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REVIEW OF PROJECT CONNECT

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Executive Summary

Project Connect—a planning consortium sponsored by the City of Austin, Capital Metro, the Capital Area Metropolitan Planning Organization, and Lone Star Rail—proposes to build a 9.5-mile, high-capacity transit line in Austin from East Riverside & Grove to Austin Community College's Highland campus. Transit vehicles would follow a dedicated guideway—either rails or an exclusive busway—with trains or buses stopping about every one-half mile. Although buses are being considered as an alternative, it is clear that Project Connect planners already favor rail; as a presentation by Project Connect concludes: “Urban Rail is the appropriate mode to meet system needs.”¹

There are several problems with this proposal. First, the proposed rail line is not truly high-capacity transit; though Project Connect has failed to admit it, buses can actually move more people than light rail. While light rail can move about 9,000 people per hour—most of them standing—double-decker buses on city streets can potentially move 18,000 people per hour—most of them comfortably seated.

Second, the line is projected to cost \$1.38 billion, but planners have failed to demonstrate the need for an expensive, dedicated guideway system of either bus or rail. In fact, the peak-hour demand projected for the line is well below the capacity of either buses or light rail. Austinites make more than six million person trips per day, of which the light-rail line would carry less than a third of a percent. Yet constructing the light-rail line would consume 5 percent of the region's

1. Project Connect, Presentation to Central Corridor Advisory Group, Meeting #12, May 2, 2014, slide 25.

transportation budget for the next 25 years, and operations and maintenance would increase the cost still further. By comparison, express lanes now under construction on the MoPac freeway cost one-seventh as much as the light rail yet are expected to significantly reduce congestion and move four times as many people per day.

Finally, project planners have greatly overestimated the benefits of the proposed line. Far from relieving congestion, light rail will make it worse as it will have priority at traffic signals, disrupting the flow of traffic for everyone else. Far from providing people with speedy travel, its speeds will average no more than 22 miles per hour and, more likely, less than 18 miles per hour. Far from providing clean transportation, light rail will require fossil fuels to generate the electricity it needs; power plants for Dallas' light-rail system use more energy and emit more carbon dioxide per passenger mile than the average sport-utility vehicle. Far from promoting economic development, light rail is liable to slow it down as the taxes required to support it will discourage businesses from moving to Austin.

For much less than the cost of a single fixed-guideway transit line serving a few travelers, Austin can both improve bus service and relieve traffic congestion for all travelers. Traffic signal coordination, staggered bus stops in high-demand areas, increased bus frequencies, double-decker buses on high-demand routes, and the construction of more HOT lanes will smooth traffic flows and provide better transportation for everyone in the Austin area.

Transit Capacity

Rail advocates frequently call light rail “high-capacity transit.” In fact, light rail is by definition low-capacity transit, as the term “light” refers not to weight but to capacity.² While heavy rail

2. Gregory L. Thompson, “Defining an Alternative Future: Birth of the Light Rail Movement in North America,” presentation given at the 9th National Light Rail Transit Conference, p. 29.

(subways and elevateds) operates in exclusive rights of way, most light-rail lines sometimes operate in or cross city streets. Trains can therefore be no longer than a city block, which in Austin means three-car trains. This greatly limits the capacity of light rail relative to heavy rail, which typically operates trains as long as eight to eleven cars.

Nor are light-rail capacities greater than buses. Although an individual light-rail car may hold more passengers than a single bus, for safety reasons most light-rail systems can move no more than about 20 trains per hour in each direction. By comparison, studies by Portland State University researchers have found that a single bus stop can serve more than 40 buses per hour.³ Portland has staggered bus stops in its most heavily used corridor so there are four stops every two blocks, meaning the corridor can move more than 160 buses per hour in each direction.

Project Connect ignores such bus capacities, basing its analysis on an assumed maximum of 20 buses per hour. This artificial maximum illustrates Project Connect's bias against buses.

Project Connect says a light-rail car can carry 170 passengers, while a bus can carry 85 passengers.⁴ Reflecting the planners' bias towards rail, the first number is probably high; the second is low. Light-rail cars typically have about 65 to 70 seats. While manufacturers may claim a standing room capacity of 100 people or more, Americans are not willing to crowd in this tightly. About 70 to 80 standing passengers is a more realistic maximum, for a total capacity of about 150 people.

Standard 40-foot buses have about 40 seats and standing room for about 20 people. The buses being considered by Project Connect are likely articulated buses (buses pulling a trailer). These buses have about 60 seats and room for 25 or so people standing. But this technology has been rendered obsolete by new double-decker buses now being used by transit agencies in Las Vegas

3. Robert L. Bertini, "Bus Facility Capacity," Portland State University, May 2, 2006, p. 15.

4. Project Connect, Presentation of May 12, 2014, slide 18.

and other American cities. These buses, whose heights can be as low as 13.5 feet, have about 80 seats, room for at least 30 people standing, and occupy a much smaller footprint than articulated buses (42 feet vs. 60 feet), making them more nimble and less of a contributor to congestion. They are also more energy-efficient per seat mile.

Operating as single cars every three minutes, light rail can move about 3,000 people per hour. Increasing train length to three cars pushes this to 9,000 people per hour. By comparison, single-decker 40-foot buses on staggered bus stops can move more than 10,000 people per hour, while double-decker buses can move more than 18,000 people per hour.

Unlike the trains, the buses can continue beyond the end of the corridor, fanning out to serve many neighborhoods and allowing more people to ride without transferring between bus or car and rail. Moreover, with 80 seats per bus, a much higher share of passengers will get to ride in comfortable seats rather than standing precariously as railcars lurch through starts and stops.

Project Connect says that one of the advantages of rail is that it is “scalable for special events.”⁵ The truth is that buses are far more scalable because the cost per passenger is about the same for any level of passengers between 40 and 18,000 per hour. In addition, buses have a wide choice of routes, while railcars can only go where rails go.

Rail is not scalable at all, as the first increment requires a huge capital investment. After that, increasing train lengths requires buying more cars (currently costing well over \$4 million each compared with under \$400,000 each for standard buses and \$650,000 for double-decker buses), lengthening train platforms, and expanding storage tracks for those cars. Buses are not only less expensive than railcars, they are inexpensive to park and require no special loading platforms.

5. Project Connect, Presentation to Central Corridor Advisory Group, Meeting #11, April 11, 2014, slide 27.

SuperBowl spectators discovered the lack of rail scalability this year when more than half of all SuperBowl patrons had to take transit to the game. Those who chose rail faced three-hour wait times in both directions.⁶ Those who took buses had no wait problems.⁷

Project Connect estimates that the buses in its analysis would cost \$900,000 to \$1.0 million.⁸ This cost is valid for articulated buses, but double-decker buses are less expensive. For example, earlier this year MegaBus purchased double-decker intercity buses, with such amenities as leather seats, power ports at each seat, and WiFi, for \$700,000 each.⁹ Even though buses have a shorter lifespan than rail vehicles, their cost per seat-mile or seat-year is far less. At \$700,000 with seating and standing capacity of 105 people and a 12-year lifespan, buses cost about \$550 per person per year. At \$4.4 million with a capacity of 150 people and a 25-year lifespan, railcars cost twice as much at \$1,100 per person per year even before counting the higher cost of rail infrastructure.

As the Cascade Policy Institute pointed out with regards to a light-rail line in Portland that cost about the same as the proposed Austin line, for the cost of light rail, a transit agency could buy enough luxury double-decker buses, complete with free WiFi, leather seats, and headrest televisions, to double existing bus service in the corridor and to operate those buses 24 hours a day, free of charge to transit riders (who would also get free coffee and doughnuts), for 150 years. When compared with light rail, this would save enough money to buy every high school freshman in Portland a new iPad and MacBook Air every year, also for 150 years.¹⁰

6. Andre Malok, "Angry Super Bowl Train Passengers Curse NJ over Delays, Crowding," NJ.com, February 2, 2014, tinyurl.com/m2elw5s.

⁷7. Joseph R. Vena, "Super Bowl 2014 Transit: Bus Riders Avoid Mob Scene That Train Riders Faced," NJ.com, February 2, 2014, tinyurl.com/l5f3p9n.

8. Project Connect, Presentation of May 12, 2014, slide 26.

9. "New Coaches for MegaBus.com," *busandcoach.com*, January 27, 2014, tinyurl.com/oh32xtn.

10. "The \$1.5 Billion Milwaukie Light Rail Alternative," *Cascade Insider*, September 14, 2011, tinyurl.com/nu6cubz.

Ridership

Project Connect estimates that the proposed transit guideway will attract about 15,000 to 20,000 passengers per day, with peak weekday ridership reaching 2,500 people per hour.¹¹ This is much smaller than the capacity of either bus or rail transit, which leads to the question of why Project Connect planners even think Austin should spend more than \$1 billion on a dedicated guideway.

According to the Capital Area Metropolitan Planning Organization's 2035 transportation plan, Austinites take more than 6 million person-trips each weekday.¹² The 2035 plan also says that the region's transportation budget over 25 years is \$28.4 billion, or slightly more than \$1 billion per year to build, operate, and maintain highways, transit, and bike/pedestrian paths.¹³ Project Connect proposes to spend more than an entire year's worth of the region's transportation funding on less than a third of a percent of the region's travelers.

Buses using streets shared with other vehicles can provide service that is only slightly inferior to buses or rail on dedicated guideways. Light rail tends to be faster than buses mainly because it stops less frequently than conventional bus service: typically about one stop per mile vs. seven or eight stops per mile for ordinary bus service. The great advantage of sharing streets with other vehicles is that the cost of those streets can be spread to many more vehicles, so the effective cost to transit services is very low.

The main disadvantage of operating buses in streets shared with other vehicles is that the streets may become congested at times. Dedicated guideways allow transit riders to escape this congestion. But given the high cost of dedicated guideways and the small number of riders, it

11. Project Connect, Presentation of May 12, 2014, slide 22.

12. *CAMPO 2035 Regional Transportation Plan Appendices* (Austin: CAMPO, 2010), p. 60.

13. *CAMPO 2035 Regional Transportation Plan Appendices*, p. 13.

makes more sense to spend funds on things that reduce congestion for everyone, rather than the relative handful of people who ride transit.

For example, high-occupancy/toll (HOT) lanes such as the MoPac Express Lanes that are now under construction offer a congestion-free alternative to regular lanes and cost far less per mile than a rail line. Project Connect planners estimate the 9.5-mile rail route will cost \$1.38 billion, or \$145 million per route mile (with two rail miles per route mile), all to carry no more than 20,000 trips per day.¹⁴ By comparison, the MoPac Express Lanes are expected to cost \$200 million for eleven miles, or less than \$20 million per route mile (with two lane miles per route mile). These lanes are expected to carry more than 50,000 vehicle trips per day in 2015, growing to nearly 75,000 per day in 2035.¹⁵ Since vehicle occupancies average more than 1.6 people per car, this represents more than 80,000 person trips per day in 2015, more than four times as many as urban rail for one-seventh of the cost.¹⁶

Unlike light rail, HOT lanes not only give travelers a speedy, congestion-free alternative, they significantly reduce congestion on the nearby untolled lanes. Before the 183A toll road opened, rush-hour travelers required 36 minutes to go the 11.5 miles on US 183 from the San Gabriel River to RM 620. After 183A opened, travelers paying to use the toll road made this same trip in just 13 minutes, but travelers going on the untolled US 183 required just 19 minutes, a savings of nearly 50 percent from before the toll road was opened.¹⁷

14. Project Connect, Presentation of May 12, 2014, slide 56.

15. *MoPac Improvement Project Environmental Assessment* (Austin: Texas Department of Transportation, 2012), p. 198, says the MoPac highway will carry 201,700 vehicles per day in 2015 between RM 2244 and US 183. Since the express lanes project adds two new lanes to the current six, the 50,000 number for 2015 presumes 25 percent of the traffic will use the express lanes.

16. Adella Santos, Nancy McGuckin, Hikari Nakamoto, Danielle Gray, and Susan Liss, *Summary of Travel Trends: 2009 National Household Transportation Survey* (Washington: Federal Highway Administration, 2011), Table 16.

17. "Study Shows 183A Toll Road Benefits All Drivers," Central Texas Regional Mobility Authority, October 5, 2007, tinyurl.com/okl3szg.

When combined with the recently completed Manor Expressway and the older 183A toll road, these three projects of the Central Texas Regional Mobility Authority relieve congestion on more than three times as many miles of corridors as the Project Connect's light-rail line, yet cost less than that line. Moreover, the cost of HOT lanes is shared among many users, greatly reducing the cost attributable to transit riders. Since the cost of these lanes is at least partly covered by toll revenues, it would make more sense for Capital Metro to invest in a network of HOT lanes throughout the region so that it can provide congestion-free bus service to everyone rather than just the small number of people riding limited rail systems such as MetroRail and the proposed urban rail.

Though Project Connect's estimate of 15,000 to 20,000 riders per day is well below bus or rail capacities, this estimate may be high. To validate it, Project Connect compares ridership per mile with other light-rail lines, including lines in Virginia Beach, Charlotte, Phoenix, Seattle, Minneapolis, and Houston.¹⁸ When compared with these systems, Project Connect's projection of about 1,900 people per mile seems reasonable.

Project Connect, however, neglected to consider many light-rail systems that get far lower ridership, including systems in Baltimore (900 trips per mile), Cleveland (600), Dallas (1,000), Pittsburgh (1,000), Sacramento (1,200), Salt Lake City (1,600), San Jose (800), and St. Louis (1,100).¹⁹ Given that (as detailed below) the Austin light-rail line will likely operate at slower speeds than the average line in America, it will probably also attract fewer riders per mile than average.

Project Connect also claims that many light-rail systems ended up carrying more riders than projected. However, this is deceptive because transit agencies frequently lower their projections

18. Project Connect, Presentation of May 12, 2014, slide 20.

19. Calculated from the *2012 National Transit Database* (Washington: Federal Transit Administration, 2013), Service and Fixed Guideway spreadsheets.

after persuading politicians and the public to build rail lines. When new lines open, they may carry more than the lowered projections but less than the original projections that were used to persuade people to build the line.

For example, the original projection for Denver's most recent (West) light-rail line was that it would carry 29,100 weekday riders. By the time it opened, this projection had been reduced to 19,300 weekday riders. This allowed the agency to claim it was a success by the later projection when actually it was a failure by the original projection.

Benefits

Austin may be the fastest-growing urban area in the nation, having grown by nearly 65 percent between 2000 and 2012. In such a dynamic urban area, travel patterns change frequently. It is worth noting, for example, that Austin has considered several light-rail proposals in recent years, and each proposal has been for a different route, reflecting these rapidly changing travel patterns. Whatever route is picked could easily become obsolete soon after, or even before, construction is complete.

Advocates of Project Connect often refer to Austin's growing traffic congestion. Yet light rail is far more likely to increase congestion than to reduce it. To make transit more attractive, the Federal Transit Administration strongly encourages cities to give light rail "signal priority" over other traffic, and nearly all, if not all, light-rail lines built in the last fifteen years enjoy such a priority. Yet this disrupts traffic signal coordination for other travelers, increasing the delays they face. For example, when Minneapolis opened its Hiawatha light-rail line, it so disrupted traffic signals that auto travelers in the corridor saw an extra 20 to 40 minutes added to their trips.²⁰

20. Laurie Blake, "Light Rail Will Always Slow the Flow," *Minneapolis Star-Tribune*, December 12, 2004.

The Austin light-rail is also certain to contribute to congestion near downtown Austin as it will be between Interstate 35 and downtown. Traffic attempting to go between I-35 and downtown will have to cross the light-rail tracks and will be delayed by frequent light-rail cars or trains on those tracks.

Two light-rail lines now being planned in Maryland are both predicted to increase congestion. The traffic analysis for Baltimore's Red Line projects that it would reduce average travel speeds from 31.4 mph to 31.2 mph.²¹ The analysis for the Purple Line, in the Washington, DC area, projects that it will reduce average travel speeds from 25.5 mph if line isn't built to 24.4 mph if it is—a small decrease, but considering the large number of travelers in the region, it effectively adds 13 million hours of annual delay to regional travelers.²² Similarly, a plan for a streetcar in Anaheim, California estimates that the streetcar will take up to 287 cars per hour off the road—but that it would also reduce the capacity of the road by 1,100 cars per hour.²³

Project Connect claims the dedicated guideway will have an average speed of a little more than 20 miles per hour.²⁴ This, however, is optimistic. Most American light-rail lines have an average speed of a little more than 20 miles per hour, but most American light-rail lines average just one stop per mile. Lines that average one stop per half mile, as proposed by Project Connect, have average speeds of less than 18 mph. For example, the Minneapolis Central Corridor project, which is expected to open in June, 2014, has 23 stops in 11 miles. This line is projected to have an average speed of less than 17 mph, and test trains have not even reached that speed.²⁵

21. Maryland Department of Transportation, *Red Line Final Environmental Impact Statement* (Baltimore: Maryland Department of Transportation, 2012), p. 5-125.

22. Maryland Department of Transportation, (Baltimore: Maryland Department of Transportation, 2008), pp. 4-1-4-2.

23. Orange County Transportation Authority, *Anaheim Rapid Connection Fixed Guideway Alternatives Analysis Report* (Draft)(October 3, 2012), pp. 3-26.

24. Project Connect, Presentation of May 12, 2014, slide 16.

25. Laura Yuen, "11 Miles in 67 Minutes?" *MPR News*, May 14, 2014, tinyurl.com/l285rfk.

Project Connect's mode comparison claims that rail has a positive effect on vehicle emissions while buses have a negative effect. While light rail may be powered by electricity, most electricity in Texas comes from burning fossil fuels. Power plants for the Dallas light-rail system use more energy and emit more carbon dioxide per passenger mile than the average sport-utility vehicle.²⁶

Finally, Project Connect claims that rail transit will promote economic development. This is unrealistic; a transit line that carries fewer than 20,000 trips per day is not going to influence economic development in an urban area where people travel more than 6 million trips per day.

Even the busiest high-capacity rail transit lines, such as the San Francisco BART system or the Washington Metro system, do not contribute to urban growth. At best, they shuffle development around from one part of an urban area to another, which means some property owners win while others lose: usually, the downtown area benefits at the expense of everyone else.²⁷ At worst, the added tax burden required to support rail transit actually slows economic growth; of the nation's 64 largest urban areas, those that spent more on transit capital improvements in the 1990s grew measurably slower in the 2000s than those that spent less.²⁸ Austin, for example, is the nation's fastest-growing urban area, yet it is difficult to attribute any of this growth to the region's transit system, which carried just 2.9 percent of the region's commuters to work in 2012, down from 3.4 percent in 2000.²⁹

26. Calculations based on *2012 National Transit Database* (Washington: Federal Transit Administration, 2013), Service and Energy spreadsheets reveal that Dallas light rail used 5,000 BTUs and emitted 337 grams of carbon dioxide per passenger mile. The *Transportation Energy Data Book* (Oak Ridge, TN: Department of Energy, 2013), table 2-13, says the average for SUVs with 1.6 occupants was 4,350 BTUs and 290 grams of carbon dioxide

27. Robert Cervero and Samuel Seskin, *An Evaluation of the Relationship between Transit and Urban Form*, (Washington: Transportation Research Board, 1995), p. 3.

28. Randal O'Toole, "Transit and Urban Growth," *The Antiplanner*, November 6, 2013, ti.org/antiplanner/?p=8412.

29. *2000 Census* (Washington: Census Bureau, 2002), table P030, "Means of Transportation to Work," for Austin urbanized area; *2012 American Community Survey* (Washington: Census Bureau, 2013), table C08301, "Means of Transportation to Work," for Austin urbanized area.

Nor will low-capacity transit lines help revitalize existing neighborhoods. At most, they provide cities an excuse to subsidize such revitalization. Portland opened its first light-rail line in 1986; ten years later, a Portland city planner testified to the city commission that “we have not seen any of the kind of development—of a mid-rise, higher-density, mixed-use, mixed-income type—that we would’ve liked to have seen” along the light-rail line.³⁰ In response, the city began using tax-increment financing and other subsidies to stimulate such development—but those subsidies would have been sufficient to stimulate redevelopment without the rail line as well.

When Portland opened its streetcar line in 2001, it was ready to hand out hundreds of millions of dollars of subsidies to developments along much of that line—development that city officials later attributed solely to the streetcar. But one part of the line received no subsidies, and almost no new development took place in that area.³¹

Conclusions

Austin does not need a fixed-guideway transit system. The high costs of such systems can be justified only when demand goes beyond what can be provided with ordinary bus service, and Austin’s demand is nowhere near these levels now or in the future.

For much less than the cost of a single fixed-guideway transit line, Austin can both improve bus service and relieve traffic congestion for all travelers. Traffic signal coordination, staggered bus stops in high-demand areas, increased bus frequencies, double-decker buses on high-demand routes, and the construction of HOT lanes will smooth traffic flows and provide alternatives throughout the Austin area.

30. Quotes from the October 23, 1996, city council meeting are taken from a videotape of that meeting made by the city of Portland, a synopsis of which is available at tinyurl.com/2nhgnj.

31. Randal O’Toole, “The Great Streetcar Conspiracy,” Cato Institute Policy Analysis no. 699, June 14, 2012, pp. 5–7.