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ATTACHMENT 2

David Bonk

From: tjrieck@transystems.com
Sent: Friday, December 22, 2006 2:09 PM
To: David Bonk
Subject: Draft 3 of the Work Scope
Attachments: scope of work draft3.pdf

David

Here is the revised work scope based on our latest conversation.

As I mentioned, I will be on vacation for the next week and a half, returning January 4.

Have a great holiday and see you next year!

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SCOPE OF WORK

This work scope is intended to be a feasibility level of analysis for transit improvements in the combined Carrboro/Chapel Hill community. It is anticipated that any alternative that will eventually seek federal New Starts or Small Starts funding will require additional study (such as an alternatives analysis). The fundamental goal of this study is to lay the groundwork for such additional work.

This work scope is divided into five main phases as seen in the table below. The phases are: Existing and Future Conditions; Travel Demand Modeling; Alternatives; Land Use; and Documentation.

Study Phase	Associated Tasks
?—Existingand Future Conditions	Task 1: Identify Principal Transportation Corridors Task 2: Assess Current and Planned Transportation System Task 3: Develop Goals, Objectives and Evaluation Criteria
2-Travel Demand Modeling	Task 4: Update/Enhance/DevelopTravel Forecasting Model(s) Task 5: Project Future Travel Demand and Transportation Corridor Capacity
3--Alternatives	Task 6: Identification and Preliminary Evaluation of Transit Technologies Task 7: Assessment and Refinement of High Level Transit Alternatives **Task 8: Combined with Task 7**
4-Land Use	Task 9: Future Land Development
5-Documentation	Task 10: Assessment of Transportation Refinements and Finalize Plan Task 11: Implementation Plan Task 12: Financial Plan Task 13: Monitoring Plan

Existing and Future Conditions encompasses Tasks 1, 2, and 3. These tasks establish the parameters for the development of the long range plan and set the stage for the rest of the planning work.

Travel Demand Modeling encompasses Tasks 4 and 5. They basically relate to rationalizing the Triangle Regional Model as an appropriate means to evaluate future conditions for the Chapel Hill-Carrboro area.

Alternatives involve Tasks 6 and 7 (Task 8 is combined with Task 7) winnow the choices of transit service technologies to manageable and sensible options for each principal travel corridor.

Land Use with Task 9 attempts to create a linkage between the transit plan and land development policies.

Documentation which includes Task 10 to 13 develops the preferred transit strategies for the principal corridors by refining the technologies and developing implementation, financial and monitoring plans.

During the project, the TranSystems Team understands the desire of the Plan stakeholders to keep financial options open including the pursuit of federal New Starts/Small Starts funding. As such, the

planning process described in the scope below contains elements necessary to successfully compete for those funding pools.

Work Task 0: Project Development

Ted Rieck, AICP, will serve as project manager and will be the day-to-day contact. His goal is to make the project progress smoothly. His experience in many transit operations and planning projects will prove invaluable in developing a long range transit plan for the Chapel Hill-Carrboro area.

Through the Transit Study Committee (TSC) and a separate Technical Committee (TC), TranSystems will pursue a team-orientated approach with the Towns of Chapel Hill and Carrboro as well as the University of North Carolina. TranSystems believes a successful project outcome will depend on a close and collegial atmosphere among the study participants. It is anticipated that meetings with the TSC and TC will occur sequentially in a time period not requiring more than one night overstay by the consultant team. It is also anticipated that in support of these meetings that the Town of Chapel Hill will arrange for meeting space as well as any needed audiolvisual equipment and materials.

A project kick-off meeting will be the key to successfully completing this task. At this meeting the key project team members will meet to clarify project goals and establish communication protocols. We will also review the study area, assumptions, approach and division of responsibilities, and refine, as needed, the consultant scope of work and schedule as required to meet study objectives. The project schedule will be confirmed with interim meetings tentatively scheduled.

Finally, this task also provides for briefing presentations by the project manager at the end of this study to the appropriate governing bodies of the Towns of Carrboro and Chapel Hill as well as the University of North Carolina. It is anticipated that these presentations can be made in one business trip consuming no more than two overnight stays.

Existing and Future Conditions Phase

Work Task 1: Identify Principal Transportation corridors, Study Area and Travel Patterns

The purpose of this task is to identify principal transportation corridors. A corridor is broadly defined as a travel catchment area of a main arterial roadway and includes ancillary roadways, non-motorized travel paths as well as railroad rights-of-way. Up to six main corridors will be identified within the study area that consists of area within the corporate limits of the Towns of Chapel Hill and Carrboro as one geographic unit. This is proposed to be accomplished by a "telescopic" review of completed local and regional comprehensive plans, master plans, area plans, long range transportation plans, transit plans, circulation plans, mobility plans and other reports or studies associated with transportation. These existing documents and data (to be supplied through the Towns, the University and the Transit Study Committee in electronic format as appropriate) provide information on existing and projected travel characteristics. It is possible that the identification of the corridors will come about in a qualitative manner from initial meetings with the TSC and TC. To the extent this occurs, this Task may be modified to focus on such identified corridors. This will enable the TranSystems Team to gain appropriate background information with which to conduct the rest of the study.

The telescopic perspective begins with a macroscopic review of travel patterns that will in turn assist in defining a study area most likely at the Traffic Analysis Zone (TAZ) level associated with the LRTP's travel demand model for both existing and projected conditions. Within the study area, principal transportation

corridors will be identified based upon the extent of person trips today and in the future. These transportation corridors may best be described as "getting from point A to point B" and not necessarily by a specific route. This is because different means of transportation, be it transit, personal vehicle or other means (bicycle or foot), may be used. In order to account for potential mode shift opportunities, the study area boundaries are proposed to include a primary node or core defined by a physical area and a secondary ring around that node representing a potential capture area for various modes of travel. Some expected nodes include Downtown Chapel Hill, Downtown Carrboro, University of North Carolina, and Carolina North.

1.1 Review Available Documents

These documents include those listed on page *2* of the "Request for Qualifications." It is anticipated that several of these documents will be critical to this task. Those include the Durham-Chapel Hill-Carrboro LRTP for information on TAZs and travel patterns, the 2003 Chapel Hill-Carrboro Mobility Repolt Card (or the 2005 Repolt Card if available) , which we expect will contain a wealth of information on various travel characteristics for all modes, and the Triangle Transit Authority Regional Transit Plan that looks ahead to future regional service needs.

1.2 Define Existing and Projected Travel Patterns

Using the above information, the Triangle Regional Model (TRM) and other readily available data sources such as U.S. Census data, basic trip exchanges will be identified between TAZs or their aggregates. The focus will be on the exchange between external and internal trips with some focus upon internal to internal trips (where a shuttle system may be applicable) and little if any focus upon external to external trips. The travel patterns will be divided into categories and by mode. To the extent data is readily available, general consideration of travel originating outside the corporate limits of Chapel Hill and Carrboro will be made. For example, Alamance and Chatham Counties may be both current and future sources of travel on key corridors within Chapel Hill and Carrboro.

1.3 Establish Study Area(s)

The establishment of the study area is thought to encompass the TAZs in a grouping of travel exchanges, potentially by direction (such as to the northwest or southeast) that would result in the identification of a corridor. Depending upon the size the TAZs and the concentration and type of trip exchanges, a series of TAZs may be grouped together. Also, in an effort to potentially capture a larger share of trips or a shift in travel mode, the TAZ may be refined to a "nodal" core with an outlying ring that could potentially include Park & Ride lots.

1.4 Identify Principal Transpoltation Corridors

The principal transportation corridors are an organic outgrowth from the travel patterns and establishment of the study area(s). The actual definition of a given corridor at the facility level will be accomplished in Work Task 2, because each of the modes may have a different set of facilities that accomplishes the same exchange of trips. Up to six corridors will be initially identified.

Task Documentation: The overall task will be documented in a technical memorandum. This memorandum will be combined with the Task 2 memorandum.

Work Task 2: Assess Current and Planned Transportation System within Principal Transportation Corridors

The purpose of this task is to assess the operations of and identify opportunities along the principal transportation corridors from the network identified in Work Task 1. A maximum of six corridors will be so evaluated. This will be accomplished for both the existing transportation system as well as the projected transportation system as defined in the LRTP. It is anticipated that summary material of this task will be presented to the TSC under Work Task 3. Input on the goals, objectives and evaluation criteria may have an iterative refinement upon the selection and assessment of the transportation system. Consequently Work Task 2 will not fully be complete until after receiving input from Work Task 3.

2.1 Assess Existing Transportation System

The transportation system consists of three major elements: transit operations, highway operations (vehicles); and non-motorized travel. Each of these elements will be assessed based upon the standard methodologies applicable to that mode of transportation. In the case of non-motorized transportation, the existing assessment may focus on the available facilities and conditions, yet the projected assessment will turn its attention to the opportunity to attract trips to this mode, potentially in combination with transit. The summary is likely to be similar to a mobility report card. It is assumed that GIS files associated with the transportation system of Towns of Carrboro and Chapel Hill.

Transit Operations

The transit operational analysis will review the existing transit services available along the identified principal corridors but also within the established study area. Each of the transit routes will be assessed based upon the level of service provided and financial operations (assuming a theoretical independent operation of each route). The efficiency of the existing service in terms of rider carrying capacity will also be reviewed to determine how close to maximum capacity the system is actually operating. It is anticipated that Chapel Hill Transit (CHT) will provide relevant data (such as passenger loading information) in electronic format including GIS files of the route system.

Hiahwav Operations

The highway operations analysis will give consideration to the segment and intersection peak periods of travel along specific streets and highways of the identified principal corridors. The level of service (LOS) for highways will meet the definition of volume to capacity (vlc ratio) and will be expressed in standard highway terms. However for a comparative analysis with other modes, specifically transit, a conversion of the operational analysis will be made to travel time. It is anticipated that much of the travel time along a particular corridor can be estimated using information from the 2003 (or 2005) Chapel Hill-Carrboro Mobility Report Card, The benefit of using travel time is the ease of comparing the transit and highway operations and to determine where transit has the best opportunity to effectively compete for person trips.

Non-motorized Operations

The non-motorized assessment will review the availability of existing facilities for pedestrian and bicycle travel. Since bicyclists are legally allowed to travel on all streets (except interstates and other designated facilities) a quick rule-of-thumb assessment could be made for the above identified highway routes using the Bicycle Compatibility Index (BCI). It is noted that in the Planning for Chapel Hill's Future: The Comprehensive Plan, the BCI is identified as an action item and measure for progress. The index allows an assessment of a bicyclist's stress level based upon the number of travel lanes, lane width and/or presence of bike lanes, traffic volumes and percentage of trucks. Because other less stressful routes may be parallel and available to bicyclists, a cursory review of such potential routes will be undertaken based

upon available information on the roadway's classification, typical section and vehicular use (vehicles per day).

2.2 Assess Projected(2030 LRTP) Transportation System

The projected transportation system will rely heavily upon the most recent Triangle Regional Model (TRM) used for the projected year 2030. This travel demand model includes the projected transportation network assumed to be in place by 2030. As part of the documentation of this task, a technical memorandum will be prepared summarizing the projected transportation systems operating characteristics. A summary will compare differences with the existing systems and assist in identifying potential corridors where other modes could effectively compete and help improve mobility, air quality and health. If 2035 projections are desired at this point, this sub-task will need to be paused until the completion of Work Task 5.

Transit Operations

The transit operational analysis will review the existing transit service level currently provided along and around the identified principal corridors under the projected demand as defined by 2030 LRTP. In many ways this is likely to be an assessment of no-build conditions for transit, without any specific improvements in service or coverage.

Highway Operations

The highway operations will continue its review of segment and intersection peak periods of travel along the specific streets and highways of the identified principal corridors using standard highway measures. Again, for comparative analysis with transit, a summary of the operational analysis will be converted to travel time.

Non-motorized Operations (Opportunities)

The non-motorized assessment could continue its review of identified corridors using the Bicycle Compatibility Index (BCI). The DCHC LTRP includes specific information on 38 projects in the Chapel Hill/Carrboro area primarily for bike lanes that total more than $10.2 million. An MPO policy has also resulted in all road projects in the LRTP are expected to provide appropriate accommodations for pedestrians and bicyclists. Consequently it is hoped that with the implementation of such "bicycle friendly" measures that bicycle usage would increase. On the other hand, the transportation network may need to be reviewed with the intent of identifying opportunities for mode shifts along the identified transit and vehicular corridors. While on-road facilities may offer options to commuters as bicyclists, multi-use paths or trails can also afford the opportunity to make long-distance connections and therefore accommodate major trip exchanges.

Task Documentation: The overall task will be documented in a technical memorandum.

Work Task 3: Develop Goals, Objectives and Evaluation Criteria

The goal of this Task will be to establish goals and objectives for the evaluation of transit alternatives for the corridors identified in Tasks 1 and *2* above. To this end, this task will have two major components. The first outlines the process for achieving consensus on goals and objectives. The second addresses in more technical terms the process for developing transit technology evaluation criteria which will be based on the goals and objectives.

3.1 Goals and Objectives

While a fundamental goal for the Long Range Transit Study is to use transit mode share objectives as measured in "person trips" for key corridors, it is vital that the development and selection of viable transit alternatives consider other important factors as well. Many transit technologies may be able to accomplish a given diversion of people from private vehicles, thus achieve a given transit mode share. However, only some of those modes may be practical for Carrboro and Chapel Hill. The purpose of this sub-task, then, is to review other factors that may be important to the community in discerning which transit alternative best meets the desired objective of reducing future traffic congestion by diverting person trips to transit.

The process will involve the TSC with these basic steps:

1. Review the data and analysis from Tasks 1 and *2.* Discuss the primary corridors as well as preliminary capacity issues based on projections.
2. Present a menu of alternative evaluation factors such as (but not limited to):
    a. Transit mode share (or person trip reduction targets)
    b. Capital and operating costs
    c. Right-of-way needs
    d. Travel time savings
    e. Congestion levels
    f. Implementation lead time
    g. Need for supporting policies
3. With discussion from the Committee, select and prioritize the factors presented in step *2.*
4. The factors will be formulated into goals and objectives and fed back to the committee for concurrence.
5. Finalized goals and objectives will be documented as part of the overall documentation of this task.

3.2 Evaluation Criteria and Process

Using the goals and objectives developed above, the TranSystems Team will prepare an evaluation procedure and measures for analyzing the principal travel corridors to determine their warranted level of transit investment. Congestion, current and projected, is expected to be a primary criterion. However, other factors such as comparative travel times, land use development and community preservation objectives may weigh heavily as well.

The consultant team will develop a set of evaluation measures for use in the analysis of costs, benefits and impacts of transit strategies and specific methodologies designed to estimate these measures. The measures will be summarized and discussed with the TSC. Once there is concurrence on these measures, the consultant team will specify the methods to be used to apply them to the targeted corridors.

Sample Screening Criteria

5	The alternative is considered "best" in addressing the criterion or consideration, or the alternative has a substantial benefit.
4	The alternative addresses the criterion or consideration, but not to the fullest extent. The alternative has a significant benefit.
3	The alternative only moderately addresses the criterion or consideration. The alternative has some benefit, or is neutral in terms of impact.
2	The alternative does not address the criterion or consideration. The impacts of alternative are somewhat negative.
1	The alternative fails to address the criterion or consideration. The impacts of alternative are significantly negative.

Task Documentation: The overall task will be first documented in a draft technical memorandum. This memorandum will be finalized following a discussion with the Transit Study Committee.

Travel Demand Modeling Phase

Work Task 4: Update/Enhance/Develop Travel Forecasting Model(s)

In Task 4, the TranSystems Team, overseen by Larry Englisher with much of the lead working coming from Cambridge Systematics, will establish the model platform for the analysis and enhance that platform for the needs of the Long Range Transit Plan.

Transportation modeling will be used to forecast peak period and daily travel demands by mode and to help evaluate the impact of various transportation improvements and land use changes. The existing TransCAD-based Triangle Regional Model (TRM) has been developed with the capability of undertaking transit analyses. Transit data for Capital Area Transit (CAT), NC State University Wolfline, Triangle Transit Authority (TTA), Durham Area Transit Authority (DATA), Duke University Transit, and Chapel Hill Transit (CHT) are coded in the current version. We understand that in 2005, the model was updated to reflect a 2002 base year and migrated to the TransCAD 4.8 platform, and steps were made in preparation to develop a 2005 base year version of the model. In 2006, the Institute for Transportation Research and Education at North Carolina State University (ITRE) has been working to integrate enhancements developed for the TTA New Starts analyses into the TRM.

We anticipate that the TRM will be adequate to perform much of the necessary transportation system analysis work for the Transit Plan. This option would be desirable because it represents a regionwide standardized approach to transportation analysis. However, we do anticipate that some post-processing GIs-based procedures will be required to estimate some policies, programs and infrastructure investments whose impacts may not be able to be captured fully by the TRM. Such improvements might include bicycle and pedestrian investments, transportation demand management (TDM) programs and transit-oriented development (TOD) enhancements. In addition, it may be desirable to define and set up a windowed subarea analysis framework to enable network analysis with greater detail in the study area vicinity. The TranSystems Team is expert in developing such adaptations.

The transportation model used for the project will include the ability to represent existing travel behavior, including public transit, Park & Ride, bicycling and pedestrian activity. Most major metropolitan area regional forecasting models include transit and Park & Ride capability. Non-motorized modes are rarely fully represented in models. For an area like Chapel Hill, where pedestrian and bicycle activity can

represent a significant share of movements, it is important to be able to estimate, and understand, pedestrian and bicycle traveler demand responses to transportation system changes, particularly non-motorized facility or environment enhancements. The TranSystems Team has a great deal of expertise in this area, including contributing to the research for a forthcoming Transit Cooperative Research Program (TCRP) report on traveler response to pedestrian and bicycle system changes. Further, the TranSystems Team compiled the seminal work on bicycle and pedestrian demand estimation, which compiled all available methods for forecasting non-motorized travel for the Federal Highway Administration.'

The basic steps in model review will be to:

a). review the adequacy of detail in the inputs, including the zone system and zonal data (e.g., household, employment, transit access, and parking information), networks for highway and transit modes, and bicycle and pedestrian facility coverage;

b), determine the availability of supplemental data such as new home interview survey information for use in the effort;

c), review the model's structure for and ability to respond to changes in key policy variables;

d). review model design and/or output for general sensitivity to changes in inputs;

e). identify gaps, such as any in geographic detail or extent, demand or supply characteristics, or model capabilities, as related to the desired use of the model for this project, such as for calculating target transit mode shares as described in the Long Range Transit Plan Discussion Paper; and,

9. check study area model validation with available modal share and ridership data. On this latter effort, we can compare the available information to the model outputs, describe how these results could affect the forecasting effort, and suggest ways of improving or adapting to the model's performance.

Once the review is undertaken, recommendations will be made for any enhancements or alterations for use with this project. Gaps would likely be addressed through the adjustment of inputs or the use of special post-processing tools. For example, for enhanced bicycle and pedestrian analysis, it may be possible to develop benefits estimates using a GIS analysis or other sketch-planning methods. Such recommended method(s) would be described as a product of the review.

The TranSystems Team will review the transportation improvements or changes incorporated in the 2030 TRM with the Towns, University, DCHC MPO, Orange County, North Carolina Department of Transportation (NCDOT), and Triangle Transit Authority (TTA). The TranSystems Team will develop a network of existing projects and one of committed and currently-planned projects to reflect only those improvements that are likely to be in place by 2030. The list of future year projects will be compiled for review and approval of the project manager or the technical review team. Similarly, socioeconomic and other zonal input data would be assembled and offered for review by the project stakeholders. The future year network will serve as a key scenario against which other scenarios can be compared.

[1] Guidebook on Methods to Estimate Non-Motorized Travel, U.S. Federal Highway Administration, Office of Safety R&D, prepared by Cambridge Systematics, Inc., 1999.

Work Task 5: Project Future Travel Demand and Transportation Corridor Capacity

The Project Team will develop future year travel demand analysis to assist stakeholders and other decision-makers understand the size of potential travel markets. The no-build analysis will be performed on a future year network that reflects anticipated transportation improvements in the horizon year. The scope of anticipated transportation improvements is understood to include the adopted elements of the 2030 DCHC Long Range Transportation Plan and other improvements as delineated by the Transit Study Committee. Year 2035 socio-economic projections will be used to estimate future travel demand by mode of travel.

Our process in working through this task will be to:

a). develop and assemble future horizon year information, including zonal and network data, including making necessary adjustments to ensure a single horizon year (i.e., 2030 versus 2035);

b). apply the forecasting tools to project future travel demand patterns;

c). perform calculations to develop corridor capacity and performance measures;

d). prepare summary information to highlight issues and use for Transit Plan development. GIS will be used to assist in the preparation of this summary information.

There is a stated interest in calculating person-trip capacity rather than simply vehicle-trip capacity. The TranSystems Team will convert vehicle-trip capacity into person trip capacity by using average vehicle occupancy statistics either available locally or from analogous areas. We will attempt to quantify non-motorized travel capacity as well using simplified techniques.

Alternatives Phase

The work of this phase assumes that a maximum of six corridors have been selected through the process described above. The goal of this phase is to determine one leading build alternative for each of the six corridors. The basic process starts with six alternatives per corridor, reduced to two, and then one preferred alternative.

Work Task 6: Identification and Preliminary Evaluation of Transit Technologies

The goal of this task is to initially evaluate a series of transit alternatives that could potentially meet the stated RFQ objectives of reducing single occupant automobiles while coexisting with anticipated land uses, the community character, and natural environment. While a broad range of alternatives is typically desirable at this stage, we believe in proposing realistic alternatives that have a reasonable chance for implementation. In an effort to minimize the time and cost in evaluating alternatives, the following six basic alternatives will be evaluated and reduced to no more than two primary transit alternatives per corridor. Further, any alternative is assumed to operate wholly within the corporate limits of Chapel Hill and Carrboro. An alternative that requires extension beyond these corporate limits will be handled in a summary fashion for that portion outside of the boundaries. The initial alternatives (which implicitly will consider technical variations of each to be roughly equivalent to each other) to be considered are:

1. Light rail
2. Express Bus
3. Bus Rapid Transit (BRT) in dedicated right-of-way
4. BRT on street with mixed traffic
5. Streetcar
6. Local Bus

These alternatives will be evaluated for the corridors identified in the previous study phase. The evaluation will be based on common characteristics associated with the mode and the degree to which the corridors have such characteristics. Comparison of the ridership potential of these alternatives will be based on the application of sketch planning and/or elasticity based techniques. No application of the TRM will be used in this level of analysis. The characteristics to be used include the following:

- Typical transit markets served
- Population/housing densities
- Typical passenger travel distances
- Typical stop spacing
- Productivity in terms of riders per hour
- Typical hourly passenger capacity
- Operating and Capital Cost

In conjunction with these initial alternatives, the TranSystems Team will also develop basic service design and deployment guidelines for the various service types that are developed above. The service standards are intended to illustrate the transit service types to the public and project stakeholders. The standards will also provide direction to transit planners in subsequent tasks that involve greater detail. For example, transit modes with higher capital costs (such as LRT) are expected to have higher service levels to rationalize the capital investment. Other less capital intensive transit service can efficiently operate at lower service levels, consistent with lower population and development densities.

Specifically, the purpose of these design standards is to:

- Create an objective basis for designing transit service,
- Achieve a degree of consistency in the deployment of service across the metropolitan area, and
- Reflect policy and financial considerations in transit service design in a structured manner.

The service standards will be based on transit service design principles taken from industry practice and experience in other metropolitan areas,

Task Documentation: The overall task will be documented in a technical memorandum.

Combined Work Task 7 and 8: Assessment and Refinement of High Level Transit Alternatives

The goal of this work task will be to further reduce the list of alternative transit technologies created in Work Task 6 (two per corridor) to one viable build alternative per corridor. As appropriate, a preliminary assessment of New Starts/Small Starts funding eligibility will be made.

Utilizing the evaluation methodology developed and described in Work Task 3 above, the two build alternatives per corridor identified in Work Task 6 will be further screened with a more detailed and rigorous set of criteria and measures based on qualitative and quantitative measures (population served, goalslobjectives, travel demand, land use impacts, operational issues, and a high level, fatal flaw environmental scan). A Secondary Stage evaluation matrix identifying each alternative's relative standing and compliance with goals and objectives will be prepared.

Application of the travel demand model from Work Tasks 4 and 5 will be part of the evaluation procedure in helping discern between the two remaining alternatives. Up to six corridors, with up to two alternatives each will be evaluated using the demand model. Each corridor will have a model run with each of the two alternatives. Thus, up to twelve "runs" will be performed. If, during the course of the analysis, a different package of runs is desired, TranSystems will work with the TSC and TC to devise other run scenarios. For example, model runs of multiple corridors as a group may be desired. At the time of this decision, TranSystems will estimate the adjustment to the study price, if any.

Following the analysis and prioritization process developed previously, the TranSystems Team will use a workshop session with the Transit Study Committee to discuss and present refinements to the remaining transit strategies. This final screening will consider all of the information developed during previous tasks. At this point the strategies will be well developed in terms of costs, benefits, feasibility, funding requirements and environmental considerations.

It is TranSystems'experience that the project participants can achieve a high level of consensus at this stage of the project. The process is designed to generate consensus. However, the TranSystems Team is prepared to employ meeting facilitation techniques to assist the Committee to arrive at decisions on the recommended or preferred strategies should this be warranted.

Task Documentation: The overall task will be documented in a technical memorandum.

Land Use Phase

Work Task 9: Future Land Development

Crosby Schlessinger Smallridge (CSS) of the TranSystems Team will lead this very important task. The success of the Long Range Transit Plan will likely depend not only on well-conceived transit services, but also on supporting land use and other policies. The promotion of transit supportive development is the goal of this task.

CSS will follow this basic process in recommending a vibrant and proactive land use policy that truly supports transit services:

1. Review current land use regulations, development patterns and area land use plans.
2. Determine deficiencies between the land use plans and the land uses necessary to support transit.
3. Recommend changes to local land use regulations as well as develop standards and locations for transit orientated development.
4. Develop TOD design guidelines to be used by the University as it moves forward with its plans with Carolina North.

9.1 Review Current Land Use Regulations, Development Patterns, and Area Land Use Plans

CSS will talk with planning departments and review ordinances regarding the status of land use development in the Chapel Hill-Carrboro community. Allowable densities, set backs, street orientation, parking ratios, and restrictions relating to mixed used development are among the items that will be discerned in the regulations. Chapel Hill's Comprehensive Plan, equivalent documents from Carrboro, and the UNC Master Plan will also be reviewed to determine the future pattern of development. Factors that presently exist that support TODs will be noted.

9.2 Compare Future Land Use with TOD

The current and future land use trends will be compared with transit supportive factors to determine opportunities for change. CSS will create a matrix showing key trends and regulations and how they relate to TOD factors. This assessment will include how well the future plans support or don't support the goals and preliminary recommendations of the transit plan.

9.3 Recommend Changes to Local Land Use Plans and Regulations

Based on the comparison of future land use patterns with TOD requirements, CSS will recommend various regulatory changes as well as considerations for amending the land use regulations and other policies. As appropriate, model and/or sample land use ordinances will be developed and presented to the communities for consideration.

9.4 Develop Transit Orientated Design Guidelines for Carolina North

Using the above work, CSS will develop general design guideline for the Carolina North development in order to make it a "transit orientated development."

Task Documentation: A technical memorandum documenting the work of this task will be prepared.

Documentation Phase

Work Task 10: Assessment of Transportation Refinements and Finalize Plan

This task will mainly involve the documentation of the Long Range Transit Plan but will also include development of conceptual design and operating plans for the alternatives that operate wholly within the corporate limits of the combined Chapel Hill/Carrboro community. These efforts will reflect any adjustments to the preliminary recommendations reached during the Alternatives and Land Use Phases. It is expected that one leading "build" alternative will be identified for each of the six corridors developed earlier.

This task will provide for a 2-percent conceptual design for the leading alternative for the targeted, primary corridors. Not all corridors may require a design effort. The conceptual design task involves the delineation of an alignment in the corridor, probable stationlaccess locations, typical cross sections, characteristics of up to three basic design levels for access locations, and associated design guidelines and standards. The concept design will also identify major constraints associated with developing the given corridor for transit. Constraints can include right-of-way availability.

In addition to the concept design, the work of this task will include the development of an operating plan for the recommended alternative advanced from the Alternatives and Land Use Phases above. The operating plan will be a high level look at how the leading alternative will actually operate on the street. The plan will generally consist of maps as well as tabular information regarding service frequencies, service spans, and hours and miles of operation. Operating assumptions will be based on analogous situations as field testing

may not be entirely practical. This look will be intended to give confidence to the CHT and other stakeholders that the alternative potentially can work in the corridor. The TranSystems Team has hands-on experience in developing and managing real world operating plans for transit clients across the country.

A key part of this documentation will be an assessment of the recommended alternative(s) under New Starts or Small Starts criteria. Karla Karash, Ph.D. of TranSystems will lead this evaluation. As Small Starts criteria are in development, there will be discussion on how this assessment will be performed under the New Starts program. However, if Small Starts criteria become available in time for this portion of the study, then the evaluation will be based on those criteria. As appropriate, a modified approach will be discussed with the Transit Study Committee. Evaluation based on Small Starts criteria presumes that the data collected previously is applicable and also presumes the new criteria are similar in concept to the New Starts criteria. If the Small Starts criteria are vastly different than expected and materially impact the study's budget, then the TranSystems Team will discuss such impacts with the study committee.

The New Starts Criteria, which are used for federal funding decision-making, emphasize transportation and related mobility benefits. The cost-effectiveness of a proposed project is based on an assessment of user benefits such as travel time savings for transit and automobile users and improved accessibility to jobs for low income households who typically depend on transit, attraction of new transit ridership, and the annualized costs of providing the service. The local interests have had a wide variety of other goals for the project including attracting new businesses and residential development to boost the tax base or supply job opportunities. These types of evaluation measures are more likely to be evaluated qualitatively or through proxy measures.

The TranSystems Team will evaluate the options in terms of the FTA New Starts Criteria. The FTA defines seven criteria:

Mobility Improvements
- Environmental Benefits
- Operating Efficiencies
  Cost Effectiveness
- Transit Oriented Development
  Local Financial Commitment
- Other Factors

The FTA uses these defined criteria to standardize the comparison of projects nationwide for funding eligibility. Most of these new criteria are already universally in use, so formalizing their application does not radically depart from past practice. TranSystems will calculate the measures to the extent that data has been fully developed.

Task Documentation: The overall task will be documented in a draft and final report.

Work *Task* 11: *Implementation Plan*

This work task will involve the development of a multi-year, multi-phase plan for implemented the recommended service in the targeted corridor. This plan will be developed in tandem with the financial plan (Work Task 12 below). As the TranSystems Team consists of former transit system operators, we can develop an implementation plan that both meets the transportation needs of the community, we can also develop a plan that is operationally feasible.

The plan will consist of a prioritization of services to implemented, major milestones for the acquisition of equipment and personnel, and pre-implementation work. Further, strategic decisions regarding land and right-of-way acquisition as well as work with the overall Triangle region will be factors in the implementation plan.

Task Documentation: This overall task will be documented in a draft and final report.

Work Task 12: Financial Plan

TranSystems will prepare operating, maintenance, life-cycle, and capital cost estimates for the leading alternative carried from Combined Work Task 7/8 and refined in Work Task 10. The costs will be developed in both current and future dollars and include associated bus network modifications and will be based on industry standard costs as adjusted for conditions similar to the Triangle area. Operating and maintenance cost estimates for bus service will be based on CHT's current operating costs, as well the proposed changes in operations (and costs) associated with the service increases. Bus operating costs will be developed based on CHT's current cost structure, supplemented by discussions with staff to identify all relevant proposed changes in operations. TranSystems has prepared operating cost estimates for many transit systems and is familiar with a variety of financial structures. Operating costs for transit modes not currently operated in the metropolitan area (e.g., LRT) will be developed based on information from other comparable transit systems.

A clear understanding of the associated capital costs is critical for assessing the viability of each proposed alternative. These capital costs must be credible, realistic, and not understate the true costs of implementing an alternative. The consultant team will establish capital costs for remaining build alternatives. Such costs can serve as inputs for cost-effectiveness calculations in the evaluation process and subsequent financial implementation plan. The methodology for capital cost estimating involves using a PC-based spreadsheet program to enable detailed reviews and updates. Our cost estimates are also formatted to fit into the cost annualization calculations, by grouping the various capital cost categories according to their estimated useful lives to facilitate annualization calculations. The work program for this subtask will:

- Develop unit costs for all items of work.
- Aggregate basic unit costs to represent costs of typical sections (per unit length), station and special (atypical) sections.
- Develop costs for systemwide elements (e.g. vehicles, maintenance shops and power supply, if necessary).
- Develop factors for add-on costs (e.g. design, administration, contingencies).
- Perform a quantity takeoff of each conceptual construction element depicted in the plan and profile drawings.
- Incorporate costs for vehicle procurement as developed from the ridership forecasting work.
- Develop a base or "best" cost for each alternative.
- Develop a project implementation schedule for each alternative.
- Prepare a year-by-year capital cost expenditure based on the project implementation schedules for use in the financial analysis and to guide the operations and maintenance cost estimates.

Bus system capital costs will be based on the area's most recent experience, supplemented by the experience of the TranSystems Team, as appropriate.

The Team will develop conceptual cost estimates associated with procuring required rights of ways. For some modes and alternatives new rights of way may not even be required. For other alternatives, such as rail-based modes or Bus Rapid Transit operating on a new busway, new rights of way may be required, whether they operate within the confines of a public street or upon an existing active railway right of way. Using a public street versus using an active railroad line has different cost implications which must be considered including:

1) property acquisition or railway track access fees,
2) roadway widening or railway right of way widening,
3) maintenance of roadway traffic or train traffic (if an active rail line is used).

The TranSystems Team will use locally applicable real estate costs to determine required property acquisition. For railway track access fees or other railway related access issues, we will use comparable fees from railway-negotiated agreements.

For build alternatives requiring extension beyond the corporate limits of Chapel Hill and Carrboro, operating and capital costs will be grossly estimated with a broad range of assumptions.

Task Documentation: This overall task will be documented in a draft and final report.

Work Task 13: Monitoring Plan

This work task will prepare a procedure for the Long Range Transit Plan to be both monitored and up-dated. The monitoring procedure will be based on the implementation plan format and allow the Plan custodian to check progress.

Of key consideration in the development of a monitoring plan will be the ability to react to changes in assumptions. As the Long Range Transit Plan will be based on a view of projected conditions in the year 2035, economic, social, technological and political events will influence those future conditions. As the picture of the future unfolds, the Long range Transit Plan will need adjustment. The monitoring plan will identify critical events or milestones that may trigger a given action.

Task Documentation: This overall task will be documented in a draft and final report.

Schedule and Assumptions

The schedule for the study is shown at near the end of this work scope and anticipates a signed contract and or purchase order on or about January 15,2007. The study is expected to be completed by the middle of October, 2007 with a presentation to one or more governing bodies (per Task 0) by the end of October. The schedule has these assumptions:

- Triangle Regional Model for 2035 is available at times consistent with the schedule. Any material delay in the model that impacts other work tasks will result in a change in the overall schedule.
- Task 2 can proceed as scheduled with 2030 projections. If 2035 projections are desired, then the schedule will need to be revised accordingly.
- Meetings with the Transit Study Committee and Technical Committee take place as noted.
- Decisions, feedback, and requested data for the above tasks are provided in a timely and reasonable manner consistent with the schedule.

- TranSystems will be prepared to work with the Transit Study Committee in adjusting the above work scope to allow for the timely completion of the study per the attached schedule.

compensation and Assumptions

TranSystems anticipates that the study be paid on a "time and materials" basis. If additional work or tasks are requested (such as, but not limited to, additional model runs and/or a review of alternatives not listed above or in more reviewed in more detail than described above) additional expenses may be incurred and compensated. Further, if delays in the schedule push the completion date beyond December 31, 2007, additional compensation may be requested. All elements of the study budget, presented by Work Task, are understood to be flexible. That is, the actual expenditure of time and effort in a given work task may be higher or lower than the budget and any "savings" in one work task may be used in another work task(s).

Further, all of the above mentioned technical memorandum and interim reports (including drafts of the final report) will be produced and distributed electronically only. At the end of the project, with the approval of a draft final report, no more than twelve final reports will be produced in hardcopy and delivered to the Town of Chapel Hill. An electronic version of the final report will also be provided to the Town on a CD. Study final reports will be a compilation of the technical memorandum associated with each Work Task as noted above.

The project budget anticipates no more than six meetings in the Chapel Hill area with the Transit Study Committee (TSC) and a Technical Committee (TC). It is anticipated that meetings with the TSC and TC will occur sequentially in a time period not requiring more than one night overstay by the consultant team. The meetings are listed on the attached schedule and generally correspond with these tasks:

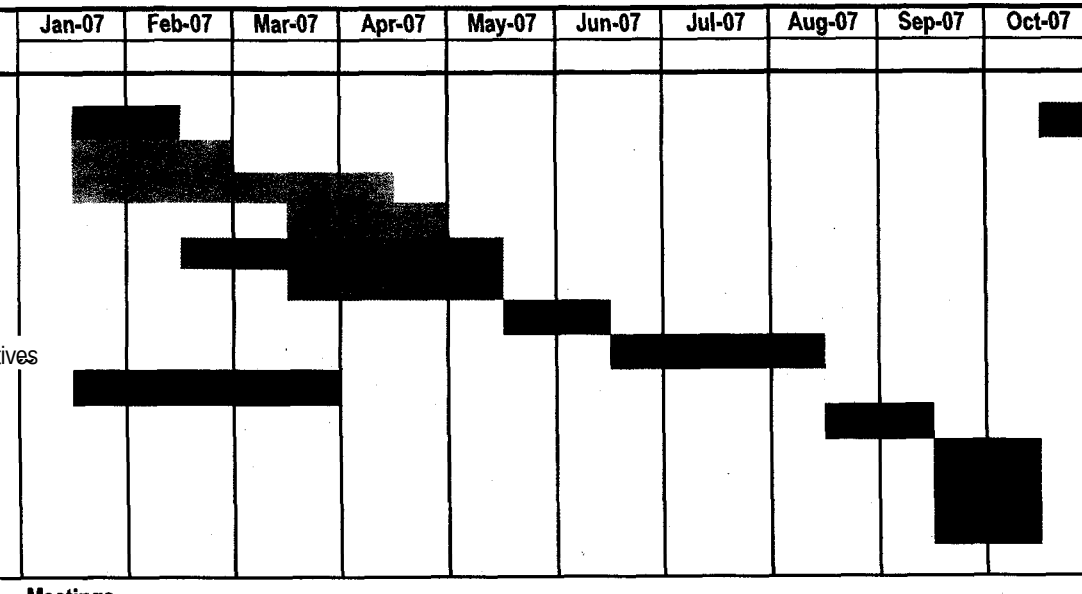
1. Task 019
2. Task319
3. Task6
4. Combined Task 7,8
5. Task10
6. Tasks 11,12, and 13

Meeting logistics including meeting space, audio/visual equipment and material (such as easels, flip charts), as well as notification of meeting invitees will be supplied by the Town of Chapel Hill. TranSystems will produce meeting hand outs and presentations as well as drafts of notifications for use by the Town as desired. It is assumed that meeting materials will be distributed electronically to committee members prior to meetings and that TranSystems will produce extra copies only for distribution at the meetings. TranSystems may ship meeting materials (such as display boards and hardcopy documents) to the Town of Chapel Hill in advance of meetings.

TranSystems will work with the Towns and the University to adjust the work scope to fit in any remaining budget should additional funding not be available.

Project Schedule

Work Task No.	Title
0	Project Development
1	Identify Principal Travel Corridors
2	Assess Current and Planned Transportation System
3	Goals, Objectives, Evaluation Criteria
4	Update/Enhance/Develop Travel Model
5	Project Future Travel Demand
6	Identify and Prelimin Evaluation of Alternatives
718	Assessment and Refinement of High Level Transit Alternatives
9	Future Land Development
10	Assessment of Transportation Refinements
11	Implementation Plan
12	Financial Plan
13	Monitoring Plan



Meetings

* *Transit Study* Committee and Technical Committee 6 meetings (Work Tasks *0/9,3/9,6,7/8,10,11M2/13)*
♦ *Final Governing Body Presentation*

TranSystems

Chapel Hill/Carrboro Long Range Transit Plan

Project Budget

Budget is understood to be flexible with TranSystems permitted to shift dollars among tasks, firms, including direct expenses.

Task	Task Name	Hours	Labor Cost/Firm TranSystems	Crosby SS	ETC	Planners Collab	Cambridge Systematics	HSH	Totals
0	Project Developen t	192	$ 25,680	$ -	$ -	$ -	$ 2,225	$ -	$ 27,906
1	Identify Principal nsp Coridors	280	$ 23,823	$ -	$ -	$ 3,924	$ -	$ -	$ 27,748
2	Assess Current ad Planned Transportatio System	228	$ 13,656	$ -	$ -	$ 6,801	$ -	$ -	$ 20,457
3	Develop Goals,bj cotives,andl Evaluati Criteria	164	$ 18,337	$ -	$ -	$ 591	$ -	$ -	$ 18,928
4	Update/Enhance/Develop Travel Forecasting Model(s)	472	$ 13,523	$ -	$ -	$ 7,526	$ 47,180	$ -	$ 68,229
5	Project Future Travel Demand and Transportation Corridor Capacity	358	$ 17,374	$ -	$ -	$ 3,118	$ 23,243	$ -	$ 43,735
6	Identify and Preliminary Evaluation of Transit Technologies	160	$ 21,034	$ -	$ -	$ -	$ -	$ -	$ 21,034
7	Assessment of High Level Transit Alternatives	408	$ 48,261	$ -	$ -	$ -	$ -	$ -	$ 48,261
	Combine in Work Task 7/8								
8	Refinement and Assessment of Initial Alternatives	771	$ 22,636	$ -	$ -	$ 591	$ 76,108	$ -	$ 99,335
9	Future Land Development	314	$ 3,962	$ 28,990	$ -	$ -	$ -	$ -	$ 32,952
10	Assessment of Transportation Refinements and Finalize Plan	372	$ 36,056	$ -	$ -	$ 1,774	$ -	$ -	$ 37,830
11	Implementation Plan	68	$ 6,712	$ -	$ -	$ 591	$ -	$ -	$ 7,303
12	Financial Plan	220	$ 25,502	$ -	$ -	$ -	$ -	$ -	$ 25,502
13	Monitoring Plan	50	$ 5,917	$ -	$ -	$ -	$ -	$ -	$ 5,917
Labor Totals		4,057	$ 282,472	$ 28,990	$ -	$ 24,918	$ 148,757	$ -	$ 485,136
Direct *(Out of Pocket Expenses)*									
	Office *(including 12 hardcopy final reports, draft reports to be delivered electronically)*		$ 3,100	$ 400	$ -	$ 20	$ 4,355	$ -	$ 7,875
	Travel		20,725	3,250	-	2,250	2,800	-	29,025
	Total Direct Expenses		$ 23,825	$ 3,650	$ -	$ 2,270	$ 7,155	$ -	$ 36,900
Total Fee			$ 306,297	$ 32,640	$ -	$ 27,188	$ 155,912	$ - $ -	$ 522,036
Firm Shares			58.7%	6.3%		5.2%	29.9%		100.0%

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