EXHIBIT C

Memorandum of Walter Kulash, P.E. ("Kulash Memo")

Nimmo Parkway Phase VII-B: Review of Draft Environmental Assessment

MEMORANDUM

DATE: June 23, 2022

TO: Morgan Butler, SELC

FROM: Walter Kulash, P.E. (VA 064353) WMK

PROJECT: Nimmo Parkway Phase VII-B: Review of Draft Environmental Assessment

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I. Assessing Reliability of Wetland Impact Figure Used for Upgrading Sandbridge Road in Draft EA

I undertook an assessment of whether the wetland impact figure provided for the "Sandbridge Road (Previously Studied)" alternative included in Table 3 of the Draft Environmental Assessment ("Draft EA") can be considered a reliable estimate in light of improvements that have made to the corresponding segment of Sandbridge Road since that wetland impact figure was developed in 2003.

First, it should be noted that the wetland impact figure (8.8 acres) that Table 3 of the Draft EA lists for the "Sandbridge Road (Previously Considered)" alternative is taken from the *Comparison Report* for *Sandbridge Road and Nimmo Parkway*, dated January 14, 2003, and prepared by Vanasse Hangen Brustlin, Inc. (hereafter referred to as "2003 VHB Comparison"). The 2003 VHB Comparison is attached to this report as Exhibit 1.

More specifically, the wetland impact figure for the "Sandbridge Road (Previously Considered)" alternative represents the wetland impact that the 2003 VHB Comparison computed for an approximately 2.7-mile section ("Section 3") of the preferred alignment ("Hybrid 1") from the *Sandbridge Corridor Improvements Summary Report* that VHB had previously prepared for the City of Virginia Beach in 2002 (hereafter referred to as "2002 VHB Summary Report"). The 2002 VHB Summary Report is attached to this report as Exhibit 2.

As shown on page 5 of Exhibit 1, "Section 3" of "Hybrid 1" extended from a point approximately 500 feet west of the Atwoodtown Road/Sandbridge Road intersection to the approximate area on existing Sandbridge Road where it would tie into the Nimmo Parkway Phase VII-A proposal.

This is all to say that the wetland impact figure that the Draft EA presents for upgrading the Sandbridge Road corridor is the wetland impact figure computed in 2003 for the pertinent segment of a design and alignment for improving Sandbridge Road that was developed in 2002 (hereafter referred to as "2002 alignment").

Appendix B to the Draft EA explains that the 2002 alignment "generally followed the existing Sandbridge Road corridor, with the exception of a deviation into an

undeveloped parcel containing forested wetlands," and it states that the deviation was "needed to ease sharp curves and other hazards."[1] That "deviation" from the existing Sandbridge Road corridor in the 2002 alignment is an approximately 4,000-foot segment that extends from the vicinity of the Atwoodtown Road/Sandbridge Road intersection to east of the Flanagans Lane/Sandbridge Road intersection.

Pages 5 and 7 of Exhibit 1 show that this 4,000-foot "deviation" from the existing Sandbridge Road corridor accounted for 4.2 acres of the total 8.8 acres of wetland impacts attributed to Section 3 of the 2002 alignment.[2] Thus, nearly half (47%) of the 8.8 acres of wetland impact attributed to the "Sandbridge Road (Previously Considered)" alternative in Table 3 of the Draft EA are due to this "deviation" through forested wetlands.

As noted above, the Draft EA states that this "deviation from the existing Sandbridge Road corridor [was] *needed to ease sharp curves and other hazards*."[3] Looking at the aerial images and surveys of Sandbridge Road as it existed at that time (which are included in the 2003 VHB Comparison and the 2002 Sandbridge Corridor Improvements Summary Report), the most deficient of the "sharp curves" that the "deviation" was intended to ease was clearly the curve on Sandbridge Road in the vicinity of the Flanagans Lane intersection. At the time of the 2002 and 2003 VHB studies, this curve had a 150-foot radius with a design speed of around 20-25 miles per hour.

The most obvious of the "other hazards" on Sandbridge Road that the "deviation" was likely intended to ease were: (1) the skewed-angle intersection of Flanagans Lane with Sandbridge Road; and (2) the Sandbridge Road/Lotus Drive/Atwoodtown Road intersection, which had a confusing (and therefore potentially dangerous) "three-way" configuration at that time.

Significantly, all of the above reasons for the 2002 preferred alignment to deviate from the Sandbridge Road corridor have been rendered obsolete by major improvements to Sandbridge Road that have been made since the 2002 and 2003 VHB studies. More specifically:

- The "sharp" 150-foot radius (20-25 miles per hour) curve that formerly existed on Sandbridge Road in the vicinity of Flanagans Lane has been substantially "eased" with a 450-foot radius (35-40 miles per hour) curve.

- The problematic and confusing configurations at the Sandbridge Road/Locust Drive/Atwoodtown Road intersection and the Sandbridge Road/Flanagans Lane intersection have been replaced with standard right-angle intersections,

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[1] Draft EA at page 4.

[2] Page 5 of Exhibit 1 shows where the Hybrid 1 alignment cuts through significant areas of "Unconfirmed Wetlands Delineated by Others," and page 7 of Exhibit 1 shows that of the 8.8 acres of wetlands that Section 3 of the Hybrid 1 alternative would impact, 4.2 are labeled as "Unconfirmed."

[3] Draft EA, App. B at page 3. (Emphasis added.)

supplemented with auxiliary turn lanes and channelization.

A properly updated alternative for improving the Sandbridge Road corridor would no doubt account for the current alignment in the vicinity of Flanagans Lane (which now has an adequate curve radius) and the current intersection configurations at the Sandbridge Road/Lotus Drive/Atwoodtown Road and Sandbridge Road/Flanagans Lane intersections (which now have acceptable right-angle geometry). Given these corrected conditions on Sandbridge Road, the apparent need for the 4,000-foot "deviation" from the existing Sandbridge Road corridor evaporates, along with the 4.2 acres of wetland impacts that were associated with it. In other words, a properly updated Sandbridge Road alternative would avoid those now unnecessary wetland impacts, significantly reducing (by nearly 50%) the wetland impacts attributed to the "Sandbridge Road (Previously Considered)" alternative in Table 3 of the Draft EA.

II. Assessing Wetland Impacts Due to Multi-Use Path

I also conducted a simple analysis to determine the approximate extent to which removing the multi-use path from the 2002 preferred alignment would reduce even further the wetland impacts that are attributed to the "Sandbridge Road (Previously Considered)" alternative in Table 3 of the Draft EA.

To do so, I analyzed the jurisdictional wetlands maps for "Section 3" of the "Hybrid 1" alignment that were included in the 2002 VHB Summary Report. I determined where the multi-use path shown on those maps directly impacted wetlands, and I then developed a linear footage estimate for the total length of those impacts, which is approximately 5,500 linear feet. I then deleted from that figure the approximately 1,900 linear feet of the "deviation" described above that would impact wetlands so that I would not "double-count" those wetlands. This resulted in a net total of 3,600 linear feet.

I then determined the width of the proposed multi-use path to be 12 feet, based on scaling the cross-section elements from enlargements of the jurisdictional wetlands maps from the 2002 VHB Summary Report.

At that point, I was able to develop an estimate of the total square footage of wetland impacts for the 2002 preferred alignment that were due to its inclusion of the multi-use path. At a width of 12 feet, the linear distance of 3,600 feet of impacted wetlands equates to 43,200 square feet—or roughly 1.0 acre—of wetland impact caused by the multi-use path. Thus, the wetland impacts attributed to the "Sandbridge Road (Previously Considered)" alternative included in Table 3 of the Draft EA would drop by another 22% (from 4.6 acres down to 3.6 acres) if the multi-use path had not been part of that 2002 alignment.

I should also note that not including a multi-use trail would also noticeably reduce the acreage of property needed for upgrading the existing Sandbridge Road corridor. By my estimate, it would save approximately 4 acres of property impacts along the 2.7-mile segment included in Table 3 of the Draft EA.

III. Uncertain Impacts of Additional Elevation

Section 2.2.1.3 of the Draft EA states that new design standards adopted by the City of Virginia Beach would require the road to be raised "approximately 1.5 – 4.0 feet higher than the elevation considered in previous studies." That section of the Draft EA then catalogues a list of potential impacts that raising the road elevation could cause. For instance, the Draft EA suggests: the need for "a new off-line roadway alignment;" that raising in place "cannot be safely completed" while maintaining traffic; that altered driveway grades "may cause drainage concerns for adjacent properties;" and that raising the road could "potentially lead to additional displaced homes, impacts to wetland and impacts to cultural resources."

This cataloging of impacts of raising the elevation of Sandbridge Road risks being misleading and is of little use in assessing or understanding the actual impact of the road. As an initial matter, there is a range of potential impacts that generally vary according to the 1.5 – 4.0 feet range of additional elevation increase referenced in the Draft EA. One cannot determine from that broad range, for example, where or how much additional right-of-way may be needed, whether and where additional wetlands might be impacted, or whether or where drainage concerns may be a valid concern for adjacent properties. Further, even at the high end of the 1.5 – 4.0 feet range, there are ways to approach construction and project design that can minimize many of those concerns or avoid them completely.

By failing to study the amount of road elevation increase that would be necessary at various points along the corridor and then evaluate how it would translate to actual impacts, the Draft EA's discussion of this issue is too conjectural to be reliable, and it risks misleading the reader and exaggerating the challenges of upgrading the existing corridor.

Conclusion

Based on my review of the wetland impacts attributed to the "Sandbridge Road (Previously Studied)" alternative included in Table 3 of the Draft EA and my analysis of current conditions on the Sandbridge Road corridor, the 8.8 acres of wetland impact attributed to the Sandbridge Road alternative in Table 3 of the Draft EA include at least 4.2 acres that would not be impacted by a properly updated Sandbridge Road alternative, and another 1.0 acre of wetland impact resulting from the inclusion of a multi-use path in the 2002 alignment.

The wetland impact figures attributed to the "Sandbridge Road (Previously Studied") alternative in Table 3 of the Draft EA should therefore not be considered a reliable estimate of what the wetland impacts would be for a properly updated Sandbridge Road alternative. In addition, the Draft EA's failure to evaluate the amount of road elevation increase that would be necessary at various points along the corridor

due to the City's new design standards prevents a fair and proper understanding of the impacts of the additional elevation.