



WELLS + ASSOCIATES

MEMORANDUM

TO Jeff Jennings District Department of Transportation

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RE Square 102B – The George Washington University Museum
Transportation Assessment

DATE March 14 2012

INTRODUCTION

The George Washington University (GW) Campus Plan/PUD identifies Square 102B as a potential redevelopment site on campus. Square 102B is located on the northeast corner of the 21st Street/G Street, NW intersection as shown on Figure 1. The University is moving forward now with the Second Stage PUD and further processing application for the Square 102B redevelopment.

The proposed redevelopment plan calls for the construction of the GW Museum which will include a new structure and a renovation of the historic Woodhull House as shown on Figures 2A and 2B. The new museum building will cover a footprint of approximately 7 300 square feet (SF) with two below grade and four above grade stories with a total combined gross floor area of approximately 24 000 SF. The Museum will house gallery and exhibition spaces including a high bay gallery and will provide learning and educational facilities. In addition there will be library facilities staff offices and collections processing.

The University also will construct an approximately 20 000 SF conservation and resource center on its Virginia Science and Technology Campus (VSTC) in Ashburn Virginia for the study and care of Museum's collections. This center will include storage facilities a conservation laboratory and facilities for access to the collections. Importantly this center will help facilitate deliveries to the new museum on the Foggy Bottom Campus by allowing the University to coordinate and consolidate deliveries from various off site locations and use smaller vehicles for these deliveries.

A curb cut is proposed on 21st Street to access the Museum's loading facilities however no on site parking is proposed. Therefore patrons of the Museum will use public transportation and taxicabs walk bike or park in nearby parking garages or nearby on street parking spaces. Those who work at the Museum would be University employees and would have access to the University's existing transportation

demand management (TDM) plan which includes various amenities and incentives that encourage University employees to utilize alternative modes of transportation

This memorandum provides a transportation assessment of the (1) anticipated trip generation for the Museum (2) proposed loading for and access to the Museum (3) availability of nearby public parking garages and on street parking spaces and (4) existing TDM amenities and incentives offered by the University for its employees

TRIP GENERATION

Overview

Since the Institute of Transportation Engineers Trip Generation does not include trip generation rates/equations for museums (or any similar uses) various other studies for museums and information provided by the existing Textile Museum (which will become part of the GW Museum) were taken into consideration when estimating the number of vehicle trips anticipated to be generated by the proposed Museum. Specifically studies for the Northern California Natural History Museum the Chicago Children's Museum and the Hillwood Museum and Gardens (HMG) in Washington DC were examined to determine appropriate trip generation estimates for the GW Museum. The following is a summary of the relevant information from each of those studies

Northern California Natural History Museum

Memorandum dated October 16 2007
To California State University Chico
From ESA Community Development
Subject: Natural History Museum Intersection Analysis

- Proposed to be located on the campus of California State University Chico
- Proposed to be approximately 17 533 SF
- Assumed 2.7 visitors per vehicle
- Assumed one daily visitor per 25 SF (for a total of approximately 700 daily visitors)
- Calculated 260 daily trips 10 weekday AM peak hour trips and 26 weekday PM peak hour trips

Chicago Children's Museum

Traffic Impact Analysis Report dated June 19 2007
Prepared for Jones Lang LaSalle and Chicago Children's Museum
Prepared by Metro Transportation Group Inc

- Proposed to be relocated to Grant Park in Chicago Illinois

- More than 2 200 visitors per day (based on 811 000 annual visitors and 365 days per year) at the existing Children s Museum
- Estimated 2 56 visitors per vehicle

Hillwood Museum and Gardens

Transportation Study dated October 12 2004
Prepared for Hillwood Museum and Gardens
Prepared by Wells + Associates

- Located on 25 acres in Rock Creek Park in the northwest section of Washington DC
- 80 full time and 15 part time employees
- 15 to 20 volunteers per day
- Attracted 43 000 annual visitors
- Attendance limited to a maximum of 250 visitors per day
- Average weekday attendance was 156 visitors per day
- Observed 2 4 visitors per vehicle
- Observed 25 AM and 28 PM commuter peak hour trips on a day with 103 daily visitors

Based on all of the information above it was determined that the HMG had the most similar operating characteristics compared to the anticipated operating characteristics of the proposed GW Museum (i.e. number of daily visitors location average vehicle occupancy). Therefore much of the data collected as part of the HMG Transportation Study was applied to the information known about the proposed GW Museum. However it should be noted that the HMG s nearest Metro station is nearly one mile away (walking distance) and additionally the area surrounding the HMG is not nearly as transit oriented (bus service walk/bike accessible etc.) as the GW Museum site consequently use of the HMG data should be considered conservative.

Visitor Trip Generation

The existing Textile Museum currently has an average attendance of 62 visitors per day. With its relocation to Square 102B GW anticipates the average daily attendance by non GW affiliated patrons to increase by approximately 10 percent (or to approximately 68 visitors per day). An additional increase in the number of daily visitors is anticipated from GW affiliated patrons however all of these visitors would walk (or bike) to and from the Museum since they would be on the Foggy Bottom campus. Therefore the increase in visitors from GW affiliated patrons was not included in the vehicle trip generation calculations.

The site is well served by a variety of transportation options. The Foggy Bottom – GWU Metro station is located just four blocks from the site and several bus routes operate near the site. Additionally 17 Zipcars are located on the Foggy Bottom campus and two Capital Bikeshare Stations are located within three blocks of the subject site. Therefore a portion of the non GW visitors would access the Museum

via non auto modes of transportation. A 25 percent non auto mode split which likely is very conservative for this development due to the prevalence of other transportation options proximate to the site was applied to the number of anticipated visitors. Accordingly it is estimated that 51 visitors would utilize a vehicle to visit the Museum each day. Note that the 51 visitors arriving via a vehicle would include patrons using personal vehicles who would need to find parking in nearby parking garages or on street spaces and also would include patrons who take taxicabs who would not require parking.

Next, the average vehicle occupancy (AVO) of 2.4 visitors per vehicle observed at the HMG was applied to the 51 visitors utilizing a vehicle. Therefore 21 vehicles would be expected to be used to transport visitors to/from the Museum. Each vehicle would generate two trips (one inbound and one outbound) therefore the Museum would generate 42 vehicle trips per day from visitors.

Finally the Textile Museum currently operates from 10:00 AM to 5:00 PM on weekdays. Based on recent studies in the surrounding area the commuter (or roadway) peak hours in the site vicinity generally occur anywhere between 7:30 AM and 9:30 AM for the AM commuter peak hour and anywhere between 5:00 PM and 6:30 PM for the PM commuter peak hour. Therefore it is not anticipated that any visitor vehicle trips would be added to the roadway network during the AM commuter peak hour. Based on data from the HMG study it was assumed that approximately 10 percent of the total daily visitor vehicle trips (or four trips) would occur during the PM commuter peak hour. The number of trips generated by museum visitors is summarized in Table 1.

Employee Trip Generation

Staff at the existing Textile Museum will be moved to the proposed GW Museum upon completion of the new Museum. The Textile Museum currently is staffed with approximately 37 employees. Of the 37 employees 27 will be located at the new Museum on the Foggy Bottom Campus. Ten of the employees will be located at the proposed conservation and resource center at the VSTC.

According to information provided by the Textile Museum approximately 75 percent of the current employees take public transportation or walk to work. This practice is expected to continue at the new museum. Therefore 20 employees are expected to take public transportation or walk to work, seven employees would drive to work.

Each of the employees who drive would generate two trips (one inbound and one outbound) therefore the Museum employees would generate 14 vehicle trips per day.

Information in the HMG study indicates that approximately 10 percent of the daily trips would occur in each of the AM and PM commuter peak hours. However for the GW Museum it conservatively was assumed that all employees who drive would arrive during the AM commuter peak hour and all employees who drive would leave during the PM peak commuter peak hour. The anticipated number of employee trips is summarized in Table 1.

As shown in Table 2 the proposed GW Museum is anticipated to generate a total (visitor + employee) of seven AM peak hour vehicle trips 11 PM peak hour vehicle trips and 56 daily vehicle trips. Detailed trip generation calculations for the proposed Museum are included in Attachment 1.

Table 1
 Trip Generation Summary

Component	AM Peak Hour			PM Peak Hour			Daily
	In	Out	Total	In	Out	Total	
Visitor	0	0	0	1	3	4	42
Employee	7	0	7	0	7	7	14
Total	7	0	7	1	10	11	56 [†]
[†] The number of daily trips excludes truck trips which are expected to be minimal. The number of parcel deliveries (i.e. UPS/FedEx) is expected to be on the order of one per day. The number of other deliveries using the curbside loading zone (e.g. catering deliveries) is expected to be one per week, on average. The number of deliveries using the on-site loading berth is expected to be three per week, on average.							

LOADING AND ACCESS

The Museum will showcase a wide variety of priceless artifacts; therefore, care in transporting these items from the delivery vehicle into the Museum is of the utmost importance. In order to ensure the safekeeping of these national and international artifacts, it is imperative that they be protected from the elements in a secure, temperature- and climate-controlled environment. As such, the proposed building has been designed to include a loading berth, which will enable the majority of delivery vehicles to back into the berth (located inside the building) to unload/load the items within the secure, climate-controlled building. Since an existing alley network does not exist on Square 102 and the interior of the square is characterized by a large pedestrian-oriented network of pathways and open space known as the University Yard, a curb cut is proposed on 21st Street to access the Museum's loading facilities to adequately serve the loading needs of the GW Museum.¹

On average, it is anticipated the curb cut would be used for deliveries three times per week. During setup or teardown of an exhibit, the number of deliveries per week may be slightly higher. Thus, even though the curb cut is of paramount importance to ensure proper protection of the artifacts, the curb cut is not anticipated to be a high-volume driveway.

Based on discussions with the District Department of Transportation (DDOT), GW has agreed to restrict loading activities during the roadway peak periods. That is, delivery trucks will be prohibited from utilizing the curb cut from 7:00 AM to 9:00 AM and from 4:00 PM to 7:00 PM.

The University is willing to provide a mountable curb at the proposed curb cut so that a physical obstruction minimizes unintended use of the curb cut. Additionally, the University is willing to assign a trained traffic control person to monitor and assist with deliveries to the loading berth (i.e., via the curb cut). The traffic control person would help to minimize pedestrian-vehicle conflicts when a vehicle is backing into the curb cut. Finally, the University is willing to allow the curb cut to undergo a monitoring period of three to six months so that its adequacy and safety can be evaluated based on actual operation and observations.

¹ For a more detailed description of the types of loading activity that will take place via the proposed curb cut, see the curb cut justification memorandum submitted to DDOT from Wells + Associates on October 26, 2011.

In order to limit the number of vehicles that must use the curb cut, GW also is proposing a 40 foot loading zone on 21st Street, as shown on Figure 3. Note that the curbside loading zone will overlap the curb cut as shown on Figure 3. The curbside loading zone will be utilized for deliveries that do not include Museum exhibit pieces that must be transported in a secure, temperature- and climate controlled environment. These types of deliveries would include catering vehicles delivering food or rental companies delivering chairs, for example. Furthermore, the curbside loading zone would be utilized for parcel deliveries (e.g., FedEx, UPS, etc.). Providing a curbside location for parcel delivery trucks would discourage these trucks from double parking on 21st Street.

Finally, as shown on Figure 3, in order to facilitate visitor pick ups and drop offs at the Museum, GW is proposing a 53 foot no parking building entrance zone on 21st Street that would prohibit parking during the Museum's operating hours (approximately 10:00 AM to 5:00 PM). The provision for this drop off/pick up zone would further eliminate the need for unintended users to use the curb cut for the loading berth.

With the curbside loading zone and the no parking building entrance zone, five metered on street parking spaces would be eliminated on 21st Street. Three metered spaces would remain south of the no parking building entrance zone and five metered spaces would remain north of the curbside loading zone (near H Street). Additionally, with the relocation of the University Police Department from Woodhull House, the four spaces on G Street that currently are signed for police vehicles only would become available for public parking. Note that once the University Police Department relocates to its new location (to be determined), they likely will need on street parking spaces near that location.

PARKING

Public Parking Garages

On site parking for Museum patrons is not proposed. Therefore, patrons will be required to park in nearby public parking garages or utilize on street parking. As shown on Figure 4 and Table 2, thirteen public parking garages are located within a ¼ mile radius of the proposed Museum. Additionally, as shown on Figure 4, many additional public parking garages are located within one third of a mile of the proposed Museum.

Based on the prevalence of public parking garages in the area surrounding the proposed Museum, it is anticipated that Museum patrons who utilize personal vehicles to access the Museum will have adequate opportunities for parking in public parking garages.

Table 2
 Public Parking Garages within ¼ mile of GW Museum

Garage Number	Address	Operating Days	Operating Hours
1	2112 F Street, NW	Monday – Friday	6 00 AM – 6 00 PM
2	520 19 th Street NW GW Elliott School Garage	Monday – Friday	7 00 AM – 11 00 PM
3	660 18 th Street, NW	Monday – Friday	6 00 AM – 10 00 PM
4	2125 H Street, NW GW Marvin Center Garage	Monday – Sunday	6 30 AM – 12 00 AM
5	820 20 th Street, NW	Monday – Thursday	7 00 AM – 12 30 AM
		Friday	7 00 AM – 1 30 AM
		Saturday	9 00 AM – 1 30 AM
		Sunday	9 00 AM – 12 30 AM
6	2101 I Street, NW	Monday – Thursday	7 00 AM – 12 30 AM
		Friday	7 00 AM – 1 30 AM
		Saturday	9 00 AM – 1 30 AM
		Sunday	9 00 AM – 12 30 AM
7	801 22 nd Street (access from H Street) GW Academic Center Garage	Monday – Sunday	24 hours
8	965 21 st Street, NW	Monday – Friday	7 00 AM – 8 00 PM
9	981 21 st Street, NW	Monday – Friday	6 30 AM – 10 00 PM
10	970 20 th Street NW	Monday – Friday	7 00 AM – 10 00 PM
11	930 20 th Street NW	Monday – Friday	7 00 AM – 8 00 PM
12	1919 Pennsylvania Avenue NW	Monday – Friday	7 00 AM – 9 00 PM
13	1851 H Street, NW	Monday – Friday	7 00 AM – 7 00 PM
14	2020 G Street, NW GW Square 103 Garage	Under Construction	Under Construction

On Street Parking

An inventory of on street parking spaces on the roadways surrounding the site was performed. As shown on Figure 5 various on street parking options would be available for patrons of the Museum. Both metered and unmetered two hour parking is present on 21st Street and G Street during daytime hours (generally 7 00 AM until 6 30 PM). Additional on street parking options would be available specifically on 21st Street after daytime hours (generally after 6 30 PM) when time limit restrictions are lifted.

As previously mentioned to accommodate the proposed curb cut, curbside loading zone and the no parking building entrance zone the University proposes to remove five parking meters on the east side of 21st Street, as shown on Figure 3.

TRANSPORTATION DEMAND MANAGEMENT

Overview

The proposed Museum will be well served by various transit services. The subject site is considered to be a walker's paradise and a transit rider's paradise according to the Walk Score website (www.walkscore.com). In fact, the site scores a 95 out of a possible 100 on the walk score scale and a 92 out of a possible 100 on the transit score scale. The walk score considers how close various amenities such as coffee shops, grocery stores, schools, parks, and banks are to the site. The transit score considers how close rail and bus services are to the site. The scales utilized by Walk Score are shown in Table 3.

Table 3
Walk and Transit Score Scales

WALK SCORE	DESCRIPTION
90–100	Walker's Paradise — Daily errands do not require a car
70–89	Very Walkable — Most errands can be accomplished on foot.
50–69	Somewhat Walkable — Some amenities within walking distance
25–49	Car Dependent — A few amenities within walking distance
0–24	Car Dependent — Almost all errands require a car
TRANSIT SCORE	DESCRIPTION
90–100	Rider's Paradise — World class public transportation
70–89	Excellent Transit — Transit is convenient for most trips
50–69	Good Transit — Many nearby public transportation options
25–49	Some Transit — A few nearby public transportation options
0–24	Minimal Transit — It is possible to get on a bus

While the location of the proposed development is expected to naturally encourage the use of transit, GW currently has several other strategies in place to encourage the use of non auto modes of transportation. Specifically, the GW Transportation Management Plan (TMP) was created as a comprehensive plan that promotes safe and efficient traffic operations within the campus, encourages alternate modes of transportation, and maximizes the use of the on- and off-street parking facilities to efficiently serve the campus parking demands. Employees of the Museum would be GW employees and therefore would be able to take advantage of the many amenities offered in the GW TMP.

The campus wide plan consists of the following measures

- Transportation Management Coordinator
- Public Transportation Pass
- GW Parking Facility Permits
- On and Off Campus Parking Pre-Tax Deductions
- Carpool Programs
- Attendant Parking
- Shuttle Bus Service Plan
- Car Sharing
- Technology Initiatives
- Web Based Transit Purchases
- Parking Management during On site construction
- Truck Management Plan

Transportation Management Coordinator

In accordance with the approved Campus Plan the University designated a Transportation Management Coordinator (TMC) in the fall of 2006. The TMC is responsible for implementing and monitoring the TMP including:

- Advising undergraduate students, faculty, and staff of the various TMP initiatives through student and faculty/staff orientation programs
- Marketing and promoting TMP initiatives through printed materials and online resources
- Working with students, faculty, and staff to evaluate appropriate locations for bike racks and lockers (including evaluation of bike storage facilities in connection with future University development projects) to encourage more members of the GW community to bike to campus and
- Working with appropriate University offices to promote public transportation for special events on campus

In the spring of 2010, the University combined the responsibilities for transportation and parking initiatives to allow for a comprehensive approach to campus transportation matters.

Public Transportation Pass

The Foggy Bottom campus is served by the Foggy Bottom – GWU Metrorail station, conveniently located within the Campus, and numerous Metrobus lines. GW offers a pre-tax transportation benefits program.

to University employees (regular full time and part time) to promote the use of public transportation. This program (SmartBenefits) allows employees to purchase a SmartTrip Card which can be used on Metrorail Metrobus and on MARC or VRE commuter trains.

GW Parking Facility Permits

Parking permits are issued to students faculty staff residents and physicians who drive and park on campus. The permits are sold with monthly contracts or on an occasional/daily parking basis and are assigned to a specific parking facility. Visitors are required to pay hourly rate fees but do not need to purchase a permit.

Discounted daily parking rates are offered to encourage faculty staff and students who do drive to park in University garages. Parking fees can be paid conveniently by payroll deduction or via funds deposited to the GWorld card.

On and Off Campus Parking Pre-Tax Deduction Program

A pre tax deduction for on campus parking fees is offered to all regular GW employees. Additionally an off campus parking pre-tax deduction program allows employees who pay for parking at a Metro station or at a commercial parking facility to participate in a pre tax parking program.

Carpool Programs

Carpooling is encouraged at GW through the Carpool Program which allows employees to park any car registered in their carpool group in one group shared parking space in any parking facility. The University is enrolled in NuRide a ride sharing program that encourages and rewards carpooling. Registered riders earn reward points that can be redeemed for gift cards discounts and event tickets.

Car Sharing

The University actively promotes Zipcar at University fairs and events. Since 2007 GW affiliated Zipcar memberships have increased by more than 50 percent (including students faculty staff and alumni). Since then the University has worked closely with Zipcar to increase the number of Zipcars on campus. Currently 17 Zipcars are located within approximately one third of a mile from the site.

Shuttle Bus Service Plan

To alleviate the need for private automobile use on campus and between campuses GW provides four forms of campus transportation: the Colonial Express Shuttle the Vern Express Shuttle the Virginia Science and Technology Campus Shuttle and the University Police Department (UPD) Escort Service.

Technology Initiatives

The University promotes the use of video conferencing podcasts online library resources the Bb@GW online course management system (based on the Blackboard Learning System™) and administrative document management systems to reduce the need for physical movement to and between the Foggy

Bottom and other GW campuses The University's website also provides links to Commuter Connections and other transportation resources

Web based Transit Purchases

In accordance with the Campus Plan approval GW now provides a link from its website to Metro pass sales information where members of the University community can purchase transit fare media, including SmarTrip fare cards online Additionally SmarTrip fare cards are available for purchase in the GW Bookstore

CONCLUSIONS

In summary the proposed GW Museum will be a low trip generating use specifically during the commuter peak hours In fact, the proposed GW Museum is anticipated to generate only seven AM commuter peak hour vehicle trips 11 PM commuter peak hour vehicle trips and 56 daily vehicle trips The proposed curb cut will facilitate loading activities for climate sensitive Museum pieces while the curbside loading zone will minimize the use of the curb cut and provide a location for parcel delivery vehicles (e.g FedEx UPS etc) The proposed no parking building entrance zone will provide a convenient and safe area for visitor pick ups and drop offs for Museum patrons Adequate parking in public parking garages is available in the area surrounding the proposed Museum to accommodate patrons who utilize a personal vehicle to visit the Museum Finally GW's TMP will encourage employees of the Museum to utilize non auto modes of transportation

We trust that this memorandum provides you with sufficient information regarding the Museum's transportation matters Please do not hesitate to contact us at (724) 933 9010 jlmilanovich@mjwells.com or anmikec@mjwells.com with any questions you may have regarding this memorandum

FIGURES

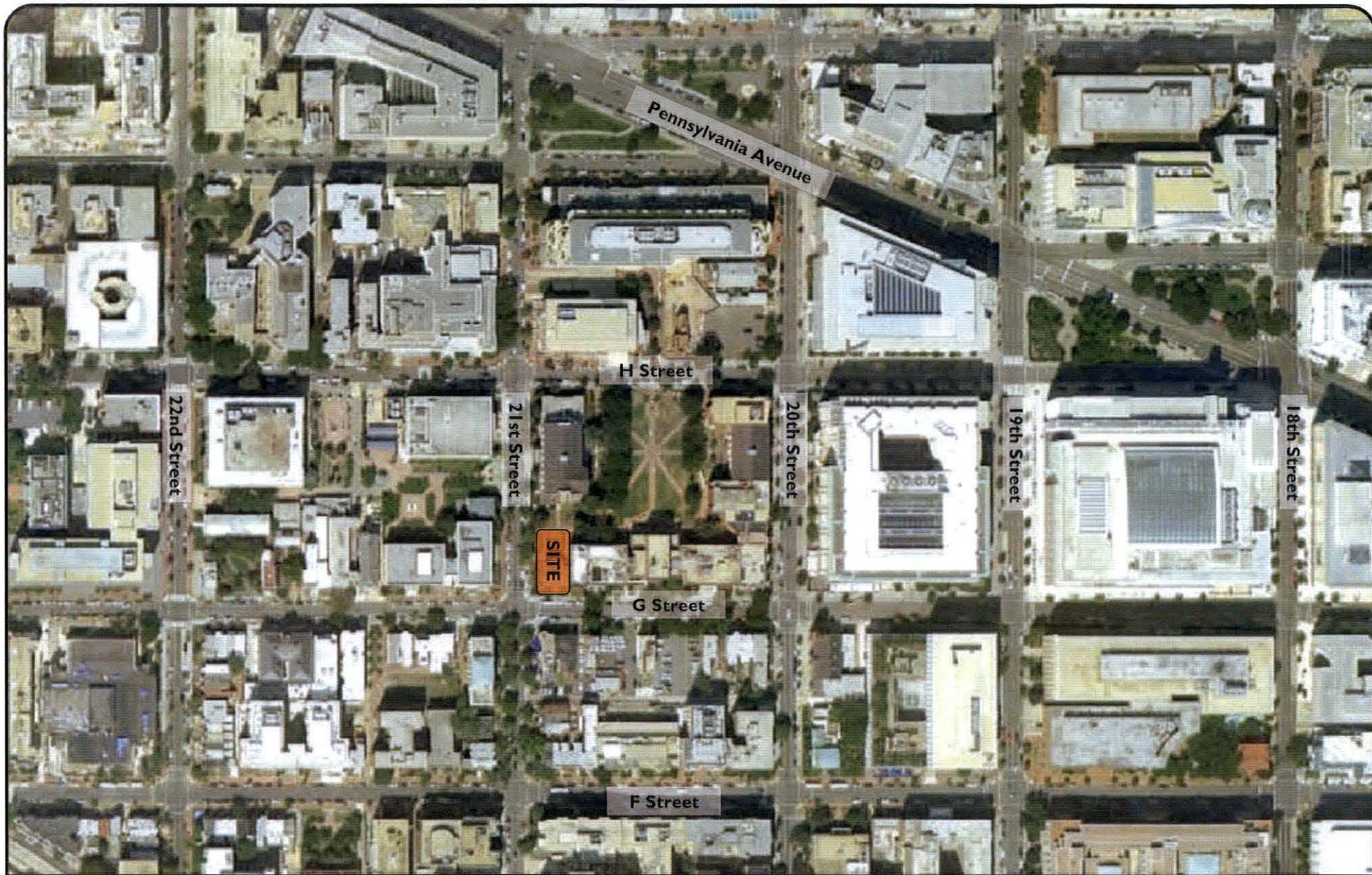


Figure I
Site Location Map



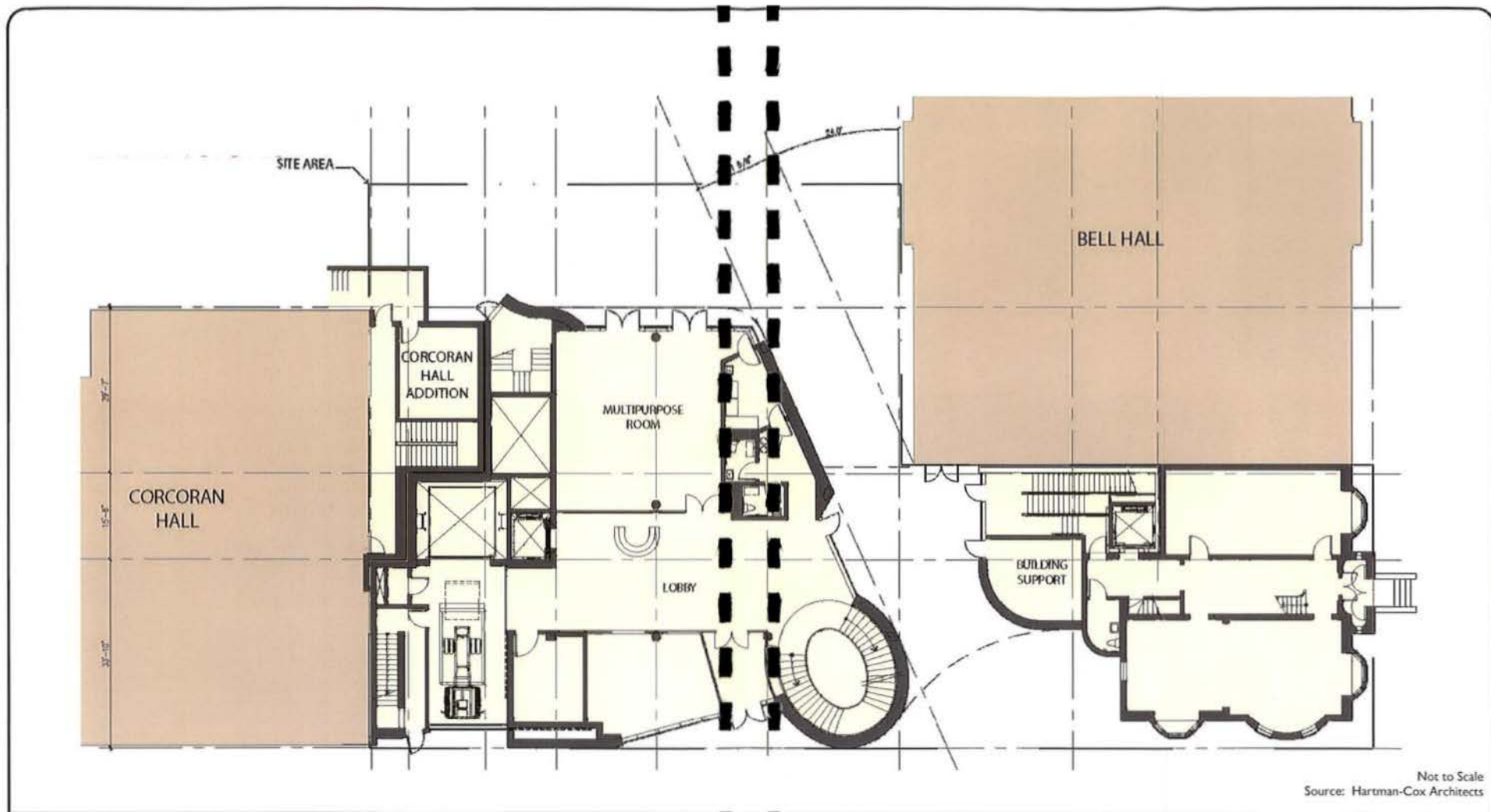


Figure 2A
Ground Floor Plan



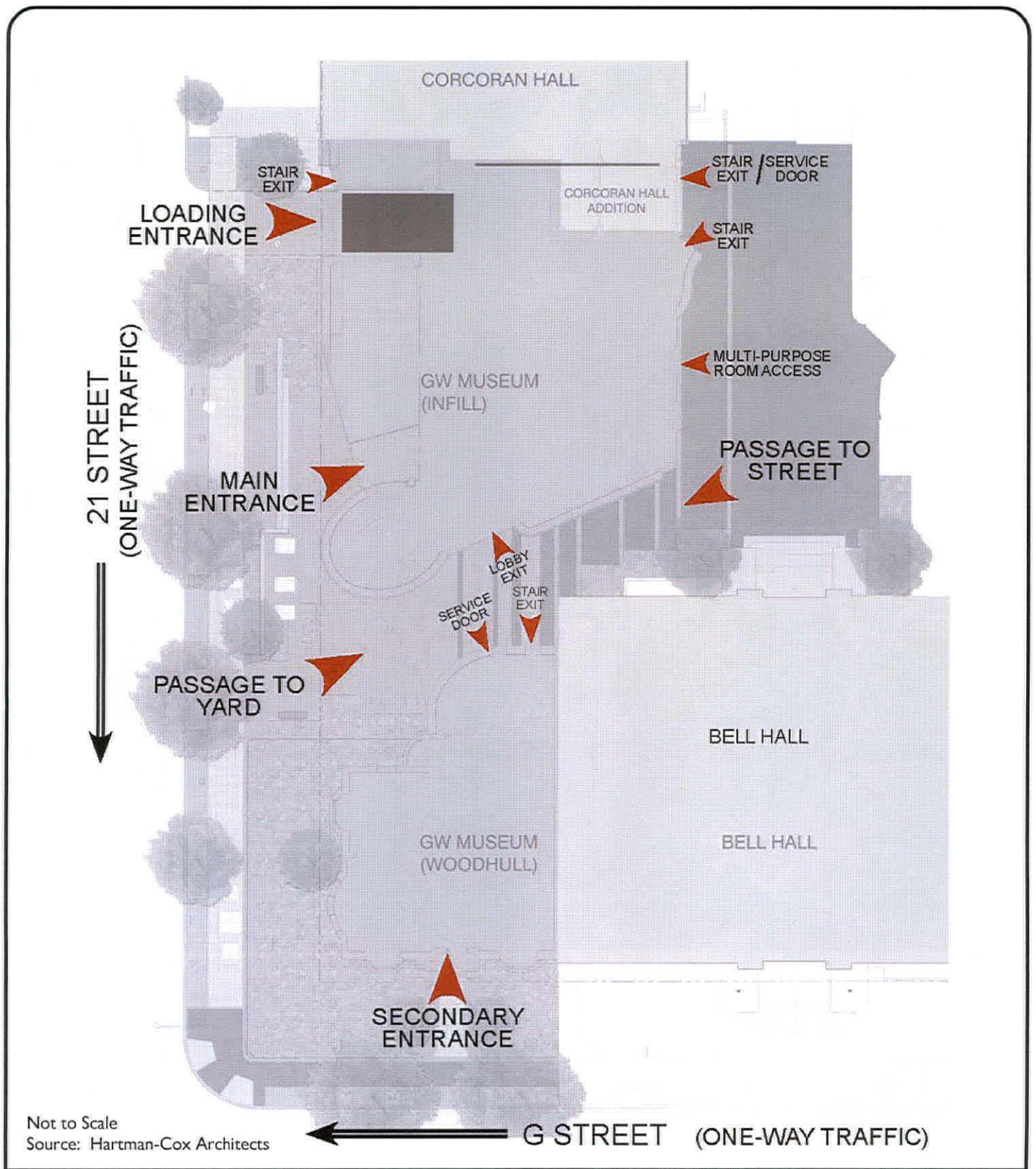


Figure 2B
Circulation Plan



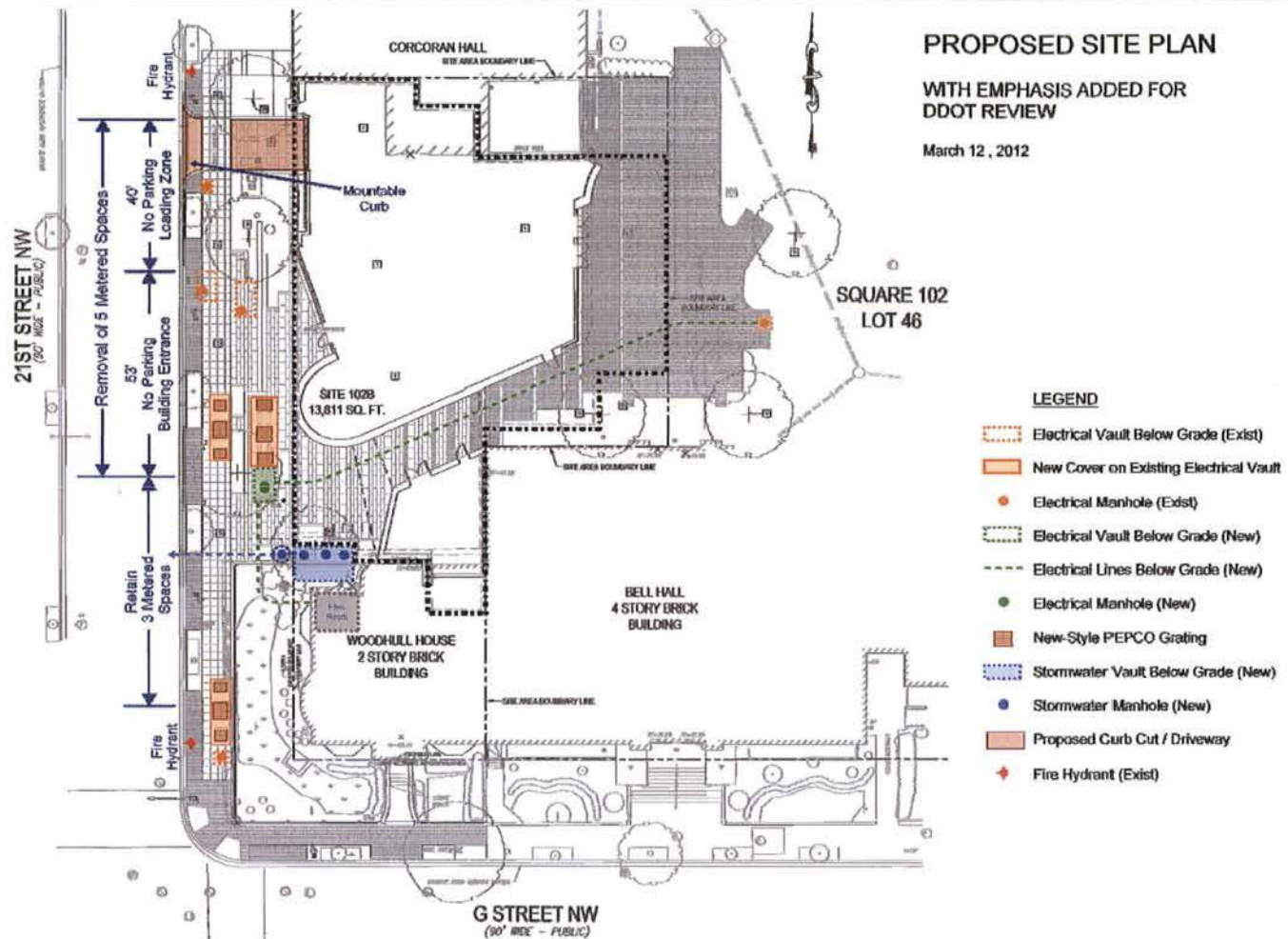


Figure 3
 Curbside Loading Zone and Building Entrance Zone



Figure 4
Public Parking Garage Location Map

○ 1/4 Mile Radius # Parking Garage within 1/4-mile Radius
○ 1/2 Mile Radius P Parking Garage Outside of 1/4-mile Radius



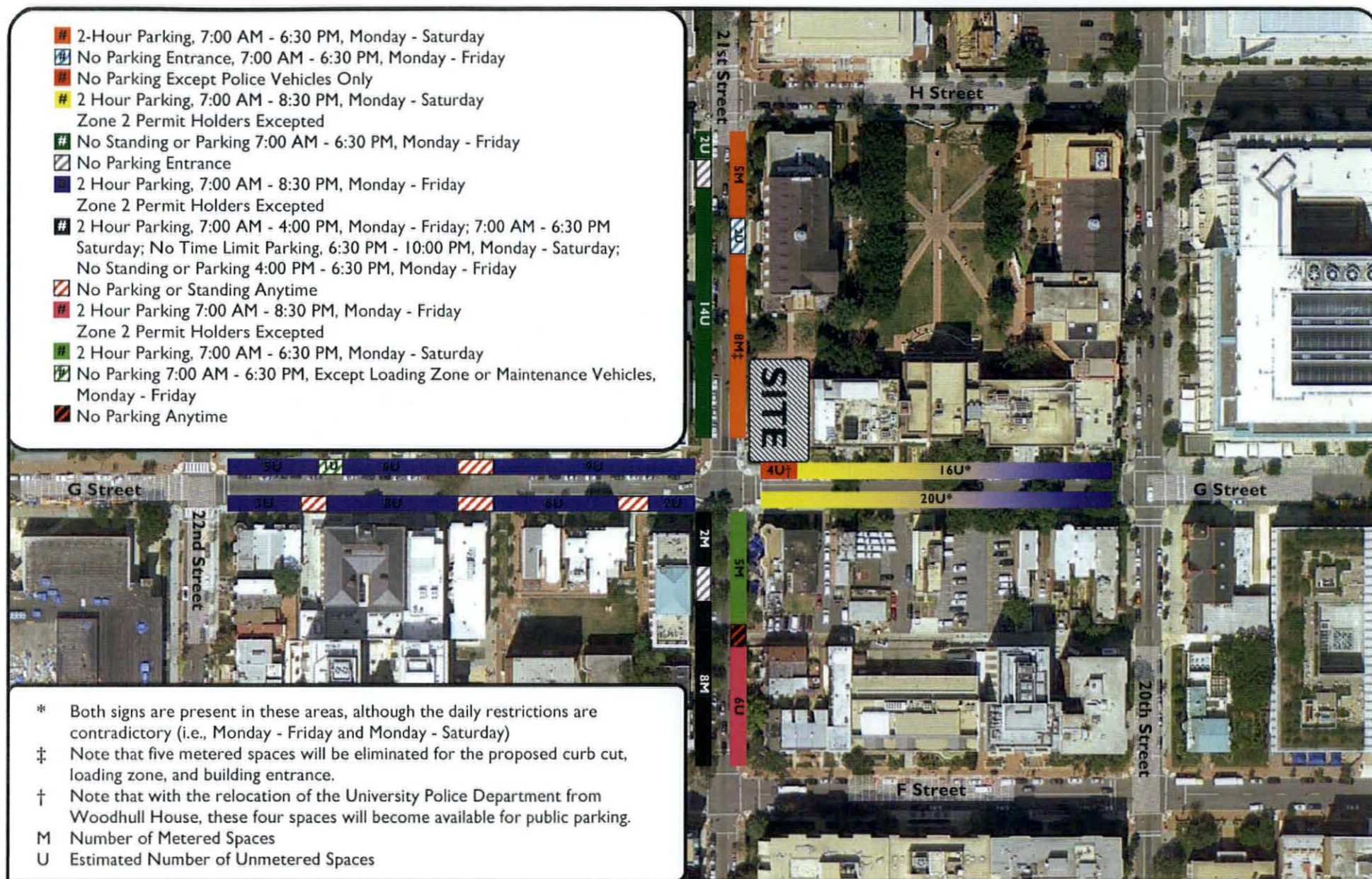


Figure 5
Existing On-Street Parking Restrictions