

Ronald J. Howard
City Administrator
City of Hurstbourne
304 Whittington Parkway, Suite 100
Louisville, KY 40222

April 10, 2007

Re: Oxmoor Farms Rezone Traffic Impact and Air Quality Study and
Hurstbourne Area Transportation Study and Small Area Plan Review
Louisville, KY
Yarger Engineering Job Number: 20070302

Dear Mr. Howard,

At your request, we have reviewed the Oxmoor Farms Rezone Traffic Impact and Air Quality Study (Rezone Study) for accuracy and the potential for cut through traffic on the residential streets in Hurstbourne. We have also reviewed the transportation portions of the Hurstbourne Area Transportation Study and Small Area Plan (Transportation Study).

We have found numerous areas where we have concerns about the accuracy of the Rezone Study, and in particular, with the traffic forecasts for cut through traffic in both the Rezone Study and the Transportation Study. These comments are listed in a systematic order and not in the order of importance.

1. The lists of study intersections in both studies leave out several key intersections in the study area and all of the interchange ramps. Those intersections include the signalized and stop controlled ramps at I-64 at Hurstbourne Parkway, and I-264 at Shelbyville Road. The Rezone Study leaves out the intersection of Hurstbourne Parkway and Taylorsville Road, but the Transportation Study includes it. This intersection in the Transportation Study shows a level of service F for 2009. These are crucial to determining the capacity restrained assignment based on travel times and more fully understand the impacts of the proposed development and improvements.
2. The parcel sizes listed in Rezone Study Table 1-1, Development Parcels, do not appear to match the proportions of the parcels show in Figure 2, Site Plan. Several of the parcels are not even shown on the site plan map. Parcel 8A is troublesome because it appears to be an order of magnitude off and if so, then we suspect that the shopping center size is also off an order of magnitude. This could easily be an increase 180,000 sft of shopping center and the associated traffic. Some of the minor roadways on the Site Plan in the Rezone Report do not match the Strategic Concept Plan dated May 2002. While the traffic studies can only estimate the final uses of the developed land, the conclusions drawn from the study are only as good as the assumptions in the study, including the assumed land use.
3. In the in Rezone Study, the specialty retail density of parcel 1 appears to be low, about half of what we would expect. We normally expect around 10,000 sft per acre for retail, and from 10,000 to 20,000 sft per acre for offices unless parking garages are involved. Some of this might have gone to green space requirements, but parcel 15 has 78.7 acres set aside as a preservation easement along with parcel 2 having 5.4 acres of open space adjacent to the specialty retail in parcel 1.

4. The Rezone Study used the ITE Trip Generation Report equations where possible in generating its traffic estimates. These equations are based on data taken from similar sites and a best fit equation is derived from the data. It should be noted that many of the actual data points do not fall on the equations, but are higher or lower than what the equations would predict. The standard deviation from the averages rates can be substantial, such as in the case of a shopping center having an average rate of 3.74 trips per thousand square feet (KSFT) in the PM street peak, but the standard deviation is 2.73 trips per KSFT.
5. The Rezone Study used an average weekday in generating its traffic estimates. This does not account for peaking on Fridays or for the retail peaking in late November and December. The Trip Generation Report contains data on day to day variation within the week showing that Fridays can be 15% higher than the average day. It also contains information on month to month variations with December being about 42% higher than the average month. Commissioner Ed Dahlem told me that he checked with Oxmoor Mall administration who told him they have a 300% increase in customers in late November and December. This is much higher than the national data in the Institute of Transportation Engineer's (ITE) Trip Generation Report, but being local data, I tend to believe it.
6. The Rezone Study's internal trips credit appears to be applied in phase 1, but they are taking credit for trips to and from developments that won't be built until later phases. This does not matter for build-out. The internal trips calculations show development of parcel 15. I assume that parcels were renumbered since the size and use of parcel 15 in the calculations matches the size and use of parcel 14 in table 1-1.
7. The distribution information in the Rezone Study lacks clarity and justification. The distribution relates to where the trips start and end. The assignment considers every turn along the way. All the report has to say is that the City of Louisville approved the distribution. It is unclear if the City of Louisville also approved the individual turning percentages involved in the assignment, or just the overall distribution.
8. The Rezone Study appears to have based its distribution on long distance trips, but did not include any diverted link trips where a person may make multiple stops, but not necessarily be traveling by one stop on the way to another. These trips are different than primary trips where a trip starts at home and ends at work or a store, and then returns back to home, and differs from pass-by trips because they divert farther from the original route than just a single turn into a secondary stop. This type of diverted trip can lead to more trips cutting through Hurstbourne if the other stops are on Hurstbourne Parkway between Shelbyville Road and I-64. The percentage of these types of trips is normally considered to be insignificant and the trips are included in the primary trips; however, given the potential secondary stops along Hurstbourne Parkway and for cut through traffic in Hurstbourne, diverted link trips could alter the assumed trip distribution and assignment and should probably have been at least noted.
9. The Rezone Study's pass-by trip percentage appears to be a little high. It appears to use the average rate from the ITE Handbook instead of using the equation to percentage. Using the equation to calculate the percentage, we get 30%, not 34% for shopping centers.
10. The manner that the pass-by trips were accounted for in the trip assignment calculation appears to be wrong and likely leads to a very low estimate of traffic. In short, about 34% of the total retail traffic appears to be omitted from the forecasts.

11. The 2001 traffic forecast before any development appears to have mistakes in the 1% adjustment from 2000 to 2001 at Shelbyville Road and Oxmoor Lane. The eastbound right turn appears to be 40 vehicles per hour (vph) low in both the morning and afternoon. The rest of the movements at this intersection appear to be correct. In order to keep our review fees down, we did not review every intersection at this level of detail.
12. The Rezone Study indicates that the amount of anticipated cut through traffic from the new development via Lyndon Lane could be 1 - 2%, but no traffic was assigned to Lyndon Lane, or to any of the other stub streets that are proposed to connect such as Oxmoor Woods Parkway or Linn Station Road. This seems to contradict the information in the Hurstbourne Area Transportation Study and Small Area Plan, which estimates that 40% of the traffic in Hurstbourne (excluding Shelbyville Road and Hurstbourne Parkway) is cut through. While the numbers are not directly comparable, the order of magnitude does suggest that the Rezone Study's estimate of no cut through traffic is unrealistic. One or two percent would also be unrealistically low. This type of assignment where all new traffic is assigned to the major roads is appropriate when the roads receiving the new traffic have sufficient capacity to handle the total traffic after all improvements. That is not the case here according to the Rezone Study.
13. The Hurstbourne Area Transportation Study and Small Area Plan's estimate of 40% cut through daily traffic has a lot of problems with it, but even with accounting for problems, an estimate of 20% is not unrealistic and is likely to peak during rush hour traffic for Shelbyville Road and Hurstbourne Parkway due to congestion on the main roads.
14. The level of service calculations in the Rezone Study and Transportation Study are for isolated intersections with estimates of upstream and downstream influences as an input. Upstream and downstream influences are important with closely spaced intersections and should be considered with proper methods instead of user estimates. The Rezone Study mentions using CORSIM and this would be one way to directly consider these influences, but there is no CORSIM information included in the report.
15. The Rezone Study says on pages 22 and 23 that level of service F is unacceptable to most drivers. Tables 1-8 through 1-28 include many intersections at level of service F with delays over 100 seconds per vehicle. Part of this is because there appears to be no attempt to optimize the traffic signal timings for the new traffic. While some of the intersections appear to have too much traffic for the number of lanes, the capacity of an intersection is related to the signal timings as well as the number of lanes. Changes in signal timings can substantially reduce delays where the initial signal timings are inadequate for the traffic and may raise some of the levels of service from F to E or higher. Better signal progression can also help lower delays and improve the levels of service. Taking the statement on pages 22 and 23, and the tables 1-8 through 1-28, it appears that most motorists will find the resulting congestion caused by the rezone to be unacceptable.
16. Given that some of the intersections are way over capacity and will continue to be that way even with optimized signals, the traffic assignment should have been adjusted to use alternate routes to account for motorists' nature inclination to find the shortest travel time route. This is per the directions given in the ITE Traffic Access and Impact Studies for Site Development, A Recommended Practice, page 33, center column, last paragraph. It reads, "*Once the initial projected total traffic volumes have been estimated, capacity analyses should be performed, as described later in this chapter. In some cases, the projected demand may be unrealistically higher than the capacity on segments of the proposed roadway system. In those cases where improvements are not feasible, an*

adjustment should be made in the site and/or background traffic components to reflect realistic traffic diversion caused by capacity restraint and travel time considerations."

This would likely include increasing the amount of traffic cutting through Hurstbourne where the opportunity exists. Existing traffic may also find alternate routes due to the increases in congestion caused by the proposed traffic, so while some of the new traffic may not have alternate routes, cut through traffic may still increase.

17. Bunsen Parkway may serve as alternate route for some of the existing and future cut through traffic that would otherwise use Linn Station Road and Oxmoor Woods Parkway. This depends on their ultimate trip distribution and the capacity of the intersections along their desire routes. The Rezone Study does not provide enough detail as to the assignment process to see how much has been assigned to movements at the I-64 and Hurstbourne Road interchange. The Transportation Study provides some turn movement volumes at key intersections, but does not indicate their entire route. The congestion at the I-64 and Hurstbourne Parkway interchange may divert traffic from Bunsen Parkway to Linn Station Road if their route involves Hurstbourne Parkway north of I-64 and no counter measures are taken such as road closures.
18. Cut through traffic can be addressed a number of ways as mentioned in the Transportation Study, but each way has its pluses and minuses. Given the magnitude in the travel time differences between cutting through Hurstbourne and traveling around using Shelbyville Road and Hurstbourne Parkway, many of the less restrictive traffic calming methods may address speeding but not the volume of cut through traffic.
19. A study to estimate the amount of cut through traffic from the rezone would need to include all of the study intersections, the ramps and missing intersections noted in item 1, a signal system optimization program such as Transyt-7F or Synchro, a micro-simulation program such as CORSIM or SimTraffic, and possibly a microscopic travel demand model such as Paramics. Even with existing traffic counts, estimating the cut through traffic is difficult without a license plate or similar origin-destination study. Traffic counts and traffic estimates by land use alone are insufficient to estimate the cut through traffic other than to bracket the answers. Even to bracket the cut through numbers it takes more information than was included in the Transportation Study's estimate of 40%. For example, they left out several land uses within the study area, internal trips, and did not count all roads into the study area. They also did not account for the deviation from the ITE trip generation equation results mentioned in items four and five.
20. Closing the stub streets and Christian Way from Hurstbourne into Oxmoor Farms will reduce the potential for cut through traffic, but will also cause Hurstbourne residents to use Shelbyville Road and Hurstbourne Parkway to access Oxmoor Mall and Farms. Closing only the stub streets and leaving Christian Way open to all traffic will basically continue the current cut through pattern, but as mentioned above the volume of cut through traffic may increase due to congestion on Shelbyville Road and Hurstbourne Parkway.
21. Closing the stub streets and installing gates would provide the maximum reduction in cut through traffic if placed on Lyndon Lane and Oxmoor Woods Parkway near their intersection with Christian Way. Gates would be expensive, require maintenance and have some operational costs. Automatic gates will have lower operating costs, but will not be flexible enough to deal with service personnel and guests. Emergency personnel would need to have access though the gates. Providing police, fire and ambulances access cards should be sufficient. Trash trucks would also need access cards. Guest and other service personnel will have to know to use alternate routes to enter Hurstbourne. A

third gate location on Nottingham between Seaton Springs Parkway and Linn Station would reduce the cut through traffic trying to avoid the congestion on Hurstbourne Parkway. If gates are installed, turn arounds will also be needed for traffic attempting cut through and not being able to do so. Given the potential for semis getting stuck, the size of the turn around would need to be large enough for them. An alternative would be for the police to open one of the gates and let the semi through, but the driver may be reluctant to call the police and tear up the ground surrounding a turn around that is too small for semis.

22. The Transportation Study lists other traffic calming measures, such as diverters and chicanes, but these will probably not have a noticeable effect on cut through volumes given the difference in travel time through and around Hurstbourne. Some of them may help if a speed problem exists after closing the stub streets and installing gates, but we recommend waiting until these measures are in place and then finding there are still problems.

In conclusion, we believe that there are serious issues with the Rezone Study and find its estimates of future cut through traffic caused by the new development (none) to be substantially low. The estimate seemed to ignore the potential for additional cut through traffic from existing traffic avoiding the new congestion caused by the development. Bunsen Parkway may reduce some of the existing cut through traffic, but the Rezone Study also failed to quantify it. Simply assuming that they will balance out without providing a justification is not an acceptable practice when trying to identify the impacts on Hurstbourne from a new, very large development like Oxmoor Farms.

We further believe that the Transportation Study, which took information from the Rezone Study, has also under estimated the potential for additional cut through traffic unless some of the more drastic measure mentioned in the study such as gates and street closures in Hurstbourne are taken.

Both studies failed to considers some of the most important intersections and ramps that will lead to cut through traffic. They have also assumed that the freeways will be able to handle the additional traffic without justifying the assumption or even discussing it.

As noted in the Transportation Study, cut through traffic is a quality of life issue. The justification process for installing counter measures to the cut through traffic needs to consider more than just roadway capacity and speeds.

If you have any questions or comments, please call me at (317) 475-1100, or toll free at 800-965-4587. You may also email me at bwyarger@yargerengineering.com.

Sincerely,
YARGER ENGINEERING, INC.



Bradley William Yarger
Kentucky Professional Engineer License No. 25159
President



1 Cor. 10:31
...whatever you do,
do it all for the glory of God.

Jim Leidgen
City Administrative Officer
City of Hurstbourne
304 Whittington Parkway, Suite 100
Louisville, Indiana 40222

February 15, 2019

Re: Road Closures of Stamford Drive and Cheffeld Drive
Hurstbourne, Kentucky
Yarger Engineering Job Number: 20190202

Dear Mr. Leidgn:

In 2007 Yarger Engineering, Inc. was hired to review and comment on a few reports by others concerning cut-through traffic potential in Hurstbourne from the proposed Oxmoor Farm development to the west. John Singler, your City Attorney, asked us to assist in closing Stamford Drive and Cheffeld Drive in Hurstbourne due to the likelihood of cut-through traffic using them.

Yesterday I spent the day observing traffic in Hurstbourne and making travel time runs along US 60 (Shelbyville Road), KY 1747 (Hurstbourne Parkway), Christian Way, Oxmoor Woods Parkway, and Linn Station Road. My observations and travel time runs confirmed that my concerns expressed in my April 10, 2007 letter are still appropriate today. I witnessed firsthand some cut-through traffic, although that was not my primary objective, and therefore didn't quantify it yesterday.

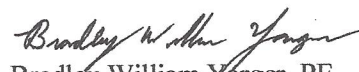
My travel time runs and observations concluded that there is significant congestion at points along US 60 and KY 1747, particularly near the interchanges during the afternoon rush. The westbound queue on US 60 from I-264 (Watterson Expressway) stretched back past Whipps Mill Lane, and the southbound queue on KY 1747 stretched back through Williamsburg Plaza. At these times, drivers could reduce their travel times by several minutes by cutting through Hurstbourne using the residential local streets as if they were collectors, and then enter the queues to the interchanges in the middle of the line at the signals on US 60 at Christian Way, and on KY 1747 at Linn Station Road.

If Oxmoor Farms were to develop to the south of the mall, it is forecasted to create even more congestion on the arterial streets in the area, which would likely cause a significant increase in cut-through traffic in Hurstbourne on the local streets, including the residential areas. Directly connecting Oxmoor Woods Parkway at Stamford Drive and Cheffeld to the proposed Oxmoor Farms development would only exacerbate the cut-through problem in the residential areas.

Connecting local streets in Hurstbourne to the proposed Oxmoor Farm development would also appear to contradict the Land Development Code 6.2.5.C.2, which states, "All local and cul-de-sac streets shall be related to the topography of the subdivision and shall generally tend to discourage fast or through traffic." Connecting Oxmoor Farm to Hurstbourne at Cheffeld and Stamford Drive would promote through traffic by creating shorter and quicker paths from Oxmoor Farm to KY 1747 and I-64.

If you have any questions or comments, please call me at (317) 475-1100. You may also email me at bwyarger@yargerengineering.com.

Sincerely,
Yarger Engineering, Inc.


Bradley William Yarger, PE
Kentucky Professional Engineer License No. 25159
President

BWY/bwy