



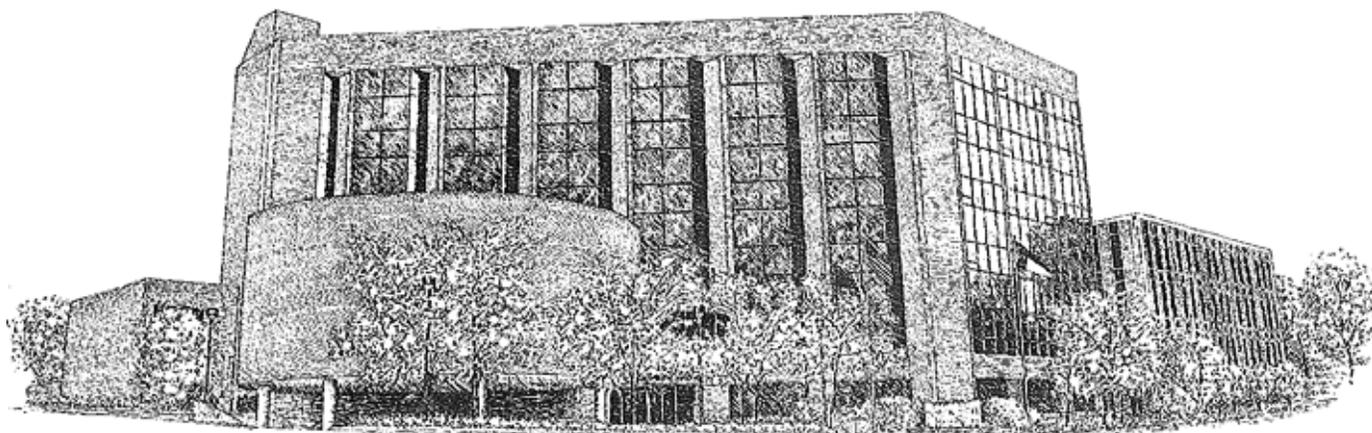
Official Agenda

RALEIGH CITY COUNCIL

Nancy McFarlane, Mayor
Kay C. Crowder, Mayor Pro Tem
Mary-Ann Baldwin
Corey D. Branch
David N. Cox
Bonner Gaylord
Russ Stephenson
Dickie Thompson

TUESDAY, MAY 17, 2016
11:30 A.M. LUNCH WORK SESSION
CONFERENCE ROOM 305

Avery C. Upchurch Government Complex



222 West Hargett Street, Raleigh, North Carolina 27602

A. MEETING CALLED TO ORDER BY THE MAYOR

B. AGENDA

1. Traffic Impact Analysis

Todd Delk, Transportation Planning

As requested by the Council, staff will provide a review of the current policy and processes for traffic studies as required by the Unified Development Ordinance (Article 8.2) in the Raleigh Street Design Manual (Section 6.23).

2. East College Park Development Alternatives

Larry M. Jarvis, Housing and Neighborhoods Department

During the work session staff will present alternative development options for East College Park, including a “community consensus” option prepared as a result of a neighborhood walk-through with residents and staff.

Article 8.2. Infrastructure Sufficiency

Sec. 8.2.1. In General

- A. To lessen congestion in the streets and to facilitate the efficient and adequate provision of transportation, water and sewage and to secure safety from fire, every subdivision plan and site plan shall be subject to a determination of the sufficiency of infrastructure, as defined below according to the established levels of service in this Article.
- B. Infrastructure shall be considered sufficient where it is demonstrated to have available capacity to accommodate the demand generated by the proposed development as well as other approved developments and PD Master Plans.
- C. In order to avoid undue hardship, the applicant may propose to construct or secure sufficient funding for the facilities necessary to provide capacity to accommodate the proposed development at the adopted level of service. The commitment for construction or advancement of necessary facilities shall be included as a condition of development.

Sec. 8.2.2. Streets

- A. Required street capacity shall be measured based on the methodology of the Highway Capacity Manual.
- B. The impact of proposed development shall be measured by AM and PM peak trips based on the methodology of the Institute of Transportation Engineers (ITE).
- C. Adequate streets shall be provided consistent with the requirements of this Chapter provided a level of service E or better is maintained.
- D. There are 3 required traffic impact assessment thresholds:
 - 1. Trip Generation Report (a test of AM/PM peak hour traffic);
 - 2. Traffic Assessment (where the AM/PM peak hour traffic fails to meet adequate levels of service, this study reviews queueing and delays); and
 - 3. Traffic Impact Analysis (where queueing and delays are unacceptable, this full analysis includes calculation of trips, delay, queueing and capacity at intersections).
- E. Where a trip generation report or traffic impact analysis demonstrates a degradation of overall intersection level of service below level of service E or

impacts to an existing intersection operating at level of service F, the proposed site plan may be approved provided that:

- 1. The residential density does not exceed 50 units per acre; or
- 2. The office floor area ratio does not exceed 0.5; or
- 3. The floor area ratio for commercial uses does not exceed 0.25; or
- 4. The peak hour delay at the intersection does not exceed what would be produced by development consistent with paragraphs 1., 2. or 3. above as shown by a Traffic Impact Analysis.
- 5. Where paragraphs *Sec. 8.2.2.E.1.*, *Sec. 8.2.2.E.2.*, *Sec. 8.2.2.E.3.* or *Sec. 8.2.2.E.4.* are selected, the applicant shall prepare and submit a traffic mitigation plan to the Public Works Director. The mitigation plan shall identify capital projects and phasing strategies that would bring the development impact to within the acceptable threshold specified in paragraph E.4 above. This plan may identify improvements undertaken by the private sector, the public sector or both. Site plan approval shall not be granted until the Public Works Director determines that the plan provides reasonable and adequate mitigation. Factors to be considered by the Public Works Director include whether: the cost of the mitigation measures exceeds the value of the proposed development; transportation demand management strategies including multi-modal improvements are included; alternative access strategies are considered; and new street connections are evaluated.
- F. An exception to *Sec. 8.2.2.E.* shall be granted for one or more of the following situations:
 - 1. The City has a capital improvement project within the adopted 5-year Capital Improvement Program that would improve the level of service above level F;
 - 2. NCDOT has proposed a project within the first 4 years of the adopted 7-year Transportation Improvement Program that would improve the level of service above level F;
 - 3. There is within ¼ mile of the site plan an existing or funded transit stop that is served by one of the following: fixed or dedicated-guideway transit, 5 vehicles an hour on a single route in 1 direction during peak commuting hours or 10 vehicles an hour in any direction during peak commuting hours;
 - 4. The site is mapped with a conditional use district approved within the prior 20 years that includes a trip budget as a zoning condition; or

5. If the property is zoned Downtown Mixed Use (DX-).

Sec. 8.2.3. Water Supply

- A. Water supply shall be determined based on system capacity and average and peak flows.
- B. The minimum size of any water line shall meet current Public Utilities Handbook requirements and may require off-site improvements.

Sec. 8.2.4. Wastewater Disposal

- A. Wastewater disposal shall be determined based on system capacity and average and peak flows.
- B. The minimum size of any wastewater line shall meet current Public Utilities Handbook requirements and may require off-site improvements.

Sec. 8.2.5. Fire Suppression

- A. Required fire flow shall be determined using the methodology of the Insurance Services Office (ISO).
- B. In determining the impact of the proposed development on fire suppression, the City shall consider water pressure available to the development.

Sec. 8.2.6. Stormwater

- A. The minimum configuration of any stormwater facility shall meet current Stormwater Manual requirements and may require off-site improvements.
- B. When development of an area changes the flow regime from sheet flow to concentrated flow, the drainage system shall be designed to minimize impacts of the flow on adjoining properties.

- A. Additional specifications regarding streetlights along City of Raleigh public roadways:
1. Energy provider leased Light-Emitting Diode (LED) streetlight fixtures must be used on public right-of-way if they are to be added to the City account. The energy provider will conduct all troubleshooting, repairs, and maintenance.
 2. The energy provider must develop a lighting plan meeting or exceeding the City of Raleigh lighting standards as stated in Sec. 10-3059 of the City Code of Ordinances. This plan must be approved by Transportation Operations staff before the energy provider is authorized to install.
 3. The energy provider generally determines the type (wattage) of LED streetlight fixture to be used along each public roadway and the associated pole spacing to meet the City's lighting standards. This can be modified by City staff if need be, and must be approved by staff before installation begins.
 4. All streetlights must be underground fed, unless overhead infrastructure already exists where streetlights will be placed.
 5. Underground facility installation and any abnormal costs (trenching, boring, reseeding, rock removal, etc.) associated with streetlight installation must be paid for by the developer, per the Streetlighting Developer Requirements.
 6. In order for the streetlights to be added to the City account, they must be installed on 30' wood or gray fiberglass poles. If gray fiberglass is used, a \$250/pole buy down can be paid to the City in order to have the streetlights added to our account. This buy down must be paid before City staff will authorize the installation of gray fiberglass poles.
 7. If the developer uses any type of black poles, post-top lamp streetlights, or pedestrian scale lighting the streetlights cannot be added to the City's streetlight account. These must remain on a private account. If a state registered non-profit owner's association exists for the development, an agreement can be drafted to allow for the annual reimbursement of city standard lighting costs to the association.

6.23. Traffic Studies

6.23.1. Purpose of Traffic Studies

- A. In order to better serve the public, the City of Raleigh has adopted a set of minimum standards for traffic studies. This document provides guidance to ensure consistency, to make findings more accurate and to maximize confidence in the results. Deviation from these practices requires justification. By reviewing reports, plans, and submittals, the City of Raleigh in no way relieves the traffic engineer of possible claims or additional work resulting from errors or omissions.
- B. The purpose of a Traffic Study is:
1. To provide reliable guidance on short- and long-range planning of site access and off-site improvements
 2. To assist developers and property owners in making critical land use decisions regarding traffic and other modal needs
 3. To provide government review agencies with recommendations for achieving responsive and consistent transportation and access policies
- C. Development plans and rezoning cases have a burden to prove that the expected increase in trips will not create unsafe or inefficient traffic conditions. If the expected increase in trips does create unsafe or inefficient traffic conditions, the developer must mitigate the traffic impacts. The standard to provide mitigation is when overall intersection or approach level-of-service degrades from LOS-E to LOS-F. Another standard to provide mitigation is when arterial level-of-service degrades from LOS-E to LOS-F. Mitigation may involve changes to signal timings, constructing additional lanes, restricting access, prohibiting left turns or other measures.

Guidance: City staff, in consultation the traffic engineer, will determine the magnitude of mitigation measures on a case-by-case basis.

6.23.2. Initiating Traffic Studies

In considering the transportation aspects of land development, it is important to determine early in the process if and when a traffic study is needed. Not all land development projects warrant a traffic impact analysis; City staff shall determine when trip generation, traffic assessment or traffic impact analysis reports are required.

6.23.3. Land Uses

Traffic impact analyses shall be required for the following land uses:

- A. Single Family Residential Developments \geq 150 Dwellings
- B. Apartment Developments \geq 240 Dwellings
- C. Residential Condo/Townhome Developments \geq 300 Dwellings
- D. General Office Buildings \geq 64,000 sq.ft.
- E. Medical Office Buildings \geq 47,000 sq.ft.
- F. Shopping Centers \geq 23,000 sq.ft.
- G. Supermarkets \geq 20,000 sq.ft.
- H. Convenience Market w/ Gas Pumps: 6 or more Fueling Positions*
- I. Pharmacy w/ Drive-Thru \geq 29,000 sq.ft.
- J. Drive-In Bank \geq 11,500 sq.ft.
- K. Fast-Food Restaurant w/ Drive-Thru \geq 6,000 sq.ft.

* Fueling positions are defined as the maximum number of vehicle that can be fueled simultaneously

Guidance: The development intensities listed in Section 6.24.3 are consistent with the estimated volume of new trips on the public street system in Section 6.24.4 after deductions for pass-by trips.

6.23.4. Trip Generation

Traffic impact analyses shall be required for the following trip generation volumes:

- A. Peak Hour Trips \geq 150 veh/hour
- B. Peak Hour Trips \geq 100 veh/hour if primary access is on a 2-lane road
- C. More than 100 veh/hour trips in the peak direction
- D. Daily Trips \geq 3,000 veh/day
- E. Enrollment increases at public or private schools

Guidance: The volumes listed in Section 6.24.4 are for new trips on the public street system after deductions for pass-by trips and, for mixed-use developments, internal capture trips.

6.23.5. Site Context

Traffic impact analyses shall be required when the following conditions exist in the vicinity of the development site:

- A. Affects a location with a high crash history [Severity Index \geq 8.4 or a fatal crash within the past three years]
- B. Takes place at a highly congested location [volume-to-capacity ratio \geq 1.0 on both major street approaches]
- C. Creates a fourth leg at an existing signalized intersection
- D. Exacerbates an already difficult situation such as a RR Crossing, Fire Station Access, School Access, etc.
- E. Access is to/from a major arterial roadway such as a Parkway, Multi-Way Boulevard or Multi-Lane Avenue
- F. Proposed access is within 1,000 feet of an interchange
- G. Involves an existing or proposed median crossover
- H. Involves an active roadway construction project
- I. Involves a break in controlled access along a corridor

6.23.6. Miscellaneous Applications

Traffic impact analyses shall be required for:

- A. Planned Development Districts
- B. In response to Raleigh Planning Commission or Raleigh City Council concerns

Guidance: For rezoning applications, the basis of comparison for trip generation thresholds will be the difference between the maximum allowable land use intensity under current zoning compared to the maximum land use intensity under the proposed zoning. For site plans and subdivisions, the basis of comparison for trip generation thresholds should be the difference between trips generated by the site at the time of preliminary plan submittal versus the expected increase in roadway trips upon development of the site.

6.23.7. Study Area

The extent of a traffic study depends on the location and size of the proposed development and the conditions prevailing in the surrounding area. It is recognized that an excessively large study area may unnecessarily increase costs, time and effort for the developer, the traffic engineer and City staff. Alternatively, an inappropriately small traffic study area may fail to include roadway segments and/or intersections that would need to be improved to accommodate the trips generated by a proposed development.

6.23.8. Access Points and Intersections

- A. Any traffic study that analyzes off-site impacts shall include all site access points and major intersections (signalized and unsignalized) adjacent to the site.
- B. Guidance: City staff (with input from the developer's traffic engineer) will determine any additional areas to be included based on local or site-specific conditions, development size or neighborhood sensitivities. The study area boundaries may also be influenced by impacts other than pure capacity issues such as neighborhood cut-thru trips, known congestion issues, accident history, temporary anomalies in the existing roadway system that would influence travel patterns, long-range transportation planning goals, etc.

6.23.9. Traffic Study Scope

It is critical that all parties discuss the traffic study early in the planning process. An understanding as to the level of detail and the assumptions required for analysis will be determined at that time. In addition to learning the study issues, coverage and level of detail, the traffic engineer must obtain and verify the following information:

1. Available traffic counts
2. Information about available transit, bicycle and pedestrian facilities
3. Committed and planned roadway improvements and the schedule for those improvements
4. Approved development and background traffic data
5. Applicable agency codes and policies
6. Existing congestion locations within the study area
7. Crash data for all intersections and/or street segments within the study area
8. Traffic signal timings
9. Committed and planned signal system improvements
10. Neighborhood sensitivities
11. Other traffic-related issues determined by City staff

Guidance: City staff will assist the traffic engineer in obtaining all information needed to initiate and complete the traffic study.

6.23.10. Traffic Model Analysis Programs

Except for very simple cases, all traffic analyses shall be produced with special software programs that are designed specifically for traffic model applications. For software to be acceptable it must be based on the most current Highway Capacity Manual methods.

6.23.11. Preferred Analysis Programs

| | |
|--|------------|
| A. Signalized intersection delay | Synchro |
| B. Unsignalized intersection delay | Synchro |
| C. Queuing and blocking | SimTraffic |
| D. Roundabouts | SimTraffic |
| E. Simulation | SimTraffic |
| F. Actuated signal cycle variables | SimTraffic |
| G. Arterial delay | SimTraffic |
| H. Arterial travel time | SimTraffic |
| I. Arterial speed and Level-of-Service | SimTraffic |
| J. Network total stops | SimTraffic |
| K. Network stops per vehicle | SimTraffic |
| L. Network fuel consumed | SimTraffic |
| M. Network air quality/vehicle emissions | SimTraffic |
| N. Multimodal Level-of-Service | Artplan |

Guidance: Use of alternate analysis software must be approved by City staff; however the above software is not specifically endorsed by City staff. Other traffic analysis tools and programs will be considered on a case-by-case basis. City staff shall determine the appropriateness of the alternative models.

6.23.12. Existing Conditions

Once all information listed in the study scope has been obtained, it is used to create an existing conditions traffic model. The existing conditions model will be used to create a foundation for assessing the land use and traffic impact changes over time. Thus it is critical that the existing conditions model be as accurate as possible.

6.23.13. Existing Conditions Data Requirements

Traffic volumes shall reflect normal weekday and/or peak hour traffic conditions. When submitting a traffic study document for review, the traffic counts used for capacity analysis purposes shall have been taken no more than one year prior to the submittal date of the document. Exceptions to this standard can be approved on

a case-by-case basis. In some cases, it is necessary to conduct new traffic counts. Counts shall not be taken on holidays, when school is not in session, during adverse weather or when special events occur. The existing conditions model shall accurately reflect the current street and traffic control environment including, but not limited to:

- A. Road geometry
- B. Number and type of travel lanes
- C. Auxiliary turning lanes, storage lengths and tapers
- D. Medians and two-way left turn lanes
- E. Traffic volumes, including heavy vehicles and pedestrians
- F. Transit stops, exclusive bicycle lanes and on-street parking (when applicable)
- G. Cycle length, signal offsets, splits and phase sequence
- H. Detector layout and detector settings
- I. Phase settings such as recall mode, volume-density settings, minimum green, maximum green and clearance times
- J. Two-way and all-way stop control
- K. Roundabouts and other unconventional intersections

Guidance: City staff will assist the traffic engineer in obtaining turning movement counts, existing signal plans and current signal timings from City of Raleigh archives.

6.23.14. Non-Site Traffic Forecast

- A. Estimates of non-site traffic are required to complete the analysis of horizon year conditions. Non-site traffic volumes, when added to existing volumes, are typically known as Background Traffic. These estimates characterize the “base” conditions, i.e., traffic conditions prior to a site being redeveloped. Non-site traffic consists of two components: existing traffic volumes projected forward to the horizon year using an annual grow rate and trips generated by approved developments within or adjacent to the study area.
- B. Projections of existing traffic volumes to the horizon year are dependent on an assumed annual growth rate. City staff (with input from the developer’s traffic engineer) will determine the appropriate growth rate based on information such as the Triangle Regional Traffic model, historical daily traffic volumes obtained from NCDOT, existing turning movement counts, previous traffic studies or other sources.

Guidance: City staff will provide any necessary information on approved development trips within the study area.

6.23.15. Site Traffic Generation

- A. The ITE Trip Generation Manual (latest edition) shall be used to compute Daily, AM peak and PM peak period trips for each land use. At the discretion of City staff, locally obtained trip generation data can be substituted. The ITE Trip Generation Manual (latest edition) method shall be used to select between trip generation average rates and equations.
- B. Trip generation for individual outparcels shall be calculated separately from the remainder of the development. Some land uses require additional justification or local studies. For example, the use of Specialty Retail shall include definite plans for the specific retail that will be in place.

6.23.16. Internal Capture Trips

- A. Internal capture calculations shall be used cautiously. The internal capture calculations shall utilize the percentages from the ITE Trip Generation Manual (latest edition) to estimate the internal capture reduction percentage. Alternatively, the National Cooperative Highway Research Program Report 684, Enhancing Internal Trip Capture Estimates for Mixed-Use Developments can be used with concurrence of City staff.
- B. Reductions for internal capture shall be applied to multi- or mixed-use sites only. Internal capture shall not be taken for AM peak hours or from lodging land uses without prior approval by city staff. Internal capture procedures shall not be used on a retail-only site. The internal capture reduction shall be applied before the pass-by trips are calculated.

6.23.17. Pass-by Trips

Pass-by percentages shall be obtained from the ITE Trip Generation Manual (latest edition). Pass-by percentages shall only be applied to land uses numbered in the 800s and 900s. For multi-use developments, pass-by percentages shall be applied to the retail component only. Pass-by trips shall not exceed 10% of the total volume on the adjacent street.

6.23.18. Alternative Mode Trips

Increasingly, site trips are made by alternative modes such as transit, bikes and walking; City staff recognizes this trend. Reductions in passenger car trips due to alternative modes will be considered, case-by-case, provided that the rationale behind the reduction is clearly stated and evidence or data to support the reduction is reviewed and approved by City staff.

6.23.19. Site Traffic Distribution and Assignment

- A. The expected volume of trips generated by a development must be distributed and assigned to the roadway network so that traffic impacts on intersections and street segments can be analyzed and quantified. Site traffic distribution shall be based on clearly stated assumptions and the rationale behind those assumptions. Primary trip distribution shall be based on a gravity model. Pass-by trips shall follow the existing volume distribution of the primary access road.
- B. Guidance: All efforts should be made to ensure that upstream and downstream traffic volumes along corridors balance and maintain continuity. If balanced volumes are not attainable, explanation must be provided. Documentation regarding the balancing methodology must be provided in the technical appendices.

6.23.20. Analysis

Analyses shall be submitted for each of the following scenarios:

TABLE 6.23A: ANALYSIS SCENARIOS

| <i>Scenario</i> | <i>Rezoning</i> | <i>Site Plan/Other</i> |
|------------------------------------|-----------------|------------------------|
| Existing Year | Yes | Yes |
| Background/Horizon Year | Yes | Yes |
| Build-out under current zoning | Yes | Yes |
| Build-out under proposed zoning | Yes | No |
| Build-out in phases | No | Yes |
| Build-out with proposed mitigation | No | Yes |

6.23.21. Measures of Effectiveness

When performing analyses, providing overall intersection Level-of-Service alone is not sufficient. Items such as queuing, approach level of service, and volume-to-capacity ratio for example shall also be evaluated. The measures of effectiveness listed the following table shall be used for all traffic studies unless waived by City staff.

TABLE 6.23B: INTERSECTION, ARTERIAL AND NETWORK MEASURES OF EFFECTIVENESS

| | |
|---------------------------|--|
| Signalized intersection | Intersection average delay per vehicle |
| | Intersection level-of-service |
| | Approach average delay per vehicle |
| | Approach level-of-service |
| | Movement volume |
| | Percent of cycles maxed out (by phase) |
| | Maximum observed queue length |
| | Average queue length |
| | Upstream block time (%) |
| | Storage block time (%) |
| | Volume-to-capacity ratio (by phase) |
| | Intersection vehicle hours of delay |
| Unsignalized intersection | Movement delay |
| | Movement level-of-service |
| | Movement maximum queue length |
| Arterial | Delay |
| | Travel time |
| | Speed |
| | Level-of-Service |
| Network | Stops per vehicle |
| | Fuel consumed |
| | Overall delay |
| | Air quality/vehicle emissions |
| | Multimodal Level-of-Service |

Guidance: Measures of effectiveness for isolated intersections, all intersections along a particular road or all intersections within a roadway network can provide important information when evaluating transportation and land use alternatives. Network and Arterial MOEs are not appropriate for every study. City staff will determine the appropriate measures of effectiveness for each traffic study on a case-by-case basis.

6.23.22. Traffic Analysis Default Values

- A. The existing cycle length, signal offsets, splits and phasing scheme for all traffic signals within the study area shall be maintained for all analysis scenarios. Traffic models shall match the signal plans with respect to detector size, detector location and all other detector settings unless it can be demonstrated that the detectors have been field adjusted to other values. All nodes and links within the traffic models shall be accurately located based on NC Grid Coordinates.
- B. Microsimulation programs, such as SimTraffic, shall use a seed time of 10 - 15 minutes and a recording time of 60 minutes. The resulting performance measures shall be averaged over at least 10 simulation runs.
- C. Under Options > Intervals and Volumes set the SimTraffic Parameters as follows:

TABLE 6.23C: SIMULATION SETTINGS

| <i>Intervals</i> | 0 | 1 | 2 | 3 | 4 |
|----------------------|----------|----------|----------|-----------|----------|
| Interval Name | Seeding | Grow | Peak | Stabilize | Recover |
| Duration (minutes) | 10 - 15 | 15 | 15 | 15 | 15 |
| Record Statistics | No | Yes | Yes | Yes | Yes |
| Growth Factor Adjust | No | No | No | No | No |
| PHF Adjust | No | No | Yes | No | No |
| Anti-PHF Adjust | No | Yes | No | Yes | Yes |

- D. The Base Saturation Flow Rate shall be used in accordance with the Highway Capacity Manual (latest edition). Lane Utilization Factors shall be used in accordance with the Highway Capacity Manual (latest edition). A Peak Hour Factor (PHF) of 0.90 shall be used. If traffic counts have been acquired, the resulting PHF may be used for existing and projected conditions. Where schools are present, a PHF of 0.50 shall be used for the AM peak period.
- E. Under the traffic model's simulation settings, change **Enter Blocked Intersections** to Yes for the major street approaches to all unsignalized intersections.

Guidance: The seeding interval should be set to a minimum of 10 minutes or the length of time required for a vehicle to traverse the entire network (including stop time) whichever is greater.

6.23.23. Traffic Impact Mitigation Measures

- A. If a proposed mitigation involves changing the cycle length, phase duration, phase sequence, splits or offsets of any traffic signal then the traffic engineer will be required to meet personally with Public Works staff in the Raleigh Traffic Control Center. The traffic engineer must demonstrate to Public Works staff's satisfaction that their proposed signal changes will not have unacceptable adverse impacts on other intersections or signals. Public Works staff will determine the area to be considered and the extent of the signal network to be studied. Public Works staff will determine the quality and quantity of information necessary to evaluate the proposed signal timing plan. Once Public Works staff has met with the developer's traffic engineer, staff will have five business days to decide if they will accept or not accept the proposed signal changes. City staff will reply to the traffic engineer in writing and either state explicitly that the proposed changes are acceptable or explain why the proposed signal changes were rejected.
- B. Recommended storage lane lengths shall be provided for all exclusive turn lanes. The 95th percentile queue from a deterministic model or the maximum observed queue from a simulation (whichever is larger) shall be used to determine the storage lane length. Queuing shall not exceed the storage capacity of the approach. Full storage for queue lengths shall be rounded up to the nearest 25 feet with a minimum of 100 feet for both right-turn and left-turn lanes. A default taper length of 100 feet shall be modeled for all added lanes unless specific taper lengths are known.

6.23.24. Traffic Study Report

- A. The submitted traffic analysis document shall include, but is not limited to: a summary of the analysis and results, site plans, traffic counts and forecasts, volume generation, any assumptions used in the analysis, and any variations from these guidelines. It shall be signed and sealed by a Professional Engineer who is licensed to practice engineering in North Carolina. To facilitate examination by City staff and other interested parties, a one- or two-page executive summary that concisely summarizes the study purpose, findings and conclusions shall be provided.
- B. The traffic study report shall include all current signal timing and signal offset data, obtained from the Raleigh Traffic Operations Center or NCDOT, in the technical appendices.
- C. The traffic study report shall show a side-by-side comparison of Background traffic performance measures at the network, arterial, intersection and approach levels to Build-Out performance measures. The report shall quantify and qualify the changes in magnitude. It will identify which traffic impacts are directly attributable to the development and discuss them in the body of the report.

6.23.25. Multimodal Analysis

All traffic studies shall include a section on Multimodal Level of Service (MMLOS). City Staff will provide information on obtaining software to automate the MMLOS analysis. The traffic engineer will provide an assessment and discussion of current MMLOS conditions in the body of the report as well as a description of how the proposed development will advance Multimodal Level of Service.

6.23.26. Accident History

- A. The traffic study report shall include a section on the accident history of study area intersections and/or street segments. It must assess the number and types of accidents that have occurred in the past three years; it must evaluate the accident severity. If any of the study intersections have a high Severity Index, i.e., greater than 8.40, the report shall discuss possible countermeasures.

- B. The North Carolina Department of Transportation maintains a database of all reported accidents that occur within the state. NCDOT has developed special software known as TEAAS (Traffic Engineering Accident Analysis Software) to analyze and report on crashes that occur on roadway segments. TEAAS reports shall be included in the technical appendices. City staff will assist the traffic engineer in obtaining TEAAS reports from NCDOT.

6.23.27. Traffic Study Conclusion and Recommendations

- A. The traffic study report is to be an objective, technical analysis. All conclusions and recommendations shall be based solely on information contained within the report; all findings shall be clearly documented. It is acceptable to cite publications within the public realm such as the Manual on Uniform Traffic Control Devices, the AASHTO Highway Safety Manual, Federal Highway Administration reports, etc. in order to provide supporting evidence or to articulate key points provided that the citation includes the title, section/chapter and page number of the reference source.
- B. The analyses shall be presented in a straightforward and logical sequence. The analyses shall lead the reader step-by-step through the various stages of the process to the resulting conclusion and recommendations. Sufficient detail shall be included so that City staff will be able to follow the rationale and methodology of the analysis.
- C. Whenever possible, data should be presented in tables, graphs, maps and diagrams rather than narrative text. When appropriate, schematic drawings of roadway improvements, such as intersection reconfigurations, may be included and described in the text. Since the report may be read by nontechnical decision-makers and interested citizens, it should be as concise as possible with a minimum of jargon.
- D. Recommendations where mitigation or improvements are identified “by others” shall clarify which parties are to provide the additional improvements. The traffic study report shall provide documentation that those parties have agreed to construct the additional improvements. The study shall not use planned, but unfunded improvements, by government agencies as a means of mitigation.
- E. The traffic study report shall not include political views or statements, nor shall it take an advocacy position.

Guidance: City staff reserves the right to impose additional conditions and to ask for additional information during the course of the review if warranted by obvious concerns over possible traffic impacts on adjacent properties, roads or intersections. Inadequate reports will be returned to the traffic engineer for completion or modification. In such cases, City staff will state in writing the report’s deficiencies and will provide direction for addressing those deficiencies.

6.23.28. Traffic Study Submittal Requirements

- A. Submit all traffic model data files, a pdf file of the traffic study report [including appendices] and two bound copies of the traffic study report directly to:

City of Raleigh, Office of Transportation Planning
One Exchange Plaza, Suite 727
Raleigh, NC 27601
- B. City staff will acknowledge receipt of the report via email within 24 hours. Until acknowledged by City staff, the report has not been officially received.

Guidance: Staff’s preference is that one hard copy contains the body of the report and the second hard copy contains both the body and the technical appendix.

6.24. Bicycle Infrastructure

6.24.1. Bike Parking Standards

- A. Standard U-Rack Design Detail
 - 1. Distance to other Racks:
 - a. Racks aligned parallel to each other (side by side) must be at least 36 inches (3ft) apart.
 - b. Rack units aligned end to end must be at least 96 inches (8ft) apart.
 - 2. Distance from a Curb:
 - a. Rack units placed perpendicular to the curb must be at least 48 inches (4ft) from the curb to the nearest vertical component of the rack.
 - b. Rack units placed parallel to the curb must be at least 24 (2ft) inches from the curb.

OTP

office of transportation planning

Traffic Studies

City Council Work Session

May 17, 2016

Why Do We Need TIAs?

UDO Article 8.2.1 Infrastructure Sufficiency

- A. ***To lessen congestion in the streets and to facilitate the efficient and adequate provision of transportation***, ...every subdivision plan and site plan shall be subject to a determination of the sufficiency of infrastructure.
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- C. ...the applicant may propose ***to construct or secure sufficient funding for the facilities necessary to provide capacity to accommodate the proposed development*** at the adopted level of service.

Traffic Studies

- **Trip Generation Reports** project AM/PM peak hour traffic.
 - Staff performs or reviews for any rezoning case/ site plan in conjunction with Envision analysis.
- **Traffic Assessments** reviews queueing and delays.
 - Council can request these of applicant or staff.
- **Traffic Impact Analyses** combine both calculation of trips, delay, queueing and capacity at intersections.
 - Staff can require TIA per City's adopted criteria.
 - Council may request TIA for any rezoning case.



Source: News & Observer 5/12/14

TIA Process

1. Is a TIA required?
2. What should the TIA include?
3. Does the TIA show the network can handle the site traffic?
4. What improvements can be made to ensure traffic operates at acceptable LOS?



RSDM, Section 6.23

Traffic Studies Required for Zoning

REQUIRED FOR TRIPS

- Peak Hour Trips \geq 150 vph
 - *Peak Hour Trips \geq 100 vph if main access on 2-L road*
- Peak Hour Trips \geq 100 vph in peak direction
- Daily trips \geq 3,000 vpd
- School proposes increased enrollment

REQUIRED FOR SITE CONTEXT

- High crash history
- Highly congested locations
- New 4th approach at signal
- Main access to Major Street (4- or 6-lane)
- Other specific locations based on access or difficult situations

Traffic Studies Required for Site Plans

RESIDENTIAL

- **150 Single Family Homes***
- 240 Apartments
- 300 Condo/Townhome

COMMERCIAL

- **23,000 SF Shopping Centers***
- 20,000 SF Supermarkets
- 29,000 SF Pharmacy w/ Drive-Thru

OFFICE

- **64,000 SF General Office***
- 47,000 SF Medical Office

HIGH GENERATORS

- 11,500 SF Drive-In Bank
- Convenience Market w/ 6+ Gas Pumps
- 6,000 SF Fast-Food w/ Drive-Thru

Example TIA Worksheet

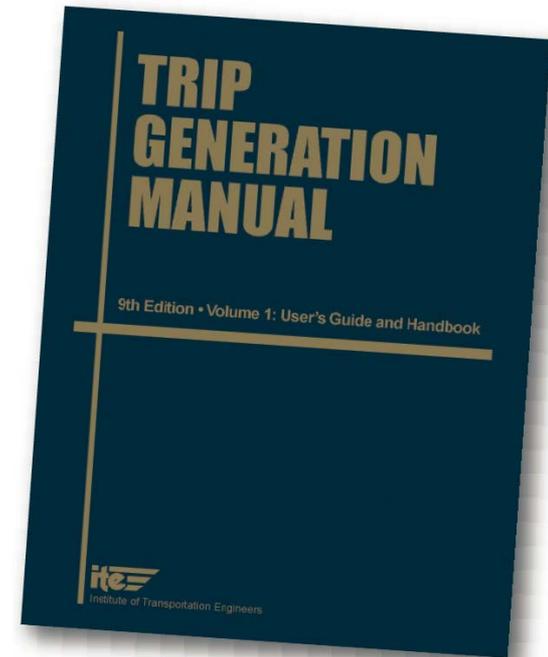
| Z-X-2016 Traffic Study Worksheet | | |
|----------------------------------|---|--|
| 6.23.3 | Land Uses | Meets TIA Conditions? (Y/N) |
| A | Single Family Residential Developments ≥ 150 Dwellings | For Rezoning Cases, Use criteria below |
| B | Apartment Developments ≥ 240 Dwellings | |
| C | Residential Condo/Townhome Developments ≥ 300 Dwellings | |
| D | General Office Buildings ≥ 64,000 sq.ft. | |
| E | Medical Office Buildings ≥ 47,000 sq.ft. | |
| F | Shopping Centers ≥ 23,000 sq.ft. | |
| G | Supermarkets ≥ 20,000 sq.ft. | |
| H | Convenience Market w/ Gas Pumps: 6 or more Fueling Positions | |
| I | Pharmacy w/ Drive-Thru ≥ 29,000 sq.ft. | |
| J | Drive-In Bank ≥ 11,500 sq.ft. | |
| K | Fast-Food Restaurant w/ Drive-Thru ≥ 6,000 sq.ft. | |
| 6.23.4 | Trip Generation | Meets TIA Conditions? (Y/N) |
| A | Peak Hour Trips ≥ 150 veh/hr | No, the change in average peak hour trip volume is 118 veh/hr |
| B | Peak Hour Trips ≥ 100 veh/hr if primary access is on a 2-lane road | Yes, this segment of Rock Quarry Road is a two-lane street (no curb, gutter or sidewalk) |
| C | More than 100 veh/hr trips in the peak direction | No |
| D | Daily Trips ≥ 3,000 veh/day | No, the change in average daily trip volume is 1,678 veh/day |
| E | Enrollment increases at public or private schools | Not Applicable |
| 6.23.5 | Site Context | Meets TIA Conditions? (Y/N) |
| A | Affects a location with a high crash history [Severity Index* ≥ 8.4 or a fatal crash within the past three years] | Yes, there was a fatal crash at Rock Quarry/ New Hope in August 2013 |
| B | Takes place at a highly congested location [volume-to-capacity ratio ≥ 1.0 on both major street approaches] | No |
| C | Creates a fourth leg at an existing signalized intersection | No |
| D | Exacerbates an already difficult situation such as a RR Crossing, Fire Station Access, School Access, etc. | No |
| E | Access is to/from a Major Street as defined by the City's Street Plan Map [latest edition] | Yes, Rock Quarry Road is classified as a major street (Avenue, 4-Lane, Divided) |
| F | Proposed access is within 1,000 feet of an interchange | No |
| G | Involves an existing or proposed median crossover | No |
| H | Involves an active roadway construction project | No |
| I | Involves a break in controlled access along a corridor | No |
| 6.23.6 | Miscellaneous Applications | Meets TIA Conditions? (Y/N) |
| A | Planned Development Districts | No |
| B | In response to Raleigh Planning Commission or Raleigh City Council concerns | None received by Transportation Planning as of May 10, 2016 |

*According to NCDOT's Traffic Engineering Accident Analysis System manual, a severity index of 8.4 is the threshold for locations that have more serious crashes.

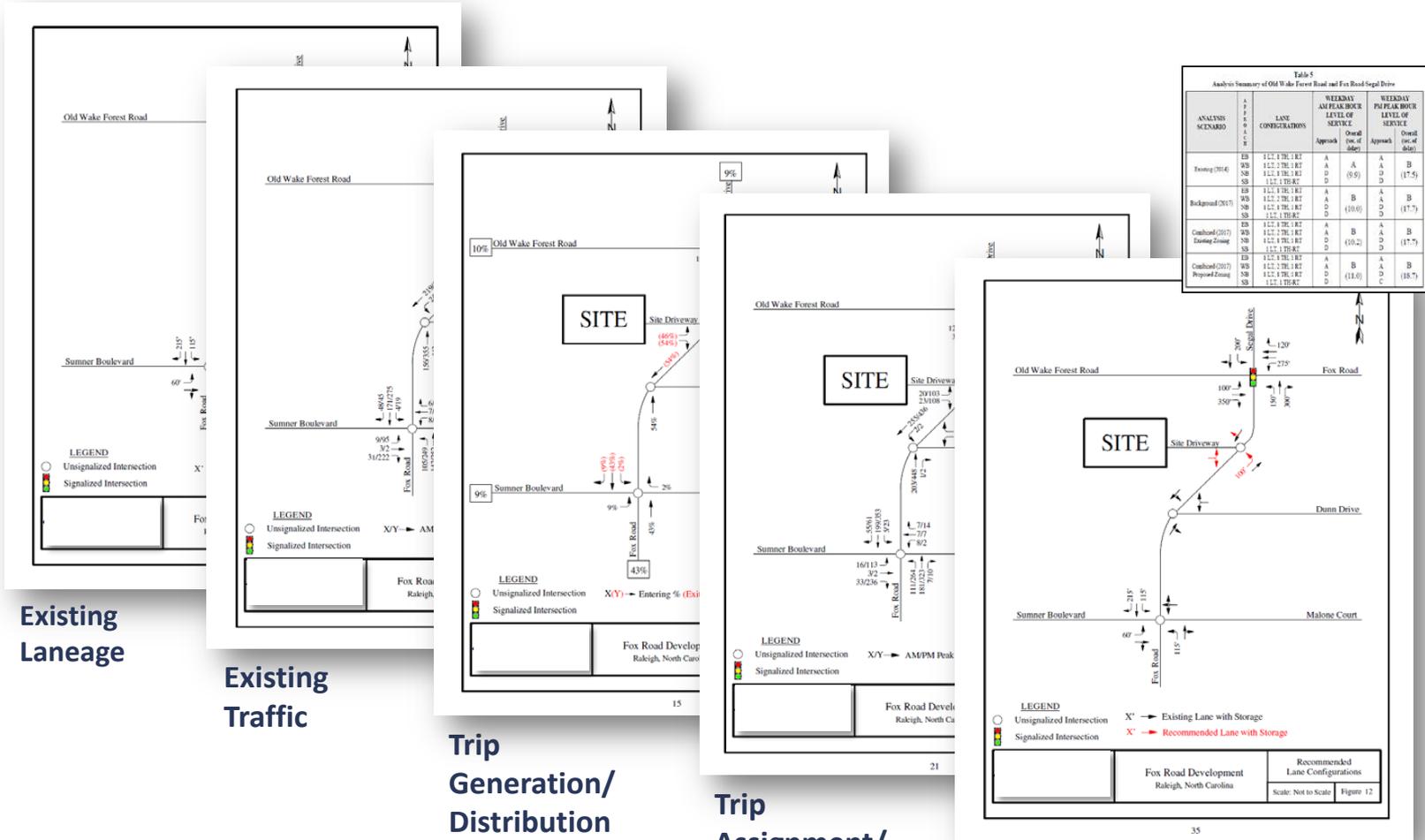
TIA Evaluation

Standard “Four-Step” Travel Demand Process

- **Trip Generation** determines number of trips using ITE Trip Generation Manual or approved alternative method
- **Trip Distribution** counts existing traffic; uses travel patterns plus assumptions to determine where trips go
- **Mode choice** determines how trips will be made
- **Trip assignment** uses previous steps to forecast where the trips go



TIA Process



Existing Laneage

Existing Traffic

Trip Generation/
Distribution

Trip Assignment/
Mode Split

Evaluation &
Improvements

Evaluation Scenarios

TABLE 6.23A: ANALYSIS SCENARIOS

| <i>Scenario</i> | <i>Rezoning</i> | <i>Site Plan/Other</i> |
|------------------------------------|------------------------|-------------------------------|
| Existing Year | Yes | Yes |
| Background/Horizon Year | Yes | Yes |
| Build-out under current zoning | Yes | Yes |
| Build-out under proposed zoning | Yes | No |
| Build-out in phases | No | Yes |
| Build-out with proposed mitigation | No | Yes |

Multimodal Considerations

Multimodal Level-of-Service (MMLOS; Bike/Ped/Transit) reviewed using ARTPLAN software by Florida DOT

- Bicycle & Ped LOS → user's perception of environment
- Transit LOS → service frequency

Alternative Mode Trips considered case-by-case

| LOS | Automobile | Bicycle | Pedestrian | Bus |
|-----|---|--|---|---|
| A/B |  |  |  |  >4 buses/hour |
| C/D |  |  |  |  2 to 4 buses/hour |
| E/F |  |  |  |  ≤ 1 bus/hour |

Source: *FDOT 2013 QLOS Handbook*

Traffic Impact Mitigations

Improvements considered:

- Roadway improvements/widening required by Street Plan
- Changes to signal timing/phasing
- Additional turn lanes
- Turn/access restrictions
- Multimodal improvements
- Payment in lieu

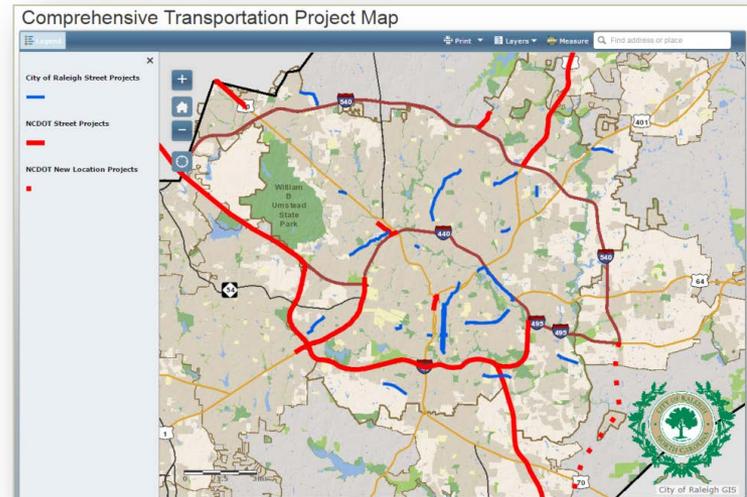


Exemptions

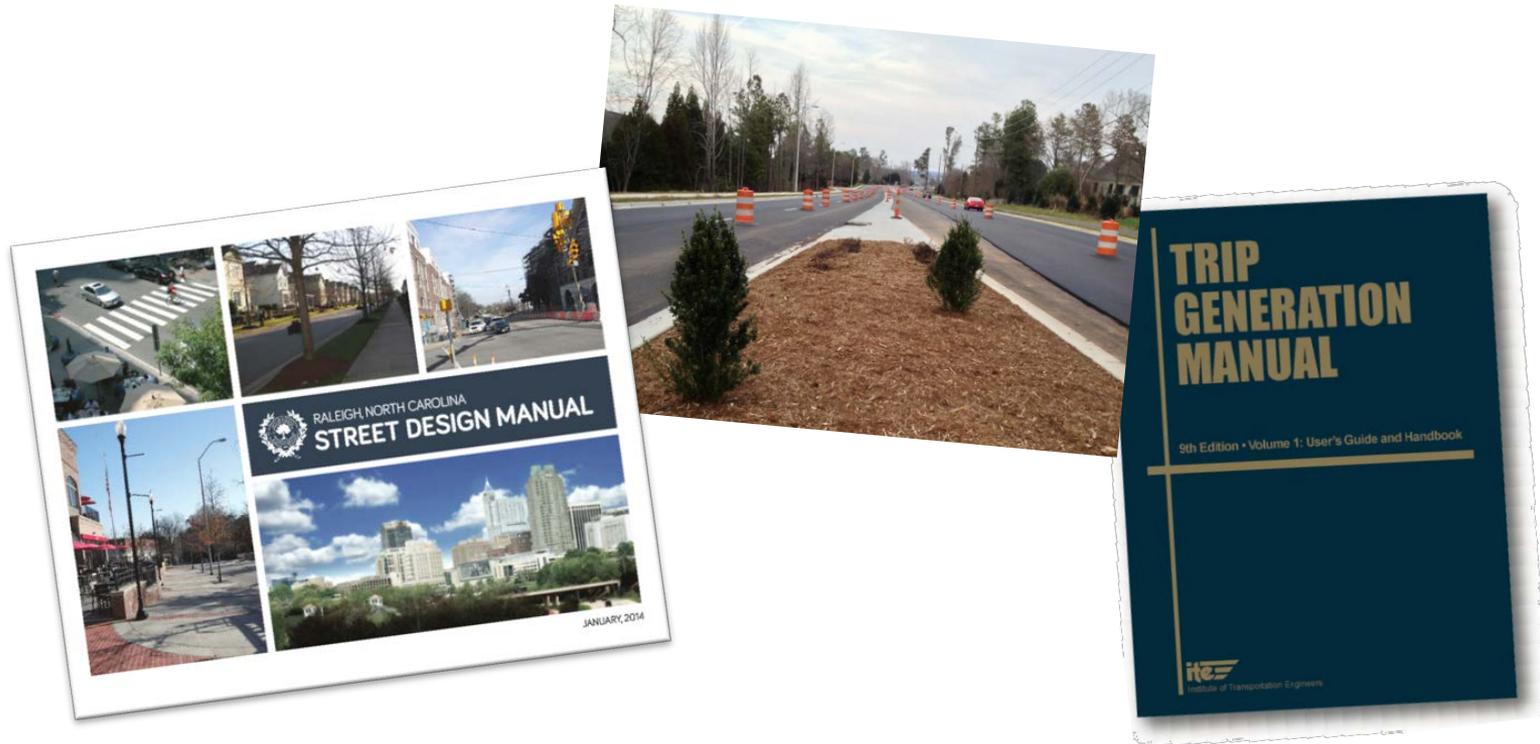
TIAs are exempted in
Downtown Mixed Use
(DX-) zoning

Traffic mitigation may exempted if:

- City project within 5-year CIP
- State project within first 4 years of NCDOT TIP
- Within ¼ mile of transit stop served by rail/BRT or 12-minute bus service in peak hour
- Trip budget zoning condition with prior 20 years



QUESTIONS / DISCUSSION



Todd B. Delk, PE – Office of Transportation Planning

todd.delk@raleighnc.gov | 919-996-2661



Memorandum

To: Ruffin Hall, City Manager

From: Larry M. Jarvis, AICP
Director, Housing and Neighborhoods Department

Subject: City Council Work Session Agenda Item – May 17, 2016
Council Consideration of East College Park Development Alternatives

Date: May 11, 2016

What is requested:

For City Council to consider development options on City-owned sites in East College Park and provide staff with direction on the preparation of an agenda item to select the preferred option for the June 7 City Council meeting.

Background:

The City of Raleigh owns more than 140 properties in the East College Park neighborhood, primarily vacant lots where single family structures or small multi-unit structures once stood. Overwhelmingly, the structures provided rental housing and most of them were considered deteriorated or blighted when they were acquired.

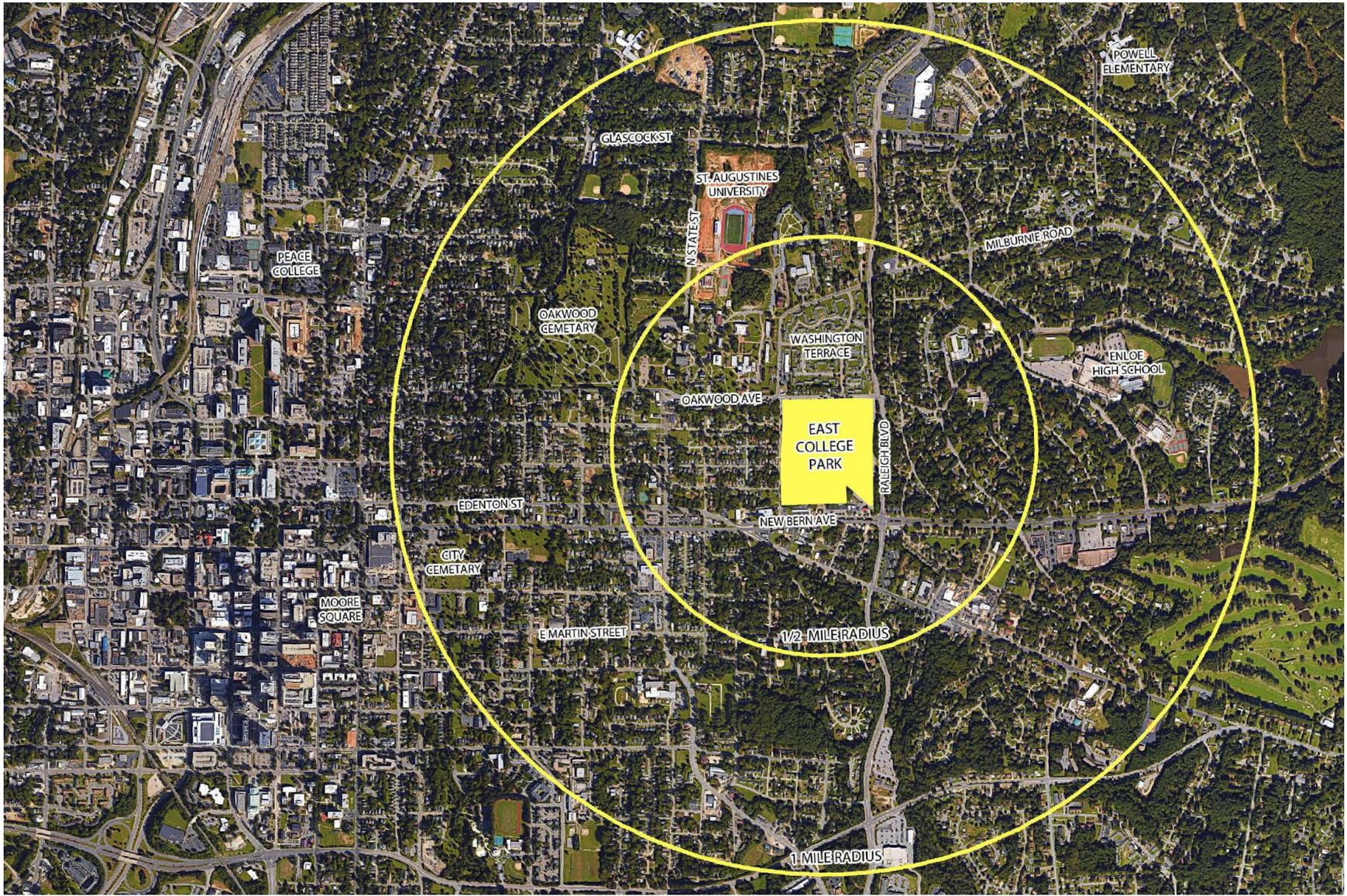
The creation of mixed-income housing opportunities for both homeowners and renters is a specific objective of the approved Neighborhood Revitalization Strategy Area (NRSA) Plan for the area, as is achieving diversity. Achieving those objectives requires a mix of housing product types and the broadest band of price points possible for affordable homeownership. In addition to providing some rental units which would reflect the historic tenure mix and possibly serve populations with special needs, including both townhomes and single-family detached homes would provide for a broader range of homeownership affordability.

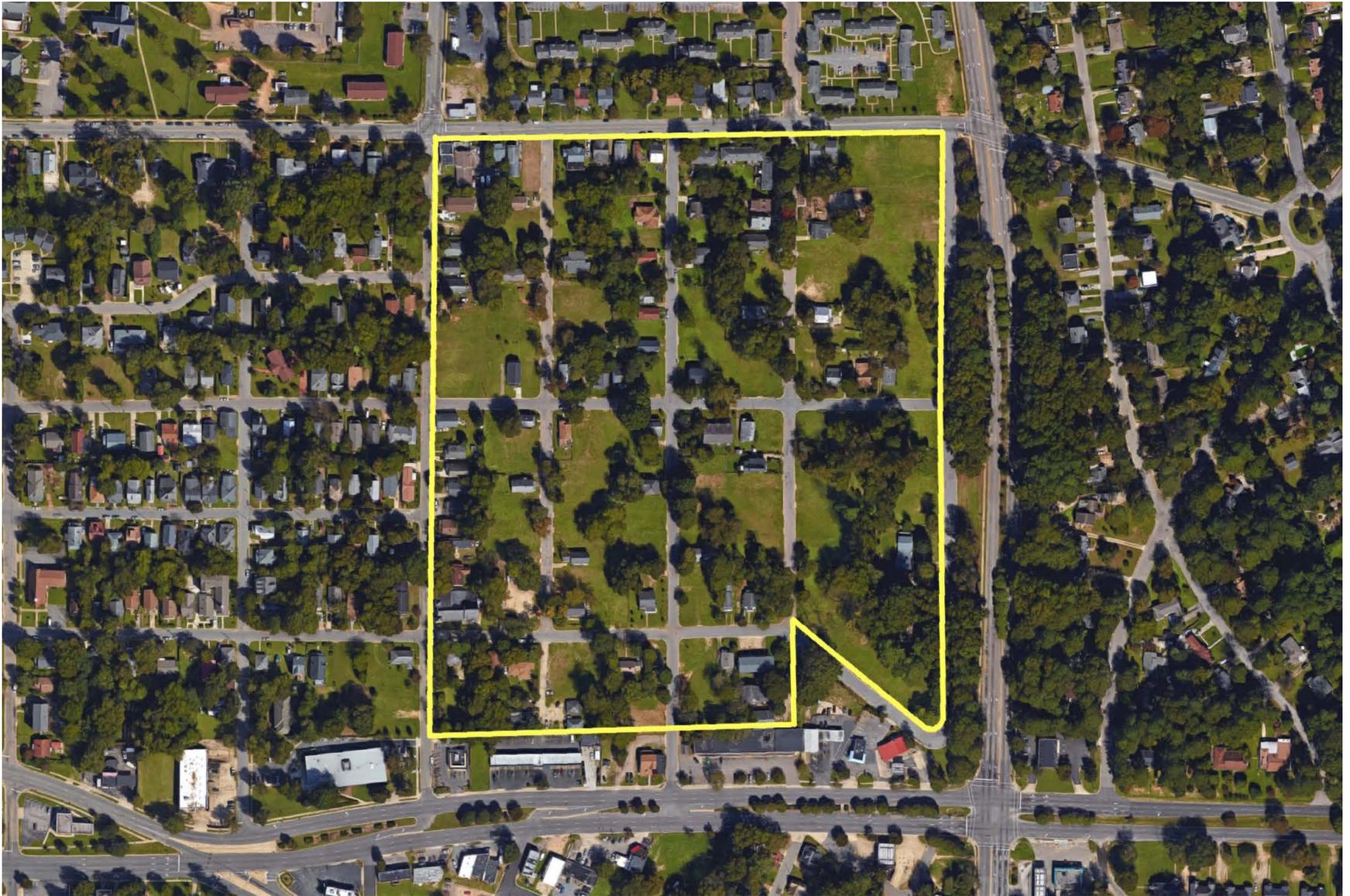
In February, Council approved the contract for the replacement of water, sewer and storm water lines in East College Park. The contract is funded in part with HUD Community Development Block Grant funds which carry with them expenditure deadlines. The contractor will focus first on the stormwater improvements before beginning the replacement of water and sewer lines. Because of the requirement to move the work forward to meet expenditure deadlines, the "default" design for water and sewer services (laterals) assumes that single family detached homes will go back on existing lots of record. The infrastructure contract however provides a window of opportunity to adjust services locations now to accommodate other residential unit types. Making a decision on unit types now would avoid having to cut into a newly paved street to provide services for townhouses in the future. It should also be noted that smaller rental properties typically have only one service per building.

At the work session, alternative development options will be presented including a "community consensus" option prepared as a result of a neighborhood walk thru with residents and staff. The options depict variations as to the number and locations of single-family detached units, townhomes and rental units.

ECP Development Patterns









LEGEND

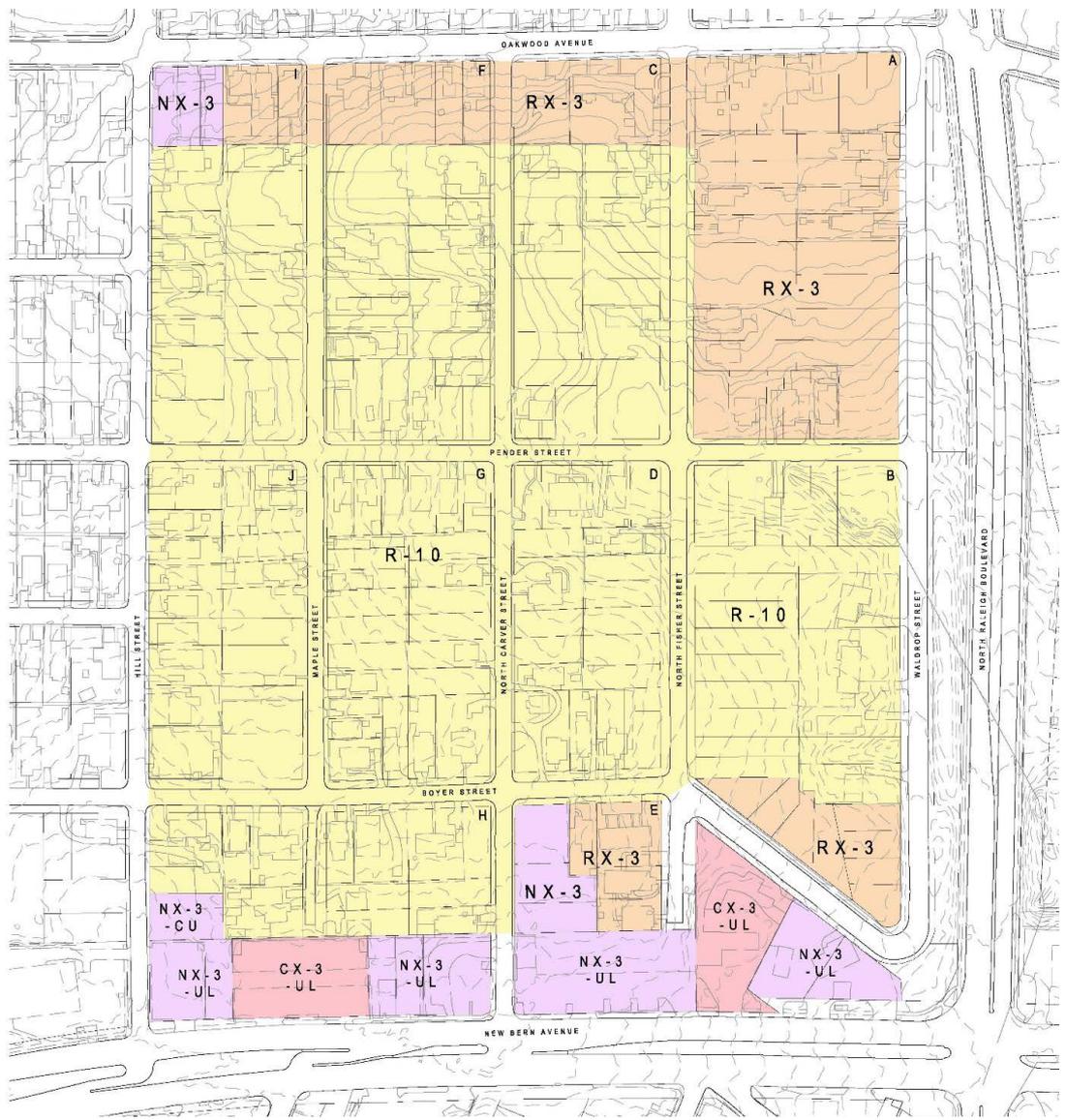
11 BLOCKS BOUNDED BY
NEW BERN - HILL - OAKWOOD - WALDRUP

 PRIVATELY OWNED LOTS

 138 CITY OWNED LOTS

 EAST COLLEGE PARK
STUDY AREA BOUNDARY





Meeting Chronology

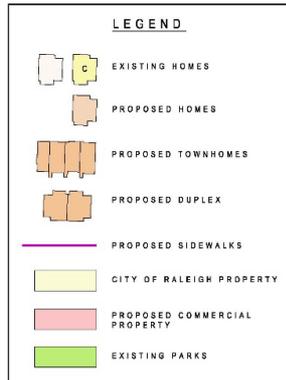
| <u>Date</u> | <u>Event</u> | <u>Location</u> |
|--------------------|---|------------------------|
| March 3, 2016 | ECP Mapping Open House | TRCC |
| March 8, 2016 | North Central CAC meeting | TRCC |
| April 14, 2016 | ECP Mapping/Housing Preferences Public Meeting | TRCC |
| April 20, 2016 | ECP Walking Tour | ECP area |
| April 27, 2016 | ECP Mapping Meeting | TRCC |

- 
- Alternative A – Single-family centric with medium yield
 - Alternative B – Medium with Commercial
 - Alternative C – High Yield
 - Alternative D – Neighborhood Walking Tour Consensus

**Alternative "A" - Single-Family
Centric w/ Medium Yield**

Apartments, Townhouses and Single-Family

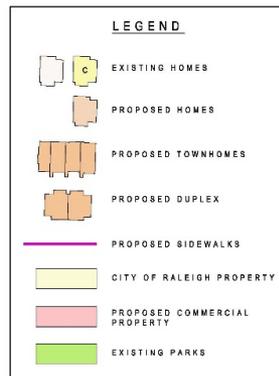
| | | |
|---------------|------------|----------------------|
| Apartments | 24 | 15% |
| Townhouses | 50 | 25% |
| Single-family | 104 | 60% |
| Total | 178 | Housing Units |



Alternative "B" - Medium Yield w/ Commercial

Apartments, Townhouses, and Single-Family w/
Commercial

| | | |
|---------------|------------|----------------------|
| Apartments | 24 | 15% |
| Townhouses | 56 | 30% |
| Single-family | 94 | 55% |
| Total | 168 | Housing Units |



Alternative "C" - High Yield

Apartments, Townhouses, and Single-Family

| | | |
|---------------|------------|----------------------|
| Apartments | 24 | 10% |
| Townhouses | 98 | 50% |
| Single-family | 75 | 40% |
| Total | 197 | Housing Units |

LEGEND

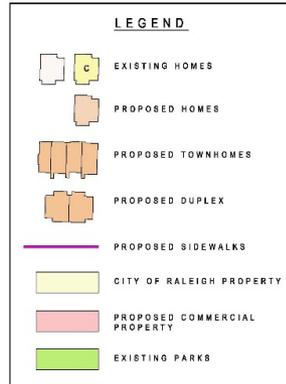
- EXISTING HOMES
- PROPOSED HOMES
- PROPOSED TOWNHOMES
- PROPOSED DUPLEX
- PROPOSED SIDEWALKS
- CITY OF RALEIGH PROPERTY
- PROPOSED COMMERCIAL PROPERTY
- EXISTING PARKS



Alternative "D" - Neighborhood Walking Tour Consensus

Duplex, Townhouses, and Single-Family w/
Commercial

| | | |
|---------------|------------|----------------------|
| Duplex | 8 | 5% |
| Townhouses | 34 | 25% |
| Single-family | 99 | 70% |
| Total | 141 | Housing Units |



Next Steps

- Receive direction from City Council on advancing the preferred Development Pattern Alternative to the June 7 City Council Meeting.