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March 16, 2011

George Zapalac
City of Austin
505 Barton Springs Road, 2nd Floor
Austin, TX 78704

SUBJECT: Champion Tract TIA Update

Dear George:

This letter is an update to the reports submitted by HDR to the City on December 3, 2010 and March 9, 2011; and incorporates all changes to the project land use that have been discussed and modeled since that time. In particular, this update adds a trip generation table for the proposed land uses, which includes the pass-by reduction assumptions. This information had always been provided in the enclosures, but is now being made part of the report. In addition, a discussion of available sight distance is provided, which had been submitted to the City separately.

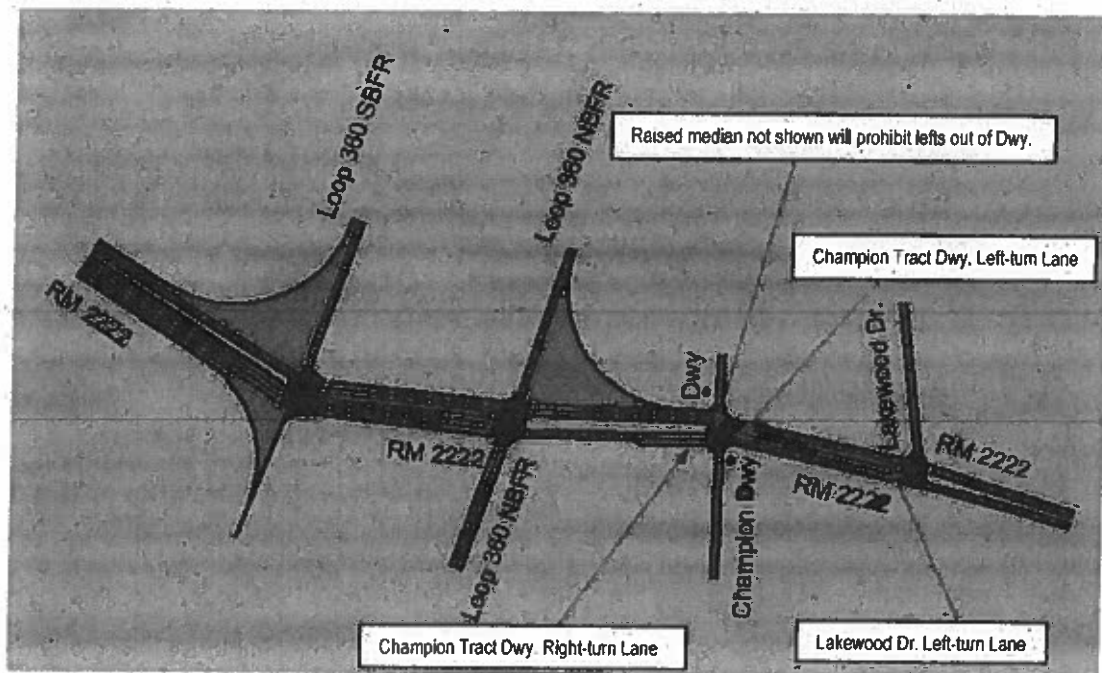
At your request, HDR has conducted an analysis of several area intersections, as well as the proposed Champion Tract driveway on RM 2222, east of Capital of Texas Highway (Loop 360), in Austin, Texas. The purpose of this analysis is to determine whether left-turn access into the site would be feasible without adversely affecting Intersection operations in the vicinity of the site.

Project History and Analysis Assumptions

At present, the driveway is approved as a right-in/right-out only driveway. TxDOT is currently reconstructing this section of RM 2222, which will result in available pavement width to provide a left-turn lane approximately 100 feet in length for entering-only traffic at this driveway, as shown in Figure 1, and on the RM 2222 plan profile sheets enclosed. Lefts out of the driveway will not be allowed. The RM 2222 project also includes providing a left-turn lane for eastbound traffic turning left onto Lakewood Drive, and it has removed the large-radius northbound right-turn lane at the Loop 360 Northbound Frontage Road

(NBFR)/RM 2222 intersection. A signal will also be installed at the intersection of Lakewood Drive and RM 2222.

Figure 1
RM 2222 Proposed Lane Configuration



The Champion Tract project is anticipated to be completed in 2015. There are two land use combinations possible for this project. In both cases, there will be a convenience store 3,000 square feet in size. The remaining 53,810 square feet will function either as a shopping center or as specialty retail. To provide a conservative analysis, the highest of the two trip estimates was used. (Trip generation output is enclosed.) For the AM peak, this was the Specialty Retail/Convenience Store land use mix, and for the PM Peak this was the Shopping Center/Convenience Store land use mix. The proposed project will generate approximately 5,579 *unadjusted* daily trips at final buildout in 2015. Table 1 provides a detailed summary of traffic production, which is directly related to the assumed land use plan.

Table 1.
Summary of Unadjusted Daily and Peak Hour Trip Generation

Proposed Land Use	Size (SF)	24-hour Two-way Volume	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Convenience Store	3,000	1,040	47	47	51	53
Shopping Center <i>or</i> Specialty Retail Center*	53,810	4,539	177	191	206	214
Total		5,579	224	238	257	267

*The higher of the two trip generators was used for each peak hour.

A pass-by reduction of 47% was assumed for the Shopping Center during the PM Peak. No other pass-by reductions were assumed, nor was internal capture assumed. Table 2 provides a detailed summary of the adjusted traffic production which is directly related to the assumed land use activity for the proposed development given the pass-by reduction discussed previously. As a point of reference, the total *adjusted* trips per day are estimated at 5,337 vehicles per day.

Table 2.
Summary of Adjusted Daily and Peak Hour Trip Generation

Proposed Land Use	Size (SF)	24-hour Two-way Volume	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Convenience Store	3,000	798	47	47	51	53
Shopping Center <i>or</i> Specialty Retail Center*	53,810	4,539	177	191	110	114
Total		5,337	224	238	161	167

*The higher of the two trip generators was used for each peak hour.

In addition to the project driveway located on RM 2222, a right-in/right-out only driveway (not depicted) will be constructed on the Loop 360 NBFR. This study will compare two scenarios. Scenario One assumes that the RM 2222 driveway is right-in/right-out only, while Scenario Two assumes that left-turns in are allowed. For Scenario One (no lefts in), it is assumed that traffic entering the site from either the north on Lakewood

Drive or from the west on RM 2222 would travel west on RM 2222 and make a u-turn at the Loop 360 Southbound Frontage Road (SBFR)/RM 2222 intersection, or head south on Loop 360 and make a u-turn at Courtyard Drive to access the second site driveway on the Loop 360 NBFR. In all cases, it is assumed that left-turns out at this driveway would not be allowed. A right-turn deceleration lane is also proposed at this driveway location.

The intersections of interest include the following:

1. Loop 360 and RM 2222 (two intersections)
2. Champion Driveway and RM 2222
3. Lakewood Drive and RM 2222

As shown in Figure 1, the Champion Tract driveway on RM 2222 will be aligned with an existing driveway to a retail center on the north side of RM 2222. This driveway is a right-in/right-out only driveway. Counts were not available for this location; therefore, traffic to and from this retail center was estimated given the land use present on the site, which includes 14,600 square feet of quality restaurant, 8,330 square feet of high turnover restaurant, and 4,070 square feet of shopping center. (Trip generation information is enclosed.) The retail center also has an access driveway (not depicted) on Loop 360 Northbound Frontage Road, north of RM 2222. For clarification, the 2007 turning movement counts used for this analysis do include traffic generated by this retail center, since it was occupied at that time; however, counts for the driveway itself are not available. Therefore, traffic from this retail center was not added to the intersections listed above.

Field review of the roadway network indicates that the posted speed limit is 45 MPH. The signalized intersections of Loop 360/RM 2222 are currently under TxDOT control during construction. However, the City of Austin will take over signal operations upon completion of construction. Therefore, signal timing and phasing information was obtained from the City in order to analyze 2015 traffic conditions. The signal timing and phasing were not optimized in order to provide a straight comparison of the two scenarios. In addition, the signal timing and phasing for the intersection of Lakewood Drive/RM 2222 were developed using SYNCHRO to determine optimal operations. Once this was done, signal timing and phasing was fixed for both scenarios.

Results and Recommendations

The intersections listed previously were modeled for both scenarios using the highest trip generating land use mix during both the AM and PM peaks. Distribution spreadsheets and output from the SYNCHRO model are enclosed and are summarized below. As shown in Table 3, providing left-turn access at the Champion Tract Driveway on RM 2222 does not adversely affect delay and level of service (LOS) at the intersections of interest.

Table 3
Intersection Analysis Results

Intersection	AM Peak*				PM Peak**			
	No Left Turn		With Left Turn		No Left Turn		With Left Turn	
	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS	Delay (sec/veh)	LOS
Loop 360 SBFR	90.4	F	85.9	F	401.3	F	401.6	F
Loop 360 NBFR	91.7	F	87.0	F	98.3	F	93.2	F
Champion Tract Driveway	0.7	A	1.0	A	0.5	A	0.8	A
Lakewood Dr.	11.6	B	11.6	B	14.1	B	14.1	B

*Assumed Specialty Retail category for retail, since this generates the highest trip estimate.

**Assumed Shopping Center category for retail, since this generates the highest trip estimate.

An equally important area of interest is the operational characteristics of the left-turn lane itself. The City requested that data be provided regarding the delay experienced by drivers waiting to turn left onto the Champion Tract driveway, as well as the anticipated queue lengths during the peak hours. The estimated left-turn volumes for the AM and PM peaks are 45 vehicles and 90 vehicles, respectively. As shown in Table 4, during the AM peak, left-turning traffic is expected to experience 24.5 sec/veh of delay, which is LOS C. During the PM peak, delay is expected to be 13.3 sec/veh, which is LOS B. The 95th percentile queue lengths are 19 feet and 17 feet for the AM and PM peaks, respectively. For reference, a typical vehicle is approximately 20 feet in length; therefore, the results indicate that an appropriate queue is anticipated.

Table 4
Champion Tract RM 2222 Driveway
Left-turn Lane Delay, LOS, and Queue Length Results

	AM Peak			PM Peak		
	Delay (sec/veh)	LOS	Queue Length (ft.)	Delay (sec/veh)	LOS	Queue Length (ft.)
Champion Tract Driveway	24.5	C	19	13.3	B	17

Note: One vehicle occupies 20 feet.

One other operational characteristic of interest is the critical gap for the westbound left-turn maneuver at the Champion Tract Driveway. This is the time required for a vehicle to make a left-turn from the lane into the Champion Tract Driveway, which is estimated as 4.1 seconds. While no direct data is available regarding the number of gaps in the opposing traffic (RM 2222) stream, since counts could not be taken during construction, the signal at Loop 360 NBFR/RM 2222 will meter eastbound RM 2222 traffic and create gaps in the traffic stream as demonstrated by the delay and queue length analysis results above.

Finally, questions arose regarding sight distance that must be addressed. There are three criteria that need to be checked for this driveway location. The first is sight distance for a left-turn maneuver from a major street, or the traffic turning from RM 2222 into the site driveway. Given a design speed of 55 MPH, the sight distance requirement is 445 feet. The second is sight distance for a right-turn maneuver from the driveway. Given a design speed of 55 MPH, this sight distance requirement is 530 feet. The third is the sight distance required by the Hill Country Roadway ordinance, which is 550 feet. The available sight distance was calculated using the plan profile sheets for TxDOT's reconstruction of RM 2222, since ongoing construction prohibits actual measurement in the field. The available sight distance to the west along RM 2222 is approximately 990 feet, which is well in excess of the required sight distance. (Calculations are enclosed.)

Given the results of this analysis, I respectfully request that a westbound left-turn lane on RM 2222 be approved for construction to allow "left-turn in" access to the Champion Tract site. Please feel free to contact me if you have any questions regarding this information.

Sincerely,



Kathleen A. Hornaday, P.E., PTOE

Senior Project Manager

cc: Terry Bray/Michael Whellan; Graves Dougherty Hearon & Moody

Enclosures



