CHAPTER 6
FINANCIAL ANALYSIS AND EVALUATION

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6.0 INTRODUCTION

This chapter presents cost estimates of the Trinity Parkway. The various sources of funding and cost sharing opportunities to construct the proposed project are discussed.

Due to funding constraints and uncertainties associated with implementation of the project by TxDOT using gasoline tax revenue sources, the proposed action is being considered for implementation as a limited access toll facility with NTTA as the local sponsor. Subject to environmental clearance and other agency considerations, implementation of the proposed action as a NTTA toll facility would involve the sale of toll financed revenue bonds to private investors at competitive rates. Notwithstanding this approach, should other local, state, or federal funding become available at some future date, this funding may be used to support the proposed action.

6.1 CITY OF DALLAS FUNDING

On May 2, 1998, the City of Dallas held a Capital Bond Program election to fund 11 propositions (City of Dallas, 1998a). The bond election passed in its entirety, including Proposition 11 that authorized the following:

> The issuance of $246,000,000 general obligation Trinity River Corridor Project Bonds, the Project to include floodways, levees, waterways, open space, recreational facilities, the Trinity Parkway and related street improvements, and other related, necessary, and incidental improvements to the Trinity River Corridor (City of Dallas, 1998a).

The Trinity River Corridor Project Bonds fund the city's share of several projects, programmed to be implemented over several years and expected to leverage substantial additional funding from state, federal, and other agency sources. Proposition 11 was subdivided into the following program categories:

Dallas Floodway Extension	$ 24,700,000
Elm Fork Levee	$ 30,000,000
Transportation Improvements	$ 118,000,000
Great Trinity Forest	$ 41,800,000
Chain of Lakes	$ 31,500,000

The Transportation Improvements program category has direct application to the proposed action (Trinity Parkway) and is further described in **Section 6.2**. All of the other listed program categories, excluding the Elm Fork Levee item, have direct influence on the study corridor and are further described in other sections of the FEIS.

6.2 COST SHARING

The Trinity Parkway was allocated $84 million of the $118 million Transportation Improvements category funds identified above in Proposition 11 of the City of Dallas 1998 Capital Bond Program. The funding was intended to be used for preparation of the EIS, schematic plans, detailed design, right-of-way acquisition and relocation assistance, utility relocations and construction.

Subject to environmental clearance and other agency considerations, NTTA would expect to provide a substantial share of the initial cost of the project through toll revenue bonds and related project financing instruments. It is also NTTA standard practice to pay for on-going operations and maintenance costs from toll receipts. Future costs for project improvements would also be expected to be financed from toll revenue on the project. The exact amount of toll revenue contribution to initial cost will be determined at a future date based on an Investment Grade Traffic and Revenue Analysis (see **Section 6.7**). The NTTA contribution may include "System Financing," a funding mechanism wherein NTTA collateralizes all or part of their overall system, to achieve better financial terms and contributions for a particular expansion project. Additional transportation funding sources that may be utilized to fund the initial portion of Trinity Parkway include:

- TxDOT (which includes allocation of federal funding, revenue bonds, and other sources)
- Dallas County
- City of Dallas – General Transportation Improvements
- Other state and federal funding sources, such as loans through the Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA).

The 1999 Interlocal Agreement between TxDOT, the City of Dallas, and NTTA concerning the development of the Trinity Parkway identified certain focus areas for cost sharing. In concept, TxDOT

would contribute funds to provide connections from the toll facility to the state highway system. The City of Dallas would contribute money for the roadway preliminary engineering, roadway right-of-way acquisition, utility services to the toll gantries and other construction. The NTTA would fund the construction of the tollway, connections to state facilities, and maintenance for the entire facility. This Agreement may be modified or expanded at some future date, subject to environmental clearance of the project, additional financing studies, and other agency considerations.

6.3 FINANCING TOOLS

Funding for Texas state highway projects has historically been based on a "pay as you go" approach, with TxDOT's capacity and authority to borrow severely restricted. In this environment, only turnpike and tollway authorities authorized by Texas State Statute were permitted to use alternative financing or issue revenue bonds in connection with highway projects. In 2001, the Texas Constitution was amended (Art. 3, sec. 49-K) to create the Texas Mobility Fund. Under legislation implementing the TMF, revenue bonds may be issued by TxDOT. Pursuant to legislation passed in 2003, the authority for the administration of the TMF is delegated to the Texas Transportation Commission ("TTC").

In 2005, TxDOT gained certain authority under HB 3588 to enter into "Comprehensive Development Agreements" (CDA) for tollroads. CDAs are public-private partnerships, under which a private developer contracts with the state to finance, design, build and/or operate a roadway under certain financial terms, including collection of tolls. In 2007, this authority was modified by SB 792, which enacted a two year moratorium on Texas CDA agreements, but exempted several projects, including SH-121, the Trinity Parkway, Loop 9, and managed lane projects in North Texas. The bill created a market valuation process for new toll roads, and gave the NTTA the first option to develop future toll projects in its service area. NTTA was also authorized to use CDA procurement for toll projects, under rules which mirror TxDOT's process for entering into CDAs.

6.4 COST ESTIMATE FOR THE TRINITY PARKWAY

The cost estimate for Trinity Parkway Alternative 3C is summarized in **Table 6-1**, and shown in detail in **Appendix D**. Estimated costs include roadway construction, engineering, utility relocations, contingences, right-of-way acquisition, environmental remediation and mitigation. Costs are based on recent highway construction cost data. Right-of-way costs are estimated using local real estate prices and assessed values, and include additional costs related to the acquisition process. Remediation and mitigation costs are estimated based upon the best information available at this time and on industry cost information. Additional details regarding the estimates for environmental costs are discussed following the table below.

TABLE 6-1. ESTIMATE OF PROBABLE COST

Category	TRINITY PARKWAY ALTERNATIVE 3C (2013 Dollars)
CONSTRUCTION COSTS	
Roadway	101,451,105
Structures (Bridges & Walls)	464,190,260
Drainage	14,512,300
Miscellaneous (Signage, Lighting, Landscaping, Traffic Control)	106,319,340
Toll Gantries	7,000,000
Maintenance Facilities	11,300,000
Mobilization (10%)	70,477,300
Subtotal- Construction Costs	775,250,305
Construction Contingencies (20%)	155,050,061
ITS	10,368,000
TOTAL CONSTRUCTION COST	940,668,366
ROW & UTILITY COSTS	
Subtotal - ROW & Utility Costs	145,745,297
TOTAL ROW & UTILITY COSTS	145,745,297
AGENCY COSTS	
Subtotal - Agency Costs (Design, Construction Management)	227,923,590
TOTAL AGENCY COST	227,923,590
TOTAL PROJECT COST SUMMARY - ROUNDED UP	
Total Construction Cost	940,668,366
Total ROW & Utility Cost	145,745,297
Total Agency Cost	227,923,590
TOTAL PROJECT COST	1,314,337,253
TOTAL PROJECT COST SUMMARY (ESCALATED $) - ROUNDED UP	
Escalated Total Construction Cost	1,058,730,533
Total ROW & Utility Cost	145,745,297
Escalated Total Agency Cost	256,530,008
TOTAL PROJECT COST (ESCALATED $)	1,461,005,839
Notes: All estimated costs are preliminary and subject to change as the project is further developed and refined.	

Table 6-2 details the preliminary environmental mitigation costs for Alternative 3C. Some of the environmental mitigation components include:

- Replacement of waters of the U.S., including wetlands;
- Revegetation of disturbed areas, wildlife enhancements, and tree plantings;
- Noise barriers;
- Historic structures mitigation;
- Hazardous waste remediation; and
- Asbestos abatement of displaced buildings.

Preliminary cost estimates of the known features that would require mitigation are listed in **Table 6-2**. In the event Alternative 3C is selected, more detailed mitigation plans and refined cost estimates will be developed.

TABLE 6-2. ESTIMATED ENVIRONMENTAL MITIGATION COSTS

Criteria	Trinity Parkway Alternative 3C
Vegetation Enhancements (Acres of Non-Wetland Woodlands Impacted)	49.1
$13,000 per acre[1] ($)	638,300
Noise Barriers (Square Feet)	40,365
$50 per square foot ($)	2,018,250
Waters of the U.S., Including Wetlands (Impacted Acres)	65.55
($)	4,059,965[2]
Historic Structures (Number of NRHP-Eligible or Listed Sites with Adverse Effects)	1 (Continental Ave. Viaduct) No cost developed at this time. If necessary, coordination with THC on various mitigation options will occur following selection of an alternative in the anticipated ROD.
Hazardous Material Sites (Number of High Risk Sites within ROW)	24
Total Investigation/Remediation Cost[3] ($)	6,550,625
Building Displacements (Number of Buildings)	30
Asbestos surveys and abatement[4] ($)	9,630,200
TOTAL (2013 $)	**22,897,340**

Notes:

1) Woodland plantings used an assumed cost of $13,000 per acre; this was based on the following information:
   Bare root seedlings - plant and installation = $15/tree
   Plant 300 trees an acre = $4,500 per acre x 3 plantings = $13,500 per acre
   or
   2-inch diameter trees - $250 per inch of diameter x 2" = $400 per tree installed
   100 trees per acre x $400 per tree = $4,000 per acre x 3 plantings = $12,000 per acre
2) The number of required mitigation bank credits for Alternative 3C impacts to waters of the U.S., including wetlands was determined using impact and qualitative data provided in **Table 4-30**, and debit ratios from local banks suitable for providing compensatory mitigation. Costs per credit were estimated based on recent transaction data; costs per credit vary between banks and are subject to change.
3) Remediation costs for hazardous material sites vary widely depending on the type and extent of remediation. The investigation/remediation costs presented in this table were prepared utilizing commonly accepted standard cost estimate practices.
4) Estimates for asbestos abatement were made using current asbestos abatement costs ranging from $7 to $11 per square foot and include costs for abatement specifications, air monitoring, and oversight.

6.5 COST ESTIMATES FOR ANNUAL OPERATIONS AND MAINTENANCE

Estimated costs for annual roadway O&M expenditures have been prepared for Trinity Parkway Alternative 3C considering the proposed lane miles indicated in **Table 6-3**. It is assumed that other underlying characteristics such as possible intermittent wet conditions in the roadway embankment would be mitigated by roadway design so that O&M costs would be normalized to typical NTTA roadway conditions.

These costs are estimated over a feasibility study 52-year[1] period based on standard practices for NTTA O&M. For Alternative 3C, **Table 6-3** shows the estimated O&M costs in 2012 dollars and as escalated dollars assuming a 2.75% escalation rate over a 52-year period (2020 – 2071).

TABLE 6-3. ESTIMATE OF PROBABLE ROADWAY O&M COSTS

Alternative	Lane Miles	2012 Dollars	Escalated Dollars
3C	65	$ 220,032,054	$ 597,906,208

Notes:

- Lane miles expressed above include Mainlanes, Ramps & Frontage Roads.
- Factors including design changes, specific agreements with local, state and/or federal entities and unique maintenance characteristics can affect the estimated O&M cost. The level of information used to estimate O&M for this project is based on conceptual layouts that do not provide sufficient detail to prepare final O&M costs. The estimates developed are based on the best available information. Final O&M costs may vary from estimates provided in **Table 6-3**.
- These O&M cost estimates exclude costs for back office toll collection systems, System Incident Management (SIM) equipment, tolling and roadway alert equipment, courtesy patrol and police.
- The estimated values shown above do not include flood event clean-ups because the cost for such an event is provided separately in **Section 6.6**.
- The estimates in **Table 6-3** assume that it would be the NTTA's responsibility to maintain areas inside the ROW associated with the Trinity Parkway applying the same standards used for other NTTA roadway systems.
- These O&M cost estimates do not include maintaining any landscaping on frontage roads other than turf maintenance within the Trinity Parkway ROW.
- These O&M cost estimates assume that there would be no landscaping to maintain under bridges in the Trinity Parkway ROW other than turf maintenance.
- These O&M cost estimates are only for annual roadway O&M and do not include lifecycle roadway maintenance costs.

As described in **Section 2.7.1**, it is assumed that proposed City of Dallas BVP lakes within the Floodway could be used as borrow sites to produce needed material to build roadway embankments. As stated in **Section 2.7.3**, in the time period between the end of Parkway construction and start-up of BVP lake construction, there would be an extra maintenance responsibility for the excavated areas in the Floodway. This maintenance responsibility would be in addition to the annual O&M expenditures shown in **Table 6-3**. Based on preliminary coordination with the City of Dallas, it is anticipated that the City Flood Control District (FCD)

[1] The 52-year time frame is tied to the statutory limit of concession projects in Texas State law of 55 years, including project development. For cost estimating purposes, a three-year development/construction period was assumed, thus leaving 52 years for the O&M phase.

would take responsibility for removing sediment and reestablishing grass cover in the excavated areas, as necessary, in the event intermittent flooding causes substantial sedimentation of these features following completion of the construction of the Trinity Parkway. A future interlocal agreement between the City and NTTA would further detail and define the maintenance responsibilities.

The actual cost of sediment removal and re-grassing might be reduced by several actions taken at the time the Parkway is actually built, assuming that a committed schedule for BVP construction might be available at the time. For instance, the lake bottoms might be initially over-excavated by some amount to allow for estimated sediment accretion. Removal of the sediment, if required, could add to the City's annual O&M expenditures for such time as this might be necessary before the start-up of BVP lake construction.

In order to develop an estimate of the cost of such sediment removal, the study team reviewed available sedimentation studies from the Dallas Floodway. The best available information appears to be the City of Dallas report *Trinity River Corridor, Master Implementation Plan, Lake Design and Recreational Amenities Report* (City of Dallas, 1999a) (see **Section 1.6.1.2**). This study indicates an expected sediment accretion rate in the Floodway of three inches per year. For Alternative 3C, assuming this accretion rate applied to the entire 236 acres in the potential excavation bottom areas gives a required removal of approximately 95,214 cubic yards of sediment each year. This may be over-estimated, since the free-draining configuration of the excavations would be expected to reduce the amount of trapping and settling of sediment from the river water. However, based on the full three inch accretion rate, the estimated annual cost for removal of the sediment would be approximately $1.485 million as detailed in **Table 6-4**.

TABLE 6-4. ESTIMATE OF ANNUAL SEDIMENT REMOVAL FROM PROPOSED FLOODWAY BORROW AREAS

Item	**Annual Removal Cost (2013 Dollars) for Alt. 3C Excavation Areas** (95,214 cy)
Excavation and Transport of Sediment	$1,159,000
Stormwater Pollution Prevention during Construction	$59,000
Hydro mulch Grassing	$16,000
Administration, Environmental Coordination and Contingencies	$251,000
Total	**$1,485,000**
Note: Estimated costs are preliminary and subject to change as the project is further developed and refined.	

6.6 COST ESTIMATES FOR FLOOD DAMAGES IN THE EVENT OF A FLOOD EXCEEDING THE 100-YEAR EVENT IN THE DALLAS FLOODWAY

As described in **Chapter 2**, Alternative 3C in the Dallas Floodway would be protected by embankments and flood separation walls to a level above the 100-year flood event (an event with 1% chance of being equaled or exceeded in any one year time period.) This level of protection meets or exceeds NTTA and TxDOT standards for design of highway mainlane facilities. The following analysis provides an estimate of potential damages in the event of a storm exceeding the 100-year event, sufficient to cause overtopping of the roadway.

A very large flood (such as a Standard Project Flood or "SPF") in the Dallas Floodway would rise and recede over several days. Based on available hydrologic and hydraulic modeling for the Floodway, it is estimated Alternative 3C would be under water 24-48 hours as the river crests during an SPF event. This would affect the entire segment of the Trinity Parkway within the Floodway (approximately 6.2 miles in length). As described in **Section 2.7**, the roadway would be protected by flood separation walls and pumps at low points under the cross bridges in the Floodway. Assuming these walls are overtopped, the pumps are estimated to take 3 to 6 hours to pump out the flooded segments of roadway after the river level falls below the 100-year level. The out-of-service time due to a flood of SPF magnitude could be estimated at approximately 5 days as outlined below:

Time of barricading up to time of actual flooding..... ¼ day
Duration of flooding..... 2 days
Duration of pump-out of sags..... ¼ day
Duration of cleanup/repair..... 2 days

The estimated river flow velocities in the area of the roadway under SPF conditions are in the 6 to 9 feet per second range. Although this velocity range is not expected to be particularly erosive due to the short duration of inundation and the likely resilience of established landscape cover, the damage estimates include the costs of total landscape replacement as well as replacement of aesthetic enhancements. The estimate for flood damage and recovery also includes the cost for debris and sediment removal, including testing and appropriate disposal of contaminated sediments, and disposal of debris in a sanitary landfill.

Based on the above assumptions, the following are estimated costs for flood damage repairs and cleanup in the event of a flood exceeding the 100-year event in the Dallas Floodway:

TABLE 6-5. ESTIMATE OF PROBABLE FLOOD DAMAGE RECOVERY COST

Item	Alternative 3C (2013 Dollars)
Landscape and Aesthetic Treatment Replacement	$1,500,000
Debris and Sediment Removal	$1,386,000
Administration, Environmental Coordination and Misc. Repairs	$286,000
Total	**$3,172,000**

Notes:

- Estimated costs are preliminary and subject to change as the project is further developed and refined.
- The O&M costs for a flood event recovery include the cost for debris and sediment removal/disposal, total landscape replacement and restoration of aesthetic enhancements.
- Debris would be removed and disposed of at a sanitary landfill.
- Debris removal was estimated at 30 cubic yards of debris for every quarter mile for the flooded sections of the roadway and 100 cubic yards for every quarter mile for the elevated sections including debris cleanup under the bridges.
- Debris and sediment removal and disposal would be conducted in accordance with best management practices and in accordance with applicable regulations and environmental requirements. Both hazardous and non-hazardous clean-up procedures for the sediment disposal were evaluated.
- Maintenance operations would concentrate on restoration of the roadway to an acceptable service level followed by completion of cleanup and restoration.
- Cleanup activities and disposal would be coordinated with the TCEQ and local Health Department organizations, if necessary. Compliance with all applicable OSHA regulations and requirements would occur.
- Cleanup operations would be conducted 24 hours a day until an acceptable level of service is restored, followed by 12 hours a day, until the initial cleanup is complete. Reconstruction/restoration would be implemented in a timely manner.
- The aesthetic enhancements within the flooded areas of the road are assumed to be replaced.
- Landscapes, within flooded areas, are assumed to be replaced.

Rounding the above costs, it is estimated to cost around $3.2 million to restore Alternative 3C after an inundation event. Assuming an average traffic volume of 120,000 vehicles per day on the Parkway (see **Section 2.9.1.3**) and a future year toll of $2.00 for a full-length trip, a five day shutdown of the roadway is estimated to cost $1.2 million in lost toll revenue. This makes the total cost of shutdown and recovery around $4.4 million for Alternative 3C.

It is stressed that the flood shutdown and recovery figures shown above are for a relatively unlikely event of a flood in excess of the 100-year event. Taking a 1% annual chance of occurrence, the annualized cost of the event is $44,000 for Alternative 3C. Assuming a 52-year period for a toll facility financial evaluation, the probability of one flood event equal to or exceeding the 100-year event in the period is approximately 40%.[2]

[2] This exceedance probability is based on a mathematical formula for determining statistical probabilities and was calculated as follows: $P_e = 1 - [1 - (1/T)]^n$ where T is the return period of a given storm threshold (i.e., 100-year), and n is the number of years (i.e., 52 for the period used for the financial evaluation).

The probable flood damage costs discussed above would mostly comprise clean-up costs (i.e., sediment/debris removal and landscape replacement) and assumes no physical damage to the road. There would be additional costs in the event there is substantial damage to the road itself, such as pavement failure, due to unforeseen flow concentrations and velocities during the inundation and recession periods for a flood in excess of the 100-year level. A contingency amount of $2 million and an additional 10 days of downtime resulting in another $2.4 million of lost toll revenue was estimated to be sufficient to cover such repairs. This would increase the total repair and downtime allowance to $8.4 million. Considering the 100-year recurrence interval, this equates to an annualized cost of $84,000. This issue is discussed further in **FEIS Appendix F-2**.

6.7 FUTURE TRAFFIC AND REVENUE ANALYSIS

In the event Alternative 3C is selected, NTTA will commission an Investment Grade Traffic and Revenue Analysis for the project. As a result of these analyses and actions of the NTTA Board of Directors, revenue bonds may be issued for the Trinity Parkway in a final amount to be determined. As stated above, the NTTA contribution may include "System Financing" to achieve better financial terms and contributions for a particular expansion project.

6.8 BENEFIT/COST ANALYSIS

A benefit-cost analysis was not conducted for the project, as it is not a requirement under FHWA's NEPA guidelines as set forth under FHWA's Technical Advisory T 6640.8 (1987). Direct capital costs of construction have been estimated and are documented in the FEIS, as well as indirect costs such as lost tax revenue resulting from business displacements.

6.9 FHWA MAJOR PROJECTS REQUIREMENTS

A provision in SAFETEA-LU requires the FHWA to designate any highway projects with a total cost in excess of $500 million as "Major Projects." For these projects, the FHWA guidelines call for preparation of a Project Management Plan describing the proposed implementation of the project, plus a Cost Estimate Review and a Financial Plan. The FHWA guidelines include the following recommendations or requirements potentially affecting the timeline for a Major Project:

- Recommend preparing the Project Management Plan no later than 60 days prior to completing the FEIS;

- Require the Project Management Plan to be approved within 90 days of ROD issuance or prior to authorizing a design-build contractor to proceed to final design and construction;
- Recommend conducting the Cost Estimate Review no later than 30 days prior to FEIS completion or 90 days before issuing a ROD in the case of design-build projects;
- Recommend preparing the Financial Plan after completing the Cost Estimate Review and the ROD; and
- Require approval of the Financial Plan prior to authorization of federal financial assistance for construction or prior to issuing permission for a design-build contractor to proceed to final design and construction.

The SAFETEA-LU provisions for Major Projects were carried forward in MAP-21. In addition, MAP-21 includes a requirement to provide an assessment of the appropriateness of a public-private partnership to deliver the project, and also provides some flexibility by allowing for a phasing plan, if applicable, when there are insufficient financial resources to complete the entire project. As the estimate of probable cost for Trinity Parkway Alternative 3C exceeds $500 million, the proposed project would be classified as a Major Project under the FHWA guidelines and would require preparation of a Project Management Plan and a Financial Plan.

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