Overview of Progressive Design-Build Project Delivery Process and NEWPP Expansion Project Update

June 18, 2018
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Project Background
Project needed to meet subsidence regulations & growth

- Current requirement
- January 2025 requirement
- January 2035 requirement

% of Water Demand Supplied by Surface Water

0% 10% 20% 30% 40% 50% 60% 70% 80% 90%

- Current requirement
- January 2025 requirement
- January 2035 requirement
Houston is delivering project on behalf of four Authority partners.

Cost Share:
- North Harris County Regional Water Authority: 35.31%
- West Harris County Regional Water Authority: 25.76%
- North Fort Bend Water Authority: 21.41%
- City of Houston: 16.00%
- Central Harris County Regional Water Authority: 1.53%
Progressive Design-Build Process
About Design-Build Institute of America (DBIA)

• **Mission** – The Design-Build Institute of America (DBIA) promotes the value of design-build project delivery and teaches the effective integration of design and construction services to ensure success for Owners and design and construction practitioners.

• **Purpose** - DBIA is the only organization that defines, teaches and promotes best practices in design-build project delivery.
One entity, the design-builder, enters into a single contract with the Owner to provide both design and construction services.

Design-build is also defined by the attitude of everyone involved in the project. In successful design-build projects, everyone makes the mental shift to think and act as a single entity.
Design-build utilization continues to expand into project sizes <$25 million as Owners continue to gain exposure to benefits of design-build.

“Historically, design-build has been used on large projects. Recently, we have seen a growing use of design-build on smaller projects.”

“When we have a multimillion-dollar project we look towards design-build. Generally, we believe that we get a better value for the investment with design-build.”

“We will continue to see bigger projects going design-build.”
Key Design-Build Advantages

- Errors are addressed - not used as excuses or claims;
- Project benefits from innovation;
- Close coordination among entire team (*especially beneficial for complex projects*);
- Fewer changes, fewer claims & less litigation;
- Allocate risks to those who can best manage;
- Faster, more cost-effective delivery system; and
- Ability to fast track the project.
## Design-Build Performance

### COMPARISON OF PROJECT DELIVERY METHODS

<table>
<thead>
<tr>
<th>METRIC</th>
<th>DESIGN-BUILD VS. DESIGN-BID-BUILD</th>
<th>DESIGN-BUILD vs. CM@R</th>
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<tbody>
<tr>
<td>UNIT COST</td>
<td>6.1% lower</td>
<td>4.5% lower</td>
</tr>
<tr>
<td>CONSTRUCTION SPEED</td>
<td>12% faster</td>
<td>7% faster</td>
</tr>
<tr>
<td>DELIVERY SPEED</td>
<td>33.5% faster</td>
<td>23.5% faster</td>
</tr>
<tr>
<td>COST GROWTH</td>
<td>5.2% less</td>
<td>12.6% less</td>
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<tr>
<td>SCHEDULE GROWTH</td>
<td>11.4% less</td>
<td>2.2% less</td>
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Source: Construction Industry Institute (CII)/Penn State research comprising 351 projects ranging from 5,000 to 2.5 million square feet. The study includes varied project types and sectors.
Design-Build Done Right™ Principles

- Principles that create high likelihood of superior project outcomes
- Articulated in DBIA’s Best Practices publication
- Philosophies
  - Integration and collaboration
  - Environments based on trust and flexibility
    - Integrity
    - Honest communication
    - Mutual respect for and appreciation of diverse perspectives and ideas
Design-Build Done Right™ Principles (cont.)

• Manifested through specific implementing techniques
  • Selecting most qualified team
  • Letting design-builder use its ingenuity and experience to develop design solutions
  • Weighting price significantly less important than non-price factors
    • Seeking best value solutions
• Over 50 other techniques
Progressive Design-Build

• Differs from traditionally procured design-build: design and price are progressively developed after design-builder is under contract
• Design-builder retained by Owner early in project’s life
• Design-builder selected primarily, if not exclusively, on qualifications
• Final project cost and schedule commitment is not established as part of the selection process
• Two phases of services
  • Preliminary Services (including Early Work Packages)
  • Final Design and Construction
Progressive Design-Build: Core Features

• Design-builder collaborates with Owner during Phase 1 to create or confirm project’s basis of design

• Design-builder advances design
  • Decisions based on cost, schedule, operability, life cycle and other considerations
  • Ongoing, transparent, cost estimates to achieve budget requirements
Progressive Design-Build: Core Features (cont.)

• Formal commercial proposal for Phase 2
  • “Appropriate” level of definition, often at 40-60% design completion
  • Often dependent on amount of control Owner desires to maintain over design definition and reduction of contingency

• Phase 2 initiated upon acceptance of commercial proposal
# Trade-Offs: Control of Design vs. Price Certainty

<table>
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<tr>
<th>Early Knowledge of Firm Price/Cost</th>
<th>Best Value</th>
<th>Progressive</th>
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<tbody>
<tr>
<td>Provides Owner firm fixed-price (lump sum) or GMP at time of contract award.</td>
<td>Final cost is not finalized until GMP is set, allowing Owner and design-builder to <strong>co-create and agree upon the final scope, cost and schedule.</strong></td>
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Early Work Packages (EWPs)

- Developed in conjunction with design-builder
- Independent packages that take into account all potential impacts to the project (*minimal technical interference with other elements of the scope*)
- Schedule requirements tied to overall project schedule
- Used for discrete elements of the physical work (e.g., procurement of long lead items, demolition, site work, etc.)
- Allows for overlap of design and construction
Advantages of Early Work Packages

- Helps expedite project completion
- Cost savings
- Improved scheduling
- Risk Mitigation (i.e., price escalation)
Design-build is anticipated to continue to gain market share over the 2018-2021 period.

Distribution of delivery method utilization
Source(s): FMI analysis of multiple sources – June 2018

2013-2017 CPIP: $2,779B
- Design-build: 39%
- CMGC/CMAR: 32%
- Design-bid-build: 27%
- Other: 2%

2018-2021 CPIP: $2,729B
- Design-build: 44%
- CMGC/CMAR: 35%
- Design-bid-build: 19%
- Other: 2%

- Dissatisfaction with the adversarial nature and limitations of design-bid-build as well as increasingly challenging project characteristics and demands has resulted in greater interest in and use of design-build and other alternative delivery methods.
- Negative project Owner experience and perceptions of design-bid-build are most influenced by limited opportunity for innovation, lack of a fast-track process and higher risk profile for the project Owner.

*Other includes EPC and IPD
**CMGC/CMAR, design-bid-build and Other percentages are based on estimated utilization across construction spending.
Project Status
Project is mid-way through Preliminary Services phase

Preliminary Services
- Basis of Design
- Component 1
- Design/Preconstruction
- Early Work Packages
- We are Here (June 2018)

Final Design & Construction Services
- GMP Proposal/60% design
- Phase 1 (80 mgd) milestone
- 6/30/22 (current estimate)
- Guaranteed Maximum Price Approval (Late 2018)
- Phase 2 (240 mgd) milestone
- 6/27/24 (current estimate)

Transition & Warranty Services
- Final Acceptance (Dec 2024)
Design & procurement ongoing

Design
• 60% design of Intake Pump Station submitted
• 60% Balance of Plant design to be submitted mid-June

Procurement
• Ongoing subcontractor & supplier procurements

• Early Work Package 6 includes:
  o Intake Pump Station
  o Pretreatment Module
  o Deep Pipes within Facility
  o Equalization Basins
  o Equipment
Early Work Package overview

Early Work Package 1 – Site Preparation
- $37.3M
- Lazer, Emerald, Others

Early Work Package 2A – Phase 1 Filter/Transfer Pump Station Structure
- $45.5M
- McCarthy Construction

Early Work Package 4 – Raw Water Pipelines
- $57.9M
- Barnard Construction
Early Work Package 1 – Site preparation

Site clearing, construction roads, stormwater controls, etc.

Construction trailers almost ready for occupancy
Early Work Package 4 – Raw Water Pipelines Construction

Pile driving for tunnels under West Lake Houston Parkway

Corridor cleared for pipeline construction

108” raw water pipes ready for installation
Early Work Package 2A – Phase 1 Filters & Transfer Pump Station Structures

Ongoing Activities
• Mobilization
• Excavation
• Shop drawing submittal & review
M/WBE Participation – Design (as of May 2018)

Design-Builder Subconsultant Participation

- M/WBE Firms - 21.15%
- Regional – 4.36%
  (Binkley & Barfield, RPS Klotz, & LAN)
- Houston Waterworks Team – 74.49%

Project Advisor/Technical Consultant Subconsultant Participation

- M/WBE Firms – 23.88%
- Regional – 6.95%
  (SWCA, CP&Y, Espey)
- Carollo – 69.17%
**MWSBE Participation – Construction (as of May 2018)**

- **MWSBE Participation for EWP 1 ($13.8M of $17.18M direct construction cost)**
  - Balance of Work: 19.7%
  - M/WBE Firms include Landtech, Fence Master, Lazer and Emerald: 13.3%
  - 86.2%*

- **MWSBE Participation for EWP 2A ($3.8M of $35.5M direct construction cost)**
  - Balance of Work: 11.55%
  - M/WBE Firms include Rebar Reinforcement Placers, Cohen Industrial Supply, and C&B Waterworks, Inc.: 88.45%

- **MWSBE Participation for EWP 4 ($4.3M of $32.2M direct construction cost)**
  - Balance of Work: 13.4%
  - M/WBE Firms include Republic Traffic Safety, J. Simmons, Fierro Group, Z Logistics, M&D Foundation, AGS Consultants, All Steel: 86.6%

*80.5% Commitment of which 13.3% paid through May 2018 & 67.2% remaining to be paid
## Upcoming Requests for Council Action

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<thead>
<tr>
<th>Action</th>
<th>Approx. Date</th>
<th>Amount</th>
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<tbody>
<tr>
<td>Approve Legal Services Appropriation</td>
<td>July 2018</td>
<td>$154,000</td>
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<tr>
<td>Approve Houston Waterworks Team Contract Amendment 7 – Early Work Package #6</td>
<td>July-Aug 2018</td>
<td>Approx. $230M</td>
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<tr>
<td>Approve Houston Waterworks Team Contract Amendment 8 – GMP for Balance of Plant</td>
<td>Late 2018</td>
<td>TBD</td>
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<tr>
<td>Approve Project Advisor/Technical Consultant Appropriation</td>
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