

Case Study

Design-build contracts (23 U.S.C. [112](#) and [23 CFR part 636](#)) are agreements that provide for the design and construction of a project by a contractor or private developer. With design-build procurements, contracting agencies execute a single, fixed-fee contract for architectural and engineering services and construction.

Design-build became more viable for major Federal-aid highway construction and maintenance projects after legislative modifications in the last two decades eliminated dollar thresholds for projects to use design-build contracts without special approval. (Section 1503 of SAFETEA-LU and Section 1304 of MAP-21)

This is one of a set of case studies highlighting practices for coordinating highway construction that touches on railroad rights-of-way.

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When Road Construction Meets the Railroad: Exploring Better Design-Build Delivery

This case study looks at recent activities initiated by State transportation departments to improve coordination with railroads on design-build projects.

Introduction

Design-build (D-B) project delivery is among the methods State Departments of Transportation (DOTs) consider when seeking to provide highway improvements more quickly to the public. However, D-B's faster pace and tighter schedules can conflict with railroad companies' complex and methodical approval processes when planned construction includes or is adjacent to railroad facilities. Risks include delays to projects before construction or while construction is underway. Delays can result in hefty cost overruns from delay claims and later project delivery to the traveling public.

Public infrastructure projects that touch railroad property include modifications to highway-rail grade crossings, overpasses or underpasses over railroad tracks, and parallel roads or bicycle and pedestrian trails. Railroad owners process permits, agreements, engineering reviews, and temporary rights of entry related to the project.

This case study focuses on the Minnesota, Texas, and Utah DOTs (MnDOT, TxDOT, and UDOT) as examples of State DOTs seeking useful practices for navigating D-B projects involving railroads.

Strategies that helped these State DOTs include communicating early and often with the railroad, preplanning the specifications and concepts related to railroad facilities before assigning the D-B contract, discouraging midstream design changes, and establishing clear points of contact for railroad coordination at the railroad and State levels, as well as among the D-B project team.

MnDOT, for example, had some success when the State and the railroad agreed on the design concepts related to railroad facilities before a D-B contract was assigned and then disallowed any changes to those pre-set specifications.

Background

The Federal Highway Administration (FHWA) conducts periodic Railroad-DOT Community of Interest sessions to facilitate conversations between railroads and local transportation departments on common highway and railroad infrastructure topics. In the fall of 2023, FHWA emailed liaisons from several State DOTs and railroad companies who had participated in these sessions, inviting them to share their experience with recent D-B highway projects that impacted the railroad right-of-way.

The State DOT responses reflect a variety of approaches. At least one State DOT rail liaison reported discouraging D-B procurement altogether when a railroad was involved, though the State's districts had used D-B anyway. Another State DOT said it had tried two different approaches: (1) Managing 100 percent of the coordination with the railroads, even after a D-B contract was signed or (2) including railroad coordination in the D-B contract, making communicating with the railroad 100 percent the D-B contractor's responsibility.

MnDOT, TxDOT, and UDOT shared their approaches in more depth during separate, hour-long discussions held with FHWA in late 2023 and early 2024. Regional public project managers at two Class 1 freight railroad companies also offered background on railroad considerations for D-B projects.

Railroad Perspective

Both Class 1 railroad regional managers acknowledged that obtaining approval of design plans from railroads can be slow-going. Railroads evaluate for engineering and safety on designs for new construction or reconstruction of grade separations, grade crossings, or operations that call for construction equipment and scheduling flaggers. As one railroad manager said: "It takes a long time, and we want to make sure that we've got plenty of time built into the schedule."

The railroad managers identified the following specific challenges they have noticed with reviews of D-B projects in their regions: the Midwest, in one case, and the Southeast, in the other.

- Projects can move too fast, putting pressure on the railroad to expedite reviews to meet construction timelines.
- Projects may advance through design stages without sufficient railroad involvement and the railroad's interests in mind.
- D-Bs may propose changes to earlier agreed-on design concepts before or after being awarded

Railroad Facts

- The U.S. freight rail network runs on nearly 140,000 route miles, with seven Class I (major) freight railroads, 22 regional railroads, and 584 local or short line railroads. Two of the Class I railroads are Canadian owned.
- Amtrak, the passenger railroad, operates in 46 of the 48 contiguous U.S. States and the District of Columbia.
- There are approximately 212,000 highway-railroad grade crossings in the U.S., on approximately 140,000 miles of track.

*Source: Federal Railroad Administration,
<https://railroads.dot.gov>*

the D-B contract. These changes may come with a warning about delay costs if the design is not changed or the railroad does not approve those plan changes quickly enough. One of the railroad managers said that the railroad prefers at least 30 days to evaluate a plan change.

- D-B contracts may be awarded to the lowest bidder. The lowest bidder may not have experience with railroads or the particular railroad involved. This was a concern because specifications and procedures vary from railroad to railroad and, in turn, may be different from the State's requirements and procedures.
- Points of contact with the State DOT may be unclear, making it difficult for railroads to communicate concerns during D-B project construction.

Minnesota Department of Transportation (MnDOT)

Representatives of the MnDOT Rail Safety and Coordination Program compared two recent D-B projects where railroad coordination was done differently. According to the MnDOT team, the Highway 14 Expansion went fairly smoothly in large part because the railroad and the State had agreed on specifications and right-of-way requirements before the project was awarded and released to a D-B developer. These agreements were worked out while the State waited for financing to be available for the project.

After financing became available, the project was let to a D-B contractor in 2019 and completed in 2021. The project rerouted Highway 14, which mostly parallels a Class 1 railroad corridor, replacing numerous at-grade crossings with two- or three-grade separations.

MnDOT credited these other factors in expediting project delivery:

- MnDOT had a direct point of contact at the railroad when the agreements were signed (though that same contact later left the role). That person also had the experience and authority to make decisions, making signoffs more efficient.
- MnDOT made clear to the D-B contractor that portal dimensions had been agreed to by the railroad and were already set, even though the contractor had suggestions for minimizing the approach over the railroad line.
- MnDOT staff includes designated railroad safety managers to coordinate between the railroads and the MnDOT districts.

In contrast, the 12-mile, \$200 million I-35 West North MnPASS project had more challenges obtaining railroad signoffs to meet the D-B construction schedule. The railroad had not yet approved the plan designs when the project was let to a D-B contractor in 2018. Getting those approvals was more complex than the MnDOT team had expected.

Chris Rice, MnDOT Railroad District Project Manager, recalled: "As it was a design-build project with a short line operating railroad, we assumed it would be easier. But it became quite problematic whenever the Class 1 track owner got involved."

What followed was extensive back-and-forth between the railroad, MnDOT, and the D-B contractor over the height clearance of two replacement bridges over the railroad track. The D-B contractor followed State specifications for the bridge portals' height, which differed from the railroad's specifications by about 6 feet. An added complication was the railroad's lengthy, formal review process, which was often conducted through an online platform.

MnDOT is working with the Wisconsin Department of Transportation (WisDOT) on a billion-dollar, complex plan to replace the I-55 Blatnik Bridge between Duluth, Minnesota, and Superior, Wisconsin. Connectors to the bridge abut or cross over railroad yards. The project is slated for D-B, and talks with the affected railroads are underway.

Texas Department of Transportation (TxDOT)

Texas has three Class 1 railroads operating in the State, numerous short lines, and active D-B transportation construction at any time. TxDOT has sought to improve D-B project delivery by having the State DOT conduct as much upfront railroad coordination and agreement execution as possible ahead of construction. Robert Travis, TxDOT Transportation Engineer, described TxDOT's goal when facilitating and coordinating with railroads on D-B projects: "Make it quick and easy."

Strategies TxDOT uses for projects, including those using D-B, are that the State:

- Set up agreements and develop plans to ensure that most—and in some cases all—coordination with the Class 1 railroads is done ahead of construction.
- Has railroad-approved plans to 30 percent before bidding on the project. The contractor is then responsible for completing the 100 percent plans with railroad approval.
 - The agreement execution clock starts only once the railroad approves those plans. Construction activity is not allowed prior to the execution of the agreement.
- Engages the railroad early, starting with a preliminary engineering agreement once there is a concept and before 30 percent plan development.
- Receives the railroad charges, such as staff time, labor costs, materials, and permit fees related to the project. The State then ensures those charges are sent to the contractor to pay the railroad.
- Promotes design and construction operations that may lead to quicker railroad approval and workarounds during construction.
 - For example, overpasses over railroads instead of underpasses and associated shoofly.
- Alerts contractors to busier times for railroads when planning the schedule.
 - For example, grain season or before Christmas.
- Asks railroads to prioritize a D-B plan and agreement review over other State projects due to the shorter timeframe of the D-B projects.

TxDOT has also begun including the railroad impact and stage of the plans in its procurement documents for the D-B contractor. At least one of the Class 1 railroads operating in Texas will reach agreements only with the State and not with a private company. For that railroad, the State manages coordination related to the railroad right-of-way separate from the rest of the D-B arrangement.

In addition, the State Rail Division alerts railroads of upcoming projects and meets monthly with a strategic group that oversees TxDOT's D-B projects statewide.

Utah Department of Transportation (UDOT)

UDOT described two recent major highway projects where D-B was used. Lessons from one project were applied to the second project, allowing for better coordination. The earlier project widened and reconstructed 18 miles of Interstate-15 through Salt Lake County, including reconstructing grade separations over Class 1 railroad lines. UDOT started meeting with the railroad in 2016 and released a Request for Proposal for a D-B in 2017 while it was still working on agreements for over-crossings, which were new structures that would carry the tracks. By 2019, agreements with the railroad were still not in place.

Lisa Zundel, a project manager for UDOT at the time, remembered long waits to obtain the railroad's approval on design concepts. "We would think we were at a good place with [the railroad] and they would be positively moving forward with us and giving us positive feedback of certain things," Zundel said. "And then they'd say: 'Oh no, we don't like that piece of it, we've got to start over.'"

According to UDOT, the railroad had been undergoing a reorganization, with personnel changes that made the lines of contact unclear. Construction could continue around the railroad facilities until the railroad signoffs were received. However, the time waiting for railroad approvals eventually resulted in delayed claims and change orders that added costs.

For a later D-B project constructing a new State highway, UDOT coordinated design concepts with the railroad before advertising the D-B contract. UDOT also discouraged the D-B developer from changing those concepts or specifications. As a result, Brian Allen, the project's manager at the time, stated: "We had all the agreements signed, we had the process done, we had all the parties in place, so it went pretty quick."

What also helped was that the D-B contractor had chosen a concept that was very close to UDOT's base concept when preparing the bid for the project. UDOT also kept the D-B contractor involved in conversations with the railroad, bringing them into every meeting.

State DOT Suggestions for Other Agencies

MnDOT, TxDOT, and UDOT offered these suggestions for other States seeking to improve the process for D-B/railroad projects:

- Engage railroads early and often during planning. Bring the railroad representative into the discussions and meetings to get feedback on planning concepts—even if those concepts may change. Consider bringing the railroad to meet with the design-builder.

- Adjust the construction schedule in consideration of a railroad’s business needs.
- Plan for more time for D-B projects than for other delivery methods, such as design-bid-build. “Keep designs simple, don’t allow too much change, and ensure agreements are already in place,” said a State DOT project manager. “There’s no plan B with the railroad.”
- Avoid any midstream design changes affecting the railroad after a D-B project has been let, even changes that may have value to the State.
- Keep the State as the direct point of contact for railroad issues throughout construction. At least one Class 1 railroad will only work directly with the State.
- Set up single points of contact at the State level and with the design-builder for railroad matters related to the project. That person can be the conduit to the district managers. This way, railroads know who to talk to if issues arise during construction.
- Keep relevant railroads informed about upcoming Federal-aid projects within the State.

State DOT Suggestions for Railroads

- Set up clear communication channels where State rail coordinators can speak directly to railroad reviewers authorized to give direct feedback.
- Avoid a middleman process, such as using third-party vendors with no authority to make decisions on behalf of the railroad.
- Provide a railroad representative to participate in early discussions of major projects affecting railroads.
- Be available and have an efficient process for providing feedback.

Railroad Suggestions for State DOTs

The two Class 1 railroad regional managers offered these suggestions to States to facilitate coordination with railroads on D-B projects.

- Involve the railroad company as early as possible, and “don’t be shy.” Let the railroad look at plans at 30 percent design (before a project is put out to bid) or 60 percent to provide feedback that can head off problems.
- Pay attention to a railroad’s public projects manual; most Class 1 railroads have one. Deviation from the public projects manual will likely cause delays and add time.
- Avoid midstream design changes and requests for other changes in design or operations near the railroad right-of-way.
- Have the State manage the relationship with the railroad, even doing the work related to the railroad.
- Consider a railroad coordination office. There are advantages to having railroad coordination go

through a single person or office, which not all States have. Railroads have encountered States where each step was handled by different departments within the State DOT, such as those for agreements, construction, bridges and structures, or right-of-way.

- Aim for 100 percent of the plans to be approved and accepted before construction starts within a railroad right of way.
- Develop a plan with the D-B contractor for handling procedures and communications related to railroad matters.
- Consider railroad experience when advertising for a D-B project. One of the Class 1 regional managers said: “If you can find a design-build contractor that has worked with us before and knows our requirements—it is going to run a lot smoother than one that hasn't.”
- Consider bringing in the railroad during interviews with prospective D-B contractors to allow the railroad to ask questions directly. This has worked well in the past, according to one Class 1 railroad manager. This lays out the railroad process and requirements “very clearly so that there's no surprises and [the D-B contractors] know what they're getting themselves into.”

Contacts and Resources

Relevant Authorities

23 U.S.C. Section 130: <https://www.govinfo.gov/app/details/USCODE-2021-title23/USCODE-2021-title23-chap1-sec130>

23 U.S.C. Part 636: <https://www.govinfo.gov/content/pkg/CFR-2021-title23-vol1/xml/CFR-2021-title23-vol1-part636.xml>

Minnesota

MnDOT Rail Safety and Coordination Program, <https://www.dot.state.mn.us/ofrw/railroad/index.html>

- Julie Whitcher, MnDOT State Rail Safety Engineer
- Chris Rice, Project Manager for MnDOT Districts 7 and 8
- Paul DeLaRosa, Project Manager for MnDOT Districts 1 and 2

Texas

TxDOT Rail Division website, <https://www.txdot.gov/about/divisions/rail-division.html>

- Robert Travis, TxDOT Transportation Engineer
- Patti Warnasch, TxDOT Rail Letting Section Director

Utah

UDOT Rail Division, <https://www.udot.utah.gov/connect/about-us/operations/rail-division/>

- Brad G. Palmer, UDOT Rail Division Director

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