

Francisco Astorga

From: Nicole Deforge <ndeforge@fabianvancott.com>
Sent: Friday, June 09, 2017 8:45 AM
To: Francisco Astorga
Cc: Charles Stormont
Subject: Treasure Hill
Attachments: Treasure Hill Traffic Study Review Memo-20170608.pdf

Dear Francisco,

THINC has commissioned a report from Ivan Hooper, a well-known traffic expert, to evaluate the traffic report submitted by Treasure Hill. A copy of that report is attached.

Mr. Hooper has identified a number of critical flaws in the Treasure Hill report, which we urge you to consider in preparing your staff report for the Planning Commission.

We very much appreciate your efforts in connection with this process. Please let me know if you have any questions.

Thanks.

Nikki

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MEMORANDUM

To: THINC
From: Avenue Consultants
Date: June 8, 2017
Subject: Treasure Hill Traffic Studies Review

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This memorandum describes the findings of a technical review by Avenue Consultants of the traffic studies performed for the proposed Treasure Hill development project located in Park City, with a particular emphasis on the Treasure Hill Traffic Study Draft Addendum #7, dated May 4, 2017 and prepared by Triton Engineering. Unless otherwise mentioned, all references to the “study” refer to Addendum #7.

Our biggest concern with the Treasure Hill study is the traffic analysis was only performed for intersections, which we don’t feel is sufficient for the study area. In a typical location capacity is driven by the intersections; however, the Treasure Hill study area is decidedly non-typical due to the narrow width and steep grade of most roads in the study area. These non-standard features, especially when combined with heavy snowfall, on-street parking, lack of sidewalks, heavy truck traffic, and many pedestrians, create conditions where traffic capacity is dictated by mid-block locations where only one car in one direction can pass at a time, rather than by intersection performance. The study needs to consider these actual roadway-constrained conditions rather than the just the idealized intersection-constrained conditions.

The study area is also unique in that existing traffic volumes can vary greatly by season. Unfortunately, the times when traffic volumes are the highest (i.e., during good ski days) are also the times when roadway capacity is the lowest. Because the study fails to account for these non-standard factors, it does not accurately quantify the impact of the project on traffic.

There are other areas of concern as well. First, the study does not account for the lower than normal traffic volumes that were present on February 18, 2017 when traffic data was collected. We found that area traffic volumes that day were actually less than even a typical Saturday in February, let alone a holiday weekend. Second, the approach to estimating background future traffic volumes was unusual by basing it solely on citywide population growth rather than localized growth projections or outputs from the traffic model. Similarly, the study does not appear to properly account for future traffic volumes due to the Bamberger and Resort entitled developments. Third, the trip reduction rates applied in the study are highly speculative and overly aggressive

Beyond the failure to recognize the unique characteristics of the study area and analyze the area accordingly, the study also lacks detailed information regarding the analyses that were performed. Furthermore, the study does not discuss or reference any previous analysis regarding walkability/pedestrian safety, construction impacts, or delivery truck traffic or attempt to determine whether these decade-old studies are still appropriate under 2017 conditions. This is particularly pertinent given our understanding that the size and scope of the Treasure Hill project has increased substantially since the original study was completed in 2005.

Given these failures, it is our opinion that the study does not provide a reliable projection of the true impact of the Treasure Hill development on traffic in the affected study area.

The following sections summarize the findings of our technical review including recommendations.

1 EXISTING TRAFFIC VOLUMES

For its study, Triton Engineering selected President’s Day weekend as the baseline for determining peak traffic volumes given that this is typically one of the busiest ski times and traffic volumes are generally higher than on a typical day. Past studies also used President’s Day weekend as the baseline. However, it is our understanding that President’s Day weekend this year was abnormally warm and rainy, resulting in less than ideal skiing conditions and therefore less than normal traffic volumes. Additionally, it is our understanding that this year President’s Day weekend was a “black-out” period for the Epic Local Pass, which would likewise result in artificially low traffic volumes in the subject area at that time. The Epic pass was not available during prior years when earlier traffic studies were performed, resulting to an apples-to-oranges comparison between 2017 traffic volumes and volumes in prior years.

The Utah Department of Transportation operates a number of permanent traffic counters throughout the state. We examined the counter on SR-224, which is located just north of Canyons Resort Drive, to understand how traffic volumes on Saturday, February 18, 2017 compared to the rest of the month. We found that February 18 was actually the lowest volume Saturday of the month. The AM volumes reported in the study would need to be increased by 18% just to match the average of the other Saturdays in the month, while the PM volumes would need to be increased by 5%. Adjustments to account for the typical increase due to the holiday weekend would only increase those factors.

Also, with Saturdays not having much of an AM peak, we looked at how weekday AM peak volumes compare to Saturday AM peak volumes. Based on the data from the SR-224 station, an upward adjustment factor of 31% would be needed to bring the Saturday, February 18 AM volumes as reported in the study up to equivalent weekday AM values. This issue is less relevant for the PM peak where the Saturday volumes are larger than the weekday volumes.

Given that all of the analyses in the study build on the existing volumes, most of the conclusions drawn by the study are inherently unreliable. At a minimum, the study would need to incorporate the following recommendations to meet minimum traffic study requirements.

RECOMMENDATIONS

- Apply an adjustment factor to the existing traffic volumes to scale them up to average February Saturday values
- Provide the peak hours within the respective peak period counts to know the specific hour analyzed for the AM & PM time periods

2 FUTURE TRAFFIC VOLUMES

In the Future (2037) Traffic Volumes section of the study, it states that Summit County has created a traffic model to analyze future traffic conditions and that future traffic volumes are “based on demographics associated with land use plans approved by Park City and Summit County.” However, the study then goes on to say that future volumes were estimated using anticipated 25.8% population growth of Park City rather than outputs from the traffic model. It is unclear why the traffic model itself wasn’t used to develop the future traffic volumes instead of land use data that would be an input to the traffic model. With the 25.8% being a universal value, the localized impacts of growth are diluted. This is the benefit of using the traffic model, the volume increase occurs where the growth occurs.

Also, it is unclear if the population growth of 25.8% includes factor in the two entitled projects referenced in the study (“Bamberger” and “Resort”) as the study provides insufficient detail. Although the study appears to show that the estimated trip generation falls within the growth at the Park Ave/Deer Valley intersection, which is the busiest study intersection, it does not compare the growth at any of the other study intersections that may be impacted due to the two entitled projects. For example, the intersection of Lowell Ave/North Star shows a PM peak hour growth of 12 vehicles per hour. The study then projects that the two developments will generate 332 to 462 additional PM peak hour trips. Although the study is unclear as to the location of the two developments, it appears that at least one of them would have access off the south end of Lowell Avenue. Out of 332 or more peak hour trips, it is unreasonable to assume that only 12 of them would use the Lowell Ave/North Star intersection. This illustrative of the point above about universal versus localized growth. Consequently, the study fails to properly account for the traffic from the Bamberger and Resort projects. Those volumes should be calculated and explicitly added to all study intersections.

RECOMMENDATIONS

- Use outputs from the traffic model in estimating future traffic volumes or provide an explanation of why using population growth projections is the preferred approach
- Provide trip generation tables for the Bamberger and Resort developments as well as what was assumed for the “variety of mixed land uses” when estimating the trip generation
- Add the new vehicle trips from the entitled Bamberger and Resort developments to all study intersections as part of the future traffic volumes

3 PROJECT TRAFFIC VOLUMES

3.1 Trip Generation

Based on inadequate information in the study, it is impossible to determine how trip generation data was calculated. Although the study described the ITE land use code that was used for each land use category of the proposed project, it doesn’t describe specifically which chart or equations within those categories were used. It appears that the weekday AM & PM peak hour generator was used for all land uses. Given that the traffic volume data collection occurred on the weekend, Saturday trip generation rates should have been used where available. The study needs more explanation of why weekday trip generation values were used instead of Saturday. Analyzing AM and PM peak periods on Saturday creates difficulties in the analysis. Saturday ITE trip generation values, if provided at all, are only for the peak hour of generator rather than for the AM and PM periods. Daily vehicle trips should also be calculated and provided in the trip generation table.

From the study, it is unclear what the square footage and number of rooms of the proposed Treasure Hill hotel will be. According to the introduction, the hotel is 200,000 square feet (sq-ft) with 202 rooms. But in the Project Traffic Volume section it is stated that the initial trip generation rate for the hotel was calculated at 83% occupancy, which also uses a value of 202 rooms. As a result, it is uncertain if the hotel has a total of 202 rooms or if 202 rooms is the number of rooms at 83% occupancy. It is also uncertain why 83% occupancy was applied to reduce the projected traffic generation as this is not a recommendation in the ITE Trip Generation Manual, but rather an average occupancy rate of studies that provided information on occupancy rates at the time the ITE studies were conducted. It is interesting to note that the original study back in July 2004 assumed 100% occupancy, which is a good assumption for a winter holiday weekend. This study should also assume 100% occupancy.

Similarly, in the Project Traffic Volume section of the study, the employee housing number of units is said to be approximately 25 units. In Table 4 it shows 30 units for the employee housing land use; however, the trip generation appears to be based off of 25 units. It also appears that in the Parking Analysis section of the report 30 employee housing units was used to calculate the number of parking stalls. Therefore, there is inconsistency in the number of employee housing units between the trip generation and the parking generation. Using 30 units of employee housing when calculating trip generation rates would result in an increase of 2 AM trips and 3 PM trips.

We were also unable to replicate the trip generation values of 56 AM trips and 109 PM trips for the commercial land use in Table 4 using the ITE Trip Generation Manual, assuming 8,735 sq-ft of Specialty Retail and 8,735 sq-ft of Quality Restaurant. With the given information in the Treasure Hill study it is uncertain how these numbers were obtained. We calculated the trip generation values for the respective land uses assuming 8,735 sq-ft for both land uses using the weekday peak hour of the generator and the average trip rates for both AM and PM peak hours from the ITE Trip Generation Manual, which equated to 108 AM trips and 123 PM trips—a substantial increase over the number calculated in the study.

The use of weekday instead of Saturday trip generation data and lack of detail are concerning. The study would need to incorporate the following recommendations to meet minimum traffic study requirements.

RECOMMENDATIONS

- Perform the trip generation calculations using Saturday data where available
- Calculate and provide daily trips in the trip generation table
- Provide more detail regarding the actual rates or equations used in the trip generation process
- Provide clear and consistent assumptions regarding the size of the hotel and the number of employee housing units throughout the study
- Re-evaluate or state assumptions made for the commercial land use in Table 4 and separate the commercial land use into two separate land uses showing both the Specialty Retail and Quality Restaurant land use trip generation

3.2 Trip Reduction

As repeatedly acknowledged by the study's author during the recent Planning Commission meeting, some of the trip reduction percentages applied in the study are largely speculative. For example, the study improperly relies on old 2014 data from the Park City Chamber of Commerce Convention & Visitors Bureau Economic Profile to reduce hotel trip generation estimates based on a presumed 65% hotel occupancy rate. This is an overly aggressive approach. During President's Day weekend, it is far more likely that the hotel would be operating near or at capacity. As such, the hotel trip generation should be increased not decreased. The study also makes no effort to determine whether 2014 hotel occupancy rates are consistent with rates in 2017 or future projections, or if there were historic factors that resulted in suppressed rates during that time period.

There are also limited details on how the internal capture percentages provided in the Trip Reduction section were calculated. It appears that these percentages were derived from Table 7.1 or 7.2 in Volume 1 of the ITE Trip Generation Manual. If that is the case, those percentages were not applied correctly. They are not intended to be instant reductions at all. Rather, they are origin and destination percentages that are dependent upon the trips entering and exiting the different land uses. The ITE Trip Generation Manual Volume 1 shows how these internal capture percentages are to be applied on pages 89 – 100. The ITE manual also provides blank worksheets that allow for the calculation of trip reductions due to internal capture as seen in Figure 1.

The appendix of the study should include ITE worksheets or something similar showing how the internal capture percentages were calculated. Furthermore, ITE suggests that if the site has two or more buildings containing the same land use the land uses should be combined if they are situated within reasonable and convenient walking distance of each other when calculating internal capture. This methodology was not followed in the study. With the limited details provided in the study, it is uncertain how the internal capture percentages were actually obtained.

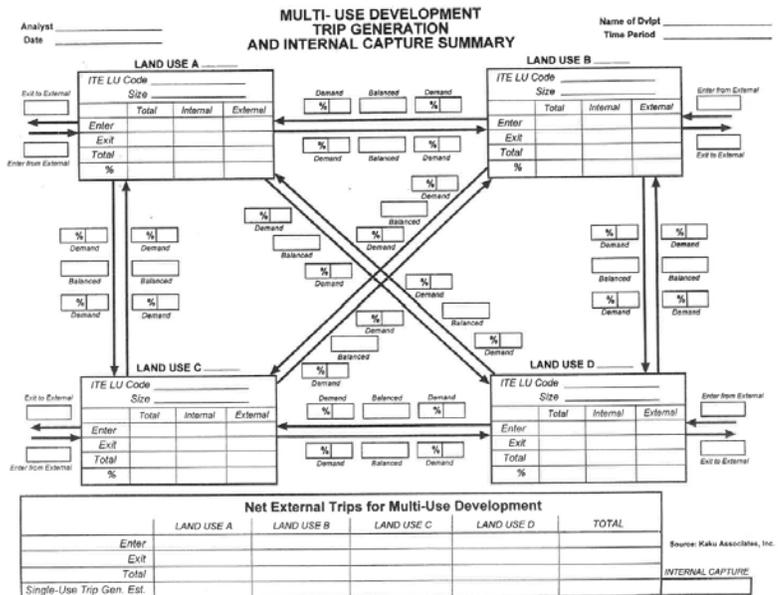


Figure 1: ITE Internal Capture Worksheet

Also, as noted in the study, internal capture information is not provided for the hotel land use. When this is the case, ITE recommends that either (1) local data be collected to establish an internal capture rate, or (2) no internal capture be assumed. The study takes neither approach and instead assumes a 16% trip reduction for the hotel use. Based on guidance from ITE, the 16% trip reduction assumed in the study for the hotel land use was improper.

When considering the trip reduction for the cabriolet, the study doesn't provide any details on why the 30% trip reduction was assumed. Again, the study's author expressly acknowledged that the reduction percentage was speculative. Although we acknowledge the difficulty in forecasting a reasonable value, we believe a 30% rate is too high for this application. The best approach under the circumstances would be to perform sensitivity testing around the assumption to determine how important this assumption really is. Analyses could be performed with different cabriolet trip reduction factors (e.g., 15% or 0%) and then compared against the other scenarios to understand the related impacts to the roadway network. Under the circumstances, a smaller, more conservative trip reduction factor would be more reasonable.

RECOMMENDATIONS

- Eliminate the hotel trip reduction factor based on occupancy to be conservative or at least provide a detailed explanation of how the factor was applied
- Provide ITE internal capture worksheets or something similar showing internal capture calculations
- Show how each trip reduction factor was applied to each land use

- Perform sensitivity testing be performed for a range of cabriolet trip reduction percentages to determine the impacts associated with this assumption

4 TRAFFIC ANALYSIS

The most critical flaw in the study is that the traffic analysis section deals only with the intersections and not road capacity. Under typical conditions this approach might be appropriate, but in this non-standard study area capacity is governed far more by the width and grade of the roads, how that width is affected by snow banks, the number of heavy trucks and pedestrians, and the weather (see Figure 2). Under ideal conditions, a single lane can carry approximately 1,800 passenger cars per hour. The presence of traffic signals, stop signs, heavy vehicles, and roadway grades typically reduce this capacity by more than 50%. Here, even under ideal conditions, the study area roadways might have a one-way capacity of 600-700 vehicles per hour, which is probably achieved during summer. However, during winter conditions when the roadway width is reduced to one lane and vehicles must regularly yield to oncoming traffic or even back up to make way for another vehicle, the roadway capacity may reasonably be assumed to drop to as little as one-tenth of the ideal values, which would be only 60-120 vehicles per hour.



Figure 2: Study Area Roadways During Peak Conditions

A volume-to-capacity analysis using these types of values is therefore recommended and would be more representative of actual conditions in the study area. Of course, the challenge with this type of analysis is that it is unique, and capacity is not very easy to measure. However, field observations could be performed to see how

many vehicles are able to cross a point during peak winter conditions when capacity is low and volumes are high. The failure to consider mid-block roadway capacity in the study, away from intersections, renders the traffic analysis highly suspect and unreliable.

Another factor that should have been considered is the impact on quality of life for those that live in the area, especially on Lowell and Empire Avenues. It is important to understand, on a daily level, how much additional traffic will be on these roads in order to assess this impact. Comparing existing daily volumes at several locations along these roads to what they would be with the proposed project would be vital. Just comparing existing to project volumes at the Lowell Ave/North Star intersection reveals that the project will increase PM peak hour volumes by more than 140%. Understanding these quality of life impacts along the Lowell and Empire corridors would be valuable for a complete understanding of the impact of the Treasure Hill project on the surrounding historic neighborhoods.

Independent of these new analyses, the study provided limited or no details regarding the details of the traffic analysis for the following items.

- Assumptions regarding heavy vehicles, roadway grades, or peak hour factors, nor are any details regarding the SimTraffic analysis, such as the number of runs that were performed
- Whether the mitigated level of service and delay results shown at the intersection of Empire Ave/Silver King are for a signal or roundabout
- Signal spacing, safety, or queuing concerns/issues with adding a signal to Empire Ave/Silver King
- Assumptions regarding left turn phasing at Empire Ave/Silver King
- Whether existing signal timing parameters were obtained for the signal at Park Ave/Deer Valley

The study also states that need for mitigation at the Empire Ave / Silver King intersection is due to background growth that would occur independent of the Treasure Hill development. However, that background growth occurs over a period of 20 years. It is possible that the Treasure Hill development may be built before the mitigation would be required. The study should consider existing traffic conditions plus the proposed project to determine if the traffic impacts of the development alone would require mitigation.

Furthermore, the study doesn't discuss or reference any previous analysis regarding walkability/pedestrian safety, construction impacts, or delivery truck and emergency vehicle traffic that would provide some information or detail about these items. Nor does it address which previous analyses are still appropriate under 2017 conditions, particularly given the significant increase in the size and scope of the project since the first studies.

RECOMMENDATIONS

- Provide a roadway volume-to-capacity analysis under constrained winter conditions where Lowell Ave and Empire Ave and any other impacted streets are reduced to a single lane
- Provide a comparison of daily volumes on Lowell and Empire Avenues and similarly-situated streets within and without the proposed project
- Provide additional details on the intersection analyses that were performed
- Perform a traffic analysis for existing plus project conditions
- Provide any updated information on walkability/pedestrian safety, construction impacts, and delivery truck traffic or reference previous analyses if such studies are still appropriate

5 PARKING ANALYSIS

It is not clear what the purpose of the parking analysis in the study is, but if it is to be used to determine how much parking should be provided, it will be important to consider reserved spaces. For example, residential units typically have a number of reserved parking spaces which are not available for use by business patrons. In such a condition, when calculating the total number of spaces needed, the weekday and weekend values may then be the same (depending on the number of reserved spaces), thereby increasing the number of required weekend parking spaces.

RECOMMENDATIONS

- Provide an explanation of the purpose of the analysis and, if necessary, account for reserved parking spaces in the calculation of total parking needs
- Use a consistent employee housing unit number throughout the study
- Show each parking reduction applied to each land use on a separate row to provide a better understanding of the degree of reduction for each land use

6 SUMMARY OF FINDINGS & RECOMMENDATIONS

In conclusion, the Treasure Hill study does not provide adequate detail or analysis to ultimately be able to determine the full impact the proposed project will have on traffic in the study area, much less determine mitigation measures that might address actual impacts. Most notably, because the Treasure Hill study area is non-standard due to the narrow width and steep grade of most roads in the study area, the failure to analyze traffic flow and capacity at mid-block locations under typical winter conditions undermines any conclusions as to impact. Additionally, as described in detail above, the Treasure Hill study is questionable in regards to existing traffic volumes, future background volume projections (including traffic from the Bamberger and Resort developments), trip reduction factors.

Overall, the study is often too basic and simplistic in nature and omits necessary detail to determine or replicate the analysis procedures and assumptions that were used. The study seems to be generally conservative in estimating existing and future volumes for which the Treasure Hill would have no responsibility, but aggressive in reducing trips (and thereby impacts) that would be attributable to the development. The study also fails to discuss or reference any previous analyses regarding walkability/pedestrian safety, construction impacts, or delivery truck traffic. It is critical to know whether these items are still appropriate under 2017 conditions, particularly given what we understand to be a substantial increase in the scope and size of the project since the first study was prepared in 2004.

Our study recommendations are as follows:

- Apply an adjustment factor to the existing traffic volumes to scale them up to average February Saturday values
- Provide the peak hours within the respective peak period counts to know the specific hour analyzed for the AM & PM time periods
- Use outputs from the traffic model in estimating future traffic volumes or provide an explanation of why using population growth projections is the preferred approach
- Provide trip generation tables for the Bamberger and Resort developments as well as what was assumed for the “variety of mixed land uses” when estimating the trip generation

- Add the new vehicle trips from the entitled Bamberger and Resort developments to all study intersections as part of the future traffic volumes
- Perform the trip generation calculations using Saturday data where available
- Calculate and provide daily trips in the trip generation table
- Provide more detail regarding the actual rates or equations used in the trip generation process
- Provide clear and consistent assumptions regarding the size of the hotel and the number of employee housing units throughout the study
- Re-evaluate or state assumptions made for the commercial land use in Table 4 and separate the commercial land use into two separate land uses showing both the Specialty Retail and Quality Restaurant land use trip generation
- Eliminate the hotel trip reduction factor based on occupancy to be conservative or at least provide a detailed explanation of how the factor was applied
- Provide ITE internal capture worksheets or something similar showing internal capture calculations
- Show how each trip reduction factor was applied to each land use
- Perform sensitivity testing be performed for a range of cabriolet trip reduction percentages to determine the impacts associated with this assumption
- Provide a roadway volume-to-capacity analysis under constrained winter conditions where Lowell Ave and Empire Ave are reduced to a single lane
- Provide a comparison of daily volumes on Lowell and Empire Avenues and similarly situated streets within and without the proposed project
- Provide additional details on the intersection analyses that were performed
- Perform a traffic analysis for existing plus project conditions
- Provide any updated information on walkability/pedestrian safety, construction impacts, and delivery truck traffic or reference previous analyses if such studies are still appropriate.
- Provide an explanation of the purpose of the analysis and, if necessary, account for reserved parking spaces in the calculation of total parking needs
- Use a consistent employee housing unit number throughout the study.
- Show each parking reduction applied to each land use on a separate row to provide a better understanding of the degree of reduction for each land use.