



AIA Utah

268 S. State Street, Suite 190 - Salt Lake City, Utah 84111
Phone 801/532.1727 · Fax 801/847.6517 · info@aiautah.org

AIA UTAH · ARCHITECTURE FOR EDUCATION COMMITTEE · WHITE PAPER SERIES · VOLUME B · ISSUE 1 · MARCH 2011

Brian Parker AIA, REFP
Jenefer Youngfield, USOE

SCHOOL DESIGN AND CONSTRUCTION DELIVERY METHODS

Introduction:

The development and delivery of school facilities offers many unique challenges to school building officials. There are three appropriate methods that the development of school facilities can be organized and delivered, this is known as the "project delivery method." This method will define how a school construction project is taken from original conception to final completion.

Selecting a "project delivery method" early in development is critical. It will have an impact on all aspects of the project's development and provide a common framework that all participants associated with the project can understand and work within. The chosen method can be aligned to compliment an owner's capabilities and budget requirements as well as the architect, engineers and contractor's expertise and experience.

Owners need to carefully consider the best delivery method for each project. The Utah State procurement office allows only three project delivery methods to school districts and charter schools; they are:

1. **DESIGN – BID – BUILD (DBB)**
2. **CONSTRUCTION MANAGER/ GENERAL CONTRACTOR AT RISK (CM/GC)**
3. **DESIGN – BUILD (DB)**

Design-Bid-Build is the traditional and most common delivery method which entails the design and documentation of a project accomplished by the Owner working with the Architect. The completed Construction Documents are then

offered to General Contractors for bidding to accomplish the scope of work shown in the documents.

The **CM/GC (at risk) delivery method** employs a CM/GC early in the design process to provide valuable cost, schedule, project marketing and value engineering services to the production team during the design and documentation of the project, as well as construction services. The construction manager is a separate entity from the architect and is contracted separately by the owner.

An effective way to successfully complete a CM/GC at risk project is to require the CM/GC to provide a guaranteed maximum price (GMP) at the end of the Design Development phase, allowing a design contingency to cover changes in the design during the production of contract documents. Holding the CM/GC at risk in this manner will ensure the CM/GC is fully integrated into the design process and engaged in the successful development of project goals. This is why the Utah State Procurement Office recommends that the CM/GC be at risk in this delivery method.

The **Design Build method** employs a team consisting of the general contractor as the design build leader and the architect to provide a turn-key project in both design and construction. The design builder and the architect are hired as a team with the single responsibility of meeting all project design goals, budget, schedule, and quality required by the owner for the successful delivery of the project.



See the attached advantages and disadvantages list for a more thorough evaluation of these three delivery methods.

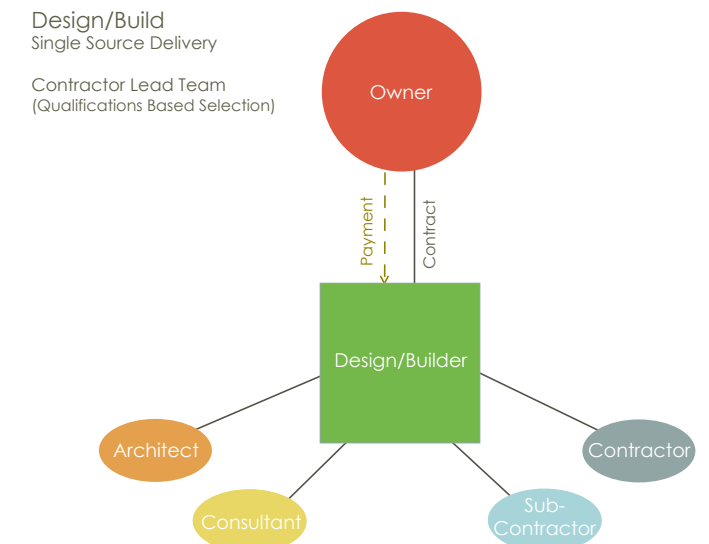
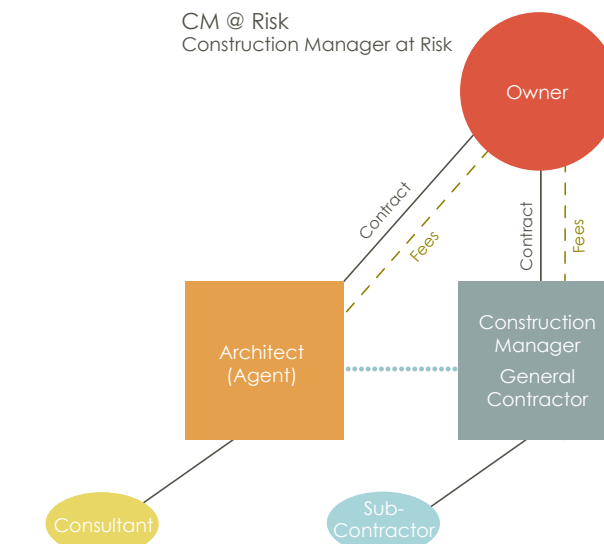
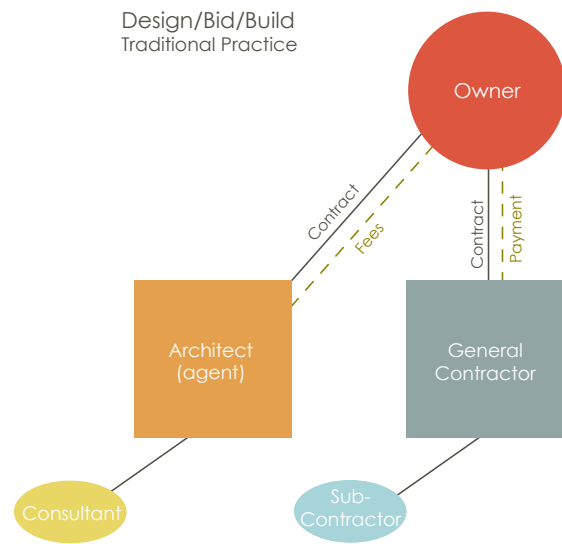
Additional Information:

Answers to questions regarding the proper processes and procurement procedures can be found at the Utah State Office of Education – School Finance Facilities website: www.schools.utah.gov/finance/Facilities.aspx.

The guidelines involved in school design and construction are found in the School Construction Resource Manual: www.schools.utah.gov/finance/Facilities/School-Construction-Resource-Manual.aspx.

Brian Parker is Associate Principal at MHTN Architects and leads the k-12 design efforts for the firm. He has completed the Advanced Certificate Program for Educational Facility Planning at San Diego State University and is a Registered Educational Facility Planner.

Jenefer Youngfield with the USOE is also available to help and answer questions. jenefer.youngfield@schools.utah.gov



Design-Bid-Build (DBB) Pros and Cons

Traditional method - Procure design, then call for Bids for Construction

ADVANTAGES

- The DBB process and roles are most universally understood
- "Low-Bid" for construction phase can bring competitive price control
- Can thwart favoritism
- Provides opportunities to pre-qualify bidders based on past performance and experience
- Documents may be more thoroughly detailed and complete in order to avoid gaps and questions in bidding thereby providing tighter document control

DISADVANTAGES

- "Lowest responsible bid" criterion for construction doesn't always award the most qualified contractors and leans heavily on the architect to police construction for quality
- The construction team is hired too late to assist in design with constructability analysis or value engineering
- Process can be more prone to conflict as the design team represents the owner and construction team represents the bottom line, which may place them in somewhat adversarial roles
- The lowest bid based on bid documents may result in more contractor initiated change orders
- Early packages and expedited schedules are not possible
- The possibility for time delay, scope reduction or project cancellation due to bidding being over budget

PREFERRED APPLICATIONS:

- Repeat or prototype school projects
- Projects with a clear concise defined scope
- Single facility
- Projects with flexible schedule

Construction Manager/General Contractor (CM/GC) at Risk Pros and Cons

ADVANTAGES

- Allows for early introduction of construction expertise while maintaining a separate process to procure design and construction teams
- Allows procurement of construction team based on evaluation criteria, not just "lowest bid"
- Allows for price competition among construction teams on proposed fees
- The architect acts as owner's representative on site
- Guaranteed maximum price (GMP) should be agreed to during the design process, ideal timing to agree to GMP is at the end of the Design Development Phase
- Guaranteed maximum price is set with clear understanding of design, and guaranteed with performance bond
- Opportunity for overlap of design and construction phases for faster project completion time
- Constructability analysis and value engineering occur throughout the design process
- There may be less time incurred in the procurement process than DBB
- Less contractor initiated change orders because CM/GC has better understanding of documents and owner's intent
- Owner understands project budget up front, thus allowing the potential for scope enhancements / improvements as the project is awarded.

DISADVANTAGES

- There are additional contractor fees due to the additional responsibilities of a construction manager during design
- If contractor has insufficient experience in the construction management they may be unable to provide the level of service and advice on issues for constructability and value for the project
- Possibility for inflated cost estimates to ensure CM's GMP is met at bid day. This can lead to reduced scope and/or quality before GMP is set
- CM/GC at risk can be the most problematic construction method if either the architect or CM/GC do not have sufficient experience.

PREFERRED APPLICATIONS:

- Complicated or Multiple Phased Projects
- Projects with short timelines
- Owners or clients with little construction knowledge or experience can be better supported by an experienced design team and CM/GC

Design-Build (DB) Pros and Cons

ADVANTAGES

- Design team and contractor are procured together, providing a complete team approach
- Opportunity to fast track and save time
- Less complicated process – Simplified documents and bidding
- Construction expertise is available from the beginning of design
- Leads to value engineering and constructability improvements from the beginning of the design process
- Allows ability to fast track the project from conception to occupancy.
- Diminishes risk of need for re-design due to enhanced collaboration between owner, contractor and design team.
- Less adversarial relationship between design and construction teams due to the fact that architect works for the contractor not the owner
- Ability to solve complicated or multiple phased projects as a complete team
- Maximum allowable construction cost is agreed to by all parties in advance

DISADVANTAGES

- Quality often suffers because design-builder may have an incentive to reduce quality and scope
- If the owner is not highly qualified and experienced they may be taken advantage of
- Additional time and expense are needed to clearly define scope before D/B team on board
- Stakeholder relationships critical for success
- There is not an independent architect on owner's team to serve as "watchdog" over construction, introduces the potential loss of checks and balances
- The process is not understood as well as DBB, so construction performance can suffer
- The DB process often stifles creativity and design solutions for the building

PREFERRED APPLICATIONS:

- Projects for districts with experienced construction personnel on staff
- Projects with short timelines
- Complicated or multiple phased projects