Quality Matters
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2012 Specifications Update—

What to do with projects in the pipeline?

With the looming publication of the Kentucky 2012 Standard Specifications for Road and Bridge Construction (word has it publication is awaiting FHWA approval, and may make the April Letting), the question becomes, "What to do with projects in the pipeline?" This article presents some changes that stand to affect projects designed under the auspices of a 2008 specification based letting. Beyond the changes presented, this article will try to detail the situation and provide resources that can help with your conversion.

First, the bad news, the changes below are in no way a full representation of what you will need to consider. Additionally, please do not assume that our Plan Processing Branch will take care of any conversion your project needs. While these folks do a great job and will catch issues that slip through the cracks, their purpose is to ensure plans are complete not to provide a conversion service. The bottom line is the responsibility rests with you.

Here is the help. A 2012 draft version of the specifications is available at ***www.transportation.ky.gov/construction***. Once published, the same web address will have access to a highlighted version of the specifications showing changes from the 2008 version. If you have specific questions, you may contact this office or the Technical Support Branch in the Division of Construction for assistance. The following table also presents many changes pertinent to Project Delivery.

Additionally, the 2012 edition of the Highway Standard Drawings will be applicable to the April 2012 letting. These are accessible at ***http://transportation.ky.gov/Highway-Design/Pages/Standard-Drawings.aspx***.

by Roy Sturgill, P.E.

Specification	Summary of Changes*
105.05 Contract Documents	The letting questions and answers will be a contract document.
112 Temporary Traffic Control	• Devices compliant with NCHRP 350 or MASH 08. • New bid item for Law Enforcement Officers with required credentials. • New bid item Temporary signs to avoid confusion from permanent signs when installed by contract.
203 Removal of Structures and Obstructions	Box culvert removal is to be included in the Remove Structure bid item.
205.05 Borrow Excavation	Borrow Excavation bid item is eliminated and costs become incidental to Embankment in Place or Roadway Excavation.
212.03.03 Erosion Control	May want to note Urban seed mixes will only include Fescue and Ryegrass.
403 Production and Placement of Asphalt Mixtures	MTV is no longer a special note. Used on all layers of driving lanes on interstates and parkways and elsewhere per contract. Cost is incidental to the asphalt mixture bid item.
410 Asphalt Ride Quality	If no ride quality requirements are listed in the contract, category B requirements apply.
615 Precast Three-Sided Structures	New section covering precast three-sided structures. *(See page 3.)*
701 Pipe Installation and Testing	Pipeline video inspection required on projects with more than 250 linear feet of storm sewer or culvert pipe and where roadway ADT is greater than 1000 vehicles. Camera/ video inspection on 100% of pipes under the roadway and 50% not passing under the roadway.
704 Underdrains	New bid item for Perforated Pipe Edge Drain.
716 Roadway Lighting Systems	In depth revision of this section with a large number of new bid items.

* Not a complete list.

ABC 101

Maybe you had the opportunity to see the excellent presentation about Accelerated Bridge Construction (ABC) at last year's Partnering Conference or read about ABC in some of the latest engineering periodicals. In case you've had your head in the sand for the last few years, this article will present the ABC's on ABC and how it may be beneficial to a project that you're working on.

With ABC, bridge elements are prefabricated offsite and then delivered and assembled onsite. This greatly reduces construction time, road closures, and traffic control. ABC is a paradigm shift in project design and procurement, used where there is a need to minimize impacts to travelers or the environment. Using ABC can often reduce costs, shorten construction time, improve worker safety, and provide higher construction quality.

Workers install one of four bridge slabs at a job site in Harlan County.

KYTC recently began to use ABC concepts on select projects. One example, in Harlan County, was for a quick turnaround bridge replacement. The two-span bridge crosses a creek providing the only access to residents of the area. Under conventional construction methods, that connection for the residents would be closed for weeks. The project design team decided it was critical to minimize the closure time and therefore used an ABC approach. The contract called for an eight-hour maximum total closure time. Rather than a typical cast-in-place span, the standard drawing was modified to split the 20-foot span width into two, allowing the contractor to cast each quarter of the superstructure at a quality-controlled site in Lexington. The slabs were shipped by truck and lifted into place by crane. The contractor was successful in meeting their time constraint and the bridge fit together perfectly.

On a larger scale, ABC is being used on the half-mile long Milton-Madison bridge replacement project over the Ohio River. Segments (600-700' long) of the steel truss bridge are being assembled at a nearby site; they will be barged out to temporary piers and then lifted into place. To minimize closure time, the contractor will build the new bridge temporarily next to the existing bridge. When complete, they will demolish the old structure and then slide the new bridge onto the existing piers. The road will only be closed twice, each time for less than a week, resulting in minimal disruptions to those living in Milton and Madison.

Example of one type of prefabricated bridge element

Prefabricated superstructure pieces are not the only elements provided under ABC. Columns, column segments, pier caps, and abutments can all be procured with this method. Other elements available to help accelerate bridge construction and improve quality include:

- Continuous flight auger piles: cast-in-place piles built by pumping a grout or concrete mix through a hollow stem auger as the auger is being pulled out of the shaft.
- Geosynthetic Reinforced Soil Integrated Bridge Systems (GRS-IBS): a fancy term to describe the use of alternating layers of granular fill and geotextile fabric contained by a masonry wall to provide support for bridges and eliminate the bump at the bridge ends.
- EPS Geofoam: very lightweight material that can be used to quickly backfill slopes in place of soil. The technology has been used for over 30 years worldwide.
- Varying structural Placement Methods: includes self-propelled modular transporters that can move large prefabricated bridge sections

No matter which methods are best suited to your job, ABC is a winning solution; construction time is reduced, quality control is increased, worker safety is enhanced, while impacts to travelers and the environment are minimized.

The Federal Highway Administration has an ABC Manual and State Highway Research Program 2 has developed standard drawings and specs for ABC components. To learn more about ABC visit these sites: ***http://www.fhwa.dot.gov/bridge/abc/*** or ***http://www.fhwa.dot.gov/everydaycounts/technology/bridges/intro.cfm***

by ***Brent A. Sweger, PE, AVS***

The Frustrations with Three-Sided Structures

A recent Post-Construction Review involved a Contractor who was rather frustrated with the level of information provided for bidding Three-Sided Structure projects. Participants urged the Transportation Cabinet to develop guidance for Designers. As it turns out, the Division of Highway Design's Drainage Branch has already been working on this very issue!

A draft of their work thus far, Preconstruction Policy on Precast Three-Sided Culverts is being finalized and will be issued by a forthcoming design memo.

Three-Sided Structures are alternatives to conventional cast-in-place culverts. The major advantage of opting for Three-Sided Structures is quick construction and therefore reduced road closures.

Much of the feasibility and requirements for Three-Sided Structures are determined by geotechnical investigation, providing required bearing pressure, drainage, and soils information. The Cabinet's Geotechnical Branch is responsible for evaluating the selection of the Three-Sided Structure alternatives.

Preferred locations for Three-Sided Structures involve foundation in solid rock. Otherwise, there may be no time or cost advantage. Special foundation treatments can make Three-Sided Structures expensive solutions. If the solid rock foundations are not available, cast-in-place bid items will be included as an alternative to the Three-Sided Structure.

Additional information on Three-Sided Structures can also be found in the not-yet-released Section 615 2012 Specifications; a draft is posted online. Three-Sided Structures will be paid by the linear foot with foundations and wing walls included as incidental items. Foundation preparation, excavation, and backfill will have separate bid items.

Vicki Boldrick, P.E. is the Cabinet's Subject Matter Expert on Three-Sided Structures and can be contacted at 502-564-3280 or Vicki.Boldrick@ky.gov.

by Mary Wade, PE

Highway Design Traffic Engineering Prequalifications

New!

There are two new Prequalification categories that have been established to elevate the awareness and successful use of traffic engineering principles in highway designs.

- Basic Traffic Engineering Design
- Advanced Traffic Engineering Design & Modeling

These will be available for KYTC project managers to use in the consultant selection process beginning in July. One of the requirements for the Basic level will be for staff to attend a KYTC course called Basic Traffic Engineering Design. This course will focus on some of the related KYTC policies and capacity analysis. The first offering will be in April 2012. To register, contact Kevin Martin at 502-564-3280.

Quality Matters Staff Spotlight:

Roy Sturgill joined the Quality Assurance Branch in November 2011. He has been with the Kentucky Transportation Cabinet (KYTC) since 2007, working in the Central Office, Division of Construction. He was a KYTC Civil Engineering Scholarship recipient from 1998 to 2003, and then attended Virginia Tech and participated in research with the Virginia Department of Transportation until returning to work at KYTC.

The transition from Construction to Design has been enlightening for Roy. He enjoys the new challenges. In his role as the Constructability Review Coordinator, Roy seeks to focus reviews at the Preliminary Line and Grade and Final Joint Inspection stages of Project Development. Please include Roy when scheduling meetings at this stage. He or another constructability reviewer will attend or provide comments for your project. An additional service that constructability review will provide is the evaluation of contract time determination. These reviews will be completed when check prints are submitted.

Upcoming Training

NHI Access Management, Location & Spacing
April 23-25 Frankfort TOB
Contact Kevin Martin, Highway Design 502-564-3280

Approach Slabs + IEBs = Maintenance Issues?

Do you often wonder about the bump in the road as you approach bridges? Do you have issues like this in your district with integral end bents (IEBs)? Our branch is on a quest for ideas and solutions. Designers, Construction and Maintenance folks, we would like to hear your theories, solutions, current practices for fixes to this ongoing problem. Please contact Boday Borres @ 502-564-3280 ext. 3362, 502-229-5737 or *boday.borres@ky.gov*.

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Look for us on the 5th floor of TCOB, email, or call (502) 564-3280

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Lessons Learned

This is the first in a series of installments entitled Lessons Learned from the Post Construction Review Circuit. The Quality Assurance Branch has been traveling from district to district, listening to input from KYTC staff, design consultants, and contractors. Thus far this cycle, meetings have been held in Districts 4, 8, 9, 10, and 11. Based upon what the QAB is hearing, here are a few of the issues calling for additional discussion and debate.

Using Lightweight Fill for Concrete Box Culvert Extensions/ Removing, Replacing, and Extending Concrete Box Culverts

Removing or partially replacing concrete culverts in order to extend them may be unnecessary if the existing culvert remains in relatively good condition. Rather than replacing all or part of a culvert, perhaps the existing structure could be left in place and retrofitted while lightweight fill is used to accommodate the extension and prevent overloading. When applicable, this method preserves resources by reducing the need for concrete masonry removal, foundation preparation, and additional materials needed to rebuild. Additionally, the cost and effort required to maintain traffic may also be decreased.

Maintenance Issues Involving Structures

When designed properly, reinforced box culverts provide a useful alternative to traditional structures. However, sometimes these devices can have unintended consequences. Double barrel culverts, for example, can cause reoccurring maintenance issues due to the tendency for debris to become affixed on the concrete divider between the two barrels. When considering the use of a double barrel culvert, be mindful of their potential for blockage. The increased maintenance required by double barrel culverts may make a single barrel culvert or a small bridge a better option. Whether designing box culverts or bridges, a four foot height minimum has been recommended in order to further alleviate future maintenance issues.

Temporary Barrier Walls and Rockfall Debris in Narrow Mountainous Conditions

Temporary barrier walls are sometimes utilized by designers to prevent rockfall debris from encroaching upon the roadway. Barrier walls are typically more effective when used for drop-off protection, similar to guardrail, rather than being placed between a cut slope and road to block falling debris in narrow conditions. In the latter situation, walls can actually be a hindrance because rocks become trapped behind them where insufficient room to deploy proper cleanup equipment exists. This predicament creates an unsafe situation because construction personnel must then work beneath dangerous cuts removing debris. Blast material that falls on barrier walls causes significant and costly damage while moving barrier walls can create delays and frustrate the traveling public. In narrow conditions, traffic barrels are preferable because they warn the traveling public of the impending hazard and yet can still be easily repositioned to facilitate cleanup. Barrier walls are most effectively used in conjunction with blasting and high walls when there is sufficient room to position them and clear behind them, which is generally not the case with narrow roads in mountainous terrain.

by Nathan Wilkinson