Metroplex Freight Mobility Study

Phase III Study Technical Memorandum

Texas Department of Transportation (TxDOT) - Rail Division

June 2024

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Introduction

The purpose of the Metroplex Freight Mobility Study (Study) is to conduct a comprehensive analysis of the freight and passenger rail transportation network in the 16-county area to identify mutually beneficial mobility improvements. The outcome of the analysis will be the development of a program of projects to address freight rail performance concerns in the Metroplex. The work includes three phases:

- Phase I: Metroplex Freight and Passenger Rail Integration Study [Completed June 2019]
  - A freight and passenger rail improvement plan was developed for select railroad subdivisions based on Railroad Traffic Control (RTC) modeling and qualitative data provided by the host railroads. The Phase I study area is a subset of the modeled territory and is comprised of portions of the Burlington Northern Santa Fe Railway (BNSF) Subdivisions including Fort Worth, Madill, DFW, and trackage rights over the Union Pacific Railroad (UPRR), as well as portions of Dallas Area Rapid Transit (DART), TEXRail/Cotton Belt, and the Trinity Railway Express (TRE).
  - The objective of Phase I was to confirm infrastructure improvements needed to support expanded passenger service on the existing TRE route as well as new passenger service on the Madill Subdivision from Irving to Prosper, including the Cotton Belt support moves from Irving to Carrollton, without adversely impacting freight operations.
- Phase II: Metroplex Freight Study [Completed February 2021]
  - The RTC model expanded to include freight rail systems in the North Central Texas Council of Governments (NCTCOG) planning region to evaluate multimodal freight mobility and identify opportunities for public-private partnerships to improve multimodal freight movement across the region. Phase II excluded consideration of potential new passenger rail service on freight rail lines.
  - The objective of Phase II was to identify mutually beneficial mobility improvements needed to support growth on the freight rail and highway networks.
- Phase III: Metroplex Freight Study [Current Phase]
  - The RTC model evaluates multimodal freight mobility and opportunities identified in Phase II at Control Point (CP) 217 to improve multimodal freight movement across the region.
  - The objective of Phase III is to:
    - Identify and achieve consensus on proposed improvements needed to support increased capacity and separate freight and passenger movements at CP 217;
    - Provide preliminary engineering services, cost estimates, pre-National Environmental Policy Act (NEPA) review, and a benefit-cost analysis (BCA) to evaluate proposed operational improvements identified in Phase II at CP 217[1];
    - Study the feasibility of a reduction in control points near the JFK Junction; and

[1] Future alignments identified are not included in the engineering, environmental, and economic analyses.

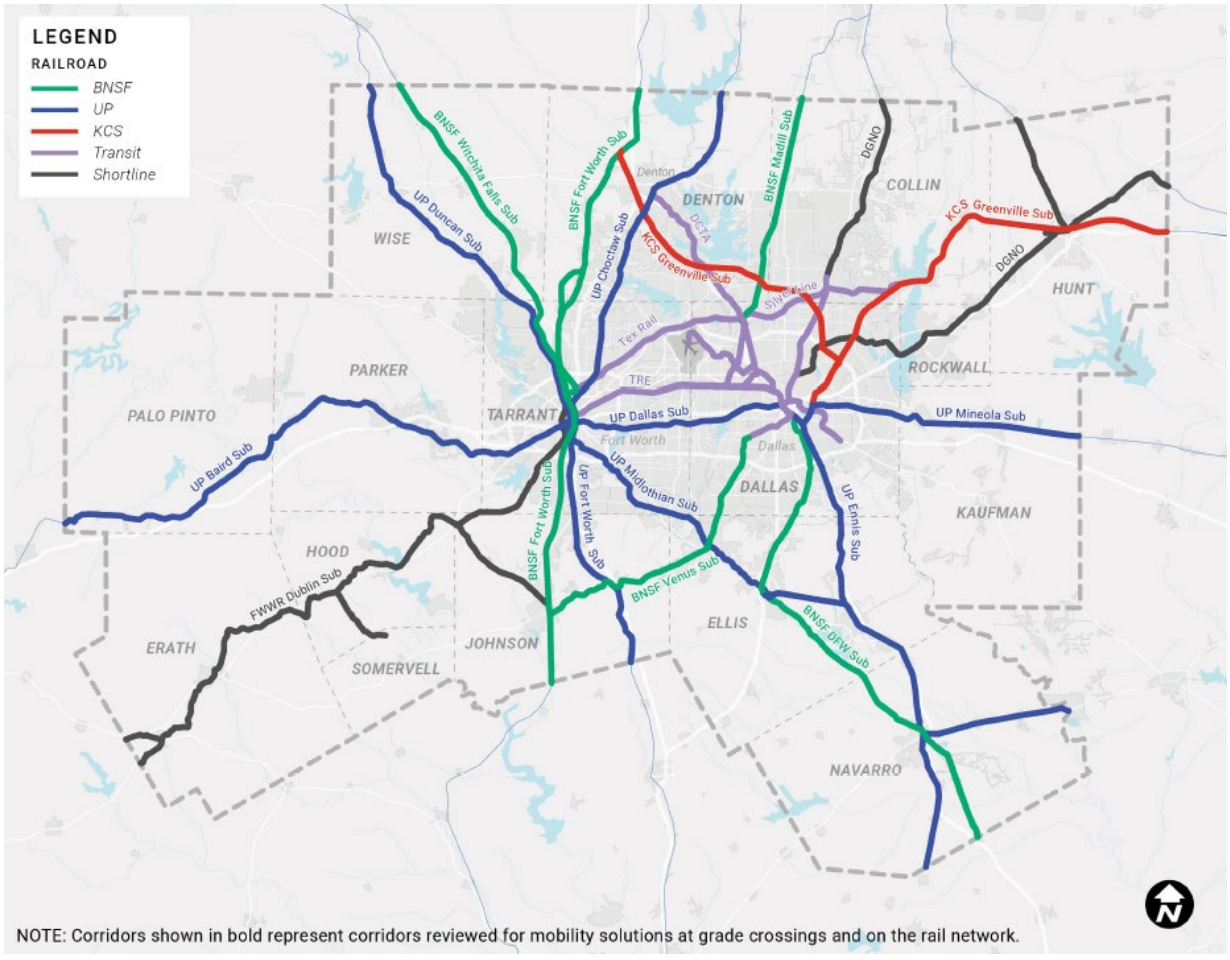
- Set potential future boundaries at Tower 55 that address future rail volumes and passenger rail services.

Figure 1: Metroplex Phase Completion Timeline

Phase I Study Area

The Metroplex is comprised of the 16-county region of North Central Texas, which is centered around the two urban centers of Dallas and Fort Worth. For Phase I, the study area focused on the joint-use freight and passenger rail network. The Phase I subdivisions included BNSF Fort Worth, BNSF Madill (Madill to Carrollton), BNSF DFW, DART Madill (Carrollton to Irving), UPRR Midlothian, along with TRE east-west corridor between Dallas and Fort Worth, the TEXRail line, and the planned Cotton Belt line that are highlighted in Figure 2.

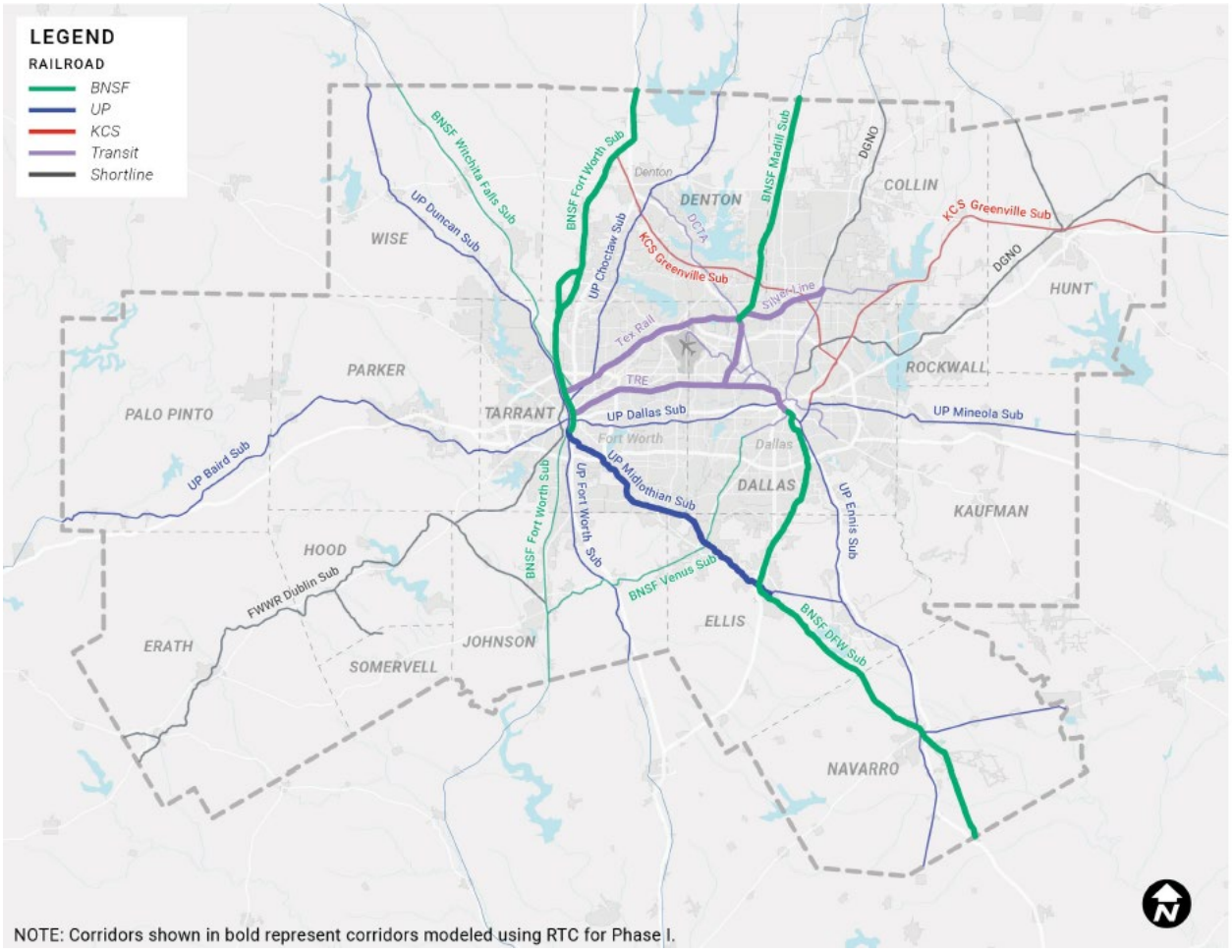
Figure 2: Phase I Study Area



Phase II Study Area

The Phase II study area included the full freight rail network in the 16-county region highlighted in Figure 3. The second phase of the Study was conducted in two stages. The first stage described a grade crossing screening and subsequent solutions. The second stage described railroad solutions to accommodate future growth for freight rail movements on the network. Two locations, Tower 55 and CP 217, were identified as priority areas for improvements due to the potential of bottlenecks at these locations.

Figure 3: Phase II Study Area



Stakeholder Engagement

Throughout Phase III, the study team engaged stakeholders through in-person and virtual stakeholder workshops and individual stakeholder meetings. Engagement efforts were completed with stakeholders from local governments, railroad partners, and other public-entities and included dialogue on data, railroad operations, transit service, mobility solutions, and implementation plans. Three all-stakeholder meetings were held for Phase III and meeting minutes are included in Appendix A. Each meeting's objective is identified below:

Phase III Stakeholder Meeting #1: September 30, 2022
Objective: Identify future highway and passenger rail projects within the Tower 55 and CP 217 areas.

Phase III Stakeholder Meeting #2: February 16, 2023
Objective: Discuss proposed design updates for CP 217, including Amtrak access.

Phase III Stakeholder Meeting #3: December 7, 2023
Objective: Achieve consensus on proposed CP 217 improvements and Tower 55 corridor preservation conceptual layout.

Phase III Technical Memorandum Outline

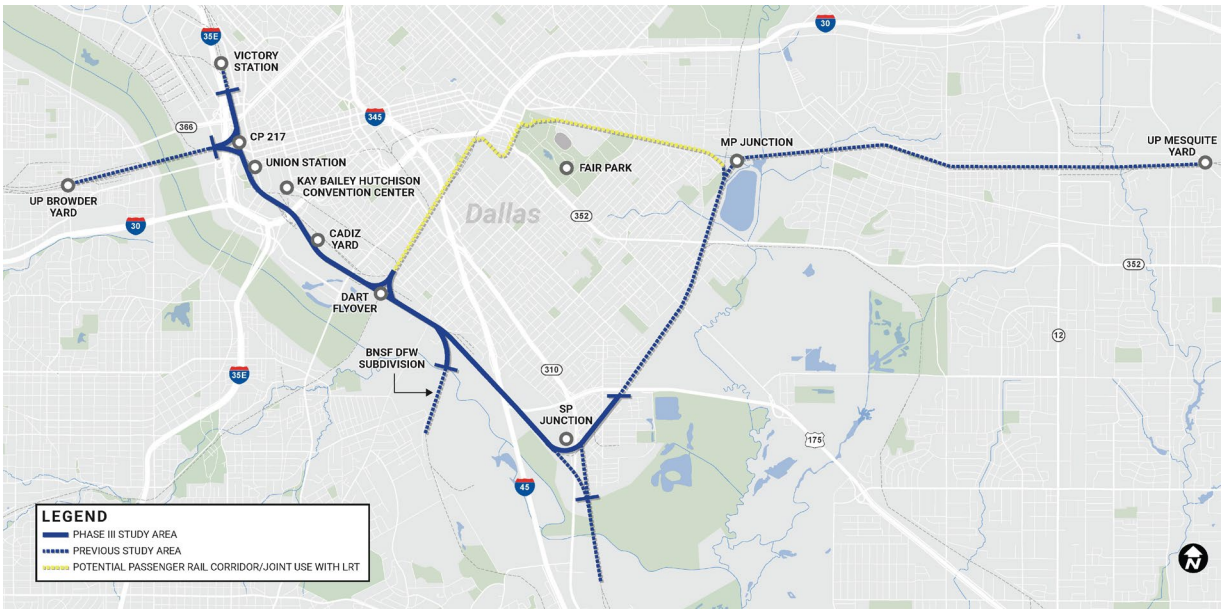
The *Phase III Technical Memorandum* includes the following sections:

- Phase III Study Area
- CP 217
- Phase III Network Improvement Summary
- Phase III Modeling
- Cost Estimate
- Benefit-Cost Analysis
- Environmental Readiness
- Tower 55

Phase III Study Area

Two locations, CP 217 and Tower 55 were identified as primary locations needing improvements from Phase II. The Phase III CP 217 study area included the 5-mile freight rail network from Victory Station to SP Junction in downtown Dallas, shown in Figure 4. Phase III also evaluated Tower 55 to delineate a corridor preservation boundary in Fort Worth (Figure 7).

Figure 4: Phase III CP 217 Study Area



CP 217

Preliminary engineering designs at CP 217 focus on accommodating future demand for both freight and passenger movement in this combined corridor.

History

At CP 217, the interaction between intercity passenger trains (Amtrak), commuter trains (TRE), and freight trains (BNSF, DGNO, UPRR) is complicated by scheduled passenger service, multiple dispatch handoffs, and future growth. The need for improvements at CP 217 was identified through initial Phase I modeling. In Phase II, modeling was used to measure the performance of a select set of infrastructure scenarios aimed at accommodating growth in rail traffic. Feasible infrastructure scenarios were advanced in Phase III and includes existing, proposed, and future tracking concepts, included in Appendix B[2]. A reduction in CPs, in the vicinity of CP 217,was not determined to be feasible at the level of study. Similarly, detailed operational plans were not developed. Preliminary design developed in this study was solely to evaluate the feasibility of increasing the network's freight capacity in this subsection of the Metroplex network.

[2] Proposed concepts do not preclude future improvements if they occur. Future concepts are projects that *may* materialize in the future.

Future Projects

Project Pegasus is a series of TxDOT highway projects intended to reduce congestion and delay within the City of Dallas.[3] The project focused on the IH30 and IH35E freeway. The area is split into three distinct areas: the 'Mixmaster', 'Canyon', and 'Lower Stemmons'. The Mixmaster area focused on the IH30/IH35E within downtown Dallas. The Canyon section includes the depressed portion of IH30 south of downtown and the Lower Stemmons area includes the IH35E area north of downtown.

The 2004 Project Pegasus schematic design, as shown in Figure 5, identifies that the UPRR bridge will need to be extended. The existing UPRR bridge is located just west of the Dallas Wye. Prior to the necessary railroad bridge extension, a shoofly bridge will need to be constructed to accommodate future trackage from both Union Station and Victory Station. An example shoofly is shown in Figure 6. The shoofly will cover the proposed west leg extension length and help maintain railroad access as the remainder of the bridge is reconstructed. After the remainder of the bridge is completed, the shoofly can remain in place. It will become a permanent structure for the future third mainline to the Browder Yard and the Future West Leg of the Dallas Wye.

The Canyon Project[4] is a TxDOT and City of Dallas project focused on the reconstruction and widening of I-30 from I-35E to I-45/I-345, known as the I-30 Canyon. The proposed improvements include reconstructing the I-30 Canyon as an urban freeway with six main lanes in each direction with discontinuous frontage roads. The proposed project would require approximately 2.5 acres of additional ROW. The Canyon project is the latest funded project, of the three portions within Project Pegasus, and is scheduled to be let for construction bids in 2024. The mainlines south of the Dallas Convention Center will be reconfigured via the Canyon project. The Canyon project will be constructed prior to the proposed construction of this Metroplex project. The proposed trackage layouts shown in this study conform to the Canyon design agreed to by TxDOT Dallas District and UPRR.

Figure 6: Portion of Project Pegasus Schematic [2004]

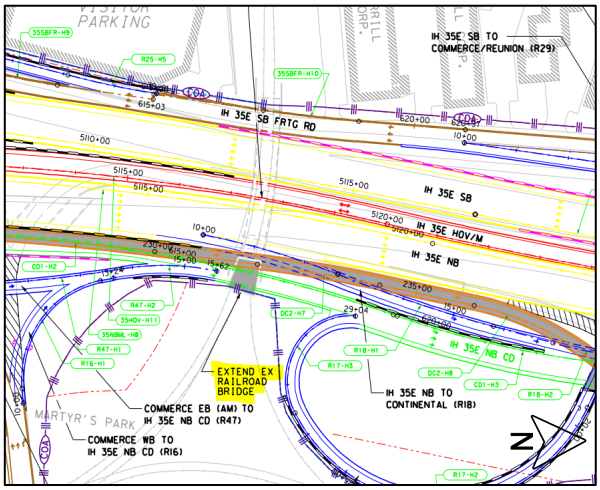
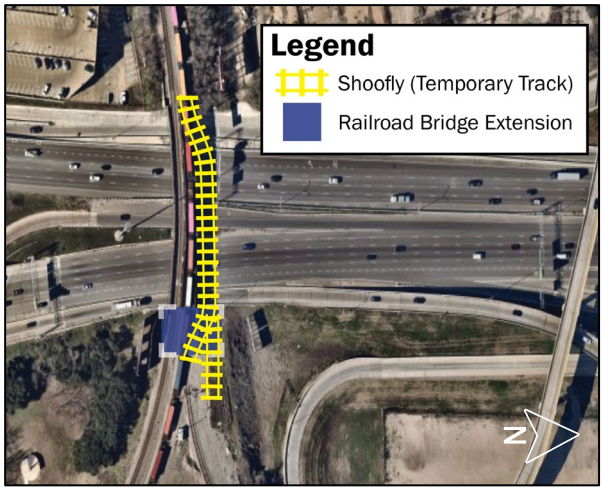


Figure 5: Example Shoofly over IH35E



[3] https://projectpegasus.org/overview.htm

[4] https://www.txdot.gov/projects/hearings-meetings/dallas/archive/012921.html

Phase III Network Improvements Summary

The purpose of Phase III is to complete conceptual engineering, prepare cost estimates, pre-NEPA review, and analyze proposed concepts that improve the efficiency of freight transportation and passenger rail movement in the Metroplex. The following section includes an overview of proposed improvements at each major location within the CP 217 study area. This phase of the study considered existing conditions, ongoing projects, stakeholder's design criteria, ROW, and environmental impacts[5]. Key design notes are included below:

- UPRR standard design criteria recommends #20 turnouts; size 15 turnouts have been approved in the TxDOT Canyon Project. These conceptual designs include size 15 turnouts when size 20 lengths are not achievable. (See page 8)
- When coming from Irving, Amtrak can arrive directly at the platform at Victory Station. When coming from Arlington, Amtrak will have to pass the station to use a proposed crossover at Houston Street and then complete a move back to access the Victory Station platform. (See page 8)
- UPRR desires to reduce and flatten the curve at the western section of CP 217 Wye before placing the curve back into service. The interchange of Spur 366 and IH35 will need to be reconstructed to allow for the desired flatted, higher speed, railroad curve. (See page 8)
- An additional mainline is proposed to be constructed north of the two existing mainline tracks under the DART flyover, a rail-over-rail bridge carrying DART's red and blue lines, vicinity of Tower 19's historical site. This proposed track alignment will require the demolition and reconstruction of the existing floodgate system in the area. (See page 12)
- The proposed mainline north of the two existing mainline tracks will need to be shifted south to follow the existing alignment at Cedar Crest Boulevard to avoid conflict with the bridge columns. The southern existing track will be shifted to facilitate the continuation of the third mainline. These proposed track shifts will require a ditch relocation and upgrades to the existing drainage design through this area of the corridor. (See page 12)
- There are three at-grade crossings within the corridor of this project located at Forest Avenue, Lenway Street, and Botham Jean Boulevard. All crossings will require upgraded light and gate systems.
- The track speeds for the corridor were maintained throughout the design to match existing conditions.
- This study assumed no increase of passenger rail traffic.

[5] The proposed design allows for a double main shoofly for future construction. This alignment was included in the overall corridor map showing future layouts and how they are projected to fit into the current design. Additional design and restriction criteria are listed in Appendix C.

CP 217

Existing: There are two DART tracks, a TRE track, and an industry track existing in this location. The industry track is used by BNSF and DGNO. The west leg of the UPRR Dallas Subdivision Wye is not currently in service.

Proposed: Phase I identified double tracking the TRE mainline for 0.45 miles from North Junction to Union Station. Phase II included a preliminary track concept for this location. Phase III considers the same concept for proposed improvements. This would require modification to the west leg of UPRR Dallas Subdivision Wye. Modifications to Riverfront Boulevard and Union Boulevard may be needed in the vicinity of the Dealey Plaza historic preservation area. This will require a construction easement for the installation of new track 4. The new TRE tracks will be upgraded to match existing track speed capacity. The additional industry track will be lengthened through CP 217, granting access to TRE on both sides of the platform at Union Station. The connection of the industry track at the UPRR Dallas Subdivision Wye is proposed to be established in future coordination with this corridor. This reconnection would ease the amount of northbound traffic by decreasing the number of trains moves and providing a direct connection to Browder Yard.

Union Station

Existing: Seven tracks exist at this location: an industry track from CP 217 merged with the two tracks from the Browder Yard, one track utilized by Amtrak,, two DART tracks, and two TRE tracks.

Proposed: Phase I proposed additional tracks in this area to minimize interaction between freight and passenger trains. Phase II included a 10% preliminary track concept for this location. Two industry tracks from Victory Station and two industry tracks from Browder Yard would continue through Union Station, with a proposed retaining wall on the west side. The additional industry track will cause an alignment shift to the east through Union Station. The new TRE tracks would tie into the existing tracks. Extension of the existing bridge will be required to facilitate the proposed new track. It is likely the catenary poles will be affected by the proposed design. A future study should assess the impacts and mitigation measures to the catenary poles in this area. Height clearances will need to be approved for the proposed improvements.

Kay Bailey Hutchinson Convention Center

Existing: Five tracks exist at this location: two industry tracks used by BNSF, DGNO, UPRR, one track used by Amtrak track, and two DART tracks. Passenger and freight tracks merge and DART light rail tracks divert to an independent corridor at this location. Minimum vertical clearance for the corridor is set at 23‘-6“. The track 4 alignment at South Houston Street is currently out of service (OOS).

Proposed: This design was able to achieve this minimum vertical clearance in all cases except for track 4 alignment under South Houston Street. This track 4 alignment at South Houston Street will require horizontal and vertical realignment to achieve the necessary design criteria. A reconstructed Houston Street needs to conform to UPRR’s 23’4’’ vertical standard to allow for double stack containers and autoracks. Track 4 alignment will be shifted and lowered in this area. The other vertical clearance consideration is roadway related. Carlton Garrett Street underpass requires some vertical clearance improvements for the roadway under the tracks. This road may need to be lowered to accommodate the new rail bridge.

A double stack container option was considered through this corridor. In existing conditions, it has been observed that double stack container operations currently navigate through this corridor. It is assumed these double stack operations can continue with this design.

Cadiz Yard

Existing: Cadiz Yard is accessed from Mainline 1 and consists of three yard tracks. The CJ Yard is to be completed as a part of the TxDOT's I-30 "Canyon Project."

Proposed: The proposed design incorporates the Canyon Project improvements, which include adding four tracks to CJ Yard as explored in Phase II. These improvements are expected to be completed before the proposed improvements from this Study begin construction. Phase III's proposed mainline tracks will shift coming out of the Convention Center. The dead-end track would be extended to tie into the mainline tracks. Final configuration would have three mainline tracks through the corridor in this area. The Cadiz Yard lead track would be accessed off the northern mainline and CJ Yard lead track would be accessed off the southern mainline. In other areas, horizontal track shifts are required to meet design criteria. Track 2 has been shifted to a new alignment south of Cadiz Yard to achieve three main lines. The three main lines configuration goes from Cadiz Yard to SP Junction where mainline 2 and 3 turn to the east and mainline 4 continue south. Stakeholder feedback supports a study of the feasibility of a pocket track in the ditched drainage area between the two yards should be explored.

DART Flyover

Existing: There are two mainline tracks under the DART flyover.

Proposed: No improvements are planned for the DART flyover tracks. In Phase II, it was determined additional consideration for track capacity should be made to Forest Avenue where the BNSF DFW Subdivision turns south. One mainline track is proposed to be constructed north of the two existing mainline tracks. This proposed track alignment conflicts with the existing floodgate system in the area. The owner of this floodgate system will be a part of the coordination as the design progresses. There are no proposed impacts to the flyover bridge horizontally or vertically. Crossovers between the mainline tracks in this area give access to all tracks to from the connection to the DART flyover tracks and the BNSF mainline to the south. These crossovers also give the ability of trains to access any mainline line in each direction of travel. The mainline was shifted at Cedar Crest Boulevard overpass to navigate the tracks through the existing bridge columns and maintain the existing right-of-way (ROW) through this part of the corridor. The proposed designed mainline is shifted back to the north of the existing mainlines east of Lenway Street.

SP Junction

Existing: Currently there is one track in each direction of the SP Junction Wye.

Proposed: Phase II identified additional track capacity near Trinity Junction, with an ultimate desire for three main tracks. The proposed improvements at SP Junction will require coordination with TxDOT and the City of Dallas to improve clearances at several locations as additional main tracks are added along the railroad. The proposed mainline to the north of the two existing mainlines will follow the track alignment through the SP Junction to the north toward the MP Junction. The existing mainline will be shifted at Botham Jean Boulevard to allow horizontal clearance for the double track under the South Central Expressway (SH310) bridge. The proposed double mainlines will be constructed to tie-in to the existing double main south of Bethurum Avenue. The proposed additional trackage will reduce the vertical clearance under Carlton Garret Street. Construction of a new bridge is proposed over Carlton Garret Street to provide appropriate vertical clearance. The new bridge is expected to be more cost effective than extending the existing bridge. This allows construction to be done offline before connecting the new tracks to the system, allowing mainline service to continue through construction.

Phase III Railroad Traffic Control Modeling

Phase III represents a critical subset of the regionwide improvements, highlighted above, and proposed and simulated in Phase II. Phase II identified the efficacy of a regionwide approach to network planning with the Class I railroads (UPRR and BNSF) defining their infrastructure improvements for future years out to the projected traffic levels in 2045. TRE likewise proposed track and signal improvements that would not simply meet its long-term needs, but would contribute to enhanced future operations for its tenants, BNSF and DGNO. The development of this Study does not include any future operating plans for the TRE or future operating plans for any additional commuter or regional rail service at Dallas Union Station. No specific future operating plans for UPRR were obtained for this Study. Freight trains from the baseline 2020 scenario were increased using a 2% growth rate compounded annually. Growth by train count was used for this analysis, rather than by length. For a full report of Phase III modeling, see Appendix D.

Simulation Methodology

RTC, the simulation program, makes an unlimited number of attempts to dispatch trains that are in direct conflict, even to the extent of temporarily reversing the simulation to attempt a new dispatching solution. The 2019 train data was used to project the future year 2045 train volumes, similar to the process for Phase II. When RTC completes a successful simulation, it provides the best solution for all trains. The process spread out the increased number of trains operating on the network in proportion to the train counts by train classification. Intermodal trains represent trains carrying high-value expedited service primarily in containers, far outnumber the number of heavy trains, which represent trains carrying high-weight commodities, such as coal, grain, and rock.

The current study focuses on a critical infrastructure shared by the major carriers in the Metroplex that operate on the segment of track connecting Victory Station on TRE through CP 217/JFK Junction and Union Station to Forest Avenue and SP Junction. Five railroads operate over this segment:

- Amtrak Texas Eagle service:
  - Victory Station to/from Union Station
  - Union Station to/from MP Junction enroute to/from Mineola in Wood County
- TRE Fort Worth:
- Victory Station to/from Union Station
- BNSF:
  - Victory Station to CP 214 Forest Avenue to Teague
- DGNO:
  - Mockingbird Yard through Victory Station to/from Cadiz Yard and SP Junction and MP Junction and Browder Yard via the Wye at CP 217
- Union Pacific:
  - CP 217 (JFK Junction) to SP Junction (Miller Yard and DIT-Dallas Intermodal Terminal) to MP Junction (Mesquite Yard)

Phase III required four distinct simulations:

- Existing Infrastructure Network with Existing Train volumes
- Existing Infrastructure Network with Future 2045 Freight Train volumes
- Phase III Improvements with Existing Train volumes
- Phase III Improvements with Future 2045 Freight Train volumes

These simulations spanned a two-week period, a standard study period for most network simulations. The original Phase II data for existing trains was based on actual recorded dispatch records. The Future (year 2045) trains were derived from a mathematical model that calculated the frequencies of trains and cloned those trains to run at realistic future intervals. A summary of the benefits for the most applicable outputs are reported in Table 1.

Table 1: Percent Difference Between Future 2045 Trains with Existing Network vs. Future 2045 Trains with Proposed Network

Train Type	Train Count*	Average Speed (Percent Difference)	Delay Percent (Percent Difference)
Passenger	812	0%	47%
Expedited	727	1%	-10%
Freight	2,675	1%	-5%
Heavy	93	-1%	2%
All Train Groups	**4,307**	**1%**	**-5%**
Intended (increase/decrease)	n/a	increase	decrease

*Train count insignificantly varied between infrastructure scenarios due to the ability of the train to complete its run on the network. This table shows the total train count for the proposed improvements with future trains.

Modeling included 1,380 miles and 23 subdivisions on four railroads. While there are marginal differences in train speed, there are substantial delay percent differences from the existing to the proposed network in the future train scenario. The drop in Passenger Train Group delay performance was solely attributable to freight traffic on the BNSF Fort Worth Subdivision south of Dallas. The north and southbound Amtrak trains experienced delays on the single-track portion of this line on different days of the week. The drop in Heavy Train Group performance is explained by priority. Heavy trains take longer to begin moving from a dead stop. Since heavy trains have a lower priority than other classes of trains, stop delays occur more frequently. These trains generally move slower owing to a lower ratio of locomotive horsepower to train weight. Within this network, the "heavy" trains are concentrated on the branches that have limited signaling and sidings.

The improvement of these five miles will prove a vital investment in upgrading the critical infrastructure work envisioned by the stakeholders. These improvements are one step in achieving greater capacity within the

overall network. Building on the strategic operational enhancement of these five miles, cost estimation is used to ascertain the economic feasibility and align the necessary investments with the broader network capacity goals.

Cost Estimate

Since COVID-19, we have entered a period of significant construction cost inflation. Construction costs can be highly volatile due to fluctuations in the prices of raw materials such as steel, concrete, and wood. This volatility can result in substantial project cost variations, making accurate budgeting and cost estimation a challenging aspect of construction planning. This is a preliminary estimate for programming purposes to give awareness of magnitude of costs. The total cost for Phase III improvements is $139,661,180 (in 2023 construction value) and includes a 15% contingency. Category estimates to replace the existing bridge, contained in Appendix E, include the following costs:

- Guideway and Track Elements: $40,896,400
- Sitework and Special Conditions: $15,632,500
- Systems: $37,765,000
  - Railroad Control Points: 28,000,000
  - Grade Crossing Warning Device Upgrades: 1,050,000
  - Miscellaneous: $8,715,000
- ROW, Land, Existing Improvements: $748,280
- Professional Services: $26,402,300

Benefit-Cost Analysis

The BCA used the above modeling and cost estimates to compare the costs of the proposed rail improvements (i.e., the Build scenario) to the monetized societal benefits for each project. This comparison is used to determine whether societal benefits outweigh the costs of the Build scenario.

- Societal benefits – include rail operating efficiencies provided by the project's proposed rail
- Improvement costs – include development (planning and engineering (P&E), ROW, construction, and contingencies)

All annual monetary flows (i.e., benefits and costs) are discounted to account for the time value of money and to facilitate project evaluation metrics. The planning-level project cost estimate, including contingency, was developed for the project based on unit prices in 2023 dollars and converted to 2022 dollars based on U.S. Department of Transportation BCA guidance. The full BCA Technical Report is included in Appendix F.

Table 2 shows a summary of BCA project metrics, undiscounted and with project impacts discounted at 3.1%, except for CO2-related impacts which are discounted at 2.0%. The results show that the project is highly infeasible, with a negative net present value of -$100.410 million and a BCR of 0.13 over the 20-year analysis period.

Table 2	Construction Cost in 2023 Dollars, in Thousands	BCA Summary in 2022 Dollars, in Thousands	
Description	**Construction and ROW**	**Undiscounted**	**Discounted**
Net Benefits	-	$33,503	$15,148
Costs	$139,661	$136,923	$115,558
Benefit-Cost Ratio (BCR)	-	**0.24**	**0.13**
Net Present Value (NPV)	-	**($103,420)**	**($100,410)**

The railroad improvements proposed by the project yielded infeasible metrics with unrealistically achievable breakeven benefit increases or cost reductions. The BCA conducted is one of several feasibility assessments. Others include technical, operational, or institutional, as addressed in other technical reports. While the BCA shows strong economic infeasibility metrics for the project, it may warrant further segment-specific analysis. Moreover, project feasibility is a function of many quantifiable and qualitative analyses, including environmental readiness, of which this level of economic analysis is one contributing factor.

Environmental Readiness

The pursuit of federal funding is desired to advance and implement the proposed Metroplex railroad improvements. Federal participation triggers the need for a NEPA decision document approval in addition to standard permitting. The lead agency for these improvements is presumed to be the Federal Railroad Administration (FRA) and the Class of Action for the NEPA document is presumed to be a Categorical Exclusion (CE). NEPA readiness is a strong component of the evaluation criteria in federal grant applications for selection. As such, it is beneficial to the success of a grant application submittal to include a draft NEPA document to articulate NEPA 'readiness' – the ease of obtaining NEPA approval as a prerequisite to obligating funds for final design and construction. Therefore, the conceptual development of the Phase III proposed project includes the preparation of a draft FRA CE Worksheet provided in Appendix G. The draft FRA CE Worksheet notes the agency coordination to be initiated to obtain their concurrences, likely associated mitigation measures, and other potential environmental commitments to be included in the NEPA documentation that will be prepared for approval. In addition, the draft FRA CE Worksheet includes references to the permits anticipated to be required prior to the start of construction.

The draft FRA CE Worksheet documents the potential impacts on the human and natural environment without formal agency consultations, approvals, or concurrences. However, the NEPA document demonstrates the agency considerations associated with implementing the proposed project to enable FRA reviewers to assess the likely level of effort to be undertaken if the grant is requesting funds for Preliminary Engineering and NEPA. In the case of requesting funds for Final Design and Construction, NEPA approval is a prerequisite for awarding the grant, if selected; therefore, FRA will score favorably for this criterion, if the NEPA Readiness articulates a straightforward, efficient review and approval. Ideally, FRA wants to swiftly obligate the funds by awarding the grant to the eligible Grantee so the funds are available for reimbursement and may be expended within the period of performance for the grant. Otherwise, the funds expire and that is not only unfortunate for the

Grantee but also reflects poorly on the FRA. The draft FRA CE Worksheet may enable FRA to confidently make an informed decision about NEPA Readiness.

When federal participation is likely, the evaluation of environmental resources is always considered during the design process. There is a collaboration of engineers, technicians, planners, and environmental scientists, even at the conceptual phase, to inform alignment considerations in conjunction with design standards. To support this early phase of design, the environmental study area for Metroplex Phase III was developed conservatively to accommodate reasonable shifts in alignment and not preclude minor right-of-way needs not yet confirmed. The design team collaborated with the environmental team to assess the likely impacts on the human and natural environmental resources to avoid, minimize, or anticipate mitigation of likely impacts from project implementation. The environmental evaluations included the potential permanent impacts of the proposed improvements as well as the potential temporary impacts during construction such as access, staging, laydown, etc.

Funding strategies for full or phased development will include recommendations for obtaining NEPA approval(s) to advance phase individual improvements and/or a compilation of improvements based on the timeline and perceived ability of an improvement to address the need independently from the implementation of the rest of the corridor. Timeline is important because a re-evaluation is required for all NEPA approvals more than three years old.

ROW

Up to 1.0 acre of ROW acquisition is anticipated for project activities. Temporary easements for retaining wall construction may be required at the parking lots located at 411 Elm Street and 201 Reunion Boulevard West. No commercial or residential displacements are expected to result from the project. As the project advances, ROW will need to be coordinated in areas where there appears to be ROW encroachments depicted on the Dallas Central Appraisal District Property Map. The ROW Abstract map is included in Appendix H.

Utility

The Study assumed existing utilities were placed in coordination with the owning railroad at the time of utility construction. Any adjustment of utilities to meet current accommodation standards will be non-compensatory and need to be coordinated with the City of Dallas. All utilities are assumed to be in place either by permit or sufferance. Utilities are included on the corridor plans in Appendix B.

Tower 55

History

Tower 55 has the highest freight train volumes in the Metroplex and fifty-five percent (55%) of passenger and freight trains operating in the Metroplex pass through Tower 55. BNSF, Fort Worth and Western Railroad (FWWR), and UPRR operate through the Tower 55 area. A TIGER II discretionary grant, with contributions from the UPRR, BNSF, NCTCOG, City of Fort Worth, and TxDOT, funded significant improvements to Tower 55 in 2014. The grant project included:

- Constructing a third north-south mainline track through Tower 55;

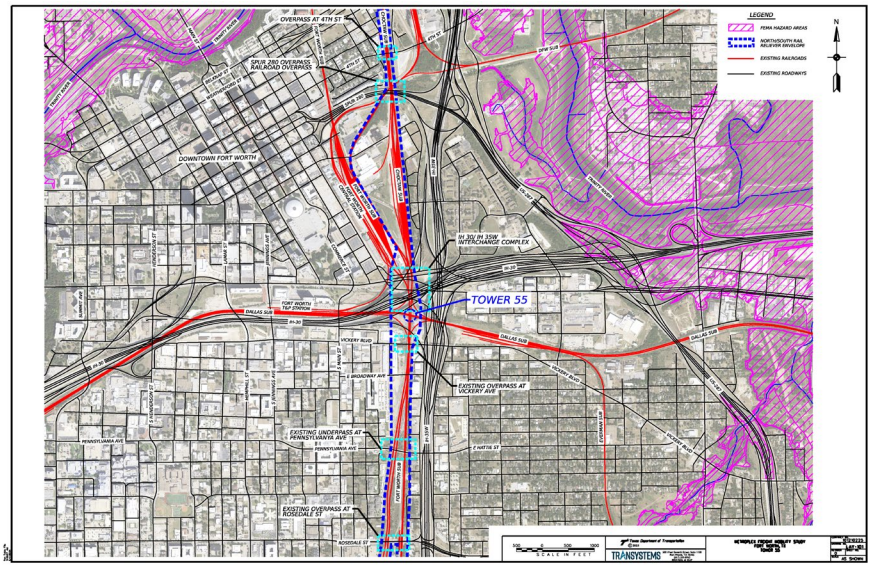
- Building and improving staging tracks near Tower 55 for more efficient train flows; and
- Enhancing signal arrangement, track alignment, and switches for faster train movements.

Previous studies included potential grade separations of the primary north-south and east-west mainlines; however, implementation remains challenging with adjacent highway interchange ramps and other infrastructure in close proximity.

This TIGER II project sought to improve capacity and prevent bottlenecking at Tower 55, but growth outpaced capacity projections. Based on the 2045 train volumes projected for the Metroplex Phase II model, about 55% of passenger (non-TRE) and freight trains operating in the study area pass through Tower 55. The high volume of trains traveling through this portion of the study area triggered a sketch-level analysis. While the 2014 improvements to Tower 55 included train staging, greater growth in the number of trains held before traversing the diamonds compared to overall train growth indicates a growing delay at this location. Train growth through Tower 55 is forecasted to increase by 61% between 2020 and 2045. However, the amount of delay due to train holds is expected to increase by 330%. The Phase II model analysis shows that continued investment in the Metroplex railroad network is needed to minimize the deterioration of rail network fluidity and to reduce train delays as the anticipated growth in train volumes to 2045 materializes.

Tower 55 Corridor Preservation Concept Layout

Figure 7: Tower 55 Existing Constraints Area Map



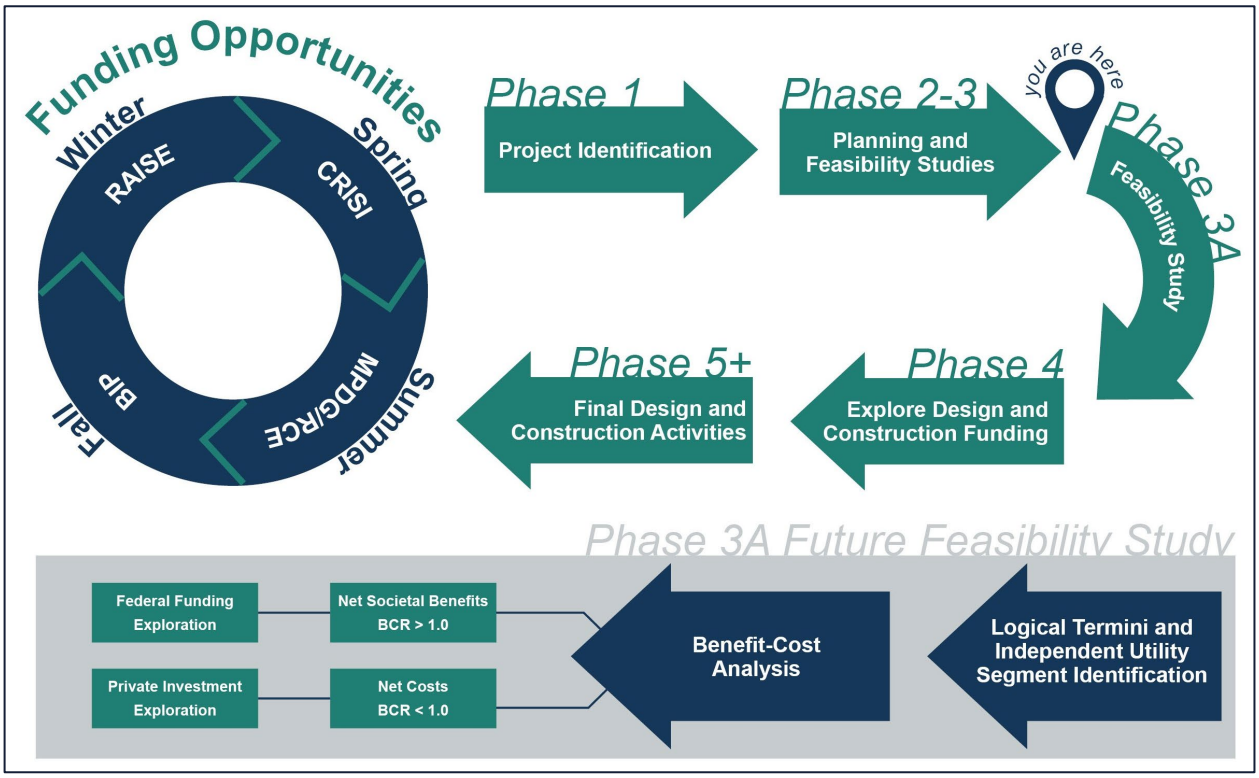
Phase III developed an existing constraints (Figure 7) map which was used to inform a preservation boundary for stakeholder coordination in the Tower 55 area. Previously, the NCTCOG completed a IH30/IH35W study of a north-south trench at Tower 55. Based on stakeholder coordination, UPRR expressed keeping the maximum grade for the area at 1%. These two constraints were the basis for identifying existing constraints. Box validation, a process that confirms boundaries are sufficient and effective by analyzing geographical, environmental, regulatory and stakeholder compliance, was then created to determine the maximum boundaries for corridor preservation. Any transportation projects that occur within the Tower 55 preservation boundary trigger relevant stakeholders to be notified and engaged in said projects. Coordination is critical to prevent project redundancy, cost escalations, and incompatible project timelines. The full corridor preservation concept layout is included in Appendix I.

Executive Strategy

While the findings of the Study Phases I and II provide insight into mobility solutions for the Metroplex, Phase III refines those solutions to initiate progress toward implementation. This study provides 15% preliminary engineering designs, cost estimates, pre-NEPA review, and a BCA that do not preclude future projects currently underway in the Dallas (CP 217) and a corridor preservation boundary in Fort Worth (Tower 55). This installment of the Metroplex Freight Mobility Study examines the key pinch points at CP 217 and Tower 55. Stakeholder input, gathered during stakeholder meetings and additional coordinated efforts, guided proposed improvements in these two areas that will ultimately benefit the entire Metroplex railroad network. While the BCA does not show the totality of proposed improvements to be economically feasible, a future study could analyze the overall proposed Phase III improvements to identify individual segments, or sub-elements, which may be competitive for future grant applications as individual projects. This future study would also include refinement of project development costs to include construction, individual BCAs, identification of potential funding partners, and project sponsors.

Figure 8 outlines a project's development timeline by phase and common rail-related federal funding opportunities. Phase I and II were able to advance from project identification phase to initial planning studies by narrowing down points of interest and determining feasibility of alternatives within the Dallas-Fort Worth region. Phase III advances this project by identifying corridor-specific improvements, laying the groundwork for securing funding through grant opportunities in Phase IV. At Phase V, these projects begin to break ground. Grants provide a feasible way to fund additional planning studies, final design, and construction. Before funding exploration takes place, a Phase IIIA feasibility study is recommended.

Figure 8: Project Development and Grant Opportunity Cycle



Currently, there are constraints outside of the Phase III study area that limit network capacity and overall BCA benefit. Once external constraints are mitigated, to successfully secure design and construction grant funding, future modeling and BCA scenarios should be conducted. The first step for a Phase IIIA study is identifying segments of independent utility that have logical termini. Each of these independent segments will undergo a BCA. Segments that yield a BCR greater than or equal to 1.0 can be advanced for federal grant funding opportunities. Segments that do not yield a net societal benefit could explore private investments options.

In addition to Phase IIIA study, other potential studies to pursue include:

- Analyzing the feasibility of a pocket track in the drainage ditch area between Cadiz and CJ Yards. This study will need to confirm the vertical design, drainage, and track tie-ins along this corridor segment. It will also require a thorough examination of greater right-of-way considerations for future improvements.
- Strategies for sequencing or combining major transportation projects to enhance the likelihood of receiving state or federal grants.
- Modeling future passenger service and conducting a technical assessment for a potential future passenger track connection to Fair Park east of Dallas Union Station.
- Exploring the advantages and limitations of double-tracking the TRE.
- Analyzing the effects of improvements at Victory Station on the network.
- Evaluating the impacts of proposed improvements at Union Station on catenary poles and the necessary mitigation measures.