

Eastside Transportation Association

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A FREEWAY LANE CAN MOVE MORE PEOPLE THAN LIGHT RAIL

James W. MacIsaac Research Committee - July, 2015

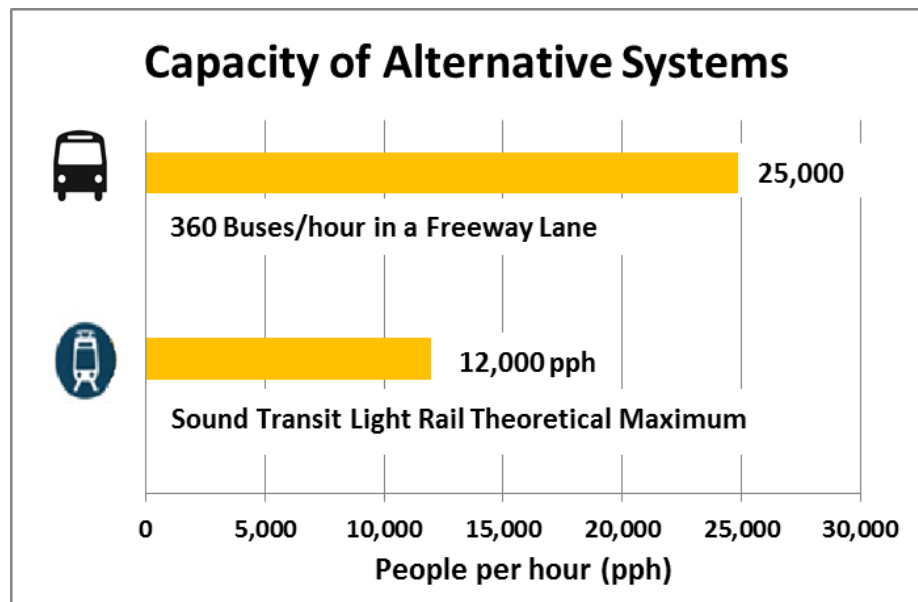
Sound Transit is aggressively promoting the myth that: “*Light rail can carry up to 12,000 persons per hour in each direction compared to 2,000 vehicles per hour in a freeway lane*”¹. The myth implies that light rail is six times more efficient than a freeway lane for carrying people.

THE THEORETICAL CAPACITY MYTH

The myth is based on an apples-to-oranges comparison between the theoretical capacity of a light rail train system to carry persons with the capacity of a general purpose freeway lane to carry vehicles. The 12,000 pph volume occurs at Central Link’s maximum load point in the downtown transit tunnel. But a combined bus/car or bus only freeway lane can carry far more passengers than light rail.

A. The person capacity of a freeway lane in bus only mode is easily in excess of 25,000 pph.

Buses operating on an exclusive lane have an easily demonstrated one-way capacity of 25,000 pph and a theoretical capacity well above 50,000 pph.”² An HOV freeway lane could be operated as a bus only lane. The adjacent chart shows the demonstrated capacity of a freeway lane operated as a bus only lane with 360 articulated buses per hour vs. ST’s theoretical light rail capacity.



¹ Sound Transit Board Chairman Dow Constantine testimony to the House Transportation Committee Work Session on January 28, 2015.

² NCHRP Report 414, HOV Systems Manual, 1998; p 5-44. Maximum capacity of Bus HOV lane is 700 to 800 vph. This is based on the buses per hour that utilize the contra flow bus lane approaching the Lincoln Tunnel.

B. Sound Transit's Light Rail Theoretical Capacity

Sound Transit uses 12,000 pph as an estimate of the theoretical maximum capacity of light rail on the highest use rail segment in Seattle which is the Downtown Seattle Transit Tunnel (DSTT). The tunnel stations have platform lengths that limit the trains to 4 cars. Light rail train operations limit the minimum time between trains to about 3 minutes. If each train car carries 150 passengers (6 passengers more than ST's planned maximum design load which includes ½ standees) the light rail theoretical capacity is a maximum of 12,000 people per hour per direction. Also of critical note, Link's southern and eastern legs are limited to a minimum of 6 minute headways due to at-grade arterial operations, so those legs have maximum capacities of only 6,000 pph each. While theoretically okay, no 4-car light rail system in the world carries 12,000 persons in an hour.

C. Buses can carry over 12,000 people/hour in an HOV lane with other vehicles.

Sound Transit's theoretical light rail capacity of 12,000 pph could be carried in 170 buses. An existing HOV lane can easily carry 170 buses with room to spare for vanpools, 3+ carpools and even some buy-in SOV's and 2+ carpools if operated with variable tolls to manage the bus-way speeds at 45 mph 90% of the time. These additional vehicles could easily carry 2000 more people, for a total of 14,000 pph. The buses could enter and exit the freeway at various direct access ramps or interchanges and distribute the passengers to multiple transit centers and bus stops providing wide coverage that light rail cannot. In addition bus routes can disperse to multiple destinations such as South Lake Union, Downtown Seattle or SODO rather than a single corridor in the Seattle CBD.

Highlights

- +** **The Myth: Light Rail is 6 times more efficient than a freeway lane.**
- +** **The Reality: Buses operating in an exclusive freeway lane can easily carry twice as many passengers as light rail.**
- +** **Light rail's "capacity" could be carried in 170 buses.**
- +** **A freeway lane can carry 14,000 people/hr. (with 170 buses + vans & carpools at 3+).**