



Enhanced Bus Service (EBS)

WorkshopLV: Multimodal

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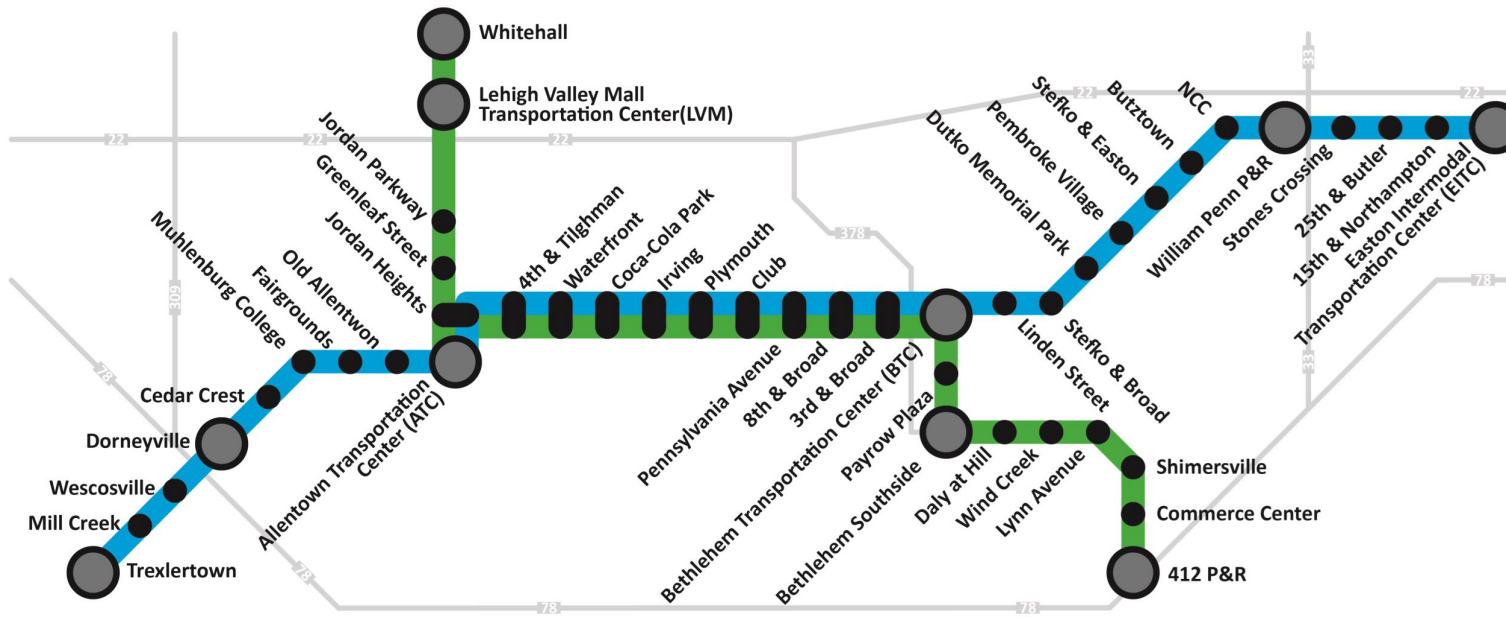
Enhanced Bus Service (EBS)

Bus Rapid Transit (BRT) for the Lehigh Valley.

➤ What is BRT?

BRT provides fast, frequent, and comfortable transit service along a dedicated transit line or corridor.

BRT provides most of the features expected by both frequent and casual mass transit riders without the expensive costs of rail.



MAJOR ELEMENTS OF BRT

Wide choice of running ways

BRT systems can operate on all types of running ways—mixed flow arterials, mixed flow freeways, dedicated arterial lanes, at-grade transitways, fully grade-separated surface transitways, managed lanes, and in tunnels.

Enhanced stations

Aesthetically-designed stations make BRT systems attractive while providing passenger amenities such as shelters, benches, lighting, ticket vending machines, security features, and next vehicle arrival information.

Innovative vehicles

Stylized and specialized buses can operate along BRT corridors, with emphasis on comfort, aesthetic enhancements, easy access, passenger circulation, and environmentally-friendly propulsion. Purchase costs for higher-end BRT vehicles can range from \$370,000 to \$1.6 million, depending on the size and propulsion technology.

Improved fare collection

Electronic fare cards, off-board fare collection, or proof-of-payment options allow for shorter dwell times and shorter overall travel times.

State-of-the-art technologies

BRT incorporates ITS (intelligent transportation system) applications such as transit signal priority, advanced communication systems, automated scheduling and dispatch systems, and real-time traveler information at stations and on vehicles for faster and more convenient trips.

Improved service

BRT systems generally include rapid transit features such as all-day service spans, greater spacing between stations, and more frequent service than local bus service. The flexibility and lower-cost of BRT allow it to provide greater network coverage.

Modern branding and marketing

Distinctive logos, colors, styling and technologies for vehicles and facilities help develop a system identity. BRT services can be marketed as a new bus route or a new tier of service or as part of a multi-modal rapid transit network.



Transit Service Progression

Where we are

Where we're aiming

Buses per Hour along Corridor

Stop/Station Scale & Amenities

Current Levels

LANTA
EB/BRT
Phase I

LANTA
EB/BRT
Phase II

LANTA
EB/BRT
Phase IV

Added Capacity
based on Demand

Added Capacity
based on Demand

Mode Shift based
on Demand and
Cost Efficiencies



BRT/Limited Express Bus



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EBS Case Studies for Station Stop Improvements

Realtime Signage, Unique Branding, Ticket Vending Machines, Lighting and Shelter at all Station Stops.



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What will stations look like?



- A** Pylon markers help riders identify stations from a distance.
- B** Real-time NexTrip signs provide bus information, and on-demand annunciators speak this information for people with low vision.
- C** Shelters provide weather protection and feature push-button, on-demand heaters and shelter lighting. Shelter sizes will vary based on customer demand (small shown here).
- D** Ticket machines and fare card readers collect all payment before customers board the bus.

- E** Emergency telephones provide a direct connection to Metro Transit police. Stations also feature security cameras.
- F** Stations feature trash and recycling containers.
- G** Platform edges are marked with a cast-iron textured warning strip to keep passengers safely away from the curb while the bus approaches. Many stations also feature raised curbs for easier boarding.
- H** Platform areas are distinguished by a dark gray concrete pattern.

- I** Benches at stations provide a place to sit.
- J** Most stations have bike parking.

Some stations have pedestrian-scale light fixtures to provide a safe, well-lit environment.

At some stations, railings separate the platform from the sidewalk.

Enhanced Bus Service (EBS)



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EBS Case Studies for Station Stop Improvements

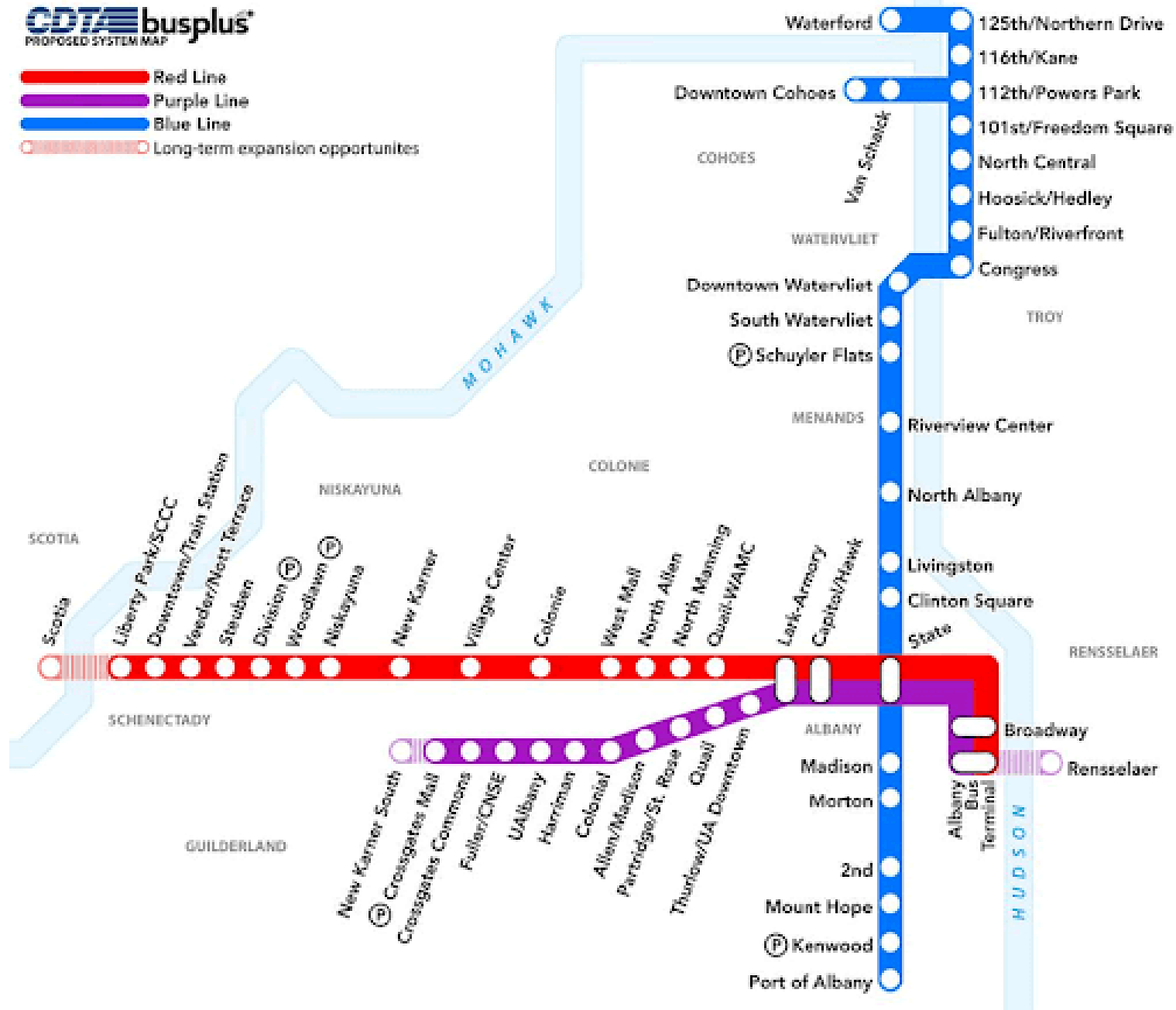
Realtime Signage, Unique Branding, Ticket Vending Machines, Lighting and Shelter at all Station Stops.



Albany, NY
CDTA
BusPlus



Enhanced Bus Service (EBS)

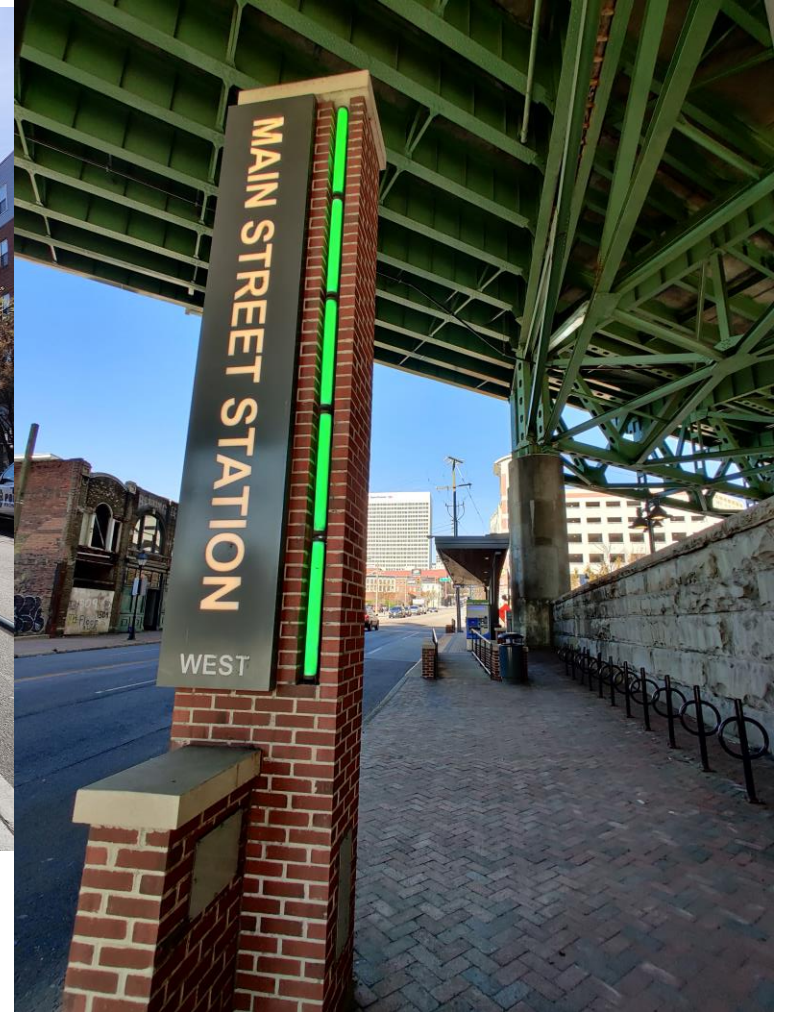


Albany, NY
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EBS Case Studies for Station Stop Improvements

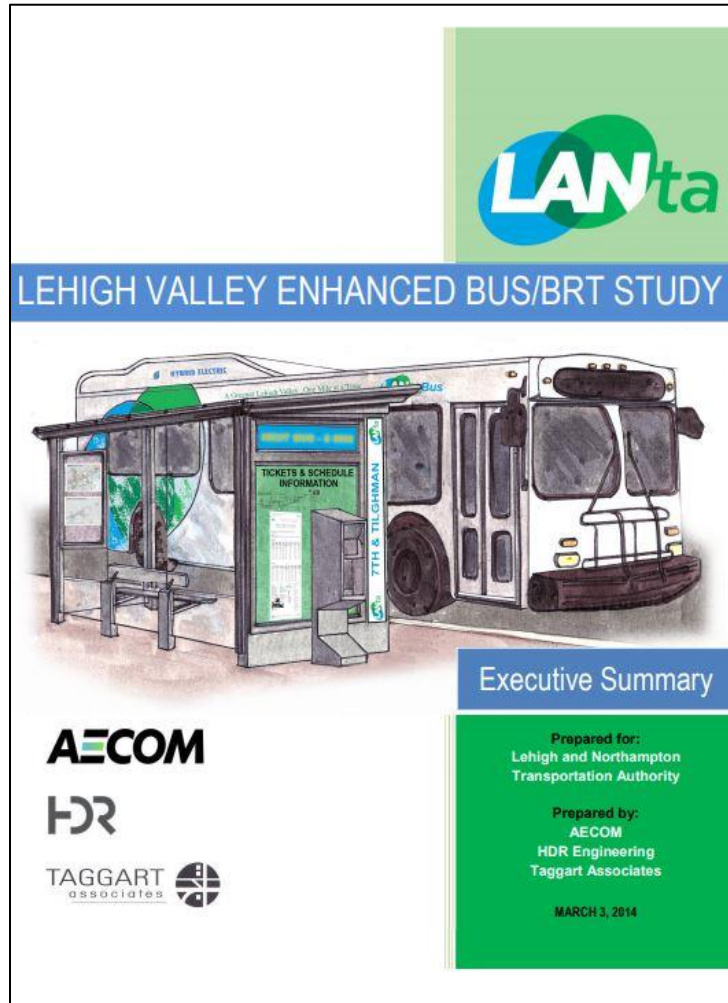
Realtime Signage, Unique Branding, Ticket Vending Machines, Lighting and Shelter at all Station Stops.



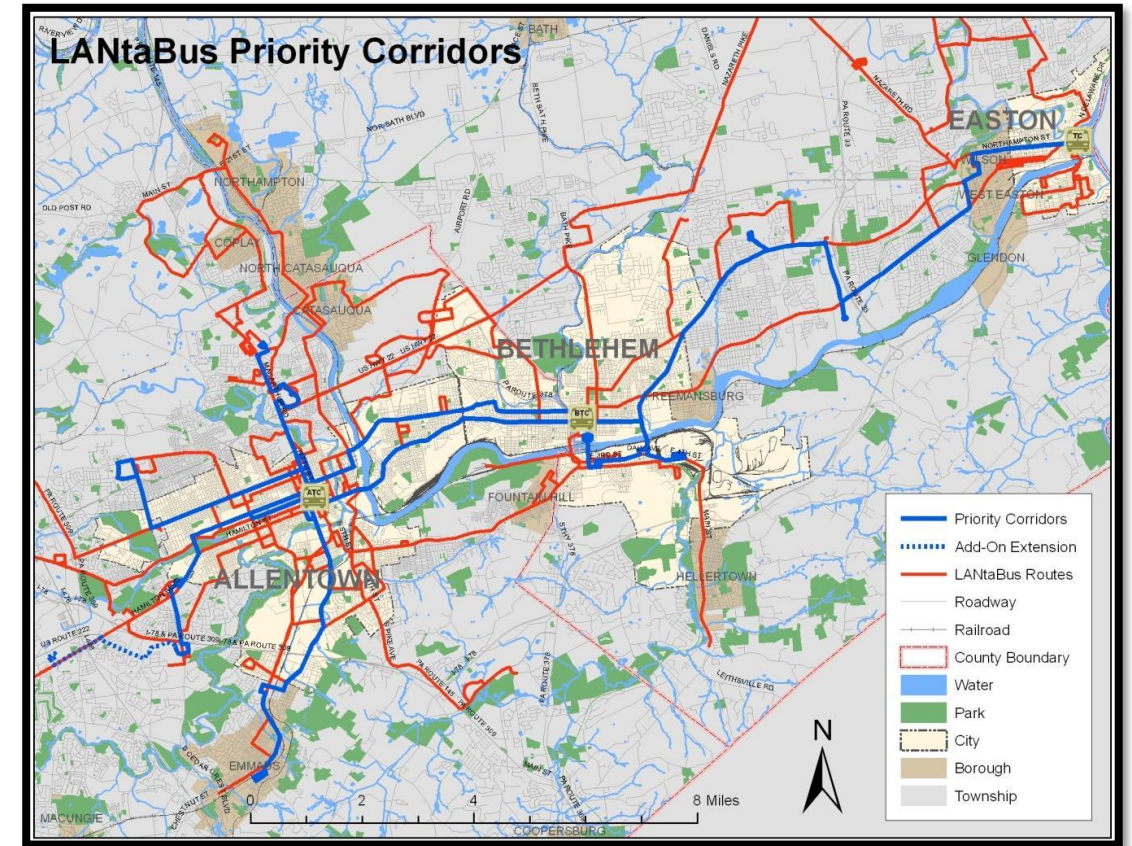
Richmond, VA
GRTC
Pulse

Enhanced Bus Service (EBS)

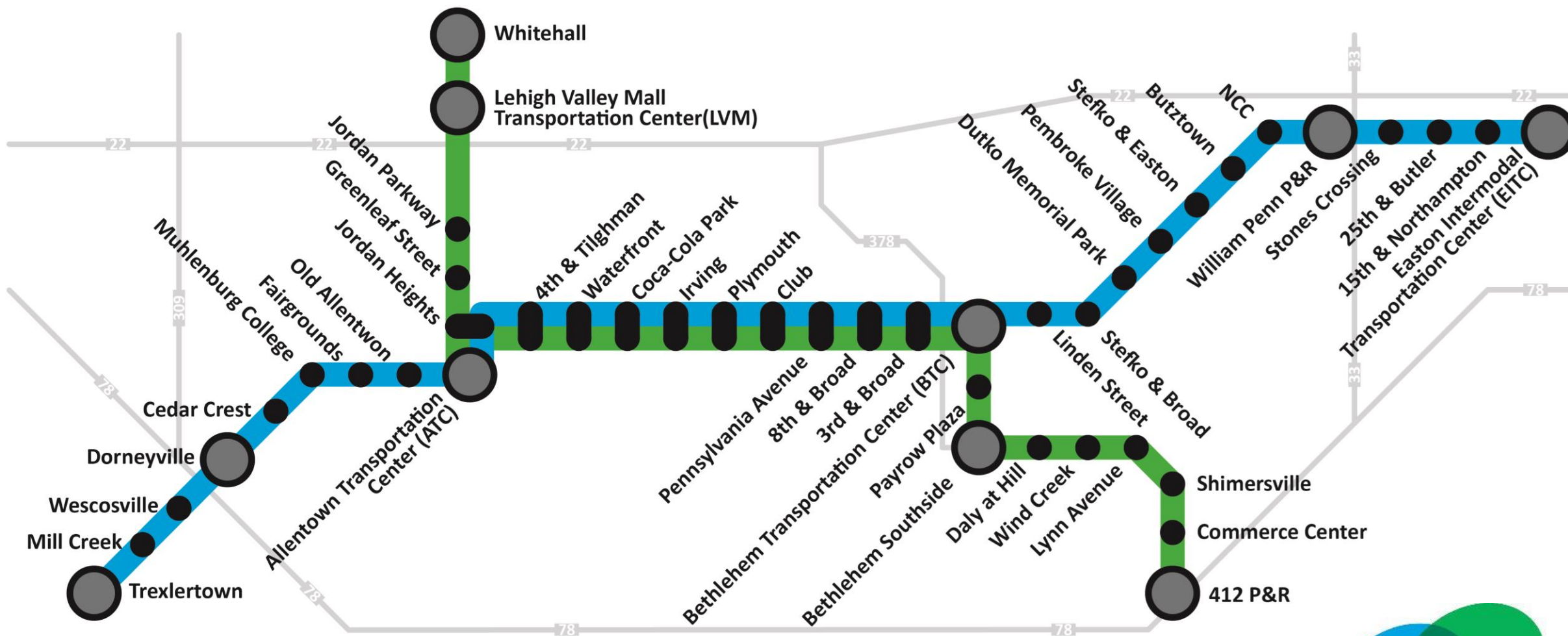
- Lehigh Valley began the process in 2012, completing the Lehigh Valley Enhanced Bus/BRT Study in 2014.



- Core network corridors and alignments were identified and assessed.
- Additional analyses and assessments have provided additional refinement of alignments. And station stop placements.
- Two Lines have been identified as productive BRT corridors for development.



Enhanced Bus Service (EBS)





Enhanced Bus Service (EBS)

EBS plays an integral role in key regional plans, including FutureLV, LRTP, Eastern RMTC ROP, and various municipal plans.



2.3

Encourage enhanced transit connections to improve mobility and job access.

- Enhance public transit service and pedestrian and bicycle facilities
- along corridors.
- Link growing job and population centers.
- Strengthen mixed-transportation access to regional transit hubs.
- Improve connections between mass transit and pedestrian and bicycle infrastructure.
- Support mass transit access to neighboring regions.

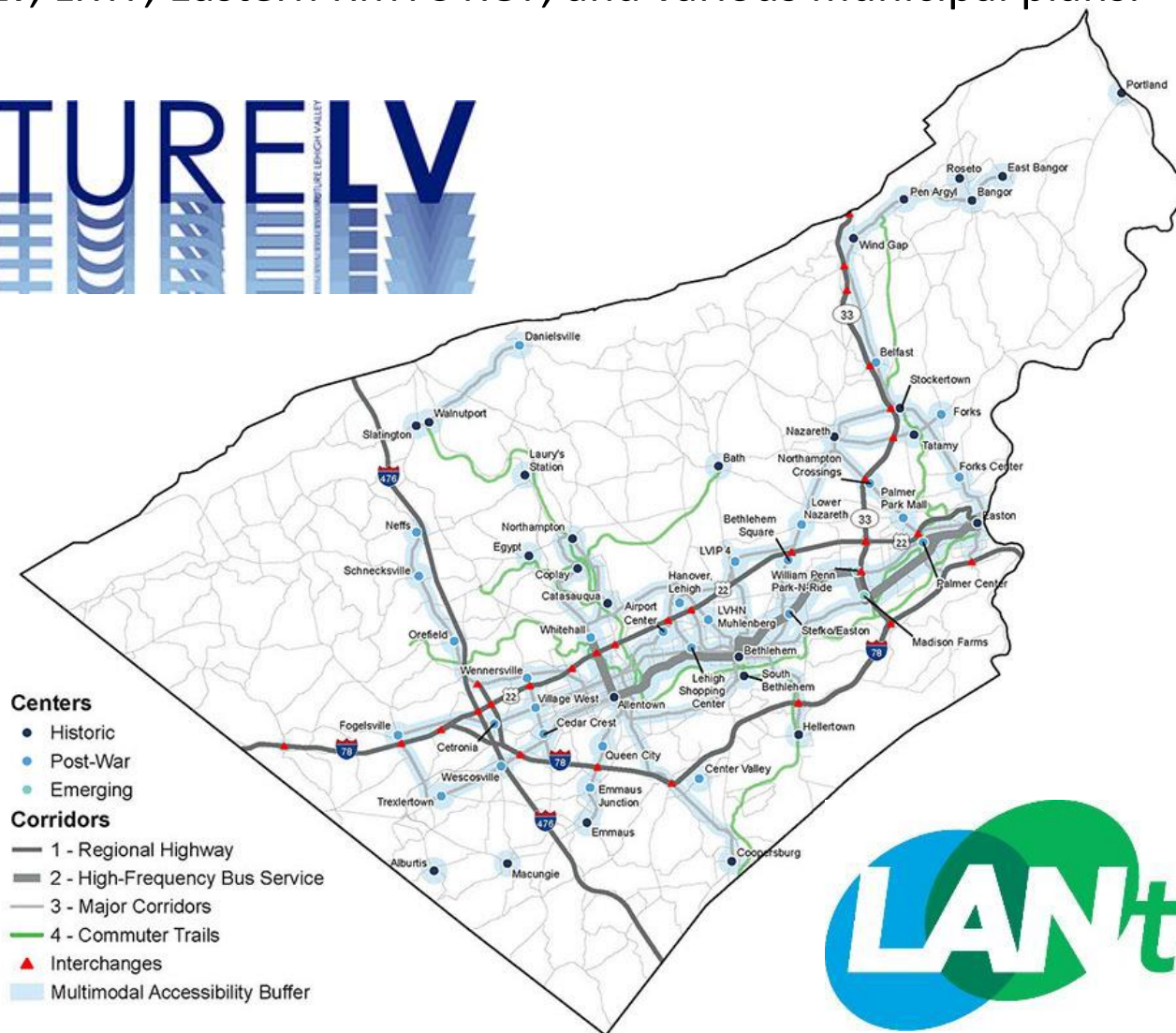
Themes



Implementation Partners

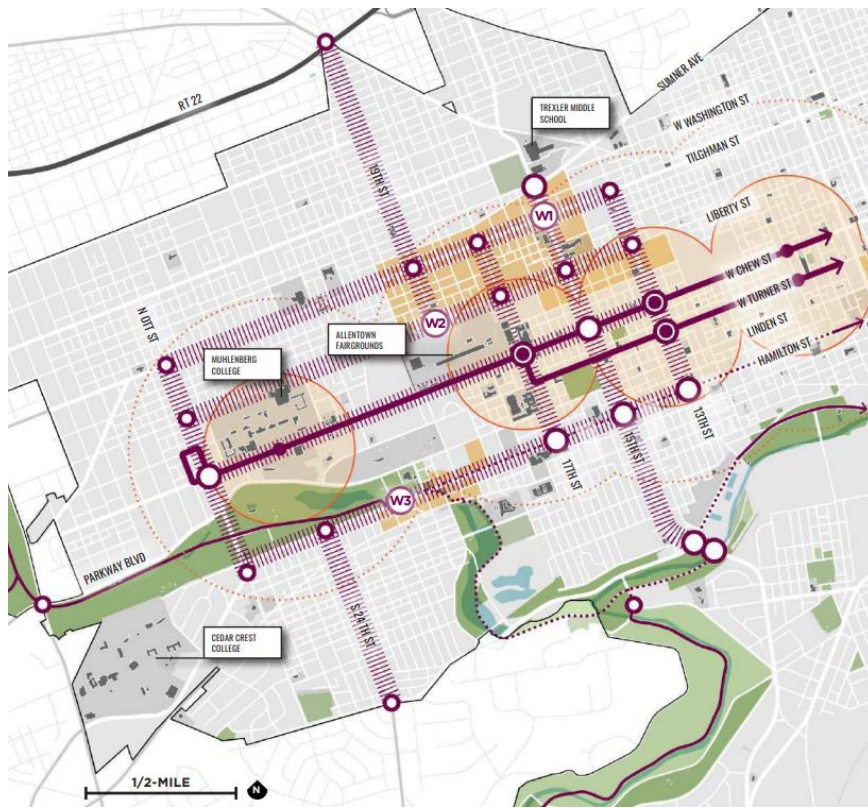
Lehigh Valley Planning Commission, Pennsylvania Department of Transportation, US Department of Transportation, Lehigh and Northampton Transportation Authority, Lehigh and Northampton Counties, 62 Municipalities, Workforce Board Lehigh Valley, Community Advocates

Related Policies



Enhanced Bus Service (EBS)

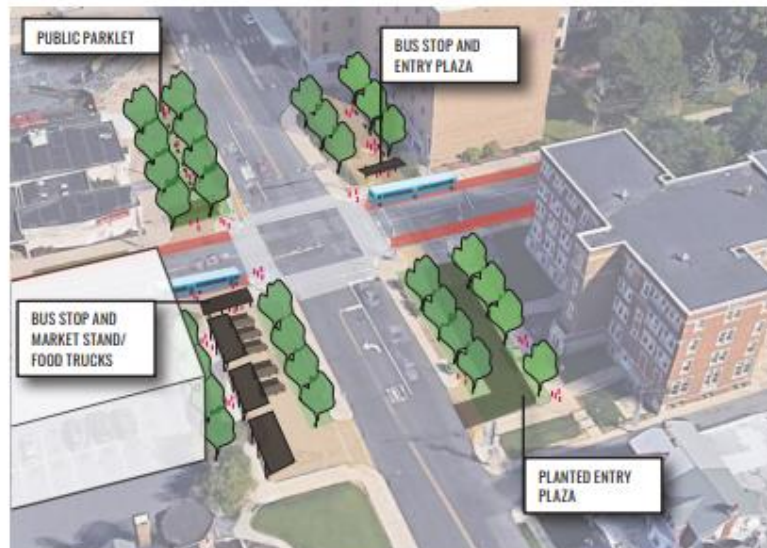
Coordination with municipal comprehensive plans in the region. These are from Allentown Vision 2030, the City of Allentown's comprehensive plan.



MOBILITY HUB

Example: Chew and 17th Streets

The site at Chew and 17th Streets could become a mobility hub with prioritized signals for bus service and unused pull-off areas could be repurposed for public plazas. These improvements would benefit students at nearby Allen High School and major employers in the area as well as attract other infill development.



WHAT WE HEARD...

People in Allentown sometimes say "Allentown is built out," meaning there is no room for development. In fact, there is a great opportunity for infill development. The darker orange blocks above have large parking lots or have buildings with less square footage than the lot size (FAR<1). This area would be ideal for a commercial-flex district and could attract infill development.

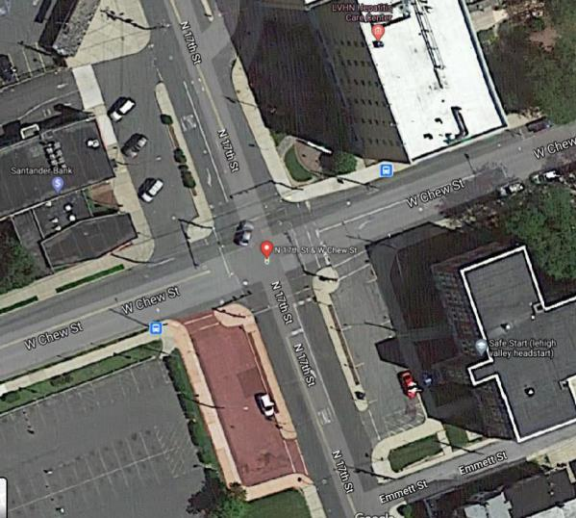
LEGEND

- Commercial
- Low Density Commercial
- Theatre District
- Park or Open Space



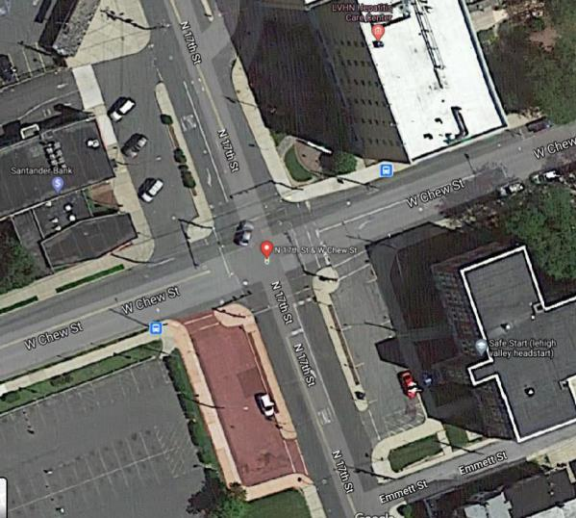
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Fairgrounds Station – 17th & Chew Mobility Hub



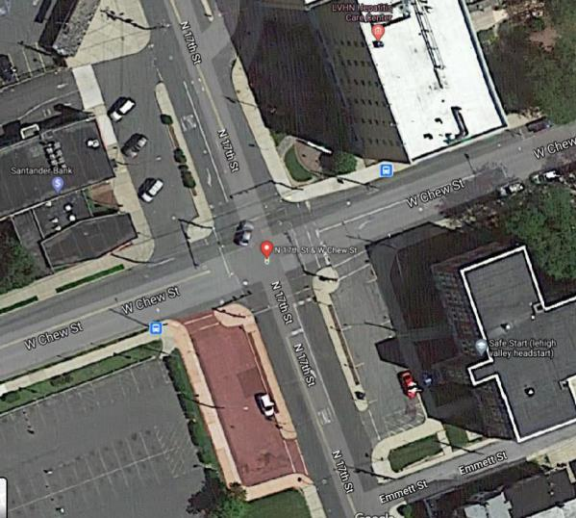
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Fairgrounds Station – 17th & Chew Mobility Hub



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Fairgrounds Station – 17th & Chew Mobility Hub



Enhanced Bus Service (EBS)

➤ What will we gain?

- Lower cost per rider
- Increased economic activity
- Enhanced safety
- More robust tourism
- Increased property values
- High frequency bus service corridors
- Corridors for targeted regional development

Significantly decreased travel time

Exclusive transitways have been shown to operate at an average of 17 to 30 miles per hour. This can achieve an overall travel time savings as high as 55% compared to regular bus services and compares well with rail transit.

- The Silver Line Washington Street has experienced reductions in mean running times as high as 25%, especially in the midday and PM peak periods.
- Las Vegas experienced 37% (northbound) and 43% (southbound) reductions in running times compared to pre-MAX bus services.
- With the implementation of BRT, travel time in the BRT corridor in Pittsburgh decreased 55%.
- In Los Angeles, the MetroRapid achieved travel savings as high as 40%, equally attributed to fewer stops, transit signal priority, and low floor vehicles.

Increased reliability

BRT's use of exclusive transitways, level boarding, improved fare collection, and automated vehicle location technologies allow for greater reliability.

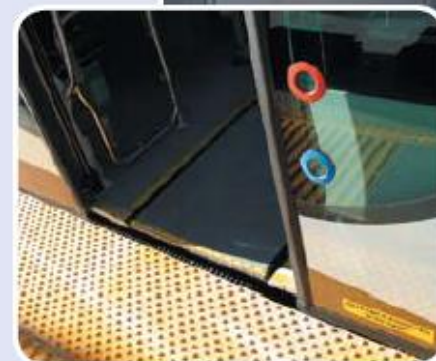
Improved accessibility

Vehicle, station, ITS, and fare collection design options can greatly improve the accessibility of a BRT system to mobility-impaired and other riders.

Increased safety and security

With modern technologies and facilities, customers report BRT systems to be safer than other local bus service.

- In Boston, passengers rating the safety as "above average" increased 19% after the Silver Line began operating.
- In Las Vegas, 69% of riders rated MAX vehicles as "excellent" and 54% rated safety at MAX stations as "excellent."



Enhanced Bus Service (EBS)

➤ What's Next?

1. Corridor Scoping (Substantially Complete)
2. Corridor Plan Development (18-24 months)
 - Establish Technical Advisory Committee (TAC)
 - Plan scoping
 - Interagency issue resolution & early public engagement (6-12 months)
 - Recommended Corridor Plan development & review (1-2 months)
 - Plan Public Comment (1-2 months)
 - Final Plan Adoption by TAC (2-3 months)
3. NEPA (~24 months)
 - Determination of Categorical Exclusion, Section 106, Section 4(f), DCE Documents, etc.
4. Engineering (~24 months)
5. Construction (~12 months)

Following funding securement, project can be completed in 3-5 years.



Enhanced Bus Service (EBS)

➤ What will it cost build?

Name	Location	Miles	New	New	New	Stations per Mile	Total Capital Cost (\$YOE)	Section 5309	Section	Non-CIG	Annual Operating Cost	Capital Cost	Capital Cost	Capital Cost	Capital Cost
			Stations	Buses	VRM			CIG Value (\$YOE)	5309 CIG Share (%)			per Mile	per Station	per Vehicle	of New Facility
METRO Gold Line Bus Rapid Transit	St. Paul, MN	10.3	16	12	117000	1.6	\$ 460,900,000	\$ 207,410,000	45.0%	\$ 253,490,000	\$ 9,360,000	\$ 44,747,573			
South Corridor Rapid Transit Project	Miami, FL	20	16	0	491000	0.8	\$ 299,810,000	\$ 100,000,000	33.4%	\$ 199,810,000	\$ 39,280,000	\$ 14,990,500			
Woodhaven Boulevard Select Bus Service	New York City,NY	6.1	11	41	352000	1.8	\$ 258,840,000	\$ 97,170,000	37.5%	\$ 161,670,000	\$ 28,160,000	\$ 42,432,787			
Downtown-Uptown-Oakland-East End Bus Rapid Transit	Pittsburgh, PA	15	46	15	777000	3.1	\$ 249,900,000	\$ 99,950,000	40.0%	\$ 149,950,000	\$ 62,160,000	\$ 16,660,000			
IndyGo Blue Line Rapid Transit	Indianapolis, IN	24	36	20	138875	1.5	\$ 220,000,000	\$ 100,000,000	45.5%	\$ 120,000,000	\$ 11,110,000	\$ 9,166,667			
BusPlus Full System	Albany, NY	40.4	52	44	238875	1.3	\$ 301,390,000	\$ 176,880,000	58.7%	\$ 124,510,000	\$ 19,110,000	\$ 7,460,149			
IndyGo Purple Line Rapid Transit	Indianapolis, IN	14.8	23	15	102000	1.6	\$ 155,000,000	\$ 77,500,000	50.0%	\$ 77,500,000	\$ 8,160,000	\$ 10,472,973			
Pacific Avenue/SR 7 Corridor BRT	Tacoma, WA	14.3	32	17	14125	2.2	\$ 150,000,000	\$ 59,870,000	39.9%	\$ 90,130,000	\$ 1,130,000	\$ 10,489,510			
Capital Area Transportation Authority BRT	Lansing, MI	8.5	27	15	95250	3.2	\$ 141,850,000	\$ 97,820,000	69.0%	\$ 44,030,000	\$ 7,620,000	\$ 16,688,235			
North-South Bus Rapid Transit	Chapel Hill, NC	8.2	16	14	73750	2.0	\$ 141,390,000	\$ 100,000,000	70.7%	\$ 41,390,000	\$ 5,900,000	\$ 17,242,683			
Madison Street BRT	Seattle, WA	2.3	10	9	83375	4.3	\$ 121,180,000	\$ 59,900,000	49.4%	\$ 61,280,000	\$ 6,670,000	\$ 52,686,957			
The Rapid BRT Full System	Grand Rapids, MI	11.4	26	8	235250	2.3	\$ 189,890,000	\$ 109,500,000	57.7%	\$ 80,390,000	\$ 18,820,000	\$ 16,657,018			
Ogden/Weber State University BRT	Ogden, UT	5.3	13	8	30000	2.5	\$ 99,680,000	\$ 64,500,000	64.7%	\$ 35,180,000	\$ 2,400,000	\$ 18,807,547			
RapidRide Roosevelt Project	Seattle, WA	6.1	13	0	205250	2.1	\$ 90,210,000	\$ 45,000,000	49.9%	\$ 45,210,000	\$ 16,420,000	\$ 14,788,525			
EBS Full System	Allentown, PA	35	44	54	420000	1.3	\$ 86,314,800	\$ 47,473,140	55.0%	\$ 38,841,660	\$ 6,475,000	\$ 2,466,137	\$ 750,000	\$ 580,000	\$18,750,000
Swift Orange Line BRT	Everett, WA	11.3	13	16	116250	1.2	\$ 84,160,000	\$ 41,650,000	49.5%	\$ 42,510,000	\$ 9,300,000	\$ 7,447,788			
BusPlus Purple Line	Albany, NY	8.5	16	16	36250	1.9	\$ 81,180,000	\$ 60,890,000	75.0%	\$ 20,290,000	\$ 2,900,000	\$ 9,550,588			
Swift II BRT	Everett, WA	12.3	18	13	77000	1.5	\$ 73,630,000	\$ 43,190,000	58.7%	\$ 30,440,000	\$ 6,160,000	\$ 5,986,179			
The Rapid Laker Line BRT	Grand Rapids, MI	13.3	11	16	59875	0.8	\$ 72,760,000	\$ 56,190,000	77.2%	\$ 16,570,000	\$ 4,790,000	\$ 5,470,677			
Wake Bus Rapid Transit: New Bern Avenue Project	Raleigh, NC	5	10	6	30875	2.0	\$ 71,450,000	\$ 35,050,000	49.1%	\$ 36,400,000	\$ 2,470,000	\$ 14,290,000			
Milwaukee East-West BRT	Milwaukee, WI	9.1	19	11	75875	2.1	\$ 54,790,000	\$ 40,930,000	74.7%	\$ 13,860,000	\$ 6,070,000	\$ 6,020,879			
Mill Plain BRT	Vancouver, WA	10	21	7	18375	2.1	\$ 49,860,000	\$ 24,890,000	49.9%	\$ 24,970,000	\$ 1,470,000	\$ 4,986,000			
EBS Green Line (Whitehall-South Bethlehem)	Allentown, PA	14.1	17	18	169200	1.2	\$ 43,541,400	\$ 23,947,770	55.0%	\$ 19,593,630	\$ 2,608,500	\$ 3,088,043	\$ 750,000	\$ 580,000	\$18,750,000
Central Avenue Bus Rapid Transit Project	St. Petersburg, FL	11	17	9	47125	1.5	\$ 41,360,000	\$ 20,360,000	49.2%	\$ 21,000,000	\$ 3,770,000	\$ 3,760,000			
BusPlus Blue Line	Albany, NY	16	30	20	36875	1.9	\$ 40,880,000	\$ 32,700,000	80.0%	\$ 8,180,000	\$ 2,950,000	\$ 2,555,000			
BusPlus Red Line	Albany, NY	17	18	15	27656	1.1	\$ 36,500,000	\$ 16,000,000	43.8%	\$ 20,500,000	\$ 2,212,500	\$ 2,147,059			
The Rapid Silver Line BRT	Grand Rapids, MI	9.6	18	10	27250	1.9	\$ 35,285,000	\$ 28,228,000	80.0%	\$ 7,057,000	\$ 2,180,000	\$ 3,675,521			
EBS Blue Line Phase One (Muhlenberg-Easton)	Allentown, PA	19.7	20	26	236400	1.0	\$ 32,050,000	\$ 17,627,500	55.0%	\$ 14,422,500	\$ 3,644,500	\$ 1,626,904	\$ 750,000	\$ 580,000	
EBS Blue Line Phase Two (Muhlenberg-Trexlerstown)	Allentown, PA	7.1	7	9	85200	1.0	\$ 11,313,400	\$ 6,222,370	55.0%	\$ 5,091,030	\$ 1,313,500	\$ 1,593,437	\$ 750,000	\$ 580,000	

Figures are assumptions based on peer assessment of FTA Small Starts Submissions.
Formal costing is required to refine costs.

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