Attachment 8 - Nelson/Nygaard Shared Parking Analysis, May 12, 2010

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M E M O R A N D U M

To: Lisa Ring, Senior Planner, San Mateo Planning Department

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Subject: Station Park Green Shared Parking Analysis

Introduction

Nelson\Nygaard Consulting Associates and Hexagon Transportation Consultants have been retained by the City of San Mateo to prepare a shared parking analysis for Station Park Green, a mixed-use project proposed for development within the Hayward Park Station Zone of San Mateo's Rail Corridor Plan area.

For project within the Corridor Plan area the following policies apply with respect to parking;

Objective (Q): Encourage Shared Parking-As part of an overall Transportation Demand Management (TDM) program, reduce the amount of land or buildings devoted solely to storage of automobiles by encouraging parking management solutions such as shared parking between different compatible uses, particularly office and residential development. Explore the feasibility of sharing parking among the future Hillsdale Station Caltrain garage, the San Mateo County Expo Center, and adjacent development.

Policy 7.21 Traffic analysis of development projects within the Corridor plan area shall include development of recommended parking reductions and companion trip reduction programs. The recommendations shall also include definition of appropriate trip generation thresholds for the project.

For this analysis three development scenarios were evaluated. In all scenarios the project includes development of 599 residential units. For Alternative 1, Maximum Retail Scenario, other uses include 10,000 square feet of office uses and 60,000 square feet of retail uses, including the incorporation of a new 22,000 square foot Michael's retail store and up to 15% (9,000 square feet) restaurant uses. For Alternative 2, Maximum Office Scenario, other uses include 45,000 square feet of office uses and 25,000 square feet of retail uses including up to 15% (3,750 square feet) restaurant uses. For Alternative 3, Maximum Office and Retail Scenario, other uses include

38,000 square feet of office uses and 32,000 square feet of retail uses including up to 15% (4,800 square feet) of restaurant uses.

In all scenarios, 839 parking spaces will be exclusively designated for residential units and 311 parking spaces will be shared between residential visitor spaces, office, retail, and restaurant uses, for a total of 1,150 parking spaces provided on site.

This analysis assumes that all residential units will be rental rather than for-sale and that the applicant will implement shared parking between all visitors and customers at Station Park Green. These assumptions are conservative, because rental residential units would result in a higher parking demand than for-sale units. At this time, it has not been determined if the residential units will be rental, for-sale or a combination of both.

The development would include underground parking to allow for street walls with active uses, including residential or retail ground-floor entrances. Transit-oriented features at the site will include amenities for pedestrians, bicyclists, area shuttles, and motor vehicles alike. Station Park Green is envisioned as a defining, new neighborhood for San Mateo and its overarching premise is to fulfill the goals of the San Mateo Rail Corridor Plan: Transit-Oriented Development Plan, adopted on June 6, 2005 (Rail Corridor Plan)–to foster transit-oriented development (TOD), and, thereby, to implement San Mateo's chosen approach to growth in the area.

The project will also incorporate a number of Transportation Demand Management (TDM) measures designed to reduce the number of vehicle trips that will be generated by the proposed development, in compliance with the Rail Corridor Plan's goal of achieving "an overall reduction in new vehicle trips of at least 25 percent corridor-wide." (p. 7-13).

The list of TDM measures that will be included in this project are listed below:

- First-class tele-commuting opportunities
- Carsharing
- Shuttle service
- Neighborhood-serving retail
- Bicycle storage
- Unbundled parking
- Shared parking
- TMA participation
- Transportation kiosk
- Improved transit stop
- Transportation coordinator

By implementing the TDM measures listed above Station Park Green will reduce the number of vehicle trips generated by this project by 4%.

Shared Parking Analysis

Overview of Shared Parking

Mixed-use developments, such as the proposed project, offer the opportunity to share parking spaces between various project uses with different parking demand periods. Shared parking

therefore reduces the total number of parking spaces required compared to what the same uses would require in stand-alone developments. This is a primary benefit in mixed-use development contexts of moderate-to-high density, and is a cornerstone of smart growth policies. Mixing uses and sharing parking offers many benefits to the surrounding community, including a more efficient use of land resources and fewer vehicle trips.

Mixed-use development creates opportunities for shared parking because of the staggered demand peaks for parking associated with different uses. All land uses generate unique levels and patterns of parking demand, varying by time of day and day of the week. Parking supplies at mixed-use locations accommodate these demand fluctuations more efficiently than segregated supplies, by accommodating peaking uses with spaces left vacant by other uses, thereby substantially reducing the overall number of parking spaces needed by a project. For example, spaces occupied by daytime retail shoppers or office workers during the day, are largely empty during the evening and can be filled, or "shared," with residents who are parking overnight or visitors to a nearby restaurant. The peak parking demands for the primary components of the Station Park Green project, including residential visitor parking, retail, restaurant, and office, will have different peak demand periods and will therefore allow for shared parking to occur throughout the days of the week.

Parking Rates

The first step before conducting the shared parking analysis was to determine the appropriate parking ratios for the Station Park Green development. Oftentimes, Institute of Transportation Engineers (ITE) parking generation ratios are used for this type of analysis. However, ITE parking ratios are typically based on suburban developments where all uses are physically isolated and all trips are made by car. This is also the case for the City of San Mateo's citywide parking requirements, which evaluate land uses individually and not as part of dense, mixed-use developments. Therefore, it has been determined that neither ITE nor San Mateo citywide parking ratios are suitable for large, dense, pedestrian friendly, mixed-use TOD such as Station Park Green.

At TOD developments, many different land uses are located within walking distance of one another and the uses are directly adjacent to mass transit (rail and bus). For people who do travel by automobile, this type of development reduces the need to make multiple vehicle trips to a number of destinations and instead drivers can park once and walk between uses. Accordingly, Objective (Q) of the Rail Corridor Plan is to encourage parking management solutions such as shared parking between different compatible uses, as part of an overall TDM plan (p. 3-3). In turn, the San Mateo Municipal Code provides that all uses at the project site are subject to the development standards policies and guidelines specified in the Rail Corridor Plan, including off-street parking (sec. 27.90.050).

Based on the characteristics of the Station Park Green project, just mentioned, it has been determined that this project will include a scale, density, arrangement and mix of uses most like development in the Downtown zone in San Mateo, and therefore the city's Downtown parking requirements are the most relevant to the project. As Figure 1 below shows, Downtown parking requirements are lower than citywide parking rates and similar to ITE parking ratios.

Figure 1 Municipal Code Parking Requirements

Land Use	Citywide Parking Requirements (spaces per 1,000 sq. ft/unit)	Downtown Parking Requirements (spaces per 1,000 sq. ft/unit)	ITE Parking Generation Manual (spaces per 1,000 sq. ft/unit)
Residential			
Studio	1.3	1.0	1.2**
1 bedroom	1.6	1.3	
2 bedroom	1.8	1.5	
3 bedroom	2.0	1.8	
Visitor	0.2	0.2	NA
Office	2.99	2.6*	2.4
Retail	4.44	1.9*	2.65
Restaurant	1 space per 50 sq. ft public service area	3.9*	15.4

*Includes visitor parking
**ITE does not provide different rates for number of bedrooms

For residential parking, the Downtown parking requirements have been applied to the project, for a total projected demand of 839 parking spaces (excluding visitor parking, which is treated separately in Figure 2). This equates to a residential parking ratio as shown in the table above, based on the number of bedrooms in the unit. Since the project is still in the Specific Plan stage, the exact mix of unit types has not been selected. For the purposes of this analysis, it is assumed that 50% of the dwelling units will be one-bedroom and 50% of the dwelling units will be two-bedroom, which is the most likely scenario at this time. If a different mix of residential units were later proposed additional parking may be required to meet the ratios shown in the table above (Downtown Parking Requirements).

For residential visitor parking, the Downtown parking requirements of 0.2 spaces per unit were used for this analysis. Residential weekday and weekend peak rates are assumed to be equal based on Urban Land Institute (ULI) estimates.[1] It should be noted that only residential visitor parking ratios are included since only visitor spaces will be shared with commercial and retail uses.

For restaurant uses, City code for downtown requires 3.9 spaces per 1,000 sq. ft. while the ITE Parking Generation manual estimates 15.4 spaces per 1,000 sq. ft. Since this restaurant space will mainly be aimed at serving local residents and employees, we estimate that the parking demand will be 7 spaces per 1,000 sq. ft. on weekends. This rate was adjusted for weekdays based on ULI Shared Parking data. ULI states a default rate of 10.5 spaces per 1,000 sq. ft. during weekdays and 15 spaces per 1,000 sq. ft. during weekends. Weekday peak demand for restaurants is calculated based on the ratio of ULI weekday and weekend rates (7*10.5/15).

For office uses, weekday office peak parking ratios were derived from City of San Mateo Downtown parking requirements, which are 2.6 spaces per 1,000 sq. ft. The weekend office peak rate was calculated based on the ratio of the ULI weekday and weekend rates (2.6*.38/3.8).

For weekend retail peak parking ratios, City code for downtown (1.9) is assumed. The weekday retail peak ratio was calculated based on the ratio of the ULI weekday and weekend rates (1.9*3.6/4).

[1] ULI has members in 95 countries worldwide, representing the entire spectrum of land use and real estate development disciplines, working in private enterprise and public service. The ULI estimates used here are published in “Shared Parking” (2nd ed., 2005) [?].

Figure 2 below presents the weekday and weekend parking demand ratios that were used in the shared parking analysis for all alternatives.

Figure 2 Peak Parking Ratios

Land Use	Weekday Parking Demand (spaces per 1,000 sq. ft/unit)	Weekend Parking Demand (spaces per 1,000 sq. ft/unit)
Residential (Visitor Only)	0.2	0.2
Office	2.6	0.26
Retail	1.71	1.90
Restaurant	4.9	7.0

The parking ratios for each land use were then used to determine the number of parking spaces required at peak demand for each land use by applying the peak ratio to the total square footage for commercial uses, and the number of units for residential units.

Shared Parking Analysis

The shared parking analysis accounts for how parking demand can be expected to vary by time of day, from 6 a.m. through midnight. For each land use, parking demand is analyzed for both weekdays and Saturdays. For most land uses, including retail, parking demand on Sundays is considerably lower, and therefore is not analyzed here.

Time-of-day parking demand distributions, which represent the percent of peak hour demand throughout the day, use ULI data. These were applied to the parking ratios for each land use to determine the number of spaces required for each land use over each hour of the day. The analysis shows that retail parking demand is at 7% of its peak parking demand at 7 a.m. on weekdays and reaches its peak parking demand at 1 p.m. In contrast, office parking demand peaks at 10 a.m. on weekdays and drops to 23% of its peak demand at 6 p.m. Residential visitor parking peaks at night and drops to 20% of peak demand in the middle of the day on both weekdays and weekends.

Option 1 – Maximum Retail Scenario

Since parking for the Station Park Green project can be shared, the project's peak demand for parking is the sum of the usage for all uses at the busiest hour. Assuming full sharing of the parking supply between visitor parking spaces, retail, restaurant, and office uses, Figure 3 illustrates how the cumulative parking demand for the project will vary over a typical weekday in the Maximum Retail Scenario. Figure 4 illustrates how the cumulative parking demand for this scenario will vary over a typical Saturday.

With all visitor, retail, restaurant and office parking shared, weekday peak parking demand is estimated to be 241 vehicles at the peak hour (7pm). On Saturdays, peak parking demand is estimated to be 240 vehicles at the peak hour (7pm). At that hour, restaurant and retail demands are near their peaks and many residents are home for the evening. If an effective parking capacity[2] of 95% is used, then 254 parking spaces would need to be provided to meet this aggregate peak parking demand. The implementation of the TDM measures listed in the introduction of this memo would reduce the number of vehicle trips associated with this project, which in turn would further reduce parking demand; however, to maintain a conservative methodology the impacts of the TDM program were not taken into account as part of this analysis.

[2] Effective capacity is parking occupancy at which a driver can easily find a parking space. If the effective capacity is exceeded drivers will have to circle, search, and wait for vacant spaces, possibly causing congestion and blocking other vehicles.

Figure 3 Weekday Shared Parking Demand – Option 1 Maximum Retail Scenario

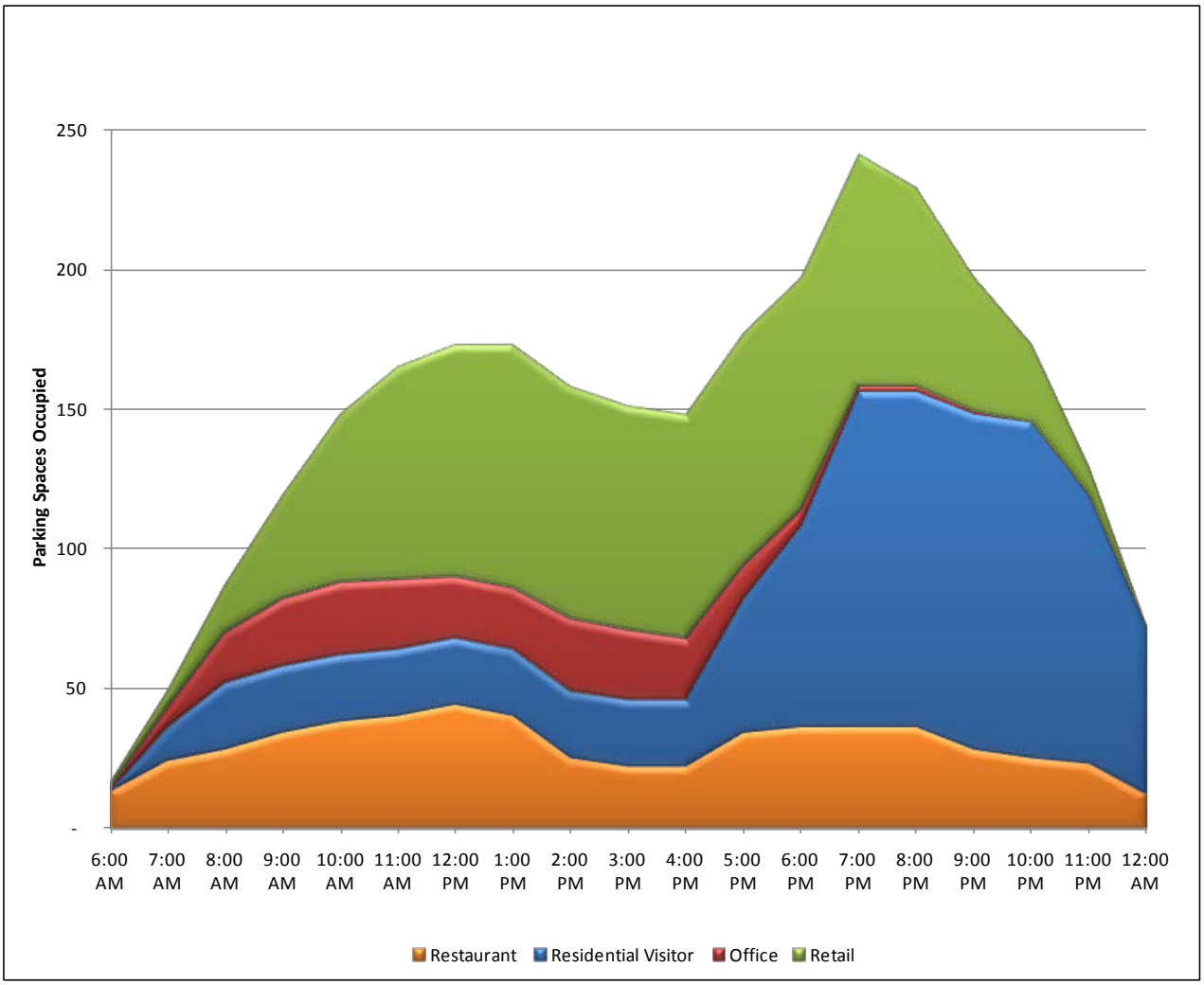
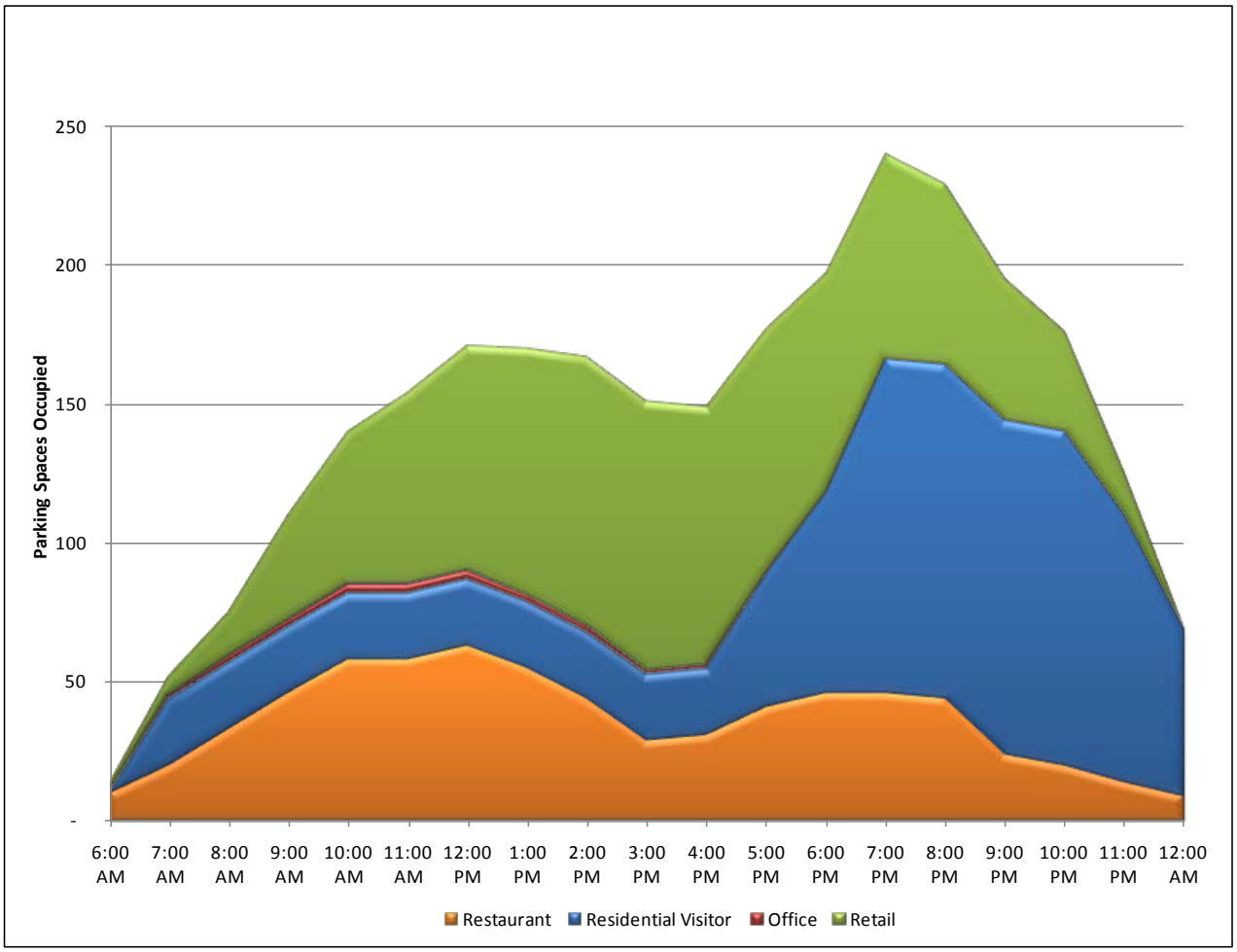


Figure 4 Weekend Shared Parking Demand – Option 1 Maximum Retail Scenario



Option 2 – Maximum Office Scenario

Assuming full sharing of the parking supply between visitor parking spaces, retail, restaurant, and office uses, Figure 5 illustrates how the cumulative parking demand for the Maximum Office Scenario will vary over a typical weekday. Figure 6 illustrates how the cumulative parking demand for this scenario will vary over a typical Saturday.

With all visitor, retail, restaurant and office parking shared, weekday peak parking demand is estimated to be 183 vehicles at the peak hour (11am). On Saturdays, peak parking demand is estimated to be 169 vehicles at the peak hour (7pm). At 11am on weekdays, office use is at its peak and retail and restaurant demands are near their peaks. If an effective parking capacity[3] of 95% is used, then 193 parking spaces would need to be provided to meet this aggregate peak parking demand. The implementation of the TDM measures listed in the introduction of this memo would reduce the number of vehicle trips associated with this project, which in turn would further reduce parking demand; however, to maintain a conservative methodology the impacts of the TDM program were not taken into account as part of this analysis.

[3] Effective capacity is parking occupancy at which a driver can easily find a parking space. If the effective capacity is exceeded drivers will have to circle, search, and wait for vacant spaces, possibly causing congestion and blocking other vehicles.

Figure 5 Weekday Shared Parking Demand – Option 2 Maximum Office Scenario

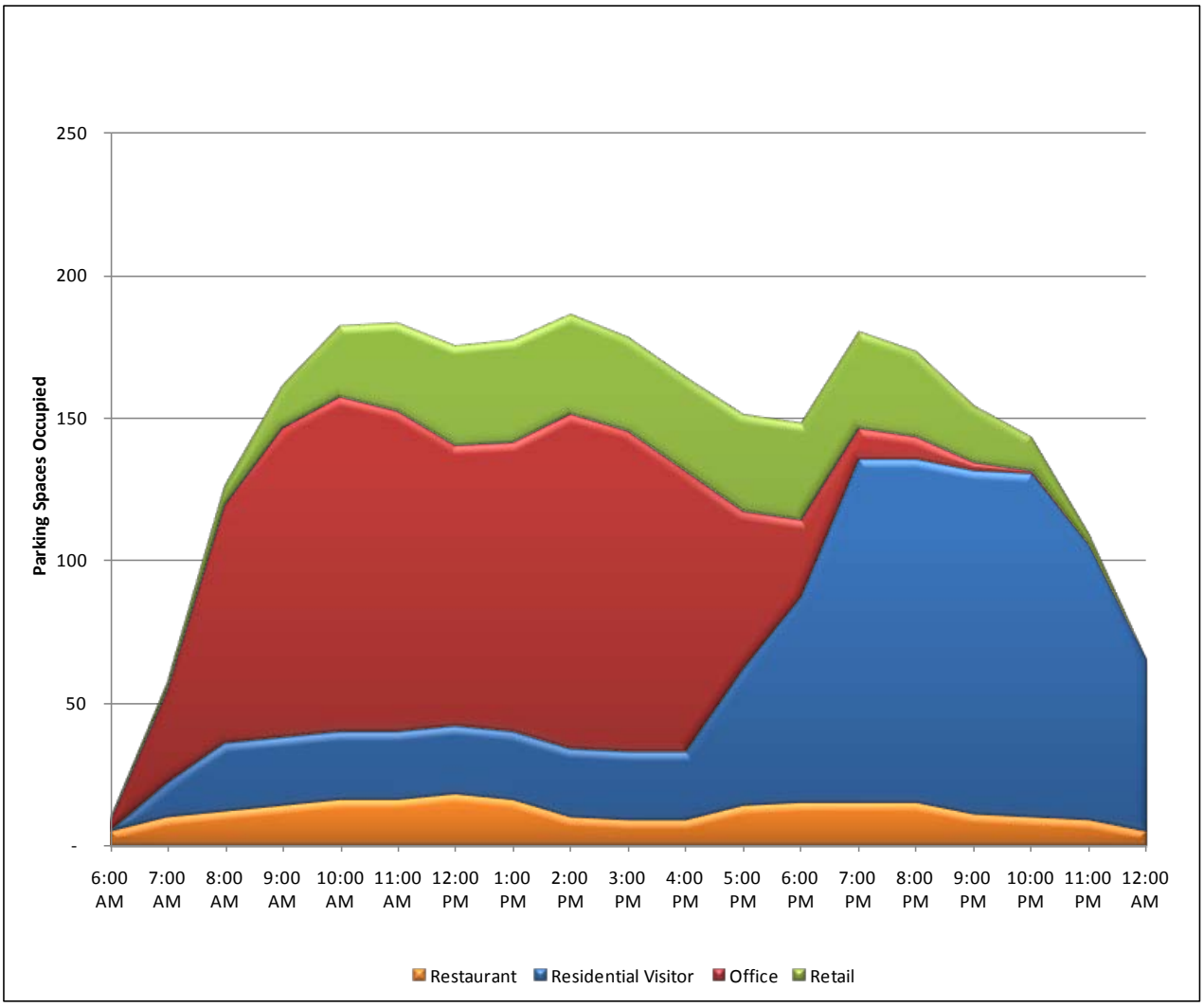
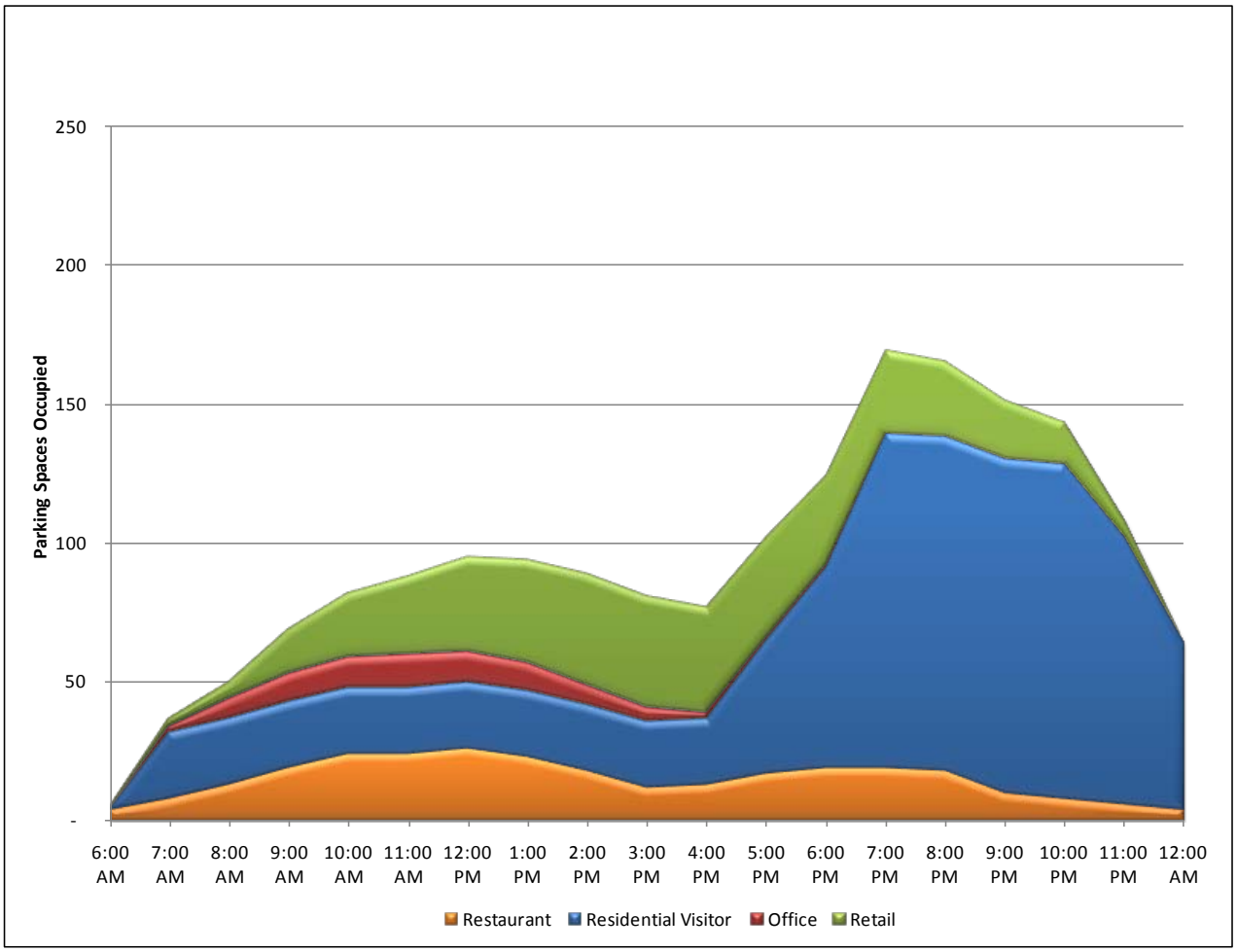


Figure 6 Weekend Shared Parking Demand – Option 2 Maximum Office Scenario



Option 3 –Office and Retail Scenario

Assuming full sharing of the parking supply between visitor parking spaces, retail, restaurant, and office uses, Figure 7 illustrates how the cumulative parking demand for the Maximum Office and Retail Scenario will vary over a typical weekday. Figure 8 illustrates how the cumulative parking demand for this scenario will vary over a typical Saturday.

With all visitor, retail, restaurant and office parking shared, weekday peak parking demand is estimated to be 194 vehicles at the peak hour (7pm). On Saturdays, peak parking demand is estimated to be 185 vehicles at the peak hour (7pm). At 7pm on weekdays, retail and residential uses are at their peak and restaurant demands are near their peak. If an effective parking capacity[4] of 95% is used, then 204 parking spaces would need to be provided to meet this aggregate peak parking demand. The implementation of the TDM measures listed in the introduction of this memo would reduce the number of vehicle trips associated with this project, which in turn would further reduce parking demand; however, to maintain a conservative methodology the impacts of the TDM program were not taken into account as part of this analysis.

[4] Effective capacity is parking occupancy at which a driver can easily find a parking space. If the effective capacity is exceeded drivers will have to circle, search, and wait for vacant spaces, possibly causing congestion and blocking other vehicles.

Figure 7 Weekday Shared Parking Demand – Option 3 Office and Retail Scenario

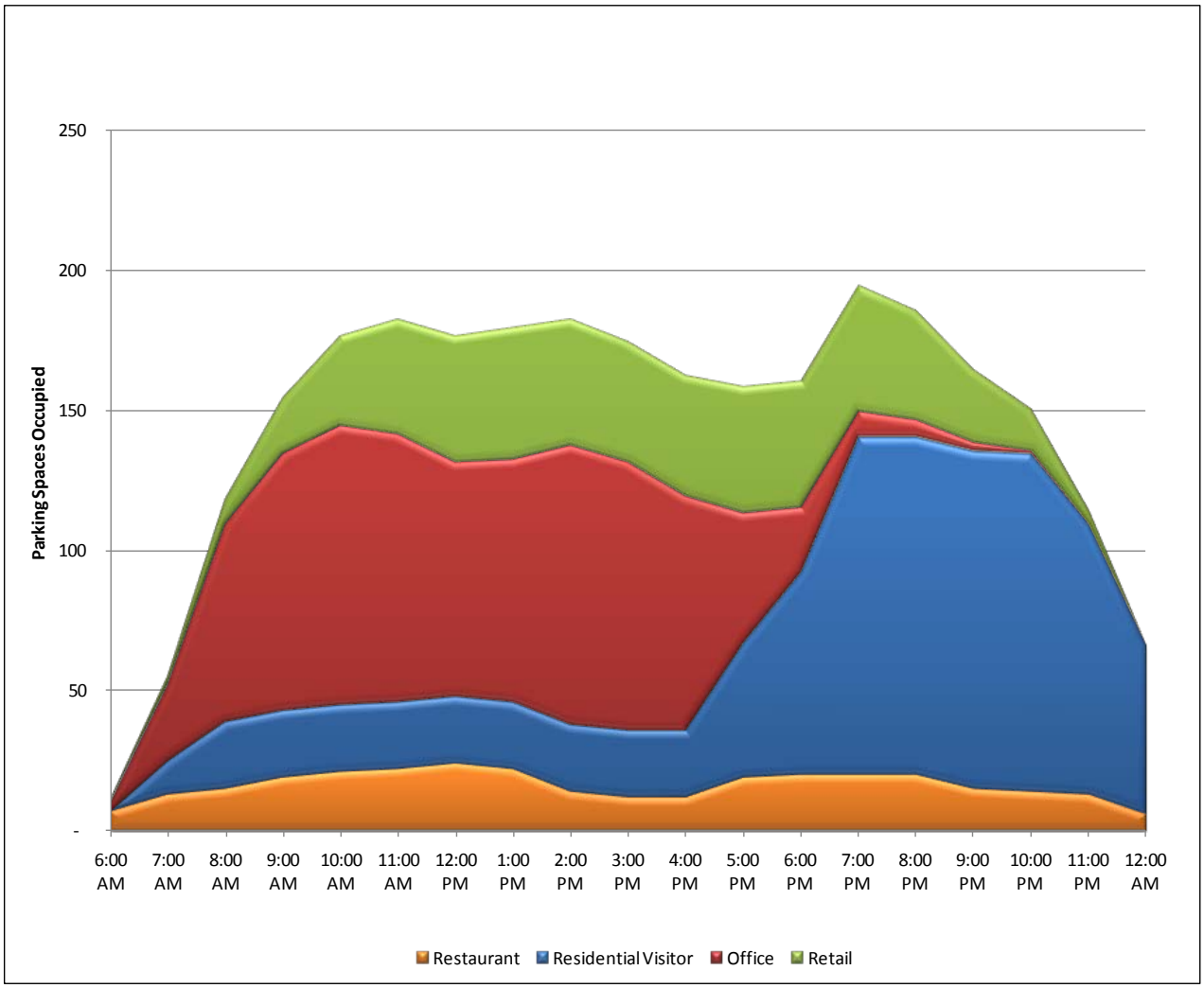
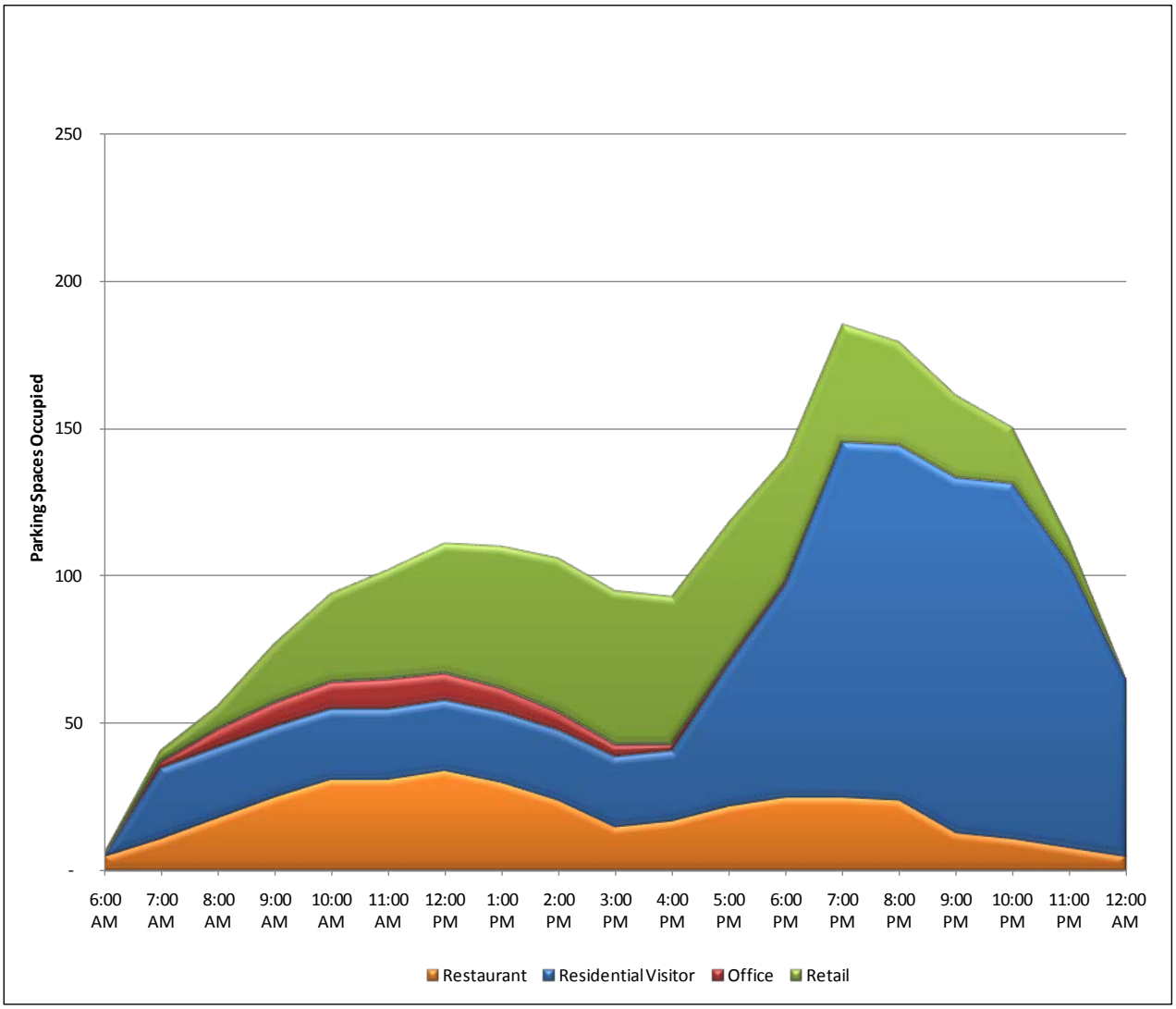


Figure 8 Weekend Shared Parking Demand – Option 3 Office and Retail Scenario



Conclusion

Based on the findings of the shared parking analysis, Station Park Green will have adequate parking to meet the expected peak hour parking demand for all alternatives. Furthermore, the number of parking spaces currently proposed could even be reduced. This development proposes to provide 839 parking spaces designated exclusively for residential units, and another 311 parking spaces to be shared between residential visitor spaces, office, retail, and restaurant uses (Figure 7).

The shared parking analysis for Alternative 1, Maximum Retail Scenario, indicates that at the peak weekday hour of 7pm the peak parking demand is for 241 parking spaces. If this number is adjusted to account for an effective parking capacity of 95% at the peak hour, parking demand increases to 254 parking spaces, which is still 57 fewer parking spaces than is proposed. The applicant may wish to reallocate some of the shared spaces to designated resident spaces in order to have greater flexibility in the mix of residential unit types (e.g. allow for more two and three bedroom units versus studio and one bedroom units).

The shared parking analysis for Alternative 2, Maximum Office Scenario, indicates that at the peak weekday hour of 11am the peak parking demand is for 183 parking spaces. If this number

is adjusted to account for an effective parking capacity of 95% at the peak hour, parking demand increases to 193 parking spaces, which is 118 fewer parking spaces than is proposed. Alternative 2 requires 61 fewer spaces than Alternative 1 because it would permit less restaurant space. Furthermore, although the office use has a greater peak parking ratio than retail, the critical time period is weekday evenings at 7pm when the office parking demand is relatively low but both retail and residential are at or near their peaks.

Alternative 3 requires 194 spaces at the peak weekday hour of 7pm. If this number is adjusted to account for an effective parking capacity of 95% at the peak hour, the parking demand increases to 204 spaces, which is 107 fewer spaces than is proposed. Alternative 3 requires 50 fewer spaces than Alternative 1 but requires 11 more spaces than Alternative 2.

See Figure 9 below for a summary of proposed parking supply and the number of parking spaces needed in the three alternatives.

Figure 9 Number of Parking Spaces Provided

Land Use	Number of Parking Spaces Proposed	Number of Spaces Needed under Option 1 Maximum Retail	Number of Spaces Needed under Option 2 Maximum Office	Number of Spaces Needed under Option 3 Office/Retail
Residential	839	839	839	839
Residential Visitor Parking Office, Retail, Restaurant	311	254	193	204
Total	1,150	1,093	1,032	1,043

Given the findings of the shared parking analysis, the 311 parking spaces proposed as part of the Station Park Green project will be adequate to address the parking demand arising from a range of proposed square footages for the office and retail component of this project. Thus, if the final mix of office and retail square footage falls within the bounds tested as part of this analysis, the project will be adequately parked.

Given that the square footage by land use may continue to shift before the project is constructed, a set of parking ratios by land use has been developed to enable City staff to adjust the number of required shared parking spaces as necessary. The rates shown in Figure 10 below are based on the outcomes of the shared parking analysis and have been calculated to ensure that these ratios will result in the number of parking spaces necessary to meet the peak parking demand for each of the three alternatives as identified in the shared parking analysis. It is critical to note that these ratios are based on the assumption that 599 residential units will be constructed and in turn 127 visitor parking spaces will be provided to serve these units. If the proposed number of residential units is changed these parking ratios will no longer be appropriate.

Figure 10 Parking Ratios by Land Use

Land Use	Parking Ratio per 1,000 sq. ft.	Number of Spaces Provided under Option 1 Maximum Retail	Number of Spaces Provided under Option 2 Maximum Office	Number of Spaces Provided under Option 3 Office/Retail
Residential Visitor	NA	127	127	127
Office	0.32	3	14	12
Retail, Restaurant	2.06	124	52	66
Total		254	193	205

As shown in Figure 10, the total number of parking spaces provided for each alternative based on the parking ratios developed, is equal to the number of parking spaces needed in each alternative (Figure 9).