

TRAFFIC IMPACT STUDY

WYNCOTE ELEMENTARY SCHOOL

Cheltenham Township, Montgomery County

Pennsylvania

December 14, 2012

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TRAFFIC IMPACT STUDY

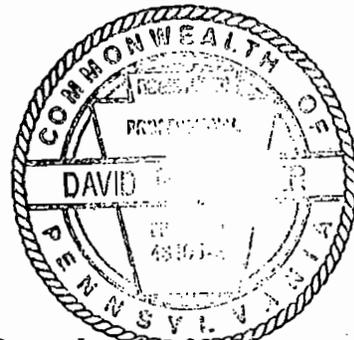
WYNCOTE ELEMENTARY SCHOOL

Rice's Mill Road
Barker Road

Cheltenham Township
Montgomery County
Pennsylvania

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INTRODUCTION

Horner & Canter Associates has prepared this Traffic Impact Study on behalf of the School District of Cheltenham Township for the proposed reconstruction of the Wyncote Elementary School located on the east side of Rice's Mill Road between Church Road (S.R. 0073) and Barker Road in Cheltenham Township, Montgomery County, Pennsylvania. The site location is depicted in Figure 1. The existing Wyncote Elementary School has a 2012-2013 school year enrollment of approximately 413 students (grades K-4). The capacity of the reconstructed school will be approximately 500 students. Access is currently provided via one driveway intersecting Barker Road.

The proposed reconstruction of the Wyncote Elementary School will include the replacement of the existing school building and modifications to the access and on-site parking and circulation. Access to the site will be modified to provide separate access points for buses and passenger vehicles. Passenger vehicle access is to be maintained via the existing access to Barker Road. Two alternatives for a separate bus access are being considered -- one option being a driveway intersecting Rice's Mill Road and one option being a second driveway intersecting Barker Road. The projected build-out and re-occupancy of the school is anticipated for September 2014.

The purpose of this Traffic Impact Study is to determine the traffic impact of the reconstructed elementary school will have on the adjacent roadways and intersections. In making this determination, this Traffic Impact Study has included:

- A site inspection and inventory of existing roadway features such as geometric layout, lane configurations, traffic control devices, and other pertinent physical characteristics.
- The acquisition of traffic count data for the weekday AM (7:00 AM - 9:00 AM) and weekday PM (2:00 PM - 4:00 PM) peak periods at the following intersections which constitute the study area:
 - Rice's Mill Road/Church Road (S.R. 0073)
 - Rice's Mill Road/Barker Road
 - Barker Road/Greenwood Avenue
 - Barker Road/Existing School Access
- Analysis of existing traffic conditions at the study area intersections.

- A projection of school expansion-generated traffic volumes along with a re-distribution of existing school traffic to reflect the site layout changes.
- Establishment of future traffic volumes for the study horizon year (2014), including background traffic growth projections and the school-generated traffic.
- Analysis of future traffic conditions in 2014 at the study area intersections and determination of any improvement needs to mitigate the impact of the school reconstruction.
- Formulation of conclusions and recommendations with regard to the traffic impact of the proposed reconstruction of the Wyncote Elementary School.

EXISTING CONDITIONS

The study area roadway network was inventoried with regard to the existing physical and operating characteristics as they affect traffic flow. The study area roadway network is described in further detail below.

Rice's Mill Road is a local Township roadway that extends between Ogontz Avenue and Glenside Avenue, providing one travel lane in each direction. In the vicinity of the school, Rice's Mill Road provides a cartway width of 34 feet. The posted speed limit on Rice's Mill Road is 25 miles per hour.

Barker Road is a local Township roadway that extends between Rice's Mill Road and Greenwood Avenue, providing one travel lane in each direction. The posted speed limit on Barker Road is 25 miles per hour, although there is a 15-mph school zone sign in the vicinity of the school frontage.

The nearest signalized intersection to the school is the intersection of Rice's Mill Road/Church Road (S.R. 0073). This intersection is controlled by a two-phase traffic signal operating under a 60-second cycle length. A reduced-size copy of the traffic signal permit plan for this intersection is provided in the Appendix on page A-1.

The study intersections of Rice's Mill Road/Barker Road and Barker Road/Greenwood Avenue are unsignalized "T"-intersections, with stop-sign control on the Barker Road (minor street) approach at each location. The intersection of Barker Road and the existing school driveway is stop-sign controlled for the school driveway approach.

EXISTING TRAFFIC VOLUMES

In order to evaluate when the greatest amount of traffic will be present on the adjacent roadways and intersections, the critical peak hours must be determined. Critical peak hours refer to the times when the combined effect of existing traffic and traffic generated from the proposed development will result in maximum traffic flow conditions.

The critical periods for school-generated traffic coincide with the daily opening and closing of the school day. The Wyncote Elementary School hours are from 9:00 AM to 3:40 PM. Thus, the student arrivals generally occur between 8:40 AM and 9:00 AM, while the departures generally occur between 3:40 PM and 4:00 PM. In order to capture both the school peak periods, we acquired traffic count data on a representative weekday during the 7:00 - 9:00 AM and 2:00 - 4:00 PM periods at the following intersections which constitute the study area:

- Rice's Mill Road/Church Road (S.R. 0073)
- Rice's Mill Road/Barker Road
- Barker Road/Greenwood Avenue
- Barker Road/Existing School Access

The summarized peak hour traffic count data is provided in the Appendix on pages A-2 through A-9.

The traffic counts taken at the school driveways indicate that the highest volume of existing school-generated traffic occurs from 8:00 to 9:00 AM and from 3:00 to 4:00 PM, correlating with the beginning and end of the school day. It is these two peak hours that are evaluated in detail in this traffic study.

The existing peak hour traffic volumes are presented in Figures 2 and 3 for the weekday AM and weekday PM peak periods, respectively.

EXISTING LEVELS OF SERVICE

In order to determine the ability of the adjoining streets, highways and intersections to accommodate the site-generated traffic, the Level of Service of these facilities is computed. Level of Service (LOS) is a measure of the quality of the traffic flow and generally is expressed as follows:

- Level of Service
- A - Excellent - Free flow
 - B - Very Good - Minor adjustments in traffic flows
 - C - Good - Stable flow of traffic
 - D - Satisfactory flow - Occasional short periods with minor delays
 - E - CAPACITY FLOW- Regular delays
 - F - Forced Flow - Significant delays and queuing

At signalized intersections, Level of Service is based on the average delay to all motorists at the intersection. The volume-to-capacity (v/c) ratio represents the capacity sufficiency of the intersection and its individual movements based on its physical characteristics.

At unsignalized intersections, Level of Service is based on the average delay to controlled and yielding movements, such as exiting movements from a stop sign or the left-turn from a through street into a side street. The delay thresholds for various Levels of Service are located in the Appendix on pages A-10 and A-11.

The existing operating conditions within the study area were evaluated using the above-described methodology. The resultant Levels of Service for the study area intersections are presented in Figure 4 and described below. The detailed capacity analysis worksheets are contained in the Appendix on pages A-12 through A-19.

As shown in Figure 4, the signalized intersection of Rice's Mill Road/Church Road (S.R. 0073) currently operates at acceptable LOS B both overall and for all movements during the two study peak periods. The unsignalized intersections in the study area operate at acceptable LOS A/B indicative of excellent operating conditions. The site access intersecting Barker Road operates at highly acceptable LOS A during both peak periods.

SITE TRAFFIC

The estimation of the amount of site traffic a development proposal will generate is dependent upon the type and site of the use and, in some cases site-specific operating characteristics. For the proposed reconstruction of the existing Wyncote Elementary School, the existing site-generated traffic has been documented through the conduct of traffic counts during the peak activity hours of a typical school day.

Table 1 below summarizes the existing peak hour traffic generation for the school. It is noted that the traffic volumes include both counted traffic activity at the Barker Road driveway and those observed parent pick-ups and bus activity along the frontage roadways that did not enter/exit the driveway.

Table 1						
Existing Peak Period Site Traffic Volumes						
Wyncote Elementary School						
	Weekday AM Peak			Weekday PM Peak		
	In	Out	Total	In	Out	Total
Existing School	56	20	76	22	41	63

The capacity of the reconstructed school will be 500 students. Based on information provided by the school district representatives, the existing staffing (62 employees, including full and part-time) will increase to 65 with the reconstruction. While the enrollment is not expected to reach this capacity upon the opening of the school in 2014, for the purpose of this report we have assumed a "worst-case" enrollment increase from the existing 413 students to the 500 student capacity, an increase of approximately 21 percent over existing. To project the future school-generated traffic, therefore, we increased the existing school-generated traffic volumes by 21% as shown in Table 2 below:

Table 2						
Projected Peak Period Site Traffic Volumes						
Wyncote Elementary School						
	Weekday AM Peak			Weekday PM Peak		
	In	Out	Total	In	Out	Total
Existing (413 students)	56	20	76	22	41	63
Future (500 students)	68	24	92	24	47	71
Projected Traffic Increases	12	4	16	2	6	8

The projected traffic increases represent the additional traffic that would be generated by the reconstructed school at full capacity. In conjunction with the reconstruction of the school and the modifications to the on-site circulation, the school access will also be modified as described previously. Thus, in addition to the projected traffic increases related to the projected enrollment increases, the school-generated traffic volumes are redistributed to the study area based on the change in the school driveways.

FUTURE TRAFFIC VOLUMES

To properly assess the traffic conditions when the proposed reconstruction of the school will be fully built and occupied, future traffic volumes must be projected to a design year. For the purpose of this study, a design year of 2014 was utilized.

To account for general traffic growth in the area, PennDOT's growth factors developed by the Bureau of Planning and Research were utilized. For this area, a growth rate of .76% per year is appropriate; thus, 1.53% growth was applied to the existing non-school driveway traffic volumes within the study area.

The 2014 Build traffic volumes -- which include the existing traffic volumes factored upward by 1.53% and the school-generated traffic redistributed as described in the previous section -- are presented in Figures 5 and 6 for the weekday AM and PM peak hours, respectively.

ASSESSMENT

An assessment of the future 2014 Build operating conditions within the study area was completed. The assessment included a Level of Service (LOS) analysis of the study intersections and school driveways to determine the traffic impact of the proposed re-construction of the Wyncote Elementary School on the study area. The LOS results for the future Build (with the school reconstruction) are presented in Figure 7. The detailed capacity analysis worksheets for both the No-Build and Build scenarios are contained in the Appendix on pages A-20 through A-29.

The assessment results are summarized below:

Rice's Mill Road/Church Road (S.R. 0073) - As shown in Figure 7, this intersection will continue to experience LOS B operations both overall and for all movements during both peak periods in the Build scenario. Thus, it is our conclusions that the school reconstruction will have an insignificant impact on the operations at this intersection.

Rice's Mill Road/Barker Road - This stop-sign controlled driveway will continue to operate at acceptable LOS A/B after the reconstruction of the school. The school reconstruction will have an insignificant impact on the operations at this intersection.

Greenwood Avenue/Barker Road - This stop-sign controlled driveway will continue to operate at acceptable LOS A/B after the reconstruction of the school. The school reconstruction will have an insignificant impact on the operations at this intersection.

Barker Road/School Driveways – The school will be provided with two distinct access driveways after the reconstruction. Both access intersections (with Barker Roads) will operate at acceptable LOS A/B during the peak periods, indicative of acceptable operating conditions.

Internal Circulation

We have reviewed the internal circulation proposed as a result of this school reconstruction in terms of providing safe and efficient traffic flow. The reconfigured traffic flow is such that the school buses (and limited staff) will use a separate access driveway, while passenger vehicles, including most staff, visitors and parent drop-off/pick-up will use the existing access location on Barker Road. The proposed development plan provides two significant benefits from a traffic perspective. One, all school-related traffic functions are accommodated on-site, including bus and parent pick-up/drop-offs which now often occur along the frontage roadways. Two, the separation of the bus activity from the passenger vehicle traffic flow is desirable as it reduces

vehicular and pedestrian conflict and improves safety. Proper and clear signage must be provided for the access driveways and at the internal junctions to ensure orderly traffic flow.

The plan provides a distinct area for parent drop-off/pick-up which will improve the efficiency and safety of this operation. This represents a significant improvement to the existing situation which included the use of Rice's Mill Road itself for drop-off/pick-ups. All parent vehicular maneuvers will take place within the confines of the school parking area improving the safety for the traveling public on Rice's Mill Road.

The separate bus access and on-site stacking area will eliminate the use of Barker Road for these maneuvers also improving the overall traffic safety in the area. There are two options being considered with regard to the separate bus access. One option is to provide this access to Rice's Mill Road. A second option is to provide this access to Barker Road, resulting in two driveways onto Barker Road and none onto Rice's Mill Road. We have evaluated both options and have concluded that while both options are acceptable and achieve the desired objective of separating bus and vehicular traffic flow, the more desirable option is to provide all school vehicular access to Barker Road. Barker Road carries less traffic volume than Rice's Mill Road resulting in less vehicular conflict and potential delay with bus entering/existing movements than would occur on Rice's Mill Road. There would continue to be pedestrian access via Rice's Mill Road.

Based on our review of the internal circulation proposed with the school reconstruction, it is our conclusion that it is appropriate to serve the traffic flow needs of the school in a safe and efficient manner. It represents an improvement to the existing conditions primarily due to the defined separation of the bus and vehicular traffic movements and to eliminating the use of the frontage roadways for drop-off and pick-up maneuvers.

CONCLUSIONS

The conduct of this Traffic Impact Study for the proposed reconstruction of the existing Wyncote Elementary School located along Rice's Mill Road between Church Road (S.R. 0073) and Barker Road, has led to the following conclusions:

1. The existing access driveway will generally remain in its current location after the reconstruction. A new access driveway for buses (and limited staff) is recommended to be provided onto Barker Road which will improve the internal circulation patterns on the property by separating bus flow from passenger vehicle flow.
2. The driveways will function at acceptable Level of Service (LOS) A/B during both critical peak periods -- the weekday AM and weekday PM peak hours.
3. The expansion of the school from its current enrollment of 413 students to its capacity of 500 students (approximate 21% increase) will result in an additional 16 trips in the AM peak and 8 trips in the PM peak.
4. The study area intersections will continue to operate at LOS B during both peak hours, indicating that the reconstruction of the school will not have a significant impact on these intersection operations.
5. We find the proposed internal circulation appropriate to safely and efficiently accommodate the traffic needs for the school. It represents an improvement to the current conditions, in part due to the defined separation of the bus and vehicular traffic flow and by accommodating all drop-off/pick-up maneuvers entirely within the property eliminating any continued use of the frontage roadways for this purpose.

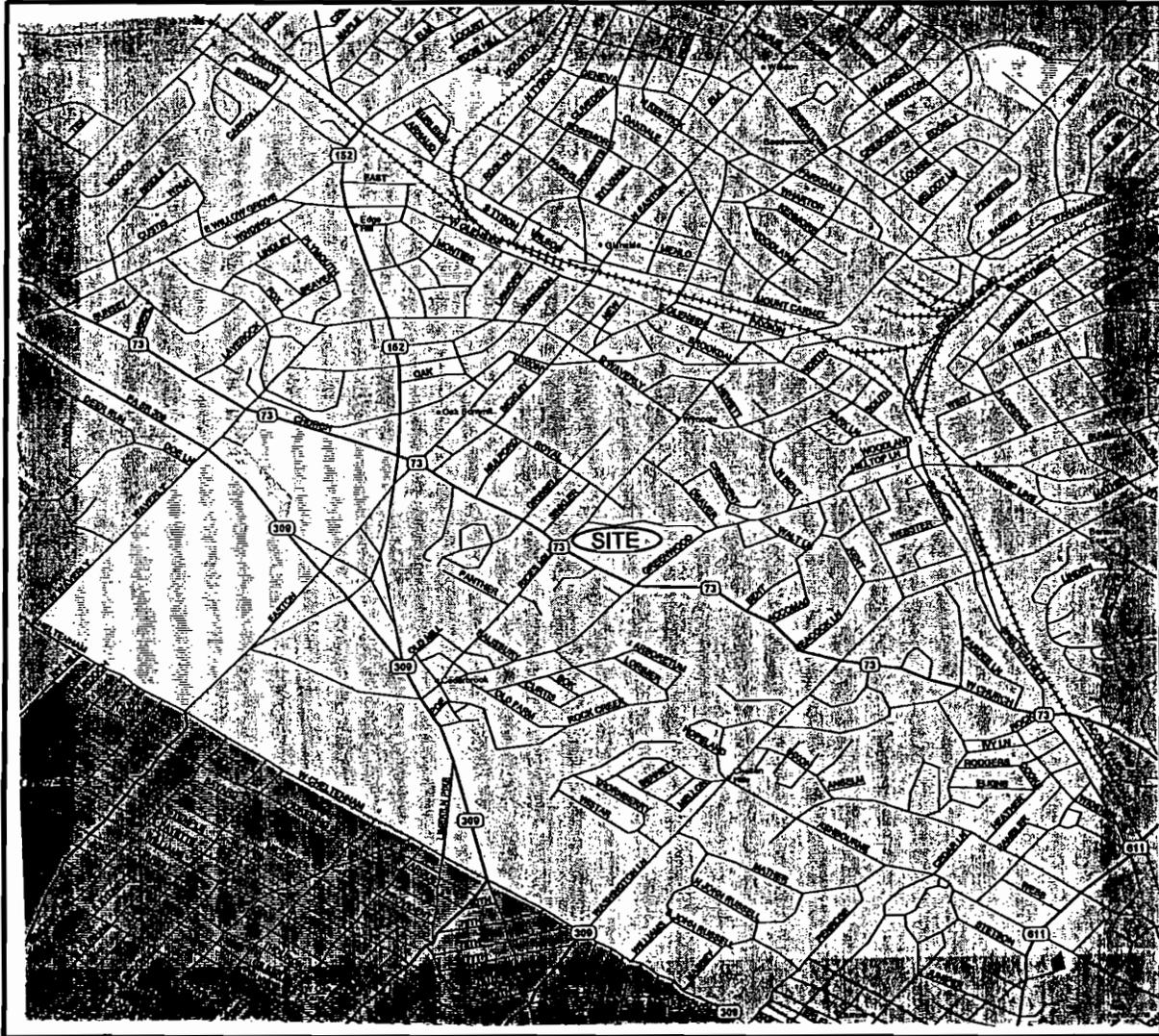
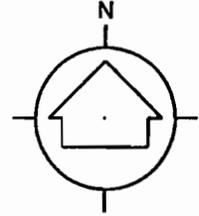


FIGURE 1
SITE LOCATION MAP

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CHELtenham TOWNSHIP, MONTGOMERY COUNTY, PA

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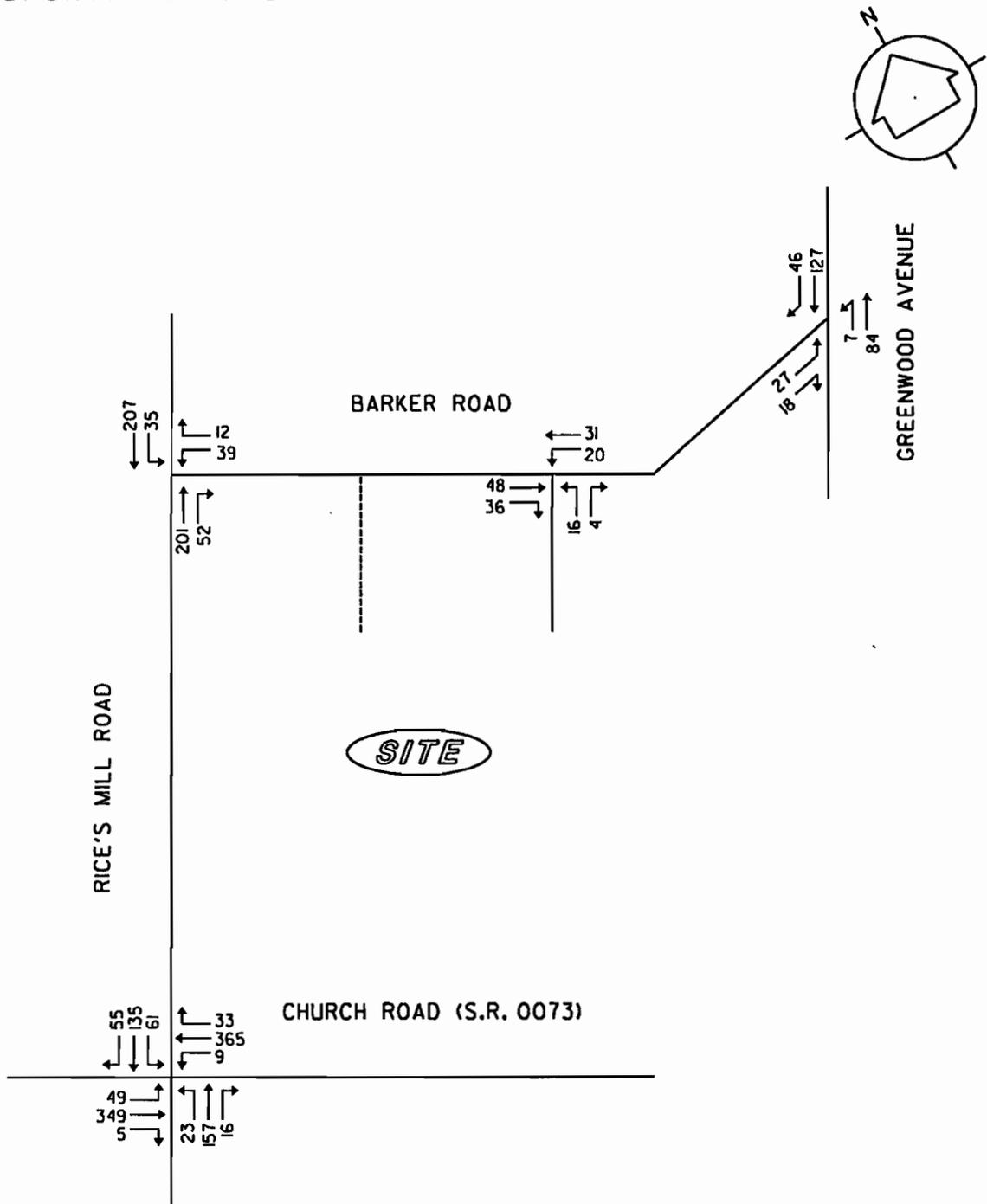


FIGURE 2
 EXISTING WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

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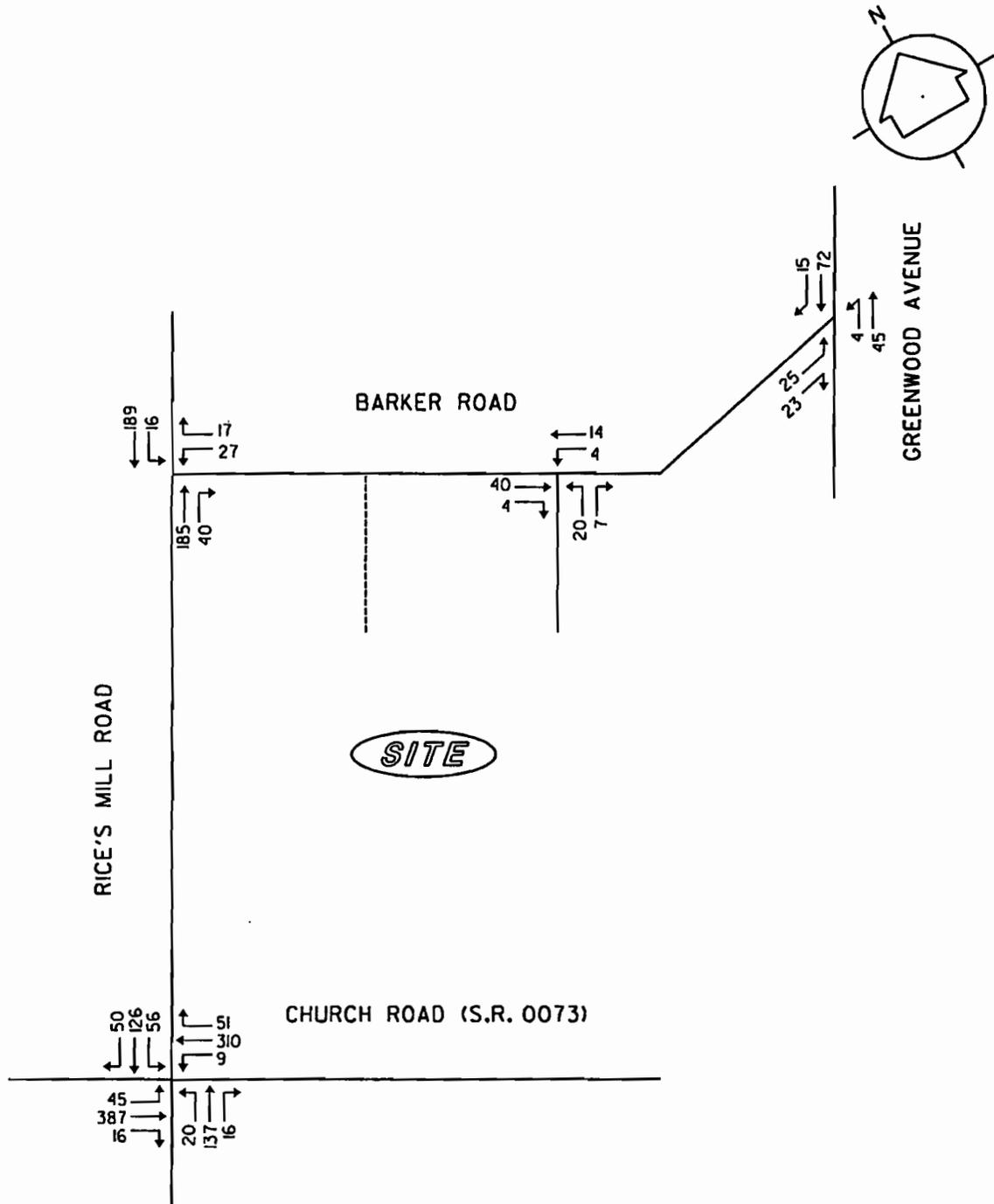


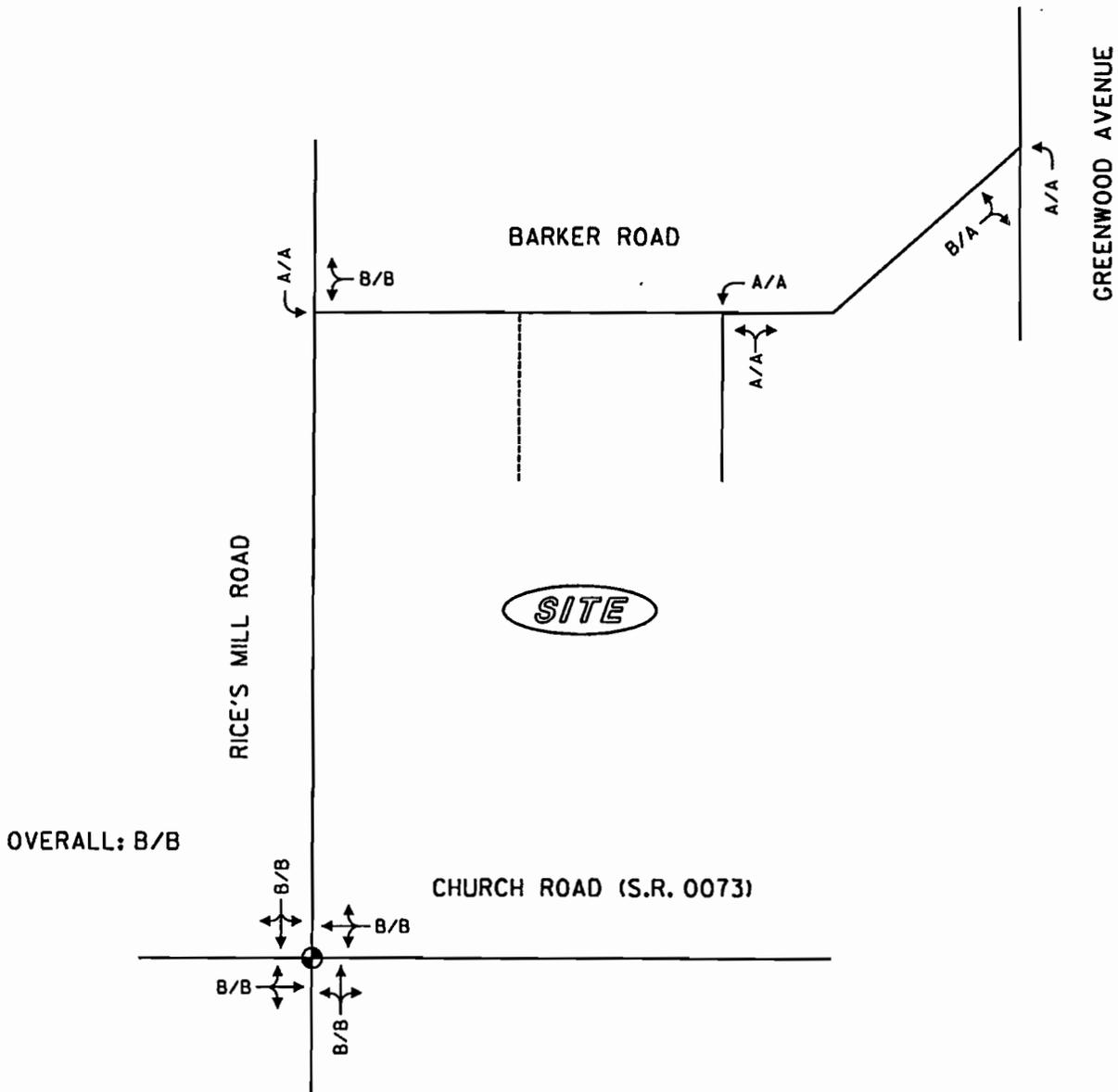
FIGURE 3
 EXISTING WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

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LEGEND:

- ← AM/PM PEAK HOURS
- ⊕ TRAFFIC SIGNAL

FIGURE 4
 EXISTING LEVELS OF SERVICE

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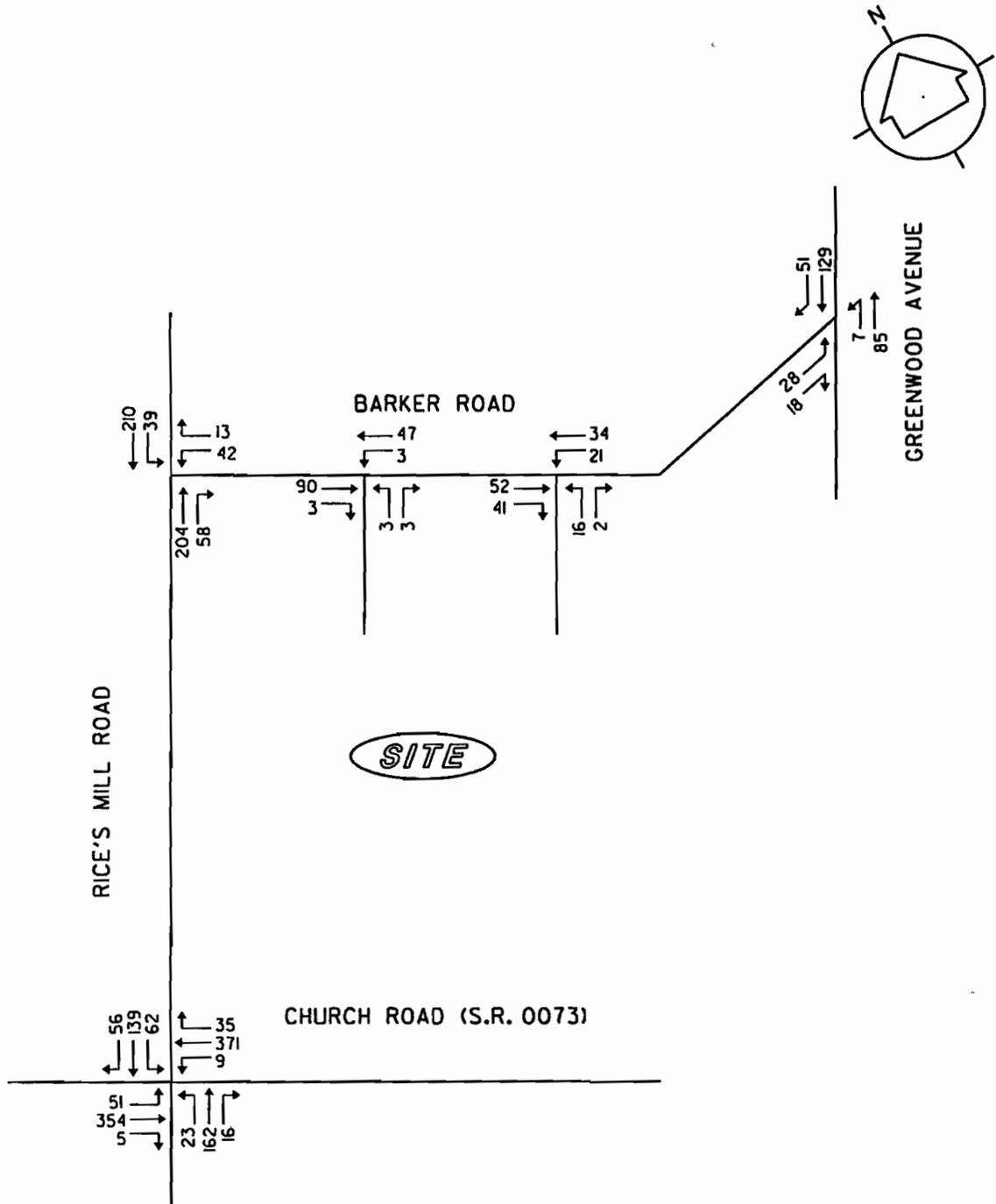


FIGURE 5
 FUTURE 2014 BUILD
 WEEKDAY AM PEAK HOUR TRAFFIC VOLUMES

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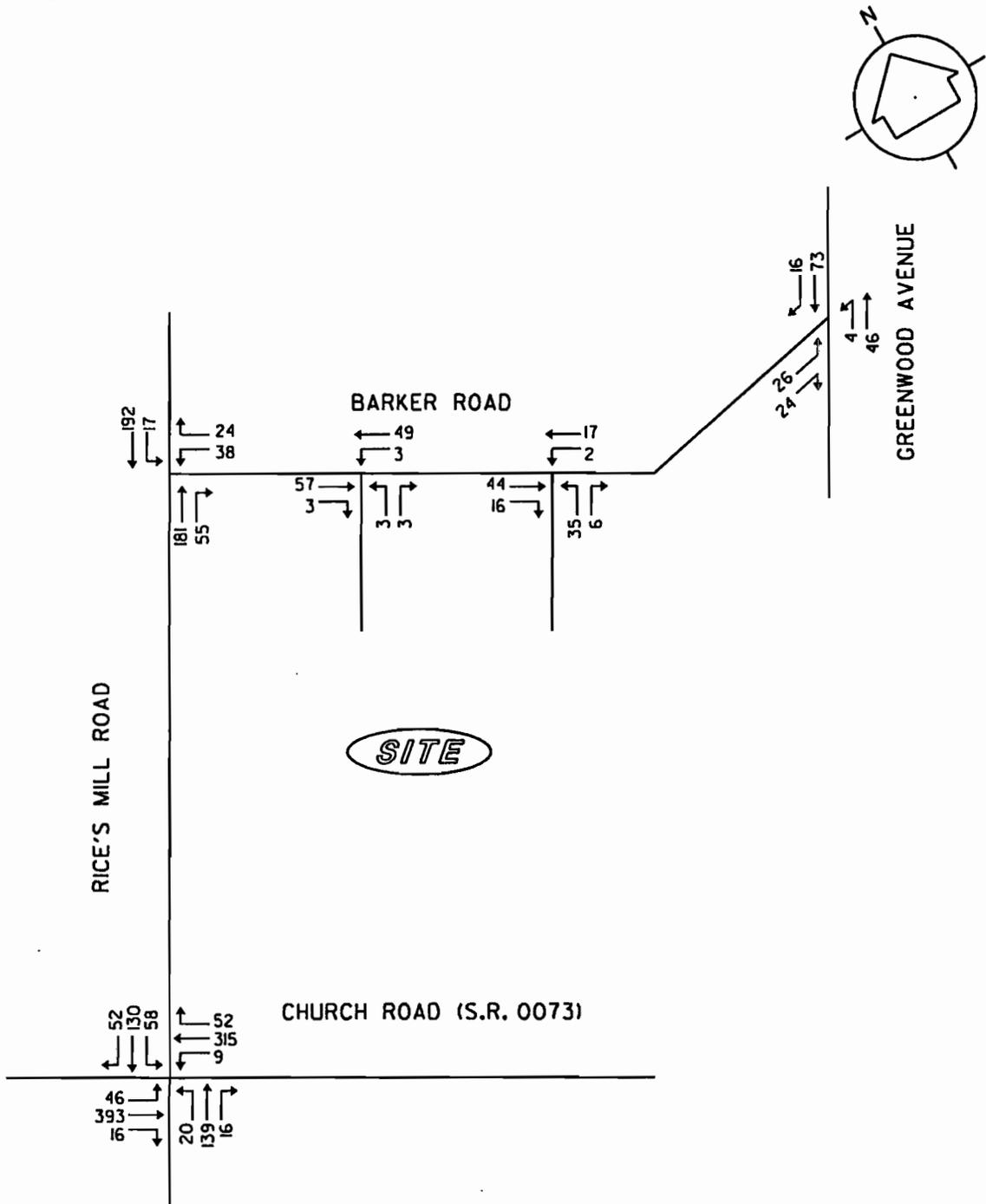


FIGURE 6
 FUTURE 2014 BUILD
 WEEKDAY PM PEAK HOUR TRAFFIC VOLUMES

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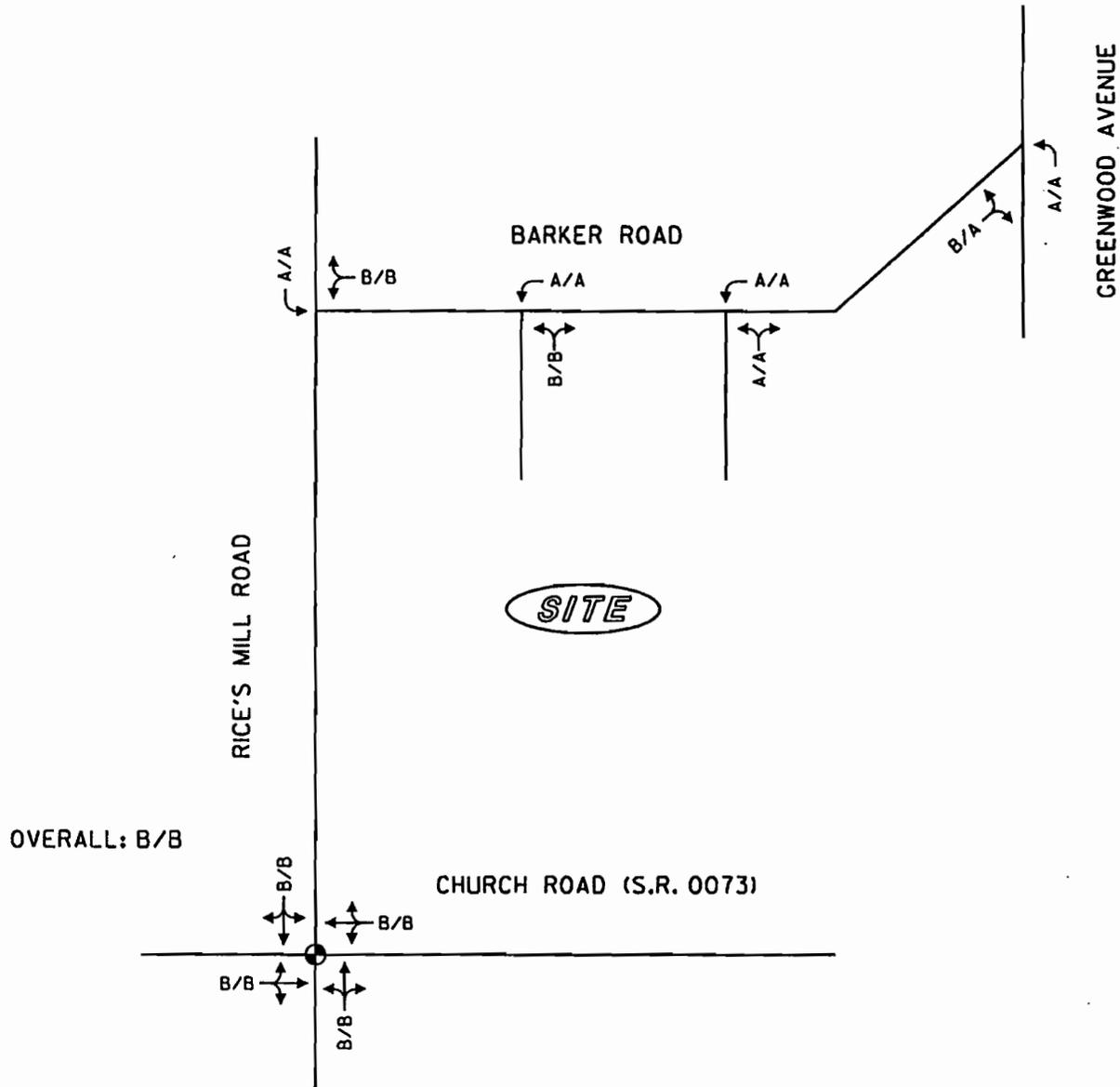


FIGURE 7
 FUTURE 2014 BUILD
 LEVELS OF SERVICE

LEGEND:

- ← AM/PM PEAK HOURS
- ⊕ TRAFFIC SIGNAL

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APPENDIX