

CASE STUDY / INTERSTATE 35 HIGHWAY IMPROVEMENT PLAN

KEEP AUSTIN CLEAR: RIGHT-OF-WAY EXPANSION TO RELIEVE CONGESTION

Austin, Texas, is booming, and travel through the heart of the city is less than ideal.

A series of innovative schematic designs led to a solution offering wider roadways and improved interchanges and intersections along a crowded and chaotic Interstate 35 corridor.



COST-EFFECTIVE ROADWAY IMPROVEMENTS DELIVER INCREASED MOBILITY AND SAFETY

To gain operational efficiencies and highway capacity, the design team focused on traffic engineering, public involvement and schematic design — and came in under budget.

PROJECT STATS

CLIENT

Texas Department of Transportation

LOCATION

Austin, Texas

TOTAL PROJECT COST

\$4.2 billion

RIGHT-OF-WAY SCHEMATIC COMPLETION DATE

May 2018

18

INTERCHANGE AND INTERSECTION IMPROVEMENTS

\$3B

COST SAVINGS TO THE STATE

CHALLENGE

Austin, Texas, draws in close to 100 new residents a day with its desirable year-round weather, distinctive culture and favorable job market. For the past decade, it has been one of the fastest-growing cities in the country, boasting a current population of nearly 1 million.

As a result of its popularity, Austin also is home to some of the most congested roadway segments in the state. I-35, a major north-south interstate highway in the U.S. that stretches from Laredo, Texas, to Duluth, Minnesota, passes right through central Austin — where it ranks second among the state's most gridlocked traffic corridors.

Besides congested roadways, travelers along this portion of I-35 also grappled with the proximity of intersections and the inefficient operations and ill timing of traffic signals associated with high peak volumes. Additionally, the multilevel section, commonly referred to as the bridge deck section, splits into upper and lower lanes, allowing for multiple access points to and from Martin Luther King Jr. Boulevard on the south and Airport Boulevard on the north. The additional lane added at Airport Boulevard created another challenge along the corridor as it drops when approaching downtown Austin, generating a substantial bottleneck.

With mounting traffic concerns, the Texas Department of Transportation (TxDOT) needed a comprehensive schematic design that would address mobility improvements as well as safety along the corridor, from U.S. 183 — including U.S. 290, Airport Boulevard, Martin Luther King Jr. Boulevard and all cross streets — to Ladybird Lake in downtown Austin. Developed in the initial design stage, the schematic design documented preliminary plans in detail, using 3D sketches, to help determine the overall design concept. This plan, though, also had to adhere to stringent criteria and budgetary limits while keeping potential population and employment growth in mind.

SOLUTION

With a deep desire to provide a safer, more reliable travel experience through Travis County, TxDOT initiated the I-35 Future Transportation Corridor (FTC) Planning and Environmental Linkages (PEL) study. Its purpose was to determine the ideal lane type and mode choice for the FTC, and results pointed to the integration of a managed lane system (one lane in each direction).

TxDOT hired our team to create schematics for this proposed solution, which consisted of ingress and egress points for the managed lane as well as intersection and

rail line reconfigurations and collector-distributor roadways. While working through the design details, the client was approached with an unsolicited bid for an alternative design: a two-lane system. Given its attractive price point, our team was asked to assess the option and verify its constructability, all within a month. While the option was feasible, it failed to meet essential criteria set by the client — as did the managed lane system.

Vital criteria, as outlined by TxDOT, required lanes not go higher than the deck nor wider than the existing right-of-way, leaving little room for lane additions. Switching directions — and going lower because of height restrictions — our alternative proposal featured a triple stack tunnel through the deck section and a managed lane tunnel to the lake. Though it met the necessary criteria and solved for existing right-of-way constrictions, especially between University of Texas practice fields and an adjacent cemetery, it wasn't a cost-effective solution. Plus, the required detours and disruptions to local businesses would present excessive prolonged impediments.

After revisiting and revising the necessary criteria, we returned to our original idea of purchasing right-of-way through the deck section, which allowed for a wider footprint where the managed and main lanes could be depressed on the same level below the various cross streets. This plan eased traffic control during construction; reduced the cost of excavation; and eliminated the original alternatives' required life-safety elements, such as jet fans and escape stairwells. Our design also considered — and solved for — two

railroad crossings, one downtown and another in the deck section. To summarize and explain key design aspects, our team developed technical memorandums around airport and rail line configurations and alternatives.

As we moved forward, strategic design configurations emerged as not only viable but also desirable options, providing billions of dollars in cost savings as compared to a tunnel system. Creating and presenting additional alternatives allowed for comparisons to be made regarding mobility, access, environmental effects, safety, implementation and impacts to development. Armed with such valuable information, the client was able to choose the most suitable configuration for the managed lanes.

RESULTS

With the goal of reducing bottlenecks and mitigating congestion along I-35, we worked with TxDOT as well as the public via various neighborhood design workshops to create innovative alternatives and improvements for 18 interchanges and intersections within Travis County. For a smoother travel experience through downtown Austin, we delivered a design configuration — expanding right-of-way and improving accessibility with ramps — that checked all the boxes, providing enhanced mobility and safety at the lowest cost to the community. Furthermore, the design incorporated once-missing pedestrian services to adjacent developments and schools. Construction is slated to begin in 2025.

Additionally, Burns & McDonnell was invited by TxDOT to lead one of its main roadway groups, with various stakeholders, in a 2020 design charrette, where participants

brainstormed enhancements and alternative solutions to particularly challenging project concerns: unavoidable right-of-way impacts, downtown accessibility, neighborhood access and reliable drainage of depressed sections. From this meeting, we were able to develop eight additional concepts that addressed these challenges along the deck section and provided alternatives for the corridor (no tunnel required).

MOVING IN THE RIGHT DIRECTION: I-35/WELLS BRANCH PARKWAY INTERCHANGE EVOLUTION

While working on plans for the future transportation corridor in downtown Austin, our team also developed alternatives and designed schematics for a breakout project on the North 16 segment. After analyzing the original triple roundabout concept provided, we replaced the configuration with a direct access ramp and single-point urban interchange. The resulting improvements increased traffic mobility and minimized construction impacts at a lower overall cost. We also recommended a diverging diamond interchange to improve short-term intersection operations while utilizing the existing main lane bridges.



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