APPENDIX O
Supplemental Information

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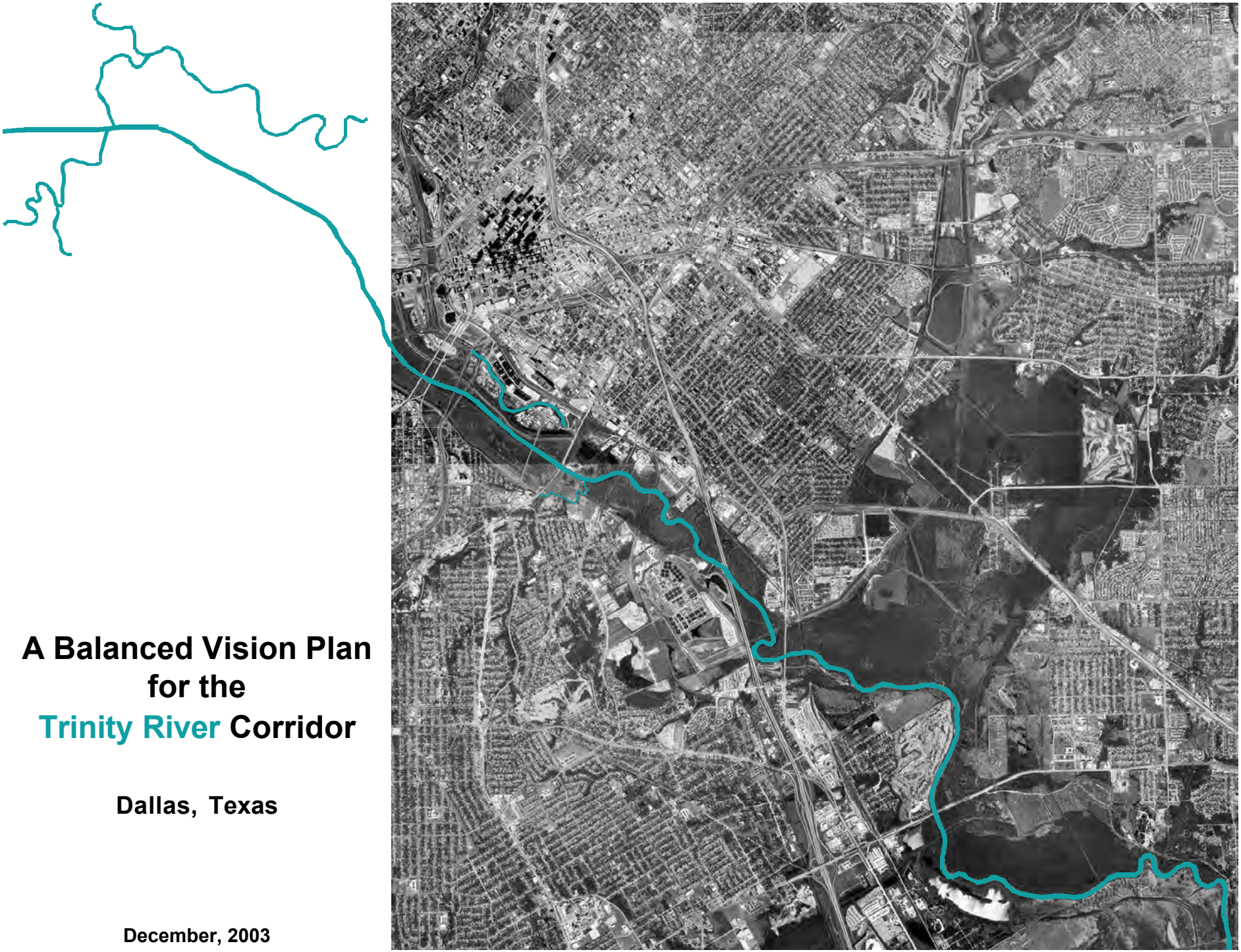

A Balanced Vision Plan for the Trinity River Corridor

Dallas, Texas

December, 2003

Prepared for:

City of Dallas
Mayor Laura Miller
and
Former Dallas County Judge Lee Jackson

Prepared by:

Cooperating Entities
- **The Dallas Plan**
- **AIADallas**
- **The Dallas Institute of Humanities & Culture**

Consulting Professionals
- **Chan Krieger & Associates**
- **TDA, Incorporated**
- **Hargreaves Associates**
- **Carter + Burgess**

In Cooperation With
- **Trinity River Corridor Project Office**
- **Camp Dresser & McKee Inc.**

"A decade from now, people driving into Dallas will see the city's river not as an obstacle to be overcome, but as a destination to discover. Our changing relationship to the water, I predict, will enliven every aspect of urban life in our city."

- Mayor Laura Miller

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Executive Summary

This urban design study began as a privately funded initiative that sought to ensure that we achieve the fullest potential of a massive and complex, multi-agency project – the largest and most challenging public works project ever undertaken by our city. It was expected that the study of the Trinity River Corridor would be general in scope, would be completed in a few short months and would offer a critique of the original plan from a fresh perspective. However, once that initial critique was complete and a bold, long-range vision was presented, it became clear that the study needed to go further. Questions about project costs, funding, timing, inter-agency coordination, and maintenance and operations needed reliable answers before critical decisions could be made. As a result, the study was expanded significantly. City staff, State and Federal agencies, consultants, and citizens joined the effort to complete this study. The result is a plan with broad support and the underlying belief that this grand vision for the long range health and vitality of our city is within our grasp.

An amazing landscape lies behind the levees and is in need of civic affection and stewardship.

The key to that broad support of this plan is that it successfully balances diverse and potentially conflicting goals for the Trinity River Corridor.

- It will provide undiminished flood protection for the full length of the corridor in a way that supports the achievement of environmental, recreational, mobility and economic goals.
- It will complete bold initiatives of environmental responsibility, restoration, and proper management in the midst of an intensely urban setting.
- It will create a magnificent recreation and urban open space amenity (without equal in any American city) while co-existing successfully with flows of vehicular traffic as well as periodic floodwaters.
- It will meet the stated regional transportation goals in a way that supports economic development, air quality improvement and appreciation for the park.
- It will create critically important community and economic opportunities for the neighborhoods bordering the Trinity River, for downtown, and as the centerpiece of a major urban region.

Phased Implementation

Although this plan outlines a vision that will take generations to fully implement, many of the most important elements can be realized within a few years. This study divides the scope of work into three parts based on the potential for funding.

- **Basic Phase 1**– the elements of the project that can be completed with funds from the 1998 City Bond Election combined with anticipated funding from other governmental sources.
- **Expanded Phase 1** – the basic plan plus a series of elements that are highly desirable in achieving a bold change in the Trinity River Corridor in the first ten years of investment. Additional funding would be required.
- **Ultimate Plan** – this long range vision is offered to guide development of the corridor in future decades.

If possible, the "basic plan" and the "expanded basic plan" should be implemented concurrently as "Phase 1".

	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Flood Protection Component			
Dallas Floodway Extension	All		All
Elm Fork Flood Protection	Phase 1 of Elm Fork F.P. management plan		Complete
Raise of Existing Levees	All		All
Environmental Restoration and Management Component			
Great Trinity Forest Land Acquisition	All, per 1998 bond funds		Addional land acquisition recommended
Trinity Interpretive Center	All		All
Trinity Forest Trails (pedestrian, bicycle, equestrian)	All, per '98 bond funds		All currently identified and possible additions
Floodway Area Trails (pedestrian, bicycle, equestrian)	Minimal scope	Expanded scope	Complete
River Meanders (including armoring)	Downstream from Sylvan		Entire flooday stretch
River-related Infrastructure	Part (bridge pier armoring at meanders)		All
Enhancement of Habitat in the Floodway	Downsteam from Sylvan	Additional	All
Stormwater Wetlands	None	Pavaho wetlands	All
"Headwaters" Wetlands	None	Part	All
Boardwalks for Nature Observation	Not included	Partial scope	Complete

	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Parks and Recreation Component			
Urban Lake and Stormwater Culverts	Part (lake and culverts)	Amenities including promenade	All
Natural Lake (incldues lake and amenities)	Lake	Amenities	All
Trinity Equestrian Center	All		All
Water Supply for Terraced Lake System	Groundwater supply for make-up	Complete flowing lakes system from Central Wastewater Plant	Possible expanded reuse initiatives
Boat, Canoe, Kayak Access in Floodway Area	As exists	As exists	All
Gateway Parks	Six parks per 1998 funding	Additional as funding permits	Remaining parks per MIP
Elm Fork Soccer Complex	All		
Elm Fork Dog Park	All		
Elm Fork Trails	Part	Additional trails	All
Connections between Lakes and to Trinity River	Between lakes	All	
Natural Lake amenities	None	All	
Whitewater Rafting Course	None	None	All
Park Access Roads (including roadways, bridges and parking)	None	Partial scope	All
Canoe launches	All		
West Dallas Lake/Wetland Area	None	None	All
Active Recreation Terraces (two)	None	None	All
Amphitheater	None	None	All
Concession/Event Facilities	None	None	All
Park District Maintenance Facility	None	All	All
Transportation Component			
Woodall Rodgers Bridge	All		
Signature Bridges at IH-30 and IH-35	None	None	All
Trinity Parkway	Complete (6-4-4 lanes)		Complete (6-4-4 lanes)
Industrial Boulevard	Partial upgrade?	Complete upgrade?	All
Pedestrian Deck Parks and Connections	Basic elements	Enhanced facilities	All
Downtown Levee-top Roads	None	None	All
Oak Cliff Levee-top Road	None	All	
Beckley Boulevard	Woodall Rodgers to Commerce	50%	Commerce to IH-30
South Lamar Street Upgrade to Boulevard	None	None	All
S.M. Wright Conversion to Boulevard	Part (TXDOT demolish overpasses)		All
Community and Economic Development Component			
Comprehensive Land Use Study	Study complete		

Costs and Funding

Costs estimates indicate the total capital cost of the basic plan to be approximately $1,060,241,000. The City's portion of those costs equals the $246,000,000 allocated and available from the 1998 bond election. The remaining $814,241,000 is anticipated to be contributed by State and Federal agencies and programs as well as other identified sources.

Completion of the expanded basic plan, concurrently with the basic plan, would require an additional $110,233,000. Identification of those funding sources should begin immediately.

The cost of the ultimate plan is estimated to be $1,733,634,000. This study has not attempted to identify phasing or funding for this long range project completion.

Implementation Schedule

This project requires a unique level of inter-governmental cooperation since many of its components share functions and funding. These components are subject to differing agency standards and processes. Through this study, these agencies have worked together to create a plan for expediting reviews and approvals. Because of the interrelated nature of the creation of lakes, the construction of the parkway and the raising of the levees, many of the major project elements are on a timeline for starting construction in 2007 with completion in 2011. However it may be possible to complete other, less interconnected components on a much faster time line. Here are examples of such components:

- Land acquisition in the Great Trinity Forest
- Completion of the Trinity Interpretive Center
- Completion of the Buckeye Trail
- Conversion of S.M. Wright as a boulevard
- Completion of the Elm Fork Soccer Complex
- Completion of several Gateway Parks
- Completion of the Comprehensive Land Use Study

Maintenance and Operations

This study includes a proposed maintenance and operations plan for the various elements of the Trinity River Corridor Project. The annual cost of park and recreation maintenance and operations is expected to compare favorably with major signature parks in other cities.

I. INTRODUCTION

A city focusing on its river: A portion of the Charles River Esplanade in Boston.

The future of the Trinity River Corridor will be a major factor in shaping the future of Dallas itself. For that reason, it is one of only six Strategic Initiatives in the city's long-range plan - *The Dallas Plan* - adopted in 1994. In the years since that plan was adopted, extensive community discussion has occurred through the Trinity River Corridor Citizens Committee and various studies have been completed that address the issues it identified - **flood protection, environmental management, recreation, transportation,** and **community/economic development**. These studies have clarified the challenges associated with the Trinity River Corridor; in proposing solutions, they have also generated debate among community members who value the various components differently.

Study Objectives

This Trinity Urban Design and Transportation Study was designed to take a fresh look at the potential of the Trinity River Corridor. It began in May 2002, when recently-elected Mayor Laura Miller proposed that an independent study of the Trinity be conducted to review the past projects and recommend an urban design vision that would offer an appropriate balance among the five inter-related issues noted above. It proposes a solution to these issues that achieves an appropriate balance. Its implementation should ensure that the investments Dallas ultimately makes in the Trinity River Corridor are coordinated and successful in strengthening and revitalizing this important part of a major

The Trinity River as it meanders through the Great Trinity Forest.

U.S. city.

Study Organization

The study's structure is unique. It is privately funded by the individuals, corporations and foundations noted on this page. The clients for the study are Mayor Laura Miller and former Dallas County Judge (current Chancellor of the University of North Texas) Lee Jackson, two highly-regarded leaders who held differing views about the Trinity at the study's outset. A team of three organizations were asked to coordinate the study - The Dallas Plan (which also serves as project manager), the Dallas Institute of Humanities and Culture and AIADallas; these organizations also began the study with varied ideas about the corridor.

Study Funders

- AlonUSA
- Anonymous
- Belo Corporation
- Caren Prothro
- Carole and John Ridings Lee
- Centex Corporation
- Crow Holdings
- Dallas Foundation
- Deedie & Rusty Rose
- The Emily Summers Group
- Henry C. Beck III
- Marilyn Augur
- The Marilyn Augur Foundation
- Meadows Foundation
- JP Morgan Chase
- Nancy & Jeff Marcus
- T. Boone Pickens
- Trammell S. Crow
- Trinity Commons
- WalMart GoodWorks Program

A diverse selection panel, including architects, engineers, City staff and community leaders, reviewed proposals from top national urban design firms and unanimously selected the consultants for this study. Chan Krieger and Associates, an urban design firm based in Cambridge MA, was selected to lead the urban design aspects of the study. Hargreaves and Associates, based in San Francisco CA, provided landscape architecture expertise. Finally, TDA, Inc., based in Seattle WA, was asked to provide transportation planning expertise. In addition to this initial team, Carter & Burgess has provided expertise to address particular engineering issues.

Public Agency Partners

Public agencies, their staff and consultants have been an important part of this project. When the project began, they met with the consultants to share information and analysis about the Trinity River and the past projects. Staff members continued to provide input as the vision was developed. Following the preliminary City Council briefing in March 2003, the urban design team and public agency staff worked together to refine the concept and to develop the recommendations contained in this report.

The City of Dallas staff in the Trinity River Corridor Project Office, the City Manager's Office, the Public Works & Transportation Department and the Park and Recreation Department have been active participants in the development of this overall vision and set of recommendations, as has CDM, the City's consultant to the Trinity River Corridor Project Office. Other departments, including the Office of Intergovernmental Affairs, the Office of Development Services, the Streets Department and Dallas Water Utilities, have provided more specialized input. The North Central Texas Council of Governments, the North Texas Tollway Authority, the Texas Department of Transportation and the U.S. Army Corps of Engineers have all participated in discussions related to their areas of responsibility.

Scope of the Study

This study focuses on the geographic area within the city limits of Dallas that is known as the "Trinity River Corridor". This area includes the Trinity River floodway (the area between the existing levees), the floodplain area downstream from the levees and the neighborhood and business areas adjacent to

the river and extending approximately one mile on either side.

The study has four major phases. The first phase began in September 2002. During this phase, the consultant team reviewed plans, studies and reports dating back to the early 1900's. They met with the staff and consultants responsible for the many recent Trinity River projects. They interviewed leaders from Dallas' business, neighborhood, arts and environmental communities. A community brainstorming session was held in late September, allowing interested citizens to share their visions of the Trinity's future with the consultant team.

In the second phase, the consultants and the three cooperating entities (The Dallas Institute of Humanities and Culture, AIADallas and The Dallas Plan), with the involvement of City staff and partner agency representatives, began to define a vision for the corridor that would provide an appropriate balance. The second phase involved analysis of technical issues and computer modeling of traffic patterns as well as creation of urban design, environmental and recreation concepts. This phase resulted in a preliminary vision for the Corridor that was presented to the Dallas City Council in March 2003. The Council was enthusiastic about the overall vision but asked that the team continue to work with City staff and other public agencies to refine technical aspects of the proposal and seek to develop a refined concept that would be supported by those agencies as well as the urban design team.

The third study phase followed the March briefing; it focused on efforts to reach an agreement on a refined vision plan. This phase involved many meetings and discussions with the urban design team, City staff and representatives from other agencies. Additional computer modeling was completed, transportation system refinements were studied, further discussion refined the conceptual design of lakes and wetlands, and work on estimating capital, operations and maintenance costs began. At the end of this phase, the urban design team and transportation partners agreed to add a sixth build alternative to the ongoing Environmental Impact Study for the Trinity Parkway. A second City Council briefing, in June 2003, presented the refined vision and the new build alternative. Community input has been a part of this third phase, as discussed below.

The fourth and final phase of this study has involved a close partnership between the City of Dallas and the urban design team. It has completed refinements to the vision plan that respond to technical, community and operational concerns. In addition, cost and revenue estimates have been developed for the project. Lastly, this final report has been produced jointly by the City of Dallas and the urban design team. Its recommendations - for this vision of the Trinity's future and for action

View of the Trinity River from the Southeast. The Trinity Forest begins in the foreground.

to achieve it - are supported by the urban design team and the City staff.

Community Input and Involvement

A great deal of public involvement and discussion about the Trinity River Corridor has occurred through the many studies conducted over the past 10 years. When this study began, its objective was to review the results of those studies and recommend a balanced vision for the Trinity. It was not structured to include a significant public outreach effort; instead, it sought to build on those previous efforts by reviewing the community input they received and then using small-group interviews with key community leaders to supplement and update past information.

In September 2002, a series of interviews was conducted with representatives from organizations representing community, environmental, business and arts interests. A community visioning session was also held, as was a session with media representatives. From October 2002 through May 2003, individuals and organizations were contacted as needed to follow up on comments received initially.

The City Council briefing in June 2003 presented a refined vision for the Trinity Corridor. Immediately following that briefing, three community workshops were held to share this vision with the community and seek feedback. Those meetings were very well attended, with over 300 individuals participating. Other comments were received through email, letters, questionnaires and presentations to organizations. These comments reflected a diverse range of opinions, ranging from support for the overall concept to questions about costs and operations (information that was not available at the time of these meetings). Comments about the parkway included some that criticized the proposal because it did not provide enough transportation capacity or sufficient access to downtown and Oak Cliff; other comments opposed inclusion of any sort of major roadway in the corridor.

In addition to the general community workshops held in June and July, four workshops which focused on the lake and recreational concepts were held in August 2003. These workshops provided an update on functionality issues with the Dallas Floodway and how all the components work together. They also educated and updated the community on the status of these studies and provided an opportunity to receive public input. More information on the public comments received this summer can be found in Appendix A of this report.

Public support for a vision of the Trinity will be essential if the project is to become a major new asset for the Dallas community. The comments received during this study have been valuable to the team's understanding of the various perspectives and opinions in Dallas. Public comments and suggestions have also been important in shaping this concept and its implementation recommendations.

Downtown Dallas in relationship to Trinity River Corridor.

II. VISION

An active and vital river edge in Singapore.

Overview

Dallas faces an unprecedented city-building opportunity: to reclaim the Trinity River as a great natural resource, create a great public domain, and achieve a model of environmental stewardship. Seizing this opportunity will be seen by future historians as a watershed moment in the city's still relatively brief history - the moment when the citizens of Dallas emphatically turned their attention to real urban enrichment, from simple growth to constructing a great and urbane 21st century metropolis.

Not since the era of Frederic Law Olmsted, more than a century ago, when cities such as New York, Chicago, Boston, Washington D.C., St. Louis and Kansas City set out to create impressive park systems to stem the impacts of ferocious industrialization and population growth, has a city embarked on so ambitious an environment-enhancing project as the Trinity River Corridor. The stakes are high, but so are the benefits to be enjoyed for posterity.

Let Us Look Ahead to What the Trinity Might be Approximately a Decade - or so - from Today . . .

The Trinity River Corridor as envisioned in this Balanced Plan.

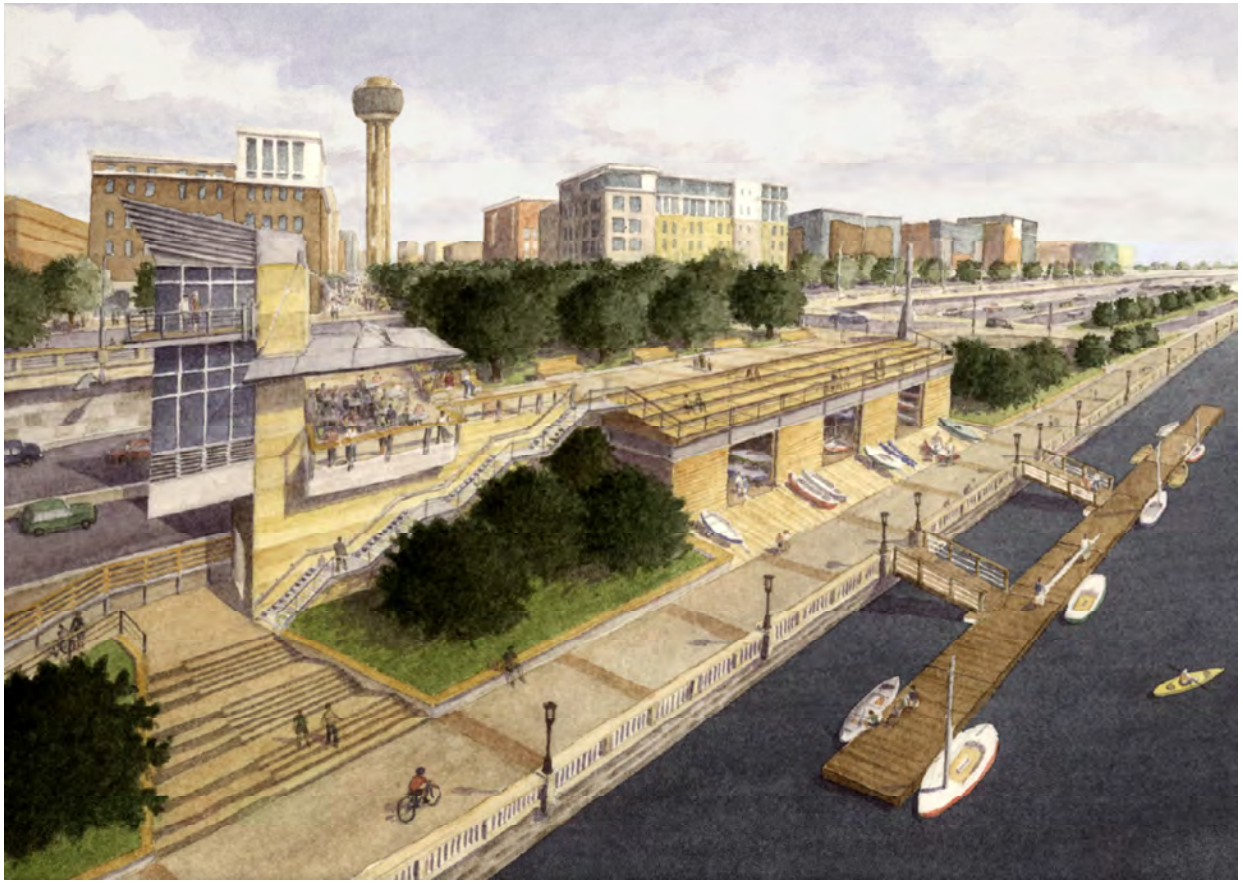
Imagine a vast public, green, easily accessible environment that is **among the largest urban parks in America**. Imagine that it contains a variety of recreational amenities from trails to playing fields, from picnic areas to great assembly spaces, from formal promenades to intimate places to encounter nature, from areas affording great urban vistas to hideaways that make the bustling city recede from consciousness.

Imagine **a water-based environment**, containing a river with restored sinuosity, not today's artificially straightened channel. Imagine a large pair of terraced lakes with water features connecting them to one another and to the river, and a host of wetland environments that provide both a measure of improved water quality and places for native habitat, plants and animals, to thrive. Furthermore, imagine that through its physical design and engineering this environment helps to educate people about urban water usage, run-off, recycling, flood control and management.

Imagine that **a well-designed, context sensitive road** runs along the downtown side of the park corridor. It is tucked against the downtown levee, is largely screened from the park and lake environments, and covered with pedestrian decks and parks in portions of its downtown segment.

But imagine that this road also affords wonderful occasional vistas into the park and to the city. While its largely four- and six-lane segments provide needed capacity for regional mobility, it also enables thousands of Dallas citizens to encounter the Trinity environment on a daily basis, and thus to develop a connection to it - an affection for it - that is mostly absent today.

Trails and a park access road will facilitate pedestrian connections between neighborhoods and park, and encourage non-motorized travel. Transit stations near the park will make it accessible to all visitors.

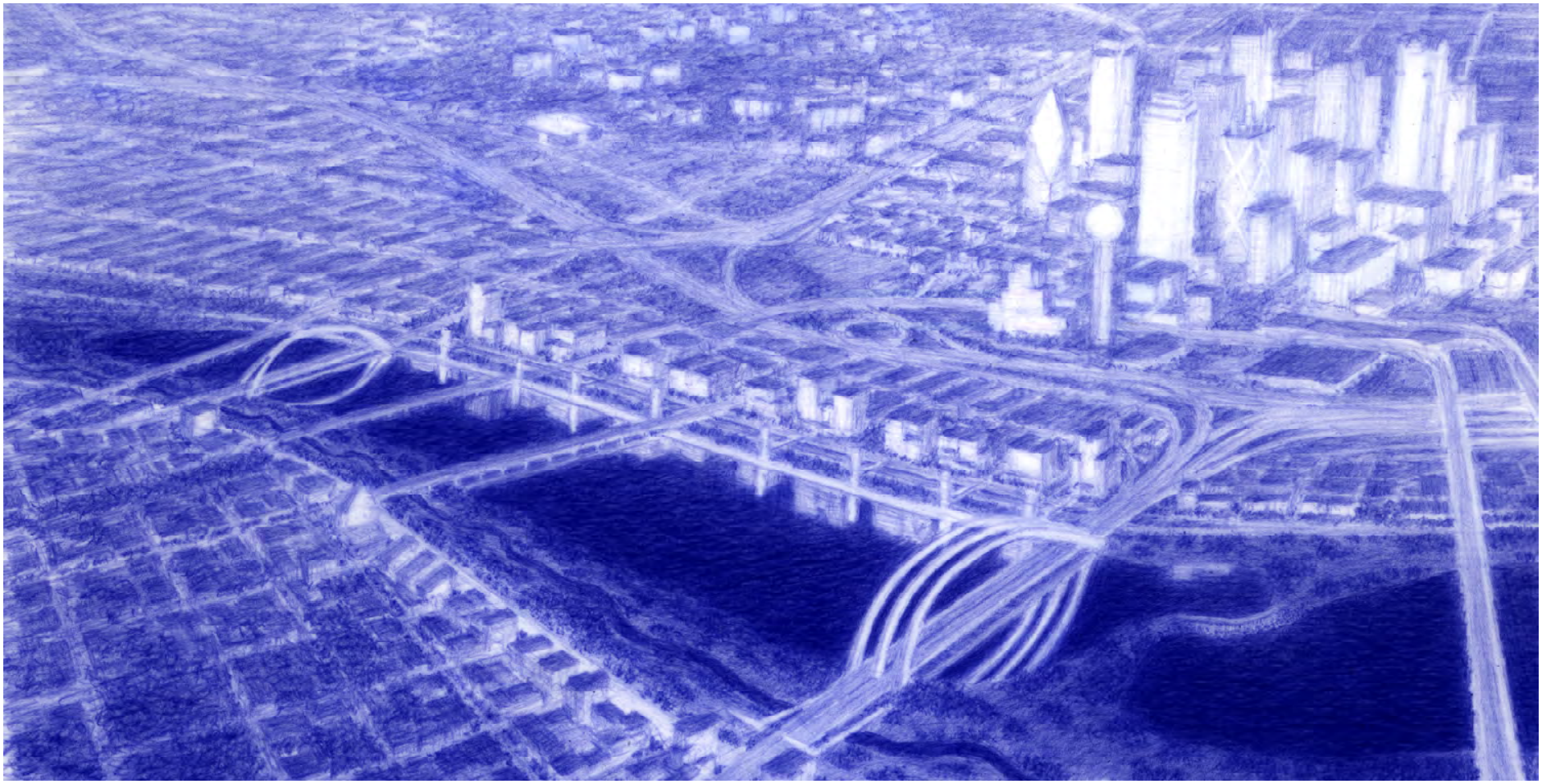


The proposed Reunion overlook with the parkway below and the promenade along the urban lake in the foreground.

Imagine that long-term **flood protection** is achieved through levee improvements, and that the design of these improvements is combined with trails, parks and local streets on the levee tops which allow people on both the West Dallas/Oak Cliff side and the downtown side much easier access to the river environment. Imagine that the Floodway Extension and Elm Fork Protection projects provide protection to several neighborhoods and business areas that have not had the benefit of adequate protection before. Imagine that new flood control measures, including the more naturalized river, the lakes and chain of wetlands all help the Trinity River and its Forest to thrive in terms of habitat health and diversity. Imagine that these flood control measures are achieved all the while creating a more natural area in the heart of Dallas.

View of the proposed Oak Cliff levee-top road with future development along it. In the foreground is the Houston Viaduct. The Calatrava Bridges are in the background.

Imagine **several hundred acres of community development and reinvestment opportunities** along the length of the Trinity River Corridor. Imagine new business addresses and fine places to live overlooking the Trinity. Imagine a city focusing inward toward its river and seminal park environment rather than receding away from an uninviting and largely ignored floodway. Imagine Dallas' vibrant new urban development reflected in a large urban lake - a picture postcard view available year-round! Lastly, imagine newly valued riverfront property (valued as is riverfront property around the urban world) helping to check peripheral sprawl just a bit, while making central Dallas more competitive as a place to live and work within the region.



A prominent riverfront will attract development to its edges and reunite downtown Dallas with the Trinity.

Nothing about the preceding descriptions is far-fetched. Indeed, it is only if all of these qualities are pursued with equal vigor that the Trinity River Corridor Project becomes worthy of undertaking, and once achieved, assumes its role as the premier open space environment in the Dallas region.

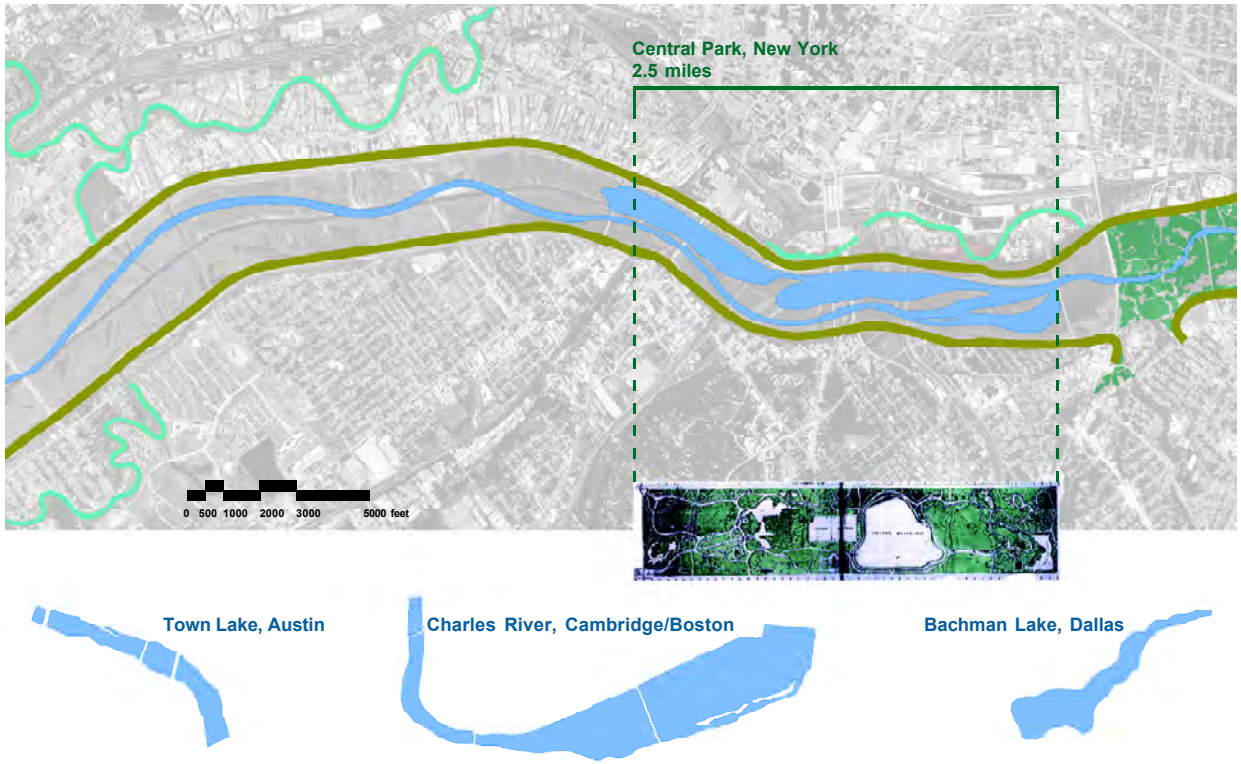
This Vision must answer the following questions....

Can the Trinity become Dallas's equivalent to New York's Central Park?

In acreage alone the enterprise dwarfs Central Park, as the accompanying scale comparison shows. The missing local instinct is to develop towards the Trinity - as New York has towards its great park for a century and a half. This can only occur by creating an environment worthy of growing towards.

Can Dallas' 'Central Park' be compatible with a major road?

Many urban park environments are. The proposed four and six-lane road - properly designed and freed from the dimensional standards of an interstate highway, as is recommended in the 'Transportation' section of this chapter - can be fully integrated into an overall park design.



The prospect of the largest city park in the nation.

Memorial Drive along the Charles River in Cambridge; traffic-free on Sundays from April through November.

Can the park and parkway be compatible with more environmentally sound flood control and water management?

This must become a performance criteria for every portion of the Trinity River Corridor project.

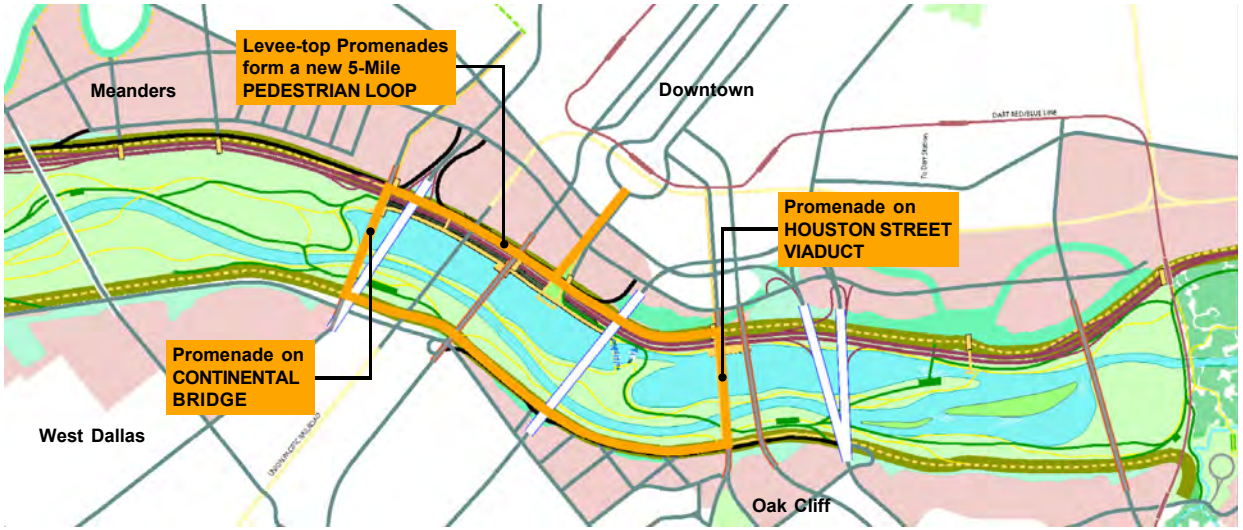
Can the Trinity Corridor become a catalyst for reinvestment?

Only through the conversion of the corridor from a desolate floodway to an open space amenity will the hundreds of acres of underdeveloped or fallow land bordering the corridor gain sufficient value to attract reinvestment. The evidence from scores of cities worldwide has been that great public environments, and well designed open spaces in particular, become the catalysts for major investment along their perimeter.

Can the Trinity be a place of daily enjoyment for the citizens of Dallas?

Great parks are desired destinations on weekends and special occasions, but they are also a source of more casual, daily pleasure. The many people who will drive along the parkway will come in contact with it and so benefit on a daily basis. A range of park drives, pedestrian trails and frequent access points will readily allow many to enter the park environment for short visits. As the diagram below indicates, better connections between the bridges, the Levee-top promenades, and the lake and riverside trails will enable midday joggers, cyclists or evening strollers to make various-length loops through the park environment.

A new park within the flood zone along the banks of the Ohio in Louisville, KY.

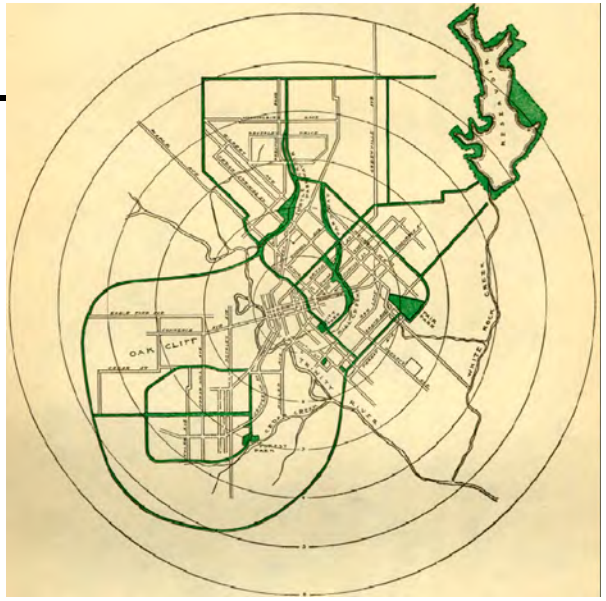


Reconnecting Dallas East and West with a 5-mile pedestrian loop.

Can the Trinity anchor a regional open space system of national significance?

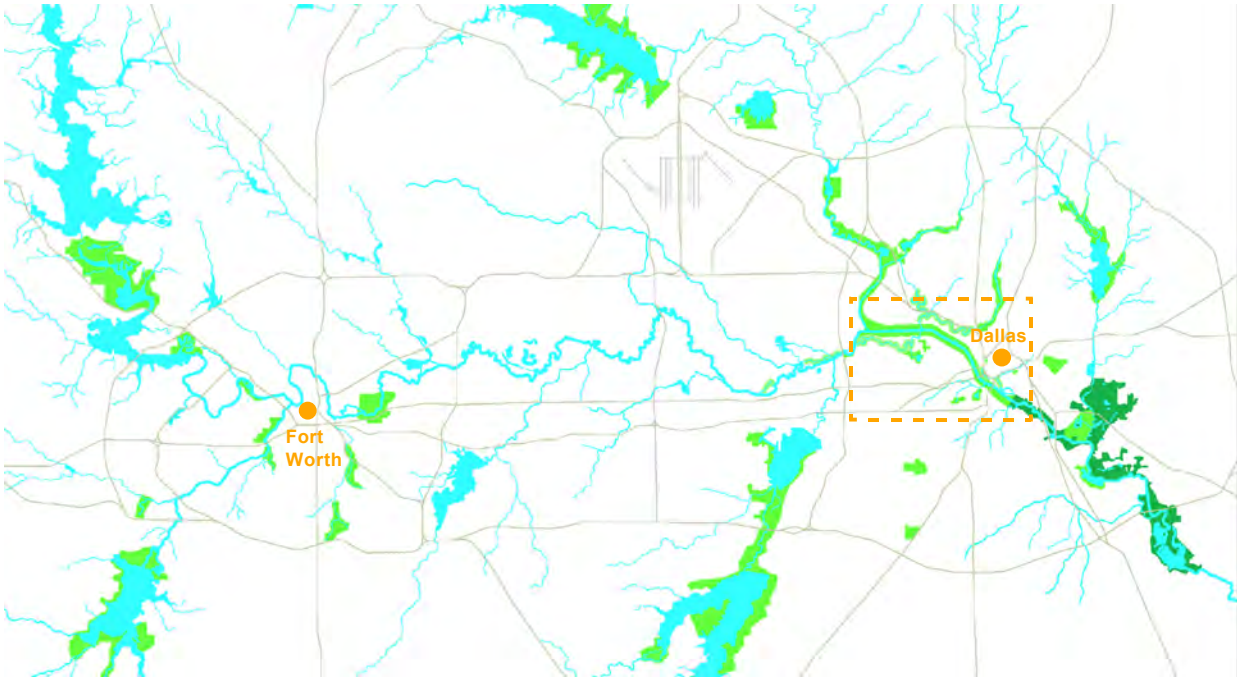
The thousands of acres that comprise the Trinity watershed as it passes through Fort Worth and Dallas constitute a potential environmental treasure virtually unparalleled in urban America. Comparable environments are such places as the 70 mile long Golden Gate National Recreational Area near San Francisco, and the 20,000 acre Metropolitan District Commission Reservations in eastern Massachusetts. This is the scale at which the entire Trinity enterprise should be considered, with the area encompassed by this plan serving as its heart. By comparison, Denver's South Platte River Park (see next page), as impressive as it is becoming, constitutes less than half of the acreage of the Trinity floodway.

The team developing this report strongly believes that the answer to each of these questions can be an emphatic 'yes' - if the vision for the Trinity River Corridor reflects an appropriate and creative balance among these features.



The 1911 Kessler Plan largely ignored the Trinity River as a regional open space resource.

A kayak race on the Elm Fork.



The Trinity River connects the communities within the Dallas Metroplex.

Three Cities with Emerging Open Space Systems

An analogous urban floodway is transformed into the next urban neighborhood in Denver...

(Photo: Landslides)

Denver's South Platte River Park

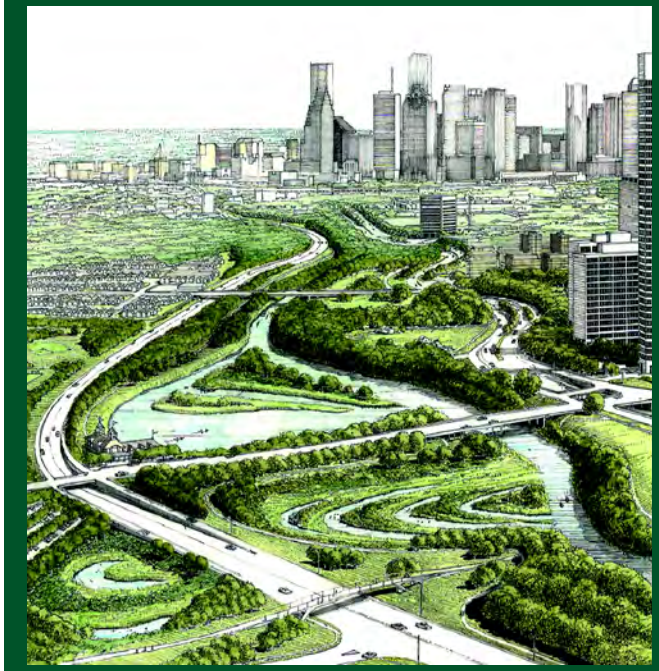
The South Platte River flows for more than ten miles through the City and County of Denver. A recreational greenway since the mid-1970s when flood events brought it to the region's attention, this urban watershed was the subject of a long-range planning effort in the late 1990s.

Recreational uses within the greenway include a constructed whitewater boating course, jogging and cycling paths. New residential uses are planned to line the River Park and will become a premier residential address in the downtown area.

A long lost treasure is reinvigorated....

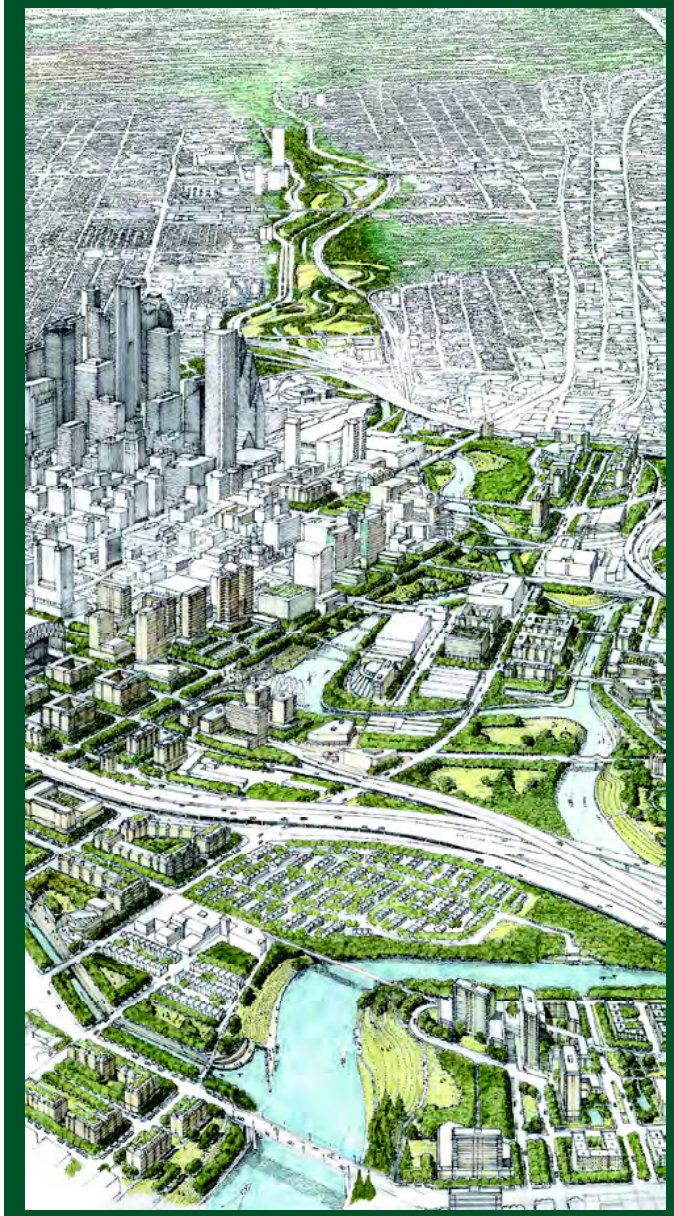
Houston's Buffalo Bayou

Over the next 20 years, Houston's Buffalo Bayou will be transformed from a sewer and floodway to a 10-mile stretch of urban waterfront. City and county agencies, private landowners and citizens joined to form this vision for a new public recreational resource, and to begin the major infrastructure improvements that will enable the vision to be achieved.



(Images: Thompson Design Group, Inc./EcoPLAN and Buffalo Bayou Partnership)

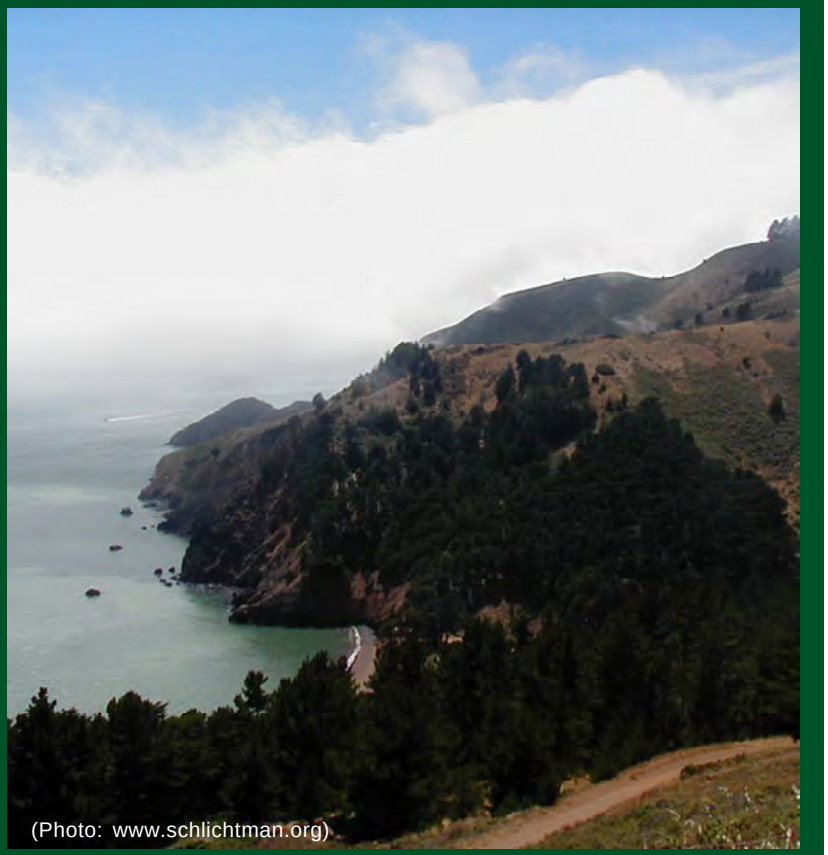
Why not in Dallas too?



A precedent for the Trinity River Watershed to be a world class regional recreation corridor

San Francisco's Golden Gate National Recreation Park

The Golden Gate National Recreation Area encompasses more than 75,000 acres (land and water). This urban park of "almost two and one-half times the size of San Francisco" was designated a National Recreation Area in 1972, and helped usher in the era of bringing "parks to the people," ensuring that underserved residents of inner cities have access to national parks. (source: www.nps.gov)



(Photo: www.schlichtman.org)

(Photo: www.math.lsa.umich.edu)

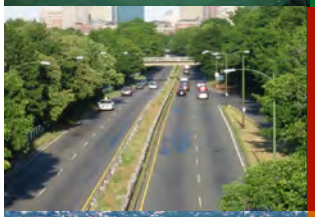
(Photo: www.math.lsa.umich.edu)

A Vision that Combines Five Essential Components....

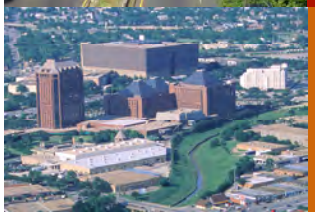
1. Flood Protection

2. Environmental Restoration and Management

3. Parks and Recreation

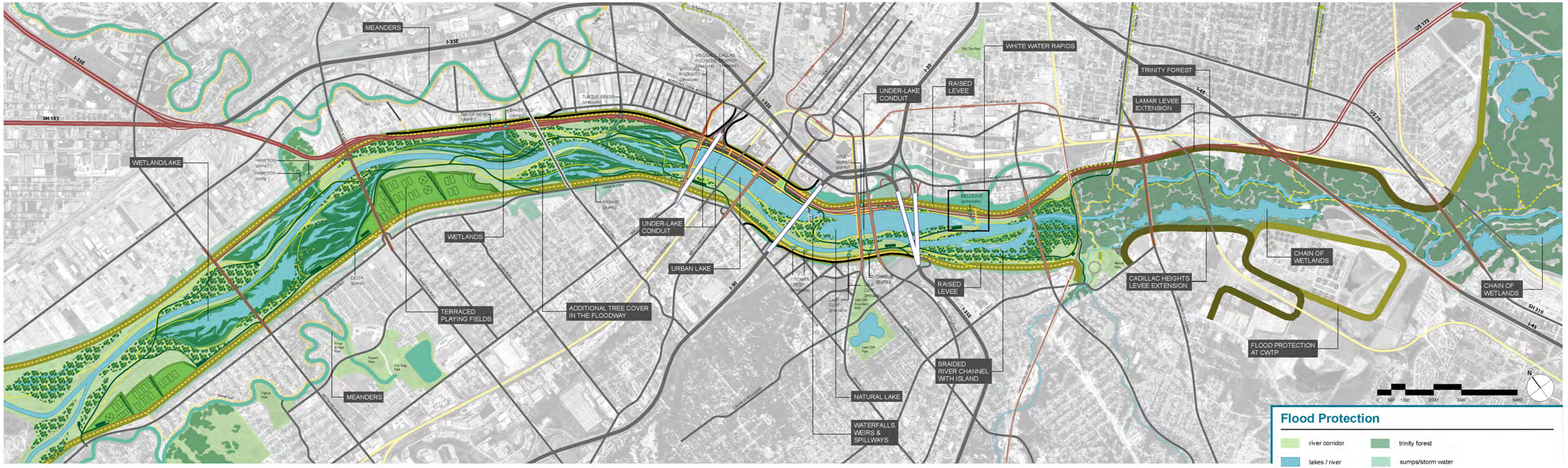


4. Transportation



5. Community and Economic Development

. . . in a way that achieves an appropriate balance.



Flood Protection

- river corridor
- lakes / river
- wetlands
- meanders
- levee
- levee extension
- trinity forest
- sumps/storm water
- sump pumps
- sump conduit
- trees

VISION Component: 1

II. VISION

component: 1

Flood Protection

A balanced vision for flood protection throughout the Dallas – Fort Worth Metroplex must include efforts to manage growth's impacts on the watershed region-wide along with investments to minimize the impacts of flooding on specific neighborhoods and business areas. Without proper planning, upstream development will continue to undermine Dallas' efforts to utilize the Dallas Floodway for a mix of uses. At the same time, the Dallas Floodway Extension Project, the Elm Fork Flood Protection Project and modest levee raises within the Dallas Floodway are critical to providing a short term structural solution to flood protection. Fortunately, the parkway, lakes, recreation, and natural habitats can all be constructed within the Dallas Floodway without negative impacts to required flood conveyance. The goal of bringing residents and development closer to the Trinity Corridor can also be accomplished without diminishing the long term effectiveness of Dallas' flood protection system.

Event on the embankments of the flood prone Ohio River along the Louisville Waterfront.

The Baker Pump Station on the east Levee.

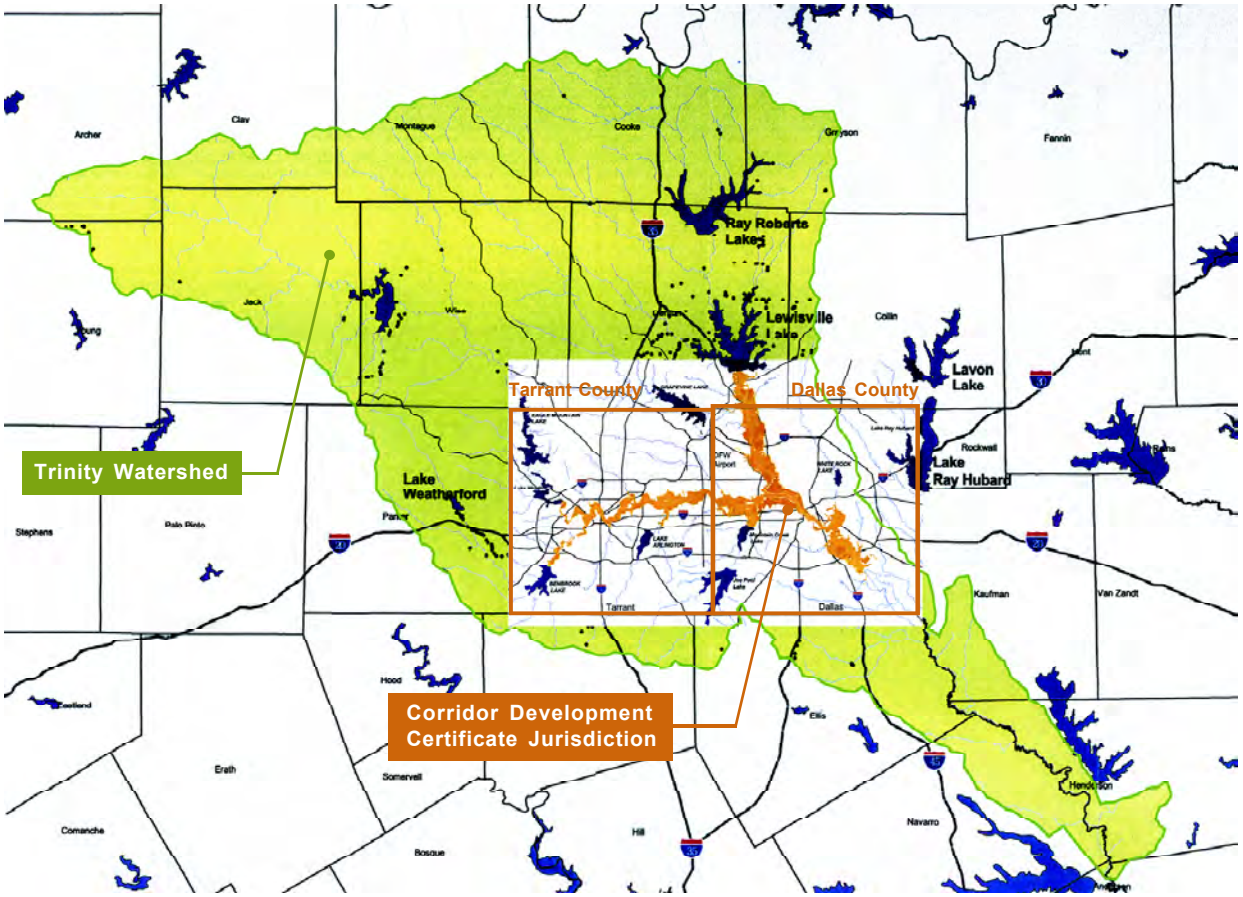
Flood Protection Strategies

Flood protection can be provided through structural means – such as floodway levees – or through non-structural means – such as floodplain preservation. Both strategies are important in a major urban area.

Floodways are composed of levees and other components necessary to provide flood protection to the adjacent properties. The levee system is the most visible of the floodway components, and the levee systems are designed to provide protection from the design storm. Other components of the floodway include storm water pump stations, sumps for storing storm water, and outfall structures for pumped and gravity flow. For the Dallas Floodway the design storm is referred to as the Standard Project Flood (SPF), which is a storm that has a probability of occurring one time in approximately 800 years.

The actual design process for levees is complex, and many variables are considered including the height of the design flood, the velocity of the water in the floodway, the type of soil available for levee construction, the characteristics of the soils the levees rest on, possible seepage patterns under and through the levees, the types of structures penetrating the levees, the type and depth of structures

Postcard view of the Flood of 1990: Dallas as it can be.



The Corridor Development Certificate process protects less than 2% of the Upper Trinity Watershed.

below the levees, etc. All of these factors are evaluated and incorporated into the details of the levee design, resulting in a levee structure that is safe and stable.

The long-term stability of the levee system is dependent on proper operation and maintenance of the levees and the other components of the floodway system. Levees must be protected from penetration by tree roots, because the roots form pathways for seepage that can result in levee failure, and levees must be mowed routinely to control vegetation. Additionally, levees have periodic slides on their sides that require repair, and levees will settle some over time; therefore, the levees must be raised to their original levels. When properly designed, operated, and maintained levees will provide a safe and stable flood protection system.

Preserving existing valley flood storage: the “sump” at Cedars West.

Non-structural strategies are also important to protect people and property from flood damages. Non-structural approaches focus on retaining the natural floodplain as an area for flood waters to inundate during times of high water flow. This may mean that floodplain areas are not used for residential development or commercial development with high occupancy or value. It may also mean that development occurs with provisions for on-site floodwater retention or detention, so the buildings and pavement in a new project do not increase the level of runoff from the property to the rest of the watershed.

Flood Protection in Dallas

Flooding of the Trinity River has been a serious issue since the establishment of the City of Dallas along its banks. After the severe flooding of 1908, planning started on controlling the floodwaters by constructing levees to protect adjacent land. Early levees were built in 1932, and were raised to their current height of approximately 30 ft. in 1960. These levees ended just past the Corinth St. Viaduct, leaving

neighborhoods without flood protection. In 1965, Congress approved a plan submitted by the U.S. Army Corps of Engineers (USACE) to provide this protection, however, citizens of Dallas voted down a cost-sharing bond proposition to implement this plan with the USACE in 1975. After major flooding occurred in 1989 and 1990, the City of Dallas expressed renewed interest in the USACE's earlier plan for flood protection. The USACE thus began a reevaluation of this plan, known as the Dallas Floodway Extension Project.

Flood protection is an important concern for Dallas neighborhoods and business areas that are currently within the floodplain, many of which are in the Southern Sector of the city. It is also an important concern for areas behind levees that do not now provide adequate levels of flood protection. Since failure of the levees would result in catastrophic damages to adjacent property, it is essential that the levees be designed and maintained in a manner that guarantees their integrity and stability.

For example, failure of the Dallas Floodway during the Standard Project Flood (SPF) is estimated to result in $8 billion in damages and the inundation over 10,000 structures. Numerous residences, schools and churches in West Dallas and Oak Cliff would be inundated. The medical district would have its first floor underwater and significant sections of downtown would be flooded as well. More serious would be the impacts as a result of flooding of the Central Wastewater Treatment Plant. Levees, equipment and electrical controls would be damaged and require extensive rehabilitation and repair. Lack of this treatment capacity would significantly impact the region's economy. The process of bringing this plant back on-line would take months and cost millions of dollars. By analyzing and designing these flood protection measures with an eye towards regional safety, the benefits far outweigh the costs of implementation.

Levees in the Flood Protection Plan

Extending the Dallas Floodway and raising levee heights within the Dallas Floodway are essential for protection of Downtown and Dallas neighborhoods.

1. The Dallas Floodway Extension

The Dallas Floodway Extension (DFE) component of the Trinity River Corridor Project will build levees along the Cadillac Heights

Landforms can be used to manage or "fine tune" floodway performance by slowing or redirecting flows.

neighborhood and the Lamar Industrial area. The levees will protect these areas from the Standard Project Flood event. The Central Wastewater Treatment Plant levee will also have improved flood protection from its current 140-year flood protection to 500-year flood protection. The existing Rochester Park levee will be improved from the 110-year flood protection to the Standard Project Flood protection level.

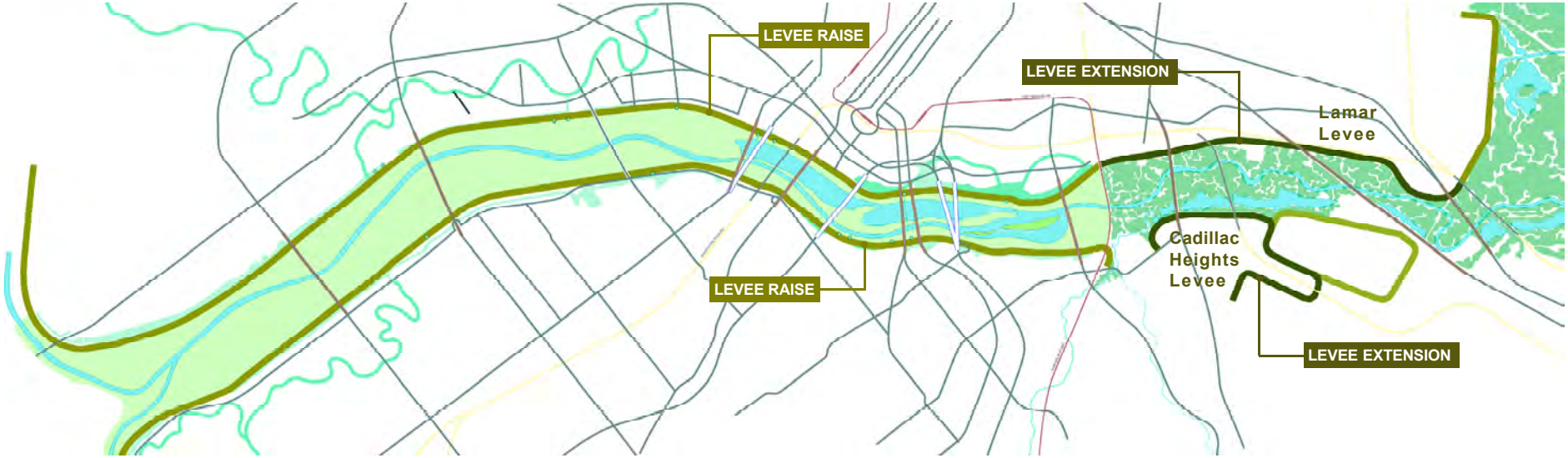
2. Elm Fork Flood Protection Project

The residents and businesses along the Elm Fork of the Trinity River have been impacted by flooding, both from the rising waters of the Elm Fork of the Trinity River, and from the lack of proper interior drainage of the creeks that flow through the area. The City of Dallas has studied the problems in this area with the help of a consultant, who developed the Elm Fork Floodplain Management Study. The recommendations for flood protection improvements from this study include by-pass swales, creek channel improvements, a small levee, and stormwater culvert replacements. Besides locating problem drainage areas and recommending solutions, this study also looked at potential recreational opportunities, including a premier soccer complex, trails and a dog park along the Elm Fork of the Trinity River. After the study is formally adopted by the Dallas City Council, the City of Dallas will begin implementation of those recommendations.

The USACE is also investigating this area in their Upper Trinity River Feasibility Study (UTRFS) to determine federal interest in a flood reduction project. While a large-scale project doesn't seem to be federally justified at this point, there may be an opportunity for the USACE to participate in some aspects identified in the Elm Fork Floodplain Management Plan.

3. Levee Improvements in the Dallas Floodway

Although the DFE Project will restore the SPF level of protection, it does not provide a "freeboard", that is, an additional area between the surface of the standard project flood and the top of the levee. Therefore, this plan



Levee extensions and levee raises in the Dallas Floodway.

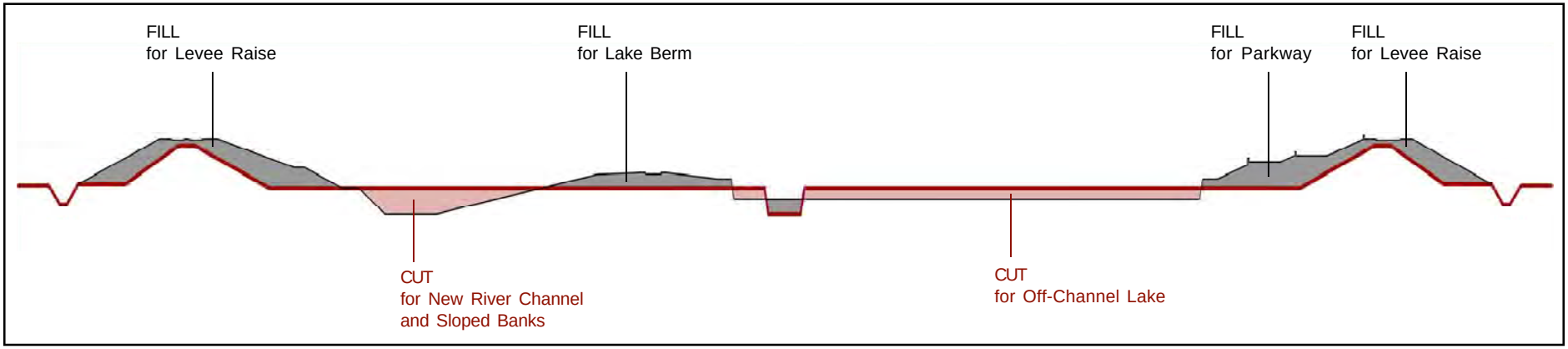
proposes that the existing levees be raised by as much as two feet to provide freeboard and that the riverside slope of the levees be flattened to reduce the likelihood of slope failure. The maximum raise will occur at the downstream end of the existing levees, near the DART rail line, and the raise will gradually diminish in height going upstream. The levee raise will also serve to provide additional stabilization of the levees, as the slopes will also have compacted fill placed on them. The fill for the levee raise will come from a portion of the excavation for the proposed lakes and river meanders in the floodway.

A Balance of Cut-and-Fill within the Dallas Floodway

First and foremost the Dallas Floodway is a flood control facility, designed to protect the health and safety of Dallas citizens as well as significant economic assets within the City. As such, any improvements to the floodway must maintain flood protection levels as established by the US Army Corps of Engineers. The proposed combination of roadways, lakes and river meandering within the Dallas Floodway has been designed to maintain the current flow characteristics of the Dallas Floodway. The excavation necessary to recreate meanders in the Trinity River, combined with excavation for several lakes is approximately the same (4.6 million cubic yards) as the quantity of soil needed to raise the parkway and the levees. The "balance" of cut and fill reduces the cost of exporting or importing soil into the corridor. This general balance also ensures that the flow characteristics of the floodway are maintained.

Two additional factors influence the flow characteristics of the floodway and are worth mentioning. Since excavation within the floodway is primarily located in the middle of the floodway, and fill within the floodway is primarily located at the edge to support the parkway, ability of the floodway to maintain flood conveyance is essentially preserved. An important change to the characteristics of flood flows is that the creation of lakes within the floodway creates a "smoother" surface for flood waters (compared to the vegetation that currently exists), which actually increases the ability of the floodway to carry flood events downstream.

While improving the ability of flood flows to move through the floodway would seem to be a benefit, increasing flood capacity has negative downstream impacts which the U.S. Army Corps of Engineers will not allow. As a result, features such as berms and trees must actually be introduced into the floodway to slow flood



"No Net Change": management of flood conveyance by balancing cut-and-fill within the floodway.

velocity so that there is no net increase or decrease in flood conveyance. This opportunity to add features to the floodway is integral to the landscape concept calling for varied terrain, wetlands and increased tree cover. Further studies will be necessary to determine the exact level of tree planting and contouring that will be possible within the floodway to offset the lakes. Floodway conveyance is expected to limit tree plantings to no more than ten percent of the floodway area; planting of meadows, grasslands, wetlands and similar habitat will not be constrained by the needs of floodwater conveyance.

Chain of Wetlands for Flood Conveyance

An important portion of the flood protection realized from the DFE project comes from the construction of the chain of wetlands in the Great Trinity Forest. The need for the floodwater conveyance provided by the wetlands actually comes from the thick growth of trees that currently slows the flow of water during heavy rain and flood events. The DFE Project will create a 3½-mile long chain of wetlands through the Great Trinity Forest. These narrow, shallow pools of water would be interconnected, and would serve two purposes. They provide a secondary path for the floodwaters to flow through the growth of the Great Trinity Forest more quickly, which reduces flood levels upstream in the downtown area and restores the protection of the existing levees to the standard project flood level. They also serve as diverse habitats for the native wildlife. The City of Dallas is in the process of acquiring land for these wetlands. USACE has completed its design of the lower chain of wetlands, and could begin construction by Spring 2004.

To some, removal of trees for a chain of wetlands has been viewed as diminishing the value of the Great Trinity Forest. The 170 acres of forest removed for wetlands, however, represents less than 2% of the Great Trinity Forest. By comparison, nearly five times as much land will be purchased as part of the environmental mitigation plan.

Furthermore, the wetland cells have been carefully located to minimize their effect on the most important parts of the Great Trinity Forest. The species to be removed for the wetland cells represent neither the most aesthetically pleasing stands within the forest nor the most biologically diverse. The areas of most diversity have been found along the edges of the forest, in grasslands, and along the edges of the Trinity River and White Rock Creek. The chain of wetlands would create a significant length of new edge condition around its perimeter. The most aesthetically pleasing stands of trees, dominated by Elms, are located in areas of the Great Trinity Forest not affected by the wetland cells. The 230 acres of trees slated for removal, are predominantly composed of dense stand of Ash, Mulberry, and Swamp Privet, specifically the types of trees most susceptible to long term drought, tornados and disease. These stands also tend to collect the most

The structural approach to flood protection focuses on the levees.
A view of the levee top today; an amazing place to be were it part of the public realm.

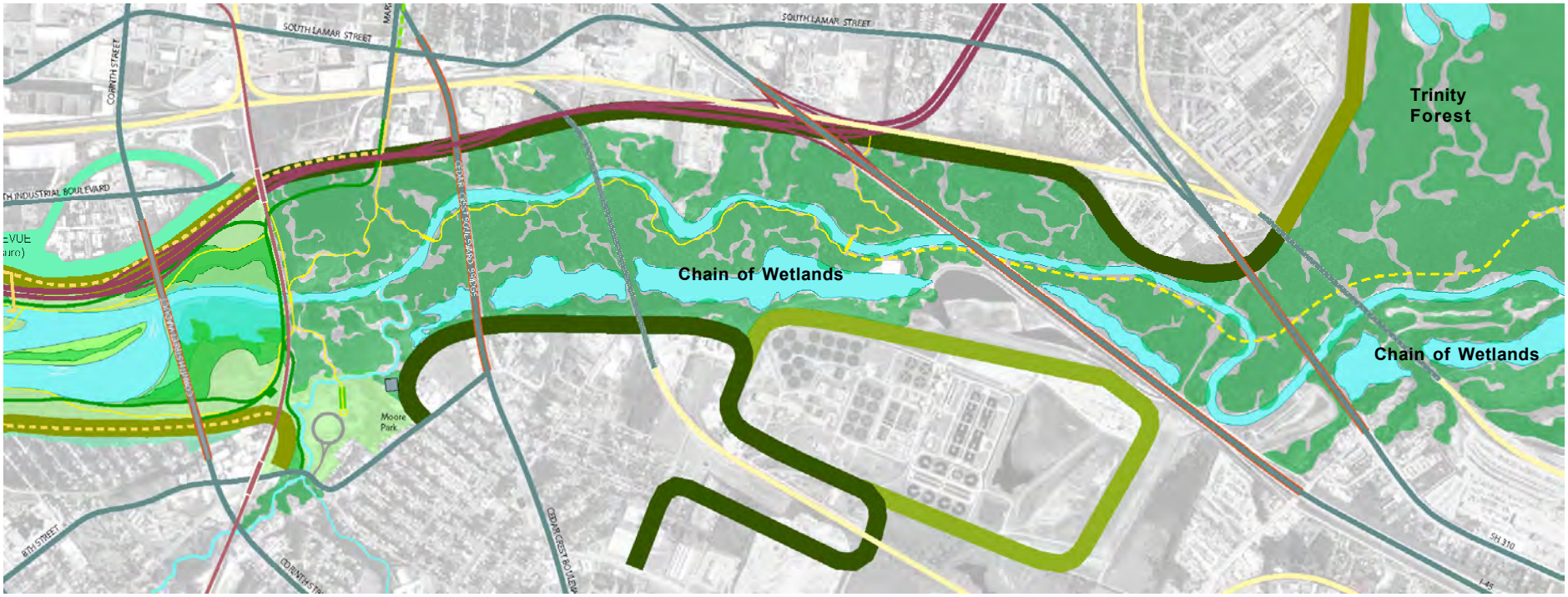
debris after frequent flooding events. Trees will also be removed in the areas of the Lamar and Cadillac Heights levees. The USACE authorized environmental mitigation area was developed in conjunction with the U.S. Fish and Wildlife Service and was concurred with by the Texas Parks and Wildlife Department. The Environmental Protection Agency's role was that of a reviewer for environmental compliance. The environmental mitigation plan calls for:

- Purchase of approximately 1,179 acres of land in the Great Trinity Forest.
- Planting of containerized trees, and tree and shrub seedlings.
- Construction of bird and squirrel boxes
- Development of a Forest Management Plan, which includes reforestation as well as prairie land restoration.

City staff has been working with the USACE to identify parcels of land that would serve the mitigation purpose. As of this writing, over 500 acres of land have already been purchased, and there are over 1,000 acres that are under survey or being appraised.

Other aspects of the DFE Project include:

- Realignment of the Trinity River at the IH-45 bridge to protect the pier structures.
- Recreational amenities including trails, gateway parks and pedestrian bridges to



The proposed chain of wetlands will add to the wetlands that already exist in the floodplain.

make the wetlands and Forest more accessible to visitors.

- Replacement of a portion of the ATSF (Railroad) Bridge with a new pedestrian facility that will reduce the current problem of debris collection on the existing piers.

Existing “volunteer” wetlands within the floodway.

Regional Flood Protection Efforts

A regional approach to flood protection must be continued to stabilize flood risk along the entire Trinity River. The (USACE) has limited permit authority in the floodplain to control extensive development and the cumulative impacts on the Trinity Corridor. Nine cities and two counties within the Trinity River Watershed in the metroplex together implement the Corridor Development Certificate (CDC) program with the North Central Texas Council of Governments (NCTCOG) providing coordination and technical assistance. This process assures similar regulations within cooperating cities and counties and allows affected communities to review and comment on their neighbors’ jurisdictions. This innovative and successful intergovernmental partnership has been effective, but is limited to a regulatory zone consisting of less than 2% of the Upper Trinity River watershed. Given the size of the watershed at 6,100 square miles - the size of New Jersey - and the rates of widespread development outside of the defined regulatory zone, the City of Dallas should advocate for more wide-reaching cooperation so the CDC process is used throughout the watershed. Failure to do so will mean continuing increases in flood elevations in the downstream areas of the region, including Dallas, and will cause Dallas citizens to face continuing pressure to increase levees or take other actions to maintain adequate flood protection.

Purchase and protection of valley flood storage areas is another effective strategy undertaken by communities to reduce the need for structural solutions to flood control. The Trinity River Corridor Project has undertaken just such a program downstream of the Dallas Floodway within the Great Trinity Forest by acquiring over a thousand acres of flood-prone bottomlands. Similar efforts, if undertaken in the watershed upstream of the Dallas Floodway, could have lasting environmental benefits and reduce the need for future levee raises.

Fact Sheet

DALLAS FLOODWAY FACTS

- Length of Dallas Floodway from confluence of Elm Fork and West Fork to DART bridge: ~7.2 miles
- Width of the Dallas Floodway at Commerce Street: ~1/3 mile (~1,900 ft)
- Stage elevation of banks of the river channel: 30 feet
- Stage elevation of existing levees: 61.38 feet (East levee at Commerce Street)
- Stage elevation of 100 year flood level: 51.23 feet (at Commerce Street)
- Number of times the river has exceeded the 100 year flood stage elevation since 1908: 0
- Number of days the river has exceeded stage elevation 37.65 feet (the height of the proposed lake protection berm) since 1960: 62 days
- Average number of days the proposed Urban Lake would be inundated per year (based on last 43 years): 1.4 days/year
- Representative flow of the Trinity River during dry periods: 800 cubic feet/second or approximately 500 million gallons/day
- Typical amount of water discharged by the Central Wastewater Treatment Plant: 150 million gallons/day
- Amount of water needed to supply the Trinity Lakes to compensate for evaporation and other losses: 4 million gallons/day

REGIONAL FLOOD CONTROL MECHANISMS

- Size of Upper Trinity River watershed: 6,100 square miles
- Size of the Regulatory Zone where a Corridor Development Certificate is required: 113 square miles

DALLAS FLOODWAY EXTENSION PROJECT

- Lamar Levee Extension (3.1 miles)

  Removes 417 acres of low lying lands (mostly occupied by industrial uses) from the 100-year flood plain
- Cadillac Heights Levee Extension (2.2 miles)

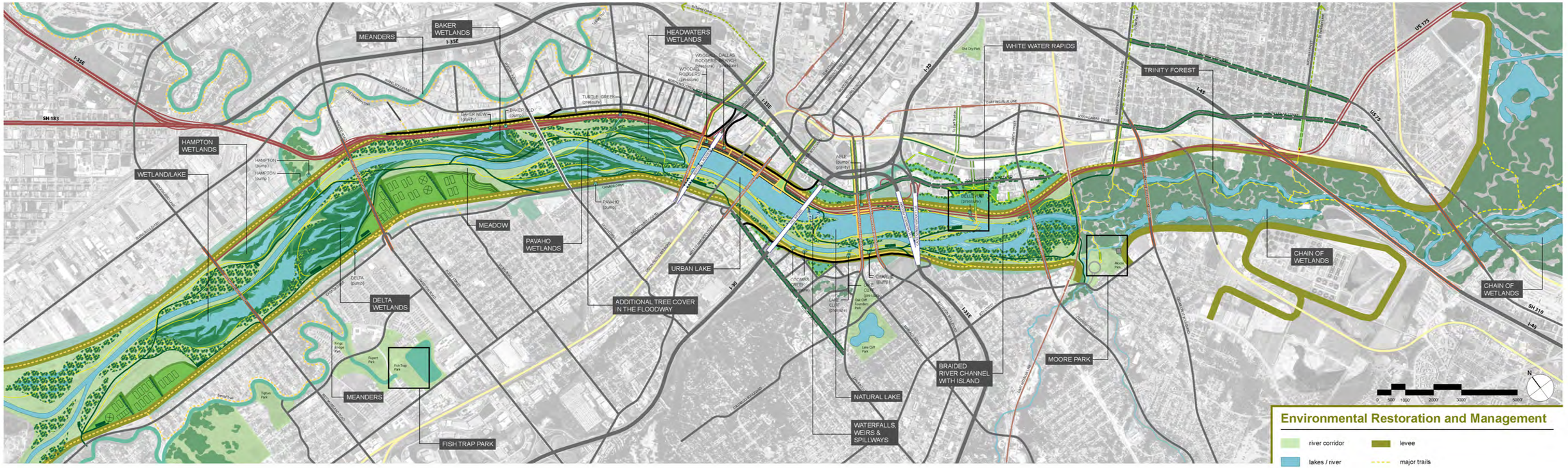
  Removes 205 acres of low lying lands (mostly composed of residential uses) from the 100-year flood plain
- Realignment of river channel at IH-45
- Chain of Wetlands replaces approximately 230 acres of bottomland hardwoods with wetlands. Year round water supply for wetlands is provided by the Central Wastewater Treatment Plant
- Mitigation includes purchasing 1,179 acres of forested low lying land including 926 acres of bottomland hardwood forest

DOWNTOWN LEVEE MODIFICATIONS

- Increase in levee height to provide up to an additional 2 feet of freeboard above the Standard Project Flood elevation
- Riverside slopes of levees will be reduced in steepness from current slopes of three in one(horizontal to vertical) to four in one. Reduced slopes will reduce risks from potential slope failures during flood events

TRINITY PARKWAY IMPACTS ON FLOOD CONVEYANCE

- Amount of soil needed to build parkway: 3.1 million cubic yards
- Amount of soil needed to increase levee freeboard by 2 feet: 1.5 million cubic yards
- Amount of soil available from lake excavations and river modifications: 4.6 million cubic yards



Environmental Restoration and Management

- river corridor
- lakes / river
- wetlands
- meanders
- trees
- trinity forest
- levee
- major trails
- paths
- equestrian trail
- sump pumps

VISION Component: 2

II. VISION

component: 2

Environmental Restoration and Management

In a balanced vision, the Trinity River will become a source of pride for Dallas and the Metroplex, with a new sustainable park environment that reveals the now hidden treasures of the Great Trinity Forest and the Trinity River. The City of Dallas can be a national leader through its ecological restoration of the Trinity River and its smarter use of the water resources of the Trinity River. By using stormwater in more ecologically sound ways, Dallas can set a standard for responsible ecological practices. This vision can be realized through action at all levels of government, in the business community and by individuals that affirms an environmental ethic valuing the long term sustainability of natural resources.

A New Environmental Ethic: Sustainability

A primary global issue for the new century will be the management of fresh water as a scarce resource. In the semiarid west, water is a limited, but renewable, natural resource. Dallas' and the Metroplex's growing population will need to cooperatively manage water as a limited resource and address the issue of water quality. Scarcity requires that we both conserve and improve the quality of water as we intervene and interrupt the natural systems and cycles of water. Any responsible water management program must include enhancement of ecosystems and habitats that are both dependent upon and enhance water quality.

Newly planted wetlands at Sydney's Olympic Park.

Environments nurturing wildlife and enriching human life.

As a community, Dallas and the Metroplex have a unique opportunity to lead by example. The challenges facing the Trinity River and its watershed are substantial and changes will only happen incrementally. As Dallas leads in more responsible practices, it can urge its neighbors in the watershed to join in embracing a new ethic of responsible water use. Among the ways Dallas can lead is by using treated effluent - rather than fresh water - in its design of the water features and amenities that will add distinction to the city.

Dallas' leadership should increase regional awareness of the critical need for sustainable environments within an urban context. The Trinity River offers endless educational opportunities for the residents of Dallas and the region. If well done, on a sufficient scale, the Trinity Central Park should be recognized at a national level; it should establish the Trinity River as a primary destination for visitors to Dallas. In much the way that visionary development of the Turtle Creek Parkway has stabilized the Turtle Creek area for well over 75 years, so too can a Trinity Central Park provide a substantial asset and amenity for Greater Dallas.

Building from this new river-based amenity, Dallas can address the broadest aspects of urban sustainability. The centers of developed urban areas must be continually revitalized so they remain attractive places for people to live, work and visit. Without such efforts, urban development will sprawl outward from historic city centers, consuming land and energy resources and increasing urban growth's effects on its natural environment. For Dallas, the best way to reduce or reverse these trends is to invest in a revitalized Trinity River Corridor. The actions proposed in the plan, by creating places for vital urban life in the center of Dallas, support a new ethic of urban sustainability for this community.

Restoring the River's Sinuosity

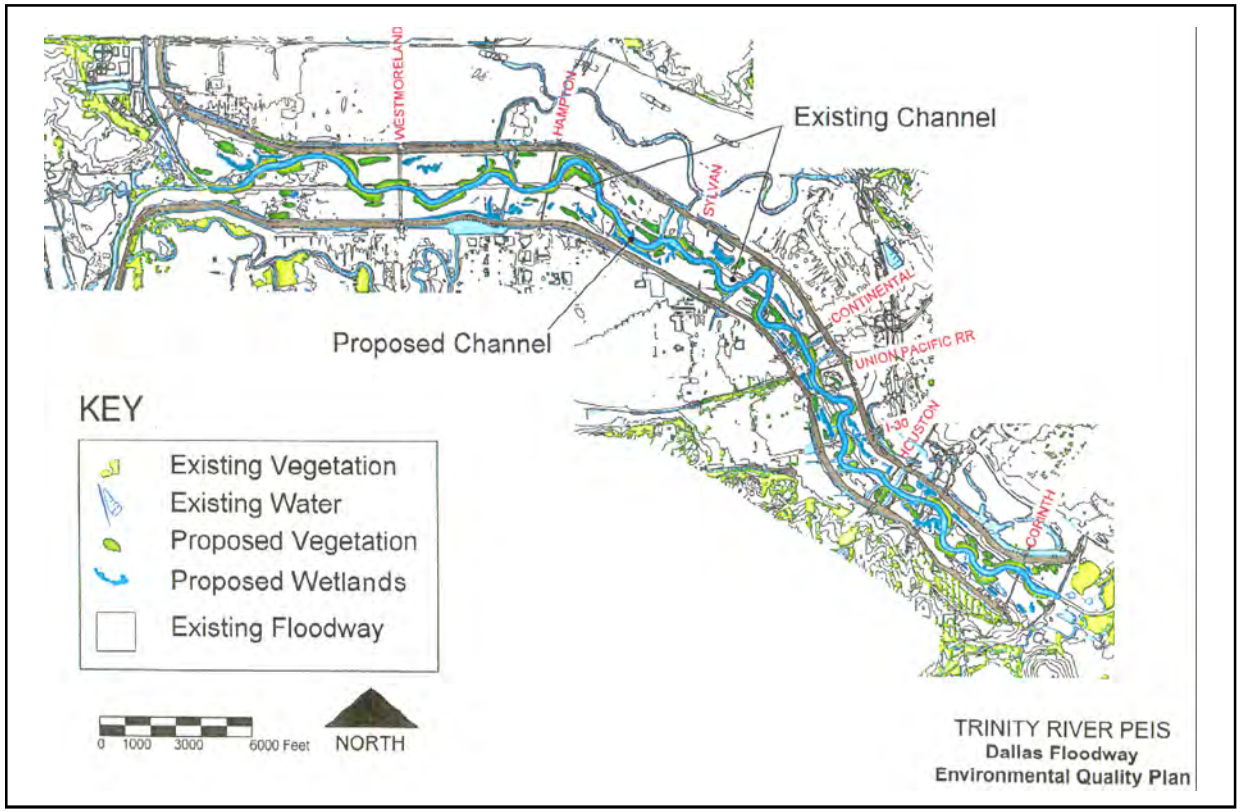
In urban areas, most waterways in need of restoration have problems that originated with harmful alteration of channel form or other physical characteristics, which in turn lead to problems such as habitat degradation, changes in flow regimes, and siltation (EPA 2000). This

Conceptual diagram illustrating how the sinuosity of the Trinity River may be partially restored. A remnant of the original river alignment, "The Meanders", is clearly visible in the right side of the photo.

is certainly the case with the Trinity River within the Dallas Floodway. Prior to the establishment of a floodway in the 1920's, the Trinity River's morphology at downtown Dallas included significant meandering consistent with a stream of its geological age. The establishment of the floodway essentially eliminated these meanders as a part of the river itself although many of the original meanders remain outside the levee system to facilitate stormwater drainage.

The development of the Dallas Floodway in the 1920's resulted in the stream channelization, removal of wetlands, and disconnection of the river from adjacent ecosystems - alterations that need to be addressed as a part of the environmental restoration aspects of this project. Restoring the original site morphology and other physical attributes of a river is essential to improving water quality and bringing back native biota (Brookes & Shields 1996).

In the June 2000 Programmatic Environmental Impact Statement (USACE 2000), the USACE developed and analyzed what was termed the Environmental Quality (EQ) Plan. The EQ Plan proposed to reestablish meanders to the Trinity in a manner analogous to the historic meanders, but within the current floodway. That plan, and subsequent discussions with USACE

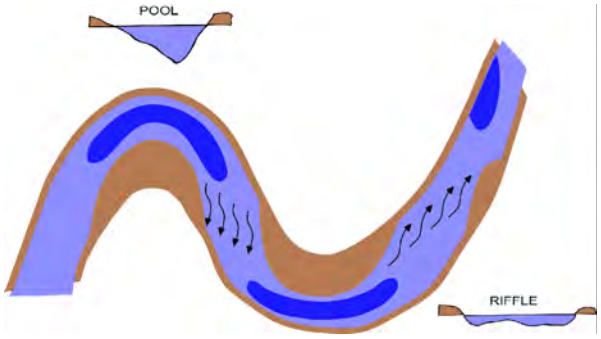


USACE Environmental Quality Plan from June 2000 Preliminary Environmental Impact Statement on the Dallas Floodway. (USACE 2000)

Pre-floodway Map shows the meandering Trinity River.

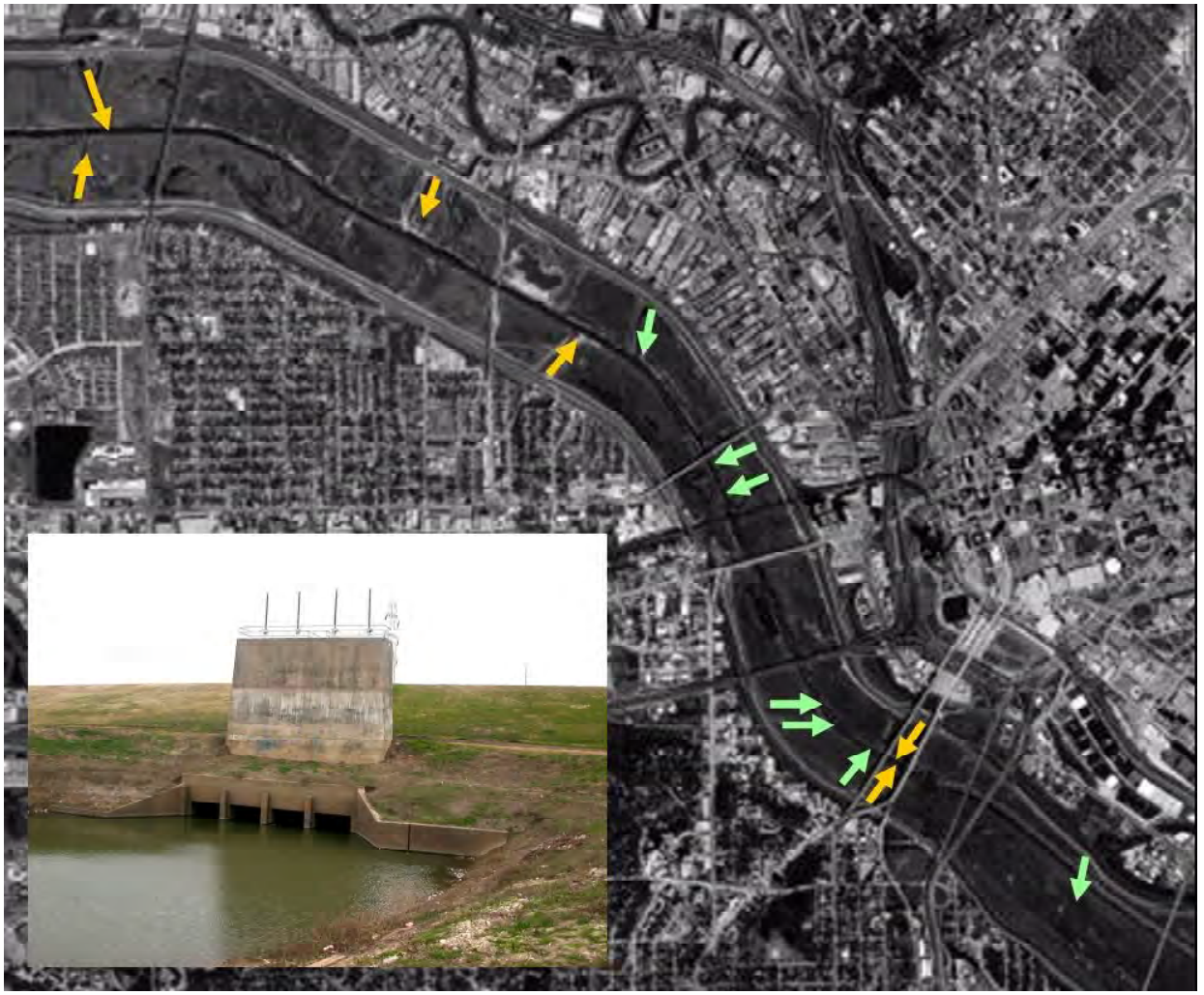
staff, give strong indications that restoring the Trinity's sinuosity within the floodway will be viewed as critical to establishing meaningful environmental restoration within the floodway. This level of restoration will likely garner federal cost-sharing for the project.

The importance of sinuosity (or meandering) to streams is characterized in the schematic illustration below. River flow around a set of curves creates different flow regimes, often characterized by faster riffle sections and slower pool sequences. These different flow regimes in turn provide different kinds of aquatic habitat and diversity. Quality and diversity of habitat is the fundamental measurement of the significance of an environmental restoration effort.



Schematic Illustration showing the principal flow regimes imparted by meandering streams - faster moving and shallower sections (riffles) and slower moving and deeper sections (pools). (Brookes & Shields 1996)

While adding sinuosity to the Trinity will enhance aquatic habitat significantly and provide the foundation from which other environmental improvements arise, sinuosity also provides significant improvements to the aesthetic and the recreational characteristics of the stream.



Interior drainage/stormwater outfall points along the Dallas Floodway.

Stormwater Wetlands

While the vast majority of storm flows in the Dallas Floodway come from the over 6,000 square mile drainage area upstream of the floodway, significant stormwater flows also are generated from developed areas immediately outside the levee system and these flows must be conveyed into the floodway. These stormwater outfalls - also known as interior drainage points - enter the Dallas Floodway either through pumping stations or under their own pressure (i.e., require no pumping). There are several pressure outfalls and six pumped outfalls. The amount of flow at capacity for these interior drainage points range from 500 to nearly 6,000 cubic feet per second (cfs). To put this in perspective, summer low flow in the Trinity River is usually around 500 cfs, so these stormwater outfalls into the floodway can create flows several times the flow of the river itself.

Pumped stormwater outfall (Delta Pump Station) with view of wetlands that exist within the floodway and how they may be enhanced.

Passage of these flows into the floodway in an unhindered fashion is critical to maintain flood protection in the areas served by these interior drainage points (Downtown Dallas, Oak Cliff, etc.); it is also essential to minimize the operating costs of the stormwater drainage system. Since the amount of water coming into the floodway from the interior drainage points can be quite large, major modifications to these systems are generally precluded because of the cost or impacts to operation and maintenance. This is particularly true of the pressure systems, which have the largest flow rates. Despite this, there are significant opportunities to improve the function of the interior drainage points/stormwater outfalls that are pumped. These points generally have lower flows and can be controlled through the use of pumps and gates to achieve two significant benefits:

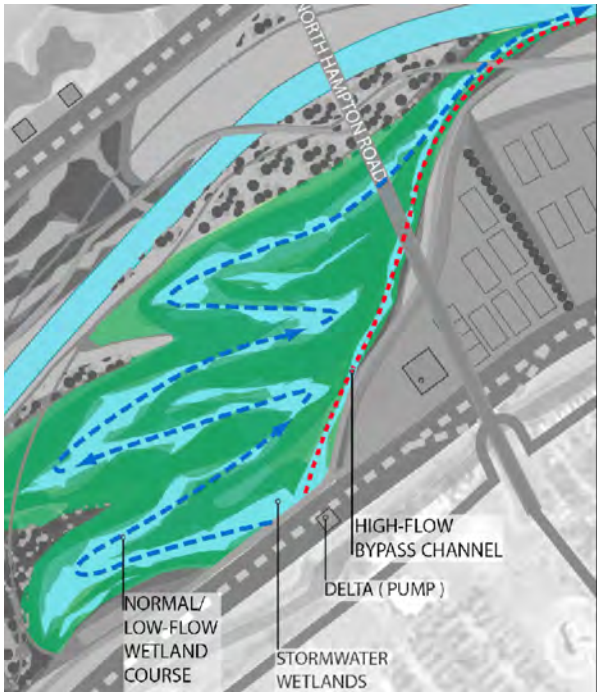


Diagram showing concept of stormwater flow through created wetlands at Delta Pump.

- Capture and removal of stormwater floatables, debris, and pollutants in the sump areas associated with each of the pump stations;

- Enhancement and reconstruction of wetland areas in the Floodway.

The strategy for enhancement and construction of nearly 300 acres of wetlands at Pavaho, Baker, Hampton and Delta sumps include raising the wetlands slightly above the base of the floodway and/or providing protection from low level inundation, debris and sediment via the use of berms. The stormwater wetlands will be designed to provide a high flow channel for larger storm events that can be easily accessed for periodic maintenance by rubber tire equipment. Only minor modifications to the floodway are necessary to facilitate additional wetland areas associated with the pumped stormwater outfalls. Indeed, most of the floodway already contains significant areas

where wetlands exist for extended periods after being inundated. By facilitating flow through these areas, the wetlands can be enhanced and made viable even during extended dry periods. The enhancement of the wetlands represents a substantial improvement and expansion of valuable and diverse habitat and strengthening of the ecosystem.

In addition to the ecosystem restoration benefits associated with these stormwater wetlands, additional benefits accrue from the improvement of stormwater quality entering the floodway through these points. The bulk of this benefit will derive from the pollutant removal capabilities inherent in the sump areas - screening of floatable material and settling of particulates. Some additional benefit is derived from uptake of nutrients and additional filtering in the wetlands during low flow (non storm) periods. It is anticipated this treatment will provide measurable benefits for the flows passing through these sump areas.

Headwaters Wetlands

In addition to improving and constructing wetlands areas within the floodway, a unique opportunity presents itself to integrate wetland habitat with the Trinity Lakes proposed for the floodway near Downtown Dallas. Wetlands here would be in the form of "headwaters" wetlands - wetlands that receive a portion of the water source intended for the lakes. Such a continuously fed wetland system will provide a unique wetland habitat that differs from the other intermittently fed wetlands in the Dallas Floodway. The headwaters wetlands will be used when reclaimed water is used as a water source for the lakes. Reclaimed water, such as that produced by the Central Wastewater Treatment Plant, has sufficient nutrients to support plant growth. By comparison, if groundwater were used as the lake water source, it is doubtful that effective headwaters wetlands could be maintained without adding nutrients.

The headwaters wetlands could remove/uptake some of the nutrients flowing into the lake and would provide an aesthetic and educational resource next to the urban lake. It is anticipated that approximately 5 MGD of reuse water (out of a total of 50 MGD for the lakes) will be routed through the headwaters wetland.

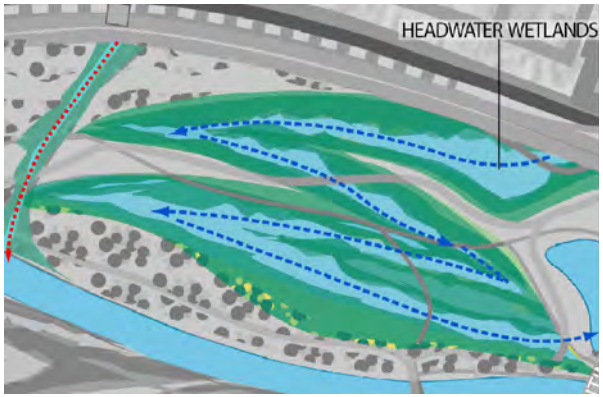


Diagram showing concept of "headwaters" flow through created wetlands above the urban lake.

Habitat Creation, Restoration and Management

In contrast to today's utilitarian floodway, the Trinity Central Park will provide a more complex and hospitable mosaic of unique aquatic and terrestrial habitats. By significantly increasing environmental contrasts within the landscape (i.e. hydrology, climate, and vegetation density) multiple habitats will be created to foster the return of a diverse community of wildlife and plant species. Such habitats include: upland and riverine forests, grasslands, successional meadows, seasonal wetlands, shallow water riverbanks, fast moving river channels, slowly meandering watercourses, turbulent rapids and eddies, and lake waters.

The contrast amongst aquatic habitats, for example, will be increased through restoration of diverse hydrological conditions. The construction of white water rapids and waterfalls will create high turbulence oxygenation zones, upon which many fish species rely. Aquatic plants will take root within these nutrient rich, sunlit waters, and will provide food and shelter for an endless array of aquatic life. Reconfiguration of the river channel and upland infiltration zones will help to protect sensitive aquatic fish and insect populations by lowering detrimental urban run-off temperatures.

Within the terrestrial zone of the Trinity River corridor, increasing contrasts in vegetation cover will assist in differentiating habitats. Creating alternating open and dense upland vegetation zones will provide both protective cover for prey and diverse food sources for predator. Multiple vegetation zones will also ensure a diverse, annual food supply for wildlife. Grasslands will provide seasonal forage and penetrable soils for burrowing, while forests provide secure tree canopies for nesting and woody vegetation for year round feeding. Collectively these diverse vegetation communities will serve as a unified migration corridor between the Trinity Forest and the Elm and West Forks of the Trinity River.

Forested habitat within the floodway will be expanded.

Leveraging the Trinity Environmental Assets

A 2,000 acre Trinity Central Park within the Dallas Floodway will link a growing system of regional open spaces now in various stages of development. The park will provide unprecedented access to the Trinity River for residents of Downtown, Oak Cliff, South Dallas and will create a western gateway to the Great Trinity Forest. The ability to access the Great Trinity Forest and the Elm Fork and West Forks of the Trinity River from a central - and highly visible - location will extend the assets of all these parks to regional residents.

The Elm Fork of the Trinity River has a variety of existing and planned public investments including an interpretive center, wetlands, wildlife habitat, recreational facilities and trails. A whitewater canoe and kayak course has been planned for the lower reaches. Linking the Elm Fork trail system to the Dallas Floodway trails will allow for completion of loop trails through the Old Meanders Trail and make possible river trips that combine segments of the Elm Fork and main fork of the Trinity River. Other trails are also proposed, with the ultimate plan having a tie to the Dalhoma Trail into Oklahoma. A series of whitewater courses, in combination with Fort Worth, would create a critical mass of recreational offerings for boaters in the Metroplex.

The Great Trinity Forest is a vast (6,000 acres) resource in early stages of development. An interpretive center and equestrian facilities are in planning stages; they will feature 31 miles of hard and soft surface trails. An equestrian trail would extend from the Great Trinity Forest through the Dallas Floodway near downtown, creating equestrian assets seldom found in the center of a major city. The Master Plan approved by City Council in 1997 also calls for trailheads and boat launch facilities.

Proper reconstruction of the Dallas Floodway will protect the investments in the Great Trinity Forest. Several hundred acres of new wetlands at the pumped stormwater outfalls and additional screening of stormwater will provide additional water quality improvements, stormwater cleaning and removal of floating trash and sediment. The habitat created by new wetlands in the Floodway will expand the ecosystem of the Trinity Forest and reconnect it to the West and Elm Forks. Inclusion of two off-channel lakes will create additional diversity for natural habitat and recreational choices within the floodway, potentially including fishing and other outdoor activities.

By creating a diverse variety of natural habitats and water resources, this plan for the Trinity will transform the floodway into an area for environmental enjoyment and education for Dallas' residents and visitors. This education can in turn promote an enhanced environmental ethic of sustainability for this major American metropolitan area.

Fact Sheet

TRINITY RIVER FACTS

- Length of Trinity River: 715 miles
- Length of Trinity River within Dallas city limits: 36 miles (including Elm Fork)
- Driving distance between Dallas and Fort Worth: 31 miles
- River distance between Dallas and Fort Worth: 54 miles

EXISTING STORMWATER OUTFALLS

- Number of Stormwater outfalls within the Dallas Floodway: 12
- Number of those outfalls that use pumps during high water periods in the Trinity River: 6
- Number of those outfalls that have trash screens to remove floatable trash: 5

PROPOSED STORMWATER WETLANDS

- Area of proposed sump-fed wetlands:
  Pavaho: 70 acres
  Baker: 50 acres
  Hampton: 50 acres
  Delta: 50 acres

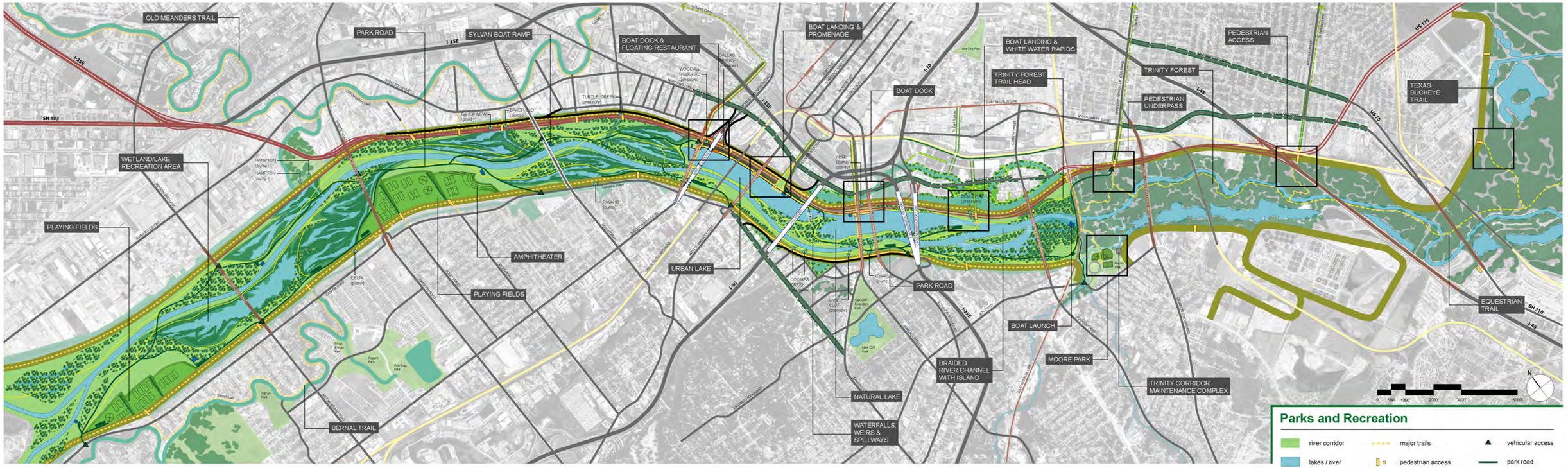
  TOTAL: 220 acres

PROPOSED HEADWATER WETLANDS

- Size of proposed headwater wetland: 70 acres
- Quantity of CWWTP water to move through the headwater wetlands: 5 million gallons/day
- Total quantity of CWWTP water to be used to supply lakes: 50 million gallons/day

PROPOSED HABITAT FOR WILDLIFE

- Total acres within the Dallas Floodway: approximately 2,000 acres
- Amount of proposed wetlands within Trinity Floodway: 495 acres
- Amount of open water for aquatic species and bird sanctuary: 205 acres



Parks and Recreation

river corridor	major trails	vehicular access
lakes / river	pedestrian access	park road
wetlands	paths	parking areas
playing fields	equestrian trail	
trees	boat access	
trinity forest	recreational facility	

VISION Component: 3

II. VISION

component: 3

Parks & Recreation

Kayaking on the Charles River, Boston.

Dallas has an historic opportunity to create what could well become the largest urban park in the nation. A Trinity Central Park within the Dallas Floodway will knit scattered recreational facilities into one system, totaling thousands of acres. Regional open space including the West Fork, the Elm Fork, the Great Trinity Forest and trail systems such as the Katy, Buckeye and Santa Fe Trails will all be anchored and enhanced. The park area within the floodway would total approximately 2,000 acres and, with the Great Trinity Forest and Elm Fork areas, becomes a park of over 6,000 acres.

The new Trinity Central Park will feature the widest possible range of recreational opportunities within an urban area: playing fields for active sports, wilderness recreational uses such as river canoeing and bird-watching, and performance venues for festivals and other events. Three lakes will be constructed between West Dallas and the Downtown that, together with the river, will provide flatwater and whitewater venues from sport fishing to canoeing and recreational rowing. The Trinity River will be reconfigured - with new meanders in the floodway - to maximize recreational uses and aquatic habitat.

Many cities in the arid west, such as Denver, Tempe and San Jose, are agressively transforming their underutilized floodways into active recreational amenities, and in so doing, are improving their downtowns and their economic fortunes.

There are numerous challenges to constructing a public park and recreational facilites within an active floodway. This park has been designed to maximize the usability of

Recreational playing fields located within the floodway with the Dallas skyline in the distance.

recreational features during minor flood events and to reduce the costs of clean-up efforts after inundation.

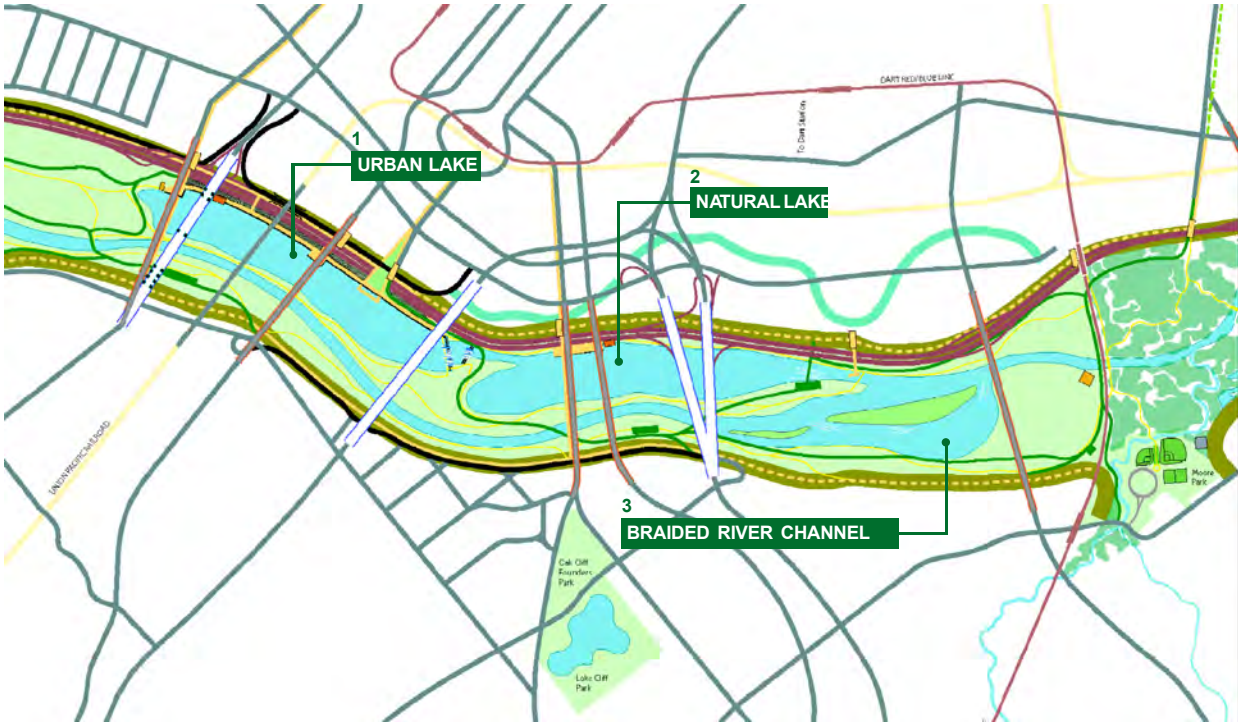
The Downtown Lakes

The two terraced lakes near Downtown will be placed above the level of the Trinity River and water will be supplied primarily from the Central Wastewater Treatment Plant. A portion of the supply water will enter the terraced lakes through a "headwaters wetland" created upstream of the upper Urban lake. The two terraced lakes, and their edge treatments, will range from the formal to the natural - creating a variety of human experience and wildlife habitats. The descriptions below describe the ultimate plan for the lakes, other water features and recreational facilities as they are currently envisioned. Further detailed engineering and geotechnical investigation may refine these concepts during the park's design phases.

The Urban Lake

This urban, off-channel lake will be approximately twenty feet higher than the the level of the Trinity River and located close to the Downtown levee. Thus positioned, aquatic recreation will be closer to downtown and the lakes will create a compelling image of the "city on the river" as viewed from Oak Cliff. The lake is placed so as to feature the two planned Calatrava signature bridges at Woodall Rodgers and Interstate 30. It is expected to be approximately 75 acres in size, with an additional 10 acres of wetlands around its banks.

The Urban Lake will be edged with a formal promenade along the downtown side that will form a new "front porch" for the city - a new gathering place in the midst of city and park. Strolling along the promenade, watching the sunlight reflect on the Calatrava bridges and the water fountains below, or photographing lakes with new Oak Cliff development in the background - all of these most urban experiences will be found in this part of Trinity Central Park. The ultimate plan for the Urban Lake could include a restaurant and other concessions. The promenade will connect directly to the pedestrian plaza deck at Reunion, so visitors could walk from the new urban development adjacent to this plaza and down to the promenade along the urban lake, enjoying views of downtown, Oak Cliff, lakes, waterfalls or fountains and Calatrava bridges.



The Downtown Lakes and the Braided River Channel.

The Urban Lake will be approximately one mile in length and average 800 feet in width. Paddleboats, canoes, kayaks, recreational rowing and small sailing craft are expected to be typical water uses. Small sailboats, with masts short enough to sail under the bridges, could be used. Recreational rowing or sculling would be possible as well, though the bridges and the curve of the floodway would preclude top competitive sculling events from any lake in the Trinity floodway. Canoes could travel either direction in the lake, as the current within the lake would not be so strong as to force travel in only one direction. Portaging would be necessary at either end of the lake.

The opposite shore of the urban lake (in the center of the floodway) will be more natural in character and will be protected from the Trinity River with a gently sloping berm. This berm will be landscaped to provide wildlife habitat near the river and would include trails or pathways so walkers can circle the lake.

A range of activities . . . both programmed and “wild”.

The Natural Lake

The Natural Lake will be located to the southeast of the Urban Lake, adjacent to the southern part of The Cedars and Cedars West areas. It is intended to provide a water recreation experience of a more natural character. The lake would be approximately 75 acres in size with an additional 15 acres of wetlands around its shores. The lakeshore would have walking and biking paths and picnic or nature observation areas rather than the formal promenade of the Urban Lake. Trees, grasses and other vegetation would create desirable habitat for birds and wildlife. Water sports would include canoeing and kayaking, again able to travel up and down the lake. Fishing could be available at the lakes, creating possibilities for fishing tournaments and family outdoor activities.

Water for the lakes would be pumped from the Central Wastewater Treatment Plant to the headwaters wetland and other outlets along the lake shores. Since the difference in elevation of the Natural Lake is expected to be approximately 5 feet lower than the Urban Lake, there are opportunities to create a wonderful and distinctive water feature between the two. Water fountains, water cannons with a pedestrian walkway below, or a dramatic waterfall are some of the possibilities. Depending on the design and specific location, this water feature could be viewed from the Oak Cliff Levee Top Road or the Reunion Pedestrian Plaza, adding drama to the view.

Water from the Natural Lake would flow down an elevation drop of approximately fifteen feet to rejoin the Trinity River in the area of the braided channels and islands. This elevation drop would likely require a portage by canoeists, but could be designed to include a whitewater course for kayakers.

The Braided River Channel

As the lake water enters the Trinity River east of Cadiz Street, the Trinity River will be divided into multiple braided river channels with low-lying wetlands and protected islands for wildlife. These channels will be designed to ensure that a primary channel has flowing water even during low water periods, so canoeists and wildlife would be assured of passage. With higher water levels, several channels would offer options for canoeists and would create protected islands for wildlife. Periodic inundation during heavy rain periods will create temporary lake-like conditions in this area. Canoe access will be provided here to offer educational programs within this reconstructed wetland habitat. The banks of the river in this area would have shrubs and trees and would be part of the Great Trinity Forest's extension upstream into the existing floodway area.

The West Dallas Lake

The West Dallas Lake is intended to provide water recreation and outdoor activity areas appealing to residents of adjacent neighborhoods. It could be supplied with water by pumping of sump waters, wells and/or periodic inundation by the Trinity River. The 80 acre lake will be highly irregular in shape with recreational opportunities for canoeing and walking through an additional 65 acres of wetland habitat. The lake shore could be designed with periodic overlooks, picnic areas and recreational access.

The proposed amphitheater at West Dallas.

Proposed lakeside recreation at the natural lake.

The Trinity River

The Trinity River will become an important recreational resource through improved access and reconfiguration of its course. Re-creating a more varied, and sinuous course for the river will increase the variety of flow patterns within the river. More pronounced riffles and pools, and divided channels will improve the recreational experience for canoeists by creating faster sections interspersed with slower pools. Divisions in the channel will allow for smaller whitewater features to be created and managed for recreational uses. The plan calls for additional canoe launches at the upper and lower ends of the Dallas Floodway to allow for a variety of trip lengths and experiences depending upon interest and skill level.

Active Sports and Recreation

Recognizing a real, identifiable public need for active recreation facilities in Dallas, the Trinity Central Park will feature playing fields on terraces raised above typical flood levels. The playing fields, predominantly located upstream of Sylvan Road, will provide ample areas for a complete array of active recreation adjacent to neighborhoods that are in need of additional

recreational resources. Running, jogging and bicycling will be accommodated on the network of in-park roads and trails that will run the length of the 6.5 mile corridor.

Events and Celebrations
Parks must be designed to work for everyday conditions, yet be usable for large events and celebrations. The Trinity Floodway is ideally suited for large events because of its central location and its large size. Fireworks, air shows and other types of events normally associated with bodies of water can be acommodated within the floodway. The lakes and the playing fields can be transformed for tournaments and other seasonal events like the Fourth of July TrinityFest.

A twelve-acre amphitheater will be carved into an upland terrace to provide an active venue for community and regional performances and events. The audience for these events would enjoy a dramatic stage area with the lakes, Calatrava bridges and the downtown skyline in the background. Concession, sports, and event infrastructure will be built into the fabric of the park along the length of the river. This infrastructure can and must be designed to be movable in the event of major flooding, or to withstand floodwaters and then be put back in service.

Nature Recreation
The underlying fabric of the park, its wetlands, stormwater and treated water, and its new river and upland habitat, provide a rich diversity of environmental education potential. Specific environments for interpretive exhibits, nature observation areas and self-guided trails include wetlands, riparian and lowland forest zones. These habitats are not currently well represented in the floodway. As these new habitat and water areas are designed, they would be located to incorporate and enhance the existing wetland and other habitat areas wherever possible.

Environmental exhibits support other nature-oriented activities such birding and ecotourism. Depending on programming resources, future plans for the park and its lakes could include fishing as well, whether catch-and-release or fishing to keep. 25 to 30 miles of hiking and equestrian trial will be constructed within the park. This trail system will tie into the larger regional trails system and link the Trinity Central Park into the larger context of parks and trails within the Metroplex.

A Park in a Floodway

Because the new river park is in an active floodway, it must be designed to function during minor floods and be repaired quickly after a flood event. This means management of floodwaters, debris and sediment. The park must be designed to work with the hydrodynamics of the river to allow for conveyance of the river from low flows to the extreme high flows during flood events. The configuration and reinforcement of major park elements, elevations of park program, slopes of surfaces for drainage, plant and paving material selections must all be

Louisville's Park along the Ohio during an event.

Proposal for Moore Park improvements.

designed to allow for peak flows and resist erosion during those events. Permanent facilities within the floodway must be designed to withstand inundation without damage to electrical and mechanical systems. Concessions can be trailer based and moved seasonally or during extreme flood conditions.

Constructed wetlands and lakes will be elevated and protected by constructed earthen berms to minimize flood-borne debris and sedimentation. The stormwater wetlands at the pumped outfalls will have a primary bypass channel for major storm event conveyance that can be accessed by rubber-tired maintenance equipment. The off-channel lakes will be configured to allow for sediment to pass through and return to the main channel during exteme flood events to reduce lake siltation. Recreation fields will be raised to an elevation to minimize inundation of floodwaters and protect turf.

Park Access and Regional Connections

Two-lane park roads and scattered parking areas within the floodway will make the park equally accessible to local and regional residents. Direct park road connections to Oak Cliff and downtown will reconnect the Trinity River to the fabric of Dallas. Twelve vehicular access points will connect major viaduct crossings and Reunion Boulevard in the downtown to the park road. The plan (see the map at the end of this section) identifies 24 pedestrian/bicycle access points to the park from both sides of the river. In addition, the existing DART stations at 8th and Corinth and the Cedars, as well as potential stations on future lines, will provide convenient non-automobile access.

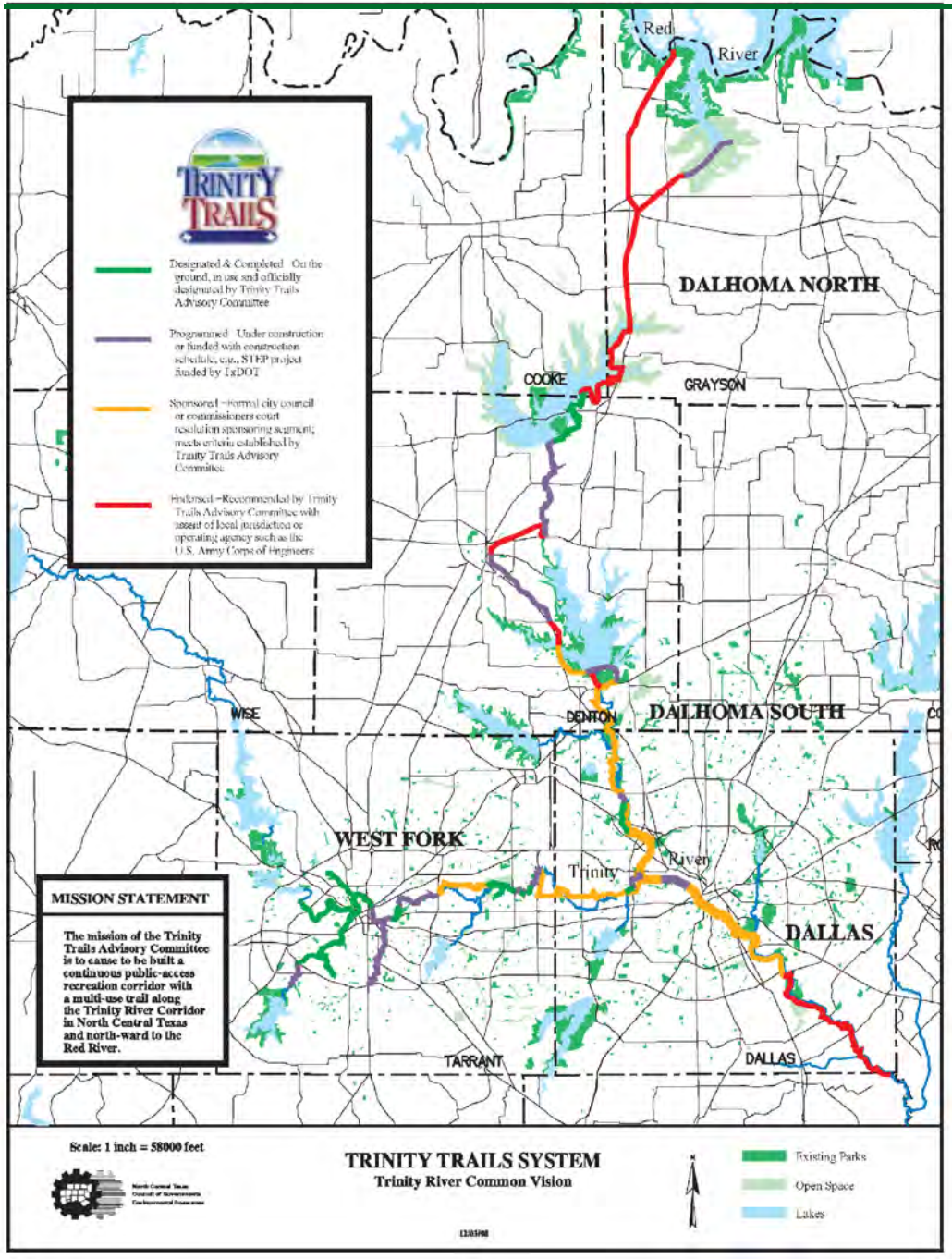
Pedestrian access to the park will be easily accomplished on the Oak Cliff side of the river. Here, a continuous levee-top trail or new local roadways along the levee will allow for unimpeded access to parklands. New levee-top roads will allow on-street parking for park users.

On the downtown side of the river, the limited access Trinity Parkway will present an obstacle to such direct pedestrian access. New overpasses or crossings under the parkway will be constructred at critical locations. At existing viaducts, pedestrian stairs or ramps will be provided adjacent to vehicular ramps. In addition, a longer pedestrian plaza is proposed over the parkway at Reunion Boulevard and wide pedestian connections would extend this human-scale environment at levee top in key downtown locations.

A trail system through the Dallas Floodway will connect trails that now are isolated and separated from one another. Along the Elm Fork, the Trinity River Greenbelt Park and L.B. Houston Parks will be able to connect via the Old Meanders Trails to the Katy Trail and the Trinity Forest. In West Dallas, the Bernal Trail system will be connected to the regional trail system and downtown. Future trails planned for Cedar Creek to connect Moore Park with the Dallas Zoo will in turn be connected to Fair Park and South Dallas via the Trinity River trails. The Trinity Floodway will set an example for how

Mill Race Park in Columbus during a performance.

Mill Race Park during a river flood.



Trinity Trails: The Trinity River will become the backbone of a regional water, open space and trails network.

the West Fork fo the Trinity River can be developed with trails and public access all the way to Fort Worth.

Some Dallas residents enjoy recreational activities in the Trinity floodway today, but most people do not perceive this as a desirable destination for active recreation, major celebrations or nature observation. The diverse water and landforms envisioned in this floodway will change that perception and will offer attractions for residents and Dallas visitors alike.

Fact Sheet

LAKES

- Two off-channel stepped lakes totaling 150 acres adjacent to downtown with an additional 25 acres of wetlands along lake edge
- A downtstream bichannel system will be called “braided river channel” totaling 60 acres with an additional 45 acres of wetlands
- An Off-channel lake in West Dallas totaling 80 acres with an additional 65 acres of wetlands
- Lake recreation, both active and passive included canoeing, sailing, rowing and fishing
- Protected with berms that provide 2-year flood protection
- Between-lakes waterfalls, pedestrian overlooks and wildlife viewing areas
- Lakeside hard-edge promenade at downtown and soft edge riparian habitat elsewhere

PLAYING FIELDS

- 160 acres of playing fields including soccer and softball fields. Fields are accessed from an internal park road system
- Irrigation from Central Wastewater Treatment Plant

EVENT/CONCESSION SPACES

- 12 acre amphitheater of sloped turf and stage structure with utilities
- 2 concession pads for seasonal or permanent use
- 1 floating restaurant pad at Upper Trinity Lake (potential if concession interest)
- 1 recreational building near playing fields

BOAT LAUNCHES

- Car-top boat launches at Westmoreland, and Corinth Streets
- Trailer-boat access at Sylvan and at Urban Lake for larger boats

VEHICULAR ACCESS POINTS

- 5 miles of internal park roads running the length of the park. 12 vehicular access points to the park road: at Canada Drive(2), Westmoreland(2), Hampton, Sylvan, Continental, Commerce, Reunion, Oak Cliff levee-top, Moore Park, and Martin Luther King Blvd.
- 6-7 acres of distributed parking areas within floodway for park users

TRAILS AND PATHS

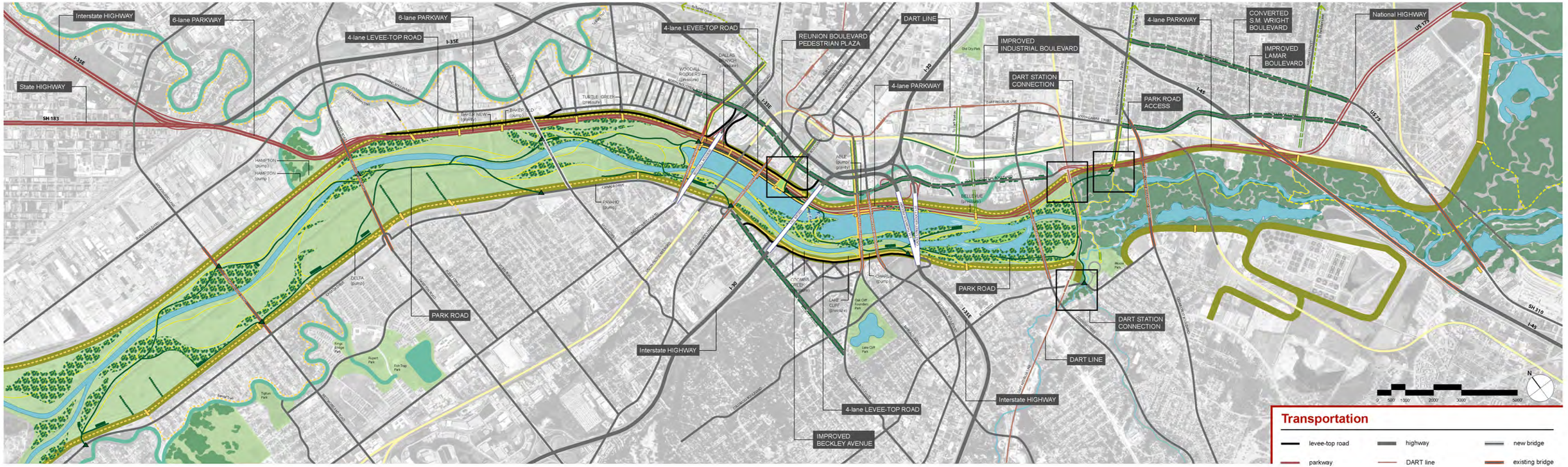
- 4,500 foot long promenade at Downtown
- 9 miles of trails with a variety of surfaces
- 3 miles of equestrian trails within the floodway (surface to be determined)
- 5,000 feet of wetlands boardwalks for nature viewing and access

PEDESTRIAN ACCESS POINTS

- One 600 foot-long pedestrian plaza overlooking the lakes and park at Reunion
- Widened pedestrian connections at other locations along the downtown levee
- Continuous pedestrian access to parkland from the Oak Cliff Levee-top road with on-street parking
- 20 new pedestrian/bicycle access points including 8 over the Parkway
- 4 vertical connector stairs/ramps added to historic viaducts at Continental, Commerce, Houston and Cornith Streets

OPEN SPACE CONNECTIONS

- On-street trail connections to Turtle Creek Katy Trail, and Bernal Trail
- MLK bike route from Trinity to Fair Park and proposed veloway
- Equestrian/pedestrian trail to Trinity Interpretive Center / Equestrian Center
- On-street connection to Oak Cliff Founders Park



Transportation

levee-top road	highway	new bridge
parkway	DART line	existing bridge
park road	DART station	historic bridge
vehicular access	railroad	levee
parking areas	railroad bridge	trails/paths
existing road	new calatrava bridge	pedestrian access

VISION Component: 4

II. VISION

component: 4

Transportation

Roads and parks are not necessarily incompatible....

Potomac Parkway, Washington, D.C.

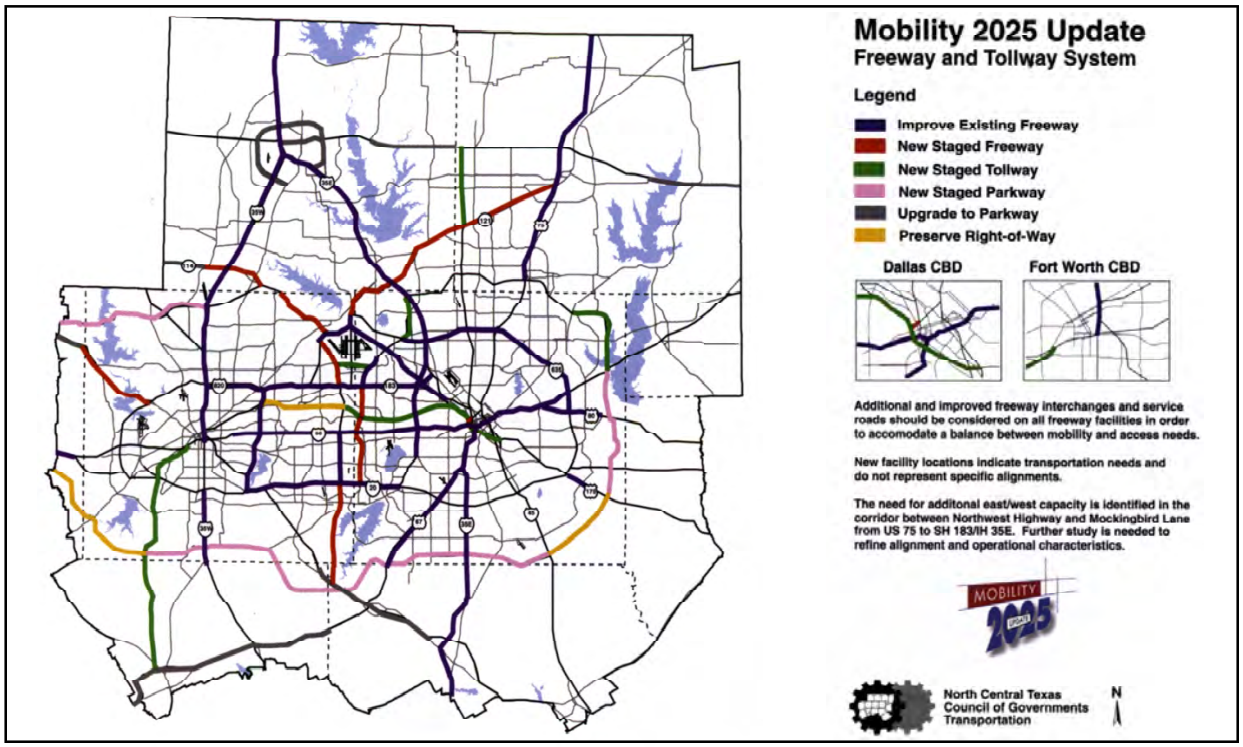
Memorial Parkway, Washington, D.C.

A Balanced Transportation Concept

This urban design study has introduced a concept for transportation improvements referred to as the "Balanced Transportation Concept". This concept actually has 4 integrated components, all necessary to meeting the objectives:

1. The Trinity Parkway itself from SH 183 in the northwest to US 175 in the southeast
2. Industrial Boulevard, which serves as a Collector/Distributor and simplifies the Parkway's role in providing access to downtown Dallas
3. Oak Cliff Levee-top Road which could serve as a critical regional transportation linkage to major highways
4. Vehicular and pedestrian access to the Park and Lakes

Dallas has been planning for a Trinity Parkway for a long time. That planning has been influenced by regional mobility demands,



The Regional Freeway and Tollway System of the Dallas-Fort Worth Metropolitan Transportation System.

financing needs and its potential location within a proposed park. Two primary objectives for the Parkway have emerged:

1. To serve as a permanent reliever route, a part of a remedy for the heavy traffic flows along the Lower Stemmons, Mixmaster and Canyon.

2. To fulfill the goal of providing access to and visibility for the proposed Trinity River Park with a context-sensitive design.

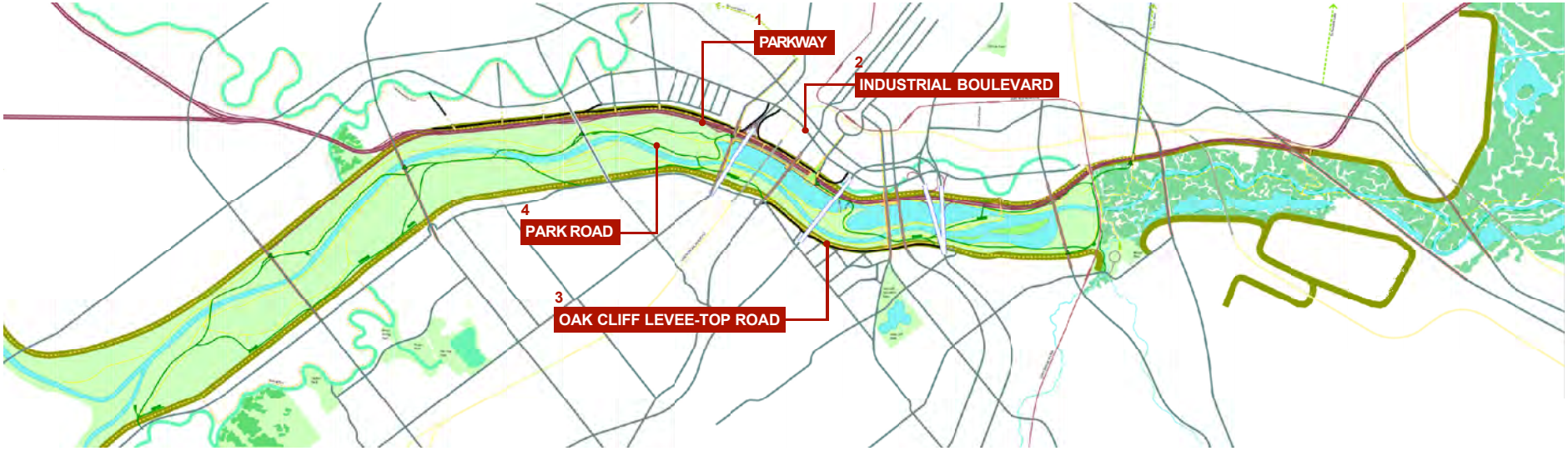
The "stakeholders" in this balanced transportation concept - the City of Dallas, TxDOT, NTTA, NCTCOG, and the Trinity River Urban Design Team - have agreed that the parkway component of the concept should be included in the Trinity Parkway Environmental Study (EIS) already underway. The Parkway component of this balanced concept is called the "Modified-Combined" alternative and is a variation of another EIS alternative.

In the 1998 Major Transportation Investment Study (MTIS), the Trinity Parkway Corridor was defined as a northwest to southeast corridor including the Lower Stemmons, Mixmaster, the Canyon, Industrial Boulevard **and potential alignments for a new roadway within or adjacent to the Trinity River levees**. Obviously, this "Parkway Corridor" included major freeway sections. The MTIS explains that the term "Trinity Parkway" Corridor is based on a placeholder name used in the Metropolitan Transportation Plan to imply a broad corridor centered on the Trinity River. "It was not intended to imply a specific type of transportation facility" (page 1-1, MTIS).

In this report, "Parkway" refers to the new roadway within the levees and related connections to other streets.

Parkway Concept

The following section describes the overall concept. Later sections will provide more detailed descriptions of the northerly, central and southern portions.



The 4 integrated components of the "Balanced Parkway Concept".

- The Parkway alignment is patterned after NTTA's previous "Combined Parkway East Levee" alternative. The conceptual alignment is illustrated in the figure on the following pages.

- The parkway will be a limited access roadway with no at grade crossings. Pedestrians will need to pass over the parkway on structures or underneath it at sumps.

- The number of lanes will be limited to 6 north of Continental and 4 to the south of Continental when the parkway is built. Though the design accommodates a future widening to 6 lanes throughout, the balanced transportation concept is to retain the 4 lane section through 2025.

- The entire length of the Parkway will be tolled, in order to assist in capital financing and O&M costs for the project. [1]

- The entire length will be posted at 55 m.p.h., with a design speed of 60 m.p.h.. This speed was necessary to maintain the partnership with NTTA. The effects of this higher speed will be partially mitigated with berms in the central section that will limit sound transmission in this narrow reach.

- The Parkway's compatibility with the Park will be maintained by:

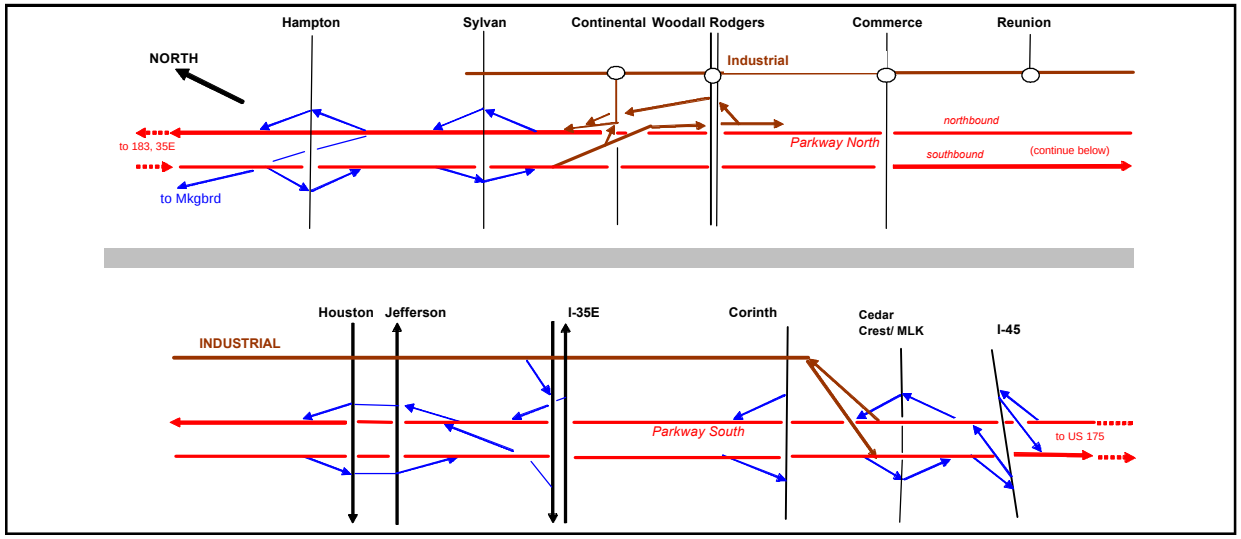
  Restricting trucks (such as semi's, tractor trailers, pole trailers and cement trucks). This restriction may be enforced through the imposition of high tolls for trucks, by a proposed City of Dallas ordinance prohibiting truck use or by other means.

  The agencies will diligently seek context-sensitive design recognizing that the road is passing through a major urban park. This design approach may include narrower lanes and shoulders, enhanced landscaping and design features, and reduced vertical clearances, all subject to FHWA approval.

  The Parkway will be above the 100-year flood level, or protected by flood walls where it must pass under bridges crossing the Trinity River.

  Revenues from tolls will assure maintenance of the roadway and landscaping, and will also provide for clean up after flooding.

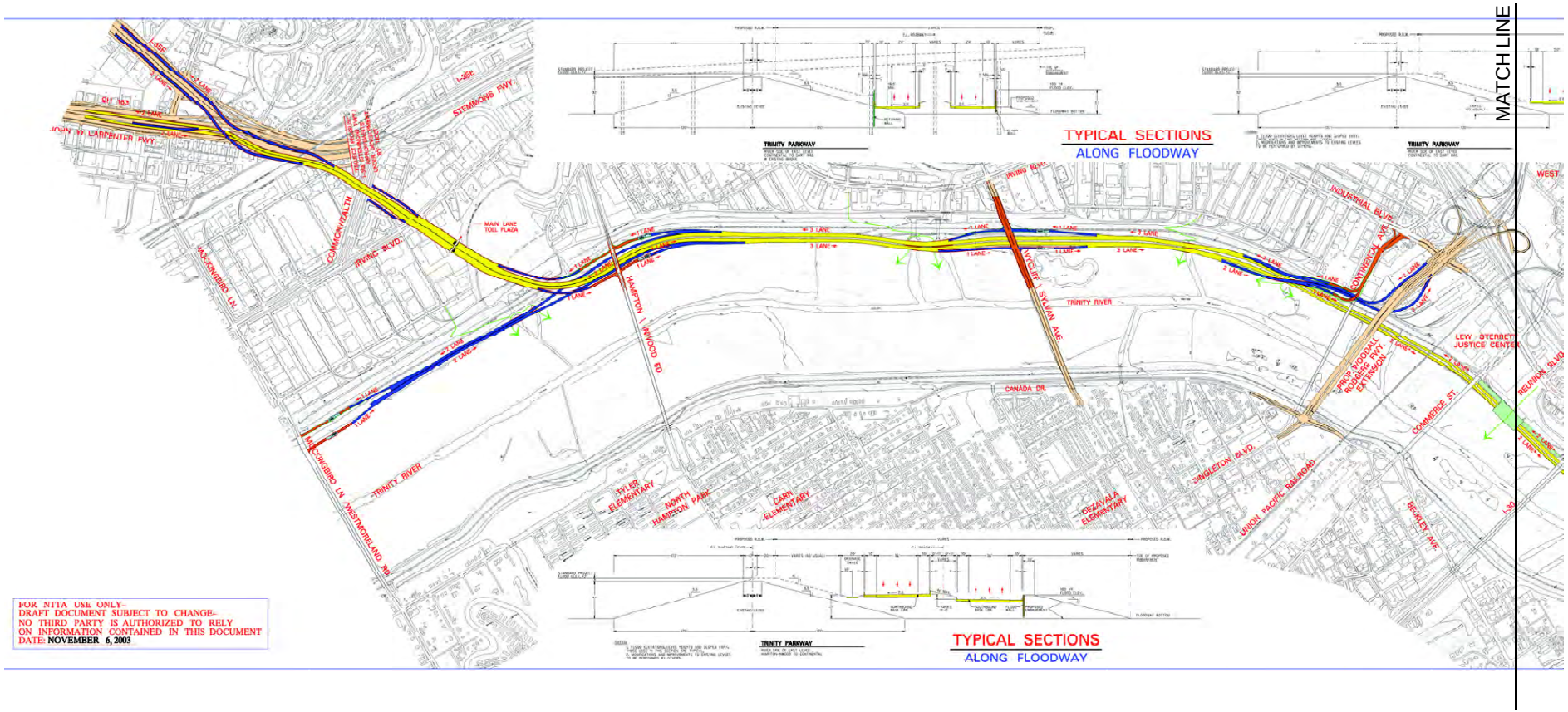
- Access connections in the balanced transportation concept are shown schematically in the adjacent figure.

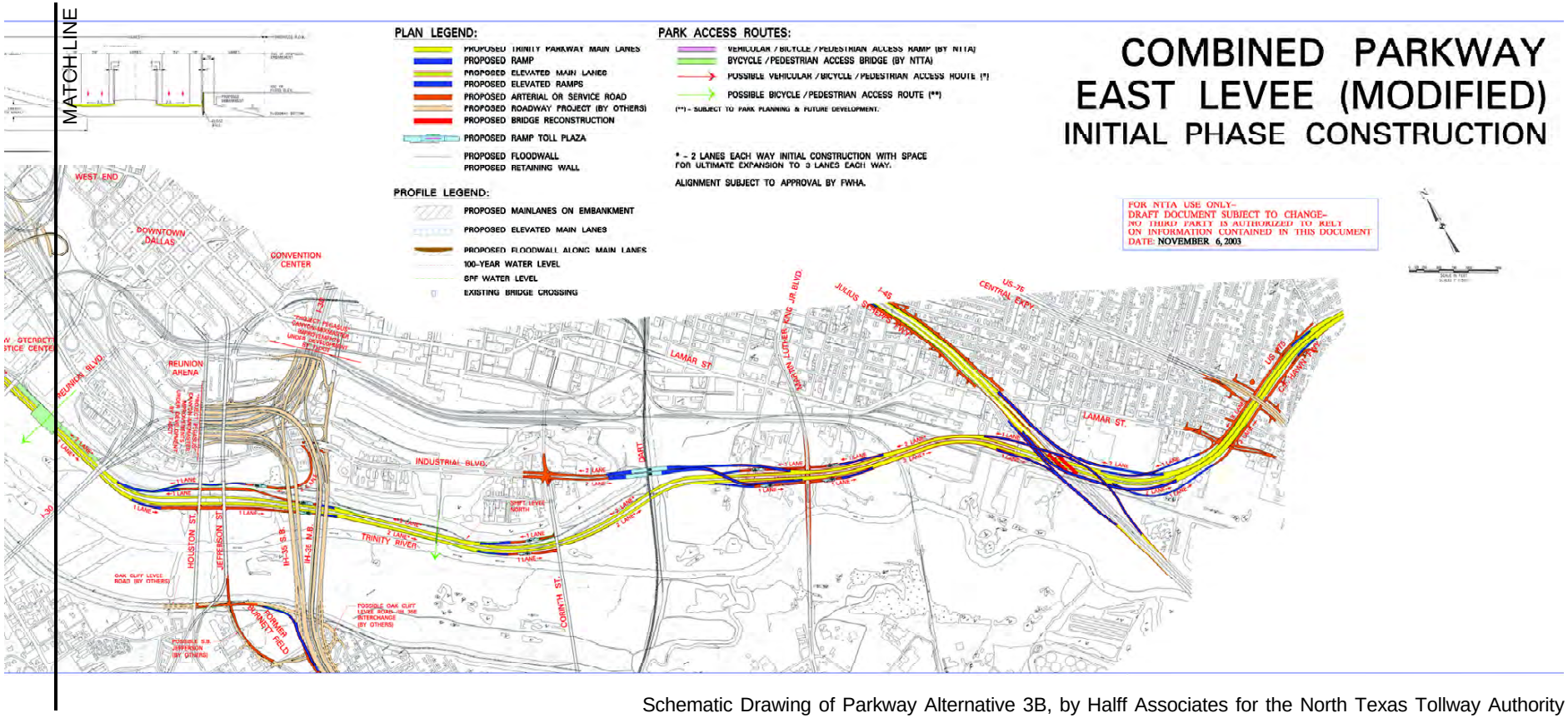


Schematic of parkway connections to other roadways.

[1] For certain events, the parkway may be free to users, with a "shadow toll" paid by the City, or others, to NTTA.

Transportation Plan





Schematic Drawing of Parkway Alternative 3B, by Halff Associates for the North Texas Tollway Authority

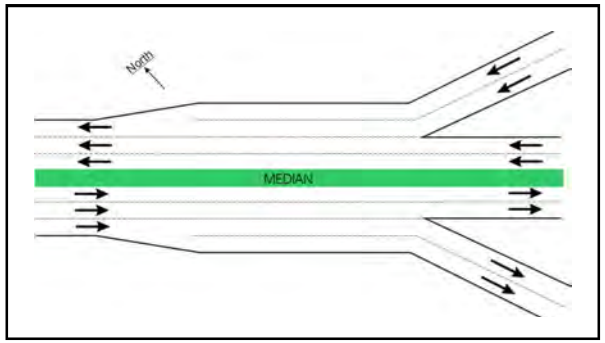
Description of Individual Parkway Sections

The paragraphs below describe specific characteristics of individual sections of roadway (the common characteristics of all Parkway sections, described above, are not repeated here).

NORTHERN PARKWAY (SH-183 to Continental)

- 6 lane section crosses to the River side of the east levee just north of Hampton.
- Projected 2025 daily volume: 90,000-105,000 vehicles per day (vpd).
- Design context: gateway transition from city to park.
- Views: outstanding views of park and downtown skyline.
- Roadway Platform: terraced to allow views of the River and lakes from either direction.
- Transition from 6 lanes to 4 lanes. North of the Continental ramps, the Parkway will have 6 lanes; south of the ramps, 4 lanes.
- See cross-section details below

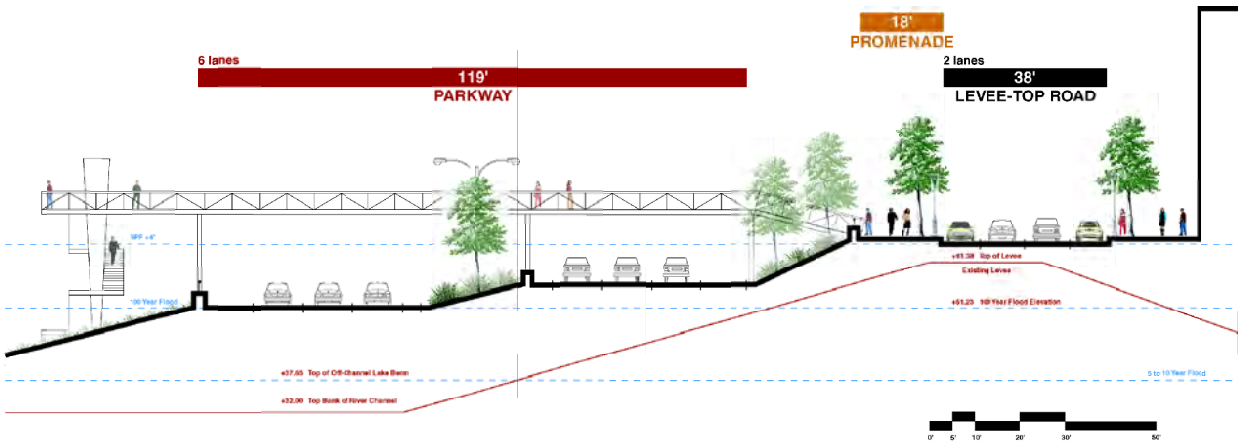
View from the road: northern segment of the Parkway.



Schematic diagram showing the transition of the Parkway from 6-lanes to 4-lanes.

CENTRAL PARKWAY (Continental to Corinth)

- 4 lane section on the river side of the downtown levee (expandable to 6 lanes)
- Projected 2025 daily volume: 80,000-90,000 vpd
- Design context: this is the narrowest section of the floodway and the Parkway must fit between downtown and the Lake. It is also the area of most intense park use.
- Views: drivers see close views of landscaping; people in park and city are screened from road views.
- Roadway Platform: single level with generous landscaping on both sides. Where it is necessary for the road to drop below the 100-year flood level for adequate bridge



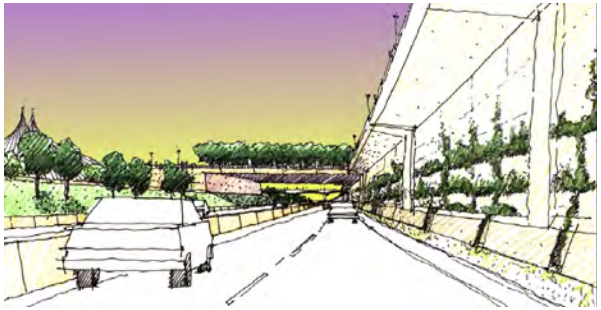
Cross-section through the northern segment of the Parkway (SH-183 to Continental).

clearance, flood walls will be provided.
- See cross-section details below

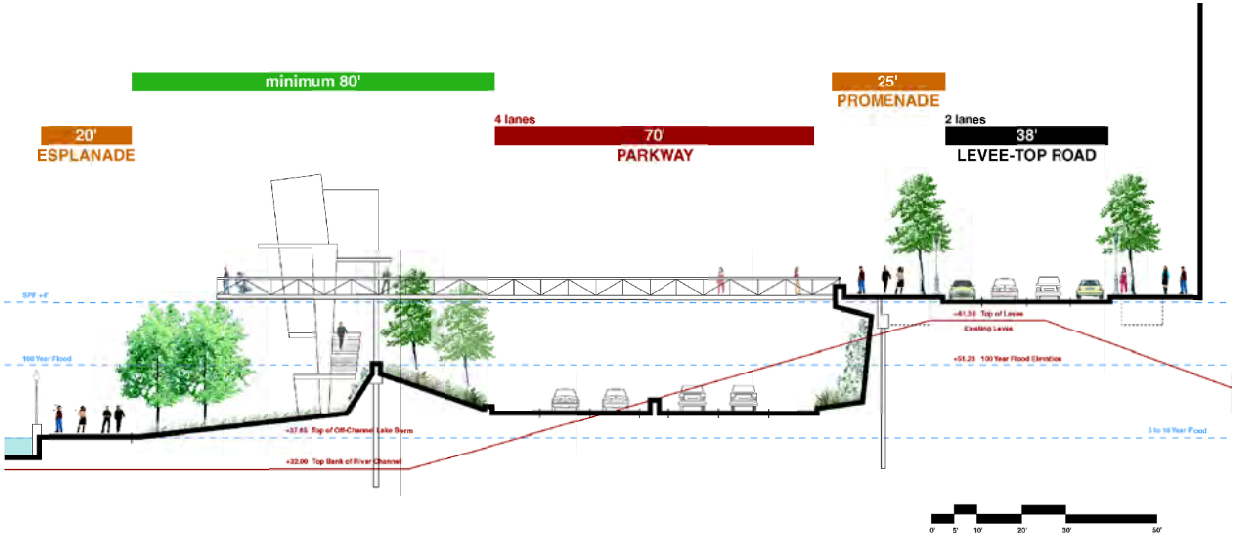
SOUTHERN PARKWAY
(south of Corinth to US 175)

- 4 lane section on the River side of the downtown levee until it crosses over the levee south of Corinth (expandable to 6 lanes if needed after 2025).
- Projected 2025 daily volume: 80,000-110,000 vpd
- Design context: transition from alignment in Park to community.
- Views: maximize views of the Park, River and lakes from the Parkway by lifting the road above the flood level where possible.
- Roadway Platform: can be terraced to allow views of the River and lakes from either direction.
- See cross-section details following page.

The Trinity Parkway's visual impact can be reduced through context sensitive design.



View from the road: central segment of the Parkway.



Cross-section through the central segment of the Parkway (Continental to Corinth).

Widening of Central and Southern Sections of the Parkway (to six lanes)

There is consensus among the agencies that the central and southern sections of the Parkway should be built with 4 lanes. The Balanced Transportation Concept goal is to retain this cross-section through 2025. A future decision to expand this parkway section to 6 lanes should balance the need for traffic capacity with the need to maintain a high quality park setting and connection to the urban fabric. In particular, a future decision to expand the parkway in this area should consider:

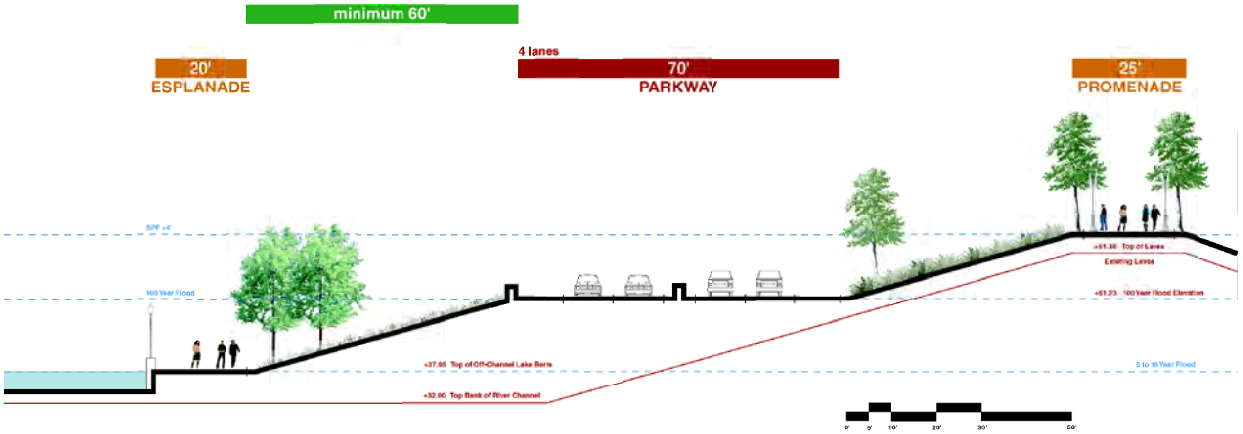
- Actual traffic demands and congestion levels;
- Use of managed lanes, differential toll structures and other transportation system management approaches that reduce peak demands on key facilities;
- Ability of public transportation to serve a larger share of the trips in this corridor;
- Ability to accommodate trips on other facilities in this corridor;
- Changing land use patterns and travel choices that reduce the number of single occupancy vehicle trips;
- Effect of the parkway expansion on the experience of the Trinity Central Park as developed;
- Effect of the parkway expansion on air quality and other environmental characteristics of the Trinity River Corridor;
- Effect of the parkway expansion on the actual urban development occurring adjacent to this part of the Trinity River Corridor.

Industrial Boulevard (Continental to south of Corinth)

This portion of Industrial Boulevard will serve as the collector/distributor for parkway trips destined to or from Downtown and the lower Stemmons area. It becomes the transition to the downtown street system. It relieves the central section of the Parkway from having to perform this function.

- 8 lanes with turn lanes at selected, signalized intersections.
- Projected 2025 daily volume: 27,000-39,000

View from the road: southern segment of the Parkway (non terraced).



Cross-section through the southern segment of the Parkway (non-terraced section shown).

vpd north of Commerce.
- 35 m.p.h. posted speed.
- Design can be accommodated within existing right-of-way, except possibly at some intersections.
- Trucks will be permitted.
- Provides additional connections between the Parkway and Woodall Rodgers.
- Design should support enhanced economic activity on adjacent properties.
- Landscaping and pedestrian improvements will improve the travel experience.

Oak Cliff Levee-top Road

This road will provide regional service along the west levee with connections to Beckley, IH-30, IH-35, and the Houston/Jefferson couplet. It will also play a vital role in providing access to the development parcels (see Levee-top Road Development Area in figure on page 60) fronting on the road and facing the Trinity Park and lakes. It will probably require 4 lanes in the peak periods; 2 of those lanes could provide parking during off-peak times. Its posted speed should be 35 m.p.h.. The latest design review has identified a method to directly connect this road to both IH-30 and IH-35; this provides the Oak Cliff Levee-top Road with an important role in the regional transportation system.

Transit Access to the Park

Existing and planned DART service will provide transit access to Trinity Park at several locations. There is existing transit service:

- At Union Station and the Convention Center Station for the Red Line and Blue Line of DART's light rail service. There is connecting bus service on Continental, Commerce, Houston/Jefferson.
- In the long run, with economic development on sites south of downtown, the Cedars Station of the Red and Blue lines may provide connections.
- On the west side, the 8th & Corinth station of the Red line at Moore Park provides access from Oak Cliff and other westside communities. It will be the major transit access point for a principal gateway into the Trinity Park.
- The Trinity Railway Express will provide commuter rail service at Union Station.
- In the southern portion of the Park, many local and express bus routes on Continental, Commerce, Houston/ Jefferson, I-35E to Cadiz, Industrial will provide connections to other areas of Dallas.
- In the north, bus routes on Westmoreland, Hampton, Sylvan and Irving Boulevard will provide connections.
- DART's planned Southeast Corridor expansion will also include stations near the Great Trinity Forest at Lake June and Buckner.

Enhancements to Other Arterials

S.M. Wright Freeway

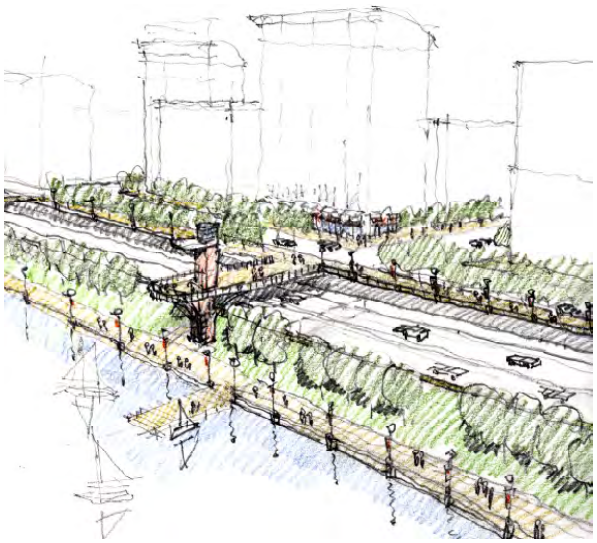
S. M. Wright Freeway should be converted to an arterial street and its design enhanced to serve as a local boulevard. This concept, identified in past community discussions by NTTA and documented as part of the Comprehensive Land Use Study, is very important to the revitalization of surrounding communities because it removes a barrier that currently divides them. Changes would lower speeds, remove the overpasses and replace them with at-grade intersections. The frontage roads would not remain. With these changes, this would become a City street rather than a State highway.

South Lamar Street

Lamar Street is currently an unattractive, underused street with a 5 lane cross-section. It is wide enough for 4 to 6 lanes, though additional right-of-way might be needed at intersections with turn lanes. It needs pedestrian improvements and landscaping. Such enhancements would give this roadway a boulevard character and should support economic revitalization in this area.

Downtown Levee-top Roads

These roads provide access to adjacent properties whose economic value will be enhanced by the Park, Lakes, Parkway and other roadway improvements. These will probably be two-lane streets with parking on both sides. More detailed design could indicate the need for 4 lanes in some locations and turn lanes at specific intersections. These streets would have a speed limit of 30 m.p.h. and 10 foot vehicular lanes (with 14 foot outside lanes where used for parking and bicycling.) They would not necessarily be continuous, but would be located where they will support substantial economic development. The map at the end of this section indicates some potential locations.



Levee-top roads will support riverfront development.

Summary

The Balanced Transportation Concept achieves a balance with other goals for the Trinity River Corridor:

- The scale of the Parkway has been reduced from the 8-lanes of previous concepts.
- The Parkway is anticipated to carry an estimated 80,000 to 100,000 vehicles per day.
- About 250,000 persons per day are afforded a variety of exposures to the Park and the Lakes.
- Vehicles will have access to the park at 12 locations, including Westmoreland, Hampton, Sylvan, Continental, Houston, Jefferson, and Canada Drive.
- In addition to other park access points, pedestrians will have access over the Parkway at 8 new pedestrian bridges, Reunion Plaza and 4 vertical stairs or ramps connecting to existing viaducts.
- With connections to the Parkway, the Houston/Jefferson couplet will be better utilized than it is currently. These connections will provide access to/from the Parkway for the Oak Cliff community (and to/from downtown).
- The Oak Cliff Levee-top Road will provide improved regional connections for the West Dallas and Oak Cliff communities and access for the economic development areas.
- The Downtown Levee-top Roads will provide access for the economic development areas on the downtown side.
- NTTA will operate and maintain the Trinity Parkway.

BACKGROUND FOR THE BALANCED PARKWAY CONCEPT

The transportation system described above meets Dallas' goals for regional mobility and local access. It also balances these goals with those of other aspects of the Trinity River Corridor. Five key factors explain this balance; each is discussed below:

Guidelines.
Design Principles.
Is this still a Parkway?
What other alternatives were considered.
Impact on historic structures.

Guidelines

Development of Parkway system alternatives was to be constrained by certain requirements,

namely:

- Design of the Parkway, in its alignment, speeds, number of lanes, dimensions, signing and landscaping should recognize dual objectives of providing access and visibility of a major urban park and serving as a reliever.

- The system should serve projected regional travel demand for 2025. However, the Parkway corridor should not be viewed as an opportunity for unlimited future expansion. That would not be appropriate to the unique location and objectives.

- Modifications to the previous Combined Parkway East Levee alternative must be sensitive to the impact they may have on status and timing of the environmental review process.

- Plans for these transportation facilities should maintain neighborhood mobility and access to Dallas jobs for Oak Cliff and South Dallas.

- The parkway concept should retain funding partnerships with NTTA and TxDOT.

- It should maintain access connections to other roadways of other NTTA alternatives, or provide substitute connections where more appropriate to the selected concept.

Design Principles

The parkway alignment is to be varied to provide diverse views, support the development potentials of adjacent properties and allow for park connections.

- The agencies will work together using context-sensitive design principles to assure the Parkway's compatibility with the Park.
- Where safe and functional operation allows a range of standards, Parkway design will emphasize using minimum values for widths of lanes, shoulders and ramp lengths. See page 54 for Context Sensitive Guidelines.
- To the extent permitted by construction efficiency and timing of travel demand growth, improvements will be built in stages.

Is This Still a Parkway?

Yes, because:

- It will have the landscaping and views of a Parkway.
- Trucks will be restricted.
- Speed limits, though higher than some parkways, are still moderate and will be enforced.
- It will be designed in the context of a road passing through a park.

What Other Alternatives were Considered?

Other Corridors

Early steps in this process investigated the potential for other corridors, such as Loop 12, to carry the reliever volumes. However, a test using NCTCOG's 2025 trip tables did not uncover effective alternatives.

Other Alternatives Within the Corridor

Trinity Parkway MTIS and EIS Alternatives:

Possible roadway alternatives within the Trinity River Corridor have been the focus of extensive study and discussion since 1995, when the Texas Department of Transportation began a Major Transportation Investment Study (MTIS) for this corridor.

This study, completed in 1997, was intended to develop a plan of action to solve regional transportation problems along the Trinity River Corridor in Dallas. It recommended a package of transportation investments including a new reliever route; the package also contained improvements to the Canyon/Mixmaster; the Woodall Rodgers connection to Beckley; DART, bicycle and pedestrian facilities; and strategies for freeway management and employee trip reduction. The MTIS evaluated 39 alternatives for the reliever route, studied three options in detail and recommended a split-riverside

PARKWAY:	SH 183 to Continental	Continental to South of I-35E	South of I-35E to US 175	CD on Industrial
Alignment	Combined, East Levee	Combined, East Levee + Industrial, Depressed	Combined, East Levee then NTTA Alt. 3	North of Continental to North of Corinth
Lanes (initial stage)	6	4	4	8
Maximum Platform (lanes)	6 lanes	6 lanes	6 lanes	Add Turn Lanes
Platform Type	Terraced	Single Level	Terraced	At Grade
Design Speed (mph)	60	60	60	40
Posted Speed (mph)	55	55	55	35
Lane Width (feet)	11	11	11	11 - 12
Median Width (feet)	25	6	25	
Right Shoulder Type	Paved	Stabilized Turf	Stabilized Turf	Paved
Left Shoulder Type	Paved	Paved	Paved	Paved
Right Shoulder Width (feet)	10	10	10	2
Left Shoulder Width (feet)	4	2	4	2
Section Type	Curbed or Open Slope	Slope on River Side with Floodwall Beyond	Curbed or Open Slope	Curbed
Tolls?	Yes	Yes	Yes	No
Reduced Toll Plaza?	Yes	N/A	Yes	N/A
Trucks Allowed	No	No	No	Yes
Pedestrian Caps	N/A	Yes (600 ft)	N/A	N/A
Visual Narrowing	Maybe, at North Levee Crossing	Yes	Maybe, at South Levee Crossing	
Park Character, Signs	Yes	Yes	Yes	No

alternative. This recommended option was adopted as the locally-preferred alternative in fall 1997 by the Dallas City Council and other regional transportation agencies.

The Dallas City Council chose to evaluate the Trinity Parkway reliever route as a toll facility in December 1997. The process to prepare an Environmental Impact Statement (EIS) for the project began in 1999. The EIS defined six alternatives for study. These are:

1. No-Build
2. Industrial Elevated
3. Industrial At-Grade
4. Combined Riverside
5. Split Riverside
6. Split Landside

Although the draft EIS has not yet been completed, information and analysis previously presented in public forums was shared with the Transportation and Urban Design Study team. These alternatives were considered in the development of this Balanced Vision Plan.

Urban Design and Transportation Study Alternatives:

This study's direction was to provide needed transportation capacity while balancing this issue with other objectives for the corridor. To develop a parkway that is a 'good neighbor' to a major park, alternatives were examined that varied the roadway's alignment, number of lanes, speed, tolling, connections to the surrounding street network and other characteristics. Approximately a dozen alternatives were modeled to test their ability to meet regional transportation demands.

The DART river crossing downstream of Corinth.

The Houston Street Viaduct.

Transit

The MTIS considered the role of transit and concluded that enhanced transit could provide about 2% of the traffic capacity goal for the Lower Stemmons and Mixmaster. To meet the corridor's travel needs with transit alone is too optimistic a role for transit. This is because development patterns in the Dallas Metroplex, like so much of the U.S., limit transit to very specific, higher density, markets.

Impact on Historic Structures

In order to provide equitable access to Oak Cliff neighborhoods, the concept requires connections to the Houston Street Bridge, which is listed in the National Register of Historic Places. Significant modifications have already been made at the downtown Dallas end of the bridge at the Convention Center. If well designed, these connections will add value to the Houston Street Bridge by increasing the productive use of this currently underutilized asset. The Houston Street Viaduct should provide safe use by pedestrians and cyclists.

Although less celebrated, the Corinth, Commerce and Continental Bridges are eligible to be designated as historic structures. Pedestrian and vehicular access to the park from these structures will be beneficial to the park and can present opportunities to enhance the historic qualities of the bridges.

Fact Sheet

PROPOSED TRINITY PARKWAY

- Length of Parkway from SH 183 to US 175: 9.1 miles
- Posted speed limit: 55 mph
- Design speed: 60 mph
- Number of lanes:

  6 lanes north/west of Continental Ave.

  4 lanes south/east of Continental Ave.

  Expandable to 6 lanes for the full length after 2025 if sufficient traffic volumes warrant expansion
- Lane widths: 11 feet (with FHWA approval)
- Trucks restricted by ordinance, high tolls or other measures
- Vertical Clearances: reduced from highway standards (with FHWA approval)
- Parkway is a tolled facility

INDUSTRIAL BOULEVARD

- Number of lanes: currently 6 lanes; proposed 8 lanes with some additional turning lanes
- Speed Limit: 35 mph
- Enhanced landscape and street trees

SOUTH LAMAR BOULEVARD

- Number of lanes: currently 4 lanes; proposed 6 lanes with some additional turning lanes
- Speed Limit: 35 mph
- Enhanced landscape and street trees

DOWNTOWN LEVEE-TOP ROAD

- Support development on properties near the levee on the downtown side
- Number of lanes: 2 travel lanes with on-street parallel parking
- Speed Limit: 30 mph
- Lane widths: 10 feet vehicular lanes (with 11 feet outside lanes where used for parking and bicycling)

OAK CLIFF LEVEE-TOP ROAD

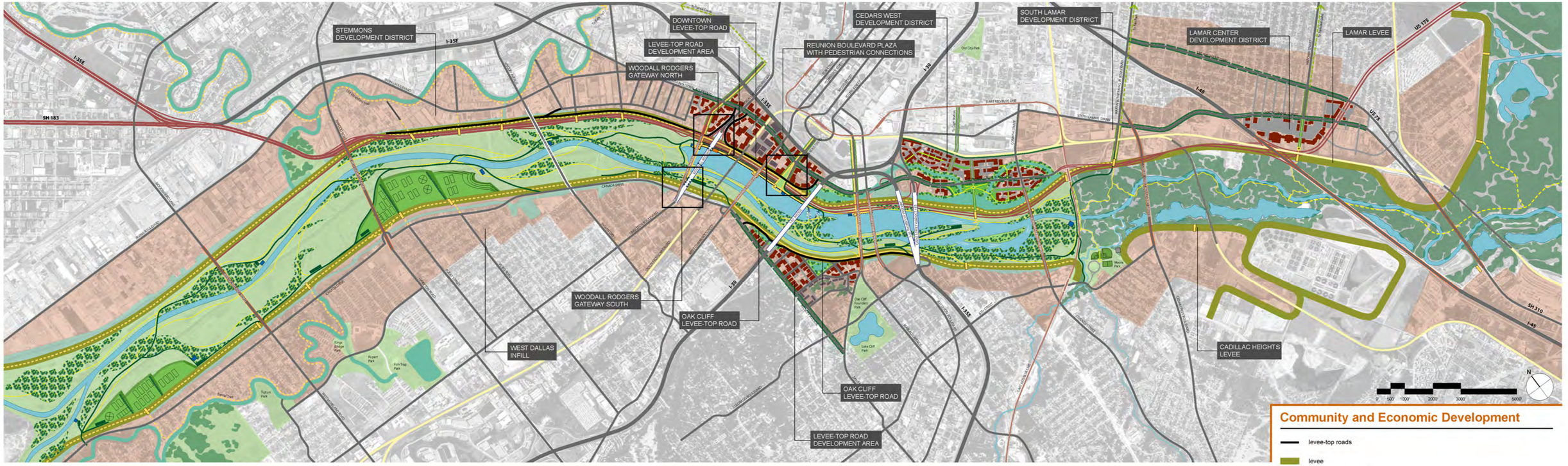
- Length of Oak Cliff Levee-top Road: 1.8 miles from Beckley to I-35
- Number of lanes: 4 travel lanes with off-peak, on-street parallel parking

S.M. WRIGHT FREEWAY

- Downgrade to surface boulevard status
- May become a city street
- Enhanced landscape and street trees

PUBLIC TRANSIT

- DART service at Union Station, Convention Center, Cedars West and Moore Park
- Trinity Railway express at Union Station
- Bus connections: Westmoreland, Hampton, Sylvan and Irving Boulevard routes
- Bus routes cross Continental, Commerce, Houston and Jefferson Viaducts


STEMMONS DEVELOPMENT DISTRICT
DOWNTOWN LEVEE-TOP ROAD
LEVEE-TOP ROAD DEVELOPMENT AREA
WOODALL RODGERS GATEWAY NORTH
REUNION BOULEVARD PLAZA WITH PEDESTRIAN CONNECTIONS
CEDARS WEST DEVELOPMENT DISTRICT
SOUTH LAMAR DEVELOPMENT DISTRICT
LAMAR CENTER DEVELOPMENT DISTRICT
LAMAR LEVEE
WOODALL RODGERS GATEWAY SOUTH
OAK CLIFF LEVEE-TOP ROAD
WEST DALLAS INFILL
OAK CLIFF LEVEE-TOP ROAD
LEVEE-TOP ROAD DEVELOPMENT AREA
CADILLAC HEIGHTS LEVEE
I-35E
SH 183
I-30
I-45
US 175
SH 310
0 500 1000' 2000' 3000' 5000'
N
Community and Economic Development
levee-top roads
levee
development districts
possible development
pedestrian access

II. VISION

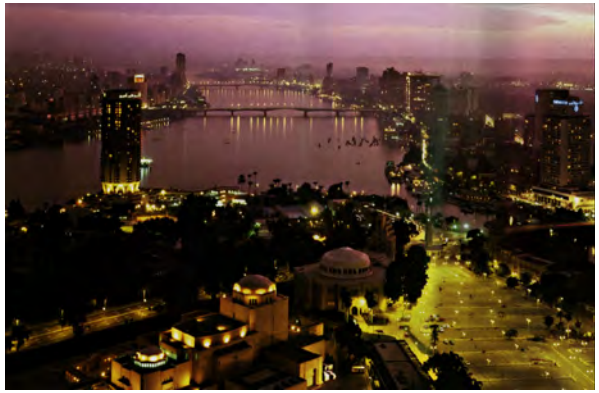
component: 5

Community and Economic Development

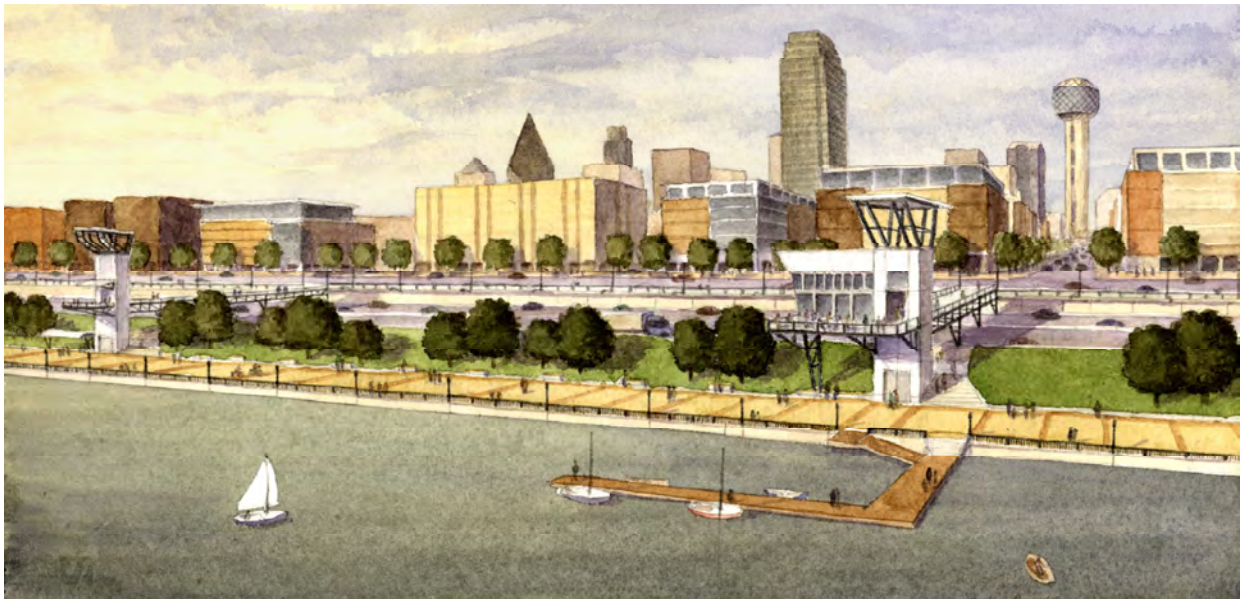
Planned well and with proper vision the Trinity River Corridor can become the focus of sustainable development at the heart of the Dallas Metroplex. A small but increasing number of people are seeking alternatives to conventional suburban living, tired of long commutes and isolation from neighbors and urban amenities. Nationally, a modest trend towards more urban life-styles is discernable, motivated both by the allure of city living and by a growing awareness of the environmental and social costs of sprawl. The center of Dallas can attract new residents looking for such alternatives to the suburbs: residents searching for a sense of place tied to the origins of the city and its landmarks. Much as Turtle Creek has continued to provide a high quality residential address for Dallasites, the Trinity River Corridor could be the focus for an urban life-style centered on proximity to downtown and easy access to cultural and recreational opportunities. In the last century, reclamation of Boston's Charles River became the growth corridor for a burgeoning metropolis and more recently the Platte River has become the next frontier for a growing Downtown Denver. The Trinity can do the same for Dallas.

Existing residents and businesses will have enhanced access to regional transportation via the Trinity Parkway and surface road enhancements along Industrial Boulevard and

Riverfront development in Valencia, Spain.



Riverfront development in Cairo.



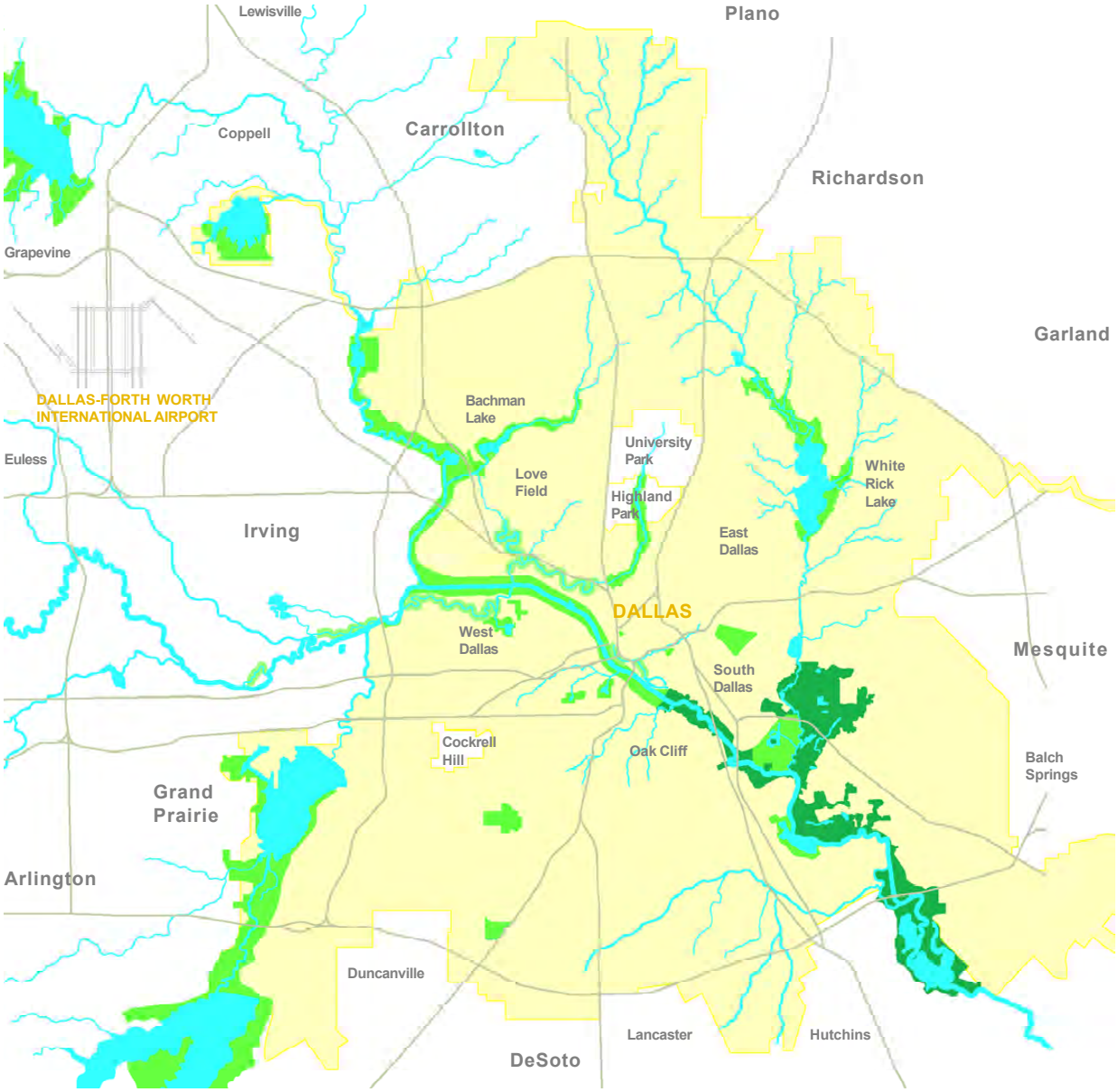
Proposed downtown Levee-top Road development and promenade at the Urban Lake.

proposed levee-top roads. Future development can be located to take advantage of existing and proposed light rail alignments. Walking and cycling will become viable modes of transit with the construction of new trails within the floodway and improvements to historic viaducts to better accommodate pedestrians and cyclists.

Residential communities along the Trinity - many of which are lower income - will be revitalized by the combination of enhanced transportation access and development of open space resources. West Dallas, South Dallas and many other Southern Sector neighborhoods will benefit from park enhancements that will place these communities near an interpretive center, an equestrian center and new recreational playing fields and lakes.

Existing businesses will benefit from enhanced access to the regional roadway system via the Parkway. New businesses will be attracted with good transportation access and high visibility sites along the river, while employees can be attracted with open space resources for afterwork leisure and recreation.

Levee extensions will stabilize property values and encourage investment by removing flood threats from low lying neighborhoods and businesses. Stabilizing - and increasing - property values is essential to increase the tax base for the City of Dallas, both to help offset the cost of the project and support improved services to the corridor.



Communities and neighborhoods connected by the Trinity Corridor (Dallas city limits shown in yellow).

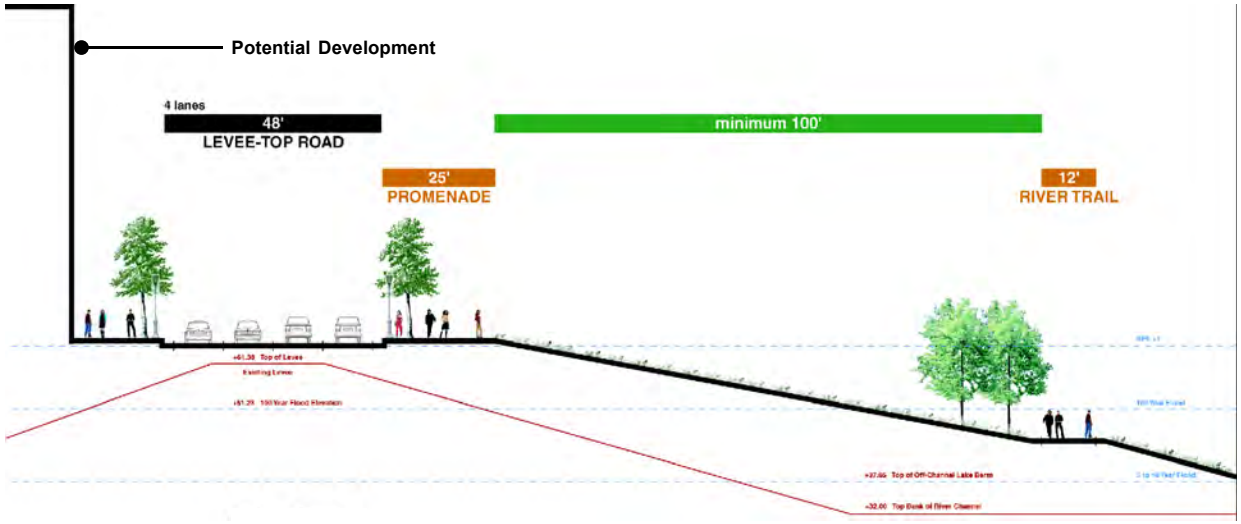
Enhanced corridor neighborhoods will make good neighbors for future parklands. Neighborhoods and businesses will become supporters and stakeholders in future park improvements by providing “eyes on the park” and future advocates for park maintenance and security.

Enhanced Access to Support Development

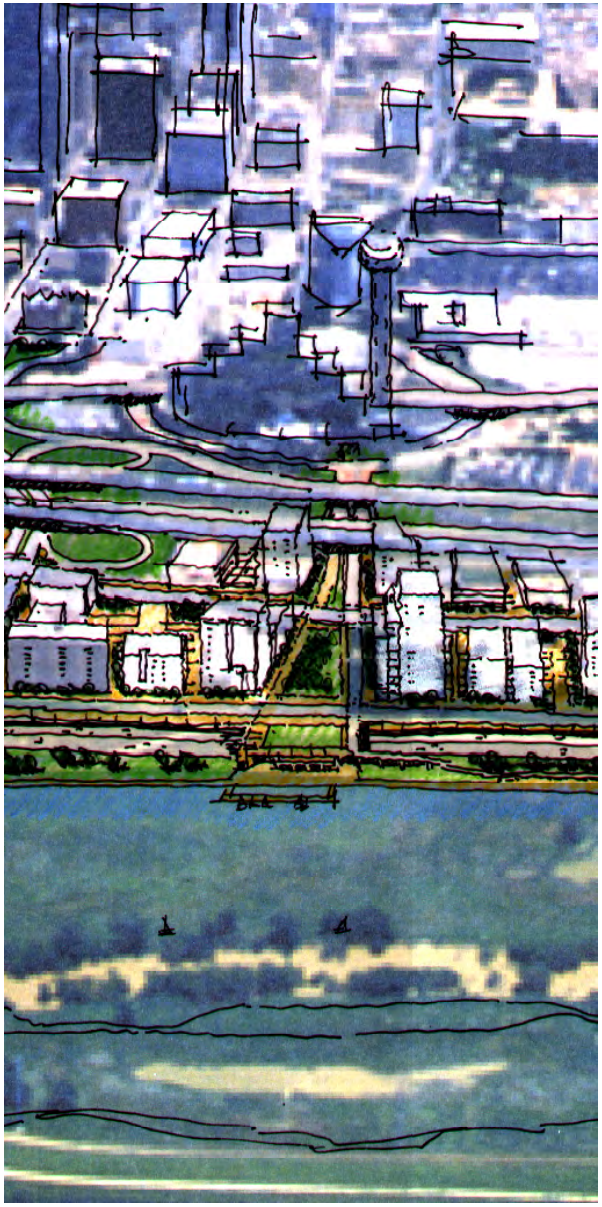
A primary element of the Plan calls for levee-top roads built adjacent to downtown, Stemmons Design District, and Oak Cliff neighborhoods. Levee roads would provide two important functions: prestigious addresses for new businesses and residences - like Turtle Creek Boulevard - and assistance to existing arterials, such as Canada Drive and Industrial Boulevard, in carrying local and regional traffic.

The levee roads would be designed to carry traffic during commute hours with up to four travel lanes, but also, during evenings and weekends, provide convenient on-street parking for park users. Wider lanes would support cyclists on the levee roads.

Technical issues relating to the continuing stability of the levees will have to be addressed as part of this project’s design. For instance, the USACE may require that the levees can accommodate additional raises in the future with low walls. Trees may have to be planted in special structures that protect the levees from failure in a flood event. Backfilling behind the levees - similar to the condition at Commerce



Oak Cliff Levee-top Road Section.



Proposed pedestrian plaza at the Reunion overlook.

Street now - could alleviate some concerns over the stability of the levees.

The roads proposed for the top of the levees could be constructed in several ways. One approach is to center the new roadway over the levee, two other concepts are to offset the roadway to either the inside or outside of the levee. Any of the three conceptual designs will require additional fill on the levee, and will result in the levee being strengthened, improving flood protection. The alignment on the outside of the levee will require relocation of some of the sump areas and other drainage structures, while construction on the inside of the levee would require off-setting excavation in the floodway to provide the same level of flood protection. The final alignment is a detailed design issue that will be based on development considerations, land use requirements, and construction costs. Continuing discussion with the USACE should ensure that the selected design will meet its concerns about levee strength and stability.

Better Access to Park Lands

Access to parklands will be achieved on the Oak Cliff (west) side of the Trinity River with a combination of continuous levee-top trails, and a proposed levee-top road running between IH-30 and IH-35. Parking along this roadway would provide unprecedented views and immediate access to parklands for regional park users and adjacent development. On the Downtown (east) side of the river, pedestrian overpasses will

Potential Oak Cliff Development between the Houston Street Viaduct and I-30 will bring new activity to the Trinity River.

provide access points to parklands between Hampton Road to the north and Cedar Crest Viaduct to the south. A total of 11 vehicular access points will be located from most major river viaducts between West Dallas and South Dallas. In addition, a continuous park road will provide vehicular access for the length of the park with entry points from adjoining neighborhoods.

In addition to frequent pedestrian bridges, a larger "pedestrian plaza" and widened pedestrian connections will be constructed over the Trinity Parkway. These pedestrian areas would cover the parkway for distances of up to 600 feet with public parkland or would provide wide walkways that cantilever over a part of the parkway to bring the walker closer to views of the lakes and park. The Reunion Street Plaza would become the focus for civic gatherings and events that relate to both downtown and the Trinity River.

Potential development at Woodall Rodgers North.

Potential development at Cedars West.

Development Districts

The combination of the Trinity Parkway and parkland development will spur new interest along the corridor. At locations with enhanced access to recreation and transportation, new large-scale development should be encouraged. Larger scale development will be required to support the cost of infrastructure such as levee stabilization and sump relocation. Throughout the corridor, these public investments should lead to revitalization and redevelopment that support existing communities and create new business and mixed use areas. Some examples of the potential for community and economic development are (listed from west to east):

Westmoreland Heights / Lake West
West Dallas neighborhoods would be made more attractive with enhanced regional access to the Trinity Parkway via Sylvan and Hampton Roads and increased recreational resources within the Trinity River Park. A variety of infill developments would be anticipated within existing neighborhoods or in commercial locations along major arterials.

Singleton Boulevard would attract commercial and residential development at the western terminus of the Woodall Rodgers Bridge. Improved highway access and enhanced views over parkland would make this site particularly attractive for larger-scale commercial and residential development.

Oak Cliff Gateway
The triangle of land bordered by Beckley, Zang and the Trinity River Levee is already becoming a desirable residential neighborhood. New development within this district would include residential and commercial development of sufficient density to offset the cost of relocating sumps and construction of a levee-top road. Future development would have unparalleled views and access to downtown, the lakes and

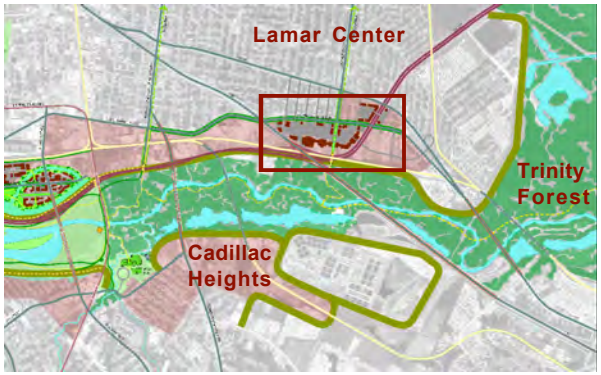
river parkland. Special treatment of the Houston Street Viaduct should be considered including better pedestrian accommodations and architectural lighting of the structure.

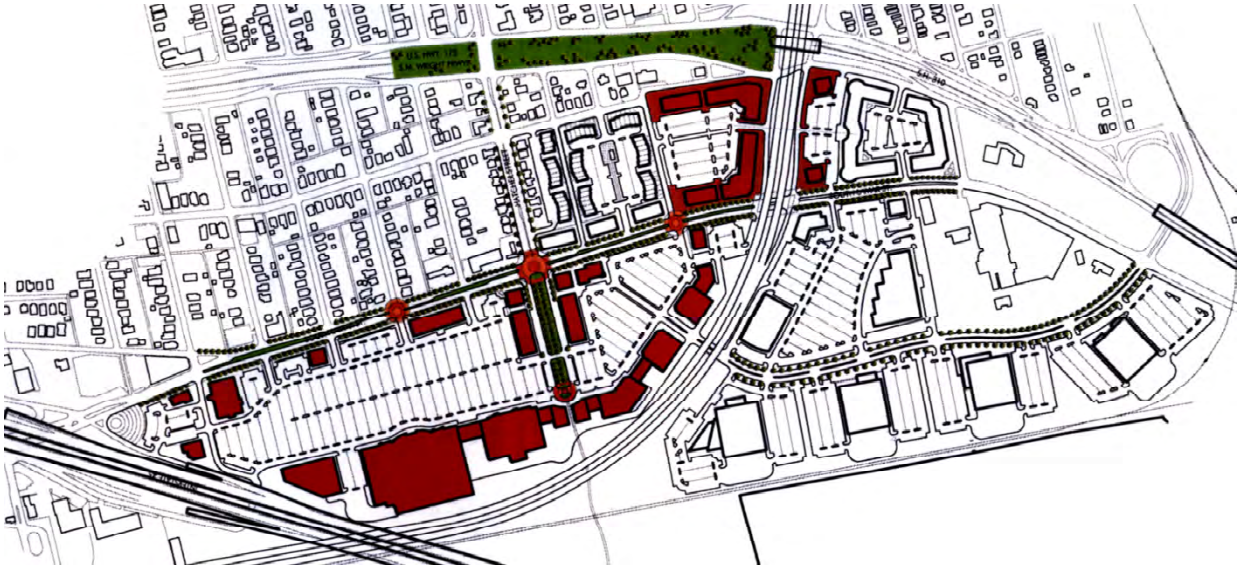
Woodall Rodgers Landing
Highly visible commercial and residential sites would be available at the east and west landings of the new Woodall Rodgers bridge. Land takings needed for bridge construction could be used to assemble parcels for future development. The Woodall Rodgers Bridge - to be designed by Santiago Calatrava - and the existing Continental viaduct should provide ample pedestrian facilities to support adjacent development. Sites on the north side of the Trinity would have unparalleled views and high visibility - from the Parkway and Woodall Rodgers - for corporate landmark buildings.

Reunion Place
On either side of Reunion Plaza extending over the Trinity Parkway, and along a new levee-top road, new development opportunities would be created adjacent to downtown with access to Industrial Boulevard and Commerce Street. A mix of residential and commerical development would benefit from views over the Trinity Lakes and easy access to the parklands via Reunion Plaza and the park road.

Cedars West District
Improvements to Industrial Boulevard could be combined with a major change of use that would include housing, office and retail development adjacent to the old Trinity Sumps. Light rail transit would be available at the 8th and Corinth Station and the Cedars Station on South Lamar; and a new station could be located at the Trinity River to serve new development.

South Lamar
Enhancements to South Lamar Boulevard and improved regional access will encourage retail and commercial development adjacent to IH-45 and IH-75. South Dallas neighborhoods will have improved access to parklands via MLK Jr. Boulevard, which will become a significant boulevard connection between two major Dallas assets - the Trinity River and Fair Park. In the Trinity River Corridor Comprehensive Land Use





South Lamar Development Area (image from Draft Comprehensive Land Use Study, HNTB/GFF).

Plan, the HNTB team illustrates an opportunity created by the connection of I-45 and C.F. Hawn Freeway for a regional retail center at the intersection of the Trinity Parkway and Lamar. This area is currently underutilized by scrap metal salvage yards and other blighted industrial uses. Because the connection between I-45 and C.F. Hawn Freeway removes the need for S.M. Wright to remain as a freeway, the Trinity River Corridor Comprehensive Land Use Plan proposes the conversion of S.M. Wright Freeway to an at-grade, landscaped boulevard. This would link the residential neighborhoods on both sides of the roadway, and strengthen the viability of the neighborhood currently between S.M. Wright and Lamar.

Cadillac Heights
Levee improvements will protect low-lying businesses and residents from periodic flooding. Cadillac Heights will benefit from improved regional access with connections to the Trinity Parkway at Corinth Street and Martin Luther King, Jr. Boulevard viaducts, an asset for a variety of possible future land uses in this area.

Planning for Revitalization

Each of the areas within the Trinity River Corridor must be planned carefully to ensure that the public investments and future community/economic development are supportive of one another. Without clear land use plans, design standards, infrastructure programs and incentive packages, such development will happen much more slowly.

The City of Dallas has a comprehensive land use study underway for the entire Trinity River Corridor. The land use plan consultant team has conducted detailed assessments of 22 'priority development areas' that have the greatest potential for revitalization resulting from these public investments. In addition, the study has developed 'prototype plans' for 10 areas that propose site planning, urban design and infrastructure strategies to encourage development.

The comprehensive land use study is currently on hold pending decisions about the Trinity Parkway. Following action on the Parkway and this Balanced Vision Plan, the land use study's recommendations to date should be reviewed so they maximize benefits from the latest designs for these public projects. Completion of this land use study and adoption of its recommendations for implementation is essential to achieve the full community benefit of this vision plan.

Comprehensive Land Use Study Priority Areas

- Dowdy Ferry / Interstate 20
- Southern Gateway
- Southward Industrial
- Joppa
- Pemberton Hill
- Rochester Park
- Ideal Neighborhood
- South Lamar Industrial District
- Cadillac Heights
- Skyline Heights
- Tenth Street Bottoms
- Cedars West
- Mixmaster / Riverfront
- Oak Cliff Gateway
- Woodall Rodgers Intercept
- La Bajada / Los Altos
- Old Trinity Industrial
- Westmoreland Heights / Lake West
- Commonwealth / Trinity Parkway
- Irving Boulevard / Regal Row
- Stemmons Crossroads
- Luna Road / Walnut Hill

Fact Sheet

ENHANCED PHYSICAL ACCESS

- **Trinity Parkway Connections**
  The Trinity Parkway will have connections to the following major arterials:
  North Hampton
  Sylvan Drive
  Continental (via Industrial Blvd)
  Commerce (via Industrial Blvd)
  Houston/Jefferson Streets
  Corinth Street
  Cedar Crest/MLK
  Commonwealth
  Industrial Blvd

- **Downtown Levee-top Road(s)**
  2.1 miles
  Downtown levee-top roads to be located as appropriate to support adjacent urban development

  The street will have two full-time travel lanes with two curb lanes capable of carrying peak traffic but reserved for parking during non-rush hour weekday periods, and weekends. Speed limit of 30 mph

- **Oak Cliff Levee Road**
  1.8 miles
  The Oak Cliff Levee-top Road will connect Beckley, Houston Street Viaduct, Jefferson Viaduct, IH-35 and IH-30

  The street will have two full-time travel lanes with two curb lanes for parking. Speed limits will be posted at 35 mph

PEDESTRIAN PLAZAS

- **Reunion Plaza**
  Area: approximately 2.75 acres (600'x200')
  Programing for the plaza will be passive recreation; viewing of lakes; retail coul include food service, boathouse for boating clubs, public meeting rooms, and vertical circulation for pedestrians and vehicles for park access

- **Widened Pedestrian Connections**
  These connections would be approximately 80' wide and would provide pedestrian areas on the levee top and potentially cantilever over the riverside levee slope.

DEVELOPMENT DISTRICTS

- **Westmoreland Heights / Lake West**
  Approximately 1,500 acres of existing neighborhoods could see residential infill of 63 new units of housing

- **Old Trinity Industrial**
  Approximately 200 acres of transitional warehouse uses could see mixed-use re-development and increased densities up to FAR of 2.0 in selected locations totaling up to 7.4 million sf

- **Woodall Rodgers Gateway (west side)**
  Approximately 100acres of highly visible sites with FAR of .30 could yield development of up to .28 million sf

- **Oak Cliff Gateway**
  Approximately 60 acres of mixed-use and residential re-development with FAR of 2.0 could yield development of up to .89 million square feet and 960 residential units.

- **Cedars West**
  Approximately 180 acres of mixed-use and residential redevelopment with FAR of 2.0 could yield development of up to 2 million square feet and 3,200 residential units.

- **South Lamar**
  Commercial development along South Lamar Street could total up to 1 million sf

- **Cadillac Heights**
  Residential infill within low-lying neighborhoods could total an additional 200 households

III. IMPLEMENTING THE VISION

The Trinity River Corridor Project will take a generation-or-more to be realized in full. It will require several phases and multiple individual projects. It will demand sustained commitment and cooperation across each phase on the part of public agencies, civic organizations, neighborhood associations, advocacy groups, and individuals. The expectations of success must prevail over temporary difficulties or constraints. Ahead lie unforeseen circumstances, potential points of conflict, budgetary complications, and periodic redirection of project specifics. All large-scale public work projects encounter such circumstances. A broadly supported, balanced vision, such as the one outlined in this report, is essential to keeping primary objectives in focus and progress maintained over the long haul.

In keeping with the idea of a balanced and realizable vision, this chapter outlines the key steps in the implementation process, one that is already underway. To the degree possible to be precise at this still conceptual point of planning, specific project costs, potential additional sources of funding, project schedules, assumptions regarding operation and maintenance, and recommendations about project management and design are outlined below.

Opening day at Crissy Field in San Francisco: restored tidal wetlands were replanted by volunteers.

While the full long-term vision is outlined and remains the ultimate goal, this chapter emphasizes the first decade-or-so of improvements. A **Basic Phase 1** is described that is achievable with the resources available from the Dallas 1998 bond program and anticipated funds from state and federal partners. And an **Expanded Phase 1** is outlined, including projects that the urban design team recommends be achieved early, but which require funds beyond those the bond program made available. As the EIS processes continue, the urban design team urges city and state officials to identify sources for these additional funds so that the expanded Phase I can proceed when final design commences approximately two years from today.

Four KEY STEPS . . .

1. Costs, Phasing and Funding
2. Project Schedule
3. Operations and Maintenance
4. Recommendations

. . . to the implementation process already underway.

III. IMPLEMENTATION

1. Cost Estimates, Phasing and Funding

Completion of this Balanced Vision for the Trinity River Corridor will take many years. As a visionary master plan, it is intended to describe an ultimate plan that may require a generation or more to complete. This long range vision is important because it should guide the work on each individual project that is completed over time. It creates a challenge, however, in terms of estimating costs and identifying potential funding sources. Along with an estimate of costs for the ultimate plan, this chapter also describes a **Basic Phase 1 package of improvements that can be funded** with the resources available from Dallas' 1998 bond program and anticipated funds from state and federal partners.

The Balanced Vision Plan provides a compelling long range vision and a reasonable initial phase of projects that can be completed in approximately the next 10 years. In this chapter, the costs to construct the ultimate plan are estimated. Next, projects for the first phase are proposed. There are actually two versions of Phase 1 – a basic and an expanded – which are detailed in this section. Finally, strategies for funding Basic and Expanded Phase 1 are explained. Detailed spreadsheets in Appendix B provide additional information on the costs and funding discussed in this chapter. Projects

The Balanced Vision Plan endorses the continuing acquisition of forested land to expand the Great Trinity Forest.

included in each phase are listed in the table below.

Phased Implementation

Although this plan outlines a vision that will take generations to fully implement, many of the most important elements can be realized within a few years. This study divides the scope of work into three parts based on the potential for funding.

- **Basic Phase 1**– the elements of the project that can be completed with funds from the 1998 City Bond Election combined with anticipated funding from other governmental sources.

- **Expanded Phase 1** – the basic plan plus a series of elements that are highly desirable in achieving a bold change in the Trinity River Corridor in the first ten years of investment. Additional funding would be required.

- **Ultimate Plan** – this long range vision is offered to guide development of the corridor in future decades.

If possible, the "basic plan" and the "expanded basic plan" should be implemented concurrently as "Phase 1".

	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Flood Protection Component			
Dallas Floodway Extension	All		All
Elm Fork Flood Protection	Phase 1 of Elm Fork F.P. management plan		Complete
Raise of Existing Levees	All		All
Environmental Restoration and Management Component			
Great Trinity Forest Land Acquisition	All, per 1998 bond funds		Addional land acquisition recommended
Trinity Interpretive Center	All		All
Trinity Forest Trails (pedestrian, bicycle, equestrian)	All, per '98 bond funds		All currently identified and possible additions
Floodway Area Trails (pedestrian, bicycle, equestrian)	Minimal scope	Expanded scope	Complete
River Meanders (including armoring)	Downstream from Sylvan		Entire flooday stretch
River-related Infrastructure	Part (bridge pier armoring at meanders)		All
Enhancement of Habitat in the Floodway	Downsteam from Sylvan	Additional	All
Stormwater Wetlands	None	Pavaho wetlands	All
"Headwaters" Wetlands	None	Part	All
Boardwalks for Nature Observation	Not included	Partial scope	Complete

	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Parks and Recreation Component			
Urban Lake and Stormwater Culverts	Part (lake and culverts)	Amenities including promenade	All
Natural Lake (incldues lake and amenities)	Lake	Amenities	All
Trinity Equestrian Center	All		All
Water Supply for Terraced Lake System	Groundwater supply for make-up	Complete flowing lakes system from Central Wastewater Plant	Possible expanded reuse initiatives
Boat, Canoe, Kayak Access in Floodway Area	As exists	As exists	All
Gateway Parks	Six parks per 1998 funding	Additional as funding permits	Remaining parks per MIP
Elm Fork Soccer Complex	All		
Elm Fork Dog Park	All		
Elm Fork Trails	Part	Additional trails	All
Connections between Lakes and to Trinity River	Between lakes	All	
Natural Lake amenities	None	All	
Whitewater Rafting Course	None	None	All
Park Access Roads (including roadways, bridges and parking)	None	Partial scope	All
Canoe launches	All		
West Dallas Lake/Wetland Area	None	None	All
Active Recreation Terraces (two)	None	None	All
Amphitheater	None	None	All
Concession/Event Facilities	None	None	All
Park District Maintenance Facility	None	All	All
Transportation Component			
Woodall Rodgers Bridge	All		
Signature Bridges at IH-30 and IH-35	None	None	All
Trinity Parkway	Complete (6-4-4 lanes)		Complete (6-4-4 lanes)
Industrial Boulevard	Partial upgrade?	Complete upgrade?	All
Pedestrian Deck Parks and Connections	Basic elements	Enhanced facilities	All
Downtown Levee-top Roads	None	None	All
Oak Cliff Levee-top Road	None	All	
Beckley Boulevard	Woodall Rodgers to Commerce	50%	Commerce to IH-30
South Lamar Street Upgrade to Boulevard	None	None	All
S.M. Wright Conversion to Boulevard	Part (TXDOT demolish overpasses)		All
Community and Economic Development Component			
Comprehensive Land Use Study	Study complete		

Cost Estimates

Assumptions Regarding Construction Costs

Three factors should be emphasized in presenting these cost estimates. First, they are estimates based on conceptual design of many projects; they are based on the best information currently available to the urban design team and City of Dallas staff regarding potential capital costs. As more detailed design, engineering and construction plans are completed, it is possible that costs may change based on new information.

Second, the basic cost estimates for these projects have been modified by three cost adjustments:

- A factor of 15% was added to the basic cost estimates to provide for the costs of project engineering and design.
- A contingency factor of 20% was applied due to the uncertainty of estimating construction costs when a project is still in a very conceptual stage.
- Since these projects will not be built immediately, cost escalation was also assumed, at an annual rate of 4%. For the Basic Phase 1 projects, costs were escalated to 4 years in the future (year end 2008) and for the Expanded Phase 1 projects, costs were escalated to 8 years in the future (year end 2011). Projects that are part of the 'ultimate' plan but not part of phase 1 are estimated in 2003 dollars, as it is not possible to gauge the timing of their construction.

Costs for projects detailed in other Trinity studies (such as the Great Trinity Forest, Dallas Floodway Extension and Elm Fork Floodplain Management study) are those developed by the other studies rather than using the factors noted here.

Third, many different funding sources will be needed to fund the projects included in this plan. Sources include local, state and federal governmental programs, funds managed by foundations or non-profit organizations and contributions from individuals.

Estimated Construction Costs for Ultimate Plan

The ultimate plan described in this report addresses five issues. The projects and estimated costs for each of these issues are summarized in the table below and discussed in greater detail in the section that follows. The costs discussed here include **costs to all funding agencies**, not just those borne by the City of Dallas. Throughout this chapter, costs are rounded to the nearest $1,000.

1. Flood Protection

Flood protection is addressed through three major projects within this plan. Two of these – the Dallas Floodway Extension and the Elm Fork Flood Protection Project – remain unchanged by the Balanced Vision Plan recommendations. This plan also supports a third flood protection project first identified by the Trinity River Corridor Citizens Committee in 1995 – the raise of existing levees to provide an additional 2 feet of "freeboard" height above the Standard Project Flood (SPF) protection provided through other initiatives. Since this vision includes roads, trails and pedestrian decks that will be located on or adjacent to the existing levees, it is important that a levee raise be designed along with these improvements.

Balanced Vision Plan Components	**Estimated Cost, Ultimate Plan**
Flood Protection	$ 197,030,000
Environmental Restoration and Management	$ 107,119,000
Parks and Recreation	$ 201,888,000
Transportation	$ 1,226,497,000
Community and Economic Development	$ 1,100,000
TOTAL	**$ 1,733,634,000**

2. Environmental Management and Restoration

Environmental management and restoration is an integral part of this Balanced Vision Plan. Current plans for the Great Trinity Forest, Trinity Interpretive Center and a system of trails in the corridor will help to protect natural areas and make them more accessible and understandable to residents and visitors. Those projects are supported by this Balanced Vision Plan.

Six environmental initiatives that occur within the existing floodway are included as part of this ultimate plan. Restoring meanders to the river's course and creating diverse habitat within the floodway are essential to this vision of the natural environment as an integral part of the visitor's experience in the central part of the Trinity Corridor.

Stormwater wetlands create habitat that is sustained by the water that runs off the urban area and reaches the Trinity River through one of the sumps along the existing levees. These wetlands will occur at each of the four pump stations where stormwater is pumped into the Trinity River (Pavaho and Delta in West Dallas; Hampton and Baker in the Stemmons Corridor). The 'headwaters wetland' will occur at the upstream end of the terraced lakes, where some of the treated effluent from the Central Wastewater Treatment Plant would be released to travel through the wetlands before reaching the lakes. In both cases, these wetland systems are intended to provide natural habitat and environmental education about water and its related natural systems.

Throughout the floodway, people need to reach the natural areas if they are to enjoy nature study and learn about the environment. This plan includes 25 to 30 miles of trails (for pedestrian, bicycle and equestrian use) and approximately 4 miles of boardwalks in selected open space areas.

Flood Protection Component	**Estimated Cost, Ultimate Plan**
Dallas Floodway Extension	$ 140,800,000
Elm Fork Flood Protection	$ 39,624,000
Raise of Existing Levees	$ 16,310,000
Master Implementation Plan	$ 296,000
TOTAL	**$ 197,030,000**

Environmental Component	**Estimated Cost, Ultimate Plan**
Great Trinity Forest Land Acquisition	$ 3,707,000
Trinity Interpretive Center	$ 14,430,000
Trails in/near the Great Trinity Forest, Trinity, Central Park and Elm Fork (pedestrian, bicycle, equestrian)	$ 37,409,000
Master Implementation Plan	$ 592,000
River Meanders	$ 29,711,000
River-Related Infrastructure	$ 1,597,000
Enhancing Habitat in the Dallas Floodway	$ 6,084,000
Stormwater Wetlands	$ 3,793,000
Headwaters Wetlands	$ 1,211,000
Boardwalks for Nature Observation	$ 8,585,000
TOTAL	**$ 107,119,000**

3. Parks and Recreation

Recreational activities within the Trinity River Corridor will include a wide variety of experiences for Dallas residents and visitors from the rest of the Metroplex, the nation and

the world. The ultimate plan described in this report involves several key construction projects for water-related recreation, active sports and major events.

In the ultimate plan, water flows through two terraced lakes and then rejoins the Trinity River through an area of braided river channels and islands. Costs for this component include the cost to supply water to the lakes, construction of the two lakes and the amenities surrounding the lakes. The ultimate plan assumes that two different approaches were used to provide water to the lakes. Initially, groundwater would be used to fill the lakes. In the long term, treated effluent from the Central Wastewater Treatment Plant will be used to supply the terraced lakes. It will be pumped to the Urban Lake, which is furthest upstream from the treatment plant. If funding were found to pump water to the lakes initially, approximately $2.56 million of the ultimate cost for this item could be saved.

The edge of the Urban Lake closest to downtown is bounded by a promenade, connecting to downtown itself through a pedestrian plaza deck crossing the Trinity Parkway. The outer edge of the Urban Lake is landscaped and accessible through paths or walkways. The connection from the Urban Lake to the Natural Lake includes a distinctive water feature, such as a waterfall, water cannons or fountain. The Natural Lake is less formal, with natural landscaping and trails. A third lake near West Dallas is also included in the ultimate plan.

Active recreation needs will be addressed by a significant soccer complex in the Elm Fork area and by two terraces within the floodway for active sports. These terraces will also contain an amphitheater for major events and public gatherings and grassy fields for informal sports. An equestrian center, canoe launches at various locations along the river and a whitewater rafting course will entice individuals with diverse recreational interests. Gateway parks connect neighborhoods to the park, and other areas for walking, picnicking and relaxation occur throughout the park.

Internal park roads are needed so visitors can reach key destinations within the park. The ultimate plan includes approximately 15 miles of park roads (with bridges over the river

Parks and Recreation Component	**Estimated Cost, Ultimate Plan**
Plans and Studies	$ 2,607,000
Elm Fork Recreation Facilities	$ 31,511,000
Trinity Equestrian Center	$ 1,720,000
Canoe Launches	$ 1,044,000
Gateway Parks	$ 10,566,000
Water Supply for Terraced Lake System	$ 15,601,000
Urban Lake (includes lake, stormwater culverts, 4500' promenade and landscaping)	$ 18,110,000
Natural Lake (includes lake and amenities surrounding lake)	$ 1,074,000
Connections between Lakes and to Trinity River (includes enhanced water feature)	$ 4,152,000
West Dallas Lake/Wetland Area	$ 4,830,000
Park Access Roads (including roadways, bridges and parking)	$ 49,832,000
Other Infrastructure and Support Facilities	$ 15,677,000
Excavation in Ultimate Plan (after completion of Phase 1)	$ 18,837,000
Active Recreation Terraces (two)	$ 19,320,000
Whitewater Rafting Course	$ 2,070,000
Boat, Canoe, Kayak Access in Floodway Area	$ 245,000
Amphitheater	$ 138,000
Concession/Event Facilities	$ 414,000
Park District Maintenance Facility	$ 4,140,000
TOTAL	**$ 201,888,000**

channel in 3 locations) and approximately 6 acres of parking areas distributed throughout the park at primary destinations.

4. Transportation

This plan for the Trinity River Corridor provides substantial transportation enhancement for Dallas and the region. Regional transportation improvements include the Woodall Rodgers Bridge, the Trinity Parkway (in the six and four lane configuration)[1], improvements to Industrial Boulevard, creation of a regional connection between the Parkway and IH-35 through part of a levee top road in the Oak Cliff area and construction of signature bridges over the Trinity at IH-30 and IH-35. Levee top roads in some sections adjacent to downtown provide circulation and economic development opportunities. Local transportation is also served by enhancements to Beckley Avenue and Lamar Boulevard and the conversion of S.M. Wright to a city boulevard. A pedestrian deck park, widened pedestrian connections and pathways along the eastern levee encourage people to walk or bicycle to the park.

Transportation Component	**Estimated Cost, Ultimate Plan**
Plans and Studies	$ 5,023,000
Woodall Rodgers Bridge	$ 78,004,000
Signature Bridges at IH-30 and IH-35	$ 331,478,000
Trinity Parkway	$ 609,334,000
Industrial Boulevard	$ 88,188,000
Pedestrian Deck Parks and Connections	$ 19,557,000
Downtown Levee-Top Roads	$ 3,241,000
Oak Cliff Levee-Top Road	$ 37,105,000
Beckley Avenue	$ 10,471,000
Lamar Boulevard	$ 17,324,000
S.M. Wright Conversion to Boulevard	$ 26,772,000
TOTAL	**$ 1,226,497,000**

Community and Economic Development Component	**Estimated Cost, Ultimate Plan**
Comprehensive Land Use Study	$ 1,100,000
TOTAL	**$ 1,100,000**

5. Community and Economic Development

Community Development is the final area of focus for the Balanced Vision Plan. Many of the investments made in other aspects of the plan will support revitalization of neighboring communities and new economic investment in the Trinity River Corridor. For example, the Gateway Parks make important connections between the neighborhoods and the river. Since they are also primary access points for the park, they offer opportunities for businesses such as restaurants, bike or canoe rentals and ecotourism guide services. Investments in roadways such as Lamar Boulevard should encourage new investment and revitalization of existing business areas. Though these projects support community and economic development, their costs are included under other plan components.

There is one item specifically related to community and economic development. The city's Comprehensive Land Use Study will develop a corridor-wide land use plan, design standards and financial incentives for private development throughout the corridor. This study is essential to ensure that future

[1] Expanding the Parkway to six lanes throughout its length would add an additional $ 8.1 M.

development occurs in a way that is compatible with existing uses and with the future parkland and other amenities in the Corridor.

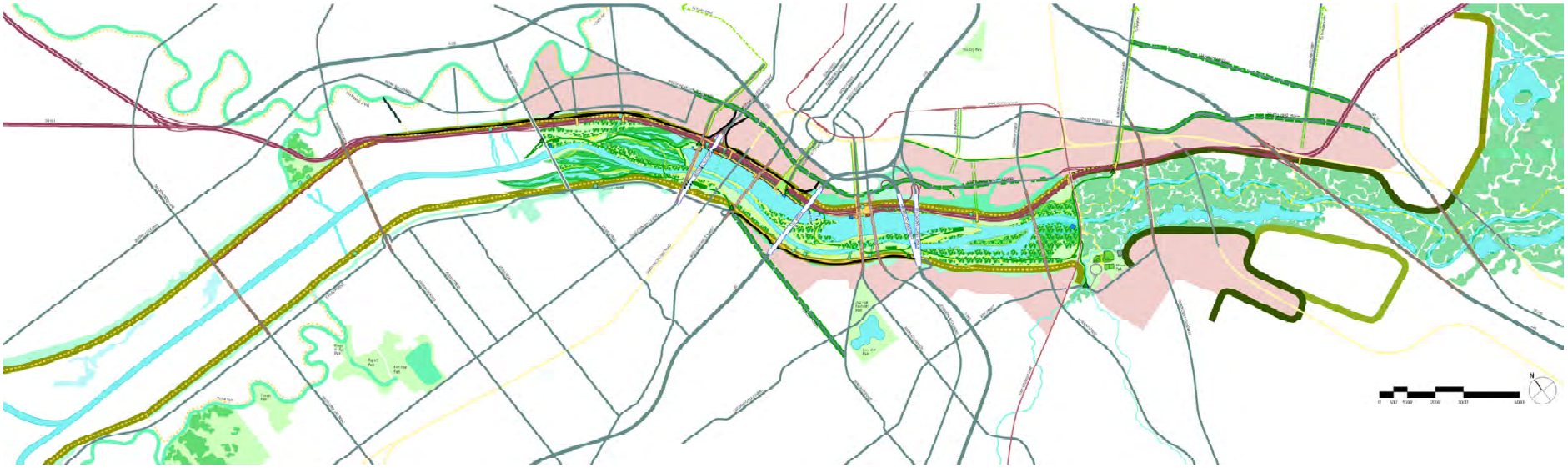
One potentially significant cost for community and economic development is not included in these estimates. This is the cost of action to relocate or underground electrical transmission lines along the Trinity River. These costs are not known at this time.

Phasing

Phase 1 Recommendations

The initial phase of this program includes projects that should be completed during the first ten years of the plan's implementation. The package of projects in the first phase should provide Dallas residents and visitors with a result they can use and enjoy. Projects should be grouped for cost and time efficiency of construction, and to gain the maximum benefit from funding partnerships.

The City of Dallas currently has $246 million available for the first phase of this project, funds approved by voters in Proposition 11 of the 1998 bond election. **The "Basic Phase 1" described below is structured so it can be completed with these bond funds and anticipated funds from State and federal partners.** Through development of this Balanced Vision Plan, the urban design team has identified an additional group of projects, called the "Expanded Phase 1", that are very desirable to achieve a significant change in the Trinity Corridor through the first ten years of investment. The team believes additional funding should be raised so the basic and expanded Phase 1 projects can occur concurrently. The table below summarizes the costs for Phase 1. The projects proposed for the Basic and Expanded Phase 1 are illustrated on the Phase 1 Map below and described in the



Map of improvements: Basic plus Expanded Phase 1 is shown (note improvements upstream of Sylvan are in later phases).

following section. A detailed breakdown of project costs is found in the report appendix.

1. Phase 1: Flood Protection

All of the flood protection projects envisioned in the ultimate Balanced Vision Plan are included in the Basic Phase 1 program.

2. Phase 1: Environmental Management and Restoration

All projects related to the Great Trinity Forest are included in the Basic Phase 1 program. In the floodway area, Basic Phase 1 changes the river's alignment to create meanders in the stretch from approximately Sylvan Avenue to the end of the Natural Lake and to create the braided channel and island area between the Natural Lake and the beginning of the Great Trinity Forest south of Corinth. Related utility relocation and protection of bridge piers are also included. River banks are restored and trees and vegetation are planted along the new river channel.

The Expanded Phase 1 includes creation of the headwaters wetland, though at approximately 2/3 the intensity of planting that the ultimate plan envisions. The first of three stormwater wetlands would be created in this phase; it would be located at the Pavaho outfall in West Dallas. Finally, the Expanded Phase 1 includes approximately 2,000 feet of boardwalks for nature study and observation within the new nature areas.

3. Phase 1: Park and Recreation

The Basic Phase 1 includes the Trinity Equestrian Center, the recreation projects planned for the Elm Fork, four canoe launches, six Gateway Parks and the planning and design studies for park-related improvements to the Corridor.

Creation of the two terraced lakes is part of the Basic Phase 1 package, though improvements around the lakes will be minimal without the Expanded Phase 1 program. In the Basic package, the lakes are fed with groundwater from wells, so there is no water flowing through them or from the lakes to the river. These lakes require construction of culverts to carry stormwater from three outfalls under the lakes and to the river channel; bridge pier protection will be needed for some existing bridges and some improvements are needed between the lakes and the river to handle flood flows. The Basic Phase 1 provides funds for some tree planting around the two lakes. In addition, a trail would connect the Reunion Plaza deck to the Urban Lake and would extend about one mile along the lake, providing an appealing pedestrian experience adjacent to Dallas' downtown.

The Expanded Phase 1 projects create a park that can indeed be a destination for Dallas residents and visitors. It would supply the lakes with water from the Central Wastewater Treatment Plant, piped to locations upstream of the Urban Lake. This important addition allows water to flow into the Urban Lake, from there down into the Natural Lake and finally back into the Trinity River. Flowing water and the amenities created where water elevations change add visual interest for park visitors and pedestrians in downtown and Oak Cliff. Connections between the two lakes and an 'outlet works' where the lakes flow into the Trinity River are included in the Expanded Phase 1. Funding for a special water feature (such as a fountain, waterfall or water cannons) between

Balanced Vision Plan Components	**Estimated Cost, Basic Phase 1**	**Estimated Cost, Expanded Phase 1**
Flood Protection	$ 170,995,000	$ 0,000
Environmental Restoration and Management	$ 54,047,000	$ 4,127,000
Parks and Recreation	$ 47,456,000	$ 43,702,000
Transportation	$ 786,643,000	$ 66,545,000
Community and Economic Development	$ 1,100,000	$ 0,000
TOTAL	**$ 1,060,241,000**	**$ 114,374,000**

the two lakes is included in this phase. The promenade on the downtown edge of the Urban Lake is part of Expanded Phase 1, as is additional landscaping around both lakes.

The Expanded Phase 1 includes 3 miles of internal park roads, approximately 1.5 acres of parking areas and utilities to service its recreational amenities. One boat ramp and two canoe access points are also included.

4. Phase 1: Transportation

Most of the transportation improvements for the Trinity Corridor are included in the Basic Phase 1 package. It includes the Woodall Rodgers Bridge, improvements to Beckley Avenue, the Trinity Parkway and Industrial Boulevard improvements. A pedestrian deck park at Reunion and widened pedestrian connections in the downtown area are also part of this package.

The Expanded Phase 1 includes additional transportation projects that support economic development as well as traffic movement. Improvements to Continental Boulevard between Industrial Boulevard and IH-35 are included. The Oak Cliff Levee Top Road, enhancements to Lamar Boulevard and conversion of S.M. Wright to a city Boulevard are included in the Expanded Phase 1.

5. Phase 1: Community and Economic Development

The Basic Phase 1 program includes the Comprehensive Land Use Study that is already underway and is essential to future economic growth and neighborhood revitalization.

Funding

Phase 1 Funding Strategies

Implementation of a plan that serves a major city, its metropolitan area and visitors from the nation and the world should be funded from sources that reflect these many levels of benefit. For the Balanced Vision Plan's Basic Phase 1, public funding sources include the City of Dallas, state and federal agencies. Additional funding may be obtained from other private or non-profit sources. Those funding sources and strategies to address the current shortfall for the Expanded Phase 1 are discussed below.

a. Basic Phase 1: City of Dallas Funding

City of Dallas investment in the Trinity River Corridor is funded by the bond program Proposition 11 authorized by voters in 1998. That proposition included a total of $246 million for public capital improvements in the Trinity River Corridor. Those funds were apportioned as noted below. All of these funds are used for Basic Phase 1 projects; the particular components of the Balanced Vision Plan funded through the sections of the bond program are noted here.

b. Basic Phase 1: Other Identified Funding Sources

The U.S. Army Corps of Engineers is an important source of funding for projects related to flood protection, environmental restoration and recreation. In the Basic Phase 1 package, the Corps provides funds to support the Dallas Floodway Extension, the levee raise, creation of the river meanders, some trails and the Gateway Parks. The Corps' funding of the

Proposition 11	**Amount**	**Balanced Vision Plan Component**
Dallas Floodway Extension	$ 24,700,000	Flood Protection
Elm Fork Levee	$ 30,000,000	Flood Protection, Parks and Recreation
Transportation	$ 118,000,000	Transportation
Great Trinity Forest	$ 41,800,000	Environment, Parks and Recreation
Chain of Lakes	$ 31,500,000	Environment, Parks and Recreation
TOTAL	**$ 246,000,000**	

Basic Phase 1 package totals $140.42 million.

Federal transportation funds (through the STEP program) cover $4.07 million of the $4.79 million cost of the Santa Fe Trestle Trail. Other federal transportation funds are utilized through the state and regional funding allocation programs described below.

Two state agencies are expected to contribute funding to the Basic Phase 1. The Texas Parks and Wildlife Department has committed almost $297,000 to construction of the Buckeye Trail and construction of canoe launches at Sylvan Avenue and Loop 12.

The Texas Department of Transportation (TXDOT) has been an active participant in the transportation aspects of this plan. Though TXDOT has not identified a specific funding level or source, it is anticipated to cover some of the costs for the Basic Phase 1. In past discussions of the Trinity Parkway MTIS improvements, TXDOT was expected to 'bridge the gap' between the Parkway's cost and the funding available locally. For prior alternatives, that gap ranged from $392 million to $976 million. As discussions with TXDOT continue, the agency should be encouraged to consider funding in that range for Balanced Vision Plan projects that serve regional transportation needs.

The North Texas Tollway Authority (NTTA) is an important partner in the transportation improvements for the Trinity Corridor. It is proposed to construct, operate and maintain the Trinity Parkway as a tolled facility. At this point, NTTA estimates that its projected toll revenues for the parkway will allow it to sell $150 million in bonds, an amount that supports construction of the facility. NTTA can participate only in those projects which are part of its tollway system, so NTTA's involvement here is limited to the parkway and its connections to the local roadway system.

The North Central Texas Council of Governments (NCTCOG) is the metropolitan planning organization for the Dallas-Fort Worth Metroplex. In that role, it is responsible for regional transportation planning and allocation of state and federal transportation funds within the region. These funding decisions are made by the Regional Transportation Commission (RTC), a policy-setting board including 33 local or appointed officials and six transportation provider representatives. Since the RTC must set priorities for funding among many necessary transportation projects in the region, it is critical that the Trinity Corridor transportation projects receive high priority for RTC funding. In June 2003, the NCTCOG Director of Transportation committed to fund two pedestrian deck parks as part of the Trinity Parkway. The assumption in this report is that this funding would cover the costs of one deck park in Basic Phase 1. Other RTC support will be essential in bridging the current transportation funding gap.

Private donations are important to the success of the projects within the Trinity Corridor. One

Balanced Vision Plan Components	**Estimated Cost, Basic Phase 1**	**Estimated Funding, Basic Phase 1**
Flood Protection	$ 170,995,000	$ 170,995,000
Environmental Restoration and Management	$ 54,047,000	$ 54,047,000
Parks and Recreation	$ 47,456,000	$ 47,456,000
Transportation*	$ 798,141,000	$ 798,141,000
Community and Economic Development	$ 1,100,000	$ 1,100,000
TOTAL	**$ 1,071,739,000**	**$ 1,071,739,000**
Funding from City of Dallas (1998 Bonds)		$ 246,000,000
Funding from Other Sources		$ 825,739,000

* This calculation assumes that state and federal transportation funding sources contribute approximately $461 million to projects serving regional transportation needs.

very significant private donation of $4.6 million has completed the funding that enables Santiago Calatrava to design the Woodall Rodgers Bridge.

c. Basic Phase 1: Costs and Funding Sources

The table on the preceding page summarizes the Basic Phase 1 program's costs and funding sources for each of the five components of this Balanced Vision Plan. **As the table indicates, there is not a shortfall in funding for the Basic Phase 1 package if state and federal transportation funds are available within the range previously anticipated.**

d. Expanded Phase 1: Funding Opportunities

The Expanded Phase 1 includes projects that are very important to the success of an initial phase of investment in the Trinity River Corridor but that cannot be funded within the constraints of the 1998 bond program and the cost assumptions for future projects noted above. The projects included in Expanded Phase 1 and their estimated costs are shown below.

These cost estimates assume that the projects are constructed an average of eight years from now. Assumptions related to contingency costs, engineering & design and annual cost escalation have a substantial effect on these project costs – for each project, these assumptions mean costs are almost double (189%) its estimated base construction costs. Future work to resolve and reduce contingencies and efforts to build these projects sooner can reduce these cost estimates.

Though there is not funding specifically committed to the Expanded Phase 1 projects, there are a number of potential sources for such funding.

The Corps of Engineers will provide matching funds for the floodway habitat improvements in the Basic Phase 1. If a local source is identified for qualifying projects in the Expanded Phase 1 program, the Corps may provide matching funds for some projects. Depending

Balanced Vision Plan Components and Projects in Expanded Phase 1	**Estimated Cost, Expanded Phase 1**
Flood Protection Total	**$ 0,000**
(no Expanded Phase 1 projects)	
Environmental Restoration and Management Total	**$ 4,127,000**
Enhanced Habitat in Floodway	$ 1,109,000
Boardwalks for Nature Study	$ 1,133,000
Headwaters Wetlands	$ 887,000
Stormwater Wetlands at Pavaho Sump	$ 998,000
Parks and Recreation Total	**$ 43,702,000**
Water Source for Flowing Water in Lakes	$ 13,038,000
Improvements around Urban Lake (includes promenade and landscaping)	$ 7,220,000
Connections between two lakes and joining lakes to river	$ 665,000
Water feature between two lakes	$ 2,106,000
Improvements around Natural Lake	$ 147,000
Park Roads and parking	$ 11,836,000
Other infrastructure	$ 4,408,000
Additional canoe and boat ramps	$ 142,000
Park District Maintenance Facility	$ 4,140,000
Transportation Total	**$ 66,545,000**
Continental Boulevard (improvements from Industrial Boulevard to IH-35)	$ 7,932,000
Oak Cliff Levee-Top Road	$ 37,105,000
Lamar Boulevard Enhancements	$ 10,010,000
Widened pedestrian connections	$ 11,498,000
Community and Economic Development Total	**$ 0,000**
(no Expanded Phase 1 projects)	
TOTAL, Expanded Phase 1	**$ 114,374,000**

on the design of the stormwater wetlands, there may be Corps interest in assisting on those as well.

As noted in the prior section, state and federal transportation funds were assumed to 'bridge the gap' between local funds and the cost of prior Trinity Parkway alternatives. Under the Basic Phase 1 package, $461 million of state and federal transportation funds are needed. The Expanded Phase 1 projects that are found to meet regional transportation needs also should be considered for funding from these sources. All of these projects could be funded within the range of funding previously assumed for state and federal contribution to the Trinity Parkway. Dallas County is another potential funding source for major arterial street improvements such as those in the Expanded Phase 1 program.

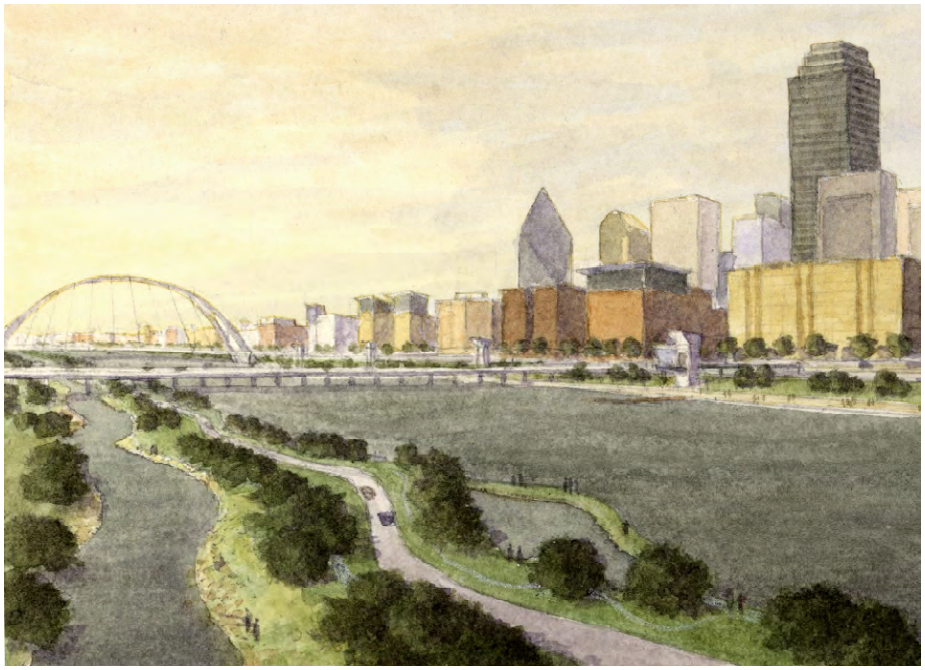
State, federal and foundation funds are also available to support park and recreation initiatives. Based on the criteria for such programs, the Park Department estimates that Dallas might receive approximately $8.6 million from these programs over a ten year period for the projects identified in this Balanced Vision Plan. Other private foundations are increasingly funding park, open space and recreation projects.

Several local sources may be investigated for Expanded Phase 1 funding. First, special districts such as Tax Increment Financing (TIF) districts could fund some of the infrastructure in designated TIF areas. For example, the Oak Cliff Levee Top Road is located within the Oak Cliff Gateway TIF. An existing TIF district's financing plan could be amended to include these improvements. The creation of new TIF's should be considered in other parts of the Trinity River Corridor. Second, projects like boulevard improvements could be considered as part of future city bond programs. Third, some improvements could be constructed as part of private development projects. Finally, local Dallas foundations, corporations and citizens could assist these projects through private donations, purchase of naming rights or other contributions.

The environmental analysis phase for the major Trinity Corridor projects will take several more years to complete. During that time, significant and coordinated efforts to raise funds for the Expanded Phase 1 projects should occur. While these projects cannot be funded with the resources the city has had since 1998, they are nevertheless important aspects of the overall vision for the corridor and will make a significant difference to residents' experience of the corridor after the initial phase of work is completed.

III. IMPLEMENTATION 2. Project Schedule

The implementation schedule for the phase 1 elements of this study will be dependent on the Environmental Impact Statement (EIS) process, which is being undertaken for both the lakes and the roadway. The process actually involves two separate EIS documents - the Dallas Floodway EIS, prepared by the USACE and the Trinity Parkway EIS, prepared by the NTTA. The Environmental Protection Agency has mandated that these two documents be merged after drafts of each have been finalized, so that there is one joint final EIS document.



View of the Trinity River and the Urban Lake with the Woodall Rodgers Bridge beyond.

Attached is a comprehensive schedule for the EIS process, and extending through design and construction of the lakes and the roadway. In general, the schedule includes the following components in this order:

- Completion of the draft Trinity Parkway EIS
- Reviews by federal and State agencies (FHWA and TxDOT in Austin, FHWA in Atlanta)
- Incorporation of agency comments, with revision confirmation by agencies
- Public Comment period, with Public Hearing
- Incorporation of public comments
- Decisions by Dallas City Council and NTTA Board of Directors on locally preferred alignment
- Completion of final Trinity Parkway EIS, concurrently with completion of draft Supplemental Dallas Floodway EIS
- Reviews of draft Supplemental Dallas Floodway EIS by federal and State agencies (FHWA and TxDOT in Austin, FHWA in Atlanta, USACE)
- Incorporation of agency comments, with revision confirmation by agencies
- Second Public Comment period, with Public Hearing
- Incorporation of public comments
- Preparation of final Joint EIS document
- Design can begin for lakes and roadways at risk (project has not technically been environmentally cleared)

- Reviews of joint Final EIS by federal and State agencies (FHWA and TxDOT in Austin, FHWA in Atlanta, USACE)
- Final Public Comment period (no Public Hearing)
- Signing of Record of Decision (FHWA, USACE)
- Construction can begin

It is critical that the signing of the Record of Decision for this document be obtained before March, 2007. If this doesn't happen, the Trinity Parkway EIS will need to be reevaluated using demographics projected for the year 2030 (the current EIS is being evaluated using demographics projected for the year 2025). This change would not only delay the schedule, but would most likely increase the traffic demands on the Trinity Parkway, requiring it to have more lanes than currently planned. For these reasons, all agencies involved are working diligently and with much coordination to finish this process as quickly as possible.

Recommendations for Detailed Schedule Development/Schedule Management

To maintain momentum and move most efficiently through the EIS process, the partnering agencies must be in frequent contact and be prepared to meet all required deadlines as shown in the attached schedule. The following recommendations are offered for schedule management:

- The Trinity River Corridor Project Office should maintain and update the attached schedule. Updates should be reviewed by partnering agencies.

- Continue with frequent scheduled meetings (already established) to discuss potential problems, recommend efficiencies and update partners on progress. These meetings include:

  Interagency Team Meeting (monthly)

  Mayor's Executive Meeting (monthly)

- Agencies should commit to maintaining (or accelerating) the attached schedule at all times. Any challenges regarding timelines should be discussed with partners as early as possible.

- Work with Trinity Commons and other organizations as appropriate.

By committing to this schedule, and by continually monitoring the progress of all agencies, the deadline of March 2007 can be achieved. **There is no room for error.**

See the Trinity Parkway and Dallas Floodway Implementation Schedule on the next page:

LEGEND:

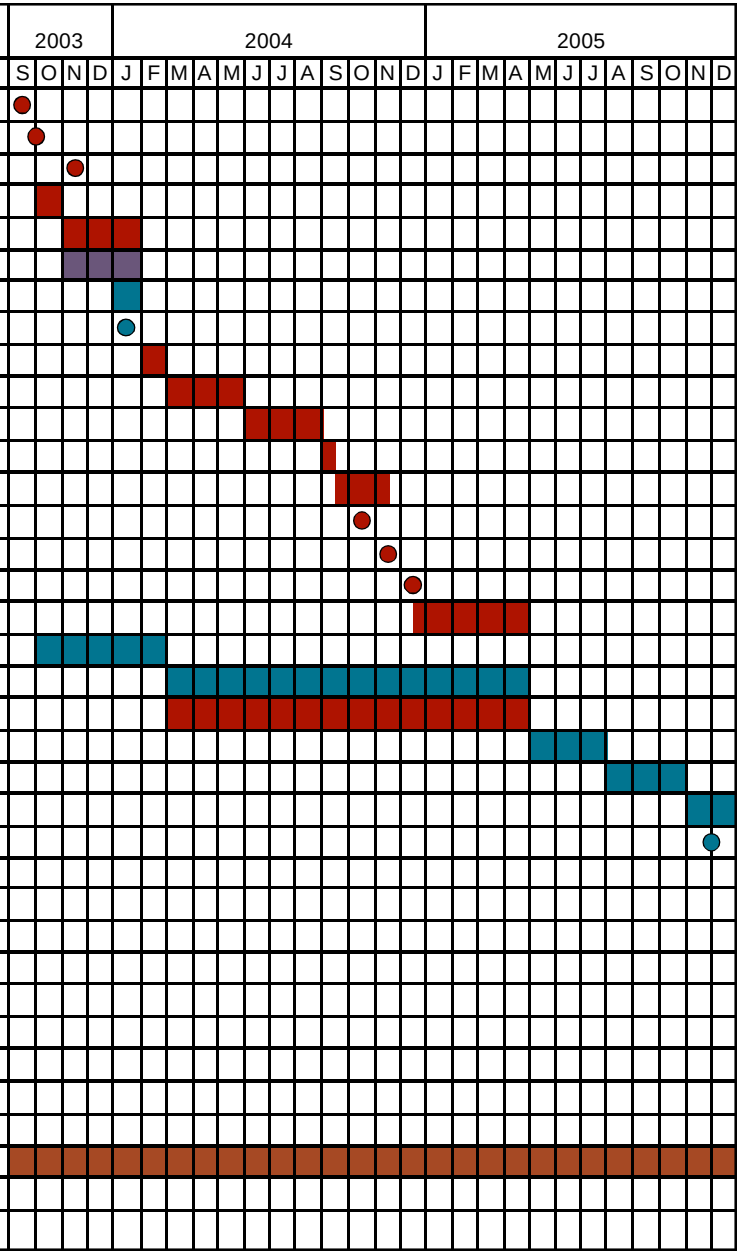
- NTTA responsibility
- USACE responsibility
- Joint EIS process (combined NTTA/USACE responsibility)
- City responsibility
- NTTA/USACE/City coordinate design & construction
- TXDOT/City coordinate design & construction
- Air Quality Conformity Plan must use 2030 demographics
- ○ indicates single day event or starting date

ACRONYMS:

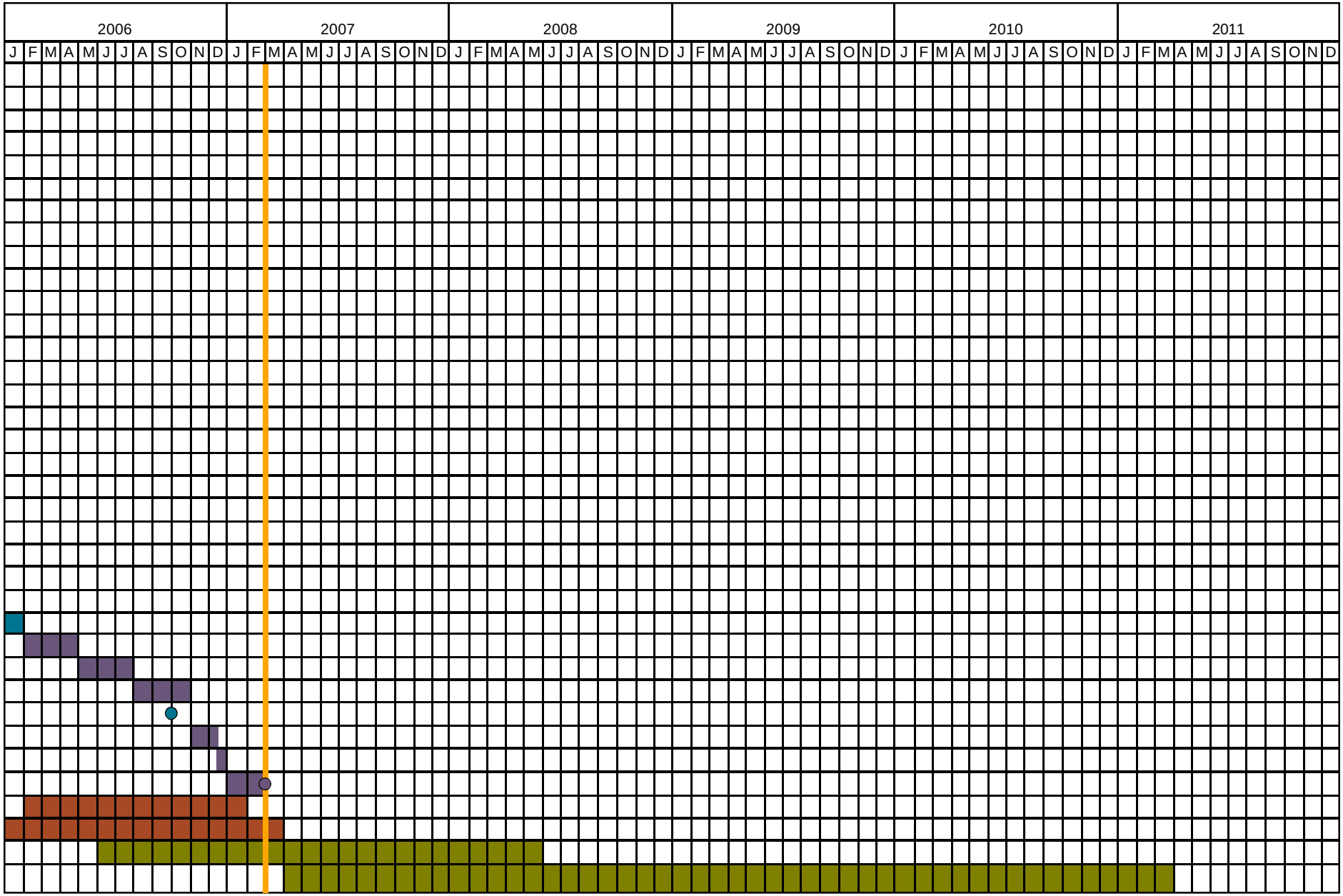
CDM - Camp, Dresser & McKee consulting firm
DEIS - Draft Environmental Impact Statement (Trinity Parkway)
EIS - Environmental Impact Statement
FEIS - Final Environmental Impact Statement
FHWA - Federal Highway Administration
HQ - Headquarters in Washington, D.C.
NCTCOG - North Central Texas Council of Governments
NTTA - North Texas Tollway Authority
SDEIS - Supplemental Draft Environmental Impact Statement (Dallas Floodway)
THC - Texas Historical Commission
TTI - Texas Transportation Institute
TXDOT - Texas Department of Transportation
USACE - U.S. Army Corps of Engineers
WRDA - Water Resources Development Act

Trinity Parkway and Dallas Floodway Implementation Schedule

	Activity (Trinity Parkway & Dallas Floodway EIS)	Duration
1	Council directs Staff to continue Urban Lakes study	September 2003
2	Council directs NTTA to include Combined-Modified alignment in Parkway EIS	October 2003
3	Council briefing on Urban Design plan	November 2003
4	Dallas/NTTA/TXDOT define Combined-Modified alignment & complete modeling	1 month
5	Halff revises preliminary DEIS (alternates & Combined-Modified alignment)	3 months
6	NTTA/TXDOT/USACE/NCTCOG/City - Dallas concurrent review (by chapters)	3 months
7	Modifications to agreements between City/NCTCOG & USACE/NCTOG on UTRFS	1 month
8	CDM study concludes, Council briefing, LPA for Lake Option	January 2004
9	NTTA addresses review comments	1 month
10	TXDOT - Austin & FHWA - Austin review, comment, revision to document	3 months
11	FHWA - Atlanta legal review, comment, revision to document	3 months
12	FHWA - Atlanta confirms revisions; TXDOT title page signatures	2 weeks
13	Public Hearing Period (DEIS reproduced & distributed)	2 months
14	Public Hearing	October 2004
15	Council Decision on Locally Preferred Alignment	November 2004
16	NTTA Board endorses Locally Preferred Alignment	December 2004
17	NTTA completes Parkway EIS	4.5 months
18	USACE develops floodway model (economic & physical)	5 months
19	USACE begins plan formulation of Supplemental DEIS	14 months
20	NTTA/Halff work on agreements with THC, City, USACE	14 months
21	SDEIS Agency Review (USACE/FHWA/TXDOT - Austin/NTTA), comments, revisions	3 months
22	FHWA - Atlanta legal review	3 months
23	Public Hearing Period (SDEIS reproduced & distributed)	60 days
24	Public Hearing	December 2005
25	USACE, NTTA address public comments	1 month
26	USACE, NTTA prepare final joint EIS (w/local review)	3 months
27	TXDOT - Austin & FHWA - Austin review, comment, revision to document	3 months
28	FHWA - Atlanta legal review, comment, revision to document	3 months
29	WRDA 2006 - USACE receives authorization for Dallas Floodway project	October 2006
30	Notice and Public Comment Period (FEIS reproduced and distributed)	45 days
31	USACE, NTTA responds to public comments	2 weeks
32	USACE HQ, FHWA processes Record of Decision	2 months
33	Utility Relocation/Coordination	12 months
34	Land Transactions (ongoing until construction)	on-going
35	Design can begin at risk (lakes and roadway)	24 months
36	Construction (lakes and roadway)	48 months

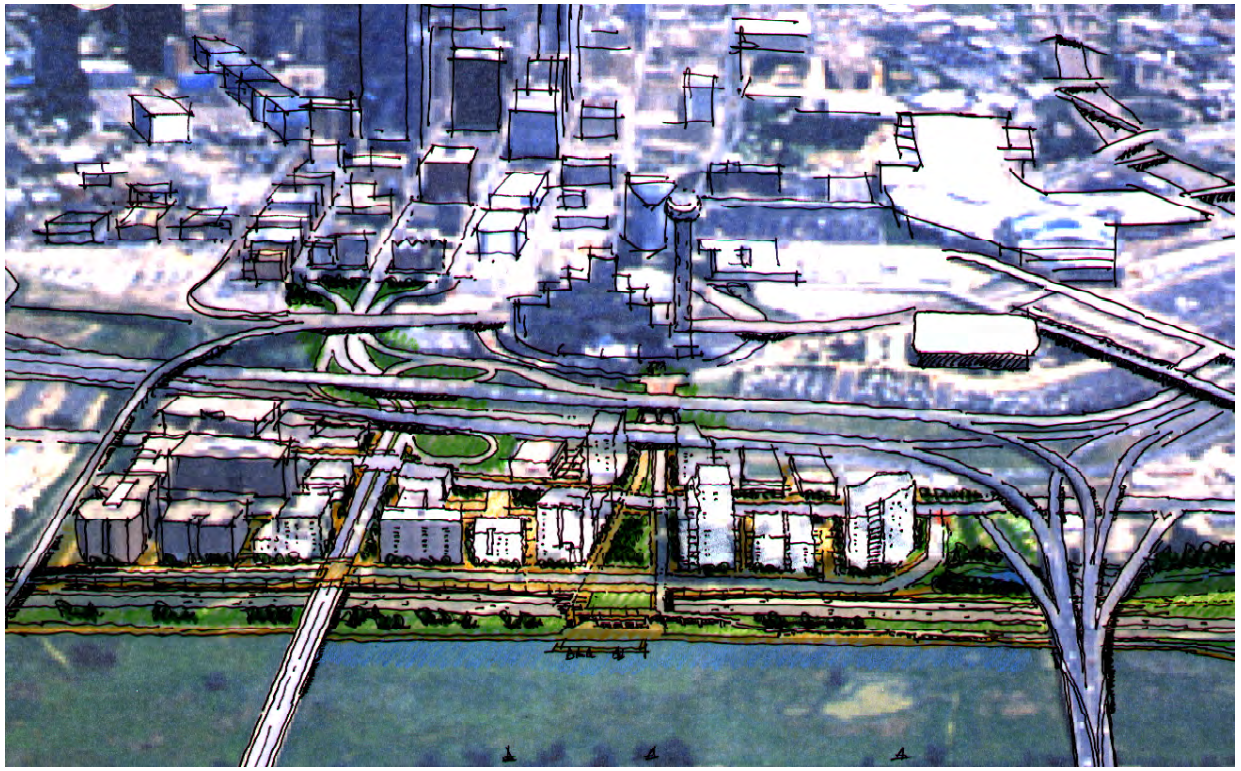


(The times shown are estimates and are subject to change.)



III. IMPLEMENTATION 3. Operations and Maintenance

Operation and maintenance (O & M) responsibilities within the Trinity River Corridor Project footprint are expected to be carried out by several agencies such as Dallas County, the Texas Department of Transportation, the North Texas Tollway Authority, and several City of Dallas departments. This section of the report will only focus on the anticipated O & M efforts by the City of Dallas that would be in addition to the City's current O & M efforts that are ongoing for this project footprint.



A signature park, such as the Trinity River, with high visibility and diverse landscapes, will need higher maintenance levels.

All information provided by the Dallas Park and Recreation Department is based on features and specifications provided by the Dallas Plan, the consultant team, and the Trinity River Corridor Project Office. With over twenty different features, the Park Department has chosen to identify the Trinity River Corridor as its own maintenance district with operation and maintenance (O & M) costs based on independent units. For example, the unit cost for O & M for one mile of park road is $43,600. There are five miles of park road anticipated in the Trinity River Expanded Vision Plan, which would equate to $218,000 at $43,600 per mile. The typical duties include debris and silt removal, pothole repair, signage maintenance, graffiti removal, restriping, street lighting maintenance, utilities, and litter removal. The Unit Cost approach allows for greater flexibility as plans and expectations inevitably will change in the future as concepts are more refined during detailed studies and engineering. Therefore, the "building blocks" of O & M costs remain solid, as units which can simply be added, reduced or removed with no affect on any other feature in the Vision Plan.

The Park and Recreation Department surveyed several cities in the United States that have some form of waterfront or riverfront park. Although there are features that the Trinity River Park may share with other cities, once completed, this park will be unlike any other in the world. With this in mind, there remains a strong possibility that not all O & M needs will

be realized until the Trinity River Park becomes reality.

Expectations and Basis of O & M Cost

The maintenance of this majestic development must be representative of excellence that will warrant economic growth, environmental and recreational involvement, while improving the Dallas floodway carrying capacity. The Dallas Park and Recreation Department is committed to providing all partners of the Trinity River Corridor Project with maintenance estimates that are representative of the needs of the Trinity River Corridor Park Vision.

Six maintenance modes have been developed by the National Recreation and Park Association (NRPA) as guidelines for specific types of landscaped park sites. High visitation, visibility, diverse landscape, and highly developed areas justify the need for higher maintenance frequencies. Modes I and II were selected for a signature park that will be comparable to other major signature parks located in urban cities such as New York's Central Park, Louisville's Riverfront Park or Boston's Emerald Necklace.

Mode I: State of the Art maintenance applied to a high quality, diverse landscape. Usually associated with high traffic areas, such as public squares, malls, governmental grounds, or highly visited parks. Expectations include daily and on-the-spot maintenance throughout the year, mowing every three to five days, litter control a minimum of once per day, and restrooms are maintained a minimum of once per day, with high traffic areas requiring multiple servicing.

Mode II: High level maintenance - associated with well developed park areas with reasonably high visitation. Weekly maintenance schedule throughout the year, mowed every five (5) days, litter control minimum of once per day, and restrooms maintained a minimum of once per day.

The Park and Recreation Department will provide maintenance to park areas located on the interior of the river levees. This distinctive maintenance district will act solely as the provider of all grounds maintenance.

As mentioned earlier the Park and Recreation Department has chosen to identify the Trinity River Corridor as its own Park Maintenance District. The O&M cost projected for this District is comparative to the average O&M of other maintenance districts within the Department, i.e., $2.7 million (it should be noted that the average maintenance cost of a maintenance district does not include the following: facility services, marketing, Trinity troopers, and administration).

Flood control maintenance for the Dallas Floodway will continue as it currently is performed by the Street Services Department for the river, levees, outfall channels, sumps, and pump stations. Although the footprint of the flood control mowing maintenance would be reduced, the level of maintenance would be increased for mowing the levees from four times per year to seven times per year, while the floodway bottom would be mowed three times per year instead of two times per year. Thus, no reduction in the O & M budget for the Streets Services Department for the Dallas Floodway would be expected.

A maintenance facility is proposed by the Park and Recreation Department as a shared facility for the Park and Recreation Department and other city departments. The Park and Recreation Department recommends that the site for the proposed maintenance facility be located at a centralized site in order to respond to grounds maintenance needs on the lakes, wetlands, and the Great Trinity Forest in a timely fashion. Although currently projected to be implemented in the Expanded Concept, the Park and Recreation Department is recommending that the maintenance facility be constructed with the Basic Concept of the Trinity Central Park (estimated cost for the facility is $4,140,000.00).

O & M Cost Estimate

The following table summarizes the O & M costs that are expected to result with the Trinity Central Park (Dallas Floodway), the Elm Fork projects, and the projects targeted for the Great Trinity Forest. In summary, the Elm Fork project is expected to require $648,000 in O & M expenses for the Basic Concept, no Expanded Concept exists, while this O & M cost estimate increases to $933,000 for the Ultimate Concept. These costs are based on an ongoing Elm Fork Floodplain Management Study and input from the Park and Recreation Department for the Soccer Complex.

The Trinity Central Park would require $1,754,000 in O & M costs for the Basic Concept, $4,765,000 for the Expanded Concept,

Operation and Maintenance* for the Trinity River Corridor Project from Royal Lane to IH-20

AREA	BASIC CONCEPT	EXPANDED CONCEPT	ULTIMATE CONCEPT
Elm Fork (Royal Lane to the Confluence)	**$ 648,000**	**$ 648,000**	**$ 933,000**
Sports Complex	$ (495,000)	$ (495,000)	$ (495,000)
Flood Control	$ (123,000)	$ (123,000)	$ (128,000)
Forest Management	-	-	$ (100,000)
Other Recreational Amenities	$ (30,000)	$ (30,000)	$ (210,000)
Floodway (Confluence to DART Bridge)**	**$ 1,754,000**	**$ 4,765,000**	**$ 7,823,000**
Lakes	$ (725,000)	$ (725,000)	$ (1,026,000)
Lakes Amenities	$ -	$ (866,000)	$ (910,000)
River	$ (200,000)	$ (200,000)	$ (467,000)
Wetlands	$ -	$ (111,000)	$ (229,000)
Floodway	$ (664,000)	$ (664,000)	$ (664,000)
Trails, Roads and Parking	$ -	$ (1,170,000)	$ (1,860,000)
Other Recreational Amenities	$ (165,000)	$ (551,000)	$ (2,189,000)
Security, Troopers	$ -	$ (478,000)	$ (478,000)
Great Trinity Forest	**$ 1,770,000**	**$ 1,770,000**	**$ 1,770,000**
Gateway Parks (excluding Trinity Interpretive and Equestrian Centers maintenance to be handled by operator), Forest Management Area, Trail Corridors and Other Associated Facilities, maintenance Modes III - V	$ (660,000)	$ (660,000)	$ (660,000)
Dallas Floodway Extension - Chain of Wetlands and New Levees	$ (550,000)	$ (550,000)	$ (550,000)
Security	$ (560,000)	$ (560,000)	$ (560,000)
GRAND TOTAL	**$ 4,172,000**	**$ 7,183,000**	**$ 10,526,000**

* This table shows cumulative figures and does not include initial capital expenditures.
** An additional annual amount of $15,000 is recommended for clean-up and facilities repair following major/catastrophic events.

and $7,823,000 for the Ultimate Concept. A detailed O & M cost breakdown for the Trinity Central Park is located in the Appendices. The Great Trinity Forest O & M costs are expected to be $1,770,000 for the Basic Concept. This cost was developed for the Master Implementation Plan (MIP) dated December 1999. No Expanded Concept was produced by the MIP. No Ultimate Concept for the Great Trinity Forest was costed for O & M. The $1,770,000 assumed a NRPA Mode level of maintenance that ranged from Mode III to Mode V, which is consistent with the current approach that the Great Trinity Forest would be managed at a lower level of maintenance than the Trinity Central Park.

NOTE: An additional annual amount of **$15,000** is recommended for the clean-up and facilities repair/replacement following a major/ catastrophic flood. Funding would be placed in a Park and Recreation Department reserve fund for such an event. This cost is not included at this time in the O & M cost table.

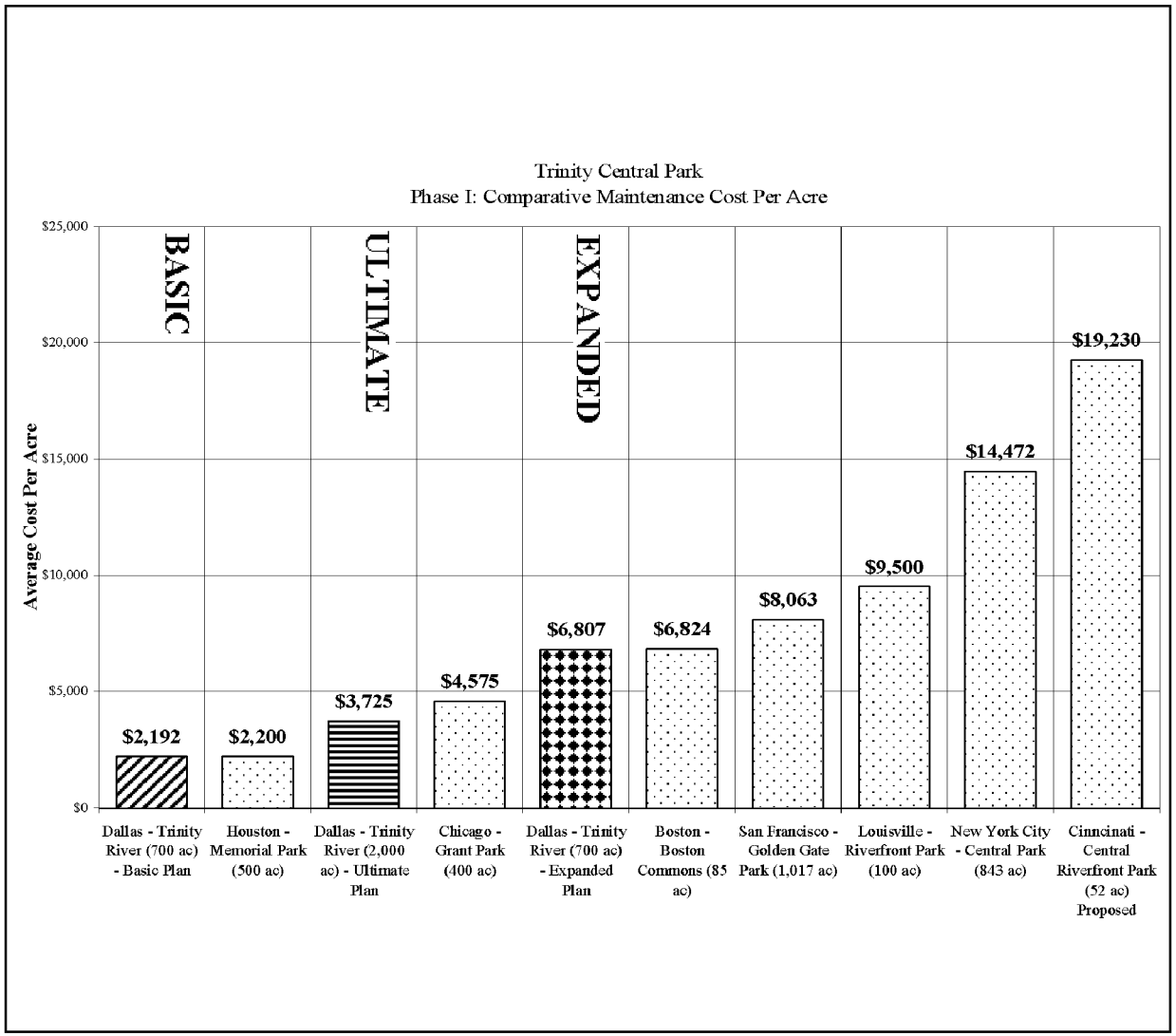
Capital Equipment Cost Estimates

These figures reflect a one-time purchase for each phase of development. A 4% amortization cost of the total annual operating budget for each phase will allow for equipment replacement after the initial useful life expectancy (7 years) of each piece of equipment. These funds would be placed into an Equipment Replacement Trust Fund for the exclusive use of the Trinity River program.

The Basic Concept is expected to require $989,000 in capital equipment costs, while the Expanded Concept and the Ultimate Concept would require $2,550,000 and $2,909,000, respectively. These capital equipment costs, which reflect today's price levels, would cover the Elm Fork projects, Trinity Central Park, and the Trinity projects targeted for the Great Trinity Forest. A detailed display of the equipment and their respective costs are presented in the Appendices.

Staffing

The personnel needed for each phase of the development is reflected in the need to provide the highest level of maintenance for this "Signature Park" designation, while also covering the O & M needs for the Elm Fork and Great Trinity Forest projects. It should also be noted that the staffing levels were based on the assumption that "seven days per week maintenance" would be required throughout the year for each phase of Trinity projects development. The Basic Concept would require 35 full-time employees. The Expanded Concept would require 81 full-time employees, while the Ultimate Concept would require 131 full-time employees. A detailed break down of the staffing needs per specific maintenance items are presented with the capital equipment cost tables in the Appendices.



Comparative Analysis of Other Major Parks

The Park and Recreation Department conducted a comparative analysis survey of other major cities to obtain the average maintenance cost per acre for similar highly maintained Signature Parks as noted in the cost per acre graphs shown in the accompanying figure.

Memorial Park, Houston:
$1,100,000 for 500 acres
Cost per acre: $2,200

Note: Entire park is 1,600 acres but only 500 acres are maintained

Amenities: Golf Course, 4 Baseball/Softball fields, one soccer field, one rugby field, one swimming pool, one picnic area, and 3.5 miles of walking/jogging trail.

Grant Park, Chicago:
$1,830,000 for 400 acres
Cost per acre: $4,575

Amenities: The site includes three world-class museums - the Art Institute, the Field Museum of Natural History, and the Shedd Aquarium, museum campus, Clarence Buckingham Memorial Fountain, lake, 18-hole putting course, seasonal annual and perennial botanic garden pathways.

Golden Gate Park, San Francisco:
$8,200,000 for 1,017 acres
Cost per acre: $8,060

Amenities: 9 acre Golf Course, athletic fields, polo fields, trail systems, equestrian center, lakes and fountains, and bowling greens.

Emerald Necklace, Boston:
$580,000 for 85 acres
Cost per acre: $6,824

Amenities: Emerald Necklace 6 mile linear park - Park consists of 9 parks that run from downtown Boston to Brooklyn, Arboretum - collection of plants and shrubs, Boston Commons Visitor's Center, Jamaica Park - 60 acre pond with fishing, rowing, sailing, and walking/jogging, Olmstead Park - bicycling, walking, Riverway Park - easily accessible by public transportation, Back Bay Fens - gardens abound in the park nearest downtown.

Riverfront Park, Louisville:
$950,000 for 100 acres
Cost per acre: $9,500

Amenities: 50 acres are highly maintained (Disney World Standards) and the other 50 acres are maintained at a lower level of maintenance, 16 restrooms, 10 acre great lawn, large children's play area to include an area for older youth and an area for toddlers, a series of manmade waterfalls, wharf, festival plaza, overlook, parking lots, 2 picnic arias, landscaping, and 2.7 miles of jogging trail.

Central Park, New York City:
$12,200,000 for 843 acres
Cost per acre: $14,472

Amenities: 150 acres in seven water bodies, 250 acres of lawns, 136 acres of woodlands, 1.58 miles of running track, 4.5 miles of trail, 58 miles of pedestrian trail, 6 mile perimeter, 26,000 trees, 125 drinking fountains, 16 restroom locations, skating rink, Central Park Zoo, 6 concession stands, 3 full service restaurants, playgrounds.

Riverfront Park, Cincinnati:
$1,000,000 for 52 acres
Cost per acre: $19,230

Proposed Amenities: 8 acre great lawn along the river edge, next to a 4 acre area with fountains to play in and a large fountain that would cascade right into the river. The park would also have a festival area for events such as Oktoberfest and Taste of Cincinnati.

Trinity River Project, Dallas:
$4,765,000 for 700 acres (Expanded)
Cost per acre: $6,807

Amenities: Two lakes (230 acres), wetlands (140 acres), meadows (350 acres), three miles of meandering river, two pedestrian plazas and nine pedestrian overpasses, 4,500 ft. promenade, one boat dock, one boat ramp, two canoe accesses, one waterfall and weir/ spillway, one whitewater rapids, five miles of park roads, three bridges on park roads, three acres of parking areas, nine miles of pedestrian trail, three miles of equestrian trails, one mile of boardwalk in the wetland area, two concession pads, and 1,500 - 2,000 ornamental trees.

The following recommendations regarding the design effort will enable the Trinity River Corridor Project to maintain the qualitative goals underlying the urban design vision throughout the long implementation process.

1. Consistent Project Management & Coordination

The many individual projects under separate agency jurisdiction (and funding) that constitute the Trinity River Corridor Project present major challenges of coordination and adherence to a common vision. The single project management/oversight structure that exists with the Trinity River Corridor Project Office should be affirmed and maintained especially so that Parkway and Park planning and design can proceed concurrently and in an integrated fashion. Additionally, the City of Dallas Trinity River Corridor Project Team should be given adequate human and fiscal resources, appropriate agency representation - and authority - to handle this crucial assignment.

2. Consistent Master Planning & Design Direction

For similar reasons to recommendation #1 above it is imperative that a consistent design voice be established. One step to assure this is to retain an overall master planner, or master planning team, to guide the work of the various designers and engineers responsible for specific projects. Urban design, planning, and engineering efforts need to be a collaborative and integrated process, not separate voices, to ensure the most efficient schedule of implementation of the program.

3. Development of a Design Guidelines Package

The master planning team should be retained well in advance of the completion of combined EIS process, indeed, should commence work now on detailed design and performance guidelines for each of the specific components of the overall project. For example, continue to develop the case for context sensitive dimensional standards for the Parkway and related access points. In addition the scope of work should include a detailed programming study for the park and recreational environments in conjunction with the Dallas Park and Recreation Department. This would be of particular importance in relationship to the Dallas Floodway EIS.

4. Initiate a significant early demonstration project

Identify and fund an early action that will galvanize support and create activity along the Trinity in advance of longer range improvements. Events, such as TrinityFest should continue to create interest and can be supported with additional river events.

5. Securing Funds for the Elements of the Plan Not Covered by the Bond Program

It is imperative that the first phase of Trinity improvements create a truly marvelous, self sufficient environment that also sets a high standard for all subsequent phases. In other words, Phase I should be of sufficient magnitude to not feel like a partial or incomplete environment, while still raising expectations about what will yet come to be. Therefore, the urban design team feels strongly that the Expanded Phase I project is what should proceed. The additional $114,374,000 necessary to do so should become a community-wide goal to secure over the next 6 to 18 months through a combined effort at the Federal, State, regional and local levels and with participation from private benefactors at all levels of donations. Particular attention should focus on additional federal funding opportunities and to the long-term funding mechanisms that could support the Trinity improvements.

6. Exploration of Public/Private Partnerships to Help Fund Capital and Maintenance Costs

A task force should be established with the specific mandate to create such partnerships. These could be modeled after similar non profit institutions such as The Central Park Conservancy in New York; to corporate sponsorship of specific components of the plan; to business improvement districts which a number of American cities have successfully implemented for important center city neighborhoods. And while it may be premature to formalize at this point (see recommendation #6) specific fiscal mechanisms such as tax increment financing should begin to be pondered.

7. Establish a Special Development Corporation

As an extension of recommendation #5, the City of Dallas should consider the implications of creating a special development district and development entity in relationship to the Trinity Project. The specific purpose of this would be to initiate private or public/private redevelopment efforts along the levees. Such a development corporation would be responsible for both managing redevelopment and securing funding for the infrastructure (such as the levee top roads) needed to support development. Washington D.C. has had particular success with such development corporations dating to the Pennsylvania Avenue Development Corporation in the '70, 80's & 90's, and presently with the Anocostia River Development Corporation, a somewhat analogous circumstance to the Trinity Corridor.

*8. Establish a Regional Trinity Park and Open Space Conservation Commissio***n**

The ultimate benefit of the Trinity River Corridor initiative is to create a **regional** open space amenity of unparalled scale within a still rapidly urbanizing region. This is beyond the capacity of any individual municipality to achieve. To both avoid planning at cross purposes and to persuade state and federal authorities about the national significance of the undertaking it is imperative that substantive regional cooperation on behalf of a unified future for the Trinity Watershed begins immediately. The lobbying power deliverable by a broad regional environmentally-based coalition will facilitate appropriation of federal and state funding, and foundation support as well, much more readily than unilateral plans or pleas for aid.

9. Continue to Gather Broad Political, Institutional & Corporate Support for the Urban Planning Innovations Imbedded in the Project

Prepare a case for why the Trinity initiative can be a national model for sustainable 21st century urbanization. With increasing national concern about sprawl and the absence of effective regional growth management strategies, the positioning of the Trinity Project as focusing on the core of the metro area will gain substantial national attention and status.

IV. LONG-TERM STRATEGY

THE TRINITY RIVER CORRIDOR AS CATALYST:

Summing up the Project's Urban Design Ambitions and Long-term Impact on the Dallas Region

It has taken many years and many people's efforts to reach the point when the conversion of the Trinity River into a great public amenity is no longer merely a long-term desire but an actual project ready to commence. It is an enterprise that will span across a generation, with consequences affecting the quality of life in Dallas for generations to come. Therefore, and because city-building undertakings of this magnitude occur only once or twice a century, every aspect of the Trinity River Corridor Project should support additional civic benefits and enable further investment in the neighborhoods of Central Dallas.

Throughout this report an overarching theme has been the idea of a balanced vision for the future of the Trinity Corridor, a vision that considers and responds equally well to at least five broad mandates, as elaborated in Section II. It is equally important to expect that the project itself, as it progresses, catalyzes further achievement in each of these five areas. The long-term benefits of this project will be substantial.

The Trinity Project can be a Catalyst for Improved Watershed Management:

As a major park and recreational environment takes shape within the Trinity Corridor, and is embraced by the citizens of Dallas, the public's desire for continued improvement to water quality will steadily increase.

Very few support the soiling or careless management of a front yard - much less a treasured city-wide amenity. The expectation that the City of Dallas will have to better manage its storm run-off and other water pollutants will inevitably spread to communities upstream along the entire Trinity watershed. There are examples of such citizen-initiated advocacy throughout the country, but it does not begin spontaneously. It begins with the determination to protect something valuable. A stronger environmental ethic will surely mark 21st century America. In Dallas the turning point will be the redesign of the Trinity River Corridor.

The Trinity Project can be a Catalyst for Improved Environmental Quality:

There should be no settling for mediocre results. Greater environmental awareness goes hand in hand with higher standards of quality in the other major components of the project. A beautifully designed park and recreational setting will set the standard for all subsequent parks and open spaces in the region. A beautifully designed road will mean that all subsequent road-building projects will also be expected to strive for context sensitivity, dislodging the attitude that producing more capacity is the singular variable in transportation planning. Taking advantage of the need for levee raising and levee extensions to produce better (not less convenient) connections between city and river will overcome the perception that flood control is inevitably a single-issue enterprise that is indifferent to other city enhancing goals. A first-rate environment must be goal of every aspect of the Trinity Project.

The Trinity Project can be a Catalyst for the Creation of a Regional Recreational Area of National Significance:

As ambitious as the balanced vision presented in this report is, it must be considered but a part of the conversion of the entire Trinity watershed within the Dallas / Fort Worth Metroplex into a regional open space.

Fort Worth is advancing its own ambitious plans for its portion of the Trinity. The Trinity Forest initiative is virtually without parallel as a stewardship of four-to-six thousand acres of forest all within the boundaries of one city. Coordinated over time, these kindred ambitions will produce the most astonishing open space / indigenous landscape / habitat enhancing environment / conservation corridor in urban America. Wouldn't that be the best rebuttal to all those who assume that Texas urbanization advances at the expense of, and only to the detriment of, its natural settings?

The Trinity Project can be an Early Indicator of a Paradigm Shift in Transportation Planning:

It is important to change the way we think about transportation planning for this corridor with these points in mind:

- In building a Trinity Parkway that is smaller than some would wish but better integrated into a recreational setting.
- In emphasizing context sensitive design standards for the parkway.
- In 'deputizing' Industrial Boulevard to better distribute access from the parkway to the downtown.
- In supporting more street grid connections over only limited access high-speed roads.
- In creating dozens of miles of trails and access roads that may offer some alternative means of commuting along or across the corridor (such as cycling and walking).
- In enabling the use of segments of the levees for additional circulation and development opportunities.
- In advocating the long-term reuse of the railroad tracks adjacent to the levee along the Stemmons Corridor for a future transit line.

In all of these and other ways the Trinity initiative may herald a more diverse, less highway dominated, approach to mobility and traffic management.

The Trinity Project can be a Catalyst for Economic Development:

The redevelopment of urban waterfronts as an engine of economic development is a world-wide phenomenon. It is easy to understand why.

People engaged in emerging economies increasingly choose where to work and live on the basis of "life-style" amenities offered by a locale. Surveys tracking locational choices among high-skilled workers consistently show that in addition to broad choices in particular job markets found in an urban area, the presence of culture and arts, a healthy environment, natural amenities, opportunities to pursue active lifestyles, a strong "sense of place," and socially diverse and progressive-minded populations are all important factors. In short, the various ingredients providing opportunities for blending work and leisure prove influential, and waterfronts are a ready accommodator of such environments. There is little doubt that over a generation land values and, therefore, reinvestment initiatives, all along the Trinity Corridor will flourish.

APPENDIX A
PUBLIC INVOLVEMENT, INPUT AND BACKGROUND INFORMATION FOR STUDY

1. Public Input - Initial Workshops

The first series of public input meetings was held during the week of September 23-26, 2002 at the beginning of this project. They provided an opportunity for individuals and groups interested in the Trinity River Corridor to provide information and share their thoughts with the consultants.

A series of four meetings was held at Dallas City Hall, each organized around specific areas of interest: Neighborhood/Community; Environmental; Business/Arts; Media. Invitation letters were sent to approximately one hundred forty-six (146) groups or individuals; follow up included faxes and phone calls. Those invited were either the president of the organization or other appropriate representative rather than the entire group. Invited individuals included those with a history of involvement in the Trinity River Corridor or those with an interest in the area.

The format of each meeting was the same with each being one hour long. The first part of the meeting included introductions of the consultants, the scope of their work for this project, the Coordinating Entities and other participants, the structure of this project, background of the process and the meeting agenda. The rest of the meeting was reserved for public comment, using the questions below as a discussion guide. At the end, the project's anticipated next steps were described. The handouts included information about the project and the consultants.

Q1: How should Dallas handle the increase in transportation demand expected in the future in this area and the entire region?

Q2: How should we integrate and balance the needs for flood protection, recreation/open space, environmental management, transportation and economic and community development?

Q3: What urban design features would best connect adjacent neighborhoods and business areas with the river?

Q4: What word or phrase best describes your vision of the Trinity River's role in Dallas 25 years from now?

Each meeting was audio-taped and some participants submitted written comments. A large map of the Trinity River Corridor within the City of Dallas was displayed.

During this week, an additional public input session was also conducted using a different format and purpose. This was called “Evening with the River”; it was designed to encourage participants to imagine the Trinity River Corridor of the future and its role in the Dallas community of tomorrow. A cross-section of community leaders and individuals was invited to participate in this visioning session held at Yvonne Ewell Townview Magnet Center. After introductions and a presentation, participants broke up into groups. Each group had the same Corridor map that was used in the workshops and a list of four questions. Each discussion question was focused on a future time and centered on the river, neighborhoods and business areas that make up the corridor.

Q1: You are leaders in Dallas in 2040. Your grandchildren are coming to visit you from another city. Write them a letter about what they’re going to see and do within the Trinity River Corridor when they visit you.
Q2: You are leaders in Dallas in 2040. Prepare a briefing to the CEO of Microsoft explaining why their new Southwestern Headquarters should be at a site in the Trinity River Corridor.

Q3: You are leaders in Dallas in 2040. A major travel magazine is considering Dallas as one of a short list of cities to feature as “great places to visit”. Draft the bullet points that highlight attractions in the Trinity River Corridor as part of the presentation to the travel magazine’s publisher.

Q4: You are leaders in Dallas in 2040. Some close friends have decided to move to Dallas from another region. Explain the reasons why you’ll recommend a neighborhood in the Trinity River Corridor for their next home.

Each group was asked to select one question to address during its discussion time and to then present its work to everyone. The other groups and consultants could then comment.

Eighty-one (81) participants attended one or more of these meetings. The combination of workshop formats during this three-day period allowed the consultants to hear from a variety of people with differing perspectives, learn more about the history of the Corridor and to begin to form a vision for the future of the Trinity River Corridor.

2. Public Input -- Follow-Up Workshops

Another series of public workshops was held in summer, 2003. Three workshops provided an opportunity to receive public comment on the proposed "Vision Plan" briefed to the Dallas City Council on June 23, 2003. This Council briefing was an update to the March 2003 Trinity River Corridor Urban Design/Transportation Study briefing and reflected refinements to the initial concept. The workshops were held at locations throughout Dallas to allow as many as possible to attend. Those invited included the organizations from the September 2002 list as well as Dallas Plan Partner organizations and others. Three hundred and ten (310) people participated in these workshops. The feedback includes notes and audio recordings of the workshops and comments received via email, voice mail and regular mail.

A report summarizing the conclusions of these sessions, and containing all written comments received, was prepared in August 2003. This report, "Trinity River Urban Design Study Public Input, Summer 2003" is available upon request.

3. Public Input -- Written Comment

As part of the overall outreach process, written comment was solicited through various means. The request for comment was included in the written invitations to workshops, requests at the workshops, on The Dallas Plan web site's Trinity River Corridor page and through the general publicity surrounding the project. All comments received were recorded in a document containing the following information:

- How comment was received -- phone, fax, email, mail, hand delivered
- From whom the comment was received
- Subject of comment
- Contents of package or attachments, if applicable.

Comments were received from individuals and from organizations such as the Dallas AIA, Mixmaster Business Association, Trinity Commons Foundation, League of Women Voters, Dallas Sierra Club. Two (2) comments were received via mail, ten (10) via email, four (4) were faxed and eleven (11) were delivered in person. All the comments were copied and distributed to the consultants and to the project management team. The originals are included in the project files and available upon request.

3. Web Site

The Dallas Plan developed a page on its web site for this project. The page included a description of the project including tasks, objectives and responsibilities, project map, Corridor map, information about the consultants' firms, activities to date and updates related to the project, a feedback form and links to other related projects. The web site also included the complete March 2003 and June 2003 Dallas City Council presentations.

4. References

A comprehensive array of resource material related to the Trinity River Corridor was assembled for the consultants in The Dallas Plan office. This material assisted the consultants in developing their recommendations. It also allowed them to see the scope and volume of previous studies and plans and understand the history and significance of the Trinity River Corridor to Dallas.

This resource material, chronologically documented and numbered, included reports, studies and recent Dallas City Council briefings related to all aspects of the Trinity River Corridor. These documents included major city plans beginning with the 1914 Kessler Plan and including the Hare and Hare Plan, Town Lake, the Chain of Wetlands and The Dallas Plan. These documents also included geographic studies and plans such as the Stemmons/Harry Hines Corridor Implementation Study, the Great Trinity Forest Park Master Plan, Oak Cliff Gateway Implementation Plan, West Dallas Community Planning Strategy and the 2003 HNTB Land Use Study, among others. TXDoT and NTTA transportation studies and maps were also part of the resource materials. The list of approximately 107 items is available upon request.

APPENDIX B
CAPITAL COST ESTIMATES

Ultimate Build Costs – Estimated By Phases

Balanced Vision Plan Components	Basic Phase 1	Expanded Phase 1 Costs are incremental	Ultimate (Future Phases) Costs are incremental	TOTAL ULTIMATE BUILD
Flood Protection	$170,995,000	$0,000	$26,035,000	$197,030,000
Environmental Management & Restoration	$54,047,000	$4,127,000	$48,945,000	$107,119,000
Park and Recreation	$47,456,000	$43,702,000	$110,731,000	$201,888,000
Transportation	$786,643,000	$66,545,000	$373,309,000	$1,226,497,000
Community & Economic Development	$1,100,000	$0,000	$0,000	$1,100,000
Total	**$1,060,241,000**	**$114,374,000**	**$559,020,000**	**$1,733,634,000**

Note: Cost estimates include an escalation factor for Basic Phase 1 and Expanded Phase 1. No escalation factor included for Ultimate Future Phase cost estimates.

Project Components by Phase

Flood Protection Component

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Dallas Floodway Extension	All		All
Elm Fork Flood Protection	Phase 1 of Flood Plain Management Plan		Complete
Raise of Existing Levees	All		All

Environmental Management & Restoration Component

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Great Trinity Forest Land Acquisition	All, per 1998 bond funds		Additional land acquisition recommended
Trinity Interpretive Center	All		All
Trinity Forest Trails	All, per 1998 bond funds		Possible trail additions & enhancements
River Meanders	Downstream from Sylvan		Upstream from Sylvan to confluence
Enhancing Habitat in the Dallas Floodway	Downstream from Sylvan	Additional	Upstream from Sylvan to Confluence

Environmental Management & Restoration Component (continued)

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Stormwater Wetlands	None	Pavaho Wetlands	All
“Headwaters” Wetlands	None	Part	All
Floodway Area Trails	Part		All
Boardwalks for Nature Observation	None	Part	All

Park & Recreation Component

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Urban Lake (includes lake and amenities surrounding lake)	Part (lake and culverts)	Amenities	
Natural Lake (includes lake and amenities surrounding lake)	Lake	Amenities	
Water Supply for Terraced Lake System	Groundwater	Central WWTP Effluent	
Elm Fork Recreation Facilities	Part (soccer complex, dog park)	Additional Trails	All
Trinity Equestrian Center	All		
Canoe Launches	All		

Park & Recreation Component

(continued)

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Gateway Parks	6 (per 1998 bond funds)	Additional as funding permits	All as identified in Master Implementation Plan
Connections between Lakes and to Trinity River (includes enhanced water feature)	Between Lakes	All	
West Dallas Lake/ Wetland Area	None	None	All
Park Access Roads (including roadways, bridges, and parking)	None	Part	All
Active Recreation Terraces (Two)	None	None	All

Park & Recreation Component

(continued)

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Whitewater Rafting Course	None	None	All
Boat, Canoe, Kayak Access in Floodway Area	As exists	As exists	All
Amphitheater	None	None	All
Concession/Event Facilities	None	None	All
Park District Maintenance Facility	None	All	All

Transportation Component

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Trinity Parkway	All		
Industrial Boulevard	Upgrade	Upgrade Continental (from Industrial Blvd. to IH-35)	
Pedestrian Deck Parks and Connection	Basic Deck and connections	Enhance, Additional Facilities	All
Woodall Rodgers Bridge	All		
Signature Bridges at IH-30 and IH-35	None	None	All
Beckley Boulevard	Woodall Rodgers to Commerce		Commerce to IH-30

Transportation Component
(continued)

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Oak Cliff Levee Top Road	None	All	
Downtown Levee Top Roads	None	None	All
S. Lamar Upgrade to Boulevard	None	50% Upgrade	All
S.M. Wright Conversion to Boulevard	Part (TxDOT responsible for overpasses)		All

Community and Economic Development Component

Component	Basic Phase 1	Expanded Phase 1	Ultimate Plan
Comprehensive Land Use Study	Study Complete		

Costs – Basic Phase 1

Balanced Vision Plan Components	Basic Phase 1	Expanded Phase 1	Ultimate (Future Phases)	TOTAL ULTIMATE BUILD
Flood Protection	$170,995,000	$0,000	$26,035,000	$197,030,000
Environmental Management & Restoration	$54,047,000	$4,127,000	$48,945,000	$107,119,000
Park and Recreation	$47,456,000	$43,702,000	$110,731,000	$201,888,000
Transportation	$786,643,000	$66,545,000	$373,309,000	$1,226,497,000
Community & Economic Development	$1,100,000	$0,000	$0,000	$1,100,000
Total	**$1,060,241,000**	**$114,374,000**	**$559,020,000**	**$1,733,634,000**

Basic Phase 1
Costs and Funding Sources

Balanced Vision Plan Components	Estimated Cost, Basic Phase 1	Potential Funding Sources
Flood Protection	$170,995,000	1998 Bond Funds of $44M, and $127M from U.S. Army Corps of Engineers
Environmental Management & Restoration	$54,047,000	1998 Bond Funds of $36.7M, STEP Grant of $4.1M, TPWD of $0.1M, and $13.1M from U.S. Army Corps of Engineers
Park and Recreation	$47,456,000	1998 Bond Funds of $46.7M, TPWD of $0.2M, and $0.6M from U.S. Army Corps of Engineers
Transportation	$786,643,000	1998 Bond Funds of $84M, NTTA of $150M, TTC of $17M, COG $13M, Federal sources of $6.7M, Future bond programs for Industrial improvements of $50M, and approx. $466M from TxDOT and County
Community & Economic Development	$1,100,000	Interest from 1998 Bond Funds
Total	**$1,060,241,000**	

Balanced Vision Plan Components in Basic Phase 1 - Detail

Balanced Vision Plan Components	Estimated Funding, Basic Phase 1
Flood Protection Total	**$170,995,000**
❑ Dallas Floodway Extension	$140,800,000
❑ Master Implementation Plan	$ 296,000
❑ Raise of Existing Levees	$ 16,310,000
❑ Elm Fork Flood Improvements	$ 13,589,000

Balanced Vision Plan Components in Basic Phase 1 - Detail (continued)

Balanced Vision Plan Components	Estimated Funding, Basic Phase 1
Environmental Management & Restoration Total	**$54,047,000**
❑ Great Trinity Forest Land Acquisition	$3,707,000
❑ Trinity Interpretive Center	$14,430,000
❑ Trails in Elm Fork, near Lake, and Great Trinity Forest	$16,691,000
❑ Trail Crossings in Great Trinity Forest	$ 1,260,000
❑ Master Implementation Plan	$ 592,000
❑ River Meanders	$14,903,000
❑ Habitat in Floodway	$ 2,464,000

Balanced Vision Plan Components in Basic Phase 1 – Detail (continued)

Balanced Vision Plan Components	Estimated Funding, Basic Phase 1
Park and Recreation Total	**$47,456,000**
❑ Elm Fork Recreation Improvements	$16,411,000
❑ Master Implementation Plan	$ 607,000
❑ Trinity Equestrian Center	$ 1,720,000
❑ Canoe Launches	$ 1,044,000
❑ Gateway Parks	$ 9,766,000
❑ Upper Trinity River Feasibility Study	$ 1,000,000
❑ Water Quality Study & Design	$1,000,000
❑ Water Source for Lakes	$ 2,563,000
❑ Stormwater Culverts Under Lakes	$ 9,265,000

Balanced Vision Plan Components in Basic Phase 1 – Detail (continued)

Balanced Vision Plan Components	Estimated Funding, Basic Phase 1
Park and Recreation (Continued)	
❑ Urban Lake Construction	$ 828,000
❑ Urban Lake Improvements	$ 798,000
❑ Basic Connections between Lakes and River	$ 1,380,000
❑ Natural Lake Construction	$ 828,000
❑ Natural Lake Improvements	$ 246,000

Balanced Vision Plan Components in Basic Phase 1 - Detail (continued)

Balanced Vision Plan Components	Estimated Funding, Basic Phase 1
Transportation Total	**$786,643,000**
❑ Woodall Rodgers Bridge Design and Construction	$ 78,004,000
❑ Parkway EIS and Related Studies	$ 5,023,000
❑ Trinity Parkway	$609,334,000
❑ Industrial Boulevard Collector Distributor Improvements	$ 80,255,000
❑ Pedestrian Deck Park	$8,059,000
❑ Beckley Improvements	$ 5,968,000
Community & Economic Development Total	**$1,100,000**
Total, Basic Phase 1	**$1,060,241,000**

Costs – Expanded Phase 1

Balanced Vision Plan Components	Basic Phase 1	Expanded Phase 1	Ultimate (Future Phases)	TOTAL ULTIMATE BUILD
Flood Protection	$170,995,000	$0,000	$26,035,000	$197,030,000
Environmental Management & Restoration	$54,047,000	$4,127,000	$48,945,000	$107,119,000
Park and Recreation	$47,456,000	$43,702,000	$110,731,000	$201,888,000
Transportation	$786,643,000	$66,545,000	$373,309,000	$1,226,497,000
Community & Economic Development	$1,100,000	$0,000	$0,000	$1,100,000
Total	**$1,060,241,000**	**$114,374,000**	**$559,020,000**	**$1,733,634,000**

Balanced Vision Plan Components in Expanded Phase 1 - Detail

Balanced Vision Plan Components	Estimated Funding, Expanded Phase 1
Flood Protection Total – No Expanded Phase 1 projects	**$0,000**
Environmental Management & Restoration Total	**$4,127,000**
❑ Enhanced Habitat in Floodway	$1,109,000
❑ Boardwalks for Nature Study	$1,133,000
❑ Headwaters Wetland	$ 887,000
❑ Stormwater Wetland at Pavaho Sump	$ 998,000

Balanced Vision Plan Components in Expanded Phase 1 – Detail

(continued)

Balanced Vision Plan Components	Estimated Funding, Expanded Phase 1
Park and Recreation Total	**$43,702,000**
❑ Water Source for Flowing Water in Lakes	$13,038,000
❑ Improvements around Urban Lake (includes promenade and landscaping)	$ 7,220,000
❑ Connections between two lakes and joining lakes to river	$ 665,000
❑ Water feature between two lakes	$ 2,106,000
❑ Improvements around Natural Lake	$ 147,000
❑ Park Roads and parking	$11,836,000
❑ Other Infrastructure	$ 4,408,000
❑ Additional canoe and boat ramps	$ 142,000
❑ Park District Maintenance Facility	$ 4,140,000

Balanced Vision Plan Components in Expanded Phase 1 - Detail

(continued)

Balanced Vision Plan Components	Estimated Funding, Expanded Phase 1
Transportation Total	**$66,545,000**
❑ Continental Boulevard (improvements from Industrial Boulevard to IH-35)	$ 7,932,000
❑ Oak Cliff Levee Top Road	$ 37,105,000
❑ Lamar Boulevard Enhancements	$10,010,000
❑ Widened Pedestrian Decks	$11,498,000
Community & Economic Development Total – no Expanded Phase 1 projects	**$0,000**
Total, Expanded Phase 1	**$114,374,000**

Costs – Ultimate Phase

Balanced Vision Plan Components	Basic Phase 1	Expanded Phase 1	Ultimate (Future Phases)	TOTAL ULTIMATE BUILD
Flood Protection	$170,995,000	$0,000	$26,035,000	$197,030,000
Environmental Management & Restoration	$54,047,000	$4,127,000	$48,945,000	$107,119,000
Park and Recreation	$47,456,000	$43,702,000	$110,731,000	$201,888,000
Transportation	$786,643,000	$66,545,000	$373,309,000	$1,226,497,000
Community & Economic Development	$1,100,000	$0,000	$0,000	$1,100,000
Total	**$1,060,241,000**	**$114,374,000**	**$559,020,000**	**$1,733,634,000**

Balanced Vision Plan Components in Ultimate Future Phase – Detail

(continued)

Balanced Vision Plan Components	Estimated Cost, Ultimate Future Phase
Flood Protection Total	**$26,035,000**
❑ Elm Fork Flood Improvements	$26,035,000
Environmental Management & Restoration Total	**$48,945,000**
❑ Trails (trail additions and enhancements)	$19,458,000
❑ River Meanders (upstream from Sylvan to confluence)	$16,405,000
❑ Habitat in Floodway	$ 2,511,000
❑ Boardwalks	$ 7,452,000
❑ Headwaters Wetlands	$ 324,000
❑ Stormwater Wetlands	$ 2,795,000

Balanced Vision Plan Components in Ultimate Future Phase – Detail

(continued)

Balanced Vision Plan Components	Estimated Cost, Ultimate Future Phase
Park and Recreation Total	**$110,374,000**
❑ Elm Fork Recreation Improvements	$15,100,000
❑ Excavation	$18,837,000
❑ Gateway Parks	$ 800,000
❑ Whitewater Rafting Course	$ 2,070,000
❑ West Dallas Lake/Wetlands	$ 4,830,000
❑ Internal Park Roads, Bridges, Parking	$37,996,000
❑ Activity Terraces (2)	$19,320,000
❑ Amphitheater	$138,000

Balanced Vision Plan Components in Ultimate Future Phase – Detail

(continued)

Balanced Vision Plan Components	Estimated Cost, Ultimate Future Phase
Park and Recreation (Continued)	
❑ Concession Pads	$ 414,000
❑ Boat and Canoe Access	$ 103,000
❑ Field Irrigation	$ 4,830,000
❑ Other Infrastructure	$ 6,293,000

Balanced Vision Plan Components in Ultimate Future Phase – Detail

(continued)

Balanced Vision Plan Components	Estimated Cost, Ultimate Future Phase
Transportation Total	**$373,309,000**
❑ Signature Bridges at IH-30 and IH-35	$331,478,000
❑ S.M. Wright conversion to city boulevard	$ 26,772,000
❑ Lamar Boulevard Enhancements	$ 7,315,000
❑ Beckley Improvements	$ 4,503,000
❑ Downtown Levee Top Roads	$ 3,241,000
Community & Economic Development Total – No Ultimate Future Phase projects	**$0,000**
Total, Ultimate Future Phase	**$563,160,000**

Cost Comparison			
March 2003 Phase 1 and November 2003 Basic Phase 1			
	Item	March '03	November '03
Flood Protection and Environment			
	Dallas Floodway Extension	$140,000,000	$140,800,000
	Levee Raise, River Meanders & Environmental Restoration	$25,200,000	$33,677,000
	Elm Fork Flood Improvements	$0	$13,589,000
	Great Trinity Forest	$0	$21,658,000
	Trinity Interpretive Center	$0	$14,430,000
Subtotal		**$165,200,000**	**$224,154,000**
Park and Recreation			
	Lakes (Urban & Natural)	$48,300,000	$15,907,000
	Master Implementation Plan	$1,500,000	$1,496,000
	Elm Fork Recreation Improvements	$0	$16,411,000
	Trinity Equestrian Center	$0	$1,720,000
	Canoe Launches	$0	$1,044,000
	Gateway Parks	$0	$9,766,000
	Park, Lake, Related Studies	$0	$2,000,000
Subtotal		**$49,800,000**	**$48,344,000**
Transportation			
	Trinity Parkway (including EIS)	$535,000,000	$614,358,000
	Woodall Rodgers Bridge	$0	$78,004,000
	Industrial Boulevard	$0	$80,255,000
	Pedestrian Deck Park	$0	$8,059,000
	Beckley Improvements	$0	$5,967,000
Subtotal		**$535,000,000**	**$786,643,000**
Community Development			
	Land Use Study	$1,500,000	$1,100,000
Subtotal		**$1,500,000**	**$1,100,000**
Total		**$751,500,000**	**$1,060,241,000**

Abbreviations

- **COG:** North Central Texas Council of Governments
- **Corps:** U.S. Army Corps of Engineers
- **NTTA:** North Texas Tollway Authority
- **RTC:** Regional Transportation Commission
- **STEP:** Surface Transportation Enhancement Program
- **TPWD:** Texas Parks and Wildlife Department
- **TTC:** Texas Transportation Commission
- **TxDOT:** Texas Department of Transportation
- **WWTP:** Waste water treatment plant

Cost Escalation Assumptions

- These factors should be emphasized in presenting cost estimates
  - Estimates are based on conceptual design
    - Based on the best information currently available
    - As more detailed design, engineering and construction plans are completed, it is possible that costs may change based on new information

Cost Escalation Assumptions

(continued)

- Cost estimates have been modified using these cost adjustments:
  - A factor of 15% was added to the basic cost estimate to provide for engineering and design costs
  - A contingency factor of 20% was applied due to the uncertainty of estimating construction costs when a project is still in a very conceptual stage
  - Since these projects will not be built immediately, cost escalation was assumed at an annual rate of 4%
    - Basic Phase 1 project costs were escalated to 4 years into the future
    - Expanded Phase 1 project costs were escalated to 8 years into the future
  - Ultimate Future Phase project costs remain in current dollars, as it is not possible to gauge the timing of their construction

TRINITY RIVER CORRIDOR PROJECT

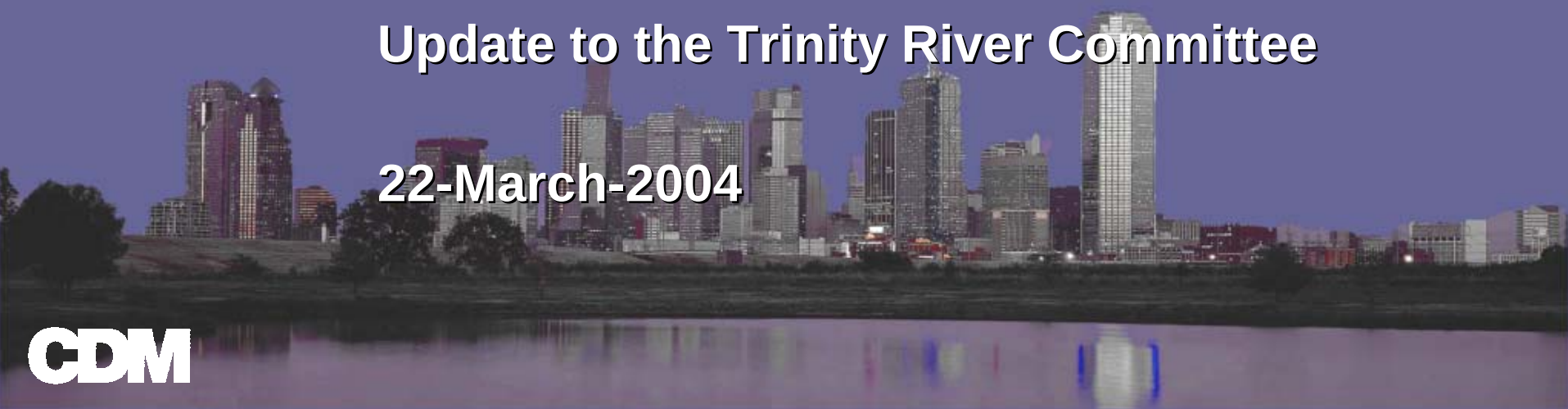
Dallas Floodway Improvements

Refinement of the Balanced Vision Plan –

- **I-30 Signature Bridge**
- **Reverse Lake Flow**

Update to the Trinity River Committee

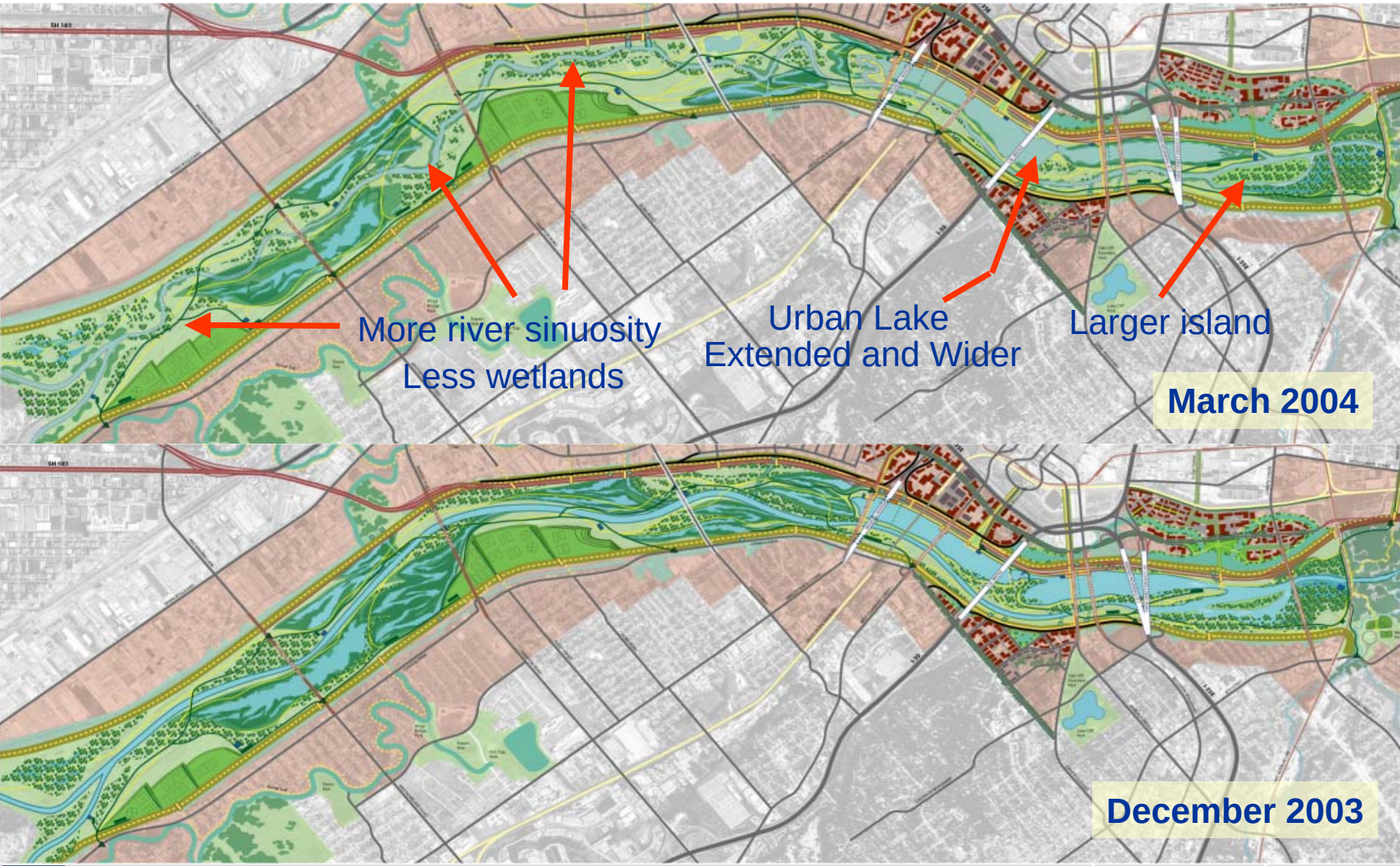
22-March-2004



Purpose

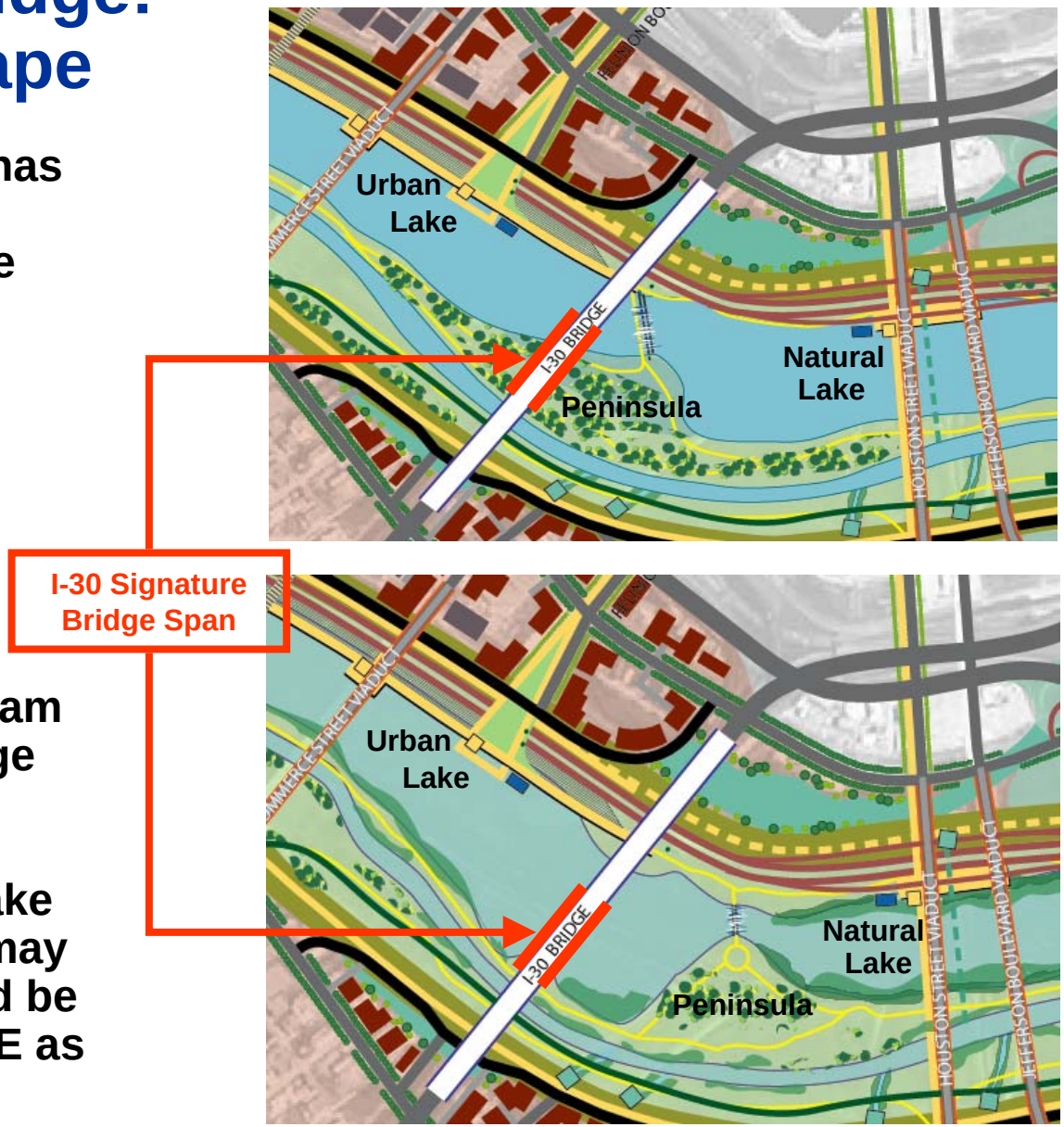
- On March 1, 2004, CDM and City staff presented the modeling results and refinements of the Balanced Vision Plan for the Dallas Floodway to the Trinity River Committee
- The TRC requested further refinements to better accommodate the future I-30 Signature Bridge initiative and to present further details concerning the alternative of reverse lake flow at the next scheduled TRC meeting (March 22, 2004)
- As a collaborative effort, City staff, CDM, and the Urban Design Team refined the lakes configuration to better accommodate the I-30 Signature Bridge initiative as presented on slide 4
- The remainder of this presentation focuses on the analysis for the reverse lake flow alternative as compared to conventional lake flow

General Comparisons: 8 Dec 03 and 22 Mar 04



I-30 Signature Bridge: Refined Lake Shape

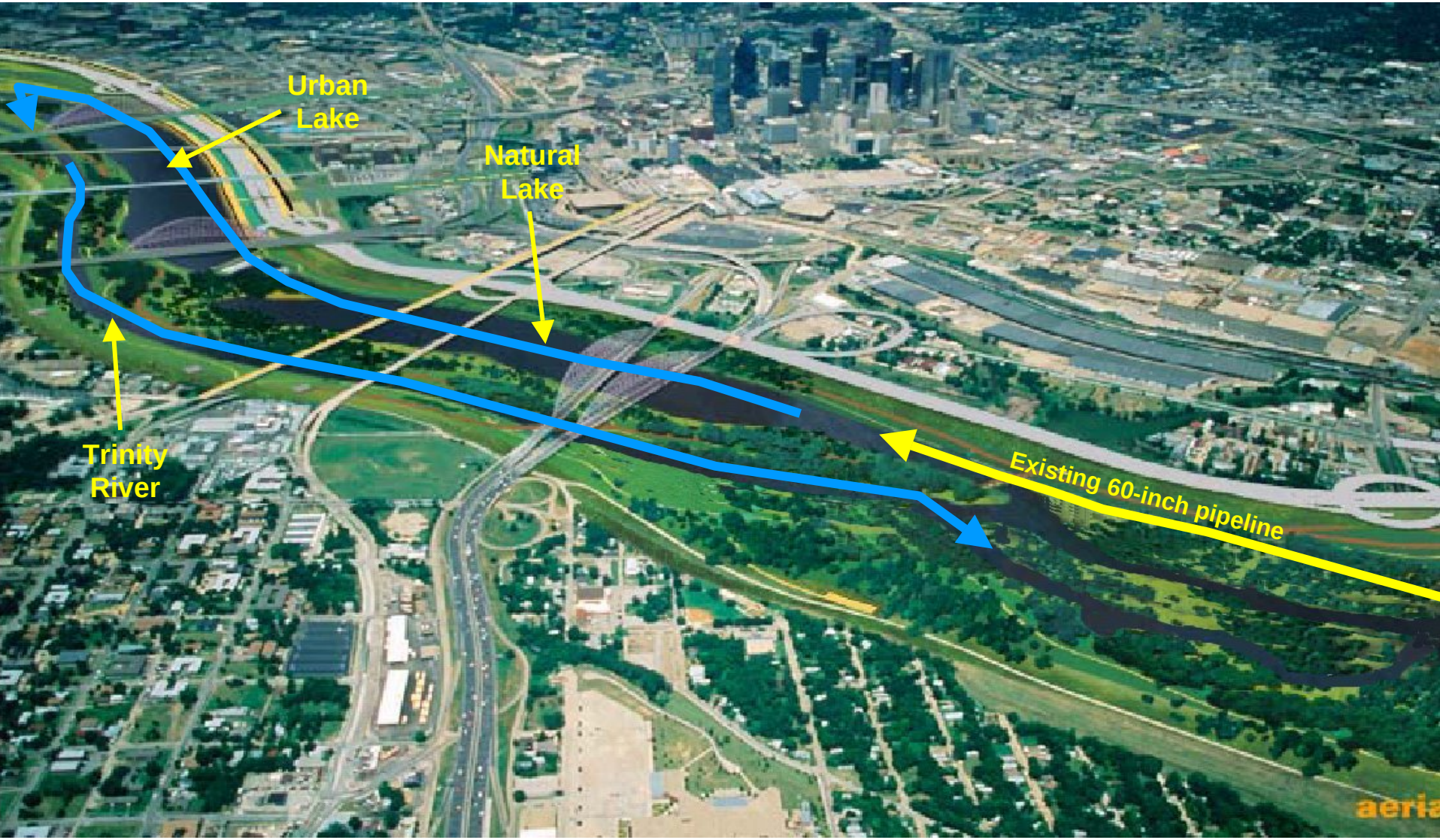
- The Urban Lake shape has been refined to better accommodate the future location of the I-30 signature bridge span
- Urban Lake has been widened and extended downstream, while peninsula has a lower elevation
- The Calatrava design team will try to keep the bridge span as far east as possible, but further reshaping of the river/lake under the bridge span may be necessary and would be pursued with the USACE as part of their study



Reverse Lake Flow Alternative

- Instead of the Urban Lake being set at three feet higher than the Natural Lake, the lake elevations are reversed where the Natural Lake is three feet higher than the Urban Lake
- The existing 60-inch pipe would deliver source water from the Central Wastewater Treatment Plant (CWWTP) to the southern end of the Natural Lake
- The CWWTP water would enter the Natural Lake from its lake bottom, where the underground pipe is currently located
- CWWTP water would flow from the Natural Lake through the Urban Lake and re-enter the Trinity River upstream of Continental Street Viaduct.
- Some of the flow from the Urban Lake would pass through a “Tailwater Wetland” while the majority could be used for a recreational whitewater course.

Reverse Lake Flow Alternative



Reverse Lake Flow: Effects on Flood Control

- The reverse lake flow alternative would produce no change in how the Dallas Floodway protects the downtown Dallas vicinity
- The Dallas Floodway levee protection would not be impacted
- The only change to the lake berm system that would protect the two lakes from a 2-year flood is that the discharge point would be located near Continental instead of near Corinth

Reverse Lake Flow: Effects on Ecosystem Restoration

- The reverse lake flow alternative would produce higher dissolved oxygen levels for:

  The two miles of the Trinity River from Continental to the southern end of the Natural Lake

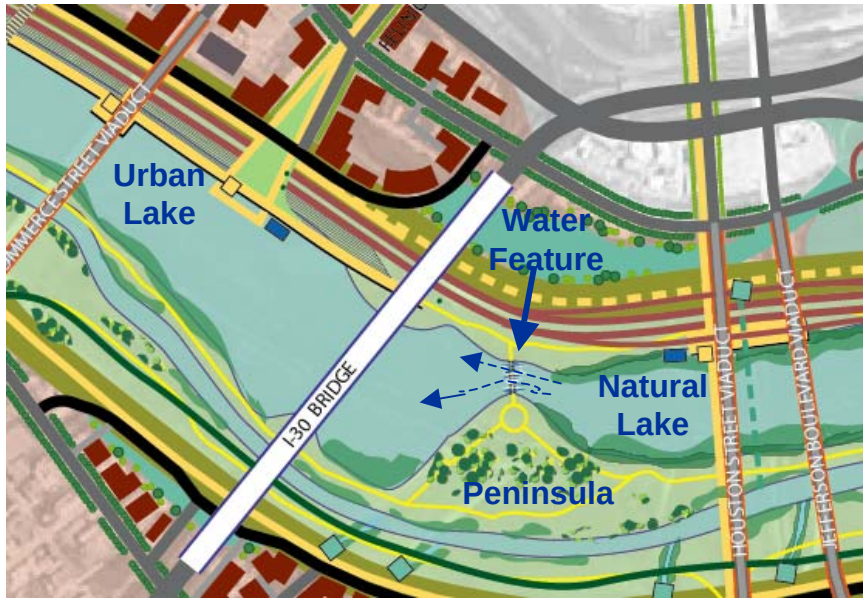
  The western portion of the split river / island feature that would not otherwise benefit from the conventional lake flow alternative

- Higher dissolved oxygen levels would contribute to enhanced aquatic habitat, wetlands features along this two-mile river segment and the split river / island feature, and riparian habitat

- Better conveyance for the upper half of the Dallas Floodway would allow additional tree plantings, reducing the 40 percent deficit for the upper half of the Dallas Floodway to 15 percent.

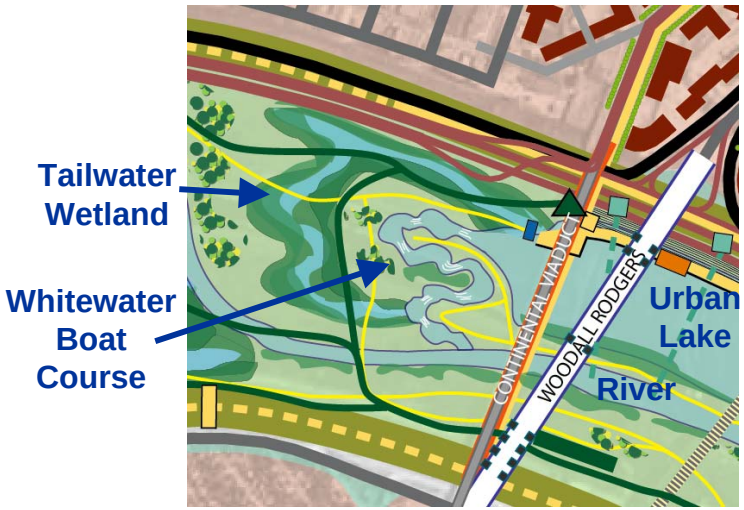
Reverse Lake Flow: Effects on Aesthetics

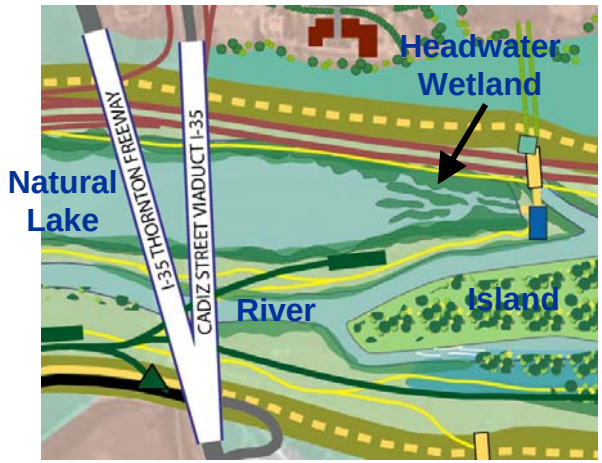
- A water feature with three-foot of drop that would face north, instead of south
- Urban Lake visitors would be able to see this feature, which enhances the primary purpose of the Urban Lake with respect to aesthetics
- The movement of the flow in the lakes would not be noticeable, except at the water feature



Reverse Lake Flow: Effects on Aesthetics

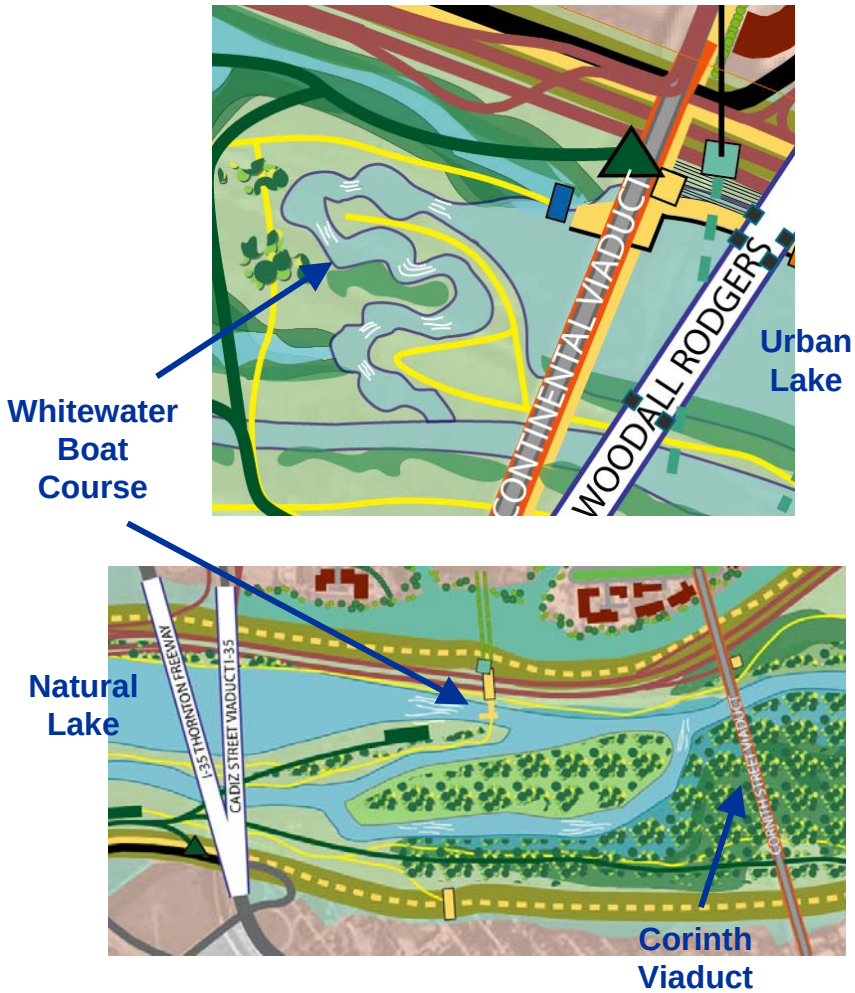
- The Continental Street Viaduct (to be pedestrian) would become a viewing platform for an upstream discharge point and recreational boating (e.g., whitewater) course.
- The Headwater Wetland is reduced in size and moved to the south end of the Natural Lake but would be compensated by another "continuously fed" wetlands system at the northern end of the Urban Lake called a Tailwater Wetland.
- The Urban Lake would be 3 feet lower than in the Urban Design Plan, which is counter to the goal to produce a lake setting as close to the top of the levees as possible





Reverse Lake Flow: Effects on Recreation

- A reverse lake flow alternative would locate a possible whitewater boat course just upstream of the Continental Bridge in a highly visible location close to the Urban Lake
- In the conventional approach, the whitewater course would be viewable from the Trinity banks or levees.



Reverse Lake Flow: Effects on Recreation

- A reverse lake flow alternative would produce a four-mile boat loop opportunity that would start at the southern end of the Natural Lake, pass through the lake transition water feature, move through the Urban Lake and return to the point of origin along the two-mile Trinity River segment
- Boaters would be assisted by the prevailing winds across the two-mile run through the two lakes and water features, while the two-mile river segment would take them back with the river current to the starting point of their trip
- For conventional lake flow, the four-mile boat loop would require four portages, while the reverse lake flow would require two such portages

Reverse Flow 4-mile Boat Loop

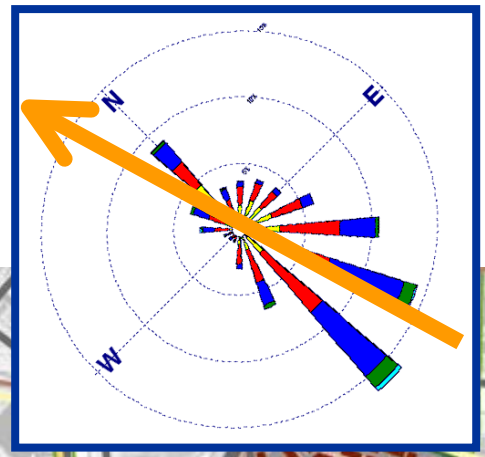
Water Feature Between Urban Lake and Natural Lake

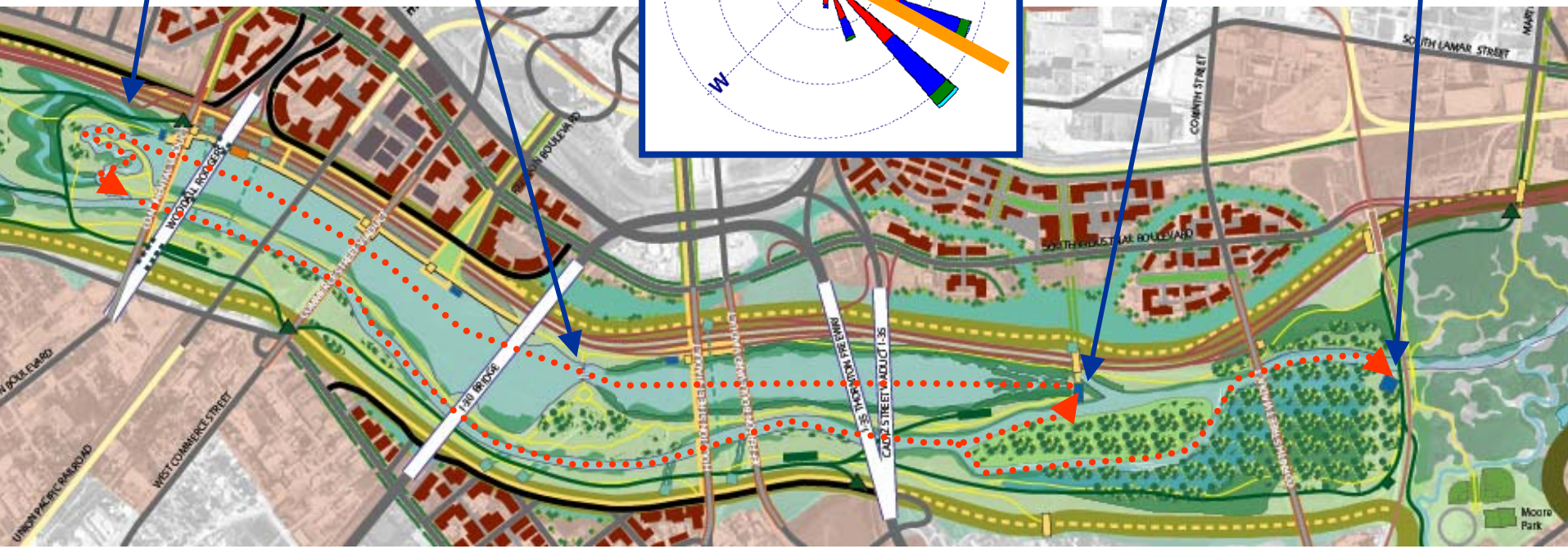
Predominant wind direction shown by yellow arrow

Primary starting and ending point

Whitewater Boat Course from Urban Lake to River

Moore Park Boat Ramp; second option for take-out





Reverse Flow 4-mile Boat Loop: Portages

Water Feature Between Urban Lake and Natural Lake

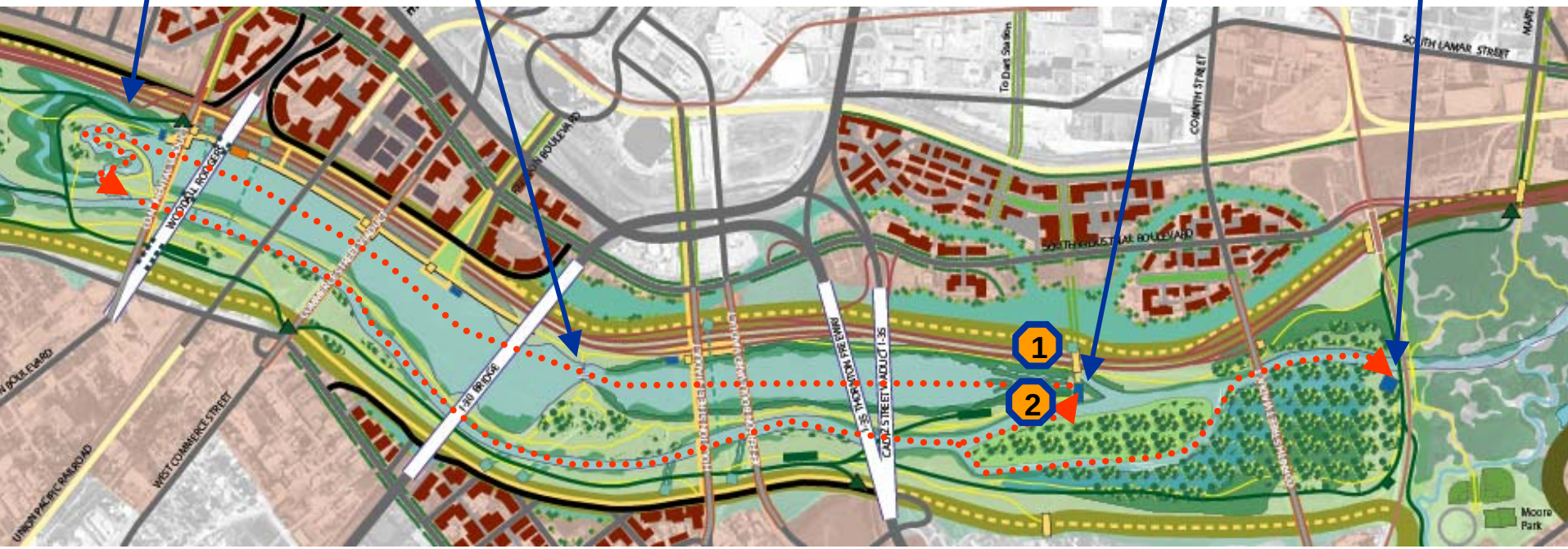
Whitewater Boat Course from Urban Lake to River

Portages for boaters

1. Put-in at Natural Lake
2. Take-out from river

Primary starting and ending point

Moore Park Boat Ramp; second option for take-out



Conventional Flow 4-mile Boat Loop: Portages

Water Feature Between Urban Lake and Natural Lake

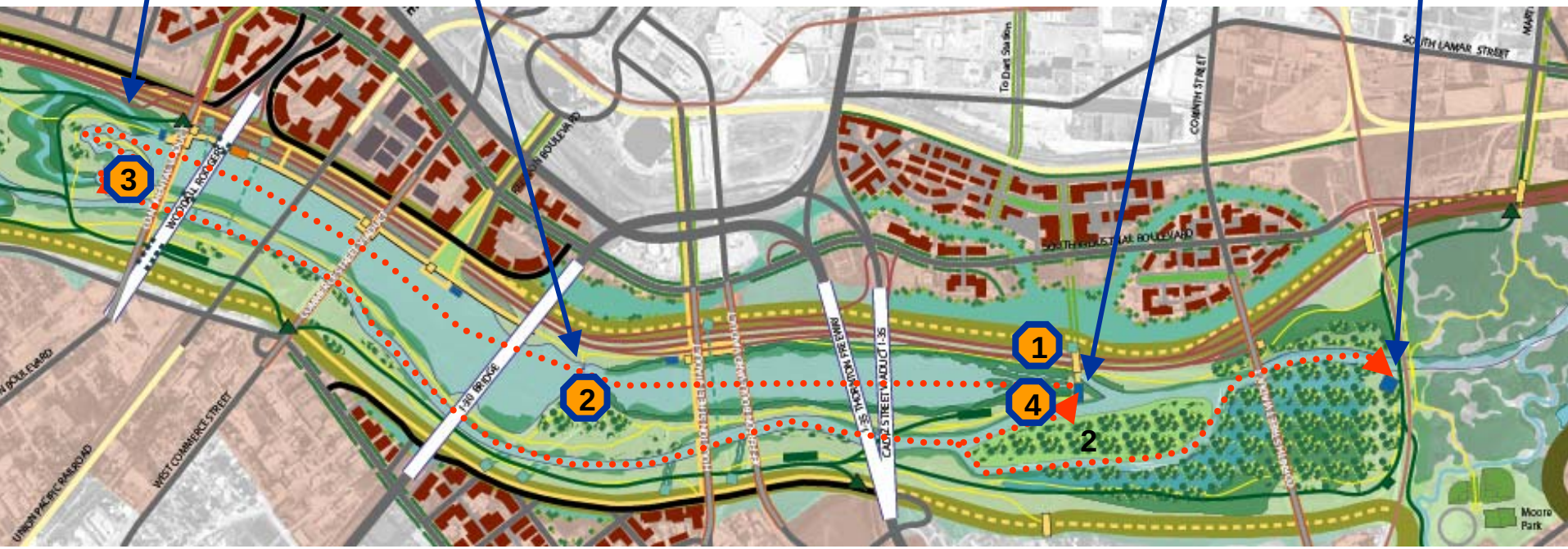
Whitewater Boat Course from Urban Lake to River

Portages for boaters

1. Put-in at Natural Lake
2. Lake transition
3. Urban Lake to river
4. Take-out from river

Primary starting and ending point

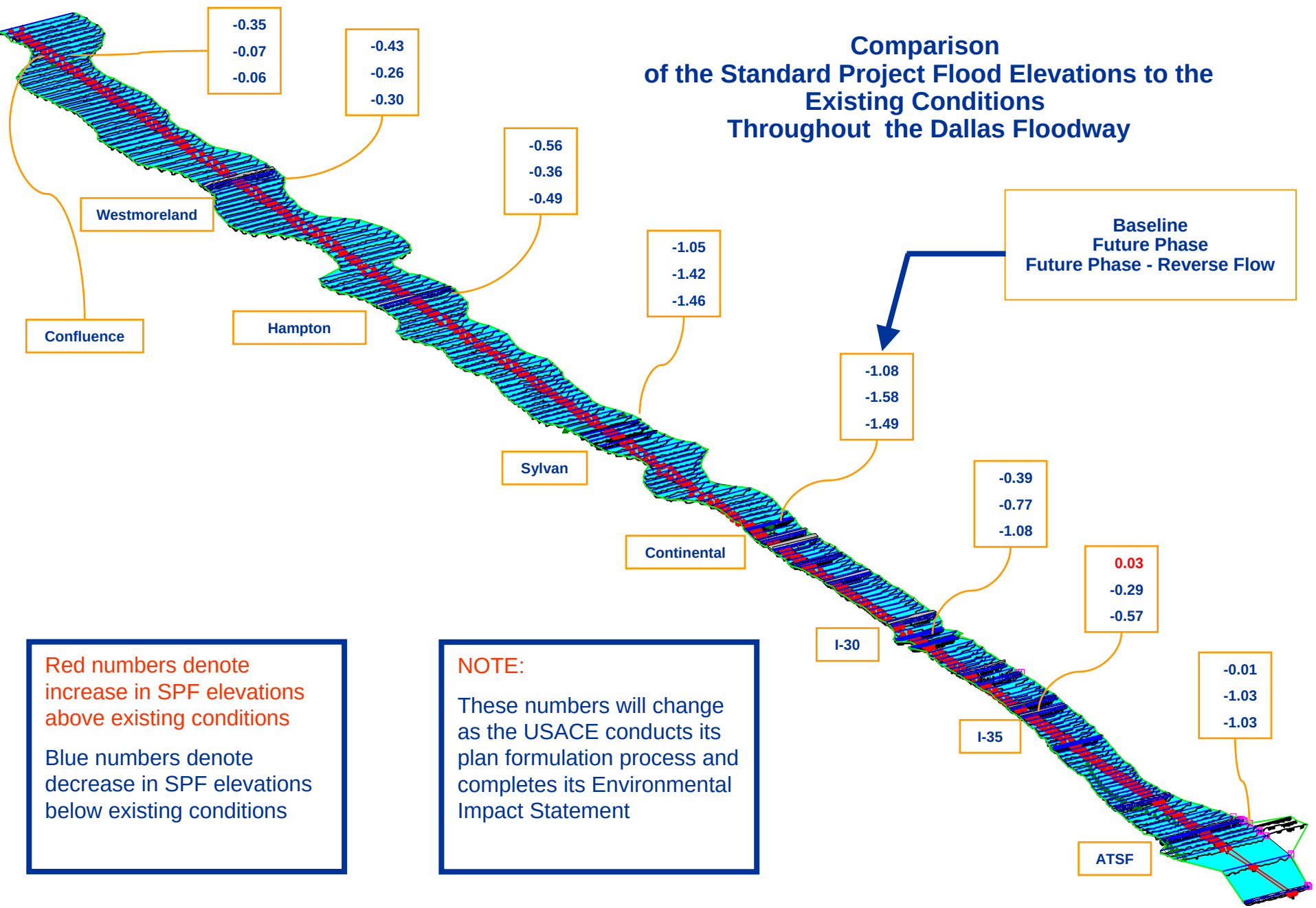
Moore Park Boat Ramp; second option for take-out



Reverse Lake Flow: Effects on Cost

- The reverse lake flow alternative eliminates the need for 2.2 miles of new pipe that would carry CWWTP water from the I-35 vicinity to the northern end of the Urban Lake resulting in a $6 million cost savings
- The annual energy cost savings are estimated to be $40,000 per year
- If annual energy cost savings are held at zero, the amount of CWWTP source water can be increased from 50 million gallons per day to 58 million gallons per day
- Additional small cost savings would be realized for reduced size of the pumps and less annual operation / maintenance costs

Comparison of the Standard Project Flood Elevations to the Existing Conditions Throughout the Dallas Floodway



Red numbers denote increase in SPF elevations above existing conditions

Blue numbers denote decrease in SPF elevations below existing conditions

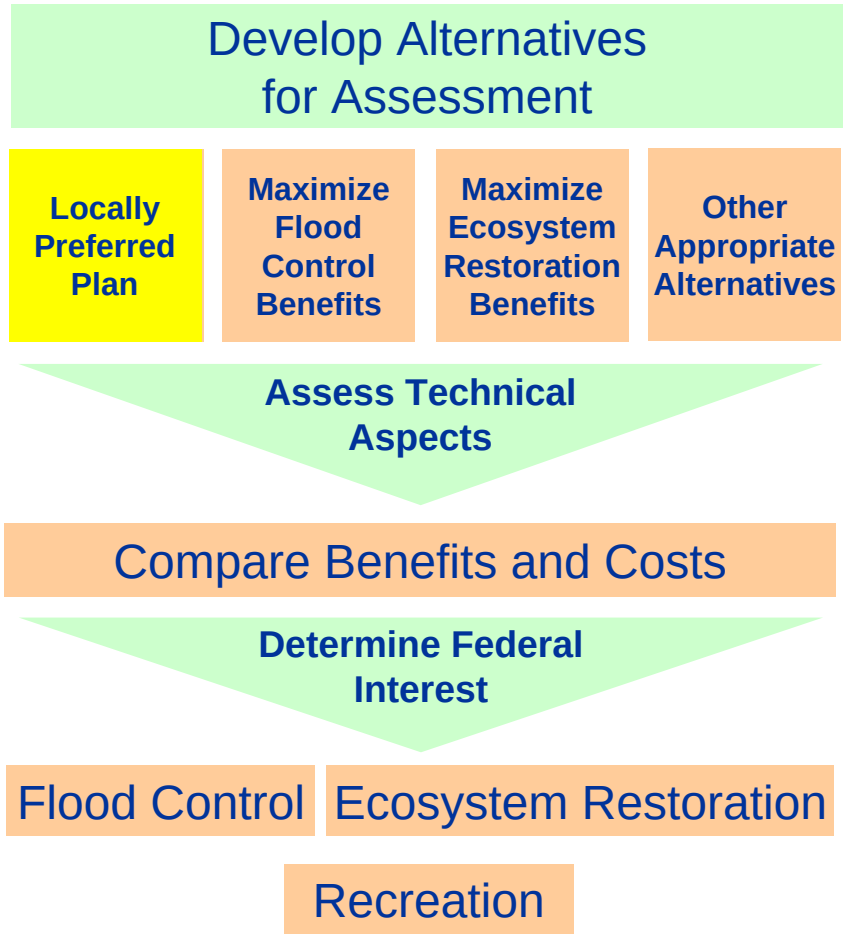
NOTE:

These numbers will change as the USACE conducts its plan formulation process and completes its Environmental Impact Statement

Recommendation and Next Steps

- City staff recommends (with TRC support) that a briefing memo packet is provided to full City Council for status update and City Council resolution is pursued for April 14, 2004
- Adopt the lake configuration change to better accommodate the future I-30 Signature Bridge
- Adopt the direction of lake flow to a reverse lake flow configuration
- Turn over hydraulic models and digital terrain models to the USACE by end of March 2004
- USACE will progress with plan formulation for the Dallas Floodway during 2004-2005, while continuing to receive City and Urban Design feedback

Next Steps (continued)



- **USACE feasibility study and EIS process carries through 2004 - 2006**
- **Draft report due in late 2005**
- **Final EIS due in late 2006, which also includes the Trinity Parkway project**

Next Steps (continued)

- CDM will complete their work on water quality and environmental restoration this Spring
- USACE will produce a Supplemental Draft Environmental Impact Statement (EIS) report by late 2005 that will establish the extent of Federal participation for the Dallas Floodway initiatives
- The City will have a concurrent study initiated in 2005 with the Bureau of Reclamation for the lakes' water delivery system, if Federal funding is established
- The City will pursue design of lakes and amenities for the Dallas Floodway during 2006, while USACE finalizes the EIS

I-30 Signature Bridge: Refined Lake Shape

- This rendering shows the possible location of the I-30 Signature Bridge span based on preliminary information
- Much more design is needed to fully explore the possibilities of centrally locating the bridge with respect to the Urban Lake

August 29, 2013

Lana Furra
Assistant Director of Aviation
City of Dallas, Dallas Airport System
Love Field Terminal Building
8008 Cedar Springs Rd., LB16
Dallas, TX 75235

RE: Assessment of the Balanced Vision Plan for the Trinity River Corridor as it Relates to Dallas Love Field Airport (DAL) Wildlife Hazards

Dear Lana,

Dallas Love Field Airport (DAL) has been notified by the U.S. Department of Transportation Federal Aviation Administration (FAA), that future projects along the Trinity River of Dallas (Trinity River Corridor Balanced Vision Plan [BVP]) have been proposed within the airport's Perimeter C (5-mile range used to protect approach, departure, and circling airspace). This report conducted by Benchmark Environmental Consultants (Benchmark) and KBA EnviroScience Ltd. (KBA) provides an assessment of the BVP as it relates to DAL wildlife hazards.

Benchmark and KBA have reviewed applicable documents regarding the BVP including:

- A Balanced Vision Plan for the Trinity River Corridor, Dallas, Texas. December, 2003
- Air Traffic Flow data for April 3 and April 7, 2013
- Wildlife Strikes to Civil Aircraft in the United States, 1990–2011
- FAA Advisory Circular (AC) No: 150/5200-33B "Hazardous Wildlife Attractants On or Near Airports."

We have performed a site visit and field surveys of avian utilization of areas along the Trinity River where the BVP will be constructed. This report provides our observations and a discussion of the potential relevance of the BVP to Dallas Love Field.

FAA Guidelines Background

The FAA has issued an Advisory Circular (AC) No: 150/5200-33B "Hazardous Wildlife Attractants On or Near Airports." The purpose of the AC is to provide guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports.

According to the AC, when considering proposed land uses, airport operators, local planners, and developers must take into account whether the proposed land uses, including new development projects, will increase wildlife hazards. For all airports, the FAA recommends a distance of 5 statute miles between the farthest edge of the airport's air operations area (AOA) and the hazardous wildlife

attractant if the attractant could cause hazardous wildlife movement into or across the approach or departure airspace.

According to the AC, wetlands are attractive to many types of wildlife, including many which rank high on the list of hazardous wildlife species. If wetlands are located on or near airport property, airport operators should be alert to any wildlife use or habitat changes in these areas that could affect safe aircraft operations. At public-use airports, the FAA recommends immediately correcting, in cooperation with local, state, and Federal regulatory agencies, any wildlife hazards arising from existing wetlands located on or near airports.

As a matter of policy, the FAA encourages operators of public-use airports who become aware of proposed land use practice changes that may attract hazardous wildlife within 5 statute miles of their airports to promptly notify the FAA.

Balanced Vision Plan (BVP) Background

The Balanced Vision Plan (BVP) was adopted by the Dallas City Council in 2003 and was the result of the Trinity Urban Design and Transportation Study – designed to take a fresh look at the potential of the Trinity River Corridor. It began in May 2002, when an independent study was conducted to review the past projects (the "Dallas Plan" and the "Trinity River Corridor Plan") and recommend an urban design vision that would offer an appropriate balance among the inter-related issues.

The BVP includes a master plan that was approved by the Dallas City Council in December 2003 and amended in March 2004. The plan includes flood damage reduction, ecosystem restoration, and recreation initiatives that can be accomplished between the levees along an eight-mile stretch of the existing Dallas Floodway. Specific project components include: levee raising and stabilization; bridge modifications; 90 and 60-acre flood conveyance lakes; a lake recharge system; over 400 acres of new wetlands within the Dallas Floodway; miles of trails, park roads, and public access points; recreation playing fields; and Trinity River meanderings and riparian habitat.

The project extends from the confluence of the Elm and West Forks of the Trinity River southward to the Corinth Street Bridge. At its closest point (approximately Hampton Road bridge), the project is approximately 2.2 miles south of the DAL Air Operations Area (AOA). At its farthest point (Corinth Street bridge), the project is approximately 5.7 miles south-southeast of the DAL AOA. At completion, wetlands will be present throughout almost all of the length of the project. Some of the wetlands exist prior to the project, but most will be newly created and the existing wetlands are expected to be enhanced (either directly or indirectly) and preserved. Two lakes are also planned in the projects. All work will be performed between the existing levees.

Field Observations

Bird surveys were performed on May 22, May 23, and May 24, 2013 at ten locations. **Table 1** shows the survey locations. Maps are included in **Attachment A: Figures**. Survey locations were chosen based on their proximity to DAL, their potential to attract similar bird species as the proposed BVP initiatives, and accessibility.

Table 1. Survey Locations for BVP Report for DAL

Site Number (Name)	Description	Coordinates
Survey 1 (South side of Westmoreland Bridge)	Levee bank on the south end east of Westmoreland Bridge	32°47'38.72"N 96°52'18.47"W
Survey 2 (Trinity River at Westmoreland Bridge)	Trinity River underneath the Westmoreland Bridge	32°47'53.00"N 96°52'26.07"W
Survey 3 (North side of Westmoreland Bridge)	Levee bank on the north end east of Westmoreland Bridge.	32°48'7.45"N 96°52'18.54"W
Survey 4 (Design District)	Levee bank south of the design district where Oak Lawn Ave ends at Levee St.	32°47'19.30"N 96°49'32.57"W
Survey 5 (E Irving Blvd)	Levee bank east of E Irving Blvd bridge near existing wetlands.	32°48'20.65"N 96°53'58.78"W
Survey 6 (Conveyor Lane)	Construction area on levee bank near New and Old Hampton Pump Stations west of Inwood Rd bridge.	32°48'7.57"N 96°51'29.33"W
Survey 7 (Fuel City)	Pump station near Fuel City gas station.	32°46'2.67"N 96°48'36.28"W
Survey 8 (Santa Fe Trestle Trail)	Wetlands and wooded area along STT and DART bridge.	32°45'1.52"N 96°47'38.28"W
Survey 9 (Pavaho Wetlands Site)	Levee bank north of Canada Drive near proposed Pavaho wetlands site.	32°47'21.10"N 96°50'30.95"W
Survey 10 (Trinity View Park, Irving)	Trinity View Park near the Trinity River.	32°48'44.65"N 96°54'24.48"W

The surveys were performed for approximately 30 minutes at each location. Both dawn and dusk surveys were conducted at each location.

Results

As shown in **Attachment B: Tables**, 49 different species of birds were observed during the morning and evening surveys at 10 sites. The most common species, according to numbers of individuals observed, were the Brown-headed Cowbird, Cliff Swallow, and European Starling. These were seen at nearly every site, along with Great Egrets, Mourning Doves, Cliff Swallows, Red-winged Blackbirds, and Western Kingbirds.

Flocking birds such as the Grackle (Great-tailed and Common), Brown-headed Cowbird, and European Starling were observed at most of the sites in moderate numbers. They commonly used the sides of levees and utility lines (for perching) and were observed flying about.

Three predatory birds (Hawks/Kestrels) were observed soaring over the levee system. These included the American Kestrel, Red-tailed Hawk, and Swainson's Hawk.

Large water-loving birds such as anhingas, cormorants, herons, egrets, and ducks were observed at most or all of the sites. Many egrets and herons were observed flying over the Trinity River Corridor and others (in smaller numbers) were observed utilizing wetlands, ditches, and open water at sites. The Great Egret and White Ibis were the most commonly observed – with the Great Egret observed flying over the corridor at every site. Also observed were the Anhinga and Double-Crested Cormorant (flying only), Blue-winged Teal, Mallard and Northern Shoveler (flying and using wetlands), and the Little Blue Heron, Snowy Egret, and Yellow-Crowned Night Heron (flying and using wetlands).

Smaller species specific to the wetlands included large numbers of Red-winged Blackbirds and one sighting of a Yellow-headed Blackbird.

Cliff Swallows, Chimney Swifts, and Purple Martins were observed at many sites – with Cliff Swallows the most common and occurring in colonies under the bridges.

Upland birds utilized the grasslands, roads, and utility lines (for perching) along the levee system and included species such as the Grasshopper Sparrow, Killdeer, Scissor-tailed Flycatcher, Western Kingbird, Western Meadowlark, and White-winged Dove.

Woodland birds were most common near parks, wooded areas, and along the Trinity River forested area. They included Carolina Chickadee, Carolina Wren, Woodpeckers (Downy and Red-bellied), Eastern Phoebe, Hermit Thrush, Northern Cardinal, Tufted Titmouse, and Yellow-billed Cuckoo.

Many common urban and habitat generalist birds were observed including Blue Jay, Common Crow, Eastern Bluebird, House Finch, Loggerhead Shrike, Mourning Dove, Northern Mockingbird, and Scissor-tailed Flycatcher. The Mourning Dove was one of the most common sightings and was frequently seen flying.

Analysis

According to the Trinity River Corridor Comprehensive Land Use Plan, there are five objectives for future development of the Trinity Corridor: reconnect North and South Dallas; establish the role of economic development along the Trinity River; create a vibrant central city; establish the Trinity River floodplain as the front yard of the City; and, enhance the City's urban form to increase the appeal of urban life. The enhancement and creation of wetlands is part of the overall public improvement along the river and includes wetlands at the outfalls of the stormwater system, headwaters wetlands adjacent to new lakes, and wetlands inside the river greenbelt. According to this plan "The Trinity River floodplain of the future will be an area with restored and revitalized natural ecosystems. The Great Trinity Forest, a tree-lined and meandering river channel, lakes of varying size and character, meadows and wetlands are all part of this vision."

The BVP does not discuss the influence of the project on local bird populations or movement patterns and does not address the potential threat of bird movement to aircraft.

<u>Wetlands</u>
It is expected that the creation of wetlands will increase both the numbers and diversity of wildlife, including birds, within the Trinity River Corridor by the introduction of a more diverse habitat and a

more stable wetland ecosystem. It is also predictable that adding wetlands will increase the bird population and diversity in the area around the wetland by providing food, water, and habitat for all types of birds.

The Trinity River in the project area is contained within a levee system in a highly urban environment. The area inside the levee where the environmental restoration will occur is currently mowed annually and there are very few trees, although a narrow row of trees line the Trinity River in some areas. In addition, there are a few scattered cottonwoods present inside the levee. Forested areas are present along the west side of the river upstream of the confluence of the Elm and West Forks of the Trinity River. The major avian habitat on the Trinity River within the 5-mile separation distance of Love Field is north of the BVP project area, beginning approximately at the Bachman Lake discharge into the Elm Fork of the Trinity River west of Interstate I-35. That area, known as the L. B. Houston Nature Area, contains an expansive mix of open water, forested wetland, emergent wetland, and forest. The area within the 5-mile separation distance, along with the locations surveyed, is depicted on the **Attachment A: Figures**. An even larger area of avian habitat exists on the Trinity River south of the project area (Great Trinity Forest).

Open Water

The BVP includes the construction of several open water features within the 5-mile separation distance of Love Field. These new water features are expected to attract a diversity of wildlife, including birds, by providing food, water, and habitat. Open water features tend to attract different species than wetlands do, some of which are larger birds, such as cormorants, that can potentially be hazardous to aircraft. There is currently very little open water habitat, except for Bachman Lake, within the 5-mile separation distance of Dallas Love Field so the BVP project is expected to increase open water habitat substantially. Therefore, an increase in birds that are attracted to open water habitat such as diving birds, is expected with the increase in open water habitat proposed by the BVP.

The Wildlife Hazard Assessment (WHA) for Love Field identified all of the features described in this document as potential hazards. Hazardous waterbirds (e.g., Cormorants, Egrets) were routinely observed during the WHA moving between Bachman Lake and the Trinity River floodplain, particularly the Elm Fork and L. B. Houston Greenbelts. It is presumed that other waterbirds also utilize Bachman Lake for feeding and loafing but use the Trinity River floodplain for nesting and roosting.

Flight Information

According to the FAA's 2005 FAA document Wildlife Hazard Management at Airports, approximately 75 percent of all bird strikes occur 500 feet above ground level (AGL) or lower and approximately 81 percent of all bird strikes occur at 1,000 feet AGL or lower.

DAL provided figures and data that depicted south air traffic flow on April 7, 2013 and north air traffic flow on April 3, 2013. On an annual basis, DAL traffic flows to the south 70 percent of the time. We evaluated the data describing all the flights on two days that intersected a 2-mile radius of three locations encompassing the entirety of the BVP project corridor. As shown in **Table 2**, there were 466 flights that passed within 2 miles of the BVP project corridor and 10 of these flights were below 1,000 feet AGL when they were within 2 miles of the BVP project corridor. Of the flights that were within 1,000 feet AGL near the BVP project corridor, 9 flights were jet aircraft and 1 was an aircraft of unknown propulsion (a helicopter).

Table 2. Summary Table of Flights from DAL that Intersected a 2-Mile Radius of the BVP Corridor

Date	Total Number of Aircraft	Total Number of Aircraft 1000 ft. AGL or Lower	Number of Jet-Propelled Aircraft	Number of Propeller-Powered Aircraft	Number Turbo Prop Aircraft	Unknown Propulsion*
April 3, 2013 (north flow)	277	9	9	--	--	--
April 7, 2013 (south flow)	189	1	--	--	--	1
Total	**466**	**10**	**9**	**--**	**--**	**32**

*helicopter

From data collected on these two dates it can be concluded that a small percentage of all flights departing from and arriving at Love Field will pass within 2 miles of the BVP project corridor. Of the flights that pass within 2 miles of the BVP project location 2.1 percent will be below 1,000 feet AGL over the project corridor.

Conclusions

Although it is anticipated that habitat improvements and restoration within the Trinity River Corridor associated with the BVP will increase the abundance of hazardous birds within the 5-mile separation distance of Love Field, it is also anticipated that the additional hazard presented by the restoration will be minimal for the following reasons:

1. Daily local movement by large waterbirds is expected to mainly be within the Trinity River corridor. Avian movement will likely be within the Trinity River Corridor and data suggest that aircraft moving in and out of Dallas Love Field typically intersect the corridor when they are above 1,000 feet AGL.

2. Seasonal (migratory) movement patterns by large waterbirds and other hazardous birds are likely to be unaffected by the addition of the wetlands and other features proposed in the BVP.

3. The BVP project is expected to attract a variety of birds, especially waterbirds, but is not expected to provide suitable habitat to increase the numbers of hazardous flocking birds (e.g., grackles, European Starling, dove, gulls).

4. The BVP project is expected to increase the amount of prey that would result in an increase in the number of hazardous avian predators (e.g., hawks) and scavengers (e.g., vultures). That increase is expected to be within the Trinity River Corridor and is not expected to be in the normal flight path of the majority of Love Field aircraft.

5. The BVP project is expected to increase the number of large mammals (e.g., coyote, fox), but the area is far enough from Love Field that no threat to Love Field from those mammals is expected.

6. A small percentage of private and commercial flights are expected to fly over the BVP project area. The aircraft will generally be above 1,000 feet AGL over the project area, and commercial aircraft will often be at least 2,000 feet AGL. According to data presented in the 2005 FAA document Wildlife Hazard Management at Airports, 81 percent of strikes occur below 1,000 feet AGL and 88 percent occur below 2,000 feet AGL, so the chances of a strike are expected to be low.

Sincerely,

Donna DeYoung
Benchmark Environmental Consultants, Inc.

C. Keith Bradley, REP, CWB
KBA EnviroScience, Ltd

Attachments: Figures, Tables

Attachment A

Figures

City of Dallas Aviation - Balanced Vision Plan Assessment
Bird Survey Overview

Legend

- Survey Site
- 5-mile Buffer
- BVP Project Area

1:125,000

0 1.5 3 Miles

N

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City of Dallas Aviation - Balanced Vision Plan Assessment
Bird Survey Locations

Legend

- Survey Site
- 5-mile Buffer
- BVP Project Area

1:25,000 0 1,000 2,000 Feet

N

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City of Dallas Aviation - Balanced Vision Plan Assessment
Bird Survey Locations

Legend

- Survey Site
- 5-mile Buffer
- BVP Project Area

1:25,000 0 1,000 2,000 Feet

N

Benchmark Environmental Consultants

City of Dallas Aviation - Balanced Vision Plan Assessment
Bird Survey Locations

Legend

- Survey Site
- 5-mile Buffer
- BVP Project Area

1:25,000

0 1,000 2,000 Feet

N

Benchmark
Environmental Consultants

City of Dallas Aviation - Balanced Vision Plan Assessment
Bird Survey Locations

Legend

- Survey Site
- 5-mile Buffer
- BVP Project Area

1:25,000 0 1,000 2,000 Feet

N

Benchmark Environmental Consultants

Attachment B

Summary Tables for Bird Surveys

Dallas Love Field Airport
Balanced Vision Plan Assessment
August 29, 2013

Summary Table from Bird Surveys: AM Surveys

Species (Common Name)	Site #										
	1	2	3	4	5	6	7	8	9	10	Total
American Kestrel	1		1	2				1			5
Anhinga					1	2					3
Barn Swallow		2		4	1		1		3	1	12
Blue Jay						1			1		2
Blue-winged Teal	2										2
Brown-headed Cowbird									4		4
Carolina Chickadee								4		3	7
Carolina Wren							1	3			4
Chimney Swift	1		1	1							3
Cliff Swallow	20	100+	20	10	8	5	4	5	3		75
Common Crow					1					2	3
Common Grackle	4	1	4	2	8	6		3	6	6	40
Double-Crested Cormorant	1						1				2
Downy Woodpecker								2			2
Eastern Bluebird										1	1
Eastern Phoebe						1	1	1			3
European Starling		2	5	2	7	20	6	10	28	5	85
Grasshopper Sparrow	5			10		3	3		7		28
Great Egret	9		6	14	2	16	3	1	14		65
Great-tailed Grackle							2				2
Hermit Thrush								1			1
House Finch								1			1
Killdeer		3	2	1		1	2	1	2		12
Little Blue Heron			1					1			2
Loggerhead Shrike		1		4							5
Mallard			2								2
Mourning Dove			1	4	5	2	3		8	18	41
Northern Cardinal		3		1		2	2	4	2	3	17
Northern Mockingbird			1	4		2		2		3	12
Northern Shoveler											0
Purple Martin	1						1				2
Red-bellied Woodpecker										1	1
Red-tailed Hawk							1				1

Dallas Love Field Airport
Balanced Vision Plan Assessment
August 29, 2013

Species (Common Name)	Site #										
	1	2	3	4	5	6	7	8	9	10	Total
Red-winged Blackbird	5		3	3	2	2	2	6	3		26
Rock Pigeon	5		25	4	15	1	1			1	52
Ruby-throated Hummingbird								1			1
Scissor-tailed Flycatcher	3				1				2		6
Snowy Egret				2			3	2	2		9
Swainson's Hawk											0
Tufted Titmouse										2	2
Western Kingbird	1		1	2	2	2	2	4	4	1	19
Western Meadowlark			1	2							3
White Ibis	1		4	2	1	1		6	1		16
White-winged Dove						1			1		2
Yellow-billed Cuckoo											0
Yellow-crowned Night-Heron	1				2	2			1		6
Yellow-headed Blackbird			1								1
TOTAL Numbers	60	12	79	74	56	70	39	59	92	47	588
TOTAL Species	15	7	15	19	14	18	18	20	19	13	44

Dallas Love Field Airport
Balanced Vision Plan Assessment
August 29, 2013

Summary Table from Bird Surveys: PM Surveys

Species (Common Name)	Site #										
	1	2	3	4	5	6	7	8	9	10	Total
American Kestrel			2								2
Anhinga			1			1	2				4
Barn Swallow					5	1	1		1		8
Blue Jay											0
Blue-winged Teal	1										1
Brown-headed Cowbird						2	100		30	1	133
Carolina Chickadee								6		1	7
Carolina Wren											0
Chimney Swift	1										1
Cliff Swallow	3	100	3	4	2	12	4	5	4	18	155
Common Crow											0
Common Grackle	4		6	5	1		4		4		24
Double-Crested Cormorant											0
Downy Woodpecker											0
Eastern Bluebird											0
Eastern Phoebe											0
European Starling	2	2	3	25	5	20	25	4	30	16	132
Grasshopper Sparrow	3			5					10		18
Great-tailed Grackle											0
Great Egret		1	5	2	1	9	2	3	2	1	26
Hermit Thrush											0
House Finch						1					1
Killdeer	3		3	2	1	1	1				11
Little Blue Heron			1	1	1						3
Loggerhead Shrike				3							3
Mallard			2			3					5
Mourning Dove	2		3	5	4	5	2	4	5	2	32
Northern Cardinal		1		1		3					5
Northern Mockingbird				1	1					2	4
Northern Shoveler									5		5
Purple Martin											0
Red-bellied Woodpecker											0
Red-tailed Hawk											0

Dallas Love Field Airport
Balanced Vision Plan Assessment
August 29, 2013

Species (Common Name)	Site #										
	1	2	3	4	5	6	7	8	9	10	Total
Red-winged Blackbird	6		3	1	5		3	4	6		28
Rock Pigeon					3		2				5
Ruby-throated Hummingbird											0
Scissor-tailed Flycatcher	2				2					2	6
Snowy Egret	1		4	2		3	3				13
Swainson's Hawk		1									1
Tufted Titmouse								3			3
Western Kingbird	2		2		2	4	2	1	4	1	18
Western Meadowlark	2		1								3
White Ibis						1		4			5
White-winged Dove											0
Yellow-billed Cuckoo		2									2
Yellow-crowned Night-Heron	1				2			2		2	7
Yellow-headed Blackbird											0
TOTAL Numbers	33	107	39	57	35	66	151	36	101	46	671
TOTAL Species	14	6	14	13	14	14	13	10	11	10	41