

**U.S. Department of Transportation**

**TRANSPORTATION INVESTMENT GENERATING  
ECONOMIC RECOVERY - II**

**“TIGER II”**

**GRANT APPLICATION**

**Project Name: Tower 55 Multimodal Improvement Project**

**Project Type: Freight Rail Transportation Project**

**Funds Requested: \$38,000,000**

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## **Executive Summary**

The Texas Department of Transportation (TxDOT) proposes the Tower 55 Multimodal Improvement Project (“Project”) for funding under the TIGER II Discretionary Grants program. The Project comprises a broad set of improvements to the transportation infrastructure of Fort Worth, Texas, centered around the downtown rail intersection known as Tower 55. The Project has evolved steadily with planning input and financial support from both public and private stakeholders, including \$1.6 million in federal funding from the SAFETEA-LU Act of 2005 with \$0.4 million local match and, more recently, \$2.5 million in local funding to advance engineering and design. The Project now enjoys its strongest level of support from interested parties—including its greatest financial commitment and its most co-investors. The Project’s benefits significantly outweigh the investment, the beneficiaries are widespread, and the economic, environmental, livability and safety costs of further delay are steep, as projected long-term economic growth threatens the capacity of today’s limited infrastructure.

**Figure 1: Tower 55 Looking North**



The remaining cost of the proposed improvements totals \$91.2 million. TxDOT has committed \$1 million, or 1.1% towards the project’s cost. The City of Fort Worth has also committed \$1 million. BNSF Railway (“BNSF”) and Union Pacific Railroad (“UP”) have jointly committed \$51.2 million, or 56.1% of remaining cost. The remaining \$38 million, or 41.7%, is requested via TIGER II Discretionary Grant.

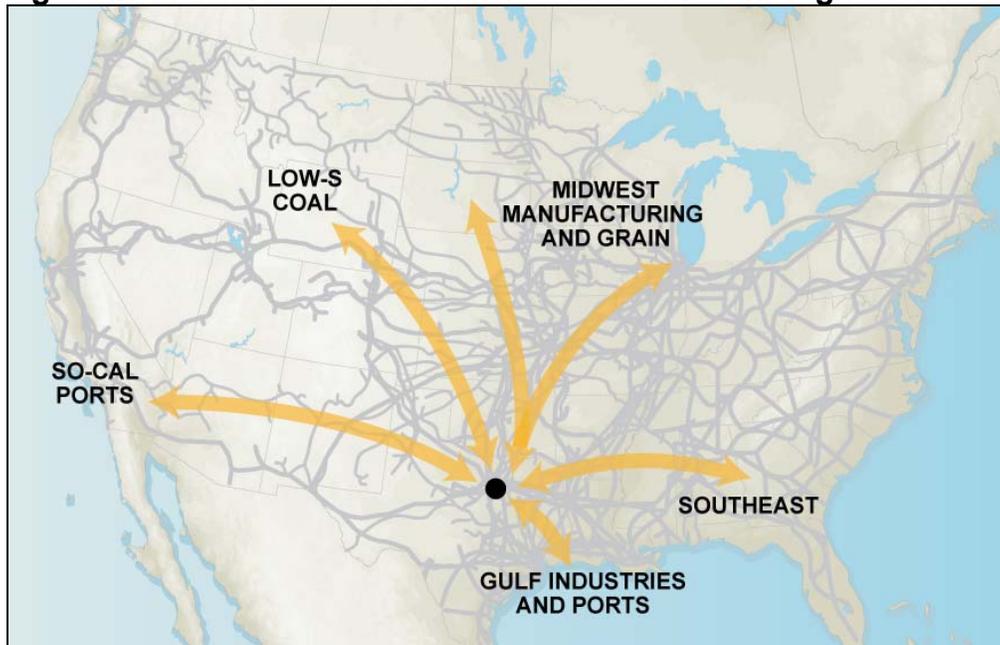
The Project consists of:

- Rail capacity improvements at Tower 55 through an additional north-south track across the intersection, a new interlocker, and improved approach trackage and signaling
- Improvement to bridges and underpasses
- Improvements to city streets and intersections to support grade-crossing closures
- Construction of neighborhood underpasses for pedestrian and bicycle use
- Improved emergency vehicle access to local neighborhoods through increased bridge-height clearances

TxDOT, Tarrant County, the City of Fort Worth, the North Central Texas Council of Governments (“NCTCOG”) and the Fort Worth Transit Authority (“The T”) have provided significant support in the creation, development and prioritization of this multimodal project. A TxDOT screening panel named the Tower 55 project the highest priority competitive grant project in the state. Recently, NCTCOG and The T provided vital financial support, coordinating to contribute \$2.5 million in funding which is currently being used to advance final engineering and design for investment readiness.

While the Project addresses critical infrastructure needs in Fort Worth, the proposed improvements yield benefits that extend far beyond the local neighborhoods, Economically Distressed Areas (EDA), and air quality nonattainment areas most adversely impacted by train and surface-traffic congestion in the immediate vicinity of Tower 55. The benefits apply beyond the nine North Texas counties<sup>1</sup> and eleven US Congressional districts<sup>2</sup> in the area directly impacted by Tower 55 congestion, extending along important corridors of commerce from the Pacific Coast to the Southeast, including the Union Pacific Sunset Route, and from the Gulf of Mexico to Canada along the BNSF MidContinent Corridor (see Figure 2).

**Figure 2: North American Flow of Commodities through Tower 55**



Specific qualitative public benefits include:

- **State of Good Repair** of the transportation infrastructure, yielding long term savings on maintenance and repair
- Increased **Economic Competitiveness** and mitigated productivity losses as a result of increased rail capacity
- Critical **Livability** improvements in accessibility and walkability for neighborhoods near Tower 55
- Environmental **Sustainability** through reduced train diversions, delays and the associated reductions in fuel consumption and exhaust emissions
- Increased Public **Safety** from closed grade crossings and new underpasses
- **Job Creation and Economic Stimulus** through significant construction work over a 22 month project timeline

<sup>1</sup> Tarrant, Dallas, Denton, Wise, Parker, Johnson, Ellis, Hood and Collin

<sup>2</sup> 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup>, 6<sup>th</sup>, 12<sup>th</sup>, 13<sup>th</sup>, 17<sup>th</sup>, 24<sup>th</sup>, 26<sup>th</sup>, 30<sup>th</sup>, 32<sup>nd</sup>

- Technological **Innovation** through an improved Centralized Traffic Control (CTC) signaling system
- **Partnership** with local, regional, state, and national stakeholders

From the community's perspective, the Tower 55 Project is a necessity for livability and safety. Reports of pedestrians crawling through stopped trains and half-hour-long waits at grade crossings are unacceptable. Downtown residential growth and mixed use development are adding to automobile congestion at grade crossings and increasing the number of people affected. Tower 55 congestion impacts Fort Worth's passenger Intermodal Transportation Center and its plans for future service growth. Railroads employ thousands of workers in Tarrant County, and railroad projects create construction and project-management jobs. This employment supports families and communities at a time of critical economic need.

Quantitative public benefits from the Tower 55 Project are derived from four categories of savings plus the direct impact of job creation and economic stimulus. The four categories are:

1. Energy Consumption Savings – associated with avoided diversions and congestion-related idling
2. Inventory Cost Savings – associated with avoided increase in shipping cycle time
3. Passenger-Rail and Vehicle-Delay Savings – avoided time and operating costs
4. Environmental Impact – avoided emissions associated with diversions and idling

The **present value of the future projected savings, discounted at 3%, is \$1.171 billion<sup>3</sup>**, yielding a public-benefit-to-cost ratio of over \$30.80 per federal dollar requested, or over \$12.80 per total project dollar expected investment.

**Figure 3: Map of Fort Worth, TX, with Tower 55 Indicated**



The Project application and supporting documentation is viewable at [www.corridorsofcommerce.com/tower55/](http://www.corridorsofcommerce.com/tower55/).

<sup>3</sup> HDR Cost-Benefit Analysis, see Appendix A

## **Project Description**

The Tower 55 Multimodal Improvement Project improves the economic competitiveness of the region by addressing the primary transportation challenge of insufficient rail capacity for future projected growth. At Tower 55, in the heart of Fort Worth, TX, eleven major freight and passenger rail routes from across North America merge into a single intersection, where two north-south main lines cross two east-west main lines. With nearly 100 trains per day crossing daily, the intersection operates above 90% of capacity today, despite rail industry volumes being down 10% from 2008 levels. Tower 55 remains is one of the

most congested rail intersections in the United States and in urgent need of capacity to meet the future expected growth of freight rail tonnage. Delaying the solution to this capacity problem would decrease economic productivity, with goods taking longer routes to reach their destination and shippers and receivers adjusting inventories upward to account for a longer transportation cycle. The

increased costs associated with the loss in productivity negatively impact economic growth and are borne by the public in the form of higher prices and, to the extent that goods shift from rail to road transportation, more congested roadways.

Tower 55's location in an urban environment within a major metropolitan area introduces another transportation challenge which the Project addresses: maintaining a safe and livable community for the population whose daily lives are impacted by the railroad. Grade crossing closures combined with safe, alternative routes are a means to reduce risk to automobiles, bicycles and pedestrians and to avoid lost productivity for those who are delayed while waiting for trains to clear a crossing. These challenges impact economically distressed areas, where lost productivity is most magnified, where children's homes are separated from their local elementary school by an active rail mainline with at-grade crossings, and where access routes for emergency vehicles are limited due to potentially blocked grade crossings and an outdated roadway underpass with too little vertical clearance. Additionally, passenger trains are delayed due to both congestion and a track alignment that forces east- or west-bound Amtrak trains to make an extra shoving move through the diamond in order to depart or arrive Fort Worth. The Project directly addresses these challenges.

**Figure 4: Intermodal Train Crossing Tower 55**



**Figure 5: Blocked Grade Crossing, Train Approaching Tower 55 from the North**



In addition to rail capacity and community livability/safety, a third major transportation challenge is addressed by the Tower 55 project: energy conservation and environmental impact. Congestion-related delay results in one of two alternatives: 1) trains and cars idle their engines as they await their turn to cross an intersection, or 2) trains and cars divert to alternate, longer routes to avoid the congestion. In both scenarios, more fuel is consumed, and more exhaust is emitted—particularly troublesome in an Air Quality Nonattainment area like the Dallas-Fort Worth metroplex. Greater capacity results in more expeditious transit, less idling at intersections, less diversion mileage, less fuel consumed, and less contaminants emitted into the atmosphere. Because of the high cost of fuel and the global importance of air quality, the energy and environment challenge is especially valuable when looked at from an economic perspective. Yet, to be conservative, the Project does not assume that rail will capture a share of freight currently handled by the trucking industry, even though the U.S. Department of Transportation's Freight Analysis Framework has estimated that the U.S. highway system will have to add capacity to handle 98 percent more tonnage than 2007 by the year 2035<sup>4</sup>. This estimate highlights the environmental importance of expanding capacity now.

Considering the high public cost of insufficient multimodal transportation infrastructure and its adverse impact on safety, livability, the environment, and economic productivity, this Project has presented an opportunity for public-private partnership in defining the project scope and achieving shared long-term objectives. In fact, the Tower 55 project has evolved over several years as a true partnership between the rail industry and the local and state stakeholders, as evidenced by the strong public and financial support at

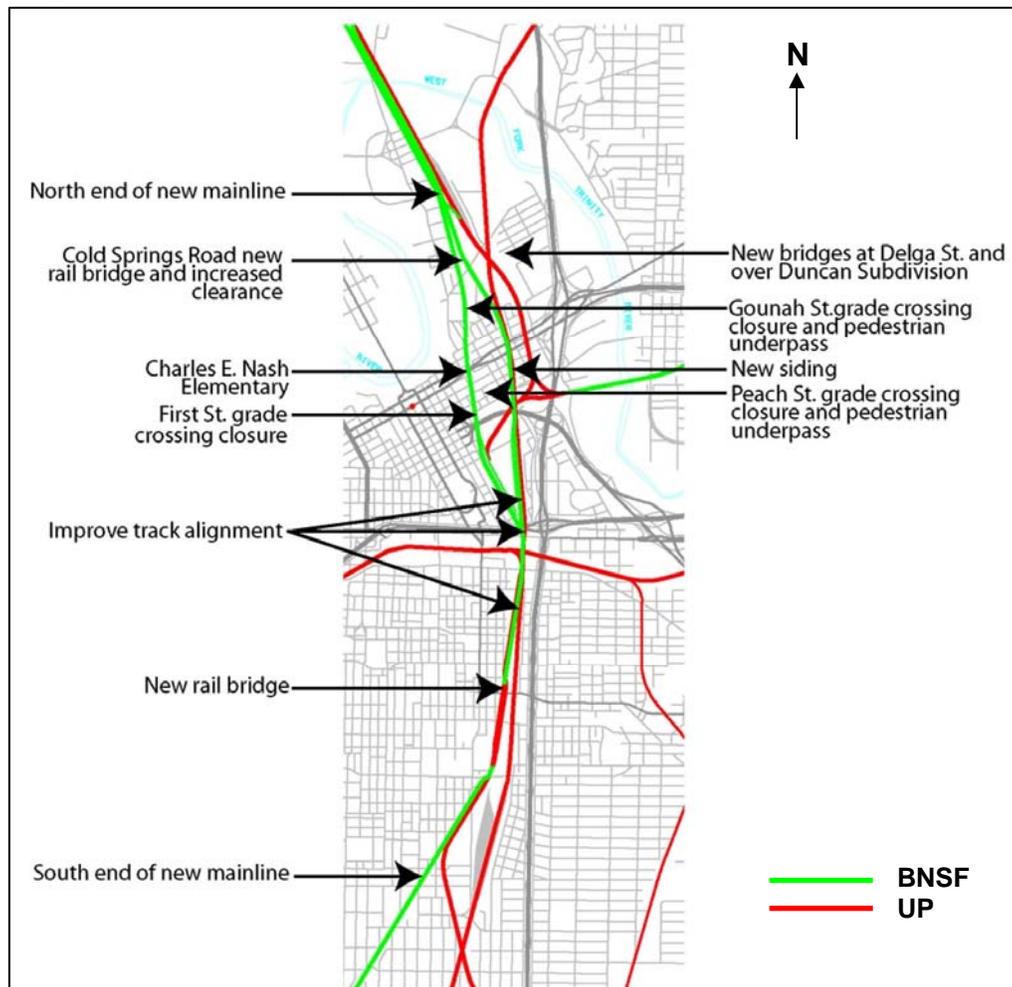
<sup>4</sup> U.S. Department of Transportation, Freight Analysis Framework, *Freight Facts and Figures*

all levels. With final engineering design and permitting already funded and nearly complete, the Project is now poised for success more than ever before.

To resolve the stated transportation challenges, the Project will implement the following changes, as displayed in Figure 6:

- Add a third north-south main line across the Tower 55 intersection
- Improve the approach trackage, track alignment, switches, bridges, roadway-bridge protection, and culverts in the proximity of Tower 55
- Improve the signal system and interlocker that controls movements at Tower 55
- Close grade crossings, introduce bicycle and pedestrian underpasses, and improve emergency vehicle access to neighborhoods adjacent to rail operations

**Figure 6: Location of Project Elements**



To translate these changes into quantifiable results, “Build” and “No-Build” scenarios were compared, as defined below:

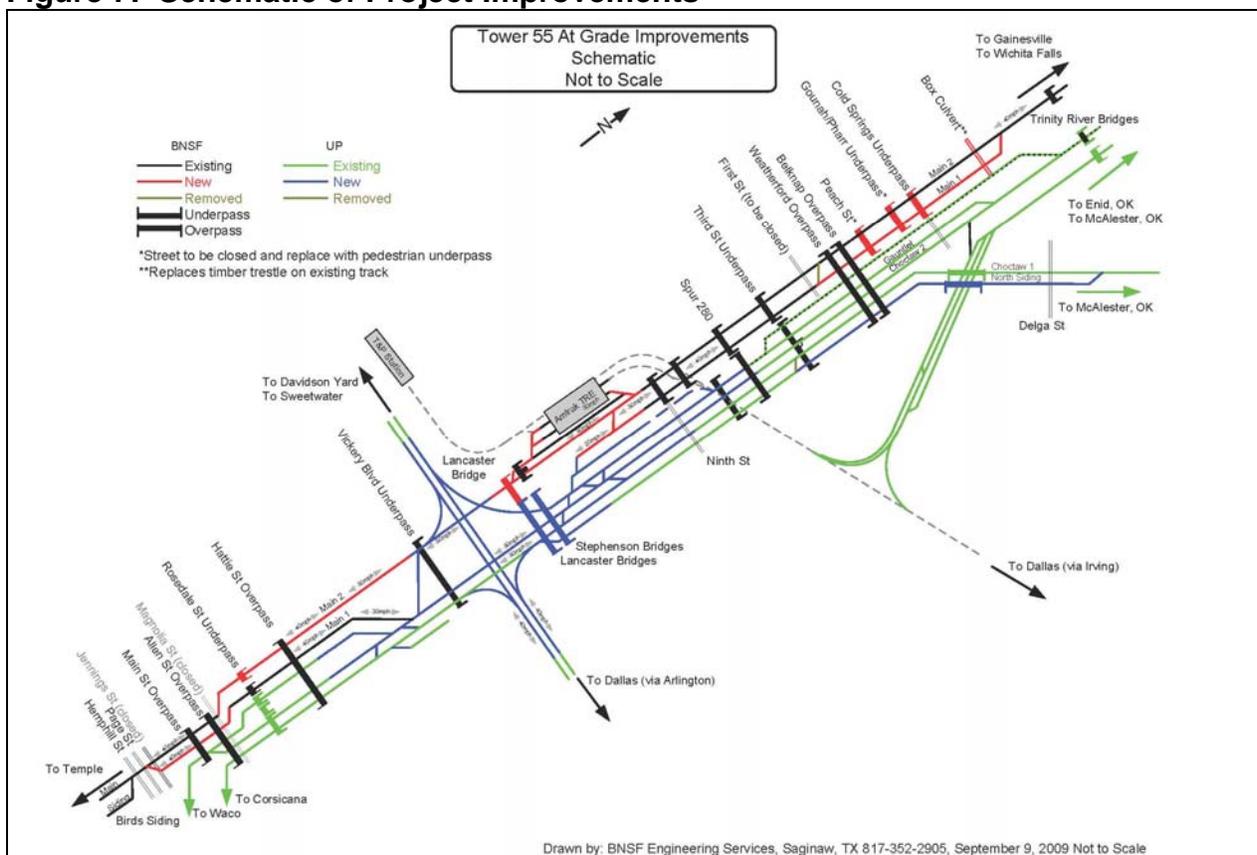
## 1. No-Build scenario

- Continued growth in train delay at Tower 55
- Train volumes in excess of current capacity of Tower 55 would be diverted to longer rail routes
- Increased air emissions in and around an Air Quality Nonattainment Zone
- Vehicular at-grade crossings in the vicinity of Tower 55 not improved
- No improvement in roadway/pedestrian grade-crossing safety, delay and vehicle operating costs

## 2. Build scenario (see Figure 7, below)

- Ability for Tower 55 to accommodate more than a 34 percent increase in rail volume over first half 2010 traffic levels with increased network fluidity and operating speed
- Reduced train delay and diversion associated with Tower 55 congestion
- Reduced air emissions in and around an Air Quality Nonattainment Zone
- Livability improvements including construction of pedestrian underpasses, grade-crossing closures, and roadway improvements north of Tower 55

**Figure 7: Schematic of Project Improvements**



**To model these two scenarios, the following assumptions were made:**

- The maximum fluid rail operating capacity of Tower 55 is 102 trains per day

based on volume metrics collected during peak volumes that occurred in 2007

- First half 2010 annualized BNSF, UP and Amtrak rail volumes are used as baseline rail volumes
- Freight rail traffic increases are based on growth rates found in Table 1 below, provided by IHS Global Insight (recognized global leader in economic and financial analysis, forecasting and market intelligence)
- Train volume exceeding the maximum sustainable capacity under the no-build scenario would divert to other viable rail routes most aligned with commodity specific origination-destination pairs

HDR Corporation<sup>5</sup> (HDR) performed the modeling associated with the scenario comparison, the results of which are discussed in greater depth in the *Selection Criteria and Results of Cost-Benefit Analysis* section, beginning on page 10. Rail Traffic Controller (RTC) analysis<sup>6</sup> was used to simulate the operating performance of all trains in and around Tower 55 to define performance when the “No-Build” scenario approached its saturation point, at which time trains would be diverted from Tower 55 to alternative, longer routes. In addition, RTC was used to simulate train performance results from the “Build” case, which is the basis for the Project’s estimated 20 years of utility given current IHS Global Insight growth rates listed in Table 1 below.

**Table 1: IHS Global Insight - Forecast Annual Growth Rates**

Commodity	2011	2012	2013	2014	2015	2016+	20-Year CAGR
Industrial - Manifest	5.1%	3.6%	2.8%	2.1%	1.8%	1.9%	2.2%
Ag - Bulk	1.2%	4.3%	5.1%	5.0%	4.6%	3.1%	3.3%
Coal - Bulk	8.7%	2.7%	0.3%	2.3%	-3.6%	1.0%	1.2%
Intermodal - Domestic	6.2%	4.2%	4.0%	3.6%	3.5%	2.9%	3.2%
Intermodal - International	9.0%	7.3%	6.2%	5.4%	5.5%	4.9%	5.3%

**Modal Diversion:** The no-build scenario analysis limited its consideration to train diversions, only, to allow a precise estimation of volumes, delays, and emission values. However, it is likely that freight volumes would also divert to highways as well, as both service reliability and transit times at Tower 55 deteriorate and diversions increase. If this were to occur, the impact on highway congestion, livability and safety, and environmental impact would be worse than under a 100% rail diversion scenario.

## **Project Parties**

**Texas Department of Transportation (TxDOT):** TxDOT, the Project applicant, pursues its mission *to work cooperatively to provide safe, effective and efficient movement of people and goods* in the State of Texas. As a member of the Tower 55 Rail Reliever Study<sup>7</sup> and a key proponent of the Tower 55 Project, TxDOT has

<sup>5</sup> HDR is a broad-based consulting firm with particular expertise in economic and transportation analysis.

<sup>6</sup> Performed by Willard Keeney and Associates

<sup>7</sup> North Central Texas Council of Governments – <http://www.nctcog.dst.tx.us/>



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collaborated with public and private stakeholders to advance the Project. TxDOT considers the Project its number-one funding priority for rail in the state.

**North Central Texas Council of Governments (NCTCOG):** NCTCOG serves a 16-county region of North Central Texas, which is centered on the urban metroplex of Dallas and Fort Worth. NCTCOG has over 230 member governments including 16 counties, numerous cities, school districts, and special districts. NCTCOG is a voluntary association of, by, and for local governments, established to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development. NCTCOG's purpose is to strengthen both the individual and collective power of local governments and to help them recognize regional opportunities, eliminate unnecessary duplication, and make joint decisions. NCTCOG is the Dallas-Fort Worth area's designated Metropolitan Planning Organization (MPO) and is recognized nationally for its innovative transportation planning and air quality initiatives. NCTCOG staff also served as the project manager and lead for the Tower 55 Rail Reliever Study.

**BNSF Railway (BNSF):** BNSF owns and operates one of the two north-south main lines at Tower 55. From the Tower, BNSF's trains operate on the Fort Worth Subdivision with Amtrak north towards Oklahoma City and south towards Temple; northwest on the Wichita Falls Subdivision towards Wichita Falls, TX; northeast on the Trinity Railway Express (TRE) line towards Irving, TX and BNSF's Madill Subdivision; and southeast on the UP's Midlothian Subdivision to Waxahachie, TX and BNSF's DFW Subdivision. BNSF operates over 32,000 route miles of track in the western 28 states and two Canadian provinces and is headquartered in Fort Worth, Texas.

**Union Pacific Railroad (UP):** UP owns and operates the other north-south main line and both east-west main lines at Tower 55. From the Tower, UP's trains operate west towards Abilene, TX on the Baird Subdivision; northwest towards Duncan, OK on the Duncan Subdivision; northeast towards Dennison, TX on the Choctaw Subdivision; east towards Dallas on the Dallas Subdivision (with Amtrak); southeast towards Midlothian, TX on the Midlothian Subdivision; and South towards Waco, TX on the Fort Worth Subdivision. UP operates over 32,400 route miles of track located in 23 western states and is headquartered in Omaha, Nebraska.

**City of Fort Worth, Tarrant County, TX:** The City of Fort Worth was established in 1849. It has over 720,000 residents, and coupled with its neighboring city to the east, Dallas, was named by the US Census Bureau in 2010 as the fastest growing metropolitan area (population 6.4 million in 2009) in the last decade. Tower 55 is located within Fort Worth city limits, underneath the highway overpasses of I-35W and I-30. Fort Worth's Mayor and City Council have been involved in the Tower 55 Project throughout its development and consider the project their top transportation infrastructure priority.



### **Sources and Uses of Project Funds**

TIGER II funding requested is \$38 million, which will constitute 41.7% of the \$91.2 million remaining cost of the Project. TxDOT has committed \$1 million with availability in 2011, and the City of Fort Worth has also committed \$1 million with availability in 2011. The remaining \$51.2 million is under commitment jointly by BNSF and UP, available per construction plan. If funded, BNSF and UP will follow a robust internal process that includes sourcing controls, advice from trained legal staff, and records management throughout this project. This process worked so well with BNSF's recent Burlington Bridge Replacement Project, funded primarily by the American Recovery and Restoration Act of 2009 (ARRA) and previous appropriations under the Truman-Hobbs Act, that it was recognized on July 27, 2010 by the U.S. Congressional Committee on Transportation and Infrastructure as one of the top transportation infrastructure projects funded under ARRA.

Compared to the previous TIGER application for this Project, which requested \$60.9 million, the current request is \$22.9 million lower. The reduction has been facilitated by the new commitments from TxDOT and City of Fort Worth plus a significant increase in BNSF's and UP's commitment. This private match increase is primarily due to an improved economic outlook as compared to 2009. Also changed since the previous TIGER application is the total project cost, which has been reduced by the recent receipt of \$2.5 million in funding from NCTCOG and The T. The \$2.5 million is currently being spent on engineering design and environmental clearance for the purpose of moving the Project towards "shovel-ready" status in anticipation of funding. Table 2, below, demonstrates the sources and uses of funds for the Tower 55 project. Table 3 outlines the construction costs by category and description.

**Table 2: Sources and Uses of Capital (USD in 000's)**

Description	TIGER II Funding (Requested)	TxDOT Committed	City of Fort Worth Committed	Private Match Committed	Total Funds	Percentage
Project Approval/Environmental Document	\$ -	\$ -	\$ -	\$ 752	\$ 752	1%
Plans Specifications & Estimate <sup>3</sup>	\$ -	\$ -	\$ -	\$ 2,359	\$ 2,359	3%
Right of Way	\$ -	\$ -	\$ -	\$ 1,869	\$ 1,869	2%
Construction	\$ 38,000	\$ 1,000	\$ 1,000	\$ 46,210	\$ 86,210	95%
Total	\$ 38,000	\$ 1,000	\$ 1,000	\$ 51,191	\$ 91,191	100%
Percentage	41.7%	1.1%	1.1%	56.1%	100.0%	



**Table 3: Categorized Construction Costs (USD in 000's)**

Category and Description	Amount	Percentage
<b>General</b>		
Mobilization	\$ 864	1%
Clearing/Grubbing	\$ 173	0%
Construction Staking	\$ 48	0%
Embankment/Excavation	\$ 3,332	4%
Culvert Extensions	\$ 367	0%
Lime Subgrade	\$ 627	1%
Subballast & Topsoil/seeding	\$ 2,335	3%
Project Management	\$ 3,955	5%
<b>General Total</b>	<b>\$ 11,701</b>	<b>14%</b>
<b>North</b>		
Street Improvements, Bridges and Underpasses	\$ 20,389	24%
Track Construction	\$ 5,400	6%
Traffic and Railroad Signals	\$ 6,706	8%
<b>North Total</b>	<b>\$ 32,494</b>	<b>38%</b>
<b>Central</b>		
Street Improvements, Bridges and Underpasses	\$ 7,204	8%
Track Construction	\$ 12,915	15%
Traffic and Railroad Signals	\$ 13,202	15%
<b>Central Total</b>	<b>\$ 33,321</b>	<b>39%</b>
<b>South</b>		
Street Improvements, Bridges and Underpasses	\$ 2,099	2%
Track Construction	\$ 3,214	4%
Traffic and Railroad Signals	\$ 3,381	4%
<b>South Total</b>	<b>\$ 8,694</b>	<b>10%</b>
<b>Total Construction Costs</b>	<b>\$ 86,210</b>	<b>100%</b>

### **Selection Criteria and Results of Cost-Benefit Analysis**

BNSF and UP engaged HDR to conduct a thorough and independent public cost-benefit analysis (CBA) and economic impact analysis (EIA), which are included in Appendices A and B. Additionally, Environ Corp. was engaged to calculate the environmental impact of the Project's proposed changes for input into HDR's analysis (see Appendix C). RTC modeling provided the train delay inputs. The analyses use first-half 2010 train volumes, comparing the operational performance of the build and no-build infrastructure options outlined in the Project Description.

The CBA compared the benefits and costs for the proposed improvements to track, signaling, and railway/roadway at-grade crossings at Tower 55 in accordance with the guidelines of the Notice of Funding Availability for the Department of Transportation's National Infrastructure Investments under the Transportation, Housing and Urban Development, and Related Agencies Appropriations Act for 2010 and Office of Management and Budget (OMB) Circulars A-4 and A-94. The analysis identified

changes in operating and capacity conditions and the national transportation impacts that reasonably would be expected to occur as a result of the construction of the Project. Each of these changes was analyzed for both build and no-build scenarios, using a 20-year study period and both 7% and 3% discount rates. The economic impact of freight diversion from rail to road as a consequence of Tower 55 congestion was not analyzed.

The Tower 55 project delivers two primary benefits: **enhanced economic competitiveness** for the country and the region and **avoided incremental environmental costs**. These benefits impact not only the rail industry's capacity to maintain its nationally important role as a low cost, low environmental footprint provider of freight and passenger

transportation, but they also impact the livability, safety and economic competitiveness of the communities that are stakeholders in this project. The benefits are quantified and totaled in dollar-value terms, but they derive from ten different sources and apply qualitatively across each of the selection criteria identified in the

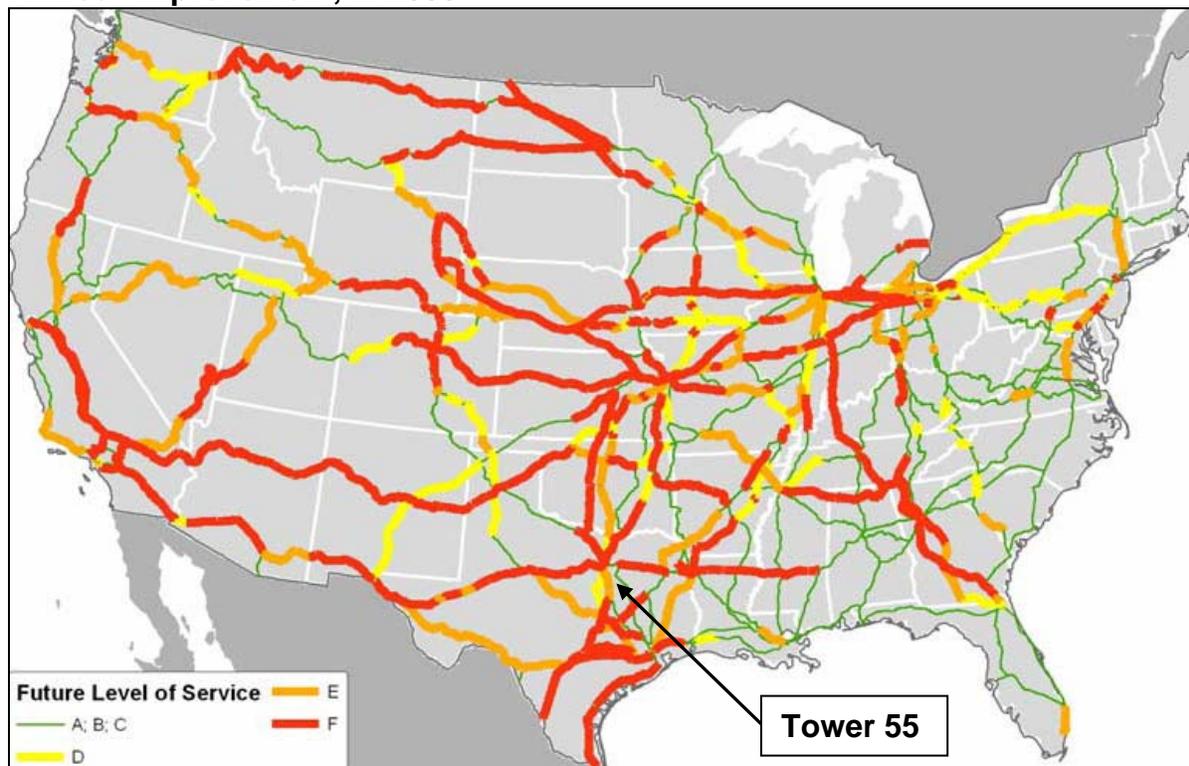
**Figure 8: Tower 55 Viewed from the North**



TIGER II Discretionary Grants program. Quantitatively, the economic benefits stem primarily from increased capacity at Tower 55. Examining the no-build scenario highlights the importance of the capacity shortfall.

Given the current state of congestion at Tower 55 and the expected increase in rail tonnage demand over the next twenty years, failure to add capacity will have significant consequences on congestion and associated rail and passenger-vehicle delay at or near Tower 55. Rail traffic that cannot traverse the Tower 55 crossing due to congestion will, by necessity, be diverted over longer routes, assuming no modal shift from rail to highway—a scenario which presents its own set of infrastructure challenges. Figure 9, below, shows expected train volumes as compared to current train capacity, as addressed in the National Rail Freight Infrastructure Capacity and Investment Study (“Cambridge Study”).

**Figure 9: Future Rail Corridor Volumes Compared to Current Capacity Without Improvement, in 2035<sup>8</sup>**



Increased congestion results in decreased productivity. The more expensive form of the productivity loss is the cost of diverting trains over longer routes. This is calculated as extra fuel burned (see benefit 1 in Table 4) and incremental inventory costs for shippers and receivers from increased route length (benefit 3). The other form of the productivity loss is increased freight and passenger train delay, calculated as incremental fuel burned by locomotives (benefits 2 and 5) and automobiles (benefit 6) waiting to clear a crossing, incremental time value for motorists and passengers (benefits 5 and 7) as they wait, and incremental inventory costs for shippers and receivers from increased transportation cycle time (benefit 4). The incremental fuel burned has an adverse societal impact, as well, i.e., the environmental costs associated with longer route diversions (benefit 8) and train (benefit 9) and automobile (benefit 10) idling at congested crossings. Modeling the build scenario quantifies the economic benefits of avoiding each of these costs. Table 4 summarizes the benefits, below.

<sup>8</sup> 2007 National Freight Capacity Study for American Association of Railroads. Service level D indicates Near capacity; E – At Capacity; F – Above Capacity

**Table 4: Summary of Discounted Economic Benefits (USD in 000's)**

Benefit Category	Ben #	PV Over 20 Years	
		7%	3%
Reduction in Transportation Costs Due to Avoidance of Future Rail Diversion to Longer Route	1	\$ 551,363	\$ 988,631
Reduction in Transportation Costs Due to Reduced Delay, Train	2	\$ 3,944	\$ 5,368
Reduction in Inventory Costs Due to Avoidance of Future Rail Diversion to Longer Route	3	\$ 1,500	\$ 2,690
Reduction in Inventory Costs Due to Reduced Delay, Train	4	\$ 105	\$ 143
Reduction in Passenger Rail Time and Operating Costs Due to Trains Not Delayed	5	\$ 9,701	\$ 13,205
Reduction in Vehicle Operating Costs Due to Reduced Vehicle Idling at Grade Crossings	6	\$ 243	\$ 336
Reduction in Vehicle Time Costs Due to Reduced Vehicle Idling at Grade Crossings	7	\$ 11,219	\$ 15,272
Reduction in Environmental Costs Due to Avoidance of Future Rail Diversion to Longer Route	8	\$ 69,402	\$ 119,460
Reduction in Environmental Costs Due to Reduced Delay, Train	9	\$ 19,292	\$ 25,724
Reduction in Environmental Costs Due to Reduced Vehicle Idling at Grade Crossings	10	\$ 37	\$ 50
<b>Total</b>		<b>\$ 666,805</b>	<b>\$ 1,170,879</b>

## A. Long Term Outcomes

### 1. State of Good Repair

The Tower 55 Multimodal Improvement Project proposes infrastructure enhancements that would result in numerous long-term quantifiable public benefits when comparing the proposed build scenario with the current state of repair and performance of the no-build scenario. These improvements to the condition, performance, and long-term cost requirements of the interlocker, approach track, signal system, road and rail bridges underpasses, roads and grade crossings, can be summarized as follows:

**Local, State and Regional Priority:** Recognizing the impact of capacity constraints at Tower 55 on the state, region, and nation, much effort has been put forth by the Project partners to develop this multimodal solution. Tower 55 is the subject of the NCTCOG's comprehensive Tower 55 Rail Reliever Study. It is included in the regional and state Transportation Improvement Program (TIP and STIP). Tower 55 was identified as a key infrastructure enhancement in a Blue Ribbon Panel's *Texas 2030 Committee Report* issued in January, 2009, which evaluated Texas' infrastructure requirements over the next 20 years on a multimodal and statewide basis. This context is essential to understanding the weight placed on creating a capacity solution with infrastructure state of repair thoroughly considered.

**Public Cost Impact:** Although the public does not contribute directly to the significant annual costs of operating and maintaining Tower 55, the economic viability of approximately 3,000 freight and passenger trains that transit Tower 55 each month is threatened by the state of repair at the intersection. As noted, the no-build scenario analysis limited its consideration to rail diversions only, however, it is probable that a portion of today's Tower 55 freight would divert to the highway system, resulting in higher transportation costs, more trucks on regional freeways, additional highway maintenance expense, added emissions, higher overall congestion and associated economic productivity losses across Texas and the south central United States. Though not quantified in this analysis, this modal shift is a well established concept, and, as discussed in the Cambridge Study, it is a real threat to the state of good repair of the highway systems, which need capacity to handle 98 percent more tonnage over the next 25 years without any change in modal market share. Hence TxDOT's intense interest in progressing this project.

**Long-Term Operating and Maintenance Costs:** The future ongoing operating and maintenance costs of the new infrastructure proposed in the Project would be privately maintained and funded by the railroads at no cost to the public sector. The Project would also enhance the railroads' ability to maintain the rail assets in the immediate vicinity of Tower 55.

## 2. Economic Competitiveness

**Long-Term Economic Competitiveness and Productivity Growth:** Productivity is vital to the nation's long-term economic competitiveness. An estimated 80 percent of the nation's job growth over the last 50 years resulted from productivity improvements. Productivity growth increases real incomes; real income growth increases demand for goods and services; and demand growth stimulates new business and business-expansion growth, both of which increase employment. The no-build scenario results in economic and environmental costs increasing to achieve the same work output—by definition a decrease in productivity. This Project presents a well planned solution at a critical point in time to avoid such a dilemma.

The long-term economic competitiveness and productivity growth benefits of the Tower 55 investment derive from:

- Avoiding a decline in transportation and logistics productivity from incremental train delay and diversion routing over the life of the project
- Avoiding a decline in the economic productivity of the suppliers, manufacturers, exporters, and distributors whose goods currently move through Tower 55 by:
  - Avoiding the need to increase inventory levels because of longer cycle times associated with delay and diversions
  - Mitigating the risk of unexpected, delay-caused production outages or inventory disruptions



- Avoiding the increased costs of a modal shift of transportation service from rail to road (not quantified in the BCA)

Supply chain capacity has decreased since 2008, with over 2,000 trucking firms having gone out of business in 2009 and another 2,000 forecast to go out of business in 2010 because of higher operating costs and lower demand<sup>9</sup>. Less capacity available coupled with an expected increase in demand from a rebounding economy will create rising transportation costs, which underscores the importance of investing in capacity today. The Tower 55 project's additional capacity not only allows for increased volume across the intersection but also improves service reliability, further supporting just-in-time delivery and mitigating transportation and inventory cost increases throughout the logistics chain.

**Reduction in Operational Costs:** The growing train-congestion delay and need for lengthy train diversions in the no-build case due to capacity constraints at Tower 55 would result in tremendous operating inefficiencies as additional costs are incurred by the shippers and rail carriers. In addition, vehicles and their drivers incur incremental operational costs anywhere they sit delayed at grade crossings waiting for a train to pass or clear the roadway. Avoiding the incremental costs of train diversions, train delay, and vehicle delay at grade crossings in the build scenario **generates a present value (PV) of \$555.6 million in benefits discounted at 7% over a 20-year period**, as shown in Table 4, benefits 1, 2 and 6.

**Reduction in Inventory Costs:** A secondary inefficiency related to growing train-congestion delay and lengthy train diversions in the no-build scenario is the longer transportation cycle and the increased probability of on-time delivery performance failure. These drags on productivity force suppliers, manufacturers, exporters, distributors, and others in the logistics pipeline to mitigate these factors by increasing inventory levels, which increases costs from one end of the logistics chain to the other. The build scenario avoids the increased inventory costs associated with lengthy diversions and increased delay, **generating a PV of \$1.6 million in benefits discounted at 7% over a 20-year period**, as shown in Table 4, benefits 3 and 4.

**Travel Time Savings:** Failing to add capacity at Tower 55 will not only delay freight transportation and impose higher operational costs for trains and automobiles, but it will also delay people, be they vehicle drivers, bicyclists, pedestrians, or passengers on a passenger-rail train. The value of a person's time is significant, and investing in Tower 55 capacity underscores this reality, **generating a PV of \$20.9 million in benefits discounted at 7% over a 20-year period** with respect to the no-build scenario, as shown in Table 4, benefits 5 and 7.

The economic impact of adding capacity at Tower 55 as proposed in the Project and thereby avoiding incremental transportation, inventory, and human costs of diversions

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<sup>9</sup> Council of Supply Chain Management Professionals (CSCMP), State of Logistics Report, 2010

and delay generates a combined PV of \$578.1 million in benefits discounted at 7% over a 20-year period.

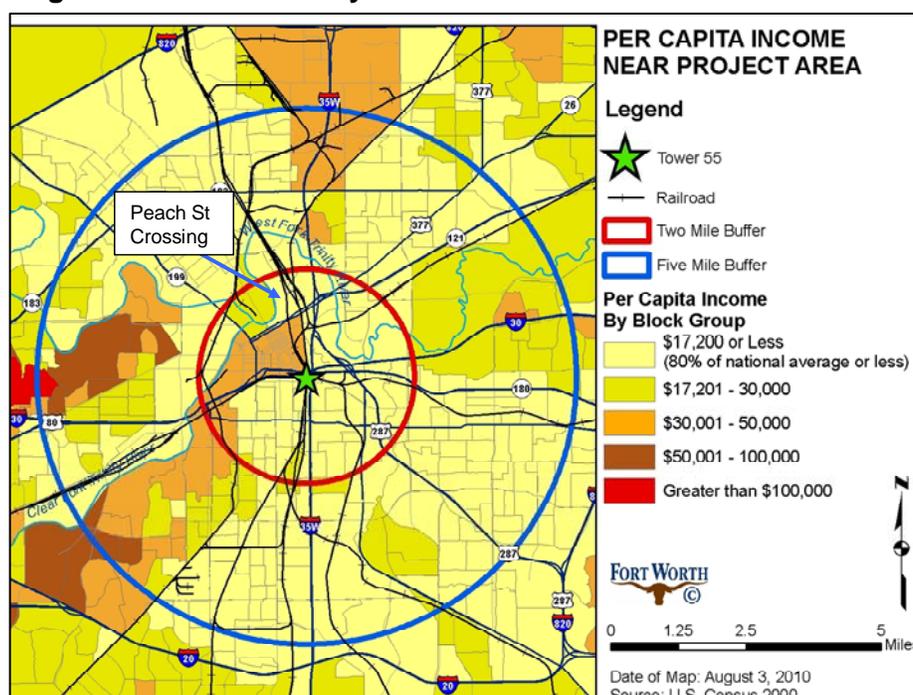
### 3. Livability

**Improved Accessibility:** Aside from the congestion relief benefits quantified in the preceding section on *Economic Competitiveness* and the environmental impact benefits that are quantified in the following section, *Sustainability*, the Project addresses two independent and significant livability issues in a neighborhood immediately to the north of Tower 55.

First is the at-grade crossing of Peach Street, which presents an accessibility problem for students and families of Charles E. Nash Elementary School. The school is west of the track, but many of the families whose children attend the school live to the east of the track. Because of congestion at Tower 55, the grade crossing is frequently blocked by an idling or slowly transiting train, which makes students late to school and parents late to pick up their children after school, and which presents a safety threat to children walking or riding bicycles between home and school (see further discussion in *Safety* section, below). The accessibility problem lies in the most direct and most used path for these families: the Peach Street at-grade crossing. Furthermore, the per capita income of the families faced with this challenge was low enough for the neighborhood to be considered an Economically Distressed Area by the Federal Highway Administration guidelines (see Fig. 10).

The Fort Worth Independent School District (FWISD) Trustee representing Nash Elementary and its families, Dr. Carlos Vasquez, has acknowledged this livability issue and supports the Tower 55 project's solution of a closed at-grade crossing at Peach Street and a safe pedestrian and bicycle underpass in its place. The vehicle mobility inconvenience of the crossing closure will be mitigated by enhancements to existing arterial routes through improved intersection signaling.

**Figure 10: Economically Distressed Areas Near Tower 55**



The second livability challenge directly addressed by the Project is accessibility of emergency vehicles through a road underpass one block north of the Peach Street crossing. The Gounah Street underpass is outdated and does not provide enough vertical clearance under the rail bridge for modern emergency vehicles. While there are other ways to access the neighborhood described in the previous paragraph, blocked crossings due to train congestion make every viable emergency access important. The Tower 55 project addresses this underpass by demolishing the current structure, lowering and widening the roadbed, and rebuilding the overhead rail bridges. While the Gounah Street and Peach Street improvements are qualitatively significant for livability in an Economically Distressed Area, they are quantitatively difficult to value in economic terms.

**Regional Planning:** At the regional level of transportation infrastructure planning, the Tower 55 project is the centerpiece of a livability-improvement effort affecting the broader Dallas-Fort Worth (DFW) metroplex. The NCTCOG is coordinating with the City of Fort Worth and the surrounding communities to create a rail transportation vision for the future which would significantly improve commuter accessibility throughout the DFW area and tie together the Dallas and Fort Worth public transportation systems, Dallas Area Rapid Transit (DART) and The T, respectively. In Fort Worth, this vision comprises current-day access to the T, the TRE, and Amtrak, as well as future access to the Southwest to Northeast Rail Project and the Urban Circulator Rail Project. The City of Fort Worth, NCTCOG, and TxDOT all agree that the Tower 55 project is the highest priority transportation problem to address, and it will have an immediate impact on livability in Fort Worth.

#### 4. Sustainability

**Reduction in Air Emissions and Environmental Costs:** It has already been established that lack of new capacity at Tower 55 will result in significant rail diversions over longer routes and increased congestion and idling for trains and automobiles in the vicinity of Tower 55. The opportunity to avoid these outcomes in the build scenario has been quantified in dollar terms, based on fuel consumption avoided, inventory-cost increases averted, and passenger and driver time saved. A corollary to the fuel consumption challenge is the environmental impact of air emissions from fuel consumed. Carbon dioxide (CO<sub>2</sub>), nitrogen oxide (NO<sub>x</sub>), hydrocarbons, carbon monoxide (CO), and particulate matter (PM) are all measurable emissions from the fossil fuel combustion cycle. These atmospheric emissions impact the health and well-being of our ecosystem, and accordingly, goal levels are set, and actual levels are assessed and monitored by state and federal agencies, such as the Texas Commission on Environmental Quality (TCEQ) and the Environmental Protection Agency (EPA). Because of the poor air quality in the Dallas-Fort Worth (DFW) area, the TCEQ has identified the DFW metroplex as an Air Quality Nonattainment Area, further underscoring the environmental risk of the no-build scenario.



To generate activity values as a basis for emissions-reduction calculations, RTC modeling was used to compare no-build and build operating scenarios relative to rail congestion and resulting environmental impact (see the Project website for analysis results). The build scenario resulted in several projected benefits: avoided rail traffic diversions, train delay savings, and reduced vehicular delays. RTC results for train delay savings were used to derive emission reductions from reduced locomotive braking, idling, and restarting due to better traffic flow. Avoided rail traffic diversions considered average line-haul fuel consumption and emissions saved by not having to utilize the longer diversion routes. Table 5 displays the total calculated emissions reductions and their economic value, below.

**Table 5: Emissions Savings**

Economic Benefit	Over 20 Years	
	Total Tons Saved	Undiscounted Savings (USD millions)
CO <sub>2</sub> emissions	1,869,524	\$ 64.5
VOC (ROG) emissions	493	\$ 0.7
NO <sub>x</sub> emissions	13,291	\$ 74.3
PM emissions	296	\$ 79.6
Total Benefit	1,883,604	\$ 219.1

In avoiding the increased fuel consumption associated with train diversions over longer routes, with increased train delay at Tower 55, and with increased vehicular delay at grade crossings as a result of train diversions and congestion, **the project will generate a PV of \$88.7 million in environmental benefits discounted at 7% over a 20-year period, as shown in Table 4 benefits 8, 9, and 10.**

## 5. Safety

**Reduced Roadway and Pedestrian Interface:** Grade-crossing safety is of paramount importance, and promoting grade-crossing safety is a shared responsibility between motorists, railroads, and local, state and federal transportation and safety agencies. The Federal Railroad Administration's (FRA) Office of Safety Analysis has documented 302 rail-related accidents or incidents in Tarrant County since 2001, including 14 fatalities. The families of Nash Elementary, discussed in the *Livability* section, above, use a phone tree to notify parents to pick up their children from school if a train is blocking the nearby at-grade crossing at Peach Street. This notification is intended to prevent primary school age children from walking through a stopped train to get home—a tremendous safety risk. The Project stakeholders have worked together to address this important issue, and the scope of work combines a grade crossing closure at Peach Street with a pedestrian and bicycle underpass in its place. Closure of the at-grade crossing at 1<sup>st</sup> Street will also increase safety in Fort Worth, as will the improved access

for emergency vehicles at Gounah Street in the event a large-scale emergency limits emergency vehicle access elsewhere. This safety benefit has not been quantified economically.

**Minimized Rail Diversions:** The proposed increase in rail capacity at Tower 55 will directly support the goal of minimizing at-grade crossing risk. In the no-build scenario, increased train diversions due to congestion would result in incremental grade crossings as the diverted trains travel over longer routes. The build scenario minimizes diversions, route length, and grade crossings, thereby maximizing safety. The safety benefit of minimized rail diversions has not been quantified economically.

### B. Job Creation and Economic Stimulus

The Tower 55 project would have an immediate and direct impact on construction employment at a time when construction development and employment is low due to the economy and in an area with two bordering counties (Johnson and Ellis) deemed Economically Distressed by the latest available information from the Bureau of Economic Analysis and Bureau of Labor Statistics. The estimated Employment Impact of Expenditures, Number of Jobs, through 2012, is shown in Table 6, below. The Estimated Economic Impact of Expenditures through September, 2012, is shown in Table 7, below.

**Table 6: IMPLAN-Estimated Employment Impact of Project Expenditures—Number of Job-Years Created, by Quarter, Total, and Annual Average**

Effect Type	4Q-2010	1Q-2011	2Q-2011	3Q-2011	4Q-2011	1Q-2012	2Q-2012	3Q-2012	Total Job-Years	Average Number of Jobs per Year*
Direct	4.6	35.2	85.6	142.9	138.8	95.5	111.2	57.1	670.8	335.4
Indirect	2.3	19	50.9	85	82.5	56.8	66.2	34	396.6	198.3
Induced	5.6	40.3	90.9	151.7	147.3	101.4	118.1	60.6	715.9	358
<b>Total</b>	<b>12.5</b>	<b>94.5</b>	<b>227.4</b>	<b>379.6</b>	<b>368.6</b>	<b>253.6</b>	<b>295.4</b>	<b>151.7</b>	<b>1,783.30</b>	<b>891.7</b>

**Table 7: Employment Impact of Project Expenditures Based on CEA Employment Multiplier, Number of Job-Years Created, by Quarter, Total, and Annual Average**

Effect Type	4Q-2010	1Q-2011	2Q-2011	3Q-2011	4Q-2011	1Q-2012	2Q-2012	3Q-2012	Total Job-Years	Average Number of Jobs per Year*
Direct and Indirect	4.2	32.2	79.3	132.5	128.6	88.5	103.1	52.9	621.3	310.7
Induced	2.3	18.1	44.6	74.5	72.4	49.8	58	29.8	349.5	174.7
<b>Total</b>	<b>6.5</b>	<b>50.3</b>	<b>124</b>	<b>207</b>	<b>201</b>	<b>138.3</b>	<b>161.1</b>	<b>82.7</b>	<b>970.8</b>	<b>485.4</b>

### C. Innovation

The most innovative characteristic of the Tower 55 project is its redesigned Centralized Traffic Control (CTC) system, which will be compatible with future PTC implementation. Upgrading the signal system will enhance dispatchers' ability to move trains through the interlocker more efficiently.

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## D. Partnership

**Jurisdictional & Stakeholder Collaboration:** The Tower 55 project is exemplary in its partnership between public and private entities. The Project is strongly supported by the spectrum of public stakeholders from local to state level, including a FWISD Trustee, the City of Fort Worth, the NCTCOG, Tarrant County, the Tarrant Regional Transportation Coalition, The T, Amtrak, Oklahoma Department of Transportation, and TxDOT. The City of Fort Worth and TxDOT have joined BNSF and UP as financial contributors. The effort to collaborate with public stakeholders has resulted in significant livability benefits to economically distressed areas as well as significant environmental benefits to all inhabitants of the Fort Worth and North Texas area. Regional planning has recognized the Tower 55 project as a necessary component to achieve the other important rail projects in Fort Worth.

**Disciplinary Integration:** The Project has enjoyed the strong support of several non-transportation public agencies that are pursuing similar objectives. Both the Fort Worth Chamber of Commerce and the Fort Worth Hispanic Chamber of Commerce have given their support in recognition of the immediate and long term economic benefits and the energy, environmental and safety benefits, as well. The Fort Worth Department of Housing and Economic Development was instrumental in securing the \$1 million contribution from the City of Fort Worth. The energy efficiency and environmental impact benefits, which have been discussed thoroughly and quantified economically in the *Sustainability* section, strongly support the TCEQ's State Implementation Plan for the DFW nonattainment area<sup>10</sup>.

The Tower 55 Project has received strong bipartisan support from Members of Congress and State and local Representatives, as well as from ports and several other organizations. Individual letters of support are posted to the Project website at <http://www.corridorsofcommerce.com/tower55/>.

## Project Readiness and NEPA

**Project Readiness:** As a result of the cash contribution of \$2.5 million from NCTCOG and The T, project engineering and design have advanced significantly since the original TIGER application. National Environmental Policy Act (NEPA) coordination with the FRA concerning categorical exclusion is in process with final determination expected following funding<sup>11</sup>. Final Project design efforts are actionable immediately upon receipt of funding and notice to proceed. Work can proceed to bid upon notice to proceed, as majority of design work is complete. Remaining design work, specifically signal design, will be completed well in advance of bidding and construction timeline for that element. Construction of the Project improvements can commence as soon as January, 2011, based on a funding obligation date of late 2010. Based on current project planning, the Tower 55 Multimodal Improvement Project is planned to progress

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<sup>10</sup> [http://www.tceq.state.tx.us/implementation/air/sip/apr2005dal\\_iop.html](http://www.tceq.state.tx.us/implementation/air/sip/apr2005dal_iop.html)

<sup>11</sup> See Appendix D: FRA Categorical Exclusion Worksheet

on a concurrent, phased BNSF and UP implementation program. Project phasing would implement all heavy civil and structural activities in 2011. Following these improvements, track work by both BNSF and UP would be performed in mid to late 2011, with signal and control systems work to follow. Assuming a funding obligation date of early 2011, the Project would be completed by September, 2012. Table 8, below, highlights the Project schedule progression and expected critical path milestones. See the Project website for additional preliminary engineering and construction schedule details.

**Table 8: Project Completion Schedule**

Description	4Q-2010	1Q-2011	2Q-2011	3Q-2011	4Q-2011	1Q-2012	2Q-2012	3Q-2012
Remaining Project Planning/Approval	19%	81%	0%	0%	0%	0%	0%	0%
Construction	0%	3%	13%	22%	21%	15%	17%	9%

**NEPA:** Extensive environmental review has already been completed and demonstrates the positive effects on the environment associated with the Tower 55 project. As part of the preliminary engineering efforts completed to date, all efforts have been taken to address and minimize to the extent possible all public and environmental impacts. No major environmental permitting is projected at this time and only minimal land acquisition is expected to support Project construction. Advanced due diligence permitting efforts are currently underway, and, as stated, a NEPA CatEx Worksheet has been submitted for FRA review and determination. Further, coordination with the Texas Historical Commission is on-going, and the railroads have engaged the help of a curator-emeritus of transportation from the Smithsonian Institution to ensure that the project will not affect historic resources.

Categorical Exclusions under the Council on Environmental Quality are those actions that belong to “a category of actions which do not individually or cumulatively have a significant effect on the human environment ... and ... for which, therefore, neither an environmental assessment nor an environmental impact statement is required.” (40 CFR 1508.4) In this case, each portion of the Project qualifies for a categorical exclusion, and the individual portions do not individually or cumulatively have a significant effect on the human environment. Specifically, the following categorical exclusions apply for these portions of the Project:

1. Construction of additional BNSF track through the interlocker and an additional 9,000 feet of track capacity north and south of the interlocker: “Minor rail line additions...construction of...passing tracks, crossovers, short connections between existing rail lines...and new tracks within existing rail yards.” (64 FR 28547)
2. Construction of an additional UP 9,000 foot siding north of the interlocker: “Minor rail line additions...construction of...passing tracks, crossovers, short connections between rail lines...and new tracks within existing rail yards.” (64 FR 28547)

3. Upgrade the switches and track geometry to 30 MPH for all north-south moves, and 40 MPH for east-west moves: "Minor rail line additions...construction of ... passing tracks, crossovers, short connections between rail lines...and new tracks within existing rail yards." (64 FR 28547)
4. Install new signaling and control systems: "Maintenance of: existing railroad facilities .. security facilities ... and other existing railroad-related facilities." (64 FV 28547)
5. Expand the bridge over Stephenson Avenue: "Replacement, reconstruction, or rehabilitation of an existing railroad bridge." (64 FR 28547)
6. Grade crossing work and pedestrian bridge required for the projects planned north of the tower: "Maintenance of: existing railroad facilities .. security facilities ... and other existing railroad-related facilities." (64 FV 28547)

In addition, construction of the entire Project would improve air quality in a nonattainment area. Therefore, the categorical exclusion for "Environmental remediation through improvements to existing and former railroad track, infrastructure, stations, and facilities, for the purpose of preventing or correcting environmental pollution of soil, air or water" (64 FR 28547) applies to the Project as a whole. See the Table 9, below and the Project website for NEPA Categorical Exclusion details [www.corridorsofcommerce.com/tower55/](http://www.corridorsofcommerce.com/tower55/).

**Table 9: Environmental Permitting - Permits and Approval Status**

No.	Submittals	Agency	Notes	Status (Aug-2010)
1	Bridge Permit	USCG	No Sect. 10 or USCG Waters	Not Applicable
2	JD / WOTUS Delineation	USACE	No Waters of the US	Approved, 7/20/09
3	Section 404 Nationwide Permit	USACE	No jurisdictional waters present per US Army Corps of Engineers, Fort Worth District	Not Applicable
4	Section 7 - T&E Species	USFWS	No Suitable Habitat	Not Applicable
5	NRHP Historic Bridges / SHPO	THC (SHPO)	Eligibility docs complete; discussions regarding eligibility with THC ongoing.	Expected Approval no later than Dec. 1, 2010
6	City of FTW - Engineering Approvals	City of FW	Coordination on-going	Coordination will continue for the life of the project, and final approvals will be obtained upon the City's receipt of final plats after project completion
7	Flood Plain Coordination	City of FW	No floodplains present in Project area	Not Applicable
8	Public Notice	FRA/TCEQ	Federal Funding Requirement	Pending NEPA
9	Stormwater Construction General Permit (TXR 150000)	TCEQ	SWPPP and NOI ready	48 hour pre-construction NOI



**Wage Rate Certification Letter:** A Federal Wage-Rate Certification Letter is included as Appendix E.

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## **Material Changes to the Pre-Application Form**

### **1. Total Amount Requested from TIGER II Funds: \$38,000,000**

Reason for change in amount requested from \$40,000,000: Since submitting the pre-application, TxDOT committed \$1,000,000, and City of Fort Worth also committed \$1,000,000.

**2. 20% Matching Funds Committed:** In addition to \$51.2 million (56%) already committed by BNSF and UP, the \$2 million committed by TxDOT and City of Fort Worth raises the matching funds to \$53.2 million, or 58% of \$91.2 million total cost. As mentioned above, these new commitments lower the request by \$2 million, from \$40 to \$38 million, or 42% of the total cost.

