parking investment opportunities. Figure 11 summarizes the method used to prioritize ODOT's truck parking issues. The resulting priority clusters of undesignated, truck parking mega-clusters encompassing them and site-specific opportunities are discussed in Chapter 5.

FIGURE 11: TRUCK PARKING ISSUE PRIORITIZATION PROCESS

Truck Parking Need Prioritization

Step 1: Identify Undesignated Truck Parking Clusters

Clusters of Ohio's truck parking needs are identified using truck GPS data and inventory of truck parking locations and capacity. Undesignated truck parking serves as the most noticeable indication of a truck parking issue. Using truck GPS data, the project team identified, validated, and classified clusters of undesignated truck parking occurring on Ohio's roadways.

Step 2: Apply Criteria to Prioritize Locations by Needs

Safety Impacts	A ***Crash Severity Score**** is calculated for each location to assess the needs based on safety impacts of unauthorized truck parking and fatigued driving. The crash severity score is weighted according to crash cost.
Capacity Shortage	The ***Count of Trucks Parked at One Time**** at each location is used to assess excess demand and capacity needs. The ***Total Stop Duration (Dwell Time)*** for undesignated trucks are used to assess total time parked in undesignated areas
Freight Network Significance	A cluster Located on or adjacent to a Nationally or Statewide Significant Corridor, or NHS intermodal connector, is flagged to prioritize highway corridors that are most critical for the movement of freight in Ohio.

Scoring Framework

- High Priority
- Medium Priority
- Low Priority

Step 3: Identify Implementation Opportunities

Identify clusters that are part of a ***Mega-Cluster***, which refers to a group of clusters located in close proximity to one another. Within mega-clusters, improvements at one location will have impacts across the group of clusters, allowing for the identification of opportunities with corridor and/or regional-level impacts.

Identify ***Site-specific Characteristics and Opportunities***, such as proximity to existing under-utilized parking facilities, weight stations, Park & Ride locations, etc., as well as potential information and capacity expansion options within ODOT's existing ROW are explored to inform short-, medium-, and long-term investment decision-making.

*American Association of State Highway and Transportation Officials (AASHTO) Highway Safety Manual methodology and weights will be used.

**75th percentile count of trucks parked at one time represents the vast majority of measurements without being impacted by outliers. Therefore, it is a good representative of capacity needs.

Source: CPCS analysis.

5 What actions should be taken?

Overview of Truck Parking Solutions

There is a range of truck parking solutions that could be used to address a particular truck parking issue. Determining the appropriate truck parking solution often depends on factors such as geography, infrastructure, asset availability and cause of undesignated parking. Additionally, each truck parking issue will have unique factors and constraints, further demonstrating that a tailored approach is needed to address truck parking needs.

Figure 12 uses the following solutions categories to present the variety of solutions that could be used to address truck parking needs:

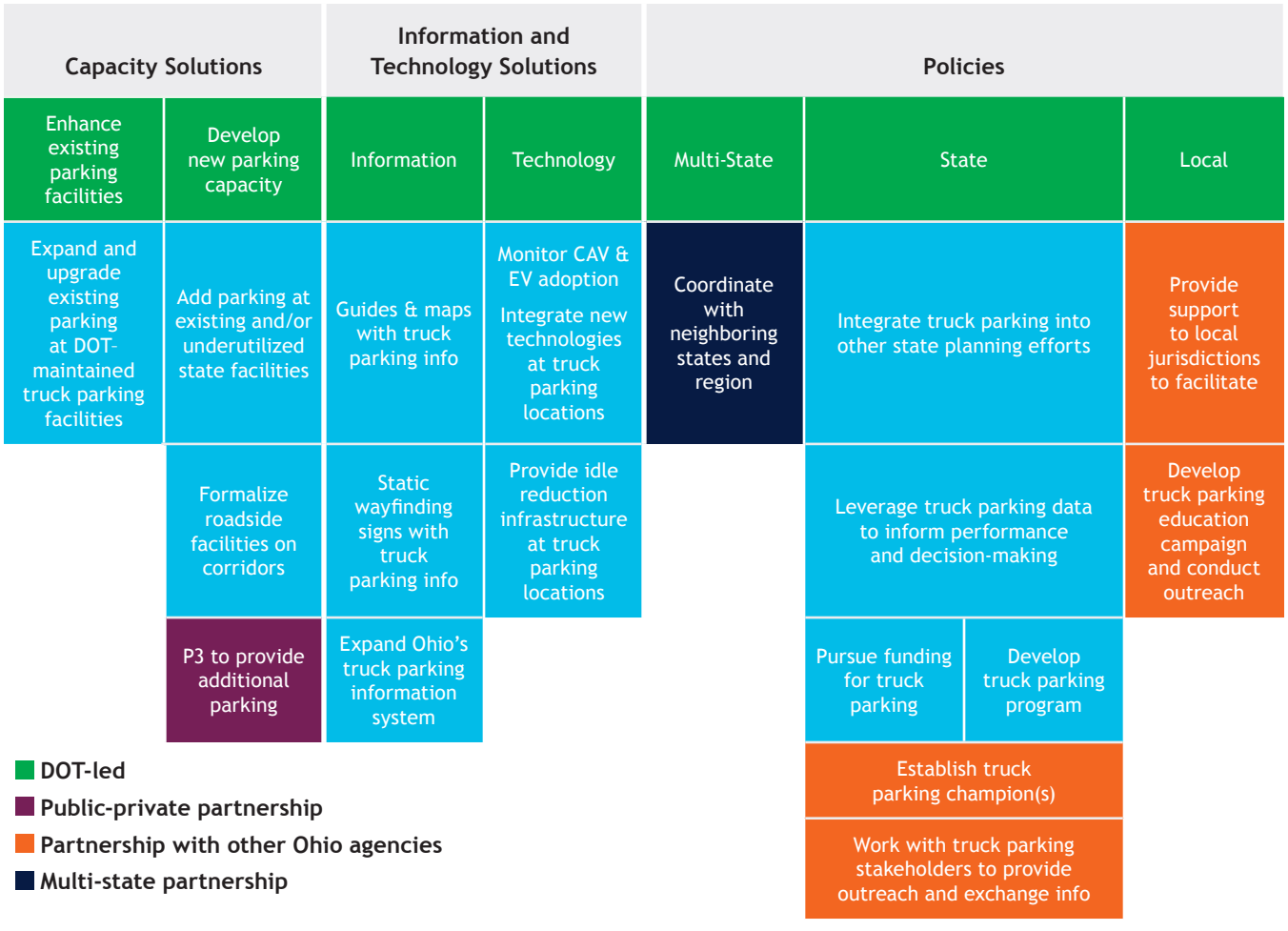
- **Projects — Capital Expansion:** Recommendations that involve the addition or enhancement of truck parking capacity, primarily through physical investments at directly targeted areas with undesignated truck parking due to truck parking demand exceeding available supply.
- **Projects — Information/Technology:** Recommendations that involve the provision of improved truck parking information and technologies for truck drivers at directly targeted areas with undesignated truck parking due to lack of information.
- **Policies/Programs:** Recommendations that involve setting guidelines, programming, planning and coordinating at the local, state and/or multi-state levels. These recommendations do not directly target an area with undesignated truck parking; rather, policies and programs may seek to advance a framework that is then used to improve truck parking, target specific truck parking issues or needs, advance truck parking solutions or incorporate truck parking into statewide and local decision-making on a more systematic basis.

In addition to the three types of solutions presented in Figure 12, the color of each solution indicates whether the solution would be led by ODOT (teal), is a Public-Private Partnership (P3) (dark green), is a partnership with other agencies in Ohio (light green) or is a multi-state partnership (gray). The role of ODOT and the initial steps for implementation vary depending on the role that ODOT has in advancing a particular solution.

Updated FWHA Guidance to ROW

In April 2021, FHWA released guidance on the use of the highway ROW by state DOTs for projects that address public needs relating to "climate change, equitable communications access and energy reliability." According to this new guidance, ODOT can leverage highway ROW for alternative uses such as providing access to utilities, which could provide the flexibility needed to provide additional amenities at truck parking facilities or other locations that can be used for overnight truck parking, if it is in the public's interest and will not affect the safe and uninterrupted flow of traffic.[15]

FIGURE 12: TRUCK PARKING SOLUTIONS TOOLBOX



Role of Partnerships

As illustrated in the truck parking solutions Ttoolbox, many truck parking solutions rely on partnerships; even for those projects led by the DOT, partnerships support the advancement of effective solutions to address truck parking issues. In addition to DOT-led solutions, there are many available solutions that require a larger role from entities other than the DOT. These include, but are not limited to, the following:

- Public-Private Partnerships involve a partnership between ODOT and a private stakeholder, such as a private truck parking company, a logistics or other freight-generating facility, or a technology vendor, among others. Public-private partnerships can enable solutions that could not otherwise be advanced by just a single party. For example, ODOT may enter into an agreement with a private company to maintain public truck parking facilities. In another example, ODOT may provide financial incentives (e.g., low-interest financing, tax incentives, etc.) for a private company – whether a truck parking facility or a freight-generating location – to provide and/or expand truck parking.
- Partnerships with other Ohio agencies may involve partnerships with local agencies (e.g., cities, counties, Metropolitan Planning Organizations (MPOs), Regional Transportation Planning Organizations (RTPOs)), as well as partnerships with other state-level agencies (e.g., Ohio State Highway Patrol) in Ohio. Partnerships with local agencies enable the identification of local truck parking issues and identify targeted solutions to address these needs. These partnerships are particularly critical to overcoming local barriers, such as public opposition to truck parking, and advance locally-driven solutions, such as integrating truck parking into local land-use zoning and planning. Meanwhile, partnerships with other state-level agencies in Ohio ensure consistent truck parking policies, practices and enforcement across the state.
- Partnerships with neighboring states involve a partnership between ODOT and neighboring state agencies (commonly a state DOT) and may occur through individual state-to-state collaborations or through a multi-state organization. Partnerships with neighboring states enable regional and corridor-wide cross-border solutions that could not otherwise be advanced by just a single state. States may coordinate on solutions such as providing truck parking information across borders or applying for competitive grants to fund multi-state projects.

Prioritization Results

Figure 13 displays the locations of undesignated truck parking clusters in Ohio. The circles representing the clusters vary in size according to how they are scored on the prioritization criteria, with high receiving three points, medium receiving two points, and low receiving one point. The resulting values were used to create mega-clusters anchored around the clusters that scored 11 or where there were many highly ranked clusters in a particular area.

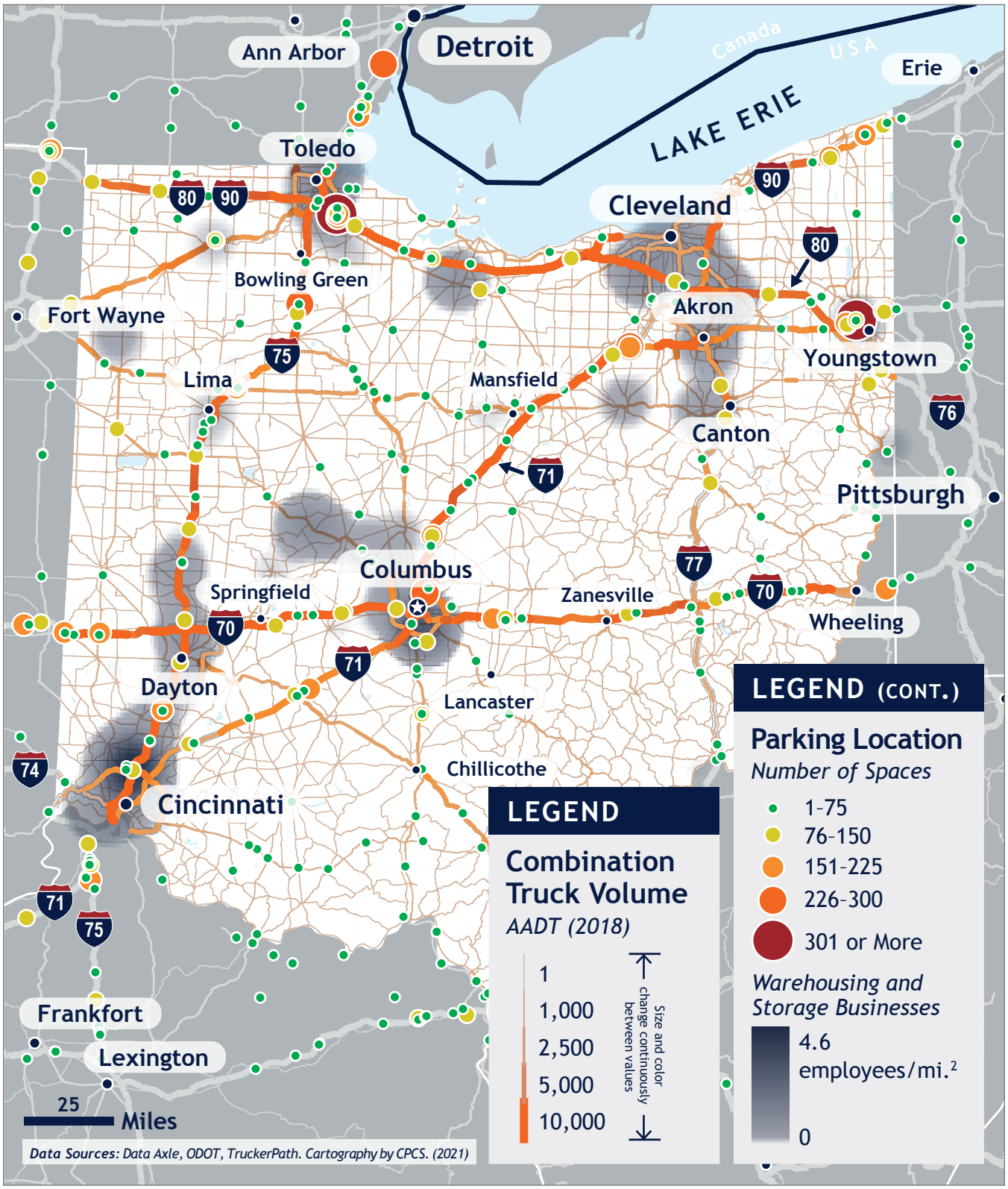
FIGURE 13: UNDESIGNATED TRUCK PARKING HOTSPOTS IN OHIO

The resulting mega-clusters (shown in blue) in Figure 14 show where there is a concentration of high prioritization scores, but that does not imply that other parts of the state do not have truck parking issues. Rather, areas such as I-75 or the connecting roadways around Toledo have areas of undesignated truck parking, but they did not rank as high as other clusters in Ohio.

Seven undesignated truck parking mega-clusters were identified. Each mega-cluster is anchored by at least one high priority cluster and includes several additional undesignated truck parking clusters as well as major highways on which the clusters are located. Together, the combination of the four megaclusters along I-70 and the Columbus and Cincinnati mega-clusters suggests significant truck parking needs in southwest Ohio and through central Ohio. Additionally, the final mega-cluster is around Akron and between Akron and Youngstown, which has many priority truck parking clusters scattered along several major corridors including: I-71, I-76, I-77, I-80, I-271 and SR 21. A comparison between the mega-clusters in Figure 14 and the areas where warehousing and storage is concentrated in Figure 15 shows the overlap between the mega-clusters and logistics establishments.

FIGURE 14: UNDESIGNATED TRUCK PARKING MEGA-CLUSTERS

FIGURE 15: PATTERNS DRIVING DEMAND FOR TRUCK PARKING



Truck Parking Strategy and Policy Recommendations

Each mega-cluster was reviewed to identify opportunities to address truck parking needs, such as proximity to existing private parking facilities that are underutilized, parking facilities that have reversed utilization patterns compared to truck parking demand (i.e., shopping malls, stadiums, weight stations, etc.), or the potential for expansion due to being located within ODOT right-of-way (ROW). This step is directly linked to the solution toolbox developed as part of this study and supports ODOT's short- and medium-term truck parking improvement investment decisions.

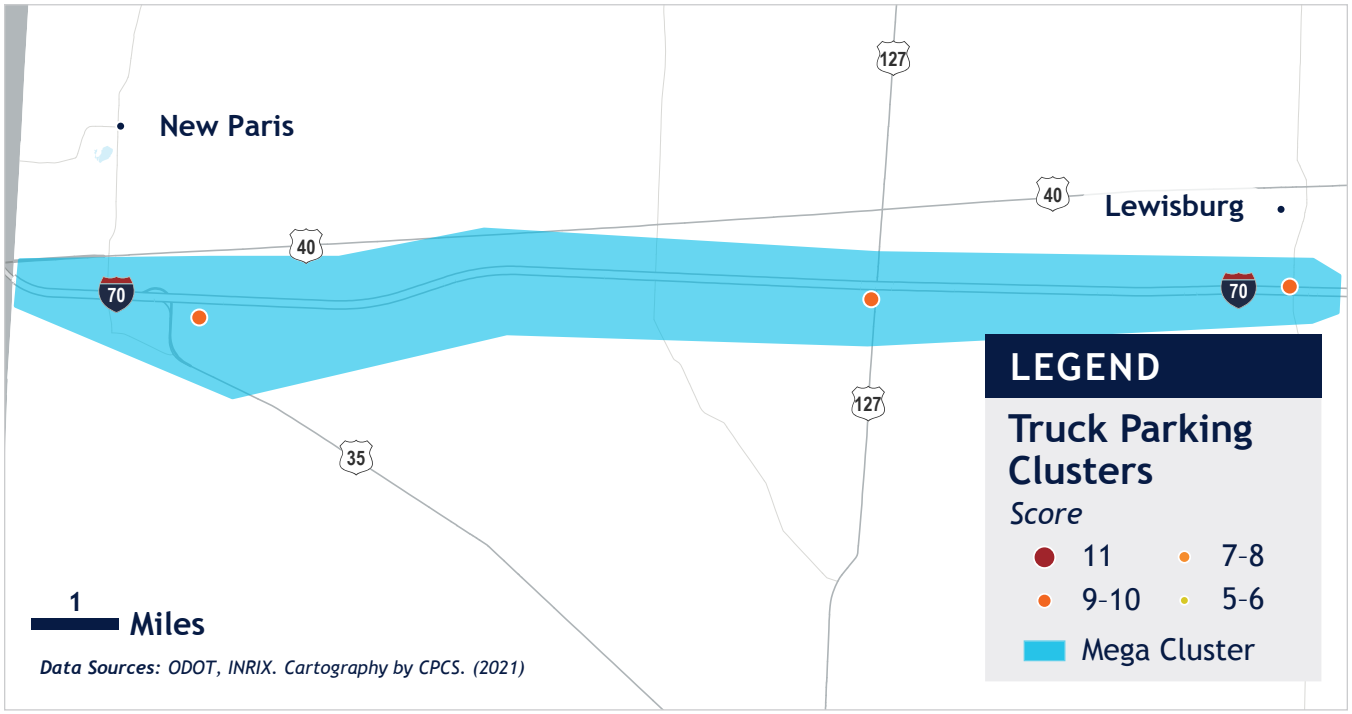
The following sections summarize the opportunities identified according to whether they are projects (including capital expansion and information/technology) or policies/programs. Additionally, the following section outlines the opportunities for funding truck parking, the role of partnerships and immediate next steps.

Capital Expansion & Information/Technology Projects

Mega-Cluster: I-70 West of Dayton

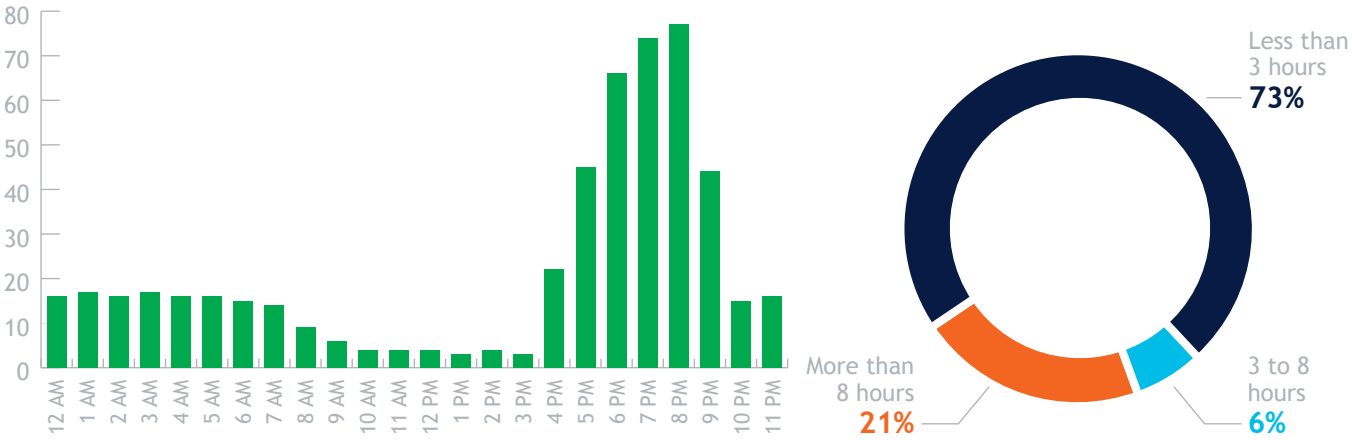
The I-70 west of Dayton mega-cluster is three clusters of undesignated truck parking located along a 15-mile stretch of the interstate, which is a nationally-designated corridor on Ohio's Strategic Freight System (SFS). Undesignated parking occurs along on/off-ramps, including using the western most cluster where trucks are using the on/off-ramp at the Preble I-70 eastbound rest area (open) and the I-70 westbound rest area (closed and demolished in 2018) for truck parking at Exit 10s and 14 (Figure 16).

FIGURE 16: WEST DAYTON MEGA-CLUSTER



In the west Dayton mega-cluster, the average number of undesignated stops is highest in the evening, between 4–10 p.m. (Figure 17). About three-fourths of undesignated stops remain below 3 hours. During the data collection period, almost 1,500 trucks parked in undesignated locations within the mega-cluster, for an average duration of 3.2 hours. Undesignated truck parking in the mega-cluster has led to 4 crashes.

FIGURE 17: WEST DAYTON UNDESIGNATED TRUCK PARKING BY TIME OF DAY



Source: CPCS Analysis of INRIX Truck GPS data, 2019.

Opportunities to address undesignated truck parking in the west Dayton mega-cluster include both information sharing and capacity expansion. There is an opportunity to provide information about available truck parking at nearby private rest areas, particularly during the evening hours where the average number of undesignated truck stops is high (Preble EB, the Pilot Travel Center at I-70/US-127, and the TA Truck Stop at I-70/US-127), but this availability decreases in the early morning. The area around the existing truck stops is rural, suggesting an opportunity for partnership. Additionally, ODOT could also consider providing overnight truck parking at the existing open weigh station on I-70 near I-70/US-35 interchange (Figure 18). The location can offer up to 15 spots and could provide overnight parking in the mega-cluster where truck parking utilization is high overnight.

FIGURE 18: OPEN WEIGH STATION ON I-70

Source: Google Maps, 2021, Imagery © 2021, IndianaMap Framework Data, Maxar Technologies, State of Ohio/OSIP, U.S. Geological Survey, USDA Farm Service Agency, Map data © 2021

High Priority Cluster: I-70 Ohio Welcome Center Rest Area

This high-priority cluster is located at the Ohio Welcome Center Rest Area in New Paris, where significant undesignated truck parking takes place along on/off- ramps, with over 600 undesignated stops during the data collection period. Among all priority clusters, the Ohio Welcome Center Rest Area ranks among the top in terms of adverse safety impacts related to undesignated parking. Undesignated truck parking within this cluster consists of trucks stopped for short breaks of less than 3 hours (60%) and trucks stopped for longer HOS compliance breaks of more than 8 hours (34%).

Although the Ohio Welcome Rest Area has high utilization during overnight and early morning hours (midnight to 3 a.m.), utilization decreases during the day and evening hours, with some availability during the mega-region's peak hour of undesignated parking from 8-9 p.m. ODOT could use the land where the Preble WB rest area was previously located for truck parking.

Mega-Cluster: I-70 Between Dayton-Columbus

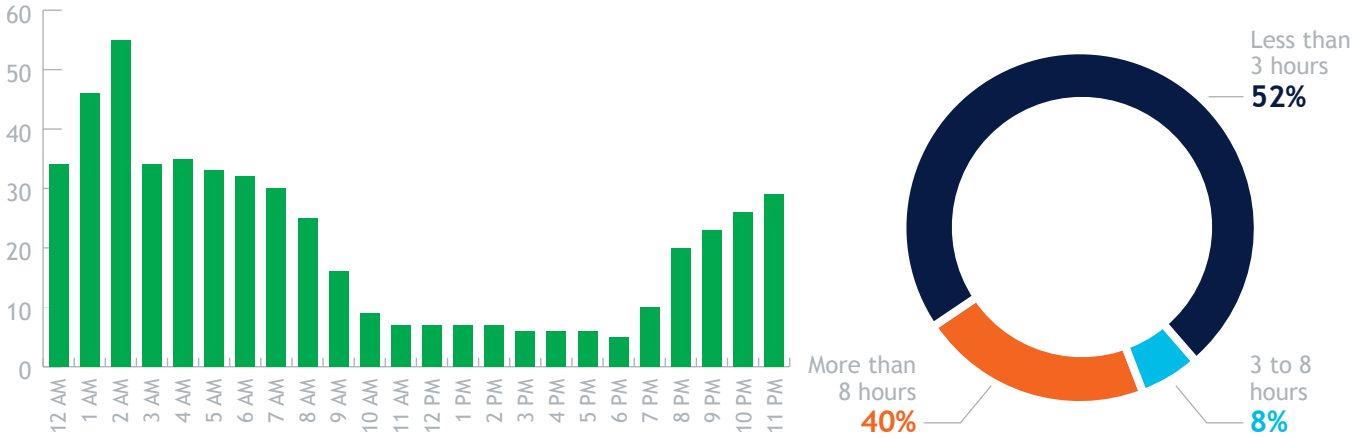
This mega-cluster is located on I-70 between Dayton and Columbus (Figure 19). During the data collection period, there were 3,900 undesignated truck stops along this 23-mile stretch of I-70, which is a nationally-designated corridor on Ohio's SFS. The average duration of undesignated truck parking lasted 5.2 hours. Among all undesignated stops, over half (52%) last less than 3 hours, with an additional 40% exceeding 8 hours. Within the mega-cluster, four crashes are related to undesignated truck parking.

Undesignated truck parking along this stretch of I-70 is the highest overnight, with average stops peaking from 2-3 a.m. (Figure 20). There are seven truck parking locations within the Dayton-Columbus mega-cluster – two public rest areas and five private truck stops. However, utilization at these facilities remains high, with limited availability at all locations overnight.

The Dayton-Columbus mega-cluster includes six clusters of undesignated parking are located within close proximity to each other, two of which are high-priority clusters. The additional nearby truck parking clusters located represent high concentrations of trucks parking along on/off-ramps – including those near public rest areas and private truck stops – as well as one cluster near Columbus where undesignated last-mile parking occurs.

FIGURE 19: DAYTON-COLUMBUS MEGA-CLUSTER

FIGURE 20: UNDESIGNATED TRUCK PARKING BY TIME OF DAY BETWEEN DAYTON AND COLUMBUS



Source: CPCS Analysis of INRIX Truck GPS data, 2019.

Opportunities to address undesignated truck-parking in the Dayton-Columbus mega-cluster focus on capacity expansion. Due to the high utilization of existing truck parking facilities in the mega-cluster, combined with some of the highest undesignated truck parking counts statewide, ODOT should explore opportunities to increase truck parking capacity along this stretch of I-70, particularly near existing truck parking facilities in the mega-regions high-priority clusters. ODOT can explore public-private partnerships for capacity expansion at existing facilities. ODOT can also explore public-private partnerships to collaborate with freight-generating facilities anchoring the undesignated last-mile cluster, to explore opportunities for a public-private partnership to provide truck parking on-site or nearby for staging.

High Priority Cluster: South Vienna Rest Stop

This high-priority cluster is located at the South Vienna Rest Stop, which has eastbound and westbound truck parking areas on I-70. Significant undesignated truck parking occurs along the rest area's on/off ramps, with the highest number of undesignated truck parking stops statewide – over 2,500 during the data collection period. Undesignated truck parking at the South Vienna Rest Stop includes trucks stopped for short breaks of less than 3 hours (46%), as well as trucks stopped for their longer HOS breaks of more than 8 hours (48%). Truck parking availability is extremely limited at the rest area, with the highest utilization levels overnight.

High Priority Cluster: I-70/US-42 Interchange

This high-priority cluster is located at the I-70 and US-42 interchange, where undesignated truck parking takes place along on/off ramps. Among undesignated stops, 61% last for less than 3 hours. This interchange is located near three private truck stops – a Pilot Travel Center north of I-70, a TA Truck Stop and a Speedway Truck Stop south of I-70. Truck parking availability is extremely limited at all three truck stops, with the highest utilization levels overnight.

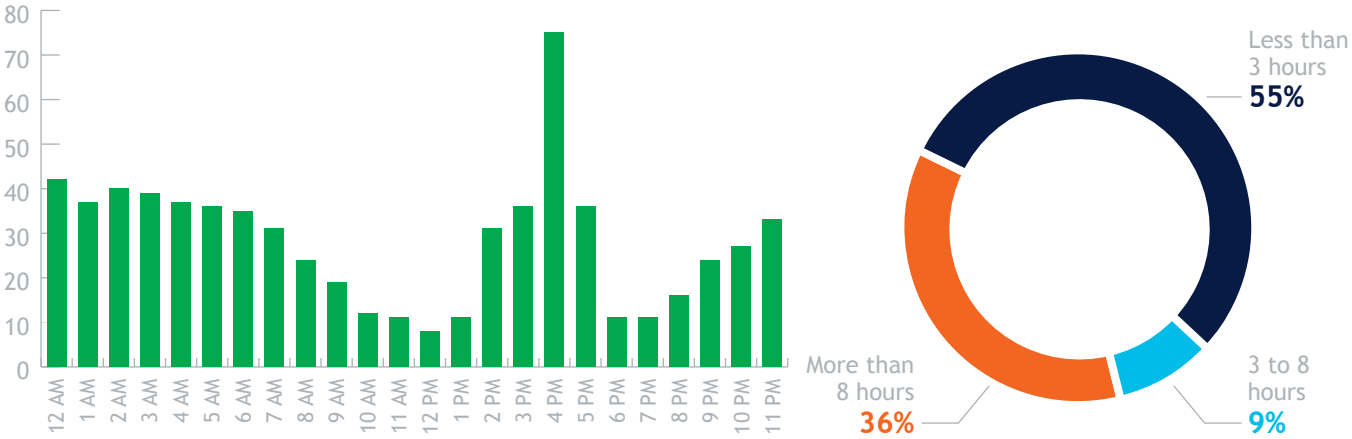
Mega-Cluster: I-70 East of Columbus

This mega-cluster is located on I-70 east of Columbus (Figure 21), with six clusters of undesignated truck parking located along a 36-mile stretch of the interstate, which is a nationally-designated corridor on Ohio's SFS. Undesignated parking primarily occurs at rest areas and along on/off ramps, with some last-mile parking in Zanesville. During the data collection period, over 4,400 undesignated truck stops were recorded within the mega-cluster, with an average stop duration of 4.9 hours. Four crashes in the mega-cluster were identified as truck parking-related. Among all undesignated stops, over half (55%) are less than 3 hours. An additional 36% last more than 8 hours. This implies trucks are stopped for short and/or staging breaks, as well as longer-HOS breaks overnight.

FIGURE 21: EAST COLUMBUS MEGA-CLUSTER

In the east Columbus mega-cluster, the average number of undesignated stops is highest in the late afternoon, from 3-6 p.m. (Figure 22). Meanwhile, truck parking demand is high overnight – among the four truck parking stops (three public rest areas and one private truck stop), utilization at these facilities is highest overnight (midnight to 7 am).

FIGURE 22: EAST COLUMBUS UNDESIGNATED TRUCK PARKING BY TIME OF DAY



Source: CPCS Analysis of INRIX Truck GPS data, 2019.

Opportunities to address undesignated truck parking in the east Columbus mega-cluster include information sharing and capacity expansion. ODOT can provide information about truck parking availability, particularly during the early evening hours where the average number of undesignated truck stops is high, but there is availability at nearby truck parking locations, the Licking Rest Area.

Additionally, due to high overnight utilization of existing truck parking facilities in the mega-cluster, combined with high undesignated truck parking counts, ODOT should explore opportunities to increase truck parking capacity along this stretch of I-70. ODOT should consider providing overnight truck parking at the existing open weigh stations located on I-70, less than 10 miles east of the east Columbus mega-cluster (Figure 23). Weigh stations are located on the westbound side of I-70. The eastbound weigh station has been repurposed for salt storage and loading.

FIGURE 23: OPEN WEIGH STATION ON WB SIDE OF I-70 IN GUERNSEY COUNTY

Source: Google Maps, 2021. Imagery © 2021 Maxar Technologies, USDA Farm Services Agency, Map data © 2021

This would provide additional truck parking availability during high-demand overnight periods. ODOT may also consider a public-private partnership for capacity expansion near existing facilities, particularly near the western end of the mega-cluster, where the high-priority Licking Rest Area cluster is located.

In addition to the existing truck parking facilities located within the mega-cluster, there are two private truck parking stops located 4 miles west of the high-priority cluster. ODOT should also collaborate with freight-generating facilities and local agencies in Zanesville to explore opportunities for a public-private partnership to provide truck parking on-site or nearby for staging.

High Priority Cluster: Licking Rest Area

This high-priority cluster is located at the Licking Rest Area, on the eastbound and westbound sides. Significant undesignated truck parking takes place along the rest area's on/off-ramps, with almost 1,300 undesignated stops during the data collection period – among the highest statewide. Undesignated truck parking at this location includes trucks stopped for a short duration of fewer than 3 hours (46%) and trucks stopped for longer HOS compliance breaks of more than 8 hours (45%).

Although the Licking Rest Area has high utilization during overnight and early morning hours (midnight to 7 a.m.), utilization is much lower in the evening hours. In fact, utilization is low during the mega-region's peak hour of undesignated parking from 4–5 p.m.

Mega-Cluster: I-70 in Rural Eastern Ohio

This mega-cluster is stretched along I-70, which is nationally-designated on Ohio's SFS, between Cambridge and Ohio's eastern border with West Virginia (Figure 24). More than 3,342 trucks stop at undesignated locations in this mega-cluster for an average duration of about 5 hours. Safety issues related to truck parking shortages have led to 7 crashes along I-70 in rural eastern Ohio.

As Figure 25 shows, undesignated truck parking in this mega-cluster is highest between midnight and 6 a.m. About 56% of the trucks parked for less than 3 hours, while over 37% parked at undesignated locations for HOS compliance breaks longer than 8 hours.

Several clusters are located within this mega-cluster, primarily due to the high density of undesignated truck parking on highway shoulders and ramp near rest areas and truck stops.

FIGURE 24: RURAL EASTERN OHIO MEGA-CLUSTER

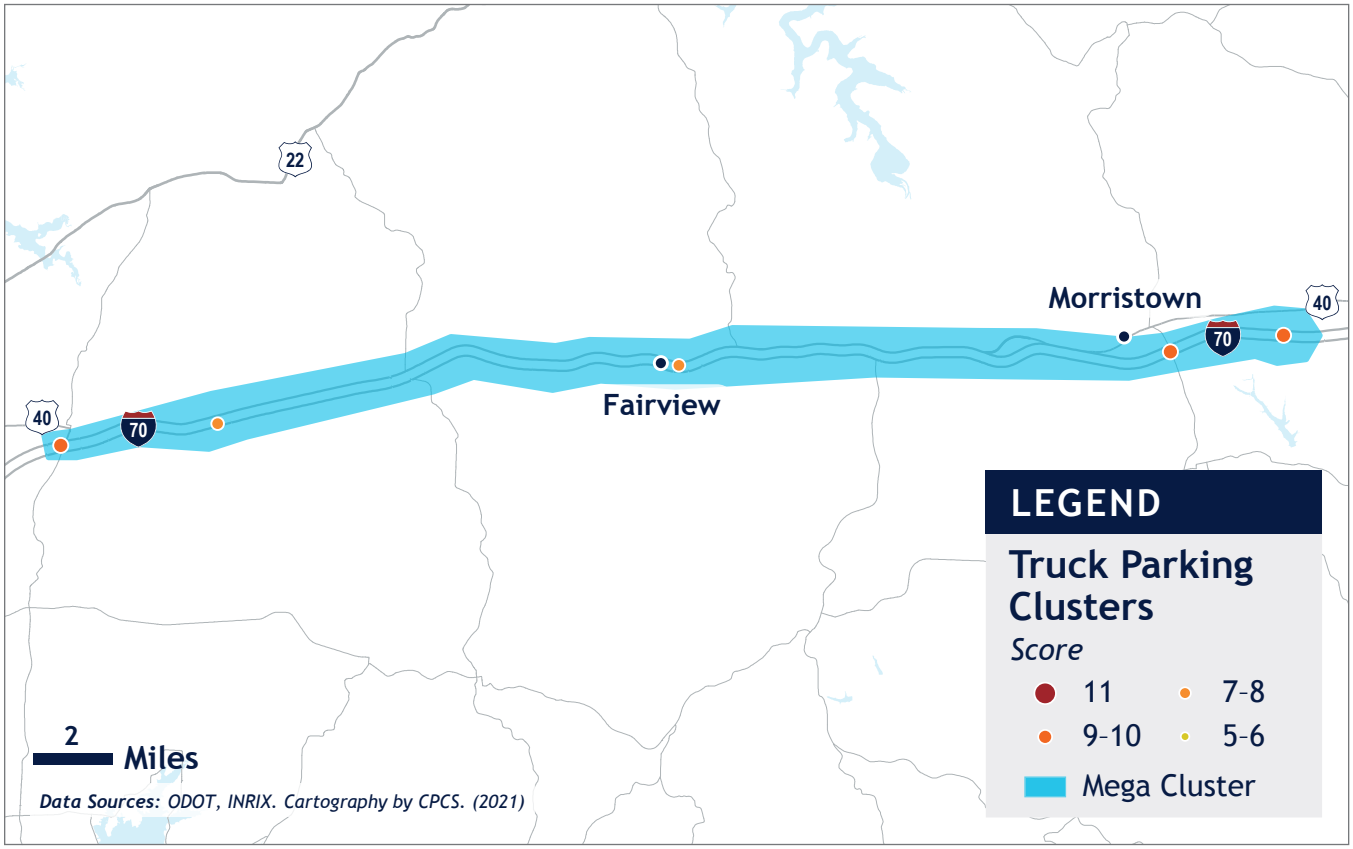
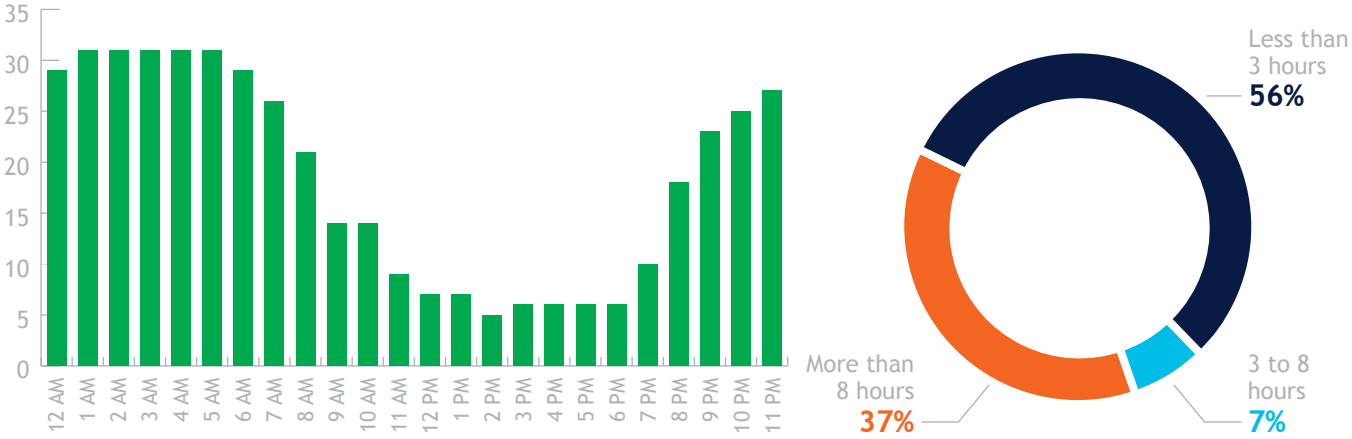


FIGURE 25: UNDESIGNATED TRUCK PARKING BY TIME OF DAY IN RURAL EASTERN OHIO



Source: CPCS Analysis of INRIX Truck GPS data, 2019.

While the rest areas and truck stop in this cluster are at capacity during overnight hours, the westbound weigh station on I-70 could be used for truck parking.

Additionally, Pilot, Flying J and Sheetz are exploring options for adding truck stops at the I-77/SR-36 interchange in Newcomerstown. The property is provided by the town for truck parking to improve safety and mitigate undesignated truck parking.

High Priority Cluster on I-70:

The cluster at the I-70 rest area north of Belmont County ranks highest among others located within the rural eastern Ohio mega-clusters, due to the relatively high number of undesignated truck parking (1,450 in 2019). The highest number of undesignated truck parking at the rest area occurs between 11 p.m. and 7 a.m.

Mega-Cluster: Columbus

Several undesignated truck parking clusters are located in downtown Columbus, near truck stops and industrial areas along I-271, I-670 and I-70 (Figure 26). Over 4,120 trucks parked at undesignated locations in this mega-cluster, for an average duration of 3.8 hours. Truck parking issues have resulted in six crashes in the Columbus mega-cluster.

The peak number of trucks parking in undesignated areas in the Columbus mega-cluster occurs between 11 p.m. and 7 a.m. Undesignated truck parking stops are particularly high between 5–8 a.m. As Figure 27 shows, about 66% of trucks parked on undesignated locations in this cluster stopped for short breaks of less than three hours, while about 20% parked for longer HOS compliance breaks of more than 8 hours.

FIGURE 26: COLUMBUS MEGA-CLUSTER

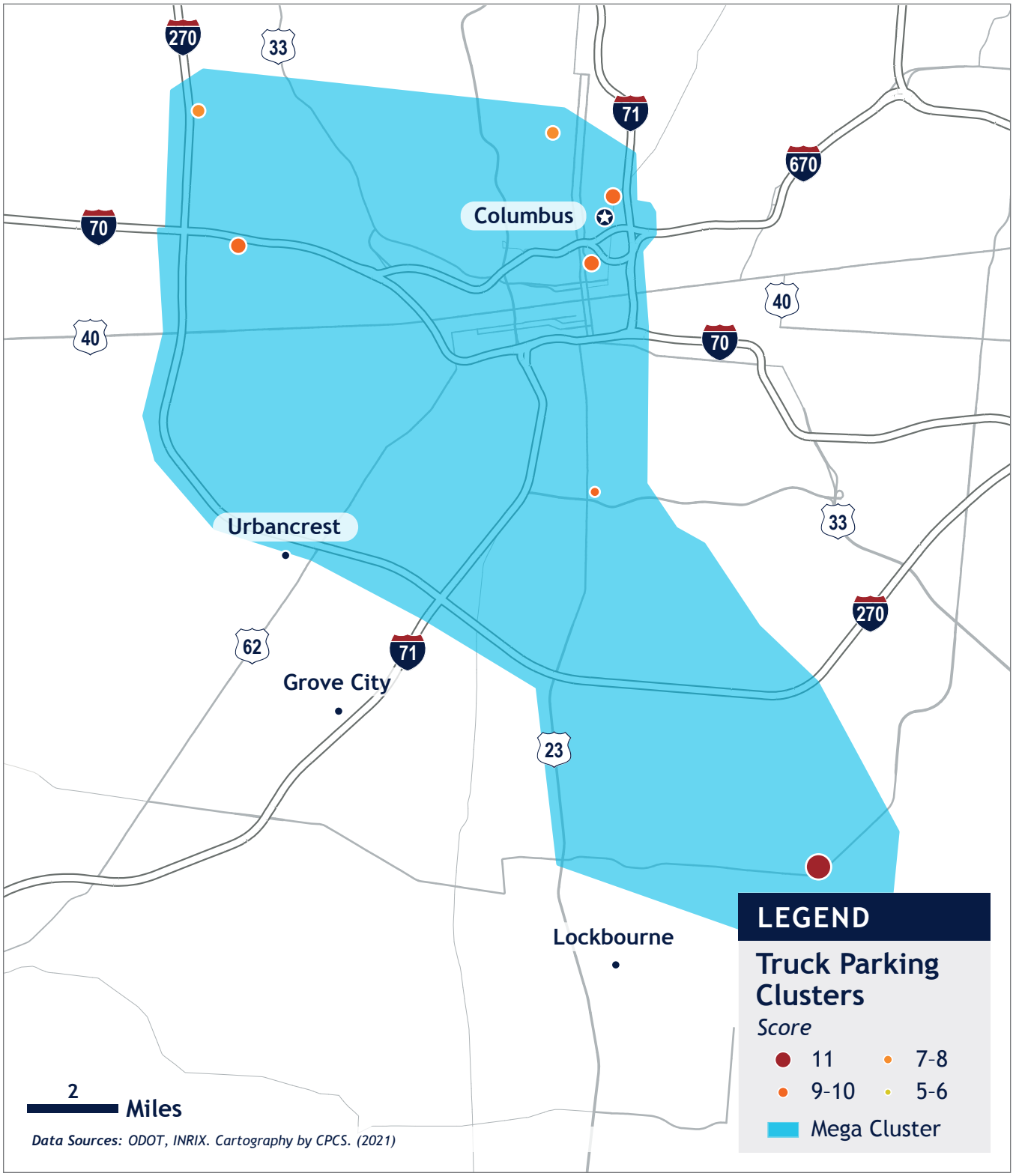
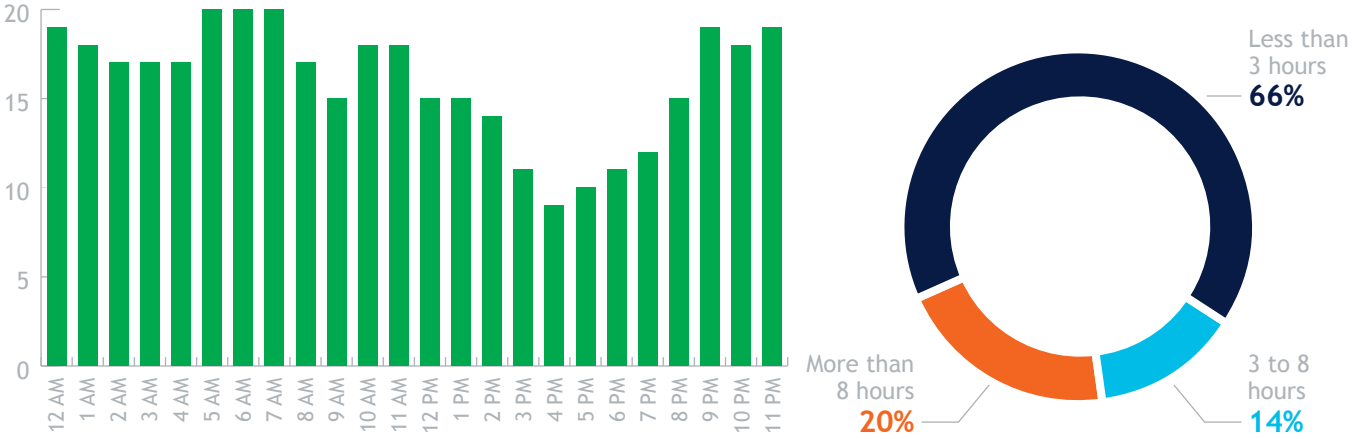


FIGURE 27: UNDESIGNATED TRUCK PARKING BY TIME OF DAY IN COLUMBUS



Source: CPCS Analysis of INRIX Truck GPS data, 2019.

Figure 28 shows examples of short-term opportunities for addressing the truck parking shortage in the Columbus area. A closed weigh station is located on I-71 in Berkshire that could provide up to 12 spots for overnight truck parking. Also, ODOT owns a strip of land located along US-23 north of SR-762. Through paving and adding lighting and other amenities at this location, ODOT can provide about 30 spots for safe overnight truck parking.

FIGURE 28: LAND AVAILABLE ON US-23 (LEFT); CLOSED WEIGH STATIONS ON I-71 (RIGHT)

Source (Left): Google Maps, 2021. Imagery © 2021 Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map data © 2021, with CPCS polygon overlaid; Source (Right): Google Maps 2021. Imagery © 2021 Maxar Technologies, State of Ohio/OSIP, U.S. Geological Survey, USDA Farm Service Agency, Map data © 2021

High Priority Cluster: Rickenbacker International Airport

One of the high-priority clusters within the Columbus mega-cluster is located in Air Haven Estates near Rickenbacker International Airport. More than 580 trucks parked at undesignated locations in this cluster, primarily for staging. This cluster was ranked as high risk due to four truck parking-related crashes and long durations of undesignated parking.

A Love's Travel Stop on Alum Creek Drive and a Marathon Gas Station on South High Street are the closest facilities to the cluster that provide truck parking. However, both facilities were under construction in 2019. According to Love's, there are 120 spaces at the Alum Creek Drive facility, which could improve the overnight truck parking shortage in this area.

High Priority Cluster: I-70/Wilson Road

The Pilot Travel Center at I-70/Wilson Road interchange is also a high-priority cluster in the Columbus mega-cluster. The imbalance in demand and supply has led to about 650 trucks parking at undesignated locations along Wilson Road that provides access to Pilot.

The Pilot Travel Center and other truck parking facilities near this cluster have limited overnight availability. Providing information on private truck stop availability through information-sharing systems could contribute to improving the undesignated truck parking issue at this cluster.

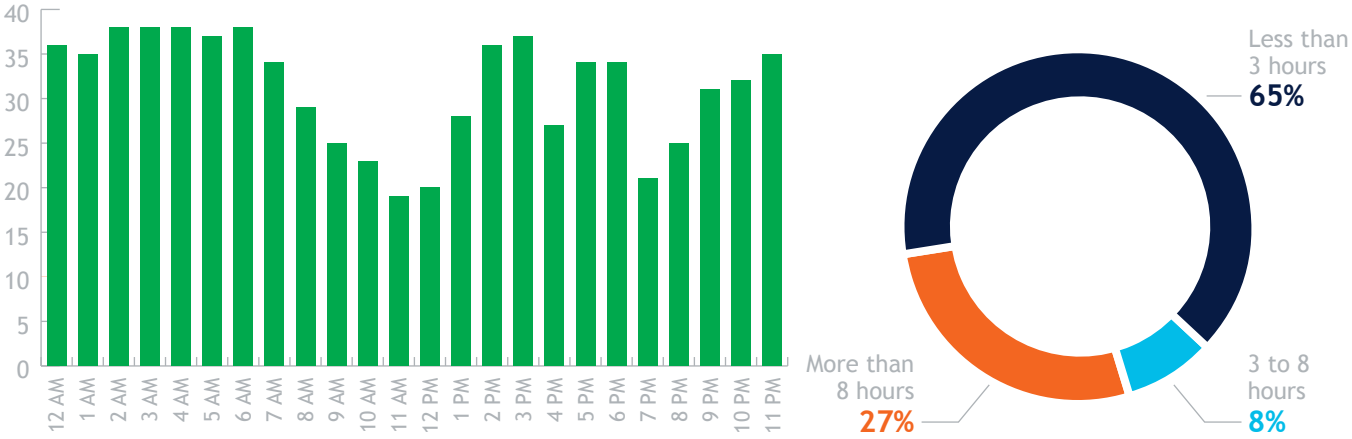
Mega-Cluster: Cincinnati

This mega-cluster is located in Cincinnati (Figure 29), encompassing high-priority undesignated truck parking clusters in the downtown area due to last-mile and urban delivery parking issues and along I-71 and I-75 due to supply-demand imbalance at truck parking facilities.

Analysis of truck stops in Ohio during 2019 shows that about 6,790 trucks parked for an average of about 4 hours in undesignated locations in this mega-cluster. Truck parking issues in this mega-cluster have led to 20 truck crashes. The peak number of undesignated truck parking in the Cincinnati mega-cluster is between 1–7 a.m. About 65% of trucks parked on undesignated locations in this cluster stopped for short breaks of less than 3 hours, while 27% parked for longer HOS compliance breaks of more than 8 hours (Figure 30).

FIGURE 29: CINCINNATI MEGA-CLUSTER

FIGURE 30: UNDESIGNATED TRUCK PARKING BY TIME OF DAY IN CINCINNATI



Source: CPCS Analysis of INRIX Truck GPS data, 2019.

In terms of opportunities to address truck parking shortage in this mega-cluster, an open weigh station on I-71 in Clinton County can provide up to 13 spaces as overnight truck parking. Also, there is a closed weigh station on I-71 in Hamilton County that can accommodate up to nine trucks for overnight parking. Figure 31 displays these opportunities.

FIGURE 31: OPEN WEIGH STATIONS ON I-71 (LEFT); CLOSED WEIGH STATION ON I-71 (RIGHT)

Source (Left and Right): Google Maps, 2021. Imagery © 2021 Maxar Technologies, U.S. Geological Survey, USDA Farm Service Agency, Map Data © 2021

High Priority Clusters: I-71 Northeast of Cincinnati

The Flying J Travel Center located at I-71/SR-123 interchange is a high-priority undesignated parking cluster in Cincinnati. Due to the high demand for overnight truck parking spots, trucks park on highway shoulders and ramps near the travel center, creating safety risks, including six truck-parking-related crashes. More than 500 trucks parked at undesignated locations in this cluster in 2019 that is located

on the national strategic freight network. A public rest area is located two miles east of Flying J on I-71. In 2019, about 500 trucks parked at undesignated locations near this rest area.

The highest number of undesignated truck parking at Flying J Travel Center and I-71 Public Rest Area is between 1-7 a.m. During this period of the day, other nearby rest areas and parking facilities have limited availability at this time. Another private facility exists on East Crescentville Road but only provides parking spots by reservation.

Mega-Cluster: Greater Akron Area

This mega-cluster is located in the area around Akron and between Akron and Youngstown (Figure 32). Since the northeastern Ohio region is served by many interstate highways and other major freight corridors, the high-priority truck parking clusters in this region are scattered along several major highways. Analysis of truck stops in Ohio during 2019 shows that about 9,825 trucks parked for an average of about 4 hours in undesignated locations in the greater Akron area. In particular, trucks parked on highway shoulders and ramps near public and private rest areas along I-71, I-76, I-77, I-80, I-271 and SR 21. Truck parking issues in this mega-cluster have led to 18 truck crashes.

The peak period for undesignated truck parking in the Akron mega-cluster is between midnight and 7 am (Figure 33). About 64% of trucks parked on undesignated locations in this cluster stopped for short breaks of less than 3 hours, while the rest stopped for three to eight hours or longer HOS compliance breaks of more than 8 hours.

FIGURE 32: GREATER AKRON MEGA-CLUSTER

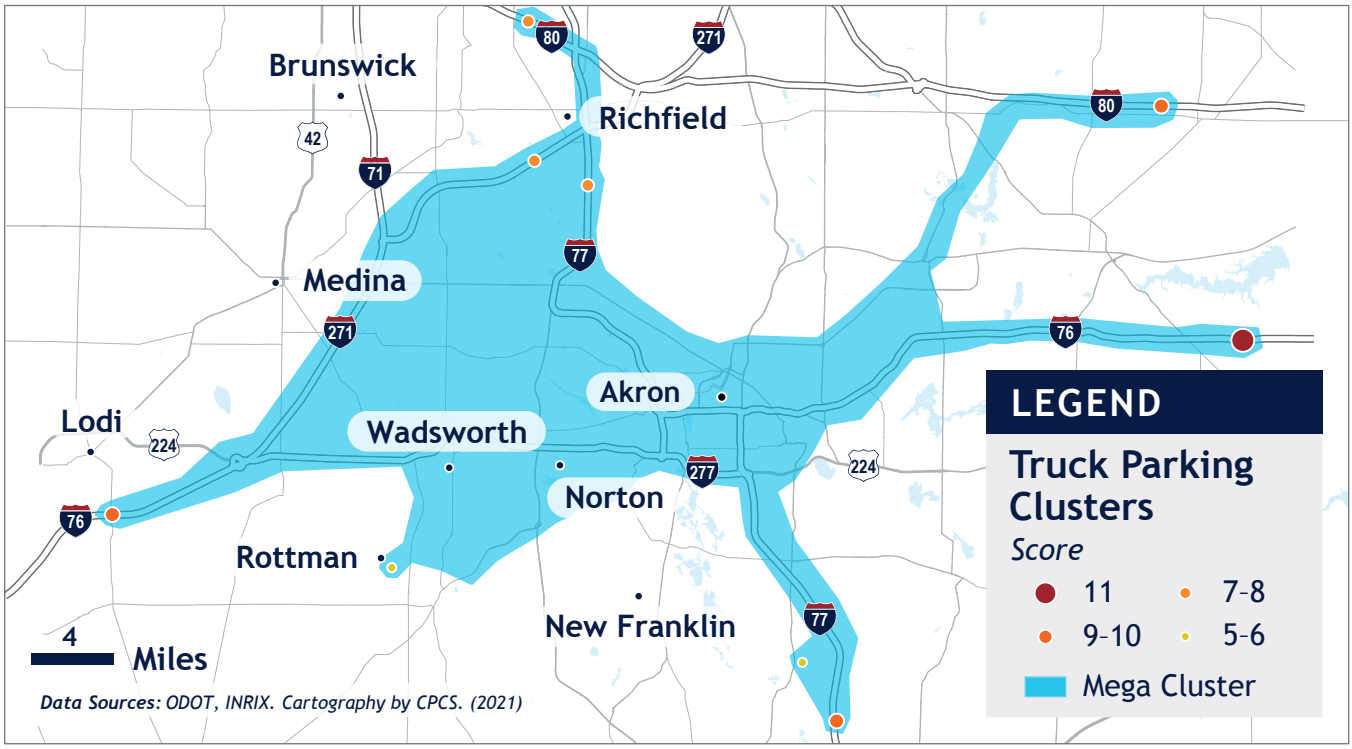
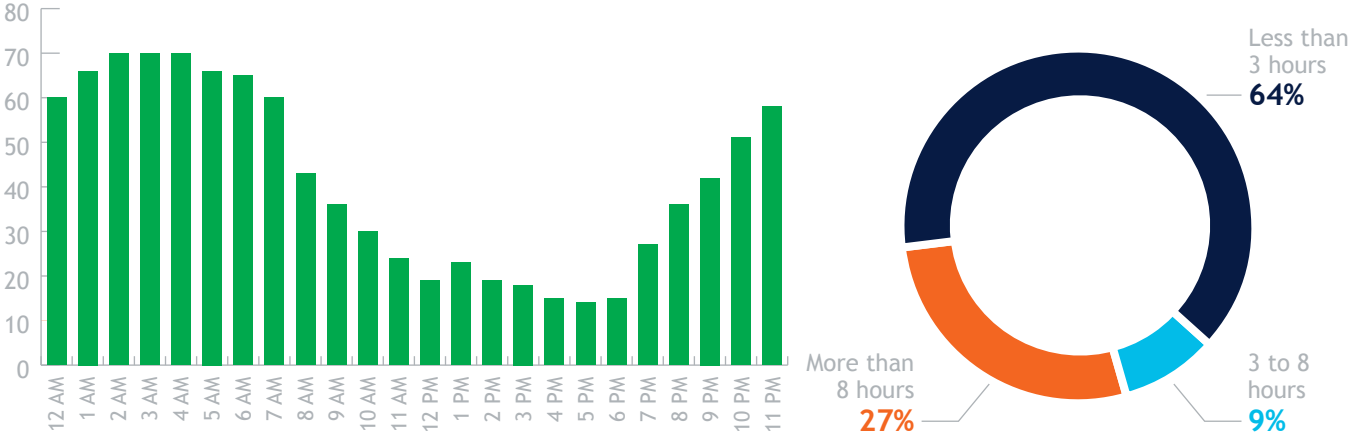


FIGURE 33: UNDESIGNATED TRUCK PARKING BY TIME OF DAY IN GREATER AKRON AREA



Source: CPCS analysis of INRIX Truck GPS data, 2019.

A short-term solution to address the truck parking supply-demand imbalance in the greater Akron region can be providing truck parking at the existing (open) weigh station located on US-224 Eastbound. A closed weigh station also exists at this location. Another closed weigh station is located on US-57 at Commerce Drive. These locations can offer about 30 spots to provide overnight truck parking when the number of trucks parked at undesignated locations is relatively high. Figure 34 displays these locations.

FIGURE 34: OPEN (EB) AND CLOSED (WB) WEIGH STATIONS ON US-224 (LEFT); CLOSED WEIGH STATION ON US-57 (RIGHT)

Source (Left and Right): Google Maps, 2021. Imagery © 2021 Maxar Technologies, State of Ohio / OSIP, U.S. Geological Survey, USDA Farm Service Agency, Map data © 2021.

High Priority Cluster: Portage/Brady's Leap Travel Plazas on I-80

Within this mega-cluster, about 1,110 trucks parked on I-80 shoulders and ramps near the Portage and Brady's Leap Travel Plaza. The highest demand for this truck parking is between midnight and 7 a.m. Other nearby rest areas and parking facilities have limited availability at this time. However, a new Love's facility on exit 48 of SR-225 could provide the additional capacity needed to address some of the parking issues in this priority cluster.

This high-priority undesignated truck parking cluster has the highest safety impacts with six truck parking-related crashes and is located on the national strategic freight system.

High Priority Cluster: Park 36 Rest Stop on I-76

Another high-priority cluster in the greater Akron area is located at Park 36 Rest Stop on I-76. Over 1,970 trucks parked on highway shoulders and ramps at this cluster, leading to high crash risks, including seven truck parking-related crashes).

Park 36 Rest Stop is located on a nationally-designated corridor of Ohio's SFS, which is key for statewide and national economic activity. However, the rest stop is at capacity at the peak demand period, between midnight to 7 a.m., leading to undesignated truck parking issues. The new Love's facility on exit 48 of SR-225 and another facility on Clarkins Drive in Mineral Ridge could provide additional truck parking capacity in this priority cluster.

Policies/Programs

Policy and program recommendations often set the stage to explore and implement larger projects and investments. The following opportunities were identified as opportunities for ODOT and its stakeholders to address truck parking needs in the short- and long-terms.

Policy/Program Opportunity #1: Identify truck parking champion to lead continued truck parking efforts in Ohio.

ODOT should identify a truck parking champion to leverage and continue the work of the Ohio Truck Parking Study. A champion would have ownership over advancing truck parking in Ohio, including the implementation of Ohio Truck Parking Study recommendations. In the medium- and long-term, a truck parking champion will enable the continued advancement of solutions to address existing and future truck parking issues in the state. A truck parking champion could also oversee the establishment of a formal ODOT truck parking program.

- ☑ Oversee the implementation of the Ohio Truck Parking Study's recommendations and monitor the impact of implemented solutions.
- ☑ Liaise with and provide support to potential partners – public and private – to identify and address truck parking issues and implement solutions, statewide and local.
- ☑ Identify and explore funding opportunities and establish a pipeline of truck parking projects.
- ☑ Continue to track and evaluate truck parking performance measures to assess truck parking annually.
- ☑ Monitor and explore new truck parking technologies that may impact truck parking, including EVs and anti-idling technologies.
- ☑ Partner to promote the integration of truck parking into statewide and local planning efforts.

Policy/Program Opportunity #2: Promote the findings of the truck parking study and share information on the importance of truck parking.

Building on the data and materials developed for the Ohio Truck Parking Study, ODOT should establish a truck parking education campaign to underscore the importance of truck parking to the public. This campaign would aim to underscore the necessity of truck parking to supply chains that support the state economy, local economies and individual consumption.

- ☑ Develop educational materials (e.g., brochures, project templates, data, etc.) to inform the public about the importance of truck parking and ease public opposition.
- ☑ Coordinate with local agencies to disseminate information to local communities and support community conflict mitigation to address land-use conflict and/or opposition to truck parking solutions.
- ☑ Provide data, technical support and other resources to local jurisdictions to identify truck parking issues, identify and facilitate potential solutions, and explore policy, project and partnership opportunities.
- ☑ Provide continued guidance and support to local jurisdictions on incorporating truck parking into local land-use zoning and planning.

Policy/Program Opportunity #3: Define the direction for TPIMS, with a focus on accuracy and providing public and private information.

ODOT is near the end of the Mid America Association of State Transportation Officials (MAASTO) TPIMS contract and has solicited responses to a Request for Information that included truck parking information selection and dissemination. ODOT and its other MAASTO partners are well-positioned to

take stock of the lessons learned and define the future direction for the ODOT TPIMS. At a minimum, ODOT should consider technology, accuracy, priority locations and information dissemination, and continue to pursue the inclusion of private truck parking data on TPIMS signs and other avenues to disseminate truck parking information. The information should be provided at optimal locations and in a way that is useful for drivers (e.g., "X" number of spaces located "Y" miles away or at "Z" mile marker). Most critically, ODOT must ensure the information provided by TPIMS reflects accurate information about locations with truck parking availability.

- ☑ Engage in peer exchange with other states to identify best practices and inform Ohio's TPIMS moving forward.
- ☑ Coordinate with the private sector to understand private sector data and how to integrate private truck parking information into TPIMS.
- ☑ Continue to monitor truck parking utilization to identify optimal locations for dynamic messaging signs.
- ☑ Through the current Request for Information, gather information about the available and best technologies, in order to inform future TPIMS decisions and operations.

Policy/Program Opportunity #4: Establish a connection to truck parking stakeholders and collect and provide information to monitor and address truck parking challenges.

ODOT has an opportunity to build on the workshop and outreach conducted during the study to build a recurring mechanism to engage truck parking stakeholders in Ohio. Through this exchange of information and continued dialogue, ODOT could work with private stakeholders to monitor truck parking issues, develop actionable truck parking solutions and leverage their insights to inform the implementation of the truck parking recommendations.

- ☑ Provide information and updates on changes to truck parking, such as locations of underutilized facilities, new capacity and unconventional parking locations (e.g., weigh stations, freight generators, off-peak venues).
- ☑ Provide guidance to truck stakeholders on trip planning tools (e.g., Trucker Path, OHGO, TPIMS, parking reservation systems) and how they can be used.
- ☑ Provide guidance to truck stakeholders on topics, such as litter reduction and use of idle reduction strategies and technologies, to help address the negative perception of truck parking.
- ☑ Work with truck parking stakeholders to obtain insight on truck parking issues and feedback on proposed and implemented solutions.

Policy/Program Opportunity #5: Pursue funding for truck parking, such as through grants, loans, tax programs or other innovative financing.

Lack of funding or financing is a critical barrier to implementing truck parking solutions focused on expanding capacity or enhancing information sharing. Funding is necessary not only for the capital costs of projects but also for ongoing operations and maintenance. ODOT should identify and explore opportunities for funding truck parking projects in the state.

- ☑ Establish a dedicated truck parking grant/loan program, available to public and private sector applicants, funded through a legislative request or federal funds.
- ☑ Explore the use of public-private partnerships for truck parking projects.
- ☑ Leverage existing federal funding opportunities, such as safety funding, National Highway Freight Program funding, discretionary grant programs (e.g., RAISE, ATCMTD), congestion mitigation/air quality programs (CMAQ) and innovative technology funding programs, among others.
- ☑ Explore opportunities for innovative financing such as low-interest financing, low-cost loans or pro-freight tax incentives, among others.
- ☑ Coordinate with other or neighboring state agencies to apply for federal funding opportunities.

Policy/Program Opportunity #6: Coordinate with neighboring states and region on truck parking.

ODOT, in combination with neighboring states and the greater region, should coordinate truck parking policies, regulations and practices to address regional truck parking issues and needs.

- ☑ Continue focused collaboration on truck parking through multi-state coalitions, such as t he MAASTO.
- ☑ Develop regional or corridor-specific truck parking studies.
- ☑ Promote the uniform presentation and display of truck parking information near state borders to inform drivers about the availability or lack of truck parking services on either side of the border.
- ☑ Inform neighboring states about truck parking changes occurring near state borders.

Truck Parking Funding Opportunities

This section identifies the funding opportunities that can be used for truck parking project capital costs or operation and maintenance costs. As a requirement of MAP-21 legislation, Jason's Law authorizes federal spending on projects that address the shortage of overnight truck parking facilities and the resulting safety risks discussed in the previous chapters. Projects that promote truck parking availability, access (information) and preservation may be eligible under the federal programs discussed below.

Fixing America's Surface Transportation (FAST) Act

The FAST Act provides federal funding for surface transportation programs focusing on improving mobility along the interstate highway system and other major corridors. Key freight-related provisions of the FAST Act include the National Multimodal Freight Network (NMFN), **National Highway Freight Program (NHFP)** and the National Highway Freight Network (NHFN) programs. Truck parking projects may be eligible under the NHFP funding program, which allocates an estimated average of $1.2 billion per year for projects that enhance freight mobility on the NHFN. NHFP funds are distributed based on the FAST Act formula. States are required to conduct a state freight plan and are encouraged to establish a freight advisory committee to become eligible for NHFP.[16] ODOT can use NHFP funds for truck parking facility construction, operation and maintenance, and planning costs.

The **Infrastructure for Rebuilding America (INFRA)** is another discretionary grant program (formerly known as FASTLANE) established by the FAST Act, providing dedicated funding for large and small projects on the critical highway infrastructure. The program's 2021 total is about $889 million. A minimum cost of $25 million for large projects and a minimum cost of $5 million for small projects can qualify for the INFRA grant.[17] ODOT can apply for INFRA dollars to pay for up to 60% of the cost of truck parking projects that are located along the NHFN.

The FAST Act also provides the **Surface Transportation Block Grant Program (STBG)**, formerly known as the Surface Transportation Program (STP), providing about $12 billion annually in flexible funds to state, regional and local transportation agencies to address infrastructure issues.[18] Truck parking capacity and information system improvement projects are eligible to receive STBG funds. Also, up to 50% of the STBG funds apportioned to the states can be transferred by the state DOTs to other FAST Act programs, including the NHFP and the **Congestion Mitigation and Air Quality Improvement Program (CMAQ)**.

CMAQ provides about $2.5 billion annually in grants to state, regional and local agency transportation projects that promote emission reductions as required by the Clean Air Act.[19] The FHWA apportions the CMAQ fund to the states under the FAST Act and the U.S. Environmental Protection Agency (EPA) determines whether the projects are located in "nonattainment or maintenance of national ambient air quality standards" areas to be eligible for receiving CMAQ funds based on the amount and likelihood of emission reductions.[20]

To apply for the CMAQ fund, state DOTs and MPOs should coordinate with FHWA as well as their air quality agencies, and submit a proposal demonstrating emission reduction impacts of projects. The CMAQ fund can be spent on truck parking projects that eliminate or reduce the need for idling at parking facilities, including installation of auxiliary power units (APUs), automatic engine idling systems, truck stop electrification (TSE) and advanced truck stop electrification (ATSE) at public or private facilities.[21/22]

To mitigate truck parking-related safety risks, the states can use the **Highway Safety Improvement Program (HSIP)**. This FAST Act program distributes an estimated $3.5 million annually to the states for projects that significantly reduce roadway crash fatalities and injuries.[23] ODOT can identify projects eligible for the HSIP fund through tracking the truck parking-related crashes and estimating the expected reduction in fatalities and injuries due to addressing priority undesignated truck parking issues.

The **National Highway Performance Program (NHPP)** is also apportioned among states based on the FAST Act distribution formula. NHPP provides about $24 billion annually to support projects that improve the National Highway System (NHS) performance, including projects to reduce the risk of damaging or failure of critical infrastructure.[24] Since undesignated truck parking can impact infrastructure condition and integrity, ODOT can use the NHPP dollars to support truck parking projects that address this issue through parking development or expansion and installation of infrastructure-based intelligence systems at facilities serving the NHS.

In addition to the programs described above, the FAST Act supports research, education and technology programs that address significant gaps and support the agencies in planning and policy-making related to emerging issues and technologies. These programs include: **Highway Research and Development (HRD), Technology and Innovation Deployment Program (TIDP)** and **Training and Education, Intelligent Transportation Systems (ITS)**.

Rebuilding American Infrastructure with Sustainability and Equity (RAISE)

The RAISE program, formerly known as Better Utilizing Investments to Leverage Development (BUILD) and Transportation Investment Generating Economic Recovery (TIGER), provides discretionary grants to state DOTs to support projects that improve safety, apply technologies and address air quality and social justice issues.

The RAISE program's notice of funding opportunity was released on April 13, 2021, making $1 billion available for the fiscal year to qualifying projects.[25] Truck parking electrification projects could qualify for RAISE under the environmental sustainability merit criterion since they include components that contribute to emission reductions, promote energy efficiency and involve the redevelopment or improvement of existing infrastructure.

Diesel Emissions Reduction Act (DERA)

The DERA grant and loan program is authorized by the US EPA to support projects that improve air quality through diesel emission reduction. The program can be used for the installation and replacement of alternative fuel equipment and infrastructure at truck parking facilities.[26]

Advanced Transportation and Congestion Management Technologies Deployment (ATCMTD)

The ATCMTD program administered by the FHWA provides nearly $50 million in the fiscal year 2021 (50/50 match) to projects that involve advanced transportation and congestion management technology deployment. Therefore, truck parking projects that deploy parking spot reservation systems to reduce undesignated parking can qualify for this program.[27]

Truck Parking Safety Improvement Act

The Truck Parking Safety Improvement Act was introduced in the US House of Representatives in 2020, directing the USDOT to establish a funding program to support truck parking projects located on the federal aid highway system.[28] The bill was reintroduced in March 2021, with support from the Owner-Operator Independent Drivers Association (OOIDA).[29] If enacted, the bill can allocate more than $750 million of the federal money available to states over the upcoming five years to public truck parking facility development projects or projects that expand or convert existing facilities to allow for safe truck parking. The bill is also supported by the American Trucking Association, the Truckload Carriers Association and the National Association of Small Trucking Companies.[30]

ODOT should monitor and prepare to apply for the program using the assessment of needs at priority undesignated truck parking clusters and identification of existing facilities such as weigh stations and maintenance yards that could be used to provide additional truck parking.

Immediate Next Steps

The Ohio Truck Parking Study has identified several different strategy and policy recommendations, as well as funding and partnership opportunities. However, there are several critical and immediate next steps that ODOT should take to set the foundation for continued truck parking efforts in Ohio. These steps are described in Figure 35. ODOT should take these steps in the short term in order to position itself to fully leverage the findings, stakeholder engagement and publication of the Ohio Truck Parking Study. Once completed, these steps will enable ODOT to further pursue and implement truck parking projects, policies and partnerships in the state.

The following next steps are low-cost options to address immediate challenges for addressing truck parking in Ohio and position the state for the future implementation of truck parking projects and policies. These next steps aim to remove existing institutional barriers to set the stage for organizing and implementing long-term solutions.

FIGURE 35: IMMEDIATE NEXT STEPS

Identify a truck parking champion to establish ownership over truck parking.

ODOT should designate a truck parking champion to lead the implementation of the Ohio Truck Parking Study's strategy and policy recommendations. A truck parking champion could be a singular person or a group of people, that takes ownership over advancing truck parking in Ohio. Lack of clear ownership of and leadership for truck parking issues is a key challenge to advancing truck parking solutions. To overcome this challenge, a designated champion would establish clear ownership over the truck parking issue in Ohio.

A champion would serve as a single internal and external point of contact for other public and private stakeholders seeking to address truck parking issues and/or advance truck parking solutions. Additionally, a champion would explore partnership opportunities with other public and private sector stakeholders. This includes, but is not limited to engaging with local public stakeholders to provide data, information, guidance and other support; and facilitating public-private partnerships, a key mechanism for implementing several solutions. A champion would also look to pursue and secure funding to advance truck parking projects in the state.

Leverage data and information developed during the study to support outreach and enable local jurisdictions to advance truck parking.

The release of the Ohio Truck Parking Study creates a window of opportunity to advance truck parking in Ohio. A negative public perception of truck parking, land-use conflicts and the need for truck parking information at the regional/local levels are each a challenge to addressing truck parking issues in Ohio. ODOT's publication of the study serves as a focusing event, enabling ODOT to underscore the importance, issues and opportunities of truck parking, to truck parking stakeholders and the general public.

To leverage this window of opportunity, ODOT should develop materials and conduct timely outreach immediately following the release of the study. ODOT could develop an outreach plan to outline key actions and steps to implement the activities outlined below.

- **Summary pamphlet:** develop and distribute these materials to quickly convey the importance of truck parking to the public.
- **Truck parking webpage:** featured on the ODOT website that provides information about ODOT's truck parking efforts.
- **Presentations:** conduct sessions to provide relevant truck parking information to the general public and local agency audiences.

Establish an ODOT Truck Parking Program.

ODOT should establish a formal truck parking program to demonstrate an institutional commitment, by allocating resources, to address truck parking issues in Ohio. A truck parking program should define short- and medium-term goals and objectives for truck parking implementation, in order to provide statewide direction and clarify ODOT's role for advancing truck parking in Ohio. A truck parking program should also develop a process for identifying and advancing truck parking projects or policies for implementation in the state.

Apply for federal competitive grant opportunities to fund truck parking projects.

ODOT should use data and information developed during the Ohio Truck Parking Study to apply for federal grants to implement truck parking projects. Insufficient funding is a significant challenge for implementing truck parking projects. Most immediately, ODOT should apply for the US DOT RAISE Grant Program to fund near-term truck parking projects in Ohio. This will position ODOT with the potential opportunity to fund the implementation of truck parking projects in the state.

Overall, the goal of the immediate next steps presented above are to develop institutional support and a foundation that can be used to advance truck parking. These actions will help identify where to expand truck parking, the future of TPIMS and assist in the transition from study to implementation. Appendix A provides a framework and set of preliminary actions to guide implementation of the Ohio Truck Parking Study.

The findings from the immediate next steps will inform subsequent implementation activities and enable ODOT and its partners to build an action plan and confidently implement infrastructure decisions and advance capital expenditures for truck parking capacity, information, technology and partnership projects.

6 What comes next?

The objective of Transport Ohio is to build on past efforts, including the prior Transport Ohio Plan, Ohio State Rail Plan, Ohio Maritime Strategy, Access Ohio 2045 and others, and to close information gaps in order to develop a federally-compliant state freight plan.

As a part of Transport Ohio, the Ohio Truck Parking Study will feed into the larger state freight plan, including the identification of projects and the development of a fiscally-constrained freight investment plan based on a series of working papers. Figure 36 displays the timeline for working paper delivery.

FIGURE 36: TRANSPORT OHIO WORKING PAPERS SUMMARY

Working Paper	Estimated Delivery
WP 1 | Characteristics of Ohio's Multimodal Freight System	November 2020
WP 2 | Existing and Future Commodity Flow Profile	April 2021
WP 3 | Truck Parking Inventory	December 2020
WP 4 | Imbalances in Truck Parking Supply and Demand	January 2021
WP 5 | Existing Freight System Needs	April 2021
WP 6 | SWOT Analysis and Future Scenarios	June 2021
WP 7 | Infrastructure Investments	September 2021
WP 8 | Assessment of Available Funding	October 2021
WP 9 | FAC Guidance	October 2021

A Appendix A - Summary of Actions Table

FIGURE 37: IMPLEMENTATION ACTION PLAN

Type / Action	Priority	Lead	Partners	Timeline (Short, Med, Long)	Est. Cost (Low, Med, High)	Funding Approach (ODOT, P3, Local, other…)	Risks
Capital Expansion							
Identify potential private sector partners to advance capital expansion projects.	High	ODOT	Private sector	Short-term	Low-Medium	P3, ODOT	Legal, Regulatory, Financial
Identify options to use weigh stations and other locations identified in this study to provide truck parking.	High	ODOT	Other state agencies	Short-term	Low-High	State, Federal, Grants	On-going maintenance and operation
Information / Technology							
Provide direction for TPIMS, with a focus on improvements to accuracy and information.	High	ODOT	Private sector	Short-term	Low	State, Federal, Grants	On-going maintenance and operation
Identify potential private sector partners to advance information/ technology projects.	High	ODOT	Private sector	Short-term	Low-High	State, Federal, Grants	Private sector participation and Financial
Policy / Program							
Identify truck parking champion to lead continued truck parking efforts in Ohio.	High	ODOT	Local government, private sector	Short-term	Low	–	Competing priorities
Establish a truck parking program.	Medium	ODOT	–	Short-term	Low-High	State, Federal, Grants	Financial
Leveraging data and information developed during the study, conduct public outreach through a statewide education campaign to share information and findings on the importance of truck parking.	High	ODOT	Local agencies	Short-term	Low	–	Local agencies address undesignated truck parking, but not the cause
Coordinate with truck parking stakeholders to provide outreach and exchange information to continue to identify and address truck parking challenges.	Medium	ODOT	Truck parking stakeholders	Long-term	Low	–	Local agencies address undesignated truck parking, but not the cause
Pursue funding for truck parking, such as through grants, loans, tax programs or other innovative financing.	High	ODOT	Public and Private Sector	Short-term	Low-Medium	State, Federal, Grants	Shifting focus of grant programs
Coordinate with neighboring states and the region on truck parking.	Medium	ODOT	Neighboring states	Long-term	Low	State, Federal, Grants	Competing priorities

B

Appendix B - Truck Crash Severity Distribution and Scoring Methodology

This appendix presents the steps used in identifying the CMV crashes associated with truck parking issues and the methodology for converting the number of crashes into weighted per crash costs. Monetizing the crash impacts involves two steps: (1) Identifying the number of crashes that are the focus of the analysis along with their level of severity; and (2) using a monetary value generalized by severity level to estimate the economic impacts of crashes such as loss of life, medical expenses, disability compensation and vehicle/property damages.

STEP 1

Isolating Truck Parking-Related Crashes

Safety risks associated with truck parking issues can be categorized into two types:

- Crashes with trucks parked at undesignated locations: speeds, speed limit enforcement provisions and road design are significant factors in the severity of these crashes.
- Crashes that occur due to fatigued driving: even with adherence to HOS regulations, truck drivers may still be fatigued, especially around the end of their shifts and when finding safe parking spots is difficult.

CMV crash data of 2015 through 2019, collected by the Ohio State Highway Patrol (OSHP) officers and processed through the ODOT's GIS Crash Analysis Tool, is used to identify and analyze the truck crashes related to undesignated parking or fatigued driving.

Crashes associated with undesignated truck parking are identified through an assessment of the pre-crash condition and actions of the units involved. An overview of the individual CMV crash reports shows that incidents involving trucks parked at undesignated locations primarily occur on highway shoulders, on/off ramps or restricted areas along local streets. The project team identified 106 crash records and verified them through a review of truck crash-related news articles. Truck crashes that lead to serious injuries or/and fatalities are major events that are often covered in detail by the local news. The project team collected a list of truck-involved crashes published in Ohio's news websites between 2015 and 2019. The dates, primary crash factors, parties involved, the sequence of events, and the consequences of these crashes were compared to the crash records filtered from the OSHP database to verify and validate the methodology.

Assessment of the drivers' pre-crash condition informed the fatigued-related crash identification. More than 15,370 fatigue-related crashes happened in Ohio between 2015 and 2019, in about 1,580 of which CMVs were involved. In 461 of these CMV fatigue-related crashes, the truck drivers were at fault.

STEP 2

Calculating Severity Weighted Cost per Crash

The crash reports collected and recorded by the OHSP officers use the KABCO injury severity scale. The KABCO scale codifies the injuries under the following categories:

- **K** — Fatal
- **A** — Disabling Injury
- **B** — Evident Injury
- **C** — Possible Injury
- **O** — Property Damage Only

The KABCO scale method developed by the National Safety Council (NSC) assigns a monetary weight to each severity level and calculates the total severity score in dollars using the following formula:

$$\text{KABCO Score} = C_i \frac{N_i}{N_{Total}} + C_i \frac{N_A}{N_{KABCO}} + C_B \frac{N_B}{N_{KABCO}} + C_C \frac{N_C}{N_{KABCO}} + C_O \frac{N_O}{N_{KABCO}}$$

Where:

- C_i is the generalized crash cost for severity level i
- N_i is the number of crashes of severity level i
- N_{Total} is the total number of crashes

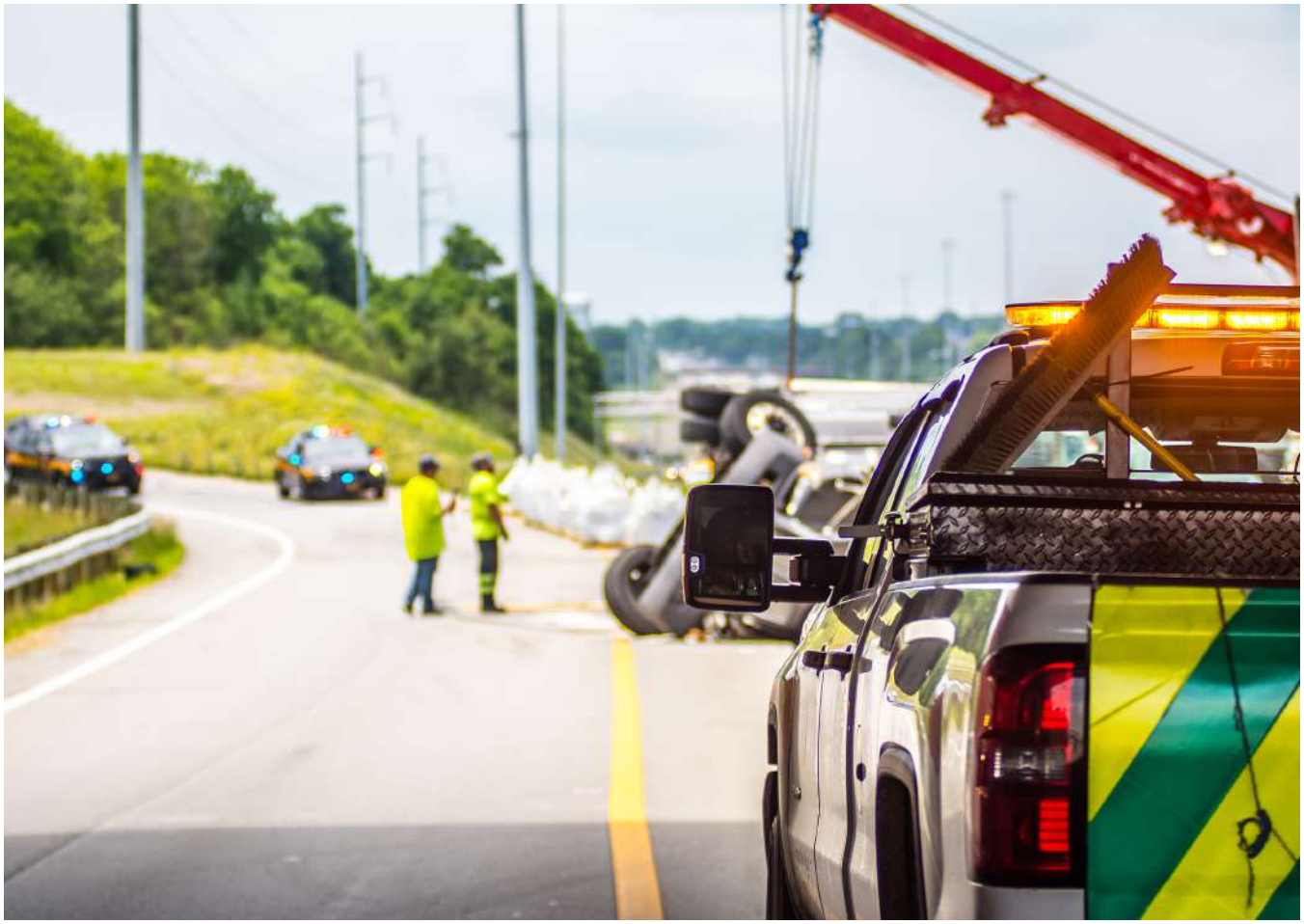
Individual crash severity scores can be calculated by multiplying the crash cost by the number of person injuries of various severity levels. Figure 38 summarizes the crash costs used by ODOT for safety analysis. As the figure shows, a majority, 58%, of the economic impact of truck parking-related crashes is associated with property damages. Fatal and disability injury crashes have the highest per-person cost impacts; however, these crashes only consist of about 12% of the total truck parking-related crashes.

FIGURE 38: ODOT CRASH COST AND NUMBER BY SEVERITY (2015-2019)

Crash Severity	Crash Costs (C_i)*	Number of Crashes (N_i)	% of Total Crashes
K — Fatal	$376,482	10	**1.8%**
A — Disabling Injury	$376,482	54	**9.9%**
B — Evident Injury	$62,883	115	**20.3%**
C — Possible Injury	$42,623	56	**9.6%**
O — PDO	$9,605	332	**58.4%**

*Costs are translated into 2021 dollars using a 1.12 inflation rate provided by the Bureau of Labor Statistics.

Source: ODOT, CMV Crash Data of 2015-2019; FHWA Safety Program Guidelines, 2018.



Endnotes

1 Federal Highway Administration, 2020. 5th Meeting of the National Coalition on Truck Parking.

2 American Transportation Research Institute (ATRI), 2020 Critical Issues in the Trucking Industry.

3 This perspective was shared by Scott Grenerth, a truck driver with 15 years of experience and 1 million miles of crash-free, over-the-road trucking.

4 Trucker Path, 2018. Truck Parking Report.

5 Commercial Motor Vehicle Driver Fatigue, Long-Term Health, and Highway Safety, The National Academies Press, 2016, ISBN 978-0-309-39252-5 | DOI 10.17226/21921.

6 CPCS analysis of CMV crash cost using crash data and KABCO injury classification scales provided by ODOT, 2021. For more information, see Appendix B.

7 Crabb, R. Semi driver cited for illegally parking rig involved in I-75 fatal accident. Dayton Daily News, 2019. https://www.daytondailynews.com/news/crime--law/semi-driver-cited-for-illegally-parking-rig-involved-fatal-accident/wso6UAYAyeV2gAhkVvjHsL/; Londberg, M. Man killed in crash with wrongly parked semi was longtime business owner in Butler Co. Cincinnati Enquirer, 2019.

8 CPCS analysis of CMV crash data provided by ODOT, 2020.

9 ATRI, Managing Critical Truck Parking Case Study – Real World Insights from Truck Parking Diaries, December 2016, https://truckingresearch.org/wp-content/uploads/2016/12/ATRI-Truck-Parking-Case-Study-Insights-12-2016.pdf; Trucker Path, Truck Parking Report, July 2018, http://files.truckerpath.com/web/trucker-path-parking-white-paper-2018.pdf

10 Herald-Star, "Council debates increasing certain fines," May 5, 2021, https://www.heraldstaronline.com/news/local-news/2021/05/council-debates-increasing-certain-fines/

11 Ohio DOT. Ohio's Rest Areas. https://www.transportation.ohio.gov/wps/portal/gov/odot/traveling/rest-areas

12 The 75th percentile number of trucks parked in undesignated locations within rest areas and on the on/off ramps leading to the rest areas was compiled by hour of the day. The lowest number of undesignated trucks occurs from 1-3 p.m. and is used as the base for the index.

13 Trucker Path, Truck Parking Report, July 2018, http://files.truckerpath.com/web/trucker-path-parking-white-paper-2018.pdf

14 Truck crashes are weighted using Highway Safety Manual weights for fatal, injury, and PDO crashes. Source: AASHTO, Highway Safety Manual, 2010.

15 FHWA Memorandum, State DOTs Leveraging Alternative Uses of the Highway Right-of-Way Guidance, April 2021.

16 USDOT, NHFP Fact Sheet, accessed May 2021. https://www.fhwa.dot.gov/fastact/factsheets/nhfpfs.cfm

17 USDOT, Infrastructure For Rebuilding America, accessed May 2021. https://www.transportation.gov/buildamerica/financing/infra-grants/infrastructure-rebuilding-america

18 USDOT, Special Federal-aid Funding, accessed May 2021. https://www.fhwa.dot.gov/specialfunding/stp/160307.cfm

19 USDOT, CMAQ Program, accessed May 2021. https://www.fhwa.dot.gov/fastact/factsheets/cmaqfs.cfm

20 FHWA, Congestion Mitigation and Air Quality Improvement (CMAQ) Program. accessed May 2021. https://www.fhwa.dot.gov/ENVIRonment/air_quality/cmaq/reference/cmaq_essentials/

21 EPA, Idling Reduction Technologies (IRTs) for Trucks and School Buses, accessed May 2021. https://www.epa.gov/verified-diesel-tech/learn-about-idling-reduction-technologies-irts-trucks-and-school-buses

22 EPA, CMAQ and Idle Reduction Techniques, 2009. https://www.michigan.gov/documents/deq/deq-ess-tas-micdi-workshop-CMAQ-ProgramOverviewHandout_269007_7.pdf

23 USDOT, Safety, accessed May 2021. https://safety.fhwa.dot.gov/hsip/

24 USDOT, National Highway Performance Program, accessed May 2021. https://www.fhwa.dot.gov/fastact/factsheets/nhppfs.cfm

25 USDOT, RAISE Discretionary Grants, accessed May 2021. https://www.transportation.gov/RAISEgrants

26 EPA, Clean Diesel and DERA Funding, accessed May 2021. https://www.epa.gov/cleandiesel

27 USDOT, ATCMTD, accessed May 2021. https://www.fhwa.dot.gov/fastact/factsheets/advtranscongmgmtfs.cfm

28 Congress Online Library, H.R.6104 — 116th Congress (2019-2020), accessed May 2021. https://www.congress.gov/bill/116th-congress/house-bill/6104?s=1&r=46

29 Congress Online Library, H.R.2187 — 117th Congress (2021-2022), accessed May 2021. https://www.congress.gov/bill/117th-congress/house-bill/2187

30 OverDrive, Congress again eyes funding for truck parking expansion, March 30, 2021.

transportation.ohio.gov/to