

**Highlights from the  
TPB Bus On Shoulders (BOS) Task Force – Meeting #1**

October 17, 2012

Place: COG Board Room

Ms. Carol Krimm and Mr. Chris Zimmerman (Co-Chairs)

**ATTENDEES:**

Bob Brown, Loudoun County	Eric Marx, PRTC
Ron Burns, Frederick County	Jim Maslanka, City of Alexandria
Melissa Chow, WMATA	Allen Muchnick, Arlington Coalition for Sustainable Transportation
Gary Erenrich, Montgomery County	Glenn Saffran, MTA
Lyn Erickson, Maryland DOT	Tina Slater, TPB Citizens Advisory Committee
Anthony Foster, District DOT	David Snyder, City of Falls Church
Claire Gron, NVTC	Kanti Srikanth, Virginia DOT
Jason Groth, Charles County	Rahul Trivedi, Virginia DOT
Renée Hamilton, Virginia DOT	Katrina Tucker, Tri-County Council for Southern Maryland
Barry Kiedrowski, Maryland SHA	Alexis Verzosa, City of Fairfax
Rick Kiegel, MTA	Randall White, Fairfax County
Mike Lake, Fairfax County	
Dan Malouff, Arlington County	

**TPB Staff:**

Ron Kirby	Rich Roisman
Eric Randall	

**1. Welcome and Introductions**

Ms. Krimm welcomed the participants and asked them to introduce themselves.

**2. Overview of Local and National Bus on Shoulder Experience**

<http://www.mwcog.org/uploads/committee-documents/kV1cXV1a20121019072750.pdf>

Mr. Randall gave a presentation on Bus On Shoulders (BOS) experience in the region and elsewhere. BOS is an arrangement by which buses providing public transportation service operate on designated highway shoulders, when safe and practical to do so, in order to circumvent peak traffic congestion. He then reviewed the schedule and participation for the task force, as well as the work plan. Next was a review of experience with BOS locally and elsewhere. Current local experience with BOS includes bus operation along a short section (1.3 mi) of VA-267 (the Dulles Toll Road), for bus access to the West Falls Church Metrorail Station, and along the shoulders of US-29 near Burtonsville, MD. Previously, bus service operated along the Maryland portion of the Capital Beltway in the vicinity of the American Legion Bridge was permitted to operate on shoulders; however, this service was discontinued in 2003. Looking ahead, VDOT is conducting an assessment of the potential of BOS along I-66 inside the

Beltway. In addition, several other cities across the United States also have BOS service; of these, Minneapolis has the most-developed network with over 280 miles of BOS corridors. Mr. Randall reviewed the policy and implementation experience of Minneapolis, and then listed and discussed in brief the key operational and other challenges for successful BOS implementation. He closed with a list of next steps, including a technical memorandum to be drafted and disseminated in November and a second meeting of the task force scheduled for January 2013.

Mr. Marx asked for more information on the VDOT plan for BOS on I-95 shoulders leading up to the Express Lanes now under construction. Mr. Randall directed him to briefings at MWCOCG on the integrated corridor management plan for the I-95/I-395 corridor. (See: <http://www.mwcog.org/uploads/committee-documents/Z11dV1Zc20120911150025.pdf> )

Mr. Erenrich asked about the ridership benefitting from BOS as opposed to number of buses, as well as peak versus off-peak use. Is there a travel time savings threshold in the Twin Cities? This is important for mode shift and new riders, and in turn is important for the benefit-cost analysis (BCA) planned for BOS corridor evaluation. Mr. Randall responded that the BCA model was only in consideration at this time, but at least initially it would focus on current conditions and not on ridership generated by offering improved transit service.

Mr. Kirby spoke to the results of TCRP Report 151, which described how riders like BOS, but also finding that no definitive BCA proving benefits or quantifying the increase in ridership from BOS has been completed.

Mr. Erenrich said that even a BCA of current empirical data would be a great effort, but that projections for the impact of new service on transit use would offer a more realistic forecast of the potential of BOS. The Beltway Mover was not just empty buses.

Mr. Brown asked about the criteria for use of shoulders in the Twin Cities: are they allowed to use lanes shoulders throughout the day? What are the safety impacts from buses going to-and-from at all hours? What are the benefits in operating cost savings from allowing deadhead buses to use the shoulders?

Mr. Kirby spoke to a conversation with the head of Cleveland transit (GRCTA) that BOS yielded his agency few tangible benefits, after the cost of preparing and clearing the shoulders and of training and supervising the drivers. However, Cleveland can be considered to have less congestion than the Washington metropolitan region, which might make BOS more effective in this region.

Mr. Erenrich noted that in Montgomery County they save four minutes in northbound trips versus southbound trips, as the former can make use of the HOV lanes up to Shady Grove. When 15-20 buses per hour are using this system, it adds up to a real benefit. In considering BOS, the issue of inside versus outside shoulders, and how to access exit ramps, also needs to be considered.

Mr. Kirby noted that an HOV makes use of lane built to all standards, which is not the case with shoulders. Mr. Erenrich concurred that naturally a network of dedicated lanes would be the ideal situation.

Ms. Krimm noted that the use of shoulders is meant to provide a near-term solution to transit operators and customers. Driver perceptions of faster, more reliable service would encourage transit ridership. Mr. Kiegel and Mr. Malouff both added that it is important to the public to see real benefits from implementing BOS.

Mr. Marx noted that he has attended several lectures by Twin Cities officials, and that they have implemented and tested just about every possible improvement in every type of scenario. Rider perception is very important, but so is a public outreach effort that noted the use of deadheading buses to save operating costs, and that longer-term builds the case for dedicated lanes.

### **3. VDOT I-66 Inside the Beltway Bus on Shoulder Pilot Program**

<http://www.mwcog.org/uploads/committee-documents/b11cXV1Z20121019072857.pdf>

Mr. Srikanth gave a presentation on the pilot program study in progress by VDOT, for BOS on I-66 inside the Beltway. He reviewed the goals and intended outcomes of the study, and stressed that the objective of the program is an implementable pilot effort within the next year. He provided detail on the working group tasks and the outreach to regional stakeholders as well as the Federal Highway Administration (FHWA). He then spoke to the data collected or available on travel along I-66, for which VDOT is fortunate in having recently completed an extensive right-of-way (ROW) study which provides much information in assessing any geometric constraints associated with BOS operation. He then presented a series of graphs on bus use of I-66, and noted that the real challenge is before or after the HOV restricted time periods, when single-occupancy vehicles increase congestion but the buses are still trying to make it through as well. He noted the issue of center versus median lanes, and how VDOT is focusing on design and operation protocols that will enable safe and effective BOS operations. Other issues include ramp volumes and the possible use of ramp meter adjustments or ramp meter bypasses for buses, and bus vehicle width versus the available shoulder width. He closed by noting that BOS is meant to be solving a problem, and that therefore the problem must be well-defined.

Mr. Erenrich asked if VDOT is considering any new bus service plans, such as the Germantown services restructuring carried out in Maryland? No.

Mr. Marx asked if congestion already prevents bus use of the corridor due to the inability to maintain schedules, and whether with more reliable travel time additional buses might make use of the corridor if they can meet schedules and reduce operating costs.

Mr. Erenrich noted that thirty buses an hour already is still impressive, and should provide sufficient basis for implementing BOS.

Mr. Brown asked if there was a plan for interchanges. Or what if the bus needs to get out of the shoulder? He noted that in Boston they allow all vehicles to use the shoulders in the peak.

Mr. Srikanth responded that the shoulders would be only for buses, and not like I-66 outside the Beltway. The overall approach is to identify areas for BOS, propose feasible solutions, and proposals to address issues. He emphasized that there are many other things to accomplish as well, such as driver training, meeting Virginia State Police requirements, and the development of operation plans. These are not insurmountable, and VDOT is committed to working with all stakeholders to achieving a feasible plan.

Mr. Marx noted that VDOT has experience now with all vehicle use of the shoulders and what happens when first responders need to use them for access, lessons which should be directly applicable to BOS. Mr. Srikanth agreed and noted that buses present additional and different issues.

Mr. Muchnick asked if VDOT would consider expanding the HOV hours, particularly in the AM period for eastbound traffic. If there is severe congestion, why not go to HOV-3 as well? Mr. Srikanth noted that this is part of VDOT's greater study of the corridor as a whole. In addition, VDOT has an HOV monitoring task force that periodically examines operational conditions.

Mr. Marx noted that the opening of the Silver Line, first to Wiehle Avenue and then to Dulles could also reduce bus services on the corridor.

#### **4. Comments by Maryland State Highway Administration (SHA) and Maryland Transit Administration (MTA)**

Mr. Kiedrowski gave remarks on Maryland DOT and SHA's study of transportation options for the west side of the Beltway, including the American Legion Bridge. He noted that SHA is using INRIX data to assess operational conditions and is looking at the feasibility for an added lane; this analysis will be ready by the end of the year. He mentioned previous experience with BOS in this region, including the Smart Mover on the Beltway and the BOS operations along US-29.

Mr. Kiedrowski expanded on the potential of BOS on segment of the Beltway leading up to the Legion Bridge. Previously, when bus drivers wanted to make use of BOS on the Beltway, they had to call-in and get permission from Maryland's CHART operations center, which led to some delay and impacted successful use. He also noted the merging issue at I-270, where using an outside shoulder created significant operational issues for BOS. Currently, SHA is looking at shoulders thickness and width conditions in this segment. Also being assessed are safety incidents, with approximately 150 responses in the past year along the segment, and discussion is taking place on how these could be handled if BOS were implemented.

Mr. Saffran then spoke to BOS operations on US-29. BOS was implemented approximately twenty years ago, between Burtonsville and Randolph/Tech Road. It was very successful, with 12-15 buses per hour in the peak, including both commuter buses and the WMATA Z line. There are many intersections along this corridor, and it was quite congested. However, over the last decade the road has been improved which has reduced congestion and made BOS relatively unnecessary. Bus drivers are allowed to make use of the shoulders at their own discretion, with

no parameters besides need. In the early years buses reduced travel times by up to two-thirds, and BOS was highly touted by the passengers. Overall travel time was not very affected, but the buses were able to adhere to schedule much better. Currently, the corridor is still marked as usable for BOS, but it is no longer necessary.

Mr. Burns asked if the shoulders were physically improved when the BOS was implemented. Mr. Saffran said very little was needed; installation of signage was the main physical action. There was concern over the bus impact on the shoulder pavement, in respect to axle loading and number of buses per hour, but these did not turn out to be significant.

Mr. Erenrich noted that the shoulders were not intended to handle BOS, and conditions have changed further with rumble strips now installed.

Mr. Saffran noted that both MTA buses and chartered buses were allowed to use the shoulders, but again it was only in the peak that there was a need.

It was asked if VDOT expected to reconstruct shoulders along I-66. Mr. Srikanth responded that their preference is not to do any reconstruction, but for small locations they are prepared to do some, and or alternatively some road re-striping to relocate or widen the shoulders. Again, there will be a series of meetings to consider the engineering and operational issues, on a schedule over the next eighteen months to coincide with the Silver Line opening. He emphasized the pilot has only limited funds, and that shoulder thickness would be considered versus frequency of buses.

Ms. Slater asked for clarification on why BOS is no longer necessary on US-29. Mr. Saffran noted that three major intersections have been grade-separated in the past decade. Queues no longer form at the signalized intersections, which were a consistent and predictable delay that led to the BOS implementation. Now traffic moves through the corridor more quickly; the BOS signage is still in place, but there is no longer much need.

## **5. General Discussion**

Mr. Erenrich noted that BOS corridors can be claimed as exclusive lanes for allocation of Federal dollars for transit right-of-way.

Mr. Snyder spoke to safety concerns, which should be first and foremost and will be on everyone's mind. What happens if there is an accident between a car and a bus? What happens to the people stuck on the bus? There may have been limited experiments in the region, but this is still an issue. Mr. Randall responded that the safety record of BOS in the Twin Cities has been exceptionally good, with only some seven property damage incidents over twenty years of operations. Operating rules, speed restrictions in weather, careful coordination, good training, and inter-agency cooperation have been key to good safety performance. Mr. Srikanth added that VDOT is looking at all these issues for I-66 as well.

Mr. White spoke to experience on the VA-267 BOS segment, from the Route 123 interchange into the West Falls Church station. VDOT looked at accident reports, and while there have been

800 accidents along this corridor, only three involved buses and none of them involved buses using BOS. Again, specific rules are key, with speeds limited to 25 MPH. More importantly, if a bus driver sees a hazard, he reports it immediately to dispatch and all buses are informed not to make use of the shoulder.

Mr. Groth asked about the criteria for roads and shoulders to be analyzed by the task force, and whether arterial highways with open access would be considered. Certainly the level of access impacts road use and safety. Interstates have fewer obstacles than arterial highways.

Ms. Krimm expanded on this question to inquire about the process for submitting corridors for consideration. Mr. Randall responded that the three key factors to consider are bus service, congested segments, and shoulders that are feasible for bus use. It is this last factor that is the most challenging; highway departments don't generally keep databases of shoulder width and strength. The I-66 study's available information is an exception. In general, any stakeholder can submit a corridor for consideration to him, and then the list will be taken to consultation with the State DOTs for shoulder condition.

Mr. Kirby asked about the arterial roadway versus Interstate issue – does BOS only work on the Interstates? Mr. Randall responded that some arterial highways could have BOS, such as US-29. The issue becomes one of the specifics of implementation and of technical definitions. If shoulders are used to circumvent a series of traffic signal queues, is this BOS or simply a series of queue jumps as seen in bus priority applications.

Ms. Krimm noted that it would be good to have the benefit of more experience. General discussion then led to the topic of inviting Twin Cities area representatives to video teleconference in to a future meeting.

Mr. Erenrich noted that he has seen some of the videos of BOS operation in the Twin Cities, and finds the narrow width of some of the shoulders in use daunting from an operational point-of-view.

Ms. Erickson noted that if the task force wants to pursue implementation, MDOT would have to conduct preliminary assessments. But this is a process that would take some time, especially the identification of safety considerations.

Mr. Snyder raised the concern of road geometry and sight lines, and suggested that response tactics by fire and safety personnel be developed for BOS. He also stressed that accident data as well as congestion data should be considered for BOS corridor analysis.

Mr. Kirby noted that one Twin Cities official had noted some circumstances where safety considerations could be troublesome. However, buses can almost always get off the shoulders and into the general lanes except in very problematic instances, when traffic is at a complete stop.

Mr. Saffran noted that the topography of US-29 was a factor in its successful BOS implementation, as it is a very flat roadway with good sight distances.

Mr. Marx noted that considering ITS components, with real-time signage to control shoulder access, would be one tool to manage safety considerations.

General discussion concluded with an announcement that the second meeting of the task force is scheduled for the morning of the January TPB meeting.

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