Exhibit G

July 28, 2021

Mr. Firat Akcay, M.S.C.E. MBA
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(305) 673-7000
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RE: Ritz-Carlton Sagamore Miami Beach Trip Generation and Queuing Analysis - #21111

Dear Firat,

The Ritz-Carlton Sagamore development is located at 1 Lincoln Road in Miami Beach, Florida. (See Attachment A for the site plan). The Ritz-Carlton Sagamore Miami Beach development is proposing an addition to the Sagamore Hotel that will replace 93 rooms within the hotel with a mixed-use tower consisting of 52 multifamily dwelling units and 53 hotel rooms. The traffic caused by the addition will utilize the same parking garage and optional valet drop-off / pick-up service area as the existing site. As such, access to the site will continue to be provided via the existing parking garage and valet area located on Lincoln Road, east of SR-A1A. Short and long-term bicycle parking will be available on the first floor of the parking garage, east of the garage entrance.

The purpose of this traffic statement is to conduct a trip generation analysis and queuing analysis for the proposed residential / hotel tower addition. A trip generation analysis was performed to estimate the trips during the AM and PM peak hour of the adjacent street. A queueing analysis was performed at the valet station to analyze if the queues will exceed the provided valet storage. Trip generation was also performed to establish the critical morning or afternoon peak volumes to use for the queuing analysis.

Trip Generation

A trip generation analysis was conducted for the proposed Sagamore Miami Beach project. The project trip generation was based on the rates/equations published by the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 10th Edition. Land Use 221, Multifamily Housing Mid-Rise and Land Use 310, Hotel were used in the analysis. A 20% reduction for other modes of transportation was applied at the request of the City. Trip generation calculations were performed for a typical weekday daily, AM and PM peak hours of the adjacent street. Trip generation for the proposed and existing site are summarized in Exhibit 1. Support documentation is provided in Attachment B.

Exhibit 1
Trip Generation

Proposed ITE Land Use Designation[1]	Number of Units	Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Hotel *Land Use Code: 310*	53 Rooms	172	12	9	21	7	7	14
Multifamily Housing (Mid-Rise) *Land Use Code: 221*	52 DU	282	5	13	18	14	9	23
Total Gross Trips		**454**	**17**	**22**	**39**	**21**	**16**	**37**
Other Modes of Transportation[2]		20.0%	-3	-4	-7	-5	-3	-8
Net Proposed Trips			**14**	**18**	**32**	**16**	**13**	**29**

Existing ITE Land Use Designation[1]	Number of Units	Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
			In	Out	Total	In	Out	Total
Hotel *Land Use Code: 310*	93 Rooms	624	24	17	41	22	21	43
Total Gross Trips		**624**	**24**	**17**	**41**	**22**	**21**	**43**
Other Modes of Transportation[2]		20.0%	-5	-3	-8	-4	-4	-8
Net Existing Trips			**13**	**10**	**23**	**12**	**11**	**23**

	Daily Vehicle Trips	AM Peak Hour Vehicle Trips			PM Peak Hour Vehicle Trips		
		In	Out	Total	In	Out	Total
Proposed	**454**	**14**	**18**	**32**	**16**	**13**	**29**
Existing	**624**	**13**	**10**	**23**	**12**	**11**	**23**
Net Trip Difference	**-170**	**1**	**8**	**9**	**4**	**2**	**6**

[1] Based on ITE Trip Generation Manual, 10th Edition.

[2] A 20% reduction was used for the transportation reduction per City request.

The results of the analysis show that the proposed Ritz-Carlton Sagamore tower will generate 170 less daily trips than the existing hotel and a total of 9 and 6 vehicle trips during morning and afternoon peak hours respectively.

Queuing Analysis

As previously stated, the proposed tower will utilize the existing parking garage and valet station. The existing valet station is located on Lincoln Road at the existing Ritz-Carlton entrance under a porte-cochere. A queuing analysis was performed for the valet station to determine if a queue will form at the proposed valet reception area that will spill back onto Lincoln Road and interfere with the internal circulation of vehicles entering and exiting the parking garage.

The queuing analysis for the proposed valet drop-off / pick-up area was performed based on the methodology outlined in the *Institute of Transportation Engineers (ITE) Transportation and Land Development*. The analysis was performed to determine the number of valet parking attendants required during the peak hour so that the queue does not extend past the valet storage area (95% confidence level analysis). The potential queues were calculated based on the peak hour traffic published by the Institute of Transportation Engineers (ITE) trip generation rates and/or equations. As the valet station currently serves and will continue to serve the traffic from the Ritz-Carlton Hotel and the Sagamore Hotel, trip generation for Ritz-Carlton Hotel and the Sagamore Hotel's proposed development plan was performed to determine the demand at the valet station. The PM peak of generator (worst case scenario) was used for the purpose of calculating the expected queues at the valet station. A 20% reduction for other modes of transportation and a 44% rideshare reduction were applied at the request of the City. As guests have the option to self-park or valet, it was assumed that 80% of the guests would use the valet services and 20% would self-park. The proposed AM and PM peak of generator trip generation is summarized in Exhibit 2. Queuing trip generation documentation is available in Attachment C.

Exhibit 2

Valet Trip Generation

ITE Land Use Designation[1]	Number of Units	AM Peak of Generator Vehicle Trips			PM Peak of Generator Vehicle Trips		
		In	Out	Total	In	Out	Total
Sagamore Hotel *Land Use Code: 310*	53 Rooms	19	17	36	20	15	35
Sagamore Multifamily Housing *Land Use Code: 221*	52 DU	5	15	20	15	10	25
Existing Ritz-Carlton Hotel *Land Use Code: 310*	374 Rooms	101	86	187	125	90	215
Total Gross Trips		**125**	**118**	**243**	**160**	**115**	**275**
Other Modes of Transportation[2]	20%	-25	-24	-49	-32	-23	-55
Rideshare Services[3]	44%	-44	-41	-85	-56	-40	-96
Net Proposed Trips		**56**	**53**	**109**	**72**	**52**	**124**
Demand at Valet Station	80%	45	42	87	58	42	100

[1] Based on ITE Trip Generation Manual, 10th Edition.

[2] A 20% reduction was used for the transportation reduction per City request.

[3] A 44% rideshare reduction was used at the valet station per City request.

The results of the trip generation show that the critical peak hour for valet parking is the PM peak hour of the generator with a total of 100 vehicle trips (in/out).

The queuing analysis used the single-channel waiting line model with Poisson arrivals and exponential service times. The analysis is based on the coefficient of utilization (ρ) which is the ratio of the average arrival rate of vehicles to the average service rate.

$$\rho = \frac{Average\ Demand\ Rate}{Average\ Sevice\ Rate}$$

The average service rate corresponds to the time it will take a valet parking attendant to park or retrieve a vehicle. If the coefficient of utilization is greater than 1, then the calculation will yield an infinite queue length.

The required queue storage (M) is determined using the following equation:

$$M = \left[\frac{\ln P(x > M) - \ln Q_M}{\ln \rho}\right] - 1$$

In this equation, *P(x > M)* is set at 5% to yield a 95% confidence that the queue will not back-up onto the adjacent street.

Since the distance from the valet drop-off / pick-up area differs for inbound and outbound trips, a weighted average was taken of the inbound / outbound valet processing time. The weighted average was based on the inbound / outbound trip distribution, which is 58% inbound and 42% outbound.

The processing rates were calculated by adding the time it will take a valet attendant to process the vehicles (**processing time**), the time it will take the attendant to circulate to the parking space (**driving time**), the time it will take the attendant to park or retrieve a vehicle (**park processing time**), and the time it will take the attendant to walk to/from the parking area (**walking time**).

A processing time of 60 seconds per vehicle was used in the analysis. This information was provided by the City of Miami Beach. The driving time for the valet attendant was calculated on a conservative speed of 15 mph, and the walking time for the valet attendant was calculated on a jogging speed of 5 ft / sec (provided by the City). The valet processing rate for the valet station can be seen in Exhibit 3.

Exhibit 3
Valet Station Processing Rate
Valet Drop-off / Pick-up

Valet Time (Inbound)	
Processing time:	60 sec / 60 sec / 1 min = ***1.00 min***
Driving time:	780 ft * 1 mile / 5280 ft * 1hr / 15 miles * 60 min / hr = ***0.59 min***
Park Processing Time:	= ***0.15 min***
Walking time:	480 ft / 5 ft / sec / 60 sec / min = ***1.60 min***
Total	= **3.34 min**

Valet Time (Outbound)

***Processing time*:**	60 sec / 60 sec / 1 min = ***1.00 min***
***Driving time*:**	510 ft * 1 mile / 5280 ft * 1hr / 15 miles * 60 min / hr = ***0.39 min***
***Park Processing Time*:**	= ***0.15 min***
Walking time:	480 ft / 5 ft / sec / 60 sec / min = ***1.60 min***
Total	= **3.14 min**

Weighted Valet Time

58% Inbound:	0.58*3.34 min = ***1.94 min***
58% Outbound:	0.42*3.14 min = ***1.32 min***
Total	= **3.26 min**

An iterative approach was used to determine the minimum number of valet attendants required during the PM peak hour to serve both the entering and exiting vehicles that will ensure that the average queue at the valet station will not extend past the valet storage. Exhibit 4 shows the calculations for the inbound / outbound valet drop-off /pick-up area during the PM peak hour of the generator.

Exhibit 4
Valet Station Queuing Calculations

$$Q = \text{Processing Rate} = \frac{60\ min/hr}{3.26\ min/process} = 18.43\ process/hr$$

$$q = \text{Demand Rate} = 100\frac{veh}{hr}$$

N = Service Positions = 9 Attendants

$$\rho = \text{Utilization factor} = \frac{q}{(NQ)} = \frac{100\ veh/hr}{9 \times 18.43\ process/hr} = 0.6028$$

Q_m = Table Value = 0.1239

M = queue length which is exceeded 5% of the time [P(x>M)]

$$M = \frac{\ln P(x>M) - \ln(Q_m)}{\ln(\rho)} - 1 = \frac{\ln(0.05) - \ln(0.1239)}{\ln(0.6028)} - 1 = 0.79, \quad say\ 1 \text{ Vehicle on queue}$$

The results of the analysis show that a total of 9 valet attendants would be able to handle the demand during the PM peak of generator at the valet station with an average queue of approximately one vehicle or less. Based on the site plan, the valet station has approximately 70 feet of storage; this distance is enough to accommodate three vehicles in the queue. It should be noted that the queuing analysis considers the worst case scenario during the peak hours to make sure that the queue never spills onto the public right-of-way or interferes with site operations. Once operational, the development can assess the actual need for valet attendants at different times of the day.

Conclusion

The Ritz-Carlton Sagamore project is proposing an addition that will replace 93 rooms of the existing Sagamore Hotel with a mixed-use tower consisting of 52 residential units and 53 hotel rooms. The tower is anticipated to generate 170 less daily trips than the existing site and only adds a total of 9 and 6 vehicle trips during morning and afternoon peak hours respectively. As the addition is adding less than 10 trips to the roadway network during peak hours, the additional vehicle trips and impacts on the adjacent roadway network can be consider *de minimis.*

As discussed above, the new tower will utilize the parking within the existing parking garage and the valet station provided on Lincoln Road at the existing Ritz-Carlton entrance. The results of the analysis show that a total of 9 valet attendants would be able to handle the demand during the PM peak of generator (worst case scenario) at the drop-off / pick-up area with an average queue of approximately 1 vehicle or less. It is our professional opinion that the additional trips from the proposed tower will not have an adverse impact on the operations of the existing valet station on Lincoln Road and will not impede the access to/from the existing parking garage.

We stand ready to provide any support needed for this project. Should you have any questions or comments, please call me at (305) 447-0900.

Sincerely,

Juan Espinosa, PE
Vice-President – Transportation

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Attachment A

PROPOSED GROUND FLOOR

SCALE: 1" = 30'-0"

Rev.	Date	Rev.	Date

Ritz-Sagamore
1 Lincoln Road
Miami Beach, FL 33139

Owner:
Name
Address
Address
Tel
Email

Consultant:
Name
Address
Address
Tel
Email

Consultant:
Name
Address
Address
Tel
Email

Consultant:
Name
Address
Address
Tel
Email

Architect of Record:
Kobi Karp Architecture and Interior Design, Inc.
2915 Biscayne Boulevard, Suite #200
Miami, Florida 33137 USA
Tel +1(305) 573 1818
Fax +1(305) 573 3766

KOBI KARP
Lic. # AR0012578

Date		Sheet No.
Scale		
Project	2120	

Attachment B

Scenario - 1

Scenario Name: Existing

User Group:

Dev. phase: 1

No. of Years to Project Traffic : 0

Analyst Note:

Warning: The time periods among the land uses do not appear to match.

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method Rate/Equation	Entry Split%	Exit Split%	Total
310 - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	93	Weekday	Best Fit (LIN) T = 11.29(X) - 426.97	312 50%	312 50%	624
310(1) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	93	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN) T = 0.50(X) - 5.34	24 59%	17 41%	41
310(2) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	93	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN) T = 0.75(X) - 26.02	22 51%	21 49%	43

Scenario - 2

Scenario Name: Proposed

User Group:

Dev. phase: 1

No. of Years to Project Traffic : 0

Analyst Note:

Warning: The time periods among the land uses do not appear to match.

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method Rate/Equation	Entry Split%	Exit Split%	Total
310 - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	53	Weekday	Best Fit (LIN) T = 11.29(X) - 426.97	86 50%	86 50%	172
310(1) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	53	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN) T = 0.50(X) - 5.34	12 59%	9 41%	21
310(2) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	53	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LIN) T = 0.75(X) - 26.02	7 51%	7 49%	14
221 - Multifamily Housing (Mid-Rise) Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Dwelling Units	52	Weekday	Best Fit (LIN) T = 5.45(X) - 1.75	141 50%	141 50%	282
221(1) - Multifamily Housing (Mid-Rise) Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Dwelling Units	52	Weekday, Peak Hour of Adjacent Street	Best Fit (LOG) Ln(T) =0.98Ln(X) - 0.98	5 26%	13 74%	18
221(2) - Multifamily Housing (Mid-Rise) Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Dwelling Units	52	Weekday, Peak Hour of Adjacent Street Traffic,	Best Fit (LOG) Ln(T) =0.96Ln(X) - 0.63	14 61%	9 39%	23

COMMUTING CHARACTERISTICS BY SEX

United States™ Census Bureau

Note: This is a modified view of the original table produced by the U.S. Census Bureau. This download or printed version may have missing information from the original table.

	Census Tract 42.06, Miami-Dade County, Florida	
	Total	
Label	Estimate	Margin of Error
Workers 16 years and over	735	±187
MEANS OF TRANSPORTATION TO WORK		
Car, truck, or van	53.2%	±12.5
Drove alone	36.1%	±14.9
Carpooled	17.1%	±10.5
In 2-person carpool	15.5%	±9.8
In 3-person carpool	0.0%	±5.3
In 4-or-more person carpool	1.6%	±2.5
Workers per car, truck, or van	1.20	±0.17
Public transportation (excluding taxicab)	10.6%	±8.8
Walked	25.0%	±10.4
Bicycle	0.4%	±1.2
Taxicab, motorcycle, or other means	7.1%	±5.1
Worked at home	3.7%	±3.9
PLACE OF WORK		
Worked in state of residence	91.8%	±6.6
Worked in county of residence	91.8%	±6.6
Worked outside county of residence	0.0%	±5.3
Worked outside state of residence	8.2%	±6.6
Living in a place	100.0%	±5.3
Worked in place of residence	35.1%	±13.8
Worked outside place of residence	64.9%	±13.8
Not living in a place	0.0%	±5.3
Living in 12 selected states	0.0%	±5.3
Worked in minor civil division of residence	0.0%	±5.3
Worked outside minor civil division of residence	0.0%	±5.3
Not living in 12 selected states	100.0%	±5.3

Table Notes

COMMUTING CHARACTERISTICS BY SEX

Survey/Program:
American Community Survey
Year:
2018
Estimates:
5-Year
Table ID:
S0801

Although the American Community Survey (ACS) produces population, demographic and housing unit estimates, it is the Census Bureau's Population Estimates Program that produces and disseminates the official estimates of the population for the nation, states, counties, cities, and towns and estimates of housing units for states and counties.

Source: U.S. Census Bureau, 2014-2018 American Community Survey 5-Year Estimates

When information is missing or inconsistent, the Census Bureau logically assigns an acceptable value using the response to a related question or questions. If a logical assignment is not possible, data are filled using a statistical process called allocation, which uses a similar individual or household to provide a donor value. The "Allocated" section is the number of respondents who received an allocated value for a particular subject.

Data are based on a sample and are subject to sampling variability. The degree of uncertainty for an estimate arising from sampling variability is represented through the use of a margin of error. The value shown here is the 90 percent margin of error. The margin of error can be interpreted roughly as providing a 90 percent probability that the interval defined by the estimate minus the margin of error and the estimate plus the margin of error (the lower and upper confidence bounds) contains the true value. In addition to sampling variability, the ACS estimates are subject to nonsampling error (for a discussion of nonsampling variability, see ACS Technical Documentation). The effect of nonsampling error is not represented in these tables.

The 12 selected states are Connecticut, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and Wisconsin.

Workers include members of the Armed Forces and civilians who were at work last week.

While the 2014-2018 American Community Survey (ACS) data generally reflect the February 2013 Office of Management and Budget (OMB) definitions of metropolitan and micropolitan statistical areas; in certain instances the names, codes, and boundaries of the principal cities shown in ACS tables may differ from the OMB definitions due to differences in the effective dates of the geographic entities.

Estimates of urban and rural populations, housing units, and characteristics reflect boundaries of urban areas defined based on Census 2010 data. As a result, data for urban and rural areas from the ACS do not necessarily reflect the results of ongoing urbanization.

Explanation of Symbols:

An "**" entry in the margin of error column indicates that either no sample observations or too few sample observations were available to compute a standard error and thus the margin of error. A statistical test is not appropriate.
An "-" entry in the estimate column indicates that either no sample observations or too few sample observations were available to compute an estimate, or a ratio of medians cannot be calculated because one or both of the median estimates falls in the lowest interval or upper interval of an open-ended distribution, or the margin of error associated with a median was larger than the median itself.
An "-" following a median estimate means the median falls in the lowest interval of an open-ended distribution.

An "+" following a median estimate means the median falls in the upper interval of an open-ended distribution.
An "***" entry in the margin of error column indicates that the median falls in the lowest interval or upper interval of an open-ended distribution. A statistical test is not appropriate.
An "*****" entry in the margin of error column indicates that the estimate is controlled. A statistical test for sampling variability is not appropriate.
An "N" entry in the estimate and margin of error columns indicates that data for this geographic area cannot be displayed because the number of sample cases is too small.
An "(X)" means that the estimate is not applicable or not available.

Supporting documentation on code lists, subject definitions, data accuracy, and statistical testing can be found on the American Community Survey website in the Technical Documentation section.

Sample size and data quality measures (including coverage rates, allocation rates, and response rates) can be found on the American Community Survey website in the Methodology section.

Attachment C

Scenario - 3

Scenario Name: Queuing

User Group:

Dev. phase: 1

No. of Years to Project Traffic : 0

Analyst Note:

Warning: The time periods among the land uses do not appear to match.

VEHICLE TRIPS BEFORE REDUCTION

Land Use & Data Source	Location	IV	Size	Time Period	Method Rate/Equation	Entry Split%	Exit Split%	Total
310(2) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	53	Weekday, AM Peak Hour of Generator	Best Fit (LOG) Ln(T) =0.84Ln(X) + 0.25	19 54%	17 46%	36
221 - Multifamily Housing (Mid-Rise) Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Dwelling Units	52	Weekday, AM Peak Hour of Generator	Best Fit (LOG) Ln(T) =0.83Ln(X) - 0.27	5 27%	15 73%	20
310(1) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	374	Weekday, AM Peak Hour of Generator	Best Fit (LOG) Ln(T) =0.84Ln(X) + 0.25	101 54%	86 46%	187
310(3) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	53	Weekday, PM Peak Hour of Generator	Best Fit (LOG) Ln(T) =0.93Ln(X) - 0.14	20 58%	15 42%	35
221(1) - Multifamily Housing (Mid-Rise) Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Dwelling Units	52	Weekday, PM Peak Hour of Generator	Best Fit (LOG) Ln(T) =0.83Ln(X) - 0.05	15 60%	10 40%	25
310(4) - Hotel Data Source: Trip Gen Manual, 10th Ed	General Urban/Suburban	Rooms	374	Weekday, PM Peak Hour of Generator	Best Fit (LOG) Ln(T) =0.93Ln(X) - 0.14	125 58%	90 42%	215

location, a 5% probability of back-up onto the adjacent street is judged to be acceptable. Demand on the system for design is expected to be 110 vehicles in a 45-minute period. Average service time was expected to be 2.2 minutes. Is the queue storage adequate?

Such problems can be quickly solved using Equation (8–9b) given in Table 8-10 and repeated below for convenience.

$$M = \left[\frac{\ln P(x > M) - \ln Q_M}{\ln \rho}\right] - 1$$

where:

M = queue length which is exceeded p percent of the time
N = number of service channels (drive-in positions)
Q = service rate per channel (vehicles per hour)
$\rho = \frac{\text{demand rate}}{\text{service rate}} = \frac{q}{NQ}$ = utilization factor
q = demand rate on the system (vehicles per hour)
Q_M = tabled values of the relationship between queue length, number of channels, and utilization factor (see Table 8.11)

TABLE 8-11
Table of Q_M Values

ρ	$N = 1$	2	3	4	6	8	10
0.0	0.0000	0.0000	0.0000	0.0000			
0.1	.1000	.0182	.0037	.0008	.0000	0.0000	0.0000
.2	.2000	.0666	.0247	.0096	.0015	.0002	.0000
.3	.3000	.1385	.0700	.0370	.0111	.0036	.0011
.4	.4000	.2286	.1411	.0907	.0400	.0185	.0088
.5	.5000	.3333	.2368	.1739	.0991	.0591	.0360
.6	.6000	.4501	.3548	.2870	.1965	.1395	.1013
.7	.7000	.5766	.4923	.4286	.3359	.2706	.2218
.8	.8000	.7111	.6472	.5964	.5178	.4576	.4093
.9	.9000	.8526	.8172	.7878	.7401	.7014	.6687
1.0	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

$\rho = \frac{q}{NQ} = \frac{\text{arrival rate, total}}{\text{(number of channels) (service rate per channel)}}$

N = number of channels (service positions)

Solution

Step 1: $Q = \frac{60 \text{ min/hr}}{2.2 \text{ min/service}} = 27.3$ services per hour

Step 2: $q = (110 \text{ veh}/45 \text{ min}) \times (60 \text{ min/hr}) = 146.7$ vehicles per hour

Step 3: $\rho = \frac{q}{NQ} = \frac{146.7}{(6)(27.3)} = 0.8956$

Step 4: $Q_M = 0.7303$ by interpolation between 0.8 and 0.9 for $N = 6$ from the table of Q_M values (see Table 8-11).

Step 5: The acceptable probability of the queue, M, being longer than the storage, 18 spaces in this example, was stated to be 5%. $P(x > M) = 0.05$, and:

$$M = \left[\frac{\ln 0.05 - \ln 0.7303}{\ln 0.8956}\right] - 1 = \left[\frac{-2.996 - (-0.314)}{-0.110}\right] - 1$$

$= 24.38 - 1 = 23.38$, say 23 vehicles.