Memorandum

To: Kay Shelton, Project Manager

From: Allan Zreet, AIA

Date: October 29, 2001

Re: DART LRT Love Field Access
Summary of Alternatives

PURPOSE

The purpose of this memorandum is to support the Draft Environmental Impact Statement (EIS) for the Northwest Corridor LRT Line to Carrollton by summarizing the range of alternatives developed to serve Love Field Airport. A description of alternatives as well as their status and/or reason for elimination is also provided.

BACKGROUND

The Northwest Corridor Major Investment Study (MIS), completed in February 2000, recommended that an option for direct LRT service to Love Field be examined during the Preliminary Engineering/Environmental Impact Statement (PE/EIS) phase. Concurrent with the PE/EIS phase, the City of Dallas initiated efforts to develop a Love Field Master Plan. DART served on the Master Plan Advisory Committee (MPAC) to ensure that coordination and consistency between the projects.

Several alternative alignments for light rail transit service to Love Field were developed and evaluated during the PE/EIS phase. Initially 11 alignment alternatives to the base alignment were developed and evaluated focusing on cost comparisons, level of service, property impacts and travel time. Several of the initial alternatives were either combined or eliminated due to fatal flaws after the preliminary analysis. This preliminary analysis was conducted in coordination with the City of Dallas and their consultant team for the *Dallas Love Field Master Plan.* Nine (9) alternatives to the Base Alignment were further evaluated and presented to the City of Dallas, FAA and the community. One of these nine alternatives is included in the Draft EIS as the Love Field Design Option.

ALTERNATIVES

A description of each of the Base Alignment and the Love Field alignment alternatives is provided below. The alternatives are categorized with A, B and C prefixes, dependant on the station location relative to the Love Field terminal building. The "A" prefix indicates a station location at or near the terminal building (five alternatives), the "B" prefix indicates

a station location southwest of the proposed parking structure (three alternatives), and "C" provides an off airport location with a people mover connection to the terminal (one alternative). Cost estimates provided are preliminary based on a conceptual alignment and are in year 2000 dollars. Subsequent cost refinements have been made to the preferred Love Field Design Option.

Base Alignment

The Base Alignment for the Northwest Corridor LRT Line to Carrollton project follows the Union Pacific Railroad (UPRR) ROW on the southwest side of Love Field adjacent to Denton Drive. No direct access is provided to the airport under the Base Alignment. Love Field access would be provided via shuttle/bus service from the UTSW/Exchange Park Station (or the Inwood Station with the Medical Center Design Option alignment), which is located approximately 1 ½ to 2 miles from the Love Field Terminal. In the vicinity of Love Field, the Base Alignment is at-grade with the exception of short tunnel section under Mockingbird Lane. Grade separation of Mockingbird with an aerial structure is not possible due to violation of the Runway Protection Zone (RPZ) air space envelope as determined by the FAA.

Cost:	$92 million
Added Corridor Travel Time:	0 minutes

Terminal Station Alternatives (A)

Alternative A1 enters airport property from the east on an aerial structure providing grade separation at Denton Drive, Cedar Springs and Mockingbird Lane. The alignment follows the perimeter of the Love Field Runway Protection Zone (RPZ) to allow for an aerial structure. After crossing Mockingbird Lane the aerial guideway structure follows the Ralston Street ROW, returns to grade within private property (rental car agency) then follows Aviation Place entering a portal into a tunnel section. The tunnel section proceeds under the east terminal building to the station location then follows under the enplaning roadway back to the airfield and crosses under the airfield and runway 31L to return to the Union Pacific ROW where it returns to grade.

The tunnel section is assumed to be a shallow bore tunnel with the station depth approximately 50' below grade. The station construction is assumed to be cut & cover construction with staging areas within the area of the east terminal building and related ramp area. The proposed station location is directly below the Old East Ticket Wing, or east terminal building, which is planned for demolition as part of the Airport Master Plan. A new east ticket lobby and baggage claim is planned for this area in the future allowing the station access to be integrated with the new terminal construction.

Cost:	$254 million ($162 million delta from base)
Added Corridor Travel Time:	2 to 2.5 minutes

Status: Alternative A1 was eliminated during the evaluation phase due to the extensive real estate acquisition and relocation requirements east of Mockingbird Lane and disruption/displacement of rental car agencies north of Cedar Springs Road. This alternative was only possible also with the initial Base Alignment that used Bomar Street to return from Harry Hines to the UP RR. Subsequent refinements to the Base

Alignment put the LRT alignment on Treadway/Mockingbird, which would have precluded use of this alignment.

Alternative A2 provides a shallow tunnel profile that enters airport property under the airfield. The tunnel section provides grade separation of Mockingbird Lane at the Union Pacific ROW and then continues west below the UP ROW then entering the airfield property approximately 2500' west of Mockingbird. The alignment then proceeds around the proposed parking garage expansion and under the Old East Ticket Wing with a station below the east terminal building as in Alternative A1. The alignment then returns to the UP ROW under the airfield as in Alternative A1.

Cost:	$300 million ($208 million delta from base)
Added Corridor Travel Time:	2 to 2.5 minutes

Status: Alternative A2 was eliminated during the evaluation phase due concerns by FAA and the City of Dallas of potential impacts to landing instruments on the east of runway 31L and concerns over shallow tunneling under the runway.

Alternative A3 provides cut & cover access by a route following the perimeter of the airfield in order to avoid tunneling under the east end of the runway. The cut & cover section proceeds under Mockingbird at Denton Drive and parallels the northwest side of Mockingbird on airport property then proceeds along the south side of Cedar Springs Road under the Jet East hanger then into a tunnel section under Cedar Springs and to the terminal building. The station would be located under the Old East Ticket Wing as in Alternatives A1 and A2. This alternative was based on the removal of the Jet East hanger on the south side of Cedar Springs.

Cost:	$248 million ($156 million delta from base)
Added Corridor Travel Time:	2 to 2.5 minutes

Status: Alternative A3 was eliminated during the evaluation phase due to the required displacement of Jet East and the determination in the Love Field Airport Master Plan that Jet East is to remain in its current location. The FAA and the City of Dallas also had concerns with the use of cut & cover construction on the southeastern end of the airport property.

Alternative A4 attempts to avoid Love Field Airport property to the extent possible through use of a cut & cover alignment on the southeast side of Mockingbird and northeast of Cedar Springs Road. The alignment crosses under Denton Drive and parallels the east side of Mockingbird Lane then passes under Mockingbird at the Cedar Springs intersection to the north side of Cedar Springs. The alignment then follows the Cedar Springs ROW to Tom Braniff Lane at which point it enters airport property along the frontage of several rental car agencies. The alignment then enters a tunnel section on approach to the station location under the Old East Ticket Wing as in the previous alternatives. Construction of this alternative would be disruptive to numerous businesses located east of Mockingbird as well as the rental car companies north of Cedar Springs. For this reason this alternative was later modified to follow the same general alignment utilizing a shallow bore tunnel located within the Cedar Springs ROW.

Cost Range	$250 to 280 million ($158 to $188 million delta)
Added Corridor Travel Time:	2 to 2.5 minutes

Status: Alternative A4 was identified as the most promising alignment as it minimized impacts to Love Field property while providing a station near the terminal area. An airspace study (Form 7460-1) was submitted to the City and FAA for their review. Based on their findings, there would be no objections from an airspace utilization standpoint.

Alternative A5 follows generally the same alignment as Alternative A2 utilizing a deep bore tunnel below the airfield, but adjusting the alignment to clear the east end of runway 31L. This alignment has been developed with further input on soil conditions and tunneling techniques and is proposed to be a deep bore tunnel 70 to 90 feet below the surface. This tunneling method reduces concerns of soil settling in the airfield area. This alignment was developed as an alternative to A4 in order to provide a shorter route and larger curve radius for optimal travel time given that the majority of users will be through passengers. The station location would be in the vicinity of the Old East Ticket Wing.

Cost Range:	$250 to 280 million ($158 to $188 million delta)
Added Corridor Travel Time:	2 .0 minutes

Status: Alternative A5 is currently under review by the FAA and City of Dallas. A Form 7460-1 was submitted on November 13, 2001. Although airspace comments are pending, this alternative is the preferred option for the Love Field Design Option since it provides optimal operating conditions while minimizing potential airport property impacts and providing a high level of service to the airport terminal area.

Parking Structure Location Station Alternatives (B)

Alternative B1 enters airport property from the east on an aerial structure to provide grade separation at Denton Drive, Cedar Springs and Mockingbird Lane. The alignment follows the perimeter of the Love Field Runway Protection Zone (RPZ) to allow for an aerial structure. After crossing Mockingbird Lane, the aerial guideway structure enters the Ralston Street ROW then proceeds southwest crossing over Cedar Springs. The alignment then returns to grade at the Jet East property then descends into an open cut southwest of the proposed parking structure. The station location would be approximately 50' below grade immediately south of the existing parking structure. The alignment then proceeds under the airfield returning back to grade in the Union Pacific ROW similar to the alternative A alignments.

The station is proposed as on open-cut configuration with a mezzanine level at each end connecting to two underground pedestrian tunnels leading to vertical circulation at each parking structure. The vertical circulation would then provide access to the pedestrian bridges from the parking structures to the terminal building.

Cost:	$191 million ($99 million delta from base)
Added Corridor Travel Time:	2 to 2.5 minutes

Status: Alternative B1 was eliminated during the evaluation phase due to the required displacement of Jet East and the determination in the Airport Master Plan that Jet East is to remain in its current location. All "B" alternatives were also eliminated due to the remote location of the station relative to the terminal building and the low level of service it would provide to transit and airport patrons. This alternative was only possible also with the initial Base Alignment that used Bomar Street to return from Harry Hines to the

UP RR. Subsequent refinements to the Base Alignment put the LRT alignment on Treadway/Mockingbird, which would have precluded use of this alignment.

Alternative B2 provides a tunnel profile that enters airport property under the airfield and proceeds to the station location southwest of the existing parking garage. The tunnel section provides grade separation of Mockingbird Lane at the UP RR ROW then continues northwest on the UPRR ROW until entering the airfield approximately 3,200' northwest of Mockingbird Lane. After crossing under the runway the alignment enters the open-cut station area. The alignment then proceeds under the airfield returning back to grade in the UP RR ROW similar to the alternative A alignments.

The station location would be approximately 50' below grade immediately south of the existing parking structure. Two underground pedestrian tunnels, similar to Alternative B1 would provide pedestrian access.

Cost:	$226 million ($134 million delta to base)
Added Corridor Travel Time:	2.0 minutes

Status: Alternative B2 was eliminated during the evaluation phase due concerns by FAA and the City of Dallas over potential landing instrument impacts on the east of runway 31L and concerns over shallow tunneling under the runway. All "B" alternatives were also eliminated due to the remote location of the station relative to the terminal building.

Alternative B3 provides an open cut alignment accessed by a route following the perimeter of the airfield in order to avoid tunneling under the east end of the runway. The open-cut section proceeds from a cut & cover section under Mockingbird at Denton Drive and parallels the northwest side of Mockingbird on airport property then proceeds along the south side of Cedar Springs through Jet East property the to the station location southwest of the existing parking structure. The alignment then proceeds under the airfield returning back to grade in the UPRR ROW similar to the alternative A alignments.

As in alternatives B1 and B2, the station location would be approximately 50' below grade immediately south of the existing parking structure. Two underground pedestrian tunnels similar to Alternative B1 would provide pedestrian access.

Cost:	$185 million ($93 million delta from base)
Added Corridor Travel Time:	2.0 - 2.5 minutes

Status: Alternative B3 was eliminated during the evaluation phase due to the required displacement of Jet East and the determination in the Airport Master Plan that Jet East is to remain in its current location. FAA and the City also had concerns related to use of an open-cut alignment on airport property. All "B" alternatives were also eliminated due to the remote location of the station relative to the terminal building

Off - Airport Alternatives (C)

Alternative C1 was developed to provide a station along the Base Alignment (known as the Brookhollow Station) with a second mode of access (Automated People Mover, LRT or other technology) to another station at the terminal building. The at-grade station on the Base Alignment would interface with an underground people mover system providing

a direct linkage under the airfield to an underground transfer station below the east terminal building. The technology for the people mover system was not determined during this phase of development.

Cost:	$198 million ($106 million delta from base)
Added Corridor Travel Time:	1 minute plus 2 to 3 minutes for people mover.

Alternative C1 was eliminated during the evaluation phase for technical and service reasons. This alternative would provide a level of service similar to an off-airport bus shuttle connection, although more direct. This mode transfer time and cost of the people mover system was not favored by DART or the City of Dallas. However, should direct LRT access Love Field not be feasible initially, this alternative would allow for a people mover system to be implemented at a later date (by DART and/or another agency) without impacting DART operations in the corridor.

SUMMARY

Alternative A5 is the preferred alternative for LRT access to Love Field for the following reasons:

- Minimal or no displacements on or off airport, with the exception of isolated areas for vent shafts and exiting.
- Alignment would be constructed as a deep bore tunnel at the end of Runway 31L to minimize potential impacts to sensitive ground equipment.
- Provides a high level of service by allowing direct access to future terminal expansion in the area of the existing Old East Ticket Wing while minimizing travel time for through passengers.
- Provides opportunity to coordinate demolition of airport facilities with construction of the station area.

The Final EIS will reflect a final decision for Love Field LRT access. Should the Love Field Design Option be selected as the preferred LRT alignment, DART would continue to work closely with the FAA and the City of Dallas Aviation Department during final design to refine the alignment and construction technique in an effort to minimize or avoid impacts to airport property. Extensive coordination would also need to take place relative to the timing of station construction, demolition and construction associated with implementation of the Dallas Love Field Master Plan, and appropriate pedestrian circulation to existing and planned airport facilities. The DART/City of Dallas Master Interlocal Agreement would likely be amended, or a new agreement created, to document required actions of both agencies.