

# Quality Matters

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from the Quality Assurance Branch (QAB) of Highway Design

## Part-time shoulder use

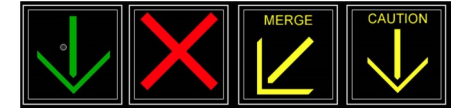
Designers are problem solvers. Sometimes project constraints are so restrictive that a flexible perspective is vital to adequately address the need. For example, trying to increase urban freeway capacity is difficult due to tight physical constrictions and steep land costs.

Introducing a relatively new tool for the urban capacity challenge: Part-Time Shoulders (PTS). PTS is a traffic management strategy in which a freeway shoulder is converted so it can be used as a driving lane during peak hours of congestion. The shoulder is used for emergency refuge for the remainder of the day. Control of shoulder usage is accomplished via static or variable message signage along with striping.

PTS started in Europe as a congestion mitigation strategy and has been gaining steam across the U.S. It can be implemented in a few different variations. First, there is the flexibility to either use the inside or the outside shoulder; this decision may be driven by existing shoulder widths, bridge clearances, and ramp configurations. Second, the shoulder can be converted to a driving lane by using a fixed or variable schedule.

Finally PTS can include an HOV requirement, variable speed limits, or even tolls, depending on the agency's objectives for the project.

At last year's Partnering Conference, Burgess and Niple engineers gave a [presentation about PTS](#)—sometimes called Hard Shoulder Running. They shared information



about corridor feasibility, design, and operations. They also shared information about the SmartLane pilot project they designed for Ohio DOT in Columbus, along with projects already operating in other states.

Increasing usage of PTS around the country can be attributed to tight budgets, limited ROW, and the need to limit construction delay costs to motorists. It's a strategy that aligns perfectly with the current KYTC Performance Based Flexible Solutions initiative.

In the right location, it is an option that can increase capacity by 1,000 to 2,000 vehicles per hour. Although capacity is less than a full-standard design, it may be enough to change a stop-and-go condition to a consistent free-flow – and at a fraction of the cost for a new lane.

As with any project, the devil is in the details. Logical termini, emergency turnouts, pavement structure, drainage, ITS, and operational monitoring are some of the important pieces that need to be accounted for in a PTS project.

To learn more about PTS, check out the FHWA comprehensive guidebook, [Use of Freeway Shoulders for Travel](#) and watch a [TRB webinar](#). The webinar shows many example projects from around the U.S., including three projects that are up and running in Virginia.



Inside shoulder conversion on I-66 in Virginia

by: [Brent A. Sweger, PE](#)

# U-ing it at the J-turn

You see this situation all across Kentucky: a four-lane divided highway intersected with a moderate-volume roadway. As a driver coming from the side road, it can be difficult to navigate a left turn or straight-across movement. It's common at these locations to have a high number of crashes, often serious ones.

As a designer, you want to avoid this situation. But how? As we know, introducing a traffic signal on a roadway meant to be free flow is not a good solution. This may lead to rear-end crashes and will certainly reduce the operation of the mainline by increasing delay.

In 2014, KYTC District 4 faced this precise situation after opening a newly built Patriot Parkway (KY 361) in Vine Grove. Over the next two years, 12 crashes occurred, including two fatalities, at the intersection of Deckard School Road. All of the crashes involved traffic crossing the parkway from the side road.

While the public preferred the installation of a traffic signal, an analysis revealed that—despite the number of crashes—that a signal was not warranted. After examining options, KYTC engineers decided to try something new.

The option they chose is called a J-turn. This specific solution has been around for over 15 years, but just recently made its way to Kentucky. The J-turn uses a pair of directional median openings that allow left-turn movements from the mainline onto the side road, but physically blocks cross movements from the side road. Vehicles from the side road wanting to go left or straight must first turn right and then do a u-turn at an opening farther down the mainline.

As we reported in the [Summer 2016 Quality Matters](#) issue, the J-turn configuration reduces the number of potential conflict points from 42 to 24. It simplifies decision-making for drivers and judgement of determining

gaps in traffic. Although the driving distance for side road vehicles is slightly increased, often the travel time is reduced.

The J-turn is typically built without a signal at each of its three intersections, but has the flexibility to be signalized should traffic volumes warrant in the future. Often, the signalized version of this concept is called a Superstreet.

For the Vine Grove project, District 4 installed temporary measures to create a J-turn in 2016 that eventually led to permanent construction in June 2017. The project included turning lanes, concrete median channelization, and loons to allow ample area for the U-turns. Starting from when the temporary measures were in place, there has been only one documented crash attributed to the geometric changes. Compare this to a signal on the same road just one mile away where there were eight crashes attributed to the crossing movement or the signal.

KYTC has built a second J-turn in Knox County on US 25E and has eight more in the design phase. Having the J-turn in the design toolbox now allows us to simultaneously address crashes, provide access, and maximize mainline traffic flow.

by: [Brent A. Sweger, PE](#)





# Building (many) bridges

KYTC's Bridging Kentucky program is off to a fast start in 2019, setting the stage for a busy construction season and what will be the busiest year of bridge work in KYTC's recent history.

More than 100 bridge-restoration projects have been let to construction since the program was launched in mid-2018, and more than 100 additional projects are scheduled for lettings in the next three months. In March alone, more than 30 construction projects were awarded for construction.

The goal of the program is to restore more than 1,000 bridges in six years, reopening bridges that have been closed and restoring structures so they can be used by buses, emergency vehicles and commercial trucks.

To date, more than a dozen bridges have been restored and reopened to

traffic. These include rehab projects that add at least 30 years of service life to bridges, as well as replacement projects that have a lifespan of at least 75 years.

Until now, the vast majority of our work on the program has been limited to assessing and prioritizing needs, designing bridges and preparing for construction. Travelers across the state are now going to see a lot more activity in the field as construction crews begin the important work of rehabilitating and replacing these critical crossings.

For more information on Bridging Kentucky and to see a list of bridges in the program, visit [www.BridgingKentucky.com](http://www.BridgingKentucky.com).

by: [Royce Meredith](#), PE  
Bridging KY Program Manager

## Purpose and need workshops

KYTC, in partnership with Neel-Schaffer, Inc., are now presenting half-day workshops on writing purpose and need (P&N) statements. Participants will learn the why and how of crafting a rock-solid P&N statement that can serve as the strong foundation for any project. The workshop will also help

project development professionals identify the true transportation need of a project so that project managers can effectively measure the performance of project alternatives and choose a value-rich solution. Be on the lookout soon for a schedule of classes through the [Kentucky Engineering Center](#).

## So long Shawn!



Congratulations to Shawn Russell for his promotion to Section Supervisor! He is now responsible for the crews that handle construction projects and maintenance in the District 6 counties of Owen, Carroll, and Gallatin.

Starting in 2013, Shawn served as the coordinator for the value engineering and constructability review programs for the Quality Assurance Branch (QAB). These programs helped improve the quality of the construction plans and save KYTC millions in construction dollars.

During his time with QAB, Shawn also became the editor-in-chief for this newsletter. As a stickler for details, you can thank him for such perfection in past publications.

If you would like to contact Shawn, you can always visit him in Owenton, or simply just drop him an email at: [Shawn.Russell@ky.gov](mailto:Shawn.Russell@ky.gov).

## Bye-bye Bob!

See Bob work. See Bob get promoted. See Bob retire. See Bob come back to work. And see Bob get promoted again! Notice a pattern?

Over the last three years, Bob Jones ran the Post Construction Review Program for KYTC, helping designers and construction staff learn from each other's experiences.

At the end of 2018, Bob was chosen to take over the helm of the Design Branch of Abandoned Mine Lands, (AML). Bob spent most of his career working in AML, helping to improve the conditions for people affected by past mining activities. If you've ever talked with him about abandoned mines, you know he's got a passion for it.

If you would like to contact Bob Jones, his email remains the same: [Bob.Jones@ky.gov](mailto:Bob.Jones@ky.gov).



# Now hiring!

The Division of Highway Design is looking for (more than) a few good women and men to join the team! The Division has several open positions. There's a wide range of jobs available, including:

- Drainage
- Constructability
- Post construction performance
- Plan processing reviews
- Roadway design
- Pavement design
- Technical/computer software support



Classifications vary from engineer, engineering tech, and others. It's a great work environment and lots of opportunities. (We also know how to eat well!) If you have an interest in working on the HD team, please don't hesitate to contact us.

by: [Jill Asher, PE](#)

## 2018 Project Excellence Award



## Partnering 2018: After the Conference

Once again, countless hours of planning and hard work led to a successful Partnering Conference last September. Great teamwork was the key! Amazingly, there were over 800 attendees.

Congratulations to Ben Hun and the crew of District 3 for taking home the William S. Gulick Project Excellence Award for top KYTC-designed project this year. The project team used a roundabout to fix a terribly skewed intersection that had sight distance issues located at the intersection of KY 526 and KY 1320 in Warren County.

If you missed a presentation at the conference, you can check out presentations from this year and many years past on the [KYTC Division of Highway Design website](#).

## Upcoming training

### ■ **Basic Traffic Engineering Design**

5/29/2019  
Frankfort 9:00 a.m. to 1:00 p.m.

### ■ **Beginner HEC-RAS**

6/4/2019 » 6/6/2019  
Frankfort 8:00 a.m. to 4:30 p.m.

### ■ **2019 ACEC-KY/FHWA/KYTC Partnering Conference**

9/3/2019 » 9/5/2019  
Louisville

Have an idea for a topic or speaker for the Partnering Conference? Share it with us by clicking here.

### ■ **Roadside Design Guide**

No classes are currently scheduled. Please notify Kevin Martin to get added to the waiting list.

*KYTC employees should register through [Kevin Martin](#) for all classes.*

*Consultants will only need to register through Kevin Martin if the class is held at KYTC. Otherwise, consultants should contact the [Kentucky Engineering Center](#).*

*All times for training are local.*

## Staff

See article in pink!

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