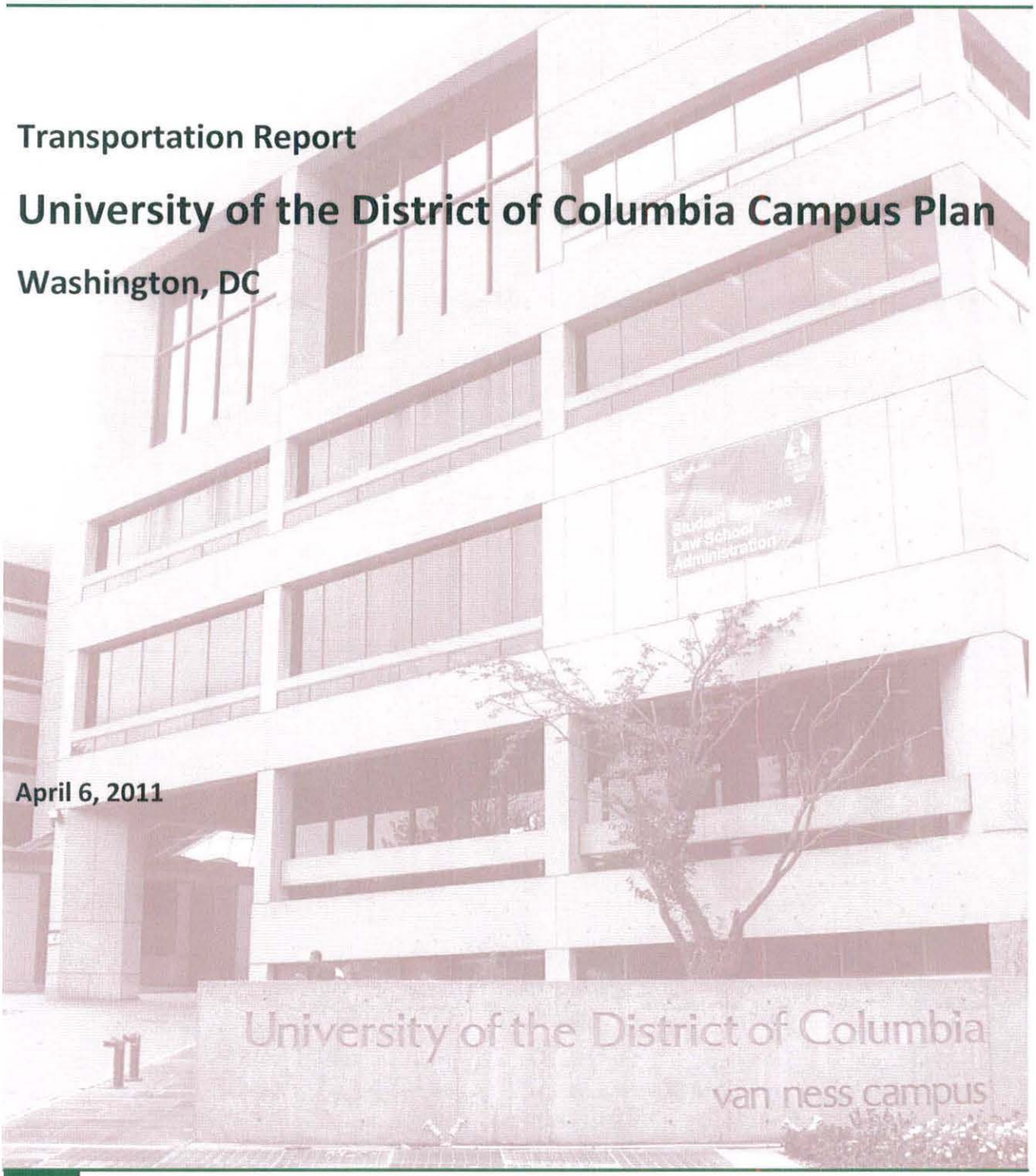
# Transportation Report

# University of the District of Columbia Campus Plan

## Washington, DC

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## EXECUTIVE SUMMARY

The UDC Campus Plan focuses on growing without significant changes to its footprint and the transportation infrastructure remains largely the same with some enhancements. Not only is the University located adjacent to a Metrorail station and current District initiatives such as Capital Bikeshare, but the recommendations contained within the CAPA and RCW2 studies, the DC Pedestrian and Bicycle Master Plans, and future transit expansions including streetcar and DC Circulator will only continue to improve the quality of multi-modal access to campus.

UDC's transportation goals for the Campus Plan were based on the District's transportation goals. They are as follows:

- Enhance Pedestrian Safety
- Promote District Transit Use
- Reduce Automobile Dependency
- Reinforce Sustainability

Based on these goals, the strategy of the transportation component of the Campus Plan is to handle the increased population on campus without adding more parking supply or roadway capacity. The University will take advantage of its location within a high quality transportation network served by multiple modes to grow without investment in vehicular-based infrastructure.

Over the course of the Campus Plan, it will not generate significant changes to roadway traffic volumes, operations or geometries. Thus, from a traditional impact analysis standpoint, impacts from the Campus Plan will be minimal. Although this may be the case, the Campus Plan will lead to a significant amount of growth in alternate modes of transportation. It is expected that student, faculty and staff use of Metrorail, Metrobus, Capital Bikeshare, and walking and bicycling in general will all increase over the life of the Campus Plan.

This report makes the following recommendations in order to ensure a smooth implementation of the campus plan:

- *Endorse the implementation of the recommendations contained within the CAPA and RCW2 studies and the DC Pedestrian and Bicycle Master Plans.*
  The exception to this recommendation is the detailed improvement from the CAPA study at Connecticut Avenue and Veazey Terrace. Currently as designed, this improvement would severely limit the ability of buses and other large vehicles to use this entrance to the University and the WMATA bus facility. This report recommends an alternative design be examined by the CAPA and UDC planning teams (presented in the main report).

- *Develop and implement a thorough set of Transportation Demand Management (TDM) programs and policies.*
  The goal of TDM program and policies are not only to reduce the vehicular demand to a campus, but to organize, market, and monitor the different TDM strategies employed to ensure efficiency in their implementation. Currently, UDC does not implement any official TDM program.

**TDM Commitments**

Although the main report reviews UDC's existing and proposed TDM programs in more detail, the following summarizes the TDM commitments proposed as part of the Campus Plan.

- UDC will designate a TDM Coordinator, who will be responsible for implementing, monitoring and marketing the TDM programs. The TDM Coordinator is Shauna Brew, Auxiliary Services Business Manager – Facilities & Real Estate; UDC will update DDOT if this position changes in the future.

- UDC will adjust parking rates in its main parking garage to help deter single-occupant driver parking, and raise revenue for TDM programs. The student and faculty rates will be adjusted yearly over the next 3 to 5 years to maintain a peak occupancy level within the parking garage of 80-90% on a typical weekday. The parking rates structure and policies will be adjusted to market rates to prevent a scenario where non-University patrons (public) can park within the UDC garage at lesser rates than public garages in the Van Ness neighborhood.
- UDC will provide preferred parking for carpools in the parking garage, at a discounted rate; the carpool parking rate will be at least half the typical parking rate. UDC will begin and market a ride-matching service, possibly through Zimride.com, and will require all carpool participants to register with Commuter Connections.
- UDC will provide preferred parking for alternative fuel vehicles.
- UDC is seeking to provide at least one (and possibly more) electric vehicle charging station and intends to do so subject to infrastructure or other constraints that are presently under review.
- UDC will implement commuting benefits for transit riders via the SmartBenefits program (dependent on the ability of the District payroll system to facilitate the benefit). If provided, the benefit will be the maximum amount allowed (currently $230 a month).
- UDC will enhance its bicycle parking inventory on campus. The current inventory contains two bicycle racks, located at Building 44 and Building 39. Over the course of the Campus Plan, UDC will add short and long-term spaces to enhance supply. The bicycle parking recommendations are shown on Figure 1 in the report.
- UDC will implement commuting benefits for bicycle riders by participating in the tax-free $20 per month bicycle commuting benefit (dependent on the ability of the District payroll system to facilitate the benefit).
- UDC will market these programs, as well as MetroRail, MetroBus, Zipcar, Capital Bikeshare and any other transportation programs via a detailed website and an information kiosk on campus (possibly located in the new Student Center). UDC will reach out to WMATA to investigate adding a SmarTrip kiosk on campus. The website will contain sections oriented to different users, including faculty/staff, students, and visitors. Any students living on-campus will be provided with a packet of information upon or prior to moving-in. New faculty/staff hires will be provided with a similar packet of information.
- UDC will approach Zipcar to seek the placement of carsharing spaces on the Van Ness Campus.
- UDC is exploring the implementation of a Transportation Sustainability Fee subject to Board of Trustees approval. The University is committed to the advancement of sustainable practices. The fee will cover the cost of the following to be provided to each student at the beginning of the academic year or at enrollment:
  - Annual Zipcar carsharing membership (or other appropriate carsharing provider)
  - Annual Capital Bikeshare membership
  - SmarTrip card with at least $20 preloaded

## INTRODUCTION

This report is an attachment so the University of the District of Columbia's (UDC) Campus Plan. It summarizes the background materials and analyses reviewed during the creation of the Campus Plan and details the transportation components of the plan.

This report has three sections:

- *Transportation Components of the Campus Plan*
  This section details the transportation components of the Campus Plan including goals, general strategy and recommendations, including details on the Transportation Demand Management (TDM) plan.

- *Transportation Sustainability Review*
  This section reviews the transportation sustainability of the existing campus, reviews possible methods for improving sustainability and lists how the development of the Campus Plan will impact transportation sustainability.

- *Review of Transportation Facilities*
  This section reviews all of the background materials that were input into the creation of the transportation components of the Campus Plan. This includes a summary of data collection and analysis performed on the local transportation network, summaries of all modes of travel on and off campus, and a review of District initiatives, future plans and other background documents.

## TRANSPORTATION COMPONENTS OF THE CAMPUS PLAN

The UDC Campus Plan focuses on growing without significant changes to its footprint and the transportation infrastructure remains largely the same with some enhancements. The strategy of the transportation component of the Campus Plan is to handle the increased population on campus without adding more parking supply or roadway capacity. The University will take advantage of its location within a high quality transportation network served by multiple modes to grow without investment in vehicular based infrastructure. Not only is the University located adjacent to a Metrorail station and current District initiatives such as Capital Bikeshare, but the recommendations contained within the CAPA and RCW2 studies, the DC Pedestrian and Bicycle Master Plans, and future transit expansions including streetcar and DC Circulator will only continue to improve the quality of multi-modal access to campus.

### *Transportation Goals*

As UDC is a public institution, its own transportation goals should reflect those of the District. The District's current transportation goals are best summarized in the District Department of Transportation's (DDOT) *2010 Action Agenda.* The *Action Agenda* lists DDOT's mission statement as:

> "Develop and maintain a cohesive, sustainable transportation system that delivers safe, affordable, and convenient ways to move people and goods — while protecting and enhancing the natural, environmental, and cultural resources of the District."

The same document also contains a vision statement:

> "DDOT is committed to achieving an exceptional quality of life in the nation's capital through more sustainable travel practices, safer streets, and outstanding access to goods and services. Central to this vision is improving energy efficiency and modern mobility by providing next generation alternatives to single occupancy driving in the city."

UDC has based its transportation goals on these statements, and the overall goals of its Campus Plan. They are as follows:

- Enhance Pedestrian Safety
- Promote District Transit Use
- Reduce Automobile Dependency
- Reinforce Sustainability

Based on these goals, the strategy of the transportation component of the Campus Plan is to handle the increased population on campus without adding more parking supply or roadway capacity. The University will take advantage of its location within a high quality transportation network served by multiple modes to grow without investment in vehicular-based infrastructure.

### *Impacts of Campus Plan*

The impacts of a campus plan or other development projects is usually based on technical analyses comparing future traffic levels on adjacent roadways. The metrics used are typically calculated by examining the differences between peak hours of use on adjacent roadways under future traffic model scenarios with and without the campus plan. Traffic models used in these analyses calculate changes to delay and capacity based on various inputs, which can be summarized in four general categories:

1. Changes to roadway volumes (i.e. as generated by new parking garages)
2. Changes to roadway geometry (i.e. additional lanes, new roads...)
3. Changes to traffic operations (i.e. new traffic signals, changing a street from two-way to one-way)
4. Changes to access that will alter existing volumes (i.e. closing a street, or opening a new gate)

The campus plan does not include significant changes to any of these categories. Traffic models of future conditions with and without the Campus Plan would be extremely similar. Thus, from a traditional impact analysis standpoint, impacts from the Campus Plan will be minimal.

Although this may be the case, the Campus Plan will lead to a significant amount of growth in alternate modes of transportation. It is expected that student, faculty and staff use of Metrorail, Metrobus, Capital Bikeshare, and walking and bicycling in general will all increase over the life of the Campus Plan.

This report makes the following recommendations in order to ensure a smooth implementation of the campus plan:

- *Endorse the implementation of the recommendations contained within the CAPA and RCW2 studies and the DC Pedestrian and Bicycle Master Plans*

  UDC desires to be surrounded by high-quality multi-modal transportation network. All of the recommendations contained in these initiatives will help increase the multi-model qualities of the transportation network. The presence of these studies, and the recommendations contained within show that DDOT is aware of the bigger picture issues regarding Connecticut Avenue, pedestrian safety and accessibility.

  UDC is extremely interested in aiding the implementation of these initiatives. Although it does not have the purview or resources to implement the recommendations contained in these report directly, it is willing to endorse these initiatives and assist where possible in their implementation.

  The exception is the detailed improvement recommended by the CAPA study at Connecticut Avenue and Veazey Terrace. Currently as designed, this improvement would severely limit the ability of buses and other large vehicles to use this entrance to the University. This report recommends an alternative design be examined by the CAPA and UDC planning teams.

- *Develop and implement a thorough set of Transportation Demand Management (TDM) programs and policies*

  The goal of TDM program and policies are not only to reduce the vehicular demand to a campus, but to organize, market, and monitor the different TDM strategies employed to ensure efficiency in their implementation. Currently, UDC does not implement any official TDM program. The following section reviews the TDM recommendations.

## *Transportation Demand Management (TDM)*

This section of the report reviews the existing Transportation Demand Management (TDM) program at UDC and makes recommendations for inclusion in the Campus Plan. Effective TDM programs require an institutional framework to implement and manage individual TDM strategies. UDC should organize all TDM programs under a single point of contact. This person will be responsible for monitoring and managing the programs, and would serve as a point of contact for DDOT or other transportation entities.

It is recommended that the University implement a plan to add new TDM strategies and begin to manage, market, and monitor all of their TDM operations to ensure efficiency in their implementation. This would ensure a system where inefficient or wasteful strategies do not get resources that could be used for ones that are more successful.

Thus, the recommendations for the TDM program are as follows:

- Assemble yearly monitoring reports, which collect performance data on the TDM strategies and make recommendations for additions and deletions from the plan based on the relative success of the performance measures.
- Promote TDM measures though coordination of marketing activities.
- Incorporate new TDM measures to encourage use of non-automobile based services.

## *TDM Management*

### Monitoring

TDM monitoring programs help to evaluate campus travel habits and the effectiveness of TDM strategies. A monitoring program would include research and measurements of traffic/parking/transportation use, such as traffic counts at lots and garages, parking occupancy counts, survey responses from campus user groups, participation/enrollment in TDM programs and discussions on the relative effectiveness of each program to budget/resources allocated. A monitoring program can be an effective resource for evaluating TDM strategies and insuring an efficient allocation of resources.

Many federal office agencies have implemented monitoring programs to evaluate TDM programs and traffic demand. For example, the National Institutes of Health has had a monitoring program in place for more than 15 years. It uses the reports to evaluate TDM strategies and to keep the local jurisdictions appraised on TDM success.

### Marketing

Creating a TDM marketing program that provides detailed transportation information to the campus community can maximize the effectiveness of TDM strategies. A marketing program would educate the UDC community about transportation policies and diverse travel options.

An effective marketing strategy should consist of an access guide that provides comprehensive transportation information for the entire UDC community. Perhaps the most effective strategy for providing travel information would be to create an enhanced transportation web site accessible from UDC's home page. The site could also include additional information, such as transit maps that identify WMATA transit routes and stops, vehicle routing and parking maps, bicycle maps and other transportation information and policies. The web allows personalized information depending on the needs and interests of an individual user, making it a good medium to disseminate information to the varied users of the University.

Another option that would complement a web site would be to produce a multi-modal access brochure, handed out to all new students and employees along with their orientation information and placed in information kiosks. This assists with developing good travel habits early on in their tenure at UDC. Visitors to the campus would both benefit from this promotion. Awareness increasing campaigns can introduce new initiatives to alter travel habits during the year.

### Commitments

The following are UDC's commitments towards TDM management as part of the Campus Plan.

- UDC will designate a TDM Coordinator, who will be responsible for implementing, monitoring and marketing the TDM programs. The TDM Coordinator is Shauna Brew, Auxiliary Services Business Manager – Facilities & Real Estate; UDC will update DDOT if this position changes in the future.
- UDC will market TDM programs, as well as MetroRail, MetroBus, Zipcar, Capital Bikeshare and any other transportation programs via a detailed website and an information kiosk on campus (possibly located in the new Student Center). UDC will reach out to WMATA to investigate adding a SmarTrip kiosk on campus. The website will contain sections oriented to different users, including faculty/staff, students, and visitors. Any students living on-campus will be provided with a packet of information upon or prior to moving-in. New faculty/staff hires will be provided with a similar packet of information.
- UDC is exploring the implementation of a Transportation Sustainability Fee subject to Board of Trustees approval. The University is committed to the advancement of sustainable practices. The fee will cover the cost of the following to be provided to each student at the beginning of the academic year or at enrollment:
  - Annual Zipcar carsharing membership (or other appropriate carsharing provider)
  - Annual Capital Bikeshare membership
  - SmarTrip card with at least $20 preloaded

## *TDM Measures*

In the future, several transportation demand management policies may be adopted by UDC in order to reduce campus traffic. Several of the policies and services described before may have a major impact on UDC trip generation rates and travel habits. The following describes key policies and services that may be implemented at UDC.

**Parking**

- *Existing Program*

  The University currently has a parking supply of approximately 932 spaces. Surveys performed in the fall of 2010 showed that on a typical weekday during the semester, the parking inventory in the main University garage peaked at approximately 95% and averaged at approximately 91% between 11:00 AM and 4:00 PM.

  Parking for full time employees if $150 per semester. For on and off campus students, parking is $75 per academic year. Motorcycle permits are also available for $40 per semester. Additionally, students, faculty, and staff who do not purchase a parking permit may pay a discounted rate of $3.50/day to park on campus. All others must pay the $8/day rate.

- *Future Commitments*

  UDC will adjust parking rates in its main parking garage to help deter single-occupant driver parking, and raise revenue for TDM programs. The student and faculty rates will be adjusted yearly over the next 3 to 5 years to maintain a peak occupancy level within the parking garage of 80-90% on a typical weekday. The parking rates structure and policies will be adjusted to market rates to prevent a scenario where non-University patrons (public) can park within the UDC garage at lesser rates than public garages in the Van Ness neighborhood.

  UDC is seeking to provide at least one (and possibly more) electric vehicle charging station and intends to do so subject to infrastructure or other constraints that are presently under review.

- *Monitoring*

  The success of parking policies on campus could be measured in several ways, including (1) the amount of parking passes sold per year compared to full-time equivalent employees, (2) the amount of occupied spaces on a typical semester weekday.

**Carpooling**

- *Existing Program*

  No existing carpooling program exists at UDC.

- *Future Commitments*

  UDC will provide preferred parking for carpools in the parking garage, at a discounted rate; the carpool parking rate will be at least half the typical parking rate. UDC will begin and market a ride-matching service, possibly through Zimride.com, and will require all carpool participants to register with Commuter Connections.

- *Monitoring*

  The success of the campus carpooling program could be measured through the number of carpools and total participants, and the ratio of carpool passes to overall employee parking passes on campus.

**Car-Sharing**

- *Existing Program*

  Car sharing is an effective strategy for reducing campus trip rates. Car sharing is a model of car rental where people rent cars for a short period, often by the half-hour for an all-inclusive rate that includes gas and insurance. Car sharing is ideal for campuses where students do not have access to private vehicles. It also allows employees that commute by transit to have easy access to a vehicle during the course of the day for errands or emergencies.

  Access to Zipcar, a private car-sharing operator, is provided near the University. Two spaces reserved for Zipcar are provided on Windom Place west of Connecticut Avenue, and two spaces are provided on Van Ness Street west of Connecticut Avenue.

- *Future Commitments*

  UDC will maintain Zipcar availability and investigate placing reserved Zipcar spots on the Van Ness Campus.

- *Monitoring*

  Measuring the success of the car-sharing program would probably require cooperation from the car-sharing provider to help measure the use of vehicles parked adjacent to or on campus.

**Transit**

- *Existing Program*

  UDC is located adjacent to the Van Ness/UDC Metrorail station, which provides access to the WMATA red line. In addition, several Metrobus routes stop adjacent to the University along Connecticut Avenue.

- *Future Commitments*

UDC will implement commuting benefits for transit riders via the SmartBenefits program (dependent on the ability of the District payroll system to facilitate the benefit). If provided, the benefit will be the maximum amount allowed (currently $230 a month).

- *Monitoring*

  The overall percentage of employees registered in the SmartBenefits program is a good indicator of transit use.

**Bicycle Programs**

- *Existing Program*

  Bicycling is increasingly popular in the District, and bicyclists and parked bicycles are visible throughout the campus. UDC has two bicycle racks, at Building 39 and at Building 44. A Capitol Bikeshare station is located near the campus on the sidewalk along Connecticut Avenue.

- *Future Commitments*

  UDC will enhance its bicycle parking inventory on campus. The current inventory contains two bicycle racks, located at Building 44 and Building 39. Over the course of the Campus Plan, UDC will add short and long-term spaces to enhance supply. The bicycle parking recommendations are shown on Figure 1.

  UDC will implement commuting benefits for bicycle riders by participating in the tax-free $20 per month bicycle commuting benefit (dependent on the ability of the District payroll system to facilitate the benefit).

  As part of a marketing campaign, UDC will provide information about bicycle riding in the District, bike routes between campus and major destinations, and locations on campus for bike parking and storage.

- *Monitoring*

  The monitoring of bicycle program success depends on the TDM strategies employed. Increases in quality parking could be directly measured by counting the number of high quality parking locations added since the last monitoring report and providing a running total. The number of new bike registrations per would be a good measure to include. Bike sharing used could be measured by the amount of activity at a bike-sharing station.

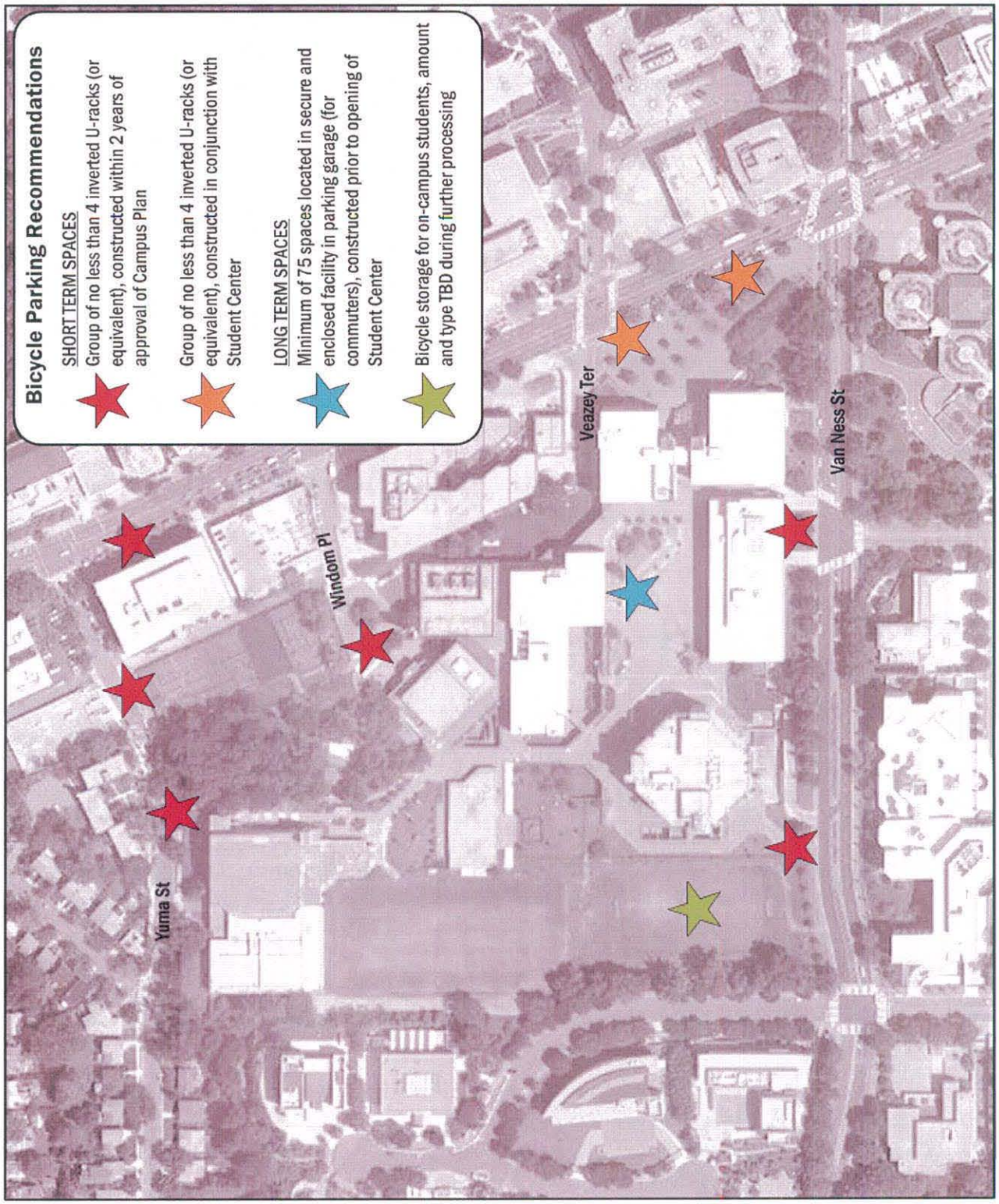


Figure 1: Bicycle Parking Recommendations

## TRANSPORTATION SUSTAINABILITY REVIEW

Numerous universities are developing broad sustainability initiatives and incorporating them into campus planning and policy documents. The location of UDC and its compact design indirectly lead to many sustainable transportation qualities.

This section of the report presents a broad review of transportation sustainability on campus, starting with establishment of goals and detailing campus policies and programs.

Sustainable transportation initiatives have three goals:

- Improve accessibility and mobility
- Conserve environmental resources
- Enhance social equity and economic vitality

The remainder of this section examines these three goals in detail, identifying current programs and policies and making recommendations on how to achieve these goals.

### *Improve Accessibility and Mobility*

UDC accessibility and mobility needs are met by an off campus multimodal transportation network including sidewalks, bike routes, transit, and an extensive roadway network.

- *Pedestrian:*
  - Current Status: UDC has walkways, a pedestrian core, and many destinations within walking distance. This allows many trips to be made by walking, especially those within campus. This promotes public health, reduces automobile trips, and creates vibrant public spaces.
  - Possible Improvements: It is likely that in order to increase the amount of campus users that walk to/from campus, UDC will need to encourage more student, faculty and staff to live within walking distance to campus, and provide more on-campus services (varied land-uses within campus). Since campus pedestrian infrastructure is already high quality, improvements will not likely lead to a significant increase in the percentage of campus users that walk.
  - Impact of Campus Plan: The addition of a student center will add more services to the campus, thus enabling more trips to be made by walking than prior to the development of the student center. The addition of on-campus housing will allow for many student trips to be converted to intra-campus pedestrian trips.
- *Bicycle:*
  - Current Status: Bicycles are common on campus and bicycling is a viable option for many trips. Bicycling promotes public health and reduces automobile trips.
  - Possible Improvements: Increasing the amount of campus users that bicycle to and from campus may be difficult due to the poor nature of external bike routes. Programs to encourage more users to bike could take the form of expanded and enhanced bicycle parking on campus, a bicycle sharing program, bicycle shower and storage facilities for commuter use, and bicycle subsidies for faculty/staff commuters.
  - Impact of Campus Plan: Recommendations to increase the cycling experience on campus are included in the TDM section. They include incorporating bike parking into new buildings, exploring adding a bike commuting

benefit, reserving space for expansion of Capitol Bikeshare, and increased marketing to students, faculty and staff.

- *Transit:*
  - Current Status: UDC is well served by a public transit system that links UDC with the city and region; this is especially beneficial for faculty, staff, commuter students, and visitors. Transit reduces private automobile trips and is a low cost option that ensures access and mobility for all users.
  - Possible Improvements: UDC is limited in how it can enhance the Metrobus and Metrorail service. Instituting a SmartBenefits program could encourages transit use.
  - Impact of Campus Plan: The TDM recommendations include adding a SmartBenefits program.
- *Traffic and Parking:*
  - Current Status: On- and off-campus roadways are extensive and traffic operates with limited delay. The University Parking Garage often fills to capacity during the day. There are car-sharing vehicles near campus, which reduces the number of on-campus students that need to bring a car to campus parking space because they have access to a vehicle.
  - Possible Improvements: The current UDC traffic and parking system operates well, access points to campus operate efficiently, although the parking supply frequently fills to capacity. Enhancements to the traffic and parking system may be counter-productive for many sustainable initiatives, so no improvements to the traffic and parking system are recommended.
  - Impact of Campus Plan: No improvements to the traffic and parking campus infrastructure are recommended in the plan.

## *Conserve Environmental Resources*

Transportation has an enormous impact on the environment. Transportation infrastructure consumes amounts of land, motorized vehicles consume enormous amounts of energy, and transportation is a major source of pollution.

- *Land Devoted to Infrastructure:*
  - Current Status: Land is required for sidewalks, roadways, and parking facilities but efficiently managing the per capita land devoted to transportation facilities is essential for conserving resources. Efficient infrastructure design and land-use management is important for conservation because infrastructure and land-use impact the number of trips required and the duration of trips taken.
  - Possible Improvements: UDC does not reserve a significant amount of land to transportation infrastructure. There are no significant surface parking lots or internal roadways on campus.
  - Impact of Campus Plan: The Campus Plan will not significantly change the amount of land devoted to infrastructure.

- *Energy consumption:*
  - Current Status: Transportation is responsible for 22 percent of global energy consumption. Energy consumption by campus fleets, commuting, and campus air travel are a major component of many institutions greenhouse gas emissions. Walking and bicycling are the most efficient modes in terms of energy consumption.
  - Possible Improvements: Continued efforts to encourage student, faculty and staff walking and bicycling use.
  - Impact of Campus Plan: The TDM recommendations will aid in encouraging low-energy consuming modes of transportation.
- *Air pollution:*
  - Current Status: Transportation is a significant source of air pollution, air toxics and greenhouse gases. The combustion and evaporation fuel produces 30 percent of global air pollution and greenhouse gasses and is the primary cause of air pollution in many urban areas.
  - Possible Improvements: UDC can reduce pollution by promoting non-motorized options, alternative fueled vehicles, and efficient modes.
  - Impact of Campus Plan: The transportation plan does not envision growth in vehicular-based travel demand to and from campus. The University will explore adding re-charging stations for electric vehicles to help encourage use of electric vehicles.
- *Noise pollution*:
  - Current Status: Roadway traffic is a major source of noise pollution. The main cause of noise pollution is noise created by engines and the friction of wheels on the road. The ambient noise created by cars, trucks and buses impairs the quality of life. Traffic noise within campus is generally low because vehicle volumes and speeds are low. Traffic noise is occasionally an issue along the adjacent roadways due to the high volume of traffic, prevailing speeds and volume of heavy vehicle traffic. The impact is limited to buildings located along the periphery of campus.
  - Possible Improvements: UDC has limited options for reducing noise pollution along the periphery because most traffic is non-campus related.
  - Impact of Campus Plan: The transportation plan does not envision growth in vehicular-based travel demand to and from campus.
- *Water Pollution:*
  - Current Status: Vehicle exhaust, leaks, and wear and tear are sources of storm water pollution. During a rain storm, these pollutants leach into the ground or are washed from roadways and parking lots into the Chesapeake Bay through storm water drains.
  - Possible Improvements: Reducing vehicle trips and treating storm water are two options for addressing water pollution. Thus, continued encouragement of alternate modes by UDC could help reduce water pollution.
  - Impact of Campus Plan: Changes to water pollution from transportation sources should be minimal with development of the campus plan.

## *Enhance Social Equity and Economic Vitality*

Transportation has social and economic aspects that impact the university community. Social impacts of the transportation network include impacts on equity, health, livability and cohesion, accessibility of historic and cultural resources, and aesthetics. The economic impacts of transportation include congestion, infrastructure costs, user costs, resource depletion, mobility barriers, and crash damages. These costs limit economic development and can be a strain on individual and community resources.

As a community, UDC addresses these issues in various ways. UDC provides quality facilities and services for all users, regardless of mode choice, especially for those with disabilities or limited financial resources. The campus location, size and design contribute to low on-campus crash rates and high physical activity. Economically, UDC benefits from limited traffic congestion and crashes, which would reduce campus productivity and safety.

- *Proximity of Mixed-Land Uses:*
  - Current Status: Having mixed land uses or diverse land uses within walking or bicycling distance can reduce the amount of vehicle trips and shorten travel distances for typical trips. Sprawling development and separate land uses require more vehicle trips and longer travel distances. More frequent and longer trips increase energy consumption and transportation pollution. UDC has a compact campus, a good land use mix and is located in compact, urban location. This reduces the number of trips required and allows many to be made by walking, bicycling or transit.
  - Possible Improvements: There are two ways UDC can increase the proximity of land-uses: (1) by encouraging more students, faculty and staff to live on or closer to campus, and (2) to increase the amount of services on campus. A user survey could help determine if additional trips could be reduced by adding news services on-campus or nearby.
  - Impact of Campus Plan: The Campus Plan includes several new additions to campus that will increase services, notable the student center.
- *User Costs:*
  - Current Status: No parking is free on campus; all parking is by permit with varied costs per user. UDC does not offer any benefits for alternate mode usage.
  - Possible Improvements: Encouraging alternative modes can be done through increasing parking fees, although there is a limit to the amount of fees becomes too high for the campus to maintain competitiveness with other institutions. The University could also encourage alternative mode use through subsidizing bicycle commuting and car-sharing.
  - Impact of Campus Plan: The TDM recommendations contained in the Campus Plan include revisiting the parking fees and policies, adding a transit and bike commuting benefits, and implementing a reduced parking fee for carpoolers.
- *Crash Costs:*
  - Current Status: Transportation crashes on campus have not been significant, mostly due to a lack of internal campus roadways.

- Possible Improvements: The presence of the CAPA and RCW2 studies, as well as the recommendations contained within show that DDOT is aware of the bigger picture issues regarding Connecticut Avenue, pedestrian safety and accessibility.

  UDC is extremely interested in aiding the implementation of these initiatives. Although it does not have the purview or resources to implement the recommendations contained in these report directly, they are willing to endorse these initiatives and assist where possible in their implementation.

- Impact of Campus Plan: The Campus Plan does not contain any programs to reduce on-campus crash rates due to a minimal amount of internal roadways. The University will continue to work with DDOT to implement crash reduction measures on external roadways.

- *Mobility Barriers:*

  - Current Status: There are several physical barriers surrounding the campus that may limit mobility. The commuter traffic dominated Connecticut Avenue corridor also can be seen as a barrier to pedestrian and bicycle mobility. Although many crossings are made across these roadways, they can be seen as difficult due to high travel speeds. High speeds combined with the narrow travel lanes and grades make bicycling difficult.

  - Possible Improvements: Efforts to reduce travel speeds can be helpful in reducing the barrier that these roadways may present.

  - Impact of Campus Plan: The Campus Plan does not contain any programs to reduce mobility barriers on external roadways because they are not located on campus. The University will continue to work with DDOT to coordinate measures to lower speeds and reduce mobility barriers on external roadways.

## REVIEW OF TRANSPORTATION FACILITIES

The transportation review summarizes the state of the University's transportation network by identifying all areas of concern that may hinder future campus transportation needs and opportunities to be considered during development of the campus plan.

### *Site Location and Major Transportation Features*

The University of the District of Columbia (UDC) is located in northwest Washington, DC in Ward 3. UDC is located in an area of the District served by several major roadways and public transportation sources. The University is bounded by Yuma Street on the north, Connecticut Avenue on the east, and Van Ness Street to the south. The University does not have a roadway on its western boundary.

UDC is served by several principal and minor arterials, including Connecticut Avenue, Reno Road, and Tilden Street. Major collector roadways include Albemarle Street and Van Ness Street. The site is also served by several public transportation sources, including Metrorail and Metrobus. The Van Ness/UDC Metrorail station is adjacent to campus. UDC is also served by a pedestrian network consisting of sidewalks and crosswalks along the local streets surrounding the University. In addition to pedestrian accommodations, the site is also served by the on- and off-street bicycle network, which consists of bike lanes and signed bicycle routes along local roadways. A Capital Bikeshare station is located adjacent to campus.

### *Transit*

#### *Existing*

The Metrorail and Metrobus systems provide high quality public transportation access to campus. The Van Ness/UDC Metrorail station is located adjacent to the University. The nearest portal is located on the northwestern corner of the intersection of Connecticut Avenue and Veazey Terrace, and a second portal is located at the northeastern corner of the intersection, across Connecticut Avenue from the University. The red line serves the Van Ness/UDC station, running approximately every 3 minutes during the morning and afternoon peak periods, every 10 minutes during the noon peak period, and every 15 to 20 minutes during the weekday off-peak periods and on weekends.

Metrobus service is accessible to the University, with stops adjacent to the site on Connecticut Avenue and near UDC on other surrounding roadways. The majority of the Metrobus lines that serve the site converge at the Van Ness/UDC Metrorail station. These routes connect the site with several destinations throughout downtown DC and the surrounding areas. The University does not operate an on or off-campus shuttle.

Table 1 shows a summary of the bus route information for the lines that serve the site, including service hours and the headways. Figure 2 shows the existing rail and bus service.

**Table 1: Bus Route Information**

| Route Number | Route Name | Service Hours | Headway |
|---|---|---|---|
| D32 | Deal Junior High School Line | Monday – Friday 8:00 AM and 3:30 PM when schools are open | N/A – Only 1 bus |
| H2, 3 | Crosstown Line | 4:30 AM – 2:00 AM Monday – Friday<br>5:00 AM – 1:30 AM Saturday/Sunday | 30 min for each route |
| L1, 2, 4 | Connecticut Avenue Line | 5:00 AM – 1:00 AM Monday – Friday<br>6:00 AM – 1:00 AM Saturday/Sunday | 12 – 15 min for each route during peak, 30 min off-peak |
| N8 | Tenleytown-Glover Park Loop | 6:30 AM – 8:00 PM Monday – Friday | 20 min during peak, 40 min during off-peak |

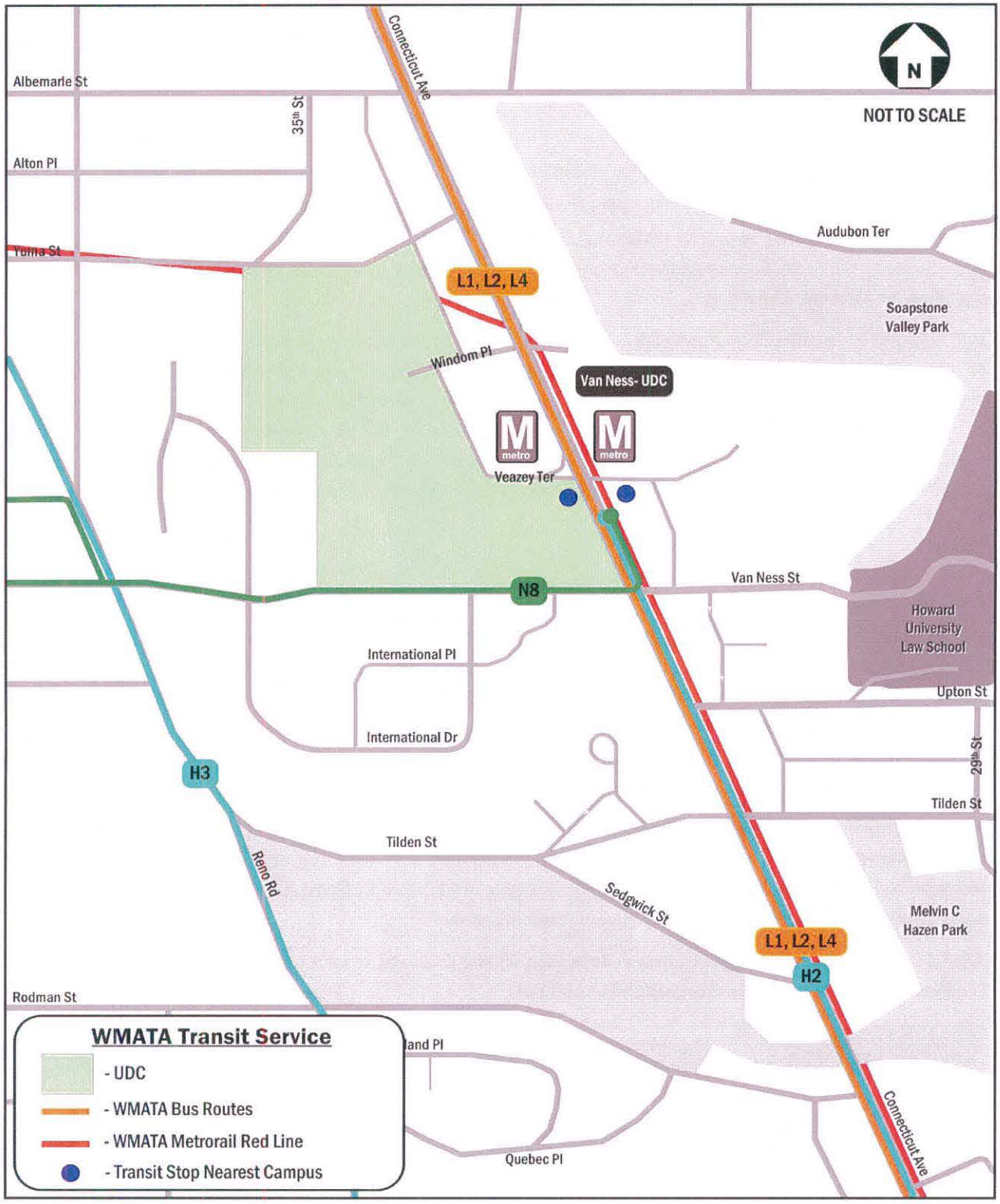


Figure 2: Existing Transit Service

### *Future*

Due to growth of population, jobs, and retail in several neighborhoods in the District and the potential for growth in other neighborhoods, the District's infrastructure is challenged with the need for transportation investments to support the recent growth and further strengthen neighborhoods. In order to meet these challenges and capitalize on future opportunities, the District Department of Transportation (DDOT) has developed a plan to identify transit challenges and opportunities and to recommend investments. This is outlined in the *DC's Transit Future System Plan* report published by DDOT in April 2010. This plan includes the reestablishment of streetcar service in the District and the implementation of limited-stop bus service along major corridors near the proposed development.

The streetcar system element of the plan does not include any routes that would serve UDC. However, the Woodley Park/Adams Morgan to Brookland Line and the Woodley Park/Adams Morgan to Congress Heights Line will be located approximately one mile from the UDC campus. These routes will be accessible via Metrorail and Metrobus. The Metro Express limited-stop bus service element of the plan also does not include any routes that would directly serve the University. However, the network of new limited-stop bus service ("Metro Express") will consist of high-frequency bus services using specially marked vehicles, operated by WMATA, which will supplement the existing Metro Express routes that operate along Calvert Street and Wisconsin Avenue south and west of the site, respectively. Stops will generally be located every ¼- to ½-mile along the routes. The Metro Express bus services will also include traffic signal priority and real-time Next Bus arrival displays.

In addition to the *DC's Transit Future System Plan* report, the DC Circulator has outlined a number of proposed corridors for future expansion of the system[1]. These corridors were identified at public open house meetings run by DDOT and the DC Circulator. The network of new Circulator routes includes a corridor connecting Tenleytown to Brookland, which would travel along Connecticut Avenue near the University. This route would provide an additional connection to areas of the District not currently served by a direct transit connection.

## ***Pedestrian Facilities***

### *Existing*

The roadways in the immediate vicinity of UDC provide satisfactory pedestrian facilities and connectivity throughout the area. Sidewalks are located along the roadway networks with crosswalks linking segments at intersections within the study area. Adequate crosswalks are provided at the majority of intersections near the University. Controlled crosswalks are provided where traffic signals exist to help control the flow of vehicles. Uncontrolled crosswalks are provided at the other intersections, where traffic volumes and speeds do not prohibit safe pedestrian movements.

Although most roadways and intersections near UDC have sidewalks and crosswalks, respectively, the amount of traffic on Connecticut Avenue can create in intimidating pedestrian environment. This is notable during commuter rush hours during the loss of the on-street parking buffer between moving vehicles and pedestrians. In addition, the wide width of Connecticut Avenue is a deterrent to crossing the street, as the marked crosswalks are long. Due to activity on both sides of the street, jaywalking is common and the wide width of the street exacerbates pedestrian/vehicular conflicts.

[1] http://www.dccirculator.com/images/pdf/CirculatorRecommendedCorridors-11-8-10.pdf

### *Pedestrian Master Plan*

The *DC Pedestrian Master Plan* from April 2009 identifies several recommendations in order to reduce the number of pedestrians killed and injured in crashes with motor vehicles and to increase pedestrian activity by making walking a comfortable and accessible mode of travel throughout all parts of the District. These recommendations include constructing new sidewalks where missing on streets in the Districts, improving pedestrian access and safety at controlled and uncontrolled crossing and intersections, and improving pedestrian access and safety at bus stops while maximizing transit efficiency.

### *CAPA Study*

The Connecticut Avenue Pedestrian Action (CAPA) group was formed in 2009 by residents of DC from the Chevy Chase, Forest Hills, Cleveland Park, and Woodley Park neighborhoods; ANC Commissioners from ANCs 3C, 3F, and 3G; DC Councilmember Mary Cheh; IONA Senior Services; the Coalition for Smarter Growth; DCPED, a pedestrian advocacy group; the DC chapter of AARP; the Murch and Oyster-Adams Elementary Schools' Safe Routes to School Programs; the Cleveland Park and Chevy Chase Citizen Associations; and Ward 3 Vision. The purpose of the group is to create a pedestrian-friendly environment on Connecticut Avenue by evaluating barriers such as dangerous crosswalks, inadequate time for pedestrians to cross streets at traffic lights, motorists speeding, and motorists not yielding to pedestrians. Their goal is to create a Connecticut Avenue where all residents can safely cross the street in crosswalks, traffic lights provide ample time for pedestrians to cross the street, motorists obey the speed limit and stop for pedestrians in crosswalks, bus shelters are sighted in ways that provide greater visibility of pedestrians, businesses thrive from pedestrian traffic, all sidewalks and curbs are ADA-compliant, pedestrian injuries and fatalities no longer occur, and more residents walk.

The final report from the Pedestrian Safety Audit was published to the public on February 16, 2011 by the Toole Design Group. The project focuses on the stretch of Connecticut Avenue between Calvert Street, near Rock Creek Park, and Western Avenue, at the border of the District with Maryland. The study area includes 43 blocks of roadway, 44 intersections (26 signalized, 18 unsignalized), and three midblock crossings. 50 bus stops serving 11 Metrobus routes and three Metrorail stations on the red line are located within the study area. The study presents the existing pedestrian system, which was surveyed by a group of volunteer data collectors who documented existing conditions and behaviors at 43 intersections and 23 block segments, and identifies key barriers to walking. Additionally, the report provides general recommendations for system-wide improvements along Connecticut Avenue and a more detailed analysis and recommendations for five case-study intersections.

Near UDC, seven intersections were included in the CAPA study, with the intersection of Connecticut Avenue and Veazey Terrace selected for a more detailed analysis. In general, recommendations at the study area intersections included installing and repainting, removing, and repaving crosswalks; installing curb ramps and tactile surfaces; removing pedestrian push buttons; correcting visual and physical obstructions; retiming traffic signals to increase "Walk" time, add a leading pedestrian interval, and adjusting countdown displays; installing traffic signals; and installing "No Turn on Red" signs. The improvements recommended for the six intersections near UDC (not including Connecticut Avenue and Veazey Terrace) total approximately $100,000 according to the estimates provided in the CAPA study.

The analysis of the intersection of Connecticut Avenue and Veazey Terrace presents the following existing conditions observations:

- The Van Ness/UDC Metrorail station is located north of the intersection. Metrobus stops are also located on both sides of the Connecticut Avenue, north of the intersection. An additional Metrobus stop is located on westbound

Veazey Terrace, west of the intersection, which was observed as an informal drop-off zone for the Metrorail station. The eastbound approach of Veazey Terrace has relatively low traffic volumes because it is primarily an entrance for businesses.

- Veazey Terrace west of Connecticut Avenue is split by a pedestrian refuge island, which creates a slip lane for vehicles turning right from southbound Connecticut Avenue. The curb radius is relatively large and the wide cross-section of Veazey Terrace leads to faster vehicle speeds. The pedestrian refuge island includes a split pedestrian phase, although pedestrian were observed to continue crossing one at the refuge, even when they were not provided with a "Walk" signal.
- Pedestrians crossing Veazey Terrace on the west side of the intersection frequently do not stay within the marked crosswalk but instead cross farther west of the intersection to create a more direct route to the Van Ness/UDC Metrorail station.
- Motorists were observed U-turning on westbound Veazey Terrace at the Metrobus stop and informal drop-off zone, resulting in conflicts with pedestrians crossing Veazey Terrace away from the marked crosswalks.

In order to address the pedestrian concerns, the following recommendations were made to improve the pedestrian environment of the intersection:

- Close southbound slip lane from Connecticut Avenue to Veazey Terrace to slow turning vehicular traffic, better organize vehicular movements, and reduce pedestrian crossing distance across Veazey Terrace. Widen the remaining section of Veazey Terrace slightly to allow vehicles to turn from southbound Connecticut Avenue.
- Add an informal Kiss & Ride area behind the Metrobus stop on Veazey Terrace west of Connecticut Avenue for the Van Ness/UDC Metrorail station.
- Remove the steel plate in the roadway covering the east crosswalk leg, patch with asphalt, and restripe the crosswalk to increase pedestrian visibility and reduce the need for motorists to swerve to avoid driving over the plate.
- Install a seat wall or other landscaping elements along eastbound Veazey Terrace west of the intersection to channel pedestrian traffic to the crosswalk across Veazey Terrace.

Figure 3 shows the proposed recommendations for the intersection of Connecticut Avenue and Veazey Terrace from the CAPA study. The study also includes a cost estimate for their recommendations, totaling approximately $600,000.

The configuration shown in the CAPA study does not adequately accommodate large vehicles, such as buses using the WMATA transfer facility, and some trucks accessing the UDC loading facilities. This report recommends altering the recommendation in the CAPA study to an alternate design that maintains the goals of improving conditions at the intersection while still providing necessary maneuvering room for large vehicles. Figure 4 shows a sketch of an alternative concept. The further processing application for the Student Center building will contain additional details on this design.

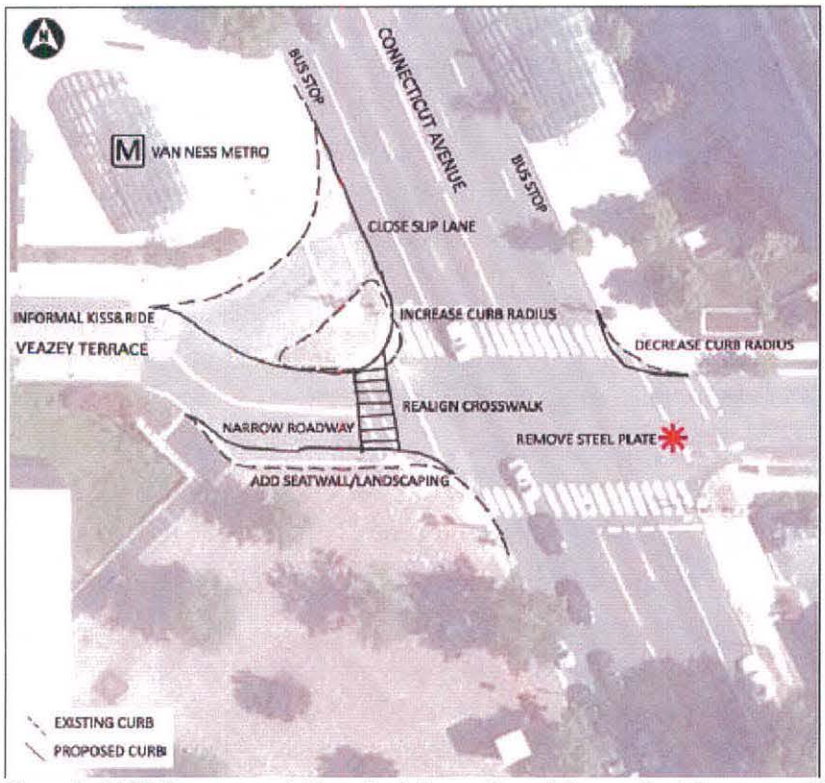


Figure 3: CAPA Recommendations for Intersection of Connecticut Avenue and Veazey Terrace

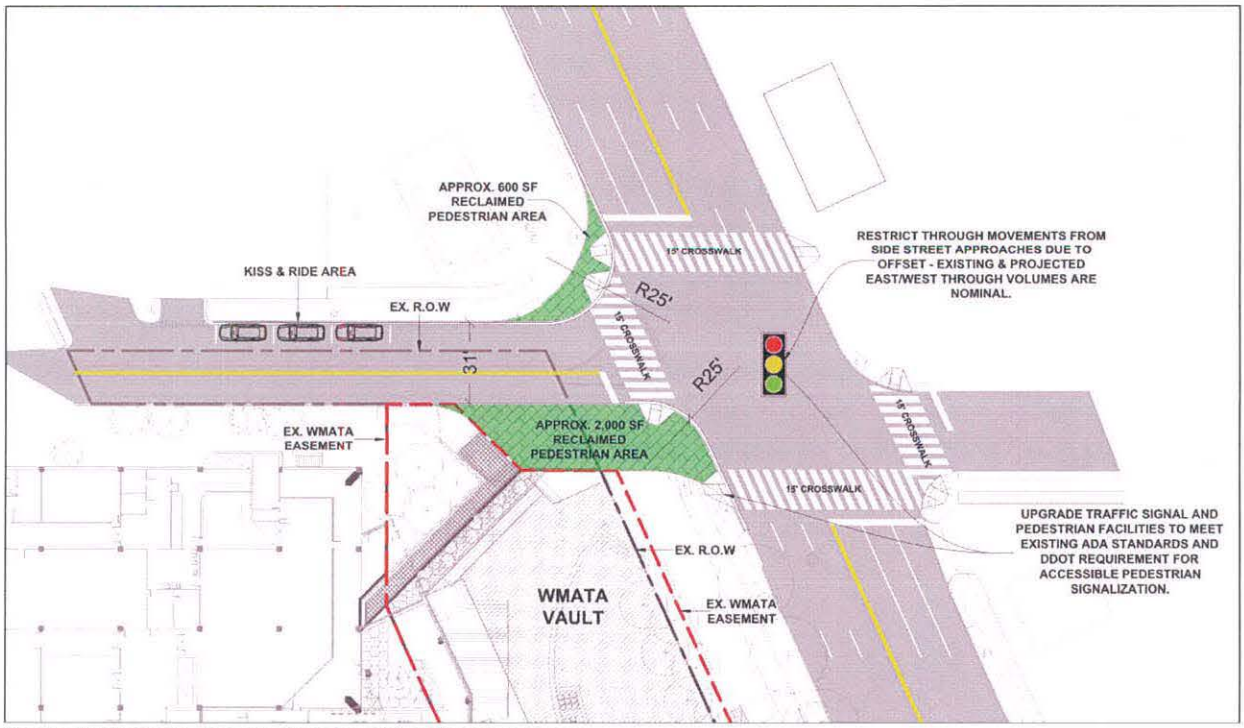


Figure 4: Alternate Design Suggested for Veazey Terrace

## *Rock Creek West II Livability Study*

The Rock Creek West II (RCW2) Livability Study was initiated by the District Department of Transportation (DDOT) to take a big picture look at the roadway network and to identify concrete actions to increase transportation and safety options, concentration on transportation safety and quality of life issues for all users. The RCW2 study is the first of three Livability Studies to be initiated in 2010.

The draft final recommendations for the RCW2 Livability Study were presented to public in October 2010, and based on public comments and additional analysis, the draft final recommendations were presented to the public in December 2010. The final report for the project was posted in February 2011, following the closing of the public comment period. The study focuses on an area located in the northwest quadrant of the District, in Ward 3. It includes the neighborhoods of American University Park, Chevy Chase, Forest Hills, Friendship Heights, and Tenleytown and community anchors such as public schools, recreation centers, community centers, libraries, and three universities, including UDC. The study area is bounded by Rock Creek Park and the state of Maryland.

Near UDC, several corridors and intersections were included in the RCW2 study. Table 2 shows the reported issues, the final recommendations, and the impacts expected from the proposed changes.

**Table 2: Final Recommendations from Rock Creek West II Livability Study**

| Location | Reported Issue | Final Recommendation | Expected Impacts |
|---|---|---|---|
| 36th Street Corridor between Yuma Street and Linnean Avenue | No bicycle facilities. | Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments. | Reduced vehicle speeds due to visual cues; increased cyclists. |
| Albemarle Street between 43rd Street and Reno Road | No bicycle facilities. | Add bike sharrows in both directions. | Alert drivers to bicycle traffic; increased cyclist volumes. |
| Van Ness Street between Wisconsin Avenue and Connecticut Avenue | No bicycle facilities. | Add bike sharrows in both directions. | Alert drivers to bicycle traffic; increased cyclist volumes. |
| Van Ness Street between Reno Road and International Court | Unclear lanes. | Add centerline to meet new raised median. | Clarify lanes; reduce vehicle speeds by visually narrowing roadway. |
| Van Ness Street and Connecticut Avenue | Pedestrian safety and vehicle congestion. | Implement previous DDOT recommendations: increased pedestrian signal timing, right turn lane from eastbound Van Ness Street to southbound Connecticut Avenue. | Improved pedestrian safety; reduced vehicle congestion. |
| Yuma Street between Massachusetts Avenue and Connecticut Avenue | No bicycle facilities. | Designate as bicycle boulevard: add pavement markings and wayfinding signs; potential for other treatments. | Reduced vehicle speeds due to visual cues; increased cyclists. |

## *Bicycle Facilities*

### *Existing*

According to DDOT's March 2010 Bicycle Map, bicycling conditions near UDC range between good, fair, and poor. Some local streets provide adequate cycling conditions, but there are few attractive routes for trips between residential clusters and major destinations. Near campus, bike lanes are only provided along the portion of Tilden Street east of Connecticut Avenue. A signed bike route is provided along 36th Street, Warren Street, and 37th Street west of the University. This portion of the District has several major roads with high traffic volumes and speeds, man-made and natural barriers, and a lack of existing bicycle facilities. These conditions contribute to low bicycle ridership in the study area and discourage people from using bicycles for short trips. Figure 5 illustrates existing conditions.

The newly formed Capital Bikeshare was launched in late September 2010, replacing the DC SmartBike program. This program includes 110 bicycle-share stations across Washington, DC and Arlington, VA with approximately 1,100 bicycles provided. Near UDC, a Capital Bikeshare station was installed along the UDC side of Connecticut Avenue between Veazey Terrace and Windom Place[2].

### *Bicycle Master Plan*

As shown in the *DC Bicycle Master Plan* from April 2005, DDOT's proposed bicycle infrastructure for the roadways in the vicinity of the proposed development includes several multi-use trails, on-street bike lanes, and signed bicycle routes. The facilities will significantly improve bicycling conditions in the study area and may lead to higher rates of cycling. They also provide additional links between the University and major residential and commercial destination in northwest, DC and beyond. Figure 6 illustrates future and proposed bicycle conditions from the Bicycle Master Plan.

### *Rock Creek West II Livability Study*

As described above, the RCW2 study includes both pedestrian and bicycle recommendations. The majority of the recommendations contained in Table 2 are bicycle oriented, which, if implemented, would greatly increase the amount of bicycle facilities in the vicinity of the campus.

[2] Capital Bikeshare: www.capitalbikeshare.com

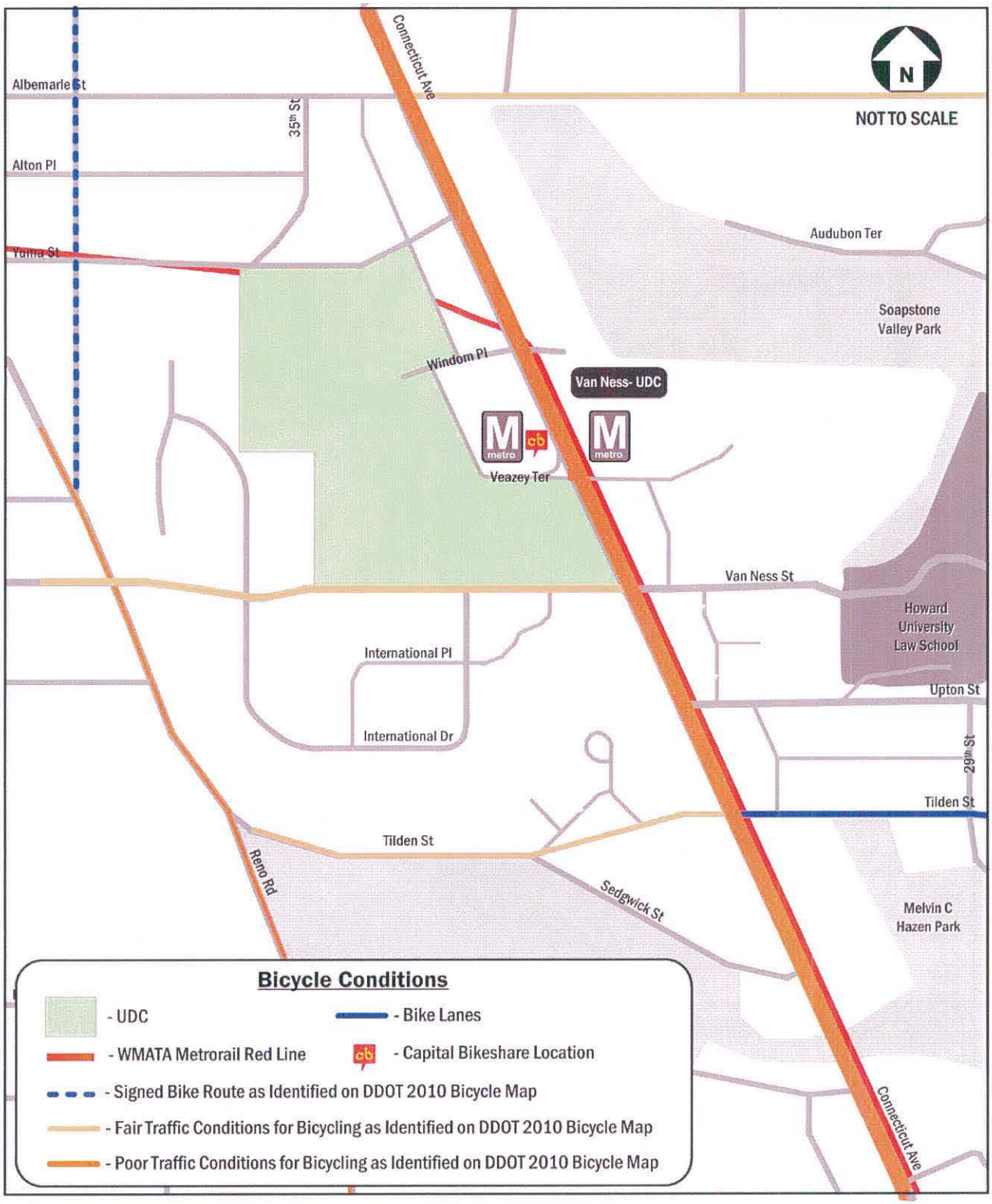


Figure 5: Existing Bicycle Conditions

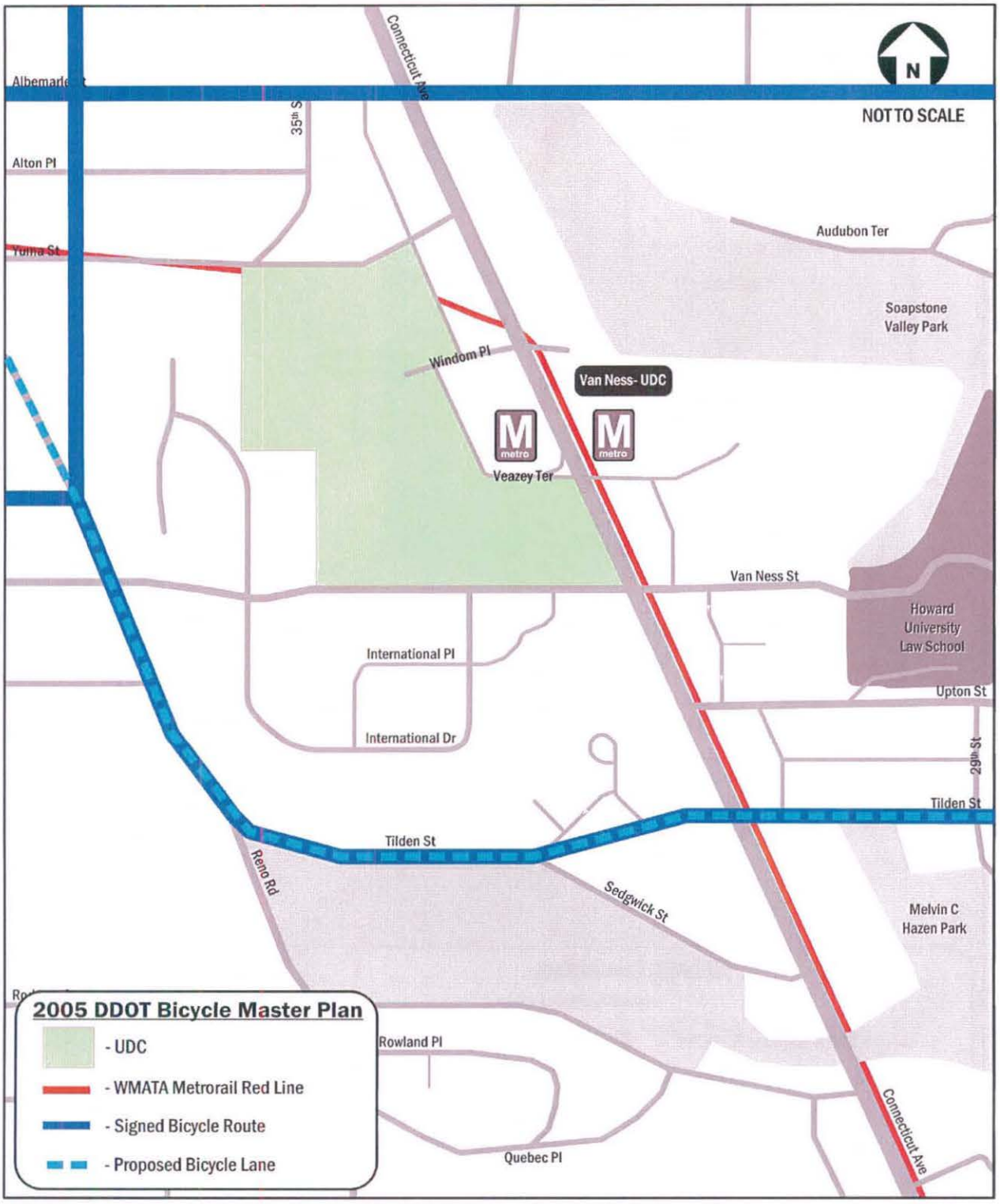


Figure 6: 2005 DDOT Bicycle Master Plan

## *Parking*

### *Existing Parking Policy*

UDC provides parking for students, faculty, and staff members. The majority of parking spaces are located in the Underground Parking Garage, which contains a total of 758 spaces. 83 of these spaces are reserved for faculty and staff, 14 spaces are designated as handicap, and two spaces are designated for motorcycles (accommodating four motorcycles). Other sources of on-campus parking are small groups of surface spaces located between and behind buildings, such as those on the Circle/Breezeway, near Building 47, and at the loading dock.

In addition to the on-campus parking locations, an overflow lot for the Underground Parking Garage is provided at the Days Inn lot. The two-story lot is owned by the Van Ness Limited Partnership and is located off Connecticut Avenue on Yuma Street. The lot is shared through a Memo of Understanding between the Days Inn and the University. The University-controlled portion contains 56 spaces (48 unrestricted and 8 reserved) located on the top portion of the lot. An additional parking garage is located in Building 52, which contains 100 parking spaces (93 unrestricted, 5 reserved, and 2 handicap). However, this parking garage is currently utilized by Wilson Senior High School. Prior to Wilson's presence on the campus, daily patrons and permit holders were allowed to park in the garage.

The Underground Parking Garage is staffed between the hours of 6:00 AM and 9:00 PM Monday through Friday. During other times, parking is free and open. The existing configuration of the parking garage consists of fare gates to control access in to and out of the garage. Parking fees are paid upon entry to the garage. The University is currently installing a revenue control system in the Underground Parking Garage, which will consist of ticketed fare gates and a Pay on Foot system.

Parking permits are available for students and faculty/staff members, which are required to park in University parking facilities. Permits for faculty and staff are sold for $150 per semester for the 2010-2011 academic year, and student permits are sold for $75 per semester. Motorcycle parking is also available for $40 per semester for faculty, staff, and students. Students, faculty, and staff who do not purchase a seasonal parking permit may pay a $3.50 discounted daily parking rate; all others must pay the $8 daily rate. Permits are sold by the Office of Public Safety and Emergency Management. Campus police enforce the parking policy and issue citations to vehicles who do not comply.

### *Parking Capacity and Utilization*

In order to determine the existing parking demand at UDC, parking counts were performed on Wednesday, November 10, 2010 to reflect a typical weekday when classes are in session. Parking occupancy was recorded in the Underground Parking Garage between 7:00 AM and 7:00 PM on an hourly basis, as shown in Table 1. The results of these counts show that peak occupancy occurred at 2:00 PM with 719 parked cars, which represents 95% occupancy. Between the hours of 11:00 AM and 4:00 PM, the garage had an average occupancy of 686 parked vehicles, which represents a mean occupancy of 91%. For efficient operations, parking demand generally should not raise about 90% of the available marked spaces. Therefore, Gorove/Slade would consider the Underground Parking Garage above capacity.

**Table 3: Underground Parking Garage Occupancy Data**

| Time | Underground Parking Garage | | | | Percent Occupied |
|---|---|---|---|---|---|
| | Unrestricted | HC | Reserved | Total | |
| 7:00 AM | 60 | 1 | 2 | 63 | 8% |
| 8:00 AM | 118 | 2 | 3 | 123 | 16% |
| 9:00 AM | 296 | 1 | 12 | 309 | 41% |
| 10:00 AM | 442 | 5 | 41 | 488 | 64% |
| 11:00 AM | 586 | 9 | 36 | 631 | 83% |
| 12:00 PM | 649 | 10 | 59 | 718 | 95% |
| 1:00 PM | 627 | 11 | 55 | 693 | 91% |
| 2:00 PM | 650 | 11 | 58 | 719 | 95% |
| 3:00 PM | 633 | 8 | 57 | 698 | 92% |
| 4:00 PM | 597 | 6 | 54 | 657 | 87% |
| 5:00 PM | 561 | 10 | 48 | 619 | 82% |
| 6:00 PM | 492 | 7 | 39 | 538 | 71% |
| 7:00 PM | 427 | 3 | 29 | 459 | 61% |
| **Average (11:00 AM-4:00 PM)** | **624** | **9** | **53** | **686** | **91%** |

As stated previously, additional parking is located in the Building 52 parking garage and the Days Inn Lot. Parking counts were performed for these lots on Thursday, March 17, 2011 to reflect a typical weekdays when classes are in session. Parking occupancy was recorded in these locations between 12:00 PM and 3:00 PM, as shown in Table 4 and Table 5.

**Table 4: Days Inn Parking Lot Occupancy Data**

| Time | Days Inn Parking Lot | | | | Percent Occupied |
|---|---|---|---|---|---|
| | Unrestricted | HC | Reserved | Total | |
| 12:00 PM | 8 | 0 | 7 | 15 | 27% |
| 1:00 PM | 10 | 0 | 9 | 19 | 34% |
| 2:00 PM | 9 | 0 | 7 | 16 | 29% |
| 3:00 PM | 8 | 0 | 5 | 13 | 23% |
| **Average (12:00 PM-3:00 PM)** | **9** | **0** | **7** | **16** | **29%** |

**Table 5: Building 52 Parking Garage Occupancy Data**

| Time | Building 52 Parking Garage | | | | Percent Occupied |
|---|---|---|---|---|---|
| | Unrestricted | HC | Reserved | Total | |
| 12:00 PM | 89 | 2 | 5 | 96 | 96% |
| 1:00 PM | 93 | 2 | 5 | 100 | 100% |
| 2:00 PM | 93 | 2 | 5 | 100 | 100% |
| 3:00 PM | 87 | 2 | 5 | 94 | 94% |
| **Average (12:00 PM-3:00 PM)** | **91** | **2** | **5** | **98** | **98%** |

## *Existing Roadways*

As stated previously, several principal arterials serve the UDC study area, including Connecticut Avenue; minor arterials, including Reno Road, and Tilden Street; and collector roadways, including Albemarle Street and Van Ness Street. Key local access roads include Yuma Street, Windom Place, Veazey Street, Upton Street, International Court, 35th Street, and 36th Street. Figure 7 shows the roadway network hierarchy and the annual daily traffic volumes for the roadways in the vicinity of the University.

### *Field Observations*

Observations of the study intersections were performed by Gorove/Slade in order to assess the existing operations of the roadway network. During these observation periods, remarks were noted in regards to signal operation, vehicular queuing, and pedestrian activity. The study area was observed on Tuesday, September 28 between 7:30 and 8:30 AM and between 4:30 and 5:30 PM.

The following observations were recorded for the intersections within the study area.

- *Connecticut Avenue and Albemarle Street*

  The intersection did not experience any delay during the morning peak hour. The majority of traffic was traveling southbound on Connecticut Avenue. Only a small number of vehicles were observed on Albemarle Street, with little to no queue development.

  The intersection did not experience any delay during the afternoon peak hour as well. The majority of traffic was traveling northbound on Connecticut Avenue. Only a small number of vehicles were observed on Albemarle Street, with little to no queue development.

  Very few pedestrians were observed during the morning and afternoon peak periods.

- *Connecticut Avenue and Yuma Street*

  The intersection operated under acceptable conditions during the morning peak period. The majority of traffic was traveling southbound on Connecticut Avenue. The northbound approach had a high volume of vehicles as well. North- and southbound queues of 1-2 vehicles and eastbound queues of 3-4 vehicles developed. Only a small number of vehicles were observed traveling eastbound, with a majority of those vehicles turning onto Connecticut Avenue.

  During the afternoon peak period, the intersection also operated under acceptable conditions. The majority of traffic was traveling north- and southbound on Connecticut Avenue. Only a small number of vehicles were observed traveling eastbound, with a majority of those vehicles turning onto Connecticut Avenue.

  Significant pedestrian traffic was observed near the intersection of Connecticut Avenue and Yuma Street. Due to large traffic volumes, most of the pedestrians appeared to utilize the crosswalks and pedestrian signals.

- *Connecticut Avenue and Windom Place*

  The intersection operated under acceptable conditions during the morning peak period. The westbound approach experienced a small amount of delay during the north- and southbound green time. Westbound queues of 1-2 vehicles developed.

The intersection operated under similar conditions during the afternoon peak period. However, the majority of traffic was traveling northbound on Connecticut Avenue. Westbound queues of 3-4 vehicles developed during the north- and southbound green time. The green time allocated to the east- and westbound approaches appeared to be provided for pedestrian traffic. However, the signal remained green in order to provide adequate time for pedestrians to cross Connecticut Avenue.

- *Connecticut Avenue and Veazey Terrace*

  The intersection experienced an acceptable amount of delay during the morning peak hour. The majority of traffic was traveling both north and southbound on Connecticut Avenue. However, after the end of the morning peak period, the southbound vehicles experienced delay extending from Albemarle Street. This caused a long southbound queue to develop of 10-12 vehicles. Due to the construction work on Connecticut Avenue near Veazey Terrace, the southbound curb lane was closed. However, the southbound movement was generally able to clear the intersection during the majority of the green time. Only a small number of vehicles were observed traveling westbound on Veazey Terrace. Some pick-up and drop-off activity for the Van Ness/UDC Metrorail station was observed along the eastbound approach of Veazey Terrace.

  The intersection operated under similar conditions during the afternoon peak period. However, the majority of traffic was traveling northbound on Connecticut Avenue. Westbound queues of 1-2 vehicles developed during the north- and southbound green time. An increase in eastbound vehicular traffic was observed, with vehicles exiting the campus. Similar to the morning peak period, some pick-up and drop-off activity for the Van Ness/UDC Metrorail station was observed.

  The majority of pedestrians observed during the morning and afternoon peak periods appeared to travel across Connecticut Avenue from the Metrobus stops and the Metrorail station portals adjacent to the intersection. Some east- and westbound pedestrians were observed, although the majority of pedestrians were observed crossing north- and southbound along Connecticut Avenue. Most of the pedestrians appeared to utilize the crosswalks and pedestrian signals. However, a significant number of pedestrians were observed jaywalking across the intersection due to the signal timing provided to cross the eastbound approach of Veazey Terrace. Pedestrians were also observed crossing the intersection outside of the marked crosswalk in order to shorten the path across the intersection to the Van Ness/UDC Metrorail station.

- *Connecticut Avenue and Van Ness Street*

  The intersection experienced an acceptable amount of delay during the morning peak hour. The majority of traffic was traveling both north- and southbound on Connecticut Avenue. The eastbound approach experienced a small amount of delay during the north- and southbound green time. Only a small number of vehicles were observed traveling westbound. Some northbound congestion was observed during the morning peak period due to vehicles turning left on to Van Ness Street. This was mostly due to vehicular queues backing up to the intersection along Van Ness Street, blocking additional vehicles from turning left.

  The intersection operated under similar conditions during the afternoon peak period. An increase in eastbound vehicular traffic was observed, with vehicles exiting the UDC campus and the adjacent embassies and office complexes. North- and southbound queues of approximately 1-2 vehicles developed.

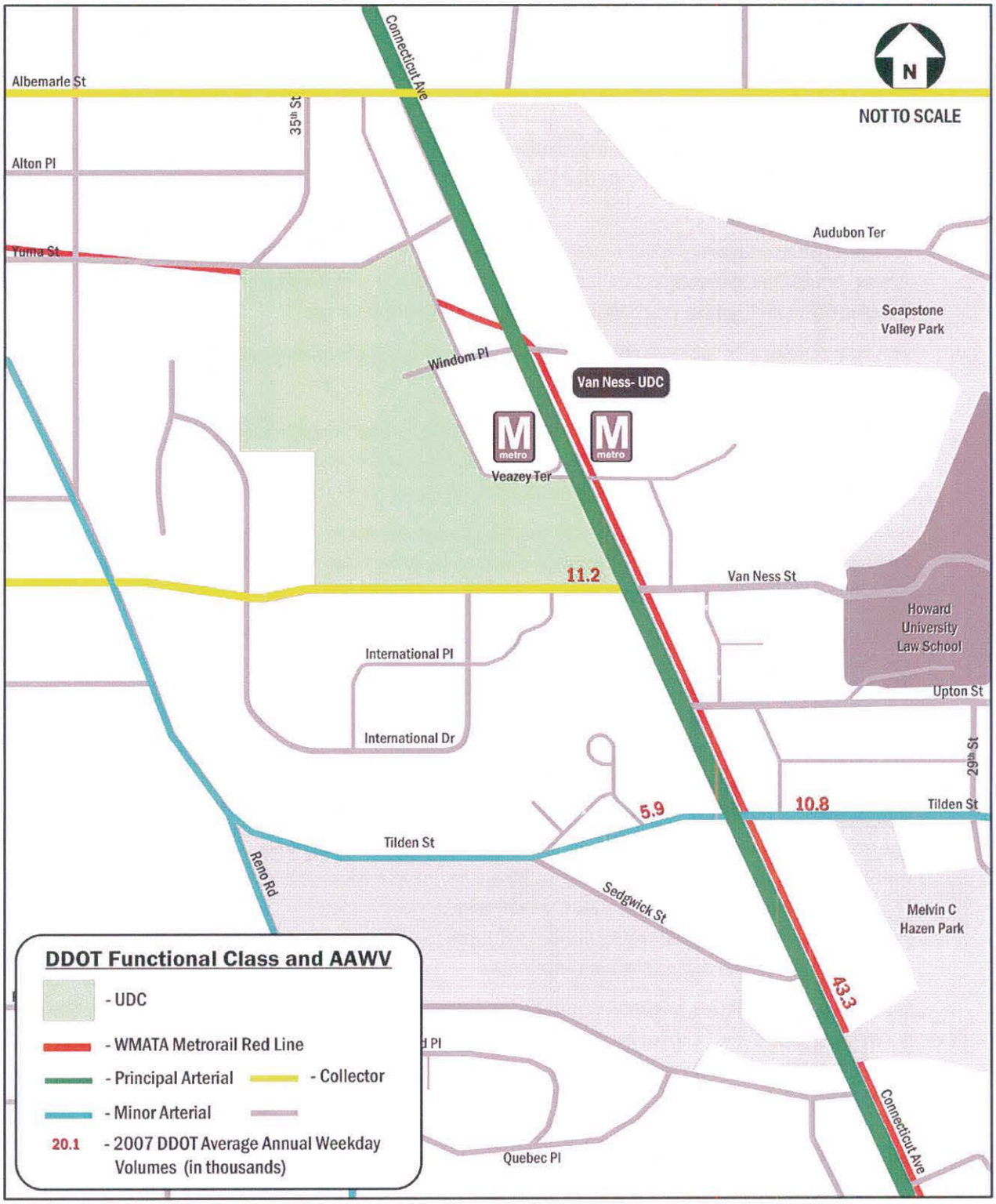


Figure 7: DDOT Functional Classification and Average Annual Weekday Volume

The majority of pedestrians observed during the morning and afternoon peak periods appeared to travel across Connecticut Avenue from the Metrobus stops adjacent to the intersection. Some east- and westbound pedestrians were observed. Most of the pedestrians appeared to utilize the crosswalks and pedestrian signals.

- *Connecticut Avenue and Upton Street*

  During the morning peak period, the intersection operated under acceptable conditions. North- and southbound traffic free-flowed through the intersection, incurring little to no delay. A small amount of traffic was observed traveling westbound.

  During the afternoon peak period, similar traffic conditions were observed. North- and southbound traffic free-flowed through the intersection, and a small amount of traffic was observed traveling westbound. The vehicles traveling westbound did not experience an unacceptable amount of delay.

  Very little pedestrian activity was observed during the morning and afternoon peak periods.

- *Connecticut Avenue and Tilden Street*

  During the morning peak period, the intersection operated under acceptable conditions. Minor queuing was observed for the southbound left-turn movement on Connecticut Avenue, with queues of approximately 2-3 vehicles developing. Also, some queuing was observed on the westbound approach of approximately 3-4 vehicles.

  During the afternoon peak period, the intersection also operated under acceptable conditions. The north- and southbound approaches of Connecticut Avenue and the westbound approach of Tilden Street was observed to operate similar to the morning peak period.

  Very little pedestrian activity was observed during the morning and afternoon peak periods.

- *Van Ness Street and UDC Parking Garage/International Drive*

  The intersection operated under acceptable conditions during the morning peak period. However, some queuing was observed along the westbound approach due to vehicles entering the UDC parking garage, which occasionally extended to the intersection of Van Ness Street with Connecticut Avenue. Few vehicles were observed exiting southbound from the UDC parking garage and traveling northbound on International Drive.

  The intersection also operated under acceptable conditions during the afternoon peak period. A small amount of traffic was observed entering the UDC parking garage and turning on to International Drive. A significant number of vehicles were observed exiting the UDC parking garage and traveling north on International Drive. However, drivers were able to find acceptable gaps in cross-traffic in order to exit. Queues of approximately 2-3 vehicles developed on the north- and southbound approaches.

  Some pedestrian activity was observed, with the majority of pedestrians traveling eastbound on Van Ness Street. A few pedestrians were also observed crossing Van Ness Street during the afternoon peak period. Although vehicles must yield to pedestrians in a crosswalk, several vehicles did not yield for pedestrians attempting to cross Van Ness Street.

- *Van Ness Street and UDC Parking Garage*

  The intersection experienced little to no delay during the morning peak period. Few vehicles were observed exiting the UDC parking garage, and east- and westbound traffic free-flowed through the intersection.

The intersection also operated under acceptable conditions during the afternoon peak period. Vehicles were observed exiting the UDC parking garage and incurring an acceptable amount of delay while waiting for gaps in traffic to turn on to Van Ness Street.

Very few pedestrians were observed during the morning and afternoon peak periods.

- *Van Ness Street and International Drive*

  The intersection operated under acceptable conditions during the morning peak period. The majority of traffic was traveling eastbound on Van Ness Street. The westbound approach had a high volume of vehicles as well, with a small amount of delay. East- and westbound queues of 2-3 vehicles developed. Only a small number of vehicles were observed traveling north- and southbound.

  The intersection operated under similar conditions during the afternoon peak period. However, the majority of traffic was traveling westbound on Van Ness Street. East and westbound queues of 2-4 vehicles and queues of approximately 1-2 vehicles developed. An increase in north- and southbound vehicular traffic was observed, with vehicles exiting the embassies and office complexes located along International Drive.

  Very few pedestrians were observed during the morning and afternoon peak periods.

- *Van Ness Street and Reno Road*

  The intersection operated under acceptable conditions during the morning peak period. The east- and westbound approaches experienced a small amount of delay during the north- and southbound green time. East- and westbound queues of 4-6 vehicles developed.

  The intersection operated under similar conditions during the afternoon peak period. East- and westbound queues of 4-6 vehicles developed during the north- and southbound green time. An increase in north- and southbound vehicular traffic was observed. North- and southbound queues of approximately 1-2 vehicles developed.

  Some pedestrian activity was observed during the morning and afternoon peak periods, with the majority of pedestrians traveling along Van Ness Street.

## *Existing Vehicular Analysis*

The purpose of the vehicular capacity analysis is to determine the existing conditions at the intersections located within the study area. The results of the existing conditions of the study intersections will be used to determine the impact of future development on the UDC campus. The following set of intersections, primarily located along Connecticut Avenue and Yuma Street near the University, were chosen for evaluation:

1. Connecticut Avenue & Albemarle Street
2. Connecticut Avenue & Yuma Street
3. Connecticut Avenue & Windom Place
4. Connecticut Avenue & Veazey Terrace
5. Connecticut Avenue & Van Ness Street
6. Connecticut Avenue & Upton Street

7. Connecticut Avenue & Tilden Street
8. Van Ness Street & International Drive/UDC Garage
9. Van Ness Street & UDC Garage Exit
10. Van Ness Street & International Drive
11. Van Ness Street & Reno Road

Intersection capacity analyses were performed for the existing conditions at the intersections contained within the study area during the morning and afternoon peak hours. In order to determine the peak hour turning movement traffic volumes, traffic counts were performed on Tuesday-Wednesday, September 28-29, 2010 from 6:30 to 9:30 AM and from 4:00 to 7:00 PM, reflecting conditions on a typical weekday when classes are in session. The existing traffic volumes for the intersections contained within the study area are shown on Figure 8 and Figure 9.

Analysis of the existing traffic data determined that morning peak hour is from 8:00 to 9:00 AM, and the afternoon peak hour is from 5:30 to 6:30 PM. Gorove/Slade conducted field reconnaissance to obtain the existing lane configurations and traffic controls at the intersections within the study area, shown on Figure 10 and Figure 11.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. An average delay (of each approach) and LOS for the signalized intersections is also shown for an overall intersection LOS grade. For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of "E" or better on each approach. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay.

The existing capacity analysis is based on the roadway network as shown in Figure 10 and Figure 11 and the traffic volumes described above and shown previously on Figure 8 and Figure 9. The results of the intersection capacity analyses are presented in Table 6 and shown on Figure 12 and Figure 13.

***Table 6: Existing Capacity Analysis Results***

| Intersection | Approach | Existing Conditions (2010) | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Albemarle Street** | **Overall** | **15.4** | **B** | **13.9** | **B** |
| | Eastbound | 37.7 | D | 37.2 | D |
| | Westbound | 49.8 | D | 32.9 | C |
| | Northbound | 5.8 | A | 11.4 | B |
| | Southbound | 10.8 | B | 8.7 | A |
| **Connecticut Avenue & Yuma Street** | **Overall** | **9.7** | **A** | **8.0** | **A** |
| | Eastbound | 50.0 | D | 45.8 | D |
| | Northbound | 3.7 | A | 8.9 | A |
| | Southbound | 8.0 | A | 1.7 | A |
| **Connecticut Avenue & Windom Place** | **Overall** | **3.5** | **A** | **18.2** | **B** |
| | Eastbound | 48.6 | D | 33.5 | C |
| | Westbound | 42.5 | D | 58.8 | E |
| | Northbound | 4.5 | A | 14.4 | B |
| | Southbound | 1.5 | A | 14.1 | B |

| Intersection | Approach | Existing Conditions (2010) | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Veazey Terrace** | **Overall** | **15.5** | **B** | **12.8** | **B** |
| | Eastbound | 31.4 | C | 31.2 | C |
| | Westbound | 29.3 | C | 33.6 | C |
| | Northbound | 9.5 | A | 11.1 | B |
| | Southbound | 16.4 | B | 13.2 | B |
| **Connecticut Avenue & Van Ness Street** | **Overall** | **29.2** | **C** | **13.6** | **B** |
| | Eastbound | 35.1 | D | 37.6 | D |
| | Westbound | 36.8 | D | 35.3 | D |
| | Northbound | 37.7 | D | 7.0 | A |
| | Southbound | 24.8 | C | 16.3 | B |
| **Connecticut Avenue & Upton Street** | Westbound | 10.9 | B | 13.3 | B |
| | Southbound Left | 2.4 | A | 7.2 | A |
| **Connecticut Avenue & Tilden Street** | **Overall** | **100.4** | **F** | **55.0** | **D** |
| | Eastbound | 109.6 | F | 146.8 | F |
| | Westbound | 303.3 | F | 226.3 | F |
| | Northbound | 263.7 | F | 18.6 | B |
| | Southbound | 15.1 | B | 35.2 | D |
| **Van Ness St & UDC Garage** | Eastbound Left | 8.3 | A | 8.5 | A |
| | Westbound Left | 8.4 | A | 8.4 | A |
| | Northbound | 11.7 | A | 20.2 | C |
| | Southbound | 13.8 | B | 23.3 | C |
| **Van Ness St & UDC Garage Exit** | Southbound | 8.9 | A | 13.6 | B |
| **Van Ness Street & International Drive** | Eastbound Left | 3.7 | A | 1.1 | A |
| | Northbound | 16.5 | C | 16.4 | C |
| | Southbound | 17.5 | C | 16.7 | C |
| **Van Ness Street & Reno Road** | **Overall** | **19.1** | **B** | **20.3** | **C** |
| | Eastbound | 26.1 | C | 19.2 | B |
| | Westbound | 12.3 | B | 29.4 | C |
| | Northbound | 17.2 | B | 19.3 | B |
| | Southbound | 18.7 | B | 15.8 | B |

All study intersections operate at acceptable conditions. However, some individual movements operate under unacceptable conditions. These include the northbound left-turn at the intersection of Connecticut Avenue and Van Ness and the north-, east-, and westbound approaches at the intersection of Connecticut Avenue and Tilden Street during the morning peak hour. During the afternoon peak hour, the east- and westbound approaches at the intersection of Connecticut Avenue and Tilden Street operate under unacceptable conditions. The unacceptable conditions at the intersection of Connecticut Avenue and Tilden Street are due to a high concentration of vehicles turning at the intersection, the prioritization of green time for commuter volumes into and out of the District, and a narrow cross-section provided on Tilden Street.

While the capacity analysis results generally confirm what was observed in the field, not all results match the observations performed by Gorove/Slade. This is the case because, although on paper the capacity analyses are correct, in reality, jaywalking, double-parking and other things not accounted for in the traffic models create congestion. The Connecticut Avenue corridor is thus what's known as 'sensitive' to variability. Anything that constricts the network or changes volumes can have a large effect on traffic delays and queues. For example, a temporary lane closure on southbound Connecticut Avenue was observed, which backed up traffic for several blocks. This situation would not be modeled in the capacity analysis.

### *Existing Pedestrian Analysis*

Pedestrian analyses were performed for the existing conditions at the intersections contained within the study area during the morning and afternoon peak hours. The analysis was based on "Chapter 18: Pedestrians" of the Highway Capacity Manual (HCM).

The methodology for signalized intersections was used in order to estimate the average delay experienced by a pedestrian at a signalized crosswalk (the amount of time waiting for a "Walk" sign). This calculation is based on the effective green time programmed for pedestrians and the cycle length and rated by the amount of delay experienced. As stated in the HCM, pedestrian delay is not constrained by capacity, even when pedestrian flow rates reach 5,000 pedestrians per hour (pph). The results of the signalized intersection analyses are expressed in level of service (LOS) and delay (seconds) for each crosswalk. LOS results range from "A" being the best to "F" being the worst. The delay and LOS show the likelihood that a pedestrian will not comply with a traffic-control device (i.e. jaywalking).

The methodology for unsignalized intersections was used in order to estimate the average delay experienced by a pedestrian at an uncontrolled crosswalk. This methodology applies to unsignalized intersections with a pedestrian crossing against a free-flowing traffic stream or an approach not controlled by a stop-sign. The unsignalized intersection methodology does not apply to zebra-striped crossings at unsignalized intersections or at crossings against a traffic stream controlled by a stop-sign because pedestrians have the right-of-way and therefore experience no delay. It should be noted that in the District, pedestrians have the right-of-way at all crosswalks, including those against a free-flowing traffic stream, and therefore, theoretically experience no delay. However, the analysis was performed at pedestrian crossings against free-flowing traffic streams and yield-controlled approaches in order to evaluate the theoretical delay experienced by pedestrians. The calculation for average pedestrian delay at an unsignalized crossing is based on the average pedestrian walking speed, crosswalk length, assumed pedestrian lost time (start-up and end clearance time), and conflicting vehicular flow rate. The results of the unsignalized intersection analyses are expressed in level of service (LOS) and delay (seconds) for each crosswalk. LOS results range from "A" being the best to "F" being the worst. The delay and LOS show the likelihood that a pedestrian will engage in risk-taking behavior (i.e. accepting a short gap between vehicles).

Table 7 and Table 8 show the results of the capacity analyses, including LOS and average delay (in seconds). The analysis results indicate that all signalized crosswalks in the study area operate at acceptable levels of service during both the morning and afternoon peak hours, with the exception of the westbound crosswalk at Connecticut Avenue and Van Ness Street and the east- and westbound crosswalks at the intersection of Van Ness Street & Reno Road. This indicates a low (LOS A and B) to moderate (LOS C and D) likelihood of non-compliance by pedestrians, which is reflected by pedestrians jaywalking across the intersection. The study intersections with crosswalks operating at LOS D and E will experience a moderate to high likelihood of non-compliance.

The analysis results also indicate that all of the unsignalized crosswalks in the study area, where a vehicle is not controlled by a stop-sign, operate at unacceptable levels of service during the morning and afternoon peak hours. This indicates a very high (LOS F) likelihood of risk-taking behavior for pedestrians, which is reflected in pedestrians dashing between vehicles during short gaps in traffic. As stated previously, pedestrians have the right-of-way in all crosswalks in the District, so vehicles must yield to pedestrians in the crosswalk at the study intersections listed in Table 8. However, the LOS F calculated indicates an unfriendly and intimidating environment for pedestrians.

**Table 7: Existing Pedestrian Levels of Service for Signalized Intersections**

| Intersection | Parallel Approach | Existing Conditions (2010) | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Albemarle Street** | Eastbound | 39.6 | D | 39.6 | D |
| | Westbound | 39.6 | D | 39.6 | D |
| | Northbound | 8.0 | A | 8.0 | A |
| | Southbound | 8.0 | A | 8.0 | A |
| **Connecticut Avenue & Yuma Street** | Eastbound | 37.0 | D | 35.3 | D |
| | Northbound | 8.4 | A | 9.2 | A |
| | Southbound | 8.4 | A | 9.2 | A |
| **Connecticut Avenue & Windom Place** | Westbound | 37.0 | D | 35.3 | D |
| | Northbound | 11.5 | B | 12.5 | B |
| | Southbound | 11.5 | B | 12.5 | B |
| **Connecticut Avenue & Veazey Terrace** | Eastbound | 37.0 | D | 39.6 | D |
| | Westbound | 37.0 | D | 39.6 | D |
| | Northbound | 13.0 | B | 10.1 | B |
| | Southbound | 7.2 | A | 6.1 | A |
| **Connecticut Avenue & Van Ness Street** | Eastbound | 37.8 | D | 37.0 | D |
| | Westbound | 41.4 | E | 40.5 | E |
| | Northbound | 13.5 | B | 14.0 | B |
| | Southbound | 18.6 | B | 20.5 | C |
| **Connecticut Avenue & Tilden Street** | Eastbound | 39.6 | D | 39.6 | D |
| | Westbound | 39.6 | D | 39.6 | D |
| | Northbound | 37.0 | D | 18.0 | B |
| | Southbound | 12.0 | B | 12.0 | B |
| **Van Ness Street & Reno Road** | Eastbound | 40.5 | E | 40.5 | E |
| | Westbound | 40.5 | E | 40.5 | E |
| | Northbound | 29.6 | C | 29.6 | C |
| | Southbound | 29.6 | C | 29.6 | C |

**Table 8: Existing Pedestrian Levels of Service for Unsignalized Intersections**

| Intersection | Parallel Approach | Existing Conditions (2010) | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Upton Street** | Northbound | N/A - Stop controlled crossing, LOS A | | | |
| **Van Ness St & UDC Garage** | Eastbound | N/A - Stop controlled crossing, LOS A | | | |
| | Westbound | N/A - Stop controlled crossing, LOS A | | | |
| | Northbound | 216.9 | F | 400.3 | F |
| | Southbound | 128.0 | F | 249.9 | F |
| **Van Ness St & UDC Garage Exit** | Westbound | N/A - Stop controlled crossing, LOS A | | | |
| **Van Ness Street & International Drive** | Eastbound | N/A - Stop controlled crossing, LOS A | | | |
| | Westbound | N/A - Stop controlled crossing, LOS A | | | |
| | Northbound | 159.7 | F | 283.3 | F |
| | Southbound | 187.7 | F | 275.7 | F |

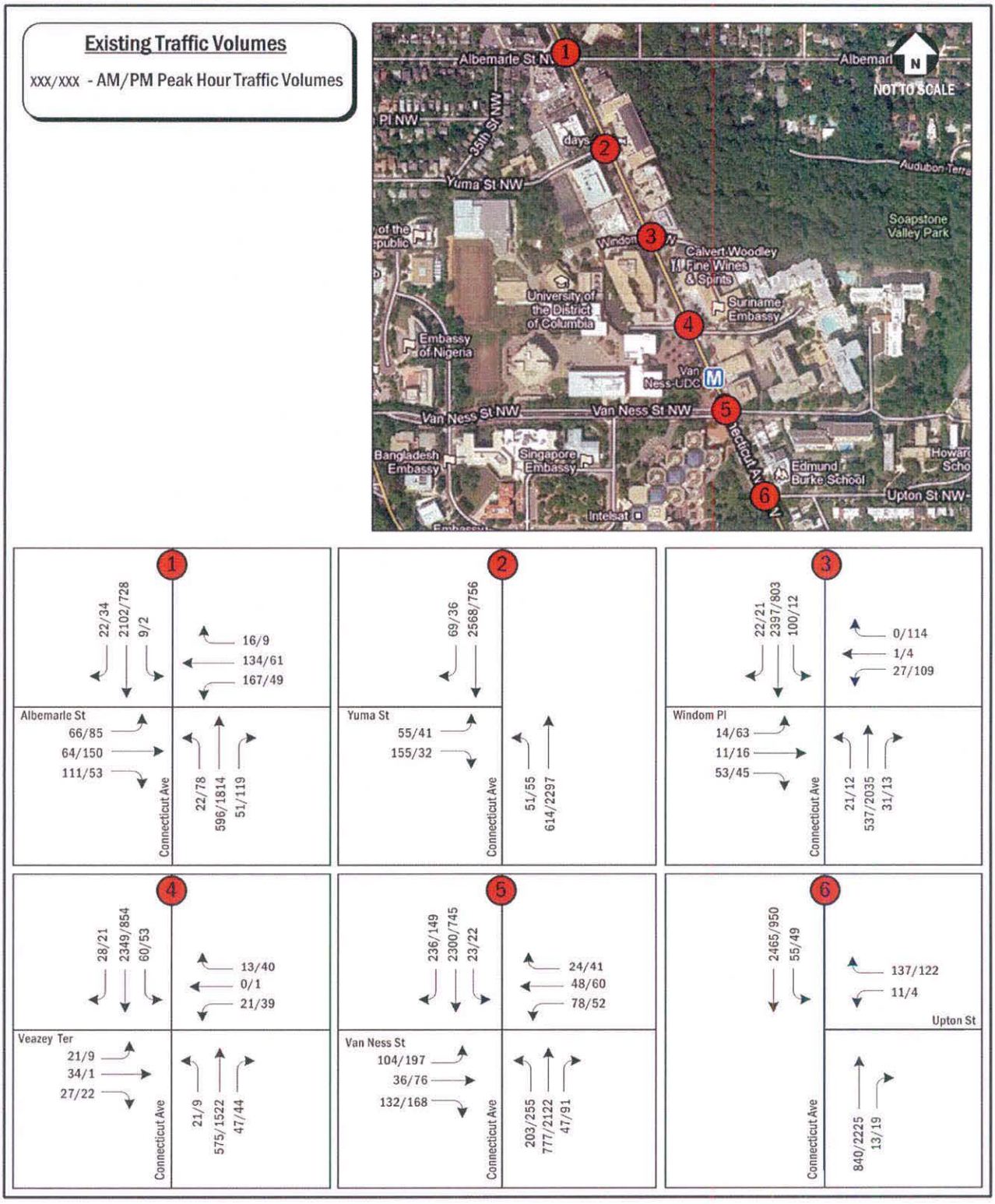


Figure 8: Existing Traffic Volumes (Page 1 of 2)

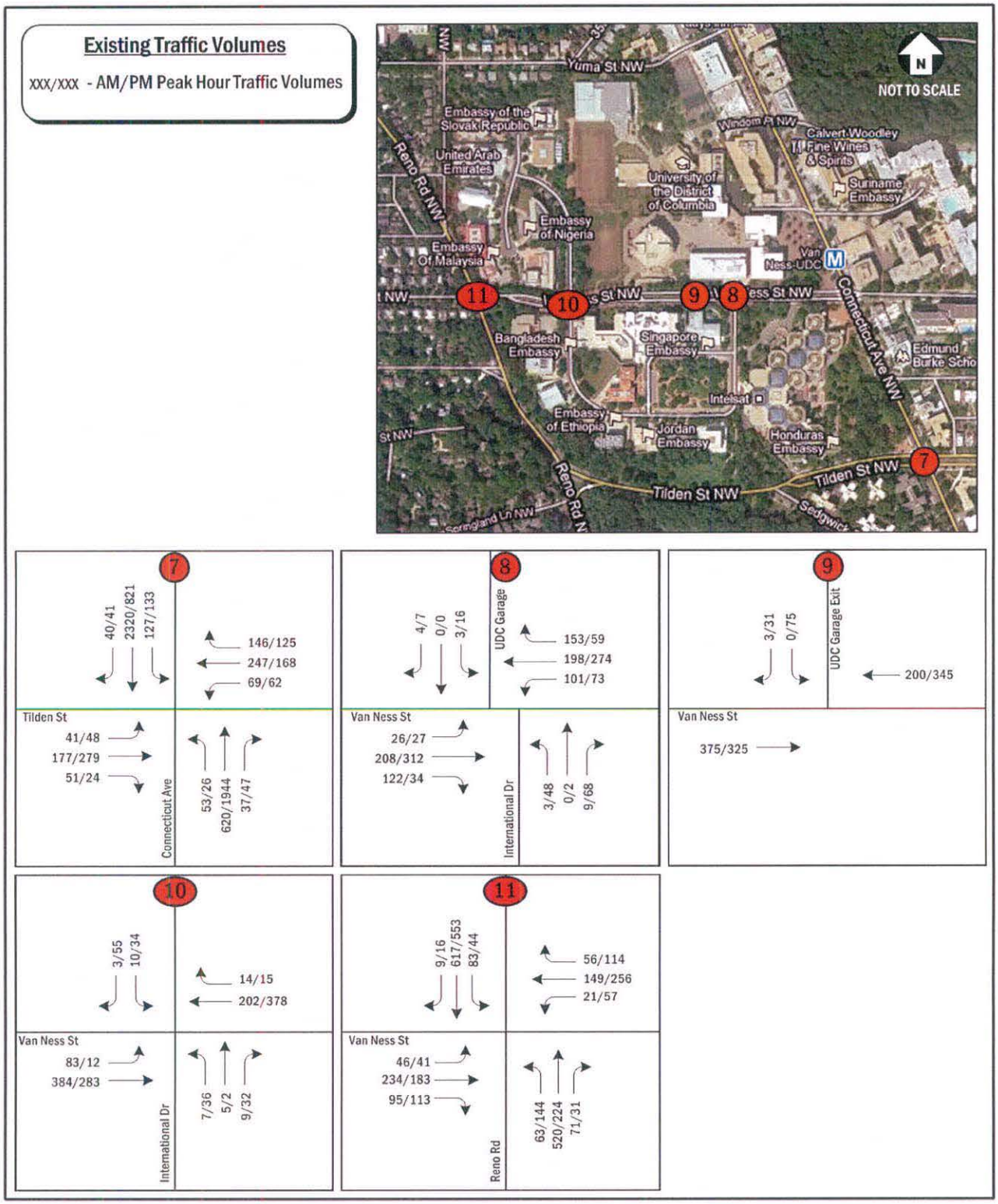


Figure 9: Existing Traffic Volumes (Page 2 of 2)

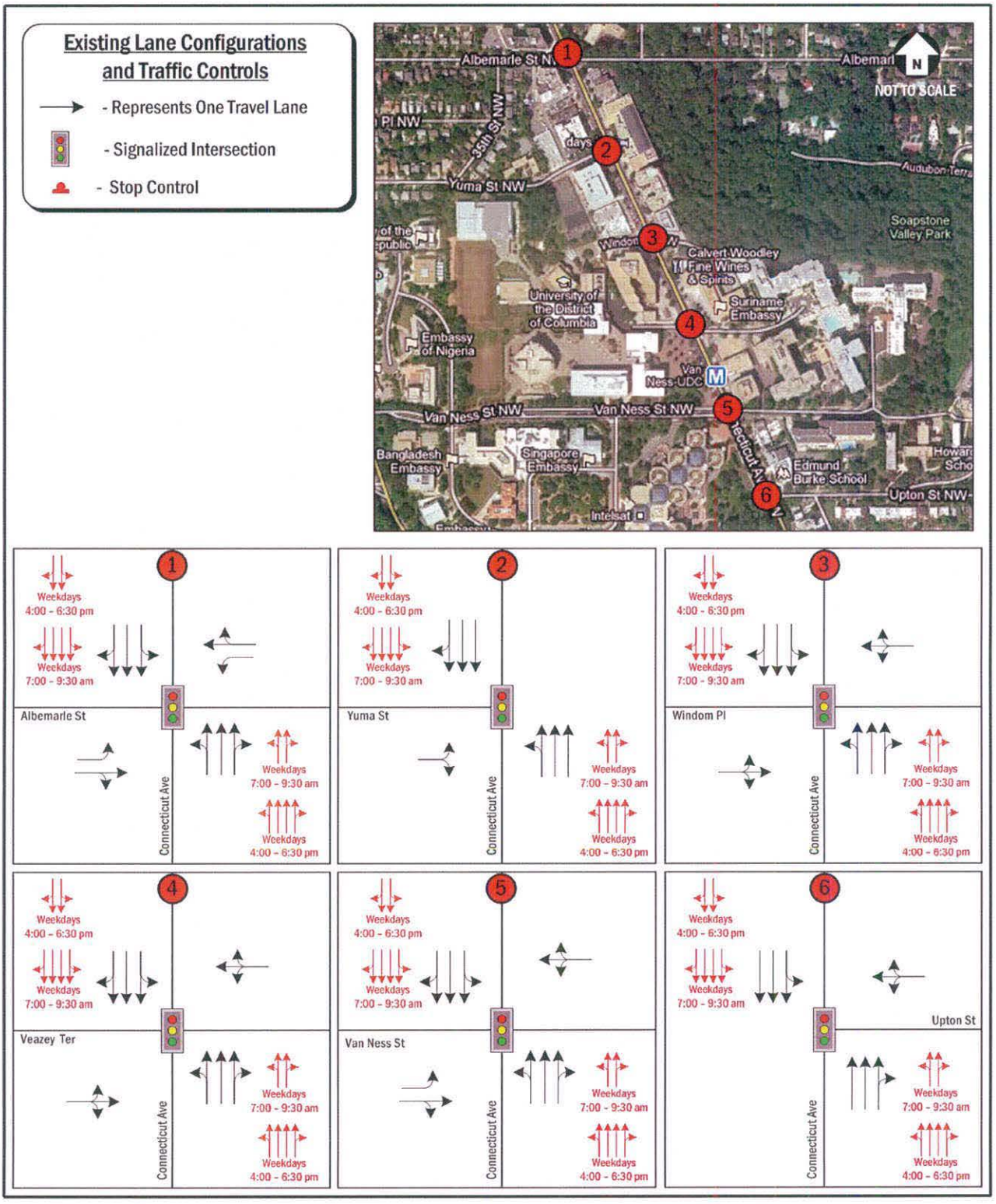


Figure 10: Existing Traffic Controls and Lane Configurations (Page 1 of 2)

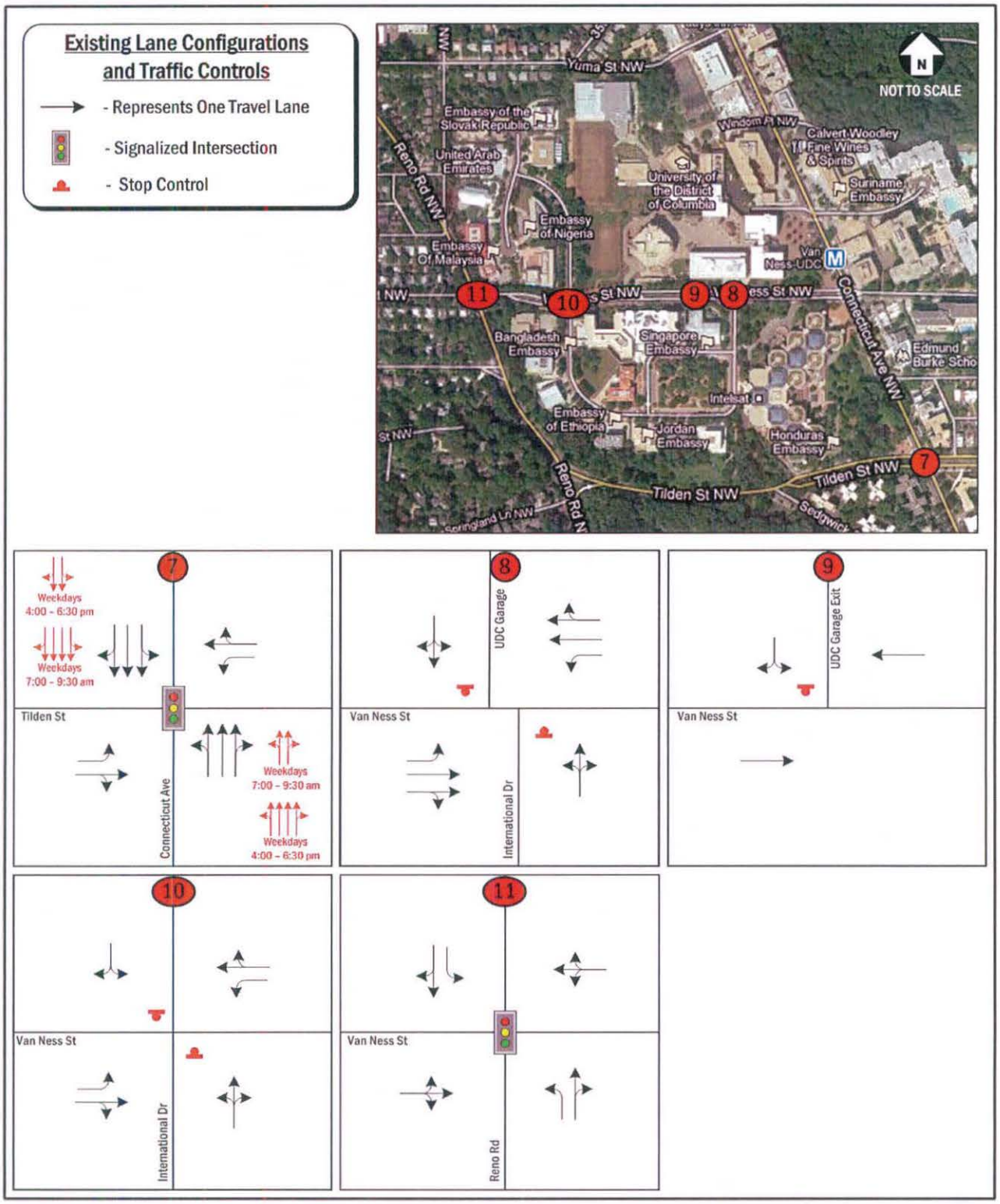


Figure 11: Existing Traffic Controls and Lane Configurations (Page 2 of 2)

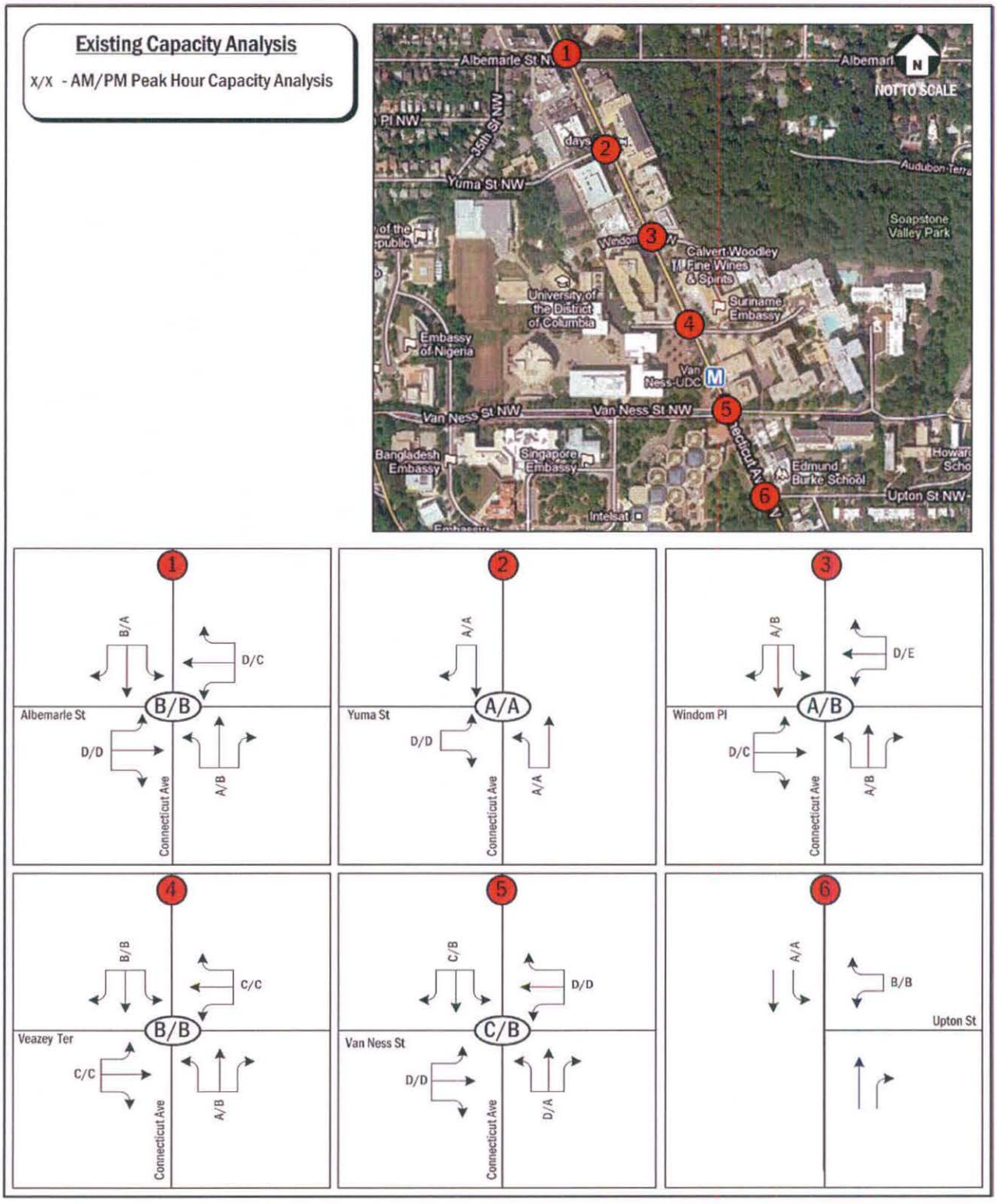


Figure 12: Existing Level of Service (Page 1 of 2)

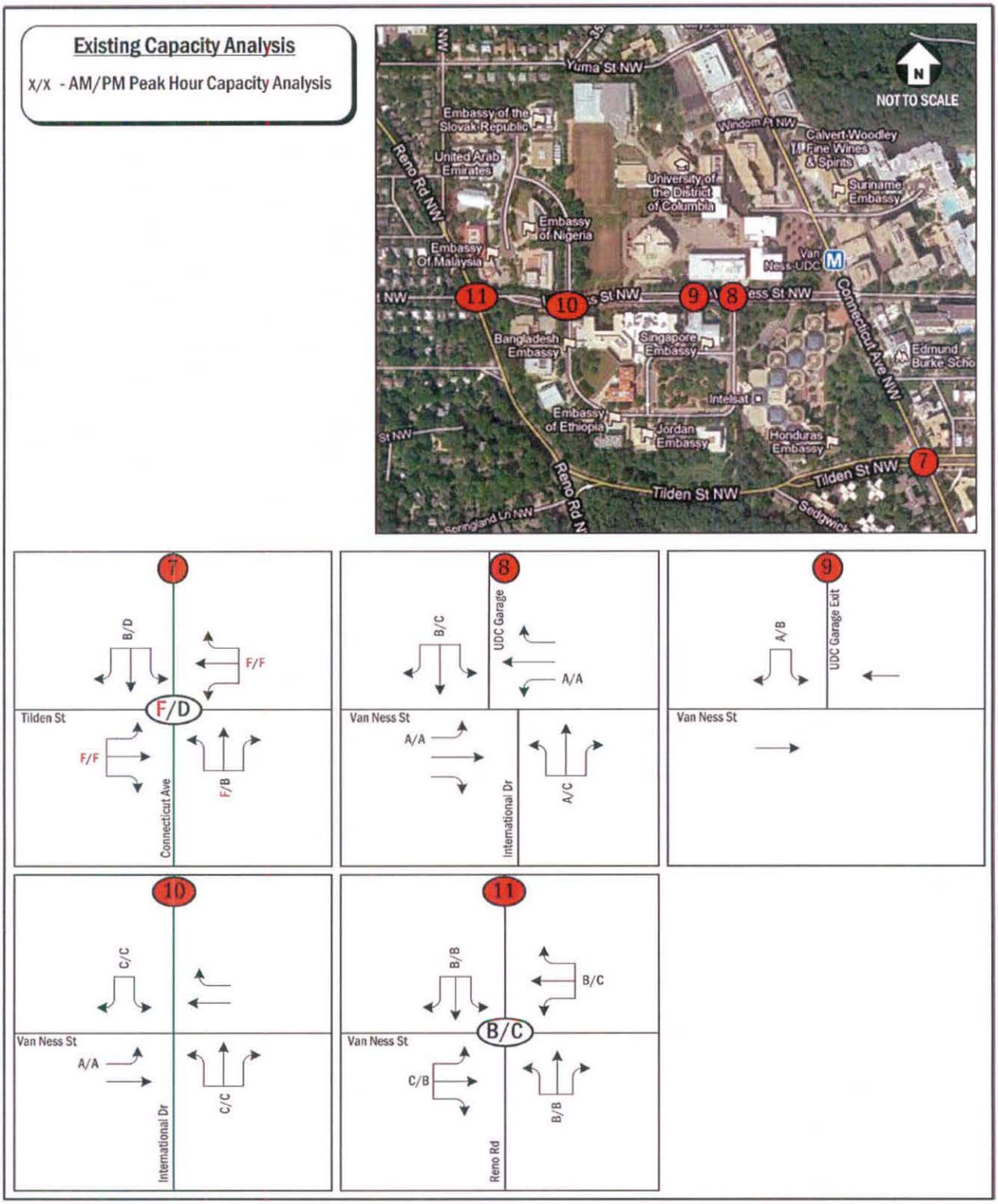


Figure 13: Existing Level of Service (Page 2 of 2)

### *Future Roadways*

As stated previously, several background studies have been conducted in the study area, including the Connecticut Avenue Pedestrian Action (CAPA) Pedestrian Safety Audit and the Rock Creek West II (RCW2) Livability Study. Both of these studies include proposed improvements to several of the study area intersections. This report presents an analysis of the future conditions with the improvements proposed by the CAPA Audit and the RCW2 Livability Study in order to determine the possible impacts to the vehicular and pedestrian levels of service presented previously.

The following improvements are included for the study area intersections from the CAPA Audit:

- Connecticut Avenue and Albemarle Street
  - Add "No Right Turn on Red (RTOR)" restrictions for south- and eastbound approaches;
  - Add four-second leading pedestrian intervals (LPIs) on all crosswalks; and
  - Increase east- and westbound crossing time by adding LPIs.
- Connecticut Avenue and Yuma Street
  - Add "No RTOR" restrictions for south- and eastbound approaches;
  - Add four-second LPIs on all crosswalks; and
  - Increase east- and westbound crossing time by adding LPIs.
- Connecticut Avenue and Windom Street
  - Add "No RTOR" restrictions for northbound approach;
  - Add four-second LPIs on all crosswalks;
  - Add eastbound crosswalk and pedestrian crossing signal; and
  - Increase eastbound crossing time by adding LPIs.
- Connecticut Avenue and Veazey Terrace
  - Add four-second LPIs on all crosswalks.
- Connecticut Avenue and Van Ness Street
  - Add "No RTOR" restrictions for north- and eastbound approaches;
  - Add four-second LPIs on all crosswalks; and
  - Increase east- and westbound crossing time by adding LPIs.
- Connecticut Avenue and Tilden Street
  - Add "No Right Turn on Red (RTOR)" restrictions for all approaches.

As stated previously, the design proposed for the intersection of Connecticut Avenue and Veazey Terrace, as proposed in the CAPA Audit, would severely limit the ability of buses and other large vehicles to use this entrance to the University. In order to keep with the spirit of the proposed improvements, this analysis includes the following improvements to the intersection:

- Remove southbound slip-lane provided for southbound right-turn;
- Realign intersection to allow all vehicular movements; and
- Restrict through movements along Veazey Terrace due to configuration of off-set intersection since existing and projected east- and westbound through volumes are nominal.

In addition to the improvements proposed in the CAPA Audit, an improvement for the intersection of Connecticut Avenue and Van Ness Street from the RCW2 Livability Study includes the construction of a right-turn lane on eastbound Van Ness Street.

### *Future Vehicular Analysis*

Intersection capacity analyses were performed for the future conditions with the proposed improvements at the intersections contained within the study area during the morning and afternoon peak hours, following the methodology outlined previously. The capacity analyses for the future conditions were based on: (1) the existing lane use and traffic controls; (2) the proposed improvements outlined previously; (3) the existing peak hour turning movement volumes described previously; (4) the rerouting of the existing east- and westbound through movements at the intersection of Connecticut Avenue and Van Ness Street to adjacent intersections due to the improvements outlined previously; and (5) the Highway Capacity Manual (HCM) methodologies (using *Synchro 7* software). Detailed LOS descriptions and the analysis worksheets are contained in the Technical Attachments.

The results of the capacity analyses are expressed in level of service (LOS) and delay (seconds per vehicle) for each approach. An average delay (of each approach) and LOS for the signalized intersections is also shown for an overall intersection LOS grade. For the purpose of this analysis, it is desirable to achieve a level of service (LOS) of "E" or better on each approach. The HCM does not give guidelines for calculating the average delay for a two-way stop-controlled intersection, as the approaches without stop signs would technically have no delay.

The results of the intersection capacity analyses are presented in Table 9 and shown on Figure 14 and Figure 15.

**Table 9: Existing Capacity Analysis Results**

| Intersection | Approach | Future Conditions | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Albemarle Street** | **Overall** | **20.4** | **C** | **16.2** | **B** |
| | Eastbound | 37.5 | D | 37.8 | D |
| | Westbound | 43.0 | D | 32.4 | C |
| | Northbound | 15.8 | A | 13.4 | B |
| | Southbound | 16.5 | B | 13.2 | B |
| **Connecticut Avenue & Yuma Street** | **Overall** | **10.3** | **B** | **10.2** | **B** |
| | Eastbound | 54.2 | D | 47.6 | D |
| | Northbound | 10.0 | A | 10.9 | B |
| | Southbound | 6.8 | A | 4.6 | A |
| **Connecticut Avenue & Windom Place** | **Overall** | **9.7** | **A** | **19.9** | **B** |
| | Eastbound | 48.6 | D | 34.2 | C |
| | Westbound | 42.6 | D | 62.5 | E |
| | Northbound | 10.9 | B | 12.7 | B |

| Intersection | Approach | Future Conditions | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| | Southbound | 7.9 | A | 23.7 | C |
| **Connecticut Avenue & Veazey Terrace** | **Overall** | **9.9** | **A** | **11.6** | **B** |
| | Eastbound | 31.6 | C | 31.2 | C |
| | Westbound | 31.9 | C | 33.7 | C |
| | Northbound | 18.0 | B | 11.3 | B |
| | Southbound | 6.7 | A | 9.7 | A |
| **Connecticut Avenue & Van Ness Street** | **Overall** | **79.8** | **E** | **21.4** | **C** |
| | Eastbound | 31.2 | C | 40.3 | D |
| | Westbound | 34.1 | C | 34.1 | C |
| | Northbound | 10.9 | B | 9.8 | A |
| | Southbound | 115.0 | F | 41.2 | D |
| **Connecticut Avenue & Upton Street** | Westbound | 10.9 | B | 12.8 | B |
| | Southbound Left | 2.4 | A | 7.2 | A |
| **Connecticut Avenue & Tilden Street** | **Overall** | **97.2** | **F** | **56.3** | **E** |
| | Eastbound | 114.0 | F | 149.6 | F |
| | Westbound | 327.0 | F | 256.6 | F |
| | Northbound | 266.8 | F | 18.6 | B |
| | Southbound | 4.3 | A | 28.2 | C |
| **Van Ness St & UDC Garage** | Eastbound Left | 8.3 | A | 8.5 | A |
| | Westbound Left | 8.4 | A | 8.4 | A |
| | Northbound | 11.7 | A | 20.2 | C |
| | Southbound | 13.8 | B | 23.3 | C |
| **Van Ness St & UDC Garage Exit** | Southbound | 8.9 | A | 13.6 | B |
| **Van Ness Street & International Drive** | Eastbound Left | 3.7 | A | 1.1 | A |
| | Northbound | 16.5 | C | 16.4 | C |
| | Southbound | 17.5 | C | 16.7 | C |
| **Van Ness Street & Reno Road** | **Overall** | **20.2** | **C** | **21.1** | **C** |
| | Eastbound | 22.5 | C | 17.2 | B |
| | Westbound | 12.3 | B | 25.2 | C |
| | Northbound | 19.7 | B | 23.3 | C |
| | Southbound | 21.8 | C | 17.8 | B |

All study intersections operate at acceptable conditions, with the exception of the intersection of Connecticut Avenue and Tilden Street during the morning peak hour. This intersection operates under similar conditions in the existing scenario. No additional movements at the intersection operate under unacceptable conditions, though the existing delays are negatively impacted. Additionally, the southbound approach of Connecticut Avenue operates under unacceptable conditions in the future conditions due to the reconfiguration and retiming of the intersection. Removing the southbound right-turn slip lane and removing eight seconds of green time provided to the north- and southbound movements due to installing the LPIs causes the southbound approach to operate under unacceptable conditions. As stated in the existing conditions analysis,

the Connecticut Avenue corridor is sensitive to variability, and small changes to the system can have large impacts on traffic delays and queues.

### *Future Pedestrian Analysis*

Pedestrian analyses were performed for the existing conditions at the intersections contained within the study area during the morning and afternoon peak hours. The analysis was based on "Chapter 18: Pedestrians" of the Highway Capacity Manual (HCM), as outlined previously.

Table 10 and

Table 11 show the results of the capacity analyses, including LOS and average delay (in seconds).

The analysis results indicate that all signalized crosswalks in the study area operate at acceptable levels of service during both the morning and afternoon peak hours with the improvements proposed in the CAPA Audit and the RCW2 Livability Study. This indicates a low (LOS A and B) to moderate (LOS C and D) likelihood of non-compliance by pedestrians, which is reflected by pedestrians jaywalking across the intersection. The study intersections with crosswalks operating at LOS D will experience a moderate likelihood of non-compliance.

The analysis results also indicate that all of the unsignalized crosswalks in the study area, where a vehicle is not controlled by a stop-sign, operate at unacceptable levels of service during the morning and afternoon peak hours. This indicates a very high (LOS F) likelihood of risk-taking behavior for pedestrians, which is reflected in pedestrians dashing between vehicles during short gaps in traffic. As stated previously, pedestrians have the right-of-way in all crosswalks in the District, so vehicles must yield to pedestrians in the crosswalk at the study intersections listed in

Table 11. However, the LOS F calculated indicate an unfriendly and intimidating environment for pedestrians.

**Table 10: Future Pedestrian Levels of Service for Signalized Intersections**

| Intersection | Parallel Approach | Future Conditions | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Albemarle Street** | Eastbound | 36.1 | D | 36.1 | D |
| | Westbound | 36.1 | D | 36.1 | D |
| | Northbound | 9.7 | A | 9.7 | A |
| | Southbound | 9.7 | A | 9.7 | A |
| **Connecticut Avenue & Yuma Street** | Eastbound | 36.1 | D | 35.3 | D |
| | Northbound | 10.1 | B | 9.2 | A |
| | Southbound | 8.8 | A | 9.2 | A |
| **Connecticut Avenue & Windom Place** | Eastbound | 36.1 | D | 35.3 | D |
| | Westbound | 36.1 | D | 35.3 | D |
| | Northbound | 12.5 | B | 12.5 | B |
| | Southbound | 12.0 | B | 12.5 | B |
| **Connecticut Avenue & Veazey Terrace** | Eastbound | 36.1 | D | 36.1 | D |
| | Westbound | 36.1 | D | 36.1 | D |
| | Northbound | 15.7 | B | 14.6 | B |
| | Southbound | 7.6 | A | 7.6 | A |
| **Connecticut Avenue & Van Ness Street** | Eastbound | 37.0 | D | 37.0 | D |
| | Westbound | 37.0 | D | 37.0 | D |
| | Northbound | 16.2 | B | 16.2 | B |
| | Southbound | 26.6 | C | 28.1 | C |

| Intersection | Parallel Approach | Future Conditions | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Tilden Street** | Eastbound | 39.6 | D | 39.6 | D |
| | Westbound | 39.6 | D | 39.6 | D |
| | Northbound | 37.0 | D | 18.0 | B |
| | Southbound | 12.0 | B | 12.0 | B |
| **Van Ness Street & Reno Road** | Eastbound | 39.6 | D | 39.6 | D |
| | Westbound | 39.6 | D | 39.6 | D |
| | Northbound | 32.8 | C | 32.8 | C |
| | Southbound | 31.2 | C | 31.2 | C |

**Table 11: Future Pedestrian Levels of Service for Unsignalized Intersections**

| Intersection | Parallel Approach | Future Conditions | | | |
|---|---|---|---|---|---|
| | | *AM Peak Hour* | | *PM Peak Hour* | |
| | | Delay | LOS | Delay | LOS |
| **Connecticut Avenue & Upton Street** | Northbound | N/A - Stop controlled crossing, LOS A | | | |
| **Van Ness St & UDC Garage** | Eastbound | N/A - Stop controlled crossing, LOS A | | | |
| | Westbound | N/A - Stop controlled crossing, LOS A | | | |
| | Northbound | 216.9 | F | 400.3 | F |
| | Southbound | 128.0 | F | 249.9 | F |
| **Van Ness St & UDC Garage Exit** | Westbound | N/A - Stop controlled crossing, LOS A | | | |
| **Van Ness Street & International Drive** | Eastbound | N/A - Stop controlled crossing, LOS A | | | |
| | Westbound | N/A - Stop controlled crossing, LOS A | | | |
| | Northbound | 159.7 | F | 283.3 | F |
| | Southbound | 187.7 | F | 275.7 | F |

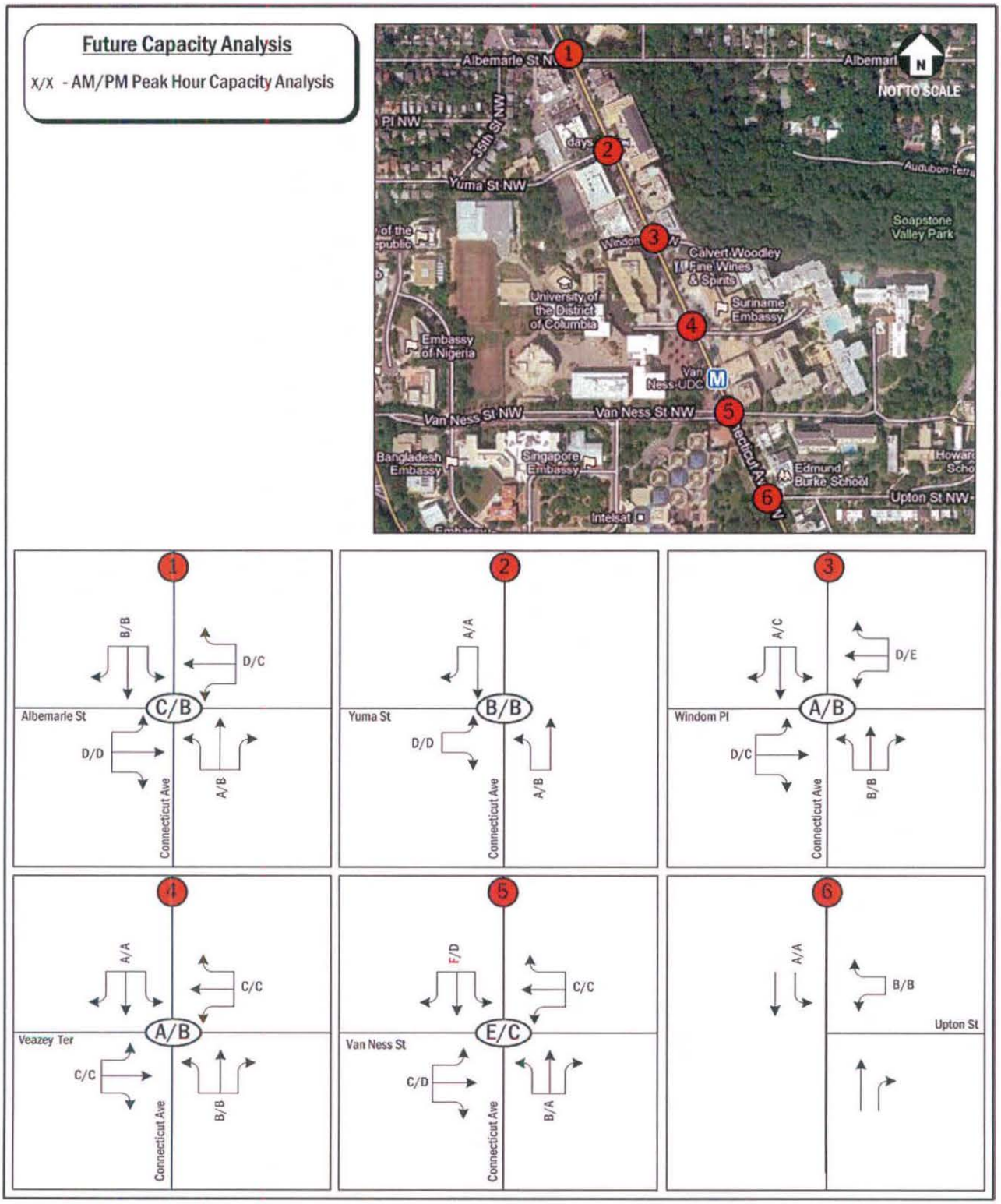


Figure 14: Future Level of Service (Page 1 of 2)

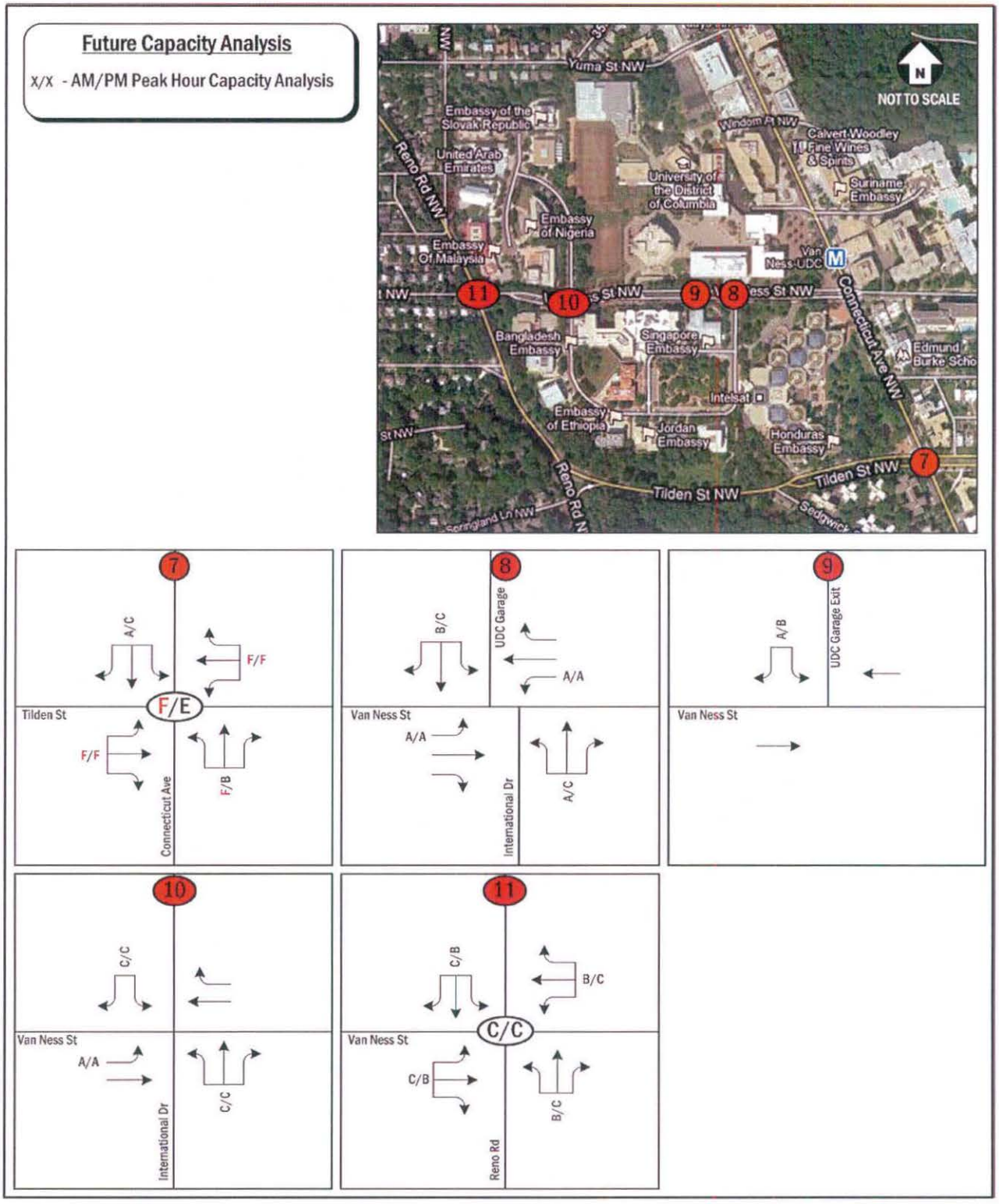


Figure 15: Future Level of Service (Page 2 of 2)