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Transportation Impact Study – Addendum

PROPOSED RESIDENTIAL DEVELOPMENT

2512, 2522, 2532 Argyle Road
City of Mississauga, Ontario

Third Submission: August 15, 2019
Second Submission: May 9, 2019
First Submission: October 23, 2018
Project No: NT-17-254

520 Industrial Parkway South, Suite 201
Aurora, Ontario L4G 6W8

Phone: 905-503-2563
www.nextrans.ca

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NextEng Consulting Group Inc.

August 15, 2019

Plazacorp Investments Ltd.
10 Wanless Avenue, Suite 201
Toronto, ON M4N 1V6

Re: Transportation Impact Study Addendum
Proposed Residential Development
2512, 2522, 2532 Argyle Road, City of Mississauga
Our Project No. NT-17-254

On behalf of our client, Plazacorp Investments Ltd., we acknowledge City of Mississauga transportation comments dated July 2019 with respect to our Transportation Impact Study, dated May 9, 2019.

The subject site is currently occupied by three (3) one-storey single detached dwelling units and is located at the west of Argyle Road and south of Dundas Street West in the City of Mississauga. The development plan consists of 101 stacked back-to-back townhouse units with vehicular access via Argyle Road and 153 parking spaces provided in an underground parking garage.

Based on the comments received from the City of Mississauga, an addendum letter is required for our third submission. Our responses are addressed as follows:

PLANNING COMMENTS

1. *Based upon review of the Parking Utilization Study provided by Nextrans, dated May 8,2019 and Transportation Impact Study Addendum by Nextrans dates May 9, 2019 the following rates can be supported: 1 Bedroom at 1.1 spaces per unit, 2 Bedroom at 1.3 spaces per unit, 3 bedroom at 1.4 spaces per unit, and keep 0.25 visitor spaces per unit = 150 spaces required with the units currently proposed.*

Response

Since the unit matrix has not been altered from the previous submission, the above parking rates are acknowledged, and the revised parking requirement based on the above comment and supply is summarized in **Table 1**.

Table 1 – Recommended Parking Rates for 2512, 2522, 2532 Argyle Road Residential Development

Use	Units	Parking Rate	Parking Requirement	Parking Provided	Difference
Condominium Horizontal Multiple Dwelling (*without exclusive use garage and driveway*)	32 1-bedroom 67 2-bedroom 2 3-bedroom	1.1 spaces per 1-bedroom unit 1.3 spaces per 2-bedroom unit 1.4 spaces per 3-bedroom unit	35 87 3	153	+3
Condominium Horizontal Multiple Dwelling – Visitor	101	0.25 spaces per unit	25		
Total			**150**	**153**	**+3**

As summarized in **Table 1**, the supported parking rates result a combined parking requirement of 150 parking spaces. The proposed site provides a total of 153 parking spaces which results in a surplus of three (3) parking spaces. On this basis, the future parking demand is completely satisfied with the parking provision.

URBAN DESIGN COMMENTS

1. *Waste Collection – provide accurate vehicle turning templates to determine the required movements of the Peel Region waste collection truck. In addition, show all the required bins (waste, blue and green bins and bulky items) within the staging/pick-up area on the concept plan, and show the required bins and chutes in the U/G parking garbage room.*

Response

An updated vehicle turning template of the Peel Region waste collection truck is provided in **Figure 1** (page 6) at the end of this letter and depicts that the truck can effectively maneuver through the loading space.

TRANSPORTATION & WORKS: TRAFFIC REVIEW COMMENTS

1. *Provide a section in the Traffic Impact Study stating how the Peak Hour Factors have been calculated since the default PHF is not being used.*

Response

A calculated PHF per each traffic movement was utilized to capture the most accurate traffic conditions which were also carried forward to future traffic scenarios. PHF are calculated by taking the peak hour flow rate and dividing that by four times the peak 15-minute flow rate within that hour, per the following formula:

$$PHF= \frac{\text{Hourly Flow Rate}}{(4 \times \text{Peak 15-minute Flow Rate})}$$

A sample calculation for the AM peak hour westbound through movement on Dundas Street West and Argyle Road is provided below:

$$PHF= \frac{V}{(4 \times V_{15})}$$

$$= \frac{610}{(4 \times 174)}$$

$$= 0.88$$

The calculation is referenced in the Highway Capacity Manual Chapter 7, and an excerpt of the chapter is provided in **Appendix A**. The PHF utilized in our analysis are referenced in the traffic data sheets and similarly in the synchro reports, provided in Appendices D, E, F, and H of the second submission transportation study.

2. *Based on a community meeting held, a signal warrant is required to be completed for the intersection of Dundas Street West and Argyle Road.*

Response

In order to determine whether a signal light is warranted at the intersection of Dundas Street West and Argyle Road, a warrant analysis was conducted based on the methodology outlined in the *Ontario Traffic Manual Book 12 – Traffic Signals*. The signal warrant analysis is provided below.

Peak Hour Volumes in future total traffic conditions are first converted to Average Hourly Volumes (AHV) for a typical day; calculated as follows:

$$AHV_{\text{ALL APPROACHES}} = \frac{amPHV + pmPHV}{4}$$

$$= \frac{1991 + 2454}{4}$$

$$= 1112 \text{ vehicles}$$

$$AHV_{MINOR\ STREET} = \frac{amPHV + pmPHV}{4}$$

$$= \frac{87 + 88}{4}$$

$$= 44 \text{ vehicles}$$

$$AHV_{MAJOR\ STREET} = \frac{amPHV + pmPHV}{4}$$

$$= \frac{1904 + 2366}{4}$$

$$= 1068 \text{ vehicles}$$

$$AHV_{MINOR\ STREET+PEDESTRIAN} = \frac{amPHV + pmPHV}{4}$$

$$= \frac{(87+17) + (88+22)}{4}$$

$$= 54$$

Table 1 – Justification 7 – Projected Volumes (OTM Book 12)

Justification	Description	Minimum Requirement 2 or more lanes	Compliance		
		Restricted Flow	Sectional		Entire %
			Numerical	%	
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	1350	1112	82	17
	B. Vehicle volume, along minor streets (average hour)	255	44	17	
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	1350	1068	79	21
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	255	54	21	

It shall be noted that since Dundas Street West and Argyle Road is a "T" intersection, the restricted flow volumes were increased by 50% because the recorded values in the *OTM Book 12 Table 21* are originally based on four-legged intersections. It is also important to note that all cases must meet the warrant requirement in order to justify a signal light. So, the minimum sectional percent value is selected for each case under the "Entire %" column.

For an existing intersection with a new development, Justification 7 as outlined in **Table 1**, needs to be met to 120%. The proposed development only meets 17% of the required 120% thus, a signal light is not warranted at Dundas Street West and Argyle Road.

Moreover, according to *OTM Book 12*, signalized intersection spacing that is less than 415 meters may affect progression efficiency at a posted speed of 50 km/h. Dundas Street West has a posted speed limit of 50 km/h and the intersection of Dundas Street West and Argyle Road is approximately 260 meters and 85 meters, west of Confederation Parkway and east of Parkerhill Road, respectively. Thus, a signal light at Dundas Street West and Argyle Road will introduce greater delays to traffic flow.

On the above analysis and assessment, a signal light at the intersection of Dundas Street West and Argyle Road is not warranted with the proposed development.

3. *Provide a digital copy of the Traffic Impact Study, Turning Templates are not visible from the hard copy of the TIS or provide a drawing full size with the turning templates of the underground parking.*

Response

A digital copy of the turning templates will be provided.

4. *Section 2.1 Argyle Road: unposted speed limits along local roads are default 50 km/h.*

Response

The above comment is acknowledged and was revised in the second submission of the transportation impact study report in Section 2.1 page #9.

5. *Section 8.0 Transportation Demand Management: "Consider providing transit incentives for residents, if appropriate." It should be noted that the City of Mississauga does not provide any transit incentives such as pre-loaded PRESTO cards. All TDM measures and associated costs are to be borne by the applicant.*

Response

It is acknowledged that the City of Mississauga does not provide any transit incentives.

6. *Provide turning template for the underground parking and the garbage/loading area.*

Response

AutoTURN software was used to assess the vehicle turning maneuvers. Updated turning templates are provided at the end of this letter in **Figure 1** and **Figure 2** for the proposed loading space and underground parking, respectively.

REGION OF PEEL COMMENTS

1. *A Waste Feasibility Study is required to confirm adequate collection to the Site. The Waste Feasibility Study should show the Collection vehicle entering and exiting the site (meeting the 13m turning radii on all turns) and 18m head on approach.*

Response

An updated vehicle turning template of the Peel Region waste collection truck is provided in **Figure 1** (page 6) at the end of this letter and depicts that the truck, which meets the above parameters, can effectively maneuver through the loading space.

We trust the enclosed sufficiently addresses your needs. Should you have any questions, please do not hesitate to contact the undersigned.

Yours truly,

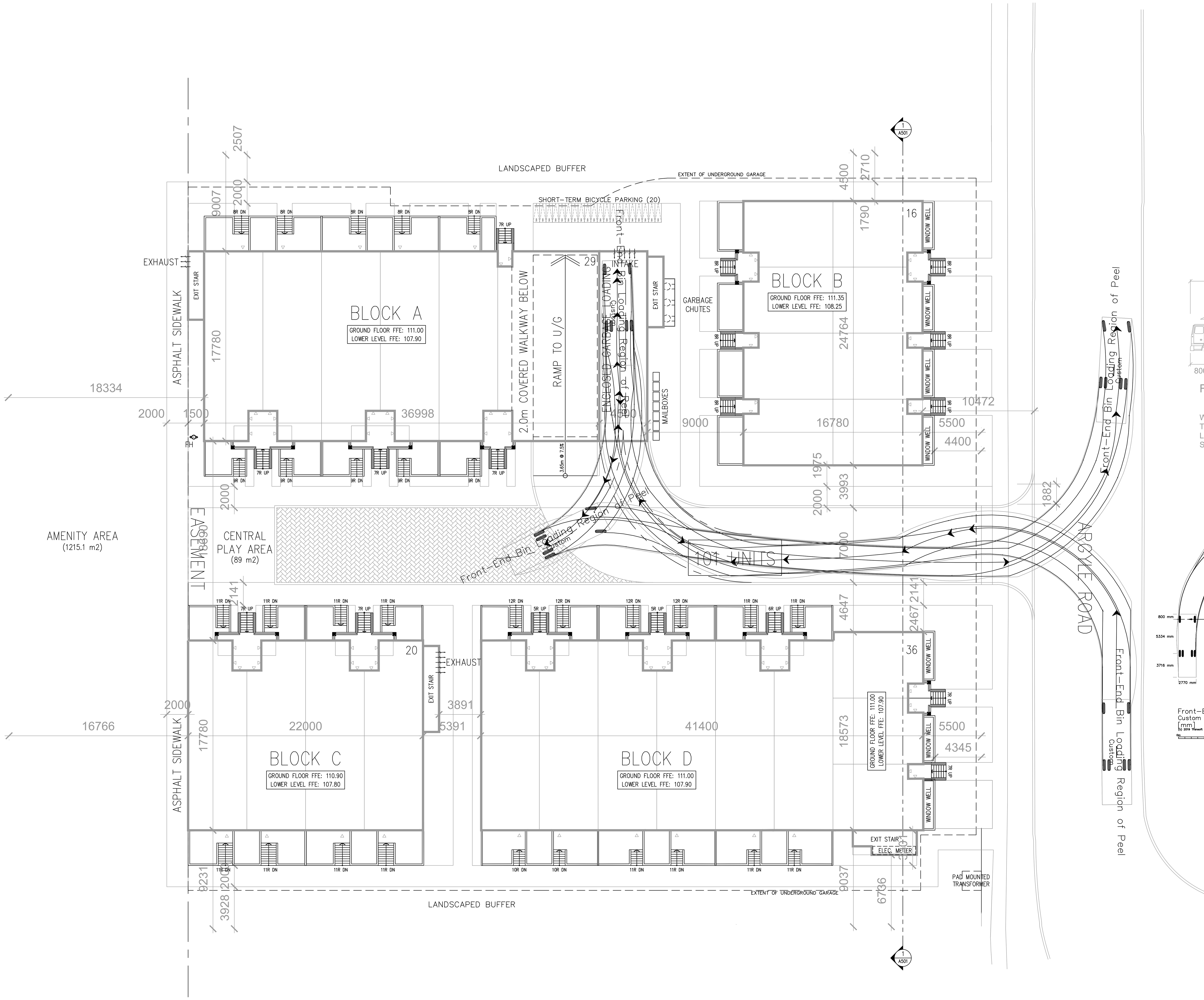
NEXTRANS ENGINEERING

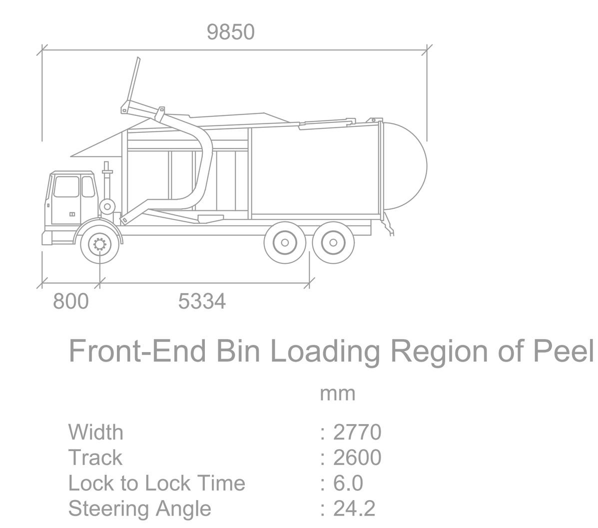
Prepared by:

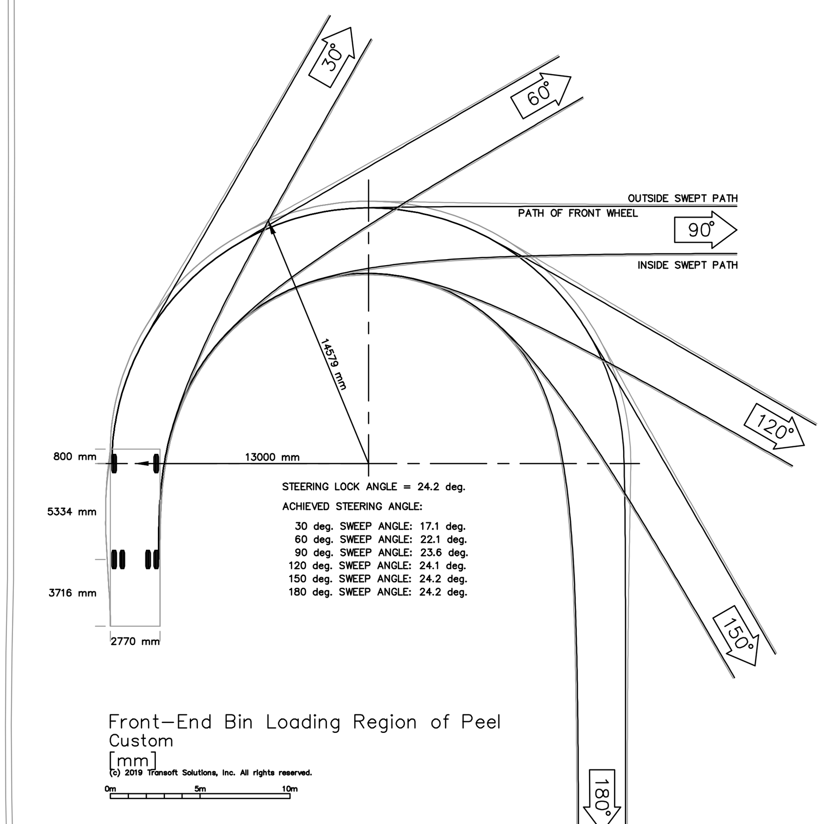
Madeleine Catz, EIT
Transportation Analyst

Reviewed by:

Richard Pernicky, CET, MITE
Principal







BENCHMARK

NO	REVISION	DATE	BY

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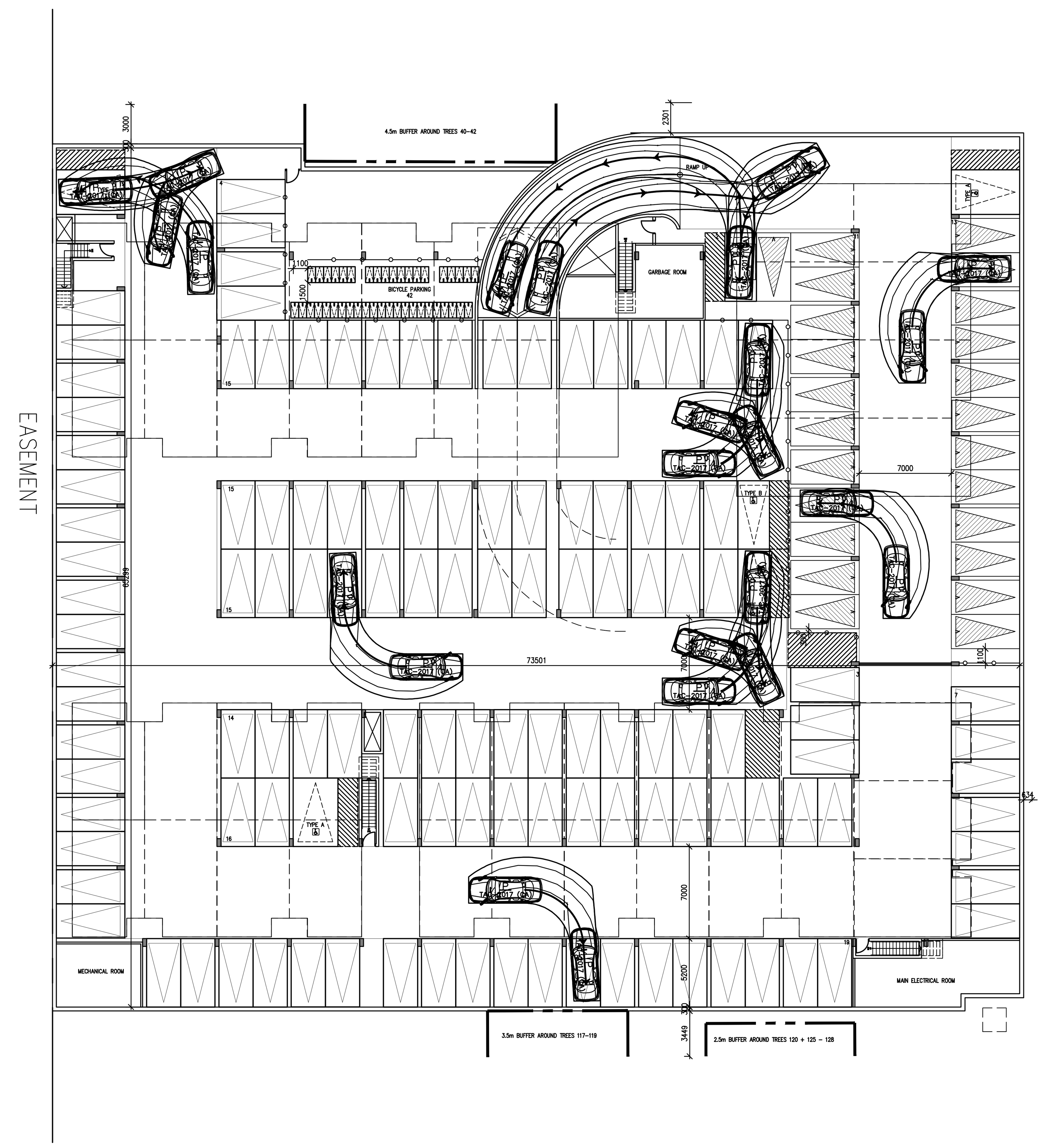
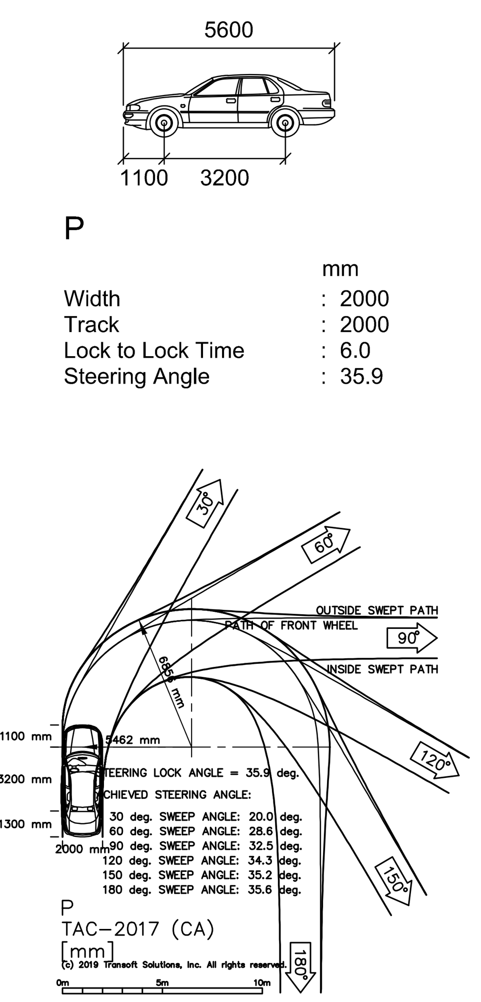
nexTrans CONSULTING ENGINEERS
520 Industrial Parkway South, Suite 201
Aurora, Ontario L4G 6W8
Tel: 905-503-2563
www.nextrans.ca

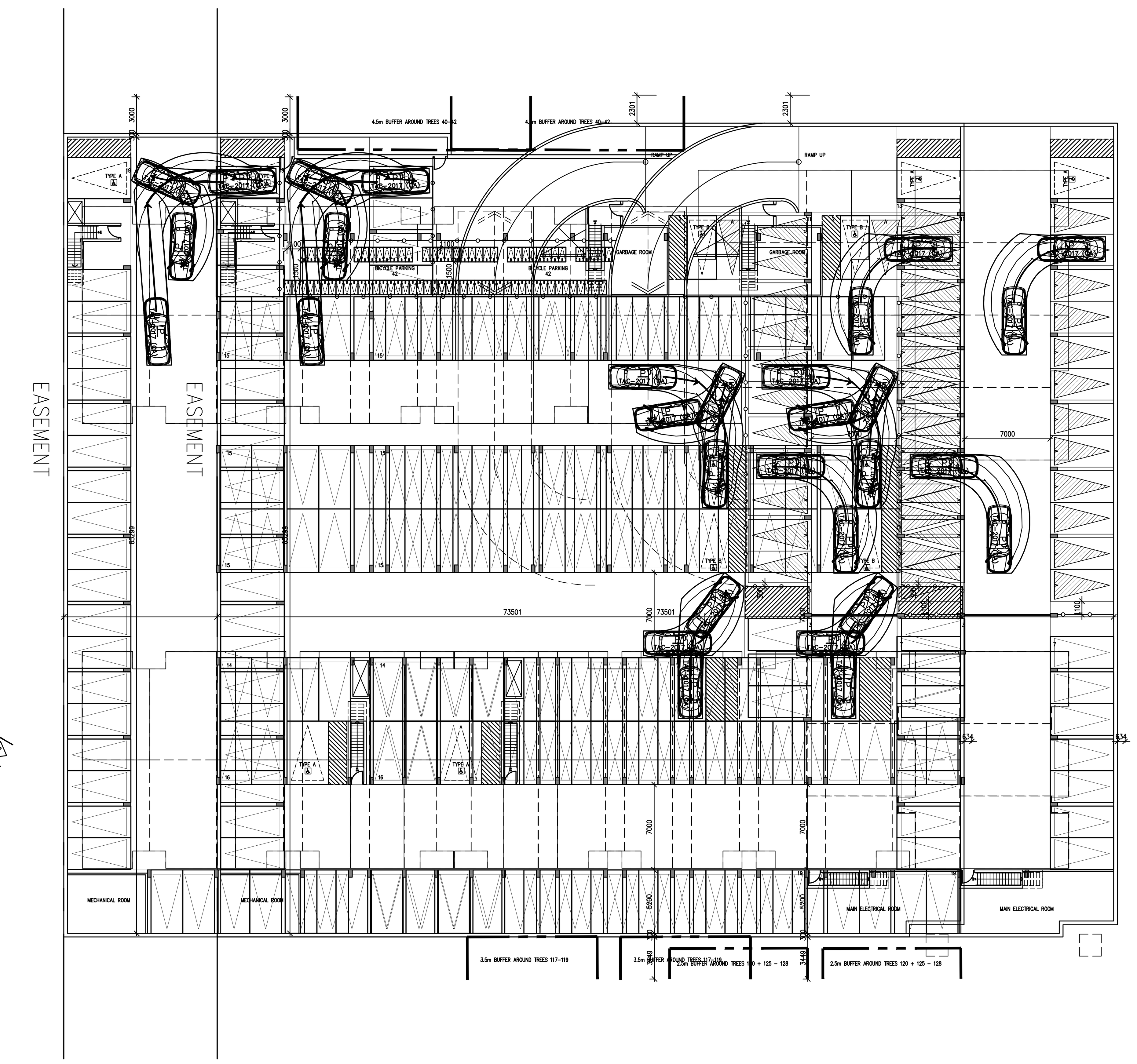
PROJECT NAME:
RESIDENTIAL DEVELOPMENT
2531 Argyle Road
(CITY OF MISSISSAUGA)

DRAWING TITLE:
AutoTURN Analysis
(9.85m Front-End Loading Waste Collection)

DESIGN BY: A.S.	DATE: August 15, 2019
CHECKED BY: R.P.	PROJECT NO. NT-17-254
DRAWN BY: A.S.	
SCALE: 1:200	DRAWING NO. Figure 1







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REVISONS

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CONSULTING ENGINEERS
520 Industrial Parkway South, Suite 201
Aurora, Ontario L4G 6W8
Tel: 905-503-2563
www.nextrans.ca

PROJECT NAME:

RESIDENTIAL DEVELOPMENT

2531 Argyle Road
(CITY OF MISSISSAUGA)

DRAWING TITLE:

AutoTURN Analysis
(P TAC−2017)

DESIGN BY: A.S.	DATE: May 8, 2019
CHECKED BY: R.P.	PROJECT NO. NT-17-254
DRAWN BY: A.S.	
SCALE: 1:300	DRAWING NO. Figure 2

Appendix A – Highway Capacity Manual Excerpt for Peak Hour Factor Calculation

I. INTRODUCTION

Three basic variables—volume or flow rate, speed, and density—can be used to describe traffic on any roadway. In this manual, volume or traffic flow is a parameter common to both uninterrupted- and interrupted-flow facilities, but speed and density apply primarily to uninterrupted flow. Some parameters related to flow rate, such as spacing and headway, also are used for both types of facilities; other parameters, such as saturation flow or gap, are specific to interrupted flow.

II. UNINTERRUPTED FLOW

VOLUME AND FLOW RATE

Basic concepts for uninterrupted-flow facilities: volume, flow rate, speed, density, headway, and capacity

Volume and flow rate are two measures that quantify the amount of traffic passing a point on a lane or roadway during a given time interval. These terms are defined as follows:

- Volume—the total number of vehicles that pass over a given point or section of a lane or roadway during a given time interval; volumes can be expressed in terms of annual, daily, hourly, or subhourly periods.
- Flow rate—the equivalent hourly rate at which vehicles pass over a given point or section of a lane or roadway during a given time interval of less than 1 h, usually 15 min.

Volume and flow are variables that quantify demand, that is, the number of vehicle occupants or drivers (usually expressed as the number of vehicles) who desire to use a given facility during a specific time period. Congestion can influence demand, and observed volumes sometimes reflect capacity constraints rather than true demand.

The distinction between volume and flow rate is important. Volume is the number of vehicles observed or predicted to pass a point during a time interval. Flow rate represents the number of vehicles passing a point during a time interval less than 1 h, but expressed as an equivalent hourly rate. A flow rate is the number of vehicles observed in a subhourly period, divided by the time (in hours) of the observation. For example, a volume of 100 vehicles observed in a 15-min period implies a flow rate of 100 veh/0.25 h or 400 veh/h.

Volume and flow rate can be illustrated by the volumes observed for four consecutive 15-min periods. The four counts are 1,000, 1,200, 1,100, and 1,000. The total volume for the hour is the sum of these counts, or 4,300 veh. The flow rate, however, varies for each 15-min period. During the 15-min period of maximum flow, the flow rate is 1,200 veh/0.25 h, or 4,800 veh/h. Note that 4,800 vehicles do not pass the observation point during the study hour, but they do pass at that rate for 15 min.

Consideration of peak flow rates is important in capacity analysis. If the capacity of the segment of highway studied is 4,500 veh/h, capacity would be exceeded during the peak 15-min period of flow, when vehicles arrive at a rate of 4,800 veh/h, even though volume is less than capacity during the full hour. This is a serious problem, because dissipating a breakdown of capacity can extend congestion for up to several hours.

Calculating a peak-hour factor

Peak flow rates and hourly volumes produce the peak-hour factor (PHF), the ratio of total hourly volume to the peak flow rate within the hour, computed by Equation 7-1:

$$PHF = \frac{\text{Hourly volume}}{\text{Peak flow rate (within the hour)}} \qquad (7\text{-}1)$$

If 15-min periods are used, the PHF may be computed by Equation 7-2:

$$PHF = \frac{V}{4 \times V_{15}} \qquad (7\text{-}2)$$

where

PHF = peak-hour factor,
V = hourly volume (veh/h), and
V_{15} = volume during the peak 15 min of the peak hour (veh/15 min).

When the PHF is known, it can convert a peak-hour volume to a peak flow rate, as in Equation 7-3:

$$v = \frac{V}{PHF} \tag{7-3}$$

where

v = flow rate for a peak 15-min period (veh/h),
V = peak-hour volume (veh/h), and
PHF = peak-hour factor.

Equation 7-3 does not need to be used to estimate peak flow rates if traffic counts are available; however, the chosen count interval must identify the maximum 15-min flow period. The rate then can be computed directly as 4 times the maximum 15-min count. When flow rates in terms of vehicles are known, a conversion to a flow rate in terms of passenger car equivalents (pce) can be computed using the PHF and the heavy vehicle factor.

SPEED

Although traffic volumes provide a method of quantifying capacity values, speed (or its reciprocal of travel time) is an important measure of the quality of the traffic service provided to the motorist. It is an important measure of effectiveness defining levels of service for many types of facilities, such as rural two-lane highways, urban streets, freeway weaving segments, and others.

Speed parameters

Speed is defined as a rate of motion expressed as distance per unit of time, generally as kilometers per hour (km/h). In characterizing the speed of a traffic stream, a representative value must be used, because a broad distribution of individual speeds is observable in the traffic stream. In this manual, average travel speed is used as the speed measure because it is easily computed from observation of individual vehicles within the traffic stream and is the most statistically relevant measure in relationships with other variables. Average travel speed is computed by dividing the length of the highway, street section, or segment under consideration by the average travel time of the vehicles traversing it. If travel times t_1, t_2, t_3,..., t_n (in hours) are measured for n vehicles traversing a segment of length L, the average travel speed is computed using Equation 7-4.

$$S = \frac{nL}{\sum_{i=1}^{n} t_i} = \frac{L}{\frac{1}{n}\sum_{i=1}^{n} t_i} = \frac{L}{t_a} \tag{7-4}$$

where

S = average travel speed (km/h),
L = length of the highway segment (km),
t_i = travel time of the ith vehicle to traverse the section (h),
n = number of travel times observed, and
t_a = $\frac{1}{n}\sum_{i=1}^{n} t_i$ = average travel time over L (h).

The travel times in this computation include stopped delays due to fixed interruptions or traffic congestion. They are total travel times to traverse the defined roadway length.

Several different speed parameters can be applied to a traffic stream. These include the following: