

January 4, 2017

Second Declaration of Frank J. Lysy

My name is Frank J. Lysy, and I live in Washington, DC. I am submitting this Declaration in support of Plaintiffs' opposition to the Federal Defendants' and State of Maryland's renewed cross-motions for summary judgment, filed on December 16, 2016.

1. I have a Ph.D. in Economics from Stanford University and spent most of my career as an economist at the World Bank. I retired in 2010 after 26 years of service, where my last position was Chief Economist and Director of the Economics and Policy Department of the Multilateral Investment Guarantee Agency, a member agency of the World Bank Group. In my work at the World Bank I assessed and reviewed the economics of a large number of World Bank Group supported projects, including transportation and other infrastructure projects, as well as structures such as public-private partnerships. A methodology I developed was used by staff to assess the broader economic and societal impacts of private projects supported by the World Bank Group.

2. Based on my professional experience and training, as well as my longstanding familiarity with the Purple Line project, I am fully competent to offer opinions and observations that are pertinent to the assertions made in the documents submitted by Federal Defendants and the State of Maryland in support of their motions. I have not been paid for this work, and I do not live close to where the proposed Purple Line will run.

Defendants Failed to Address the Impact of the Metrorail Concerns in Any Credible Manner

3. On September 16, 2016 I executed a detailed Declaration setting forth my views that, especially in light of the well-documented problems with the Metrorail system, the Purple Line ridership projections are highly speculative, subject to multiple misplaced assumptions, and lack necessary transparency as to their derivation. I also explained the need for a rigorous new comparison of alternatives, with particular focus on upgraded bus services. My Declaration was filed with the Court and also submitted directly to the Federal Transit Administration (“FTA”) and the Maryland Transit Administration (“MTA”). It is found at AR6_000308 to AR6_000323 of the supplemental administrative record filed with the court on December 16, 2016.

4. I have reviewed both the FTA’s determination (as explained in its memorandum of December 13 and filed with the court¹) and the November 3 MTA report² on which it is based. Neither the FTA nor the MTA has expressly addressed in these documents the issues raised in my earlier Declaration in any manner. Nor have they otherwise examined the substantive issue of whether, with the likely lower future Purple Line ridership attributable to the Metrorail difficulties, less environmentally damaging alternatives (such as upgraded bus services) might be able to handle ridership demand. Transit services that would meet that demand could then be provided without the environmental damage that is inevitable with a dual fixed rail line, in particular on this proposed route.

¹ FTA Memorandum authored by Dan Koenig and dated December 13, 2016, filed with Court on December 16, 2016, and marked there as Exhibit 1.

² MTA, “Assessment of the Potential Effects of WMATA Metrorail Ridership and Safety Issues on the Purple Line Project”, November 3, 2016.

5. The new, post-remand, FTA and MTA documents do not give any serious consideration to perspectives and critiques by outside experts such as myself. They appear designed simply to justify the decision previously made to construct the Purple Line as a rail line regardless of whether new developments and information, in conjunction with longstanding concerns regarding the ridership projections, point in the direction of more cost-effective and less environmentally destructive alternatives. In this Declaration, which is intended to supplement the one I submitted in September 2016, I will explain how the new FTA and MTA documents again skirt critical questions and why an SEIS process is needed to address them.

Transit Alternatives Exist Without the Environmental Harm of a Rail Line

6. There is no disagreement that construction of a light rail line such as the proposed Purple Line, with its dual railroad tracks, overhead catenary power wires, and 21 stations, will have significant adverse environmental impacts. It was, for example, necessary for the MTA recently to file applications with the Army Corps of Engineers, the Maryland Department of Natural Resources, and the Maryland Department of the Environment, for permits that would grant it exceptions to the normal environmental requirements to enable construction of this proposed rail line.³ Construction of the rail line would do irreversible damage to wetlands and would require the clearance of 42.49 acres of forests (all within the Capital Beltway). With a rail line, this is unavoidable. Much of this irreversible damage would also ensue soon after the start of construction as the right of way is cleared of

³ See the Public Notice #16-54 posted at <http://www.nab.usace.army.mil/Missions/Regulatory/Public-Notices/Public-Notice-View/Article/939360/pn16-54-corps-mtapurple-line-2016-61278-m07-mde-nontidal-wetlands-and-waterways/>

existing forest cover. The issue is whether there are alternatives that could provide the needed transit services without necessitating such environmental harm.

7. Upgraded bus services would not have light rail's environmental costs.⁴ It is also recognized by all that the bus options examined in the AA/DEIS to provide transit services in this corridor would be both much cheaper (indeed cheaper both in operating and in capital costs) and more cost-effective.⁵ Upgraded bus services could also provide the capacity needed for the forecast ridership, at least for several decades.

8. Why then, did the MTA choose the light rail option rather than one of the bus options, despite the higher costs, lower cost-effectiveness, and inevitable environmental damage resulting from such a rail line? The primary reason given was that at some unspecified date in the future, at least beyond 2030, only a rail line would be able to provide the capacity then needed to service the forecast future ridership levels. But even if true, this is not an argument to build the rail line now. One could rely on an upgraded bus system for the decades until that capacity is needed. And any ridership forecasts are also highly uncertain. Even with no underlying bias, such forecasts are inherently difficult to do. This is particularly true for a large new project in a corridor where such services have not been provided before.

⁴ The Alternatives Analysis / Draft Environmental Impact Statement ("AA/DEIS") provides an assessment of the differing environmental impacts of the various alternatives examined. See AA/DEIS, Chapter 4, "Environmental Resources, Impacts, and Mitigation", September 2008.

⁵ See, for example, page 32 of the November 3 MTA report, or page 8 of "State of Maryland's Memorandum in Support of Renewed Cross-Motion for Summary Judgment", dated and filed December 16, 2016, where it notes "light rail is more costly and not as cost effective".

9. Unfortunately, rail lines are not able to address such uncertainty. The entire rail line and its stations must be built at once. And once built, little is saved by running fewer trains. Bus services, however, can manage well such uncertainty, as one can increase or decrease bus services in a corridor depending on the ridership demand that actually materializes. Any mismatch between planned capacity and actual demand can be quickly and easily rectified.

10. The recent Metrorail safety and ridership issues compound the uncertainty of how many riders would make use of the Purple Line light rail system, if it is built. One of the primary benefits presented by the MTA for building the Purple Line is that it would tie together four branches of the Metrorail system. If fewer riders are taking Metrorail, the number who would then take the Purple Line to connect to it would likely fall as well.

11. By relying solely on the November 3 MTA report, the FTA did not then examine whether, in light of the potentially lower ridership than earlier forecast, the Purple Line's high cost and environmental harm could be avoided through an alternative such as upgraded bus services. FTA did not look at whether an alternative approach (such as the bus options) would be able to achieve the objectives without the environmental costs of a rail line. Rather, it only examined the narrow issue of whether the environmental impacts of the rail line, once built, would be greater as a consequence of fewer riders. The answer they gave to that overly narrow question, not surprisingly, was no. The environmental damage (harm to wetlands, clearing of forest cover, and more) would already have been incurred when the rail line was built, and if there were fewer riders the damage would be largely the same.

12. But this exceedingly narrow review avoids the critical question: Would alternatives that would not lead to such environmental damage (and that would also be far less costly financially), now be able to handle the possibly lower future ridership? The FTA December 13 memorandum simply never addressed this question. It therefore never examines whether, with the possibly now lower future ridership, only a light rail option would be able to provide the service required at the capacity required. An SEIS would allow there to be a review of this critical issue.

Bus Alternatives Would Also Meet the Project's Purpose and Need

13. The December 13 FTA memorandum states (pages 6 and 7) that the light rail alternative for the Purple Line still will meet the project's stated "Purpose and Need", even should ridership be reduced due to the Metrorail concerns. For this reason, the FTA says it did not consider alternatives (such as bus options). The stated purpose and needs, as summarized in the FTA memo (page 6), are to: 1) "Provide faster, more direct, and more reliable east-west transit service connecting the major activity centers in the Purple Line corridor ..."; 2) "Provide better connections to Metrorail services located in the corridor"; and 3) "Improve connectivity to the communities in the corridor located between the Metrorail lines."

14. However, the FTA memorandum fails to note that even if it is correct that light rail would continue to meet such purpose and need, this is also true of the other options, which would not only meet the stated purpose but also do so at lower cost and without the environmental damage of a rail line. Those alternatives should not then have been ignored. And when choosing the best alternative when there are several, one must take

into account not only how well each might meet the project purpose and need, but also at what cost, including the environmental costs.

15. Furthermore, any gains in the stated first and second purposes and need (i.e. faster transit service connecting major activity centers in the corridor, and better connections between the four arms of Metrorail) are either limited or non-existent, precisely because one can use Metrorail itself for these connections. There are six possible station pairs between the four Metrorail stations (New Carrollton, College Park, Silver Spring, and Bethesda). For four of the six possible pairs, it is faster (in two of the cases) or as fast (in two of the cases) to take Metrorail than it would be to take the proposed Purple Line.⁶ Of the two station pairs where Metrorail travel times would be longer, forecast times for rush hour trips by regular Metrobus service would require only an extra four minutes in one case and an extra eight minutes in the other case.⁷

16. The time advantages one would gain from traveling via the proposed Purple Line light rail between these four Metrorail stations and activity centers are therefore non-existent in four of the six station pairs and modest in the other two. Incredibly, it appears that the MTA Purple Line ridership forecasts never recognized the option of simply taking Metrorail for many of the trips, which resulted both in an over-estimate of what ridership might be and in an over-estimate of what rider benefits might ensue (from time savings). This also

⁶ This is based on travel time figures reported in the “Travel Forecasts Results Technical Report”, Volume III of the FEIS, August 2013, and available at http://www.purplelinemd.com/images/studies_reports/feis/volume_03/010_PL-Tech-Report_Travel%20Forecast_August%202013.pdf. It is based on a comparison of the figures for existing travel times by Metrorail between the four Metrorail stations provided in Table 6 on page 19, to the travel times between the same station pairs calculated by adding the individual segment times provided in Table 11 on page 30.

⁷ Also based on figures provided in Tables 6 and 11 of “Travel Forecasts Results Technical Report”, Volume III of the FEIS, August 2013.

underscores the importance of ensuring Metrorail itself is not allowed to deteriorate further through poor management or inadequate funding. The use of scarce funds for public transit on expensive new projects such as the Purple Line, rather than on ensuring Metrorail safety and reliability are secured, just adds an unwelcome additional challenge to Metrorail's future.

17. Light rail is not an attractive alternative for such trips because light rail is, by nature, slow. The average speed of the proposed line is only 15.5 miles per hour.⁸ Furthermore, while MTA has asserted that bus travel times in the corridor will be significantly worse in the future due to increasing congestion, the experts who prepared the "Travel Forecasts Technical Report" of the FEIS say the opposite. They state (page 18): "Bus travel times would remain relatively unchanged between 2012 and 2040 on the routes serving the Purple Line markets."⁹ The primary congestion issues in the area are not in the east-west lines that the Purple Line will cover, but rather in the radial lines to and from downtown. And the Purple Line will not be of much help to these either.

18. With a similar capital and operating cost of the light rail alternative as before, but now with possibly significantly fewer riders to spread that cost over, the relative attractiveness of the lower cost bus alternatives will be enhanced. These alternatives need to be examined afresh, as they could provide a lower cost way to provide transit services in the corridor at the reduced ridership levels that may follow from the Metrorail concerns, and do this

⁸ Table 11 on page 30 of "Travel Forecasts Results Technical Report", Volume III of the FEIS, August 2013.

⁹ Page 18 of "Travel Forecasts Results Technical Report", Volume III of the FEIS, August 2013.

without the unavoidable environmental damage of a light rail line. A proper SEIS would allow this examination to be done.

The Reasons Provided by MTA for Light Rail Are Not Sound

19. The MTA report of November 3¹⁰, and on which the FTA memorandum is based, does go into reasons why MTA believes the light rail alternative remains MTA's preference. But the reasons given are not convincing, were not discussed in the FTA analysis (which is the agency to decide whether an SEIS is needed, not the MTA), and should have been subjected to a careful examination as they are closely interrelated to the environmental issues. If economically viable (and indeed economically preferable) alternatives exist which could provide the transit services required at expected ridership demand, then such alternatives would provide a means of avoiding the inevitable environmental damage resulting from a rail line. A proper SEIS would allow this to be reviewed.

20. The reasons given by MTA for its preference for the more costly light rail option were:¹¹

- a. "Light rail carries more riders than BRT under any scenario involving a comparable level of investment.": MTA goes on to say that it recognizes that "light rail is more costly and is not as cost effective", but asserts that benefits are greater since light rail will carry more riders. But if fewer riders choose to use the Purple Line (because of the Metrorail and possibly other concerns), then such benefits would be less and

¹⁰ MTA, "Assessment of the Potential Effects of WMATA Metrorail Ridership and Safety Issues on the Purple Line Project", November 3, 2016.

¹¹ *Id.*, at 32.

perhaps fail to offset the far higher costs (economic as well as environmental) of light rail. This needs to be examined. There are no benefits from running more empty seats. Furthermore, just because prospective riders might prefer light rail does not mean that one should always build light rail. Light rail is costly, and those costs need to be taken into account.

- b. “Light rail has an inherently greater capacity to accommodate long-term growth”: But if light rail is not needed until some future point in time, there is no justification for building it now. One can build it later when that capacity is needed, a point in time that even under the official ridership forecasts will not occur for decades. And many analysts believe such capacity will in fact never be required.
- c. “Light rail is expected to generate greater economic development and community revitalization benefits, because a light rail investment is perceived as a more permanent improvement”: This is yet another one-sided assessment. There are other ways for government to show such a long-term commitment to transit services, that would cost far less and be a more productive use of scarce resources. For example, government could enter into a long-term contract to provide such transit services via a more cost-effective bus service.
- d. “Light rail has consistently attracted greater support from the regional and local governments”: However, almost all of the \$6.2 billion total cost (to build and then operate the proposed light rail system over 35 years) will be borne by the State of Maryland and the federal government. The local governments will not bear the costs, but will receive the benefits, such as they are.

21. Even if one were to uncritically accept these rationales, fewer riders, whether due to the Metrorail safety and reliability problems or something else, would affect each of them. With fewer riders, the less expensive bus options would become more attractive financially while avoiding the environmental damage of a rail line. Such options merit a close examination before a commitment totaling \$6.2 billion over 35 years is signed. A proper SEIS would allow this.

It Was Incorrect for MTA to Assert the Purple Line Would be “Viable” Even With Just 50,000 Trips per Day

22. The MTA report of November 3 asserts (page 22) that the Purple Line as a light rail line would be a “viable project” under any of the five scenarios it considered (of various levels of reduced ridership due to the Metrorail concerns). The most extreme scenario would be that there were no riders transferring to or from Metrorail. Based on its forecast level of Purple Line ridership in 2040 (forecasts that many dispute as far too high), this would still leave 50,000 trips taken on the Purple Line per day.

23. MTA asserts that the Purple Line remains “viable” even under such an extreme scenario because four light rail lines recently completed in the US of broadly similar length have broadly similar ridership, or even less.¹² As discussed above and in my earlier Declaration, the relevant and critical question is whether, following from the recent Metrorail developments, there might be superior alternatives. It is not whether the Purple Line is “viable” in some abstract sense. In any event, a simple comparison of the Purple Line to other light rail projects is far short of what is needed to assess viability. To start, an

¹² See Table 8 on page 23 of the November 3 MTA report.

important difference for each of these four is that their ridership numbers are not in fact comparable to what is forecast for the Purple Line, as each of the four are radial lines leading to and from major urban downtown centers (and with one going from downtown Minneapolis to downtown St. Paul).

24. More fundamentally, ridership numbers in themselves are not a measure of viability. Cost also matters. The estimated capital cost of the Purple Line is currently \$2.4 billion, with \$1.8 billion of this coming from the federal government.¹³ At 16 miles, the cost per mile is \$150 million. The capital cost per mile of each of the four systems the MTA report cites were less, and sometimes far less. Using figures summarized in a report issued by the Maryland Public Policy Institute,¹⁴ the capital cost per mile was \$45 million for the Denver line, \$54 million for the Phoenix line, \$87 million for the Minneapolis-St. Paul line, and \$128 million for the Seattle line. The Seattle line was relatively costly as it involved the construction of a 1.3 mile tunnel under downtown Seattle. Despite this, its cost per mile is still less than the Purple Line. The cost per mile of the others were all far less.

25. The viability of a rail line depends on far more than simply ridership. It depends on the cost of the project, and importantly also the cost and cost-effectiveness of any alternatives. No analysis has been done as to whether the light rail alternative for the Purple Line would be viable under any scenario where forecast ridership falls due to the Metrorail concerns. A proper SEIS would allow this to be done.

¹³ Made up of a proposed \$936 million in federal grants, and \$875 million from a low cost federal loan made available through the TIFIA program. See the announcement at <https://www.transportation.gov/briefing-room/us-department-transportation-announces-tifia-loan-8746-million-maryland-purple-line> .

¹⁴ See Table 1, page 7, of Randal O'Toole, "Review of the Purple Line", Maryland Public Policy institute, 2015. Available at https://mdpolicy.org/docLib/20150318_ReviewofthePurpleLineFINALSTUDY.pdf .

The Ridership Forecasts Remain Highly Questionable

26. The five scenarios for the possible future impacts of reduced Metrorail ridership were all calculated relative to the forecasts made in the FEIS of the number of Purple Line riders in 2040 who would transfer to or from Metrorail for a portion of their journeys. But the FEIS ridership forecasts have been questioned by many, including by transportation experts contracted by the Town of Chevy Chase to review them.¹⁵ The ridership forecasts presented by MTA have also varied widely over time, with little or no explanation. The differing numbers obviously could not all have been right. No one could reasonably dispute that they are uncertain.

27. The forecast ridership figures have varied widely. The average daily boardings for the year 2030 forecast by MTA have ranged from 47,000 in 2007 to 62,600 in the AA/DEIS (October 2008) to 64,538 in the FEIS (August 2013) to 69,000 now (as posted on the MTA Purple Line web site¹⁶). They have also increased over time even though operating hours were cut significantly from what was initially planned, and train frequency during peak hours was cut by 25% (from one every 6 minutes to one every 7 1/2 minutes). Such reductions in operating service would be expected to **reduce**, not increase, ridership. Yet the MTA ridership forecasts rose steadily over time, with no explanation and no public assessment as part of the EIS process. FTA ridership figures have also varied substantially over time, at 60,100 in its November 2012 Project Summary Sheet and only 52,064 in its most recent

¹⁵ See, for example, Memorandum from Sam Schwartz Engineering to Town of Chevy Chase, "MTA Purple Line Follow-Up Issues and Questions", September 11, 2014. Available at <http://www.townofchevychase.org/DocumentCenter/View/1536>

¹⁶ See <http://www.purplelinemd.com/en/about-the-project/project-overview> . Accessed December 22, 2016.

Project Summary Sheet (of November 2015¹⁷). Why there was this sharp fall in the FTA figures at a time when the MTA forecasts were showing a sharp increase, is not clear.

28. That the MTA and FTA ridership forecasts have each varied so much over time, with little or no explanation, casts significant doubt on the projections that the defendants continue to rely on to justify this light rail project.

29. The only explanation that has been provided for why any of the forecast ridership figures differed was by MTA for the relatively modest changes in the figures on total ridership between the AA/DEIS and FEIS. But it was only a limited and partial explanation, and indeed raises some important questions. The FEIS states (with this re-summarized in the November 3 MTA report) that the forecasts were updated from those in the AA/DEIS to reflect updated population and employment forecasts for the region, as well as use of an updated version of the Metropolitan Washington Council of Governments regional forecasting model (version 8.0 rather than 7.0). Most importantly, it appears, the estimates were updated to reflect ridership surveys of existing Metrorail and other transit users to determine their possible demand for Purple Line services.

30. The net result of these changes between the AA/DEIS and FEIS ridership forecasts was to leave the total number of daily riders about the same, with the FEIS total just 3% above the AA/DEIS total. However, the composition of the riders changed dramatically. As the November 3 MTA report notes, but does not fully explain, the share of Purple Line riders who would transfer to and from Metrorail fell from 43% in the AA/DEIS to 27% in the

¹⁷ See FTA, "Maryland National Capital Purple Line, Bethesda to New Carrollton, Maryland, New Starts Engineering (Rating Assigned November 2015)". Available at https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/MD_Maryland_National_Capital_Purple_Line_Profile_FY17_0.pdf. The 2030 ridership figure was calculated based on interpolation between figures shown for 2035 and the base year.

FEIS. In terms of absolute numbers, the number transferring to and from Metrorail was forecast to fall from 27,200 in 2030 in the AA/DEIS to 17,224 in the FEIS, a reduction of about 10,000 or over a third. And while the absolute ridership numbers were far smaller for those forecast to transfer to and from MARC, the relative change was even greater, at a two-thirds reduction between the AA/DEIS and FEIS numbers.

31. While not stated directly, it appears these dramatic declines in forecast ridership levels of those transferring to and from Metrorail or to and from MARC were a result of the findings of the transit rider surveys conducted. Evidently, a far smaller share of transit riders indicated they would make use of the Purple Line than had been assumed in the AA/DEIS. Yet it was the AA/DEIS analysis that was used as the basis for the choice of the medium light rail alternative as the preferred alternative.

32. This fall in forecast ridership demand when potential riders were surveyed is in fact not surprising. The Purple Line appears not to be as attractive to potential riders as was initially assumed. But what is curious are the resulting figures in the FEIS of the number of Purple Line riders other than those transferring to and from Metrorail or MARC. As noted above, the forecast total ridership did not change much between the AA/DEIS and the FEIS - just a 3% increase, or less than 2,000 riders. But with those also taking Metrorail falling by about 10,000 (a decline of over a third) and those also taking MARC falling by about 1,000 (a decline of over two-thirds), the number of Purple Line riders who would reach the rail line by bus or by walking or some other means was forecast to increase by about 13,000, or 38%. Why there should be such a surprising jump in the forecast for this set of Purple Line riders, when the transit rider surveys apparently led to sharp reductions in the

forecasts of those who would also be taking Metrorail or MARC, has never been explained and is not addressed in the new FTA and MTA documents. It is also a very large jump, which, perhaps not coincidentally, just happens to offset the fall in riders who would also take Metrorail or MARC. This lack of explanation is a glaring omission because defendants have relied heavily on the assertion - which has no support in the materials available to the public - that “only” 27% of the projected Purple Line ridership will also use Metrorail. Again, a proper SEIS would allow this crucial issue to be reviewed.

33. The ridership forecast for the Purple Line is also exceptionally high in comparison to actual ridership found on other light rail lines in the US. Table 8 on page 23 of the MTA November 3 report shows the figures on four other light rail systems in the US which MTA says are broadly comparable. It had used this, as discussed above, to argue the Purple Line would remain “viable” even under the most extreme scenario it produced of the possible impacts on ridership of the Metrorail concerns. But what that table shows is that ridership numbers (actual, not forecast) on three of the four light rail lines highlighted by MTA have been far below what MTA is forecasting for the Purple Line in 2030. Ridership on two of the lines (in Phoenix and Denver) are each one-third less than what was forecast for the Purple Line in the FEIS for 2030, and 42% less in another (Minneapolis-St.Paul). It is only comparable in the case of the Seattle line, which runs from Sea-Tac International Airport to and through downtown Seattle (via a tunnel).

34. Furthermore, all four of the examples brought up by the MTA as comparable are radial lines that run to and from major urban downtowns (and with the Seattle route also connecting a major airport to the city). The Purple Line will not do this, but rather run

through areas of generally medium to low density. If there are countervailing factors that led to the far higher ridership forecasts of the MTA for this corridor than what has actually materialized elsewhere in the United States (on routes to and from dense downtown areas), they are nowhere mentioned in the MTA report. It seems doubtful there is a cogent explanation for this discrepancy, but a properly conducted SEIS would permit a review.

35. There are good reasons, then, to examine whether MTA's ridership forecasts are likely, particularly in light of the Metrorail concerns. At more plausible levels, there is less reason to be concerned that an upgraded bus system will be inadequate to handle the ridership load. A proper SEIS would allow this to be reviewed.

Summary and Conclusion

36. A properly conducted SEIS would allow for a systematic review of the impact of recent developments that have reduced ridership on the Metrorail system, and how that relates to the relative merits of the alternative ways by which transit services can be provided in the Purple Line corridor. The ridership forecasts are key, and as noted above, there are compelling reasons to question the forecasts that have been presented over the years for the Purple Line. There is now also the complication of uncertain ridership on Metrorail, where the Purple Line has long been presented as a line to connect four arms of Metrorail to each other as well as to connect Metrorail riders to their homes. But other transit options, less environmentally damaging while less costly and more cost-effective, can also do this. At lower levels of ridership there is even less reason not to consider them.

37. There is also the issue of timing for when a project such as this should be built. There is no reason to build a rail line now, with its high cost and unavoidable environmental damage, if the capacity provided by a rail line will not be needed until decades from now. Bus services can be upgraded by rationalization of routes, increased frequencies, use of express and shuttle services, use of large articulated buses where ridership warrants, and use of bus rapid transit systems in corridors of especially high demand. Costs are far less than for a rail line, and if at some point a rail line is needed to provide the then necessary capacity, the buses (which account for most of the cost of a bus-oriented system) can be shifted to different routes. The investment in the upgraded bus services would not be lost. And such bus systems can also manage uncertain future demand by adding or subtracting capacity as needed. Rail lines cannot do this.

38. There are therefore important issues for an SEIS to review, before the federal authorities commit over \$900 million in grant funds on top of \$875 million in a low cost federal loan. This has yet to be done.

Pursuant to 28 U.S.C. § 1746, I, Frank J. Lysy, declare under penalty of perjury that the foregoing is true and correct.

Executed on January 4, 2017.

A handwritten signature in black ink, reading "Frank J. Lysy", written over a horizontal line.

Frank J. Lysy