

Part II: Corridor Planning: Introduction



Guiding Principles

Four distinct guiding principles were identified when the RTKL Team began the process of analyzing and selecting implementation methods. The following are these underlying principles which guided the process of developing the recommended land use plan.

Enhance the entire Corridor's identity

The Corridor currently lacks a clear and coherent identity. It is comprised of a series of districts varying widely in their level of improvement, development type, and overall image. The addition of light rail through the corridor will become a tool by which to better define one's experience of the properties along the corridor. Identity is a subjective matter; and is critical towards one's ability to understand the environment they are within. Although the rail itself has no direct relationship with the identity of the Corridor, the activity of the trains and passengers will have an effect on how one perceives each sub area. As such, special care has been given to the specific placement of each station in order to create an identifiable image and "feel" unique to each station area. The unique qualities around each station were also planned to be seen as one in a series of experiences which, when viewed in total, will create the overall identity of the corridor itself.

Provide improved visibility and access to underdeveloped land

Several land parcels are currently impaired by a lack of visibility and/or access from a traffic circulation perspective. As visibility and physical access basic factors in real estate development, care has been taken in the specific alignment of the rail and placement of the stations to maximize the new access and visibility provided by light rail in the area. In addition, this Study includes recommendations to improve the overall access and visibility in areas which are not directly served by light rail.

Maximize development opportunities and potential value around stations

The development impact of light rail is attached to its stations, where they work as magnets for people and businesses. Therefore higher densities and diversity of uses typically concentrate around station areas, as evidenced by the market dynamics of public transit across the country (as is currently beginning to happen elsewhere in the DART system). This Study planned the uses and physical characteristics around each of the proposed station areas to maximize and enhance these opportunities.

Promote land use and transportation synergies

Land uses can highly benefit from appropriate traffic and transportation systems, either through good street frameworks that will support proposed land uses or easy access to public transit that

will be an attraction for end users. Several land use categories are compatible and indeed enhanced by the interaction with public transit. This Study recommendations aim to take full advantage of synergies resulting from these interactions within the parameters of current market development characteristics. Development scenarios which require air rights over station areas, common entrances for both stations and buildings, etc are rather complex from an implementation perspective and should be addressed on a case-by-case basis.



The RTKL Team set clear goals to guide the planning approach for the entire Corridor envisioning high quality, dynamic and economically sustainable environments. The following planning goals are not only compatible with light rail but are in reality enhanced by it -- transit in this context is seen as an amenity and not as an infrastructure element.

An overarching goal of this Study was to recommend a vision plan that would work both in the interim period until the start of light rail operation and beyond. This vision plan will work as a template for the future development to occur in the Corridor, related or not to light rail, and simultaneously accommodate the implementation of the DART light rail line.

Program and Development Goals

Balance of housing and employment

The vision plan calls for a better balance of the complementary uses of housing and employment that reflect the current trends in the marketplace and create a more integrated, mixed-use setting. The resulting environment is safer and more dynamic, alternating night and day utilization patterns and providing sharing opportunities such as parking and amenities. This flexibility in land use also responds to different market conditions, allowing either residential or commercial developments to occur when their respective markets is favorable.

Service, lifestyle and neighborhood retail

A range of retail uses is to be offered to provide for the demands of a more varied resident population and a changing workforce. Small service venues as grocery stores are compatible with the envisioned denser urban setting. Entertainment retail is a vocation in the Corridor, capitalizing on the visitor population that is drawn to the Urban Center/Williams Square area, as well as the Texas Stadium area. Retail developments are encouraged to be integrated with other uses to generate sidewalk activity, a sense of place, a feeling of security and an overall level of vitality to these areas.

Physical Goals

Compact settings (within a 5-10 minute walk)

Dense developments within a quarter mile of station areas (a five to ten minute walking radius), capitalize on the benefits of light rail. Such compact settings provide for pedestrian-friendly, lively environments and provide focus for significant improvements to be seen and appreciated by residents, workers and visitors.

Urban form and block-face closure

Generally, an urban form has been recommended around station areas that is intended to encourage street life and promote a self-policing environment by layering and mixing uses within buildings placed close to the street and streetscape. All residential buildings should be consciously designed to address and overlook the streets and public parks with front doors, balconies, stoops and porches. All supporting functions and amenities such as health spas, leasing offices, neighborhood retail, and “in-home” office spaces are to be deliberately externalized and located at street level in flex spaces along the street frontages of apartments and commercial buildings.

Hierarchical public open space system

A public open space system has been recommended that works at both a neighborhood and community scale which includes urban parks, jogging trails, and direct connection to Campion Trails for the City’s special events and general enjoyment of the Trinity corridor. In addition, by purposely proposing major gathering and identity spaces within each sub-area, we have provided an opportunity to create signature experiences that, when combined with public art commissions, will be recognized as major landmarks in the Dallas/Ft. Worth Metropolitan area.

Social and Community Goals

Exciting Public Realm

Pedestrian-friendly, inviting and exciting public environments are envisioned by the creation of memorable open spaces and the high-quality treatment of streets and public infrastructure. Key locations have been identified to become “events” in the overall land use plan, particularly near civic uses, station platforms, the waterfront and major development nodes. These will work as visual references and will lend identity to the different districts envisioned.



Create Alternative Live/Work Patterns

New development along the Las Colinas transit mall should consider the new economy of high technology, instant communications and rapidly growing entrepreneurial companies that is reshaping the traditional mentality of 9-to-5 workdays and its clear separation between living and working. A flexible workforce values “livability” as found in environments that are unique, attractive and provide access to services, entertainment, the workplace and home. The transit mall has been intended to provide such an environment.

Promote a Pedestrian Focus

Our recommendations rely on a development framework composed of a high quality public infrastructure incorporating a district-wide, pedestrian-friendly, closely spaced street grid made up of collector streets, residential streets, and a series of more randomly spaced garage access streets – patterned on the British “mews” -- where appropriate. A streetscape master plan that highlights the varied nature of each Sub-Area should be prepared, which also provides some commonality in its detailing to maintain the civic sense of one’s being within the City of Irving at each station.

Improve Community’s Quality of Life

High-quality public infrastructure

Mobility and Infrastructure Goals

Parking and traffic management:

A key feature of the recommended land use plan is the provision of parking within each Sub-Area by the sharing of structures and surface lots between complementary uses wherever possible. The integration of the APT and DART systems also contribute to shared parking situations. An efficient public transit system, coupled with traffic management measures such as the proposed street framework for each Sub-Area, will broaden the traffic options for the Corridor.

Increased light rail ridership over typical development patterns

Implementation Goals

Development controls

Development controls should be prepared that go beyond typical zoning and building code requirements that set standards for exterior finishes, site landscaping, parking supply and distribution, and the compatibility of building scale regardless of use.

Balanced & efficient land-use patterns

Shared parking and amenities

Mixed and complementary land uses (i.e. commercial, retail, entertainment, housing)

Enhanced public/private investment

Economic Goals

Create Economically Sustainable Developments

Memorable and Effective Public Spaces

Increased land value over time



The goals described in the previous pages result in physical environments that are denser than typical suburban settings.

The following diagrams show how this applies to Sub-Areas 3 and 4, in comparison with the original Las Colinas master plan and its current condition.

Master Plan Vision



The vision behind the recommended master plan is based on issues of land use, rail alignment, station location, and overall identity of place, where the intent was to avoid “canibalization” between the sub-areas by offering unique attractions to each of them. The vision is conceived as a series of events correlating with the station areas which have a consistent visual appeal, while varied in design approach, promoting the experience of the rider. The land use patterns around all stations is intended to be mixed-use and dense in nature, relying on a strong, pedestrian-friendly street system to define the development itself. The master plan vision depicts the intention that each of the four sub-areas will offer identifiable districts, diverse environments and unique attractions. The following is a summary of the main characteristics envisioned in the sub-areas.

Sports/Entertainment District

A major mixed-use development positioned around a sports entertainment theme. The uses supporting this concept would include office, hotel, restaurant, retail, entertainment, and urban residential. Entertainment retail and restaurants could lie at the base of loft residential and office space; the overall district would be defined by striking public spaces, interesting streetscape experiences, shared parking, and direct access to light rail.

Corporate/Residential Campus

The mix of the complementary uses of office and residential, when combined with good landscape design, can create exceptional high quality settings for both live and work in a campus-like environment. Some retail uses are added to the mix to enhance the district synergies, especially around the light rail station.

Transit Mall

The transit mall is envisioned to combine vehicles, rail, and pedestrian traffic into an integrated urban environment defined by small setbacks and streetscape activity. As such, a large amount of special paving and other pedestrian-oriented streetscape elements should be integrated into its design. Uses along the transit mall are a mixture of office, residential, retail and service, enhanced by memorable open spaces around station areas.

Transit Village

A full range of uses are anchored around the light rail station in a setting that is in between denser urban and suburban settings.



Land Use Vision

The recommendations for land uses along the Corridor range in intensity and form from surface parking and distribution uses in a portion of the Sub-Area 1 (defined by Texas Stadium) to Class A office and hotel towers within the Las Colinas Urban Center. As such, our land use recommendations vary greatly in their proposed intensity and form.

It is important to consider the existing context within each sub-area. Much of the area immediately adjacent to the proposed light rail alignment is currently undeveloped or underdeveloped. Existing zoning at the southern end of the Corridor is designed to promote light industrial and transportation uses. Further north, the zoning promotes office and retail uses. All along the Corridor, the various zoning categories adopted are zoning categories that were designed, both by use and by the regulations related to the physical form of development, with an orientation to the automobile and highway uses rather than an orientation to transit and pedestrians.

In fact, the bulk of the Urban Center is zoned M-FW (Freeway). Even prior to the removal of multifamily as a permitted use in the M-FW zoning category, it is clear from a review of the development standards in the regulations that the regulations were premised on an ideal of having separation between residential and nonresidential uses. It also seems evident that it was presumed that the space between such uses would be bridged by automobile travel. This zoning

was not entirely in keeping with the vision for the Urban Center, which appears to have contemplated a somewhat broader mix of uses and some concessions to alternate forms of transportation (the APT) and the pedestrian. Thus, it appears that almost all development within the Urban Center has required a rezoning to either S-P-1 or S-P-2 Site Plan zoning. When the need for rezoning is considered in light of the fact that there is also a rather complicated private deed restriction and design review regime, it is no wonder that some are left with the impression that the resulting overall development approval process can be very cumbersome. The Urban Business overlay district has represented a fairly recent attempt at regulations more in keeping for the original goals for the Urban Center.

However, with a required density of no less than 40 dwelling units per acre these regulations contemplate only one type of residential format, more conducive to condominium towers than to a range of residential products.

Moreover, by capping the number of dwelling units, the regulations limit the opportunities for developing transit ridership, to increase the range of residential options available and for providing true mixed-use neighborhoods within the overlay district.

The revision of residential uses allowed in the current zoning is indeed an important task that will aid in the successful implementation of the recommended vision master plan. The envisioned urban housing typology to be encouraged in the Corridor is a high-quality product both in its design concept and construction. It functions as a “building block” in the proposed land use, either as a single use or as part of a mixed-use scenario. Structured parking is recommended to fully capitalize on the sharing of amenities between residential and other uses, as well as to screen automobiles. Retail and civic uses at ground level are not only compatible with residential uses but highly desirable to create rich and lively communities.

Design guidelines to be prepared for the Corridor should recommend residential buildings to have small setbacks to engage the streetscape, the use of balconies, porches, chimneys, varied roof lines and window openings, human-scaled building massing (avoiding long, overwhelming facades), well-defined entries and high-quality construction detailing throughout. The screening of parking structures and surface lots should also be recommended.

Apart from establishing the right combination of permitted uses, a key issue for the Transit Corridor will be the physical form that development along the Corridor is to take. The construction of light rail transit through the Corridor warrants not only a review of the overall form promoted by the existing regulations, but also warrants consideration of methods to separately distinguish and organize density and function around the rail stations.

Finally, it will be important to consider the ramifications of factors outside of the land use regulations themselves that also have significant influence on the mix of uses and the development process. These factors include private deed restrictions, regulation of alcoholic beverage sales, and building and fire code issues.



▲ Light Rail Alignment Vision

The determination of the light rail alignment through the study area was a detailed process that considered a multitude of factors.

Ultimately, the exact alignment will be established by DART during the preliminary engineering process and possibly modified somewhat even in final engineering.

The alignment that was determined in this land use study is a general alignment that should be viewed as a recommendation that will be verified or modified by the subsequent, more

detailed, implementation process conducted by DART.

Although the alignment findings of this Study are considered a recommendation, it should be noted that land use is one of the most important of the criteria that are considered in the decision-making process concerning major capital investments. The very fact that the general alignment developed herein is a component of a transit-oriented development land use study, means that it satisfies some of the most important criteria used in the determination of the feasibility of the proposed investment in the Northwest Corridor Light Rail Line.

In addition to criteria that favored transit-oriented land use, this Study also considered the pertinent locational criteria that are used in alignment and station location analysis. Throughout Sub-Areas 1 and 2, the proposed alignments were established in concert with DART and their engineering consultant. This collaboration between DART and the City of Irving ensures that the planning detail used in the land use study has arrived at an alignment that will stand the rigors of preliminary engineering. The following criteria discussion indicates the considerations that were most significant in the land use Study Area.

Light Rail Alignment Criteria

Existing and Proposed Transportation and Utilities

The existing and proposed transportation network in the Study Area affects the proposed and recommended alignments directly and indirectly. The direct impact is that as an existing use and a part of the overall transportation network it is difficult to replace a street with a rail line. Crossing a street may mean elevating the rail line to avoid operational conflicts. Obviously, freeways and other high volume facilities must be grade separated. One of the benefits of light rail, however, is the ability for light rail to cross a street at-grade or even to operate within the street right-of-way if conditions permit.

This means that the existing street and highway network is a significant constraint upon where the light rail line may be located, both horizontally and vertically. In the Study Area, the existence of a complex system of freeways and interchanges between those freeways dramatically influences the location opportunities for the light rail line and stations.

The freeways include SH-114 which bisects Sub-Area 1 and Sub-area 2, Loop 12 which is the boundary between Sub-Areas 1 and 2, and SH-183 that forms the southern boundary of Sub-Areas 1 and 2. The reconstruction of all three of these highways and the interchange between them is currently in the project planning or design process. This presents both a complication and an opportunity for this Study. The complication is that the uncertainty of the design and ultimate right-of-way location adds a degree of uncertainty to the location of the light rail alignments and the access to property. However, the opportunity to jointly develop the highway and rail alignments is a significant opportunity that will result in a better ultimate system.

Two other significant Texas Department of Transportation (TxDOT) facilities are Spur-348 (Northwest Highway) and Spur-482. Spur-482 forms the eastern boundary of Sub-Area 1 and Spur-348 bisects Sub-Area 4. Spur-482 is an arterial highway that assumes a freeway condition (main lanes, service roads, and controlled access) as it crosses the flood control levee and approaches the SH-114/183 interchange.

Spur-348 is an arterial road but it is anticipated that improvements will grade-separate Spur-348 and O'Connor Boulevard and the proposed extension of Las Colinas Boulevard. Although the project has not been designed, it is assumed that service roads and control of access will bring this facility to freeway conditions as well.

There are several planned expansions of existing arterial roadways and completely new roads which also affect potential rail alignments. The existing roads that are slated for widening include Tom Braniff Drive north of SH-114, California Crossing, and Rochelle Boulevard from Teleport Boulevard to O'Connor Boulevard. Completely new roads planned for the area include the completion of the gap in Las Colinas Boulevard West from Fuller Street in Sub-Area 4 to Customer Way just north of the Study Area. Significant for its potential to provide new access to Las Colinas is the proposed extension of Walnut Hill Lane from its terminus in Dallas across the Elm Fork into Sub-Area 4. Another proposed street in the Urban Center is Las Colinas Boulevard East from Teleport Boulevard to the current segment that runs south from O'Connor Boulevard.

Environmental and Cultural Resources

A necessary step in the development of the light rail line is an environmental investigation and environmental documentation to comply with the National Environmental Policy Act (NEPA). This typically will cause the production of an Environmental Impact Statement (EIS) which concludes with a Record of Decision (ROD) which allows the project to be implemented.

The location of alternative alignments was prepared with awareness of several environmental and cultural resource constraints which exist in the Study Area. Environmental and cultural resource impacts cannot always be avoided but can usually be minimized and mitigated. The alternative alignments and the recommended alignment will have environmental effects. These will be documented as will avoidance and mitigation measures. It is important to understand, at this stage of project planning, that environmental and cultural resources exist in the Corridor, and that they have been avoided to the greatest extent possible.

Cost

A basic goal of this study is to minimize the cost to implement the light rail line through the Study Area and to maximize the total economic benefit derived from the system. As with any route location process, the need to minimize cost is balanced with the need to meet the purpose and need for the system, maximize the benefits, and minimize environmental and social impacts.

While this land use planning process is underway, DART is engaged in the preliminary engineering analysis for the line. In Sub-areas 1 and 2, DART has performed location and cost analysis which indicates the alignment which is most viable from a cost and engineering perspective. This input is reflected in the documentation of the preferred alignment in this report.

In Sub-areas 2 and 3, where DART has not yet provided the same level of detailed engineering, the Study team utilized a rational approach to select an alignment which minimized implementation costs. This rational approach is based on the following principles:

- Construction costs are about twice for aerial alignments compared to surface alignments
- below-grade alignments are more expensive than aerial alignments
- at-grade street crossings are possible at many (but not all) locations
- crossing street and utility rights of way increases implementation and operating costs
- rail alignments within roadway, highway, or utility rights of way (parallel operation) increase implementation and operating costs
- a right-of-way cross-section of 100 feet has been used for planning purposes. Narrower rights-of-way are possible but construction costs may be greater to accommodate drainage, utilities, or slopes. In some cases, easements may be used for these purposes if it is necessary to minimize the right of way
- environmental impacts and potential mitigation costs establish the preference to avoid environmental resources including wetlands, flood plains, and water bodies
- undeveloped or vacant land is favored over developed land for right of way
- the development potential of property remainders should be considered in alignment locations
- utility relocation and adjustment expenses should be considered (minimized) even if the relocation expense is not borne by the City or DART.

These considerations are important guidelines that were used in the identification of cost effective alternatives. None of these should be interpreted as establishing an absolute rule regarding potential alignments such as “no alignment shall be underground”. However, it is believed that the alternatives identified, and the alternative recommended, are cost effective and feasible. Preliminary engineering is required to establish a reasonable opinion of the probable cost of implementation.

Transit Service and Operational Criteria

As with design criteria, this Study has relied on discussions with DART staff and existing examples to guide the alternatives and station proposals. The proposals made in this Study are an

attempt to maximize the land development benefits and transit benefits through joint, cooperative development of the transit system. This Study did not, however, restrict the recommendations to those with examples in DART's existing service. All recommendations are believed to be consistent with the parameters used by DART relative to service and operational criteria.

Existing and Proposed Developments and Land Use

This Study identifies that existing land use, proposed land use, and proposed developments as an important consideration regarding light rail alignment location. Land use is always important, but in this case the importance of new development and redevelopment opportunities is somewhat greater in relationship to serving existing land uses. This is true for three different reasons:

The most obvious reason is that raw land or land that is not developed to the highest and best use is generally less expensive to acquire, if there is a need to purchase land for right-of-way. Proposed alignments, therefore, tend to veer towards undeveloped land.

The second reason is that there is more potential to capture the value added by the light rail investment on land that is currently undeveloped or on land that has the potential to be completely redeveloped. Land that is already developed and economically utilized offers less potential to realize an economic benefit that can be used to help finance the implementation of the system.

A third reason specific to the Urban Center is that the existence of the Las Colinas APT offers a way to connect much of the existing development in Las Colinas to the light rail system. The APT offers the opportunity to extend the immediate vicinity impact of light rail stations.

There are other land use considerations that influence the alignment location in this transit oriented development Study, notably ownership of the land and owner's predisposition toward development or redevelopment. Most, but not all, of the land in the Study Area is held by parties with an interest in developing or selling the land. Land owners who are content with the current land use are not initially interested in the potential benefits of the light rail system, possibly afraid of changing conditions around their property. Land owners who are interested in selling rather than developing land are usually interested in anything that they perceive will positively affect the value of their property.

Alignment terminals

The most basic element regarding the location of the light-rail line in the Study Area is the location of the line outside of the Study Area. The "given" location of the line where it enters and leaves the Study Area establishes the common points for all alternatives. The Northwest Corridor Major Investment Study established the alignment just west of and parallel to State Highway Spur (Spur) 482. This alignment will come into Sub-Area 1 on a bridge over the Elm Fork flood plain and the Irving Flood Control District No.1 Levee. This means that all alternatives will be elevated on structure or embankment as they enter the Study Area.

The location of the light rail line north of the Study Area is less definite. The Northwest Corridor Major Investment Study indicates an alignment that crosses Hackberry Creek and is aligned with

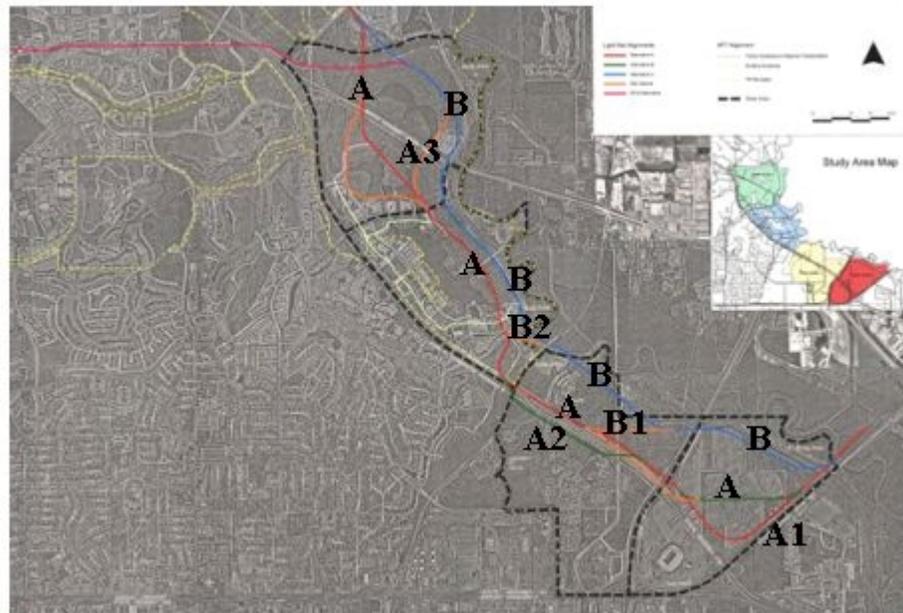
North Las Colinas Boulevard. The Northwest Corridor/Las Colinas Land Use Study assumed that this alignment (outside of the Study Area) is not determined and will be influenced by the alignment selected within the Study Area. It is known that the alignment will cross Hackberry Creek between Las Colinas Boulevard and O'Connor Boulevard on a bridge structure.

Engineering Design Criteria

This analysis did not produce engineering drawings of the alternative and recommended alignments. However, these were drawn with the intent that the design criteria as specified in the DART Design Criteria Manual could be met. Where DART has initiated preliminary engineering, the alignments shown in this land use planning effort are based on draft alignments obtained from the DART engineering team. To the greatest extent possible, alignments and station locations have been patterned after components of the DART Starter System which is now in operation. The engineering design criteria include minimum turning radius, right-of-way dimensions, section and plan layouts, accessible design details and other standard DART elements.

Light Rail Alignment Alternatives Alignment A

Alignment A enters Sub-Area 1 as the light rail line crosses the Irving Flood Control District No. 1 levee and parallels Spur-482. The light rail line continues for approximately one thousand feet before returning to grade and curving westerly through the middle of the northern properties in Sub-Area 1. The station location in Sub-Area 1 would be in the



center of the northern properties. As the line approaches the Loop 12 / SH-114 Interchange it curves slightly and parallels SH-114. The crossing of Loop 12 would preferably be below-grade, but could be elevated if need be depending on cost and station location.

As the light rail crosses Loop 12 and enters Sub-Area 2, the line remains adjacent to the SH-114 service road. It rises to cross Tom Braniff Drive either at grade or on an elevated structure depending on how the rail crosses Loop 12 and associated costs. The station that serves Sub-Area 2 would be located just east of Tom Braniff Drive. Once past the station, the light rail line crosses over the service road and ramp to parallel SH-114 between the main lanes and the service

road. The alignment continues within the SH-114 right-of-way past the Cistercian property and descends just past Cistercian Drive and goes under the Burlington Northern Santa Fe Railroad (BNSFR). Where the alignment is within the existing SH-114 right-of-way it should be noted that the alignment is based on the reconstruction of SH-114 in the same vicinity and the design of SH-114 and the light rail facilities would need to be coordinated.

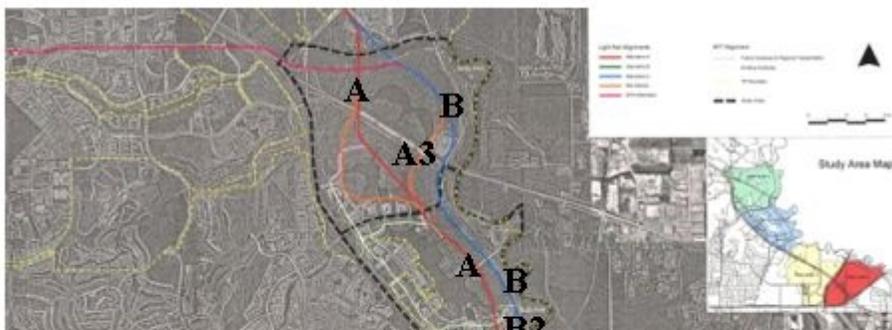
The alignment enters Sub-Area 3 immediately west of the Burlington Northern Santa Fe Railroad. Here the alignment curves to the right near Teleport Boulevard and then curves to the left to avoid existing development and enters the Las Colinas Urban Center. An at grade crossing of Rochelle Boulevard just east of the Post Office leads to the first of three transit stations. The alignment goes under the Las Colinas Area Personal Transit (APT) alignment immediately west of the APT Maintenance Facility. This location affords the opportunity to build a station, which includes a direct connection to the APT line, facilitating easy transfer between the two systems. On this northwesterly course the light rail system traverses the undeveloped land in the Las Colinas Urban Center between Lake Carolyn and Rochelle Boulevard.

The light rail line is proposed to be in the center median of the Las Colinas Transit Mall. The Transit Mall would accommodate the light rail line, transit stops (stations), local vehicular traffic, off-peak parking, and pedestrians. A second station would be located midway between California Crossing and O'Connor Boulevard in the transit mall. The rail leaves Sub-Area 3 with an at-grade crossing of O'Connor Boulevard.

Crossing O'Connor Boulevard into Sub-Area 4, the alignment continues in the transit mall environment between Lake Carolyn and O'Connor Boulevard. The alignment serves development sites adjacent to the lake on the southwest and adjacent to Northwest Highway on the northeast. As the alignment approaches the proposed extension of Las Colinas Boulevard it curves to the right to cross Northwest Highway (Spur-348). This proposed Spur-348 will be configured as an urban expressway or freeway with a diamond intersection at Las Colinas Boulevard. The light rail line will cross the service roads at grade but will go under the main lanes and will stay on the eastern side of Las Colinas Boulevard and then cross Hackberry Creek, leaving the Study Area. Three stations would serve Sub-Area 4. The first station is to be just north of O'Connor Boulevard. The second station would serve the proposed convention center and the development north of Lake Carolyn from a location just east of the line's curve to the north. The third station on this alignment would be approximately midway between Spur-348 and Hackberry Creek.

The alignment north of the Urban Center is unresolved and must be fully addressed in the PE/EIS process.

Alignment B



Alignment B enters Sub-Area 1 as the light rail line crosses the Irving

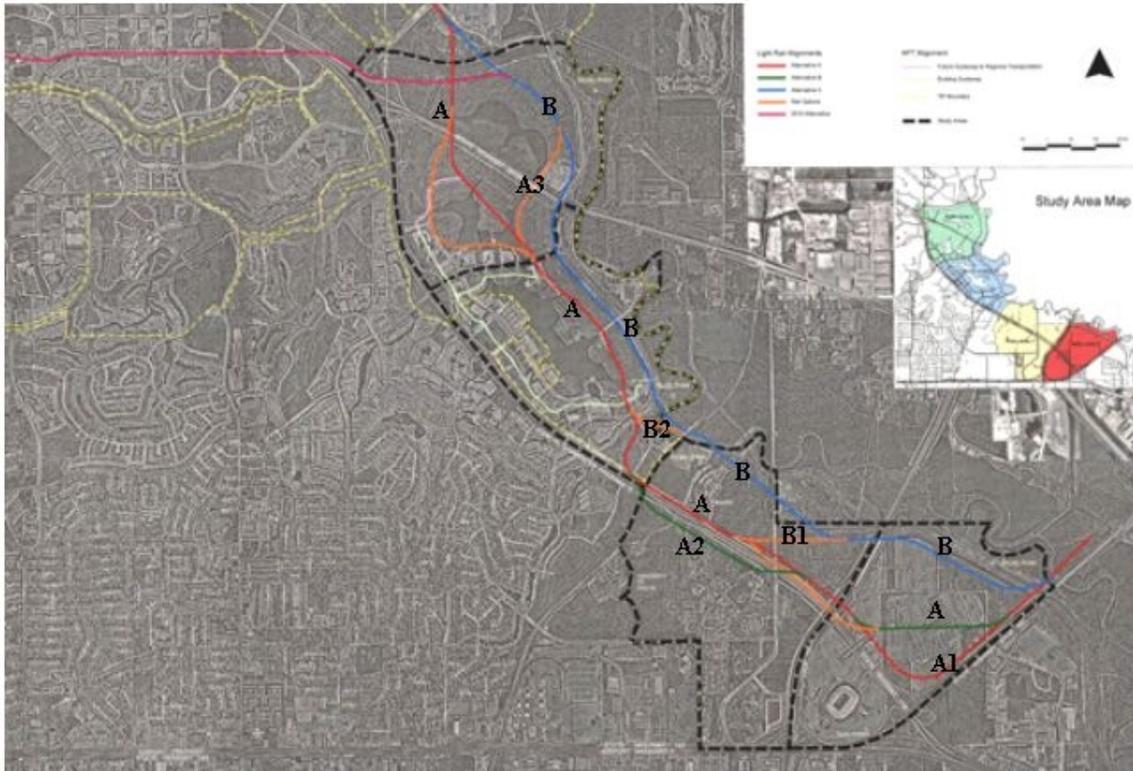
Flood Control District No. 1 levee and parallels Spur-482. This alignment then curves to the right to generally parallel the Irving Flood Control District No.1 levee southwest of the Elm Fork of the Trinity River. Through Sub-Area 1 the alignment is elevated on structure or embankment. This rail line is behind the Federal Express facility and traverses vacant land or Texas Stadium parking lots before an elevated crossing of Loop 12. A station serving the sub-area would be located midway through the area.

Alignment B enters Sub-Area 2 on an east-west alignment and curves to the right so as to remain away from SH-114 frontage and behind the Cistercian Preparatory School. The alignment traverses vacant land, including a corner of unincorporated Dallas County, then crosses Tom Braniff Drive, the Burlington Northern Railroad, and the Trinity River in two locations. The vertical alignment would be at grade where possible but would be elevated for considerable distances with bridge structure crossings of Loop 12, wetlands, the Trinity River and the railroad. The location for a station in this sub-area is just west of Loop 12 and Tom Braniff.

Alignment B enters Sub-Area 3 on a bridge over the Trinity River near the outfall control point from Lake Carolyn. The alignment then descends to grade near Rochelle Boulevard / Colorado Drive. The light rail alignment runs parallel to and east of Rochelle Boulevard, adjacent to Campion Trails Park, and crosses California Crossing at grade. This alignment is predominately at the same grade and adjacent to the existing roadway, however the vertical alignment would be on fill above the existing natural ground to ensure that the line is above the 100-year flood elevation. This alignment is located in land which is reserved for park or transportation uses. One station serving Sub-Area 3 would be located near Colorado Drive to facilitate transfers to the Las Colinas APT. A second station location is near the O'Connor Boulevard intersection.

The alignment enters Sub-Area 4 at the O'Connor Boulevard/ Rochelle Boulevard intersection, switching the alignment to run west of O'Connor Boulevard. It crosses Northwest Highway (Spur-348) and is grade separated for the main lanes of the highway. This alignment runs through the North Irving Transit Center before turning westward through the undeveloped land west of O'Connor Boulevard and north of Lake Carolyn. The alignment leaves the Study Area as it crosses Hackberry Creek. The alignment is largely at grade throughout the sub-area and the preferred station location in Sub-Area 4 is centered in the area north of Lake Carolyn.

Alignment B-2



Alignment B-2 is a path that would connect Alignment B in Sub-Areas 1 and 2 to Alignment A in Sub-Area 3. Proceeding west from Alignment B, this variation maintains a northwesterly tangent to intercept the transit mall of Alignment A. Station locations serving Sub-Area 3 would be essentially the same as for Alignment A.

Alignment A-1

This alternative alignment is a variation of Alignment A with the line as close as possible to Spur -482 and SH-114. The station location for this alignment would be on the SH-114 side in the vicinity of the existing overpasses across SH-114.

Alignment A-2

Alignment A-2 is an alternative to Alignment A in Sub-Area 2 that places the light rail line west of SH-114 on the University of Dallas (UD) campus. The line would cross SH-114 in an aerial alignment in the vicinity of Tom Braniff Drive. It would then parallel SH-114 for most of the university's frontage of SH-114. East of the Burlington Northern Santa Fe Railroad the line would curve to the right to once again cross the BNSF Railroad and SH-114. As the alignment enters Sub-Area 3 it assumes the original Alignment A. The station location on this alternative alignment would be situated as appropriate to serve the student population and fit within the campus master plan.

Alignment A-3

Alignment A-3 is an alternative alignment which switches from Alternative A to Alternative B in

Sub-Area 4. As the line proceeds north from O'Connor Boulevard the alignment curves to the right to cross Spur-348 just east of the canal which connects the northern and southern portions of Lake Carolyn. The alignment is at grade until it approaches Spur-348 where it descends to cross under Spur-348. As it proceeds northeasterly it curves to the left to intercept Alignment B. There are no stations located on this alternative alignment. With this alternative the sub-area would be served by two stations: the station on Alignment A north of O'Connor Boulevard and the last station on Alignment B.

Alignment B-1

This alternative alignment switches from Alignment B to Alignment A in Sub-Area 2. The route extends from the westerly line of Alignment B until it intercepts Alignment A west of Tom Braniff Drive. The station location under this alternative would be located immediately west of Tom Braniff Drive, just north of the location used in Alignment A.



▲ Recommended Light Rail Alignment

The Recommended light rail alignment crosses the Irving Flood Control District No. 1 levee and parallels Spur-482 for about 1000 feet before a curve to the right takes the line on grade to a westerly course in the center of Sub-Area 1. As the line approaches the Loop 12/ SH-114 Interchange a curve to the right takes it parallel and east of SH-114.

The crossing of Loop 12 may be either elevated or below-grade, depending on cost and station location considerations. The most likely vertical profile will go under Loop 12. The station location in Sub-Area 1 will be in the center of the sub-area on the east-west tangent segment.

As it enters Sub-Area 2 under Loop 12, the route remains adjacent to the SH-114 westbound service road. It rises to cross Tom Braniff Drive at-grade. West of Tom Braniff Drive the alignment shifts to cross over the service road and ramp to parallel SH-114 between the main lanes and the service road. This alignment crosses over Cistercian Drive next to the main lanes and descends to go under the Burlington Northern Santa Fe Railroad (BNSF). Where the alignment is within the existing SH-114 right-of-way it should be noted that the alignment is based on the reconstruction of SH-114 in the same vicinity. The design of SH-114 and the light rail facilities will be coordinated. Also, a possible alternative is the alignment running parallel to SH-114, within the right-of-way or not, in order to avoid crossing the frontage road twice. The station that serves Sub-Area 2 will be located just east of Tom Braniff Drive.

The alignment enters Sub-Area 3 immediately west of the BNSF. Here the alignment curves to the right on a northerly alignment near Teleport Boulevard. A curve to the left brings the alignment through an existing building and a grade crossing of Rochelle Boulevard just east of the Post Office. The alignment goes under the Las Colinas Area Personal Transit (APT) alignment immediately west of the APT Maintenance Facility. On this northwesterly course the light rail system traverses the undeveloped land in the Las Colinas Urban Center between Lake Carolyn and Rochelle Boulevard.

This part of the alignment is on the platted alignment for Las Colinas Boulevard, except that the curve in the center of this segment is straightened out for the light rail alignment. In this location,

the light rail line is proposed to be in the center median of the Las Colinas Transit Mall. The Transit Mall would accommodate the light rail line, transit stops (stations), local vehicular traffic, off-peak parking, and pedestrians. The Transit Mall alignment leaves Sub-Area 3 with an at grade crossing of O'Connor Boulevard. Sub-Area 3 would be served by two transit stations. The first station would be located where the light rail line is crossed by the APT. This location affords the opportunity to build a transfer station between DART and the APT line. A second station would be located midway between Rochelle Boulevard and O'Connor Boulevard in the Transit Mall.

Crossing O'Connor Boulevard into Sub-Area 4, the alignment is also in a Transit Mall environment between Lake Carolyn and O'Connor Boulevard. As the line proceeds north from O'Connor Boulevard the alignment curves to the right to cross Spur-348 just east of the canal which connects the northern and southern portions of Lake Carolyn. The alignment is at grade until it approaches Spur-348 where it descends to cross under the roadway. As it proceeds northeasterly behind the North Irving Transit Center it curves to the left through the undeveloped land west of O'Connor Boulevard and north of the Lake. The alignment leaves the Study Area as it crosses the Lake impounded on Hackberry Creek. The first station in Sub-Area 4 is in the transit mall just north of O'Connor Boulevard. The preferred station location in Sub-Area 4 north of Spur-348 is centered in the area north of Lake Carolyn.



As noted earlier the Recommended Alignment is a composite of the individual alignment alternatives described in Section 2.1. The following text refers back to the alternative alignment segments and Figure 2.1 in order to summarize the analysis which led to the Recommended Alignment.

Through Sub-areas 1, 2, and 3 the Recommended Alignment is Alternative Alignment A. In Sub-Area 1 this alignment is in the center of the sub-area. This location is preferred because it provides more developable land within walking distance of the transit station. Both Alignment A-1 and Alignment B would place the light rail line and therefore the station on the edge of the development area which reduces the transit benefits to the site.

Alternative A in Sub-Area 2 is preferred over the Alignment A-2, Alignment B, and Alignment B-1. In Alignment A-2 the line and station location on the University of Dallas campus precludes the development opportunities that exist for the property owned by the University north of SH-114 that are not designated for campus use. In addition, Alignment A-2 crosses SH-114 twice, possibly implicating in higher cost and certainly adding bridge structures over SH-114 in a section of the highway that has already many infrastructure elements. Alignment B-1 was eliminated from consideration because of the preference for Alignment A in Sub-Area 1. Alignment B in Sub-Area 2 and into Sub-Area 3 has considerable environmental complications with wetlands and cost considerations with crossings over the Elm Fork of the Trinity River. This alignment also traverses Cistercian Preparatory School which is avoided by Alignment A by shifting into SH-114 right-of-way.

The distinction between Alignment A and B in Sub-Area 3 is primarily related to land

development opportunities. The Rochelle Boulevard alignment is developable on one side only. Further, the alignment would either be on the west side of Rochelle Boulevard, reducing developable acreage, or it would be on the east side of Rochelle Boulevard, on expensive fill to be above the flood elevation. Although the land east of Rochelle Boulevard is reserved for park and transportation use, a transit line on Alignment B may have some detrimental affects on the Campion Trails facility. Alignment A, which operates in a transit mall, serves development on both sides. Also, by using land platted for a road, this alignment uses less developable land for operation of the light rail system.

The preferred route in Sub-Area 4 is A-3. Alignment A is less viable than A-3 or B because it provides much less land development opportunity to the land north of Spur-348. Also, the alignment presents design difficulties in that it would need to leave the transit mall, curve into a parallel alignment to Las Colinas Boulevard, cross the Spur-348 service roads at grade, and then enter the median of Las Colinas Boulevard. The preference of Alignment A-3 over Alignment B also is based on development opportunities and transportation reasons. Alignment B would need to cross Spur-348 either within or adjacent to O'Connor Boulevard. Either approach presents operational difficulties. Also, the alignment would need to cross O'Connor Boulevard at some location. The crossing of parallel facilities is problematic because the flat crossing angle requires a long grade crossing with poor visibility and a large crossing area. Grade-separation would be longer and more expensive at this location than the simpler crossing for Alignment A-3. The development advantages of A-3 relate to the avoidance of the need for driveways crossing of the light rail line and the opportunities offered by continuation of the transit mall on each side of Spur-348.