Christopher J. Phipps, P.E., Director

MEMORANDUM

TO: File

FROM: Nestor A. Flores, P.E, PTOE
Eric Tabacek

SUBJECT: Ft. Smallwood Park Access

DATE: 3/5/2021

Concerns:

The Traffic Engineering Division (TED) was asked to review road capacity concerns for the Ft. Smallwood Road access to Ft. Smallwood Park. The concerns stem from the addition of approximately 27 parking spaces within the Park.

Existing Roadway Conditions:

Ft. Smallwood Road is a two-lane two-way road leading to the entrance to Ft. Smallwood Park. Maryland State Highway Administration collected traffic data in 2019. The Average Daily Traffic (ADT) is 501 (0.1 mile South of Fort Smallwood Park). Fort Smallwood Park currently has 377 parking spaces including 48 boat trailer spaces.

Data Collection/Observations:

Anne Arundel County Recreation and Parks provided daily vehicle count data from January 2019 through December 2020. The highest daily traffic count was 1,389 vehicles entering the park. Any background information for departing vehicles?

Analysis:

Given
The 'K Factor' or peak hour percentage of the average daily traffic is 10% (from SHA Data). Therefore, the peak hour of the highest travel day noted above was approximately 139 vehicles entering the park. We will use 139 vehicles for the peak hour for the analysis. Should the peak hour include a factor for both entering and departing vehicles?

Trip generation
2019 vehicle trips per parking space using R&P data - 1.28 Weekend; 0.53 Weekday
2020 vehicle trips per parking space using R&P data - 1.53 Weekend; 0.82 Weekday

With the addition of 27 spaces, the estimated additional trips are as follows:

2019 – 27 x 1.28 = 34.6 round 35 vehicles total
35 x 0.5 = 18 per direction
2020 – 27 x 1.53 = 41.3 round 41 vehicles total
41 x 0.5 = 21 per direction

Assuming the 2020 trip generation, the new demand is approximately 160 (139 + 21) vehicles per hour (vph).

Capacity calculation
The Highway Capacity Manual 6th edition provides the following equation to calculate the capacity of a two-way two-lane road.

Eq. 15-12: Capacity = 1,700 x $f_{g,ATS}f_{hv,ATS}$ = 1,700 x 1.0 x 0.975 = 1,658 vphpl
Where:
$f_{g,ATS}$ (grade adjustment factor)= 1.0 for grades less than 2 percent
$f_{HV,ATS}$ (heavy vehicle adjustment factor) = $1/(1+P_T(E_T-1)$ = $1/(1+.05(1.5-1)$ = 0.975
PT (define)= 5% per SHA Counts
ET (define)= 1.5 based on directional flow of 139 vph and Exhibit 15-11

The capacity of Ft. Smallwood Road near the park entrance is 1,658 vphpl. The roadway will have enough capacity to handle the projected highest hour of daily traffic of 160 vph.

Follow-up:

In an effort to effectively advise motorists seeking to access Ft. Smallwood Park of its closure prior to an adequate turn-around area, we recommend placing a Variable Message Board (VMS) west of the Compass Point Golf Course access.