

August 5, 2020

To: Mayor and Members of City Council
From: Paula Boggs Muething, Interim City Manager
Subject: Netting Beneath the Western Hills Viaduct

REFERENCE DOCUMENT #202000050

On January 23, 2020, the Budget and Finance Committee referred the following for a report:

MOTION, submitted by Vice Mayor Smitherman, WE MOVE that the City Administration identify the best resource(s) to pay for the installation of netting beneath the Western Hills Viaduct in order to protect automobiles and individuals from damage or injury. The cost of the netting is estimated to be \$2,000,000.

REPORT

Loose concrete is a common problem experienced by nearly all public agencies that maintain an inventory of bridges. While loose concrete can develop on newer bridges, risk and frequency tend to increase as a bridge ages and deterioration becomes more widespread. In maintaining its inventory of bridges, the Department of Transportation and Engineering (DOTE) must address various infrastructure issues every year. Part of that process involves weighing the pros and cons of the various methods for addressing those issues. Available funding is a consideration as well.

A prominent location that has experienced multiple incidents of loose concrete over the years is the Western Hills Viaduct. In 2017 DOTE evaluated installing protective netting underneath the viaduct to mitigate the possibility of falling concrete. The benefit of installing netting is the potential reduction of loose concrete dropping onto the roadway. However, there are several disadvantages; those are listed below:

- The netting would reduce vertical clearances, especially when debris falls into the netting causing it to sag.
- The netting would impede visibility during annual routine bridge inspections.
- The netting would have to be temporarily removed and reinstalled every two years in order to perform federally mandated Fracture Critical (FC) inspections.
 - The temporary removal of the netting for these inspections would result in additional closures of the bottom deck.
 - The temporary removal of the netting would increase the cost of these inspections.
 - Repeated removal and reinstallation of the netting may compromise its performance.

- The netting would be attached to the existing concrete. The attachments could compromise and loosen new areas of concrete, thus creating new areas of concern.

DOTE evaluated the effectiveness and practicality of installing netting across the viaduct. Given the disadvantages listed above, installing netting above the entire length of the lower deck is not the best solution. Rather, a better approach is to identify specific areas along the viaduct that are most susceptible to concrete coming loose and which pose the most significant risk to the traveling public.

To identify these areas, DOTE used the following criteria:

- Susceptibility of the area to accelerated deterioration
- Difficulty of routine inspection of the area to determine suspect concrete
- Difficulty of access to the area for chipping
- Location of the area, i.e., the area is relatively high above traffic and poses greater risk of damage or injury
- Incidents of falling concrete causing vehicular damage
- Feasibility of the installation of netting at the location

DOTE has identified five specific areas which meet all or some of the criteria listed above. The locations and the associated cost to install netting at each is listed below from the highest benefit to the lowest benefit.

Area	Estimated Amount
#1 - Above the Intersection of Spring Grove Ave and Lower Deck	\$ 65,000
#2 - Arch above Spring Gove Ave	\$ 120,000
#3 - Above Lower Deck near I-75 ramps	\$ 60,000
#4 - Above Lower Deck west of Spring Grove Ave	\$ 60,000
#5 - Above Lower Deck along midsection of Viaduct	\$ 320,000
Total	\$ 625,000

Next Steps

Location #1 would benefit the most from netting, as it is the only location which meets all the criteria above. DOTE will install netting at this location as soon as possible using existing bridge maintenance funds.

Regarding the other four locations: DOTE has adopted a maintenance policy for the Western Hills Viaduct that includes regular inspections and concentrated chipping to proactively remove deteriorated and/or loose areas of concrete. DOTE currently performs a visual inspection of the entire viaduct once per year, as well as a close-up inspection of critical components of the bridge (also known as a "fracture critical" inspection) every two years as mandated by federal law. DOTE uses the information from these inspections to schedule the removal of deteriorated concrete. This takes place at least twice per year. The frequency and scope of chipping work has increased in recent years in order to better manage the worsening condition of the viaduct.

DOTE will continue to monitor the status of the bridge and the rate of deterioration to determine if there are any necessary changes to the maintenance policy for the Western Hills Viaduct.

cc: John S. Brazina, Director, Department of Transportation and Engineering