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WHAT TRANSPORTATION CAN BE.

MEMORANDUM

Date:	April 5, 2021	**TG:**	18352.00
To:	Patrick Yamashita – City of Mercer Island John Davies - KPG		
From:	Michael Swenson and Nick Gorman – Transpo Group		
cc:	Lu Zhang, Johnston Architects		
Subject:	Mercer Island Mixed Use: Transportation Impact Analysis Addendum		

Subsequent to the approval of the October 2020 Transportation Impact Analysis (TIA), there has been minor revisions to the split of the commercial uses between Retail and Restaurant uses. This memorandum provides an updated trip generation and parking demand forecasts that correspond to the change in retail and restaurant square footage and total number of residential units. A comparison of the original assumptions and the current plan are included below in Table 1.

Table 1. October 2020 TIA Development Plan Versus April 2021 Development Plan

	Residential Dwelling Units	Retail Square Footage	Restaurant Square Footage
October 2020 TIA	160 du	7,930 sf	5,417 sf
April 2021	159 du	7,579 sf	5,727 sf
Difference	**1 du**	**351 sf**	**310 sf**

Trip Generation

Weekday AM and PM peak hour trip generation for the proposed development was estimated based on the land use size and trip rates from the Institute of Transportation Engineers' (ITE) *Trip Generation,* 10th Edition for Shopping Center (LU #820), High-Turnover (Sit-Down) Restaurant (LU #932) and Mid-Rise Multifamily Housing (LU #221). The trip generation was adjusted for pass-by and internal trips to account for the localized nature of the commercial uses. Pass-by trips reflect traffic already on streets in the vicinity of the project site that would visit the commercial component of the project. Based on ITE *Trip Generation Handbook (2017* 3rd Edition), a 34 percent pass-by adjustment was made for the retail uses during the PM peak period and a 43 percent pass-by adjustment was made for the restaurant uses. Internal trips were calculated based on the method presented in the *Trip Generation Handbook.* This methodology is consistent with the approved October 2020 TIA.

The proposed project would redevelop the existing uses north of SE 29th Street and between 77th Avenue SE and 78th Avenue SE. The existing buildings total approximately 19,136 square-feet with a mix of commercial uses including a pet store, a restaurant, and other small retail shops. The church on the southwest corner of the site would remain. Traffic counts were collected at the existing site access driveways in November 2018 to identify the trip generation and travel patterns of the existing uses. The data shows that the current uses generate approximately gross 19 trips during the weekday AM peak hour and approximately gross 65 trips during the weekday PM peak hour. A detailed summary of the existing counts is provided in Attachment A.

To calculate the anticipated net new project generated traffic and account for existing site traffic, the trip generation was adjusted for traffic generated by the existing on-site uses. The result is the

weekday net new off-site vehicle trips generated by the proposed project shown in Table 2 below. Detailed trip generation calculations are provided in Attachment B.

Table 2. Estimated Weekday Project Trip Generation

Land Use	Size	Trip Rate[1]	Unadjusted Trips	Internal Trips[2]	Pass-by Trips[3]	Total Trips		
						Total	In	Out
AM Peak Hour								
Proposed								
Shopping Center (#820)	7,579 sf	0.94	7	0	0	7	4	3
High-Turnover (Sit-Down) Restaurant (#932)	5,727 sf	9.94	57	7	0	50	25	25
Mid-Rise Multifamily Housing (#221)	159 DU	0.36	57	7	0	50	14	36
Sub-total			*121*	*14*	*0*	*107*	*43*	*64*
Existing[4]								
Various Uses	19,136 sf	-	19	-	0	19	10	9
Net New Trips			**103**	**14**	**0**	**88**	**33**	**55**
PM Peak Hour								
Proposed								
Shopping Center (#820)	7,579 sf	EQN	81	34	16	31	18	13
High-Turnover (Sit-Down) Restaurant (#932)	5,727 sf	EQN	56	28	12	16	14	2
Mid-Rise Multifamily Housing (#221)	159 DU	0.44	70	24	0	46	28	18
Sub-total			*207*	*86*	*28*	*93*	*60*	*33*
Existing[4]								
Various Uses	19,136 sf	-	97	-	32	65	33	32
Net New Trips			**110**	**86**	**-4**	**28**	**27**	**1**

Notes: sf = square-feet, du = dwelling units
1. Average trip rates & regression equation from ITE Trip Generation Manual, 10th Edition (2017). Rate or equation used consistent with ITE Trip Generation Handbook, 3rd Edition (2017) methodologies.
2. Internal Capture methodology consistent with ITE Trip Generation Handbook, 3rd Edition (2017)).
3. Pass-by rates based on ITE Trip Generation Handbook, 3rd Edition (2017).
4. Existing trips based on counts collected on November 2018.

As shown in Table 2, the proposed project would generate 88 net new AM peak hour trips and 28 net new PM peak hour trips.

Previously, per the October 2020 Traffic Impact Analysis, the project was estimated to generate 86 net new AM peak hour trips and 27 net new PM peak hour trips. The proposed update represents an increase in **2 AM peak hour trips** and **1 PM peak hour trip**. Given the small increase in trip generation, no additional transportation impacts as compared to the previous TIA are forecast to occur.

Parking Demand

The parking demand associated with the residential use of the proposed project was calculated using the King County Right Size Parking calculator[1]. The King County Right Size Parking calculator is an online tool developed by King County that estimates parking/unit ratios for

[1] www.rightsizeparking.org

multifamily developments throughout urban areas of King County. The Right Size Parking calculator relies on the unit mix of the proposed development and the development location to estimate a parking demand ratio. Based on the calculator and unit mix, an average parking rate of 0.83 per unit was assumed. Parking spaces are not expected to be bundled and an estimated monthly charge of $200 per parking stall.

For the retail use, the parking rate used to estimate the peak parking demand was based on the ITE Parking Generation rates. The ITE Parking Generation land use assumed for the analysis included Shopping Center (LU #820) and High Turnover Sit Down Restaurant (LU #932). The number of required parking spaces consistent with City code, estimated peak parking demand, and proposed parking supply are summarized in Table 3. It is important to note that the peak parking demand shown below are not forecast to occur at the same time. Detailed parking demand calculations can be found in Attachment C.

Table 3. Parking Demand

Proposed Land Use	Size[1]	Peak Parking Demand
Residential Parking		
Apartments (LU #221)	159 units	131 vehicles
Retail Parking		
Shopping Center (LU #820)	7,579 sf	15 vehicles
Restaurant (LU #932)	5,727 sf	54 vehicles

1. du = dwelling unit, sf = square-feet
2. Mercer Island City Code 19.11.110 B.1

As shown in Table 3, the peak parking demand for the residential use is 131 vehicles. For the retail land uses, the shopping center use peak is 15 vehicles, and the restaurant peak is 54 vehicles.

As these uses will not peak at the same time during the day, a shared parking analysis was conducted which involves time of day distributions applied to each individual land use's peak parking demand to find overall demand per each hour of day. Attachment C contains a shared parking demand analysis. As shown in Attachment C, the overall peak parking demand for the development is expected to occur at 8 p.m. on a typical weekday with a peak demand of 151 vehicles.

Parking Supply

The development includes a total of 202 parking stalls. The applicant has submitted a shared parking management plan to accommodate the site's residential and commercial parking needs. This plan includes dedicated commercial spaces, dedicated residential spaces, and flex spaces to be shared between the commercial and residential uses.

The parking management plan identifies the number of flex spaces based on a 90% occupancy goal for all shared parking uses. The 90% occupancy (or 10 free spaces) includes both the commercial demand and residential flex space demand during the highest commercial peak demand of 12:00 p.m. – 1 p.m. All other hours of the day will experience 30 – 85% occupancy for these shared spaces.

Based on the utilization target of 90% for the commercial and flex space parking supply, 59 total flex spaces are proposed that would allow commercial customers to park in those spaces between business hours of 11 a.m. – 9 p.m. while residential tenants would be able to park in those spaces at any time of the day. In addition, 43 commercial only spaces and 100 residential only spaces will

be provided for a grand total of 202 parking spaces on-site. The shared parking management plan will be considered mitigation for the proposed project. Details regarding parking enforcement and signage would be provided during the permitting process.

See Attachment C for parking demand calculations, and the hourly breakdown of the shared parking supply and demand per time of day.

Summary/Conclusions

Updates to the development plan resulted in a net decrease of 41 square feet of overall commercial space, with the amount of general retail and restaurant space shifted slightly. The updated plan resulted in an increase of 2 trips during the weekday AM Peak hour and 1 trip during the weekday PM peak hour. This increase is not significant and would not alter the findings, conclusions, or mitigation requirements outlined in the October 2020 TIA.

With the shift in the commercial uses, the hourly parking demands for the project shifted slightly. This resulted in a need to increase the flex parking total from 56 stalls to 59 stalls to accommodate the slight increase in commercial parking demand.

Attachment A: Existing Site Counts

Exhibit 2

Existing On-Site Peak Hour Trips															
	Driveway	1		2		3		4		5		TOTAL		PEAK HOUR		
	Time	in	out	in	out	in	out	in	out	in	out	in	out	in	out	total
AM Peak Hour	7:00	2	1	1	3	0	0	0	0	1	1	4	5			
	7:15	0	0	0	0	0	1	1	1	2	0	3	2			
	7:30	0	0	0	0	0	0	0	0	0	0	0	0			
	7:45	0	1	0	0	0	0	0	0	2	0	2	1	9	8	17
	8:00	0	1	0	1	0	0	0	0	2	0	2	2	7	5	12
	8:15	2	4	0	1	0	0	1	0	0	0	3	5	7	8	15
	8:30	2	1	0	0	0	0	0	0	1	0	3	1	**10**	**9**	**19**
	8:45	0	0	0	0	0	0	0	0	1	0	1	0	9	8	17
	Site	1		2		3		4		5		TOTAL		PEAK HOUR		
PM Peak Hour	16:00	2	5	0	3	0	0	1	2	4	1	7	11			
	16:15	5	3	0	3	0	0	0	2	4	1	9	9			
	16:30	3	6	1	1	1	1	1	1	2	0	8	9			
	16:45	8	11	0	3	2	1	1	1	8	4	19	20	43	49	92
	17:00	2	5	2	2	2	0	1	2	3	0	10	9	46	47	93
	17:15	3	4	0	0	1	2	1	0	4	2	9	8	46	46	92
	17:30	2	5	1	0	0	2	4	3	4	1	11	11	**49**	**48**	**97**
	17:45	11	6	0	0	1	1	1	1	10	1	23	9	53	37	90

Mercer Island - Driveway Counts
Thursday, November 15, 2018
SITE 1

	SITE 1 (AM)	
TIME	**IN**	**OUT**
7:00	2	1
7:15	0	0
7:30	0	0
7:45	0	1
8:00	0	1
8:15	2	4
8:30	2	1
8:45	0	0
TOTAL	6	8

	Site 1 (PM)	
TIME	**IN**	**OUT**
16:00	2	5
16:15	5	3
16:30	3	6
16:45	8	11
17:00	2	5
17:15	3	4
17:30	2	5
17:45	11	6
TOTAL	36	45

Mercer Island - Driveway Counts
Thursday, November 15, 2018
SITE 2

	SITE 2 (AM)	
TIME	**IN**	**OUT**
7:00	1	3
7:15	0	0
7:30	0	0
7:45	0	0
8:00	0	1
8:15	0	1
8:30	0	0
8:45	0	0
TOTAL	1	5

	Site 2 (PM)	
TIME	**IN**	**OUT**
16:00	0	3
16:15	0	3
16:30	1	1
16:45	0	3
17:00	2	2
17:15	0	0
17:30	1	0
17:45	0	0
TOTAL	4	12

Mercer Island - Driveway Counts
Thursday, November 15, 2018
SITE 3

	SITE 3 (AM)	
TIME	**IN**	**OUT**
7:00	0	0
7:15	0	1
7:30	0	0
7:45	0	0
8:00	0	0
8:15	0	0
8:30	0	0
8:45	0	0
TOTAL	0	1

	Site 3 (PM)	
TIME	**IN**	**OUT**
16:00	0	0
16:15	0	0
16:30	1	1
16:45	2	1
17:00	2	0
17:15	1	2
17:30	0	2
17:45	1	1
TOTAL	7	7

Mercer Island - Driveway Counts
Thursday, November 15, 2018
SITE 4

	SITE 4 (AM)	
TIME	**IN**	**OUT**
7:00	0	0
7:15	1	1
7:30	0	0
7:45	0	0
8:00	0	0
8:15	1	0
8:30	0	0
8:45	0	0
TOTAL	2	1

	Site 4 (PM)	
TIME	**IN**	**OUT**
16:00	1	2
16:15	0	2
16:30	1	1
16:45	1	1
17:00	1	2
17:15	1	0
17:30	4	3
17:45	1	1
TOTAL	10	12

Mercer Island - Driveway Counts
Thursday, November 15, 2018
SITE 5

	SITE 5 (AM)	
TIME	**IN**	**OUT**
7:00	1	1
7:15	2	0
7:30	0	0
7:45	2	0
8:00	2	0
8:15	0	0
8:30	1	0
8:45	1	0
TOTAL	9	1

	Site 5 (PM)	
TIME	**IN**	**OUT**
16:00	4	1
16:15	4	1
16:30	2	0
16:45	8	4
17:00	3	0
17:15	4	2
17:30	4	1
17:45	10	1
TOTAL	39	10

Exhibit 2


77th Ave SE
78th Ave SE
BOTH DRIVEWAYS COMBINED
1
2
3
4
5
77th Ave SE
78th Ave SE
SE 29th St
SE 29th St

Attachment B: Trip Generation

Exhibit 2

AM Peak Hour Trip Generation

Land Use	Size	Trip Rate[1]	Total Trips				Internal Trips[3]			Driveway Trips			Pass-By Trips				Primary Trips		
			Total	In%[2]	In	Out	In	Out	Total	In	Out	Total	Pass-By Rate[4]	In	Out	Total	In	Out	Total
Proposed																			
Shopping Center (820)	7,579 sq ft	0.94 per 1000 sq ft	7	62%	4	3	0	0	0	4	3	7	0%	0	0	0	4	3	7
High-Turnover (Sit-Down) Restaurant (932)	5,727 sq ft	9.94 per 1000 sq ft	57	55%	31	26	6	1	7	25	25	50	0%	0	0	0	25	25	50
Multifamily Housing (Mid-Rise) (221)	159 units	0.36 per unit	57	26%	15	42	1	6	7	14	36	50	0%	0	0	0	14	36	50
Existing[5]																			
Various Uses[5]	19,136 sq ft												0%	0	0	0	10	9	19
Net New																	**33**	**55**	**88**

1. Trip rate from ITE *Trip Generation*, 10th Edition (2017) and methods in *Trip Generation Handbook*, 3rd Edition (2017).
2: In/out percentages based on ITE *Trip Generation*, 10th Edition (2017)
3: Internal Trips methodology consistent with ITE *Trip Generation Handbook*, 3rd Edition (2017)
4: No weekday AM peak hour pass-by rate is given, assumed to be 0% for conservative purposes.
5. Existing trip generation based on driveway counts conducted in November 2018.

Exhibit 2

PM Peak Hour Trip Generation

Land Use	Size	Trip Rate[1]	Total Trips				Internal Trips[3]			Driveway Trips			Pass-By Trips				Primary Trips		
			Total	In%[2]	In	Out	In	Out	Total	In	Out	Total	Pass-By Rate[4]	In	Out	Total	In	Out	Total
Proposed																			
Shopping Center (820)	7,579 sq ft	Ln(T)=.74*LN(X)+2.89	81	48%	39	42	13	21	34	26	21	47	34%	8	8	16	18	13	31
High-Turnover (Sit-Down) Restaurant (932)	5,727 sq ft	9.77 per 1000 sq ft	56	62%	35	21	15	13	28	20	8	28	43%	6	6	12	14	2	16
Multifamily Housing (Mid-Rise) (221)	159 units	0.44 per unit	70	61%	43	27	15	9	24	28	18	46	0%	0	0	0	28	18	46
Existing[5]																			
Various Uses[5]	19,136 sq ft												34%	16	16	32	33	32	65
Net New																	**27**	**1**	**28**

1. Trip rate from ITE *Trip Generation* , 10th Edition (2017) and methods in *Trip Generation Handbook* , 3rd Edition (2017).
2: In/out percentages based on ITE *Trip Generation* , 10th Edition (2017)
3: Internal Trips methodology consistent with ITE *Trip Generation Handbook* , 3rd Edition (2017)
4: Weekday PM peak hour pass-by rate from ITE *Trip Generation Handbook* , 3rd Edition (2017).
5. Existing trip generation based on driveway counts conducted in November 2018.

Exhibit 2

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Mercer Island Residential	**Organization:**	Transpo Group
Project Location:	Mercer Island Residential	**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:		**Checked By:**	
Analysis Period:	**AM Street Peak Hour**	**Date:**	

Table 1-A: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				7	4	3
Restaurant				57	31	26
Cinema/Entertainment				0	0	0
Residential				57	15	42
Hotel				0	0	0
All Other Land Uses[2]				0	0	0
				121	50	71

Table 2-A: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]	1.00	0%	0%	1.00	0%	0%

Table 3-A: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-A: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		0	0	0	0
Restaurant	0	0		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	0	6	0		0
Hotel	0	0	0	0	0	

Table 5-A: Computations Summary

	Total	Entering	Exiting
All Person-Trips	121	50	71
Internal Capture Percentage	12%	14%	10%
External Vehicle-Trips[5]	107	43	64
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-A: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	0%	0%
Restaurant	19%	4%
Cinema/Entertainment	N/A	N/A
Residential	7%	14%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-A vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made to Tables 5-A, 9-A (O and D). Enter transit, non-motorized percentages that will result with proposed mixed-use project complete.

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Exhibit 2

Project Name:	Mercer Island Residential
Analysis Period:	**AM Street Peak Hour**

Table 7-A: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-A (D): Entering Trips			Table 7-A (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	4	4	1.00	3	3
Restaurant	1.00	31	31	1.00	26	26
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	15	15	1.00	42	42
Hotel	1.00	0	0	1.00	0	0

Table 8-A (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		0	0	0	0
Restaurant	8	4		0	1	1
Cinema/Entertainment	0	0	0		0	0
Residential	1	0	8	0		0
Hotel	0	0	0	0	0	

Table 8-A (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		1	7	0	0	0
Retail	0		16	0	0	0
Restaurant	0	0		0	1	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	1	6	0		0
Hotel	0	0	2	0	0	

Table 9-A (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	4	4	4	0	0
Restaurant	6	25	31	25	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	1	14	15	14	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-A (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	0	3	3	3	0	0
Restaurant	1	25	26	25	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	6	36	42	36	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-A

[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Exhibit 2

NCHRP 684 Internal Trip Capture Estimation Tool			
Project Name:	Mercer Island Residential	**Organization:**	
Project Location:	Mercer Island Residential	**Performed By:**	
Scenario Description:		**Date:**	
Analysis Year:		**Checked By:**	
Analysis Period:	**PM Peak Hour**	**Date:**	

Table 1-P: Base Vehicle-Trip Generation Estimates (Single-Use Site Estimate)

Land Use	Development Data (*For Information Only*)			Estimated Vehicle-Trips[3]		
	ITE LUCs[1]	Quantity	Units	Total	Entering	Exiting
Office				0	0	0
Retail				81	39	42
Restaurant				56	35	21
Cinema/Entertainment				0	0	0
Residential				70	43	27
Hotel				0	0	0
All Other Land Uses[2]				0	0	0
				207	117	90

Table 2-P: Mode Split and Vehicle Occupancy Estimates

Land Use	Entering Trips			Exiting Trips		
	Veh. Occ.[4]	% Transit	% Non-Motorized	Veh. Occ.[4]	% Transit	% Non-Motorized
Office	1.00	0%	0%	1.00	0%	0%
Retail	1.00	0%	0%	1.00	0%	0%
Restaurant	1.00	0%	0%	1.00	0%	0%
Cinema/Entertainment	1.00	0%	0%	1.00	0%	0%
Residential	1.00	0%	0%	1.00	0%	0%
Hotel	1.00	0%	0%	1.00	0%	0%
All Other Land Uses[2]	1.00	0%	0%	1.00	0%	0%

Table 3-P: Average Land Use Interchange Distances (Feet Walking Distance)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office						
Retail						
Restaurant						
Cinema/Entertainment						
Residential						
Hotel						

Table 4-P: Internal Person-Trip Origin-Destination Matrix*

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	0		10	0	11	0
Restaurant	0	9		0	4	0
Cinema/Entertainment	0	0	0		0	0
Residential	0	4	5	0		0
Hotel	0	0	0	0	0	

Table 5-P: Computations Summary

	Total	Entering	Exiting
All Person-Trips	207	117	90
Internal Capture Percentage	42%	37%	48%
External Vehicle-Trips[5]	121	74	47
External Transit-Trips[6]	0	0	0
External Non-Motorized Trips[6]	0	0	0

Table 6-P: Internal Trip Capture Percentages by Land Use

Land Use	Entering Trips	Exiting Trips
Office	N/A	N/A
Retail	33%	50%
Restaurant	43%	62%
Cinema/Entertainment	N/A	N/A
Residential	35%	33%
Hotel	N/A	N/A

[1]Land Use Codes (LUCs) from *Trip Generation Manual*, published by the Institute of Transportation Engineers.

[2]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator.

[3]Enter trips assuming no transit or non-motorized trips (as assumed in ITE *Trip Generation Manual*).

[4]Enter vehicle occupancy assumed in Table 1-P vehicle trips. If vehicle occupancy changes for proposed mixed-use project, manual adjustments must be made

[5]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P.

[6]Person-Trips

*Indicates computation that has been rounded to the nearest whole number.

Estimation Tool Developed by the Texas A&M Transportation Institute - Version 2013.1

Exhibit 2

Project Name:	Mercer Island Residential
Analysis Period:	**PM Street Peak Hour**

Table 7-P: Conversion of Vehicle-Trip Ends to Person-Trip Ends

Land Use	Table 7-P (D): Entering Trips			Table 7-P (O): Exiting Trips		
	Veh. Occ.	Vehicle-Trips	Person-Trips*	Veh. Occ.	Vehicle-Trips	Person-Trips*
Office	1.00	0	0	1.00	0	0
Retail	1.00	39	39	1.00	42	42
Restaurant	1.00	35	35	1.00	21	21
Cinema/Entertainment	1.00	0	0	1.00	0	0
Residential	1.00	43	43	1.00	27	27
Hotel	1.00	0	0	1.00	0	0

Table 8-P (O): Internal Person-Trip Origin-Destination Matrix (Computed at Origin)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		0	0	0	0	0
Retail	1		12	2	11	2
Restaurant	1	9		2	4	1
Cinema/Entertainment	0	0	0		0	0
Residential	1	11	6	0		1
Hotel	0	0	0	0	0	

Table 8-P (D): Internal Person-Trip Origin-Destination Matrix (Computed at Destination)

Origin (From)	Destination (To)					
	Office	Retail	Restaurant	Cinema/Entertainment	Residential	Hotel
Office		3	1	0	2	0
Retail	0		10	0	20	0
Restaurant	0	20		0	7	0
Cinema/Entertainment	0	2	1		2	0
Residential	0	4	5	0		0
Hotel	0	1	2	0	0	

Table 9-P (D): Internal and External Trips Summary (Entering Trips)

Destination Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	13	26	39	26	0	0
Restaurant	15	20	35	20	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	15	28	43	28	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

Table 9-P (O): Internal and External Trips Summary (Exiting Trips)

Origin Land Use	Person-Trip Estimates			External Trips by Mode*		
	Internal	External	Total	Vehicles[1]	Transit[2]	Non-Motorized[2]
Office	0	0	0	0	0	0
Retail	21	21	42	21	0	0
Restaurant	13	8	21	8	0	0
Cinema/Entertainment	0	0	0	0	0	0
Residential	9	18	27	18	0	0
Hotel	0	0	0	0	0	0
All Other Land Uses[3]	0	0	0	0	0	0

[1]Vehicle-trips computed using the mode split and vehicle occupancy values provided in Table 2-P

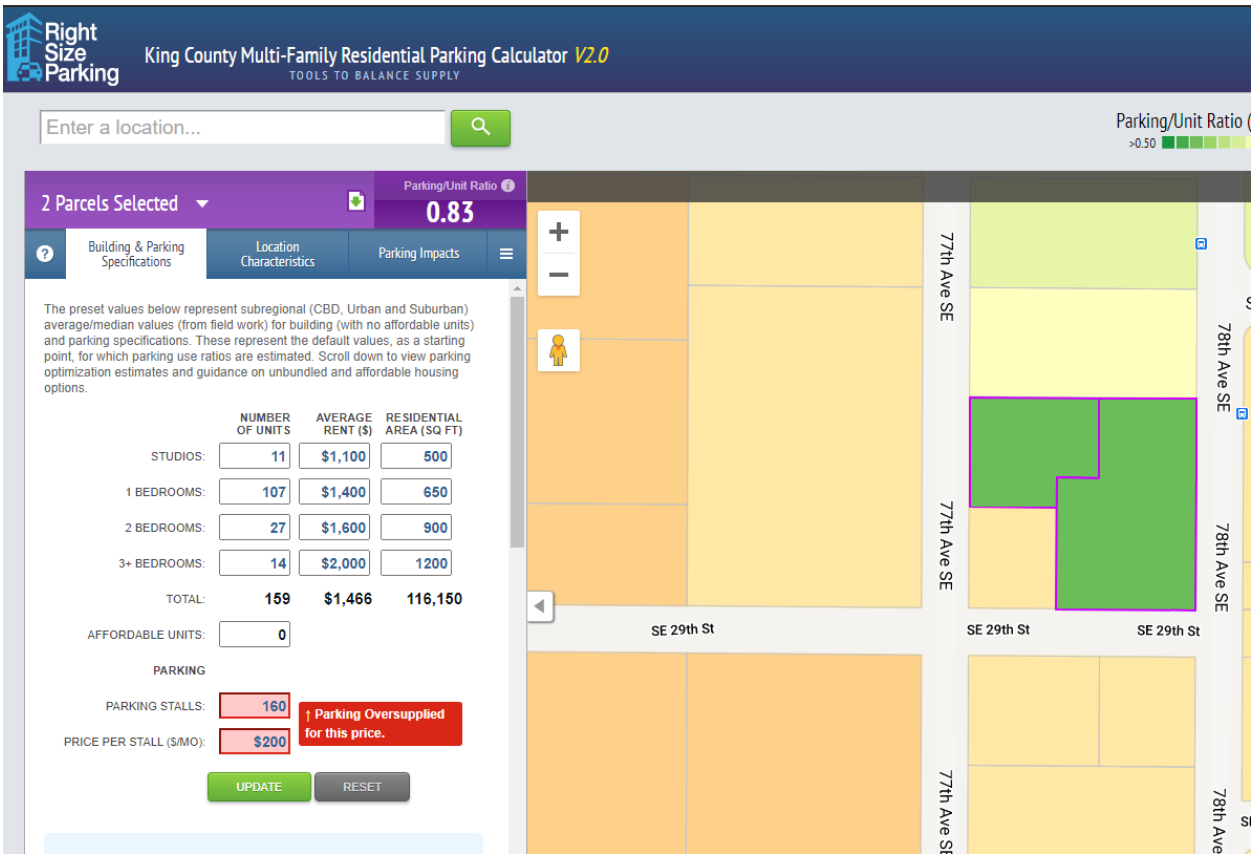
[2]Person-Trips

[3]Total estimate for all other land uses at mixed-use development site is not subject to internal trip capture computations in this estimator

*Indicates computation that has been rounded to the nearest whole number.

Attachment C: Parking Demand

Exhibit 2


Right Size Parking
King County Multi-Family Residential Parking Calculator V2.0
TOOLS TO BALANCE SUPPLY
Enter a location...
Parking/Unit Ratio
>0.50
2 Parcels Selected
Parking/Unit Ratio
0.83
Building & Parking Specifications
Location Characteristics
Parking Impacts
The preset values below represent subregional (CBD, Urban and Suburban) average/median values (from field work) for building (with no affordable units) and parking specifications. These represent the default values, as a starting point, for which parking use ratios are estimated. Scroll down to view parking optimization estimates and guidance on unbundled and affordable housing options.
NUMBER OF UNITS
AVERAGE RENT ($)
RESIDENTIAL AREA (SQ FT)
STUDIOS: 11 $1,100 500
1 BEDROOMS: 107 $1,400 650
2 BEDROOMS: 27 $1,600 900
3+ BEDROOMS: 14 $2,000 1200
TOTAL: 159 $1,466 116,150
AFFORDABLE UNITS: 0
PARKING
PARKING STALLS: 160
PRICE PER STALL ($/MO): $200
↑ Parking Oversupplied for this price.
UPDATE
RESET
77th Ave SE
78th Ave SE
SE 29th St
SE 29th St
SE 29th St

Retail Parking Demand Rate Calculation		
Project Information		
Project:	Mercer Island Mixed Use	
Project No:	18352.00	
Retail Size:		
Commercial Space		
7,579	sf	Retail
Local Mode Split Data[1]:		
Vehicle	100%	
Walk / Bicycle	0%	
Transit	0%	
	100%	
Parking Demand Rate[2]:		
1.95	stalls / 1,000 sf (ITE Shopping Center #820)	
Localized Parking Demand Rate:		
Parking Demand Rate x Vehicle Mode Split		
1.95	vehicles / 1,000 sf	Shopping Center
Parking Demand:		
Retail Size x Localized Parking Demand Rate		
15	vehicles	

Notes:

1 Based on ITE Parking Generation (5th Edition, 2019) shopping center land use 820 for non-Friday weekday, non-December.

Restaurant Parking Demand Rate Calculation		
Project Information		
Project:	Mercer Island Mixed Use	
Project No:	18352.00	
Retail Size:		
Commercial Space		
5,727	sf	Restaurant
Local Mode Split Data[1]:		
Vehicle	100%	
Walk / Bicycle	0%	
Transit	0%	
	100%	
Parking Demand Rate[2]:		
9.44	stalls / 1,000 sf (High-Turnover Sit Down Restaurant)	
Localized Parking Demand Rate:		
Parking Demand Rate x Vehicle Mode Split		
9.44	vehicles / 1,000 sf	Restaurant
Parking Demand:		
Retail Size x Localized Parking Demand Rate		
54	vehicles	

Notes:

1 Based on ITE Parking Generation (5th Edition, 2019)) High-Turnover Sit Down Restaurant land use 932 on a weekday

Exhibit 2

Weekday Shared Parking Demand Estimate

	Retail (LU #820)		Restaurant (LU #932)		Residential (LU#221) Dedicated Parking		Residential (LU#221) Flex Parking		Total Commercial & Residential Flex Demand	Total Commercial & Residential Flex Supply	Occupancy (%) of Shared Flex and Commercial Spaces	Cumulative Parking Demand
Size	**7,579 sf**		**5,727 sf**		**103 du**		**56 du**					
Rate[1]	1.95 vehicles per 1,000 sf		9.44 vehicles per 1,000 sf		.83 vehicles per unit		.83 vehicles per unit					
Peak Demand	**15**		**54**		**85**		**46**					
Parking Spaces	**43 shared commercial spaces**				**100 spaces**		**59 spaces**					
Time of Day[2]	**% Hourly Demand[2]**	**Hourly Demand**	**% Hourly Demand[2]**	**Hourly Demand**	**% Hourly Demand[2]**	**Hourly Demand**	**% Hourly Demand[2]**	**Hourly Demand**	**Hourly Demand**	**Total Spaces**	**Percent Occupied**	**Hourly Demand**
12-4:00 AM	0%	0	0%	0	100%	85	100%	46	46	102	45%	131
5:00 AM	0%	0	0%	0	94%	80	94%	43	43	102	42%	123
6:00 AM	0%	0	0%	0	83%	71	83%	38	38	102	37%	109
7:00 AM	0%	0	0%	0	71%	60	71%	33	33	102	32%	93
8:00 AM	15%	2	0%	0	61%	52	61%	28	30	102	29%	82
9:00 AM	32%	5	0%	0	55%	47	55%	25	30	102	29%	77
10:00 AM	54%	8	9%	5	54%	46	54%	25	38	102	37%	84
11:00 AM	71%	10	15%	8	53%	45	53%	24	42	102	41%	87
12:00 PM	99%	15	100%	54	50%	43	50%	23	**92**	**102**	**90%**	135
1:00 PM	100%	15	81%	44	49%	42	49%	23	82	102	80%	124
2:00 PM	90%	13	54%	29	49%	42	49%	23	65	102	64%	107
3:00 PM	83%	12	33%	18	50%	43	50%	23	53	102	52%	96
4:00 PM	81%	12	26%	14	58%	49	58%	27	53	102	52%	102
5:00 PM	84%	12	29%	16	64%	54	64%	29	57	102	56%	111
6:00 PM	86%	13	58%	31	67%	57	67%	31	75	102	74%	132
7:00 PM	80%	12	70%	38	70%	60	70%	32	82	102	80%	142
8:00 PM	63%	9	77%	42	76%	65	76%	35	86	102	84%	151
9:00 PM	42%	6	61%	33	83%	71	83%	38	77	102	75%	148
10:00 PM	15%	2	41%	22	90%	77	90%	41	65	102	64%	142
11:00 PM	0%	0	0%	0	93%	79	93%	43	43	102	42%	122
												151

Note: sf = square-feet, DU = dwelling units

1. Retail and Restaurant Parking demand rate based on the ITE Parking Generation, 5th Edition . Residential parking demand rate based on Right Size parking.

2. Time of day based on the ITE Parking Generation, 5th Edition.