RESOURCE
SYSTEMS GROUP
INCORPORATED

MEMORANDUM

To: Dan Bradley
From: R. Chamberlin
M. McCrory
Subject: Burlington Waterfront Study Update
Date: 16 June 2000

INTRODUCTION

As part of Resource Systems Group's study of future vehicular and pedestrian traffic flows at the Burlington Waterfront, we have completed analyses of existing parking demands in the Waterfront area. In this technical memorandum, we will summarize our findings and provide an outline for the next steps that we will take to complete this study.

PARKING STUDY DESCRIPTION

The purpose of the parking study was to assess the key characteristics of parking demand at the Waterfront so that we can accurately estimate future conditions. Overall, we inventoried parking conditions at eleven distinct parking areas (Table 1). We conducted a license plate survey of each parking area during a day. By recording license plates each hour, we could accurately record the number of vehicles, and how long each was parked. We recorded this information using personal digital assistant (PDA) handheld computers, tagged the information with the time of day, and downloaded the information into MS Excel after the count.

Table 1: Locations included in Parking Survey

PARKING LOCATION	# SPACES
Pease Public Parking Lot	84
Union Station Surface Parking Lot	87
102 Lake Private Parking Lot	112
Corner Stone Building Parking Structure	47
Lake Champlain Basin Science Center	75
On-Street: Union Station, Main to College	34
On-Street: Lake St., College to Depot	30
On-Street: College St., Lake to Battery	10
On-Street: Battery St., Main to King (5-20 Survey Only)	28
Lake & College Parking Lot	55
Moran Plant Public Parking Lot	20

We conducted these surveys 10 AM to 6 PM on Wednesday, 17 May 2000, and 10 AM to 4 PM on Saturday, 20 May 2000. The weather on Wednesday was sunny and warm. Although the survey days

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were too early in the year to be considered summertime, the good weather on Wednesday helped provide for summer-like recreation activities. On Saturday, the weather began with partly sunny skies, but became cloudy, cool, and rainy. While the Saturday conditions were less summer-like, this information will help us understand the way the parking areas are used on a Saturday.

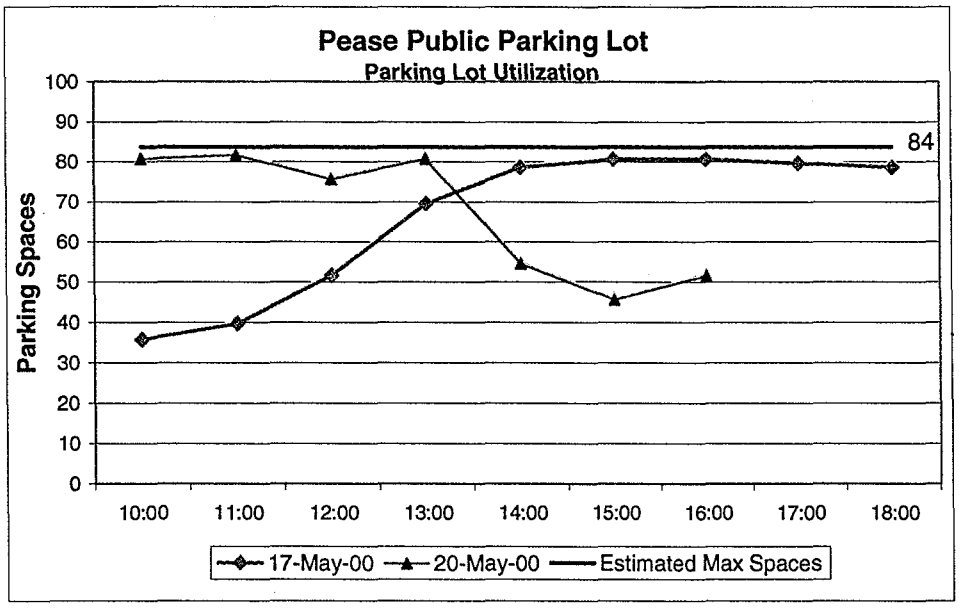
PARKING ANALYSIS

We analyzed data from the parking survey, focusing on hourly parking area utilization, percent occupancy, and the residence time, or the length of time each vehicle stayed in a space. The following discussion will address parking conditions we observed.

Pease Public Parking Lot

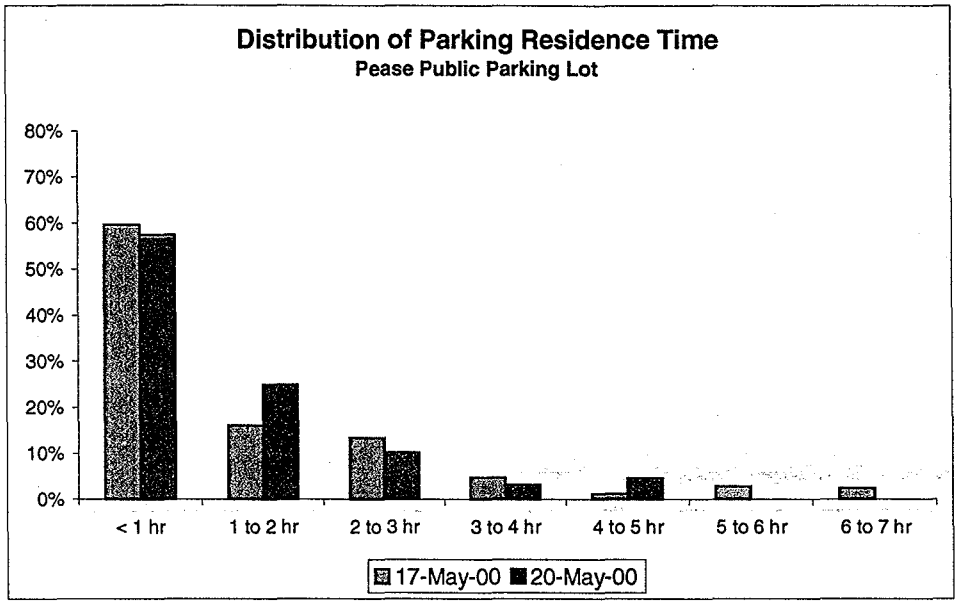
The Pease Parking Lot was free parking during the study periods. Typically, this lot becomes fee parking during the summer months. Based on the surrounding land uses and the public activities the overall parking characteristics for this particular lot would not differ between pay and metered operations. According to survey data, the Pease Parking Lot was being used near capacity for long periods on both days (Figure 1). The drop in occupied spaces on Saturday corresponds to a change in weather from partly sunny to cool and rainy.

Figure 1: Occupancy, Pease Parking Lot (spaces occupied)



Approximately 75 percent of vehicles surveyed stayed at this lot for less than two hours (Figure 2). Parking residence time was consistent for the weekday and Saturday studies. Peak demand occurred at 4 PM on Wednesday and at 1 PM on Saturday.

Figure 2: Proportional Distribution of Residence Time, Pease Parking Lot



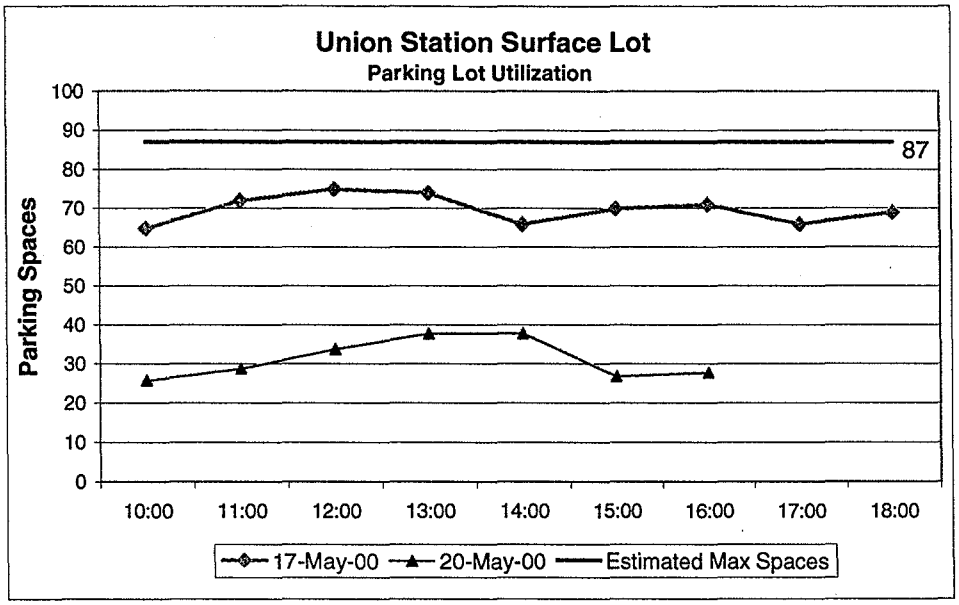
Union Station Surface Parking Lot

The Union Station Surface Lot is reserved for those who patronize or work in the Union Station office building (Table 2). Parking restrictions were not enforced for this area during the study days. Saturday occupancy was half that of the weekday (Figure 3).

Table 2: Summary of Land Uses Served by Union Station Surface Lot

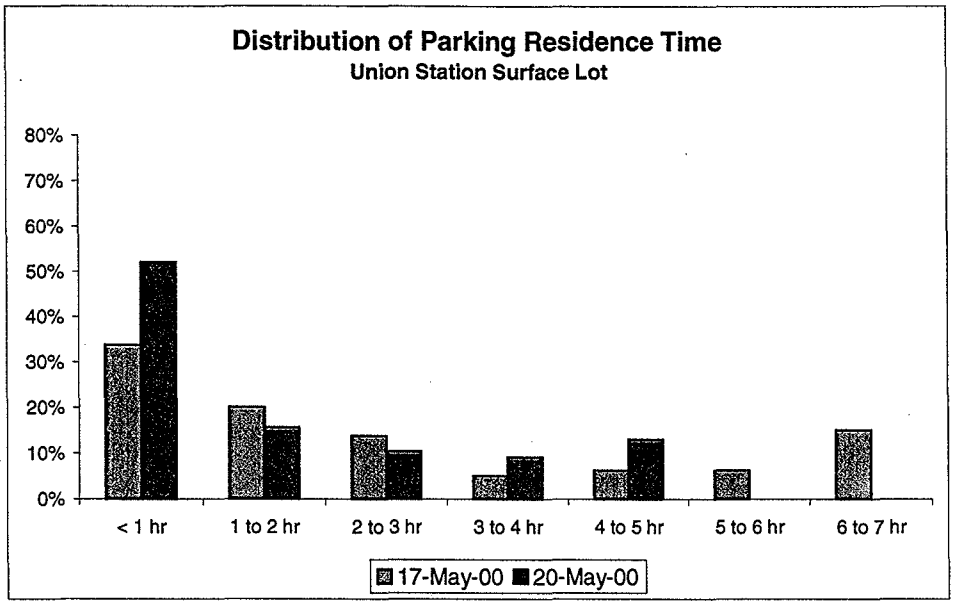
LAND USE	APPROXIMATE AREA (Sq Ft)
Commercial/Office	7,340
Train Station	10,000

Figure 3: Occupancy, Union Station Lot (spaces occupied)



The residence times for the parked cars were well distributed in the weekday study period (Figure 4), suggesting higher use by commuters. The short-term parking on Saturday increased by approximately 20 percent. The peak demands for this parking lot were around 12 PM on Wednesday and between 1 PM and 2 PM on Saturday.

Figure 4: Proportional Distribution of Residence Time, Union Station Lot



102 Lake Private Parking Lot

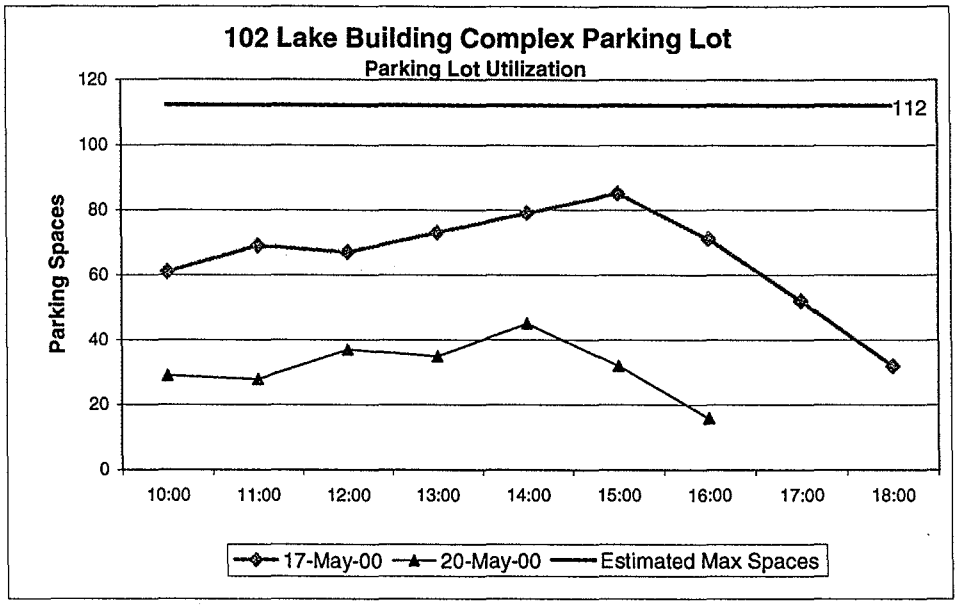
The 102 Lake Street Parking Lot is reserved for those who are visiting the various offices or services in the 102 Lake Street area. The land uses this parking area serves are a restaurant, offices, day care, and other services (Table 3). Similar to the Union Station Parking Lot, the parking demand is higher during the weekday (Figure 5).

Table 3: Summary of Land Uses Served by 102 Lake Parking Lot

LAND USE	APPROXIMATE AREA (Sq Ft)
Commercial/Office	21,500
Restaurant	2,500

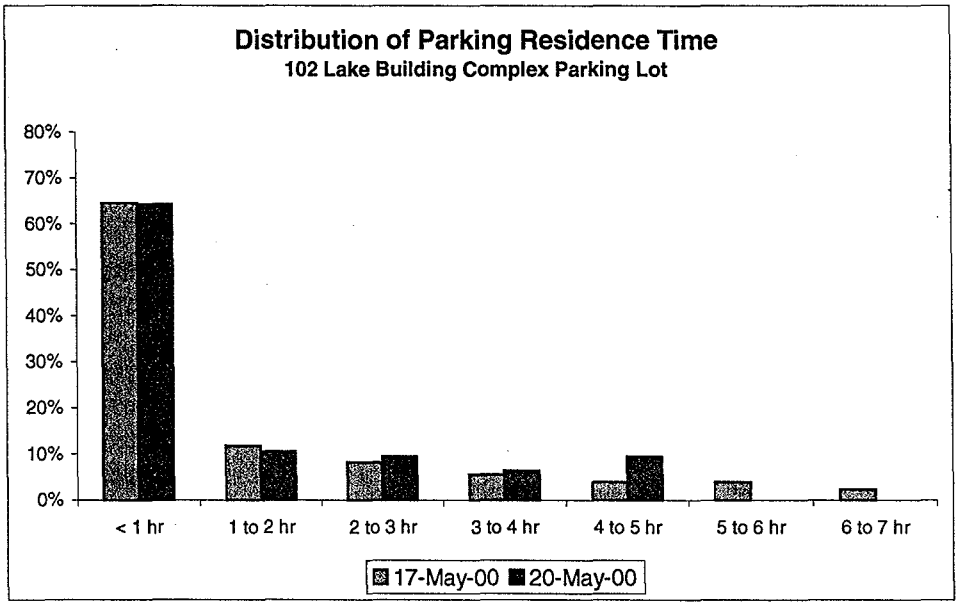
Note: A portion of the land use areas were calculated using orthographic photos

Figure 5: Occupancy, 102 Lake Parking Lot (spaces occupied)



The peak hours of parking demand occurred at 3 PM on Wednesday and 2 PM on Tuesday. The majority of vehicles were recorded as parked for less than one hour (Figure 6). There was an even distribution of vehicles staying between 1 and 5 hours.

Figure 6: Proportional Distribution of Residence Time, 102 Lake Parking Lot



Corner Stone Building Parking Structure

The Corner Stone Building is adjacent to the Union Station, situated at the corner of Lake Street and Battery Street. The Corner Stone Building consists of mostly offices, some retail space, a restaurant, and residences. The parking structure likely serves this building and the Wing Building, adjacent to the Corner Stone Building that also contains office, retail, and residential space (Table 4). This parking structure occupies the lower floors of the Corner Stone Building and consists of a metered parking area and a permit parking area. The metered parking lot was barely used (Figure 7) and the permit area moderately used (Figure 8).

Table 4: Summary of Land Uses Served by 102 Lake Parking Lot

BUILDING	LAND USE	APPROXIMATE AREA (Sq Ft)
Cornerstone Building	Commercial/Office	21,500
	Restaurant	2,500
	Residential	2 Housing Units
Wing Building	Commercial/Office	7,000
	Residential	4 Housing Units

Figure 7: Occupancy, Corner Stone Building Metered Parking Lot (spaces occupied)

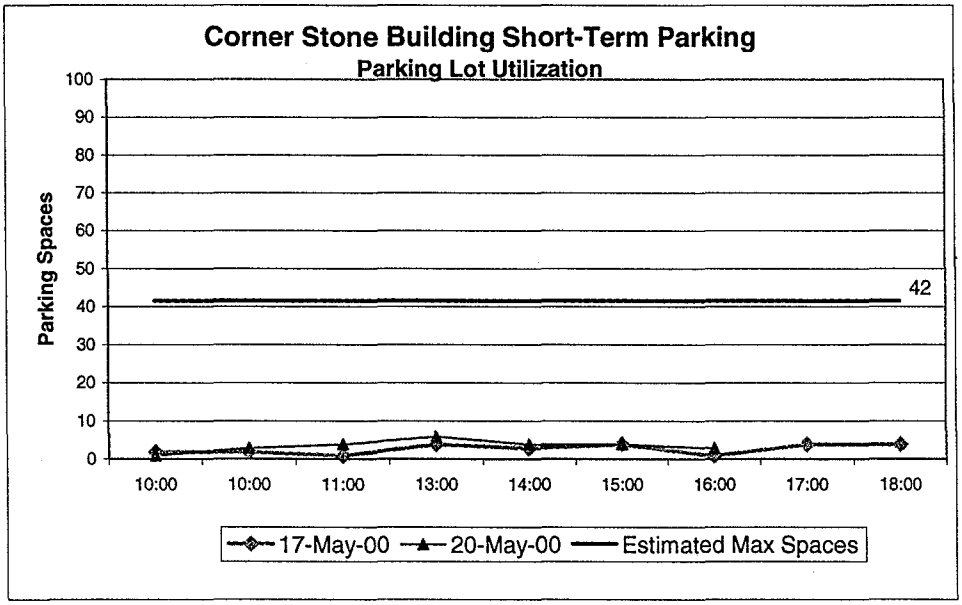
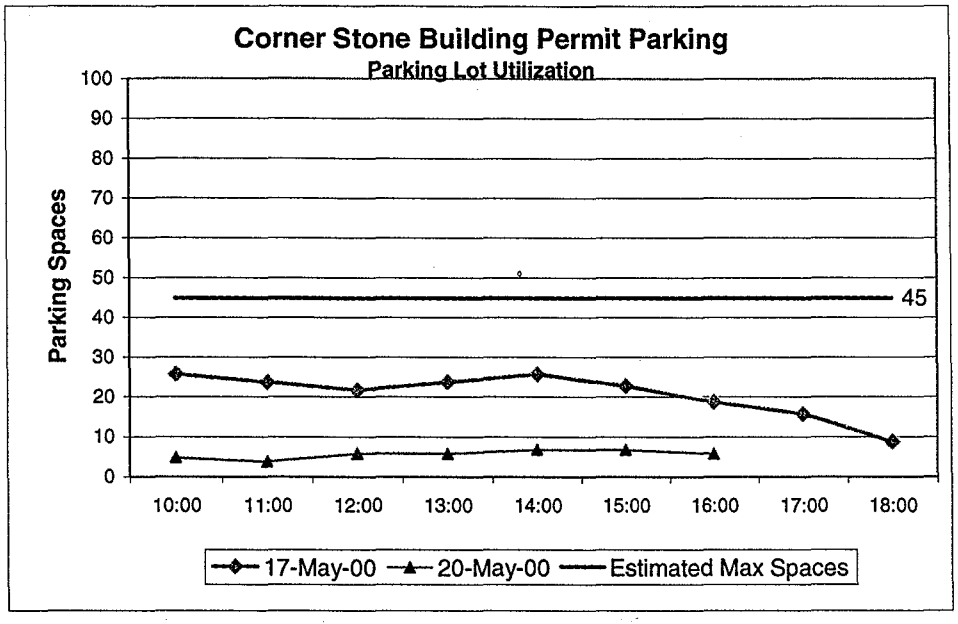


Figure 8: Occupancy, Corner Stone Building Permitted Parking Lot (spaces occupied)



These two parking areas have distinctly different characteristics related to vehicle residence time (Figure 9 and Figure 10). The metered parking residence time is similar to other lots, even with for the low occupancy numbers. Residence time at the permit parking lot seems to have a high percentage of vehicles staying for up to five hours. These vehicles likely belong to residents and restaurant workers, and the residence time distribution was exaggerated because of the low occupancy numbers.

Figure 9: Proportional Distribution of Residence Time, Corner Stone Building Metered Parking Lot

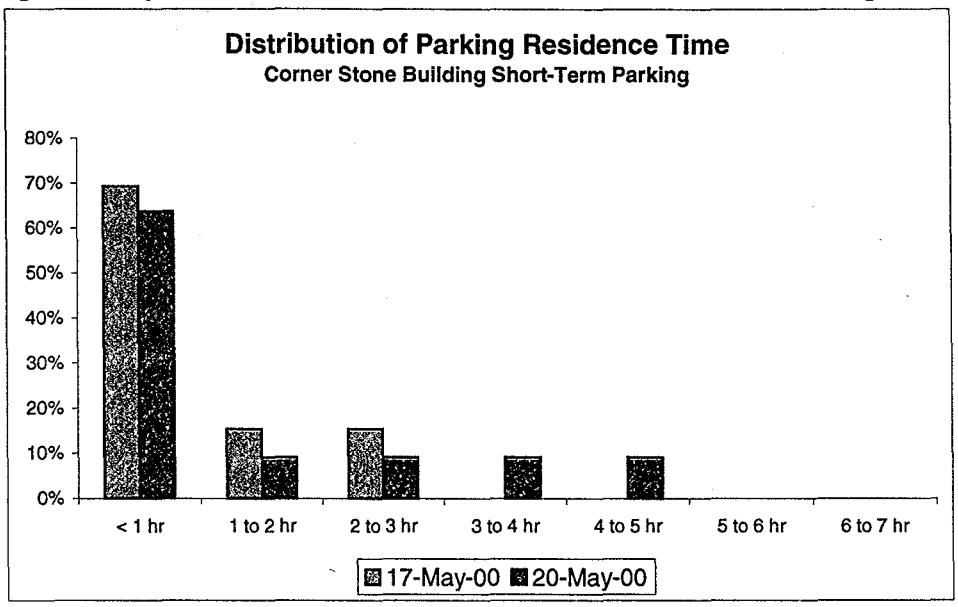
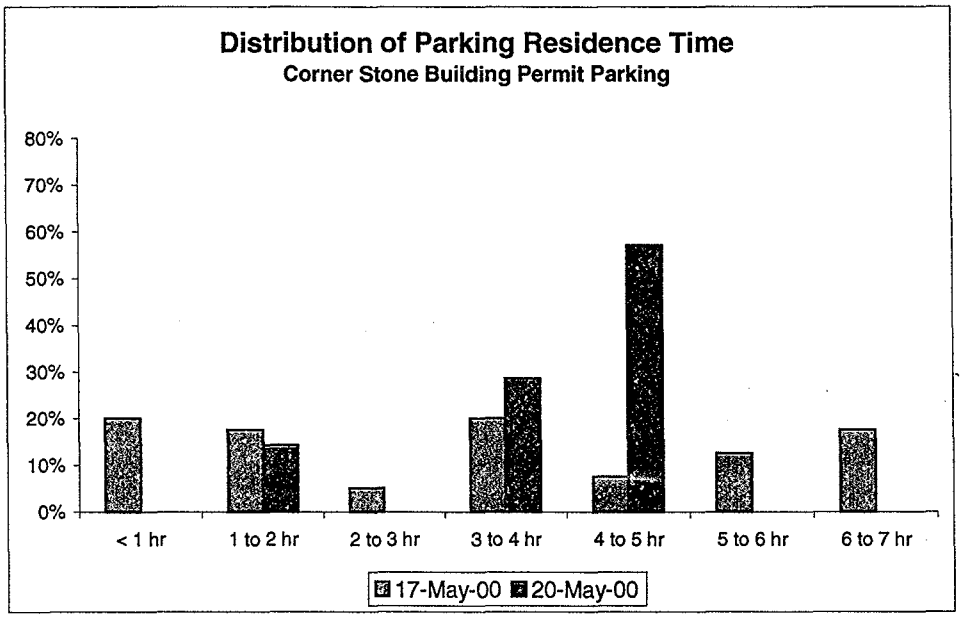


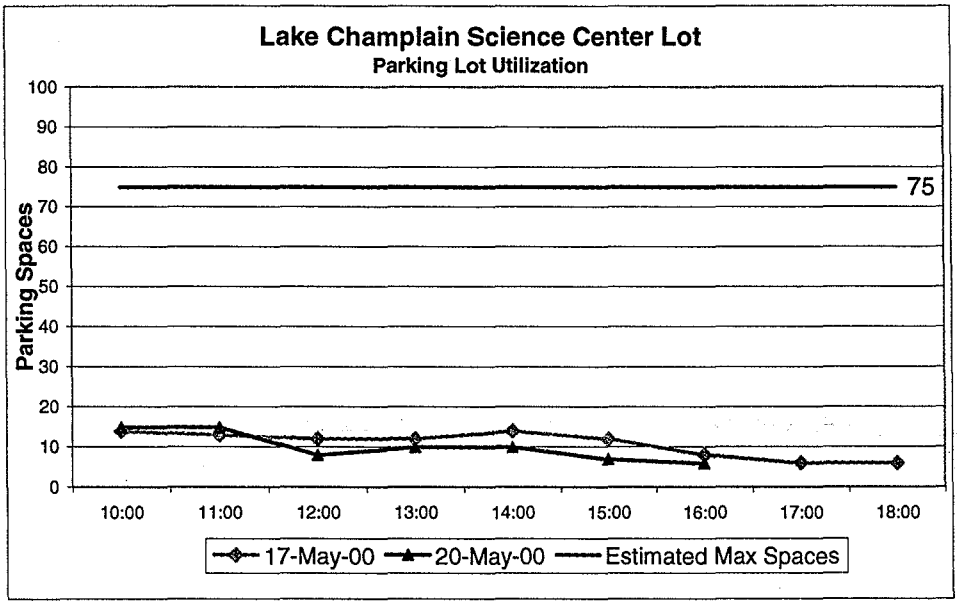
Figure 10: Proportional Distribution of Residence Time, Corner Stone Building Permitted Parking Lot



Lake Champlain Science Center Parking Lot

To the south of the Lake Champlain Science Center, there are paved and gravel parking spaces. During the count periods, the gravel parking was restricted to those using a nearby marina. This area is significantly under-utilized (Figure 11), largely due to the lack of marina activity on the count days.

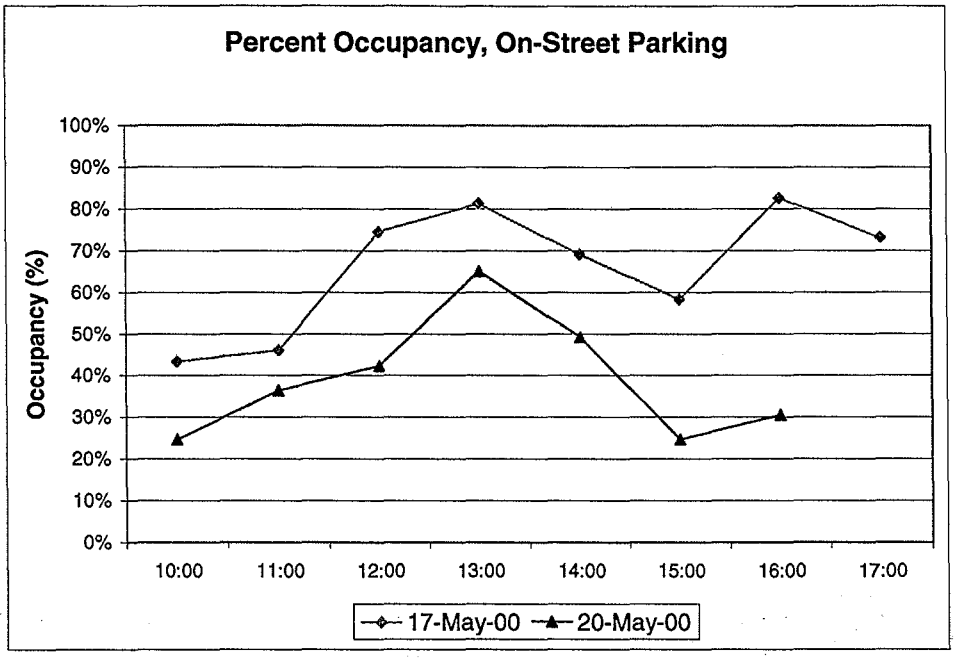
Figure 11: Occupancy, Lake Champlain Science Center Parking Lot (spaces occupied)



On-Street Parking Areas

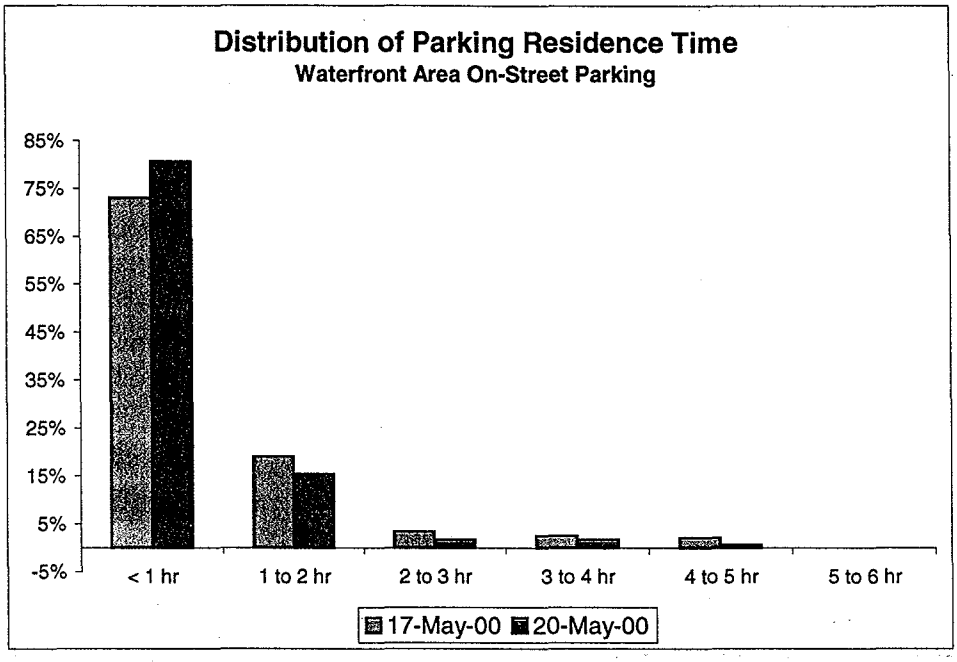
In order to simplify the information, we combined the on-street parking areas within the core Waterfront area. For the Saturday survey, we counted a parking area not addressed in the Wednesday survey. The on-street parking areas were along Lake Street, from Main Street to the north, College Street west of Battery Street, and an additional Saturday count along Battery Street between Main and King Streets. To compare the two days, we analyzed the percent occupancy, by total number of spaces.

Figure 12: Occupancy, 102 Lake Parking Lot (spaces occupied)



Approximately 80 to 85 percent of vehicles were parked for less than one hour (Figure 13). Less than five percent remained for more than 2 hours. On both Wednesday and Saturday, peak parking demand occurred at 1 PM.

Figure 13: Proportional Distribution of Residence Time, 102 Lake Parking Lot



Moran Plant and Lake & College Surface Parking Lots

Both parking lots at the Moran Plant and at the northeast corner of the Lake Street/College Street intersection are considered public parking. Although not enforced at the time of the study, parking at the Lake & College Parking Lot is restricted. Parking at the Moran Plant indicates steady demand throughout the day on both days, while the Lake & College Parking Lot remained mostly empty on both days.

Overall Parking Utilization

We combined the overall parking space counts into one chart showing utilization for the Waterfront parking areas for Wednesday (Figure 14) and Saturday (Figure 15), respectively. These summary figures indicate underutilization of parking spaces in the Burlington Waterfront core area. The peaking also suggests peaking of demand at 1 PM and 4 PM.

Figure 14: Occupancy, Overall Parking Summary, Wednesday, 17 May 2000 (spaces occupied)

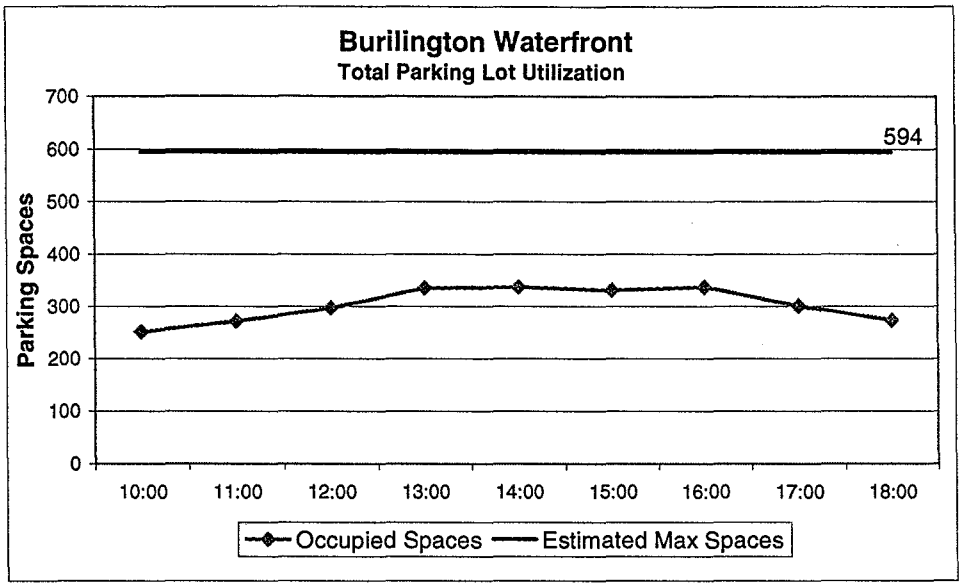
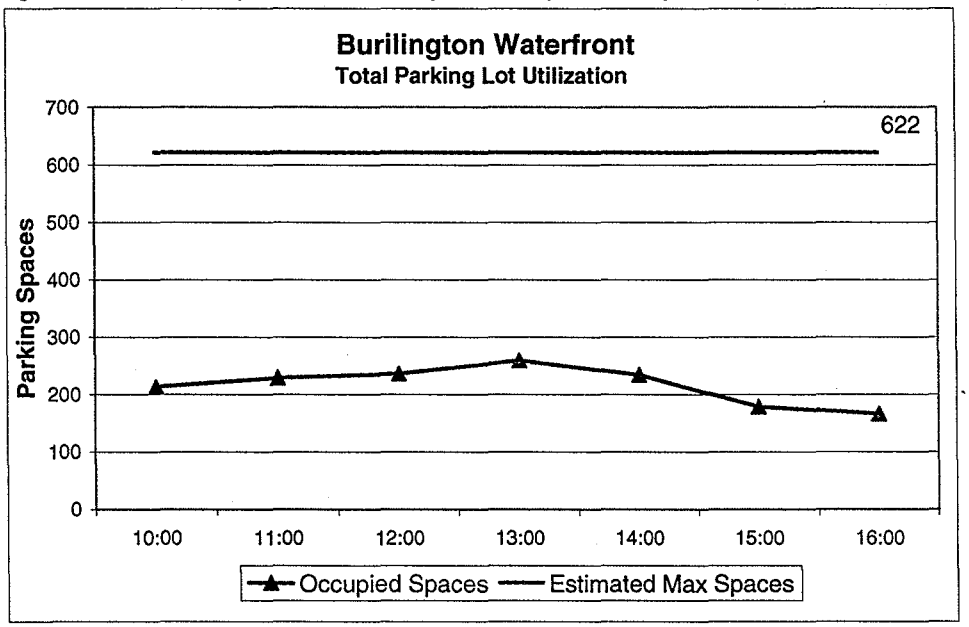


Figure 15: Occupancy, Overall Parking Summary, Saturday, 20 May 2000 (spaces occupied)



CONCLUSION & NEXT STEPS

Resource Systems Group conducted parking lot surveys for the Burlington Waterfront core area on Wednesday, 17 May 2000, and Saturday, 20 May 2000. These surveys recorded the vehicle license plate numbers to assess the number of vehicles present in a parking area, and the length of stay for those vehicles. This survey data provides information to understand the characteristics of the local parking demand.

The next step in this study is to associate parking demand with the uses at each site. These will enable the estimation of parking demand coefficients that can be used to more accurately model temporal parking demand for mixed uses on the Burlington Waterfront. This will be a direct input to the following stage of analysis, where we will estimate time of day parking demand associated with the build-out of the Waterfront. These estimates will be compared with parking requirements that are part of the Burlington Zoning Ordinance.

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LETTER OF TRANSMITTAL

Date: June 17, 2000

To: Dan Bradley

Project: Burlington Waterfront Pedestrian Safety and Circulation Study

We are sending you:

☒ enclosed ☐ under separate cover

Copies	Date	Description
1	6/16/00	Burlington Waterfront Study Update

These are transmitted:

☐ for approval ☐ for review and comment

☒ for your use ☐ for distribution

☐ as requested ☐ for other

Copy to: None

Remarks: None at this time

Signed:

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RESOURCE
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MEMORANDUM

To: Dan Bradley
From: R. Chamberlin
Subject: Burlington Waterfront Study Update
Date: 24 August 2000

This memorandum is a follow up to the memorandum of 16 June 2000 that dealt with the analyses of the existing parking demands and vehicular flow in the Waterfront area. In this technical memorandum, we will summarize our analyses and findings for the build out conditions and provide recommendations to mitigate anticipated constraints.

PURPOSE

The focus of this project is to understand the traffic, pedestrian, and circulation issues arising from the cumulative development proposals for the Burlington Waterfront. The future build out conditions includes the Multi-Modal Transportation Center (MMTC), Lake Champlain Science Center expansion, and other planned commercial and recreational developments. The study assessed the parking and circulation needs arising from these cumulative developments. The study also developed a series of recommendations for managing vehicular circulation and parking within the Waterfront area.

APPROACH TO ANALYSIS

Resource Systems Group inventoried parking conditions at eleven distinct parking areas (Table 1) on two survey days; 10 AM to 6 PM on Wednesday, 17 May 2000, and 10 AM to 4 PM on Saturday, 20 May 2000. We conducted a license plate survey of each parking area. The weather on Wednesday was sunny and warm. Although the survey days were too early in the year to be considered summertime, the good weather on Wednesday helped provide for summer-like recreation activities. On Saturday, the weather began with partly sunny skies, but became cloudy, cool, and rainy. While the Saturday conditions were less summer-like, this information will help us understand the way the parking areas are used on a Saturday.

Since the majority of the parking spaces in the study area are multi-use, we classified the parking supply in two geographical zones. Zone 1 includes the on- and off-street parking spaces from (including) Lake and College Street development to the south, with 435 parking spaces. Zone 2 is made up of a portion of the Lake Street on-street parking plus off-street parking spaces at 102 Lake Street development an the parking at Moran Plant. This totals to 147 parking spaces.

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Table 1: Locations included in Parking Survey

PARKING LOCATION	# SPACES	Zone
Pease Public Parking Lot	84	1
Union Station Surface Parking Lot	87	1
102 Lake Private Parking Lot	112	2
Corner Stone Building Parking Structure	47	1
Lake Champlain Basin Science Center	75	1
On-Street: Union Station, Main to College	34	1
On-Street: Lake St., College to Depot	30	1,2
On-Street: College St., Lake to Battery	10	1
On-Street: Battery St., Main to King (5-20 Survey Only)	28	1
Lake & College Parking Lot	55	1
Moran Plant Public Parking Lot	20	2
Total	582	

Based on our analysis of the data, we used the Wednesday data for the 2000 design day conditions[1].

LAND USE

To establish the build out conditions, we collected information concerning the planned and permitted developments within the study area. Figure 1 shows the planned developments in the study area. The Main Street Landing Phase I Development is to be included in existing conditions. Other developments are assumed to be in the build out conditions. To establish the magnitude of the future developments, we contacted the developers and the planners in charge of these projects (Table 2).

[1] Design Day for this analysis represents an average summer day.

Figure 1: Waterfront Developments

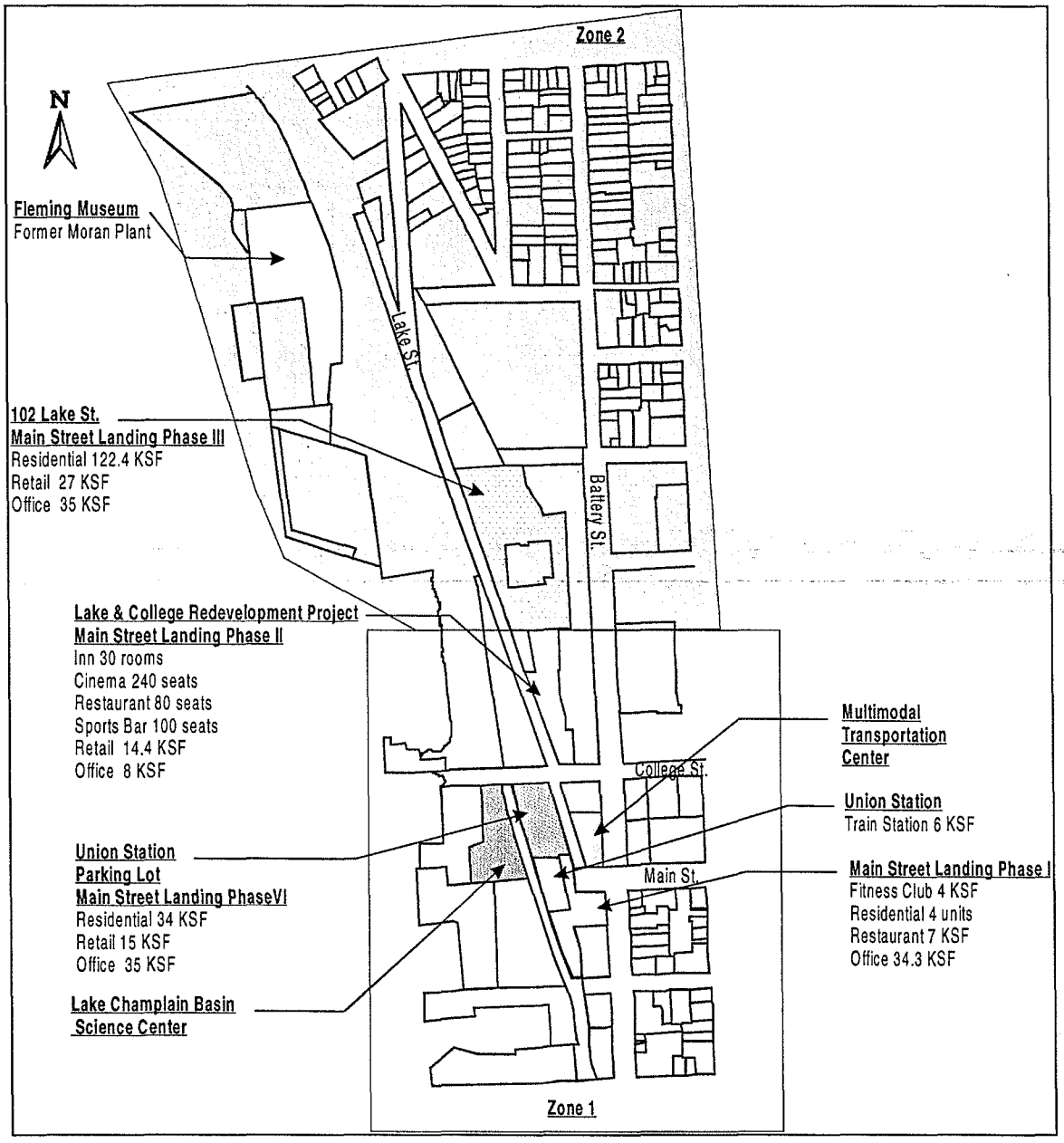


Table 2: Proposed Waterfront Development and Parking Zones

Building Site	Exisitng Land use	units	Parking required regs.*	Parking provided	Future Land use	units	Parking required regs.*	Parking exisiting	Anticipated additional parking	Total Parking
Union Station	Train Station	6,000								100
	Fitness Club	4,000	40							
Union Station	Offices	7,340	24							
Wing Building	Offices	7,000	23							
Wing Building	Residential	4 units	6							
Cornerstone	Restaurant	7,000	25							
Cornerstone	Offices	20,000	67							
			185	100						100
Lake & College Redevelopment					Inn	30 rooms	30			
					Cinema	240 seats	80			
					Theater	50 seats	17			
					Restaurant	80 seats	20			
					Sports Bar	100 seats	25			
					Offices	8,000	27			
					Retail	14,400	96			
							294	55	57	112
Lake Champlain BSC				92	100% increase in op.		92			92
Union Station		N/A					55			
Multimodal Transportation Center										134
Union Station Parking Lot					Residential	34,000	20			
					Retail	15,000	100			
					Office	35,000	117			
							237	87	13	100
102 Lake Street					Residential	122,400	73			
	Retail	6,000	40		Retail	27,000	180			
					Office	22,100	74			
							327	112	95	207
Fleming Museum					Floor Area	33,000	47		35	35

* Parking required by Burlington Zoning Ordinance or other parking standards

DESIGN DAYS

We analyzed the parking survey data, focusing on hourly parking utilization, percent occupancy, and the residence time, or the length of time each vehicle stayed in a space. The results indicated underutilization of parking spaces in the Burlington Waterfront core area. The data also suggests peaking of demand at 1 PM and 4 PM. The results of this survey were discussed in the previous memorandum (16 June 2000).

We determined that the design days should consider the variation in summer demand for the recreational land uses in the study area. Therefore, using the 1999 Red Book[2], we used the average Group V roads summer recreational factor of 1.37 s to apply to the survey data. Figures 2 and 3 show the parking utilization for the 2000 design day.

[2] Continuous Traffic Counter Grouping Study & Regression Analysis Based on 1999 Traffic Data, VTrans.

Figure 2: Zone 1 Parking Utilization, 2000 Design Day

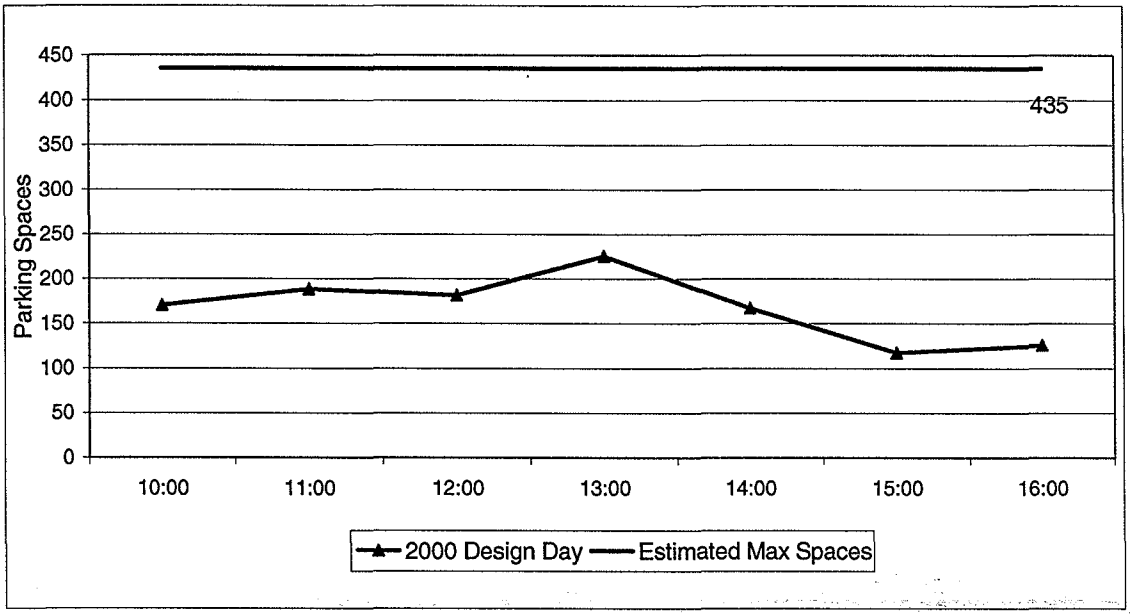
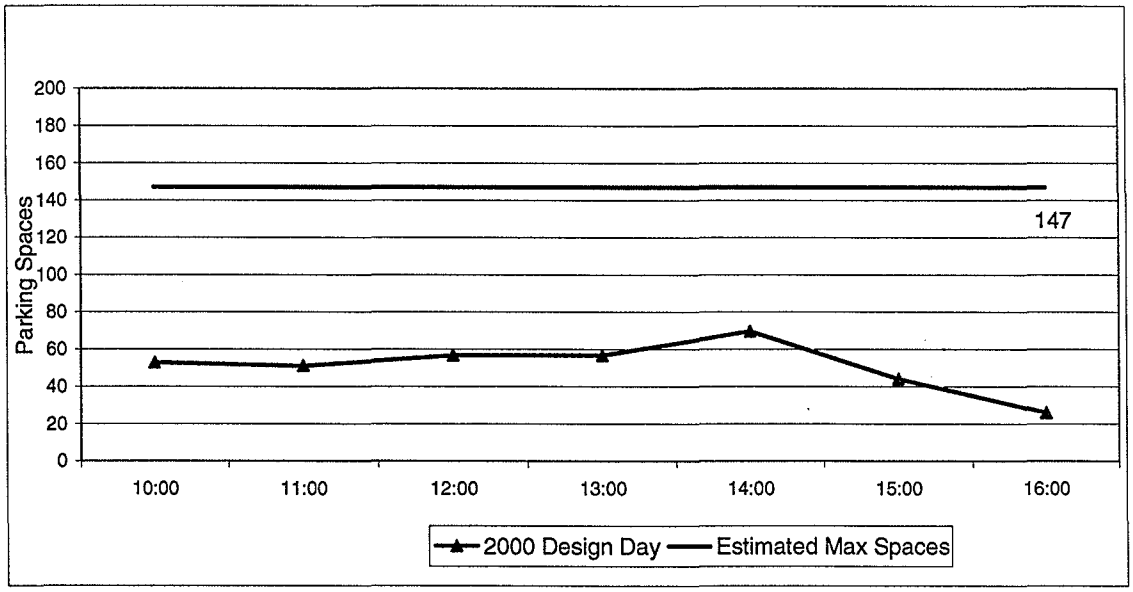


Figure 3: Zone 2 Parking Utilization, 2000 Design Day



The results also showed that under the existing conditions, there is no overall shortage of parking spaces and plenty of surplus parking spaces available. Nevertheless, shortfalls do occur at the specific popular lots (e.g. Pease), and during the special events.

2005 BUILD OUT CONDITIONS

Several assumptions were made to estimate the Build out design day conditions. The year 2005 parking demand consists of the following components;

- Year 2000 design day,
- Planned development (recreational, others)
- Projected daily and peak hour commuter rail boarding,
- Fleming Museum, and
- Lake Champlain Basin Science Center.

The parking demand in the previous section was used as the year 2000 design day demand. Based on shared parking algorithms[3], we determined the parking demand for the future developments. To account for the recreational demand variation we applied the recreational factor (1.37) to the land uses that are affected by this variation. We assumed all the land uses except for the residential and office will be affected.

For the Union Station parking demand, first, we determined the future commuter service from the pervious studies. Burlington/Essex Passenger Rail Feasibility Study and Corridor Analysis[4] estimates two scenarios for the year 2009 services. The scenarios are all-day service at Union Station (high and low growth) and morning-afternoon service (high and low growth). For the purpose this study, morning-afternoon service with high growth was selected as the most likely scenario. Using the boarding estimates from this report and data from *Parking*[5], parking accumulation at Union Station was determined (Figure 4).

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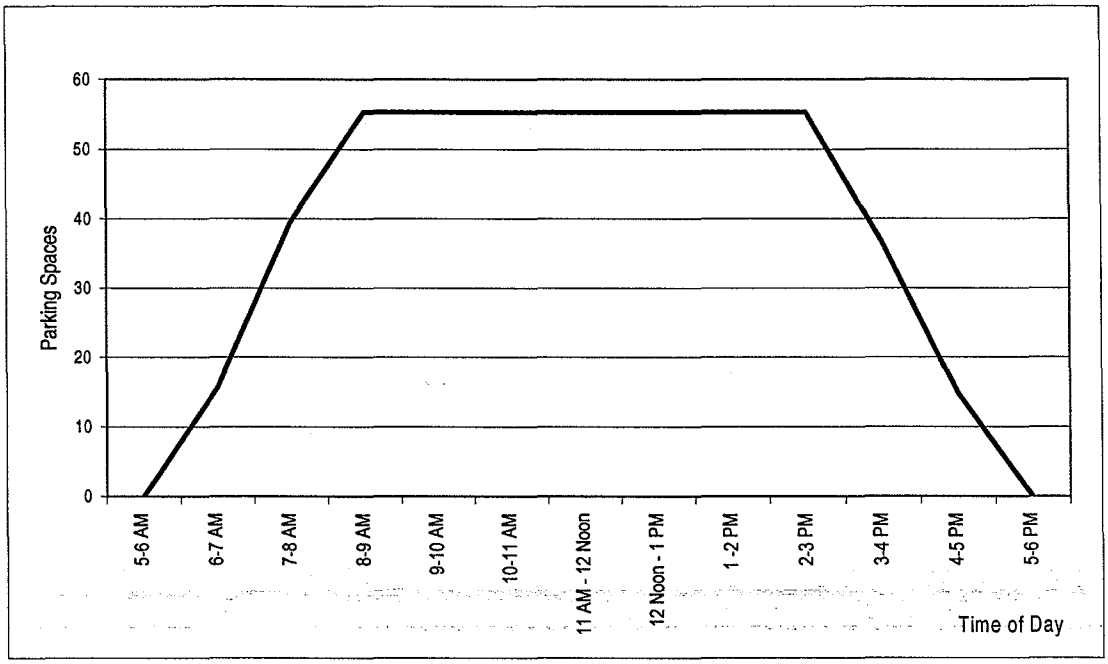
[3] *Shared Parking,* The Urban Land Institute, Washington, D.C., 1983.

[4] *Burlington/Essex Passenger Rail Feasibility Study and Corridor Analysis,* R.L. Banks & Associate, Washington, D.C., 1999.

[5] *Parking,* Eno Foundation For Transportation, West Port, CT, 1989.

Figure 4: Build Out Year Parking Accumulation Due to Train Boardings



The parking demand for the Fleming Museum that will be located at the site of the Moran Plant has two components, office and visitors. The Fleming Museum will have a total square footage of 33,000, of which it was assumed that 10,000 square feet will be used as the office space. For this component of the parking demand, we used the shared parking algorithms, referenced previously. For the visitor component, it was also assumed that during an average peak hour, there will be 50 visitors of which 75% need parking spaces, the peak demand will be achieved at 4:00 PM. We also applied the recreational factor to the visitor demand.

To estimate the parking demand from the expansion Lake Champlain Basin Science Center, we talked to the people in charge of the expansion. It became apparent that the expansion will approximately double the activities at the center, therefore, it was assumed that the existing parking demand (from the year 2000 design day) will increase by 100%[6].

Since Lake Street does not carry any external traffic (from other origins to other destinations), we assumed that the only growth in parking demand would result from developments in the study area.

The build out parking supply was determined by adding on street and existing parking to the additional parking spaces provided by the developments. Figure 5 and 6 illustrate the hourly parking demand versus inventories in Zone 1 and Zone 2, respectively.

[6] Conversation with Mr. Ray Lavigne, Director of Lake Champlain Basin Science Center, July 2000.

Figure 5: Zone 1 Parking Utilization, Build Out Design Day

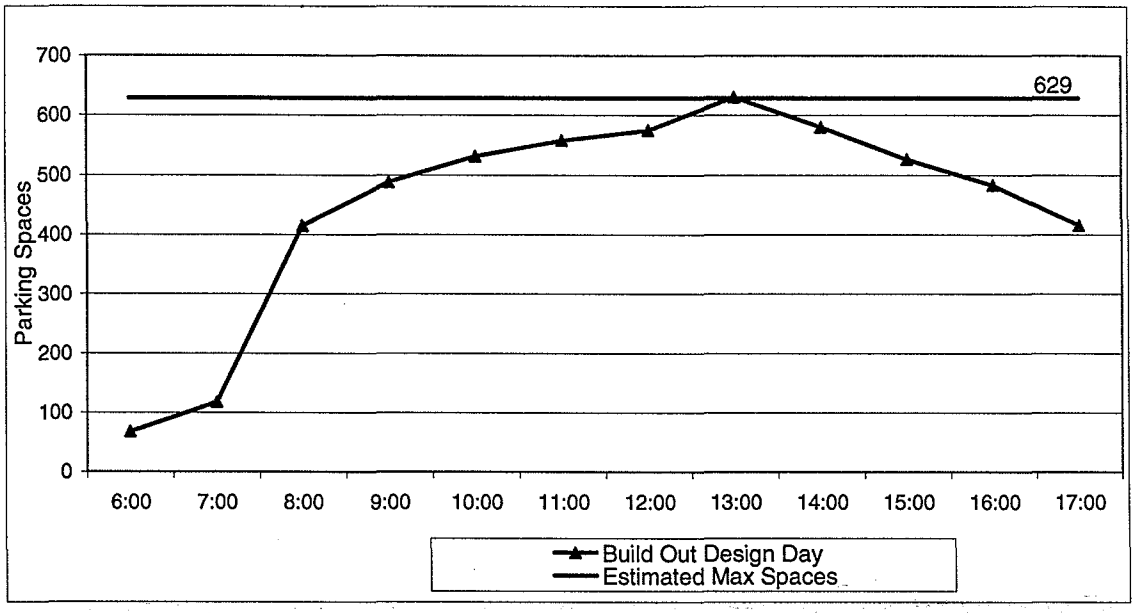
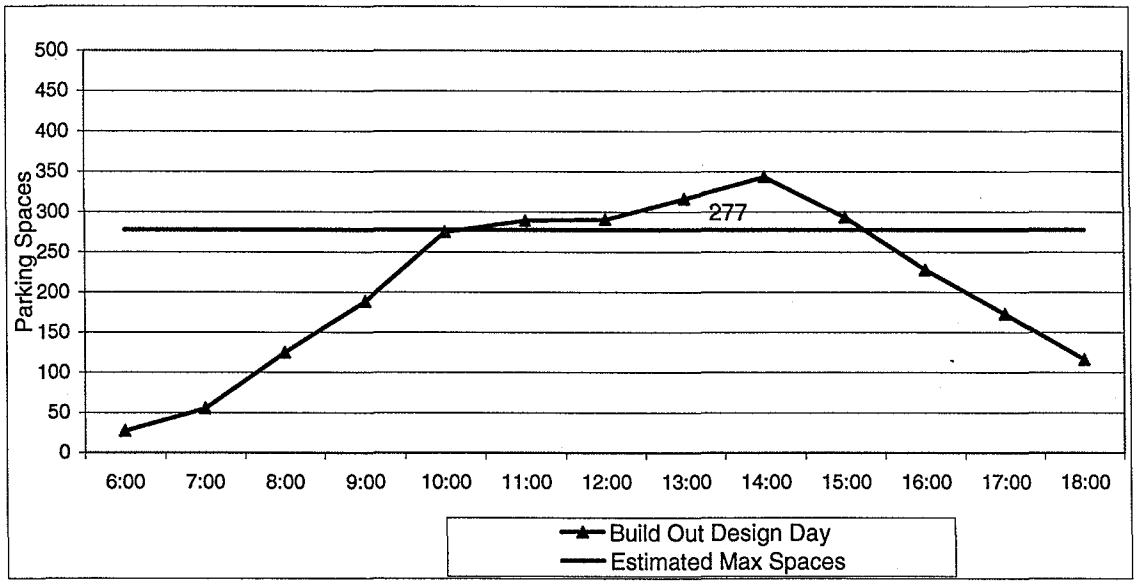


Figure 6: Zone 2 Parking Utilization, Build Out Design Day



The analysis shows that the parking demand in Zone 1 for the build out design day is very likely to be met for most hours of the Build out design day. Conversely, Zone 2 parking demand is not met during the afternoon peak period. The analysis shows a year 2005 design day shortfall of approximately 100 parking spaces.

We also estimated the number of parking required by the *Burlington Zoning Ordinance* and by *Parking* (when Zoning Ordinance did include the land use). These estimates show that Zone 1 and Zone 2 will require approximately 678 and 374 parking spaces, respectively (Table 2).

TRAFFIC AND CIRCULATION

To estimate the number of trips generated by the future developments in the study area, the trip generation rates where obtained from the Institute of Transportation Engineers *Trip Generation*[7].

Trip Generation did not contain trip generation rates that were applicable to the visitors at Fleming Museum and Lake Champlain Basin Science Center. Therefore, it was assumed that every three visitors will generate one vehicle trip with 50% entering and 50% exiting. Nevertheless, to compensate for any shortcomings, it was assumed that each site would generate 150 visitors per peak hour.

Table 3 illustrates the build out vehicle trips generated by each land use in each zone.

Table 3: Build Out Trip Generations

Zone 1			Rates						Trips					
ITE, LU			AM	IN	OUT	PM	IN	OUT	AM-Total	IN	OUT	PM-Total	IN	OUT
310	Inn	30 rooms	0.67	0.53	0.47	0.71	0.49	0.51	20	11	9	21	10	11
444	Cinema	240 seats				0.14	0.53	0.47				34	18	16
444	Theater	50 seats				0.14	0.53	0.47				7	4	3
831	Restaurant	80 seats	0.19	0.7	0.3	0.3	0.59	0.41	15	11	5	24	14	10
832	Sports Bar	100 seats	0.47	0.52	0.48	0.42	0.58	0.42	47	24	23	42	24	18
710	Offices	8 1000 SF	1.56	0.88	0.12	1.49	0.17	0.83	12	11	1	12	2	10
710	Offices	35 1000 SF	1.56	0.88	0.12	1.49	0.17	0.83	55	48	7	52	9	43
814	Retail	14 1000 SF	6.41	0.48	0.52	4.93	0.57	0.43	92	44	48	71	40	31
814	Retail	15 1000 SF	6.41	0.48	0.52	4.93	0.57	0.43	96	46	50	74	42	32
230	Residential	20 units	0.44	0.17	0.83	0.54	0.67	0.33	9	1	7	11	7	4
710	LCSC	4 full time emp	0.48	0.88	0.12	0.46	0.17	0.83	2	2	0	2	0	2
		150 visitors	0.33	0.5	0.5	0.63	0.5	0.5	50	25	25	95	47	47
090	MMTC	140 spaces	0.78	0.8	0.2	0.63	0.22	0.78	109	87	22	88	19	69
		24 buses	2	0.5	0.5	2	0.5	0.5	48	24	24	48	24	24
TOTAL									507	311	197	444	219	225
Zone 2														
710	Offices	22 1000 SF	1.56	0.88	0.12	1.49	0.17	0.83	34	30	4	33	6	27
814	Retail	27 1000 SF	6.41	0.48	0.52	4.93	0.57	0.43	173	83	90	133	76	57
230	Residential	72 1000 SF	0.44	0.17	0.83	0.54	0.67	0.33	32	5	26	39	26	13
710	Fleming M.	15 EMP	0.48	0.88	0.12	0.46	0.17	0.83	7	6	1	7	1	6
		150 visitors	0.33	0.5	0.5	0.63	0.5	0.5	50	25	25	95	47	47
TOTAL									296	150	146	306	156	150

[7] Institute of Transportation Engineers, *Trip Generation*, Washington DC, October 1998

The percentage of non-automobile trips within downtown Burlington is very high compared to suburban areas. The Chittenden County Regional Transportation Demand Model shows that the non-automobile share of person trips in the Burlington Central Business District is approximately 25%. Resource Systems Group performed a survey in 1993[8], which determined that non-automobile trips in the Burlington Central Business District (CBD) make up 25.2% of the total trips. Additionally, Resource Systems Group conducted an intensive pedestrian intercept survey at Burlington Square Mall as part of the traffic permitting for the Filene's Department Store[9]. Of 350 downtown pedestrians surveyed during a weekday afternoon in January[10], 35% stated that they traveled to downtown Burlington in a bus, by walking, or by other non-automobile means. Therefore, for this study, we assumed that 25% of the trips generated by these developments are non-automobile trips.

The analysis indicates that under build out conditions in 2005, an estimated 603 AM peak hour vehicle trips, and an estimated 638 PM peak hour vehicle trips will be generated by the developments.

BACKGROUND TRAFFIC

Background traffic was estimated for 2005. Raw traffic count data were adjusted 2 ways. First, traffic volumes were adjusted to reflect design hour conditions. The design hour is the thirtieth highest hour of traffic recorded over a year. This represents a highly congested traffic situation, which will occur less than 1% of the hours of the year (30^{th} hour/8760 hours per year = 0.3%).

The second count adjustment escalates all data to year 2005 conditions. For this adjustment, we have assumed an average annual growth rate of 1% per year. The combined effect of both adjustments is to increase the raw traffic count volumes by 21.9% for 2005.

Table 4 shows the estimated 2005 design hour traffic volumes at the study intersections.

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[8] IVIS Stated Preference Survey, Burlington, VT, 1993.

[9] Traffic Impact Study for Burlington Square Mall Expansion, 1997.

[10] The Day of the pedestrian intercept survey was January 1997.

Table 4: Estimated 2005 Background Traffic Volumes for Study Area, PM Peak Hour

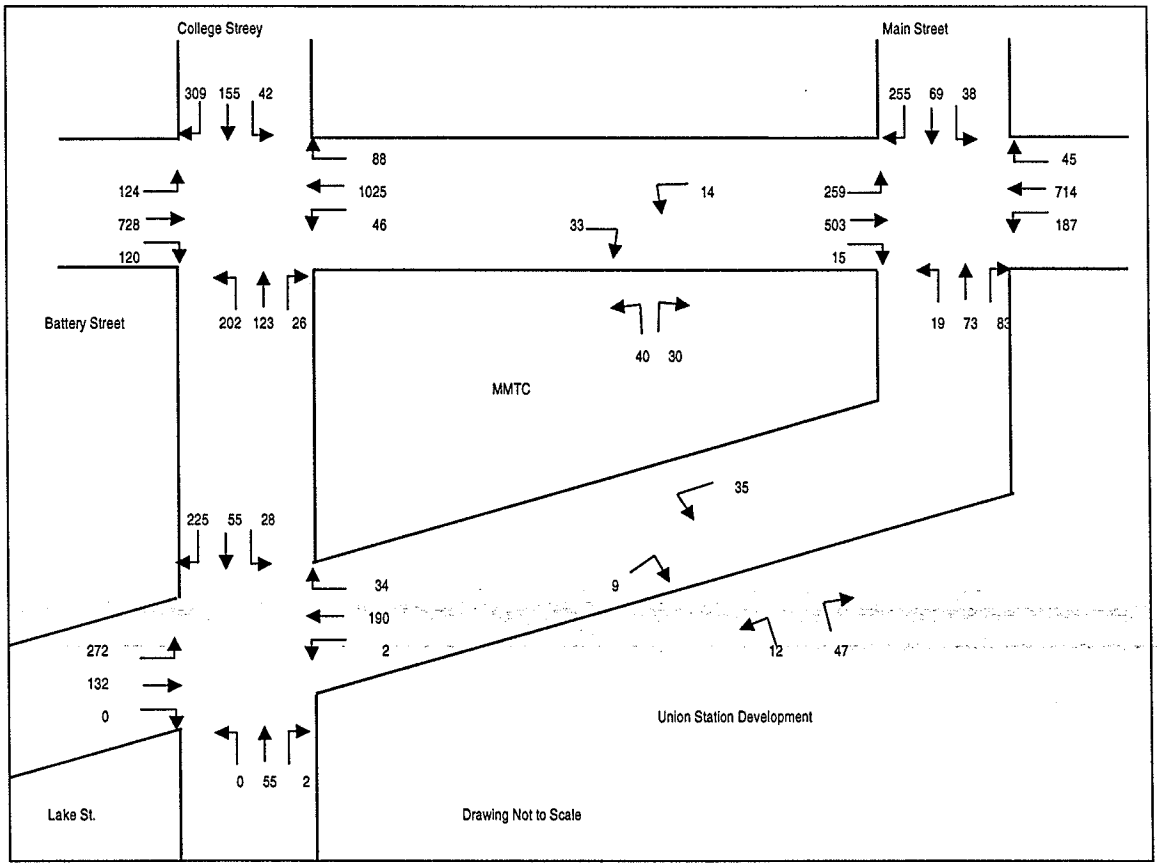
		EB	WB	NB	SB	
Lake & College	Left	0	20	2	81	
Burlington, VT	Through	55	55	28	46	
	Right	2	37	22	0	348
	Enter	57	111	53	127	348
	Exit	158	57	65	68	348

		EB	WB	NB	SB	
College/Battery	Left	85	34	16	124	
Burlington, VT	Through	52	52	988	703	
	Right	11	309	85	43	2,501
	Enter	148	394	1,089	870	2,501
	Exit	261	110	1,382	749	2,501

		EB	WB	NB	SB	
Main/Battery	Left	17	38	39	249	
Burlington, VT	Through	45	42	678	483	
	Right	51	255	29	11	1,938
	Enter	114	335	746	743	1,938
	Exit	323	92	951	573	1,938

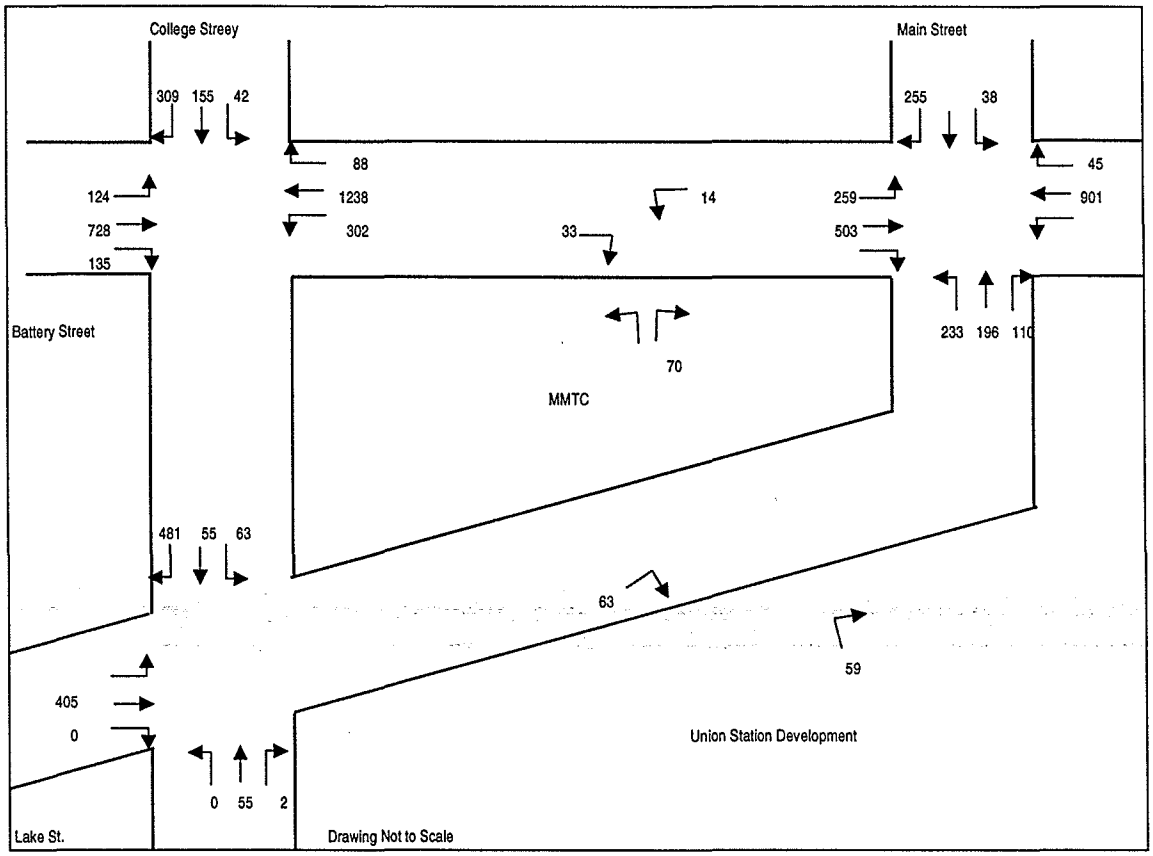
We used the background traffic to determine the development trip distribution within the local road network (Figure 7).

Figure 7: Build Out Traffic, PM Peak Hour



In order to evaluate the effects of a one-way road system, assumed that Lake Street from College to Main will one way southbound. The background traffic and the traffic generated from the development were reassigned to a one-way system.

Figure 8: Build Out Traffic, One-way Road Network, PM Peak Hour



RECDOMMENDATIONS

As it determined, Zone 2 is likely to experience a shortage of parking during most of hours of the build out design day. To remedy the parking shortage, we recommend encouraging the use of the surplus parking that exists at the Filene's Department Store during the time that Zone 2 experiences parking shortage. The Filene's Department Store is a short walking distance from the Waterfront, therefore, it is not an unappealing walk for visitors. Second, the Filene's Department Store to the Waterfront provides a suitable corridor to create a pedestrian mall that links the downtown area to the Waterfront on Cherry Street. This pedestrian mall would further reduce the vehicular trips, improve the pedestrian flow and provide access to the Waterfront. To make this practical, a major pedestrian walkway scaling the slope from Battery Street is a critical infrastructure element for the Waterfront.

The intersections in the study area should be further monitored and studied to determine the feasibility of a one-way street network.