REVISED TRAFFIC ANALYSIS FOR AIR QUALITY CONFORMITY REVIEW OF SEA-TAC MASTER PLAN UPDATE

prepared for
THE AIRPORT COMMUNITIES COALITION

by

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INTRODUCTION AND EXECUTIVE SUMMARY

We have reviewed the ground transportation related elements of the *Sea-Tac Airport Master Plan Final EIS* and the related documents and data provided by the Federal Aviation Administration (FAA). In our review, we have discovered a number of fundamental flaws which affect the ground traffic analysis and, as a consequence, the air quality conformity analysis.

- There is a substantial inconsistency between the treatment of the Do Nothing Alternative and the North Unit Terminal Alternative (the "Preferred Alternative" in the FEIS) in the encoding of the Traffix forecast model for year 2010. (Traffix is the simulation model used to predict and analyze traffic and provide input to the air quality conformity analysis (the CAL3QHC model)). The nature of the inconsistencies in treatment in the Traffix model bias the outcome in favor of the North Unit Terminal Alternative and to the disadvantage of the Do Nothing Alternative. The nature of the inconsistencies are documented in detail subsequently herein. In response to this issue, we have prepared an updated North Unit Terminal Traffix analysis which attempts to bring consistent treatment to the assessment of the North Unit Terminal Alternative and the Do Nothing Alternative. The results of this effort are described below. It should be noted that although we have attempted to eliminate the largest biasing inconsistencies, time has precluded us from addressing many of the smaller ones. A completely consistent treatment would result in an even less favorable representation of the North Unit Terminal Alternative relative to the Do Nothing Alternative than our analysis presents.

- A primary cause of the difference in traffic performance between the North Unit Terminal Alternative and the Do Nothing Alternative in the FEIS and air quality conformity analysis is the inclusion of a connector road between the existing terminal and the intersection of S. 188th Street with 28th Avenue S. in the North Unit Terminal Alternative (but not as part of the Do Nothing Alternative). Documentation from the Port of Seattle Commission Agenda for the meeting of 3-12-96, Item 8b, (comprised of a memorandum from Doug Holbrook, Mike Ehl and Walter Ritchie to M.R. Dinsmore along with attached engineering reports by Tudor Engineering, P&D Consultants and ICF Kaiser) addresses the subject of this south access road. That documentation makes clear that the Port of Seattle is actively considering this south access roadway in response to existing traffic problems at the existing terminal. There is nothing in the nature of this proposed south access that would make it a feature or asset exclusive to the North Unit Terminal Alternative. An objective traffic analysis for year 2010 would have included this south access road as an element of **both** the Do Nothing and North Unit Terminal Alternatives. We have prepared a revised 2010 Do Nothing Traffix forecast which includes the south access as part of the Do Nothing street system. These results are also shown below.

- The basic reason for undertaking the proposed SEA-TAC airport project, according to the FEIS, is because under the existing runway configuration adverse weather conditions impair inbound aviation operations about 44 percent of the time. During adverse weather, according to the FEIS, landing capacity is reduced at least 20 percent

(often 40 or 60 percent). Without commenting at this point on the FEIS contention that the same number of air passengers would be served regardless of weather impairment - the consequence is just delay - we note that it is undeniable that in the pm peak commute hour, under conditions of weather impaired flight operations, the numbers of arriving air passengers released onto the ground traffic system would be reduced by at least 20 percent. When a condition that is substantially different from normal occurs as frequently as 44 percent of the time, it should be analyzed as a separate case in an EIS. The fact that the Do Nothing case would have considerably less traffic than "normal" nearly half the time is of particular significance in the air quality analysis where the frequency of violation is a key element. We have prepared an assessment of the Do Nothing alternative traffic for year 2010 under conditions where weather impaired flight operations reduce the numbers of pm peak hour arriving air passengers departing the Airport complex on ground transportation vehicles by at least 20 percent. These results are also presented below.

- The entire FEIS analysis has been based upon the premise that the number of air passengers and the number of airport employees operating the facility would be essentially identical under the North Unit Terminal and Do Nothing Alternatives. This premise is unsustainable. An alternative involving more gate positions unquestionably would involve more ground crews, more gate attendants, more security personnel, more concessionaires, more janitors and the like. This was not taken into account in the FEIS. We have taken EPA comments on the DEIS into consideration, as well as forecast estimates by Dr. Clifford Winston[1] which indicate that the difference in air passenger activity between the North Unit Terminal and Do Nothing Alternatives could be as great as 33 percent. Moreover, if increased air operations capacity is provided and the probability of a high frequency of weather-induced delay is eliminated, the air carriers are likely to schedule more of their service in the peak periods when people naturally want to travel. All of the foregoing elements would tend to cause greater peak hour ground traffic in the North Unit Terminal case than in the Do Nothing case. None of these clear differences between the North Unit Terminal and Do Nothing Alternatives have been addressed in the FEIS or air quality conformity work. In response, we have prepared an alternative North Unit Terminal forecast involving a 30 percent increase in peak period passenger traffic, a corresponding increase in service personnel and a lesser increase in air cargo and maintenance operations at the airport. Results of that forecast are also summarized below.

- The intersections selected by the FAA for air quality analysis using the CAL3QHC model are intended to be indicators for how the airport alternatives affect air quality at similar intersections throughout the area affected by a substantial volume of airport traffic. The selected locations are all in the Highway 99 (International Boulevard) corridor at its intersections with S. 160th, 170th, 188th and 200th Streets. If one examines the locations of these intersections with respect to the configuration of the street networks under the Do Nothing and North Unit Terminal Alternatives, it is obvious that the particular "indicator" intersections selected are clustered in a corridor that is a prime airport access corridor under the Do Nothing Alternative but is a de-

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[1] Dr. Clifford Winston, Evaluation of the FAA's Forecasts of Traffic at Sea-Tac Airport (Mar. 15 1996).

emphasized corridor with the North Unit Terminal Alternative. The North Unit Terminal Alternative completely eliminates the connection between Highway 99 and the airport at S. 170th Street, limits access from Highway 99 to the terminal just north of S. 188th street to one way only (both these accesses are fully open in the Do Nothing Alternative) and adds a south access to S. 188th Street at 28th Avenue S. (not included in the FEIS version of the Do Nothing Alternative). This south access allows much traffic to bypass the air quality assessment intersections of Highway 99 with S. 188th and S. 200th Streets. Including the south connection in the Do Nothing Alternative (as we have done) provides a more representative comparison of traffic and air quality effects at the designated indicator intersections. However, adding other intersections to the air quality analysis is necessary to provide an objective assessment. The FEIS and the present conformity analysis examined only intersections along a route where it could have been predicted (without ever running a traffic forecast model) that, given the way the 2010 street networks were defined for the FEIS, the North Unit Terminal Alternative would show an advantage. We have provided analysis for the intersection of Military Road and S. 188th Street as an example of what an objective, broader-seeking analysis would have found. This analysis has input to the CAL3QHC procedure.

SUMMARY OF UPDATED ANALYSIS FINDINGS

FAA provided computer disc copies of the actual Traffix model input, command and output files that are the product of the traffic analysis for and basis for the traffic findings in the FEIS and input to the CAL3QHC air quality analysis. Our scrutiny of these files led to identification of many of the issues of concern cited above. We then loaded the Traffix files provided by FAA on our own licensed copy of the Traffix software, made modifications to the input data structure addressing most of the concerns expressed above and executed revised forecast/analysis runs for some of the alternatives and forecast years.

Table 1 summarizes key findings of our analysis for the year 2010, presenting vital peak period traffic performance data including volume to capacity relationship (vol/cap) and average delay per vehicle (in seconds) for the four air quality indicator intersections specified in the FEIS plus the intersection of Military Road and S. 188th Street. Comparison of the information on the table leads to the following conclusions:

- In its comparative assessment of North Unit Terminal and Do Nothing traffic in the FEIS, FAA's analysis showed North Unit Terminal traffic performance to be superior by large margins at all four of the intersections selected for air quality study (compare columns 1 and 4 for the top four intersections). The results of our independent analysis show that the uniform and clear superiority indicated by FAA in the FEIS no longer prevails when consistent treatments are applied in encoding the alternatives in the Traffix model or when the potential differential in air traffic activity inherent in the two alternatives is considered.

- With consistent forecasting assumptions (relative to those used with the Do Nothing Alternative) regarding trip generation rates, origin-destination patterns, off-site parking by air travelers and baseline traffic, the traffic performance of the North Unit Terminal Alternative is considerably inferior to that represented in the FEIS (compare data in

TABLE 1: COMPARATIVE ANALYSIS - YEAR 2010 FORECASTS

Intersection	FEIS-DN	S-DN[1]	S-DN 2[2]	FEIS-NUT	S-NUT 1[3]	S-NUT 2[4]
Hwy.99/S.160'th						
delay/vehicle	81.9	81.9	73.6	112.8	128.4	154.6
volume/capacity	1.172	1.172	1.143	1.235	1.267	1.314
Level Of Service	F	F	F	F	F	F
Hwy.99/S.170'th						
delay/vehicle	350.1	281.9	255.5	187.6	259.9	348.2
volume/capacity	1.420	1.413	1.363	1.301	1.439	1.568
Level Of Service	F	F	F	F	F	F
Hwy.99/S.188'th						
delay/vehicle	468.4	466.3	398.8	322.5	449.9	575.9
volume/capacity	1.628	1.597	1.573	1.446	1.579	1.676
Level Of Service	F	F	F	F	F	F
Hwy.99/S.200'th						
delay/vehicle	207.2	197.4	175.8	164.7	195.7	222.2
volume/capacity	1.414	1.405	1.362	1.346	1.402	1.442
Level Of Service	F	F	F	F	F	F
188'th/Military Rd.						
delay/vehicle	243.9	271.5	235.4	197.1	283.3	337.8
volume/capacity	1.482	1.517	1.465	1.411	1.534	1.592
Level Of Service	F	F	F	F	F	F

[1] S-DN = Do Nothing Alternative with south access connecting terminal to intersection of S. 188'th and 28'th Ave. S.

[2] S-DN 2 = Do Nothing with south access to S. 188'th and 20% weather impairment on inbound air passenger arrivals (ground traffic departures from terminal).

[3] S-NUT 1 = FEIS NUT (2010) with Traffix model input adjusted for consistency with Do Nothing input.

[4] S-NUT 2 = 2010 North Unit Terminal with assumption of increased airport activity over Do Nothing.

columns 4 and 5 in Table 1). On all 5 intersections the column reflecting consistent assumptions and encoding shows North Unit Terminal performance considerably inferior to that represented in the FEIS.

- With consistent forecasting assumptions, comparison of the 2010 North Unit Terminal Alternative (S-NUT 1) to the FEIS Do Nothing shows virtually equal performance (compare data in columns 1 and 5). Each alternative has two intersections operating at conditions clearly superior to the other and the fifth has virtually indistinguishable performance. This result is in sharp contrast to the original FEIS results which portrayed the North Unit Terminal as superior in all cases.

- If the assumption is made that the North Unit Terminal would attract a moderately higher level of peak hour activity than the Do Nothing and had higher levels of staffing to service that higher activity and the increased gate positions and physical area of the North Unit Terminal Alternative, the results would be as indicated in column 6 of Table 1 (S-NUT 2). Traffic performance for the Do Nothing Alternative as defined in the FEIS (column 1 on the table) would be clearly superior to the North Unit Terminal Alternative (column 6) at four of the five intersections and essentially equivalent at the fifth.

- If conditions of weather impairment to arriving flights is considered, the Do Nothing would have superior traffic performance at four of the five intersections and essentially equal performance at the fifth compared to the North Unit Terminal Alternative under consistent model assumptions (compare column 3 with column 5). If the North Unit Terminal Alternative is assumed to have moderate increases in passengers and corresponding employment over the Do Nothing, the comparison (column 3 with column 6) shows the Do Nothing to have superior traffic performance over the North Unit Terminal at all five locations. Under the Do Nothing configuration when weather conditions result in 40 percent and 60 percent impairment of arriving flights, the results of this comparison would be even more significantly in favor of the Do Nothing alternative. (We have run such versions of the model; the detailed results are not presented in Table 1 for simplicity).

- If the Do Nothing analysis for 2010 had included the south connection to the terminal, the comparison between the Do Nothing and North Unit Terminal cases would have been even more favorable to the Do Nothing (compare others to S-DN, column 2 in the table).

BACKGROUND DETAILS ON THE REVISED ANALYSIS

The foregoing presented a summary of our analysis in the SEA-TAC matter. This section provides a more detailed discussion of the problems we identified in the FEIS analysis and a description of how we compensated for them in our revised analysis.

Inconsistent Treatments

There are a number of significant inconsistencies in the forecast modeling treatment of ground transportation alternatives in the FEIS which unreasonably bias the results in favor of the

"Preferred" North Unit Terminal Alternative as compared to the "Do Nothing" Alternative. Since the output of the ground traffic analysis is a fundamental input to the air quality analysis, these biases would carry over to the air quality analysis comparisons of the North Unit Terminal and Do Nothing Alternatives and could lead to incorrect conclusions regarding air quality conformity assessments. In our analysis we have attempted to rectify the effects of the following instances or types of inconsistency in the FEIS work.

1. The FEIS ground traffic analysis makes inconsistent assumptions between the Do Nothing and North Unit Terminal Alternative about the traffic generating characteristics of certain airport related activities. It also makes inconsistent and unusual assumptions about air passenger use of off-site parking. The result of these inconsistent assumptions is that the North Unit Terminal Alternative is said to generate less traffic than the Do Nothing Alternative The FEIS projects 10027 pm peak hour trips in August, 2020, for the North Unit Terminal versus 11081 for the Do Nothing. That is, the FEIS projects the Do Nothing would generate 1059 more peak hour trips! Because 2816 of the trip total are attributable to non-airport activities near the airport (for example, the Federal Detention Center), the actual difference reflects a counterintuitive assumption that somehow the Do Nothing Alternative would generate about 15 percent more trips than the North Unit Terminal project. This seems completely implausible since the FEIS has asserted that passenger totals would be identical and since the larger complex (the North Unit Terminal) would obviously need a larger work force of ground crews, gate crews, check in attendants, security personnel, janitorial and maintenance personnel and the like.

More of the Do Nothing Alternative's traffic is said to originate at the off-site parking lots which are in close proximity to the intersections which have been selected by the FEIS preparers as the indicator intersections for the air quality conformity assessment. Both these assumptions bias the assessments of ground transportation impacts and air quality conformance in a manner which favors the North Unit Terminal Alternative. Specific elements of inconsistency include the following:

- Physical changes in the airport configuration under the North Unit Terminal Alternative would increase the number of maintenance employees located at the South Airport Services Area (SASA) from 1651 with the Do Nothing Alternative (DN) to 2200 with the North Unit Terminal Alternative (NUT). Yet by assuming a different rate at which employees would make trips during the peak period, the FEIS preparers make the contra-intuitive assertion that SASA with 2200 maintenance employees in NUT would generate 86 **fewer** trips than it would in DN with only 1651 employees. (This assertion is made both for forecast years 2010 and 2020.) If the trip generation rate used for the DN been applied consistently with the NUT, this unit would generate 88 **more** trips with NUT than with DN. There is no inherent feature of the NUT alternative which would justify use of a different peak period tripmaking rate for these employees. Hence, this rate change must be viewed as an arbitrary one biasing the analysis in favor of the Preferred Alternative. We have used a single consistent rate for both cases in our analysis.

- A similar inconsistency is evident in the accounting of ground tripmaking for other activity in SASA. Despite the fact that the NUT Alternative intensifies the land uses in SASA as compared to DN, the FEIS traffic analysis shows pm peak non-maintenance-employee tripmaking for SASA is 655 **less** for the NUT than DN in 2010 and 141 **less** for NUT than DN in year 2020. No explanation is offered to justify this

counterintuitive result which obviously tends to bias the ground traffic and air quality analyses in favor of the Preferred NUT Alternative.[2] We have assumed consistent employment in this area in our revised analysis.

- The FEIS ground transportation analysis of the DN alternative for years 2010 and 2020 assumes that a substantial degree of off-site parking by air travelers will take place at a number of sites in the Highway 99/International Boulevard corridor. In the analysis of the NUT for years 2010 and 2020, the FEIS assumes that a high percentage of those who would park off-site in the DN alternative will be attracted into the airport terminal parking facilities. This assumption is contrary to well understood behavior patterns. Most people who park off site at major airports do so because parking off site is considerably less expensive than in the terminal; not because terminal parking is unavailable. So increased availability of terminal parking space in the NUT alternative is not likely to alter behavior and attract parkers who favor less expensive off-site parking.

  The off-site parking lots used by air passengers are located in the Highway 99 corridor. This is the corridor where the indicator intersections selected by the FAA for evaluation in the air quality analysis are located. The assumption that many fewer air travelers would park at off-site lots in the North Unit Terminal case than in the Do Nothing case has the effect of keeping a proportional amount of North Unit Terminal traffic away from the air quality assessment intersections. It appears that the assumption of less off-site parking in the North Unit Terminal alternative may have been driven by a desire to influence conditions at the air quality assessment intersections in favor of the North Unit Terminal alternative (by having less traffic in the Highway 99 corridor) rather than by any realistic appraisal of traveler motivation in use of off-site parking.

  Moreover, in the 2010 analysis, in carrying out this shift of parking related traffic to shield it from the air quality evaluation points, the FEIS traffic analysis apparently miscalculates its projection of vehicles carrying air passengers accessing and egressing the terminal area. Although the FEIS asserts the number of air passengers arriving and departing in the peak hour would be equal under the DN and NUT schemes, and although the FEIS assumes 166 peak hour vehicle trips by air passengers who park off-site in the DN Alternative would be drawn into the terminal in the NUT scheme, the traffic analysis inexplicably asserts there would be 109 **fewer** air passenger vehicles to and from the terminal with the NUT Alternative than with the DN Alternative (4594 versus 4803). This apparent error also tends to bias the transportation and air quality analysis in favor of the NUT Alternative. In our revision to the analysis we have assumed that consistent numbers of terminal patrons would use the off-site parking in the Highway 99 corridor and that consistent amounts of ground traffic would be generated by air passengers at the terminal under both alternatives.

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[2] Appendix O-B to the FEIS does explain that, subsequent to the publication of the DEIS, the Port Of Seattle was able to obtain new information on airport employee trip generation and that this information was used in preparation of the FEIS. However, it does not explain why the new and more favorable (lower) rate information was applied in the North Unit Terminal case but not in the Do Nothing case.

2. The encoding of route choices that travelers between airport activity areas and regional locations are predicted to use and the assumptions regarding the percentages of airport tripmaking between various airport activity stations and specific locations in the region and the encoding of base traffic volumes are inconsistent between the NUT and DN alternatives in the FEIS analysis. The nature of the inconsistencies are such as to bias the traffic and air quality analyses in favor of the North Unit Terminal Alternative in comparison to the Do Nothing.

To understand the points being made here, it is necessary to understand the nature of the "Traffix" traffic forecasting and analysis software. Most forecasting software projects the way traffic will spread itself over the street and highway system in traveling from one given point to another through an optimizing algorithm. In such procedures, **the computer allocates traffic** over the most plausible routes in an iterative process, considering distance, travel time, congestion and other factors. The Traffix model is one of a different class of forecasting programs in which the **human user specifies the route or routes traffic will follow** through a street and highway system in moving from one given point to another. The computer just does the bookkeeping on the traffic assignments that the human analyst tells it to make. In such user specified assignment programs, the objectivity of comparisons between alternatives is heavily dependent on (or biased by) the understanding, judgement, preferences or biases, habits, penchant for detail and consistency of the human analyst. Where more than one analyst is involved in the work, the objectivity of comparisons between alternatives is further dependent on (or compromised by) the degree of consistency between two or even several human analysts on all of the above characteristics. This type of forecast procedure is readily subject to deliberate human intervention with nuances of internal model details to make one particular alternative emerge seeming to perform in a manner superior to another.

The SEA-TAC project and analysis area is an extremely large one to be analyzed using forecasting methods typified by the Traffix software. The analysis involves large numbers of alternatives. It has been carried out over a lengthy period of time during which the alternatives were doubtless refined and rerun several times. The scale of this forecast model, the large number of alternatives and the duration of the analysis creates a degree of complexity where there is extensive opportunity for unintentional inconsistency in decisionmaking by the human analyst or analysts, to say nothing of direct intervention to advance the relative performance of a particular alternative.

Here is a hypothetical example of one type of subtle difference in encoding of the Traffix model that could accentuate marginal distinctions or blur large distinctions in the traffic performance of alternatives. Assume that four different analysts encode "Traffix" paths between the same two points.

Analyst 1 encodes a single path, the most direct route between the two points and that 100 percent of the trips between them will use it.

Analyst 2 encodes 2 paths, the most direct one and the next most logical route and that 75 percent of the trips will use the most direct route; 25 percent the other one.

Analyst 3 encodes the same paths as Analyst 2 but encodes that 60 percent of the trips will use the most direct path and 40 percent will use the next most logical one.

Analyst 4 also encodes two paths, the same most direct one everyone else recognized and another path that meanders to avoid potentially congested locations. Analyst 4 encodes that 50 percent of the trips will use the most direct path and 50 percent will use the meandering path.

If an identical project alternative is analyzed on the "Traffix" models encoded by the our four analysts and there is some congestion on the most direct route, the results would appear as follows: Analyst 1's results would show the most serious problems. Analyst 2 would show less serious problems than Analyst 1. Analyst 3 would show less serious problems than 2 and much less serious problems than 1. Analyst 4 might show no problem at all.

If the encodings prepared by the different analysts are used to evaluate different alternatives, Analyst 4's might show that an alternative involving much higher volumes of trips as performing similarly to or better than an alternative involving far fewer trips but analyzed on the model as encoded by Analyst 1.

A high degree of consistency in the encoding is essential if accurate conclusions are to be drawn in comparisons between a "do nothing" and a "preferred" alternative. But in fact there is substantial inconsistency in the Traffix encoding for Sea-Tac.

The following are examples of inconsistencies and problematic nuances of the Traffix encoding for the FEIS which appear to bias the comparison of traffic and consequent air quality performance of the Do Nothing and North Unit Terminal Alternatives.

- In the 2010 analysis, where multiple paths are encoded, the split between primary path and secondary path encoded for the Do Nothing Alternative gives more intense traffic on the primary path than the comparable encoding for the North Unit Terminal Alternative. For example, in the encoding for Traffix Zone 2 (representing trucks to and from the north air cargo area), paths to Gateways 2, 4, 6, 7, 13, 28, 30, and 33 (representing various areas of the region outside the airport), the split between the primary path and the secondary path is 65% : 35%. In the comparable encoding for the North Unit Terminal Alternative the split is 60% : 40%.[3] This type of arbitrary difference in the encoding, a type of difference repeated in many other path sequences, makes traffic more concentrated in the Do Nothing alternative. As the result, equal numbers of trips generated by Sea-Tac Airport will appear to cause worse traffic congestion problems in the Do Nothing than the North Unit Terminal analyses where in fact the results should show equal conditions.

- In the 2010 analysis, the encoding of route paths between some locations on the North Unit Terminal Alternative involves meandering paths to avoid congested intersections or take the traffic through them on a favorable movement (i.e., a right turn rather than a through movement or a through movement rather than a left turn). The analogous path in the Do Nothing encoding is invariably a most direct one. A specific example of this is the path from SASA (Zone 29 - non-maintenance employees) to Gateway 6 (representing all the areas north of Route 518 linked to the airport by I-5). In the North Unit Terminal analysis, this path is encoded to backtrack south on 28th Ave.

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[3] Printouts of pages from the relevant Traffix input files from the FEIS as forwarded by FAA and illustrating the cited inconsistency are appended. Comparison of the full input files reveals many similar inconsistencies.

S., turn east on S. 192nd, back north on Highway 99, turn right at S. 188th St. and proceed east to I-5. In the Do Nothing Alternative, this same exchange is encoded for traffic to simply proceed most directly, emerging north from 28th Ave. S. and proceeding east on S. 188th to I-5. The intersection of Highway 99 and S. 188th Street is a heavily congested intersection and one selected as an indicator intersection in the air quality analysis. This difference in path encoding has the effect of changing what are through movements at the 99/S.188th intersection in the Do Nothing case to right turn movements from another approach in the North Unit Terminal Alternative. Through movements at this location have heavy influence on vehicle delay and level of service whereas right turns on the northbound approach have almost no consequence. Hence, our objection is not just to the illogical nature of this particular path encoded in the North Unit Terminal Alternative and the fact of its inconsistency with the path encoded for the Do Nothing Alternative; our objection focuses on the biasing effect such inconsistency has on the outcome of the comparative traffic and air quality evaluations that results from this and accumulations of this type of inconsistency.

A similar example of this type of inconsistency is in the encoding of paths for Zone 29 to Gates 28 and 29. In the Do Nothing Alternative, all the trips to these gates are encoded to pass through the intersection of Highway 99 with S. 200th Street (one of the intersections evaluated in the air quality conformity work). In the encoding for the North Unit Terminal Alternative, half the trips to Gate 28 and all the trips to Gate 29 are encoded to bypass this intersection. There is no justification for this discrepancy in the encoding.

In our revised analyses, we have attempted to use consistent paths where appropriate for both alternatives. However, because of the brief time to perform this work, we have not been able to insert consistent logic on every path or verify the logic of all paths encoded in the original FEIS work. Hence, our results probably retain a substantial portion of the original bias in favor of the North Unit Terminal Alternative.

- In the 2010 analysis, the percentages of trips between the various airport activity points and the "gateways" representing various subareas of the region is inconsistent between the Do Nothing and North Unit Terminal Alternatives. In such an analysis it is inappropriate to have differing regional trip distributions (inconsistent gateway percentages) unless something inherent in the nature of the alternatives under consideration changes the mix of people who would use the facility and the places they would come from. In this instance, there is no justification for such a change. The nature of the inconsistency in the 2010 analysis is to increase, in the North Unit Terminal case, the percentage of trips to/from locations north of Route 518 and locations accessed via I-5 and I-405 to the northeast. The effect of this unjustified change in the trip distribution is to place a higher percentage of North Unit Terminal tripmakers on patterns where they immediately access the Airport Expressway and the freeway system and pass out of the area without ever encountering the indicator intersections for the air quality analysis. Conversely, the more dispersed, less north-oriented distribution of air terminal trips in the Do Nothing case means more tripmakers in the Do Nothing case are likely to have paths which take them through the indicator intersections. Hence, this unjustified inconsistency in trip distribution has a biasing influence on the outcome of the traffic and air quality analyses. In our revised analysis we have used consistent trip distributions for all comparable traffic generating activity zones.

3. Background traffic volumes, normally assumed constant across all alternatives for a given forecast year in a Traffix-type process, are altered at a key air quality indicator intersection in the 2010 analysis. The alteration of background volume is larger (favoring the relative performance of the North Unit Terminal Alternative) than the amount of background traffic that could be affected by differences in fundamental roadway features of the two alternatives.

In forecasting approaches of the Traffix type, project traffic is estimated and added to "background" or "base" traffic to create an estimate of total traffic at particular points before level of service and delay calculations are performed. Base or background traffic is traffic which is in the area but has nothing to do with the project being evaluated. In most cases background traffic is estimated for forecast years by applying growth factors to existing counts or by extracting information from broader scale regional models. Background traffic is normally held constant across all alternatives for a given analysis year. Only where a feature of a project alternative is of such nature that it would cause changes in the routing of background traffic would the background traffic data base be altered.

In the SEA-TAC instance, the North Unit Terminal Alternative incorporates a feature which closes access of S. 170th Street east of the Airport Expressway. This street pattern change necessitates a change in base traffic as well as in the pattern of Airport traffic. However, in estimating base traffic change, it is obvious the preparers of the FEIS erred because in adjusting the relevant movements at the intersection of 170th and Highway 99 they eliminated more base traffic than had previously traveled along 170th at the point where the North Unit Terminal design severs it. In our revised analysis we have limited the amount of base traffic adjustment at this location to the amount justified by the former base traffic passing through the severance point.

South Access To Terminal

The FEIS definition of the 2010 roadway network for the Do Nothing Alternative is unreasonably constrained, whereas the North Unit Terminal Alternative includes a number of traffic improvements which are entirely separable from the third runway/terminal expansion project. This creates a situation where, by comparison, the North Unit Terminal Alternative must inevitably have superior traffic performance. In a reasonable comparison of the alternatives, the connection between the terminal and the S. 188th Street/28th Avenue S. intersection would be included in the Do Nothing Alternative.

The element which creates the primary distinction in traffic conditions between the North Unit Terminal and Do Nothing Alternatives in the 2010 analysis is the added roadway connection between the terminal complex and the intersection of S. 188th Street and 28th Avenue South. This connection is a key feature of the North Unit Terminal project (since the project cuts off other access points). But the connection to S. 188th/28th S. is not an element which is solely feasible or practical to construct as part of the North Unit Terminal project. It could as readily be constructed as a link to the existing terminal complex. In fact, there is documentation that the Port Of Seattle is actively planning this link as an immediate response to existing problem traffic conditions. Hence, it should be included as part of the Do Nothing Alternative for 2010.

The entire FEIS traffic and air quality analysis is predicated upon a fundamental assertion that the Do Nothing and North Unit Terminal Alternatives would serve identical numbers of air passengers in future years. That fundamental assertion carries with it the underlying presumption that the Do Nothing terminal complex has adequate ground access in those years to sustain that level of airport activity. This underlying presumption is supported in the FEIS 2020 analysis by inclusion of the

South Connector to Route 509 in **both** the Do Nothing and North Unit Terminal Alternatives and the connection to S.188th/28th S. in **both** alternatives if Route 509 extension is not constructed. However, in the 2010 analysis, the connector to S. 188th/28th S. is assumed to only be part of the North Unit Terminal Alternative.

If roadway connection of the terminal to the S. 188th Street - 28th Avenue South intersection were incorporated in the Do Nothing Alternative for 2010 as it reasonably should be, the Do Nothing Alternative could have superior traffic performance to the North Unit Terminal Alternative. The entire traffic analysis undertaken for the year 2010 (and the consequent air quality analysis) is inconsistent with the basic assumption that the terminal alternatives would serve equal levels of activity. We have not had adequate working time to fully analyze this option in the context of the Do Nothing Alternative. Our preliminary results, shown in column 5 of Table 1 (S-DN), when compared to the revised North Unit Terminal in column 3 (S-NUT 1) show two intersections performing better, two worse (including one in which the North Terminal closes one leg of the intersection to traffic) and one the same.

In addition to the foregoing, we also note that the mitigation assumed for the intersections of Highway 99 with S. 160th St. and with S. 170th St. in the North Unit Terminal Alternative is likely to be carried out by Year 2010 even in the Do Nothing scenario if as much activity is served at the Do Nothing terminal as is asserted in the FEIS. Assessing this mitigation as an exclusive asset of the North Unit Terminal Alternative is unreasonable.

Reduced Peak Period Ground Traffic During Weather-impaired Flight Operations

A fundamental distinction between the alternatives, and the purported reason for the proposed project, is that adverse weather conditions reduce flight operation capacity of the existing facility whereas an additional runway would allow "poor-weather" flight operations to continue at levels similar to those possible at the existing airport under good weather conditions. The lower landing capacity of the Do Nothing Alternative at times when weather conditions impairs flight operations would result in significantly lower peak hour ground traffic generated by that alternative. The number of arriving air passengers released onto the ground transportation system at times of weather-impaired flight conditions would be significantly less than in unimpaired conditions. According to the FEIS impaired conditions occur up to 44 percent of the time and cause increments of 20 percent, 40 percent and 60 percent impairment to normal landing capacity. However, the FEIS ground traffic analysis solely compares the alternatives on the basis of weather conditions which would not impair flight operations. During an episode of bad weather, most departing air passengers might still be assumed to make their ground journey to the airport based on scheduled departure times. But the reductions in landing capacity will certainly preclude, depending on the degree of weather impairment, 20, 40 or 60 percent of the scheduled arriving peak period air passengers from arriving in that period. Hence, they would be unavailable to be released onto the ground transportation system in that peak period. The failure to analyze ground traffic and air quality in the Do Nothing alternative under the various levels of weather impaired flight operations masks a significant distinction between the Preferred and Do Nothing Alternatives on ground traffic effects which could potentially lead to differing conclusions on the air quality conformity assessment.

In our analysis we have performed traffic assessments for conditions at the 20, 40 and 60 percent impairment levels. The results for the lowest level of impairment level, the 20 percent level are shown in the rightmost column of Table 1. Comparison of these results to our revised North Unit

Terminal forecast (S-NUT 1) show that at all five intersections, the Do Nothing Alternative performs better than the North Unit Terminal Alternative. When such a performance difference would occur up to 44 percent of the time, it should be directly addressed in the analysis.

Increased Activity With North Unit Terminal Alternative

It is obvious that a larger terminal complex will have a larger work force and generate more facility-related traffic than the existing facility. It is also highly likely that the presence of increased all-weather flight operations capacity at this currently severely weather constrained facility would lead the air carriers to schedule more of their flights during the peak periods when people prefer to travel. This would increase peak hour traffic even if the total number of people flying daily did not change. These two factors alone would lead to the North Unit Terminal Alternative having higher pm peak traffic characteristics than the Do Nothing Alternative.

In addition, with unconstrained availability of flights at prime times, more people will be able to fly -- people who don't fly now because they can't get space available at the right time. Also, with more frequent flights, price competition among the carriers will increase, allowing more people to afford flying more frequently. This will tend to increase total and peak traffic of the North Unit Terminal Alternative over the Do Nothing Alternative. We have seen economic reports indicating that over time the differential resultant from this could amount to over 30 percent.

Although the FEIS wishes to maintain the presumption that both alternatives will serve the same number of air passengers, because of the controversial and debatable nature of this presumption an objective assessment would at least perform a sensitivity analysis of the consequences of a significant passenger differential. We have performed such an analysis assuming a 30 percent increase in peak period passenger related and passenger service traffic and lesser increases in other airport traffic.

Unrepresentative Indicator Intersections

The intersections selected as representative intersections for assessing the proposed airport alternatives' impacts on air quality are clustered in a location and orientation relative to the airport facilities and area street network that is predictable as being minimally affected by traffic from the NUT alternative and maximally affected by the DN alternative. An unbiased analysis would have included dispersed indicator sites rather than sites located in a single linear pattern. Selection of air quality analysis sites solely in a corridor which is a primary access/egress corridor for the airport under the DN alternative but which is largely a secondary corridor with constrained access to the Airport in the NUT alternative biases the air quality analysis in favor of the NUT alternative to an extent that renders the air quality conformity findings meaningless.

All of the four intersections chosen as the indicator sites for the air quality assessment are located in the International Boulevard/Highway 99 corridor at its intersections with South 160th, South 170th, South 188th and South 200th Streets. At present and in the FEIS traffic analysis model encoding for the 2010 Do Nothing analysis, S. 170th Street has direct access to the northern air cargo/maintenance areas of the airport and is the first interchange on the Airport Expressway feeding the main terminal and garage. Another access point from Highway 99 is provided just north of South 188th Street. No air passenger ground access is provided to the SEA-TAC terminal from the south (only a service vehicle connection exists). At present all airport traffic to and from the south, southeast and southwest (except a few service vehicles) must use the access points from

Highway 99 at S. 170th Street or north of S. 188th Street. Vehicles to and from areas to the north, northeast and northwest also use these access points from Highway 99.

In the North Unit Terminal Alternative this situation is radically altered. S. 170th Street is completely severed from connection to the airport facilities. The connection from Highway 99 just north of S. 188th Street is limited to one way westbound (no airport egress is provided). A new southerly access point connecting the terminal complex with S. 188th Street and 28th Avenue S. is provided. This new link logically becomes a primary route for airport traffic to/from the south, southeast and southwest. As a result of this configuration, the dependence of airport traffic on Highway 99, particularly the segment of Highway 99 between S. 160th Street and S. 188th Street, would be reasonably expected to be sharply reduced. In addition, as discussed earlier, the FEIS chose to assume that most of the off-site parking by air passengers that takes place in the Highway 99 corridor would be drawn into terminal parking by the North Unit Terminal complex. This has the effect of reducing the off-site parking traffic at the monitoring locations.

The setting of SEA-TAC is one where concentrations of airport traffic contribute to traffic congestion and air pollution emissions at numerous locations over a broad area. The four intersections selected for air quality analysis with the CAL3QHC program are meant to be representative of the airport's effects on air quality over the primary area where its traffic concentrates. Yet the indicator intersections are all located in a single linear corridor, which an analyst who understood the proposed project would recognize as most likely to have lower proportions of airport traffic under the preferred scheme. Selecting additional sites to the east and west of the airport and on the roads where the Preferred Alternative orients its traffic, as well as on the road it deemphasizes, would present different results. To illustrate this, our analysis has included data for the intersection of Military Road and S. 188th Street.

SUMMARY OF CHANGES INCORPORATED IN SE&M ANALYSIS

FAA provided computer disc copies of the actual Traffix model input, command and output files which are the product of the traffic analysis for, and basis for the traffic findings in, the FEIS. Our scrutiny of these files led to identification of many of the issues of concern cited above. We then loaded the Traffix files provided by FAA on our own licensed copy of the Traffix software, made modifications to the input data structure addressing most of the concerns expressed above and executed revised forecast/analysis runs for some of the alternatives and forecast years. The specific revised forecast runs we prepared and the nature of the revisions include:

Revised 2010 North Unit Terminal Alt. August PM Peak Hour Forecast/Evaluation including the following adjustments:

- The trip generation rate of SASA maintenance employees was placed on a consistent basis with the rate used for these same employees in evaluation of the Do Nothing alternative. This makes the 2200 employees involved in the North Unit Terminal Alternative generate 88 more trips than the 1651 employees involved in the Do Nothing rather than 86 fewer trips as was the case in the original FEIS work.
- The trip generation total for other activity in SASA was made equal to that used in the Do Nothing alternative rather than 655 less.
- Traffic generated by parking by terminal passengers in the off-site lots was made equivalent to the totals in the Do Nothing alternative. This includes reallocation of the Doug Fox lot totals (lot 15) to the closest nearby sites. Trip totals from the terminal

garage were adjusted downward accordingly on a one-for-one basis and off-site shuttle totals were also adjusted accordingly.

- Origin-destination patterns for the various activities at the airport were set equal to those applied to the equivalent activity in the Do Nothing Alternative.
- Base trips on the northbound left and westbound through movements at the intersection of S. 170th Street and Highway 99 were readjusted so that the adjustment to account for the closure of S. 170th west of the intersection only totaled the number of trips which reached the closure point from these movements. (In the original FEIS runs, the adjustment on these movements eliminated 32 percent more trips than actually reached the closure point when it was open.)

Having made these adjustments, we reran the Traffix model for the 2010 North Unit Terminal Alternative and also reran the evaluations of the proposed mitigation at the intersections of Highway 99 with S. 160th and S. 170th for that alternative.

<u>Performed Traffix runs and evaluation on the 2010 North Unit Terminal Alternative under assumption of higher pm peak hour activity for that terminal than for Do Nothing.</u>

- Runs reflect 30 percent increase (over Do Nothing) in peak period air passengers and in passenger-related services and employment.

- These runs reflect lower increases in activities not directly related to air passengers -- generally 15 percent -- such as air cargo and maintenance activities.

<u>Performed revised Traffix runs and evaluation on the 2010 Do Nothing Alternative including:</u>

- Runs reflecting 20 percent, 40 percent and 60 percent reductions in arriving peak hour air passengers departing the terminal in ground transportation vehicles reflecting levels of weather impairment to flight operations under the Do Nothing runway configuration.

- Runs incorporating the proposed access connection between the terminal and the intersection of S. 188th Street with 28th Avenue South (as in the roadway system used with the North Unit Terminal alternative).

- Evaluations incorporating the site mitigation identical to the North Unit Terminal Alternative at the intersections of Highway 99 with S. 160th Street and with S. 170th Street.

Due to the brief time we had working access to these files, it was impractical for us to adjust the path files where the original FEIS encoding arbitrarily concentrated more Do Nothing traffic than North Unit Terminal traffic on the primary routes in circumstances involving identical choices about apportioning trips among multiple paths. Likewise, it was impractical for us to adjust all the input files where the original FEIS encoding arbitrarily specified a Do Nothing path directly through a problem site while specifying the North Unit Terminal path for the same point-to-point trip exchange on an avoidance path relative to the problem area. As a result, our forecasts and evaluations still retain some of the bias inherent in the original FEIS work. That is to say, our

results still tend to overstate the traffic impact of the Do Nothing case or understate the traffic impact of the North Unit Terminal case.

Additional Comments On Traffix Model

The Traffix traffic forecast and analysis software and procedure for encoding the Traffix model for use in the Seattle-Tacoma International Airport Master Plan Update EIS is poorly suited to an application of this type. Although it produces volumes of detailed results of extensive numeric computations, giving an impression of a high level of technical precision, in a long-range, large-area application such as this one that apparent precision is illusory. The lack of connection between base traffic estimated in this particular application and actual future land use intensities, spatial locations and travel generating characteristics as well as the lack of connection to future transportation network considerations makes this forecast a completely inadequate basis for evaluating traffic impact in the Sea-Tac FEIS or for using the output of the traffic model as input to analysis for air quality conformity evaluations.

To appreciate this point, some understanding of the theory, structure and procedure for applying the Traffix model is needed. In brief, Traffix computes the amount of traffic generated by new land uses (the project) based on quantities and rates the user specifies, computes the added movements through each study intersection (based on what destinations the user tells the program the traffic is going to and what specific routes the user tells the program that traffic will follow), adds the project traffic to "base traffic" at each intersection (non-project background traffic that the user tells the program is there) and then computes the volume/capacity relationship, level of service and average delay per vehicle (per a recognized procedure selected from several options by the user). As originally conceived, Traffix was intended to evaluate fairly short range (say 3-5 years) traffic impacts of a project or projects where it could be assumed reasonably that "base" traffic would not change at all or that its growth could be estimated accurately by a modest annual growth factor. In communities where land use growth (other than the project under study) is generally static and no significant changes to the street network are planned, this forecasting approach can be used reliably for even longer periods into the future. However, in a study area where there is significant land use growth other than the study project itself, the fundamental underlying assumption essential to the validity of this model structure - that base traffic is stable - is no longer applicable.

Compromise to the validity of a Traffix-type model structure can become acute under a number of conditions. These include:

- When the study area is large so that subareas experience differential rates of growth of non-project land uses (hence differential growth of base traffic).

- Where significant new streets and highway routes or improvements to some existing ones (or significant corridor transit facilities) are added that would change the route choices of drivers accounted in the base traffic.

- When land use growth other than the project under study causes base traffic alone to create undesirable congestion levels at study area intersections (suggesting base traffic patterns would not remain stable but rather that drivers accounted in the base would seek to make adjustments to less congested routes).

- When the project under study is quite large and adds significantly to congestion conditions at study intersections (again suggesting that rather than base traffic remaining static, drivers accounted in the base who have alternative routes available would react to project traffic by selecting those alternative routes).

- When there is error or doubt in the original measurement of base traffic.

- When the forecast is a long-range one (since all of the above factors which undermine validity of the model are operative for longer periods of time).

All of the above compromising factors are operative in the Traffix model structure for the Sea-Tac FEIS analysis. The key forecasts are quite long- range in nature, 16 and 26 years. The study area is quite large, certainly large enough that significantly different growth of land use and base traffic would be expected over time. There would be significant congestion from future base traffic alone (average peak hour delay per vehicle of 5 minutes or more at some key intersections according to the model) and even more significant congestion resulting from the project (average additional delay of one minute per vehicle), both tending to cause base traffic to seek alternate routes. The addition of a significant new highway route, the extension of the 509 freeway, would also cause significant alteration of the pattern of base traffic. Although the study did attempt to estimate the base traffic growth and the effect of Route 509 freeway construction by extracting annual growth rates from the Puget Sound Regional Council's regional travel forecast model (which is of the network optimization type), the connection of base traffic projections to actual land use growth and driver reaction to congestion conditions on the street and highway system is too remote for the results to be credible.

What the FAA has put forward in the FEIS is in essence 1994 traffic counts multiplied by 16 or 26 years of growth factors. And the starting point for all of this multiplication may be wrong. In its report entitled "Air Quality Report, SR 99 International Boulevard from S. 188th to S. 170th Street" the Washington State Department of Transportation (WSDOT) published pm peak hour traffic volumes for the intersection of SR 99 with S. 188th Street. These volumes were measured within a year of the traffic volumes used as a base in the FEIS and should be virtually identical. A comparison shows that while total peak hour vehicle movements through the intersection reported by WSDOT differ by 4 percent from those reported in the FEIS, individual approach volumes differ by as much as 26 percent and 40 percent (the westbound and southbound approaches, respectively). Since computations of delay, volume/capacity ratio and Level of Service are much more sensitive to individual approach movement totals than to aggregate movements through the intersection, the differences indicated cast substantial doubt on the reliability of the results reported in the FEIS. The FEIS may well have been multiplying the wrong base -- a number possibly over 40 percent wrong on crucial movements -- by 16 and 26 years worth of growth factors for the 2010 and 2020 analysis.

It might be argued that even though this model is not perfect, it provides an objective basis for comparative evaluation of the relative traffic and air quality impacts of the land use alternatives. We have provided documentation of the lack of objectivity and consistency in the treatment of the airport alternatives in this model in prior sections of this report. But aside from the objectivity issue, a fundamental concern is that the model's Year 2010 and 2020 base traffic estimates, arrived at by inflating 1994 counts by estimated growth rates, is so different from the traffic that would likely result from actual projected land use and reactions of drivers to conditions on the street system at those times that a meaningful comparison of the project alternatives' effects on traffic is impossible.

As an illustration of the lack of realistic assumptions in this model, consider the delay it predicts in the year 2010 for the individual vehicle driving up Highway 99 from S. 200th Street to Route 518. Total delay --sitting and waiting to clear major intersections -- is projected at 18 minutes and 30 seconds. In other words, the model suggests there would be nearly three times as much delay time sitting at intersections as it normally takes in running time to drive this route. Under such conditions, many of the drivers in the base traffic - assumed to maintain a constant driving pattern by the model -would certainly seek other routes.

Our criticism of the Traffix model as applied in the Sea-Tac FEIS might be countered by the argument that, though the model might not be perfect, it is the best tool reasonably available for performing the traffic impact analysis for Sea-Tac. This argument can be dismissed by considering the fact that the Puget Sound Regional Council traffic forecast model (a land-use based optimization model) was available and was actually used by the preparers of the FEIS to estimate growth rate of base traffic. With about the same level of effort as was devoted to preparation of the Traffix model, a variant of the PSRC model focused on the airport area could have been developed. Such an approach would have results directly related to future land use and street and highway network conditions.

Another flaw in the FEIS traffic analysis concerns the use of peak hour factors in the capacity analysis portion of the work. Peak hour factor (peak hour traffic divided by four times traffic in the peak 15 minutes) is a consideration which distinguishes peaks of brief duration from peaks which maintain intensity over the entire peak hour. At urban intersections, peak hour factors significantly less than 1.0 indicate that while undesirable levels of service may occur for a few moments during the peak hour, the duration of that condition is brief and reserve capacity exists within the peak hour. When traffic conditions deteriorate deeply into Level of Service F (as is the case at many locations in the forecast years of this analysis), peak hour factor moves to 1.0 indicative of a steady state demand in excess of capacity throughout the peak hour. In the Sea-Tac Traffix analysis the peak hour factors observed in 1994 were assumed to hold constant throughout the forecast period rather than moving to 1.0 as they would under conditions of serious Level of Service F operations. In one case (Highway 99 and S. 188th Street) a peak hour factor of .84 was assumed to remain constant through all the forecast years, even though by Year 2010 this intersection was projected to operate well into Level of Service F. Recomputing the capacity analysis on this intersection with a peak hour factor of 1.0 as would be operative under the demand projection, the Traffix program indicates several **minutes** less average delay per vehicle than in the FEIS analysis. Similar, though not so dramatic results are found at the other intersections selected for air quality assessment. Because of the inappropriate treatment of peak hour factor in the entire traffic analysis, it is questionable whether any meaningful conclusions can be drawn from the results presented in the FEIS.

Yet another flaw in the FEIS traffic analysis concerns the treatment of right turning traffic in the delay/capacity utilization computations. On most intersection approaches, the right turns are ignored in the FEIS calculations. Ignoring right turns in the calculations reflects the assumption that right turning traffic can complete its turns generally unaffected by opposed traffic. Such an assumption is appropriate when overall traffic is light, in moderate traffic conditions when right turning traffic has an exclusive approach lane and even in heavily congested traffic conditions if the right turning traffic has an exclusive departure lane as well as an exclusive approach lane. In the 2010 and 2020 forecast situations, the conditions where right turning traffic can move freely (and hence can be ignored in the calculations) will usually not exist. Traffic will be heavily congested but few intersections will have departure lanes available exclusively or almost

exclusively for right turning vehicles. Hence, at key intersection approaches, the computations should have included, not ignored, right turning traffic. We tested what the implications for FEIS results would be if right turns had been considered in the analysis at key intersections. If one exercises the option within Traffix to consider right turning traffic in the calculations, extreme values of vehicle delay and capacity utilization are indicated (reported as "Overflow" on printouts; indicated as 111318 seconds average delay per vehicle on the computer monitor screen!).

This is yet another indication that the future traffic analysis results in the FEIS lack credibility and are not a suitable basis for drawing conclusions about the alternatives. It also points up a conclusion that might well have been reached in the original FEIS work. That conclusion is that, with a dozen or more key study area intersections loaded seriously over capacity as well as many key freeway and freeway-to-freeway ramp segments loaded seriously over capacity, the level of airport activity projected to justify the North Unit Terminal Alternative for Year 2010 cannot be supported by the area's ground transportation system unless a significant upgrading beyond anything considered in current plans is undertaken.