

Southwest Detroit Truck Route Implementation Study

Network Analysis Report

June 2025

Table of Contents

Executive Summary	3
Introduction	5
Study Purpose.....	5
Supplemental Study Approach	6
Prior Southwest Detroit Truck Route Study (2021).....	7
Prior Study Gap Analysis Plan	10
Other Key Issues.....	11
Network Analysis Context.....	12
Southwest Detroit Land Use Challenges	12
Community and Land Use Concerns	13
Viaducts	15
Gordie Howe International Bridge Changes	16
Origin and Destination Analysis.....	19
Truck Trip and Route Data Sources	19
Key Truck Generators	20
Extraction of Truck Routes.....	25
Network Data Processing.....	25
Network Analysis Results.....	26
Issue Routes and Alternate Routes.....	28
Issue Routes	28
Key Community Concerns	30
Truck Route Identification	31
Individual Routing.....	34
Refined Overall Network	43
Adherence Measures for Proposed Truck Route Network.....	48
Outreach	50
Recommended Infrastructure Improvements.....	50
Natural Encouragements and Discouragements	55
As-Needed Traffic Signal and Intersection Modifications	55
Appendix A: Inbound and Outbound Maps from Replica	57
Appendix B: Routing for Individual Generators	86

Executive Summary

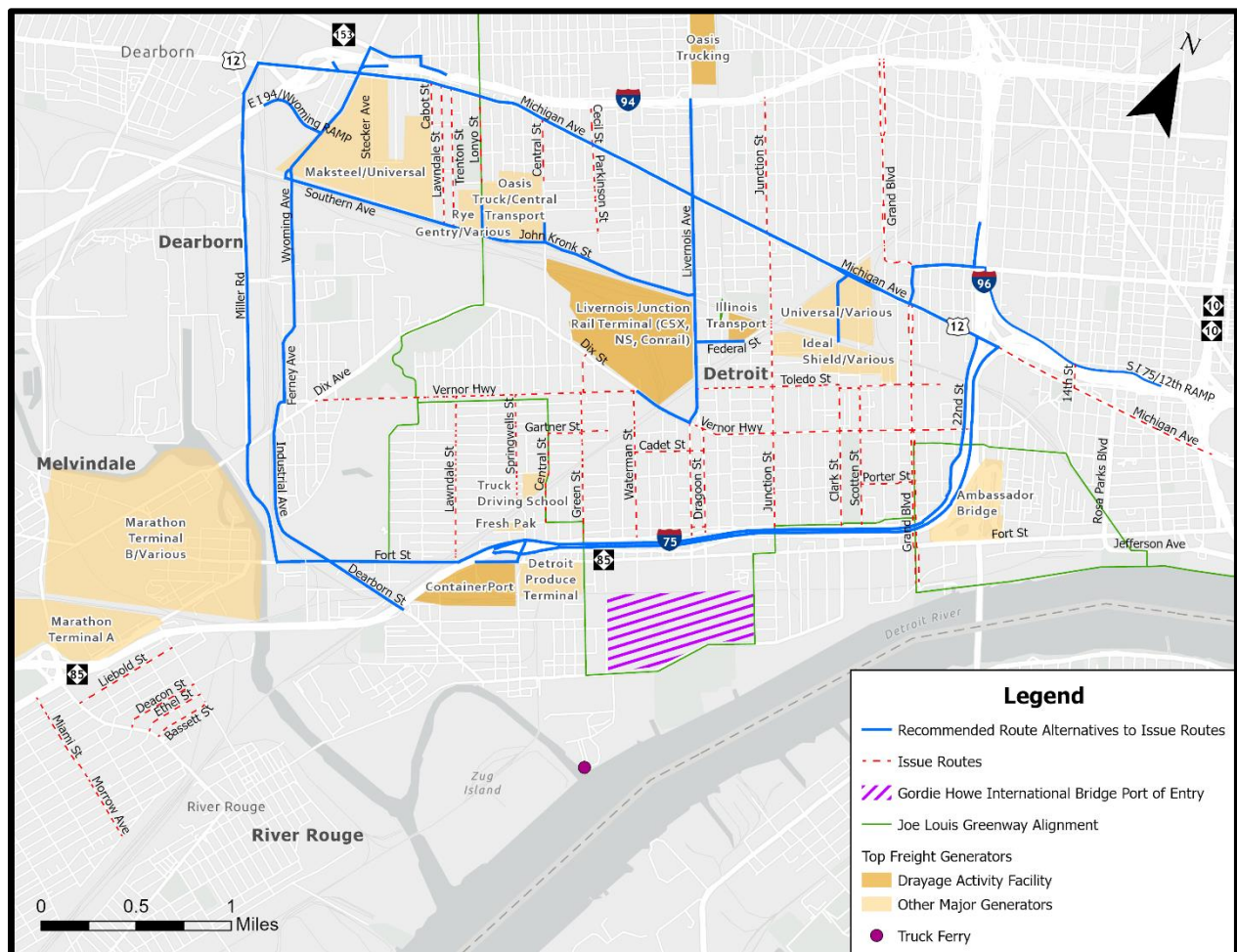
The purpose of the *Southwest Detroit Truck Network Implementation Study* is to identify opportunities for the City of Detroit and its partners to better manage local truck activity through Southwest Detroit to reduce truck traffic impacts on the local community while preserving access and network connectivity. To achieve this, this study refines the Southwest Detroit trucking network as recommended in the 2021 *Southwest Detroit Truck Route Study* report, completed by Giffels Webster. This process included conducting a network analysis of the various generators in Southwest Detroit and identifying travel behavior to and from these generators, while also making recommendations based on travel behavior associated with restrictions caused by the construction of the Gordie Howe International Bridge.

An analysis of road use data associated with the various generators in Southwest Detroit was conducted using three data sources, Geotab, Replica, and Miovision. Using this data, along with input from City staff and the community, WSP developed a list of “issue routes” that carry heavy truck traffic now, but are not recommended for future truck use because they have a high level of residential land use, vulnerable roadway users like people walking and biking, and/or sensitive receptors.

In total, after all network modifications, the network of blue segments shown in Figure 1 represents the roadways recommended for encouraged truck use, and the dashed segments recommended for discouragement of truck use. The generators chosen for route recommendations in this study are based on whether routing data indicates that trucks are currently traveling on routes that are not recommended for future travel. Targeted route recommendations for each freight generator are included in the appendix for use in direct communications with the operators of select generators.

Appendix A of this report shows inbound/outbound travel data for generators and was used to help inform re-routing recommendations. Appendix B provides individual routing maps for select generators (those that might require re-routing based on the analysis in this report). The individual routing maps in Appendix B are intended to be presented to select truck traffic generators in communications for the purpose of encouraging alternative routing.

Figure 1: Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



Introduction

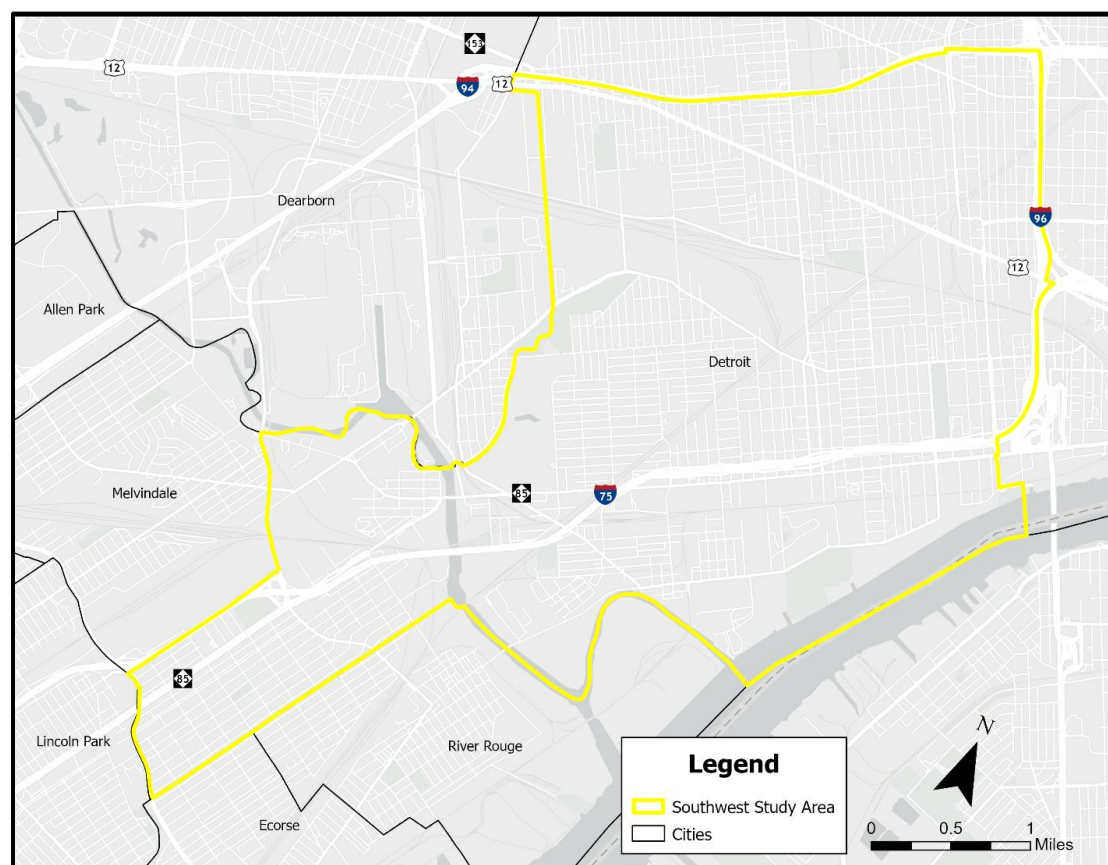
Study Purpose

Southwest Detroit is an international commercial gateway and key node in the local, regional, and state-level freight, logistics, and manufacturing sectors. Southwest Detroit encompasses 18 square miles and is bordered or intersected by the Detroit and Rouge Rivers, I-75, I-94, and I-96 freeways, and has multiple rail lines crisscrossing through it. The neighborhood is host to the Ambassador Bridge, the busiest United States–Canada border crossing and only international crossing between Detroit and Windsor, Canada that allows large trucks. A second bridge span across the Detroit River, the Gordie Howe International Bridge, which will also carry truck traffic, is currently under construction and projected to open in 2025. These transportation corridors have made Southwest Detroit a prime location for industrial activity. These activities contribute to environmental, health, and quality of life issues for residents of the community.

The purpose of this report is to identify opportunities for the City of Detroit and its partners to better manage local truck activity through Southwest Detroit to reduce truck impacts on the lives of residents and the neighborhoods nearby while preserving access and network connectivity. This is an especially important consideration as over the past 3-4 years, there have been an increasing number of truck and rail intermodal trips and an increase in the number of container storage yards.

The study area is bounded by I-94 on the north, I-96 on the east, the Detroit River on the south, and the city borders of Dearborn, Melvindale, Lincoln Park, and River Rouge to the west, as shown in Figure 2.

Figure 2: Study Area Map

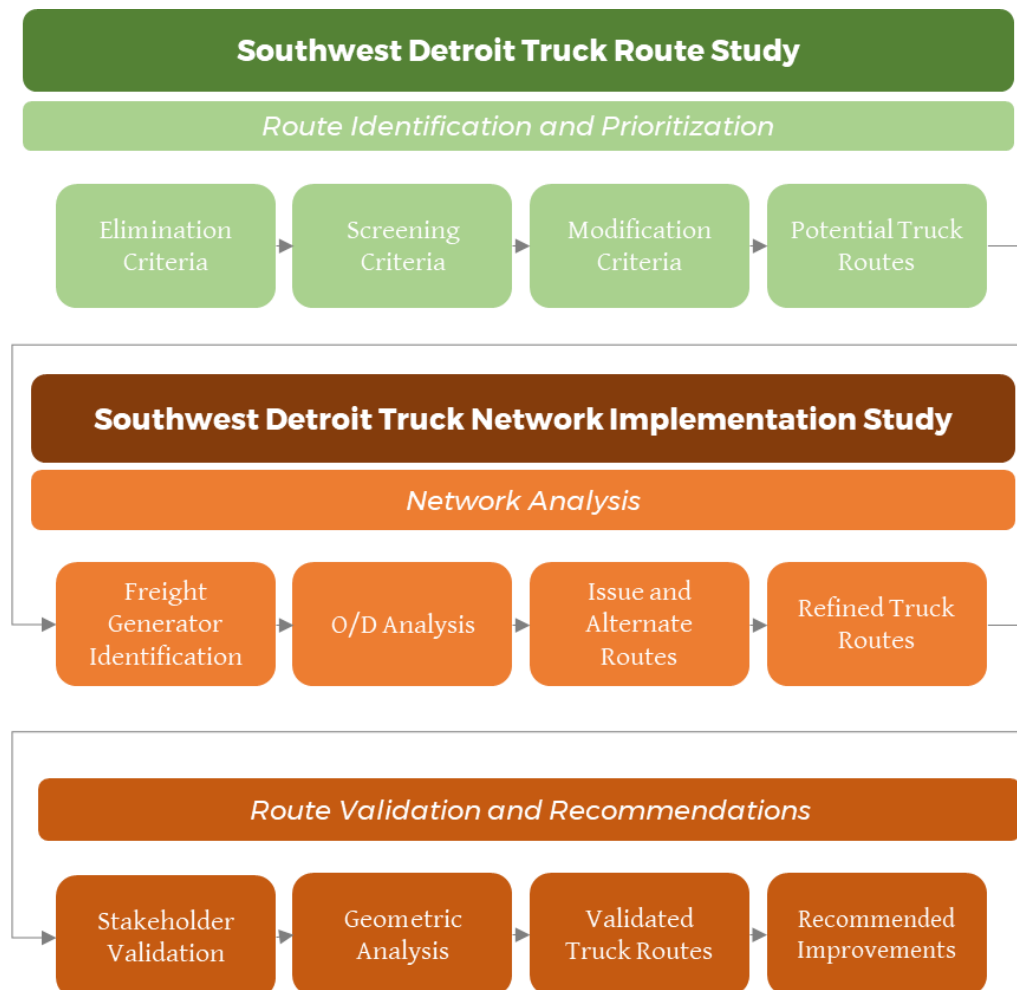


Supplemental Study Approach

This study builds upon the Southwest Detroit Truck Study completed in 2021 by Giffels Webster. WSP work supplements that report with additional network analysis, a recommended priority network and a list of key projects that will help facilitate the usage of that network.

The process for refining and validating the truck route network and developing recommended improvements in the previous study is illustrated in Figure 3. This report summarizes the Network Analysis steps undertaken to refine that network. The core of WSP's network analysis approach is the use of truck road use data not included in the original study. The analysis examined heavy truck traffic data utilizing two geospatial telematics data sets: 1) Replica and 2) Geotab. The data sets provide insight on truck movements to and from major generators located in Southwest Detroit. The granularity of the data enables baselining truck movements and volumes to proof and adjust the truck route recommendations made in the 2021 study, and to develop recommended improvements to the street network that facilitate truck movements on the network and discourage them off of the network. In addition to the quantitative network analysis, WSP incorporated City of Detroit staff, stakeholder, and freight industry input to validate the data, develop priorities, understand where existing truck traffic was most intrusive, and determine the feasibility of the draft truck route network.

Figure 3: Implementation Study Process Overview



Prior Southwest Detroit Truck Route Study (2021)

In 2019, the City of Detroit brought on board Giffels Webster, a civil engineering and planning firm, to develop a proposed designated truck route network that balanced the needs of industrial operations while protecting the interests of residents and commercial business owners in the area. The study included data collection, public involvement, truck route assessment, and route recommendations, with both near-term and long-term strategies. It was completed in 2021.

Data Collection

Giffels Webster obtained data from several public agencies including the City's Traffic Engineering Division (TED), Planning and Development Department (PDD), Detroit's Open Data Portal, Michigan Department of Transportation (MDOT), Michigan Department of Licensing and Regulatory Affairs (LARA), and the Southeast Michigan Council of Governments (SEMCOG). The study team also tapped resident knowledge through the Improve Detroit portal and a bespoke SW Truck En Route application. Taken altogether, the data informed the study and its recommendations. The collected data included the following:

- Current Designated Truck Routes (MDOT/Wayne County)
- Traffic Volumes (AADT)
- Truck Crash Rates
- Vehicle Classification (FHWA)
- Roadway Characteristics
- Pavement Rating
- Bridge Characteristics (clearance and weight limit)
- Bridge Rating
- Intermodal Facilities
- Adjacent Land Use
- Future Land Use
- Sensitive Receptors
- Environmental Impact
- Local Connections
- Cross-jurisdictional Connections
- International and statewide Connections
- Intermodal Connections
- Pedestrian and Bicycle Facilities
- Act 51 Roadway Map
- Related Studies
- Improve Detroit Application
- SW Truck En Route Application

Public Involvement

The public shaped the route map and recommendations through community meeting, online interaction, and a steering committee. Between July and October of 2019, there were six community meetings. The first two meetings were "Introduction Meetings" that provided general information on the project and summarized the challenges in developing a future truck route network. The second set of meetings were "Check-In Meetings" that included feedback from the first set of meetings and introduced truck route elimination criteria. The last set of meetings were the "Results Meetings" which recapped the previous

meetings and provided a ranking of roadway segments from least preferred to most preferred. In addition to participating in community meetings, an ESRI Story Map webpage and a City of Detroit web application were developed to allow for the public to provide input online.

The project team assembled a steering committee with representatives from local agencies, residents, TED, and the Detroit Police Department. The steering committee met regularly to discuss recent issues and check on progress of the study. Limited external stakeholder engagement to identify roadways and routes utilized by trucks occurred through stakeholder interviews and questionnaires.

Truck Route Assessment

Giffels Webster used a three-tier approach to develop the proposed truck route network through elimination, prioritization, and comprehensive network evaluation:

1. **Elimination Criteria:** The first assessment focused on eliminating roadway segments that did not meet the minimum required criteria for a truck route destination. The criteria examined included national functional classification, Act 51 certification type, bridge vertical clearance, bridge weight limit, and restriction by code.
2. **Screening Criteria:** The second assessment uses a scoring system to rank each roadway segment from the least to the most preferred truck routes based on specific criteria. The criteria include adjacent land use, sensitivity receptors, non-motorized impact, environmental impact, and connectivity.
3. **Modification Criteria:** The third assessment was developed to identify roadway segments requiring improvements for increased suitability as truck routes. The criteria include pavement condition, number of crashes, future land use, geometric improvements, and bridge conditions.

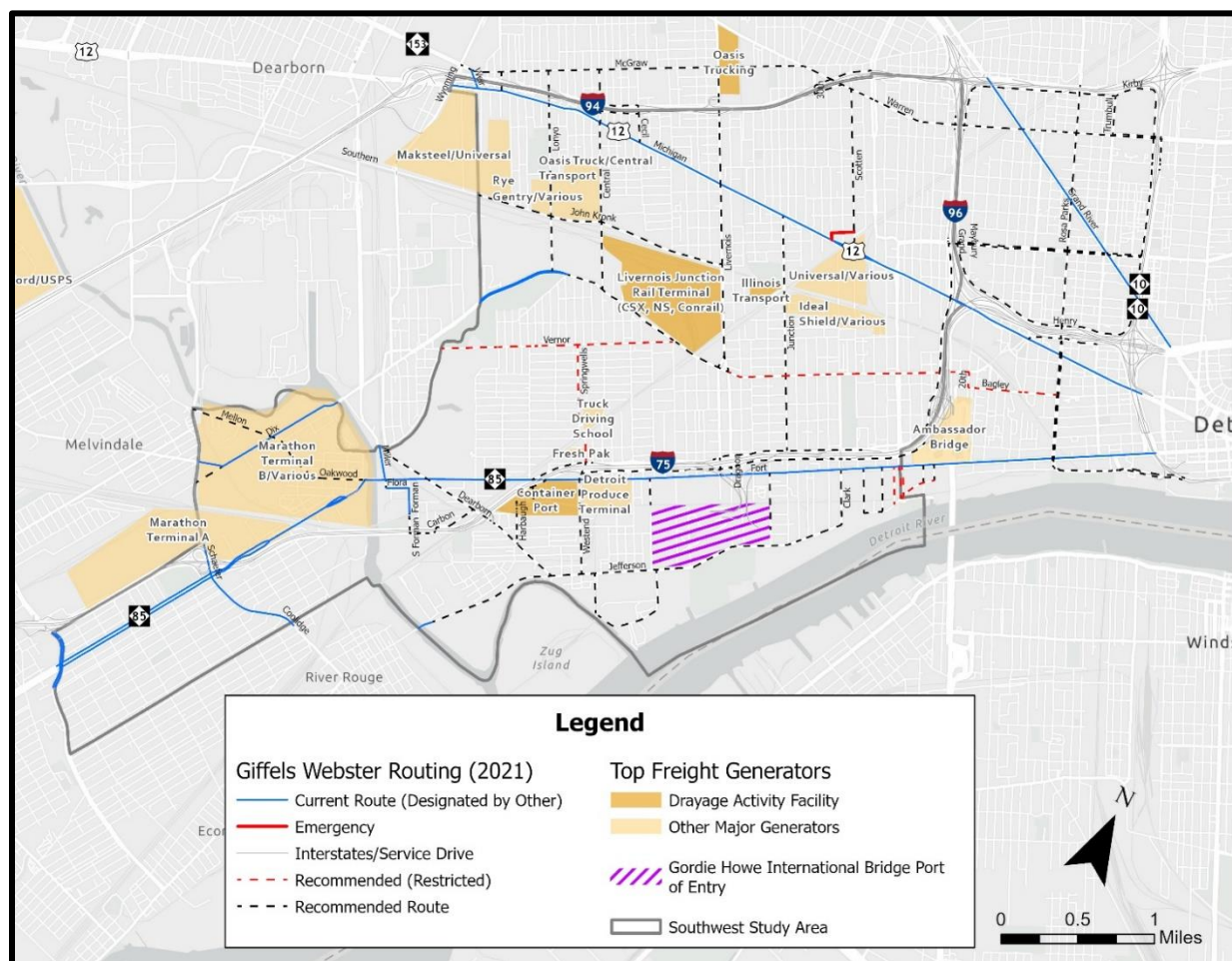
Route Recommendations

The study provided a series of recommendations for the City of Detroit to designate truck routes in Southwest Detroit. A total of 61 roadway segments were recommended. The designated network included the following route classifications:

- **Recommended Route:** Designated truck through routes
- **Recommended Restricted Route:** Designated local access truck routes restricting pass-through truck traffic
- **Emergency Route:** Undefined
- **Route Designated by Others:** MDOT and Wayne County designated truck routes

The truck route network proposed in the 2021 report is shown in Figure 4, but with incorporation of the current implementation study boundaries (see Figure 2) rather than those used in the 2021 report. Note that routes in Figure 4 are drawn exactly as they were drawn in the 2021 report. Figure 4 is not intended to show recommended truck routes for individual generators as outlined in this study, and routing does not account for updated considerations such as vertical clearance of bridges.

Figure 4: Proposed Truck Routes from the 2021 Southwest Detroit Truck Route Study



Source: Southwest Detroit Truck Route Study, 2021

The 2021 report recommended improvements to several roadway segments which were identified during route assessment. The segments included are as follows:

- Vernor Hwy/Dix St (from Waterman St to Dagoon St)
- Livernois Ave (from Michigan Ave to Vernor Hwy)
- Lonyo St (from Michigan Ave to Dix Ave)
- Junction St & Vernor Hwy intersection
- Springwells St & Vernor Hwy intersection
- Springwells St (from Pershing St to N. I-75 Service Drive)
- Dearborn St (Fort St to Jefferson Ave)
- Rosa Parks Blvd (Michigan Ave to Fort St)
- Fort St and Schaefer Hwy intersection

The 2021 report also examined truck crash countermeasures. The study provided detailed crash countermeasures for the following locations:

- Livernois Ave (from Vernor Hwy to Jefferson Ave)
- Dagoon St (from Vernor Hwy to Jefferson Ave)

- Central St (from Michigan Ave to Lafayette Blvd)
- Lonyo St (from Michigan Ave to Dix Ave)
- Schaefer Hwy (from Fort St to Jefferson Ave)

Giffels Webster also reviewed the city's truck route ordinances as well as those of peer cities. Topics included the following:

- Cut-through sensitive areas
- Trucks using non-designated routes
- Inconsistent street categories
- Truck definition
- Truck weight limit
- Truck signage
- Utility trucks
- Local delivery trucks
- Truck parking
- Off-peak delivery
- Truck route enforcement

Ultimately, near-term and long-term strategies were formed for how to address truck routing and implement the recommendations outlined. Near-term recommendations centered around education, outreach, and communication regarding the changes. The target audience of these strategies was truck drivers and stakeholders.

Long-term strategies centered around truck owner incentive programs to update vehicles to cleaner models with support from the EGLE Clean Transportation program, and efforts to reduce peak impacts through an off-peak delivery program.

Prior Study Gap Analysis Plan

As part of the Implementation Study, WSP produced a gap analysis of 2021 report. With consideration of six other peer studies – which evaluated networks in New York, Oakland, Seattle, Minneapolis-St. Paul, Watertown, NY, and Will County, IL – WSP found that the Southwest Detroit Truck Route Study had many of the key components found in other studies, but could be strengthened through the following activities:

- Supplement and validate the proposed truck route network using origin/destination (O/D) analysis
- Expand case studies for freight generators and interview freight operators and industry stakeholders to determine pain points and opportunities
- Define a clear route hierarchy with definitions based on data
- Provide and expand infrastructure recommendations to include improvements to intersection geometry, traffic signals, traffic calming, and lighting
- Add technology recommendations
- Strengthen enforcement and education recommendations
- Add environmental mitigation measures

Other Key Issues

The analysis in this report expands upon and refines the network recommended in the 2021 study. For example, a few of the recommended routes go underneath viaducts that will not allow for regular truck traffic, given their vertical clearance below 13'6". Examples of this include all of Junction St, particularly the intersection at Federal St, as well as Central between John Kronk St and Dix St. There are also routes that will need to be recommended for removal from the trucking network due to their location in residential areas, or their misalignment with future projects within the City of Detroit, such as the Joe Louis Greenway and roadway modifications on Michigan Ave east of I-96.

Additionally, the City is interested in further detail about origins and destinations for local yards and operators. This analysis further refines the network in the previous report while also offering insight into O/D data for key generators in Southwest Detroit. Using data to help identify inbound and outbound data from key generators, as well as traffic count data from Miovision to understand how heavily traveled roadways are in the study area, helps inform network recommendations for Southwest Detroit freight traffic.

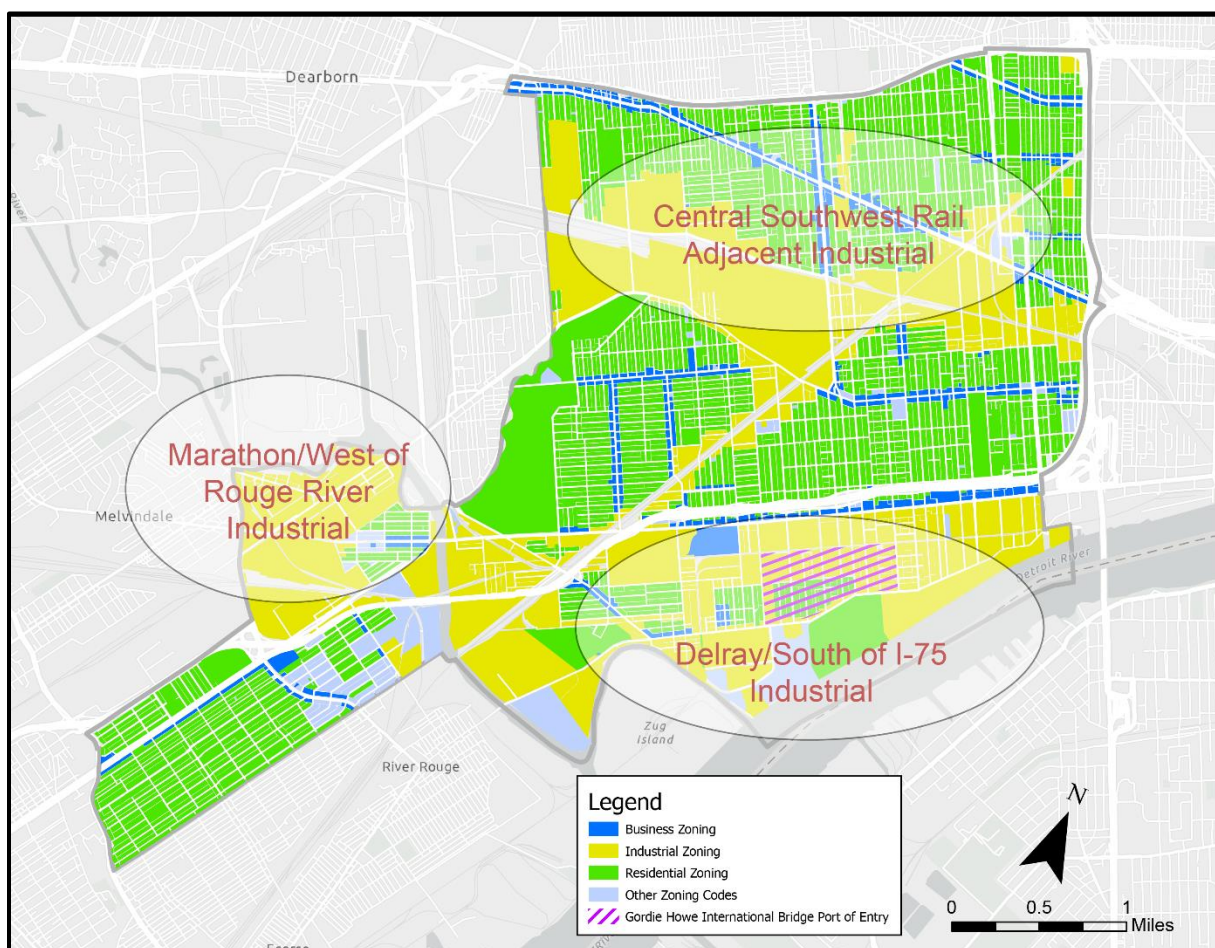
Finally, further analysis is needed because since completion of the 2021 study, there has been an increasing number of truck and rail intermodal trips, as well as an increase in the number of container storage yards.

Network Analysis Context

Southwest Detroit Land Use Challenges

Industrial uses are interspersed throughout residential areas in Southwest Detroit, as illustrated in Figure 5. These uses generate heavy trucks that pass by homes, schools, and parks as they travel between industrial sites, from intermodal terminals to local users, or to and from the freeways, the Ambassador Bridge, and the future Gordie Howe International Bridge. There are three primary areas of industrial activity within the study area: 1) west of the Rouge River around the Marathon Terminal (Oakwood), 2) south of the I-75 freeway in Delray, and 3) along the rail lines through the heart of the Southwest Detroit residential section, especially along the Conrail corridor, with particularly extensive activity at the Livernois Junction Rail Terminal. There are additional industrial clusters just west of our study area in Dearborn along Wyoming Ave and at the Ford Rouge River plant. The first two have minimal trucking impact on Detroit neighborhoods due to their access and use of the freeways or recent rezoning and relocation of residents. However, the latter – which is also the largest – provides the most challenges in relation to neighborhood truck intrusion. Smaller scattered industrial sites throughout the project area also create truck traffic that poses a nuisance to residents.

Figure 5: Southwest Detroit Simplified Zoning



Source: City of Detroit Open Data Portal

Community and Land Use Concerns

The industrial area that spans along the old Conrail corridor/Norfolk Southern Railroad line is bounded by residential areas to the north and south. Truck traffic generated at current or legacy rail-served industrial and logistics uses bound for destinations outside the neighborhood must pass through these residential areas to reach the freeway system. Lonyo St, Central St, Junction St, Dragoon St, Livernois Ave, Clark St, and Scotten St connect north-south across the neighborhood between I-75 and I-94 and have all been raised by residents as problem areas. Truck traffic also leaves main streets to access facilities in neighborhoods or to use local streets as cut-through routes.

To respond to truck intrusion concerns expressed by residents, the City of Detroit has installed truck restriction signage like that shown in Figure 6. Most signs prohibit truck traffic from entering side streets, while some ban truck traffic on higher-volume streets, like Livernois Ave south of Vernor Hwy. The signage primarily addresses truck traffic between I-75 and Vernor Hwy, as shown in the map in Figure 7.

Figure 6: Southwest Detroit Truck Restriction Signs

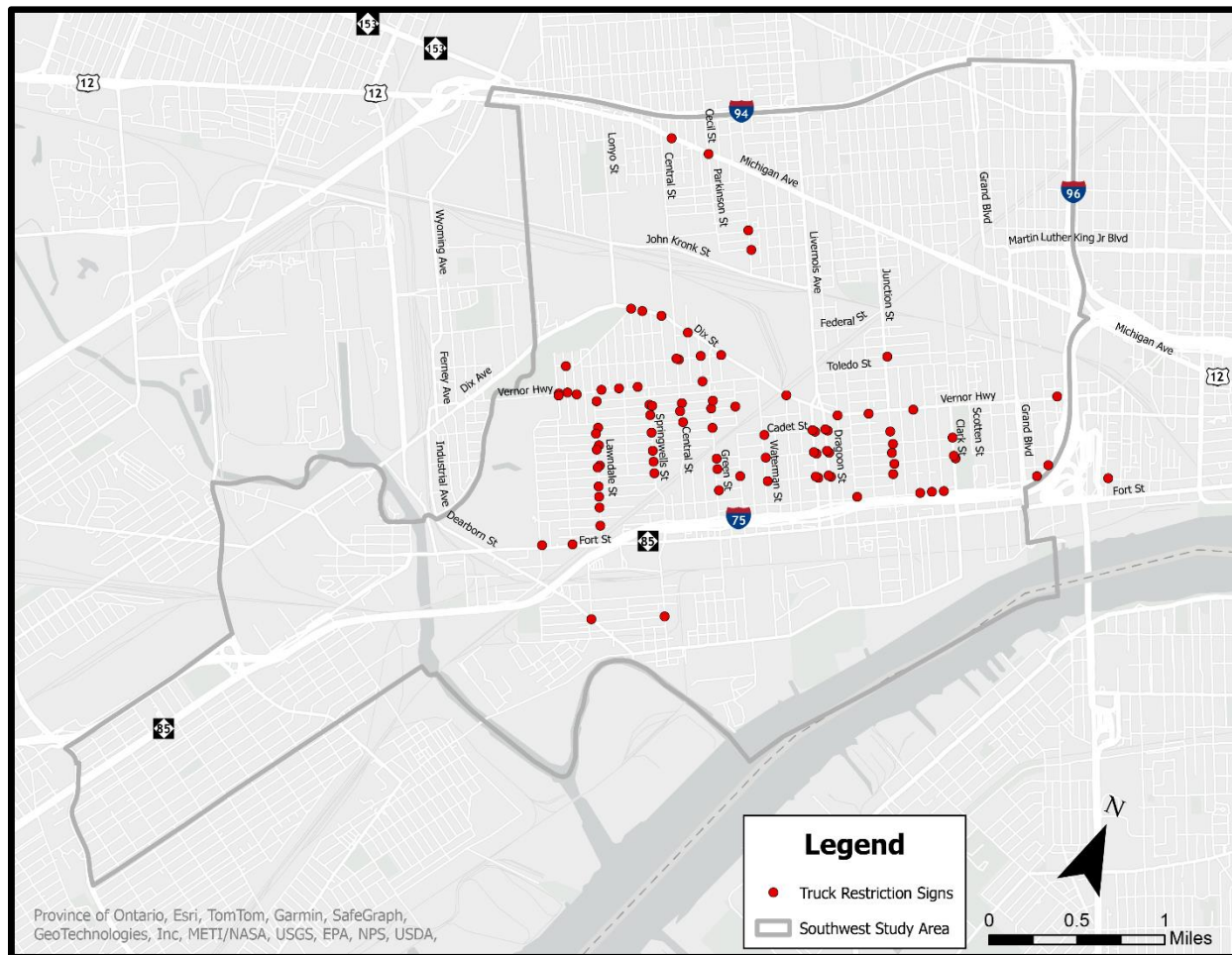


Source: Google Streetview

Truck restriction signs are predominantly located at intersections of local streets with collectors or arterials where truck traffic is common and passing between freight generators and freeways. These signs are not yet complemented by geometric changes that physically restrict or discourage use.

Many of the collectors and arterials where trucks are still allowed, however, have significant residential uses. A primary focus of the Implementation Study is to determine whether trucks can be discouraged from using collectors and arterials with high residential land use as through routes and incentivized to travel on other streets where they would have less impact on quality of life for residents. Recommended routing coupled with potential roadway projects can help prioritize or deprioritize travel on certain roads in the network.

Figure 7: Study Area Truck Restriction Signs

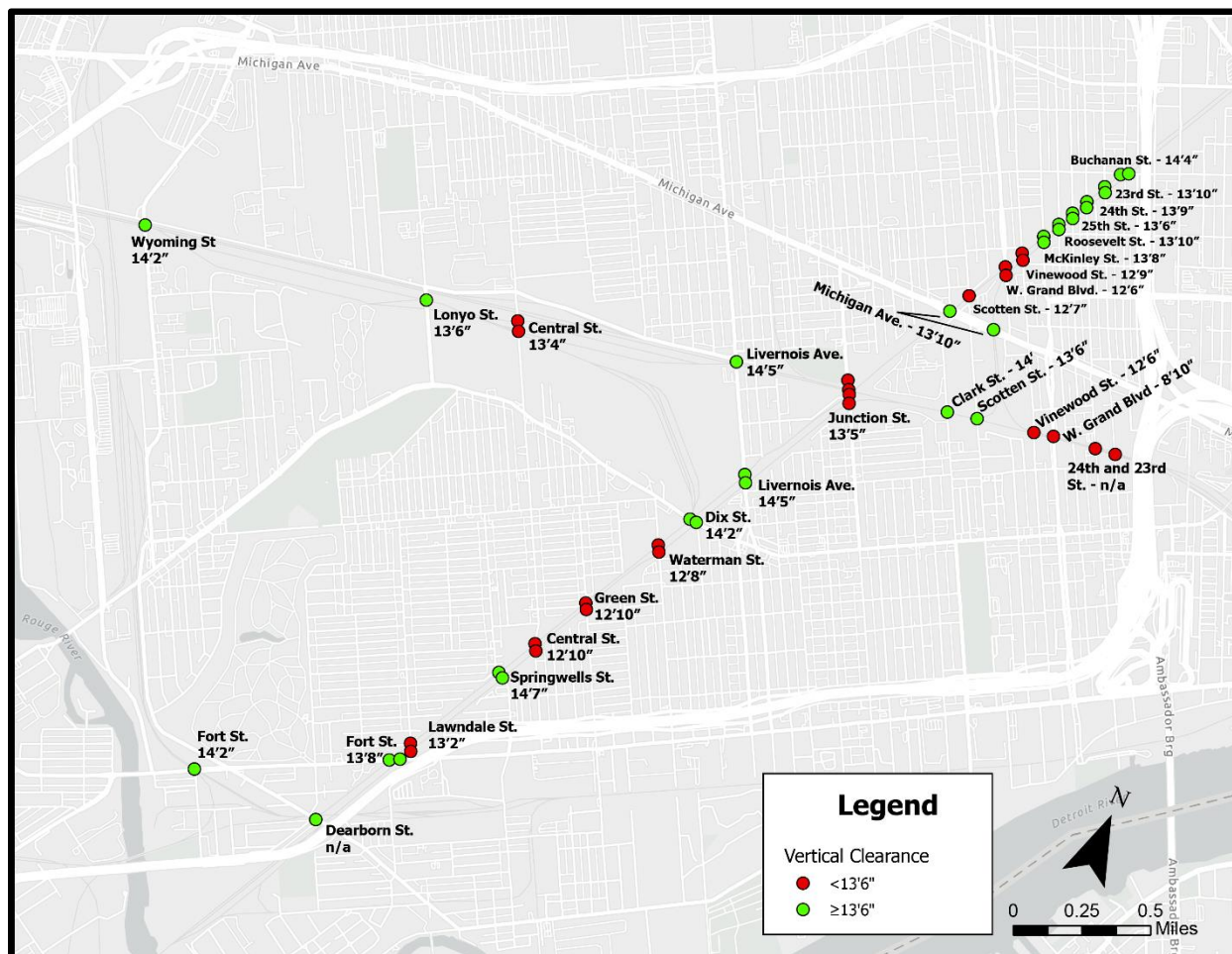


Source: City of Detroit, Department of Public Works – Traffic Engineering Division

Viaducts

Vertical clearance also has the potential to restrict use of certain roadways in the trucking network. Viaduct data helps further refine the network analysis by identifying the areas that are not suitable for future freight traffic rerouting. Standards for construction indicates that vertical clearance must be at least 14 feet. However, most viaducts in the study area have a vertical clearance less than 14 feet but still carry significant truck traffic, as indicated by the truck index data and travel data detailed in Appendix A. The red dots in Figure 8 identify vertical clearances that are not likely to be passable for many trucks on the network. Information about vertical clearance was used to help determine preferred routing alternatives for individual generators discussed later in this report and in Appendix B.

Figure 8: Vertical Clearance*



*Viaducts labeled "n/a" either have restricted access (23rd St and 24th St) or are unmarked (Dearborn St)

Gordie Howe International Bridge Changes

The Gordie Howe International Bridge, currently under construction and slated to open in 2025, is a new international crossing between Detroit and Windsor, Canada that will allow passenger, freight, bicycle, and pedestrian traffic. The project includes the construction of a new bridge over the Detroit River, a port-of-entry/service plaza in Delray, and new ramps and bridges to I-75. The Gordie Howe International Bridge is expected to be a major truck trip generator and destination, with truck trips originating from and heading to Southwest Detroit.

From a network perspective, the Gordie Howe International Bridge project impacts 1.8 miles of I-75 between Springwells St and Clark St. The project will change the geometries of many roadways along the stretch and modify service drive access. The new bridge also eliminates several local road bridges connecting neighborhoods across I-75 and on-ramps/off-ramps previously used by heavy truck traffic. Table 1 outlines the status of bridges along the corridor, the elimination and addition of ramps, and configuration for the access to the Gordie Howe International Bridge.

Table 1: Gordie Howe International Bridge Changes

Bridges	
Roadway	Status
Clark St	Reconstructed
Junction St	Removed
Dragoon St	Removed
Livernois Ave	Reconstructed
Waterman St	Removed
Green St	Reconstructed
Springwells St	Reconstructed

Ramp Future Condition		
Roadway	NB	SB
Springwells St	On/Off	On/Off
Rademacher St	None	Off
Livernois Ave	On	None
Campbell St	Off	None
Junction St	None	None
Clark St	On	Off

Ramp Elimination		
Roadway	NB	SB
Livernois Ave	Off	On
Clark St	Off	On

From Gordie Howe International Bridge Nearest Local Access	
Along Northbound I-75	Vernor Hwy
Along Southbound I-75	Springwells St
To Gordie Howe International Bridge Nearest Freeway Access	
Northbound	Waterman St – Ramp B
Southbound	Junction St – Ramp D

Changes to Existing Truck Routing

Of the changes noted above, the elimination of exits at Livernois Ave and Clark St are having significant effects on truck movements between I-75 and Vernor Hwy. Trucks traveling to and from industrial and logistics facilities along the Norfolk Southern Railroad line will have modified and somewhat less desirable paths along Livernois Ave and Dagoon St but may instead divert to other non-desirable routes such as Clark St, Junction St, and Springwells St.

Removal of the Junction St, Dagoon St, and Waterman St bridges across I-75 will consolidate trucks traffic at Livernois Ave, Springwells St, Green St, and Clark St. Without restrictions, geometric changes, or improvements elsewhere in the system, these streets may experience more truck traffic, triggering a subsequent rise in resident complaints and a need to implement changes such as intersection and timing redesign to mitigate issues. Concerns about how the bridge construction will affect neighborhood streets is discussed later in this report with the identification of issue routes.

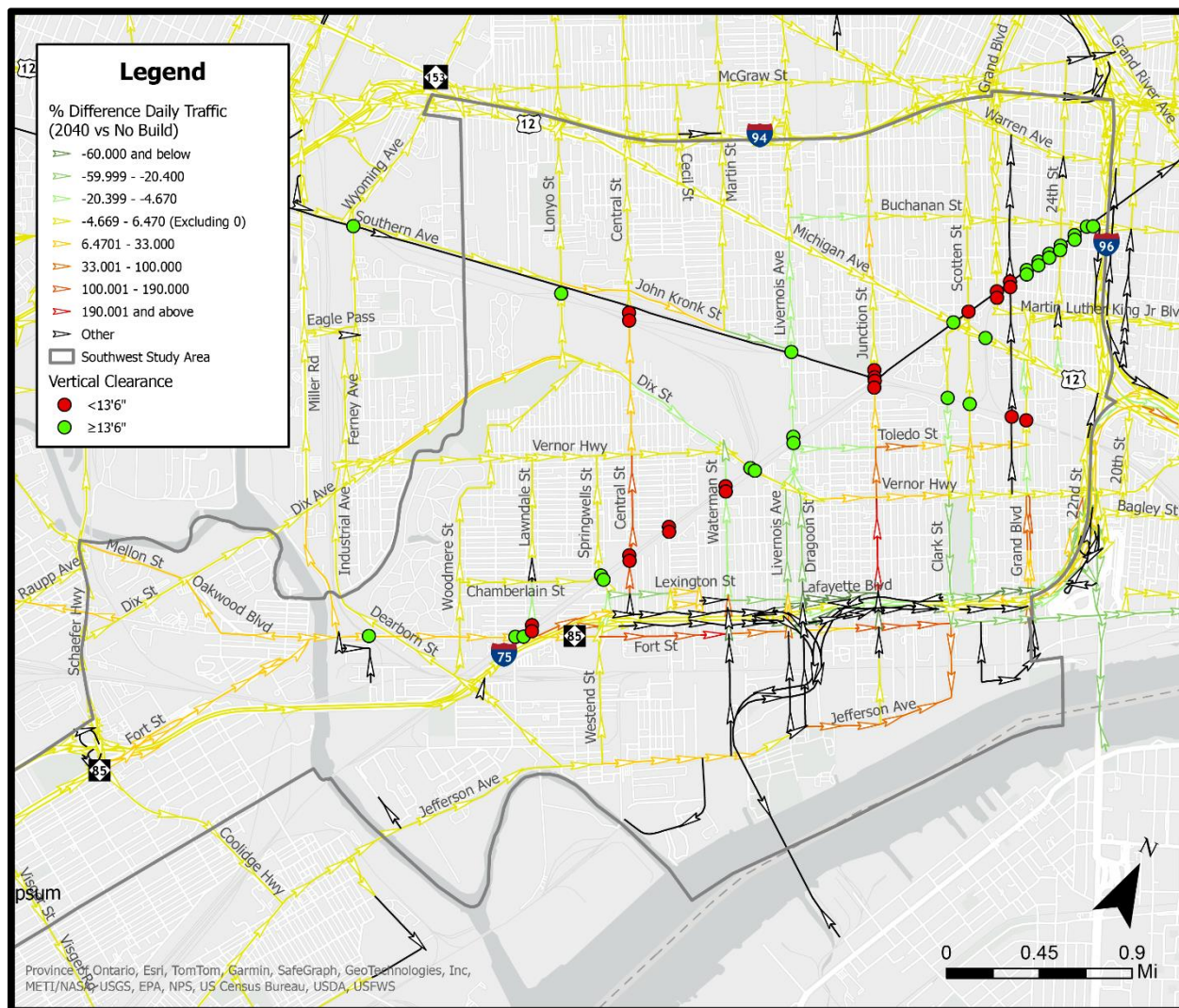
Projected Changes to Truck Volumes Associated with Gordie Howe International Bridge

WSP produced a *Supplemental Travel Demand Modeling Report* for the National Environmental Policy Act (NEPA) re-evaluation of the Gordie Howe International Bridge in 2018. The *Supplemental Travel Demand Modeling Report* document provides an overview of the travel demand modeling work completed as part of the re-evaluation, which includes updating the base year to 2015, and the forecast years to 2025 and 2040, validation of the model to the base year, and a review of the model outputs for 2040.

The WSP *Supplemental Travel Demand Modeling Report* incorporates forecasts of induced demand developed by MDOT in 2007. Based on the additional growth and redistribution of population and employment associated with the increased accessibility provided by the second international crossing in Detroit, MDOT estimated a small 0.8% overall growth in population and employment over and above anticipated growth. MDOT's analysis goes on to state that "only a small portion of this growth will affect the international crossing themselves, making the impact to traffic volume on the bridges even less."

While overall growth in local trips is projected to be small, the estimated redistribution of trips within Southwest Detroit is meaningful. Induced demand, co-location, and new routing patterns associated with Gordie Howe International Bridge may create traffic analysis zone (TAZ) and link-level changes. The supplemental travel demand modeling forecasts that 8,109 commercial vehicles will utilize the Gordie Howe International Bridge by 2025 on an average weekday, mainly by redistributing trips from the Ambassador Bridge. By 2040, average weekday volumes are projected to grow to 10,766 commercial vehicles. Figure 9 shows the percent difference in daily traffic on each road comparing the 2040 Gordie Howe International Bridge scenario to the 2040 No-Build.

Figure 9: Percent Difference in Daily Traffic (2040 GHIB Build vs 2040 No Build)*



Source: WSP 2018

*Traffic distributions displayed in Figure 9 were based on roadway classification and proximity, but they do not account for vertical clearance under viaducts and other bridges. While trucks have various clearance needs, the realized truck redistribution may be overstated for routes like Central St where clearance is low, and in tandem the redistribution may be understated for nearby roadways that have larger vertical clearances.

Changes in activity in the new bridge area can already be observed today. Existing and new industrial users are expanding and siting facilities in Delray and Southwest Detroit to take advantage of proximity to the new bridge. Along with planned trips originating from local access points on the new service plaza, these new and expanded uses are anticipated to create new truck trips south of I-75 at minimum.

Origin and Destination Analysis

WSP conducted an analysis to identify the routes used by trucks to access the largest freight generators in Southwest Detroit. Many of the largest freight generators are close to the interstate system, allowing for quick access to and from the facilities for travel throughout the region and beyond. However, some significant freight generators are located away from the interstate system in or around residential communities. Understanding the routes that trucks use to access these generators is important to manage community impacts while ensuring that the freight-intensive facilities have adequate access, with trucks directed to streets capable of accommodating higher truck traffic.

Truck Trip and Route Data Sources

Analyzing regional and sub-regional truck routing is challenging as no single data set describes the operations of all trucks. Truck AADT estimates are useful for describing truck volumes on highways and to a lesser extent arterials. These estimates, however, are usually imprecise for local or collector streets, which are a key focus of this study as they account for a significant amount of resident concerns. Moreover, AADT estimates do not indicate where trucks are coming from or going to, making it difficult to know who is generating the truck traffic so that alternative routes can be explored.

To analyze truck routes in Southwest Detroit WSP developed an innovative approach that leverages two of the largest sources of truck GPS data available: Geotab and Replica. Both data sets report the origination and routing of hundreds of thousands of truck trips in Southwest Detroit, enabling the most comprehensive view available on how trucks travel to, from, and through the region and neighborhoods. This approach is innovative because it combines two non-overlapping sets of truck GPS route data into a single database. Virtually all studies into truck routing are based on just one source of GPS data. While Replica and Geotab each account for approximately 10-15 percent of trucking activity, together they likely account for close to a third of all trucks. It is difficult to estimate precisely what fraction of all truck trips is accounted in the combined data set because there is no source that reports total truck trip generation for a region of this size. While bringing both data sets together provides unprecedented information about truck operations, it only provides a fraction of travel from non-GPS-equipped trucks. The benefits and limitations of the data are described below.

Short descriptions of the Geotab and Replica data are provided below:

- **Geotab:** Geotab is the largest commercial vehicle telematics provider in North America, operating in over 2.1 million commercial vehicles in 2022. Recently they have begun to share their telematics data with public agencies. For the Implementation Study, the City of Detroit purchased access to the Geotab ITS Altitude Platform, which shows the operations of trucks in the study region for three City selected months in 2022 (August, October, and December). This platform reported the origins, destinations, travel times, and routes (along with other operational data) of over 750,000 medium duty and heavy-duty trucks operating in and around the study region in the 3 months of data purchased.
- **Replica:** Replica is a company owned by Alphabet Inc., which produces a data set and modeling platform that describes travel patterns throughout the U.S. Replica uses truck GPS data from various sources to describe the origination and routes of truck trips. Replica uses a statistical model to expand the GPS data to represent total truck travel, however it is not able to represent truck trips from origins or destinations not covered in the underlying GPS data. The SW Detroit study queried Replica to estimate the travel patterns of medium-duty and heavy-duty trucks in the region.

Geotab and Replica are built from different sources of truck telematics data, and therefore complement each other. A key difference, however, is that the Replica data set has an internal process where it expands the telematics records to represent total truck activity on highways, while the Geotab data is not expanded. Therefore, interpreting roadway volumes from these sources requires nuance. The combination of the Replica and Geotab data should be interpreted as providing an order-of-magnitude estimate of trucking activity at different clusters. It should not be interpreted as a precise estimate of the trucks entering or exiting a specific facility. The Replica and Geotab data are much more precise in the identification of routes used by trucks to access facilities than in the estimation of truck volumes on these routes.

Another platform, Miovision, provides continuous traffic counts at various intersections within the city. Only thru-traffic counts for single-unit trucks and articulated trucks (those with an attached trailer) were included in this report. This data indicates that with current routing, there is a high volume of traffic using Livernois Ave, whether as thru traffic or to access specific generators. Since cameras are not available at every generator entry/exit point of each individual generator, it cannot be directly compared to the supplemental O/D analysis provided by Geotab and Replica. However, it is especially useful for understanding traffic on more local roads, as Replica is limited in that it primarily identifies long-haul travel on major roads. Geotab data is categorized by trucking activity, including drayage, but data from Miovision intersections can also help account for drayage movement.

The sections below describe how the WSP team analyzed truck GPS data and Miovision traffic counts to identify key truck generators in Southwest Detroit and the primary routes used by trucks to access these generators.

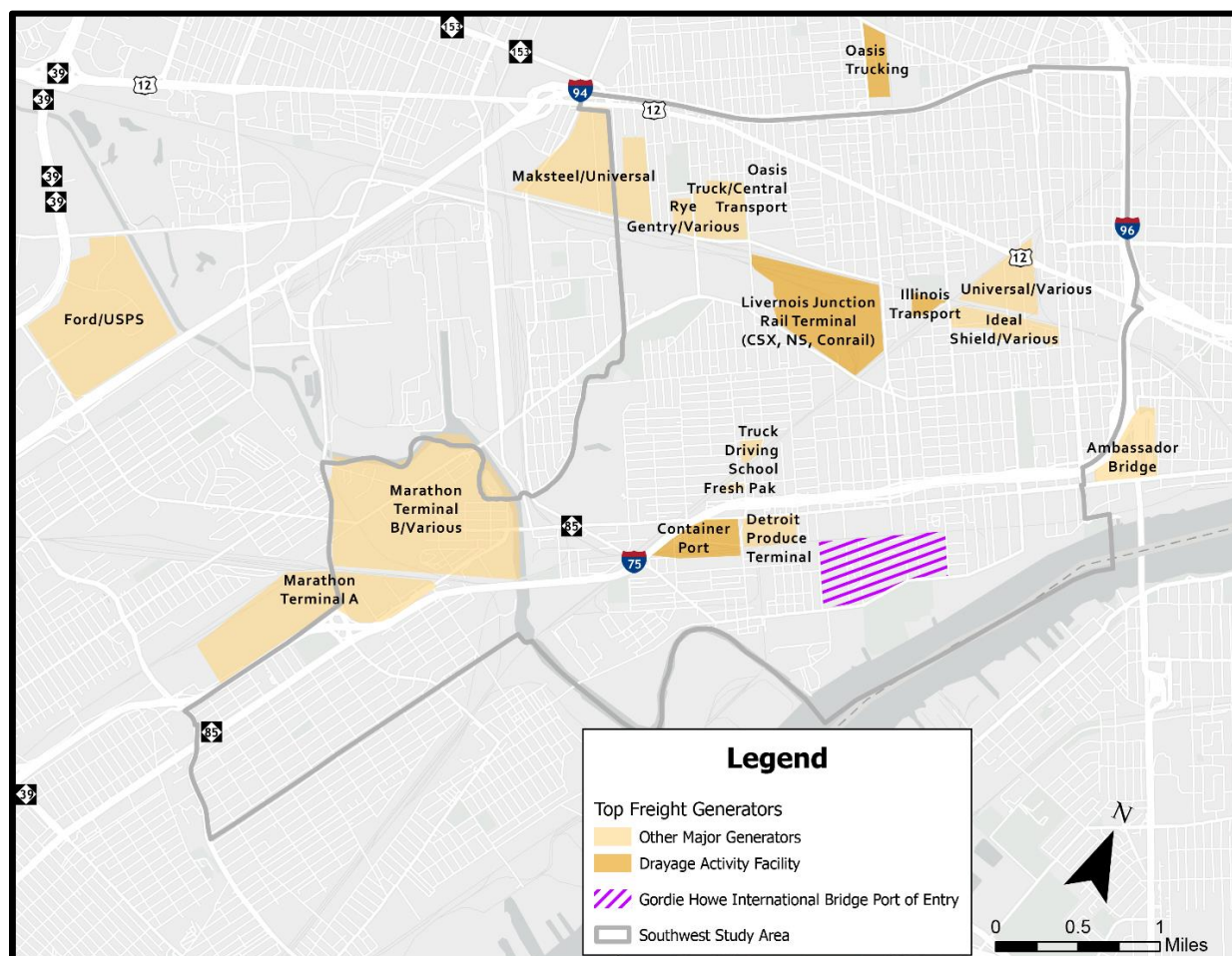
Key Truck Generators

Key truck generators are facilities or clusters of facilities that house freight-intensive activities requiring frequent truck shipments. These could be manufacturing buildings, distribution warehouses, intermodal terminals, or international gateways. City officials provided an initial list of key truck generators, including major facilities on interest. WSP expanded this initial list by finding the areas of Southwest Detroit that generate the most truck trips in the Geotab and Replica data sets. Because these data sets do not overlap – meaning that if a truck is included in the Geotab data it is not included in the Replica data – different generators could show up in each data set. As expected, the top generators in both data sets were the Livernois Junction Rail Terminal and the Ambassador Bridge, as a wide range of businesses and trucking companies use them. However, key generators that represent a large building or facility are often served by only a few trucking companies, and therefore they tend to show up in either the Geotab data or the Replica data.

The generators in Figure 10 and Table 2 are categorized by whether they generate intermodal drayage movements. Drayage in Southwest Detroit is generally defined by the movement of containers between select generators to and from the Livernois Junction Rail Terminal. For example, ContainerPort is an international container yard, and trucks make short-haul trips to the Livernois Junction Rail Terminal for domestic freight trips. These are categorized separately because they indicate that these locations generate more short-haul movement, and that there is travel between these locations. The Livernois Junction Rail Terminal is one of the most important generators in the region due to drayage activity.

Furthermore, freight traffic to Livernois Junction Rail Terminal is likely to increase over the next five to 10 years as the Port of Monroe expands following \$16 million of state and federal investment in 2023.¹

Figure 10: Map of Key Truck Generators in Southwest Detroit



¹ Duffy, M. (2023, April 10). *Port of Monroe to become first container port in Michigan*. WXYZ Detroit. <https://www.wxyz.com/news/port-of-monroe-to-become-first-container-port-in-michigan>

Table 2: Key Truck Generators, by Sample Truck Trips

ID	Name	Unexpanded Geotab Trucks Per day	Replica Trucks per Day	Total Trucks Per Day in Sample
1	Livernois Junction Rail Terminal - Federal St Access Point	12	3	15
2	Livernois Junction Rail Terminal - Vernor Hwy Access Point	14	18	32
3	Ambassador Bridge	47	966	1,013
4	Oasis Truck/Central Trans.	8	89	97
5	Ford/USPS	44	92	134
6	Marathon Terminal A	71	145	216
7	Marathon Terminal B/Various	51	92	143
8	Maksteel/Universal	79	24	103
9	Detroit Produce Terminal	5	19	24
10	Universal/Various	5	362	367
11	ContainerPort	9		9
12	Ideal Shield/Various	2	9	11
13	Illinois Transportation	2		2
14	US Truck Driver/Various	2		2
15	Fresh Pak	2	2	4
16	Rye Gentry/Various	1		1

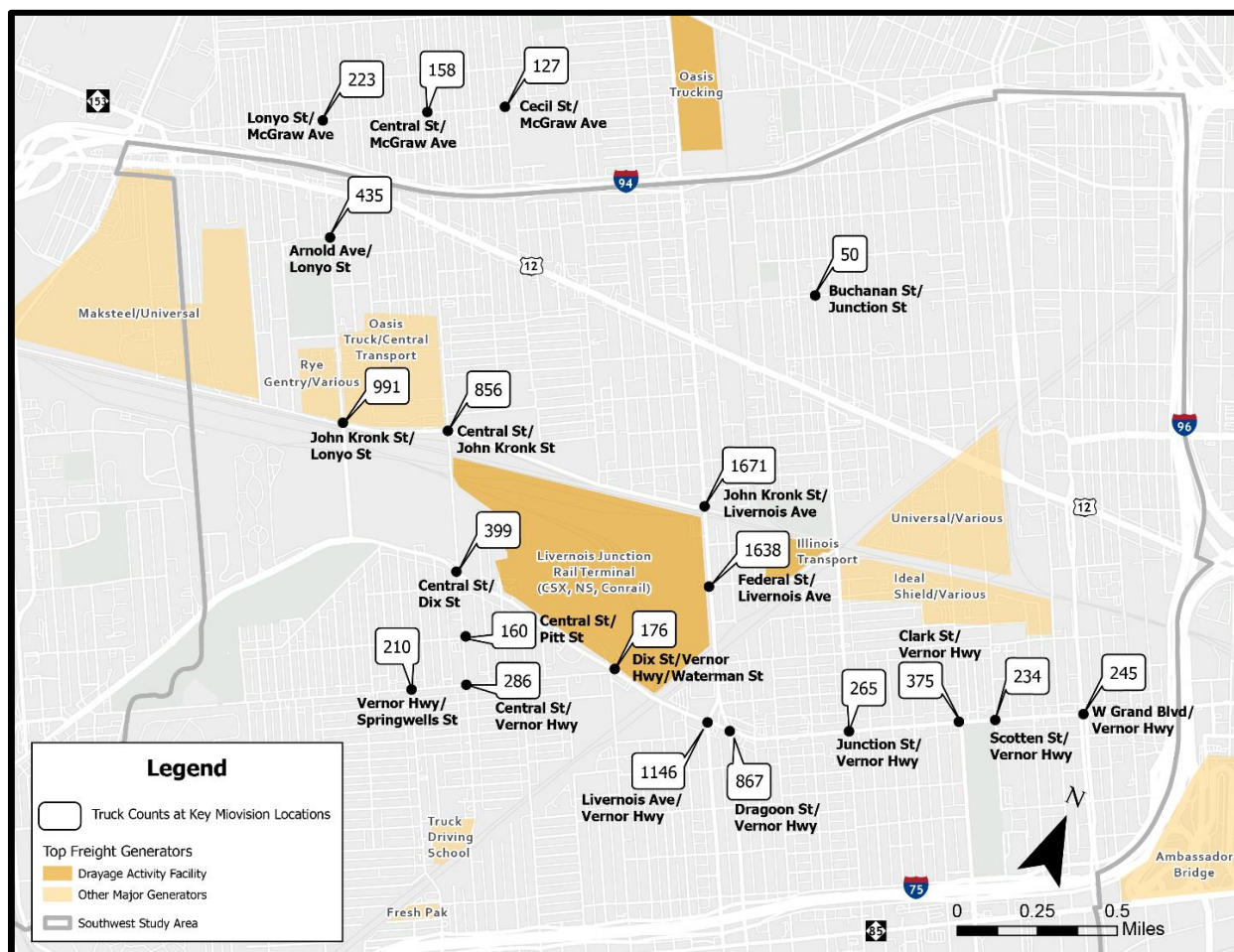
Source: Replica, Geotab, WSP analysis, 2023

Of the generators, the Ambassador Bridge accounts for the most total heavy truck trips per day in the combined Geotab and Replica sample, at 1,013, followed by Universal Trucking between Clark St and Scotten St south of Michigan Ave at 367 trips. Taken together, the generators account for over 2,500 trucks per day. The routes that these trucks take represent the best available sample of truck trips through Southwest Detroit and represent relative scales of truck travel on streets throughout Southwest Detroit.

As noted in the description of the data above, these volumes may not be accurate to actual trips. For instance, hundreds of trucks a day leave the Livernois Junction Rail Terminal and ContainerPort, but, taken in sum, constitute about one-third of the total truck trips in Southwest Detroit. Because Livernois Junction Rail Terminal is known as a high-volume freight generator despite the number in Table 2, it is likely that the Geotab and Replica data under-represent short-haul drayage. To help supplement this under-representation, WSP also sourced data at various intersections, including at Livernois Ave and Federal St, from Miovision to qualitatively support understanding of truck movements and routing.

Provided for a sense of truck volume magnitudes on the road network, Figure 11 and Table 3 identify per-day averages for thru trips counted by Miovision cameras between October and December 2022.

Figure 11: Miovision Data at Select Truck Route Network Intersections



Source: Miovision

Table 3: Average Daily Truck Thru Volumes at Select Truck Route Network Intersections

Location	Per-Day Truck Average
John Kronk St and Livernois Ave	1671
Federal St and Livernois Ave	1638
Livernois Ave and Vernor Hwy	1146
John Kronk St and Lonyo St	991
Dragoon St and Vernor Hwy	867
Central St and John Kronk St	856
Arnold Ave and Lonyo St	435
Central St and Dix St	399
Clark St and Vernor Hwy	375
Central St and Vernor Hwy	286
Junction St and Vernor Hwy	265
W Grand Blvd and Vernor Hwy	245
Scotten St and Vernor Hwy	234
Lonyo St and McGraw Ave	223
Vernor Hwy and Springwells St	210
Dix St/Vernor Hwy/Waterman St	176
Central St and Pitt St	160
Central St and McGraw Ave	158
Cecil St and McGraw Ave	127
Buchanan St and Junction St	50

Extraction of Truck Routes

Key truck generators represent businesses and operations that are major contributors to the local and regional economy, supporting significant employment and downstream positive economic impacts throughout the region. Ensuring that these locations have safe, reliable, and efficient truck access to the highway system is critical so they remain competitive and continue to be engines of economic growth for Detroit. At the same time, the movement of heavy-duty vehicles to and from these locations can generate significant negative impacts to nearby residents and other roadway users. The objective of urban truck networks is to mitigate these negative impacts and conflicts while preserving competitive accessibility to freight-intensive activities. With key truck generators in hand, WSP conducted a routing analysis to identify how trucks are accessing these generators and refine the truck route network in the 2021 study for Southwest Detroit. The truck route network should consider the locations of conflicts and incompatible land uses, so that some of the truck flows can be channeled through streets that are better equipped to accommodate the movement of heavy-duty vehicles, reducing community impacts.

WSP used data from Geotab and Replica to characterize existing truck routes and movements. The WSP team developed Application Programming Interfaces (APIs) to communicate with Geotab and Replica data servers and obtain detailed route information for trucks heading to and from each of the key truck generators. Records involving both heavy-duty and medium-duty trucks were retrieved. WSP's analysis, however, focuses on heavy-duty truck routes as these are the focus of this study. Medium-duty truck trips were thus dropped in tables and maps presented in this report. Heavy-duty truck routes inbound to and outbound from each key freight generator, which are illustrated using Replica data, are in Appendix A.

WSP used Geotab and Replica data to supplement and evaluate the truck route network proposed in the 2021 Southwest Detroit Truck Route Study based on truck activity patterns, revealing potential additions, subtractions, and alternatives to recommended routes.

Network Data Processing

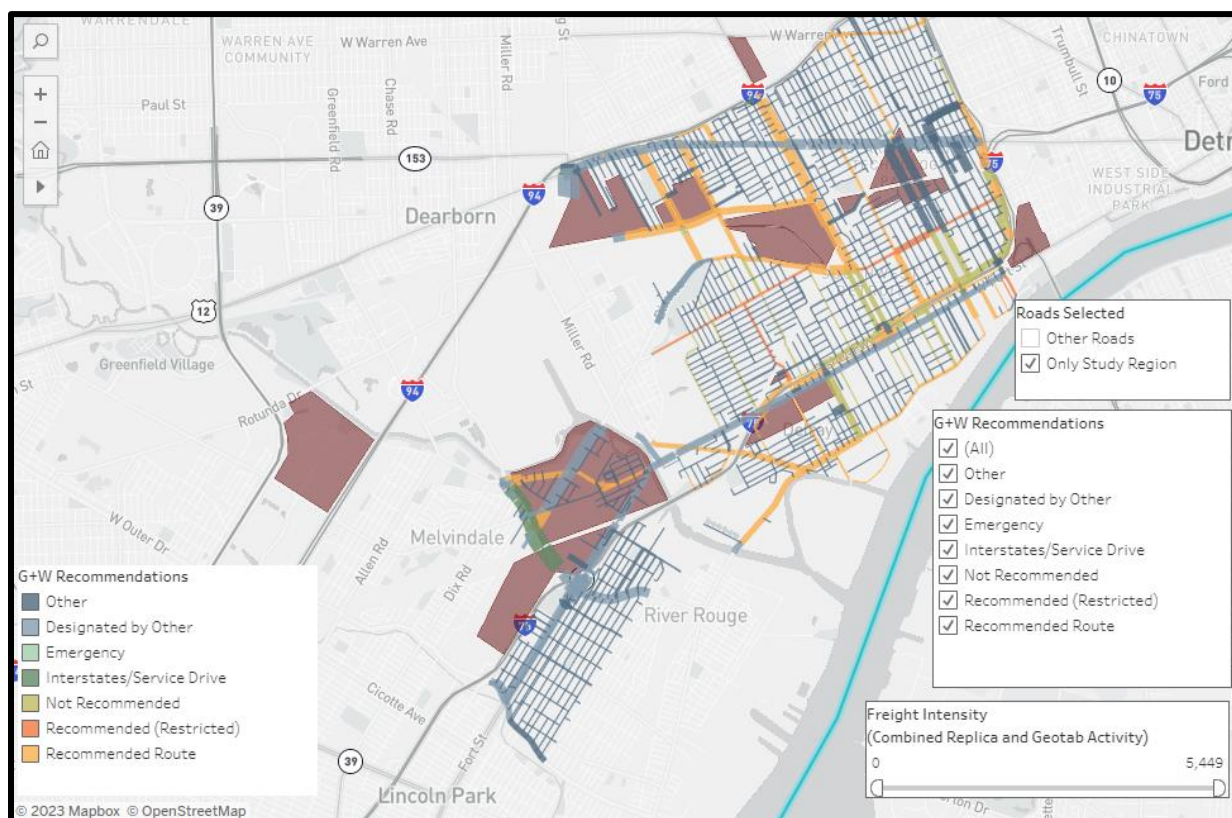
The 2021 Southwest Detroit Truck Route Study recommended truck route network, the Geotab route data, and the Replica route data are all reported in different GIS network geometries. This makes it difficult to combine the Geotab and Replica data, and then to use results to evaluate the network in the 2021 study. Given that this is an urban study, where roadway geometry is complex, with a high density of intersections and local streets, simple spatial joins in GIS would be inadequate to combine the data. Moreover, the project team determined that the results of the analysis needed to be summarized in the roadway inventory network maintained by SEMCOG. This represents the consensus roadway inventory network in the region, containing official detailed information about roadway characteristics that is integrated into other data systems. However, joining the extremely detailed Geotab and Replica network data to this inventory roadway network is particularly challenging because of the level of detail and complexity in the geometries. Roads do not line up exactly on-top of each other, and the network segmentation is different. Another complicating factor was that the Replica and Geotab networks preserved direction of travel detail while the available SEMCOG network does not.

To resolve this, WSP developed an algorithm using state-of-the-art techniques to bring the Replica, Geotab, and the Routes from the Southwest Detroit Truck Route Study into the SEMCOG inventory. This algorithm is not perfect, as it relies on approximations and interpretation of roadway direction and geometry. Nonetheless, results were satisfactory, with the vast majority of roadway data across all data sets joining accurately to the city inventory network. This permitted the combination of Geotab and Replica route data, and systematic evaluation and revisions of the network outlined in the 2021

Southwest Detroit Truck Route Study. WSP developed an additional algorithm to combine both directions of travel in the Replica data so they could line up with other data sources.

To interpret the results, WSP visualized the combined network data in a Tableau dashboard (screenshot shown in Figure 12). This dashboard allows users to click on specific roads and see the Geotab and Replica volumes, the key generators (e.g., buildings, facilities, terminals, etc.) driving these volumes, the designation relative to the network outlined in the 2021 Southwest Detroit Truck Route Study, and other roadway characteristics shown in the inventory network. This dashboard was useful in communicating to stakeholders the function that different roads play in supporting freight and economic activity in the region.

Figure 12: Southwest Detroit Truck Route Analysis Dashboard



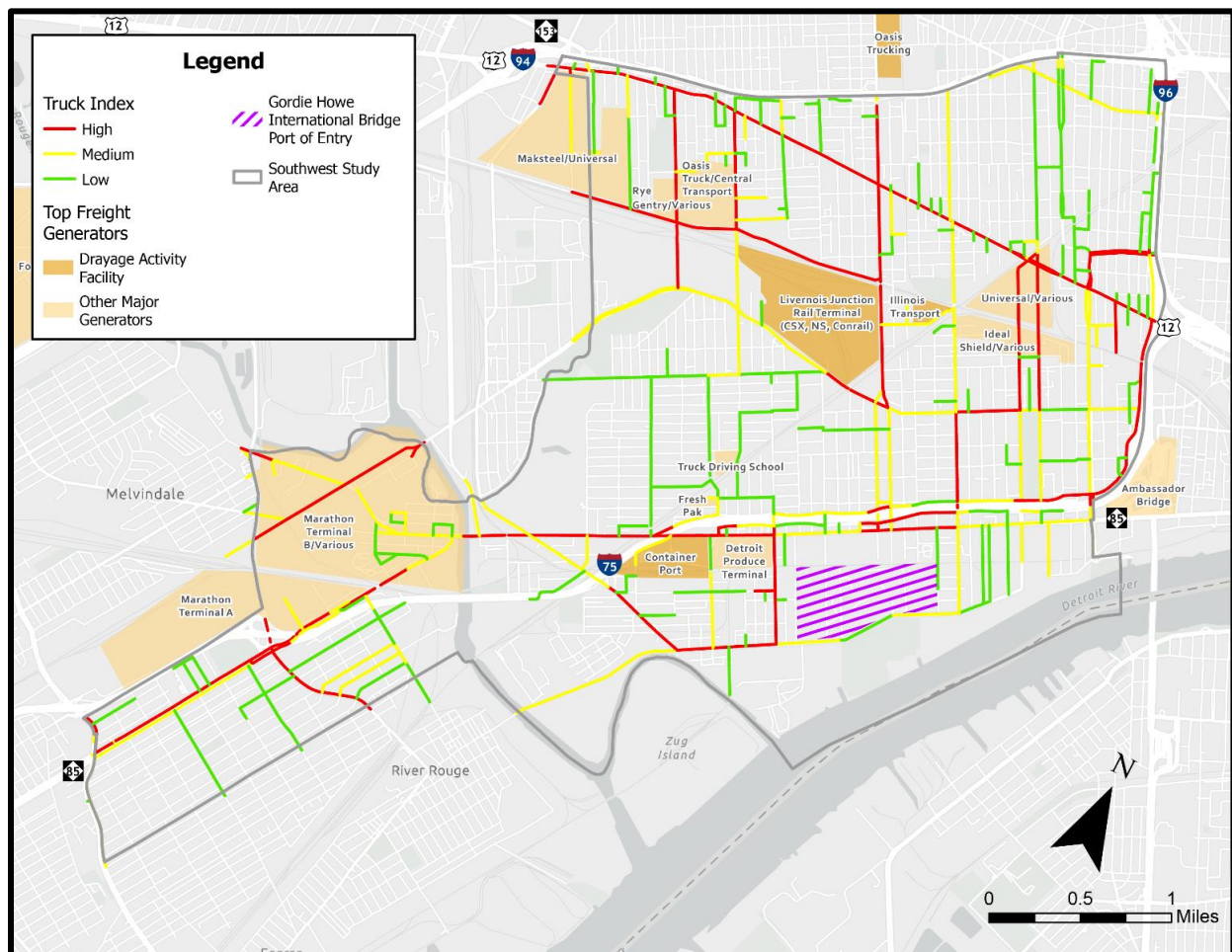
Source: WSP 2023

Network Analysis Results

WSP prioritized the truck route network designated by Giffels Webster based on total truck trips included in the combined Geotab and Replica data. WSP converted Geotab data to average daily estimates, and then expanded it by multiplying by seven, which came from regional expansion factors provided by Geotab. The Geotab volume estimates could then be added to the Replica volume estimates to generate an order-of-magnitude estimation of volumes on streets within Southwest. Origin and destination detail was preserved to identify which key freight generators were responsible for driving truck traffic.

Figure 13 shows surface streets in the Southwest Detroit study area categorized into segments that have high, medium, or low volumes of heavy-duty trucks in the combined Geotab and Replica data.

Figure 13: Southwest Detroit Local Network Heavy-Duty Truck Index



Source: WSP 2023

The existing conditions shown in Figure 13 help refine the recommendations included in this report, as they can help identify streets that could be removed or added to the proposed truck network. Additionally, the truck index illustrates truck traffic in heavily residential areas or areas with sensitive receptors, like schools and parks. A deeper understanding of how trucks are traveling through these more sensitive areas allows the City to take steps to discourage or divert heavy-duty trucks away from these areas.

Issue Routes and Alternate Routes

To mitigate the impacts of truck traffic on residents, WSP developed an issue route network to divert truck traffic from, and a set of potential alternate routes to receive that truck traffic from key generators. In general, based on discussions with the City, many issue routes are created by truck traffic to or from key generators located along the railroad lines that cut through the heart of the neighborhood.

Issue Routes

WSP used a two-step identification procedure to develop a list of issue routes to complement the known routes that heavy trucks are using to access the key generators identified in Southwest Detroit. Issue routes are streets where there are known or anticipated truck through movements and a high level of residential land use, vulnerable roadway users like people walking and biking, and/or sensitive receptors like schools, parks, and community centers. To increase safety and quality of life, it is preferable to divert heavy truck traffic to other streets where possible. Issue routes may be candidates for geometric restrictions or may be least-best truck routes where suitable alternate routes cannot be found.

WSP first identified known issue routes based on the results from the O/D and network analysis and/or routes identified by City staff based on local knowledge and past community engagement. WSP then identified potential alternate routes that heavy truck drivers may use instead of the known issue routes en route to the key freight generators, classifying those that are adjacent to sensitive land uses as potential diversion issue routes. Issue routes are shown in Figure 14 and listed in Table 4.

Figure 14: Issue Routes

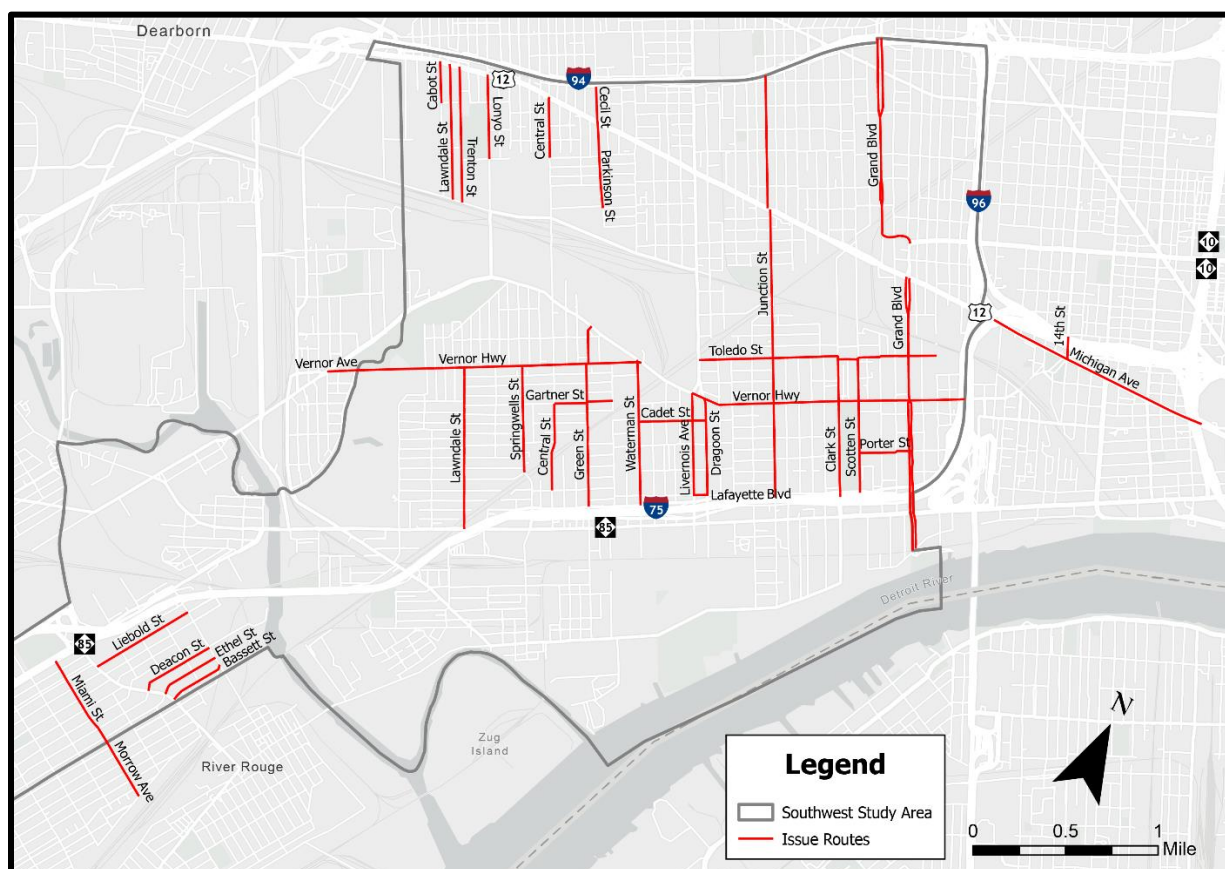


Table 4: Issue Routes, by Type

Street	From	To	Type
Toledo St	Clark St	24 th St	Existing Issue Route (City)
14th St	I-75	Michigan Ave	Existing Issue Route (City)
Michigan Ave	I-96	Lodge Fwy	Existing Issue Route (City)
W. Lafayette Blvd	Livernois Ave	Dragoon St	Existing Issue Route (City)
W Grand Blvd	I-94	Martin Luther King Jr Blvd	Existing Issue Route (City, O/D)
W Grand Blvd	Michigan Ave	W. Jefferson Ave	Existing Issue Route (City, O/D)
Scotten St	Toledo St	I-75	Existing Issue Route (City, O/D)
Clark St	Toledo St	I-75	Existing Issue Route (City, O/D)
Junction St	I-94	I-75	Existing Issue Route (City, O/D)
Dragoon St	Vernor Hwy	W. Lafayette Blvd	Existing Issue Route (City, O/D)
Livernois Ave	Vernor Hwy	W. Lafayette Blvd	Existing Issue Route (City, O/D)
Vernor Hwy	Dix St	Waterman St	Existing Issue Route (City, O/D)
Vernor Hwy	Livernois Ave	I-75	Existing Issue Route (City, O/D)
Springwells St	Vernor Hwy	Chamberlain St	Existing Issue Route (City, O/D)
Central St	Michigan Ave	St. John St	Existing Issue Route (City, O/D)
Lonyo St	Michigan Ave	St. John St	Existing Issue Route (City, O/D)
Cecil St	I-94 Service Dr	Michigan Ave	Existing Issue Route (City, O/D)
Cabot St	Michigan Ave	Arnold Ave	Existing Issue Route (O/D)
Parkinson St	Michigan Ave	Clayton St	Existing Issue Route (O/D)
Porter St	Scotten St	W Grand Blvd	Existing Issue Route (O/D)
Cadet St	Waterman St	Dragoon St	Existing Issue Route (O/D)
Central St	Gartner St	Lafayette Blvd	Existing Issue Route (O/D)
Gartner St	Central St	Beard St	Existing Issue Route (O/D)
Lawndale St	Vernor Hwy	Fort St	Existing Issue Route (O/D)
Deacon St	Schaefer Hwy	Pleasant St	Existing Issue Route (O/D)
Ethel St	Schaefer Hwy	Pleasant St	Existing Issue Route (O/D)
Bassett St	Schaefer Hwy	Pleasant St	Existing Issue Route (O/D)
Liebold St	Schaefer Hwy	Pleasant St	Existing Issue Route (O/D)
Miami St/Morrow Ave	Fort St	Kleinow Ave	Existing Issue Route (O/D)
Green St	Dix St	Fisher Service Dr	Diversion Issue Route
Waterman St	Vernor Hwy	Fisher Service Dr	Diversion Issue Route
Toledo St	Livernois Ave	Clark St	Diversion Issue Route
Trenton St	Michigan Ave	John Kronk St	Diversion Issue Route
Lawndale St	Michigan Ave	John Kronk St	Diversion Issue Route

Key Community Concerns

A few community concerns stood out and informed both issue route selection and the recommendations section of this report. Key concerns were expressed for the following areas:

- **Vernor Hwy between Springwells St and Dix St:** This section of road is designed as a central vein for residential and neighborhood business access. It is not appropriate as a pass-through for heavy trucks.
- **The CSX entrance on Dix St and Waterman St:** The design of this intersection is discussed in the recommendations section of this report; geometric upgrades to this intersection will help improve safety of all road users and will help restrict problematic movements onto Vernor Hwy
- **Vernor Hwy east of Livernois Ave:** With the construction of the Gordie Howe International Bridge, as discussed in that section, traffic that no longer has a path northbound from I-75 may divert to residential areas such as Clark St and Junction St, which both intersect with Vernor Hwy. As Vernor Hwy provides routing to major generators such as Livernois Junction Rail Terminal, there is a risk of increased truck traffic on this section of roadway. This section of Vernor Hwy was previously discussed in the 2021 study as being a source of concerns regarding safety, speeding, and unwanted truck movements and behavior. It also identified the pavement rating on this section, particularly at the Junction St intersection, as poor.
- **Springwells St between Vernor Hwy and Fort St:** Overuse of Springwells by pass-through traffic, which feeds the overuse of Vernor, has been a long-standing issue. On its own, Springwells is an appropriate road for local deliveries, with easy access to and from I-75 and sufficient railroad viaduct height just south of Chamberlain St. However, it is not appropriate for traffic between freight yards and freeways or drayage yards. Given the residential nature of the area it is important to consider ways to divert truck traffic to other routes, particularly with the addition of the new Gordie Howe International Bridge.
- **I-75 Exit Ramps at Springwells St:** With bridge removals and I-75 access changes to the northeast of Springwells St, added traffic can be expected at the I-75 and Springwells St interchange. This is an important location to monitor for as-needed signal and geometry upgrades, both to deal with increased demand and to discourage truck traffic passing through along Springwells St.
- **Livernois Ave and Dragoon St between Vernor Hwy and Fort St, and the W. Lafayette Blvd connection between Livernois Ave and Dragoon St:** Unlike the area of Livernois north of Vernor Hwy, the segment of Livernois Ave and Dragoon St between I-75 and Vernor Hwy is heavily residential and overused by trucks because it provides access between I-75 and the Livernois Junction Rail Terminal and other points to the north. Additionally, the section of W. Lafayette Blvd. is a route of concern since it links the two roadways.
- **Central St and Lonyo St between John Kronk and Michigan Ave:** These sections are adjacent to multiple key generators. However, Lonyo St between St. John St and Michigan Ave is heavily residential, is adjacent to Romanowski Park, and runs alongside the future alignment of the Joe Louis Greenway. Similarly, Central St from St. John St to Michigan Ave is heavily residential.
- **Clark St and Scotten St south of Vernor Hwy:** This stretch of Clark St and Scotten St includes numerous homes, Clark Park, Western High School, Amelia Earhart Elementary and Middle School, and Maybury Middle School. This is an especially important segment of roadway to consider given the geometric changes resulting from the construction of the Gordie Howe International Bridge.

- **Junction St between I-75 and I-94:** The entirety of a Junction St is an issue route because it runs through multiple neighborhoods, alongside homes, churches, local businesses, parks, and schools.
- **Clark Ave and Universal Trucking:** Trucks have been observed queueing on Clark Ave in wait to be processed at Universal Trucking. It is important that trucks never block through traffic on Clark Ave. Curbside standing on Clark Ave can be minimized by a strategy of allowing trucks to queue within the Universal Trucking site where possible.

Exclusion from the issue route network does not imply that all other routes are feasible for truck traffic. For example, though Central St between John Kronk St and Dix St is not an issue route, as it does not meet the definition of issue routes outlined here, it is still unsuitable for trucks due to its low vertical clearance of 13'4".

Truck Route Identification

WSP proposed alternate routes for key generators that would be significantly impacted by potentially closing identified issue routes to heavy truck through traffic. Route data from Geotab and Replica did not indicate significant truck impacts along the issue routes for several of the identified key freight generators in Southwest Detroit, including ContainerPort, the Produce Terminal, FreshPak, and the Marathon Refinery. This does not mean that impacts from those facilities do not exist, but that they were not identified in the data, and as a result they are not generally expected to have as great an impact as the facilities that were identified. Table 5 summarizes the freight generators that are currently accessed via the issue routes, based primarily on the Geotab and Replica data. One generator, ContainerPort, was added to the list as it was identified by the City as a generator with known issue route connectivity due to freight movements to and from the Livernois Junction Rail Terminal.

The table indicates feasible alternate routes between known O/D pairs, as well as potential routing for trucks to access the nearest ramps for each interstate (I-75, I-94, and I-96) in all applicable directions. Designated truck routes may experience a non-negligible increase in travel time and/or costs for truck operators. However, every route designated for truck traffic has available capacity to support the projected traffic increases while maintaining acceptable levels of delay for all road users.

Table 5: Issue Route Generators and Proposed Alternative Routes

Key Freight Generator	Roads to be Avoided (segments where trucks use should be limited or restricted)	Proposed Alternative Routes (segments designed to manage heavy truck traffic)
Ambassador Bridge	Clark St – I-75 to Toledo St Dragoon St – I-75 to Vernor Hwy	Michigan Ave – I-96 to Livernois Ave Livernois Ave – Michigan Ave to Vernor Hwy
Universal at 2860 Clark St	Clark St – Toledo St to I-75 Scotten St – Toledo St to I-75 Vernor Hwy – Junction St to I-75 Junction St – Vernor Hwy to I-75	Michigan Ave – Livernois Ave to I-96 I-75 Service Drive – Michigan Ave to W Grand Blvd MLK Blvd – W Grand Blvd to I-96 W Grand Blvd – MLK Blvd to Michigan Ave

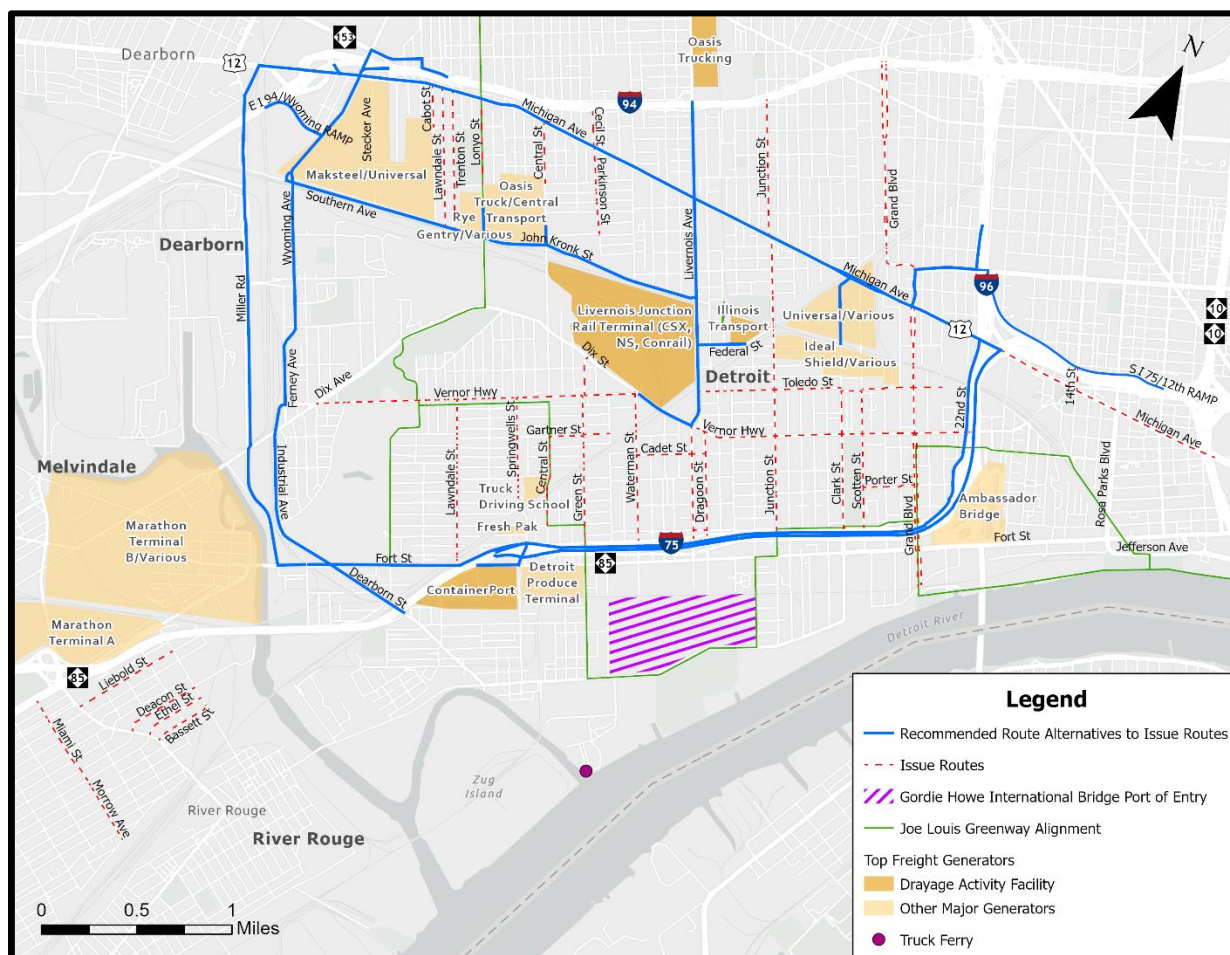
Table 5: Issue Route Generators and Proposed Alternative Routes (cont.)

Key Freight Generator	Roads to be Avoided (segments where trucks use should be limited or restricted)	Proposed Alternative Routes (segments designed to manage heavy truck traffic)
Livernois Junction Rail Terminal (Federal and Vernor entrances)	Vernor Hwy – Dragoon St to Junction St Livernois Ave – Vernor Hwy to W. Lafayette Blvd Dragoon St – Vernor Hwy to W. Lafayette Blvd W. Lafayette Blvd – Livernois Ave to Dragoon St Dix Ave/St – Lonyo St to Waterman St	Michigan Ave – Livernois Ave to I-96 Livernois Ave – I-94 to Vernor Hwy Vernor Hwy – Waterman St to Livernois Ave I-75 Service Drive – Michigan Ave to W Grand Blvd
Central Transport/Oasis	Central St – Michigan Ave to St. Stephen Lonyo St – Michigan Ave to St. John	Michigan Ave – Livernois Ave to I-96 Livernois Ave – I-94 to John Kronk St John Kronk St/Southern Ave – Wyoming Ave to Livernois Ave*
Universal/Mak Steel	Central St – Michigan Ave to St. Stephen Lonyo St – Michigan Ave to St. John Livernois/Junction Yard – outbound right turns	Livernois Ave – Michigan Ave to Vernor Hwy Vernor Hwy – Waterman St to Livernois Ave John Kronk St/Southern Ave– Wyoming Ave to Livernois Ave*
Rye Gentry	Lonyo St – Michigan Ave to St. John	Michigan Ave – Livernois Ave to I-96 Livernois Ave – I-94 to John Kronk St John Kronk St/Southern Ave – Wyoming Ave to Livernois Ave*
Illinois Transportation* <i>*Little change in routing as trucks appear to use Livernois, but must discourage use on Junction</i>	Junction St – All Federal St – between Illinois Transportation and Junction	Livernois Ave – I-94 to Federal (to connect to all freeways, not just I-94) Michigan Ave – I-96 to Livernois Ave
ContainerPort	Springwells St – Vernor Hwy to I-75 Waterman St – Vernor Hwy to I-75 Livernois Ave – Vernor Hwy to W. Lafayette Blvd Dragoon St – Vernor Hwy to W. Lafayette Blvd	Michigan Ave – I-96 to Livernois Ave

**Routing affects non-City of Detroit jurisdictional routes; routing may be subject to change.*

The combined alternate routes to/from key local generators and nearby freeways, which allow major generators to avoid issue routes, are found in Figure 15 and Appendix B. They are also detailed in the following pages. This includes suggested re-routing for current origins and destinations, as well as suggested routes to/from the Gordie Howe International Bridge. The process for determining routing between major neighborhood generators and the new bridge included identifying potential highway routes, least cost paths for getting between the bridge and the generators (to help understand the potential for trucks to travel through neighborhoods and issue routes), and the preferred route that will allow trucks to avoid issue routes and neighborhoods.

Figure 15: Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



To defray truck travel on the issue routes, the following segments would likely experience increased truck volumes:

- Michigan Ave – Livernois Ave to SB I-75 Service Drive
- Livernois Ave – I-94 to Vernor Hwy
- I-75/Fisher Service Dr – Michigan Ave to W Grand Blvd
- Vernor Hwy – Waterman St to Livernois Ave
- John Kronk St/Southern Ave² – Wyoming Ave to Livernois Ave
- W Grand Blvd – Martin Luther King Jr Blvd to Michigan Ave
- Martin Luther King Jr Blvd – I-96 Service Dr to W Grand Blvd

An analysis of AADT and Commercial AADT of these routes found that the increased truck volumes are not likely to add significant delay to the roadways that experience increased volumes.

Individual Routing

Table 6 lists generators that currently use issue routes identified throughout the network analysis process. In addition to identifying the issue routes that should be avoided, alternative routing and estimated travel times from Google Maps are also listed. These are available in map form in Appendix B.

Table 6: Generator Re-Routing

Generator	Livernois Junction Rail Terminal (Vernor Hwy Entrance/Exit)
Key Origins and Destinations, based off the Replica maps and Tableau data	Key Origins: I-96, I-94, I-75, Maksteel/Universal Key Destinations: I-96, I-94, I-75
Routes to Avoid	Vernor Hwy – Dragoon St to Junction St Livernois Ave – W. Lafayette Blvd to Vernor Hwy Dragoon St – W. Lafayette Blvd to Vernor Hwy W Lafayette Blvd – Livernois Ave to Dragoon St Dix St – Lonyo St to Waterman St
New Routing and Travel Times to Freeway Access	To/From I-94 - Vernor Hwy to Livernois Ave - Travel time to/from I-94: 7-8 min To NB I-75 - I-94 Route, then EB I-94 to NB I-75 - Travel time to I-94: 7 min - Travel time from EB I-94 to NB I-75: 5 min From NB I-75/Gordie Howe International Bridge /Ambassador Plaza - I-96 Ramp at Michigan Ave, to WB Michigan Ave to SB Livernois Ave to WB Vernor Hwy - Travel time from I-96 ramp: 10 min To SB I-75/Ambassador Plaza/Gordie Howe International Bridge - Vernor Hwy to NB Livernois Ave to EB Michigan Ave to SB Fisher Service Dr to ramp - Travel time to freeway: 13 min From SB I-75 - Use I-94 route (SB I-75 to WB I-94 to SB Livernois Ave to WB Vernor Hwy) - Travel time from I-94: 8 min To WB I-96 - Use I-94 route (EB Vernor Hwy to NB Livernois Ave to EB I-94 to WB I-96) - Travel time to I-94: 7 min - Travel time to from EB I-94 to WB I-96: 2 min From EB I-96 - Use I-94 route (EB I-96 to WB I-94 to SB Livernois Ave to WB Vernor Hwy) - Travel time from I-94: 8 min - Travel time from EB I-96 to WB I-94 to Livernois Ave: 3 min

Table 7: Generator Re-Routing (cont.)

Generator	Livernois Junction Rail Terminal (Federal St Access Point)
Key Origins and Destinations, based on Replica and Tableau data	Key Origins: I-96, I-94, I-75, Maksteel/Universal Key Destinations: I-96, I-94, I-75
Routes to Avoid	Vernor Hwy – Dragoon St to Junction St Livernois Ave – W. Lafayette Blvd to Vernor Hwy Dragoon St – W. Lafayette Blvd to Vernor Hwy Dix St – Lonyo St to Waterman St
New Routing and Travel Times to Freeway Access	To/From I-94 • Livernois Ave • Travel time: 5 min To NB I-75 • Livernois Ave • Travel time to I-94: 5 min • Travel time from I-94 to I-75 NB: 5 Min From NB I-75/Gordie Howe International Bridge /Ambassador Plaza • I-96 Ramp to Michigan Ave to Livernois Ave • Travel time: 6 min To SB I-75/Ambassador Plaza/Gordie Howe International Bridge • Livernois Ave to Michigan Ave to Fisher Service Dr to ramp • Travel time to SB I-75: 9 min From SB I-75 • I-75 SB to I-94 WB to Livernois Ave • Travel time from SB I-75 ramp to I-94 WB off-ramp at Livernois Ave: 6 min • Travel time from I-94: 5 min To WB I-96 • NB Livernois Ave to EB I-94 to WB I-96 • Travel time to I-94: 5 min • Travel time from EB I-94 to WB I-96: 2 min From EB I-96 • SB Livernois Ave • Travel time from I-94: 5 min • Travel time from EB I-96 off-ramp to WB I-94 to Livernois Ave: 3 min

Table 8: Generator Re-Routing (cont.)

Generator	Central Transport
Key Origins and Destinations, based on Replica and Tableau data	Key Origins: I-75, I-96, I-94, Universal at Clark St, Universal/Maksteel Key Destinations: I-75, I-96, I-94, Universal at Clark St
Routes to Avoid	Central St – Michigan Ave to St. Stephen St Lonyo St – Michigan Ave to St. John St 14th St – Fisher Service Dr to Michigan Ave Michigan Ave – I-96 Ramp to Rosa Parks Blvd
New Routing and Travel Times to Freeway Access	To I-94 • SB Central St to EB John Kronk St to NB Livernois Ave to I-94 On-Ramp • Travel Time: 7 min From I-94 • I-94 Off-Ramp to SB Livernois Ave to WB John Kronk St to NB Central St • Travel time: 7 min To NB I-75 • Same as I-94, then onto NB I-75 once on I-94 • Travel Time to I-94: 7 min • Travel Time from EB I-94 to NB I-75: 5 min From NB I-75 • WB Dearborn St to NB Industrial St to EB Vernor Hwy to NB Ferney St to Wyoming Ave to EB Southern Ave to EB John Kronk St to NB Central St • Travel time from I-75: 12 min From Ambassador Plaza and Gordie Howe International Bridge • I-96 Off-Ramp to WB Michigan Ave to NB Livernois Ave to WB John Kronk St to NB Central St • Travel time from I-96 ramp: 10 min To SB I-75/Ambassador Plaza/Gordie Howe International Bridge • SB Central St to EB John Kronk St to NB Livernois Ave • Travel time to I-94: 7 Min From SB I-75 • SB I-75 to WB I-94 to SB Livernois Ave to WB John Kronk St to NB Central St • Travel time from I-94: 7 min • Travel time from SB I-75 to I-94 Off-Ramp at Livernois Ave: 6 min To WB I-96 • SB Central St to EB John Kronk St to NB Livernois Ave to EB I-94 to WB I-96 • Travel time to I-94: 7 min • Travel time from EB I-94 to WB I-96: 2 min From EB I-96 • EB I-96 to WB I-94 to Livernois Ave to John Kronk St to Central St • Travel time from I-94: 7 min • Travel time from EB I-96 to WB I-94 to Livernois Ave: 3 min

Table 9: Generator Re-Routing (cont.)

Generator	Oasis Trucking (Central St)
Key Origins and Destinations, based on Replica and Tableau data	Key Origins: I-75, I-96, I-94, Universal at Clark St, Universal/Maksteel Key Destinations: I-75, I-96, I-94, Universal at Clark St
Routes to Avoid	Central St – Michigan Ave to St. Stephen Lonyo St – Michigan Ave to St. John 14th St – Fisher Service Dr to Michigan Ave Michigan Ave – I-96 Ramp to Rosa Parks Blvd
New Routing and Travel Times to Freeway Access	To I-94 • SB Central St to EB John Kronk St to NB Livernois Ave to I-94 On-Ramp • Travel Time: 8 min From I-94 • I-94 Off-Ramp to SB Livernois Ave to WB John Kronk St to NB Central St • Travel time: 8 min To NB I-75 • Same as I-94, then onto NB I-75 once on I-94 • Travel Time to I-94: 8 min • Travel Time from EB I-94 to NB I-75: 5 min From NB I-75 • WB Dearborn St to NB Industrial St to EB Vernor Hwy to NB Ferney St to Wyoming Ave to EB Southern Ave to EB John Kronk St to NB Central St • Travel time from I-75: 12 min From Ambassador Plaza and Gordie Howe International Bridge • I-96 Off-Ramp to WB Michigan Ave to NB Livernois Ave to WB John Kronk St to NB Central St • Travel time from I-96 ramp: 11 min To SB I-75/Ambassador Plaza/Gordie Howe International Bridge • Same as I-94 (SB Central St to EB John Kronk St to NB Livernois Ave) • Travel time to I-94: 8 Min From SB I-75 • SB I-75 to WB I-94 to SB Livernois Ave to WB John Kronk St to NB Central St • Travel time from I-94: 8 min • Travel time from SB I-75 to I-94 Off-Ramp at Livernois Ave: 6 min To WB I-96 • SB Central St to EB John Kronk St to NB Livernois Ave to I-94 EB to I-96 • Travel time to I-94: 8 min • Travel time from EB I-94 to WB I-96: 2 min From EB I-96 • EB I-96 to WB I-94 to SB Livernois Ave to WB John Kronk St to NB Central St • Travel time from I-94: 8 min • Travel time from EB I-96 to WB I-94 to Livernois Ave: 3 min

Table 10: Generator Re-Routing (cont.)

Generator	Universal at 2860 Clark St
Key Origins and Destinations, based on Replica and Tableau data	Key Origins: I-75, I-96, I-94, Ambassador Bridge, Oasis Trucking Key Destinations: I-75, I-96, I-94, Oasis Trucking
Routes to Avoid	Clark St – Toledo St to I-75 Scotten St – Toledo St to I-75 Vernor Hwy – Junction St to I-75 Service Dr Junction St – Vernor Hwy to I-75 Service Dr 14th St – Fisher Service Dr to Michigan Ave Michigan Ave – Rosa Parks Blvd to I-96/Michigan Ave Ramp
New Routing and Travel Times to Freeway Access <i>*Significant volumes coming up Clark St and Scotten St from I-75/Vernor Hwy as well as Junction St-Vernor Hwy-Clark St (due to Clark St bridge over I-75 being out of service for Gordie Howe International Bridge construction, as well as the permanent removal of Junction Ave bridge over I-75)</i>	To/From I-94 - Clark St to Michigan Ave to Livernois Ave - Travel time: 5 min To NB I-75 - Clark St to Michigan Ave to Livernois Ave - Travel time to I-94: 5 min - Travel time from EB I-94 to NB I-75: 5 min From NB I-75/Gordie Howe International Bridge/Ambassador Plaza - I-96 Ramp at Michigan Ave to Michigan Ave to Clark St - Travel time: 3 min To SB I-75/Ambassador Plaza/Gordie Howe International Bridge - Clark St to Michigan Ave to Fisher Service Dr to SB I-75 ramp - Travel time: 3 min From SB I-75 - Fisher Service Dr to MLK Blvd to W Grand Blvd to Michigan Ave to Clark St - Travel time: 4 min To WB I-96 - Clark St to Michigan Ave to Livernois Ave - Travel time: 4 min - Travel time from EB I-94 to WB I-96: 2 min From EB I-96 - Jeffries Service Dr to MLK Blvd to W Grand Blvd to Michigan Ave to Clark St - Travel time: 4 min To Oasis - Clark St to Michigan Ave to Livernois Ave to John Kronk St to Central St - Travel time: 9 min From Oasis - Central St to John Kronk St to Livernois Ave to Michigan Ave to Clark St - Travel time: 8 min

Table 11: Generator Re-Routing (cont.)

Generator	Universal/Maksteel
Key Origins and Destinations, based on Replica and Tableau data	Key Origins: I-75, I-96, I-94, Marathon Terminal B Key Destinations: I-75, I-96, I-94, Marathon Terminal B, Livernois Junction Rail Terminal (Vernor Hwy Entrance/Exit)
Routes to Avoid	Central St – Michigan Ave to St. Stephen Lonyo St – Michigan Ave to St. John Livernois Junction Rail Terminal (Vernor Hwy Access) – outbound right turns
New Routing and Travel Times to Freeway Access	To Livernois Junction Rail Terminal (Vernor Hwy) - Wyoming to Southern/John Kronk St to Livernois Ave to Vernor Hwy to yard - Travel time: 11 min From Livernois Junction Rail Terminal (Vernor Hwy) - Vernor Hwy to Livernois Ave to Michigan Ave to Wyoming Ave - Travel time: 15 min (alt) Vernor Hwy to Livernois Ave to John Kronk St/Southern to Wyoming Ave - Travel time: 13 min To Livernois Junction Rail Terminal (Federal St Access Point) - Wyoming Ave to Southern/John Kronk St to Livernois Ave - Travel time: 8 min From Livernois Junction Rail Terminal (Federal St Access Point) - Livernois Ave to Michigan Ave to Wyoming Ave - Travel time: 10 min (alt) Livernois Ave to John Kronk St/Southern to Wyoming Ave - Travel time: 8 min To EB I-94/Ambassador Bridge/I-96/I-75/Gordie Howe International Bridge - Wyoming Ave to I-94 On-Ramp - Travel time: 2 min From EB I-94 - EB I-94/Wyoming Off-Ramp - Travel time: 1 min To WB I-94 - Wyoming Ave to WB Michigan Ave to WB I-94 On-Ramp - Travel time: 4 min From WB I-94/EB I-96 - WB I-94 Off-Ramp to NB Addison St to McGraw Ave to SB Wyoming Ave - Travel Time: 4 min From SB I-75/Gordie Howe International Bridge - Springwells St Exit SB to WB Fort St to NB Miller Rd to EB Michigan Ave to SB Wyoming Ave - Gordie Howe International Bridge Alt: WB I-96 to Michigan Ave to Wyoming Ave

Table 12: Generator Re-Routing (cont.)

Generator	ContainerPort
Key Origins and Destinations, based on Replica and Tableau data	Key Origins: Livernois Junction Rail Terminal, I-96, I-94, I-75 Key Destinations: Livernois Junction Rail Terminal, I-96, I-94, I-75
Routes to Avoid	Springwells St – Vernor Hwy to I-75 Waterman St – Vernor Hwy to I-75 Livernois Ave – Vernor Hwy to W. Lafayette Blvd Dragoon St – Vernor Hwy to W. Lafayette Blvd W Lafayette Blvd – Livernois Ave to Dragoon St
New Routing and Travel Times to Freeway Access	To SB I-75 - Fisher Service Dr to Fort St to Springwells St to I-75 SB On-Ramp - Travel time to ramp: 3 min From NB I-75 - I-75 SB Off-Ramp to Springwells St to Fort St to Fisher Service Dr - Travel time: 2 min From SB I-75, Ambassador Bridge, Gordie Howe International Bridge, I-94, I-96 - Springwells Off-Ramp to Springwells St to Fort St to Fisher Service Dr - Travel time: 3 min To NB I-75, Ambassador Bridge, Gordie Howe International Bridge, I-94, I-96 - Fisher Service Dr to Fort St to Springwells St to I-75 NB On-Ramp - Travel time to ramp: 3 min To Livernois Junction Rail Terminal - Fisher Service Dr to Fort St to Springwells St to I-75 NB to I-96/Michigan Off-Ramp to Michigan Ave to Livernois Ave - Travel time to Livernois Junction Rail Terminal: 12-14 min From Livernois Junction Rail Terminal - Livernois Ave to Michigan Ave to I-75 SB Service Drive to I-75 to Springwells St Off-Ramp to Springwells St to Fort St - Travel time to Livernois Junction Rail Terminal: 12-14 min

Table 13: Generator Re-Routing (cont.)

Generator	Illinois Transportation
Key Origins and Destinations, based off the Replica maps and Tableau data	Key Origins: I-75, I-96, I-94, Ambassador Bridge, Gordie Howe International Bridge Key Destinations: I-75, I-96, I-94
Routes to Avoid	Junction St
New Routing and Travel Times to Freeway Access	From NB I-75, Gordie Howe International Bridge, Ambassador Bridge - NB I-96 to Michigan Ave to Livernois Ave to Federal St - Travel time: 9 min To/From I-94, NB I-75, WB I-96, From SB I-75, I-96 - Federal St to Livernois to I-94, to I-96 or I-75 - Travel time to/from I-94: 6 min

Table 14: Generator Re-Routing (cont.)

Generator	Rye Gentry
Key Origins and Destinations, based off the Replica maps and Tableau data	Key Origins: I-75, I-96, I-94 Key Destinations: I-75, I-96, I-94
Routes to Avoid	Lonyo St – Michigan Ave to St. John 14th St – Fisher Service to Michigan Ave Michigan Ave – I-96 to Rosa Parks Blvd
New Routing and Travel Times to Freeway Access <i>*Little data picked up from Geotab/Replica, but assumption is they have similar routing to Central, Universal, and Maksteel</i>	To/From I-94 - Lonyo St to John Kronk St to Livernois Ave - Travel time: 8 min To NB I-75 - Lonyo St to John Kronk St to Livernois Ave to EB I-94 to NB I-75 - Travel time to I-94: 7 min - Travel time from EB I-94 to NB I-75: 5 min From NB I-75 - Dearborn to Industrial to Ferney to Wyoming Ave to Southern/John Kronk St to Lonyo St - Travel time: 10 min From Ambassador Plaza/Gordie Howe International Bridge - I-96 to Michigan Ave to Livernois Ave to John Kronk St to Lonyo St - Travel time: 9 min To SB I-75/Ambassador Plaza/Gordie Howe International Bridge - Lonyo St to John Kronk St to Livernois Ave - Travel time to I-94: 7 min From SB I-75 - Same as I-94 - Travel time from I-94: 7 min To WB I-96 - Lonyo St to John Kronk St to Livernois Ave to EB I-94 to WB I-96 - Travel time to I-94: 7 min - Travel time from EB I-94 to WB I-96: 2 min From EB I-96 - EB I-96 to WB I-94 to Livernois Ave to John Kronk St to Lonyo St - Travel time from I-94: 7 min

Refined Overall Network

In addition to providing individual routing recommendations for each major generator, this report also uses information about routing to and from individual generators to refine the overall trucking network, identifying roadways that are most appropriate for truck travel. This network is inclusive of the routing for the individual generators, but also extends beyond those individual networks. The blue lines show where truck traffic is appropriate regardless of generator; the red lines show the issue routes that are recommended to be avoided.

Figure 16 is a refinement of the network defined in the 2021 study.

Figure 16: Refined Overall Network

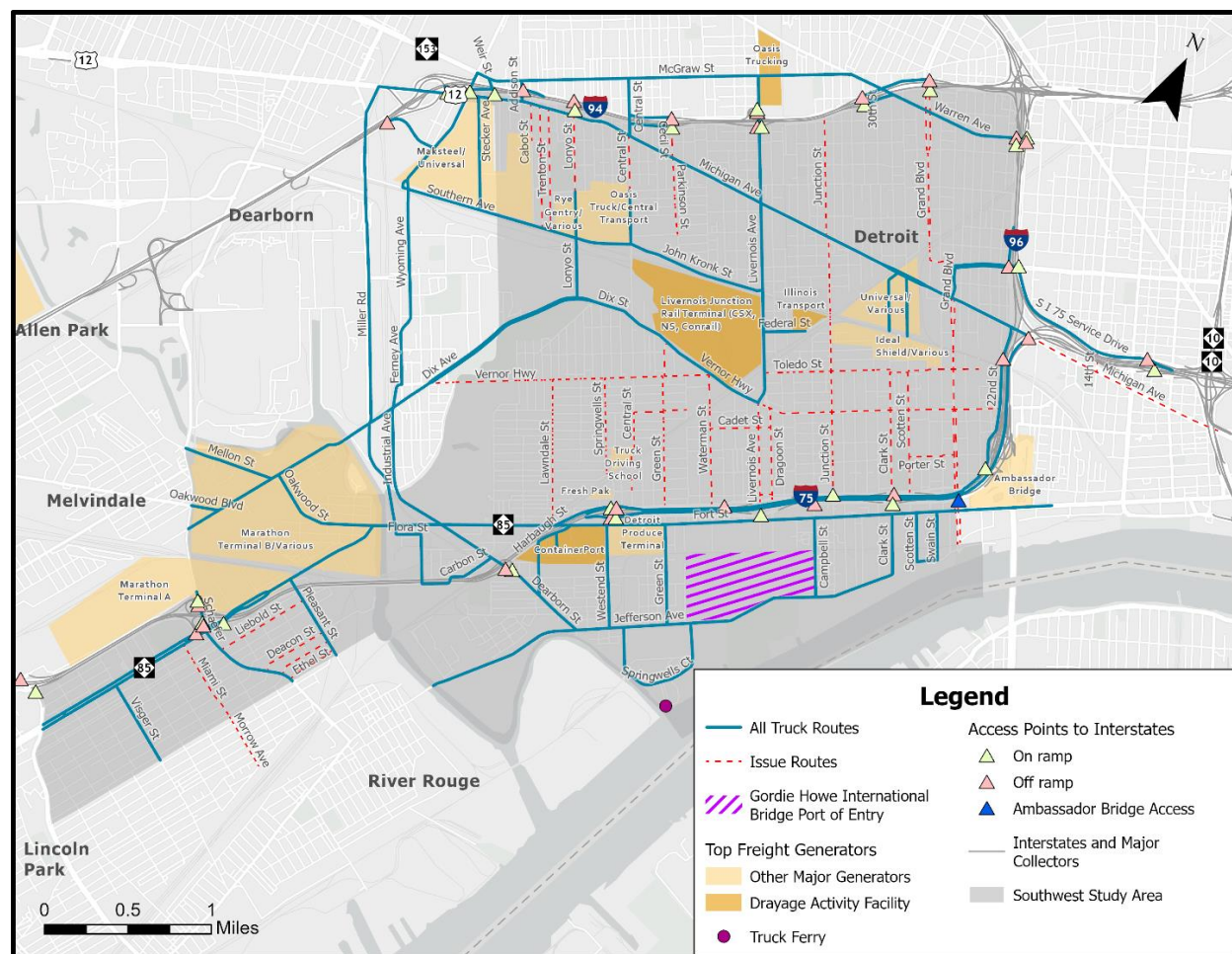


Table 15 details all segments shown in Figure 16 and whether they were added, kept, or removed from the routing suggested in the previous report. Routing was added based on community feedback and if those routes are now in the preferred generator routing as detailed in this report. Routing was removed from the original 2021 recommendations for a variety of reasons, including vertical clearance issues, routing being outside of the current study area, and if those original recommendations were restricted or business access only.

Table 15: Modified Routing from 2021 Study

Roadway	From	To	Note
Martin Luther King Jr. Boulevard	I-96	Grand Boulevard	Added
Southern Avenue	Wyoming Avenue	Stecker Street	Added
Green Street	Fort Street	West Jefferson Avenue	Added
Clark Avenue	Michigan Avenue	NS Tracks	Added
Scotten Street	Michigan Avenue	NS Tracks	Added
Wyoming Avenue	McGraw Street	Southern Avenue	Added
Dix Street	Miller Road	Vernor Highway	Added
Miller Road	Michigan Avenue	Fort Street	Added
Wyoming Avenue-Ferney Street-Industrial Street	Michigan Avenue	Dearborn Street	Added
I-94 off-ramp	I-94	Wyoming Avenue	Added
Visger Street	Fort Street	Detroit/River Rouge Border	Added
Pleasant Street	Fort Street	Detroit/River Rouge Border	Added
Stecker Avenue	Michigan Avenue	Southern Avenue	Added
McGraw Street	Wyoming Avenue	West Warren Avenue	Kept
Michigan Avenue	Miller Road	I-75 off-ramp	Kept
Schaefer Highway	Within study area		Kept
John Kronk Street	Stecker Street	Livernois Avenue	Kept
Dix Street	Woodmere Street	Dragoon Street	Kept
Mellon Street	Schaefer Highway	Oakwood Boulevard	Kept
Oakwood Boulevard	Mellon Street	Fort Street	Kept
South Dix Street	Schaefer Highway	Oakwood Boulevard	Kept
Forman Street	Flora Street	Carbon Street	Kept
Carbon Street	Forman Street	Dearborn Street	Kept
West Jefferson Avenue	Brennan Street	South Clark Street	Kept
Springwells Court	West Jefferson Avenue	“End”	Kept

Table 15: Modified Routing from 2021 Study (cont.)

Roadway	From	To	Note
Zug Island Road (private)	West Jefferson Avenue	Zug Island	Kept
Livernois Avenue	McGraw Street	Dix Street	Kept
West Edsel Ford Service Drive	Trumbull Street	John C Lodge Service Drive	Kept
Harbaugh Street	West Fort Street	Dearborn Street	Kept
South Westend Street/Springwells Street	I-75	West Jefferson Avenue	Kept
South Campbell Street	West Fort Street	West Jefferson Avenue	Kept
South Clark Street	West Fort Street	West Jefferson Avenue	Kept
Reisener Street	West Fort Street	Flora Street	Kept
Scotten Avenue	West Fort Street	West Jefferson Avenue	Kept
West Jefferson Avenue	Scotten Street	Swain Street	Kept
Swain Street	W. Jefferson Avenue	Fort Street	Kept
Addison Avenue	McGraw Street	Michigan Avenue	Kept
Dearborn Street	Riverside Drive	West Jefferson Avenue	Kept
Weir Street	McGraw Street	Michigan Avenue	Kept
Dix Street	Within study area		Kept
John C Lodge Service Drive	West Edsel Ford Service Drive	West Forest Avenue	Kept
North I-75 Service Drive	Fort Street	Southbound I-75 Off-Ramp (East of Springwells Street)	Kept
North I-75 Service Drive	Southbound I-75 On-Ramp (West of Livernois Avenue)	Southbound I-75 Off-Ramp (East of Scotten Avenue)	Kept
South I-75 Service Drive	Springwells Street	Southbound I-75 Off-Ramp (East of West Grand Boulevard)	Kept
West I-96 Service Drive	Southbound I-96 Off-Ramp (North of Warren Avenue)	Southbound I-96 On-Ramp (South of Warren Avenue)	Kept
West I-96 Service Drive	Southbound I-75 On-Ramp (North of Howard)	Southbound I-96 Off-Ramp (North of Martin Luther King Jr. Boulevard)	Kept

Table 15: Modified Routing from 2021 Study (cont.)

Roadway	From	To	Note
South I-94 Service Drive	Warren Avenue	Trumbull Street	Kept
West John C Lodge Service Drive	Trumbull Street	West Grand River Avenue	Kept
North I-75 Service Drive	Martin Luther King Jr. Boulevard	Temple Street	Kept
South I-75 Service Drive	Michigan Avenue	Trumbull Street	Kept
North I-94 Service Drive	Central Street	Southbound I-94 Off-Ramp (East of Cecil Avenue)	Kept
South I-94 Service Drive	Central Street	Cecil Avenue	Kept
North I-94 Service Drive	Southbound I-94 On-Ramp (West of 30th Street)	Southbound I-94 Off-Ramp (East of Grand Boulevard)	Kept
Warren Avenue	McGraw Street	John C Lodge Freeway	Kept until I-96
Fort Street	Within entire study area		Kept
Lonyo Avenue	John Kronk Street	Dix Street	Kept
Brennan Street	GLWA/DWSD Facility	West Jefferson Avenue	Not included
Central Street	John Kronk Street	Dix Street	Removed
Vernor Highway	Riverside Drive	Dix Street	Removed
Vernor Highway	Livernois Avenue	Dragoon Street	Removed
Vinewood Street	West Jefferson Avenue	Fort Street	Removed
West Jefferson Avenue	23rd Street	West Grand Boulevard	Removed
Northbound West Grand Boulevard	West Jefferson Avenue	Fort Street	Removed
Springwells Street	Vernor Highway	I-75 Ramp	Removed
Bagley Street	20th Street	Rosa Parks Boulevard	Removed
20th Street	West Vernor Highway	Bagley Street	Removed
Junction Street	Michigan Ave	North I-75 Service Drive	Removed
West Vernor Highway	Dragoon Street	20th Street	Removed
Torrey Avenue	Scotten Street	28th Street	Removed

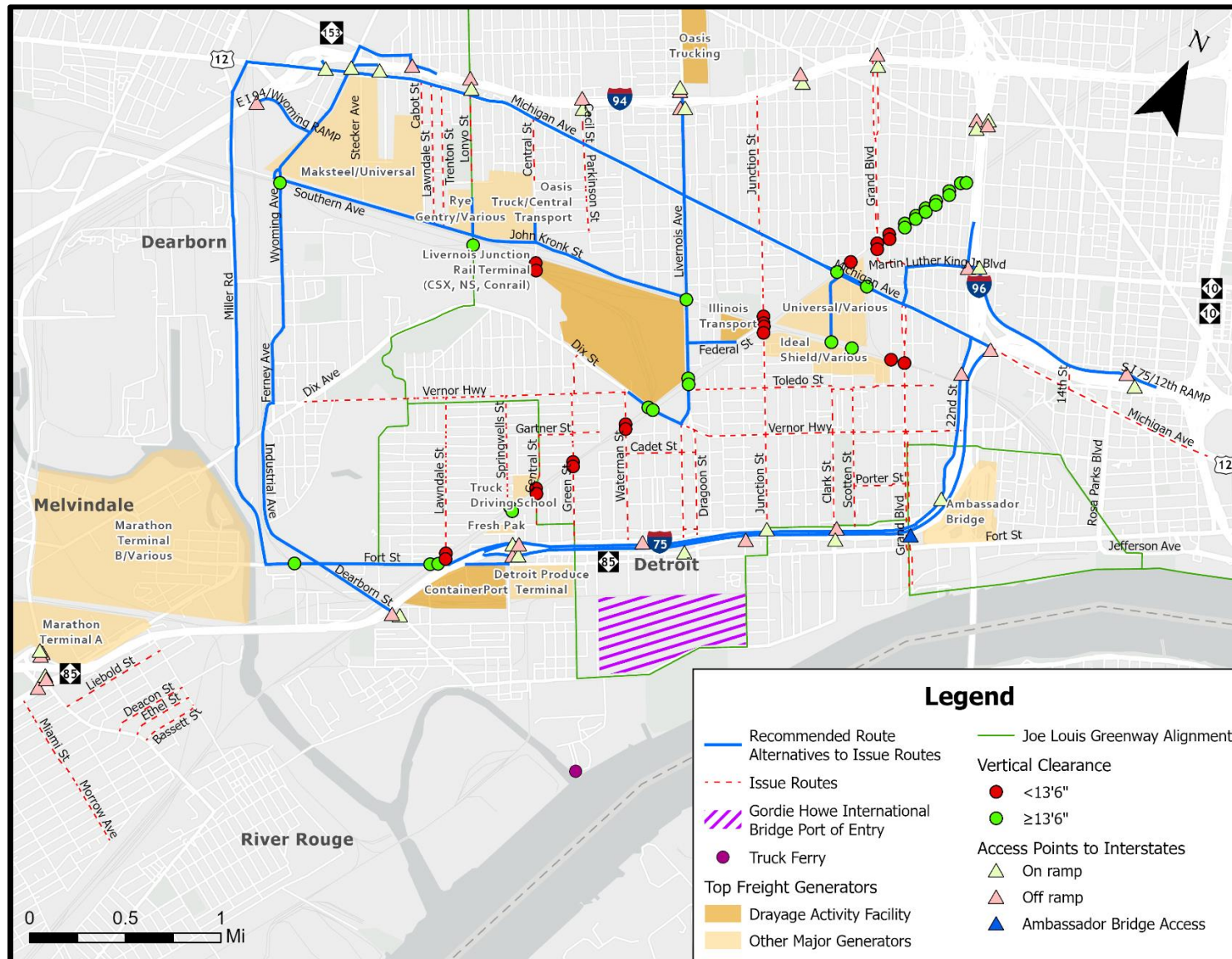
Table 15: Modified Routing from 2021 Study (cont.)

Roadway	From	To	Note
28th Street	Torrey Avenue	Michigan Avenue	Removed
23rd Street	West Jefferson Avenue	Fort Street	Removed
24th Street	West Jefferson Avenue	Fort Street	Removed
Post Street	Fort Street	Gordie Howe International Bridge Port of Entry	Removed
Central Street	McGraw Street	Dix Street	Removed
Lonyo Avenue	McGraw Street	John Kronk Street	Removed
Dragoon Street	Livernois Avenue	Vernor Highway	Removed
Michigan Avenue	I-75 Off-Ramp	John C Lodge Freeway	Removed
Cecil Avenue	Southbound I-94 Off-Ramp	Michigan Avenue	Removed
Trumbull Street	I-94	Warren Avenue	Removed
Grand River Avenue	I-94	John C Lodge Freeway	Removed
Martin Luther King Jr Boulevard	Jeffries Freeway Service Drive	John C Lodge Freeway	Removed
West Jefferson Avenue	Rosa Parks Boulevard	John C Lodge Freeway	Removed
Rosa Parks Boulevard	I-94	West Jefferson Avenue	Removed
Scotten Street	West Warren Avenue	Torrey Avenue	Removed
Clark Avenue	Scotten Street	Michigan Avenue	Removed

Adherence Measures for Proposed Truck Route Network

The essential outcome of this truck route implementation study is the improved use of the Southwest Detroit Road network by trucks for community benefit by limiting truck use on neighborhood streets. Ultimately, with knowledge of the information provided in this report, shown in terms of appropriate alternate truck paths, issue routes to avoid, and viaduct clearance values in Figure 17, this goal will be met through outreach to truck traffic generators, a focus on truck network operations improvements, and the ongoing technical advancement of truck navigation tools. Note that the on-ramps and off-ramps reflect the changes with the Gordie Howe International Bridge.

Figure 17: Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit (Detailed)



Outreach

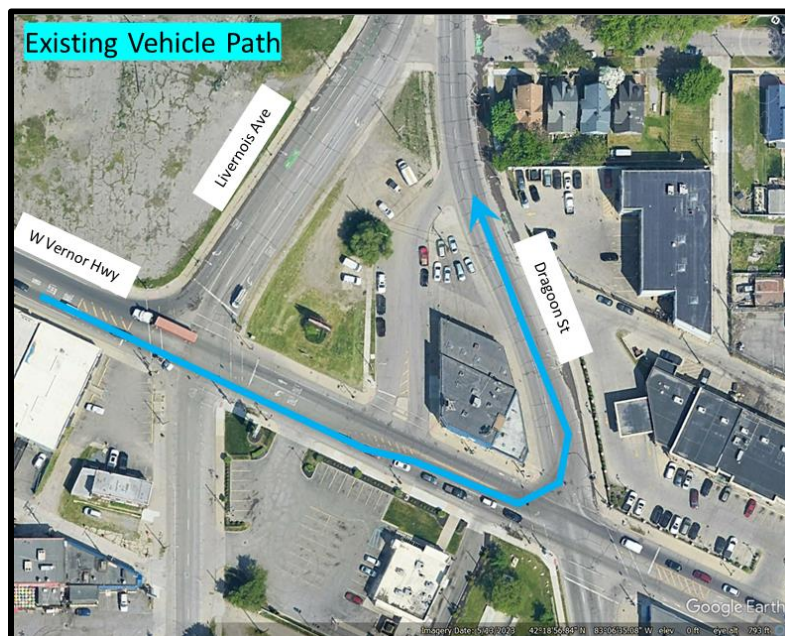
Single page cut sheets have been developed for each of the major truck traffic generators that presently have significant truck volumes navigating non-truck appropriate issue routes either in approach or departure of their facility. These pages are intended to be presented to said truck traffic generators in communications for the purpose of encouraging alternative truck path selection that is more appropriate. See generator specific routing information sheets in Appendix B for communication and dissemination to study area truck generators and operators.

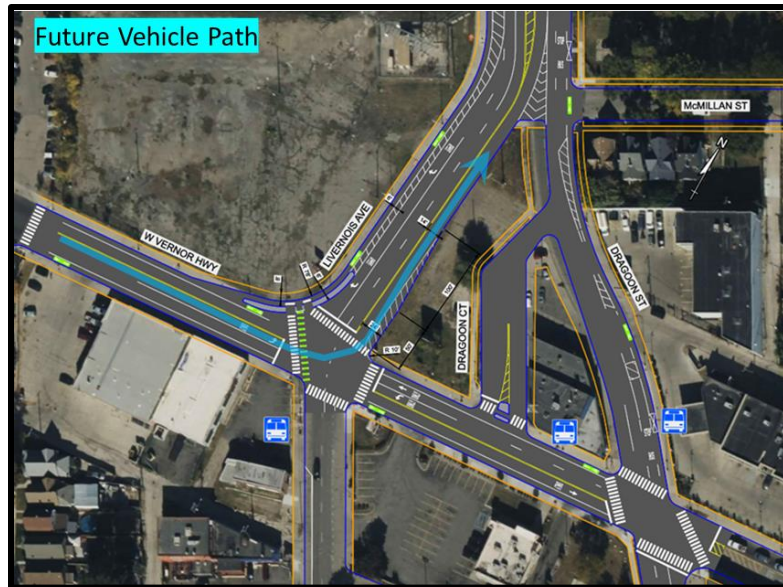
Recommended Infrastructure Improvements

Livernois Ave/Dragon St/Vernor Hwy Intersection

WSP has confirmed that the proposed truck route alternatives to the currently used neighborhood routes will comfortably handle the truck traffic diverted from issue routes. However, this evaluation is dependent on the successful completion of a roadway improvement at the intersection of Livernois Ave and Vernor Hwy. At this location, seen in Figure 18, the City has considered modifying an existing segment of Livernois Ave and providing more direct and efficient truck flow between the Vernor Hwy entrance of the Livernois Junction Rail Terminal and the greater freeway network. Completion of this project will depend on various factors, including whether the project will require right-of-way acquisition.

Figure 18: Vernor Hwy/Livernois Ave/Dragon St Modifications Concept

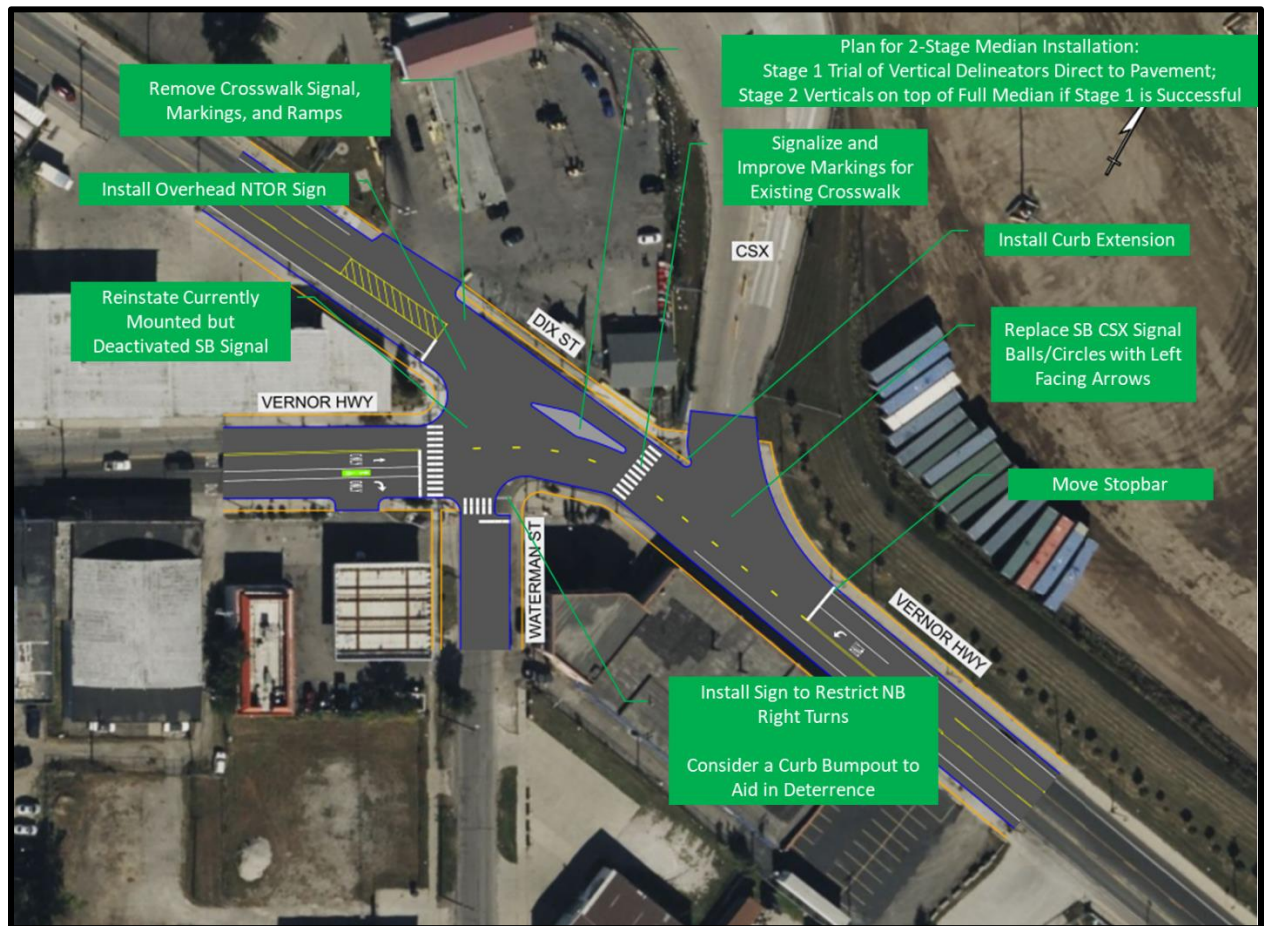




Dix St/Waterman St/Vernor Hwy Intersection

A second location where modifications are recommended is the intersection of Vernor Hwy, Dix St, and Waterman St on the west side of the Livernois Junction Rail Terminal. Figure 19 identifies several intersection redesign components that should be considered for various purposes, including safety for both motorized and non-motorized road use, promotion of desirable truck movements, and restriction of problematic truck movements to keep truck traffic off of Vernor Hwy to the west. This collection of updates represents a first look at improvements for this location and should be modified and improved upon if better options reveal themselves in the design process, including possible relocation/realignment of the CSX yard access location.

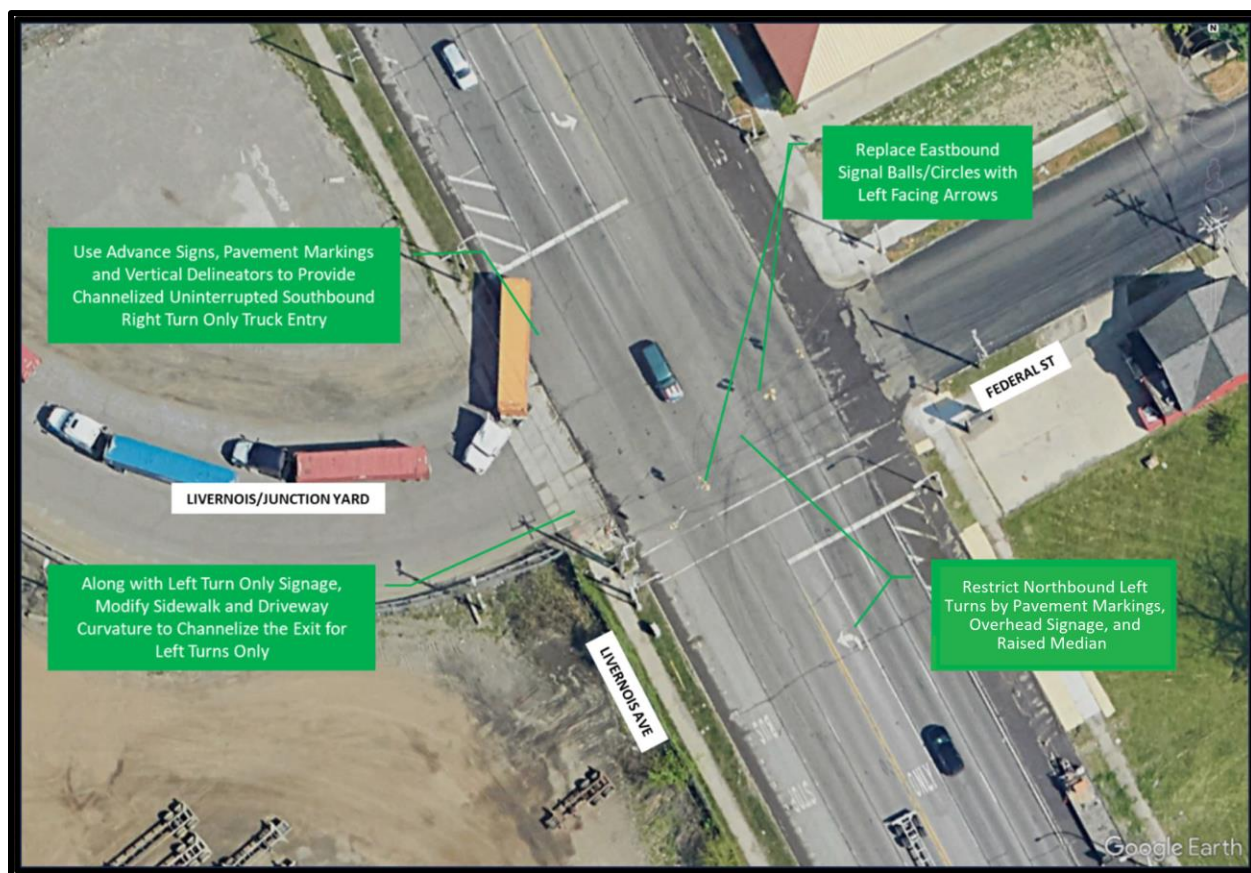
Figure 19. Vernor Hwy/Dix St/Waterman St Intersection Improvements Concept



Livernois Ave/Federal St Entrance to Livernois/Junction Yard

At the Federal St entrance to the Livernois Junction Rail Terminal, all traffic is preferred to enter the yard from Livernois to the north and exit the yard back onto Livernois to the north since traffic on Livernois Ave south of Vernor Hwy is discouraged. As such, it is recommended that the City pursue installation of various devices like those described in Figure 20 that force right-turn entry and strongly promote left-turn exit of the freight yard. Specifics of these updates would be figured out in the design stage.

Figure 20: Livernois Ave/Federal St Entrance and Exit Channelization Ideas



In addition to the treatments identified for both access points to the Livernois Junction Rail Terminal, there would be operational benefit to internally connecting access within the yard such that both CSX and Norfolk Southern trips could be made in the most efficient manner for each. With the pairing of intersection enhancements and a new ability for trucks to fully avoid the Livernois and Vernor intersection, both truck traffic and community road users should see congestion and delay reduction benefits.

Viaduct Heights

Railroad viaduct heights in Southwest Detroit, as shown in Figure 8, impose significant limitations on the truck routing options. Vehicle heights must be at or below 13'6"; additionally, the MDOT Michigan Design Manual requires vertical clearance of bridge construction to be greater than or equal to 14'. The Michigan Bridge Design Manual language on the subject is shown in Figure 21.

While the most appropriate and heavily traveled roadways in the area for truck use are still passable for most large trucks despite vertical clearances below 14', such as Michigan Ave, design standards require that compliant vertical clearances ultimately be met to ensure safe travel for all roadway users.

Figure 21: Vertical Clearance Requirements, Michigan Design Manual

MICHIGAN DESIGN MANUAL BRIDGE DESIGN - CHAPTER 7: LRFD					
7.01.08 (continued)					
Vertical Clearance					
A. Requirements					
VERTICAL CLEARANCE REQUIREMENT TABLE (8-20-2009) (6-22-2015)					
Route Classification Under the Structure	All Construction (Desired)	New Construction (Min *)	Road 4R Construction (Min *)	Bridge 4R Construction (Min *)	3R Construction (Min *)
Freeways	16'-3"	16'-0"	16'-0"	16'-0"	16'-0" ***
NHS Arterials (Local & Trunkline)	16'-3"	16'-0"	Maintain Existing** and 14'-6" Min	16'-0"	Maintain Existing** and 14'-0" Min
Non NHS Arterials (Local & Trunkline)	16'-3"	14'-6"	Maintain Existing** and 14'-6" Min	Maintain Existing** and 14'-6" Min	Maintain Existing** and 14'-0" Min
Collectors, Local Roads & Special Routes ⁽¹⁾	14'-9"	14'-6"	Maintain Existing** and 14'-6" Min	Maintain Existing** and 14'-6" Min	Maintain Existing** and 14'-0" Min

3R = Rehabilitation, Restoration, Resurfacing

* Minimum Vertical Clearance must be maintained over complete usable shoulder width.

** Existing vertical clearances greater than or equal to the minimums shown may be retained without a design exception. Vertical clearance reductions that fall below the minimums for new construction require a design exception. (6-22-2015)

4R = Reconstruction

Information on the NHS systems can be obtained by contacting the Statewide Planning Section, Bureau of Transportation Planning or found on the MDOT website at: <http://www.michigan.gov/mdot/programs/highway-programs/nfc> (5-23-2022)

Pedestrian bridges are to provide 1'-0" more underclearance than that required for a vehicular bridge. For Freeways (Interstate and non-Interstate), including Special Route

Encouragements and Geometric Improvements Associated with Gordie Howe International Bridge

In addition to technological changes as discussed in the Network Analysis Context section, there are also the realities of geometric changes and reconstruction around the Gordie Howe International Bridge and the I-75 freeway. Most notably, the removal of on-ramps and off-ramps at Livernois Ave and at Clark St to and from the I-75 freeway actually may help to shift truck traffic to more appropriate roads. Though there will be discouragements at that intersection, traffic on Springwells St between Vernor Hwy and Chamberlain St, just north of I-75, also needs to be discouraged due to its identification as an issue route.

Major freight generators for the new bridge include Universal Trucking at Clark St, the Vernor Hwy/Dix St/Waterman St entrance at Livernois Junction Rail Terminal, and Central Transport. Of these, there is a risk of trucks coming from the Gordie Howe International Bridge using Springwells St to access the Vernor Hwy/Dix St/Waterman St entrance to Livernois Junction Rail Terminal. While truck deterrence from Springwells St and along Vernor Hwy is best handled at entry points to the issue route, including the Dix St/Waterman St/Vernor Hwy intersection and the Springwells St at I-75 interchange, there may be modifications that could happen within the issue route. The specifics of this strategy would have to be worked out but may include features like curb radius adjustment and geofencing.

Lonyo St and Central St from Michigan Ave to St. John St

The segment of Lonyo St from Michigan Ave to St. John St is currently used by trucks, but the Joe Louis Greenway alignment runs parallel to this road; it is also a residential area. Trucks need to access Lonyo St to reach Rye Gentry, but outbound traffic needs to be discouraged from traveling northbound on Lonyo St. Geometric improvements to this segment of the road could make it less hospitable for trucks – for example, raised features, such as raised crosswalks for accessing Romanowski Park at St. John St/Lonyo St.

Intersection at I-96 WB Off-Ramp and Michigan Ave

With increased truck traffic connecting to area generators via the I-96 freeway off-ramp at Michigan Ave, intersection signalization may be beneficial. Signalization at this location will ensure sufficient gaps for trucks to exit the WB/NB freeway off-ramp and make their way safely onto WB Michigan Ave. It may also serve to encourage truck drivers to use this preferred route because turn support provided by the signal will increase the ease in which drivers can access the route.

Lonyo Railroad Project

The segment of Lonyo St from John Kronk St to Dix St is currently used by trucks and is a recommended route alternative to issue routes, but the Joe Louis Greenway alignment is on this segment of the road. While trucks require access to this stretch of Lonyo, there is a need to consider enhancements to the railroad-roadway grade crossings, including two at-grade crossings and three rail-over-road grade separation facilities. Implementing infrastructure improvements and incorporating best practices in bikeway design could enhance both truck mobility and Joe Louis Greenway user safety. For instance, strategies such as separating the two at-grade railroad crossings, realigning railroad tracks, consolidating rail-over-road grade separation facilities, widening Lonyo St and including colored bike lanes could be beneficial.

Natural Encouragements and Discouragements

With ever growing technological capability, most specifically in gains in functionality of GPS based navigation devices, truck routing can be expected to continue toward increased dictation by navigation systems to automatically instruct truck drivers to use routes that are more appropriate for truck use. This work can be expected to occur naturally over time but there may be opportunities for the City to speed up and support this progress by providing specific geofencing direction to navigation software providers.

As-Needed Traffic Signal and Intersection Modifications

As truck and other vehicle traffic shifts on the road network, new volume levels and distributions may warrant measures as dedicated left-turn lanes, dedicated signalized left-turn movements, and restricted movements if safety or operations issues arise. Intersections of note for monitoring include but are not limited to the interchange at Springwells St at I-75 and signalized locations along Michigan Ave between

Livernois Ave and Wyoming Ave. All roadway modifications have advantages and disadvantages. Specific traffic and safety mitigations should be designed to meet the needs of the intersection and the network where issues arise or opportunities are identified.

Appendix A: Inbound and Outbound Maps from Replica

The maps in this appendix show heavy truck routes detected Replica data for each of the identified Key Truck Generators. Route by specific location is not uniformly available from Geotab.

Figure 22: Livernois Junction Rail Terminal (Federal St Inbound Truck Count Map)

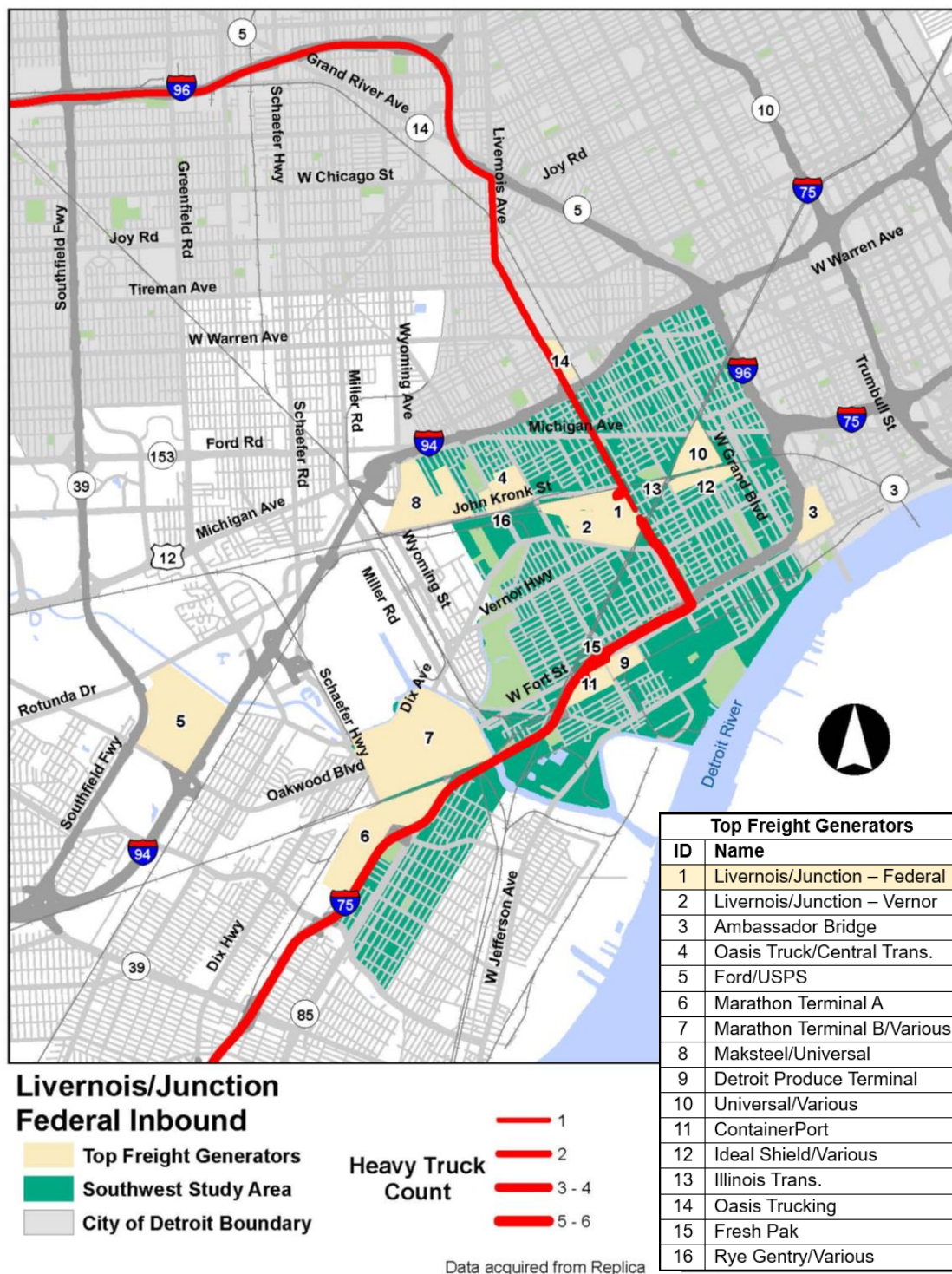


Figure 23: Livernois Junction Rail Terminal (Federal St Outbound Truck Count Map)

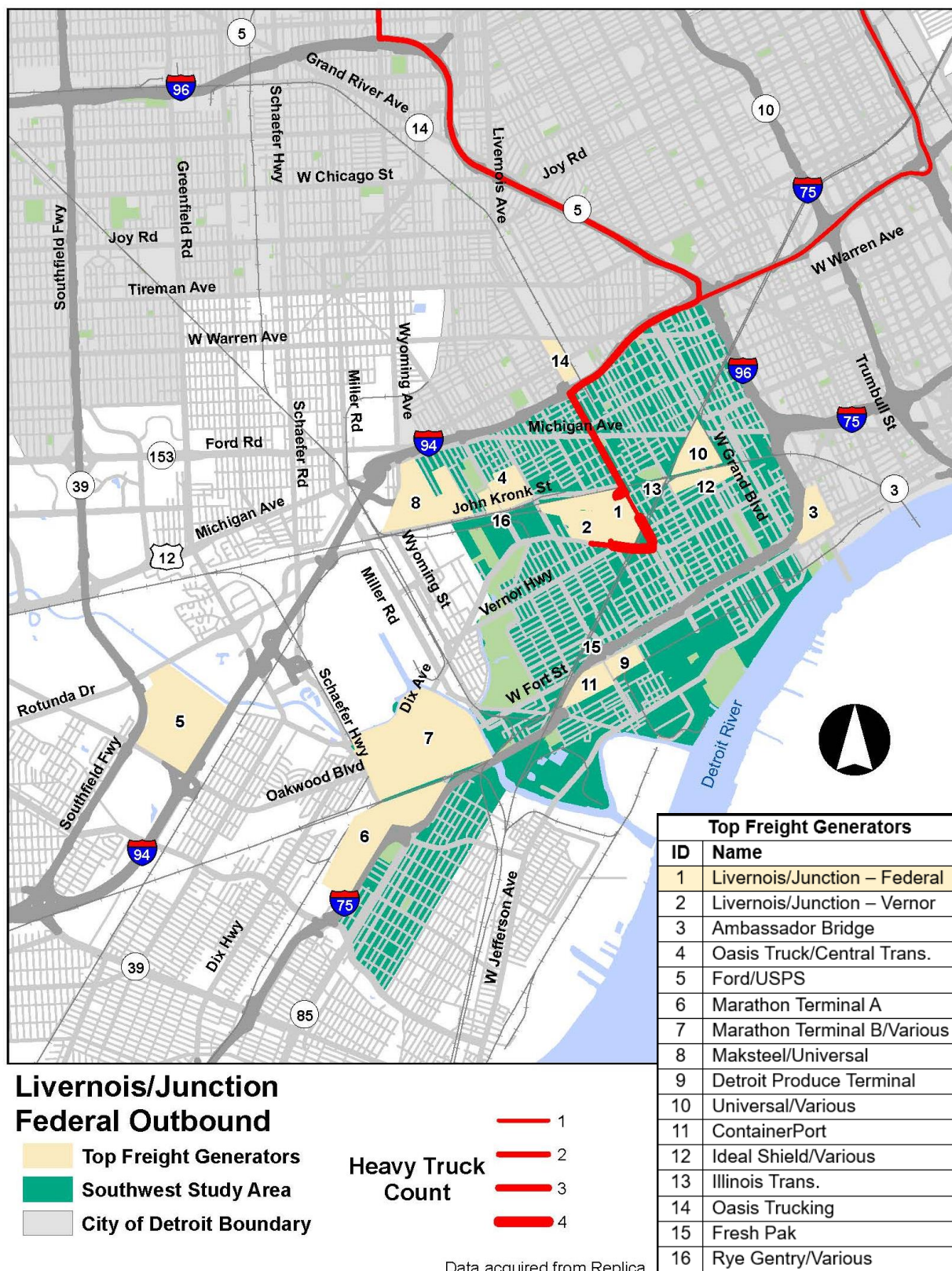


Figure 24: Livernois Junction Rail Terminal (Vernor Hwy Inbound Truck Count Map)

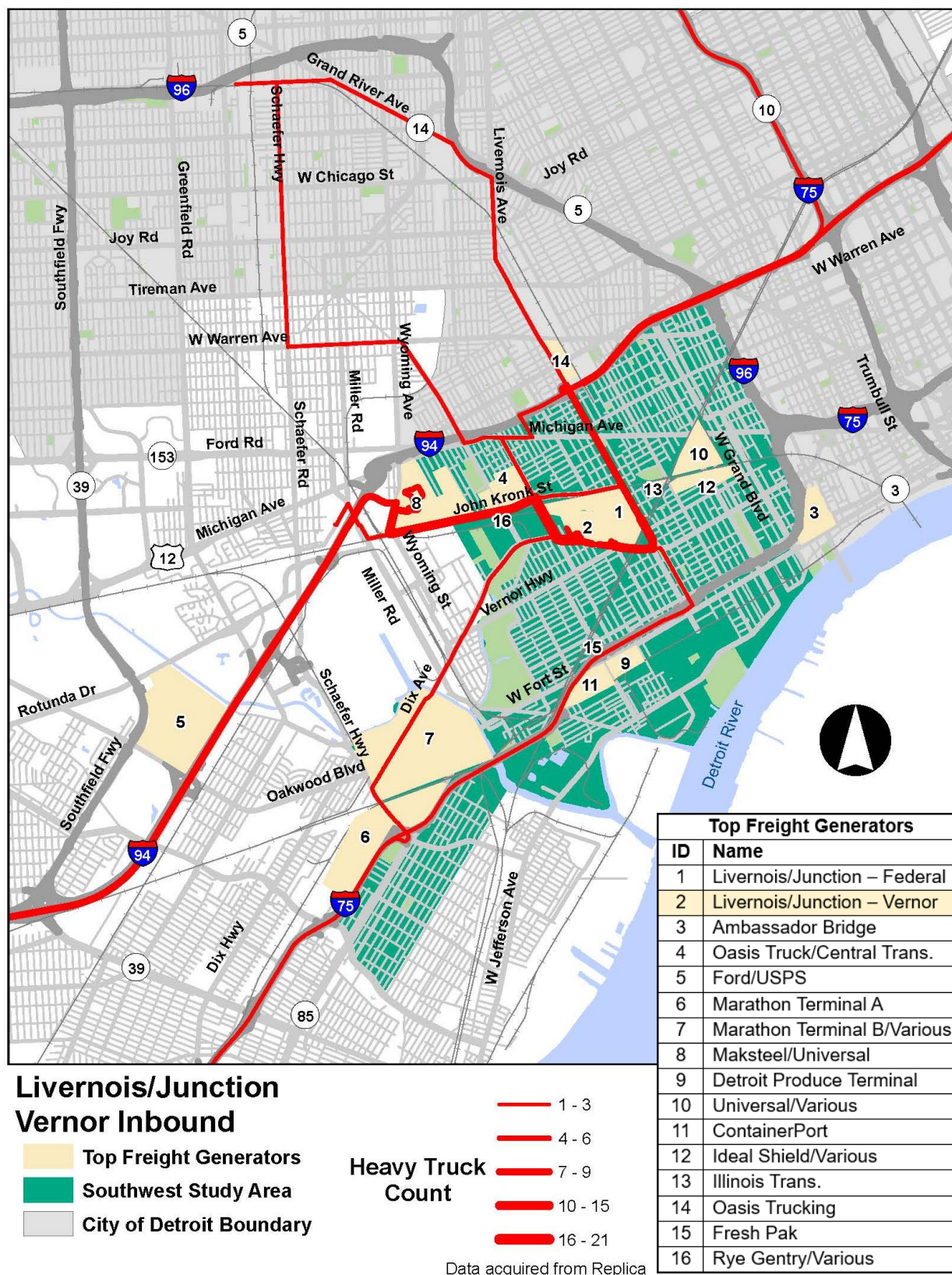


Figure 25: Livernois Junction Rail Terminal (Vernor Hwy Outbound Truck Count Map)

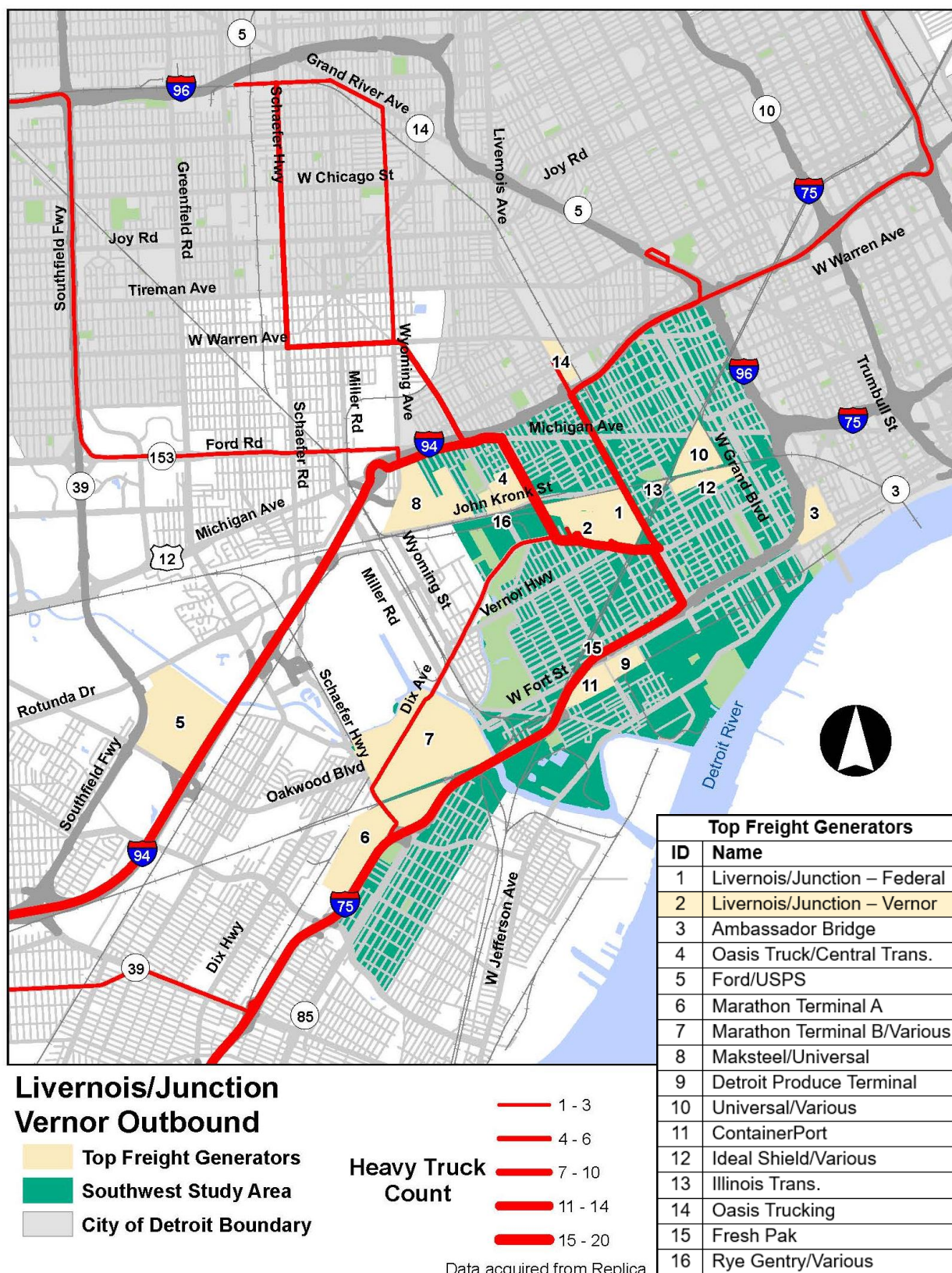


Figure 26: Ambassador Bridge Inbound Truck Count Map

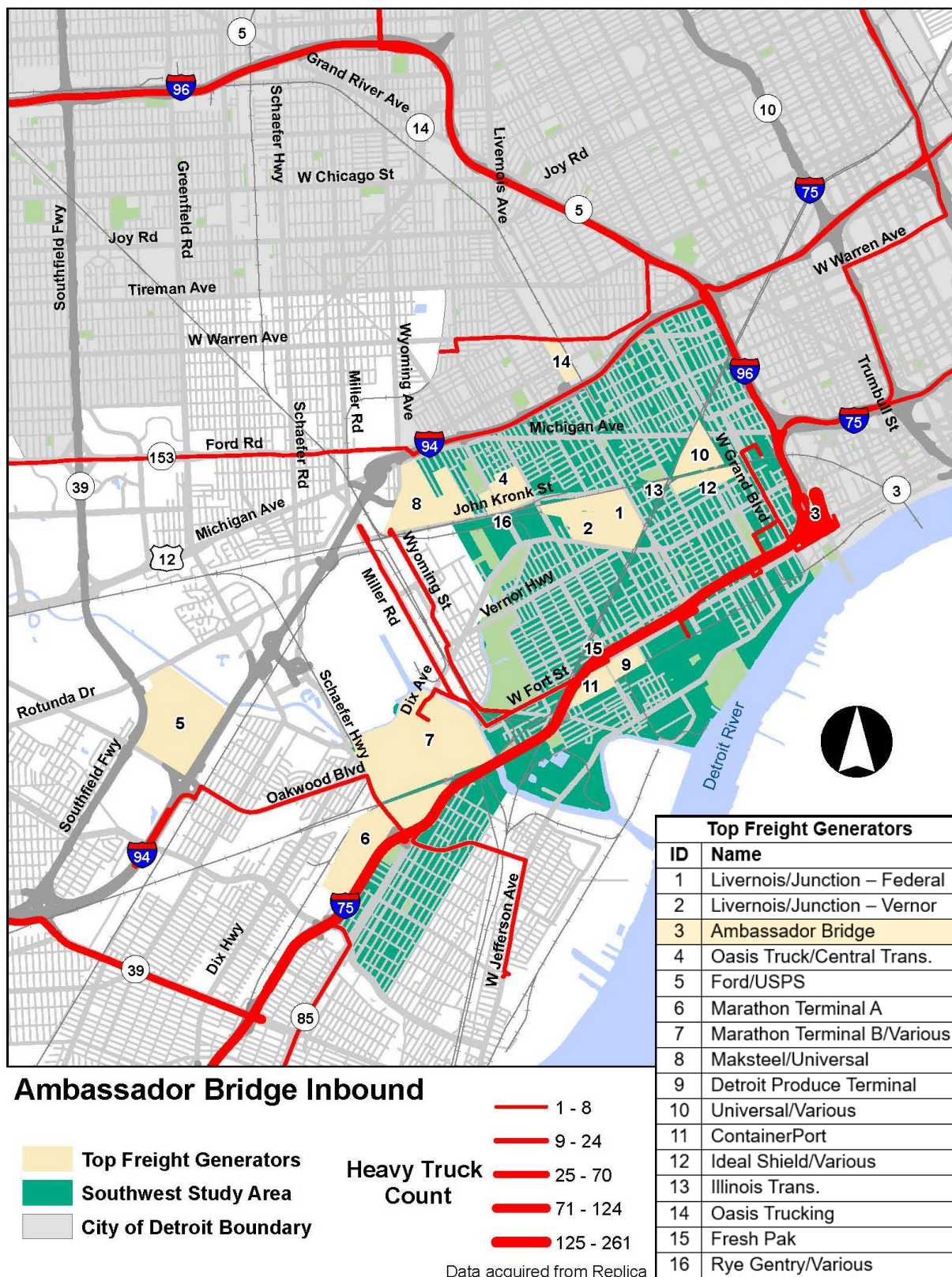


Figure 27: Ambassador Bridge Outbound Truck Count Map

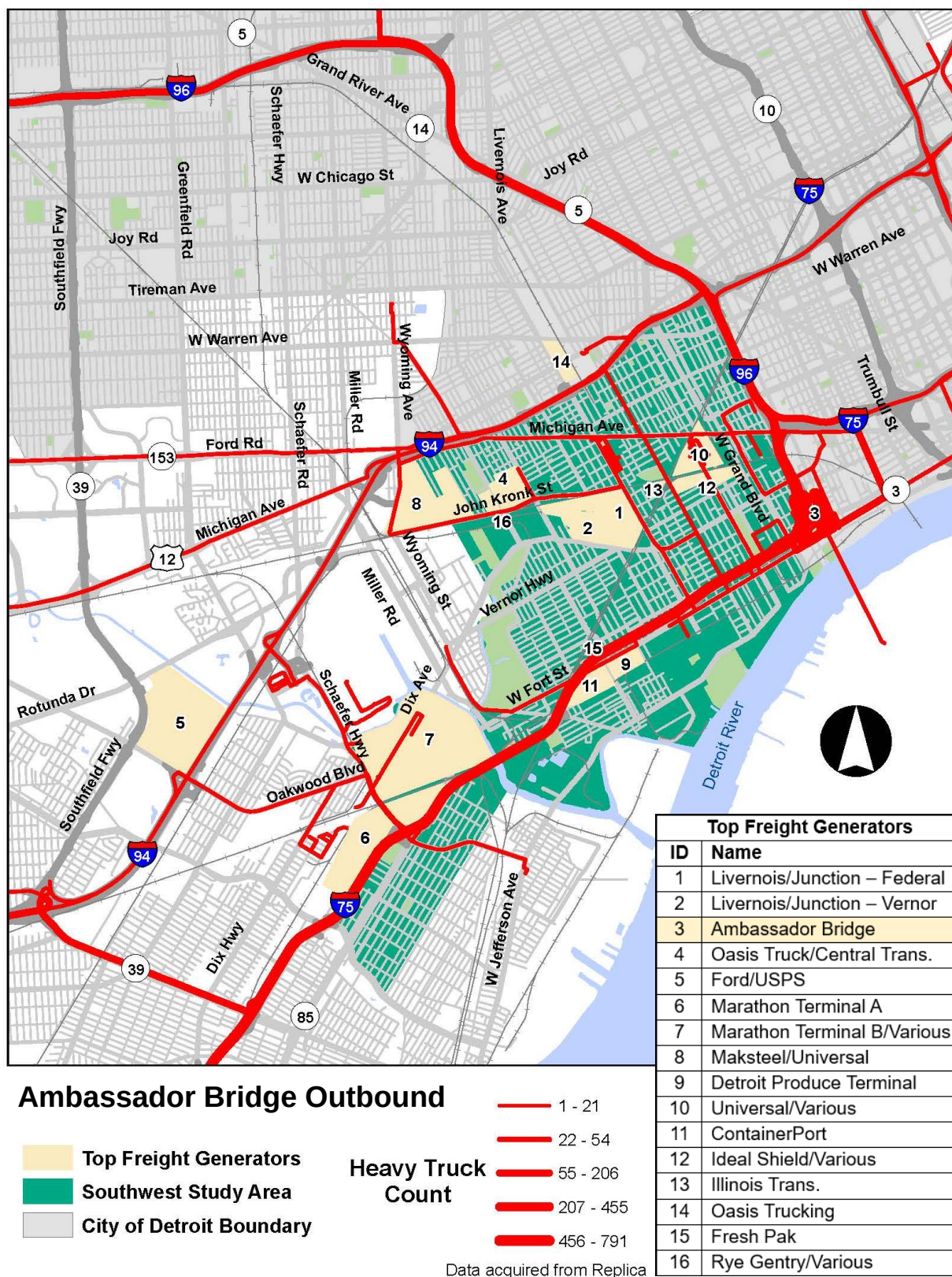


Figure 28: Oasis Truck/Central Trans. Inbound Truck Count Map

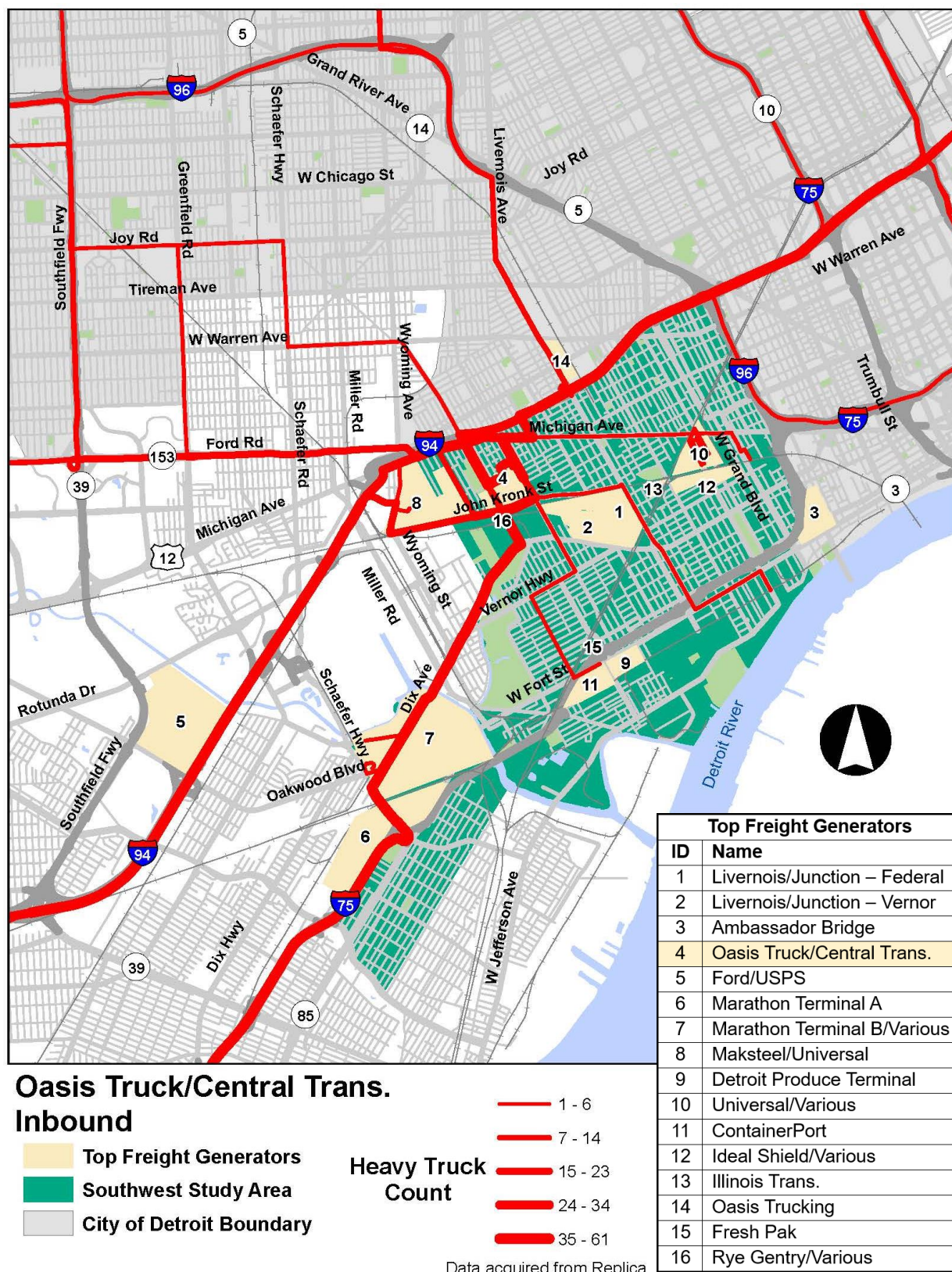


Figure 29: Oasis Truck/Central Trans. Outbound Truck Count Map

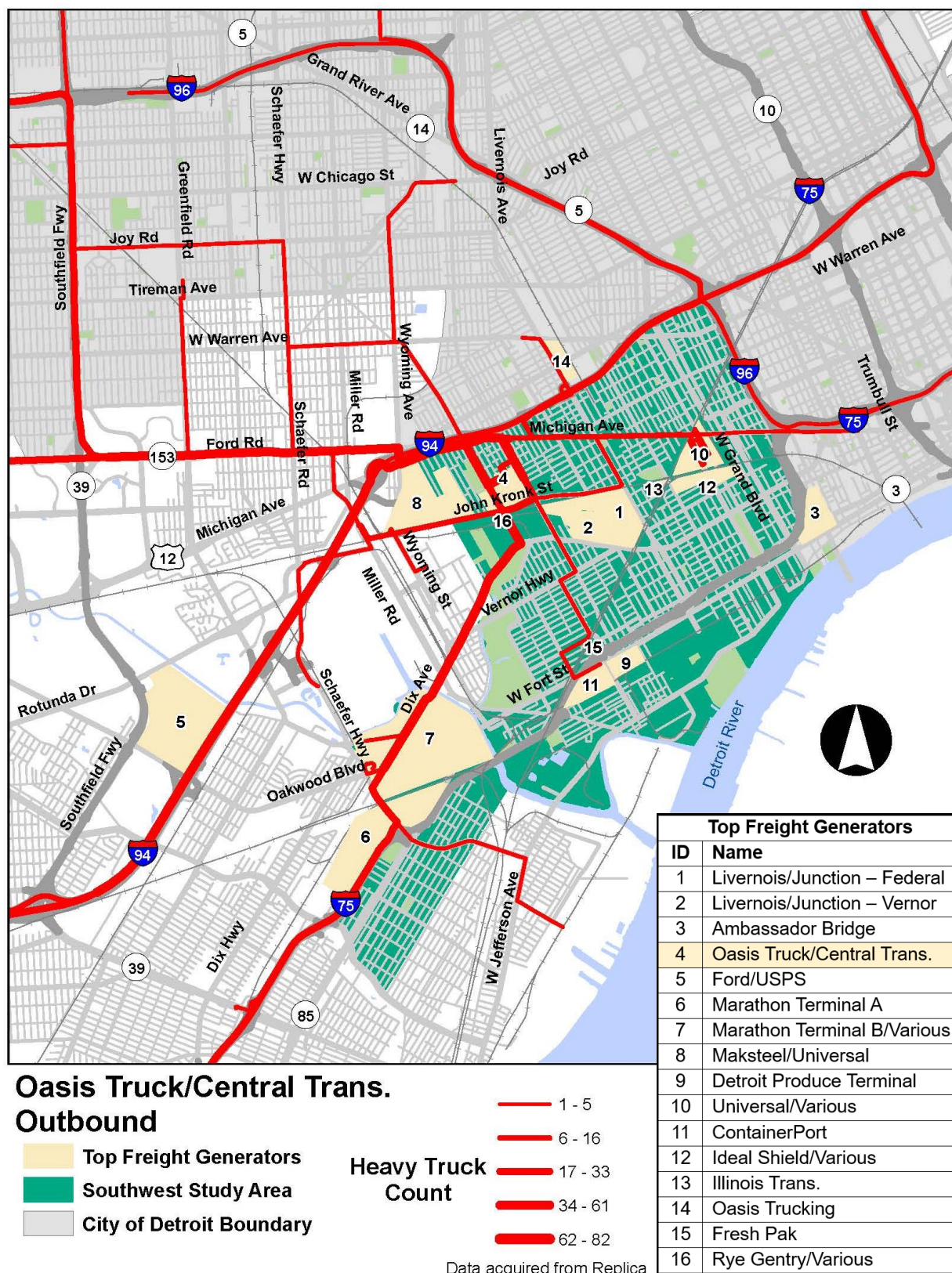


Figure 30: Ford/USPS Inbound Truck Count Map

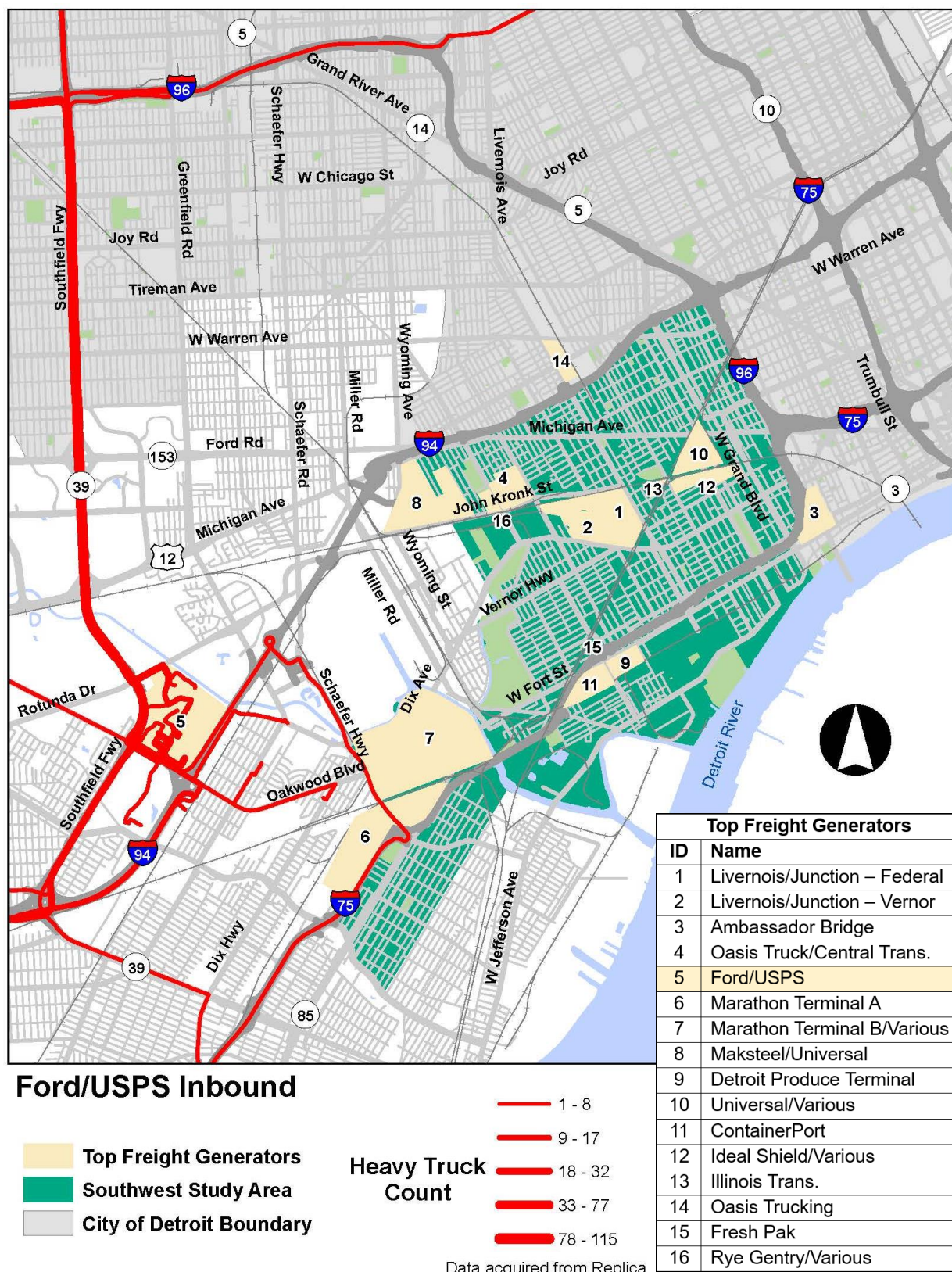


Figure 31: Ford/USPS Outbound Truck Count Map

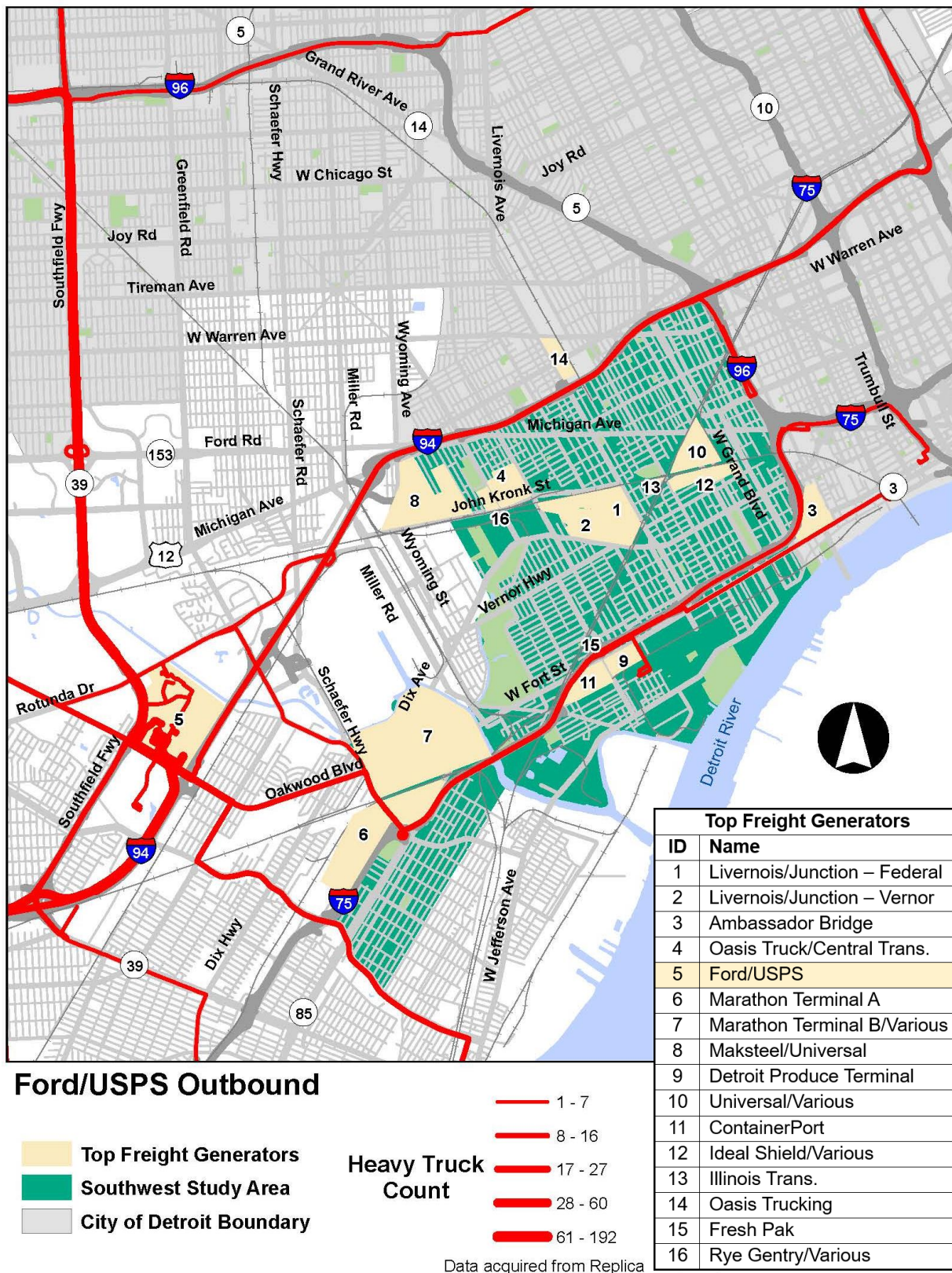


Figure 32: Marathon Terminal A Inbound Truck Count Map

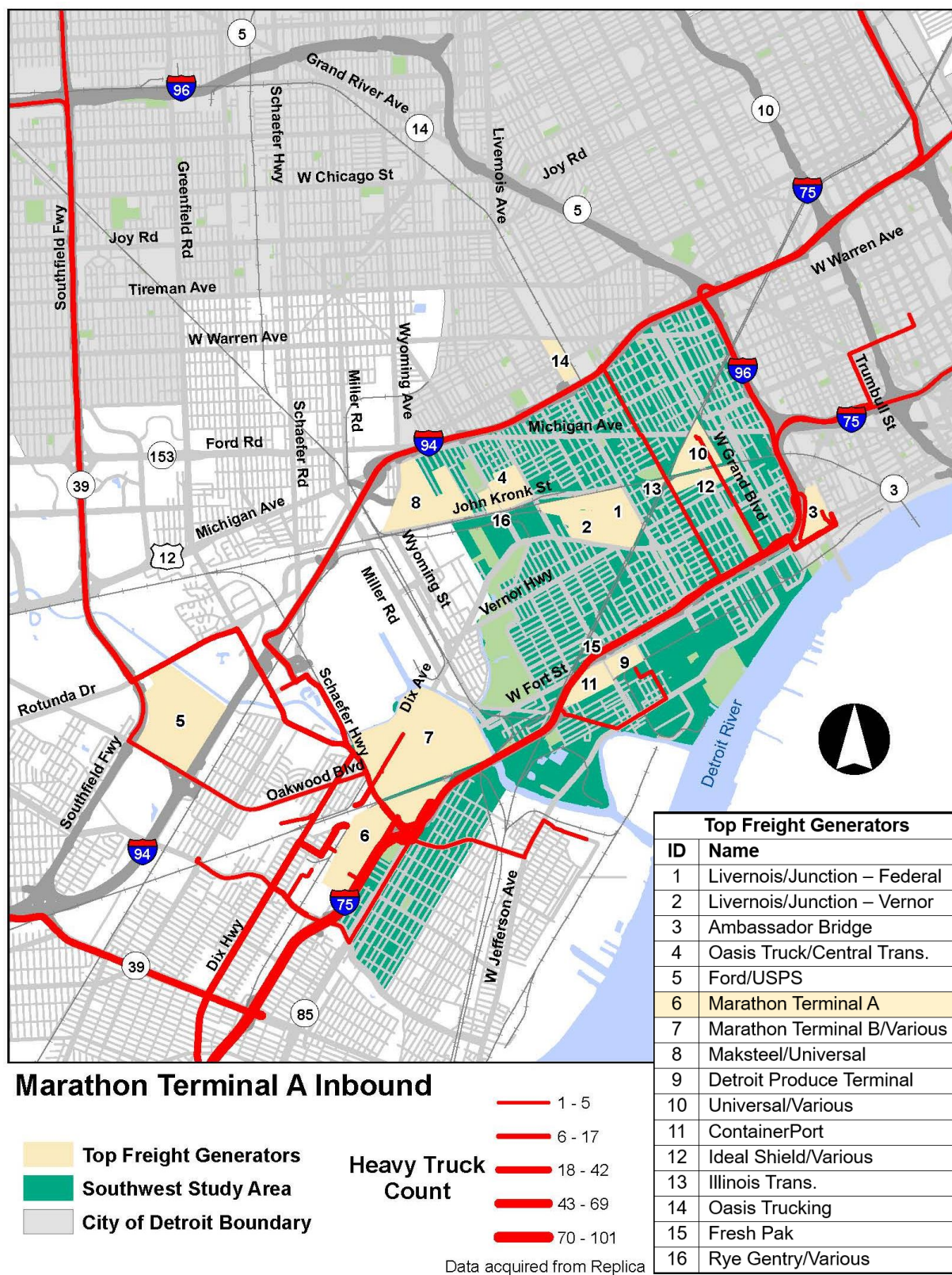


Figure 33: Marathon Terminal A Outbound Truck Count Map

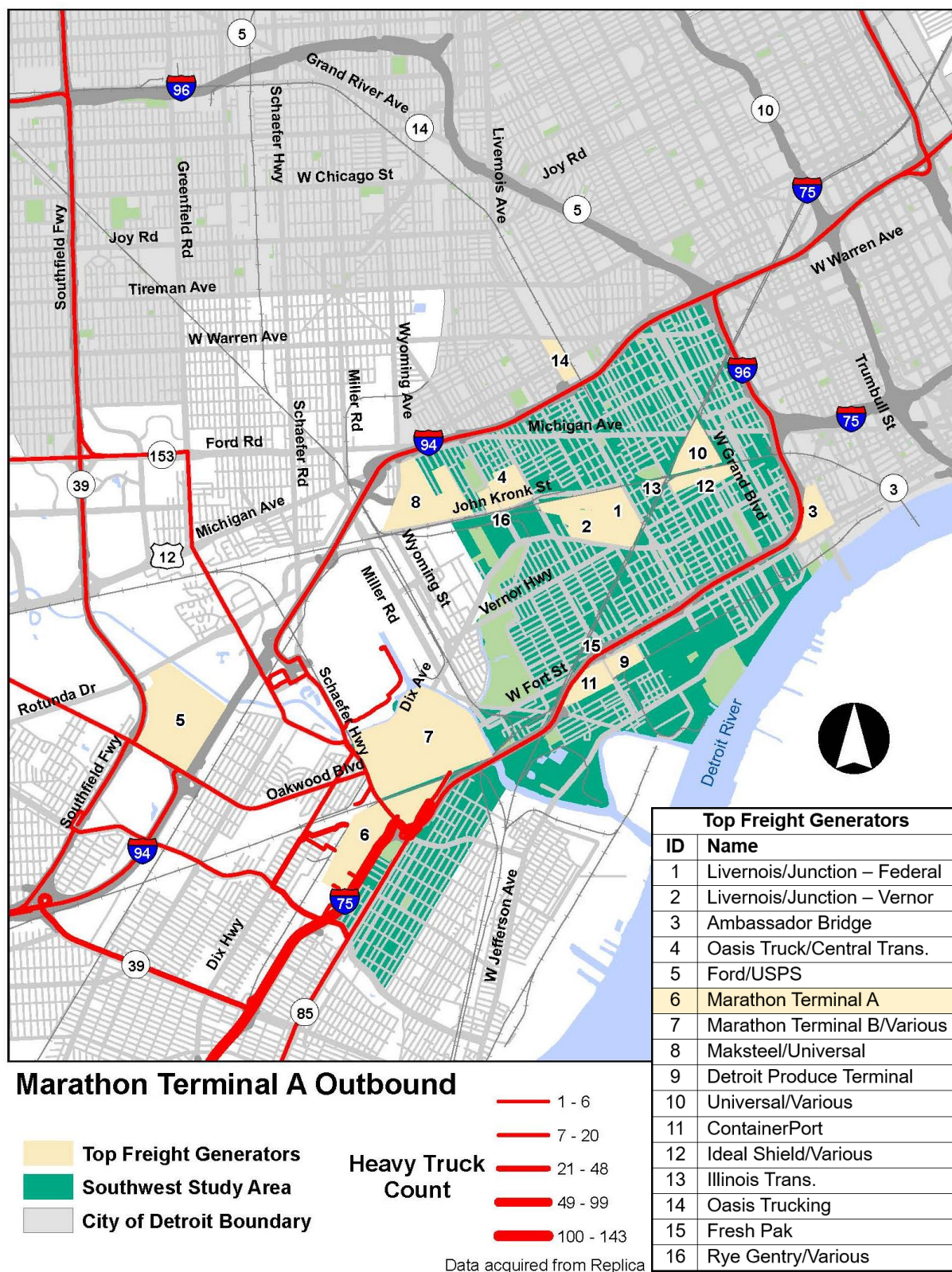


Figure 34: Marathon Terminal B Various Inbound Truck Count Map

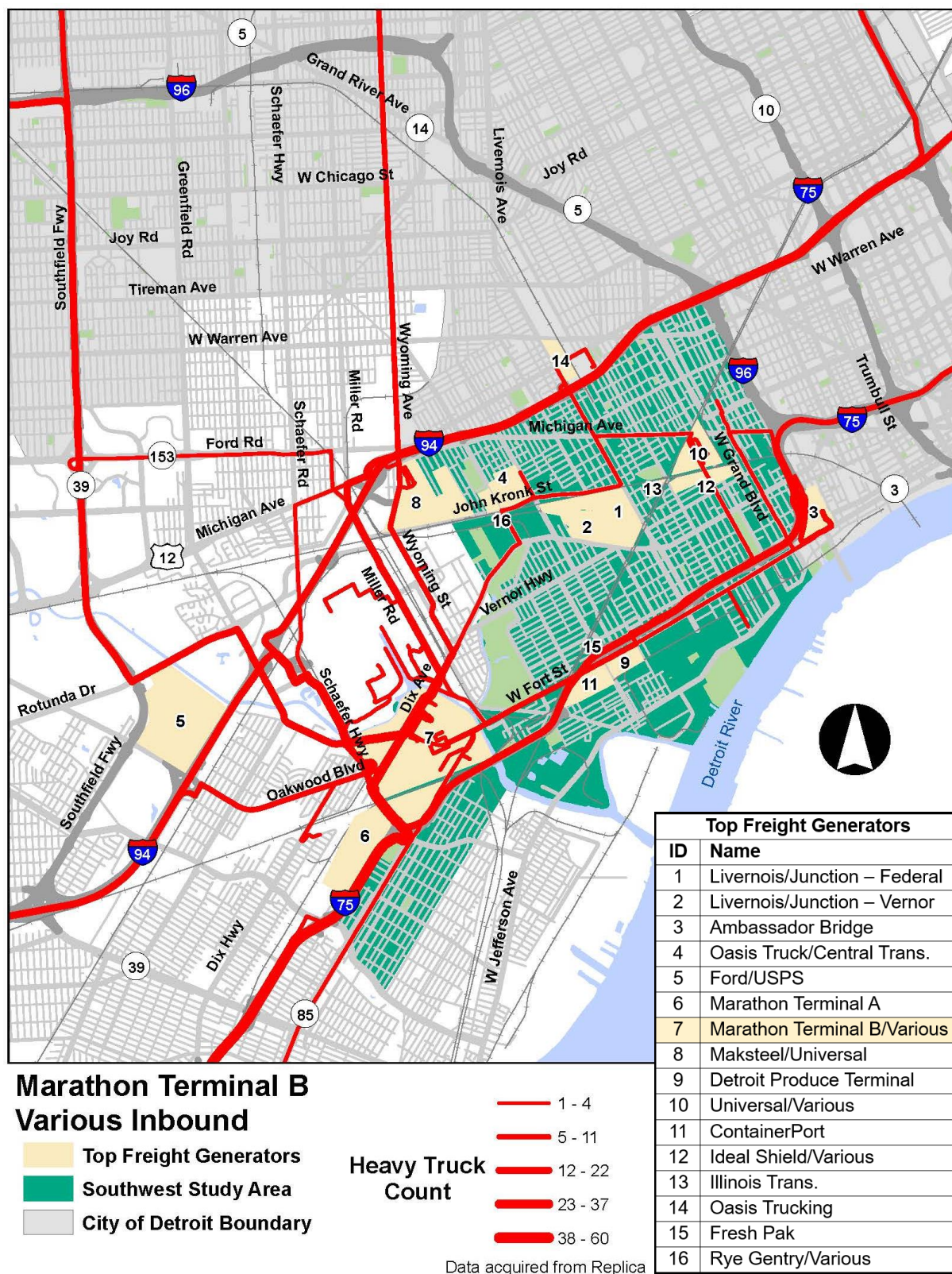


Figure 35: Marathon Terminal B Various Outbound Truck Count Map

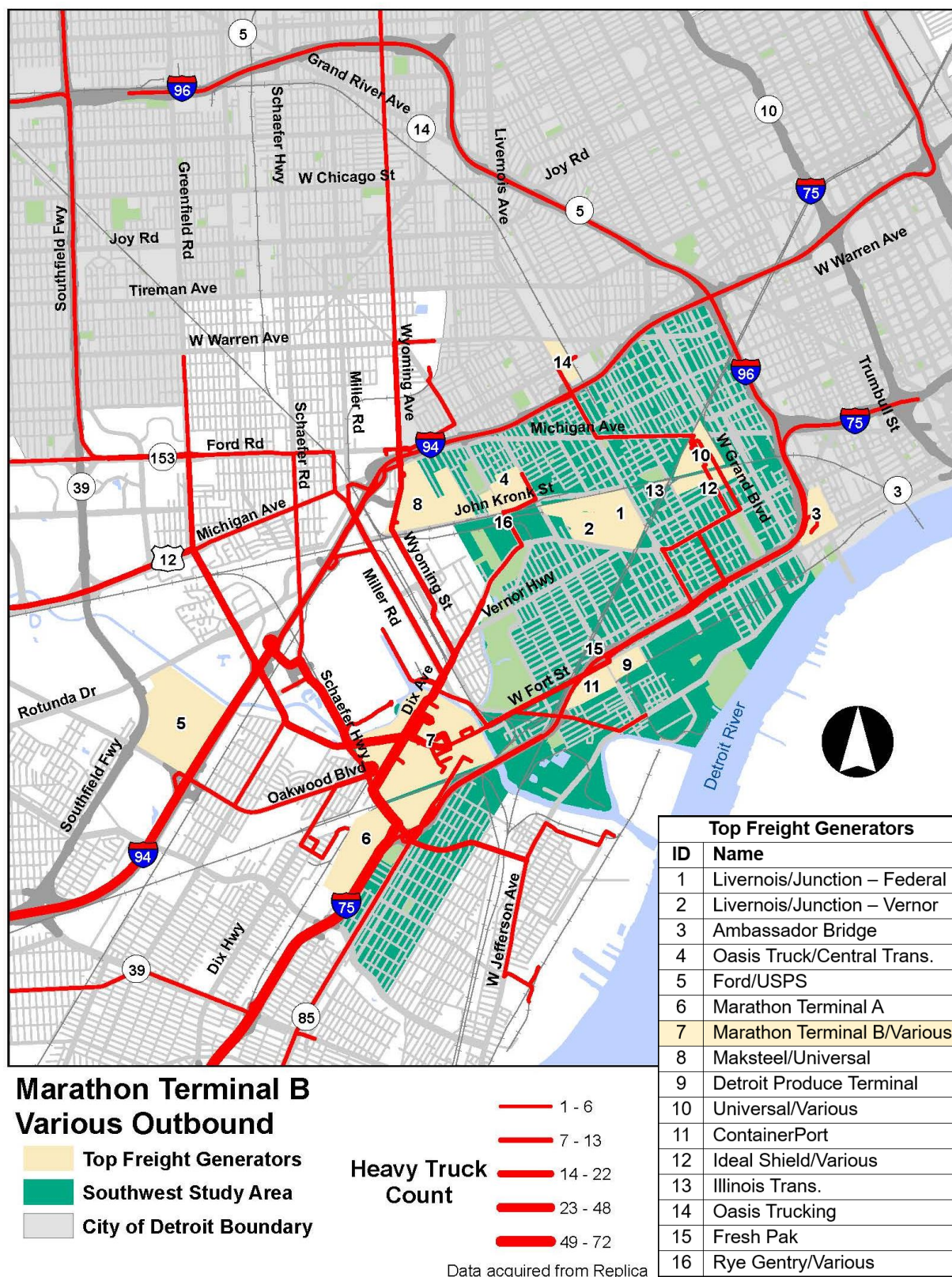


Figure 36: Maksteel/Universal Inbound Truck Count Map

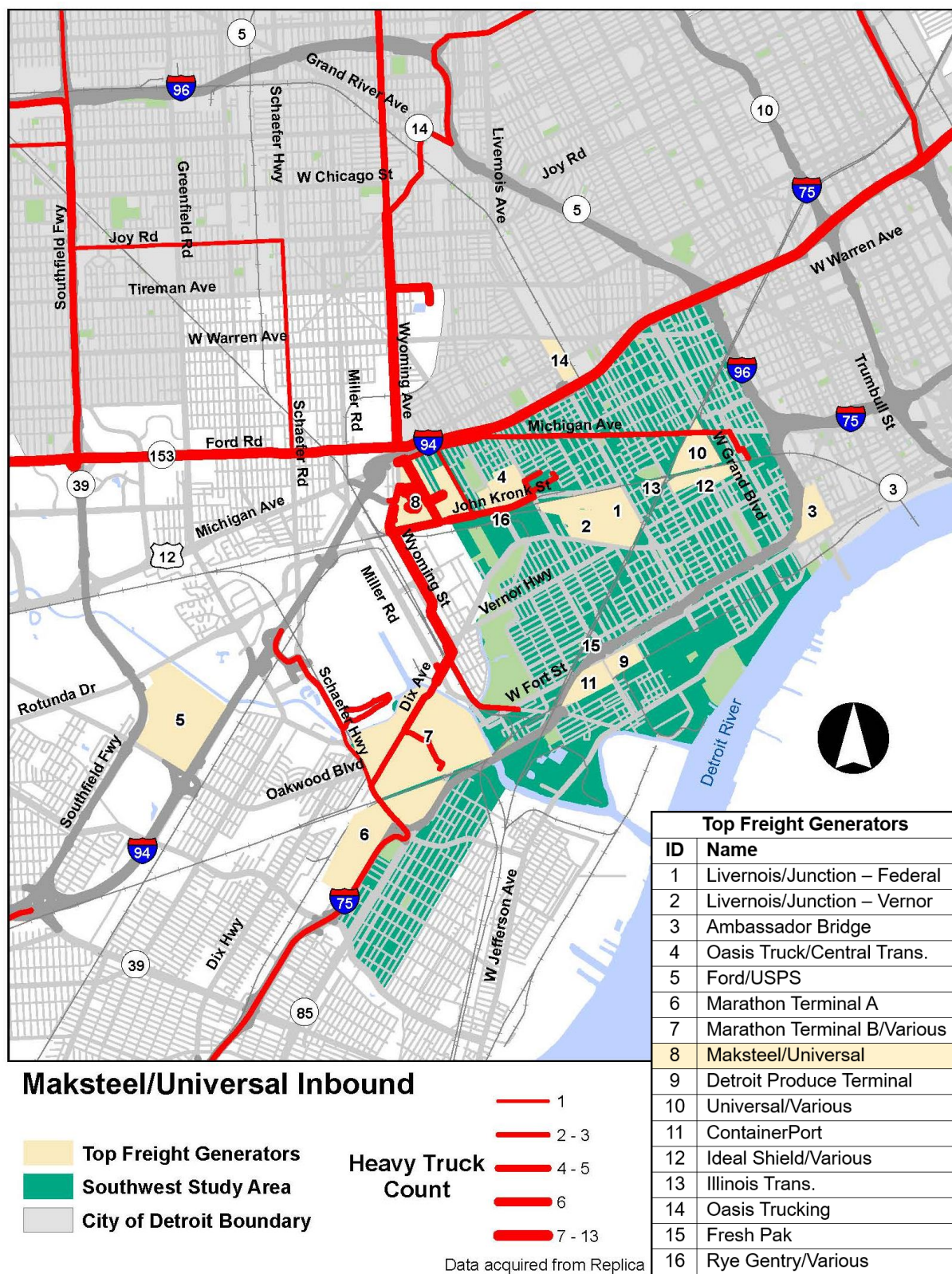


Figure 37: Maksteel/Universal Outbound Truck Count Map

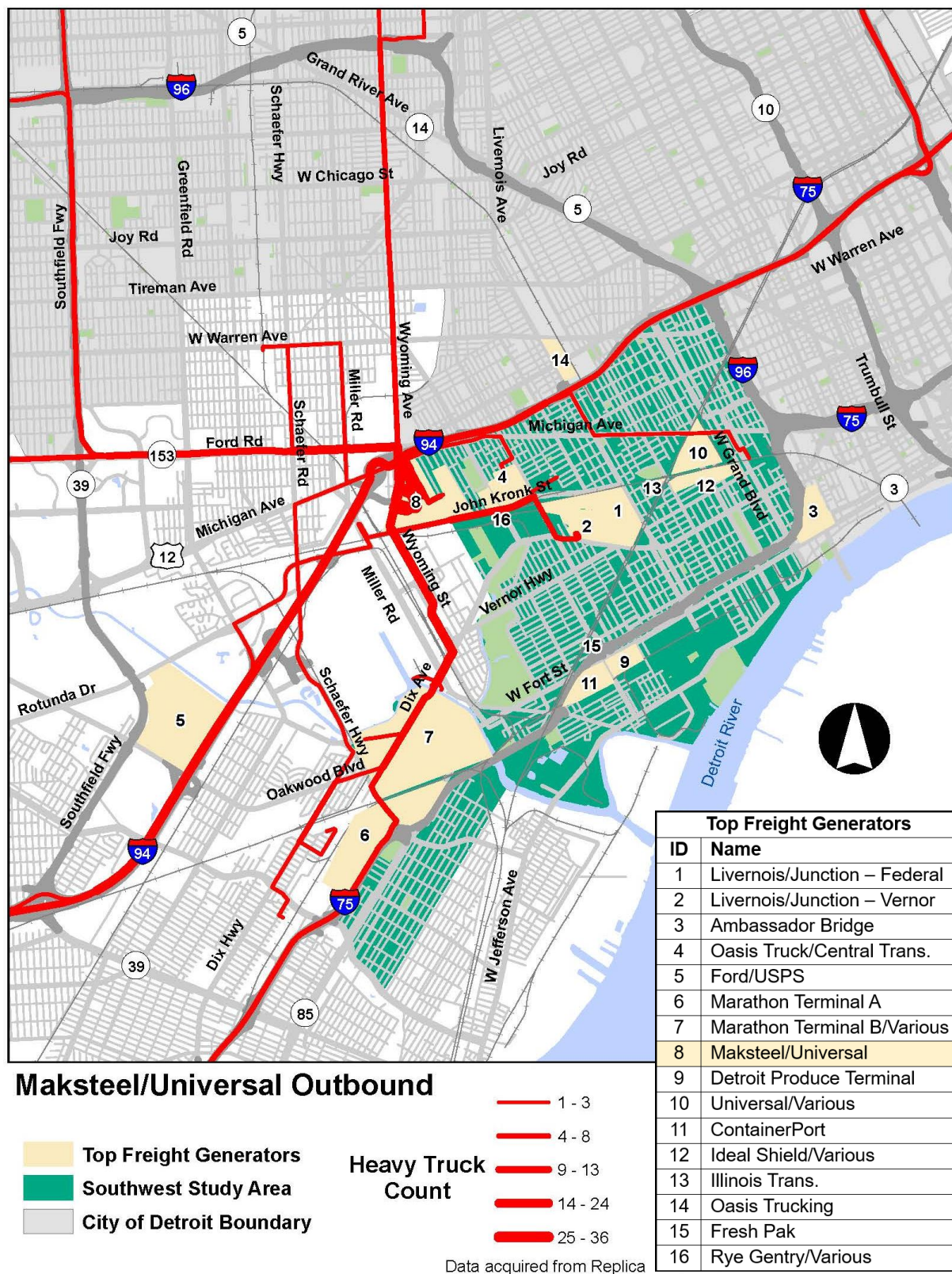


Figure 38: Detroit Produce Terminal Inbound Truck Count Map

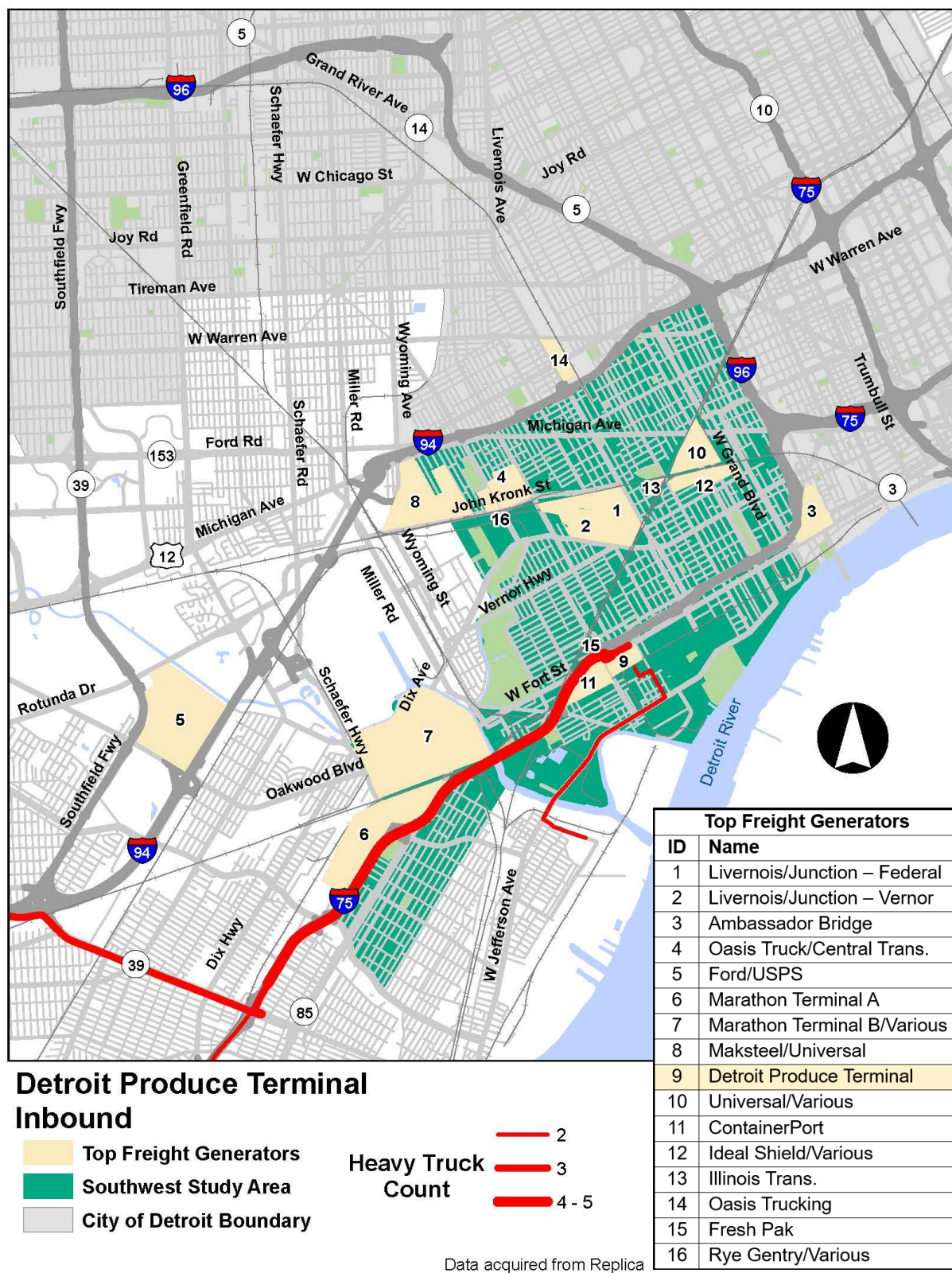


Figure 39: Detroit Produce Terminal Outbound Truck Count Map

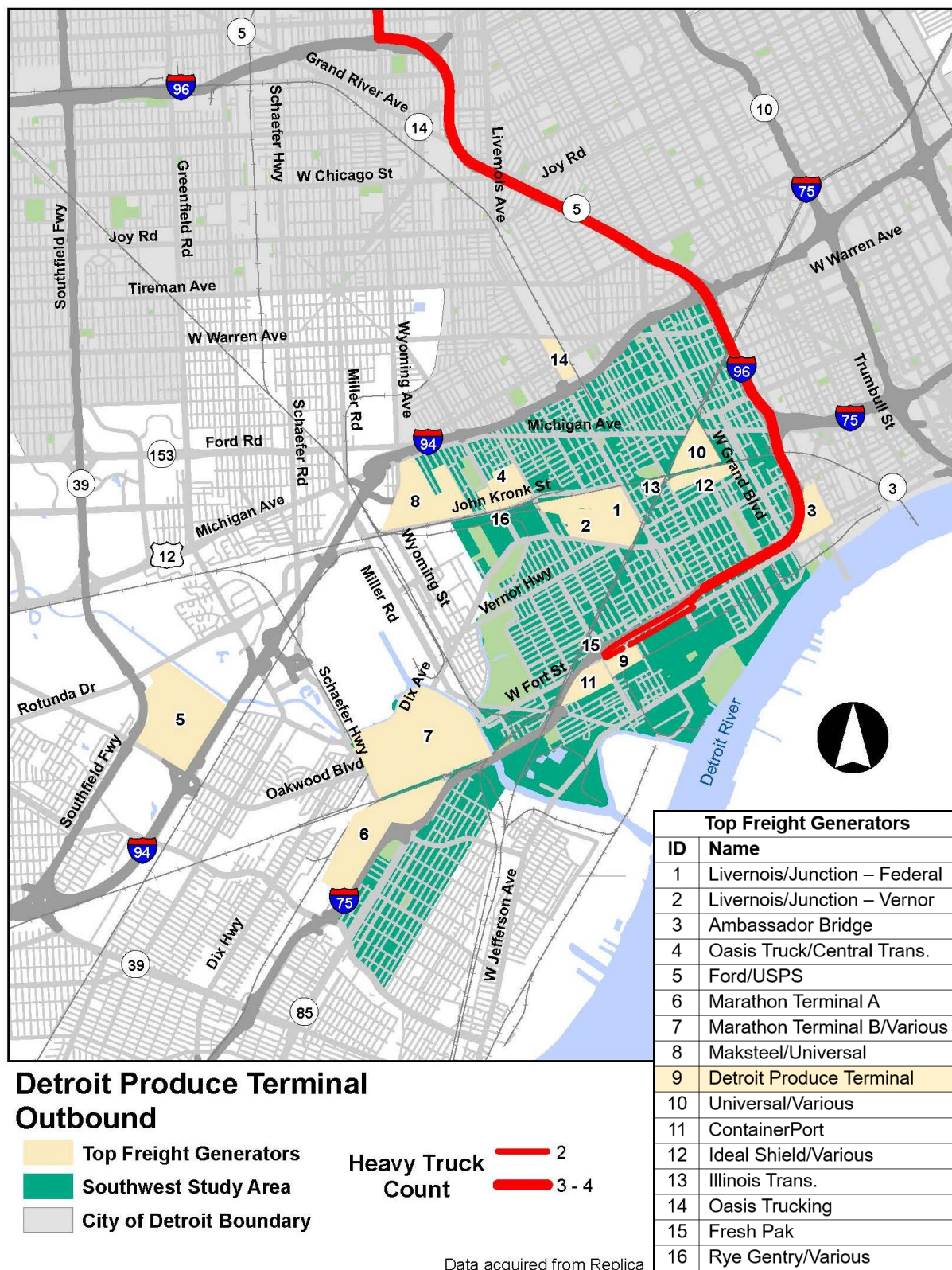


Figure 40: Universal/Various Inbound Truck Count Map



Figure 41: Universal/Various Outbound Truck Count Map

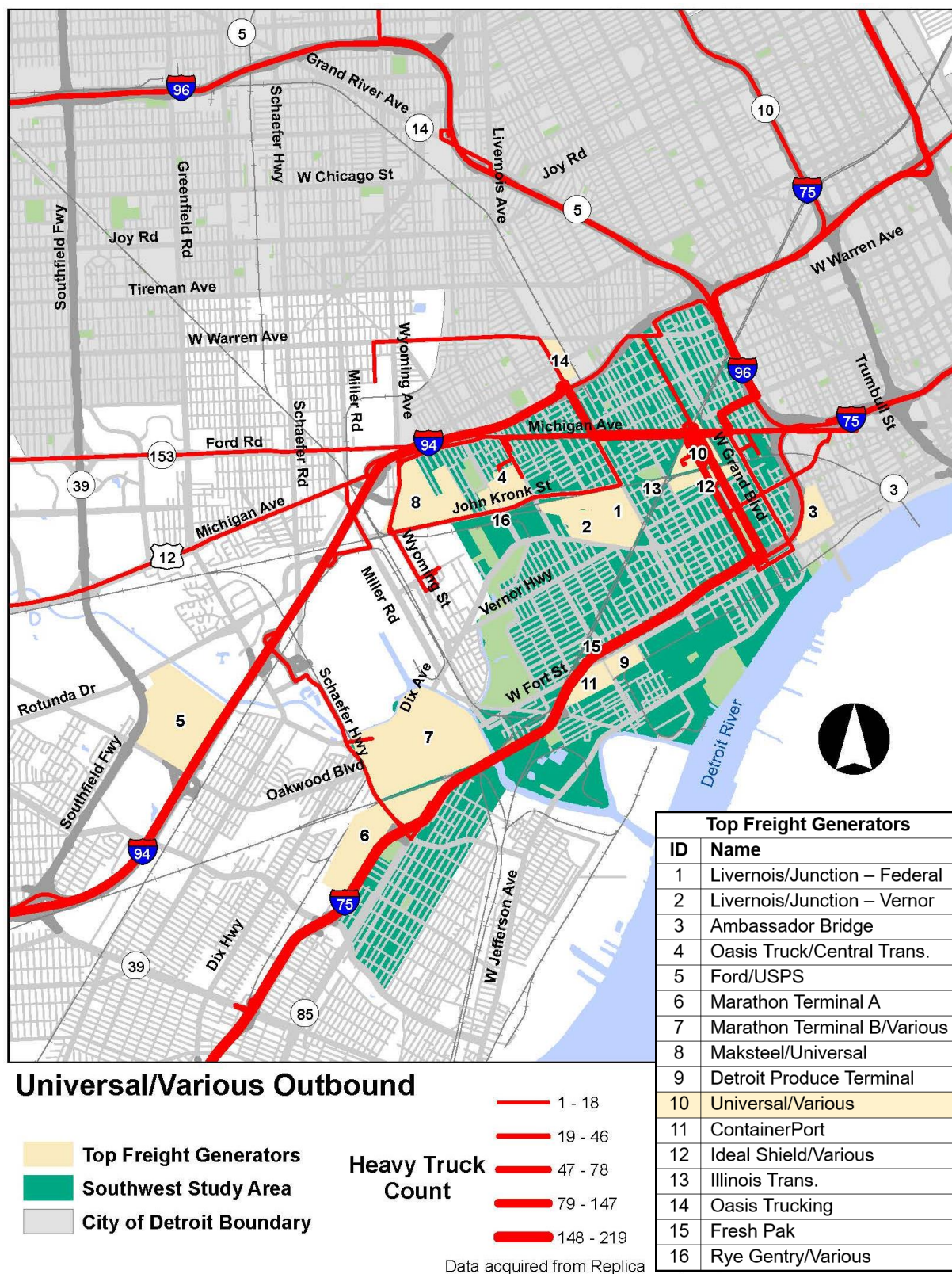


Figure 42: ContainerPort Inbound Truck Count Map*

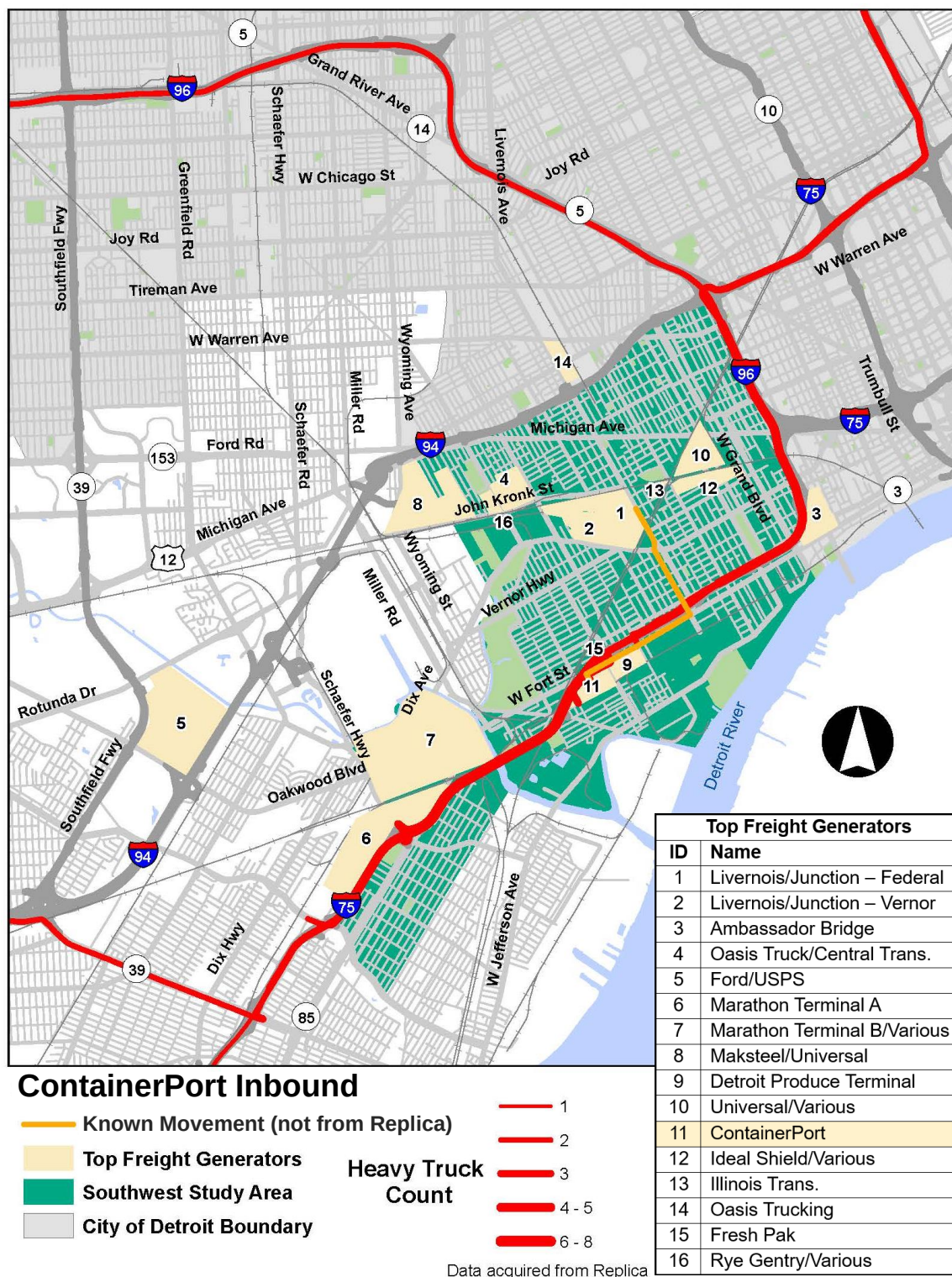


Figure 43: ContainerPort Outbound Truck Count Map

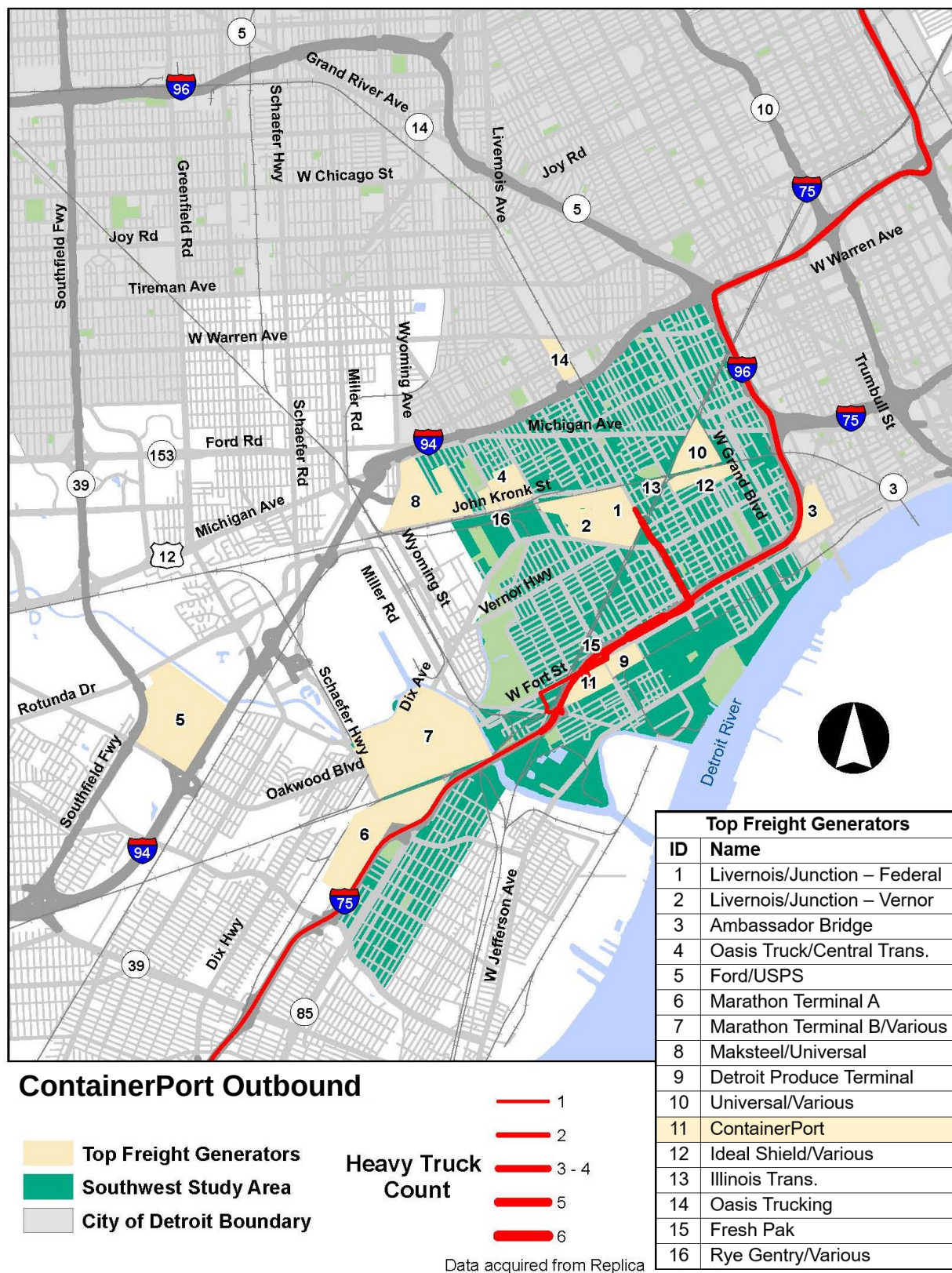


Figure 44: Ideal Shield/Various Inbound Truck Count Map

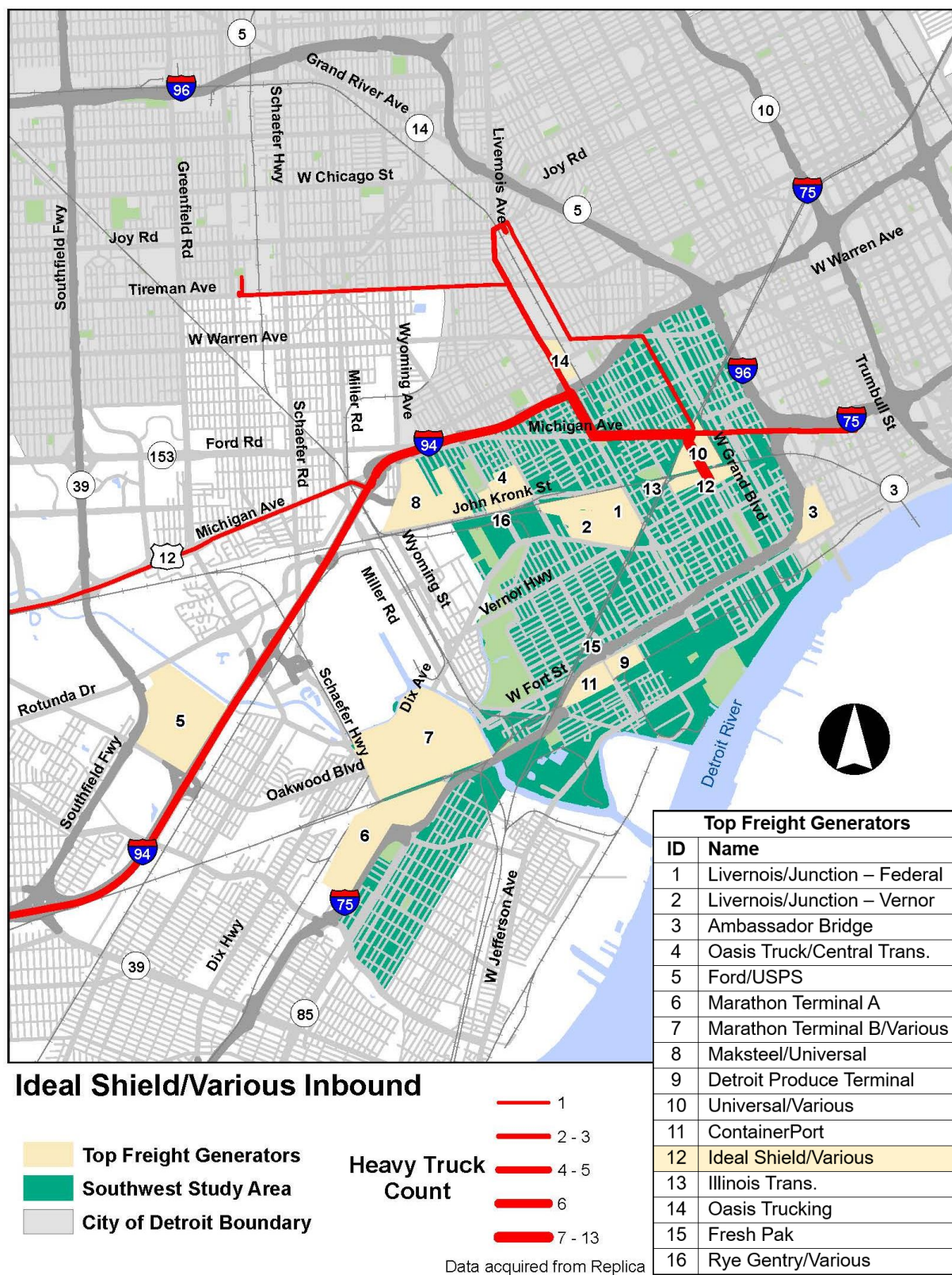


Figure 45: Ideal Shield/Various Outbound Truck Count Map

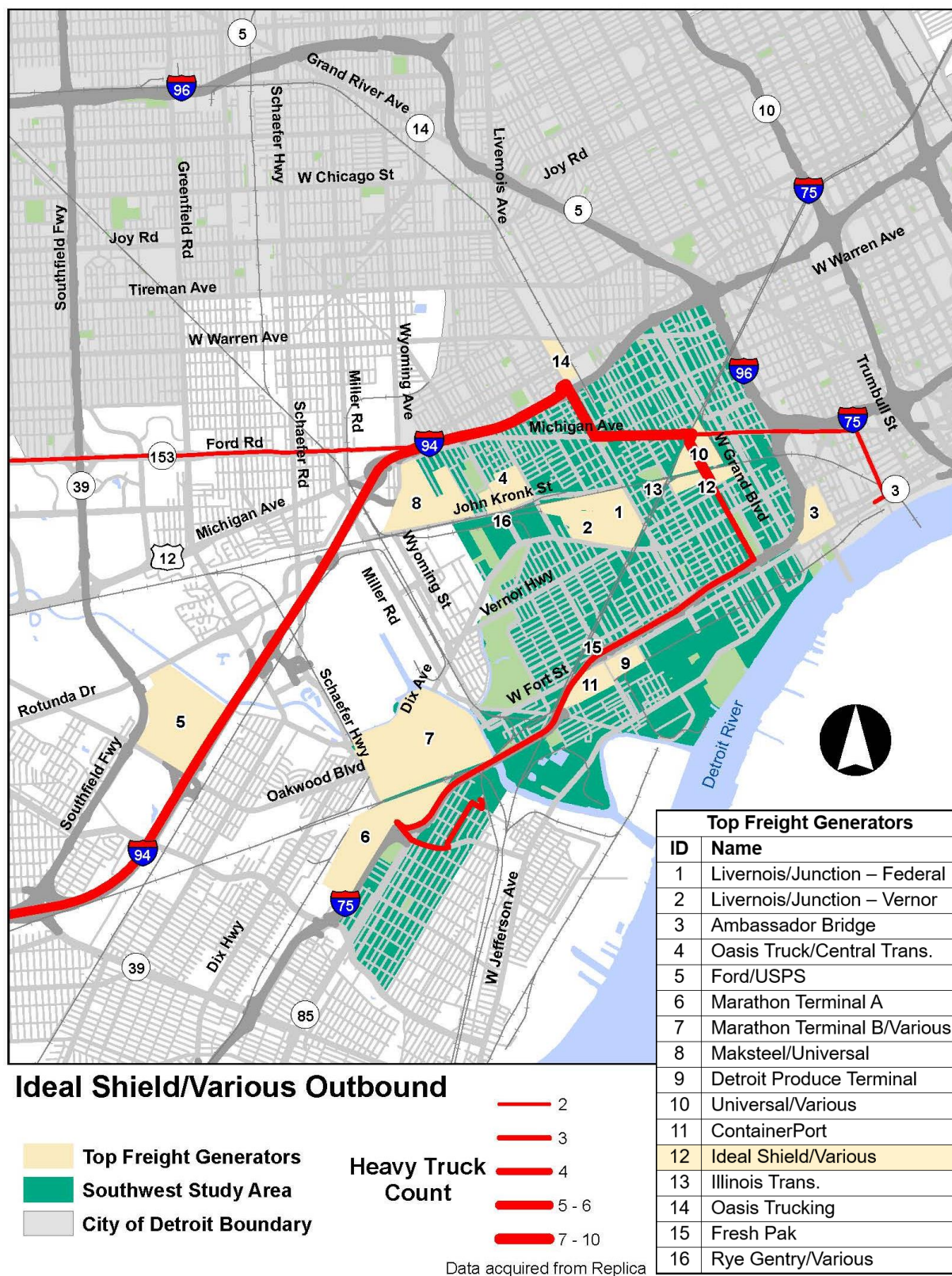


Figure 46: US Truck Driver/Various Inbound Truck Count Map

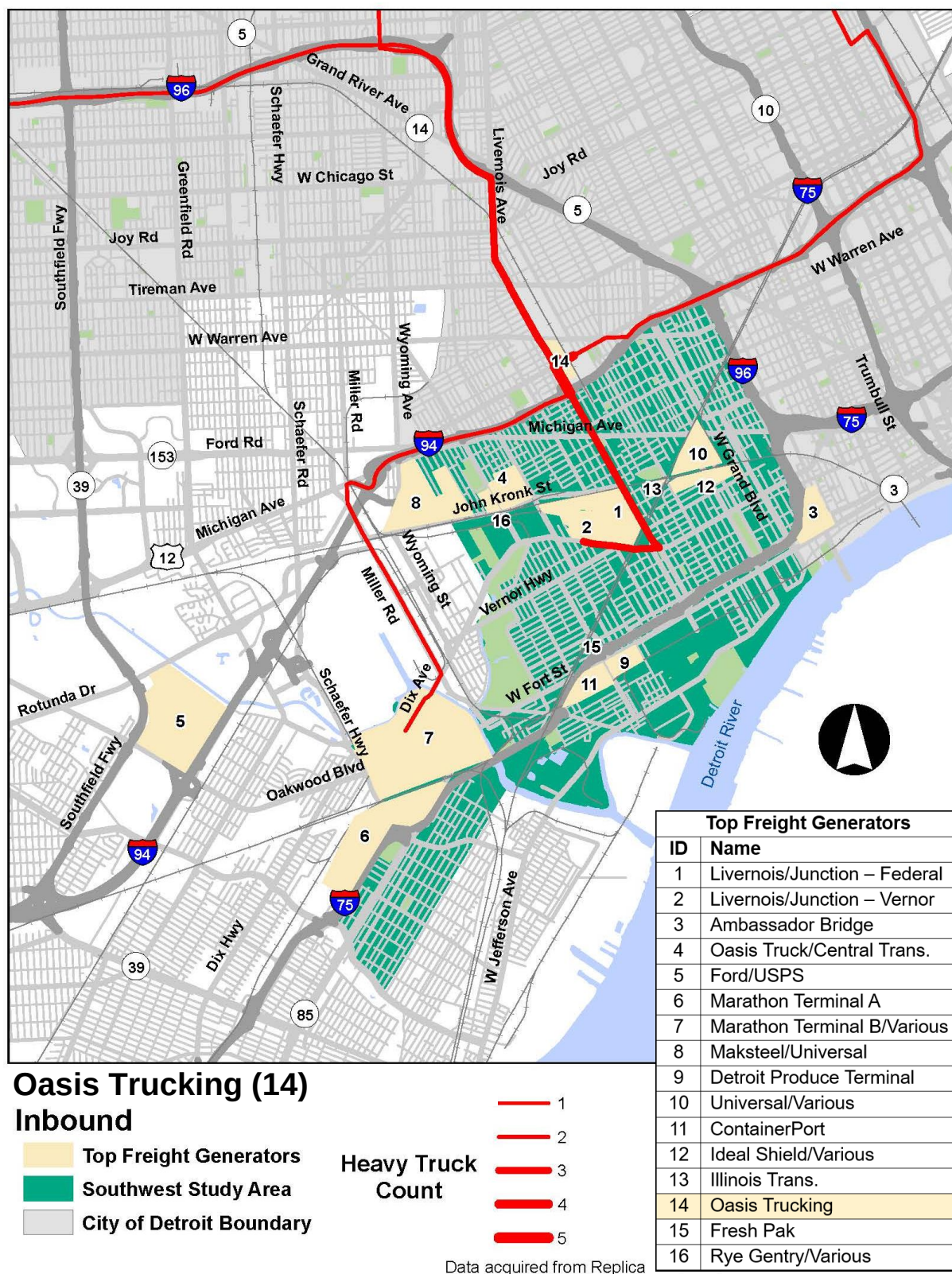


Figure 47: US Truck Driver/Various Outbound Truck Count Map

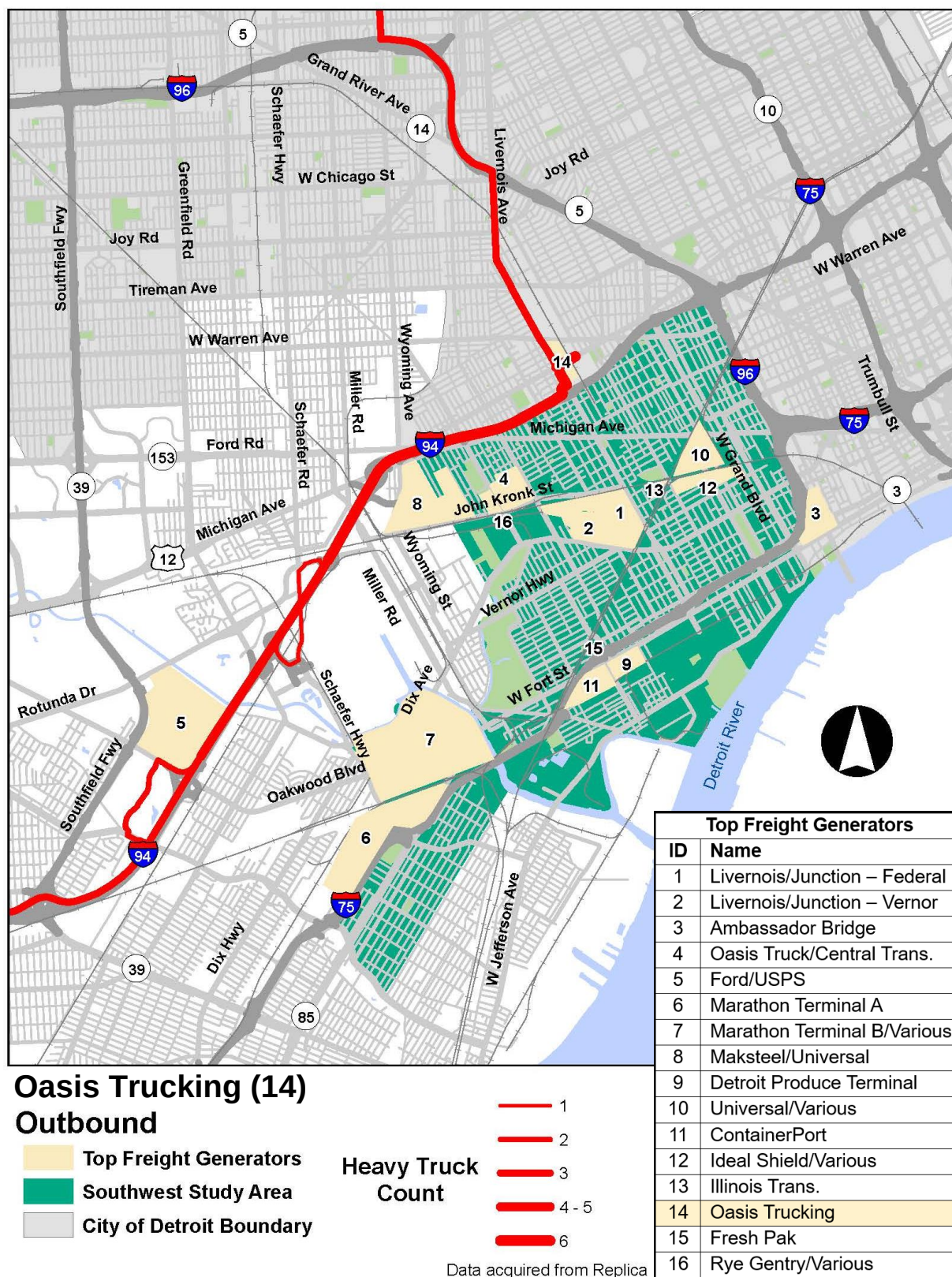
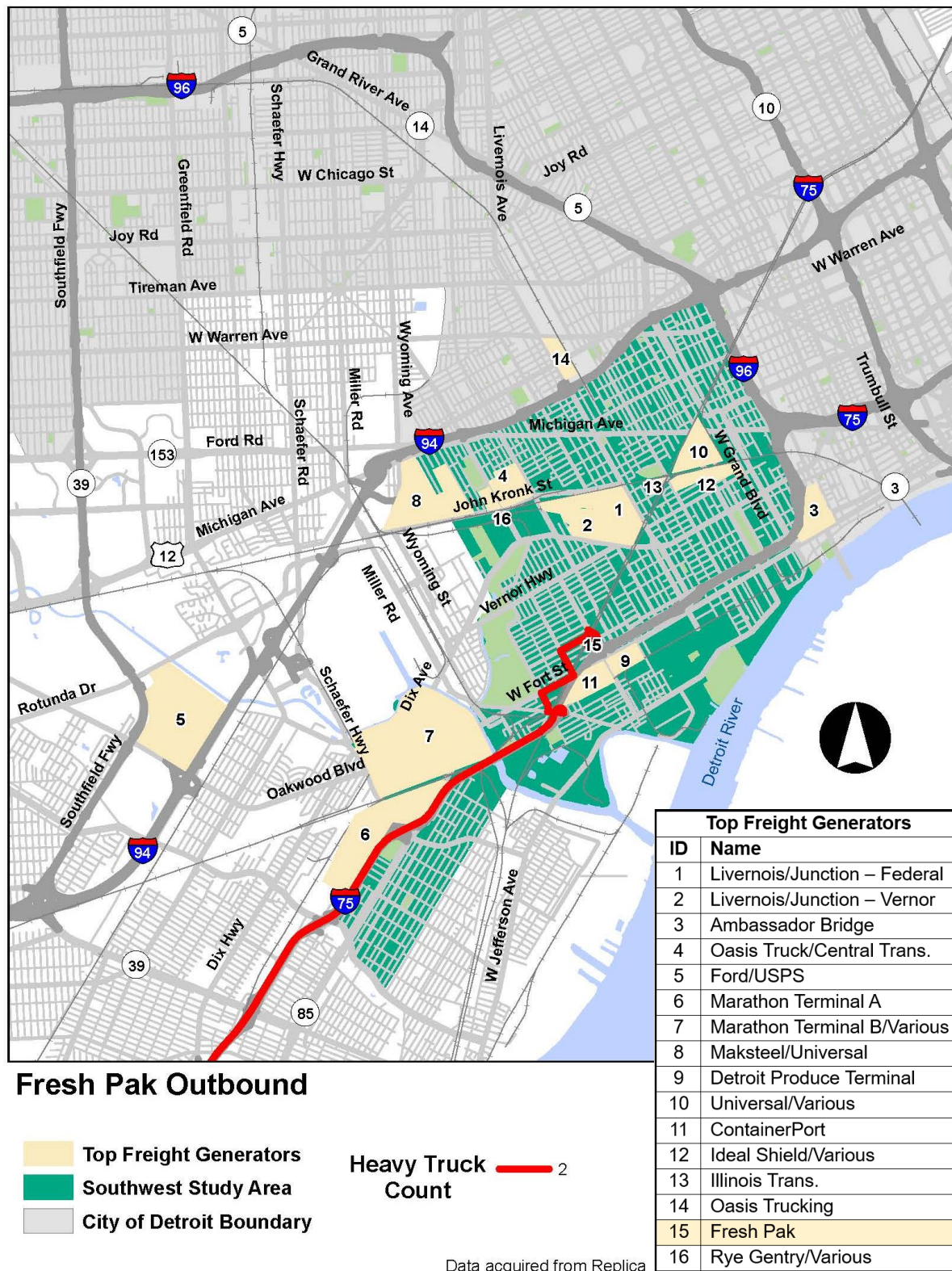
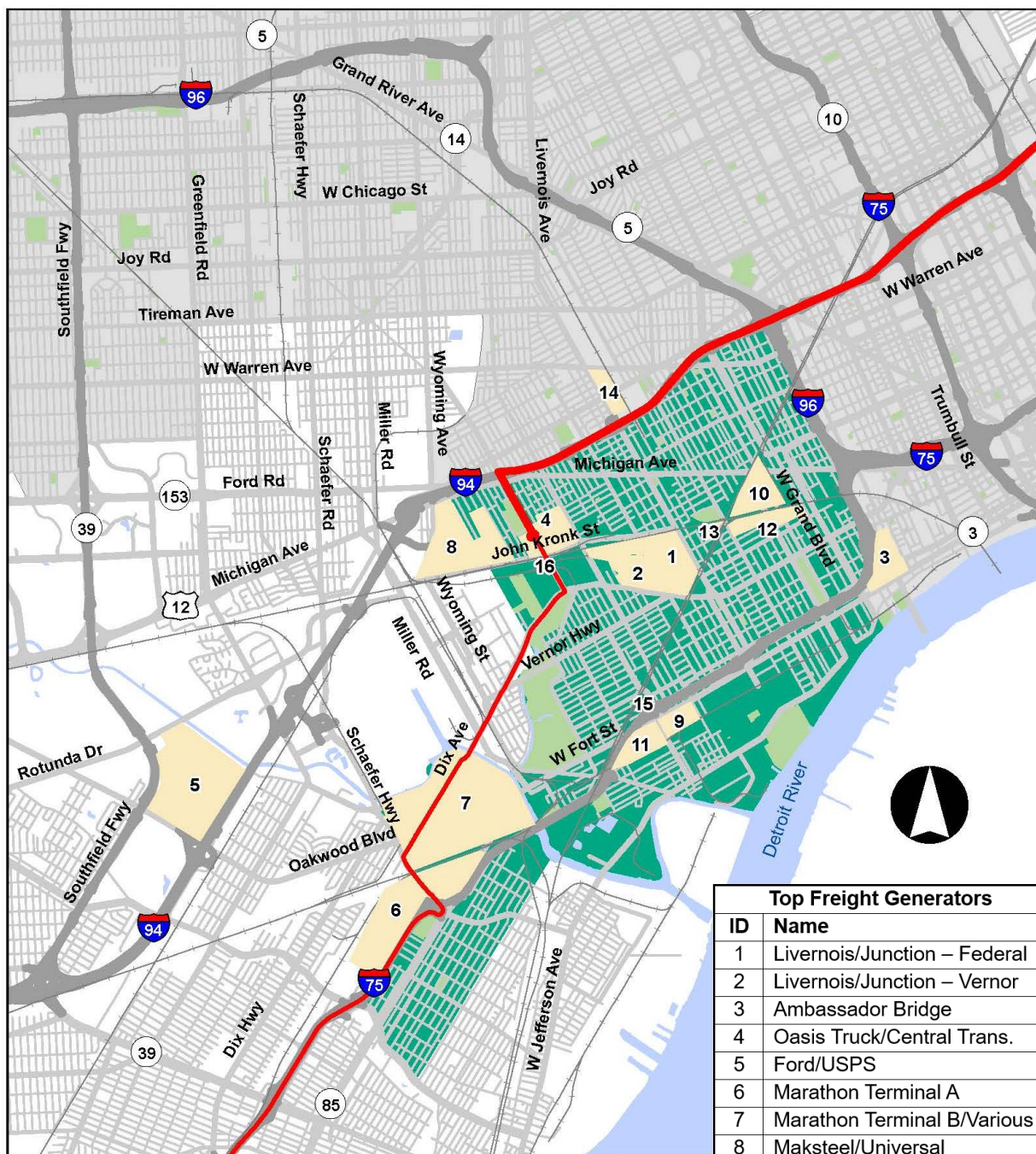


Figure 48: Fresh Pak Outbound Truck Count Map*



* Replica did not have inbound data for Fresh Pak

Figure 49: Rye Gentry/Variou Inbound Truck Count Map



Rye Gentry/Variou Inbound

- Top Freight Generators
- Southwest Study Area
- City of Detroit Boundary

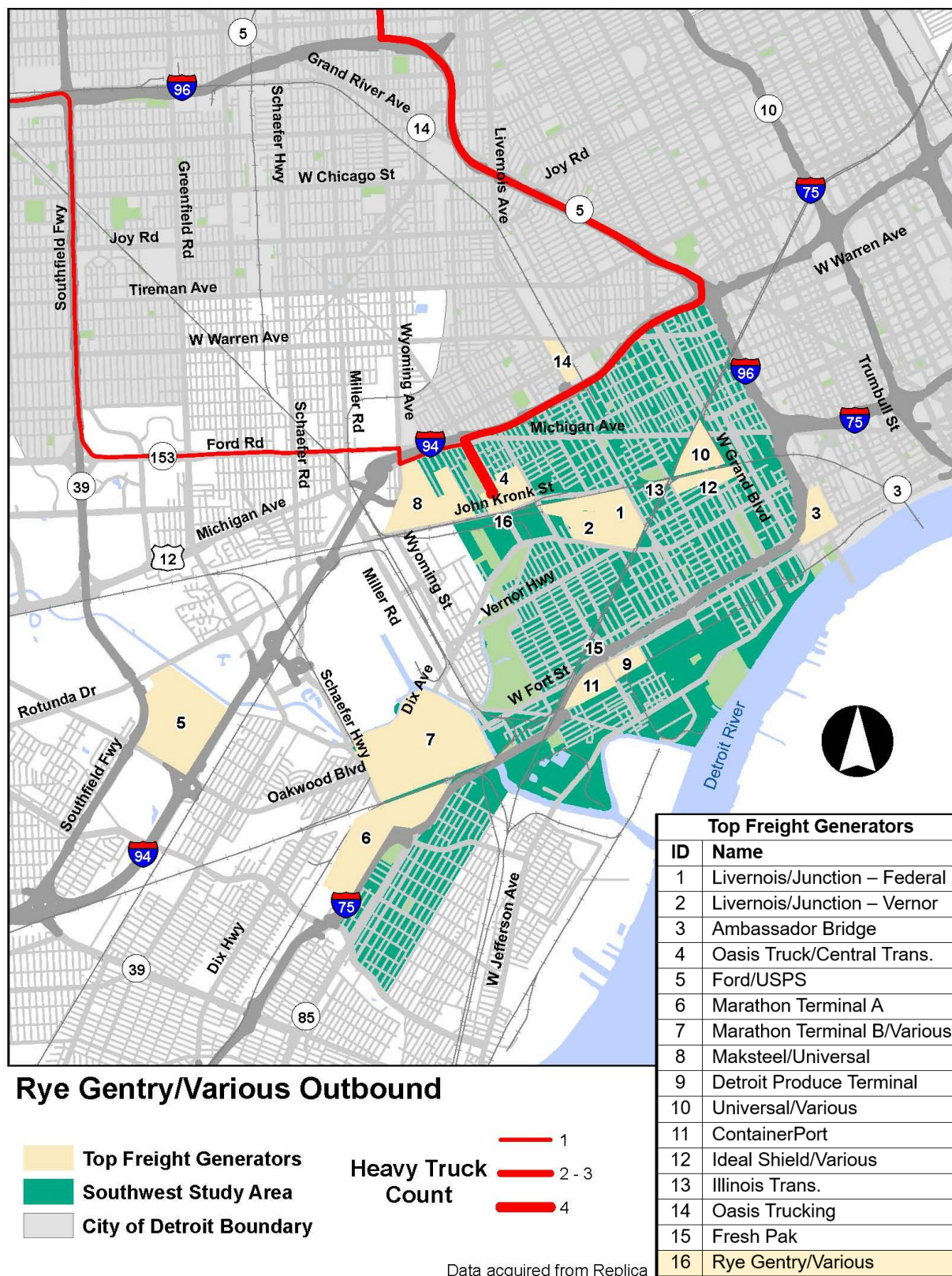
Heavy Truck Count

- 1
- 2 - 5
- 6

Data acquired from Replica

Top Freight Generators	
ID	Name
1	Livernois/Junction – Federal
2	Livernois/Junction – Vernor
3	Ambassador Bridge
4	Oasis Truck/Central Trans.
5	Ford/USPS
6	Marathon Terminal A
7	Marathon Terminal B/Variou
8	Maksteel/Universal
9	Detroit Produce Terminal
10	Universal/Variou
11	ContainerPort
12	Ideal Shield/Variou
13	Illinois Trans.
14	Oasis Trucking
15	Fresh Pak
16	Rye Gentry/Variou

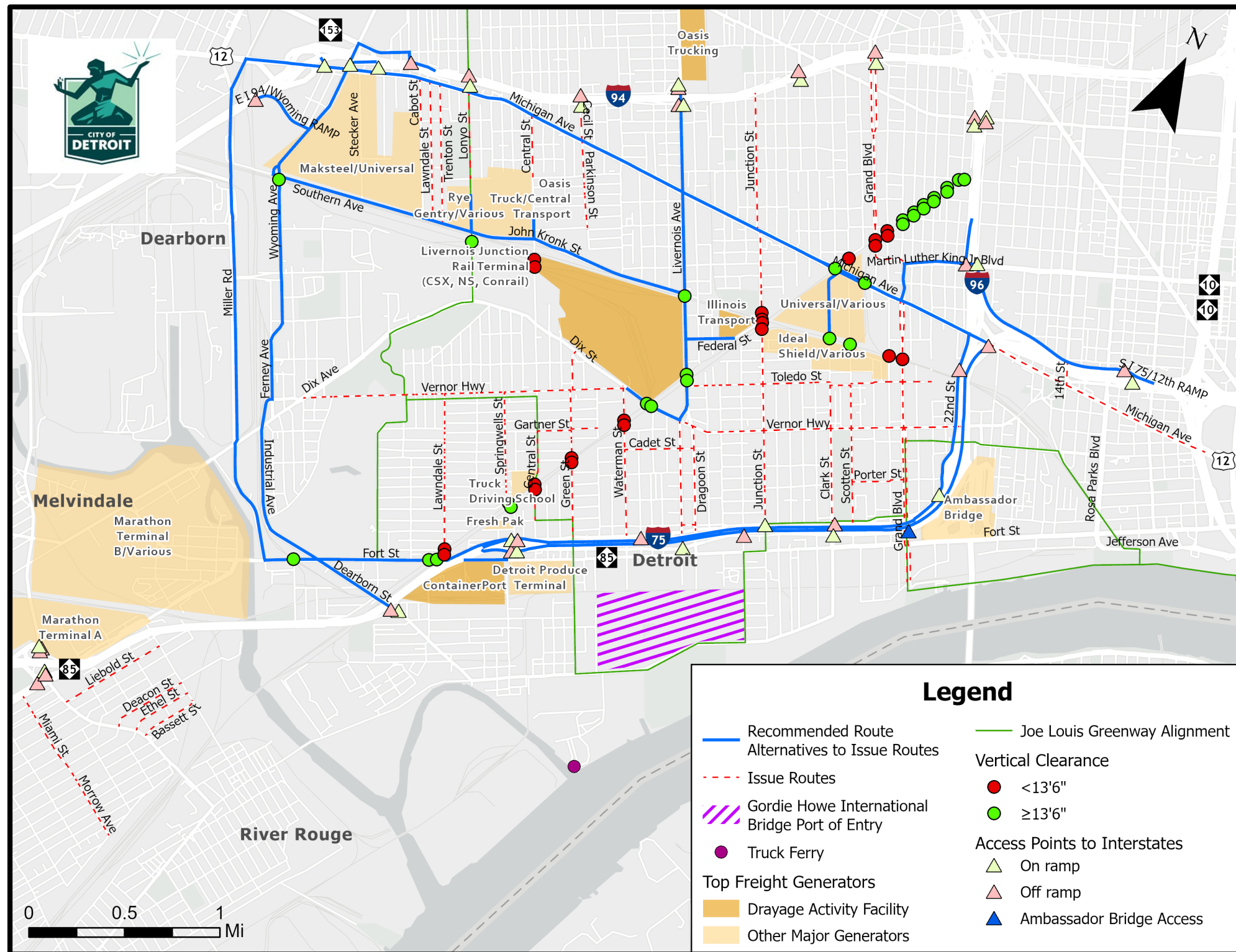
Figure 50: Rye Gentry/Variou Outbound Truck Count Map



Appendix B: Routing for Individual Generators

See slides on following pages for individual routing for generators.

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

This map illustrates the freight network around the Livorno/Junction (Vernor) area. The central feature is the Livorno/Junction Rail Terminal (CSX, NS, Conrail), marked with a red pin. Surrounding this terminal are several major freight generators, including Oasis Truck/Central Transport, Illinois Transport, Universal/Various, Ideal Shield/Various, and the Ambassador Bridge. The map shows a complex network of roads, including I-94, I-75, I-96, and various local streets like Michigan Ave, Grand Blvd, and Vernor Hwy. A legend in the bottom left corner defines the color-coded routes: purple for I-94 to I-75, green for I-75 to the Ambassador Bridge, and orange for the return route. Arrows indicate the direction of freight flow. The map also identifies top freight generators, with orange shading for drayage activity facilities and yellow for other major generators.

Legend:

- Livorno/Junction (Vernor)
- To/From I-94, to NB I-75, to NB I-96, from SB I-75 and I-96
- From NB I-75/Gordie Howe Bridge/Ambassador Bridge
- To SB I-75/Gordie Howe Bridge/Ambassador Bridge

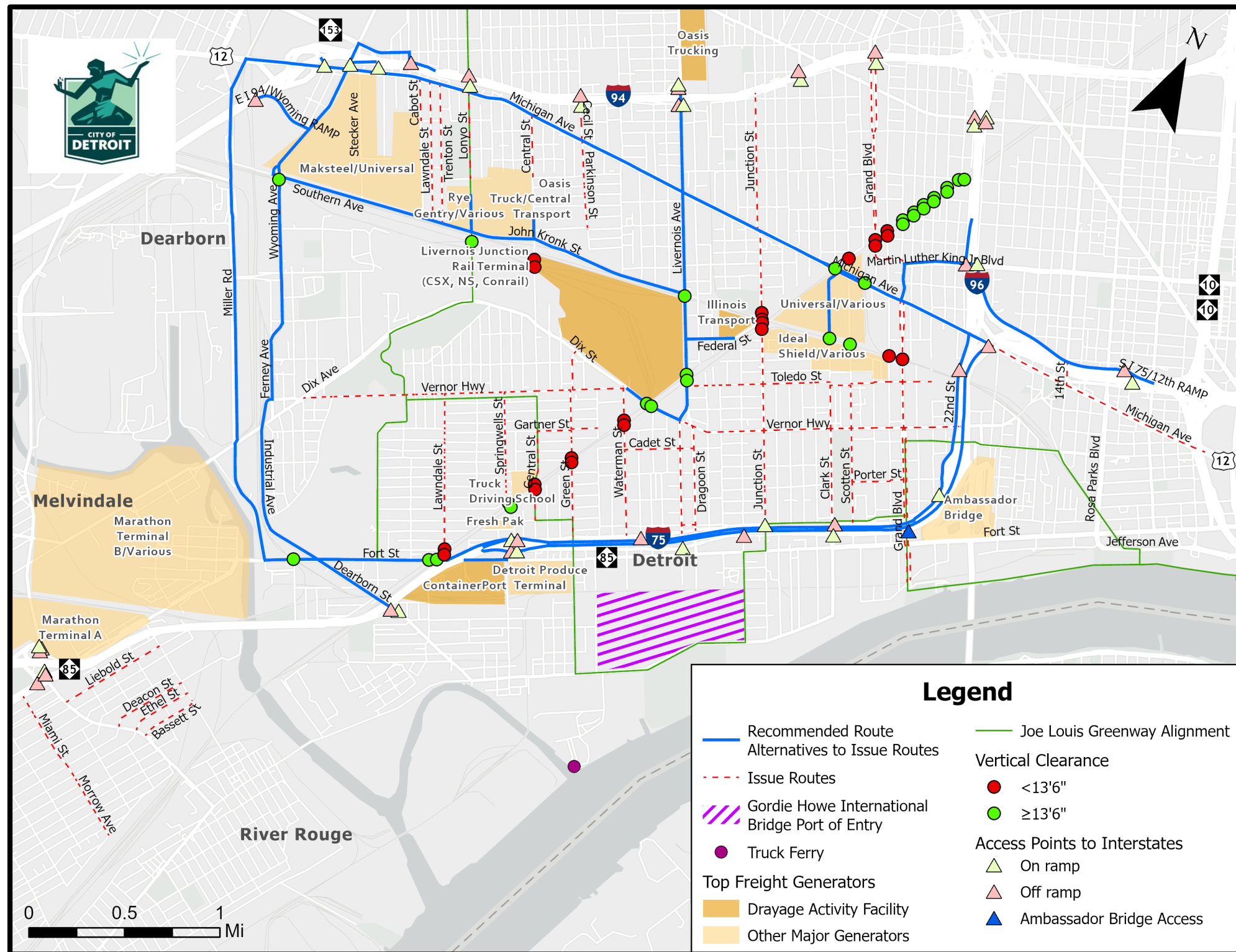
Top Freight Generators

- Drayage Activity Facility
- Other Major Generators



**Turn
Over**

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit

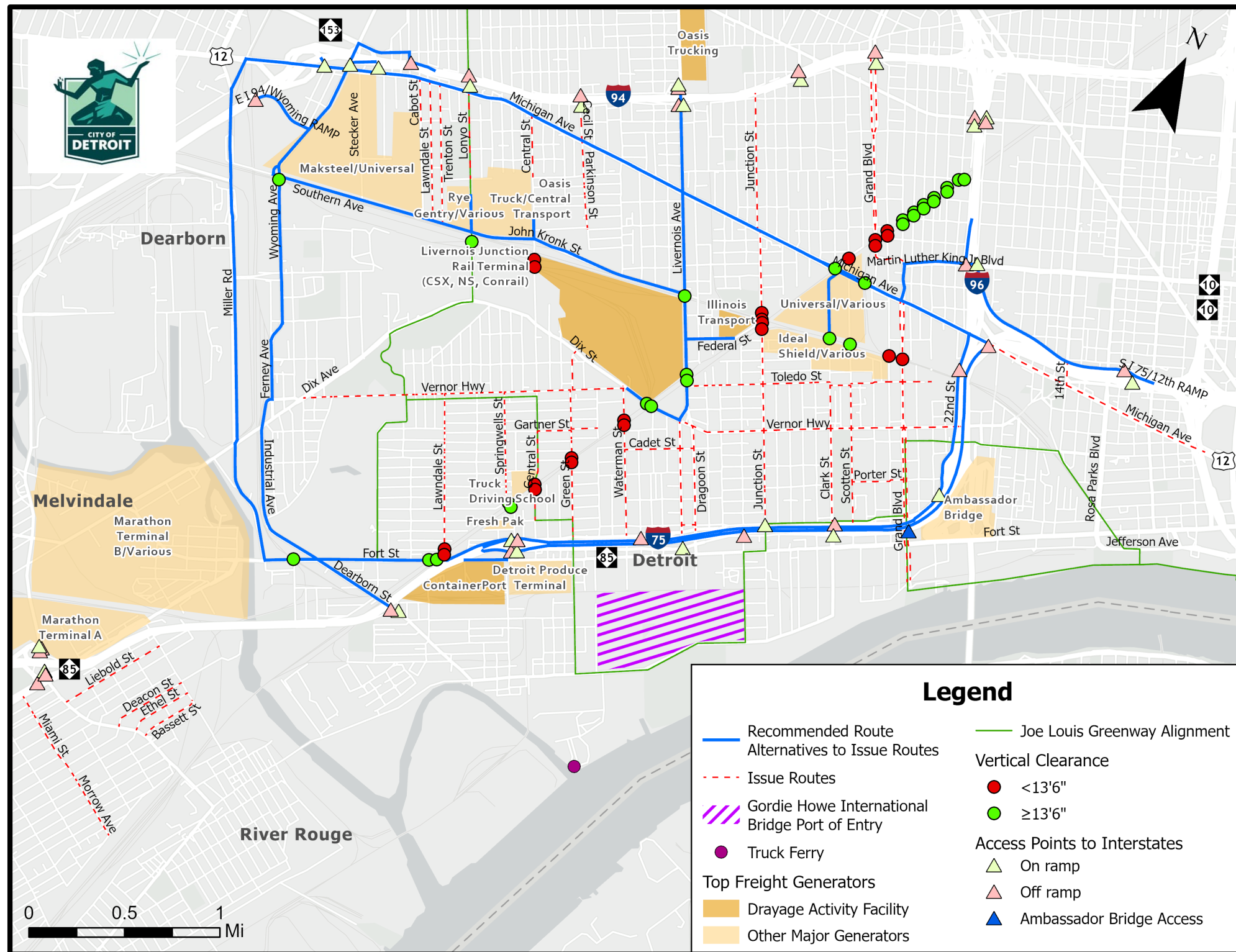


Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

Suggested Routes for Livernois Junction Rail Terminal (Federal St)

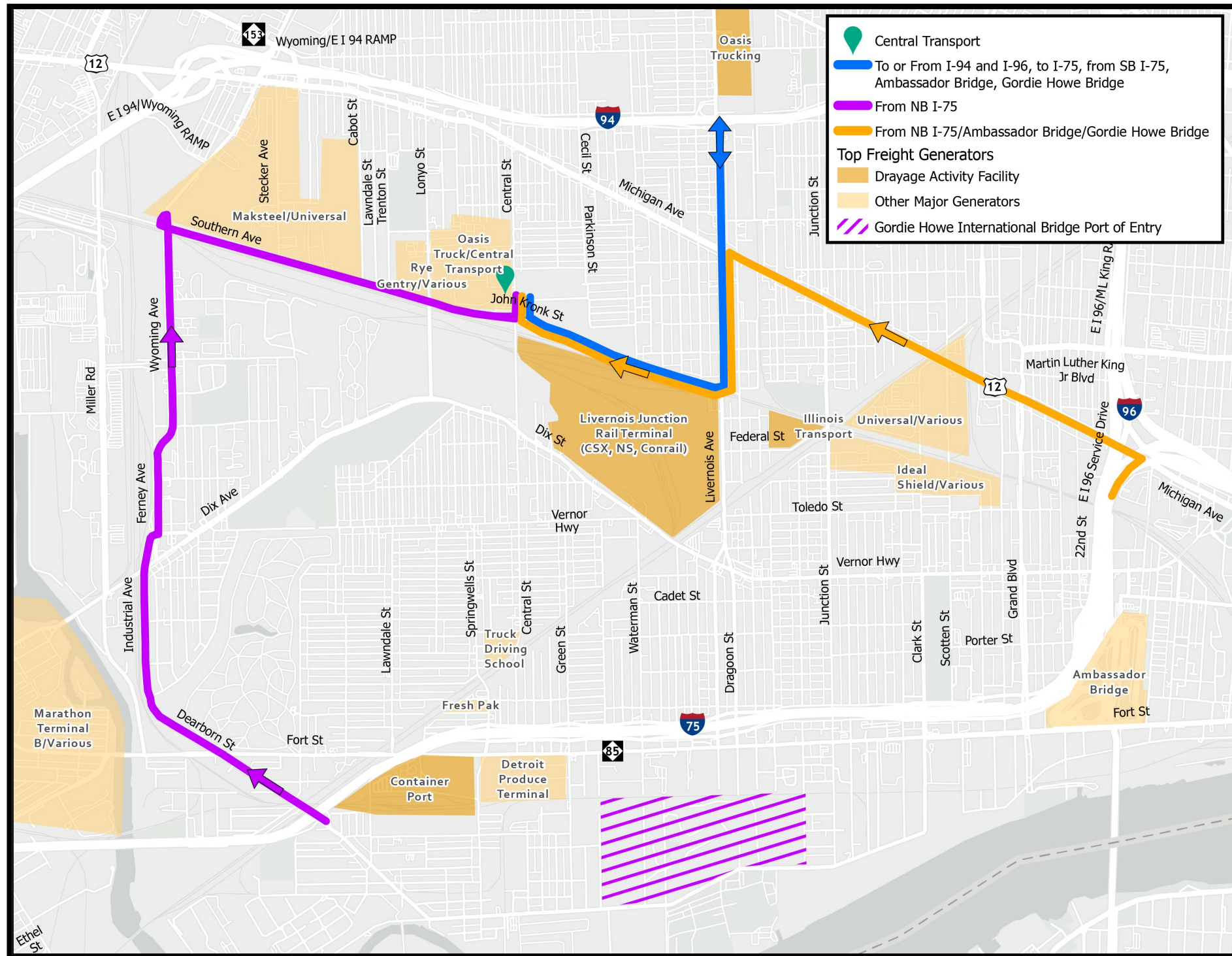


Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



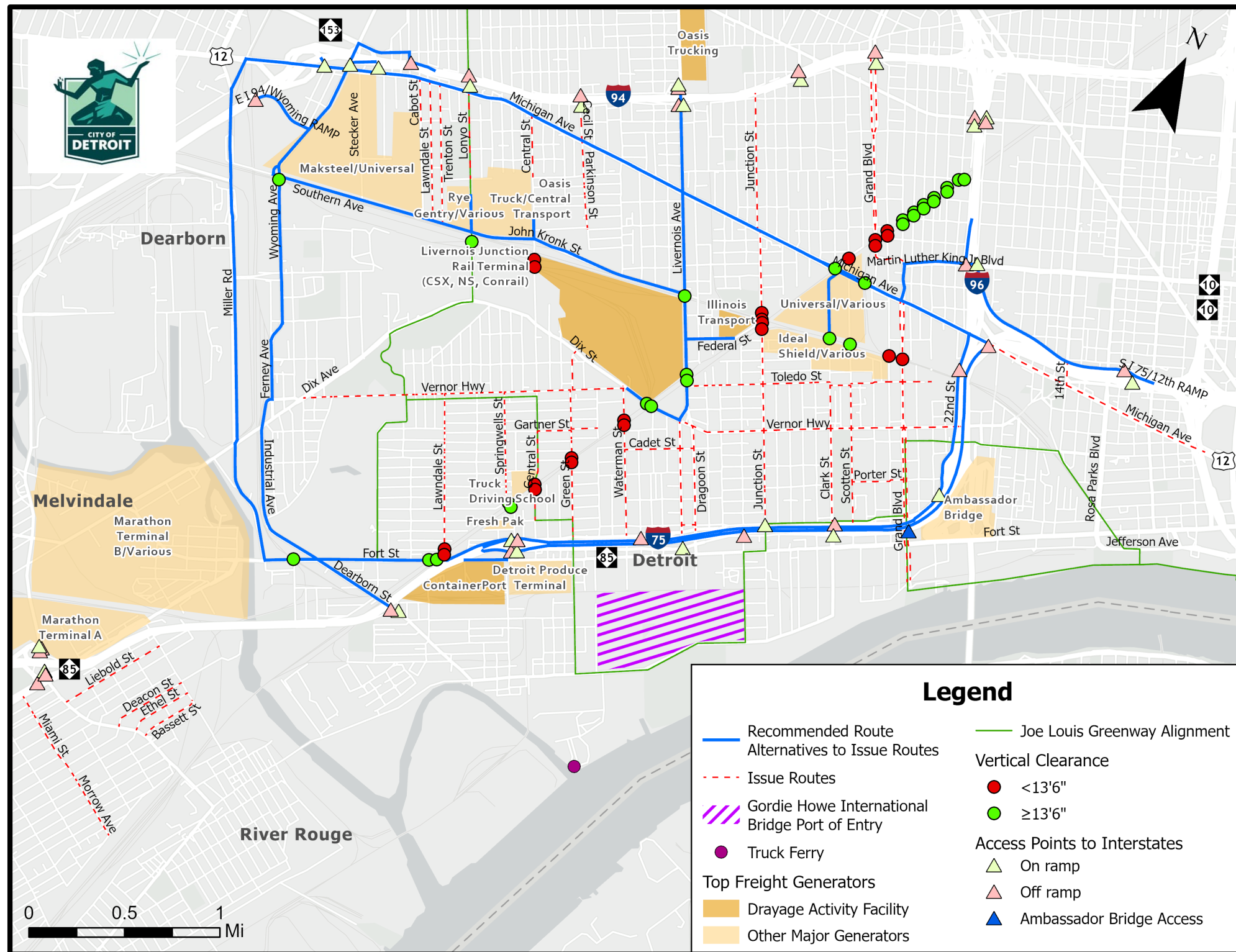
Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

Suggested Routes for Central Transport (Central St)



Turn Over

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



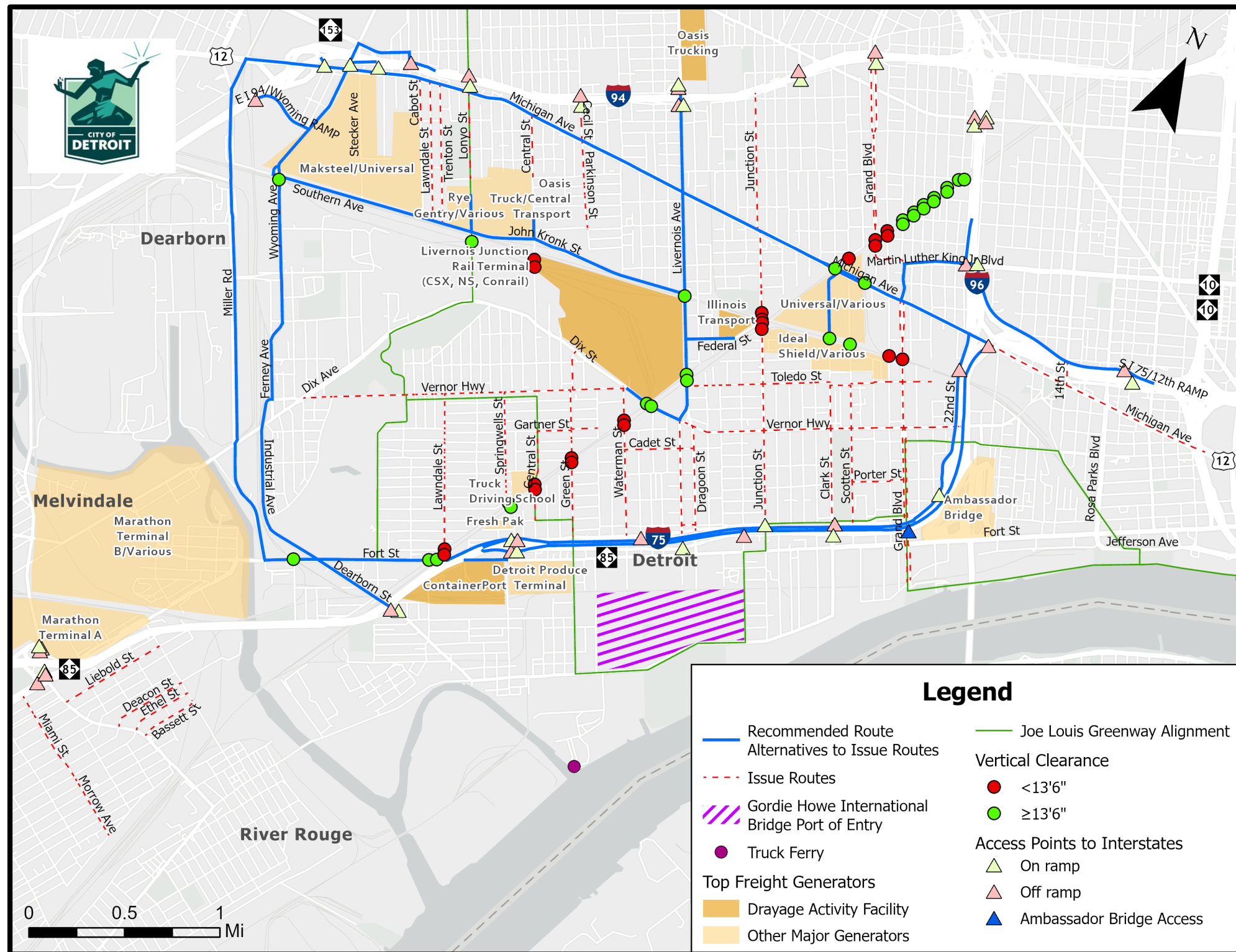
Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

Suggested Routes for Oasis Trucking (Central St)



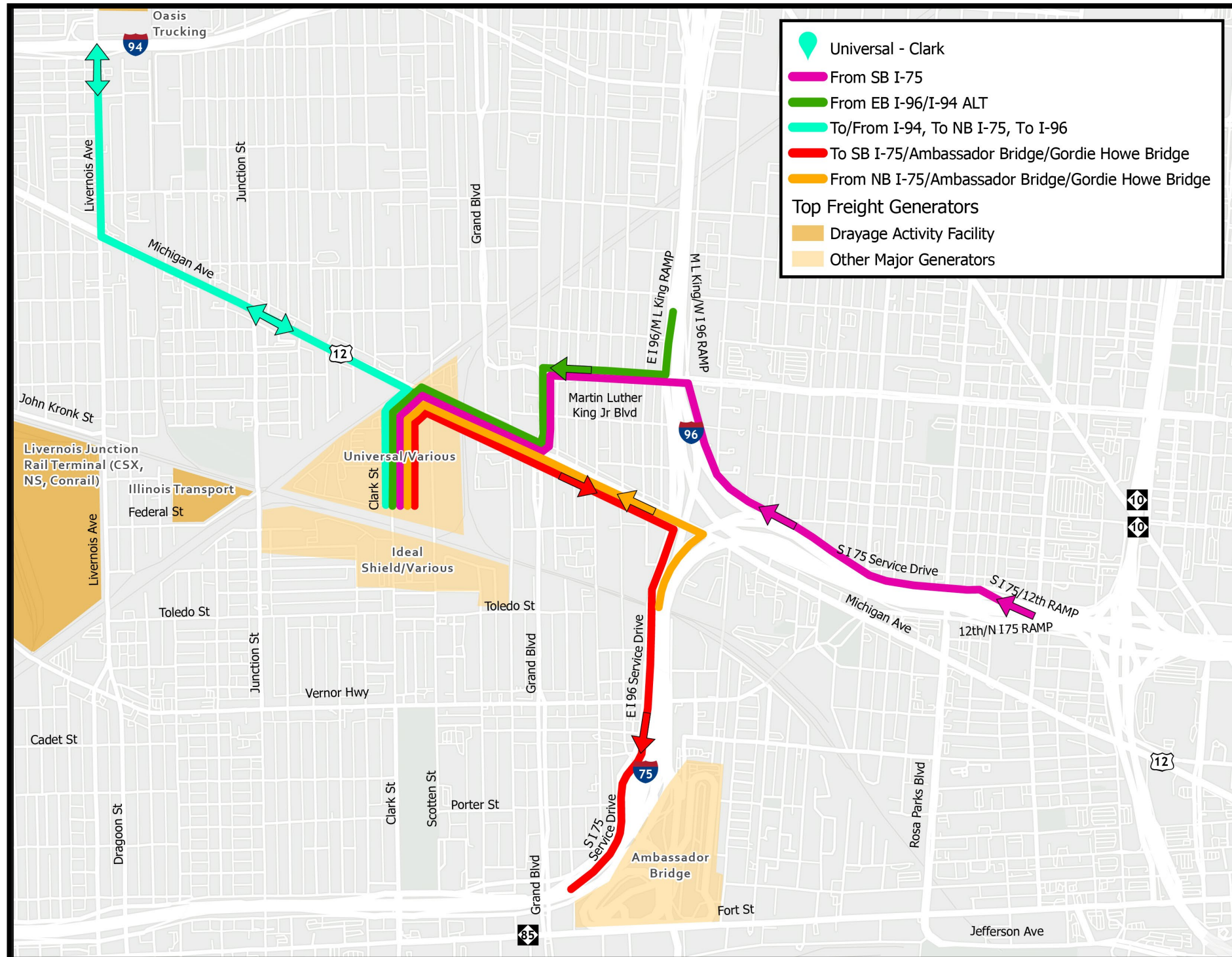
Turn Over

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



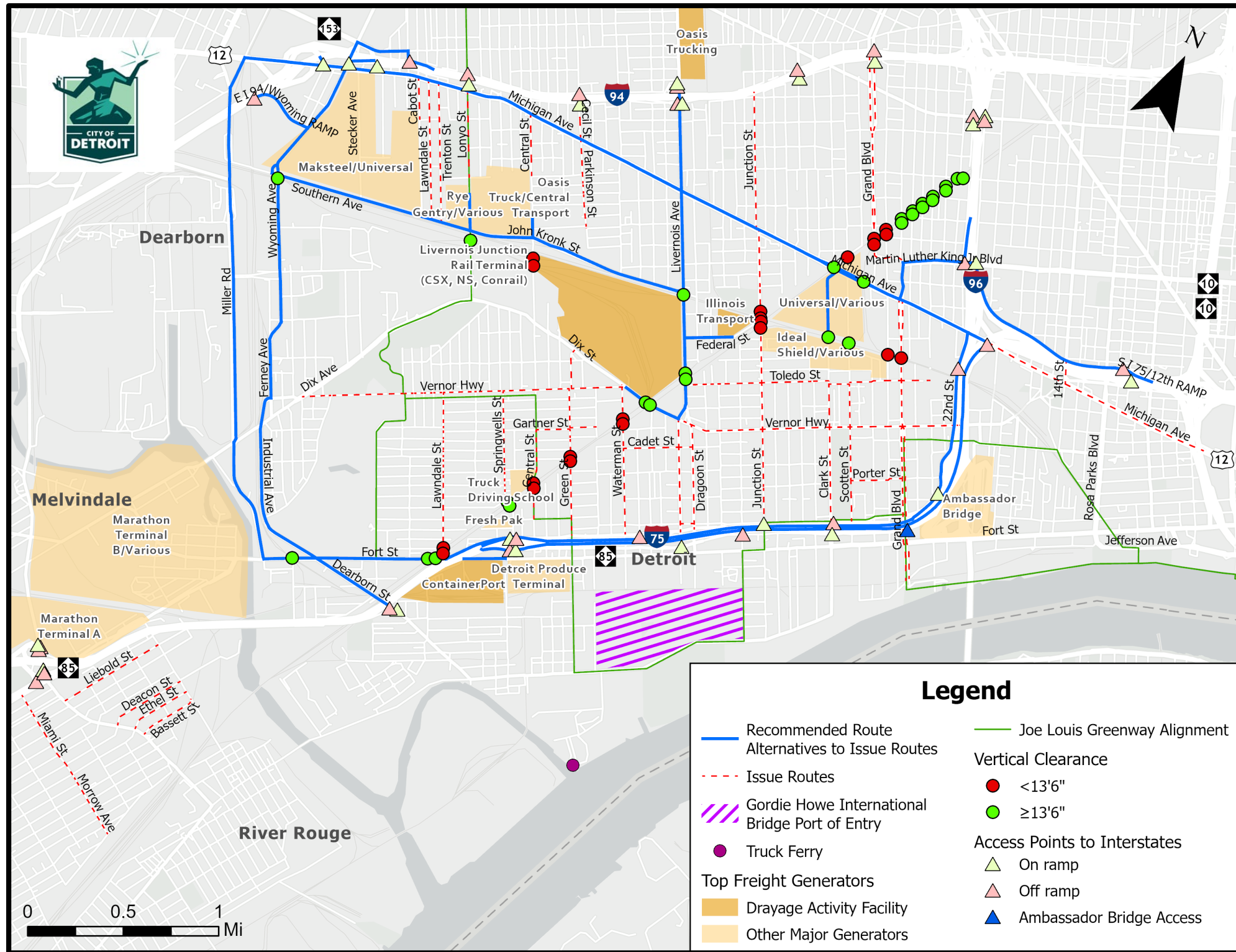
Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

Suggested Routes for Universal at Clark St



Turn Over

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit

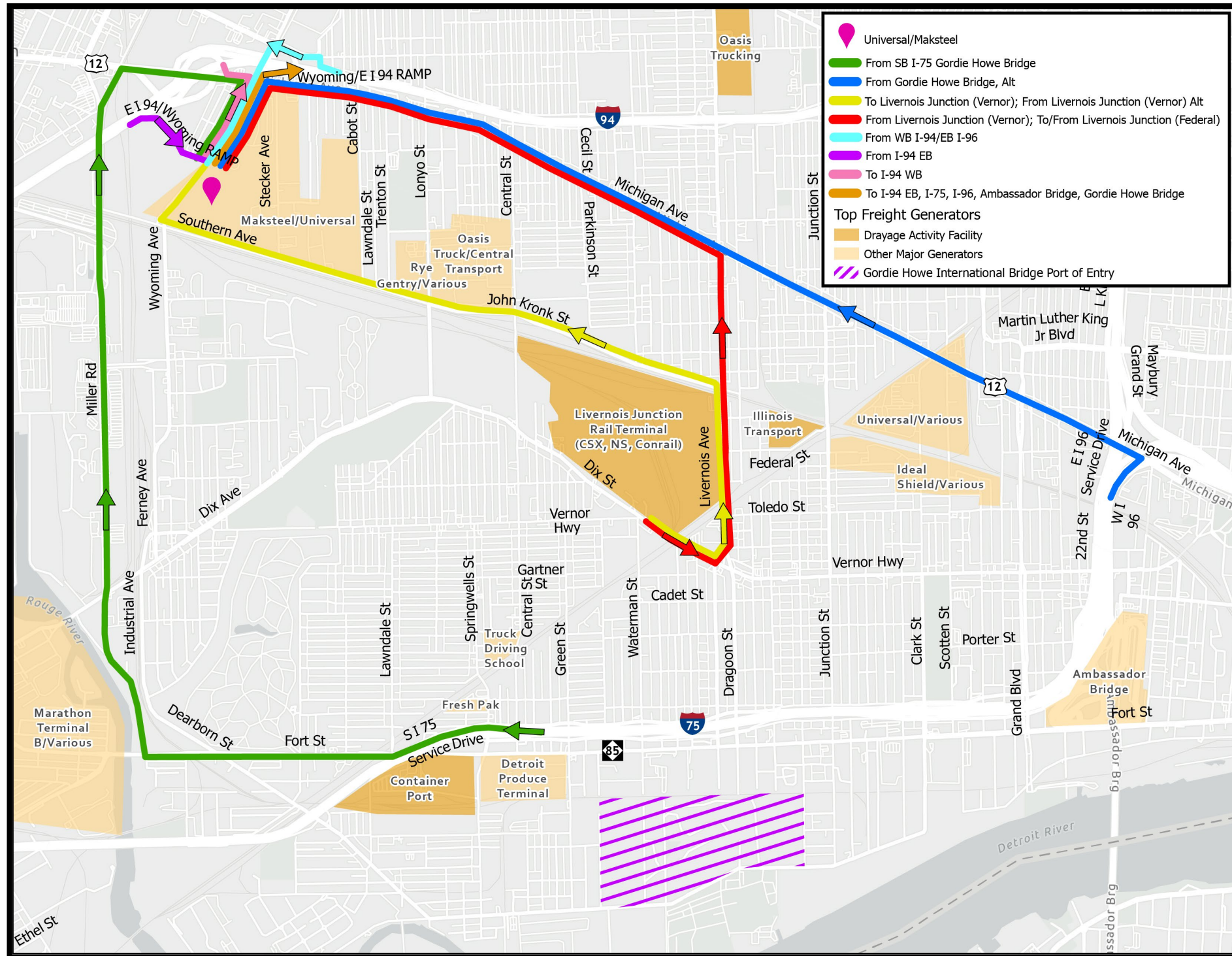


Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.



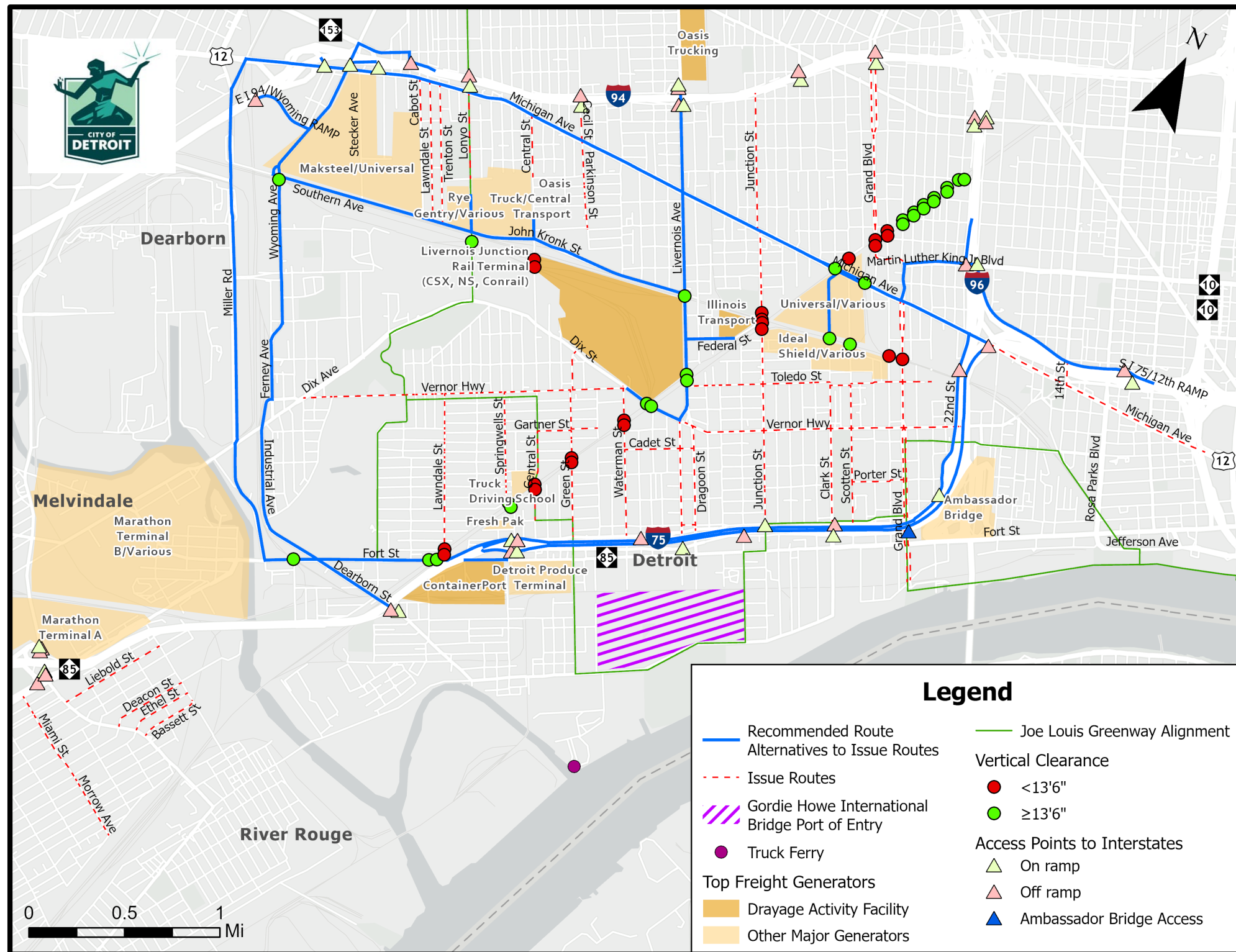
**Turn
Over**

Suggested Routes for Universal/Maksteel (Wyoming Ave)



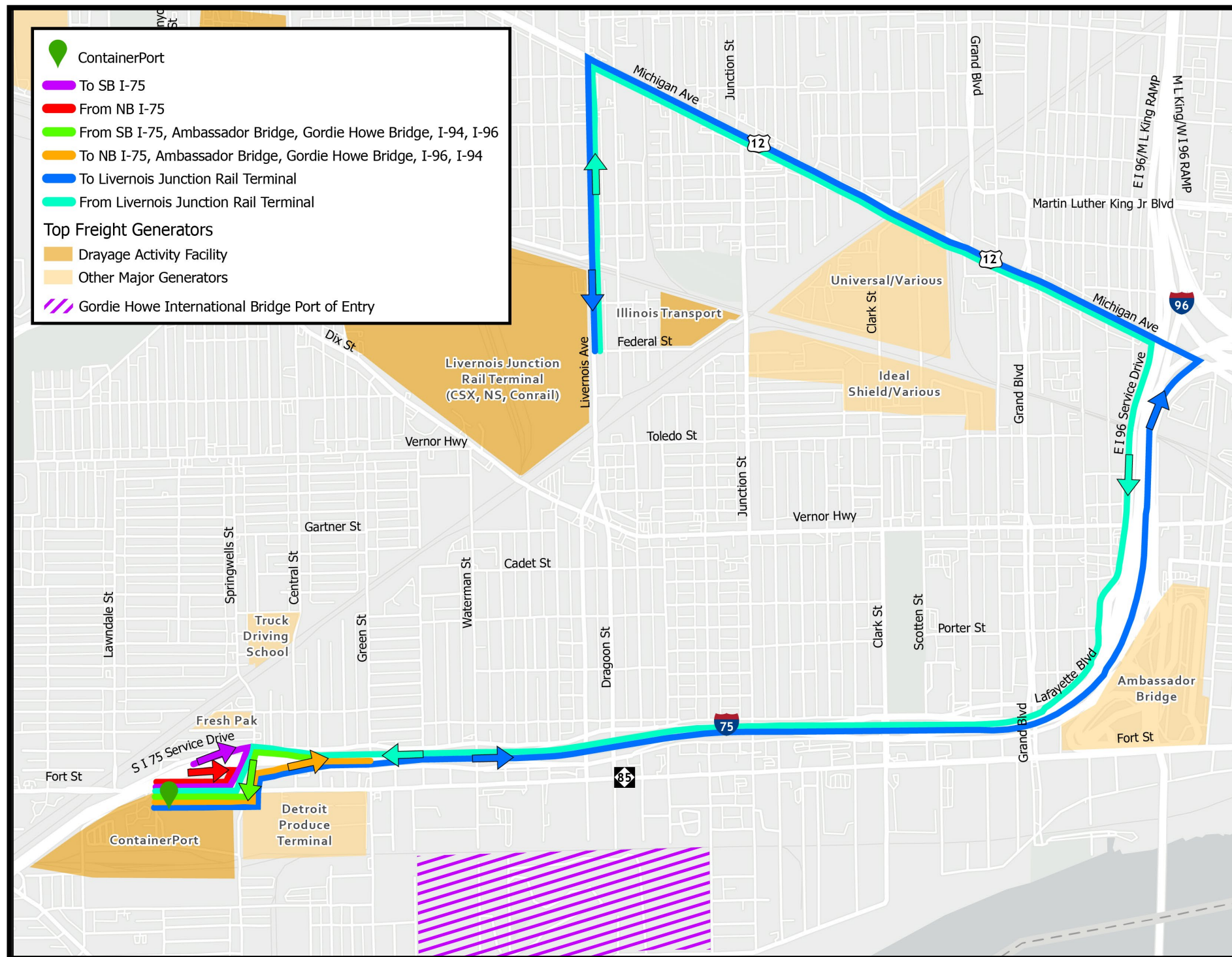
Turn Over

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit

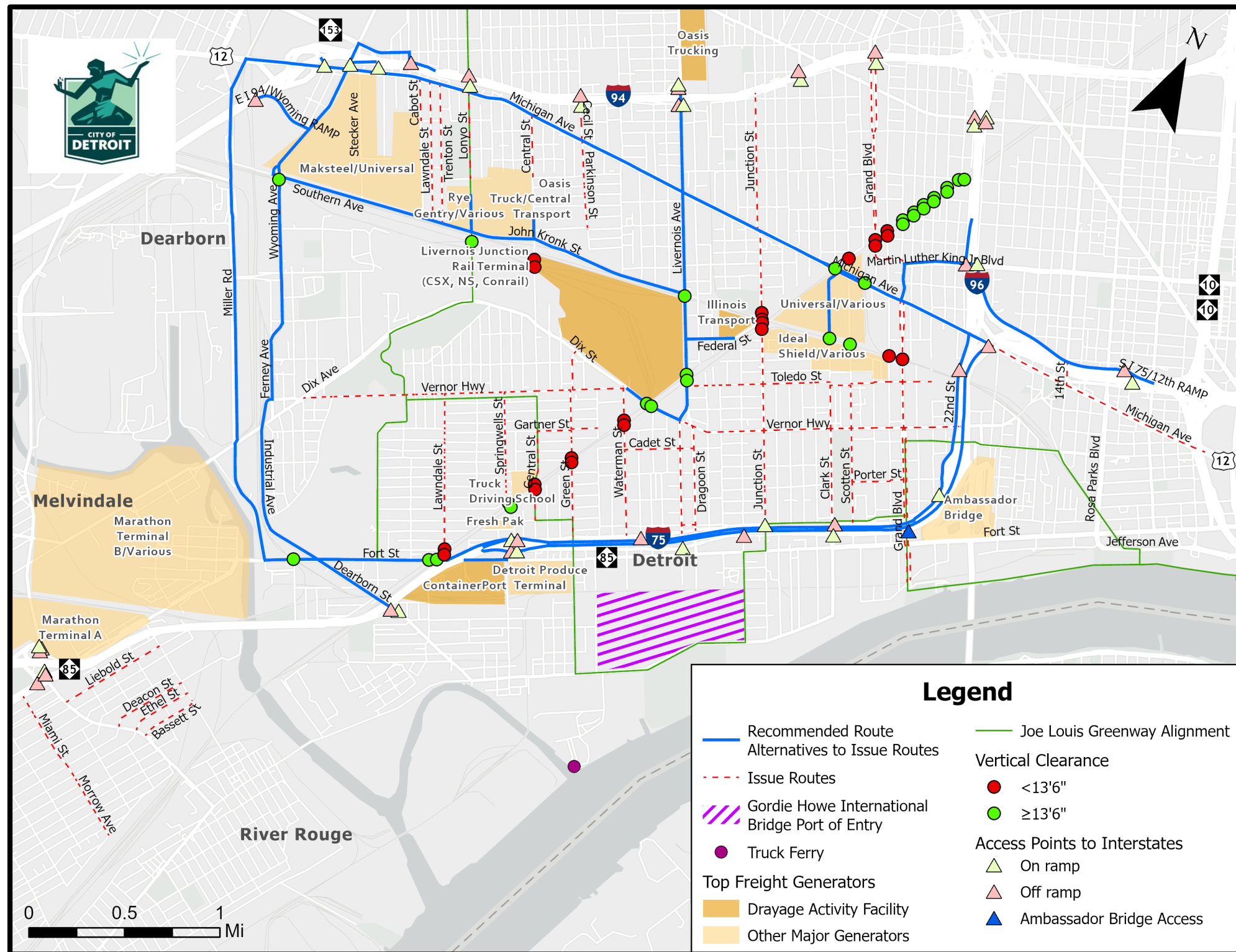


Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

Suggested Routes for ContainerPort



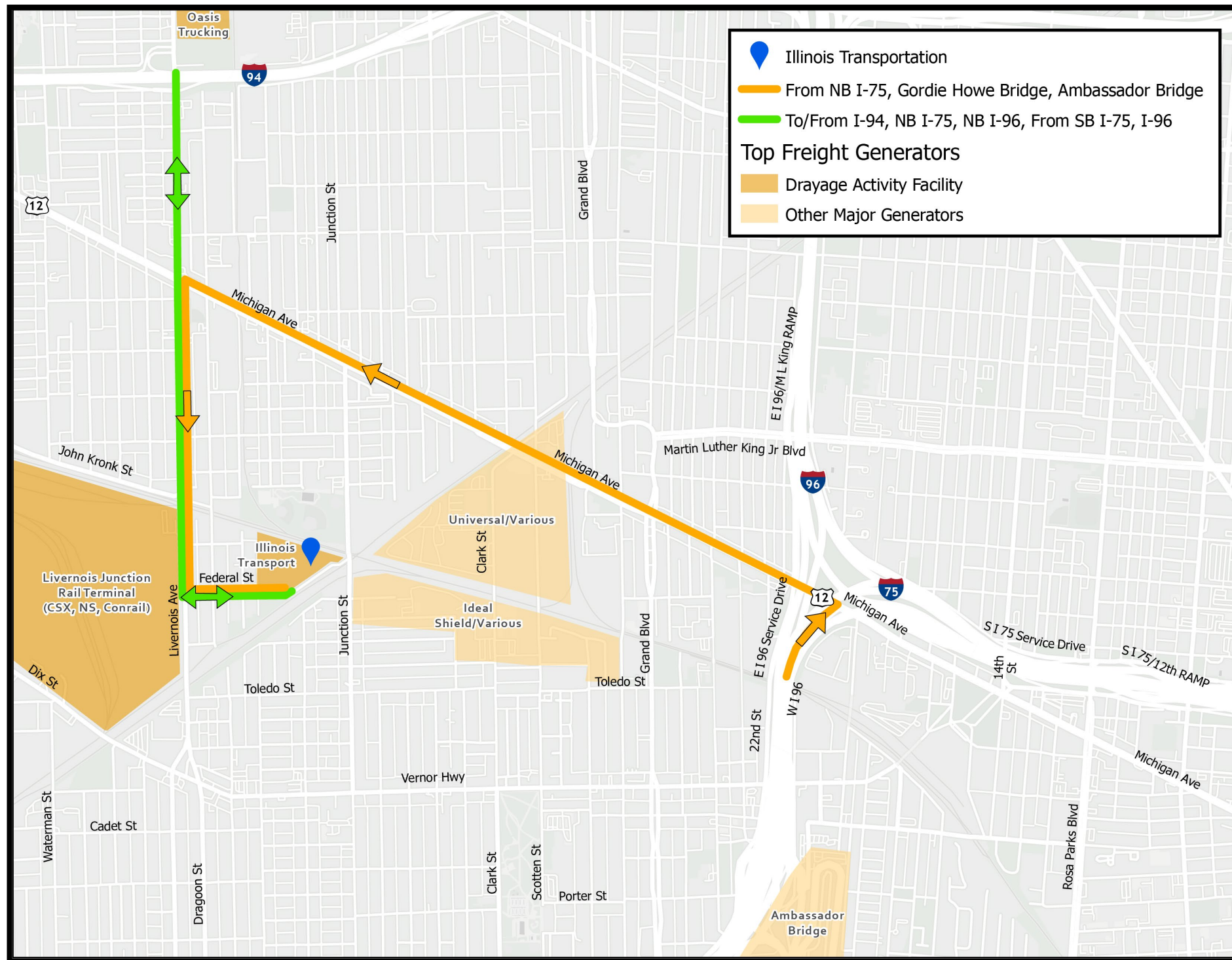
Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

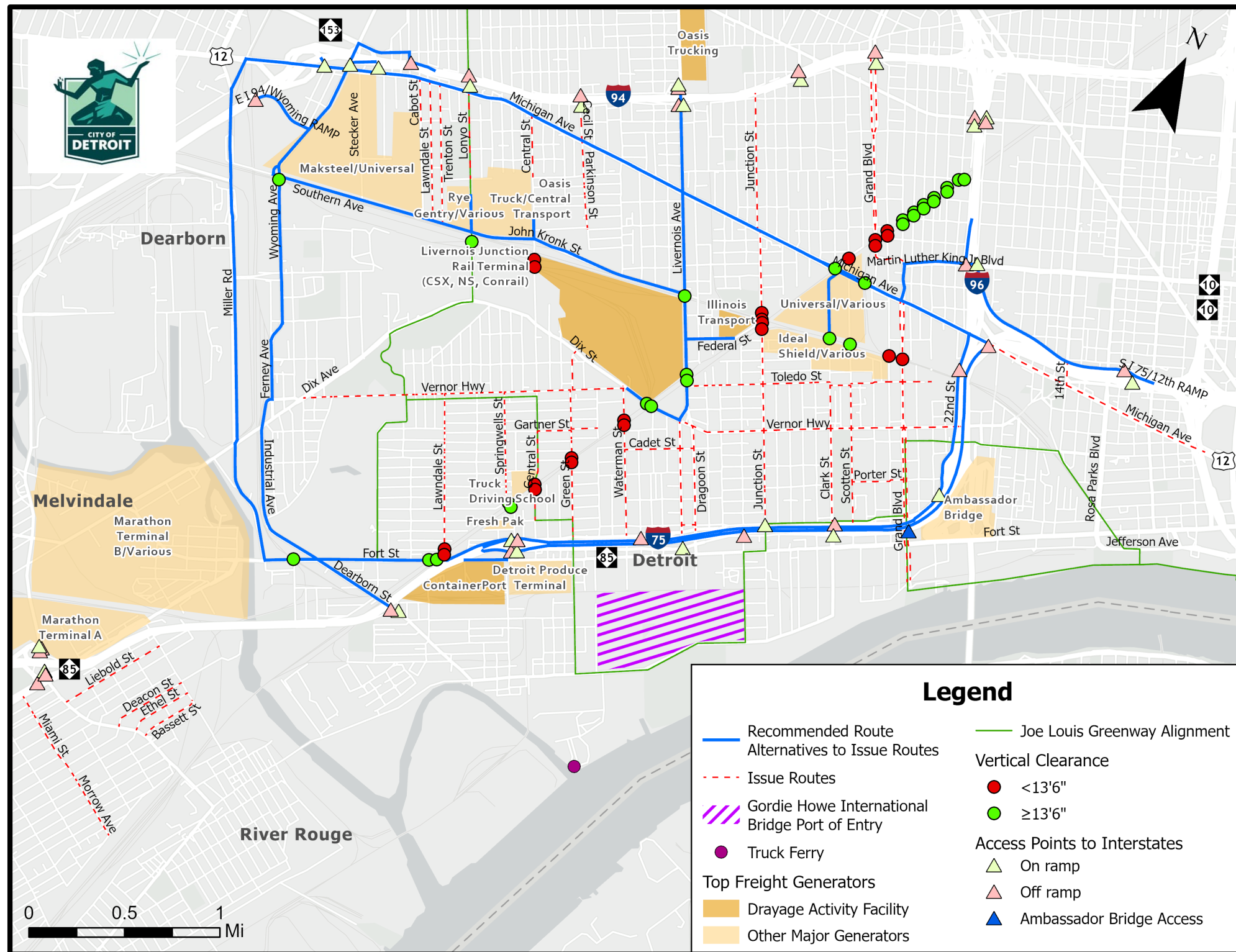


Suggested Routes for Illinois Transportation (Federal St)



Turn Over

Truck Network Issue Routes and Recommended Alternatives in Southwest Detroit



Routes in blue should be used instead of issue routes (in red) for truck travel. Issue routes and other local roads should only be used by trucks when required in local deliveries and loading. Major roads not marked in the image have not been identified as issue routes and may continue to be used.

Suggested Routes for Rye Gentry (Lonyo St)

