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## Section I INTRODUCTION

This report presents the results of a transportation impact study that was prepared in support of the Monument Realty plans to develop office, retail, residential and hotel uses on the property located on Squares 700 and 701 in southeast Washington D.C. The development site is located in the land area bounded by M Street SE, N Street SE, South Capitol Street and Cushing Place SE as shown on Figures 1-1 and 1-2.

Monument Realty plans to develop the site in phases. The first phase would include 330 dwelling units, 288,285 S.F. of office, 196 hotel rooms and 60,000 S.F. of ground floor retail supported by 726 below-grade parking spaces. The first phase would be located in Square 701 as shown on Figure 1-2 and would be complete in 2008. This traffic study supports the Phase I development application; however a future 2014 horizon including preliminary plans for Phases 2 & 3 on Square 700 is also analyzed. Phases 2 & 3 would include an additional 881 dwelling units, 448,210 S.F. of office, and 67,856 S.F. of ground floor retail. The conceptual site plan for all phases of development is shown in Figure 1-3.

The site is currently a mix of functioning and non-functioning parcels, many of which are not generating significant peak hour traffic. A WMATA bus facility is located between Half and Van Streets to the south of M Street. This facility will be relocated so that the site can be redeveloped in Phases 2 or 3.

A portal to the Navy Yard Metro station is located on site at the southeastern corner of M and Half Streets providing Green line service. This portal will remain and is to be enhanced to accommodate the additional demand created by the new USDOT headquarters located two blocks to the east and the new Major League Baseball Ballpark being constructed one block to the south. There are also several bus lines providing service along M Street.

All access to the parking garage and service areas for the Phase I component of the project will be located on Cushing Place. Cushing Place will be extended to intersect N Street rather than dead-end within the block as it does today. Phases 2 & 3 will have all access from Van Street. Half Street will be developed as a pedestrian-oriented retail corridor between the Metro station at M Street and the ballpark entrance at N Street. The design of Half Street will include features consistent with an urban pedestrian street such as traffic calming elements, on street parking and special pavement treatments.

The Monument site is located within the Ballpark District immediately adjacent to and north of the new Major League Baseball Ballpark site. The ballpark is scheduled for completion in Spring 2008. The ballpark site is bounded by N Street SE, Potomac Street SE, South Capitol Street and First Street SE.

As part of the work to prepare the area for the new ballpark pedestrian and vehicular traffic, the streets around the ballpark are being improved. Streetscape and road improvements will be implemented for South Capitol, Potomac, First, N and Eye Streets before opening day. In addition, the Frederick Douglass bridge viaduct is being lowered so that at-grade intersections are created on South Capitol Street at Potomac, P and O Streets where they do not exist today.

A Traffic Operations Control Plan (TOCP) is currently being developed by the DC Sports and Entertainment Commission (DC SEC) for the new ballpark. It is expected that during ballpark events Half Street between M and N Streets and N Street between Van Street and First Street will be closed to vehicular traffic. These closures are to better provide for the anticipated pedestrian flows that are forecasted between the ballpark and the Metro and the various parking facilities. Details of the TOCP have not been fully identified at the time of this study therefore the street closures described above were assumed to prepare weekday ballpark afternoon and evening peak hour traffic assignments.

In addition to the ballpark, there are several other significant projects planned or under construction in the vicinity of the site that were considered in the analysis as “pipeline” traffic generators.

Tasks undertaken in this study included the following:

1. Review Monument Realty’s proposed development plans and phasing build out.
2. Field reconnaissance of existing roadway and intersection geometrics, traffic controls, traffic signal phasing/timings, and speed limits.
3. Interaction with DDOT staff regarding the traffic study scope.
4. Coordination with the transportation consultant developing the TOCP for the new Major League Baseball Ballpark.
5. Compilation of existing vehicular and pedestrian traffic at 10 intersections.
6. Analysis of existing levels of service during the commuter AM and PM peak hours was conducted.
7. Other approved and planned developments in the site vicinity were identified and their traffic impacts were included.



8. Planned roadway improvements associated with the new ballpark were reviewed.
9. Background future traffic volumes were forecasted for 2008 and 2014.
10. Background levels of service were calculated at key intersections based on background traffic forecasts, future traffic controls, and future intersection geometrics.
11. The number of AM and PM peak hour trips that would be generated by the proposed project were estimated based on: (1) Institute of Transportation Engineers (ITE) trip generation rates, (2) the proximity of the project to the Navy Yard Metrorail Station, and (3) experience with other projects in Washington, D.C.
12. Total future traffic AM and PM commuter peak hour volumes were forecasted for 2008 and 2014.
13. Total future levels of service for commuter peak hours were calculated at key intersections based on total future traffic forecasts, future traffic controls, and future intersection geometrics for 2008 and 2014.
14. Background future traffic volumes for the Ballpark 4-5 PM weekday afternoon peak hour in 2008 were forecasted.
15. Traffic generated by the Ballpark during the 4-5 PM weekday afternoon peak hour was calculated based on information provided by the DC SEC transportation consultant.
16. The number of site trips that would be generated by the project during the Ballpark 4-5 PM peak hour were estimated.
17. Total future traffic volumes during the Ballpark 4-5 PM weekday afternoon peak hour were forecasted for 2008.
18. Background future traffic volumes for the Ballpark 6-7 PM weekday evening peak hour in 2008 were forecasted.
19. Traffic generated by the Ballpark during the 6-7 PM weekday peak hour was calculated based on information provided by the DC SEC transportation consultant.

20. The number of site trips that would be generated by the project during the Ballpark 6-7 PM weekday evening peak hour were estimated.
21. Total future traffic volumes during the Ballpark 6-7 PM peak hour were forecasted for 2008.

Sources of data for this analysis included traffic counts conducted by Wells & Associates; ITE; the Washington Metropolitan Area Transit Authority (WMATA); DDOT; the DC Sports and Entertainment Commission Ballpark development team; the Anacostia Waterfront Corporation; and the Monument Realty development team.

*The conclusions of this traffic impact study are as follows:*

1. *The proposed Monument Ballpark development on Squares 700 & 701 provides effective vehicular and pedestrian access to the Navy Yard Metrorail Station and the surrounding street network. The immediate proximity to the Metrorail station and the urban street grid helps reduce the demand for private automobile use.*
2. *Heavy commuter traffic along the South Capitol Street corridor contributes to vehicle delays on the main line and at the cross streets in the study area.*
3. *Most of the study intersections currently operate at acceptable levels of service during the AM and PM peak hours with the exception of a few approaches at the South Capitol Street Intersections.*
4. *M Street is the east-west corridor serving the SW and SE DC waterfront areas. Substantial development is planned in the vicinity that will substantially increase future traffic volumes on M Street and the local street network.*
5. *Major roadway improvements planned in conjunction with the construction of the new ballpark will greatly improve vehicular access around the site along with enhance the pedestrian and bicycle environment.*
6. *The pipeline developments in the study area would generate a total of 913 AM peak hour trips and 1,003 PM peak hour trips upon completion in 2008. An additional 2,134 AM peak hour trips and 3,497 PM peak hour trips would be generated by the pipeline developments by 2014.*

7. *A new traffic signal at the intersection of M Street and Half Streets will mitigate the unacceptable LOS that occurs in the 2008 background condition prior to site trips being added to the network.*
8. *A signal at M Street and Half Streets would have great benefit for pedestrians crossing M Street. The location of the Metro portal at the intersection and the location of the ballpark entrance a block to the south will increase pedestrian flows at this intersection. A signal at this location is consistent with the spacing of existing signals along M Street.*
9. *The Pedestrian Volume signal warrant for M Street and Half Street will likely be met in future conditions as a result of planned development even if the Monument Phase 1 and Phase 2 & 3 sites are not developed. There is also the potential for the intersection to satisfy the Four-Hour Vehicular Volume warrant in 2014 conditions.*
10. *The Monument Ballpark – Phase 1 project in Square 701, including 330 condominium apartments, a 196 room hotel, 288,285 S.F. of office and 60,000 S.F. of retail, will generate approximately 499 AM peak hour vehicle-trips and 720 PM peak hour vehicle-trips at full build out and occupancy in 2008.*
11. *The traffic generated by the Phase 1 site trips in 2008 will not degrade the study intersections beyond acceptable LOS with the exception of Cushing Place at M Street where the minor Cushing Place approaches increase in delay as a result of site traffic. The level of delay is generally considered acceptable for an urban, minor street approach.*
12. *The Monument Ballpark – Phase 2 & 3 project in Square 700, including 881 condominium apartments, 448,210 S.F. of office and 67,856 S.F. of retail, will generate approximately 691 AM peak hour vehicle-trips and 947 PM peak hour vehicle-trips at full build out and occupancy in 2014.*
13. *The traffic generated by the Phase 2 & 3 site trips in 2014 will cause some additional delay at the South Capitol Street intersections. However, because the delay increase changes some marginal LOS "D's" to "E's," there will not be a noticeable operational difference.*
14. *The Phase 2 & 3 site trips will increase delay at the intersections of Cushing Place and Van Street at M and N Streets, particularly during the PM peak hour. The delay will affect outbound site trips and not thru traffic on M Street or N Street.*

15. *Cushing Place and Van Street facilitate site access and both streets intersect M Street with unsignalized stop control. These unsignalized approaches will experience long delays during peak periods, particularly for outbound site traffic wanting to turn left (westbound) onto M Street. At times the delay will cause familiar motorists to seek alternate routes. A new signal at M Street and Half Street would help create acceptable gaps in M Street traffic thereby benefiting these unsignalized intersections.*
16. *The Monument Ballpark – Phase 1 would provide approximately 550 parking spaces. This is more than the minimum requirement of 395 spaces required by DC regulations. The Phase 2 & 3 program would require a minimum of 629 spaces based on the preliminary program. A parking program has not been determined for Phase 2 & 3.*
17. *The Monument Ballpark – Phase 1 would provide sufficient loading dock accommodations. The loading needs for Phases 2 & 3 will be determined when the building program is further refined.*
18. *It is estimated that 4,600-4,700 cars will park within the vicinity of the ballpark for a sellout weekday game.*
19. *The weekday Ballpark traffic will peak from 4-5 PM for the outbound flow of a 1:05 PM game or peak during 6-7 PM for the inbound flow of a 7:05 PM game. These peak ballpark flows do not directly overlap the peak commuter hour of 5-6 PM.*
20. *Approximately 70% of ballpark patrons will depart in the 4-5 PM hour after a game start time of 1:05 PM and 60% of the patrons will arrive in the 6-7 PM hour before the game start time of 7:05 PM.*
21. *The Traffic Operations Control Plan for the ballpark is currently in development. The TCOP will need to address the dependence of site access on the operation of the M Street and Cushing Place intersection when N and Half Streets are closed to vehicular traffic. There may be an opportunity to maintain partial vehicular circulation on N Street between Cushing Place and First Street to aid site access.*

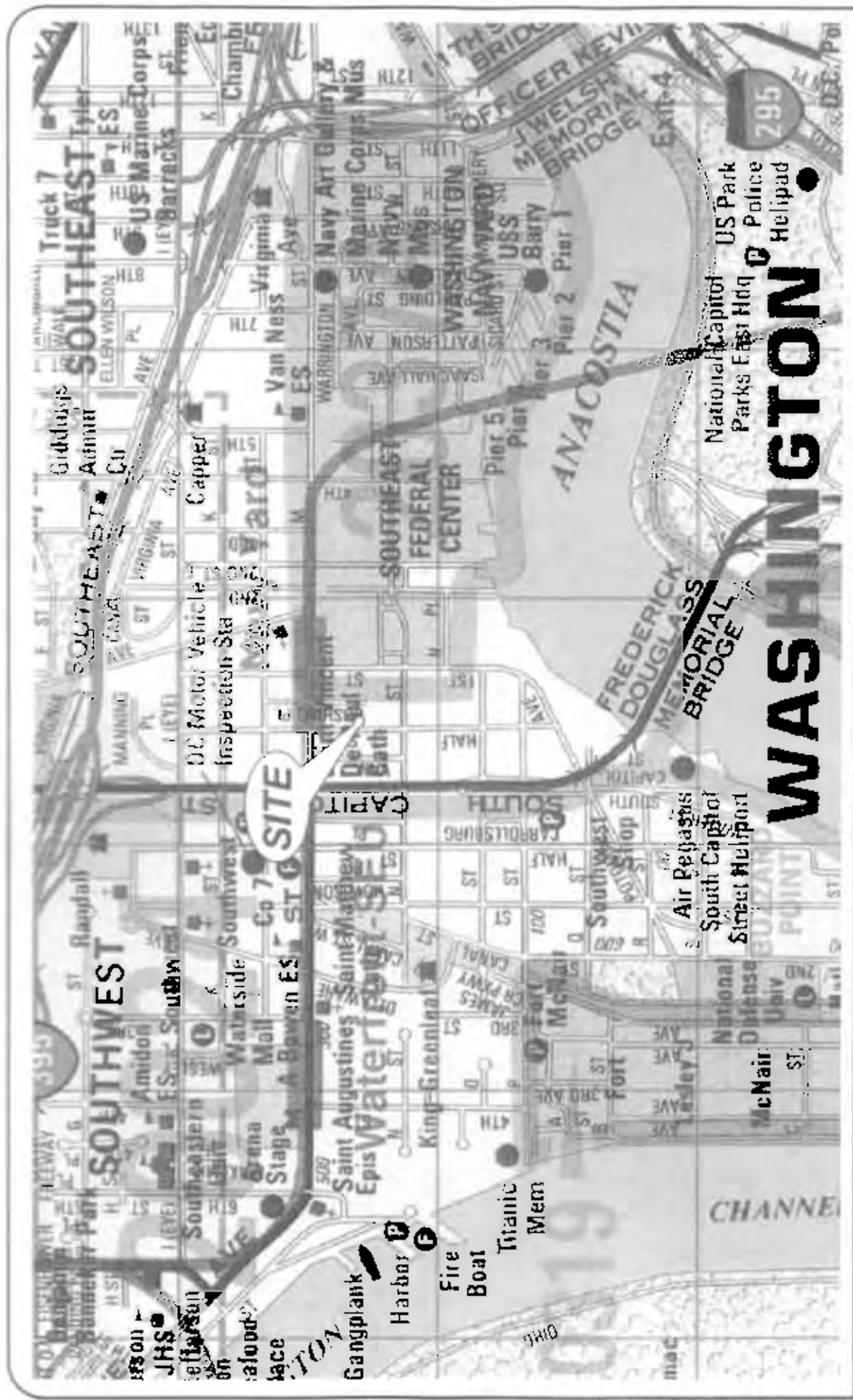


Figure 1-1  
Site Location Map



a) Figure 1-2  
Aerial Image

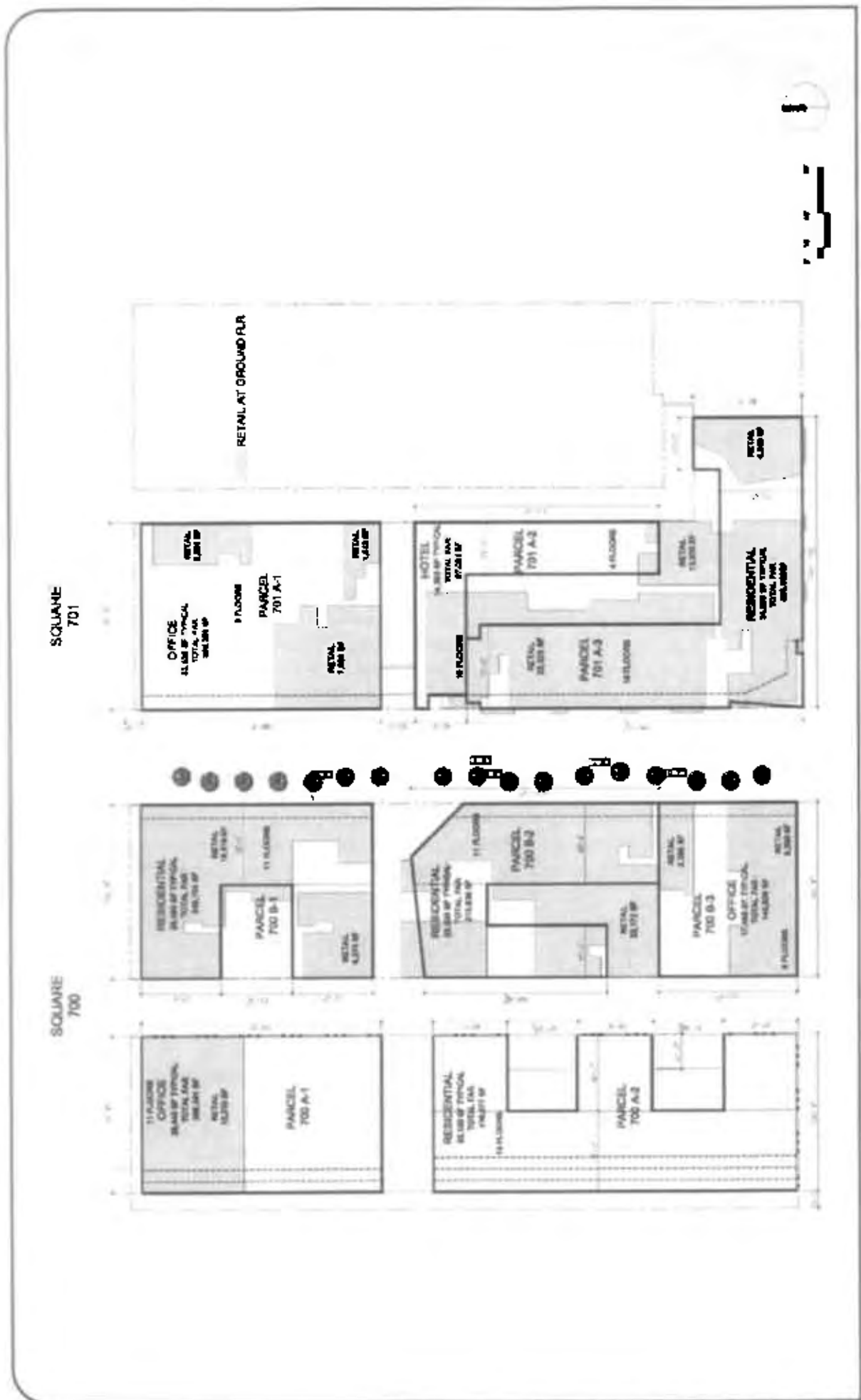


Figure 1-3  
Conceptual Site Plan - Phase 1, 2 & 3

## Section 2 BACKGROUND DATA

### Study Scope

The traffic study scope was discussed with DDOT staff during a scoping meeting on September 21, 2006 and captured in a scoping letter dated September 27, 2006. The study area was selected based on the intersections that would potentially be most affected by the proposed development. This study includes the following intersections:

1. South Capitol Street/Eye Street
2. South Capitol Street/M Street (local lanes only)
3. M Street SE/Van Street SE
4. M Street SE/Half Street SE
5. M Street SE/Cushing Place SE
6. M Street SE/I<sup>st</sup> Street SE
7. South Capitol Street/N Street
8. N Street SE/ Van Street SE
9. N Street SE/Half Street SE
10. N Street SE/Cushing Place SE (future intersection)
11. N Street SE/I<sup>st</sup> Street SE

This study evaluates the transportation impacts of the following approved and planned pipeline developments in the vicinity of the site for two future horizons; 2008 and 2014. The development programs associated with each pipeline project were determined in consultation with DDOT's Anacostia Waterfront Initiative Coordinator and they include the following:

#### For 2008

1. MLB Ballpark (baseball stadium)
2. 20 M Street (office)
3. Square 0699N Phase I – I<sup>st</sup> & L Street SE (residential)
4. Jefferson at 70 Eye Street – Phase I (residential)
5. 100 M Street SE (office and retail)
6. USDOT Headquarters (office and retail)

#### For 2014

1. Cohen Site (residential, retail and office)
2. Ballpark District Waterfront Development (residential and retail)
3. Jefferson at 70 Eye Street – Phase II (residential)
4. Federal Gateway II (office and retail)
5. Ballpark District On Site Development (residential, hotel and retail)



6. SE Federal Center – Phase IA & IB (residential, office and retail)

**Public Road Network**

Regional access to the Monument Realty site is provided by I-295, I-395, South Capitol Street, and M Street SW/SE. Local access is provided from Cushing Place and Van Street via M or N Streets SE. Existing intersection lane use and traffic control at key intersections in the site vicinity are shown on Figure 2-1.

**Planned Improvements**

Numerous street improvements in the Ballpark District are on a fast track to be completed by spring 2008 prior to opening day of the ballpark and prior to opening of Monument Realty's Phase I development. The improvements are described below as per the October 5, 2006, DDOT Streetscape Coordination meeting.

South Capitol Street

Improvements to South Capitol Street include removal of the elevated viaduct north of the Frederick Douglass Memorial Bridge such that South Capitol Street intersects Potomac Avenue, P, O and N Streets at new at-grade, signalized intersections. The proposed cross-section of South Capitol Street within the 130' right-of-way from Potomac Avenue to N Street will include two 11' lanes and a 13' curb lane in both directions. The north and south traffic will be divided by an 18' median. Left turn lanes will not be provided and left turns will be restricted during peak hours. On street parking may be permitted during off-peak hours, but will be restricted during peak commuter peak periods.

Long-term improvements for South Capitol Street also include a new traffic oval at the Potomac Avenue intersection; however, this planned improvement will occur beyond the timeline contained in this traffic study. Similarly, removal of the grade-separation at South Capitol and M Street has been proposed as a long-term improvement. No firm plans for such an improvement currently exist and a timeline is unknown therefore it was not considered in the analysis.

Potomac Avenue SE

Potomac Avenue from South Capitol Street to First Street SE will consist of a 70' pavement section from curb to curb within a 120' right-of-way. Two 11' traffic lanes, a 5' bike lane and a 7' curb parking lane will be provided in both directions of travel. The existing pavement width is 40'

### First Street SE

The reconstruction of First Street SE will include the section from Potomac Avenue to Eye Street SE. First Street is essentially a continuation of the 70' Potomac Avenue pavement section. It will include two 11' traffic lanes, a 5' bike lane and a 7' curb parking lane in both north and southbound directions. The total right-of-way is 110' offering slightly less planting area and sidewalk than on Potomac Avenue. The existing pavement width of First Street is 45'. New traffic signals were assumed to be installed at the First Street intersections with N Street and Potomac Avenue.

### N Street SE

N Street will be reconstructed within a 90' right-of-way between South Capitol Street and First Street. The pavement section will include a 15' travel lane and an 8' parking lane in each direction with a total curb to curb width of 48'. On street parking will be restricted during peak hours if needed and was assumed in the analysis. The existing street section is 30' wide.

### Eye Street SE

The existing 90' right-of-way on Eye Street between South Capitol Street and New Jersey Avenue will remain but with a wider pavement section of 60'. It will include two 11' traffic lanes and a 7' curb parking lane in both east and westbound directions.

Future lane use and traffic controls for the 2008 and 2014 analysis horizons consistent with the improvements described above are shown on Figure 2-2.

### **Existing Traffic Counts**

Existing AM and PM peak period vehicular and pedestrian traffic counts were conducted on Tuesday, September 26, 2006, from 7:00 AM until 10:00 AM and from 4:00 PM until 7:00 PM by Wells & Associates at nine (9) of the study intersections listed above. The intersection of South Capitol and Eye Street was also counted from 7:00 AM until 10:00 AM and from 4:00 PM until 7:00 PM by Wells & Associates but on Thursday, October 6, 2005 during a prior study in the area.

The vehicular traffic counts are presented on Figure 2-3; the pedestrian traffic counts are presented on Figure 2-4. These counts are presented in Appendix A. The resulting AM peak hour is 7:30-8:30 AM and the resulting PM peak hour is 5:00-6:00 PM.

Figure 2-3 indicates that South Capitol Street south of N Street coming to/from the Frederick Douglass Memorial Bridge carries 4,935 AM peak hour vehicle-trips and 4,313 PM peak hour vehicle-trips. Approximately 65 percent of all AM peak hour trips travel in the northbound

direction toward downtown Washington; 35 percent travel in the southbound direction away from the DC urban core. As would be expected of a commuter corridor the pattern is opposite during the PM peak; approximately 64 percent of all PM peak hour trips travel in the southbound direction and 36 percent travel in the northbound direction.

M Street east of South Capitol Street carries 1,200 AM peak hour vehicle-trips and 1,659 PM peak hour vehicle-trips. Approximately 43 percent of all AM peak hour trips travel in the westbound direction and 57 percent travel east. Approximately 35 percent of all PM peak hour trips travel in the westbound direction and 65 percent travel in the eastbound direction.

First Street south of M Street presently carries 381 AM peak hour vehicle-trips and 295 PM peak hour vehicle-trips. Based on the traffic counts and field observations it is estimated that approximately 5% of the traffic is related to ballpark construction.

N Street east of South Capitol Street currently carries 259 AM peak hour vehicle-trips and 87 PM peak hour vehicle-trips. Based on the traffic counts and field observations it is estimated that approximately 5% of the traffic is related to ballpark construction.

Half Street south of M Street currently carries 66 AM peak hour vehicle-trips and 55 PM peak hour vehicle-trips. Based on the traffic counts and field observations it is estimated that approximately 26% of the AM traffic and 11% of the PM traffic is related to the existing WMATA bus maintenance facility and the few other remaining on site uses.

The highest numbers of pedestrians were observed at the M Street Cushing Place intersection where 150 pedestrians crossed during the AM peak hour and 88 pedestrians crossed during the PM peak hour. Overall the pedestrian patterns were consistent with what would be expected given the location of the Navy Yard Metro portals along M Street and the locations of existing development.

### **Existing Levels of Service**

Existing peak hour levels of service were estimated based on: the existing lane usage and traffic control shown on Figure 2-1; the existing vehicular and pedestrian traffic counts shown on Figures 2-3 and 2-4, respectively; existing traffic signal phasing/timings; and the Synchro intersection capacity analysis software. The results are presented in Appendix B and summarized in Table 2-1.

South Capitol Street carries heavy amounts of regional traffic during the commuter peak hours; the peak flows are northbound (inbound) in the AM and southbound (outbound) in the PM. Vehicle queues are experienced in the peak directions along South Capitol Street, however, these queues are largely isolated to the South Capitol Street mainline. This analysis considers

the operation of the South Capitol local ramps at the grade-separated M Street intersection. It also considers the at-grade South Capitol and Eye Street intersection.

As shown in Table 2-1, the eastbound approach of Eye Street at South Capitol Street currently operates at LOS "F" during the PM peak hour. The eastbound approach of M Street at the South Capitol southbound ramp operates at LOS "E" during the PM peak hour. The northbound approach of the South Capitol Street northbound ramp at M Street currently operates at LOS "F" during the AM peak hour. These delays are attributable to the congestion on South Capitol Street caused by commuter traffic flows.

The overall LOS for the M Street and South Capitol northbound ramp intersection is an "F" during the AM peak hour. All other study intersections operate at overall LOS "D" or better during the AM and PM peak hours. Many of the intersections and their approaches operate at a good LOS of "A" or "B."

### **Public Transportation Facilities and Services**

The Navy Yard Metro station is located within the Square 701 – Phase I development site at the corner of M Street and Half Street. The Navy Yard station is served by the Metrorail Green line. A transfer to the Orange, Yellow and Blue lines is possible two stops away at the L'Enfant Plaza station. Virginia Rail Express (VRE) commuter service is also located at L'Enfant Plaza. The Red line Metrorail transfer is four stops away at the Gallery Place-Chinatown station. Maryland Rail Commuter (MARC) service is located at Union Station which is accessed via the Red line or the N22 Metrobus running between the Navy Yard and Union Station via the Eastern Market Metro station (Blue line). The capacity of the Navy Yard Metro station will be upgraded to better accommodate the USDOT headquarters traffic and the nearly 16,000 patrons that are anticipated to use the station during a sell out at the new ballpark.

In addition to the N22 Metrobus, the Monument Ballpark project is served by the V7, V8, V9, A42, A46, A48, P1 and P2 lines which run along M Street. Other bus lines located within several blocks of the site include the P6, V5, 90, 92, 93, 70 and 71.

New on street bike lanes will be included in the reconstruction of Potomac Avenue and First Street. These new lanes will connect to the off-street trail that crosses the Frederick Douglass Bridge to points east of the Anacostia River.

### **Parking Requirements**

The District of Columbia Municipal Regulations were reviewed to determine the number of parking spaces required for the Monument Ballpark project. Per the DC regulations the following parking requirements apply in a CG/CR zoning district:

Office – In excess of 2,000 SF, 1 for each additional 1,800 SF of gross floor area

Hotel – 1 for each 4 rooms usable for sleeping plus 1 for each 300 SF of floor area in either the largest function room or the largest exhibit space, whichever is greater

Retail – In excess of 3,000 SF, 1 for each additional 750 SF of gross floor area

Residential – 1 for each 3 dwellings

The Phase 1 development plan includes 330 residential condominium apartments, 288,285 S.F. of office, a 196 room hotel and 60,000 S.F. of retail. Based on the requirements given above, the project would require 395 total spaces. The proposed parking garage for Phase 1 will have approximately 550 spaces therefore exceeding the minimum requirement.

The Phase 2 and 3 development plan is very preliminary and is subject to change. The preliminary program includes an additional 881 residential condominium apartments, 448,210 S.F. of office, and 67,856 S.F. of retail. The minimum parking requirement for this program per code is 629 spaces. The parking program for these later phases of development has not been determined at this time.

### **Loading Requirements**

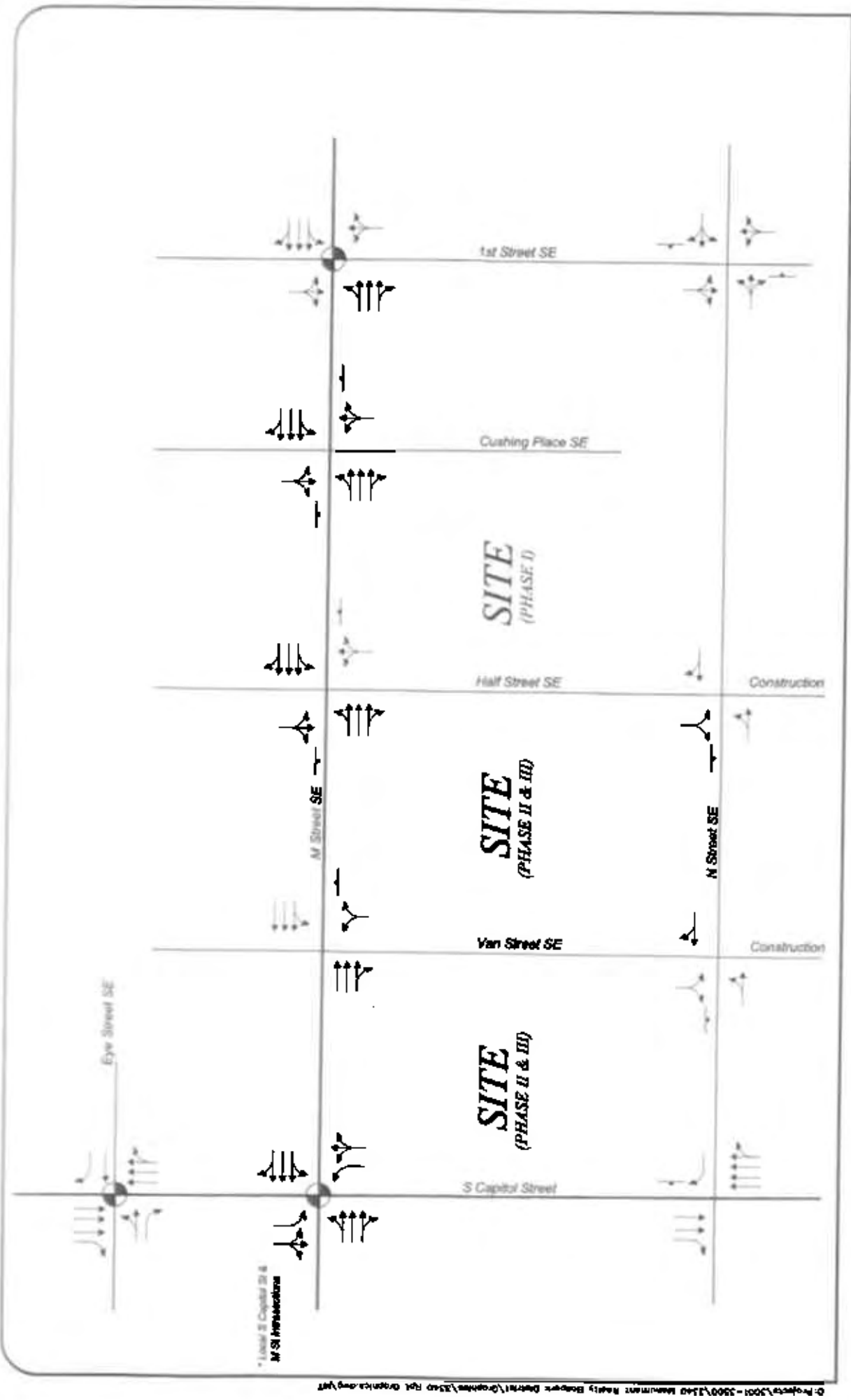
The District of Columbia Municipal Regulations were reviewed to determine the number and size of off-street loading berths required for the Monument Ballpark Phase 1 project.

Per code, an office project in excess of 200,000 S.F. would require three (3) 30 feet deep loading berths with 100 S.F. platforms and one (1) 20 feet deep service berth. The residential component would require one (1) 55 feet deep loading berth with a 200-foot platform, plus a 20 feet deep service berth. A hotel would require one (1) 30 feet deep berth with a 100 S.F. platform plus a 20 feet deep service berth. Retail would require one (1) 30 feet deep berth with a 100 S.F. platform and (1) 55 feet deep berth with a 200 S.F. platform plus a 20 feet deep service berth.

The Phase 1 program will provide a total of one (1) 65 feet deep loading berth, six (6) 30 feet deep berths and two (2) 20 feet service areas. Relief is sought to reduce one berth under the office building to 30 feet deep instead of 55 feet. Additionally, relief is sought for two (2) 20 feet service areas. The requirements given above are for individual uses and do not consider the mixed-use nature of the project or that the berths will be shared. The truck accommodations are anticipated to adequately meet the needs of the mixed-use Phase 1 program. There may be times when the service facilities will need to be managed to make sure all tenants are accommodated.

All service access for Phase I will be from Cushing Place which is 30 feet in width. The truck maneuvering was reviewed to determine that trucks and service vehicles utilizing the berths would have the ability to maneuver acceptably. The portion of the loading dock containing the 65 foot berth is angled to ease maneuvering. Trucks using the angled berth will need to enter Cushing Place from M Street and exit out to N Street. Trucks larger than 30' cannot be accommodated during ballpark event street closures of N Street. The event street closures are expected to occur weekday afternoons, weekday evenings and weekends when service vehicle deliveries do not occur or are infrequent.

The Phase 2 & 3 program has not been fully determined and therefore the loading requirements were not reviewed.



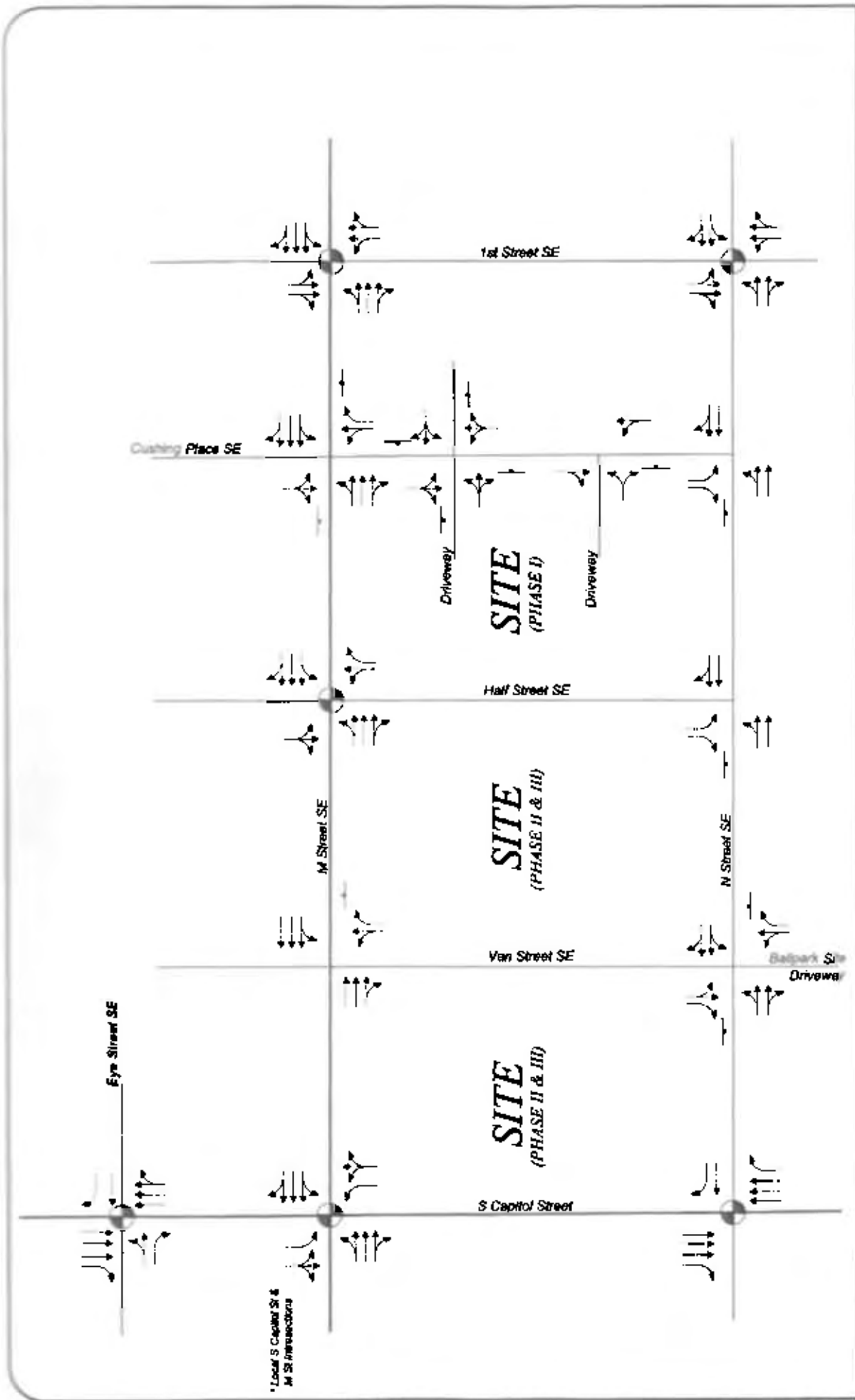
\* Local 28 Capitol SE & M St Intersection

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Figure 2-1  
Existing Lane Use and Traffic Controls



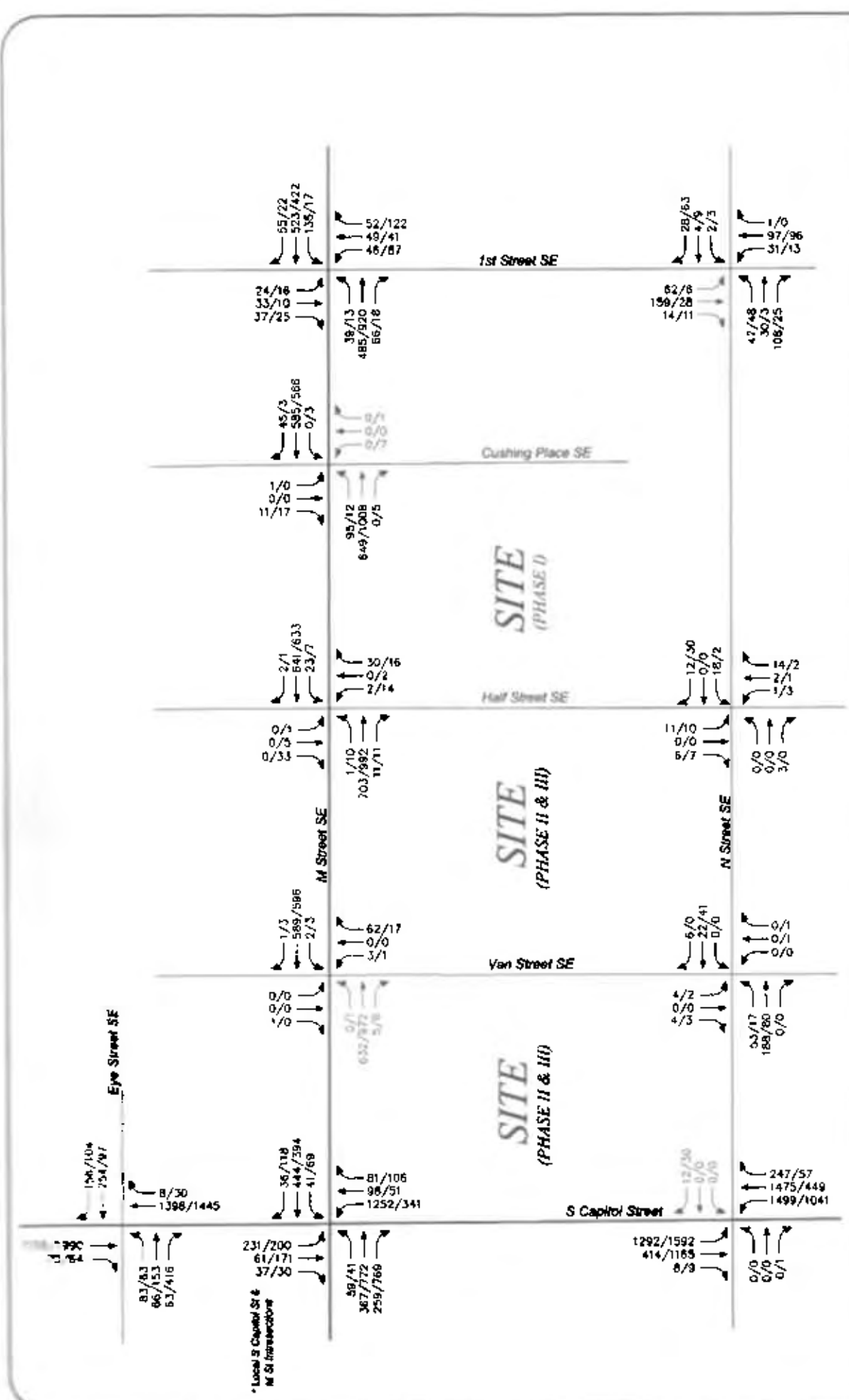
Monument Ballpark - Square 700 & 701  
Washington, D.C.



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Figure 2-2  
 Future Lane Use and Traffic Controls 2008 & 2014

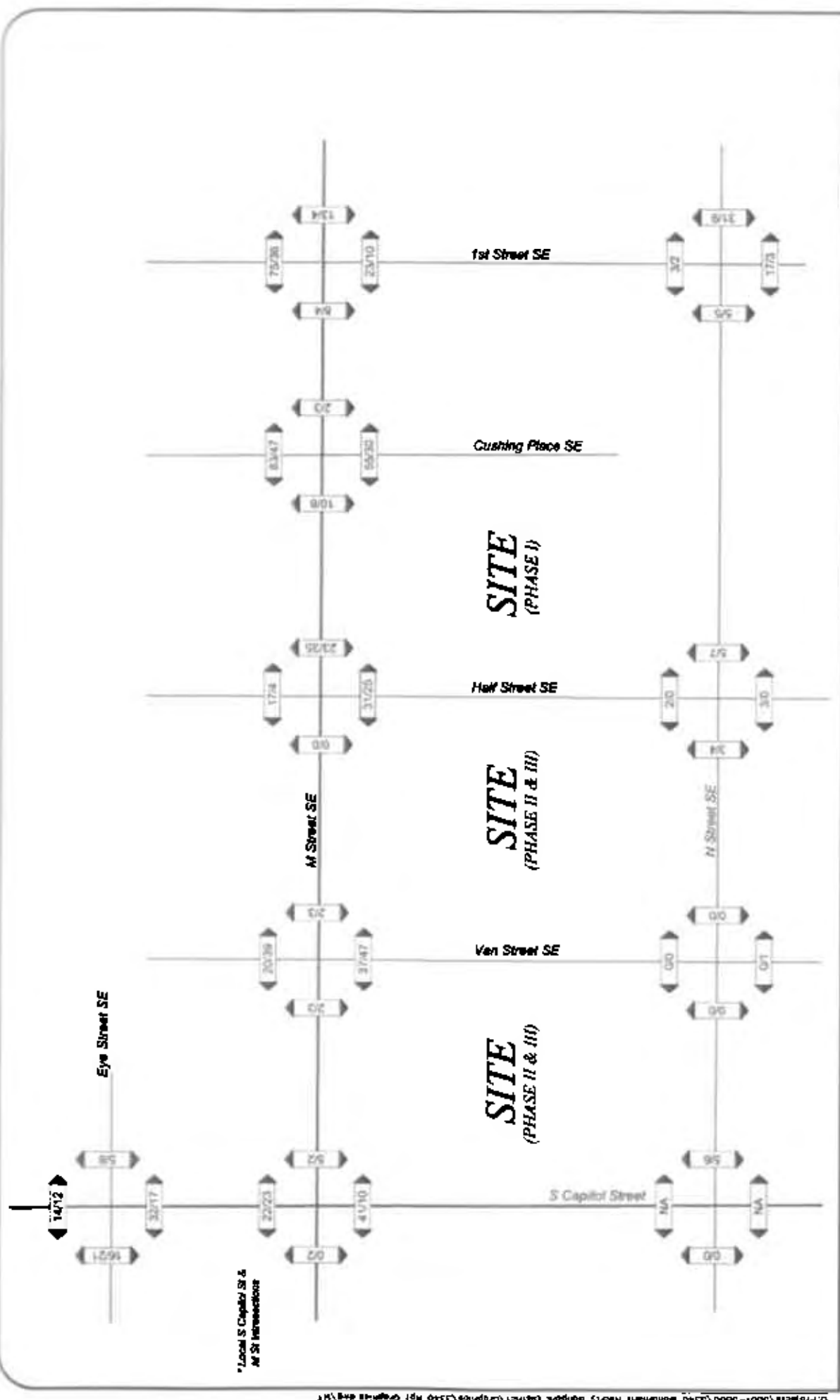




AS PER PLAN  
9/10/08

North

19 **Figure 2-3**  
**Existing Peak Hour Vehicular Traffic Counts**



20  
**Figure 2-4**  
**Existing Peak Hour Pedestrian Traffic Counts**



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Table 2-1  
 Monument Ballpark - Square 700 & 701  
 Existing Intersection Levels of Service <sup>1,2,3</sup>

Intersection	Control	Approach	Existing, 2006	
			AM	PM
1. Eye Street & S Capitol Street	Signalized	EB	D (54.0)	F (104.4)
		WB	D (42.7)	D (38.4)
		NB	B (11.7)	A (9.9)
		SB	B (10.2)	B (12.0)
		Overall	B (17.4)	D (27.4)
2. M Street & Local S Capitol SB Ramp	Signalized	EB	D (26.7)	E (68.9)
		WB	A (0.5)	A (1.2)
		SB	C (12.4)	C (14.5)
		Overall	B (13.4)	D (45.5)
M Street & Local S Capitol NB Ramp	Signalized	EB	A (1.3)	A (2.6)
		WB	C (34.5)	C (32.7)
		NB	E (140.5)	C (21.4)
		Overall	F (84.4)	B (14.9)
3. M Street SE & Van Street	Unsignalized	WB/LT	A (0.0)	A (0.1)
		NB/R	A (9.7)	B (10.1)
4. M Street SE & Half Street	Unsignalized	EB	A (0.0)	A (0.1)
		WB	A (0.4)	A (0.1)
		NB	B (10.6)	D (31.8)
		SB	A (0.0)	C (48.1)
5. M Street SE & Cushing Place	Unsignalized	EB	A (1.6)	A (0.1)
		WB	A (0.0)	A (0.1)
		NB	A (0.0)	D (28.3)
		SB	B (12.2)	A (9.3)
6. M Street SE & 1st Street SE	Signalized	EB	A (5.1)	A (4.9)
		WB	A (7.4)	A (7.5)
		NB	C (34.7)	D (41.7)
		SB	C (33.4)	C (28.2)
		Overall	B (18.2)	B (11.5)
7. N Street SE & S Capitol Street	Unsignalized	WB/R	C (19.3)	B (10.2)
8. N Street SE & Van Street	Unsignalized	EB	A (1.9)	A (1.4)
		SB	A (9.6)	A (8.9)
9. N Street SE & Half Street	Unsignalized	EB	A (1.2)	A (1.7)
		SB	A (9.6)	A (9.0)
10. N Street SE & 1st Street SE	Unsignalized	EB	B (12.0)	B (10.5)
		WB	B (10.1)	A (9.4)
		NB	A (1.1)	A (0.9)
		SB	A (2.3)	A (1.0)

Notes:

<sup>1</sup> Based on an Synchro version 6

<sup>2</sup> Numbers in brackets, [ ], represent control delay in seconds per vehicle for unsignalized intersections.

<sup>3</sup> Numbers in parenthesis, ( ), represent control delay in seconds per vehicle for signalized intersections.

### **Section 3**

## **PHASE I (2008) – COMMUTER AM & PM PEAK HOUR ANALYSIS**

### **Other Development Trip Generation**

The number of peak hour trips that will be generated by the pipeline projects in 2008 were generated based on ITE trip rates and WMATA mode splits percentages. As shown in Table 3-1, it is estimated that these projects will generate a total of 913 AM peak hour trips and 1,003 PM peak hour trips, upon completion and full occupancy.

This analysis does not include trips generated by a ballpark event. Weekday PM ballpark peak hour conditions will be analyzed in Section 5.

### **Other Development Project Traffic Assignments**

The trips shown in Table 3-1 were assigned to the public road network based on the information obtained from their respective traffic studies and traffic pattern changes expected with roadway improvements. A summation of the pipeline development traffic is shown on Figure 3-1.

### **Background Traffic Growth**

Annual background traffic growth was estimated at 2 percent per year compounded for two (2) years for project buildout in 2008 as agreed to during the DDOT scoping meeting. This growth rate was applied to all the movements at all intersections. The background traffic growth is shown on Figure 3-2.

### **Background Traffic Forecasts**

Background peak hour traffic forecasts, without the Monument Ballpark – Phase I project, were estimated based on existing traffic counts, traffic generated by the pipeline projects, historic background traffic growth and planned roadway improvements. The resulting 2008 background traffic forecasts are shown on Figure 3-3.

### **Background Future Levels of Service**

Future peak hour levels of service, without the Monument Ballpark – Phase I project, were estimated based on: the future lane usage and traffic control shown on Figure 2-2; the 2008 background traffic forecasts shown on Figure 3-3; and the Synchro intersection capacity analysis software. Planned roadway improvements for the Ballpark District described in the previous

section were assumed and are reflected in Figure 2-2. The results are presented in Appendix C, and are summarized in Table 3-3.

Table 3-3 indicates that the significant background traffic will increase delays at some critical locations. While the overall LOS remains relatively unchanged at the Eye Street and South Capitol Street intersection, the eastbound approach during the AM peak hour goes from an LOS "D" to LOS "E" when compared to existing conditions.

Delays increase at the M Street and South Capitol southbound ramp such that the overall level of service during the PM peak hour changes from an LOS "D" to LOS "E."

The northbound approach to the unsignalized intersection of M Street and Half Street changes from an LOS "D" to LOS "F" during the PM peak hour as a result of additional traffic growth on M Street. A possible mitigation measure at this location would be the installation of a traffic signal therefore this condition was analyzed. Based on the forecasted traffic volumes it is not likely that a signal would be warranted at this location.

The westbound approach of N Street at South Capitol Street changes from a LOS "B" to LOS "E" during the PM peak hour as a result of additional traffic and a change to the operation of the intersection. The planned roadway improvements include a new signal at this location and the addition of westbound left and through movements that are not possible presently.

The remaining intersections either operate with acceptable LOS or are largely unchanged from existing conditions operation.

### **Site Trip Generation Analysis**

The numbers of trips that will be generated by the Monument Ballpark – Phase I when complete in 2008 were forecasted based on: (1) ITE trip generation rates, (2) the proximity of the project to the Navy Yard Metrorail station, and (3) experience with other comparable projects in Washington, D.C. The development plan includes 330 residential condominium apartments, 288,285 S.F. of office, a 196 room hotel, and 60,000 S.F. of retail. The trip generation calculations are shown in Table 3-2.

Table 3-2 shows that the project would generate 499 (346 in and 153 out) AM peak hour trips, and 720 (285 in and 435 out) PM peak hour trips. These estimates assume that approximately 54 percent of all residents, 27 percent of the hotel guests, 35 percent of the office workers and 10 percent of retail patrons would use Metro or some other non-auto mode during peak hours.

### **Site Traffic Assignments**

The site-generated traffic volumes were assigned to the public road network based on previously-approved traffic impact studies, existing traffic counts, and knowledge of future roadway improvements. The resulting site traffic assignments are shown on Figure 3-4.

The existing WMATA bus facility was assumed to remain for the 2008 analysis. In addition, the other existing site uses were observed to not generate significant peak period traffic. Although these existing uses will be removed with the redevelopment of the site, no adjustment to existing traffic volumes was performed to account for their removal. Therefore the traffic volumes represent a conservatively higher estimate of future conditions than what may be ultimately realized.

### **Total Future Traffic Forecasts**

The site traffic assignments in Figure 3-4 were added to the future background traffic volumes shown on Figure 3-3 to yield the total future traffic forecasts shown on Figure 3-5.

### **Total Future Levels of Service**

Future peak hour levels of service, with the proposed Monument Ballpark – Phase I project, were estimated based on: the future lane usage and traffic control shown on Figure 2-2; the 2008 total future traffic forecasts shown on Figure 3-5; and the Synchro intersection capacity analysis software. The results are presented in Appendix D, and are summarized in Table 3-3.

With the addition of Phase I site trips to the network there are some minor fluctuations of intersection delays, however, the changes are generally negligible resulting in no changes to LOS when compared to background conditions. There are a few exceptions discussed below.

If the intersection of Half Street at M Street remains unsignalized, the northbound approach would continue to operate at LOS "F" as in the background condition. However, the addition of site trips would result in significant additional delay. The delay would likely cause familiar motorists to seek other routes. If a signal is installed the intersection would operate at LOS "A" during both the AM and PM peak hours.

The southbound approach of Cushing Place at M Street operates at LOS "F" during the AM peak hour as compared to LOS "B" in the background condition. This delay is attributable to the additional site turning movement traffic at this intersection making it difficult for the southbound traffic to find acceptable traffic gaps in the M Street flow. While the LOS is failing, the number of vehicles using this approach is relatively small and the delay of 69.7 seconds is not uncommon for a minor street approach.

Table 3-1

Monument Ballpark - Square 700 & 701  
2008 Pipeline Project Trip Generation <sup>1,2</sup>

Background Development	Land Use	Land Use Code	Size	Units	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
<b>20 M Street SE</b>										
	Office	710	180,633	S.F.	18	88	106	66	33	99
<b>Square 0699N Phase I (1st &amp; L Street SE)</b>										
	Residential	230	250	D.U.	7	33	40	31	16	47
<b>Jefferson at 70 Eye Street (Phase I)</b>										
	Residential	220	449	D.U.	17	83	100	80	39	119
<b>100 M Street SE</b>										
	Office	710	225,000	S.F.	111	15	126	20	97	117
	Retail	820	15,000	S.F.	18	11	29	49	53	102
					129	26	155	69	150	219
<b>US Department of Transportation Headquarters <sup>3</sup></b>										
	Office	710	5,500	Employees	462	35	497	47	422	469
	Retail	820	13,500	S.F.	9	6	15	24	26	50
					471	41	512	71	448	519
<b>Total Background Development</b>					<b>642</b>	<b>271</b>	<b>913</b>	<b>317</b>	<b>686</b>	<b>1,003</b>

Notes: (1) Based on Trip Generation, 7th Edition, Institute of Transportation Engineers.

(2) Non-auto mode splits were adapted from the U.S. Census 2000 Data Summary File 3

	20 M St	Sq 0699N	Jefferson	100 M St Off	100 M St Ret
Non-auto mode split:	0%	0%	0%	0%	0%
Average vehicle occupancy (persons per vehicle)	1.15	1.15	1.15	1.15	1.15
	20 M St	Sq 0699N	Jefferson	100 M St Off	100 M St Ret
Non-auto mode split:	60%	58%	49%	60%	36%
Average vehicle occupancy (persons per vehicle)	1.30	1.30	1.30	1.30	1.30

(3) US DOT Trip Generation was taken from "United States Department of Transportation Traffic Impact Statement", Gorove-Slade Associates, March 14, 2003

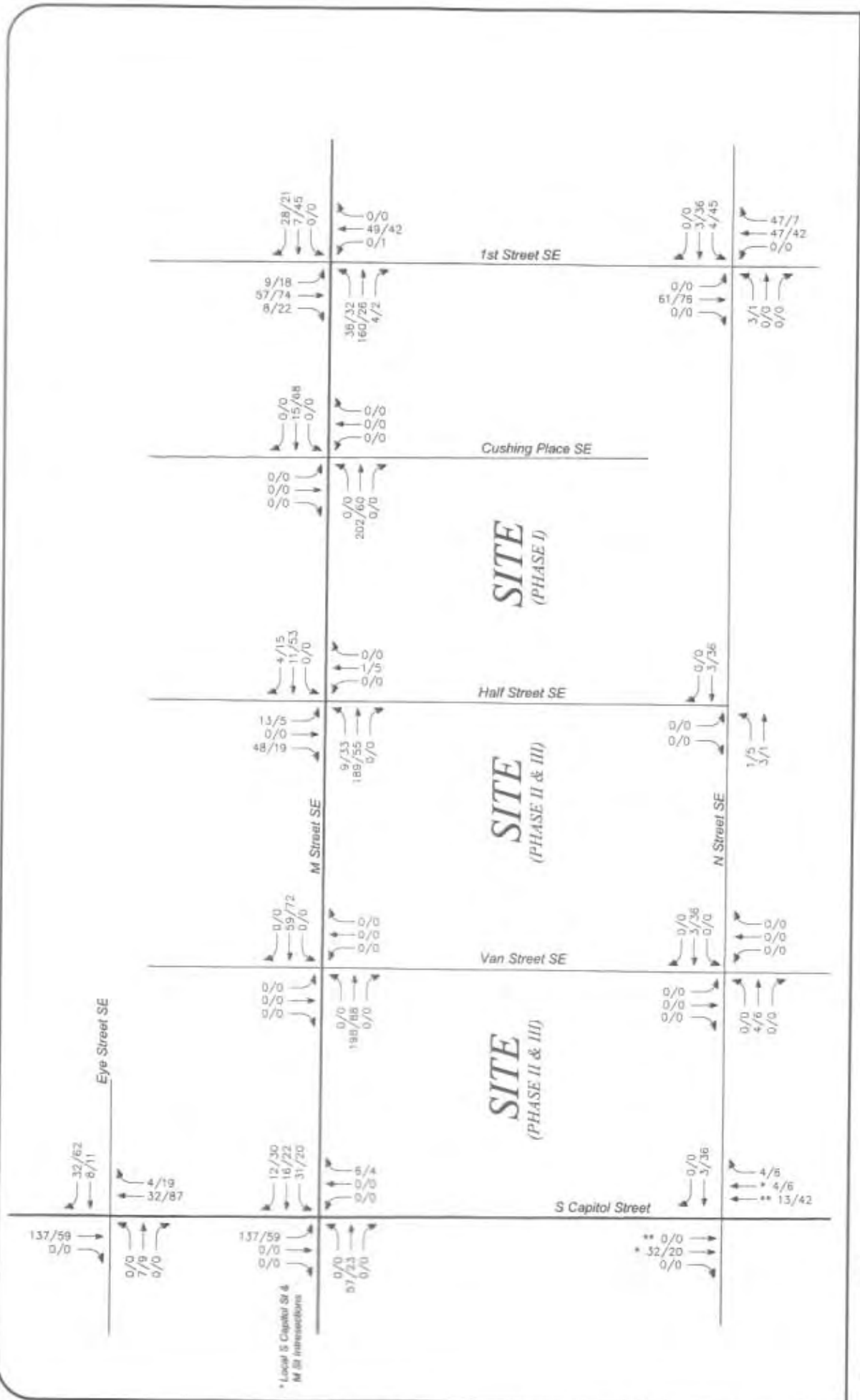


Figure 3-1  
 2 Other Development Peak Hour Traffic Assignments 2008

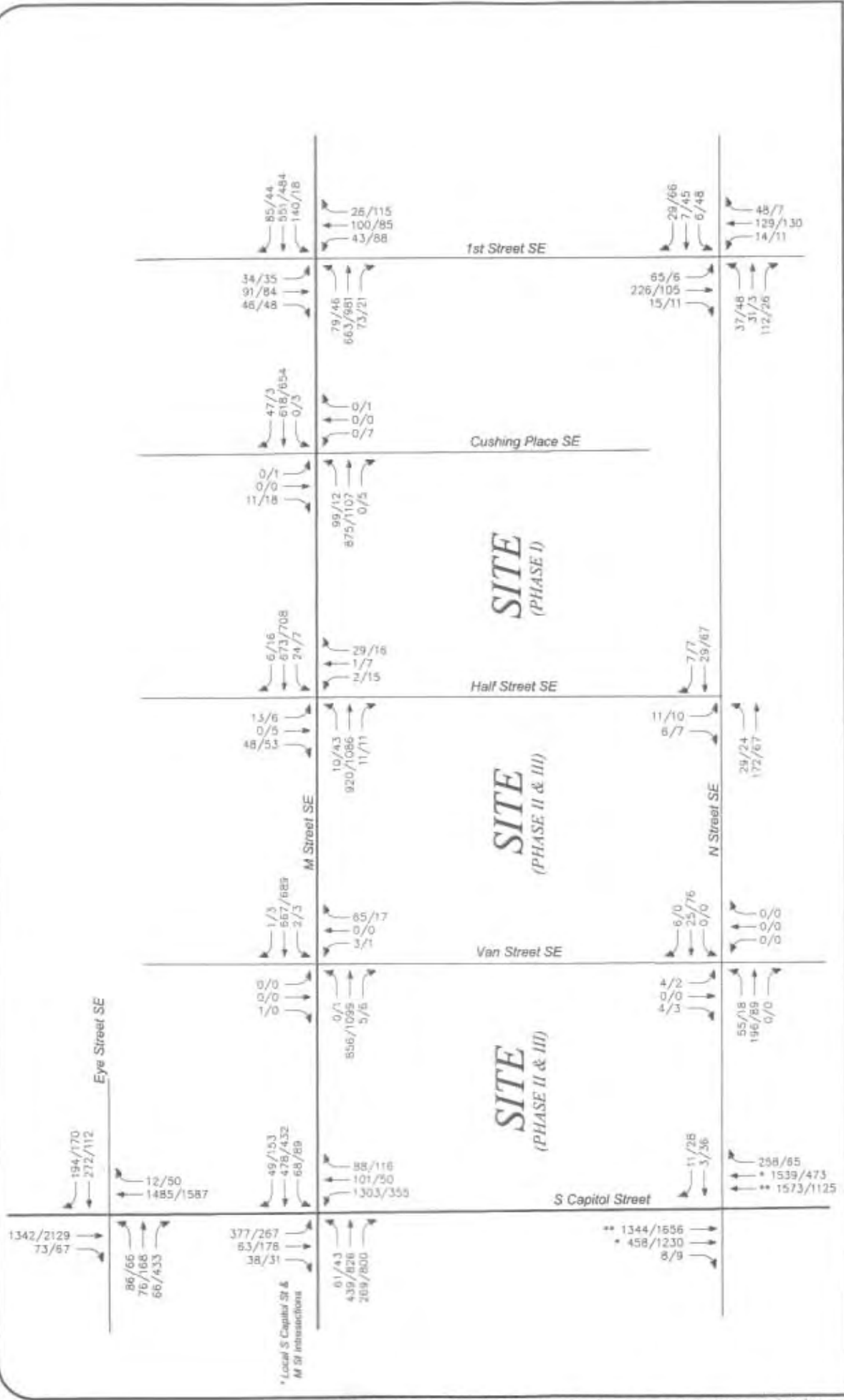
\* To/From Local S Capitol Street & M Street Intersection  
 \*\* To/From S Capitol Street Underpass  
 3000 3932 PM  
 3000 3932 PM  
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Monument Ballpark - Square 700 & 701  
 Washington, D.C.







000/0000  
 \*\* From S Capitol Street Underpass  
 \* To/From Local S Capitol Street & M Street Intersection

**Figure 3-3**  
**Background Future Peak Hour Traffic Forecasts 2008**

Table 3-2  
 Monument Ballpark - Square 700 & 701  
 Phase I (2008) Site Trip Generation

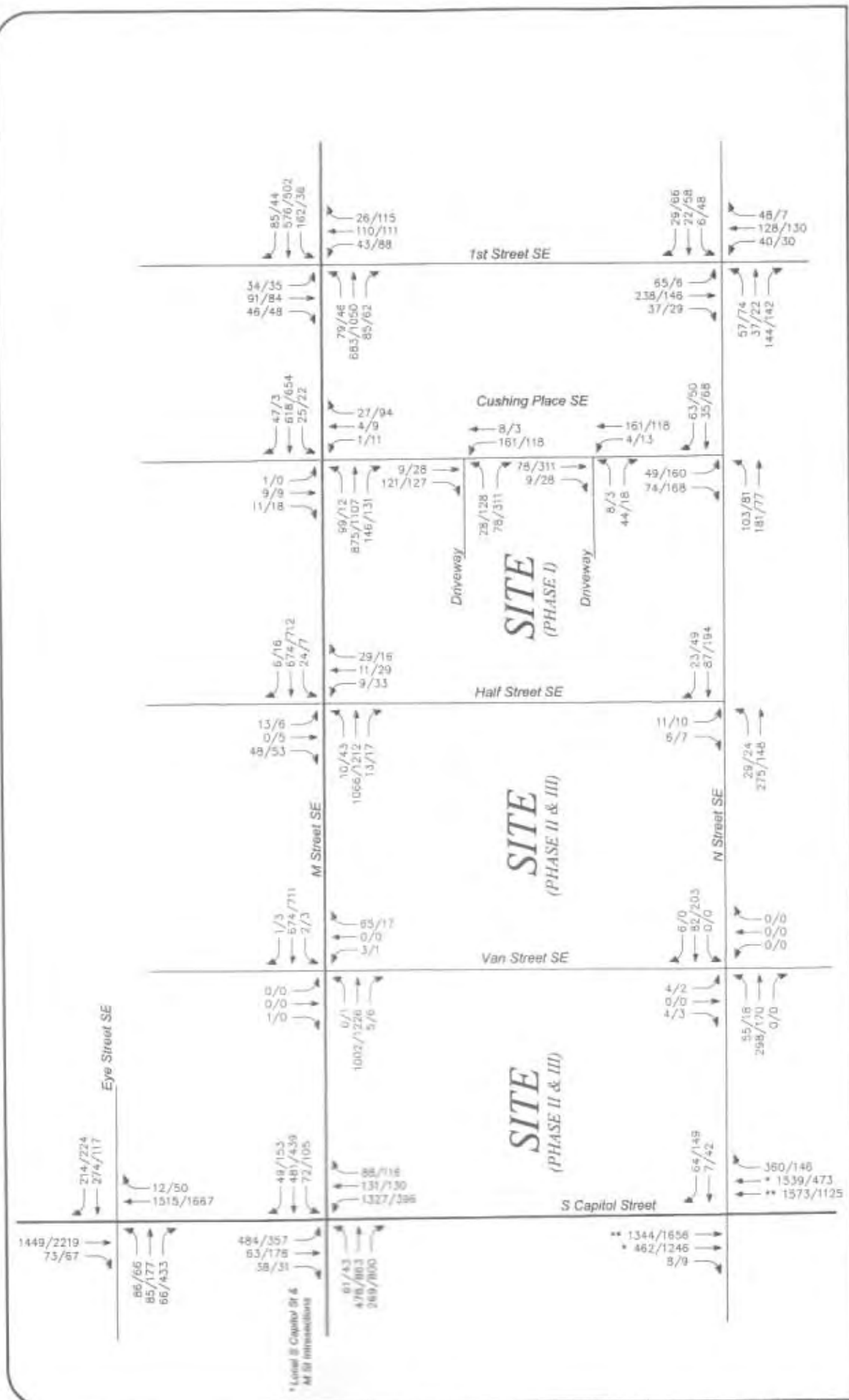
Land Use	ITE Code	Size	Units	AM Peak Hour			PM Peak Hour		
				IN	OUT	TOTAL	IN	OUT	TOTAL
<b>Square 701</b>									
<b>Apartment</b>	220	330	DU's	33	132	165	129	70	199
Internal Capture				1	4	6	28	18	46
External Trips (Total - Internal)				32	128	159	101	52	153
Person Trips <sup>2</sup>				36	147	183	116	60	175
Site Specific External Vehicle Trips <sup>1,4</sup>				13	52	65	41	21	62
<b>General Office Building</b>	710	288,285	SF	385	53	438	68	334	402
Internal Capture				3	1	4	7	7	14
External Trips (Total - Internal)				382	52	434	61	327	388
Person Trips <sup>2</sup>				440	59	499	71	376	447
Site Specific External Vehicle Trips <sup>4,5</sup>				220	30	250	36	188	224
<b>Hotel</b>	310	196	Rooms	57	37	94	61	55	116
Internal Capture				2	2	4	20	3	23
External Trips (Total - Internal)				55	35	90	41	52	93
TDM Reduction <sup>4,6</sup>				15	9	24	11	14	25
External Vehicle Trips (External - Transit)				40	26	66	30	38	68
<b>Shopping Center</b>	820	60,000	SF	70	45	115	215	232	447
Internal Capture				6	5	11	24	47	72
External Trips (Total - Internal)				64	40	104	191	185	375
Person Trips <sup>7</sup>				64	40	104	191	185	375
Site Specific External Vehicle Trips <sup>4,8</sup>				58	37	95	164	177	341
<b>Total External Vehicle Trips (Square 701 - Phase I)</b>				<b>331</b>	<b>145</b>	<b>476</b>	<b>271</b>	<b>424</b>	<b>695</b>

Notes:

- <sup>1</sup> Vehicle trips generated using Institute of Transportation Engineers (ITE) Trip Generation, Seventh Edition.
- <sup>2</sup> Based on a non-auto mode split of 0% and an average auto occupancy of 1.15.
- <sup>3</sup> Based on a non-auto mode split of 54% and an average auto occupancy of 1.30.
- <sup>4</sup> Non-auto mode split taken from 2005 Development-Related Ridership Survey Final Report dated March 2006.
- <sup>5</sup> Based on a non-auto mode split of 35% and an average auto occupancy of 1.30.
- <sup>6</sup> Based on a non-auto mode split of 27%.
- <sup>7</sup> Based on a non-auto mode split of 0% and an average auto occupancy of 1.0.
- <sup>8</sup> Based on a non-auto mode split of 10% and an average auto occupancy of 1.0.



30 Figure 3-4 Site-Generated Phase I - 2008 Peak Hour Traffic Assignments



000/000  
 \* To/From Local S Capital Street & M Street Intersection  
 \*\* To/From S Capital Street Underpass

North

Figure 3-5  
 Total Future Phase I - 2008 Peak Hour Traffic Forecasts

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Table 3-3  
 Monument Ballpark - Square 700 & 701  
 Future Intersection Levels of Service 2008 <sup>1,2,3</sup>

Intersection	Control	Approach	Background, 2008		Total Future, 2008	
			AM	PM	AM	PM
1. Eye Street & S Capitol Street	Signalized	EB	E (68.5)	F (148.0)	E (75.0)	F (148.3)
		WB	D (45.2)	D (38.5)	D (46.3)	D (42.8)
		NB	B (12.2)	B (13.1)	B (12.4)	B (13.7)
		SB	B (11.1)	B (17.8)	B (11.7)	B (19.4)
		<b>Overall</b>	<b>B (19.6)</b>	<b>D (35.6)</b>	<b>C (20.4)</b>	<b>D (36.4)</b>
2. M Street & Local S Capitol SB Ramp	Signalized	EB	D (37.9)	F (109.1)	D (38.6)	F (127.5)
		WB	A (0.6)	A (1.8)	A (0.7)	A (3.0)
		SB	D (38.0)	D (37.6)	D (45.1)	D (43.0)
		<b>Overall</b>	<b>B (15.7)</b>	<b>E (66.7)</b>	<b>B (18.0)</b>	<b>E (76.2)</b>
		M Street & Local S Capitol NB Ramp	Signalized	EB	A (1.7)	A (3.1)
WB	C (33.6)			C (33.6)	C (29.8)	D (36.4)
NB	F (162.9)			C (22.2)	F (181.9)	C (24.4)
<b>Overall</b>	<b>F (89.2)</b>			<b>B (16.2)</b>	<b>F (95.0)</b>	<b>B (17.5)</b>
3. M Street SE & Van Street	Unsignalized			WB	A [0.2]	A [0.1]
		NB	A [9.6]	B [10.2]	A [9.9]	B [10.4]
		EB	A [0.1]	A [0.5]	A [0.1]	A [0.5]
		WB	A [0.5]	A [0.1]	A [0.5]	A [0.2]
		NB	B [12.7]	F [70.1]	E [39.9]	F [350.8]
4. M Street SE & Half Street	Unsignalized	SB	C [15.2]	C [23.3]	C [16.6]	D [33.3]
		EB	A (1.6)	A (2.4)	A (1.5)	A (2.3)
		WB	A (3.7)	A (5.7)	B (10.8)	A (4.5)
		NB	C (30.0)	C (27.6)	C (31.3)	C (31.4)
		SB	C (32.4)	C (29.1)	C (32.4)	C (29.1)
<b>IMPROVEMENT:</b> Add Signal	<b>Signalized</b>	<b>Overall</b>	<b>A (4.1)</b>	<b>A (5.0)</b>	<b>A (6.7)</b>	<b>A (4.9)</b>
5. M Street SE & Cushing Place	Unsignalized	EB	A [1.4]	A [0.1]	A [1.2]	A [0.1]
		WB	A [0.0]	A [0.1]	A [0.5]	A [0.5]
		NB	A [0.0]	D [34.7]	D [25.0]	C [19.5]
		SB	B [10.6]	B [10.0]	F [69.7]	D [30.4]
		6. M Street SE & 1st Street SE	Signalized	EB	A (4.9)	A (3.7)
WB	A (7.7)			A (6.5)	A (8.0)	B (10.9)
NB	C (28.0)			C (25.1)	C (28.0)	B (18.6)
SB	C (31.9)			C (31.9)	C (32.0)	C (24.5)
<b>Overall</b>	<b>B (10.5)</b>			<b>A (9.8)</b>	<b>B (17.4)</b>	<b>B (10.6)</b>

Notes:

<sup>1</sup> Based on as Synchro version 6

<sup>2</sup> Numbers in brackets, [ ], represent control delay in seconds per vehicle for unsignalized intersections.

<sup>3</sup> Numbers in parenthesis, ( ), represent control delay in seconds per vehicle for signalized intersections.

Table 3-3 Continued  
 Monument Ballpark - Square 700 & 701  
 Future Intersection Levels of Service 2008<sup>1,2,3</sup>

Intersection	Control	Approach	Background, 2008		Total Future, 2008	
			AM	PM	AM	PM
7. N Street SE & S Capitol Street	Signalized	WB	D (45.7)	E (62.2)	D (51.2)	E (78.2)
		NB	B (11.3)	A (3.3)	B (11.1)	A (3.3)
		SB	A (2.0)	A (7.3)	A (2.0)	A (7.4)
		<b>Overall</b>	<b>A (8.2)</b>	<b>A (6.6)</b>	<b>A (8.6)</b>	<b>A (8.7)</b>
8. N Street SE & Van Street	Unsignalized	EB	A [1.7]	A [1.3]	A [1.3]	A [0.8]
		SB	A [9.4]	A [9.0]	A [9.9]	A [9.8]
9. N Street SE & Hall Street	Unsignalized	EB	A [1.1]	A [2.0]	A [0.8]	A [1.1]
		SB	A [9.3]	A [9.2]	B [10.0]	B [10.3]
10. N Street SE & East Street SE	Signalized	EB	C (29.2)	C (28.6)	C (29.8)	C (30.4)
		WB	C (27.8)	C (29.5)	C (28.0)	C (30.0)
		NB	A (6.4)	A (6.2)	A (6.5)	A (6.3)
		SB	A (6.2)	A (4.7)	A (6.5)	A (6.6)
		<b>Overall</b>	<b>B (13.3)</b>	<b>B (16.6)</b>	<b>B (14.3)</b>	<b>B (19.3)</b>
11. N Street SE & Cushing Place	Unsignalized	EB	NA	NA	A [2.9]	A [4.0]
		SB	NA	NA	B [10.3]	B [11.3]
12. North Site Driveway & Cushing Place	Unsignalized	EB	NA	NA	B [10.6]	C [15.8]
		NB	NA	NA	A [7.7]	A [7.6]
13. South Site Driveway & Cushing Place	Unsignalized	EB	NA	NA	A [9.0]	B [10.7]
		NB	NA	NA	A [0.2]	A [0.9]

Notes:

<sup>1</sup> Based on the Synchro version 6

<sup>2</sup> Numbers in brackets, [ ], represent control delay in seconds per vehicle for unsignalized intersections.

<sup>3</sup> Numbers in parenthesis, ( ), represent control delay in seconds per vehicle for signalized intersections.

## **SECTION 4**

### **PHASE 2 & 3 (2014) – COMMUTER AM & PM PEAK HOUR ANALYSIS**

#### **Other Development Trip Generation**

The number of peak hour trips that will be generated by the pipeline projects in 2014 were generated based on ITE trip rates and WMATA mode splits percentages. As shown in Table 4-1, it is estimated that these projects will generate a total of 2,134 AM peak hour trips, and 3,497 PM peak hour trips, upon completion and full occupancy. These pipeline trips are in addition to the pipeline traffic identified for 2008 conditions.

#### **Other Development Project Traffic Assignments**

The trips shown in Table 4-1 were assigned to the public road network based on the information obtained from their respective traffic studies and traffic pattern changes expected with roadway improvements. A summation of the pipeline development traffic is shown on Figure 4-1.

#### **Background Traffic Growth**

Annual background traffic growth was estimated at 2 percent per year compounded for eight (8) years for project build out in 2014 as agreed to during the DDOT scoping meeting. This growth rate was applied to all the movements at all intersections. The background traffic growth is shown on Figure 4-2.

#### **Background Traffic Forecasts**

Background peak hour traffic forecasts, without the Monument Ballpark – Phase 2 & 3 project, were estimated based on existing traffic counts, traffic generated by the pipeline projects, historic background traffic growth and planned roadway improvements. The resulting 2014 background traffic forecasts are shown on Figure 4-3.

#### **Background Future Levels of Service**

Future peak hour levels of service, without the Monument Ballpark – Phase 2 & 3 project, were estimated based on: the future lane usage and traffic control shown on Figure 2-2; the 2014 background traffic forecasts shown on Figure 4-3; and the Synchro intersection capacity analysis software. Planned roadway improvements for the Ballpark District described in the previous section were assumed and are reflected in Figure 2-2. The results are presented in Appendix E, and are summarized in Table 4-3.



Table 4-3 indicates that the considerable background traffic growth will increase delays at all study intersections when compared to 2008 background traffic conditions.

The eastbound approach at the Eye Street and South Capitol Street intersection operates at LOS "F" during both the AM and PM peak hours. Poor LOS also on the westbound approach during the PM peak hour causes the overall intersection to operate at LOS "E."

The M Street intersections with the South Capitol Street ramps operate at LOS "F" during the PM peak hour. The intersection with the South Capitol Street northbound ramp also operates at LOS "F" during the AM peak hour. While this operation is not generally desirable it is often typical of urban intersections that handle significant commuter traffic.

The pipeline traffic growth causes the minor stop-controlled approaches (northbound and southbound) at the intersection of M Street and Cushing Place to operate at LOS "F." The delay at these approaches is excessive and will cause motorists to seek alternative routes. The installation of a signal at M Street and Half Street would help create gaps in the M Street mainline traffic. The effect of this traffic gapping is not accurately represented by the analysis software.

The westbound approach of N Street at South Capitol Street operates at LOS "E." This signalized approach is subject to limited green time because much of the signal cycle is needed to accommodate the mainline north-south traffic on South Capitol Street.

### Site Trip Generation Analysis

The numbers of trips that will be generated by the Monument Ballpark – Phase 2 & 3 when complete in 2014 were forecasted based on: (1) ITE trip generation rates, (2) the proximity of the project to the Navy Yard Metrorail station, and (3) experience with other comparable projects in Washington, D.C. The development plan includes an additional 881 residential condominium apartments, 448,210 S.F. of office, and 67,856 S.F. of retail. The trip generation calculations are shown in Table 4-2.

Table 4-2 shows that the project would generate 691 (449 in and 242 out) AM peak hour trips, and 947 (375 in and 572 out) PM peak hour trips. These estimates assume that approximately 54 percent of all residents, 35 percent of the office workers and 10 percent of retail patrons would use Metro or some other non-auto mode during peak hours.

While the WMATA bus maintenance facility will be relocated before this phase of development the traffic was not discounted from the trip generation or the road network. Therefore, this report presents a conservative analysis.

### **Site Traffic Assignments**

The site-generated traffic volumes were assigned to the public road network according to the directional distribution described above. The resulting site traffic assignments are shown on Figure 4-4.

### **Total Future Traffic Forecasts**

The site traffic assignments in Figure 4-4 were added to the future background traffic volumes shown on Figure 4-3 to yield the total future traffic forecasts shown on Figure 4-5.

### **Total Future Levels of Service**

Future peak hour levels of service, with the proposed Monument Ballpark – Phase 2&3 project, were estimated based on: the future lane usage and traffic control shown on Figure 2-2; the 2014 total future traffic forecasts shown on Figure 4-5; and the Synchro intersection capacity analysis software. The results are presented in Appendix F, and are summarized in Table 4-3.

The addition of Phase 2 & 3 site trips causes the overall LOS of the M Street at South Capitol Street southbound ramp intersection to change from LOS "D" to LOS "E" during the AM peak hour. The LOS "F" during the PM peak hour would occur even if the site is not developed. Similarly, the northbound South Capitol ramp intersection at M Street would operate at LOS "F" with or without site traffic on the network.

The approaches of Van Street and Cushing Place to M Street providing site access will operate at LOS "F" during the PM peak hour. The Cushing Place approaches will also operate at LOS "F" during the AM peak hour. These approaches are "minor" approaches in that they carry significantly less volume than the M Street mainline. Mitigation traffic control options at these locations are limited because of the proximity of Van Street to the signalized South Capitol Street intersection and the proximity of Cushing Place to the signalized First Street intersection. The analysis assumes a new traffic signal is located between the two intersections at Half Street. A signal at Half Street is consistent with the spacing of traffic signals along M Street. While a signal at Half Street does not directly reduce delays at Cushing Place and Van Street, it acts to create gaps in the M Street traffic stream that will increase the number of acceptable gaps. The Synchro analysis does not accurately represent the benefit of a new signal.

It should be noted that a traffic signal at M Street and Half Street was identified as a mitigation measure for 2008 background conditions to mitigate the intersection itself. With or without Monument Ballpark development, a signal at this location will ultimately be needed to achieve acceptable LOS. A signal at this location would also benefit pedestrian traffic that presently must cross M Street at Half Street without signal protection. Pedestrians on the north side of M Street cross at this location to enter the Navy Yard Metro station south of M Street rather

than walk down to the portal located on the north side of M Street at New Jersey Avenue. The signal will be of particular benefit for ballpark patrons that park north of M Street and cross at Half Street walking to the ballpark entrance at N Street.

The approaches of Van Street and Cushing Place at N Street will operate with high delay and marginal LOS with the addition of site traffic to the network during the PM peak hour. These delays are not atypical in urban areas during peak conditions, particularly for minor approaches that do not carry significant traffic volume.

Table 4-1

## Monument Ballpark - Square 700 &amp; 701

Trips Generated by Other Developments 2014 <sup>1,2</sup>

Background Development	Land Use	Land Use Code	Size	Units	AM Peak Hour			PM Peak Hour		
					In	Out	Total	In	Out	Total
<b>Cohen Site <sup>3</sup></b>										
	Residential	230	430	D.U.	13	65	78	63	31	94
	Retail	814	20,000	S.F.	41	26	67	32	30	62
	Office	710	30,400	S.F.	227	31	258	40	196	236
					281	122	403	135	257	392
<b>Ballpark District Waterfront Development</b>										
	Residential	230	474	D.U.	78	48	126	235	234	468
	Retail	820	15,000	S.F.	10	39	49	30	15	45
					88	87	175	265	249	513
<b>Jefferson at 100 Eye Street (Phase II)</b>										
	Residential	220	246	D.U.	10	46	56	46	23	69
<b>Federal Gateway II</b>										
	Office	710	187,000	S.F.	103	14	117	19	90	109
	Retail	820	13,000	S.F.	17	11	28	47	50	97
					120	25	145	66	140	206
<b>Ballpark District On Site Development</b>										
	Residential	220	600	D.U.	24	95	119	80	42	122
	Hotel	310	180	Rooms	37	23	60	29	35	64
	Retail	820	25,000	S.F.	35	22	57	96	84	179
					96	140	236	205	161	365
<b>SE Federal Center (Phase Ia &amp; Ib)</b>										
	Residential	220	2,914	D.U.	116	465	581	417	223	640
	Office	710	334,695	S.F.	248	33	281	41	213	254
	Retail	820	244,559	S.F.	157	100	257	518	541	1,058
					521	598	1,119	976	977	1,952
<b>Total Background Development</b>					<b>1,116</b>	<b>1,018</b>	<b>2,134</b>	<b>1,693</b>	<b>1,807</b>	<b>3,497</b>

## Notes:

(1) Based on Trip Generation, 7th Edition, Institute of Transportation Engineers.

(2) Non-auto mode splits were adapted from the U.S. Census 2000 Data Summary File 3

	Waterfront	100 Eye St	FG OFF	FG Ret	Ballpark	SE Fed Cent
Non-auto mode split:	0%	0%	0%	0%	0%	0%
Average vehicle occupancy (persons per vehicle)	1.15	1.15	1.15	1.15	1.15	1.15
Non-auto mode split:	Waterfront	Jefferson	FG OFF	FG Ret	Ballpark	SE Fed Cent
Average vehicle occupancy (persons per vehicle)	54%	49%	57%	32%	54%	54%
	1.30	1.30	1.30	1.30	1.30	1.30

(3) Cohen Site Trip Generation was taken from "Square 701 S.E.; Alley Closing Traffic Assessment", Wells &amp; Associates, October 11, 2006

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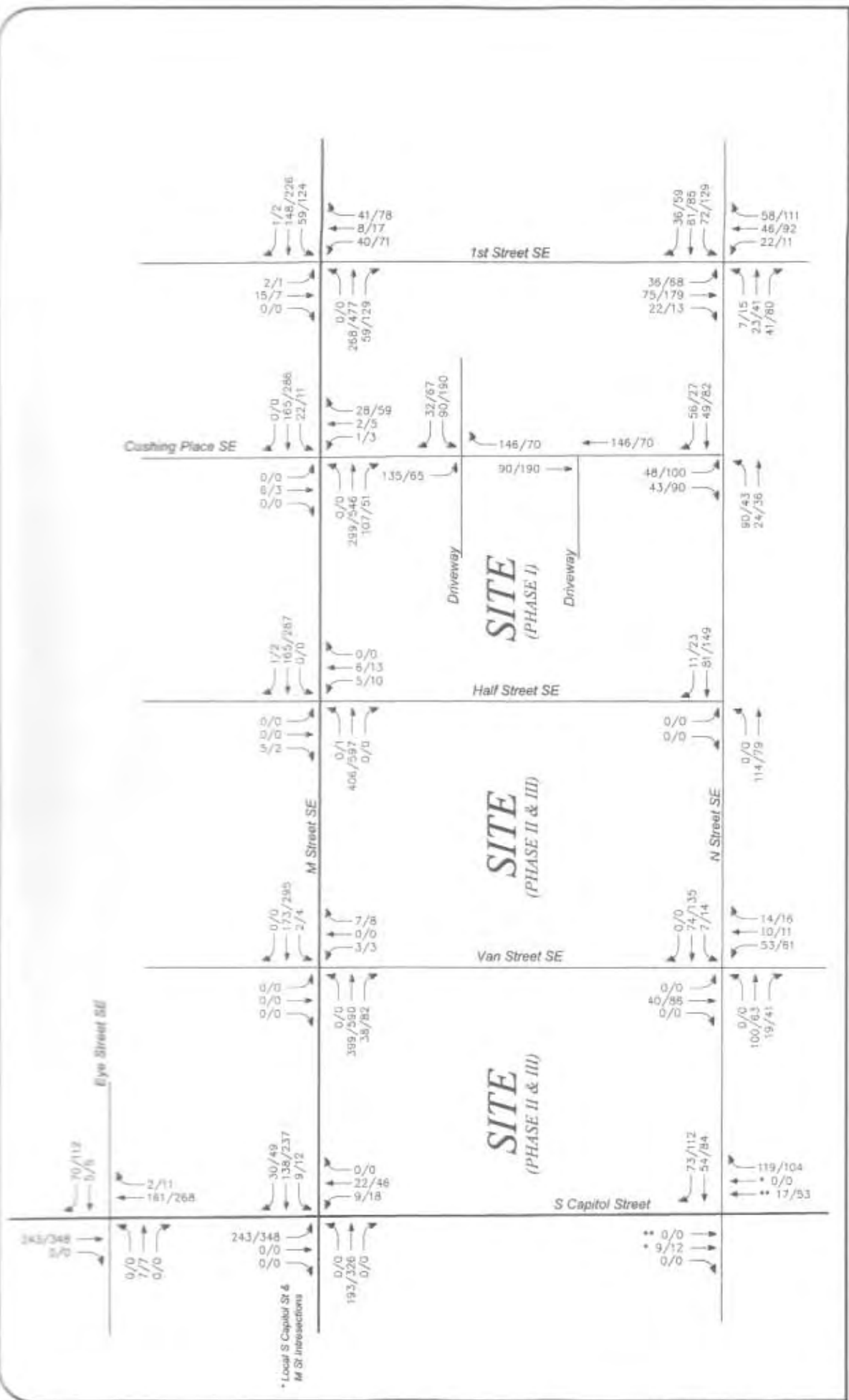
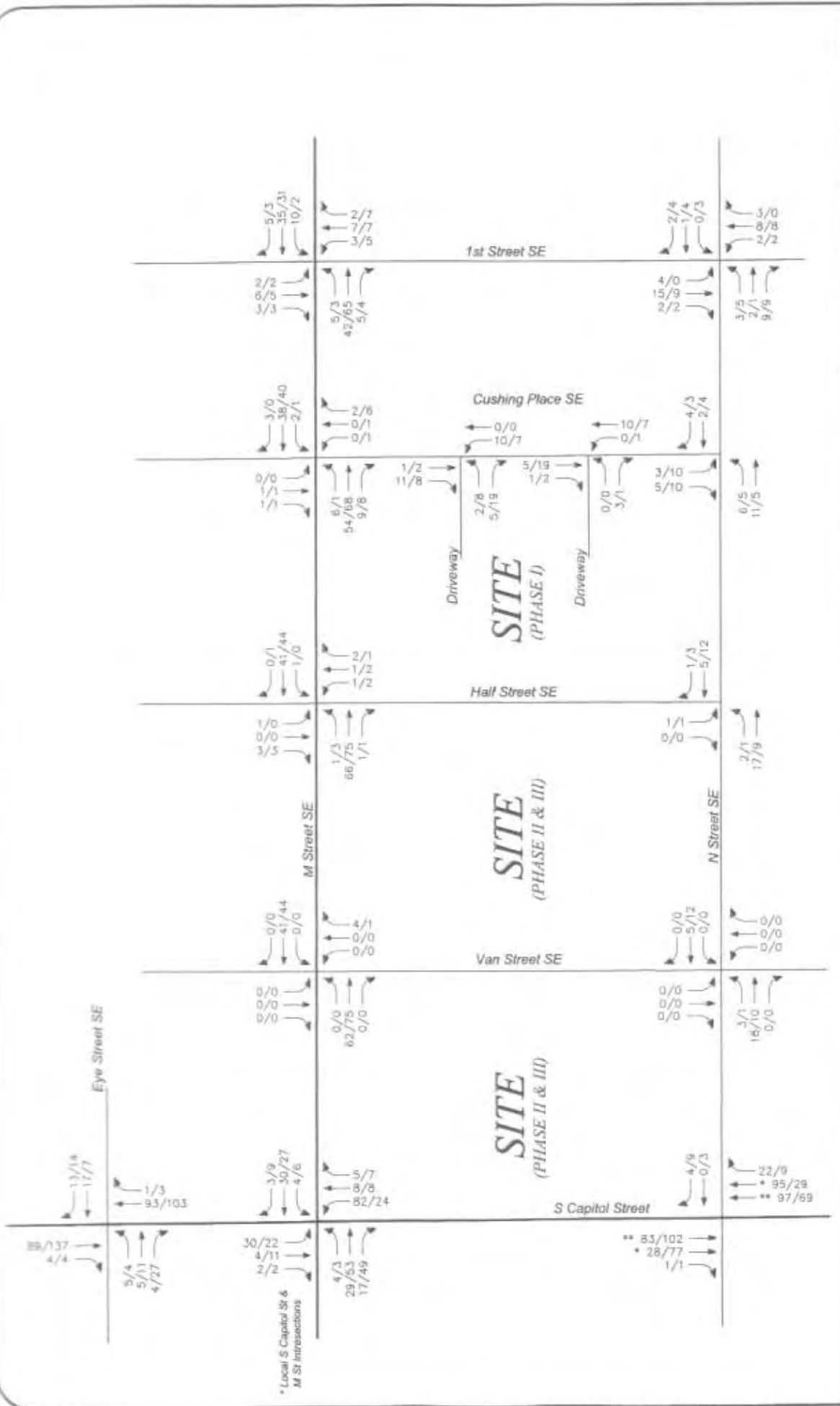


Figure 4-1  
Other Development Peak Hour Traffic Assignments 2014



Monument Ballpark — Square 700 & 701  
Washington, D.C.

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**Figure 4-2 Background Traffic Growth 2014**

\* TopFrom Local S Capital Street & M Street Intersection  
 \*\* TopFrom S Capital Street Underpass



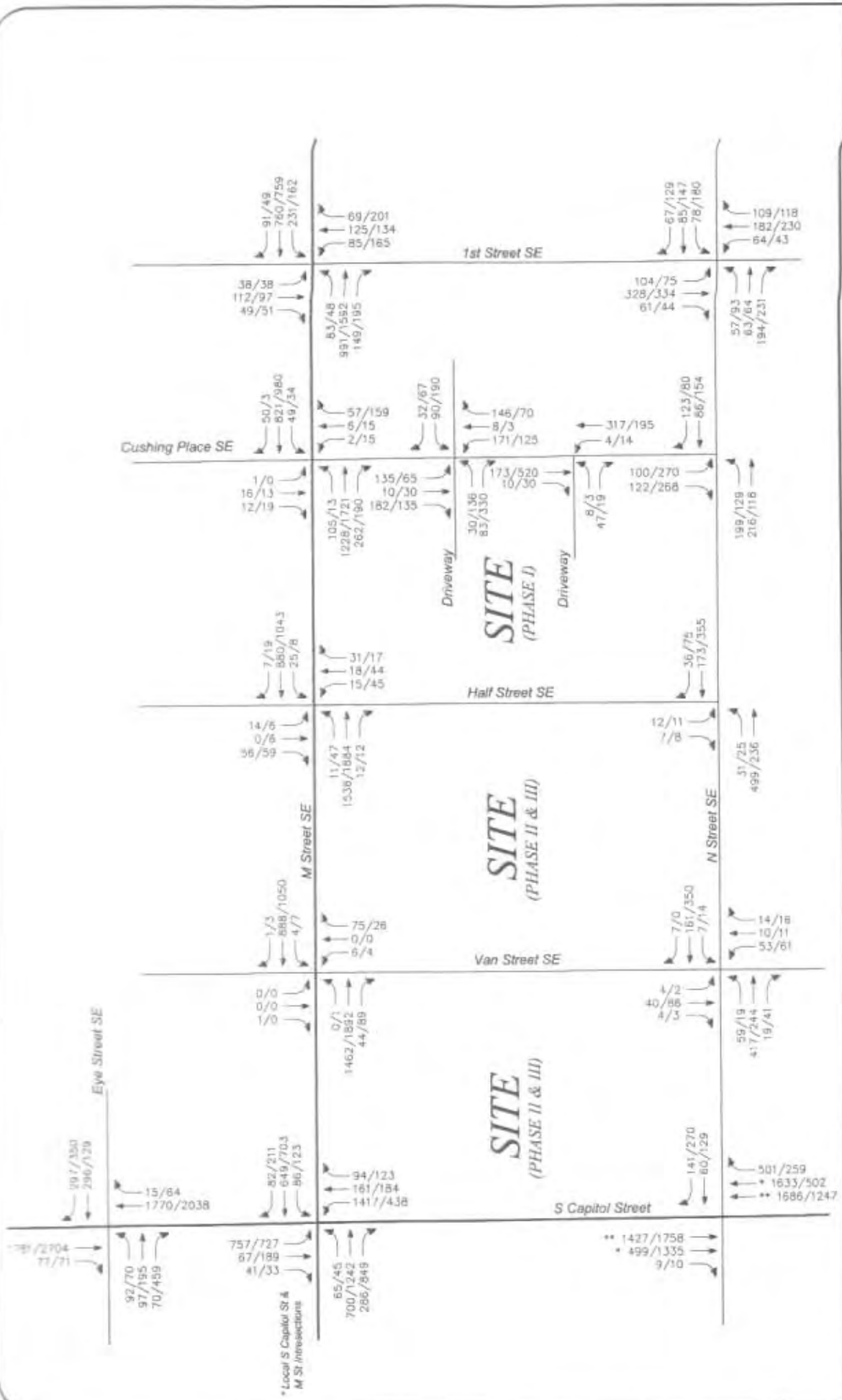


Figure 4-3 Background Future Peak Hour Traffic Forecasts 2014

• To/From Local S Capitol Street & M Street Intersection  
 \*\* To/From S Capitol Street Underpass



Table 4-2  
 Monument Ballpark - Square 700 & 701  
 Phase II & III (2014) Site Trip Generation

Land Use	ITE Code	Size	Units	AM Peak Hour			PM Peak Hour		
				IN	OUT	TOTAL	IN	OUT	TOTAL
<b>Apartment</b>	220	881	DU's	87	348	435	326	176	502
Internal Capture				2	7	10	35	21	56
External Trips (Total - Internal)				85	341	425	291	155	446
Person Trips <sup>2</sup>				108	435	543	372	198	570
Site Specific External Vehicle Trips <sup>3,4</sup>				38	154	192	132	70	202
<b>General Office Building</b>	710	448,210	SF	548	75	623	99	482	581
Internal Capture				5	2	6	8	10	17
External Trips (Total - Internal)				543	73	617	91	472	564
Person Trips <sup>2</sup>				694	94	788	117	604	721
Site Specific External Vehicle Trips <sup>4,5</sup>				347	47	394	59	302	361
<b>Shopping Center</b>	820	67,856	SF	76	48	124	233	252	485
Internal Capture				5	4	9	26	38	63
External Trips (Total - Internal)				71	44	115	207	214	422
Person Trips <sup>7</sup>				71	44	115	207	214	422
Site Specific External Vehicle Trips <sup>4,8</sup>				64	41	105	184	200	384
<b>Total External Vehicle Trips (Square 701 - Phase II &amp; III)</b>				<b>449</b>	<b>242</b>	<b>691</b>	<b>375</b>	<b>572</b>	<b>947</b>

Notes:

- <sup>1</sup> Vehicle trips generated using Institute of Transportation Engineers (ITE) Trip Generation, Seventh Edition.
- <sup>2</sup> Based on a non-auto mode split of 10% and an average auto occupancy of 1.15.
- <sup>3</sup> Based on a non-auto mode split of 54% and an average auto occupancy of 1.30.
- <sup>4</sup> Non-auto mode split taken from 2005 Development-Related Ridership Survey Final Report dated March 2006.
- <sup>5</sup> Based on a non-auto mode split of 35% and an average auto occupancy of 1.30.
- <sup>7</sup> Based on a non-auto mode split of 0% and an average auto occupancy of 1.0.
- <sup>8</sup> Based on a non-auto mode split of 10% and an average auto occupancy of 1.0.



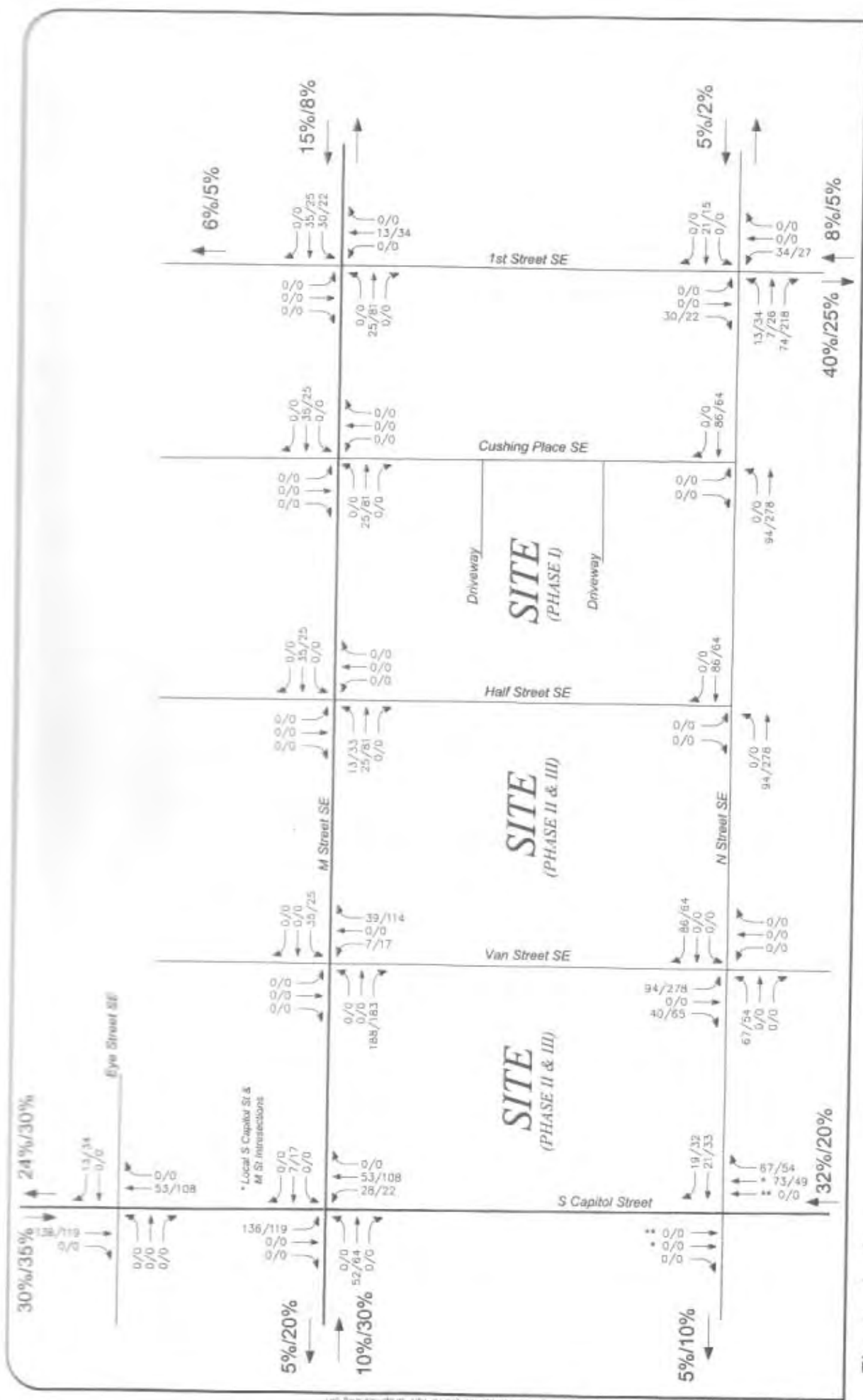


Figure 4-4

Site Generated Phase II & III - 2014 Peak Hour Traffic Assignments

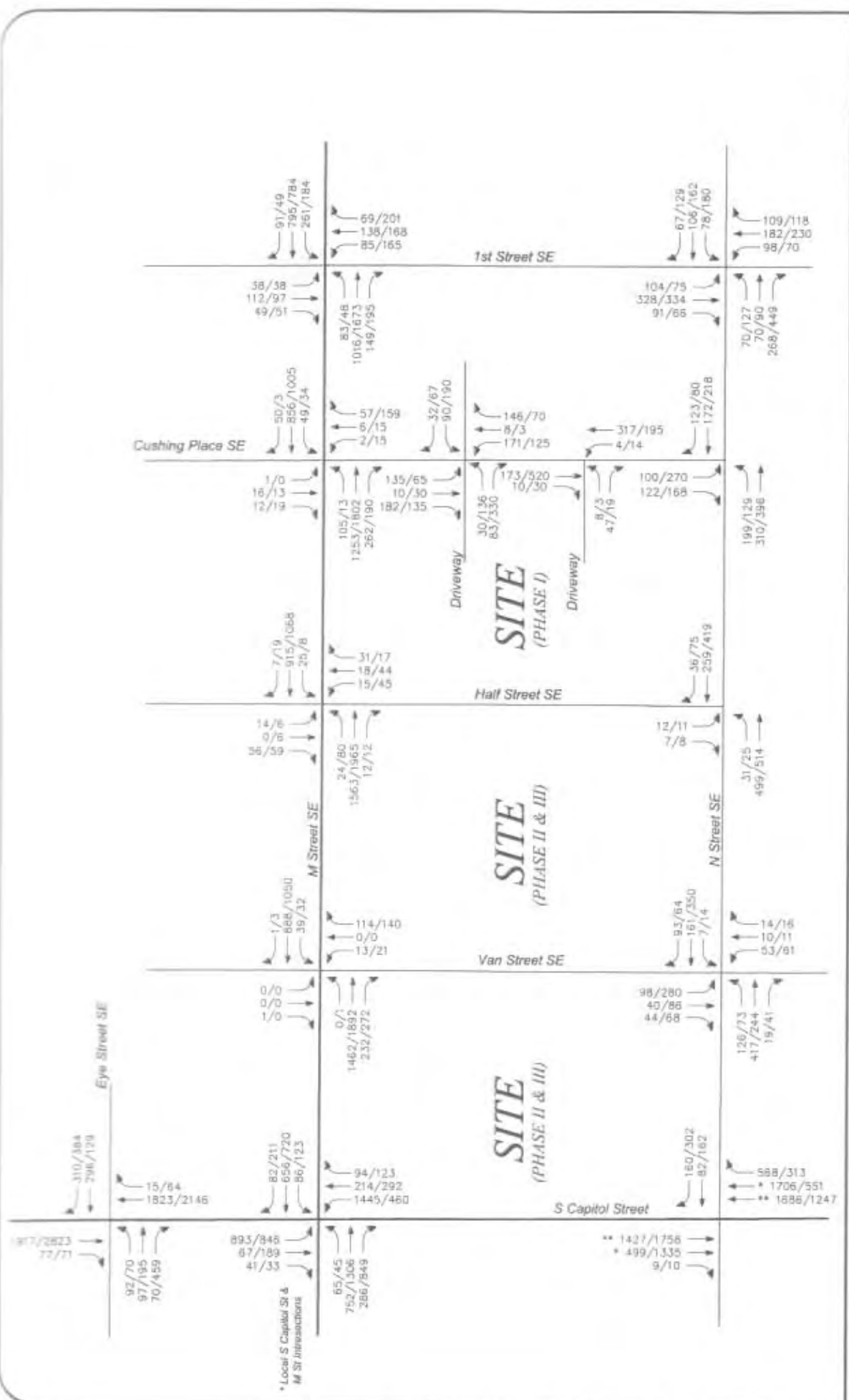
XX% / XX% = Office Uses/Residential & Hotel Uses  
 \* To/From Local S Capital Street & M Street Intersection  
 \*\* To/From S Capital Street Underpass



Monument Ballpark - Square 700 & 701  
 Washington, D.C.

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Project: 2001-2000/2340 Monument Westway Improvements District/Project/2340 Rpt Graphics.dwg/1



44 Figure 4-5 Total Future Phase II & III - 2014 Peak Hour Traffic Forecasts



Monument Ballpark - Square 700 & 701  
Washington, D.C.

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Table 4-3

Monument Ballpark - Square 700 & 701  
Future Intersection Levels of Service<sup>1,2,3</sup>

Intersection	Control	Approach	Background, 2014		Total Future, 2014	
			AM	PM	AM	PM
1. Eye Street & S Capitol Street	Signalized	EB	F (127.9)	F (172.6)	F (128.0)	F (173.1)
		WB	E (58.0)	F (85.2)	E (61.6)	F (113.4)
		NB	B (14.3)	B (17.9)	B (14.7)	B (19.8)
		SB	B (13.9)	D (49.7)	B (15.2)	E (66.6)
		Overall	C (26.4)	E (56.1)	C (27.2)	E (66.2)
2. W Street & Local S Capitol SB Ramp	Signalized	EB	D (50.5)	F (289.1)	E (59.2)	F (310.6)
		WB	A (4.1)	B (13.8)	A (6.2)	B (14.2)
		SB	F (156.1)	F (159.4)	F (190.4)	F (225.1)
		Overall	D (48.4)	F (180.7)	E (62.3)	F (206.1)
		W Street & Local S Capitol NB Ramp	Signalized	EB	A (4.5)	E (60.6)
WB	E (60.2)	F (156.1)		E (76.3)	F (168.5)	
NB	F (199.0)	C (27.1)		F (257.5)	C (31.4)	
Overall	F (96.9)	F (80.1)		F (121.9)	F (105.8)	
3. W Street SE & Van Street	Unsignalized	WB	A [0.1]	A [0.3]	A [1.2]	A [2.5]
		NB	B [12.3]	C [18.5]	C [15.7]	F [54.9]
4. W Street SE & Half Street	Signalized	EB	A (1.6)	A (6.8)	A (1.6)	A (9.2)
		WB	A (3.8)	A (6.1)	A (3.9)	A (3.7)
		NB	C (31.8)	C (32.1)	C (29.9)	D (44.6)
		SB	C (32.6)	C (29.3)	C (32.6)	D (36.0)
		Overall	A (3.9)	A (7.9)	A (3.9)	A (9.1)
5. W Street SE & Coching Place	Unsignalized	EB	A [1.2]	A [0.1]	A [1.3]	A [0.1]
		WB	A [1.4]	A [1.6]	A [1.4]	A [1.9]
		NB	F [*]	F [*]	F [*]	F [*]
		SB	F [519.0]	F [425.7]	F [605.7]	F [509.1]
6. W Street SE & 1st Street SE	Signalized	EB	A (7.8)	A (9.2)	A (8.7)	B (13.2)
		WB	B (11.2)	B (11.1)	B (11.8)	B (11.4)
		NB	C (33.0)	D (40.6)	C (31.3)	D (45.0)
		SB	C (31.1)	C (30.5)	C (31.1)	C (30.6)
		Overall	B (13.3)	B (15.4)	B (13.7)	B (18.2)

## Notes:

<sup>1</sup> Based on as Synchro version 6<sup>2</sup> Numbers in brackets, [ ], represent control delay in seconds per vehicle for unsignalized intersections.<sup>3</sup> Numbers in parenthesis, ( ), represent control delay in seconds per vehicle for signalized intersections.

Table 4-3 Continued  
 Monument Ballpark - Square 700 & 701  
 Future Intersection Levels of Service <sup>1,2,3</sup>

Intersection	Control	Approach	Background, 2014		Total Future, 2014		
			AM	PM	AM	PM	
7. N Street SE & S Capitol Street	Signalized	WB	E (67.2)	E (78.7)	E (76.6)	E (72.3)	
		NB	B (15.3)	A (8.3)	B (17.8)	B (10.7)	
		SB	A (2.3)	C (23.6)	A (2.3)	D (35.0)	
		<b>Overall</b>	<b>B (12.8)</b>	<b>C (22.0)</b>	<b>B (15.2)</b>	<b>C (29.0)</b>	
8. N Street SE & Van Street	Unsignalized	EB	A [1.1]	A [0.6]	A [2.2]	A [2.0]	
		WB	A [0.4]	A [0.4]	A [0.2]	A [0.3]	
		NB	C [20.9]	C [19.9]	D [34.9]	E [36.5]	
		SB	C [18.1]	C [20.5]	D [33.8]	F [258.0]	
9. N Street SE & Half Street	Unsignalized	EB	A [0.6]	A [0.9]	A [1.5]	A [0.5]	
		SB	B [11.2]	B [12.2]	B [12.5]	B [14.3]	
10. N Street SE & 1st Street SE	Signalized	EB	C (24.7)	B (14.9)	C (22.7)	B (17.3)	
		WB	C (25.2)	B (17.6)	C (22.8)	B (17.4)	
		NB	B (11.0)	C (21.8)	B (14.1)	C (26.1)	
		SB	A (8.2)	B (18.0)	B (10.9)	C (20.9)	
		<b>Overall</b>	<b>B (15.4)</b>	<b>B (18.0)</b>	<b>B (16.7)</b>	<b>B (20.0)</b>	
11. N Street SE & Cushing Place	Unsignalized	EBLT	A [4.2]	A [4.4]	A [3.7]	A [2.3]	
		SBLR	C [15.6]	C [21.8]	C [19.6]	F [50.3]	
12. North Site Driveway	Unsignalized	EB	B [14.9]	D [33.5]	NA	NA	
		WB	E [41.0]	F [318.6]	NA	NA	
		NB	A [4.8]	A [5.3]	NA	NA	
		SB	A [3.8]	A [2.4]	NA	NA	
	<b>IMPROVEMENT:</b> 4-way Stop	Unsignalized	EB	A [9.9]	D [29.9]	A [9.9]	D [29.9]
			WB	B [10.6]	C [16.4]	B [10.6]	C [16.4]
			NB	B [12.9]	B [14.8]	B [12.9]	B [14.8]
			SB	B [12.6]	C [15.3]	B [12.6]	C [15.3]
13. South Site Driveway	Unsignalized	EB	B [10.1]	B [12.9]	B [10.1]	B [12.9]	
		NB	A [0.1]	A [0.7]	A [0.1]	A [0.7]	

Notes:

<sup>1</sup> Based on as Synchro version 6

<sup>2</sup> Numbers in brackets, [ ], represent control delay in seconds per vehicle for unsignalized intersections.

<sup>3</sup> Numbers in parenthesis, ( ), represent control delay in seconds per vehicle for signalized intersections.

## **SECTION 5 BALLPARK EVENT WEEKDAY AFTERNOON AND EVENING PEAK HOUR ANALYSIS 2008**

### **Ballpark Event Activity and Street Closings**

The new Major League Baseball Ballpark is being constructed to the south of the Monument Ballpark site and will be complete in spring 2008. The Traffic Operations Control Plan (TOCP) for game time conditions is currently being developed by Gorove/Slade Associates for the DC Sports and Entertainment Commission. Although the details of the TOCP are being formulated, it is presently understood that Half Street between M Street and N Streets will be closed to vehicular traffic along with N Street from Van Street to First Street during game times. The analysis contained in this section assumes these street closures for traffic conditions between 4:00 to 5:00 PM on a weekday afternoon and 6:00 to 7:00 PM on a weekday evening. Afternoon games will begin at 1:05 PM and end with approximately 70% of the patrons leaving in the 4 PM hour. Weekday evening games will begin at 7:05 PM with approximately 2/3 of the patrons arriving in the 6 PM hour. The PM peak hour presented in earlier analysis considered the commuter peak which is 5:00-6:00 PM. This section considers traffic conditions that occur on a game day the hour before and the hour after the PM commuter peak.

### **Other Development Trip Generation**

The number of peak hour trips that will be generated by the pipeline projects in 2008 during the ballpark weekday afternoon 4-5 PM hour and weekday evening 6-7 PM hour were generated based on ITE trip rates, WMATA mode splits percentages and diurnal trip generation rates from Institute of Transportation Engineers (ITE) and ULI (Urban Land Institute) sources. As shown in Table 5-1 it is estimated that these projects will generate a total of 824 trips during ballpark post-game 4-5 PM conditions and 432 trips during ballpark pre-game 6-7 PM conditions.

### **Other Development Project Traffic Assignments**

The trips shown in Table 5-1 were assigned to the public road network based on the regional distribution obtained from their respective traffic studies but adjusting the assignments to reflect ballpark event road closures. A summation of the pipeline development traffic for the two time periods is shown on Figure 5-1 and Figure 5-7.

### **Background Traffic Growth**

Existing traffic patterns occurring during the ballpark 4-5 PM and the 6-7 PM peak hour were adjusted to account for game time street closures. A growth rate of 2 percent per year

compounded for two (2) years for ballpark and project buildout in 2008 was applied to all permitted movements at all intersections. The background traffic growth is shown on Figure 5-2 and Figure 5-8.

### **Ballpark Trip Generation Analysis**

Gorove/Slade Associates is the traffic consultant for the DC Sports and Entertainment Commission. According to the Gorove/Slade Associates reports entitled Washington Nationals Ballpark Transportation Management Plan dated April 13, 2006 and the Ballpark TOPP Taskforce Summary of Recommendations dated October 11, 2006, it is estimated that 4,600-4,700 cars will be parked around the ballpark for a sell-out weekday game. These parking spaces will be located at various garages and surface lots. Of the 4,700 parked cars, approximately 2,700 spaces are located such that the ballpark trips generated by them would impact the study intersections.

Based on the Gorove/Slade Associates parking inventory for available parking around the ballpark, the following spaces are located in the vicinity of the study intersections:

1. Ballpark On-site North Parking – 975 spaces
2. Ballpark On-site South Parking – 100 spaces
3. 1100 South Capitol Street – 90 spaces
4. 1000 South Capitol Street – 100 spaces
5. 20 M Street – 190 spaces
6. 80 M Street – 200 spaces
7. 100 M Street – 200 spaces
8. SE Federal Center Parcel H/I – 406 spaces
9. WASA Site – 444 spaces

TOTAL – 2705 spaces

Using the information in the Gorove/Slade reports it was assumed that 70% of ballpark patrons depart in the 4 PM hour, three hours after the afternoon start time of 1:05 PM. Similarly, 60% of ballpark patrons arrive in the hour before a weekday evening game which starts at 7:05 PM. For the analysis this was translated to correspond to 1,894 outbound ballpark trips during the 4-5 PM hour when there is a 1:05 PM weekday game and 1,623 inbound ballpark trips during the 6-7 PM hour when there is a 7:05 PM weekday game. The distribution of ballpark parking spaces in the various parking lots around the ballpark is given in Table 5-2.

### **Ballpark Trip Distribution and Assignment**

The ballpark Transportation Management Plan (TMP) derived that the primary automobile routes for patrons arriving to the ballpark would be as follows:

To/From North on South Capitol Street	47%
To/From North on New Jersey Avenue	2%
To/From South on South Capitol Street	10%
To/From East on M Street SE	27%
To/From West on M Street SW	14%

The distribution from the TMP was used to assign traffic generated by the ballpark to the network. The resulting assignments for ballpark generated traffic is shown on Figure 5-3 and Figure 5-9.

### Background Traffic Forecasts

Background weekday ballpark afternoon post-game peak hour traffic forecasts for 2008 without the Monument Ballpark – Phase I site trips were estimated based on existing 4-5 PM traffic counts, traffic generated by the pipeline projects for 4-5 PM, historic background traffic growth, traffic generated by ballpark patrons, planned roadway improvements and ballpark event-time road closures. The resulting traffic forecasts are shown on Figure 5-4.

Similarly, background weekday ballpark evening pre-game peak hour traffic forecasts for 2008 without the Monument Ballpark – Phase I site trips were estimated based on existing 6-7 PM traffic counts, traffic generated by the pipeline projects for 6-7 PM, historic background traffic growth, traffic generated by ballpark patrons, planned roadway improvements and ballpark event-time road closures. The resulting traffic forecasts are shown on Figure 5-10.

### Site Trip Generation Analysis

The number of peak hour trips that would be generated by the Monument Ballpark – Phase I in 2008 during the ballpark weekday afternoon and evening peak hours were generated based on: (1) ITE trip generation rates, (2) the proximity of the project to the Navy Yard Metrorail station, (3) experience with other comparable projects in Washington, D.C., and (4) diurnal trip generation rates from ITE and ULI sources. As in the 2008 commuter peak analysis, the development plan includes 330 residential condominium apartments, 288,285 S.F. of office, a 196 room hotel, and 60,000 S.F. of retail. The trip generation calculations are shown in Table 5-3.

Table 5-3 shows that the project would generate 813 vehicle trips (307 in and 506 out) during the afternoon ballpark peak hour of 4-5 PM. The project would generate 601 vehicle trips (365 in and 236 out) during the weekday evening ballpark peak hour of 6-7 PM. The trips in Table 5-3 also assume 250 parking spaces would be available for baseball patrons on site. As with the other ballpark generated trips it was assumed that 70% (175) of the parking space trips would

depart during the 4-5 PM hour and 60% (150) of the parking space trips would arrive in the ballpark evening peak hour of 6-7 PM.

### **Site Traffic Assignments**

The site-generated traffic volumes for the 4-5 PM hour and the 6-7 PM hour were assigned to the public road network based on previously-approved traffic impact studies, existing traffic counts, knowledge of future roadway improvements and ballpark game-time street closures. The resulting site traffic assignments are shown on Figure 5-5 and Figure 5-11.

### **Total Future Weekday Afternoon and Evening Traffic Forecasts with Ballpark Event**

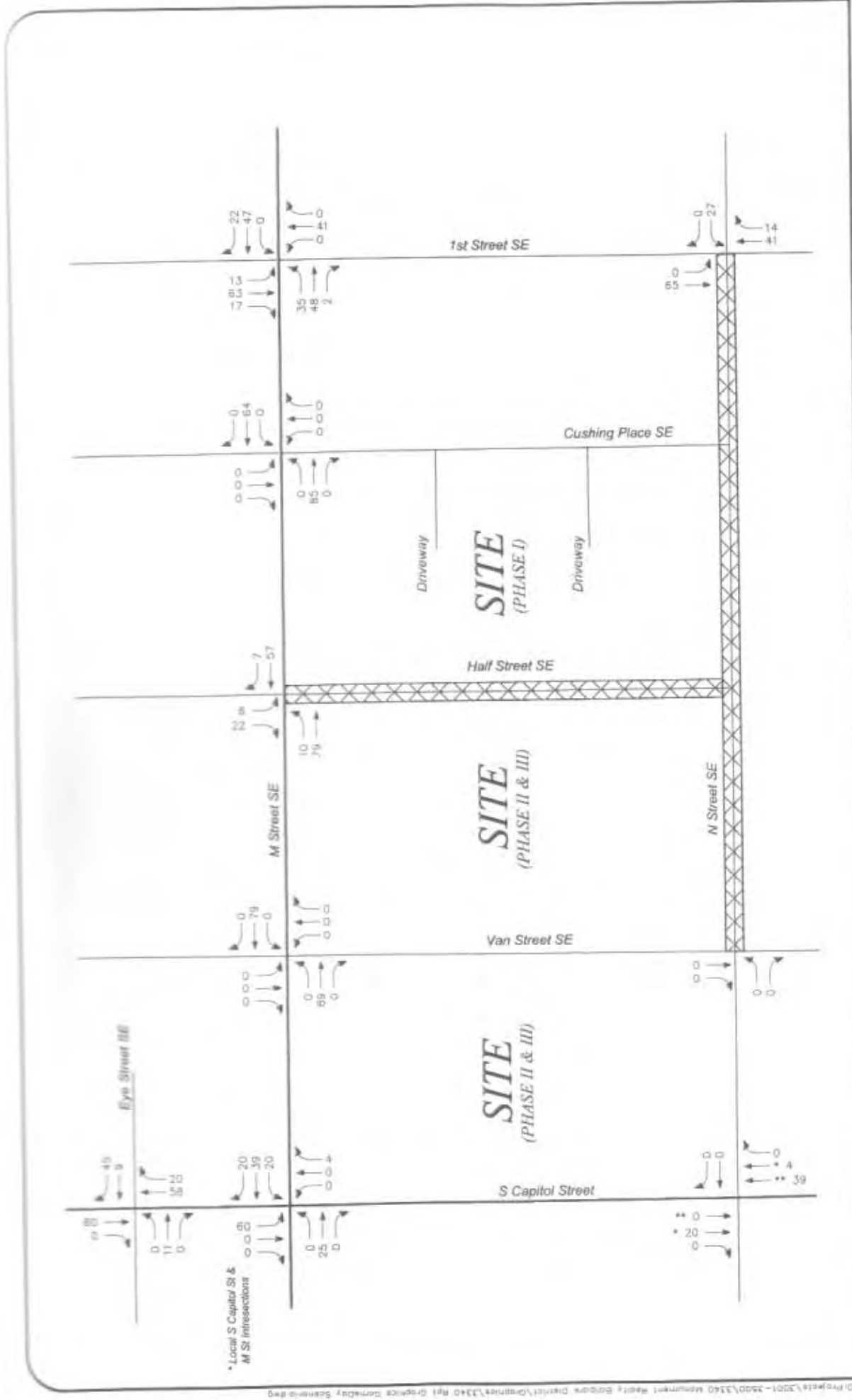
The site traffic assignments for the 4 PM hour in Figure 5-5 were added to the future background traffic volumes shown on Figure 5-4 to yield the total future 4-5 PM traffic forecasts shown on Figure 5-6. The site traffic assignments for the 6 PM hour in Figure 5-11 were added to the future background traffic volumes shown on Figure 5-10 to yield the total future 6-7 PM traffic forecasts shown in Figure 5-12.

As Figure 5-6 and Figure 5-12 indicate, all site traffic must enter and exit via Cushing Place at M Street because of the game time street closures. Traffic that is normally distributed to three other intersections (Half Street at M Street, Half Street at N Street and Cushing Place at N Street) is concentrated to Cushing Place at M Street. The turning movements at Cushing Place and M Street are significantly increased and will need to be managed during ballpark events. A possible option may be to allow at least a partial opening of N Street between Cushing Place and First Street to relieve the demand at Cushing Place and M Street. The operations management of these intersections will be worked out in the TCOP. The demands of vehicular and pedestrian flows will have to be carefully balanced.

It should also be noted that many of the vehicles destined for the parking located north of the ballpark will need to use Van Street through the Phase 2 & 3 site because southbound left turn traffic from South Capitol Street onto N Street will not be permitted during weekday commuter flow periods.

Capacity analysis for the total future traffic volumes occurring during ballpark event conditions was not performed. The TOCP will determine how game-time traffic conditions will be managed therefore the assumptions that would go into the capacity analysis are not fully known at this time. The assignments assembled in this section will be used as an input to guide the TOCP analysis and development of the particulars of the management plan.





North  
000/000

Figure 5-1  
Other Development Ballpark Peak 4-5 PM Traffic Assignments 2008

Monument Ballpark - Square 700 & 701  
Washington, D.C.

WELLS & ASSOCIATES, LLC  
PLANNING, ENGINEERING, AND ARCHITECTURE

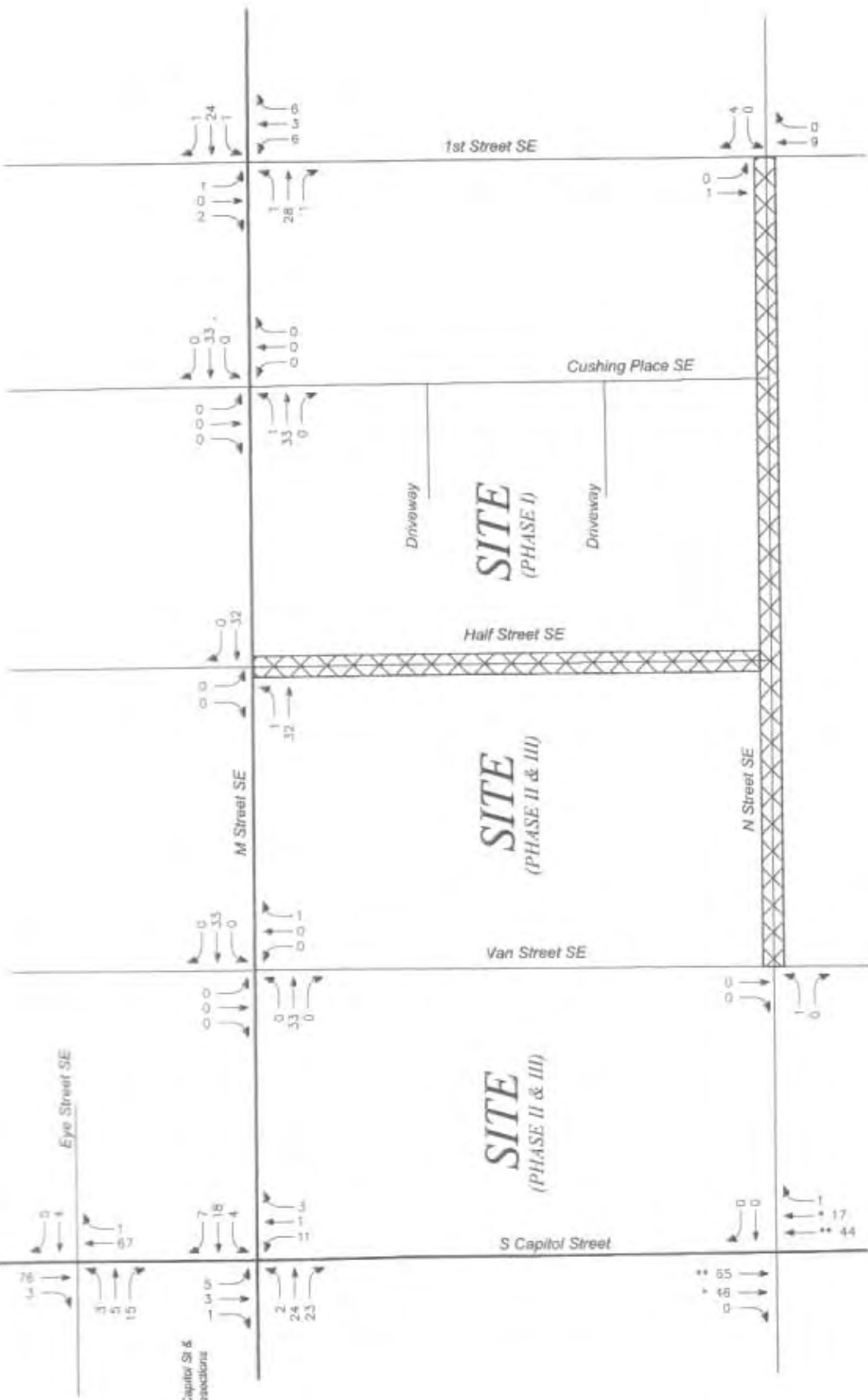


Figure 5-2 Background Future Ballpark Peak 4-5 PM Traffic Growth 2008



Monument Ballpark - Square 700 & 701  
Washington, D.C.

WELLS & ASSOCIATES, LLC  
TRAFFIC, ENGINEERING, AND SURVEILLANCE CONSULTANTS

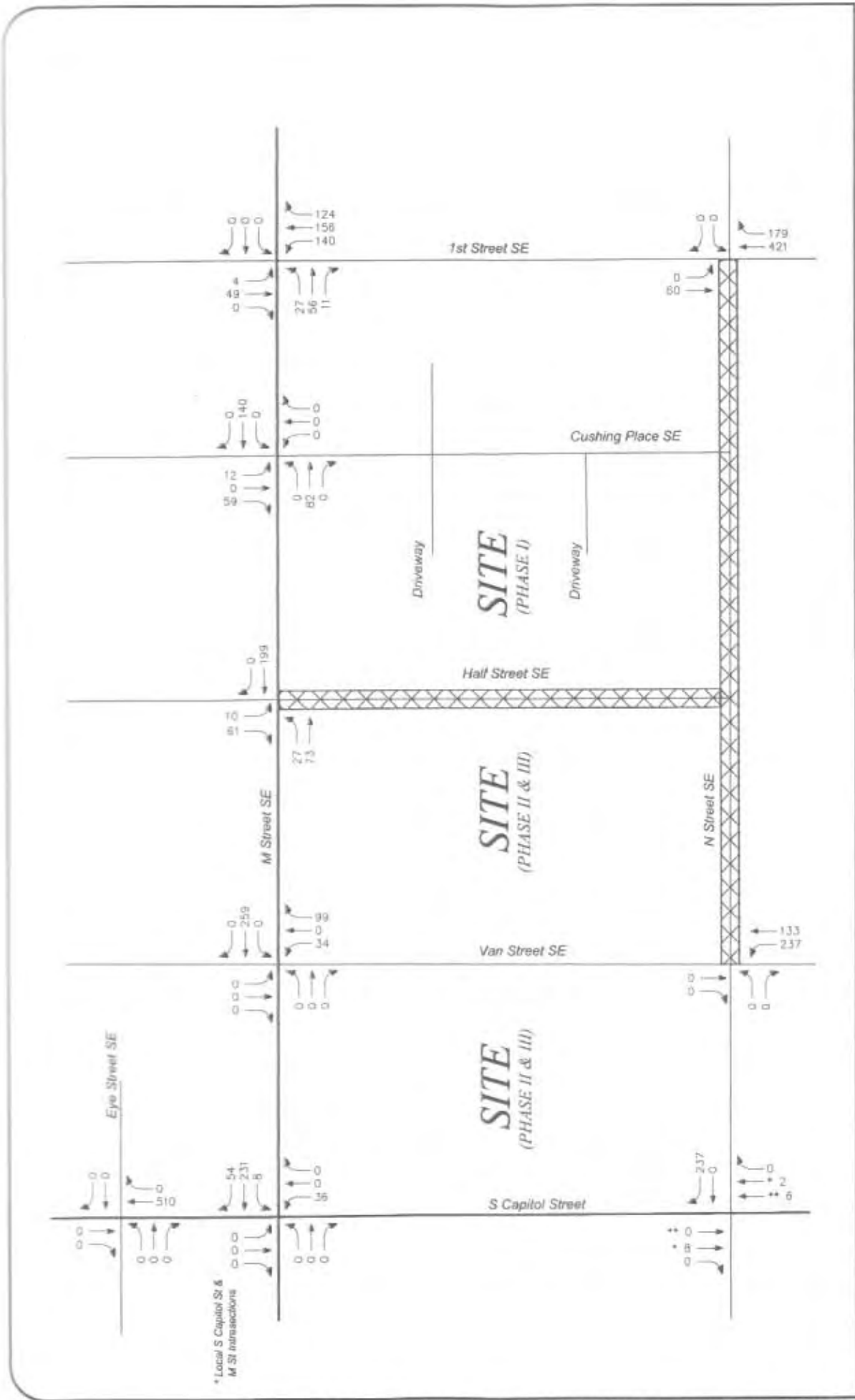
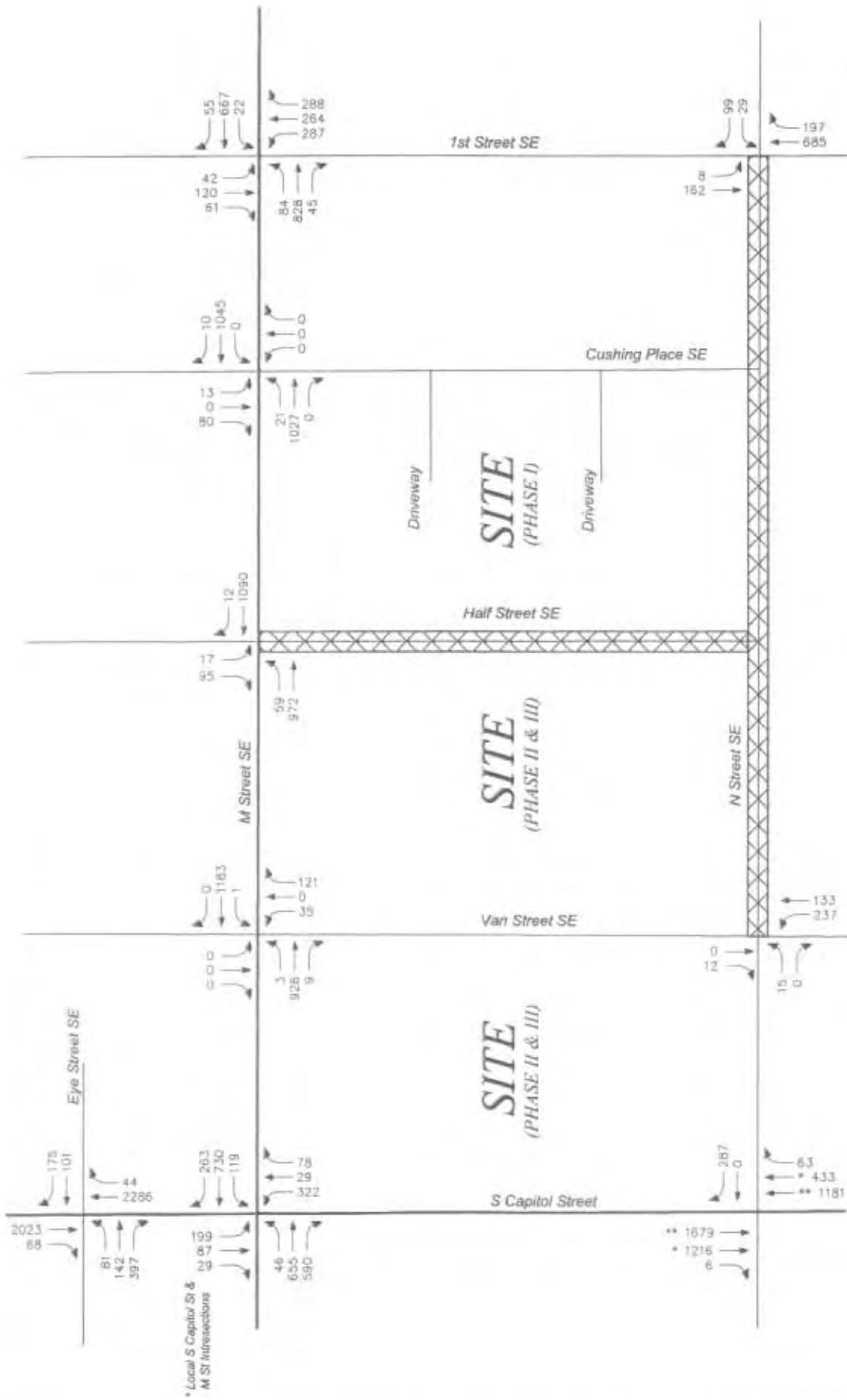


Figure 5-3  
Ballpark Generated Traffic Peak Hour 4-5 PM Assignments 2008





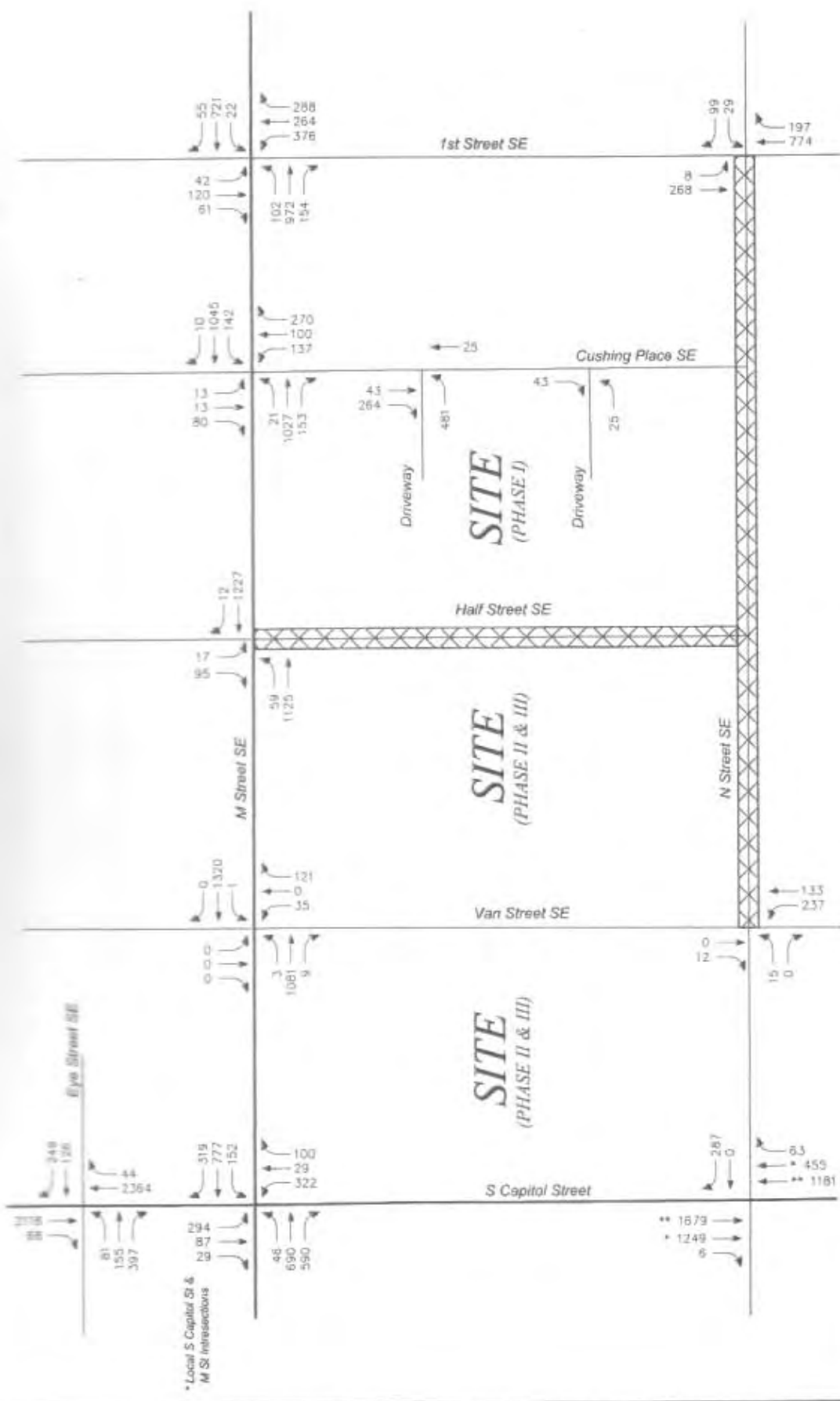
**Figure 5-4**  
**Background Future Ballpark Peak 4-5 PM Traffic Forecasts 2008**



Monument Ballpark - Square 700 & 701  
 Washington, D.C.

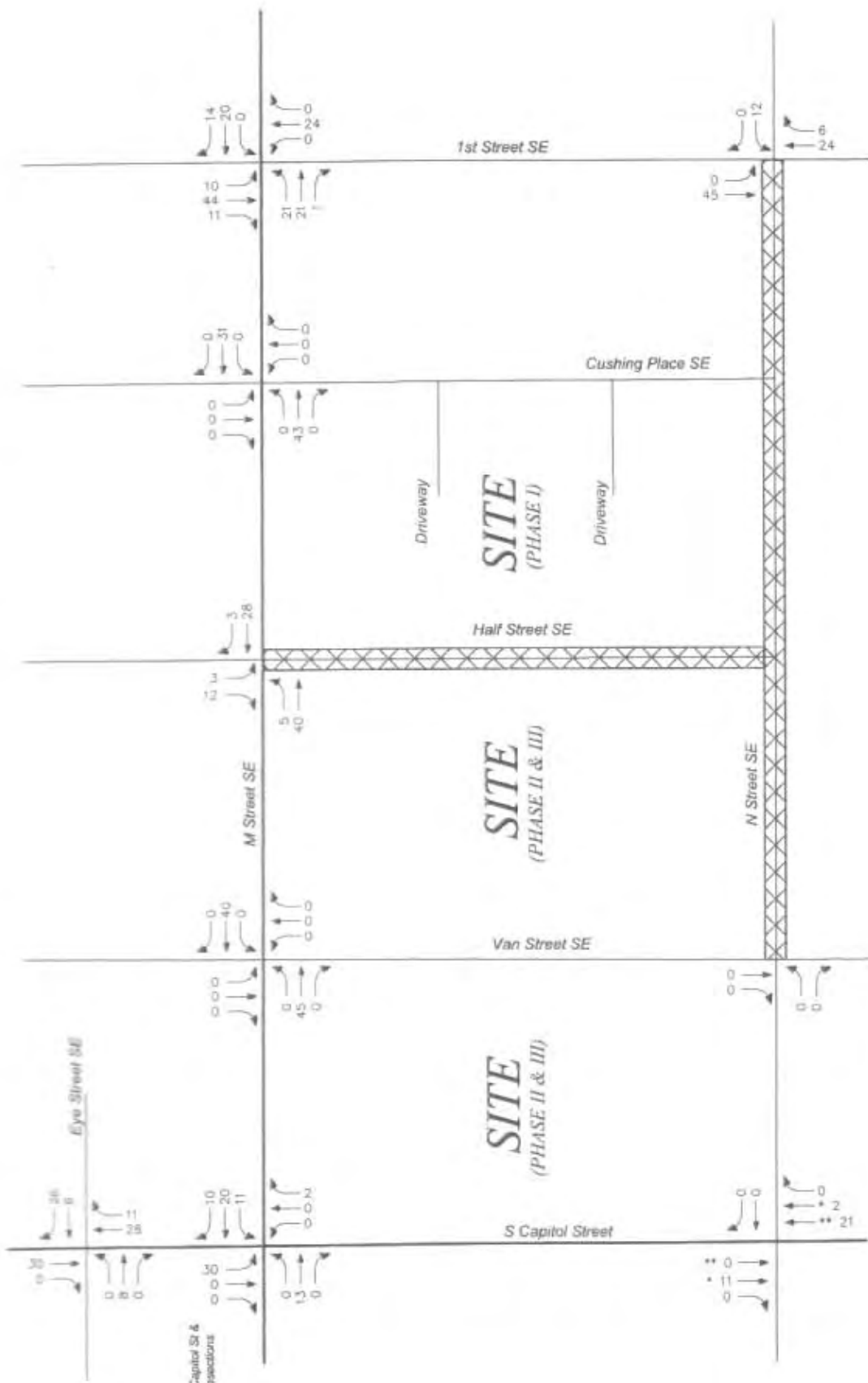
WELLS & ASSOCIATES, LLC  
 TRAFFIC, TRANSPORTATION, and URBANIC CONSULTING





56 **Figure 5-6**  
**Total Future Ballpark Peak 4-5 PM Traffic Forecasts 2008**

C:\Projects\2001-2500\3340 Monument Field\Report\Chart\Graphic\3340 RA1-Graphic\Chart\Graphic\Chart1.dwg



AS PER WORK  
10/11/2008

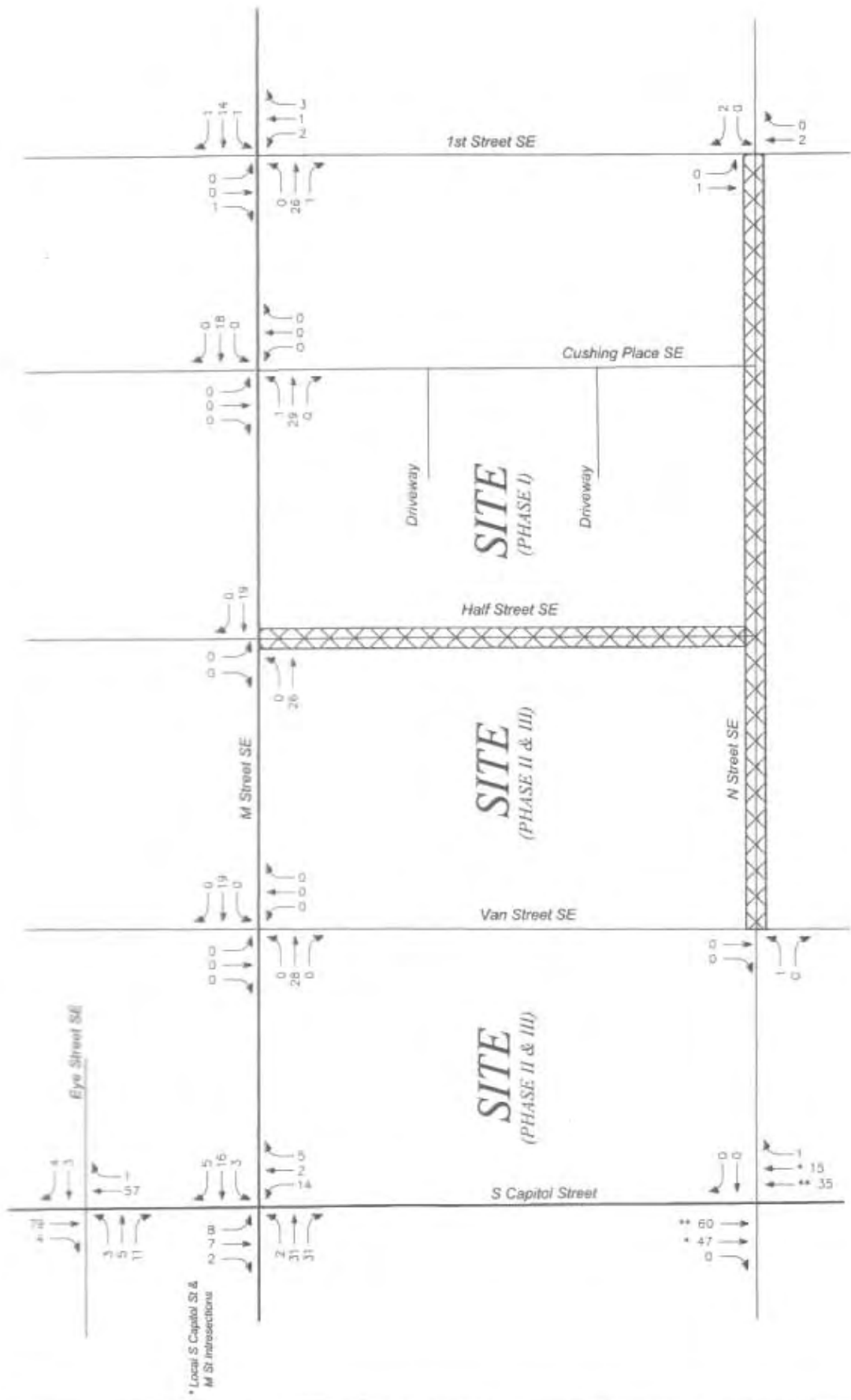
North

Figure 5-7  
Other Development Ballpark Peak 6-7 PM Traffic Assignments 2008

57

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Monument Ballpark - Square 700 & 701  
Washington, D.C.



\* Local S Capital St & M St Intersections

= Road Closure During Baseball Games  
 To/From Local S Capital Street & M Street Intersection  
 To/From S Capital Street Underpass

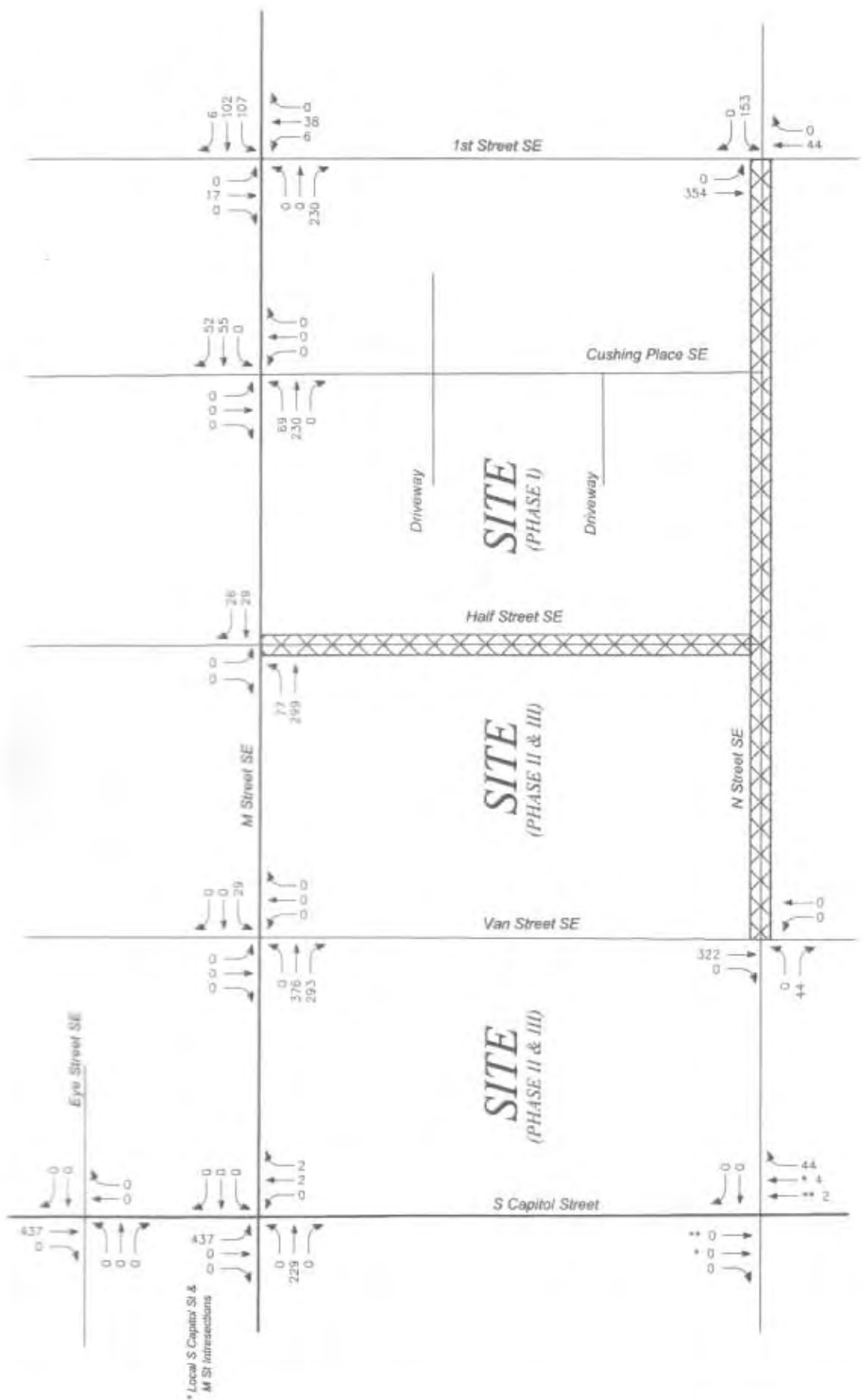
Figure 5-8  
Background Future Ballpark Peak 6-7 PM Traffic Growth 2008



Monument Ballpark - Square 700 & 701  
Washington, D.C.

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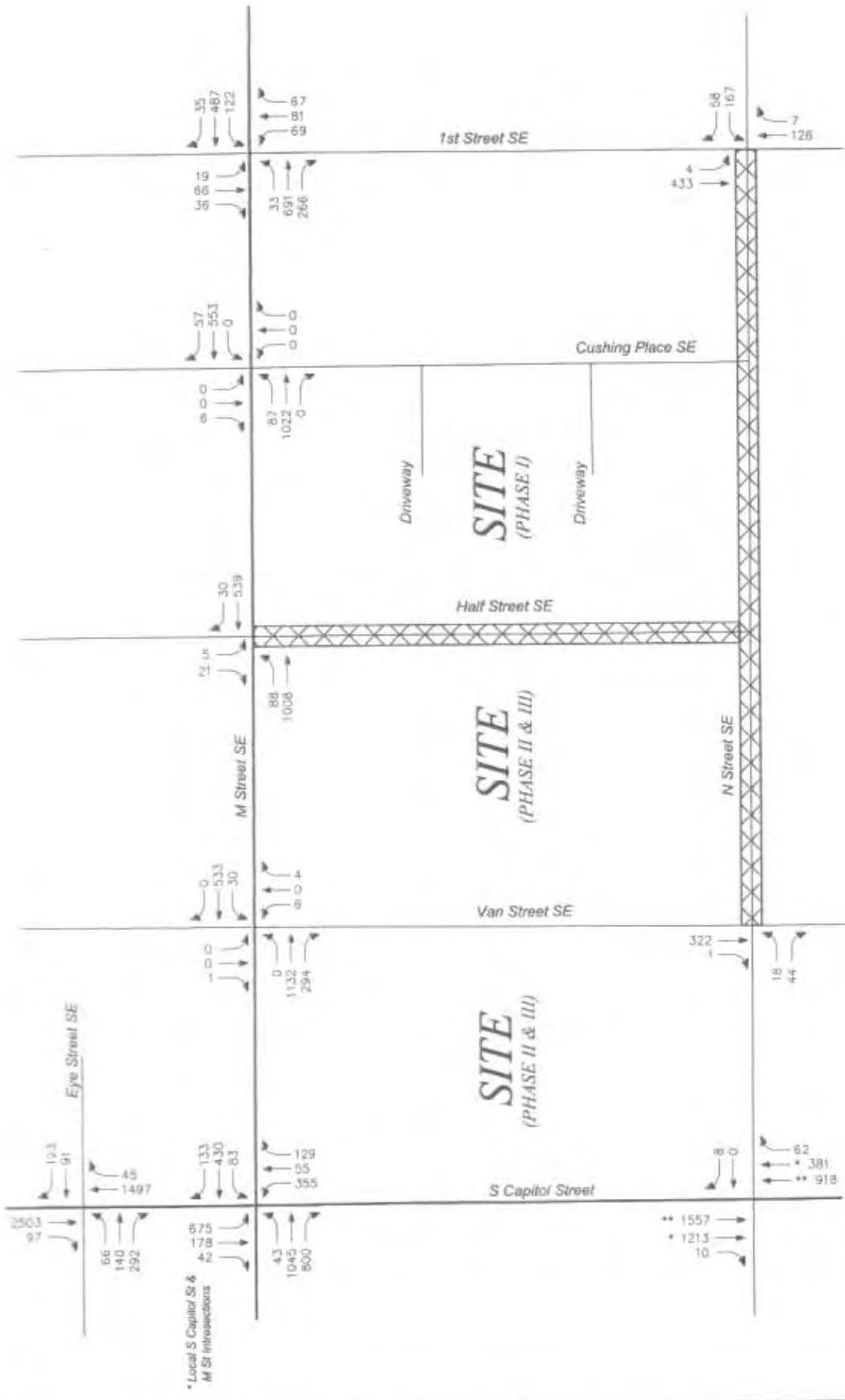
▲ PEAK HOUR  
▲ PEAK HOUR  
000/700  
North

☒ = Road Closure During Baseball Games  
\* Top From Local S Capitol Street & M Street Intersection  
\*\* Top From S Capitol Street Underpass

50 Figure 5-9  
50 Ballpark Generated Traffic Peak Hour 6-7 PM Assignments 2008

Monument Ballpark - Square 700 & 701  
Washington, D.C.

◆ WELLS & ASSOCIATES, I.L.C.  
PLANNING, TRANSPORTATION, AND PUBLIC CONSULTANTS

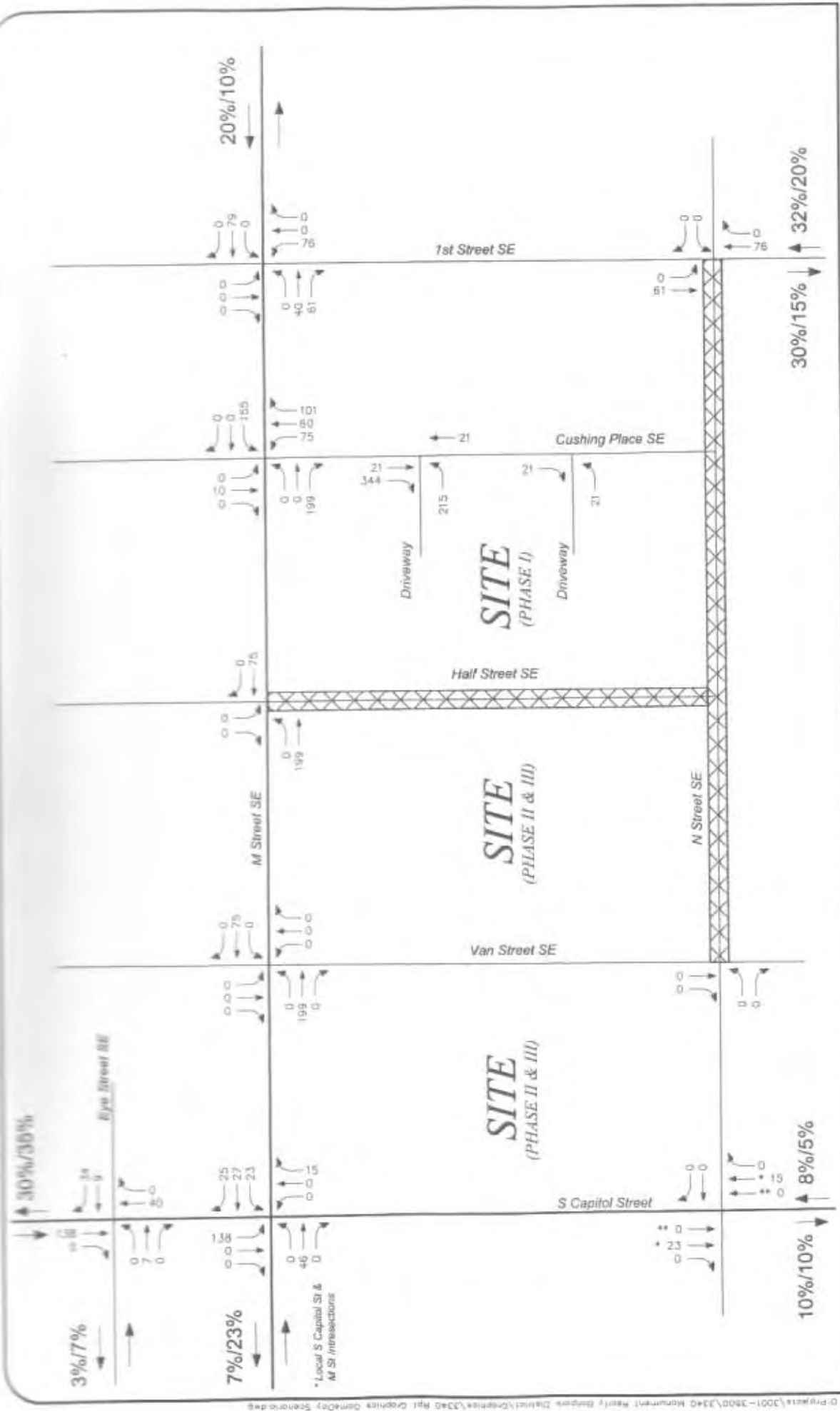


60 Figure 5-10 Background Future Ballpark Peak 6-7 PM Traffic Forecasts 2008

Monument Ballpark - Square 700 & 701  
Washington, D.C.

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TRAFFIC ENGINEERING AND PLANNING CONSULTANTS





XX% / XX% = Office Uses/Residential & Hotel Uses  
 XXX% / XX% = Road Closure During Baseball Games  
 \* To/From Local S Capitol Street & M Street Intersection  
 \*\* To/From S Capitol Street Underpass

Figure 5-11  
 Site Generated Phase I - 6-7 PM Traffic Assignments



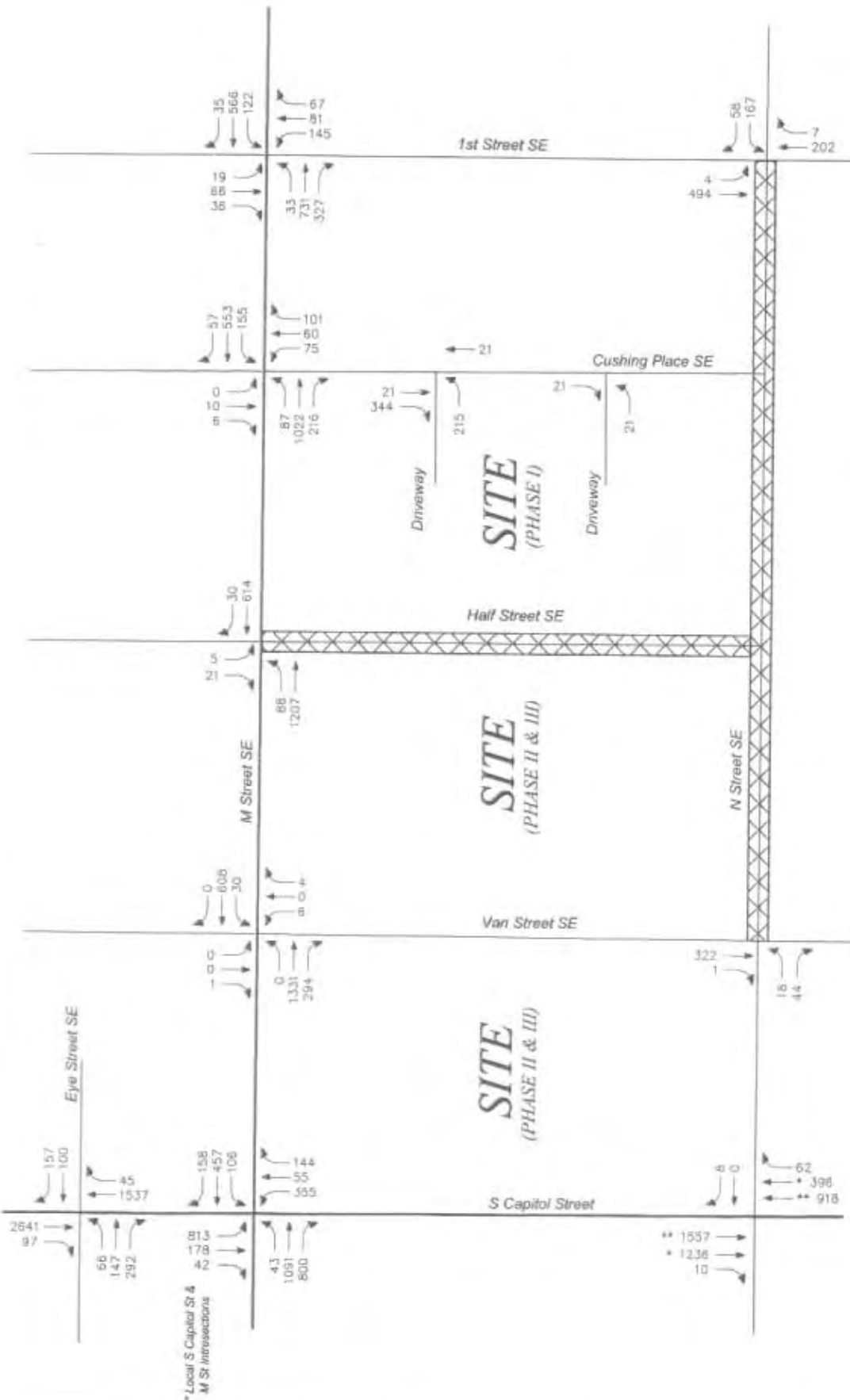


Figure 5-12  
Total Future Ballpark Peak 6-7 PM Traffic Forecasts 2008



Monument Ballpark - Square 700 & 701  
Washington, D.C.

WELLS & ASSOCIATES, LLC  
TRAFFIC, TRANSPORTATION, AND PLANNING CONSULTANTS

Table S-1

Monument Ballpark - Square 700 &amp; 701

2008 Pipeline Project Trip Generation Game Day Condition(1)

Background Development Land Use	Land Use Code	Size	Units	Afternoon Game (Post-Game) Peak Hour 4-5 PM			Evening Game (Pre-Game) Peak Hour 6-7 PM		
				In	Out	Total	In	Out	Total
<b>200 W. Street SE</b>									
Office	710	180,633	S.F.	18	38	56	6	15	21
<b>Square 667PH Phase I (1st &amp; L Street SE)</b>									
Residential	230	250	D.U.	33	20	53	18	16	34
<b>Inflow on 70 E. Street (Phase I)</b>									
Residential	220	449	D.U.	82	49	131	46	40	86
<b>100 W. Street SE</b>									
Office	710	225,000	S.F.	21	45	66	8	18	26
Retail	820	15,000	S.F.	55	59	114	42	47	89
				76	104	180	50	65	115
<b>US DOT</b>									
Office	710	5,500	Employees	114	240	354	41	95	136
Retail	820	13,500	S.F.	24	26	50	12	21	40
				138	266	404	60	116	176
<b>Total Background Development</b>				<b>347</b>	<b>477</b>	<b>824</b>	<b>180</b>	<b>252</b>	<b>432</b>

Notes: (1) Based on Trip Generation, 7th Edition, Institute of Transportation Engineers.

Percent of ADT used to calculate diurnal traffic (4-5 PM):

Residential	Office	Retail
Inbound: 6.40%	Inbound: 2.44%	Inbound: 4.85%
Outbound: 3.85%	Outbound: 5.11%	Outbound: 5.20%

Percent of ADT used to calculate diurnal traffic (6-7 PM):

Residential	Office	Retail
Inbound: 3.55%	Inbound: 0.87%	Inbound: 3.7%
Outbound: 3.15%	Outbound: 2.03%	Outbound: 4.15%

(2) Non-auto mode splits were adapted from the U.S. Census 2000 Data Summary File 3

(3) US DOT Trip Generation was taken from "United States Department of Transportation Traffic Impact Statement", Gorove-Slade Associates, March 14, 2003

Table 5-2

Monument Ballpark - Square 700 &amp; 701

Ballpark Generated Traffic: Departing Afternoon Game 4-5 PM &amp; Arriving Evening Game 6-7 PM

Park Lot Location	Number of Patron Spaces <sup>1</sup>	Percent Departing Afternoon Game Between 4-5 PM <sup>2</sup>	Outbound	Percent Arriving Evening Game Between 6-7 PM <sup>2</sup>	Inbound
On-Site North Parking	975	70%	683	60%	585
On-Site South Parking	100	70%	70	60%	60
1100 S Capital Street	90	70%	63	60%	54
1000 S Capital Street	100	70%	70	60%	60
20 M Street	190	70%	133	60%	114
80 M Street	200	70%	140	60%	120
100 M Street	200	70%	140	60%	120
SE Federal Center Parcel H11	406	70%	284	60%	244
WASA	444	70%	311	60%	266
<b>Total Ballpark Generated Vehicle Trips</b>			<b>1,894</b>		<b>1,623</b>

Notes:

<sup>1</sup> Parking lot information received from Gorove-Slade Associates<sup>2</sup> Departure & Arrival information based on "D.C. Major League Baseball Park", Gorove-Slade Associates, April 13, 2006

Table 3-3  
 Monument Ballpark - Square 700 & 701  
 Site Trip Generation Summary<sup>1</sup>

Land Use	ITE Code	Size	Units	Afternoon Game (Post-Game) Peak Hour 4-5 PM			Evening Game (Pre-Game) Peak Hour 6-7 PM		
				IN	OUT	TOTAL	IN	OUT	TOTAL
<b>Phase 1</b>									
<b>Square 700</b>									
Apartment	220	330	DU's	137	82	219	76	67	143
Internal Captions				32	21	41	25	16	41
General Trips (Total - Internal)				105	61	178	51	51	102
Person Trips <sup>2</sup>				121	70	205	59	59	117
Site Specific General Vehicle Trips <sup>3,4</sup>				43	25	68	21	21	42
General Office Building	710	288,285	SF	74	154	228	26	61	87
Internal Captions				8	8	16	6	5	11
General Trips (Total - Internal)				66	146	212	20	56	76
Person Trips <sup>2</sup>				76	168	244	23	64	87
Site Specific General Vehicle Trips <sup>4,5</sup>				38	84	122	12	32	44
Hotel	310	196	Rooms	61	55	116	61	55	116
Internal Captions				20	3	23	20	3	23
General Trips (Total - Internal)				41	52	93	41	52	93
TDM Reduction <sup>6,7</sup>				11	14	25	11	14	25
General Vehicle Trips (External - Transit)				30	38	68	30	38	68
Shipping Center	820	60,000	SF	236	253	489	180	202	382
Internal Captions				29	62	91	23	53	76
General Trips (Total - Internal)				207	191	398	157	149	306
Person Trips <sup>2</sup>				207	191	398	157	149	306
Site Specific General Vehicle Trips <sup>4,8</sup>				188	174	362	143	135	278
Ballpark Public Parking <sup>9</sup>		250	Parking Spaces	-	175	175	150	-	150
<b>Total External Vehicle Trips (Square 701 - Phase 1)</b>				<b>299</b>	<b>496</b>	<b>795</b>	<b>356</b>	<b>226</b>	<b>582</b>

Notes:

- <sup>1</sup> Vehicle trips generated using Institute of Transportation Engineers (ITE) Trip Generation, Seventh Edition.
- Percent of ADT used to calculate diurnal traffic (4-5 PM):
 

Residential	Office	Retail
Inbound: 6.40%	Inbound: 2.44%	Inbound: 4.85%
Outbound: 3.85%	Outbound: 5.11%	Outbound: 5.20%
- Percent of ADT used to calculate diurnal traffic (6-7 PM):
 

Residential	Office	Retail
Inbound: 3.55%	Inbound: 0.87%	Inbound: 3.7%
Outbound: 3.15%	Outbound: 2.03%	Outbound: 4.15%
- <sup>2</sup> Based on a non-auto mode split of 25% and an average auto occupancy of 1.15.
- <sup>3</sup> Based on a non-auto mode split of 54% and an average auto occupancy of 1.30.
- <sup>4</sup> Non-auto mode split values from 2005 Development-Related Ridership Survey Final Report dated March 2006.
- <sup>5</sup> Based on a non-auto mode split of 25% and an average auto occupancy of 1.30.
- <sup>6</sup> Based on a non-auto mode split of 27%.
- <sup>7</sup> Based on a non-auto mode split of 0% and an average auto occupancy of 1.0.
- <sup>8</sup> Based on a non-auto mode split of 10% and an average auto occupancy of 1.0.
- <sup>9</sup> 10% Departure (4-5 PM) & 60% Arrival (6-7 PM), based on "D.C. Major League Baseball Park", Gorove-Stade Associates.

**SECTION 6**  
**M STREET AT HALF STREET – CONSIDERATION OF SIGNAL WARRANT**  
**CRITERIA**

A traffic signal was identified as a possible mitigation measure for the Half Street and M Street intersection in beginning in 2008 Future Background conditions prior to any site traffic being added to the network. While a signal mitigates the undesirable LOS indicated by the capacity analysis, the Manual for Uniform Traffic Control Devices (MUTCD) traffic signal control warrant criteria need to be reviewed to determine if a signal is justified. Each of the eight warrants from the MUTCD is reviewed to identify if a signal could be “warranted” at this location.

**Warrant 1, Eight-Hour Vehicular Volume**

This warrant is intended for locations where a large volume of intersecting traffic is the principal reason to consider installing a signal or where the traffic volume on a minor intersecting street suffers excessive delay. To satisfy this warrant the minimum vehicular volume conditions given in Table 6-1 need to exist for each of any 8 hours of an average day.

Table 6-1  
 Monument Ballpark – Square 700 & 701  
 Warrant 1 Minimum Volume Criteria

Warrant 1, Eight-Hour Vehicular Volume	Major Street Total Minimum <sup>1</sup>	Higher Minor Street Approach Minimum <sup>1</sup>
Condition A-Minimum Vehicular Volume	600	150
Condition B-Interruption of Continuous Traffic	900	75
Combination of Conditions A and B <sup>2</sup>	480 and 720	120 and 60

<sup>1</sup>Based on 2 or more major street approach lanes and 1 minor street approach lane.

<sup>2</sup>Based on 80% of minimum required volumes for Condition A and Condition B.

In that only AM and PM peak period traffic was considered in this study, there is not sufficient data to fully evaluate this warrant. However, the peak hour volumes for each analysis horizon were reviewed based on the minimum vehicle requirements in Table 6-1 to give an indication of possible warrant satisfaction. The results of the analysis are shown in Table 6-2.

As shown in Table 6-2, only Condition B is satisfied for the PM peak hour starting in the 2008 Total Future condition. For 8 hours of a typical day to meet the minimum warrant criteria, it would be expected that at least both the AM and PM peak hours would meet the criteria. Since this is not the case it is doubtful that Warrant 1 will be satisfied in future conditions.



**Table 6-2**  
**Monument Ballpark – Square 700 & 701**  
**Warrant 1 Evaluation for Peak Hour Conditions**

Scenario	Peak Hour	Major Street Total	Higher Minor Street Approach	Condition A Satisfied? <sup>1</sup>	Condition B Satisfied? <sup>1</sup>	Combination of A and B Satisfied? <sup>1,2</sup>
Existing	AM	1,381	32	No	No	No
	PM	1,654	39	No	No	No
2008 Background	AM	1,644	61	No	No	No
	PM	1,871	64	No	No	No
2008 Total Future	AM	1,793	61	No	No	No
	PM	2,007	78	No	Yes	No
2014 Background	AM	2,473	70	No	No	No
	PM	3,013	106	No	Yes	No
2014 Total Future	AM	2,546	70	No	No	No
	PM	3,152	106	No	Yes	No

<sup>1</sup>Based on 2 or more major approach lanes and 1 minor street approach lane.  
<sup>2</sup>Based on 80% of minimum required volumes for Condition A and Condition B.

### Warrant 2, Four-Hour Vehicular Volume

The Four-Hour vehicular volume warrant conditions are intended to be applied where the volume of intersecting traffic is the principal reason to consider installing a traffic control signal. In order for this warrant to be met, the higher volume minor approach must have 80 vehicles per hour and the major street must have at least 1,400 vehicles per hour. This condition must exist for 4 hours of a typical day.

Referring back to Table 6-2, this condition is met for the PM peak hour beginning in the 2014 Future Background condition. If the resulting conditions in 2014 result in another 3 hours of the day satisfying this criteria than this warrant would be satisfied. A warrant study would need to be done at a future date to determine if the criterion is satisfied.

### Warrant 3, Peak Hour

The peak hour signal warrant is intended for unusual cases that attract or discharge large numbers of vehicles over one hour on an average day. Such cases include manufacturing plants, industrial complexes, office complexes, etc. Even though the new stadium will discharge a large amount of traffic in a short duration, this will not be an average day condition and therefore this warrant is not applicable.

#### **Warrant 4, Pedestrian Volume**

The Pedestrian Volume signal warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street. For this warrant to be satisfied, both of the following criteria must be met:

- A. The pedestrian volume crossing the major street during an average day is 100 or more for each of any 4 hours or 190 or more during any 1 hour; and
- B. There are fewer than 60 gaps per hour in the traffic stream of adequate length to allow pedestrians to cross during the same period when the pedestrian volume criterion is satisfied.

The existing pedestrian counts crossing M Street at this location are 23 and 35 for the AM and PM peak hours, respectively. These volumes occur with relatively little existing development. Most of these pedestrians are crossing M Street to use the Metro portal located in the southeast quadrant of the intersection.

As discussed in the 2008 and the 2014 analysis, there will be substantial background development that will add considerable pedestrian traffic to the streets. The USDOT headquarters will contain 5,500 employees. In addition, more than 5,000 dwelling units, approximately 1,000,000 s.f. of office and 350,000 s.f. of retail are planned in the vicinity of the intersection for both sides of M Street. The new baseball park will also add substantial pedestrian traffic during game times. Many of the parking spaces available for baseball patrons will be north of M Street with patrons crossing at Half Street to get to the stadium entrance one block away. This development does not include the additional pedestrian traffic that will be generated by the Monument development on Squares 700 and 701.

Given the radical change that is expected for the area, it is anticipated that pedestrian volumes will evidentially exceed the minimum warrant criteria and therefore planning for a future signal at this location is recommended regardless of the development taking place on the Monument site. Pedestrian volumes should be revisited at a later date once the new streetscape and new development begin to establish pedestrian patterns. This warrant is anticipated to be met in future conditions.

#### **Warrant 5, School Crossing**

This warrant is not applicable as the intersection is not a school crossing.

#### **Warrant 6, Coordinated Signal System**

This warrant is not applicable because the resultant signal spacing would be less than 1,000 feet.

**Warrant 7, Crash Experience**

This warrant requires that 5 or more crashes of the types susceptible to correction by a traffic control signal have occurred within a 12 month period. Crash data needs to be reviewed for the past 3 years to determine if this warrant is met. The potential for incidents could increase with the new traffic generated by the collective future development. This warrant is not known to be met at this time.

**Warrant 8, Roadway Network**

This warrant is applicable to intersections of two or more major routes and does not apply.

## SECTION 7 CONCLUSIONS

The conclusions of this traffic impact study are as follows:

1. The proposed Monument Ballpark development on Squares 700 & 701 provides effective vehicular and pedestrian access to the Navy Yard Metrorail Station and the surrounding street network. The immediate proximity to the Metrorail station and the urban street grid helps reduce the demand for private automobile use.
2. Heavy commuter traffic along the South Capitol Street corridor contributes to vehicle delays on the main line and at the cross streets in the study area.
3. Most of the study intersections currently operate at acceptable levels of service during the AM and PM peak hours with the exception of a few approaches at the South Capitol Street intersections.
4. M Street is the east-west corridor serving the SW and SE DC waterfront areas. Substantial development is planned in the vicinity that will substantially increase future traffic volumes on M Street and the local street network.
5. Major roadway improvements planned in conjunction with the construction of the new ballpark will greatly improve vehicular access around the site along with enhance the pedestrian and bicycle environment.
6. The pipeline developments in the study area would generate a total of 913 AM peak hour trips and 1,003 PM peak hour trips upon completion in 2008. An additional 2,134 AM peak hour trips and 3,497 PM peak hour trips would be generated by the pipeline developments by 2014.
7. A new traffic signal at the intersection of M Street and Half Streets will mitigate the unacceptable LOS that occurs in the 2008 background condition prior to site trips being added to the network.
8. A signal at M Street and Half Streets would have great benefit for pedestrians crossing M Street. The location of the Metro portal at the intersection and the location of the ballpark entrance a block to the south will increase pedestrian flows at this intersection. A signal at this location is consistent with the spacing of existing signals along M Street.
9. The Pedestrian Volume signal warrant for M Street and Half Street will likely be met in future conditions as a result of planned development even if the Monument Phase

1 and Phase 2 & 3 sites are not developed. There is also the potential for the intersection to satisfy the Four-Hour Vehicular Volume warrant in 2014 conditions.

10. The Monument Ballpark – Phase 1 project in Square 701, including 330 condominium apartments, a 196 room hotel, 288,285 S.F. of office and 60,000 S.F. of retail, will generate approximately 499 AM peak hour vehicle-trips and 720 PM peak hour vehicle-trips at full build out and occupancy in 2008.
11. The traffic generated by the Phase 1 site trips in 2008 will not degrade the study intersections beyond acceptable LOS with the exception of Cushing Place at M Street where the minor Cushing Place approaches increase in delay as a result of site traffic. The level of delay is generally considered acceptable for an urban, minor street approach.
12. The Monument Ballpark – Phase 2 & 3 project in Square 700, including 881 condominium apartments, 448,210 S.F. of office and 67,856 S.F. of retail, will generate approximately 691 AM peak hour vehicle-trips and 947 PM peak hour vehicle-trips at full build out and occupancy in 2014.
13. The traffic generated by the Phase 2 & 3 site trips in 2014 will cause some additional delay at the South Capitol Street intersections. However, because the delay increase changes some marginal LOS "D's" to "E's," there will not be a noticeable operational difference.
14. The Phase 2 & 3 site trips will increase delay at the intersections of Cushing Place and Van Street at M and N Streets, particularly during the PM peak hour. The delay will affect outbound site trips and not thru traffic on M Street or N Street.
15. Cushing Place and Van Street facilitate site access and both streets intersect M Street with unsignalized stop control. These unsignalized approaches will experience long delays during peak periods, particularly for outbound site traffic wanting to turn left (westbound) onto M Street. At times the delay will cause familiar motorists to seek alternate routes. A new signal at M Street and Half Street would help create acceptable gaps in M Street traffic thereby benefiting these unsignalized intersections.
16. The Monument Ballpark – Phase 1 would provide approximately 550 parking spaces. This is more than the minimum requirement of 395 spaces required by DC regulations. The Phase 2 & 3 program would require a minimum of 629 spaces based on the preliminary program. A parking program has not been determined for Phase 2 & 3.

17. The Monument Ballpark – Phase I would provide sufficient loading dock accommodations. The loading needs for Phases 2 & 3 will be determined when the building program is further refined.
18. It is estimated that 4,600-4,700 cars will park within the vicinity of the ballpark for a sellout weekday game.
19. The weekday Ballpark traffic will peak from 4-5 PM for the outbound flow of a 1:05 PM game or peak during 6-7 PM for the inbound flow of a 7:05 PM game. These peak ballpark flows do not directly overlap the peak commuter hour of 5-6 PM.
20. Approximately 70% of ballpark patrons will depart in the 4-5 PM hour after a game start time of 1:05 PM and 60% of the patrons will arrive in the 6-7 PM hour before the game start time of 7:05 PM.
21. The Traffic Operations Control Plan for the ballpark is currently in development. The TCOP will need to address the dependence of site access on the operation of the M Street and Cushing Place intersection when N and Half Streets are closed to vehicular traffic. There may be an opportunity to maintain partial vehicular circulation on N Street between Cushing Place and First Street to aid site access.