Requirements Analysis Report for Trns•port Estimation, Preconstruction, Construction, Decision Support and Electronic Bidding Systems

Prepared for the Connecticut Department of Transportation (ConnDOT)

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16. Abstract
Info Tech conducted an on-site visit at the Connecticut Department of Transportation in Newington from October 27-31, 2008. The purpose of the visit was to conduct an analysis of ConnDOT's processes and to review the operations and business systems currently in place at ConnDOT relative to the proposed systems. This report outlines the tasks and requirements for implementation of the selected estimation, pre-construction, construction, electronic bidding system, and decision support products. This report includes projected costs and schedules for Info Tech services to assist ConnDOT with the implementation activities.

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1. Executive Summary

At the request of the Connecticut Department of Transportation (ConnDOT), Info Tech, Inc. (Info Tech) conducted an analysis to identify requirements, issues, estimated costs, and timelines to implement new or upgrade existing systems used to manage cost estimation, preconstruction, construction, bid submission and processing, and decision support throughout the agency.

The Trns•port and Trns•port-related systems addressed by this analysis include:

- Highway Construction Cost Estimation System (Estimator®)
- web Trns•port® Preconstruction™
- Electronic Proposal Bidding System (Trns•port Expedite®)
- Electronic Internet Bidding Service (Bid Express®)
- SiteManager®
- Decision Support System (BAMS/DSS®)

Estimator is a standalone cost estimation system that can be used by the agency and external design consultants to prepare detailed estimates for transportation agency projects.

Expedite and web Trns•port Preconstruction are designed to support the life cycle of a construction project from the preliminary engineer's estimate through the contract award.

Bid Express is a secure, electronic, Internet bidding service provided by Info Tech, Inc. for use by contractors in conjunction with Trns•port Expedite to access letting information, perform searches, communicate, and securely submit bids.

The Decision Support System (BAMS/DSS) provides for in-depth analysis and reporting from the entire history of construction program data and the Trns•port historical data warehouse.

SiteManager is a comprehensive construction, materials, and laboratory information management system (LIMS) tool. It provides for data entry, tracking, reporting, and analysis of contract data from contract award through finalization.

At ConnDOT's request, a separate proposal and cost estimate to upgrade the current ConnDOT SiteManager environment has been developed for ConnDOT's consideration. The recommendations in this proposal assume that ConnDOT, either with Info Tech's assistance or on its own, has upgraded its current environment from SiteManager 3.5a to 3.9a.

1.1 Options Summary

Two implementation options have been identified based upon analysis of ConnDOT's resources availability and project requirements. Alternative Support Option B requires more support from ConnDOT staff than the Recommended Comprehensive Support option.

Options	Description	REQUIRED Tasks Total Service Units and AASHTO $ Amount	OPTIONAL Tasks Total Service Units and AASHTO $ Amount
Option A Recommended Comprehensive Support	This option provides ConnDOT with a full-time on-site Info Tech analyst that will perform various project activities and help to keep the project momentum. Additional Info Tech support staff will supplement the on-site resource as needed for various activities, such as workshops, installation, and training.	93.35 Service Units $1,260,225	22.35 Service Units $ 301,725
Option B Alternative Support	This option provides ConnDOT with a half-time on-site Info Tech analyst(s) that will perform various activities and facilitate project momentum. The half-time on-site support may be accomplished by different analysts, depending on which skill set is most needed by ConnDOT at the time, but there is typically a primary resource for continuity purposes. Additional Info Tech support staff will supplement the on-site resource(s) as needed for various activities, such as workshops, installation, and training.	79.45 Service Units $ 1,072,575	22.70 Service Units $ 306,450

1.1.1 A – Proposed Approach – Comprehensive Support

The Implementation and Project Planning section outlines the Comprehensive Support option, which provides time and materials based cost estimates for tasks, descriptions, and a project schedule proposed by Info Tech to provide maximum support to the agency during the Trns•port Implementation. This includes a full-time on-site analyst plus additional on-site support trips for all stages of the implementation through production and project closing. Even though ConnDOT resources will be needed to support this project at all stages of implementation, the full-time on-site resource option allows ConnDOT to somewhat reduce the amount of time these resources will need to dedicate to the project.

1.1.2 B – Alternative Support

The Implementation and Project Planning section provides time and materials based cost estimates for tasks, descriptions, and a project schedule proposed by Info Tech to provide alternative support to the agency during the system Implementation. This includes a reduced level of Info Tech support and project management services. More project responsibility will fall to ConnDOT's resources.

Both options can include the following areas of support:

- Implementation Planning Meeting
- Implementation Kick Off Workshop
- Ongoing Project Management and Implementation Oversight
- System Training Class for ConnDOT Implementation Team
- ConnDOT Implementation Team Support
- System Installation Support
- System Interface Support
- Report Development Support
- Testing Support
- Training Support
- Production Placement Support

1.2 Analysis Project and Report Summary

Info Tech conducted an on-site visit at the Connecticut Department of Transportation in Newington from October 27-31, 2008. The purpose of the visit was to conduct an analysis of ConnDOT's processes and to review the operations and business systems currently in place at ConnDOT relative to the proposed systems. Production applications, interfaces with other applications, current business practices, and potential implementation strategies were discussed with ConnDOT personnel. ConnDOT provided examples of current reports and file layouts.

Using the information obtained during the on-site interviews, various documents provided by ConnDOT, and follow-up communications with ConnDOT staff, Info Tech then performed an implementation requirements analysis. The results and recommendations from this analysis effort are documented in this report.

Info Tech's goal is to assist ConnDOT with the partial or full replacement of its preconstruction legacy systems. This analysis also addresses existing preconstruction and construction Trns•port systems in need of replacement or upgrade. A two-phased approach is proposed in this report. Phase 1 is intended to implement the preconstruction systems (web Trns•port Preconstruction, Expedite, and Bid Express) as generically as possible, minimizing customizations to only those that are extremely important to the business work flow. Phase 1 includes upgrades to ConnDOT's existing Trns•port systems (Estimator and BAMS/DSS) and upgrades to SiteManager. These upgrades will be performed by ConnDOT staff or with the assistance of Info Tech and will utilize existing configurations as much as possible.

Phase 2 is a conditional phase based on ConnDOT evaluation of these systems compared to the current functionality of its legacy systems. This two-phased approach is recommended for the following reasons:

1. The expectation of the Phase 1 implementation is to replace ConnDOT's legacy systems and provide the agency a functioning preconstruction system with Trns•port and Trns•port-related systems as its basis. Once familiar with the features of these new systems in their minimally customized form, the agency will be in a better position to identify needed customizations.

2. During use of Trns•port and Trns•port-related systems in production, it will become apparent to the agency what functions in other legacy systems can be replaced by these new systems and to determine how best to proceed with replacement activities.

3. Because web Trns•port releases impacting Estimator, Expedite, and BAMS/DSS will occur in the future, keeping customizations to a minimum is recommended for ease of migration and upgrades.

Info Tech's experience indicates that agencies who implement with minimal customizations find they conduct business equally well or better under the generic

Trns•port business model and with most of the standard reports when compared to their legacy processing model. Attempts to merely replicate current practices should be managed as much as possible.

> **Note:** The Trns•port business model has evolved over time based upon input and requests from the large group of member agencies.

Business process improvements and best practices will also be addressed as a result of the Trns•port software implementation activities. Trns•port is an AASHTOWare® product, and the AASHTO joint-development process provides a good environment for agencies to learn from their counterparts in other states.

Info Tech will work with ConnDOT on the design of an efficient Trns•port implementation with minimal customizations of the software, while still meeting the critical business needs of the organization. This analysis addresses business processes, data interfaces, reports, data migration, training requirements, and implementation planning. This deliverable is intended to serve as a planning tool for implementation of the Trns•port cost estimation, preconstruction, procurement, construction, and decision support systems documented within.

The project approach recommended by Info Tech is based on its knowledge of ConnDOT's organization and processes and is designed to achieve the most efficient implementation possible. The proposed project plan details the estimated hours of Info Tech services required for implementation of the Trns•port estimation, preconstruction, procurement, construction, and decision support systems documented within.

The proposed schedule and recommended tasks for the implementation of Estimator, web Trns•port Preconstruction, Expedite, Bid Express, SiteManager, and BAMS/DSS are divided into three major parts, as follows:

- Part 1: System Planning and Data Conversion
- Part 2: Test Systems Implementation and Customization
- Part 3: Production Implementation, Testing, and Startup

Part 1 includes prerequisite tasks related to setting up the systems infrastructure to support the Trns•port systems, converting available ConnDOT legacy data as necessary, and loading it into Trns•port databases. Part 2 involves the implementation of the test systems with converted data at ConnDOT for the Trns•port systems. Part 2 will allow initial system testing by ConnDOT users to verify process functionality and address specific areas that require customization to adequately meet ConnDOT's business requirements. Part 3 includes implementation of the Trns•port systems in a production environment using the latest available Trns•port releases for each system.

The schedule, hours, and cost estimate have been prepared with the assumption that services will be provided on a time and materials basis using AASHTO Service Units.

This agreement, once approved by ConnDOT, will reflect the scope of work. Individual project sub-tasks and schedules will be mutually agreed upon by ConnDOT and Info Tech after notice to proceed has been received from ConnDOT. Info Tech's provision of services will be governed by the terms and conditions of the AASHTO Trns•port Maintenance, Support, and Enhancement Work Plan active at the time services are provided.

The Estimator, web Trns•port Preconstruction, Expedite, Bid Express, SiteManager, and BAMS/DSS implementation will be a collaborative effort between ConnDOT staff and Info Tech staff. The majority of the Trns•port implementation tasks are assigned to Info Tech. ConnDOT's portion of the implementation tasks is broken down into required tasks and optional tasks that have been selected by ConnDOT. The optional tasks are recommended to better support ConnDOT's implementation activities.

Costs associated with the annual AASHTO licensing fees for the Trns•port and Trns•port related-systems used by ConnDOT and the additional cost of hardware and software required for the implementation are not included in the estimate. The pricing and timeframes mentioned are based on the assumptions and constraints contained in this document.

2. Introduction

This detailed requirements analysis was requested by the agency in preparation for the proposed implementation or upgrade of the Trns•port preconstruction and construction systems. This report provides ConnDOT with an estimate of the effort required and identifies issues to be resolved concerning the implementation of the selected Trns•port systems. ConnDOT has expressed a willingness to adjust its business practices and adopt the Trns•port functionality as much as possible in order to minimize customizations, while still meeting the functional requirements of its business processes. The recommendations and proposed processes contained in this document reflect this approach.

2.1 Implementation Requirements Analysis Project Description

This implementation requirements analysis includes the following:

Business Process Analysis (Current and Proposed)

A review of present ConnDOT business processes was performed, starting from the time a project is created until it is moved into the construction and financial management systems. Recommendations were developed for the proposed business flow involving the Trns•port systems to be implemented or upgraded at ConnDOT. This includes analysis of interface requirements between the Trns•port systems and ConnDOT systems.

Data Conversion Analysis

Sources of existing data were discussed to identify data mapping and conversion requirements for migrating ConnDOT legacy data into the Trns•port systems. Standard reference data required in Trns•port was also reviewed.

Reports and Document Analysis

A selection of current agency reports, forms, letters, worksheets, manuals and other relevant agency documents were reviewed and compared with the standard reports available in Trns•port.

Recommendations for use of existing Trns•port reports or development of custom reports using web Trns•port's ActiveReports are provided.

Trns•port Hardware and Software Requirements

The responses to the Trns•port questionnaire completed by ConnDOT were reviewed in conjunction with information gathered at the on-site technical analysis meetings. Recommendations were developed for network infrastructure and hardware and software needs to provide efficient performance of the Trns•port systems to be utilized at ConnDOT.

Training Analysis

The types of training required for the Trns•port systems to be implemented at ConnDOT were identified. For each type of training, a description of the training, an estimated number of classes, and a total estimated number of agency trainees are provided.

Trns•port Security

A synopsis of the Trns•port security features, including Access Control Groups, User Roles, Workflow and Phase usage, and individual User Accounts, has been outlined.

Implementation Issues and Considerations

Preliminary requests, considerations, concerns and issues pertaining to the implementation were identified and documented. Detailed resolutions of issues uncovered will take place during subsequent implementation activities.

Implementation and Project Planning

A recommended schedule, along with cost estimates for all defined required and optional tasks have been developed. These include implementation support services, hardware and software setup, system and application software installation, data migration and/or conversion, system configurations and customizations, training, support, and administration.

2.2 Products and Services Addressed

This requirements analysis addresses the implementation requirements for the following systems. Other services available for the systems to be implemented at ConnDOT are also listed.

Trns•port Estimator®

Trns•port Estimator is an interactive, PC-based, stand-alone cost estimation system for transportation construction that provides a graphical user interface for the preparation of detailed estimates. Estimator supports generation of cost estimates using cost-based and bid-based techniques.

All base data for these estimates, such as wages, equipment and material costs, production rates, and historical item price estimation data is stored and maintained on the PC. Estimator can import bid-based item price estimation data from BAMS/DSS and supports

multiple bid histories from which the user can choose. Estimator can transfer data to the web Trns•port Preconstruction system for integration of project estimates into proposal estimates. Projects can be checked out from web Trns•port into Estimator for detailed estimation or fine-tuning of prices. Estimator is well-suited for distributing the estimation function throughout district offices and for exchanging data with design consulting firms. Estimator is integrated with the other Trns•port systems, and supports additional file formats, such as XML and HTML.

The Estimator installations in ConnDOT are several versions out of date, and marginally utilized. This analysis includes among its recommended tasks making current all Estimator installations within the agency, providing updated training on new program functionality unknown to ConnDOT, and refreshing bid history information.

web Trns•port® Preconstruction™

The web Trns•port Preconstruction system provides design, contract administration, and estimation staff with a computerized tool to support master item file management, project definitions, funding specifications, project cost estimation, contract proposal creation, and bid letting packaging. The detailed cost estimate for the Plans, Specifications and Estimates (PS&E) package and bidding proposal can be created in web Trns•port Preconstruction.

Web Trns•port Preconstruction also provides bid-letting personnel with automated tools to manage the notice to contractors, planholder and proposal holder lists, bid data entry, bid tabulation, low-bid analysis, and contract award processing. Besides processing the letting activity, an important function performed by the web Trns•port Preconstruction system is vendor management, including vendor qualification, affiliation, and Disadvantaged Business Enterprise (DBE) information. Integrating the web Trns•port Preconstruction and BAMS/DSS systems provides additional bid review and award analysis capabilities with sophisticated statistical analyses of bid data.

Web Trns•port Preconstruction can provide data to and receive data from both Estimator and Expedite. It will also provide data to BAMS/DSS and SiteManager.

Trns•port Expedite®

Expedite is an electronic bidding system used for bid tab entry by the contractors for bid submission through an electronic Internet bidding system or on electronic media (i.e. CD).

Highway agencies use Expedite to receive proposal and vendor data from web Trns•port Preconstruction and convert it to an electronic bid system (EBS) file for distribution to the contractors. Agencies also use Expedite to process the bids contractors return through an Internet bidding system or on electronic media, and load the EBS file into web Trns•port Preconstruction for bid tab analysis. It can also be used by the agency to enter paper bids received from contractors.

Info Tech, Inc. Bid Express®

Bid Express is an Internet bidding system used by contractors in conjunction with Trns•port Expedite to access letting information and submit bids. Utilizing simple interfaces, Bid Express accepts specific file uploads from the outputs (electronic bidding files, planholder lists, qualified vendor lists, bid tabulation results) generated by both Trns•port Expedite and web Trns•port.

Trns•port SiteManager®

Trns•port SiteManager is a comprehensive client/server based construction management tool. It provides for data entry, tracking, reporting, and analysis of contract data from contract award through finalization. SiteManager can be used by all levels of construction personnel such as field inspectors, technicians, project managers, clerks, auditors, lab personnel, management, producer/suppliers, contractors, and the FHWA.

Materials Management and Laboratory Information Management System (LIMS) related areas of SiteManager are beyond the scope of this document.

Trns•port BAMS/DSS®

The Trns•port BAMS/DSS system provides a fully integrated decision support system for use by senior management, budget/planning officers, construction cost estimators, contract award/bid review committees, contract administrators, antitrust investigators, and other managers. BAMS/DSS provides a complete historical database of the highway agency's construction contract information, a comprehensive set of statistical analysis models, and the capability for ad hoc query and analysis. BAMS/DSS supports a broad variety of applications including executive information requests, summary reports for management, bid management, contract monitoring analyses, market analyses, cost index creation, project planning, project cost estimation, and data compilation for legislative presentations.

BAMS/DSS receives bid and award data directly from web

Trns•port Preconstruction and construction data from SiteManager. Data from non-Trns•port sources can also be imported to maintain its historical database. BAMS/DSS provides historical pricing information to Estimator and web Trns•port Preconstruction for use in developing bid-based estimates.

Training Services

Trns•port software training is conducted on site using agency computers and data. The types of training recommended for ConnDOT include:

- Estimator User Training
- web Trns•port Preconstruction User and System Administrator Training
- BAMS/DSS Basic User and System Administrator Training
- ActiveReports Training (web Trns•port Preconstruction)
- Trns•port Screen Customization Training
- Electronic Bidding System Agency User and System Administrator Training (Expedite and Bid Express)
- Electronic Bidding System Contractor Training (Expedite and Bid Express)
- SiteManager Construction User and System Administrator Training
- SiteManager Template Development Training

Change and Transition Management Support

Info Tech will provide services to discuss with ConnDOT options for developing a plan to manage the transition and change for agency stakeholders affected by the implementation. One Info Tech staff member will travel to the client site to lead a half-day discussion with key agency personnel to educate them about the stages of change, the needs of stakeholders as they go through a change, and techniques to help transition agency stakeholders through the change.

System Customization Services or Support

Creation or Customization of Trns•port Reports, Forms, or Interfaces:

Included are Info Tech recommendations for custom interfaces, batch processes, reports and forms to be developed, and modifications to web Trns•port standard reports. As ConnDOT chooses, Info Tech will development, review, create, test, and deliver selected reports and processes to the agency. These reports and processes may be modified versions of standard Trns•port reports and processes, or completely customized versions.

Onsite Resources

Info Tech resources will live locally and work full time at the agency site for a defined length of time to perform certain activities. This could be a recurring schedule of separate visits, a short term assignment of several months or a long term relocation of one or more years. Two options are included for ConnDOT consideration. Info Tech resources available for onsite projects and the work performed include:

- Project Manager - plan and coordinate Trns•port implementation activities, manage schedules and costs, and collaborate with the agency's Project Manager and/or staff
- Business Analyst - assist with the Trns•port implementation process from the business perspective.
- Technical Resource - develop Trns•port custom reports and processes, support Trns•port system installations and upgrades, and troubleshoot Trns•port technical problems, etc.

2.3 Trns•port Configurations and Customizations

It is important for ConnDOT to understand the difference between Trns•port configurations and customizations because these two terms will be used throughout this document with different implications to the decisions the agency will be making regarding its Trns•port implementation.

Trns•port configurations are supported by the system and allow agencies to tailor the system to their standards. Configurations are typically managed as installation options, such as the database environment and proposal item line numbering increment (for example, 5, 10, 15, and so forth).

Trns•port customizations are modifications to the system that may not be supported and could be overwritten by system updates. However, customizations can be classified as minor and major. Many agencies utilize numerous minor customizations that require a small amount of effort and are typically not impacted by system updates. Examples of minor customizations include some screen modifications, report modifications, and new reports when these reports are written in ActiveReports when using web Trns•port systems. A few minor Trns•port customizations should be expected by the agency. Major Trns•port customizations include modifications to the system such as base code changes, reports that are written in something other than ActiveReports in web Trns•port systems, and completely new processes for functionality not available in Trns•port that are attached to the system via its Plug-in environment. Major customizations typically require significant effort and are at risk for becoming disabled by system updates.

2.4 Info Tech Observations and Recommendations

Observation 1:

A review of the agency's implementation of SiteManager has revealed that the agency is only using a small portion of SiteManager functionality in both the construction and materials management components of the application. A more complete use of the application has been hampered by a deficiency of resources and the use of a legacy preconstruction system that was not engineered to interact with SiteManager in a complete, planned workflow. While ConnDOT has done an estimable effort under the circumstances, a more complete implementation of SiteManager will provide the agency with great efficiencies and provide better data for decision making from the total Trns•port suite.

Observation 2:

Info Tech understands that it is ConnDOT's desire to replace the functionality of its BMIS mainframe legacy preconstruction management system as much as possible.

Observation 3:

Trns•port can be implemented using several approaches, ranging from completely replicating existing business practices and reports to using the generic system "straight out of the box." It is Info Tech's understanding that the agency is open to balancing business process changes versus customizations to the system. The pros and cons of each customization should be carefully considered.

Observation 4:

Info Tech understands the agency would like to proceed with the Trns•port implementation soon and on a reasonably fast implementation schedule.

Observation 5:

ConnDOT faces current and future constraints on personnel staffing levels. Trns•port requires certain regular maintenance activities related to data processing, security, and administration. Collectively the Trns•port modules support critical business functions, and it is crucial to identify and retain sufficient staff resources to support and maintain these modules and their processes.

Recommendation 1:

For the reasons listed above in the observations, Info Tech recommends the agency utilize a Rapid Application Deployment (RAD) methodology for its Trns•port implementation, minimizing the amount of minor customizations to the system and applying no major customizations.

Recommendation 2:

Info Tech believes that the agency will be able to make more informed decisions regarding its customizations to the Trns•port application if it approaches its implementation in a two-phased approach. Phase 1 provides minimal but adequate customizations and implementation activities for the agency to go into production with

Trns•port while replacing functionality of the mainframe BMIS system. Several agencies have been able to successfully go into production with Trns•port for their preconstruction activities with this conservative approach. Phase 2 will then provide the agency an opportunity to have production Trns•port experience before making decisions regarding more major customizations to replace other mainframe systems' functionality.

Recommendation 3:

Info Tech's experience shows that agencies who use full-time or nearly full-time on-site support from an Info Tech implementation specialist go into production with the system faster and with fewer issues than those who use only the required on-site presence for activities such as installations/training. Therefore, Recommendation 3 is to select the full-time on-site resource option that is provided in this document's work plan.

Recommendation 4:

Based on the current implementation plan, Info Tech is recommending ConnDOT implement web Trns•port Preconstruction along with appropriate upgrading of its client/server versions of SiteManager and BAMS/DSS. It is also recommended to upgrade the Estimator software for all users. The approach is to upgrade SiteManager first in a test environment, test it thoroughly, then upgrade it in the production environment. Concurrently, the upgrades of Estimator and BAMS/DSS will take place in the production environments, followed by the implementation of web Trns•port Preconstruction in the test environment. At an agreed upon time, web Trns•port will be implemented in the production environment, replacing selected BMIS mainframe system functionality.

Recommendation 5:

ConnDOT should identify dedicated staff resources for supporting and maintaining the Trns•port modules in production. Two dedicated and separate system administrators for SiteManager and Trns•port preconstruction (Estimator, BAMS/DSS, web Trns•port) should be identified. These administrators will be minimally responsible for system and user security, data management issues, software upgrades, and managing configurations and customizations for their respective modules. They may also be involved in initial and ongoing user training and assistance, manual creation and maintenance, and process review and realignment efforts as agency use of Trns•port evolves.

Recommendation 6:

ConnDOT requested information on the benefits of using Trns•port modules as their mission critical applications for preconstruction and construction business processing. Info Tech can provide a list of benefits ConnDOT should anticipate, such as: fewer required line staff to process the same or increasing workloads resulting in potentially lower payroll costs, reduced procurement costs to the agency by eliminating rejected low bids resulting from contractor submitted data errors, and more accurate long range and detailed project estimates resulting in more efficient use of road program dollars. These are only a few, each of which would result in real dollar savings for the agency. However, the best feedback on the benefits of Trns•port usage comes from its users, agencies who have depended upon Trns•port for years to safely and securely process their preconstruction and construction business. Info Tech recommends contacting other

agencies and frankly discussing their Trns•port experiences, particularly agencies of similar program size or numbers of employees. We can provide a number of ways and contacts to facilitate these discussions at the convenience of ConnDOT.

Recommendation 7:
It has been our experience that typical Trns•port implementation projects enjoy significant benefits from team members who are able to retain their association with the project throughout its life. These team members meld into a unit with shared investment in project goals and outcomes, facilitating the important consultant and agency communications and cross-education necessary for a successful implementation. As much as possible, Info Tech establishes implementation project teams with core resources assigned to the project for its duration. Info Tech recommends that ConnDOT use a similar approach when identifying its core project staff resources.

2.5 Info Tech Project Team

The following Info Tech staff members were key participants in the ConnDOT implementation requirements analysis project and contributed to this report:

Staff Member	Title/Area of Expertise
Mark Douglas	Project Manager: web Trns•port Preconstruction, Expedite
Kathy Yellé	Project Sponsor/Senior Manager: Estimation, Decision Support, web Trns•port Preconstruction
Marie Hammer	Senior Analyst: Estimation, Decision Support, web Trns•port Preconstruction
John D. Lee	Consultant: Trns•port Construction implementation and usage
David Kaiser	Systems Analyst: Electronic Bidding Systems
Charles Girard	Systems Analyst: Databases and Technical Configurations

Table 2-1. Info Tech Implementation Requirements Analysis Team

3. Current ConnDOT Processing Environment

This chapter analyzes the current business flow and processing environment at ConnDOT as they relate to the implementation of the Trns•port and related systems.

ConnDOT has a total of eight counties and four ConnDOT regional areas referred to as Districts. The state is also divided into 169 subareas designated as Towns, with the entire state designated as Town number 170 for data aggregation and reporting purposes. ConnDOT's Office of Engineering currently uses SiteManager to manage its construction projects. BAMS/DSS and Estimator are used in small roles during estimation phase activities. The preliminary and detailed analysis meetings provided a comprehensive review of ConnDOT's current workflow. The analysis presented in this chapter is based on the information gathered at those meetings. The meetings focused on the processes associated with design and estimation, preconstruction, and the letting and award functionality. The meetings also encompassed selected activities conducted by Planning and Programming, Management and Finance, Construction, Project Development, Contract Services, Public Works, Operations, Traffic Engineering, Systems Engineering and Project Management business areas.

Workflows of relevant departments were reviewed, as was the exchange of information between departments. Also reviewed were the software systems currently in use, data flows between the various systems, and selected reports generated by those systems.

It is understood that ConnDOT would like to perform a minimum amount of customizations to the standard Trns•port systems. ConnDOT is willing to change business processes in order to standardize practices across the departments. This will minimize time currently spent entering information into multiple places and maintaining hardware and software for multiple systems.

3.1 Current ConnDOT Business Flow

This section analyzes the current business flow for ConnDOT's Design, Estimation, and Preconstruction section.

Figure 3-1 illustrates the current business process flow for ConnDOT during the design and estimation phases. The shaded boxes detail primary tasks performed at each stage.

This figure is included in this template as a sample of the type of information and level of detail to collect.

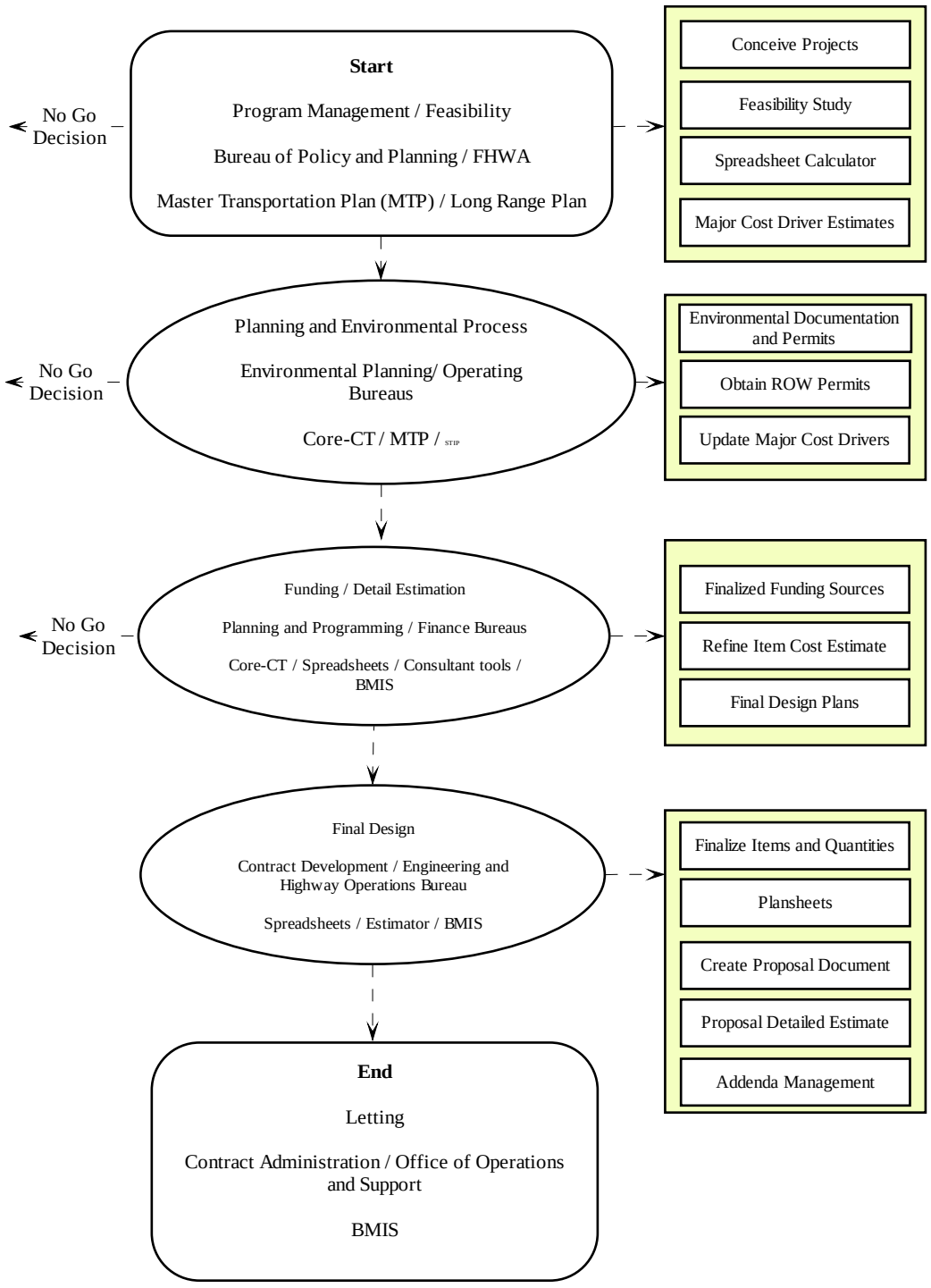


Figure 3-1. Current ConnDOT Design and Estimation Business Flow

Figure 3-2 illustrates the current business process flow for ConnDOT during the preconstruction, and letting and award phases.

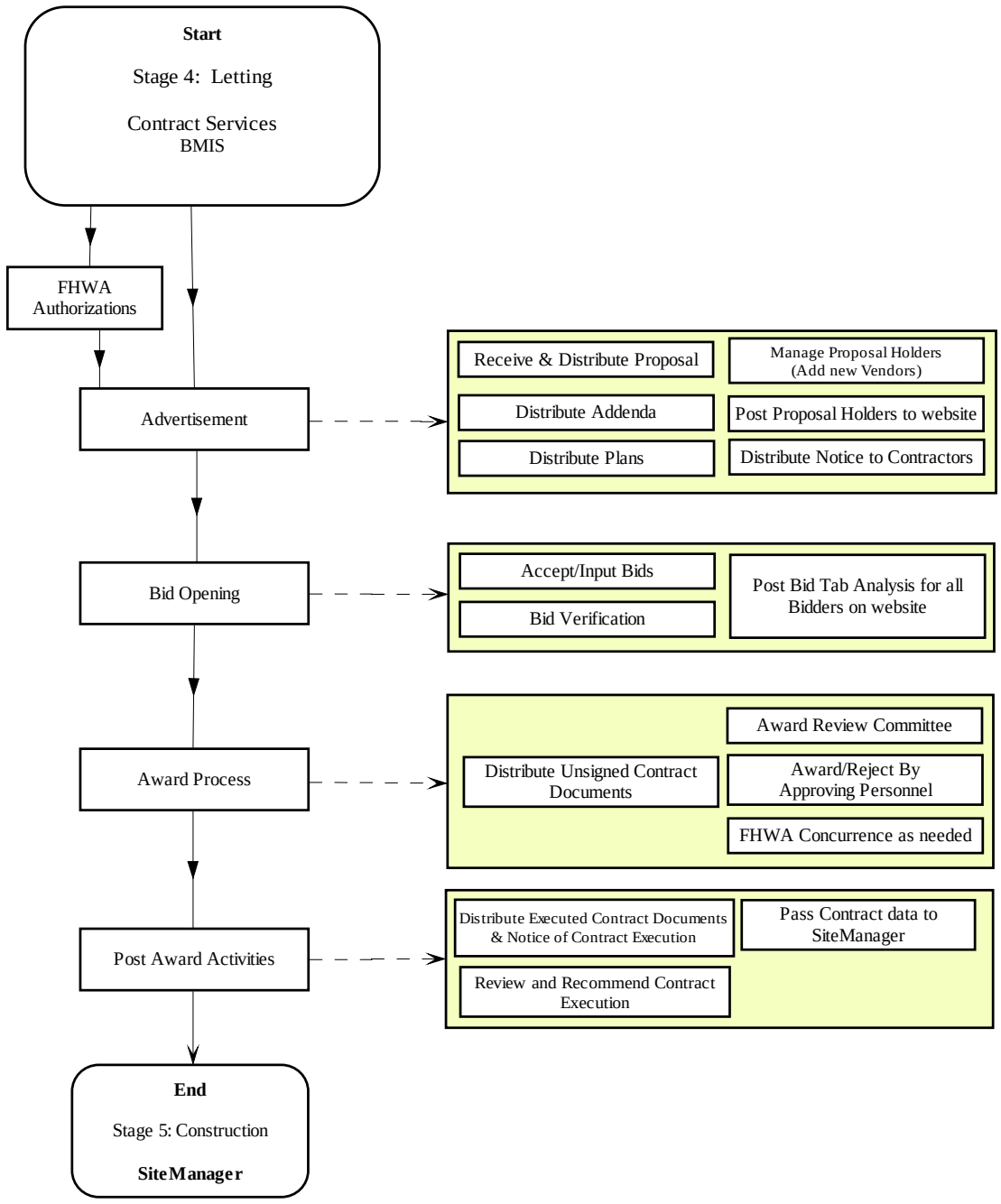


Figure 3-2. Current ConnDOT Preconstruction, Letting and Award Business Flow

Figure 3-3 illustrates the current business process flow for ConnDOT during the construction phase.

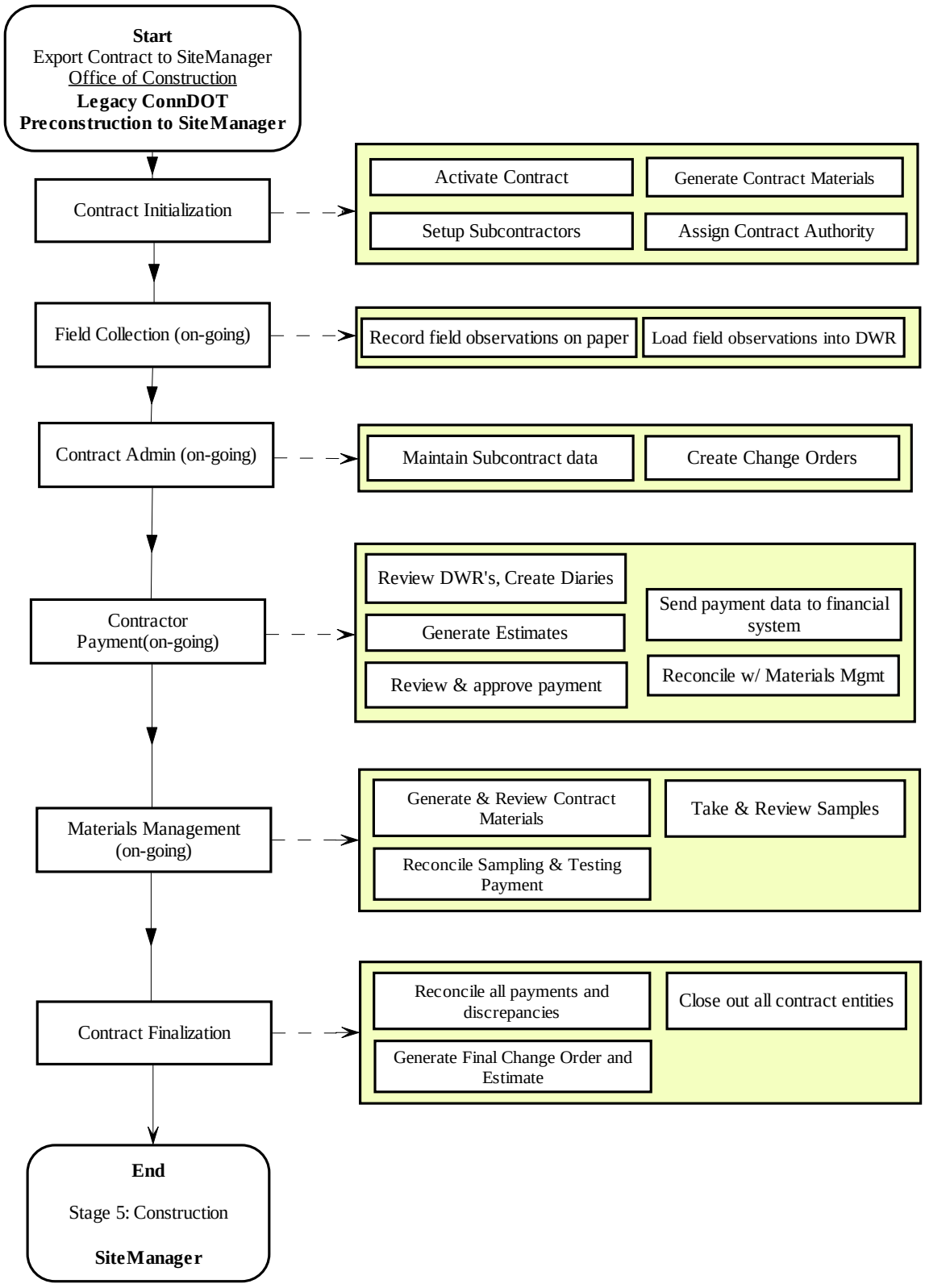


Figure 3-3. Current ConnDOT Construction Business Flow

3.1.1 Project Delivery Process

Project conception starts as part of Connecticut's continuous long range plan development. At this point, there are only conceptual development frameworks with no specific projects formed for ConnDOT construction. As the long range plan develops and is approved, various components are moved into a nearer term window, which are ideas and development intentions that may become funded within the next seven to ten years. These intentions form the master transportation plan (MTP), a moving target of program asset development and maintenance, intended to be procured within that ten-year time frame. During this time, the conceptual and policy-generated intentions may be framed as potential projects. The various operating bureaus provide scoping or parametric-type estimates, used for program planning and advance funding efforts.

As selected projects take shape and become more coherent, design and estimation activities begin for any which are scheduled as falling into the first four years of the master transportation plan. These first four years form the basis of the statewide transportation improvement program (STIP), the group of firm projects intended for letting.

As projects become confirmed, they receive formal project initializing information from the CORE-CT financial system, which establishes them as real projects. It also introduces them to funding and finance information. Funding details are specified, which may impact project feasibility or scheduling decisions.

Consultant designers are responsible for the bulk of agency designs and provide initial detailed project estimates. Estimates are prepared by the consultants using their preferred systems, then transferred to ConnDOT staff liaisons for review. Agency estimation staff provide cost refinement of their estimate prices and completion of proposal packages.

As the estimate packages are received from designers, the Bid Management Information System (BMIS) is updated with this information. Estimation refinement is performed by in-house estimation staff utilizing several tools. As these estimates are refined and completed, the BMIS system is updated with what eventually becomes the final engineer's estimate.

While project refinement is taking place, proposal packages are created, in which one or more projects are bundled into a bidding package for publication and distribution. Once the final engineer's estimate is approved for all projects in a proposal, the proposal is readied for advertisement. Bid letting dates are assigned and the proposal is released to the contracting community. Proposal and plan sets distribution and sales are recorded, and the agency website is updated with necessary bid letting, addenda/amendment, and other proposal and bidding related information.

On bid letting day bids are received, BMIS is updated with letting results, and proposal award determinations begin. Later, the website and other publications are updated with final proposal award determinations, contracts are completed, and contractors are provided with notice to proceed with construction activities. Awarded contract

information is passed to the current construction management systems and construction activities begin.

3.2 Current ConnDOT Systems Environments

Figure 3-4 illustrates the current engineering processing environment for ConnDOT's design, estimation, preconstruction, and construction activities. The numbering provides cross-references to the corresponding information in the following sections.

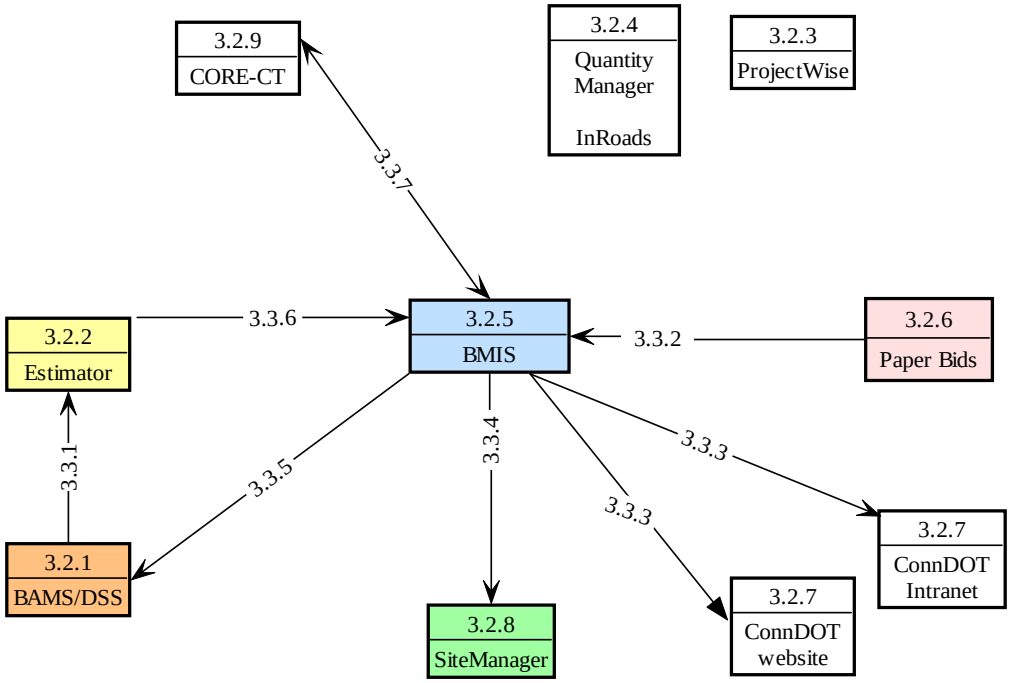


Figure 3-4. Current ConnDOT Engineering Processing Environment

3.2.2 BAMS/DSS Standalone

BAMS/DSS provides bid histories for use with the Trns•port Estimator system. The bid tabulation information processed by BAMS/DSS comes from history stored in BMIS. Currently complete bid history information is not provided to BAMS/DSS, nor is the information provided in a time frame conducive to supporting the creation of useable or reliable bid histories.

3.2.3 Estimator

Estimator is provided bid history catalogs from BAMS/DSS. Currently, the catalogs are not useful to ConnDOT estimators, so the Estimator system is used by the estimators solely to provide a tool for identifying order of magnitude types of data entry errors. Its primary estimation features go largely unutilized.

3.2.4 Bentley ProjectWise

ConnDOT is currently using Bentley ProjectWise for a document management system. In the future, this system may be integrated into ConnDOT's preconstruction and/or construction management processes. There are no current links between this system and others listed here.

3.2.5 Bentley InRoads and Quantity Manager

Bentley InRoads is the current CAD/roadway design system used by ConnDOT. It contains a Quantity Manager utility which is capable of interfacing with Trns•port preconstruction and estimation systems. There are no current links between this system and others listed here.

3.2.6 BMIS

The Bid Management Information System (BMIS) is the main preconstruction system in use in ConnDOT. It holds project estimate data, proposal package data, vendor data, bid letting results and bid tabulation history. Designer estimate, final engineer estimates, and contractor bids are stored here.

3.2.7 Paper Bids

Paper bids are received on bid letting day and manually keyed into BMIS by agency staff.

3.2.8 ConnDOT Website and Intranet

The ConnDOT public website currently hosts various reports and files related to preconstruction and construction activities. These reports are generated from several systems and are intended for internal and public distribution. Some samples are prequalified vendor lists, previous bid letting results, and notice to contractor announcements.

3.2.9 SiteManager

The SiteManager release in use at ConnDOT is its primary construction management system. It is currently at an unsupported version level. SiteManager helps the agency manage the construction activities, including daily inspections, vendor payment calculations, and materials management. Certain system functionality is underutilized in the way it is currently deployed by ConnDOT.

3.2.10 CORE-CT Financial System

CORE-CT is the primary financial and accounting system used by ConnDOT. Personnel payroll information, project funding allocations, and vendor payment functions are processed here.

3.3 Current ConnDOT Data Flows

This section describes the current ConnDOT data flows. It includes the standard Trns•port interfaces as well as the current custom interfaces with Trns•port. The subsection numbers correspond with the numbering annotated in Figure 3-4.

3.3.1 BAMS/DSS to Estimator Catalogs

Item bid history data generated by the Price Estimation Methods (PEMETH) model in BAMS/DSS is passed into Estimator for detailed bid-based estimation. English and metric items may be imported into different catalogs. This is a standard interface in the releases of Trns•port in use at ConnDOT that has been updated and improved in the current releases.

3.3.2 Paper Bids to BMIS Pass

Paper bids received by ConnDOT during bid letting bid submissions are hand-keyed into BMIS. This is a manual data pass.

3.3.3 BMIS to ConnDOT Public Website and Intranet

Both of these passes represent ConnDOT data hosted on its public and internal intranet website. Various information related to preconstruction and construction activity is posted and updated on an ongoing basis. These reports and data are generated from several systems and are intended for internal and/or public distribution. Some samples are prequalified vendor lists, previous bid letting results, and notice to contractor announcements.

3.3.4 BMIS to SiteManager Pass

This custom data pass provides details of contract awards from BMIS to SiteManager, including proposal, project, and awarded bid tabs. Reference data is also passed as required.

3.3.5 BMIS to BAMS/DSS Pass

This customized process passes details of contract awards or rejections, including proposal, project, and bid tab data, from BMIS to BAMS/DSS. Reference data is also

passed. The data mapping this process is based upon should be reviewed and revised for completeness, as it was created for a version of BAMS/DSS which is now obsolete.

3.3.6 Estimator to BMIS

This custom pass sends corrected estimate data from Estimator to BMIS as part of finalizing project and proposal preparation. The Estimator pricing catalogs are out of date so project estimates are corrected in Estimator using data from other sources.

3.3.7 BMIS to CORE-CT

This is a manual data pass. Project header and initiation information is generated in CORE-CT and used in BMIS to create new projects. Preconstruction financial, accounting, and funding information from CORE-CT is also hand-keyed into BMIS. Finalized cost estimates from BMIS are updated in CORE-CT.

4. Proposed ConnDOT Processing Environment

This chapter describes the proposed business flow and processing environment at ConnDOT as they relate to the implementation of the web Trns•port Preconstruction and electronic bidding systems, and the upgrade and reassessing agency use of the Estimator, BAMS/DSS and SiteManager systems. The current ConnDOT systems that will remain in place are mentioned in this chapter in terms of how they will be impacted by the Trns•port implementation.

4.1 Proposed ConnDOT Business Processes

The implementation of Trns•port presents opportunities to improve the efficiency of the workflow at ConnDOT and consolidate processing for the planning, estimation, preconstruction, advertisement, letting and award, decision support and construction functions into an integrated set of AASHTO-supported products.

Web Trns•port Preconstruction will become the holding place for selected long range planning estimate information, project information, and funding data. As projects proceed through the design phase, item and quantity information can be exported from the CAD system using Bentley's InRoads Quantity Manager utility and imported into web Trns•port Preconstruction or Estimator. Projects may be checked out to Estimator from web Trns•port Preconstruction for detailed cost estimation.

Estimator will be used for estimating projects both internally and by consultants. Use of improved bid histories in Estimator from BAMS/DSS should enhance the accuracy of cost estimation and help to eliminate errors. Cost-based, percentage-based, and reference pricing can also be performed in Estimator.

Web Trns•port will help in streamlining proposal creation, setting up lettings and awarding contracts. Data transfer is easily accomplished between web Trns•port Preconstruction and Expedite and the associated Internet bidding system for advertising the lettings, posting the proposal bid document, accepting electronic bids, and publishing bid tabs.

Using BAMS/DSS, various types of pre-award analyses can be performed on recently let proposals in web Trns•port Preconstruction.

After award, contract data from web Trns•port Preconstruction is passed to SiteManager for construction management, and to BAMS/DSS for warehousing and running various types of decision support analyses.

ConnDOT's plan is to phase out and sunset its legacy mainframe system BMIS (Bid Management Information System), whose functionality would be replaced by the above-named Trns•port systems. In addition, web Trns•port Preconstruction is expected to replace some of the functionality of the already phased-out PCMS (Preconstruction Management System), for maintaining information on projects, contacts, locations, and planning estimates.

Interfaces with the CORE-CT statewide financial management system may be required. Depending on the requirements, this may involve simply reformatting existing Trns•port import/export file formats.

4.1.1 Proposed ConnDOT Design, Estimation, Preconstruction, and Construction Business Flow

Figure 4-1 and Figure 4-2 illustrate the proposed business process flow for ConnDOT during the design, estimation, preconstruction, letting/award, and decision support phases, including the information systems which are a part of, or may interface with, Trns•port. Figure 4-3 depicts the SiteManager and Materials process flow.

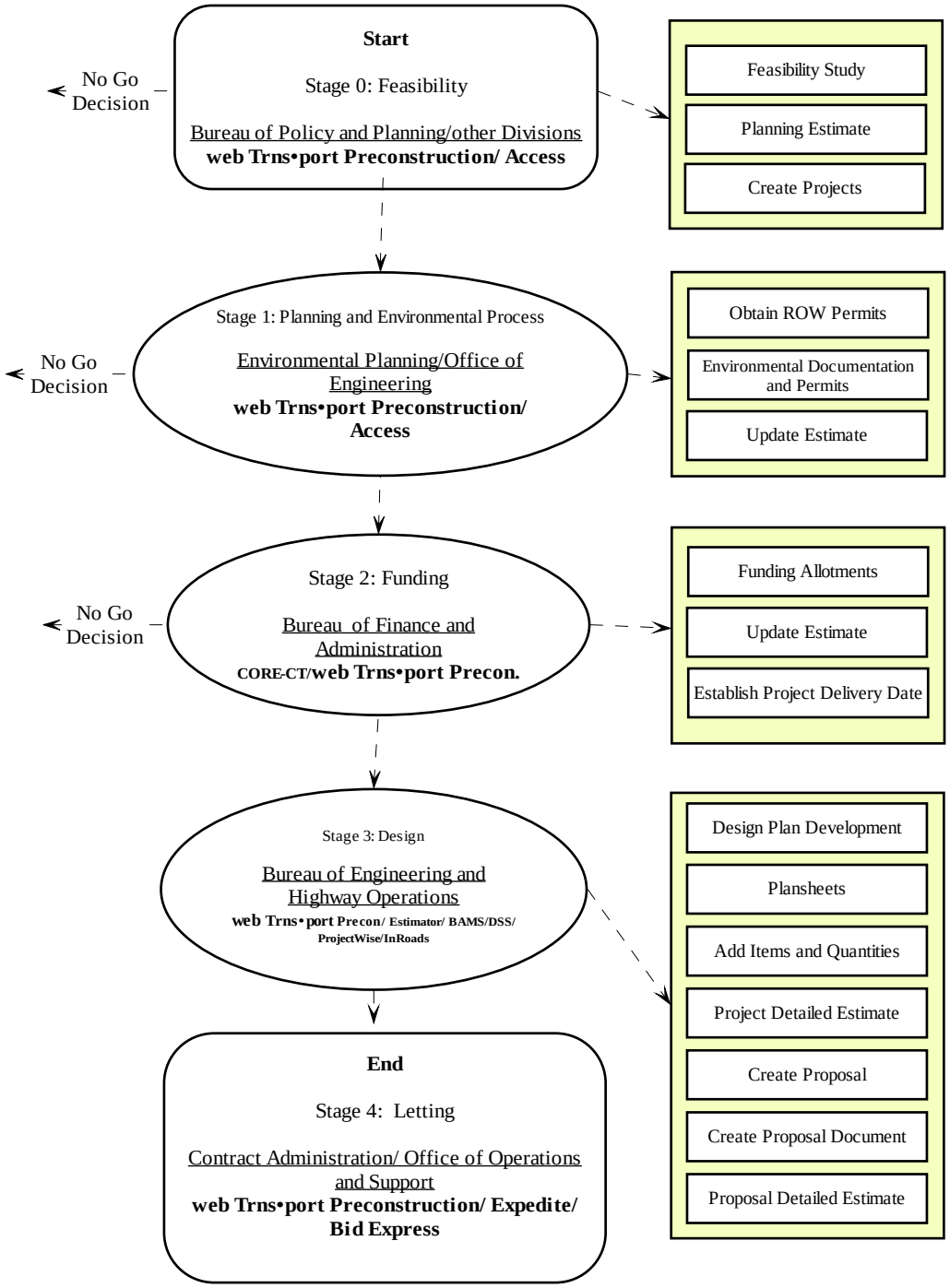


Figure 4-1. Proposed ConnDOT Design and Estimation Business Flow

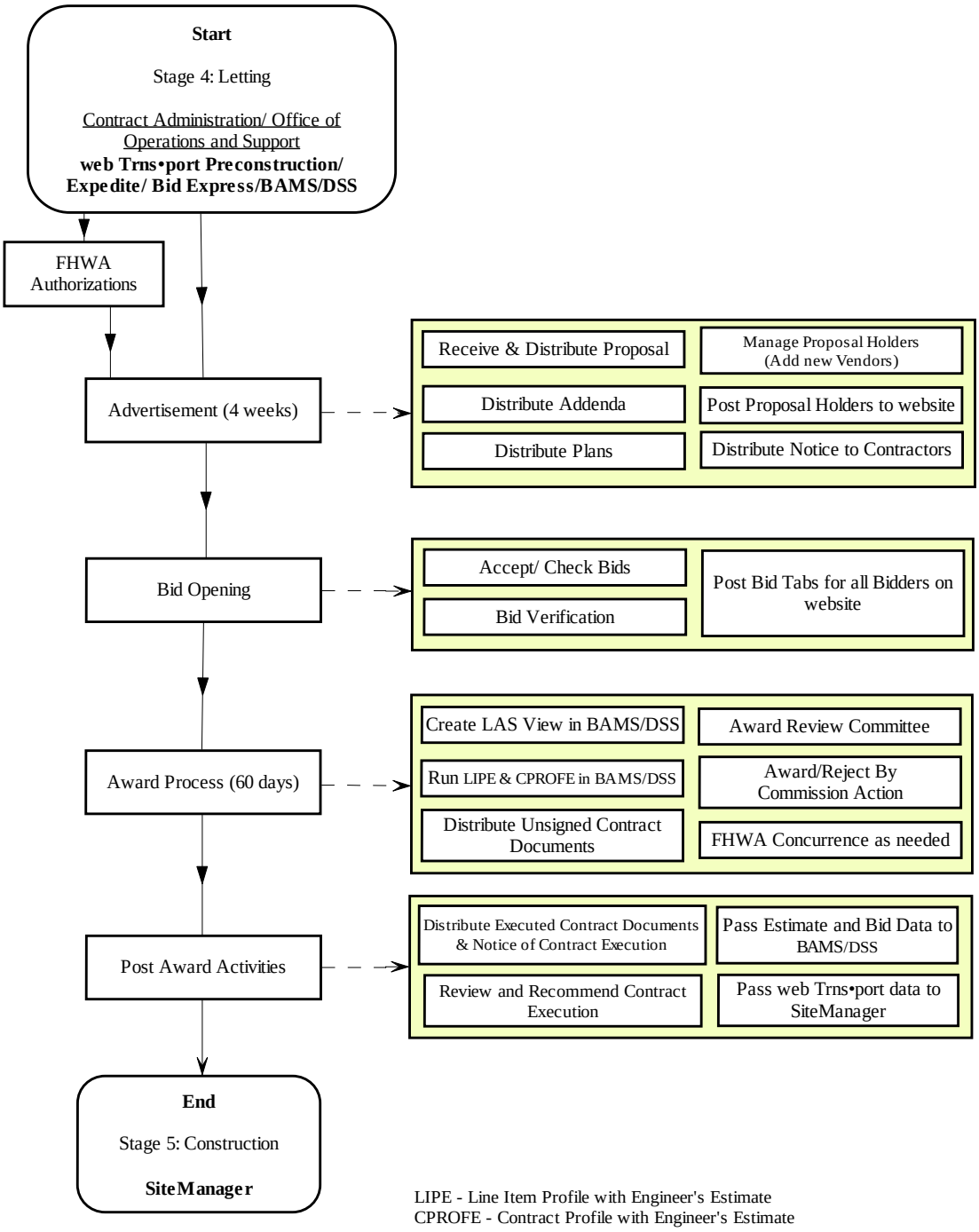


Figure 4-2. Proposed ConnDOT Preconstruction, Letting and Award, and Decision Support Business Flow

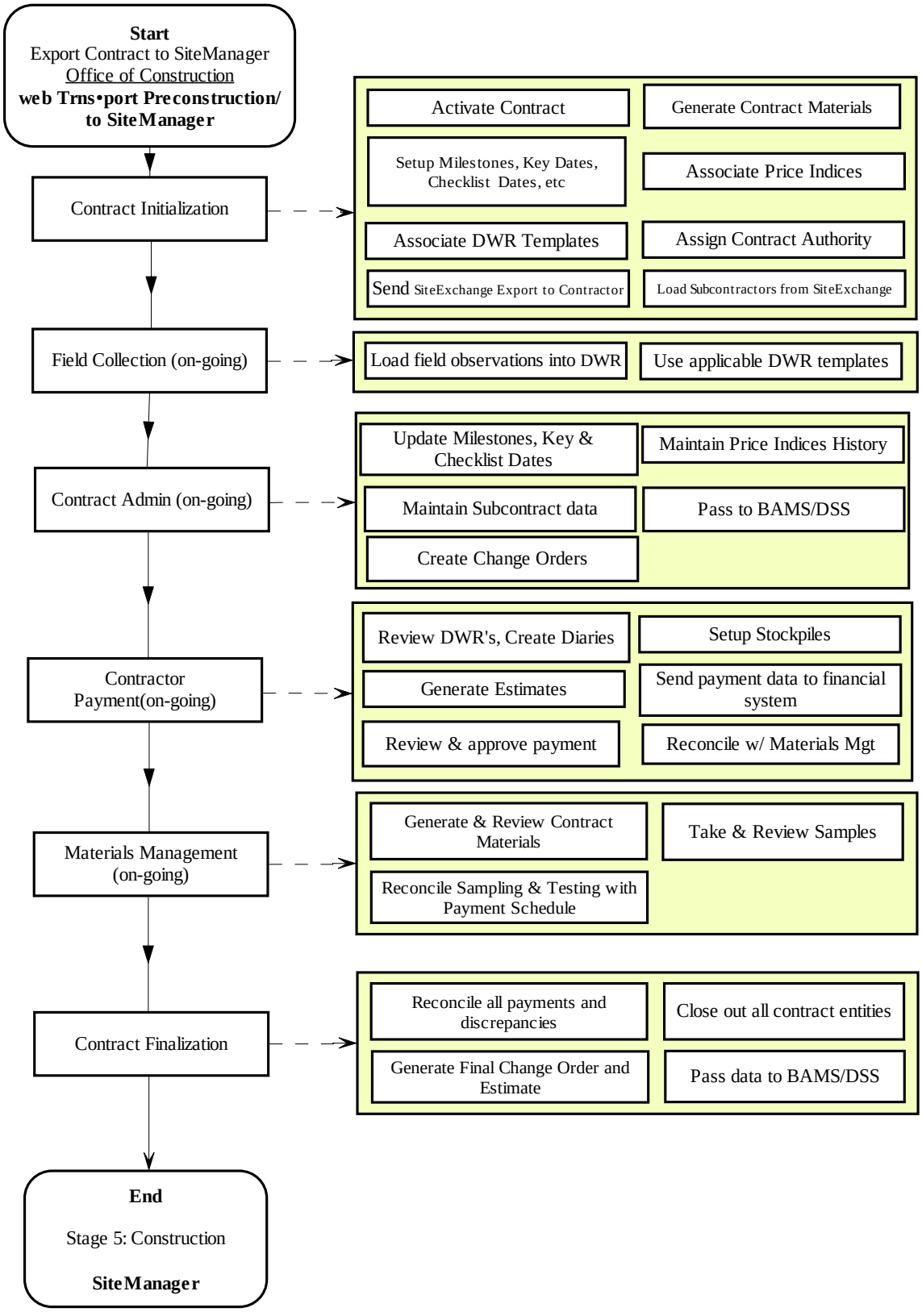


Figure 4-3. Proposed ConnDOT Construction Business Flow

4.1.2 Impact of Proposed Implementation on ConnDOT Bureaus

This section describes how the proposed Trns•port implementation would contribute to the business process flow in the various bureaus and sections at ConnDOT.

Bureau of Policy and Planning

The Bureau of Policy and Planning and other divisions involved with long-range planning may use web Trns•port Preconstruction to enter and record projects at conception. Basic project information, location, contact, and funding data can be initiated and updated in the web Trns•port project records. This could potentially replace some of the lost functionality from the former PCMS system. If interfaces with CORE-CT are required, the standard web Trns•port import and export file formats can be adapted.

The long range planning estimate can be recorded and managed throughout the project's pre-letting life-cycle in web Trns•port Preconstruction. Planning estimates can be calculated as they are currently, and/or BAMS/DSS reports could be used. BAMS/DSS provides historical data for bid-based pricing and potentially for lane-mile costs. Items could be collapsed into major item groups so that bid history models in BAMS/DSS can be used for estimation before the item details are known.

Bureau of Finance and Administration, Capital Services Division

In its capacity of assigning funding sources for projects, the Bureau of Finance and Administration Capital Service Division would benefit from implementation of web Trns•port Preconstruction. The department may be involved in maintaining the project funding information, and the application should provide easy access for informational purposes as well. Web Trns•port is accessed through a web browser and security can be set to limit user access according to the phase of the project. Reports that may be useful are described in Chapter 6.

Bureau of Engineering and Highway Operations, Design Services

The Design Services Division of the Bureau of Engineering and Highway Operations will use web Trns•port Preconstruction to progressively add information throughout the project design life cycle. Project items and quantities can be imported from InRoads Quantity Manager. Projects are checked out to Estimator from web Trns•port Preconstruction for item level estimation.

Estimator has been under-utilized by ConnDOT in the past, serving mainly as a means to check for errors. Updating and fine-tuning the historical data in BAMS/DSS will improve the basis for cost estimation. The bid history regression and weighted average analyses from BAMS/DSS are imported into the Estimator catalog for use by both in-house estimators and consultants, thus helping to standardize the estimation process.

Projects will be assembled into proposals, and proposals assigned to scheduled lettings in web Trns•port Preconstruction. Proposals can be checked out to Estimator for fine-tuning of unit prices. Existing systems for assembling the proposal document and specifications will be kept, except that the schedule of items for bidding will be produced in web Trns•port Preconstruction.

Ownership of the BAMS/DSS system is important because it is the historical data repository that supports bid-based estimation, pre-award analyses and a wide variety of decision support analyses and reporting. ConnDOT has decided that the Engineering Applications Section will continue to be the home for BAMS/DSS. Data will be passed to BAMS/DSS from both web Trns•port Preconstruction and SiteManager. An initial data conversion process will take place to repopulate the BAMS/DSS data with historical data from BMIS. Once web Trns•port is in full production, data will no longer be passed from BMIS to BAMS/DSS.

Bureau of Finance and Administration, Contract Administration

The Contract Administration Section, which is part of the Bureau of Finance and Administration, will begin to use web Trns•port Preconstruction to manage all of the letting activities up to and including the award process. BMIS will be run in parallel during the testing and validation stages of the implementation project and will eventually be phased out of production use.

The Contracts section is divided into three operating units: the Prequalification Unit, the Pre-Bid Unit, and the Post-Bid Unit.

The Prequalification Unit would most likely handle management of vendor information, including vendor prequalification, which is recorded in web Trns•port Preconstruction and passed to the other Trns•port modules. Currently, SiteManager handles management of Trns•port reference tables such as the vendor and item master lists. All Trns•port reference table management will move to web Trns•port Preconstruction when its implementation is completed.

The Prequalification Part C form could be incorporated into the Expedite Bid program for use by contractors submitting bids electronically. Currently at ConnDOT, the prequalification process is executed manually. Research is needed to determine how this process could be facilitated using web Trns•port. The classification codes for contract type of work should be coordinated with the contractor work classifications.

The Contracts Pre-Bid Unit can use web Trns•port Preconstruction in conjunction with Bid Express and Expedite to advertise and distribute proposals, issue addenda, accept bids electronically and post apparent bid results. If ConnDOT opts to implement the Bid Express Plan Room, all plans and specifications could be distributed through this service. Decisions should be made as to whether the Bid Express service can fully or partly replace the Notice to Contractors subscription process.

The Post-Bid Unit will use web Trns•port Preconstruction and BAMS/DSS for pre-award analysis of bids. Statistical models can be run in BAMS/DSS against data from the web Trns•port database to compare bid data to the estimate, profiling the contract as a whole using the Contract Profile with Engineer's Estimate model (CPROFE), and at the item level using the Line Item Profile with Engineer's Estimate model (LIPE). Graphics and reports are produced for review by the award committee.

After award, standard processes are run to move contract information from web Trns•port Preconstruction to SiteManager and BAMS/DSS.

Bureau of Aviation and Ports and Bureau of Public Transportation

All types of projects currently estimated and bid through the BMIS system will be processed through the Trns•port systems. Construction contract management will continue to be handled in SiteManager, with the potential for business process reevaluation.

Bureau of Engineering and Highway Operations, Construction Division

The bureau has implemented SiteManager for its construction contracts. As a new workflow is established with web Trns•port Preconstruction replacing ConnDOT's legacy systems, many code table and reference table decisions should be revisited in light of the new integrated Trns•port workflow. The recommended business process reevaluation of ConnDOT's current SiteManager utilization will result in a more complete use of the application.

Bureau of Finance and Administration, CORE-CT Support Unit

The CORE-CT Support Unit, a division of the Bureau of Finance and Administration, may be involved in any interfaces between Trns•port and the CORE-CT state-wide financial management system. Further research is needed to determine interface requirements, if any.

4.2 Proposed ConnDOT Systems Environment

The Proposed ConnDOT Processing Environment Diagram in Figure 4-4 shows the Trns•port–related information systems and interfaces with existing ConnDOT systems after the proposed Trns•port implementation tasks are completed. The shaded boxes reflect standard Trns•port and Info Tech systems and the numbering provides cross-reference to the corresponding information in the following sections. Dotted lines indicate potential interfaces, and solid lines indicate interfaces using existing processes.

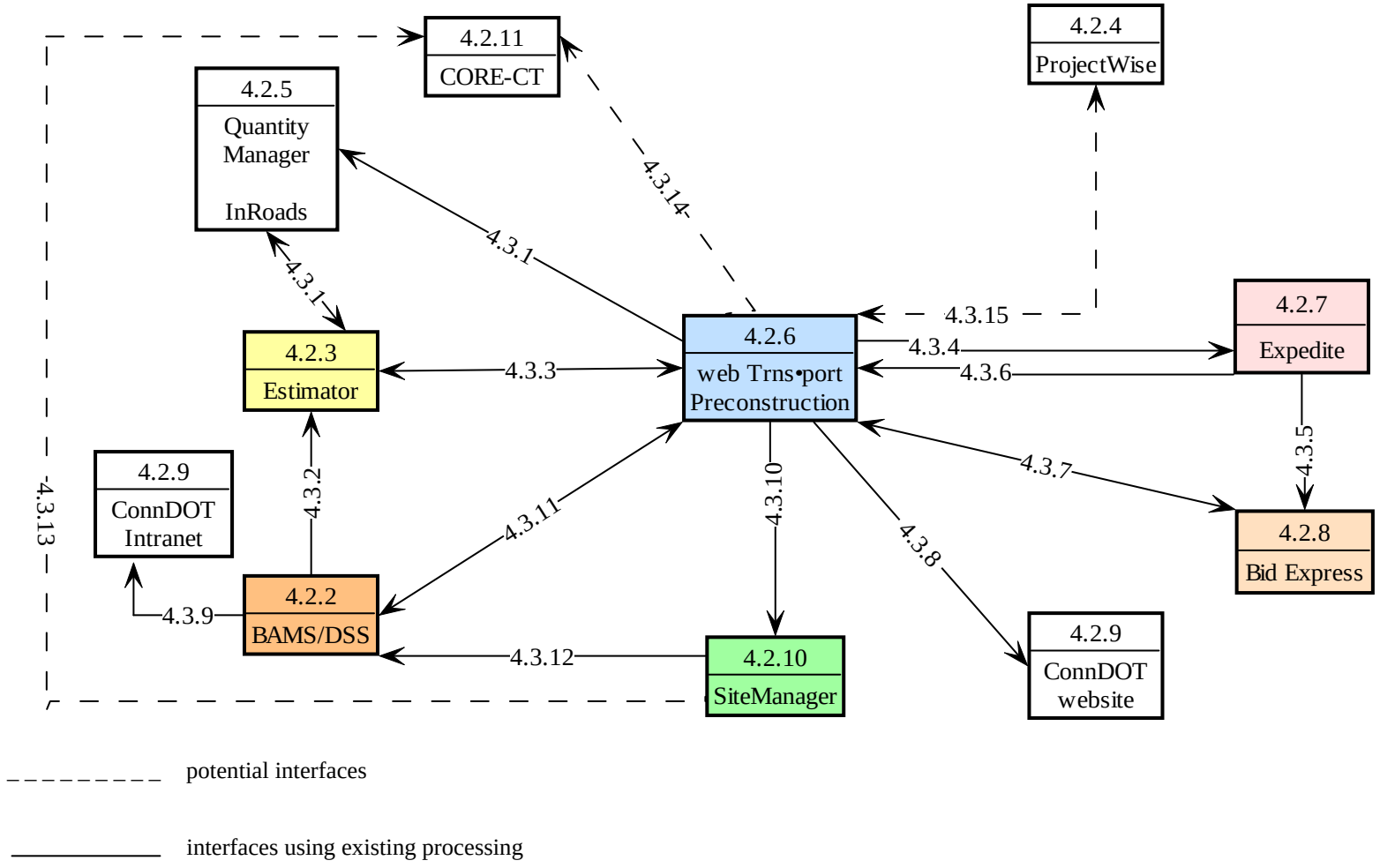


Figure 4-4. Proposed ConnDOT Processing Environment

4.2.1 Implementing the Trns•port Preconstruction Environment

The web Trns•port Preconstruction system will be implemented in a web-based environment interfacing with client-server BAMS/DSS, server-based Estimator, standalone Expedite, and web-based Bid Express.

The SiteManager client/server construction system upgrade and business process reevaluation can take place independently of the preconstruction systems implementation.

Info Tech recommends a three-part approach to the upgrade and implementation of the client/server and web-based Trns•port preconstruction systems.

Part 1 – Legacy Data Mapping and Conversion

Implementation Part 1 will define the code tables and reference data required for all of the Trns•port systems, and identify the existing agency data to be converted from the BMIS system. Reference data will be extracted from the ConnDOT SiteManager database, and project and proposal estimate and bid data will be converted from BMIS.

Updated data mapping from ConnDOT's BMIS and other required systems to BAMS/DSS and/or web Trns•port Preconstruction will be determined. (Converting in-process project and proposal data to web Trns•port Preconstruction is optional.) A cross-walk spreadsheet and summary notes of the mapped data representing a crosswalk between BMIS and Trns•port will be created. This document will list mapping activities and any mapping or conversion issues in informal notes format.

ConnDOT Trns•port systems will be set up at Info Tech's Gainesville, Florida office for data conversion and testing.

Info Tech will write programs to convert an extract of ConnDOT historical data into BAMS/DSS and/or web Trns•port Preconstruction. Info Tech recommends converting all available historical contract data that can be mapped into BAMS/DSS. For the web Trns•port optional data conversion task, all in-progress projects up to a pre-determined cutoff date can be converted. Otherwise, in-progress projects would be completed in BMIS with only new projects to be entered into web Trns•port. Further information on the proposed data conversion is in Chapter 5.

Bid histories will be built for and imported into Estimator and web Trns•port Preconstruction. Info Tech will perform initial testing of the bid history prices generated from the refreshed BAMS/DSS data.

ConnDOT intends to gradually replace BMIS with web Trns•port Preconstruction. To help with that process, the following steps should be performed:

1. A functionality gap analysis should to be conducted as part of the Trns•port implementation project as soon as possible to identify whether there is any BMIS functionality that is not supported by Trns•port.

2. A plan should be made for phasing out projects in progress in BMIS as web Trns•port Preconstruction goes into production. This will be affected by whether ConnDOT accepts the option of converting in-progress project data into web Trns•port.

Definition of standard preconstruction business processes must also begin in Part 1. While business processes will continue to evolve throughout the implementation project, high-level processes must be defined early so that they can be fine-tuned as the project continues.

Part 2 – Test System Implementation and Custom Configuration

In Part 2 the latest release of BAMS/DSS will be installed in a client/server environment (unless the standalone option is selected). Ideally this environment or standalone system will be accessible by authorized Info Tech project members via secure VPN remote connections. The new database will be populated with the converted data and tested. Profiles will be set up for standard processes including imports, data views, and models. Testing can be done on the production system for BAM/DSS, since most processes do not alter the database.

Secure VPN remote access greatly facilitates Info Tech's ability to support the agency during and after the project. ConnDOT is encouraged to explore this option.

BAMS/DSS provides a complete historical database of estimation and construction contract information, receiving data from web Trns•port Preconstruction and SiteManager. BAMS/DSS also provides item price data to Estimator and web Trns•port Preconstruction for use in developing estimates.

The upgrade and reassessment of the Estimator system can take place prior to web Trns•port Preconstruction implementation. Estimator links to and shares information with web Trns•port Preconstruction and BAMS/DSS via standard Trns•port data passes. It is not necessary to install a separate test system as the Estimator data is file-based and test projects can be created.

The web Trns•port Preconstruction system will be installed at ConnDOT in a test environment to validate the operating system and will be used by ConnDOT for testing and training. The test system will also be the environment used by ConnDOT or InfoTech programmers while any customized ActiveReports reports or Crystal reports and custom interfaces are being written. Ideally this environment will be accessible by authorized Info Tech project members via secure VPN remote connections.

Web Trns•port Preconstruction is first installed as a generic application, a process that includes the installation and setup of the Oracle database, running generic SQL scripts to

populate metadata and code tables, and then the installation and setup of the application server(s). (Metadata refers to descriptive information about the database structure, such as table names, column names, column data types, validation rules, and so forth.)

Initial acceptance tests are run using packaged generic data to test the installation. Optionally, a separate system can be installed for running the automated acceptance tests, which truncate the database tables as part of the process. If the second test system is not installed, the single test database could be backed up before running automated acceptance tests and restored after completion.

Once generic web Trns•port is installed and tested, ConnDOT's converted data will be loaded into the Oracle database. (Depending on the data conversion option selected, this includes projects in progress and/or reference data.) ConnDOT users will be trained on the test system to perform testing activities.

Interfaces will be written for communication between Trns•port and ConnDOT non-Trns•port production systems. Integrating the web Trns•port Preconstruction and BAMS/DSS systems provides additional bid review and award analysis capabilities with sophisticated statistical analyses of bid data.

Different modules in the Expedite electronic bidding system will be used by ConnDOT to create the schedule of biddable items and load contractors' bids; and used by contractors to enter and submit their bids. All of the Expedite modules are installed as standalone applications on a user's computer. The Expedite modules interface with a web-based bidding information service accessed by contractors over the Internet. A web portal link for downloading bids will be installed on two workstations at ConnDOT. These workstations will be accessible by the designated ConnDOT electronic bidding administrators and used to prepare data for import into web Trns•port Preconstruction.

Expedite and the associated Internet bidding system will go through a thorough testing period by ConnDOT and volunteer contractors before production begins.

Part 3 – Production Implementation, Testing, and Startup

Production Trns•port systems will be installed at ConnDOT along with new ActiveReports, interfaces, and refreshed data converted from legacy systems. The production systems installed will be the most recent client/server and web-based Trns•port releases at the time of this activity. The test database will also be refreshed with the newest converted data. (If there is a separate system for acceptance testing, its database will remain unpopulated.)

Parallel tests will be run using both ConnDOT's legacy and new Trns•port production systems to validate the accuracy of the new Trns•port systems, interfaces, and procedures. Any issues discovered during the parallel testing activities will be addressed.

After parallel testing has been successfully completed, use of the ConnDOT BMIS system will be phased out and Trns•port will be used to run a full production letting.

From that point forward, Trns•port will be the production environment for ConnDOT's preconstruction activities as identified in this analysis document.

4.2.2 BAMS/DSS Upgrade to Client/Server Environment

ConnDOT's outdated BAMS/DSS system will be upgraded to the newest current release. Most likely the system will be installed as a client/server environment; however, ConnDOT has requested an alternative option for one or two installations as a standalone application on users' computers. A test environment will probably not be used for BAMS/DSS because of the small number of users and because it is not a transactional system.

During implementation, BAMS/DSS data will be repopulated with converted historical data from BMIS. Once in production, data will be passed from web Trns•port Preconstruction to BAMS/DSS. Construction data will be passed from SiteManager to BAMS/DSS, both initially to populate the new construction tables in the current release of BAMS/DSS, and on a continuing basis.

If ConnDOT is using any customized ad hoc programs it wishes to retain, these will be evaluated for migration to the new environment.

4.2.3 Estimator Upgrade to Shared Network Install

Estimator will be installed on a shared network drive, allowing ConnDOT users to initiate the application through a URL in an icon on their desktop. Consultant users will license and install Estimator independently, but will download the Estimator reference catalogs from the ConnDOT website.

4.2.4 Bentley ProjectWise

ConnDOT is currently using Bentley ProjectWise for a document management system, and is interested in integrating this with Trns•port. Further research in this area should be performed during the process review stages of the Trns•port implementation.

4.2.5 Bentley InRoads and Quantity Manager

Bentley InRoads is the current CAD/roadway design system used by ConnDOT. The Quantity Manager utility is capable of interfacing with web Trns•port Preconstruction and Estimator to pass project items and quantities. The Quantity Manager standard item list is imported from web Trns•port Preconstruction.

There is a significant amount of initial setup work needed to allow the Bentley and Trns•port modules to share item master lists. Cost and time estimates for this work is beyond the scope of this project and is not included in this document or proposal.

4.2.6 web Trns•port Preconstruction

Web Trns•port Preconstruction permits the flexible definition of a project and its associated funding requirements to track and manage project cost information and set up the bidding proposal prior to the bid letting activity. Data can be entered at the project, category, and item level, and grouping of multiple projects is allowed to track all related costs and funding sources. The system supports preparation of the PS&E estimate for Federal Aid highway construction projects, allows projects to be combined into proposals for bid letting, and permits the selection of a group of proposals for a bid letting package.

Web Trns•port Preconstruction also provides bid-letting personnel with automated tools to manage the notice to contractors, planholder/proposal holder lists, bid data entry, bid tabulation, low-bid analysis, and contract award processing. Besides processing the letting activity, another key function performed by the web Trns•port Preconstruction system is reference data management, including item master maintenance, vendors and their qualifications and joint venture affiliations, and Disadvantaged Business Enterprise (DBE) information.

Web Trns•port Preconstruction shares reference data and letting information with Expedite and the associated Internet bidding system. Web Trns•port Preconstruction also passes awarded contract information and reference data to SiteManager and BAMS/DSS.

4.2.7 Expedite and Bid Express

The Expedite electronic bidding system and the associated Bid Express web portal for publishing and receiving bids will be setup during the implementation period. Info Tech analysts will setup the service and train ConnDOT staff and contractors. Installation includes setting up templates in web Trns•port Preconstruction for exporting vendor, planholder, bid tabs, and other relevant information.

The Expedite electronic bidding system and the associated Bid Express web portal for publishing and receiving bids will be implemented during two on-site visits by Info Tech analysts to install the service and train ConnDOT staff and contractors. Installation includes setting up templates in web Trns•port Preconstruction for exporting vendor, planholder, bid tabs, and other relevant information.

Info Tech will work with ConnDOT to configure the Expedite Gen program to include ConnDOT-specific information or questions for contractors submitting bids as part of its generated electronic bidding system (ebs) file. For example, check boxes could be used to verify that the bidder is prequalified, or that they have seen all the addenda. Expedite Bid is a standalone component of Expedite and is used by Contractors to process this ebs file for their bid submission. Expedite Bid is provided free of charge to contractors.

A proposal detailing only the Expedite and Bid Express implementation is in Appendix C and provides further details; however, the electronic bidding implementation is generally included as part of this document.

4.2.8 ConnDOT Website and Intranet

The ConnDOT public website currently hosts various reports and files. Some of this information will be available from standard or customized web Trns•port Preconstruction reports and other output. All standard reports in web Trns•port are available in Adobe PDF format, ready for web site posting or other means of electronic distribution.

Trns•port reports can be posted on the ConnDOT Intranet as well, including bid history cost estimation reports from BAMS/DSS.

4.2.9 SiteManager

The unsupported SiteManager release in use at ConnDOT will be upgraded to the latest current release, continuing as a client/server environment. The system will be updated first in a test environment and then for production. Instead of importing data from BMIS, SiteManager will begin to receive awarded contract data from web Trns•port Preconstruction and will send data to BAMS/DSS.

The recommended business process analysis of ConnDOT's current SiteManager utilization would result in a more complete use of the application for construction administration. Potential interfaces with CORE-CT could be assessed during the analysis process.

Changes may be made to the SiteManager reference data to correspond to the Trns•port preconstruction systems. For example, the master item list may have English and metric items separated into different spec years. Code tables that are shared by both systems should be reviewed and codes added as appropriate.

4.2.10 CORE-CT Financial System

Decisions by ConnDOT are needed regarding potential data flows between Trns•port and CORE-CT, mentioned in Sections 4.3.13 and 4.3.14. Projects are initiated into CORE-CT when funding is needed. An interface with web Trns•port Preconstruction could be used at that point. Also, research should be performed on how vendor information is updated in CORE-CT to see if an interface from web Trns•port Preconstruction would be useful.

Currently, data for contractor payments is manually entered into CORE-CT from paper documents. Exporting this information from SiteManager will be explored as part of the SiteManager business process analysis tasks.

4.3 Proposed ConnDOT Data Flows

This section describes the proposed ConnDOT data flows. It includes the standard Trns•port interfaces as well as the proposed interfaces that should be created prior to

going into production with Trns•port preconstruction systems. These custom interfaces are suggested to improve efficiency through the exchange of data with ConnDOT legacy systems that will remain in use with the implementation of ConnDOT preconstruction Trns•port. The subsection numbers correspond with the numbering annotated in Figure 4-4.

4.3.1 Bentley Quantity Manager to Estimator and web Trns•port Preconstruction

Bentley InRoads is used by ConnDOT when creating designs for roadwork projects. Quantity Manager can be used to pass project items and quantities (not CAD data) to Estimator and web Trns•port Preconstruction.

4.3.2 BAMS/DSS to Estimator Catalogs

Item bid history data generated by the Historical Item Regression Model (HIREG) in BAMS/DSS is passed into Estimator for detailed bid-based estimation. Variations on the model by time period, type of work, etc, can be imported into different catalogs for a more targeted approach to estimation. This is a standard interface in Trns•port.

4.3.3 Estimator Interfaces With web Trns•port Preconstruction

Standard interfaces allow completed estimates to be passed either way between Estimator and web Trns•port Preconstruction. A user may update or create new web Trns•port Preconstruction projects with information from Estimator projects, or temporarily check out projects from web Trns•port Preconstruction to Estimator for item pricing.

4.3.4 web Trns•port Preconstruction to Expedite Pass

This standard pass in web Trns•port Preconstruction creates an electronic file that is processed and distributed to contractors. Contractors load the electronic file in Expedite Bid and enter their bids.

4.3.5 Expedite to Bid Express Interface

If Bid Express is implemented for two-way bidding, contractors will submit their electronic bid files from Expedite Bid by loading them directly to a secure location hosted by Bid Express. Bids are protected by a double encryption system and can only be accessed by ConnDOT at the time of letting.

4.3.6 Expedite to web Trns•port Preconstruction Pass

This is a standard pass to web Trns•port Preconstruction from Expedite, as an alternative to two-way bidding via Bid Express. There are several options for utilizing the Expedite to web Trns•port Preconstruction pass. Either ConnDOT can hand-key contractor paper

bids into Expedite Entry (or directly into web Trns•port Preconstruction); or ConnDOT can push Expedite out to the contractors and allow them to key in their own bids. The contractor then generates an electronic file that ConnDOT receives and processes, then loads directly into web Trns•port Preconstruction for bid analysis activities.

4.3.7 web Trns•port Preconstruction to Bid Express Data Pass

Through this standard data pass in Trns•port, web Trns•port Preconstruction creates bid packages which can be posted on the Bid Express website. Conversely, if Bid Express is implemented for two-way bidding, Bid Express downloads submitted bids to the agency for processing and loading into web Trns•port Preconstruction at the time of the letting. Also, information such as the bid tabs and the apparent low bidder can be posted almost immediately after the letting to Bid Express using standard web Trns•port templates provided during Bid Express implementation.

4.3.8 web Trns•port Preconstruction to ConnDOT Public Website

Web Trns•port Preconstruction can provide reports and information to be posted to the ConnDOT website. Information such as the bid tabs and the winning bidder data will be extracted from web Trns•port Preconstruction in report form and posted to the agency website. Updates of the standard Itemlist can be extracted for posting.

During implementation, the information that needs to be extracted from web Trns•port Preconstruction will be explored in more detail to determine whether custom web Trns•port Preconstruction ActiveReports reports or Crystal reports are necessary. A custom web-posting process can be developed if ConnDOT determines the need.

4.3.9 BAMS/DSS to ConnDOT Intranet

Various estimation-related reports can be generated from the following BAMS/DSS models: HIREG (Historical Item Price Regression), PRHIST (Price History Reports), PRICES (Item Price Analysis), PEMETH (Price Estimation Methods) and IRANK (Item Rank Analysis). These reports could be used by estimators to supplement and check the bid history prices derived from the catalogs in the Estimator system.

4.3.10 web Trns•port Preconstruction to SiteManager Pass

This standard Trns•port process passes details of contract awards, including proposal, project, and awarded bid tabs, from web Trns•port Preconstruction to SiteManager. Reference data is also passed.

4.3.11 web Trns•port Preconstruction to BAMS/DSS Pass

This standard Trns•port process passes details of contract awards or rejections, including proposal, project, and bid tab data, from web Trns•port Preconstruction to BAMS/DSS. Reference data is also passed. Also, web Trns•port can use a pre-defined bid history

catalog enabling bid history-based project item pricing, including display and some manipulation of data points and charts supporting calculated regression prices.

4.3.12 SiteManager to BAMS/DSS

This standard Trns•port process passes ongoing and final construction information from SiteManager to BAMS/DSS. This can be initiated from within BAMS/DSS as a direct odbc pull, and/or as a flat file export from SiteManager imported into BAMS/DSS.

4.3.13 SiteManager to CORE-CT

A customized interface could be used to pass contractor payment data from SiteManager to CORE-CT. This could be achieved by re-formatting data output from the standard SiteManager export process.

4.3.14 web Trns•port Preconstruction to CORE-CT

A customized interface could be used to pass funding information between web Trns•port Preconstruction and CORE-CT, early in the project life cycle. This could be achieved by re-formatting data from the standard web Trns•port export/import process. Further research is needed regarding initiation of projects.

4.3.15 web Trns•port Preconstruction to Bentley ProjectWise

ConnDOT is currently using Bentley ProjectWise for a document management system and is interested in integrating this with Trns•port. Further research in this area should be performed during the process review stages of the Trns•port implementation.

5. Data Conversion Analysis

This chapter presents an analysis of the data conversion requirements and options for the Trns•port preconstruction and decision support implementation at ConnDOT.

ConnDOT has requested full conversion of historical data to repopulate the upgraded BAMS/DSS system, and population of reference data in all Trns•port preconstruction systems.

ConnDOT has also requested an optional task for converting in-progress (not yet let) projects and proposals to populate web Trns•port Preconstruction. A major consideration is that ConnDOT wishes to replace the BMIS system with Trns•port systems.

The following table provides a summary of the data conversion requirements and comments related to conversion options for the Trns•port estimation, preconstruction, and decision support systems.

System	Data Conversion	Comments
BAMS/DSS	Reference tables (vendors, items, and code tables). Reference tables must be built as one of the first tasks of the implementation project since all Trns•port systems use them. Proposal/project bid history, to the item level. Proposal/project estimate history, to the item level. Construction contract history, to the sub-contractor item level.	Although ConnDOT has a populated BAMS/DSS database, they believe the data to be incomplete and unreliable. They have requested to have the database re-populated using historical data converted from BMIS. Since a goal of this project is to replace BMIS, all data fields that can be mapped from BMIS to BAMS/DSS should be converted. If budget allows, the entire time span represented in BMIS should be converted. This effort would allow ConnDOT to utilize the data for the following purposes: Estimation: There are 11 tables that must be populated with two to five years of converted data to run the model that produces the historical bid price statistics for use in Estimator and web Trns•port Preconstruction. Trend Analysis: There are several models in BAMS/DSS that provide item pricing history information for trend analysis. The tables necessary for these models are a subset of the tables necessary for Estimation above. However, three to five years of converted data is recommended for meaningful results. Bid Competition Analysis: This data would include subcontractor and supplier data in addition to the project/bid data and should go back five or more years. In addition, project coordinates (project center latitude/longitude) and vendor facilities should be added. If subcontractor and supplier information is tracked in SiteManager, it can be exported to BAMS/DSS through the standard export process; however, this data may not go back far enough in time and should be converted from BMIS if available.

System	Data Conversion	Comments
web Trns•port Preconstruction	Reference Tables including the following: Code Tables (not all code tables are required) Items Vendors and children tables District Offices Funds Special Provisions (optional) In-progress project/proposal data (optional)	Web Trns•port Preconstruction can be implemented with manually entered new projects, proposals, and bid lettings; or in-progress data can be converted programmatically from BMIS. ConnDOT requested an estimate for an optional task to convert all of its in-progress projects expected to be let after web Trns•port Preconstruction is in production. Having the data populated in web Trns•port Preconstruction would hasten shutting down BMIS. It would also help with testing, training users, and developing ConnDOT specific reports and documentation. If ConnDOT chooses to only convert historical data to BAMS/DSS, then the Code Tables, Items, and Vendors reference tables created during the BAMS/DSS data conversion can be migrated to the web Trns•port Preconstruction database. Reference data already residing in SiteManager will be the starting point for web Trns•port Preconstruction and BAMS/DSS reference data, but should be re-evaluated for preconstruction requirements. The final decisions on reference data will have to meet the needs of preconstruction activities as well as construction activities. Parallel processing and verification testing of some projects and proposals on old and new systems is anticipated with either option.
Estimator	Reference data (items and code tables), which can be passed from BAMS/DSS and web Trns•port Preconstruction respectively. Bid price history from BAMS/DSS.	Estimator is usually implemented with new projects and proposals instead of converting in-progress data. Some existing data can be entered for testing purposes. For bid-based estimation, historical item bid prices are obtained from BAMS/DSS and linked to the standard items. For reference-based estimation, reference prices must be entered manually. For cost-based estimation, cost sheet data including labor, material, and equipment rates can be imported from another source or entered manually.

System	Data Conversion	Comments
SiteManager	In production – database is already populated. Item list and code tables will need adjustments to correspond with other Trns•port systems.	For items in SiteManager, the key is item number, spec year (lastchangedyear), and unit system. In the Trns•port preconstruction systems, the item key structure is item number and spec year. ConnDOT has items that have the same number and spec year but one is metric and the other is English. This numbering scheme would result in duplicate items and must be modified before data can be loaded into the Trns•port preconstruction systems. ConnDOT has initially agreed to use different spec years for English and Metric.

Table 5-1. Summary of Data Conversion Requirements

5.1 Required Data To Be Converted

The following discussion provides additional detail regarding the data conversion that is required to implement the Trns•port and Trns•port related systems. Info Tech analysts will work with ConnDOT to determine relevant standards for data, identify the data to convert, and define appropriate mapping to the Trns•port tables. Info Tech analysts will then write programs to convert and load the ConnDOT information from agency sources.

Reference data, including item, vendor, funding, and code tables are required for all Trns•port systems. Historic construction projects data, including all bids, should be converted to support bid-based estimation and miscellaneous trend analyses.

ConnDOT's legacy data must be converted at the outset of the implementation project to enable the various Trns•port systems to be fully implemented. For example, bidtab data is needed to facilitate generation of bid-based prices for estimating the cost of new projects in Estimator. While Info Tech analysts write the conversion programs, they will need appropriate input and assistance from ConnDOT in this effort. Since ConnDOT wishes to maintain online access to the historical data that is currently stored in BMIS, the data conversion effort will attempt to convert all of this available data to the BAMS/DSS historical database. Info Tech will perform quality assurance and data verification activities after conversion.

5.2 Trns•port Reference Tables

The Trns•port systems use several core reference tables, most of which are required for processing. These include the following:

- Code Tables List (some code tables are required, but not all)

- County List
- District Office List
- Fund List
- Item List
- Special Provisions List (not required)
- Vendor List, with children tables

Although the types of information are similar, there are differences in the table structure between web Trns•port Preconstruction, BAMS/DSS, and SiteManager. Web Trns•port Preconstruction will support the transfer of reference data to client/server reference tables in BAMS/DSS and SiteManager.

5.2.1 Code Tables

Trns•port uses many code tables to translate shorter codes to longer descriptions. Examples of code tables include:

- Type of Bid Received
- Status of Bid
- Units of Measure
- County
- Type of Vendor Certification
- DBE/WBE Codes
- Federal Work Type
- Highway Type
- Staff
- Material Type
- Event Type
- Permit
- Weather

Some of these examples are used in all Trns•port systems, while others, such as the SiteManager code Weather, are only used in the originating system and in BAMS/DSS.

In practice, no agency uses every code table, and some agencies create additional code tables for their own use to support data entered in the agency-specific, or generic, fields. Also, certain codes are required inputs, i.e. data must be entered in those fields from the allowed list of code values before the record can be stored. For example, when adding a new item to the REFITEM or ITEMLIST table, a valid value from the UNITS code table is required.

As part of the Data Conversion task, Info Tech will populate the code tables by importing relevant ConnDOT SiteManager code tables into Trns•port preconstruction systems to use as a starting point. Any additional codes used in BMIS will also be reviewed and used as appropriate. Code tables should be developed jointly by ConnDOT and Info Tech, with Info Tech providing direction as to required and recommended values. Both parties need to collaborate on critical decisions related to issues such as item classifications and contract work classifications. When deciding upon the codes to use and the values for each, ConnDOT needs to consider its use across all of the Trns•port systems.

From a quick initial examination of ConnDOT code values currently in SiteManager, the following issues need attention. Values have not been defined for Type of Item (ITEMTYP), Item Classification (ITMCLSS), and Project Type of Work (PWRKTYP). Contract Type of Work (WRKTYP) codes have been defined but are too finely cut for effective use in BAMS/DSS analyses and for estimation.

Unit of Measure (UNITS) codes need some cleaning up. For example, one code contains a slash which can be problematic if used in certain programs or reports. Some codes are upper case and some lower, for no apparent reason. Codes are case sensitive in Trns•port.

Some ConnDOT code tables contain two codes with the same description.

The final list of code tables will be reviewed and approved by ConnDOT.

5.2.2 Item Master List

After web Trns•port Preconstruction is implemented, new items will be initiated in web Trns•port Preconstruction and passed to Estimator, BAMS/DSS, and SiteManager. The REFITEM table in web Trns•port Preconstruction will contain details of all the standard ConnDOT work items.

The key is REFITEM_ID and SPECBOOK. Trns•port preconstruction systems use spec year to differentiate between items in different specification books. Spec year can also be used to separate English and metric items in the specification book. For each project and proposal created in Trns•port, both a unit system (English or metric) and a spec year are assigned to it. This ensures that only the corresponding items can be used; only items from its defined spec year with appropriate units can be used on that project or proposal. The spec year appears on numerous Trns•port standard reports and listings.

Currently, ConnDOT uses spec year 1995 for standard items used in preconstruction. Spec year 2000, 2003, and 2004 are used for construction items only. Change Order items are further identified by "CO" at the beginning of the item number, with spec year 2000. Items with numbers beginning with "V" with spec year 2000 are breakouts of building specifications from the vendor. These are used as subitems after award, for vertical construction (buildings). Items beginning with "F" with spec year 2004 appear to be division-specific. There are 14 items in the SiteManager item master with spec year 2003, which are used for adjustments, claims, interest, and liquidated damages. Mixing item spec years within a contract would be problematic when contracts are passed from SiteManager to BAMS/DSS, and ConnDOT should consider changing these spec years in the item master as part of the data conversion project.

For data conversion, the intent is to create the web Trns•port Preconstruction and BAMS/DSS item masters from the existing SiteManager item master table. For items in SiteManager, the key is item number, spec year (LASTCHANGEDYEAR), and unit system; in the Trns•port preconstruction systems, the item key structure is item number and spec year. ConnDOT has items that have the same number and spec year but one is metric and the other is English. This numbering scheme would result in duplicate items and must be modified before data can be loaded into the Trns•port preconstruction systems. ConnDOT has initially agreed to use different spec years for English and metric, for example, spec year 95 could be retained for English items, and metric items' spec year could be changed to 96.

Other ConnDOT item master issues need to be addressed during data conversion. There are over a thousand items in SiteManager missing critical information such as description and units of measure. Item Classification and Item Type codes are not populated in any item records, and codes have not been determined. Item Classification is particularly important for BAMS/DSS analysis.

The DBE Interest Flag is not used. ConnDOT staff felt that DBE usage is industry driven rather than item-specific, so this flag is not needed.

The items in the web Trns•port Preconstruction REFITEM table are passed to the BAMS/DSS ITEMLIST table through a standard pass. Similarly, the REFITEM data is passed from web Trns•port Preconstruction to SiteManager, but in this interface the unit system is added to the key structure.

The ITEMLINK crosswalk table is used in BAMS/DSS to perform unit/quantity data conversion, so that English and metric data can be combined for analysis when required. ITEMLINK can be systematically built as part of the data conversion. If there is not a one-to-one correspondence between English and metric items, a file or spreadsheet that details the mapping of each English item to a corresponding metric item will be needed from ConnDOT.

Additional items would have to be added to support items that are in the historic data in BMIS but do not currently exist in SiteManager, if any. Obsolete items that are needed for the converted historic data will be loaded only into BAMS/DSS.

If historic ConnDOT items from BMIS are required, mapping of the corresponding fields in the ITEMLIST and REFITEM record format will be determined under the Data Mapping task of the implementation project. The final list of items will need to be reviewed and approved by ConnDOT.

Once the web Trns•port Preconstruction REFITEM table is established and in production, addition of new items should be centrally controlled to avoid duplication and minimize proliferation of items. Too many items defined for basically the same thing results in dilution of historical data (too few observations per item for good bid-history pricing and other trend analyses). From initial discussions, it appears that ConnDOT has this under control; however, a decision must be made on who will maintain the item master in the future. The ConnDOT spec book and supplements are updated every six months, which could impact the item master.

It appears that ConnDOT adequately controls usage of nonstandard items. ConnDOT staff reported that nonstandard items are not used on highway construction jobs.

5.2.3 Vendor List

The REFVENDOR table in web Trns•port Preconstruction and the VENDOR table in client/server Trns•port systems contains details of all companies that do business with ConnDOT. This includes contractors, subcontractors, design consultants, insurance entities, material suppliers, and manufacturers. The key to these records is REFVENDOR_ID, or VENDOR. Unique vendor numbers must be assigned to each vendor that is tracked in Trns•port for purchasing plans and proposal packages, bidding, subcontracting, and supplying. The same vendor should not have multiple vendor numbers. Collapsing multiple vendor numbers for the same vendor may be necessary during the data conversion task. If collapsing vendor numbers is not practical, the relationships should at least be logged in the Vendor Affiliate table (AFFILIAT).

After web Trns•port Preconstruction is implemented, new vendors and changes to vendor information will be initiated in web Trns•port Preconstruction and passed to BAMS/DSS and SiteManager. Addition of new vendors should be centrally controlled to avoid duplication.

The ConnDOT SiteManager system currently uses the Taxpayer ID as its Vendor ID. ConnDOT has expressed an interest in keeping this identifier for other Trns•port systems. The Taxpayer ID must be suppressed from public display. This should be researched regarding any impact on reports to be posted on the ConnDOT website. The CORE-CT statewide financial system has a separate Vendor ID number which also appears on the vendor prequalification statement and on the paper contract. Research should be performed regarding whether the CORE Vendor ID is already in the Trns•port vendor table, and if not, whether it should be added as an Alternate Vendor ID.

Five child tables for VENDOR and REFVENDOR exist: Addresses, Affiliations, Insurance Data, Officers, and Work Classifications. Two additional VENDOR child tables reside in BAMS/DSS: Vendor Facilities and Vendor Facility Materials. The

initial Vendor List, as well as additional vendor data, will come from the SiteManager vendor tables. However, some vendor data may need to be converted from BMIS or other ConnDOT sources for historical vendors who do not exist in SiteManager. Obsolete vendors that are needed for the converted historic data will be loaded only into BAMS/DSS. BAMS/DSS models use these vendor-related tables for a variety of contract analyses.

5.2.4 District Office List

The District Office List contains information about each ConnDOT district. The Office Address, Office Phone Number, Area Engineer's Name, and other information are maintained for each district office record. The district office data that currently resides in SiteManager will be re-evaluated for appropriateness in the preconstruction and decision support systems. Final district office data will need to meet the needs of all areas of Trns•port.

5.2.5 Funds List

Web Trns•port Preconstruction contains funding tables to keep track of all the possible fund or program codes that could be applied to a project/estimate. The REFFUND table should be populated with the fund codes used by ConnDOT. The FUNDLIST table is the corresponding table in BAMS/DSS.

Funding reference data that currently resides in SiteManager will be re-evaluated for appropriateness in the preconstruction systems. Final funding reference data will need to meet the needs of all areas of Trns•port.

BAMS/DSS does not use the funding reference table in any models, but it stores the data for archival purposes.

5.2.6 Special Provisions

This table called REFSPECIALPROVISION in web Trns•port Preconstruction and DPRPPROV in BAMS/DSS contains a listing of the standard special provisions that can be linked to proposals. This can be a large file, so the special provision text would be converted and loaded into the web Trns•port Preconstruction database from an electronic ConnDOT source. Formatting is not stored. Trns•port also has an attachment feature to link an external document to the proposal record. These external documents can be formatted as required. Special provisions are merged with other statements for inclusion in the final proposal document.

The standard special provisions will be reviewed during implementation, and the most appropriate proposal document creation process for ConnDOT will be determined.

5.2.7 BAMS/DSS Map Datasets

Some models in BAMS/DSS use the COUNTY and STATEMAP reference coordinate datasets to generate map output, e.g. project and facility locations by vendor. Typically, these SAS map datasets are state specific and are provided as part of the BAMS/DSS installation. The COUNTY file contains one record for each county, with the location of the county (maximum, minimum and midpoint coordinates) and its ConnDOT district number. The STATEMAP file contains the coordinates for county outlines used in the various mapping models. This information can be derived from the current ConnDOT BAMS/DSS system, assuming that the Connecticut counties have been mapped to ConnDOT districts.

5.3 Historical Data

The following sections provide additional information regarding the historical data that ConnDOT has chosen to convert as part of the Trns•port estimation, preconstruction, and decision support system implementation. ConnDOT has expressed its intention to have the BAMS/DSS database repopulated from scratch using historical data from BMIS.

5.3.1 BAMS/DSS

Converting ConnDOT historical data is desirable for bid-based estimation support and other historical data analysis purposes, and to create a complete and reliable BAMS/DSS database. This conversion serves to archive ConnDOT's historical data in Trns•port, ensuring future online access, thus allowing BMIS to be phased out. Most of the historical project data currently resides in the ConnDOT BMIS system. If other historical data sources are identified before BAMS/DSS is implemented, the value of converting data from those sources should also be considered.

Info Tech analysts will write programs to convert the appropriate ConnDOT legacy data. It will be necessary for ConnDOT to provide the source data in an acceptable format (such as ASCII text), with supporting data dictionary documentation, for both English and metric data. Further analysis is required to determine the specific details for mapping ConnDOT data to corresponding Trns•port fields, consistent with the data validation requirements and required fields in Trns•port, and the rules and formats that ConnDOT will adopt for entering new project data into Trns•port.

The data conversion effort will require ongoing analytical support from ConnDOT experts over a period of several months to address issues such as missing or problematic data, item numbers, and so forth. Typically, there are more data problems to be resolved with older data. Creation of the Code Tables (CODETBLS), Vendor (VENDOR) and Master Item List (ITEMLIST) tables is a prerequisite step for data conversion.

The historical data conversion effort is estimated based upon the assumption that all available historic data will be converted. Multiple rounds of data conversion will be

required to resolve issues. The optional task of converting current in-process projects and proposals is addressed in Section 5.4.

Historical Bid-Based Item Price Data

In order for ConnDOT to produce useful estimates from Trns•port, certain BAMS/DSS database tables must be populated with converted ConnDOT historical bid data. This will provide data for running the Historical Item Regression Model (HIREG), the BAMS/DSS model that produces bid-based price history data for use in Estimator and web Trns•port Preconstruction.

The following BAMS/DSS tables need to be populated by converting historical data from ConnDOT's legacy systems:

- Bidders (DBIDDERS)
- Bid Tabs (DBIDTABS)
- Project Category (DPRJCATG)
- Project Item Prices (DPRJITP)
- Project Item Quantities (DPRJITQ)
- Project (DPROJECT)
- Proposal Estimate (DPROPEST)
- Proposal (DPROPOSL)
- Item Link (ITEMLINK)
- Item List (ITEMLIST)
- Vendor (VENDOR)

ITEMLIST and VENDOR are two of the reference tables mentioned previously. ITEMLINK provides a link between equivalent English and metric items.

Item Prices Trend Analysis Using BAMS/DSS

Four BAMS/DSS models provide item pricing history information that is used for trend analysis and to provide supplemental information for estimation. Each model uses a subset of the tables that are accessed by HIREG. The models include the following:

- Item Rank Analysis (IRANK)

- Price History Reports (PRHIST)
- Item Price Analysis (PRICES)
- Price Estimation Methods (PEMETH)

In order for ConnDOT to begin with the necessary data to produce useful trend analysis information, the BAMS/DSS tables must be populated with two to five years of converted ConnDOT data.

Historical Contract Locations in BAMS/DSS

When historical contract data is to be converted for use in BAMS/DSS, project coordinates (usually for the mid-point of the job) are desirable for analyses that utilize the mapping models, such as vendor work location maps. Depending on the available sources, it may be possible to convert this data into BAMS/DSS. Otherwise, either ConnDOT staff or an InfoTech analyst will need to pinpoint the project location from descriptive information and determine latitude and longitude.

Historical Construction and Subcontract Data in BAMS/DSS

Assuming that differences in reference data discussed earlier can be resolved, construction data can be pulled into BAMS/DSS from SiteManager. This would allow for analysis of variances between awarded item costs and final constructed costs.

Subcontract data (amounts and items) is desirable for thorough vendor analysis. While subcontract data is important to develop a comprehensive picture of what work a contractor is actually performing, it is not essential for the initial implementation of BAMS/DSS and can be entered at a later time to facilitate detailed contract bid competition analyses.

Currently ConnDOT tracks subcontractor information in SiteManager, but it may not be uniformly reported in the field. Research should be performed to determine whether the SiteManager subcontract data is reliable; however, this need not be part of the data conversion. Info Tech recommends that, in the future, ConnDOT thoroughly track subcontract and material supplier information in SiteManager to be passed to BAMS/DSS.

Facility Data

Facility information for permanent and portable plants (such as asphalt and concrete) is recorded in the BAMS/DSS database using the FACILITY table. The FACILITY key fields are Vendor (owner) ID, Facility Number and Facility Open Date. The facility record also contains location coordinates. Each permanent plant will usually have one FACILITY entry per owner, while portable plants may have multiple entries to accurately reflect time periods spent at different project locations. Additional facility

detail information, such as type of material produced and plant capacity, is recorded in the FACMATLS (Facility Materials) table in BAMS/DSS.

For comprehensive vendor activity analyses, the facility information should be current and complete. However, facility data is not essential for the initial implementation of BAMS/DSS and can be entered at a later time to facilitate detailed contract bid competition analyses.

The Facility information in ConnDOT's SiteManager database is incomplete and would require additional research and data entry for populating the data in BAMS/DSS. If adequate funding for the data conversion task allows, Info Tech analysts could perform this work during data conversion or at a later time.

Bid Competition Analysis Using BAMS/DSS

The data necessary to perform a thorough bid competition analysis should go back five or more years. For a thorough bid competition analysis that will provide the total picture of what work individual vendors are performing, the data should include subcontract and material supplier information. Project and facility coordinates are also essential.

5.3.2 Estimator Data Setup

The Estimator system will be updated from the unsupported 1.8a version to 2.6a. The new release can be installed without uninstalling the old release, and will be treated as a new install. Estimator is currently used by ConnDOT only for checking the estimate, while projects in the estimation phase are stored in BMIS. Therefore, it should not be necessary to convert or migrate projects from one Estimator version to another.

Projects not yet let will either be finished out in BMIS and new projects started in web Trns•port Preconstruction, or some of the in-process projects will be converted from BMIS to web Trns•port. An alternative to converting in-process projects is for ConnDOT to manually enter these projects into web Trns•port Preconstruction, particularly if the number of contracts is small. This option avoids the cost of conversion and also provides good practice for web Trns•port users. Projects can be checked out of web Trns•port Preconstruction into Estimator for cost estimation. Alternatively, projects could be started in Estimator and exported to web Trns•port Preconstruction.

New Estimator reference catalogs will be created. Changes in the standard Itemlist and to some code table values will be implemented in the Estimator catalog by importing these from BAMS/DSS and web Trns•port.

For bid based estimation, historical item bid prices are obtained from BAMS/DSS and linked to the standard items in the Bid History catalogs. Updated and improved bid history files will be generated by Info Tech after the ConnDOT historical data has been converted and loaded into BAMS/DSS. Once in production, bid history update files will be generated by ConnDOT on a regular basis, typically quarterly, to reflect current price

trends. Info Tech will work with ConnDOT to develop the most appropriate parameters to use for bid history creation.

Different item bid history files generated by the BAMS/DSS HIREG model can be maintained in multiple Estimator catalogs, representing different lengths of time or type of work. The resulting data will be passed to Estimator where a single catalog can be used for a project or multiple catalogs can be applied, allowing estimators to use more focused data for selected items. For example, asphalt items historic pricing may be more reliable using the most recent six months bid data while structures items show better prices with two years bid data.

The Estimator Reference Catalog is a list of reference prices for items. For example, one or more price quotes on an item, obtained from contractors, can be stored in the Reference Catalog. To price that item on a project, the user can select one of the reference prices. If ConnDOT wants to use reference prices for quoted prices, empirical pricing, or in situations where there is not enough historical bid data to produce either regression or average prices, the prices may be determined and entered manually in the Estimator reference catalog. Alternately, a bid-based weighted average price generated from another BAMS/DSS model such as Price Estimation Methods (PEMETH) or Item Ranking (IRANK) could be used for comparison with the price calculated by Historical Item Regression (HIREG). Or initially, prices generated from BMIS could be used for this purpose.

For estimation of lump sum, nonstandard, or other items whose price may vary from job to job, cost sheets could be used. Standard cost sheets can be built and associated with items in the catalog for scratch estimating, with the formula components researched and manually entered. Cost sheets are supported by labor, material, and/or equipment rates catalogs. Development of cost sheets is labor intensive and requires specialized expertise which is outside the scope of this project; however, individual estimators may create their own cost sheets.

5.4 web Trns•port Preconstruction In-Progress Data to be Converted (Optional)

As detailed for web Trns•port Preconstruction earlier in this chapter, the conversion and population of reference data such as items, vendors, funds, and code tables is a required part of the Trns•port implementation. Conversion of historical data for BAMS/DSS is also required.

ConnDOT has requested the option for additionally converting in-progress (not yet let) project and proposal data from BMIS to web Trns•port Preconstruction.

Some of the advantages to this approach are that ConnDOT data would be available for testing, training, and developing customized reports or interfaces. Screen captures featuring ConnDOT data could be used for customized documentation. Sunsetting of the

BMIS system could occur months or possibly years sooner because ConnDOT would not have to wait for project completion.

If the budget does not support the optional conversion of data not yet let, the in-progress projects and proposals can be completed in BMIS, and new ones entered by users into web Trns•port Preconstruction as they are initiated. Some agencies have had users manually move (rekey) estimated projects from a legacy system to Trns•port in order to speed up the cutover from one system to another. A combination of these methods could be used, where projects before a certain date could be rekeyed into web Trns•port.

Parallel processing and verification testing of some projects and proposals on old and new systems is anticipated with either option.

The following web Trns•port tables would be included in the conversion of in-progress data:

- Projects
- Categories
- Project Items
- Project Locations
- Fund Packages
- Item Alternate Sets.

The following additional tables could be converted, depending on how far in advance projects are associated with proposals, and proposals scheduled for bid letting:

- Bid Letting
- Proposal
- Proposal Items
- Proposal Locations
- Proposal Times
- Proposal Sections.

Multiple rounds of data conversion will be required to resolve issues, and to capture any new proposals let in BMIS since the initial conversion cutoff point. This should happen before refreshing the web Trns•port Preconstruction database prior to parallel production testing.

6. Reports and Document Analysis

The Reports Analysis section provides a comparison of ConnDOT's current forms and reports to Trns•port's standard reports. General information regarding the reporting capabilities within Trns•port is also presented.

Analysis of the current reports obtained from ConnDOT has been performed in order to provide an assessment of the reporting component of the implementation.

The summary of the analysis results is presented in this section. The list of reports received from ConnDOT is represented in Table 6-3. Samples of the standard Trns•port reports comparable to ConnDOT reports are shown in Appendix A, Standard Trns•port Reports. Appendix A also includes samples of other useful standard reports created in Trns•port. It is recommended that to conserve budget resources, ConnDOT should consider adapting to the workflow of the Trns•port systems, and limit software customizations by incorporating standard Trns•port reports wherever possible.

6.1 Trns•port Reports

Trns•port systems provide various methods to produce reports or link to externally produced reports. These methods include the web Trns•port standard reports produced by ActiveReports, the Crystal Reports output from Estimator, BAMS/DSS standard model output reports and graphs, BAMS/DSS SAS ad hoc reports, SiteManager's Powerbuilder and secondarily its Report Template Facility (RTF), and the Attachments function. During the process review stages of the Trns•port implementation, research can be done regarding potential interfaces with the Bentley ProjectWise document management system.

No SiteManager reports have been included in the reports analysis, since ConnDOT is already using SiteManager. However, a Report Analysis and Development task has been incorporated into the proposed business process analysis effort to revisit standard and custom SiteManager report issues in light of expanded SiteManager and Trns•port usage.

During this effort, ConnDOT may discover revised reporting needs to be incorporated into its construction business practices, as part of the process analysis.

6.1.1 Trns•port Standard Reports

The standard reports for Trns•port are generated as follows:

web Trns•port Preconstruction

Web Trns•port uses ActiveReports to generate reports. This tool enables trained users, either Info Tech or ConnDOT staff, to modify existing reports and/or create new reports. Base reports can be changed through a utility that comes with the software. ConnDOT would need to purchase an ActiveReports license to create new reports. It may be possible to use another report writer such as Crystal Reports; however, this has not been tested.

SiteManager

Standard reports are written using either PowerBuilder, or the Info Tech Report Template Facility (RTF). The agency can modify existing PowerBuilder reports or create new ones if an appropriate PowerBuilder license is procured. Alternately, Info Tech can be contracted to modify or create PowerBuilder reports.

RTF enables trained users (either Info Tech or ConnDOT staff) to modify existing report templates and/or create new reports. The RTF programming language is used to create a template that defines the layout and logic for generating the report. Processes are established within the Trns•port systems for the RTF templates and, when executed, the processes generate the RTF reports.

BAMS/DSS

Standard reports and graphs are generated from the system's statistical analysis models (written in SAS). The user can choose to produce the reports in different formats: Acrobat, text file, and html. Some adjustments, such as colors and symbols, can be made to the parameters of the graphic output from within the model profiles. Adjustments to the SAS code creating the reports can be done; however, this practice is generally not recommended. Ad hoc SAS analysis and reports may be developed by experienced users, either Info Tech or ConnDOT staff.

Attachments

Select windows in web Trns•port Preconstruction and SiteManager have an attachments capability. This capability allows you to integrate OLE-compatible documents (such as Microsoft Word documents or Microsoft Excel spreadsheets) or web pages into Trns•port. These attachments are conveniently printed using the OLE parent application's native Windows printing capabilities.

6.2 ConnDOT Reports

ConnDOT provided to Info Tech a number of hardcopy printouts of reports and forms. These have been reviewed and compared with standard Trns•port reports to determine which ConnDOT reports can be replaced by Trns•port reports.

Table 6-1 and Table 6-2 provide summary estimates for the number of reports that will need to be addressed during the implementation and the level of effort required to provide customizations. New reports and processes refer to those that would need to be created as custom reports and processes in Trns•port. Reports and processes requiring customization are existing Trns•port reports and processes that can be customized to fit a particular format. Customization estimates include further analysis of the reports, identification of specific customization requirements, development, testing, documentation, and installation of customized reports.

Table 6-3 lists current ConnDOT reports with comparable standard Trns•port reports, comments, and recommendations for report customizations. Estimated levels of effort for customizing the reports are also included. ConnDOT reports that are not available in or applicable to Trns•port functionality are also included.

Report Configuration Status	Number of Reports
ConnDOT Reports or Processes that require new reports for web Trns•port Preconstruction, Estimator, or BAMS/DSS	22
ConnDOT Reports or Processes that require customizations to standard reports for web Trns•port Preconstruction, Estimator, or BAMS/DSS	4
ConnDOT Reports recommended for replacement with standard Trns•port reports	6
ConnDOT Reports or Processes that are not supported in Trns•port	6
TOTAL	38

Table 6-1. Existing ConnDOT Reports and Processes Customization Summary

Level of Effort	Estimated Hours to Perform, Test, and Install Changes for each report	Number of Reports
Minor	25 hours or less	12
Medium	Between 26 and 50 hours	13
Major	Between 50 and 100 hours	1
TOTAL		26

Table 6-2. Estimated Effort for ConnDOT Reports Requiring Customization

6.2.1 ConnDOT Reports Analysis

Info Tech personnel reviewed the reports provided by ConnDOT. Comments are provided and specify whether a standard Trns•port report exists with the same information, or if a customized report or new report is recommended. Either Info Tech or ConnDOT personnel can modify the standard Trns•port reports. Any reports that were not provided to Info Tech could not be included in the analysis.

Report No.	Report Label	ConnDOT Report Name	Comments About Report Data and Function	Trns•port Report	Recommended Action	Effort Level for Configured Reports and Configuration of Existing Reports
1	COBB01	Draft Schedule of Prices	Estimate with Designer's prices. Need to retain Designer prices in Trns•port. Need to determine how items with special provisions will be flagged in Trns•port for display on all item level reports.	Preliminary Detail Cost Estimate	Create new report	Medium
2	-	Engineer's Estimate	Uses Engineer's prices	Preliminary Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #1 is being created and can be cloned.
3	-	Engineer's Estimate	Same as #2, but no prices printed except tor Railroad item	Preliminary Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #1 is being created and can be cloned.
4	FPBB02	Federal Estimate (Preliminary)	Includes section breakdown by participating vs. non-par dollars	Preliminary Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #1 is being created and can be cloned.
5	FPBB01	Federal Estimate (P.A.E)	Same as #4 but with bid prices	Final Detail Cost Estimate	Create new report	Medium
6	SPBB01	Project Estimate (Designer)	Breakdown by project using Designer prices.	Preliminary Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #1 is being created and can be cloned.
7	SPBB02	Project Estimate (Engineer)	Same as #6 but with Engineer's prices	Preliminary Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #1 is being created and can be cloned.

Report No.	Report Label	ConnDOT Report Name	Comments About Report Data and Function	Trns•port Report	Recommended Action	Effort Level for Configured Reports and Configuration of Existing Reports
8	SPBB03	Project Estimate (Bid Prices)	Same as #6 and #7 but with bid prices	Final Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #5 is being created and can be cloned.
9	LSBB01	Lump Sum /Est Prices (Designer Amts)	Listing of "lump sum and estimated items", using Designer's prices. Quantities are blank and extension matches unit price. Level of Effort column assumes items for report are identifiable by Unit of Measure Will need clarification on what "estimated items" are in order to determine if Trns•port should treat them as lump sum items.	N/A	Create new report	Medium
10	LSBB02	Lump Sum /Est Prices (Engineer Amts)	Same as #9 but with Engineer's prices.	N/A	Create new report	Minor Effort Level assumes Report #9 is being created and can be cloned.
11	COBB04	Special Provision Items	List of proposal items that have a special provision (as indicated on reports with "A" after the item #). Includes item #, item description, and supplemental description. Will need to discuss how these items will be identified to Trns•port. New custom report is needed, as well as a way to flag which items have special provisions.	N/A	Create new report	Medium
12	-	Section Breakout (Designer)	Same as #4 and #5 but with Designer prices	Preliminary Detail Cost Estimate	Create new report	Minor Effort Level assumes Report #1 is being created and can be cloned.
13	-	Estimate Sheet	Recapitulation report (PS&E) Significantly different format than Trns•port Detail Estimate.	Preliminary Detail Cost Estimate Funding reports	Create new report if format is important; otherwise consider using Detail Estimate Funding Reports	Medium

Report No.	Report Label	ConnDOT Report Name	Comments About Report Data and Function	Trns•port Report	Recommended Action	Effort Level for Configured Reports and Configuration of Existing Reports
14	-	Estimate Sheet	Same as #13 but uses bid prices.	Final Detail Cost Estimate Funding reports	See # 13	Medium
15	FPBB12	Federal Estimate - Confidential	Same as #4 with Confidential stamp	Preliminary Detail Cost Estimate	Create new report with Confidential in report header	Minor Effort Level assumes Report #4 is being created and can be cloned.
16	SPBB12	Project Estimate - Confidential	Same as #7 with Confidential stamp	Preliminary Detail Cost Estimate	Create new report with Confidential in report header	Minor Effort Level assumes Report #7 is being created and can be cloned.
17	-	Estimate Sheet - Confidential	Same as #13 with Confidential stamp	Preliminary Detail Cost Estimate	Create new report with Confidential in report header	Minor Effort Level assumes Report #13 is being created and can be cloned.
18	-	Listing of Awarded Proposals	Awarded proposals by vendor over time, including summary statistics. Needs to be implemented in BAMS/DSS	BAMS/DSS Vendor Profile	Create BAMS/DSS Ad hoc report	Medium
19	LOBB02	Proposal Selection Report of Location Items	Cost per location within section (category) at user specified status point (Design, Eng Est, Bid, Award). Trns•port stores location info at category level rather than item level. Further analysis and discussion is required.	N/A	Create new report	Major
20	RPBB02	Proposal Selection Report	All but Designer info is available on Trns•port Tabulation of Bids. Format is different. Scope estimate assumes Trns•port report is acceptable.	Tabulation of Bids For designer prices, see #6.	For Eng Est and bid/award prices, run Tabulation of Bids. For designer prices, run #6.	N/A
CE-1	-	Estimator Detailed Estimate	From Estimator	Estimator Estimate report	Use existing Estimator report	N/A

Report No.	Report Label	ConnDOT Report Name	Comments About Report Data and Function	Trns•port Report	Recommended Action	Effort Level for Configured Reports and Configuration of Existing Reports
CE-2	-	Engineer's Estimate	Duplicate of # 2.	See #2	See #2	See #2
CE-3	-	Calendar Day Chart	Project schedule from MS Project	N/A	Continue to generate from MS Project	N/A
CE-4	-	Bid History	Very similar to Historical Bid Price Listing generated by BAMS/DSS Price History Model. Need to add several calculated fields.	BAMS/DSS Price History Model	Create BAMS/DSS Ad hoc report	Medium
CE-5	-	Weighted Unit Prices	Simple listing of weighted average price for each item. One listing for English items and one for metric items.	BAMS/DSS IRANK or Prices Model	Use existing report	N/A
CE-6	-	Preliminary Cost Estimating Guidelines	Info from various BAMS/DSS reports can be used to help compile these guidelines. Also, web Trns•port will automatically access BAMS/DSS to generate a bid-based estimated price for each project item based on several factors including item quantity, location, and season.	N/A		N/A
CE-7	OMB No. 2125-0010 FHWA-45	FHWA Bid Price Data	Data needed for filling out this FHWA form (total dollars, units, and average price by item class for a given contract) is available in Trns•port.	N/A	Create New Report to extract needed data for form	Medium
CE-8	-	P.A.E	Package includes Cover Sheet plus # 5 above (with contractor and Eng % typed on it), and #14 above. Cover Sheet includes summary of cost data and participating and non-par dollars.	Final Detail Cost Estimate	Use Final Detail Cost Estimate to extract data for Cover Sheet. For #5 and #14, see above	N/A
Part of CE-9	-	Memorandum from Principal Engineer to Mgr of Contracts	CE-9 Bid Analysis package includes 5 reports: Memo is in narrative form and contains summary of bids received, identification of significant areas of variance from estimate, and related interspersed commentary. Data can be derived from Trns•port.	N/A	N/A	N/A

Report No.	Report Label	ConnDOT Report Name	Comments About Report Data and Function	Trns•port Report	Recommended Action	Effort Level for Configured Reports and Configuration of Existing Reports
Part of CE-9	-	Memorandum Attachment A: Cost Analysis Worksheet	Item bid amounts for low 3 bidders, plus difference between low bid and Estimate, for selected items, with summary info only for the remaining items as a whole.	A cross between 2 Bid Tab Analysis reports: Low Bid Item Analysis and Tabulation of Bids	Customize Low Bid Item Analysis or create new report	Medium
Part of CE-9	-	Memorandum from Mgr of Design Services to Mgr of Contracts	Very similar to the Memo to Mgr of Contracts above.	N/A	N/A	N/A
Part of CE-9	Bid Tabs	Memorandum Attachment A: Bid Tabs	Oversized (11X17) bid tabs of low 4 bidders plus Estimate, with varying color highlighting of selected cells. Also includes bid totals of remaining bidders.	Tabulation of Bids report	Create 11X17 version of Tabulation of Bids. User can manually apply color via Adobe Acrobat.	Medium
Part of CE-9	ACC-263	Tabulation of Bids	Bid tabs for low 3 bidders only, plus bid totals for remaining bidders	Tabulation of Bids	Customize existing report	Medium
	-	D.O.T. Contracts	Simple historical stats by year	N/A	Create BAMS/DSS Ad hoc report	Minor
-	-	Projects Bid Summary	List of project data by month. Need to discuss possibility of using COUNTY code table to store towns.	N/A	Create BAMS/DSS Ad hoc report	Medium
Con 3	-	Bid Proposal Form	Boiler plate text including a few graphic images	Proposal Cover Page	Consider continuing to generate in the same manner in which this is currently generated.	N/A
-	-	Code of Ethics	Contains no data.	N/A	N/A	N/A

Report No.	Report Label	ConnDOT Report Name	Comments About Report Data and Function	Trns•port Report	Recommended Action	Effort Level for Configured Reports and Configuration of Existing Reports
-	-	Contract and Special Provisions	Cover Sheet, Schedule of Items, and contract addenda text (Note: this is contract addenda, not proposal addenda)	Contract Cover Page and Schedule of Items	Customize cover page and use existing Schedule of Items. Generate Contract Addenda as currently being done.	Minor

Table 6-3. ConnDOT Reports and Recommendations

6.2.2 Recommendations

Many of the reports ConnDOT provided to Info Tech for review are identical to one another in content and format, and they appear to represent different stages in the project life cycle, but with varying headers. These reports print project item quantities and estimated unit prices. Some have additional information such as participating amount or different level of totals, and a few have items listed by section or category.

- Several reports carry information which is largely a subset of the information displayed on various Trns•port standard reports. In general we recommend taking maximum advantage of our existing report structures and content, and utilizing them where possible. Making a determination to use the existing Trns•port reports will result in significant savings in this area.

- Several reports show a minor level of effort with the proviso that another report is used as a reference report, or cloned. We recommend including the reference report when selecting any report which has this reference footnote, as the level of effort was calculated with this assumption.

- There are several item level reports which currently allow for an "A" after item number if item has an associated special provision. Significant time and resources would be required to modify web Trns•port preconstruction reports to accommodate this aspect. We recommend reviewing the need for this coding. If needed, we will assess where the code can be stored and on which reports it should be produced. Revising the many standard web Trns•port reports to include could result in significant costs to the agency.

- In web Trns•port, data for reports can be accessed in two ways. Web Trns•port ships with a selection of preconfigured datasets, which provide "views" into the underlying data tables. This offers a measure of database security and protection, as reports are not connecting directly to the database. These dataset views are the standard way to access web Trns•port data for reporting. In cases when the datasets may not contain all of the desired fields for a particular report, you may initiate a direct ODBC database connection for access to all the fields existent on the data table. Use of this method may raise concerns of Oracle database user IDs becoming known, as web Trns•port offers no encryption of the database user IDs or passwords typically used to complete such a direct ODBC connection. We recommend that ConnDOT review its database policies and security procedures in case the latter method is considered to accommodate reporting requirements.

- Our effort hours for each report encompasses time for coding, installation, testing, troubleshooting, and minimal documentation. Documentation covers changes to existing web Trns•port reports to create new ones and basic report layouts to confirm agreement on report specifications before coding. Documentation does not include formal design documents or formal deliverable package. We recommend the agency review its internal requirements to determine if this type of formal documentation is necessary. If so, these cost estimates would be adjusted accordingly.

- The effort hours listed above assumes an expert level of programming resource to accomplish the coding using ActiveReports. We recommend using Info Tech programming resources for any reports selected from this list. Alternately, the agency may elect to use internal resources knowledgeable in ActiveReports to modify or create the selected reports. If ConnDOT chooses the latter route, we recommend retaining some hours in this task to accommodate Info Tech assistance with issues such as web Trns•port data table structures and report integration.

7. Trns•port Hardware and Software Requirements

This chapter summarizes ConnDOT's current hardware, software and network architecture as it pertains to the preconstruction and construction areas and provides suggested specifications for the Trns•port systems.

At ConnDOT's request, a separate proposal and cost estimate to upgrade the current ConnDOT SiteManager environment has been prepared. However, the SiteManager system requirements are included in this chapter for ease of review.

Recommendations and estimates may be subject to change based on knowledge gained through proof of concept or more detailed analysis during implementation planning. The information in this chapter often refers to the AASHTO Trns•port Cloverleaf web site for hardware and software requirements and recommendations. Due to fast-changing technology, Cloverleaf is the best source for current Trns•port technical information. The information on Cloverleaf is based upon the Trns•port testing environment. Performance testing is executed with 40 simultaneous users (ConnDOT will probably never have more than 20). Due to tremendous variability in agency technical infrastructure, such as networks and multiple applications sharing resources, recommendations beyond what is used for system testing would be unreliable.

> **Note:** System design documentation can be requested from AASHTO if so desired.

7.1 Current ConnDOT Infrastructure

This section describes the current ConnDOT infrastructure for information technology, relative to the architecture and infrastructure requirements for Trns•port implementation. Mainframe systems intended for replacement are not included.

7.1.1 Current Hardware

Table 7-1 shows the current hardware that is present at ConnDOT for deployment of Trns•port systems. Any machine that meets the Trns•port Architecture guidelines and has the required software can be used to run Trns•port software.

Servers listed below may be currently used for a combination of existing Trns•port systems and other (non-Trns•port) applications.

Hardware	Description
Client Desktops	The client machines used at ConnDOT are a combination of Windows® XP and Vista.
Database Servers	Five Windows 2003 database servers are on the ConnDOT network.
File/Print Servers	Ten file/print servers are in use, with a combination of Windows 2000 and 2003 server.
Application Servers	Two Windows 2003 application servers are on the ConnDOT network.
Internet/Intranet/Web Servers	Two Microsoft IIS servers on Windows 2003, accessible only from the ConnDOT Intranet.

Table 7-1. Current ConnDOT Client/Server Hardware for Trns•port

7.1.2 Current Software

The following table outlines software packages used by ConnDOT that are pertinent to Trns•port system implementation.

Purpose	Software Used
Client Operating System	Windows® XP, Vista. Most commonly used is Windows® XP.
Client Web Browser	Microsoft Internet Explorer 7
Server Operating System	Windows Server™ 2003
Database Software	Oracle™ 10.02.03 on Windows Server 2003
Network Protocol	TCP/IP
Web Server Software	Microsoft IIS 6 and 7

Table 7-2 Current ConnDOT Client/Server and Web Software for Trns•port

7.1.3 Current Network Architecture

ConnDOT personnel were not able to provide a network system diagram; however, from an Info Tech review of the reported ConnDOT network infrastructure specifications, the network appears to be adequate for the Trns•port systems.

7.2 Trns•port Client/Server Architecture

This section describes the architecture for the Trns•port client/server systems.

Almost all client/server applications require a central database server for managing shared data and a client personal computer for providing the user interface. Two-tier applications put all remaining functionality on either the database server or the client.

Trns•port client/server is a multi-tier client/server application; i.e., it consists of a combination of multiple servers and client machines. This means that application functionality is partitioned between several different components, rather than completely residing on either the database server or the client personal computers. Depending on the combination of Trns•port systems installed, the following tiers are required for optimal performance of the Trns•port client/server applications:

Application Server Tier

All complex program processing required for many reports and data management tasks reside on this tier, which can consist of one or more server personal computers. Different Trns•port client/server components require different software installed on their application servers, so software license costs can be reduced by using different application servers for certain specialized requirements. For processing efficiency, it is strongly recommended to keep the BAMS/DSS application server separate from the other application servers.

Web Server Tier

Trns•port client/server is gradually providing more and more functionality to users via web browsers. This tier consists of one or more server personal computers that service those web browsers. This server tier does not require its own dedicated box. It can be installed on one of the application servers.

This tier is not the same as web Trns•port Preconstruction. BAMS/DSS has its own web browser that is part of this tier.

BAMS/DSS Interface Server Tier

The specialized data analysis functions of BAMS/DSS require that large volumes of data be converted to SAS data sets for processing. Though this could take place on an application server, it is very common for the same data sets to be used for multiple analyses, requiring them to be kept in a location available to any BAMS/DSS application server. That location is the interface server. Since this tier stores information for clients, it must be a single logical server.

For ConnDOT, Info Tech recommends that BAMS/DSS be configured with a single application server and that the interface server and web server reside on the same physical machine as the application server. Due to the heavy I/O required for decision support processing, it is also recommended that the BAMS/DSS application server be used solely for BAMS/DSS and not shared with other applications, including Trns•port applications. The single physical machine configuration for the BAMS/DSS application, interface, and web servers can improve performance by keeping this heavy I/O activity confined to a single machine without the constraints of network traffic.

Including the database server and the client tiers, there are currently five tiers in all for client/server Trns•port. In certain cases, some of these "logical server" tiers can be combined to reside on one physical machine. An in-depth discussion of server configuration options can be found at http://www.cloverleaf.net/sys_arch/reference/ctsco.pdf.

7.3 web Trns•port Architecture

This section describes the architecture for the web Trns•port system.

Web Trns•port is a multi-layer web application that consists of a combination of multiple servers. Client computers access the systems via a locally installed web browser. The web Trns•port architecture is partitioned into the following layers:

Client Layer The web Trns•port client layer represents external clients that are responsible for submitting requests to web Trns•port and processing the responses. The client layer consists of two components: External Systems and Web Clients. An External System is an external software system that directly accesses web Trns•port functionality exposed through public web Trns•port web services, or in the case of ConnDOT's configuration, through the ConnDOT Intranet. A Web Client is a web browser such as Microsoft® Internet Explorer or Mozilla® Firefox that translates user actions into web Trns•port requests and displays the results to the user. The interactions with the Presentation Layer utilize standard web protocols.

Presentation Layer The web Trns•port Presentation Layer is responsible for receiving a client request, invoking the appropriate Business Layer components to service the request, transforming the Business Layer response as needed, and delivering the response to the client.

Business Layer The web Trns•port Business Layer is responsible for business data, rules, and functions, for report generation, and for custom process execution.

Data Layer The web Trns•port Data Layer is responsible for transaction management and execution, object/relational translation, and data persistence, logically through the Relational Database Management System (Relational DBMS). Business Objects make transaction requests to Entity Storage which utilizes the Data Handler to perform the low-level interactions with the Relational DBMS.

7.4 Trns•port Infrastructure Recommendations

Trns•port is supported on several platforms. It is tested on Windows Server 2003 servers. Several other database server operating systems are supported. The specific supported platforms, associated software requirements, and the specific hardware configurations under which Trns•port is tested are available online at: **http://www.cloverleaf.net/sys_arch/**.

Client/server Trns•port software is provided on CD-ROM, so servers running client/server Trns•port components should have a CD-ROM drive or network access to a shared CD-ROM drive. Web Trns•port software is provided through secure, online download.

Note that the hardware and software configurations used for Trns•port testing are not necessarily sufficient for production environments. It is recommended that ConnDOT systems exceed these configurations both for future upgrades in system requirements that may result from improved technology and for optimal performance.

Since ConnDOT's SiteManager installation has been in place for some time, it would be prudent for ConnDOT to compare its current technical environment with Trns•port client/server architecture technical requirements described in Section 7.2 to ensure that the ConnDOT SiteManager installation meets these requirements.

All requirements and recommendations in this document are current as of the date of this study, but should be reviewed nearer the time of purchase to ensure ConnDOT has the latest hardware and software needed. This information is available online at: **http://www.cloverleaf.net/sys_arch/**.

It is recommended for web Trns•port Preconstruction and SiteManager that separate production and test systems be set up for these mission-critical applications. Training systems may also be installed; however, SiteManager has a separate training application. Many agencies do not maintain a separate test system for BAMS/DSS since its function is chiefly analytical and the user base is small. No test system is needed for Estimator, as the configuration is simple, with no centralized database.

Database Server

Info Tech recommends a server with 2.5 GHz dual processor or better and 2 GB or better RAM. Additional processors and RAM could improve performance.

Since this machine will manage dynamic Trns•port data, it should have a hardware RAID storage system for maximum reliability. Performance of this machine will be critical to the entire organization, so the RAID system should use high performance disks in a RAID 5 configuration, with hot-swap capabilities. The average available storage should be at least 100 GB total (not 100 GB per environment) to support a production database environment as well as staging, testing, and training database environments. Agencies with unusually large programs should plan for more storage capacity.

Network performance is also critical on this server, so it should have at least a 100 Mb/second Ethernet network interface. Given the relatively low prices of networking equipment today, Info Tech recommends providing two network adapters, each at 1 Gb/second, for redundancy and performance.

The only software required on this server is the operating system and database engine. Info Tech does not recommend installing any additional software on the database server for reliability, performance, and security reasons.

AASHTO's Trns•port policies classify platforms as release tested, supported, validated, or unsupported. For client/server Trns•port, both Oracle 9i and 10g are supported on Windows 2003 database servers and Windows XP workstations. For web Trns•port, Oracle 10g is supported on Windows 2003 database and web/application servers.

Our recommendation to ConnDOT is to use Oracle 10g for the database platform. Our second recommendation is for ConnDOT to use one Oracle 10g database server for the SiteManager client/server system and one Oracle 10g database server for preconstruction client/server systems and web Trns•port Preconstruction. If ConnDOT anticipates adding the Trns•port civil rights software (web Trns•port CRLMS) in the future, a more robust database server should be considered for the web systems environment.

> **Note:** For detailed information regarding the platform certification classifications, please see Appendix C, Understanding Platform Certification Classifications. For additional platform component status information, refer to Appendix D, Trns•port Platform Component Status by Year.

Web/ Application Servers 1 - 4

The web/application servers will support web Trns•port Preconstruction and SiteManager. The servers will not include any components dealing with BAMS/DSS. Should usage levels become high enough to overload the initial application servers, additional servers identical to these can be added at any time for load balancing and disaster recovery.

Info Tech recommends at least two Windows 2003 servers for SiteManager (one for development and one for production) and two Windows 2003 servers for web Trns•port (one for test[1] and development combined and one for production) with a 2.5 GHz or better CPU and 1.5 GB RAM. We recommend one or more SCSI disks (UltraSCSI-160 preferred) with total available storage of at least 15 GB, and one 100 Mb/second or faster Ethernet network adapter.

The software required on these servers is Windows 2003 server, an ODBC driver for the Oracle database, .NET Framework 2.0, and Microsoft's IIS 6 web service. ConnDOT is using both IIS 6 and 7. IIS 7 is not an AASHTO supported platform. Therefore it is recommended that ConnDOT only use IIS 6 with Trns•port systems.

Application/ Interface/ Web Server 5 (BAMS/DSS capable)

BAMS/DSS Application Server:
Although there is only one logical tier for client/server application servers, Info Tech makes a distinction between ones capable of supporting BAMS/DSS and ones that cannot. That is because supporting BAMS/DSS on an application server requires installation of relatively expensive SAS software. Additionally, BAMS/DSS is a decision support analytical tool rather than a transaction processing system, and the robust BAMS/DSS processing can negatively impact performance for web Trns•port Preconstruction processing. Info Tech recommends that only one application server is configured to support BAMS/DSS.

Application servers store only working copies of data, and so do not require the extremely high reliability provided by RAID storage systems. They also have no extraordinary processing or performance requirements because even a fairly low-end server will perform most tasks in a timely manner, and additional servers can be deployed to satisfy heavy user loads. This application server, however, will be performing relatively intensive calculations for the BAMS/DSS system, so a higher-level computer is being specified than would be otherwise required.

[1] Web Trns•port test environment is used for running the automated system tests that are part of every web Trns•port installation or upgrade and uses only test data supplied with the system. Web Trns•port development environment is used for checking out system changes with ConnDOT's real data.

BAMS/DSS Interface Server:
The interface server does store data, but all such information is extracted from the relational database and can be easily recreated if needed, so the reliability of RAID storage is not needed.

BAMS/DSS Web Server:
Web servers store no local data, providing only user interface logic for users of BAMS/DSS database browser. This server also supports Web Item/Price Scatterplots in web Trns•port Preconstruction and Estimator as well as BAMS/DSS.

Info Tech recommends a Windows 2003 Server Standard Edition with a 2.5 GHz or better CPU and 2 GB RAM. Info Tech recommends one or more SCSI disks (UltraSCSI-160 preferred) with total available storage of at least 30 GB, and one 100 Mb/second or faster Ethernet network adapter.

The software required on this combination server is Windows Server 2003 and an ODBC driver for the Oracle database, plus the following SAS software: Base SAS, SAS/STAT, SAS/GRAPH, SAS/CONNECT, and SAS/ACCESS to ODBC, and SAS/SHARE. Apache 2.0.48 (or higher) web server (at no license cost) is required for BAMS/DSS web-based features (database browser and item price scatterplots).

BAMS/DSS Standalone option

Info Tech recommends the client/server configuration for BAMS/DSS, since it is accessible to multiple users as needed. However, ConnDOT requested specifications for the option to install standalone BAMS/DSS. The typical configuration is for standalone BAMS/DSS to be installed on a user's workstation computer. It is anticipated that ConnDOT would need to run at least two standalone BAMS/DSS applications to meet their needs. Standalone BAMS/DSS can connect to an Oracle database on a database server with the same specifications as for client/server. The release-tested hardware specifications are for a 2.5-GHz processor with 512-MB RAM, 80-GB available hard disk space, CD-ROM optical drive, and Network adapter.

The software required for each standalone machine is Microsoft® Windows® XP Professional (with SP1a) operating system, Apache Web Server (optional for web-based functions described above), Base SAS, SAS/ACCESS to ODBC, SAS/GRAPH, and SAS/STAT.

Client Machines

Info Tech recommends an Intel® Pentium® (or AMD processor) compatible PC with 2.5 GHz or higher processor, 512 MB or more RAM (Operating System dependent), 20 GB or higher hard disk capacity, CD-ROM drive, and Network adapter.

The software required on Client PCs is Windows XP, TCP/IP

implementation and ODBC Driver software supported by the Database Client, and Internet Explorer 5.5 or later.

For web Trns•port Preconstruction, the client is required to have either Internet Explorer 6 or 7 or Mozilla Firefox 1.5®. Adobe Acrobat Reader is required to be installed on the client for those wanting to view PDF documents. Adobe SVG Viewer is required to use the Web Scatterplot functionality.

In summation, Info Tech recommends that ConnDOT provide at least the following servers for production use of Trns•port:

- One database server for SiteManager;
- One database server for web Trns•port Preconstruction and BAMS/DSS together;
- One application server for SiteManager;
- One web server for web Trns•port Preconstruction; and
- One application server, interface server, and web server combined on the same physical machine for BAMS/DSS.

In addition, Info Tech recommends that ConnDOT provide at least the following two servers for test/development use of Trns•port:

- One application server for SiteManager;
- One web server for web Trns•port Preconstruction.

The hardware and software requirements for each server at the time of this report are listed in the following tables, but Cloverleaf is the best source for current hardware and software requirements.

Product	Quantity per Server
High-end Intel Pentium class processor: Minimum 2.5 GHz or better CPU	2-4
Memory: 2 GB minimum	1
Cache: 512 KB	1
Hard Drive: 125 GB SCSI minimum (UltraSCSI-160 RAID 5 recommended)	1
Network Adapter: 100Mb/second or 1Gb/second Ethernet	1
CD-ROM drive	1

Table 7-3. Database Server Hardware Configuration

Note: The hard drive could be a single disk, but we recommend achieving the required storage with smaller SCSI drives with a hardware-controlled RAID 5 for more reliable and higher performance data storage.

The CPU specified is the minimum; adding additional CPUs and increasing CPU speed will improve performance.

Product	Vendor	Quantity per Server
Windows 2003 Server	Microsoft	1
Oracle 10g (10.2.0.2) for client/server systems	Oracle	1
Oracle 10g (10.2.0.3) for web Trns•port	Oracle	1

Table 7-4. Database Server Software Configuration

Product	Quantity per Server
High-end Intel Pentium class processor: Minimum 2.5 GHz or better CPU	1
Memory: 1 GB (2 GB minimum for the Interface server)	1
Cache: 512 KB	1
Hard Drive: 10 GB SCSI minimum (50 GB SCSI minimum for the Interface server)	1
Network Adapter: 100 Mb/second or 1 Gb/second Ethernet	1
CD-ROM drive	1

Table 7-5. BAMS/DSS Application/Interface/Web Server Hardware Configuration

Note: The CPU and RAM specified is the minimum; adding an additional CPU, increasing CPU speed, or increasing RAM will improve performance.

Product	Vendor	Quantity per Server
Windows 2003 Server	Microsoft	1
Oracle ODBC Driver 10.2.0.2	Oracle	1
SAS/ACCESS to ODBC 9.1.3	SAS	1
Base SAS 9.1.3	SAS	1
SAS/GRAPH 9.1.3	SAS	1
SAS/STAT 9.1.3	SAS	1
SAS/SHARE 9.1.3	SAS	1
SAS/CONNECT 9.1.3	SAS	1
Apache™ Web Server 2.0.48 or higher	Apache	1

Table 7-6. BAMS/DSS Application/Interface/Web Server Software Configuration

Product	Quantity per Computer
High-end Intel Pentium class processor: Minimum 2.5 GHz or better CPU	1
512 KB RAM	1
Hard Drive: 80-GB available hard disk space	1
Network Adapter	1
CD-ROM drive	1

Table 7-7. BAMS/DSS Standalone Hardware Configuration

Note: The CPU and RAM specified is the minimum; adding an additional CPU, increasing CPU speed, or increasing RAM will improve performance.

Product	Vendor	Quantity per Computer
Windows XP Professional (with SP1a)	Microsoft	1
Oracle ODBC Driver 10.2.0.2 (if using Oracle database)	Oracle	1
SAS/ACCESS to ODBC 9.1.3	SAS	1
Base SAS 9.1.3	SAS	1
SAS/GRAPH 9.1.3	SAS	1
SAS/STAT 9.1.3	SAS	1
Apache™ Web Server 2.0.48 or higher	Apache	1

Table 7-8. BAMS/DSS Standalone Software Configuration

Product	Quantity per Server
High-end Intel Pentium class processor: Minimum 2.5 GHz or better CPU	1
Memory: 1 GB (2 GB minimum for the Interface server)	1
Cache: 512 KB	1
Hard Drive: 10 GB SCSI minimum (50 GB SCSI minimum for the Interface server)	1
Network Adapter: 100 Mb/second or 1 Gb/second Ethernet	1
CD-ROM drive	1

Table 7-9. web Trns•port Preconstruction and Web Server Hardware Configuration

Note: The CPU and RAM specified is the minimum; adding an additional CPU; increasing CPU speed, or increasing RAM will improve performance.

Product	Vendor	Quantity per Server
Windows 2003 Server	Microsoft	1
Oracle ODBC Driver 10.2.0.2	Oracle	1
Oracle 10g Client for web Trns•port Preconstruction	Oracle	1
.NET Framework 2.0	Microsoft	1
Windows Interface Information Server 6.0	Microsoft	1

Table 7-10. web Trns•port Preconstruction and Web Server Software Configuration

The hardware and software requirements for each client are listed in the following tables.

Product	Quantity per Server
High-end Intel Pentium class processor: Minimum 2.5 GHz Intel Pentium	1
Memory: 512 MB	1
Cache: 512 KB	1
Hard Drive available space: 10 GB	1
Network Adapter: 10/100 Base T Fast Ethernet	1
CD-ROM drive	1

Table 7-11. Client Hardware Configuration

Note: The CPU and RAM specified are recommendations; the system will run on lesser systems (any Pentium 4 with 256MB RAM), but with diminished performance; increasing CPU speed above the recommendation will improve performance.

The hard drive size is the minimum; suggested size is 40 GB.

Product	Vendor	Quantity per Client
Windows XP Workstation	Microsoft	1
Oracle ODBC Driver 10.2.0.2 for BAMS/DSS Clients	Oracle	1
TCP/IP implementation supported by Database Client	Various	1
Winsock (conformant to Windows Socket Specifications 1.1)	Various	1
Net Client 10.2.0.2	Oracle	1
Required Support Files 10.2.0.2	Oracle	1
Net Required Support Files 10.2.0.2	Oracle	1
Oracle Trace Required Support Files 10.2.0.2	Oracle	1
SQL*PLUS 10.2.0.2 (optional)	Oracle	1

Product	Vendor	Quantity per Client
Adobe Acrobat Reader (optional)	Adobe	1
Internet Explorer 6.0	Microsoft	1

Table 7-12. Client Software Configuration

7.5 Expedite and Internet Bidding System Requirements

The components of the Expedite system for electronic bidding will be installed as standalone applications on the personal computers of several individuals in the ConnDOT Contract Administration unit. Specifications are the same as those detailed in the requirements for client machines in Tables 7-11 and 7-12, except that Expedite requires any Windows 2000 or newer operating system and only 1 GB minimum of available hard drive space.

ConnDOT may select the Bid Express service to interface with Trns•port to implement two-way bidding over the Internet. The Bid Express website is hosted by Info Tech, Inc. Information on server security and encryption of data is in Chapter 9, Trns•port Security. ConnDOT will be required to provide its own primary and backup Internet access in order to access the Bid Express site. The back up Internet access is required should ConnDOT's primary means of Internet access become unavailable. It is recommended that ConnDOT procure a dial-up local or regional Internet Service Provider (ISP) as a backup; however this is not required.

In a typical configuration using the Bid Express service for Internet bidding, the Bid Express Retrieval Console (BERC) for downloading bids is installed on two to five user workstations. The requirements are the same as the Client Hardware Configuration designated in Table 7-11, except that BERC requires any Windows 2000 or newer operating system, and only 1 GB minimum of available hard drive space.

7.6 Estimator Configuration and Requirements

There are three configuration options for the installation of Estimator software and reference catalogs: standalone, client only, and server. Estimator does not use a centralized database; users access the reference item and pricing information through the catalog, and project files are saved individually by the user.

The recommended method for ConnDOT employees using Estimator is a multi-user shared network install. This option utilizes a single installation of Estimator on a network drive that multiple users can use concurrently and share a common catalog. (Access to the software is http-based and does not require Terminal Services or Citrix.) This option requires installation of a web server that supports the execution of Perl

scripts to protect the catalogs from being overwritten when more than one user is using the catalog. The latest version of ActivePerl for the server's operating system can be used; for example, 5.8.8.824 or higher. It is also required to install Crystal Reports Runtime version 9 or 10 on each user's computer; however, this is generally a one-time task, only requiring an update if the runtime version changes in Estimator. Project estimate files can be saved on the user's local machine or on a shared network drive.

ConnDOT consultants using Estimator will be responsible for their own Estimator licensing and installation, with ConnDOT providing the reference catalog(s). Consultants generally use the standalone installation method, with Estimator and its catalog(s) installed on the user's workstation computer. As mentioned above, ConnDOT can establish a web server which will host the catalog(s) which ConnDOT users can access and consultants can download the latest Estimator catalog updates. Estimator can be configured to automatically notify users when updated catalogs are available.

Because of the large number of Estimator users, the standalone and the client only installations are not recommended for ConnDOT because the Estimator software must be installed and maintained on each user's computer.

Users of Estimator client machines must have a 2.5-GHz processor or better, with at least 10 gigabytes available disk space and 512-megabytes of RAM.

Users must be running Microsoft® Windows® XP Professional (with SP1a or higher). In order to import and export estimates using Microsoft Excel®, Microsoft Office 2002 or higher is required. Microsoft .NET Framework 2.0 must be installed before installing Estimator. Estimator's Web Services require Microsoft Internet Explorer 5.5 or greater (with the bundled MSXML3 parser).

To host the Estimator catalogs and users table for the shared network install, Apache and ActivePerl are required. To conserve resources, the BAMS/DSS web server can be used for this purpose.

7.7 Trns•port Network and Bandwidth Requirements

All the servers described in the Trns•port hardware and software requirements should be housed in the Central Office in close physical proximity to one another. A fully switched 100 Mb/second or even 1 Gb/section local area network should be used to connect those machines to each other and isolate them on their own subnet. Their connection to the rest of the ConnDOT's networks can be any speed Ethernet from 10 Mb/second on up.

The physical characteristics of the wide area network are not important for Trns•port client usage. What is important is the effective bandwidth of the TCP/IP connection. All client computers require network connectivity to the central servers. For most systems a 128 Kb/second connection will provide good performance, and a 28.8 Kb/second connection will be adequate.

7.8 Remote Communications for Info Tech Support

Often, agencies request remote support during implementation and sometimes on a continuing basis. Giving Info Tech staff access to Trns•port servers is highly recommended during the migration phase to ensure the highest level of support. This will allow Info Tech's second-level support team to work directly on ConnDOT servers to pinpoint and resolve problems and make recommendations.

Info Tech subject matter experts using a Virtual Private Network (VPN) remote connection service may provide a portion of the services provided by Info Tech offsite. This approach will not only reduce the travel time and expenses required to support the project, but will also assure that the ConnDOT project receives the most effective attention and effort from the appropriate resources for support and issue resolution. This connection will allow for faster responses and real-time problem diagnosis by Info Tech's second-level support staff. If ConnDOT chooses to implement this remote access, Info Tech will work with ConnDOT to establish the required VPN access in accordance with ConnDOT policies for security and network access.

ConnDOT has expressed an interest in allowing designated Info Tech employees to have remote access.

7.9 Potential Issues

1. Currently, Windows 2008 is in use at ConnDOT but is not AASHTO supported or tested for use with Trns•port systems. This is subject to change in the coming year, but probably not soon enough for the intended ConnDOT implementation.

2. VMware environments which are currently in use at ConnDOT are not AASHTO supported or tested and have been found to adversely affect performance of Trns•port systems.

3. Currently, Oracle 10g (10.2.0.2) is required for Trns•port client/server systems, including BAMS/DSS and SiteManager, while Oracle 10g (10.2.0.3) is required for web Trns•port. Accordingly, the recommended version of Oracle ODBC Driver and related software for client machines is 10.2.0.2.

4. It is not recommended that servers designated for Trns•port systems be shared with non-Trns•port applications, as is currently the practice at ConnDOT.

5. Currently ConnDOT is using Terminal Services for users to access the SiteManager client. Terminal Services is not an AASHTO supported or release-tested platform. Citrix is also not an AASHTO supported or release-tested platform; however, it is more robust and is used by a number of Trns•port agencies who are generally willing to offer guidance.

6. The version of Crystal Reports Runtime required on each user's computer to run Estimator reports could be incompatible if a different version of Crystal is already installed on the user's computer, although this is rarely an issue. In the standalone mode, Estimator uses Crystal Reports version 9. The multi user installation recommended for ConnDOT is compatible with version 9 or 10.

7. It is critical that ConnDOT provide adequate hardware to avoid disruption of operation of the Trns•port systems. Failure to do so could result in missed project deadlines, interrupted bid letting procedures, delayed payment to contractors for work performed or other impacts on productivity.

CAUTION: All technical requirements and versions information included in this chapter are appropriate at the time this report was written. Due to ongoing technology updates, it is critical for ConnDOT to review these requirements and versions on Cloverleaf before procuring hardware and software for this project.

8. Training Analysis

The types of training available for the web Trns•port Preconstruction, Estimator, Expedite and electronic bidding, BAMS/DSS, and SiteManager systems are described in this chapter. In addition, information is provided on training for ActiveReports used in web Trns•port report customizations and SAS ad hoc reporting in BAMS/DSS. Descriptions of the various training activities in this section are based upon generic training standards such as how many trainees and the number of training days. ConnDOT's specific training requirements will be determined prior to these training activities. The cost estimate is based upon these generic standards, but final costs will be modified according to the actual training requirements for ConnDOT.

8.1 Info Tech Training Services

Training is a critical element in any enterprise software implementation. It is driven by the implementation approach and must be structured and timed in a manner that fully supports the goals of the project. To facilitate an efficient implementation that brings ConnDOT into production status with the Trns•port systems, a *just in time* training method with related elements in the project schedule is recommended (i.e., the trainee's acquired knowledge is applied directly to related implementation activities in the time period immediately following the training). During training, Info Tech will facilitate discussions with trainees regarding the detailed approach to implementation activities that are scheduled to take place after training.

Typically, different training classes are offered for different user groups based on their functional area and the corresponding Trns•port system. The minimum training sessions required for effective implementation of the web Trns•port Preconstruction, Estimator, Bid Express, BAMS/DSS, and SiteManager systems at ConnDOT are as follows:

- **web Trns•port Preconstruction**
  - web Trns•port Preconstruction System Administrator Training

- web Trns•port Preconstruction Core Team User Training
- web Trns•port Preconstruction Projects User Training
- web Trns•port Preconstruction Proposals and Bid Lettings User Training, including Expedite Interfaces

- **Estimator**
  - Estimator System Administrator Training
  - Estimator User Training
- **Electronic Bidding using Expedite and Bid Express**
  - Expedite and Bid Express ConnDOT Administrator Training
  - Expedite and Bid Express Pilot Contractor Training
  - Expedite and Bid Express Contractor Training
- **BAMS/DSS**
  - BAMS/DSS System Administrator and Basic User Training
- **SiteManager**
  - SiteManager System Administrator Training
  - SiteManager User Training

Additional, more advanced training is also available once Trns•port is in production and the Trns•port users are more experienced with the Trns•port systems. At that time, ConnDOT can decide which of the following advanced training classes would be appropriate:

- BAMS/DSS SAS Ad Hoc Training
- ActiveReports Training (for web Trns•port Preconstruction)

Further details on each of the above training classes are provided in the following sections. The information presented includes a description for each training type, as well as the number of days, number of instructors, and number of students accommodated.

Levels of training differ according to the needs of each highway agency. For systems with fewer ConnDOT users such as web Trns•port Preconstruction and BAMS/DSS, Info Tech recommends that the training sessions be conducted to include all Trns•port users of the relevant system. This will ensure the most effective delivery of training services. Due to the complexity of BAMS/DSS, this training approach is particularly recommended for that system.

For systems with many users such as Estimator and SiteManager, the training could be presented in a Train-the-Trainer format for ConnDOT staff who have been identified as the trainers for the agency. However, with the limited staff available at ConnDOT, this may not be feasible.

The training program for all Trns•port systems follows a standard presentation method, using supplemental training handouts to facilitate the hands-on training. This program teaches different processes to different audiences and focuses on sections and exercises that are applicable to the ConnDOT business processes of most concern to the audience. Info Tech will use ConnDOT-specific terminology where possible. However, no customizations will be made to the standard training materials. This presentation method requires the least amount of preparation time as the classroom materials can be used in their existing format.

> **Note**: There is no standard training documentation shipped with the web Trns•port system. Training handouts will be prepared for ConnDOT.

Alternatively, custom procedures manuals could be developed to reflect ConnDOT's Trns•port procedures for specific systems. However, this is a more time-consuming and costly method of classroom material preparation that could delay the delivery of essential user training.

Info Tech has included an optional task in the proposed project plan to write custom procedures documents that would be specific to Trns•port as implemented at ConnDOT. This could include, for example, a *ConnDOT Preconstruction Projects, Proposals, and Bid Lettings Procedures Manual;* a *ConnDOT Cost Estimation Procedures Manual;* and/or a *ConnDOT BAMS/DSS Procedures Guide*. These documents could also serve as the basis for custom classroom materials to be used in subsequent training for additional users.

Estimates for the costs of providing the minimum recommended training for ConnDOT are included in Chapter 11, Implementation and Project Planning. These estimates are based on the provision of just-in-time training to facilitate efficient completion of project tasks according to the proposed implementation schedule. For some systems, an early training session will be provided for the core team of ConnDOT users who will test the systems and participate in setting procedures.

> **Note**: The cost estimates provided for the general user training are based on the number of classes described in the charts below and the use of non-custom versions of training documents. Depending on the total number of users to be trained, additional classes may be required. Such additional classes are not included in the current cost estimates or in the proposed project schedule.

8.2 Required Training

This section describes the types of training that will be required for web Trns•port Preconstruction, Estimator, Expedite and Bid Express, BAMS/DSS, and SiteManager.

8.2.1 web Trns•port Preconstruction Training

The web Trns•port Preconstruction system provides a full range of project and proposal creation, letting, and award capabilities from project conception to award of the contract. At ConnDOT, web Trns•port Preconstruction can be used by a combination of planners, designers, estimators, and contract administrators.

Minimum ConnDOT staffing support levels for web Trns•port Preconstruction include a System Manager and a backup for this person.

Recommended web Trns•port Preconstruction training begins with a thorough orientation for the system managers in the configuration and maintenance of the systems. A training session will then be provided in all functional areas of the system for the core team of ConnDOT users who will test the systems and participate in analysis workshops. These sessions should be scheduled to closely follow the web Trns•port Preconstruction installation.

Shortly before ConnDOT is ready to go into production with web Trns•port Preconstruction, the training progresses to two focused functional area training sessions for ConnDOT users of the system. Taken together, the training courses described below comprise the basic web Trns•port Preconstruction training. Class size is limited to 15 students. If the number of participants exceeds these limits, multiple classes will be required.

web Trns•port Preconstruction System Administrator Training

Training Type	web Trns•port Preconstruction System Administrator Training
Number of Days	1
Number of Instructors	1
Number of Students	2 – 4
Description	The purpose of this class will be to train the web Trns•port Preconstruction system administrators in the following areas: ▪ Routine Trns•port utility tasks, such as importing and exporting from and to other Trns•port systems ▪ Maintenance of the database server and web-application server, as it relates to applying web Trns•port product updates ▪ System overview ▪ Routine process for setting up Users and Roles within web Trns•port ▪ Common question resolution, troubleshooting, and Info Tech support techniques ▪ Impacted business processes and flows ▪ Demonstrate how to perform screen and field customizations

Table 8-1. web Trns•port Preconstruction System Administrator Training

web Trns•port Preconstruction Core Team Training

Training Type	web Trns•port Preconstruction Core Team Training
Number of Days	2
Number of Instructors	2
Number of Students	up to 15
Description	The purpose of this class is to train ConnDOT staff in the following web Trns•port Preconstruction areas, with a focus on implementation considerations: ▪ Create projects in web Trns•port Preconstruction ▪ Develop project details in web Trns•port Preconstruction ▪ Import and export data from and to Estimator ▪ Import projects from InRoads Quantity Manager ▪ Finalize projects in web Trns•port Preconstruction ▪ Generate the Preliminary Detail Estimate ▪ Create and develop a proposal ▪ Create a bid letting and link proposals to it ▪ Generate the Proposal Schedule, including creation of a file for Expedite ▪ Generate the Notice to Contractors ▪ Enter Planholders ▪ Create Addenda (Amendments) ▪ Use Expedite to create bidding files for contractors ▪ Enter bids using Expedite ▪ Import bid tab and DBE information from xtabdat and xdbedat files ▪ Perform Bid Tab Edits ▪ Perform Bid Tab Analysis ▪ Award the contract in web Trns•port Preconstruction ▪ Generate the Final Detail Estimate ▪ Pass data to BAMS/DSS ▪ Pass data to SiteManager ▪ Maintain Reference Data (vendors, codes, items, etc.)

Table 8-2. web Trns•port Preconstruction Projects User Training

web Trns•port Preconstruction Projects User Training

Training Type	web Trns•port Preconstruction Projects User Training
Number of Days	1
Number of Instructors	2
Number of Students	up to 15
Description	The purpose of this class is to train ConnDOT staff in the following web Trns•port Preconstruction areas: ▪ Create projects in web Trns•port Preconstruction ▪ Develop project details in web Trns•port Preconstruction ▪ Import/export data from/to Estimator ▪ Import projects from InRoads Quantity Manager ▪ Finalize projects in web Trns•port Preconstruction ▪ Generate the Preliminary Detail Estimate ▪ Maintain Reference Data (for example, codes, items, etc.)

Table 8-3. web Trns•port Preconstruction Projects User Training

web Trns•port Preconstruction Proposals and Bid Lettings User Training

Training Type	web Trns•port Preconstruction Proposals and Bid Lettings User Training
Number of Days	2
Number of Instructors	2
Number of Students	up to 15
Description	The purpose of this class is to train ConnDOT staff in the following areas: ▪ Create and develop a proposal ▪ Create a bid letting and link proposals to it ▪ Generate the Proposal Schedule, including creation of a file for Expedite ▪ Generate the Notice to Contractors ▪ Enter Planholders ▪ Create Addenda (Amendments) ▪ Use Expedite to create bidding files for contractors ▪ Enter bids using Expedite ▪ Import bid tab and DBE information from xtabdat and xdbedat files ▪ Perform Bid Tab Edits ▪ Perform Bid Tab Analysis ▪ Award the contract in web Trns•port Preconstruction ▪ Generate the Final Detail Estimate ▪ Pass data to BAMS/DSS ▪ Pass data to SiteManager ▪ Maintain Reference Data (vendors)

Table 8-4. web Trns•port Preconstruction Proposals and Bid Lettings User Training

8.2.2 Estimator Training

Estimator is a standalone estimating tool used for preparing detailed project estimates. Estimator allows engineers and professional estimators to develop price estimates using a variety of estimation techniques, including any combination of bid-based, cost-based, and reference-price approaches. Estimator can be purchased by external design consultants, which allows the consultants to submit detailed estimates in a Trns•port compatible format that can be loaded directly into web Trns•port Preconstruction.

Reference catalog data (codes, standard items, bid price history) is required for Estimator use and should be updated on a regular basis, typically quarterly, to reflect current price trends.

Staffing support levels for Estimator include a System Manager and a backup person. Since their primary function will be to update reference data and bid histories with current data derived from BAMS/DSS, this task could also be assigned to the BAMS/DSS System Manager or other BAMS/DSS resource. The BAMS/DSS training includes instruction on bid history creation.

Estimator Systems Administrator and Basic User Training are minimum requirements to begin using Estimator. This training should be scheduled after the Estimator upgrade installation and after the BAMS/DSS upgrade and data conversion, once initial bid histories have been created for the Estimator catalogs.

The Estimator training course described below would be provided in a four day format. Seven half-day Basic User Training classes are provided, with each class limited to 15 students. The second half of the first day is devoted to System Administrator Training so that the System Administrators can attend user training in the first session.

Since ConnDOT has about 100 potential in-house Estimator users, four days of training would accommodate all users. As an alternative, the first class could be presented in a Train-the-Trainer format for ConnDOT staff who have been identified as trainers for the agency. These agency trainers could practice training as assistants or lead trainers under the InfoTech instructors' guidance during the rest of the sessions. They would then be qualified to train future employees or to conduct training for consultant Estimator users.

There are no provisions in this plan for training the design consultants who will be using Estimator; this could be addressed at a later time. Consultant training has the same requirements as in-house Estimator training – two instructors for 15 trainees and a half day for each class. In Info Tech's experience, when training is offered for consultants, very few of them attend unless it is required by the agency. Customized procedures guides are helpful for assuring that consultants understand ConnDOT requirements for estimate preparation.

Estimator System Administrator Training

Training Type	Estimator System Administrator
Number of Days	1/2
Number of Instructors	2
Number of Students	2 - 4
Description	The purpose of this class is to train ConnDOT Estimator System Administrators in the following areas: ▪ Estimator terminology, functionality and file structure ▪ Setting up ConnDOT agency options ▪ Estimator security and setting up users ▪ Importing reference data and BAMS/DSS bid histories to update Estimator catalogs ▪ How Estimator interfaces with other systems

Table 8-5. Estimator System Administrator Training

Estimator Basic User Training

Training Type	Estimator Basic User
Number of Days	1/2 day each; 7 sessions over 4 days
Number of Instructors	2
Number of Students	105 (15 students per Basic User Training class)
Description	The purpose of this class is to train ConnDOT estimators in the following areas of Estimator: ▪ Estimator terminology, functionality and file structure ▪ Estimator navigation (user-interface) ▪ How Estimator interfaces with other systems ▪ Building and updating job cost estimates ▪ Pricing items using bid-based, cost-based, percentage-based and ad hoc methods ▪ Fine-tuning prices in Estimator

Table 8-6. Estimator Basic User Training

8.2.3 Expedite and Bid Express Electronic Bidding Training

Expedite is an electronic bidding system used by contractors for proposal bid tab entry for bid submission. Highway agencies use Expedite to process the bids contractors return through an Internet bidding system or on electronic media, and to load the bids into web Trns•port Preconstruction. Agencies also use Expedite to receive proposal and vendor data from web Trns•port Preconstruction and convert it to an electronic bid system (EBS) file for distribution to the contractors.

Contractors who subscribe to the Bid Express service and acquire a digital ID can enter their bids using the Expedite Bid software and submit them electronically through the Bid Express Internet Bidding service.

The Bid Express Retrieval Console (BERC), the web portal access software for agency use in downloading bids, will be installed on two to five workstations at ConnDOT accessible by the designated ConnDOT electronic bidding administrators. The web portal interfaces with web Trns•port Preconstruction.

Staffing support levels for electronic bidding systems include an administrator and a backup person.

Expedite and Bid Express will go through a testing period by ConnDOT and volunteer contractors before production begins. Training will be provided during the installation process for the ConnDOT administrators and the pilot contractors doing testing. After the test period is finished (about four months), training will be offered for all interested contractors.

Electronic Bidding Pilot Contractor Training

Training Type	Electronic Bidding Pilot Contractor Training
Number of Days	½ day, during the 3 day Info Tech on-site installation visit
Number of Instructors	2
Number of Students	Up to 20
Description	The purpose of this class will be to train the electronic bidding pilot contractors in the following areas: ▪ Creating a digital ID ▪ Expedite and Bid Express two-way bidding ▪ Common question resolution, troubleshooting, and Info Tech support techniques

Table 8-7. Electronic Bidding Pilot Contractor Training

Electronic Bidding Contractor Training

Training Type	Electronic Bidding Contractor Training
Number of Days	2 classes per day, up to six (6) classes
Number of Instructors	2
Number of Students	up to 120 (20 per class)
Description	The purpose of this class will be to train contractors in the following areas of electronic bidding: ▪ Creating a digital ID ▪ Expedite and Bid Express two-way bidding ▪ Common question resolution, troubleshooting, and Info Tech support techniques

Table 8-8. Electronic Bidding Contractor Training

8.2.4 BAMS/DSS Training

BAMS/DSS is a decision support system that provides the historical database repository for Trns•port data and a range of statistical processes (models) for data analyses purposes. The predefined statistical analysis models that are provided with BAMS/DSS, together with built-in support for user-written ad hoc reporting, create the environment for users to perform a variety of data analyses, including but not limited to the following:

- Bid History Analysis for Estimation
- Contract Award Analysis
- Bid Competition/Vendor Activity Analyses
- Bid versus As-built Cost Variation Analysis
- Executive Summary Reporting

While the number of dedicated BAMS/DSS users is typically low in comparison to other Trns•port software systems, BAMS/DSS satisfies numerous demands for access to historical data. In particular, BAMS/DSS is the source for item reference and bid-history data that is critical for effective use of the Estimator system. This estimation-support data must be generated in BAMS/DSS on a regular basis, typically quarterly, in order to reflect current price trends. Therefore, in addition to general usage, initial BAMS/DSS training is designed to develop the basic skills necessary to create and maintain current bid-history files.

Minimum ConnDOT staffing support levels for BAMS/DSS include a System Manager and a backup for this person. The number of other users will vary, gradually increasing as the capabilities for data analysis and reporting from BAMS/DSS become more apparent to the agency.

BAMS/DSS System Administrator and Basic User Training are minimum requirements to begin using BAMS/DSS. This training should be scheduled to closely follow the BAMS/DSS upgrade and data conversion. The optional BAMS/DSS SAS Ad Hoc Training is a higher-level course that can be scheduled for later delivery once users have had time to use BAMS/DSS for a while and are ready explore more advanced features of the product.

The BAMS/DSS training course described below is usually provided in a three day format. Class size is limited to eight students. Therefore, if the number of participants exceeds this limit, multiple classes will be required to affect delivery.

BAMS/DSS System Administrator and Basic User Training

Training Type	BAMS/DSS System Administrator and Basic User Training
Number of Days	3
Number of Instructors	2
Number of Students	up to 8 (including the System Manager)
Description	The purpose of this class is to train ConnDOT staff in the following areas: ▪ BAMS/DSS functionality and database structure ▪ How to navigate BAMS/DSS (user-interface) ▪ How BAMS/DSS interfaces with other systems ▪ How to create BAMS/DSS data views ▪ How to query and maintain the data ▪ How to run analysis models and ad hoc programs The basic user training class consists of two to two and a half days of on-site training conducted by a team of two instructors for up to eight class participants. One-half to one day is spent with the system administrators and data managers alone for one-on-one system and data management training.

Table 8-9. BAMS/DSS System Administrator and Basic User Training

8.2.5 SiteManager Training

SiteManager is a comprehensive client/server based construction management tool. It provides for data entry, tracking, reporting, and analysis of contract data from contract award through finalization. SiteManager can be used by all levels of construction personnel such as field inspectors, technicians, project managers, clerks, auditors, lab personnel, management, producer/suppliers, contractors, and the FHWA.

Staffing support levels for SiteManager include a System Manager and a backup person. SiteManager System Administrator and Basic User Training are minimum requirements

to begin using SiteManager. This training should be scheduled after the SiteManager upgrade installation.

The SiteManager User Training course can be provided to the core team of ConnDOT staff who will participate in analysis workshops, or presented in a Train-the-Trainer format for ConnDOT staff that have been identified as the SiteManager Construction trainers for the agency. Or if ConnDOT would prefer Info Tech's assistance in providing end-user training, the cost of the course and the materials described herein can be the pricing for five instructional days for 15 participants. With ConnDOT guidance, Info Tech instructors can teach subsets of the materials to like groups of users. For instance, the five day quote can be just as easily applied to the instruction of one three-day Project Engineer course and one two-day Inspector course making up a comparable five day instructional period.

SiteManager System Administrator Training

Training Type	SiteManager System Administrator Training
Number of Days	5 day
Number of Instructors	2
Number of Students	up to 10
Description	SiteManager System Administration Training includes a five-day training course covering the following: ▪ SiteManager Architecture ▪ SiteManager Installation & Setup ▪ Security ▪ Configuring Defaults ▪ System and Reference Tables ▪ DWR Master Lists ▪ Material Management tables[1] ▪ RTF intro ▪ Generic fields ▪ Material templates ▪ DWR templates ▪ Customizing Templates Two of the modules require the installation and use of PowerBuilder. It would be the agency's responsibility to install licensed copies of PowerBuilder if the participants are to follow along in the exercises. Otherwise, a less effective demonstration of these two modules can be performed by the instructor. [1] This would not include a review of LIMS tables and dependencies.

Table 8-10. SiteManager System Administration Training

SiteManager User Training

Training Type	SiteManager User Training
Number of Days	5 day
Number of Instructors	2
Number of Students	up to 15
Description	SiteManager Training includes a five-day training course covering the following: ▪ SiteManager Overview ▪ Contract Administration ▪ Remote Data Collection (DWR and Pipeline) ▪ Contractor Payments ▪ Change Orders ▪ Materials Management[1] The course uses the standard end-user training guides and training data that is delivered with each SiteManager Release. The guides cover all the basic functional areas of SiteManager and include exercises. [1]The standard user training course includes the SiteManager Materials Management module, but does NOT include instruction in the new LIMS component of SiteManager.

Table 8-11. SiteManager User Training

8.3 Optional Training

The following advanced training courses are also available.

8.3.1 BAMS/DSS SAS Ad Hoc Training

Training Type	BAMS/DSS SAS Ad Hoc Training
Number of Days	3
Number of Instructors	1
Number of Students	up to 4
Description	The purpose of this class is to train staff in the basics of the SAS programming language within the context of the BAMS/DSS in-built ad hoc programming environment. This training will include the following topics: ▪ A review of basic BAMS/DSS functionality and database structure ▪ Syntax Rules for basic SAS programming ▪ Sample ad hoc programs for data queries and report creation ▪ Writing basic ad hoc programs in SAS

	▪ More advanced features, including graphical output The SAS ad hoc training class consists of three days of on-site training conducted by a team of one instructor for up to four class participants. Exercises are performed using the agency's own BAMS/DSS data, allowing trainees to generate real reports and graphics that are immediately useful to them. The BAMS/DSS database structure is reviewed, but class attendants should have a reasonable knowledge of their data and be already familiar with the BAMS/DSS user interface.

Table 8-12. BAMS/DSS SAS Ad Hoc Training

8.3.2 ActiveReports Training

ActiveReports training allows Trns•port users to make custom configurations to existing web Trns•port Preconstruction reports if needed. It also allows them to develop new custom reports for reporting needs not covered by the standard reports available in web Trns•port Preconstruction.

This training is usually provided in a two day format. Class size is limited to six students. Only one ActiveReports training class is usually needed since only a small number of users are likely to be involved in report configuration activities.

Training Type	ActiveReports Training
Number of Days	2
Number of Instructors	1
Number of Students	up to 6
Description	The purpose of this class is to train staff in the basics of ActiveReports, the report writing tool within web Trns•port. This training will include the following topics: ▪ Procedure to modify base web Trns•port reports. ▪ Creation of custom reports and the process of defining them in web Trns•port. ▪ Learn about Report Entities and Report Datasets that are packaged with the base reports and how they can be used to write custom reports. ▪ More advanced features such as scripting, parameters, report events and sub-reports. The ActiveReports training class consists of two days of on-site training conducted by one instructor for up to six class participants. ▪ Hands-on exercises are performed using the Info Tech, Inc.-provided web Trns•port data. ▪ Class attendees should have prior programming or report writing experience.

Table 8-13. ActiveReports Training

9. Trns•port Security

This chapter describes the security features in Estimator, web Trns•port Preconstruction, Expedite, SiteManager and BAMS/DSS.

9.1 Estimator Security

Estimator system security is managed with user login ID/passwords and privileges, e.g. data management authorizations for system data catalogs (item master file, bid histories, code tables, etc.). The Estimator Users List contains the users authorized to run Estimator and privilege information about each user. Some users have privileges that allow them to modify data in the reference catalogs.

Table 9-1describes the different security roles in Estimator.

Security Role	Description
User	Estimator users must have a name Estimator uses to identify them. Users must enter this name when they run Estimator to gain access to the program.
Active	Most users are active users. An inactive user cannot log into Estimator. An inactive Estimator user, for example, could be a person who no longer works for the particular agency, but whose username is still needed.
Super-User	A super-user has privileges not available to normal users. A super-user can open any Estimator estimate file and have owner privileges in that file. A super-user can import and edit catalogs, and change the catalog location. You must have super-user privileges to edit the Users List.
New Estimate Access	There are five different types of access that a user can have to new estimates: ▪ **None**: The user cannot access a new estimate at all. ▪ **Read**: The user can read a new estimate, but cannot edit any part of it.

Security Role	Description
	▪ **Write**: The user can read and edit a new estimate. ▪ **User**: The user can read and edit a new estimate, add users to an estimate, and do a variety of other actions in an estimate, much the same as a user with Owner access. ▪ **Owner**: The user has the same capabilities as a person with User access, but can also add and delete users to the Owner level.
Catalog Editing	This privilege gives the user the ability to edit the price bases, rate, and code table catalogs.
Catalog Imports	This privilege gives the user the ability to import catalog information.

Table 9-1. Estimator Security Roles

Estimator is designed to run in two modes – single-user and multi-user. In single-user mode, the reference catalogs and user list reside in a file on the local computer. In multi-user mode, the catalogs and user list reside on a Web server or network location. The multi-user mode is recommended for ConnDOT in-house Estimator users. Copies of the catalogs can be provided separately for consultants to download from the ConnDOT website or on cd, so that consultant Super-users can not edit the master ConnDOT catalog.

Project security is managed within each project by entering a list of individual Estimator users that have read or read/write authorization on that project estimate file. No groups are supported in Estimator, but this process can be simplified by setting up default generic project templates with different lists of users. The appropriate template can be copied to initiate a new project. External design consultants using Estimator will have to make sure the appropriate ConnDOT Estimator file receivers are included in the Authorized User's List before passing the file on to the agency.

9.2 web Trns•port Preconstruction Security

Security in the web Trns•port Preconstruction system is accomplished through a combination of individual user accounts, roles, and groups. These are defined as follows:

User Accounts Control initial access to the system. All users must have a valid User Account to perform any Trns•port functions.

Workflow/Phase Assigned to bid lettings, proposals, and projects, and can control when work is available for viewing based on the user's role assignments.

Roles Assigned to users, and can control which aspects of the work a user can access.

For example, via role and workflow/phase assignments a project design engineer may have full access to projects that are in planning or in estimation, but may have read only access when work is in the advertisement, bid letting or bid review stage.

Additionally, the project design engineer may work in District 1 and be allowed to see everything in District 1, but not be able to see anything in the other districts. The project design engineer could have full access to projects that are in planning or estimation in District 1. He could have read-only access to work in advertisement, bid letting or bid stage review only for District 1. Any other work outside of District 1 would not be viewable to this engineer.

Security for web Trns•port Preconstruction is, for the most part, page based security. This means that access is given at a web page level, for example, a user could have access to view or edit all Reference Vendor screens except the Annual Data screen, which includes the vendor's Gross Receipts information.

Web Trns•port Preconstruction also supports some field based security called Column Access Rights, to limit access to particular fields in certain tables. For example, a user could have access to all Project and Proposal Item information, except for the estimated Unit Prices, Extended Amounts and estimated Project and Proposal Item Total. This would effectively prevent the user from seeing the official engineer's estimate. ConnDOT expressed an interest in keeping the original estimated prices, which could be held in the Project Item Previous Price field. Users could have access to that field without being able to see the final engineer's estimate.

Permissions can also be set for whether a user can run standard or customized reports, processes, and imports or exports.

9.3 Expedite Security

The Expedite electronic bidding system security is structured around access to Expedite bid proposal files rather than access to the system itself. Several individuals in the ConnDOT Contract Administration unit would have the agency modules of the software installed for creation of new proposal files and for the generation of the interface files to and from web Trns•port Preconstruction and the Bid Express service. ConnDOT would need to establish a shared drive for such files and install security on the drive to ensure appropriate access by key individuals.

Expedite supports, through the use of PGP™ technology, secure bidding over the Internet to ensure that a submission is in fact from the bidding contractor. This requires implementation of the Bid Express online bidding service, described in Appendix B.

9.4 SiteManager Security

SiteManager security is multi-layered. Depending on a user's SiteManager security privileges, SiteManager security not only controls access to the application, but also whether a user has inquiry or update rights to certain data, and the mode of access (standalone or network), as described below.

9.4.1 The Individual User ID

Authorized access to the SiteManager application is implemented through the individual user ID and password. These user IDs are created and maintained by the System Administrator on the System Administration panel using the User Security icon.

The individual ID controls:

- Access to SiteManager
- The Groups the User is in
- Global or conditional access to Contracts

9.4.2 The Group ID

Additionally, each individual user must belong to a Group. The group or groups that a user determines whether the user has:

- Update rights to SiteManager windows and data
- Inquiry rights only and be able to access data and print reports, but not update information
- Update rights on some SiteManager windows, inquiry only on other windows, and/or no access to other windows
- Update rights on some SiteManager data, inquiry rights on other data, and/or no access to other data
- Access to SiteManager in only a standalone mode
- Access to SiteManager in only a network mode
- Access to SiteManager in both a standalone and network mode
- Access to Attachments
- Access to Applications Server processes
- Access to Intranet for inquiry of SiteManager

Groups IDs are also created and maintained by the System Administrator on the System Administration panel using the Group/User Security icon.

9.4.3 Component Authority

Some SiteManager components also control what authority to data is granted to the individual or group ID. The components that control authority to data are described in the following table.

Component	Location of Authority Window	Basis of Authority	Description of Authority
Contract Administration	Contract Administration Panel, Contract Records Panel, Contract Authority icon	Individual ID	Allows access to individual Contracts
Contractor Payments	Contractor Payments Panel, Reference Table Panel, Contractor Payment Approval Levels icon	Group ID	▪ Allows Estimate approval and rejection for up to five levels of review ▪ The number of approval levels may vary by contract ▪ The number of approval levels may vary by estimate type (i.e., progress)
Change Orders	Change Order Panel, Reference Table Panel, CO Approval Groups icon	Group ID	Allows definition of the Departmental and Non-departmental Groups Ids required to approve change orders.

Table 9-2. SiteManager Authority Table

9.4.4 SiteManager Database Security

The preceding security layers are controlled by the SiteManager application. However, prior to gaining access to the database, SiteManager has to pass through the DBMS defined security (database user ID and password). The SiteManager ADMIN Utility application is used to set up this DBMS security access.

This makes the database security access transparent to the user. The user will enter only one user ID and password that is the SiteManager user ID and password. SiteManager automatically verifies the database security by logging into the database with the database user ID and password of that user. This database security information is kept in an external security file outside of the DBMS. The location of this file is supplied to SiteManager through the SMAPP.INI file (SiteManager initialization file) entry 'ServerDir'.

ConnDOT's SiteManager installation has been in place for some time. During the course of the business process analysis workshop described elsewhere, security and contract

authority will be reevaluated in light of the potentially expanded utilization of the program.

9.5 BAMS/DSS Security

BAMS/DSS security is granted by the system manager through the Add User procedures. The system manager assigns each user a BAMS/DSS Login ID, password, privileges, and one of these three user types:

Normal A user with a user type of NORMAL cannot access the System Management or System Profiles processes. The system manager can grant or restrict a Normal user's access to ad hoc reports, BAMS/DSS data views, and BAMS/DSS database management. The system manager can assign read and write access to database-related tables to each Normal user.

System A system manager can access all parts of the BAMS/DSS system except the installation management processes on the bottom of the System Management menu. The system manager's primary function is to maintain the BAMS/DSS-specific components.

Installation An installation manager can access all parts of the BAMS/DSS system. The installation manager's primary function is to install the BAMS/DSS system and software updates and to perform periodic maintenance if changes occur in a site's underlying environment.

The system manager can assign user privileges and read/write access to specific tables for the selected user on the PRIVILEGES tab (see Figure 9-1).

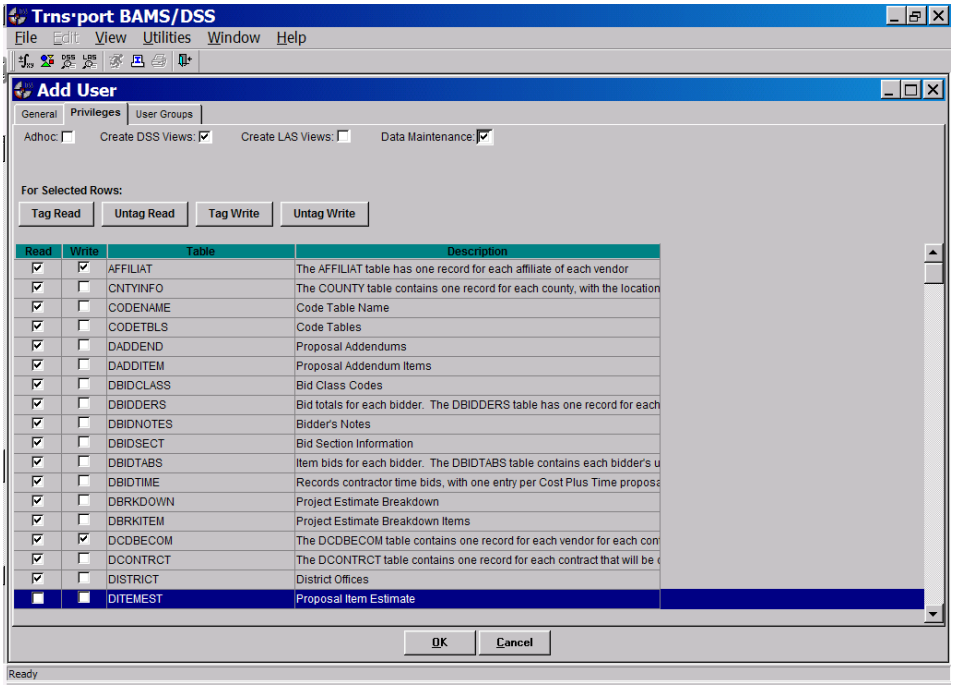


Figure 9-1. Add User Tabbed Folder - Privileges Tab

By clicking one or more of the four checkboxes at the top of the PRIVILEGES tab, the system manager can give the selected user access to these options:

Ad hoc — When you check this option, the user can access ad hoc reporting. If you do not check this option, BAMS/DSS disables the Ad Hoc Reports selection on the File menu for this user.

Create BAMS/DSS Views — When you check this option, the user can create BAMS/DSS views. If you do not check this option, BAMS/DSS disables the BAMS/DSS Views selection on the File menu for this user.

Create LAS Views — When you check this option, the user can create LAS (web Trns•port Preconstruction) views. If you do not check this option, BAMS/DSS disables the LAS Views selection on the File menu for this user.

Data Maintenance — When you check this option, the user can access the data management processes when they select **Data Management** from the **Utilities** menu. If you do not check this option, BAMS/DSS disables the Data Management selection from the Utilities menu.

The system manager assigns read and write access to database tables for each user with a user type of Normal. (System Manager and Installation Manager user types automatically receive full read/write access to all database tables.) Column level security is not supported. The assigned access privileges do not apply to BAMS/DSS data views. BAMS/DSS data views are assigned a password by the user who creates the view.

Standard BAMS/DSS output maintains security by requiring the user to have authorization to all of the database tables that are used for each report. For example, a user that does not have authorization to view engineer's estimates is not allowed to run the LIPEST model (Line Item Profile with Engineer's Estimate).

Casual database browsers who access the BAMS/DSS database via the web browser (not requiring the BAMS/DSS client software) also require a BAMS/DSS Login ID, password, and privileges pre-assigned by the BAMS/DSS system manager.

The system manager assigns access to BAMS/DSS Services, which allow the user to browse the database, or to see additional information from the Historical Item Regression (HIREG) model. On the User Groups tab for each user, there are two choices: All Users, which allows access to the DataBrowser; and UHREGSERVICE, which permits access to four kinds of HIREG data services.

In addition, the Oracle Database Administrator can provide data table security if desired. Many agencies keep the historic engineer's estimates and vendor qualification information secured. The original BAMS/DSS database was designed with engineer's estimate data stored in a separate table so that it could be secured, as per the requirements of the original user states. Vendor qualification data was handled the same way. Info Tech's lead bid competition expert, James T. McClave, Ph.D., also recommends not publishing engineer's estimates in order to better promote competition. ConnDOT will need to carefully evaluate the extent to which users can access the BAMS/DSS database.

9.6 Database Security

The underlying database software used to store Trns•port data also contains security options. Oracle provides different modes of security. Typically, Info Tech recommends specific configurations for Trns•port use. These will be discussed in greater detail during the implementation.

10. Implementation Issues and Considerations

This chapter lists potential issues of the Trns•port implementation identified during the detailed implementation analysis study. These issues have not yet been resolved. Further clarification and research is needed to resolve these issues. The resolutions to these issues and decisions made by ConnDOT will have an impact on the Trns•port implementation. Additional issues may also arise during the implementation project.

Issues are tagged as Critical, Immediate, Important, or Optional. Critical issues are crucial to implementation and must be resolved prior to or in the earliest stages of implementation. Immediate issues represent decisions that must be made early in the implementation project. Important issues must be resolved at some stage of implementation. Optional issues are potential issues that could arise depending on the directions taken, or that can be handled at a later time if at all.

Considerations are also listed. These are not classified and are considered to be informational. The considerations listed are questions not falling into the other categories which arose either during the on-site visit or have come up while writing this report.

This chapter can become a living document throughout the life of this project to track the status of issues and considerations and to add new issues as they arise.

10.1 Technical and General Issues

Table 10-1 lists ConnDOT's technical and general issues pertaining to the Trns•port implementation.

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
T-001	ConnDOT is using VMware, which is not an AASHTO release-tested or supported platform.	**Analysis:** ConnDOT indicated it plans to continue to use VMware in the future. **Recommendations:** Info Tech recommends that ConnDOT not use VMware for Trns•port systems. **Organizational Impact:** If ConnDOT uses VMware as a platform for Trns•port, it could result in performance issues. VMware is not an AASHTO-supported platform, which may put limitations on allowable levels of Customer Support. Info Tech is restricted by AASHTO and the Trns•port Task Force on providing assistance for unsupported platforms under the standard maintenance agreement. **ConnDOT Decision:**	**Critical**
T-002	ConnDOT hardware designated for Trns•port systems is inadequate to accommodate these mission-critical systems.	**Analysis:** ConnDOT hardware resources are inadequate; for example, there are currently only four remaining gigabytes of space allotted for the SiteManager database. Further, the hardware designated for Trns•port is shared with other applications. **Recommendations:** If ConnDOT wishes to continue using Trns•port products, they must acquire at least the minimum recommended hardware discussed in Chapter 7. Hardware designated for Trns•port should not be shared with non-Trns•port applications. **Organizational Impact:** Adequate hardware would help to assure that the mission-critical Trns•port systems continue to run and stay accessible to users as required. Upgrade of hardware would enhance agency productivity, requiring less attention from IT staff to fix emergencies. **ConnDOT Decision:**	**Critical**

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
T-003	ConnDOT IT staff support designated for Trns•port systems is inadequate to maintain these mission-critical systems.	**Analysis:** Existing Trns•port systems, SiteManager, BAMS/DSS and Estimator, are years behind the AASHTO-supported versions and are greatly underutilized due to support staff resource issues. **Recommendations:** If ConnDOT wishes to continue using Trns•port products, it must implement upgrades to current releases and designate adequate staff to support it. **Organizational Impact:** Upgrade of applications would greatly enhance agency productivity and allow for the most effective customer support from Info Tech under the AASHTO maintenance agreement. **ConnDOT Decision:**	**Critical**
T-004	ConnDOT would like to make Estimator software available to 100 agency users, and additionally make catalog (reference and pricing data) available to 75 consultants. This should be accomplished with the minimum impact on IT resources.	**Analysis:** ConnDOT discussed using Terminal Services, which is not an AASHTO release-tested platform. Estimator has installation options which do not require updates to each client machine. **Recommendations:** Info Tech recommends the Estimator shared network installation method, where the application is installed and updated on a server (could be on the BAMS/DSS web server). In order to run reports, a Crystal Reports run-time version 9 or 10 must be installed on each user's machine; however, this would rarely require updating. Info Tech recommends that catalogs for consultants be posted on a web location for download. **Organizational Impact:** IT resources would be minimized by Estimator network installation approach. **ConnDOT Decision:**	**Critical**
T-005	Apache web service is required for: 1) Estimator shared network installation; 2) Scatterplots in Estimator and BAMS/DSS; 3) Bid-based pricing in web Trns•port Preconstruction. ConnDOT doesn't support or install Apache; permission from DOIT is required.	**Analysis:** Apache software is free. The minimal resources required for maintenance will be more than offset by the time saved using the network installation of Estimator. **Recommendations:** InfoTech recommends that ConnDOT apply for permission from DOIT to use Apache. **Organizational Impact:** IT resources would be minimized by Estimator network installation approach. Estimators would have improved access to item pricing information. **ConnDOT Decision:**	**Critical**

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
T-006	ConnDOT Terminal Services environment used for SiteManager is under-powered, and is not an AASHTO release-tested platform.	**Analysis:** Two pilot projects are under way at ConnDOT to address enhanced remote connectivity, but both rely on the under powered Terminal Services links. ConnDOT IT staff reported longstanding delays in equipment upgrades designed to address the issues. **Recommendations:** ConnDOT should consider using Citrix instead of Terminal Services. Citrix is not an AASHTO release-tested platform; however, a number of agencies are successfully using it and could provide advice. **Organizational Impact:** Lack of connectivity to SiteManager could seriously impact users' ability to do their jobs. **ConnDOT Decision:**	**Critical**
T-007	ConnDOT is using both Microsoft IIS 6 and 7. IIS 7 is not an AASHTO release-tested or supported platform.	**Analysis:** Although no major issues are expected for running web Trns•port with IIS 7, this platform has not been tested and results could be unpredictable. **Recommendations:** ConnDOT should use IIS 6 with Trns•port products. **Organizational Impact:** If ConnDOT uses IIS 7 with web Trns•port, which is not an AASHTO-supported platform, it would put limitations on allowable levels of Customer Support. Info Tech is restricted by AASHTO and the Trns•port Task Force from providing assistance for unsupported platforms under the standard maintenance agreement. **ConnDOT Decision:**	**Immediate**

Table 10-1. ConnDOT Trns•port Implementation Technical and General Issues

10.2 Application Issues

Table 10-2 lists ConnDOT's overall issues pertaining to the implementation of Trns•port applications.

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
A-001	FEIN and SSN are used as the key in SiteManager Vendor tables, which would be the initial source for Vendor data in web Trns•port and in an Internet bidding system. FEIN and SSN can not be displayed to the public.	**Analysis:** The Vendor Number can be hidden from public display on an Internet bidding system. Care must be taken to hide the Vendor Number on any other reports posted for public view. **Recommendations:** Hide the Vendor Number as described. **Organizational Impact:** Minimal impact. **ConnDOT Decision:**	**Immediate**

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
A-002	ConnDOT needs to record and store both the designer's estimate and the final Engineer's Estimate. The preference is to display both estimated unit prices on the same screen, while limiting access to the Engineer's Estimate.	**Analysis:** There are two fields for estimated unit price on the Project Item screen in web Trns•port Preconstruction. Both fields are passed to BAMS/DSS for data warehousing. **Recommendations:** In web Trns•port Preconstruction, the Project Item Unit Price field (for Engineer's estimated price) is populated by the user or by import from Estimator or Quantity Manager. The Project Item Previous Price field (for Designer's estimated price) is populated by the user. ConnDOT could consider implementing a customization to automatically populate the Designer's estimated price field. Further evaluation of this method during implementation is suggested. An alternate suggestion is being explored: retaining the Designer's estimate in a separate project. This allows for all normal printing and web Trns•port functionality to be used. When updates to the Designer's estimate are complete, make a copy of the project for the basis for the official Engineer's estimate. That allows for restricting access, full functionality, and retention of both estimates. The downside is there's no way to have both estimates compared side-by-side, or both produced on the same report as ConnDOT does now. **Organizational Impact:** Designer's estimated prices may only be available on customized reports. Using alternate suggestion means all standard reporting can be used with Designer's estimates and Engineer's estimates, but not on the same report. Security measures in web Trns•port Preconstruction (Workflow and Phase) can be used to limit access to the Engineer's Estimate. **ConnDOT Decision:**	**Immediate**

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
A-003	The standard Item List table in SiteManager uses three keys to distinguish items (Item Number, Spec Year, and Unit of Measure); whereas the Item List in web Trns•port, Estimator and BAMS/DSS only uses two keys (Item Number and Spec Year). The ConnDOT Item List contains duplicated Item Numbers within a spec year, with different Units of Measure, which is incompatible with most Trns•port systems.	**Analysis:** The issue can be resolved in two ways: 1) Assign separate Spec Years for English and metric items; or 2) Assign different Item Numbers for the same item with different Units of Measure (i.e., append E/M or Units Code to end of Item Number). **Recommendations:** Assign separate Spec Years for English and metric items during historical data conversion from BMIS to BAMS/DSS. Research the best way to correct or work around the issue with data passed to or from SiteManager, or change the Item spec year in SiteManager. **Organizational Impact:** Research whether item-level data is passed to CORE-CT, (as in Project Transaction Upload). Assess any impact on projects which continue in BMIS. **ConnDOT Decision:** At Info Tech's initial meeting**,** ConnDOT personnel expressed a preference for creating a second spec year for metric items.	
A-004	The Traffic division projects may need location information associated at the item level for reporting.	**Analysis:** Trns•port only records the location information at the category or project level, not at the item level. **Recommendations:** Further analysis during implementation is recommended. **Organizational Impact:** Unknown at this time. **ConnDOT Decision:**	
A-005	"Alternate" Items (i.e. Noise Wall) use a single item number as a placeholder for multiple specification 'bundles'. The contractor has the option of selecting which construction method they want, and specify this in their bid.	**Analysis:** This methodology does not allow for item level detail in historical data for bid histories or other analyses. **Recommendations:** Info Tech recommends that ConnDOT add items to the standard Item List to break out this type of item according to construction method, i.e., "Noise Wall, Wooden" or "Noise Wall, Concrete". Instruct bidders in use of Trns•port alternate item grouping. **Organizational Impact:** Involves re-educating bidders and bid reviewers. **ConnDOT Decision:** At initial meeting, ConnDOT personnel expressed their interest in this solution.	

Issue Number	ConnDOT Issue	Info Tech Comments	Priority
A-006	In ConnDOT proposals, Planting items (for example) may be bid as a single lump sum item but are tied to a Schedule of Values (a list of sub-items such as specific kinds of plants). Bidders specify the sub-items.	**Analysis:** Trns•port does not accommodate sub-items. **Recommendations:** Further analysis during implementation is recommended. **Organizational Impact:** Unknown at this time. **ConnDOT Decision:**	
A-007	ConnDOT needs to notify all bidders that they must be prequalified in the appropriate work category, and have sufficient available capacity in order for their electronic bid to be accepted. They can not prevent unqualified vendors from electronic bidding.	**Analysis:** Bid Express subscribers can submit electronic bids even if they are not qualified for the work. ConnDOT needs to warn bidders of the need for qualification. **Recommendations:** A Requirements page can be incorporated into Expedite Bid, where bidders can acknowledge their understanding of the requirements by checking a box. **Organizational Impact:** None. **ConnDOT Decision:**	
A-008	ConnDOT uses winter shut-down periods that have to be calculated in the time for Liquidated Damages. This has not been resolved in SiteManager.	**Analysis:** Liquidated Damages are calculated both for phases and for the whole project. There may be phases of work (e.g., bridge closure) that have incentive or disincentive attached. ConnDOT is currently managing time charges in SiteManager via Change Orders. **Recommendations:** Further analysis during implementation is recommended. **Organizational Impact:** Unknown at this time. **ConnDOT Decision:** John R. Lee is looking into this.	
A-009	Contractors can get bi-weekly payments for “Major Items” (items contributing to top 60% of awarded dollars). Currently, a flag is manually set in SiteManager to identify these items.	**Analysis:** Info Tech needs to research whether a BAMS/DSS ad hoc program or custom process in web Trns•port Preconstruction can be used to identify major items and check the flag in SiteManager. **Recommendations:** Further analysis during implementation is recommended. **Organizational Impact:** A custom process would save time for users currently calculating major items. **ConnDOT Decision:**	**Optional**

Table 10-2. ConnDOT Issues Regarding Trns•port Implementation

10.3 Considerations

Table 10-3 lists considerations for ConnDOT pertaining to the implementation of Trns•port applications.

Issue Number	ConnDOT Consideration	Info Tech Comments
C-001	ConnDOT's intention is to replace and sunset BMIS.	**Analysis:** BMIS contains current and historical project and proposal estimate, bid and award data, funding and reference data. This functionality will be replaced by web Trns•port Preconstruction and BAMS/DSS. **Recommendations:** A decision is needed whether to convert and migrate in-process projects to web Trns•port; or to let in-process projects continue in BMIS until completion. **Organizational Impact:** Consider operating costs of BMIS v. cost of additional data conversion. **ConnDOT Decision:**
C-002	ConnDOT would like to integrate Bentley ProjectWise with Trns•port.	**Analysis:** InRoads Quantity Manager can exchange item and quantity data with Trns•port. No such exchange is currently available with ProjectWise. **Recommendations:** Info Tech needs to explore this with Bentley and research a customized interface as well. **Organizational Impact:** Improved communication between systems. **ConnDOT Decision:**
C-003	In the past, PCMS was used for long-range project planning. With the introduction of CORE-CT for financial management, some functionality was lost. ConnDOT would like to use Trns•port for creation and maintenance of planning estimates, with basic project information, such as description, location, measurements, funding and long range estimate.	**Analysis:** While Trns•port CES would be ideal for this purpose, it was deemed too complex for the small ConnDOT program to support. **Recommendations:** Web Trns•port Preconstruction can supply all or most of the requested functionality. Long range estimation could be done by creating major items, and using BAMS/DSS models and/or ad hoc programs for pricing. **Organizational Impact:** Being web-based, web Trns•port Preconstruction would be easily accessible to management and planners. **ConnDOT Decision:** ConnDOT expressed an interest in exploring this solution.

Issue Number	ConnDOT Consideration	Info Tech Comments
C-004	ConnDOT staffing constraints must be considered, both in the IT and process development areas.	**Analysis:** Lack of staff, especially in IT areas, could have significant impact on the success and timing of the implementation. **Recommendations:** ConnDOT should consider this when making decisions regarding implementation options, such as whether to use InfoTech on-site resource(s). **Organizational Impact:** **ConnDOT Decision:**
C-005	ConnDOT's BAMS/DSS historical database is outdated and considered unreliable.	**Analysis:** BAMS/DSS database has not been populated in a timely manner and therefore is not used for bid histories in Estimator as it could be. ConnDOT staff felt that historical data should be converted from BMIS and totally re-populated. **Recommendations:** Info Tech recommends converting legacy data to re-populate BAMS/DSS, with the option to additionally populate in-process (pre-letting) projects and proposals in web Trns•port. **Organizational Impact:** Management and estimators would benefit from access to more reliable data for reports and bid histories. **ConnDOT Decision:**
C-006	Some data for planning and estimation is currently in Access databases.	**Analysis:** **Recommendations:** Info Tech recommends further research to determine whether/how these impact the Trns•port implementation. **Organizational Impact:** **ConnDOT Decision:**

Table 10-3. ConnDOT Trns•port Applications Implementation Considerations

11. Implementation and Project Planning

This chapter describes the recommended implementation approach and the tasks, proposed schedule, cost estimates, and resource commitments anticipated during the implementation. The project plan presented in this chapter details the hours of Info Tech services required for implementation of the Trns•port estimation, preconstruction and decision support systems, and the business process analysis of the construction system. The schedule, hours, and cost estimates presented have been prepared with the assumption services will be provided on a time and materials basis, using AASHTO Trns•port Service Units.

11.1 Project Approach

The project approach recommended by Info Tech is based on its knowledge of ConnDOT's organization and processes. As a partner in ConnDOT's implementation of Trns•port estimation, preconstruction, decision support and construction systems, Info Tech proposes to provide services to help ConnDOT use the systems in the shortest possible time while minimizing the demands made on the agency. ConnDOT has indicated that it is committed to implement internal business practice adjustments, where possible, to conform to Trns•port standards in order to minimize customization of the software, while still meeting the functional requirements of its business processes. This decision will provide an efficient basis in the future for ongoing maintenance of Trns•port within the agency, while allowing ConnDOT to maximize the benefits derived through use of the system. The project plan presented herein is designed to reflect these requirements and to achieve the most efficient implementation possible.

The proposed schedule and recommended tasks for implementation of Estimator, web Trns•port Preconstruction, BAMS/DSS, and the assessment of current SiteManager usage are divided into two phases. Phase 1 includes all the work required to setup the system, test the system, and the necessary steps to put the products into production. Phase 2 is a conditional phase based on ConnDOT evaluating the Trns•port products against the functionality currently in its systems. ConnDOT's decision to potentially phase out or

consolidate its systems may require that the Trns•port products be further customized. Because of the variable nature of Phase 2, a range of small, medium, or large estimates is provided.

The proposed schedule and recommended tasks for the Phase 1 implementation of Estimator, web Trns•port Preconstruction and BAMS/DSS, and the assessment of current SiteManager usage are divided into four major parts:

- Part 1: System Planning and Data Conversion
- Part 2: Test Systems Implementation and Customizations
- Part 3: Production Implementation, Testing and Startup
- Part 4: SiteManager Business Process Assessment

Part 1 includes prerequisite tasks related to setting up the systems infrastructure to support the Trns•port systems and converting the available ConnDOT legacy data so that it can be loaded into the Trns•port databases.

Part 2 involves the implementation and testing of test systems, using the converted data, at ConnDOT for the Trns•port systems. This will allow initial system testing by ConnDOT users to verify process functionality and to address specific areas requiring customization to adequately meet ConnDOT's processing needs. For example, during Part 2 custom reports will be developed for reporting needs not already provided by standard reports available in Trns•port. Similarly, appropriate interfaces for communicating with other ConnDOT applications external to Trns•port will be written. Problems identified with the converted data will also be resolved at this time.

In Part 3, final Trns•port systems including the completed customizations, together with the latest updates for converted data, will be implemented in a Production environment. Issues arising during system testing will be addressed as needed. Production systems will be implemented using the latest available Trns•port releases for each system. Parallel testing to compare old and new systems will be conducted and any issues will be addressed before committing to live production use.

In Part 4, a complete SiteManager business process analysis is performed, reviewing reports, templates, DWR usage and any refresher training indicated due to new software functionality. It addresses issues arising from ConnDOT using an unsupported version of the software, and includes an analysis effort to identify and document Info Tech recommendations relative to the agency's SiteManager usage.

The participation in the project activities by key members of ConnDOT and targeted Trns•port users will be necessary throughout the project period. This includes the following areas:

- Participation in project planning sessions;

- Participation in progress status and steering committee meetings;
- Participation in work sessions to derive and populate the system data;
- Execution of system testing and parallel processing with existing systems; and
- Individual consultation with Info Tech project staff.

In addition, ConnDOT will be required to perform those specific tasks ConnDOT chooses to perform in-house. These tasks are an integral part of the project plan and task performance must adhere to the project schedule in order for the project to progress on time. Info Tech can provide additional support to ensure these tasks are completed on time, if ConnDOT determines such additional support is warranted.

11.2 Work Breakdown – Task Descriptions

The tasks needed to implement the proposed Trns•port systems have been developed with the idea of conducting the most efficient implementation possible and to maximize consistency. They consist mostly of *required* tasks, with a small number of *optional* tasks. As the names suggest, required tasks must be included in the project scope of work in order to achieve a successful outcome. The optional tasks included in this document are only those optional tasks in which ConnDOT expressed an interest.

From a scheduling and workflow perspective, the tasks are divided into the four parts of Phase 1 with a few tasks extending over more than one part. For example, the Project Management task applies to all four parts. Some tasks can also be conducted in parallel with other tasks. These are indicated in the summary project schedule overview.

Based on the activities involved, the majority of the tasks are assigned to Info Tech, with input and participation by ConnDOT as required. Various subject matter experts from Info Tech will provide services on and offsite as required. ConnDOT will have sole responsibility for some tasks and both parties will share responsibility for others. Regardless of primary responsibility, it is essential for both parties to collaborate fully, providing information and support as needed, to ensure successful completion of each task. The following sections provide detailed descriptions and other relevant information for each task.

11.2.1 Implementation Project Management (Required) – All Parts

This section discusses the required general project management task and an optional transition change management activity that is beneficial for the users moving to Trns•port and the overall health of the project by promoting user buy-in.

Task 0a. Project Management (Required) – All Parts

Info Tech will provide project management services and administrative support throughout the implementation project period. For cost estimation purposes, the project management components of the individual tasks have been combined to create an overall project management task. Generally, this task will include the following:

- Project administration
- Resource planning and coordination
- Team management and communications
- Task and budget tracking
- Maintenance of the project schedule
- Communications with ConnDOT, including on and offsite meetings
- Status reporting, risk management
- Issue resolution
- Requirements change control
- Other project management activities as needed

Info Tech's assigned project manager will work closely with the ConnDOT project manager in the performance of this task. In particular, both project managers will cooperate to schedule on-site trips for installation activities, coordinate arrangements for training classes, etc.

Task 0b. Change and Transition Management (Optional)

Change and Transition Management is the means by which we introduce or facilitate a change within the organization. Change and Transition Management is the process and tools (for example, communication, sponsorship, and coaching) used to help accommodate the knowledge, skills, and psychological needs of those experiencing the change.

At a high-level, an organization is concerned with four primary components. Each of these components is interdependent; a change to any single component is likely to affect other components. Every component should be reviewed for potential impact when a change is made to any one component.

- Organization (culture, staff, responsibilities, activities, structure)
- Process/Work (functions, data flow, input/output processes)

- Data (standards, structure, ownership and access)
- Technology (software, hardware, architecture, performance standards)

As organizational and process changes occur during a large implementation, staff affected by these changes undergo an emotional transition as they move from familiar activities to unfamiliar processes. Addressing the user community's fears will help make implementation successful. Change and Transition Management helps to control and assist the affected staff in adapting to these changes as efficiently as possible. The lack of a transition management plan and its execution has been cited as a major contributor to the failure of large implementation projects.

ConnDOT has requested to forgo the standard change and transition management activity we typically recommend to an agency. Instead, we are offering a half day series of discussions to educate agency project staff on what our standard change and transition management offering includes and potential pitfalls of excluding integrated change and transition management from any project. We will offer change and transition management suggestions and general recommendations the agency could conduct on its own, arising from our corporate experience implementing similar projects nationally.

If ConnDOT later decides to obtain our formal change and transition management offerings, we will address that additional scope by way of a contract change order executed under standard ConnDOT policy and procedures.

11.2.2 System Planning and Data Conversion – Part 1

Part 1 includes prerequisite tasks related to setting up the systems infrastructure to support the Trns•port systems and converting the available ConnDOT legacy data so that it can be loaded into the Trns•port databases.

Task 1. Trns•port Environment Planning and Setup (Required)

This is primarily a ConnDOT task. It involves establishing the Trns•port system infrastructure, including server, networking, operating systems and third-party (for example, Oracle, SAS) software requirements, based on the detailed analysis provided in Chapter 7, Trns•port Hardware and Software Requirements, and the current client/server Trns•port hardware and software specifications which are available online at this internet address: **http://www.cloverleaf.net/sys_arch/**.

ConnDOT will be responsible for ensuring the appropriate environment is in place, with hardware installed and required software loaded and configured, prior to implementation of the test Trns•port systems during Part 2 of the project. Info Tech will provide assistance as needed to review the operating environment and recommend modifications or enhancements to that environment in preparation for the installation of the Trns•port systems. The Info Tech Project Manager and primary on-site resource will be the primary consulting contributors for this task.

Note: Info Tech does not provide any hardware or operating systems. Software and database licensing costs are not included in any cost estimates presented in this document.

Ultimately, Info Tech recommends ConnDOT establish full-scale Test and Production environments separately. (Test environments are not necessary for BAMS/DSS and Estimator.) This facilitates testing of new releases and custom configurations without impacting the live production systems. In practice, less robust machines can be utilized for the Test environment since production standards of performance would not apply. However, it is recommended the Test environment accurately reflect the Production environment physical setup, with the same server configuration. ConnDOT will be responsible for ensuring the appropriate environments are in place, with hardware installed and required software loaded and configured, prior to implementation of the Test/Production Trns•port systems in Parts 2 and 3, respectively. It is recommended that ConnDOT consult with Info Tech regarding the specifications of any hardware prior to purchase to ensure optimum performance, particularly for the production environment.

Since the web Trns•port Preconstruction system is new to ConnDOT, implementing a test system allows initial system testing by ConnDOT users in order to verify process functionality and address specific areas requiring customization to adequately meet ConnDOT's processing needs (such as reports, screens, and interfaces with other ConnDOT applications external to Trns•port). The test systems also provide an opportunity to identify and resolve issues with the converted legacy data.

Info Tech subject matter experts using a Virtual Private Network (VPN) remote connection service may provide a portion of the services provided by Info Tech offsite, if ConnDOT is willing to permit VPN access to its network. This approach will not only reduce the travel expenses required to support the project, but will also assure the ConnDOT project receives the most effective attention and effort from the appropriate resources for support and issue resolution. This connection will allow for faster responses and real-time problem diagnosis by Info Tech's support staff. Info Tech will work with ConnDOT to establish the required VPN access in accordance with ConnDOT policies for security and network access.

This task also includes installation of "mirror" systems in Info Tech's Gainesville office, to be populated with sample ConnDOT data for use in data conversion, support, report customization and documentation tasks.

Task 2. Reference and Historical Data Mapping (Required)

Data mapping and conversion of legacy data is a critical upfront task for Trns•port implementation. Certain data is required in Trns•port, including reference data such as codes, items, vendors, and so forth. In addition, historical data is essential for certain processes. For example, historical bid data is needed in order to facilitate use of bid-based price estimation in Estimator. This data must be established and/or converted at the outset to enable the various systems to be fully implemented. A complete discussion of data conversion requirements is provided in Chapter 5, Data Conversion Analysis.

This task includes a three day on-site visit by two Info Tech analysts to conduct data mapping analysis with the appropriate ConnDOT personnel to compile detailed information to be processed in Info Tech's Gainesville office. As much of the existing ConnDOT data as possible will be mapped to the corresponding Trns•port fields. Default values will be determined for missing data that is required to enable the data to be loaded into Trns•port. Info Tech will provide a Data Mapping Crosswalk spreadsheet to ConnDOT to document the results of the analysis.

ConnDOT wishes to convert all historical bid data to support bid-based price estimation and other data analyses. The data to be converted includes historical project, bid and contract data, as well as reference data for codes, items, vendors, etc. ConnDOT may choose the optional task to convert its in-progress project and proposal data to web Trns•port Preconstruction.

Precisely how the ConnDOT items will be mapped to populate the corresponding fields in the Trns•port ITEMLIST record format will also be determined under this task. Generally, it should be possible to create most ITEMLIST records programmatically from the current ConnDOT standard item records in SiteManager. However, the issue of differing table key structures between SiteManager and the Trns•port estimation, preconstruction, and decision support systems will need to be addressed early on. The final list of items will need to be reviewed and approved by ConnDOT.

> **Note:** Unlike other Trns•port systems, SiteManager includes the item unit system in its key structure.

The initial Vendor List, as well as additional vendor data, is expected to come from the SiteManager vendor tables. However, some vendor data may need to be converted from BMIS or other ConnDOT sources for historical vendors who do not exist in SiteManager. Since web Trns•port Preconstruction is usually the starting point for vendors, some analysis will be needed to determine what, if any, conversion needs to be performed.

Task 3. Historic and Reference Data Conversion (Required)

Under this task, Info Tech analysts will develop conversion programs to convert ConnDOT's historic contracts data and reference data. The data conversion effort is estimated based upon the assumption that as much historical data will be converted as possible. Several rounds of data conversion will be required to resolve issues and to capture any new data entered in ConnDOT's current systems since the initial conversion cutoff point before refreshing the Trns•port database prior to starting parallel testing.

Reference data will be converted to populate BAMS/DSS, Estimator and web Trns•port Preconstruction reference and code tables. Additional code table values may need to be developed for preconstruction and estimation, with input and review by ConnDOT.

If funding for this task remains after the basic historical and reference data has been converted, efforts should be made to convert subcontract and facility data as well. Facility data may require manual data entry rather than data conversion.

Task 4. Data Conversion of In-Progress Projects and Proposals (Optional)

If this optional task is selected, Info Tech analysts will convert in-progress (not yet let) projects and proposals from BMIS to populate the web Trns•port Preconstruction database. Before refreshing the web Trns•port Preconstruction database prior to starting parallel testing, several rounds of data conversion will be required to resolve issues and to capture any new data entered in ConnDOT's current systems after the initial conversion cutoff point.

Some of the advantages to this approach are that ConnDOT data would be available for testing, training, and developing customized reports or interfaces in web Trns•port Preconstruction. Sunsetting of the BMIS system could occur earlier because ConnDOT would not have to wait for award process completion.

The option to covert in-progress data must be selected before any data mapping or conversion has begun, as it will affect how the conversion process is performed.

> **Note:** The cost of the optional conversion of in-progress data stated in the estimates below does not apply if the option is selected after work on the data mapping and historical data conversion task has begun.

Task 5. Bid History Creation for Detailed Estimates (Required)

Using the converted historical data, Info Tech analysts will build initial bid history files in BAMS/DSS to facilitate bid-based price estimation in Estimator. Catalogs will be produced for use in Estimator, containing the Itemlist, required code tables, and item bid histories. Multiple Estimator catalogs, representing different lengths of time or type of work, will be produced to allow estimators to use more focused bid-based pricing for selected items.

11.2.3 Systems Upgrade and Test Systems Implementation and Customizations – Part 2

Part 2 involves the implementation of test systems at ConnDOT for the Trns•port systems, using the data converted previously during Part 1. Training will be provided to ConnDOT users. This will allow initial system testing by the users to verify process functionality and address specific areas requiring customization to adequately meet ConnDOT's processing needs. For example, during Part 2, custom reports will be developed for reporting needs not already provided by standard reports available in Trns•port. Similarly, appropriate interfaces for communicating with other ConnDOT applications external to Trns•port will be identified, specified and documented. Problems identified with the converted data will also be resolved in Part 2.

Task 6. On-site Support Resource

This task includes one Info Tech analyst on-site at ConnDOT to assist in ConnDOT's web Trns•port Preconstruction, Estimator, and BAMS/DSS implementation. There are two options, which are represented in the two sets of estimates below.

The first option is to have a resource on site at the ConnDOT offices for two standalone weeks per month. This function may be shared by more than one person, depending on project needs. The resource would generally spend three days on site for each week, with a travel day at each end. On some occasions the resource will be on site four days instead of three, to accommodate certain tasks or scheduling needs. This option has the advantage of utilizing Info Tech's analysts' areas of specialization, and flexibility in matching the resource to the task.

The second option is to have a resource working full time on site in the ConnDOT office. This approach is advantageous in situations where the agency is short on staff and provides a consistent approach to the implementation. The resource gains valuable insights on agency functioning and provides critical communications continuity between Info Tech and ConnDOT. The resource is allowed one trip home per month, including two business days.

The estimated length of time for either on site option is approximately 14 months. The date and times of the trips will be coordinated between ConnDOT and the Info Tech Implementation Project Manager.

Task 7. Upgrade BAMS/DSS in Production System (Required)

Installation of the production BAMS/DSS system involves two Info Tech analysts on site for four days at ConnDOT to install the server software, database, and client software on up to six client machines. A test system is not required for BAMS/DSS since its function is chiefly analytical and the user base is small.

The installation team will load the converted historic data and run the data through standard tests in BAMS/DSS.

The installed software will be tested to ensure a complete and successful installation. Informal basic system management training will be conducted to facilitate ConnDOT running the systems until formal BAMS/DSS training is provided.

This task requires technical support to be available from ConnDOT including, but not limited to, the database administrator and the network administrator. ConnDOT will also be responsible for ensuring the appropriate environment is in place, with hardware installed and required supporting software loaded and configured, prior to installation of the BAMS/DSS system.

The role of the second installer will be filled by the Info Tech on-site resource.

Task 8. BAMS/DSS Basic Training (Required)

This task involves a three-day on-site visit by two Info Tech trainers to conduct BAMS/DSS training. One-half day will be reserved for System Administrator Training and the remaining two and a half days will be allocated for Basic User Training for up to eight users. Training will include instruction related to generating bid histories for use in Estimator plus other decision support activities, such as contract award analysis. Info Tech will tailor the training to focus on the areas of most interest for ConnDOT.

ConnDOT will coordinate the provision of appropriate training facilities to include the training room, client machines for each student, and a client machine with overhead projection connections for the Info Tech trainer. ConnDOT will set up the training room in advance and verify the clients are properly installed and connected to both application and database servers. ConnDOT will also set up all training user IDs and test them in advance.

This task requires technical support to be available from ConnDOT, including, but not limited to, the database administrator and the network administrator.

The role of the second trainer will be filled by the on-site resource.

Task 9. Upgrade Estimator in Production System (Required)

Upgrading the Estimator system involves the installation of a new system rather than performing an update. The Info Tech on-site resource will assist ConnDOT with Estimator installation and configuration. Agency options and the initial user file will be established. Estimator catalogs are provided as part of the bid history creation (Task 5).

The multi-user Estimator installation method is recommended for the ConnDOT in-house estimation staff. The BAMS/DSS web server can be used to host the Estimator catalogs and users table. Due to the large number of Estimator users, ConnDOT will be responsible for installing Crystal Reports Runtime on each user's computer, with guidance from the InfoTech installer.

Consultant Estimator users are responsible for their own licensing and installation; however, catalogs can be posted to the web location for consultant estimators to download.

Task 10. Estimator Training (Required)

This task involves a four-day on-site visit by two Info Tech trainers to conduct Estimator Basic Training for up to 105 ConnDOT users. One-half day will be reserved for System Administrator Training and the remaining three and a half days will be allocated for Basic User Training. Training will include instructions related to using bid-based, cost-based, ad hoc, and reference item pricing methods for detailed project estimates.

ConnDOT will coordinate the provision of appropriate training facilities to include the training room, client machines for each student, and a client machine with overhead projection connections for the Info Tech trainer. ConnDOT will set up the training room in advance and verify the clients are properly installed and connected to both application and database servers. ConnDOT will also set up all training user IDs and test them in advance. ConnDOT's converted data will be used in the Estimator catalogs to ensure an effective training experience.

This task requires technical support to be available from ConnDOT, including, but not limited to, the database administrator and the network administrator.

The role of the second trainer will be filled by the on-site resource.

Task 11. Install web Trns•port Preconstruction in Test and Production Systems and Train Core Team (Required)

Installation of the web Trns•port Preconstruction system involves two Info Tech analysts on site for five days at ConnDOT. Two days will be spent loading the web Trns•port Preconstruction software on up to three web-application servers, installing the databases, and loading the web Trns•port Preconstruction client software on up to six web-client machines. Converted reference data will be imported into the web Trns•port Preconstruction database(s).

Basic system testing will be performed to verify the installation. System management training will be conducted for one-half day to prepare ConnDOT for configuring and maintaining the system.

Info Tech trainers will conduct two days of basic web Trns•port Preconstruction training for the core project team.

This task requires technical support to be available from ConnDOT including, but not limited to, the database administrator and the network administrator. ConnDOT will also be responsible for ensuring the appropriate environment is in place, with hardware installed and required software loaded and configured, prior to installation of the test web Trns•port Preconstruction system.

The role of the second analyst will be filled by the Info Tech on-site resource.

Task 12. web Trns•port Preconstruction Configurations (Required)

This task covers the area of web Trns•port Preconstruction configuration. Areas of discussion include screen and user interface configurations, code and reference table data review, installation options and agency preferences on software behavior. User security, workflow requirements, and system access control are also covered.

Complete documentation is provided for all configuration decisions so ConnDOT can maintain or modify these parameters as usage of Trns•port evolves.

The task involves one Info Tech analyst on site for three days at ConnDOT on four separate occasions to hold workshops. Workshops are expected to cover the following:

- One workshop will cover user roles, workflows and security.
- One workshop will cover screen layouts and data entry validations and constraints.
- One workshop will cover code tables and their data.
- One workshop will cover reference data reviews, and agency installation options.

Two of these workshops will be covered by the Info Tech on-site resource person during the regularly scheduled visits. The other two workshops are covered under this task. This task provides documentation for all agency decisions in these areas.

This task requires technical and business support to be available from ConnDOT including, but not limited to, current legacy application managers, ConnDOT business subject matter experts, and system administrators responsible for user security.

The role of the analyst will be filled partially by the Info Tech on-site resource, as described above.

Task 13. Workshops to Gather Business Process Information (Required)

Under this task, two Info Tech analysts will spend two weeks (ten business days) conducting workshops with the ConnDOT core project team plus resources with various areas of expertise. One analyst will conduct the session and one analyst will assist and take notes.

Each session will last about a half-day and will address a specific topic, such as Contract Award Procedures or Vendor Data Maintenance. All areas of business processes involved in the web Trns•port Preconstruction, BAMS/DSS, and Estimator applications will be addressed. Information gathered in the sessions will be used in setting up system options and configurations; defining required customizations to application screens, reports, tables and interfaces; writing customized procedures documentation; setting code table values; and generally defining system usage.

The role of the second analyst will be filled by the on-site resource.

Task 14. Write Custom Procedures Documents (Optional)

This optional task involves development of ConnDOT-specific Trns•port procedures documents. This includes the following documents:

- *ConnDOT web Trns•port Preconstruction and Expedite Procedures Manual*

- *ConnDOT Estimation Procedures Manual*
- *ConnDOT BAMS/DSS for Beginners Guide*

Info Tech analysts will customize existing template versions of the above documentation, taking into account how ConnDOT will use the Trns•port systems and any custom configurations that have been implemented. Actual ConnDOT data and screen captures will be used to tailor these guides for the ConnDOT audience. These documents are in addition to the standard AASHTO user documentation delivered with Trns•port.

This task is anticipated to begin near the end of Part 1.

Task 15. Electronic Bidding System Implementation Trip 1 (Required)

This task involves a three-day on-site visit by two Info Tech analysts to set up the ConnDOT electronic bidding system's Expedite software and associated web portal for publishing and receiving bids via the internet. Expedite configuration customizations and web portal links will be implemented.

The Info Tech analysts will train the ConnDOT electronic bidding system administrator(s) during the installation process. Up to 20 contractors involved in electronic bidding pilot testing will also be trained in one half-day session.

This task requires technical support to be available from ConnDOT, including, but not limited to, the designated electronic bidding administrator and the backup for this person.

Task 16. ActiveReports Training (Optional)

This task involves a three-day on-site visit by one Info Tech trainer to conduct training and general discussion for a small core group of ConnDOT users (no more than six trainees) on writing custom reports in Trns•port using ActiveReports. The two-day training will include a web Trns•port Preconstruction database overview, procedures to modify base web Trns•port reports, creation of custom reports and the process of defining them in web Trns•port, plus advanced features such as scripting, parameters, report events, and sub-reports. A third day is reserved for general discussion and guided hands on working with actual web Trns•port reports.

If ConnDOT does not have sufficient expertise in ActiveReports, this training is needed to make customizations to existing Trns•port reports and develop new custom reports for reporting needs not provided by the standard reports available in Trns•port.

ConnDOT will coordinate the provision of appropriate training facilities to include the training room, web-client machines for each student, and a web-client machine with overhead projection connections for the Info Tech trainer. ConnDOT will set up the training room in advance and verify the web-clients are properly installed and connected to both web-application and database servers. ConnDOT will also set up all training user IDs and test them in advance.

This task requires technical support to be available from ConnDOT, including, but not limited to, the database administrator and the network administrator.

Task 17. Reports and Interfaces Analysis (Required)

This task involves a three-day on-site visit by two Info Tech analysts to assist ConnDOT with analyzing existing reports and interfaces. Under this task, it will be determined what customizations need to be made to existing Trns•port reports and what new custom reports and interfaces need to be created. Info Tech will provide initial assistance for ConnDOT to identify which reports can be written using ActiveReports. For those processes that ConnDOT prefers Info Tech to engineer, this task provides for creation of basic design documents detailing those custom processes. These design documents will require agency validation and signed approval before Info Tech proceeds with any subsequent engineering based upon them.

Info Tech can provide additional support to ensure this task is completed on time if ConnDOT determines additional support is warranted. Should ConnDOT request additional support, Info Tech will provide an estimate of the cost and schedule for performing the additional work so that ConnDOT can determine the best course of action to pursue.

The role of the second analyst for this task will be filled by the primary on-site resource.

Task 18. Reports and Interfaces Creation (Required)

Under this task, Info Tech or ConnDOT will make customizations to existing Trns•port reports, if needed, and develop new custom reports for reporting needs not provided by the standard reports available in Trns•port. Info Tech or ConnDOT will also develop appropriate interfaces for communicating with other ConnDOT applications external to Trns•port. This task provides for engineering and testing of designed processes for which ConnDOT determines it would prefer Info Tech to engineer and for which design documents were created in the previous task (ActiveReports and Interface Analysis). Info Tech can provide additional support to ensure this task is completed on time if ConnDOT determines such additional support is warranted.

Should ConnDOT request additional support, Info Tech will provide an estimate of the cost and schedule for performing the additional work so that ConnDOT can determine the best course of action to pursue.

Task 19. Unplanned Report Writing and/or Support (Required)

This task provides support by Info Tech for unforeseen problems or circumstances or unanticipated requirements related to report writing or interface development. For example, under this task, Info Tech could provide additional support to assist ConnDOT with custom ActiveReports development. This task is anticipated to extend to the end of the project.

Items of work for this task will be assigned on an as-needed basis, in consultation with the ConnDOT project manager. Approval by the ConnDOT project manager for the items of work will be required before work can begin.

Task 20. Perform System Integration Testing and Miscellaneous Follow-up Support (web Trns•port Preconstruction, Expedite, Estimator, BAMS/DSS) (Required)

This task will be performed by the Info Tech on-site analyst and by remote analysts accessing the systems through VPN (Virtual Private Network) connections, to assist ConnDOT with testing the Trns•port systems and providing support as needed.

Testing by ConnDOT users will serve to verify process functionality and identify specific areas requiring custom configuration to adequately meet ConnDOT's processing needs, such as reports, screens, and interfaces with other ConnDOT applications external to Trns•port. Testing of the systems also provides an opportunity to identify and resolve outstanding issues with the converted data. Info Tech will work with ConnDOT to resolve any issues arising with use of the Trns•port systems.

11.2.4 Production Implementation, Testing, and Startup – Part 3

In Part 3, final Trns•port systems to include any completed custom configurations previously developed, together with the latest updates for converted data, will be implemented in a Production environment. Parallel testing to compare old and new systems will be conducted and any issues will be addressed before committing to live production use. Issues arising during system testing will be addressed as needed.

Task 21. web Trns•port Preconstruction End User Training (Required)

This task involves a four day on-site visit by two Info Tech trainers to conduct web Trns•port Preconstruction System Administrator Training and web Trns•port Preconstruction User Training on the test system for ConnDOT users. One day will be reserved for System Administrator Training and three days will be allocated for User Training for up to 15 trainees. User training will include instruction related to projects, proposals, and bid lettings, and using Expedite with Trns•port. Chapter 8 details the type of information that will be covered during the training.

ConnDOT will coordinate the provision of appropriate training facilities to include the training room, web-client machines for each student, and a web-client machine with overhead projection connections for the Info Tech trainers. ConnDOT will set up the training room in advance and verify the web-clients are properly installed and connected to both web-application and database servers. ConnDOT will also set up all training user IDs and test them in advance.

This task requires technical support to be available from ConnDOT, including, but not limited to, the database administrator and the network administrator.

The role of the second trainer will be filled by the on-site resource.

Task 22. BAMS/DSS SAS Ad Hoc Training (Optional)

This task involves a three-day on-site visit by one Info Tech trainer to conduct BAMS/DSS SAS Ad Hoc training for up to four users. The purpose of this class is to train staff in the basics of the SAS programming language within the context of the BAMS/DSS built-in ad hoc programming environment. Info Tech will tailor the training to focus on the areas of most interest for ConnDOT.

ConnDOT will coordinate the provision of appropriate training facilities to include the training room, client machines for each student, and a client machine with overhead projection connections for the Info Tech trainer. ConnDOT will set up the training room in advance and verify the clients are properly installed and connected to both application and database servers. ConnDOT will also set up all training user IDs and test them in advance.

This task requires technical support to be available from ConnDOT, including, but not limited to, the database administrator and the network administrator.

Task 23. Run Parallel Tests in Production Environment and Assist With Two Parallel Lettings (Required)

ConnDOT will be responsible for testing the Trns•port systems on the Production systems, with Info Tech providing consulting support as needed. This task will be performed by the on-site Info Tech analyst to provide support during the first two parallel lettings. In addition, a secondary Info Tech analyst will spend three days on site during the first parallel letting. This task will include full-scale testing of the web Trns•port Preconstruction production system in parallel with continued production use of the legacy systems in order to validate the accuracy of the new Trns•port systems and procedures, compare outputs (where appropriate), and generally verify correct operation of the Trns•port systems before going to live production use. To be effective, parallel testing requires all data entry and processing steps be performed in both old and new systems. This will require careful attention by ConnDOT users to ensure all necessary steps are repeated in Trns•port during this period. Also, it may be necessary to initially enter a small amount of catch-up data into Trns•port to bridge the gap between loading of the last data conversion and the initiation of parallel testing, so both production environments are fully synchronized from the beginning.

Info Tech will work with ConnDOT to resolve any issues arising with use of the Trns•port systems in the Production environment.

Task 24. First Production Letting Assistance (Required)

Following successful completion of the parallel testing and resolution of any final issues, ConnDOT will be ready to commit to live production use of Trns•port. At this point, use

of the legacy systems for managing lettings will be terminated and all future data entry will be done in Trns•port.

The Info Tech on-site resource will provide support for ConnDOT's first live production letting using Trns•port. In addition, a secondary Info Tech analyst will spend three days on site during the first production letting. The support provided in this final task is required to ensure everything runs smoothly in the time-sensitive environment of a ConnDOT letting.

Task 25. Electronic Bidding System Implementation Trip 2 (Required)

This task involves a three-day on-site visit by two Info Tech analysts to train up to 120 contractors in up to six half-day sessions. Contractors will learn to create a digital ID and use Expedite to interface with Bid Express for two-way bidding.

During the on-site visit, Info Tech analysts may also provide electronic bidding system and Expedite support, fine-tuning Expedite configurations and troubleshooting for ConnDOT.

This task requires technical support to be available from ConnDOT, including, but not limited to, the designated Bid Express administrator and the backup for this person.

Task 26. Create Phase 2 Work Plan (Optional)

Under this optional task, Info Tech will work with ConnDOT to resolve any outstanding issues remaining with its decision to phase out or consolidate any of its legacy systems in the Production environment. ConnDOT's decision to potentially phase out or consolidate its legacy systems may require the Trns•port products be further customized.

This task includes one on-site visit by three Info Tech analysts, including the on-site analyst, for three days each to analyze and gather requirements to put together a Phase 2 work plan. A draft work plan will be delivered to ConnDOT for its review within eight weeks of this visit. A final work plan will be delivered within four weeks of receiving ConnDOT's feedback.

11.2.5 SiteManager Business Process Analysis – Part 4

Part 4 includes tasks recommended to re-evaluate the utilization of SiteManager in ConnDOT. The tasks below are divided into tasks assisted by Info Tech that are required for effective re-evaluation of ConnDOT's use of SiteManager, and tasks that should be done by ConnDOT with or without Info Tech's assistance.

Task 27. SiteManager Implementation Training for Core Team (Required)

Info Tech will provide initial SiteManager training to the core team up to 15 students in the entire SiteManager workflow including critical components not currently in use. The

training will ensure the team is familiar with the breadth of the software and how it works. This training will include two courses as follows:

SiteManager System Administration Training (Required)

This course covers all the technical, architectural, security, and configuration areas of SiteManager.

SiteManager Core Team Training (Required)

This course covers full functionality and interaction of the construction component areas of SiteManager – Contract Administration, Remote Data Collection, Change Orders, and Contractor Payments.

Although many of the Core Team members may already be SiteManager users, they may be unaware of its complete functionality and the options available. The training will help provide the team with the necessary information they require in order to make sound decisions during business process analysis workshops described below.

Tasks 28-32. SiteManager Business Process Analysis Workshops

To assist ConnDOT in its re-evaluation of its utilization of SiteManager, Info Tech will conduct workshops for Core Team members in the component areas described below. The results of these workshops will be a procedure document for each SiteManager component window detailing what groups of users will use it and how each window will be used. The workshop will also develop documentation for code tables, work flow, system parameter settings, and attachment usage.

Task 28. SiteManager DWR Template Analysis and Development (Required)

Daily Work Report Templates are agency-designed windows that can be used by field inspection staff to capture installation information about contract items on Daily Work Reports. Info Tech will support ConnDOT with the following DWR Templates tasks:

DWR Template Analysis Workshop (Required)

Info Tech will conduct a DWR template analysis workshop to obtain input from Core Team members about what items need templates and document what data and calculations need to be performed in each template. The result of this workshop will be a template master design specification document detailing the templates that need to be developed and their content.

DWR Template Development or Support (Required)

Info Tech will develop or support ConnDOT in the creation and testing of DWR templates within the agreed upon budget allotted for this activity and capped at 100 hours.

Task 29. SiteManager Administration Analysis (Required)

Info Tech will conduct an administration analysis workshop to analyze and document issues, resolutions, and procedures surrounding Contract Administration and Change Order functionality within SiteManager and the agency's business processes. This will include contract activation and finalization. Emphasis will be placed on the contract activation, contract finalization, automated notifications for date-related functionality, Change Order review and approval processes to include automated notifications. The potential use of SiteXchange will also be reviewed.

Task 30. SiteManager Field Data Collection and Contractor Payment Analysis (Required)

Info Tech will conduct an analysis workshop to analyze and document issues, resolutions, and procedures surrounding field data collection, DWR workflow, item payment adjustment, and approval processes, including automated notifications within SiteManager and the agency's business processes.

Task 31. SiteManager System Administration Analysis (Required)

Info Tech will conduct a System Administration analysis workshop to analyze and document issues, resolutions, and procedures surrounding System Administration functionality within SiteManager and the agency's business processes, including system parameters, configurations, and general system policies such as use of Attachments.

Task 32. SiteManager Report Analysis and Development (Optional)

Info Tech will support ConnDOT with the following Reports Analysis and Development tasks:

Report Analysis Workshop

Info Tech will conduct a report analysis workshop to obtain input from participants about changes to any current custom SiteManager reports and any additional report that may be needed. The result of this workshop will be a report design specification for each modified existing report or new report.

Report Development or Support

Info Tech will develop or support ConnDOT in the creation and testing of custom reports within the agreed upon budget allotted for this activity and capped at 100 hours.

Task 33. Systems Test of Procedures in SiteManager Test Environment (Optional)

Info Tech will support testing the SiteManager procedures and workflow on the test SiteManager system, providing support as needed. Testing by the users will serve to verify process functionality and identify specific areas requiring custom configuration to adequately meet ConnDOT's processing needs, such as reports, and screens.

Task 34. SiteManager Training Course (Optional)

Info Tech will conduct one five-day training course for ConnDOT staff for up to 15 students. The course will use the standard end-user training guides and training data that is delivered with each SiteManager Release. The guides cover all the basic functional areas of SiteManager and include exercises. ConnDOT must provide an agency resource familiar with the findings of the business process analysis workshops and the new ConnDOT SiteManager procedures to provide guidance to the participants about revised SiteManager utilization.

The course can be presented in a Train-the-Trainer format for ConnDOT staff that have been identified as the SiteManager Construction trainers. If ConnDOT would prefer Info Tech's assistance in providing end-user training, the quoted cost of the course and the materials described herein can be used to cost additional five-day classes, each with a maximum of 15 participants. With ConnDOT guidance, Info Tech instructor can teach subsets of the materials to like groups of users. For instance, the five day quote can be easily applied to the instruction of one three-day Project Engineer course and one two-day Inspector course, making up a comparable five day instructional period.

Task 35. Run Parallel Tests in SiteManager Test Environment (Optional)

Info Tech will provide remote assistance to ConnDOT administrative personnel as they support parallel testing of their new SiteManager procedures with their production SiteManager environment. These tests will include use of SiteManager in the field offices with active contract(s). Info Tech's remote support of this effort will be limited to the agreed upon budget allotted for this activity and capped at 60 hours.

11.3 Proposed Schedule

A proposed project schedule for the effort associated with ConnDOT's Trns•port estimation, preconstruction, decision support, and construction system implementation follows. This preliminary schedule has been developed to support the work tasks

described in previous sections and the logical order in which these tasks should be performed. This schedule has been developed to provide ConnDOT with an earlier production date by scheduling independent tasks to be worked on concurrently. The task schedule in the final agreement will reflect the scope of work, relative start and end dates, and responsible party to which ConnDOT and Info Tech mutually agree in the process of reviewing this document and defining the implementation project.

Table 11-1 lists the proposed schedule and the responsible party assigned for each task. For completeness, the schedule includes required (R) and optional (O) tasks. The schedule reflects relative dates by month number. ConnDOT and Info Tech will agree on an actual start date. Trns•port implementation tasks are highly interdependent. Work not completed accurately or on time for any task will negatively impact the completion of succeeding tasks. Both Info Tech and ConnDOT will need to make every effort to ensure their assigned tasks are completed on time to stay on the final agreed-upon schedule.

Connecticut Department of Transportation and Development PHASE 1 - Proposed Schedule for Trns•port Implementation					
Task No.	**Req/ Opt**	**Task Description**	**Responsible Party**	**Approximate Start Date**	**Approximate End Date**
NA	R	Final Work Plan Delivered to ConnDOT	Info Tech		
NA	R	ConnDOT Notice to Proceed (signed proposal)	ConnDOT		
0a	R	Implementation Project Management	ConnDOT and Info Tech	Month 1	Month 18
0b	O	Change and Transition Management	ConnDOT and Info Tech	Month 1	Month 3
Part 1 – System Planning and Data Conversion				**Month 1**	**Month 15**
1	R	Trns•port Environment Planning and Setup	ConnDOT and Info Tech	Month 1	Month 2
2	R	Reference and Historical Data Mapping	ConnDOT and Info Tech	Month 2	Month 2
3	R	Reference and Historical Data Conversion: Initial, Periodic and Final	Info Tech	Month 2	Month 15
4	O	Data Conversion of In-Progress Projects and Proposals	Info Tech	Month 2	Month 15
5	R	Bid History Creation for Detailed Estimates	Info Tech	Month 5	Month 5
Part 2 – Systems Upgrade and Test Systems Implementation and Customizations				**Month 5**	**Month 16**
6	RO	On-site Support Resource	Info Tech	Month 4	Month 18
7	R	Upgrade BAMS/DSS in Production System	Info Tech	Month 6	Month 6
8	R	BAMS/DSS Basic Training	Info Tech	Month 6	Month 6

Connecticut Department of Transportation and Development PHASE 1 - Proposed Schedule for Trns•port Implementation					
Task No.	**Req/ Opt**	**Task Description**	**Responsible Party**	**Approximate Start Date**	**Approximate End Date**
9	R	Upgrade Estimator in Production System	Info Tech	Month 6	Month 6
10	R	Estimator Training	Info Tech	Month 6	Month 6
11	R	Install web Trns•port Preconstruction in Test and Production Systems and Train Core Team	Info Tech	Month 7	Month 8
12	R	web Trns•port Preconstruction Configurations	Info Tech	Month 8	Month 12
13	R	Workshops to Gather Business Process Information	Info Tech	Month 7	Month 10
14	O	Write Custom Procedures Documents	Info Tech	Month 8	Month 14
15	R	Electronic Bidding System Implementation Trip 1	Info Tech	Month 9	Month 9
16	O	ActiveReports Training	Info Tech	Month 8	Month 8
17	R	Reports and Interfaces Analysis	ConnDOT and/or Info Tech	Month 8	Month 12
18	R	Reports and Interfaces Creation	ConnDOT and/or Info Tech	Month 9	Month 13
19	R	Unplanned Report Writing and/or Support Activity	ConnDOT and/or Info Tech	Month 5	Month 16
20	R	Perform System Integration Testing	Info Tech	Month 5	Month 16
Part 3 – Production Implementation, Testing, and Startup				**Month 12**	**Month 18**
21	R	web Trns•port Preconstruction End User Training	Info Tech	Month 12	Month 12
22	O	BAMS/DSS SAS Ad Hoc Training	Info Tech	Month 13	Month 13
23	R	Run Parallel Tests in Production Environment and Assist with Two Parallel Lettings	ConnDOT and/or Info Tech	Month 15	Month 17
24	R	First Production Letting Assistance	ConnDOT and Info Tech	Month 16	Month 18
25	R	Electronic Bidding System Implementation Trip 2	Info Tech	Month 16	Month 16
26	O	Create Phase 2 Work Plan	ConnDOT and Info Tech	Month 15	Month 18
Part 4 – SiteManager Business Process Analysis				**Month 5**	**Month 18**

Connecticut Department of Transportation and Development PHASE 1 - Proposed Schedule for Trns•port Implementation					
Task No.	**Req/ Opt**	**Task Description**	**Responsible Party**	**Approximate Start Date**	**Approximate End Date**
27	R	SiteManager System Administration and Core Team Training	Info Tech	Month 5	Month 6
28	R	SiteManager DWR Template Analysis Workshop and Development/Support	ConnDOT and Info Tech	Month 8	Month 12
29	R	SiteManager Administration Analysis Workshop	ConnDOT and Info Tech	Month 8	Month 12
30	R	SiteManager FDC & CP Analysis Workshop	ConnDOT and Info Tech	Month 8	Month 12
31	R	SiteManager System Administration Workshop	ConnDOT and Info Tech	Month 8	Month 12
32	O	SiteManager Report Analysis Workshop and Development/Support	ConnDOT and Info Tech	Month 12	Month 14
33	O	Systems Test of Procedures in SiteManager Test Environment	ConnDOT and Info Tech	Month 14	Month 16
34	O	SiteManager Training	Info Tech	Month 14	Month 18
35	O	Run Parallel Test in SiteManager Test Environment	ConnDOT and Info Tech	Month 16	Month 18
[1] R, Required; O, Optional; RO One of two options is required					

Table 11-1. Project Schedule With Relative Dates

11.4 Cost Estimates

Formation of these cost estimates included consideration of Info Tech's experience from many previous implementation engagements. We create task scope and budget based on an agency's size and requirements based on the information we gathered during the requirements analysis. Even with careful estimation beforehand, there are tasks which will individually require more or less funding than represented by the task estimate.

We find that it helps streamline project management administration for project managers, from both the agency and Info Tech, if the agency grants expressed consent to allow funds to be reallocated among tasks as needed. Reallocation would occur for any task funds not expended at the completion of a task and would not require a formal change order. Any reallocation activity is required to have no impact upon the overall original project budget established at project inception.

Estimated Service Units for Info Tech to provide services to perform or assist with the required tasks as described in Section 11.2, showing both on-site resource options, are

provided in Table 11-2. One column displays costs if ConnDOT selects the option for an Info Tech on-site resource for two weeks per month. The other column displays costs if ConnDOT selects the option for a full time Info Tech on-site resource. ConnDOT-selected optional tasks costs are provided separately in Table 11-3.

Task No.	Required Task Description	Responsible Party	Service Units with On-site Resource Two Weeks per Month	Service Units with Full-Time On-Site Resource
NA	Final Work Plan Delivered to ConnDOT	Info Tech		
NA	ConnDOT Notice to Proceed (signed proposal)	Info Tech		
0a	Implementation Project Management	ConnDOT and Info Tech	15.35	16.00
1	Trns•port Environment Planning and Setup	ConnDOT and Info Tech	0.30	0.30
2	Reference and Historical Data Mapping	Info Tech	1.85	1.15
3	Reference and Historical Data Conversion: Initial, Periodic and Final	Info Tech	4.80	4.80
5	Bid History Creation for Detailed Estimates	Info Tech	0.60	0.60
6	On-site Support Resource	Info Tech	16.00	34.95
7	Upgrade BAMS/DSS in Production	Info Tech	1.20	0.95
8	BAMS/DSS Basic Training	Info Tech	1.00	1.00
9	Upgrade Estimator in Production System	Info Tech	0.35	0.10
10	Estimator Training	Info Tech	1.25	1.15
11	Install web Trns•port Preconstruction in Test and Production Systems and Train Core Team	Info Tech	1.50	1.05
12	web Trns•port Preconstruction Configurations	Info Tech	2.45	0.90
13	Workshops to Gather Business Process Information	Info Tech	2.35	1.85
15	Electronic Bidding System Implementation Trip 1	Info Tech	1.95	1.95
17	Reports and Interfaces Analysis	ConnDOT and/or Info Tech	1.90	1.30
18	Reports and Interfaces Creation	ConnDOT and/or Info Tech	1.90	1.90
19	Unplanned Report Writing and/or Support	ConnDOT and/or Info Tech	1.20	0.50

Task No.	Required Task Description	Responsible Party	Service Units with On-site Resource Two Weeks per Month	Service Units with Full-Time On-Site Resource
20	Perform System Integration Testing	Info Tech	0.70	0.70
21	web Trns•port Preconstruction End User Training	Info Tech	1.15	1.00
23	Run Parallel Tests in Production Environment and Assist with Two Parallel Lettings	ConnDOT and Info Tech	1.15	0.85
24	First Production Letting Assistance	ConnDOT and Info Tech	0.95	0.80
25	Electronic Bidding System Implementation Trip 2	Info Tech	1.10	1.10
27	SiteManager System Administration and Core Team Training	Info Tech	5.65	5.65
28	SiteManager DWR Template Analysis Workshop and Development/Support	ConnDOT and Info Tech	3.65	3.65
29	SiteManager Administration Analysis Workshop	ConnDOT and Info Tech	3.05	3.05
30	SiteManager FDC & CP Analysis Workshop	ConnDOT and Info Tech	3.05	3.05
31	SiteManager System Administration Workshop	ConnDOT and Info Tech	3.05	3.05
	Total AASHTO Service Units		**79.45**	**93.35**
	Total Estimate for Required Tasks		**$ 1,072,575**	**$ 1,260,225**

Table 11-2. Cost Estimates for Required Tasks With Both On-Site Resource Options

Estimated hours and costs for Info Tech to provide services to perform ConnDOT-selected optional tasks as described in Section 11.2, showing both on-site resource options, are provided in Table 11-3. One column displays costs if ConnDOT selects the option for an Info Tech on-site resource for two weeks per month. The other column displays costs if ConnDOT selects the option for a full time Info Tech on-site resource.

All costs for the on-site resource are included in Table 11-2 for required tasks and will not change if any of these selected optional tasks are de-selected before project inception.

Task No.	Optional Task Description	Responsible Party	Service Units with On-site Resource Two Weeks per Month	Service Units with Full-Time On-Site Resource
0b	Change and Transition Management	ConnDOT and Info Tech	0.65	0.55
4	Data Conversion of In-Progress Projects and Proposals	Info Tech	0.90	0.90
14	Write Custom Procedures Documents	Info Tech	3.90	3.90
16	ActiveReports Training	Info Tech	1.20	0.95
22	BAMS/DSS SAS Ad-Hoc Training	Info Tech	1.00	1.00
26	Create Phase 2 Work Plan	Info Tech	5.25	5.25
32	SiteManager Report Analysis Workshop and Development/Support	ConnDOT and Info Tech	3.65	3.65
33	Systems Test of Procedures in SiteManager Test Environment	ConnDOT and Info Tech	2.40	2.40
34	SiteManager Training	Info Tech	2.90	2.90
35	Run Parallel Test in SiteManager Test Environment	ConnDOT and Info Tech	0.85	0.85
	Total AASHTO Service Units		**22.70**	**22.35**
	Total Estimate for Optional Tasks		**$ 306,450**	**$ 301,725**

Table 11-3. Cost Estimates for ConnDOT-Selected Optional Tasks With Both On-Site Resource Options

11.5 Phase 2 Activities – What ConnDOT Can Expect

The customizations in Phase 1 are intended to provide ConnDOT's users with enough functionality to use Trns•port in production mode, but not the full range of customizations that may be desired by the agency to meet all of its long-term requirements. Phase 1 customizations are designed to minimize the initial effort and budget for a more rapid deployment of the system. This also allows users to make more informed decisions on the requirements of future customizations. For example, users often find they do not need a particular customized report with their specific format after using a generic report with the same content.

Info Tech has assisted agencies with customizing their Trns•port implementations ranging from the bare minimum number of customizations to complete and major customization activities. It is difficult to anticipate how much effort ConnDOT's Trns•port Phase 2 customizations will require until end-users are actively testing the system and using it in production. However, in order to provide the agency with an idea of what to anticipate for Phase 2 budgeting, this section describes three levels of customizations (small, medium, and large) that have been performed for other agencies. This section also details the types of customizations that are typically included in each level. A range of costs from these previous implementation customizations is also provided for each level of customization. A few agencies have significantly exceeded the large category; however, that information is not included in this document since ConnDOT does not appear to require an extremely large customization activity for its business processes. If ConnDOT decides to proceed with Phase 2 customization activities, Info Tech will work with the agency to develop a detailed estimate and proposal. It should also be noted that the number and complexity of customizations will impact the implementation timeframe.

11.5.1 Small Implementation Customizations

Typical customization types:

- New small reports
- Small report changes
- Few medium report changes
- Small screen changes

Typical cost range: Eight to 11 Service Units.

11.5.2 Medium Implementation Customizations

Typical customization types:

- New small reports
- Small report changes
- New medium reports
- Medium report changes
- Medium screen changes
- Small number of simple interfaces

Typical cost range: Fifteen to 25 Service Units.

11.5.3 Large Implementation Customizations

Typical customization types:

- New small reports
- Small report changes
- Medium report changes
- New medium reports
- New large reports
- Large report changes
- Large screen changes
- Medium to large number of complex interfaces

Typical cost range: Twenty-five to 30 Service Units.

Due to ConnDOT's size and the current number of reports, Info Tech does not expect ConnDOT to fit into the large customization category. It is our expectation that ConnDOT will fit closer with the small or medium customization category if ConnDOT decides to move forward with Phase 2 activities.

12. Terms and Conditions

12.1 General Terms

Info Tech's work in connection with this proposal will be governed by the terms of its annual agreement with AASHTO for the support, maintenance, and enhancement of AASHTO Trns•port. Should the Connecticut Department of Transportation (ConnDOT) prefer not to use AASHTO Service Units to fund this work, then Info Tech's work in connection with this proposal will be governed by an agreement between ConnDOT and Info Tech containing provisions similar to those in Info Tech's annual agreement with AASHTO regarding the administration of the contract, the conduct of the work, and the responsibilities of the parties.

The time and cost estimates in the final approved proposal will reflect the scope of work and schedule commitments to which ConnDOT and Info Tech mutually agree once ConnDOT gives approval and AASHTO confirms that ConnDOT has purchased the necessary AASHTO Service Units for this implementation project.

Costs associated with the annual AASHTO licensing fees for the Trns•port systems used by ConnDOT and the additional cost of hardware and software required for the implementation are not included in the cost estimates.

Info Tech does not anticipate the need to exceed the estimated total budget. However, if unforeseen circumstances make a budget overrun appear likely, Info Tech will alert ConnDOT to this situation as early as possible to give ConnDOT the opportunity to assess Info Tech's progress and to determine the best course of action going forward. Info Tech will not be required to provide services that will produce charges in excess of the budgeted amount for any task in this implementation project.

Info Tech will schedule on-site visits after ConnDOT and Info Tech mutually agree to the dates for those visits. Should ConnDOT cancel or reschedule an on-site visit, Info Tech may charge ConnDOT for any unrecoverable costs incurred in changing or canceling the associated travel reservations, including but not limited to penalties for rescheduling, or

the price of unused airline reservations for which rescheduling is impractical or not cost-effective. Info Tech will use commercially reasonable means to alleviate such contingent costs so as to avoid charging them to ConnDOT, but reserves the option to do so under appropriate circumstances. These contingent costs are not included in our proposed pricing but may be charged by Info Tech if they arise, even if such charges cause our total charges to exceed the estimated price quoted in this proposal.

12.2 Project Administration

Info Tech recommends that ConnDOT establish a Project Supervisory Committee, consisting of three to four staff members with appropriate business knowledge and technical expertise, to serve as the primary source of direction for Info Tech on this implementation project. This Committee will signify acceptance of Info Tech deliverables. Membership of the Committee should include a designated ConnDOT Project Manager for the project, who will serve as the principal point of contact for Info Tech on all matters relating to this project, the Trns•port End User Designee, plus an expert in each of the primary application areas, such as estimation and contract administration.

As work progresses on the project, it may be necessary for Info Tech to revise the plan by which the work is accomplished. If this occurs, Info Tech will advise the Committee at the earliest opportunity of the proposed changes so that the Committee can review and approve those changes.

12.3 Project Funding

This project will be funded by ConnDOT through its purchase of Trns•port Service Units from AASHTO. Info Tech will issue project invoices to AASHTO to be charged against ConnDOT's purchased Service Units. Project billing information will be provided to ConnDOT upon request, but no approval shall be required prior to Info Tech's issuance of its invoices to AASHTO. Should either ConnDOT or Info Tech determine that an invoicing error has occurred, Info Tech will correct the error in a subsequent invoice as soon as practical.

12.4 Assumptions and Constraints

Info Tech's estimates of pricing and schedule and its obligations under this proposal are based on the assumptions and constraints that appear below and elsewhere throughout this document.

1. Info Tech's services will be provided on a time and materials basis at the AASHTO labor rates in effect at the time the services are performed.

2. ConnDOT will hold valid software licenses for the Trns•port software throughout the duration of the project.

3. Info Tech's goal is to assist ConnDOT in the design of an efficient Trns•port implementation that will allow ConnDOT to use the Trns•port systems in the shortest possible time.

4. ConnDOT has indicated it is committed to implementing internal business practice adjustments, where possible, to conform to Trns•port standards in order to minimize custom configuration of the software, while still meeting the functional requirements of its business processes.

5. Info Tech will make every effort to ensure its assigned tasks are completed on time in order to maintain the project schedule.

6. Similarly, the ConnDOT will make every effort to ensure its assigned tasks are completed on time in order to maintain the project schedule.

7. ConnDOT and Info Tech will mutually agree upon the dates of any on-site visits.

8. Info Tech will provide staff resources, including Consultants, Analysts, and Trainers, with appropriate knowledge and skills to perform on-site tasks as required by the project plan.

9. Info Tech offsite subject matter experts, as needed, will provide portions of the services provided by Info Tech.

10. ConnDOT will provide adequate facilities, including suitable work spaces, personal computer equipment if required, access to the appropriate ConnDOT systems and networks, and access to such other standard office equipment (for example, telephone, copier, or fax machine) as may be needed, for Info Tech staff members while on-site at the ConnDOT offices.

11. ConnDOT may allow specified Info Tech employees working on the project to have VPN access to its network to facilitate remote support. This may require approval from ConnDOT management.

12. ConnDOT will coordinate the provision of appropriately equipped training facilities for on-site training, as required by the project plan.

13. Info Tech will not provide any computer hardware or operating systems.

14. ConnDOT will be responsible for ensuring the appropriate hardware and software environment is in place, with hardware installed and required software loaded and configured, prior to implementation of the Trns•port systems at each stage of the project.

15. A core group of ConnDOT users will be established to conduct pilot system testing in order to verify process functionality and identify specific areas that require custom configuration to adequately meet ConnDOT's processing needs.

16. Participation in the project activities by key members of ConnDOT and targeted Trns•port users will be necessary throughout the project period. Key members include, but are not limited to, database administrators, network administrators, and other technical resources.

17. ConnDOT will make its staff available to Info Tech on a reasonable basis for technical assistance, resolution of issues, and other matters related to this work throughout the duration of the project.

Appendix A. Standard Trns•port Reports

This appendix provides samples of some of the standard reports produced by Trns•port processes.

A.1 Estimation Reports

This section contains a sampling of reports generated by standard Trns•port estimation processes in CES. Each process name is followed by its nickname in parentheses.

A.1.1 Generate Job Detail Estimate (CESGJDE)

```
                                                    STATE HIGHWAY AGENCY
  VALUE:         40.00000
  FORMULA:
  COMMENT: PRICE IMPORTED FROM PES

  TASK:  BID 001           TYPE:  BID-BASED        ACTIVE?: Y
  REGRESSION:           33.87
  MODEL:   1   WORKTYPE: 017   AREA: 1     SEASON: FALL  HIGHWAY TYPE: ASPH  URBAN/RURAL: R     QUANTITY LEVEL: 3
  COMMENT: REGRESSION MODEL 1


                                                    STATE HIGHWAY AGENCY
DATE  : 09/16/2004
PAGE  : 2

                                                    JOB DETAIL ESTIMATE
=================================================================================================================================================
  TASKS FOR JOB ITEM LINE NUMBER: 0015
  ====================================

  TASK:  REF 001           TYPE:  REFERENCE PRICE  ACTIVE?: N
  VALUE:       6000.00000
  FORMULA:
  COMMENT: PRICE IMPORTED FROM PES

  TASK:  BID 001           TYPE:  BID-BASED        ACTIVE?: Y
  REGRESSION:         8039.28
  MODEL:   1   WORKTYPE: 017   AREA: 1     SEASON: FALL  HIGHWAY TYPE: ASPH  URBAN/RURAL: R     QUANTITY LEVEL: 5
  COMMENT: REGRESSION MODEL 1
```

A.1.2 List Job Snapshots (CESLJSN)

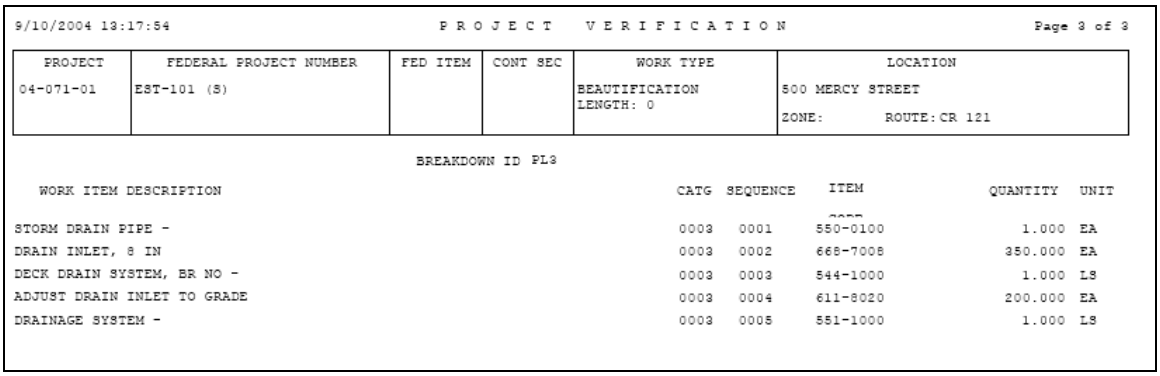
```
                                                    STATE HIGHWAY AGENCY
DATE  : 09/16/2004
PAGE  : 1

                                                     LIST JOB SNAPSHOTS
=================================================================================================================================================
  -------------------------------------------------------------------------------------------------------------------------
  JOB NUMBER : C14225            SNAPSHOT ID:     1
  USER NAME  : DBA              DATE CREATED: 10/10/2003
  REASON     : USER            CONTROL GROUP: 01
  DESCRIPTION: SAVE 01
  -------------------------------------------------------------------------------------------------------------------------
```

```
GENERAL JOB INFORMATION
-----------------------
JOB DESCRIPTION: SH 9, SH 24, SH 285 CALL BOXES
SPEC YEAR: 99         DISTRICT: 1410       FEDERAL/STATE NUMBER: STA R100-097

JOB COST SHEET INFORMATION
--------------------------
DAVIS-BACON WAGES?: N     LABOR RATE CLASS:       MATERIAL RATE CLASS:       EQUIPMENT RATE CLASS:

JOB BID-BASED AND INFLATION INFORMATION
---------------------------------------
COUNTY: C154  WORK TYPE: 017   SEASON: FALL  URBAN/RURAL: R     HIGHWAY TYPE: ASPH
INFLATION PCT.:   0.00   YEARS UNTIL WORK:   0.00   BASE DATE: 09/16/2002   USE JOB INFLATION
ITEM BID HISTORY LIBRARY: E3Y02Q2                    COST GROUP BID HISTORY LIBRARY:

TOTALS
------
CONCEPTUAL ESTIMATE:
ESTIMATED COST     :      196441.54
CONTINGENCY PERCENT:         0.00
ESTIMATED TOTAL    :      196441.54

MISCELLANEOUS INFORMATION
-------------------------
WIDTH:    0   DEPTH:    0   LENGTH:     0.  LANE MILES:
CONSTRUCTION/ENGINEERING PCT.:         JOB TYPE:           UNIT SYSTEM: E
LATITUDE:   39319  LONGITUDE: 1055450  BEGINNING TERM.:   162 00        ENDING TERM.:    25870
ESTIMATOR: DAS         DATE CREATED: 10/10/2003    LAST UPDATE: 10/10/2003


                                     CATEGORIES FOR JOB C14225           SNAPSHOT     1

CATEGORY    DESCRIPTION                                                  ALT CODE
-------------------------------------------------------------------------------
0001        BID ITEMS


                                       ITEMS FOR JOB C14225           SNAPSHOT     1

LINE  ITEM           DESCRIPTION                                          QUANTITY          PRICE        AMOUNT
-------------------------------------------------------------------------------------------------------------------
0005  614-00011                                                            184.000       20.36538       3747.23
0010  614-01582                                                            230.000       33.87327       7790.85
0015  614-87500                                                             23.000     8039.28084     184903.46
-------------------------------------------------------------------------------------------------------------------
```

```
                                                  STATE HIGHWAY AGENCY
DATE  : 09/16/2004
PAGE  : 2

                                                 LIST JOB SNAPSHOTS
=============================================================================================================================================
  TASKS FOR JOB ITEM LINE NUMBER: 0005
  ====================================

  TASK:  REF 001      TYPE:  REFERENCE PRICE    ACTIVE?: N
  VALUE:         20.00000
  FORMULA:
  COMMENT: PRICE IMPORTED FROM PES

  TASK:  BID 001      TYPE:  BID-BASED          ACTIVE?: Y
  AVERAGE:           20.36538
  MODEL:       WORKTYPE:       AREA:       SEASON: FALL  HIGHWAY TYPE: ASPH  URBAN/RURAL: R     QUANTITY LEVEL:
  COMMENT:


  TASKS FOR JOB ITEM LINE NUMBER: 0010
  ====================================

  TASK:  REF 001      TYPE:  REFERENCE PRICE    ACTIVE?: N
  VALUE:         40.00000
  FORMULA:
  COMMENT: PRICE IMPORTED FROM PES

  TASK:  BID 001      TYPE:  BID-BASED          ACTIVE?: Y
  AVERAGE:           33.87327
  MODEL:       WORKTYPE:       AREA:       SEASON: FALL  HIGHWAY TYPE: ASPH  URBAN/RURAL: R     QUANTITY LEVEL:
  COMMENT:


  TASKS FOR JOB ITEM LINE NUMBER: 0015
  ====================================

  TASK:  REF 001      TYPE:  REFERENCE PRICE    ACTIVE?: N
  VALUE:       6000.00000
  FORMULA:
  COMMENT: PRICE IMPORTED FROM PES

  TASK:  BID 001      TYPE:  BID-BASED          ACTIVE?: Y
  AVERAGE:         8039.28084
  MODEL:       WORKTYPE:       AREA:       SEASON: FALL  HIGHWAY TYPE: ASPH  URBAN/RURAL: R     QUANTITY LEVEL:
  COMMENT:
```

A.2 Pre-Construction Reports

This section contains a sampling of reports generated by the Preconstruction component of web Trns•port.

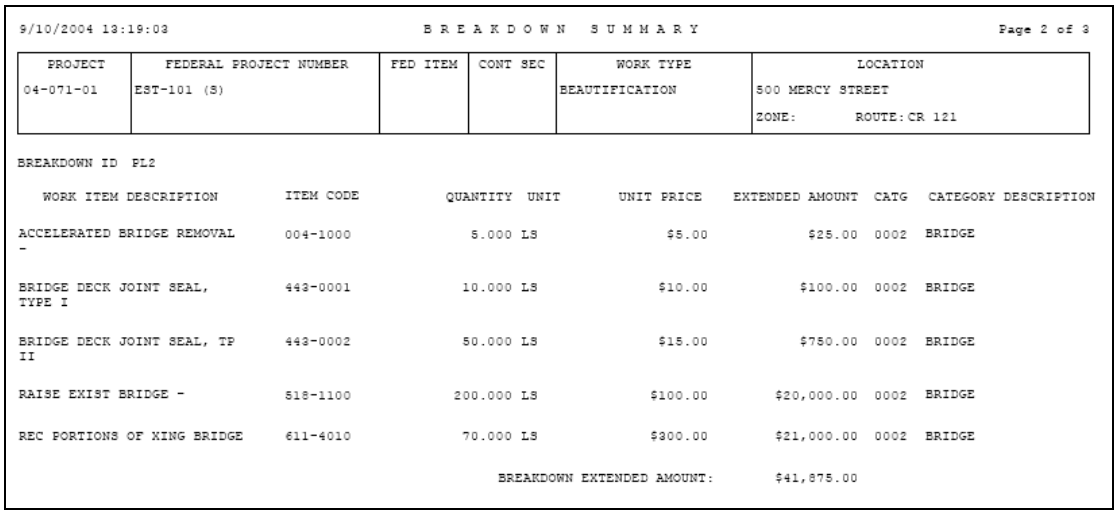


9/10/2004 13:17:54 P R O J E C T V E R I F I C A T I O N Page 3 of 3

PROJECT	FEDERAL PROJECT NUMBER	FED ITEM	CONT SEC	WORK TYPE	LOCATION
04-071-01	EST-101 (S)			BEAUTIFICATION LENGTH: 0	500 MERCY STREET ZONE: ROUTE: CR 121

BREAKDOWN ID PL3

WORK ITEM DESCRIPTION	CATG	SEQUENCE	ITEM CODE	QUANTITY	UNIT
STORM DRAIN PIPE -	0003	0001	550-0100	1.000	EA
DRAIN INLET, 8 IN	0003	0002	668-7008	350.000	EA
DECK DRAIN SYSTEM, BR NO -	0003	0003	544-1000	1.000	LS
ADJUST DRAIN INLET TO GRADE	0003	0004	611-8020	200.000	EA
DRAINAGE SYSTEM -	0003	0005	551-1000	1.000	LS



9/10/2004 13:19:03 B R E A K D O W N S U M M A R Y Page 2 of 3

PROJECT	FEDERAL PROJECT NUMBER	FED ITEM	CONT SEC	WORK TYPE	LOCATION
04-071-01	EST-101 (S)			BEAUTIFICATION	500 MERCY STREET ZONE: ROUTE: CR 121

BREAKDOWN ID PL2

WORK ITEM DESCRIPTION	ITEM CODE	QUANTITY	UNIT	UNIT PRICE	EXTENDED AMOUNT	CATG	CATEGORY DESCRIPTION
ACCELERATED BRIDGE REMOVAL -	004-1000	5.000	LS	$5.00	$25.00	0002	BRIDGE
BRIDGE DECK JOINT SEAL, TYPE I	443-0001	10.000	LS	$10.00	$100.00	0002	BRIDGE
BRIDGE DECK JOINT SEAL, TP II	443-0002	50.000	LS	$15.00	$750.00	0002	BRIDGE
RAISE EXIST BRIDGE -	518-1100	200.000	LS	$100.00	$20,000.00	0002	BRIDGE
REC PORTIONS OF XING BRIDGE	611-4010	70.000	LS	$300.00	$21,000.00	0002	BRIDGE

BREAKDOWN EXTENDED AMOUNT: $41,875.00

A.2.3 Preliminary Detail Estimate

Detail Cost Estimate Cover Sheet

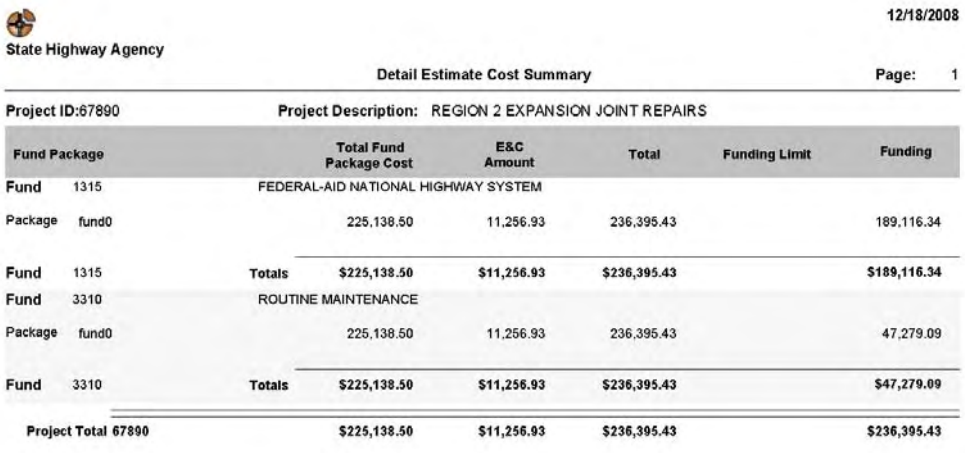
The cover sheet is header information pertaining to the project(s) contained in the estimate. One cover sheet is printed for each project.

State Highway Agency
Detail Cost Estimate

Project ID: 67890
Project Description: REGION 2 EXPANSION JOINT REPAIRS
Spec Book: 99
Date Printed: 12/18/2008
Federal Project Number: M 67-890
State Project Number:

Detail Estimate Cost Summary

The Detail Estimate Cost Summary presents totals by project number for each funding source. Costs are broken out by direct costs, construction and engineering costs, and total costs. If you set a funding limit when you defined the project/category, limits will be shown.



State Highway Agency — 12/18/2008

Detail Estimate Cost Summary — Page: 1

Project ID:67890 — Project Description: REGION 2 EXPANSION JOINT REPAIRS

Fund Package		Total Fund Package Cost	E&C Amount	Total	Funding Limit	Funding
Fund 1315	FEDERAL-AID NATIONAL HIGHWAY SYSTEM					
Package fund0		225,138.50	11,256.93	236,395.43		189,116.34
Fund 1315	Totals	$225,138.50	$11,256.93	$236,395.43		$189,116.34
Fund 3310	ROUTINE MAINTENANCE					
Package fund0		225,138.50	11,256.93	236,395.43		47,279.09
Fund 3310	Totals	$225,138.50	$11,256.93	$236,395.43		$47,279.09
Project Total 67890		$225,138.50	$11,256.93	$236,395.43		$236,395.43

Detail Cost Estimate

The Detail Cost Estimate includes item quantities, prices, and the total amount for the category for each category of work associated with an estimate. Alternate items not included in the low cost total are flagged.

12/18/2008

State Highway Agency

Detail Cost Estimate Page: 1

Project ID: 67890 **Federal Project Number:** M 67-890 **State Project Number:**

Project Description: REGION 2 EXPANSION JOINT REPAIRS

Line #	Ref. ID	Description	Alt. Set	Alt. Member	Units	Qty.	Price	Ext. Amount	Flags*
5	626-00000	MOBILIZATION			LS	1.000	15,000.00000	15,000.00	L B
10	630-10005	Traffic Control			LS	1.000	20,000.00000	20,000.00	L B
15	202-00226	Removal of Asphalt Mat (Special)			SY	181.000	10.25000	1,855.25	L
20	518-01002	Bridge Expansion Device (0-2 Inch)			LF	812.000	110.00000	89,320.00	L
25	202-00226	Removal of Asphalt Mat (Special)			SY	200.000	10.25000	2,050.00	L
30	518-01002	Bridge Expansion Device (0-2 Inch)			LF	878.000	110.00000	96,580.00	L
35	602-00010	Reinforcing Steel (Galvanized)	AA	1	LB	620.000	0.61250	379.75	
40	602-00020	Reinforcing Steel (Epoxy Coated)	AA	2	LB	620.000	0.53750	333.25	L
					Estimate Total	67890		**$225,138.50**	

** Flags: (F)ixed Price, (N)on Bid, (L)ow Cost Contributor, (B)id as Lump Sum*

Detail Estimate Funding Summary

The Detail Estimate Funding Summary shows the total dollar amounts for each category of work within a project. The report groups funding sources by category.

12/18/2008

State Highway Agency

Detail Estimate Funding Summary — Page: 1

Project ID: 67890 — Project Description: REGION 2 EXPANSION JOINT REPAIRS

Category	Cost	E&C Percent	E&C Amount	Total	Funding Package	Fund	Funding Amount
0200	ROADWAY						
	35,000.00	5.00 %	1,750.00	36,750.00	fund0	1315	29,400.00
					fund0	3310	7,350.00
					Total For Category	**0200**	**$36,750.00**
0301	STR K-18-CI						
	91,175.25	5.00 %	4,558.76	95,734.01	fund0	1315	76,587.21
					fund0	3310	19,146.80
					Total For Category	**0301**	**$95,734.01**
0302	STR K-18-CJ						
	98,963.25	5.00 %	4,948.17	103,911.42	fund0	1315	83,129.13
					fund0	3310	20,782.29
					Total For Category	**0302**	**$103,911.42**
					Project Total	**67890**	**$236,395.43**

Detail Estimate Funding Summary by Fund

The Detail Estimate Funding Summary by Fund shows the total dollar amount allocated to each category of work from each fund for each fund included in the estimate.

12/18/2008

State Highway Agency

Detail Estimate Funding Summary By Fund — Page: 1

Project ID: 67890 — Project Description: REGION 2 EXPANSION JOINT REPAIRS

Fund ID / Category ID		Cost	E&C Amount	Total	Funding Amount
Fund ID: 1315	**Fund Desc: FEDERAL-AID NATIONAL HIGHWAY SYSTEM**				
Category ID: 0200	Category Desc: ROADWAY	28,000.00	1,400.00	29,400.00	29,400.00
Category ID: 0301	Category Desc: STR K-18-CI	72,940.20	3,647.01	76,587.21	76,587.21
Category ID: 0302	Category Desc: STR K-18-CJ	79,170.60	3,958.53	83,129.13	83,129.13
	Fund 1315 Total	**$180,110.80**	**$9,005.54**	**$189,116.34**	**$189,116.34**
Fund ID: 3310	**Fund Desc: ROUTINE MAINTENANCE**				
Category ID: 0200	Category Desc: ROADWAY	7,000.00	350.00	7,350.00	7,350.00
Category ID: 0301	Category Desc: STR K-18-CI	18,235.05	911.75	19,146.80	19,146.80
Category ID: 0302	Category Desc: STR K-18-CJ	19,792.65	989.64	20,782.29	20,782.29
	Fund 3310 Total	**$45,027.70**	**$2,251.39**	**$47,279.09**	**$47,279.09**
	Project Total 67890				**$236,395.43**

Detail Estimate Funding Summary by Unit

The Detail Estimate Funding Summary by Unit is a table with the total dollar amount for each unit of work by funding source for each unit included in the estimate. Unit Numbers provide a way to group categories for reporting.

State Highway Agency

12/18/2008

Detail Estimate Funding Summary By Unit Page: 1

Project ID: 67890 **Project Description:** REGION 2 EXPANSION JOINT REPAIRS

Unit		Cost	E&C Amount	Total	Funding Amount
Fund ID: 1315	**Fund Desc.:** FEDERAL-AID NATIONAL HIGHWAY SYSTEM				
1		180,110.80	9,005.54	189,116.34	189,116.34
	Fund 1315 Totals	**$180,110.80**	**$9,005.54**	**$189,116.34**	**$189,116.34**
Fund ID: 3310	**Fund Desc.:** ROUTINE MAINTENANCE				
1		45,027.70	2,251.39	47,279.09	47,279.09
	Fund 3310 Totals	**$45,027.70**	**$2,251.39**	**$47,279.09**	**$47,279.09**
Project Total 67890		**$225,138.50**	**$11,256.93**	**$236,395.43**	**$236,395.43**

A.2.4 Proposal Price Schedule

Sample output from the Proposal Price Schedule process is shown in this section.

The cover sheet shows proposal information and projects associated with the proposal.

AASHTO Trns·port Transportation Software Management Solution

State Highway Agency Proposal

Contract ID : 67890

Projects : 67890

Districts : 2

Counties : PUEBLO

The second page of the Proposal Schedule Cover Sheet lists the proposal sites, estimated number of days to complete the contract, and the liquidated damages per day rate. If the proposal has alternate items, they are also listed.

Contract ID : 67890

REGION 2 EXPANSION JOINT REPAIRS

Time ID	Completion Date or Number of Units	Unit Type	Time Type	Liquidated Damages Rate	Contract Time Flag
00	90	Days	AD	100.00 Days	√

(*) - Indicates Cost Plus Time Site. See Schedule of Items for Cost Per Unit

The following are alternate sets:

Set AA Structural Steel

Bidders must enter all unit prices, make all extensions, and total the bid.

12/18/2008

State Highway Agency

Proposal Schedule of Items

Contract ID: 67890 **Project(s):** 67890

SECTION: 2 STRUCTURES

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
15	202-00226 Removal of Asphalt Mat (Special)	381.000 SY				
20	518-01002 Bridge Expansion Device (0-2 Inch)	1,690.000 LF				

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Proposal Schedule of Items **Page:** 3

Contract ID: 67890 **Project(s):** 67890

SECTION: 2 STRUCTURES

Alternate Set: AA Structural Steel

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
25	602-00010	620.000				
AA	Reinforcing Steel (Galvanized)	LB	_____.	_____	_____.	___
1						
30	602-00020	620.000				
AA	Reinforcing Steel (Epoxy Coated)	LB	_____.	_____	_____.	___
2						

Section: 2 Total: _____.___

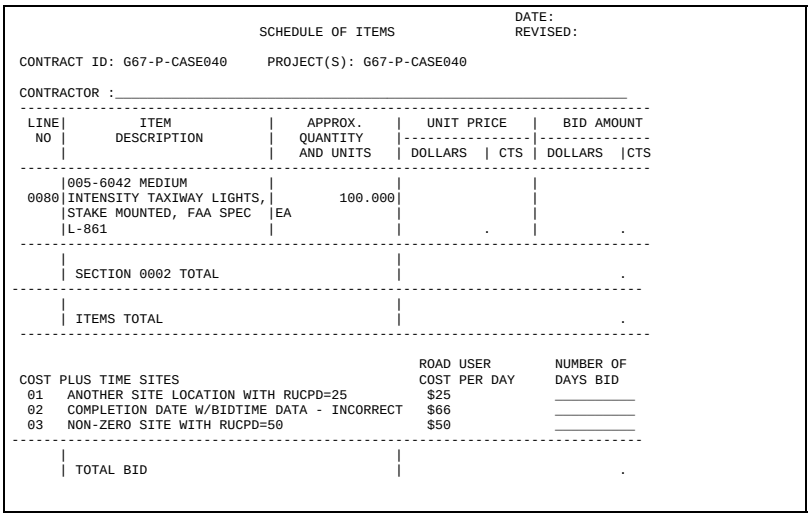
Total Bid: _____.___

Proposal Schedule of Prices

The Proposal Schedule of Prices lists all bid items and their quantities.

```
                          STATE HIGHWAY AGENCY            PAGE:          1
                                                          DATE:
                           SCHEDULE OF ITEMS              REVISED:

CONTRACT ID: G67-P-CASE040     PROJECT(S): G67-P-CASE040

CONTRACTOR :_____________________________________________________________
-------------------------------------------------------------------------------
 LINE|         ITEM            |    APPROX.     |   UNIT PRICE    |   BID AMOUNT
  NO |      DESCRIPTION        |   QUANTITY     |-----------------|--------------
     |                         |   AND UNITS    | DOLLARS  | CTS | DOLLARS  |CTS
-------------------------------------------------------------------------------

SECTION 0001  CATEGORY 1

-------------------------------------------------------------------------------
     |002-2000 EMERGENCY       |                |                 |
 0010|MAINTENANCE -            |LUMP            |LUMP             |
     |                         |                |                 |          .
-------------------------------------------------------------------------------
     |005-0002 INSTALLATION OF |                |                 |
 0020|LIGHTING FACILITIES      |LUMP            |LUMP             |
     |                         |                |                 |          .
-------------------------------------------------------------------------------
     |005-6033 CABLE SPLICE,   |                |                 |
 0030|FAA SPEC L-108           |        100.000 |                 |
     |                         |EA              |          .      |          .
-------------------------------------------------------------------------------
     |005-6041 MEDIUM          |                |                 |
 0040|INTENSITY RUNWAY LIGHTS, |        100.000 |                 |
     |BASE MOUNTED, FAA SPEC   |EA              |                 |
     |L-861                    |                |          .      |          .
-------------------------------------------------------------------------------
     |                         |                |
     | SECTION 0001 TOTAL      |                |                          .
-------------------------------------------------------------------------------

SECTION 0002  CATEGORY 2

-------------------------------------------------------------------------------
     |002-2010 EMERGENCY       |                |                 |
 0050|MAINTENANCE, DETOURS,    |LUMP            |LUMP             |
     |TEMP CROSS OVERS,        |                |                 |
     |BARRIER WALLS &          |                |                 |
     |INSPECTION               |                |                 |          .
-------------------------------------------------------------------------------
     |005-0003 INSTALLATION OF |                |                 |
 0060|LIGHTING FACILITIES      |           1.000|                 |
     |                         |*$*             |          .      |          .
-------------------------------------------------------------------------------
     |005-6035 RETROREFLECTIVE |                |                 |
 0070|MARKERS, FAA SPEC L-853  |        100.000 |                 |
     |                         |EA              |          .      |          .
-------------------------------------------------------------------------------
```

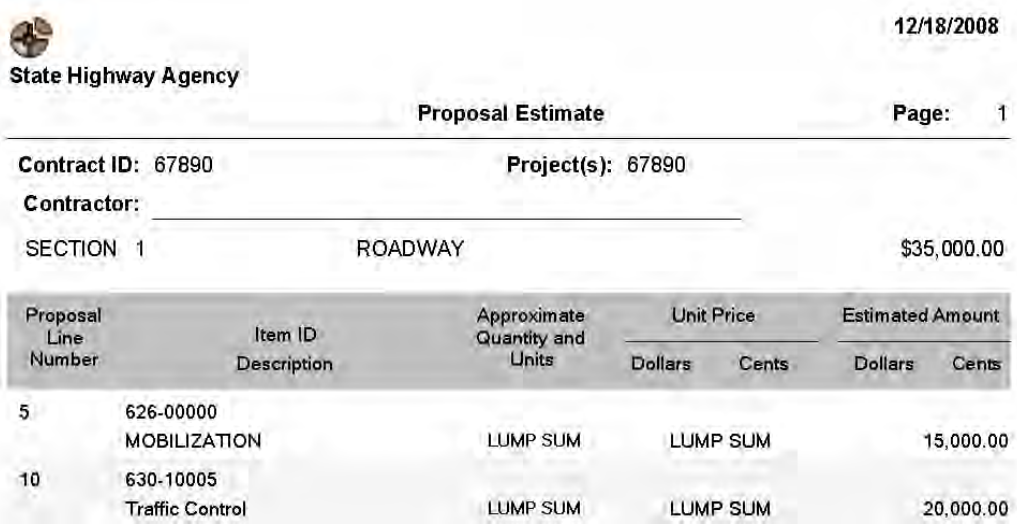
```
                          STATE HIGHWAY AGENCY            PAGE:          2
```



```
                                                                    DATE:
                              SCHEDULE OF ITEMS                     REVISED:

CONTRACT ID: G67-P-CASE040     PROJECT(S): G67-P-CASE040

CONTRACTOR :_____________________________________________________________

-------------------------------------------------------------------------------
 LINE|         ITEM            |    APPROX.     |   UNIT PRICE    |   BID AMOUNT
  NO |      DESCRIPTION        |   QUANTITY     |-----------------|--------------
     |                         |   AND UNITS    | DOLLARS  | CTS | DOLLARS  |CTS
-------------------------------------------------------------------------------
     |005-6042 MEDIUM          |                |                 |
 0080|INTENSITY TAXIWAY LIGHTS,|        100.000 |                 |
     |STAKE MOUNTED, FAA SPEC  |EA              |                 |
     |L-861                    |                |          .      |          .
-------------------------------------------------------------------------------
     |                                          |
     | SECTION 0002 TOTAL                       |                           .
-------------------------------------------------------------------------------
     |                                          |
     | ITEMS TOTAL                              |                           .
-------------------------------------------------------------------------------

                                                 ROAD USER        NUMBER OF
COST PLUS TIME SITES                             COST PER DAY     DAYS BID
 01   ANOTHER SITE LOCATION WITH RUCPD=25          $25              _________
 02   COMPLETION DATE W/BIDTIME DATA - INCORRECT   $66              _________
 03   NON-ZERO SITE WITH RUCPD=50                  $50              _________
-------------------------------------------------------------------------------
     |                                          |
     | TOTAL BID                                |                           .
```

Proposal Estimate

The Proposal Estimate report is similar to the Proposal Schedule of Prices. The engineer's estimated price for each item is printed with section subtotals and the total estimated amount. The report is intended for in-house agency use only.



State Highway Agency 12/18/2008

Proposal Estimate Page: 1

Contract ID: 67890 **Project(s):** 67890

Contractor: _____

SECTION 1 ROADWAY $35,000.00

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Estimated Amount Dollars	Estimated Amount Cents
5	626-00000 MOBILIZATION	LUMP SUM	LUMP SUM		15,000.00	
10	630-10005 Traffic Control	LUMP SUM	LUMP SUM		20,000.00	

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State Highway Agency

Proposal Estimate **Page:** 2

Contract ID: 67890 **Project(s):** 67890

Contractor: _____

SECTION 2 STRUCTURES $190,138.50

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Estimated Amount Dollars	Estimated Amount Cents
15	202-00226	381.000				
	Removal of Asphalt Mat (Special)	SY		10.25000		3,905.25
20	518-01002	1,690.000				
	Bridge Expansion Device (0-2 Inch)	LF		110.00000		185,900.00

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Proposal Estimate **Page:** 3

Contract ID: 67890 **Project(s):** 67890

Contractor: _____

SECTION 2 STRUCTURES $190,138.50

Alternate Set AA Structural Steel

Proposal Line Number	Item ID Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Estimated Amount Dollars	Estimated Amount Cents
25	602-00010	620.000				
AA	Reinforcing Steel (Galvanized)	LB		0.61250		379.75
1						
30	602-00020	620.000				
AA	Reinforcing Steel (Epoxy Coated)	LB		0.53750		333.25
2						

Estimated Total : $225,138.50

Proposal Schedule DBE Interest Report

The DBE Interest report lists contract line items you flagged as likely candidates for DBE participation in the Item list. The report shows the estimated quantity and estimated price for each item. This report is a beginning guide for setting DBE participation goals.

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State Highway Agency

Proposal Schedule
DBE Interest Report

Page: 1

Proposal ID: 67890

Item Number	Alternate	Item Description	Estimated Quantity	DBE Pct	Item Units	Unit Price	Item Cost
Item Class: 202		Removal Of Structures And Obstructions					
202-00226		Removal of Asphalt Mat (Special)	381.000	100.00 %	SY	10.25	3,905.25
		Total For Class	202				$3,905.25
		Percent Of Estimate:					1.73%
		Total For Proposal:					$3,905.25

A.2.5 Notice to Contractors

The Notice to Contractors report notifies contractors about bid letting details. This report specifies the proposals that are up for bid in the letting and the work items that comprise those proposals.

Notice to Contractors -- Letting December 15, 2008

Sealed proposals for furnishing all labor, material, equipment and other things necessary for the work described herein will be received by the undersigned at the General Office of the Department of Highway until 10:00 AM on December 15, 2008 and publically opened.

Soil borings are generally available on all grading or bridge projects. They are free. They may be ordered at (999) 999-9999. There will be no refunds for plans or proposals. Please put the invoice number on all checks when paying for plans, proposals and specifications.

Quantities shown herein are for information only and should not be used for bidding purposes. The Department reserves the right to change these quantities without notice.

Contract ID Federal Project Number / State Project Number Description
67890 M 67-890 REGION 2 EXPANSION JOINT REPAIRS
M 67-890 REGION 2 EXPANSION JOINT REPAIRS

The Items Quantities Listing specifies the work items that comprise those proposals up for bid in the letting.

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State Highway Agency

Notice To Contractors - Contract ID 67890 Page 2

Contract ID: 67890
Letting Date: December 15, 2008 10:00 AM **Projects:** 67890 M 67-890
Counties: PUEBLO
District: 2 **DBE Goal Percent:**
Description:
Contract Time: AD - 90 Days

Item No.	Description	Quantity	Units
626-00000	MOBILIZATION	(1)	LS
630-10005	Traffic Control	(1)	LS
202-00226	Removal of Asphalt Mat (Special)	381.000	SY
518-01002	Bridge Expansion Device (0-2 Inch)	1,690.000	LF
602-00010	Reinforcing Steel (Galvanized)	620.000	LB
602-00020	Reinforcing Steel (Epoxy Coated)	620.000	LB

( ) Item will be bid as lump sum.

A.2.6 Bid Tab Edit Report

The Bid Tab Edit report analyzes individual line item bids for numerical accuracy. It marks irregular bids in the exception report. The report checks to make sure bidders enter extended amounts that are in line with the unit prices they offer, and it indicates why bidders are irregular.

The Item Bid Edit lists errors with proposal bid tabs, such as invalid extended amounts.

The first section of this report is the Item Alternate Bid Edit. This report indicates bidding errors for item alternates such as incomplete bids on a set of alternates.

The third section is the Proposal Section Edit. If a bidder's extended amounts do not add up to the section total, Trns•port lists that information in this section of the report.

The fourth section is the Proposal Total Bid Edit. If a bidder's extended amounts do not add up to the proposal total, Trns•port lists that information in this section of the report.

The fifth section is the Bid Time Edit, which reports any errors with the time portion of the bids if it is a Cost Plus Time job.

The sixth section is the Bidders Summary and Ranking, which ranks each bidder according to the calculated bid total. These rankings are *apparent* and Trns•port only considers them to be true rankings if Sections 1 through 5 of the report list no errors. The bid exception status column indicates the vendors who have errors.

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State Highway Agency

Bid Summary Page: 1

Letting: 20081201
Call Order: 2
Contract ID: 67890

ITEM BID EDIT

Letting	Call	Vendor	Line Number	Proposal Quantity	Bid Price	Bid Amount	Error

No Item Bid Errors Found

ITEM ALTERNATE BID EDIT

Letting	Call	Vendor	Alternate Set	Alternate Member	Error
20081201	2	009A	AA		Alternate Set 'AA': Incomplete Bid - missing bids for item(s) for at least one alternate member in the Alternate Set.

SECTION BID EDIT

Letting	Call	Vendor	Section	Bid Section Total	Calculated Section Total	Error
20081201	2	009A	2	190,138.50		Section ID '2': Incorrect Section Bid Total - calculated section total of " does not equal entered amount of '190138.50' for Section Bid Total.

PROPOSAL TOTAL BID EDIT

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State Highway Agency

Bid Summary Page: 2

Letting: 20081201
Call Order: 2
Contract ID: 67890

Letting	Call	Vendor	Extended Amount	Calculated Bid Total	Error

No Bid Total Errors Found

BID TIME EDIT

Letting	Call	Vendor	Milestone	Error

No Bid Time Errors Found

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State Highway Agency

Bidders Summary and Ranking Page: 1

Letting Date: 20081201
Call Order: 2
Contract ID: 67890

Rank	Vendor ID	Vendor Name	Calculated Bid Item Total	Proposal Bid Item Total	Plus Time Bid Item Total	Valid Bid / Irreg. Reason
1	005A	CITY OF SMITHVILLE	228,433.25	228,433.25	228,433.25	Valid
2	007A	CITY OF MONROE	231,138.50	231,138.50	231,138.50	Valid
0	009A	CITY OF SPARKS		225,138.50		Irregular

A.2.7 Bid Tab Analysis

Report results of the Generate Bid Tab Analysis can help you evaluate bids and award contracts. The report includes an item-by-item report, a low bid summary, and Trns•port' recommendation.

Low Bid Summary

The first section of the report is the Low Bid Summary, which indicates the low bidder and low bid value (corrected bid) and the engineer's estimate of the cost (estimated cost). Additionally, Trns•port records the low bid as a percentage of the engineer's estimate and as a dollar value over or under the engineer's estimate.

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State Highway Agency

Low Bid Summary Page: 1

Letting Date: December 15, 2008 **Letting ID:** 20081201

Call Order	Contract ID / Project(s)	Number of Bids	Low Bidder	Estimated Cost	Corrected Bid	Percent of Estimate	Overrun (+) Underrun (-)
2	67890 M 67-890	3	CITY OF SMITHVILLE	$225,138.50	$228,433.25	101.46%	$3,294.75
Letting Totals		3		$225,138.50	$228,433.25	101.46%	$3,294.75

Tabulation of Bids

The Tabulation of Bids lists proposal header information, vendor ranking with bid totals, and item bid information for each proposal. The report displays the item bid information with three vendors per page of output. The engineer's estimate appears as the first vendor.

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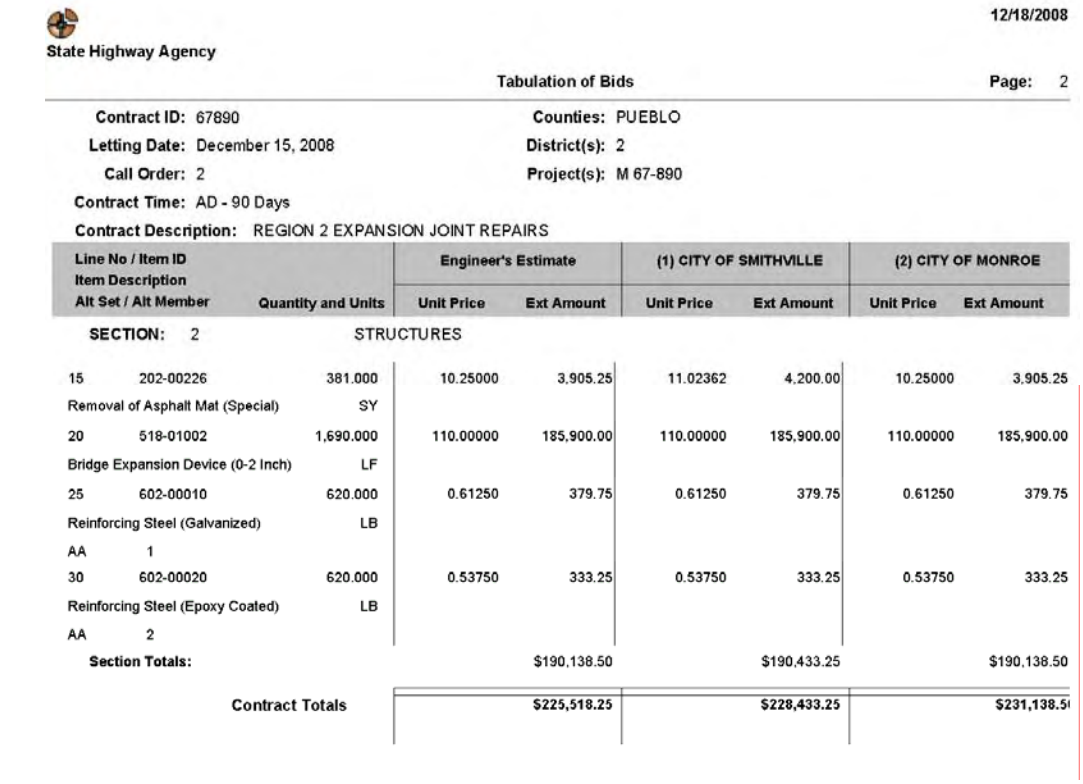
State Highway Agency

Tabulation of Bids Page: 1

Contract ID: 67890 **Counties:** PUEBLO
Letting Date: December 15, 2008 **District(s):** 2
Call Order: 2 **Project(s):** M 67-890
Contract Time: AD - 90 Days
Contract Description: REGION 2 EXPANSION JOINT REPAIRS

Line No / Item ID / Item Description / Alt Set / Alt Member	Quantity and Units	Engineer's Estimate		(1) CITY OF SMITHVILLE		(2) CITY OF MONROE	
		Unit Price	Ext Amount	Unit Price	Ext Amount	Unit Price	Ext Amount
SECTION: 1 ROADWAY							
5 626-00000	(1)	15,000.00000	15,000.00	18,000.00000	18,000.00	18,000.00000	18,000.00
MOBILIZATION	LS						
10 630-10005	(1)	20,000.00000	20,000.00	20,000.00000	20,000.00	23,000.00000	23,000.00
Traffic Control	LS						
Section Totals:			$35,000.00		$38,000.00		$41,000.00



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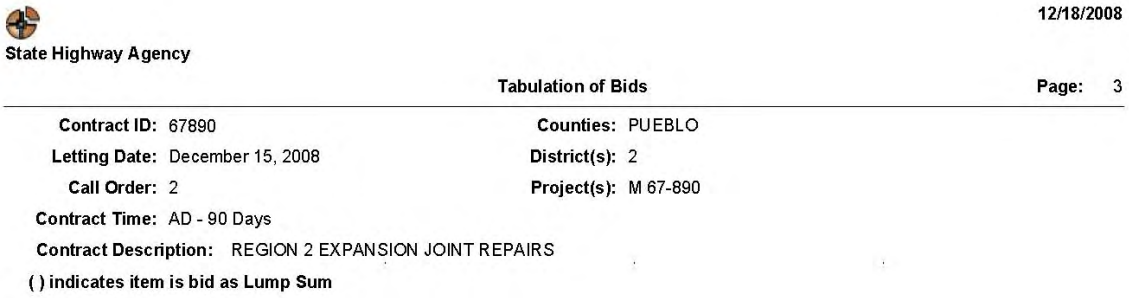
State Highway Agency

Tabulation of Bids — Page: 2

Contract ID: 67890 — **Counties:** PUEBLO
Letting Date: December 15, 2008 — **District(s):** 2
Call Order: 2 — **Project(s):** M 67-890
Contract Time: AD - 90 Days
Contract Description: REGION 2 EXPANSION JOINT REPAIRS

Line No / Item ID / Item Description / Alt Set / Alt Member	Quantity and Units	Engineer's Estimate		(1) CITY OF SMITHVILLE		(2) CITY OF MONROE	
		Unit Price	Ext Amount	Unit Price	Ext Amount	Unit Price	Ext Amount
SECTION: 2 STRUCTURES							
15 202-00226	381.000	10.25000	3,905.25	11.02362	4,200.00	10.25000	3,905.25
Removal of Asphalt Mat (Special)	SY						
20 518-01002	1,690.000	110.00000	185,900.00	110.00000	185,900.00	110.00000	185,900.00
Bridge Expansion Device (0-2 Inch)	LF						
25 602-00010	620.000	0.61250	379.75	0.61250	379.75	0.61250	379.75
Reinforcing Steel (Galvanized)	LB						
AA 1							
30 602-00020	620.000	0.53750	333.25	0.53750	333.25	0.53750	333.25
Reinforcing Steel (Epoxy Coated)	LB						
AA 2							
Section Totals:			$190,138.50		$190,433.25		$190,138.50
Contract Totals			**$225,518.25**		**$228,433.25**		**$231,138.5**



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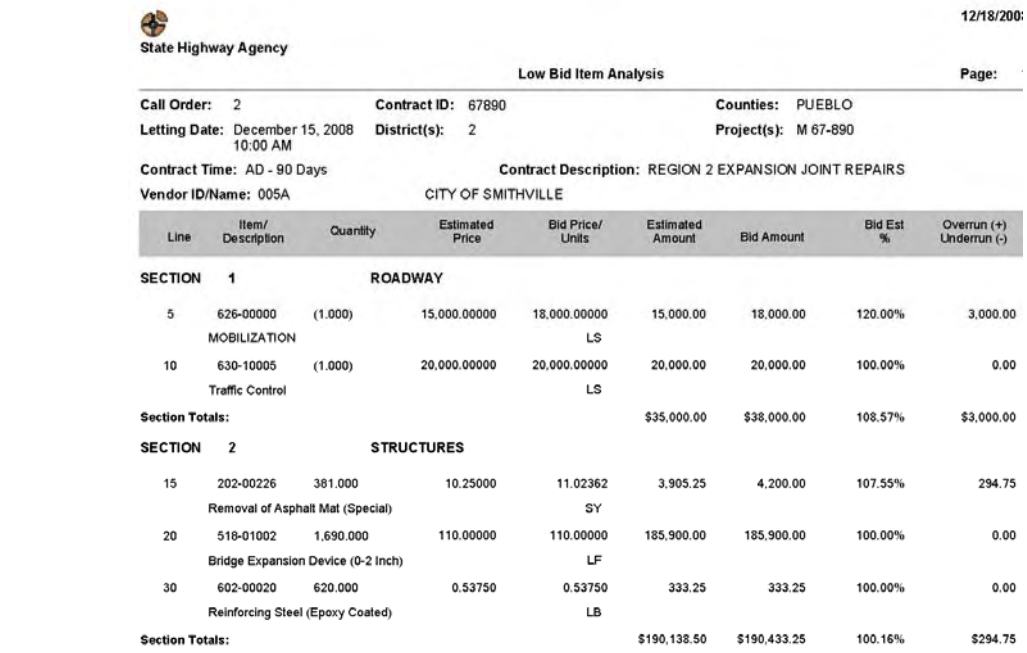
State Highway Agency

Tabulation of Bids — Page: 3

Contract ID: 67890 — **Counties:** PUEBLO
Letting Date: December 15, 2008 — **District(s):** 2
Call Order: 2 — **Project(s):** M 67-890
Contract Time: AD - 90 Days
Contract Description: REGION 2 EXPANSION JOINT REPAIRS
( ) indicates item is bid as Lump Sum

Low Bid Item Analysis

The Low Bid Item Analysis lists proposal header information and a detailed item price comparison between the low bidder and the engineer's estimate for each proposal in the selected letting.



12/18/200

State Highway Agency

Low Bid Item Analysis

Page:

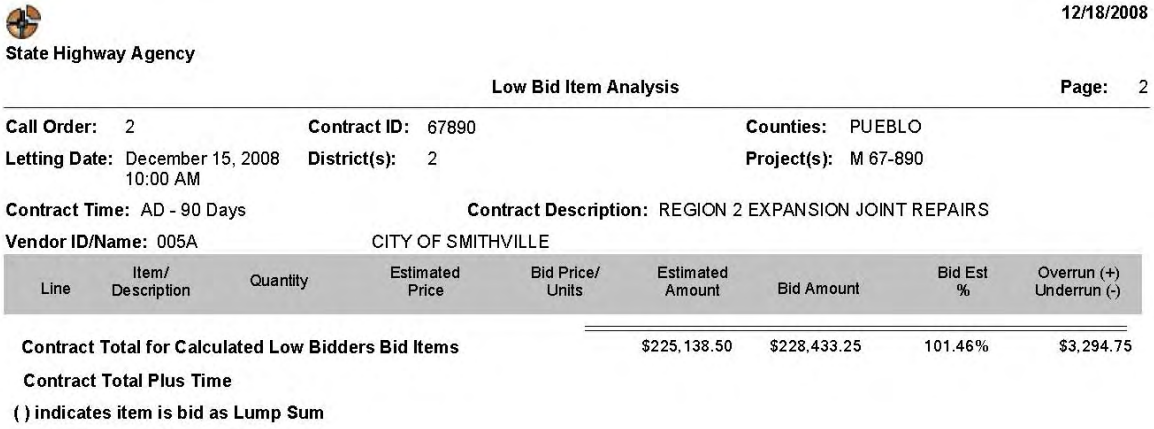
Call Order: 2 **Contract ID:** 67890 **Counties:** PUEBLO

Letting Date: December 15, 2008 10:00 AM **District(s):** 2 **Project(s):** M 67-890

Contract Time: AD - 90 Days **Contract Description:** REGION 2 EXPANSION JOINT REPAIRS

Vendor ID/Name: 005A CITY OF SMITHVILLE

Line	Item/ Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est %	Overrun (+) Underrun (-)
SECTION 1		**ROADWAY**						
5	626-00000	(1.000)	15,000.00000	18,000.00000	15,000.00	18,000.00	120.00%	3,000.00
	MOBILIZATION			LS				
10	630-10005	(1.000)	20,000.00000	20,000.00000	20,000.00	20,000.00	100.00%	0.00
	Traffic Control			LS				
Section Totals:					$35,000.00	$38,000.00	108.57%	$3,000.00
SECTION 2		**STRUCTURES**						
15	202-00226	381.000	10.25000	11.02362	3,905.25	4,200.00	107.55%	294.75
	Removal of Asphalt Mat (Special)			SY				
20	518-01002	1,690.000	110.00000	110.00000	185,900.00	185,900.00	100.00%	0.00
	Bridge Expansion Device (0-2 Inch)			LF				
30	602-00020	620.000	0.53750	0.53750	333.25	333.25	100.00%	0.00
	Reinforcing Steel (Epoxy Coated)			LB				
Section Totals:					$190,138.50	$190,433.25	100.16%	$294.75



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State Highway Agency

Low Bid Item Analysis

Page: 2

Call Order: 2 **Contract ID:** 67890 **Counties:** PUEBLO

Letting Date: December 15, 2008 10:00 AM **District(s):** 2 **Project(s):** M 67-890

Contract Time: AD - 90 Days **Contract Description:** REGION 2 EXPANSION JOINT REPAIRS

Vendor ID/Name: 005A CITY OF SMITHVILLE

Line	Item/ Description	Quantity	Estimated Price	Bid Price/ Units	Estimated Amount	Bid Amount	Bid Est %	Overrun (+) Underrun (-)
Contract Total for Calculated Low Bidders Bid Items					$225,138.50	$228,433.25	101.46%	$3,294.75

Contract Total Plus Time

( ) indicates item is bid as Lump Sum

Vendor Ranking

The Vendor Ranking displays all bid totals and their ranking.

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State Highway Agency

Vendor Ranking Page: 1

Call Order: 2 **Contract ID:** 67890 **Counties:** PUEBLO

Letting Date: December 15, 2008 10:00 AM **District(s):** 2

Contract Time: AD - 90 Days

Contract Description: REGION 2 EXPANSION JOINT REPAIRS **Project(s):** M 67-890

Rank	Vendor ID/Name		Total Bid	Percent Of Low Bid	Percent Of Estimate
0	-EST-	Engineer's Estimate	$225,138.50	98.56%	100.00%
1	005A	CITY OF SMITHVILLE	$228,433.25	100.00%	101.46%
2	007A	CITY OF MONROE	$231,138.50	101.18%	102.67%
	009A	CITY OF SPARKS	Irregular		

A.2.8 Bid Letting Summary

The Bid Letting Summary shows the status of each contract proposal for the selected lettings. It also shows the winning vendor and contract amount if you award the proposal.

Proposal Addenda Detail

The first section of the report lists any addendums for any of the proposals in the bid letting package.

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State Highway Agency

Proposal Addenda Detail Page: 1

Proposal ID: 67890

No Addenda for Proposal

Bid Letting History

The Bid Letting History lists summary information about the contract if you previously let it but the contract was rejected. This section also shows current letting information.

State Highway Agency

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Bid Letting History

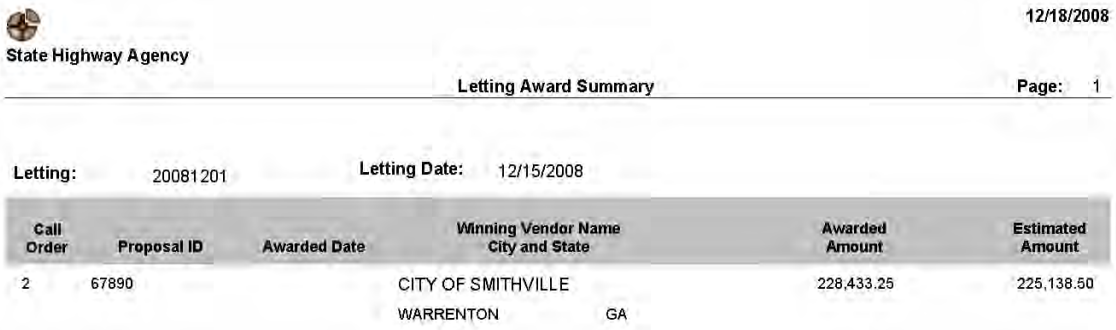
Page: 1

Letting Date: 12/15/2008

Call Order	Previous Letting Date	Proposal ID	Vendor	Vendor Name	Estimate Amount	Bid Amount	# of Bids	Bid % of Est
2		67890	005A	CITY OF SMITHVILLE	225,138.50	228,433.25	3	101.46%

Letting Award Summary

The Letting Award Summary lists information about the winning vendor.



State Highway Agency

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Letting Award Summary

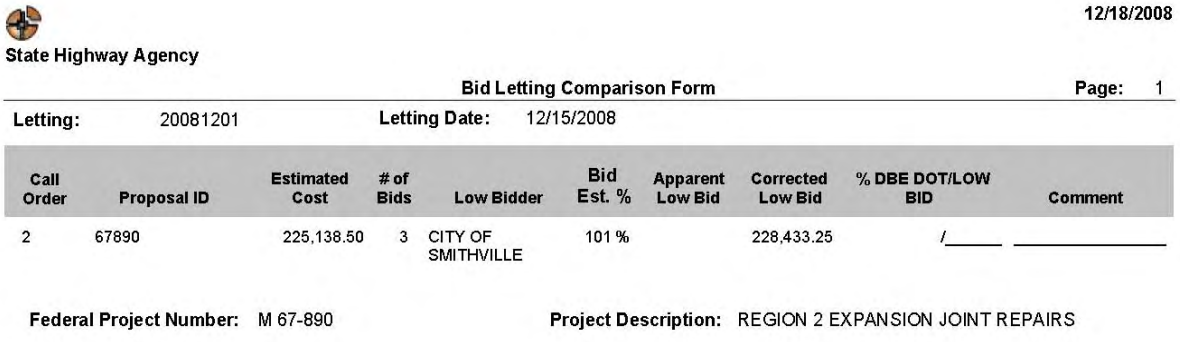
Page: 1

Letting: 20081201 Letting Date: 12/15/2008

Call Order	Proposal ID	Awarded Date	Winning Vendor Name City and State		Awarded Amount	Estimated Amount
2	67890		CITY OF SMITHVILLE		228,433.25	225,138.50
			WARRENTON	GA		

Bid Letting Comparison Form

The Bid Letting Comparison form lists the proposals in call-order sequence and includes selected proposal information and blank fields for manual entry at the bid letting.



State Highway Agency

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Bid Letting Comparison Form

Page: 1

Letting: 20081201 Letting Date: 12/15/2008

Call Order	Proposal ID	Estimated Cost	# of Bids	Low Bidder	Bid Est. %	Apparent Low Bid	Corrected Low Bid	% DBE DOT/LOW BID	Comment
2	67890	225,138.50	3	CITY OF SMITHVILLE	101 %		228,433.25	/_____	_____

Federal Project Number: M 67-890 Project Description: REGION 2 EXPANSION JOINT REPAIRS

Prequalified Contractors

The fifth section lists prequalified contractors. This report lists all vendors who have a vendor work classification that matches one of the three proposal work classification fields.

State Highway Agency

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PREQUALIFIED CONTRACTORS Page: 1

FOR THE LETTING OF 12/15/2008

RATING FOR THE FOLLOWING CONTRACTS

Letting Number: 20081201
Call Order: 2
Proposal ID: 67890

Date	Contractor	Class	Contractor Name
1/31/2010	005A	202C-Bridges	CITY OF SMITHVILLE

A.2.9 Contract Price Schedule

The Contract Price Schedule report is generated after the proposal is awarded and contains the bidder's unit prices and extended amounts for each item.

Schedule Cover Sheet

The first section of the report is the contract cover sheet. The second page of the cover sheet contains additional information such as DBE/MBE/WBE goals and site time limitations.

AASHTO Trns•port Transportation Software Management Solution

State Highway Agency
Contract

Date of Opening : December 15, 2008

Contract ID : 67890

Projects : 67890

Counties : PUEBLO

Code : 005A
CITY OF SMITHVILLE

Contract ID: 67890

REGION 2 EXPANSION JOINT REPAIRS

Time ID	Completion Date or Number of Units	Unit Type	Time Type	Liquidated Damages Rate		Contract Time Flag
00	90	Days	AD	100.00	Days	√

(*) - Indicates Cost Plus Time Site.

Contract Schedule

The second section is the contract schedule of prices. Trns•port will wrap long item descriptions over several lines as needed.

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State Highway Agency

Contract Schedule **Page:** 1

Contract ID: 67890 Project(s): 67890

Awarded 005A CITY OF SMITHVILLE

SECTIO 1 ROADWAY $38,000.00

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
5	626-00000 MOBILIZATION	LUMP SUM	LUMP SUM		18,000.00	
10	630-10005 Traffic Control	LUMP SUM	LUMP SUM		20,000.00	

SECTIO 2 STRUCTURES $190,433.25

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
15	202-00226 Removal of Asphalt Mat (Special)	381.000 SY		11.02362	4,200.00	
20	518-01002 Bridge Expansion Device (0-2 Inch)	1,690.000 LF		110.00000	185,900.00	

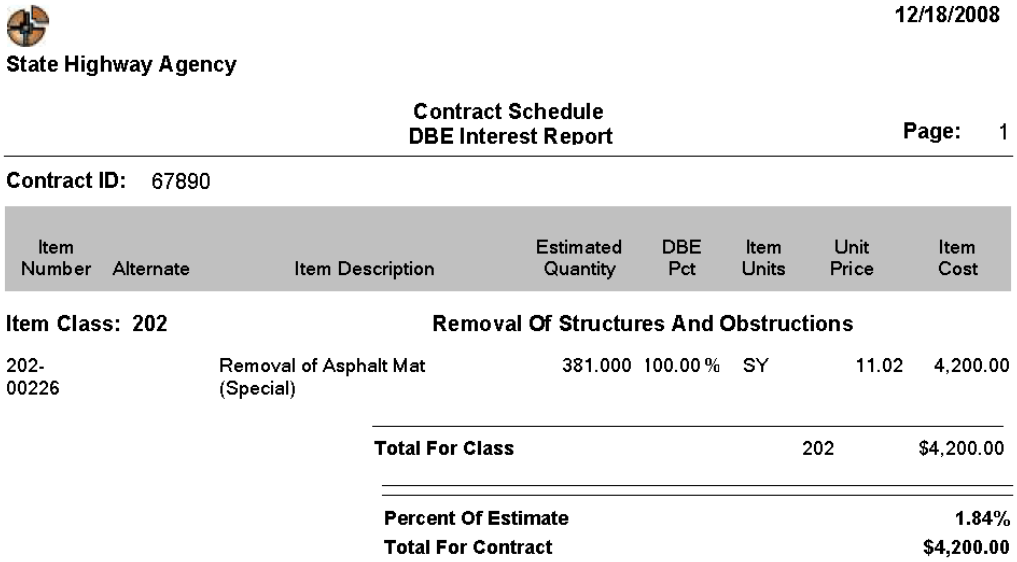
Alternate Set AA Structural Steel

Proposal Line Number	Item ID / Description	Approximate Quantity and Units	Unit Price Dollars	Unit Price Cents	Bid Amount Dollars	Bid Amount Cents
30 AA 2	602-00020 Reinforcing Steel (Epoxy Coated)	620.000 LB		0.53750	333.25	

Total Bid: **$228,433.25**

DBE Interest Report

The DBE Interest report lists contract line items you flagged as likely candidates for DBE participation in the Item list. The report shows the estimated quantity and awarded price for each item. This report is a beginning guide for setting DBE participation goals.



12/18/2008

State Highway Agency

Contract Schedule
DBE Interest Report

Page: 1

Contract ID: 67890

Item Number	Alternate	Item Description	Estimated Quantity	DBE Pct	Item Units	Unit Price	Item Cost
Item Class: 202		Removal Of Structures And Obstructions					
202-00226		Removal of Asphalt Mat (Special)	381.000	100.00 %	SY	11.02	4,200.00
		Total For Class				202	$4,200.00
		Percent Of Estimate					**1.84%**
		Total For Contract					**$4,200.00**

A.2.10 Final Detail Estimate

Detail Cost Estimate Cover Sheet

The cover sheet is header information pertaining to the project(s) contained in the estimate. One cover sheet is printed for each project.

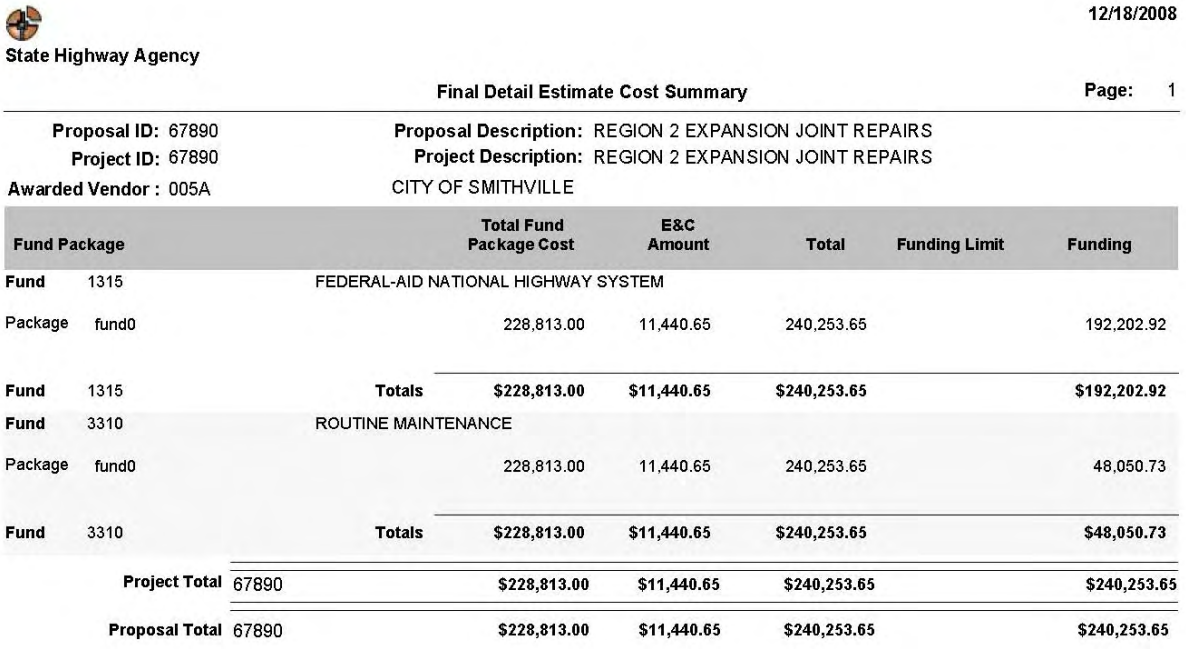
State Highway Agency
Final Detail Cost Estimate

Proposal ID: 67890
Proposal Description: REGION 2 EXPANSION JOINT REPAIRS
Spec Book: 99
Date Printed: 12/18/2008
Federal Project Number: M 67-890
State Project Number:

PROJECT ID	PROJECT DESCRIPTION
67890	REGION 2 EXPANSION JOINT REPAIRS

Detail Estimate Cost Summary

The Detail Estimate Cost Summary presents totals by project number for each funding source. Costs are broken out by direct costs, construction and engineering costs, and total costs. If you set a funding limit when you defined the project/category, limits will be shown.



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State Highway Agency

Final Detail Estimate Cost Summary Page: 1

Proposal ID: 67890 **Proposal Description:** REGION 2 EXPANSION JOINT REPAIRS
Project ID: 67890 **Project Description:** REGION 2 EXPANSION JOINT REPAIRS
Awarded Vendor : 005A CITY OF SMITHVILLE

Fund Package			Total Fund Package Cost	E&C Amount	Total	Funding Limit	Funding
Fund	1315	FEDERAL-AID NATIONAL HIGHWAY SYSTEM					
Package	fund0		228,813.00	11,440.65	240,253.65		192,202.92
Fund	1315	**Totals**	**$228,813.00**	**$11,440.65**	**$240,253.65**		**$192,202.92**
Fund	3310	ROUTINE MAINTENANCE					
Package	fund0		228,813.00	11,440.65	240,253.65		48,050.73
Fund	3310	**Totals**	**$228,813.00**	**$11,440.65**	**$240,253.65**		**$48,050.73**
Project Total	67890		**$228,813.00**	**$11,440.65**	**$240,253.65**		**$240,253.65**
Proposal Total	67890		**$228,813.00**	**$11,440.65**	**$240,253.65**		**$240,253.65**

Detail Cost Estimate

The Detail Cost Estimate includes item quantities, prices, and the total amount for the category for each category of work associated with an estimate. Alternate items not included in the low cost total are flagged.

12/18/2008

State Highway Agency

Final Detail Cost Estimate Page: 1

Proposal ID: 67890 **Proposal Description:** REGION 2 EXPANSION JOINT REPAIRS

Project ID: 67890 **Federal Project Number:** M 67-890 **State Project Number:**

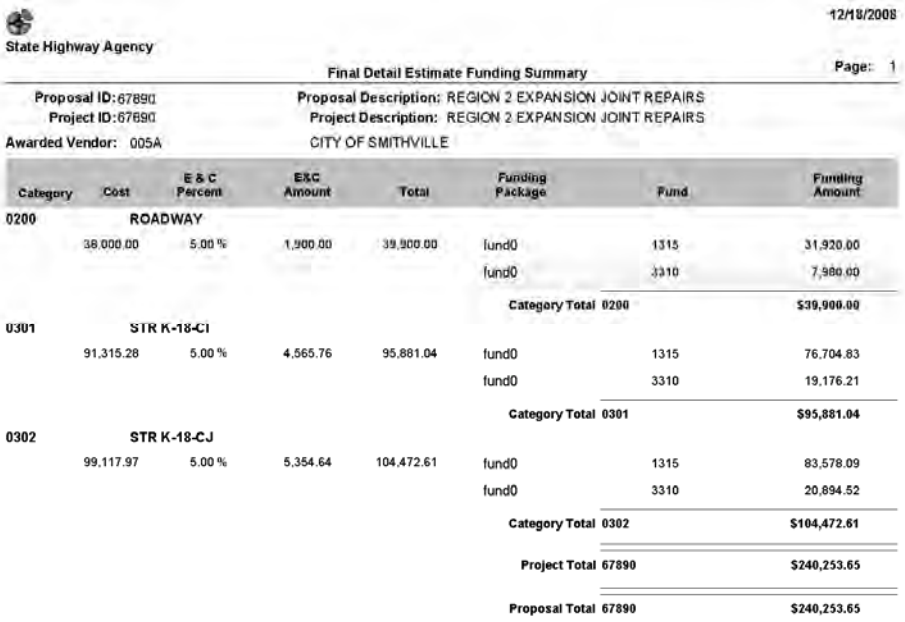
Project Description: REGION 2 EXPANSION JOINT REPAIRS

Line #	Ref. ID	Description	Alt. Set	Alt. Member	Units	Qty	Price	Ext. Amount	Flags*
5	626-00000	MOBILIZATION			LS	1.000	18,000.00000	18,000.00	L B
10	630-10005	Traffic Control			LS	1.000	20,000.00000	20,000.00	L B
15	202-00226	Removal of Asphalt Mat (Special)			SY	181.000	11.02362	1,995.28	L
20	518-01002	Bridge Expansion Device (0-2 Inch)			LF	812.000	110.00000	89,320.00	L
25	202-00226	Removal of Asphalt Mat (Special)			SY	200.000	11.02362	2,204.72	L
30	518-01002	Bridge Expansion Device (0-2 Inch)			LF	878.000	110.00000	96,580.00	L
35	602-00010	Reinforcing Steel (Galvanized)	AA	1	LB	620.000	0.61250	379.75	
40	602-00020	Reinforcing Steel (Epoxy Coated)	AA	2	LB	620.000	0.53750	333.25	L
					Project Total	**67890**		**$228,433.25**	
					Proposal Total	**67890**		**$228,433.25**	

** Flags: (F)ixed Price, (N)on Bid, (L)ow Cost Contributor, (B)id as Lump Sum*

Detail Estimate Funding Summary

The Detail Estimate Funding Summary shows the total dollar amounts for each category of work within a project. The report groups funding sources by category.



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State Highway Agency

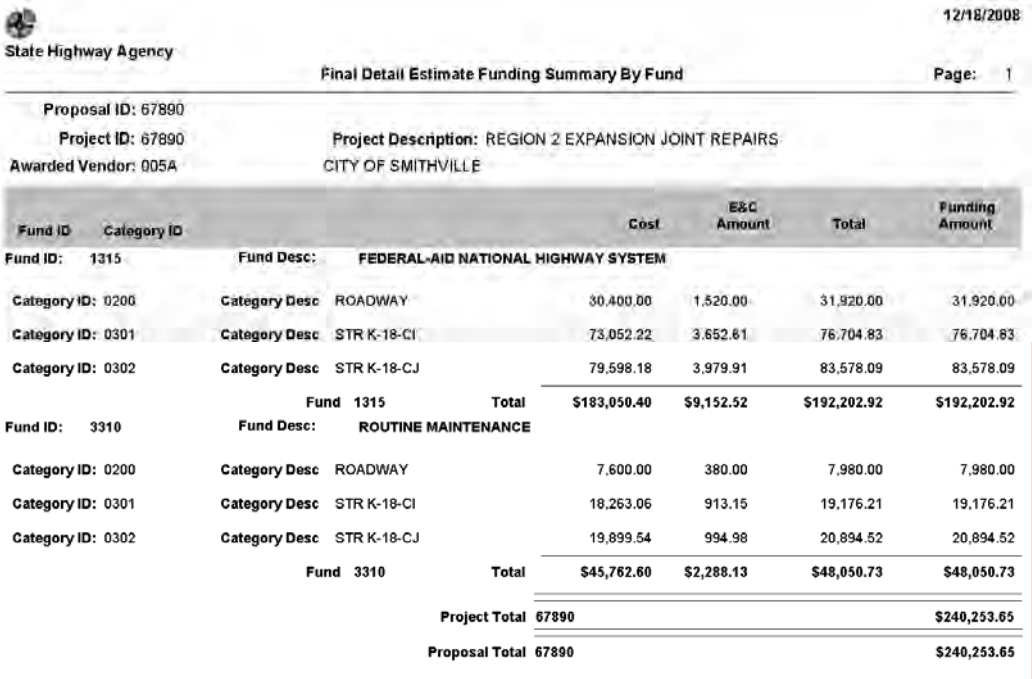
Final Detail Estimate Funding Summary — Page: 1

Proposal ID: 67890 — Proposal Description: REGION 2 EXPANSION JOINT REPAIRS
Project ID: 67890 — Project Description: REGION 2 EXPANSION JOINT REPAIRS
Awarded Vendor: 005A — CITY OF SMITHVILLE

Category	Cost	E & C Percent	E&C Amount	Total	Funding Package	Fund	Funding Amount
0200	ROADWAY						
	38,000.00	5.00 %	1,900.00	39,900.00	fund0	1315	31,920.00
					fund0	3310	7,980.00
					Category Total	0200	$39,900.00
0301	STR K-18-CI						
	91,315.28	5.00 %	4,565.76	95,881.04	fund0	1315	76,704.83
					fund0	3310	19,176.21
					Category Total	0301	$95,881.04
0302	STR K-18-CJ						
	99,117.97	5.00 %	5,354.64	104,472.61	fund0	1315	83,578.09
					fund0	3310	20,894.52
					Category Total	0302	$104,472.61
					Project Total	67890	$240,253.65
					Proposal Total	67890	$240,253.65

Detail Estimate Funding Summary by Fund

The Detail Estimate Funding Summary by Fund shows the total dollar amount allocated to each category of work from each fund for each fund included in the estimate.



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State Highway Agency

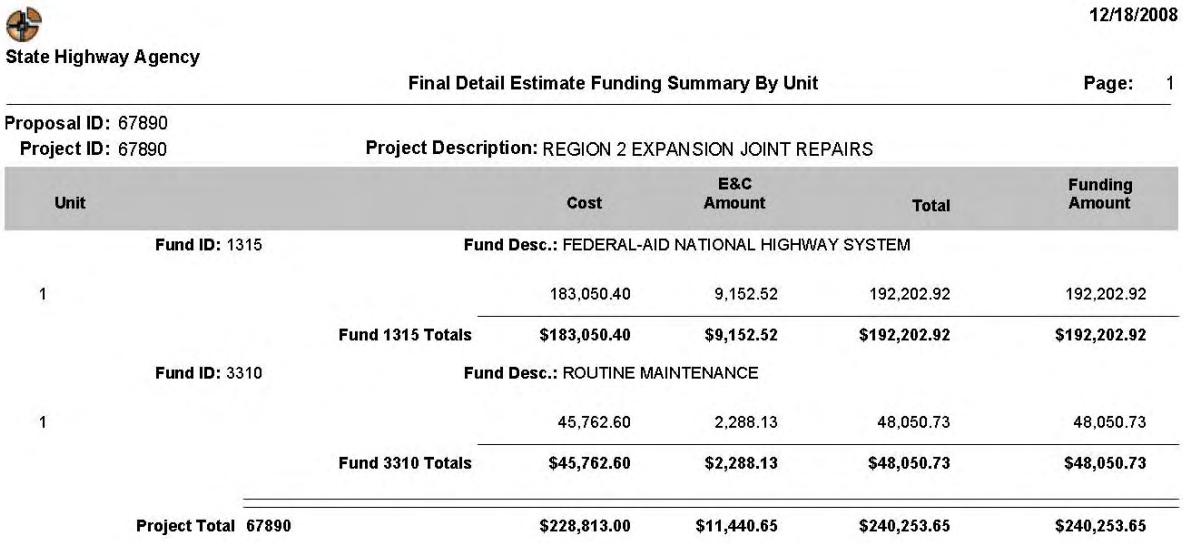
Final Detail Estimate Funding Summary By Fund — Page: 1

Proposal ID: 67890
Project ID: 67890 — Project Description: REGION 2 EXPANSION JOINT REPAIRS
Awarded Vendor: 005A — CITY OF SMITHVILLE

Fund ID	Category ID		Cost	E&C Amount	Total	Funding Amount
Fund ID: 1315	Fund Desc:	FEDERAL-AID NATIONAL HIGHWAY SYSTEM				
Category ID: 0200	Category Desc	ROADWAY	30,400.00	1,520.00	31,920.00	31,920.00
Category ID: 0301	Category Desc	STR K-18-CI	73,052.22	3,652.61	76,704.83	76,704.83
Category ID: 0302	Category Desc	STR K-18-CJ	79,598.18	3,979.91	83,578.09	83,578.09
	Fund	1315 Total	$183,050.40	$9,152.52	$192,202.92	$192,202.92
Fund ID: 3310	Fund Desc:	ROUTINE MAINTENANCE				
Category ID: 0200	Category Desc	ROADWAY	7,600.00	380.00	7,980.00	7,980.00
Category ID: 0301	Category Desc	STR K-18-CI	18,263.06	913.15	19,176.21	19,176.21
Category ID: 0302	Category Desc	STR K-18-CJ	19,899.54	994.98	20,894.52	20,894.52
	Fund	3310 Total	$45,762.60	$2,288.13	$48,050.73	$48,050.73
		Project Total 67890				$240,253.65
		Proposal Total 67890				$240,253.65

Detail Estimate Funding Summary by Unit

The Detail Estimate Funding Summary by Unit is a table with the total dollar amount for each unit of work by funding source for each unit included in the estimate. Unit Numbers provide a way to group categories for reporting.



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State Highway Agency

Final Detail Estimate Funding Summary By Unit Page: 1

Proposal ID: 67890
Project ID: 67890 **Project Description:** REGION 2 EXPANSION JOINT REPAIRS

Unit		Cost	E&C Amount	Total	Funding Amount
Fund ID: 1315	**Fund Desc.:** FEDERAL-AID NATIONAL HIGHWAY SYSTEM				
1		183,050.40	9,152.52	192,202.92	192,202.92
	Fund 1315 Totals	**$183,050.40**	**$9,152.52**	**$192,202.92**	**$192,202.92**
Fund ID: 3310	**Fund Desc.:** ROUTINE MAINTENANCE				
1		45,762.60	2,288.13	48,050.73	48,050.73
	Fund 3310 Totals	**$45,762.60**	**$2,288.13**	**$48,050.73**	**$48,050.73**
Project Total 67890		**$228,813.00**	**$11,440.65**	**$240,253.65**	**$240,253.65**

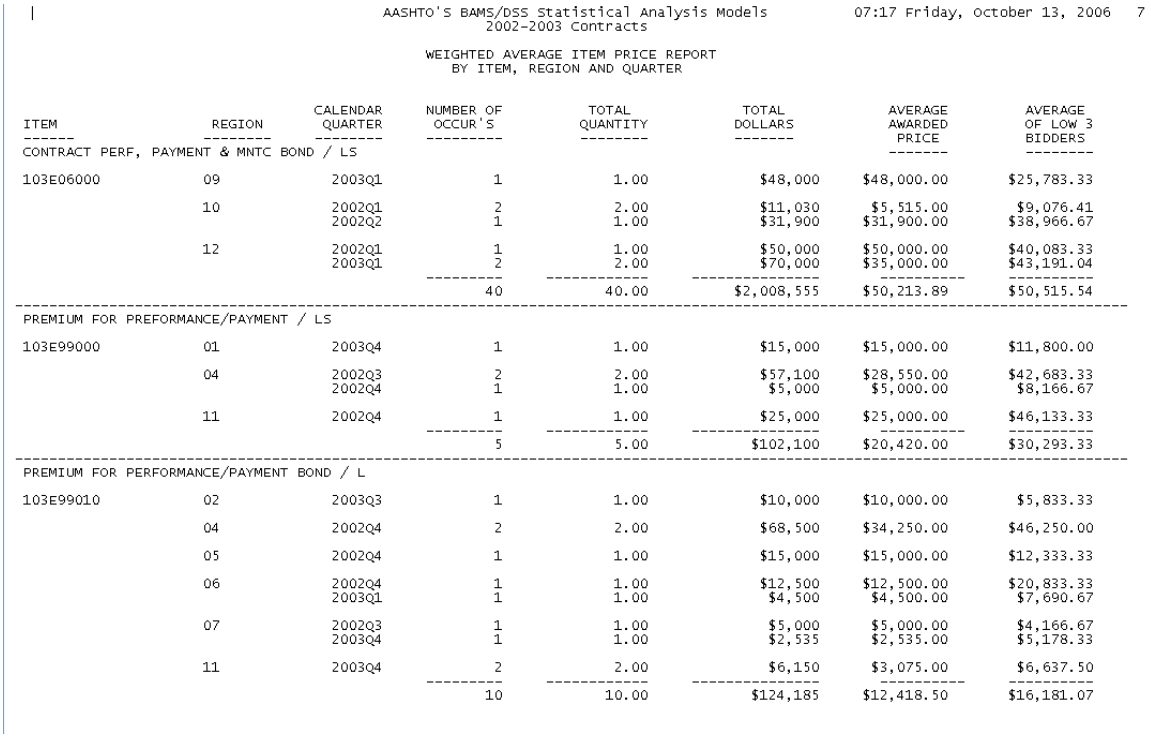
A.3 BAMS/DSS Reports

This section contains a sampling of reports generated by standard Trns•port processes in BAMS/DSS. Each process name is followed by its nickname in parentheses.

A.3.1 Weighted Average Item Price Report

Project Summary Log

The Project Summary Log lists the weighted averages for items across all projects for a selected period.



AASHTO'S BAMS/DSS Statistical Analysis Models 07:17 Friday, October 13, 2006 7
2002-2003 Contracts

WEIGHTED AVERAGE ITEM PRICE REPORT
BY ITEM, REGION AND QUARTER

ITEM	REGION	CALENDAR QUARTER	NUMBER OF OCCUR'S	TOTAL QUANTITY	TOTAL DOLLARS	AVERAGE AWARDED PRICE	AVERAGE OF LOW 3 BIDDERS
CONTRACT PERF, PAYMENT & MNTC BOND / LS							
103E06000	09	2003Q1	1	1.00	$48,000	$48,000.00	$25,783.33
	10	2002Q1	2	2.00	$11,030	$5,515.00	$9,076.41
		2002Q2	1	1.00	$31,900	$31,900.00	$38,966.67
	12	2002Q1	1	1.00	$50,000	$50,000.00	$40,083.33
		2003Q1	2	2.00	$70,000	$35,000.00	$43,191.04
			40	40.00	$2,008,555	$50,213.89	$50,515.54
PREMIUM FOR PREFORMANCE/PAYMENT / LS							
103E99000	01	2003Q4	1	1.00	$15,000	$15,000.00	$11,800.00
	04	2002Q3	2	2.00	$57,100	$28,550.00	$42,683.33
		2002Q4	1	1.00	$5,000	$5,000.00	$8,166.67
	11	2002Q4	1	1.00	$25,000	$25,000.00	$46,133.33
			5	5.00	$102,100	$20,420.00	$30,293.33
PREMIUM FOR PERFORMANCE/PAYMENT BOND / L							
103E99010	02	2003Q3	1	1.00	$10,000	$10,000.00	$5,833.33
	04	2002Q4	2	2.00	$68,500	$34,250.00	$46,250.00
	05	2002Q4	1	1.00	$15,000	$15,000.00	$12,333.33
	06	2002Q4	1	1.00	$12,500	$12,500.00	$20,833.33
		2003Q1	1	1.00	$4,500	$4,500.00	$7,690.67
	07	2002Q3	1	1.00	$5,000	$5,000.00	$4,166.67
		2003Q4	1	1.00	$2,535	$2,535.00	$5,178.33
	11	2003Q4	2	2.00	$6,150	$3,075.00	$6,637.50
			10	10.00	$124,185	$12,418.50	$16,181.07

A.3.2 Weighted Average Item Price for Overlay Projects Report

Project Summary Log

The Project Summary Log lists the weighted averages for items across all overlay projects.

Appendix B. Further Electronic Bidding Details

This appendix includes further details on the deliverables, assumptions, and constraints regarding implementation of the proposed electronic bidding system.

Bid Express® is an online information service for transportation bidding owned and operated by Bidx.com, Inc. (Bidx.com), a wholly-owned subsidiary of Info Tech, Inc. It is a two-way service: publishing bid-related information from state transportation agencies to the contracting community; and allowing online, secure bid submission from the contracting community to the agency. The Bid Express service also offers On-Line Plansheets, Bid Tab Analysis, and a Small Business Network for subcontractors to provide quotes to prime contractors.

The electronic bidding system deliverables are composed of two categories:

- Deliverables related to work performed on or with Expedite electronic bidding software or web Trns•port as part of implementing the proposed electronic bidding system are included in the Deliverables section and are represented in this proposal's cost estimate.
- Deliverables related specifically to work performed on the Bid Express web service or performed exclusively with the Bid Express web service will be provided at no charge to the customer, provided this work is performed as part of the overall Trns•port implementation project described in this requirements analysis document.
- Planned requirements were gathered from the Bid Express Implementation questionnaire and are listed in Section B.4.

B.1 Deliverables

The implementation of the generic Internet bidding services will include the following deliverables:

- One three-day on-site visit for the ConnDOT electronic bidding software installation, staff training, and pilot contractor training. The tentative timeframe for the first three-day visit is September 2009.
- One three-day on-site visit specifically for ConnDOT contractor training. Two classes per day up to six classes maximum. The tentative timeframe for the second three-day visit is February 2010.
- Set up of the standard data extraction templates in web Trns•port Preconstruction for exporting vendor, planholder, bid tabs, and other relevant information to the Bid Express service.
- ConnDOT staff support in the use of the Bid Express service's Agency Administrators facility.
- Configuration of Expedite Bid files to minimum ConnDOT legal requirements.
- Customer support for up to 20 ConnDOT-approved bidders to participate in four two-way Internet test lettings and four two-way Internet parallel lettings, for testing electronic bidding related web Trns•port and Expedite configurations.
- Technical support for the electronic bidding service via telephone and email (customer.support@bidx.com) for ConnDOT staff and pilot contractors for the Trns•port implementation project's duration. Telephone and email support continues through the life of production usage.

B.2 No Charge Deliverables

This section includes deliverables specific to exclusive Bid Express implementation activities performed at no charge to ConnDOT as part of the overall Trns•port implementation project.

- The set-up of a ConnDOT generic Bid Express service web portal capable of interfacing with Trns•port Expedite and other appropriate Trns•port modules for Internet Bid Submission. This generic version will include an active digital plan room area.
- Installation of the web portal access software Bid Express Retrieval Console (BERC) for downloading bids on two to five workstations accessible by the designated ConnDOT Bid Express Administrator(s) and training of the ConnDOT Bid Express administrator(s) in its use.

- Activating three Bid Express service Administrator accounts and three Bid Express service Basic User accounts for ConnDOT staff to use during and after testing the electronic bidding system's interaction with Expedite and web Trns•port.
- Bid Express service digital IDs and customer support for up to 20 ConnDOT-approved bidders participating in testing.

B.2.1 ConnDOT Electronic Bidding Administrator Training

Training Type	ConnDOT Electronic Bidding Administrator Training
Number of Days	2 ½ days during the 3 day Info Tech on-site installation visit
Number of Instructors	2
Number of Students	2 – 5
Description	The purpose of this class will be to train the ConnDOT electronic bidding administrators in the following areas: ▪ Overview of Expedite and Bid Express two-way bidding ▪ Use of Bid Express Retrieval Console (BERC) for downloading bids ▪ Interfaces with web Trns•port Preconstruction for exporting vendor, planholder, bid tabs, etc. ▪ Use of the Bid Express Agency Administrators facility ▪ Use of the Digital Plan Room ▪ Use of the Small Business Network (SBN) ▪ Common question resolution, troubleshooting, and Info Tech support techniques

Table B-1. Electronic Bidding ConnDOT Administrator Training

B.3 Assumptions and Constraints

The electronic bidding system implementation services described above are based upon the following assumptions and constraints:

- ConnDOT will use either Trns•port Expedite release 5.6b or a later release.
- ConnDOT will license Trns•port Expedite and web Trns•port Preconstruction and will be able to operate with the Bid Express service in the non-customized, generic default configuration.
- After the pilot implementation phase is complete, ConnDOT will enter into a service and license agreement for the Bid Express service with Bidx.com, Inc. (Bidx.com), provide a written production Notice to Proceed to Bidx.com, and go into production with Bid Express two-way on-line bidding in or before May 2010.

- At the completion of the pilot implementation or May 2010, whichever comes first, all Bid Express service pilot accounts and digital IDs will be deactivated.

- Bidx.com will charge its standard fees to contractors who subscribe to the service. A current fee schedule can also be found at this web site: http://www.bidx.com/main/info/agreement/fees.html.

- Info Tech will not charge ConnDOT any license or other fees for the production use of the Bid Express service. Info Tech's recovery of the costs to operate, maintain, and support the Bid Express services are dependent on subscription fees. These two conditions are contingent upon ConnDOT's designation of the Bid Express service as the sole entity through which internet bids may be submitted to ConnDOT for highway construction bidding.

- ConnDOT agrees to help Info Tech inform Connecticut bidders about the Bid Express service including handing out informational fliers about the service and posting a link to the Bid Express service's web portal from the ConnDOT State web site.

- ConnDOT will be required to provide its own primary and backup Internet access. The back up Internet access is required should ConnDOT's primary means of Internet access become unavailable. We recommend that ConnDOT procure a dial-up local or regional Internet Service Provider (ISP) as a backup.

- Should ConnDOT find that additional customizations, training sessions, or other customer support services are required, the cost for the additional customizations, training sessions, and customer support services will be provided by Info Tech under a separate proposal.

- All software and templates related to the electronic bidding service provided to ConnDOT by Info Tech are the sole property of Info Tech, Inc., and Bidx.com, Inc. This includes software and templates either installed on ConnDOT computers or accessed by ConnDOT through a web service as required to set up and run the Bid Express service and to produce input and output files to and from the Bid Express service web portal. In addition, the software and templates cannot be used by any other entity or for any other purpose without written consent and approval from Info Tech and Bidx.com.

B.4 Planned Requirements for Bid Express

The following planned requirements have been gathered from the Connecticut Bid Express Implementation Questionnaire.

B.4.1 Expedite Customizations

The following requirements are needed for Expedite Customizations.

1. A DBE commitment form.
2. A way to handle miscellaneous information like certifications and federal or state compliance information. This nay also include the Part B form, Buy America Cert, Demolition of Structures, SSPC QP1 & QP2 Cert, Non-Collusion Affidavit, Bid Proposal Submission Qualification Affidavit Part C, Consulting Agreement Affidavit, and Affirmation of Receipt of State Ethics Laws Summary.
3. A customize gen.cfg file for bid bond verification.

B.4.2 Bid Express Files

According to the BidX Questionnaire, Connecticut will post the following files to Bid Express:

Letting Schedule (Advertisement Dates) in PDF format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Advertisement (Notice to Contractors) in PDF format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Item List (i.e. Expedite EBS files) in EBS format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Proposal Documents in PDF format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
EBS Amendments (i.e. Expedite amendment files) in EBS amendment format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Proposal Amendments in PDF format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Amendment Transmittal Letters in PDF format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.

Eligible Bidders List in PDF or HTML format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Plan Holders List in PDF or HTML format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Bid Tabulations in PDF or HTML format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Bid Summary in PDF or HTML format	Bidx.com will create and provide a file upload area where the agency can upload the file(s) created.
Plansheets in PDF format	Bidx.com will provide a file upload area where the agency can upload the file(s) created. The agency will upload a multipage PDF file on a proposal by proposal basis.

B.5 Bid Express Internet Bidding Service Security

The Bid Express Internet bidding service has been in operation for over ten years, with better than 99.95 percent uptime. The Bid Express servers are connected to battery backup, and the battery systems are connected to a generator backup. All Bid Express servers are paired, with each server monitoring the other and automatically taking over should there be a problem. Bid Express has installed servers in a separate geographical location, using a separate Internet provider, for even greater redundancy. Bid Express servers utilize a DMZ screening firewall as well as a host-based firewall along with OSSEC intrusion detection software and an out-of-band log monitoring system.

Expedite and Bid Express use PGP™ (Pretty Good Privacy), public/private Key Pair technology, which is used throughout the world for encrypting and digitally signing documents. The Key Type is 1024/1024 Diffie-Hellman/DSS KeyPair (PGP nomenclature). Bid Express uses 1024 DSA Key for Encryption / 1024 ElGamal (Diffie-Hellman) Subkey for Signing. Symmetric Algorithm is CAST with a 128 bit key. Cryptographic hashes provided using the Secure Hash Algorithm (SHA). Data is compressed prior to the encryption step with zip compatible compression.

The components of the Bid Express Platform, namely, its supporting infrastructure, the governing policies, processes, and procedures, have been certified under the VeriSign® Security Certification Program as of February 29, 2008. A copy of the certification letter is at http://www.bidx.com/main/BidX_Certification_Letter_022908.pdf.

The Bid Express system is accessed through two types of accounts: individual User accounts, used by contractors and other interested parties (including agency users), and Administrator accounts, used only by state highway agencies' designated administrators.

B.5.1 User Accounts

User accounts are created to assist with Bid Express' subscription based model. User accounts can limit user access to various features of the service, including Digital IDs for Internet bid submission.

The Bid Express service checks the user's account/password pair against the database and determines if they are a valid account holder. Users can modify which features they want by clicking on their MyBidX page after they've logged in.

Users with a Digital ID can submit bids electronically through the Bid Express online bidding service. Bids are encrypted and stored on the Bid Express servers and cannot be read by anyone until ConnDOT downloads the bids at the time of the bid letting. Bidders have the option of withdrawing or replacing their electronic bids up until the time of the letting.

B.5.2 Agency Administrator Account

During the implementation phase of Bid Express, the Info Tech team will work with ConnDOT to define agency administrators for electronic bidding using the Bid Express service. Once the administrator(s) have been identified, the Bid Express team will set up administrative access to ConnDOT's Bid Express website and to the Bid Express Retrieval Console (BERC) for retrieving electronic bids.

Appendix C. Understanding Platform Certification Classifications

The Trns•port Task Force (TTF) has adopted a policy for a client/server platform that includes classifications of certified, supported, validated, and unsupported platforms.

C.1 Certified Platform

A certified platform is a computing environment essentially identical to one used by the Trns•port contractor for release testing. The exact specifications for certified platforms will be published on the contractor's support Web site. The Trns•port community can expect the following of a certified platform:

- The current release of Trns•port has been thoroughly tested against the platform.
- The Trns•port contractor has the platform on site.
- The goal is to have at least one certified version of the platform unless the platform as a whole is being downgraded in classification.
- States using the platform will be fully supported.

Note: Although the certified designation does not apply to the SiteManager system, SiteManager is supported on the same platforms that are certified for the other Trns•port client/server systems.

C.2 Supported Platform

A supported platform is a computing environment that does not meet the rigorous specifications of a certified platform, but which is quite close to such a platform. The

Trns•port Task Force makes the determination of what is "quite close." The Trns•port contractor will publish specifications of supported platforms on its Web site and will advise potential licensees as to whether their intended platform meets those specifications. The TTF determines supported platforms on a case-by-case basis.

The Trns•port community can expect these statements to be true of a supported platform:

- The platform is similar enough to one of the certified platforms to be reasonably confident that Trns•port will operate on it.
- The current release of Trns•port was not tested against the platform.
- The Trns•port contractor may not have the platform on site.
- States using the platform will be fully supported. On-site trips or remote connection may be required for some issue diagnoses.

C.3 Validated Platform

A validated platform is a computing environment on which a state pays to have standardized tests performed on a one-time basis. This testing is less rigorous than the tests performed during the certification process and does not change the support status of the platform.

C.4 Unsupported Platform

An unsupported platform is any computing environment, not covered by any of the above classifications of certified, supported, or validated, that a state believes should be able to run the Trns•port client/server application.

> ! **Warning**: States electing to use validated and unsupported platforms assume the responsibility for providing support for those platforms.

Appendix D. Trns•port Platform Component Status by Year

Table D-1 shows the classification schedule of each Trns•port platform through the 2004-2008 AASHTO fiscal years.

Platform Component	2005–2006 Fiscal Year		2006–2007 Fiscal Year		2007–2008 Fiscal Year	
	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4	Q1/Q2	Q3/Q4
Clients (Including BAMS/DSS 6.x Standalone, Estimator 2.x, Expedite 5.x, FieldManager, SAPW, and SiteXchange 1.x)						
Windows 2000	Supported					
Windows XP	Supported					
SitePad, FieldPad						
Palm OS 4 on Palm 500-series devices (SitePad only)	Supported		Unsupported after 06/30/2006			
Pocket PC 2002	Supported		Unsupported after 06/30/2006			
Windows Mobile 2003 for Pocket PC	Supported				To be determined	
Windows Mobile 5.0			Supported			
Middle-Tier Servers						
32-bit Windows 2000	Supported					
32-bit Windows Server 2003	Supported					
Oracle Database Servers						
8i on 32-bit Windows 2000	Supported		Unsupported after 06/30/2006			
8i on Alpha OpenVMS 7	Supported		Unsupported after 06/30/2006			
8i on Sun Solaris 8	Supported		Unsupported after 06/30/2006			
8i on HPUX	Supported		Unsupported after 06/30/2006			
9i on 32-bit Windows 2000	Supported					
9i on 32-bit Win Server 2003	Supported					
9i on Alpha OpenVMS 7	Supported					
9i on Sun Solaris 8	Supported					
9i on HPUX	Supported					
10g on 32-bit Windows 2000			Supported			
10g on 32-bit Win Server 2003			Supported			
10g on Alpha OpenVMS 7			Supported			
10g on Sun Solaris 8			Supported			
10g on HPUX			Supported			
DB2 Database Servers						
7.2 on 32-bit Windows 2000	Supported		Unsupported after 06/30/2006			
8 on 32-bit Windows 2000	Supported					
8 on 32-bit Win Server 2003	Supported					
Sybase Adaptive Server Database Servers						
12.5 on 32-bit Windows 2000	Supported				Unsupported after 06/30/2007	
12.5 on 32-bit Win Server 2003	Supported				Unsupported after 06/30/2007	
12.5 on Alpha UNIX 4	Supported				Unsupported after 06/30/2007	
Sybase SQL Anywhere Database (BAMS/DSS Simulated Import, FieldManager, SiteManager and SAPW)						
8	Supported				To be determined	
9					To be determined	
MySQL Database Servers (BAMS/DSS Only)						
3 on 32-bit Windows 2000	Supported					
3 on 32-bit Win Server 2003	Supported				To be determined	
4 on 32-bit Win Server 2003					To be determined	

Notes:
Trns•port Intranet is supported on Oracle databases only.
FieldManager is supported on Oracle 9i and Sybase SQL Anywhere 8 databases only.

Table D-1. Classification Schedule of Trns•port Platforms