

Adopted July 2, 2001

**NOISE AND LIGHT PERFORMANCE STANDARDS
for development and redevelopment in the
OFFICE/INSTITUTIONAL-4 (OI-4) ZONING DISTRICT**

This document represents a common understanding of Town and University officials regarding what will be expected and accepted as fulfilling the requirements of Section 16.3.1 of the Development ordinance for information on Noise and Light Management to be submitted as part of a Main Campus Development Plan.

Purpose

These standards are intended to establish maximum acceptable noise and light impacts on property* outside of the OI-4 Zoning District which result from development and redevelopment associated with an approved Development Plan.

Noise Standards

Noise levels on property* outside of the OI-4 Zoning District and resulting from development and redevelopment associated with an approved Development Plan shall not exceed noise levels allowed by the Town of Chapel Hill Noise Ordinance as established at the time the development or redevelopment receives final Town approval under Article 16 of the Development Ordinance.

Each application for a Site Development Permit associated with an approved Development Plan must include a signed and sealed letter from a Professional Engineer, licensed in the State of North Carolina and with demonstrable expertise in acoustical design and attenuation practices, certifying that any increase in measurable noise above existing pre-Development Plan noise levels on property* outside of the OI-4 Zoning District will not exceed the levels allowed in the Noise Ordinance.

Light Standards

Design Requirements: All lighting, including that used in and around buildings, recreation areas, parking areas, walkways, roadways, and signs shall be designed to minimize spillover of light onto property* outside of the OI-4 Zoning District. Lighting shall also be designed to prevent glare that could impair vision and/or otherwise deteriorate normally accepted qualities and uses of property* outside of the OI-4 Zoning District.

Standards: The following standards apply to new lighting associated with an approved Development Plan.

Outdoor lighting, except sports and athletic field lighting, shall be mounted at heights no greater than fifteen (15) feet for non-cutoff lights; and no greater than thirty-five (35) feet for cutoff lights.

Lighting for sports and athletic fields must include glare control features and must be designed so that primary illumination is directed onto the play area and immediate surroundings, and such that offsite illumination/glare is restricted.

Increases in illumination on property* outside of the OI-4 Zoning District shall not result in lighting levels in excess of 0.3 foot-candles, measured at ground level. On property* outside of the OI-4 Zoning District, where existing ambient lighting levels are in excess of 0.3 foot-candles, no increase in measurable lighting levels will be allowed as result of an approved Development Plan.

Submittals: Each application for a Site Development Permit shall include a lighting plan that shows existing and proposed lighting fixture types and locations. The plan shall indicate, by isolux contour diagram and grid points, the measured and calculated pre-development and post-development foot-candles at grade both on the development site and on property* outside of the OI-4 Zoning District where lighting impacts are expected. The lighting plan must be sealed by a Professional Engineer licensed in the State of North Carolina and with demonstrable expertise in lighting design and mitigation strategies.

*These Noise and Light Standards shall not be enforced and need not be met on property outside of the OI-4 Zoning District that is in the same ownership as property within the OI-4 Zoning District.

Adopted July 2, 2001

**STORMWATER MANAGEMENT PERFORMANCE STANDARDS
For development and redevelopment in the
OFFICE/INSTITUTIONAL-4 (OI-4) ZONING DISTRICT**

This document represents a common understanding of Town and University officials regarding what will be expected and accepted as fulfilling the requirements of Section 16.3.1 of the Development Ordinance for information on Stormwater Management to be submitted as part of a Main Campus Development Plan.

1. Post-Construction Runoff Control Criteria

Development plans submitted under the OI-4 Zoning District shall employ the following stormwater management practices for land area in the Development Plan:

- (i) TREATMENT:
 - (a) Stormwater treatment shall be designed to remove 85% of Total Suspended Solids.
 - (b) Stormwater treatment shall occur on the volume of post-construction runoff resulting from the first 1 inch of precipitation.
 - (c) Post-development runoff conditions shall be such that either the runoff volume draws down to the pre-storm design stage within 5 days but not less than 2 days; or, the post-development discharge rate shall be no larger than the predevelopment discharge rate for the 1-year frequency, 24-hour duration storm event (3.00 inches).
 - (d) Stormwater treatment shall occur prior to entering the Waters of the State.

(ii) RATE:

The discharge rate of post-construction runoff, at all locations where stormwater runoff exits the land area in the development plan, shall not exceed the pre-development or existing conditions discharge rate for the local 2-year (3.60 inches), 10-year (5.38 inches), 25-year (6.41 inches), and 50-year (7.21 inches) frequency, 24 hour duration storm event.

- (iii) VOLUME:
 - (a) Based on the USDA, Soil Conservation Service methodology for runoff depth, the post-construction volume of stormwater runoff shall not exceed the pre-development (existing conditions) volume of runoff for the 2-year frequency, 24-hour duration storm event (or 96% of the rainfall that statistically would occur in a 100-year period based on the record data) at locations where stormwater exits the OI-4 Zoning District. This may be achieved by hydrologic abstraction, recycling and/or reuse, or any other accepted scientific method. All new development will conform with these criteria.
 - (b) The University is currently undertaking a stormwater improvement plan that is intended to implement projects that reduce the volume and rate of runoff from existing campus development. This plan will assure that no increase in volume will be generated from the UNC main campus following new development.
 - (iv) Stormwater management and treatment practices shall comply with all applicable Federal and State regulations, and revisions thereof.

2. Best Management Practices Standards

- (i) At a minimum, any structural best management practice(s) for sedimentation and erosion control, post-construction stormwater treatment, and discharge rate control shall be designed, constructed and maintained in accordance with applicable federal and state design, construction and maintenance requirements.
- (ii) The Development Plan may implement any structural or non-structural best management practice to manage stormwater runoff in accordance with the post-construction runoff control criteria.
- (iii) These standards are subject to any applicable revision(s) to Federal or State regulations.

3. Site Development Permit Application Procedures

- (i) As a part of the Development Plan, the following procedures apply for individual Site Development Permits:
 - (a) Design(s) for all structural best management practices associated with a Site Development Permit shall be sealed by a Professional Engineer, licensed in the State of North Carolina, with demonstrable expertise in stormwater management engineering practices.

- (b) All applications to the Town for a Site Development Permit shall include a signed and sealed letter from a Professional Engineer indicating the locations in the drainage area (see attached map) and the methodologies of how stormwater management measures associated with the permit application will meet or exceed the performance standards described herein as part of an approved Development Plan.
- (c) Post-construction runoff control measures, utilizing best management practices, shall be installed coincident with or prior to Site Development Permit activities.

4. Monitoring

- (i) Outfall monitoring by the University shall occur periodically as described in a, b, c, and d below. The types of monitoring will include stream gauge or stream flow data collection, visual inspection, and/or benthic sampling depending on the location. The data will be used as baseline information for ongoing system response analysis.
 - (a) Meeting of the Waters outfall: A stream/rain gauge will collect and measure precipitation, stream flow, selected ambient water chemistry and stormwater data. Benthic sampling will be conducted at a minimum every 6 months, based on appropriate scientific methodologies. Visual inspections will occur quarterly within the floodplain of the boundaries of the North Carolina Botanical Garden or south of Fordham Boulevard, to monitor and report physical conditions including channel stability, scour, sedimentation, or any other physical characteristics associated with stormwater runoff exiting the tract.
 - (b) Morgan Creek outfall: Visual inspections will occur quarterly at the outfall behind the south chiller. These inspections will monitor and report physical conditions including channel stability, scour, sedimentation, or any other physical characteristics associated with stormwater runoff exiting the tract.
 - (c) Battle Branch outfall: Visual inspections will occur quarterly at a selected location where the stream becomes clearly defined below the confluence with its tributaries. The same visual monitoring methodology will be used as described in (b) above.

- (d) Bolin Creek outfall(s): Visual inspections will occur quarterly at appropriate inlet locations along the tract boundary and Franklin Street. The inspections will monitor for sedimentation and/or debris buildup.
- (ii) The University will store the information collected, according to the above monitoring procedures and will provide the data to the Town upon request.

5. Definitions

Redevelopment – Any real estate parcel or portion thereof where development has previously occurred and further development takes place. (See *Development* as defined in the Town of Chapel Hill Development Ordinance.)

Stormwater Treatment - The management of stormwater runoff through engineered structural and/or non-structural best management practices designed to meet or exceed required North Carolina Division of Water Quality water quality performance standards.

Structural Best Management Practices - Facilities designed to provide stormwater treatment to remove pollutants from non-point source runoff through physical removal and settling, filtering, chemical reaction, and/or bio-chemical transformation.

Non-structural Best Management Practices - Regulations, programs and practices designed to reduce or eliminate pollutants in stormwater runoff.

Waters of the State - Any stream, river, brook, swamp, lake, sound, tidal estuary, bay, creek, reservoir, waterway, or other body or accumulation of water, whether surface or underground, public or private, or natural or artificial, that is contained in, flows through, or borders upon any portion of this state, including any portion of the Atlantic Ocean over which the state has jurisdiction. (G.S. 143-212 (6))*

*A precedent has been established by the NCDWQ defining “Waters of the State” as blue-line streams shown on the USGS quadrangle maps or soil survey maps.

Post-Construction Runoff - Stormwater runoff as a result of re-development or development activities.

Hydrologic Abstraction - The reduction of total rainfall to effective rainfall through runoff interception, infiltration, surface storage, evaporation and/or evapotranspiration.

Adopted July 2, 2001

**TRANSPORTATION IMPACT ANALYSIS GUIDELINES
for development and redevelopment in the
OFFICE/INSTITUTIONAL- 4 (OI-4) ZONING DISTRICT**

This document represents a common understanding of Town and University officials regarding what will be expected and accepted as fulfilling the requirements of section 16.3.1 of the Development Ordinance for information on Transportation Management to be submitted as part of a Main Campus Development Plan.

PURPOSE

A Transportation Impact Analysis for a Development Plan shall be submitted to the Town of Chapel Hill by the University of North Carolina at Chapel Hill in accordance with the requirements of the Town's Office/Institutional-4 (OI-4) Zoning District regulations. The purpose of the Transportation Impact Analysis is to provide updated data that allows identification of transportation impacts and mitigation measures associated with a Development Plan, along with an implementation and monitoring plan for identified mitigation measures. The analysis would also identify the extent of the University's contribution to and responsibility for mitigating transportation impacts. Elements to be addressed, as part of the analysis shall include motorized traffic, transit, parking, bicycle and pedestrian traffic, and associated air quality issues.

SCHEDULE

The Initial Transportation Impact Analysis shall be submitted with the Development Plan. An Updated Transportation Impact Analysis shall be submitted in December 2001. Subsequent updates shall be submitted in December 2003 and biennially thereafter (referred to as Biennial Updates) until construction of the buildings included in the Development Plan is substantially complete or until a new Development Plan is approved.

No new data shall be collected for the Initial Transportation Impact Analysis that accompanies the Development Plan. The Initial Transportation Impact Analysis shall rely on existing data only. Where reasonably current data are available, the University shall use said data to make current estimates of the required data.

Collection of new data as described under *Methodology* shall be undertaken for the December 2001 submission of the Updated Transportation Impact Analysis and subsequent Biennial Updates. This data shall be collected in September/October of the applicable year.

The Transportation Management Plan shall be undertaken every three years because of the length of time required to construct and occupy projects within the Development Plan. The first Transportation Management Plan shall be submitted in December 2001. Subsequent updates shall be submitted in December 2004 and every three years

thereafter until construction of the buildings included in the Development Plan is substantially complete or until a new Development Plan is approved.

Depending on the results of the data and the associated analyses, the University and Town may agree that some data collection and associated analyses may be eliminated or added for Biennial Updates.

METHODOLOGY

A. Initial Submittal (to accompany Development Plan)

The following methodology and procedures shall be applied in developing the Initial Transportation Impact Analysis for each submitted Development Plan, and they shall take precedence over the Proposed Guidelines for Traffic Impact Analysis, Town of Chapel Hill, North Carolina (May 2001).

1. A map showing the location of proposed projects included in the Development Plan shall be prepared. The site of each proposed project shall be numbered so that it can be associated with its specifications that shall be described in a separate table (see Item A2).
2. A table for each project site and the totals for all proposed projects shall be prepared including the following data:
 - A project number that corresponds to the map described in Item A1.
 - The name of the project.
 - The date construction is anticipated to commence.
 - If a building, the date the building is anticipated to be occupied.
 - Whether the building is a new facility, adds additional space to an existing building, is a renovation, or is a replacement of an existing facility.
 - Gross square feet (GSF) of the proposed building.
 - Net assignable square feet of the building
 - Brief description of the general use of the building(s) (e.g., office, research facility, classroom, housing, etc.).
 - Estimated number of employees planned to occupy the building.
 - If applicable, estimated number or other occupants, e.g., students, theater patrons, patients.
 - A description of any existing buildings or other activities on the proposed project site so that net transportation impacts can be ascertained.
 - The origin of the employees and other occupants of the proposed building, specifically whether they are currently located in other buildings within the Development Plan area or are new to the Development Plan area.
 - A general conclusion on whether the proposed project for that site has the potential to increase transportation demands in the Development Plan area.
3. An additional table shall be prepared that includes only those projects from Item A2 that have the potential to increase or redirect transportation demands in the Development Plan area. This table shall include the following data for each of those projects and the totals for all proposed projects:

- A project number that corresponds to the map described in Item A1.
 - The name of the project.
 - Gross square feet of the proposed building.
 - Brief description of the general use of the building, e.g., office, research facility, classroom, housing.
 - Estimated number of employees planned to occupy the building.
 - If applicable, estimated number or other occupants (e.g., students, theater patrons, patients).
 - The appropriate code for the type of building use, as defined in the most current edition of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*.
 - The A.M. and P.M. peak hour and daily (24-hour weekday) traffic generation estimates from the *Trip Generation Manual*, or other available sources if the University can provide a more accurate estimate of traffic generation. Where the necessary data is available, the trip generation shall be calculated in two ways: based on GSF and based on number of employees. The purpose of these estimates is to provide baseline traffic data for the hypothetical situation where no traffic mitigation strategies are implemented.
 - Corresponding estimates of the generated person trips.
4. Existing 24-hour traffic counts (where possible summarized hourly and by direction) shall be estimated where reasonably current data are available for the following roadways (exact locations to be agreed on by the Town and the University):
- Manning Drive (two locations)
 - South Columbia Street (two locations)
 - Pittsboro Street
 - Cameron Avenue (two locations)
 - South Road (two locations)
 - Ridge Road
 - Country Club Road
 - Raleigh Road

This information shall be shown on a map.

5. Existing A.M and P.M. peak hour turning movement counts (where possible summarized in 15-minute increments) shall be estimated where reasonably current data is available for the following intersections:
- Cameron Avenue/Pittsboro Street
 - Cameron Avenue/Columbia Street
 - Cameron Avenue/Raleigh Road
 - Country Club Road/South Road
 - Raleigh Road/South Road
 - Ridge Road/Manning Drive
 - South Columbia Street/South Road
 - South Columbia Street/Manning Drive

- Manning Drive/Fordham Boulevard
- Manning Drive/East Drive
- Manning Drive/West Drive
- Mason Farm Road/South Columbia Street
- Mason Farm/East Drive
- Mason Farm/West Drive
- Franklin Street/Raleigh Road
- Pittsboro Street/McCauley Street
- Mason Farm Road/Fordham Boulevard
- Merritt Mill Road/Cameron Avenue
- Columbia Street/Franklin Street
- Columbia Street/Rosemary Street
- Columbia Street/NC 54 East Ramp
- Columbia Street/NC 54 West Ramp
- Columbia Street/Purefoy Road
- Purefoy Road/Mason Farm Road
- Manning Drive/Skipper Bowles Drive

This information shall be shown on a map.

6. The count data collected in Items A4 and A5 shall be tabulated
7. The traffic generation estimates developed in Item A3 shall be adjusted to account for proposed trip reduction strategies, with the results shown in the table. Anticipated trip reduction strategies may include but are not limited to:
 - Park-and-Ride
 - Local and regional transit
 - Ridesharing and vanpooling
 - Bicycling
 - Walking
 - Telecommuting
 - Flextime
 - Housing
 - Parking availability and location

The impact of each of the proposed trip reduction measures shall be described and evaluated at the time of the Development Plan submission. The descriptions shall include actions taken to date and planned programs, actions, and facilities.

8. Growth rates to account for increases in background traffic (unrelated to projects in the Development Plan area) between the year for which the counts described in Items A4 and A5 apply and the year the final project in the Development Plan is completed shall be applied to those counts to obtain future “no-build” traffic estimates. The University and Town will agree on appropriate growth rates for each location. The no-build traffic counts (peak hour and 24-hour) shall be shown on a map.

9. A map and table showing proposed parking changes in the Development Plan area that accompany and are part of the Development Plan shall be prepared. The table shall include a tabulation of parking losses and increases by location, and the existing and proposed allocation of that parking by type of user (student, employee, visitor).
10. A summary of total parking in the Development Plan area by location, allocation (type of permits), use by patients/visitors, and peak occupancy shall be prepared to the degree existing data is available. Directional hourly entering/exiting counts from existing parking decks shall be estimated from available data.
11. The amount of traffic generated in the A.M. and P.M. peak hours and on a typical day shall be calculated for each parking facility that is proposed for permanent addition, expansion, or elimination. The calculations shall be based on traffic generation rates for the different types of parking facilities (employee, student, and visitor) obtained in Item A10. This traffic shall be subtracted or added as appropriate to the Development Plan area road system by applying a traffic distribution pattern that will be determined by the University and agreed to by the Town. This data shall be shown on a map.
12. The no-build traffic counts estimated in Item A8 shall be modified based on the changes determined in Item A11 to obtain "build" traffic (i.e., traffic with background growth and projects in the Development Plan). This data shall be shown on a map.
13. To the degree available, transit data shall be summarized. This shall include individual route transit stop boardings to be provided by Chapel Hill Transit. The University shall provide an inventory of all existing and future proposed bus stop locations and amenities in the Development Plan area.
14. Existing bicycle counts (preferably bi-directional hourly for a 12-hour period from 7:00 A.M. to 7:00 P.M.) shall be estimated where reasonably current data is available for the following locations (exact locations to be agreed on by the Town and the University):
 - Cameron Avenue (west of Pittsboro Street)
 - Columbia Street
 - Airport Road
 - McCauley Street
 - South Road
 - Manning Drive
 - Raleigh Road/Country Club Road (All the approaches)
15. Existing pedestrian counts (preferably hourly for a 12-hour period from 7:00 A.M. to 7:00 P.M.) shall be estimated where reasonably current data is available for the following street crossing locations:
 - Franklin Street at the Post Office pedestrian crossing (N/S)
 - Franklin Street at the Carolina Coffee Shop pedestrian crossing (N/S)
 - Hillsborough Street/Franklin Street (N/S)

- Columbia Street/Franklin Street (N/S, E/W)
- Cameron Avenue/Pittsboro Street (E/W)
- South Road/Columbia Street (N/S, E/W)
- South Road/Bell Tower Lot entrance (N/S, E/W)
- Manning Drive/Ridge Road (N/S, E/W)
- Franklin Street/Church Street (N/S)
- Columbia Street/Fraternity Court pedestrian crossing (E/W)
- Raleigh Road/Country Club Road (All the approaches)

16. The counts collected in Items A13, A14, and A15 shall be tabulated.

17. Level of service (LOS) shall be calculated for existing, no-build, and build conditions at the intersections identified in Item A5 using the latest version of the Highway Capacity Manual Software, Synchro, or other similar software. These results shall be shown in a table.

Intersections in addition to those listed in Item A5 shall be analyzed for existing, no-build, and build conditions LOS if they meet either of the following criteria:

- The Development Plan adds 10 percent or more to the no-build traffic on any approach leg of the intersection during the A.M. or P.M. peak period where the intersection is operating at LOS C or better.
- The Development Plan adds 5 percent or more to the no-build traffic on any approach leg of the intersection during the A.M. or P.M. peak period where the intersection is operating at LOS D or worse.

Such intersections shall be identified by applying the traffic estimates from the traffic distribution task described in Item A11 to traffic count data to be provided by the Town for intersections that the University and Town agree may potentially meet the above criteria. If an intersection is identified as meeting the criteria, LOS analysis shall be undertaken for existing, no-build, and build conditions using available count data.

18. Mitigation strategies for impacts identified in A17 shall be proposed to the degree feasible or practical. Mitigation strategies may include but are not limited to:

- Roadway improvements
- Traffic Signal Improvements
- Pedestrian Facility Improvements
- Others

19. An estimate of air pollution impacts shall be determined based on the calculated number of vehicular trips associated with the Development Plan with and without trip reduction strategies. Calculations shall include the total reduction in vehicle miles of travel (using the average vehicular trip length as ascertained from the Triangle Regional Model or other reliable sources) and generally accepted rates of emissions per vehicle mile of travel, to be agreed on by the Town and the University.

- 20 The findings, methodology, supporting data and calculations (including electronic files) shall be documented in a report to be referred to as the Initial Transportation Impact Analysis.

B. Subsequent Submittals (December 2001 and Biennial Updates)

The following methodology and procedures shall be applied in developing the Updated Transportation Impact Analysis and Biennial Updates for each submitted Development Plan, and they shall take precedence over the Proposed Guidelines for Traffic Impact Analysis, Town of Chapel Hill, North Carolina (May 2001).

1. If applicable, the map showing the location of proposed projects described in Item A1 shall be updated.
2. If applicable, the table described in Item A2 shall be updated.
3. If applicable, the table described in Item A3 shall be updated.
4. Existing 24-hour, bi-directional hourly traffic counts shall be undertaken on the roadways specified below (exact count locations to be agreed upon by the Town and the University):
 - Manning Drive (two locations)
 - South Columbia Street (two locations)
 - Pittsboro Street
 - Cameron Avenue (two locations)
 - South Road (two locations)
 - Ridge Road
 - Country Club Road
 - Raleigh Road

All counts shall be undertaken on a Tuesday, Wednesday or Thursday when school is in session. The subsequent count undertaken for each location for the biennial updates shall be undertaken on the same weekday as the initial count. This information shall be shown on a map.

5. Existing A.M and P.M. peak hour turning movement counts shall be undertaken from 7:00 to 9:00 A.M. and 4:00 to 6:00 P.M. (in 15-minute increments) at the intersections specified below:
 - Cameron Avenue/Pittsboro Street
 - Cameron Avenue/Columbia Street
 - Cameron Avenue/Raleigh Road
 - Country Club Road/South Road
 - Raleigh Road/South Road
 - Ridge Road/Manning Drive
 - South Columbia Street/South Road
 - South Columbia Street/Manning Drive
 - Manning Drive/Fordham Boulevard
 - Manning Drive/East Drive
 - Manning Drive/West Drive
 - Mason Farm Road/South Columbia Street

- Mason Farm/East Drive
- Mason Farm/West Drive
- Franklin Street/Raleigh Road
- Pittsboro Street/McCauley Street
- Mason Farm Road/Fordham Boulevard
- Merritt Mill Road/Cameron Avenue
- Columbia Street/Franklin Street
- Columbia Street/Rosemary Street
- Columbia Street/NC 54 East Ramp
- Columbia Street/NC 54 West Ramp
- Columbia Street/Purefoy Road
- Purefoy Road/Mason Farm Road
- Manning Drive/Skipper Bowles Drive

All counts shall be undertaken on a Tuesday, Wednesday or Thursday when school is in session. The subsequent count undertaken for each location for the biennial updates shall be undertaken on the same weekday as the initial count. This information shall be shown on a map.

6. The count data collected in Items B4 and B5 shall be tabulated along with corresponding data collected in previous years and the percent growth (or decline) calculated and shown.
7. The no-build traffic data (peak hour and 24-hour) shall be projected by applying appropriate growth rates to be agreed on by the University and Town (as described in Item A8).
8. If applicable, the map and table showing proposed parking changes in the Development Plan area as described in Item A9 shall be updated.
9. The summary of total parking in the Development Plan area by location, allocation (type of permits), use by patients/visitors, and peak occupancy, as described in Item A10, shall be updated. Sample directional entering/exiting counts from each parking deck shall be undertaken on an hourly basis for a 24-hour period on a Tuesday, Wednesday or Thursday.
10. The amount of traffic generated in the A.M. and P.M. peak hours and on a typical day shall be calculated for each parking facility that is proposed for permanent addition, expansion, or elimination. The calculations shall be based on traffic generation rates for the different types of parking facilities (employee, student, and visitor) obtained in Item B9. This traffic shall be subtracted or added as appropriate to the Development Plan area road system by applying a traffic distribution pattern that will be determined by the University and agreed to by the Town. This data shall be shown on a map.
11. The no-build traffic projected in Item B7 shall be modified based on the changes determined in Item B10 to obtain updated build traffic. This data shall be shown on a map.

12. Transit data shall be collected and summarized. This will include individual route transit stop boardings to be provided by Chapel Hill Transit. The University shall provide an inventory of all existing and future proposed bus stop locations and amenities in the Development Plan area.
13. 12-hour (7:00 A.M. to 7:00 P.M.) bi-directional hourly bicycle counts shall be undertaken at the locations specified below (exact locations to be agreed upon by the Town and the University):
 - Cameron Avenue (west of Pittsboro Street)
 - Columbia Street
 - Airport Road
 - McCauley Street
 - South Road
 - Manning Drive
 - Raleigh Road/Country Club Road (All the approaches)

All counts shall be undertaken on a Tuesday, Wednesday or Thursday when school is in session. The subsequent count undertaken for each location for the biennial updates shall be undertaken on the same weekday as the initial count. This information shall be shown on a map.

14. 12-hour (7:00 A.M. to 7:00 P.M.) hourly pedestrian counts shall be undertaken at the street crossing locations specified below.
 - Franklin Street at the Post Office pedestrian crossing (N/S)
 - Franklin Street at the Carolina Coffee Shop pedestrian crossing (N/S)
 - Hillsborough Street/Franklin Street (N/S)
 - Columbia Street/Franklin Street (N/S, E/W)
 - Cameron Avenue/Pittsboro Street (E/W)
 - South Road/Columbia Street (N/S, E/W)
 - South Road/Bell Tower Lot entrance (N/S, E/W)
 - Manning Drive/Ridge Road (N/S, E/W)
 - Franklin Street/Church Street (N/S)
 - Columbia Street/Fraternity Court pedestrian crossing (E/W)
 - Raleigh Road/Country Club Road (All the approaches)

All counts shall be undertaken on a Tuesday, Wednesday or Thursday when school is in session. The subsequent count undertaken for each location for the biennial updates shall be undertaken on the same weekday as the initial count. This information shall be shown on a map.

15. The counts collected in Items B12, B13, and B14 shall be tabulated along with corresponding data collected in previous years and the percent growth (or decline) calculated and shown.
16. A survey of a representative sample of University and Hospitals employees and students shall be undertaken to determine mode of travel and other travel characteristics. The survey methodology, data collected and summary of

findings shall be similar to The University Commuting Study undertaken by the University in April, 1997.

17. Biennial updates shall include a summary of place of residence by zip code and total employment at all University and Hospital facilities (Main Campus and other locations).
18. The traffic generation estimates developed in Item B3 shall be adjusted to account for proposed trip reduction strategies, with the results shown in the table.
19. Level of service (LOS) shall be calculated for existing, no-build, and build conditions at the intersections identified in Item B5 using the latest version of the Highway Capacity Manual Software, Synchro, or other similar software. These results shall be shown in a table. As part of the LOS analysis, existing signal timing plans shall be modified if needed. Additionally, progression analyses shall be conducted using the Synchro software on the major roadways associated with intersections listed in Item B5. The detailed time-space diagrams produced by the Synchro software shall be part of this report.

Intersections in addition to those listed in Item B5 shall be analyzed for existing, no-build, and build conditions LOS if they meet either of the following criteria:

- The Development Plan adds 10 percent or more to the no-build traffic on any approach leg of the intersection during the A.M. or P.M. peak period where the intersection is operating at LOS C or better.
- The Development Plan adds 5 percent or more to the no-build traffic on any approach leg of the intersection during the A.M. or P.M. peak period where the intersection is operating at LOS D or worse.

Such intersections shall be identified by applying the traffic estimates from the traffic distribution task described in Item A10 to traffic count data to be provided by the Town for intersections that the University and Town agree may potentially meet the above criteria. If an intersection is identified as meeting the criteria, LOS analysis shall be undertaken for existing, no-build, and build conditions using available count data.

20. The mitigation measures developed in A18 shall be reviewed and modified or adjusted as needed.
21. An estimate of air pollution impacts developed in Item A19 shall be revised based on the calculated number of vehicular trips associated with the Development Plan with and without trip reduction strategies. Calculations shall include the total reduction in vehicle miles of travel (using the average vehicular trip length as ascertained from the Triangle Regional Model or other reliable sources) and generally accepted rates of emissions per vehicle mile of travel, to be agreed on by the Town and the University.
22. The findings, methodology, supporting data and calculations (including electronic files) shall be documented in a report to be referred to as the Updated Transportation Impact Analysis or Biannual Update, as appropriate. The report

shall also include an assessment of the effectiveness of the traffic mitigation strategies, and describe any proposed modifications to such strategies.