California High-Speed Rail Peer Review Group

August 24, 2016

The Honorable Kevin de León
Senate President Pro Tem
State Capitol Building
Room 205
Sacramento, CA 95814

The Honorable Anthony Rendon
Speaker of the Assembly
State Capitol Building
Room 219
Sacramento, CA 95814

The Honorable Jean Fuller
Senate Republican Leader
State Capitol Building
Room 305
Sacramento, CA 95814

The Honorable Chad Mayes
Assembly Republican Leader
State Capitol Building
Room 3104
Sacramento, CA 95813

Dear Honorable Members:

On May 1, 2016, the California High-Speed Rail Authority released the final 2016 Business Plan (the Plan). This is an important document as it reflects the Authority's experience to date, including the award and inception of three large construction contracts. The Plan represents the Authority's best judgment as to what it can complete, and when it can complete it, given the constraints of current funding. The final Plan responds to comments received from a number of sources on the draft 2016 Business Plan released on February 18, 2016.

Our review of the final Plan highlights two points: 1) there is a need for improved oversight by setting a clear commitment by management to achieve the expected scope, schedule, cost and performance of the project (the project baseline); and, 2) there is a need to match the amount and timing of the projected construction costs and the financial performance of the project (demand, revenue, operating costs and ongoing capital needs) against currently identified sources of funding.

These issues are discussed in more detail below. In summary, the Plan furnishes a sound basis for setting the project baseline for scope, schedule, and construction cost as well as for demand, revenues, and net cash flows. In addition, analysis of the Plan shows that, while the proposed initial segment (the Valley to Valley, or V2V line) could be funded from identified sources if those sources materialize, a substantial gap remains between the total construction cost of the project through Phase 1 and the funding available from all currently identified and proposed sources. Although there is a projected balance between the initial segment and proposed funding, the overall gap remains because the Authority plans to build the remainder of Phase 1 in parallel with the initial segment and insufficient funding has been identified to complete this work until Phase 1 is in operation.

If there are no new sources of funding beyond forecast Cap and Trade funding, the gap to complete Phase 1 could be as much as $40 billion. However, if the proposed $2.9 billion in unidentified funding can be realized, the forecast net cash flows turn out to be correct, and the resulting cash flows can be monetized as projected, the gap would range from about $20 billion for the low demand forecast, $14 billion for the medium demand forecast, and $2 billion in the most favorable case of the high demand forecast. Because the system must be financed and built before any net operating cash flows can be monetized for the Phase 1, approximately $36 billion in shorter term financing will be needed until cash flows are proven and monetization becomes possible on the Phase 1 system. Proceeds from monetization of the V2V line could be used sooner to help contribute to extending the system and could be a part of closing the funding gap for Phase 1.

Setting the Project Baseline

The concept of the project and estimates of its costs and performance have changed over the years. The table below gives an idea of the project's evolution, though we stress that assumptions and adjustments were needed to bring all Business Plans into 2015 dollars (2015$) and the same time-frame (2040), making the comparisons approximate. The point to be stressed is that the project has not been well defined in the past: clearly none of the Plans prior to 2016 would have been suitable for use as an actual baseline.

Evolution in Capital Costs, System Size and Demand, Revenue and Net Revenue Forecasts

(Projections for the Year 2040 re-stated in 2015$)

Demand and Revenues are Medium Level Estimates

Business Plan	Capital Cost ($ Billions)	Miles	Capital Cost/Mile ($Millions)	Demand (Millions)	Gross Revenue* ($Millions)	Net Revenue** ($Millions)	Ratio: Net/Gross (%)
2012 Draft	59.2	520	113.8	36.8	2,488.0	1,389.0	55.8
2012 Final	56.7	490	115.7	26.4	1,890.0	1,044.0	55.2
2014 Final	56.4	490	115.1	34.9	1,713.0	818.0	47.8
2016 Draft	55.3	520	106.3	42.8	2,437.0	1,519.0	62.3
2016 Final	**55.3**	**520**	**106.3**	**42.8**	**2,437.0**	**1,519.0**	**62.3**

* Farebox revenue plus 1% ancillary revenue

** Gross Revenue minus O&M Costs and ongoing capital replacement

In recent letters and testimony, the Peer Review Group and the Legislative Analyst's Office have focused on the critical need for effective project oversight that, we believe, can be well supported by documentation currently produced by the Authority. One of the key concepts underlying effective oversight must be the establishment of a clear and stable project **baseline**: what are the project's stated objectives and what should the management be held responsible for delivering?

Baselines are the fundamental tool for determining whether commitments are being realized and for determining where intervention is needed if problems arise. Baselines are in effect "goalposts" that, once established, should not be moved. In conventional project management practice, the baseline would focus on the "iron triangle" of scope, schedule and budget: to this we believe that measures of the eventual performance of the system – demand, revenues and cash generation – should be added, in particular because a significant share of the proposed project financing is based on monetization of cash flow to be generated from operations and because Proposition 1A requires the Authority to operate without a subsidy.

Earlier this year, we worked with the Authority to develop a set of broad "dashboard" indicators meant to give the Legislature an overall perspective from period to period of how the project is progressing and of where problems might be arising. At a very high level these dashboard indicators will show whether progress is as expected or will warn of emerging reasons for concern. The Authority will furnish these dashboards to the Legislature twice yearly and they will be posted on the PRG website.

Looking beyond the dashboards, the Plan permits the Legislature to establish a firmer baseline against which future performance should be evaluated and we note that the Legislature's interest in doing so has been reflected in a number of pending bills. The PRG asked the Authority to provide from the final Plan a data set showing forecasts by year in Year of Expenditure (YOE)$ and in constant 2015$ of: Construction Costs; Ridership, Revenues; Operations and Maintenance Costs; and Life-Cycle Costs (on-going capital needs for replacement). The original version of this data set is posted on our website at www.cahsrprg.com/documents.html. Simplified tables showing this information are attached in the Appendix to this letter. We recommend that the Legislature use these tables as the baseline for oversight of future performance of the Authority.

In making this recommendation we emphasize that achieving the baseline's objectives is only partly under the control of the Authority. Many factors, such as legal decisions and legislative actions, will critically impact the project, but are outside the Authority's control. The purpose of a baseline is to define current expectations and commitments so that an oversight agency and can clearly identify changes and can assign responsibility for corrective actions wherever that responsibility may lie.

Figure 1 shows planned construction costs by project section (V2V and Phase 1 Increment) in 2015$. The maximum annual outlay rate will be around $7 billion in 2022, and the last year of construction is forecast to be 2029, by which time the project will have expended $55.3 billion in 2015$. Figure 2 shows the cumulative total of spending at the end of each year.

Figure 1
Planned Construction Cost By Year
(2015$ billion)

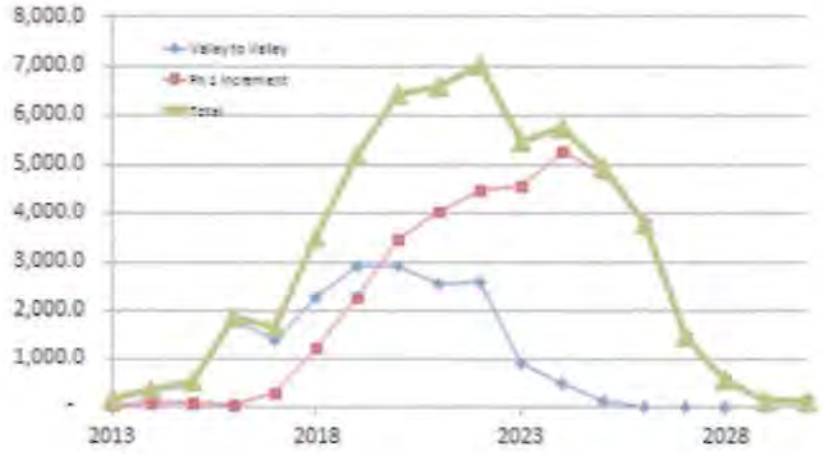
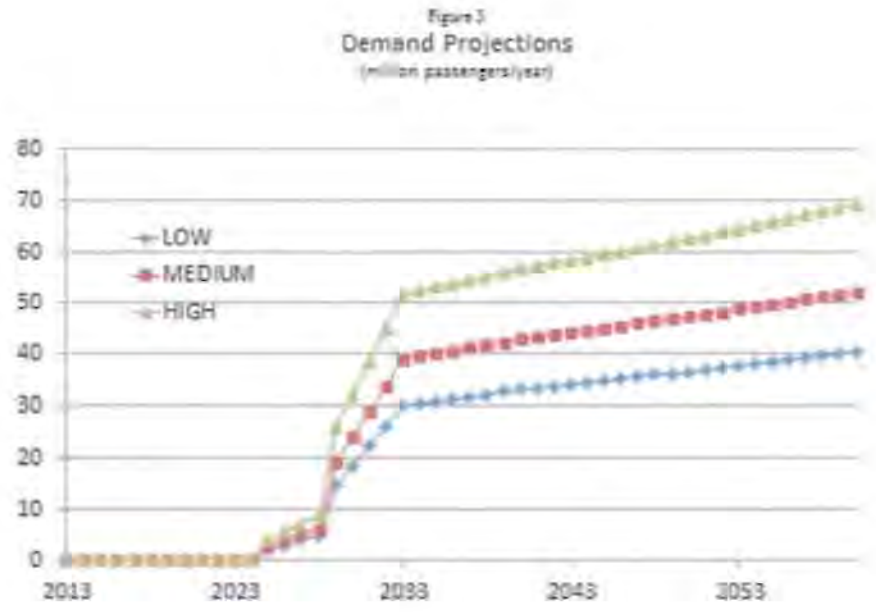


Figure 2
Planned Cumulative Construction Costs
(2015$ billion)

Figure 3 shows the growth over time of projected demand. Operations are planned to begin in 2025 with the initiation of the V2V service from Bakersfield to San Jose. Full system demand begins in 2029 when the Phase 1 incremental improvements are finished. The full demand ramp-up finishes in 2033 after which the system is projected to settle into steady growth. Figure 3 shows the sensitivity of demand to the assumptions and data inputs from the Authority's demand models. The Authority uses three demand levels: Low, for which they estimate there is only a 25 percent probability that demand will fall below this level; Medium, for which there is a 50%

probability that demand will be below (or above) this level; and, High, for which there is a 75% probability that demand will fall below this level and a 25% probability that it will be above.



Although it will be many years before actual demand can be compared with these projections, the demand baseline can be compared with any changes in demand projections shown in future Business Plans issued before operations begin.

Matching Financing Needs with Financing Sources

As background for a discussion on funding and finance, it is important to recall that the Legislature and voters, by approving Proposition 1A, provided only about a quarter of the funding needed to complete the system. The Authority emphasized in the 2016 Plan that limits in the availability of construction funding played a critical role in the decision to shift from completing the link south of Bakersfield into the Los Angeles Basin toward completing the line north from Madera to San Jose. The Authority also identified and estimated the amounts that could be expected from existing and relatively new sources of funding, including its share of Cap and Trade proceeds and potential private investment as discussed in the Expressions of Interest (EOI) received from the private sector. In our letter of March 25, 2016, we noted that a significant gap would remain to complete Phase 1, even if all the assumed flows of money actually occurred. The 2016 Plan and data furnished by the Authority permit a better picture of the funding required for system completion versus the funding currently identified and of the gap(s) that will remain.

The Currently Identified Available Public Funding table in the Appendix details the Authority's estimate of funding currently available from Proposition 1A, Federal grants and Cap and Trade

proceeds. For purposes of this table, we assume that Proposition 1A litigation will be decided favorably for the Authority and the funds will have been available for expenditure in coming years as needed. The Federal grants are already fully available for expenditure though any unexpended ARRA funds will expire on September 30, 2017. The Authority has stated repeatedly that it expects to be able work fast enough to avoid having any of these funds expire and that it is on pace to do that.

Consistent with the position of the Air Resources Board that administers the Cap and Trade Program, the Authority assumes that the program will extend beyond 2020 until at least 2050. The Authority also assumes that its share (25%) will average $500 million annually through 2024. After that, the Authority assumes it will be able to monetize (securitize) the $500 million annual flow of funds between 2025 and 2050 to support a net bond yield of $5.237 billion along with $83 million annually (the difference between the $500 million annual proceeds and $417 million needed to pay off the bonds issued in 2025). We have used the Authority's current timing estimate to show the availability of funds, but the timing is approximate because the Plan's assumptions with respect to financing are not meant to commit to a specific approach or conditions. Instead, the Plan is intended to illustrate how the funding stream could support a level of financing that addresses cash flow needs. The exact methods and levels of financing will not be determined for a number of years.

The estimated monetization assumes that the purchaser of the income stream will base its payment on a predictable average flow of Cap and Trade receipts of $500 million annually. As discussed in our recent letter, the predictability of the flow would be improved if the Authority were given a fixed claim on the first $500 million of Cap and Trade income generated rather than a 25 percent share of potentially volatile annual flows. This might add to the value of the monetized flow.

The Authority has recognized the overall funding gap and has suggested that other federal programs, such as RRIF or TIFIA loans might serve as potential added sources. As discussed in our earlier letters, for the most part these programs are not large enough to completely fill the permanent or temporary gap. More importantly, the only programs offering substantial amounts of Federal funds are loans rather than grants, so the state will have to provide a means of paying them back. It is possible, however, that a RRIF loan secured against Cap and Trade receipts could be received on more favorable terms than the proposed bond issue: if so, the monetization of Cap and Trade funding could yield larger amounts.

One concern in the prediction of Cap and Trade funding is the absence of any generally agreed, official forecast of the amounts (or even the range of amounts) to be generated from the Cap and Trade program. Although initial auctions exceeded expectations, more recent auctions have generated only a fraction of the amounts expected. Expressions of interest received from the private sector emphasized the importance of ensuring the levels and stability of the Authority's receipts from the Cap and Trade program and clearly indicated that the level of monetization would be directly related to the risks that investors perceive for the income stream to be received by the Authority.

We can offer no judgment on the likelihood of future receipts of the Cap and Trade funding since the Legislature has not clarified the long-term status of the program. The Legislature is best placed to make this assessment. We recommend that the Legislature ask the appropriate agency of government to develop an accepted estimate of Cap and Trade results under appropriate assumptions so that future Business Plans by the Authority (and by other users of the Cap and Trade funds) will reflect a commonly agreed estimate for both potential receipts and risks related to those receipts.

New Sources of Investment

The Authority has identified two new potential sources of added investment. The first is federal grants of $2.9 billion from a source yet to be identified to use in enlarging the V2V segment to include Bakersfield and extension of service to the Transbay Terminal in San Francisco. The likelihood of this outcome depends heavily on the future willingness of the Congress to develop and fund new transportation funding programs that would include grants for high-speed rail.

The Authority's revenue, cost and ongoing replacement investment projections forecast a surplus in its net cash generation (revenue minus operating and maintenance costs and replacement investments). Positive cash flows can also be monetized (securitized) similar to the monetization of expected Cap and Trade receipts. In developing forecasts of the amounts that a potential investor would pay for the right to generate the projected cash flows, the Authority has made a number of assumptions:

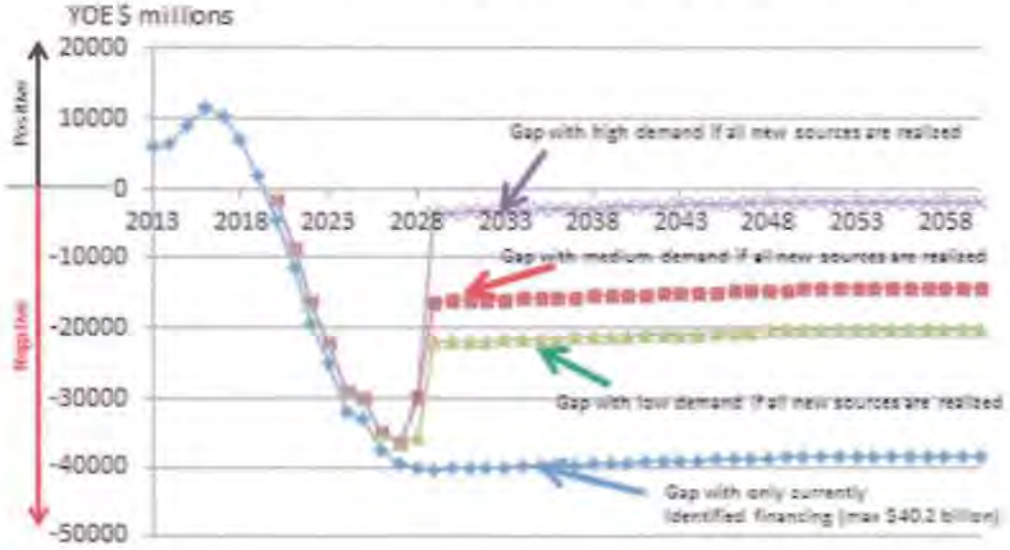
1. The private investor's demand and operating cost forecasts will be equivalent to those of the Authority;
2. Private investors will use a weighted average discount rate for the net cash flows of between 8% and 14%, with 11% as a reasonable mid-level;
3. The V2V segment will be securitized in 2028 after three years of actual demand experience demonstrated by revenue producing operations while the Phase 1 increment will be fully securitized in its first year of operation (2029) based on a successful demonstration of demand on the V2V segment.

The accuracy of the projected cash flows is clearly uncertain because the forecast monetization events will take place many years in the future. Actual flows could increase or decrease and many of the assumptions currently made by the Authority may not reflect the judgments made by the private sector when decisions are actually made.

For purposes of this analysis, it is possible to assemble a picture of the project and its potential funding requirements if we grant the Authority's assumptions. The Authority developed forecasts based on a large number of scenarios that would be too complex to discuss here. In order to illustrate the potential outcomes, we will use the three demand scenarios (Low, Medium and High) and an 11% discount rate for monetizing the operating cash flows with all numbers calculated in YOE$. The results are shown in Figure 4. In this figure we have displayed the Authority's forecast by year of construction outlays, currently identified sources and expected

new sources. The net result is the gap (or surplus) between inflows and outflows over the course of the project including completion of Phase 1. For example, the figure shows that the financing currently identified and available will be insufficient to cover accumulated outlays beginning in about 2020, and would eventually result in a gap of about $40 billion if no new sources are identified for completion of Phase 1. This is true even though the V2V section can balance costs and funding because the Authority plans to build the remainder of the Phase 1 system simultaneously.

Figure 4
Gap Between Total Cumulative Construction Cost versus
Currently Identified Financing plus Potential New Financing (YOE$)
Assumes 11% discount rate for monetizing the net cash flow



The gap can clearly be reduced if the assumptions about new sources of financing are realized. For the low demand scenario, the gap could be around $20 billion, with a lower gap of around $14 billion for the medium demand scenario, and an even lower gap of about $1.7 billion if the high demand forecast were realized for the full Phase 1 system. If the assumptions discussed above turn out to be inaccurate, the gaps would of course be correspondingly off target. Figure 4 also shows that there is a gap in timing between when outlays must be made and when potential inflows for the Phase 1 system from operating cash flows might be realized. No matter what the demand assumption, there is a maximum gap of $36 billion that must be filled before any monetized inflows can be generated because the entire system must be built and paid for before any possible monetization of operating cash flow for the full Phase 1 can occur. While monetization of the V2V line could occur before Phase 1 is complete, allowing significant capital to be generated to help pay for system expansion, there would remain a need for at least temporary financing between about 2020 and 2028 of as much as $36 billion.

Please let me know if you have any questions, need further information about our comments, or would like to meet with the Group directly.

Sincerely,

Louis S. Thompson
Chairman, California High-Speed Rail Peer Review Group

cc: Hon. Jim Beall, Chair, Senate Transportation and Housing Committee
Hon. Anthony Canella, Vice Chair, Senate Transportation and Housing Committee
Hon. Jim Frazier, Chair, Assembly Transportation Committee
Hon. Katcho Achadjian, Vice Chair, Assembly Transportation Committee
Brian Kelly, Secretary, California State Transportation Agency
Mac Taylor, State Legislative Analyst
Ken Alex, Director, Governor's Office of Planning and Research
Dan Richard, Chair, California High-Speed Rail Authority
Jeff Morales, Chief Executive Officer, California High-Speed Rail Authority
Betty T. Yee, California State Controller
Members, California High-Speed Rail Peer Review Group

APPENDIX TABLES

HSRA Estimates of Currently Identified Available Public Funding in 2016 Business Plan

(YOE$ millions)

	Federal					Cap and Trade			TOTAL Currently Identified Public Funding Available	
	Prop 1A*	FY 2010	ARRA**	Planning and Environ.	Total Federal Grants	Yearly flows	Monetized***	Monetization Surplus***	Year	Cumul.
2013		928.6	2,551.0	(315.0)	3,164.6	191.0				6,520.2
2014						400.0			400.0	6,920.2
2015	2,609.0					500.0			3,109.0	10,029.2
2016	4,160.0					500.0			4,660.0	14,689.2
2017						500.0			500.0	15,189.2
2018						500.0			500.0	15,689.2
2019						500.0			500.0	16,189.2
2020						500.0			500.0	16,689.2
2021						500.0			500.0	17,189.2
2022						500.0			500.0	17,689.2
2023						500.0			500.0	18,189.2
2024						250.0			250.0	18,439.2
2025							5,237.0		5,237.0	23,676.2
2026								83.0	83.0	23,759.2
2027								83.0	83.0	23,842.2
2028								83.0	83.0	23,925.2
2029								83.0	83.0	24,008.2
2030								83.0	83.0	24,091.2
2031								83.0	83.0	24,174.2
2032								83.0	83.0	24,257.2
2033								83.0	83.0	24,340.2
2034								83.0	83.0	24,423.2
2035								83.0	83.0	24,506.2
2036								83.0	83.0	24,589.2
2037								83.0	83.0	24,672.2
2038								83.0	83.0	24,755.2
2039								83.0	83.0	24,838.2
2040								83.0	83.0	24,921.2
2041								83.0	83.0	25,004.2
2042								83.0	83.0	25,087.2
2043								83.0	83.0	25,170.2
2044								83.0	83.0	25,253.2
2045								83.0	83.0	25,336.2
2046								83.0	83.0	25,419.2
2047								83.0	83.0	25,502.2
2048								83.0	83.0	25,585.2
2049								83.0	83.0	25,668.2
2050								83.0	83.0	25,751.2
2051									-	25,751.2
2052									-	25,751.2
2053									-	25,751.2
2054									-	25,751.2
2055									-	25,751.2
2056									-	25,751.2
2057									-	25,751.2
2058									-	25,751.2
2059									-	25,751.2
2060									-	25,751.2

*Total Prop 1A Funds	9,950
Regional Connectivity	(950)
Caltrain/Metrolink Investments	(1,100)
Administration/Pre-Construction	(1,125)
Available for construction	6,775

Dates for funding availability are approximate, but do not effect overall conclusions

** Any unexpended amounts of the ARRA money expire September 30, 2017. HSRA projects that no money will expire

*** HSRA estimates a $500 million annual flow from Cap and Trade continuing from 2025 through 2050
For illustration, this flow is assumed to support a net bond issue of $5.237 billion with a repayment stream of $417 million each year, leaving a surplus each year of $83 million for use by the Authority.

2016 Business Plan Construction Costs									
	(2015$ millions)					YOE$			
	Valley to Valley Line	Phase 1 Incr.	TOTAL	Cum. Total		Valley to Valley Line	Phase 1 Incr.	TOTAL	Cum. Total
2013	118.9	29.2	148.1	148.1	**2013**	118.9	29.2	148.1	148.1
2014	300.0	58.4	358.4	506.5	**2014**	300.0	58.4	358.4	506.5
2015	415.2	87.6	502.8	1,009.3	**2015**	415.2	87.6	502.8	1,009.3
2016	1,830.3	44.7	1,875.0	2,884.3	**2016**	1,866.9	45.6	1,912.5	2,921.8
2017	1,385.3	280.5	1,665.8	4,550.1	**2017**	1,444.8	292.6	1,737.3	4,659.1
2018	2,261.6	1,239.7	3,501.3	8,051.3	**2018**	2,411.8	1,322.0	3,733.8	8,392.9
2019	2,917.0	2,264.1	5,181.1	13,232.4	**2019**	3,180.7	2,468.8	5,649.5	14,042.4
2020	2,920.5	3,482.9	6,403.5	19,635.8	**2020**	3,256.2	3,883.3	7,139.5	21,181.9
2021	2,552.7	4,014.5	6,567.1	26,203.0	**2021**	2,910.1	4,576.6	7,486.7	28,668.6
2022	2,580.3	4,447.7	7,028.0	33,230.9	**2022**	3,007.8	5,184.5	8,192.4	36,861.0
2023	907.6	4,543.4	5,451.0	38,681.9	**2023**	1,081.8	5,415.3	6,497.1	43,358.1
2024	463.6	5,278.5	5,742.2	44,424.1	**2024**	565.1	6,433.1	6,998.1	50,356.2
2025	95.9	4,837.9	4,933.8	49,357.9	**2025**	119.5	6,028.8	6,148.3	56,504.5
2026		3,794.5	3,794.5	53,152.4	**2026**		4,870.4	4,870.4	61,374.9
2027		1,482.5	1,482.5	54,634.9	**2027**		1,959.9	1,959.9	63,334.8
2028		563.3	563.3	55,198.2	**2028**		767.1	767.1	64,101.9
2029		97.2	97.2	55,295.4	**2029**		136.3	136.3	64,238.2
TOTAL	18,748.9	36,546.5	55,295.4		**TOTAL**	20,678.8	43,559.4	64,238.2	

2016 Business Plan Demand Scenarios

(million passengers)

	Low	Med.	High
	(25%)	(50%)	(75%)
2013	-	-	-
2014	-	-	-
2015	-	-	-
2016	-	-	-
2017	-	-	-
2018	-	-	-
2019	-	-	-
2020	-	-	-
2021	-	-	-
2022	-	-	-
2023	-	-	-
2024	-	-	-
2025	2.3	3.0	4.2
2026	3.1	4.1	5.8
2027	4.0	5.2	7.4
2028	4.9	6.4	9.0
2029	14.9	19.3	26.0
2030	18.6	24.1	32.2
2031	22.4	28.9	38.6
2032	26.3	33.9	45.1
2033	30.3	39.1	51.8
2034	30.7	39.6	52.5
2035	31.1	40.1	53.2
2036	31.5	40.6	53.9
2037	31.9	41.2	54.6
2038	32.3	41.7	55.3
2039	32.8	42.3	56.0
2040	33.2	42.8	56.8
2041	33.5	43.3	57.3
2042	33.9	43.7	57.9
2043	34.2	44.1	58.5
2044	34.6	44.6	59.1
2045	34.9	45.0	59.7
2046	35.2	45.5	60.3
2047	35.6	45.9	60.9
2048	36.0	46.4	61.5
2049	36.3	46.8	62.1
2050	36.7	47.3	62.7
2051	37.0	47.8	63.3
2052	37.4	48.3	64.0
2053	37.8	48.7	64.6
2054	38.2	49.2	65.3
2055	38.5	49.7	65.9
2056	38.9	50.2	66.6
2057	39.3	50.7	67.2
2058	39.7	51.2	67.9
2059	40.1	51.7	68.6
2060	40.5	52.3	69.3

2016 Business Plan: Revenue, O&M Costs, Lifecycle Costs and Net Cash Flow Demand Scenarios

(2015$ millions)

	Farebox Revenue			Oper. and Maint. Costs			Lifecycle Costs			Net Cash Flow*		
	Low	Med.	High	Low	Med.	High	Low	Med.	High	Low	Med.	High
	(25%)	(50%)	(75%)	(25%)	(50%)	(75%)	(25%)	(50%)	(75%)	(25%)	(50%)	(75%)
2013												
2014												
2015												
2016												
2017												
2018												
2019												
2020												
2021												
2022												
2023												
2024												
2025	143.7	184.1	260.8	217.7	227.4	248.9				(72.6)	(41.5)	14.5
2026	197.6	253.3	358.8	240.5	251.3	275.0				(40.9)	4.6	87.4
2027	251.7	322.6	456.9	262.3	274.1	300.0				(8.2)	51.7	161.5
2028	305.7	391.9	555.0	284.5	297.3	325.3				24.3	98.6	235.3
2029	863.7	1,104.4	1,468.6	699.2	729.6	798.4				173.1	385.9	684.8
2030	1,067.4	1,364.6	1,799.3	724.0	755.5	826.7				354.1	622.8	990.6
2031	1,276.7	1,631.8	2,139.0	758.0	791.1	865.7				531.4	857.0	1,294.7
2032	1,491.7	1,906.3	2,487.9	783.9	818.0	895.2				722.7	1,107.3	1,617.6
2033	1,712.5	2,188.2	2,846.2	811.2	846.5	926.3				918.4	1,363.5	1,948.3
2034	1,736.6	2,219.0	2,886.3	819.0	854.6	935.2	23.8	26.2	28.5	911.3	1,360.3	1,951.4
2035	1,761.1	2,250.2	2,927.0	822.5	858.4	939.3	23.8	26.2	28.5	932.4	1,388.2	1,988.4
2036	1,785.9	2,281.9	2,968.2	825.8	861.8	943.0	2.1	2.3	2.5	975.8	1,440.7	2,052.3
2037	1,811.0	2,314.1	3,010.0	829.2	865.4	947.0	2.1	2.3	2.5	997.8	1,469.5	2,090.6
2038	1,836.5	2,346.6	3,052.4	827.2	863.2	944.6	48.0	53.0	57.7	979.7	1,454.0	2,080.6
2039	1,862.4	2,379.7	3,095.3	836.3	872.8	955.1	75.8	83.6	91.0	968.9	1,447.2	2,080.2
2040	1,888.6	2,413.2	3,138.9	837.4	873.9	956.3	39.1	43.1	46.9	1,031.0	1,520.3	2,167.1
2041	1,898.1	2,425.3	3,154.6	833.3	869.6	951.6	39.1	43.1	46.9	1,044.7	1,536.8	2,187.6
2042	1,907.5	2,437.4	3,170.4	837.4	873.9	956.3	10.8	11.9	12.9	1,078.5	1,576.0	2,232.9
2043	1,917.1	2,449.6	3,186.3	840.1	876.8	959.4	104.7	115.4	125.7	991.4	1,481.9	2,133.0
2044	1,926.7	2,461.8	3,202.2	839.1	875.7	958.3	140.6	155.0	168.8	966.3	1,455.8	2,107.2
2045	1,936.3	2,474.1	3,218.2	842.6	879.3	962.2	141.9	156.4	170.4	971.2	1,463.1	2,117.8
2046	1,946.0	2,486.5	3,234.3	840.0	876.6	959.2	79.3	87.5	95.3	1,046.1	1,547.4	2,212.2
2047	1,955.7	2,498.9	3,250.5	845.0	881.9	965.0	43.4	47.8	52.1	1,086.9	1,594.2	2,265.8
2048	1,965.5	2,511.4	3,266.7	849.0	886.0	969.6	104.6	115.3	125.6	1,031.6	1,535.2	2,204.2
2049	1,975.3	2,524.0	3,283.0	844.9	881.7	964.9	113.8	125.5	136.6	1,036.3	1,542.0	2,214.3
2050	1,985.2	2,536.6	3,299.5	850.2	887.2	970.9	66.9	73.8	80.4	1,088.0	1,601.0	2,281.2
2051	1,995.1	2,549.3	3,316.0	851.4	888.6	972.4	64.0	70.6	76.9	1,099.6	1,615.6	2,299.9
2052	2,005.1	2,562.1	3,332.5	849.2	886.2	969.8	63.5	70.0	76.3	1,112.4	1,631.4	2,319.8
2053	2,015.1	2,574.9	3,349.2	854.0	891.2	975.2	244.5	269.6	293.6	936.8	1,439.8	2,113.9
2054	2,025.2	2,587.7	3,365.9	855.8	893.1	977.3	312.4	344.4	375.1	877.3	1,376.2	2,047.2
2055	2,035.3	2,600.7	3,382.8	855.4	892.7	976.9	330.5	364.4	396.9	869.7	1,369.6	2,042.8
2056	2,045.5	2,613.7	3,399.7	858.7	896.2	980.7	328.0	361.6	393.8	879.2	1,382.0	2,059.2
2057	2,055.7	2,626.7	3,416.7	856.8	894.1	978.4	530.4	584.7	636.9	689.1	1,174.1	1,835.5
2058	2,066.0	2,639.9	3,433.8	853.5	890.6	974.6	609.9	672.3	732.3	623.4	1,103.3	1,761.2
2059	2,076.3	2,653.1	3,450.9	855.0	892.2	976.3	727.2	801.7	873.2	514.9	985.7	1,635.9
2060	2,086.7	2,666.3	3,468.2	856.5	893.8	978.0	762.9	841.1	916.0	488.3	958.2	1,608.8

* 1% is added to Farebox Revenue (for ancillary revenues) and then O&M and Lifecycle Costs are subtracted

2016 Business Plan: Revenue, O&M Costs, Lifecycle Costs and Net Cash Flow Demand Scenarios

(YOE$ millions)

	Farebox Revenue			Oper. and Maint. Costs			Lifecycle Costs			Net Cash Flow*		
	Low	Med.	High	Low	Med.	High	Low	Med.	High	Low	Med.	High
	(25%)	(50%)	(75%)	(25%)	(50%)	(75%)	(25%)	(50%)	(75%)	(25%)	(50%)	(75%)
2013	-	-	-	-	-	-	-	-	-			
2014	-	-	-	-	-	-	-	-	-			
2015	-	-	-	-	-	-	-	-	-			
2016	-	-	-	-	-	-	-	-	-			
2017	-	-	-	-	-	-	-	-	-			
2018	-	-	-	-	-	-	-	-	-			
2019	-	-	-	-	-	-	-	-	-			
2020	-	-	-	-	-	-	-	-	-			
2021	-	-	-	-	-	-	-	-	-			
2022	-	-	-	-	-	-	-	-	-			
2023	-	-	-	-	-	-	-	-	-			
2024	-	-	-	-	-	-	-	-	-			
2025	191.2	245.1	347.1	289.7	302.7	331.3	-	-	-	(96.7)	(55.2)	19.3
2026	270.9	347.3	491.8	329.7	344.5	377.0	-	-	-	(56.1)	6.3	119.7
2027	355.3	455.5	645.0	370.4	387.0	423.5	-	-	-	(11.5)	73.0	228.0
2028	444.6	570.0	807.2	413.7	432.3	473.1	-	-	-	35.4	143.3	342.1
2029	1,293.7	1,654.4	2,199.8	1,047.4	1,092.9	1,195.9	-	-	-	259.3	578.0	1,025.8
2030	1,646.8	2,105.3	2,776.0	1,117.0	1,165.5	1,275.4	-	-	-	546.4	960.8	1,528.3
2031	2,028.9	2,593.1	3,399.1	1,204.6	1,257.1	1,375.7	-	-	-	844.5	1,361.9	2,057.4
2032	2,441.6	3,120.2	4,072.2	1,283.1	1,339.0	1,465.2	-	-	-	1,182.9	1,812.4	2,647.7
2033	2,887.1	3,689.1	4,798.5	1,367.6	1,427.2	1,561.7	-	-	-	1,548.4	2,298.8	3,284.7
2034	3,015.6	3,853.2	5,012.0	1,422.1	1,484.1	1,624.0	38.6	42.6	46.4	1,585.0	2,365.1	3,391.8
2035	3,149.8	4,024.7	5,235.1	1,471.1	1,535.2	1,680.0	39.8	43.9	47.8	1,670.4	2,485.9	3,559.6
2036	3,290.0	4,203.8	5,468.1	1,521.3	1,587.6	1,737.3	3.6	4.0	4.3	1,798.0	2,654.3	3,781.1
2037	3,436.4	4,390.9	5,711.4	1,573.5	1,642.1	1,796.9	3.7	4.1	4.5	1,893.6	2,788.7	3,967.2
2038	3,589.3	4,586.4	5,965.6	1,616.6	1,687.0	1,846.1	87.9	96.9	105.6	1,920.7	2,848.2	4,073.6
2039	3,749.1	4,790.5	6,231.1	1,683.5	1,756.9	1,922.6	142.9	157.5	171.6	1,960.2	2,923.9	4,199.2
2040	3,915.9	5,003.7	6,508.4	1,736.3	1,812.0	1,982.9	75.9	83.7	91.1	2,142.9	3,158.0	4,499.5
2041	4,053.6	5,179.5	6,737.2	1,779.6	1,857.2	2,032.3	78.2	86.2	93.8	2,236.3	3,288.0	4,678.4
2042	4,196.1	5,361.6	6,974.0	1,842.0	1,922.3	2,103.5	22.2	24.5	26.6	2,373.8	3,468.5	4,913.6
2043	4,343.6	5,550.1	7,219.1	1,903.5	1,986.5	2,173.8	222.1	244.8	266.7	2,261.4	3,374.2	4,850.9
2044	4,496.2	5,745.2	7,472.9	1,958.2	2,043.6	2,236.3	307.1	338.6	368.8	2,275.8	3,420.4	4,942.6
2045	4,654.3	5,947.1	7,735.6	2,025.3	2,113.6	2,312.9	319.3	352.1	383.5	2,356.2	3,540.9	5,116.6
2046	4,817.9	6,156.1	8,007.5	2,079.6	2,170.2	2,374.8	183.9	202.7	220.8	2,602.6	3,844.8	5,491.9
2047	4,987.2	6,372.5	8,288.9	2,154.9	2,248.9	2,460.9	103.6	114.2	124.4	2,778.6	4,073.2	5,786.5
2048	5,162.5	6,596.5	8,580.3	2,230.0	2,327.2	2,546.7	257.2	283.6	308.9	2,726.9	4,051.7	5,810.5
2049	5,344.0	6,828.4	8,881.9	2,285.9	2,385.4	2,610.4	288.3	317.8	346.1	2,823.3	4,193.4	6,014.2
2050	5,531.8	7,068.4	9,194.1	2,369.0	2,472.3	2,705.4	174.6	192.5	209.7	3,043.5	4,474.3	6,370.9
2051	5,726.3	7,316.9	9,517.3	2,443.8	2,550.3	2,790.8	172.1	189.7	206.6	3,167.7	4,650.0	6,615.0
2052	5,927.6	7,574.0	9,851.8	2,510.5	2,619.9	2,866.9	175.8	193.8	211.1	3,300.6	4,836.1	6,872.4
2053	6,135.9	7,840.3	10,198.1	2,600.3	2,713.6	2,969.5	697.1	768.6	837.1	2,899.9	4,436.5	6,493.5
2054	6,351.6	8,115.9	10,556.6	2,683.9	2,800.9	3,065.1	917.3	1,011.3	1,101.5	2,813.9	4,384.8	6,495.6
2055	6,574.9	8,401.1	10,927.6	2,763.4	2,883.8	3,155.8	999.7	1,102.1	1,200.4	2,877.5	4,499.2	6,680.7
2056	6,806.0	8,696.4	11,311.7	2,857.3	2,981.9	3,263.0	1,021.8	1,126.6	1,227.0	2,994.9	4,675.0	6,934.8
2057	7,045.2	9,002.1	11,709.3	2,936.3	3,064.3	3,353.2	1,702.0	1,876.4	2,043.7	2,477.3	4,151.4	6,429.5
2058	7,292.8	9,318.5	12,120.9	3,012.6	3,143.8	3,440.3	2,015.7	2,222.2	2,420.3	2,337.4	4,045.6	6,381.5
2059	7,549.2	9,646.1	12,547.0	3,108.5	3,243.8	3,549.7	2,475.7	2,729.4	2,972.8	2,040.4	3,769.3	6,150.0
2060	7,814.5	9,985.1	12,988.0	3,207.3	3,347.0	3,662.6	2,675.0	2,949.2	3,212.1	2,010.3	3,788.8	6,243.2

* 1% is added to Farebox Revenue (for ancillary revenues) and then O&M and Lifecycle Costs are subtracted