

## APPENDIX K

### Alternative Project Delivery Methods



**Regional Optimization Master Plan  
Final Report**

Appendix K – Alternative Project Delivery Methods

## Table of Contents

<b>1 - Alternative Project Delivery Methods.....</b>	<b>K-1</b>
1.1 Introduction .....	K-1
1.2 Design-Build .....	K-1
1.2.1 Description .....	K-1
1.2.2 Advantages .....	K-3
1.2.3 Disadvantages .....	K-5
1.3 Design-Build-Operate.....	K-7
1.3.1 Description .....	K-7
1.3.2 Advantages .....	K-9
1.3.3 Disadvantages .....	K-10
1.4 Construction-Manager-at-Risk .....	K-10
1.4.1 Description .....	K-10
1.4.2 Advantages .....	K-11
1.4.3 Disadvantages .....	K-12
1.5 Procurement Method Selection Considerations .....	K-13
1.5.1 Procurement Process Considerations .....	K-13
1.5.2 Design and Construction Considerations .....	K-14
1.5.3 Operation and Maintenance Considerations .....	K-14

## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

## 1 - Alternative Project Delivery Methods

### 1.1 Introduction

Arizona law offers considerable flexibility to local government agencies in the procurement of public works. In addition to the design-bid-build (bid-build) method of contracting traditionally used by local government agencies across the United States, Arizona law enables local government agencies in Arizona to use the following alternative project delivery methods: design-build (including design-build-operate, design-build-finance-operate and design-build-finance-own-operate); construction-manager-at-risk; and job-order-contracting. A brief discussion concerning the design-build, design-build-operate and construction-manager-at-risk project delivery methods follows.<sup>1</sup>

The following discussion assumes a familiarity with the traditional, bid-build method of project delivery. The County has a great deal of experience with this traditional method. The bid-build method is addressed throughout the following discussion on a comparative basis with each of the alternative project delivery methods

### 1.2 Design-Build

#### 1.2.1 Description

**General.** Under the design-build method of project delivery, a governmental agency contracts with a single entity to provide both design and construction services for a project. In selecting the design-build contractor, the governmental agency employs a competitive proposal process, which consists generally of the issuance of a request for qualifications followed by the issuance of a request for proposals. The design-build contractor is selected based on the overall value of the proposal, considering factors such as qualifications, performance guarantees, and the quality of the proposed design, as well as price, rather than price alone.

The typical design-build contract requires the design-build contractor to design and construct a project in accordance with a basic set of “design requirements” and to demonstrate that the project can achieve a defined set of “performance standards” through the successful completion of an “acceptance test”. Design and construction services are generally completed in concurrent phases, enabling the design-build contractor to achieve efficiencies in the design and construction schedule. Following “acceptance” of the

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<sup>1</sup> Job order contracting method has limited applicability to the types of major capital improvements contemplated by this report. Additionally, discussion concerning design-build-finance-operate or design-build-finance-own-operate are not included. Private financing, with or without private ownership, involves a large number of additional complexities beyond the scope of this report. Nonetheless, Arizona law does appear to authorize these methods should the County wish to consider them in connection with the projects considered in this report. As the repayment of any private financing would involve a long-term operations and maintenance contract for the privately financed asset, many of the considerations set forth below concerning design-build-operate will apply to design-build-finance-operate and design-build-finance-own-operate.



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

project, primary responsibility for the project, including project operations (if applicable), transfers to the owner-governmental agency, subject to basic warranties of construction for a limited period (typically, one to two years).

**Structuring the Design-Build Project.** The first step in implementing a design-build project is for the governmental agency to develop a basic description of the project and to define the required performance standards for the project. Owner-governmental agencies typically contract with engineering and procurement consultants to assist in defining project requirements, drafting procurement documents, and drafting and negotiating the design-build contract. In the context of a County wastewater treatment facility, the procurement documents would include the performance standards that the completed facility would be required to meet and any design elements that the County wishes to mandate for inclusion in any proposed design.<sup>2</sup> The preliminary design included in the proposal selected through the procurement process forms the basis of the “design requirements” under the design-build contract.

**Transfer of Design Liability.** A critical function of the design-build contract is the transfer of design liability to the design-build contractor. As discussed above, the design-build contractor proposes the preliminary design for the project as part of the procurement process and, once the design-build contract is signed, develops the detailed plans and specifications for the project in a manner that is fully consistent with the contractual design requirements. In this way, the design-build contractor is fully responsible for the design of the project and therefore bears all risk associated with design errors or defects. The design-builder will be “on the hook” under the contract until the project passes the acceptance test, subject to relief only in the event of the occurrence of circumstances beyond the design-builder contractor’s control.<sup>3</sup>

**Single Point of Responsibility.** A well-drafted design-build contract establishes the design-build contractor as the single point of responsibility for all aspects of design and construction, with the sole responsibility for disputes between design subcontractors and construction subcontractors. If the project fails to perform, the owner-governmental agency has a contract claim against the design-build contractor

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<sup>2</sup> For example, the County may wish to mandate that any proposed facility include membrane technology in the treatment process so that, in order to be responsive to the request for proposals, respondents would need to incorporate membrane technology in their proposed design. Problems can arise where a governmental agency is overly prescriptive in developing its project requirements. As discussed below, the transfer of design liability is premised upon the fact that the design-build contractor is responsible for developing the design from the preliminary design level to the detailed plans and specifications. The owner-governmental agency runs the risk of negating this transfer of design liability where detailed plans and specifications are included in the procurement documents.

<sup>3</sup> In order to provide for a clear allocation of risk between the parties to a design-build contract, it is generally recommend that the parties attempt to negotiate an “uncontrollable circumstance” definition in the contract. For example, in no event should any act, event or circumstance that would not have occurred had the affected party complied with its obligations under the contract constitute an uncontrollable circumstance. Conversely, a change in applicable law is generally beyond the control of a party and should therefore be defined as an uncontrollable circumstance. The occurrence of an uncontrollable circumstance (including traditional “force majeure”) generally entitles the design-builder to price, schedule and performance relief.



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

without the need to establish the negligence of the design subcontractor or to become involved in disputes between the design subcontractor and the construction subcontractor.

#### 1.2.2 Advantages

**Risk Transfer.** As discussed above, the design-build contracting method enables the owner-governmental agency to transfer risks associated with design liability and disputes between design subcontractors and construction subcontractors to the design-build contractor. This is in contrast to the traditional, bid-build method of contracting where the owner-governmental agency must enter into separate contracts for design and construction. Under established United States Supreme Court precedent, when an owner-governmental agency furnishes plans and specifications to a construction contractor, as under the traditional, bid-build method of contracting, there is an implied warranty that the furnished design is capable of construction.<sup>4</sup> Accordingly, the extent of the obligation of a construction contractor under a bid-build contract is the construction of the project in accordance with the furnished plans and specifications. The construction contractor bears no liability for the furnished design. Moreover, the design engineering contract in a bid-build project is generally not a performance-based contract, which means that an owner-governmental agency must establish the negligence of the design engineer in order to prevail in a claim if there are design issues encountered in a project. This negligence standard creates a bar to relief for an owner-governmental agency in the event design issues cause a project to not operate properly or otherwise fail that is significantly higher than the claim available under a design-build contract. Additionally, it is often unclear as to whether issues that cause a project to fail originate from a project's design or from its construction, which can leave an owner-governmental agency under a bid-build contract forced to pursue claims against both the design contractor and the construction contractor, with each pointing the finger at the other. Under a design-build project, one party (the design-build contractor) is responsible for making the project work. If the project does not work, absent carefully defined uncontrollable circumstances, the design-build contractor is responsible, regardless of whether the reason for the failure is due to design or construction issues. That single contractor, rather than the owner-governmental agency, has to sort out issues among its various subcontractors.

**Prequalification.** The procurement process authorized under Arizona law for a design-build project enables the owner-governmental agency to pre-qualify potential design-build firms through the issuance of a request for qualifications preceding the issuance of the request for proposals. Through this process, the owner-governmental agency is able to narrow the field of respondents to the request for proposals to those firms possessing the best financial and technical qualifications for the project. While this pre-qualification process is generally available for the other alternative project delivery methods discussed in this chapter, it is not available for the selection of a construction contractor under the traditional bid-build method of contracting. Prequalification is particularly important in projects such as wastewater facility projects, which involve sophisticated technology and can take a number of years to implement. The prequalification process can provide assurance to the County that its contracting partner has the technical expertise to address challenges as they arise and the financial wherewithal to sustain a long-term project effort.

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<sup>4</sup> See generally United States v. Spearin, 248 U.S. 132 (1918).



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

**Competition on Factors Other than Price.** The request for proposals process enables competition on factors other than price, which can result in innovative proposals and enable an owner-governmental agency to tap into private sector ingenuity to solve the particular design challenges of a given project. This is particularly useful in the context of a project involving a public utility asset such as a wastewater treatment facility, as contrasted to the construction of an office building, which does not have to “work”. Through the request for proposals process, an owner-governmental agency can stipulate a basic set of performance requirements for the completed facility and require the design-build firms to compete on proposed design solutions in their proposals. As price is also a factor in the selection process, the design-build method generates competition over the optimal way to achieve the performance requirements in the most cost-effective manner.

**Collaboration on Design and Construction.** The design-build contracting method enables collaboration between the design subcontractor and the construction subcontractor in the development of the proposal. The exchange of ideas between these two parties can avoid problems down the road when the construction subcontractor actually begins to implement the design with shovels in the ground. In contrast, under the bid-build method and, to a lesser extent, the construction-manager-at-risk method, the construction contractors have no involvement in the development of the design or in constructability issues, and therefore run a greater risk of encountering problems in the implementation of the owner-governmental agency’s design.

**Early Stage, Lower Cost Price Certainty.** Both bid-build and design-build contracting offer fixed pricing: bid-build for the construction work, and design-build for both design and construction services. The key difference is that under the design-build method, the lump sum price for the project can be ascertained by the owner-governmental agency much earlier in the procurement process, and for a much lower “transactional” cost. Design-build contractors will propose a fixed price in response to a request for proposals based on a 20-30% complete design; bid-build contractors, by virtue of the nature of the procurement method, must await a 100% complete design from the owner in the request for bids. Further, design-build transaction costs (primarily the owner-governmental agency’s procurement and engineering advisors) typically run between 1-3% of the project’s construction cost, while bid-build transaction costs can run from 8-12% of construction cost (mostly engineering fees for the 100% complete design). Using these benchmarks for a hypothetical \$200 million treatment plant, an owner-governmental agency can know the actual cost of the project under design-build within approximately nine to 12 months (the time for project planning, design to 20-30%, and proposal), with procurement transaction costs of \$3-5 million. However, contract negotiations may protract the time. Under the bid-build method, actual project costs will not be known for 18-24 months (the time for project planning, design to 100%, procurement and bidding), with transaction costs of \$16-24 million (project design, engineering and procurement costs). Estimated project costs are prepared at the preliminary stage under either method, but under design-build, the owner-governmental agency is in a much better position than it is under bid-build in the event actual pricing is unexpectedly higher than the early planning estimates.

**Schedule Compression.** Design-build contracting is particularly useful in the context of a project where schedule is a key concern. As contrasted with the bid-build method of contracting where the design must be fully developed under a separate contract prior to the procurement of the construction contract, the design-build method contemplates concurrent design and construction of the project, which enables the design-build contractor to achieve efficiencies in the design and construction schedule. Indeed, more



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

rapid project delivery is often cited as the key reason for selecting the design-build project delivery method.

**Minimization of Change Orders.** Design changes under a design-build contract are generally the responsibility of the design-build contractor. In the event that the design-build contractor determines that a change to the design is required in order to meet the performance requirements of the design-build contract, the design-build contractor must make such changes at its own expense and without schedule or performance relief. Change orders under a design-build contract generally issue only in the event of the occurrence of uncontrollable circumstances or in the event that the owner-governmental agency's project requirements change. Conversely, change orders are common under the bid-build and construction-manager-at-risk methods of contracting where the owner-governmental agency retains liability for the furnished design and where, as a practical matter, modifications to the complete design are required due to inadvertent errors or newly determined objectives.

### 1.2.3 Disadvantages

**Lack of Full Design Control.** One of the concerns raised by representatives of the County in our discussions concerning alternative project delivery and, particularly, design-build, was the fact that the County would have limited control over the development of the final design for a project. County representatives noted the importance of operator input in the design of a wastewater treatment facility and expressed concern over the limited opportunity for such input under the design-build method. As discussed above, in a typical design-build transaction, the owner-governmental agency develops only a basic description of the project and its requirements, focusing primarily on the performance standards that the completed project will be required to meet and on construction quality standards. While an owner-governmental agency may include prescribed design elements in a request for proposals, an overly prescriptive request for proposals runs the risk of negating the transfer of design liability.<sup>5</sup> Accordingly, the nature of design-build does require an owner-governmental agency to relinquish some control over design development. This makes the development of the performance requirements and construction quality standards for the completed facility in the request for proposals all the more important, as such performance requirements can serve to dictate the nature of the design of the facility.

**Lack of Familiarity.** While we understand that the County has some experience with the design-build method of project delivery in projects such as the Skyline Drive Design-Build Improvement Project, the County has never implemented a design-build wastewater project, where the operations of the facility can be critical. The role of the County utilities department in implementing a design-build wastewater project would be different from the role associated with a traditional bid-build project. During the design and construction phase following contract signing, the County's role would be limited to monitoring the design-build contractor's progress to determine whether the work is progressing in accordance with the design requirements set forth in the contract. The County would review and comment on design

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<sup>5</sup> See generally note 2, above. There is no bright-line rule to determine how much is too much in terms of including prescribed design elements in a request for proposals. For any given project, an owner-governmental agency must evaluate the importance of its preferences, considering the tension between stipulating design elements and transferring design liability.



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

submittals and other deliverables, but would not have an “approval” role with respect to such deliverables. Rather, the focal point of a design-build project is project acceptance, which occurs only after demonstration through the performance of an acceptance test that the project has been constructed in accordance with the design requirements and that it meets the performance standards. Prior to project acceptance, the design-build contractor has primary control over the means and methods toward achieving project acceptance, provided that such means and methods comply with applicable law and the specific terms and conditions of the design-build contract. Over-involvement by an owner-governmental agency in the design and construction phase can lead to disputes over responsibility in the event that things go wrong and may serve to negate the transfer of design liability.<sup>6</sup> Accordingly, in order to implement a design-build wastewater project, the County would likely need to reexamine its general contracting policies and procedures to adapt to the different roles associated with design development and implementation in the context of a design-build project.

**Lack of Long-Term Vested Interest.** A potential disadvantage of implementing a project such as a wastewater treatment facility on a design-build basis is the lack of a long-term stake on the part of the design-build contractor with respect to the operations of the facility. Respondents to a request for proposals are motivated by the competitive process to propose the lowest cost facility that will achieve the performance standards. However, the design-build contractor’s responsibility with respect to project performance effectively ends at the completion of the acceptance test and the turnover of operation responsibility to the owner-governmental agency.<sup>7</sup> Accordingly, while the County can be confident that the design-build process will result in a facility that will pass the acceptance test, risks associated with post-acceptance operations, including project operability and operations, maintenance, repair and replacement costs, will remain with the County. While this risk can be mitigated by carefully developed selection criteria, prescribed design elements and performance standards, there are risks associated with these mitigation measures. For example, while the County can include items such as project operability and life cycle costs as evaluation factors in the selection criteria, there is no way to contractually guarantee such items, as the design-build contractor has no control over project operations following acceptance and will therefore not ordinarily assume risks associated with such operations. Additionally, prescribed design elements carry the risks associated with the effective transfer of design liability discussed above. While the County can attempt to develop performance standards that will form the basis of an acceptance test that will measure long-term operability and cost efficiency, the acceptance test will be time limited and, by its nature, will only go so far as a long-term indicator. It is important to note that the absence of a long-term vested interest in the project on the part of the contractor is also a fundamental characteristic of the traditional bid-build method.

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<sup>6</sup> For example, an interim “approval” by the County of a design submittal may provide the design-build contractor with a defense in the event of an ultimate failure of the project to pass the acceptance test. Generally, approvals of interim design submittals are inconsistent with the notion that the design-build contractor bears full responsibility and liability for the design.

<sup>7</sup> While a typical design-build contract includes a one to two year warranty of construction following project acceptance, its extent is generally limited to a warranty that the design-build work complies with the design-build contract and is free of defects. Design-build contractors will not ordinarily warrant or guarantee the performance of an operating facility beyond performance during an acceptance test, as they have no control over the operations of the facility.



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

These risks associated with project operations are mitigated through the bid-build method of project delivery through the development of a project design tailored to the County's particular operating concerns. However, in the bid-build context, the County will ultimately bear the operating risk, as well as the design and construction risks discussed above. In determining which method will best serve the County's needs, the County will need to weigh the risks associated with project operations in the design-build context, along with the mitigation measures discussed above, against the advantages and benefits of design-build. One way to solve for the operations risks associated with design-build, while retaining its advantages and benefits, is through the design-build-operate method discussed below.

### 1.3 Design-Build-Operate

#### 1.3.1 Description

**Generally.** The design-build-operate project delivery method combines long-term operation and maintenance services with project design and construction services into a single service contract. The primary purpose for combining design, construction and operation into a single contract is to integrate all three areas of expertise and responsibility during every phase of the project. The aggregation of these services allows for an "operator-driven" design and permits a full level of cooperation between the designer, builder and operator. By knowing their partners, and working together on all aspects of the project, an optimal design can be created and optimal pricing established by the reduction of the pricing contingencies typically included by these participants when they work individually, without the opportunity to collaborate, in the typical bid-build process. The design-build-operate contractor serves as the single point of responsibility for all aspects of design, construction and operation for the term of the service contract (typically 15 to 20 years following project acceptance).

**The Design-Build-Operate Service Contract.** A typical service contract incorporates the design-build contract provisions generally discussed above and further requires the design-build-operate contractor to operate and maintain the facility for the term in accordance with carefully defined performance guarantees. The service contract will provide for the payment of an annual fixed service fee for the performance of the operations and maintenance services, subject to an indexed inflation adjustment factor.<sup>8</sup> Accordingly, in addition to assuming the risks associated with design and construction, the design-build-operate contractor assumes risks associated with project operations, including the risks of project performance and the costs of operations and maintenance. As under the design-build method, the typical service contract provides for price, schedule and performance relief only in the event of carefully defined uncontrollable circumstances.<sup>9</sup>

**The Selection Process.** Under Arizona law, an owner-governmental agency employs the same competitive proposal procedures in selecting a design-build-operate contractor as are employed in

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<sup>8</sup> The indexed adjustment factor is ordinarily based on the Consumer Price Index and applied on an annual basis.

<sup>9</sup> For example, the service provider may be relieved of its obligations under the facility effluent guarantee in the event that flows and loadings received at the facility exceed contractually stipulated levels of flows and loadings. See also note 3, above.



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

selecting a design-build contractor. As such, many of the same considerations discussed above with respect to the design-build method of contract delivery apply to the structuring of a design-build-operate project and the evaluation of its advantages and disadvantages. Accordingly, the following discussion will focus primarily on the operations considerations associated with design-build-operate projects, while pointing out the differences in design and construction considerations between the design-build and design-build-operate methods.

#### **Structuring the Design-Build-Operate Project - The Project Description and Performance**

**Guarantees.** An owner-governmental agency will consider similar factors in developing the project description as considered under the design-build method. However, as the contracting entity will assume long-term operations and maintenance responsibility for the project, prescribed design elements are generally less of a concern, enabling the owner-governmental agency to rely on the performance requirements to generate competition over the optimal, most cost-effective design. Additionally, the design-build-operate method enables owner-governmental agencies to “look down the road” toward anticipated changes in law in developing the operating performance guarantees. “Enhanced standards” can be included in a design-build-operate contract in order to capture standards expected to be required under applicable law in the future.<sup>10</sup>

**Structuring the Design-Build-Operate Project - Workforce Protection Practices.** Any consideration of the design-build-operate method of project delivery for a County wastewater treatment facility must factor in the County’s existing wastewater operations and maintenance workforce. Customarily, when an owner-governmental agency implements a design-build-operate wastewater project with an existing operations and maintenance staff, the design-build-operate contractor is required to offer unconditional employment to the existing operations and maintenance staff on terms that equal or exceed the employment terms offered by the owner-governmental agency. Example design-build-operate projects that have included such a stipulation include projects implemented by the City of Springfield, Massachusetts in 2000, the City of Newport, Rhode Island in 2000 and the City of Holyoke, Massachusetts in 2005. These service contracts require wages and benefits that are equal to or better than existing wages and benefits, recognition and crediting of years of service, the transfer of accrued liabilities (e.g., annual leave, sick leave and incentive payments), recognition of unions and labor agreements, and the obligation to bargain in good faith with any recognized collective bargaining agent.<sup>11</sup>

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<sup>10</sup> Generally, the basic operating performance standards under a design-build-operate contract require the contractor to comply with applicable law. For example, a wastewater facility effluent guarantee will require the facility effluent to meet all standards of applicable law. Enhanced standards can be used to address particular concerns of the owner-governmental agency not covered by applicable law, or, as suggested, to address requirements that are expected to be implemented in the foreseeable future. Enhanced standards can be included in the performance guarantees with associated liquidated damages for nonperformance or, alternatively, on an incentive basis where the contractor will be entitled to additional payment for achieving the enhanced standard.

<sup>11</sup> In the Holyoke, Massachusetts example, the City determined to specifically require respondents to the request for proposals to offer the existing employees a defined benefits package similar to the City’s pension plan, rather than allowing respondents to demonstrate that a proposed benefits package including a 401k plan would equal or exceed the City’s plan. While this approach was ultimately successful for the City of Holyoke, it can

## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

These contracts also stipulate that the design-build-operate contractor may not terminate a “transferred employee” in the absence of just cause. The particular considerations associated with the County’s existing wastewater operations and maintenance staff should be factored into the structuring of any design-build-operate project involving the wastewater facilities.

#### 1.3.2 Advantages

**Risk Transfer.** In addition to the transfer of design liability and the risk of disputes between various subcontractors, the design-build-operate method enables the owner-governmental agency to transfer significant operating risks to the contracting entity. The basic obligation of the design-build-operate contractor with respect to operations is to operate and maintain the facility in accordance with applicable law, including all permit requirements and stipulations.<sup>12</sup> In the event of a failure of the contractor to comply with applicable law in the operation of the facility, the contractor is ordinarily responsible for all fines and penalties assessed by the applicable governmental bodies and must indemnify the owner-governmental agency from any and all third-party claims. The contractor therefore bears the basic risks associated with the operation and maintenance of the facility, including the risk that the facility simply costs more to operate and maintain than anticipated by the contractor in developing its proposal and offering its fixed service fee. As noted above, in a typical design-build-operate contract, the design-build-operate contractor’s fixed service fee will be subject to adjustment only in accordance with the indexed inflation adjustment factor or in the event of the occurrence of carefully defined uncontrollable circumstances. If, for example, the design-build-operate contractor requires more chemicals in the operation of the facility than originally budgeted or must implement a more aggressive maintenance schedule than originally planned, the associated operating costs are for the account of the contractor and not the owner-governmental agency.

**Operator Collaboration in the Preparation of the Design - Vested Interest in Long-Term Operations.** As suggested above, the design-build-operate method enables the development of an “operator-driven” design, which will likely involve significant attention to project operability. The risks assumed by the design-build-operate contractor in the operations phase help to ensure that the project will be designed and constructed in a manner that will produce a highly operable, cost-effective facility. When the owner-governmental agency steps in upon expiration or earlier termination of the service contract, it can do so with a high level of confidence in the operability and cost-effectiveness of the facility.

**Strong Companies.** The companies that compete in the design-build-operate industry are strong companies that specialize in providing the services required for a design-build-operate project. More often than not, these companies have investment grade credit ratings, which enable them to provide the financial security required in connection with major capital improvement projects. Owner-governmental

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have the effect of limiting competition, as most companies are unwilling or unable to offer a pension plan similar to a municipal pension plan.

<sup>12</sup> As suggested above, this basic obligation may be enhanced by the inclusion of enhanced standards in the design-build-operate contract. See note 10, above.



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

agencies can be confident that sufficient resources will be brought to bear on the successful completion of a design-build-operate project, given the nature of the companies in the industry and the prequalification procedures authorized under Arizona law.

**Design-Build Advantages Apply.** In addition to the foregoing, each of the advantages discussed above in connection with the design-build method of contracting apply equally under the design-build-operate method.

#### 1.3.3 Disadvantages

**Control by Contract.** The design-build-operate method of project delivery requires owner-governmental agencies to relinquish direct operating control over a critical public asset to the design-build-operate contractor. While the governmental agency remains the owner of the asset and retains the power to set the associated rates, control over the day-to-day operations transfers to the contractor. In the event service issues arise affecting ratepayers or the general public, the owner-governmental agency must work within the parameters of its rights in the design-build-operate contract to address such issues. For this reason, it is critical that the design-build-operate contract clearly define the service responsibilities of the contractor and provide real enforcement mechanisms for the owner-governmental agency. Additionally, the owner-governmental agency must understand that it will have a continuing contract administration and monitoring role for the life of the contract. It should be noted that many governmental agencies, based on their experience, believe that private contract management of utility assets that have been procured on a design-build-operate basis actually gives municipalities greater control over operations than direct management of public employees actually provides, with its attendant issues of labor relations, limited appropriations for capital maintenance, and the absence of contractually specified standards of performance.

**Limited Market.** While, as noted above, the companies that compete in the design-build-operate industry are strong companies, they are limited in number and meaningful competition can be a concern. In the current market, public design-build-operate projects often attract interest from only two, three or four companies. However, these market conditions are shifting in nature and only five years ago, an owner-governmental agency conducting a design-build-operate procurement could expect to receive five or more responses to the request for qualifications.

#### 1.4 Construction-Manager-at-Risk

##### 1.4.1 Description

**Generally.** The construction-manager-at-risk (CMAR) procurement method preserves the traditional bid-build bifurcation of design contracts from construction contracts. The key difference between bid-build and CMAR is that the owner-governmental agency is permitted to select the construction manager on a qualifications basis, and also to negotiate an “at risk” guaranteed maximum price (GMP) for the construction of the project.

**Services and Selection.** Arizona law permits a construction management contract to be entered into simultaneously with or later than the design contract. The design work and the construction services may



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

be performed in sequential phases (as with bid-build), or in concurrent phases (as with design-build). The construction manager is permitted to provide advice (including supplemental design services) during the design phase. The construction management contract may also include related finance maintenance and operations services, although such services are not typically part of a CMAR arrangement in practice.

CMAR procurements begin with a qualifications-based selection of an engineering firm to provide a 100% complete design of the project. Concurrently with, or more often subsequent to, the procurement of the design engineering services, the owner-governmental agency conducts a separate qualifications-based procurement for the construction manager. The firms seeking construction manager work normally are those with specialized construction management expertise or general contractors willing to serve in a construction management role. The pricing of construction management services is not a selection factor, but is negotiated with the firms determined to be the highest qualified based on the selection criteria included in the request for qualifications. The procurement in essence is conducted on a professional services basis.

**Construction Manager Responsibilities.** The design engineer is responsible for the full design of the project, which is typically divided into several, separately biddable, “packages”. Once the design packages are complete, the construction manager is generally responsible for supervising the letting of the various construction contracts on a low-bid basis on behalf of the owner, and coordinating the performance of the work of all of the contractors to whom the project contracts are awarded. The construction contracts normally, but not always, are entered into between the owner-governmental agency and the various contractors, rather than between the construction manager and such contractors. CMAR permits the owner-governmental agency, nonetheless, to negotiate a GMP for entirety of the construction work, based on the construction manager’s estimate as to where all of the bids will come in. The negotiations center typically around how far the project design needs to be advanced before the construction manager can be asked to propose a GMP, the reasonableness of the GMP and its contingencies, and the extent to which, if the actual total price is less than the GMP, the savings will be shared between the owner and the construction manager. If the actual price exceeds the GMP, the construction manager ordinarily bears the loss. The effect of design changes made after the GMP is agreed upon, and of change orders once the construction contracts are let, complicate GMP-related determinations.

#### 1.4.2 Advantages

**Professional Selection of Construction Interface.** A primary advantage of CMAR is the ability of an owner-governmental agency to select the firm managing the construction on a qualifications basis. The construction manager usually oversees the construction work, rather than self-performing and subcontracting the work in the manner of a general contractor. Thus, in CMAR the construction manager is the key interface between the owner and the actual performance of the construction work, rather than the general contractor, as is the case with bid-build. Through the CMAR qualifications-based selection of the construction manager, the owner can take into account factors such as experience, skill, record of performance, professionalism and similar elements of judgment. Such factors cannot be used in the selection of a general contractor under bid-build, except insofar as they pertain to whether the bidder is “responsible.”



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

**Guaranteed Maximum Price.** The total cost of the construction work under CMAR will be the sum of the construction manager's fee, plus the prices bid by the various contractors under all of the construction contracts let by the owner based on the design engineer's bid packages. As discussed above, CMAR permits the negotiation of a GMP at some point during the design process, usually toward the end. The GMP can give the owner a reliable assurance as to total project price when the design is largely but not fully complete and before it is actually bid, which may help with the owner-governmental agency's project planning and budgeting process.

**Design Phase Assistance.** CMAR permits the construction manager to assist the owner in the development of the project based on the firm's construction experience and any design expertise it may have. The construction manager can, accordingly, contribute to the project in a value-engineering sense, as well as from a constructability standpoint. This participation does not operate to transfer any design liability from the design engineer to the construction manager. It does, however, give the construction manager a reasonable basis for proposing a guaranteed maximum price for the work. Thus, the construction manager is not at "at risk" for the design or for whether the project will operate as intended, but may be "at risk" for price.

**Delivery Schedule.** CMAR may permit a slightly faster delivery schedule than bid-build. If separate bid packages can be prepared and construction of some portions of the project commenced earlier than other portions, CMAR contracting has the potential to expedite the project, at least in comparison to bid-build. It should be noted that the design-build method generally offers an even greater schedule advantage.

**Complete Control of Design.** The owner-governmental agency completely controls project design under CMAR, as it does under bid-build, and is able to bring to bear on the project's design any experiences it may have with the development and operation of similar facilities. CMAR has the additional advantage of potential design and constructability input from the construction manager. Like bid-build, the owner has complete discretion to modify the design throughout the entire design process, and even during construction, through the issuance of change orders (with the attendant cost and risks that design changes entail).

#### 1.4.3 Disadvantages

**Multiple Points of Responsibility.** CMAR does not fundamentally change the basic structure of responsibility involved in bid-build contracting. The owner-governmental agency retains design liability, as it does traditionally in bid-build. The design engineer is responsible only for professional negligence, not for project performance, cost or schedule. The various contractors are responsible for constructing their portion of the work in accordance with the engineer's design, but not for the operational efficacy of their portion of the work or the overall project. With multiple points of responsibility, CMAR raises the potential for disputes among the owner and the design engineer, the construction manager and the various contractors, and the attendant risk of added cost, delay and performance deficiencies.

**Retention of Design Liability.** Under CMAR, as with bid-build, the owner retains design liability. Inadequate design may result in poor project performance, higher than expected operating or maintenance costs, additional construction costs due to the need for corrective work, and similar adverse conditions. The owner can rely to a certain extent on the design engineer's professional competence, and errors and



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

omissions professional liability coverage, but none of these design liability risks is transferred to the construction manager or any firm involved in performing the construction work.

**No Design Competition.** As with bid-build, there is no competition among engineering or construction firms interested in securing project contracts. The owner-governmental agency thus foregoes any benefits that such a design competition may afford, including design, construction and technology innovations; cost savings from different or improved designs; and improved performance.

**Limited Life Cycle Cost Considerations.** CMAR, again like bid-build, focuses predominately on design and construction costs. Long term operating and maintenance costs are estimated by the owner, designer and construction manager based on reasonable assumptions, but they are not proposed and guaranteed by a private operating contractor. Potential operating and maintenance practices and innovations that might affect capital construction or otherwise lower total project life cycle costs over a 20 or 30 years period tend to receive less consideration under CMAR (as well as under bid-build and design-build) than they do under various forms of design-build-operate contracting.

**Degree of Design Conservatism.** The CMAR and bid-build procurement methods often lead to a very high degree of design conservatism, which in turn can produce construction and operating costs significantly in excess of those that would be entailed under the more moderately conservative designs characteristic of the design-build and design-build-operate methods. Highly conservative designs tend to result from processes like CMAR and bid-build in which there are limited incentives built into the development process (other than general rate resistance) to produce a less costly design, and strong incentives built in so that design engineers can be assured of properly discharging their professional responsibilities and owners can be assured that the project has enough redundancy and ease of operability for a general public-sector workforce. Excess design conservatism can thus be regarded as a disadvantage (from a cost perspective) or as an advantage (from the perspective of the likelihood having treatment capacity that is more than sufficient).

## 1.5 Procurement Method Selection Considerations

Selecting among the procurement methods legally available to the County under Arizona law requires a weighing of numerous relevant criteria. Different procurement methods may be determined to be appropriate for each of the three major projects that are expected to be implemented under the County's regional optimization master plan for the wastewater system. Set forth below is a list of selection criteria involving procurement process, design and construction, and operation and maintenance considerations. As noted earlier, this analysis assumes the availability of conventional public financing for the capital improvement program. If the County wishes to consider private financing, it is likely that some form of design-build-operate procurement would be necessary to support the private financing plan.

### 1.5.1 Procurement Process Considerations

- County familiarity and experience with the project delivery method
- Transactional and engineering costs for conducting the procurement process
- Stage at which actual project costs are known
- Schedule: time to commencement of construction
- Depth and quality of contractor market



## Regional Optimization Master Plan Final Report

### Appendix K – Alternative Project Delivery Methods

- Selection process complexity
- Likelihood of re-design and re-bid

#### 1.5.2 Design and Construction Considerations

- Possibility of selections based on performance and qualifications
- Risk of disputes between owner-governmental agency, designer and builder
- Schedule: time to completion of construction
- Degree of owner-governmental agency design control
- Potential for innovation through design and construction competition
- Transfer of design, construction and acceptance liability
- Degree of design conservatism desired
- Suitability for “greenfield” projects
- Suitability for modifying and expanding existing facilities treatment
- Suitability for pipeline and transmission facilities
- Guaranteed permit compliance
- Total contract price for design and construction
- Construction monitoring costs
- Likelihood of bid/proposal protests
- Likelihood of change orders

#### 1.5.3 Operation and Maintenance Considerations

- Control by owner-governmental agency over project operations
- Direct versus contract
- Guaranteed operational performance
- Guaranteed regulatory compliance
- Overall 20-year life cycle costs of the project
- Guaranteed operating and maintenance costs
- Operational integration of project with entire wastewater system





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