Transit Oriented Development for a More Climate Resilient Connecticut

Challenges and Opportunities in Fairfield and New Haven Counties

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Dr. Rosalie Singerman Ray, Dr. Carol Atkinson-Palombo, and Dr. Norman Garrick
Transportation Technology and Society Research Group

CIRCA
Connecticut Institute for Resilience and Climate Adaptation

CONNECTICUT Department of Housing

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Executive Summary

Over the past decade, Connecticut has made a strong push for transit-oriented development (TOD), receiving grants from the federal department of transportation and giving grants of their own to cities and towns to support it. In some parts of Connecticut, however, TOD is as much returning to past forms of urbanism as building anew, as cities along the Metro-North New Haven Main Line were largely developed before the car. While TOD as a policy to facililate less auto-dependent lifestyles is essential for climate change mitigation and resilience, implementation has been slow, with project proponents struggling to coordinate the many moving parts, facing opposition in towns, and building around transit that may not be as fast and as frequent as it needs to be. The challenge of sea level rise, which disproportionately threatens many of these cities and towns along the Metro-North New Haven Main Line adds to the difficulty.

Using a mixed-methods approach, this project assessed the challenges and obstacles to TOD along the Metro-North New Haven Main Line. We analyzed all TOD plans for those towns and stations that had them, then supported that analysis with interviews with 13 stakeholders. In parallel, we conducted our own quantitative analyses of bus service and station area walkability, and a geospatial analysis of the effects of sea level rise on parcels within a half-mile of the station. For sea level rise, we used CIRCA's 1% annual exceedance probability (AEP) storm surge flood shapefile in 2050 (with 20 inches sea level rise, herein referred to as CIRCA 1% AEP 2050) (O'Donnell, 2019).

In analyzing the 17 plans we identified, we found that parking was the most thoroughly discussed piece of TOD plans, with towns struggling to balance the need for limiting parking and removing it from view with demands for parking around stations. Only a few towns (Darien, Fairfield, and Bridgeport) addressed the central cause of the tension: parking minimum standards for new development. Walkability was the second most discussed, but only seven stations had detailed maps of specific improvements that would be made to the street network. Congestion appeared as a central concern in nine plans, but with the exception of the Cos Cob Neighborhood Plan, all chose to address congestion through traffic calming and walkability improvements rather than further accommodating the car. Twelve TOD plans incorporated discussion of the bus network into the plan, acknowledging that transit includes more than just the Metro-North, and seven had detailed changes to bus stop locations or routes. Turning to sea level rise, discussions of flooding focused on either flood plain location or constraints to subterreanean parking, while only the most recent plan, East Norwalk, explicitly discussed sea level rise.

Interviews largely revealed that progress has been made since the plans were produced, but also that state-level planning has not yet targeted attention on those cities with the most TOD potential. Nearly every public-sector interviewee acknowledged sea-level rise as a major issue they were considering moving forward, dating their awareness of the issue to Superstorm Sandy. Since completing their downtown plan, Bridgeport has moved forward on a plan to eliminate parking minumums. Cities and transit districts are also collaborating more on transit, though the interest lies as much in microtransit as in traditional fixed-route service. That said, much of the state's focus on TOD over the last decade has been not on the Metro-North corridor but along new-build transit projects, believing that the New Haven Main Line TOD would take care of itself. This may be shifting with recent efforts to improve travel times on the Main Line and the

potential availability of federal money for Barnum Station, an express station project in Bridgeport that would unlock TOD potential in its urban street grid.

The walkability analysis measured the intersection density and link-node ratio (the average number streets per intersection) around the station and then used Google Maps Streetview to conduct an assessment of walkability by noting available crosswalks and sidewalks, road witdh and speed, and the presence of building frontage (as opposed to surface parking). The potential Barnum Station location ranked highest on intersection density and link-node ratio, followed by the New Haven and Norwalk stations and Milford. Westport, Green's Farms, and Cos Cob ranked the lowest.

The bus network analysis, identifying the average daily frequency of all networks interfacing with the Main Line revealed significant discrepancy between New Haven and the rest of the towns on the line. Of the 23 routes that come more frequently than once every half-hour, 14 are in New Haven. New Haven also has the only two routes that come more frequently than every 15 minutes, the gold standard of show-up-and-go service. Buses support the daily trips that make car-free living possible, and outside of New Haven, and to a lesser extent Bridgeport, the bus networks along the Main Line are not robust enough to provide that support.

The sea level rise analysis revealed that only Noroton Heights and Darien have station areas untouched by the CIRCA 1% 2050 flood projections. The station areas with significant impacts on parcels within a half-mile of the station are Fairfield, Stamford, Cos Cob, and Green's Farms. The most impacted TOD zones (areas included in TOD planning) are Stamford (whose entire station area is a TOD zone), Bridgeport, South Norwalk, Stratford, West Haven, and State Street New Haven. New Haven, Norwalk, and Bridgeport also have more than half-a-mile of track that fall within flood projections, while Westport and Fairfield have between a quarter and a half mile of affected track. The track estimates have implications for the system as a whole, as the success of TOD along the eastern stretches of the line depends on the resilience of the entire line, even in areas, like Green's Farms, which may not be suitable for TOD itself.

Given the above, we recommend the following:

1. **Mandate incorporation of sea-level rise analysis in TOD planning.**
2. **Invest in the cities that already have transit-supportive land uses and street networks.**
    a. **Incorporate metrics of intersection density (100+ per half-mile radius) and link-node ratios of at least 1.4 into evaluation of transit investment planning and TOD implementation grants to encourage towns to build dense, connected, and walkable projects, in addition to existing attention paid to complete streets style improvements.**
3. **Invest in the buses in those cities to facilitate car-lite living.**
    a. **Build in more scope for local governments to contribute financially to transit and support quarterly meetings between cities and transit providers**
    b. **Target transit funding to key corridors, supported by incentives for densification.**
4. **Proactively plan for TOD at the state level**
    a. **Improve standardized, state-wide data collection and provision.**
    b. **Support hiring of transportation staff with holistic expertise in land use and resiliency, including by developing a pipeline of trained planners in the state.**

Introduction: What is TOD?

The state of Connecticut defines transit-oriented development (TOD) as "the development of residential, commercial, and employment centers within one-half mile of walking distance of public transportation facilities, including rail and bus rapid transit and services, that meet transit supportive standards for land uses, built environment densities, and walkable environments, in order to facilitate and encourage the use of those services (CGS 13b-79o)." The definition accords with Peter Calthorpe's initial conception of the idea: building out islands of dense, mixed-use, walkable neighborhoods connected by transit, and slowly expanding those islands to transition away from auto-dominated land uses (Calthorpe, 1993).

Along the Metro-North New Haven main line, however, we are as much returning to TOD as we are building it out. Strung out along one of the busiest commuter rail lines in the country are the relatively walkable downtowns of Greenwich, Stamford, Norwalk, Fairfield, Bridgeport, Stratford, Milford, and New Haven, all built before the car dominated city streets. Some of these downtowns, notably Stamford, Bridgeport, and New Haven, were redeveloped to accommodate the car, necessitating efforts to restore the dense, mixed-use downtowns, and the transit service that once supported them (Polinski, 2015). Restoring TOD around these areas means activating and valuing the existing resources the state has.

Building compact, walkable, mixed-use developments near transit is essential for transitioning from auto-dominance toward more sustainable cities. Yet, despite its popularity, implementation of TOD has been slow, even in Connecticut. One of the challenges for TOD is that it is an example of networked governance, requiring multiple actors from both the public and private sector to collaborate on a complicated project, manage multiple goals, and mitigate risk for an extended period (Mu and de Jong, 2016). Another is that as currently operated, with commuter rail service focused on peak-hour travel to New York City and buses running too infrequently, much of our transit infrastructure does not support car-lite living, in which car ownership is not a necessity because non-car modes can meet a resident's basic needs (Basu and Ferreira, 2021). Moreover, neither the transit nor the development piece of TOD is universally popular, and there can be significant political opposition to reducing the convenience of the automobile or increasing density, or both. Lastly, even if political support exists, much of the state's current transit infrastructure, built to serve coastal cities in the early part of the twentieth century, is now both aging and vulnerable to sea level rise, leading to concerns for the resilience of the transit infrastructure around which TOD is built. This project sought to understand how cities are thinking about flooding and sea-level rise in their TOD planning and what additional support might be needed.

This research project took a mixed-methods approach. On the qualitative side, we conducted a content analysis of the TOD plans for all towns along the Metro-North main line that had conducted studies and then contextualized the findings with 13 interviews. On the quantitative side, we analyzed the street networks and bus transit around the stations, and used CIRCA's 1% annual exceedance probability (AEP) storm surge flood shapefile in 2050 (with 20 inches sea level rise, herein referred to as CIRCA 1% AEP 2050) to assess TOD's vulnerability to sea-level rise (O'Donnell 2019). Maps of predicted flood inundation based on O'Donnell (2019) can be found at https://circa.uconn.edu/sea-level-rise-and-storm-surge-viewer/. The 2050 storm surge was chosen because new development built today will likely still exist in 2050, and as such, it is the appropriate time horizon for TOD planning. Based on the research, we made recommendations for the next steps. Before getting into the analysis, however, we first took a look at the commuter rail line itself and its scope for improvement.

Commuter Rail Oriented Development?

The New Haven Line is a critical connecting link in the Northeast Corridor and the key to creating a healthy, sustainable, and economically viable public transit network in Connecticut and beyond. According to the Connecticut State Rail Plan, on an average weekday nearly 400 trains utilized the New Haven Line's rail network, including Metro-North, Amtrak, and limited freight traffic (CTDOT, 2012). From a ridership standpoint, the Metro-North New Haven Line is quite successful--40,298,687 passengers rode the New Haven Line in FY 2018 (MTA, 2018). This number has been steadily increasing since the 1980s, even as fares have increased, making it the least subsidized Metro-North line (Cameron, 2018). Obviously, the negative impacts from Covid-19 will cause temporary stagnation and drop in ridership, however, the long-term picture still includes rail travel as a vital component of mobility and access within southwestern Connecticut.

However, as it is currently operated, the line serves as commuter rail to move people in and out of New York City rather than a rail line that serves Connecticut. In 2014, 61% of all riders traveled between Stamford and Grand Central, while only 39% travelled within Connecticut between Stamford and New Haven. In the morning peak period, 85% of riders were destined for New York City (RPA, 2014). The pattern held as recently as January 2020, when 28% of all trains departing Grand Central Terminal left between the hours of 5pm and 7pm (Dunham, 2021). The current Metro-North New Haven Line service is geared towards serving commuters that travel to and from Manhattan, rather than providing frequent all-day service between Connecticut towns.

Regional rail, an alternative service model that currently operates in Europe and Asia and is being promoted in cities across America, provides high-frequency service thoughout the day, allowing for more flexible trip patterns (Transit Matters, 2018). Regional rail would provide service at least every 30 minutes throughout the day, with a mix of express and local trains. CTDOT has just announced a step in this direction, with a plan to run express trains serving only New Haven, Bridgeport, South Norwalk, and Stamford en route to Grand Central, saving 10 minutes from the two-hour current travel time (Crowley, 2021). The service would be timed to minimize transfers with Shoreline East and branch line services. Regular 30 minute service would also aid in coordination with the bus network, providing a more integrated transit experience along the corridor.

While the Metro-North faces challenges of aging infrastructure and could better serve Connecticut residents, the corridor's main struggles are with non-Metro-North transit and that also matters for the success of TOD. We tend to think of the rail station as the key piece of transit infrastructure, but in a provocative article Chatman (2013) argues that the presence of bus service, lower parking availability, and higher housing densities are more important than distance from a rail transit station in terms of lowering auto ownership and car commuting. In other words, the presence of the rail station is less important than whether the overall neighborhood is oriented to cars and whether transit service is available to multiple destinations rather than a single rail line. In Connecticut, most Metro-North trips begin with car trips to the station, creating a high demand for parking right by the stations, which then renders station areas less friendly to pedestrians. The link between cars and Metro-North can also come into play in discussions of congestion. Increased auto congestion can lure people to transit, but congestion around the station areas can also lead to calls for more accommodation of cars (e.g. road

widening, additional parking) that can hinder walkability. We explored how cities discussed these issues of parking, walkability, congestion, and bus service, as well as flooding and sea level rise, in the plan analysis section below.

Plan Analysis

TOD is a multi-scalar activity, requiring coordination at the state, regional, and local level. While the interviews included all three levels, we focused the plan analysis on the local level for two reasons: 1) because it is the site of much of the perceived resistance to TOD and therefore would best reveal the obstacles, and 2) because localities are on the front lines of sea level rise and may have more to reveal in terms of how they are thinking about sea level rise and development.

For the content analysis of plans, we searched town websites for TOD plans of Metro-North train stations along the New Haven line. If none were identified, we googled the station name and TOD, as most TOD planning is focused around stations. In one instance, Darien, this revealed a development rather than a plan, and we searched successfully within the city website and developer website for the plan that initiated the development. Bridgeport and Stamford stations are unique in that rather than having station area TOD studies, the TOD is included in the general town plan. We focused on the Downtown Plan for Bridgeport, and in Stamford, we supplemented a recent bus and shuttle study with presentation material on Stamford's TOD efforts.

In total, we found 17 plans for the 21 stations along the corridor. Six stations (Greenwich, Riverside, Old Greenwich, Rowayton, Green's Farms, and Southport) had no plans, while Stamford and New Haven Union Station had two each and Fairfield covered two stations in one plan. We also included the Barnum Station TOD plan in the review even though the station was not constructed. The plans range in date of publication from 2006 to 2020. All but two of the plans were completed after Governor Malloy established a state TOD program to support planning efforts in 2012. New Haven completed its TOD report for Union Station in 2008 and Darien's plan was based not on TOD specifically but completed as part of a Main Street project in 2006.

For this research, we were interested in how the plans discussed sea level rise and flooding most prominently as all stations along this line are located in coastal municipalities. We also explored the degree to which the plans addressed tensions between the provision of parking for commuter rail and the need for a walkable urban space, whether plans included the bus network as an essential component to more car-lite development, whether they viewed congestion as a problem to be solved or an unavoidable by-product of successful economic development, and the attention paid to the walkability and livability of the station area.

Table 1. Analysis of TOD plans along the Metro-North Mainline.

Station	Year	Parking	Walkability	Congestion	Bus Network	Flooding	Sea Level Rise
Cos Cob*	2014						
Stamford (1)*	2013						
Stamford (2)*	2016						
Noroton Heights	2018						
Darien	2006						
South Norwalk*	2016						
East Norwalk*	2020						
Westport*	2018						
Fairfield*	2019						
Fairfield Metro*	2019						
Bridgeport*	2007						
Barnum Station*	2016						
Stratford*	2015						
Milford*	2017						
West Haven*	2016						
Union Station (1)*	2008						
Union Station (2)*	2013						

Key:

- Discussed in detail, maps included (if applicable).
- Touched upon/discussed, but not in depth.
- Not discussed
- Denotes station with sections of station area within CIRCA 1%AEP by 2050

Parking

Unsurprisingly, given parking's centrality to the question of TOD, it is discussed in every plan we reviewed, and the majority provide diagrams and detailed analysis of current and future parking needs. Devoting too much land use to parking impedes walkability and lessens the density that helps transit thrive. And yet, the difficulty of parking is one of the most significant predictors of whether someone chooses to drive or take transit for a trip, so making parking easier can lessen the mode shift to transit (Weinberger, 2012). On the other hand, conventional planning holds that development that increases economic activity requires increasing parking, as most municipal zoning codes mandate a minimum amount of parking per residence or business. This positive relationship between parking and economic development may be shifting though, particularly given muncipalities' willingness to reuse on-street parking as commercial space during the Covid-19 pandemic.

One of the main drivers of the link between parking and economic development is the parking minimum. Most towns in Connecticut require a minimum amount of parking to be provided per bedroom for new residential units or per square foot for new commercial development. These minimums generally have no empirical basis, but are set based on those found in nearby towns or historical practice (Shoup, 2005). Current best practice in TOD planning is to set parking maximums, rather than minimums, and allow developers to let the market decide (Connecticut Fund for the Environment et. al., 2013). Among the plans, only three (Downtown Darien, Fairfield Metro, and Downtown Bridgeport) addressed the need to reduce the amount of parking required for new development. The Downtown Darien plan calls for a reduction in parking minimums, noting that more parking is available than needed even at the 5pm peak. Fairfield Metro's plan suggests reducing parking requirements for restaurants, noting that a number of restaurants have requested waivers. Fairfield is also monitoring the use of parking in new TODs, testing whether residents are more car-lite than non-TOD residents. Downtown Bridgeport supported a reduction in parking requirements but gave no specifics. All other plans did not directly address parking mimums and none set a parking maximum.

For the plans that did not address parking minimums, they instead addressed parking by changing the location of parking or replacing surfact lots with structured parking. A street feels more walkable when it is lined with businesses rather than parking lots, so many plans recommend putting lots behind buildings. Similarly, parking garages take up less land than surface lots, so many studies call for those. Increasingly, garages are also "wrapped" with other uses, as proposed in Milford's plan (Figure 2). Saugatuck's plan explicitly stated that controversy would ensue if structured parking were proposed at the station, even though 61% of respondents to a survey conducted as part of the 2017 Plan of Conservation and Development would be in support of a parking structure at the station.

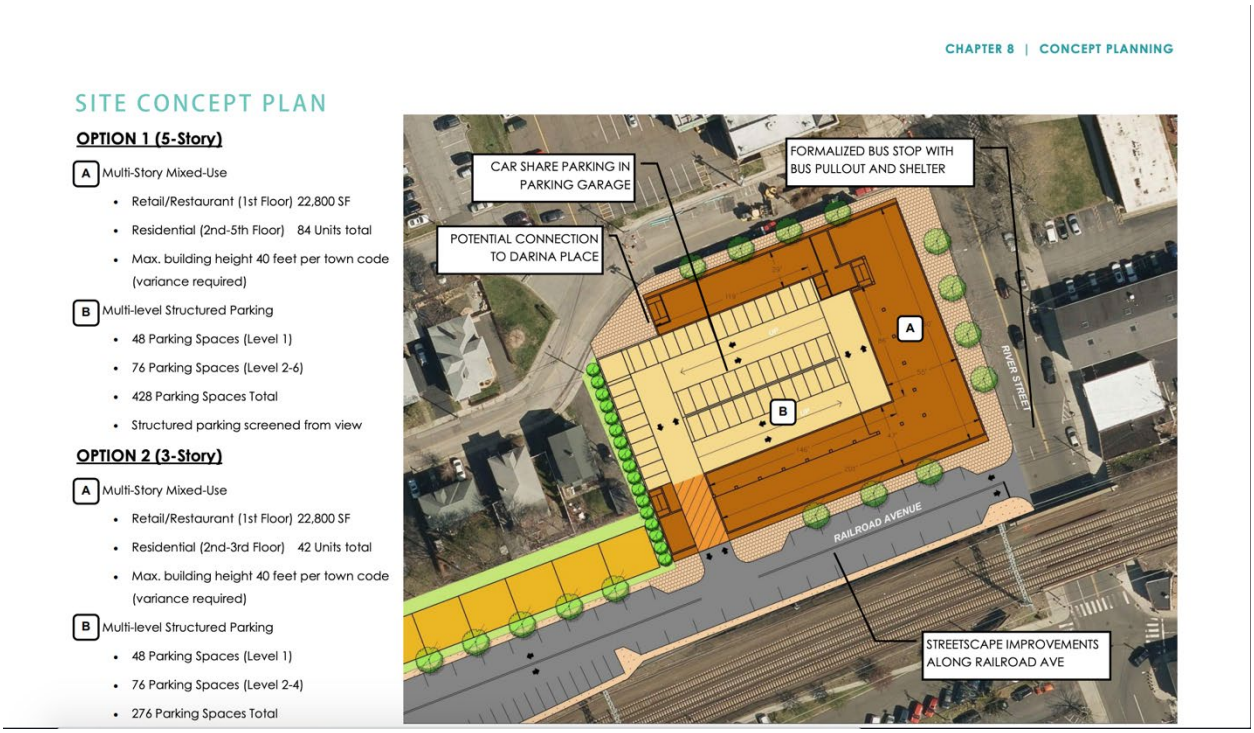


Figure 1. Wrapped parking concept from Milford's TOD plan

In addition to requiring parking locate behind buildings and wrapping structured parking, plans also suggested shared parking, in some cases municipally owned. With respect to policy changes, there is both a need to challenge conventional assumptions about the links between parking and economic development by reducing or eliminating parking minimums and a need to address parking governance. One way to reduce parking is to have shared parking; rather than requiring each business to provide their own spaces, cities can provide municipal lots that are used by multiple businesses and commuters. That way, commuter lots that are empty by 6 pm can be used to support evening businesses or weekend shopping. Creating a municipal parking system for such shared parking was one of the main recommendations of the Downtown Darien plan.

Station Area Walkability

The only other topic to be discussed as much as parking, was station area design and walkability. Despite the ubiquity of the desire for more walkability, only six of the plans included any maps or analysis of locations to add more sidewalks, crosswalks, and pedestrian signals. Interestingly, all six plans were completed after 2016, suggested ongoing improvements to planning for TOD. To build on this section of the analysis, our research team conducted its own analysis of station areas, below.

Congestion

Eight of the 17 studies mentioned traffic congestion reduction as either a goal of the study or a major concern the plan hoped to address. This is a somewhat concerning finding, as traditionally states and towns have attempted to resolve congestion by expanding roadways, leading to induced demand and more vehicle use. However, the suggested proposals rarely encouraged roadway expansion, other than a few proposals to add links to the street network to improve

connectivity. In three of the plans, there was a suggestion to either reconnect streets divided by the railroad or convert streets from one way to two. In all other cases, the solution set included support for pedestrian activity and restricted access for cars in the hopes of encouraging a "park once and walk" approach to the downtown area.

Nine of the 17 studies barely mentioned congestion. Most of these take the non-auto-oriented approach a step further, recognizing congestion as not a problem but a natural result of density. Their focus, instead, is on improving the walkability of the area. One study, the Bridgeport study, sees their downtown's current lack of congestion as an asset (comparing themselves positively to Norwalk and Fairfield) and hopes that congestion may one day be a problem because that would reflect the return of economic activity.

Bus Network

For many plans, being located next to a Metro-North station is considered to be sufficient provision of transit. Stamford's discussion of TOD does not include buses, though the city eventually conducted a separate Bus and Shuttle Study to address the growing congestion caused by private shuttles running from the train station to large employers and hotels. One conclusion of the study was that the shuttle clientele was unlikely to ride Stamford's public CTTransit buses, which was attributed to perceptions of added cost and time. The current bus riders in Stamford were not considered as potential users of the TOD.

Perhaps reflecting an increasing understanding that buses provide an essential component of TOD, later studies include more discussion of the bus network. The Barnum Station plan (2016) includes a space for buses to turn around at the station, allowing for more feeder service to the station. The Stratford (2016) and South Norwalk (2016) plans also suggest improvements to stop amenities and new routes or route modifications to better serve the area. Downtown Bridgeport's 2007 plan even proposes a new route or streetcar service for the area, which never came to fruition. The most recent plan, from East Norwalk in 2020, discusses microtransit as a possible solution rather than new routes, promoting a new partnership with VIA, a microtransit provider, in which VIA app users can receive door-to-door service in a shared van. However, no plans discuss the importance of fast, frequent service for extending the transit-oriented area.

Flooding

Nine of the 17 plans mentioned flooding, but only six (Cos Cob, South Norwalk, East Norwalk, Westport, Stratford, and Milford) include a map of any flood zone within the plan boundary. Four of those used both the 100 and 500 year FEMA zones. South Norwalk's plan also referenced past storms (Sandy) and recurring high tide flooding on Water Street, while Westport's plan included wetlands and the Coastal Area Management boundary. Concerning development, plans for Noroton Heights and Westport noted that flooding prevents the construction of underground parking, and Westport recommended (and has already constructed) buildings with first-floor parking to elevate further development. Three plans (East Norwalk, Barnum, and Milford) suggested specific measures to reduce flooding, including a bioswale, a greenway, and a combination of measures to lower grades and provide restorative plantings. Lastly, Bridgeport's plan for a possible transit connector for Downtown highlighted its possible utility in flood-related evacuations. Because sea-level rise is so central to this report, it will be discussed more in-depth below.

Interviews

Initial interviewees were sought through emails to towns and councils of government along the corridor based on the following criteria: towns had to have a station on the main line and experience pushing for a TOD project, though the TOD project did not have to be successful. While initial emails were sent to both elected officials and town staff, the one elected official who replied referred us to town staff. Additional interviewees were identified through snowball sampling, in which initial interviewees are asked to recommend others whose perspectives might be valuable. In total, we spoke to four town planners or economic development specialists, one CT Transit employee and one transit district executive director, two real estate developers and one real estate banking specialist, two CTDOT planners, one COG executive director, and one transportation activist. Because of interview request-response rates, the interviewees were biased toward Fairfield County and places that were embarking on or had experience with TOD. To the extent possible, we tried to capture the voices we were not hearing through reference to their TOD plans. Westport's plan in particular is quite candid about the community's struggle with TOD. Findings are divided into four sections: the TOD planning process, transit, development, and how interviews differed from the plan content.

Existing conditions of TOD Planning

Much of the state's focus on TOD over the last decade has been not on the Metro-North corridor but along the Hartford Line and CT Fastrak bus rapid transit. CTDOT completed a study of TOD capacity along the Fastrak corridor in 2016 and then received a $700,000 TOD planning grant from the Federal Transit Administration for planning on the Hartford Line. The Fastrak study included "Desire and Readiness" workshops that assessed the community's willingness to embrace density and its capacity to absorb development investment. The four key criteria were physical suitability, plans in place, local leadership, and development interest (CTDOT, 2016, iii). Of these criteria, the only critique to be made is the desire for large parcels to be attractive to developers. Even with that criteria, however, the plan implicitly recognized the possibility of incremental development, as in those locations without large parcels (E.g. East Street Station in New Britain), by envisioning complete streets interventions as a way to attract more traffic to the station and eventually develop more of a commercial center. Each jurisdiction also received specific strategy suggestions to assist with TOD as part of the plan, including branding suggestions for redevelopment, public realm improvements (especially complete streets improvements), and policy and planning recommendations. The Hartford Line study followed the same pattern of assessing desire and readiness and making recommendations but added an additional step. The town and the CTDOT selected one of the recommendations and developed an action plan, such that the municipality ended the planning process with concrete steps toward a parking plan, for example.

While this planning was underway, interviewees suggested that state agencies perceived TOD on the Metro-North corridor as "happening organically" due to existing market demand, without much need for state subsidy (Interview, 4/27/21). In contrast, the two large CTDOT capital investments detailed above represented opportunities to catalyze denser development opportunities in other locations. While more evaluation is needed with respect to TOD outcomes such as a shift from cars to transit, the agreed success story among interviewees with respect to

interagency cooperation has been Meriden, where an interagency task force came together to find solutions to multiple problems, centered around persistent flooding in the downtown. That interagency effort built a network of officials across DECD, DEEP, DOT, and OPM focused on TOD. They met regularly for a few years, addressing ongoing projects and convening for grant-making efforts. As the pool of projects lessened and the grant making ended in 2017, the network has ceased meeting, but still exists informally as a set of contacts if network members have questions.

The Transit Oriented Development Planning Grant program, part of the network's activities mentioned above, first started as a DOT program in 2015. Subsequent rounds in 2016 and 2017 became Planning and Implementation Grants, funding construction of complete streets improvements and property acquisition in addition to planning, but no grants have been given since 2017. Of the 17 plans reviewed above, only four (East Norwalk, Saugatuck, Milford, and Barnum) were funded by the program, supporting CTDOT's understanding that towns along the corridor had other resources and interests besides state support to encourage TOD. Figure 2 shows the dollar amount of grant activity by town. Grants were made outside of TOD areas for complete streets efforts, and larger numbers generally reflect implementation projects rather than planning projects. As Figure 2 shows and the interviewees discussed, the bulk of activity happened along the new corridors, with some funding for the Stamford and New Haven, though Stamford's investment was along a branch line station.

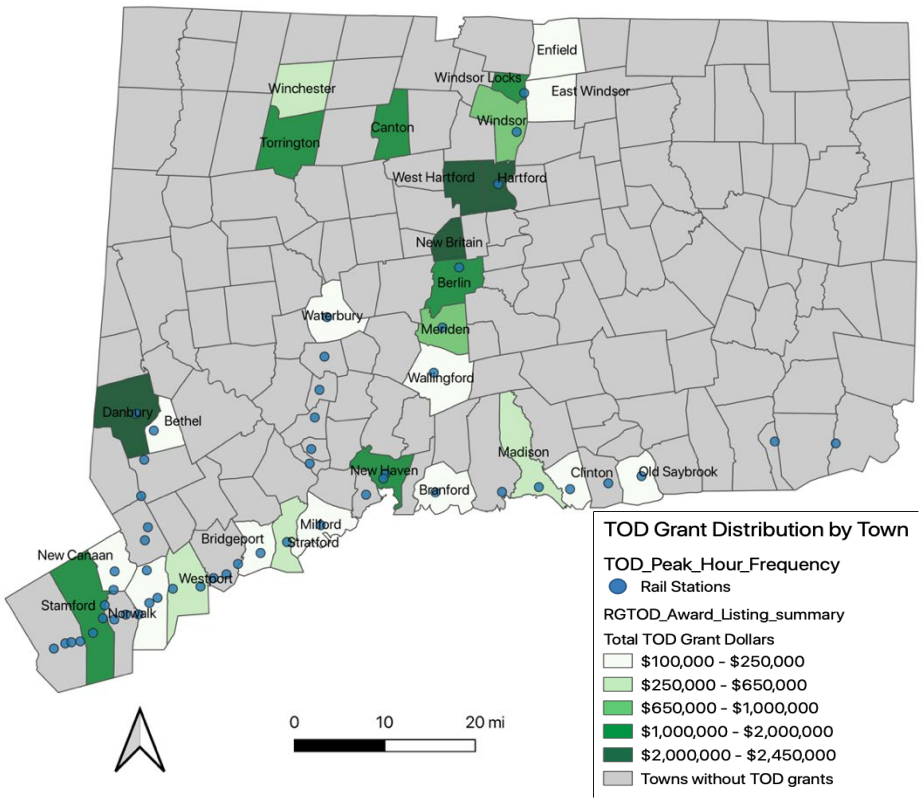


Figure 2. TOD Grant Distribution by Town

Transit

There are two governance models for fixed-route bus transit in Connecticut; the transit district model and the CTTransit model. In the transit district model, a local transit district plans and operates service, with funding provided largely by the state. In the CTTransit model, the state-owned CTTransit contracts for transit service, with service areas broken into divisions. There are ten transit districts and eight CTTransit divisions. In both the transit district model and the state-run CT Transit model, coordination of transit and land use is formalized at the COG level, with the regional COG tasked with producing a plan of development that takes into account both transportation and land use (CTDOT Handbook, 2017). Coordination at the local level is currently only informal, but some cities are interested in making more it formal. One example that came up in the interviews was a medical office relocated from a downtown location well-served by transit to a new greenfield office location. At the moment, that kind of move is something the transit agency only learns about when the office calls up and asks for more service to their location unless the project is over a certain size threshold. Ideas for more formal coordination include linking land-use proposals to transit service, or promoting transit corridors, which receive improved service as density along the corridors increases. One city is also exploring regular check-in meetings with their transit district and finding ways to contribute funding to the district to pilot new types of transit, like on-demand micro transit to serve the downtown. Currently, the large majority of all transit funding in the state comes from the state, whether CT Transit or the transit districts provide the transit. Norwalk provides a $500-600,000 grant to its transit district each year, while New Haven contributes to planning efforts like the recent Move New Haven plan for improved bus service in the city (City of Norwalk, 2020; Move New Haven, 2019). According to interviewees, Bridgeport historically did contribute to the transit district, but at the moment, it does not, nor does Stamford.

With respect to coordination with Metro-North, the infrequency of bus service means there is little "pulsing" around the train schedule. In European networks, rail traditionally runs either as frequently or less frequently than buses, such that buses can extend train services by having all routes meet the train at the station and then head out full of passengers. When asked if they operated similar pulsing techniques, the transit director said, "If you have a train every 8 minutes and buses only every half hour, there's only so much you'll be able to do." In that situation, pulsing to one train means less service for the next train. This situation describes peak-hour service, though pulsing is technically possible during hourly off-peak and weekend service.

Development

According to our banking interviewee, TOD is one of the most preferred types of real estate investment along the Metro-North main line, but it does not always feel that way from the perspective of planners and advocates. This tension lies in the fact that the demand for more car-lite living is very much there, but the supply of TOD is limited by the difficulty of finding and gaining approval for suitable sites. First, the New Haven main line is a premium service compared to the branch lines. The main line has more frequent service and electric trains; the first improves access, the second reduces noise. As such, access to one of those 21 station areas is a scarce commodity. Second, not all communities along the line are excited about or welcome growth. The Westport/Saugatuck station TOD plan, for example, contains a preamble from the community-appointed committee that worked on the plan expressing alarm at the estimations for market demand and its possible effects on the community. The plan then identifies five possible development sites, of which none would provide a sufficient rate of return at currently allowed

densities unless the current landowners did the development themselves due to high costs of property acquisition. One developer we spoke to estimates that the parking lots at the Westport/Saugutuck station are the second most valuable locations in all of Connecticut, exceeded only by the lots at Darien, but it would be complicated to assemble parcels from various owners in order to build a project. Moreover, the Saugutuck TOD plan opposes structured parking, the current best practice to build out of the tension between a perceived need for parking to facilitate access to the train and the desire to build more human-scaled and less car-oriented development around prime transit hubs. There is a lack of political will to support TOD in some areas where the market would absorb it, and significant eagerness for TOD in areas with little demand like branch line towns.

The cities along the Metro-North line represent the best opportunities for TOD, and their advancement along the process of reducing car use is reflected in the amount of parking a developer estimates is needed for a unit in a given city. In Stamford and New Haven, one developer we interviewed estimates you can provide less than one space per bedroom. Fifteen years ago, anywhere along the line would have been 1.67 spaces per bedroom, now in South Norwalk they would do 1.2. Other than Stamford, New Haven, and South Norwalk, very few places along the corridor are sufficiently urban for this developer to feel safe lowering the parking requirements, though distance to a station also factors into his decision. In many cities, the parking minimums are high enough that the question of what the market demands is out of a developer's hands.

The interviewees are also uncertain whether commuter rail-based TOD is sufficient to reduce the need for a car. One developer used an intra-Connecticut trip as an example, stating that even if a Milford-Darien commuter wanted to take the train to work, she would still have to drive to Milford station, and there is not enough parking at Milford for her to find a spot. One COG executive director made a similar argument that even if all the TOD sites were developed in their region, people would still drive to the station from single-family houses. This is an assumption that should be tested, however. Given 2018 ridership data by station, you would need only 411 daily commuters to equal Southport's ridership (the lowest along the line) and 19,200 for Stamford's (the highest, and inflated by Amtrak trips).[1] Future research should test the extent to which TOD areas could bear the lion's share of Metro-North trips or whether the car-lite lifestyle that lower parking minimums (or even parking maximums) could enable requires improvements to bus services and targeted investments in already walkable areas.

Bridgeport stands out somewhat in the development context. It was not mentioned by any developer as a primary TOD site, despite being the largest city in the state. In Bridgeport, as in Hartford, the rent you can charge on a building does not always cover the cost of construction, a phenomenon the economic development professional referred to as an "appraisal gap". It is as expensive to build in Bridgeport as it is in Stamford or New Haven, if not more so due to brownfield remediation, but rents are much lower. As such, the Bridgeport planners recommended state programs that help to reduce the appraisal gap, reducing the costs of development even for construction that is not specifically designated as affordable housing, in the hopes of spurring Bridgeport to be a functional market. The other piece that came up in interviews was that Bridgeport has an ecosystem of local developers, arising from downtown

[1] These numbers were calculated by dividing the annual boardings and alightings in 2018 by 500, reflecting 2 trips a day, 5 days a week, 50 weeks a year. This is a back of the envelope calculation, and reflects only the roughest estimate to provide a sense of scale. More research, and finer grained ridership data, is needed to address this question.

property owners and general contractors that have moved into the property development business. Educating these local actors about TOD-type buildings with less parking is another area with a possible payoff, along the lines of the incremental development model promoted by the Incremental Development Alliance (Incremental Development Alliance, undated). It improves development outcomes and builds local wealth.

Comparison of interviews to plans

Comparing the interviews to plans revealed the extent to which the discussion around TOD has and has not progressed over the intervening years since the plans were created. Nearly every public-sector interviewee acknowledged sea-level rise as a major issue they were considering moving forward, dating their awareness of the issue to Superstorm Sandy. They also acknowledged the difficulty of planning that far into the future, and were excited that analyses were being done to map vulnerable areas. Developers, however, maintained that their responsibility was to meet existing FEMA guidelines, and that while they were invested in building enduring communities, accounting for sea level rise was not their job.

City and transit actors expressed more interest in other forms of transit than the plans did, while developers maintained that the transit of transit-oriented-development, at least in Connecticut, would remain rail and bus rapid transit rather than buses. Interviewees were also more open about the structural racism that shapes transit use in Connecticut. One developer, went so far as to say "white man doesn't ride a bus," in explaining why his company focuses on rail for TOD. His solution is to build other services, like light rails and streetcars, that do not have the same connotation, believing that the negative stigma of the bus will not be resolved in his lifetime. While not stated explicitly, this reluctance to confront the structural racism around buses in Connecticut seems to also animate city proposals for circulators or micro-transit, as public officials seek a non-stigmatized service rather than investing in the existing bus network.

Cities are also opening up a little more on parking. The recently passed HB 6107 does move the needle, setting residential parking requirements at 1 space for a 1 bedroom and no more than 2 for 2+ bedrooms unless the local planning and zoning commission opts out of that provision, but it does not say anything around parking requirements for new commercial development (Pub. Law 21-29,2021). Bridgeport has recently removed parking mimimums in its North Downtown area and is seeking to remove them citywide following a similar move by Hartford. However, as long as the state DOT views parking as its primary land use mission around the stations, as was stated in interviews, the tensions around parking will remain.

Street-level analysis

We calculated the intersection density of station areas, the link-node ratio, the number of city connectors exiting the station area, and walkability for the street level analysis of station areas.

Table 2. Street-level analysis metrics

Metric	Definition	Purpose	Calculation
Intersection density	Number of intersections per square mile	Measure of density	# intersections within half-mile buffer/ $\pi(0.5)^2$
Link-node ratio	Number of links (streets connecting	Measure of connectivity	#links/#nodes

	two intersections or an intersection and a dead end)/number of intersections or dead ends		
Count of City connectors	Multi-lane roadways and state numbered routes	Measure of permeability	Identified by Google Map scan
Walkability	Comprised of provision of pedestrian infrastructure, building frontage, and perceptions of safety based on road width and observed speed	Measure of walkability	Identifed by observation of Google Streetview images of roadways along the likely travel paths away from the station (see Appendix B).

The intersection density serves as a quick estimate of block size and walkability: denser street grids have more spaces for economic activity and, therefore, more possible destinations within a short walk. The link-node ratio measures the number of streets per intersection (Ewing, 1996). Used in combination with intersection density, it serves as a valuable indicator of connectivity, with some cities incorporating a standard ratio of 1.4 links per node to measure whether a neighborhood is walkable (Dill, 2004). The city connectors concept measures how accessible the neighborhood is to other neighborhoods. Our definition of city connectors began with state numbered routes but extended to any multi-lane roadway (e.g. West Ave in Norwalk) that extends beyond the station area. The walkability assessment was qualitative, based on an estimation of travel speed, road width, sidewalk availability, and building frontage (as opposed to parking or large lawns) (See Appendix 2 for the complete assessment table and methodology). Table 3, below, displays the results of the assessment and is sorted by intersection density.

Table 3. Street Network Analysis of Metro-North Station Areas

Station	Count of intersections	Intersection Density (Intersections / Square Mile)	Link/Node Ratio	Number of city connectors exiting station area	Walkability Assessment
Barnum Station (proposed)	126	160.4	1.75	2	
State Street	122	155.3	1.55	2	
Union Station	98	124.8	1.76	2	
South Norwalk	92	117.1	1.63	3	
East Norwalk	89	113.3	1.37	2	
Milford	89	113.3	1.44	2	
Southport	87	110.8	1.21	2	
Stratford	84	107.0	1.39	7	

Stamford	83	105.7	1.45	3	
Bridgeport	82	104.4	1.60	5	
Noroton Heights	79	100.6	1.35	0	
Fairfield Metro	76	96.8	1.41	4	
Darien	68	86.6	1.35	4	
Fairfield	68	86.6	1.52	2	
Rowayton	65	82.8	1.33	2	
Greenwich	61	77.7	1.21	0	
Riverside	61	77.7	1.31	0	
West Haven	60	76.4	1.46	2	
Old Greenwich	54	68.8	1.34	0	
Westport	46	58.6	1.31	3	
Green's Farms	30	38.2	1.35	0	
Cos Cob	25	31.8	1.25	0	

To understand how transit supportive a station area's street network is, the indicators need to be incorporated in combination with each other. While Southport has a high intersection density, it is not well-connected, with only a few routes crossing under the rail lines and highway. Fairfield and Greenwich are dense well-connected downtowns but small in area, placing them in the lower half of stations for intersection density. Union Station in New Haven has a dense and well-connected street network, but the parking lots on Union Avenue and the highway disamenity along Water Street lower the walkability of the area. The proposed Barnum Station site places the highest of any of station areas on the intersection density and link-node metrics, but the existing sidewalks need repair. These metrics can be used to put numbers to the "transit-supportive standards for land uses, built environment densities and walkable environments" currently included in the state definition of TOD (Sec. 13b-79o), and can also guide towns in prioritizing how to improve the street network near their stations.

Bus network analysis

There are 101 bus routes that interface with the Metro-North mainline.[2] Of these routes, only five have average daily headways of less than 20 minutes, and only New Haven's Whalley and Grand Avenue buses have headways faster than 15 minutes (see Table 1). Headways refer to the amount of time in between buses serving a given stop. Four buses an hour, evenly spread, means 15 minute headways. Headways of 15 minutes or less are the gold standard of "show up and go" service, service that does not require the user to consult a schedule, though some advocates are pushing for 15 minutes to be considered the bare minimum for service labeled "frequent" (Higashide, 2019). Eighteen routes have average daily headways of between 20 and 30 minutes, reflecting routes that have show up and go service for some parts of the day and

[2] An online search conducted in Fall 2020 revealed 101 routes that either connected to stations or connected to routes that stopped at stations, but schedules were only available for 97.

provide skeleton service in the off-peak and evening hours, including the Coastal Link, a joint venture among Norwalk Transit District, Bridgeport Transit District, and Milford Transit District. The remaining routes (not shown in Table 4) run either heavily peaked service, with almost no off-peak service, or regular service that operates less frequently than every 30 minutes.

Table 4. "Frequent" bus service along the Metro-North corridor

ROUTE	PROVIDER	HOURS OF OPERATION	BUSES PER DAY	PEAK PERIOD	PEAK BUSES	AVERAGE HEADWAY
212 GRAND-FERRY	CT Transit New Haven	7AM-11:30PM	70			13
243 WHALLEY AVE	CT Transit New Haven	4:30 AM-11PM	82	6:45-7:45AM	8	14
265 CONGRESS AVE	CT Transit New Haven	5:15 AM-12AM	68	3:40-4:40	6	17
238 DIXWELL	CT Transit New Haven	5AM-1AM	70	4-5PM	7	17
WHEELS 9	Norwalk Transit District	6AM-7:15PM	41		2	19
261 BOSTON POST RD	CT Transit New Haven	5:15AM-11:15PM	54	1:40-2:40	7	20
WHEELS 10	Norwalk Transit District	5:45AM-7:30PM	41		4	20
UNION STATION SHUTTLE	CT Transit New Haven	6AM-10:15PM	48		4	20
223 LOMBARD ST	CT Transit New Haven	5:30AM-9PM	44	7AM-8AM	4	21
274 SARGENT DR	CT Transit New Haven	5:45AM-9PM	43	7-8AM	6	21
ROUTE 8	Greater Bridgeport Transit	6:30AM-10:45PM	45		4	22
246 EDGEWOOD AVE	CT Transit New Haven	5:30AM-8PM	36	4-5PM	4	24
268 WASHNINGTON AVE	CT Transit New Haven	6AM-9:30PM	37	7:50-8:50AM	7	25
241 GOFFE ST	CT Transit New Haven	5:45AM-7:45PM	33	4-5PM	4	25
311 PORTCHESTER	CT Transit Stamford	5AM-12AM	39	4-5	5	26
331 HIGH RIDGE RD	CT Transit Stamford	5:15AM-11:30PM	41	4-5	4	27
271 KIMBERLY AVE	CT Transit New Haven	5:25AM-10:30PM	38	4-5	5	27
324 FAIRFIELD AVE	CT Transit Stamford	5:30AM-12AM	41	7-8AM	4	27
265B BULL HILL LANE	CT Transit New Haven	5:15AM-12AM	39	3:40-4:41	6	29
224 STATE ST	CT Transit New Haven	6AM-10:30AM	34	4-5PM	2	29
COASTAL LINK	Norwalk/Bridgeport/Milford	5:30AM-11AM	36		3	29

ROUTE 1	Greater Bridgeport Transit	5:30AM-11AM	35	3	30
ROUTE 9	Greater Bridgeport Transit	6AM-10:30PM	33	3	30

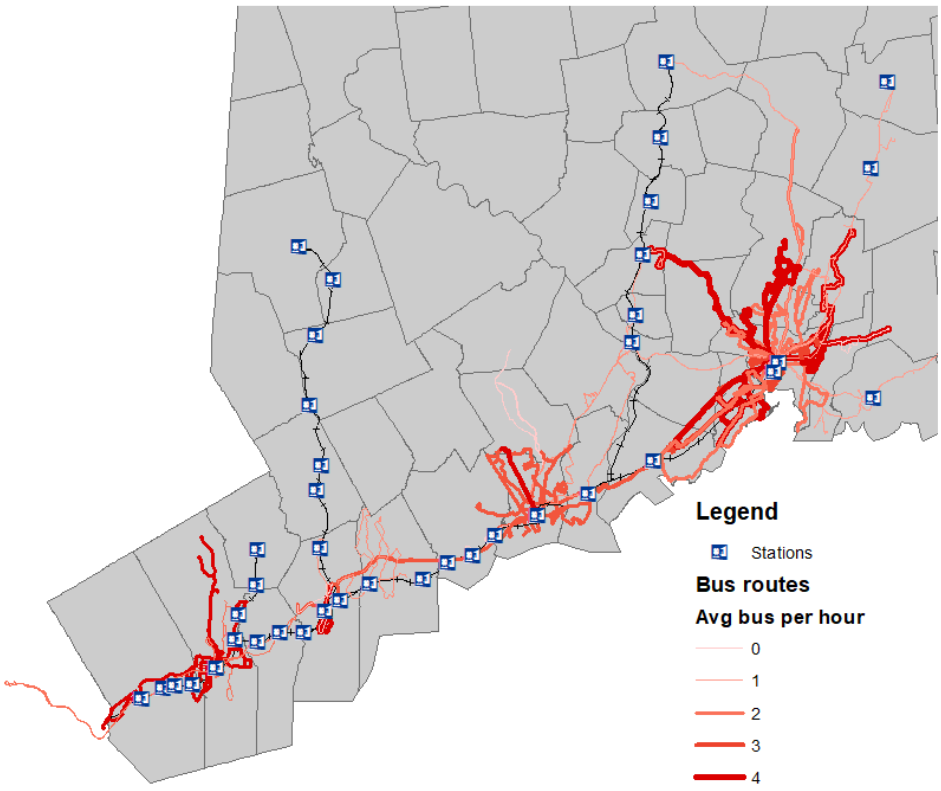


Figure 3. Frequency map of bus service along the Metro-North corridor

Figure 3 highlights how New Haven's investments in bus frequency make effective TOD possible to a greater degree than elsewhere. Bridgeport also has excellent coverage every twenty minutes, with 95% of its residents within a quarter mile of a bus route. Stamford and Norwalk have less robust networks, while the Westport service barely registers. Milford's service is not depicted on the map, but it has two all-day hourly bus routes and one route that runs hourly only doing the morning and afternoon peaks. Investing in transit in Stamford, Norwalk, and Birdgeport, and in TOD in those cities with robust bus networks provides the best bang for the buck.

Sea level rise analysis

This report analyzes the potential effects of sea-level rise on TOD efforts along the Metro-North New Haven mainline. Of the 21 stations along the line, 14 have studied potential TOD development around their stations. Of those 14, only two, Noroton Heights and Darien, are inland enough that the projected 1% AEP flood risk by 2050 does not touch their TOD area. This report shows the 2050 1% AEP flood risk overlay over the TOD study areas for the other twelve stations. The Bridgeport study area also includes the station area for the proposed Barnum Station.

As shown in Table 5, the station areas with significant impacts on parcels within a half-mile of the station are Fairfield, Stamford, Cos Cob, and Green's Farms. However, many of the most affected station areas have not completed TOD plans, and Fairfield's affected parcels are largely south of the downtown station area. The most impacted TOD zones are Stamford (whose entire station area is a TOD zone), Bridgeport, South Norwalk, Stratford, West Haven, and State Street. However, the model does not take the Stamford Hurricane Barrier into account, nor the levee project that New Haven is developing with the Army Corps of Engineers. Westport, East Norwalk, Fairfield Metro, and Milford also have affected TOD parcels.

Table 5. Parcels affected by sea level rise along the Metro-North corridor

STATION	# OF PARCELS W/IN 0.5 MILES OF STATION	# OF AFFECTED PARCELS W/IN 0.5 MILES OF STATION	% OF STATION PARCELS AFFECTED	# OF AFFECTED PARCELS STUDIED FOR TOD
GREENWICH	738	76	10%	0
COS COB	481	194	40%	0
RIVERSIDE	768	61	8%	0
OLD GREENWICH	786	226	29%	0
STAMFORD	790	375	47%	-
NOROTON HEIGHTS	934	0	0%	0
DARIEN	564	0	0%	0
ROWAYTON	765	275	36%	0
SOUTH NORWALK	1166	161	14%	79
EAST NORWALK	1271	117	9%	27
WESTPORT	434	101	23%	28
GREEN'S FARMS	149	60	40%	0
SOUTHPORT	526	156	30%	0
FAIRFIELD	791	402	51%	5
FAIRFIELD METRO	1042	357	34%	28
BRIDGEPORT	491	72	15%	87*
STRATFORD	825	75	9%	44
MILFORD	786	58	7%	4

WEST HAVEN	835	64	8%	42
UNION STATION	709	43	6%	26
STATE STREET	1274	47	4%	39

*** INCLUDES BARNUM STATION PARCELS AS WELL**

In addition to the station area mapping, we also assessed the rail system's vulnerability, calculating the intersection between the rail line and the 2050 1% AEP flood risk. The intersection encompassed 3.27 miles of track in total, including the main line and a piece of the Danbury line in Norwalk. Of those sections, the largest are between Union Station and State Street in New Haven, the Danbury Branch in Norwalk, Bridgeport station and the viaducts crossing the Pequonnock River in Bridgeport, a stretch between Westport and Green's Farms along the Sherwood Millpond, and between Fairfield and Fairfield Metro. The track between Union Station and State Street has experienced flooding in the past and depth projections estimate flooding of more than six feet on that stretch. Additionally, while the track is elevated in Stamford, the Stamford yard is not. That track mileage is not included in the 3.27 miles, nor is the New Haven Yard, but both are submerged by the 2050 1% flood risk shapefile, with Stamford seeing somewhere between 4 and 6 feet of flooding in the yard and New Haven under four except along the track to State Street (see figure 4).[3] However, it is important to note that both Stamford and New Haven either have or are building levees which are not included in the CIRCA sea level rise models, so in these cities, in particular, these assessments represent a worst-case scenario. Full images of all stretches are included in the Appendix.

Table 6. Length of rail line vulnerable to 1% AEP in 2050 by town

TOWN	LENGTH (FT)	LENGTH (MILES)
NEW HAVEN	3800	0.72
NORWALK	3455	0.65
BRIDGEPORT	2919	0.55
WESTPORT	2467	0.47
FAIRFIELD	1883	0.36
GREENWICH	1264	0.24
MILFORD	685	0.13
STRATFORD	546	0.10
STAMFORD	232	0.04
WEST HAVEN	28	0.01
TOTAL	**17278**	**3.27**

[3] The depth values of the flooding are referenced based on NAVD88

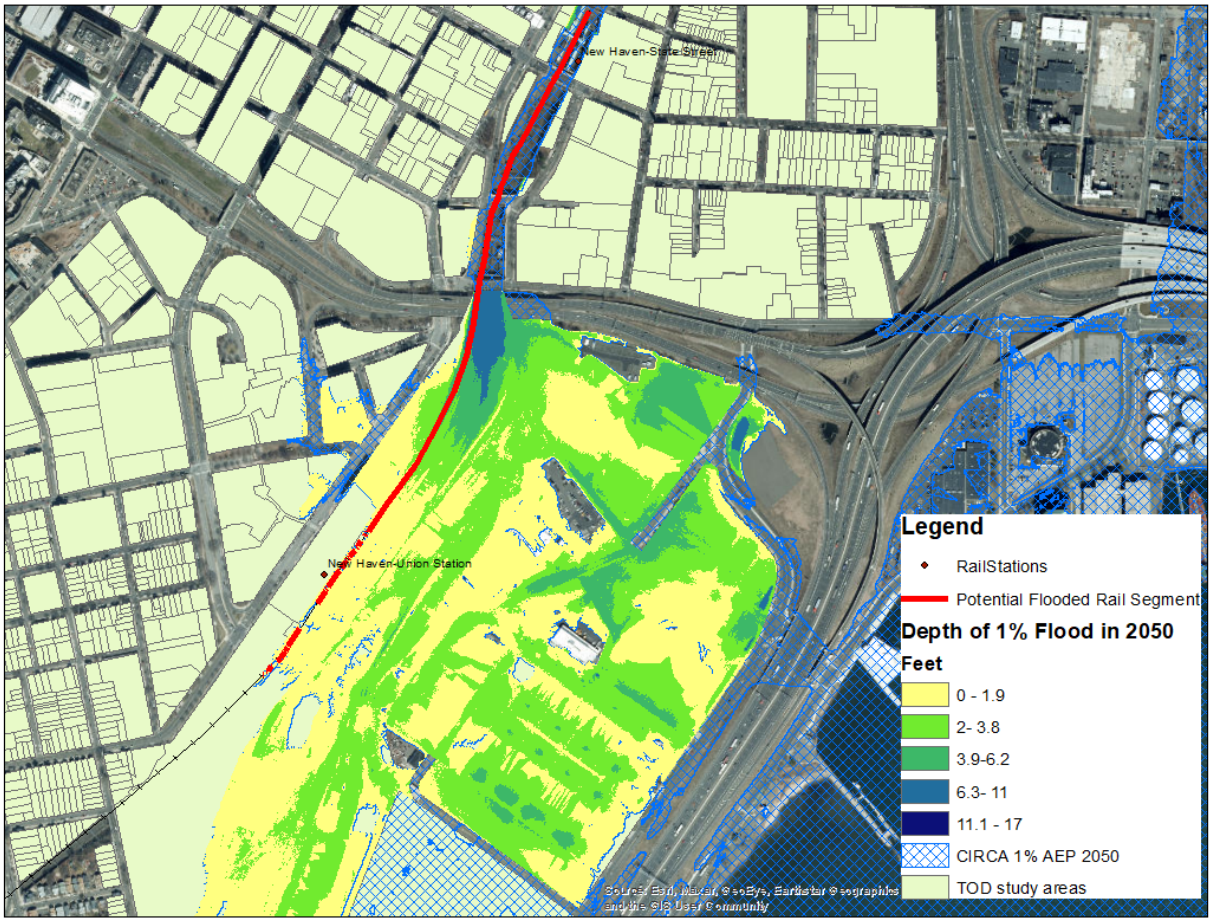
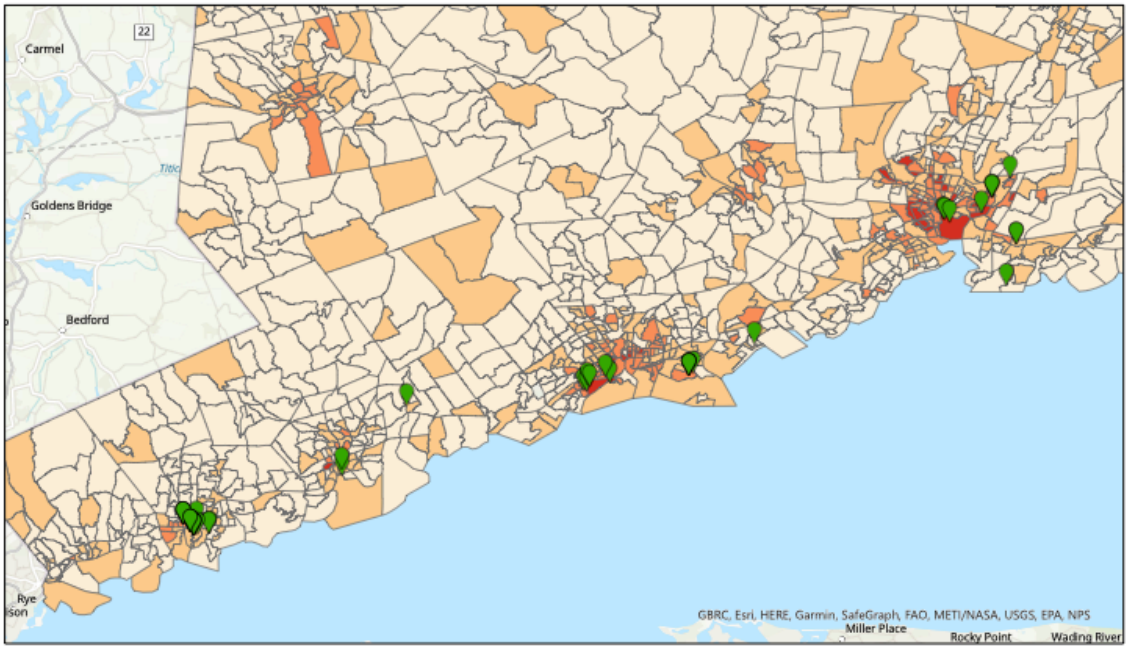


Figure 4. New Haven Sea Level Rise with Depth

Lastly, we also identified whether any of CT Transit's 200 busiest bus stops or its federally funded affordable housing properties would be impacted by the 2050 1% flood. Thankfully, none of the top 200 bus stops are among the 192 CT Transit stops in the flood zone. On the other hand, 45 federally subsidized affordable housing complexes included in the National Housing Preservation Database (NHPD) are within 60-ft of the 1% flood in 2050, of which 19 are in Stamford, 9 in New Haven, 6 in Bridgeport, and 5 in Stratford. The NHPD data covers all federal subsidies, including Low-Income Housing Tax Credits, public housing, section 8 project-based vouchers, and others. All told, they represent 4,240 units of housing (see Figure 5).

Figure 5. Southeastern CT Affordable Housing Units Affected by the 1% Flood in 2050



Percent % Below Poverty
- 0.000% - 7.928%
- 7.929% - 20.430%
- 20.431% - 38.783%
- 38.784% - 100.000%
- Affordable Housing

Affordable Housing Affected By Sea Level Rise: 45

New Haven: 9
Stamford: 19
Bridgeport: 6
Stratford: 5
East Haven: 2
Norwalk: 2
Milford: 1
Westport: 1

N

0 2.5 5 10 15 20 Miles

Data acquired by National Housing Preservation Database, CLEAR, and U.S. Census Bureau. Basemap is form ESRI Database. Map created by Emily Kaufman

Recommendations

Connecticut already has strong bones on which to build a resilient corridors growth strategy, but there are also significant challenges. Climate resiliency and mitigation requires shifting away from car-based travel, which means rethinking and reforming the way we plan transportation in the state, returning to the transit-linked urbanism that existed during the early part of the 20th century. At the same time, because the infrastructure of transit-linked urbanism is a century old, the time has come to think critically about how to maintain and replace it, paying attention to its vulnerability to storm damage and rising sea levels. As such, we need holistic, integrative transportation planning to support resilient corridors.

5. **Mandate incorporation of sea-level rise analysis in TOD planning.** It is time to start discussing how planners and developers should treat parcels identified as a flood risk due to sea-level rise, given that the average building life span is 30 years. This first means making the kind of sea-level rise analysis Norwalk conducted for the East Norwalk plan mandatory so that cities develop a sense of where their vulnerabilities are.
6. **Invest in the cities that already have transit-supportive land uses and street networks.** Perhaps the most significant finding of this report is the degree to which the state lacks clear metrics for transit-oriented development and investment. TOD is defined in the state code as "the development of residential, commercial and employment centers within a one-half mile or walking distance of public transportation facilities, including rail and bus rapid transit and services, that meet transit-supportive standards for land uses, built environment densities and walkable environments, in order to facilitate and encourage the use of those services." However, there are no metrics of what "transit-supportive standards" mean.
    a. **We recommend incorporating metrics of intersection density (100+ per half-mile radius) and link-node ratios of at least 1.4 into evaluation of transit investment planning and TOD implementation grants to encourage towns to build dense, connected, and walkable projects, in addition to existing attention paid to complete streets style improvements.** These metrics could ensure that even large parcel style development like Fairfield Metro will still incorporate dense street networks, as additional connectivity is needed to bring the Fairfield Metro station area up to 100+ density and 1.4 link-node ratio.
7. **Invest in the buses in those cities to facilitate car-lite living.** Given the lack of good transit service other than the commuter rail in many towns, a reluctance to imagine a car-lite lifestyle is understandable. As such, we recommend more sustained investment in local bus services, bringing key corridors up to show-up-and-go levels of service, and coordinating these service improvements with land use densification along the corridor. Increased investment and coordination can be achieved through:
    a. **Build in more scope for local governments to contribute financially to transit and support quarterly meetings between cities and transit providers** (e.g. Seattle's Transit Benefit District, Norwalk's grants to the transit district)
    b. **Target transit funding to key corridors, supported by incentives for densification.** Performance metrics are needed for state bus service. Working with the transit districts, CTDOT should identify key bus corridors within each district to target for high-frequency service, similar to New Haven's efforts in the Move New Haven transit plan, which doubles down on supporting New Haven's

high-frequency transit corridors. The state can also incentivize focusing development along these corridors in the transit operating document, committing to giving more funding to those districts coordinating with cities and investing in resilient corridors.

8. **Proactively plan for TOD at the state level**
    a. **Improve standardized, state-wide data collection and provision.** Connecticut is behind the curve for the availability of standardized GIS data. In attempting to find the data necessary to measure intersection density and the link-node ratio, the ease of calculation varied by which council of government the station was in. In WestCOG, which has the staff and resources for significant GIS work, there are "local streets" and "local intersections" shapefiles and parcels with standardized zoning information. This kind of standardized data did not exist for the eastern half of the corridor, necessitating hand counting of intersections and streets. Moreover, no council of government along the corridor had any sort of financial information, like sale price, available by parcel. This data constraint makes independent assessments of the market nearly impossible. Similarly, while the National Housing Preservation Database contains geospatial data for federally subsidized affordable housing, CT is only now beginning to map its locally subsidized housing. Connecticut is one of only five states without a state GIS officer who would take responsibility for this sort of standardization, a gap that should be rectified (Wilson, 2021).
    b. **Support hiring of transportation staff with holistic expertise in land use and resiliency, including by developing a pipeline of trained planners in the state.** Addressing the challenges posed by sea-level rise while also managing a transition to more sustainable transportation requires transportation professionals capable of holistic, integrated thinking across sectors. While we spoke to many such professionals in the interviews, there is an ongoing need for a pipeline of these thinkers, particularly as the bulk of CTDOT staff approach retirement age. Supporting such a pipeline could occur at varying levels of investment
        i. Individual course partnerships between CTDOT and UConn faculty, assisting with the resiliency assessment and public transit planning planned for next year
        ii. Development of an NSF IGERT program that would train masters and Ph.D. students in sustainability thinking, teaching them to be "physicians" of the city rather than specialists in any one field, such that they would be prepared to plan projects for both watershed management and transportation planning and have knowledge of both land use and transportation planning skillsets
        iii. Building towards an accredited planning program within the state of Connecticut, one of the few states without one.

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Interviews conducted 3/4/21-4/27/21

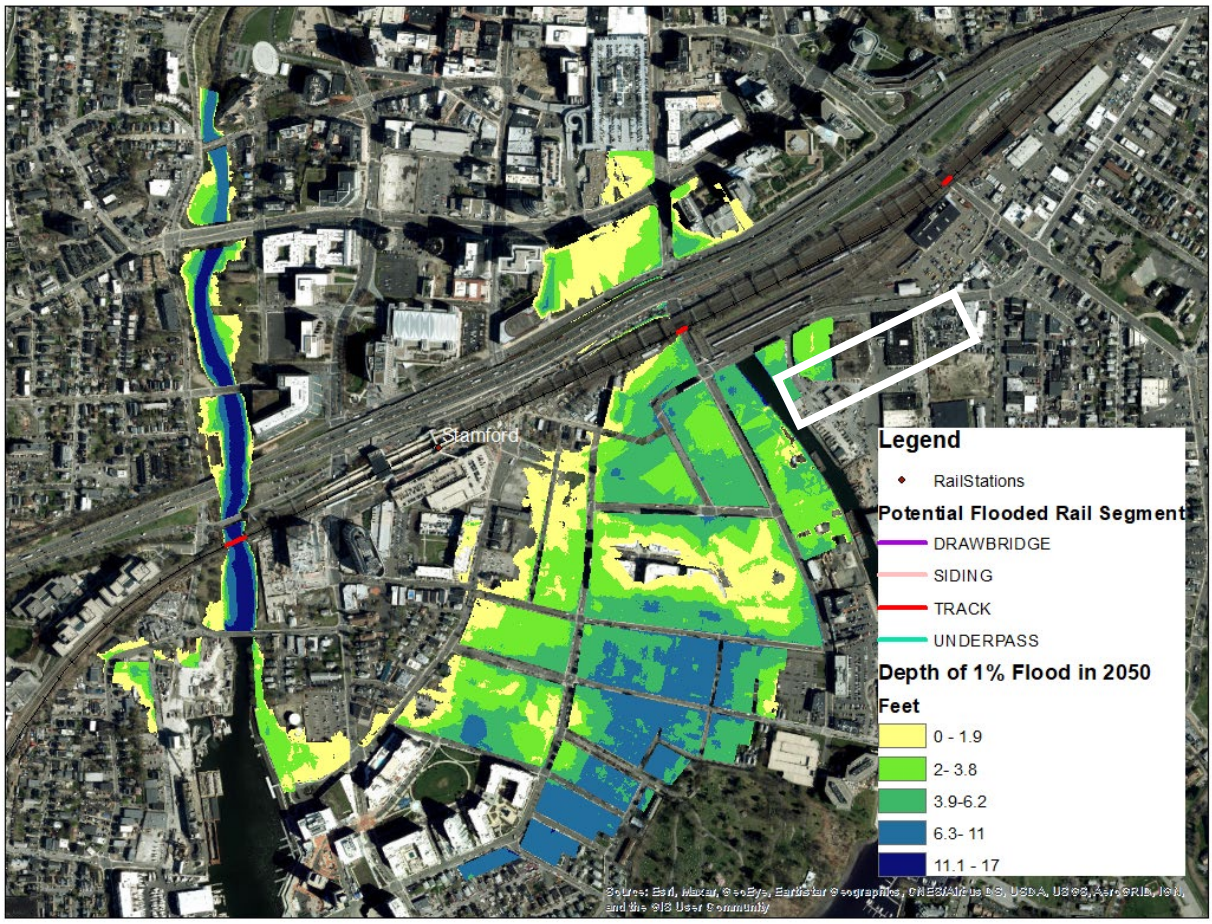
Appendix 1: Sea Level Rise Analysis

Greenwich

The only station in Greenwich with any mention of TOD is a neighborhood plan for Cos Cob. The identified parcel in that plan is one of the few north of the Cos Cob station not within the reach of the CIRCA 1% AEP. Otherwise, the risk to TOD in Greenwich are the sections that pass over bodies of water, including the Cos Cob bridge and a small section over Lower Lake Pond, not because of development in Greenwich but because of their potential to affect the resiliency of the transit corridor as a whole.

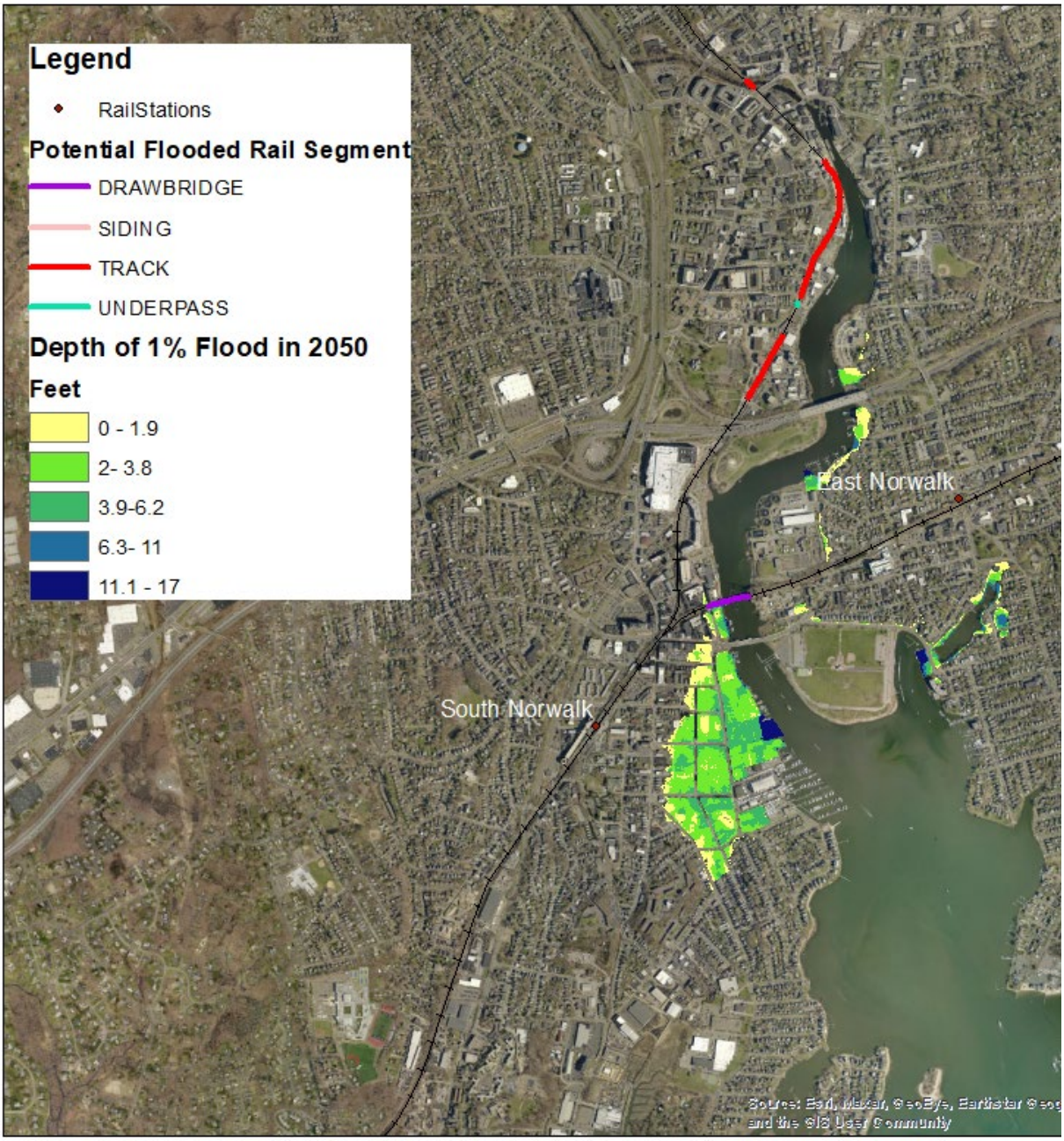
Stamford

Stamford's affected rail lines are bridges over roadways, as the through tracks are elevated within Stamford. Its two vulnerabilities are the street-level railyard highlightled below and the area to the south and east of the station where much of its TOD is located. The railyard is likely to see 1% AEP floods of 3-4 feet, given the depth seen in neighboring parcels. For the existing TOD, those buildings located in the 1% AEP by 2050 zone do not have parking on the ground floor, unlike similarly located buildings in Norwalk.



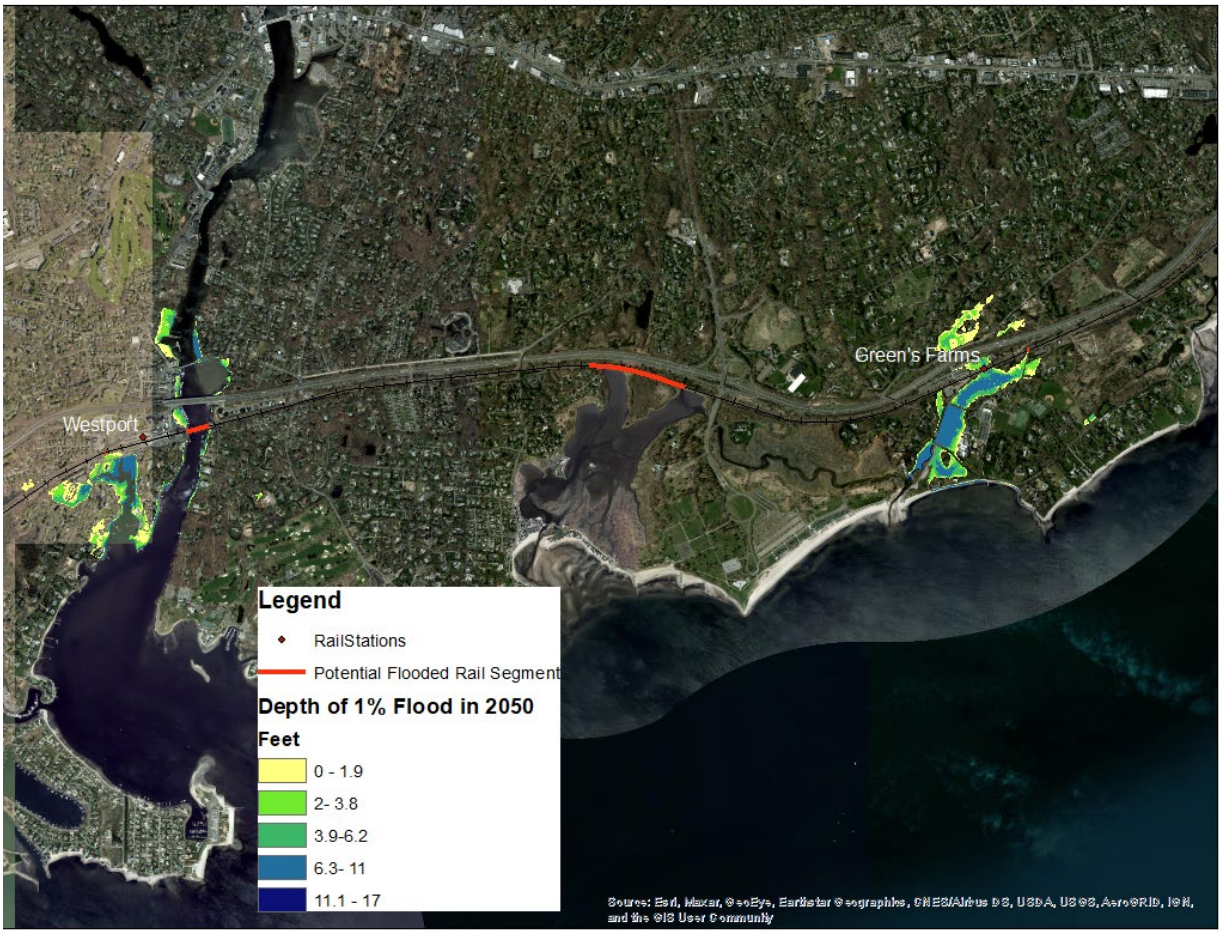
Norwalk

Along with Stamford, Norwalk has a high share of its TOD areas vulnerable to sea level rise. Much of the new development in South Norwalk is already built with parking on the ground floor or with elevated retail accessible by ramps and stairs. Norwalk's rail vulnerability is along the Danbury Branch line north of I-95. In East Norwalk, most of the TOD zone is outside of the 1% AEP in 2050, except for the Liberty Square Village District, just north of Veteran's Park and Fort Point Street which may see 1-2feet of flooding. This flood potential should be taken into account during the proposed planning for the district, after the Walk Bridge is completed.



Westport

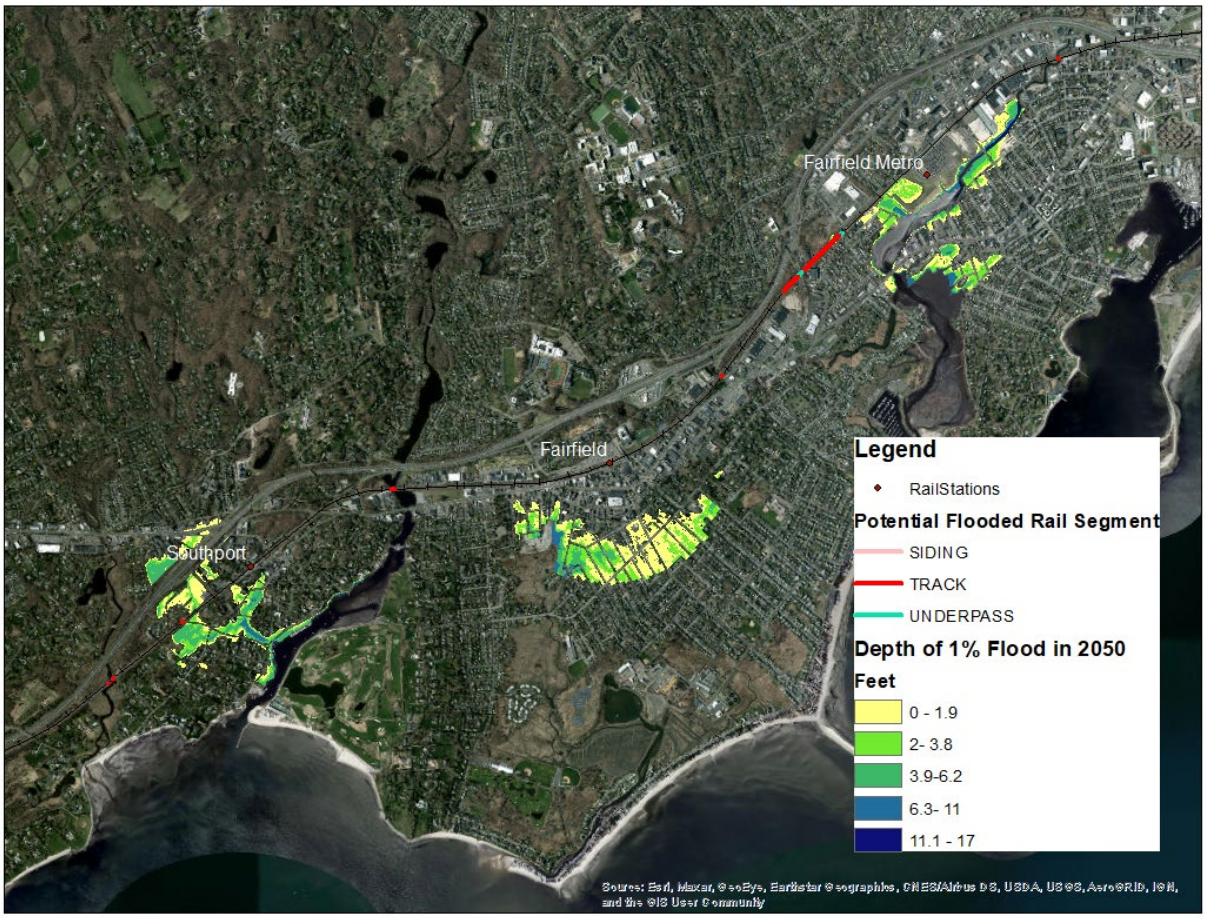
Westport's major sea level rise concerns are away from the Westport station area TOD. Green's Farms is one of the more vulnerable stations, with potential flooding of more than four feet on either side of the tracks. The stretch of track along Sherwood Millpond and Mill Creek is also vulnerable. Around Westport Station itself, the vulnerabilities are the far southwestern parking parcel and properties that lie along the Saugatuck River, of which only the one just above the track between the track and I-95 has been identified as potential TOD. The plan did identify the need for ground-floor parking at that site.



Fairfield

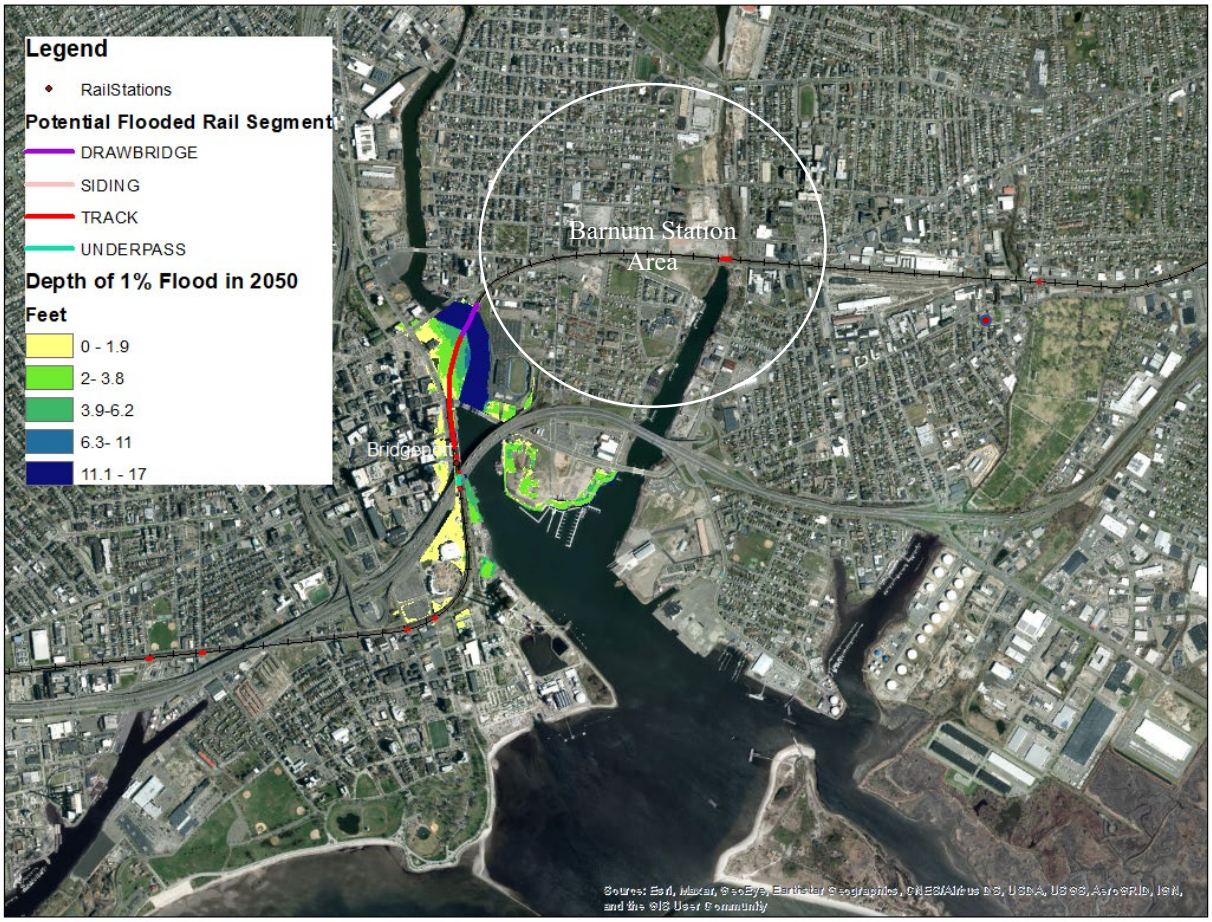
In Fairfield, sea-level rise affects the edge of the Fairfield Center TOD study and a considerable portion of the parcels within half a mile. At Fairfield Metro, potential flooding from Ash Creek should be taken into account when planning the pedestrian bridge between the station and Black Rock in Bridgeport. The design for the rest of the station area does seem to account for the flood potential with a greenway along the rest of the parcel border with Ash Creek, but one of the potential building locations, on the southwestern edge of the large parcel, is also possibly affected.

From a TOD perspective, the greatest area of concern is the Metro-North track linking Fairfield and Fairfield Metro, which is at ground level for that stretch and covered by the CIRCA 1% AEP by 2050. Roughly 2,000 feet of track, including two underpasses, is underwater between the two stations, with the remainder seeing the flooding stop just below the tracks. TOD around the stations will suffer if the transit portion between them is vulnerable. The town has no TOD plans at Southport station, and likely should not, given the flood concerns.



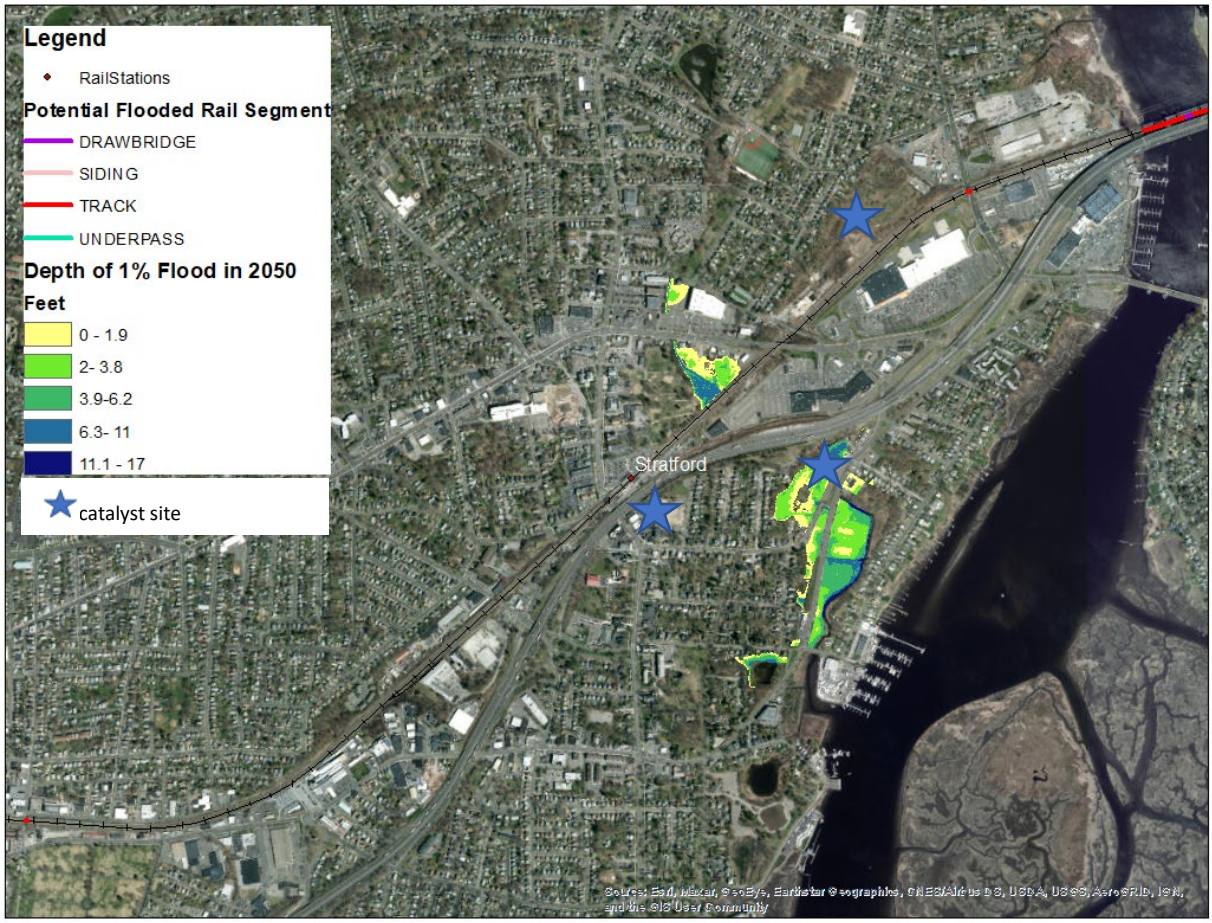
Bridgeport

In Bridgeport, there is less vulnerability for proposed development sites and more for the train infrastructure itself. While the tracks and station are elevated in Bridgeport, past storms have temporarily rendered the station, built on fill, inaccessible. The problem has been compounded by the decision to locate Bridgeport's bus hub near the station, which eases connections but increases the bus network's vulnerability to sea level rise. The proposed Barnum Station site, whose study area and project plan were included in this research, is significantly less vulnerable to sea level rise. There is a creek bed with a proposed greenway and bioswale running just to the east of the proposed station, but less chance of the station itself being frequently cut off by flooding. The Barnum Station proposal was eventually shelved due to funding constraints, as it would have required replacing three viaducts to create a center platform. If these viaducts need to be replaced for resilience reasons, it makes sense to reopen the Barnum Station proposal.



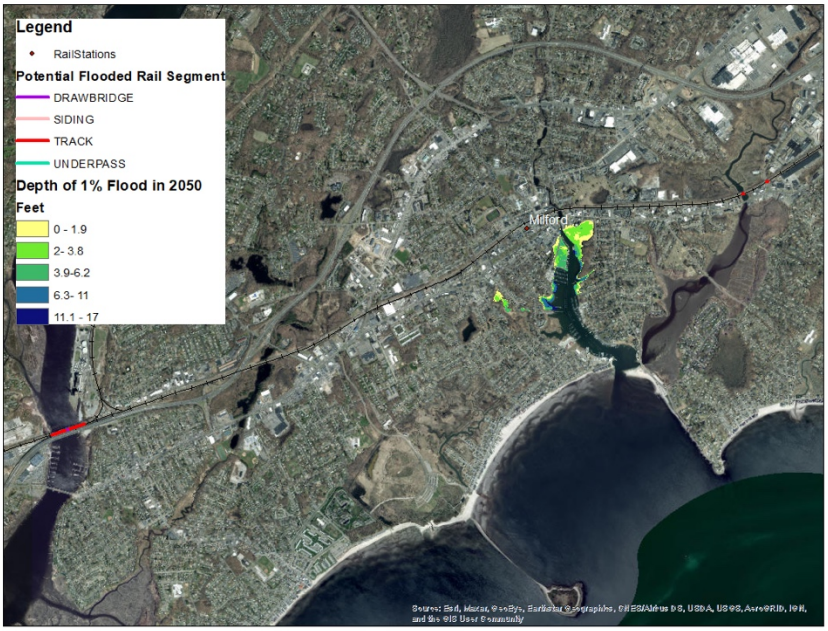
Stratford

Stratford identified three "catalyst" sites to spur redevelopment in their TOD plan, marked on the image below with stars. Of the three, one is fully covered by the CIRCA 1% by 2050. The flood risk to the catalyst site is mentioned in the coastal resilience plan, but not the TOD plan. The TOD plan mentions occasional flooding under the Metro-North overpass, but the issue did not appear in the CIRCA 1% AEP by 2050, as Stratford's rail is mostly safe from flooding with the exception of the bridge over the Housatonic River.



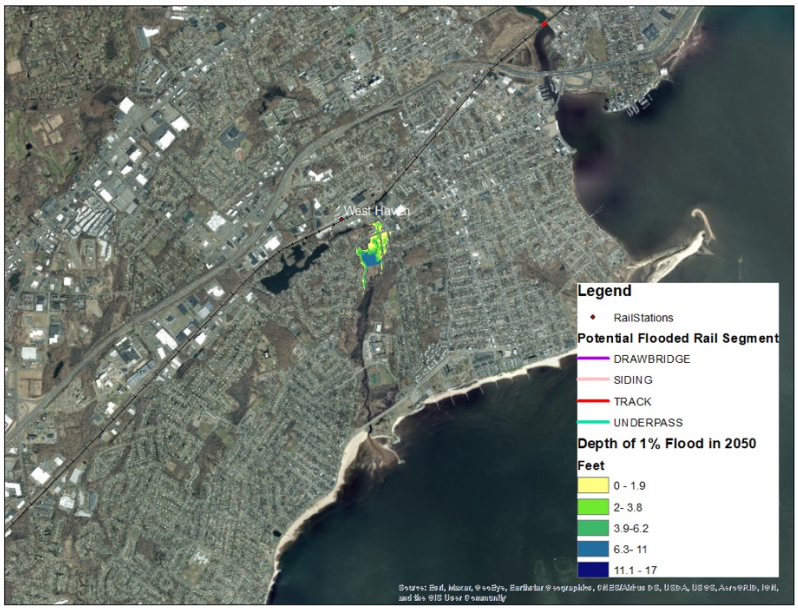
Milford

In Milford, the main stretch of vulnerable rail is the bridge over the Housatonic. There is also a bridge over the Indian River and an overpass over Old Gate Lane that may be an issue. Within the station area, the parcels with flood potential are southeast of the station and not targeted for development.



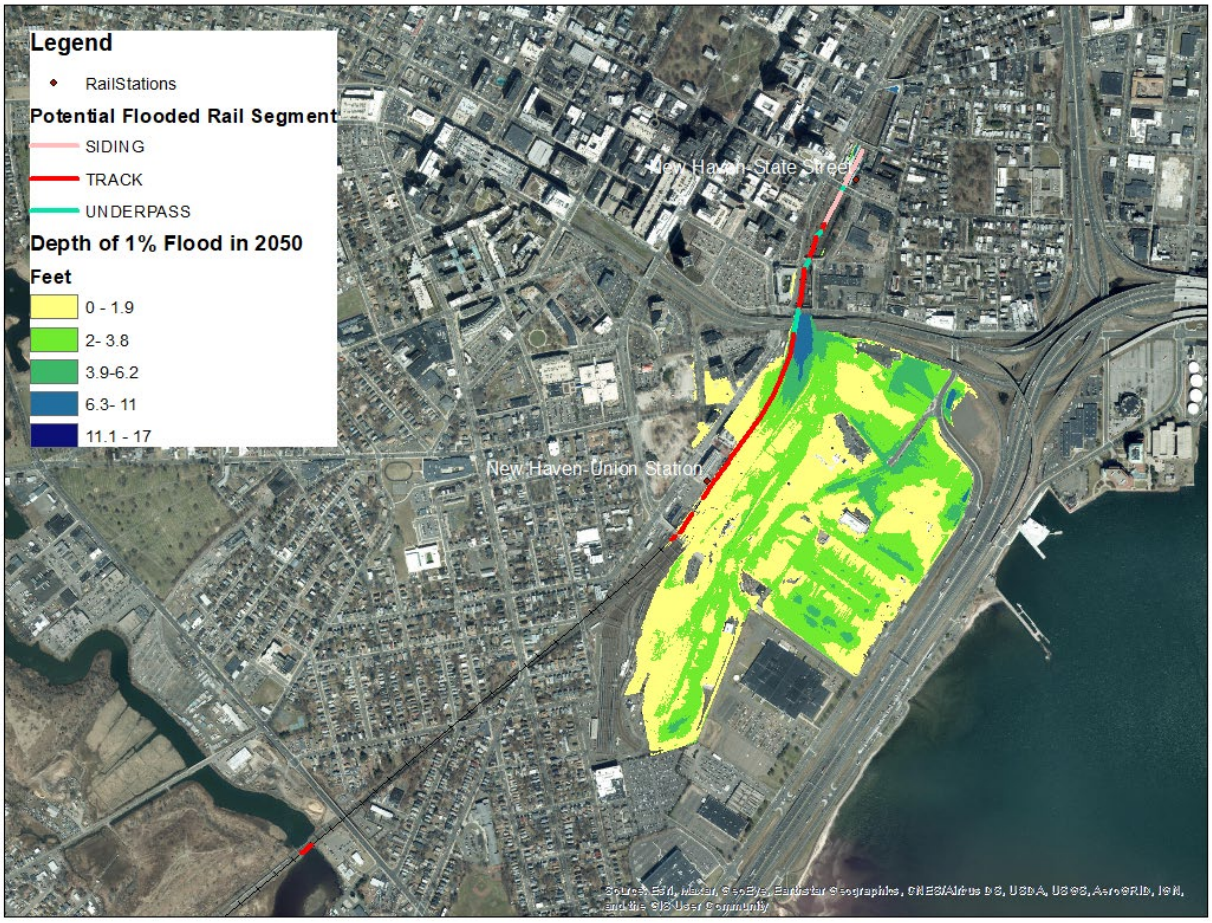
West Haven

Though there is projected flooding within West Haven's station area, the only impacted TOD parcel is marked as either potential open space or development near the station, part of a trend in that plan to show "illustrative" possibilities rather than firm recommendations. The only stretch of rail is 28 feet on the bridge over the West River between West Haven and New Haven.



New Haven

In New Haven, aside from the more well-known problem of flooding in Long Wharf, the flood risk goes as far as Union Street and the police station, as well as along the Metro-North tracks from Union Station to State Street, the longest stretch of affected track. Those zones of the city have previously experienced flash flooding from an August 2012 storm sufficient to lift cars off the road. The TOD plan for the area would be impacted in the parcels directly in front of the station and in the proposed new parking garage for which the state has already committed funding. The Army Corps of Engineers plan for Long Wharf should mitigate this, though the flooding along the Metro-North tracks to State Street was outside the project's study area, so potential benefit was not mentioned.



Appendix 2: Walkability Analysis

For the walkability analysis, we selected all potential walking exits from the station, as well as any major streets within the half-mile zone. We measured the road width, and sidewalk width where available, on Google Maps, as well as any marked or unmarked but visible street parking or bike lanes. We assessed a sense of speed based on road width, lane striping, and parking availability, and tested the sense of speed amongst multiple researchers. We then identified crosswalks and sidewalks. Finally, we used Street View to assess building frontage, with good building frontage being that which had diverse uses and engaging views, like a street of shops or houses, fair frontage being large single-use buildings or less well-maintained shops or houses, and poor frontage being parking lots, guardrails, or grassy roadsides.

To get a rating, we considered each factor on its own but also the relationship between them. For example, wide roads can be mitigated by crosswalks, and high speeds with good sidewalks on both sides. In reverse, narrow, slow streets may not need a mid-block crosswalk if pedestrians feel safe crossing anywhere. We also set as a rule that no street with sidewalks on only one side could be rated green or above, though we made an exception for Milford's Broad Street (CT-162) since Milford Green is a median as well as a park. Blue streets are those streets that make an extra effort in favor of pedestrians, such as the mid-block crosswalks on Washington Street East of Main Street in Norwalk, Main Street in Bridgeport's wide sidewalks relative to its width, and Bank Street in Bridgeport's narrowness combined with wide sidewalks. The rating for the station as a whole is the average of the analyzed streets. For Barnum Station, because there is no fixed location as yet, we made a general assessment of the streets in the area.

Station	Road	ROAD FEATURE 1:	Road Width (ft)	Sense of Space (depth)	Both SW	One SW	No SW	CW(s) Major Intxns	Few CW	No CW	Good RF	Fair RF	Poor RF	Both On-st Parking	One On-st Parking	No On-st Parking	Wide Segments (min +)	High Speeds (Mode +)	Bike Lane	SWWidth (ft)	Comments on Walkability
Greenwich	Greenwich Plaza		48	10	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	5	Only one SW but low-speed: -1, fas
Greenwich	Railroad Ave		48	25-30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	8	Checks off all of the boxes, but bell
Greenwich	Greenwich Ave		58	25	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	TRUE	FALSE	FALSE	10	Good RF, sidewalks, etc but crosswa
Greenwich	Steamboat Road		40	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	8	Fair BF: -1.5, CW Density case impro
Cos Cob	Sound Shore Drive		25	30	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	8	Only one SW but low-speed: -1, fas
Cos Cob	Station Drive		30	30	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	3.5	No SW but low-speed: -1.5, few cro
Cos Cob	Loughlin Ave		30	20	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5.5	Few cross walks but narrow road: -1
Riverside	Corona Drive		25	20	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	8	Only one SW but low-speed: -1, Ov
Riverside	Riverside Ave		25-28	25-30	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	8	Only one SW but low-speed: -1, fas
Riverside	Oval Ave		28	30	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Only one SW but low-speed: -1, On
Old Greenwich	Sound Beach Ave		50	25	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	12	Checks off the major boxes but the
Stamford	Washington Blvd		50	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	TRUE	8	Has both sidewalks but a high spee
Stamford	Station Place		30	20	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	8	Fair BF: -.5
Stamford	Atlantic Street		50	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	5-15	It's a wide road but has crosswalks
Noroton Heights	Heights Road		33	35	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	5	Few CW but narrow road: -1, High s
Noroton Heights	Hollow Tree Ridge Road		33	25	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Only one SW but low-speed: -1, Fe
Noroton Heights	Edgerton Street (Closer to station)		28	25-30	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Only one SW but low-speed: -1, Po
Noroton Heights	Noroton Ave		40	30	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5.5	Only one SW but low-speed: -1, CW
Noroton Heights	West Ave		32	30	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4.5	Only one SW but low-speed: -1, CW
Darien	Route 1		44	40	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	7	Could always use more sidewalks b
Darien	Route 124		28.5	30	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	4.5	Only one SW but low-speed: -1, few cro
Darien	Route 136		38	40	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE	5	Only one SW and has high speeds: -1.5,
Darien	West Ave		33	35	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	4.5	Only one SW and has high speeds: -1.5,
Rowayton	Route 136		33	35	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	5	Only one SW and has high speeds: -1.5,
Rowayton	Rowayton Ave		29	35	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	5	Only one SW and has high speeds: -1.5,
South Norwalk	Martin Luther King Jr. Drive		47	35-40	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	8	Only one SW and has high speeds
South Norwalk	Washington Street (West of Main Street)		44	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	10	Has both sidewalks but a high spee
South Norwalk	Washington Street (East of Main Street)		25-40	20-25	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	10-20	Most walkable street
South Norwalk	Madison Street		32	30-35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	5	Has both sidewalks but a high spee
South Norwalk	Monroe Street		40	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	8	Fair BF: -.5
East Norwalk	Route 136		36	30	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4.5	Few CW but narrow road: -1, Fair BF
East Norwalk	East Ave		40	35	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	8	Has both sidewalks but a high spee
East Norwalk	Fitch Street		40	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	7	Fair BF: -.5, could use more CW
Westport	Saugatuck Ave		33	30	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5.5	Only one SW but low-speed: -1, fas
Westport	Riverside Ave		35	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	7	BF is inconsistent / could use more
Westport	Charles Street		35	30-35	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	5	Few cross walks but narrow road: -1, Fe
Westport	Railroad Place		25	15	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	5	Checks off all the boxes but could b
Westport	Franklin Street		30	25	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	7	Few CW but narrow road: -1, Poor BF: -
Green's Farms	New Creek Road		35	30	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	(Basically) No SW: -1.5, (Basically) no
Green's Farms	Greens Farms Road		26	30	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	N/A	No SW -1.5, No CW: -1.5, Poor BF
Green's Farms	Maple Lane		22	20	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	N/A	No SW -1.5, No CW: -1.5, fair BF: -
Southport	Route 1		60	45	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	4	Only one SW and has high speeds
Southport	Spruce Street (South of I-95)		25	20-25	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4	Narrow road but no CW: -1.5, could
Southport	Pequot Ave		45	30	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Inconsistent: double SW but few spe
Southport	Station Street (Parallel to Tracks)		26	5	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	4	Only one SW but low-speed: -1, few
Southport	Station Street (Perpendicular end of the	parallel segment)	25	10-15	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	N/A	No SW but low-speed: -1.5, No CW
Southport	Station Street (Perpendicular to Tracks)		28	15	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	3	Only one SW but low-speed: -1, No
Southport	John Street		20	near station, 15 elsewhere	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	3.5	No SW but low-speed: -1.5, No CW
Southport	Old Post Road		32	30	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Only one SW but low-speed: -1, few
Fairfield	Route 1		60	25 or 30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	12	Pretty perfect, wide sidewalks in ar
Fairfield	Mill Plain Road		42	30-35	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	5	Has both SW but is high speed: -.5, few
Fairfield	Carter Hilary Drive		54	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	8	Low speed, but there is one crosswalk
Fairfield	Miller Street		28	20	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	7	Few CW but narrow road: -1, Fair BF
Fairfield	Sanford Street		38	25	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	9	Few CW but narrow road: -1,
Fairfield Metro	Route 1		60	40	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	5	Has both SW but is high speed: -.5, Few
Fairfield Metro	Kings Highway		40	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	TRUE	4	Has both SW but a high speed: -.5,
Fairfield Metro	Commerce Drive		48	35	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5.5	Only one SW and has high speeds
Fairfield Metro	Black Rock Turnpike/Brewster Street		42	35-40	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	5	Has both SW but is high speed: -.5, Few
Fairfield Metro	Ash Creek Boulevard		54	40	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	5	Has both SW but is high speed: -.5, few
Fairfield Metro	Constant Comment Way		24	25	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	N/A	No SW but low-speed: -1.5, Few CW
Bridgeport	Fairfield Ave		40	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	10	Fair BF: -.5, could use more CW as
Bridgeport	Water Street		60	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	12	Has both SW but a high speed: -.5,
Bridgeport	John Street		40	30	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	9	Fair BF: -.5
Bridgeport	Bank Street		20	15-20	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	10	Could use more CW, one way road
Bridgeport	State Street		24	20-25	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	10	Few BF: -.5
Bridgeport	Main Street		32	25	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	12	Could have more greenway but prett
Stamford	Route 1		60	45	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	5	Has both SW but is high speed: -.5,
Stamford	Route 106		41	35	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	4	Only one SW but has high speeds
Stamford	Route 130		42	35-40	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	N/A	No SW and high speed: -2, few CW
Stamford	Route 113		64	40	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	TRUE	TRUE	FALSE	8	Has both SW but is high speed: -.5, Roo
Milford	Route 162		38	30	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	9	Only one SW but low speed: -1, could a
Milford	High Street		26	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4	Few BF: -.5, Some peds can be bal
Milford	Derby Place		29	25	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4.5	Few CW but narrow road: -1,
Milford	Railroad Ave (North, Parallel to tracks)		26	10	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	N/A	No SW but low-speed: -1.5, Few CW
Milford	Railroad Ave (South, Parallel to tracks)		33	10	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	4	Only one SW but low-speed: -1, Few CW
Milford	River Street		45	20	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	8.5 & 14	Could always use more CW but still
West Haven	Saw Mill Rd		46	15	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Has both SW but is high speed: -.5, Few
West Haven	Main St/ Platt Ave (West of Kelsey Ave)		40	35-40	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4.5	Only one SW (but is inconsistent) and h
West Haven	Elm Street		40	35	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	5	Has both SW but is high speed: -.5, Few
West Haven	Railroad Ave		35	30-35	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4.5	No SW and high speed: -2, few CW but
Union Station	Columbus Ave		38	30	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	11	Few CW but narrow road: -1, Fair BF: -
Union Station	Church Street		66	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	10	Has both SW but is high speed: -.5, Roo
Union Station	Union Ave		60	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	11.5	Has both SW but is high speed: -.5, Roo
Union Station	Water Street		45	25-30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	9	Poor BF: -.5, unkept area: -.5, Rest
Union Station	Spring Street		38	25	FALSE	TRUE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	6 - 11	Only one SW but low speed: -1, walking
State Street	Union Ave		60	35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	11.5	Has both SW but is high speed: -.5, Roo
State Street	Water Street		43	25-30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	9	Poor BF: -.5, unkept area: -.5, Rest
State Street	State Street		73	30-35	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	TRUE	FALSE	12	Has both SW but is high speed: -.5, Roo
State Street	Elm Street		70	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	10	Road is wide but there are plenty of CW
State Street	Grand Ave		34	30	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	7.5	Few BF: -.5, could use more CW as
State Street	Chapel Street (East of tracks)		40	25	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	4-10	Few BF: -.5, could have more CW and h
State Street	Chapel Street (West of tracks)		47	20	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE	10	Needs more CW, but other than tha
State Street	Court Street		25	20	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	TRUE	FALSE	FALSE	TRUE	FALSE	FALSE	FALSE	FALSE	8	Fair BF: -.5