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This document is an introductory guide for owners who face the choice of delivery methods for their projects, and for the construction and program managers whose role it is to advise owners and to manage the design and construction process utilizing the most appropriate method.

While not intended to be an exhaustive analysis of each delivery method, this guide provides a comparison among the various available methods, an outline of the pros and cons of each, and an overview of the role of a program manager or agency construction manager in each delivery method.

There are many delivery methods in use today, but virtually all of them are variations of the four most common methods that are the subject of this document. Closely related to project delivery methods are procurement strategies, contractual arrangements, and compensation methods. While not the focus of this document, there is a brief discussion that touches on how these contract strategies align with the various delivery methods.

Project delivery methods will continue to evolve. This guide is thus a reflection of today's construction market, and will be periodically updated to reflect future developments. The characteristics of each delivery method are objectively presented in keeping with CMAA's policy of remaining delivery method neutral.

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How the project will be designed and constructed, or the project delivery method, is one of the most important decisions made by every owner embarking on a construction project. With a variety of delivery methods in use today across the design and construction industry, it is possible to tailor a delivery method that best meets the unique needs of each owner and each project.

Several fundamental project considerations are directly impacted by the delivery method selected. These considerations include the need to adhere to a realistic budget, a schedule that accurately presents the performance period, a responsive and efficient design process that leads to a quality set of documents, a thorough risk assessment followed by the proper allocation of risk by the owner, and a recognition of the level of expertise within the owner's organization or available to it.

There is a wealth of information in the public domain regarding alternative delivery methods. Most treatments divide the various options into three basic categories: Design-Bid-Build, Construction Management At Risk, and Design-Build. Recent discussions, including the discussion in this guide, add a fourth method, Integrated Project Delivery. Other delivery methods are variations of these four, and are treated as such for our purposes.

The project delivery methods examined are:

***Design-Bid-Build (DBB)*** – The traditional U.S. project delivery method, which customarily involves three sequential project phases: design, bid (DBB) 6(n)TJ0 Tc 0 Td(v)3(a)4(-0.022w5 0 Td,)15( )TJ8(o)2(ns)2(t)-

method that offers the best opportunity for success.

Construction Management is a discipline uniquely tailored to the planning, design, and construction process of capital projects. *Agency Construction Management* is a management process whereby the owner utilizes a construction manager (CM) as its principal agent to advise on or manage the process over the life of the project, or during specific phases of the project. The use of agency construction management, whether through an in-house resource to the owner or from a third-party firm, has proven effective regardless of the chosen contract form or project delivery method. The role of the CM on each project delivery method is discussed in this document.

Whether provided through owner staffing or a third-party firm, the CM should be engaged as early in the project as possible to guide and assist the owner through all phases of delivering the project. In fact, the CM can be an invaluable source of advice and counsel to the owner when choosing the optimum delivery method for a project. The CM may also act as the owner's representative to the rest of the project team, being the point of contact for the designer, contractor, and other specialty consultants engaged in the project by the owner.

Contracting and compensation methods for professional services and construction services will generally fall into one of three categories: Lump Sum/Fixed Price (LS), Guaranteed Maximum Price (GMP), or Reimbursable. These methods are not specific to any particular delivery





Every owner responsible for the implementation of a construction project must make an early and important decision regarding the method by which the project will be designed and constructed—the project delivery method. This decision has become more difficult in recent years as several alternative delivery methods have been developed to address potential weaknesses in the traditional design-bid-build scenario. Methods that have gained in popularity include construction management at-risk, multiple prime contracting, design-build, and the latest, Integrated Project Delivery. Proponents of particular alternative methods advocate or promise improvements over the traditional system in terms of project schedule and cost control, and the number of disputes.

For the owner, with a wealth of choices available, the ultimate decision can be both good and bad. The downside is that with the variety of delivery systems, along with the accompanying assurances of the superiority of one method over another, confusion is inevitable. The good news is the increased number of alternatives offers the owner or developer more flexibility to choose an appropriate and effective system for its particular project.

*Construction Management* is a discipline uniquely tailored to the planning, design and construction process of capital projects. It has proven effective regardless of the chosen contract form or project delivery method. Indeed, owners have utilized construction management successfully in all contracting methods and delivery systems, using either internal staffing or third-party firms. It is particularly helpful for owners who do not continuously maintain a CM staff in numbers or qualifications necessary to deal with the complex responsibilities involved in the management of major projects.

A companion CMAA document, *An Owner's Guide to Construction and Program Management* defines CM and PM as follows:

 is a professional management practice applied to construction projects from project inception to completion for the purpose of controlling time, cost, scope and quality.

 is the practice of professional Construction Management applied to a capital improvement program of one or more projects from inception to completion. Comprehensive Construction Management services are used to integrate the different facets of the construction process—planning, design, procurement, construction and commissioning—for the purpose of providing standardized technical and management expertise on each project.

Construction management comes in two general, but very different forms, agency construction management (CMA) and construction management-at-risk (CMAR or CM@R). Outside of this







## 2.1 Owner's Requirements and Risk Considerations

An owner has several areas of concern when embarking on a construction program or project. It is necessary to choose an overall project delivery and contracting strategy that effectively and efficiently delivers the project. The following are some of the key considerations that will influence the selection of the project delivery method for a project:

### Budget

Determining a realistic budget before design to evaluate project feasibility, to secure financing, to evaluate risk, and as a tool to choose from among alternative designs or site locations is a primary need. Once the budget is determined, the owner requires that the project be completed at or near the established budget figure. Owners must decide how quickly they need to establish final project costs and with what risk level of exceeding this cost.

### Design

Of foremost importance to the owner is that the desired facility function as envisioned while successfully fulfilling the needs of the owner and users. Therefore, the design team should be well qualified in the type of facility being designed. In addition, the owner must ensure that the program needs are clearly conveyed to the design team. Since the design of the facility must be buildable and design intent must be properly communicated, the owner requires that the design documents are constructible, complete, clear and coordinated. The documents should



equivalent of a general contractor during the construction phase.

***Design-Build (DB)*** – A project delivery method which combines architectural and engineering



1. Fixed Price or Lump Sum (LS)
2. Guaranteed Maximum Price (GMP)
3. Reimbursable

These methods are not specific to any particular delivery method, and may be applied to

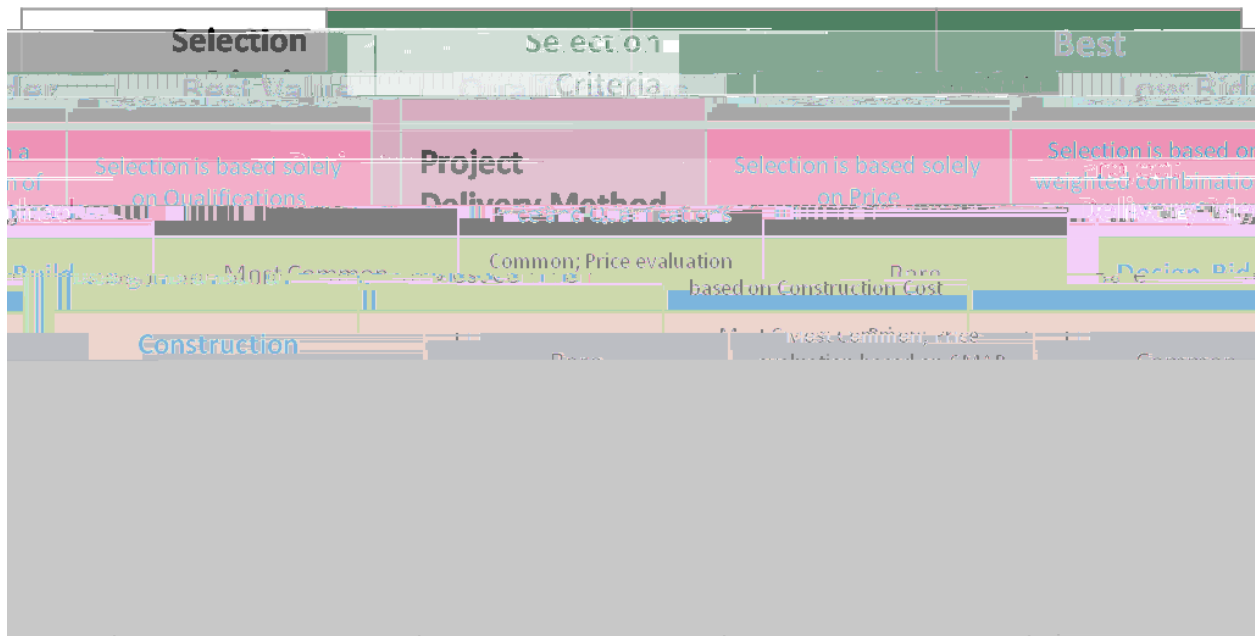
## 2.5 Procurement Alternatives

Procurement of professional services and construction services will generally be accomplished in one of three ways:

1. Priced based
2. Qualifications based
3. Best value (combination of 1 and 2)

Procurements may also involve a one-step process, in which there is just a single round of submittals that determine the selection, or a two-step process, which may include a qualifications submittal as the first step and then a price proposal as the second step.

For the procurement of construction services, the chart below illustrates the use of the various options.



Services will be procured for a single project or for multiple projects within a single procurement. By far, the most common procurement method is the single project award. In this method, an owner has a specific project and they procure services specifically for, and only for, that project.

The other procurement option is the multiple project award method, of which there are several variations. This method can be utilized to procure both professional services and construction services. With this method, an owner procures the services of one or more firms to perform a series of projects, also sometimes referred to as tasks. Each project is priced separately, but a







more adversarial relationships between all parties when issues develop, as there is no contractual relationship between the contractor and the designer and no opportunity for collaboration during the design phase.

Advantages:

This method is widely applicable, well understood, and has well-established and clearly defined roles for the parties involved.

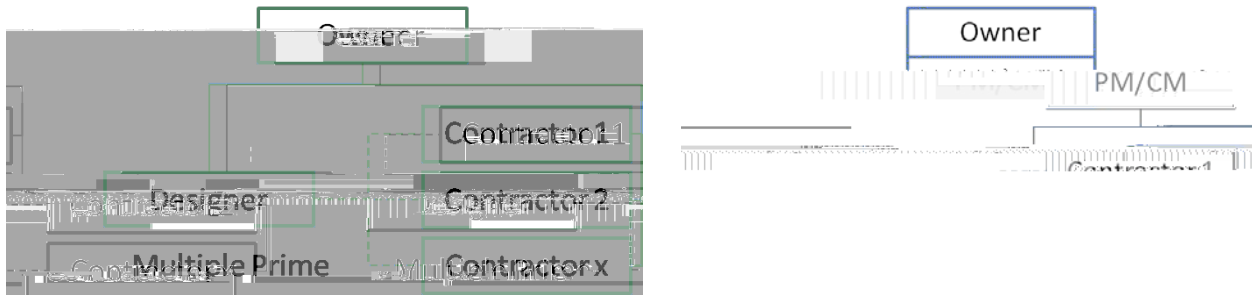
This method is the most common approach for public owners having to comply with local, state or federal procurement statutes.

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owner may reduce liability for delays by postponing the bidding of follow-on work. Another advantage of this system is that the owner has the potential to realize savings by directly procuring major material items, such as structural steel or major mechanical equipment, and avoiding contractor mark-ups.



### Risk Analysis

The very nature of this delivery system causes its primary disadvantages. To work properly, there is a need for increased coordination in the development of the separate bidding and contract packages for each separate prime, leading to the potential that work scope will be omitted or duplicated. Additionally, the final cost of the project is not known until the final prime contract is procured. In addition, there have been numerous cases when this method did not work well due to the absence of overall authority and coordination among the prime contractors once construction was underway. The problems primarily arise from lack of coordination and contractor delay issues. While the general construction prime contractor is often given contractual responsibility to coordinate the work among trades, including schedule, this contractor generally lacks the direct contractual authority to dictate the schedule of another prime contractor.

#### Advantages:

- The ability to “fast-track” early components of construction prior to full completion of design.

#### Disadvantages:

- No central point of contractor coordination and responsibility for all trades. By default, the owner assumes this responsibility.

- Potential for numerous claims between various contractors.

### Role of the CM

The role of the CM in a multiple prime contracting delivery system is very similar to the role of the CM in a design-bid-build delivery. Whether provided through owner staffing or a third-

party, the CM is engaged as early in the project as possible and guides and assists the owner through all phases of delivering a project. The CM also acts as the owner's representative with the rest of the project team, acting as the point of contact for the designer, contractors, and other specialty consultants engaged in the project by the owner.

The primary difference involves the fact that in most instances there is not a single prime general contractor involved to oversee and manage the activities of all of the various trades. Instead, in a multiple prime environment, all trades are contracted directly with the owner. The CM, acting as the owner's representative, may be required to actively coordinate and manage all trade contractors on the project.

This effort involves increased levels of scheduling, since the CM role changes from managing a single schedule from the general contractor to consolidating and managing the schedules of multiple firms. Any schedule slip or design issue will potentially need to be addressed with multiple trades simultaneously, so the level of effort can increase significantly for the CM.

### Description

This delivery system is similar in many ways to the Design-Bid-Build system, in that the Construction Manager at Risk (CMR) acts as a general contractor during construction. That is, the CMR holds the risk of construction performance and guarantees completion of the project for a negotiated price which is usually established when the design is somewhere between 50 percent and 90 percent developed. However, in this scenario, the CMR also provides advisory professional management assistance to the owner prior to construction, offering schedule, budget and constructibility advice during the project planning and design phases. Thus, instead of a traditional general contractor, the owner deals with a hybrid construction manager/general contractor.

In addition to providing the owner with the benefit of pre-construction services which may result in advantageous changes to the project, the Construction Management at Risk scenario offers the opportunity to begin construction prior to completion of the design. The CMR can bid and subcontract portions of the work with an approved design at any time, often while design



As with Design-Bid-Build, private owners may choose to negotiate directly with pre-selected CMRs.

### Role of the CM

The role of the CM in a CMAR delivery system is sometimes considered redundant. However, there is still a vital role for the CM to play, whether the CM is from within the owner





The primary caution for an owner considering DB is that the owner should carefully consider the level of involvement it requires for a successful project. First, the owner needs to recognize the effort and completeness that must be behind its initial scope/preliminary design which forms the basis of its contract with the design-builder. Often, the owner will require additional consultants to help it develop the scope or preliminary design, in the role of a traditional design firm.

May be inappropriate if the owner is looking for an unusual or iconic design.

### Contracting and Procurement Methods

One common contracting method in the Design-Build delivery method is to initially enter into an agreement with the DB team for a fixed-fee contract for design and pre-construction costs and an agreed General Conditions costs and construction fee given as a percentage of total construction costs.

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The CM's role in a Design-Build delivery method begins early in the project, assisting with the development of the owner's project requirements and the important selection of the DB team.

The role then become



Transfers risk to the private sector

Not subject to capital budget allocations or voter referendums

- Accelerates construction starts
- Reduces construction cost and interest rate risks

Takes advantage of private-sector efficiencies and innovations in construction, scheduling, and financing

Provides efficiencies in long-term operations and maintenance

Presents an opportunity to combine public and private uses in mixed-use developments to leverage economic development

Disadvantages of P3 include:

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Design-Build-Operate (DBO) - A public entity contracts with a private entity to design, build and operate a public asset.

Design-Build-Operate-Maintain (DBOM) - A public entity contracts with a private entity to design, build, operate, and maintain a public asset.

Design-Build-Finance-Operate-Maintain (DBFOM) - A public entity contracts with a private entity to design, build, operate, and maintain a public asset. Additionally, the private entity will also finance the project in exchange for either user fees, lease payments or some other revenue stream.

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Description

Integrated Project Delivery contracts are a relatively new entry into the U.S. marketplace and



### Risk Analysis

All of the advantages of the CMAR and DB project delivery approaches would apply

IPD contracts have not yet been tested in law, so the result of a failure within the team is unpredictable.

### Contracting and Procurement Methods

The most common contracting method in an Integrated Project Delivery approach is a joint agreement that includes the design firm, the construction firm, and the owner. The typical contract is a cost-plus-incentive-based contract built around target costs for all elements of the project and on the achievement of non-cost-related project goals.

On the procurement side, the selection process is generally a qualifications-based selection, consistent with the objective of making sure all team members make good team partners to enhance the likelihood of the success of this approach.

The selected team enters into a pre-design phase and together creates and agrees on the project's target cost, program and definition, achievement goals, schedule, other critical players to bring into the team (and the timing of entry) and other contract basics. At this point, the contract is fully executed and the project process proceeds.

### Role of the CM

The role of the Construction Manager in an IPD delivery system will be very similar to the CM's role in the CMAR and DB delivery approach in providing the industry and management expertise to represent the owner within the IPD team, whether the CM comes from within the owner's staff or from a third party.

In addition to the owner representation, successful IPD teams require an integrator and leader to keep the team on track, focused on project goals, and to facilitate the IPD behaviors necessary to carry the team to success. This role would encompass initial leadership of the IPD project management team, developing protocols to perform and then managing everyday tasks, such as making recommendations on payment of invoices, managing disputes, resolving issues and the like.

The CM, as owner's representative, may or may not be party to the IPD agreement. The CM, if playing the role of integrator, would typically be a party to the agreement.



One of the most important decisions made by any owner embarking on a construction project is the choice of the project delivery method – how the project will be designed and constructed. There are many options for delivery methods and many variations within those options.

An owner faced with choosing a project delivery method should consider several factors in making the decision, including:

- Project size
- Type of project
- Legislative and regulatory requirements
- Tolerance for risk
- Schedule
- Local market knowledge
- Desired level of involvement
- Owner's resources and capabilities

When these factors are properly evaluated, a good decision can be made on the selection of a project delivery method that best fits the goals and requirements of the owner and the project.

The use of a *qualified* Construction Manager can greatly help in developing a project and in making the decision on project delivery methods, regardless of whether this expertise comes from internal staff or from a third-party provider.