



Benefits of Using a Collaborative Construction Delivery Approach

# Introduction

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Overview of Delivery Methods

Legislative Changes

Criteria for selecting a delivery method

Project delivery methods

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Productivity in construction

Conclusion / Q&A

## Delivery Methods Overview

- Design-Bid-Build
- Best Value Bid
- Construction Manager as Agent (CMA)
- Construction Manager at Risk (CMR)
- Design-Build
- Integrated Project Delivery (IPD)

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According to a 2017 McKinsey study about capital projects and infrastructure, **only 2% of construction projects are delivered on-time, on-budget, and to the satisfaction of all stakeholders.** This lack of positive results is why we need to increase value and reduce waste and ensure that construction-sector productivity improves. The way owners procure construction services plays a major part in this important industry development.

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# Project delivery is increasingly collaborative

- Project delivery has become increasingly collaborative, leading to the need for new ways of working together.
- Design and construction firms are pursuing alternative teaming arrangements approaches that may warrant co-location...and teams are looking for ways to communicate more efficiently.
- As the industry gravitates towards more collaboration, the contracts that bind project teams together are evolving.
- The technology that supports teams is evolving rapidly too.

# Delivery Method Options for Public Entities

## “Best Value”

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In 2007, a law was passed in MN that allows public entities to procure construction services using "Best Value Contracting." The criteria for this is:

### MN STATUTE **16C.28 CONTRACTS; AWARD.**

The state recognizes the importance of the inclusion of a best value contracting system for construction as an alternative to the current low-bid system of procurement. In order to accomplish that goal, state and local governmental entities shall be able to use best value.



## “Best Value” (continued)

**Best value; definition.** "best value" describes the result determined by a procurement method that considers price and other criteria, which may include, but are not limited to:

- (1) the quality of the vendor's or contractor's performance on previous projects;
- (2) the timeliness of the vendor's or contractor's performance on previous projects;
- (3) the level of customer satisfaction with the vendor's or contractor's performance on previous projects;





## “Best Value” (continued)

- (4) the vendor's or contractor's record of performing previous projects on budget and ability to minimize cost overruns;
- (5) the vendor's or contractor's ability to minimize change orders;
- (6) the vendor's or contractor's ability to prepare appropriate project plans;
- (7) the vendor's or contractor's technical capabilities;
- (8) the individual qualifications of the contractor's key personnel; or
- (9) the vendor's or contractor's ability to assess and minimize risks.



## “Best Value”

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**§Subd. 1c.Procedures.** ....the entity shall establish procedures for developing and awarding best value requests for proposals for construction projects. **The criteria to be used to evaluate the proposals must be included in the solicitation document and must be evaluated in an open and competitive manner.**

**§Subd. 1d.Training.** Any personnel administering procurement procedures for best value must be trained in the request for proposals process for best value contracting or construction projects.

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# Setting up your project for success

- Before launching a construction project, begin by exploring delivery methods and selecting the one that best meets the unique needs of your project.
- No one model is perfect—all have benefits and drawbacks. Nonetheless, there is likely an optimal delivery method for your organization and project.
- By choosing the right method for your project, you can reduce overall risk and better manage budget and schedule.
- Before selecting a delivery method, compare the five criteria that are most important to ensuring your project's success.

# Before selecting a project delivery method...

Compare the criteria that are most important to your project's success:

- 1. Budget**
- 2. Design**
- 3. Risks**
- 4. Schedule**
- 5. Owner Expertise**

# 1. Budget

- Set your realistic budget early on.
- Consider how much contingency is appropriate

## 2. Design

- Visualize the general design and functionality of your building.
- Prioritize between form and function, flexibility, and innovation.
- Determine constructability.

## 3. Risks

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- Conduct a thorough risk evaluation.
  - Budget
  - Phasing
  - Occupant Disruption
  - Public Safety
  - Historic Considerations
- If your in-house team will be heavily involved in administering the project, consider your responsibility for keeping the project on track.



## 4. Schedule

- Schedule and budget are closely tied to one another (phasing, overtime)
- Determine the timing necessary to meet the schedule and budget.

## 5. Owner Expertise

- Consider your organization's level of familiarity with construction, especially a project of similar scope and size.
- Determine how many of your staff are available and how much time they have to help oversee the process.
- Understand your staff's expertise, since it will help indicate what type of delivery method is needed.
- Be aware that some construction delays are caused by bottlenecks at the owner level.

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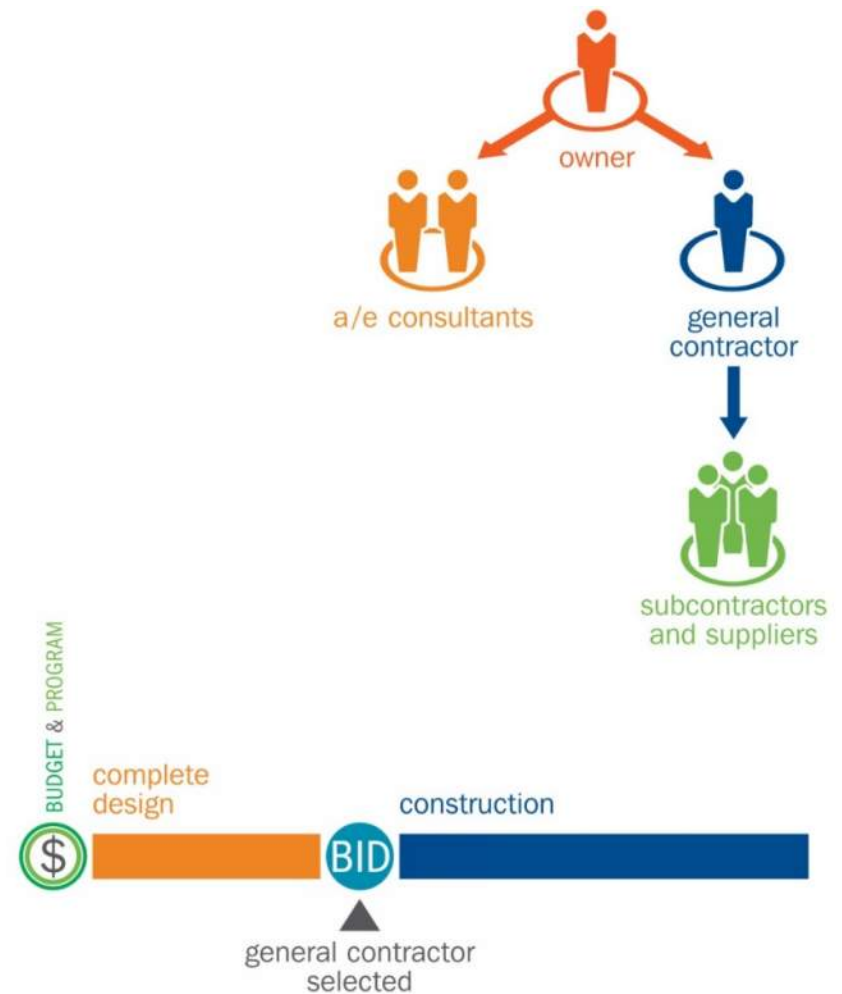
# Design-Bid-Build

## Competitive Bid

The design team and the general contractor are selected separately, and each reports directly to the owner.

Plans and specifications are completed by the architect and then bids documents are issued.

Contractors bid the project exactly as it is designed with the lowest responsive bidder awarded the work.



# Design-Bid-Build

## IDEAL FOR:

- Simple projects that are easy to document and construct.
- Owners / Designers that have the experience and ability to enforce the construction documents and qualify/negotiate change orders.

## PROS

- A familiar and straightforward delivery method.
- Completely Objective - Lowest initial price is proposed and accepted on bid day.

## CONS

- Longest schedule duration; no overlap of design and construction.
- Price is not established until bids are received. The project may require redesign and rebid if the bids exceed the budget.
- Quality of contractors and subcontractors is not assured.
- No cost transparency for the Owner. All savings are retained by the GC.
- This delivery fosters adversarial relationships amongst all parties.
- Most prone to change orders.
- No design phase input from the contractor on issues of budget, schedule, and constructability.

# CMA

## Agency Construction Management

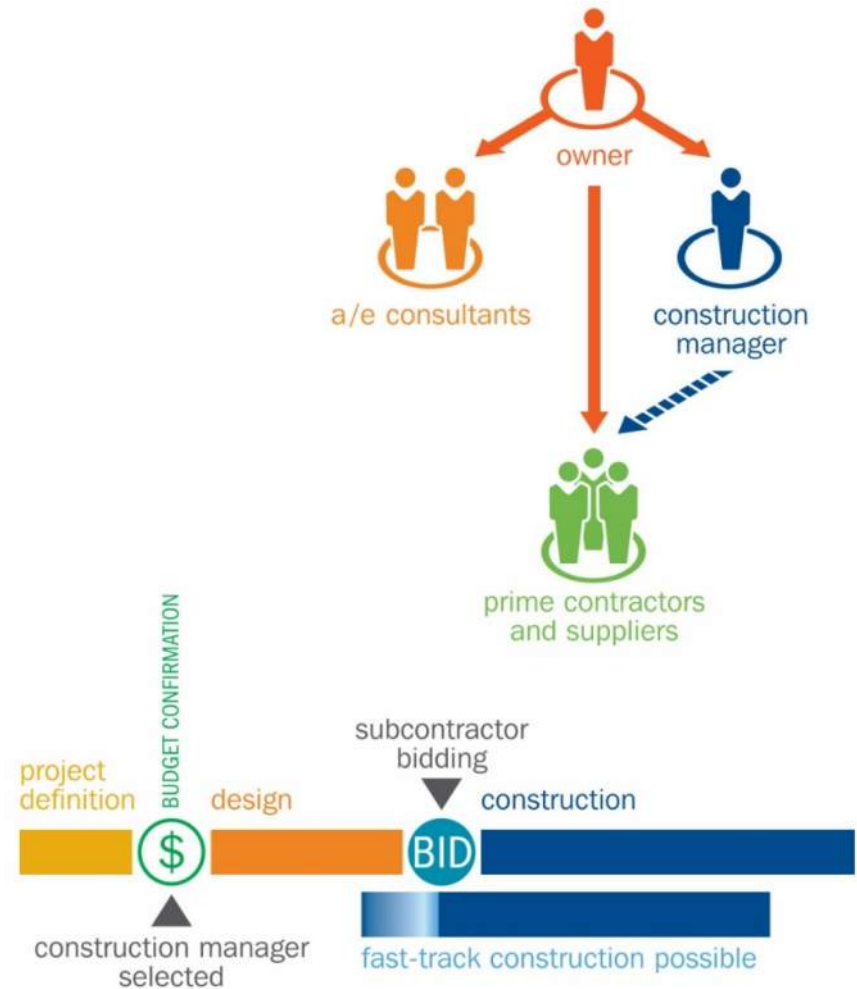
The owner selects a fee-based contractor to function in an advisory capacity as the owner's agent.

The CM is responsible exclusively to the owner and acts in the owner's interests at every stage of the project.

The CM and design team collaborate to develop a design that provides the owner with the best value.

Construction is typically provided by prime contractors other than the agent CM.

No guaranteed maximum price (GMP) is provided by the CM, as the owner carries the risk for cost, quality, and schedule.



# CMA

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## IDEAL FOR:

- Public agency owners that prefer to select both the architect and agency CM, based on qualifications and experience.
- Owners that do not desire an early guarantee of cost, and are capable of managing the contracts, performance, and schedule of all subcontractors.

## PROS

- Contractor provides cost, schedule, and constructability assistance/opinions during all design phases.
- All pricing is fully transparent to the owner and savings are returned to the owner.
- Faster schedule than design-bid-build.

## CONS

- The owner carries the risk for cost and schedule overruns, as no GMP has been established.
- The owner holds all subcontractor contracts, and is responsible for their performance and quality.

# CMR

## Construction Management at Risk

The owner selects a fee-based contractor based upon qualifications and experience, early in the design phase.

Though selected separately, the CMR and design team collaborate as the owner's agents to develop a design that provides the owner with the best value.

An early guaranteed maximum price (GMP) is provided by the CM, who then hard bids the scopes of work to trade subcontractors.





# CMR

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## IDEAL FOR:

- Owners that prefer to select a CM, based on qualifications and experience.
- Larger and more complex projects.
- Owners that desire a delivery method that is faster than design-bid-build.
- Owners that desire a fully transparent process.
- Owners that desire an early guarantee of cost and subsequent cost savings.

## PROS

- CM provides cost, schedule, and constructability assistance during all design phases.
- Owner has the ability to select CM that is most qualified for the project.
- All pricing is fully transparent to the owner and savings realized during the bidding process are returned to the owner.
- Faster schedule than design-bid-build, as fast-track construction is possible.
- CM carries the risk for cost, quality, and schedule.

- All subcontractor contracts are held by the CM, and the CM is responsible for their performance.

## CONS

- Prequalification of subcontractors may limit competition during bidding
- Early GMP may require contingencies to cover unknown/unforeseen issues.

# Minnesota State Capitol

\$292.6M // 302K SF



# Minnesota State Capitol

- Comprehensive restoration of National Historic Landmark.
- Large, complex project.
- Highly-visible project in public eye.
- Occupied renovation.
- Includes national, specialty trades.
- Diversity requirements.
- Required construction start prior to completion of CDs.
- Program exceeded initial budget (helped prioritize dollars spent).
- Integrating modern systems into a historic building.
- Unique detailing.



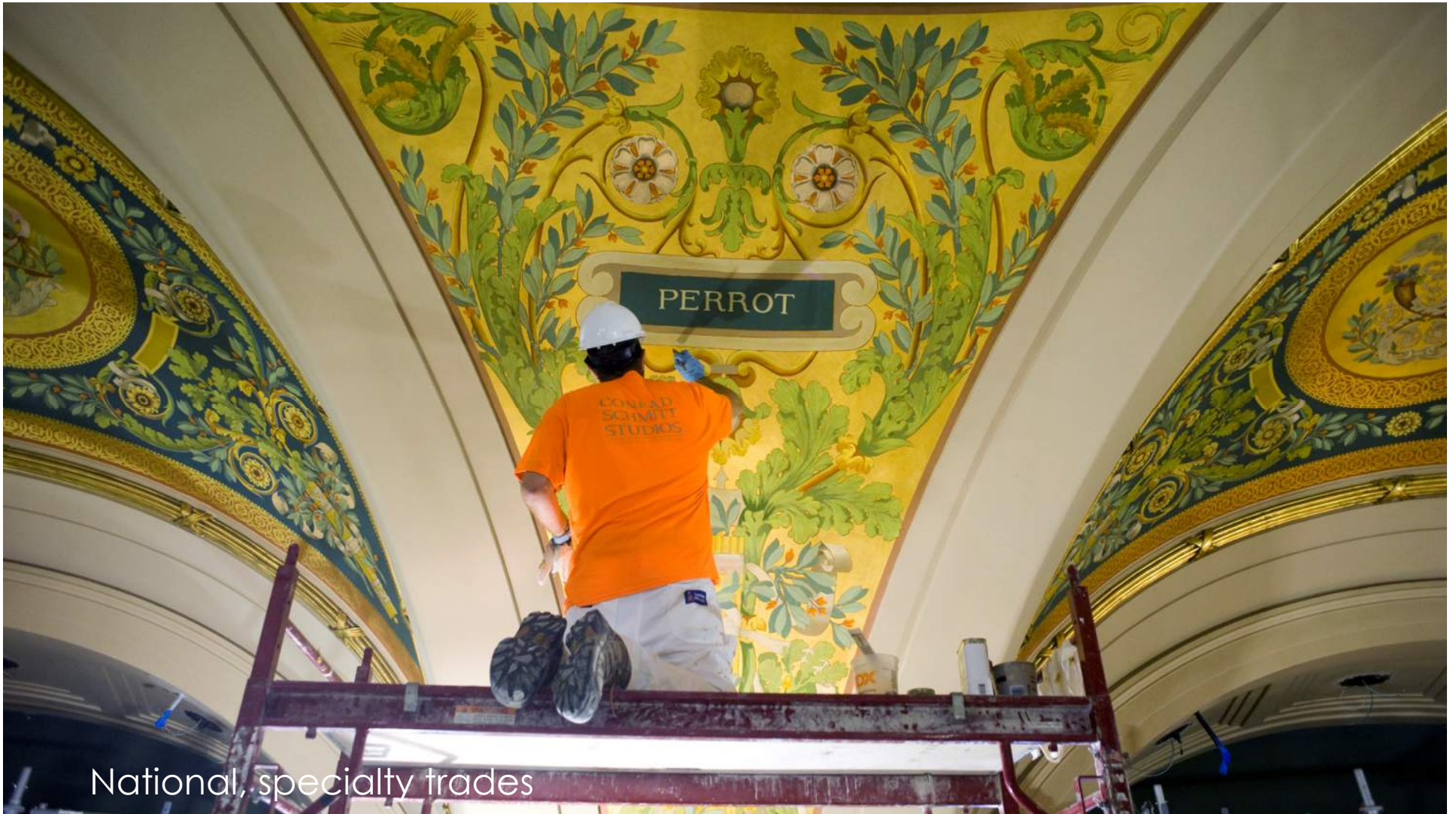
Highly-visible project



Occupied renovation



Unique detailing



National, specialty trades



Integrating modern systems



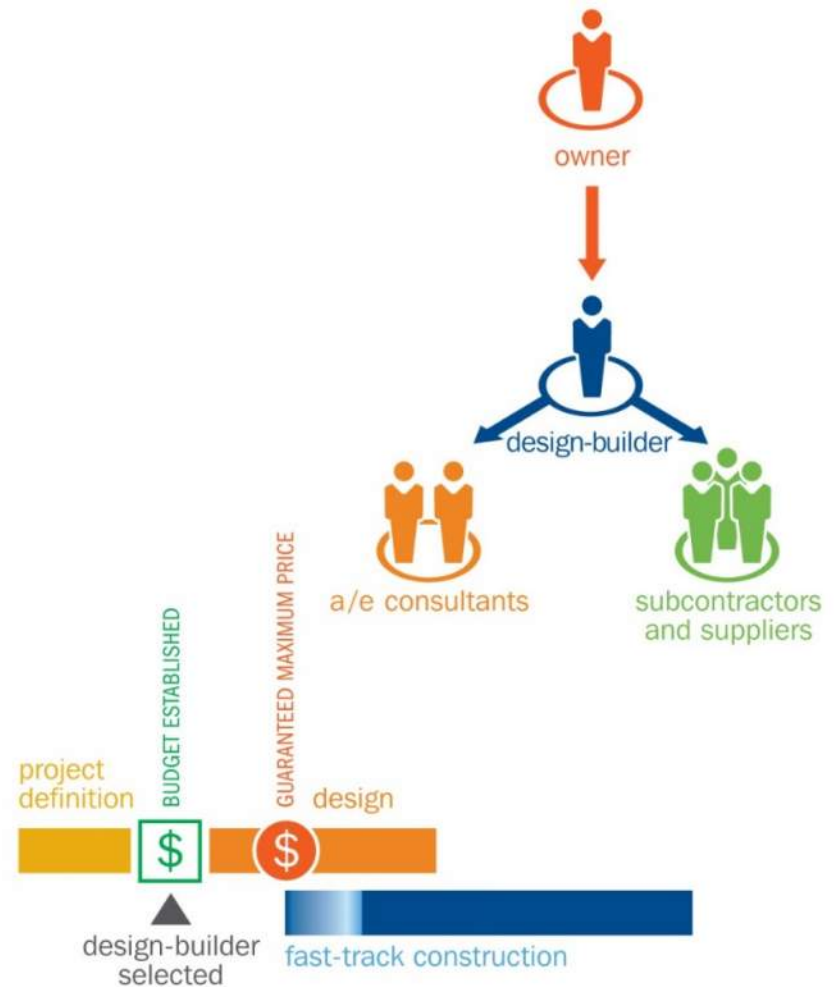
# D-B

## Design-Build

The contractor and architect team together as one entity, hired by the owner to deliver a complete project.

A guaranteed maximum price (GMP) is provided by the D-B team early in the project based on preliminary design.

The D-B team then develops drawings that fulfill the criteria and complete the design while staying below the furnished GMP.



# D-B

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## IDEAL FOR:

- Projects where an owner desires a single point of contact and contract.
- Fast track projects

## PROS

- Single point of contact responsible for design and construction.
- Selection based on qualifications, experience, and team.
- Contractor provides design phase assistance in budgeting and planning.
- Speed: fast-track construction is possible.
- GMP is possible earlier in process.

## CONS

- Difficult for owner to determine whether the lowest price has been achieved for the work.
- If fast-tracked, changes may be difficult and expensive to make.
- Quick decisions are necessary with reduced time for reviews and input.
- Considered a “sophisticated” delivery method, owner must have a clear understanding of scope and concept before selection.

# Minnesota Senate Office Building

\$76M // 293K SF

- New construction.
- Quick turnaround: designed/built within two years.



Courtesy of Minnesota Department of Administration

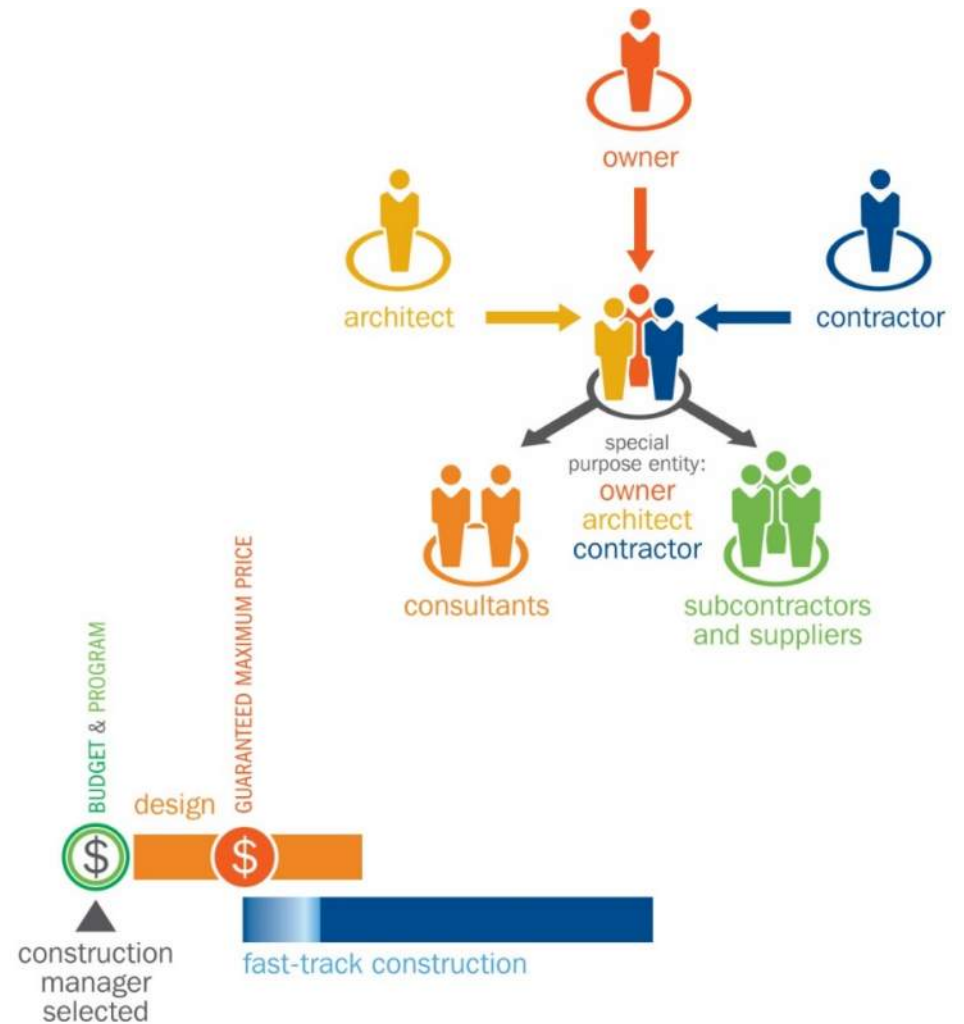
# IPD

## Integrated Project Delivery

Generally speaking, this means that the owner, the design team, and the construction team are bound by a single contract with shared risks and rewards.

All entities are incented to perform collaboratively to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of the project.

Technology and collaboration is highly leveraged in this method.



# IPD

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## IDEAL FOR:

- Owners who desire a collaborative process, and are willing to accept a commensurate share of the project risk.
- Experienced owners with personnel and resources to dedicate to this process for the duration of the project.

## PROS

- Mutual respect and trust.
- Shared risks and rewards.
- Collaborative innovation and decision-making.
- Early involvement of all key participants.
- Open and enhanced communication, use of technology.

## CONS

- Still a relatively new method, may have learning curve.
- Contract forms for IPD exist but have not been tested over time.
- Insurance industry does not yet have standard coverages in place for IPD agreements.

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# Minnesota Children's Museum

\$14.9M // 67K SF



# Minnesota Children's Museum

- Renovation/expansion.
- Occupied building (public safety, i.e., children).
- Extremely tight “moving target” budget (based on fundraising).
- Multiple funding sources.
- Diversity requirements.
- Integration of owner exhibits within building.
- Inexperienced owner.





Occupied renovation



Public safety, i.e., children



Integrating owner exhibits

# Minnesota Veteran's Home

\$53.4M // 141K SF



# Minnesota Veteran's Home

- New construction.
- Occupied campus (logistics).
- Tied into existing campus systems.
- Tight budget.
- Maximize program.





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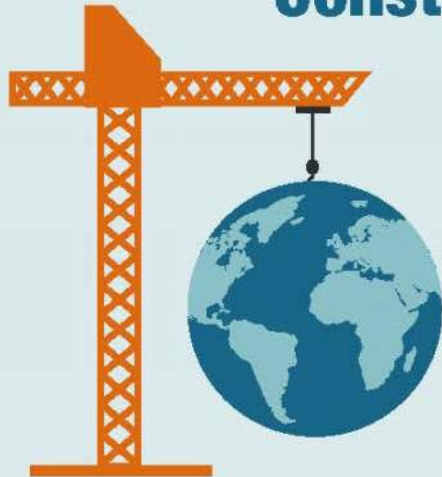
Conclusion / Q&A



# The **productivity opportunity** in construction



## Construction matters for the world economy ... but has a long record of poor productivity



Construction-related spending  
accounts for

**13%** of the world's GDP

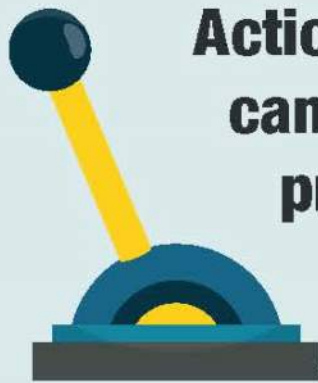
...but the sector's annual productivity  
growth has only increased

**1%** over the past 20 years

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**\$1.6 trillion** of additional value added could be  
created through higher productivity,  
meeting half the world's infrastructure need

# The **productivity opportunity** in construction

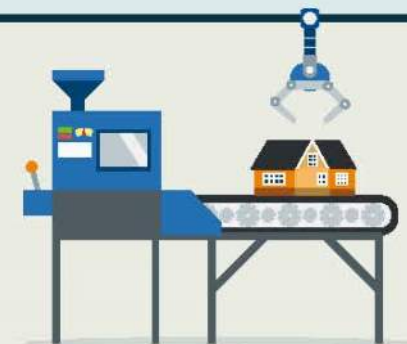


Action in seven areas  
can boost sector  
productivity by  
**50–60%**

- Reshape regulation
- Rewire contracts
- Rethink design
- Improve procurement and supply chain
- Improve onsite execution
- Infuse technology and innovation
- Reskill workers

## **5–10X** productivity boost

possible for some parts of the industry by moving to a manufacturing-style production system



From McKinsey Global Institute's *Reinventing Construction: A Route to Higher Productivity* (2017)

# Productivity in construction

- 82% of owners feel they need more collaboration with their contractors.
- Nearly 60% of construction companies are not investigating new technologies.
- The average cost of rework is 9% of total project cost (i.e., both direct and indirect factors combined).

# How to boost productivity?

1. Rewire the contractual framework to reshape industry dynamics.
2. Rethink design and engineering processes.
3. Improve procurement and supply-chain management.
4. Infuse digital technology, new materials, and advanced automation.
5. Reskill the workforce.

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# Conclusion

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- Since the early 1800s, public entities have been using the simplistic low-bid process of project delivery. This method instills natural friction in the team and negates the benefits of project collaboration.
- Construction sectors productivity growth has only increased 1% over the past 20 years.
- Collaborative project delivery methods, such as CM@R, foster a team approach while keeping cost and accountability in check...increasing productivity.



# Conclusion

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- Key benefits of collaborative project delivery include:
  - Integration of construction manager's expertise early in the design phase.
  - Owner has the ability to select the CM that is most qualified for the project.
  - All pricing is fully transparent to the owner, and savings realized during the bidding process are returned to the owner.
  - Allows for fast-track construction projects.
  - CM carries the risk for cost, quality, and schedule.
  - Accountability for budget and schedule still reside with the CM.



## Conclusion (continued)

**By choosing the right delivery method for your project, risk can be reduced, productivity increased, and budget and schedule can be optimally managed.**



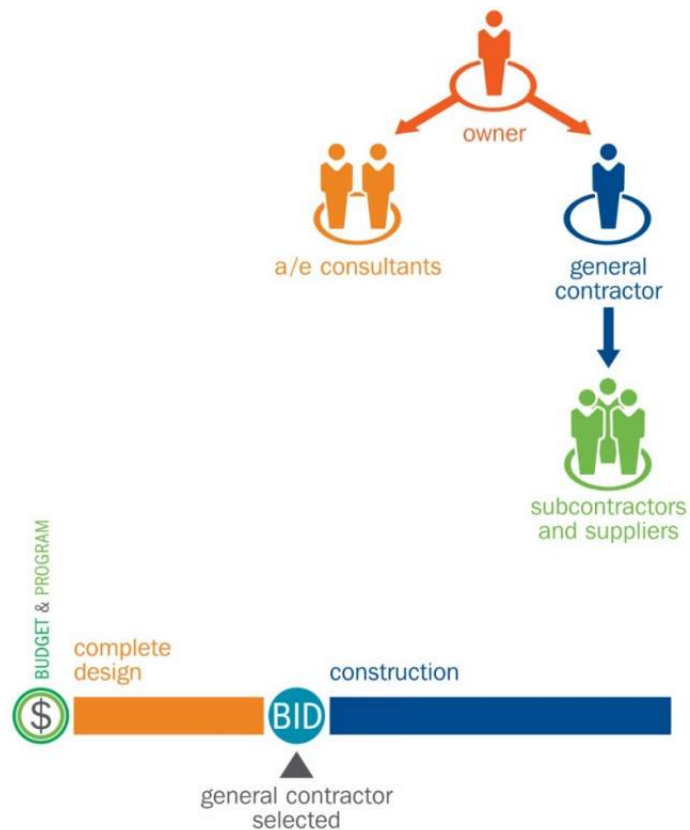
Construction services are dynamic and should not be treated as a commodity!

Jeff Callinan

952.833.5961

[jeff.callinan@jedunn.com](mailto:jeff.callinan@jedunn.com)

## Competitive Bid // Design-Bid-Build



Often referred to as design-bid-build, this method is a linear process where one task follows the completion of another with no overlap. The design team and the general contractor are selected separately, and each reports directly to the owner. Plans and specifications are completed by the architect and then bids documents are issued. Contractors bid the project exactly as it is designed with the lowest responsive bidder awarded the work.

### IDEAL FOR

- Simple projects that are easy to document and construct
- Projects where completion schedule is not the most pressing priority
- Owners that have the experience and ability to enforce the construction documents and qualify/negotiate change orders

### PROS

- A familiar and straightforward delivery method
- The owner has significant engagement with the architect, as well as decision making on design options
- Lowest initial price is proposed and accepted on bid day

### CONS

- Longest schedule duration. No overlap of design and construction
- Price is not established until bids are received. The project may require redesign and rebid if the bids exceed the budget
- Quality of contractors and subcontractors is not assured
- No cost transparency for the Owner. All savings are retained by the GC.
- This delivery fosters adversarial relationships amongst all parties
- Most prone to change orders
- No design-phase input from the contractor on issues of budget, schedule and constructability

# Construction Management at Risk // CM@R



- CON:
- Owners that desire a fully transparent process.
  - Owners that desire an early guarantee of cost and subsequent cost savings.

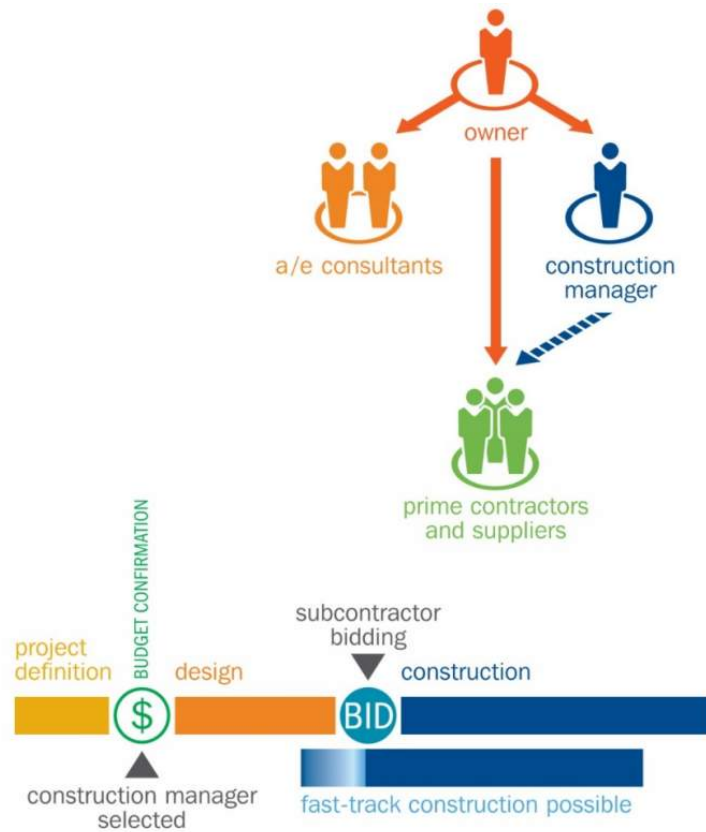
## PROS

- CM provides cost, schedule, and constructability assistance during all design phases.
- Owner has the ability to select CM that is most qualified for the project.
- All pricing is fully transparent to the owner and savings realized during the bidding process are returned to the owner.
- Faster schedule than design-bid-build, as fast-track construction is possible.
- CM carries the risk for cost, quality, and schedule.
- All subcontractor contracts are held by the CM, and the CM is responsible for their performance.

## CONS

- Prequalification of subcontractors may limit competition during bidding
- Early GMP may require contingencies to cover unknown/unforeseen issues

# Agency Construction Management // CM



In Agency Construction Management (CMA), the owner selects a fee-based contractor to function in an advisory capacity as the owner's agent. The CM is responsible exclusively to the owner and acts in the owner's interests at every stage of the project. The CM and design team collaborate to develop a design that provides the owner with the best value. Construction is typically provided by prime contractors other than the agent CM. No guaranteed maximum price (GMP) is provided by the CM, as the owner carries the risk for cost, quality, and schedule.

## IDEAL FOR

- Public agency owners that prefer to select both the architect and agency CM, based on qualifications and experience.
- Owners that desire a delivery method that is faster than design-bid-build.
- Owners that desire a fully transparent process.
- Owners that do not desire an early guarantee of cost, and are capable of managing the contracts, performance, and schedule of all subcontractors.

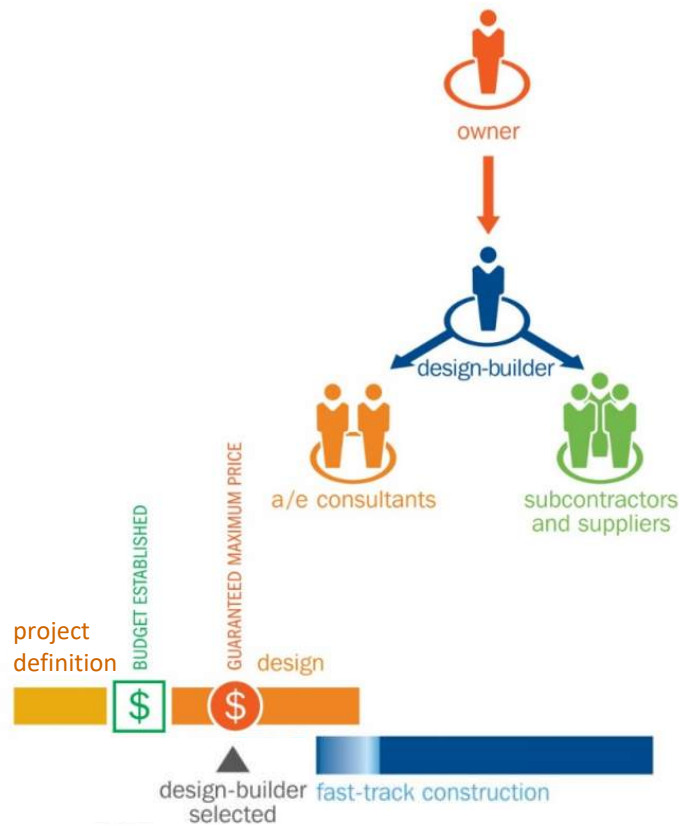
## PROS

- Contractor provides cost, schedule, and constructability assistance/opinions during all design phases.
- All pricing is fully transparent to the owner and savings are returned to the owner.
- Faster schedule than design-bid-build.

## CONS

- The owner carries the risk for cost and schedule overruns, as no GMP has been established.
- The owner holds all subcontractor contracts, and is responsible for their performance and quality.

## Design-Build // D-B



In Design-Build (D-B), the contractor and architect team together as one entity, hired by the owner to deliver a complete project. A guaranteed maximum price (GMP) is provided by the D-B team early in the project based on preliminary design. The D-B team then develops drawings that fulfill the criteria and complete the design while staying below the furnished GMP. The contractor solicits proposals, receives and awards contracts.

### IDEAL FOR

- Projects where an owner desires a single point of contact and contract.

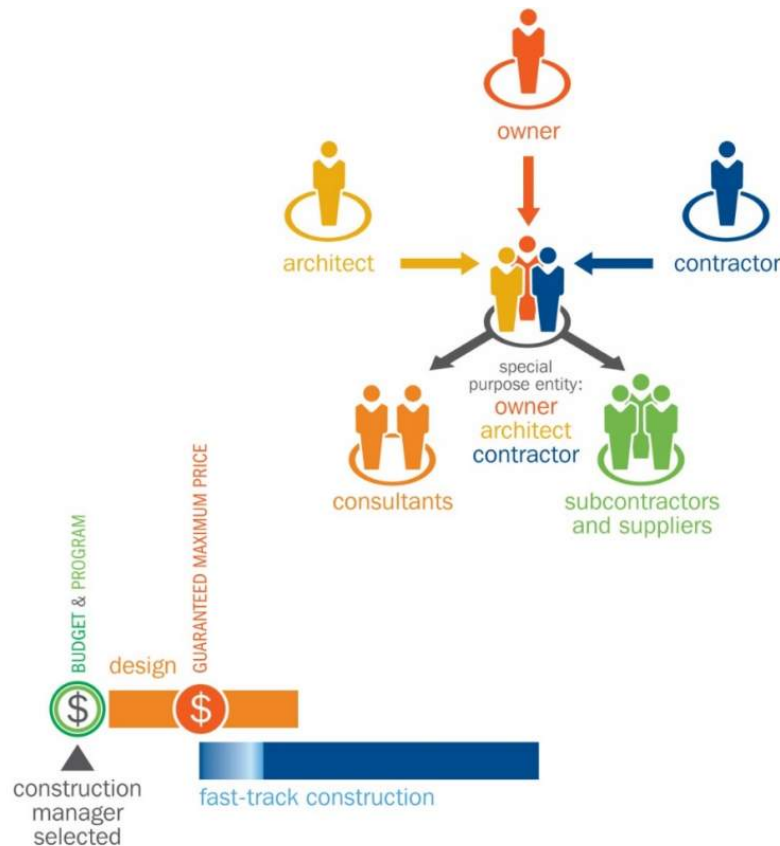
### PROS

- Single point of contact responsible for design and construction.
- Selection based on qualifications, experience, and team.
- Contractor provides design phase assistance in budgeting and planning.
- Speed: fast-track construction is possible.
- GMP is possible earlier in process.

### CONS

- Difficult for owner to determine whether the lowest price has been achieved for the work.
- If fast-tracked, changes may be difficult and expensive to make.
- Quick decisions are necessary with reduced time for reviews and input.
- Considered a "sophisticated" delivery method, owner must have a clear understanding of scope and concept before selection.

# Integrated Project Delivery // IPD



Integrated Project Delivery (IPD) is a method in which the interests of the primary project stakeholders are aligned so that the members are integrated for optimal project performance. Generally speaking, this means that the owner, the design team, and the construction team are bound by a single contract with shared risks and rewards. People, systems, business structures, and practices perform collaboratively to optimize project results, increase value to the owner, reduce waste, and maximize efficiency through all phases of design, fabrication, and construction. Technology and collaboration is highly leveraged in this method.

## IDEAL FOR

- Owners who desire a collaborative process, and are willing to accept a commensurate share of the project risk.
- Experienced owners with personnel and resources to dedicate to this process for the duration of the project.

## PROS

- Mutual respect and trust.
- Shared risks and rewards.
- Collaborative innovation and decision-making.
- Early involvement of all key participants.
- Open and enhanced communication, use of technology.

## CONS

- Still a relatively new method, may have learning curve.
- Contract forms for IPD exist but have not been tested over time.
- Insurance industry does not yet have standard coverages in place for IPD agreements.

# Productivity in construction

- 40% of construction companies are still using paper plans on the job.
- Nearly 60% of construction companies are not investigating new technologies.
- 35% of a construction professionals' time is spent on non-productive activities (i.e., looking for information, dealing with mistakes, conflict resolution).
- 26% of construction workers are frustrated by the lack of tools they need to do their jobs better.
- Young construction workers declined by 30% from 2005-2016, with 200,000 unfilled positions in 2016 alone.
- 35% of all construction projects will have a major change.
- The average cost of rework is 9% of total project cost (i.e., direct and indirect factors).
- 82% of owners feel they need more collaboration with their contractors.



## Workforce and safety

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- Young construction workers declined by 30% from 2005-2016.
- The construction workforce had 200,000 unfilled positions in 2016 alone.
- Construction accounts for only 4% of workers, but 21% of workplace-related deaths in the U.S.

# Construction workforce

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- Young construction workers declined by 30% from 2005-2016.
- The construction workforce had 200,000 unfilled positions in 2016 alone.

# Job safety

- Construction accounts for only 4% of workers, but 21% of workplace-related deaths in the U.S.