



## ***The Power of Design-Build***

### **The Emergence of Design Build as Preferred Project Delivery Method For Environmental Remediation and Facilities**

By Paul H. Werthman, P.E.

Design-build (D-B) is a project delivery method whereby the owner or project sponsor contracts with a single entity to provide both engineering design and construction services.

In the traditional “design-bid-build” (D-B-B) project delivery method, the owner commissions an engineer to prepare drawings and specifications (contract documents) and subsequently selects a construction contractor(s) by competitive bidding or negotiation. The engineer then serves as the owner’s representative during construction to: interpret the contract documents; observe construction for conformance with the contract documents; and to administer the construction contract. Another variation on the D-B-B method is construction management (CM) where a construction manager is engaged by the owner to serve as the owner’s representative during construction and the design firm is relegated to a reduced role of interpreting or clarifying design documents during construction. The CM firm may also perform some “value engineering” or “constructability” review during the design phase.

Design-build is not a new concept. It was employed by “master builders” of ships, railroads, and other large civil projects hundreds of years ago. Complex power plants, chemical process facilities, and power plants are technically intensive and/or highly specialized and, by necessity, typically employ designer- or professionally-led design-builders.

During the past decade or so, the use and interest in D-B has accelerated in North America. The American Institute of Architects, the American Society of Civil Engineers and the Design-Build Institute of America cite a number of reasons for the growing acceptance of D-B by owners and the design and construction community, including the desire to:

- Avoid the legal entanglements of adversarial relationships;
- To reap the benefits of a cooperative effort by all parties under a single contract;
- Save time and money through a process where the owner’s objectives of budget, schedule, quality and functionality of the built project are better defined, understood and consistently adhered to;
- Better allocate project responsibilities and risks to the party most capable of successfully managing them.

## The Emergence of Design Build, continued from Page 1

Design-Build may not be appropriate for every project, however the benefits of a well-managed D-B process include:

***Singular Responsibility:*** With both the design and construction in the hands of a single entity transitional conflicts inherently disappear. The typical “finger pointing” by the designer and construction contractor that the other one “screwed up” does not apply. Problems or conflicts must be addressed and resolved regardless of whether they are design or construction issues. Since it’s the same project management team, the focus is on problem resolution rather than blame.

***Quality:*** The singular responsibility inherent to D-B is a powerful quality motivator. Poor design cannot be relegated to someone else to correct during construction and; construction issues cannot be relegated to poor design. An integrated and consistent D-B management team better anticipates and designs to avoid construction problems, intercedes quicker and cooperates fully when problems inevitably occur.

***Time Savings:*** With overlapping design and construction tasks; because design documents do not need to be as thoroughly detailed; because engineering review and approvals of contractor submittals are eliminated; and because bidding periods are eliminated, significant reductions in project implementation schedules can be realized.

***Cost Savings:*** Since time is money, the time savings discussed above translate to lower total project costs. Value engineering and constructability are utilized continuously and more effectively when designers, constructors and vendors work together for their collective and common interests. Change orders during construction are minimized to those related to changed conditions as the design-builder cannot cast dispersion upon their own design.

***Early Knowledge of True Project Costs:*** Bottom-line as-built project costs are known much earlier compared to other delivery systems. The entity responsible for design is simultaneously estimating construction costs and can accurately conceptualize the completed project at an early stage with a much higher probability of the contract price and completed project cost being substantially equal.

Benchmark and TurnKey companies were founded over eleven years ago principally on the notion that professional design-build was well-suited to the cost-effective and timely implementation of environmental facilities and environmental remediation. These complex projects with the myriad of: regulatory permits; public information, health & safety, monitoring, and reporting requirements; specialized equipment and technology require an inordinate level of involvement by experienced engineers and scientists throughout all project phases. Our design-build track record validates these expectations. We have highlighted a few notable D-B projects in this Buzz.

## Three Heroes

By - Ted Garrison

*Hero* may seem strong to some, but I think it's richly deserved. If they played for the Minnesota Twins and hit a home run in the bottom of the ninth inning to win a baseball game, people would call them a hero. Yet these three gentlemen did something more important to the community of Minneapolis than hit a home run. They rebuilt a bridge in record time and every day they salvaged by doing it right, they saved the community more than \$400,000 in transportation costs alone. And this doesn't take into account the cost impacts on the businesses that rely on the bridge.

The idea that someone is able to rebuild a bridge in less than fourteen months from the date of its collapse is almost too much to believe. Where I live in Florida, the construction time alone to rebuild the I 95 bridge over the main road in my town was approximately two and half years. I think the team in Minneapolis lapped our local team several times. While I'm sure a lot of people contributed to the success of



The St. Anthony Falls Bridge Collapsed on August 1st, 2007

this project, three people's leadership was clearly important for its success. Jay Hietpas, P.E., is the design-build program manager for the Minnesota Department of Transportation. His commitment to the design-build approach was instrumental in this project's success. Jon Chiglo, the I 35W Bridge project manager for the Minnesota Department of Transportation, the on-site representative for the state, was critical in keeping the process moving at high speed. Peter Sanderson, the project manager for the Flatiron-Manson project team, certainly carried a huge burden in completing this project way ahead of the original aggressive schedule of December 24, 2008.

During my interviews with these three individuals, the information that came forth was very interesting. For example, when I questioned Hietpas on why the Department of Transportation selected the design-build approach, he almost laughed. He responded that if they had decided to go with the conventional design-bid-build approach, they would be going out for bids in September of 2008 instead of opening the bridge.



Bridge complete in 339 days, 3 months ahead of schedule.

For those who have been reading *The Garrison Report* for years, you know that I've always stressed the importance of innovation, communication and collaboration as answers to the challenges facing the construction industry.

## Three Heroes, continued from Page 3

In my conversation with Jon Chiglo, I asked what he contributed to the great success of the project. He attributed a great deal of achievement to the high level of quality communication. He even went on to say that, on project of this nature, the contractor, the design team and the owner all collocate. His feeling was that not only did this improve the speed of communications, but it increased the quality of those communications.

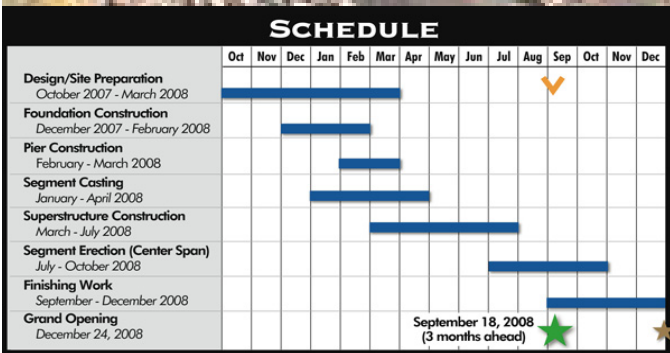
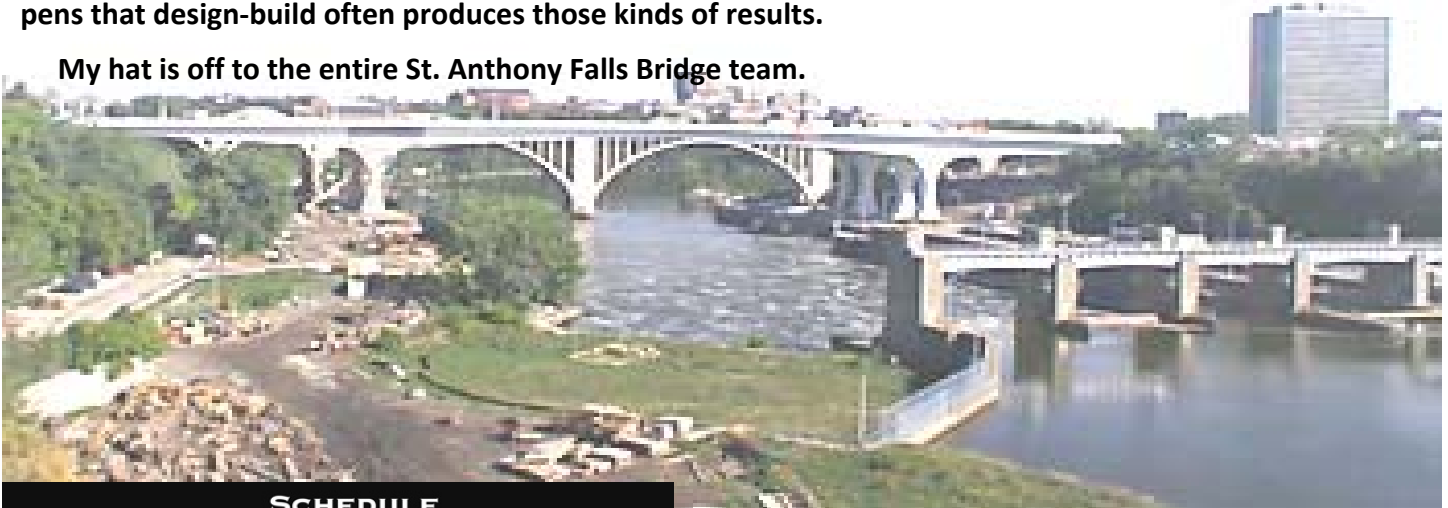
This high level of communication led to greater collaboration because it allowed the design team, the contractor and owner to overlap their efforts. This resulted in increased innovation that brought forward substantial benefits in both time and cost savings.

From the contractor's perspective, it was still a treadmill that was running almost out of control, reports Peter Sanderson. Yet despite all the challenges, which Sanderson said appeared almost constantly, the project has continued to beat its schedule. To a great extent, the success is due to the can-do attitude of Sanderson and his team. They focused on how to do things the fastest way possible. A key example is that forms were planned to be used only once. In other words, if they had six piers, they showed up with forms for six piers so they could all be worked on that same time.

When Sanderson was asked what advice he would have for other contractors on this type of project, he advised them to get the design approved as quickly as possible. Despite the fact that he felt the owner was extremely cooperative, this was a major challenge and constantly caused problems. When you listen to Sanderson, he clearly is not claiming to have pitched a perfect game, but there is no doubt that he did throw a shutout for the win.

I'm not attempting to argue that design-build is the solution to every construction problem, but **the point I want to make is that collaboration, communication and innovation are what's needed. It just happens that design-build often produces those kinds of results.**

**My hat is off to the entire St. Anthony Falls Bridge team.**

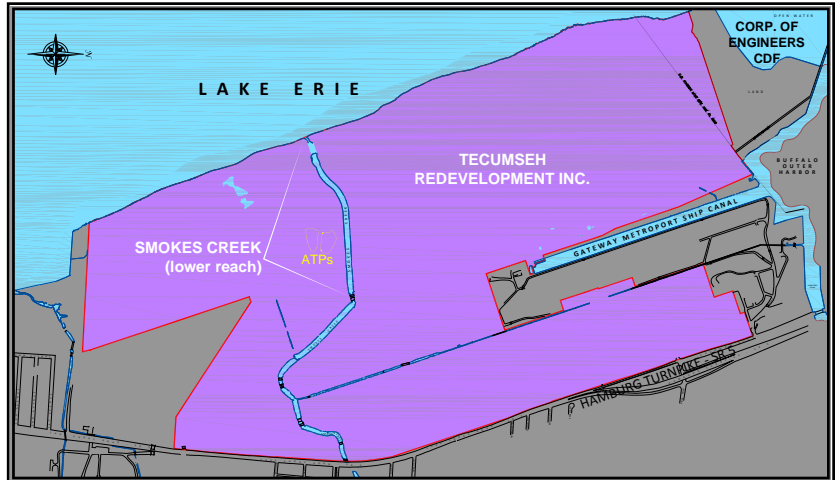


# Smokes Creek Environmental Dredging and Floodway Restoration

## ***Design-Build Kept Project On-Track and On-Budget***

By John T. Deth

The Smokes Creek Flood Control Project was constructed in 1970 the US Army Corps of Engineers (COE) to provide flood protection to the City of Lackawanna. The original project included channel improvements from its outlet to Lake Erie across the entire nearly 1-mile lower reach of the Creek on the former Bethlehem Steel-Lackawanna Property and further upstream to beyond the confluence of the North and South Branches. The lower roughly half-mile of the Smokes Creek flood improvements were constructed by Bethlehem Steel in accordance with its Land Patent Agreements with Federal and State governments, as this lower portion of Smoke's Creek and the adjacent lands were reclaimed from Lake Erie by placement of slag fill. Bethlehem Steel was also obligated to operate and maintain the Creek flood channel along the lower reach. However, little maintenance of the Creek was performed by Bethlehem since the steel plant closed over 20 years ago. Tecumseh Redevelopment Inc., having purchased the property from Bethlehem Steel out of bankruptcy in 2003, effectively assumed the maintenance obligations for that portion of the Creek. The New York State Department of Environmental Conservation (DEC) has responsibility to operate and maintain the balance of the Creek flood channel.



Following Hurricane Katrina, Congress mandated the COE perform a nationwide evaluation of federal flood control projects. As part of that effort, the COE determined that sediment accumulated in Smokes Creek was significantly reducing its hydraulic flood flow capacity. In 2006, based upon the COE data, the Federal Emergency Management Agency (FEMA) initiated the redrawing of flood maps for Smokes Creek and anticipated the expansion of the 100-year flood plain into the City's First Ward. This FEMA action would require hundreds of low-income residential properties and businesses to secure flood insurance. Upon learning this, Tecumseh immediately pronounced its intent to proceed with the implementation of the restoration of the original design flow capacity of the lower reach of the Creek in an attempt to mitigate the 100-year floodplain expansion into the First Ward.



## Smokes Creek, continued from Page 5

This proved to be a tall challenge as much of the sediment in the lower reach contained elevated concentrations of inorganics (predominantly lead), volatile and semi-volatile organic contaminants that are believed to have migrated from three former disposal areas, commonly referred to as the Acid Tar Pit (ATP) Solid Waste Management Unit (SWMU) Group located adjacent to the Creek. As such, the COE would not initially accept the sediment for disposal into their Confined Disposal Facility (CDF) located approximately 1.5 miles north of Smokes Creek. Dredging permits had to be secured from the COE and DEC and dredging was not permitted between May 1st and July 1<sup>st</sup> to protect spawning walleye. Furthermore, in order to avoid recontamination of the Creek sediment after dredging, a separate corrective measure was proposed to address the ATP SWMU Group in an expedited manner.



Tecumseh tasked Benchmark & TurnKey to: prepare dredging bid documents; assist in the selection of a dredging contractor; secure the dredging permit; assist in negotiation of an Interim Corrective Measure Consent Order with DEC; secure COE approval for disposal of dredged spoils into the COE Confined Disposal Facility; and to provide resident engineering and inspection for the dredging. Government approvals required approximately 18 months to secure. The final hurdle was an agreement with the COE for Tecumseh to construct an upland sedimentation detention basin to receive approximately 25,000 cubic the more contaminated

sediment with the balance disposed directly into the CDF. That agreement was executed on October 14, 2008. The dredging contract was awarded on the same date with a scheduled completion date of December 31, 2008. Only by a fast-tracked design-build of the spoils dewatering/disposal cell by Benchmark/TurnKey could the project schedule be saved. Benchmark/TurnKey designed, secured COE approval and constructed the approximately 3-acre sedimentation detention basin in approximately 45 days while the less-contaminated upper portion of the Creek was being hydraulically dredged.

Another issue that arose and threatened to derail the schedule and potentially result in significant change order costs was the release of petroleum sheen during dredging. When the sediment was disturbed oily “blebs” rose to the surface creating a rainbow-like sheen on the Creek surface. Again Benchmark/TurnKey stepped in to mobilize and maintain oil absorbent booms in the Creek to keep the project on schedule and on budget.

