Managed Lanes, Managed Arterials, and Enhanced Transit

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Introduction: the search for more cost-effective transit

- New rail is very costly, serves mostly radial, suburb-to-CBD routes.
- Predominant U.S. commuting pattern is suburb-to-suburb.
- Much larger rail network might serve suburb-to suburb trips, but very costly:
  - 250-mile light rail: $27B (2012 $)
  - 250-mile heavy rail: $85B (2012 $)

Advantages of Express Bus and Bus Rapid Transit (BRT)

- Faster to implement than rail
- Lower capital costs (and sometimes lower operating costs)
- Network connectivity/one-seat rides:
  - *Less so* if used as *trunk only*, from station to station.
  - *More so* if used for *direct service*, from origin to destination.

Three types of Enhanced Bus

- Express Bus: Local pickups, nonstop service on dedicated ROW, local drop-offs (like Miami's 95 Express)
- BRT Heavy: dedicated ROW, off-board ticketing, signal priority, etc. (like Curitiba)
- BRT Lite: in mixed traffic, signal priority, limited stops (like LA's Metro Rapid)

Expressway Managed Lanes and Enhanced Bus

- Variable pricing makes ML a “virtual exclusive busway.”
- Transit agency gets uncongested guideway at no capital cost, and no charge to use.
- Miami’s I-95 Express quadrupled express bus ridership in five years, using new I-95 Managed Lanes.

Network for Express Bus and BRT?

- Express Toll Lanes network on expressways a good start.
- Complete network requires major arterials, as well.
- But how could you do ETLs on arterials?

Bus-Only Lanes on arterials?

Three alternatives, none good:

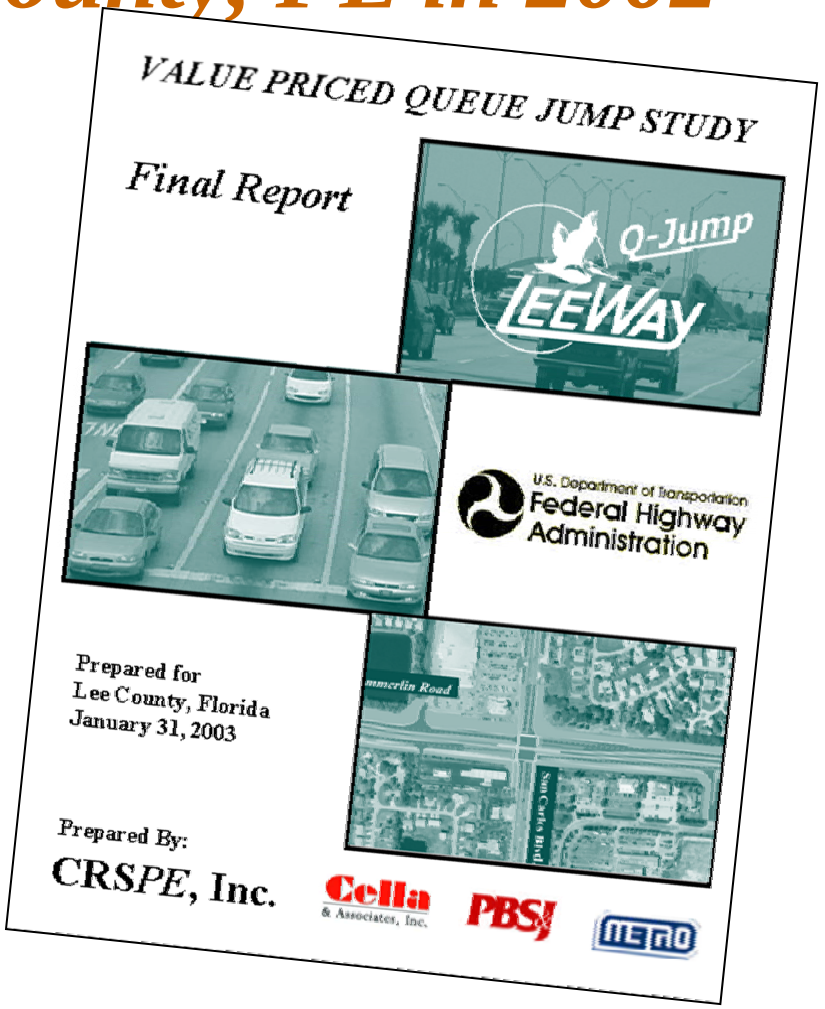
- Convert median to one-lane reversible—safety problems
- Convert one lane each direction—large negative impact on traffic, congestion
- Add one lane each direction—costly, and under-uses most of new capacity.

Managed Arterials

- Series of tolled (AET) grade separations at intersections of major arterials
- Either underpass or overpass
- Charge only for using the new capacity
- All current alternatives still available at signalized intersection, for those not using the grade separation.

Idea originated in Lee County, FL in 2002

- Value priced queue jump study
- Funded by FHWA Value Pricing Pilot Program, FDOT, and Lee County
- Implementation deferred due to recession.



Enhanced bus on arterials

	Restriping	Convert GP	Add Lanes	Managed Arterial
Right of way cost	None	None	High	Low
Construction cost	Low	Low	High	High
Reduced left turns	Yes	Yes	Yes	Yes
Impact on auto throughput	Minor, negative	Major, negative	Minor, positive	Major, positive
Under-utilized bus lane(s)	Yes	Yes	Yes	No
Impact on congestion	Minor, negative	Major, negative	Minor, positive	Major, positive
Safety impact	Some, negative	Minor, negative	Minor, positive	Minor, positive
Revenue generation	No	No	No	Yes, significant

Typical arterial underpass

Capacity advantage of M.A.

- Six-lane arterial: 51,800 vpd
- Eight-lane arterial: 67,000 vpd
- 6-lane Managed Arterial: 87,450 vpd
- Limiting factor for arterial throughput is traffic signals more than number of lanes.

Potential busway conversion

South Miami-Dade Busway:

- Built on former railroad ROW (100 ft.)
- Adjacent to very congested arterial (U.S. 1)
- Many cross-streets, signalized intersections
- Many accidents at those intersections
- Hence: speed restrictions, low performance

Potential busway conversion, cont.

Conversion studies:

- Preliminary feasibility study, 2008
  - Grade separations at (some) intersections
  - Widen, and allow toll-paying SOVs
  - Congestion relief to parallel U.S. 1
- PD&E study commissioned by Miami-Dade Expressway Authority
- Tier 1 report, December 2012

Tier 1 Busway findings

- Highest car, bus demand in northern 12 miles.
- 2 lanes each way, grade separations at all 22 intersections.
- 20-year toll revenues would cover construction cost.
- Bus service assumed same as today—not Express Bus or BRT.

Negative local political reactions

- Overpass drawings = “visual eyesores”
- Overpasses every half-mi. = “roller coaster”
- “Where is our promised light rail transit?”

Tier 2 work carried out, but not released.

Alternative Busway concept

- Underpasses, not overpasses
- Semi-depressed main line to prevent “roller coaster” effect
- Non-stop Express Bus to Metrorail station at north end.
- *30-year* toll revenue nearly covers construction and O&M costs.

Figure 2, Underpass Cross-Section

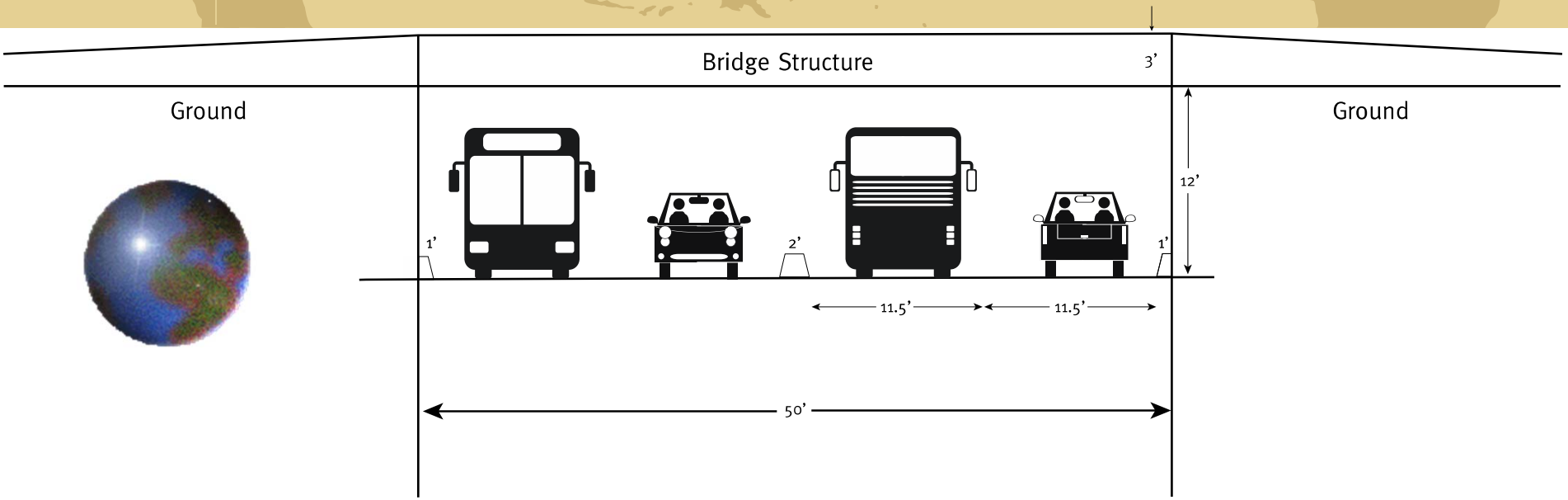


Figure 3, Underpass Side View

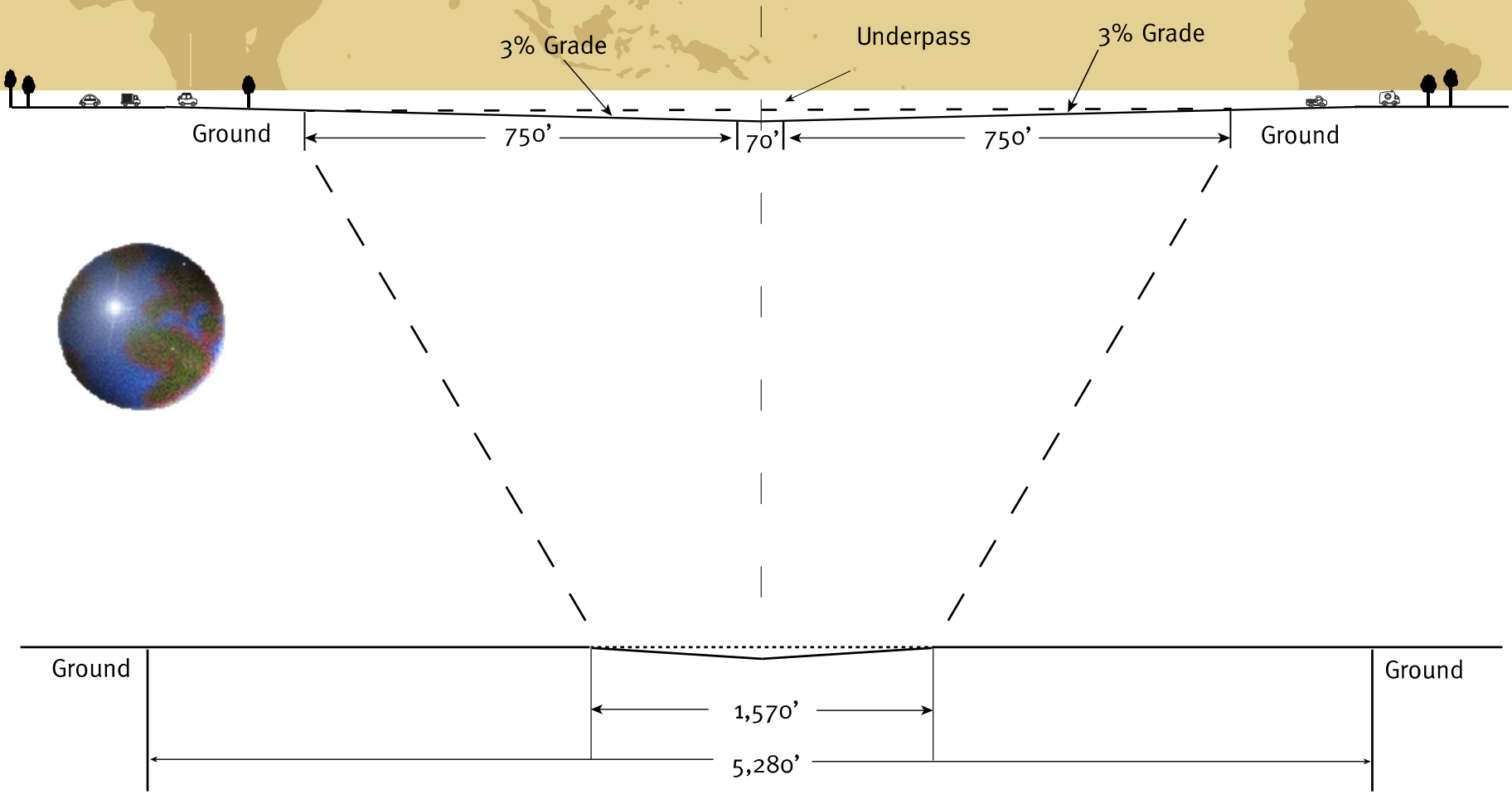
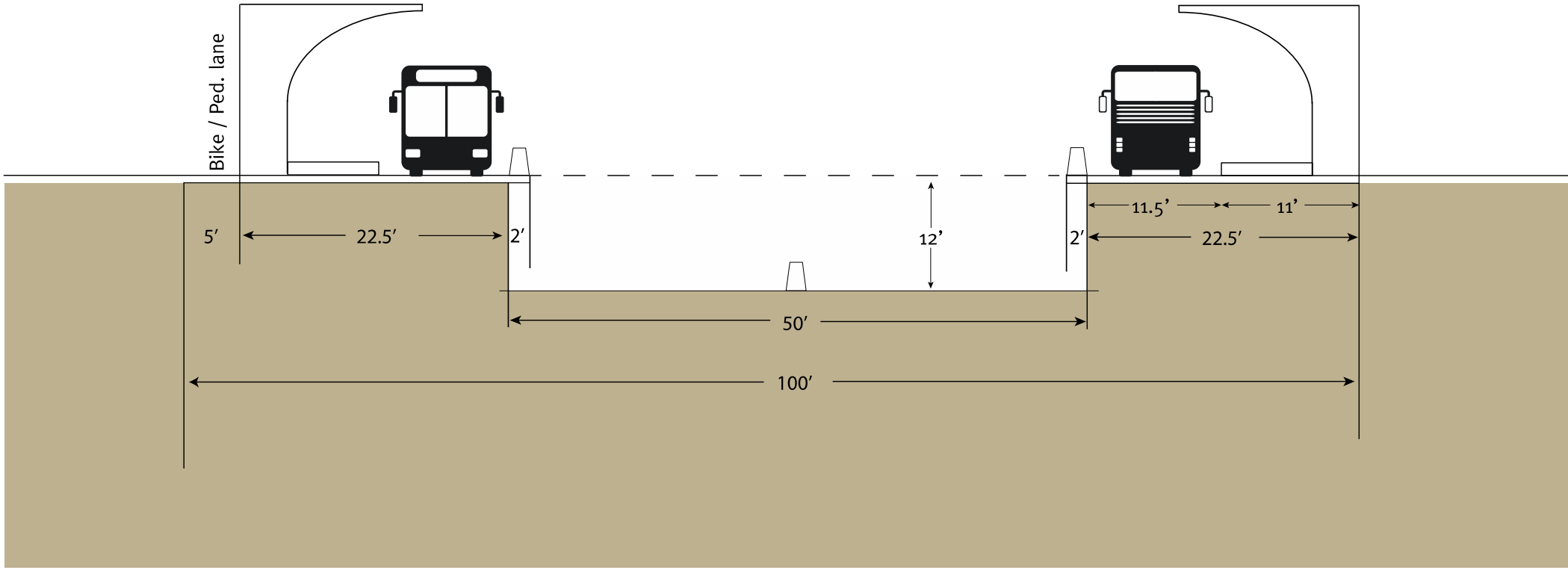


Figure 4, Cross-Section at Bus Station



Conclusions on Managed Arterials

- Comparable benefits to Managed Lanes on expressways: congestion relief plus Express Bus and BRT
- Avoids negative impacts of bus-only lanes on arterials.
- Applications:
  - Congested arterials where widening is difficult
  - Alternative to adding bus-only lanes to arterials
  - Conversion of low-performing busways

Questions?

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