

## **The Hyannis Access Study** **Scope of Services**

The following sections address the specific tasks of the Scope of Services to be undertaken by the consultant, and are intended to serve as a guide in preparing the technical Feasibility Study. The Executive Office of Transportation (EOT) and the Office of Transportation Planning (Planning) are initiating a comprehensive study of the greater Hyannis area in the Town of Barnstable and surrounding areas and will examine and recommend ways to improve overall transportation mobility for residents, businesses, and visitors, while minimizing impacts to neighborhoods and communities. The goals of this study as defined by a recent MassHighway memo are:

- To understand the effects of current transportation projects on the existing transportation system.
- To identify solutions (transportation and land use) that may mitigate future traffic impacts.
- To develop a set of analysis tools (modeling) that allow testing of alternative transportation and land use scenarios to support intelligent decision making.

A full range of alternatives, including previously studied "Exit 6½" alternatives, will be analyzed and developed as the study progresses. This range also includes transportation demand management and other "non-highway" and transit options in addition to potential roadway improvements. A recommended plan of short-term and long-term improvements – based on the alternatives analysis and the collective input of many stakeholders – will be the end product of this study.

Due to significant commercial, industrial, and residential development in recent years, traffic congestion has increased steadily in and around Hyannis. In 1998, MassHighway completed a "Conceptual Design and Feasibility Study for a New Route 6 Interchange in the Town of Barnstable." This potential interchange became known as "Exit 6 ½," and was proposed to provide direct access to the industrial properties along Independence Drive, west of Mary Dunn Road. The 1998 study and its recommendations will serve as background information for this present study, the Hyannis Access Study.

Current roadway improvement projects in the area include the widening of Route 132 (Exit 6 of Route 6) and widening of Willow Street (Exit 7). There is also a new access road planned for the Barnstable Municipal Airport. These projects will improve traffic operations throughout the area, and need to be considered as part of an updated evaluation of potential improvements such as Exit 6 ½. The Hyannis Access Study will look beyond the immediate vicinity of Exit 6 ½ and undertake a broader, more comprehensive analysis and evaluation of all transportation issues in the area.

The purpose of this project will be to evaluate accessibility issues in the Hyannis and Mid-Cape area especially with regard to access to the Industrial Park at Independence Drive west of Mary Dunn Road, the Cape Cod Hospital, the Barnstable Municipal Airport, the Hyannis Central Business District, Barnstable Village, and the Hyannis Ferry area. This will be accomplished through designation of two primary focus study areas; the first being the area of Local Interest defined by Exits 6 & 7 and bounded by Route 132, Route 28 and Willow Street to the South and Route 6A to the North; and the second is an area of Regional Focus looking at the greater Mid-Cape Region taking into consideration expanded coverage. This project will review the

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alternatives of the 1998 study and will look at additional potential alternatives that will address current accessibility needs of the seasonal traffic period for the Cape. Modeling and traffic analysis will be developed and expanded from prior CCC models and studies to determine points of congestion and prolonged delay caused by roadway and intersection capacity constraints, improper signalization, and traffic diversions caused by motorists avoiding known points of congestion and delay. Transit will be evaluated for both bus and rail to determine whether Mid-Cape congestion and accessibility could be improved by expanded transit service and access. The resultant origin and destination modeling coupled with traffic and transit analysis will provide a basis by which potential alternatives for roadway, intersection or transit alternatives may be developed and evaluated.

Planning will be responsible for all study activities in coordination with an established Study Task Force (TF). This TF, an integral part of the public participation process, will include but not be limited to: the Executive Office of Transportation, Planning, the Cape Cod Commission, the Towns of Barnstable and Yarmouth, citizen advisors, MassHighway District 5, federal and other state agencies, legislators, local elected officials, and community organizations. Assistance from various MassHighway Departments (Highway Design, Environmental, Traffic Operations, Right-of-Way Bureau, District 5, etc.), as well as from the Cape Cod Commission staff will be utilized as availability and resources permit. This study is expected to take approximately 12 months from initiation to completion.

The consultant team will be directed by Planning and the consultant's progress will be monitored by the Planning Project Manager. The Project Manager (and/or other Planning staff as designated) will serve as the primary interface between the consultant and the TF. All major tasks conducted by the consultant for Planning will be done in coordination with the TF.

The consultant will perform specific tasks as outlined below, with a summary report and presentation materials (in PowerPoint software) as products for each major task. Each task will be accomplished in coordination with a public involvement plan.

**Task 1 – Study Area, Goals and Objectives, Evaluation Criteria, and Public Participation**

The purpose of this task is to develop the framework for the study. The consultant, in consultation with Planning and the TF, will finalize the defined study areas - local and regional; and develop goals, objectives, evaluation criteria, and a public participation plan. Evaluation criteria will be determined based on the goals and objectives.

A. Study Area

The initial **local focus study area** will be bounded by Exits 6 and 7 on Route 6, Route 6A to the North, Route 132 to the West, and Route 28 to Yarmouth Road to the East. The study area will also include the Barnstable Municipal Airport, Willow Street, Independence Drive, Phinney's Lane, Attuck's Lane and Mary Dunn Road. A **regional focus area** will include roads required to access the Cape Cod Hospital, the Cape Cod Community College, the Hyannis Central Business District, Barnstable Village, and the ferry area. Bearses Way, Route 28 from Yarmouth, and Enterprise Road will be included. These study areas may be extended to include additional roadways such if Planning determines that significant differences in traffic volumes may occur which could affect potential alternatives. The study area boundary will be finalized in the first stages of the study with input from the TF.

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In preparing to identify recent growth in land use types, population changes and employment, particularly in the focus area, the team will assess institutional and special generators that may not have been considered in prior traffic modeling. This analysis will assist in identifying the proper study area for this study. Specifically, recent changes in land use might influence the study area boundaries.

Product:

- Study area definition

B. Goals and Objectives

The Goals and Objectives shape the entire framework for the study, identifying its purpose, and providing a “mission statement”. The goals and objectives will focus on improvements to traffic flow, mobility, access and safety within the study area. Economic, community development, and environmental goals will also be included.

Product:

- Goals and Objectives

C. Evaluation Criteria

Based on the goals and objectives, the evaluation criteria are specific considerations, or measures of effectiveness, used to assess the benefits and impacts of the alternatives. Such criteria commonly fall into the following categories: mobility, safety, environmental effects, land use and economic development, community effects, construction cost and schedule. For example, criteria related to mobility may include improving access to existing commercial areas and institutions, and decreasing commuting times. Land use evaluation criteria may include indicators that growth will be channeled into areas served by existing infrastructure, that disruptions to residential areas will be avoided, and that targeted undeveloped areas will remain less accessible. Economic evaluation criteria may include lowering freight shipping times and limiting disruption to existing businesses. Whenever possible, criteria will be quantitatively measured and directly derived from either previously developed information or analysis techniques used in the study. However, all evaluation criteria – both the quantifiable and the more subjective, qualitative measures of effectiveness – should be used to determine the best solutions for the defined goals and objectives.

The criteria are largely used during Task 4, alternatives analysis. Therefore, in preparation for that task, the consultant team will develop as part of this task a standard approach to evaluating improvements using the evaluation criteria. Planning and the Task Force will review this approach and provide input.

An essential part of Task 1.C. will be not only to identify the important social and economic criteria, but also to define them in such a way that some useful measures of quantitative or qualitative effects can be obtained during the course of the study.

Product:

- Evaluation criteria and measurement methods

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D. Public Involvement Plan

The Study Task Force serves as a forum for discussion of key issues such as existing transportation conditions and problems in the study area, environmental constraints, and feasibility of various alternatives to be considered. The TF also serves as a sounding board to the public.

The study's Public Involvement Plan will, at a minimum, have two components: 1) meetings with the TF, and 2) general public informational meetings at key project milestones. TF meetings will be scheduled at key project milestones to gather input from the members, and will be conducted by Planning and the consultant. At the outset, a TF meeting will be scheduled to finalize the study area, establish the goals, objectives, and evaluation criteria for the project, and to allow the TF the opportunity to comment on these elements. The TF is anticipated to have eight (8) meetings throughout the course of the study.

Three (3) public meetings, to be scheduled and publicized by Planning and the consultant, are anticipated at key intervals of the study. The consultant will prepare display materials and other documents for meetings. The TF will have an opportunity to provide comments and suggestions on the material before it is presented at these meetings.

An additional three (3) meetings are also included for meetings with the Cape Cod Commission, Towns or stakeholders as needed.

Products:

- Public involvement plan
- Web site (potential product)

FINAL PRODUCTS FOR TASK 1:

1. Draft report/chapter containing the following:
  - ? Study area
  - ? Goals and objectives
  - ? Evaluation criteria and measurement methods
2. Public involvement plan

**Task 2 – Existing Conditions and Issues Evaluation**

Using the 1998 Conceptual Design & Feasibility Study as a historical base, the existing and anticipated future year conditions for the Hyannis Access Study area will be evaluated. Existing and future land use and environmental constraints will also be examined on an as-needed basis. Other issues raised by the TF may be evaluated if feasible.

A. Existing Conditions and Data Collection

Current year (2006) transportation conditions will be analyzed based on all available traffic volume counts, turning movement counts, and accident data for the study area facilities. Various sources - including the 1998 Conceptual Design & Feasibility Study, MassHighway, the Cape Cod Commission, and the municipalities of Barnstable and Yarmouth - will be used to collect this

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information. Other sources of available data may also be used if appropriate. Recent data will be used to the greatest extent possible, and historical data will be used to examine trends. However, it will be necessary to recount specific locations to complete the assessment of existing conditions. New or additional traffic counts (automatic traffic recorder (ATR) and/or turning movements (MTM)) will be undertaken by MassHighway.

At present, it is anticipated that the number of study locations where MTM counts will be conducted is approximately 15, and the ATR counts will be conducted at about 15 locations as well. The locations of the MTM and ATR counts will be finalized based on discussions with Planning and the TF. If additional locations are required beyond the current estimate, the SOW and Cost may need to be adjusted. The data will be collected during an average weekday, average Saturday as well as during a peak summer weekday and Saturday.

The ATR counts will be summarized to obtain the average weekday and summer weekday counts as well as the hourly traffic profiles. The MTM counts will be used to extract peak hour turning movement volumes at intersections during an average weekday, average Saturday, summer weekday and summer Saturday. The peak hour volumes will be used in the level of service analysis that will be performed using the Synchro software.

The consultant will also incorporate data from the MassHighway Crash Record Database (developed from the Registry of Motor Vehicles crash data) into the analysis. Other crash information, such as from local police departments, may be used to supplement this analysis if appropriate and feasible.

To assist with the study area definition (Task 1.A.) and to provide a check of the socioeconomic baseline data used in the traffic model (described in more detail below), a comprehensive inventory of relevant social, economic, and land use data will be undertaken at the outset of the study. Information will be collected for the project area from the CCC, from Barnstable and Yarmouth town officials, from all relevant and publicly available secondary source data (US Census, Mass Department of Workforce Development, US Bureau of Economic Analysis Regional Economic Information System, and so forth), and from subscription data services (such as Claritas Site Reports) maintained by the consultant. The database capabilities will enable the consultant team and study participants to understand detailed household and housing characteristics (household size and type, income, housing values, mode of transport to work, age and ethnicity, and so forth) and detailed business characteristics (number and type by 2-digit SIC, employment, and annual sales) within the study area and within any specific geographic sub-area. The consultant team will also undertake selective interviews as needed with major employers, business groups (such as the Hyannis and Cape Cod Chambers of Commerce), businesses, and residential property owners within the project focus area (and within the overall study area as warranted) to identify issues of importance to the study, including plans for expansion or contraction, travel-related issues affecting customer service, sales and productivity, and so forth. Some of this information will be integrated into the traffic model, as described in more detail below.

Additional land use/economic development data not already mentioned above may also be collected, such as data on: land-use patterns (existing and planned parcels), zoning, right-of-way, property values, tax revenues, car and truck access, transit access, bicycle and pedestrian use, parking, regional employment, elevation and visibility information, emergency response, and public facilities and utilities.

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Environmental data to be collected may include, but not be limited to: wetlands, aquifers, public water supplies, surface geology, protected and recreational open space, ACECs, hazardous materials sites, noise levels, air quality, wildlife habitats, and cultural, historical, and archaeological resources. In particular, it is known that drainage and public water supplies are an issue in the study area.

The consultant will assemble land use and environmental data from existing sources to the degree feasible. These sources may include, but are not limited to: planning and economic development staff of surrounding communities, local comprehensive planning documents, previous studies, tax revenue information, zoning regulations, and GIS data layers that are available from municipal or regional GIS sources, and MassGIS sources. Planning will provide available aerial photography files and any previously existing maps for the development or updating of base maps by the consultant as necessary. The general accuracy of these data will be confirmed through site visits. Final resolution/scales of photographs and base maps will be determined jointly by Planning and the consultant team, and will be based on available data files. Recent and proposed commercial/industrial developments, residential subdivisions, and other proposed projects with significant trip generation in the study area will be identified and mapped.

In summary, the consultant team will identify all potential land use and environmental constraints that could affect the feasibility of any alternatives developed during the study. Other transportation issues, such as those suggested in the public involvement process, may be evaluated as appropriate.

Calibration of the Cape Cod Commission's Traffic Analysis Model

The statewide model is typically used to evaluate overall implications of major network changes. It is not intended for specific traffic analyses within a smaller area, such as the project area. Therefore, the statewide model will be referenced, but the Cape Cod Commission's regional model will be the main analysis tool for the project. In preparation for this task, the CCC model will need a significant amount of updating and new detail added to it.

Both the demographics and the employment components of the model will need to be updated to the 2006 base year. US Census data for 2000 and Census estimates for 2005 will be used. The zonal employment within the CCC model will receive the most attention. The CCC will provide control totals at the Town level that will be used for the model's control totals. The Claritas data will also be used. Once the population and employment data is properly allocated to traffic zones, it must be forecast. The consultant team will work with CCC staff to define the County and Town control totals that will yield the zonal forecasts. In addition, to evaluate intersection level traffic flows, traffic analysis zones will need to be subdivided and many roads that are important to the area's traffic flow will need to be added. Special generators – such as the ferry area, hospitals, airports, seasonal attractions, and major shopping centers – will also need to be added.

Once these enhancements are made, the model will need to be calibrated to ensure its results match observed traffic counts. This calibration will require traffic counts for peak periods at all major intersections (a major intersection is one where an operations analysis is to be conducted). In addition, approximately 60 directional roadway segment volumes collected by traffic records will be needed to complete the calibration.

Using the above collected data, a base map will be assembled in a GIS format for use in the future tasks.

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Transit, Transportation Demand Management and ITS

The role of public transit in addressing the transportation problems in the study area will be a significant component of this project. All available data on transit services, routes, schedules, and ridership will be inventoried. Existing public transit services in the area include local bus and para-transit services, as well as intercity bus service providing connections between metropolitan Boston, Hyannis and the ferry area.

Transportation Demand Management (TDM) is a combination of strategies and actions whose goal is to encourage travelers to use alternatives to driving alone. TDM may include: encouraging the use of public transit, public/private buses, van/carpools, ferry boats, bicycles and walking; promoting the use of alternative work hours; telecommuting; parking management and financial incentives; providing commuter information; and marketing alternatives to single-occupant vehicles. The consultant will examine and document existing TDM services and incentives in the Hyannis Access Study area.

Intelligent Transportation Systems (ITS) is a broad term that refers to technologies intended to maximize the efficiency of the transportation system by, for example, providing real-time information to the traveling public on incidents and alternate routes. Improving emergency responsiveness through surveillance and improved communications are among the other goals. The consultant will gather information on any existing ITS programs and equipment in the study area.

Bicycle and Pedestrian Travel

The Consultant will collect available data on pedestrian and bicycle routes from local sources including applicable pedestrian/bicycle groups, organizations, and committees. Existing bicycle and pedestrian activity or evidence such as beaten paths that are observed during site reconnaissance will be noted. Input from local planners and from the TF will be documented.

In summary, Task 2.A. will include analysis of the study area for traffic volumes and levels of service, safety, transit services, bicycle and pedestrian travel, extent of ITS, and other conditions as necessary.

Products:

- Existing traffic volumes, turning movements, levels of service, and accident data
- Existing transit services for study area
- Existing bicycle and pedestrian facilities and routes
- Existing environmental and land-use/economic development data

B. Future Year Conditions

Conditions in the study area will be forecasted for the horizon year of 2030. One of the primary tools to be used for estimating future conditions is a travel demand model. Future year data will be obtained from Planning's Statewide Model. Traffic will be forecasted for a "no-build" condition, which assumes that no alternatives (including any potential changes to the interchange)

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are implemented. Throughout the region, only existing or planned projects that can reasonably be expected to be in place by 2030 will be included in the “no-build” condition. Projections may be based on various scenarios in the study area, combined with forecasts from the Statewide model to incorporate regional growth trends and planned projects throughout the area. The Statewide model results will provide estimated regional and external traffic volumes (and projected transit usage) for input into micro-simulation programs to assess the future no-build operational conditions of selected interchanges. Planning, in consultation with the consultant, will determine the most appropriate model(s) needed for the study. For costing purposes, the CCC model has been assumed to be run for one forecast year, for the AM and PM peak period for the summer condition. For this model run, intersection turning movements for all the key intersections will be generated. In addition, project metrics will be generated along with traffic flow maps and travel desire lines. The model has been assumed to be run for one forecast year with all of the committed projects assumed to be built. All the time periods and metrics as discussed above for the no-build forecast will also be developed for this alternative. The consultant team will also prepare graphics showing travel patterns to and through the area.

The latest available version of the Highway Capacity Software - with the *2000 Highway Capacity Manual* procedures implemented – will be used for any ramp junction analysis. All level-of-service and other performance measures will be performed with software that incorporates the *2000 Highway Capacity Manual* procedures. The Synchro software will be used to analyze the signalized and unsignalized intersections included in the study. The highway network of the travel demand model (used to estimate traffic demands) will include highway links that lie outside the study area as defined in Task 1.

The consultant will coordinate closely to utilize regional model results as inputs to traffic analysis and transit services depicting a future no-build condition. This future no-build condition should also include current socioeconomic projections (seasonal and year-round populations, households, and employment), and estimates of future land use. Existing data obtained from the 1998 Conceptual Design & Feasibility Study and the Cape Cod Commission’s seasonal and off-season models will be used. However, new traffic data and analysis will be developed for seasonal traffic conditions.

Estimates of future years’ population, households, and employment for the overall study area will be based on the socioeconomic data maintained for future years in the Statewide and CCC traffic models, as modified by new information developed in the baseline inventory, such as planned or proposed developments as well as discussions with CCC staff and others to develop consensus on population and employment forecasts to 2030. Planning, the study team and the CCC will work to develop new forecasts of households and jobs to calibrate the micro-simulations of traffic in future years.

Population, employment and household forecasts for Barnstable County and its individual communities are available to 2030 from the collaboration between the Cape Cod Commission and Planning. There will be an iterative process between the land uses/socioeconomic and traffic modeling disciplines to update appropriate social and economic data at zonal or more disaggregated geographic sub-areas in surrounding areas that may influence transportation, as well as for Cape Cod overall. As warranted, alternative forecasts of households and jobs may be developed to reflect different assumptions about population, housing, and employment conditions in future years based on environmental and/or policy and regulatory constraints.

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Products:

- Forecasted traffic levels and conditions
- Forecasted transit ridership and services
- Socio-economic projections
- Land use projections

C. Issues Definition and Evaluation

Existing deficiencies and issues in the study area will be identified, quantified, and evaluated. As part of defining transportation issues in the study area, the following elements will be considered: current and future traffic congestion, safety, environmental issues, community effects, economic development, land use, transit, and other factors as appropriate. Wherever feasible, issues will be presented in graphical or map form suitable for presentation at a public informational meeting.

Product:

- Inventory and definition of issues

D. Constraints Identification

Planning and the consultant team will identify a set of project constraints related to environmental impacts, engineering/design feasibility, business and residential effects, cost, and other factors as appropriate. Constraints for engineering feasibility will be based on appropriate MassHighway guidelines as applicable.

Drawing upon the results of prior tasks, the consultant will develop a list of social and economic factors that may be optimized for economic development and fiscal benefits and/or minimized to avoid adverse land use, social, and economic consequences. Factors affecting the study area as a whole, individual communities and the study focus area will be identified. Social and economic constraints are likely to include a) residences and businesses whose takings are to be avoided, accessibility and safety for b) commercial vehicles serving local businesses, c) patients and emergency vehicles of health institutions, d) police and fire protection services, e) students and faculty of educational and cultural institutions, and f) customers and employees of targeted business areas such as downtown Hyannis. Sensitive areas, such as those areas where the communities' goals and objectives discourage new development, will also be identified.

Product:

- Inventory of project constraints

FINAL PRODUCT FOR TASK 2:

Completed draft chapter/section containing the following:

- ? Existing traffic volumes, turning movements, levels of service, and accident data
- ? Existing transit services for study area
- ? Existing environmental and land-use data
- ? Forecasted traffic levels and conditions

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- ? Forecasted transit ridership and services
- ? Socio-economic projections
- ? Land use projections
- ? Inventory and definition of issues
- ? Inventory of project constraints

**Task 3 – Alternatives Development**

Transit options provide area residents and visitors with some new choices in how they travel. Transit may also alleviate some congestion or mitigate its impact. Therefore, the consultant will develop a series of short- and long-range transit options that may complement a proposed roadway or intersection improvement. For example, new or improved local bus service to the airport, the hospital, and the area's hotels and shopping areas may provide some benefits. Other options may include new Park & Ride lots and/or shuttle services. The possible impacts of enhanced long distance commuter and intercity transit services will also be estimated. These services could include enhanced bus service from Boston (or other metropolitan areas), and could, in the long range, also include extension of commuter rail service, or reactivating local rail lines for passenger service or freight needs. The potential ridership and shift of trips from the auto mode for each transit option will be approximated and applied to traffic forecasts to determine whether congestion is improved. Any other benefits that relate to the evaluation criteria will also be considered.

A general assessment of existing Transportation Demand Management (TDM) strategies and the potential of new or enhanced strategies will also be conducted. Increased ridesharing could result in a general increase in vehicle occupancy in the region or could be targeted to specific destinations resulting in reduced auto trips in specific areas. Considering the extent that other TDM strategies could reduce auto trips at peak times and address congestion will also be assessed. Improving signage along state highways is another low-cost, short-term solution that will be evaluated.

Intelligent Transportation Systems have the potential to alleviate traffic congestion and increase access to planned areas. ITS techniques provide some effective tools that deal with both recurring congestion and isolated incidents. Furthermore, recent federal transportation legislation provides states with greater flexibility in implementing ITS strategies. MassHighway is laying a solid foundation with the implementation of a Mass 511 system. Providing a greater level of real-time monitoring and more accurate pre-trip information to travelers, this system is expected to lead to more efficient use of the existing transportation system. With this in mind, the consultant will develop additional ITS options that may complement or enhance Mass 511.

While ITS, transit, and TDM options alone are not likely to solve the entire region's congestion problems, the most promising and cost-effective elements will most likely be combined with roadway improvements to increase their overall collective effectiveness. Roadway improvements may include a new interchange between Exit 6 and 7 on Route 6, additional improvements to Route 132, Route 28, Willow Street, and/or other area arterials. Roadway improvements may also include intersection or ramp improvements. Improvements to secondary roads will involve bicycle and pedestrian considerations as outlined in the new MassHighway Project Development Guidebook. Planning and the consultant team, in consultation with the TF, will develop a variety of roadway improvements to be combined with non-highway elements. Together, these will make short- and long-range alternatives for both the local and regional focus areas. Where it is

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deemed appropriate, visual imaging tools (using three dimensional display techniques) may be used to provide greater understanding of these types of improvements.

This task will involve screening a variety of roadway and intersection improvements so that a smaller number of favorable options can be analyzed in detail. The intent of the screening process is to have a framework to quickly and inexpensively test a wide range of area improvements. Basically, the screening process will not develop the detailed intersection turning movements. Instead the screening analysis will only generate project metrics summaries, volume summaries, and presentation maps. Following this initial screening process, the most favorable roadway and intersection options will be combined with the most favorable non-highway options to create a small set of alternatives to be analyzed in Task 4.

**FINAL PRODUCT FOR TASK 3:**

Draft section/chapter containing the following:

- ? Descriptions of short and long-range alternatives
- ? Maps and graphics showing alternatives
- ? Documentation of the modeling process and planning process

**Task 4 – Alternatives Analysis**

The alternatives from Task 3 will be analyzed based on the evaluation criteria from Task 1. Any necessary mitigation related to each alternative will also be considered in this analysis.

A. Mobility Analysis

The consultant will analyze the alternatives' impacts on mobility in the study area. Mobility as it relates to both the highway and transit systems will be considered. The highway system to be analyzed includes both Exit 6 & 7 interchanges, Route 6, and local roads and intersections (including transit, bicycle and pedestrian accommodations) in the study area. The consultant will coordinate closely with Planning and the CCC to utilize the CCC 2030 summer PM model results to analyze and evaluate the alternatives. Two alternative model iterations will be run in this task assignment. Existing data, such as from the 1998 Conceptual Design & Feasibility Study, will be used to the fullest extent possible.

Level of service analysis will be performed at specific locations for both the average as well as the peak summer time frames with build volumes under each proposed alternative.

Product:

- Alternatives analysis for traffic operations and transit usage

B. Safety Analysis

The consultant will analyze the traffic safety impacts in the study area for each alternative to the degree feasible, including examining the impacts on vehicular, bicycle and pedestrian movements in the study area.

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Products:

- Alternatives Analysis for Traffic Safety

C. Environmental Effects Analysis

The consultant will analyze the environmental impacts for each alternative to the degree feasible, including examining: wetlands, aquifers, public water supplies, surface geology, protected and recreational open space, ACECs, hazardous materials sites, air quality, noise, wildlife habitats, cultural, historical and archaeological resources, and other constraints as necessary to fully analyze each alternative. Existing data, such as the 1998 Conceptual Design and Feasibility Study will be used to the fullest extent possible.

Product:

- Alternatives Analysis for Environmental Effects

D. Land Use and Economic Development Analysis

The consultant will analyze land use, economic development and business impacts for each alternative to the degree feasible, including examining: right-of-way, property values, tax base, planned and potential zoning changes, planned developments (including 40B), parking, car and truck access to existing or planned parcels, visibility, labor force impacts, regional and local employment, and other elements as necessary to fully analyze each alternative.

Based on congestion under no-build and possible travel time savings under the build alternatives, the consultant team will generally assess the effects of travel time savings on regional productivity, including distribution costs savings (based on reduced freight shipping times) and the potential effect of such savings on regional business sales and employment. Effects on labor force mobility and the effective commuting shed for area businesses will also be discussed. This regional economic assessment will also use vehicle hours traveled (VHT) differences between alternatives to estimate annual user benefits for both autos and trucks (dollar rates for trucks and autos per hour are based on current, best available empirical data and adjusted to the local region) that can be compared to the annualized capital construction, maintenance and operating costs attributable to the build alternatives.

In addition to the quantitative analysis of regional economic effects, the consultant team will qualitatively assess the likely effect of alternatives on regional goals and objectives for economic development and land use.

E. Local Area Social and Economic Effects

Effects of the project alternatives on community facilities and services, health care and educational institutions, business sales, jobs, household income, and property taxes, residential and commercial land uses and growth within the overall project and focus areas will be generally assessed based on changes in travel times estimated in the traffic model, and access provided by new physical connections. This assessment will address a) continuation of current conditions and forecasts under no-build, b) possible gains in community services, economic activity and tax revenues attributable to improved access or accessibility from the build alternatives, c) possible adverse effects on sensitive areas not designated for new growth in regional and community

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plans, and d) possible losses in business, employment, and tax revenues attributable to right-of-way takings and displacement. This assessment will be accomplished using secondary source data and information from interviews, and by applying working hypotheses and analytic techniques that are generally recognized within the economic analysis discipline and supported by empirical case studies and other relevant literature. Possible effects on planned or proposed new development, community goals and objectives, urban and other areas targeted for future growth, and community comprehensive plans will be specifically addressed.

Product:

- Alternatives analysis for land use and economic/business impacts

F. Community Effects/Environmental Justice Analysis

The consultant will analyze the community impacts for each alternative to the degree feasible, including examinations of: right-of-way, noise levels, air quality, open space, land-use patterns, property values, vehicular access, transit access, solar access, emergency response, public facilities and utilities, cultural, historic, and archeological resources, elevation and visual impact, and other constraints as necessary to fully analyze each alternative. Where applicable, the consultant team will complete conceptual level right-of-way plans for each alternative in accordance with appropriate design criteria. Plans will not include detailed design of any structural elements, but may use visual imaging software (where applicable) to portray the visual characteristics of certain alternatives that may be proposed for analysis. The consultant should also analyze the possible social equity impacts of the alternatives analyzed and how they may impact or benefit the minority and disadvantaged populations that now reside in and adjacent to the study area.

Product:

- Alternatives analysis for community effects/ environmental justice

G. Cost Analysis

Approximate construction, operations, right-of-way, and mitigation costs (including possible noise barriers) will be estimated for each alternative. Other information (project implementation scenarios, construction schedules, etc.) will be estimated to the extent possible.

Products:

- Analysis of costs associated with each alternative

**FINAL PRODUCT FOR TASK 4:**

Draft report section evaluating all alternatives based on Task 1 criteria, including:

- ? Mobility
- ? Safety
- ? Environmental effects
- ? Land use and economic development
- ? Community effects
- ? Cost

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**Task 5 – Recommendations**

Recommendations may include both short-range (within five years) and long-range recommendations as a result of the analysis completed in the previous tasks.

**FINAL PRODUCT FOR TASK 5:**

Draft report section/chapter on recommendations containing:

- ? Tables of short and long-range recommendations
- ? Recommendation narrative
- ? Recommendation maps, graphics, and displays

**Task 6 – Final Report**

A Final Report will be prepared consisting of revised versions of the report chapters developed under Tasks 2 through 5, with an introductory chapter discussing the overall project and the goals-related material developed in Task 1. The report will also include an executive summary and appendices. The consultant team will be expected to deliver fifty (50) copies of the report to Planning and others. The final report should also be made available in Adobe Acrobat format, with 5 CD-ROM copies provided to Planning. All electronic files (Word, PowerPoint, GIS Data layers, traffic analysis software, etc.) used to print the final report should also be provided to Planning on CD-ROM.

**FINAL PRODUCTS FOR TASK 6:**

1. Draft final report
2. PowerPoint document of recommendations
3. Revised final report

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