Appendix B

Environmental Resource Technical Memorandum
Assessment on Travel Pattern and Access Impacts
TECHNICAL MEMORANDUM
ENVIRONMENTAL RE-EVALUATION FOR UNION STATION TO OAK CLIFF
DALLAS STREETCAR

To:        Jay Kline, AICP – DART Project Manager

From:      Reggie Herman, AICP – Deputy Project Manager
            Scott A. Feldman, PE, PTOE and Derek Benedict, PE (CA)

Date:      January 30, 2012

RE:        Assessment of Travel Patterns and Access Impacts
            General Planning Consultant Services - Dallas Area Rapid Transit (DART)
            Contract ID C-1017751-01
            Task Order #14: Reassessed Traffic Analysis of TIGER Streetcar EA/PE

INTRODUCTION AND METHODOLOGY
This technical memorandum revisits the traffic analysis conducted in the Environmental Assessment
(EA), Appendix C Design Considerations Technical Memoranda, C-6: Roadway Capacity Analysis prepared
for the Union Station to Oak Cliff Dallas Streetcar Project. This project was environmentally cleared on
July 21, 2011 with a Finding of No Significant Impact (FONSI). This memorandum reassesses the
intersection capacities as a result of the addition of the passing track (proposed action) to the
environmentally cleared streetcar project known as Union Station to Oak Cliff Dallas Streetcar. The
proposed action is known as the Passing Track for Union Station to Oak Cliff Dallas Streetcar. The passing
track would be placed in the median of Zang Boulevard at the Oakenwald Street stop adjacent to the
Zang and Oakenwald intersection. The purpose of the proposed action is to provide an area where
disabled streetcar vehicles can be removed from service. The need of the proposed action is to have the
ability to maintain headways.

The reassessment of intersection capacities includes an analysis of the proposed action’s impact on
motorized traffic flow and operations for both existing and future conditions.

EXISTING CONDITIONS
Existing Zang Boulevard is currently a six-lane roadway in the vicinity of the Oakenwald intersection. For
the purposes of this memorandum, analysis conditions were taken as those conditions analyzed as part
of the initial EA for the Streetcar project. In the initial EA, Zang Boulevard at Oakenwald Street has two
southbound lanes and three northbound (two through and a turn bay) lanes, and six-to-eight foot
sidewalks. Schematic sketches of the conditions analyzed are provided in Figures 1-4 at the end of this
document. Dedicated bicycle facilities do not exist on the corridor. The proposed alignment is along a
designated City of Dallas bicycle route.
Existing Vehicular Operations

Data collection efforts in support of the Union Station to Oak Cliff Dallas Streetcar Project occurred in January 2011, and included: 1) 24-hour volumes on the Oak Cliff end of the Houston Street Viaduct; 2) 24-hour volumes on Zang Boulevard between Oakenwald Street and Plowman Avenue; and 3) AM and PM peak turning movement counts at the intersections of Houston and Young streets and Zang and Colorado boulevards. This data was supplemented in December of 2011 to include peak period turning movement counts at the intersection of Zang Boulevard and Oakenwald Street to account for the proposed action.

The speed limit on Zang Boulevard in the immediate vicinity of the intersection at Oakenwald is 35 miles per hour.

To establish a baseline condition, intersection levels of service (LOS) have been evaluated based on procedures contained in the Highway Capacity Manual (HCM). Generally accepted practices define LOS E as unacceptable operations which would require mitigation. For this analysis, LOS D is the minimum acceptable LOS.

Using the supplemental data collected, intersection analysis has been performed at the intersection of Zang Boulevard and Oakenwald Street. This intersection is currently operating under unsignalized, minor-street stop control. The results of the existing conditions (six-lane) analysis are provided in Table 1. A lane reduction is proposed on Zang Boulevard to accommodate the streetcar alignment with the passing track. The intersection has also been analyzed under the analysis geometry (four-lane), and these results are also provided in Table 1.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM Peak</th>
<th>PM Peak</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Delay (sec/veh)</td>
<td>LOS</td>
</tr>
<tr>
<td>Zang/Oakenwald (Original Geometry)</td>
<td>0.3</td>
<td>A</td>
</tr>
<tr>
<td>Zang/Oakenwald (Analysis Geometry)</td>
<td>0.3</td>
<td>A</td>
</tr>
</tbody>
</table>

Based on the results shown above, this intersection is currently operating at acceptable levels, and is projected to do so with the implementation of the streetcar alignment with the passing track.

FUTURE CONDITIONS

The future conditions analysis for vehicular traffic consists of projected volumes with proposed geometry. Future year (2014 opening year) conditions include full build-out trip generation estimates for the recently completed Zang Triangle Apartments, a multi-family residential development.

Future Vehicular Operations

The previous EA included the impact of reducing Zang Boulevard to two travel lanes between Greenbriar Lane and Colorado Boulevard. Oakenwald Street is a local collector roadway with one travel lane in each direction. There is a driveway at the Zang and Oakenwald intersection serving the Oak Cliff Founder’s Park parking lot. It should be noted that during the data collection peak periods in December 2011, no
vehicles were observed entering this parking lot. The inclusion of the proposed passing track in the project would remove the northbound turn bay for left turning traffic onto Oakenwald Street. Thus, the future analysis considers that northbound left-turns at the intersection would have to be made from a general purpose traffic lane.

The original traffic analysis detailed in the EA (Appendix C Design Considerations Technical Memoranda, C-6: Roadway Capacity Analysis) stated the left-turning movements through the median opening at Zang and Oakenwald intersection resulted in traffic conflicts with the streetcar alignment. To mitigate traffic conflicts a traffic signal at the intersection was proposed as part of the original environmentally cleared action. The traffic analysis conducted for the proposed passing track examined potential traffic impacts with signalized and unsignalized operation at the Zang and Oakenwald intersection. The analysis determined an unsignalized Zang and Oakenwald intersection would temporarily experience poor sight distance for left-turn movements (from Oakenwald Street and from Zang Boulevard into Oak Cliff Founder’s Park parking area) if the passing track is utilized for the removal and storage of the disabled streetcar vehicle. However, the original proposed mitigation (installation of the traffic signal) would alleviate the temporary poor sight distance and further enhance pedestrian access to the streetcar stop from Oak Cliff Founder’s Park and the apartment complexes to the north and west. The intersection has been analyzed under future year conditions and under signalized control. The results of this analysis are provided in Table 2.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>AM Peak Delay (sec/veh)</th>
<th>AM Peak LOS</th>
<th>PM Peak Delay (sec/veh)</th>
<th>PM Peak LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zang/Oakenwald</td>
<td>16.4</td>
<td>B</td>
<td>15.5</td>
<td>B</td>
</tr>
</tbody>
</table>

As indicated in Table 2, under signalized control, the intersection is projected to operate at LOS B under future conditions. Due to the obstruction caused by queuing left-turns in the northbound lane, the signal has been assumed to operate split-phase, with protected-only left turns onto Oakenwald Street. This would also allow for left-turns into Oak Cliff Founder’s Park. Traffic signalization installed at this intersection should comply with guidelines contained in the Texas Manual on Uniform Traffic Control Devices (TMUTCD).

Oak Cliff Founder’s Park has driveways providing access to Zang Boulevard and the Zang and Oakenwald intersection. The park driveways currently provide one-way circulation with inbound traffic at the intersection, and outbound traffic near the median opening serving the Grand Estates at Founders Park Apartments (formerly Kessler Park apartment complex). The City of Dallas would reverse circulation to facilitate efficient automobile movements in relation to the streetcar operations in Zang Boulevard. This would entail inbound (ingress) traffic accessing the driveway at the existing median opening at the apartment complex, and outbound (egress) traffic accessing the driveway at the intersection. Coordination has occurred with the City of Dallas Parks and Traffic Operations departments, which do concur with the proposed circulation modification.

**Additional Operational Considerations**

With the reduction in lanes for northbound traffic on Zang Boulevard, a potential lane alignment issue is created. Currently, the right-hand lane of Zang is channelized onto southbound Marsalis Avenue just north of Oakenwald Street with the two left lanes continuing onto the Jefferson Street Viaduct. Given
that queing left turns may block a through lane at Oakenwald Street, the major northbound traffic movement from Zang Boulevard to Jefferson Boulevard could be forced to make two lane changes between Colorado and Jefferson boulevards. This would be mitigated by re-striping Zang Boulevard between Oakenwald Street and Marsalis Avenue to have both lanes at Oakenwald Street continue as through lanes onto the Jefferson Viaduct with a right-turn lane pocket introduced at Marsalis Avenue. The re-striping of the Zang Boulevard lanes is currently reflected in the 10 percent Design Plan Set for the passing track dated January 13, 2012.

**SUMMARY**

The Passing Track for the Union Station to Oak Cliff Dallas Streetcar has been evaluated with respect to future operations at the intersection of Zang Boulevard and Oakenwald Street. **Table 3** provides a comparison of existing and proposed operations.

<table>
<thead>
<tr>
<th>Intersection</th>
<th>Existing Geometry</th>
<th>Unsignalized</th>
<th>Signalized</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zang/Oakenwald</td>
<td>AM Peak</td>
<td>PM Peak</td>
<td>AM Peak</td>
</tr>
<tr>
<td>Delay</td>
<td>LOS</td>
<td>Delay</td>
<td>LOS</td>
</tr>
<tr>
<td>0.3</td>
<td>A</td>
<td>1.1</td>
<td>A</td>
</tr>
</tbody>
</table>

As indicated in the summary tables, the proposed action would not result in unacceptable vehicular traffic operations, which is consistent with the traffic analysis determination as detailed in the EA (Appendix C Design Considerations Technical Memoranda, C-6: Roadway Capacity Analysis). No new mitigation is proposed; however, due to an oversight in the original EA the traffic signal at the Zang and Oakenwald intersection had not been included in the Mitigation and Monitoring Plan. In conjunction with the Environmental Re-evaluation the Mitigation and Monitoring Plan has been modified to include the original mitigation measure and is reflected in **Appendix H**.
Figure 1
Schematic Lane Alignment
Zang Boulevard Near Oakenwald Street