TEXAS DEPARTMENT OF TRANSPORTATION
GENERAL SERVICES DIVISION

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TEXAS STATEWIDE MULTIMODAL PASSENGER AND COMMODITY FLOW FREIGHT MODEL

SPECIFICATIONS AND CONDITIONS

PUBLICATION: This specification is a product of the Texas Department of Transportation (TxDOT). It is the practice of TxDOT to support other entities by making this specification available through the National Institute of Governmental Purchasing (NIGP). This specification may not be sold for profit or monetary gain. If this specification is altered in any way, the header and all references to TxDOT must be removed. TxDOT does not assume any liability when this specification is used in the procurement process by any other entity.

1. SCOPE: This specification describes services to develop a statewide multimodal passenger and commodity flow freight model, hereafter referred to as the statewide model.

2. BACKGROUND AND GENERAL REQUIREMENTS

2.1. CONTEXT: The Texas Department of Transportation (TxDOT) currently builds and maintains travel demand models for individual urban areas within the state. These traditional three-step models use a custom trip generation program called TRIPCAL5; a custom atomistic gravity model called ATOM2, and a capacity restraint assignment. Models are maintained on a mainframe platform and downloaded to TRANPLAN after validation. TxDOT is in the process of converting its models to a TransCAD platform. TxDOT needs to expand the coverage of its travel demand modeling in a statewide model to include consideration of different passenger and freight modes, and the interaction between modes.

This Request for Offer (RFO) is being offered to select a vendor to develop a Texas statewide model. Some portions of model development are completed and will be provided to offerors as a work package, as noted below. The completed work may be used at the option of the selected vendor. However, the review and any changes to completed work require the approval of the review panel. Completed work includes a statewide highway network based on the Texas Trunk Highway System and a zone structure built from census tracts. There are approximately 1400 zones inside Texas, 57 buffer zones in neighboring states, and 81 external stations. In conjunction with the buffer zones, external trips have been initially designed to be calculated based on the results of a national-level assignment with data from Metropolitan Statistical Areas. Five area types were defined: large urban, urban, small urban, satellite, and rural. The satellite area type is based on journey to work trip lengths from the census; it is designed to account for the different geographic settings of Texas rural areas.

The full body of completed work, a description of available data, a description of the TRANSEARCH database, and a description of the TxDOT programs TRIPCAL5 and ATOM2 will be provided on request to offerors as a work package for their review and use. The request must be made to the purchaser shown in Attachment A no later than Monday, October 18, 1999. The work package is for evaluation only, and remains the property of TxDOT. TxDOT copyrights the work package, including all individual components.

The work package shall be returned to TxDOT along with the response to this RFO. If the offeror chooses not to respond to this RFO, the work package alone shall be returned by the response due date specified in Attachment A.

2.2. EXPECTATIONS: This project will be TxDOT’s first multimodal model, first freight model, first model to be developed completely in a TransCAD format, and first model with statewide coverage. As such, it is expected that this model will launch a continuing series of models to be developed and enhanced in the coming years. While TxDOT recognizes that this first model will not be the penultimate, there are specific expectations for its capabilities:

2.2.1. The model is expected to bring TxDOT up to the state-of-the-practice for statewide multimodal passenger and freight modeling. It is neither expected nor desired that the model will advance the state-of-the-art. Model advancements that are not warranted by the policy environment in Texas, or that require excessive data compared to their contributions to model accuracy, are not desired.

2.2.2. Validation measures shall include a match of modeled to counted VMT for total traffic of ±15 percent for corridor intercepts and for each cell of a functional class / area type matrix. Freight flows shall be validated to ±15 percent of the TRANSEARCH dataset from Reebie Associates for both tons and trips.
2.2.3. The model shall be complete and fully operational for passenger and freight, for all specified modes, and for the interactions between modes.

2.2.4. The statewide model shall provide consistent and accurate analysis of the following general types of projects:

2.2.4.1. The model shall be capable of forecasting accurate statewide traffic volumes by mode for passenger and freight.

2.2.4.2. The model shall be capable of forecasting mode shifts for passenger and freight. The truck/rail interaction is particularly important.

2.2.4.3. State-level multimodal analysis of alternatives for each mode should be accurate enough to support analysis for project selection.

2.2.4.4. The analysis of concurrent modal and multimodal network alternatives should be supported.

2.2.4.5. The model should support the analysis of the relative impacts of domestic and through traffic for passenger and freight at the statewide and at individual urban area levels.

3. DESCRIPTION OF WORK: The offeror shall evaluate the following specific tasks and develop a strategy for their resolution. The initial recommendations stated below shall be considered as expressing TxDOT's minimum criteria for the models. The offeror may recommend alternate strategies for TxDOT's consideration if it can be shown that their recommendations are superior. Offerors are encouraged to propose creative approaches and solutions that will meet the statewide model requirements in the most timely and cost-effective manner.

Regarding model compatibility, TxDOT recognizes the fundamental differences in theory and operations between the passenger component and the freight component models. In some instances, it is not advantageous for TxDOT to specify absolute standards for model compatibility, but rather to allow the offeror more flexibility in their response. The offeror is neither expected nor required to attempt to make the component models more compatible than are theoretically sound or practically feasible, but shall in every instance provide a clear and concise explanation of their proposed strategies.

3.1. Task: Participate in continuous, comprehensive two-way dialog throughout the life of the project.

3.1.1 The project will be managed by a TxDOT project manager and the statewide analysis model review panel (referred to as the review panel). The review panel provides a range of expertise and perspectives, and includes modelers, end users, researchers, data specialists, GIS specialists, and management.

3.1.2 The vendor's project manager shall communicate with the TxDOT project manager a minimum of once each week during the life of the project. An informal status report reflecting progress, milestones, and work itinerary shall be E-mailed to the TxDOT project manager on Friday of each week. More formal progress meetings with the full review panel shall be held approximately once every four weeks, commonly in conjunction with the panel's discussion of their review of deliverables.

3.1.3 The TxDOT project manager shall be the vendor's primary point of contact with TxDOT. All communication with TxDOT staff or the review panel shall be coordinated through the project manager.

3.2. Task: Meet with the review panel to report and discuss proposed actions, technical directions, progress, and to obtain approvals to proceed as mutually agreed.

3.2.1 This project must be seen as delivering a product according to client expectations, not as independent research work. All work shall conform to the directions of the review panel. No changes to processes or products shall be made without the prior knowledge and approval of the review panel.

3.2.2 Deliverables will be reviewed by the review panel to determine their acceptability. The calendar of work shall provide a minimum two week review period for each deliverable. The review panel may, at its discretion, approve, approve with questions, disapprove with questions, or reject a deliverable. The vendor may submit an invoice only after the review panel has approved the deliverable in writing.

3.2.3 With each deliverable, the vendor shall provide the results of their internal quality control checks for the review panel. As an example, a network deliverable should include separate plots or TransCAD map files color-coded by functional class, by number of lanes, by area type, etc. This method provides evidence that the vendor checked the deliverable for errors, assists the review panel in their own review, and speeds the review process.

3.3 Task: Establish a detailed calendar of work for statewide model development, based on the broad scope supplied in the work package.
3.3.1 The calendar of work shall define deliverables and their due dates, and budgeted hours per person to be worked for each task. It shall include dates for demonstrations of model operations, as specified in task 3.9. Additional milestones and deliverables for payment may be suggested.

3.3.2 In accordance with paragraph 7, Payment Schedule, contract negotiations will include setting amounts to be paid for each task. Part of the justification for each task's cost will be the amount of hours bid for that task and the amount of hours left to complete the contract. Only the total cost per task need be submitted; it is not necessary for proprietary hourly rate information to be disclosed. The intent is to balance the monies spent with the amount of work completed.

3.3.3 All deliverables shall be judged according to the specifications of the calendar of work.

3.3.4 The detailed calendar of work shall itself be subject to approval by the review panel. The calendar of work shall be approved by TxDOT before work commences on statewide model development.

3.4 Task: Review the work package, and make any necessary refinements with the approval of the review panel.

3.4.1 Platforms: The statewide model shall use TransCAD 3.5 and shall be compatible with existing urban area models to the maximum extent practical. Compatibility is considered in terms of access to geographic files, networks, zone files, data files, matrices, and modeling procedures. Reports and documentation shall use the MS Office 97 suite, operating in a Windows NT 4.0 environment.

3.4.2 Datasets: Input datasets should have a similar format and be consolidated when practical to minimize the number of separate datasets that have to be maintained. Output datasets should have similar formats to allow using similar analysis tools and techniques.

3.4.3 Integration: The passenger and the freight models shall use as many of the same model components as practical. The statewide model should be capable of integrating with the inputs and outputs of existing urban models as much as is practical.

3.4.4 Interfaces: The statewide model shall have an overall operating interface as well as specific interfaces for component models, as noted in tasks 3.4.10, 3.4.11, 3.4.12, 3.4.13, and 3.5.1.3. In addition to the overall operating interface for modeling, the model shall have an executive-level, user-friendly interface in an ArcView platform for the display of information and model results only. This second interface does not need to support modeling work, but should simply make model data and results available to less technically oriented users.

3.4.5 Modes: The passenger component shall, at a minimum, model cars and rail. Provisions shall be made for future extension of the model to include other passenger modes without requiring significant restructuring. The freight component shall, at a minimum, model trucks, rail, truck/rail, rail/seaport and truck/seaport intermodalism. Provisions shall be made for future extension of the model to include other freight modes without requiring significant restructuring.

3.4.6 Commodities: Freight commodities shall include manufactured and non-manufactured goods, empty trailers and trucks travelling without load, and legally overweight trucks which are issued permits.

3.4.7 Commodity groups: The model shall aggregate commodities into commodity groups, and maintain the capability of editing the base datasets to define new commodity groupings.

3.4.8 Zone structure: The zone structure as defined is based on aggregated census tracts. Previous work has established approximately 1400 zones in Texas, plus 57 buffer zones in neighboring states, and 81 external stations. There are five area types. The vendor shall review the existing zone structure supplied in the work package and enhance it as necessary.

3.4.9 Networks: The highway network is based on the National Highway System and the Texas Trunk Highway System. Rail lines and facilities, port facilities, and their connections shall also be included. The vendor shall review the existing highway network supplied in the work package and enhance it as necessary. The vendor shall prepare all other base and forecast year networks.

3.4.10 Trip Generation: The vendor shall use the PC version of TxDOT's TRIPCAL5, and develop an interface with TransCAD. Any proposed modifications to meet the requirements of statewide trip generation shall be detailed. Proposals shall be detailed; mere reference to other software manuals is not acceptable. The criteria for defining special generators shall be defined.

3.4.11 Trip Distribution: The trip distribution model shall use the PC version of TxDOT's ATOM2 gravity model unless an alternate model can be shown to be markedly superior, and develop an interface with TransCAD. Any proposed modifications to meet the requirements of statewide trip distribution shall be detailed. Proposals shall be detailed; mere reference to other software manuals is not acceptable.
3.4.12 Mode choice: The mode choice models for passenger and for freight may be developed separately. Commercial off the shelf models (COTS) shall be considered. The required accuracy of statewide mode shifts, and the relative complexity of the mode choice model, shall be considered when proposing the model to be used. Proposals shall be detailed; mere reference to other software manuals is not acceptable.

3.4.13 Assignment: A TransCAD assignment model shall be used. Any proposed modifications to meet the requirements of statewide trip assignment shall be detailed. The freight model shall output trips and tons per commodity group, and shall have the capability of assigning loads to various types of trailers and containers. Proposals for multi-class assignment, or other methods for dealing with assigning vehicles and trucks, shall be detailed; mere reference to other software manuals is not acceptable.

3.4.14 Validation: Define the data, criteria, and procedures for validating the passenger and freight models’ 1996 base year.

3.4.15 Any alterations of the model structure mentioned above shall be subject to approval by the review panel. These must be approved by TxDOT before work commences on statewide model development.

3.5 Task: Develop annotated model flowcharts and an integrated data management system.

3.5.1 Flowcharts: Develop annotated flowcharts showing the component models, processes, interfaces, and datasets and their interrelationships in the fully integrated model, including all the specifications of tasks 3.4.1 through 3.4.15. It is critical to define all datasets and all processes that will be used in the model before model development actually begins. Separate flowcharts shall be provided for running the full model, for running the passenger side only, and for running the freight side only.

3.5.1.1 Component models: The flowcharts shall identify component models in TransCAD and other software. Internal sub-models need not be identified unless necessary for clarity or to assist in identifying the use of other components.

3.5.1.2 Processes: Processes used between models or to manipulate datasets shall be identified. Either the software’s own language (Excel macros, GISDK, etc.) or VISUAL BASIC shall be used unless prior approval is given by the review panel.

3.5.1.3 Interfaces: The flowchart shall define the overall operating interface and all interfaces between components. The interfaces shall be defined and approved by TxDOT before they are developed.

3.5.1.4 Datasets: Define the inputs, outputs, interim outputs, and validation/benchmark data for the various components of the model and define data set structures and software for sharing and consolidating data so that only a minimal number of separate datasets have to be maintained. Each dataset used shall be identified in the flow chart. Each version/permutation of a dataset must be identified. For example, if a vehicle occupancy dataset is stratified by trip type or area type, this shall be identified and described.

3.5.2 Data management: Define an integrated data management system for all base and forecast year data for all modes. Each dataset shall be described in terms of the data it contains, format, sources, and the conceptual procedures used to collect, rectify, and manipulate it.

3.5.3 The integrated data management system shall include a file naming convention for datasets from all sources, including inputs, outputs, interim outputs, and validation/benchmark data. The convention shall be able to define and track files for alternative analyses, files for different modes for the same analysis, and updates/working versions of the same file. The convention shall be compatible with TransCAD 3.5.

3.6 Task: Explore the possibilities for the model to make maximum use of commercial off-the-shelf (COTS) models, procedures, research projects, and data produced by TxDOT. Evaluation of existing work will allow the review panel to determine which of the existing projects, data sets, or model components should be incorporated into the statewide model.

3.6.1 Existing components: Evaluate existing component models and procedures that are commercially available or in use by TxDOT in relation to the proposed Texas model. Descriptions of existing TxDOT component models will be provided in the work package.

3.6.2 Existing datasets: Evaluate datasets produced by TxDOT containing input information that may be used in the model, or containing output information that may duplicate or validate model output. Descriptions of existing TxDOT datasets will be provided in the work package.
3.7 **Task:** Define and acquire any additional data sets necessary to develop the statewide model for the validated base year and forecast year.

3.7.1 **Passenger:** Population forecasts shall use the Texas State Data Center forecasts for each county as a control total. Employment forecasts shall be compatible with the scenarios and geography used in the population forecasts.

3.7.2 **Freight:** The Reebie TRANSEARCH multimodal freight database for 1996, described in the work package, will be provided to the vendor to use in developing the statewide model. The vendor shall acquire any other data as necessary to meet the requirements of this RFO.

3.8 **Task:** Develop the integrated statewide multimodal passenger and commodity flow freight models.

3.8.1 **Model development:** Develop the passenger and freight models with as much integration as practical with each other and with existing urban models. Integration is defined in terms of input and output dataset formats, model components and tools, and operation. The statewide model shall operate as a suite of related models with a common operating interface. The preferred integration is to have hot links between operating modules, common analysis tools and procedures, seamless access to all datasets with common analysis tools, and consistent zone structures.

3.8.2 The initial statewide model shall be delivered for TxDOT review once it is structurally complete and operational, and before the validation process commences. This should be completed as early in the process as possible. It will provide the review panel with a general context for the operation of the model, and assist in their review of model components. The complete, validated model shall be a separate deliverable.

3.8.3 **Base year validation:** The models shall be validated to the criteria of paragraph 2.2, and any additional criteria agreed upon in advance by the review panel. The base year shall be 1996.

3.8.4 **Forecasts:** Develop separate forecast mechanisms as necessary for both the passenger and freight models, including forecasts of intermodal shifts. Any available COTS freight forecasts shall be considered. The forecast year shall be 2025.

3.9 **Task:** Demonstrate the capabilities and accuracy of the statewide model.

3.9.1 Demonstrate the operation of the statewide model at points in the development process as specified in the calendar of work developed according to task 3.3 and as noted in paragraph 4. These demonstrations shall include, at a minimum, a demonstration of the following:

3.9.1.1 Overall operating interface in TransCAD.

3.9.1.2 TRIPCAL5 operation and interface.

3.9.1.3 ATOM2 operation and interface.

3.9.1.4 Mode choice operation.

3.9.1.5 Assignment operation.

3.9.1.6 Validated base year and forecast.

3.9.1.7 Executive-level operating interface in Arc/View.

3.9.2 Where appropriate, separate demonstrations may be provided for the passenger and freight side and for each mode.

3.9.3 These demonstrations may be scripted live model runs or scripted slide shows featuring selected screen displays from model runs, as appropriate. In either case, the script shall be provided to the review panel. Reports shall be included as appropriate.

3.10 **Task:** Develop and evaluate scenarios of operating the statewide model for implementation into the planning process. After the statewide model is completed, it can be implemented into the statewide planning process in a variety of ways. Implementation scenarios depend on the trade-off between resources committed to operation versus response time and accuracy of the process. Analysis of the various scenarios will allow TxDOT to determine relative budgets and to develop an optimum scenario for implementing the models. The vendor shall develop a minimum of two scenarios of statewide model implementation considering the following issues, and conduct a sensitivity analysis to evaluate each scenario.

3.10.1 Hardware requirements to run the models and support their data management and manipulation needs.
3.10.2 Additional software required for management, analysis, and reporting.
3.10.3 Staffing requirements in terms of full time employees and their general level of training required.
3.10.4 Frequency and method of model validation and forecasts.
3.10.5 General response time to complete a project under each scenario.
3.10.6 General level of accuracy under each scenario.

3.11 **Task:** Implement the statewide model according to the chosen scenario: After the review panel evaluates the sensitivity analyses and chooses the implementation scenario, the vendor shall implement the statewide model into Transportation Planning and Programming operations in accordance with the chosen scenario.

3.11.1 TxDOT will be responsible for actually loading software on its own workstations and server. The vendor shall be responsible for the compatibility of the statewide model with TxDOT equipment, platforms, and software.
3.11.2 The vendor shall perform demonstration(s) of the operation of the complete statewide model loaded on TxDOT workstations to prove the operation of all features, either complementing or in addition to task 3.9. All of these demonstrations shall be live model runs.

3.12 **Task:** Provide documentation on the operation and maintenance of the statewide model as developed.

3.12.1 Provide manuals as an electronic file and one hard copy in loose-leaf format that give guidance in the operation of the model. Each manual or document shall consist of a single MS Word file; all charts and graphics shall open and be editable within MS Word. The manuals shall be written at a level understandable to the experienced urban modeler; coverage of modeling basics is not expected. Procedures using TransCAD or other software shall be explained, rather than merely providing a reference to other manuals.

3.12.1.1 A separate manual shall be provided for the underlying theory of the statewide model and component models as they differ from TxDOT standard urban modeling. The review panel will approve the outline for this manual.
3.12.1.2 A separate manual shall be provided for everyday operations of the model, including preparing forecasts and alternative analyses. The review panel will approve the outline for this manual.
3.12.1.3 A document shall be provided that tracks the base year validation and the forecast efforts, beginning after the initial model is complete as specified in task 3.8.2. This may be an informal working journal; its purpose is to guide future validation and forecasting efforts.
3.12.1.4 A document shall be provided that tracks quality control and editing performed for initial model construction, base year validation, and the forecast efforts. This may be an informal working journal; its purpose is to guide future validation and forecasting efforts.
3.12.1.5 A separate document shall be provided listing any problems and opportunities for enhancement that were encountered in validation and forecasting. This may be an informal working journal; its purpose is to guide future statewide model development and enhancement efforts.
3.12.2 The final report shall include a report of the results of the stress test conducted per task 3.13. Any required assistance, changes to the model stream, changes to the documentation, or problems encountered shall be documented.

3.13 **Task:** Conduct a stress test of sample projects in coordination with TxDOT staff. This is to ensure the operation of the model with sample projects, and to test the quality of the documentation in providing guidance to modeling staff.

3.13.1 Sample projects shall be chosen in coordination with the review panel. Projects shall feature full operation of the passenger and freight models. They shall include, at a minimum, network alternatives, demographic alternatives, mode shifts, and a re-definition of commodity groups.
3.13.2 The results of the stress test must be intuitively correct, but need not be precise. These are samples of operation rather than actual projects. The goal is to prove the operation of the model, rather than to analyze a particular project.
3.13.3 TxDOT staff shall perform the stress test guided by the documentation provided through task 3.12. The vendor shall assist as required. Any required assistance, changes to the model stream, changes to the documentation, or problems encountered shall be documented in the final report per task 3.12.

4. **DELIVERABLES:** In the performance of the tasks listed above, the selected vendor shall deliver the specified products to TxDOT in accordance with the following:

4.1 The detailed calendar of work specified in task 3.3, any proposed revisions to the model structure per task 3.4, and the integrated data management system specified in task 3.5 shall be a deliverable submitted to the review panel for approval before any other work commences on the development of the statewide model. Any proposed changes to work already completed must be approved by the review panel.

4.2 A series of memoranda summarizing the disposition of each of the tasks from the Specifications and Conditions, tasks 3.1 through 3.13 shall be delivered along with the deliverables themselves. The frequency and due dates of these memoranda shall be specified in the calendar of work per task 3.3.

4.3 A demonstration of the initial, complete model structure and preliminary assignment run per tasks 3.8.2 shall be a deliverable. This is to demonstrate the features and operation of the model rather than its results. This demonstration may be live model runs or a slide show featuring selected screen displays from model runs, as appropriate.

4.4 Demonstration of model construction and validation per tasks 3.8 and 3.9 shall be deliverables. These demonstrations shall include a report of validation results. These demonstrations may be live model runs or slide shows featuring selected screen displays from model runs, as appropriate.

4.5 A demonstration of the forecast per tasks 3.8 and 3.9 shall be a deliverable. This is to show that the forecast is reasonable. This demonstration shall include a report of forecast results. This demonstration may be live model runs or a slide show featuring selected screen displays from model runs, as appropriate.

4.6 A minimum of two implementation and operation scenarios shall be developed under Task 3.10. The vendor shall perform a sensitivity analysis describing the advantages and disadvantages of each scenario.

4.7 Outlines for the documentation on the statewide model as specified in tasks 3.12.1.1 and 3.12.1.2 shall be delivered to the review panel for review and approval before work commences on the documentation itself.

4.8 The documentation specified in task 3.12 shall be a deliverable.

4.9 The final report as specified in task 3.12.2, updated and amended as necessary per task 3.13, shall be the final deliverable, completing all work under this contract.

5. **TENTATIVE DEADLINES FOR DELIVERABLES:** An 18-month period is postulated for the development and implementation of the statewide model. The deadlines specified below, and additional deadlines as specified in the calendar of work per task 3.3, may be flexible with prior approval of the review panel. Deadlines, which are missed without the prior approval of the review panel, are subject to a liquidated damages penalty.

**Friday, January 21, 2000**
Vendor is notified of selection, contract negotiations begin.

**Friday, February 4, 2000**
Contract is finalized; notice to proceed.

**Friday, March 31, 2000**
Initial package of review of existing work, flowcharts, and detailed calendar of work per tasks 3.3, 3.4, and 3.5 due.

**Friday, May 19, 2000**
Networks for all modes per task 3.8 due.

**Friday, July 21, 2000**
Passenger and freight trip generation per task 3.8 due.

**Friday, Sept. 15, 2000**
Passenger and freight trip distribution per task 3.8 due.

**Friday, Nov. 10, 2000**
Passenger and freight mode choice per task 3.8 due.

**Friday, Jan. 19, 2001**
Passenger and freight preliminary assignment and initial model per task 3.8 due.

**Friday, April 27, 2001**
Passenger and freight validated base year per task 3.8 due.

**Friday, June 8, 2001**
Passenger and freight forecast per task 3.8 due.

**Friday, July 20, 2001**
Demonstration of full implementation per task 3.9 due. All documentation specified in task 3.12.1 due.

**Friday, Aug. 17, 2001**
Stress tests per task 3.13 due.
6. PERIOD OF SERVICE: Service shall begin on issuance date of purchase order award and continue for 24 months.

7. PAYMENT SCHEDULE

7.1. Payments will be periodic based on the receipt of deliverables judged to be acceptable by the review panel. After approval of a deliverable by the review panel, the vendor shall submit an invoice for the amount previously specified in the calendar of work for that task. Payment will be within 30 days after receipt of a correct invoice.

7.2. As part of the contract negotiations, all deliverables and due dates will be determined and approved. New deliverables for payment or to break the tasks into finer detail may be proposed as part of the calendar of work.

As part of the contract negotiations, the amount of payment for each deliverable as a proportion of the total bid price will be pre-approved. Part of the justification for each task's cost will be the bid number of hours per task, so that the total monies paid at any time balance the amount of work completed.

Additional Service: During the period of service, if the vendor is of the opinion that any work TxDOT requests is beyond the scope of the specification and constitutes additional requirements, the vendor shall promptly notify TxDOT in writing prior to beginning the requested work. After review, if TxDOT determines that the request constitutes work outside the scope of the specification, TxDOT will advise the vendor in writing, and will provide payment to the vendor based on a mutually agreed cost prior to the work being started. TxDOT will not pay for additional work performed if the vendor does not notify TxDOT. If necessary, a purchase order change notice to add additional work to the specification requirement will be issued.

8. LIQUIDATED DAMAGES

8.1 In the event the vendor fails to provide the specified deliverables to the review panel by the specified dates, according to the Specifications and Conditions, paragraphs 3 through 5, TxDOT may at its sole discretion require the vendor to pay damages not to exceed ten percent of the cost for that deliverable as specified in the calendar of work. Any deliverable that is more than ten working days late provides grounds for cancellation or additional damages.

8.2 Failure to perform in accordance with the terms of the purchase order, as identified by TxDOT, after having been notified in writing by TxDOT of a specific deficiency, may result in TxDOT requiring the vendor to pay damages not to exceed ten percent of the cost of the appropriate deliverable as specified in the calendar of work. If the deficiency is not corrected in a timely manner according to TxDOT’s sole discretion, the vendor may be considered in default. Should the vendor default on the purchase order, TxDOT may purchase the service elsewhere and charge any increase in cost to the defaulting vendor.

9. CANCELLATION

9.1 The purchase order may be canceled by either party by providing 30 days written notice to the other party. TxDOT will pay the vendor the bid price for products delivered and accepted by the review panel up to the date specified in the notice of cancellation. Termination under this paragraph shall not relieve the vendor of any obligation or liability that has occurred prior to cancellation.

9.2 The purchase order is subject to cancellation without penalty, either in whole or in part, if funds are not appropriated by the Texas Legislature or otherwise made available.

10. SOFTWARE DELIVERY AND INTELLECTUAL PROPERTY RIGHTS

10.1 Delivery. The vendor shall deliver:

10.1.1 All custom and reuse software, described in Paragraph 10.8 as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only vendor could change);

10.1.2 Tools required for the modification and compilation of the custom and reuse software programs;

10.1.3 Source codes for all custom and reuse software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and

10.1.4 All documentation concerning protocol for custom and reuse software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.
10.2 Software.

10.2.1 The vendor shall not create software that only the vendor could modify.

10.2.2 The vendor shall not create or utilize reuse software that is not in the public domain.

10.3 License.

10.3.1 The vendor shall not place any legend on the custom and reuse software that restricts TxDOT's rights in such software unless the restrictions are set forth in a license agreement approved and executed by TxDOT.

10.3.2 The vendor shall not use any of the custom software developed for this contract without a license from TxDOT.

10.4 Ownership.

10.4.1 The vendor shall transfer to TxDOT or purchase for TxDOT all licenses to COTS Software, described in Paragraph 10.8, acquired in conjunction with this project, including all original media, documentation, warranties, licenses, applications software, and developmental software used in developing custom applications.

10.4.2 TxDOT will own the entire rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to the custom software development documentation, software, and any other intellectual properties created for custom software and versions thereof, and all works based upon, derived from, or incorporating works thereof, and in and to all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the custom software and copyrights arising therefrom, and in and to all rights corresponding to the custom software and versions thereof throughout the world.

10.5 Work-made-for-hire.

10.5.1 This is a "work-made-for-hire" as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. so that all copyright and other property interest in the custom software shall vest at the time of their creation for TxDOT and the vendor shall have no copyright or other property interest in any custom software produced under this contract.

10.5.2 All future works relating or pertaining to said custom software and versions thereof shall be regarded as works-made-for-hire within the meaning of the copyright laws of the United States and that if, for any reason, said future works relating or pertaining to said custom software shall be held not to be a work-made-for-hire within the meaning of the copyright laws of the United States, Vendor does hereby sell, assign, and transfer to TxDOT, its successors and assigns, all of Vendor's rights, title and interests in and to said future custom software versions thereof, relating or pertaining to the custom software.

10.6 All software owned, developed, or licensed by TxDOT shall be returned to TxDOT before the end of the contract.

10.7 Vendor acknowledges that the source code, program, and related documentation constitute valuable trade secrets for TxDOT. Vendor shall not disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering TxDOT's intellectual property and related documentation.

10.8 Description of Software. Software to be developed and/or designed shall include, but not necessarily be limited to, the central processors, the operator and projector workstation, the PC hardware platforms, and the system control units located throughout the system. The software implementation activities include the following:

10.8.1 Reuse Software: Operational software in the public domain that vendor shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required system functionality. Inclusion of reuse software is subject to TxDOT's approval. Vendor shall benchmark test each reuse software item to assure its performance of required functionality;

10.8.2 Commercial Off-The-Shelf Software Acquisition (COTS): COTS software that is required to provide necessary system functionality. Vendor shall submit to TxDOT sufficient information and documentation on the software items to determine if the proposed items meet the required system functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by TxDOT prior to the purchase of the item. Vendor shall accept delivery of, facility install and acceptance test all COTS software to assure its performance of required functionality;
10.8.3 Custom software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or reuse software products that vendor shall code or unit test. This custom software shall be developed in accordance with the modular detailed design approved at the critical design review.

10.8.4 Vendor shall determine that all reuse and COTS software shall function within the requirements of the attached year 2000 performance warranty by requiring validation from originating sources, either by software company's signature, company name and name of software on the year 2000 performance warranty or software company's published statement. All custom software shall be warranted under year 2000 performance warranty.

11. TECHNOLOGY ACCESS CLAUSE: Effective February 1, 1998, the 75th Legislature passed Senate Bill (SB) 1752, amending Texas Government Code, Title 10, Section 2157.005 mandating that the Technology Access Clause be included in all Automated Information system procurements, regardless of the dollar amount. Effective September 1, 1999, the 76th Legislature issued SB 1127 amending SB 1752, Section 2157.005 to more aptly define "automated information system". SB 1382 provides an amendment to the Technology Access Clause. This information is available at: www.capitol.state.tx.us/tlo/billnbr.

The Vendor expressly acknowledges that state funds may not be expended in connection with the purchase of an automated information system unless that system meets certain statutory requirements relating to accessibility by persons with visual impairments. Accordingly, the Vendor represents and warrants to the Texas Department of Transportation that the technology provided to the Texas Department of Transportation for purchase is capable, either by virtue of features included within the technology or because it is readily adaptable by use with other technology, of:

1. providing equivalent access for effective use by both visual and non-visual means;

2. presenting information, including prompts used for interactive communications, in formats intended for both visual and non-visual use; and

3. being integrated into networks for obtaining, retrieving, and disseminating information used by individuals who are not blind or visually impaired.

For purposes of this clause, the phrase "equivalent access" means a substantially similar ability to communicate with or make use of the technology, either directly by features incorporated within the technology or by other reasonable means such as assistive devices or services that would constitute reasonable accommodations under the federal Americans with Disabilities Act or similar state or federal laws. Examples of methods by which equivalent access may be provided include, but are not limited to, keyboard alternatives to mouse commands and other means of navigating graphical displays, and customizable display appearance.

12. VENDOR EVALUATION: TxDOT will evaluate the offeror and proposed project staff. Selection criteria will include: (1) vendor experience, skills, and qualifications; (2) references; (3) costs; and may include (4) oral presentations at the discretion of TxDOT. Vendor selection will be based 60 percent on the attached evaluation matrix and 40 percent based on the project and task costs provided in the response. The evaluation matrices, references, and any oral presentations will be evaluated first. Costs will then be evaluated.