20 Reasons for Choosing Bus Technology on Flexible Guideway with Exclusive and Shared Lanes for Honolulu

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1. From a capacity analysis standpoint, rubber tire technology even with plain buses is comparable and in many aspects superior to steel-wheel on steel-rails technology. The exhibits on the next page provide evidence. They are all taken from the Highway Capacity Manual, 2000 edition, and the Transit Capacity and Level of Service Manual, 2003 edition, both of which are widely used national standards produced by the Transportation Research Board in Washington, D.C.

   Exhibits 27-1 and 27-4 declare that if transit is provided for over 18 hours per day and in shorter than 10 minute headways, then the level of service (LOS) is A which means best in a grading scale from A to F. Both buses and rail systems can provide this type of service and achieve LOS=A.

   Exhibit 2-14 from the Transit Capacity and Level of Service Manual shows the actual (as opposed to theoretical estimates) passenger loads carried by bus systems in exclusive or semi-exclusive arrangements. Honolulu's *TheBus* currently has a fleet of about 575 buses. This exhibit shows that 150 to 225 buses can carry 6,000 to 11,000 people. The expected peak load for the proposed fixed guideway transit for Honolulu is 6,000 people. In the Request for Information (RFI) this was increased to 9,000 to represent a future "crash" load. Based on actual bus performance, both the 6,000 and 9,000 figures are attainable by specific bus systems in North American cities.

   Exhibit 14-18 from the Highway Capacity Manual presents light rail capacities. Rail stations for Honolulu's proposed system are limited to 300 ft. length, thus a maximum of 3-car trains can fit along these stations. Rail car capacities vary, but, for example the Bombardier vehicle has a capacity of 135 people. Thus, if we were to select this vehicle, a 2-car train could have a peak load capacity of 8,100 people and a 3-car train a peak load capacity of 12,000 people, at the stated 2 minute headway (30 trains per hour.)

   It is important to quote this excerpt from the Transit Capacity and Level of Service Manual: *CAUTION Light rail signaling is rarely designed for minimum headway. No light rail line in the US and Canada carries more than 10,000 passengers per peak hour direction.*

   HOT lanes in a 2-lane configuration have a capacity of well over 2,000 vehicles per hour per lane of which 100 may be loaded express buses and 200 may be 5+ people vanpools, and the rest may be 3,500 vehicles with an average occupancy of 1.5 (and likely higher to share the toll) resulting in a people moving capacity of 11,500 people in the peak hour, all of them sitting comfortably. By comparison, about two thirds of rail passengers will be standees in the peak.

Highway Capacity Manual 2000

EXHIBIT 27-4. HOURS-OF-SERVICE LOS

LOS	Hours per Day	Comments
A	> 18–24	Night or owl service provided
B	> 16–18	Late evening service provided
C	> 13–16	Early evening service provided
D	> 11–13	Daytime service provided
E	> 3–11	Peak-hour service/limited midday service
F	0–3	Very limited or no service

EXHIBIT 27-1. SERVICE FREQUENCY LOS FOR URBAN SCHEDULED TRANSIT SERVICE

LOS	Headway (min)	Veh/h	Comments
A	< 10	> 6	Passengers don't need schedules
B	≥ 10–14	5–6	Frequent service; passengers consult schedules
C	> 14–20	3–4	Maximum desirable time to wait if bus/train missed
D	> 20–30	2	Service unattractive to choice riders
E	> 30–60	1	Service available during hour
F	> 60	< 1	Service unattractive to all riders

Location	Facility	Peak Hour Peak Direction Buses	Peak Hour Peak Direction Passengers	Average No. of Pass. per Bus
New Jersey	Lincoln Tunnel Approach	735*	32,600	44
Ottawa	West Transitway	225	11,100	49
New York City	Madison Avenue	180	10,000	55
Portland	6th Avenue	175	8,500	50
New York City	Long Island Expy.	165*	7,840	48
New York City	Gowanus Expy.	150*	7,500	35
Newark	Broad Street	150	6,000	40
Pittsburgh	East Busway	105	5,400	51
Northern Virginia	Shirley Highway	160*	5,000	35
San Francisco	Bay Bridge	135*	5,000	37
Denver	I-25	85*	2,775	33
Denver	Broadway/Lincoln	89	2,325	26
Boston	South/High Streets	50	2,000	40
Vancouver	Granville Mall	70	1,800	26
Vancouver	Highway 99	29	1,450	50

*no stops

Exhibit 2-14
Observed Peak Direction Peak Hour Passenger Volumes on U.S. and Canadian Bus Transit Routes (1995-97)[R10,R21,R26]

Highway Capacity Manual 2000

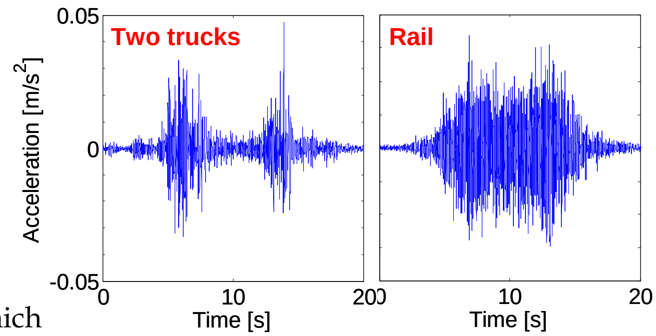
EXHIBIT 14-18. TYPICAL LIGHT-RAIL TRANSIT PERSON CAPACITIES: 30 TRAINS/TRACK/h 92- TO 98-ft ARTICULATED CARS

Cars/ Train	Passengers/Car				
	75[a]	100	125	150	175
1	2250	3000	3750	4500	5250
2	4500	6000	7500	9000	10,500
3	6750	9000	11,250	13,500	15,750
4	9000	12,000	15,000	18,000	21,000

Therefore, **from a peak hour person carrying capacity perspective, light rail does not have an advantage over a rubber tire system, which can be as simple as a bus-based system, or HOT lanes. In fact, there is strong evidence that simple bus based systems on exclusive or semi-exclusive guideways have a much better actual performance in the US than light rail.**

2. Review of the technical specifications in side-by-side comparisons reveal that rubber tire systems have a number of advantages such as:

  - ❖ Better acceleration and deceleration (e.g., Phileas accelerates at 2.9 mph per second, whereas [redacted] accelerates at 2.24.)
  - ❖ Accident avoidance deceleration is far superior for buses (e.g., Phileas can decelerate at 11.2 mph per second, whereas [redacted] peak deceleration is 2.9.)
  - ❖ Higher top speed.
  - ❖ Lighter vehicle weight (e.g., Phileas ranges from 37,000 to 49,000 lbs. depending on its length, Siemens is 95,000 and [redacted] is 273,000 lbs.)
  - ❖ Much better turning ability which is critical for Honolulu's tight geometry; generally rubber tired buses or "trains" can turn with radii of less that 100 ft. whereas steel-wheel on steel-rails trains require over 350 ft., with one of them requiring over 600 ft. radii.
  - ❖ Rubber tire systems are the most maneuverable. On the other hand, the monorail and three steel-wheel on steel-rails systems do not meet the 150 ft. turning radius for maneuvering in the maintenance yard, which means that a much larger facility will be needed for rail; a significant disadvantage in land-poor Oahu.
  - ❖ All technologies provide the same number of wheelchair positions per vehicle.
  - ❖ Some rubber tire systems including simple or advanced buses do not require a dedicated power distribution system. Virtually all steel-wheel on steel-rail systems require one substation per mile, with an electrical energy size varying between 1 MW and 4 MW, averaging at about 3 MW (megawatt). Thus a fully built system of about 30 miles needs 30 substations which will have an electrical power draw of 30 x 3 MW for a total draw of 90 MW which roughly matches HECO's new $142.3 million, 110-MW plant (under development.) The plant is expected to burn between 7 and 20 million gallons of fuel per year.
  - ❖ Although some rail suppliers claim to be as quiet as buses, the questionnaire in the RFI (1) failed to ask about steel-wheel on steel-rail squealing on tight turns, and there will be several tight turns in urban Honolulu, and (2) failed to ask questions about vibrations, which are far worse for rail than for buses and trucks, as the graphic above illustrates. Vibrations are far more disturbing to sleep and regular activities than noise.



- The cost per vehicle is also indicative of overall costs: Rubber tire technology has the price advantage on both a per-vehicle and a per-passenger basis:
  - A regular bus carrying 80 people costs under $0.5 million.
  - An articulated "superbus" like Phileas carrying 200 people costs $1.8 million.
  - A train of 2 steel-wheel on steel-rail cars carrying 250 people costs $5.0 million.

3. The City planning and engineering design consultant for this project, PB Americas, Inc., provided a spreadsheet with 21 criteria to evaluate technologies. At the Panel's inaugural meeting on February 15, 2008 it was decided that panel members may add criteria and use their independent evaluation method.

   The author used a scoring method both with and without weights to evaluate two technologies suggested by the consultant (**rubber tire** and **steel-wheel on steel-rail**) and one added by the author, **managed lanes/HOT lanes**. **Monorail** and **Maglev** technology evaluations were eliminated from the comparisons due to the limited information provided by the manufacturers and various technology-specific issues and limitations. Additionally, an evaluation of **Personal Rapid Transit** (PRT) systems could not be conducted due to the extremely limited time (4.5 days) that was allowed for the entire evaluation and submission of results.

   Although the use of weights in the analytical evaluation made a difference with respect to each specific criteria, upon aggregation their effect vanishes and results are consistent with or without weights. Managed lanes/HOT lanes is by far the most advantageous alternative for Honolulu based on the PB Americas' criteria, Prevedouros' criteria and their sum.

   On a grading system from 1 to 10 where 10 is best, managed lanes/HOT lanes receives a grade of 9.5, rubber tire technology receives a grade of 7.5 (a good but not best technology that is suitable for Honolulu), and steel-wheel on steel-rail receives a falling grade of 3.8 and is deemed to be unsuitable for Honolulu.

		Rubber Tire	Steel Wheel, Steel Rail	Managed Lanes / HOT Lanes
Weights from 1 to 10 differenciate the importance of each criteria	Original questionnaire with 21 criteria	84%	51%	96%
	Evaluator's added 11 criteria	60%	16%	100%
	Combined score from 33 criteria	75%	38%	98%
No weights; all criteria are worth the same	Original questionnaire with 21 criteria	83%	50%	92%
	Evaluator's added 11 criteria	60%	13%	100%
	Combined score from 33 criteria	75%	38%	95%

4. Based on U.S. experience, a proposed "light rail" system for Honolulu will produce too little benefit to justify its very high cost. Actually Honolulu is proposing a heavy rail system with an all-exclusive, elevated guideway but on it, it plans to operate light rail cars. This is a worst case combination because it combines the most expensive guideway costs with relatively small capacity vehicles. The attached table from the Transit Capacity and Level of Service Manual shows the performance of existing light rail systems in North American cities.

   To make the exhibit useful, systems outside the U.S. were removed and systems that were not open or they were a "vintage trolley" and the like were also removed. The two columns on the right summarize U.S. systems in terms of their length and daily boardings. Averages are estimated at the bottom of the columns.

   The average LRT in the U.S. has a length of 43.3 miles and carries an average number of daily boardings of 57,270. If these averages are proportioned for Honolulu's first operating segment of 20 miles and full system of 32 miles we receive estimates of boardings of 26,471 (20 mi) and 42,354 (32 mi), respectively. Honolulu's Alternatives Analysis however has come up with boardings of 95,000 (20 mi) and 125,800 (32 mi) in an attempt to convince the FTA that the system is viable. The AA numbers are unreasonable based on U.S. experience.

Exhibit 2-24
North American Light Rail Transit Systems (2000)[R2,R12,R15]

Region	Type	Dir. Route Length (mi)	Dir. Route Length (km)	Avg. Weekday Boardings	Veh. Operated in Max. Service
Baltimore	LR	57.6	92.7	27,400	40
Boston	LR/SC	51.0	82.1	255,600	154
Buffalo	LR	12.4	20.0	23,200	23
~~Calgary~~	~~LR~~	~~40.4~~	~~65.0~~	~~132,100~~	~~81~~
Cleveland	LR	30.8	49.6	14,100	25
Dallas	LR	40.8	65.6	37,700	48
Denver	LR	28.0	45.1	22,500	29
~~Edmonton~~	~~LR~~	~~13.9~~	~~22.4~~	~~38,000*~~	~~31*~~
~~Galveston, TX~~	~~VT~~	~~5.2~~	~~8.4~~	~~300**~~	~~4**~~
~~Guadalajara~~	~~LR~~	~~29.8~~	~~48.0~~	~~149,000~~	~~NA~~
~~Houston~~	~~LR~~	~~14.0~~	~~22.5~~	~~scheduled 2004 opening~~	
Jersey City (Hudson-Bergen)	LR	13.8	22.2	3,100	12
~~Kenosha, WI~~	~~VT~~	~~1.9~~	~~3.1~~	~~150~~	~~1~~
~~Little Rock~~	~~VT~~	~~4.2~~	~~6.8~~	~~scheduled 2004 opening~~	
Los Angeles	LR	82.4	132.6	91,300	51
~~Memphis~~	~~VT~~	~~5.8~~	~~9.3~~	~~3,500~~	~~9~~
~~Mexico City~~	~~LR~~	~~32.3~~	~~52.0~~	~~55,000~~	~~NA~~
~~Minneapolis~~	~~LR~~	~~23.2~~	~~37.3~~	~~scheduled 2004 opening~~	
Monterrey	LR	28.6	46.0	123,000	NA
New Orleans	SC/VT	16.0	25.7	14,900	23
Newark (City Subway)	LR	8.3	13.4	16,900	16
~~Ottawa~~	~~DLR~~	~~10.0~~	~~16.1~~	~~5,800*~~	~~2*~~
Philadelphia	LR/SC	69.3	111.5	83,100	108
Pittsburgh	LR/SC	34.8	56.0	24,600	47
Portland (MAX)	LR	64.9	104.4	73,600	56
~~Portland (Streetcar)~~	~~SC~~	~~4.8~~	~~7.7~~	~~4,200*~~	~~4*~~
Sacramento	LR	40.7	65.5	29,100	32
St. Louis	LR	34.0	54.7	41,500	26
Salt Lake City	LR	29.6	47.6	20,100	20
San Diego	LR	96.6	155.4	83,500	83
San Francisco	LR/SC	70.0	112.6	134,600	125
San Jose	LR	55.8	89.8	25,600	43
~~Seattle~~	~~VT~~	~~3.7~~	~~6.0~~	~~600~~	~~3~~
~~Southern New Jersey~~	~~DLR~~	~~68.0~~	~~109.4~~	~~scheduled 2003 opening~~	
~~Tacoma~~	~~SC~~	~~3.2~~	~~5.2~~	~~opened 2003~~	~~2†~~
~~Tampa~~	~~VT~~	~~4.6~~	~~7.4~~	~~1,200*~~	~~4*~~
~~Toronto~~	~~SC~~	~~136.4~~	~~219.5~~	~~196,000~~	~~155*~~

*2002 data from agency **1998 data †2003 data from agency
LR = light rail, DLR = diesel light rail, SC = streetcar, VT = vintage trolley, NA = not available
NOTE: Only those vintage trolleys operated by public transit agencies are included. The privately operated Tandy Subway in Fort Worth, 1.0-mi (1.6-km) long, closed in 2002.

	Miles	Boardings
	13.8	3,100
	30.8	14,100
	55.8	25,600
	57.6	27,400
	29.6	20,100
	34.8	24,600
	40.7	29,100
	28.0	22,500
	96.6	83,500
	40.8	37,700
	16.0	14,900
	82.4	91,300
	64.9	73,600
	69.3	83,100
	34.0	41,500
	12.4	23,200
	70.0	134,600
	8.3	16,900
	28.6	123,000
	51.0	255,600
Average U.S. LRTs	43.3	57,270
Honolulu 20 miles	20.0	26,471
Honolulu 32 miles	32.0	42,354

Projected 20 miles → 95,000
Projected 32 miles → 128,500

Rail transit was built in Jan Juan, Puerto Rico and it has a dismal performance since it attracts less than one half of its projected 80,000 ridership. For an extended period of time fares were eliminated in an attempt to attract riders. Honolulu's rail transit expects over 128,000 riders for Oahu's 0.9 million people, whereas the much poorer (and thus more dependent on transit) Puerto Rico of 2.2 million people generates 30,000 trips!

If one takes these 20 systems and removes those with the four highest and four lowest boardings per mile, a more representative average for a 20 mile U.S. LRT system is estimated at 37,419 boardings. This appears to be an attainable ridership level for a 20-mile system in Honolulu. What does 37,419 boardings mean?

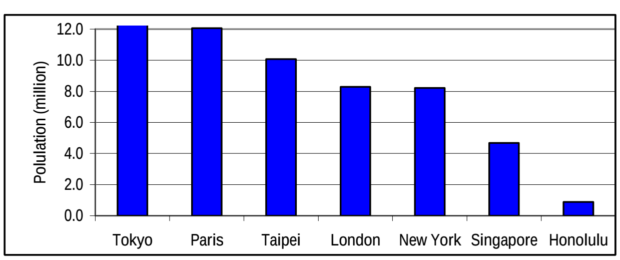
If we assume that the average regular user of the system makes 2.2 trips per weekday and that 10% of the trips are made by visitors and tourists, then **the proposed light rail system will serve 15,308 residents with some of their daily transportation needs. This is a very low level of public accommodation for such an expensive system. For an installation (only) cost of $3.6 billion, the price we pay per Oahu rail user is $235,172.** Investment of public funds in such a system is reckless.

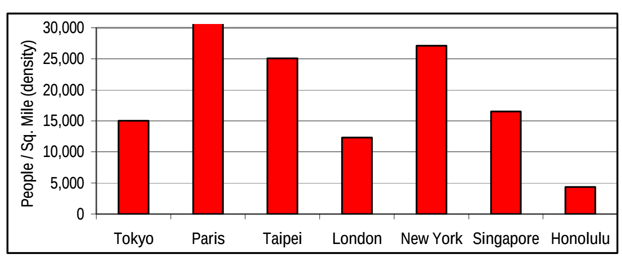
5. Honolulu is simply too small for any light or heavy rail system. The smallest US city with a light rail system is Buffalo, NY with a population rank of 43rd and actual population of 1.2 million. Buffalo's system is tiny at 6.6 miles.

   Honolulu's metropolitan area population rank is very low at 56th in the nation with a population of 880,000 which includes the entire island. The subject fixed guideway corridor barely has 600,000 population. The smallest U.S. metropolitan area with a rapid transit system is Cleveland, OH with a rank of 15th and population of 3.0 million people.

   The Technology Expert Panel's Chair Ron Tober is quoted in *Progressive Railroading* (January 2008 issue) saying that "I think light rail is going to serve this community well." The community is Charlotte, NC with a metropolitan population of 1.4 million, rapid growth and home to eight Fortune 500 companies. Compare these statistics:
   - Charlotte: at-grade, 9.6 miles, 15 stations, $463 million, or $331 cost per resident
   - Honolulu: all elevated, 20 miles, 20 stations, $3,600 million, or $4,091 per resident

6. People often refer to large rail systems in world capitals. Here are some sample comparisons of magnitudes, starting with two island metropolitan cities: Singapore and Taipei. Singapore has a population of 4.7 million and a density of 16,392 people per square mile. Taipei in Taiwan has a population of 2.6 million and a density of 25,031 people per square mile. There are large rapid transit systems in London, New York City, Paris and Tokyo among others. The respective densities of these cities are 12,331 for London, 27,083 for New York City, 52,921 for Paris and 35,559 for Tokyo. The density in urban Honolulu is comparatively tiny at 4,337 people per square mile.



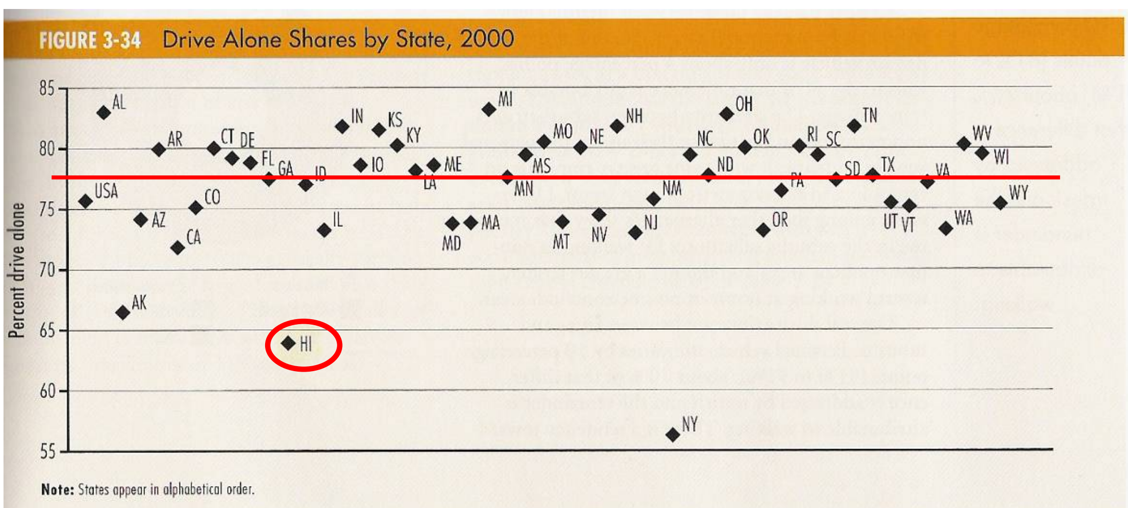


7. In general, U.S. rail ridership numbers are dismal for new systems. A 2007 FTA report compared the actual average weekday boardings in the transit agency's forecast year with the projected boardings for that year which were made at the AA/DEIS decision point: The average for all 19 projects for which data were available was 65%. Only three exceeded their projections (by between 1% and 34%), and the range among those falling short is very wide—from a low of 6% (Jacksonville people mover) to many others in the 40%-60% range, with the rest in the 70%-80% range.

   Some rail projects with fairly high percentages achieved them simply by aiming low: BART's Colma extension got 86% of what it projected, but that amounted to only 13,060 weekday boardings, for a very costly heavy rail line. Likewise for Baltimore's heavy-rail Johns Hopkins extension; it averages only 10,128 weekday boardings. For comparison, Honolulu's expectation for a rail system is about 90,000 riders for its first operating segment of 20 miles.

8. It is clear from *Commuting in America III* [TRB, 2006] that Hawaii has the second lowest drive-alone rate in the country and the highest carpooling rate. To succeed, Oahu's infrastructure choices must foster the prevalent habits of carpooling and bus usage.

   For this fundamental reason alone (trip making behavior,) public policy for transportation on Oahu should focus on HOT lanes as the most suitable technology. HOT lanes is a transitway for express buses and high occupancy car- and van-pools.



9. From a federal policy stand point, BRT makes the most sense for public transit financing: "Major emphasis on the Metro Networks program would significantly modify the focus of the federal transit program. After three decades of sustained capital investment in rail transit, a program that has resulted in retrofitting 22 cities with rail transit infrastructure, the nation has begun to run out of truly cost-effective new rail projects.

   "While federal funding support of extensions to existing rail transit networks should continue, **the needs of smaller cities aspiring to rail transit could be satisfied more effectively with rapid bus service (BRT) on express toll lanes**.

"According to Federal Transit Administration cost data, based on nine recent light rail projects, a mile of light rail costs an average $123.8 million. By contrast, a lane-mile of freeway in urban setting costs $12-20 million.

"This would allow the federal transit program to shift some of its resources from the costly New Starts rail projects to the Metro Networks program."
Source: Innovations Briefs, March 17, 2007.

10. Recently Forbes analyzed the cost of owning a car for five years and ranked Hawaii last: "In Hawaii, for example, owning a car for five years will cost the average driver $59,457. Compare that to New Hampshire, where the average car owner pays $47,599."
    Source: Egan, Drew, Best and Worst States to Own a Car, Forbes, 2/14/08.

    This shows that owning a car is already most punishing in Hawaii. Higher taxes and other disincentives (like ever worsening congestion) for Hawaii motorists would be rather absurd.

11. Rail is 19th century polluting technology. In the U.S., excluding the New York City metro area which has an exceptionally high transit mode share compared to anywhere else in the U.S., transit averages 310 grams per passenger mile, compared with 307 for the average 2006 model car and 328 for the overall car fleet in 2006. The 2007 Toyota Prius hybrid car measures at 147, and a 2008 Peugeot hybrid diesel (available in Europe) at 101. Both are comparable or better than New York City transit (140). Technology is moving toward more efficient and less intensive greenhouse gas vehicles. In 2030 many vehicles will be largely non-polluting, whereas rail will be a fossil energy relic.

12. The failure of Sound Transit in Seattle is a luminous prediction of rail for Oahu: In 1996, officials affirmed that the construction of Sound Transit would cost $3.9 billion and be completed in 10 years. In 2007, costs skyrocketed to $15 billion with an estimated completion time of 24 years. With an expected 351,000 riders on the rail system, the cost to take one passenger vehicle off the roadway would be roughly $100,000 per person.

    Refer to point 4 above which shows that the equivalent cost for Oahu's proposed "light rail" system will be close to $250,000 per Oahu user, many of whom will be current *TheBus* riders.

    This quote from the Seattle Times editorial also tells it like it is: "Consider Portland. That city opened its first light-rail line two decades ago, and has built several of them, all of which replaced bus lines. Overall, Greater Portland is no less car-dependent than Seattle. Its congestion has gotten worse, just as it has here. Many Portlanders are proud of light rail, but the last three times new light-rail plans have been on the ballot in the Portland area, the people rejected them. Maybe they learned something."

13. Unlike the relative simplicity of expressways with buses and vanpools, metro rail (heavy and light rail) is a complex electromechanical system with literally millions of wearing and weathering components, in addition to those destroyed by misuse or vandalism.

Consider this quote from the Santa Clara Times: "At 35, BART is getting old. The transit system's board approved a 25-year road map that foresees the need to spend $11.4 billion on hardware and equipment." So every 30 to 40 years, rail systems need a thorough re-building.

14. Transit Oriented Developments (TOD) are generally Taxes Offered to Developers, but even if one insists that they are a prudent packing of more individuals into less land, then TODs can be established along or near a bus-based facility which can be more redily accessible at ground level. National experience suggests that elevated rail technology is not a requirement and is, in fact, inferior for TODs.

15. Honolulu is not likely to charge the $3.50 to $8.00 fares charged in similar rail systems. Instead, its elected officials insist that the proposed fixed guideway will be priced at the same levels of the current *TheBus* public transit, about $1.50 per ride. The annual cost for operating *TheBus* is in the order of $170 million per year and over two thirds of this amount is subsidy from taxes. This city, therefore, at best can afford improved buses. It cannot afford a rail system that will add another $150 million per annum on O&M costs.

16. It is unreasonable to expect that a new fixed guideway that does not provide a competitive travel time will be appreciated and used by Oahu commuters. (The City's Alternatives Analysis says that all trips between Aiea and either Waikiki or Manoa, will be faster by auto than rail in year 2030 congested conditions, with rail.) The proposed rail fixed guideway is not designed to provide express trains, so, by definition, it will be a reliable but slow service. A bus or HOT lane fixed guideway facilitates express buses which can indeed connect Kapolei to UH in 45 minutes with comparable reliability. Rail service will take 75 minutes for this trip, and its door-to-door time will be comparatively longer.

17. Hawaii is susceptible to weather and natural disasters. A bus guideway (or HOT Lanes) can be designed in a way that allows for emergency vehicle access. The new facility can become an essential lifeline for relief in case of a disaster given the scarcity of roadway capacity to/from leeward Oahu. In the case of HOT Lanes, the corridor can also benefit tour buses, which are a major asset to Oahu's tourism-dependent technology. None of these can be done with a rail fixed guideway.

18. Markets, people and manufacturers adapt to new technologies and emerging challenges such as fossil fuel depletion and global warming. Rail is a 19th century technology that with the exception of electronic controllers and modernized interiors has not improved much in the last 30 years. Rail will not enable Oahu to take advantage of large expected improvements in technology. If rail is chosen, then in year 2030 Oahu will have a transit system which will look and function like a typical 1980s metro rail system. In contrast, in 2030 the presently advanced, quiet and economical Toyota Prius will be a relic.

19. Traditional advocates for rail who also were strong advocates for rail in the 2006 public testimonies in Honolulu include Planners, Architects and College Students. Recently these groups have some notable "change of heart":

- ❖ Architects were vocal supporters of rail. Now they oppose elevated rail. In a letter to Mayor Hannemann dated December 28, 2007, AIA (Architects of Hawaii) states that "the potential for successful TOD is significantly better with an at-grade system" and quote senior planner with the Portland Bureau of Planning Debbie Bischoff "At-grade works best for TOD." Note that the city plans a facility that is elevated for its entire length.

- ❖ Planners were supportive of rail. Now they do not favor in-town elevated rail. APA (Planners of Hawaii) deployed a survey in January 2008. Seventy three surveys were completed and 49.3%, chose a "street-grade" system, 32.9% chose an "overhead guideway" and 17.8% chose "it does not matter". Throughout the responses there is a substantial sentiment that and elevated fixed guideway is undesirable for urban Honolulu. It is disappointing, however, that the APA-HI survey failed to ask the basic question: Trains or lanes?

- ❖ UH students were strong supporters of rail. Now they support a guided "superbus" concept. The Associated Students of the University of Hawaii (ASUH) have adopted a resolution which concludes as follows:

  "WHEREAS, Magnet-Rail technology, such as the Phileas system, utilizes existing computer and GPS technology to guide a train of vehicles along a trail of small magnets embedded on a dedicated fixed guideway; and,

  "WHEREAS, at an affordable cost of about $25 million per mile, as opposed to the proposed system's cost of between $150-$200 million per mile, this technology will allow the City and County of Honolulu to tie together an efficient, integrated, island-wide mass transit system with versatile routes, connecting H-1, H-2, H-3, and the UH system with the elevated dedicated guideway as it's backbone;

  "BE IT RESOLVED, that a Magnet Rail System, such as the Phileas Guided Busway, is the only form of mass transit that can fit the needs of Oahu in a cost-effective and environmentally friendly manner; and

  "BE IT FURTHER RESOLVED, that the Associated Students of the University of Hawai`i fully supports the construction of a Magnet Rail System as the City's form of mass transit."

20. Managed lanes/HOT lanes should be the preferred alternative compared to traditional, limited definitions of fixed guideways because of this fundamental saying for roads, attributed to President John F. Kennedy: *It is not the wealth of a nation that builds roads, but the roads that build the wealth of a nation.*