Project Delivery and Innovative Practices Study of WSDOT

Study Progress Report

For: Washington State Joint Transportation Committee

Date: December 30, 2024

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1. INTRODUCTION

1.1 STUDY OVERVIEW

Objectives

The Joint Transportation Committee (JTC) of the Washington State Legislature has engaged a team led by HKA Global LLC to:

- Study the Washington State Department of Transportation's (WSDOT) current project delivery practices, and
- Recommend changes as appropriate to current policies, practices and statutory requirements that could reduce costs, improve competition, shorten the delivery schedule, or make progress in a combination of all three of these factors.

Key Tasks

To accomplish the study objectives, the Request for Proposals for the study set forth the following integrated tasks:

Task 1: Project Delivery Methods – Background, Overview & Examples

Task 2: Engagement with WSDOT & Industry Stakeholders

Task 3: Document Issues, Opportunities & Suggested Improvements

Task 4: Recommendations: Improvements to Existing Project Delivery Practices, Other Innovative Approaches, and Washington-Specific Opportunities

Task 5: Coordinate with the Staff Technical Team

Task 6: Presentations

Task 7: Preliminary and Final Reports

Oversight and Direction

The study is being guided by JTC staff and a Staff Technical Committee (STT) consisting of the individuals identified in Table 1.1.

Table 1.1: Staff Technical Team Roster

Organization	Representatives
Washington State Department of Transportation	• Art McCluskey, Design-Build Program Manager, Construction Division • Joanna Lowery, Assistant State Design Engineer, Development Division • Nina Jones, ECMCA, Assistant Director of Business Diversity and Inclusion, Office of Equity & Civil Rights • Travis Snell, Legislative Relations
Office of Financial Management	• Maria Thomas, Budget Advisor to the Governor
House & Senate Transportation Committees	• Chris Thomas, HTC Senior Fiscal Analyst • Danny Masterson, STC Senior Fiscal Analyst
Senate and House Democratic and Republican Caucuses	• Hannah McCarty, Senior Staff Counsel • Martin Presley, Senior Staff Counsel • Loren Othón, Senior Policy Analyst • Dana Quam, Senior Counsel
Joint Transportation Committee	• Alyson Cummings, Senior Policy Analyst, Project Manager • Rachel Dean, Policy Analyst

1.2 SCOPE OF THIS PROGRESS REPORT

This progress report in combination with the preliminary report provided to the JTC on December 11 documents the work performed by the HKA team to date, which included the following key activities:

a) HKA identified the project delivery methods regularly used in the United States to deliver large transportation infrastructure projects and evaluated:

   – The general advantages and disadvantages of each method;

   – Project circumstances or conditions typically associated with successful implementation of each method;

   – Examples of projects on which the methods have been implemented; and the

   – Potential impact of each method on cost, competition, and delivery schedule.

   This evaluation is presented in Chapter 2 of this report.

b) The team collected and reviewed cost and schedule data for the projects initiated by WSDOT between January 2017 and May 2024.

c) The team began to interview various WSDOT representatives and external stakeholders as part of the Task 2 outreach effort.

d) The team provided regular briefings on study progress to the JTC project managers and STT.

e) The preliminary report for this study was provided to the JTC as part of the December meeting and is available at the following link. preliminary-report-12-11-24.pdf

2. PROJECT DELIVERY METHODS

2.1 INTRODUCTION

Overview

As part of Task 1, the HKA team evaluated methods public owners in the US are regularly using to deliver capital construction projects. This review included the following methods identified in the study Proviso:

- Design-bid-build (DBB),
- Design-build (DB),
- Progressive design-build (PDB),
- General contractor/construction manager (GC/CM), and
- Public-private partnerships (P3).

In addition, HKA also took a brief look at other methods that are being implemented internationally, but which remain largely untested in the US market, including alliance contracting and other tri-party or integrated project delivery (IPD) models.

Approach

To conduct this evaluation, HKA reviewed:

- Relevant reports and guidance information related to project delivery, including documents published by:
  - US Federal Highway Administration (FHWA),
  - National Cooperative Highway Research Program (NCHRP),
  - WSDOT and other state Departments of Transportation (DOTs), and
  - Industry organizations such as the Design Build Institute of America (DBIA)
- Statutory requirements related to the delivery of projects by WSDOT, and
- Example solicitation documents issued by WSDOT.

In addition, the HKA team also considered its own experience in providing consulting and advisory services to agencies and contractors in relation to the delivery of major capital programs and projects.

The sections that follow present preliminary observations and findings from this evaluation, including:

- General advantages and disadvantages of each delivery method;
- Project circumstances or conditions typically associated with successful implementation of each method;
- Examples of projects on which the methods have been implemented; and the
- Potential impact of each method on cost, competition, and delivery schedule.

Definitions and General Overview of Different Project Delivery Methods

A "project delivery method" (PDM) refers to the overall process used to execute and complete a capital project, including planning, programming, design, and construction, and potentially operations and maintenance for some methods.

Commonly used PDMs to deliver major transportation infrastructure projects in the US are defined in Table 2.1 below.

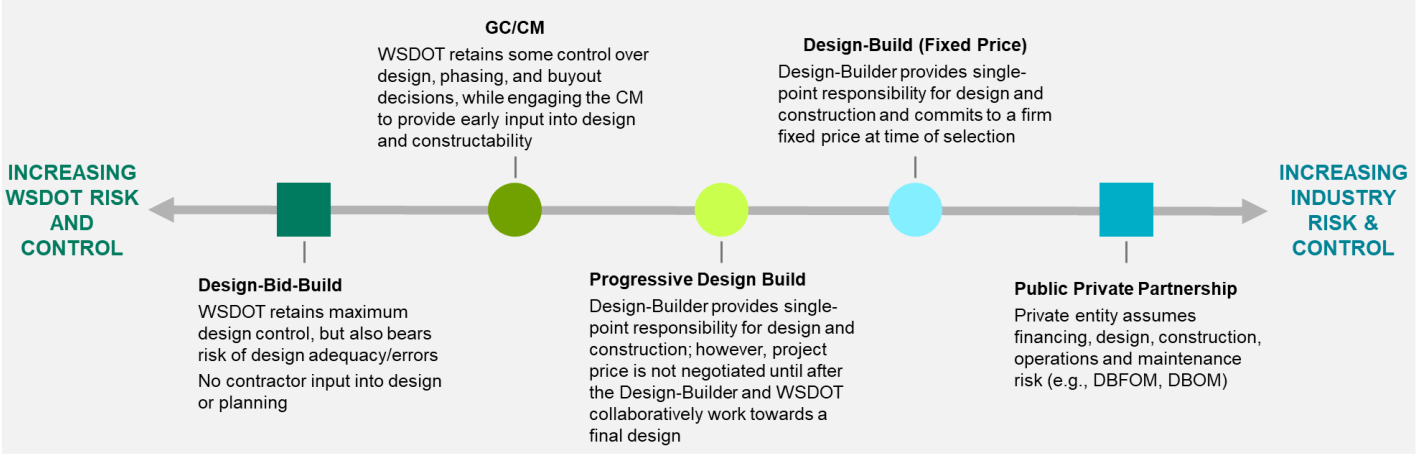
Table 2.1: Common PDMs used to Deliver Transportation Infrastructure Projects

Method	Definition
Design-Bid-Build	The traditional PDM in which the owner completes its own designs, or retains a designer to provide design services, and then advertises and awards a separate construction contract based on a completed set of construction documents
Design-Build (Traditional)	A PDM in which the owner procures both design and construction services in the same contract from a single, legal entity referred to as the design-builder, who commits to a fixed price for the entirety of the work at the time of selection.
General Contractor Construction Manager	A PDM in which the owner engages the contractor at the early stages of design to provide preconstruction services. Such services typically entail providing input to the owner and design team regarding constructability, scheduling, pricing, and phasing. When the project scope is sufficiently defined, the owner and contractor will negotiate a price for the construction of the project.
Progressive Design-Build	A variation of design-build in which the design-builder is engaged early in the project development process to validate the owner's basis of design and to collaboratively advance or "progress" towards a final design and associated price for construction services.
Public Private Partnership	A contractual agreement usually involving a public agency contracting with a private entity to finance, design, and construct, operate, maintain and/or manage a facility or system. Common P3 structures include the following: • **Design-Build-Finance (DBF)** combines traditional DB delivery with some amount of private sector capital (typically to fill gaps in funding and allow projects to be built faster). • **Design-Build-Operate-Maintain (DBOM)** combines the design and construction responsibilities of DB contracts with operations and maintenance responsibility for the private partner. • **Design-Build-Finance-Maintain (DBFM)** is similar to the DBF approach, but the private partner also assumes short-to-medium term operational responsibility. Unlike DBOM, however, the owner retains responsibility for operations. • **Design-Build-Finance-Operate-Maintain (DBFOM)** is similar to the DBOM approach, but the private partner also assumes responsibility for financing.

Historically, public sector construction entailed the almost exclusive use of the design-bid-build (DBB) delivery method, involving the separation of design and construction services and the sequential performance of design and construction. However, transportation owners in the US, including WSDOT, have increasingly been exploring use of alternative PDMs to improve the speed and efficiency of the project delivery process. These alternative PDMs move closer to the integrated services approach to project delivery favored in the private sector.

To illustrate this concept, the various PDMs used in US highway construction have been arranged below on a continuum, with the traditional DBB approach appearing on the left and the more alternative methods arranged from left to right according to increasing responsibility and performance risk assumed by an owner's industry partners.

Figure 2.1: Continuum of Project Delivery Methods Commonly used in US Highway Construction



Key Takeaway: Different PDMs are generally distinguished by how they approach risk and responsibility allocation among the owner, the designer, and the builder. As shown, the owner has maximum control and risk under the DBB approach. Moving from left to right along the continuum, industry involvement and performance risk increases.

Each of these PDMs is discussed in greater detail in the sections that follow.

2.2 DESIGN-BID-BUILD

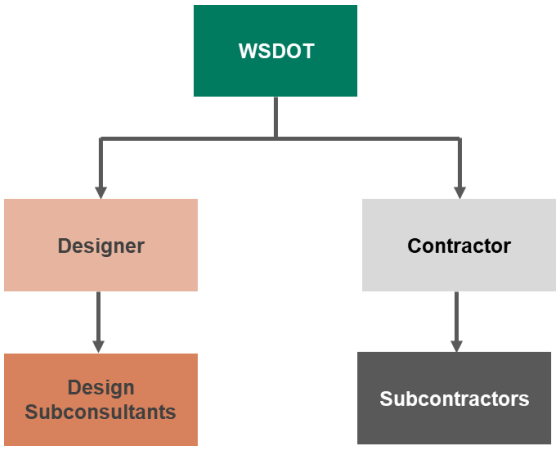
Overview

Design-bid-build (DBB) is the traditional and most common method used by WSDOT to deliver construction projects. Under this method,

- WSDOT either uses in-house staff, and/or engages an engineering firm, to prepare 100% complete design documents. (RCW 39.80)
- The design documents are then advertised for competitively procured public bids.
- The contract is awarded to the responsive and responsible bidder that submits the lowest price. (RCW 47.28.090)

As shown in Figure 2.2, a defining feature of DBB delivery is the separation of design and construction services. Under such an arrangement, WSDOT largely retains design control and thus the risk and financial responsibility for design errors or omissions encountered by the contractor.

Figure 2.2: DBB Contractual Structure



A defining feature of DBB delivery is the separation of design and construction services and the sequential performance of a project's design and construction phases.

Use of this Delivery Method

All WSDOT projects qualify for the DBB delivery method; however, it tends to be most advantageous for projects that:

- Lack schedule sensitivity,
- Require a high degree of owner control, and
- Have a high level of third-party risks and unknowns that are best managed by the owner.

Potential Advantages and Disadvantages

In general, conventional DBB delivery, particularly when implemented with a low bid procurement process, has served owners reasonably well, providing adequate facilities at the lowest *initial* price that responsible, competitive bidders may offer. While awarding to the lowest bidder provides no guarantee that the owner will receive the *final* lowest price, it does:

- Simplify the construction award process and provide confidence that favoritism did not play a role in the selection decision, and
- Minimize the need for sophisticated price negotiation tactics.

In addition, the owner, having had full control over the design process, should be positioned to receive the exact end product that it desires. However, as there is no contractor involvement in the design stage, the design may lack elements of constructability, potentially impacting the cost and/or duration of the work. Furthermore, the separation of services under DBB has the potential to create adversarial relationships among the project participants that the owner will then have to referee.

A summary of such advantages and disadvantages related to DBB is presented in Table 2.2.

Table 2.2: DBB – Potential Advantages and Disadvantages

Potential Advantages	Potential Disadvantages

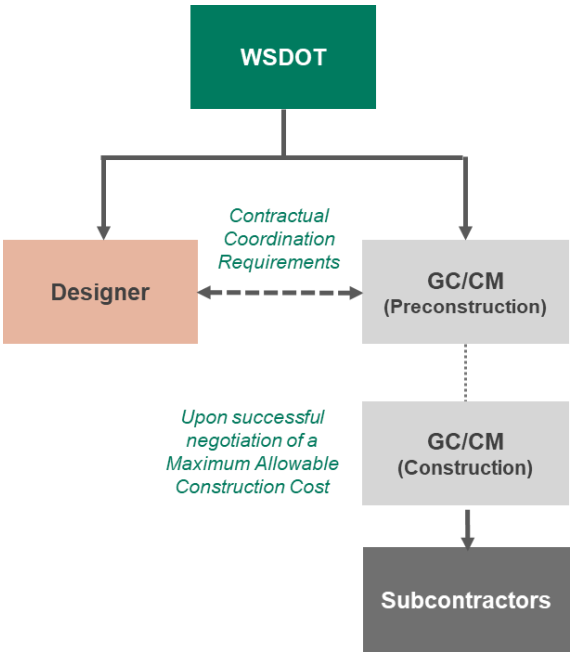
• **Broad Applicability.** DBB is the traditional delivery method that is:
  - Applicable to a wide range of projects
  - Well-understood and accepted by owners and industry, with well-established legal precedents
• **Competition.** DBB tends to promote high competition among contractors.
• **Procurement Duration.** Bid period is typically the shortest of all methods.
• **Owner Control.** The designer working directly for, and on behalf of, the owner, provides the owner with maximum design control.
• **Cost.** DBB offers the lowest initial price that responsible, competitive bidders can offer. In addition, basing estimates on 100% complete designs typically enhances the accuracy and certainty of cost estimates.
	• **Adversarial Relationships.** The separation of design and construction contracts can create adversarial relationships as the parties may have different agendas and objectives. In contrast to DB methods, the owner must manage/referee two contracts.
	• **Design Risk.** The owner bears the risk of design adequacy/errors.
	• **Lack of early contractor involvement** may impact constructability and pre-construction value engineering, increasing the potential for errors and omissions, change orders, delays, and other adverse outcomes. Without contractor input, the design team may have limited knowledge of the true construction cost and scheduling/phasing ramifications of design decisions.
	• **Extended Delivery Schedule.** The sequential design, procurement, and construction phases can extend the delivery schedule.

2.3 GENERAL CONTRACTOR / CONSTRUCTION MANAGER (GC/CM)

Overview

General Contractor/Construction Manager (GC/CM) is a process of collaborative management among the owner, designer, and contractor teams. As depicted in Figure 2.3, under the GC/CM approach – similar to DBB – WSDOT would hold separate contracts with the designer and the GC/CM firm.

Figure 2.3: GC/CM Contractual Structure



A key difference between DBB and GC/CM is the timing of contractor selection. Unlike DBB, in which the contractor is not selected until 100% complete design, the GC/CM firm is typically selected early in the design process, ideally at 15 to 30% design. This early engagement allows the GC/CM firm to participate in the project's design development phase as a construction advisor, providing input regarding constructability, scheduling, pricing, phasing, and risk management as part of their preconstruction services.

When the design documents are at least 90% complete (RCW 39.10.370), the GC/CM firm and WSDOT, typically with assistance of an independent cost estimator (ICE), will then negotiate a Maximum Allowable Construction Cost (MACC) for the construction phase of the project, during which the GC/CM firm will act as a general contractor (i.e., holding the trade

contracts, managing the construction of the work, and assuming 'performance risk' for cost, schedule, and quality).

RCW 39.10.370 also allows for major work packages to be bid before agreement is reached on the total MACC to allow portions of the work to be constructed before the final design is completed (thus supporting some schedule compression).

To procure GC/CM services, RCW 39.10.360 requires WSDOT to include an estimated Maximum Allowable Construction Cost (MACC) in the solicitation documents. The GC/CM firm is then selected using a best-value procurement process that considers both qualifications criteria and price-related factors, such as a proposed percent fee on the estimated MACC.

In Washington State, GC/CM projects can be delivered as either a traditional GC/CM, which is aligned more closely with vertical (building) construction, or "Heavy Civil" GC/CM, which is often applied to horizontal or transportation projects with significant civil scopes of work. In either instance, RCW 39.10.380 requires trade subcontract packages to be competitively bid.

Under traditional GC/CM, the GC/CM can bid on subcontract work not to exceed 30% of the negotiated MACC (RCW 39.19.390). For Heavy Civil GC/CM, the GC/CM can bid on up to 50% of the subcontract packages and may also openly compete for another 20% of the work. Heavy Civil GC/CM thus allows the GC/CM firm to self-perform up to 70% of the work, which in turn would allow this firm to control the schedule and phasing of the work, ideally promoting construction efficiencies and reduced durations.

Use of this Delivery Method

Pursuant to RCW 39.10.340, GC/CM may be used, subject to CPARB Project Review Committee (PRC) permission, if at least one of the following conditions is met:

- Implementation of the project involves complex scheduling, phasing, or coordination;
- The project involves construction at an occupied facility which must continue to operate during construction;
- The involvement of the GC/CM during the design stage is critical to the success of the project;
- The project encompasses a complex or technical work environment;
- The project requires specialized work on a building that has historic significance; or
- The project is, and the public body elects to procure the project as, a heavy civil construction project.

These criteria are generally consistent with national practice.

Potential Advantages and Disadvantages

Although use of the GC/CM approach will not eliminate the potential for adversarial disputes to arise between the parties, the early involvement of the GC/CM firm should help foster more of a collaborative and integrated team approach to problem solving.

In addition, early collaboration with the GC/CM firm during the design phase can be used to help establish design priorities, identify prefabrication opportunities, provide pricing for design alternates, and establish strategies for overcoming or mitigating potential construction risks. The earlier such input and ideas are obtained, the more seamlessly they can be incorporated into the final design solution.

A summary of additional advantages and disadvantages associated with GC/CM is provided in Table 2.3.

Table 2.3: GC/CM – Potential Advantages and Disadvantages

Potential Advantages	Potential Disadvantages
• **Budget Control.** The more collaborative design development process promoted under GC/CM can provide owners with priced alternatives to assist with decision-making, as well as the flexibility to adjust the final project scope and budget as new information becomes available during the design process. • **Schedule Compression.** Early engagement of the GC/CM firm with the owner and design team can help establish design priorities, identify prefabrication opportunities, facilitate procurement of long-lead items, support early construction work packages, and establish strategies for overcoming or mitigating potential construction risks, all of which can help reduce the overall delivery schedule. • **Risk Management.** The owner, the designer, and the GC/CM firm can collectively assess risks, identify the need to perform additional site investigations to further identify and reduce risks, and properly allocate risk prior to entering the construction phase. • **Change Control.** GC/CM involvement during the design phase should improve the quality of the design and bidding documents and thus reduce cost growth due to change orders and claims once construction is underway. • **Owner Control.** In contrast to design-build delivery, the GC/CM method allows the owner to retain significant control and influence over design and construction phasing decisions.	• **Negotiated Cost.** The construction price is not known at time of GC/CM contract award but is instead negotiated following preconstruction activities. - Cost estimating expertise is needed during final cost negotiations to ensure a fair price is received. - Extensive negotiations to reach agreement on construction costs and final risk allocation can extend the overall project schedule. - If agreement on construction costs is not reached, the project will be substantially delayed. • **Design Risk.** The owner bears the risk of design adequacy and thus costs related to design errors and omissions. In addition, having two contracts to manage may lead to adversarial relationships between the designer and GC/CM firm that flow through the owner. • **Design Churn.** A consensus-driven design process entailing the owner, designer, GC/CM firm, and stakeholders during the pre-construction phase can lead to design "churn" that extends the overall delivery schedule. (A strong owner's project manager is needed to control scope and schedule.)

GC/CM Experience

WSDOT Experience

WSDOT used the heavy civil GC/CM delivery method for the Seattle Multimodal Terminal at Colman Dock project. The project, which was originally budgeted at $268M, had an approximate 7-year duration from spring 2015 to January 2023.

GC/CM was selected for this project due to:

- The complexity of the work (scope entailed heavy civil marine, structural, and building construction),
- Extensive coordination needs with other projects and stakeholders, and
- Complex phasing needs, in which the existing facility was to remain open during construction.

The project building elements were descoped and then rescoped later causing delay and added cost. Further scope changes and coordination issues resulted in cost growth and delay. The project is currently funded at $489M with completion in early 2025. WSDOT is compiling lessons-learned that it plans to apply to future GC/CM projects.

Experience of other Owners in Washington State

Sound Transit and the City of Seattle have more extensive experience with GC/CM. Their results have been mixed, with large, complex GC/CM projects exhibiting cost and schedule growth.

The City of Seattle, however, indicated that smaller GC/CM projects (in the range of $25-$150M) generally come in on or close to budget. The City uses the pricing and constructability input provided by the GC/CM firm to adjust the project's scope and design to meet a fixed budget.

National Experience

GC/CM, which owners outside of Washington State often refer to as either Construction Manager at Risk (CMAR) or Construction Manager/General Contractor (CM/GC), is widely used and often the default delivery method for "vertical" building construction involving the coordination of multiple trade contracts and complex phasing and staging requirements.

It has also become a common alternative delivery option for the "horizontal" highway construction industry. The Federal Highway Administration (FHWA) has approved CM/GC for use on federal-aid projects throughout the U.S. Several DOTs have used CM/GC extensively, including Arizona, Colorado, Connecticut, Delaware, California, Massachusetts, Michigan, Utah, and Vermont, among others. Several DOTs have developed manuals of practice addressing CM/GC as well as other alternative delivery methods.

2.4 DESIGN-BUILD (FIXED PRICE)

Overview

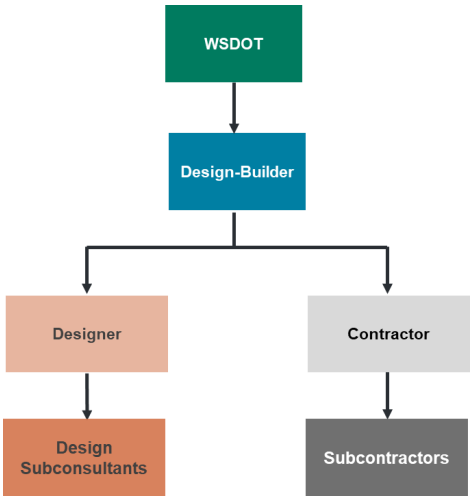
Design-build (DB) is a project delivery method under which WSDOT contracts with a single legal entity, referred to as the "design-builder", to both design and construct a project.

The integration of design and construction services under one contract (as depicted in Figure 2.4), is intended to support:

- Earlier cost and schedule certainty (as the design-builder commits to a fixed price and schedule at the time of contract execution),
- Closer coordination of design and construction activities, and a
- Non-sequential delivery process that allows some construction activities to proceed simultaneously with final design (i.e., "fast-tracking").

To procure DB services, WSDOT uses a two-step "best value" process entailing:

Figure 2.4: DB Contractual Structure



- A Request for Qualifications (RFQ) step through which WSDOT establishes a shortlist of 3 to 5 qualified design-builders, followed by
- A Request for Proposals (RFP) step, during which the shortlisted teams are invited to submit technical and lump price proposals for the work, which WSDOT then evaluates based on price and non-price factors set forth in the RFP to select the team that offers the best value.

Use of this Delivery Method

RCW 47.20.785 authorizes WSDOT to use DB for projects over $2 million when:

- Construction activities are highly specialized, and a DB approach is critical to developing the construction methodology;

  Or

- The project provides opportunities for innovation and efficiencies between the designer and builder;

  Or

- Significant savings in project delivery time would be realized.

Nationally, owners have also generally found DB to be advantageous when the project:

- Has minimal third-party risks (or such risks can be effectively managed by the design-builder);
- Is unlikely to experience significant changes outside of the design-builder's control;
- Does not entail complex phasing or operational considerations; and
- Entails scope that can be adequately communicated to proposers without 100% plans and specifications.

Potential Advantages and Disadvantages

Potential advantages and disadvantages related to DB are presented in Table 2.4 below.

Table 2.4: DB – Potential Advantages and Disadvantages

Potential Advantages	Potential Disadvantages
• **Time Savings.** In comparison to DBB, overall project durations tend to be reduced under DB because detailed design work can often overlap with construction. • **Early Price Certainty.** Under DB, the total contract price for design and construction will be established at the time of design-builder selection and prior to design finalization. In comparison to DBB, DB thus provides for earlier confirmation of project pricing and supports earlier obligation of construction funds.	• **Risk Pricing.** Locking in lump sum prices early may result in high-risk pricing to cover uncertainties or incomplete design elements. Similarly, if risks allocated to the design-builder are not well defined or otherwise are perceived as being onerous, it may also result in high bid premiums. • **Reduced Owner Design Control.** Owner and stakeholder interests may be underrepresented in final design decisions given reduced owner control over the design process.

Potential Advantages	Potential Disadvantages
• **Single Point of Responsibility.** DB offers a single point of responsibility for both the design and construction of the project. This centralized responsibility will, in large part, allow owners to avoid the effects of the Spearin doctrine (United States v. Spearin, 248 U.S. 132 (1918)), which places the risk of a defective design on the owner. Use of DB should thus reduce the potential for change orders and disputes compared to a DBB project, in which a separate designer and builder may ultimately clash over whether a project issue stems from a poor design or the contractor's execution of that design. • **Innovation and Enhanced Constructability.** Having the designer and contractor working together under one contract can foster enhanced collaboration during design and construction, allowing for the early incorporation of contractor expertise and optimization of the design to align with the contractor's strengths and chosen means and methods. Such collaboration also supports a continuous value engineering and constructability review process, allowing the contractor and designer to work together to identify potential construction issues early in the project development process.	• **Procurement process** can be lengthy and resource intensive. Time and effort needed for contractors and designers to prepare responsive DB proposals may reduce competition. • **Cost.** Owner incurs additional costs for project criteria development and possibly stipends for unsuccessful proposers. Funding may not support fast-tracking construction or accelerated cash flows.

DB Experience

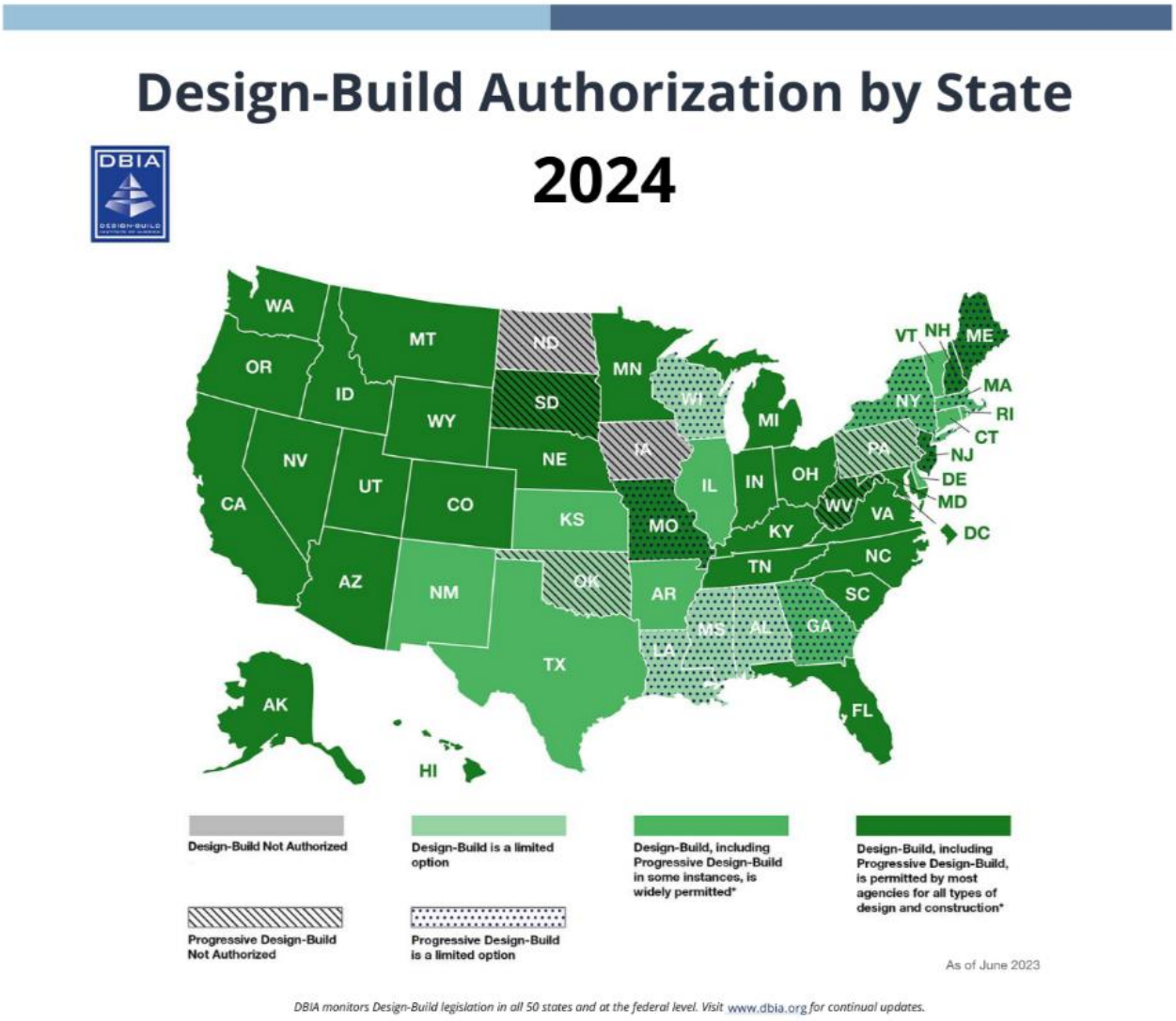
WSDOT

WSDOT's first DB project was executed in 2001. Subsequently, it has initiated approximately 62 DB projects over the last 23 years with additional projects in the pipeline. The project sizes have ranged from mega projects or programs in excess of $1B to several small DB projects in the $2-10M range. WSDOT has generally adopted national best practices regarding DB delivery advocated by DBIA, FHWA, and sister agencies with mature DB programs, and its DB program has been generally well received by industry. However, recent DB mega-projects have resulted in fewer bidders and higher bids compared to the Engineer's Estimate. The next phase of the study will seek to evaluate the reason(s) for this change.

National Experience

DB has been authorized for use at some level of by most of the state governments in the United States, including for Departments of Transportation, as shown in Figure 2.5.

Figure 2.5: Design-Build Authorization
(source: Design Build Institute of America 2024)



The use of DB and other alternative contracting methods are viewed by many DOTs today as a strategy to better manage limited internal DOT resources and improve efficiency by shifting more responsibility for project delivery to the private sector. This has resulted in transitioning DOT staff from traditional roles in the organization (e.g., design and quality management) to more of an oversight and compliance role.

Only a few DOTs (e.g., Florida, Maryland, and Minnesota) actively track performance metrics for their DB program. Florida and Maryland track project performance outcomes such as cost increases, time increases, and number of claims. Minnesota monitors more process-oriented metrics such as the DOT's time to respond to ATCs, number of clarifications needed, and variances between promised versus actual dates related to the procurement process. Other DOTs have indicated that they viewed performance monitoring to be a best practice that they would like to implement in the future, pending available resources. Several DOTs have also expressed a desire to better document and raise awareness of lessons learned, which were viewed by some to be just as, if not more, important than tracking metrics. As explained by one DOT, tracking performance metrics and lessons learned can be very resource intensive.

A national comparative study of DBB, DB, and GC/CM projects completed in 2018 indicated that the use of DB results in time savings compared to DBB given the greater integration (overlapping) of design and construction phases and potential for accelerated design and construction durations.[1]

2.5 PROGRESSIVE DESIGN-BUILD

Overview

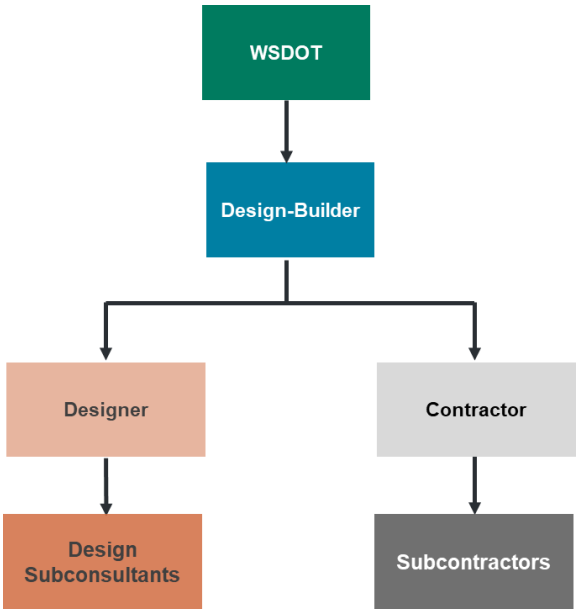
Progressive Design-Build (PDB) is a variation of DB in which the design-builder is engaged early in the project development process to validate the owner's basis of design and collaboratively advance or "progress" towards a final design and associated price for construction services.

WSDOT is authorized to perform PDB under RCW 39.10 but must obtain permission from the CPARB Project Review Committee (PRC).

The basic PDB contractual structure, as shown at right, is comparable to the more conventional fixed-price variant of DB in which the design-builder provides a single point of responsibility for design and construction services. However, under PDB, the design-builder will typically deliver the project in two phases:

- Phase 1 (preliminary or preconstruction services) includes validation of the owner's basis of design, development of the preliminary design, and negotiation of a firm contract price.
- Phase 2 includes final design, construction, and commissioning.

Figure 2.6: PDB Contractual Structure



Similar to GC/CM, the PDB team is engaged early in the design process (e.g., at 0 to 15% design). The PDB team will typically be selected using a best-value process considering qualifications, experience, and selected price-related elements similar to the criteria outlined in RCW 39.10.360 for GC/CM. Unlike traditional DB, the proposers are not required to provide a final design, schedule, or full project price as part of their proposals, which should shorten the duration of the procurement process.

When implementing PDB, the design-builder must typically provide a subcontracting plan, subject to owner approval, identifying the work packages it plans to bid out to qualified subcontractors, as well as what specific portions of work it intends to self-perform (which is often limited to a specified threshold, e.g., 30-40% of the total contract value). Some owners allow the design-builder to procure certain subcontract packages on a sole source basis, if deemed to be in the project's best interest.

[1] Alternative Contracting Method Performance in U.S. Highway Construction, FHWA Publication No. FHWA-HRT-17-100, research performed by the University of Colorado, Boulder, the University of Kansas, and Hill International, Inc., April 2018. https://des.wa.gov/sites/default/files/2024-05/WDSOT-PDMRTF-TechBrief-FHWA-AltContMethodPerformance-04-2018.pdf

Use of this Delivery Method

PDB projects under RCW 39.10.300 must meet similar requirements to traditional DB under RCW 47.20.785. This entails showing the project meets at least one of the following criteria:

- The construction activities are highly specialized, and a DB approach is critical in developing the construction methodology;

  Or

- The projects selected provide opportunity for greater innovation or efficiencies between the designer and the builder;

  Or

- Significant savings in project delivery time would be realized.

Based on national experience, additional factors that lend projects to PDB delivery are similar to those for GC/CM and include projects:

- Having a high potential for unknown or poorly defined risks that would benefit from early design-builder involvement
- Entailing complex phasing and/or operational or stakeholder impacts that would benefit from ongoing owner/stakeholder input
- Entailing major risks that can be mitigated by having the contractor and designer collaborate more closely in a direct contractual relationship (in contrast to GC/CM)

Potential Advantages and Disadvantages

Potential advantages and disadvantages related to PDB are presented in Table 2.5 below.

Table 2.5: PDB – Potential Advantages and Disadvantages

Potential Advantages	Potential Disadvantages
• **Single Point of Responsibility.** In contrast to GC/CM, under PDB, the direct contractual relationship for design services shifts from the owner to the contractor. This "single point of responsibility" can be beneficial for projects with major risks that would benefit from minimizing potential conflicts between the designer and contractor and change orders related to "errors and omissions". • **Cost and Competition.** The progressive process of developing a construction price under PDB allows the owner to bring in a design-builder very early in the development process and thereby avoid the time and expense of developing a set of baseline design documents to the level needed to obtain a binding construction price from a design-builder during	• **Negotiated Cost.** Unlike fixed-price DB, no cost certainty is provided at the time of design-builder selection. The project price is instead negotiated following design development and preconstruction activities. - Cost estimating expertise is needed during final cost negotiations to ensure a fair price is received. - Extensive negotiations to reach agreement on construction costs and final risk allocation can extend the schedule. - If agreement on construction costs is not reached, the project will be substantially delayed

Potential Advantages	Potential Disadvantages
the procurement stage. This can also reduce risk pricing and help attract bidders that would otherwise be reluctant to assume fixed-price risk at low levels of design. • **Flexibility and Budget Control.** The collaborative design development process promoted under PDB can provide owners flexibility to adjust the final project scope and budget as new information becomes available during the design process. • **Schedule Compression.** Because PDB firms can be brought on very early, primarily on the basis of qualifications and management plans (rather than complete design solutions and fixed prices), the owner can avoid a lengthy preliminary design phase and prolonged procurement process. Further schedule compression may occur if the design-builder can start the procurement of long-lead items early and begin construction on early work packages before the design is 100% complete.	• **Design churn.** Consensus-driven design process can lead to design "churn" that extends the overall delivery schedule. (A strong owner's project manager is needed to control scope and schedule.).

PDB Experience

WSDOT Experience

WSDOT has started using PDB on a limited number of projects, having received approval from the PRC to perform the following PDB projects:

- US 101/SR 109 Remove Fish Barriers project on March 26, 2020.
- Remove Fish Passage Barriers in Kitsap County project on July 28, 2022.
- Thurston & Grays Harbor Counties Removal of Fish Barriers Project on September 28, 2023, and
- SR 167, I-5 to SR 161 New Expressway (Stage 2b) on January 26, 2024.

All of the Fish Barrier projects are focused on the removal of individual fish barriers rather than construction of highways or bridges. WSDOT's first highway PDB project is the SR 167, I-5 to SR 161 project, and WSDOT is currently developing the contract and procurement documents for the use of PDB for a highway project.

Experience of other Owners in Washington

PDB is more often used in non-transportation projects in Washington. Experienced users include the State of Washington Department of Enterprise Services, University of Washington, Washington State University, Western Washington University, and several Washington cities and counties. The City of Wenatchee is currently using PDB for its Confluence Parkway Project and Spokane County used PDB for its U.S. Pavilion project and for its new Public Works Operations Building among other PDB projects in the works.

National Experience

Nationally, PDB has been more widely used for water/wastewater and major public sector airport terminal expansion projects in the U.S. involving complex, multi-year construction projects.

For highway infrastructure, PDB is currently being implemented by more than a dozen DOTs, including Arkansas, Alabama, Colorado, Kansas, Ohio, Maryland, Michigan, Nevada, and Virginia among others. Some high-profile transportation mega-projects currently using PDB include:

- Ohio and Kentucky DOTs' $3.6B Brent Spence Bridge Corridor projects https://brentspencebridgecorridor.com/ and the
- $1.7-1.9B Maryland Transportation Authority's Key Bridge Replacement Project https://www.keybridgerebuild.com/ that recently awarded a $78M Phase 1 contract for pre-construction services.

2.6 PUBLIC PRIVATE PARTNERSHIPS

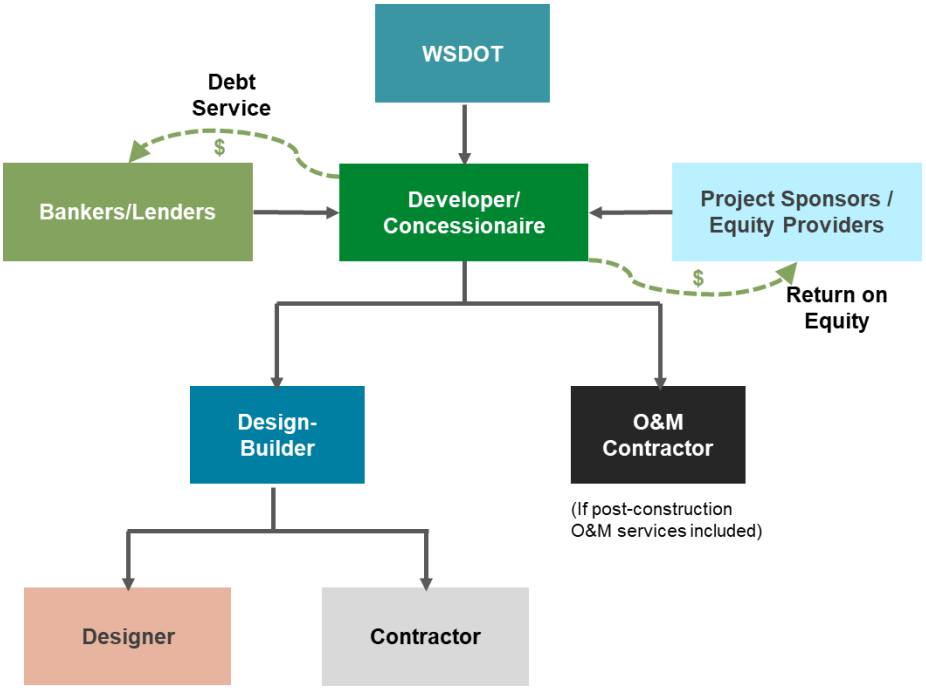
Overview

A Public Private Partnership (P3) agreement centralizes project delivery under a single contract with a developer or concessionaire (which may entail a consortium of multiple firms), to assume design, construction, operations, maintenance, and/or financing responsibilities of a public facility.

The terms and conditions under which the private sector participant is to design, build, finance, operate, and/or maintain the facility largely depends on the owner's priorities regarding overall cash outlay, the timing of the owner's monetary obligations, performance needs, short-and long-term risk allocation (for both operational and financial performance), and resource availability.

Figure 2.7 depicts the typical structure of a P3 agreement.

Figure 2.7: P3 Contractual Structure



P3 agreements for highway transportation assets are typically further structured as either a "revenue-risk" toll concession or an "availability payment" concession.

Under a revenue risk concession, tolls paid by project users often comprise the primary revenue source for a P3 transaction. In return for the right to collect tolls during the concession period, the P3 developer bears the risk that the revenues may be inadequate to repay the underlying project loans and equity investments. In the event of greater-than-expected revenues, some concession agreements include a revenue-sharing provision between the private partner and public owner.

With availability payment concessions, the public agency pays the P3 developer throughout the concession period for making the non-tolled facility available to users. Payments may be reduced if the private partner does not meet operational performance standards such as lane closures, incident management, or snow removal. These transactions often include construction "milestone" payments to defray the amount of the ongoing availability payment.

Use of this Delivery Method

In general, P3 agreements are often seen as a recourse to address budget constraints or financing gaps, particularly for owners that wish to execute large-scale capital projects requiring access to significant equity investment.

For owners that otherwise have the financial capacity and "investment grade" credit ratings to pursue such projects on their own, P3s can provide an effective option to efficiently deliver projects that are outside of the owner's core mission and for which the owner lacks the staff expertise to operate and maintain the asset.

Potential Advantages and Disadvantages

Potential advantages and disadvantages related to P3 are presented in Table 2.6 below.

Table 2.6: P3 Agreements – Potential Advantages and Disadvantages

Potential Advantages	Potential Disadvantages
• Early contractor involvement and input in all aspects of project lifecycle including design, construction, operations and maintenance can enhance the maintainability of design solutions, and provide a better approximation of lifecycle costs • Revenue risk P3 allows for delivery of large projects much sooner than otherwise would be possible through traditional DOT funding or financing. • Availability P3 can motivate the contractor to increase the quality of design and workmanship to help minimize future maintenance issues • P3 developer may be able to provide specialized expertise to operate and manage ancillary assets that are not part of .an owner's core mission.	• Poor risk allocation can reduce cost efficiency and/or detract proposers. • Procurement process can be time-consuming, costly, and complex. • P3 projects may be susceptible to political or public opposition. • Owner may give up control over design details and some aspects of operations and maintenance. • Higher costs may stem from debt financing, cost of capital.

P3 Experience

WSDOT Experience

To date no P3 transportation infrastructure projects have been completed in Washington State. WSDOT has authorization (RCW 47.29.030 & 090) to procure and contract with private parties to develop eligible transportation projects as a P3. However, based on the findings and recommendations from a P3 study conducted by the JTC P3 Work Group concluded in 2024, the existing P3 law under RCW 47.29 is not utilized because it places too much risk on the private sector. The P3 workgroup developed a legislative framework for a revised P3 law, with proposed components that are intended to balance the public and private sector risk for P3 projects; including administrative rules and policies, and an implementation plan for P3 use in Washington State - including education and outreach, developing policies and procedures, and securing resources needed to develop P3 projects. The JTC P3 Work Group deliverables can be found on the Completed Studies page, under 2024.

National Experience

At the national level, major P3 transportation projects have been completed while others are in the early stages of development, in procurement, preconstruction, or are under construction.

Notable P3 projects that came to commercial close within the past 10 years have included the following:

Table 2.7: Projects executed using P3 Agreements

Project	Agency	P3 Structure	Commercial Close	Value ($ millions)
I-95 Express Lanes (FredEx)	Virginia DOT	Revenue Risk	2019	830
Gordie Howe International Bridge	Windsor-Detroit Bridge Authority	Availability Payment	2018	4,415
Central 70, I-70	Colorado DOT	Availability Payment	2017	1,271
Transform 66, Outside the Beltway	Virginia DOT	Revenue Risk	2016	3,724
SH 288 Toll Lanes	Texas DOT	Revenue Risk	2016	425
Rapid Bridge Replacement	Pennsylvania DOT	Availability Payment	2015	1,119
I-77 High Occupancy Toll (HOT)	North Carolina DOT	Revenue Risk	2014	655
I-4 Ultimate Improvements	Florida DOT	Availability Payment	2014	2,323

In the past 5-10 years, owners are reporting there have been fewer and higher bids particularly for large, complex, multi-season fixed-price P3 projects. Significant post-pandemic escalation and volatility in construction labor, commodities, and equipment costs have added to the uncertainty of pricing, and significant cost growth related to the use of fixed-price P3 (as well as DB) delivery. This has led several major developers and contractors to approach P3 projects more cautiously and be much more selective in the pursuit of P3 projects.

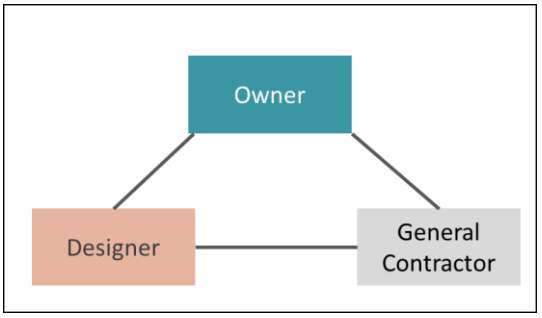
Transportation owners are also rethinking how and when to use P3 and have implemented progressive processes including engaging industry in a pre-development phase under the P3 model to assess project feasibility before entering into a comprehensive development agreement. The I-495 Managed Lanes project in Maryland was recently advertised as a progressive P3, but after failing to attract developers due to excessive political and technical risk, it was cancelled. Similarly, LA Metro is advancing the Sepulveda Corridor P3 project under a competitive pre-development process that may result in a no build option if the project risks and costs come in too high.

2.7 ALLIANCE CONTRACTING

Overview

Under project alliancing, an owner and one or more service providers (constructors, consultants, designers, suppliers, or a combination thereof) collaborate on the delivery of a project. In contrast to GC/CM and PDB, which also entail a collaborative, relationship-based approach to project delivery, alliancing uses contractually established financial incentives to encourage project performance and cooperation among the alliance participants.

Figure 2.8: Alliance ("tri-party" agreement) Contractual Structure



A project alliance, which typically takes the form of a multi-party agreement as depicted in Figure 2.8, typically includes the following characteristics:

- The project team members jointly develop and agree to project goals and a target cost.
- At project completion, the target cost is then compared to the final cost, and the under-runs or overruns are shared equitably (through pre-agreed ratios) among the participants based on their relative contributions to the leadership, performance, outcomes, and overall success of the project. In this manner, all participants have a financial stake in the overall project performance.
- Project risk and responsibilities are shared and managed collectively, rather than allocated to specific parties.
- All participants have a say in decisions for the project, with decisions made on a "best-for-project" basis, rather than to further individual interests.
- All participants provide "best-in-class" resources. Full access is provided to the resources, skills, and expertise of all participants.
- The agreement creates a no-fault, no-blame, and no-dispute culture in which no legal recourse exists except for the limited cases of willful default and insolvency.
- All transactions are open book.

Use of this Delivery Method

Alliance contracting has rarely been used to deliver public infrastructure projects in the US. However, it is generally thought that this delivery method has the potential to deliver complex, high-risk projects, where risks are unpredictable, inherent to the nature of the project (rather than due to inadequate planning,

scoping, or time), and best managed collectively. The project should also derive significant benefit from the involvement of both the owner and non-owner participants in all aspects of project development and implementation.

Potential Advantages and Disadvantages

Potential advantages and disadvantages related to Alliance Contracting are presented in Table 2.8 below.

Table 2.8: Alliance Contracting – Potential Advantages and Disadvantages

Potential Advantages	Potential Disadvantages
• Increased efficiency provided by a well-functioning team and open communication • Improved ability to manage risks due to the sharing of responsibility and the incentive for all participants to proactively mitigate risks • Transparent pricing of the project, including contingencies	• Absence of direct price competition can lead to overly conservative and easily achievable performance targets • Participants are exposed to a broader range of risks than on a traditional project (and may be liable for the performance of other team members) • Requires high level of involvement from senior management to establish and maintain an integrated team • Owner's ability to make unilateral decisions is severely restricted

Experience

Alliance contracts were first used in the early 1990s by British Petroleum (BP) to develop its North Sea oil and gas reserves. The method has since been used on multiple public infrastructure projects in Australia and New Zealand.

In the US, use of alliance contracting remains extremely limited, particularly for public infrastructure projects. However, Georgia DOT and the Washington (DC) Metropolitan Area Transit Authority (WMATA) have expressed interest in its use.

It has become far more common for owners, particularly when using DB, GC/CM or PDB delivery, to incorporate elements of collaborative contracting without executing formal multi-party agreements. Such practices aim to drive all project participants to act more as an integrated project delivery team, and include use of techniques such as collaborative partnering, Building Information Modeling (BIM) as a platform for collaboration throughout the project's design and construction phases, and Lean design and construction tools to support collaborative planning and problem solving.

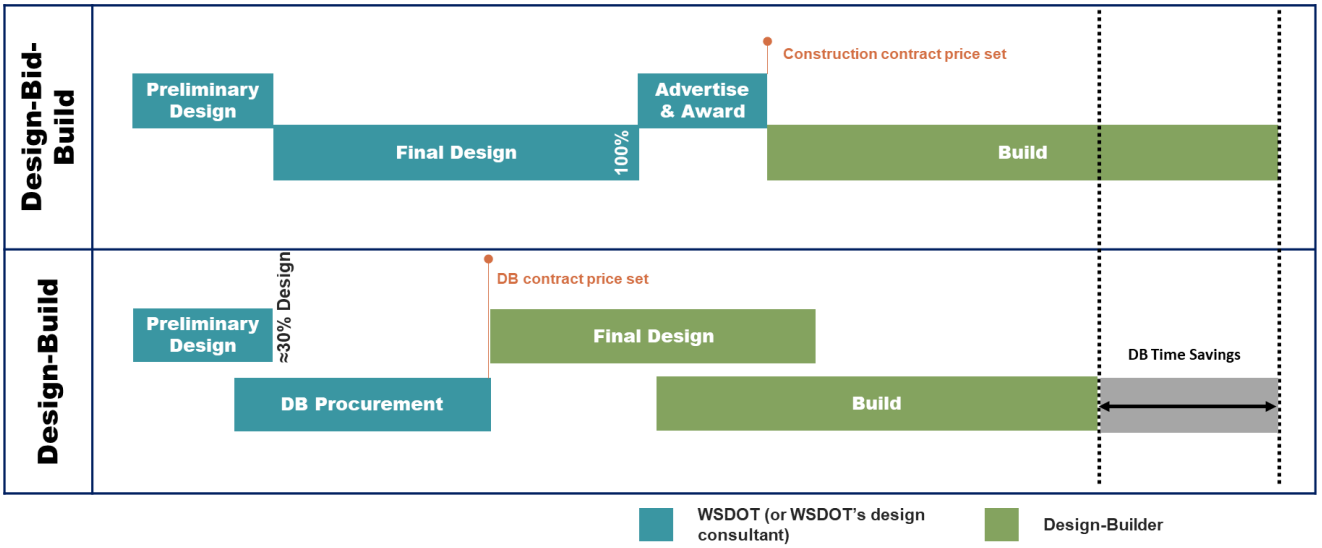
2.8 IMPACT OF PROJECT DELIVERY METHOD SELECTION ON SCHEDULE, COST, AND COMPETITION

Schedule Compression

In comparison to DBB, overall project durations tend to be reduced under alternative project delivery methods that allow for early contractor involvement and the overlapping of detailed design with construction.

For example, Figure 2.9 conceptually depicts how such schedule fast-tracking can occur with fixed price DB.

Figure 2.9: Potential Time Savings using Design-Build (Fixed Price)



National studies from the last 20 years comparing DBB with DB across multiple construction sectors have shown that use of DB can provide time savings. For example, a recent national empirical study comparing DBB with DB have shown that use of DB results in shorter design and construction durations for similar size projects compared to DBB.[2]

GC/CM and PDB also offer the potential to reduce the overall project delivery schedule. For example:

- Neither method requires the owner to fully define the project's scope of work prior to engaging the GC/CM or design-builder. (In PDB it is common to bring on the design-builder at the start of programming or preliminary design; in GC/CM, the CM firm is typically engaged a bit later, at approximately 15 to 30% design.)

- Because the GC/CM and PDB firms are selected primarily on the basis of qualifications and management plans (rather than complete design solutions and fixed prices as is the case with traditional DB), the owner can avoid a lengthy procurement process.

- The early engagement of the GC/CM during the preconstruction phase provides opportunities to complete early construction work packages (e.g., clearing, demolition, site work, etc.) and procurement of long-lead items, before design of the entire project is complete.

Some transportation owners, however, have indicated anecdotally that the higher level of stakeholder collaboration and the iterative, consensus-driven design process often associated with both GC/CM and PDB delivery can act to prolong the design phase, and failure to reach agreement on construction costs can further delay the project.

[2] Alternative Contracting Method Performance in U.S. Highway Construction, FHWA Publication No. FHWA-HRT-17-100, research performed by the University of Colorado, Boulder, the University of Kansas, and Hill International, Inc., April 2018. https://des.wa.gov/sites/default/files/2024-05/WDSOT-PDMRTF-TechBrief-FHWA-AltContMethodPerformance-04-2018.pdf

Cost Performance

A national study[3] comparing "award growth" (calculated as the difference between the contract award price and the Engineer's Estimate) for DBB, fixed-price DB and GC/CM projects indicated that award growth is lowest for DBB projects, followed closely by DB, and highest for GC/CM projects. The study did not provide causes for these results, but one hypothesis is that the lower award growth in DBB projects could be a result of having 100% complete designs to estimate/bid and generally greater competition. Similarly, the higher award growth in GC/CM could result from the lack of competitive tension in the negotiated pricing process.

The same study also examined "cost growth" (calculated as the difference between the contract award value and final cost) and found that there was no statistically significant difference in cost growth between DBB, DB, and GC/CM, although the cost growth of the GC/CM projects was the lowest (suggesting that cost certainty is more accurate for GC/CM once a construction price is negotiated). Regarding change orders, all the delivery methods experienced change orders related to unforeseen conditions and other risk events. However, industry is absorbing some of the pricing risk on alternative delivery methods, as reflected in reduced change order cost growth for unforeseen conditions, plan quantities, and design errors and omissions with both fixed-price DB and GC/CM.

Anecdotal feedback received from industry and owners as part of an ongoing national research study[4] supports that progressive PDMs (GC/CM and PDB) typically result in reduced risk pricing, but the owner may ultimately pay more for the work compared to using a fixed-price competitive procurement process.

Competition

For all delivery methods, higher numbers of bidders have been shown to result in more competitive pricing compared to the Engineer's Estimate. Procurement regulations for public sector construction throughout the U.S. generally require at least three bidders to achieve a reasonable level of competition. An agency must typically justify an award when fewer than three bidders submit.

Nationally, the overheated construction market experienced in recent years has allowed industry (designers, contractors, and subcontractors) to be more selective in the projects they pursue and aggressive in bidding high contingencies, particularly for large and/or complex projects with significant risks.

By their very nature, traditional DB and P3 projects, which require proposers to commit to a lump sum price with minimal design, can be viewed by industry as being particularly high risk, especially when material and labor costs are volatile, and the project duration extends multiple years.

Very large and complex fixed-price DB and P3 projects above certain $ thresholds (>$500M) have attracted fewer qualified bidders and are more likely to result in higher award costs relative to the Engineer's Estimate.

[3] Alternative Contracting Method Performance in U.S. Highway Construction, FHWA Publication No. FHWA-HRT-17-100, research performed by the University of Colorado, Boulder, the University of Kansas, and Hill International, Inc., April 2018. https://des.wa.gov/sites/default/files/2024-05/WDSOT-PDMRTF-TechBrief-FHWA-AltContMethodPerformance-04-2018.pdf
[4] NCHRP 23-22, Alternative Project Delivery Methods: Assessing and Allocating Risk to Increase Competition

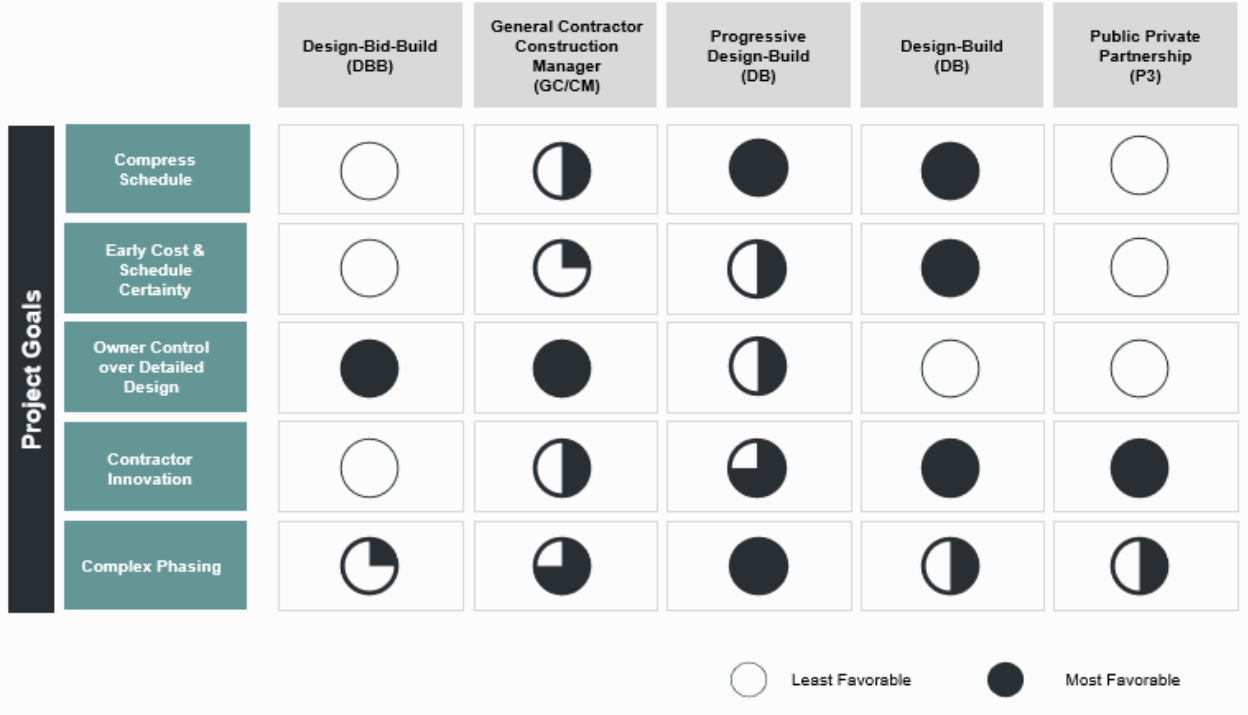
GC/CM and PDB have been shown to generate significant interest from industry. However, the lack of competitive tension in negotiations with the selected GC/CM or PDB team to reach a construction phase price may result in higher costs if management and cost controls are not in place during preconstruction.[5]

2.9 SUMMARY

No single delivery method is appropriate for *all* projects and situations. As discussed in the sections above, all project delivery methods hold unique advantages and disadvantages that should be carefully weighed when considering how to best deliver a particular project.

When considering which method to use to deliver a particular project, a good starting point entails prioritizing project goals (e.g., accelerated schedule, early cost certainty, innovation, etc.), as some methods are more likely to advance certain goals than others. Figure 2.10 provides a high-level summary of common project goals along with the perceived applicability of different methods in the context of these goals.

Figure 2.10: Aligning Project Delivery Method Selection with Project Goals



[5] NCHRP 23-22, Alternative Project Delivery Methods: Assessing and Allocating Risk to Increase Competition