



Krager and Associates

1390 Stuart Street
Denver, Colorado 80204-1243
303 446 2626 fax 303 446 0270

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Mr. Thomas G. McNeill, Attorney-at-Law
Dickinson Wright PLLC
500 Woodward Avenue
Suite 4000
Detroit Michigan 48226
313 223 3632
tmcneill@dickinsonwright.com

RE: 550/160 Connection Draft SEIS

1102 farmington hill.doc

Dear Tom:

Per your request, I have reviewed the "US 550 South Connection to US 160 Supplemental Draft EIS Section 4(f) Evaluation", October 2011 (the Draft SEIS). My review has been conducted as a Professional Engineer in the State of Colorado as well as a Professional Traffic Operations Engineer (PTOE) with 33 years of public and private experience. Based on my review of this document, I have three areas of concern that I would like to address. They are:

1. Year 2030 traffic projections for State Highway 550 and State Highway 160
2. Errors in the Draft SEIS resulting from inflated traffic projections
3. Accident analysis and assumptions of Farmington Hill (SH 160)

Year 2030 Traffic Projections for State Highway 550 and State Highway 160

Year 2030 traffic projections are used to determine the future roadway needs for SH 550 and SH 160. According to the Draft SEIS, traffic on SH 160 will increase from a current volume of 19,000 vehicles per day (vpd) to an estimated volume of 77,910 vpd in Year 2030. This indicates a 20-year total growth factor of 4.10. This projection was developed using an assumed 20-year base growth factor of 1.56 and adding onto this projection the potential traffic to be generated by approved development plans in the Grandview area.

This method of projecting traffic volumes has major flaws, and would not be accepted if the SEIS study was being done under the review of a Metropolitan Planning Organization (MPO). The use of traffic projections from a development plan is a questionable procedure. Most developers, for both commercial and residential developments, request a higher level of density, than what will be actually built. This practice is typically done so that the property can be sold if needed for a higher value. Developers also tend to assume that other area developments will not be built or be successful. This results in each development assuming maximum build-out, when actual growth in the area will be more

limited. Once approved, there is no guarantee of when all projects will be built, if ever. Existing zoning in Year 2011 does not necessarily mean full development by Year 2030. For example, in 1986, the City of Colorado Springs annexed and zoned a proposed 26,000-acre development known as Banning Lewis Ranch. Twenty-five years later, less than one percent of the development has been completed. Even that small portion of the development is far less dense than what was approved for that section. If the method of projecting traffic used in the SEIS had been used since 1987 in Colorado Springs, all traffic projections would have been seriously inflated, and the ability to identify appropriate and justifiable roadway improvements would have been compromised.

In order to avoid traffic projections that are inflated by development plans, most large area projections are based on population growth projections that consider both the increase of population and the increase in employment that maintains the population. The State Demographers Office in Colorado has been tasked with providing 20-year projections by county for the entire State. The Office determines the population growth anticipated for the State of Colorado, and then assigns the growth per county based on area trends. All MPO's use the State Demographers projections for their area forecasts. This assures CDOT and FHWA that a jurisdiction is not using over-inflated traffic volumes to secure unneeded transportation funding. According to the State Demographers Office, the total 20-year growth factor for La Plata County is 1.57. If this growth factor were used, the projected Year 2030 traffic for SH 160 would be 29,830 vpd.

Local jurisdictions often study their traffic projections to fine-tune the State projections. La Plata county and the City of Durango used the consulting firm LSA to produce the "2030 Transportation Integrated Plan" in Year 2006. This study projected 20-year growth factors of 1.76 for La Plata County and 1.93 for the City of Durango. Assuming the City's higher growth factor, the Year 2030 traffic projection would be 36,670 for SH 160.

The traffic projections based on the developed 20-year growth factors described above are summarized in Table 1. All volumes are also shown seasonally adjusted by an estimated 8,000 additional trips, which is the assumption used in the Draft SEIS.

Source	20-Year Growth Factor	Year 2030 Average Daily Traffic - vpd	Year 2030 ADT Seasonally Adjusted - vpd
State Demographer	1.57	29,830	37,830
"2030 Transportation Integrated Plan	1.96	37,240	45,240
SEIS	4.1	77,900	85,900

Based on the comparison of the three traffic projections, it is obvious that the projections in the Draft SEIS are too high. The SEIS projections indicate that traffic volumes would more than quadruple over the next 20 years. This type of growth in traffic would require a similar growth in population to generate the traffic. The future population of La Plata County would need to be approximately 230,000 people to support this traffic volume, rather than the projected 93,000 that is anticipated. In recent history the fastest population growth in Colorado occurred in the 1990's and that growth spurt was limited to 30% (or a growth rate of 1.3). This is far less than the anticipated growth rate of 4.5 used in the Draft SEIS. Even when considering the localized impacts of development on an adjacent roadway I have rarely seen traffic volumes triple over a twenty-year period, and have never seen a quadrupling of traffic volumes on an existing road as projected here.

A similar trend can be seen in the SH 550 projections. The current volume of traffic on SH 550 south of SH 160 is 6,800 vpd. The Year 2030 projection from the Draft SEIS is 17,500 vpd, and 19,550 vpd, seasonally adjusted. These projections represent a 20-year growth factor of 2.58. Table 2 illustrates the 2030 average daily traffic (ADT) projections for SH 550 based on the three described methodologies.

Table 2			
Year 2030 Traffic Projections			
State Highway 550 South of SH 160			
Source	20-Year Growth Factor	Year 2030 Average Daily Traffic - vpd	Year 2030 ADT Seasonally Adjusted - vpd
State Demographer	1.57	10,676	12,676
"2030 Transportation Integrated Plan	1.96	13,328	15,328
SEIS	2.58	17,544	18,544

It is my professional opinion that the traffic projections used in the Supplemental EIS Evaluation are inflated. Traffic projections based on the growth projections of the Colorado State Demographers Office or the La Plata County / City of Durango "2030 Transportation Integrated Plan" would provide a more reliable basis for the consideration and design of roadway improvements for the SH550/SH160 connection.

Errors Caused by Over-Inflated Traffic Projections

Traffic projections are the basis for much of a roadway project analysis. First and foremost, they are used to determine the need for roadway projects based on inadequate capacity. However, traffic projections are also used in air quality analysis, time/delay studies, fuel consumption analysis, and safety projections. A significant error in traffic projections will cause the results of all these studies to be incorrect.

The traffic projections used in the Draft SEIS show the combined Year 2030 traffic volumes, seasonally adjusted, to be 104,444 vehicles per day (vpd). If the traffic projections had been based on the Durango growth rate from the "2030 Transportation Integrated Plan", the combined volume would be 60,568 vpd. This means the traffic projections used were inflated by 72%. Such a large increase would seriously alter the results of any analysis which relies upon traffic projections.

For example, the capacity analysis of the existing SH160/SH 550 signalized intersection indicated that the intersection will operate at Level of Service F in the Year 2030. However, if the traffic volumes are adjusted to reflect the projected City of Durango growth rate, the projected Level of Service would be D in the Year 2030, an acceptable level of operation in an urbanized area. To further illustrate the impact of inflated traffic projections, the existing intersection can be improved to Level of Service B (LOS B) by the Year 2030 with the relatively simple addition of a dual westbound left-turn lane.

Under normal conditions, an interchange is not considered to replace a signalized intersection operating at LOS B. If an interchange is desirable at this location for reasons other than capacity, there are numerous interchange designs that can easily accommodate more realistic traffic projections. For example, a Standard Diamond, Tight Urban Diamond, Trumpet, or Single Point Interchange could be used at the existing SH 160/SH550 intersection location. A Modified or Junior Interchange could also be used at this location. Junior Interchange designs can be seen along the reconstructed section of SH 285 from Bailey to Denver.

Finally, there are some new interchange designs which could be used successfully at this location. For example, the use of a Diverging Diamond design could be used to provide a Two-Level Trumpet interchange rather than the traditional Three-Level Trumpet.

With such a dramatic change in results of level of service analysis, the results of other studies based on traffic projections will also change. These include air quality and fuel consumption studies. These studies are particularly susceptible to change, since the other alignment alternatives will increase the total vehicle miles of travel. With the reduction in anticipated congestion on the existing alignment, air quality and fuel consumption will likely increase with the alternative alignments.

For example, Alternative G increases travel distance for vehicle going to and from Durango on SH 550 by nearly two miles. Their Draft SEIS assumes that this increase distance is

justified due to congestion delays on the existing Farmington Hill alignment. However, if corrected traffic projections are used, delays do not occur on Farmington Hill. This means that Alternative G results in an increase of 2.3 million vehicle miles per year of additional travel. This increase in miles of travel will cost approximately \$280,000 per year in additional fuel costs. This out of direction travel will also increase the travel time by approximately one minute per vehicle. This 60-second delay is the same as traveling through an additional level of service F intersection for each trip. The increase in travel time and travel delay will decrease air quality and increase fuel consumption.

Invalid Safety Analysis

The safety analysis conducted for the Draft SEIS also relies upon the traffic projections. SH 550 currently experiences 3.7 accidents per mile per year over both the Farmington Hill and Florida Mesa sections. No fatalities have occurred during the study period. This accident rate is slightly less than average for a highway of its type, according to the Safety Analysis Section of the Colorado Department of Highways (CDOT). This better-than-average rating occurs on SH 550, even though the Draft SEIS stresses the dangers of the grade on Farmington Hill and the potential for ice. This hypothesis does not match the existing accident history, which shows a consistent pattern of accidents across both Farmington Hill and the Florida Mesa.

The projection for future accidents in the "No Action" Alternative shows a substantial increase in accidents due to anticipated congestion and capacity concerns. Obviously, this analysis is incorrect if the anticipated Level of Service is B rather than F. Furthermore, no safety study was conducted assuming an improved Farmington Hill alignment, with improved sight distance, appropriate guard rail installation and four lanes of divided traffic. I believe such an analysis would show a lower accident rate than the rates projected for the Alternative Alignments.

In addition, it appears that the accident analysis for the alternative alignments do not take into account the increased wildlife areas that those routes will traverse. Alternative G will divide a pasture used intensely by both deer and elk with a four-lane highway. Wildlife accidents are the most common type of accident along SH 550. Given the high number of wildlife-related accidents, total accidents will increase on the alternative alignments, including Alternative G. In addition, the high design speeds of the alternatives will result in an increase of accident severity.

The Draft SEIS also discusses the problem of icing on the north-facing slope of Farmington Hill. It neglected to mention the icing problems that will occur on the structures over SH 160 for the proposed interchange of Alignment G. Bridges ice over faster and more often than at-grade road sections. Drivers are often unaware of bridge icing because there may be no ice on the roadway itself. In addition bridges often ice over before road maintenance crews are out. These problems should have been considered in the accident analysis.

Summary

My analysis of the Draft Supplemental EIS indicates that there are severe flaws in the traffic projections that result in flawed analysis for project need, environments impacts, and safety analysis. Numerous viable alternatives were not considered due to the error in traffic projections. The practice of adding site-specific trip generation onto traffic projections is a highly questionable practice, and not typically used in environmental documents. The concept that traffic would more than quadruple on SH 160 over 20 years does not meet the "common sense" test and should not have been used as the basis for this study. Many alternative solutions are available based on revised analysis that would meet the long-term needs of the community, be less impactful to the environment (including historic sites), and cost less money.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kathleen L. Krager".

Kathleen L. Krager, PE, PTOE
Transportation Engineer

Attachment: Three Intersection Capacity Analysis summaries

E-mail