

**Design/Build Institute of America  
Rocky Mountain Region – Water/Wastewater Committee**

**Project Delivery Selection Approach**

**Overview**

This document provides an approach for water and wastewater project delivery method evaluation and selection. Template forms are attached for use by owner organization staff and practitioner project team members. By using these forms, a brief project delivery selection summary may be generated for individual projects. The primary objectives of this document are:

- Present a structured approach to assist owner organizations of water and wastewater systems in making project delivery method decisions;
- Assist the owner organization in determining if there is a foremost or obvious choice of project delivery method; and
- Provide documentation of the project delivery method decision in the form of a Project Delivery Decision Report.

**Background**

Project delivery is the process by which a project is comprehensively designed and constructed including project scope definition, organization of designers, builders and various practitioners and their contracting relationships, sequencing of design and construction operations, execution of design and construction, and closeout and start-up. Differences in project delivery methods are distinguished by the manner in which contracts between the owner organizations, designers and builders are formed, and the relationships that are established between each party based on the contracts. Currently, there are several types of project delivery methods available for publicly and privately funded projects in Colorado. Individual owner organizations have varying procurement processes and requirements related to project delivery methods.

The most common water and wastewater project delivery methods are:

- Design/Bid/Build (D/B/B)
- Construction Management At-Risk (CMAR)
- Progressive Design/Build
- Prescriptive-Based Design/Build

Less frequently implemented forms of water and wastewater project delivery methods are:

- Performance-Based Design/Build
- Engineer-Procure-Construction Manager (EPCM)
- Job Order Contracting (JOC)
- Design-Build-Operate (DBO)
- Design-Build-Finance-Operate (DBFO)
- Design-Build-Own-Operate-Transfer (DBOOT)

## **Alternative Project Delivery Methodology Comparative Matrix**

The Alternative Project Delivery Methodology Comparative Matrix (pages 4-5) summarizes the distinctions between the project delivery methods.

The following primary differentiators between traditional design/bid/build projects in comparison to alternative delivery projects, among others, are illustrated in the Matrix.

- Involvement of construction personnel early in the project design phase to proactively identify and resolve potential constructability, schedule, and quality issues prior to beginning field work.
- Opportunity to select the design/builder based on overall best value considering a comprehensive range of selection criteria, including quality, schedule, risk, and cost factors.
- Best value selection for major equipment and subcontractor procurements may be completed during the progression of the design phase.
- For Progressive Design/Build and Prescriptive Design/Build, single-point accountability for both design and construction.
- Early knowledge and certainty of total project costs.

### **Distinction between Progressive and Prescriptive-Based Design/Build**

In Progressive Design/Build, the owner selects the design/builder based on qualifications or best value, then works with the design/builder to progress the design to a level where the owner then requests the design/builder to submit a price for completing the final design and construction. For a Prescriptive-Based Design/Build project, the design/builder agrees to design and construct the project for a fixed price, and the service provider's price is based on the owner's description of the project requirements or on a conceptual design provided in the procurement documents.

### **Overview of the Project Delivery Selection Process**

The Project Delivery Selection Process consists of the following elements:

- A. Describe the project and set the project goals
- B. Determine and review project-dependent constraints
- C. Determine the Evaluation Criteria that affect the selection of project delivery method. Evaluation Criteria Definitions are provided in Table 1 (page 6).
  1. Level of Control
    - i. O&M/Equipment Selection Considerations
    - ii. Design/Sustainability
    - iii. Level of Owner Control
    - iv. Project Quality
    - v. Owner Resources (staffing and knowledge of project delivery)
  2. Schedule
    - i. Implementation Schedule
    - ii. Construction and Operational Flexibility

3. Cost
  - i. Cost Competitiveness
  - ii. Cash Flow
  - iii. Cost Certainty
  - iv. Market and Industry Visibility
4. Risk
  - i. Project Size and Complexity
  - ii. Impact on Public
  - iii. Legislative and Legal
  - iv. Allocation
  - v. Regulatory Compliance
  - vi. Right-of-Way and Environmental Permitting Control
5. Level of Design completed at the time of the procurement
6. If the Evaluation Criteria indicates there is a clear choice of the delivery method, then perform an initial risk assessment for the desired delivery method to ensure that risks can be properly allocated and managed.

Typically the entire selection process can be completed by the project team in a 4-hour workshop session, if individual team members have familiarity with the alternative project delivery methods and have performed assessments before the workshop.

### Evaluation Criteria Ranking Summary

Table 2, Evaluation Criteria Ranking Summary (page 7), summarizes the assessment of the Evaluation Criteria for the project delivery methods. The form is qualitatively scored using the scoring provided below.

#### Evaluation Criteria Scoring Key

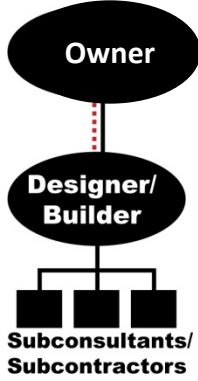
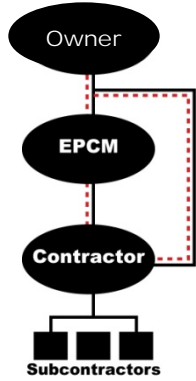
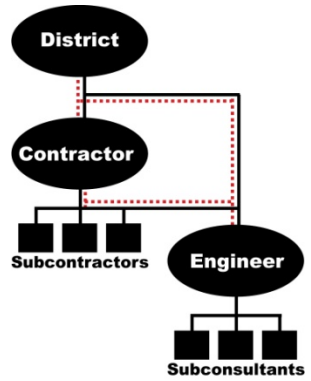
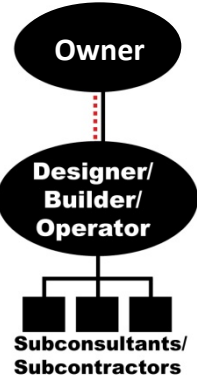
<b>++</b>	Most appropriate delivery method
<b>+</b>	Appropriate delivery method
<b>-</b>	Least appropriate delivery method
<b>X</b>	Fatal Flaw (discontinue evaluation of this method)
<b>NA</b>	Factor not applicable or not relevant to the selection

The form also includes a section for comments and conclusions. The completed Evaluation Criteria Ranking Summary provides an executive summary of the key reasons for the selection of the project delivery method.

### Reference

It is suggested that owner organizations of water and wastewater systems review *The Municipal Water and Wastewater Design-Build Handbook* published by the Water Design-Build Council for additional information on evaluating whether it is appropriate to use alternative project delivery methods, and if so, how to use them effectively.

<p><b>ALTERNATIVE PROJECT DELIVERY METHODOLOGY – COMPARATIVE MATRIX</b></p>					
		<p><b>Design/Bid/Build (D/B/B)</b></p>	<p><b>Construction Management-At-Risk (CMAR)</b></p>	<p><b>Progressive Design/Build (D/B)</b></p>	<p><b>Prescriptive-Based Design/Build (D/B)</b></p>
<b>ALTERNATE TERMINOLOGY</b>		Competitive Bidding or Hard Bid	Construction Manager / General Contractor (CM/GC)	--	Lump Sum Design/Build, Engineer-Procure-Construct (EPC)
<b>GENERAL DESCRIPTION</b>		A project delivery method where the owner selects an engineer to design and develop construction documents, from which the owner solicits lump sum bids. Selection is based on the lowest responsive bid, and the contractor serves as a single point of responsibility for construction. The owner procurement rules allow some variations to the "traditional" design/bid/build project delivery method in order to increase level of "control" of certain project elements, if desired. Options include potential pre-qualification of contractors and/or specific suppliers, pre-selection and/or pre-purchase of selected equipment, or other non-standard variations. Selection is based on the lowest responsive bid and the contractor serves as a single point of responsibility for construction.	A project delivery method where the construction manager serves as the general contractor providing pre-construction and construction services, while the engineer completes design under a separate contract, with the intent of promoting enhanced collaboration between all parties during design development. Qualification-based selection (QBS) of the CMAR or CM/GC is typically done early in the design process. If no acceptable GMP is reached, the owner still maintains the option to bid out the construction work.	A project delivery method that uses a qualifications-based selection (QBS, often with a proposed fee structure) similar to CMAR or CM/GC, but combines separate design and construction procurements into one procurement and selection of a single-contract design/build entity. Once selected, design commences and a construction estimate is "progressively" developed in an open-book format until a price can be agreed upon between the design/builder and owner. If no acceptable GMP or Stipulated Price is reached, the owner still maintains the option to bid-out the construction work.	A project delivery method that typically uses a two-step procurement process, requiring short-listed design/builders to propose lump sum solutions based on the owner's specifications and project concept, usually using a design developed by others provided in the RFP. The selected design/builder works under a single contract and is required to deliver a facility that meets the owner's specifications at the proposed price.
<b>PRICING STRUCTURE</b>		Fixed Bid Price (Lump Sum)	Negotiated GMP	Negotiated GMP or Stipulated Price	Fixed Price (Lump Sum)
<b>TOOLS / ELEMENTS</b>					
<b>Method</b>	Legislative / Regulatory State of Colorado	ALLOWED	ALLOWED	ALLOWED	ALLOWED
	Selection Process Qualifications-Based	NO	YES	YES	YES
	Price-Based	YES	POSSIBLE - BEST VALUE	POSSIBLE - BEST VALUE	YES
	Pre-Selection	POSSIBLE AS A VARIATION	POSSIBLE	POSSIBLE	POSSIBLE
	Pre-Purchase (by Owner)	POSSIBLE AS A VARIATION	POSSIBLE	POSSIBLE	POSSIBLE
	Pre-Purchase (by Contractor)	NO	POSSIBLE	POSSIBLE	POSSIBLE
<b>Implementation</b>	Pre-Qualification General Contractors	POSSIBLE AS A VARIATION	RECOMMENDED FOR CMAR	RECOMMENDED FOR D/B TEAM-	RECOMMENDED FOR D/B TEAM
	Subcontractors	POSSIBLE FOR MAJOR	POSSIBLE	RECOMMENDED FOR MAJOR	RECOMMENDED FOR MAJOR
	Suppliers	POSSIBLE AS A VARIATION	RECOMMENDED FOR KEY EQUIPMENT	RECOMMENDED FOR KEY EQUIPMENT	POSSIBLE FOR KEY EQUIPMENT
	Multiple Contracts	POSSIBLE AS A VARIATION	NOT LIKELY	NOT LIKELY	NOT LIKELY
	Multiple Phases	NOT WELL SUITED	POSSIBLE	POSSIBLE	POSSIBLE
	Incentives	POSSIBLE	POSSIBLE	POSSIBLE	POSSIBLE

<b>ALTERNATIVE PROJECT DELIVERY METHODOLOGY – COMPARATIVE MATRIX</b>					
		<b>Performance-Based Design/Build (D/B)</b>	<b>Engineer-Procure-Construction Manager (EPCM)</b>	<b>Job Order Contracting (JOC)</b>	<b>Design-Build-Operate (DBO)</b>
<b>ALTERNATE TERMINOLOGY</b>		Traditional Design/Build, Lump Sum Design/Build, Engineer-Procure-Construct (EPC)	Program Manager-At-Risk (PMAR)	Delivery Order Contracting, Work Order Contracting	--
<b>GENERAL DESCRIPTION</b>		A project delivery method that typically uses a two-step procurement process, requiring short-listed design/builders to propose lump sum best value solutions on the owner's project performance criteria, but with little or no pre-developed design. The selected designer/builder works under a single contract and is required to deliver a facility that meets the performance criteria at the proposed price.	A project delivery method where the owner selects an EPCM (typically an engineer) as the overall agent to design, procure and manage the construction process. The EPCM is not the constructor, but instead is the construction manager. The EPCM typically is contracted under a professional services agreement. The contractor may be contracted by the EPCM or the owner directly.	A project delivery method commonly utilized for contracting the minor repair, rehabilitation, or alterations of facilities when the work is of a recurring nature but the delivery times, type and quantities of work are indefinite.	An alternative form of the design/build project delivery method where the facility is operated privately under a fixed-term contract following construction and start-up. Typically uses a two-step procurement process similar to either the performance-based or prescriptive-based D/B, but also includes technical and cost proposals associated with operations (which typically vary between 5 and 20 year terms, often with prescribed renewals).
<b>PRICING STRUCTURE</b>		Fixed Bid Price (Lump Sum)	Negotiated (EPCM) Fixed Bid Price or GMP (Contractor)	Negotiated GMP or Negotiated Unit Pricing w/ Markups	Fixed Bid Price (Lump Sum)
<b>TOOLS / ELEMENTS</b>					
<b>Method</b>	Legislative / Regulatory State of Colorado	ALLOWED	ALLOWED	ALLOWED	ALLOWED
	Selection Process Qualifications-Based	YES	YES	YES	YES
	Price-Based	YES	NOT LIKELY	NO	YES
<b>Implementation</b>	Pre-Selection	POSSIBLE	POSSIBLE	POSSIBLE	POSSIBLE
	Pre-Purchase (by Owner)	POSSIBLE	POSSIBLE	POSSIBLE	POSSIBLE
	Pre-Purchase (by Contractor)	POSSIBLE	POSSIBLE	POSSIBLE	POSSIBLE
	Pre-Qualification General Contractors	--	POSSIBLE	--	--
	Subcontractors	NOT LIKELY	POSSIBLE	POSSIBLE	NOT LIKELY
	Suppliers	NOT LIKELY	POSSIBLE	POSSIBLE	NOT LIKELY
	Multiple Contracts	NOT LIKELY	POSSIBLE	POSSIBLE	NOT LIKELY
	Multiple Phases	POSSIBLE	POSSIBLE	POSSIBLE	POSSIBLE
Incentives	POSSIBLE	POSSIBLE	POSSIBLE	POSSIBLE	

— Contractual Relationship      - - - - - Working Relationship

<b>Table 1 Evaluation Criteria Definitions</b>	
<b>Criteria and Sub-Criteria</b>	<b>Definition</b>
<b>LEVEL OF CONTROL</b>	
O&M/Equipment Selection Considerations	The ability for the owner to implement its preferred operations and maintenance methodology using the procurement method.
Design/Sustainability	The ability for the project to be sustainable over its design life using the procurement method.
Level of Owner Control	The ability for the owner to exercise control of the project given the contract resulting from the procurement method.
Project Quality	The extent to which the procurement method impacts the quality of the project including opportunities for innovation in design, construction, and project delivery.
Owner Resources (Staffing and Knowledge)	The extent to which the procurement method will impact the owner's staffing needs.
<b>SCHEDULE</b>	
Implementation Schedule	The extent to which the procurement method impacts the project implementation schedule.
Construction & Operational Flexibility	The extent to which the procurement method allows for changes to the project if operational or construction improvements are identified during design or construction.
<b>COST</b>	
Cost Competitiveness	The ability of the procurement method to produce a project cost that is within the range of costs for other methods of delivery.
Cash Flow	The ability of the procurement method to meet cash flow requirements consistent with the owner's financial plans and funding level.
Cost Certainty	The point at which the procurement method provides cost certainty.
Market and Industry Viability	The ability of the procurement method to result in a competitive process under current market conditions.
<b>RISK ALLOCATION</b>	
Project Size & Complexity	The extent to which the project's size and complexity provides an opportunity to realize the advantages associated with the procurement method.
Impact on Public	The extent to which the procurement method will reduce or minimize the impact to the public.
Legislative & Legal	The ability of the procurement method to readily meet State and owner procurement requirements.
Risk Allocation	How the procurement method allocates financial risk.
Regulatory Compliance	The ability for the owner to comply with regulatory and permitting requirements that will be imposed on the project using the procurement method.
Right-of-Way & Environmental Permitting Control	The ability of the owner to meet timing requirements for the acquisition of right-of-way or environmental permits using the procurement method.

<b>Table 2 Evaluation Criteria Ranking Summary</b>				
	D/B/B	CMAR	Progressive D/B	Prescriptive-Based D/B
	Rank	Rank	Rank	Rank
<b>LEVEL OF CONTROL</b>				
O&M Considerations				
Sustainability				
Level of Owner Control				
Project Quality				
Owner Resources (Staffing)				
<b>SCHEDULE</b>				
Implementation Schedule				
Construction & Operational Flexibility				
<b>COST</b>				
Cost Competitiveness				
Cash Flow				
Cost Certainty				
Market and Industry Viability				
<b>RISK ALLOCATION</b>				
Project Size & Complexity				
Impact on Public				
Legislative & Legal				
Risk Allocation				
Regulatory Compliance				
Right-of-Way & Environmental Permitting Control				

# APPENDICES

The following attachments will facilitate the process.

## ■ **Project Description Checklist**

Provide information on the project that is using this tool. This includes size, type, funding, risks, complexities, etc. All information should be developed for the specific project.

## ■ **Project Goals Worksheet – including example project goals**

A careful determination of the project goals is an instrumental first step of the process that will guide both the selection of the appropriate method of delivery as well as the specific delivery procurement process and implementation of the project.

## ■ **Project Constraints Worksheet (Go / No-Go Decisions)**

Carefully review all possible constraints to the project. These constraints can potentially eliminate a project delivery method before the evaluation process begins.

## ■ **Opportunity/Obstacle Checklists**

These forms provide the project team with guidance concerning typical delivery method opportunities and obstacles associated with each of the eight Evaluation Factors. However, these checklists include general information and are not an all-inclusive checklist. Use the checklists as a supplement to developing project specific opportunities and obstacles.

## ■ **Initial Risk Assessment Guidance**

Because of the unique nature of Evaluation Factor 4, “Initial Project Risk Assessment,” this document provides the project team with additional guidance for evaluation for that factor, including typical project risks, a general project risks checklist, and a Risk Opportunities/Obstacles checklist.



## Project Description Checklist

The following items should be considered in the project description as applicable. Other items can be added if they influence the project delivery decision. Relevant documents can be added as appendices.

- Project Name
- Location
- Estimated Budget
- Estimated Project Delivery Period
- Required Delivery Date (if applicable)
- Source(s) of Project Funding
- Project Property Acquisitions and Easements
- Major Features of Work – process mechanical equipment, electrical, I&C, structural, coordination with plant operations
- Major Schedule Milestones – funding; bond elections, NPDES compliance deadlines
- Major Project Stakeholders
- Major Challenges (as applicable)
  - With Utilities and/or Environmental Approvals
  - During Construction Phase
- Main Identified Sources of Risk
- Safety Issues
- Sustainable Design and Construction Requirements

## Project Goals

An understanding of project goals is essential to appropriate project delivery selection. Typically, the project goals can be defined in three to five items. Examples are provided below,<sup>1</sup> but the report should include project-specific goals. These goals should remain consistent over the life of the project.

### Project-Specific Goals

1. Goal #1
2. Goal #2
3. Goal #3
4. Goal #4

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<sup>1</sup> Generic Project Goals

#### Schedule

- Meet compliance order deadline
- Minimize project delivery time
- Complete the project on schedule
- Accelerate start of project revenue

#### Cost

- Minimize project cost
- Maximize project budget
- Complete the project on budget
- Maximize the project scope and improvements within the project budget

#### Quality

- Meet or exceed treatment requirements
- Select the best team
- Provide a high quality design and construction constraints
- Provide design that is permittable by various jurisdictions
- Water quality requirements, influent/effluent limits and characteristics

#### Functional

- Maximize the life cycle performance of the project
- Maximize capacity
- Minimize operating costs
- Maximize safety
- Redundancy of process equipment
- Coordination of plant operations during construction

#### Sustainability

- Life cycle costs
- Energy efficiency
- Carbon footprint

#### Local/Regional Issues

- Odor
- Chemical delivery traffic and chemical storage

## **Project Constraints**

There are potential aspects of a project that can eliminate the need to evaluate one or more of the possible project delivery methods. General constraints are provided, but it is critical to identify constraints that are project specific.

### Constraints Examples:

- Source of Funding
- Schedule constraints; permit compliance deadlines, plant operation limitation, site constraints, etc.
- Federal, state, and local laws
- Project specific constraint
- Project specific constraint
- Project specific constraint

## **Opportunity and Obstacle Checklists**

**1) Delivery Schedule Checklist:** Delivery schedule is the overall project schedule from scoping through design, construction, and opening to the public. Assess time considerations in getting the project started or funding dedicated and assess project completion importance.

DESIGN/BID/BUILD	
Requires time to perform sequential design and construction procurement.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Milestones may be easier to define</li> <li><input type="checkbox"/> Project designs may more easily be “shelved”</li> <li><input type="checkbox"/> Elements of design can be advanced prior to permitting, construction, etc.</li> <li><input type="checkbox"/> Time to communicate/discuss final design with stakeholders prior to commencement of construction</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Requires time to perform a linear design-bid-construction process</li> <li><input type="checkbox"/> Design and construction schedules can be unrealistic due to lack industry input</li> <li><input type="checkbox"/> Errors in design lead to change orders and schedule delays. Owner liable for errors/omissions of designer.</li> <li><input type="checkbox"/> Low bid selection may lead to potential delays and other adverse outcomes</li> <li><input type="checkbox"/> Construction cost not known until bids received and may exceed budget, requiring re-design</li> <li><input type="checkbox"/> Owner assumes risk for project schedule</li> <li><input type="checkbox"/> Owner must allow time for multiple procurements (designer first, then contractor)</li> <li><input type="checkbox"/> Sequential process of design, then ROW/property acquisition, then bid, then build, results in longer overall schedule to deliver a completed project</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
Quickly gets contractor under contract and under construction to meet funding encumbrance obligations before completing design. Parallel process of development of contract requirements, design, procurements, and construction can accelerate project schedule. However, schedule can be slowed down by coordinating design-related issues between the CM and designer and by the process of reaching a reasonable Guaranteed Maximum Price (GMP).	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Ability to start construction before entire design, etc., is complete (i.e., phased design, early construction packages)</li> <li><input type="checkbox"/> More efficient procurement of long-lead items</li> <li><input type="checkbox"/> Early identification and resolution of design and construction issues (e.g., utility, ROW, and earthwork)</li> <li><input type="checkbox"/> Can provide a shorter procurement schedule than Prescriptive D/B, but essentially the same as Progressive D/B</li> <li><input type="checkbox"/> Team involvement for schedule optimization</li> <li><input type="checkbox"/> Continuous constructability review and VE</li> <li><input type="checkbox"/> Contractor input for phasing and constructability may reduce overall schedule</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Potential for not reaching agreement on GMP and substantially delaying schedule</li> <li><input type="checkbox"/> Designer-CMAR-Owner disagreements can add delays</li> <li><input type="checkbox"/> Strong Owner management is required to control schedule</li> <li><input type="checkbox"/> Owner liable for errors/omissions of designer and the impact this has on the schedule.</li> <li><input type="checkbox"/> Requires two separate procurements of designer and contractor versus Prescriptive D/B and Progressive D/B which are one procurement.</li> <li><input type="checkbox"/> _____</li> </ul>

PROGRESSIVEDESIGN/BUILD	
<p>Quickly gets design/builder under contract and under design/construction to meet funding encumbrance obligations before completing design Parallel process of design and construction can accelerate project delivery schedule. Selection is qualifications and or best value based and so not as lengthy at Prescriptive Based Design/Build which requires some level of design be completed on which D/B Teams propose. Two step procurement recommended; RFQ and RFP to evaluate firms for selection.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> D/B Team may be engaged from inception before any design work has been done.</li> <li><input type="checkbox"/> Potential to accelerate schedule through parallel design/build process</li> <li><input type="checkbox"/> Shifting schedule risk to D/B team</li> <li><input type="checkbox"/> Project costs known earlier in the project schedule</li> <li><input type="checkbox"/> Encumbers construction funds more quickly</li> <li><input type="checkbox"/> Early D/B input and collaboration into schedule development</li> <li><input type="checkbox"/> More efficient procurement of long-lead items</li> <li><input type="checkbox"/> Ability to start construction before entire design is complete (i.e., phased design)</li> <li><input type="checkbox"/> Allows innovation in resource loading and scheduling by D/B team</li> <li><input type="checkbox"/> Schedule risks allocated to entity best able to manage risk</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Undefined events or conditions found after procurement, but during design can impact schedule (and cost)</li> <li><input type="checkbox"/> Requires agency and stakeholder commitments to an expeditious review of design to allow D/B to stay on schedule</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PRESCRIPTIVE-BASED DESIGN/BUILD	
<p>Can get project under construction before completing design. Parallel process of design and construction can accelerate project delivery schedule; however, procurement time can be lengthy due to the time necessary to develop an adequate RFP, evaluate proposals and provide for a fair, transparent selection process.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Potential to accelerate schedule through parallel design/build process</li> <li><input type="checkbox"/> Shifting schedule risk to D/B team</li> <li><input type="checkbox"/> Project costs known earlier in the project schedule</li> <li><input type="checkbox"/> Encumbers construction funds more quickly</li> <li><input type="checkbox"/> Early D/B Team input and collaboration into schedule development</li> <li><input type="checkbox"/> More efficient procurement of long-lead items</li> <li><input type="checkbox"/> Ability to start construction before entire design is complete (i.e., phased design)</li> <li><input type="checkbox"/> Allows innovation in resource loading and scheduling by D/B team</li> <li><input type="checkbox"/> Schedule risks allocated to entity best able to manage risk</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Request for proposal development and procurement can be intensive</li> <li><input type="checkbox"/> Undefined events or conditions found after procurement, but during design can impact schedule (and cost)</li> <li><input type="checkbox"/> Time required to adequately define technical requirements and expectations through RFP development can be intensive</li> <li><input type="checkbox"/> Requires agency and stakeholder commitments to an expeditious review of design to allow D/B to stay on schedule</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

**2) Project Complexity & Innovation Checklist:** Project complexity and innovation is the potential applicability of new designs or processes to resolve complex technical issues.

DESIGN/BID/BUILD	
<p>Allows Owner to fully resolve complex design issues and qualitatively evaluate designs before procurement of the general contractor. Innovation is provided by Owner and/or Consultant expertise and through traditional owner-directed processes such as VE studies and bid alternatives. Does not incorporate the Builder's experience and guidance on constructability into the design process.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Owner can have more control of design of complex projects</li> <li><input type="checkbox"/> Owner and Consultant expertise can select innovation independently of contractor abilities</li> <li><input type="checkbox"/> Opportunities for value engineering studies during design, more time for design solutions</li> <li><input type="checkbox"/> Full control in selection of design expertise</li> <li><input type="checkbox"/> Complex design can be resolved in advance and competitively bid</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Innovations recommended by Builder after bidding can add cost or time and constrain contractor's benefits</li> <li><input type="checkbox"/> No contractor input to optimize value</li> <li><input type="checkbox"/> No ability for integrated design and construction solutions (limited to constructability and or VE after bid awarded)</li> <li><input type="checkbox"/> Difficult to assess construction time and cost impact due to innovation</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
<p>Allows selection of designer and contractor based on independent evaluation of their qualifications and other factors to jointly address complex innovative designs through three-party collaboration of Owner, Consultant, and Constructor. Allows for a qualitative (nonprice oriented) design but eventually requires agreement on GMP.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Highly innovative process through 3-party collaboration</li> <li><input type="checkbox"/> Allows for owner control of a designer/contractor process for developing innovative solutions</li> <li><input type="checkbox"/> Allows for an independent selection of the best qualified designer and best qualified CMAR</li> <li><input type="checkbox"/> VE inherent in process and enhanced constructability</li> <li><input type="checkbox"/> Risk of innovation can be better defined and minimized and allocated</li> <li><input type="checkbox"/> More opportunity to achieve "best" solution</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Process depends on separately contracted designer and CM willingness to collaborate</li> <li><input type="checkbox"/> No contractual relationship between designer and CM</li> <li><input type="checkbox"/> Innovations can add cost or time</li> <li><input type="checkbox"/> Scope additions can be difficult to manage</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PROGRESSIVE DESIGN/BUILD	
<p>Incorporates both designer and builder input into design process through a qualifications based or best value selection of a single entity. May begin with Owner’s vision of technical solution in form of conceptual design. Accommodates design/builder proposed Alternate Technical Concepts (ATCs) – which are a cost oriented approach to providing complex and innovative designs.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> D/B Team engaged at inception of project before any design is started, maximizing their input and ability to innovate</li> <li><input type="checkbox"/> D/B Team collaborates with Owner to optimize means and methods and enhance innovation</li> <li><input type="checkbox"/> Uses qualifications based or best-value procurement to select design/builder with best qualifications</li> <li><input type="checkbox"/> Constructability and VE inherent in process</li> <li><input type="checkbox"/> Early team integration supports innovation</li> <li><input type="checkbox"/> Sole point of responsibility</li> <li><input type="checkbox"/> Coordination of construction with plant operations enhanced by earlier involvement of D/B and Owner collaboration</li> <li><input type="checkbox"/> Owner not required to develop well defined performance/prescriptive characteristics in advance to procure D/B Team</li> <li><input type="checkbox"/> More opportunity to achieve “best” solution</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Qualifications based or best value selection, so cost certainty is not achieved until GMP or Stipulated Price is negotiated</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>



PRESCRIPTIVE-BASED DESIGN/BUILD	
<p>Begins with Owner’s vision of technical solution in form of performance/prescriptive criteria and or some degree of preliminary design. Incorporates both designer and builder input into design process through best value selection of a single entity. Accommodates design/builder proposed Alternate Technical Concepts (ATCs) – which are a cost oriented approach to providing complex and innovative designs. Requires that desired performance/prescriptive criteria to complex projects be well defined through contract requirements</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Designer and contractor collaborate to optimize means and methods and enhance innovation</li> <li><input type="checkbox"/> Opportunity for innovation through draft RFP, best value and ATC processes</li> <li><input type="checkbox"/> Uses fixed-price procurement to select design/builder with lowest cost technical solution</li> <li><input type="checkbox"/> Constructability and VE inherent in process</li> <li><input type="checkbox"/> Early team integration enhances innovation</li> <li><input type="checkbox"/> Sole point of responsibility</li> <li><input type="checkbox"/> Coordination of construction with plant operations enhanced by designer, builder, and Owner collaboration</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Requires desired performance/prescriptive characteristics of complex systems to be well defined through technical requirements in the RFP (difficult to do)</li> <li><input type="checkbox"/> Allows for less innovation than Progressive Design/Build because performance/prescriptive characteristics are defined by the Owner without collaboration with the D/B Team.</li> <li><input type="checkbox"/> Qualitative requirements are difficult to define (example. aesthetics) for purposes of the RFP</li> <li><input type="checkbox"/> Risk of time or cost constraints on designer inhibiting innovation</li> <li><input type="checkbox"/> Some design solutions might be too innovative or unacceptable</li> <li><input type="checkbox"/> Quality assurance for innovative processes are difficult to define in RFP</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

**3) Level of Design Checklist:** Level of design is the percentage of design completion at the time of the project delivery procurement.

DESIGN/BID/BUILD	
100% design complete by Owner or by Owner's Consultant, with Owner having complete control over the design	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> 100% design by Owner or Owner's Designer</li> <li><input type="checkbox"/> Owner has complete control over the design (can be beneficial when there is one specific solution for a project)</li> <li><input type="checkbox"/> Project/scope can be thoroughly developed through design</li> <li><input type="checkbox"/> The scope of the project is well defined through complete plans and contract documents</li> <li><input type="checkbox"/> Well-known process to the industry</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Design errors and omissions are the responsibility of the Owner and can result in a higher number of change orders, claims, etc. impacting the budget</li> <li><input type="checkbox"/> Limited opportunity for competitive innovation</li> <li><input type="checkbox"/> Can reduce the level of constructability since the contractor is not bought into the project until after the design is complete</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
Utilize a lower level of design completion to procure the CMAR services, then joint collaboration of Owner, Designer, and CMAR further develops the design. Iterative nature of design process risks extending the project schedule	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Can utilize a lower level of design prior to selecting a CMAR, then collaboratively advance design with Owner, Designer, and CMAR</li> <li><input type="checkbox"/> CMAR involvement in early design improves constructability</li> <li><input type="checkbox"/> Owner controls designer</li> <li><input type="checkbox"/> Design can be responsive to risk minimization</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Teaming and communicating between separately contracted Designer and CMAR concerning design can cause disputes which Owner must resolve</li> <li><input type="checkbox"/> Three-party process can slow progression of design</li> <li><input type="checkbox"/> If design is too far advanced when CMAR procured it will limit the advantages of CMAR or could require design backtracking</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PROGRESSIVE DESIGN/BUILD	
May begin with Owner's vision of technical solution in form of conceptual design (10% to 15%).	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> D/B Team on board prior to design starting, maximizing input of Builder into design.</li> <li><input type="checkbox"/> Does not require any design to be completed before awarding project to the D/B Team, however allows for conceptual design by Owner prior to procurement of D/B Team</li> <li><input type="checkbox"/> Contractor involvement in early design, which improves constructability and innovation</li> <li><input type="checkbox"/> D/B Team is brought into the project early in the process and will have design responsibility</li> <li><input type="checkbox"/> Owner control of design through progressive process</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> The basis for the contract price is defined following progression of design as either mutually acceptable negotiated GMP or Stipulated Price at a % complete of design, or based on cost of work plus fee.</li> <li><input type="checkbox"/> Without initial conceptual design or performance specifications, or if there is overconfidence in the D/B's ability to innovate, can risk quality</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PRESCRIPTIVE-BASED DESIGN/BUILD	
Design advanced by Owner to the level necessary to define project performance/prescriptive requirements and properly allocate risk (typically 10% to 30%).	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Design advanced by the Owner to a certain level prior to procurement of the D/B, so some level of Owner control over design.</li> <li><input type="checkbox"/> Does not require much design to be completed before awarding project to the design-builder (between ~ 10% - 30% complete)</li> <li><input type="checkbox"/> Contractor involvement in early design, which improves constructability and innovation</li> <li><input type="checkbox"/> Drawings and specifications can be schematic because the design/builder is bought into the project early in the process and will have design responsibility</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Must have very clear definitions and performance/prescriptive requirements in the RFP because it forms the basis for the contract price submitted with the proposals</li> <li><input type="checkbox"/> If design is too far advanced when D/B is procured, it will limit the advantages of design-build or could result in design backtracking</li> <li><input type="checkbox"/> Potential for lacking or missing scope or performance/prescriptive definitions if RFP not carefully developed</li> <li><input type="checkbox"/> Inadequate performance/prescriptive specifications or if there is overconfidence in the D/B's ability to innovate can risk quality through reduced technical requirements</li> <li><input type="checkbox"/> Less Owner control over the design</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

**4) Cost Checklist:** Project cost is the financial process related to meeting budget restrictions, early and precise cost estimation, and control of project costs.

DESIGN/BID/BUILD	
<p>Competitive bidding provides a low initial capital cost for a fully defined scope of work. Cost estimates prior to bidding are not as accurate since not produced by a contractor. Higher likelihood of change orders with cost impact due to Owner being responsible for the adequacy of the design documents. Final capital cost likely to be higher than the initial bid.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Competitive bidding provides a low initial price for construction of capital improvements</li> <li><input type="checkbox"/> Initial price of construction (before change orders) is defined and contractually set before construction begins</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Cost estimate accuracy during design is limited because estimates not produced by a contractor.</li> <li><input type="checkbox"/> Initial construction price not locked in until design is 100% complete.</li> <li><input type="checkbox"/> Price reductions due to contractor innovation and constructability are difficult to obtain</li> <li><input type="checkbox"/> Fixed price nature of D/B/B incentivizes contractor to minimize its cost (potential loss of quality) to maximize profit.</li> <li><input type="checkbox"/> More potential for price impact change orders due to owner having design responsibility.</li> <li><input type="checkbox"/> Total project costs not known until completion of project</li> <li><input type="checkbox"/> Initial bid price gives false sense of certainty as to final project cost, which is often higher than initial bid.</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
Owner, Designer, and CMAR collaborate to reduce pricing risk. May provide project cost savings as compared to budget. CMAR can take competitive bids from general contractors and subcontractors to provide competitive procurement. However non-competitive, self-performed work introduces price risk. Good flexibility to design to a budget.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Owner, Designer, and CMAR collaborate to reduce and properly allocate project risk, which can result project cost savings.</li> <li><input type="checkbox"/> Early CMAR involvement can result in savings through VE and constructability</li> <li><input type="checkbox"/> Price will be known earlier when compared to D/B/B</li> <li><input type="checkbox"/> Integrated design and construction process provides a cost efficient strategy to achieve project goals</li> <li><input type="checkbox"/> GMP capping the compensation gives more certainty to maximum project price, barring discovery of unknown conditions or Owner directed changes.</li> <li><input type="checkbox"/> Allows for a cost of work compensation method, and factors used to calculate the CMAR compensation, such as the CMAR's billable hourly rates for preconstruction services and percent markups on the cost of the work for insurance, bonds, overhead, and profit can be competitively solicited and used as an evaluation criterion in the CMAR selection</li> <li><input type="checkbox"/> Can take to market for hard bidding as contingency if cannot agree on GMP</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Non-competitive negotiated GMP could introduce price risk.</li> <li><input type="checkbox"/> Not as cost competitive as DBB since single source negotiated GMP</li> <li><input type="checkbox"/> Difficulty in GMP negotiation introduces some risk that GMP will not be successfully executed requiring aborting the CMAR delivery method.</li> <li><input type="checkbox"/> Paying for CMAR involvement in the design phase may increase total cost (but may also add more value).</li> <li><input type="checkbox"/> Preconstruction services fees for contractor involvement may not be easily quantified in advance</li> <li><input type="checkbox"/> GMP would be subject to revision if unknown conditions are discovered or if Owner directed scope changes occur.</li> <li><input type="checkbox"/> Owner must manage two separate contracts, increasing procurement and overall administrative costs.</li> <li><input type="checkbox"/> _____</li> </ul>

PROGRESSIVE DESIGN/BUILD	
<p>Early Design/Builder collaboration can provide a cost-efficient method to achieving project goals. Costs are negotiated at various milestones of design completion and are not known when D/B contract awarded. D/B can take competitive bids from equipment suppliers and subcontractors to provide competitive procurement. However non-competitive, self-performed work introduces price risk . Good flexibility to design to a budget.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Contractor teams with designer through single contract and provides input into design, which minimizes price to Owner</li> <li><input type="checkbox"/> Design/Builder collaboration can provide a cost-efficient method to achieve project goals</li> <li><input type="checkbox"/> Alternatives exist to establish compensation method. Can use cost of work plus fee method or the contract can allow either a lump sum or GMP price to be negotiated at some milestone during the design process.</li> <li><input type="checkbox"/> Potential for fewer change orders and lower average cost growth due to D/B responsibility for design.</li> <li><input type="checkbox"/> Funding can be obligated in a very short timeframe to meet appropriation expiration deadlines.</li> <li><input type="checkbox"/> Contract can utilize a GMP compensation approach, so maximum price is known early on and final project price could potentially under run the maximum.</li> <li><input type="checkbox"/> Allows for a cost of work compensation method, and factors used to calculate D/B compensation, such as the D/B's billable hourly rates for preconstruction services and percent markups on the cost of the work for insurance, bonds, overhead, and profit can be competitively solicited and used as a best value evaluation criterion in the D/B selection</li> <li><input type="checkbox"/> Off ramp at end of preconstruction services if GMP or Stipulated Price cannot be negotiated</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Scope is not fully defined at D/B procurement, so prices not defined at contract award,.</li> <li><input type="checkbox"/> If GMP is negotiated during design, non-competitive nature of self-performed work negotiations could introduce price risk</li> <li><input type="checkbox"/> Difficulty in GMP negotiation introduces some risk that GMP will not be successfully executed requiring aborting the D/B delivery method.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

<b>PRESCRIPTIVE-BASED DESIGN/BUILD</b>	
<p>Design/Builder collaboration can provide a cost-efficient response to project goals. Cost (Fixed Price) may be solicited with design/builder proposal or may be negotiated at various milestones of design completion. May also use a project budget approach, where the D/B Team proposes the scope they can provide to match a fixed budget. Poor risk allocation or ill-defined performance/prescriptive criteria can result in high contingencies in fixed prices received with proposals. Good flexibility to design to a budget.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Contractor teams with designer and provides input into design</li> <li><input type="checkbox"/> Design/builder collaboration can provide a cost-efficient response to project goals</li> <li><input type="checkbox"/> Fixed Prices are contractually set at either the D/B proposal phase or the contract can allow either a GMP or Stipulated Price to be negotiated at some milestone during the design process.</li> <li><input type="checkbox"/> Allows a variable scope proposal to match a fixed budget</li> <li><input type="checkbox"/> Potential for fewer change orders and lower average cost growth due to D/B responsibility for design.</li> <li><input type="checkbox"/> Funding can be obligated in a very short timeframe to meet appropriation expiration deadlines.</li> <li><input type="checkbox"/> Contract can utilize a GMP compensation approach, so maximum price is known early on and final project price could potentially under run the maximum.</li> <li><input type="checkbox"/> Allows for a cost of work compensation method, and factors used to calculate D/B compensation, such as the D/B's billable hourly rates for preconstruction services and percent markups on the cost of the work for insurance, bonds, overhead, and profit are competitively solicited and used for the D/B selection.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> If the Owner solicits fixed price proposals without 100% design complete, risks associated with this approach can compromise financial success of the project.</li> <li><input type="checkbox"/> May be challenging to review and compare variable scope proposals</li> <li><input type="checkbox"/> If GMP is negotiated during design, non-competitive nature of self-performed work negotiations may introduce price risk</li> <li><input type="checkbox"/> Difficulty in GMP negotiation introduces some risk that GMP will not be successfully executed requiring aborting the D/B delivery method.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>



## 5) Initial Risk Assessment

Risk is an uncertain event or condition that, if it occurs, has a negative effect on a project's objectives. Risk allocation is the assignment of unknown events or known conditions to the party that can best manage them. An initial assessment of project risks is important to ensure the selection of the delivery method that can properly address them. An approach that focuses on a fair allocation of risk will be most successful.

Three sets of risk assessment checklists are provided to assist in an initial risk assessment relative to the selection of the delivery method:

- A. **Typical Owner Water/Wastewater Project Risks**
- B. **General Project Risks Checklist**
- C. **Opportunities/Obstacles Checklist (relative to each delivery method)**

It is important to recognize that the initial risk assessment is to only ensure the selected delivery method can properly address the project risks. A more detailed level of risk assessment should be performed concurrently with the development of the procurement documents and through the design progression to ensure that project risks are properly allocated, managed, and minimized through the procurement and implementation of the project.

### ***A. TYPICAL OWNER PROJECT RISKS***

Following is a list of project risks that are frequently encountered on W/WW projects and a discussion on how the risks are resolved through the different delivery methods.

**A.1: Site Conditions and Investigations** How unknown site conditions are resolved. For additional information on site conditions, refer to 23 CFR 635.109(a) at the following link: <http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&sid=91468e48c87a547c3497a5c19d640172&rgn=div5&view=text&node=23:1.0.1.7.23&idno=23#23:1.0.1.7.23.1.1.9>

#### **DESIGN/BID/BUILD**

When the schedule allows, site condition risks are generally best identified and mitigated during the design process prior to procurement of the constructor to minimize the potential for change orders and claims during construction.

#### **CMAR**

The Owner, the Designer, and the CMAR firm can collectively assess site condition risks, identify the need to perform site investigations in order to reduce risks, and properly allocate risk prior to the Owner and CMAR agreeing upon a GMP.

### **PROGRESSIVE DESIGN/BUILD**

Responsibility for utility locate and clearance need to be clearly defined in D/B procurement documents and the resultant contract requirements, and appropriately allocated to both Design/Builder and the Owner:

*Private utilities (major electrical, gas, communication transmission facilities):* Need to define coordination and schedule risks and responsibilities. These cannot be priced in advance and therefore will be factored into the GMP or Stipulated Price negotiations as the design progresses. . Note: By state regulation, private utilities have schedule liability in Design/Build projects, but they need to be made aware of their responsibilities.

*Public Utilities:* Design and construction risks can be allocated to the Design/Builder, if properly incorporated into the contract requirements.

### **PRESCRIPTIVE-BASED DESIGN/BUILD**

Certain site condition responsibilities can be allocated to the design/builder provided they are well defined and associated approval processes are well defined. Caution should be used, as unreasonable allocation of site condition risk will result in the design/builder incorporating high contingencies in their price proposal. Owner should perform site investigations in advance of procurement of design/build services to define conditions and avoid duplication of effort by proposers. Owner should consider performing the following investigations prior to fixed-price procurement of a D/B firm so that this information may be disclosed to the proposing firms. This allows the proposing firms to perform preliminary design for preparation of their bid or proposal without extensive additional investigations:

- 1) Hazardous materials investigations to characterize the nature of soil and groundwater contamination and Phase I EA
- 2) Geotechnical baseline report

## **A.2: Utilities**

### **DESIGN/BID/BUILD**

Utility risks are best allocated to the Owner, and mostly addressed prior to procurement to minimize potential for claims during construction, when the schedule allows.

### **CMAR**

Can utilize a lower level of design prior to contracting with the CMAR in anticipation of joint collaboration of the Owner, Designer, and CMAR in the further development of the design being used to resolve utility conflicts.

**PROGRESSIVE DESIGN/BUILD**

Responsibility for utilities locate and clearance need to be clearly defined in D/B procurement documents and the resultant contract requirements, and appropriately allocated to both design/builder and the Owner:

*Private utilities (major electrical, gas, communication transmission facilities):* Need to define coordination and schedule risks and responsibilities. These cannot be priced in advance and therefore will be factored into the GMP negotiations as they arise. . Note: By state regulation, private utilities have schedule liability in design/build projects, but they need to be made aware of their responsibilities.

*Public Utilities:* Design and construction risks can be allocated to the design/builder, if properly incorporated into the contract requirements.

**PRESCRIPTIVE-BASED DESIGN/BUILD**

Utility locate and clearance responsibilities need to be clearly defined in D/B procurement documents and the resultant contract requirements, and appropriately allocated to both Design/Builder and the Owner:

*Private utilities (major electrical, gas, communication transmission facilities):* Need to define coordination and schedule risks as they are difficult for design/builder to price. Best to obtain the utilities' agreements regarding relocation if possible before procurement of the Design/Builder. Note: By state regulation, private utilities have schedule liability in Design/Build projects, but they need to be made aware of their responsibilities.

*Public Utilities:* Design and construction risks can be allocated to the Design/Builder, if properly incorporated into the contract requirements.

**A.3: Railroads (if applicable)**

**DESIGN/BID/BUILD**

Railroad risks are best resolved prior to procurement of the contractor and when the schedule allows relocation designs included in the project contract documents.

**CMAR**

Railroad impacts and processes can be resolved collaboratively by the Owner, Consultant, and CMAR. A lengthy resolution process can delay the GMP negotiations.

**PROGRESSIVE DESIGN/BUILD**

Railroad impacts and processes can be resolved collaboratively by the Owner and Design/Builder. Railroad coordination and schedule risks should be well understood to be properly allocated. To the extent it is known, the railroad risk information should be disclosed in the Design/Builder procurement documents. These risks cannot be priced in advance and therefore will be factored into the GMP or Stipulated Price negotiations as the design progresses. Railroad design risks can be allocated to the Design/Builder if it can be well defined.

**PRESCRIPTIVE-BASED DESIGN/BUILD**

Railroad coordination and schedule risks should be well understood to be properly allocated and these risks are often assumed by the Owner. The railroad risk information should be disclosed in the design builder procurement documents so that it can be properly accounted for in the design builders bid or proposal. Railroad design risks can be allocated to the design builder if it can be well defined.

**A.4: Drainage/Water Quality Best Management Practices (construction and permanent)**

Both drainage and water quality often involve third party coordination that needs to be carefully assessed with regard to risk allocation. Water quality in particular is not currently well defined, complicating the development of technical requirements for projects.

Important questions to assess:

- 1) Do criteria exist for compatibility with a third party offsite system (such as an OSP (Outfall System Plan))?
- 2) Is there existing undersized drainage facilities that will be impacted by the project?
- 3) Can water quality requirements be precisely defined? Is right-of-way adequate?

**DESIGN/BID/BUILD**

When the schedule allows, drainage and water quality risks are best designed prior to procurement of the contractor to minimize potential for claims during construction.

**CMAR**

The Owner, the Consultant, and the CMAR can collectively assess drainage risks and coordination and approval requirements, and minimize and define requirements and allocate risks prior to agreeing upon a GMP.

**PROGRESSIVE DESIGN/BUILD**

The Owner and the Design/Builder can collectively assess drainage risks and coordination and approval requirements, and minimize and define requirements and allocate risks prior to agreeing upon a GMP. The Owner may be in the best position to manage the risks associated with third-party approvals regarding compatibility of project requirements with impacted systems, and should pursue agreements to define requirements for the Design/Builder. Design and construction risks can be allocated to the Design/Builder if properly incorporated into the contract requirements.

**PRESCRIPTIVE-BASED DESIGN/BUILD**

The Owner may be in the best position to manage the risks associated with third-party approvals regarding compatibility of project requirements with impacted systems, and should pursue agreements to define requirements for the design/builder. Design and construction risks can be allocated to the design/builder if properly incorporated into the contract requirements.

**A.5: Environmental:** Meeting environmental document commitments, (noise, 4(f) and historic, wetlands, endangered species, etc.)

**DESIGN/BID/BUILD**

When the schedule allows, environmental risks are best mitigated by the Owner through its design consultant prior to procurement of the contractor.

**CMAR**

Environmental risks and responsibilities can be collectively identified, minimized, and allocated by the Owner, the consultant, and the CMAR prior to agreeing upon a GMP.

**PROGRESSIVE DESIGN/BUILD**

Environmental risks and responsibilities can be collectively identified, minimized, and allocated by the Owner and the Design/Builder prior to agreeing upon a GMP. Certain environmental approvals and processes that can be fully defined can be allocated to the Design/Builder. The Owner may have more knowledge of the permit requirements and experience with working with the permitting agencies than the Design/Builder. Due to the early procurement of the D/B, it is not likely to be possible or desirable to obtain agreements or MOUs with approval agencies prior to procurement of the Design/Builder.

**PRESCRIPTIVE-BASED DESIGN/BUILD**

Certain environmental approvals and processes that can be fully defined can be allocated to the Design/Builder. The Owner may have more knowledge of the permit requirements and experience with working with the permitting agencies than the Design/Builder. Due to the early procurement of the D/B, it is not likely to be possible or desirable to obtain, agreements or MOUs with approval agencies prior to procurement of the Design/Builder.

**A.6: Third Party Involvement:** Timeliness and impact of third party involvement (funding partners, adjacent municipalities, adjacent property owners, project stakeholders, environmental activists, PUC, etc.)

**DESIGN/BID/BUILD**

When the schedule allows, third party risk is best mitigated through the design process prior to procurement of the contractor to minimize potential for change orders and claims during construction.

**CMAR**

Third-party agreements, approvals, and processes can be resolved collaboratively by the Owner, the consultant, and the CMAR.

**PROGRESSIVE DESIGN/BUILD**

Third-party agreements, approvals, and processes can be resolved collaboratively by the Owner and the Design/Builder through the design progression. Due to early procurement of the DB, it is not likely that it will be possible or desirable to obtain agreements or MOUs with third parties prior to procurement of the Design/Builder .

**PRESCRIPTIVE-BASED DESIGN/BUILD**

Third-party agreements, approvals, and processes that can be fully defined can be allocated to the design/builder. Due to early procurement of the DB, it is not likely that it will be possible or to obtain, agreements or MOUs with third parties prior to procurement of the Design/Builder.

**B. GENERAL PROJECT RISK CHECKLIST (items to consider when assessing risk)**

Environmental & Permitting Risks	External Risks
<ul style="list-style-type: none"> <li><input type="checkbox"/> Defined and non-defined hazardous waste</li> <li><input type="checkbox"/> Environmental regulation changes</li> <li><input type="checkbox"/> 404 permitting issues</li> <li><input type="checkbox"/> CDPHE Site Application, Utility Plan Approvals</li> <li><input type="checkbox"/> CDPHE design review/approval delays</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Stakeholders request late changes</li> <li><input type="checkbox"/> Influential stakeholders request additional needs to serve their own commercial purposes</li> <li><input type="checkbox"/> Local communities/activists pose objections</li> <li><input type="checkbox"/> Community relations</li> <li><input type="checkbox"/> Conformance with regulations/guidelines/design criteria</li> <li><input type="checkbox"/> Intergovernmental agreements and jurisdiction</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>
Third-Party Risks	Geotechnical and Hazmat Risks
<ul style="list-style-type: none"> <li><input type="checkbox"/> Unforeseen delays due to utility owner or other third-party</li> <li><input type="checkbox"/> Encounter undocumented/unknown utilities during construction</li> <li><input type="checkbox"/> Utility integration with project not as planned</li> <li><input type="checkbox"/> Coordination with other projects</li> <li><input type="checkbox"/> Coordination with other government agencies</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Unexpected geotechnical issues</li> <li><input type="checkbox"/> Surveys late and/or in error</li> <li><input type="checkbox"/> Hazardous waste site analysis incomplete or in error</li> <li><input type="checkbox"/> Inadequate geotechnical investigations</li> <li><input type="checkbox"/> Adverse groundwater conditions</li> <li><input type="checkbox"/> Other general geotechnical risks</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>
Right-of-Way/Land Acquisition Risks	Design Risks
<ul style="list-style-type: none"> <li><input type="checkbox"/> Objections to ROW appraisal take more time and/or money</li> <li><input type="checkbox"/> Excessive relocation or demolition</li> <li><input type="checkbox"/> Acquisition ROW problems</li> <li><input type="checkbox"/> Difficult or additional condemnation</li> <li><input type="checkbox"/> Accelerating pace of development in project corridor</li> <li><input type="checkbox"/> Additional ROW purchase due to alignment change</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Design is incomplete or has errors</li> <li><input type="checkbox"/> Scope definition is poor or incomplete</li> <li><input type="checkbox"/> Project purpose and need are poorly defined</li> <li><input type="checkbox"/> Communication breakdown within project team</li> <li><input type="checkbox"/> Pressure to deliver project on an accelerated schedule</li> <li><input type="checkbox"/> Constructability of design issues</li> <li><input type="checkbox"/> Project complexity (scope, schedule, objectives, cost, and deliverables are not clearly understood)</li> <li><input type="checkbox"/> _____</li> </ul>
Organizational Risks	Construction Risks
<ul style="list-style-type: none"> <li><input type="checkbox"/> Inexperienced staff assigned</li> <li><input type="checkbox"/> Losing critical staff at crucial point of the project</li> <li><input type="checkbox"/> Functional units not available or overloaded</li> <li><input type="checkbox"/> No control over consultant or contractor staff priorities</li> <li><input type="checkbox"/> Lack of leadership in coordination and communication within Owner, Consultant or Contractor's staff</li> <li><input type="checkbox"/> Owner political issues</li> <li><input type="checkbox"/> Owner internal red tape causes delay getting approvals, decisions</li> <li><input type="checkbox"/> Too many projects or new priority projects inserted into program</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Pressure to deliver project on an accelerated schedule</li> <li><input type="checkbox"/> Inaccurate contract time estimates</li> <li><input type="checkbox"/> Construction QC/QA issues</li> <li><input type="checkbox"/> Unclear contract documents</li> <li><input type="checkbox"/> Problem with construction sequencing/ staging/ phasing</li> <li><input type="checkbox"/> Safety during construction</li> <li><input type="checkbox"/> Impact of construction on plant operations</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

**C. RISK OPPORTUNITIES/OBSTACLES CHECKLIST (relative to each delivery method)**

DESIGN/BID/BUILD	
<p>Risk allocation for design/bid/build is well understood by the industry. However, for best results it requires that most design-related and third-party risks be resolved prior to procurement of the contractor to avoid costly contractor contingency pricing and change orders and claims during construction.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Risk allocation is most widely understood/used</li> <li><input type="checkbox"/> Opportunity to avoid or mitigate risk through complete design</li> <li><input type="checkbox"/> Ideal situation for pricing certainty is for risks related to environmental and third- party involvement are resolved prior to contractor procurement</li> <li><input type="checkbox"/> Project can be shelved while resolving risks</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Owner accepts risks associated with project complexity (the inability of designer to anticipate all conditions that will be encountered during construction) and project unknowns</li> <li><input type="checkbox"/> Low-bid related risks</li> <li><input type="checkbox"/> Potential for misplaced risk through prescriptive specifications</li> <li><input type="checkbox"/> Innovative risk allocation is difficult to obtain</li> <li><input type="checkbox"/> Limited industry input in contract risk allocation</li> <li><input type="checkbox"/> Change order risks likely greater</li> <li><input type="checkbox"/> Contractor may avoid risks</li> <li><input type="checkbox"/> Attempt to resolve risks before contractor procurement extends schedule</li> <li><input type="checkbox"/> Owner liable for errors/omissions of designer</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
<p>Provides opportunity for Owner, Designer, and CMAR to collectively identify and minimize project risks, and allocate risk to appropriate party. Has potential to minimize CMAR contingency pricing of risk, but can lose the element of competition in pricing.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Early involvement of CMAR affords them a better understanding of the project risks and potential unknown conditions as design progresses</li> <li><input type="checkbox"/> Innovative opportunities available to allocate risks to different parties who are better able to manage them (e.g., construction schedule, means and methods, phasing)</li> <li><input type="checkbox"/> Opportunities to manage construction costs risks through CMAR early involvement during design</li> <li><input type="checkbox"/> CMAR will help identify and manage risk</li> <li><input type="checkbox"/> Owner still has considerable say in how risks are managed.</li> <li><input type="checkbox"/> Negotiation of a GMP avoids low-bid risk in procurement of construction</li> <li><input type="checkbox"/> More flexibility and innovation available to deal with unknowns early in design process</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Disagreement among Designer, CMAR, and/or the Owner can put the collaborative process at risk and may cause delays</li> <li><input type="checkbox"/> Owner may be required to mediate and make decisions if Designer and CMAR do not agree on design direction versus budget</li> <li><input type="checkbox"/> If GMP cannot be agreed upon and the Owner hard bids the project, low-bid risks reappear</li> <li><input type="checkbox"/> Strong Owner management is required to negotiate and allocate risks</li> <li><input type="checkbox"/> Depending on the allocation of risk for unknown conditions, discovery of such conditions during construction can result in a change order increasing the GMP, which can be compounded in phased construction</li> <li><input type="checkbox"/> Owner may retain considerable responsibility for involvement with third parties and mitigating risks associated with them.</li> <li><input type="checkbox"/> Owner liable for errors/omissions of Designer</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>



PROGRESSIVE DESIGN/BUILD	
Provides opportunity for Owner and Design/Builder to collectively identify and minimize project risks, and allocate risk to appropriate party. Has potential to minimize Design/Builder contingency pricing of risk, but can lose the element of competition in pricing.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Early involvement of Design/Builder affords them a better understanding of the project risks and potential unknown conditions as design progresses</li> <li><input type="checkbox"/> Innovative opportunities available to allocate risks to different parties who are better able to manage them (e.g., construction schedule, means and methods, phasing)</li> <li><input type="checkbox"/> Opportunities to manage construction costs risks through Design/Builder early involvement during design</li> <li><input type="checkbox"/> Design/Builder will help identify and manage risk</li> <li><input type="checkbox"/> Owner still has considerable say in how risks are managed.</li> <li><input type="checkbox"/> Negotiation of a GMP avoids low-bid risk in procurement of construction</li> <li><input type="checkbox"/> More flexibility and innovation available to deal with unknowns early in design process</li> <li><input type="checkbox"/> Reward for the assumption of risk can be properly allocated</li> <li><input type="checkbox"/> Avoids low-bid risk in procurement</li> <li><input type="checkbox"/> Design/builder will help identify risks related to environmental, railroads, ROW, and utilities</li> <li><input type="checkbox"/> Design/builder will work toward innovative solutions to – or avoidance of – unknowns</li> <li><input type="checkbox"/> Risk of errors and omissions in the design shifted from Owner to design/builder</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> If GMP cannot be agreed upon and the Owner hard bids the project, low-bid risks reappear</li> <li><input type="checkbox"/> Strong Owner management is required to negotiate and allocate risks</li> <li><input type="checkbox"/> Depending on the allocation of risk for unknown conditions, discovery of such conditions during construction can result in a change order increasing the GMP</li> <li><input type="checkbox"/> Owner may retain considerable responsibility for involvement with third parties and mitigating risks associated with them.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PRESCRIPTIVE-BASED DESIGN/BUILD	
Provides opportunity to properly allocate risks to the party best able to manage them, but requires risks allocated to design/builder to be well defined in RFP to minimize design/builder contingency pricing of risks in proposal.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Performance/prescriptive specifications can allow for alternative risk allocations to the Design/Builder</li> <li><input type="checkbox"/> Reward for the assumption of risk can be properly allocated</li> <li><input type="checkbox"/> Innovative opportunities available to allocate risks to different parties who are better able to manage them (e.g., construction schedule, means and methods, phasing)</li> <li><input type="checkbox"/> Opportunity for industry review of risk allocation and feedback to improve the RFP (using draft RFP, ATC processes)</li> <li><input type="checkbox"/> Avoids low-bid risk in procurement</li> <li><input type="checkbox"/> Design/builder will help identify risks related to environmental, railroads, coordination of construction with plant operation and utilities</li> <li><input type="checkbox"/> Design/builder may be more experienced with mitigating risks associated with permitting</li> <li><input type="checkbox"/> Design/builder will work toward innovative solutions to – or avoidance of – unknowns</li> <li><input type="checkbox"/> Risk of errors and omissions in the design shifted from Owner to design-builder</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Need enough detail in the RFP project scope to define the various risks and their allocation to get accurate/comprehensive responses to the RFP</li> <li><input type="checkbox"/> Poorly defined risks and their allocation during design/builder procurement phase will result in high contingencies being carried and higher bid or proposal prices.</li> <li><input type="checkbox"/> If performance/prescriptive requirements not well defined, builder may attempt to drive designer to decrease cost of their design, resulting in a risk to quality</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

**6) Staff Experience/Availability Checklist:** Staff experience and availability as it relates to the project delivery methods under consideration.

DESIGN/BID/BUILD	
Technical and management resources necessary to perform the design and plan and execute the construction.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Owner, contractors and consultants have high level of experience with the traditional D-B-B method</li> <li><input type="checkbox"/> Consultant’s staff, since they are not part of a design/build or CMAR team, can be moved to other projects more easily.</li> <li><input type="checkbox"/> May permit more specialization among Owner’s staff, some specializing in design phase and others in construction phase</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Can require a high level of agency staffing of technical resources due to extended schedule resulting from sequential D-B-B.</li> <li><input type="checkbox"/> Owner and Consultant’s staff responsibilities and assignment to the project are spread out over a longer design and construction period</li> <li><input type="checkbox"/> Owner’s utilization of specialized staff during various phases may result in loss of project knowledge when transitioning from design into construction phases.</li> <li><input type="checkbox"/> Contractor’s staff, having not been involved during design, will have a steep learning curve upon receiving award of the project.</li> <li><input type="checkbox"/> Owner’s staff must conduct a minimum of two procurements and must administer a minimum or two separate contracts throughout the project (Prime Consultant, perhaps secondary consultants such as geotech, appraisers, inspection, testing, and commissioning agents, and Contractor).</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
Owner project management resources familiar with and committed to the success of CMAR project delivery are necessary. Resource needs are similar to D/B/B except Owner must coordinate providing the CMAR's input to the Designer. Owner must understand process and be prepared for GMP negotiations.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Owner can improve efficiencies by having more project managers on staff rather than specialized technical experts</li> <li><input type="checkbox"/> Smaller number of Owner technical staff required for assignment to the project due to early involvement of CMAR in the project and collaboration between Designer and CMAR experts.</li> <li><input type="checkbox"/> Early CMAR involvement in design may result in less conflict during construction, and less Owner staff time expended on claims and conflict resolution.</li> <li><input type="checkbox"/> Early CMAR involvement may allow for early commencement of phased construction packages, thus shortening the overall schedule and reducing Owner staff time on the project.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Strong committed Owner project management is important to success</li> <li><input type="checkbox"/> Limitation of availability of staff with skills, knowledge and attitude to manage CMAR projects</li> <li><input type="checkbox"/> Existing Owner staff may need additional training to understand their new roles, responsibilities, and working relationships under CMAR project delivery</li> <li><input type="checkbox"/> Owner must understand how to negotiate a GMP for a CMAR project</li> <li><input type="checkbox"/> Owner's staff still responsible to conduct a minimum of two procurements (the Designer and the CMAR) and to administer a minimum of two separate contracts throughout the course of the project.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

<b>PROGRESSIVE DESIGN/BUILD</b>	
<p>Technical and management resources, either in-house (Owner) or outside (Owner’s Advisor), with expertise in D/B are necessary to develop the RFQ and RFP, administer the procurement and manage the D/B process from award through project completion. Concurrent need for resources with both design and construction expertise to oversee the implementation. Owner must understand process and be prepared for GMP negotiations.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Less Owner contract administration, risk management, accounts payable, etc., staff time required due to single contract nature of D/B procurement</li> <li><input type="checkbox"/> Opportunity for Owner’s staff to grow professionally by learning a new project delivery method</li> <li><input type="checkbox"/> Collaborative process is more efficient and results in less Owner staff time expended on claims and conflict resolution</li> <li><input type="checkbox"/> Overlap in design and construction phases with D/B project delivery shortens overall schedule and reduces Owner staff time on the project.</li> <li><input type="checkbox"/> Single contract for design and construction reduces coordination workload between the two activities</li> <li><input type="checkbox"/> Eliminates the construction bidding and award process</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May require Owner to retain an Owner’s Advisor to perform conceptual design for use in the D/B RFQ/RFP.</li> <li><input type="checkbox"/> Limitation of availability of Owner’s staff with skills and knowledge to manage D/B projects</li> <li><input type="checkbox"/> Existing Owner staff may need additional training to understand their new roles, responsibilities, and working relationships under D/B project delivery</li> <li><input type="checkbox"/> To achieve optimum success, requires Owner’s staff to work collaboratively with Design/Builder and avoid adversarial relationship</li> <li><input type="checkbox"/> Need to focus Owner management and technical resources at critical points in process (i.e., RFQ/RFP development, Design/Builder selection, periodic design reviews, decision points, etc.)</li> <li><input type="checkbox"/> If a GMP is utilized in the compensation of the D/B, Owner must understand how to negotiate a GMP and when a change order modifying the GMP is or is not justified.</li> <li><input type="checkbox"/> _____</li> </ul>

<b>PRESCRIPTIVE-BASED DESIGN/BUILD</b>	
<p>Technical and management resources, either in-house (Owner) or outside (Owner’s Advisor), with expertise in D/B are necessary to develop the RFQ and RFP, administer the procurement, negotiate the contract, and manage the D/B process from award through project completion. Concurrent need for resources with both design and construction expertise to oversee the implementation.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Less Owner contract administration, risk management, accounts payable, etc., staff time required due to single contract nature of D/B procurement</li> <li><input type="checkbox"/> Opportunity for Owner’s staff to grow professionally by learning a new project delivery method</li> <li><input type="checkbox"/> Collaborative process is more efficient and results in less Owner staff time expended on claims and conflict resolution</li> <li><input type="checkbox"/> Overlap in design and construction phases with D/B project delivery shortens overall schedule and reduces Owner staff time on the project.</li> <li><input type="checkbox"/> Single contract for design and construction reduces coordination workload between the two activities</li> <li><input type="checkbox"/> Eliminates the construction bidding and award process</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May require Owner to retain a consultant to do prelim investigations and or designs for use in the D/B RFQ/RFP.</li> <li><input type="checkbox"/> Limitation of availability of Owner’s staff with skills and knowledge to manage D/B projects</li> <li><input type="checkbox"/> Existing Owner staff may need additional training to understand their new roles, responsibilities, and working relationships under D/B project delivery</li> <li><input type="checkbox"/> To achieve optimum success, requires Owner’s staff to work collaboratively with design/builder and avoid adversarial relationship</li> <li><input type="checkbox"/> Need to focus Owner management and technical resources at critical points in process (i.e., RFP development, design/builder selection, periodic design reviews, decision points, etc.)</li> <li><input type="checkbox"/> If a GMP is utilized in the compensation of the D/B, Owner must understand how to negotiate a GMP and when a change order modifying the GMP is or is not justified.</li> <li><input type="checkbox"/> _____</li> </ul>

**7) Level of Oversight and Control Checklist:** Level of oversight involves the amount of Owner staff required to monitor the design or construction, and amount of Owner input and control over the project delivery process.

DESIGN/BID/BUILD	
Owner responsible for full oversight and control over a sequential design and construction process	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Full Owner control over a sequential design and construction process</li> <li><input type="checkbox"/> Oversight and control roles are well understood</li> <li><input type="checkbox"/> Contract documents are typically completed in a single package before construction begins, allowing for maximum Owner control over design</li> <li><input type="checkbox"/> Multiple checking points through three sequential phases: design/bid/build</li> <li><input type="checkbox"/> Owner fully responsible for oversight, and may conduct design peer review with in-house staff or engage an independent consultant, and may perform construction inspection and testing with in house staff or engage an independent agent. Owner’s engagement of oversight agency avoids potential for conflict of interest.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Requires a high-level of Owner technical staff resources to provide oversight since Owner has responsibility for adequacy of construction documents and management of and coordination between Consultant and Contractor during construction phase.</li> <li><input type="checkbox"/> Limited ability for Owner to integrate design and construction process</li> <li><input type="checkbox"/> Owner has no input into means, methods, phasing, or scheduling of construction.</li> <li><input type="checkbox"/> Owner must be willing to adjust the contract price and or schedule if requested changes impact the design and or the construction scope of work after contract award.</li> <li><input type="checkbox"/> Owner assumes liability for errors and omissions in design</li> <li><input type="checkbox"/> Owner manages two separate contracts and manages conflicts between design and construction</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
Owner responsible for full oversight and control over the design and construction process. Allows for Owner to control the level of collaboration between Owner, Designer, and CMAR, however placing restrictions on collaboration may be counterproductive.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> CMAR assists Owner with oversight of design.</li> <li><input type="checkbox"/> Owner maintains direct control over design while obtaining pre-construction input from CMAR.</li> <li><input type="checkbox"/> Owner has control over which CMAR recommendations are incorporated into the design.</li> <li><input type="checkbox"/> May result in a higher confidence level in the constructability of the design that with D/B/B.</li> <li><input type="checkbox"/> Until the GMP is negotiated with the CMAR, Owner has more opportunity to provide input on means, methods, phasing and scheduling of construction.</li> <li><input type="checkbox"/> Team collaboration may reduce conflicts and thereby reduce oversight effort required</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Requires a high-level of Owner technical staff resources to provide oversight since Owner has responsibility for adequacy of construction documents and management of and coordination between Consultant and Contractor during both design and construction phases.</li> <li><input type="checkbox"/> After the GMP is negotiated, Owner must be willing to adjust the contract price and or schedule if requested changes impact the scope of work.</li> <li><input type="checkbox"/> Owner assumes liability for errors and omissions in design</li> <li><input type="checkbox"/> Owner manages two separate contracts and manages conflicts between design and construction</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PROGRESSIVE DESIGN/BUILD	
<p>Owner provides input to design as design progresses. Owner collaborates during design. Owner's desired design outcomes and performance/prescriptive requirements must be written into the resulting negotiated contract documents as design progresses. Owner may have less oversight and less responsibility for control over the construction process.</p>	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> A single entity is responsible for project planning, design, scheduling, and construction, so less administrative oversight and coordination required by Owner.</li> <li><input type="checkbox"/> Owner may include a requirement in the D/B contract for a peer review of the design at certain milestones.</li> <li><input type="checkbox"/> Owner may include a requirement in the D/B contract for an independent QA/QC and or commissioning agent, to be paid by the Owner.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> To achieve desired design outcomes while maintaining D/B ability to innovate, need to focus Owner management and technical resources at critical points in procurement and progressive design process (i.e., RFQ/RFP development, Design/Builder selection, periodic design reviews, decision points, etc.)</li> <li><input type="checkbox"/> Level of Owner input desired during design iterations must be defined in the negotiated contact documents .</li> <li><input type="checkbox"/> Unless specified in the D/B contact, Owner may have limited control over approval of change during construction.</li> <li><input type="checkbox"/> Owner must be willing to adjust the contract price and or schedule if Owner requested changes impact the scope of work.</li> <li><input type="checkbox"/> _____</li> </ul>

PRESCRIPTIVE-BASED DESIGN/BUILD	
Owner exercises less control during design (Owner’s desired design outcomes and performance/prescriptive requirements must be written into the RFP and resulting contract documents). Owner may have less oversight and less responsibility for control over the construction process.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> A single entity is responsible for project planning, design, scheduling, and construction, so less administrative oversight and coordination required by Owner.</li> <li><input type="checkbox"/> Oversight of design may be provided by builder</li> <li><input type="checkbox"/> Owner may include a requirement in the D/B RFP for a peer review of the design at certain milestones.</li> <li><input type="checkbox"/> Owner may include a requirement in the D/B RFP for an independent QA and or commissioning agent, to be paid either by the D/B or by the Owner.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> To achieve desired design outcomes while maintaining D/B ability to innovate, Owner should rely on proper development of performance/prescriptive requirements during RFQ/RFP phase instead of making changes during design phase iterations.</li> <li><input type="checkbox"/> Level of Owner input desired during design iterations must be defined in the RFP documents and incorporated into the D/B contract documents.</li> <li><input type="checkbox"/> Limitation on staff with D/B oversight experience may require Owner's Advisor to assist</li> <li><input type="checkbox"/> Unless specified in the D/B RFP, Owner has no input into means, methods, phasing, or scheduling of construction. May have limited control over approval of change during construction.</li> <li><input type="checkbox"/> Control over design depends on type of D/B implemented, Fixed Price D/B, Progressive D/B, Cost Plus Fee, etc.</li> <li><input type="checkbox"/> Owner must be willing to adjust the contract price and or schedule if requested changes impact the scope of work.</li> <li><input type="checkbox"/> _____</li> </ul>

8) **Competition and Contractor Experience** – Competition and availability refer to the level of competition, experience and availability in the market place and its capacity for the project.

DESIGN/BID/BUILD	
High level of competition. Contractor selection is based primarily on low price provided they meet the minimum bar for qualifications. High level of experience with D/B/B in the marketplace.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Promotes high degree of competition in the marketplace for construction services</li> <li><input type="checkbox"/> Owner may pre-qualify and shortlist, which assures a qualified bidder will win the work.</li> <li><input type="checkbox"/> Prequalification reduces bidding expense and results in better qualified firms interested in participating.</li> <li><input type="checkbox"/> Hard bid process is transparent</li> <li><input type="checkbox"/> Reduced chance of corruption and collusion during hard bid process</li> <li><input type="checkbox"/> Most W/WW contractors are familiar with D/B/B process and participate in this type of project delivery</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Risks associated with selecting the low bid (the best contractor is not necessary selected)</li> <li><input type="checkbox"/> If prequalification not done, limited ability to incorporate contractor qualifications into selection</li> <li><input type="checkbox"/> If prequalification not done, some highly qualified contractors may choose not to bid so they don’t have to compete with firms perceived to be buying the work.</li> <li><input type="checkbox"/> In a hard bid situation, the initial bid is often not the final price, which is usually higher.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

CMAR	
Competition may be based solely on qualifications or on a combination of price and non-price factors in the selection process. May be a more limited pool of experienced CMAR practitioners in the marketplace.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Allows for a strictly qualifications based separate procurements of Designer and CMAR</li> <li><input type="checkbox"/> Allows for fee to be a competitive factor in the selection if CMAR compensation method is based on percentage fee markups which are later applied to an audited cost of work.</li> <li><input type="checkbox"/> Owner independently selects the Designer and the CMAR firm and may choose the best qualified in each category as opposed to a pre-established D/B team (or the luck of the draw on a hard bid contractor selection.)</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> May be a limited pool of firms with experience in CMAR, which will reduce the competition and availability</li> <li><input type="checkbox"/> Negotiating a GMP with the CMAR at a future point during the design process limits price competition and transparency, unless a COW plus fee compensation method is used and the percentage fee markups were used for price competition in the selection process.</li> <li><input type="checkbox"/> Owner may lack experience with or be uncomfortable with CMAR selection based solely on qualifications.</li> <li><input type="checkbox"/> Owner may lack experience with or be uncomfortable with negotiated GMP or Cost of Work Plus Fee pricing methodologies</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>

PROGRESSIVE DESIGN/BUILD	
Competition may be based solely on qualifications or on a combination of price and non-price factors (best value) in the selection process. May be a more limited pool of experienced D/B practitioners in the marketplace.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prequalification and shortlisting of proposing D/B firms or teams assures qualified firms will be selected for the project</li> <li><input type="checkbox"/> Allows for selection to be based strictly on qualifications, with price to be negotiated later as design progresses</li> <li><input type="checkbox"/> Allows for price to be a factor in the selection (best value), to the extent it is based on preconstruction service fees and or percentage fee markups which are later applied to an audited cost of work.</li> <li><input type="checkbox"/> The final price paid by the Owner may be less than the negotiated GMP proposal if the basis of the GMP was well defined during the procurement phase.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Fewer experienced practitioners in the marketplace.</li> <li><input type="checkbox"/> Owner may lack experience with or be uncomfortable with selection based solely on qualifications.</li> <li><input type="checkbox"/> Owner may lack experience with or be uncomfortable with a best value based selection</li> <li><input type="checkbox"/> Owner may lack experience with or be uncomfortable with negotiating pricing methodologies other than lump sum bids.</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>



PRESCRIPTIVE-BASED DESIGN/BUILD	
Competition may be based solely on a fixed price submitted with proposals or on a combination of price and non-price factors in the selection process. May be a more limited pool of experienced D/B practitioners in the marketplace.	
Opportunities	Obstacles
<ul style="list-style-type: none"> <li><input type="checkbox"/> Prequalification and shortlisting of proposing D/B firms or teams assures qualified firms will be awarded the project</li> <li><input type="checkbox"/> Allows for selection to be based strictly on a fixed price (if performance specs are detailed enough), or as a GMP (if basis of GMP is defined well enough)</li> <li><input type="checkbox"/> Allows for a two-step evaluation process to obtain a “Best Value” selection. Technical proposal criteria are scored first, and the technical score is used to adjust the price proposal to arrive at an “adjusted price” for the purposes of selection the best value proposal.</li> <li><input type="checkbox"/> Opportunity for innovation during the RFP process.</li> <li><input type="checkbox"/> The final price paid by the Owner may be less than the initial GMP proposal if the basis of the GMP was well defined during the procurement phase.</li> <li><input type="checkbox"/> _____</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Need to pre-qualify D/B firms or teams can limit competition due to fewer experienced practitioners in the marketplace.</li> <li><input type="checkbox"/> Owner may lack experience with or be uncomfortable with a Best Value type of competition and selection</li> <li><input type="checkbox"/> _____</li> <li><input type="checkbox"/> _____</li> </ul>