



TECHNICAL MEMORANDUM

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DATE: April 16, 2009

SUBJECT: Traffic Impact Study Addendum – 8th and H Street NE Planned Unit Development

This memorandum presents a pedestrian and bicycle level of service (LOS) assessment in support of the referenced project, and in keeping with current DDOT requirements. This document is an addendum to the submitted Traffic Impact Study dated March 30, 2009. The results of the assessment are presented below.

Pedestrian and Bicycle Level of Service Assessment

Based on discussions with DDOT staff and relevant information presented in the “*Transportation Planning Handbook*”¹ and the “*Transportation Impact Analyses for Site Development*”², the study area pedestrian and bicycle LOS conditions were determined by undertaking the following:

- 1) Field observations of the operational and service characteristics of existing facilities.
- 2) Review of the *District of Columbia Draft Pedestrian Master Plan (2008)*, the *District of Columbia Bicycle Master Plan (2005)*³ and the *DDOT H Street NE Corridor Transportation & Streetscape Study (2004)*⁴ to confirm field observations, obtain other relevant information and to determine the compatibility of the proposed development with planned facilities, policies or standards.

¹ *Transportation Planning Handbook*, ITE, 3rd Edition, ps. 986-990, 2009.

² *Transportation Impact Analyses for Site Development*, ITE, ps. 68-70, 2005.

³ <http://www.tooledesign.com/projects/dc/reports.html#dra> (DC Pedestrian Master Plan)

http://ddot.dc.gov/ddot/cwp/view.a,1245,q,634448,ddotNav_GID.1761,ddotNav,%7C34416%7C.asp (DC Bicycle Master Plan)

⁴ http://www.bakerprojects.com/hstreetne/rpt_final.asp?pdf=finalRpt_lowres.pdf#pdf (DDOT H Street NE Corridor Transportation & Streetscape Study)

- 3) **Quality of Life Assessment** to determine the level of relative comfort, convenience and safety that is currently experienced by pedestrians and bicyclists, and would be experienced in the future along the roadways adjacent to the site.

Further discussion and analysis of the above factors are presented in the sections following.

Pedestrian Level of Service (LOS)

Field Observations

The proposed development site is surrounded by wide sidewalks (including well-spaced planters) along the 8th Street and 10th Street frontages. The sidewalk widths are as follows:

- H Street (13 feet with an effective path of 8 feet)
- 8th Street (20 feet with an effective path of 14 feet)
- 10th Street (23 feet with an effective path of 18 feet)

Pedestrian facilities (at the adjacent 8th Street, 9th Street and 10th Street intersections along H Street Avenue) include 9 to 15-ft wide crosswalks and pedestrian countdown signals. These dimensions are generally consistent with the DDOT Design Manual and the District Pedestrian Master Plan. Pedestrian volumes are moderate (i.e., in the range of 150 pedestrians along the H site frontage during the morning and afternoon peak hours).

District of Columbia Draft Pedestrian Master Plan

The *District Draft Pedestrian Master Plan* estimates that the pedestrian facilities (along the site) are characterized by moderate volumes and operational deficiency. The pedestrian deficiency estimation was based on sidewalk gaps, width and buffer (with or without trees). Other factors included the number of travel lanes, volumes, speeds and the presence of medians along the adjacent roadways. A section of the Master Plan Pedestrian Activity/Deficiency Roadway Map is included as Figure 1.

The Pedestrian Master Plan does not recommend any improvements along the site frontage. However, the *H Street NE Corridor Transportation/Streetscape Study* recommends a number of improvements that would enhance and encourage pedestrian and bicycle activity along the corridor and at the site. These include the following:

- Develop a pedestrian-friendly streetscape while maintaining four travel lanes for vehicular and transit movements.
- Establish a streetcar service along the entire corridor, connecting with Union Station to the west.
- Expand sidewalks to create bulb-outs for streetcar stops at several intersections including 8th Street.
- Buffer sidewalks with trees and 24-hour curb-side parking.
- Install new crosswalks with distinctive materials and colors at all signalized intersections.
- Locate stop lines at least 6 feet from crosswalks.

In keeping with the above recommendations, the site development plan proposes several measures to enhance pedestrian circulation in the vicinity of the site. These include the elimination of an existing curb cut/entranceway which is aligned with 9th Street to the north, and the widening of the sidewalks to approximately 16- to 28-ft wide along H Street, 30-ft along 8th Street and 27-ft along 10th Street. The site entranceways along 8th and 10th Streets would be provided with special pavement designs to alert pedestrians and bicyclists to the potential presence of other users. Based on these considerations, the pedestrian facilities within the vicinity of the site would be superior to the existing conditions upon build-out of the proposed development.

Quality of Life Assessment

This assessment evaluates the level of comfort provided to or experienced by users of the pedestrian facilities within the vicinity of the site. The information presented above, in relation to the District’s master plans, demonstrates that a high level of comfort would be provided to pedestrian activity along the adjacent sidewalks and crosswalks. Other supporting considerations are as follows:

Pedestrian Level of Service (with respect to comfort)

This level of service was assessed based on a research paper entitled “*Modeling the Roadside Walking Environment: A Pedestrian Level of Service*”⁵. This document presents a statistical model for determining pedestrian LOS by “objectively quantifying the pedestrian perception of comfort and safety in the pedestrian environment”. The model estimates pedestrian perception of comfort based on the lateral separation between pedestrians and vehicles. The model’s primary inputs are sidewalk width, width and type of buffer between the sidewalk edge and the roadways edge, and the volume and speed of vehicular traffic. This methodology generates a numerical result, ranging from 0 to 5.5 or greater, that corresponds with LOS categories listed in Table 1. LOS “A” represents the most comfortable travel conditions. LOS “F” represents the least comfortable travel conditions.

**Table 1 – Pedestrian Level of Service Categories
 (With respect to Comfort)**

Level of Service	Model Score
A	≤ 1.5
B	> 1.5 and ≤ 2.5
C	> 2.5 and ≤ 3.5
D	> 3.5 and ≤ 4.5
E	> 4.5 and ≤ 5.5
F	> 5.5

⁵ *Modeling the Roadside Walking Environment: A Pedestrian Level of Service,*” Transportation Research Board Paper No. 01-0511, 2001.

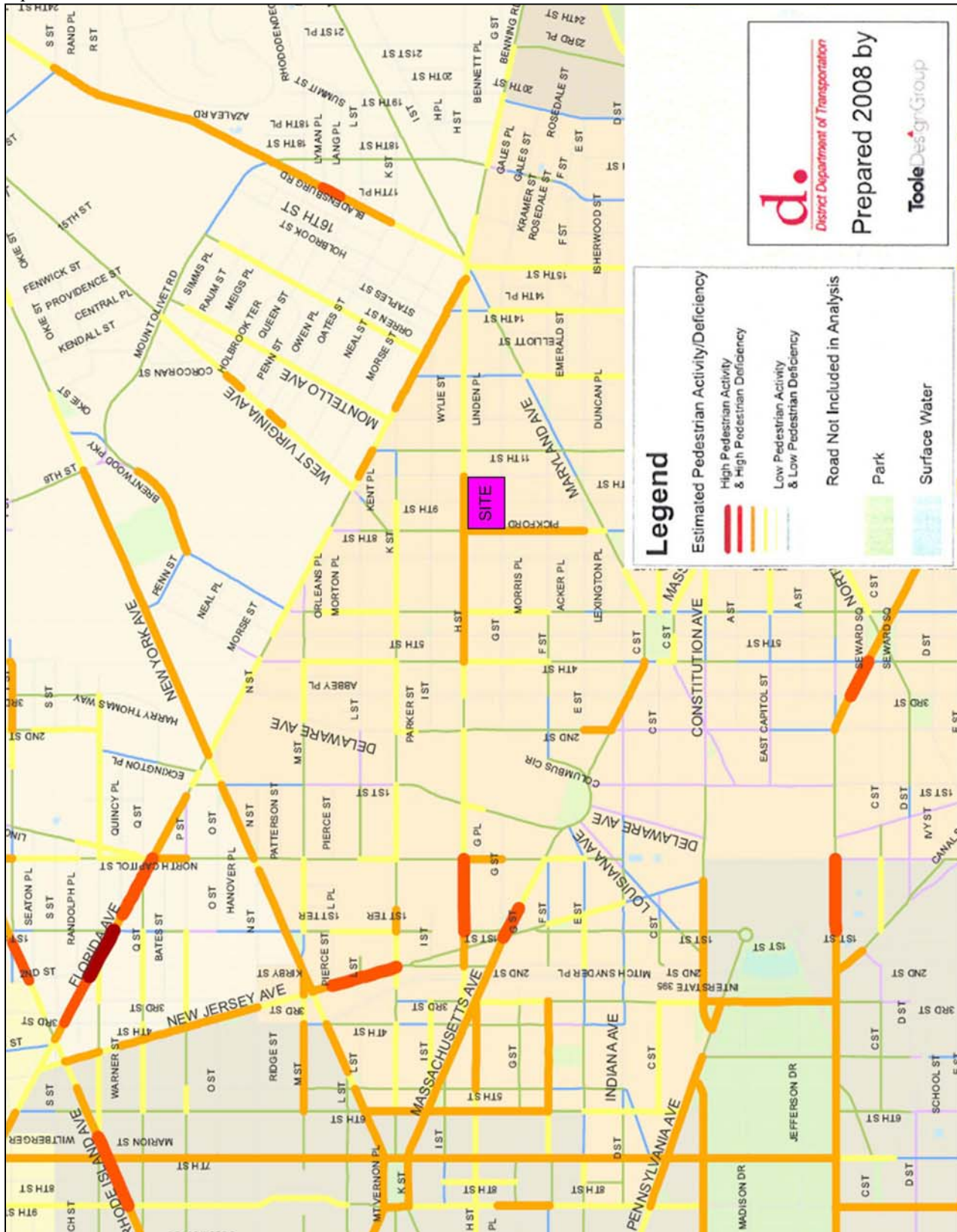


Figure 1 Pedestrian Activity/Deficiency Map

Using this methodology, pedestrian quality of life LOS was analyzed for the projected future project build-out traffic conditions along the roadways adjacent to the site. The analyses included the widths of the sidewalks, their separation from the adjacent roadways, the curb widths, the widths of the closest travel lanes and the posted speeds. The analysis results are summarized in Table 2.

Table 2 – Pedestrian Level of Service Analysis Results
(With respect to Comfort)

Location	Time	Model Score	Level of Service
H Street – South Side	AM Peak	2.09	B
	PM Peak	2.06	B
8th Street – East Side	AM Peak	1.29	A
	PM Peak	1.38	A
10 th Street – West Side	AM Peak	1.87	B
	PM Peak	1.88	B

Table 2 indicates that the pedestrian facilities within the vicinity of the site operate at acceptable levels of service, with respect to comfort. This situation would continue after the proposed project is completed.

Pedestrian Level of Service (based on Average Delay)

Pedestrian LOS (in terms of average delay) was computed for the busiest peak hour under projected site build-out conditions, considering the site entrances and the adjacent H Street intersections. The analyses were done using the procedures presented in the *Highway Capacity Manual 2000 (HCM)*⁶. The results are summarized in Table 3.

⁶ “*Highway Capacity Manual 2000*”, Transportation Research Board, 2000.

**Table 3 – Pedestrian Level of Service Analysis Results
 (Based on Average Delay)**

Intersection	Average Pedestrian Delay (seconds)	Level of Service (LOS)
8 th Street and Site Entrance*	6.0	B
10 th Street and Site Entrance*	2.0	A
H Street and 8 th Street		
- Crosswalks across H Street	30.0	C
- Crosswalks across 8 th Street	5.0	A
H Street and 9 th Street		
- Crosswalks across H Street	33.0	D
- Crosswalks across 9 th Street	4.0	A
H Street and 10 th Street		
- Crosswalks across H Street	30.0	C
- Crosswalks across 10 th Street	5.0	A

* Unsignalized
 ** Signalized

Source: Highway Capacity Manual (2000) and Gorove Slade Associates.

Table 3 indicates that pedestrians would experience acceptable levels of delay at the site entrances and the adjacent H Street intersections.

Bicycle Level of Service (LOS)

Field Observations

Bicycle travel occurs primarily along the pedestrian facilities (noted above), since there are no designated on-street facilities on the roadways. Bicycle volumes are quite low (less than 10 during the morning or afternoon peak hour) along the roadways.

District of Columbia Bicycle Master Plan

The District Bicycle Map and Master Plan indicate that the H Street roadway requires improvements to accommodate bicycle traffic effectively. However, with the implementation of the recommendations of

the *DDOT H Street NE Corridor Transportation & Streetscape Study* (as noted above), the corridor pedestrian facilities would adequately accommodate bicycle circulation. The proposed development will provide wider sidewalks and other amenities along the site which are consistent with the streetscape designs recommended by the H Street Study.

The Master Plan indicates that H Street (adjacent to the site) operates at Level of Service E, whereas the side streets operate at LOS D. These results are based on the application of a “*scientifically-calibrated Bicycle Level of Service (Bicycle LOS) Model to evaluate the comfort of bicyclists on roadway segments*” (page 13). A copy of the Master Plan LOS Map is included as Figure 2. The LOS results do not apply to bicycle travel along the area sidewalks which would be characterized by higher LOS values.

Bicycle Level of Service (based on Average Delay)

The *Highway Capacity Manual* includes procedures for the analysis of bicycle LOS at signalized intersections where there is a designated on-street bicycle lane on at least one approach. No designated on-street bicycle lane is provided in the vicinity of the proposed development site.

Conclusion

Based on the above, this study concludes that users of the pedestrian and bicyclist facilities experience and will continue to experience acceptable Levels of Service and quality of life travel conditions along the site. The proposed development would not adversely affect the operational efficiency and comfort of pedestrian and bicycle traffic movements within the study area. In keeping with the policies and recommendations of the *District of Columbia Pedestrian and Bicycle Master Plans*, and the *DDOT H Street NE Corridor Transportation & Streetscape Stud*, the project would in fact include sidewalk improvements and special entranceway design treatments at both entrances to minimize impacts and enhance the quality of the walking and bicycling experience along the site. As a result, the proposed development will be more pedestrian friendly than the existing conditions.

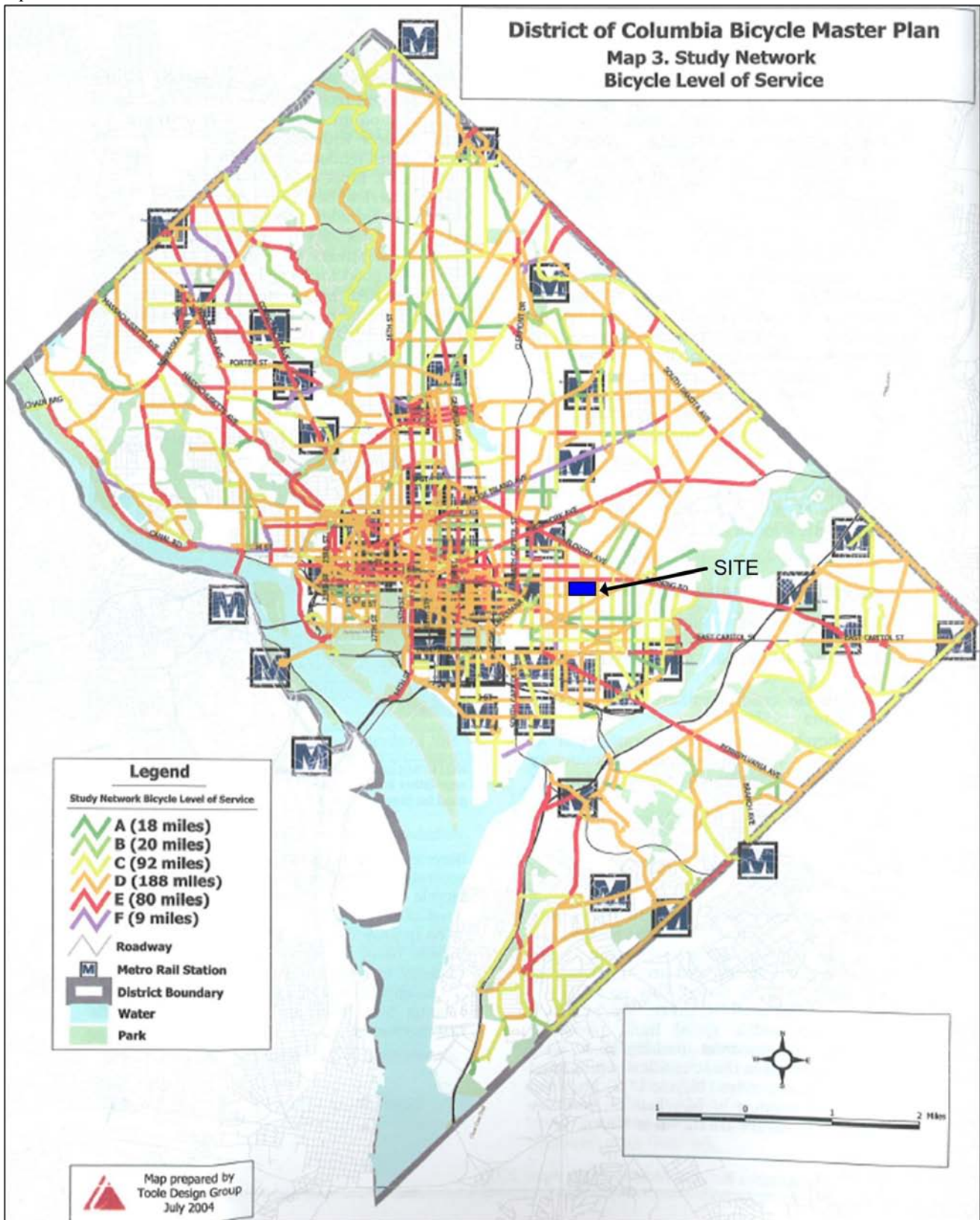


Figure 2 Bicycle Level of Service Map