



November 8, 2021

Ref: 52430.29

Mr. Samuel Durfee, AICP  
City of Concord Senior Planner  
41 Green Street  
Concord, NH 03301

Re: Traffic Engineer Peer Review  
Proposed Development – 70 Pembroke Road

Dear Mr. Durfee,

Vanasse Hangen Brustlin, Inc. (VHB) has conducted a peer review of the October 20, 2021 Traffic Impact and Access Study prepared by TFMoran Inc. for a proposed multifamily workforce housing development to be located on Tax Map 62Z Lot 1 along Pembroke Road in Concord, New Hampshire. The development program consists of constructing 123 multifamily residential units in three 3-story buildings. Access is proposed to be provided by way of a full access driveway along the north side of Pembroke Road across from an existing driveway for 2 Industrial Drive (Buildings 1 and 2). VHB has reviewed the traffic study for consistency with standard engineering practice and methodologies, including City of Concord guidelines and requirements, as applicable. This peer review letter has been prepared to outline concerns and recommendations on the traffic study.

## Introduction

The subject site is located along the north side of Pembroke Road within the City of Concord's Gateway Performance (GWP) District, east of 189 Pembroke Road, and west of 249 Sheep Davis Road. This section of Pembroke Road is under City of Concord jurisdiction. Therefore, local review and approvals are expected to be required for the proposed residential project with respect to traffic. As per the City's Zoning Ordinance (Section 28-2-2(b)(11)), the purpose of the GWP District is to "provide for well designed, large scale commercial development along arterial streets at entrances to the City. Permitted uses will be predominantly commercial and may include both individual and mixed use developments of retail, restaurant, service, and office uses. . ." In addition (Section 28-4-5(e)(2)), "Where residential uses are proposed in the GWP or [Opportunity Corridor Performance (OCP)] Districts, a Comprehensive Development Plan (CDP) must be prepared in accordance with the requirements of Sections 8-4-1(g), Applicability to Performance Districts, and 28-9-4, Decisions by the Planning Board."

**Comment 1:** These sections of the City's Zoning Ordinance are associated with on-site components of the development and are not related to off-site traffic impacts of the workforce housing

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project. Therefore, the City's Planning Board and Planning staff will need to review the development program to ensure compliance with the Zoning Ordinance for multifamily developments within the GWP District. **No response is required.**

In accordance with Section 32.01 of the City of Concord's Site Plan Regulations, a traffic study is required for land development projects that are expected to generate more than 200 vehicle trips per day and more than 20 vehicle trips per hour. As presented in Table 1 of the traffic study, the proposed development is estimated to exceed these thresholds.<sup>1</sup> Therefore, the estimated trip generation for the proposed development satisfies the City's requirement for the preparation of a traffic study (Site Plan Regulations, Chapter 5, Section 32.01). A meeting was held with the development team and City officials on September 27, 2021 to define the scope (parameters and methodologies) to be used within the traffic study.

**Comment 2:** Within the Scoping Meeting section of the traffic study, the date of the traffic scoping meeting is incorrectly stated as being held on December 17, 2020 and that Regional Planning staff attended the meeting. These errors do not change the findings of the traffic study or impact other components of review. **No response is required.**

## Existing Conditions

### Study Area

The traffic study evaluated the traffic impacts of the proposed development at the Pembroke Road unsignalized intersection with the driveway for 2 Industrial Park Drive and with the proposed site driveway.

**Comment 3:** In accordance with common traffic engineering practice<sup>2</sup> and New Hampshire Department of Transportation (NHDOT) general guidance, a development may have a noticeable impact if the addition of site trips would increase peak hour traffic volumes on an intersection approach by 100 vehicles or more. The rationale is that this magnitude could change vehicular operations (i.e., drop level of service or increase delay by 10 seconds or more). A safety or capacity deficiency may require the study of a project's impacts at an intersection even if that intersection is projected to experience less than 100 peak hour site trips. Based on the trip-generation estimates provided in Table 1 of the traffic study, the proposed development is not anticipated to generate peak hour trips to meet the 100 vehicle per hour threshold. In addition, City of Concord officials did not request additional intersections in the area to be studied during the traffic scoping

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<sup>1</sup> Weekday = 335 vehicle trips per day, Saturday = 302 vehicle trips per day, Weekday PM = 33 vehicle trips per hour, and Saturday = 28 vehicle trips per hour.

<sup>2</sup> Transportation Impact Analyses for Site Development: An ITE Proposed Recommended Practice. Washington, DC: Institute of Transportation Engineers, 2010.



meeting that are currently experiencing safety deficiencies. Therefore, the study area is deemed to be adequate. **No response is required.**

### Elements of a Traffic Study

As documented in the Accident Evaluation section of the traffic study, crash data have been requested from the Concord Police Department but had not been obtained at the time of the traffic study submittal.

**Comment 4:** In accordance with Chapter 5, Section 32.08.16 of the City's Site Plan Regulations, a traffic study should provide an evaluation of the frequency and safety issues observed. To satisfy the City's requirement, the crash data has been requested from the Concord Police Department but are not expected to be available for several months. During the traffic scoping meeting, City staff did not identify safety concerns at the Pembroke Road, 2 Industrial Park Drive driveway, and site driveway intersection. **No response is required.**

In the Sight Distance and Driveway Location section of the traffic study, the proposed site driveway is required to be located at least 200 feet from adjacent driveways and from street intersections. As proposed, the site driveway would be located across from the driveway for 2 Industrial Park Drive and would meet the City of Concord's 200 foot minimum sight distance requirement.

**Comment 5:** Although the traffic study states that a conditional use permit (CUP) is being requested for the driveway location, the distances were not referenced between the proposed site driveway and adjacent driveway/roadway intersections. Based on a review of the October 20, 2021 TFMoran Inc. Conditional Use Permit – Driveway Location letter addressed to City Planner Heather R. Shank, PLA, AICP, the proposed site driveway would be located approximately 143 feet west of Industrial Park Drive and approximately 70 feet east of the Bektash Shriners driveway at 189 Pembroke Road. While the location of the proposed site driveway was preliminarily discussed during the traffic scoping meeting, City and VHB representatives requested that the Applicant provide engineering support with respect to operations and safety for the close proximity to these intersections as the onus is on the Applicant to justify the reduced distances. Therefore, the Applicant should provide engineering documentation related to the site driveway distances to nearby driveways and intersections in support of the CUP request.

**Comment 6:** In compliance with Chapter 5, Section 32.08.16 of the City's Site Plan Regulations; Chapter 4, Section 21.09.3 of the City's Subdivision Regulations, and the City of Concord's Driveway Permit Application, a sight distance evaluation is required to be conducted based on NHDOT Rules for the Permitting of Drives and Entrances as well as the American Association of State Highway and Transportation Officials' (AASHTO's) Policy for the Geometric Design of Highways and Streets. Therefore, the Applicant should perform a sight distance evaluation by documenting the available sight lines to and from the proposed site driveway and comparing these distances with the City's minimum, NHDOT All Season Safe Sight Distance, and AASHTO requirements and guidelines.



In the On-Site Parking section of the traffic study, the Applicant is requesting a CUP to allow a parking ratio of 1.7 parking spaces per dwelling unit where the City requires a parking ratio of 2.0 parking spaces per multifamily housing unit.<sup>3</sup> As proposed, the development would provide 204 parking spaces with an allocation for an additional 42 parking spaces should they be needed in the future.

**Comment 7:** The parking ratio of 1.7 parking spaces per dwelling unit reflected in the traffic study would result in 209 parking spaces for the proposed 123 unit workforce housing development (1.7 spaces/unit x 123 units) and not the 204 parking spaces being requested. Based on a review of the October 20, 2021 TFMoran Inc. Conditional Use Permit – Alternate Parking Arrangement addressed to City Planner Heather R. Shank, PLA, AICP, the CUP request is actually for a parking ratio of 1.65 parking spaces per multifamily dwelling unit which would result in 203 parking spaces for the 123 dwelling units. Therefore, it appears that the parking ratio discrepancy is due to the rate presented in the traffic study being rounded from 1.65 to 1.7 parking spaces per dwelling unit. **No response is required.**

**Comment 8:** As stated in the October 20, 2021 TFMoran Inc. Conditional Use Permit – Alternate Parking Arrangement addressed to City Planner Heather R. Shank, PLA, AICP, the proposed parking ratio is consistent with Institute of Transportation Engineers (ITE) guidelines although no supporting data were provided. VHB reviewed ITE Parking Generation data for the proposed multifamily development and calculated the average parking demand on a weekday to be 161 parking vehicles and on a Saturday to be 150 parked vehicles.<sup>4</sup> Therefore, the requested parking ratio is less than the City's requirement but greater than the ITE parking demand ratios. **No response is required.**

### Existing Traffic Volumes

The 2021 Base traffic volumes were developed by collecting traffic counts in October 2021 during the weekday AM peak period (7-9 AM), weekday PM peak period (2-6 PM), and the Saturday peak period (11 AM-1 PM). These traffic counts were then adjusted based on seasonal and pandemic factors.

### Seasonal Adjustments

Traffic on a given roadway typically fluctuates throughout the year depending on the area and the type of roadway. Based on NHDOT guidelines for the preparation of a traffic study, the October 2021 traffic counts were increased by 7 percent to account for seasonal fluctuation in traffic volumes.<sup>5</sup>

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<sup>3</sup> City's Zoning Ordinance Article 28-7-2-e: Table of Off-Street Parking Requirements.

<sup>4</sup> Weekday average parking ratio = 1.31 spaces/dwelling unit, Saturday average parking ratio = 1.22 spaces/dwelling unit.

<sup>5</sup> Based on an average of historical data for Count Station 02051003 along NH 3A in Bow, Count Station 62099056 along NH 106 in Concord, and Count Station 72099278 along US 3 in Concord.



**Comment 9:** Based on NHDOT methodologies, peak-month traffic volume adjustments should be based on the closest permanent recorder station that is on a similar type of roadway. Although there is a typographical error in Appendix B of the traffic study that references the average January peak-month adjustment factor instead of October, the methodology used in developing the seasonal adjustment factor is reasonable. **No response is required.**

### Pandemic Traffic Adjustment

Due to the coronavirus disease 2019 (COVID-19) pandemic, traffic volumes may not be representative of normal travel conditions on New Hampshire roadways. Therefore, the seasonally adjusted traffic volumes were upwardly adjusted to reflect pre-pandemic traffic volumes by comparing traffic counts at nearby NHDOT Count Stations<sup>6</sup> in October 2019 and October 2021. This comparison revealed that traffic volumes are approximately 6 percent lower in October 2021 than in October 2019.

**Comment 10:** The methodology used in developing the pandemic adjustment factor is reasonable. **No response is required.**

### Future Conditions

#### No-Build Traffic Volumes

In accordance with Sections 32.08.14 and 32.08.15 of the City of Concord's Site Plan Regulations, the impact of site-generated traffic within the study area is to be evaluated under opening year conditions and opening year plus 10 years conditions. As documented in the traffic study, 2022 was used to represent opening year conditions and 2032 was used to reflect opening year plus 10 years conditions. Traffic volumes on the roadway network during these design horizons would include existing traffic, new traffic due to normal traffic growth, and traffic related to developments by others that are expected to be completed within these future conditions (i.e., background developments). The 2022 and 2032 No-Build traffic volumes were developed based on the following:

- Applying a 1 percent compounded annual growth rate to the 2021 Base traffic volumes.
- Adding the site trips associated with Phase 1 of the 236 unit apartment development to be constructed at 70 Pembroke Road (the former Sprague Electric site).

**Comment 11:** During the traffic scoping meeting, City and VHB representatives requested that the Applicant research historical traffic growth in the area. Should traffic volumes be found to experience less than 1 percent in annual growth, then a minimum compounded annual growth rate of 1 percent was requested to be used in accounting for general population growth and traffic to be generated by smaller developments in the area.<sup>7</sup> Although the

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<sup>6</sup> Ibid. 5.

<sup>7</sup> No less than a 1% compounded annual growth as per NHDOT methodologies.



traffic study did not provide support for the 1 percent annual growth rate, VHB conducted a review of NHDOT historical traffic volumes between 2009 and 2019 at the three Count Stations referenced within the study area.<sup>8</sup> An average of these historical traffic volume annual trends revealed an annual increase of less than 1 percent.<sup>9</sup> Therefore, the 1 percent growth rate is acceptable, and the 2022 and 2032 No-Build traffic volumes have been developed appropriately. **No response is required.**

## Build Traffic Volumes

### Trip Generation

To estimate the volume of traffic to be generated by the proposed development, trip rates published in the ITE Trip Generation Manual were reviewed. For the proposed workforce housing development, trips were developed using Land Use Code 221 (Multifamily Housing [Mid-Rise]) for 123 dwelling units.

**Comment 12:** Based on a review of the trip-generation estimates, the ITE Trip Generation 10<sup>th</sup> edition was used in estimating site trips. In September 2021 and prior to the submittal of the traffic study, ITE issued the Trip Generation 11<sup>th</sup> edition that slightly changed the trip estimates for Land Use Code 221:

- Weekday Daily:
  - › Traffic Study = 669 total trips (335 in and 334 out)
  - › Updated ITE data = 542 total trips (271 in and 271 out)
- Saturday Daily:
  - › Traffic Study = 604 total trips (302 in and 302 out)
  - › Updated ITE data = 582 total trips (291 in and 291 out)
- Weekday AM Peak Hour:
  - › Traffic Study = 44 total trips (11 in and 33 out)
  - › Updated ITE data = 43 total trips (10 in and 33 out)
- Weekday PM Peak Hour:
  - › Traffic Study = 54 total trips (33 in and 21 out)
  - › Updated ITE data = no change

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<sup>8</sup> Ibid. 5.

<sup>9</sup> Count Station 02051003 along NH 3A in Bow = 0.07%, Count Station 62099056 along NH 106 in Concord = 0.40%, Count Station 72099278 along US 3 in Concord = 1.66%, Average = 0.71%.



- Saturday Peak Hour:
  - › Traffic Study = 58 total trips (28 in and 30 out)
  - › Updated ITE data = 50 total trips (25 in and 25 out)

As shown, the ITE Trip Generation Manual 11<sup>th</sup> edition would produce less trips than the 10<sup>th</sup> edition other than during the weekday PM peak hour (which would result in the same number of trips). Therefore, the site trips used within the traffic study represent a conservative (worse-case) scenario in evaluating the traffic impacts of the proposed development. **No response is required.**

### Trip Distribution

As documented within the traffic study, the weekday daily, weekday AM peak hour, and weekday PM peak hour site trips developed for proposed workforce housing project were distributed along the adjacent roadway network based on U.S. Journey-to-Work data with the City of Concord as the place of residency. The Saturday daily and peak hour site trips were distributed within the study area proportionally based on traffic counts and travel routes.

**Comment 13:** The trip-distribution methodology is reasonable. **No response is required.**

### Intersection Analyses

Capacity analyses were performed for the Pembroke Road, 2 Industrial Park Drive driveway, and site driveway intersection with the 2021 Base, 2022 and 2032 No-Build, 2022 and 2032 Build traffic volumes during the weekday AM, weekday PM, and Saturday peak hours based on the concepts and procedures in the Highway Capacity Manual (HCM) using the *Trafficware Synchro Software* computer program.

**Comment 14:** The title of Table 2 references 2022 Phase 1 and the title of Table 3 references 2032 Full-Build. As stated in the October 20, 2021 TFMoran Inc. Conditional Use Permit – Driveway Location letter addressed to City Planner Heather R. Shank, PLA, AICP, the proposed development would be constructed in a single phase. Therefore, the Applicant should clarify if the titles of Tables 2 and 3 within the traffic study include typographical errors or if the build program would be developed in phases.

**Comment 15:** NHDOT guidance suggests that a project may have a noticeable impact on traffic operations when there is an increase of 10 seconds or more when comparing No-Build and Build traffic conditions. As reflected in Tables 2 and 3 of the traffic study, the proposed development is projected to result in delays of less than 1 second on the critical movements at the Pembroke Road, 2 Industrial Park Drive driveway, and site driveway intersection. Therefore, the proposed development is shown to result in minimal impacts to the adjacent roadway network. **No response is required.**

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## Findings

In general, the traffic study was developed in accordance with the City of Concord's Site Plan Regulations (Section 32.08: Traffic Impacts and Traffic Studies), NHDOT guidance, and standard traffic engineering practice. As requested within this traffic peer review document, the Applicant should provide additional documentation and clarification for the site driveway location with respect to adjacent driveways and intersections, sight distances, and whether the proposed development would be constructed in phases.

Please do not hesitate to contact us if you have any questions or if we can be of any further assistance.

Sincerely,

Vanasse Hangen Brustlin, Inc.

A handwritten signature in blue ink that reads "Jason R. Plourde".

Jason R. Plourde, P.E., PTP

Transportation Systems Team Leader  
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