# Separating Large Trucks from Non-truck Traffic in Work Zones

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## The Challenge

Large trucks and automobiles have very different dimensions and operating characteristics that can create challenges when approaching and passing through certain work zones. In some work zones, because of the space occupied by the work tasks, the travel lane widths are narrower than those that large trucks can easily navigate. The increased weight of large trucks can also be problematic when certain work tasks affecting pavement and subbase integrity are being performed immediately adjacent to the travel lanes. Another problem is created by the tendency of truck and automobile drivers to divert to an alternate route when they encounter work zone queueing and delays, even if that route is not well suited for large truck travel. The problem is aggravated further by in-vehicle navigational aids, using real-time travel time data, which routinely recommend diverting to such alternate routes when work zone queues form.

## A Solution — Separating Large Truck and Non-truck Traffic through and around Work Zones

In certain situations, safety and mobility through work zones can be improved through traffic management strategies that separate large trucks from other traffic approaching a work zone. Once separated, the different vehicle types can be managed by directing large truck traffic through the work zone, while detouring non-truck traffic onto an alternate route around the work zone, as illustrated in Figure 1. Drivers approaching work zones on high-volume facilities, where work zone queues form during parts of the day or night, may seek alternate routes around the work zone with shorter travel times versus traveling through the queue and work zone. Drivers of automobiles and large trucks may engage in this behavior even if the alternate route cannot adequately accommodate large trucks due to constrained available turning radii at intersections, height restrictions at bridges, etc. Encouraging large trucks to remain on the facility under construction, while diverting other vehicles to the alternate route, can help balance the travel time impacts better across both the primary and alternate route facilities. It can also keep the alternate route from being more attractive to large trucks because of a much lower travel time around the work zone.

Source: VDOT

*Figure 1. Separating large trucks from non-truck travel through work zones can be an effective impact mitigation strategy.*

The Virginia Department of Transportation (VDOT) employed this strategy during a 3.7-mile pavement rehabilitation project on southbound Interstate 81 (I-81) in western Virginia (*1*). Through this section, an alternate route (U.S. Highway [US] 11) paralleled I-81 approximately 0.5 miles to the west, accessible by exiting to State Route (SR) 654 (Figure 2).


Source: Gallo et al. (*1*)

*Figure 2. Location of the I-81 work zone and SR 654/US 11 detour.*

Under normal operations, travel times on I-81 would be 1 or 2 minutes faster than diverting over to US 11. Conversely, any queuing that developed because of the work zone would quickly make the travel time on the US 11 alternate route around the work zone attractive. However, US 11 in this area is a two-lane, two-way highway with a continuous center turn lane. The lanes themselves are striped at less than 12-foot widths, and houses, driveways, and a high school are located all along the route. Therefore, the route is not desirable for large trucks to use as an alternate route.

As a result, VDOT implemented a transportation management plan (TMP) for the project that maintained the left lane through the project and converted the right lane to an exit only lane. Portable changeable message signs (PCMSs) were positioned on I-81 upstream of the work zone. When traffic volumes were lighter, the message read:


During peak periods when queues were expected to form, the message was changed to read:


Thus, drivers were deliberately not told that the right lane was an exit only lane during periods of congestion. Channelizing devices were placed along the lane line leading to the exit ramp that accessed SR 654 to channel the right lane traffic onto the exit ramp. Flaggers were positioned at the exit ramp and along the detour route to help direct and reassure the diverted motorists.

VDOT established a comprehensive public information and outreach plan to further enhance traveler awareness of the project. Meetings were held with the Augusta County school superintendent, and the affected schools including teachers and students, with special presentations to driver education students. Meetings were also held with the local emergency responders. VDOT and the Virginia Transportation Research Council held a citizen information meeting at the high school to allow students and local citizens to see the project plans, lane closures, and detours. A press briefing was held on the same day as the citizen information meeting for local media. Interviews with local media on the progress of the project were done periodically throughout the lane closure period. VDOT purchased radio time in various markets in Virginia, West Virginia,

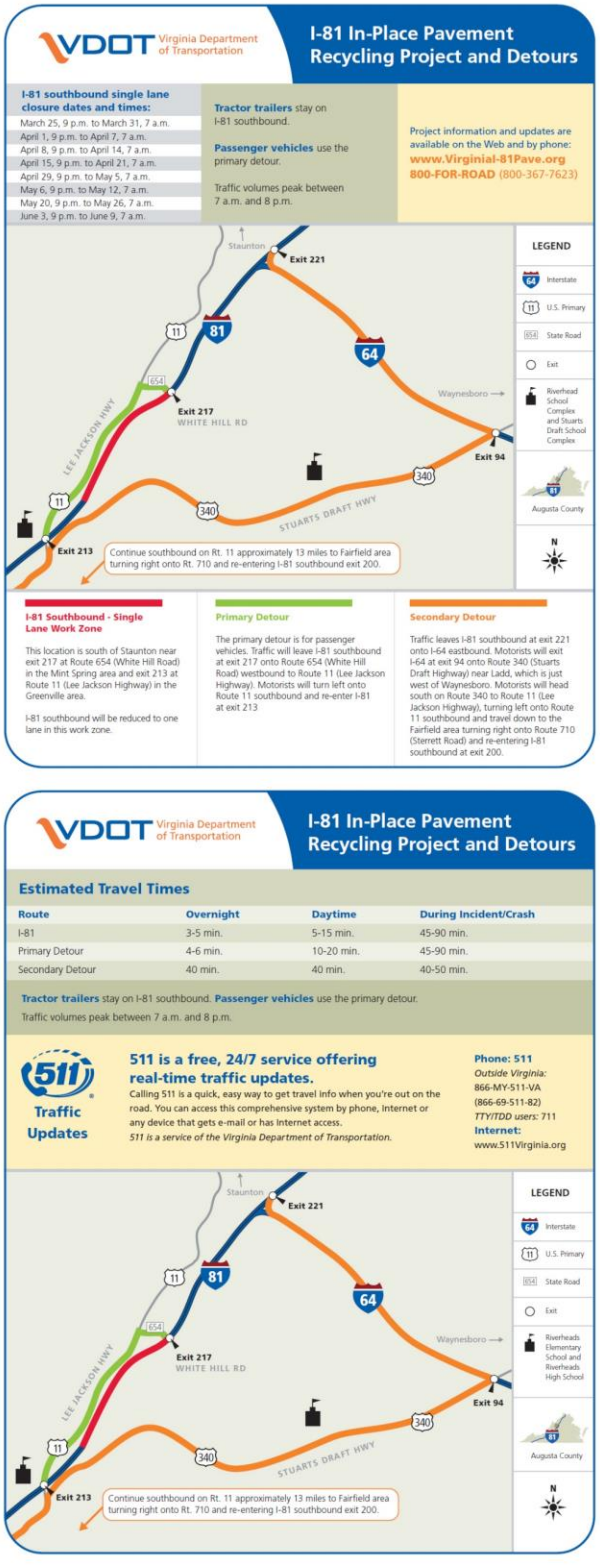
Maryland, and Pennsylvania. Also, VDOT ran banner ads on various news media sites in these states. The media material directed citizens to the VDOT website project page for this work. The project page contained a listing of dates for the lane closures, maps, detours, fact sheets about the detour, what to expect in the work zone, and research about the project. In addition, VDOT communicated with various constituencies including the local legislators, local citizens, school system research community, trucking industry, and other interests. As the project began, a media day was planned with a press conference and a citizen information meeting. The VDOT project web page was central to the communication effort, supplying travelers with lane closure schedules and detours. Radio ads in Virginia, West Virginia, Maryland, and Pennsylvania were aired. Web banners linking to the VDOT project page were purchased on news sites in these states. Rest areas in Virginia along I-81 had posters and brochures alerting citizens of the project (Figure 3).

The TMP was deemed a success by VDOT and the contractor because over 90 percent of large trucks stayed on I-81 and traveled through the work zone, whereas 45 percent of cars on I-81 utilized the SR 654/US 11 detour route. Travel times on both routes increased by approximately the same amount during the project, also verifying the success of the detour strategy employed. Delays due to queuing on I-81 were less than what was initially predicted, due primarily to the significant amount of non-truck traffic that was able to be detoured onto SR 654/US 11.

## Key Considerations

Successful implementation of this TMP strategy depends upon several key considerations:

- Proper planning.
- Adequate staffing and resources.
- Suitable site conditions.
- Useful motorist information.




Source: VDOT

*Figure 3. VDOT distributed posters and brochures such as this one at rest areas along the corridor.*

*Proper Planning* — This involves determining whether the strategy is appropriate for a given work zone and, if so, how and when such a strategy will be implemented. This strategy requires proper planning and analysis within the context of the development of the TMP for the project. The decision to utilize this specific impact mitigation strategy may flow naturally from the TMP planning process (see Federal Highway Administration guidance, *Developing and Implementing Transportation Management Plans for Work Zones,* for more information [*2*]).

*Adequate Staffing and Resources* — In addition to the staffing resources necessary to design a TMP, this strategy required significant flagger staffing at the exit ramp and along the detour route when the forced detour strategy was in use. Additional staffing was also required to closely monitor traffic conditions and switch the messages on the PCMSs as appropriate.

*Suitable Site Conditions* — It is necessary for the roadway network, traffic using the primary roadway, and the work zone itself to have suitable characteristics for this TMP strategy to be useful. In the example given previously, large trucks comprised nearly 40 percent of the traffic using I-81, and the convenient alternate route added a small additional travel distance for those drivers who were detoured onto that route before returning to I-81 downstream. The work zone, while requiring long-term lane closures that extended through peak periods and created queues and delays, was accommodated entirely between successive exit and entrance ramps.

*Useful Motorist Information* — The determination and dissemination of information that motorists can easily understand and react to will affect the effectiveness of TMP strategies like this one. Determining what information is most important to the different target audiences in the traffic stream is also critical. Likewise, it is essential that messages be designed to provide information at proper locations without overwhelming motorists' abilities to perceive, process, and react to the information while simultaneously operating their vehicles.



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## REFERENCES

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