Review of Proposed Coosa River Express

Prepared by Norman Marshall, President Smart Mobility, Inc.

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Summary

The proposed Coosa River Express (CRE) which includes a new toll bridge across the Coosa River is unlikely to attract anywhere near the traffic volume forecasted by Tim James Inc. Using two different methodologies, I estimate that the toll bridge will produce 280 to 600 vehicle trips per day with a $2 auto toll not 4,700 vehicles per day that was forecasted by the applicants.

Such a low bridge traffic volume would produce far less revenue than what is needed to return investors' money.

No evidence has been presented to support the benefits claimed: "better, safer roads; less congestion; more predictable trip times; and a reduced need for taxes to pay for roads."

Traffic Volume Will Not Achieve Forecast

As shown in Figure 1, the proposed route covers 33 miles between I-65 and U.S. 280. The route primarily uses relatively narrow county roads and is not direct. It would connect Sylacauga (2010 population: 12,749) with Calera (2010 population: 11,620). The project applicants state that there would be a 12-minute time savings between these cities.

Tim James Inc. has presented a 2020 traffic forecast for the bridge of 4,700 vehicles per day with 10% trucks (Sheet 6). This is grossly optimistic. I understand that these numbers come from an older Regional Planning Commission model. I have estimated traffic volumes using two different methods (using U.S. Census data and the most recent Regional Planning Commission model). In both cases, my estimates are much lower.

Method 1: Based on Census Data

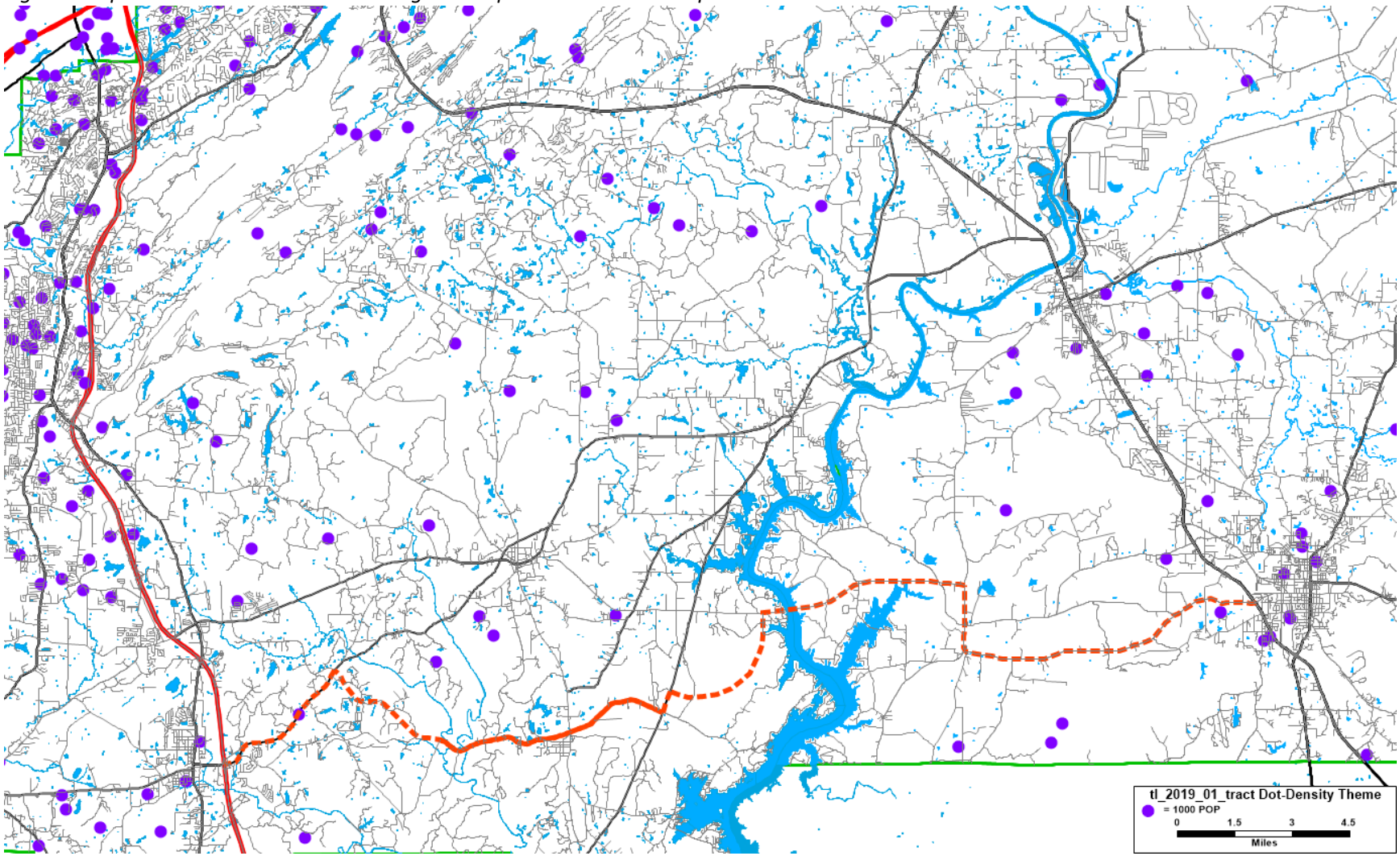
Future traffic on the proposed toll bridge can be considered as the total of five factors:

1) Diversion of County-to-County traffic – Some traffic currently traveling between Shelby and Talladega Counties that uses the U.S. 280 bridge would be diverted to the new bridge. There is good data from the American Community Survey (ACS) on County-to-County work trips.[1] As illustrated in Figure 2, there are few commuters between Shelby and Talladega County in either direction. Only 0.9% of Shelby County workers who work outside the home, commute to Talladega County (893), and only 4.6% of Talladega County workers commute to Shelby County (1,375). The total number of people commuting to work in both directions is 2,268. The ACS count includes part-time workers who do not commute every day and carpoolers. Therefore, the total has been reduced by 80% for an estimate of 1,814 daily vehicle commute trips between the two counties.

   Work trip patterns provide a general guide to overall travel patterns with work trips generally representing about a third of total vehicle trips.[2] Therefore, estimated total County-to-County vehicle trips are 5,443 per day.

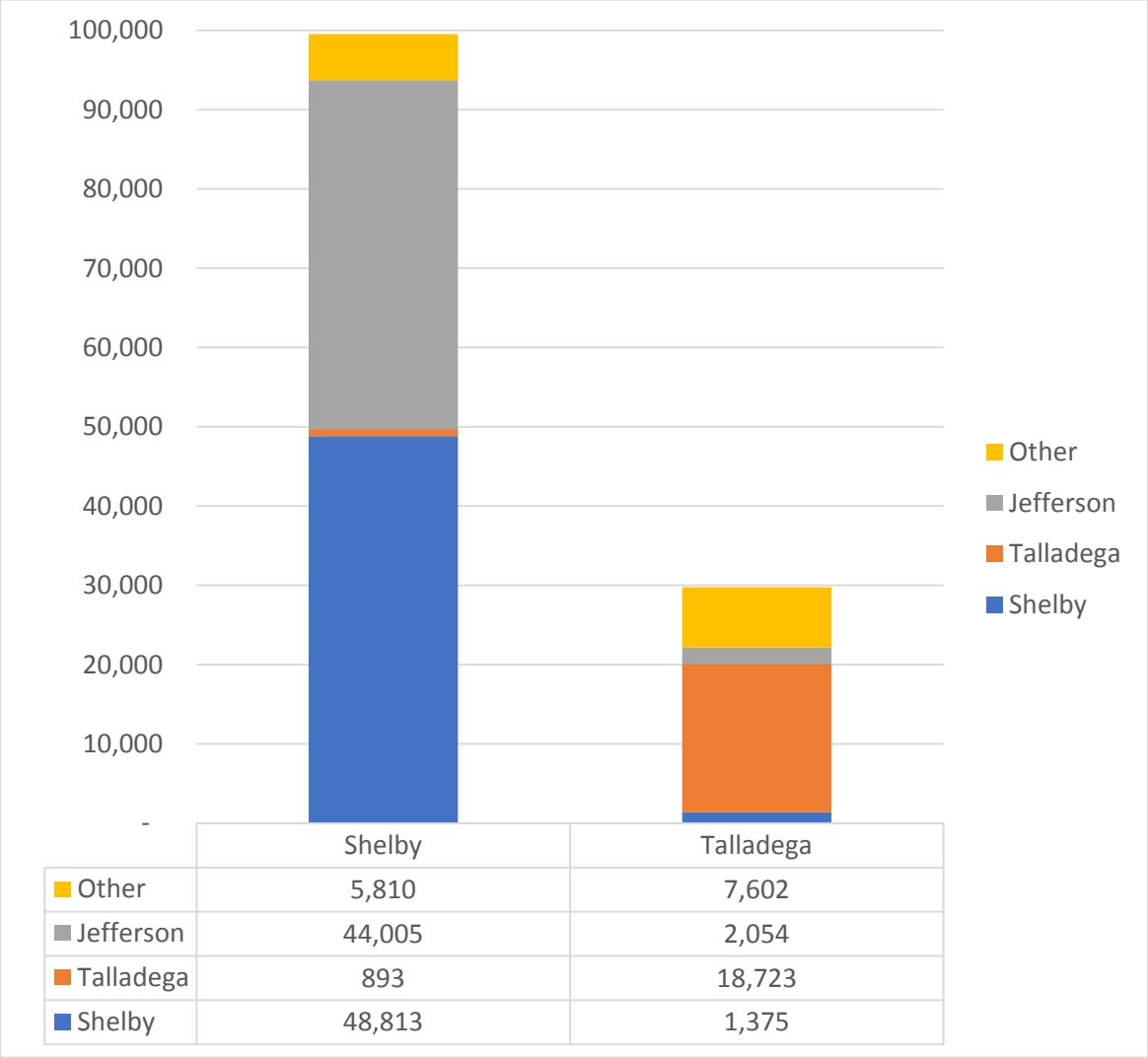
[1] U.S. Census Bureau American Community Survey. 2011-2015 5-Year Commuting Flows.
[2] U.S. Department of Transportation Federal Highway Administration. National Household Travel Survey 2017.

Figure 1 Population in the Area Surrounding the Proposed Coosa River Express



Notes: Purple dots each represent 1000 population (2017 American Community Survey)
Orange dashed line shows proposed route from I-65 to U.S. 280 with proposed toll bridge

Figure 2: Commuting Patterns of Shelby County and Talladega County Residents (American Community Survey 2011-2015 County-to-County Commuting Flows

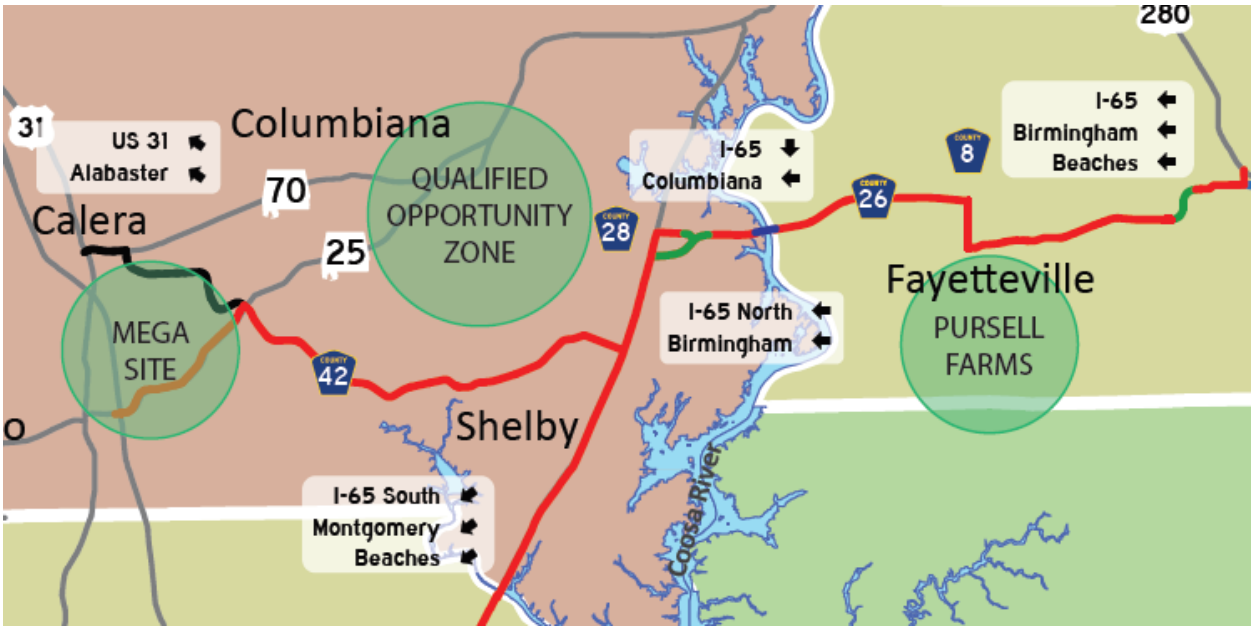


	Shelby	Talladega
Other	5,810	7,602
Jefferson	44,005	2,054
Talladega	893	18,723
Shelby	48,813	1,375

As a preliminary estimate, it is assumed that 1/3 of these vehicle trips would divert to the new bridge if it were free, i.e. 1,814 vehicle trips per day. This is a judgement based on the population distribution shown in Figure 1.

2) Diversion of longer trips originating in Talladega County, especially those traveling on I-65 - The proposal appears to lean heavily on the potential for longer travel trips. As reproduced as Figure 3, Tim James Inc. shows the CRE serving travelers from Sylacauga to Birmingham and Montgomery.

Figure 3: Reproduced from Tim James Inc. Full Map



The CRE would be a very indirect route for travelers from Sylacauga to Birmingham. This can be tested easily by using Google Maps routing. At the time this is being written (Thursday, February 27, 2020 at 11 a.m.), here are travel times from the Sylacauga City Hall to the Birmingham City Hall:

- Shortest route using US 280: 1 hour 2 minutes
- Alternative route through Calera and I-65: 1 hour 24 minutes, i.e. 22 minutes longer and too much to be made up by the 12-minute CRE time savings

The CRE offers a better option for travel from Sylacauga City Hall to the Montgomery City Hall

- Shortest route using U.S. 231: 1 hours 16 minutes
- Alternative route through Shelby: 1 hour 33 minutes, i.e. 17 minutes longer.

If the CRE provided a 12-minute time savings, this would be 5 minutes faster than the U.S. 231 route. However, as discussed below, a 5-minute time savings is unlikely to be enough for many to be willing to pay a $2 toll.

The CRE would be convenient for Sylacauga residents traveling to some Shelby County areas including Columbiana and Alabaster – but these trips are already counted in #1 above.

The potential for diverting longer distance trips from Talladega County to the CRE is quite limited. It will be accounted for by adding 10% of the total in base county-to-county trips

estimated in #1, i.e. an additional 181 vehicle trips per day. This increment and the other increments discussed below are based on my 30 years of experience in estimating travel demand.

3) Induced traffic – These are trips that are not crossing the river today but would do so if crossing were more direct. Given the relative low population density on both sides of the river, this would be limited to a few additional trips for work and to visit family and friends. Another 10% of the base county-to-county trips (181) will be added to account for this.

4) Induced land use – If the new bridge causes a different land use pattern – for example, new houses being built in Talladega County for commuters into Shelby County – this would add bridge traffic. However, there is no reason to think this will be a significant factor here given the ample vacant land on both sides of the river. However, yet another 10% of base-county-to-county trips (181) will be added to account for this.

5) Growth – Many toll road projects rely on population growth and traffic growth to pay off bonds, but growth will not bail out this project. While the area around Calera has been growing rapidly, Talladega County is not. The Alabama Center for Business and Economic Research at the University of Alabama forecasts a 5.6% decrease in Talladega population between 2010 and 2040. Given that Talladega County is expected to generate the greater share of the trips, no trips have been added for growth

Adding together factors 1-4, the estimate for daily vehicle trips is 2,358 for a free bridge.

Method 2: RPCGB Travel Demand Model

The Regional Planning Commission of Greater Birmingham (RPCGB) maintains a regional travel demand model for use in regional transportation planning. The Tim James Inc. estimate apparently is based on a previous version of the RPCGB model that has been maintained and modified by a consultant. I requested and received the most recent version of the RPCGB model which was used in the development of the 2045 Regional Transportation Plan adopted in 2019.

The model estimates auto and transit travel between almost 2,000 Traffic Analysis Zones (TAZs). 315 of these zones are in Shelby County, and the model includes all the important roads in Shelby County. Therefore, the model can estimate different travel times to and from each of the 315 TAZs in Shelby County using either the U.S. 280 route or the CRE route.

However, the model area does not include Talladega County. The model deals with traffic to and from areas outside the model boundary with a set of external road links. One of these external links is U.S. 280. In the model, this external link is a short stub that represents all travel on U.S. 280 including travel to and from Talladega County but also to and from all points beyond.

In order to estimate CRE traffic with the model, the single external model link was replaced with two external links: the original U.S. 280 and a second link representing the CRE route. These links are assumed to meet up at the eastern terminus of the CRE route, i.e. at the intersection of U.S. 280 with Old Fayetteville Road. This is illustrated in Figure 4 with the external links shown on top of a map provided by Tim James Inc. Google Maps was used to help estimate travel times along the two routes. The travel time for the U.S. 280 route from the intersection with Alabama 76 to the eastern terminus is

15 minutes. The estimated travel time for the CRE route beginning from the intersection of Shelby County 28 with Shelby County 42 to the eastern terminus is 22 minutes.

Figure 4: External US 280 and CRE Links for Modeling CRE With RPC Model

Some of the U.S. 280 bridge traffic has origins and destinations north and northeast of the CRE terminus and that traffic is less likely to use the CRE. On the other hand, there also is some U.S. 280 bridge traffic that has origins and destinations to the west of U.S. 280 that would be well served by the proposed bridge. It is assumed that these two factors cancel out.

The model base year is 2015. The model-estimated daily traffic volume assuming no tolls on the CRE is 2,641, which is very close to the estimate of 2,353 documented above.

Tolling Will Greatly Reduce Bridge Usage

Again, two methods were used to evaluate how traffic volumes would be lower with the toll.

Method 1: Using FHWA Guidance

Forecasting toll road usage is challenging because traveler choices depend both on rationale economic choices but also more subjective opinions about tolling in general. On the economic rationale side, the U.S. Federal Highway Administration (FHWA) provides guidance on values of time for use in evaluating road projects.[3] For local personal travel, they recommend taking 50% of hourly median household income. For Talladega County, median household income is $39,219. Dividing this by 2080 hours per

[3] https://www.transportation.gov/sites/dot.gov/files/docs/USDOT%20VOT%20Guidance%202014.pdf

year results in $18.86 per hour and taking 50% of that yields a value of time of $9.43 per hour. The numbers are considerably higher in Shelby County - $74,063 median household income which translates into a value of time of $17.80 per hour.

In this analysis, a value of time of $10 per hour is used because more of the travelers are expected to reside in Talladega County, and it is unlikely that many higher-income Shelby County residents will be traveling regularly to Talladega County. With a value of time of $10 per hour, a travel time savings of 12 minutes is worth $2, which matches the preliminary toll estimate given by Tim James Inc. (12 minutes = 1/5 of an hour and 1/5 of $10 is $2.)

However $2 matches the median household, i.e. 50% of residents have higher values of time and 50% have lower values of time. Therefore, economics would suggest that 50% would be willing to pay the toll for the 12-minute time savings and the other 50% would travel the extra time instead of paying.

Furthermore, the 12-minute time savings is a best case for those traveling relatively direct CRE routes such as between Sylacauga and Calera. Many of the 2,358 daily vehicle trips estimated above for a free bridge would have significantly lower time savings. The "rule of half" can be used as a starting place with the average time savings equal to half of the best case, i.e. 6 minutes which is 1/10 of an hour. To justify a $2 toll for a 6-minute time savings requires residents to value their time at $20 an hour ($2 divided by 1/10 hour = $20), which is much higher than the average $9.43 per hour value of time for Talladega residents documented above. Because of the reasons stated above, it is likely that a $2 toll on the bridge would suppress usage over the free bridge case by at least 75%, resulting in a final estimate of 600 vehicles per day.

600 vehicles per day would generate much less toll revenue than is needed to justify the investment. Assuming 330 weekday equivalents per year (less travel on weekends and holidays), a $2 auto toll and a $6 truck toll (paid by 10% of the vehicles), annual gross revenues would be less than $500,000 per year. Much of the gross revenue would be spent on the costs of toll collection. The net revenue would be much less than what is needed to pay back a $30-40 million investment.

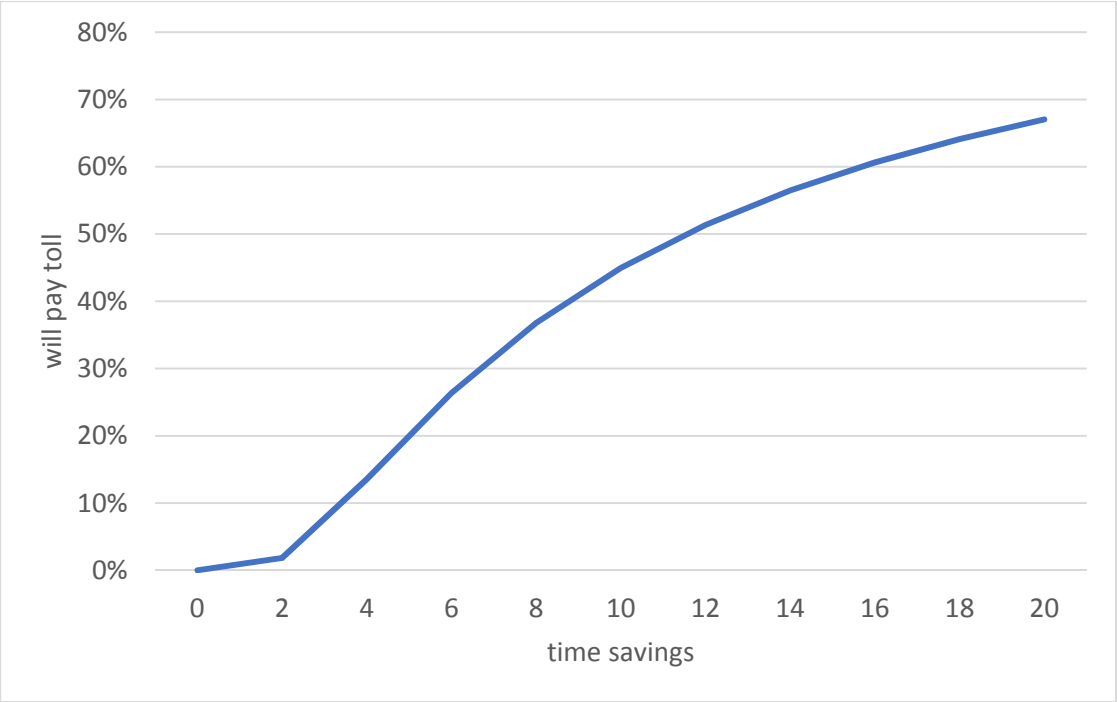
There is uncertainty around this 600-vehicle per day estimate, as there is every estimate, but it is certain that this is a high risk – low return project from the point of view of potential investors. Given a history of multiple toll road bankruptcies in the U.S.[4] including the 2013 American Roads LLC case that included four toll bridges in Alabama, any such project will face intense scrutiny of its financial forecasts. It is difficult to see how this project could get financing. It appears that outside financing is planned, because Tim James Inc. lists Raymond James as the team leader for "the financing process".

Method 2: RPCGB Travel Demand Model

The RPCGB model includes a toll diversion model based on value of time of $12 per hour for autos and $21 per hour for trucks. The percentage of drivers who would choose the toll route increases along with greater time savings as illustrated in Figure 5.

[4] Bolanos, L. Negotiations & Bankruptcies in U.S. Surface Transportation P3s. Presented at IRF Public Private Partnership Workshop, April 2018.

Figure 5: Toll Diversion Curve in RPCGB Model



As shown in Figure 5, the RPCGB model estimates that only about 50% of drivers would use a $2 toll route with a 12-minute time savings, and no more than 70% would use a $2 toll route regardless of how great the time savings.

The toll bridge traffic estimate from the RPCGB model with a $2 toll is 280 vehicles per day. This is only about half the estimate documented above. The model is not forecasting large time savings for very many of the potential users.

In both the free and toll cases, there is uncertainty about travel times on the "improved" CRE route. In the toll case, there is considerable uncertainty about willingness to pay. Despite these uncertainties, the 4,700 vehicle-per-day estimate by Tim James Inc. is much too high for the toll case.

No Evidence Presented for Other Purported Transportation Benefits

The Tim James Inc. claims that the benefits of the proposed project include: "better, safer roads; less congestion; more predictable trip times; and a reduced need for taxes to pay for roads." No evidence is presented for any of these claims:

- Better, safer roads – What "improvements" are proposed? Do these improvements address known safety deficiencies? If the travel speeds are increased (which would encourage higher traffic volumes), what evidence is there that higher speeds and traffic volumes would also enhance safety?
- Less congestion – Where is the congestion that would be alleviated? How much would the congestion be reduced?

- More predictable travel times – Where are the travel times unpredictable today? How would the CRE reduce this unpredictability?
- Reduced need to pay for roads – The CRE isn't replacing any existing roads and adds some additional roadway that must be maintained by the County. If the existing roads are widened, long-term maintenance expenses will be higher. Where are the monetary savings and what is the value of them?

Summary of Findings

The proposed Coosa River Express (CRE) is estimated to attract only 280 to 600 vehicle trips per day with a $2 auto toll. Such a low bridge traffic volume would produce far less revenue than what is needed to return investors' money.

No evidence has been presented to support the benefits claimed: "better, safer roads; less congestion; more predictable trip times; and a reduced need for taxes to pay for roads."

Resume

NORMAN L. MARSHALL, PRESIDENT

nmarshall@smartmobility.com

EDUCATION:

Master of Science in Engineering Sciences, Dartmouth College, Hanover, NH, 1982
Bachelor of Science in Mathematics, Worcester Polytechnic Institute, Worcester, MA, 1977

PROFESSIONAL EXPERIENCE: (30 Years, 15 at Smart Mobility, Inc.)

Norm Marshall helped found Smart Mobility, Inc. in 2001. Prior to this, he was at Resource Systems Group, Inc. for 14 years where he developed a national practice in travel demand modeling. He specializes in analyzing the relationships between the built environment and travel behavior, and doing planning that coordinates multi-modal transportation with land use and community needs.

Regional Land Use/Transportation Scenario Planning

Vermont Agency of Transportation-Enhanced statewide travel demand model to evaluate travel impacts of closures and delays resulting from severe storm events. Model uses innovate Monte Carlo simulations process to account for combinations of failures.

Portland Area Comprehensive Transportation System (PACTS) – the Portland Maine Metropolitan Planning Organization. Updating regional travel demand model with new data (including AirSage), adding a truck model, and multiclass assignment including differentiation between cash toll and transponder payments.

California Air Resources Board – Led team including the University of California in $250k project that reviewed the ability of the new generation of regional activity-based models and land use models to accurately account for greenhouse gas emissions from alternative scenarios including more compact walkable land use and roadway pricing. This work included hands-on testing of the most complex travel demand models in use in the U.S. today.

Climate Plan (California statewide) – Assisted large coalition of groups in reviewing and participating in the target setting process required by Senate Bill 375 and administered by the California Air Resources Board to reduce future greenhouse gas emissions through land use measures and other regional initiatives.

Chittenden County (2060 Land use and Transportation Vision Burlington Vermont region) – led extensive public visioning project as part of MPO's long-range transportation plan update.

Flagstaff Metropolitan Planning Organization – Implemented walk, transit and bike models within regional travel demand model. The bike model includes skimming bike networks including on-road and off-road bicycle facilities with a bike level of service established for each segment.

Municipal Planning

City of Grand Rapids – Michigan Street Corridor – developed peak period subarea model including non-motorized trips based on urban form. Model is being used to develop traffic volumes for several alternatives that are being additional analyzed using the City's Synchro model.

City of Omaha - Modified regional travel demand model to properly account for non-motorized trips, transit trips and shorter auto trips that would result from more compact mixed-use development. Scenarios with different roadway, transit, and land use alternatives were modeled.

City of Dublin (Columbus region) – Modified regional travel demand model to properly account for non-motorized trips and shorter auto trips that would result from more compact mixed-use development. The model was applied in analyses for a new downtown to be constructed in the Bridge Street corridor on both sides of an historic village center.

City of Portland, Maine – Implemented model improvements that better account for non-motorized trips and interactions between land use and transportation, and applied the enhanced model to two subarea studies.

City of Honolulu – Kaka'ako Transit Oriented Development (TOD) – applied regional travel demand model in estimating impacts of proposed TOD including estimating internal trip capture.

City of Grand Rapids – Michigan Street Corridor – developed peak period subarea model including non-motorized trips based on urban form. Model is being used to develop traffic volumes for several alternatives that are being additional analyzed using the City's Synchro model.

City of Dublin (Columbus region) – Modified regional travel demand model to properly account for non-motorized trips and shorter auto trips that would result from more compact mixed-use development. The model was applied in analyses for a new downtown to be constructed in the Bridge Street corridor on both sides of an historic village center.

City of Burlington (Vermont) Transportation Plan – Led team that developing Transportation Plan focused on supporting increased population and employment without increases in traffic by focusing investments and policies on transit, walking, biking and Transportation Demand Management.

Transit Planning

Regional Transportation Authority (Chicago) and Chicago Metropolis 2020 – evaluated alternative 2020 and 2030 system-wide transit scenarios including deterioration and enhance/expand under alternative land use and energy pricing assumptions in support of initiatives for increased public funding.

Capital Metropolitan Transportation Authority (Austin, TX) Transit Vision – analyzed the regional effects of implementing the transit vision in concert with an aggressive transit-oriented development plan developed by Calthorpe Associates. Transit vision includes commuter rail and BRT.

Bus Rapid Transit for Northern Virginia HOT Lanes (Breakthrough Technologies, Inc and Environmental Defense.) – analyzed alternative Bus Rapid Transit (BRT) strategies for proposed privately-developing High Occupancy Toll lanes on I-95 and I-495 (Capital Beltway) including

different service alternatives (point-to-point services, trunk lines intersecting connecting routes at in-line stations, and hybrid).

Roadway Corridor Planning

I-30 Little Rock Arkansas – Developed enhanced version of regional travel demand model that integrates TransCAD with open source Dynamic Traffic Assignment (DTA) software, and used to model I-30 alternatives. This model models freeway bottlenecks much more accurately than the base TransCAD model.

South Evacuation Lifeline (SELL) – In work for the South Carolina Coastal Conservation League, used Dynamic Travel Assignment (DTA) to estimate evaluation times with different transportation alternatives in coastal South Caroline including a new proposed freeway.

Hudson River Crossing Study (Capital District Transportation Committee and NYSDOT) – Analyzing long term capacity needs for Hudson River bridges which a special focus on the I-90 Patroon Island Bridge where a microsimulation VISSIM model was developed and applied.

PUBLICATIONS AND PRESENTATIONS (partial list)

Forecasting the Impossible: The Status Quo of Estimating Traffic Flows with Static Traffic Assignment and the Future of Dynamic Traffic Assignment. *Research in Transportation Business and Management* (forthcoming).

Assessing Freeway Expansion Projects with Regional Dynamic Traffic Assignment. Presented at the August 2018 Transportation Research Board Tools of the Trade Conference on Transportation Planning for Small and Medium Sized Communities.

Vermont Statewide Resilience Modeling. With Joseph Segale, James Sullivan and Roy Schiff. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

Assessing Freeway Expansion Projects with Regional Dynamic Traffic Assignment. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

Pre-Destination Choice Walk Mode Choice Modeling. Presented at the May 2017 Transportation Research Board Planning Applications Conference.

A Statistical Model of Regional Traffic Congestion in the United States, presented at the 2016 Annual Meeting of the Transportation Research Board.

MEMBERSHIPS/AFFILIATIONS

Associate Member, Transportation Research Board (TRB)

Member and Co-Leader Project for Transportation Modeling Reform, Congress for the New Urbanism (CNU)