

## Individual compiled responses to Riverdale CMGC questions

### Design

What benefits did you see in design because of contractor participation?

- Decision on how to match cast abutments. Brainstorming on non-composite deck panels. In general, fabrication and details of all precast elements. (*Designer*)
- Use of lightweight fill needed to meet contractor's schedule. (*Designer*)
- As the contractor we were able to provide inputs on where utilities were to be placed to reduce risk. In addition our early involvement enabled us to engage the utility companies early in the process and partner with them in finding solutions. This open relationship included our honest reporting of unexpected utility hits that were repaired instead of buried for future more costly repairs. (*Contractor*)
- Designers were able to focus R.O.W. documents and utility coordination around critical path of the project. Construction staging was laid out during the design phase to identify utility impacts and identify where to start first with relocates. Contractor was involved in developing the details on the project. (*Contractor*)
- Contractor representatives attended weekly coordination meetings between designers and utility companies. They were fully aware of required utility relocations and scheduling issues and constraints. (*UDOT*)

What challenges came up during design?

- The contractor assisted designers to determine the proposed utility locations/constructability. (*UDOT*)
- We helped to develop a sensible phasing plan that got utilities on board early where we needed them. This gave utilities adequate time to prepare for construction to meet our schedule. A sensible phasing plan also focused the design team on what to design first.
- Maintenance of Traffic was a big concern on this project and our involvement helped to minimize the impact on the public and improve construction. (*Contractor*)

What risks did you help to identify during design?

- We helped to identify and resolve utility problems, underground water issues and the slop of hills on the west end of the project.
- We were involved with the public and improved their perception of the project. The owners along the corridor gave us a rating of 88 in the first quarter. (*Contractor*)

How did the team identify, evaluate, and track project risk?

- Through task force meetings and plan reviews. One example of a risk item was the decision to use post-tensioning instead of rebar splices. The P-T may have been an increase in material cost, but the contractor felt more comfortable having to align up bars and ducts at 18" instead of aligning small tolerance splice sleeves at 6" or 8" spacing. (*Designer*)
- There were several meetings held during the CM process to identify and discuss risk items. At these meetings the level of risk was

Which contractor suggestions helped reduce risk and control costs?

discussed as well as how and where the risk would be carried.  
(Contractor)

- The discussion of cast-in-place pile caps not slowing the process anymore than precast pile caps was valuable. Precast pile caps may have increased cost and risk, and knowing that they were not needed to accelerate the schedule was helpful. (Designer)
- Discussion on prefabricated elements as stated above was valuable and helped avoid construction risk of delayed schedule and increased cost. (Designer)
- Removing concrete ribbons saved variable pavement thickness problems this also optimized the profile minimizing R.O.W takes. Eliminating dual trunk lines. Reducing depth of pipe between I-84 and begin project. (Contractor)
- Joint trench arrangement was made with the ATMS conduit, street lighting conduit and Qwest's LAN cable that reduced the cost and improve schedule efficiency for UDOT and Qwest's relocation work. (UDOT)
- Contractor provided traffic control for utility relocations insured schedule coordination, compliance with Limitation of Operations, and resulted in cost savings to both UDOT and utility companies. (UDOT)

What is the expected cost savings produced by contractor's suggestions?

- I believe the decisions really affected end product quality more than saving money. All the fabrication techniques and joint details have provided a very quality finished look to the bridge. The coordination with these new details may have saved construction problems/change orders, which would be a cost and schedule savings. (Designer)
- Lightweight increased material cost, but was used to accelerate schedule and meet required deadlines to reduce user costs. (Designer)
- Optimized pavement section, which eliminated the granular borrow section and also significantly reduced utility relocates. (Contractor)

### Innovations

What innovations were used to reduce cost?

- We encouraged the shallow design of drainage ponds to reduce cost (Contractor)
- We influenced the phasing plan and the sequencing of traffic control to reduce impact on business and the traveling public. (Contractor)
- The direction of the bridge design from the client was more focused on reducing construction schedule and user costs than reducing construction cost. (Designer)
- Joint trench for UDOT and utility facilities. (UDOT)
- Single contract to reattach all communication cables to power poles. (UDOT)
- Utility corridor for Third Party utilities. Utilizing single trunk line instead of dual trunk line design. Minimizing overall thickness of

What innovations were used to reduce schedule?

pavement section to minimize disruption and unnecessary utility relocations. Utilizing as much existing storm drain as possible. Protecting Qwest lines in place at the I-84 interchange. Minimized profile changes such that the new pavement conforms at adjacent parcels matched closely reducing unnecessary R.O.W. costs

- The direction of the bridge design from the client was more focused on reducing construction schedule and user costs than reducing construction cost. (*Designer*)
- Our help in selecting a phasing plan and encouraging early design packages to begin construction of sensitive portions of the project (*Contractor*)
- Making the contractor responsible for private utility relocations and restoration of landscaping was a benefit to the project by placing control and responsibility all on one party (*Contractor*)

What technology innovations were used?

- We used precast deck panels but because the design was late we did not save time. Phase 2 should do better (*Contractor*)
- ABC, Prefabricated bridge elements, non-composite deck panels (*Designer*)

What innovations were used to reduce impacts to the public?

- We kept the layout to the road construction simple to not confuse the traveling public (*Contractor*)
- By using the CMGC process the contractor was introduced to the public and other stakeholders early on giving the project team a face instead of the traditional method in where only the owner has interactions with the public until final design and project award. This allowed the contractor to gain valuable trust from the public as well as build relationships that were needed to negotiate property access issues, land use and an overall partnering relationship with the stakeholders.

### **Constructibility**

How was constructability improved by involvement of the contractor in design?

- Being involved with the design allowed the contractor to have input into all aspects of the design. In the CMGC process the final design decisions are made by the owner, but the contractor review and input allows open discussions on any concerns or questions the contractor has significantly alleviating field problems. This was particularly useful in developing the details for the pre-cast structure. Location of water line was optimized. (*Contractor*)
- In spite of the teams best efforts we still ran into utility conflicts. Utilities showed up in unexpected locations and did not follow expected paths. (*Contractor*)
- We did not control the design or make design decisions. Our concerns were listened to but not always followed. (*Contractor*)
- The bridge design was late and reduced the benefit of Accelerated Bridge Construction. By the time we got the deck panels cured we could have done the job just as fast if we had poured in place. (*Contractor*)

What constructability Contract phasing was identified and incorporated into plan set.

issues identified by the contractor were included in design? (Contractor)

How did these issues get followed through in the field?

- I would say 80% to 90% of the issues discussed and decisions made were carried out into the field and had a positive benefit. This is from my limited knowledge of the construction. (*Designer*)
- Ideas were incorporated into the plan set. (*Contractor*)

### **Schedule**

Was the construction schedule shortened or lengthened? How do you know? By how much?

- We had a reduced schedule because we were able to establish a workable phasing plan, get early design packages, and deal with utilities early. If this had been a traditional project it would have taken longer. (*Contractor*)
- The construction schedule was shortened by 6 months by awarding early packages for material acquisition and early construction package(s). If the project would not have received NTP on the materials for the bridge until final project design then the order for the girders would not have occurred until April, making delivery in September or October. Instead the girders were delivered in June and the traffic switched to completed Phase I structure in September. (*Contractor*)

### **Change Orders –**

What change orders occurred because of design oversights?

- Small underground conflicts that could not be foreseen in design resulted in changes orders. (*Contractor*)
- The risk of underground water was assumed by UDOT and planed for in their contingency funding. (*Contractor*)
- The risk of unstable trench material was also assumed by UDOT. (*Contractor*)

### **Environmental Stewardship**

How did bringing the contractor on early alleviate environmental concerns?

- The contractor was provided the environmental documents early on to get familiar with the key issues and commitments. This allowed the contractor and owner to discuss ideas to efficiently work while maintaining commitments made in the EA. (*Contractor*)

### **Benefits to the Public**

How did the public benefit from the CMGC process?

- Utility relocation impacts were simultaneous with construction activities; no additional impacts to the public were required. (*UDOT*)

### **Lessons Learned**

What did you learn in this CMGC process?

- We were concerned about the reaction of the UDOT complex to cost on this project. (*Contractor*)
- UDOT complex was concerned because there is close agreement between the engineer's estimate and the contractors proposed price on traditional projects but a wide separation on CMGC projects. The Riverdale project was particularly troubling because the Engineers Estimate for phase 1 and 2 were ½ the contractors

proposed cost. This was accentuated by the fact that the project did not have enough funding to do the full scope of work. (UDOT)

- Conceptually we believe that CMGC should cost less because the contractor is helping us to improve the design, constructability, and identify and reduce risk. We also anticipate that this reduction in risk and improvement in constructability will enable the contractor to reduce his expense and improve his profit while delivering more to the public for less money. Apparently you felt some of our frustration but we also take note that you have done a good job and we noted improvements in how the negotiation process improved for I-15 deck replacement where your proposal came in less than the ICE. (UDOT)
- Obviously, having the contractor's input, especially on a unique, new bridge design, was very helpful. I think the other thing I learned is that even though the contractor is involved in the design process, it is very difficult for them to put a bid together without having the final plans. Risk and guesstimates have to be included if all the information is not there. (Designer)
- CMCG also seems to lend itself to the designer being involved more with the construction after the design is let. I think this is also a benefit to the project. But this also needs to be identified in the initial scoping and cost of the designer. (Designer)
- With our project, the design was still not finalized when the Early Release Package was advertised. From a utility agreement execution perspective, there is no time between the end of design to completion of the negotiation to allow agreements to go thru the execution process. (UDOT)
- Negotiation of prices at the end of the design process makes it difficult to complete betterment agreements and others that require at least estimated prices up front. (UDOT)
- Prices for betterments were significantly higher than cities anticipated; they are not accustomed to best value approaches. (UDOT)
- Master Agreements were not used, but multiple agreements with companies were required to accommodate early release contract and certification, and then again for subsequent segments of the project. (UDOT)
- If pricing is going to be considered during the evaluations make sure that it is very clear on what is to be included. For example is overhead project overhead, company overhead, and division overhead. Also, consider that the items of work being priced may change significantly during design or not even apply at all. If this is the case then the price evaluation for the items that effect the contractor selection may not even be constructed during the project if alternate designs are used. This may deem the pricing criteria slightly faulted. Perhaps use cost model moving forward

Was there anything you would change during the RFP portion of the project?

What is your opinion of the value of CMGC?

(Contractor)

- Input from Construction, both from Construction Management/RE and the contractor, is always tremendously helpful during design, but the accelerated schedule, i.e. lack of time between the completion of roadway design and the resultant completion of utility relocation design engineering, is impractical in terms of getting the required agreements, funding and authorizations in place to allow the utility companies to schedule, order materials, and be ready to go to work as soon as the contractor can. (UDOT)
- I think the value changes depending on HOW you use it. For this project, I believe it's main use was to accelerate the overall project process and get the contractor in the field in a much shorter time than a design-bid-build would have allowed. I think it was successful in that aspect. I also think it was successful in the aspect of the quality and speed of assembly with the ABC bridge. Some see the use of CMGC to reduce *construction* costs. I don't believe that that was its goal on this project nor did it necessarily accomplish that. However, it may very well have reduced the *project costs* (including user costs) by getting all those shoppers to the stores on Black Friday. (Designer)
- In high profile or complex projects it is a viable and valuable contracting method. By bringing the owner and contractor together the project goals are collectively evaluated during design and prior to construction. This also allows the owner, designer and contractor to collectively share ideas to optimize design, streamline schedule, consider innovative ideas and ensure that the project is constructible. (Contractor)

Additional Comments:

- The contractor was very helpful during the design stage and I think most definitely improved the quality of the I-84 Bridge with their input. I think more time up-front for the design/contractor input/bid would have made the project awarding go a little smoother, but as stated above we didn't have that time and I think the CMGC process allowed the project to accomplish what it did in a short timeframe. (Designer)
- Value is added to the project because of quality, and meeting project goals. (UDOT)
- Original project intent was to identify the budget necessary to complete the project. This was one reason the project was chosen to go CMGC. (UDOT)
- Need to provide time in schedule for utilities to generate cost estimates and to execute utility agreements. (UDOT)