



City of Rochester
Comprehensive Access and Mobility Plan

Urban Goods Movement/ Emergency Service Report



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1 Background

The efficient movement of goods and the ability to provide emergency services in a timely manner are vital components of a healthy, vibrant city. Interestingly, these topics are not often addressed thoroughly in urban transportation plans. Freight planning is typically done at the regional and statewide levels. The requirements of emergency vehicles and their impact on streetscapes barely receive mention in existing transportation plans of other cities. The *City of Rochester Comprehensive Access and Mobility Plan* recognizes that planning for these non-person trips is critical to the social and economic vitality of the community.

From a transportation perspective, goods movement and emergency services are unique in that they do not involve personal travel and use larger vehicles than most forms of personal travel (the exception being public transportation). Accordingly, the Urban Goods Movement/Emergency Service Report (the Report) addresses the needs of freight and emergency service providers in a holistic manner that integrates these types of non-person trips into the overall urban ecosystem of personal travel by various modes.

Urban Goods Movement

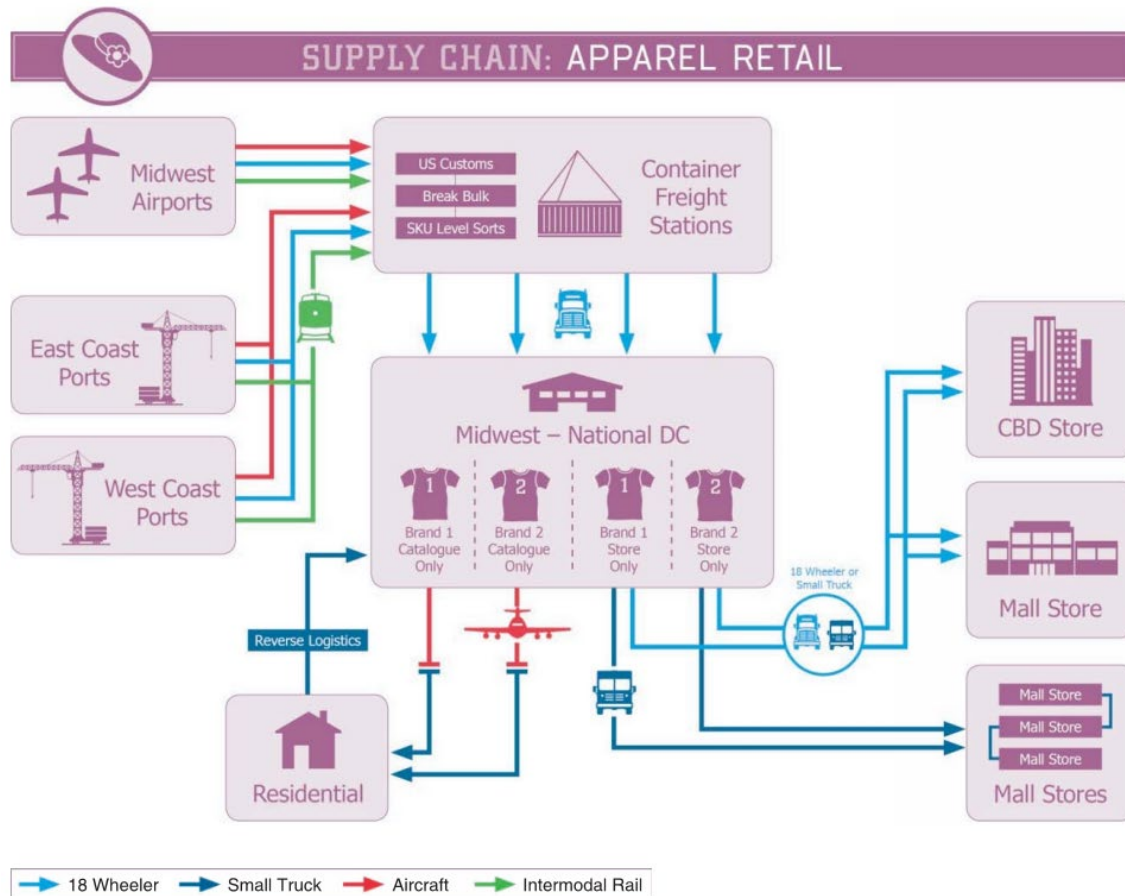
Cities will always be massive consumers of physical goods. One of the primary reasons that cities initially formed was to reduce transportation costs by bringing goods closer to a larger number of potential buyers. These goods include finished products that residents and visitors purchase to meet their basic needs as well as raw materials and intermediate inputs that businesses add value to before sending along to the next stage in the larger marketplace. Beyond the substantial network of physical infrastructure required to serve Rochester's goods movement needs there is a complex logistics framework. In their never-ending pursuit to reduce costs, shippers, carriers, and receivers are harnessing technology to maximize routing and scheduling for themselves and their customers. There are two important and overarching factors to consider in freight planning.

Global Nature of Freight

The vast majority of people do not have a full appreciation of how the things they own and use end up in their homes, their workplaces, their doctor's offices, and the restaurants they frequent. The Buy Local movement is a constructive effort that strengthens urban economies and has the potential to reduce the environmental impacts of production and consumption. While it continues to grow, the reality is that the movement of goods occurs on a global scale at each stage of development: production, transport, and delivery. This requires an interconnected network of the various modes of goods movement that generally begins and ends with trips by truck with transfers to railroads, marine vessels, and airplanes prior to delivery to

stores and residences. Figure 1 provides a flow chart of the supply chain for apparel once it enters the country as developed for National Cooperative Freight Research Program (note: "DC" stands for distribution center, which is a facility that receives and stores products for delivery to another location such as a store or directly to a customer).

Figure 1 Apparel Flowchart



Source: Rhodes, S., M. Berndt, P. Bingham, J. Bryan, T. Cherrett, and P. Plumeau, National Cooperative Freight Research Program Report 14 *Guidebook for Understanding Urban Goods Movement*, Transportation Research Board, National Research Council, Washington D.C., 2012.

Future of Retail









The nature of retail (i.e., the sale of goods to the final consumer) continues to change at an accelerating rate as does the wholesale market (i.e., the sale of goods to businesses that resell goods in smaller quantities than they receive) along with the supply chains that serve them. Terms like the "Amazon Effect" and "Now Economy" capture the public's propensity to purchase a more diverse set of goods via the internet and expect delivery in hours not days, much less weeks (Figure 2). There is no disputing that the numbers of direct deliveries to residences has and will continue to increase. However, the frequent reports of "bricks and mortar" closings

and the financial difficulties facing suburban malls paint a broad brushstroke of the retail sector that misses nuances affecting cities. Certain chains such as Dollar General and Dollar Tree continue to open new stores at a steady rate and higher end retail is becoming more experiential, offering cities the opportunity to meet both the needs of citizens with lesser financial means and to attract higher income shoppers to their downtown and neighborhoods.

Figure 2 Comparison of United Parcel Service and Federal Express

How do those shipments arrive at your front door?

United Parcel Service (UPS) and Federal Express (FedEx) are the two largest package delivery services in the U.S. UPS and FedEx are bigger than the U.S. Postal Service, which delivers approximately 30 percent of UPS and FedEx ground shipments. Here's how they compare.

		
 Fiscal Year 2017 Revenue	\$ 66 Billion	\$ 60 Billion
 Employees	450,000+	400,000+
 Shipments Per Day	20+ Million	14+ Million
 Motorized Vehicle Fleet	119,000	170,000
 Aircraft (including leases)	564	664
 Countries Served	220+	220+

Sources: FedEx Corporate Fact Sheet; UPS Fact Sheet; and Stevens, L., (2014, August 4). For FedEx and UPS, a Cheaper Route: the Post Office. *Wall Street Journal*, U.S. edition (<https://www.wsj.com/articles/u-s-mail-does-the-trick-for-fedex-ups-1407182247> - retrieved May 17, 2018).

Emergency Service

Providing the necessary services to save lives and reduce property damage resulting from natural and human-created hazards is a critical function of all city governments. Regardless of the emergency, response time is key and reducing it is a

top priority for all responders. This creates a conflict with the current goals and objectives of urban transportation planners, public health professionals, and neighborhood associations who are seeking to increase the viability of streets for all users by making them friendlier for bicyclists and pedestrians. To accomplish this requires that the decades-long design of streets to accommodate as many automobiles as possible be reversed, resulting in narrower streets. This is viewed by emergency responders as creating the potential for not only increased response times but also a lack of space to deploy needed equipment to address incidents.

Fire Trucks

Often used interchangeably by the public, fire engines and fire trucks are not synonymous. They represent the largest vehicles employed by fire departments as part of their fleets (referred to as their “apparatus”). Fire engines have a pump, water tank, and hoses, allowing firefighters to begin responding while water supply from a hydrant is being established. They are called “pumpers.” Fire trucks have an attached hydraulically operated aerial ladder in addition to ground ladders of varying sizes, which is why they are known as “ladder trucks.” Fire trucks are also equipped with outriggers to stabilize the vehicle when the aerial ladder is in use. In addition, fire trucks also typically carry additional equipment, including saws, lights, ventilation fans, and other rescue and extrication tools. Fire trucks are larger than fire engines with a longer wheelbase (the distance between the front and rear axles), requiring a larger minimum inside turning radius. Figure 3 presents pictures of a Rochester Fire Department engine and truck.

Figure 3 Rochester Fire Department Engine and Truck



These are the big-picture factors that influence the movement of goods into, out of, and through the City of Rochester and the needs of emergency responders to quickly and reliably address incidents that compromise public safety. More local information – both quantitative and qualitative – informs the development of transportation policies, projects, and programs to improve economic development and emergency response.

2 Existing Conditions

Key to determining how transportation can improve the movement of freight and the delivery of emergency services is developing an understanding of the relevant circumstances that currently exist in the City of Rochester. In gathering information on the topics of goods movement and emergency services, it is recognized that data on these important considerations are limited compared to other modes and trip purposes. As such, the data that is available has been supplemented with input from local professionals who work in transportation, economic development, and emergency services.

Volumes by Mode

Approximately 300 million tons of freight worth \$1.2 trillion¹ moved into, out of, and through the Genesee-Finger Lakes Region in 2017, and this amount is expected to increase to 420 tons valued at \$2.0 trillion in 2035. By tonnage, two-thirds of these freight flows are through movements: they neither originate at nor are destined for a location within the region. The remaining amount is split equally between inbound and outbound movements. This distribution of movements is expected to continue into the future.

When assessing freight flows in Rochester, it is assumed that a larger proportion of the trips begin or end within City limits. This is because a large amount of the long haul truck trips through the region are made using the NYS Thruway (I-90) to bypass local traffic on I-490. Trains not serving the region are routed along the CSX Westshore Branch Line between Fairport and Churchville rather than the less direct CSX Chicago Line that traverses the City of Rochester.

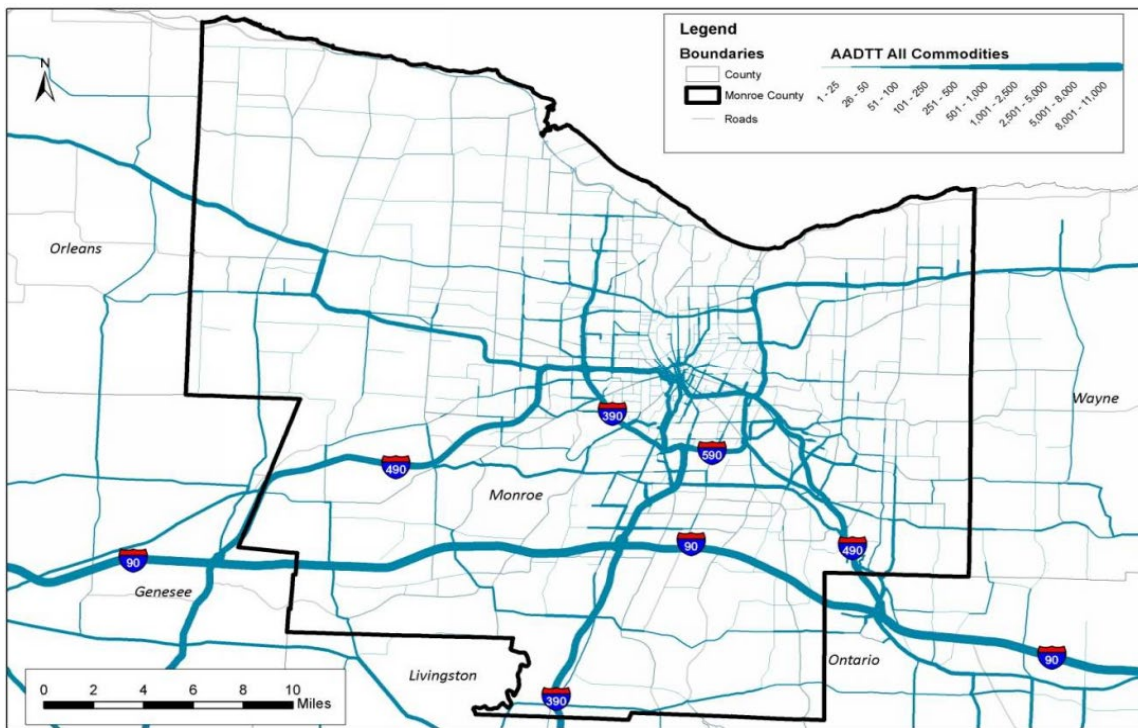
Slightly more than 80 percent of the total tonnage in 2017 (approximately 245 tons) was transported by truck. As would be expected based on the predominant movement (through trips), I-490 carries the largest numbers of trucks within City limits. Mt. Hope Avenue and Mt. Read Boulevard carry the largest numbers of trucks on City of Rochester streets as these roadways service institutional and industrial land uses (see "Freight Generators"). Figure 4 presents the projected annual average daily truck traffic (AADTT) in Monroe County in 2035.

While the vast majority of goods move by truck that is not to say that other modes of freight transportation are not important. As noted above, Rochester is served by CSX, one of seven Class I railroads. Class I railroads are the largest freight rail operators with operating revenues of approximately \$450 million in 2016. In addition to CSX, the City is also served by the Rochester & Southern Railroad (RSR), a Class III or "shortline"

¹ Calculated using IHS/Global Insight data, via the New York State Department of Transportation, as published in *Transportation Strategies for Freight and Goods Movement in the Genesee-Finger Lakes Region*, Genesee Transportation Council, 2012.

railroad. RSR is owned by Genesee & Wyoming, Inc., which owns or leases 122 freight railroads across the world, including 115 in North America. The RSR includes an interchange with CSX on the west side of the City. In addition to directly serving customers, including Eastman Business Park, CSX and RSR also operate yards for switching purposes (disassembling and reassembling cars into new trainsets), repair of locomotives, and storage of unused rail cars. The largest of these is the CSX South Goodman Yard (also known as the Rochester Yard), which extends approximately one mile from East Main Street to Culver Road. Figure 5 displays the active freight rail lines in the City of Rochester along with the location of the CSX South Goodman Yard.

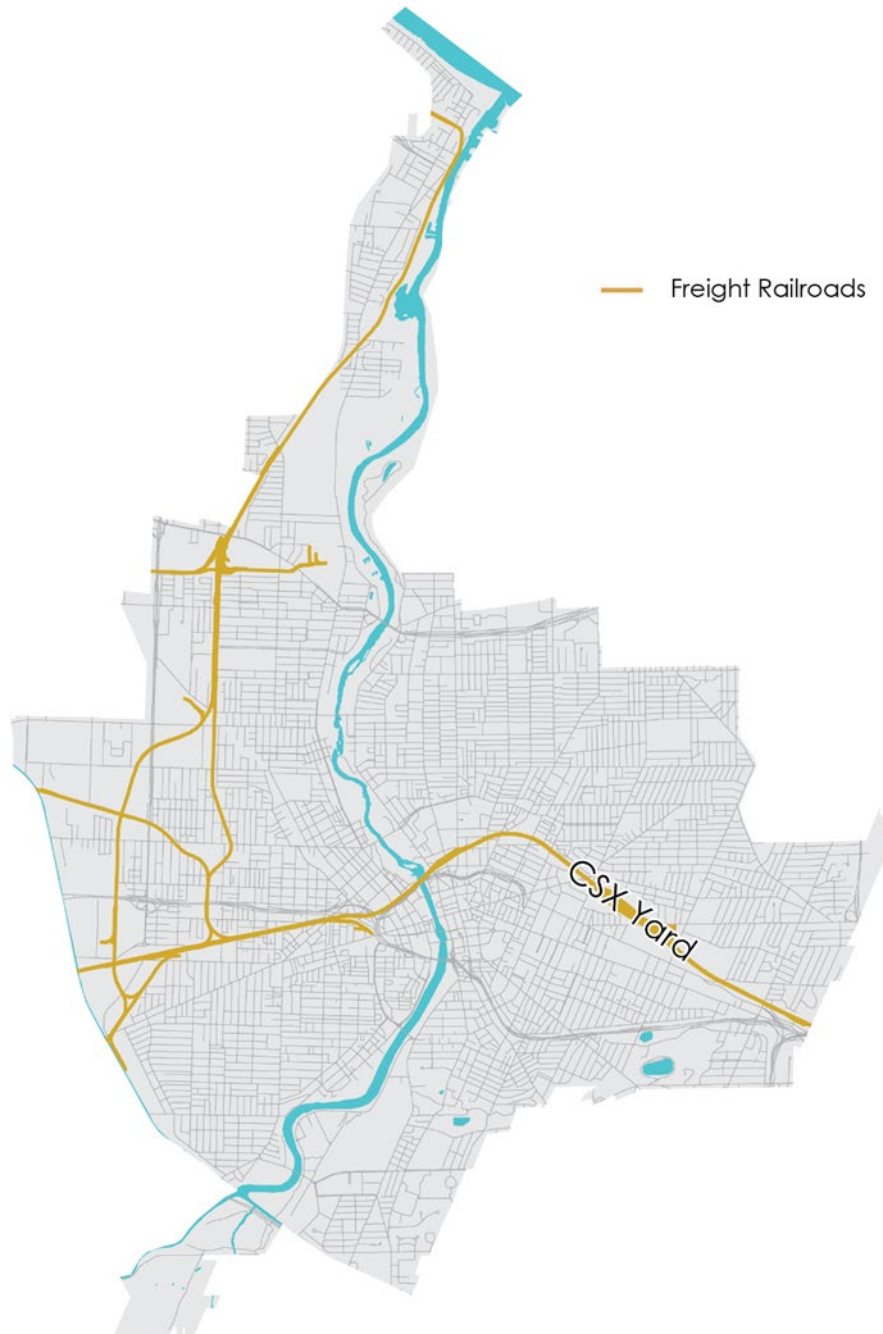
Figure 4 Total Commodity Truck Flows in Monroe County, 2035



Source: Genesee Transportation Council using IHS/Global Insight TRANSEARCH database, via the NYS Department of Transportation

With no freight-appropriate highway network serving it, plans for the Port of Rochester in the Charlotte neighborhood call for its continued redevelopment as a mixed-use district that can attract visitors from across the Region and beyond. The primary marine freight activity in the City is the shipping of cement produced at the ESSROC Canada plant located along the Genesee River near Turning Point Park approximately two miles from Lake Ontario. The McKeil Spirit transports cement produced at the plant to Toronto and Picton in Ontario, Canada.

Figure 5 Active Freight Railroads



Source: NYS Department of Transportation

Freight Generators

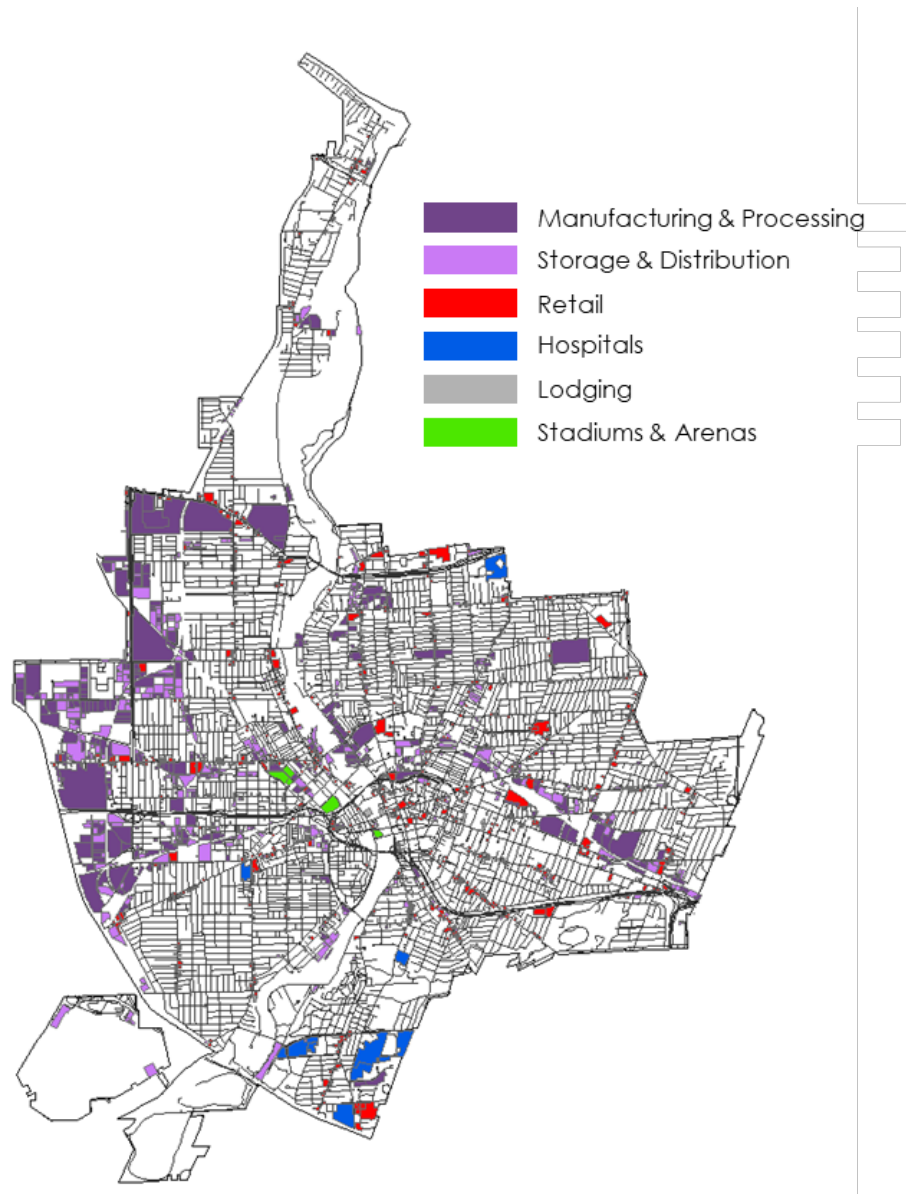
Certain land uses can generate a significant number of goods movement trips. These uses can serve as the origin for shipments, the destination for deliveries, or both (particularly, in the case of manufacturing and processing) as raw materials and intermediate inputs are further refined or finished products are created. To identify these properties in the City of Rochester, freight generating land uses were identified and then classified as:

- **Manufacturing & Processing:** This includes light, industrial, and high technology operations, as well as businesses involved in salvage. Deliveries to these facilities can come from a variety of truck sizes as well as rail. Manufacturing and processing remain vital to the City's fiscal health, accounting for approximately 15 percent of the overall economy. In addition, manufacturing and processing have a high multiplier effect, which supports other sectors of the economy through indirect and induced impacts.
- **Storage & Distribution:** This includes warehouses, distribution centers, lumberyards, and cold storage facilities for perishable items. These facilities typically have the most loading docks relative to the amount of square footage and are usually served by large trucks and rail.
- **Retail:** This includes regional, area, and neighborhood-level shopping centers, grocery stores, minimarts, and multiple use structures that currently house or are zoned to allow establishments that sell products to the general public. Depending on the industry, numerous shipments from multiple carriers can occur to and from each of these types of establishments daily.
- **Hospitals:** In addition to Strong Memorial Hospital, Highland Hospital, Rochester General Hospital, St. Mary's Campus, and Monroe Community Hospital, the Rochester Psychiatric Center and the Al Sigi Center are also included. These facilities require deliveries of equipment, food, cleaning supplies, and other materials on a large-scale.
- **Lodging:** This includes hotels and motels, which require deliveries of food, cleaning supplies, and new furnishings, linens, and equipment on a regular basis.
- **Stadiums and Arenas:** This includes the Blue Cross Arena at the War Memorial, Frontier Field, and Marina Auto Stadium. The large crowds that attend events at these venues require significant deliveries of food, cleaning supplies, and materials to maintain the performance surfaces, seating, and vending areas.

Over 2,800 properties in the City of Rochester can be defined as freight generators (Figure 6). Certain land use patterns become apparent. According to the City of Rochester Department of Neighborhood & Business Development, 70 percent of industrial activity (manufacturing and processing and storage and distribution) is

located in the City's northwest quadrant. Neighborhood retail (including stores located in multiple-use buildings) is located along multiple corridors. Larger retail outlets are present throughout the City and serve multiple neighborhoods. These include stand-alone stores such as supermarkets and the Walmart on Hudson Avenue and the Citygate development. There are hospitals located in all but the Northwest Quadrant with the greatest concentration in the Southeast Quadrant, which includes Strong Memorial Hospital, Highland Hospital, and Monroe Community Hospital. As would be expected, the majority of lodging establishments and all of the stadiums and arenas are located in and adjacent to the Center City District.

Figure 6 Freight Generators

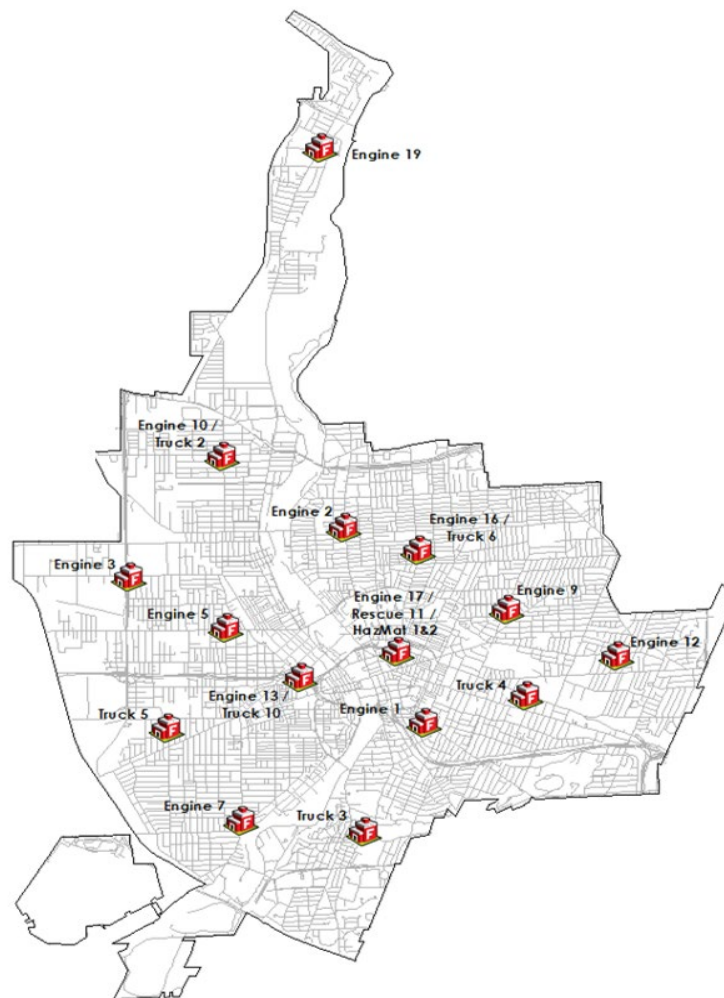


Source: City of Rochester

Firehouses

The location of firehouses and assignment of apparatus and staffing are key considerations in the emergency response planning process. In older, modest-growth urban areas like the City of Rochester, the location of the firehouses was determined decades ago and relocation of existing ones and construction of new ones are infrequent. Depending on the dimensions of the structures, there is some flexibility in the assignment of apparatus to ensure that fire trucks can respond when fire engines will not be sufficient for the respective alarm call or likely require support. The Rochester Fire Department (RFD) operates 16 firehouses: 15 within City limits and another on West Henrietta Road to provide fire protection and first responder emergency medical services as part of a contract with the West Brighton Fire Protection District. The location of the firehouses in the City of Rochester and the apparatus assigned to them is provided in Figure 7.

Figure 7 Rochester Fire Department Firehouses

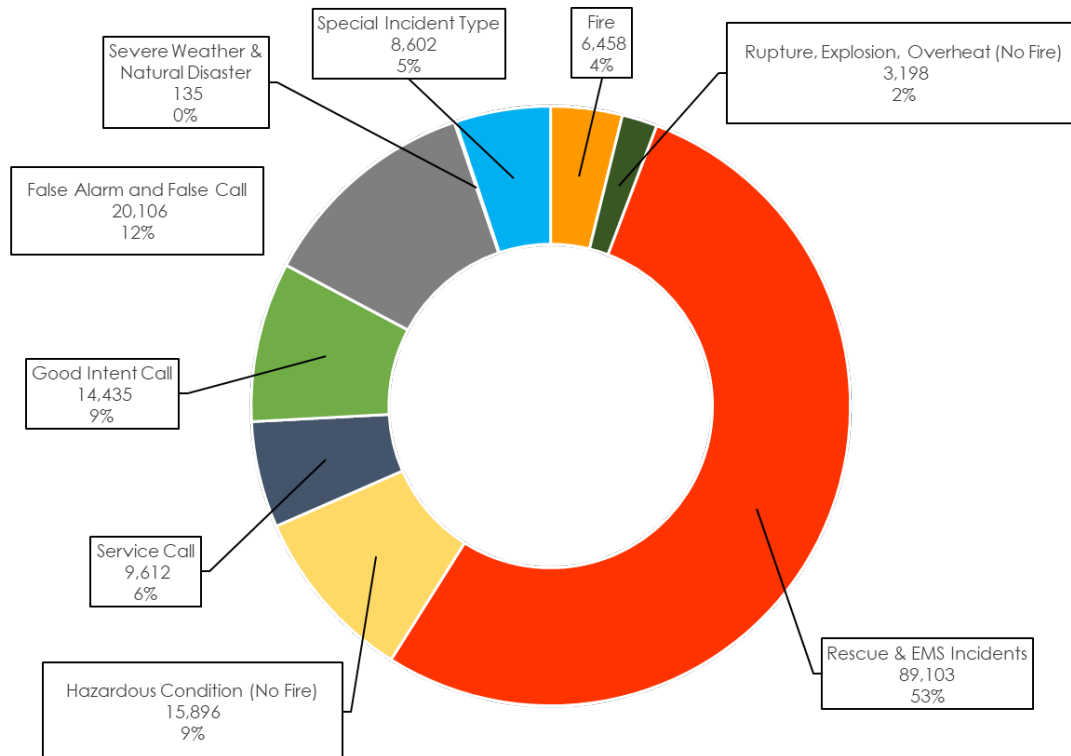


Source: Rochester Fire Department

Emergency Response Frequency

From January 1, 2013 to December 31, 2017, the RFD responded to nearly 168,000 incidents – an average of approximately 34,000 per year. Figure 8 displays these incidents by number and type over the five-year period using the National Fire Incident Reporting System (NFIRS) series. Over half of the incidents during this time period were medical assist and emergency medical service (EMS) incidents (part of the NFIRS Rescue and EMS Incidents series).

Figure 8 Rochester Fire Department Incident Response by NFIRS Series, CY 2013-2017



Source: Rochester Fire Department

The number of incidents that are responded to is an important consideration but does not provide a complete picture. The RFD responded to an average of 2,153 fire incidents each year from 2013 through 2017. Approximately half of these were structure fires and nearly 30 percent were outside rubbish fires. The resources to address these fire incidents (in terms of both personnel and equipment) is, on average, greater than any of the other types of incident series. As a result, the average number of vehicles dispatched for fire incidents was 4.5. The only other incident series for which more than two vehicles were dispatched on average was for Rupture, Explosion, Overheat (No Fire) (2.5). This information combined with additional discussions and analysis serve as the foundation for determining freight- and emergency service-related transportation needs in the City of Rochester.

3 Needs Assessment

Whether it be for personal travel, the movement of goods, or response by emergency vehicles, a city's transportation network must be safe, efficient, and reliable. Infrastructure that is in poor condition or is not operated properly can detract from quality of life, decrease economic opportunity, and jeopardize public safety. Determining current limitations of the transportation network as it relates to freight and emergency vehicle movements should be viewed as a baseline. The goal should be to identify ways to make the network a distinguishing factor that enhances economic development and social vitality.

Infrastructure

Conversations about the condition of the nation's highway, bridge, and transit infrastructure and their inability to meet the needs of a 21st century economy, as well as the lack of sufficient bicycle and pedestrian infrastructure, are increasing as the available funding falls continuously short of that needed to address identified deficiencies. While there is no denying the need for increased investment in infrastructure, the issue is more nuanced when evaluating local circumstances.

The American Transportation Infrastructure Institute, a part of the American Trucking Associations Federation, publishes an annual report entitled "Critical Issues in the Trucking Industry." The report includes a "Top Ten" list of issues affecting the trucking industry based on quantitative analysis and ranking of the difficulties faced by those in the industry. "Transportation Infrastructure/Congestion/Funding" ranked ninth in the 2017 edition of the report. The remaining issues were operational in nature with "Driver Shortage" ranking the highest. These results are consistent with what was found with respect to the needs in Rochester.

The primary infrastructure issue facing the trucking industry and emergency service providers is bridges that are in poor condition structurally. Narrowness and sight line/visibility issues are an inconvenience but these and other design issues associated with bridges built prior to current standards are not a major limitation. Bridges that are weight-restricted or height-restricted require rerouting of trucks carrying freight resulting in additional costs for businesses and, more importantly, increased response times for emergency vehicles attending to incidents.

Within City limits, there are no bridges that are not able to safely carry vehicles transporting legal weights. Legal weights of trucks are determined by the vehicle's wheelbase, number of axles, and the spacing of the axles. The legal weight of the heaviest truck is up to 80,000 pounds, enough to carry firetrucks which are typically a maximum of 70,000 pounds. Overweight permits can be applied for and granted to carry up to 102,000 pounds. The only bridge in Rochester that is "R-posted" and is not allowed to serve vehicles that have received an overweight permit is the bridge

carrying eastbound traffic on the Inner Loop over the Genesee River between the I-490 on-ramp and the St. Paul Street off-ramp.

In addition to bridges, roadways can also have weight limits imposed upon them. The City's Traffic Control Board regulates the setting of weight limits on streets. Nearly 150 streets currently have weight restrictions. Many of the weight-restricted segments are relatively short stretches on residential streets, which in some cases are the result of excessive cut through traffic over many years. However, there are some streets with weight restrictions that are not serving primarily residences. Notable street segments that provide access to and from freight generators include:

- Brooks Avenue from Genesee Street to Genesee Park Boulevard
- Browncroft Boulevard from Winton Road to the I-590 interchange
- Crittenden Boulevard from Lattimore Road to Mount Hope Avenue
- South Goodman Street from South Clinton Avenue to Elmwood Avenue
- Merchants Road from Winton Road to Browncroft Boulevard

There are railroad bridges in the City where the vertical clearance under them is less than the minimum of 14 feet and desired 14 feet 6 inches for non-National Highway System roadways. There are three notable examples of height-restricted bridges that have been identified as having impacts on freight. The CSX railroad bridge over St. Paul Street north of the Inner Loop between Cumberland Street and Ward Street has a clearance of 11 feet 3 inches. Two railroad bridges over Driving Park Avenue less than 250 feet apart – one carrying CSX tracks and the other carrying RSR tracks – also have clearances of 11 feet 4 inches. Clearances such as these do allow the highways below them to accommodate some trucks (Figure 9) but can represent impediments to efficient operation of the highway network. In the event of a bridge strike, extrication of the vehicle that struck the bridge and an inspection to affirm its structural integrity can result in rerouting of all traffic potentially causing backups and delay in the vicinity of the incident and beyond.

Figure 9 Low Bridge Clearance at St. Paul Street and the Inner Loop



Highway and bridge projects currently underway and planned that have the potential to impact goods movement and emergency service trips in Rochester include:

- Mt. Read Boulevard Highway Project – Lyell Avenue to Buffalo Road: Construction is expected to begin in fall 2018 on this pavement condition improvement project that will also include the replacement of an existing traffic circle with a roundabout, reconfiguration of traffic lanes, and replacement of traffic signals.
- NYS Route 33A Over Erie Canal Superstructure Replacement: This bridge crosses the Erie Canal, connecting Rochester and the Town of Gates. On May 6, 2014, it was closed for emergency repairs, requiring 16,000 vehicles per day to divert to other routes. Construction of a new redundant steel or concrete multi-girder design is expected to begin in spring 2020 and be completed in fall 2021.
- Inner Loop North Transformation: The City has secured \$1 million in funding to assess the feasibility of transforming the Inner Loop from East Main Street to State Street into an at-grade, complete street. This is a distance twice that of the Inner Loop East Transformation project and will require a similar analysis of traffic redistribution and associated impacts to surrounding facilities.
- NYS Route 390/I-490/Lyell Avenue Interchange: This project is located on the City's western boundary in the Town of Gates and addresses the Region's largest bottleneck, which directly affects the viability of the manufacturing, processing, and distribution establishments located in the Northwest and Southwest Quadrants of the City. The project has a price tag of approximately \$150 million and includes four phases, the last two of which will be constructed using a design-build procurement that began in July 2018. Improvements to NYS Route 390 will meet the standards for the highway to be designated an interstate, which has been recommended to assist in the marketing of sites in northwestern Monroe County to national site selection consultants.

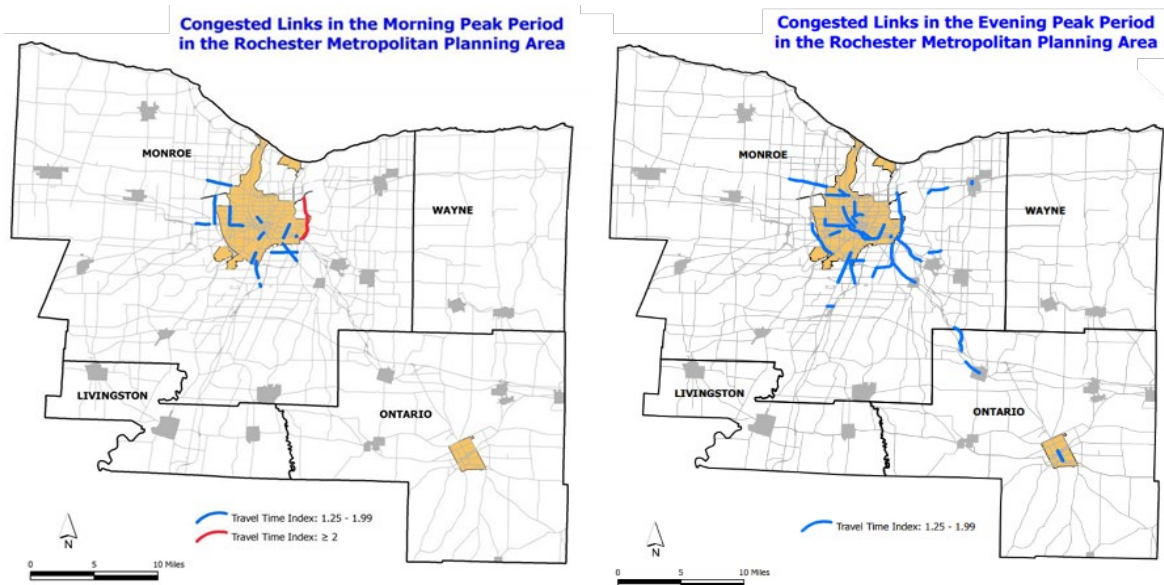
Economic & Community Development

Overall, there is sufficient capacity for current and projected freight volumes as congestion in Rochester is primarily limited to morning and evening peak periods on weekdays. This delay is lower in terms of intensity and duration than similar-sized cities. The roadways that experience it are commuter corridors heading into and out of the Center City District. This is not to say that there will not be areas of localized congestion for commercial trucks making local pickups and deliveries that will need to be addressed as the location of freight generators changes over time. Figure 10 presents the congested links in the Rochester Metropolitan Planning Area during the

morning and evening peak periods. (Note: a travel time index [TTI] of 1.25 to 1.99 means that a trip in the peak period takes 25-99 percent longer than under free-flow conditions and a TTI equal to or greater than 2.00 means that the trip takes twice as long or more in the peak period compared to free-flow conditions).

Employment levels in the manufacturing and processing industry do not correlate directly with the amount of goods created by these businesses. Increases in productivity generated by automation and improved processes mean that even if manufacturing and processing employment remains stable or declines slightly, the amount of goods and intermediate inputs developed in the City will increase, resulting in more trucks on the road. This increase will not necessarily result in more congestion on the City's and Region's roadways. The decision on when these shipments will begin their journey to the next destination can often be scheduled to coincide with lower traffic volumes in the evenings and overnight.

Figure 10 Congested Links in the Rochester Metropolitan Planning Area, 2015



Source: INRIX via Genesee Transportation Council

Opportunities to improve the transportation network for the purpose of generating additional economic activity (increased jobs in existing establishments and altogether new establishments) in the storage and distribution industry are limited. The Port of New York/New Jersey has an existing "inland port" (IP) established with CSX in Buffalo and another is being planned in the Town of DeWitt outside Syracuse to handle additional multimodal container distribution. The catchment area for the DeWitt IP is estimated to be 75-100 miles, which would mean that capacity in both Buffalo and Syracuse would need to be projected to be near fully utilized prior to considering another IP in Western or Central New York. If or when this occurs, a location in Rochester would be difficult to find. Expansion of the CSX South

Goodman Yard is not viable. While it abuts some industrial land, it is surrounded by primarily residential areas.

Future development at Eastman Business Park (EBP) is still being determined. The existing facilities are better suited for research and development activities than manufacturing and processing or storage and distribution. Internal access and circulation issues and the repurposing of buildings to better accommodate freight via improvements such as additional loading docks of longer lengths are currently being planned and implemented by Kodak. Any construction of new structures on vacant areas at EBP will need to address environmental issues and the related liability associated with development. These issues at EBP that complicate the addition of manufacturing and processing or storage and distribution combined with the locational advantages of sites to the east and west for major multimodal logistics hubs results in limited needs for additional freight rail capacity

Retail in the City is primarily locally-owned businesses, including smaller boutique-type stores. Recent non-locally-owned retail development has included discount chains (e.g., Dollar Tree, Dollar General, etc.) throughout the City and the addition of PriceRite supermarkets in the Northwest Quadrant and Southeast Quadrant. Overall, there is limited growth in retail projected citywide with most expected to occur in the Southeast Quadrant. Any additional demand for new retail is largely tied to continued residential development Downtown. If the required critical mass to attract new retail, dining, and entertainment establishments is met, additional deliveries will result. It is not anticipated that there will be much growth in retail of non-durable goods anywhere in the City as these are typically provided by big box chains that have permeated the inner ring suburbs and are also available through online ordering.

According to the U.S. Bureau of Transportation Statistics, the amount of freight generated per person annually is approximately 60 tons. As UPS, FedEx, USPS, and others increase their deliveries directly to residences rather than stores, the issue of smaller single-unit truck (box truck and van) and additional automobile traffic could become a quality of life issue in city neighborhoods. While deliveries to residences replace some person trips to stores, the majority of studies on this issue project there will be a net increase in the number of trips to residences. Two needs arise out of this scenario: 1) ensuring limited disruption to daily residential activities due to increased vehicle traffic and noise and 2) mitigating emissions from delivery vehicles.

A benefit of the sufficient capacity on existing roadways and lack of weight-restricted bridges is that large trucks are not required to reroute through residential areas as part of their through trips to other locations. The nature of cities, with mixed-use buildings in dense environments, means that there will always be interaction between residents and larger vehicles (Figure 11). However, the presence of an excessive number of larger trucks in and near neighborhoods creates not only quality of life issues but also safety concerns as these vehicles have increased

interaction with bicyclists and pedestrians on narrower streets. In addition, larger trucks in and near neighborhoods has the potential to result in environmental justice issues if the trucks are traveling through communities of concern, including those with concentrations of persons of color, low-income individuals, persons with disabilities, and individuals with limited English proficiency.

Public Safety

The ability to provide emergency response and ensure public safety requires predictability. This applies to not only certainty in personnel and equipment but also the transportation network. This is critical because, unlike freight carriers, emergency responders cannot choose when they travel and direct routing is more than an economic consideration. As discussed previously, RFD apparatus can travel over any bridge carrying a public roadway. Once on the scene of a fire, fire trucks and fire engines require a minimum amount of physical space to establish a safe distance for personnel and vehicles, access equipment, and stabilize their vehicles through the use of outriggers when utilizing aerial ladders.

Figure 11 Delivery on Park Avenue, June 2018



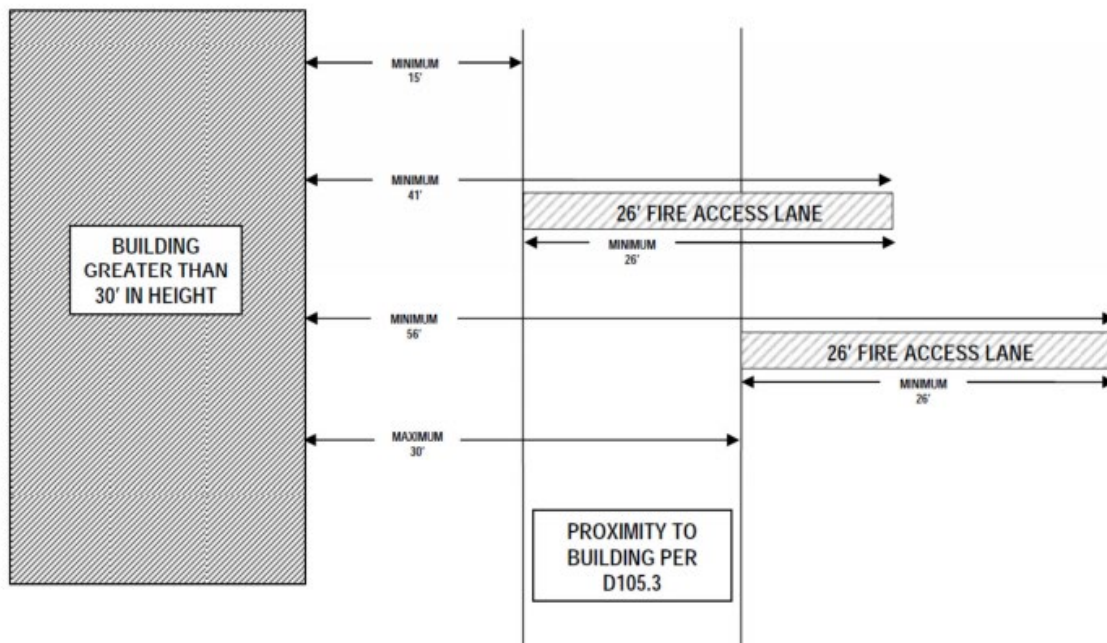
Source: T.Y. Lin International

The 2015 International Fire Code (IFC), as amended by the 2017 NYS Supplement, became effective on October 3, 2016. The IFC is produced by the International Code Council and provides construction standards to ensure that the potential for

fires, explosions, and the unsafe handling of hazardous materials is reduced to the greatest extent possible through the proper design and separation of incompatible uses within buildings. The City of Rochester Fire Marshal serves as the responsible “fire code official” (as referenced in the IFC) with the authority to require that the IFC is complied with. Section (§) FC 503 of the IFC provides the requirements for fire apparatus roads and §FCD 105 does so for aerial apparatus access roads. The NYS Supplement does not alter the IFC for these selections (i.e., municipalities in New York State are subject to the same requirements as municipalities nationwide unless their respective state has amended these sections of the IFC).

Per the IFC, all streets must have a minimum, unobstructed width of at least 20 feet, not including shoulders. Streets with even a single building whose height exceeds 30 feet, as measured by the intersection of the roof with an exterior wall (including an eave on a pitched roof) or the top of a parapet wall (whichever is greater), must have a minimum width of 26 feet, not including shoulders. These streets must also run parallel to one entire side of the building and be no less than 15 feet and no more than 30 feet from it (Figure 12). Space dedicated to on-street parking cannot be considered in the minimum width of the streets under either requirement.

Figure 12 Standard Aerial Fire Apparatus Access Road for Buildings Greater than 30 Feet Tall



Source: Town of Brighton, New York

As a result, adherence to the IFC means that the construction of buildings four stories or more (which is desired in certain parts of the City to increase density and enhance the urban fabric) could require that the streets that serve them have unobstructed widths that exceed those typically designed to slow traffic and better provide for travel by bicyclists and pedestrians. Outside of alternate street design or variances

from the New York State Regional Board of Review, the solution would be to construct roads that are either wholly dedicated to fire apparatus (including aerial) or restrict vehicles with access limited to non-motorized uses and fire apparatus.

Shared Requirements

Beyond commercial trucks and fire apparatus, other large vehicles travel along City streets. These include passenger buses (including Regional Transit Service, Greyhound/Trailways, Megabus, and tour bus operators) and refuse and recycling trucks on a daily basis. On a less frequent (but still regular) basis is the use of trucks on City streets related to traveling entertainment tours such as events at the Blue Cross Arena at the War Memorial, Kodak Center, Auditorium Theatre, and other venues. A significant difference between these types of vehicles and freight shipping and emergency service vehicles is related to their operation: they run on predictable schedules and defined routes. However, one commonality outweighs their differences. At times, all of these large vehicles compete for the same curb space in the City (albeit for typically shorter durations of time compared to passenger vehicles and fire engines and fire trucks). This reinforces the need for both designing roadways to transport users serving the myriad of functions that the City requires and managing curb space in terms of location, time of day, and duration.

4 Recommendations

While many cities grapple with infrastructure deficiencies that impair the movement of goods and/or emergency response vehicles, Rochester's highways and bridges have few structural issues and sufficient capacity to support efficient movements without excess delay. Citizen complaints about trucks creating noise and safety issues are infrequent. This provides the City the opportunity to address issues that are likely to emerge in a proactive manner with an eye on balancing economic, environmental, and equity issues. The recommendations provided herein reflect an emphasis on cost-effective solutions that will require coordination with the freight community and multiple City departments – most notably Environmental Services (DES), the RFD, and Neighborhood & Business Development (NBD). Many of the recommendations relate to each other and their advancement and ultimate success are interconnected.

Infrastructure

I.1. – Implement Context-Sensitive Improvements to Support Economic Development

To maintain and enhance the viability of City businesses that rely on the efficient movement of goods to and from their location(s), there are and will be smaller-scale capital improvements that will need to be made. In many cases, the requests from businesses will involve additional/realigned points of access and wider turning radii at intersections to accommodate trucks that ride over a portion of the curb when making right-hand turns.

Any improvements should consider all users within the context of the street on which the change(s) is being requested. Per the National Association of City Transportation Officials (NACTO), different “design vehicles” can be assigned to streets by their use so that items such as turning radii are designed for the largest vehicle that frequently uses a particular type of streets. This ensures that the surrounding land uses (i.e., the context) and the street work with rather than against each other.

Recommendation D.1. proposes that city streets be classified by the purpose they serve in moving goods. Associated design vehicles could be assigned to each freight roadway classification, with a process for determining required justifications for exceptions.

I.2. – Further Incorporate Freight & Emergency Services into Capital Programming Criteria

As noted earlier, the movement of goods and emergency vehicles are not standard considerations in city transportation planning locally and nationally. Not surprisingly, they receive scant attention in many capital improvement program project prioritization processes. The programming process yields the best results when the criteria for evaluating the universe of projects under

consideration are directly related to specific objectives. This is referred to as performance-based programming, tying investments to specific outcomes that matter to users.

In conjunction with the freight classifications created and assigned to specific City streets in recommendation D.1., criteria could be created to rank projects based on a variety of factors including:

- Does the project reduce crashes involving trucks (with additional emphasis given to crashes involving bicyclists and pedestrians)?
- Does the project increase efficiency and reliability for large vehicles on streets (including those that are currently weight-restricted) serving manufacturing and processing and storage and distribution establishments?
- Does the project mitigate the negative impacts of large vehicles (e.g., noise, emissions, etc.) to the environment and communities of concern?
- Does the project reduce response times for emergency service providers by improving street connectivity or improving egress from their facilities?
- Does the project provide designated loading/unloading zones to serve retail, dining, entertainment, and lodging establishments?

I.3. – Resolve Existing Bridge Clearance Issues

There are two ways to increase the clearance between the surface of a street and the underside of a bridge (e.g., slab, girders, etc.): lowering the profile of the street or raising the bridge. Neither of these options is cheap but lowering the roadway is almost always less expensive than raising the bridge. This is particularly true for railroad bridges. The benefits of resolving the current inefficiencies resulting from height-restricted bridges in Rochester would likely not exceed the costs of doing so when factoring the existing life left in the pavements. Therefore, it is recommended that when the streets that pass under these bridges require full-depth reconstruction, the project limits be expansive enough to allow for the lowering of the profile of the new street surface. Non-infrastructure solutions include further promotion of commercial GPS systems that provide the required information on clearances and weight restrictions to truck drivers, and the potential development of real-time detection and warning systems that alert them to impending issues.

Design

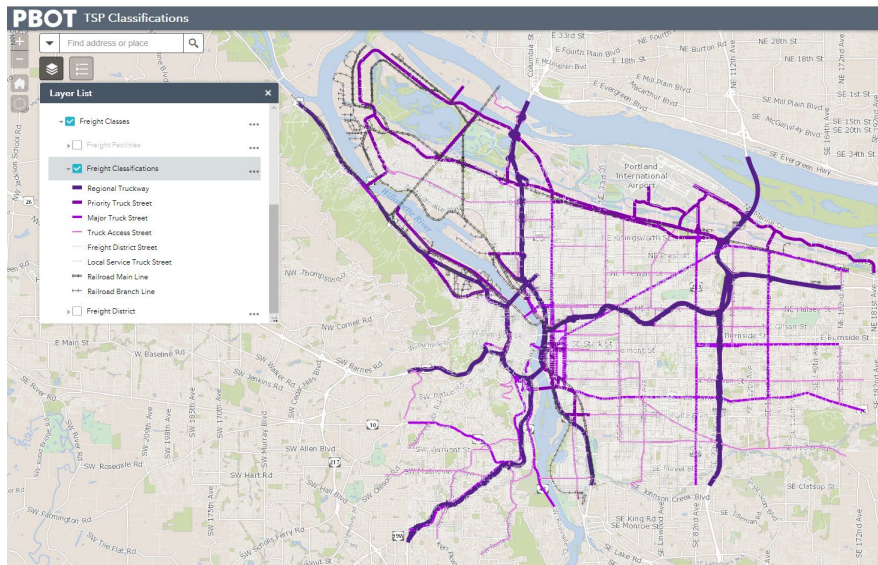
D.1. – Create Freight Roadway and Emergency Response Classifications that are Incorporated into the *City of Rochester Street Design Guide*

As referred to in the Infrastructure recommendations, classifying streets in the City according to the role they serve in moving goods and providing mobility for emergency vehicles when responding to incidents can inform design and the prioritization of projects when allocating the limited funding available for public works initiatives. These classifications can be based on multiple factors that vary for trucks and emergency response vehicles, reinforcing that accommodating large vehicles is necessary for the City to function properly.

The City of Portland, Oregon has developed hierarchal classifications for all forms of personal travel as well as freight and emergency response as part of its *2035 Transportation System Plan* (see Figure 13 and Figure 14). Factors considered in developing freight classifications include land uses served, function, connections, and design. Specific classes include:

- Regional Truckways – Include all Interstates and major arterials. They serve industrial establishments and other large freight generators with the purpose of providing “safe and efficient continuous-flow operation for trucks.” They connect to other streets that carry large numbers of trucks, such as Priority Truck Streets (see below), and are designed as limited access facilities that can accommodate all types of trucks.
- Priority Truck Streets – Provide access and circulation within designated Freight Districts and also connect them to Regional Truckways. They are designed to accommodate all types of trucks (including oversized loads) and include buffers to reduce noise in adjacent neighborhoods.
- Major Truck Streets – Serve as the principal routes for non-industrial freight-generating establishments, such as retail, connecting them to Regional Truckways. Trucks that do not make a stop along Major Truck Streets (i.e., through trips) are discouraged from using them. Their design accommodates trucks of all types “as practicable.”

Figure 13 Portland, Oregon Freight Street Classifications



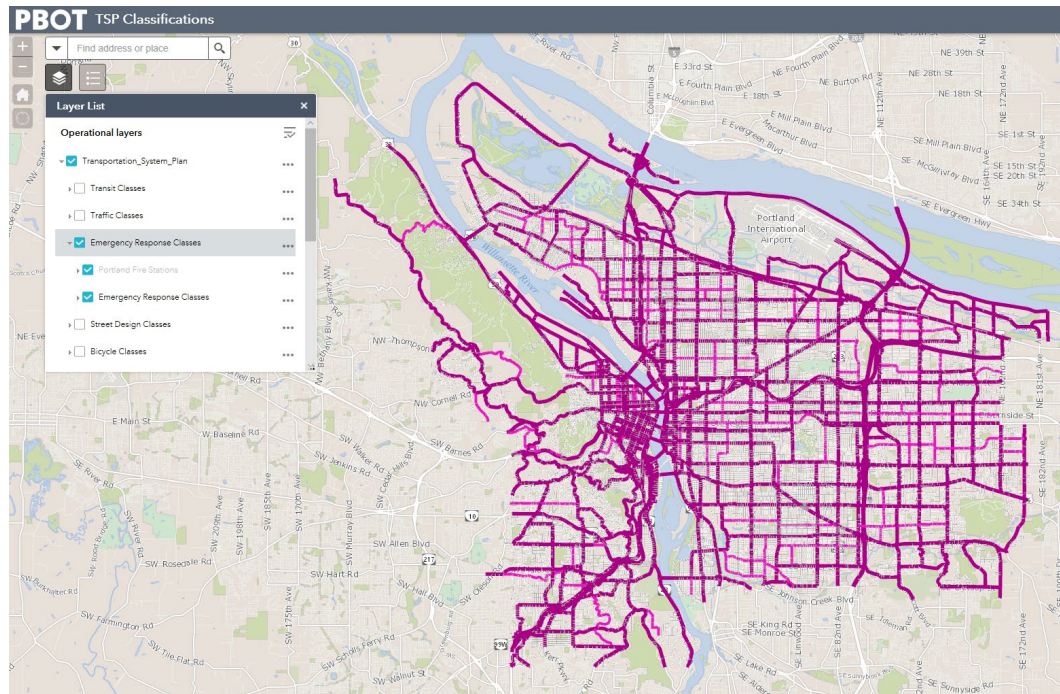
Source: City of Portland

- **Truck Access Streets** – Provide access to establishments in neighborhoods by trucks coming from Major Truck Streets. Non-local truck trips are discouraged from using these streets. They are designed to balance trucks' needs with the context of the neighborhoods they serve.
- **Local Service Truck Streets** – Serve the delivery needs of individual establishments and residences. "Use of restrictive signage" to deter non-local truck trips is appropriate on these streets.

Emergency Response Streets are intended to create an interconnected network. They are classified based on the type of design improvements that should be made and traffic slowing measures that should be avoided. Specific classes include:

- **Major Emergency Response Streets** – Design changes should improve the mobility of emergency vehicles and traffic slowing measures (where allowed based on the Traffic Classification) can only be added per the approval of the Portland Fire and Rescue Bureau.

Figure 14 Portland, Oregon Emergency Response Classifications



Source: City of Portland

- Secondary Emergency Response Streets – Design changes should improve the mobility of emergency vehicles with limited traffic slowing measures allowed “to enhance safety and livability.”
- Minor Emergency Response Streets – These are all streets not classified as Major Emergency Response Streets or Secondary Emergency Response Streets. The emphasis on these streets is the provision of access to individual properties while enhancing safety and maintaining livability.

D.2. – Identify Opportunities that Meet Both City Street Design Principles & the IFC

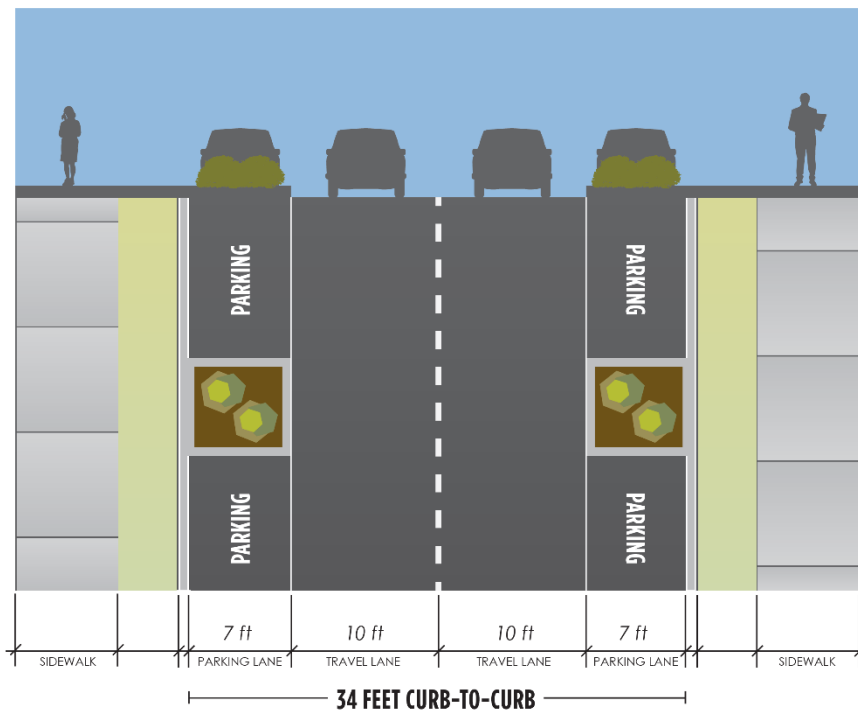
There is a mismatch between the widths of streets required by the IFC to allow for the use of fire apparatus compared to those desired by citizens, public health advocates, and others that recognize the direct correlation between narrower streets and reduced numbers and severity of crashes. One of the City’s most preferred street components can also help to meet IFC requirements: bicycle lanes. Bicycle lanes expand the width of streets, providing space for fire apparatus and creating wider turning radii for their turns.

Pavement that is colored, for bicycle lanes and other purposes, can serve as traffic calming measures. Other traffic calming measures that can assist in meeting IFC requirements include inset parking and speed cushions. Inset

parking can provide needed on-street parking and maintain limited lane widths (Figure 15). Speed cushions are speed humps or speed tables with cuts that are spaced for tires of fire engines and fire trucks, allowing unencumbered mobility for the largest emergency vehicles (Figure 16).

To address the IFC requirements for buildings whose height exceeds 30 feet and requires a minimum pavement width of 26 feet, the City should consider separate fire aerial apparatus access roads in site design to the greatest extent possible. This would alleviate the need for wider public streets. Where possible, the inclusion of bicycle lanes on the streets parallel to the side of a building and mountable curbs should be a primary consideration.

Figure 15 Inset Parking Layout and Dimensions



Source: Nelson\Nygaard

Figure 16 Speed Cushions



Sources: NACTO and Seattle Department of Transportation

D.3. – Eliminate Potential Conflicts with Bicycle Lanes & Transit Stops

A number of uses compete for street space outside of automobile travel lanes. With the City's current emphasis on promoting transit and bicycling as alternatives to automobile travel, the need for more actively managing curb space becomes imperative to ensure there are adequate spaces for loading and unloading of freight in mixed-use districts where all users are present (Figure 17).

The decision to manage curb space as dedicated for certain uses or be flexible for multiple uses will need to be carefully considered going forward depending on the projected demand for different uses. Looking to the future, the introduction of automated passenger vehicles and delivery trucks adds the consideration of revenue to the use of limited space. How limited curb space will not only be defined but also charged for becomes a factor.

Figure 17 Curb Space Usage on Main Street in front of Powers Building, July 2018



Source: T.Y. Lin International

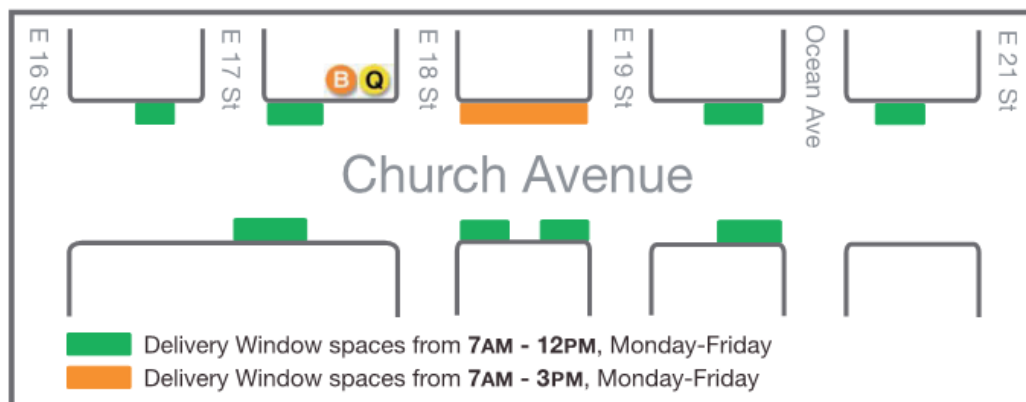
Operations

Q.1. – Track Traffic Patterns to Determine Need for Delivery Windows/Restrictions

Larger cities across the country and the world have implemented specific hours for deliveries. These can limit negative impacts to traffic operations by eliminating double parking and other activities that reduce roadway capacity. They should be part of a comprehensive curb space management policy and include not only location but also duration. These can include off-hour deliveries in neighborhoods and mixed-use districts that must include outreach to and input from residents and merchants.

In New York City, the implementation of the off-hour delivery program included recruitment of establishments, which incorporated information on benefits to them. Figure 18 presents delivery window spaces designated on Church Street in Brooklyn, New York. If issues were to arise in Rochester around delivery of goods, it would likely be in the Downtown/Center City District. Implementation of delivery windows would require modifications to and expansion of City Code "§ 111-70 Vehicles prohibited in Central Traffic District"

Figure 18 Delivery Windows on Church Avenue in Brooklyn, New York



Source: New York City Department of Transportation

Q.2. – Track Citywide Truck Movements to Determine Need for Designated Truck Routes

Cities can manage freight from a time perspective (see recommendation O.1.) and a location perspective. If the volume of trucks increases as predicted, it may be necessary for the City to manage both. In the event that designated truck routes are deemed necessary, they should be guided by the classification of streets conducted as part of recommendation D.1. to ensure consistency between the intended purpose of streets with respect to freight and their design.

Another important factor in selecting the routes is discouraging disproportionate designation of streets that run through communities of concern. The key to designated routes being effective is education and enforcement. Designated

truck routes should be signed as such and affected vehicle operators should be made aware of their introduction and any changes to them. The New York City Department of Transportation (NYCDOT) not only posts its designated truck route map on its website but also distributes approximately 80,000 hard copies annually. Integrating the truck routes into commercial GPS services is also advised. Once established, enforcement via warnings and/or fines to violators that use non-designated streets for through trips is required.

O.3. – Monitor Complaints to Determine Need for Designated Truck Parking Facilities

Commercial vehicles such as trucks (as well as recreational vehicles) are not allowed to park on any city street for more than six consecutive hours per City Code “§ 111-17 Parking of certain vehicles for more than six hours.” The lack of formal complaints to the City and comments as such received via the public involvement activities of the CAMP indicate that illegal truck parking is not currently an issue in neighborhoods in Rochester.

Opportunities for the City to harness truck parking as an economic development initiative are limited. Long haul trucks and larger fleet operators tend to only purchase fuels at travel centers located near an interstate. The lack of job creation potential indicates that mitigating and eliminating truck parking that disrupts the quality of life in City neighborhoods should be identified and addressed early if it occurs.

O.4. – Promote the Deployment and Use of Freight-Specific Intelligent Transportation Systems (ITS) Components

Increasing the amount and types of technology that provide information to truck operators has been proven to make the movement of goods safer and more efficient. The more expansive the deployment of ITS elements (e.g., closed circuit television cameras, continuous vehicle count sensors, dynamic message signs, etc.) on City roadways, the greater the ability to collect data and process it into real-time information that all users – including truck operators – can benefit from.

Specific capabilities and uses of ITS for goods movement in the City include:

- Enhancing the 511NY system to provide up-to-the-minute information on weather, crashes, construction, and road closures.
- Ensuring that GPS providers have accurate information on bridge clearances and weight limits.
- Collecting data on truck movements via ITS devices to assist in the implementation of recommendations O.1. and O.2.
- Gaining an improved understanding on the amount and type of commodities moved into, out of, and through the City.

Vehicles

V.1. – Assist Shippers & Carriers in Transitioning to Cleaner Vehicle Fleets

According to the U.S. Environmental Protection Agency (EPA), medium and heavy-duty vehicles comprise 10 percent of the overall fleet in the country but produce 20 percent of greenhouse gas (GHG) emissions. EPA and New York State both have programs that offer resources to shippers, carriers, and logistics companies to reduce emissions. The EPA SmartWay program is intended to advance sustainable transportation supply chains through performance measurement, benchmarking, and sharing of best practices among participating companies.

The New York Truck – Voucher Incentive Program includes the New York State Electric Vehicle Voucher Incentive Fund, which provides \$9 million to cover the incremental cost (the difference in price between a traditional vehicle and electric vehicle) of purchasing any truck with a gross vehicle weight rating greater than 10,000 pounds. The City can encourage companies to participate in these and other programs to help reduce emissions resulting from the movement of goods into, out of, and within the city.

V.2. – Assess Opportunities for the RFD to Utilize Smaller, Safer Fire Engines & Fire Trucks

Above all else, fire engines and fire trucks must be able to address fire incidents (structural or otherwise). The smaller apparatus employed in Europe and elsewhere are a function of needing to navigate narrow streets that were originally built several centuries ago and are insufficient for American cities. Cities such as San Francisco, Hamilton, Ontario, and others are beginning to transition the fire apparatus component of their fleets to smaller vehicles. A reduction of 10 inches in the length of the vehicle can reduce the turning radius by eight feet. Doors that roll up rather than open outward and shorter outriggers can also make fire trucks more city-friendly without compromising firefighting capabilities.

Safety features such as no tint windows so firefighters can make eye contact and more easily communicate with pedestrians and bicyclists and the addition of cameras that provide a 360-degree view outside the vehicle to the driver can increase safety during responses. Beyond the actual vehicles, departments (including the Portland Fire and Rescue Bureau) are beginning to implement processes to more efficiently respond to medical assist and emergency medical service calls.

V.3. – Support Pick Ups & Deliveries by Bicycles

Shipments to many neighborhood-level retail establishments and residences in the City are of lower volume and do not require delivery by truck or car. The same is true for restaurants and stores that make deliveries (such as grocery

stores and pharmacies). Cargo bicycles, fully human powered or with electric assist (as pictured in Figure 19), provide many benefits. They offer reduced monetary costs compared to cars and trucks in terms of initial capital outlay, for purchase of the bicycle, and ongoing maintenance and fuel. The lack of emissions of localized pollutants and GHGs improves public health. Cargo bicycles for pickups and deliveries would also leverage the City's growing number of bicycle facilities and further promote cycling as a mainstream form of travel in addition to automobiles.

Figure 19 Cargo Bicycles in New York City and Portland, Oregon



Safety

S.1. – Develop Informational Resources to Increase Safe Operation of Large Vehicles and Other Modes

When most people hear “Share the Road”, they immediately think of drivers of passenger cars and trucks being reminded that they are required to adhere to laws aimed at protecting bicyclists and motorcyclists. “Share the Road” is an initiative of the National Highway Traffic Safety Administration, a part of the U.S. Department of Transportation (USDOT), responsible for reducing injuries and fatalities on roadways.

The Federal Motor Carrier Safety Administration (FMCSA) – also part of the USDOT – has a similar responsibility with its emphasis on commercial motor vehicles (large trucks and buses). FMCSA administers its program “Our Roads, Our Safety” to educate drivers of both passenger cars and trucks, commercial drivers, and bicyclists and pedestrians on how they can better coexist, which is of particular importance in urban settings. An emphasis of “Our Roads, Our Safety” and similar programs at the state and local level, including the NYCDOT’s “Truck’s Eye View”, (Figure 20) is to increase awareness about the substantial blind spots operators of large trucks must contend with as they drive. The City could utilize the “Our Roads, Our Safety” toolkit and emulate the “Truck’s Eye View” program to promote a better understanding among motorists, bicyclists, and pedestrians of how to interact with large vehicles.

Locally, the New York Bicycling Coalition has a “Bicycle Friendly Driver” presentation and curriculum for fleets. Creating a program that recognizes

companies whose drivers have completed this program could be a means for promoting their commitment to safety to potential customers to differentiate their services and products from their competitors.

Figure 20 FMCSA and NYSDOT Educational Materials on Commercial Vehicles



S.2. – Identify Areas in Need of Increased Enforcement of Speed Limit, Parking, & Idling Laws

NHTSA reports that in 2016 (the latest year for which data is available), over 10,000 people died as a result of motor vehicles being operated at excessive speeds. This accounted for more than one in four traffic fatalities that year. The increase in pedestrian mortality rates as vehicle speed increases is well documented. The results of crashes between trucks and pedestrians are even more dire than when a passenger automobile is involved. Many parking regulations are intended to provide adequate sightlines for motorists, bicyclists, and pedestrians, as well as ensure needed access to fire hydrants. Trucks create larger safety concerns than passenger automobiles when they park illegally due to their size. The New York State Environmental Conservation Law prohibits commercial trucks and buses from idling more than five minutes at a time with fines of up to \$18,000 for the first violation. Trucks engaging in any of these activities – speeding, parking illegally, or idling in excess of the law – compromise safety and public health. Addressing these issues is critical to protecting and improving quality of life, especially in residential neighborhoods.

S.3. – Inventory and Monitor Maintenance of At-Grade Rail Crossings

There are 26 at-grade railroad crossings in the City of Rochester. There is equipment (e.g., gates, signage, lights, etc.) at these crossings to prohibit movement across them when a train nears, is present, and as it passes by. Ensuring that the safety devices at these crossings are maintained in a state of good repair is imperative as train collisions with vehicles and passengers, while rare, have a high potential to be tragic. In the best-case scenario, an equipment failure results in a closed crossing that creates delays for motorists. Congressional members representing Rochester have identified and continue to raise local grade crossing safety as a priority at the federal level. Local elected officials, neighborhood advocates, and other stakeholders can support

these efforts to have repairs made in a timely manner and for maintenance records be provided for public inspection.

Partnerships

P.1. – Establish A Freight Advisory Committee

Freight advisory committees provide a forum for cities to engage freight-related businesses, neighborhood organizations, real estate management and development companies, and regional and state transportation agencies. The primary role of the committee is to consider, deliberate, and advise the City on issues related to all facets of urban goods movement. Including a diverse array of stakeholders is vital and allows a freight advisory committee to be a well-rounded forum for discussion and knowledge transfer, as well as advocate for policy changes and resources that will benefit the City at the state and federal levels. By-laws that define purpose, membership, roles, and processes should be created as a framework to set expectations and guide decision making.

P.2. – Work with Employers, Shippers, and Carriers on Routing Options

Even if the thresholds required to designate truck routes as discussed in recommendation O.2. are not realized, the City will still have occasion to work with employers, shippers, and carriers to ensure that truck traffic does not interfere with City activities of varying duration (e.g., street construction, community events, etc.) nor is excessively hindered by city policies. Members of the freight advisory committee established by recommendation P.1. can provide outreach to other employers, shippers, and carriers to gain their input and involvement when truck traffic needs to be routed around specific locations.

P.3. – Participate in Regional Freight Planning Efforts

The current federal surface transportation legislation includes enhanced provisions for freight planning and funding compared to previous versions. The current regional freight plan produced by the Genesee Transportation Council (GTC) was completed in June 2012. When the GTC updates this plan or undertakes other regional goods movement related activities, the City should fully participate. Providing review of materials from and input to these processes could be a key function of the freight advisory committee from recommendation P.1. (if formed).

P.4. – Identify Opportunities for City Residents in Freight-Related Jobs

Careers in professions serving goods movement professions offer potential employment opportunities for City residents. Creating partnerships between the Rochester City School District, trade unions, and freight-generating

businesses and their professional associations can enhance workforce development. The development of specific school-to-work curricula and training programs can prepare individuals for a variety of jobs, including commercial truck drivers, shipping and receiving clerks, and packers/packagers.

The recommendations discussed above are intended to be cost-effective, proactive and address issues related to the economy, the environment, and equity for all citizens. Implementation of the recommendations will ensure that goods movement and emergency response capabilities in the City will be maintained and improved.