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September 11, 2008

## **The Debate's Big Lie: "The HOT lanes were studied."**

### **Executive Summary**

The term "studied" in the National Environmental Protection Act process means that the City will, "Rigorously explore and objectively evaluate all reasonable alternatives," and "Devote substantial treatment to each alternative considered in detail including the proposed action so that reviewers may evaluate their comparative merits" and "Include reasonable alternatives not within the jurisdiction of the [City]."<sup>1</sup> By no stretch of the imagination did the City undertake such a process.

The Bus/Rapid Transit (BRT) on High-Occupancy Toll (HOT) lanes proposal, or Managed Lanes Alternative (MLA), was not objectively studied. Rather, the MLA was setup as a classic "straw man," rigged to make the MLA look ineffective in comparison to rail transit.

First, the projected costs of \$2.6 billion were excessive. The city's projected cost for the MLA was twice as expensive as the H-3 freeway per lane mile, almost as much per mile as the rail transit line, and seven times as much as the Tampa Expressway, a similar but larger facility. And the City made it 50 percent longer than necessary. Further, the normal due diligence expected for a project of this magnitude was totally absent.

Had the MLA been of the length we suggested, priced to be the same as H-3 per lane mile and even though it would be twice as much as the Tampa Expressway, the projected cost would have been \$900 million. Of this amount half could have been paid for with toll revenue bonds and the other half with less than three years of the ½ percent GE tax revenues, assuming that Senator Inouye would be unable to come up with any federal funds.

Second, the city projected removing the zipper lane, which meant that the two additional lanes provided by the MLA would result in only one additional lane. Had the zipper lane been retained this alone would have radically changed the conclusions of the Alternatives Analysis (AA) in favor of the MLA. And the city did not study the effects of the MLA having three lanes as does the Tampa Expressway.

Third, the City did not study multiple access ramps but so engineered them in a way that could only result in heavy traffic congestion, which they said was a major determinant for rejecting it.

As Dr. Panos Prevedouros commented at the time, "the most egregious violation of FTA's rules on alternative specification and analysis was the deliberate under-engineering of the Managed Lanes Alternative to a degree that brings ridicule to prevailing planning and engineering principles."

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<sup>1</sup> [Council on Environmental Quality \(CEQ\) Sec. 1502. Sec. 1502.14](#)

### **The MLA as “Straw Man”**

We believe that the City and Parsons Brinckerhoff (PB) rigged the specifications and analysis such that the MLA became a classic “straw man,” an alternative designed to make the Fixed Guideway Alternative — in reality the rail transit alternative — look good in comparison to the MLA.

Professor John Kain, co-author of the classic *The Urban Transportation Problem*, who wrote extensively about such tactics, said in his *The Use of Straw Men in the Economic Evaluation of Rail Transport Projects* in the American Economic Review,

Nearly all, if not all, assessments of rail transit systems have used costly and poorly designed all-bus alternatives to make the proposed rail systems appear better than they are.<sup>2</sup>

Five specific ways in which the “straw man” alternative was rigged are listed below.

1. PB and the City proposed that automobiles with two or more occupants should be allowed toll free on the MLA. This made the current contraflow zipper lane untenable and thus provided the rationale for removing it. The net result was that the additional two lane advantage that the MLA offered to the Corridor was reduced to one lane. They failed to publish their assessment of the option of having all autos pay a toll, which would have resulted in the zipper lane and the two-lane advantage being retained. And they failed to analyze MLA options with higher occupancy thresholds, such as three through five occupants.<sup>3</sup>
2. PB and the City added unnecessary costs to the project by proposing a 16-mile facility while not testing the viability of shorter 10 to 12-mile versions.
3. PB and the City inflated MLA operating costs to make the project appear uncompetitive with the Fixed Guideway Alternative. Just two examples are, a) the projection of a totally unnecessary 5,400 parking stalls for the MLA and, b) saddling the MLA with inflated bus operating costs, which is dealt with later in more detail.
4. PB and the City engineered the ingress and egress ramps in a way that could only result in heavy traffic congestion at these points.
5. PB and the City grossly inflated the capital costs of the MLA with the result that, if correct, it would be twice the cost per lane mile of any highway ever built in the U.S.

In his letter to the City and copied to FTA, Dr. Panos Prevedouros, Professor of Traffic Engineering at the University of Hawaii, Chair of the Transportation Research Board’s Highway Micro-simulations Committee and a member of the Task Force, commented, “the most egregious violation of FTA’s rules on alternative specification and analysis was the deliberate under-engineering of the Managed Lanes Alternative to a degree that brings ridicule to prevailing planning and engineering principles.”<sup>4</sup>

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<sup>2</sup> Kain, John F. *The Use of Straw Men in the Economic Evaluation of Rail Transport Projects*. American Economic Review, Vol. 82, No. 2, Papers and Proceedings of the Hundred and Fourth Annual Meeting of the American Economic Association (May, 1992), pp. 487-493.  
<http://www.honolulutraffic.com/kainrail.pdf>

<sup>3</sup> It is not credible that no assessment was made of these options. These options would retain the zipper lane, would foster high occupancy carpools and would collect more revenue.

<sup>4</sup> [www.honolulutraffic.com/NEPAScopingReport.pdf](http://www.honolulutraffic.com/NEPAScopingReport.pdf) p. A-180

## History of the MLA

The City agrees that the original proposal for a reversible dynamically-tolled highway was proposed by HONOLULUTRAFFIC.COM and led to its inclusion in the First Scoping authorized in the first NOI of December 2005.

The concept that we laid out for the City was what Reason Foundation's Robert Poole, calls a *Virtual Exclusive Busway* where buses and vanpools have priority and go free of toll charges and all others pay a dynamically-priced toll. It has all the virtues of an exclusive busway, while also having a significant impact on automobile traffic congestion in the Corridor.

The City's Chief Transportation Planner said that he used the map of our proposed route from our website and that, "This is what HONOLULUTRAFFIC.COM requested us to study and this is exactly what we studied."<sup>5</sup> One is reminded of what unions do bring a company to its knees, "work to rule," which is to do exactly what the written orders and policies tell you to do and nothing more.

However, our original proposal was a conceptual one; at the time we did not have the technical expertise to do anything else and we certainly did not have the temerity to submit a final design to a firm of PB's engineering talents. Far from being a design, a cursory look at our original map shows a freehand line drawn none too steadily along the route with a black marker pen. It never crossed our minds that PB would not apply its expertise to provide the best possible alternative.

HONOLULUTRAFFIC.COM had forecast a cost of \$900 million for a 10-mile two-lane version. This estimate of cost came from a conference that Governor Lingle asked us to conduct in December 2002 to evaluate whether the reversible tolled transitway concept was worth pursuing.

In addition to me as Chair of the Conference, those in attendance at the conference were:

Mike Schneider, Executive Vice President of PB Consult,  
 Mel Miyamoto, Vice President, Heavy Construction, Dillingham Corporation,  
 Roger Morton, General Manager of OTS Inc, operators of the City's bus system,  
 Bruce Turner, Assistant Division Administrator, Hawaii Division FHWA,  
 Robert Poole, Director of Transportation Studies, Reason Foundation,  
 Glenn Yasui, Highways Division, Hawaii Dept. of Transportation (Hawaii DOT).

By phone:

Patrick DeCorla-Souza, AICP, Team Leader, Highway Pricing and System Analysis, Office of Transportation Policy Studies FHWA,  
 C. Kenneth Orski., Urban Mobility Corporation, consultant and publishers of *Innovation Briefs*.

In short, some of the nation's leading experts on this issue were represented either in person or by phone at the conference. The concept and cost estimates met with the general approval of the attendees and accordingly we recommended to the Governor that the project be further developed to a higher level of detail. This was not done.

## The City's projection of MLA capital costs

The City's MLA was about four miles longer than the 10 to 12-mile length that we had proposed and in the City's Alternatives Analysis (AA) they estimated that the MLA would cost \$2.6 billion.

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<sup>5</sup> League of Women Voters Forum video, <http://www.brightcove.tv/title.jsp?title=1301088850&channel=293897125> 5:00 minute mark of 10 minute video.

The absurdity of the costs of the four-lane H-3 freeway, adjusted for inflation, being the same as the two-lane MLA should be evident to anyone who has ever seen the H-3.

The City's projected costs were calculated without any attempt to justify this high cost by comparing it to similar facilities in Hawaii or on the Mainland.

### **HONOLULUTRAFFIC.COM's projection of capital costs**

As discussed earlier, our cost projection was for \$900 million for a 10-mile two-lane elevated highway, or \$90 million per mile in 2002. This cost when inflated using the *Price Trends for Federal-aid Highway Construction Index*,<sup>6</sup> results in \$134.7 million per mile in 2006 dollars.

However, this estimate was made before we were aware of the astonishing cost savings offered by the new construction method devised by Figg Bridge Company and used to construct the Tampa Expressway.

Stone and Prevedouros<sup>7</sup> tell us that "The actual contract price for the 17.5 lane miles of bridge structure was just over \$100 million. At approximately \$120 million, the deck cost for the segmental bridge portion of the project was approximately \$65 per square foot, far below the average cost for structures in Florida during the past 20 years. The average cost per lane mile for the reversible bridge is approximately \$7 million and is among the lowest for bridges constructed in the U.S."

The Figg Bridge Company tells us they "have experienced savings of approximately 40 percent to 50 percent when using precast segmental span-by-span construction in urban settings when compared to segmental balanced cantilever construction."<sup>8</sup>

Using 45 percent as the average of these savings reduces our \$134.7 million per mile projection to \$74.1 million per mile in 2006 dollars, or \$37.0 million per lane-mile.

### **Tampa Expressway**

The 14-mile Expressway cost \$320 million in 2006 (net of an impending award of \$100 million for a sub-contractor's error). Using the same *Price Trends for Federal-Aid Highway Construction Index* that the City uses, and allowing the mid-point of costs to be 2004, we calculate that the cost to build it in 2006 would have been \$458.7 million.

The cost comparison index used to inflate Florida construction costs to Hawaii's level is plus 32 percent, that being the rate given in the current Civil Works Construction Cost Index.<sup>9</sup> Applying this factor to the inflation adjusted cost, results in \$605.4 million as the cost of constructing the facility in Honolulu. Dividing this by its 14-mile length results in \$43.2 million per mile.

While Tampa has three lanes, the Expressway Authority tells us that the third lane only added 20 percent more to their costs than if they had only built two lanes. We have, therefore, divided the Tampa cost per mile by 2.4 instead of three to allow for this and it results in cost of \$18.0 million per lane-mile as a comparable cost for building such a facility in Honolulu.

### **Hawaii's H-3 Freeway**

The 16.1-mile H-3 freeway is a divided highway with two lanes in each direction and construction required boring two miles of tunnels through the solid rock of the Koolau

<sup>6</sup> <http://www.fhwa.dot.gov/programadmin/pt2006q4.cfm>

<sup>7</sup> Panos D. Prevedouros, PhD and Martin Stone, PhD, AICP. This article is shown in full in Appendix C. It has been selected to appear in the 2008 McGraw-Hill Almanac of Engineering and Technology.

<sup>8</sup> Personal Communication, CEO, Figg Bridge Company.

<sup>9</sup> <http://www.usace.army.mil/publications/eng-manuals/em1110-2-1304/entire.pdf> p. A-34.

Mountains. The total cost was \$1.3 billion at completion in 1997 making it the most expensive highway per mile ever built in the U.S.

Lacking a distribution of costs by year, we have allowed the mid-point of construction cost as occurring in 1991. Inflating the \$1.3 billion to 2006 dollars using the *Price Trends for Federal-Aid Highway Construction Index*<sup>10</sup>, results in \$2.7 billion in today's dollars.

This amount divided by the 16.1 mile length equals \$166.2 million per mile and dividing that by the four lanes results in \$41.6 million per lane-mile.

### Costs summary

We show below an adjusted cost per lane-mile comparison with two highway facilities, one from Tampa, Florida and the other, the H-3 freeway in Honolulu together with both the City and our MLA cost projections.

The table below summarizes our calculations of all four facility costs per lane-mile after being

Adjusted cost per lane-mile in 2006 dollars <sup>11</sup>	
Facility	\$millions
Tampa Expressway actual, adjusted	\$18.0
H-3 Freeway actual, adjusted	\$41.6
Our MLA estimate, adjusted	\$37.0
City's MLA estimate	\$80.5

adjusted for construction inflation costs and location cost differentials. This enables us to directly compare one with the other. The full calculation is given in detail in Appendix A.

Note the following:

Our MLA estimate is within ten percent of the adjusted H-3 freeway cost. In consideration of the extensive trans-Koolau tunneling required for H-3 one would anticipate that our MLA estimate should be somewhat less.

Even allowing for inflation and location cost differences, the adjusted Tampa Expressway cost is still less than half of either the H-3 or our MLA estimate.

However, the most important comparison is that the City MLA estimate is twice that of the H-3 freeway and over four times that of the Tampa Expressway — after all adjustments. We do not believe that this will stand scrutiny by any ethical members of the engineering community.

The cost calculations, while compelling, need more work at a level of detail requiring resources that are not available to us. Our concern is that the City, PB, or the FTA, did not make any serious effort to investigate it at any level of detail, as the following shows.

### The City's due diligence on the capital cost projections

In November 2006, the City Council convened a Transit Advisory Task Force consisting of seven individuals, one of whom, Kazu Hayashida, a former Director of Hawaii DOT, was appointed Chairman.

In turn the Chairman appointed two members to be a Technical Review Subcommittee (TRS) to review construction costs. One had been a long time senior employee of the state DOT and the other was the recently retired Director of Honolulu's City Department of Transportation Services and a former HDOT Director. Neither one had the expertise to judge construction costs in detail, especially a project of this magnitude. It would be the largest construction project in the state's history.

After the Subcommittee's first report to the Task Force, we asked the subcommittee members which companies they had contacted since there needed to be a reconciliation of the Tampa

<sup>10</sup> <http://www.fhwa.dot.gov/programadmin/pt2006q4.cfm>

<sup>11</sup> See Appendix A for details of cost adjustments for construction inflation and location differences.

Expressway cost (less the design error) of \$320 million and the PB estimate of \$2.6 billion for the MLA. They told us they had only talked to the local office of PB, which had produced the projections, and had been assured that the cost estimates were reasonable.

This was hardly appropriate due diligence for a multi-billion dollar project. Accordingly, we pushed for a consultation with the Tampa Expressway Authority and with PCL Construction, Inc., the latter having built both the Tampa Expressway and the Hawaii Convention Center, and maintained offices in both Tampa and Honolulu and would be familiar with the costs and construction difficulties in both cities.

We also suggested they contact the Figg Bridge Company since they had designed both the Tampa Expressway and its new low-cost construction methodology. One of the subcommittee members made a single, short phone call to the Tampa Expressway Authority; no one contacted PCL or Figg Bridge. The Subcommittee Report is attached as part of the Task Force Final Report.<sup>12</sup>

When one considers that PB maintains its national bridge practice in Tampa and actually designed a part of the Tampa Reversible Express Lanes project one would think that they should have been involved in the MLA evaluation. Our understanding is they were not.

### **MLA operating costs were inflated**

The AA forecasts that operating costs for the MLA would be greater than the Fixed Guideway Alternative. These high operating costs occur “as a result of additional buses that would be put in service under [the MLA]” the AA tells us.

The AA projects that the MLA will need a fleet of 906 buses versus the No-Build Alternative requiring 614 buses, a nearly 50 percent increase, yet projects only 5 percent greater ridership than the No-Build.<sup>13</sup> This small increase is projected despite the MLA offering bus users the advantage of a congestion free bus ride from the Leeward end of the Corridor to Downtown.

The 906 buses projected are far too many buses for the projected MLA ridership. One would expect that more riders per bus would be achieved by the MLA option since buses using the MLA would be operating at far higher speeds than the No-Build Alternative and thus able to make more trips per bus; the round trip being made by returning on the relatively uncongested regular freeway.

### **Insufficient ridership projected for the MLA**

The MLA should project significantly more riders than the No-Build Alternative since it will offer potential bus riders a significant time savings versus travel on the regular freeway. Currently, buses take 36 minutes to travel 12 miles at 20 mph on the regular freeway. Buses on the MLA will take 12 minutes and this significant time savings may well entice some motorists to switch to buses. The same benefits (and freedom from toll charges) will also apply to vanpools. Travel time savings can increase bus and van ridership and decrease both the amount of traffic and the share of low occupancy vehicles.

### **The Task Force Report ignored**

“... the Alternatives Analysis should have presented variations on the Managed Lane Alternative that could make this alternative more attractive. Appendix 3 contains suggestions for fleshing out possible variants of the Managed Lane Alternative.” Task Force Final Report. p. 4/7

<sup>12</sup> [www.honolulutraffic.com/TaskForceReport.pdf](http://www.honolulutraffic.com/TaskForceReport.pdf)

<sup>13</sup> The bus fleet data is taken from the AA, Table 2-1, and the daily trips data from the AA, Table 3-7. The percentages shown are calculated from these data.

The Task Force Final Report makes it clear that there was inadequate study of the MLA. The Report's Appendix 3, "Suggestions for further development of the Managed Lane Alternative," written by the former Chief Counsel of the USDOT's Volpe Center, David Glater, acting as the Transportation Analyst for the Task Force, concurs in finding an under-engineering of the MLA by producing this list of suggested modifications.<sup>14</sup>

Following are just two examples from the Report's Appendix 3, first, its concern with the elimination of the current contraflow zipper lane, and, secondly, the City's contention that traffic would build up at the entry and exit points of the MLA, which would negate the free flow benefits of the MLA.

The City and PB ignored these and all other the recommendations of the Task Force regarding the MLA.

### **Zipper lane should be studied further**

Appendix 3 contains the following statement,

The description of the Managed Lane Alternative in Chapter 2 of the Alternatives Analysis states "The H-1 zipper lane would be maintained in the Two-direction Option but discontinued in the Reversible Option." (p. 2-4). However, no explanation is provided as to why the zipper lane would not be continued in the Reversible Option. The Managed Lane Reversible Option's addition of two Koko Head-bound elevated lanes for the morning commute appears to result in a net increase of only one lane if the inbound zipper lane were removed.

Why was the zipper lane taken out? When it remains in, it alone negates the conclusions of the AA that the MLA was inferior to rail. Congestion relief together with energy consumption, both of which are required to be analyzed by statute,<sup>15</sup> would be significantly improved with the MLA.

For example, the single major freeway into downtown Honolulu from the far end of the study Corridor is H-1. It has seven lanes inbound in the am peak hour, of which one is a zipper lane, one is an HOV lane, and five lanes are regular freeway lanes.

The MLA, with the H-1 zipper lane remaining, would add two additional dynamically-priced lanes, which, according to the FHWA carry twice as many vehicles per lane hour as are carried on a regular unpriced freeway lane.<sup>16</sup> Thus, the two new priced lanes would be the equivalent of four new regular freeway lanes. The congestion mitigation effects of this four lane equivalent addition to the existing seven-lane H-1 freeway are too obvious for the effect not to have been taken into account in the AA.

### **Ingress/egress insufficiently studied**

Appendix 3 also contains the following statement,

In its discussion of travel time benefits of the Managed Lane options, the Alternatives Analysis projects that traffic congestion at both the H-1 Freeway access to the Managed Lane facility and at the Nimitz Highway exit at Pacific Street will negate travel time benefits gained from travel on the Managed Lane facility itself. The Analysis should explore how traffic congestion at these points could be alleviated (at least for mass transit vehicles) in order to enhance the overall performance of this Alternative as a transit guideway."

PB made no effort to apply its engineering competence and ingenuity to the question of ingress and egress for the MLA.

<sup>14</sup> Task Force Final Report, pp. A-32 to A-33. [www.honolulutraffic.com/TaskForceReport.pdf](http://www.honolulutraffic.com/TaskForceReport.pdf)

<sup>15</sup> 119 STAT. 1576 (d) (3) (D) <http://bulk.resource.org/gpo.gov/laws/109/publ059.109.txt>

<sup>16</sup> FHWA Congestion Pricing Primer, [www.honolulutraffic.com/congestionpricing.pdf](http://www.honolulutraffic.com/congestionpricing.pdf)

Dr. Prevedouros in his micro-simulation studies of differently designed entry and exit ramps for the MLA shows that with properly designed ramps traffic congestion can be reduced and excessive traffic congestion would not occur even during peak-hour traffic.

### **Summary**

The City made no attempt to follow up the recommendation in the Task Force Report that various matters were worthy of further investigation. Nor did the City and its consultant consider the obvious possibilities of the benefits of a three-lane facility at least for part of the MLA length.

It is quite clear that the City, PB and the FTA have failed to “rigorously explore and objectively evaluate” the MLA during the NEPA process thus far.

We no longer have confidence that FTA objectively evaluates agency submissions since its employee career incentives can only lead to an unwarranted favorable treatment of rail transit projects.

We ask that the CEQ, in conjunction with the USDOT, require the FTA and the City re-assess the MLA in the EIS process. We believe the MLA should be re-studied within the DEIS process if the DEIS is to comply with NEPA. We also believe that an independent evaluation should be required by a firm of consultants who are less self-proclaimed “client-focused” and more taxpayer-focused.

Appendix A Table A-1

Tampa Expressway			
Year	Cost index		
2004	154.4	\$320.0	original cost
2006	221.3	\$458.7	inflated using construction cost index
	+32%	\$605.4	to allow for Florida/Hawaii location cost change
		14.0	Length in miles
		\$43.2	Cost per mile
		2.4	Lanes
		\$18.0	Cost per lane/mile based on 2 lanes

H-3 Freeway			
Year	Cost Index	Real cost	
1991	107.5	\$1,300	Original Cost
2006	221.3	\$2,676	Allowing for Construction inflation
		16.1	Length in miles
		\$166.2	Cost per mile
		4	Lanes
		\$41.6	Cost per lane mile

City's Managed Lane Alternative projected cost			
Year		Real cost	
2006		\$2,572	
	Length	16	miles
		\$161	Cost per mile
	Lanes	2	
		\$80.5	Cost per lane mile

Honolulutraffic.com Managed Lane Alternative projected cost			
Year	Cost index	Real cost	
2002	147.9	\$900	
2006	221.3	\$1,347	Increase for inflation
	Length	10	miles
		\$134.7	Cost per mile
	Reduce cost 45 percent	\$74.1	Figg construction method
	Lanes	2	
		\$37.0	Cost per lane mile