7 BEST PRACTICES

Transit Priority Treatments

OTTAWA, ONTARIO; BRISBANE, AUSTRALIA; RICHMOND, BC; CLEVELAND, OH

WHAT IS IT?

Transit priority treatments are relatively inexpensive improvements (when compared to major corridor transit projects) that reduce delay and increase speed of transit services. Effective transit priority treatments optimize management of city streets to increase transit speeds while minimizing impacts on other users of the street.

WHY DO IT?

Transit priority is about getting the most out of an existing investment. To some extent, transit priority projects represent "low-hanging fruit." In contrast to expensive, lengthy, and politically challenging infrastructure investments, transit priority upgrades can be implemented incrementally as funding becomes available. The net benefit of many small improvements can amount to more than the sum of their parts, offering significant reductions in transit travel time and improvements in transit productivity and cost effectiveness. Transit priority improvements can stand alone or work with other investments to optimize system-level efficiency; for example, feeder service can be improved to leverage larger infrastructure investments. Improvements to existing services can also build demand for more extensive investments.

Median transit lanes have been applied along the Euclid Corridor BRT route in downtown Cleveland

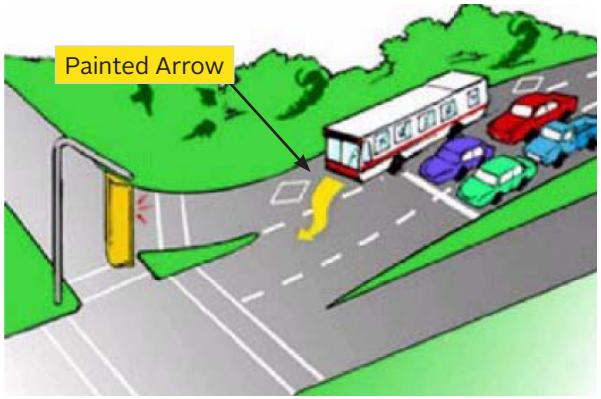
Source: Flickr Creative Commons, User So Cal Metro

HOW WELL DOES IT WORK?

This section describes the effectiveness of a variety of transit priority treatments, including queue jumps with advanced stop bars, lane striping treatments, and median transit stops.

Queue Jump with Advanced Stop Bar

Queue jumps are often paired with signal priority treatments, which give buses an early green light or extend a green light. Queue jumps enable transit vehicles to bypass long queues (or lines) at signalized intersections. An intersection with a queue jump provides an additional travel lane, which can be transit-only or shared, on the approach to a signal.



A queue jump with advanced stop bar allows buses to re-enter traffic and jump ahead of other traffic.

Source: City of Ottawa

Advanced stop bars can be used to assist transit in the following ways:

- To help buses to re-enter the traffic stream when a bus lane is ending
- To allow buses to jump to the front of a queue at a traffic signal after they have picked up passengers at a bus stop
- To assist buses in crossing lanes ahead of other traffic to reach a left-turn lane without obstructions

In situations where buses must share a right-turn lane with other vehicles, the queue jump may not function as well as possible. For example, a transit vehicle may be forced to wait to merge until the last minute and end up blocking the right-turn lane, or a transit vehicle may merge into regular traffic early and get stuck at the back of the queue, eliminating the advantage of signal priority that accompanies the queue jump. These examples are illustrated in the figure below.

Adding an advanced stop bar can create a pocket that allows buses to pull ahead of regular traffic. A stop bar may be implemented with transit signal priority to increase effectiveness by providing extra time for the bus to move ahead of stopped traffic.

Lessons Learned

An advanced stop bar was installed with a queue jump in Ottawa. Although the stop bar improved the function of the queue jump, there were several lessons that may be applicable for Seattle:

- Regular traffic did not always stop at the marked stop line, which prevented buses from jumping to the front of the queue and ahead of other traffic
- Initially, taxis and private coaches used the bus lane illegally, although violations decreased over time with enforcement
- Moving the stop bar further from the intersection in the general purpose lanes extends the length of the queue; therefore, adequate room is needed

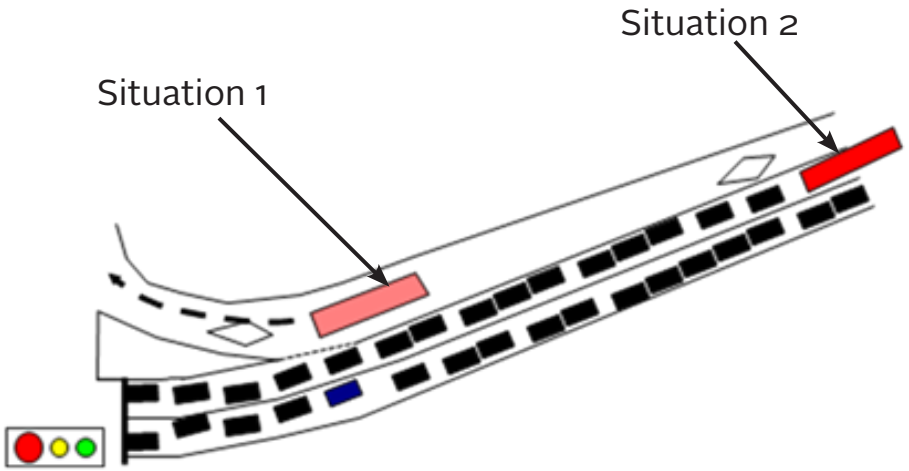
Striping Treatments

In areas where drivers do not comply with signed transit-only lanes, various striping treatments can be used to draw extra attention to the lanes. Colored bus lanes have been implemented in the U.S., Canada, and Europe, including New York City; London; Edinburgh; Ottawa; Denmark; Sydney; and Auckland.

The following highlights lessons learned from bus lane color treatment studies in Australia and New Zealand:

Brisbane, Australia - Red color applied at beginning of bus lane

In Brisbane, Australia red colored rectangular panels were installed at the beginning of bus lanes to increase visibility. This resulted in a 60% reduction in cars using the bus lane.



Source: DKS Associates

Red pavement color at the beginning of a bus lane resulted in a significant reduction in cars using the bus lane in Brisbane, Australia.

Source: City of Brisbane

Bus lane violations were reduced by applying green pavement color at the beginning of bus lanes in Auckland, New Zealand

Source: blog.greens.org.nz

Sydney, Australia reduced bus lane violations by applying a red color overlay to the lanes.

Source: Flickr user Scotticus

Sydney, Australia: Red color applied to full bus lane

Sydney, Australia applied a continuous red color overlay to bus lanes that were previously marked by pole-mounted "Bus Lane" signs and "Bus Lane" pavement markings. Surveys were conducted at three locations along the bus route after the red overlay was applied to the full lane. Results indicated that lane violations were reduced between 4% and 17%.

Auckland, New Zealand: Green pavement color applied at the beginning and end of bus lanes

Auckland, New Zealand applied green pavement color to the beginning and end of 10 miles of bus lanes. Pavement color was also applied at intermediate locations for some sections of roadway. It was reported that violations were reduced from 7% to 11% initially and were down to 2% one year after the color was applied.

Striping Treatments: Benefits and Challenges

Striping treatments have been shown to be effective at modifying driver behavior—these treatments increase compliance and lower levels of required enforcement. The effectiveness of striping is due, in part, to the additional visibility that is provided beyond regular street signage. There are also challenges with striping, primarily in terms of implementation. For example, it can be difficult to find the appropriate type of paint, and municipalities may find consistent implementation of striping treatments challenging. In addition, striping can increase maintenance costs, as the pavement color fades and requires regular reapplication.

Median Transit Lanes

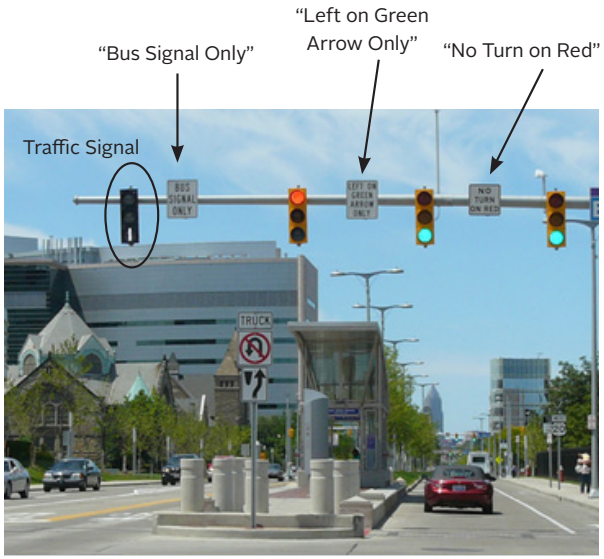
Median transit lanes allow buses to operate down the center of a roadway, avoiding the delay and potential vehicle turning conflicts associated with the curb lane. In North America, median transit lanes on arterial streets have been installed in Richmond, BC; Cleveland, OH; and Los Angeles, CA.

Richmond, British Columbia

In Richmond, median transit lanes were installed on the main commercial roadway to reduce curbside conflicts with right-turning vehicles and numerous driveways. The lanes were installed to ensure reliable service and to reduce travel times through the corridor. The median transit lanes extend 2.5 km and were created by purchasing right-of-way, eliminating a two-way left turn lane, and narrowing the general purpose lanes.

Cleveland, Ohio

Median transit lanes have been applied along the Euclid Corridor BRT route in downtown Cleveland. The median transit lanes were implemented to avoid delays associated with the curb lane, retain on-street parking, and provide more reliable transit service. The Euclid Corridor BRT (now called the "Healthline") also has low-floor buses with both right and left-side doors to allow for boarding and alighting from both sides of the bus.



A dedicated transit signal head and signage helps to direct traffic at an intersection that includes a median transit lane along Euclid Avenue in Cleveland.

Source: MetroJacksonville.com

Median transit lanes on Euclid Avenue in Cleveland include transit shelters on a median island.

Source: MetroJacksonville.com

Challenges

Challenges associated with median transit lanes include:

- Managing left turns
- Placement of traffic signals
- Increased pedestrian crossing distance and increased illegal pedestrian crossings
- Potential queuing of cross-street traffic over the busway
- Need for adequate right-of-way

Many of these challenges can be addressed with design improvements:

- Dedicated transit signal heads can help to minimize confusion over which traffic signals apply to left-turning vehicles versus transit vehicles
- Traffic control can protect or prohibit left turns
- Clear signage for pedestrians and cyclists can direct users to designated crosswalks
- Fences or barriers may discourage midblock pedestrian crossings