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Re: Cities of Inglewood and Culver City Comments on the Los Angeles International Airport North Airfield Safety Study Preliminary Report

Dear Chairpersons Bonin & Martin:

The following comments on the Los Angeles International Airport North Airfield Safety Study Preliminary Report ("Study") are submitted to the Chairpersons, Los Angeles International Airport North Airfield Safety Advisory Committee ("NORSAC"), by the Cities of Inglewood and Culver City ("Cities").

I. INTRODUCTION.

The Cities are pleased to learn that the Academic Panel ("Panel") has found that the Los Angeles International Airport ("LAX") North Airfield is safe, and that relocation of Runway 24R 100 feet to the north could add an extra measure of safety to the North Airfield complex. Although the Study's conclusion are in complete accord with three previous studies of LAX North Airfield alternatives[1] and the position expressed by the Federal Aviation Administration

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[1] *See*: *Analysis of LAX North Airfield Alternatives*, May 2007, International Aviation Management Group, Inc.; *Los Angeles International Airport North Airfield Assessment*,

("FAA") that LAX is safe in its current configuration, there are a number of revisions that could be made to the Study that would strengthen support for that conclusion. Foremost among them are: (1) inclusion of references and citations to sources for data used in the simulations and analyses, which are currently missing; and (2) use of data that is internally consistent and does not conflict with previously published reports by LAX and the FAA. The Study also sometimes digresses from its core purpose, analyzing the causes and risks of runway incursions, and instead discusses topics such as runway fatalities, risks not associated with airports and cost savings to air carriers, all of which are outside the scope of the Nine Question regarding runway incursion risks presented to the Panel. [p.4][2] Therefore, Cities submit these comments in a spirit of cooperation and support of the Study's main conclusions that the North Airfield is safe as presently configured, and that moving Runway 24R 100 feet to the North would enhance the safety of the North Airfield, and to insure that the analyses leading to those conclusions is beyond dispute.

II. THE STUDY DOES NOT LIST SOURCES FOR MUCH OF THE DATA USED, AND CONTAINS DATA THAT IS BOTH INTERNALLY INCONSISTENT AND IN CONFLICT WITH PREVIOUSLY PUBLISHED LAX RUNWAY INCURSIONS REPORTS AND FAA PUBLISHED DATA.

In any study of this complexity, it is likely that some internal inconsistencies in data will occur. The following is offered for the purpose of reconciling the conflicts to the extent possible. First, the Study would be more understandable if it listed sources for the data used in simulations and calculations, making it possible to evaluate and verify its findings and conclusions. Further, the Study should be revised with an eye on resolving conflicts between data from unidentified sources within the Study, and also with data provided to the Panel by LAWA and data published by the FAA. An example of such conflicting data from unidentified sources is in the historical LAX runway incursion numbers shown in Tables 8-5 and 8-6 at page 77. Table 8-5 shows 41 incursions on the North Airfield from 2002 through 2008. In contrast, Table 8-6 shows 36 incursions on the North Airfield during that period. No source is shown for those numbers. LAX Runway Incursions Reports provided to the Panel by LAWA show that there were 16 incursions on the North Airfield from 2002 through 2008.[3]

May 2007, URS Corporation; *LAX North Airfield Special Peer Review Summary Report*, March 13-15, 2007, Peer Review Group

[2] Unless otherwise indicated, all page references are to the Study.

[3] The LAX Runway Incursions Reports are available on the LAWA website at lawa.org/airops.aspx?id=1112

Total Number of Incursions North Airfield

Year	2002	2003	2004	2005	2006	2007	2008
Table 8-5	4	5	4	9	4	10	5
Table 8-6	3	8	2	7	3	9	4
LAX Runway Incursions Reports	1	2	2	1	2	5	3

The Study does not explain these differences.[4] If "Total Number of Incursions North Airfield" is intended to mean "Number of Heavy Aircraft Incursions North Airfield" and "Number of Group V Aircraft Incursions North Airfield" in Tables 8-5 and 8-6 respectively, the total number of incursions on the North Airfield would be even greater when combined with runway incursions involving aircraft other than Heavy and Group V Aircraft. Even if "Total Number of Incursions North Airfield" is intended to mean "appearances", as defined on page 77[5], not incursions, the numbers shown in Tables 8-5 and 8-6 would still differ markedly from the LAX Reports. For example, there could not have been nine [9] "appearances" in the single 2005 incursion on the North Airfield. Also, the Study states at page 43 that "Group V is a subset of 'heavy.'" If the totals shown in Tables 8-5 and 8-6 are actually Heavy and Group V incursions, there would have been three [3] more Group V incursions than Heavy incursions in 2003. Eight cannot be a subset of five.[6]

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[4] The Study states that it relied heavily on empirical evidence based on historical experience at LAX. [p.ix]

[5] The term "appearances" does not occur elsewhere in the Study, nor in any LAWA or FAA generated documents.

[6] The incursion percentages in Tables 8-5 and 8-6 are also confusing. For example, does the data for Heavy Incursions on the North Airfield in 2003 reflect 0.2 percent, or was it 20 percent? Similarly, was the 2003 Group V Incursion percentage on the South Airfield .07 percent, was it 7 percent? If the Total Number of Incursions on the South Airfield was 20, as shown in Table 8-6, and .07% involved Group V Aircraft, that would mean that .014 Group V aircraft were involved. If 0.07 actually means 7%, there would have been 1.4 Group V aircraft involved. Both are confusing, in that runway incursions must necessarily be expressed in whole numbers.

If we assume that "Total Number of Incursions" actually means total number of incursions, the total numbers of incursions shown in Tables 8-5 and 8-6 on the North and South Airfields combined would differ from each other, and would be significantly greater than reported in the LAX Runway Incursions Reports:

Total Number of Incursions at LAX

Year	2002	2003	2004	2005	2006	2007	2008
Table 8-5	23	24	13	28	16	36	10
Table 8-6[7]	23	28	17	27	16	36	12
LAX Runway Incursions Reports	6	11	5	6	9	12	7

The numbers of North Airfield incursions shown in Tables 8-5 and 8-6 also differ markedly from the numbers published by LAX. Table 8-5 shows that there were forty-one [41] runway incursions on the North Airfield from 2002 through 2008. Table 8-6 shows that there were thirty-six [36] during that time. The LAX Reports show that there were sixteen [16], and previous studies were based on that number.[8]

Total Number of Incursions North Airfield

Year	2002	2003	2004	2005	2006	2007	2008
Table 8-5	4	5	4	9	4	10	5
Table 8-6	3	8	2	7	3	9	4
LAX Runway Incursion Reports	1	2	2	1	2	5	3

According to LAX Runway Incursion Reports: (1) there was one [1] runway incursion on the North Airfield in 2002 (B-757 and B-747); (2) there were two [2] runway incursions on the North Airfield in 2003 (Canadair CRJ2 and B-737; Military C-12 and A-320); (3) there were two

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[7] "Group V Incursions (%) North Airfield" in Table 8-6, Row 3 should be changed to "Group V Incursions (%) South Airfield."

[8] *See, e.g., Analysis of LAX North Airfield Alternatives*, May 2007, International Aviation Management Group, Inc., p.14, Figure 10

[2] runway incursions on the North Airfield in 2004 (B-737 and B-739; B-747 and B-737); (4) there was one [1] runway incursion on the North Airfield in 2005 (two B-737s); (5) there were two [2] runway incursions on the North Airfield in 2006 (B-737 and Embraer E120; B-737 and A-320); (6) there were five [5] runway incursions on the North Airfield in 2007 (B-737 and Turboprop; A-340 and Turboprop; B-737 and A-320; two B-737s; B-737 and Turboprop); and (7) there were three [3] runway incursion on the North Airfield in 2008 (A-320 and MD-80; B-737 and Turboprop; B-777-300 and MD-80).[9]

Finally, the total numbers of runway incursions at LAX during 2004 through 2007 shown in Tables 8-5 and 8-6 conflict with those shown in the *FAA Runway Safety Report, June 2008*[10] [cited in the Study at page 35]:

Total Number of Incursions at LAX

Year	2004	2005	2006	2007
Table 8-5	13	28	16	36
Table 8-6	17	27	16	36
FAA Runway Safety Report, June 2008[11]	7	8	8	8

In summary, without knowing the source, or sources, of runway incursion data used in the Study, it is impossible to verify the data, or to reconcile the differences between Table 8-5, Table 8-6 and the LAX Runway Incursions Reports and *FAA Runway Safety Report, June 2008*. Use of officially published LAX and FAA runway incursion data as the baseline for the Study would provide greater, readily verifiable, support for the Study's finding that the North Airfield is safe.

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9 *Source* - LAX Runway Incursions - 2002 - 2008

10 *FAA Runway Safety Report, June 2008*, Appendix D, p. D-5

11 Runway incursions shown in the *FAA Runway Safety Report, June 2008* are listed for Fiscal Years. Tables 8-5 and 8-6 show incursions in calendar years. However, that slight variation does not explain the vast difference between incursions shown in Tables 8-5 and 8-6 and those shown in official FAA records.

III. THE STUDY DOES NOT ANALYZE THE ***CAUSES*** OF PAST RUNWAY INCURSIONS AT LAX.

The Study does not analyze the causes of past runway incursions at LAX, and if and how North Airfield reconfiguration might affect those causes. Pilot deviations account for 58% of runway incursions, operational errors account for 23%, and "vehicle/pedestrian deviations" account for the remainder.[12] [Note that the FAA does not directly attribute any runway incursions to airfield configuration.] Recent LAX Runway Incursions Reports show that: (1) both of the two runway incursions that occurred on the North Airfield in 2006 were caused by controller error; (2) the five runway incursions that occurred on the North Airfield in 2007 resulted from pilot deviation/error; and (3) two of the three runway incursions that occurred on the North Airfield in 2008 were the result of pilot error, the other was attributed to "Operational Error/System Error."[13] The FAA has stated that airport layout and design can play a contributory role in runway incursions.[14] However, the Study does not consider whether runway reconfiguration under the various alternatives might prevent, ameliorate or exacerbate the conditions under which those errors occurred, or are likely to occur. Similarly, the Study does not examine the causes of runway incursions on the South Airfield, both before and after separation of the runways and installation of a centerline taxiway, and how those occurrences might inform the North Airfield runway incursion analysis.

IV. RUNWAY FATALITY ESTIMATES DISTRACT FROM THE STUDY'S IMPORTANT CONCLUSION.

Runway fatalities is not a proper metric by which to assess airfield safety. The Study is replete with terms such as "fatal runway collisions", "runway fatalities", "lives per decade", "death risk per flight", "total deaths", "casualties", "dying", "perish", "mortality risks", *etc.*. Section 6 (Safety Analysis; The Baseline Case) [p.33] is devoted almost entirely to fatal runway collisions.[15] Section 12 [Comparative Summary of Safety Assessments] compares the risks to air

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[12] *Source - Final Environmental Impact Report (Final EIR), Los Angeles International Airport (LAX) Proposed Master Plan Improvements*, Part II, Volume 11, p. 3-6590.

[13] *Source* - LAX Runway Incursions - 2006, 2007, 2008

[14] *See*, fn 12

[15] "The focus is on *fatal* runway collisions . . ." (emphasis in original) . . . "what would be the baseline frequency of fatal runway collisions on the LAX North Airfield . . . what would be their consequences in lives lost?" [p.33]

travelers in terms such as "*deaths per decade*" (emphasis in original) [p.108] and "*one life every four years*" (emphasis in original) [p.109] This body count approach introduces a "death vs. cost" element into the decision making process and could foster an "even one death is to many" mentality in those using the Study to decide which configuration to adopt, or to justify one configuration over another. The Study confirms that possibility by stating "[t]he question is whether the sums spent in the reconstruction might save many more lives if used in other ways." [p.109] Given that eight of the nine questions presented to the Panel [p.4] focus on runway incursions and the risk of runway incursions, the focus of the Study should be on the relative risks of runway incursions [not mortality risks] for the various North Airfield configurations, without regard to potential fatalities.

Even the most serious FAA runway incursion classification, Category A [Separation decreases and participants take extreme action to narrowly avoid a collision, or the event results in a collision] [p.35] does not include fatalities. The Study relies heavily on the paper "Fatal US Runway Collisions Over the Next Two Decades" co-authored by Dr. Arnold Barnett, one of the Panel members. [Study, Appendix B]. However, the focus of that paper is runway fatalities. Here, the focus of the Study is comparative runway safety and, more narrowly, assessment of runway incursions. The Study should assess the risk of runway incursions under each North Airfield configuration and use reliable historical data to estimate the number of likely incursions in each runway incursion category. If reliable data is available showing the ratio of collision and non-collision Category A incursions, the Study could estimate the numbers of each, and stop at that. To go further by estimating the potential number of fatalities is too speculative for this type of study, especially where the Study makes no assumptions regarding factors such as aircraft types, sizes[16], runway and taxiway locations, closing velocities, points of impact, passengers and fuel on board, along with factors such as the possibility of fire, the effectiveness of emergency response personnel in saving lives, and other survival factors. Runway fatality estimates should not be included in the Study. To use a Panel metaphor, the risk of runway incursions is the cake. Runway deaths are the icing on the cake. LAWA and NORSAC ordered the cake without icing.

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[16] The statement that when two planes of unequal size collide, the percentage killed is generally far higher on the larger plane than on the smaller one [p.45] is contradicted by the sentence that follows: "In the 1991 collision at LAX . . . the death rate was 100% on the small computer plane and 25% on the 737 jet that crashed into it." It seems likely that the percentage killed would be generally higher in the smaller aircraft because of the probability of greater damage to, and fewer passengers aboard, the smaller aircraft, as was the case in the 1991 accident.

V. IF RUNWAY DEATH ESTIMATES CONTINUE TO BE A MEASURE FOR THE STUDY, THE DEATH TOLL IN THE FEBRUARY 1, 1991 AIRCRAFT ACCIDENT AT LAX SHOULD NOT BE INCLUDED.

Even if the Study were to continue to consider fatalities as a measure of safety, the death toll in the February 1, 1991 aircraft accident at LAX should not be included in the Study. That is because: (a) the accident was caused by factors unrelated to airfield configuration; (b) the accident occurred prior to installation of AMASS and ASDE-X radar; and (c) use of the death toll artificially inflates the runway death estimates.

A. The February 1, 1991 Aircraft Accident at LAX Involving US Air Flight 1493 and Skywest Flight 5569 Was Caused by Controller Error, and Was Unrelated to Airfield Configuration.

The 1991 accident was not the result of a runway incursion of the types identified in the Study, *i.e.*, where a pilot proceeds to cross a runway after having observed a red runway entrance light [*i.e.*, "bust the hold bar"], or has exited an outboard runway at a high speed, failed to slow down and proceeds to cross the inboard runway ["Exit No Stop" ("ENS")] [p. 74]. The accident occurred after a local controller [LC2] failed to maintain an awareness of the traffic situation when she forgot that she had placed SKW5569 into position for takeoff on Runway 24L and issued a landing clearance to USA1493 on that same runway.[17]

Second, airfield configuration was not a contributing factor in the 1991 accident. In fact, airfield configuration was not even considered by the NTSB in its investigation.[18] No airfield configuration could prevent a collision when a controller clears an aircraft to land on top of another aircraft positioned for takeoff.

Third, the Study improperly uses fatality data originating prior to the installation of the Airport Movement Area Safety System (AMASS) at LAX to estimate fatalities that are likely to occur in the future after AMASS has been installed. The NTSB stated that AMASS, which was being tested by the FAA at the time the NTSB issued its Report, could provide warnings to preclude accidents similar to the SKW5569/USA1494 collision. Further, the Study's "fatal runway collisions" estimate "assumes high effectiveness for new technologies like AMASS" [p. xii]. Thus, according to both the NTSB and the Panel, it is extremely unlikely that an accident

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[17] *See* NTSB Aircraft Accident Report AAR-91/08, pp. 74-76 - Conclusions, Findings and Probable Cause.

[18] *See* NTSB Aircraft Accident Report AAR-91/08, p.*vi*.

such as the 1991 accident would occur in the future on the North Airfield complex equipped with AMASS.[19]

Because: (1) the subject of the Study, runway configuration, was not a factor in the 1991 accident; (2) the 1991 accident did not result from a runway incursion of the types studied by the Panel; and (3) AMASS and other new airport surface traffic detection and automation technologies have since been installed on the North Airfield, the death toll from the 1991 accident should not be included in the Study.

B. Use of the 1991 Accident Death Toll Artificially Inflates the Runway Death Estimates.

Use of the high death toll from the 1991 accident serves only to inflate the runway death estimates. On the one hand, the Study finds that: (a) the Baseline configuration is extremely safe [pp. 153, 155], or exceedingly safe [p. xix]; (b) the 100-North configuration is 40% safer than the Baseline [p. xv]; (3) the 340-North configuration is 55% safer than the Baseline [p. xvi]; (4) Category A and B runway incursions have declined at 32 of the largest U.S. airports subsequent to installation of AMASS [p.35]; (5) the Study assumes that AMASS and ASDE-X are in use [p.34] ; and (6) the FAA believes that the combination of AMASS, ASDE-X and runway status lights can cut by approximately 7/8 (87.6%) the risk of runway collisions that prevailed prior to their introduction [p.34]. On the other hand, however, the Study estimates that runway deaths will increase from none [there have been no deaths attributable to the airfield configuration at LAX in recent decades, including pre-AMASS] to **five** per decade with the current runway layout, **three** per decade with 100-N, and **two and one-half** per decade with the 340-N configuration. [p. 108] This estimated increase in runway deaths, even at 2020 traffic levels, is inconsistent with the increased safety findings, and appears to be a function of introducing the death toll from the "worst runway accident in US aviation history" [p. 30] into the calculation.

VI. THE STUDY SHOULD DEFINE KEY TERMS USED IN THE STUDY.

The Study should also define certain key terms as they are used in the Study, perhaps in a separate introductory "Glossary." Doing so would add clarity and consistency to the Study and make the Study more understandable to the reader. For example, the Study sometimes refers to "safety" in terms of runway incursions, at other times in terms of runway collisions, and all to often in terms of runway fatalities. [See Section IV above] Moreover, the Study's surrogates for "safety", its broadly defined dependant variable, vary from "Fatal Collisions" to "AB Collision Risk" to "Incursion Risk" to "ENS Incursion Risk" and are used interchangeably throughout the

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[19] The Study assumes that AMASS is installed. [p. 73]

Study. "Safety" should be defined consistently throughout the Study, preferably in terms of runway incursions[20], not in terms of collisions and deaths.

VII. ESTIMATES OF COST SAVINGS TO AIR CARRIERS ARE EXTRANEOUS TO THE ANALYSES OF AIRFIELD SAFETY.

Estimates of the annual cost savings, presumedly to air carriers, [*see* pp. xvii, 119-120, 134-136] are outside the stated goals of the Study, *i.e.*, to estimate the level of future safety of several alternate configurations of the LAX North Airfield and to provide useful information about the capacity implications of the various configurations. [pp. xiv, 153] Estimates of cost savings introduce an extraneous factor, unrelated to safety or capacity, which should not, but might, be considered by decision makers in deciding how to use the Study. Just as the Panel was "not expected to estimate the dollar cost of reconfiguring the North Airfield" [p. 5], cost savings to air carriers are not a relevant consideration in the Study.

VIII. COMPARISONS OF RUNWAY INCURSION RISKS TO RISKS NOT ASSOCIATED WITH AIRPORT RUNWAYS ARE POTENTIALLY MISLEADING.

The Study should adhere to the "how much safer is X than Y?" and "how safe was Y in the first place?" approach described at p.3, where Y = the existing Baseline configuration and X = the alternative configuration under evaluation, *i.e.*, 100'-North or 340'-North. The Panel was not asked to assess the "relative risk compared to other safety hazards that face Los Angeles residents" or "runway risk relative to other mortality risks that air travelers face" [p.3]. Introduction of such unrelated risks involving events that occur outside airports has the potential to mislead or influence decision makers who rely on the Study.

For example, comparing the mortality risks to LAX passengers to "other mortality risks that face residents of Los Angeles" [p.47] is of questionable value, in that (1) not all residents of Los Angeles use LAX; and (2) many, if not most, LAX passengers are not residents of Los Angeles. The focus of the Study should be on the comparative safety of the various North Airfield configurations. Comparing LAX runway risks to the risks of dying in an auto accident or "the menace posed by the San Andreas Fault" [p. 46] is like comparing LAX runway risks to the risk of typhoons to Kansas travelers, or the risk of hurricanes to Southeast travelers. It serves no analytic purpose in assessing comparative runway safety.

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[20] Eight of the nine questions presented to the Panel [p.4] focus on runway incursions and the risk of runway incursions.

IX. THE STUDY SHOULD ASSESS CONTROLLER WORKLOAD AND ITS IMPACT ON RUNWAY SAFETY IF THE GC3 GROUND CONTROLLER POSITION IS NOT STAFFED.

The Capacity and Workload Assessments analysis [Section 13] assumes the addition of a new ground control position [GC3] to deal with the added complexity of a new midfield terminal and additional gates on the west side of the Tom Bradley International Terminal [p.123]. The GC3 position was "created" in the FCC simulation [p.20], and assumes that the GC3 position is filled. The Study states that the GC3 position "will be critical in future operations at Los Angeles International Airport . . ." [p.127]. The Study does not analyze LAX air traffic controller workload if the GC3 position is not staffed. Given historical air traffic controller staffing levels at LAX, the Study should also analyze controller workload without the GC3 controller, *i.e.*, at the current air traffic controller staffing level, and its impact, if any, on North Airfield safety if the GC3 position is not staffed.

X. THE STUDY FAILS TO EXPLAIN WHY TAXI TIMES TO AND FROM 100-N WOULD BE LONGER THAN TAXI TIMES TO AND FROM 340-N.

Figure 13-7 [p. 118] shows taxi-in times of 630 seconds from 100-N and 612 seconds from 340-N. Figure 13-8 [p.119] shows taxi-out times of 1257 seconds to 100-N and 1198 seconds to 340-N. The Study does not explain why taxi times to and from 100-N are longer than taxi times to and from 340-N, which is located farther from the gates where taxi times begin and end.

XI. EDITORIAL ERRORS CONFUSING RUNWAY 24R AND RUNWAY 24L SHOULD BE CORRECTED.

The confusion of Runways 24R and 24L frequently throughout the Study are likely typographical errors that do not change the Panel's analysis. However, they are confusing to the reader and should be corrected to enhance understanding of the Study.

Examples: Page xiv, last paragraph, line 2; "planes landing on Runway 24L" should read "planes landing on Runway 24R"

Page xv; Heading at top of page should read "Moving Runway 24R 100 Feet North"

Page 6, 4th and 3rd lines from bottom; should read "if runway 24L is unsafe for entry or crossing"

Page 157, Section 17.4.2, line 4 - "24R" should be changed to "24L"

Page 157, Section 17.4.2, line 6 - "24R" should be changed to "24L"

Page 157, Section 17.4.3 heading should be changed to "Moving Runway 24R 100 Feet North (100-N)"

Page 158, Section 17.4.4 heading should be changed to "Moving Runway 24R 340 Feet North (340-N)"

Page 158, Section 17.4.4 lines 3-4 should read pilots crossing 24L"

Page 158, Section 17.4.5 heading should be changed to "Moving Runway 24L 340 Feet South (340-S)"

XII. ADDITIONAL EDITORIAL SUGGESTIONS.

Pages xii and 155 - A decrease from 67 to 12 runway incursions is an 82% [not 80%] decrease.

Page 7, mid-page - "a departure on 25L" should read "a departure on 25R"

Page 46, Section 6.11., 2nd paragraph, line 3 - "350 million" should read "750 million". [750 million ÷ 5 = 150 million]

Page 56, 2nd paragraph, lines 5-6 - "arrivals on runway 25R" should read "arrivals on runway 24R"

Page 88 - When read in context, it appears that the last sentence of the paragraph beginning "[i]n both of these equations . . ." should read "we did **not** consider incursions involving ground vehicles".

Page 90 - It appears that the last word in the first paragraph should be changed from "south" to "**north**".

Page 92 - When read in context, it appears that the last sentence on page 92 should read "Alternative D did **not** mention any difference . . ."

In summary, the Cities thank the Panel Members for their efforts, and are confident that the preceding comments will be incorporated into the analysis in any following addendum to the Study.

Sincerely,

CHEVALIER, ALLEN & LICHMAN, LLP

Berne C. Hart

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