CDTC
Capital District Transportation Committee

CDTA

CAPITAL REGION BUS LANE FEASIBILITY STUDY

PREVIOUS PLAN AND PEER REVIEW

CONTENTS

FIGURES

TABLES

1. PLAN REVIEW TASK PURPOSE

The purpose of this task is to identify, review, and summarize all relevant local planning and policy documents related to or impacting the implementation of bus lanes and bus priority within the study area. Additional peer planning studies and resources are also included to build upon lessons learned to apply to this project. The input from previous plans and national examples will assist in planning a feasible and implementable network of transit-supportive streets in the study area.

Beyond highlighting recent relevant studies and recommendations, this review is an important step towards coordinating the various regional planning initiatives to optimize the effectiveness and minimize duplication of efforts. This review aims to identify key planning challenges and opportunities, including relevant information for this study, lessons learned, and best practices. This document is structured into three sections as a quick reference resource to inform subsequent tasks and help drive decision-making. The first section is comprised of a summary table with local planning and policy documents' major elements, recommendations, and key information of relevance to the Bus Lane Study. The second section highlights lessons learned and performance data of non-local bus priority projects across the country. Finally, the third section includes key tables, maps, and graphics from the reviewed plans.

2. LOCAL PLANS REVIEW SUMMARY

Table 1: Local Plan Review Summary

Agency / Study Name / Date	Major Elements	Key Relevance to Bus Lane Study	Recommendations	Challenges / Opportunities / Best Practices / Lessons Learned
CDTA Transit Development Report (2014) ■ Report	■ CDTA's strategic plan ■ Service standards ■ Capital projects	■ After implementing Washington-Western and the River Corridor, CDTA will look at bus-only lanes in downtown Albany again. ■ Two BRT lines along with trunk and neighborhood routes now share the same corridor along Washington Avenue and State Street between Lark Street and South Pearl Street. The amount of service and length of this segment will have a substantial impact on travel times while increasing transit ridership. ■ TSP installed on 45 NY 5 intersections; queue-jump lanes along three stretches of NY 5 Corridor (p 36, 37). ■ Additional potential queue-jump locations are listed on p. 85. ■ Defines CDTA standards for BRT corridor/stations: a corridor should have >2 million annual riders on existing services; a pair of stops should have >100 boardings per weekday (after applying an assumed 20% increase to the number of existing boardings) on p. 51. ■ Click here to jump to key graphics and maps from this plan.	■ The plan defines a Transit Priority Network (distinct from but overlapping with CDTC's network of the same name) on p. 67, with individual segments listed on p. 118-119. ■ Other recommendations include: — Continue to implement elements or amenities that reduce travel times, increase service, improve customer convenience, and attract more riders to existing BusPlus — Implement a system-wide fare collection upgrade and expansion of BusPlus ITS elements.	■ Bus Only Lanes / Exclusive Lanes are the most effective means of reducing travel time for BRT service. ■ Implementing Bus Only Lanes / Exclusive Lanes throughout the region requires taking space away from other lanes, parking, sidewalks, and/or private property, so exclusive lanes can only be included in areas with numerous bus routes, very high ridership, and broad street widths.
CDTC's New Visions 2040 (2015) ■ Executive Summary ■ Report	■ Local Transit Services ■ Traffic Congestion Management ■ Complete Streets ■ Travel Reliability	■ New Visions is a long-range 25-year regional transportation plan. ■ New Visions 2040 is an update to the New Visions 2035 plan, amended in 2016 to incorporate additional freight movement considerations. ■ New Visions 2040 Plan includes a set of principles to guide transportation planning and investment in the region for the coming years.	■ Continue to seek funding for CDTC to fund existing and small-scale new infrastructure and explore the use of new funding sources. ■ Increase funding for transit. ■ Investigate new funding mechanisms to support CDTA transit operations. ■ Expand BusPlus BRT and promote bus/transit-only travel lanes.	■ The plan recommendations indicate that funding sources and mechanisms are an area needing reform.

Agency / Study Name / Date	Major Elements	Key Relevance to Bus Lane Study	Recommendations	Challenges / Opportunities / Best Practices / Lessons Learned
CDTC New Visions 2050 Transit White Paper (2020) ■ White Paper	■ Local Transit Services ■ Performance Measures ■ New Visions 2040 Recommendations Status ■ Transit Capital Projects ■ Transit Service and Operational Changes ■ Transit Planning Funding ■ Trends and Forecasts ■ New Visions 2050 Scenarios ■ Transit Principle with Strategies and Actions	■ On p. 17, reviews New Visions 2040 recommendations—some progress made toward recommendation 4 (to promote bus-only lanes beyond the Washington/Western Corridor, "particularly in BusPlus corridors"). Training on NACTO's Street Design Guide was held in 2018. ■ Capital projects table p. 22. ■ Briefly describes CDTC's Transit Priority Network (based on but slightly extending CDTA's from 2014) (p. 35). ■ Prioritizes the completion of the Washington/Western and River Corridor BRT projects (p. 57). ■ It also says "CDTA should plan" to update basic BRT to enhanced BRT, including off-board fare collection, articulated buses, queue-jumpers, level boarding stations, increased frequency, and bus-only lanes (p. 57). ■ CDTA's Transit Priority Network to be revised before next TIP update (p. 60). ■ Bus lane feasibility study "should consider bus-only lanes, shared bus/parking lanes and shared bus/bike lanes in BRT corridors and other high ridership transit corridors" (p. 57). ■ References previous proposals for bus-only lanes on State Street. ■ Various CDTA service measures were described starting on p. 64 (headway ranges for different service types, routes meeting headway thresholds, typical spans of service by service type, BRT ridership, and performance). ■ Click here to jump to key graphics and maps from this plan.	■ Promote Bus/Transit Only Travel Lanes. ■ Provide high-quality fixed-route transit in core areas of the region. ■ Complete and Upgrade 40 Miles of Bus Rapid Transit - increased service frequency and bus-only lanes. ■ Study the Feasibility of Bus Lanes and Future BRT Lines - The feasibility study. ■ Should consider bus-only lanes, shared bus/parking lanes, and shared bus/bike lanes in BRT corridors and other high ridership transit corridors. ■ Develop and Monitor Transit Related Pilot Programs - CDTA should pursue pilot projects that support transit such as bus lanes, mobility hubs at transit stops, shared transportation services, scooters (if legalized in New York State), automated transit vehicles, and other options not yet imagined. Pilot projects offer the benefit of testing an idea in real-time with a focused public process.	

Agency / Study Name / Date	Major Elements	Key Relevance to Bus Lane Study	Recommendations	Challenges / Opportunities / Best Practices / Lessons Learned
CDTC's New Visions 2050 (2020) ■ Website ■ Executive Summary ■ Maps	■ Planning and Investment Principles ■ System Performance Report ■ Transit White Paper ■ Financial Plan	■ The New Visions 2050 is a minor update to the New Visions plan released in 2015. New Visions does not contain a list of projects that CDTC expects to undertake over the next 20 years. This Plan is a statement of principles, strategies, and budgetary emphasis to guide more detailed project decisions as the region invests in a next-generation transportation system. ■ Since New Visions 2040 was adopted in 2015, 17 miles of Bus Rapid Transit were constructed, and alternatives for I-787 were evaluated in the I-787/Hudson Waterfront Corridor Study. ■ Click here for the ITS Priority Network as defined in the plan, which highlights the Bus Rapid Transit (BRT) priority corridors and the Transit Priority Network.	■ Regional Operations and Travel Reliability: Any congestion management actions must recognize the importance of and balance of pedestrians, bicyclists, and transit users' needs and access. Key recommendations: — Right-size existing roadways. ■ Transit and Human Services: Expansion of BRT and the addition of mobility hubs, on-demand services, and integrated technologies (i.e., smartphone app) allowing users to purchase transportation when needed and seamlessly transfer between travel options is desired. Key recommendations: — Complete and upgrade 40 miles of BRT — Study the feasibility of bus lanes and future BRT — Explore conversion of enhanced BRT to light rail — Revise CDTC Transit Priority Network and TIP merit score methodology.	■ The plan contemplates four scenarios and examines the impacts on transit as follows: — Status Quo (Scenario A): assumes gradual adoption of connected and automated vehicles and more availability of shared mobility services — Sprawl Development (Scenario B): Transit service declines, transit viability is threatened, and overall fewer transportation choices are available — Concentrated Development (Scenario C): Transit services more people and has a strong market share. Overall, there are more transportation choices — Concentrated Development with Financial Incentives (Scenario D): Transit service is highly attractive and competitive, reaches higher market share and provides more transportation choices.
RPA Albany Transit Supportive Development Case Study (2009) ■ Website ■ Case Study Report	■ Bus Access to Convention Centers ■ Bus Rapid Transit (BRT) ■ Site and Program Analysis ■ Design Propositions ■ From Bus Station to Mixed-Use Multimodal Center ■ District-wide Land Use and Pedestrian Network ■ State Street as a BRT Boulevard ■ Next Steps	■ Description of existing conditions and proposal for State Street between Broadway and Eagle streets starts (p. 16). ■ Recommended median rather than curbside bus lanes to improve travel time reliability, maximize parking availability, and avoid conflicts with loading/unloading vehicles. ■ Re-imagine State Street as a BRT corridor with bus-only lanes located in the median, which allows for faster, more reliable bus travel times; maximizes the number of on-street parking spaces and loading areas; improves the streetscape of this major downtown artery (p. 4) ■ Alternative 2: Center Bus Lanes — It maintains convenient loading-unloading and parking at the curbside of the traffic lanes — It also allows for easy access to the hotel site adjacent to the corridor — Bus passengers would cross the traffic lanes at signalized pedestrian crossings reducing conflicts with drivers (p. 17) — Overall crossing distances will remain the same.	■ Reimagine State Street as a BRT Boulevard — High number and proportion of buses — Increased reliability and speed of bus service — Increased productivity of bus service for the operators — Increased safety — Increased visibility of public transit for users — Increased ridership and reduced air pollution. ■ The median bus lane is preferred to the bus lane at the outer edges of the street since it would further enhance the reliability of bus travel times, increase the number of parking spaces available, including two valet spaces for the hotel site, and allow relatively convenient loading-unloading at the curbs.	Better street design overall that accommodates all users regardless of mode.

Agency / Study Name / Date	Major Elements	Key Relevance to Bus Lane Study	Recommendations	Challenges / Opportunities / Best Practices / Lessons Learned
CDTA River Corridor Alternatives Analysis (2015) ■ Report	■ Corridor Transportation Conditions ■ Alternatives Development ■ Alternatives Evaluation ■ Implementation and Finance Plans	■ Purpose - The purpose of the project is to provide faster, more direct, more frequent, and more reliable north-south transit service connecting the major activity centers along the River Corridor at a reasonable cost and schedule (p. 17). ■ Transit Signal Priority (p. 35). ■ Queue Jump (p.36). ■ Bus Lanes - Bus lanes in this area are generally not needed to get around traffic congestion but rather to influence land development and as building blocks toward LRT. Bus lanes also ensure that travel times will remain consistent as traffic volumes grow along with increased economic development (p. 40). ■ Some sections of bus lanes are more physically feasible than others and require further study and buy-in from users, agencies, and the public (p. 40-41).	■ Recommended Alternative for this study is Alternative 2 Broadway — Best potential to support economic development and transit-oriented development — Best integration of existing local services without vast increases in resources required for the overall system — Best integration of transit priority infrastructure and connectivity to important transit-dependent neighborhoods and destinations — Best combination of travel time savings and connectivity.	■ The plan highlights the opportunity to reduce the need for parking and for better land-use decision-making. ■ Contraflow bus lanes present challenges for on-street parking and intersection signals. ■ Implementation of bus lanes may impact on-street parking, roadway widening, bicycle accommodations, traffic operations, and other right-of-way impacts. ■ Challenge with the timeline for rollout: These investments will require time to coordinate project development, design, and community input that may prolong the schedule for service rollout.
Washington/Western BRT Conceptual Design Study (2014) ■ Project Summary ■ Alternatives Analysis Report	Bus Rapid Transit (BRT)	■ Proposal for a new BRT line connecting Downtown Albany and Crossgates Mall along Washington and Western Avenues. ■ The eastern end of the proposed BRT would overlap with the existing NY5 BusPlus service and would intersect with the River Corridor BRT (the blue line) in downtown Albany.	■ The proposed route runs along Washington Avenue until the Lark-Amory station, before serving Western Avenue until it diverts to serve UAlbany directly, terminating at Crossgates Commons and Crossgates Mall. ■ Queue jump lanes, transit signal priority, and enhanced stations along the alignment. ■ An exclusive busway through the Harriman State Office Campus and the University of Albany Uptown Campus.	Opportunity to provide a direct east-west connection between several major activity centers/trip generators.

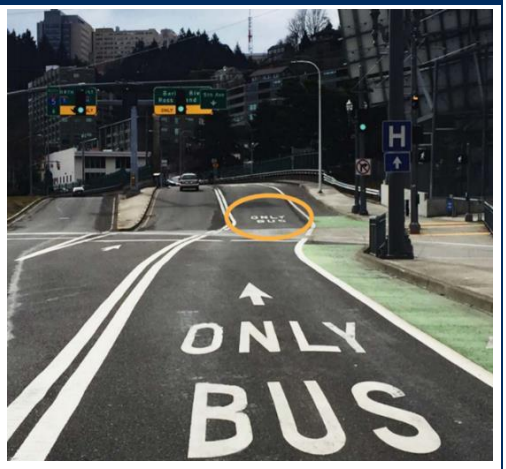
Agency / Study Name / Date	Major Elements	Key Relevance to Bus Lane Study	Recommendations	Challenges / Opportunities / Best Practices / Lessons Learned
CDTC/CDTA Conceptual Design of NY 5 BRT Priority Measures (2004) ■ Report	■ Service Concept ■ Conceptual Design of main roadway treatments and priority elements ■ Additional concepts considered	■ Queue jumpers - A preliminary evaluation of the Route 5 corridor was made to determine which intersections would be considered good candidates for the implementation of queue jumpers—short exclusive bus lanes leading up to intersections combined with transit signal priority (p. 7). ■ Transit Signal Priority - By giving signal priority to transit buses, transit travel times and delay times are shortened, translating into more convenience to the passengers and cost savings for the agency. It has also been shown that transit signal priority can allow the agency to reduce the number of trips on a route without affecting its level of service. Furthermore, signal priority can reduce or eliminate “bunching” (p. 10). ■ Downtown Albany Bus Lanes - The concept of a bus lane is to provide an exclusive lane for transit use. Several different types of bus lanes exist, including curbside lanes, interior lanes, and median lanes, each with its own advantages and disadvantages (p. 13). — A qualitative evaluation that considered five criteria was conducted to analyze the trade-offs of the alternatives under consideration. The five criteria selected for the evaluation were: 1) impact to traffic; 2) impact to parking; 3) transit improvement; 4) impact to the pedestrian environment; and 5) complexity or constructability. (p. 14). ■ Bus Lanes between Fuller Road and Route 155 — Concept - Provide bus lanes in both directions along this section either by repositioning the curbs or removing the flush median. (p. 14).	■ Queue jumpers at several key locations — The evaluation concluded that the Wolf Road and New Karner Road intersections, in the westbound direction, are strong candidates for queue jump consideration because of the delays and queues experienced at these locations and the ability for a queue-jump lane to be constructed and complement the proposed BRT stations. ■ Transit Signal Priority ■ This review concluded that the implementation of unconditional TSP at most of the signalized intersections in the Route 5 corridor should have little or no impact on side street traffic.	■ Opportunities to realize transit time travel savings with various transit priority treatments ■ Implementation of queue jumps may run into issues with property owners.

Agency / Study Name / Date	Major Elements	Key Relevance to Bus Lane Study	Recommendations	Challenges / Opportunities / Best Practices / Lessons Learned
City of Albany Complete Streets Policy & Design Manual (2016) ■ Report	■ Street Typologies ■ Process and Implementation ■ Trending City-wide Design Considerations ■ Design Guidelines for Streetscapes, Sidewalks, and Streets ■ Design Guidelines for Intersections	■ Complete streets provide accessible bus stops while allowing buses to move through traffic with greater ease, further encouraging ridership while reducing dependence on private transportation services (p. 4-2). ■ Shared transit bicycle lanes are designated for use by public transit buses, bicycles, and generally for right-turning vehicles. The primary purpose of these lanes is to provide a time advantage to public transit by taking the buses out of the general traffic flow and into a designated lane (p. 4-2). ■ Road Diets - Generally, a road diet includes removing travel lanes from a roadway (p. 4-5). ■ Design Guidelines - A Transit Lane is for public transit. This dedicated lane has the potential to enhance the frequency, efficiency, and reliability of transit service along corridors throughout the City (p. 5-18). ■ Lane striping and pavement markings convey messages to roadway users. Use of lane striping and pavement markings can indicate which part of the road is designated for which user to create a safer, more accessible roadway network for all users (p. 5-20). ■ Dedicated transit lanes are lanes used by transit vehicles only along enhanced transit corridors (p. 5-22). ■ Enhanced transit lanes or corridors incorporate dedicated transit lanes and other transit amenities such as bus shelters located in buffer zones or bus bulbs (p. 5-22).	■ Provides recommended transit lane widths for all street typologies. ■ Dedicated or enhanced transit lanes are recommended for wide downtown streets, wide community mixed-use streets, and wide community commercial streets.	Opportunities for better coordination of different agencies.
Albany Parking Authority Downtown Albany Parking Facility Feasibility Study (2017) ■ Website ■ Report	■ Analysis of Existing Parking Conditions ■ Projection of Future Parking Needs ■ Site Evaluation and Concept Parking Plans ■ Financial Feasibility	■ As presented in Table 5 on the following page, the on-street parking in the Quackenbush/Riverfront and State Street zones is barely adequate based on the effective parking supply (p. 10). ■ Although there are currently parking “hot spots” in each of the three zones where parking demand exceeds the effective parking supply, the results of the parking occupancy surveys indicate there is adequate parking within the three analysis zones and the study area overall presently, and the development of more parking is not warranted until there is additional demand generated by future development and/or the absorption of currently vacant space (p. 15). ■ The Albany Convention Center Authority and the Capital District Transportation Authority (CDTA) are teaming to develop a proposed intermodal transportation center to replace the current bus station in the Green-Hudson area (p. 22).	■ The study did not recommend an additional downtown parking garage. ■ On-street paid parking should be considered in the developing Warehouse District.	■ Opportunity for transit connections to Capital District Gondola should it proceed forward. ■ Challenge to maintain adequate parking supply without overbuilding parking facilities. ■ Consider how bus lanes could help flow into and out of the CDTA Intermodal Center.

3. PEER BUS LANE EXPERIENCE SUMMARY

Table 2: Non-Local Plans Summary

Agency/ Study Name	Lessons Learned	Performance Data	Picture
LA Metro, Flower Street Bus Lane, 2019	■ Optimal volume of buses per hour is essential for maximum bus lane performance ■ Enforcement and compliance is critical to keeping bus-only lanes clear of violators and other obstructions ■ Relocate bus stop from traffic turning movements ■ Bus lanes need to be as continuous as possible to avoid diminished lane performance ■ A previous bus lane deployment created a lot of angst with community members, so it required a lot of extra outreach to ensure this pilot went smoothly. ■ Active enforcement by police was extremely costly, equivalent to $750k annually.	■ 1.8 mile peak period bus lane pilot, June 2019 ■ Up to 80 buses/hr. ■ Person throughput increased 37% ■ Travel time improved 30% ■ 2/3rd of riders and operators reported time savings ■ Bus speeds increased by 14% ■ Limited impact on private vehicles	

Agency/ Study Name	Lessons Learned	Performance Data	Picture
Portland, TriMet, Rose Lanes, 2020	■ The project is still in the implementation phase, and lessons learned have not been determined at this time	■ Network approach: target locations with the highest delay — Increase service as enhancements implemented — Variety of tactical strategies ■ Reduced travel times from 1 to 7 minutes depending on the treatment type ■ 24% gain in job access within 45 minutes by bus on average citywide	
Boston, MBTA, Everett Bus Lane Pilot, 2019	■ You won't always see big increases in ridership, some lines already saturated, but you can make the service more reliable and faster and save people a lot of time ■ Pilot projects can be tested and made permanent in a relatively quick amount of time	■ City of Everett, MA, pilot began in 2016 ■ 1 mile inbound in AM peak ■ Travel time savings between 8 – 11 minutes during peak times ■ On average, passengers saved 24 hours per weekday morning; on bad days, they saved 65 hours ■ 4% increase in ridership	

Agency/ Study Name	Lessons Learned	Performance Data	Picture
San Francisco, MUNI, Red Transit Lanes, 2017	■ Red paint treatment had a positive impact on dedicated lane enforcement. ■ In all three study corridors during both the AM and PM peak periods, the transit travel time to traffic travel time ratio decreased following the implementation of red treatments, indicating that the treatments have been effective at insulating transit travel times from the effects of increased traffic congestion.	■ Church Street — Average travel time savings of 14% (1 minute) — Reduced travel time variability by 27% — 50% reduction in drivers violating red transit lanes — No significant impact on traffic — Police reported collisions decreased by 16% — Striping and red paint cost $280k/mile.	
Seattle, King County Metro, Rapid Ride, 2014	■ 15 to 20 % of riders said they would have driven alone if not for better RapidRide bus service. ■ While the overall performance of each route has improved in terms of reliability and travel time, safety on board buses and at stops has not.	■ Network of BRT Lite ■ Many strategies in concert, including bus lanes ■ On average, 87% ridership increase since launching RapidRide; carrying more than 43,000 riders per weekday ■ 11% speed increase for travel times ■ The number of on-time trips has improved to 84%	

Agency/ Study Name	Lessons Learned	Performance Data	Picture
Baltimore, MDOT MTA, Dedicated Bus Lanes, 2019	■ Lanes that are not painted red and peak time only do not perform as well as full-time painted red lanes. ■ When the operators were asked how the dedicated lanes affected bus operations, the following four factors were identified almost equally (46%): — Increased speed through downtown — Improved ability to pull in and pull out from bus stops — Reduced conflicts with other vehicles — Easier to maintain the schedule ■ Enforcement was an issue, clear roles/responsibilities for agencies is critical. A Task Force recently decided to implement fixed cameras.	■ Network of bus lanes in the downtown core ■ Travel time savings with an average benefit of 9.3% per corridor. ■ Reduced number of buses involved crashes by nearly 12% ■ Bus lanes are most successful when they are in effect full-time (not just during peak periods) and are very clearly marked (painted red)	
New York City, NYC DOT, Select Bus Service, 14th Street Busway, 2019	■ Cameras mounted on buses help with bus lane enforcement ■ Bike ridership increased in the project area	■ Pilot 2019, permanent 2020 ■ 24% improvement in travel times averaging 2.9 minutes faster ■ Weekday ridership increased by 14% ■ 42% reduction in crashes involving injuries ■ Vehicle travel times impacted less than 1 minute	

Agency/ Study Name	Lessons Learned	Performance Data	Picture
Washington DC, DDOT, Bus Lanes, 2019	■ Enforcement and deliveries were issues — Created loading zones on the opposite side of the street — Signal sequencing and operations updated to accommodate right-turning vehicles — Bus layover spaces moved outside the bus lane corridor ■ Pilot offered opportunity for roadway owner and operator to implement and problem solve together in an iterative fashion.	■ 2019: Peak period pilot bus lanes in the downtown core (70 buses per hour and 20% of all riders in District) — One mph increase in bus speeds — Made permanent in November 2019 — Now operate from 7:00 a.m. and 7:00 p.m. Monday through Saturday ■ The pilot provided invaluable experience for roadway owner and bus operator ■ 2020: Three bus lane corridors implemented during COVID ■ Two major bus corridors have bus lanes under construction ■ Bus Priority Plan: — 25-miles of additional bus priority by 2025 — TSP, queue jumps, bus lanes, stop consolidation, etc. — Testing automated enforcement	

Table 3: List of Additional US Cities with Bus Lanes

City, State
Albuquerque, NM
Alexandria - Arlington, VA
Arlington, MA
Austin, TX

City, State
Berkeley, CA
Cambridge, MA
Chicago, IL
Cincinnati, OH
Cleveland, OH
Columbus, OH
Denver, CO
El Paso, TX
Eugene, OR
Everett, MA
Fort Collins, CO
Grand Rapids, MI
Honolulu, HI
Houston, TX
Indianapolis, IN
Jacksonville, FL
Kansas City, MO
Las Vegas, NV
Miami-Dade, FL
Minneapolis, MN
New Britain-Hartford, CT
Oakland, CA
Orlando, FL
Pittsburg, PA
Richmond, VA
San Bernardino, CA
Santa Monica, CA

4. KEY MAPS AND GRAPHICS

2014 CDTA Transit Development Plan

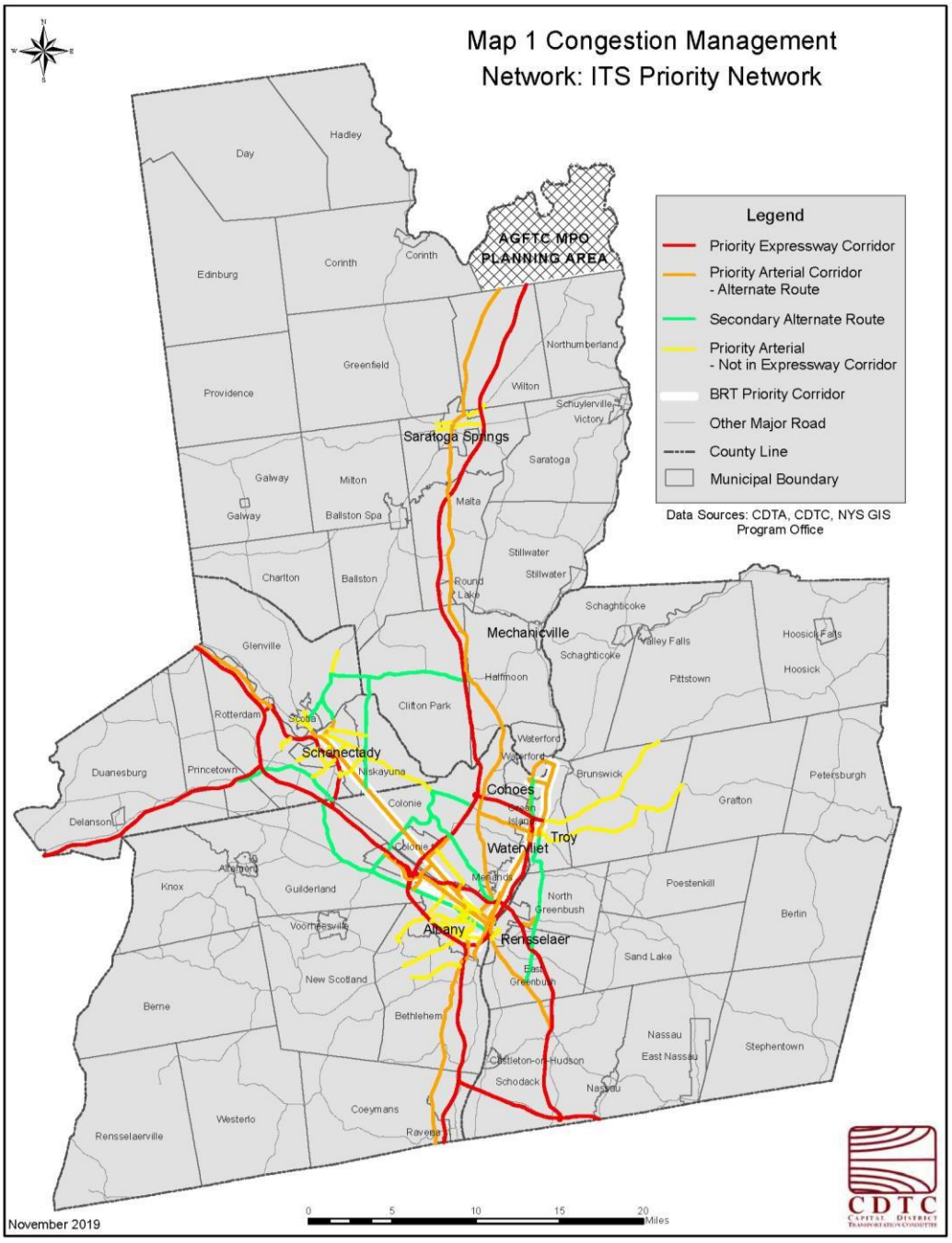
Figure 1: Capital Region BRT Corridors

Capital Region Bus Rapid Transit Corridors

Corridor Name	Description	Municipalities	Trunk Routes	Corridor Length	Annual Ridership	Status
NY Route 5	Central Avenue and State Street from downtown Albany to downtown Schenectady	Albany, Colonie (Village), Colonie (Town), Niskayuna, Schenectady	#905-BusPlus, #1	17 miles	3.7 million	Operations began in April 2011 with final stations constructed in summer 2013. Additional service rolled out fall 2013.
Washington - Western	Washington and Western Avenues from downtown Albany to Crossgates Mall	Albany, Guilderland	#10, #11, #12	8 miles	3.3 million	Planning completed; Undergoing Environmental clearance and Engineering / Design
River Corridor	Pearl Street and Broadway (NY 32) & 2nd and 5th Avenues (NY 4)	Albany, Menands, Watervliet, Troy, Cohoes, Waterford	#6, #7, #22, #80, #85	15 miles	2.5 million	Conceptual Design Study to be completed in 2014

New Visions 2050

Figure 2: Congestion Management Network: ITS Priority Network



New Visions 2050 Transit White Paper

Figure 3: Transit Priority Network, 2019

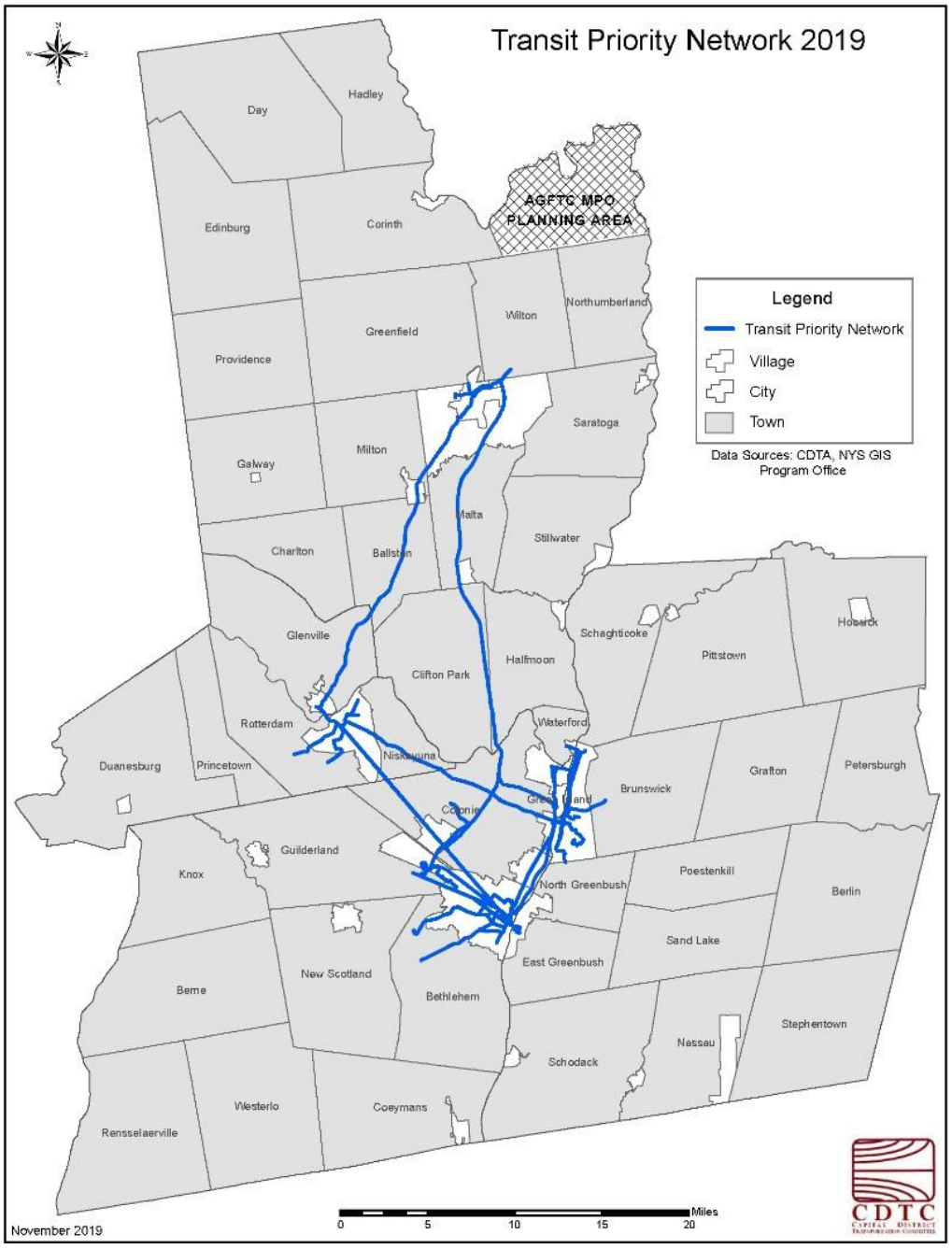
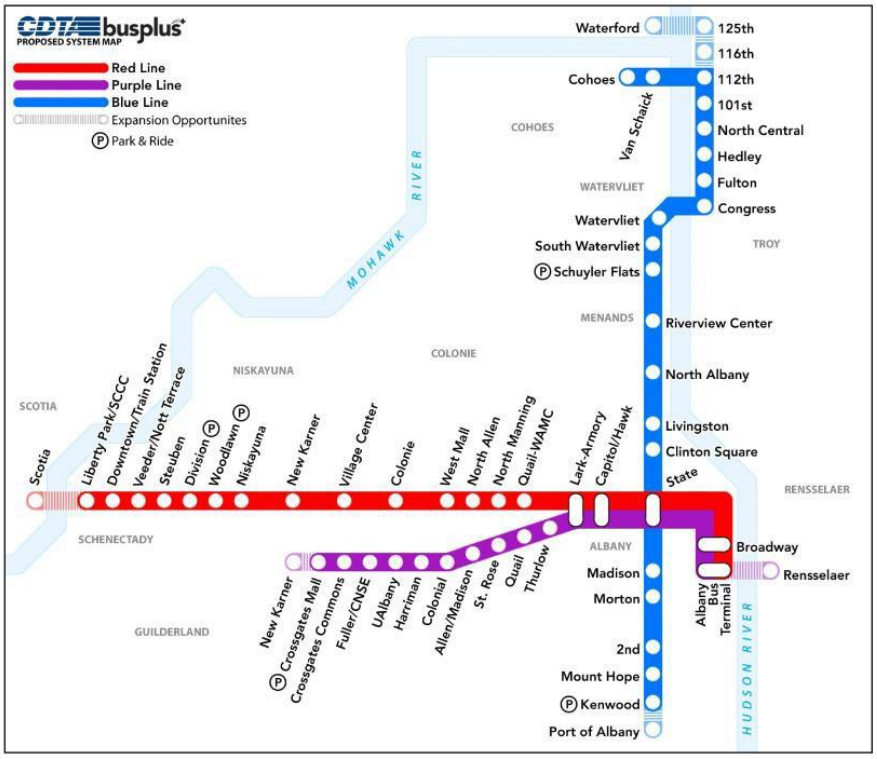


Figure 4: CDTA BusPlus



Albany Transit Supportive Development Case Study

Figure 5: Proposed State Street median bus lanes

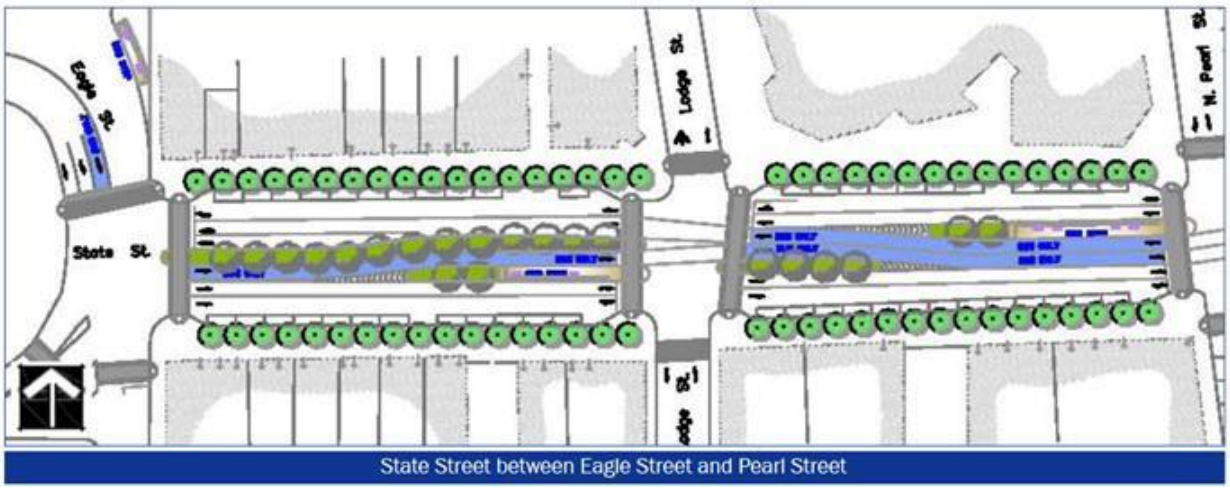


Figure 6: State Street Lanes

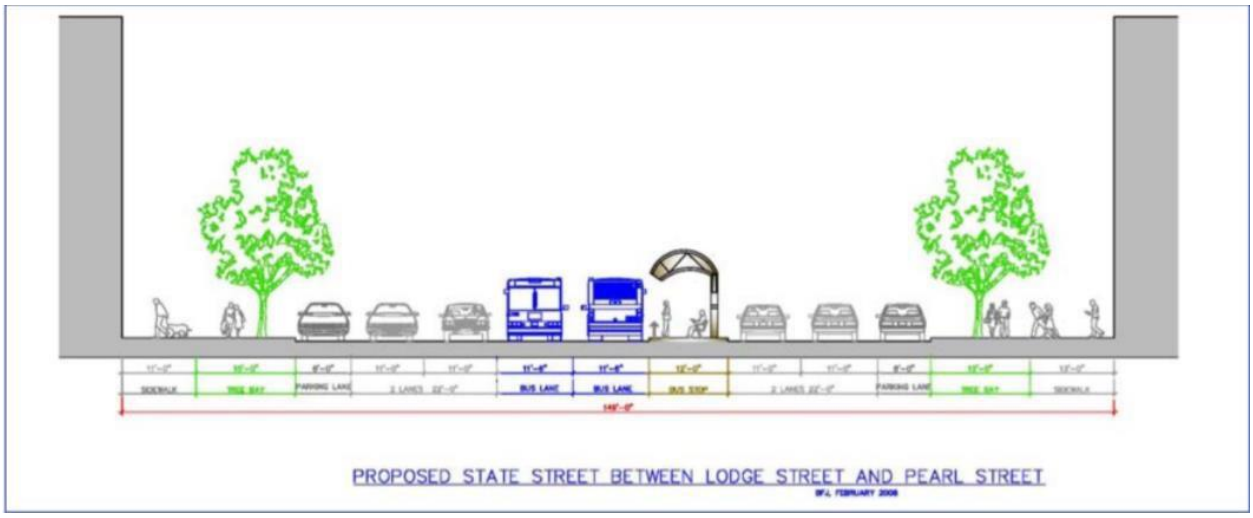


Figure 7: State Steet Lanes 2

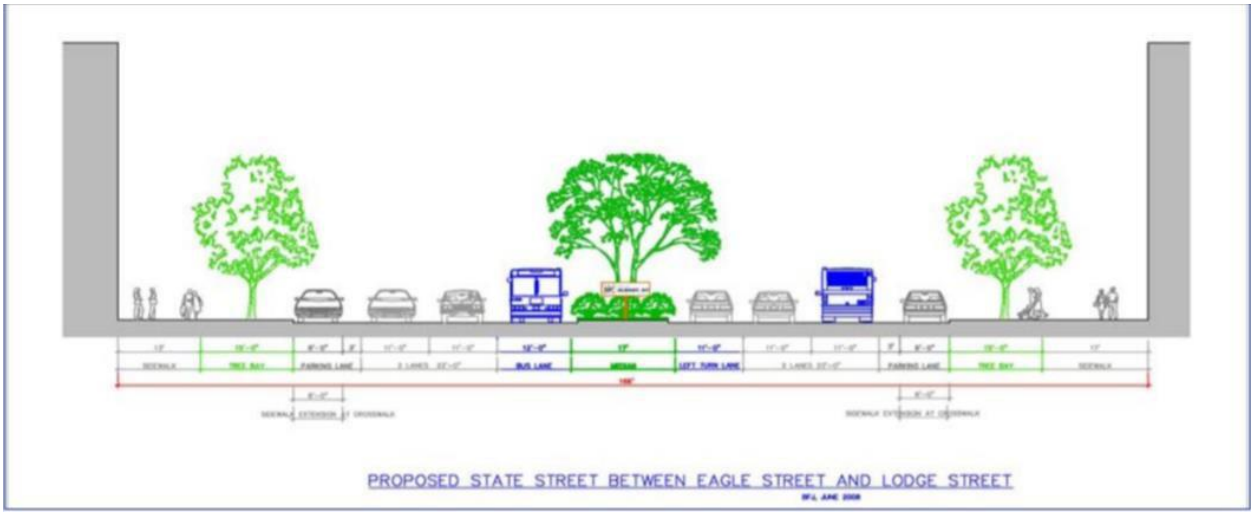
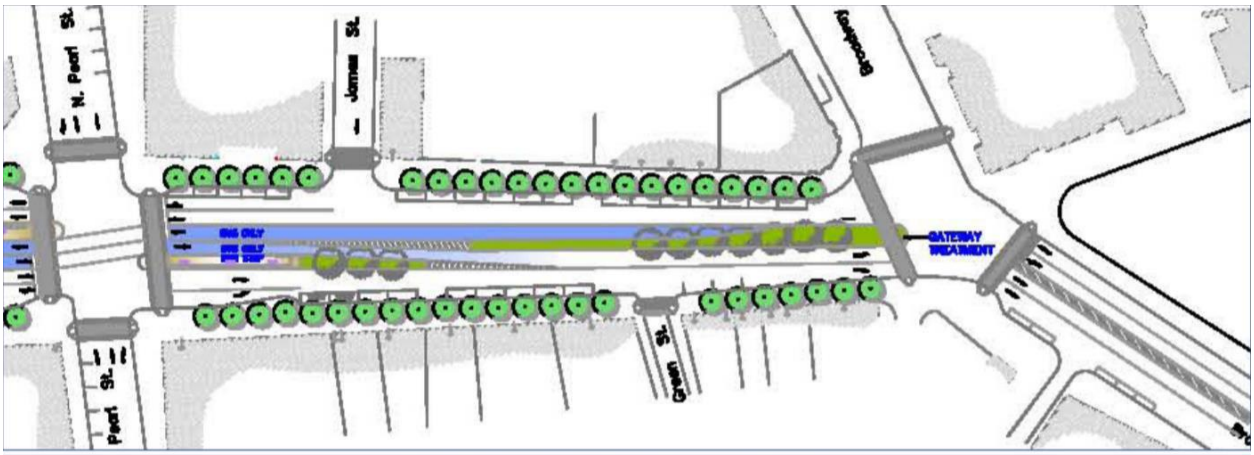


Figure 8: State Street Median Bus Lanes



State Street between Pearl Street and Broadway

River Corridor Alternative Analysis

Figure 9: CDTA River Corridor Simplified Alternatives

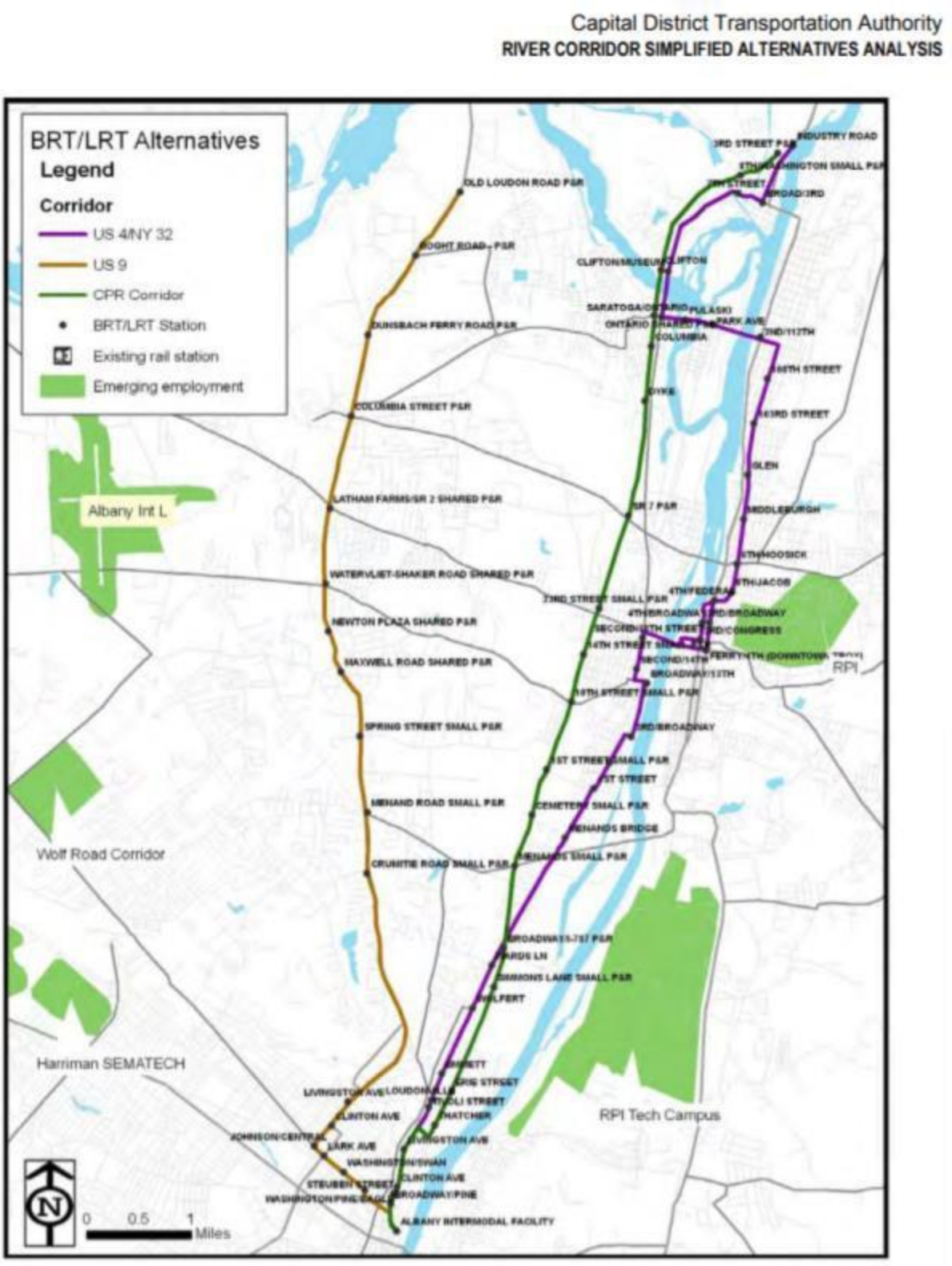


Figure 10: River Corridor Alternative 1 – Broadway (NYS 32) between Clinton Avenue and 1st Street

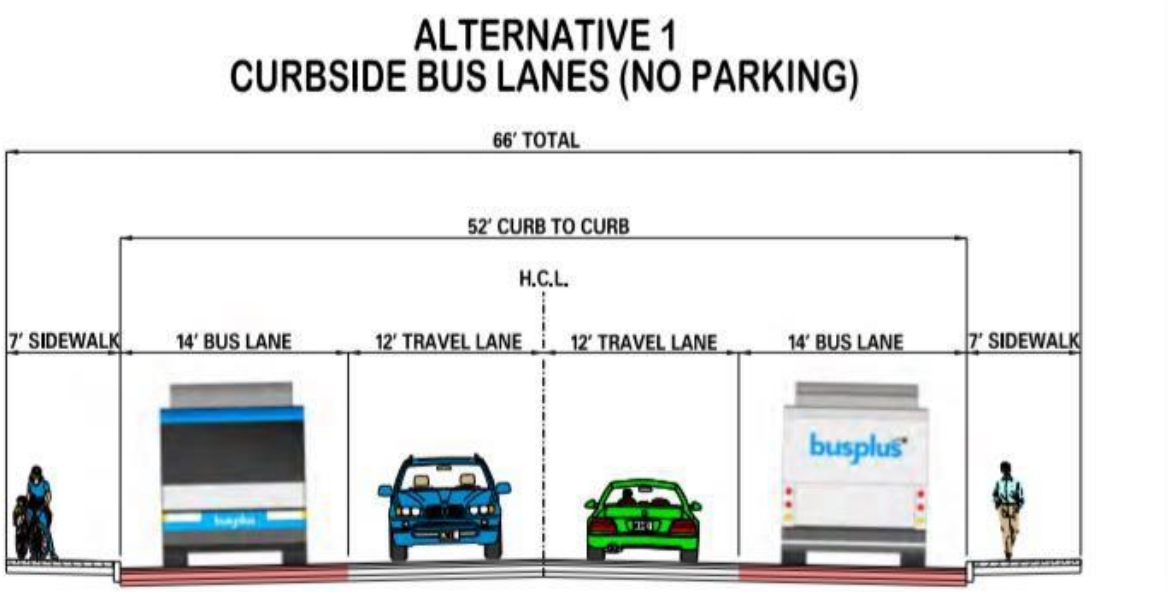


Figure 11: River Corridor Alternative 2 – Broadway (NYS 32) between Clinton Avenue and 1st Street

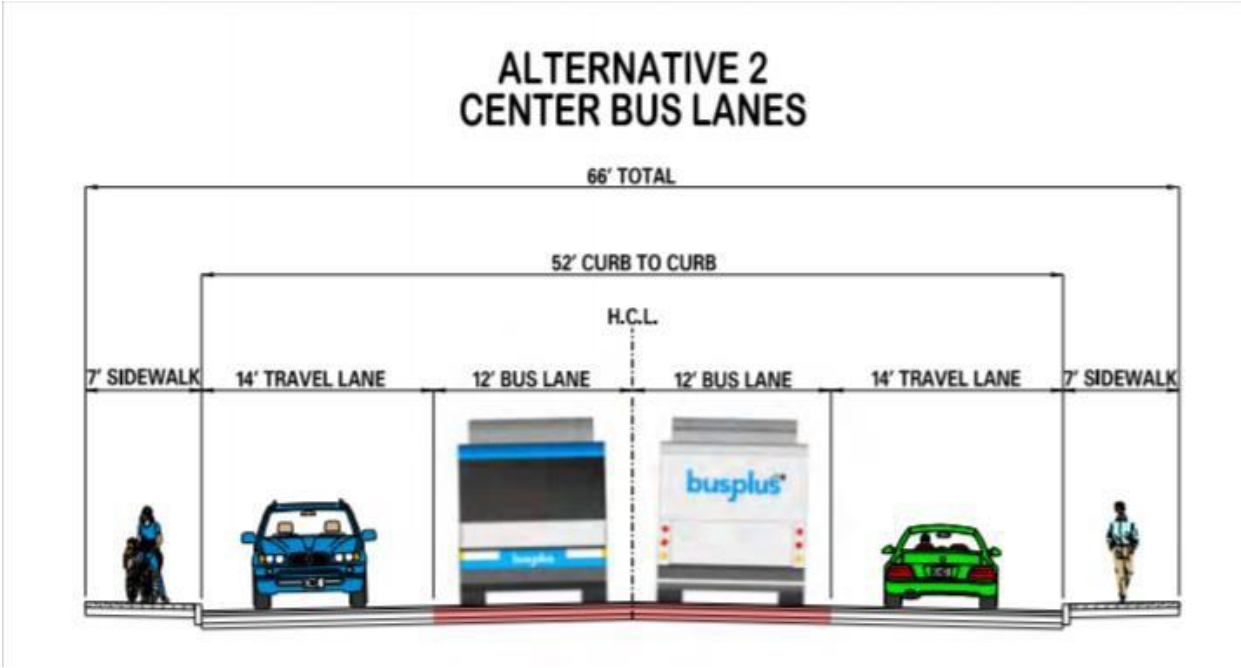
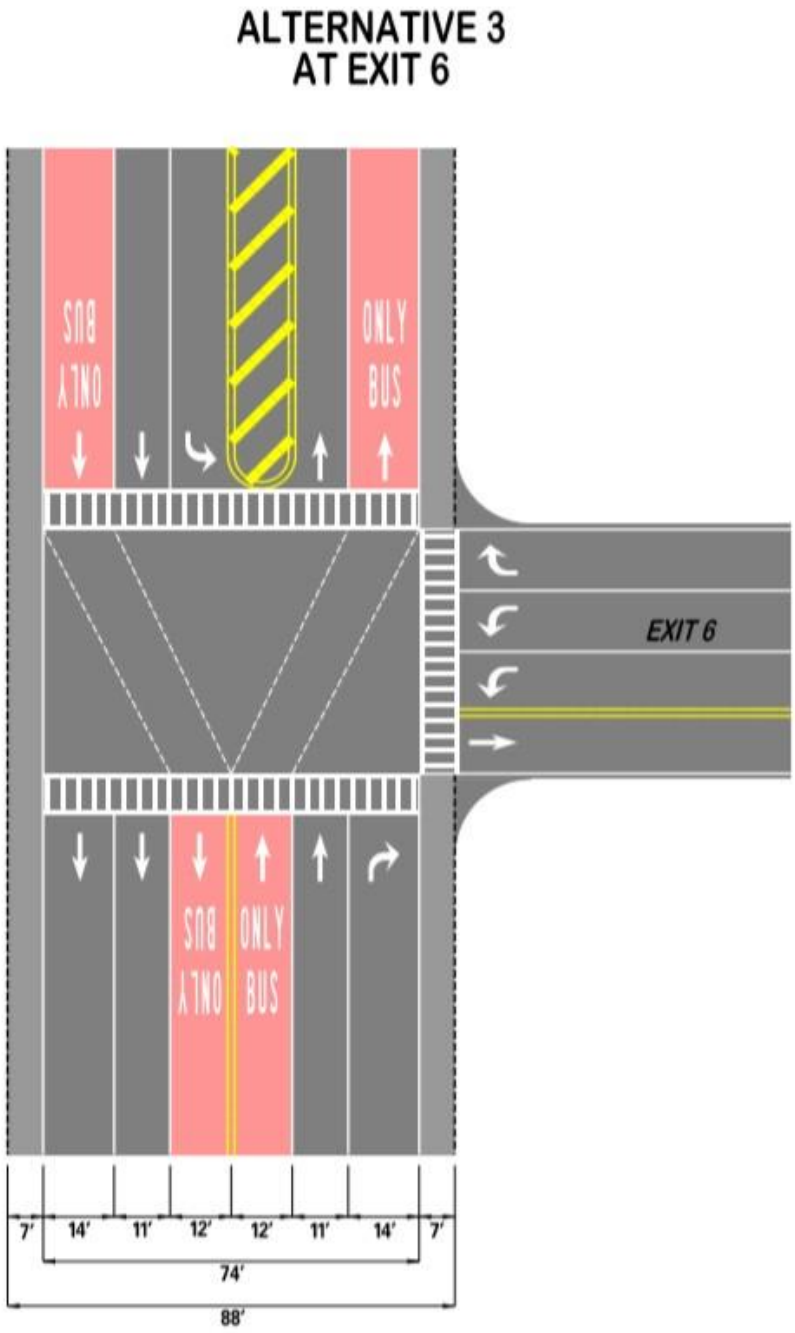


Figure 12: River Corridor Alternative 3 – Broadway (NYS 32) between Clinton Avenue and 1st Street



2014 CDTA Transit Development Plan

Figure 13: Tri City Transit Priority Corridors

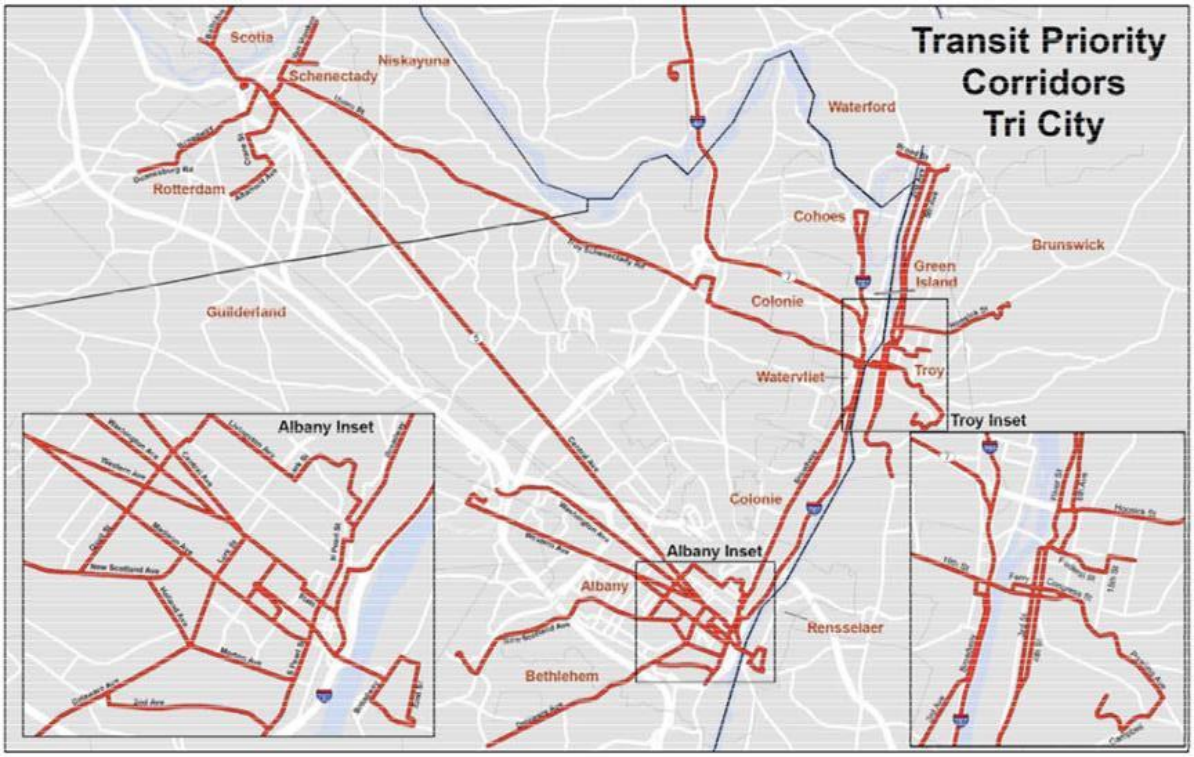


Figure 14: Transit Priority Corridors in Saratoga County

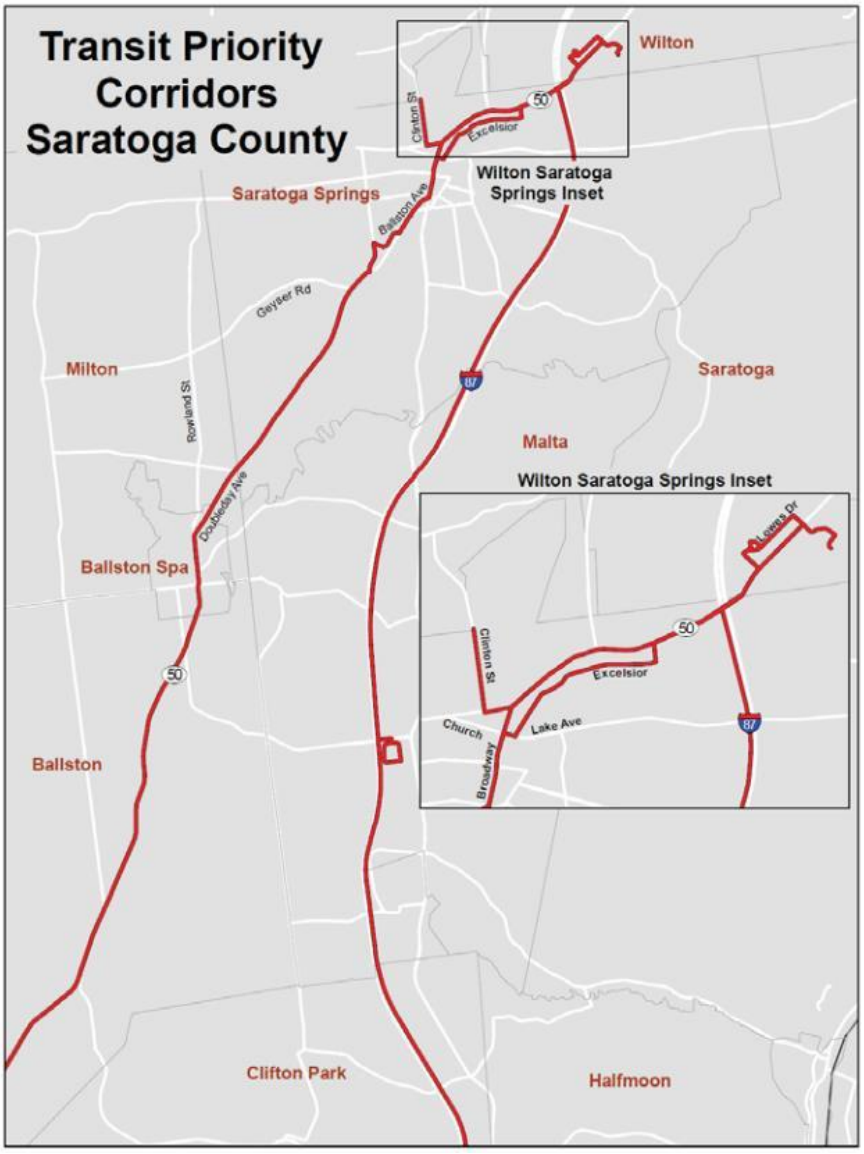
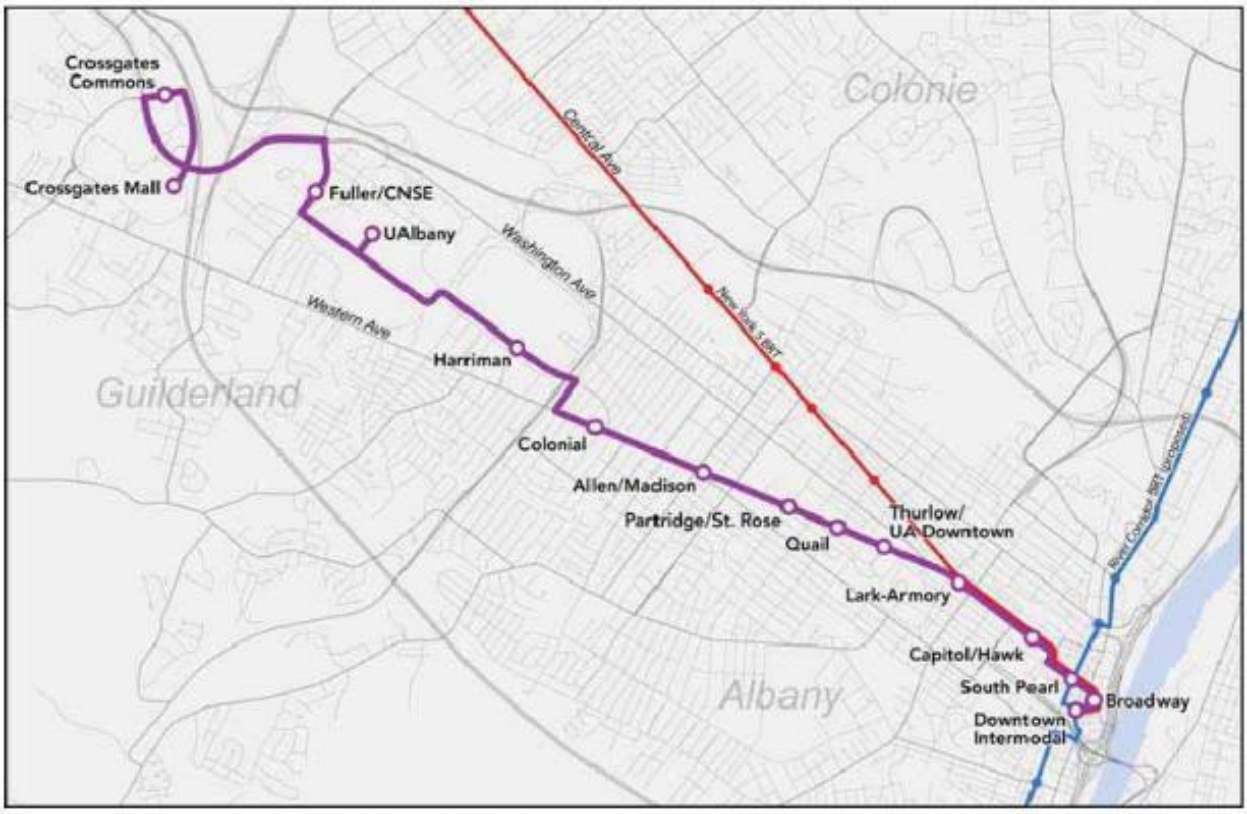
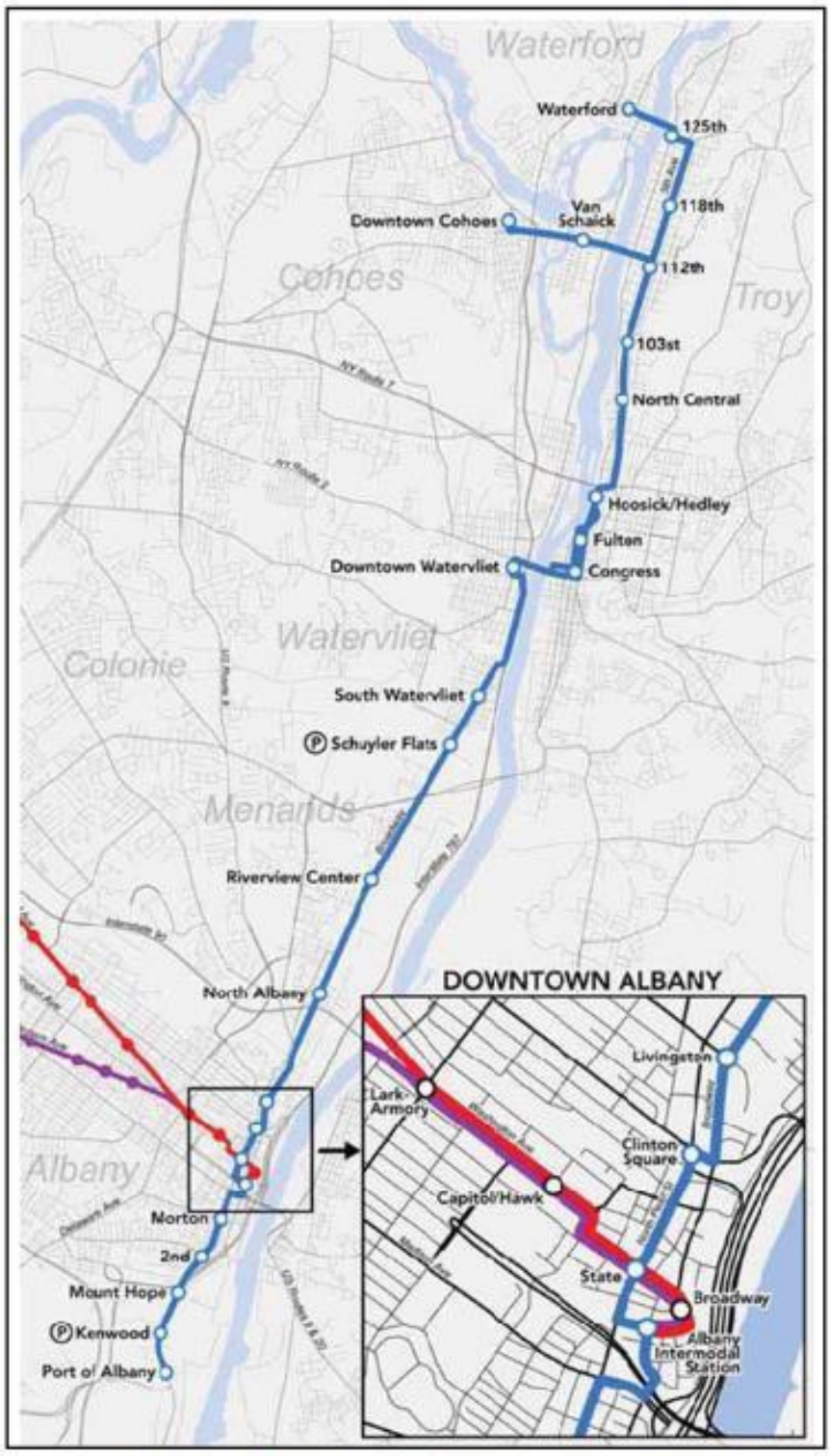


Figure 15: Washington/Western BRT Route (proposed as of 2014)



Washington-Western BRT with Proposed Station Locations

Figure 16: River Corridor BRT (proposed as of 2014)



River Corridor BRT Conceptual Routing and Station Locations

Figure 17: CDTA Transit Priority Corridors (page 1 of 2)

Segment	End Points	Municipality
Albany County		
State Street	Eagle Street – Broadway	Albany
Washington Avenue	Eagle Street – Crossgates Mall	Albany, Guilderland
Western Avenue	Washington Avenue – Crossgates Mall	Albany, Guilderland
Central Avenue and State Street (NY Rte 5)	Lark Street – Schenectady County Community College	Albany, Colonie (Village and Town), Niskayuna, Schenectady
New Scotland Avenue	Madison Avenue – Vista Technology Park	Albany, Bethlehem
Lark Street and Delaware Avenue	Washington Avenue – Cherry Avenue	Albany, Bethlehem
South Pearl Street (NY Rte 32)	State Street – Mount Hope Drive	Albany
Broadway and 3rd Avenue (NY Rte 32)	Madison Avenue – 15th Street	Albany, Menands, Watervliet
Second Avenue	South Pearl Street – Delaware Avenue	Albany
North Pearl Street (NY Rte 32)	State Street – Lark Drive	Albany
Quail Street	Livingston Avenue – New Scotland Avenue	Albany
Livingston Avenue and Lark Drive	North Pearl Street – Quail Street	Albany
Morton Avenue and Holland Avenue	New Scotland Avenue – South Pearl Street	Albany
Second Avenue	Delaware Avenue – South Pearl Street	Albany
Madison Avenue	Allen Street – North Pearl Street	Albany
South Swan Street	Washington Avenue – Madison Avenue	Albany
19th Street, Troy-Schenectady Road, and Union St (NY Rte 2 & 7)	Congress Street Bridge – Nott Terrace	Watervliet, Colonie, Niskayuna, Schenectady
South Mall Arterial, Interstate 787, and NY Rte 787	Empire State Plaza – Rte 32	Albany, Menands, Watervliet, Colonie, Cohoes
Alternate Rte 7 and Interstate 87	Interstate 787 – Mohawk River	Colonie
Remsen Street and Main Street	Rte 32 – Cayuga Street	Cohoes
Rensselaer County		
Dunn Memorial Bridge, Broadway, 3rd Avenue, East Street, & Herrick Street	Hudson River – Rensselaer Rail Station	Rensselaer

Figure 18: CDTA Transit Priority Corridors (page 2 of 2)

Ferry St & Congress Street	Congress Street Bridge to Pawling Avenue	Troy
Pawling Avenue	Congress Street – Myrtle Avenue	Troy
Maple / Myrtle Avenues, & Project Road / Madison Avenue	Pawling Avenue – Griswold Heights	Troy
Federal Street, Sage Avenue, 15th Street, and People's Avenue	River Street – Burdett Avenue	Troy
River Street and 2nd Avenue (Rte 4)	Fulton Street – 126th Street	Troy
5th Avenue and 6th Avenue	Federal Street – 125th Street	Troy
Northern Dr and 8th Avenue	5th Avenue – Corliss Park	Troy
3rd / 4th Avenue, Mill Street, and Vandenburgh Avenue (Rte 4)	Fulton Street – Hudson Valley Community College	Troy
Hoosick Street	6th Avenue – Brunswick Walmart	Troy, Brunswick
Schenectady County		
Altamont Avenue	Curry Road – Chrisler Avenue	Schenectady, Rotterdam
Ballston Road (Rte 50)	Mohawk Avenue – County Line	Glenville, Scotia
Broadway and Duanesburg Road	State Street to Rotterdam Industrial Park	Schenectady, Rotterdam
Crane Street and Chrisler Avenue	Altamont Avenue – Main Avenue	Schenectady
Main Avenue and Craig Street	Chrisler Avenue – Albany Street	Schenectady
Nott Street	Seward Place – Rosa Road (Ellis Hospital)	Schenectady
Nott Terrace, Seward Place, and Van Vranken Avenue	State Street – Wood Avenue	Schenectady
State Street and Mohawk Ave (Rte 5)	County Line – Sacandaga Road	Schenectady, Niskayuna, Scotia
Saratoga County		
Broad St (Rte 4)	Hudson River – 6th Street	Waterford (Village)
Northway (Interstate 87) *and roadways leading to park & rides*	Mohawk River – Exit 15	Clifton Park, Halfmoon, Malta, Saratoga Springs
Rte 50	County Line – Wilton Mall	Saratoga Springs, Wilton
Clinton Street & Church Street	Broadway – Skidmore College	Saratoga Springs

Conceptual Design of NY 5 BRT Priority Measures (2004)

Figure 19: Route 5 Station Locations

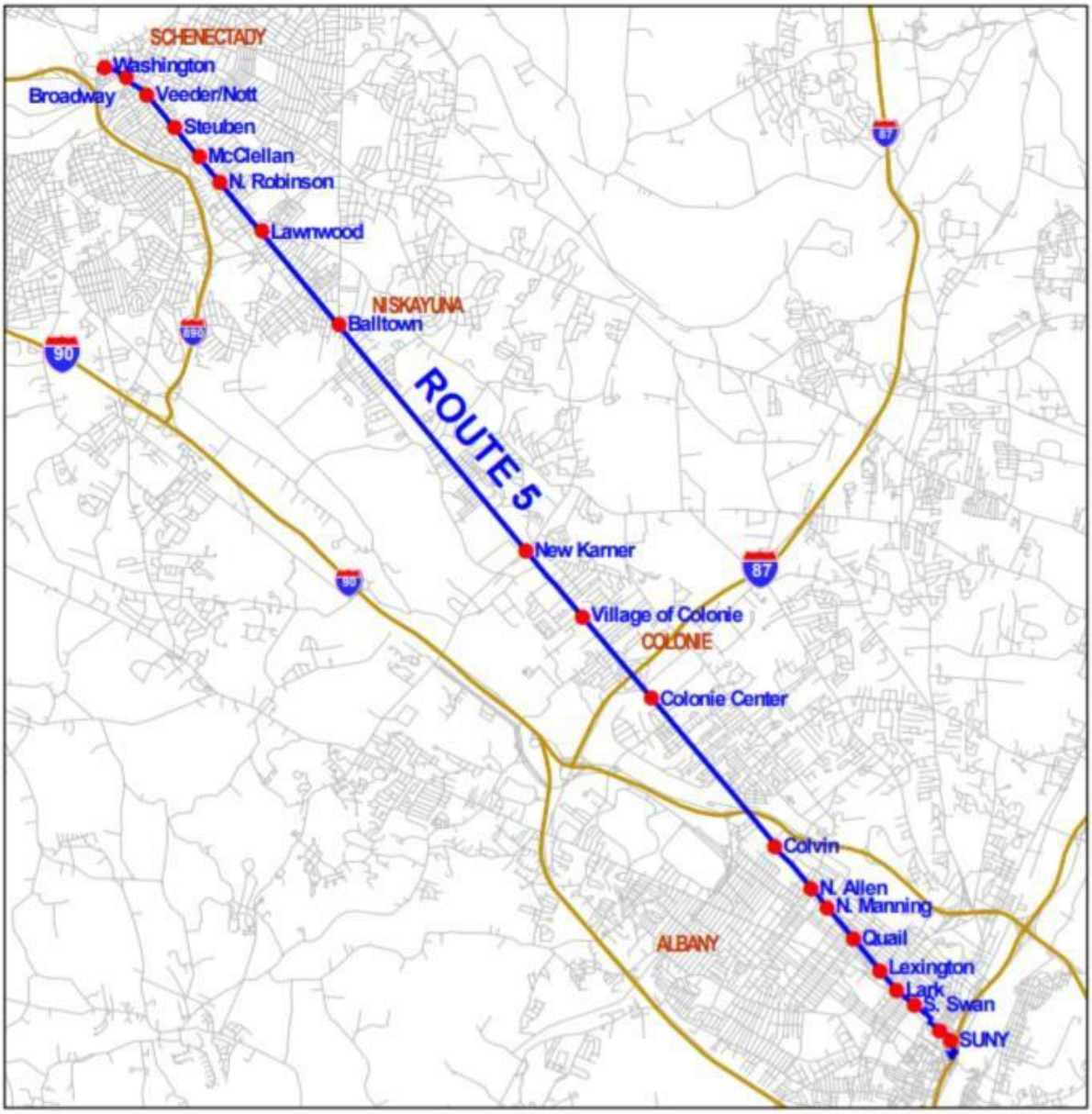


Figure 1.2 Preliminary location of BRT stations

City of Albany Complete Streets Policy and Design Manual

Figure 20: Albany Complete Streets Typologies

Table 2.1: Existing Land Use/Street Typology Characteristics

Land Use/Street Typology	Functional Classification	Modal Hierarchy	Example Elements	Existing Building Setback Range (feet)[a]	Existing ROW Width Range (feet)[b]	Existing Pavement Width Range (feet)[c]
Downtown	Principal Arterial Minor Arterial Local Road	Pedestrian Bicyclist Transit User Motorist	Sidewalks, Crosswalks, Curb Ramps Bike Racks, Shared Lanes Bus Shelters, Bus Bulbs Marked Lanes, On-Street Parking	0	48 - 152	23 - 90
Neighborhood Mixed Use	Principal Arterial Minor Arterial Major Collector	Pedestrian Bicyclist Motorist Transit User	Pedestrian Crossing Signals, Sidewalks, Benches Bike Racks, Bike Lanes, Signage Marked Lanes, On-Street Parking Bus Shelters, Bus Bulbs	0 - 20	76 - 102	45 - 59
Neighborhood Residential	Minor Arterial Major Collector Local Road	Pedestrian Bicyclist Motorist	Pedestrian-scaled Lighting, Sidewalks, Curb Ramps Share the Road Signage Minimal Obstructions, On-street Parking	20 - 25	37 - 50	18 - 28
Community Mixed Use	Principal Arterial Minor Arterial Major Collector	Motorist Transit User Pedestrian Bicyclist	Designated Turning Lanes, On-Street Parking Bus Shelters, Bus Bulbs Sidewalks, Crosswalks, Curb Ramps Bike Racks	0 - 20	98 - 103	52 - 58
Community Commercial	Principal Arterial Minor Arterial Major Collector	Motorist Transit User Pedestrian Bicyclist	Designated Turning Lanes Bus Shelters, Curb Extensions Pedestrian-scaled Lighting, Sidewalks, Curb Ramps Shared Lanes, Bike Racks	0 - 40	98 - 104	60 - 70
Industrial	Major Collector Local Road	Motorist Transit User Bicyclist Pedestrian	Dedicated Turn Lanes Bus Shelters Shared Lanes Sidewalks, Crosswalks, Curb Ramps	0 - 20	41 - 85	23 - 34

[a] *The building setback ranges are front setback minimums. These ranges are estimates and do not reflect specific requirements of the City of Albany zoning ordinance.*
[b] *The ROW width ranges reflect estimated field observations from roadways.*
[c] *The pavement width ranges reflect estimated field observations from roadways.*

Figure 21: Albany Complete Streets Preferred Design Guidelines

Table 5.2: Preferred Design Guidelines for Streets

PLEASE NOTE THAT THIS GRAPHIC IS FOR ILLUSTRATIVE PURPOSES ONLY.

Street Typology	FHWA Functional Classification [a]	Transit Lane (ft) [b]	Travel Lane (ft) [c]	Turn Lane (ft) [d]	Bicycle Lane (ft) [e]	Parking Lane (ft) [f]
Downtown	Principal Arterial / Minor Arterial / Major Collector / Local Road	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Neighborhood Mixed Use	Principal Arterial / Minor Arterial / Major Collector	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Neighborhood Residential	Minor Arterial / Major Collector / Local Road	N / A	9 – 12	9 – 12	5 – 7	7 – 8
Community Mixed Use	Principal Arterial / Minor Arterial / Major Collector	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Community Commercial	Principal Arterial / Minor Arterial / Major Collector	11 – 14	10 – 12	10 – 12	5 – 7	7 – 8
Industrial	Major Collector / Local Road	11 – 14	9 – 12	9 – 12	5 – 7	7 – 8

[a] Principal Arterials serve major centers of metropolitan areas, provide a high degree of mobility, providing access to abutting land uses. Minor Arterials serve geographic areas that are smaller than Principal Arterials, while offering connectivity to the higher Arterial system. Major Collectors serve a critical role in the roadway network by gathering traffic from Local Roads and funneling them to the Arterial network. Local Roads provide direct access to adjacent land, while providing access to higher systems and carrying no through traffic.

[b] A minimum lane width of 11 feet is required on signed CDTA bus routes. However, lane width may be as wide as 14 feet to accommodate bicycles where it is not possible to create a bicycle facility at minimum widths for travel, turning, and bicycle lanes and where it is not possible to create a shoulder for bicycle use. (See AASHTO Guide for the Development of Bicycle Facilities section 4.3.1/document incorporated into NYSDOT HDM 17.4.3. Also FHWA Incorporating On-Road Bicycle Networks into Resurfacing Projects pg 19.)

[c] Travel lane widths may vary due to traffic speed, traffic type, pavement constraints and/or right-of-way constraints. Projects located on NYSDOT Designated Qualifying Highways require a minimum lane width of 12 feet. Projects located on Designated Access Highways require a minimum lane width of 10 feet. All routes located within one mile of Qualifying Highways require a minimum travel lane width of 10 feet.

[d] Turn lane widths may vary due to traffic speed, traffic type, pavement constraints and/or right-of-way constraints. Projects located on NYSDOT Designated Qualifying Highways require a minimum lane width of 12 feet. Projects located on Designated Access Highways require a minimum lane width of 10 feet. All routes located within one mile of Qualifying Highways require a minimum travel lane width of 10 feet.

[e] Bicycle lane widths, as recommended by the AASHTO's 2012 Guide for Development of Bicycle Facilities 4th Edition and the City of Albany Bicycle Master Plan, should be at least 5 feet. AASHTO guidelines also recommend that a bicycle lane should be 7 feet wide when adjacent to an 8 foot wide or less parking lane typical of high rates of turnover. In areas with high bicycle volumes, no on-street parking, and high vehicle speeds and volumes, lane widths are recommended to be between 6 feet and 8 feet. The wider lane creates more room for potential avoidance maneuvers.

[f] Parking lane widths may vary due to potential future uses, such as becoming a travel or turn lane. According to Chapter 2 of the NYSDOT Highway Design Manual, the minimum parking lane width is 7 feet which is typically seen along residential corridors.

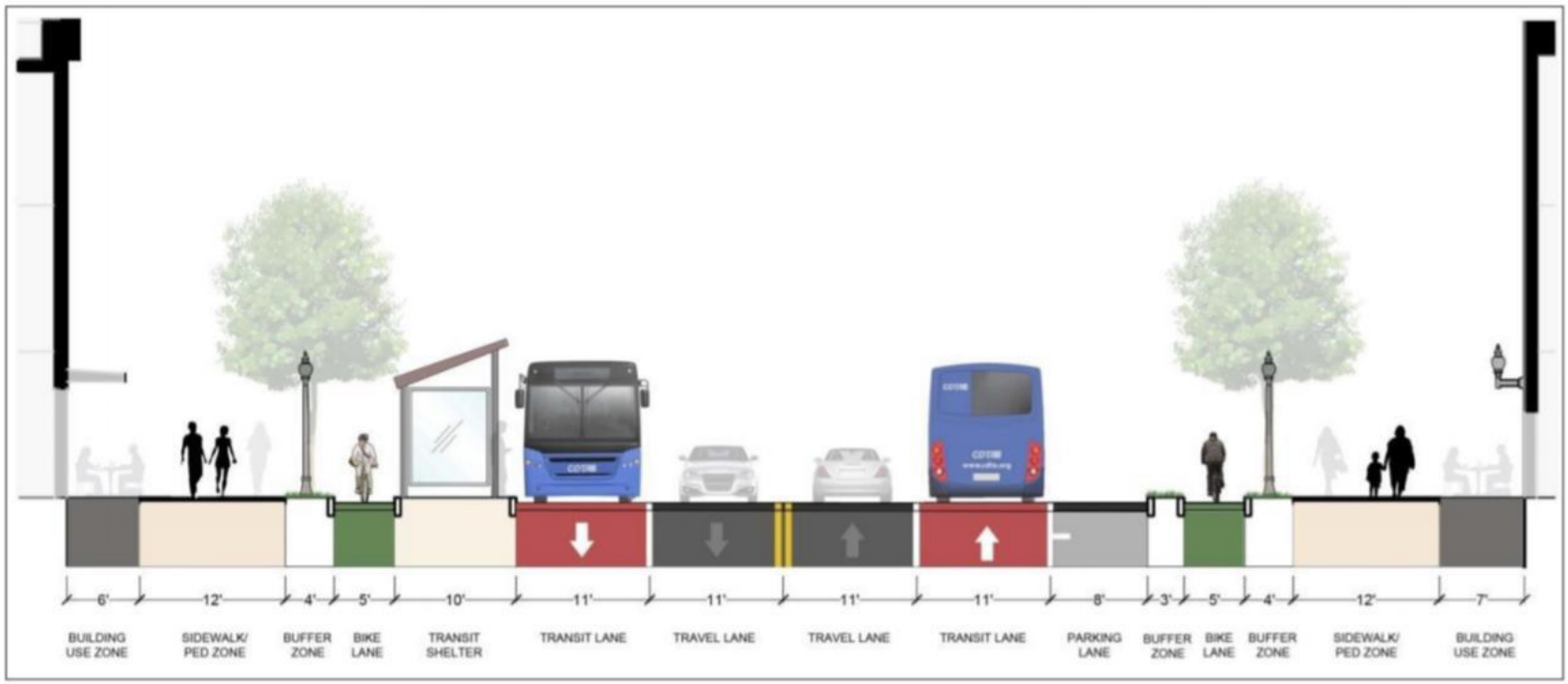
Figure 22: Albany Complete Streets Lane Widths

Complete Street Elements	Downtown		Neighborhood Mixed Use		Neighborhood Residential		Community Mixed Use		Community Commercial		Industrial	
	Wide	Narrow	Wide	Narrow	Wide	Narrow	Wide	Narrow	Wide	Narrow	Wide	Narrow
2-Lane Travelway	•	•	•	•	•	•	•	•	•	•	•	•
3-Lane Travelway	•	•	•	•			•	•	•	•	•	
4-Lane Travelway	•						•		•	•		
5-Lane Travelway	•								•		•	
Bicycle Boulevard		•			•	•						•
Buffered Bicycle Lane	•	•	•				•	•	•	•	•	
Contra-Flow Bicycle Lanes	•	•				•						
Dedicated Transit Lane	•						•		•			
Enhanced Transit Lane[a]	•						•		•			
Median	•		•		•				•		•	
One-Way Separated Bicycle Lane	•						•		•		•	
One-Way Street	•	•		•		•						
On-Street Parking (1-Way Street)	•	•		•		•						
On-Street Parking (2-Way Street)	•	•	•	•	•	•	•	•	•	•	•	
Shared Transit/Bicycle Lane	•	•					•	•		•		
Shared Use Lane Markings		•	•	•				•			•	•
Striped Bicycle Lane	•	•	•	•				•		•	•	•
Two-Way Separated Bicycle Lane	•						•		•			
Two-Way Side Path							•		•		•	

[a] *As BRT routes continue to be developed throughout the City, opportunities may arise for enhanced transit to appear in land use/street typologies not selected within this table.*

Figure 23: Albany Complete Streets Wide Right of Way

Figure 5.7 Downtown Sample: Wide Right-of-Way Street



Potential Downtown Wide ROW Travelway Elements per Table 5.3:

Figure 24: Albany Complete Streets Overview

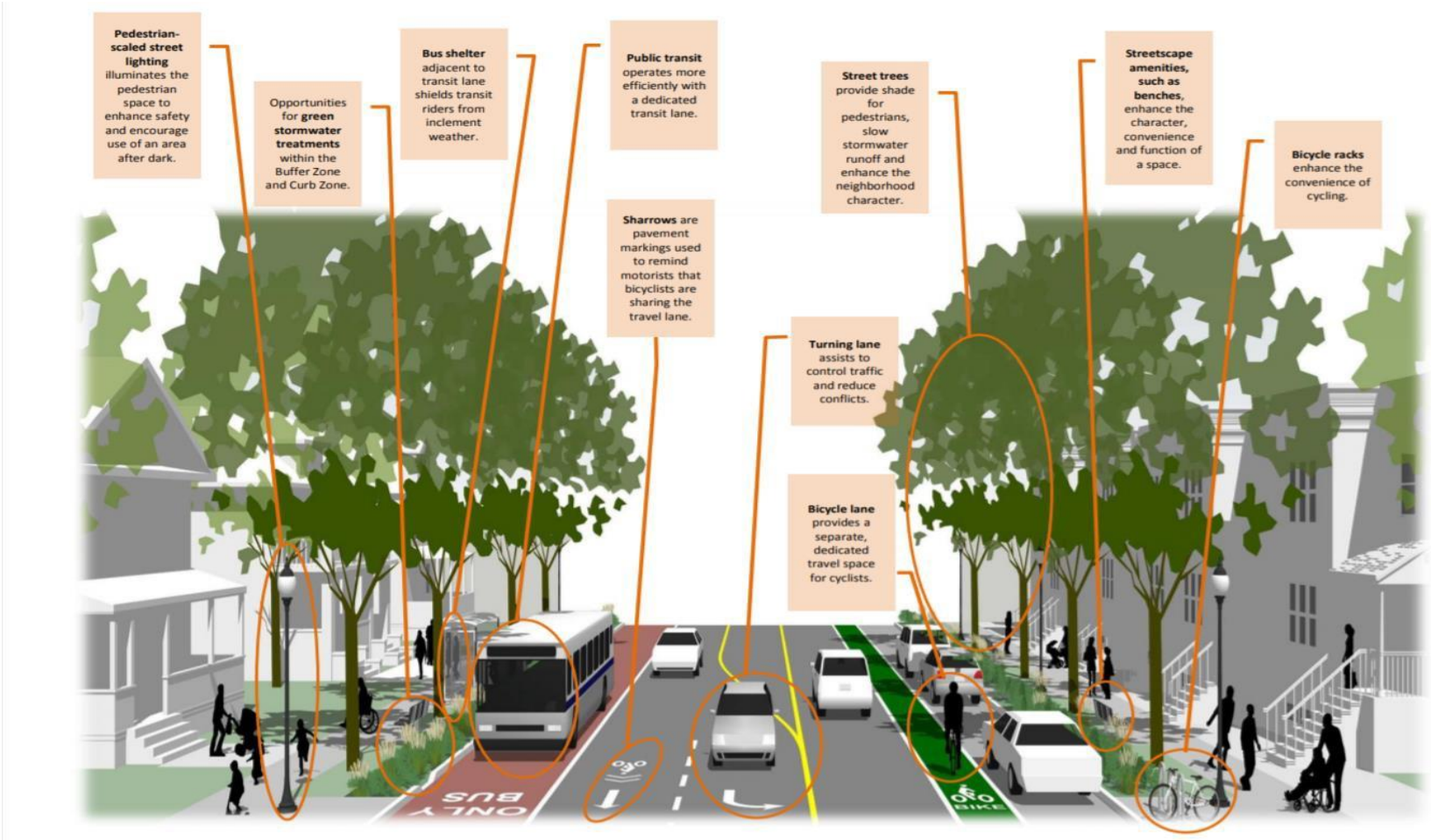


Figure 25: Albany Complete Street Plan View

Downtown Albany Parking Facility Feasibility Study

Figure 26: Parking Zones

Figure 27: Parking Deficits

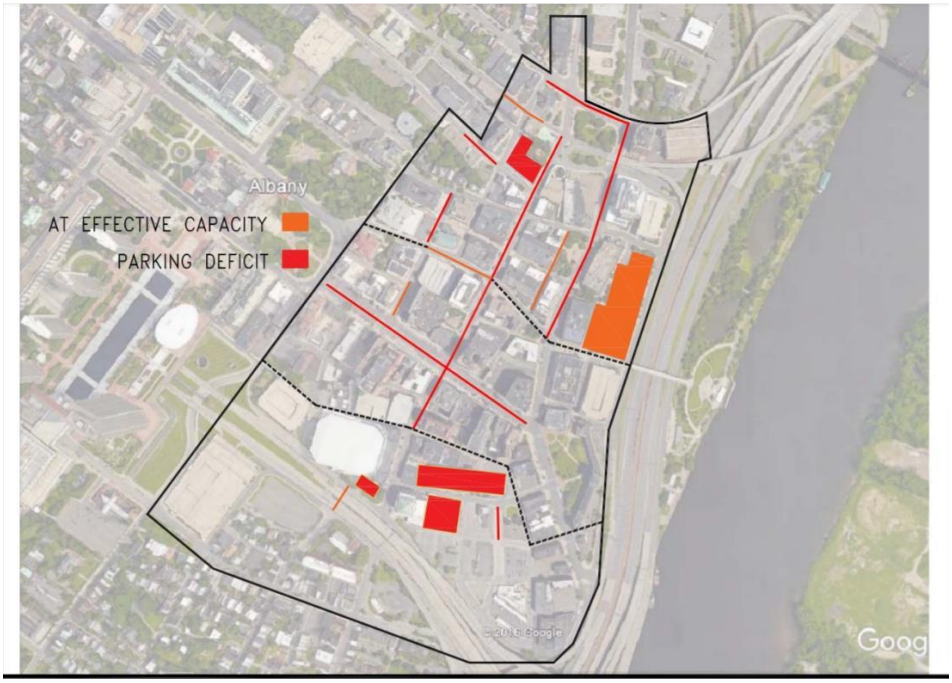


Figure 28: Downtown Albany On Street Parking

Table 5.
Existing Weekday On-Street Parking Adequacy

QUACKENBUSH/RIVERFRONT

Street/Ave.	Type	Spaces	Effective Supply	Spaces Occupied	Surplus/ Deficit
Broadway	Meters	52	44	45	(1)
Clinton Ave.	Meters	11	9	11	(2)
Columbia St.	Meters/Reserved	49	42	40	2
Eagle St.	Meters	6	5	4	1
James St.	Meters	16	14	14	0
Lodge St.	Meters	9	8	9	(1)
Monroe St.	Meters	11	9	3	6
Orange St.	Meters/Reserved	14	12	12	0
Pearl St.	Meters	36	31	32	(1)
Pine St.	Meters	7	6	6	0
Sheridan Ave.	Meters	13	11	12	(1)
Steuben St.	Meters	12	10	8	2
Total:		236	201	196	5

STATE STREET

Street/Ave.	Type	Spaces	Effective Supply	Spaces Occupied	Surplus/ Deficit
Beaver St.	Meters	14	12	10	2
Broadway	Meters/Reserved	52	44	30	14
Green St.	Meters	9	8	4	4
Howard St.	Meters	14	12	7	5
James St.	Meters	12	10	8	2
Lodge St.	Meters/Reserved	15	13	13	0
Pearl St.	Meters	30	26	32	(6)
Pine St.	Meters/Reserved	36	31	29	2
State St.	Meters	112	95	112	(17)
Total:		294	251	245	6

GREEN-HUDSON

Street/Ave.	Type	Spaces	Effective Supply	Spaces Occupied	Surplus/ Deficit
Broadway	Meters	15	13	0	13
Dallius St.	Meters	4	3	4	(1)
Grand St.	Meters	13	11	11	0
Green St.	Meters	25	21	1	20
Hamilton St.	Meters/Reserved	7	6	4	2
Hudson St.	Meters	19	16	9	7
Liberty St.	Meters	15	13	1	12
Madison Ave.	Meters	71	60	6	54
Pearl St.	Meters	25	21	15	6
Total:		194	164	51	113

TOTAL:	724	616	492	124

Figure 29: CDTA Intermodal Center

Figure 5.
CDTA Intermodal Center