Technical Memorandum

To: Karl Crawley — Masterplan Consultants
From: DeShazo, Tang & Associates, Inc.
Date: May 5, 2010
Re: Traffic Management Plan for Ann Richards Middle School in Dallas, Texas (DT&A No. 10041)

INTRODUCTION

The services of DeShazo, Tang & Associates, Inc. (DT&A) were retained by Masterplan Consultants on behalf of the Dallas Independent School District (DISD) to conduct a traffic management plan (TMP) for Ann Richards Middle School ("the school") in Dallas, Texas. DT&A is an engineering consulting firm providing licensed engineers skilled in the field of traffic/transportation engineering.

Ann Richards Middle School is proposed to be constructed on a 21.6-acre site in the City of Dallas, Texas. The subject site is currently undeveloped and zoned a mixture of light industrial, single-family residential, and commercial retail. The expected maximum enrollment is 1,250 students in grades 6th-8th. A site location map is provided in Exhibit 1.

Purpose

The purpose of this report is to develop procedures to promote traffic safety and efficiency to be used by the school during the morning drop-off and afternoon pick-up hours. The study will be provided to the City of Dallas staff ("the Staff") for review as to fulfill the associated requirements of the local approval process.

TRAFFIC MANAGEMENT PLAN

A Traffic Management Plan (TMP) is important to maintain an optimum level of traffic flow and circulation during peak traffic periods associated with student drop-off and pick-up. The City of Dallas strives for all drop-off and pick-up carpool activity to occur on private property rather than in the public right-of-way. The proposed site plan has been designed to incorporate sufficient queuing space on-site for the projected peak demands for drop-off/pick-up for the

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Approved
City Plan Commission
November 18, 2010

Planned Development
District No. 836
Middle School. A concerted effort by the school administration and the parents is encouraged to provide and maintain safe and efficient traffic operations.

**Drop-off and Pick-up Hours for Each Grade Level**

The school is expected to operate on a uniform daily schedule. Classes on typical school days for all grades are expected to begin at 8:30 AM and conclude at 3:30 PM. While these are the scheduled class times, it can be assumed that not all students enter/exit the site at these exact times based upon normal distribution patterns. Occasional special events at the school that generate traffic may also occur outside the traditional peak drop-off and pick-up periods. While some of the measures presented in this report may be applicable in conjunction with special events, these traffic characteristics are not covered in this analysis.

**Ingress and Egress Points**

Ann Richards Middle School is bounded on two sides by public streets and has four driveways accessing the public right-of-way. Three driveways are located on Prairie Creek Road and the other one intersects Military Parkway. For this report the driveways are numbered 1 through 4 starting with the farthest north and moving south.

- **Driveway 1** is to align with Pinehaven Drive, an existing local street serving a residential subdivision to the east. It will provide two outbound lanes and one inbound lane with full turning movements. A left-turn lane with a minimum of 100 feet of storage is to be constructed at this driveway. This driveway will serve school buses and all staff parking.

- **Driveway 2** will serve the main carpool and the adjacent visitor parking lot. A median opening is to be constructed at this driveway to provide full turning movements. A left-turn lane with approximately 200 feet of storage is to be constructed for northbound left-turns into this driveway. There will be one inbound and two outbound lanes, one each left-turn and right-turn only.

- **Driveway 3** serves the same lot as driveway 2, but only allows right-turns in and right-turns out. There is no median opening and only one lane in each direction.

- **Driveway 4** is the only one of the four that intersects Military Parkway. A hooded left-turn median opening is to be constructed to allow eastbound vehicles on Military Parkway to enter the site, but prohibit left-turns out of the site onto Military Parkway. There will be one inbound and one outbound lane with left and right turns in, but only right turns out of the site.

**Circulation**

The site provides two internal circulation paths—one in each of the parking lots. Circulation in the south (visitor) lot will be for student drop-off and pick-up by private vehicles. Private vehicles are not intended to circulate in the north (staff) lot - this circulation is provided for buses only. See Exhibit 2 for detailed illustrations.
All internal circulation within each lot is to be one-way, counter-clockwise to provide passenger-side vehicle loading—the safest, most efficient transportation for the students. In the south lot, traffic may enter from either driveway 2, 3 or 4, but little inbound traffic is expected to utilize driveway 3 since driveway 2 will be more convenient. Vehicles entering from driveway 2 to park should proceed to the STOP-controlled intersection and turn left to access the parking spaces. If picking-up or dropping-off students, they should proceed straight to the curb loading zone in front of the school building.

Vehicles entering from driveways 3 or 4 to access the loading zone should form a queue line starting from the east leg of the internal intersection and extend back to the east and south as necessary. The intersection should operate as an all-way STOP intersection where motorists alternate right-of-way depending on order of arrival.

After passing through the loading zone vehicles may exit out of any of the three driveways (2, 3, or 4), but driveways 3 and 4 only allow right-turns. Most of the school attendance zone lies to the south and west, so right-turns will serve the majority of vehicles and provide efficient egress from the site.

The north lot serves buses and school staff and can be accessed by driveway 1. School buses will circulate one-way, counter-clockwise around the perimeter of the lot. Staff parking is generally expected to occur at different times than buses loading and unloading, but if overlap does occur, priority is to be given to buses to maximize safety for students. In the afternoon, all vehicular operation should cease while buses are present to load students—staff should be instructed to wait until buses depart before leaving the lot.

**Drop-off and Pick-up Locations**

DT&A recommends all private vehicle drop-off and pick-up operations should only occur along the curb facing the front of the school building starting at the southern end as seen in Exhibit 2. This location provides close proximity to the school building, prevents students from crossing other traffic, and allows maximum queuing length on site.

Buses queued in the north parking lot should park along the curb to allow easy access for students to load and unload. In the afternoon, the first bus should proceed around the perimeter to the southeast corner to begin the queue. The entire perimeter of the north lot can serve as a bus loading zone, which can accommodate up to 14 buses simultaneously. In the morning, buses are expected to arrive at different times, and generate minimal queues, so drop-off should be more focused near the school building entry along the southern edge of the lot.

**Queue Lengths**

The City of Dallas strives for all vehicular queuing and drop-off/pick-up procedures to take place on private property (i.e. - off public right-of-way). A standardized technique for determining queue length does not exist, however DT&A has developed a proprietary methodology for estimating vehicular queue at schools. The model is based upon various prior studies performed at schools around the Dallas metropolitan area.
Maximum queuing at schools consistently occurs during the afternoon peak period when students are being picked-up by private automobile (the morning period is typically not a significant issue since the drop-off traffic is more temporally distributed and occurs much more quickly than student pick-up). The DT&A model represents the peak queue conditions experienced during the afternoon peak hour.

Based upon the DT&A model as empirically derived from prior observations, the maximum number of vehicles queued during the PM peak hour is equivalent to approximately 25% of the total inbound PM peak hour traffic volume. Based on the assumption that 50% of students will be bused to and from school, PM peak hour vehicular traffic was calculated based upon a total of 1,250 students using the DT&A’s methodology using ITE Trip Generation manual (8th Edition) as seen in Table 1.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Quantity</th>
<th>Weekday AM Peak Hour Trip Ends</th>
<th>PM Peak Hour Trip Ends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Middle School</td>
<td>1,250 Students (50% Busing)</td>
<td>1,688</td>
<td>566 311 255</td>
</tr>
</tbody>
</table>

ITE Trip Generation is a compilation of actual traffic generation data by land use as collected over several decades by creditable sources across the country, and it is accepted as the standard methodology to determine trip generation volumes for various land uses where sufficient data exists. Based on DT&A’s methodology to determine maximum vehicular queue, the following results were obtained:

PM inbound trip ends x 25% = Maximum Queue (veh)
176 x 25% = 44 vehicles @ 20 feet/vehicle = 880 Feet

The current driveway and internal site configuration provide a queuing space of 1,000 linear feet (or approximately 50 vehicles) which is adequate to accommodate the anticipated max queue length of 880 feet by stacking vehicles in a single-file queue as described above. Exhibit 2 illustrates this queuing layout.

Up to 14 buses are expected to serve the school. These buses require a separate queuing space on site as well. The maximum length of a school bus is 40 feet. This plus five feet of spacing means each bus requires 45 feet of queue length. This can also be accommodated by stacking the buses in one single file queue in the north parking lot. The buses all should queue counterclockwise along the perimeter of the north lot with loading side to the curb beginning at the southeast corner as shown in Exhibit 2.

Maximum queue length needed = 14 buses x 45 linear feet/bus = 630 feet
Available on-site length = 960 feet
Excess Capacity = 960 - 630 = 0 feet

NOTE: Buses could be loaded in stages if lot becomes too congested or safety is a concern.

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Staff Assistance

It is important to have a staff presence wherever students are dropped-off or picked-up, including the bus area. In the morning, there should be at least two staff members at the bus loading area and the private vehicle loading area to guide vehicles to designated locations and direct students into the school building. Because it is a middle school, students do not need as much assistance finding and loading into their vehicle in the afternoon as compared to younger grades, but staff should still be present at all times in sufficient numbers to monitor all loading operations. A greater presence is needed in the afternoon due to the increased traffic and pedestrian activity.

SUMMARY/CONCLUSIONS

This TMP is to be used by Ann Richards Middle School beginning in 2012 to provide safe and efficient transportation of students, staff, and faculty to and from the site. It was developed to prevent the queuing of drop-off/pick-up related vehicles within the City right-of-way, and shall be reviewed by the school on a regular basis to confirm its effectiveness and compliance and to investigate potential improvements.

END OF MEMO