



I-290 Phase 1 Study Alternatives Tool Box

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Heavy Rail Transit (HRT)

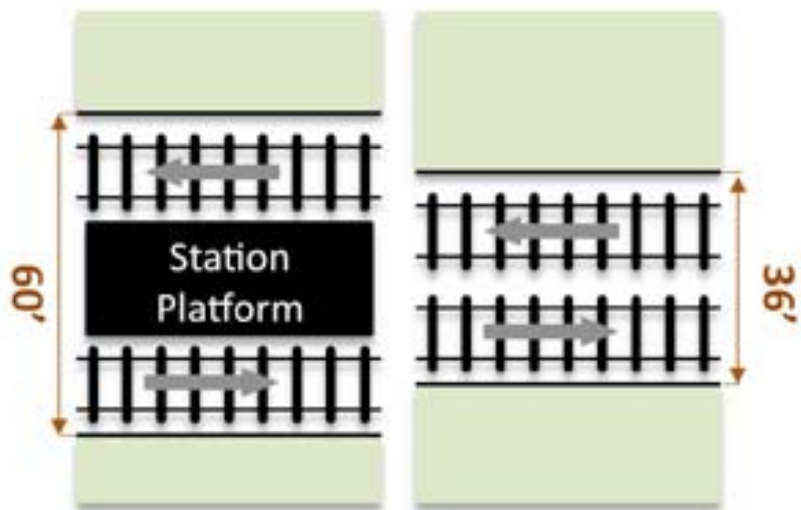
Heavy Rail Transit (HRT) are high capacity public transportation systems consisting of steel-wheeled, high performance electric powered rail vehicles operating in trains of 2 or more cars.

- The right-of-way is usually fully grade separated (elevated, trench, or subway).
- Electricity for propulsion is typically accessed by either overhead wires or a powered third rail.
- Station spacing is generally 1 mile apart, closer in dense areas, further apart in suburban settings.



Comments:

- » Typically serves urban areas.
- » Loading/unloading passengers takes place at stations with fixed, high-level platforms.
- » Park-and-ride at key stations.
- » Good bus connections at most stations.



Typical Right-of-Way Width

EXAMPLES:

- Chicago (CTA)
- San Francisco (BART)
- New York (MTA/NYCT)

Commuter Rail (CR)

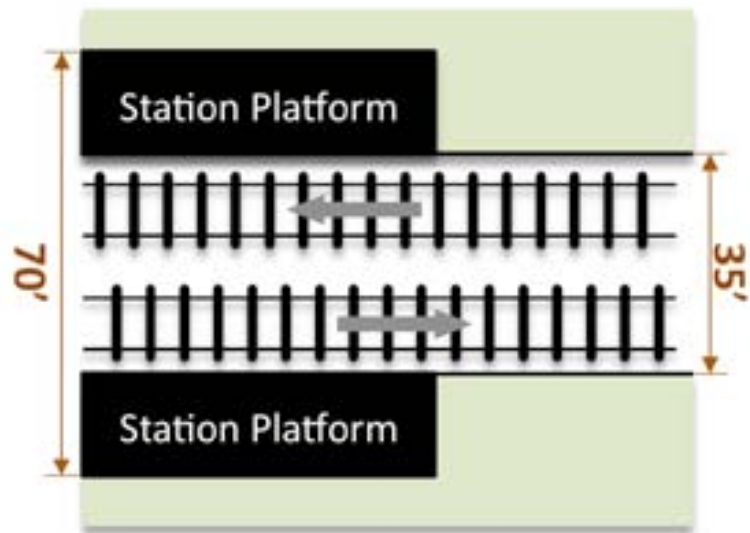
Commuter Rail (CR) facilities are high capacity public transportation systems consisting of electric or diesel propelled train sets operating in trains of approximately 2 or more cars.

- *The right-of-way is usually at ground level or on embankment.*
- *Diesel powered commuter trains are usually pushed or pulled by a locomotive, though a few lines use self-propelled diesel cars. Electric commuter trains usually access power by overhead wires.*
- *Station spacing is generally 2 to 5 miles apart.*



Comments:

- » *Typically operates between a central city and its suburbs.*
- » *Loading/unloading passengers takes place at stations with ground-level or high-level boarding.*
- » *Can operate on freight railroads and often shares tracks with freight trains and intercity passenger trains.*
- » *Emphasis on park-and-ride lots in suburbs.*



Typical Right-of-Way Width

EXAMPLES:

- *Chicago (Metra)*
- *San Francisco (Caltrain)*
- *New York (Long Island RR and Metro-North)*

Light Rail Transit (LRT)

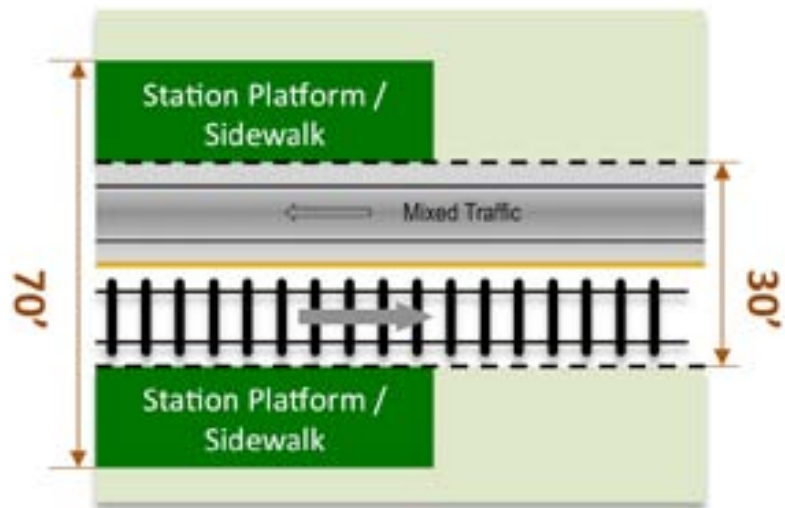
Light Rail Transit (LRT) facilities are public transportation systems consisting of steel-wheeled electric powered rail vehicles operating in trains of approximately 1 to 4 cars. Most LRT car designs are articulated (flexible) cars.

- The right-of-way can be grade separated or can operate in mixed traffic (street running), or on dedicated right-of-way.
- Electricity for propulsion is accessed by overhead wires.
- Station spacing is generally 1 mile apart, closer in dense areas, further apart in suburban settings.



Comments:

- » Typically serves urban and dense suburban areas.
- » Loading/unloading passengers takes place at stations with fixed platforms or at street level or on separate right-of-way.
- » Park-and-ride at key stations.
- » Good bus connections at most stations.



Typical Right-of-Way Width

EXAMPLES:

- St. Louis (MetroLink)
- Dallas (DART)
- Minneapolis (Metro Transit)
- Cleveland (GCRTA)

Automated Guideway Transit (AGT)

Automated Guideway Transportation (AGT) facilities are public or private transportation systems consisting of automatically operated rubber tired or steel-wheeled vehicles, usually in 1 to 4 car train sets, along a fixed guideway. These systems vary widely in form and function and include people movers, monorails, and personal rapid transit (PRT).

- Fully automated, driverless and grade-separated.
- System can be designed to operate on a fixed schedule or on demand.
- Electric propulsion is generally used.

Comments:

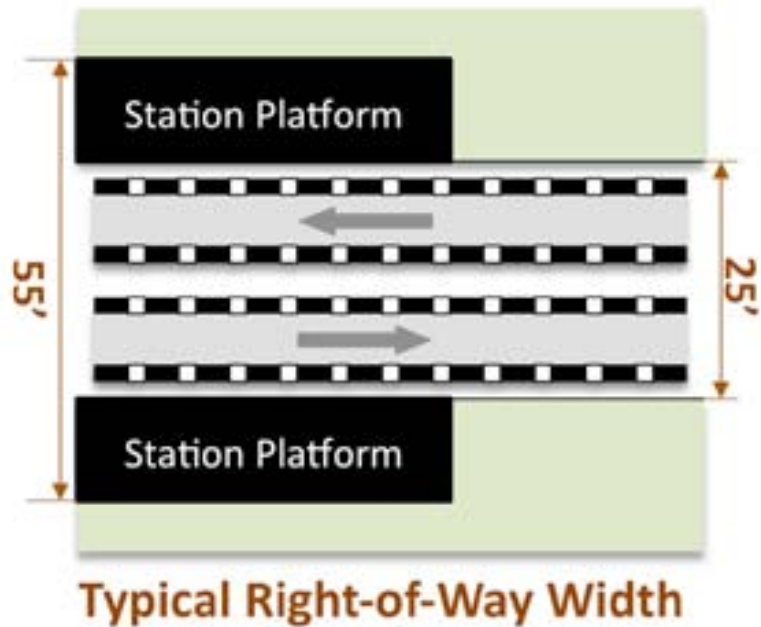
- » Typically operates in Central Business Districts or special generators (airports, universities, hospital complexes, entertainment complexes).
- » Loading/unloading passengers takes place at stations with fixed, high-level platforms.
- » PRT Vehicles are small—typically two to six passengers.
- » Airport AGT systems typically provide few seats per car allowing for more room for standing passengers with luggage.



Automated Guideway Transit



Personal Rapid Transit



Typical Right-of-Way Width

EXAMPLES:

- Chicago (O'Hare Airport)
- Detroit, MI (DTC)
- Morgantown, WV (WVU Personal Rapid Transit)
- Miami, Florida (MDTA)

Bus Rapid Transit (BRT)

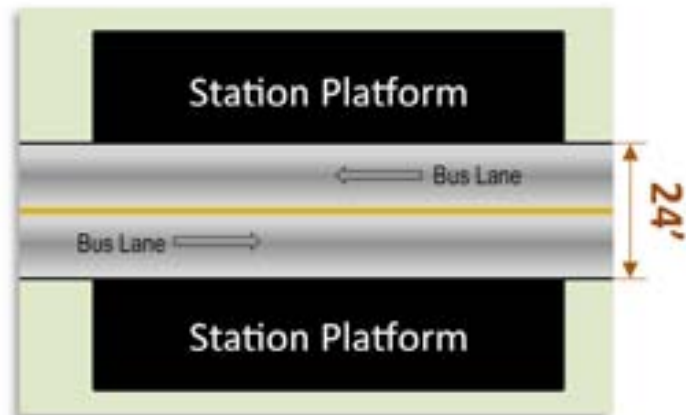
Bus Rapid Transit (BRT) facilities are public transportation systems consisting of rubber-tired bus vehicles operating on dedicated right-of-way or lanes of existing roadways reserved for bus transit.

- *BRT has the flexibility to leave the route for local access or other uses as needed.*
- *Bus vehicles can vary, including articulated for high demand, and can be diesel gasoline or alternative fuel powered.*
- *Station spacing is generally 0.25 to 2 miles apart, further apart in suburban settings.*



Comments:

- » *Typically serves urban and suburban areas.*
- » *Loading/unloading passengers typically takes place at stations with fixed platforms or at street level.*
- » *Traffic signal priority and real-time passenger information are often included in BRT systems.*



Typical Right-of-Way Width

EXAMPLES:

- *Boston (Silver Line)*
- *Pittsburgh (West Busway)*
- *Eugene, OR (EMX Green Line)*

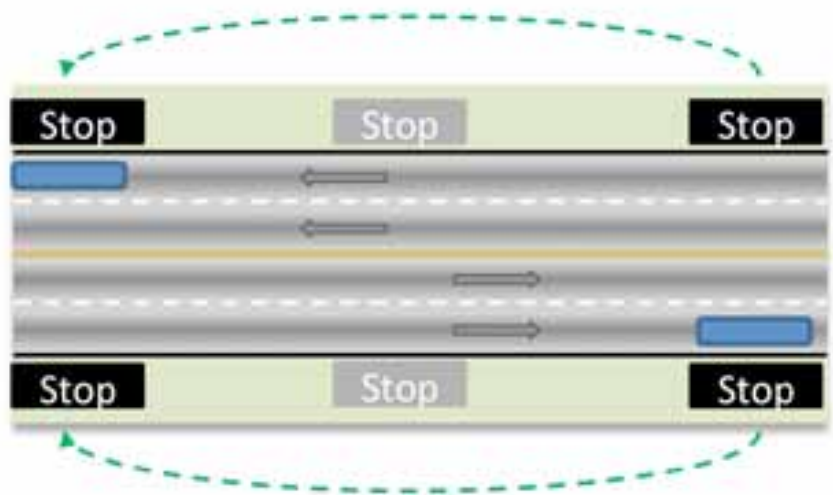
Express Bus Service is a public transportation system consisting of rubber-tired bus vehicles operating on existing roadways, where an express schedule may be implemented.

- Express bus service has the flexibility to leave the route for local access or other uses as needed.
- Bus vehicles can vary, including articulated for high demand, and can be diesel gasoline or alternative fuel powered.
- Stop spacing varies, often with few intermediate stops between trip end points.



Comments:

- » Typically serves urban and suburban areas on arterials and/or freeways.
- » Express buses can operate in general purpose lanes, managed lanes (HOV or HOT lanes), or in certain circumstances on freeway shoulders.



No additional Right-of-Way Required

EXAMPLES:

- Chicago (CTA and Pace)
- Atlanta (Xpress)
- Los Angeles (Commuter Express)

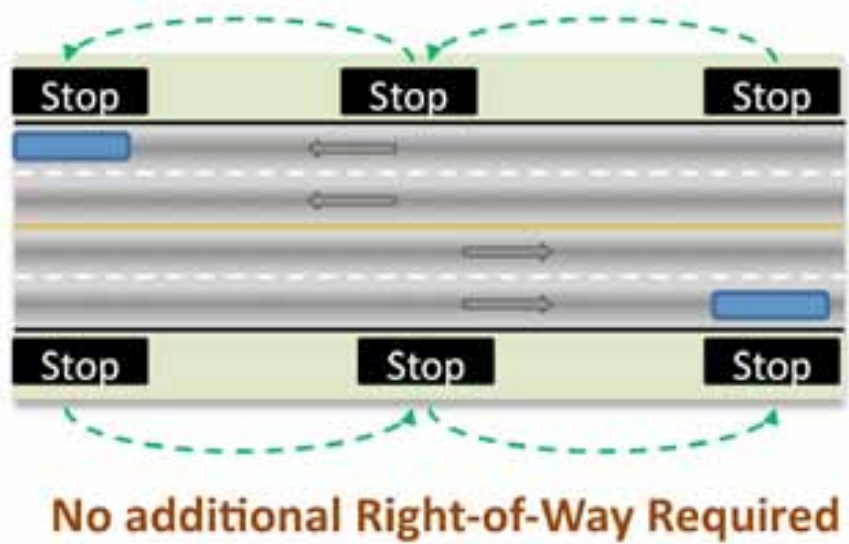
Local Bus Service is a public transportation system consisting of rubber-tired bus vehicles operating on existing roadways that serve local and commuter traffic.

- Local bus service provides local access and can be used as feeders to rail transit modes.
- Bus vehicles can vary, including articulated for high demand, and can be diesel gasoline or alternative fuel powered.
- Stop spacing varies from 2 blocks or greater, with many intermediate stops between trip end points.



Comments:

- » Typically serves urban and suburban areas.
- » Local buses operate in mixed traffic.
- » Bus stop amenities can include shelters and benches.



EXAMPLES:

- CTA (Chicago)
- Milwaukee (MCTS)
- Pace (Chicago and suburbs)

Expressway improvements do not add through lanes (capacity), but include facility condition improvements, safety improvements, and operational benefits.

- *Exit/entrance ramp improvements.*
- *Pavement/bridge reconstruction.*
- *Drainage improvements.*
- *Safety measures (Lighting, guardrails, barrier walls, shoulders, clear zones, etc.).*
- *Operational improvements (address poor weaving areas, add auxiliary lanes, improve signage).*

Comments:

- » *Usually focused on specific improvements in the most problematic areas.*
- » *Can be combined with reconstruction efforts in order to address condition/design deficiencies as well as other improvements.*



- Insufficient acceleration/ deceleration lanes and ramps
- Weaving sections
- Sharp horizontal/vertical curves
- Narrow lanes and shoulders
- Inadequate signage and pavement striping
- Other geometric deficiencies

EXAMPLES:

- *I-90/94 Dan Ryan reconstruction (Chicago)*
- *I-74 reconstruction (Peoria)*

General Purpose (GP) Highway Lanes

General Purpose facilities are highway lanes that allow unrestricted, non-tolled use by all vehicles.

- All Chicago-area expressways are currently, GP lanes except the tolled Chicago Skyway and Illinois Tollway facilities.
- GP Highway lanes can carry up to 2000 vehicles per hour.

Comments:

- » Express bus service can be considered if shoulder riding is allowed, otherwise it cannot be reliably scheduled in congested conditions.
- » GP lanes do not offer congestion-management strategies other than additional lane capacity.



Typical GP Lane Width

EXAMPLES:

- IL-53
- I-55 (Weber Road to I-80)

High Occupancy Vehicle (HOV) Lanes

High Occupancy Vehicle (HOV) facilities are highway lanes that allow priority access by vehicles that have two or more riders, such as carpool, van or bus. Single occupant vehicles are not permitted.

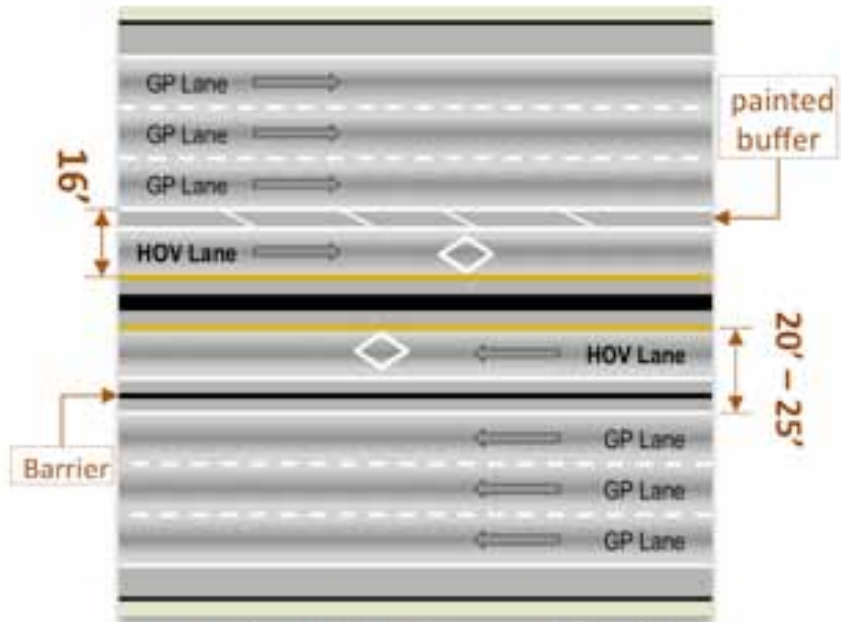
- *Carpool vehicles have a minimum of two (2+) and sometimes three (3+) or four (4+) occupants.*
- *Express bus service can also use HOV lanes; usually not considered true BRT (Bus Rapid Transit) as it is not a 'Bus Only' lane.*
- *Use of HOV lanes does not require a toll.*
- *Some HOV's also allow hybrid vehicles with single occupants.*



High Occupancy Vehicle (HOV) Lanes

Comments:

- » *Painted buffer allows easier access between GP lanes and HOV lanes.*
- » *Barrier separated HOV lanes require more width, but offer better traffic control & channelization.*
- » *Enforcement of painted buffer HOV more difficult than barrier separated HOV.*
- » *With painted HOV buffers, traffic incidents in GP lanes can negatively affect HOV lane operations. Barrier separation reduces these affects.*
- » *Barrier separation can complicate snow removal operations.*
- » *Existing lanes can be converted to HOV with little or no additional right-of-way.*
- » *Adding new HOV lanes to existing GP lanes may require additional ROW.*



Typical HOV Lane Widths

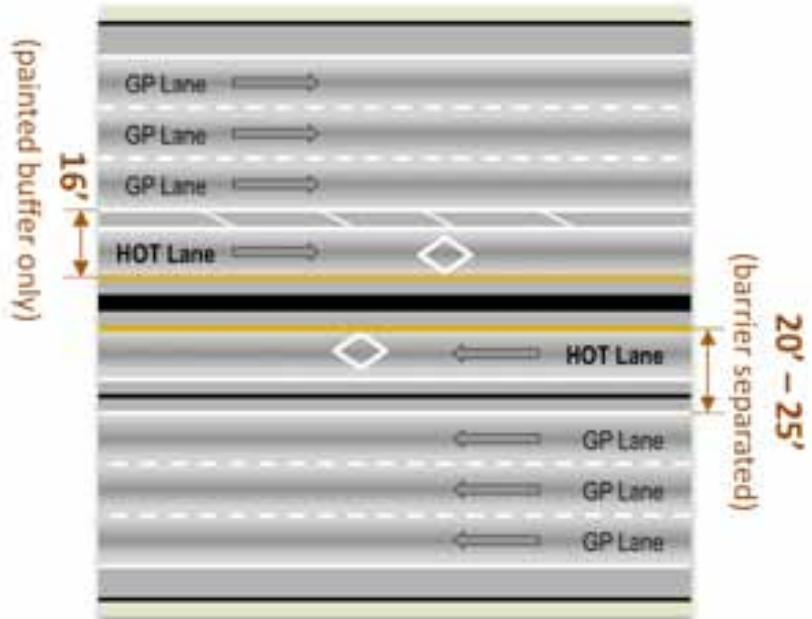
EXAMPLES:

- *I-55 (Memphis)*
- *I-25, US-36, US-85 (Denver)*
- *Shirley Highway (Virginia)*

High Occupancy Toll (HOT) Lanes

High Occupancy Toll (HOT) facilities are highway lanes that allow priority use to High Occupancy Vehicles (HOV) such as carpool, van or bus, as well as Single Occupant Vehicles (SOV) with selectively applied tolls.

- Congestion based pricing can be used to maintain acceptable levels of service for HOT lane users (example LOS "C" or better).
- Express Bus service can also use HOT lanes; usually not considered true BRT (Bus Rapid Transit) as it is not a 'Bus Only' lane.
- HOT lanes apply tolls on some or all vehicles, with SOV's and trucks (if allowed) paying highest tolls.



Typical HOT Lane Width

High Occupancy Toll (HOT) Lanes

Comments:

- » Painted buffer allows easier access between GP lanes and HOT lanes.
- » Barrier separated HOV lanes require more width, but offer better traffic control & channelization.
- » Enforcement of painted buffer HOT more difficult than barrier separated HOT.
- » With painted HOT buffers, traffic incidents in GP lanes can negatively affect HOT lane operations. Barrier separation reduces these affects.
- » Barrier separation can complicate snow removal operations.

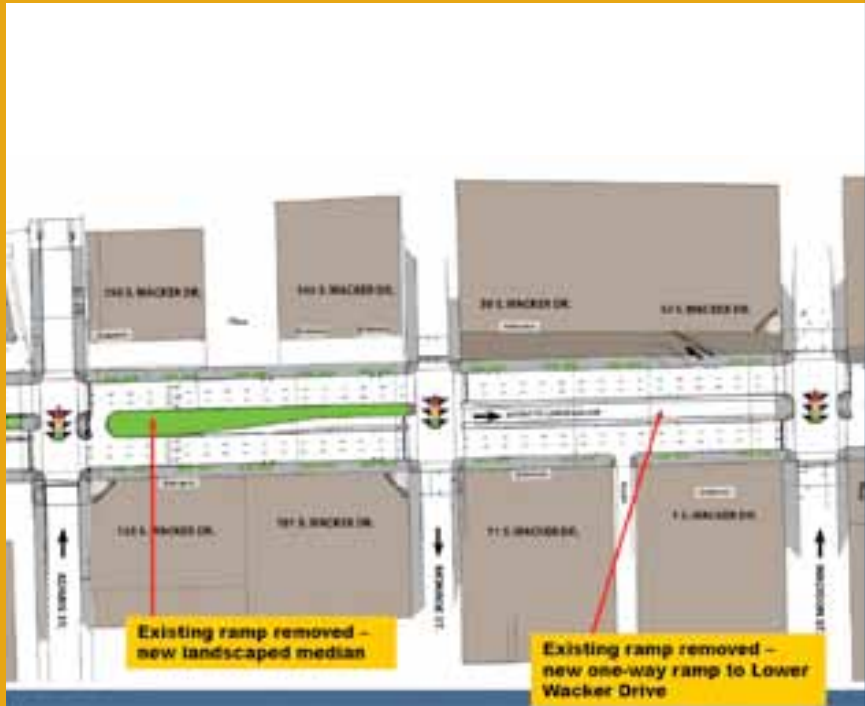
EXAMPLES:

- I-394 (Minneapolis)
- SR-91 (Orange County, CA)
- I-15 (San Diego)

Arterial Improvements

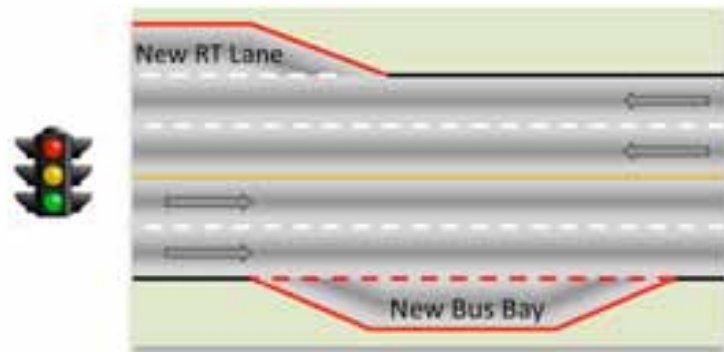
Arterial improvements do not add through lanes (capacity), but include facility condition improvements, safety improvements, and operational benefits.

- Intersection/signal improvements (widening, improving traffic control devices).
- Pavement reconstruction.
- Drainage improvements.
- Safety measures (turn prohibitions, grade separations, left/right turn lanes, removal of parking, lighting, traffic calming, pedestrian and bike improvements).
- Operational Improvements (channelization, widening, reversible lanes, one-way and bus turnout bays, access management).



Comments:

- » Arterials serve major through movements between centers of activity in the region.
- » Arterial improvements place a greater emphasis on mobility within high volume traffic corridors.



EXAMPLES:

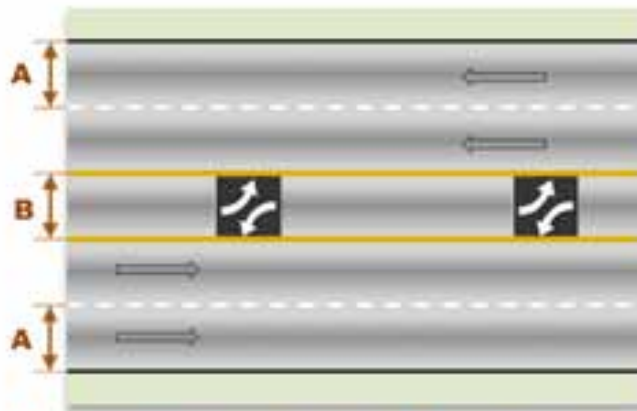
- Route 38 (Roosevelt Road)

Adding one or more lanes to a non-freeway arterial roadway.

- Capacity can be added by increasing the number of through traffic lanes.
- Operational efficiency and safety can be enhanced by adding a center two-way left turn lane.

Comments:

- » Strategic Regional Arterials are wide, multi-laned arterials with managed access that carry a mix of local and regional traffic (i.e. Mannheim Road, Cicero Avenue). Other arterials tend to carry more local traffic than regional.
- » Non-freeway arterials are limited in capacity by access points and signalized intersections, even when lanes are added.



A - Added through lanes - 11' to 14' each
B - Added 2-way center Left Turn lane - 11' to 14'

Typical Arterial Widened Lane Widths

EXAMPLES:

- 17th Avenue (Cook County)

Intelligent Transportation Systems (ITS)

Intelligent Transportation Systems (ITS) utilize technology to improve the utilization and safety of transportation facilities.

- *Traffic management/operations centers.*
- *Real-time traveller information.*
- *Video camera surveillance.*
- *Variable/dynamic message signs.*
- *Incident response.*
- *511 systems.*
- *Active Traffic Management.*
- *Variable Speed Limits.*
- *Trail Blazer Signs.*
- *Adaptive Signal Control.*

Comments:

- » *ITS strategies interact with other transportation strategies in impacting traffic congestion and mobility.*
- » *ITS applications can occur for both highway, arterial and transit operations.*
- » *The key vision for ITS is coordinated operation of the transportation system.*



EXAMPLES:

- *IDOT Minuteman*
- *I-Pass and Open Road Tolling*
- *Gary-Chicago-Milwaukee Corridor (Travel Midwest.com)*
- *CTA Bus Tracker*

A Transportation System Management (TSM) approach to congestion mitigation seeks to improve the operational efficiency of existing facilities. Through better management and operation of existing transportation infrastructure, TSM techniques are designed to improve traffic flow, air quality, and movement of vehicles and goods, as well as enhance system accessibility and safety.

TSM features are generally lower cost enhancements intended to increase the performance and improve throughput of the transportation system.

- Intersection and signal improvements.
- Data collection to monitor system performance.
- Public information & real-time traffic.
- Special events management strategies.
- Active Traffic Management.

Comments:

- » TSM projects can complement the major capacity improvements and infrastructure by providing improved traffic flow on arterials and local streets.
- » TSM strategies are integrated into CMAP transportation development process.



CONGESTION REDUCTION TOOLBOX

- Improve Service on Existing Roads
- Congestion Pricing
- Add Capacity
- Better Work Zones
- Travel Options
- Traveler Information Systems
- Signal timing
- Ramp metering

EXAMPLES:

- Expressway Ramp Metering
- RTA Trip Planner
- Real-Time Travel Information Message Board

TDM are generally non-capital intensive strategies to reduce demand for single occupancy vehicle use on the regional transportation network.

- *Commuter pre-tax benefits.*
- *Emergency ride home.*
- *Telecommuting.*
- *Flexible work hours.*
- *Compressed workweek.*
- *Parking management, cash-out, HOV priority.*
- *Transit promotion and subsidies.*
- *Non-motorized modes, pedestrian and bicycle.*

Comments:

- » *TDM focuses on demand-side strategies to increase transportation options and manage traffic congestion.*
- » *Commuter Choice programs encouraging employers to offer a broad range of commuting options to their employees by using pre-tax payroll deductions.*



EXAMPLES:

- *Pace RideShare and Vanpool*
- *Commuter Choice Programs and Tax Benefits*
- *RTA <http://drivelesslivemore.com/>*

Non-Motorized Bridge Crossings

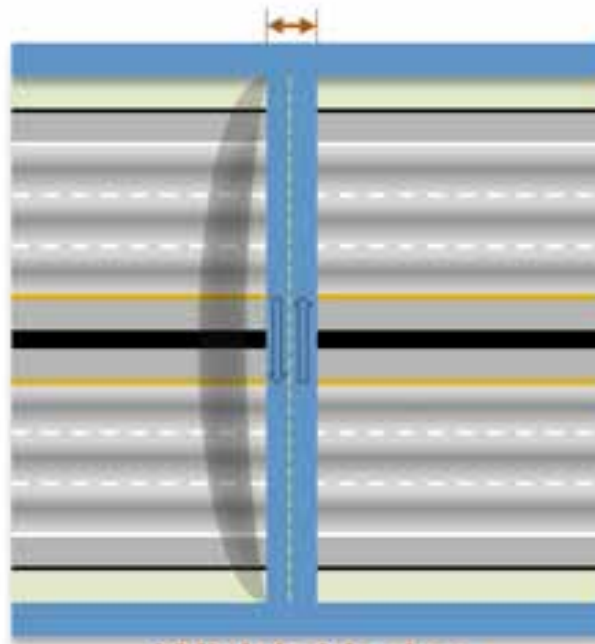
New Pedestrian/Bicycle bridge crossings would allow non-motorized users to have continuous pathways, uninterrupted by hazardous crossings where bikes, pedestrians, and vehicles intersect.



I-80, Berkley, CA



I-235, Des Moines, IA



Width Varies

EXAMPLES:

- LaVergne and Home Ave. I-290 Crossings

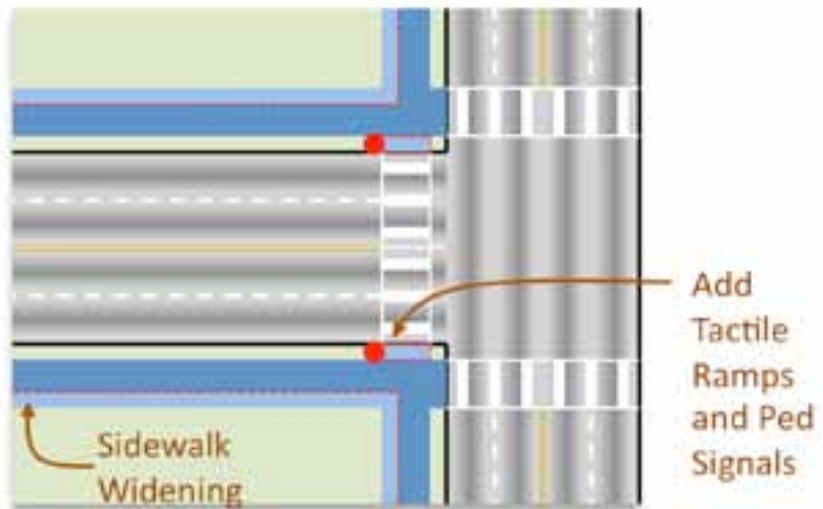
Non-Motorized Bridge Crossings

Improvements to existing Pedestrian and Bicycle facilities.

- Widened sidewalks.
- ADA sidewalk ramps.
- Traffic signal improvements for pedestrians.

Comments:

- » Annually almost 5,000 pedestrians are killed in traffic crashes and nearly 70,000 injured each year in the US (FHWA).
- » Most fatalities and serious injuries occur on roads designed with little attention for pedestrian safety.
- » Improvements usually included as part of a larger repair or reconstruction project.



EXAMPLES:

- Champaign, IL - The HAWK beacon

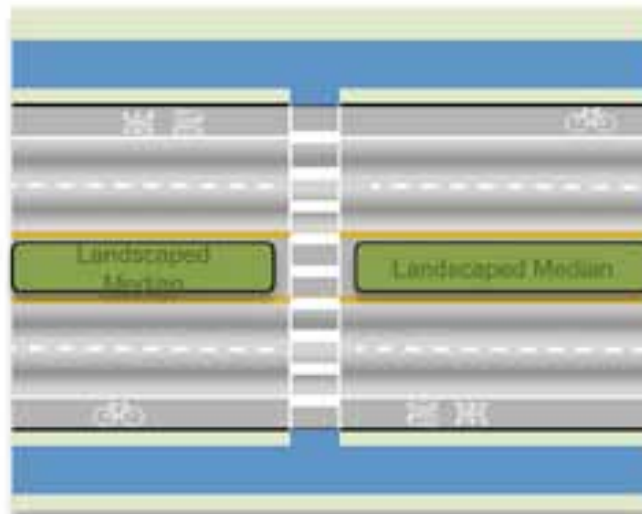
New Pedestrian and/or Bicycle facilities.

- Sidewalks.
- On-street bicycle lanes.
- Off-street shared use path.
- Bicycle parking facilities.
- Pedestrian countdown signals.
- Road Diet/Street Reclaiming.
- Mid-block crossings.



Comments:

- » Complete Streets means that roadways are designed to accommodate all modes, including walking and cycling.
- » IDOT is required by federal and state law to incorporate bicycle and pedestrian accommodations into state highway reconstruction projects in urban areas, unless 'exceptional circumstances' exist.



Added raised landscape median with mid-block ped signaled crossing 11' to 14' wide

EXAMPLES:

- IDOT Safe Routes to School Program
- Chicago Bike 2015 Plan
- Soles and Spokes Bicycle and Pedestrian Plan for Chicago Area Transportation