

**COMPENDIUM OF BEST PRACTICES FOR INCORPORATING  
ENVIRONMENTAL COMMITMENTS INTO TRANSPORTATION  
CONSTRUCTION AND MAINTENANCE CONTRACT  
DOCUMENTS**

*Requested by:*

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and Transportation Officials (AASHTO)

Standing Committee on the Environment

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## List of Acronyms

A&E	Architectural and Engineering
AREE	Area Roadside Environmental Engineer
BLM	Bureau of Land Management
BMP	Best Management Practices
CAP	Communicating All Promises
CE	Categorical Exclusion
CEDAR	Comprehensive Environmental Data and Reporting System
CFR	Code of Federal Regulations
CTS	Commitment Tracking System
DEC	District Environmental Coordinators
DENR	Department of Environmental and Natural Resources
DEP	Department of Environmental Protection
DOT	Department of Transportation
EA	Environmental Assessment
ECAP	Environmental Compliance Assurance Procedure
ECM	Environmental Compliance Meeting
ECN	Environmental Compliance Note
ECR	Environmental Commitment Record
ECS	Environmental Classification Summary
ECTS	Environmental Commitment Tracking System
EDB	Environmental Data Base
EIS	Environmental Impact Statement
EMS	Environmental Management Systems
EPS	Environmental Performance Standards
EPSC	Erosion Prevention and Sediment Control
ERS	Environmental Review Summary
ETAT	Environmental Technical Advisory Team

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ETDM	Efficient Transportation Decision Making
ETS	Environmental Tracking System
FHWA	Federal Highway Administration
FLH	Federal Lands Highways
FONSI	Finding of No Significant Impact
GIS	Geographic Information Systems
GSP	General Special Provisions
HQ	Headquarters
ICA	Immediate Corrective Action
ICC	Inter-County Connector
IR	Imposed Restrictions
NEPA	National Environmental Policy Act
NOV	Notice of Violation
NPDES	National Pollutant Discharge Elimination System
OBDP	Oregon Bridge Delivery Partners
PE	Project Engineer
PEAR	Preliminary Environmental Analysis Report
PM	Project Manager
PPMS	Preconstruction Project Management System
PS&E	Plans, Specifications, and Estimate
ReTRAC	Reno Transportation Rail Access Corridor
ROD	Record of Decision
ROW	Right-of-Way
RUMS	Right-of-Way and Utilities Management System
RWI	Right of Way Inventory
SAFETEA-LU	Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users
SEWPCP	Sediment and Erosion Water Pollution Control Plan
STEVE	Standard Tracking and Exchange Vehicle for Environmental
STIP	Statewide Transportation Improvement Plan



TESC	Temporary Erosion and Sediment Control
USACE	U.S. Army Corps of Engineers
WBS	Work Breakdown Structure

# 1 Understanding the Problem

## 1.1 Environmental Commitments in DOT Work

Environmental commitments made by Departments of Transportation (DOT) arise from public and agency scoping meetings, inter-agency agreements, commitments made to avoid, minimize or mitigate impacts, and many other sources. Commitments may be voluntary or they may be a condition of a permit or other regulatory approval. Typically, environmental commitments are documented in the National Environmental Policy Act (NEPA) document – the Record of Decision (ROD), the Finding of No Significant Impact (FONSI) or a Categorical Exclusion (CE), -- memoranda of understanding/memoranda of agreement, and permits issued by federal and state regulatory and resource agencies as products of their environmental reviews and approvals that occur during project planning and design. The project manager (PM) or project engineer (PE) may make additional commitments, environmental and otherwise, as the project progresses. Such commitments may arise in meetings after the NEPA process is complete or in discussions with landowners or other stakeholders post-NEPA and may only be captured in trip notes or a PM's memory. The DOT then needs to integrate the commitments into project design plans and construction contract documents to ensure the commitments are implemented during construction and maintained in the long-term.

Figure 1 shows an example of the overall project development process related to environmental commitments, identifying activities related to environmental commitments in planning, project development and design, construction, and maintenance.

DOTs have found that incorporating commitments into the contractual documents is one of the best ways to ensure performance of environmental commitments. Many commitments are executed through incorporation of environmental elements in the design and construction of projects. Provisions for implementing the environmental commitments are usually incorporated into the project construction plans developed in the design phase.

Through the design plans, project specifications, and special provisions, commitments and permit requirements later become part of the contract documents for construction of the project.

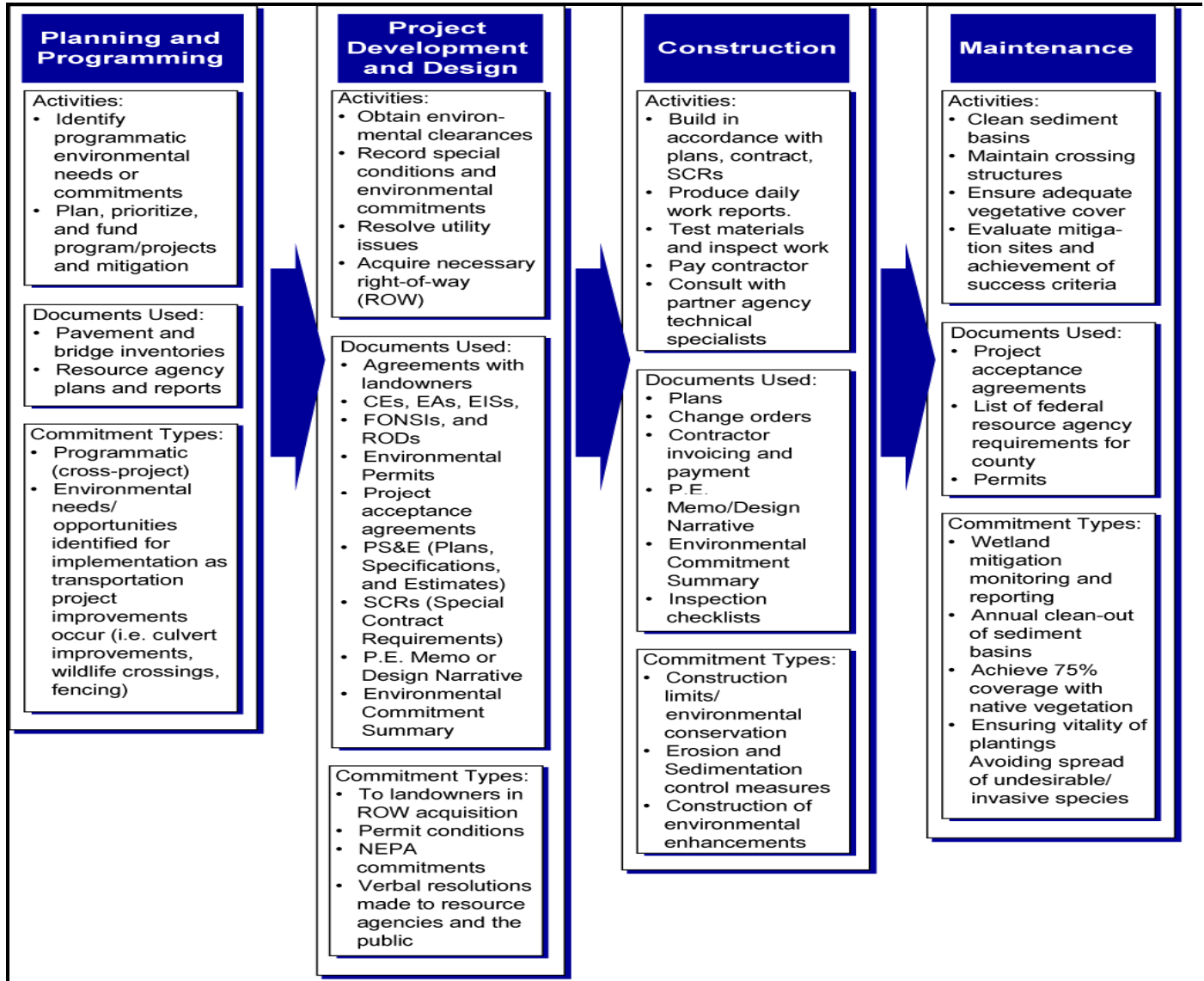
In some cases, the environmental elements pertain to permanent environmental mitigation features such as a wildlife crossing, a wetland mitigation site, permanent best management practices (BMPs) for erosion and sedimentation control, a cultural resources marker, or protection of a roadside area with rare plants. Relatively permanent features require continued execution of environmental commitments—special activities or regular activities undertaken with special precautions and environmental sensitivity during maintenance. Such cases are covered by NCHRP project 25-25(51) -

### **What are Environmental Commitments?**

Environmental commitments may include both ecological and social commitments. Commitments range from such things as pollution control measures and construction timing to avoid smothering spawning fish with sediment-laden runoff, construction of sound barriers to reduce noise in neighborhoods, avoidance of endangered species and their habitat, provision of suitable housing for displaced residents, treatment of cultural resources on the construction site and many others.

Environmental Asset Management. This project, NCHRP project 25-25(47), focuses on how the majority of environmental commitments are incorporated into construction and maintenance contract documents.

Figure 1: Overall Process Diagram



Source: ICF International, 2006

### The Consequences of Failure

The processes by which DOTs ensure they fulfill their environmental commitments are extremely important; breakdowns in these processes can produce notable negative results. Compliance with environmental commitments is a legal requirement that must be met and the consequence of non-compliance can be severe. Failure to implement environmental commitments can jeopardize the availability of federal funding as well as be grounds for not authorizing federal-aid construction funds for a project. In addition, violations can lead to financial penalties and litigation. Violations become stories of “how

things really are,” and public and interagency skepticism hinder ensuing projects and negotiations. When transportation agencies fail to implement environmental commitments they face increased regulatory burdens, project delays, and loss of regulatory and resource agency and public trust, in turn affecting the agency’s ability to deliver the transportation program or individual projects in a cost-effective and timely manner. It may take years for agencies to recover from an instance of lost trust.

## 1.2 Study Methodology

The methodology for NCHRP 25-25(47) was designed to generate a thorough understanding of how environmental commitments are being incorporated into construction contract documents and/or how such commitments can be incorporated and their performance evaluated.

The project began with a kick-off call in July 2008, with the project panel, including current and former state DOT environmental staff and the Federal Highway Administration (FHWA) personnel experienced with these issues. The panel agreed on some of the problems with existing systems; i.e. that even those tracking methods in place are not necessarily ensuring that *all* commitments are met (environmental vs. non-environmental, regulatory vs. non-regulatory, those the PM feels need to be tracked vs. a complete set approach). Thresholds or systems DOTs use to track and monitor commitments to ensure *full* implementation are rare, outside of erosion and sedimentation control compliance procedures in some lead states and wetland construction and monitoring for permit compliance. Finally, DOTs are in need of better, more reliable systems to facilitate two-way communication with Construction and Maintenance on design changes and the implications of those changes.

To begin, the team conducted a review of what has been learned on the topic to date, including a literature review and discussions with practice leaders. In 2008, we formed and initiated coordination with a group of DOT specialists and managers with the most familiarity with environmental commitment tracking systems at DOTs. We introduced them to the study and had discussions on the best way to gather input from contracting and construction staff on this topic. This feedback pointed us back to DOT environmental managers, which aligned with feedback from the panel.

Finally, we solicited the Panel’s input on survey questions the best approach for obtaining input from the DOT construction and procurement offices. The Panel approved a short survey that was sent to all 50 State DOTs, Washington DC, and Puerto Rico, designed to get a better understanding of what DOTs are doing to ensure environmental commitments are tracked through project development and incorporated into construction contracts for follow-through in construction and maintenance. The survey is attached in Appendix A and the list of contacts is in Appendix B.

## Literature Review

### Evaluation of Environmental Mitigation Measures, August 1993

The FHWA Office of Program Review evaluated environmental mitigation measures as part of the larger issue of mitigation. FHWA, state, and resource agency representatives were interviewed and site visits were conducted in seven states. Several recommendations were made regarding methods to monitor and ensure the implementation of commitments including 1) development of a model follow-up

procedure by Headquarters (HQ); 2) use of Mitigation Summary sheets in NEPA documents; and 3) inclusion of environmental mitigation in Stewardship Agreements.

### [Domestic Scan: Environmental Commitment Implementation, 2002<sup>1</sup>](#)

In the fall of 2002, a domestic scan tour, sponsored by the FHWA Office of Project Development and Environmental Review, focused on successful practices and procedures for following through on environmental commitments during and after the NEPA process. FHWA, state, resource agency, and consultant representatives conducted site visits in seven states. The report identified several best management practices and recommended approaches to effectively implement environmental commitments including: 1) adopting an environmental ethic at all levels of the agency; 2) cradle-to-grave communication; 3) environmental education and training; 4) strong stakeholder relationships; and 5) sharing successful practices.

### [FLH Environmental Commitment Tracking Assessment and Benchmarking, 2006<sup>2</sup>](#)

In 2006, to more reliably assure and document Federal Lands Highways (FLH) adherence to environmental commitments, FLH undertook a cross-divisional exploration of agency environmental commitment tracking needs as well as benchmarked against lead state DOT systems. A review of state practices in Illinois, Kentucky, New York, Texas and Washington State, found that most used Excel spreadsheets to track permits and commitments but they were not consistent and comprehensive for all types of projects.

Initially, FLH planned to implement a stand-alone environmental commitments tracking system that could be used by all Divisions but, considering each of the FLH divisions' recent investments in different project management systems, FLH decided to take an individual division approach, where each would add environmental commitment tracking functionality into their project management systems. All Divisions are now moving to web-based systems that will provide multiple features for tracking environmental commitments. FLH's development of upgraded tracking systems will lead to increased integration of environmental practices in the planning, construction, and maintenance of highway and other transportation projects as well as better management of tracking commitments.

### [FHWA 2007 National Review Program](#)

In late 2007, FHWA contracted for a review of environmental commitment systems in six states as part of their National Performance Review. This review profiled Kentucky, Maryland, Texas, Virginia, Vermont, and Washington. The review covered the vision and key objectives of the system, technology, who had access to the system and/or how that access was controlled, business process including an overview of process and system operations, issues, obstacles or limitations, successes, lessons learned and next steps.

### [WSDOT's Assessment of Best Practices of Incorporating Environmental Commitments into Contracts<sup>3</sup>](#)

In 2007, WSDOT conducted a statewide evaluation of how the various Regions incorporate environmental commitments into contract documents. The Headquarters Construction Office and Environmental Services jointly reviewed contract documents, environmental permits and other documentation to identify whether and how environmental commitments were included in the contracts and they conducted multi-

disciplinary staff interviews to identify best practices. The study found three regions had very unique processes that went beyond the typical baseline practices. The processes and recommendations from the study are discussed throughout this report.

### **Arizona Inter-Agency Review of Commitment Tracking and Compliance<sup>4</sup>**

In 2008, the Arizona Division of the FHWA, U.S Army Corps of Engineers (USACE), Bureau of Land Management (BLM), and the Arizona Department of Transportation (ADOT) participated in a review of existing processes to evaluate the extent to which environmental commitments made in NEPA documents were tracked and implemented for transportation projects in Arizona. The survey included interviews with DOT environmental planners, project managers, district engineers and site visits to get an understanding of AZDOT's commitment tracking process and made recommendations for improvements. The results of this review are discussed in Chapter 2 of this report.

### ***Multi-disciplinary Review Team***

Finally, we asked a number of practitioner representatives from AASHTO's Standing Committee on the Environment and Construction and Design Subcommittees, as well as our review team of experts from states with leading commitment tracking systems to review this report. Their recommendations have been incorporated into this final report.

## 2 Commitments through the Life of a Project: When Do Data Transfer and Communication Occur or Need to Occur?

### 2.1 Planning and Programming

Increasingly, both transportation and resource agencies are identifying and incorporating environmental opportunities at the project planning level. While most DOTs and partner agencies are not yet generating project-specific environmental commitments in the planning stage, environmental commitments made on a larger scale or “programmatic” basis may be applied later to each project within a certain geographic region. Identification and tracking of environmental commitments in the planning stage is increasing with implementation of integrated NEPA and planning processes and the federal transportation act Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) requirements (Public Law 109-59).

**Planning** – SAFETEA-LU now requires the long-range transportation plans be developed in consultation with state, tribal and local agencies responsible for land-use management, natural resources, conservation, environmental protection, and historic preservation. The long-range plan must also include a discussion of potential environmental mitigation activities and potential areas to carry out these activities. Inter-agency discussions lead to idea sharing on environmental needs and opportunities best addressed in the planning process. Other disciplines such as survey, environmental, and design engineering contribute by helping to assess the size and complexity of the proposed project and larger scale mitigation considered during planning.

**Programming** – Programming a project occurs prior to preliminary engineering, for purchase of right of way and/or for construction. In programming, projects are matched with funds available for a specific fiscal year. It also includes allocating specific funds to specific projects, which may include funding for larger scale mitigation or the environmental commitments identified at the planning level.

In the very early stages of project planning and programming, environmental commitments are likely to be very general or loosely defined. Without a formal commitment tracking system, these commitments can easily become lost over the long span of time it typically takes for a project to move from planning through design, construction and maintenance. There are many handoffs of a project during that time and unless there is a tracking system in place that is not dependant on a specific individual to follow through from cradle to grave, the commitments are subject to loss due to staff turnover at both the DOT and the resource agencies, memory loss, misplaced files and changes in politics, to name a few.

### 2.2 Project Development, Design and Contracting

Project development is the process of designing a specific project and performing all supporting activities required in order to begin actual construction. These supporting activities can include obtaining environmental clearances, recording the special

conditions and environmental commitments accepted by the DOT as part of those clearances, resolving utilities issues, and acquiring the necessary right-of-way (ROW).

Project development is the phase at which DOTs typically start to create a list of commitments such as those made to landowners during ROW acquisition, socio-economic commitments, and commitments to resource agencies to minimize potential impacts to the natural environment. Some commitments may require follow-through to maintenance and require more explicit transfer to and acceptance by the owner agency. For example, the DOT may require the local agency to maintain a bike trail constructed as part of a local agency project. Currently, DOTs use a general project acceptance agreement for this purpose.

**Project development is the phase at which DOTs typically start to create a list of commitments** to minimize impacts to the environment, to landowners during ROW acquisition, or socio-economic accommodations or enhancements. Some commitments may require follow-through to maintenance and require more explicit transfer to and acceptance by the owner agency. For example, the DOT may require the local agency to maintain a bike trail constructed as part of a local agency project.

The number of commitments generated varies with the environmental complexity of the project, as reflected in the level of NEPA documentation. Though environmental impact statements (EIS) projects are less than 10% of all DOT projects, they regularly contain hundreds of commitments. The CEs that comprise most of DOTs' work may contain only a small number of commitments, perhaps 10 to 20. Tracking of environmental commitments from CEs is often more ambiguous than tracking of other commitments; the two to four page CE document contains any requirements or restrictions, but communication systems for transferring such commitments to construction and maintenance are usually less robust.

For EISs and environmental assessments (EA), approximately 30% design is typically needed to support the development of environmental documentation and the NEPA decision on a preferred alternative. As the project moves through final design, environmental commitments may be refined; however, if too much time passes between preliminary design and final design, it becomes more difficult to track commitments unless there is a specific commitment tracking process in place. Environmental staff typically aim to be involved throughout then design and review of final design plan and any changes to those plans. A cross-functional team directed by a PM and supported by technical disciplines such as design, environment, ROW, geotechnical, hydraulics, survey, and construction carry out project development activities. When applicable, the design team also works closely with environmental staff to assure that the design meets its specific needs, including environmental factors and limitations.

Environmental specialists, project managers, and contractors for permit coordination help ensure that permits are complete and in hand prior to the project advertisement date to ensure commitments are included in the contract. Environmental offices often use a status spreadsheet to record permits and required consultations. Individual environmental or project specialists might begin keeping lists of individual commitments and compliance items. Commitments tracked in such ways rely on individuals to contact the appropriate people later in the process and transfer commitments forward to the appropriate parties: consultants, design engineers, project managers, construction



managers, contract writers, and contractors. A small but growing number of DOTs keep the commitments in an electronic tracking system so all the environmental commitments on a project are located in one place.

The lead designer is generally responsible for delivering the plans, specifications and estimate (PS&E) package and making sure all environmental commitments, particularly from the NEPA document, are included. In some states, environmental staff may work with design staff to draft a narrative to highlight environmental and other major issues and design aspects of which the PE should be aware. This can assist the PE in identifying all the commitments made throughout the planning and environmental clearance process. However, the design staff, due to busy schedules, may overlook these documents. When design plans are 95% complete, environmental staff, technical services, estimators, maintenance and construction staff may review the package to confirm the final design accurately incorporates all environmental commitments.

The product of these efforts is the plans and specifications package, including a detailed engineer's estimate of the cost to complete construction, with adequate funding and line items to fulfill noted environmental commitments. The PS&E package is the primary input to the project letting and award process for procuring the construction contract to build the project. Incorporating environmental commitments into the contract provisions informs the construction contractor of the commitments and their responsibility to implement them.

In many cases, DOTs do not track performance of environmental commitments beyond the inclusion of permits and other commitments in the contract documents. After project award, the construction engineer and the contractor are responsible for tracking environmental commitments and ensuring they are completed. Environmental staff may not be notified when permit or other environmental commitments are completed or when scope changes require new or revised mitigation. It is typically up to the construction engineer to contact environment staff to ask questions.

Given limited staff and increasing workloads, DOTs are contracting more design to outside architectural and engineering (A&E) firms. This has changed the nature of the responsibilities carried out by DOT staff from actual development of project designs to management and review of the designs produced by others, including tracking and oversight of environmental commitments from their incorporation in design to implementation during and after construction. Environmental staff try to pull this information out on projects, even CEs, to make sure the contractor is aware, but there is little feedback ensuring commitments are kept.

## 2.3 Contract Consistency

Many states are finding that making an effort to develop and use consistent, clear, easy to understand language without technical jargon in the contract documents not only saves the specialists time because they don't have to reinvent the wheel with every project, but it also helps contractors better understand their responsibilities for implementing environmental commitment and budget appropriately.

Oregon DOT (ODOT) program administrators found that environmental commitments and conditions were not being consistently presented in construction contracts and that minor changes in language could result in entirely different interpretations when in

construction. With their programmatic approach to permitting for Oregon bridges, ODOT developed Environmental Performance Standards (EPS) – minimum standards for compliance - with the goal of creating well-integrated and consistent terms and conditions for each resource agency’s respective regulatory process. The EPS also provide consistent expectations and guidelines for design and construction teams to meet ODOT and regulatory agency requirements.

Unless commitments made in the permitting packages are transferred into the construction contract, a construction change order might have to be requested or a permit modification pursued. Change orders, even ones which result in a net savings or in no additional cost, have the potential to delay a project. Permit modifications can result in more impacts to sensitive environmental resources or additional cost to the construction contract for additional protective measures required by resource or regulatory agencies as a condition of the permit modification. ODOT recognized that continued minor inconsistencies in construction contracts could result in major issues during construction.

To address this problem, program administrators developed specification templates, to help:

- Translate permit and environmental performance standard requirements into specification language.
- Streamline the design process with regard to environmental requirements.
- Increase the consistency of Environmental Performance Standards incorporation into the construction contracts to reduce variation from the design A&E firms on how they wrote up the commitments.
- Incorporate language into construction contracts to make clear the possible enforcement actions the DOT can take to ensure commitments are met during construction.
- Improve environmental commitments and specs and save time and money.
- Increase confidence/verification that the commitments were being incorporated into the specifications.

## **2.4 Tools for Turning Permit Language into Contract Language in Final PS&E**

Washington State DOT’s Commitment Tracking System (CTS) has a “contract provision wizard” tool built into it, which supports assignment of responsibility for a commitment to a contractor via a legally enforceable document. When preparing the contract in final PS&E, if the permit language is not appropriate as contract language, the CTS facilitates finding/cross-walking to contract language if it exists. If appropriate contract language does not exist, the user has the option of drafting new contract language. The CTS also provides a report for use when building the contract through PSE-Word, the agency’s primary contract building tool.

## 2.5 Construction

DOT construction operations provide oversight and management of the construction contractor to assure that the contract requirements and the design, including environmental commitments, are being met, that construction work and environmental restoration are being performed according to approved specifications, and that the contractor is being paid appropriately for the work completed. The construction team consists of the PE or PM and other technical support staff such as project inspectors who may work on the project site on a regular basis. Some PMs now get the assigned Construction Engineer more involved during the environmental clearance phase and the initial setting of and agreement to environmental commitments on more complex projects to increase awareness of the requirements for construction.

Construction staff count on major terms and conditions being included in the PS&E package. Environmental permits included in the contract are often voluminous and vulnerable to skipping or skimming; hence, it is helpful to have items from the permits in table or checklist form. Some DOTs attach “green sheets” with summaries of all environmental commitments. Other DOTs hold pre-construction meetings to go over environmental needs and commitments accumulated and recorded to that point. One former DOT environmental manager noted that it is very difficult to get contractors to add or assume responsibilities not spelled out in detail in the contract. In one particular case, the contractor ran out of funds before the environmental mitigation features were completed and argued that the “details” amounted to a change in scope for which additional funds were required. The DOT provided additional funds to keep the project moving. There needs to be enough detail in the contract so the contractor can budget appropriately and there can be no misinterpretation about the expected outcome.

The PM or PE and technical support staff provide on-site overview and inspection of the project. In addition, the construction team performs a variety of management and inspection functions including maintaining contractor performance records, reviewing and approving periodic contractor payments, ensuring materials testing, coordinating with partner agencies on any issues which may require resolution over the course of the project, and providing updates on project status to DOT (usually region/district) management. On the construction site, environmental inspections that occur are typically recorded along with other construction items in daily diaries and paper reports. The Maryland State Highway Administration (MDSHA) is one of the only DOTs with a commitment tracking and communication system to support environmental inspections; however, DOTs are increasingly tracking contractor performance more broadly and incorporating that into contracting processes.

The PE has numerous responsibilities and verification of environmental commitment implementation can come up short unless environmental commitments are incorporated into the larger system of inspections. DOTs have staff to oversee the construction projects as the workload increases and, as currently performed, engineering inspections tend to focus on the transportation improvement unless an environmental monitor is assigned, as may occur in the case of particularly sensitive and controversial projects. More commonly, a DOT environmental specialist might come out to the site to see if difficult work is being performed as needed. As with design, DOTs also are using more contract engineering resources to conduct the onsite oversight and inspection.

Environmental commitments are rarely available in an easy-to-use checklist format— as an output of an environmental commitment tracking system or otherwise generated—

which would facilitate oversight by the PE and contractor. In earlier studies, construction staff indicated a preference for an easy checklist format; for example, the PE or contractor could go to the web to check a list or matrix of environmental commitments and print out a checklist of commitments that are required for a project.

Some construction managers have indicated the desire and benefit of tracking all commitments, including those with less explicitly environmental aspects, since many of the most notable environmental requirements, such as in-stream work windows, are included in the PS&E. Formal inspection and closeout with regard to environmental items may occur infrequently. At construction project closeout, the DOT maintenance office (or that of the partnering/owning agency) may participate in a walk-through and review of the punch list. At this point, the construction contractor may hand off the subsequent responsibilities for maintaining environmental assets and implementing remaining commitments to the DOT maintenance staff.

## 2.6 Maintenance

Maintenance includes all activities related to the ongoing management of the transportation network assets after construction is complete, including making needed repairs (preventative and otherwise) as required. Transferring environmental commitments from the construction phase to the maintenance phase is highly susceptible to a disconnect and lack of follow-through on maintenance of environmental features that were installed as a result of commitments made earlier in project development. As noted in the following sections, there is often not even confirmation that the construction contractor has completed all the environmental commitments included in the PS&E package. None of the DOTs interviewed for this study said they had a standard process that requires the contractor to hand-off future maintenance requirements to the DOT Maintenance staff. And, since Maintenance is typically not involved in project planning, design or construction activities, they may not be aware of maintenance needs. Again, unless the DOT has a reliable commitment tracking process in place, follow-through can depend on the good memory and commitment of DOT environmental staff who were involved at the front end of the process. Further, with one exception, Maintenance typically lacks the staff or the budget to maintain environmental features. Maintenance of permanent water quality facilities and culverts is critical to the preservation of the transportation infrastructure and is, therefore, a routine maintenance activity.

As discussed in NCHRP 25-25/51, DOT asset management systems have only recently begun to add codes for environmental assets, and tracking and management of environmental assets is still in its infancy at many DOTs.

## 3 The Challenge at Hand

When AASHTO's Standing Committee on the Environment developed a statement of work for NCHRP 25-25/47, they said, "ensuring that environmental commitments are fully implemented during transportation facility construction and maintenance continues to be a major challenge" for state DOTs. The panel noted particular challenges:

- Ensuring that the environmental commitments are fully implemented during transportation facility construction and maintenance.
- There is often a gap in the transition between design and construction and environmental commitments are not implemented in construction.
- There are often changes in the project design during construction that changes how the environmental commitments can be implemented.

The vast majority of DOTs lack environmental tracking systems beyond the informal ones employed by DOT environmental staff. DOTs face substantial challenges in knowing what the commitments are, communicating them to the right people, and ensuring commitments are implemented.

### 3.1 What is the Top Priority?

The DOT's primary focus is on developing and constructing transportation improvements. Thus, DOTs, state legislatures, and governors often gauge performance on how fast and how well state DOTs bring a transportation improvement project to closure—close out construction projects and get them accepted into maintenance. Environmental performance measures often fail to enter the picture, and environmental compliance can face an uphill battle. Sometimes the risks and financial penalties for environmental non-compliance are orders of magnitude less than incentives for accelerated construction. In almost all cases, staff and contractors are expected to meet environmental requirements, but such requirements receive less support and emphasis from top management. Will this situation change in the current environment and the next decade? Budget pressures could increase pressures to get more transportation work done for the money, leaving less for environmental monitoring, or increased environmental concerns related to regulated or socially valued resources and the impacts of global warming could increase incentives to follow up on environmental commitments. The most progressive states value and provide an incentive for environmental compliance by including such performance in annual or project reviews.

### 3.2 Tracking Commitments across Multiple Project Phases

Individual natural and cultural resource specialists in different areas at state DOTs keep lists of important commitments in their particular resource areas. The specialist is often involved in negotiation of these commitments, and DOT failure to follow through reflects on the credibility of the specialist and provides an incentive for them to stay involved in follow-through to some degree, as long as they remain in that position at the DOT. When commitments are not well communicated throughout all phases of project development or the specialist is unable to follow the project cradle to grave, this approach is vulnerable to staff turnover, and the memory and time availability of the staff person. Environmental permitting and/or clearances of projects in the project

development queue nearly always take precedence over monitoring and follow-up of older projects because performance tracking for environmental sections and staff tend to focus on ability to keep up with environmental clearance demands, first and foremost.

In addition, many PMs are in the habit of going directly to the environmental generalist or environmental program manager for needed information about permit and other requirements. When there is not a clear line of communication and hand-off of commitments or when the PM does not work directly with the environmental specialist who negotiated a permit or resource agency approval in order to continue verification of the terms/conditions, this can result in a “dropped-ball”. The environmental program manager and even the environmental generalist in the region or district may not have all the details of a specific mitigation commitment. Environmental specialist staff maintain spreadsheets to be able to answer these questions for themselves and others and ensure some level of oversight, but maintenance of the spreadsheets is very time-consuming. In addition, a lot of the spreadsheet information is re-entered or “cut and pasted” section by section into green sheet lists or environmental commitment summaries, which are more inclusive, where used. Utah and Indiana are just beginning to implement electronic databases for tracking commitments throughout project development to ensure all commitments are included in final design plans (see Section 4.6).

### **3.3 Many Hand-Offs Occur in the Life of an Environmental Commitment**

Many DOT projects have sequential management involving multiple managers and baton passes, from the pre-award planning, design and contracting phases, award phase bid and proposal process, to the post-award construction phase and finally, maintenance. In the process of handoff from one phase to another, environmental commitments are often dropped or lost. Other times, commitments are overlooked simply due to lack of time or convenient tracking systems. Interviews conducted for 2005-2006 FLH study suggested that permits in the contract documents might be read only 20% of the time, if that frequently.

A variety of AASHTO and NCHRP studies—on implementation of improvements in cost estimation at DOTs and in a variety of other topical areas—agree on the challenge DOTs encounter in bringing about the needed communication across divisions and functional areas. DOTs with electronic workflow systems, especially environmental commitment tracking systems, have made significant strides toward the goal of facilitating communication across functional areas. DOTs report that the cross-functional effort to implement such systems in itself produced much greater awareness and cross-functional communication than in the past, changes that have persisted since those efforts.

### **3.4 Understanding the Meaning or Intent of the Commitment Isn't Always Easy**

Execution of the environmental commitment involves accurate conveyance of the commitment to the project designer and ultimately informed performance and oversight by construction personnel. If a commitment is not lost or dropped, it is successfully transferred or “handed off” many times, then received and performed by someone who

understands the intent. More than one environmental staff member interviewed for this study expressed concern that construction staff may not fully understand the commitments or how they should be implemented; across disciplines, transportation staff agree that further communication might be needed to highlight and explain certain environmentally-driven aspects of the plan, such as clearly explaining why a retaining wall is needed and why it cannot be removed as part of the value engineering process. While this information may be noted in other documents, interviewees said that a more personal hand-off or other notification identifying such “non-negotiable” design items would be helpful.

The onus is on environmental specialists and generalists at each DOT to generate common understandings, both within their agencies and among the agencies with which they negotiate. Optimally, a DOT’s environmental specialists and generalists get “boiler plate” or other language into the contract documents that can be readily understood and implemented. As discussed later in this report, MDSHA and Washington State DOT (WSDOT) have devoted significant efforts to reduce and integrate environmental requirements, to diminish redundancy and increase comprehensibility.

### **3.5 Fostering Two-Way Communication and Re-Consultation Where Necessary**

The information flow cannot be only one-way, from environmental specialist to project designer, from design to construction, from DOT to contractor, and from construction to maintenance staff. Construction changes in the project design or scope require excellent communication, re-consultation with environmental specialists, and, optimally, systems to facilitate and help document related changes to environmental commitments. Maintenance staff may also need to re-consult with environmental staff when there are changes in field conditions. Likewise, environmental staff may come up with more practical, constructible and maintainable environmental mitigation measures when they have consulted with construction and maintenance staff. All of this takes time, which may be in short supply. In addition, construction and maintenance staff quickly run up against the fact that extra work requires extra money, which often is not allocated.

### **3.6 Including Environmental Cost Estimates to Improve Success**

When budget estimates for the commitment are not developed and construction managers are left to absorb the additional work in project contingencies, construction and maintenance managers frequently scramble to come up with funding for commitments, forcing improvisation and a search for funds to cover the work. Separate funding streams address environmental commitments after construction close-out. Many states face difficulties funding the necessary maintenance of the mitigation once the contract closes and the roadway opens. When funding to cover the work is inadequate or nonexistent, DOTs shoulder substantial risks as the risk of noncompliance rises.

Some project environmental costs are regularly budgeted while others are not. Drainage unit items for water quantity control, for example, were budgeted in transportation projects even before the Clean Water Act added filtration and water quality elements.

Costs of many other items are more ambiguous and less frequently included in project budgets; many requirements and commitments do not arise until project permitting.

Most DOTs have unit prices for only a limited number of environmental items, which are paid for at the contract unit price for each of the pay items that appear in the bid schedule. For example, Colorado DOT's Contracting Section 250.09 on Basis of Payment states that payment will be made under the following areas in either lump sum, on an hourly basis, or by cubic yard, for environmental health and safety items<sup>5</sup>:

Pay Item	Pay Unit
Environmental Health and Safety Management	Lump Sum
Health and Safety Officer	Hour
Monitoring Technician	Hour
Materials Sampling and Delivery	Each
Materials Handling (Stockpile)	Cubic Meter (Cubic Yard)
Solid Waste Disposal	Cubic Meter (Cubic Yard)
Hazardous Waste Disposal	Cubic Meter (Cubic Yard)

### ***“Comply with Environmental Requirements at No Additional Cost to Agency” Provisions Found to Provide Insufficient Incentive to Comply***

In an in-depth study of environmental commitment tracking on several projects in Washington State, WSDOT project leaders discovered that contracts frequently include the language that contractors comply with all relevant environmental regulations, at no additional cost to the agency. While the language may be designed as a catch-all for costs not accounted for in other ways, and was likely designed to minimize WSDOT's liability and to control costs, WSDOT plans to alter their approach. Feedback from Regional offices has led headquarters staff to believe that the language and approach present an obstacle to ensuring needed environmental work is performed and commitments are accomplished.

### ***Provisions for Covering the Cost of Environmental Commitment Items Helps Get the Work Done***

Provisions for covering the costs of environmental requirements help ensure that commitments are accomplished. Connecticut DOT has already incorporated the following to help ensure compensation and completion of environmental commitments:<sup>6</sup>

If the Contract includes an item which does not have a corresponding specification for either performance or payment purposes, the Contractor shall notify the Engineer of that fact in writing at least two weeks prior to ordering materials for or commencing work on the item. If such a specification is lacking, the Engineer shall, if possible, derive an appropriate specification from applicable AASHTO Specifications or, if necessary ASTM Specifications. If neither of those sources provides a suitable specification, the Contractor shall seek guidance from the Engineer with regard to the item, and the Engineer will formulate a reasonable specification for the item.

As cost pressures rise on contractors as well as DOTs, further evolution toward inclusion of provisions to cover the cost of environmental work may be expected. Programmatic



permitting and integrated conservation and transportation planning also provide more information earlier, to DOTs, on what will be needed in order to comply with environmental requirements, and thus greater chance of including such work in the project budget. For example, Florida's Efficient Transportation Decision Making (ETDM) system identifies environmental issues and needs very early in the process, at the 20-year plan and prior to programming; the process ensures that all needed environmental studies and major mitigation is negotiated in advance of programming and included in the project budget.

### **3.7 So Many Commitments: The Degree to Which Commitments are Recorded**

DOTs manage a truly large number of environmental commitments, and DOTs with the most comprehensive commitment tracking systems are wrestling with how and to what degree to record them. While some commitments may not be recorded, other commitments may appear in redundant fashion in the Environmental Commitment Summary, for example, the USACE permit may reference parts of NEPA documents and ROD commitments as special conditions for a 404 permit.

The Kentucky Transportation Cabinet (KYTC) manages the number of environmental commitments in their system by focusing only on those most likely to be missed, on the basis that some environmental commitments have become part of "how DOTs do business." KYTC's Communicating All Promises (CAP) is mainly used by project managers as a place to record a small set of the most uncommon commitments (e.g., not recorded in a permit) and most likely to otherwise fall through the cracks. While this has successfully reduced the number of commitments to a practical set for project managers, CAP suffers from other shortfalls, such as intermittent levels of use and lower levels of assurance that all relevant environmental commitments are adequately recorded in contracts. KYTC is tackling these issues now.

Maryland has made more progress than any other state in integrating, combining, and thus reducing commitments across agencies. MDSHA may have been able to make more progress in this area than other DOTs with such systems in part because of the high degree of accountability and the immediacy of interagency communication built into their system of environmental monitoring and environmental inspection reporting on all projects with wetland impacts. MDSHA indicated their systems have built interagency trust and greatly assisted efforts to evaluate, combine, and reduce environmental requirements.

### **3.8 Fostering Consistent, Agency-wide Usage of Developed Systems**

DOT environmental commitment-tracking systems have helped some DOTs greatly improve their internal ability to track and ensure execution of commitments.<sup>7</sup> Despite their new capacities and impressive gains, most states that have developed electronic commitment tracking systems still struggle with consistent, agency-wide usage. For example, after roll out of the system in January 2006, WSDOT reported that only two regions were using the agency's CTS in an internal audit in late 2007. Since then, WSDOT headquarters has funded continued training and orientation efforts.

PMs at KYTC are required to use the CAP system, but the degree to which they use the system or the types of commitments recorded is entirely up to the individual manager. MDSHA's system only extends to projects that involve wetlands, though the agency is considering extending the system to other resources as well. Staffing projects with independent environmental monitors is a major agency investment.

### 3.9 Determining Compliance

The number of commitments DOTs have and are tracking, the number of people and multiplicity of phases involved, the use of developed support systems, and monitoring and incentives for compliance are not the only issues DOTs face. Even if all of these can be accomplished, a remaining issue is degree of compliance. Performance of some environmental commitments is a clear yes/no matter. For example, with historic resources, many times submission of the appropriate documentation reports comprises the commitment, e.g., was a historic building professionally recorded? Other environmental commitments occur along a range. For example, for erosion and sedimentation control, North Carolina DOT and MDSHA have implemented A through F grading systems. Such approaches add both complexity and simplification, often via a performance threshold, above which performance is considered acceptable and below which corrective action is necessary, typically within 24 hours.

Most of all, the erosion and sedimentation control monitoring systems that NCDOT and MDSHA have developed implement an essential and effective level of feedback on performance, which has lifted DOT knowledge and confidence, while garnering accolades from regulatory agencies. NCDOT operates a delegated erosion and sedimentation control monitoring program, from the state regulatory agency.

There may be a broader range of what constitutes compliance and many indicators for a satisfied commitment for wetlands or habitat. Sometimes there are also longer periods for which commitments need to be sustained or maintained (e.g. a 5 to 10 year monitoring period). Tracking the range of functioning over time and if certain parameters are exceeded can be very important.

Currently very few DOT systems address the gradation of compliance. On construction projects, the PM ultimately must "choose yes or no" or decide whether a threshold has been successfully met, to "check off" the work and accept a project for (transfer to) maintenance. Performance levels for permanent features must be tracked into maintenance. Yet more difficult, is finding the resources for long-term maintenance of environmental mitigation features, in the face of all the other maintenance needs and limited funding for maintenance.

### 3.10 Getting Commitments into the Contract is Not Enough

In late 2008, an internal review performed by WSDOT's headquarters Construction and Environmental Services Offices, most regions reported a handful of non-compliance events associated with water quality and stormwater management, intrusion on wetlands, and hazardous materials events related to broken hydraulic lines. However—and importantly for this NCHRP study—the regional staff interviewed for the project attributed none of the non-compliance events to a lack of commitments incorporated into the contract.

WSDOT staff interviewed for the project explained that successful compliance with the contract and permit requires teeth from both the DOTs and the resource agencies. More than one DOT reported that when a resource agency inspected a project, they did not cite the contractor's poor performance occurring on or off the project site. The passive approach taken by the agency when non-compliance events occurred in turn diminished the credibility of the DOT in enforcing environmental requirements on the project.

**WSDOT regional staff interviewed for the project attributed none of the non-compliance events to a lack of commitments incorporated into the contract. They explained that successful compliance with the contract and permit requires teeth from both the DOTs and the resource agencies.**

WSDOT's report on Best Practices for Incorporating Environmental Commitments in Construction Documents concluded that although regions used different methods, they generally did a good job. Recommendations for further improvement included continuation of common practices including:<sup>8</sup>

- Extract permit conditions into contract provisions or plan details in addition to attaching the permit as an appendix of the contract.
- Enhance Standard Specifications and General Special Provisions (GSP) to address common permit conditions.
- Work with resource agencies to clarify and standardize permit language.
- Recognize that environmental compliance has a cost to the DOT that cannot be deferred to the Contracting Agency.

WSDOT's report also concluded that in several instances non-compliance with contract commitments occurred for the following reasons:

- Environmental commitments were being followed and non-compliance events occurred for reasons outside of procedural control (e.g. hydraulic fluid line breaks).
- Environmental commitments were either not being followed by the contractor or were not being enforced by the DOT.

WSDOT's report concludes that the process for enforcing environmental commitments in the contract can be improved; the report suggests more effective compliance procedures and training may help.

### 3.11 Criteria for Evaluating Effectiveness: Risk Minimization

The purpose of incorporating environmental commitments into contract documents is two-fold; first, to ensure that commitments made to the public and resource agencies are carried out, and second, to provide the DOT an enforcement mechanism to ensure the contractor carries out the commitments on behalf of the DOT.

All practices reviewed in this document minimize the risk to the DOT that environmental commitments and construction requirements will be ignored, forgotten, or otherwise bypassed. Minimizing these risks has the important side benefit —vis a vis DOT negotiations with resource agencies—of increasing assurance for and the confidence of

these same resource agencies, as well as other stakeholders. As we will see, some extend the risk minimization further than others.

Some shorter items, like a provision that the contractor must follow all environmental requirements outlined in permits may reduce DOT liability for non-compliance but it may not be comprehensively understood by all contractors.

States that employ feedback mechanisms such as thresholds for adequate implementation, audit systems, environmental management systems (EMSs), connections to workflow/activity management/tracking systems, and aligned incentives for managers, inspectors, and contractors are most likely to have information on effectiveness. Indications are that “planning the work and then working the plan” are key; knowing the outcome you want to produce and then creating and implementing a system of procedures, checks, and feedback to evaluate whether the agency is accomplishing the desired goal are the most effective ways to ensure this occurs. These steps are components of environmental management systems and quality improvement approaches in general.

## 4 Environmental Commitment Tracking Systems at State DOTs

DOTs have different levels of capacities and systems for tracking environmental commitments. Some states use “green sheets” or “gold sheets” to track commitments from planning through project development to summarize commitments from the NEPA documents or environmental permits, which are then attached to the contract documents. Other states have developed more complex systems that range from KYTC’s additional screens for commitment tracking within their project management system; to environmental activity and workflow tracking systems in Texas; and stand-alone comprehensive environmental commitment tracking systems in Indiana, Washington State, and Virginia.

This chapter provides an overview of these systems and answers the first half of the question posed by the panel to be answered in this study: *What options are out there?* The panel’s following question “*and how are these activities incorporated into the construction contract documents?*” will be answered in Chapter 5.

### 4.1 Tracking Systems for DOT Mega-Projects

Meeting compliance reporting requirements may be relatively easy for a smaller construction project, but as the projects gets larger and take longer to complete, the requirements get more extensive and complicated. Mega-projects in California, Maryland, Nevada and other states have developed electronic commitment tracking processes to satisfy public and resource agency concerns regarding environmental stewardship, and in some cases to streamline commitment tracking for the DOT. Typically, commitments are copied (e.g. “cut and pasted”) to or from such systems and permits, NEPA documents, and contract documents.

#### **Caltrans San Francisco-Oakland Bay Bridge**

Caltrans has used a web-based approach to environmental commitment tracking since 2002 during construction of the San Francisco–Oakland Bay Bridge East Span Seismic Safety Project. The construction period is approximately twelve years for construction of the new East Span and two years to remove the existing structure. Caltrans has incorporated numerous measures to avoid, minimize and compensate for potential environmental impacts to birds, fish, marine mammals, eelgrass, and water quality during dredging, excavation, pile driving, construction of temporary and permanent structures, and removal of the existing bridge. Additionally, Caltrans is working with multiple resource agencies to develop on-site and off-site mitigation opportunities for creation and restoration of habitat. The off-site mitigation projects are among the largest Caltrans has ever funded and the result of many agencies and environmental interest groups working together to improve the ecosystem of the Bay. After the biological mitigation and monitoring program were underway, Caltrans began to contemplate ways to disseminate reports and information to the permitting agencies and the public in a timelier and easier manner, cost-effectively meet permit requirements and provide easy public access to the information. The website Caltrans ultimately developed had “information in general terms for members of the public who simply had an interest in the project as well as more specifics about the biological mitigation and monitoring program (e.g., monitoring protocols, work plans, and technical reports) for those who were

interested. Distribution lists of interested parties were created for the various topics. When a report or plan related to that topic was posted to the website, the members of the distribution list were emailed along with a direct link to the report. When needing to check on a piece of information, (staff and other users) didn't have to search their office for a hard copy of a report, permit, or protocol. During 2006, the website averaged about 450 visitors a week. Visitors located in numerous countries downloaded the permits and protocols, and weekly bird and marine mammal memos were very popular. (However) use of the website has been limited on other mitigation and monitoring projects"<sup>9</sup>

### ***MDSHA Inter-County Connector and Woodrow Wilson Bridge Projects***

The commitment tracking system for the Woodrow Wilson Bridge project tracked 1400 commitments and conditions and regularly updated the status of impacts, greatly facilitating negotiations with resource agencies when changes were needed in construction. MDSHA could show how they had effectively minimized impacts and reduced estimates elsewhere on the project.

MDSHA's database for the Inter-county Connector (ICC) project provides greater search ability/queries and ability to sort by issues. The system is being used to provide QA/QC on the design-build project that includes over 25 major construction contracts and 10 mitigation contracts. Community and cultural resource commitments, natural resources commitments, and individual commitments from environmental performance specifications negotiated for the project are incorporated and categorized so that the viewer can see just what they want to see by resource, permit, location, etc.

The ICC tool was built on a highly flexible platform that may be re-used on other projects or to manage a portfolio of projects. The user selects conditions specific to the contract from a large database, then goes through the final plans and specs to make sure all design commitments are incorporated, after which plan plates are developed. As with the Woodrow Wilson Bridge project, the team goes through the whole list two or three times a year for each contract to ensure commitments have been addressed. The consultant is calling the ICC tracking system a project-based EMS; however, this study was not able to collect information on procedures, internal auditing, and continuous improvement, which would help distinguish the system as such.

### ***Reno Transportation Rail Access Corridor (ReTRAC)***

The Reno, Nevada Transportation Rail Access Corridor (ReTRAC) is a below-grade corridor with a center depth of approximately 33 feet replacing 11 at-grade, street-railway crossings. The City and the Nevada Department of Transportation (NDOT) developed ReTRAC.info (also called the ReTRAC Mitigation Monitoring Program Report System), an online resource that provided the public with real-time reports on the project's compliance with NDOT's environmental commitments and streamlined note-taking and report-writing. Previously, monitors in the field would write notes on paper and return to the office to upload the data into the project database, essentially recording the same information twice. Using ReTRAC.info, monitors uploaded field reports directly from the field, using hand-held devices to conduct field surveys and upload data to the Internet via wireless connections. City officials estimated that ReTRAC.info saved each monitor 45 minutes each day per report filed, providing current, higher quality

information to the public and cooperating agencies at less cost. ReTRAC also served as a document management system containing:

- Compliance Reports: Positive statements that described how NDOT's environmental commitments were being fulfilled and provided positive feedback to contractors when they performed as expected.
- Notices: Warning reports clarified to the contractor what the City expected. When issued, notices were relayed by e-mail and pager to the contractor, NDOT officials, and other agencies.
- Non-compliance reports: Detailed reports of violations were issued subsequent to notices.

In addition, the State Historic Preservation Office, Department of Environmental Protection, and permitting agencies gave feedback online and were able to access sensitive cultural resource data that was not available to the public.

City officials estimated that the system recouped its capital investment costs within six months of implementation based on monitoring report time savings. Other savings were realized from a streamlined process for drafting the monthly, quarterly, and annual project reports. Electronic location of reports in a central repository saved consultants from sorting through hundreds of paper reports when compiling routine documents.

Because the website made the mitigation reports immediately available to the project compliance managers, the process time between a non-compliant construction activity and corrective action was shortened from days to hours. In addition, immediate report uploading from the field avoided problems associated with lost, misplaced, or misdirected hard copies. The city reported fewer compliance calls and public complaints; people could access more of the information they wanted electronically and NDOT and the city demonstrated environmental stewardship. ReTRAC.info is non-proprietary, and the agencies encourage others to contact them to discuss adapting it for use in other areas. ReTRAC.info can be adapted to solicit comments from the public when reviewing NEPA documents, as well.

## 4.2 Washington's Environmental Compliance Assurance Procedure

Washington State DOT (WSDOT) developed an Environmental Compliance Assurance Procedure (ECAP) for construction projects in 2004, and the procedure has since been incorporated into the [WSDOT Construction Manual](#). ECAP pertains to all WSDOT contracts and contains the duties and responsibilities for environmental. The purpose of ECAP is to eliminate events during construction that are not in compliance with environmental permits, standards, permits or laws.<sup>10</sup> ECAP is essentially a communications tool for when a non-compliance event happens. By design, ECAP enables WSDOT to recognize and eliminate environmental violations during the construction phase on WSDOT construction sites, and to ensure prompt notification of violations to WSDOT management and agencies. WSDOT also developed an ECAP for maintenance projects, which can be found in [Chapter 790](#) of the WSDOT Environmental Procedures Manual. The procedure is also incorporated into several [Regional Environmental Compliance Plans](#) applicable to maintenance.

In its most recent round of improvements to its commitment tracking system, WSDOT has added environmental activities and events to its commitment provision tracking and responsibility assignment. WSDOT is building the “events” portion of that improvement around the ECAP system, so that the CTS is a tool to help implement the Environmental Compliance Assurance Procedure, a communications protocol when a non-compliance event happens. Planning and Programming Level Environmental Summary Reports

### 4.3 Florida’s ETDM

In Florida’s ETDM process, FDOT conducts planning screens of projects in the 20-year plan and again before they are entered and funded in the Work Program or STIP. The planning screen includes consideration of community impacts, land use, safety, mobility, civil rights, relocations, noise, air quality, section 4(f) lands, historic sites and districts, archaeological sites and recreation areas.

A Planning Summary Report is then made available electronically to resource agencies and to the public and is used by MPOs and FDOT to prioritize transportation improvement projects in the long-range transportation plan, Florida Intrastate Highway System Plan, and the FDOT Work Program. Public input is tracked electronically and incorporated into the Plan Reports.<sup>11</sup>

Commitments are discussed, negotiated, and made using the interagency on-line Environmental Screening Tool (EST) and memorialized in the Planning Summary Report and then a Programming Summary Report, for the project. A Programming Summary Report is prepared for each project as a transition document to the project development phase. The community input and Environmental Technical Advisory Team (ETAT) analyses, commentary, and documentation contained in the Environmental Screening Tool provide the base information required for the Programming Summary Report. Standardized and automated report output forms provide an efficient and accurate method of documentation for commitments and all other documentation. The ETDM Coordinator is responsible for the preparation and posting of all Programming Summary Reports in the ETDM database and making the reports electronically available to all ETAT representatives and the FDOT design engineers. The project information, ETAT comments, and summary reports continue to be available as the project progresses through each phase. Updates are posted when new phases begin. Commitments are reviewed at each stage of project handoff, and individual regions track and incorporate commitments in the PS&E and throughout construction.

Florida DOT is currently looking at building a statewide environmental commitment tracking mechanism to consolidate information that is ultimately tracked in the Districts or Regions, at the point of construction contracting and construction monitoring, to boost accountability and statewide performance reporting and feedback.<sup>12</sup>

### 4.4 Virginia DOT’s CEDAR

The Virginia Department of Transportation (VDOT) implemented the Comprehensive Environmental Data and Reporting (CEDAR) system in May 2004 as the culmination of a five-year effort to streamline VDOT’s business and technology needs with respect to environmental data.



Virginia developed the tool out of the growing realization of the need for environmental team members to have a consolidated, automated tool to track the work they perform. CEDAR replaced the more than 73 tracking systems previously in use throughout the state and resolved issues of data redundancy and duplicative work. Environmental staff now have a single, centralized data repository that is integrated with GIS databases, offers full integration with VDOT's project management system, provides improved accountability, and improves the documentation and communication of environmental decisions and commitments.

The system encompasses all commitments on all projects. Other systems offer the ability to categorize or track commitments that are entered by project and program area (e.g. cultural resources, natural resources, and hazardous materials). However, VDOT's commitment properties include "Identified by", "Deadline", and the "Phase" in which the commitment will need to be satisfied and retired: Pre-Construction (including Project Development, Design and Environment), Construction, or Post-Construction, including wetland monitoring and other follow-up. The commitment module indicates that there is a commitment, who is responsible for it, and whether it is complete; the environmental compliance module captures data relevant to monitoring done in the field during construction. The responsible party can often be staff and/or contractors outside of the environmental division. VDOT is currently adding an environmental certification report under design, which would pull in environmental commitments. VDOT is also starting to write up scopes to connect the system to consultant services and compliance reviews on facilities (the latter is currently captured in an Access database).

VDOT is in the process of incorporating general permit provisions and commitments into CEDAR, and developing a commitment matrix to summarize these. Commitment matrices will be components of an environmental certification report that is under development. Appendix C provides additional details on VDOT's CEDAR system.

## 4.5 Design Decisions Summary Form and Environmental Review Summaries

WSDOT uses the following forms to document the results of the project scoping process, when the scope (work and materials), schedule, expected performance outcome, and budget of and for a project are identified. The Environmental Review Summary form, in particular, identifies the potential environmental issues and impacts, any proposed mitigation, and any NEPA/State Environmental Policy Act documents and environmental permits that are likely to be required. An Environmental Review Summary (ERS) for the purpose of NEPA gets changed to an Environmental Classification Summary (ECS) when approved by a lead federal agency.

- [Project Definition Form / Instructions](#)
- [Design Decisions Summary Form / Instructions](#)
- [Environmental Review Summary Form / Instructions](#)
- [Environmental Classification Summary Form](#)

People with access to the WSDOT Project Summary Database can also fill out and submit these forms electronically. The following are examples of Environmental Review Summaries for each type (i.e. Class) of project recognized by NEPA:

For Class I (Environmental Impact Statement) Projects	<a href="#">I-90 Snoqualmie Pass East Project ERS</a>
For Class II (Categorical Exclusion) Projects	<a href="#">SR 6 / Chehalis River Bridge Rehabilitation Project ERS</a>
For Class II (Documented Categorical Exclusion) Projects	<a href="#">SR 112 (MP 24.88) Environmental Retrofit Project ECS</a>
For Class III (Environmental Assessment) Projects	<a href="#">I 405 Kirkland Nickel Project ERS</a>

Environmental requirements are then manually entered into WSDOT's Environmental Commitment Tracking System (ECTS), which incorporates a few features that help expedite this (e.g. after entering one thing or set of things, the system will remain in the same category/folder, in case the user needs to enter more into that category).

## 4.6 DOT-Wide Environmental Commitment Tracking Systems

### ***AASHTO's Guidance for Tracking Compliance of Environmental Commitments***

AASHTO Practitioner's Handbook "*Tracking Compliance with Environmental Commitments/Use of Environmental Monitors*" provides recommendations for tracking compliance with environmental commitments from the environmental review phase through design, construction and maintenance of a transportation project.<sup>13</sup> AASHTO notes in the overview that it is common for there to be hundreds of commitments made to avoid, minimize, or mitigate environmental impacts in the course of the environmental review for a complex project. It is important to ensure that the DOT implements the commitments during design, construction and maintenance. AASHTO recommends using a systematic approach involving an environmental commitments database and designation of an environmental lead that has the responsibility and authority to oversee environmental commitments.

To create a strong foundation for the environmental compliance program, it is important to ensure the commitments are clearly worded, consistent and are not mutually contradictory as can sometimes happen on large, complex projects. There should be some flexibility to allow for changes if the project itself changes, new information is acquired about environmental conditions, or new technologies become available.

There are many existing, commercially available database software programs that can be used to track environmental commitments and several DOTs have created a customized system to meet the needs of each project. Regardless of what database is used, it is important to capture all of the needed information. At a minimum, the data fields should include the following elements. Notably for this project, AASHTO points out that commitments should be assigned in design or construction contracts.

- Descriptions of the Commitments - making sure that the full intent of the commitments are captured and none of the important aspects are omitted. An experienced environmental specialist or professional who is knowledgeable about the project should be responsible for screening all commitments entered into the database.
- Subject – assign the commitment to one or more categories such as air quality, water quality, traffic or noise.
- Responsible Party – is the entity with the most significant responsibility for carrying out or addressing the commitment.
- Assigned Contracts – identifies the design or construction contract with which the commitment is associated.
- Source Documents – provide the basis for the commitment such as the ROD or Section 404 permit.
- Status – describes the status of the commitment as “pending”, “ongoing”, “on hold”, or “completed”.
- Due Date – is the date the commitment is due to be completed.
- Maintenance – identifies post-construction maintenance requirements
- The database should be updated routinely to capture any new commitments and update due dates.

The key to implementing environmental commitments is to ensure they are communicated effectively to the project designers and construction contractors. The database can be used to generate a list of commitments that apply to each design and construction contract. The database manages the information related to commitments, but compliance is managed in the field. A key element in the execution of a commitment tracking database is organization of an environmental monitoring team that spans the phases of the project from the environmental review process through design and construction and into maintenance. AASHTO suggests that such a team be responsible for ensuring that all commitments are accurately entered into the database, as well as monitoring the construction contractors for compliance with environmental commitments and notifying the appropriate personnel of non-conformities and recommend corrective actions.<sup>14</sup> The environmental monitor also coordinates with the environmental resource agencies, as needed.

The guide offers eight keys for success.<sup>15</sup>

- A seamless coordination between preparers of the NEPA documents and permit conditions and environmental monitors can help the monitors understand what the environmental commitments are intended to accomplish.
- Close coordination between the environmental monitor and the design, construction, and maintenance staff to emphasize the importance of the environmental commitments and clarify the commitments, as needed.

- Frequent communication with the resource agencies to help build trust and confidence in the project and maintain a strong relationship through design and construction.
- To be the most effective, it is advantageous to maintain staffing within the environmental monitoring team.
- Provide training for resident engineers so they understand the role of the environmental monitors, the importance of meeting environmental commitments, and the steps they need to take when commitments are not being followed.
- The DOT should establish a clear hierarchy of reporting relationships within the environmental monitoring team to provide a specific point of contact for reporting to the DOT and the resource agencies.
- The DOT should convey to all project staff and consultants and that meeting environmental commitments is a high priority.
- Document daily field inspection reports from the environmental monitor for conveying information to the resident engineering staff in the field and update records in the database.

#### 4.7 Model DOT Environmental Commitment Tracking Systems

In-depth reviews of ECTS in Kentucky, Maryland, Texas, Virginia, Vermont, and Washington are included in Appendix C. Each review is structured as follows:

1. Technology, including an overview of the programming languages or systems used, the vision for the system, and who has access to the system and/or how that access is controlled.
2. Business Process including an overview of process and system operations  
Issues, obstacles, or limitations,
3. Successes
4. Lessons Learned
5. Next Steps and Summary

For example, Washington State DOT's CTS is a web-based application developed for statewide use that allows Regions to store commitments for a project, assign responsibility (link commitments with contract documents), and manage the status of commitments at all phases of project delivery. Using CTS ensures that commitments are always updated with the most current information and the status of each commitment is identifiable, making management of commitments easier. In addition, information is easily accessible by those responsible for project delivery. One drawback has been that CTS is a new tool that has taken time to implement. WSDOT headquarters is working on other improvements to the system, especially those related to assignment of responsibilities; adding activities and events, which facilitates tracking of compliance; enhanced security; improved reporting capabilities, and basic system functionality and user-friendliness. These improvements will improve building and functioning of a project team that will oversee and ensure compliance on a project.

Some systems, such as WSDOT's, help DOT or other environmental staff turn commitments into contract language, as described in the next section; however, WSDOT's ECTS was one of the only systems to date that was set up with that particular capability as a primary purpose. Utah DOT's system automatically feeds CE commitments into a project commitments database and the system allows the capture of minimal information on permits.<sup>16</sup>

### ***Indiana and Utah in the Early Stages of Comprehensive Systems***

Both Indiana and Utah are in the very early stages of implementing electronic databases to track commitments from the NEPA process through project design.

Utah DOT's Oracle-based system was designed in-house and combined several stand alone programs into a single system to cover all program and project management activities from creation of the STIP, obligation of funds, consulting services contracts, and the amount of funds used, individual project management activities on a two-week schedule by project and task, and finally it links staff working on a project to the payroll system.

The electronic program management system (ePM) includes an on-line CE Wizard. The Wizard steps the user through a series of questions about potential resource issues that may be found on a CE level project. The Wizard first asks whether a resource is present on a project. If not, the user is forwarded to the next question. If a resource is affected by the project, the user enters some basic project information including environmental mitigation commitments and the person responsible for design and construction of the commitment, and the date the commitment is complete. The commitments from a CE clearance or state environmental study are automatically fed into the commitments database. Screen shots from Utah's system are provided in Appendix D.

Supplemental information such as a project map or a resource agency clearance memo can be attached. Agreements made outside of the NEPA process, e.g. right-of-way agreements, can also be added. The environmental manager can then print and review the commitments for a specific project to compare with final design plans and the project design engineer can use the form as a check list to ensure all commitments are included in the PS&E package. The system has helped UDOT ensure they are fulfilling their commitments; helps keep track of what has and has not been done with regard to completing the commitments, and has provided consistency across the state. CE clearances that used to be done almost exclusively by consultants are now done in-house at a considerable savings to the DOT. UDOT's commitment tracking system also accommodates commitments from EA and EIS projects."<sup>17</sup>

Use of Indiana's electronic tracking system began in December 2008. The Oracle-based database was developed in-house by INDOT and is maintained by the statewide IT agency. Set up as a web application on the DOT's intranet, it draws data directly from the DOT's project scheduling system. Originally, the commitment tracking process was developed to cover permit requirements and NEPA commitments, but it has since been expanded to serve a wider audience. For example, some commitments may change over the life of the project for a variety of reasons so the current system allows some filtering of the list of commitments so that it is more useful to different types of users.

Beginning with NEPA approval, commitments are added or amended as needed by design, real estate, permitting or other subject area staff assigned to the project. All commitment types are entered including permit conditions and NEPA commitments, but it can also include commitments made during right-of-way acquisition (such as to repave a driveway or to replace a tree).

Designers are responsible for verifying that their portion of the project incorporates all of the appropriate commitments, the project manager is responsible for verifying that all of the design portions of the project have been covered, and the project engineer, who is responsible for the construction phase of the project, reviews a checklist at construction completion. District / Region Leadership and Movement to a Statewide Model

### ***Caltrans' Environmental Commitment Record and Applications***

Caltrans District 11 developed a [Mitigation Monitoring and Reporting Record \(MMRR\)](#) and District 4 uses [Permits, Agreements, and Mitigation \(PAM\)](#) forms. The MMRR helps identify specific sections and staff responsible for follow-through, to ensure the items are incorporated in the PS&E and construction when it occurs. In addition to project and basic information, the Environmental Commitment Record (ECR) lists, for each environmental commitment:

- Who is responsible – functional unit and individual
- What/how regarding action to be taken to comply with the commitment
- When it needs to be done and timing of completion
- Where the commitment or resource is located, within the limits of the project
- A reference or further definition of the commitment
- Space for notes/remarks/comments on any problems with meeting the commitment, shortcomings, or deviations from the original plan, as well as how and when issues were resolved
- Changes are referenced and recommendations presented

Project-specific and regional commitment tracking applications at Caltrans became the genesis of a headquarters requirement that all Caltrans districts develop Environmental Commitments Records. Implemented in 2006, the requirement to develop ECRs is helping Caltrans meet its environmental commitments. Agency regional staff:

- Record each environmental mitigation, compensation, and enhancement commitment made for an individual project.
- Specify how each commitment will be met.
- Document the completion of each commitment.

The ECR brings all relevant environmental compliance information together in a single place, making it easier to track progress and identify needed actions. Project Teams use it as a reference throughout all project phases to identify and track commitments and to locate the most current, detailed source of information.

ECR review is now a standing item at each team meeting. The record also facilitates quality control and continuity through staff turnover. The ECR is being integrated into Caltrans' process of preparing and updating the Resident Engineer Pending File, executing Environmental Certification at Ready to List, and preparing the Certificate of Environmental Compliance. Commitments may be identified during any phase and extend beyond project construction. The ECR does not require a specific form, but establishes standards that must be achieved, based upon the early regional models. Caltrans is now looking into developing an integrated data management system for tracking environmental documents, surveys, mitigation assessment, workflow, and environmental commitments.

#### 4.8 Transitioning to a Statewide System: Caltrans Environmental IT Solution

Caltrans developed and is implementing an Environmental Analysis IT vision, which involves an integrated environmental information and decision support system, managing information at multiple levels in concert with other systems, incorporating management and metrics tools that can efficiently process and deliver products/information to stakeholders and decision makers while contributing to and drawing upon the corporate knowledge. Linkages to contract documents are not yet included, but could be in the future. Caltrans' system consists of:

**Environmental/Product Information Flow.** Raw data may include field surveys, literature searches and agency coordination which is then analyzed and compiled in summaries, protocols, measurement against standards, etc. Issues may be presented in products (e.g. public disclosure documents, technical reports, memo, letters, meetings, consultations, etc.) to provide useful information to stakeholders (public, interest groups, internal Caltrans, FHWA, local agencies, project proponents, etc.) and process owners (resource agencies, etc.) so they can make informed decisions.

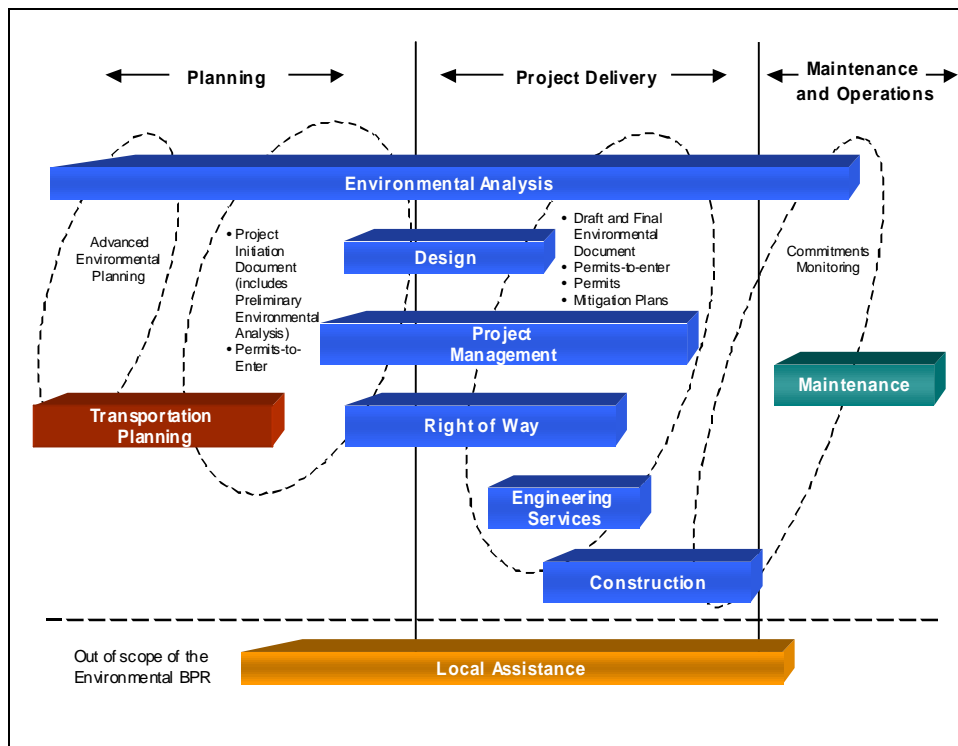
**Process Metrics and Feedback** on the "Product Information Flow" provides programmatic feedback (e.g., permit processing time, lessons learned) and focus for adjustments in policies, procedures, and guidance as well as providing insight for innovations. It also provides a basis for interaction with external stakeholders (public, legislators, and agencies) at a programmatic level considering issues in public policy, department actions, legislation, and freedom of information requests.

**Communicated corporate knowledge** allows Caltrans to reduce learning curves, avoid repeating mistakes, maximize the use of work products, broaden opportunities for analysis, and strengthens the context for decisions.

**Project Management Tracking**, for managing production process and deliverables status, to integrate delivery of environmental analysis/products in a timely and cost-effective manner. It provides information and analysis for internal project management and a means for coordination between individuals and teams working in different but interdependent areas of the process.

Caltrans identified challenges and opportunities as part of a business process review of environmental planning within a context of cross functional information sharing, stakeholders needs, business practices, legal requirements, and available technology (Figure 2).

Figure 2: Relation of Environmental Information to Project Delivery and Other Programs



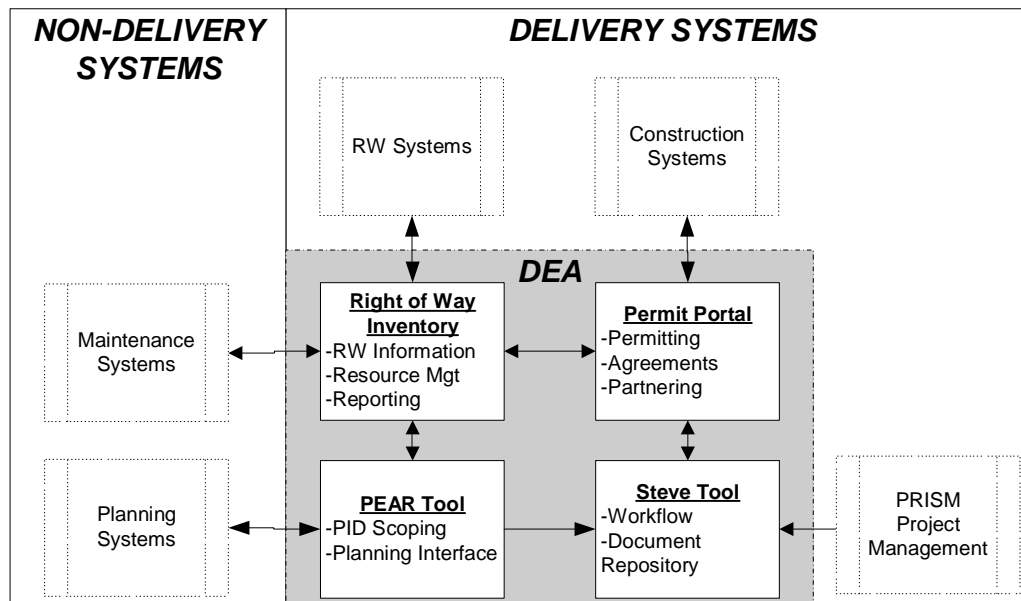
### #1 STEVE – Standard Tracking and Exchange Vehicle for Environmental Analysis [System] Workflow Management Tool and Document Repository

Caltrans completed a Business Process Review (BPR) with input from Districts, Divisions, FHWA, Resource Agencies, and other stakeholders that identified the urgent need to develop a workflow management tool and an environmental database to streamline the environmental process with refined business practices. Figure 3 shows the key components of Caltrans' Environmental Information System. Combined, Caltrans intends for the components to provide the foundation of an EMS. Caltrans' Standard Tracking and Exchange Vehicle for Environmental (STEVE) tool is a combined workflow tracking database and document management system to:

- Accelerate environmental document processing time.
- Prevent institutional knowledge loss from increasing retirements.
- Facilitate partnerships with resource agencies and local partners.
- Significant increase in the accuracy of and timely responses to legislative affairs issues.
- Significant improvement in access to data on the timeliness and quality of environmental activities and individual performance.



Figure 3: Key Components of Caltrans' Environmental Information System



## #2 PEAR – Preliminary Environmental Analysis Report [System]: Environmental Cost, Scope, and Schedule Tool for Project Initiation Documents

At Caltrans, proposed projects must undergo a preliminary environmental analysis before they can be programmed in the STIP or State Highway Operation and Protection Program. The preliminary environmental analysis report (PEAR) details environmental constraints related to the proposed project and provides a scope, schedule, and cost estimate for conducting necessary environmental studies and preparing the environmental document. The PEAR tool provides a systematic approach to data discovery (e.g., endangered species data), cost estimation and data integration in support of preparing the PEAR documents, in GIS; it provides specialists with a single tool for discovering environmental constraints (e.g., endangered species distribution), recording site visits and estimating Work Breakdown Structure resource needs, while providing environmental generalists with a single desktop tool to coordinate the PEAR and prepare the final PEAR report. Finally, the PEAR tool provides a mechanism of transferring digital spatial data (environmental mapping) between the environmental function and the project designer early in the project development process in order to more effectively identify alternative project scenarios, increasing project planning efficiency and the identification of environmental constraints near project locations. The PEAR-Tool:

- Decreases the number of hours it takes to prepare each PEAR.
- Improves the accuracy of cost/schedule estimation (from the PEARs) for environmental documents.
- Increases on-time delivery for Draft Environmental Documents.

- Increases in-budget delivery of Draft Environmental Documents.

### #3 RWI – Right of Way Inventory System: GIS-Based Inventory of Resources and Information Management

As DOTs build, operate, and maintain properties consistent with environmental laws, regulations, and policies, they must track, manage, and report upon a range of environmental resources and threats that are located within the ROW, including but not limited to underground fuel tanks, contaminant plumes, cultural resources, the historic bridge inventory, endangered species, fish passages, wetlands, and sound walls. Such information is critically important for annual reporting requirements, emergency responses, project initiation documents (input for the previously described PEAR), state environmental quality and NEPA project compliance, construction change orders, coordinating maintenance, and issuance of encroachment permits for specially funded projects or the general public within prescribed timelines. The RWI was designed to provide timely, spatially related information necessary to meet operational needs while remaining consistent with environmental laws, regulations, and policies.

The RWI is a spatially enabled database engine with web interface capabilities that allows timely input, storage, and retrieval of resource, asset, and environmental threat information for the Caltrans ROW. This field information is being integrated with the STEVE document repository to access known studies, environmental findings, and decisions, and to be able to feed critical information to the PEAR tool as well as end users such as planning, design, encroachments, construction, and maintenance. A disconnected editing feature allows near real time field collection of data, streamlining the field collection process. The system also facilitates Caltrans' provision of the mandated reports and information summaries required by FHWA and resource agencies. The RWI is increasing project planning efficiency, improving identification of environmental constraints near project locations, and allowing the DOT to meet environmental tracking commitments that result from project delivery and maintenance, as well as benefiting routine maintenance operations and the encroachment permit process. Caltrans anticipates realization of the following measurable objectives:

**Caltrans' Right-of-Way Information System is allowing the DOT to meet environmental tracking commitments that result from project delivery and maintenance, as well as benefiting routine maintenance operations and the encroachment permit process.**

- Decrease the number of hours it takes to prepare each PEAR, Encroachment Permit, Construction Change Order, or conduct Maintenance Operations.
- Improve the accuracy of cost/schedule estimation (from the PEARs) for environmental documents.
- Improve compliance with project delivery commitments and vegetation control requirements.
- Reduce the cost of annual environmental monitoring and reporting.
- Improve customer service and issuance time for encroachment permits for local agencies and the public.

- Speed reporting on locations of environmental resources, which would
- Allow speedier consideration of alignment shifts to avoid resources, which should
- Increase Caltrans' ability to avoid and minimize impacts, and
- Make field work and reporting more efficient, and
- Permanently record environmental resources of concern in GIS databases for future use.

#### #4 PEP – Portal for Environmental Permitting: Integration & Sharing of Environmental Information with Permitting Agencies and Partners

The process of consulting with agencies on new permits and ensuring compliance often requires extensive exchanges of information over long periods of time. Caltrans cited the example of an ESA section 7 consultation that may require information sharing over 15 years as a project progresses from early requests for consultation through 10 years of annual monitoring reports. Caltrans felt their former business practices and available tools were not sufficiently effective and efficient in providing the timely information agencies need to make decisions and verify compliance, resulting in higher staff costs and slower project delivery as information is passed back and forth and not readily accessible in a manner that would reduce agency decision times. To improve on this, Caltrans built a web-based interface in a secured extranet environment to allow resource and permitting agency decision makers to readily access and exchange accurate information for streamlined permit and agreement processes. The system will also allow the DOT to quickly gather input and electronic approvals on time-sensitive projects and interact with resource agencies on workload priorities and programmatic solutions. Caltrans was inspired by Florida DOT's ETDM process and EST and its effectiveness in structuring, facilitating, and increasing the efficiency of interagency review as well as the coordination within interagency Environmental Technical Advisory Teams. Caltrans is expecting: 1) a decrease in the number of hours it takes to obtain permits and agreements, track compliance, and submit annual reports, 2) improved communication between local, state, and federal agencies and partners involved in permitting, and 3) reduced cost of annual environmental monitoring and reporting. As of yet, the system has no tie-in to construction contracts, with a contract-provision development wizard such as Washington State DOT's, but this could be developed.

## 5 DOT Construction Contract Development Practices Relate to Environmental Commitments

This chapter focuses on how information in the environmental tracking system is incorporated into the construction contract documents and other options for getting commitments into the contract documents. Different approaches entail different risks but such risks can be reduced by developing a comprehensive system and building in redundancies.

### 5.1 DOT Contracts as an Implementation and Enforcement Mechanism for Environmental Commitments

DOTs increasingly perform their work in the field via contracts. For construction work, this has already been the case for many years. Contracts may be defined as the written agreement between the Authority and the Contractor to whom the award is made, setting forth the obligations of the parties for the performance of the prescribed work. In turn, contract documents are all the documents that are an integral part of the contract. These include, but are not limited to the:

- Invitation for bids
- Required contract provisions and certifications for Federal-aid projects (when applicable)
- Labor requirements
- Instructions to bidders
- Environmental requirements
- Standard Specifications – contain construction, material and contract administration requirements applicable to every project unless supplemented or changed by an Amendment or Special Provision or GSPs.
- Supplemental specifications
- Special Provisions - a compilation of several documents put together for a specific project. Components are:
  - Amendments are changes to the Standard Specifications that are effective when the contract is advertised for bid.
  - Special Provisions – additional project specific requirements that supplement previously approved provisions that have specific relationship to the contract. Other Special Provisions are written for specific project requirements that are not already included in another document.
- Proposal – the documents that include the list of bid items. The contractor fills in the bid process for each item of work.

- Appendices – other items that relate to the contract such as soil boring logs, permits
- Standard Plans – a manual of standardized, pre-approved plan details for frequently recurring work components.
- Standard Specifications – contain construction, material and contract administration requirements applicable to every project unless supplemented or changed by an Amendment or Special Provision or GSP.
- Contract Plans - standard drawings and project plans with graphical representation of the various items of work that are to be accomplished on the project.
- Bonds including bid bond, performance bond, and payment bond.
- Proposal schedule, statement of the bidder, executed agreement, and notice to proceed.
- Any addenda issued and other documents agreed to subsequent to the award of the contract that provide for the completion of the work in an acceptable manner, such as change orders, extra work orders and supplemental agreements.

None of the states responding to the survey for this study utilized a contract boiler plate or scope of work to instruct the contractor to include environmental commitments in the budget and schedule, or to ensure completion of environmental obligations by the close of the project.

## 5.2 Inclusion of Commitments in the PS&E Package

A PS&E package is prepared for each project and must be complete before the project can be advertised for bid. The PS&E is the primary means for documenting the environmental commitments for which the construction contractor will be responsible. Caltrans has perhaps one of the most comprehensive systems for tracking environmental commitments from the NEPA clearance through maintenance. Caltrans developed several forms and templates to be completed and signed by various responsible parties to help ensure all environmental commitments are tracked from the NEPA approval and included in the PS&E submittal to support FHWA federal-aid funding. The [Plans, Specifications and Estimate \(PS&E\)/Ready to List Review Tool](#) provides a handy checklist of all the possible commitments the reviewer should look for in the plan sheets and specifications as well as confirmation that environmental mitigations costs are included in the Engineers Estimate. The reviewer must also confirm that the applicable environmental document has been reevaluated, either formally or informally, that a Public Outreach Plan is in place and all environmental permits and approvals have been obtained. The reviewer must check “yes”, “no” or “not applicable” for each item. The Environmental Branch Chief must sign an [Environmental Certification](#) that also confirms that:

- All environmental commitments that belong in the PS&E are included.
- All actions in the PS&E are covered by the approved environmental documentation, which remains valid.
- All permits are complete and a list of permits is included in the statement.
- Noise abatement is included in the project

- If the project has environmental commitments, an environmental commitment Record has been prepared.

The [Summary of Required Permits And Environmental Commitment -PS&E Phase](#) summarizes the required permits, and environmental commitments that must be incorporated into the PS&E for each project. This form also identifies the staff person responsible for completion of each commitment - including the project manager and the project engineer, the phase of the project the commitment is to be completed – design, construction, post construction, the action taken and date the commitment is completed. The completed form is signed by the Office Chief of Environmental Planning.

The [Mitigation Monitoring and Reporting Record](#) is used to track the completion of environmental commitments through construction. This form is used to describe the environmental mitigation tasks, actions taken, date of completion and the staff person responsible for ensuring the mitigation requirement is complete.

In other states, DOT regions have their own Plans Review Office. A PS&E may be prepared using the procedure outlined in the DOT's *Plans Preparation Manual*, which can provide a degree of uniformity helpful to contractors and subcontractors that bid on the DOT's projects. For example, New Mexico DOT's general provisions at section 107.11 state that<sup>18</sup>:

Special environmental and cultural resource requirements developed to protect resources shall be described in the contract documents. The Contractor shall abide by all environmental and cultural resource management requirements. The Project Manager and the Environmental Program Manager are available to assist.

At a minimum, DOTs incorporate wetland mitigation, erosion control, landscaping, sound walls and other engineered mitigation in the construction plan sheets. Appendix E provides an example from Delaware. In New Mexico, a separate sheet is set aside in the construction plans that details environmental commitments that the contractor is required to follow. For example, if temporary fencing is required to protect archaeological sites, wetlands, etc., the fencing locations are placed on the plan and profile sheets. The Environmental Program Manager must sign off on the plans before the project is approved for letting.<sup>19</sup>

### ***“Green” Sheets Provide a Convenient Flag***

Many agencies use “green” sheets attached to final design plans to provide a convenient flag to distinguish environmental commitments not completed during the NEPA process. A Green Sheet may be used to convey understanding for why something was completed early and why that should not be undone. An example could be: “We decided an alignment needed to go “here” to miss a prime wetland. In this example we do not want Value Engineering (VE) or design to come along later and move the alignment back over the top of the wetland – just because it may save some money. In this case the Green Sheet would be used to exclude that option from a VE study.”<sup>20</sup> In addition, environmental permits are included in the appendix and a Memorandum describing all of the environmental commitments is also included in the appendix of the contract.

Appendix E includes examples of Michigan DOT's Gold Sheet and Iowa's Green Sheet that allow the PM to enter project commitments, identify the person responsible, and can be used to track the hand-off between environmental, design and construction. Tracking

gets divided into who made the commitment. For example, if a commitment made in the NEPA process cannot be completed prior to final design, a Green Sheet Response will go back to environmental staff when it is done. Colorado's Excel spreadsheet provides project specific commitments making it easier to track individual project commitments. However, the most comprehensive example is from FHWA for a California project, also provided in Appendix E.

In Arizona, the environmental clearance memo is sent to the Contracts and Specifications section and the mitigation measures are included verbatim in the special provisions of the bid package. The individual district is responsible for monitoring the contractor to ensure the measures are followed. Alaska DOT lists all environmental commitments in an appendix of the construction contract, along with the environmental permits.<sup>21</sup>

In WSDOT's Northwest Region office, when the PS&E for the project is being developed, the Environmental Compliance Assurance Inspector, Environmental Technical Advisor, Chief Inspector and other Design and Construction representatives hold an Environmental Compliance Meeting (ECM) to identify the environmental commitments that need to be incorporated into the contract. If needed, the project team writes Special Provisions and prepares Contract Plans ECNs that list the contractor-relevant environmental commitments. The Contract Plans also contain environmental compliance drawings that relate to the permit conditions.

### ***A Clear Established Process for Turning Permit Language into Contract Language***

Washington State DOT has a commitment tracking system intended for statewide use, but even without using a commitment tracking system, a clear established process for turning permit language into contract language in the final PS&E can suffice as well. WSDOT's Northwest Region developed a white paper entitled *Incorporating Environmental Permit Requirements into Plans and Specifications*, which addresses: (1) project risk identification, delineation, and staking of environmental resources; (2) permit acquisition for at least 90% PS&E constructability review; (3) establishment of ECN Plan Sheets; and (4) standardization of project risk types and a naming convention for all environmental resources within the project limits.<sup>22</sup> This is a well-documented process and fits the Region's business process for which the white paper was written and distributed. It provides a very custom process for each project.

In addition, this process addresses duplicate permit conditions by utilizing one note that can provide references back to the specific locations in the permit where it originated. One drawback is the potential for conflict due to placement of permit requirements in the contract and the choice of requirements used on the ECN sheets. There is a concern that there may be conflict or ambiguity between the ECN and other specifications. For example, a note related to Temporary Erosion and Sediment Control (TESC) requirements says, "the contractor shall perform periodic inspection and maintenance of all erosion control structures at a minimum frequency of every seven days."<sup>23</sup> Standard specifications say "The contractor shall inspect all on-site erosion control BMPs at least once every calendar week."<sup>24</sup> Standard specifications also include details of how inspections are to be reported and provide a means of paying the contractor for the work. In case of conflict, the Plans govern over the Standard Specifications. The partial redundancy and lack of detail on the ECN are of concern in how the contract may be

interpreted. Appendix F provides excerpts from WSDOT's NW Region Process for Incorporating Environmental Permit Requirements into Plans and Specifications.

### **FHWA's Role**

For FHWA to approve a project, commitments relating to the human and natural environment must be met.<sup>25</sup> DOTs must assure there are plans for dealing with the various issues, and the intent is that these plans be implemented and then maintained as appropriate. FHWA regulation (23 CFR 635) requires "verification that" appropriate environmental mitigation measures be included in the PS&E package to mitigate environmental harm prior to authorizing Federal-aid construction funds. For example, in keeping with current, approved guidelines, the design plans must include measures to minimize soil erosion and water pollution as a result of runoff of stormwater from the construction site.<sup>26</sup> FHWA's regulations also state that the PS&E package will not be approved by FHWA "unless those noise abatement measures which are reasonable and feasible are incorporated into the PS&E package to reduce or eliminate the noise impact on existing activities on developed or undeveloped lands for which development is planned, designed, and programmed." Despite these requirements, the 2002 domestic scan showed that in some cases, these requirements that have been around for years and have not been implemented and maintained.

The DOT is also required to submit a statement to FHWA that all right-of-way clearances, utility, and railroad work has been completed. The statement includes a certification that relocations have been carried out according to the provisions of FHWA directive(s) and the Uniform Relocation and Real Property Acquisition Policies Act, or that the process is underway and the DOT has physical possession of the property and the occupants have vacated the property. In unusual circumstances, the acquisition and right-of-entry have not been completed but the DOT has made available decent, safe and sanitary replacement housing.<sup>27</sup>

## **5.3 Multi-Disciplinary Compliance Assurance and Technical Assistance Team**

As part of WSDOT's Northwest Region's approach described earlier in this Chapter, the Region Environmental Office coordinator facilitates the environmental documentation process and obtains permits in coordination with team members of the Design Office. The project design team sets up an ECM with the Design and Construction representatives. These include the Chief Inspector, Environmental Inspector, and the Environmental Compliance Assurance Inspector and the Environmental Technical Advisor, who provide varying levels of oversight and technical assistance during construction. The ECM is held during the time when the PS&E for the project is being developed.

During the ECM meeting, the staff identify the environmental commitments that need to be incorporated into the contract. If needed, the project team writes Special Provisions and prepares Contract Plans (ECNs) that list the contractor-relevant environmental commitments. The Contract Plans also contain environmental compliance drawings that relate to the permit conditions.



## 5.4 Plan Review Involving Environmental Staff at 95% Design

Different DOTs call advanced design review by different names, such as a “Plans in Hand Review” (WSDOT) or “Final Office Review” (CDOT) that occurs at about 95% design completion. At both DOTs, the PE, Regional Engineering, plus the Maintenance, Utilities, Traffic, Environmental, and Plans Office staff attend the review. The participants review the contract Plans, plus General and Special Provisions, page by page. At WSDOT, the plans and special provisions are cross-referenced with permits and the project team looks for inconsistencies and ambiguities. A record of changes is kept, and once made, the updated contract is re-routed to the PE responsible for the project.

## 5.5 Standardizing Commitment Names and Descriptions

VDOT’s CEDAR has generated a unique degree of success among statewide environmental commitment tracking systems in the degree to which it has begun to standardize commitment names (categorizing titles of different types of commitment descriptions). CEDAR has pull-down menus with the program area and then a long list of commitment names. This helps with reporting and with internal monitoring and process improvement. WSDOT is also working on standardizing provisions as described elsewhere in this report, and Maryland has already done a huge amount of work in discussing and reducing the number of similar but varying requirements imposed by resource agencies.

## 5.6 Single Environmental Point of Contact in Development of PS&E

WSDOT’s internal audit found that every WSDOT Region implements a best practice by virtue of having staff whose role is to coordinate permit acquisition and communicate the expectations to Design and Construction, and a distinguishable process is followed.

Ensuring commitments are incorporated into project construction contract documents is a particular focal problem, one that some states have handled better than others. WSDOT’s CTS excels at support for contract specifications and maximizes confidence that all environmental commitments will be included. The system directly supports assignment of responsibilities for ensuring that commitments are handled and specifically supports contract writing (e.g., assignment of a commitment to a contractor via a legally enforceable document).

In WSDOT’s regions that are using the agency’s commitment tracking system, lead staff members from the Region Environmental Office enter commitments from environmental documents and permits into the CTS internal database. The CTS has an “Assign Responsibility” feature that allows references to contract documents to be separated between WSDOT and the contractor. The agency can then generate reports on how commitments are covered in contracts.

WSDOT’s South Central Region employs a Single Environmental Point of Contact who is assigned for the entire design phase of a project. This staff person coordinates federal and state environmental processes and records the commitments in a project file. The project file is then delivered to another individual in the Environmental Office, whose responsibility it is to coordinate with the Construction Office responsible for

building the project. This individual works with the PE's Office during the preparation of the PS&E to see that the necessary commitments are incorporated into the contract.

In contrast, the review of 95% design plans at CDOT may involve not only the region environmental coordinator but also one or more resource specialists. Once environmental staff provide comments, the design engineer is responsible for making the necessary revisions and ensuring all environmental commitments are included in the final plans.

Across the DOTs, most have a shared responsibility among the project team members for ensuring environmental commitments are included in construction contract documents.

## 5.7 Transferring DOT Requirements to the Contractor

In some cases, DOTs do not break the permit down into individual terms and conditions that are then incorporated into contract specifications. It may just be noted that the contractor "must comply with conditions of the Section 404 permit," which is included in the contract. Thus the DOT seeks to use language that minimizes the staff workload to pull out various terms and conditions, and seeks to make the contractor responsible for doing so and staying in compliance.

New Mexico DOT's General Provisions on legal relations, environmental requirements, and responsibility to the public (section 107.1) state that<sup>28</sup>:

The Contractor shall keep fully informed of all Federal and State laws, all local laws, ordinances and regulations, and all orders and decrees of bodies or tribunals having jurisdiction or authority which in any manner control pollution or impacts to the environment, affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all such laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the State and its representatives against claims or liability arising from or based on the violation of such laws, ordinance, regulation, order, or decree, whether by the Contractor himself or herself or by employees of the Contractor.

Before the start of project construction, the Contractor shall contact the municipal or State agency responsible for air, noise, and water quality control regulations to determine the standards that shall be adhered to during construction operations.

With regard to protection of streams, lakes, and reservoirs and compliance with the Clean Water Act National Pollutant Discharge Elimination System (NPDES), NMDOT simply states: "The Contractor shall comply with the requirements of Section 603, Temporary Erosion and Sediment Control, and the requirements of NPDES." And, "in carrying out work along or adjacent to live streams, "the Contractor shall comply with the regulations and requirements of the New Mexico Game and Fish Department and other regulatory authorities as set forth in the plans and special provisions."

Normally, DOTs procure the necessary environmental permits. For example, NMDOT's provisions at 107.11 say, "Before construction, the Department shall obtain the environmental and cultural resource approvals for the project area included in the contract documents. Special environmental and cultural resource requirements developed to protect resources shall be described in the contract documents. NMDOT extends responsibility for compliance with Federal-Aid requirements as well."<sup>29</sup>

107.7 FEDERAL AID PROVISIONS. When the United States Government is obligated to reimburse the Department for all or any portion of the cost of a project, the Federal laws and the rules and regulations made pursuant to such laws shall be observed by the Contractor, and work shall be subject to inspection by the appropriate Federal agency.

Connecticut's General Provisions Section 1.10 on Environmental Compliance includes requirements commonly imposed on contractors:<sup>30</sup>

The Contractor shall be bound to comply with all requirements of permits and permit applications, as though the Contractor were the permittee.

The Contractor shall be responsible for, and hold the State harmless from, any penalties or fines which may be assessed by any authority due to the Contractor's failure to comply with the terms of all applicable permit requirements.

## 5.8 Requiring Prospective Bidders to View the Project Environmental Documents

DOTs often require the prospective bidders and subcontractors to view the project environmental documents, on the theory that the contractors adequately familiarize themselves with the requirements and then take the necessary actions to address the requirements in the budget and schedule. For example, Colorado DOT's general construction requirements at section 250.03 state, "Prospective bidders, including subcontractors, are required to review the environmental documents available for (this) project. These documents are listed in subsection 102.05 as revised for (the individual) project."<sup>31</sup>

Despite such requirements, DOT staff have legitimate concerns about how well permits are reviewed and considered by contractors in the bidding process. Taking into consideration candid responses about how often such documents may be reviewed in detail, as they should, WSDOT's internal audit concluded that permits included in contract appendices should be for reference only, and if permit conditions require action of the contractor, agency staff should continue the common practice of extracting the condition and inserting it into a contract provision or plan detail. Still, attaching the permit as an appendix helps the contractor understand the original source of the commitment and is a useful resource.

## 5.9 Contractor Responsibilities

Nearly all DOTs we found have contract statements like the following, that contractors "shall at all times conduct operations in conformity with all Federal and State permit requirements concerning water, air, or noise pollution or the disposal of contaminated or hazardous materials." Such statements often go on to add further detail on what may be included or covered, such as the following:<sup>32</sup>

Permit requirements include, but are not limited to those established by federal regulations administered by the United States Coast Guard and the U.S. Army Corps of Engineers.

Appropriate permits shall be required for all activities associated with or incidental to the Contractor's operations including, but not limited to, those on the Project site and in all adjacent areas, waste and disposal areas, borrow and gravel banks, storage areas, haul roads, access roads, detours, field offices, and any other temporary staging areas.

During the course of project construction, if the contractor fails to meet the environmental commitments the DOT may issue a “stop work” order until the problem is corrected. Such provisions are primarily designed to strengthen the hand of DOTs, should they decide to take such corrective action, which is rare. Most states acknowledged the need to strengthen their process for taking corrective action when environmental commitments are not completed; for now, they rely on standard dispute processes.

The DOT has the option of issuing a “stop work” order if a commitment is not being met, e.g., the contractor’s failure to do stormwater management, and if the contractor has grossly ignored environmental commitments, payment may be withheld from the contractor until they come into compliance with any permit or environmental commitment made by the project.

DOT environmental staff members noted that enforceable provisions for environmental matters may be lacking in contract specifications; however, even where those exist, the willingness to use them must be present.

### ***Exceptional Contractor Program***

Oregon Bridge Delivery Partners (OBDP), a joint venture of HDR and Fluor consultants, is under contract to the Oregon DOT and has set a very high bar for ensuring environmental commitments are met during construction.

### ***Training the Construction Contractor’s Staff***

OBDP trains the contractor’s staff to promote environmental stewardship. The training includes such topics as the biological opinion, erosion and pollution prevention, incident response/violation procedures, and project specific environmental concerns. The contractor specialist knows ahead of time how a site will be assessed, what a compliant item looks like, and what is non-compliant. Recurring issues are discussed, and the environmental stewardship training provides a forum for training and guidance to limit or prevent future non-compliant events.

### ***Serious Environmental Compliance Inspection Program***

The program averages 40 environmental compliance inspections per project. The objective of environmental compliance inspection is to document the project compliance with respect to the program permits and the construction contract and aid construction contractors in understanding the environmental concerns. A large portion of the construction compliance program is to teach contractors about the Program and environmental stewardship and to grow everyone’s ownership in the Oregon environment. Compliant and non-compliant items are documented as well as the corrective action and associated timelines necessary to get a project back into compliance with the project permits. Most inspections are completed in conjunction with the construction contractor. The inspections allow OBDP staff members to identify areas where improvement may be necessary and/or required to improve compliance with permits and to provide a larger overall benefit to terrestrial and aquatic species and habitats. Periodic inspections help the environmental staff identify problems so they can be fixed before becoming more serious and potentially result in a formal violation from a regulatory or resource agency. The inspection team works as a partnering team with the construction community to raise awareness of the important environmental issues, a

benefit that is starting to be seen on non-Program projects and will continue to be the legacy of the success of the Program's environmental stewardship program.

Environmental compliance inspection results are shared with regulatory agencies, ODOT, program administrators, and the contractor through an online document management system. The most commonly observed items requiring correction are associated with erosion control and pollution control, such as improper installation of erosion control materials or minor fuel spillages. Contractors are able to quickly repair or remediate the situation before the issue results in a permit violation, demonstrating an increasing initiative in preventing environmental permit violations.

Standards, training, inspections, communication and the corrective action feedback system has produced results. To date, no regulatory or resource agency has issued a formal violation of an environmental permit. This collaborative approach to environmental compliance inspection is changing the construction culture; construction contractors, taking a more proactive approach to environmental stewardship, are recognizing the benefit of the programmatic permits. Lessons learned during environmental compliance inspection will continue to be incorporated into future contracts for both the Program projects as well as other ODOT projects.

### ***Contractor Disincentive Specs for Inadequate/Improper Installation of BMPs***

Thirteen state DOTs have implemented contractor disincentive specifications, allowing fines or withholdings in case of inadequate installation or maintenance of erosion and sedimentation control BMPs.<sup>33</sup> One such example is that of the Colorado Department of Transportation, which is available in Section 208 of the department's specifications: [CDOT Erosion Control Contractor Disincentive Specification on page 28](#). Essentially, the specification states that "[t]emporary erosion and pollution control measures required due to the Contractor's negligence, carelessness, or failure to install permanent controls as a part of the work as scheduled or ordered by the Engineer or for the Contractor's convenience, shall be performed at the Contractor's expense. In the case of repeated failures on the part of the Contractor in controlling erosion, sedimentation, or water pollution, the Engineer reserves the right to employ outside assistance or to use Department forces to provide the necessary corrective measures. Such incurred direct costs, plus project engineering costs, will be charged to the Contractor, and appropriate deduction will be made from the Contractor's monthly progress estimate. Accepted work performed to install measures for the control of erosion and sedimentation, and water pollution, not originally included in the Contract will be paid for as extra work in accordance with subsection 104.03."<sup>34</sup>

Utah DOT also has a \$500.00 penalty each calendar day during which the project is in non-compliance with permits and regulations. The fine is above and beyond that assessed by regulatory agencies. Furthermore, no extension of contract time is allowed for any project delay resulting directly or indirectly from a violation.<sup>35</sup>

None of the states surveyed said they hold funds in escrow to ensure the successful completion of environmental commitments. This is particularly important for things such as erosion control, landscaping and wetland mitigation that may be newly installed at the end of a project but the success or failure may not be known for several years. At least one state, Alaska, may withhold an amount equal to projected fines for any notice of

violations and many states require a contractor to warranty all plantings for one or two years with payment for the work done by a contingent sum.<sup>36</sup>

### ***Requiring the Contractor to Repair Resources Damaged by Failure to Abide by Environmental Requirements***

NMDOT adds language requiring the contractor to repair, at their expense, all damage to environmental or cultural resources caused by failure to comply with contract requirements. Such requirements increase the contractor's incentive to ensure that environmental damage does not occur, so the contractor's profit margin does not take a hit.

CDOT's provision 107.26 on Minimization Of Soil Disturbance states that, "The Contractor shall ensure that damage to or removal of vegetation and trees shall be kept to a minimum and that no extraneous clearing, grubbing, land disturbance or excavations shall take place" and "the Contractor shall bear the full cost of vegetation remediation necessary due to the Contractor's negligence as determined by the Project Manager."<sup>37</sup>

### ***Provisions for Failure of the Contractor to Comply with Environmental Requirements***

Connecticut has contract language which states that, "In case of failure on the part of the Contractor to perform pollution control work as determined by the Engineer, the Engineer may, upon 24 hours written notice, arrange for the performance of the work by approved forces and the cost thereof will be deducted from any monies due or which may become due the Contractor under the Contract or under any other State contract."

Likewise, Maine DOT's general provisions state that "If the Contractor properly implements its approved Sediment and Erosion Water Pollution Control Plan (SEWPCP), then (1) any Work required in excess of that required by the SEWPCP will be Extra Work, (2) any Delay resulting from any such excess Work will be analyzed in accordance with Section 109.5 - Adjustments for Delay.

North Dakota's General Provisions (addressed in section 110.06 on measurements and payments) state that:<sup>38</sup>

When temporary erosion and pollution control measures are required due to Contractor's negligence, carelessness, or failure to install permanent controls as part of the scheduled work and are ordered by the Engineer, the work will not be measured for payment and shall be done by and at the Contractor's expense.

Temporary erosion and pollution control work required, but not due to the Contractor's negligence, carelessness, or failure to install permanent controls, shall be performed as ordered by the Engineer. Work items required for this control work that have a Contract price shall be measured as provided by the Specifications for that item of work. Work items used or required that are not a Contract item will be measured and paid for according to Section 104.03 D. Should the Contractor fail to control erosion, pollution, and siltation, the Engineer will employ outside assistance or state forces to do the work. The direct costs, overhead costs, and engineering costs incurred under these conditions will be deducted from payments due the Contractor for work done on the Contract.

### ***Provisions for Passing along Environmental Fines to Contractor***

Lastly, many DOTs maintain provisions for passing environmental fines to contractors, as Maine DOT does with regard to Sediment and Erosion Water Pollution Control Plans:<sup>39</sup>

"(3) The Contractor will be responsible for damages relating to insufficient soil erosion and water pollution control including the cost of all environmental enforcement actions, penalties, or monetary settlements assessed any environmental regulatory entity and all costs incurred by or through the Department.

If the Contractor fails to prepare, submit, or seek approval of a SEWPCP or fails to properly implement its approved SEWPCP, then (1) the Department may suspend all Work, (2) the Department may withhold all Progress Payments or any portion thereof until the Contractor remedies all deficiencies; (3) the Department may remedy deficiencies with Departmental or contracted forces and deduct the cost thereof from payments otherwise due the Contractor; (4) any delay resulting from such failure or noncompliance will be a Non-excusable Delay; and (5) the Contractor will be responsible for all damages arising from or related to such failure or non-compliance including the cost of all environmental enforcement actions, penalties, or monetary settlements assessed by any environmental regulatory entity and all costs incurred by or through the Department including legal and consulting fees."

### ***Contractor Responsibility for Environmental Damages at No Additional Charge to the DOT***

As previously discussed in an example from WSDOT's internal study, DOTs commonly incorporate statements of contractor responsibility for environmental damages at no additional charge to the DOT. For example, Colorado DOT's Contracting Section 250.09 on Basis of Payment states, "the Contractor shall be responsible for damage caused by construction operations to the environment, persons, or property. Expenditures associated with actions of the Contractor shall be borne by the Contractor at no cost to the project."<sup>40</sup>

Again, such provisions strengthen the DOT's hand should the agency decide to take action; however, DOTs have noted difficulty in getting contractors to perform work for which they are not explicitly paid, to the extent that some, such as WSDOT, are discontinuing use of the provision.

### ***Requiring the Contractor to be Responsible for Environmental Clearance for Natural and Cultural Resources for Areas Outside of the Contract Documents***

Many DOTs require the contractor to be responsible for environmental permitting and approvals for project-related off-site disturbance such as contractor-furnished aggregate and borrow sources. Similar to most DOTs, NMDOT's General Provisions state, "The Contractor shall procure all permits and licenses, pay all charges, fees, royalties, and appropriate taxes, and give all notices necessary and incidental to the due and lawful prosecution of the work."(Section 107.2).<sup>41</sup> The contract language NMDOT utilizes is provided below:<sup>42</sup>

107.14 CONTRACTOR'S RESPONSIBILITY FOR ENVIRONMENTAL AND CULTURAL RESOURCES APPROVAL. Before beginning soil-disturbing activities at areas such as camp sites, plant sites, crusher

sites, stockpile sites, equipment yards, borrow pits, and surfacing pits (see subsection 106.1, Contractor-Furnished Aggregate and Borrow Source), as well as for any construction area obtained by the Contractor that is not included in the contract documents, the Contractor shall employ a qualified Environmental Scientist and a Cultural Resource Professional to conduct an environmental and cultural resources study. The Environmental Scientist and the Cultural Resource Professional must have appropriate resource study permits and meet the professional qualifications established by regulatory authorities to conduct the required studies. The documentation prepared must meet the standards of the Department and regulatory authorities. The documentation must also meet the standards of state, tribal, or federal land managing agencies if the proposed activity is located on land under their jurisdiction. The studies are required regardless of land ownership, and they are in conformance with the requirements included in the National Environmental Policy Act, the National Historic Preservation Act, and the New Mexico Cultural Properties Act.

The Department shall provide a form that shall be used to meet the requirements for the environmental study. The Contractor and the Environmental Scientist must sign the form. The cultural resources review must meet standards established by the State Historic Preservation Officer and, if applicable, the appropriate land-managing agency. A state, tribal, or federal agency with jurisdiction over the property may also establish other environmental and cultural resource study requirements.

The documentation prepared for the environmental and cultural resources studies shall be submitted to the Project Manager and, if required, to other regulatory authorities with jurisdiction over the land or resources that are present. Copies shall also be submitted to the Environmental Program Manager. The Environmental Program Manager shall submit the cultural resource studies to the State Historic Preservation Officer.

The Contractor shall complete any other coordination required by environmental regulations. The Project Manager shall notify the contractor when cultural resource approval from the Environmental Program Manager has been obtained. The coordination may take 30 days from the date it is delivered to the Environmental Program Manager. The requirements of subsection 104.2, Significant Changes in the Character of Work, shall apply if the time needed to obtain approval exceeds any federal or State statutory requirements containing time limits.

Approval of the State, tribal, or federal land-managing agency, if applicable, and coordination with regulatory authorities and the State Historic Preservation Officer must be completed before the Contractor initiates any soil-disturbing activities at the locations subject to this requirement. In addition, the contractor shall abide by all environmental and cultural resource requirements for protection of resources identified during the environmental and cultural resources studies. See subsection 107.13, Responsibility for Damage to Environmental and Cultural Resources.

**DOTs try to plan for coverage for activities or methods not specifically called for by the contract, plans, applications submitted or applicable permits. For example, Connecticut DOT states that:**<sup>43</sup>

Any request by the Contractor for authorization of activities or methods not specifically called for by the Contract, plans, applications submitted or applicable permits issued for the Project must be submitted by the Contractor in writing to the Engineer, and must include a detailed description of the proposed activities or methods, the justification for those activities and supporting documentation showing that the proposed activity or method will not create risks of damage to the environment. If such proposal is accepted by the Engineer, the Department will process an application to the appropriate regulatory agency or agencies for any permit amendment, modification, revision or new permit required for the Contractor to carry out the additional activities or implement the changed methods on the Project. The Department does not, however, guarantee that it will be able to obtain the desired permit amendment, modification or revision, and the Department will not be liable for the effects of any inability to do so. No



extension of time will be granted as a result of the Contractor's request to perform work not authorized as part of the established permit requirements. If the amendment, modification, or revision of the permit is not necessary for the Contractor to perform the work as required by the original Contract or as subsequently ordered by the Engineer, then no claim may be made by the Contractor based on the amount of time taken by the Department to review the Contractor's proposal, or to apply for or secure the permit amendment, modification or revision. No such proposed additional activity shall commence, nor shall such a changed method be implemented until and unless the Engineer approves in writing the Contractor's request.

### ***Requiring the Contractor to Retain Certified Specialists***

In select cases, the contractor may be required to employ certified specialists to monitor and provide quality control during construction, and assist the contractor in compliance with the environmental commitments. For example, Alaska DOT may require a wildlife biologist monitor eagle nests during construction. On some projects, FDOT requires an erosion control specialist to ensure compliance with an NPDES permit. INDOT only requires the contractor to retain a particular specialist when the law specifically requires it, i.e., the Secretary of Interior standards for Section 106. Arizona DOT found that requiring the construction contractor hire a qualified monitor when mitigation includes special provisions has worked well. The New Mexico DOT has found it effective to use a combination of contractor provided certified specialists and in-house experts.

Requiring the contractor to provide a certified specialist to oversee construction of a mitigation commitment, e.g., a wetland, or monitor potential impacts to paleontological resources, can provide relief for DOTs already strapped for resources. In many cases, monitoring would not occur during project construction and any failure to meet mitigation requirements would have to be rectified at the close of a project when there may or may not be any remaining funds, or later at additional cost to the DOT. To be the most effective, the specialist should be independent from the construction contractor.

### ***Incentives for Excellent Environmental Performance***

In construction and maintenance, DOTs have developed a variety of incentive-based approaches for contractors. DOT maintenance contracts are increasingly utilizing incentives as well as penalties or disincentives, along with warning specifications.

The disincentives for not meeting scope, schedule, and budget are severe, and DOTs often have difficulty attracting attention to adequate or excellent environmental performance. A number of state DOTs have established incentives for excellent environmental performance for staff members; however, Oregon DOT is one that has utilized financial incentives for excellent performance to contractors as well. ODOT offered \$100,000 bonuses on two design-build projects, predating the state's Oregon Transportation Improvement Act III (OTIA III) program. The bonuses worked well and the prime contractor shared the bonus with "the guys running the environmental equipment."<sup>44</sup> Everyone was happy with the results. The sample specification is included in the appendix, though the Oregon interviewee noted that the specification was inadvertently left out of the contract; however, Oregon had told the contractor it was there and honored it anyway. Oregon's Environmental Excellence Financial Incentive for Contractor specification is included in Appendix F.

## 5.10 Sorting Out Special and General Provisions, Standard and Supplemental Specs

With a wide array of general and special provisions, requirements noted on plans, supplemental and standard specifications, and other contract requirements, contractors and DOT managers are in increasing need of a structure or a template for sorting it all out. To add such clarification, Connecticut DOT has added the following to their general provisions:<sup>45</sup>

All requirements indicated on the plans or in the standard specifications, the supplemental specifications, special provisions or other Contract provisions shall be equally binding on the Contractor, unless there is a conflict between or among any of those requirements. In the case of such a conflict, the order of governance among those requirements, in order of descending authority, shall be as follows:

- Environmental Permits
- Environmental Permit Applications
- Special Provisions
- Plans other than Standard Sheets (enlarged details on plans, used to clarify construction, shall take precedence over smaller details of the same area; information contained in schedules or tables titled as such shall take precedence over other data on plans)
- Standard Sheets
- Supplemental Specifications
- Standard Specifications and other Contract Requirements

Numerical designations of dimensions shall take precedence over dimensions calculated by applying a scale to graphic representations. Neither party to the Contract may take advantage of any obvious error or omission in the Contract.

Should either party to the Contract discover such an error or omission, that party shall notify the other party of same immediately in writing. The Engineer will make such corrections and interpretations of the Contract as are necessary to fulfill the purposes of the Contract which are evident from examining the Contract as a whole.

## 5.11 BMPs Outlined in General Provisions and Standard Specifications

DOTs have many standard specifications that apply to all construction contracts and contractors are expected to be familiar with and comply with the specifications. Some DOTs include standard environmental requirements in their general provisions. For example, actions to comply with the Clean Water Act (in most cases administered by a state department of the environment) are required in every state. With the rash of EPA prosecutions and consent orders over the past several years, DOTs are taking water quality needs and requirements more seriously than ever before. A notable example and model for other states: Alabama DOT modified its proposed list of special provisions in August 2008, related to clearing and grubbing to specify that the Contractor shall not

exceed the maximum limit established for the exposure of erodible material—a key factor in pollution prevention.<sup>46</sup> Illinois DOT has an extensive section of standard specifications on earthwork, landscaping, and erosion control, to meet environmental requirements.<sup>47</sup>

Connecticut DOT's general provision Section 1.10 specifies a general set of BMPs for all projects, which "may be superseded by specific permits from DEP (Department of Environmental Protection)." Other BMPs relate to air quality and noise management. General BMP provisions relating to archaeological or paleontological information and materials provide that "Extra work ordered by the Engineer in this connection will be paid for in accordance with Articles 1.04.05 and 1.09.04."<sup>48</sup>

The Contractor shall not make any design changes in the Contract work which requires a variance from the requirements of the following items until and unless the Contractor has first submitted a detailed written proposal for such changes to the Engineer for review by the Department and for transmittal to and review by the DEP, and then received written approval from the Department of the proposed variances.

#### BEST MANAGEMENT PRACTICES

1. No construction shall proceed until erosion and sedimentation control plans, prepared by the Contractor, have been submitted in writing and approved by the Engineer, and until such controls have been installed as the Engineer directs. Such plans shall be consistent with the Connecticut Council On Soil & Water Conservation document "Connecticut Guidelines for Soil Erosion and Sediment Control," as revised, which is available from DEP, and with the Department document "On Site Mitigation for Construction Activities," as revised.
2. Refueling of equipment or machinery within 8 m of any wetland or watercourse shall be allowed only with the approval of the Engineer.
3. No construction shall proceed until a written proposal of methods to prevent construction debris, paint, spent blast materials, or other materials from entering the wetland or watercourse has been submitted by the Contractor to the Engineer and approved by the Engineer, and such methods have been implemented as the Engineer directs. These materials shall be collected and disposed of in an environmentally safe manner in accordance with all applicable Federal and State laws and regulations. The Engineer may order the Contractor to cease such activity temporarily if, in the judgment of the Engineer, wind or storm conditions threaten to cause the deposit of such materials into a waterway.
4. No materials resulting from construction activities shall be placed in or allowed to contribute to the degradation of an adjacent wetland or watercourse. Disposal of any material shall be in accordance with Connecticut General Statutes, including, but not limited to, Sections 22a-207 through 22a-209.
5. Forging of streams with equipment shall be prohibited, except as approved by the Engineer. Such equipment travel shall be minimized. Where frequent equipment travel on stream banks and beds is necessary, washed stone shall be placed to minimize erosion, scour, and turbidity, provided no significant grade change will be required for any haul road or temporary structure placed in wetlands or watercourses in accordance with provisions established under Section 1.10.02.
6. All off-site disposal locations for material and debris resulting from the progress of the Project shall be submitted in writing to the Engineer who shall determine whether or not they are acceptable.

The Contractor shall ensure that these locations are outside of designated wetlands or watercourses, unless otherwise approved by local, state, or federal agencies with jurisdiction over the matter.

7. A construction sequencing plan and a water handling plan including a contingency plan for flood events must be submitted in writing to the Engineer and approved by the Engineer prior to the commencement of any construction in a waterway. Water shall be kept deep enough in the channel to allow for the passage of fish and the continuous flow of the watercourse as required by the Engineer.
8. When dewatering is necessary, pumps shall not discharge directly into the wetland or watercourse. Prior to dewatering, the Contractor must submit to the Engineer a written proposal for specific methods and devices to be used, and obtain the Engineer's approval of such methods and devices to be used for dewatering activities, including, but not limited to, pumping the water into a temporary sedimentation bowl, providing surge protection at the inlet and outlet of pumps, or floating the intake of the pump, or other methods to minimize and retain the suspended solids. If the Engineer determines that the pumping operation is causing turbidity problems, said operation shall cease until such time as a means of controlling turbidity is submitted by the Contractor, approved by the Engineer and implemented by the Contractor.
9. Work within or adjacent to watercourses shall be conducted during periods of low flow, whenever possible. The Engineer shall remain aware of flow conditions during the conduct of such work, and shall cause such activity to cease should flow conditions threaten to cause excessive erosion, siltation or turbidity. The Contractor shall make every effort to secure the work site before predicted major storms. A major storm shall be defined as a storm predicted by NOAA Weather Service with warnings of flooding, severe thunderstorms, or similarly severe weather conditions or effects.
10. All temporary fill shall be stabilized during use to prevent erosion and shall be suitably contained to prevent sediment or other particulate matter from reentering a wetland or watercourse. All areas affected by temporary fills must be restored to their original contours or as directed by the Engineer, and revegetated. The areal extent of temporary fill or excavation shall be confined to that area necessary to perform the work, as approved by the Engineer.
11. Seeding is to be accomplished within 7 days of the Contractor's reaching an appropriate grading increment as determined by the Engineer. If the Engineer anticipates and notifies the Contractor, or if the Contractor intends, that a grading operation will be suspended for a period of 30 or more consecutive days, the Contractor shall, within the first 7 days of that suspension period, accomplish seeding, or take such other appropriate measures to stabilize the soil as may be required by the Engineer.
12. Dumping of oil, chemicals or other deleterious materials on the ground is forbidden. The Contractor shall provide a means of catching, retaining, and properly disposing of drained oil, removed oil filters, or other deleterious material. All spills of such materials shall be reported immediately by the Contractor to the DEP.
13. No application of herbicides or pesticides within 8 m of any wetland or watercourse will be allowed. All such applications must be done by a Connecticut licensed applicator. The Contractor shall submit to the Engineer the proposed applicator's name and license number, and must receive the Engineer's approval of the proposed applicator, before such application is carried out.
14. During spawning seasons, as defined in the Contract, discharges and construction activities in spawning areas of State Waters shall be restricted so as not to disturb or inhibit aquatic species which are indigenous to the waters.

If the Contractor wants to make changes in construction operations or scheduling which would affect the use of or necessity for any pollution controls, before beginning to implement those changes it must submit a written proposal detailing them to the Engineer, and must receive the Engineer's approval of those changes. As part of its submission the Contractor must submit a plan showing what erosion and

sedimentation controls above and beyond those called for in the plans and specifications would be necessitated by the changes it proposes to make in the sequence or nature of Project construction activities and related operations.

The Contractor shall inspect temporary and permanent erosion and sedimentation controls immediately after each rainfall and at least daily during prolonged rainfall. The Contractor shall maintain all erosion and sedimentation control devices in a functional condition in accordance with the document "Connecticut Guidelines for Soil Erosion and Sediment Control," as revised, and the Department's document "On Site Mitigation for Construction Activities," as revised. In the event the Contractor fails to maintain such devices in accordance with such documents, and the Contractor does not correct those failures within 24 hours after receipt of written notice of such failures from the Engineer, the Department may proceed with its own or other forces to remedy specified failure and the cost thereof will be deducted from monies due the Contractor under the Contract or under any other State contract.

NMDOT utilizes a briefer and less specific statement in its general provisions<sup>49</sup>:

All work in the vicinity of live streams, water impoundments, wetlands or irrigation supplies shall be completed in such a manner as to minimize vegetation removal, soil disturbance, and erosion. Crossing of live streams with heavy equipment shall be minimized, as determined by the Project Manager. Equipment refueling, maintenance and concrete dumping in the vicinity of water courses is strictly prohibited. These activities shall be performed in proper containment areas. The Contractor is responsible for compliance with the New Mexico Water Quality Act and applicable Clean Water Act permits and regulations.

Standard specifications and general provisions to implement BMPs on construction projects whether to prevent pollution in stormwater runoff, dust control or manage hazardous materials, provide contractors standardized, predictable requirements and leaves nothing to chance.

## **5.12 Enhance Standard Specifications and General Special Provisions**

Many state environmental offices have been working with construction and contracting offices to enhance standard specs and general special provisions to address as many known permit conditions as possible, that include conditional language commonly found throughout the state. By coordinating up front with the resource agencies, leading states are taking this opportunity to clarify and standardize permit language, to consolidate as many requirements as possible, and to reduce and streamline their overall number of commitments. For example, WSDOT Headquarters is developing Imposed Restrictions GSPs based on a model developed in the Olympic Region.

The Olympic Region's Imposed Restrictions (IR) utilizes a suite of Region GSPs, developed for the Region, along with Special Provisions that are inserted into the contract through their Region PS&E process. One of the GSPs covers all the known and repeating conditions in two separate Implementing Agreements with Department of Ecology; the Construction Stormwater General Permit; and all Nationwide Army Corps permits. There is a very formal, mandatory review of the IRs before any project can be advertised for bid. There are three steps to the process, which themselves comprise a series of methods to ensure that environmental commitments are included. Staff from the Environmental, Design, Construction, and Plans Offices:

- **Evaluate the whole Region GPSs and select applicable conditions** based on the project characteristics and exclude the rest.
- **Evaluate permits in addition to the ones covered by any IRs and determine whether those permits require supplementing language** already in the IR or include a project Special Provision.
- **Compare the results of the IR process to NEPA/SEPA documents and Biological Assessment for consistency**, which may also require addition of restrictions.

One benefit to the Region is that the IRs free up time to focus attention on permit conditions that are not covered by the IR or Standard Specifications. In addition, the IR is built around the Region's business process, which provides consistency and predictability in contract preparation, and builds confidence in the WSDOT Project Engineers who administer the contract. Projects cannot be advertised for bid without being evaluated using IR process.

On the other hand, any portion of the IRs that are based on existing Standard Specifications, must at least be double-checked when Standard Specifications are amended or GSPs are changed. In addition, if any related interagency agreements and/or permits are updated, then the IR must be evaluated and modified accordingly.

WSDOT is now developing general special provisions for the state as a whole, so that all regions can enjoy the benefits. WSDOT expects that the GSPs will be finished and available for use by mid-2009, in time for the 2010 construction season.

The GSPs help the DOT minimize risk in a number of ways. The GSPs make it easier for the DOT to compile necessary commitments in a geographic area or for a certain resource quickly and easily, increase the likelihood that commitments and resources will be covered and in a consistent manner. The GSPs also make it easier for the DOT to enforce on the contractor, if needed. Finally, it improves communications and clarity of expectations with the contractors. WSDOT anticipates that "anytime you clarify things for contractors, you should get less expensive bids" as risk is reduced.<sup>50</sup> Appendix F contains WSDOT's IRs.

## 5.13 Reinforcing Permit Requirements and Other Environmental Commitments

After providing the contractor with a copy of all permits or the ability to view them, the DOT may include language in the general provisions that reinforce those requirements and the DOT's expectation that the contractor comply with those. For example, Connecticut's General Provisions Section 1.10 on Environmental Compliance states that:<sup>51</sup>

The requirements and conditions set forth in the permit and permit application shall be binding on the Contractor just as any other specification would be. This Section reinforces those environmental protection requirements which the Contractor is bound to meet under the terms of the Contract, or under Federal or State laws and regulations. If a Contractor fails to comply with environmental provisions of the Contract or law, the Contractor shall be penalized as provided in this Section and as provided elsewhere in this contract.

Such reinforcing provisions are intended to provide extra incentive for contractors and to clarify the DOT's emphasis on and expectation of performance, with regard to the agency's environmental commitments. Appendix F contains Connecticut's Contract General Provisions as well as an example from Wyoming.

## 5.14 Project Closeout

Before a project is closed, the DOT does a walk through to do a final check to see that the project has been constructed according to the plans. At Caltrans, all projects are required to complete a [Certificate of Environmental Compliance at Construction Contract Acceptance](#) form that states that the completed project meets or exceeds all environmental commitments included in the Environmental Commitment Record (see Section 5.2). Any modifications to the commitments or out-standing post-construction commitments are included. The completed form is signed by the Environmental Construction Liaison, the Resident Engineer, the Environmental Branch Chief, and the Project Manager.

In most states, final payment may be withheld from the contractor if there are any disparities, including lack of compliance with any permit or completion of environmental commitments. However, if the agency environmental staff are not included in the final walk-through, environmental compliance may be overlooked. The primary enforcement mechanism DOTs have if contract commitments are not completed is standard contract performance dispute procedures.

Beyond a simple "yes" or "no," DOTs generally do not identify thresholds used to evaluate the accomplishment of environmental commitments. Furthermore, internal audit systems to track environmental commitments included in the contract are uncommon. At the request of FHWA, Minnesota DOT (Mn/DOT) started doing audits but it is very informal process conducted for about 1 in 100 projects. Alaska DOT & Public Facilities' Quality Assurance Section reviews the whole contract, including environmental commitments, for compliance with the FHWA or FAA programs. Audits are conducted while construction is in progress and again when the project is completed.

New Mexico DOT, as with most, attempts to ensure long-term success of environmental mitigation by good design upfront and conscientious monitoring during construction. It is common for contracts to require the construction contractor to monitor and replace landscaping or habitat restoration plantings for a one- or two-year period. Otherwise, except in very rare cases, DOT contracts typically do not include any other requirements that hold a contractor accountable for the repair or replacement of any other mitigation failures after a job is accepted. Many DOTs note that this is a problem because the DOT does not have a separate pot of funds to make the necessary repairs post-construction. In turn, resource agencies have lost confidence in the ability of the agencies to maintain the mitigation measures in the long term and are including more stringent permit requirements.

## 6 Process Improvements to Reduce DOT Risk and Build Contractor Accountability

### 6.1 Caltrans Quality Assurance Plan

As part of the contract bid documents, Caltrans has been pushing the state to have a requirement to add a quality assurance plan for environmental commitments. The plan would be similar to plans already required for traffic control, EEO Officer, and other special items/features to make the contractor accountable for the implementation of environmental commitments. The QA could be added as part of the overall QA for the project or make a specific Q for environmental commitments with a contractor “assigned” qualified/trained environmental officer. Soil and erosion control are better recognized by the contractors but section 106, section 4(f), noise, etc. requirements are lesser known by the construction staff (state contractors) as they have never really been educated on these issues. A preconstruction meeting is a very good way to help take some time to train the staff as well as their required safety “tailgate” meetings every 1-2 weeks as new employees are brought into the project.<sup>52</sup>

### 6.2 Inter-agency Process Review

In 2008, the Arizona Division of the FHWA, USACE, Bureau of Land Management (BLM), and the Arizona Department of Transportation (ADOT) collaborated in a review of existing processes to evaluate the extent to which environmental commitments made in NEPA documents are tracked and implemented for transportation projects in Arizona.<sup>53</sup> Initially, FHWA surveyed and interviewed DOT environmental planners, project managers, district engineers and agency representatives, to determine the extent to which they understood:

- Roles and responsibilities related to developing and implementing environmental mitigation measures, and
- ADOT’s processes and procedures for developing and implementing environmental mitigation measures.

Construction site visits were then conducted to determine how/if environmental commitments were being implemented. As a result of these reviews, FHWA made the following observations and recommendations:<sup>54</sup>

**Observation 1:** There is often confusion and/or uncertainty concerning who is responsible for tracking development and implementation of environmental commitments through project development, construction, and maintenance.

**Recommendation:** Establish a clear path of communication and responsibility for the “hand-off” of environmental commitments and include the information in the project files through project development, construction, and maintenance.

**Observation 2:** There is no established tracking mechanism for ensuring compliance with environmental commitments during construction activities.



**Recommendation:** Develop a plan and tracking mechanism that ensures compliance with environmental commitments during project construction activities.

**Observation 3:** Recent turn-over and staffing limitations have a direct impact on developing appropriate environmental mitigation measures during project development. Education and training specific to developing mitigation measures is limited to on-the-job training.

**Recommendation:** Education and training are critical for staff to become more aware of environmental impacts associated with transportation projects. A Mitigation Measures Training program would help staff recognize and develop appropriate environmental commitments that avoid and/or mitigate environmental impacts. Develop and offer a training program to all Office of Environmental Services staff and District Environmental Coordinators (DECs) specific to recognizing what mitigation measures would be appropriate for transportation projects and practice developing measures that can be implemented and tracked for constructability and cost effectiveness.

**Observation 4:** Environmental commitments are sometimes not understood or are difficult to construct and/or maintain, e.g. seasonal construction restrictions for endangered species, Section 106 avoidances for post construction and maintenance activities.

**Recommendation:** Greater involvement by district staff, including DECs, early in the mitigation measure development process would give planning staff better insight into constructability and maintenance issues. Involve district staff in developing the mitigation measure training recommended above.

**Observation 5:** Mitigation measures requiring re-vegetation following construction activities are often not appropriate to the project's environment. For example, re-vegetation needs/practices in Yuma are much different than those needed in Prescott or Safford.

**Recommendation:** Establish a committee within the Environmental Services Leadership Team to work with ADOT's Roadside Development section and DECs to refine re-vegetation practices specific to district environmental conditions.

## 6.3 Risk Management

Risk management is more effective near the beginning of any process, though the early project phases can be the most challenging because of the lack of project details. Risks are defined as uncertain events that have a positive or negative effect on at least one of the project objectives (scope, schedule, budget, quality). When a serious environmental non-compliance event occurs, all of these areas are at risk. Risk management is the practice of dealing with project risk: the practice includes planning for risk, assessing risk, developing risk response strategies, and monitoring risk throughout the project life cycle.

According to FHWA, "Risk management processes, tools, documentation, and communication are less standardized than any other dimension of transportation project management."<sup>55</sup> Very few DOTs said they have a formal risk management process, particularly as it relates to managing the scope, schedule and budget for the NEPA process, much less ensuring that environmental commitments are included. Only a few state DOTs, including Caltrans and WSDOT, have established explicit risk management processes to incorporate risk management in their planning to increase the probability and impact of positive events (opportunities) and decrease the probability and impact of adverse events (threats) to project objectives. WSDOT has refined its project management process to include best practices, tools, templates and examples for both

pre-construction and construction management. Other good examples include Caltrans, FDOT and VDOT.

Caltrans' [Project Resourcing and Schedule Management \(PRSM\) Risk Management Plan](#) documents the process and procedures that they use to manage project risks. The plan explains how the project manager is to identify and track risks throughout the life cycle of a project, describes the tools used, identifies the person(s) responsible for managing various areas of risk, and the terms by which contingency plans are derived and implemented.

High impact/high probability risks may be tackled through avoidance, mitigation, or transference. A DOT's or an individual's tolerance for risk may diminish if a more certain outcome is preferred and more money is at stake. Common approaches to risk are described below:

- **Avoidance**—Changing a project objective to eliminate the threat posed by an adverse risk event. For example, impacts to natural and cultural resources may sometimes be avoided through early planning or careful design.
- **Mitigation**—Reducing the probability or impact of a risk to an acceptable threshold.
- **Transference**—Shifting the negative impact of a threat, along with the ownership of the response, to a third party.

### **Caltrans' Risk Planning**

DOT project delivery performance is judged on quality, adherence to schedule, and being within budget. [Caltrans' Risk Management Handbook](#) outlines a process for PMs to use to manage risk and meet project delivery goals.<sup>56</sup>

At Caltrans, the project management team completes a Risk Management Plan when the project is initiated, and the plan is monitored and updated throughout the life of the project. Caltrans requires project managers to maintain scope, cost, and schedule estimates in a permanent project history file, which is updated annually, at project milestones, or when significant changes occur between milestones. This documentation must accompany any program change requests sent to the Headquarters Division of Project Management.

Caltrans' risk management process includes six steps, which apply to environmental risks and potential failures that occur in construction, as well as other risk areas:

- **Risk management planning** is the development of a Risk Management Plan for potential risk identification and development of a strategy to manage the risks. Caltrans uses a standard template that includes methodology, roles and responsibilities, budgeting, timing, risk categories, definitions of risk probability and impact, probability and impact matrix, reporting formats, and tracking to be used with the handbook. The template is for developing a risk management plan and ranging from incomplete environmental analysis, threat of a lawsuit, discovery of unanticipated impacts and others.
- **Risk identification** is the documentation of risks that might affect a project. The process, which uses input from internal and external stakeholders, is iterative; it evolves as the project progresses. Caltrans provides tools to help identify risks, such as a sample risk breakdown structure by project components—environmental,

design, ROW, construction, external, organization and project management—and a sample list of potential environmental risks by component.

- **Qualitative risk analysis** prioritizes risks for further action. After the risks are identified, the team assesses the probability and impact of the risks and categorizes them into high, moderate, and low risk based on the potential effect on schedule, cost, scope, or quality. The risks are then ranked by degrees of probability and impact.
- **Quantitative risk analysis** uses statistical techniques to estimate the probability that a project will meet its cost and time objectives. The analysis shows how likely the plan is to come in on schedule or on budget, how much contingency of time or money is needed, and which activities or line-item cost elements contribute the most to the possibility of overrunning the schedule or cost estimates.
- **Risk response planning** develops options to reduce or avoid risks and assigns responsibility for implementing the risk management strategy and monitoring the risk over time.
- **Risk monitoring and control** keeps track of identified risks, residual risks, and new risks over the life of the project. It also monitors the execution of planned strategies and evaluates their effectiveness.

Caltrans is committed to using a project management system, including risk management, to ensure that individual projects are delivered on time and within budget. In Caltrans' system, the director delegates responsibility for project delivery to the district directors, and the deputy director of finance has responsibility for approving changes in project scope, cost, and schedule. Only the state Transportation Commission can change the programmed cost and programmed fiscal year for projects in most programming documents, making it particularly important for engineers to avoid and manage risks.

### ***Florida's Risk-based Graded Approach***

*FDOT's risk analysis method* is similar to the Caltrans method, but FDOT also developed a risk-based graded approach—a quick process to identify the overall risk value of a project, and the Project Risk Register—a formal risk analysis using input from internal and external stakeholders for complex and risk-prone FDOT projects.<sup>57</sup> Similar to the WSDOT assessment, the first step in the FDOT method is development of a Risk Management Plan to identify and document potential project risks.

The risk-based graded approach analysis quantifies project risks early in project development and helps determine planning and control requirements; however, the assessment is not used as a substitute for formal risk identification, qualification, quantification, and response planning. FDOT's risk-based graded approach analysis helps:

- Determine where to assign limited PM resources
- Define the project scope
- Evaluate risk elements (risk versus cost)
- Get agreement from all members of the project team

FDOT identified 15 critical risk elements (other risks can be added or some eliminated) to assess the overall level of risk, per element, per project priority (i.e., scope, schedule, cost, and quality). The project team assigns each element a value between 1 and 5. Environmental risks received a low score in the sample below, perhaps due to site characteristics or the predictability added by Florida's ETDM, which includes early environmental screening and interagency consultation and approval of projects. The agency is still working on developing a concept for a statewide system to track environmental commitments; currently, these particular commitments and risks are managed in individual ways, by each District or Region and assigned a value of 1, 3, or 5 as shown in Figure 4.

**Figure 4: Florida DOT Risk-Based Graded Approach Worksheet**

ITEM	RISK ELEMENT	RISK ASSESSMENT	PRIORITY	TOTAL
1	Utility Involvement	1	3	3
2	Project Schedule	5	5	25
3	Interfaces	3	1	3
4	Experience/Capability	3	3	9
5	Right-of-Way Involvement	5	5	25
6	Environmental Impacts/Contamination	1	1	1
7	Regulatory Involvement	3	3	9
8	Contractor Issues	5	3	15
9	Resource and Material Availability	3	3	9
10	Project Funding	1	1	1
11	Political Visibility	3	5	15
12	Public Involvement	3	3	9
13	Safety	3	3	9
14	Construction Complexity	1	1	1
15	Weather Sensitivity	3	1	3
<b>Risk Score</b>				<b>137</b>
Low Risk				0 - 90
Medium Risk				90 - 150
High Risk				>150

Source: FDOT Project Management Handbook

The total risk score is calculated by multiplying the risk scores by the priority scores for each of the 15 elements. The risk element scores are totaled to determine the overall project risk score. Figure 4 illustrates a sample worksheet.

After the project management team prioritizes potential risks using the qualitative risk analysis described above, the effect of those risks can be quantified. The qualitative risk analysis prioritizes the risks and assigns a cost in dollars if the risk occurs. Techniques for quantifying risks include interviewing stakeholders to determine probabilities and impacts, sensitivity analysis, decision tree analysis, and simulation (i.e., Monte Carlo technique).

Finally, a risk response plan assigns one of the following strategies for each risk, considering the risk priority. Notably, for this project, changing the scope of a proposed or existing contract to transfer the risk to a contractor or insurance company is a key strategy in mitigating risk:

- Change the project plan to eliminate or avoid the risk.
- Mitigate the risk to reduce the probability and impact of a risk to an acceptable level.
- Accept the risk.
- Select a strategy that has the best cost-benefit.
- Change the scope of a proposed or existing contract to transfer the risk to a consultant, contractor, or insurance company.

Below, Florida DOT Risk-Based Graded Approach Worksheet illustrates a FDOT risk response plan.

### Florida DOT Risk-Based Graded Approach Worksheet

Risk	Response
<b>High Priority Risks</b>	
Local communities will pose objections	<b>Include a well prepared community action plan in the consultant scope and ensure consultant devotes adequate staff in negotiations.</b>
Delay in railroad agreement	<b>Begin negotiations with railroad early in the project and ensure adequate consultant support is available.</b>
Unanticipated project manager workload	<b>Request that an assistant PM be assigned to the project. Work closely with Professional Services to ensure the consultant selection process results in a consultant that can be expected to produce with minimum oversight by the FDOT project manager.</b>
<b>Intermediate Priority Risks</b>	
Selection of an inexperienced consultant	<b>Follow recommendation in response for unanticipated project manager workload.</b>
Aggressive schedule	<b>Review schedule before finalizing consultant scope and revise if necessary.</b>

Source: FDOT Project Management Handbook

## 6.4 Rewarding Staff and Getting Contractors to Perform

A number of state DOTs have established incentives for excellent environmental performance for staff members. Many DOTs utilize so-called performance measures to indicate whether a specific objective outlined in a quarterly or annual performance plan has been achieved. NYSDOT established a comprehensive evaluation system for new Construction and Maintenance Environmental Coordinators to build support for the positions within the agency, ensure that the positions were utilized for the intended purpose, provide requested services (outputs), and address internal stakeholder needs.

Maryland and North Carolina evaluate their resident engineers, in part, on environmental violations that occur on their watch.

A number of states have incorporated environmental accountability into annual performance evaluation for more than new environmental positions, to add incentive for improved environmental performance. In a 2002 census of state DOTs on 360 environmental best practices, including this topic area. Arizona, Indiana, North Carolina, New Mexico, New York, Pennsylvania, Rhode Island and Utah indicated they have incorporated environmental performance into annual evaluation of design staff.<sup>58</sup> Arizona added environmental performance evaluation for their maintenance staff as well. Indiana, New York, Utah, and Virginia noted they do so for both construction and maintenance, while Montana did so for construction staff only.<sup>59</sup> A longer list of states do not incorporate environmental outcomes into annual evaluations, but recognize outstanding performance or environmental outcomes where they occur.<sup>60</sup>

### State DOTs Recognizing Outstanding Environmental Work

DOTs providing individual recognition for outstanding environmental work in:	
<b>Planning</b>	CA, DC, DE, FL, IL, IN, MD, MI, NC, OH, PR, TX, WY
<b>Design</b>	CA, CO, DE, FL, IL, IN, MD, MI, MS, NC, NM, NV, NY, OH, PA, UT, WA, WI, and WY
<b>Construction</b>	CO, DE, FL, IL, IN, MD, NM, NY, PA, TX, UT, WA, WI, WY
<b>Maintenance</b>	CO, DE, FL, IL, IN, MD, NY, UT, WI, and WY

## 6.5 Process Improvements with Regard to Erosion and Sedimentation Control

A number of DOTs have developed or are developing processes to ensure better environmental performance by contractors. Erosion and sedimentation control has been a particularly active area.

### *Vermont's Erosion Prevention and Sediment Control (EPSC) Database*

VTrans' Erosion Prevention and Sediment Control (EPSC) database includes a performance evaluation on the contractor and subcontractors with 12 environmental questions. This feeds into a rating system for prequalification, giving contractors an incentive to deliver good environmental performance and those with the best environmental performance an advantage.

### Project and Commitment Data Entry

VTrans uses the Access databases for projects in the Preconstruction Project Management System (PPMS) and draws project information from this system. Construction uses Trans\*port for Construction Projects. A project scheduler, Artemis, schedules activities for preconstruction and draws from the separate mainframe (PPMS).

The projects in the Access Environmental Data Base (EDB) are downloaded from the TPMS system, automatically populating certain data fields. Likewise the Access database also displays an automatically downloaded due date for NEPA document completion from the Artemis system.

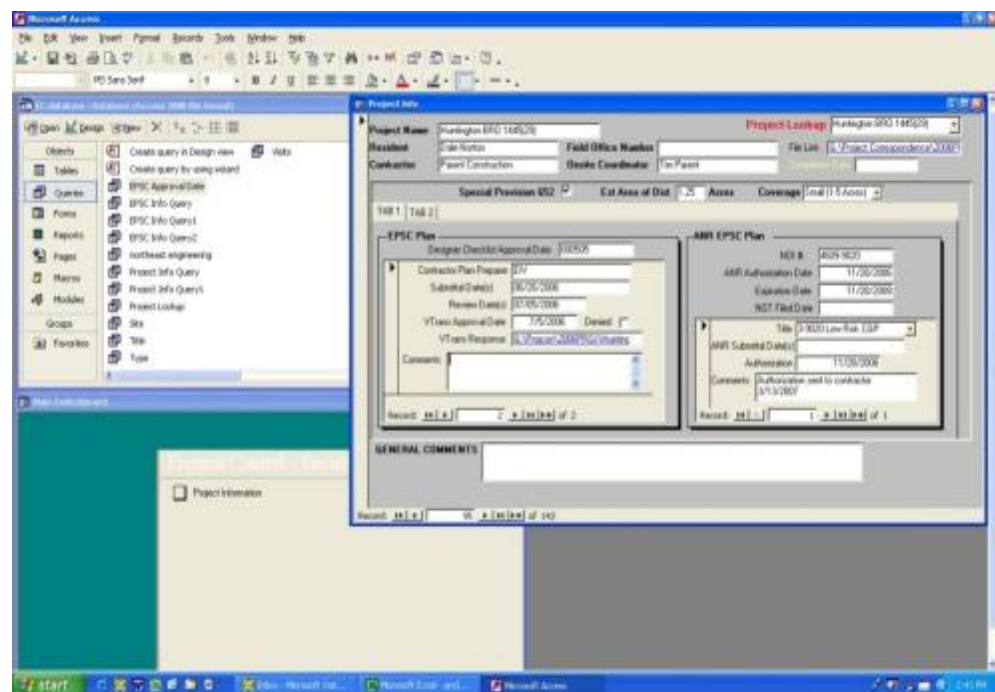
The information for each project in the Construction EPSC Database is entered after the project goes out to construction. Only the two construction environmental specialists, who manually enter plan review comments, waste, borrow and staging plan comments and site visit documentation, use the EPSC database.

**Performance Data Entry:** The construction environmental specialists use the application to fill out a performance evaluation on the contractor and subcontractors, which has 12 environmental questions. This feeds into a rating system (a dozen factors) for prequalification. The performance evaluation for contractors is in a separate database only accessible to the Prequalification Committee and is maintained only within the Construction Office.

**Commitment Tracking and Performance Management:** The construction EPSC database has the ability to do queries within itself to check the consistency or lack of consistency of consultants who develop EPSC plans for contractors. It also allows for review of field visit reports, pictures and permit compliance dates. This is all manually entered information (Figure 5). The construction EPSC database does not have a commitment tracking function, due to concerns about having the same information in two databases without provisions for keeping the information synchronized. Most projects fall under general permits, which are included in the contract plans. There is a formal hand off procedure from construction to operations, both physically and verbally.

VTrans' Access EDB is not used to track permit conditions out in the field. However, every time a construction environmental engineer does a field visit, they do a report and attach a copy of it in the construction EPSC database. VTrans has a specification that requires the contractor to maintain an on-

**Figure 5: VTrans' Construction EPSC Database Showing EPSC Plan Approval/Permitting Data**



site erosion and sedimentation control manager or inspector. VTrans' own construction environmental engineers do field inspections randomly, without notice.

### ***MDSHA System for 100 Percent Compliance in Construction Erosion and Sedimentation Control***

MDSHA believes the agency maintains one of the better DOT enforcement systems in the country. To assess compliance, MDSHA implemented a six-layer system that includes independent quality assurance ratings for each project. Certified Quality Assurance inspectors inspect projects biweekly and rate the sediment controls on a letter grade scale. Projects can be shut down based on these inspections. Ratings for all projects are summarized quarterly and annually to comply with the MDSHA Business Plan. In the past, the agency pursued ratings of B or better on 95 percent of construction projects annually. As part of a primary agency commitment though, the Chief Administrator is seeking to improve performance to achievement of 100 percent compliance in construction. EMSs and voluntary compliance communication/reporting systems such as the one employed by MDSHA in construction (EM Toolkit) can notably increase interagency trust, reduce the need for all agencies to meet in the field to decide next steps. Such approaches have the potential to reduce reporting requirements as well.

### ***NCDOT Delegated Erosion and Sedimentation Control Performance Tracking***

NCDOT has its own sediment and erosion control program as delegated by the NC Sedimentation Control Committee and the North Carolina Department of Environment and Natural Resources (DENR). The Delegation Agreement has a self-monitoring component that requires NCDOT to inspect its projects for compliance with sediment pollution laws. Area Roadside Environmental Engineers (AREE) inspect all TIP and maintenance construction projects and whenever the AREE sees a significant erosion problem on a Department project that could result in issuance of a Notice of Violation (NOV) from DENR, the AREE will issue an Immediate Corrective Action (ICA) report to project personnel. This notifies project personnel that corrective procedures should be performed to resolve identified problems immediately. ICAs and NOVs are tracked and measured electronically and NCDOT has significantly raised environmental stewardship statewide through the program.

### ***WSDOT Draws on a Combination of ISO 14001 and an EMS for Erosion and Sedimentation Control***

The Washington State Department of Transportation (WSDOT) [Erosion Control Program](#) applies the standards of an Environmental Management System (EMS) and ISO 14001 to proactively plan, implement, and monitor effective TESC efforts. Continuous improvement is achieved through regular review and update of existing erosion control policies, procedures, guidance documents, and training curriculum. Changes are based on solid data gathered through compliance assurance activities.

The WSDOT Erosion Control Program has developed measures to monitor statewide

**All construction sites are evaluated and categorized based on their inherent risk of erosion. Risk factors include size; timing and duration of work; soils; slopes; groundwater levels; and the need for in-water work.**



performance, analyze data, and report the Program's effectiveness. As part of this compliance effort, WSDOT identifies and makes compliance visits to all construction project sites in the state that possess a reasonable potential for erosion problems. Site assessments evaluate the quality of plans, implementation of the contract, and effectiveness of the best management practices. The assessment is viewed as an educational opportunity and the assessor works closely with project staff to solve any problems observed in the field.

All assessment results are stored in the TESC Assessment Database, providing EMS document control. The database generates reports for use at the project, regional, and state levels.

Recommendations are clearly identified and associated with precise standard specifications to be applied in addressing concerns. The state report provides the State Design Engineer and the State Construction Engineer with an overall picture of how the various regions are performing. Additional reports can be generated for use at the Erosion Control Program management level, such as determining how well the required planning components are being satisfied, in addition to other key issues that are instrumental in improving the Program. Also, the best management practice report reveals the frequency of use, correct application, maintenance, and overall effectiveness of standard erosion control BMPs.

Chapter 6 of WSDOT's Highway Runoff Manual establishes monitoring protocols to ensure projects are sampling water quality correctly to meet permit requirements. Monitoring results are used to both evaluate specific project performance and validate results of the TESC activities. The results from the TESC Assessments and water quality monitoring are published and widely distributed in WSDOT's *Measures, Markers and Mileposts*, a quarterly document that tracks various agency performance and accountability measures.

The complete Erosion Control Program approach was developed with input and broad support of multiple stakeholders and reflects agency-wide ownership of the solution. The program has been accepted and institutionalized into the daily activities at all levels of those responsible for designing and building the state's transportation system. As a result, WSDOT expects agency-wide performance to continually improve.<sup>61</sup>

### **Texas DOT's Construction EMS**

Environmental Tracking System for Project Development, Document Review, Construction and Facility Operations, and Commitment Tracking Inspections conducted in 2003 and 2004 resulted in EPA enforcement actions against TxDOT for multiple construction violations for stormwater discharges. Settlement terms included a civil penalty in the amount of \$34,375 and implementation of a Supplemental Environmental Project (SEP), to cost at least \$1 million.

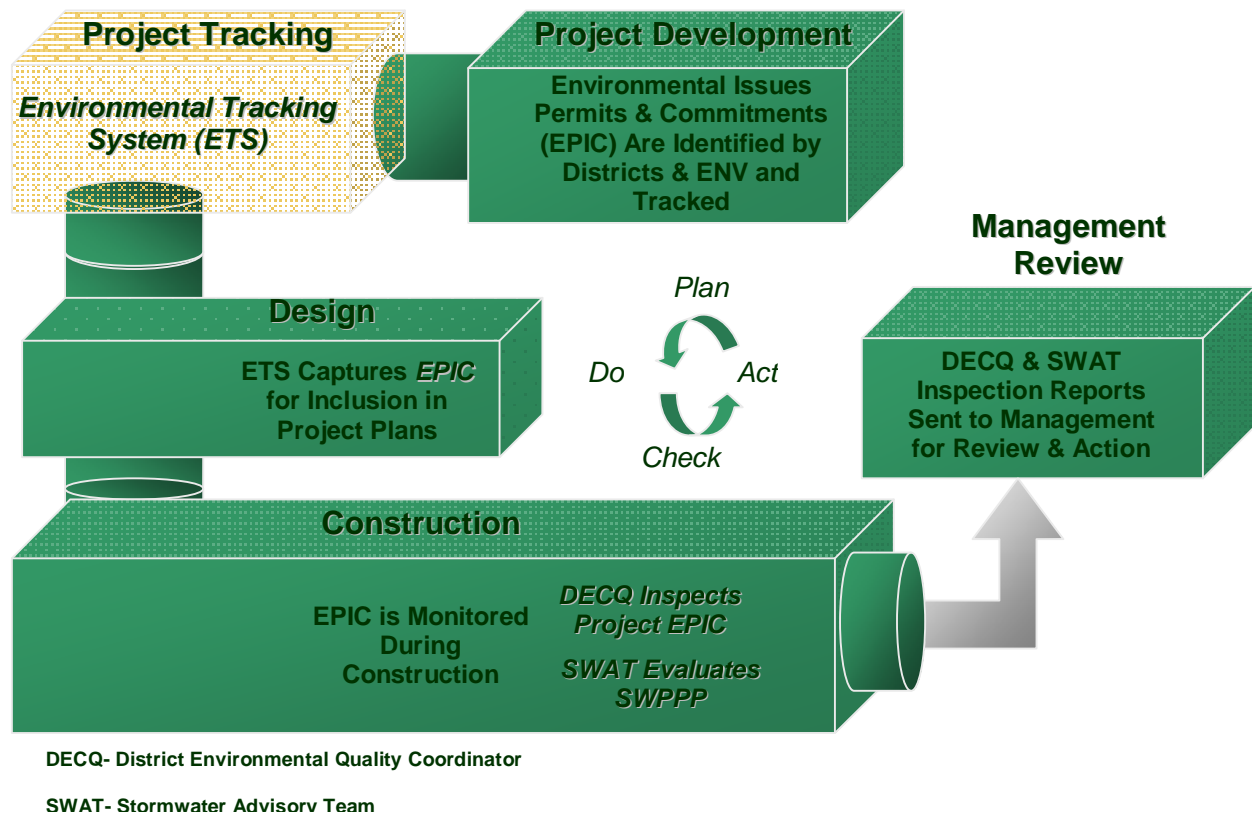
**WSDOT found that the most effective method of achieving change in construction is in partnership with the agency Construction Office and with the construction industry and by documenting the necessary changes and required practices in those directional documents that govern the construction process and in individual construction contracts. Applying ISO 14001 EMS standards provides compliance documentation and a feedback mechanism with an audit component identifying 1) how well WSDOT is protecting water quality; 2) what specific areas need improvement; 3) what strategies should be used to make improvements.**

The SEP involved the development and implementation of a statewide EMS for TxDOT's internal operations that focuses on improving environmental compliance and performance at all TxDOT road construction projects. Due to EPA SEP policy, the statewide management system is called a Construction Oversight Program in the settlement and not (technically) an EMS; however, TxDOT refers to it as an EMS (Figure 6). Key elements required as part of the consent decree, include the following.

1. Policy Statement – Clearly communicates management's commitment to achieving compliance with environmental requirements and continual improvement in environmental performance.
2. Defined Roles and Responsibilities – Protocol to identify, interpret, document and communicate to affected personnel environmental requirements applicable to road construction.
3. Identification of Environmental Requirements – Clearly define and communicate to all applicable organizational units and staff positions their roles and responsibilities associated with an environmental requirement.
4. Procedures to Assess and Maintain Compliance – Ongoing process for assessing construction operations for the purpose of maintaining compliance with environmental requirements.
5. Training and Awareness Procedures and Competency Standards – Procedures to identify specific education and training required for applicable personnel and for ensuring personnel responsible for maintaining compliance are appropriately qualified for the job.
6. Procedures to Document Compliance – Procedure for maintaining records and documentation in support of the EMS and who maintains them and where.

As a first step toward development of an EMS, the Texas Department of Transportation (TxDOT) developed a comprehensive Environmental Tracking System (ETS). This system tracks projects during project development, focusing on management of NEPA and environmental permitting requirements prior to construction. Through its commitment tracking function, TxDOT design personnel can determine if all Environmental Permits, Issues and Commitments (EPIC) are addressed in the project plans. ETS envisions including a central repository for facility surveys with the ability to make compliance updates online; for environmental policies and procedures as well as Internet links to resource agencies' policies; and job descriptions outlining how to perform environment related job duties. An overview of the system is shown in Figure 6.

**Figure 6: TXDOT Environmental Management from Project Development through Construction**



From Venner, Dewit, et al. "Current DOT Environmental Management System Development Efforts," *Transportation Research Record*, National Academy of Sciences, 2007.

## EMS Development

TxDOT organized an EMS development team, completed a gap analysis, and has developed a pilot EMS implementation plan in preparation for development, implementation, and evaluation of a statewide EMS. TxDOT's EMS Development Team consists of primarily internal staff that have a thorough knowledge of TxDOT construction operations and a good working knowledge of environmental laws and regulations. Included on the team were members from District and Division management, Area Engineer functions and duties, District construction offices, Division and District environmental staff, Design, DEQC, and Construction inspection.

TxDOT devoted particular effort to identifying aspects of operations that trigger environmental requirements, systematically identifying environmental requirements and the construction operations that might potentially trigger an environmental requirement (any applicable federal, state and local environmental statutes and regulations that must be addressed during a TxDOT road construction project). The gap analysis reviewed and evaluated the current environmental management practices and systems against the six key EMS elements. To accomplish this, the EMS Development Team:

- Interviewed District personnel and visited ongoing construction projects.

- Identified where systems had not been adequately developed or implemented.
- Identified the strengths and weakness in the existing environmental programs and practices.
- Identified expected resources and time needed to develop and implement the pilot EMS.
- Reported results of the gap analysis to EPA as per the settlement terms.

To develop the EMS implementation plan, work sessions focused on specific key elements of the EMS and developed standard operating procedures, training programs, and monitoring programs that will become part of the systems used to support the EMS. TxDOT piloted the EMS in three districts to evaluate the program before statewide implementation. In the end, TxDOT's EMS:

- Built upon the many successful environmental programs and initiatives already in place.
- Integrated new procedures into routine practices as much as possible.
- "De-mystified" environmental compliance for TxDOT and contractor personnel.
- Complied with all of the settlement's requirements.

TxDOT scheduled 65 months to complete full statewide implementation, including almost three years for the gap analysis and initial implementation and evaluation of the pilot EMSs. Another 32 months was allowed to complete the Statewide EMS implementation, not including time for final evaluation.

## **6.6 Construction Management Professional Services, Including Quality Management**

On particular high profile projects such as NMDOT's Highway 44, DOTs sometimes contract for independent construction management professional services and environmental commitment tracking. NMDOT's contract for Highway 44 included provisions for the day-to-day oversight and coordination of field operations between contractors, sub-contractors, suppliers, agencies, safety, QC/QA, designers, and technical disciplines to assure contractors' compliance with their plans. The construction management contractor was required to review the environmental commitments in the final environmental document and construction plans and prepare a plan to ensure compliance during construction. The contractor documented compliance with environmental commitments, maintained an environmental construction mitigation log, and submitted the log to the DOT upon completion of construction activities. Finally, the contractor prepared a final environmental construction report to document construction compliance with environmental commitments and demonstrate successful completion of environmental mitigation.

The Maryland State Highway Administration (MDSHA) also employs "independent environmental monitors," though in that case, the monitors are SHA employees. These staff members utilize the EM Toolkit to track compliance, corrective actions, and to communicate with other agencies.

## 6.7 Utilization of a Commitment Tracking System

Use of environmental commitment tracking systems to track commitments from planning through design, construction and maintenance could provide the most comprehensive method to ensure all commitments are met. However, as discussed previously, none of the DOTs have developed a system to track *all* commitments on all projects. In general, the less systematic tracking systems increase the risk that commitments will not be communicated effectively throughout project development. A truly effective system will require a substantial investment of resources to coordinate commitments across the project team through the life of a project, maintain and update the system to address changing conditions, provide monitors to ensure compliance in construction and maintenance.

## 6.8 Adequate Staffing for Environmental Oversight, Promoting Communication

In addition to adequate communication and tracking systems, adequate staffing can make a huge difference in ensuring that project environmental commitments are carried out.

For example, as previously discussed with regard to WSDOT's Olympic Region, the project design team sets up an ECM with the design and construction representatives when the PS&E for the project is developed. The following positions attend the ECM:

- Chief Inspector
- Environmental Inspector
- Environmental Compliance Assurance Inspector
- Environmental Technical Advisor

These staff later provide a level of oversight and environmental technical assistance during construction.

WSDOT also noted that some Regions (Washington State Ferries, North Central Region, Eastern Region, and South Central Region) had close working relationships among design, construction, and environmental staff due to their size and proximity of the respective offices.

## 6.9 Environmental Tracking for Materials and Borrow Sources

Many regulatory agencies, including the USACE, state environmental agencies, and others feel that DOTs are not doing enough to ensure that off-site areas necessary to build the transportation improvement are adequately reviewed and permitted. Increasingly, DOTs are ensuring coverage and control of such areas. At VTTrans, for example, the information for each project in the Construction Erosion Prevention and Sediment Control (EPSC) database is entered after the project goes out to bid (Figure 5). Only two construction environmental specialists utilize the EPSC system and manually enter plan review comments; Waste, Borrow and Staging Plan comments; and site visit documentation. Vermont has a very strict program in place that requires environmental resource specialists review waste, borrow, and staging areas.

Arizona DOT has general provisions for materials salvage during clearing and grubbing, including saving native plants.<sup>62</sup>

When the Contractor provides a material source, plant site, or equipment yard, he or she will be required to prepare an environmental analysis addressing the usage (refer to Subsections 107.11 and 1001-4). In addition, the Contractor must notify the Arizona Commission of Agriculture and Horticulture prior to any clearing operation. The purpose of this notice is to provide the opportunity for salvage and preservation as provided in the Arizona Native Plant Law. The Resident Engineer should bring these requirements up at the preconstruction conference if it is applicable to the project. This applies to privately owned land as well as publicly owned land.

Environmental conditions often restrict operations in sensitive watersheds. The standard specifications provide for saving all trees and shrubs found suitable for roadside improvement and beautification if they will not interfere with construction. In order that the contractor might know which trees and shrubs are to be saved, the resident engineer (with the assistance of one of ADOT's landscape supervisors) are required to mark such trees and shrubs and inform the contractor of such marking. Inspection is required between clearing and grubbing, and the following grading work.

In New Mexico contractor-furnished aggregate and borrow sources must be approved by the PM and the Environmental Manager. Before beginning any soil-disturbing activities, regardless of land ownership, the contractor must obtain any necessary permits and employ a qualified environmental specialist and a cultural resource professional to conduct the necessary studies. The contractor uses a categorical exclusion form that is signed by both the contractor and the environmental specialist. If the DOT has any environmental, social, or cultural concerns, the sources may be rejected.<sup>63</sup>

All damage to environmental or cultural resources caused by the contractor's failure to abide by all environmental requirements must be repaired by the contractor at their own expense. Repairs are determined in consultation with the DOT and the regulatory authorities with jurisdiction over the subject resources.

## 6.10 Monitoring Compliance

### *Entry and Tracking of Contractor Environmental Performance Data*

VTrans enters and tracks contractor environmental performance data. The construction environmental specialists answer 12 environmental questions to complete a performance evaluation on the contractor and subcontractors. This feeds into a rating system of a dozen factors for contractor prequalification. The performance evaluation for contractors is in a separate database only accessible to the VTrans' Prequalification Committee and is maintained within the Construction Office.

VTrans' EPSC database allows queries and checks on the consistency or lack of consistency of consultants who develop EPSC plans for contractors. It also allows for review of field visit reports, pictures and permit compliance dates, all of which are entered manually. VTrans' construction environmental engineers do field inspections randomly, without prior notice, and enters the results in the EPSC database. VTrans does this in addition to the standard specification that requires the contractor to maintain an on-site erosion and sedimentation control manager or inspector.

CDOT's Construction Contractor Evaluation Form emphasizes the importance of stormwater management and includes an evaluation the contractor's compliance with applicable requirements related to stormwater management. There is also a broad-brush note that states, "The contractor is expected to comply with all applicable environmental permits and requirements."

As previously discussed, MDSHA has an independent environmental monitoring program for projects with wetlands or water quality elements and an EM Toolkit software program that supports associated monitoring, communication, and corrective action activities.

## 6.11 How Communication Occurs and Existing Support Systems are Used

The keys to success and continual improvement are likely to be found in the subtleties of how communication occurs and existing communication support systems are used or not used. For example, TxDOT developed an initially path breaking system, the Environmental Tracking System (ETS); however, it lacks feedback functions to review and ensure that commitments are retired in design, construction, and maintenance. The system is designed to capture (commitment) data, but there are no requirements for the user to enter commitment information or to log that it has been handled. "Consistent use of this function has been the...issue," system coordinators explained. Furthermore, "they have to think if there is a commitment and enter it in the system. Nothing is prompting them to check." The transportation planning director must verify that permit issues are incorporated into the plan sheets; however, a gap is: "how did it (permit issues and conditions) get communicated in the plan set, go into the bid package, because Environmental does not review PS&E." Engineers have been instructed to review environmental permit, issue, and commitment screens and proof review the plan sheets to make sure commitments are included. Reports or checklists on commitments can be generated at the end of the project, then attached to the plan and incorporated into specifications, though the comprehensiveness of such a list is unreliable in its completeness. TxDOT interviewees supposed that various staff are "probably still keeping a lot of those commitments in a separate database" or informal ad hoc lists and systems. TxDOT IT staff are trying to gradually eliminate the need for these ad hoc systems. Elimination and consolidation of ad hoc lists in a single system that everyone can use is a primary driver in development of such systems. Virginia's CEDAR) and data integration effort has eliminated over 40 such ad hoc systems to date.

## 6.12 Funding a Complete System

The WSDOT tool is exceptional among DOTs, yet the bulkiness of the CTS, insufficient funding, and parallel initiatives have meant that rollout of the system has been protracted. A 2007 study found only intermittent use of the tool statewide and system connections to maintenance are still needed. This research found that a similar number of projects and users are loaded into the system; WSDOT leaders are focusing on improving the system and inspiring use by creating a better carrot, rather than imposing or requiring use by mandate. WSDOT has been able to get funding to expand and improve their system mainly in fits and starts. In contrast, Virginia DOT funded a comprehensive system from the start. Costing \$2.7 million to develop, VDOT's was also the most expensive system studied.

## 6.13 Continuous Improvement

WSDOT is the only known state DOT to perform an internal evaluation of how well environmental commitments are incorporated into construction documents. To accomplish this, WSDOT's Headquarters Construction Office and Environmental Services Office jointly prepared a standard set of questions to ask the Regions. WSDOT identified one project per region, obtained copies of the contract, environmental permits, and other environmental documentation, and then reviewed the contracts and environmental documents to identify whether and how environmental commitments were included in the contract. All environmental provisions from the environmental commitments and permits were flagged and/or highlighted for analysis and discussion during the interview. Finally, the team determined if the project experienced any non-compliance events.

WSDOT HQ leads met with Region staff representing Environmental, Design, and Construction to discuss questions about their contract, focusing on process and tools used. They also discussed construction compliance in an effort to determine whether the contract played a part. HQ staff took notes at all the meetings and circulated them to all who attended for review and comment and/or correction, which lead HQ staff reported as a critical step in developing a candid, consensus outcome. The notes and observations as well as an assessment of the environmental documents and contract documents formed the basis of their report. The table below shows a summary of the results for a project in one region and how specific project commitments were incorporated into contract documents. For example, for the project below, the Region used Standard Specifications, Special Provisions, GSPs, Contract Plans and Standard Plans for incorporating contract-relevant commitments into the contract, in order to satisfy requirements and minimize risks for a Hydraulic Project Approval, Individual section 404 permit, Individual section 401 permit, and a Construction Stormwater General Permit .<sup>64</sup>



Environmental Document	Contract Document Type	Method of Incorporating Commitments Into Contract
Hydraulic Project Approval (HPA)	Special Provision	A Special Provision, written to supplement Section 1-07.5(2), Section 7-03.2, and 7-03.3 of the Standard Specifications, included 44 conditions from the HPA.
	Contract Plans	The plans incorporated conditions of the HPA.
404 Individual	General Special Provision	A General Special Provision, written to supplement Section 1-07.6 of the Standard Specifications, noted that 'All contact with the Corps shall be through the Engineer. A copy of the permit is available at the Engineer's Office. The Contractor shall, at no expense to the Contracting Agency, comply with all requirements', of the permit. All but one of the 404 conditions applied to the contractor.
	Standard Specification	Cultural resource concerns from the Army Corps were addressed by Section 1-07.16(4) of the Standard Specifications.
401 Individual Water Quality Certification	Special Provision	A Special Provision, written to supplement Section 1-08.4 of the Standard Specifications, addressed one 404 permit condition.
	Standard Specification	The Region places a heavy reliance on Sections 1-07.5(2) and (3) of the Standard Specifications to enforce 401 Water Quality Certification conditions.
Construction Stormwater General Permit (NPDES)	Standard Specification General Special Provision Special Provision  Contract Plans Standard Plans	In general, the Region places a heavy reliance on Section 1-07.5(3) and Section 8-01 of the Standard Specifications to enforce the NPDES permit. This contract supplemented Section 8-01 with five GSPs and three Special Provisions.  Measures to minimize impacts to water quality are shown on these plan sheets.

For the most part, Regions relied on Standard Specifications and wrote Special Provisions, as needed, for incorporating environmental commitments. Some Regions used customized GSPs they have developed for their regions and contract plans to address permit conditions, while leveraging the existing Standard Specifications and Standard Plans.

Despite the development of CTS and a relatively standard process, WSDOT found that Regions use a variety of different methods for incorporating environmental commitments into the contract. Processes included such things as biweekly meetings with Design and Environmental staff throughout the design of the project, environmental staff involvement in writing contract provisions, plan review involving Environmental staff at 95% design, and use of the CTS to provide contractors a list of commitments.

After reviewing how the various regions incorporated environmental commitments into contract documents, some similarities and differences were observed. This section describes those below.

#### *Similarities:*

- None of the non-compliance events could be directly traced back to the adequacy of the contract.
- All Regions had dedicated personnel and had developed procedures for incorporating commitments into contracts.
- To some degree, most Regions were referencing permits with special provisions and expecting the contractor to read and apply the relevant conditions to their work. A 13-year-old GSP is used when there is an USACE permit; that GSP states that the contractor shall at, no expense to the contracting agency, comply with all the requirements.

Most Regions relied heavily on Standard Specifications to address Construction Stormwater General Permit (NPDES) conditions.

Nearly half of the Regions expressed concern with the timing between permit acquisition and PS&E. Obtaining permits late in the process may affect the thoroughness of the contract.

Most Regions noted that resource agencies were requiring greater levels of detail in the permit applications. This frequently delayed the issuing of permits and typically required a higher level of design refinement than the DOT thought reasonable.

#### *Differences:*

When Regions referenced permits in the contract provisions, there was no consistency in the availability of the permit to the contractor. In some cases, Regions made the permits available if the contractor requested them. Other Regions attach permits as an appendix.

Washington State Ferries, Southwest, Olympic, and Northwest Regions provide a highly customized contract. North Central, South Central, and Eastern Regions also customize their contracts, but not to the extent of the other Regions.

Some Regions had closer working relationships among Design, Environmental, Contracting, and Construction staff.

## 7 Conclusions

DOTs have many mechanisms for ensuring that commitments are incorporated in contract documents and that the appropriate action occurs during construction. The more systematic and comprehensive systems more effectively reduce the risk to a DOT of non-compliance and loss of trust and credibility.

### 7.1 DOTs Track Environmental Commitments but the Scope & Reliability Are Concern

It appears that all DOTs are tracking environmental commitments to some extent, whether in ad hoc lists kept by specialists or in the more evolved systems of Caltrans and WSDOT. In the absence of statewide systems developed with careful attention to business processes, staff will use whatever means necessary (sticky notes, notepads, file drawers, Word documents and tables, Excel tables, independent Access databases, etc.) to keep track of their work and commitments made. For many states, however, their tracking system has not been in place long enough to determine its effectiveness.

None of the states surveyed fully track all commitments from inception through maintenance in a single comprehensive system, documents completion of commitments, and reports on agency performance and opportunity areas for improvement. Virginia and Washington State's systems show the most promise for ultimately closing in on this objective. Several others have limited scopes of commitments tracked but know they want to do more, while others have no plans to do so; their systems are providing the functionality they sought and/or the obstacles to do more are too high.

The scope and reliability of commitment tracking is a special concern. The most functional and comprehensive commitment tracking system will have commitments enter a standard process to ensure commitments are tracked and considered at all appropriate points in the life cycle of project development and ensure that checks and balances are in place to prompt or guarantee that the right steps are taken at the right time. Tracking well in one part of the life cycle and then not in another falls short of the ultimate objective.

Challenges commonly include coping with the demands of intensive up-front effort with only limited staff time, communicating commitments across specialties such as environmental, design, contracting and construction, realistically quantifying mitigation requirements, and assigning monitoring roles and responsibilities, as well as corrective action mechanisms.

### 7.2 Commitment Tracking Functionality Varies

DOTs use a variety of systems to track their commitments, increase communication, and to become more systematic and accountable in how they perform their work, and ensure that commitments make it into contract documents. It is not unusual to have a DOT utilize multiple methods of covering a requirement or a set of requirements in contract documents. For example, WSDOT's audit found on the project they audited in one region that the hydraulic project approval utilized at least one special provision, general special provision, standard specification, and the plan documents. This sort of redundancy can be good but it may also indicate the need for more systematic, common

approaches, as ways of handling commitments and getting those commitments into contracts varied across Regions. In fact, WSDOT is now in the process of developing a series of statewide general special provisions that will provide greater consistency, as well as clarity and ease of use for the contractors and DOT users.<sup>65</sup>

Statewide electronic commitment tracking systems facilitate getting the commitments into contract documents, in part by requiring the coordination of fewer moving parts. States are serious about reducing the number of independent and uncoordinated tracking systems; this was a factor in the development of all the systems examined and was a key factor in most.

To date, Virginia DOT (VDOT)'s system has replaced over 73 discrete tracking tools. In addition to offering greater organizational consistency and compatibility, previously disconnected tracking systems are now available more broadly. Staff save time by not having to develop and maintain their own systems and the DOT reduces risks by eliminating the management of commitments (only) in many separate systems. Instead, if specialists keep their own systems, they serve as back-up and further minimize risk, if the main system is kept up.

In some cases, such as California, lead models (Excel spreadsheets) developed in the Regions have served as statewide models as the agency moves forward on commitment tracking, and requiring standard components but not dictating the format. This added greater consistency but it is unknown if the effort has minimized the issue of independent and uncoordinated tracking systems.

Only half (3 out of 6) of the environmental commitment tracking systems covered in Appendix C are fully functional in terms of their environmental commitment tracking capabilities. Half of the systems are severely hampered by uncertainty with regard to what information is in the system, irregular use in the agency such that it cannot be relied upon for commitment tracking across the entire set of project types for which it is used).

### 7.3 More Systematic Processes and Established Tools Increase Reliability

The more systematic the process is and the more established tools are developed to support it, the more robust and reliable it tends to be. An established commitment tracking software system can help, but it is not the only way to get the job done. Key approaches that can be more quickly and easily implemented include:

**Plan to include the commitments in the PS&E package to the maximum extent feasible**, in order to clarify expectations with contractors and so the DOT has recourse to use the contract as an enforcement mechanism. Strategies DOTs have used include:

- Transferring DOT requirements and potential fines to the contractor
- Incentive and disincentive language and specifications
- Requiring the contractor to retain certified specialists and inspectors

**Know what system(s) your DOT has and is using to track commitments**, whether it is staff lists, green sheets, or a more evolved electronic commitment tracking system.

Plan the work **and then work the plan** – check and make sure your system for tracking commitments is working and that everyone is using it as anticipated.

**Develop a clear established process for turning permit language into contract language.** As discussed, even in a state with one of the best commitment tracking systems, intended for statewide use, not all Regions are using it. WSDOT's Northwest Region developed a white paper entitled *Incorporating Environmental Permit Requirements into Plans and Specifications*, which addresses: (1) project risk identification, delineation, and staking of environmental resources; (2) permit acquisition for at least 90% PS&E constructability review; (3) establishment of Environmental Compliance Note (ECN) Plan Sheets; and (4) standardization of project risk types and a naming convention for all environmental resources within the project limits.<sup>66</sup> This is a well-documented process and fits the Region's business process for which the white paper was written and distributed.

**Consider producing environmental risk evaluations of projects**, with plans for greater attention to contract development and ongoing project monitoring and performance evaluation where warranted.

**Develop general special provisions for common BMPs or enhanced standard specifications.** Development of standard contract language can greatly facilitate a number of DOT objectives with regard to environmental commitment tracking and implementation in construction and maintenance, as described in the next section.

## 7.4 Review Environmental Requirements and Narrow Down a General Set of Special Provisions or Imposed Restrictions

DOT efforts to reduce and consolidate environmental commitments or requirements and cast those as contract language is one of the best and most highly recommended practices encountered, reducing risk, increasing clarity of communication internally and with contractors and other agencies, and helping ensure that the intended work is accomplished. And it can be done without having to develop an electronic commitment tracking system, though an electronic system helps users tap the standard commitments, once written.

Many state environmental offices have been working with construction and contracting offices to enhance standard specs and general special provisions to address as many known permit conditions as possible, that include conditional language commonly found throughout the state. By coordinating up front with the resource agencies, leading states are taking this opportunity to:

- Clarify and standardize permit language, consolidate as many requirements as possible and reduce and streamline their overall number of commitments. When a standard set is developed, the many similar but separate statements of requirements and provisions are evaluated and discussed with the pertinent regulatory agencies, to identify the ones that “do the job” without the confusion of others that are similar but slightly different.
- Produce clearer and more comprehensive requirements, supportive of multiple regulations, where feasible.
- Establish greater familiarity with the commitments by DOT staff and contractors.

VDOT's CEDAR has generated a unique degree of success among statewide environmental commitment tracking systems in the degree to which it has begun to standardize commitment names (categorizing titles of different types of commitment descriptions). CEDAR has pull-down menus with the program area and then a long list of commitment names. This helps with reporting and with internal monitoring and process improvement. WSDOT is also working on standardizing provisions as described elsewhere in this report, and Maryland has already done a huge amount of work in discussing and reducing the number of similar but varying requirements imposed by resource agencies.

TxDOT is working toward each project "having its own mini aspects and impacts analysis," in an EMS framework. TxDOT decided they want a "smart system to help us narrow that down." Narrowing factors will include project type, geographical setting, and urban/rural location. Regulatory requirements feed into specifications related to aspects and actions. The team is reviewing the specifications book to identify typical specifications by project type. Currently, a lot of environmental commitments or modifications are handled under special provisions in the design plans, but TxDOT is looking at incorporating more commitments into standard specifications.

DOT development of commitment tracking systems largely stem from commitments to environmental stewardship, improving compliance reliability, and demonstrating performance. As MDSHA noted, reporting and tracking systems are also a tool to build comfort levels within and across agencies and to operate within more efficient, trusting relationships.

### ***Better Utilization of FHWA's Specification Sharing Website***

The National Highway Specifications website was developed as a result of AASHTO Resolution 99-0, as a one-stop source for specification information. AASHTO's resolution endorsed development of an electronic specifications library to be hosted by FHWA. The website was launched in 2003, but has been difficult to maintain.<sup>67</sup> Categories used in the system are not amenable to environmental conditions; however, the site has the potential to be expanded for such a purpose.

Current categories include: Standard Specifications, Innovative Contracting Specifications, Emerging Technical Specifications, Construction Manuals, and Links to Standard Plans. The website is located at <http://www.specs.fhwa.dot.gov>

FHWA distributed a survey to members seeking input on organization, content, and functionality of the current site as well as possible updates and enhancements. Among other things, FHWA found that the specification library was accessed frequently but that the discussion forum was not used. They found that maintenance, the upload process, the innovative specification library, and search features need improvement. Users were looking for innovative specifications (95% of the time), contact information for specification engineers (90%), links to related websites (78%), and manuals (78%). FHWA also plans to expand their current alternative contracting section, in response to requests for more information on Design-Build contract specifications, A+B Bidding, Incentives/Disincentives, Lane Rental, and other areas. The site uses Google as a search tool and is relaxing specification submission standards, to facilitate easier sharing.

### ***Implement Better/National Methods for Coordination between Resource Agencies and DOTs, to Develop Consolidated Permit/Contract Language***

A ripe area for future work is implementation of better and/or national methods for coordination between resource agencies and DOTs around common requirements and the development of associated, potentially more standardized permit and contract language. As at least a few DOTs have begun to invest significant effort in this area, it would make sense to build on their efforts. It should be noted that creating uniform provisions is more of an inter-agency coordination and review task than a research task; as such, it may fit better in FHWA's research program and could draw on the national transportation liaisons at each of the federal resource agencies.

## **7.5 Electronic Commitment Tracking System Efforts Improve Communication**

DOTs with electronic commitment tracking systems have reported that the efforts to develop such systems as well as the implementation thereof have each improved communication in a number of ways. Implemented systems can be particularly effective at building the trust and confidence of external organizations and regulatory agencies, though DOTs' plans for external access to such systems are limited.

### ***DOTs' Plans for External Accessibility Are Limited***

The tracking systems tend to offer greater assurance to regulatory agencies that commitments are being carried out, though that is infrequently a primary purpose for which they were built. DOTs see the systems as supporting internal management and technical work tracking functions more than serving external purposes. Conversely, when external access is granted and others start to rely upon it, the quality and completeness of that data become more important than ever. Most systems were not built to increase public confidence per se, and there are no plans to create a system that is wholly or partially accessible to the public.

VDOT and WSDOT are fostering a culture of publicly reporting performance. WSDOT uses their "Gray Book" and is trying to add more performance reporting functionality to their system. Virginia does report non-compliances on its public on-line performance Dashboards. If a problem is noted twice and has not been fixed, it is recorded as a non-compliance.

### ***Resource Agency Access and Immediate Communication of Action on Non-Compliances Dramatically Increases Trust***

At MDSHA, resource agency requests, (USACE and the Maryland Department of the Environment) comments, and/or questions can be made through the EM Toolkit. This allows MDSHA the ability to immediately respond to their needs and ensure all parties involved are up-to-date on agency coordination. MDSHA is considering providing access to other agencies, consultants, contractors, and other project stakeholders as needed and limited by project.

To date, Maryland is the only state to have made their system accessible to resource agencies. Florida's ETDM is accessible to resource agencies, and ETDM tracks the agencies' comments and their acceptance by Florida, but does not track their hand-off within FDOT. MDSHA built the EM Toolkit, in part, to communicate directly with resource agencies, and the arrangement has greatly increased the USACE and the State Department of Environment's comfort level with MDSHA's responsiveness about and seriousness in tracking environmental non-compliance. MDSHA reports there is almost no response from the resource agencies when they can see/monitor with their own eyes, via the system, that MDSHA is handling non-compliance situations itself.

## 7.6 Discretion in Use or Non-Use of a System Can Limit System Utility

NYS DOT and KYTC discovered that discretion in the use or non-use of the system greatly limits its utility for everyone. For example, KYTC's CAP system is designed around the needs of the project manager – its strength and its weakness. It does not require project managers to enter anything they do not want to enter. While use of the system is required, PMs can use it more or less at their discretion. KYTC recognizes that project manager discretion in determining appropriate entries into the system creates variability in the extent to which the system can be relied upon as a “complete” record of “all” commitments. Moreover, the system does not help environmental staff document that a commitment was conveyed to the PM. Another system remains in use to help environmental staff manage their work and track communications. A number of agencies are still working on getting all staff to use the system, including WSDOT, NYS DOT (previously reviewed), and VTrans. Most recently, WSDOT has focused on increasing system functionality and user-friendliness, rather than mandating use of the system. Staff may increase the reliability of the system for their own purposes (all the commitments for a project are in the system) on a project-by-project or region-by-region basis; i.e. they are using it “all the way” or they are not using it.

## 7.7 Integration with Other DOT Information Systems is Key

At a minimum, most electronic commitment tracking systems are frequently integrated with project management so that basic project information may be downloaded, ensuring consistency with the agency's project management system and saving time on re-entry. KYTC's commitment tracking system goes a step further; it is fully integrated with their preconstruction project management system for all projects in the 6-year plan — CAP screens were add-ons to that system. Thus, none of the PMs had to learn a new system and it has become an integral part of their work.

MDSHA's Toolkits are all based on the same framework, which allows data to be easily shared between the different applications. There are on-going discussions about providing a connection between the Toolkits and MDSHA EPD's Workload Database. MDSHA controls workflow between sections and functional areas; e.g., the QA Toolkit provides a link from the section performing erosion and sedimentation control inspections to the EPD-managed projects. MDSHA is adding an activities calendar to track project activities relating to permit compliance including document submittal reviews, meetings and other associated activities. This will function as a workflow management tool, providing a calendar, milestones, and reminders on a daily, weekly, and/or monthly basis.



Virginia DOT's system is currently the most comprehensive and integrated. It has also cost the most to develop. It encompasses scoping, commitment tracking, compliance reviews and corrective action tracking, workflow management, and alerts, as well as a degree of environmental asset management. Given the transition from many individually managed databases to CEDAR, CEDAR's success is important both organizationally and financially. Utilization of staff time and effort is more efficient now that a single, centralized system acts as a repository for all environmental commitment data. Furthermore, by prompting environmental staff to add commitments when appropriate, CEDAR has produced more streamlined and consistent reports. VDOT generates the majority of environmental deliverables through the application, which is the agency's authoritative source for documentation. WSDOT's CTS in conjunction with the PMRS system they are developing may set a new standard.

### ***Increasing Investment in Workflow Management, Document Management, and Reporting and Accountability Systems, with a Premium on Integration***

Increasingly, DOTs view workload and workflow management as a highly linked, equally important task with environmental commitment tracking. Lead states are using an Oracle, SQL Server, or .NET platform. Oracle provides a way to link multiple databases and systems in many states, often including an underlying document management system shared across systems. WSDOT's CTS uses SQL and .NET.

Most of the leading systems are web-based or moving towards it. This is particularly true if the system is not static and has continued to evolve. While almost all states host their systems internally, MSHA has branched out and is experimenting with external hosting.

Lead states are seeking to link their systems to GIS, which is also seen as a way to link multiple information systems. Over half of the lead states examined here have built in the capacity (location identifiers) to ease that transition. Integration with other information systems, and especially the DOT's project management system, is a major trend.

## **7.8 Commitment Tracking System Development Is A Major Effort**

Development of electronic commitment tracking systems represents a major effort by the DOT and locating funding for systems is a major issue. WSDOT had the most sophisticated environmental commitment tracking system in 2004, but has had limited resources to continue developing the system. VDOT's CEDAR system was implemented in May 2004 as the culmination of a five-year effort to streamline the agency's business and technology needs with respect to environmental data, an effort that cost \$2.3 million. Development of Texas and WSDOT's systems has also been multi-year, ongoing efforts. WSDOT's system cost approximately \$1 million. After this, WSDOT invested in an extensive process improvement and IT integration initiative with regard to project management, but these resources did not provide significant additional funds for the commitment tracking system and/or connecting it to the project management systems, as of the end of 2007. WSDOT anticipates that the future Project Management and Reporting System upgrade will supply workflow management, document management, and alert tools. Faced with more limited funding, KYTC also

found it difficult to find the wherewithal to expand CAP and improve the system, though plans now exist for it to go on-line in the future.

One approach is to develop related shared systems tailored to the needs of particular interagency relationships and project monitoring needs. For example, MDSHA's project Independent Environmental Monitors (IEM) conceptualized and helped design the system to have an easier way to keep track of inspection observations and corrective actions and simultaneously keep stakeholders and project owners informed. The IEM represents all regulatory agencies involved at the project site, though the EM system is mainly used for projects that require Independent Environmental Monitors, namely those with Clean Water Act Section 404 permits, Maryland Department of the Environment wetland permits, and design-build projects. The EM Toolkit allows the environmental manager to keep key stakeholders informed by updating information in the EM Toolkit, for each applicable project.

At MDSHA, a number of systems have moved forward on different timetables. The Environmental Design division has a workload tracking system already in place, and they are accomplishing their goal of entering data only once into a single system that tracks permits, conditions, and workload. The commitment tracking system developed by Planning using GIS is coming on-line as a separate system that does not tackle workload management for every office. Resolution of the different divisions' preferences has required higher levels of management involvement and leadership in some cases.

New electronic database tracking systems just now being implemented by Utah and Indiana look promising and should be tracked over the next couple of years to determine their effectiveness and transferability to other DOTs.

## 7.9 Leveraging the Work of Other DOTs

The public servants who work at DOTs are sensitive to making sure the public gets the best deal for their money. DOT professionals also take the time to help each other, to provide their perspective and share best practices. Likewise, DOTs often share resources they have developed from manuals to software. For example, Vermont recently shipped their Straight-line Diagram tool to Virginia DOT, free of charge.

Other times, when systems that are more expensive are developed, such as VDOT's Right-of-Way and Utilities Management System (RUMS) that manage commitments, the system has been sold to other agencies (Caltrans and potentially Michigan DOT) to cover costs of development. RUMS has a number of functions that environmental activity and permit management systems include:

- Provide management with at-a-glance status of a highway project, including up-to-the-minute highway project status through ad hoc queries as well as reports served over a secure Intranet.
- Allow management to focus on key highway project construction dates and shift resources to ensure the completion of right-of-way and utility activities prior to those dates.
- Help right-of-way and utilities agents generate, customize, store and retrieve appraisal forms, letters of correspondence and other documentation, through an Oracle database.

- Have an intuitive user interface simple enough for a new user to easily learn and powerful enough for the advanced user to quickly navigate to specific information of interest.
- Automate the assignment and reassignment of work to division agents.
- Interface with Department of Transportation's mission critical Project/Program Management System

Other states have approached Virginia about sharing and/or selling their CEDAR system, which does not have comprehensive documentation and would likely require support in transferring the application and in assisting the new DOT with set up. VDOT has considered doing this on a time and materials basis to purchase as is.

Washington State DOT is developing a number of innovations that will be readily available to other DOTs, including:

- Risk assessment tools
- Procedures for turning permit language into contract language
- General special provisions
- Commitment tracking system and documentation.

Other contract language and specifications from multiple states are included in the body and appendices of this report.

## 7.10 Changing Environment/Moving the Goalposts

### ***Evolving Technology, Stakeholder Collaboration and Consultation Expectations, and Ability to Conduct Efficient and Effective Earlier Analysis in Planning***

While environmental regulations change very slowly, the fields of technology, environmental analysis, interagency collaboration, and consultation expectations are changing rapidly. As DOT information systems have an important role to play in these areas, there will be increasing pressure to keep up and adapt to these changes, even as DOTs catch up with each other in implementing electronic commitment tracking systems and integration with other information systems.

As TxDOT pointed out, their Environmental Tracking System (and the others) is tailored for the project development process as traditionally executed; e.g., environmental permitting after NEPA, with most interagency consultation starting at NEPA. However, as TxDOT noted, "a lot of projects require early coordination, that does not run through the proper chain. This still needs to be addressed in the future." DOT environmental sections have a need for information management support systems in this area as well, beyond simple incorporation of commitments generated at that point. We have consulted with the lead states with commitment tracking systems on this point, and it is still under-addressed to our opinion; however, evolution is expected as DOTs begin to incorporate more environmental analysis in planning, still an emerging field. California is a pioneer in this regard.

## ***Evolving Financial Context***

Declining state budgets and increasing project demands could have a number of different effects on the development of commitment tracking systems and incorporation of environmental commitments in construction contract documents. First, the onus may be on DOTs as never before to ensure that the environmental commitments are in the contract documents, to facilitate the DOT's oversight role and the contractor's ability to take on as much of the responsibility as possible and to increase the likelihood of execution. However, will economic tough times lead to even fewer resources for programmatic improvements like commitment tracking, which require investments both in staff time and software development or modification?

## ***Evolving Norms – Acceptance of Wider Responsibility?***

The last decade has seen increased measurement in the public and the private sector of the core business, frequently to the detriment of other areas. For example, DOTs have been encouraged by private sector consultants to narrow their scope of performance measures, and DOTs themselves and state legislatures have been inclined to focus on “on-time, on-budget” delivery of the project, usually the pavement. Not all states have followed this model, but arguably the majority of state DOT public on-line “dashboards” have. Few states report on the results of environmental monitoring in construction or environmental activities in maintenance.

Evolving norms in the wider economy and culture are under discussion, with the contention that “a wider understanding of ethical and social considerations” may become the new norm. For example, a recent critique of norms in the banking system and at U.S. business schools noted the following:

...that they graduate with a focus on maximizing shareholder value and only a limited understanding of ethical and social considerations essential to business leadership... Such shortcomings may have left business school graduates inadequately prepared to make the decisions that, taken together, might have helped mitigate the [financial crisis](#), critics say.<sup>68</sup>

On many campuses, changes are under way in courses and curriculums. Some schools are heightening their focus on long-term thinking or leadership, and many are adding seminars to address the economic crisis.

Jay O. Light, the dean of Harvard Business School, argues that there have been imbalances both on campuses and in the economy. “We lived through an enormous extended period of financial good times, and people became less focused on risks and risk management and more focused on making money,” he said. “We need to move that focus back toward the center.”<sup>69</sup>... In 2006, the [Yale](#) School of Management introduced a curriculum offering interdisciplinary perspectives on complex problems. It's also developing cases based on the financial crisis, and there are plans to devote sessions in the core curriculum to the crisis.<sup>70</sup>

Arguably DOTs and AASHTO have exerted substantial progressive leadership in recent years, advocating and advancing environmental stewardship and context sensitive solutions. Will any of the reflections and changing values in the external economy impact DOTs?

With SAFETEA-LU and the new proposed 2009 transportation bill emphasis on integrated transportation, land use, and environmental planning, environmental

commitment tracking will begin earlier and take on more importance than ever. DOT systems for commitment tracking and incorporation of commitments in construction documents will be a critical component.

# Appendix A

## Survey

## NCHRP 25-25-47 Survey

Name/Title

Agency

1. Has your agency developed procedures for incorporating environmental commitments into construction contract documents? If yes, please describe or attach.
2. If there is not a developed procedure, how are the environmental commitments communicated to the person writing the contract document?
3. Who is responsible for ensuring all commitments are included in the construction contract?  
Contracting office  
Design engineer  
Construction engineer  
Environmental  
Other
4. Does the agency have contract boiler plates and scopes of work that instruct the contractor to include environmental commitments in the budget and schedule, and ensure completion at the close of the project? If yes, please attach or send contact name/phone/email information for us to follow up.
5. Do the agency's contracts require the construction contractor to employ certified specialists to monitor and provide quality control for such things erosion control, cultural resources, wetlands etc. during construction? If yes, please describe how effective this is for implementing environmental commitments.
6. Do the agency's contracts require a warranty for such things as wetland mitigation, landscaping, and erosion control?  
Yes  
No  
Other
7. Does the agency hold funds in escrow to ensure funding for repairs/replacement if mitigation fails? If not, how is the contractor held accountable for environmental commitments that fail after the project is completed?
8. Do the agency's contracts contain disincentives for the contractor if not all of the environmental commitments are completed? If yes, what are the disincentives?
9. Does the agency have a developed procedure for documenting and approving construction changes that change environmental commitments? If yes, please describe.
10. Does the agency have an internal audit system to track environmental commitments? If yes,
  - a. What is tracked/measured?

- b. What thresholds do you use for accomplishment of environmental commitments, beyond those that are a simple yes or no? (please attach program description, if relevant)
  - c. If commitments are not completed, what is the process for corrective action?
11. If the agency does not have a commitment tracking system, what are the existing formal or informal mechanisms for getting commitments into contract documents? Please describe any of the following and how they work at your agency.
- a. System to incorporate commitments from the NEPA document into final design plans.
  - b. System to incorporate permit requirements into final design plans.
  - c. Process for getting feedback from resource agencies on adequacy of implementation when no permit is involved.
  - d. System for tracking "other" commitments e.g., drainage tiles on farmlands, or community enhancements such as artwork or landscaping, right-of-way/landowner commitments.
  - e. Systems for including and managing environmental commitments within the same controls that apply to contractual commitments and construction standards.
  - f. Incorporation of standard commitments (e.g., water quality protection or handling of hazardous materials) into DOT specifications.
  - g. Process to address/document issue if mitigation commitment becomes moot or infeasible.



# Appendix B

## DOT Contacts

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# Appendix C

## DOT Commitment Tracking Systems

## State DOT Environmental Commitment Tracking Approaches

### Summary of System Attributes – 2007 Study

This study resulted from interviews undertaken in October and November 2007 with six lead DOTs identified by FHWA, with follow up information gathered in December. While FHWA contracted for two page overviews, the quantity and quality of information generated in the interviews led to a decision to try to capture more information, as follows:

<b>SYSTEM CAPABILITIES AND FEATURES</b>	<b>Kentucky</b>	<b>Maryland</b>	<b>Texas</b>	<b>Vermont</b>	<b>Virginia</b>	<b>Washington</b>
<b>Functionality</b>						
Reduces the number of independent and uncoordinated tracking systems	●	●	●	●	●	●
Tracks the commitments contained within NEPA, permits, consultations	◐	●	◐	◐	●	●
Tracks commitments from inception through maintenance, if necessary	○	◐	○	○	●	◐
Covers all projects, all environmental commitments	○	○	◐	◐	●	●
Covers other commitments, such as ROW or those made to landowners	●	○	◐	○	◐	◐
System outputs become part of construction documents, codifying previous design and community commitments	●	◐	●	◐	●	●
Serves as primary tool and/or starting point of an Environmental Management System (EMS)	○	◐	●	○	●	●
Offers greater assurance/confidence to regulatory agencies	●	●	◐	◐	◐	●
Builds public support/confidence	●	◐	○	○	○	◐
Develops a common way and a standard specification for work requirements or inspections, enabling fewer provisions and better training/enforcement around standards for staff, contractors, inspectors	○	●	◐	○	◐	●
Produces a commitment checklist	●	●	◐	○	●	●
Supports, tracks, and documents corrective actions	○	●	○	○	◐	○



<b>SYSTEM CAPABILITIES AND FEATURES</b>	<b>Kentucky</b>	<b>Maryland</b>	<b>Texas</b>	<b>Vermont</b>	<b>Virginia</b>	<b>Washington</b>
Offers automatic or user-initiated notifications (emails) within the system	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Provides other mechanisms for ensuring commitments have been kept	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Has the capability to quickly search for and find a particular commitment	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Reduces paperwork through greater use of electronic systems	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Produces standard or customized reports on environmental performance or compliance	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Supports writing or modification of contract specifications to cover commitments or otherwise assists inclusion of commitments in contracts	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Integrates with the DOT's standard project management systems	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Controls workflow between sections and functional areas	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Otherwise enhances/improves communication between functional areas	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Assist workload management, to identify what needs to be done and when; e.g. wetland mitigation sites that need to be evaluated and when	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Stores and manage versions of documents, plans, and permits	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Assigned responsibilities for monitoring commitment completion	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
Helps determine performance evaluations for employees or contractors	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Provides, receives, or shares data with other systems, and vice versa	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
<b>Technical Specifications</b>						
Web-based	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>
If not web-based, plans in place for converting to web-based system	<input checked="" type="radio"/>		<input checked="" type="radio"/>	<input type="radio"/>		
Oracle, .NET, and/or SQL Server database	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

<b>SYSTEM CAPABILITIES AND FEATURES</b>	<b>Kentucky</b>	<b>Maryland</b>	<b>Texas</b>	<b>Vermont</b>	<b>Virginia</b>	<b>Washington</b>
Hosted Internally	●	○	●	●	●	●
Linked to GIS	○	○	○	○	●	○
Integrated with Project Management System	●	●	●	●	●	○
Shared with other organizations	○	●	◐	◐	●	●
<i>FHWA</i>	○	○	●	○	●	○
<i>Resource Agencies</i>	○	●	○	○	◐	○
<i>Local Agencies</i>	○	○	○	○	◐	○
<i>Consultants/Contractors</i>	○	●	○	○	◐	◐
<i>General Public</i>	○	○	○	○	◐	○

## Kentucky's "Communicating All Promises"

The Kentucky Transportation Cabinet (KYTC) built the "Communicating All Promises" (CAP) application for its engineering project managers to ensure communication of any commitments made and adequate follow-up. CAP was built as a tool to bridge the gap between the preconstruction Project Manager and the construction phase. It is an add-on to the system engineers use for project management. CAP provides a central location for commitments to be captured and automatically incorporated into construction documents. Consistent use of the system is an on-going issue that, once addressed, will greatly improve the effectiveness of the tool.

### *Vision*

Prior to development of the CAP, KYTC found that planning, design, environment or right-of-way (ROW) staff would make verbal or written commitments that were inadequately communicated to design, construction and maintenance staff and were not necessarily included in the construction drawings and specifications. CAP was developed to remedy this situation and was showcased at several AASHTO venues after its development, spurring other states to develop systems.

### *Technology*

#### Technology, Connection to Other Systems

KYTC's CAP is a Structured Query Language (SQL) customized add-on to the agency's existing Oracle-based preconstruction management program/ database. KYTC created pages within this existing system for project managers to input commitments.

Presently CAP is primarily used as a commitment repository and to produce a hard copy document for the construction managers, highlighting all project commitments.

The CAP output becomes part of the construction documents, codifying previous design and community commitments (specifically ROW and environmental). KYTC is planning to convert to a web-based system in the future. There is no GIS functionality.

#### Access by Partners and Stakeholders

Only the preconstruction project manager has the access and permission to add items to the CAP, a particularity of KYTC's system and process. The rest of the agency primarily uses read-only printouts.

Access is limited electronically to those inside the KYTC. Outside groups do not have access to the CAP system. There is no difference between the regions and headquarters in their use of CAP and the version available to them.

The system is behind a firewall, with user-restricted access, and it does not require electronic signature.

## **Business Process**

### **Process and System Operations**

Designed in 2003-2004, the CAP is an add-on to the preconstruction project management database used primarily by engineers, agency-wide, for tracking all preconstruction activities for projects in the 6-year plan.

KYTC's commitment tracking system and process is unique in that only the preconstruction program manager has the access and permission to add commitment items to the CAP. The process and philosophy reflected in the setup of the system is that the project manager must be made aware of any proposed commitments and accept them in order for them to become a commitment. This prevents commitments being made by subject matter experts who may not have knowledge of the effect or impact of their desired commitment on the project as a whole.

Most of the commitments are entered through or after discussions or emails with the preconstruction project manager, environment, design, ROW, and utilities personnel, noting that a specific commitment should be added to the CAP. This system then requires both communication with and agreement or approval by the project manager, who must add the commitment him/herself. When the project goes to construction, the commitment list is a part of the construction document.

CAP has been considered most helpful on complicated projects. Although permitting, ROW, and environmental are all separate modules in the preconstruction database, commitments from any of these areas can be entered into the system by the PM. Overall, the CAP is considered a good bookkeeping tool.

### **Issues, Obstacles, or Limitations**

The CAP system is designed around the needs of the project manager – its strength and its weakness. KYTC has encountered several drawbacks with the process, though it meets most of their needs and there is no plan to change the process.

Use of the tool is mandated; however, the extent to which it is used is largely at the PM's discretion. Each project manager has discretion regarding what is included in the CAP, so it is used in different ways. There are concerns that some project managers are more diligent than others in using the CAP.

Regular environmental practices and/or otherwise known and documented commitments are not included; the CAP is used as a tool to help document commitments that might be more easily forgotten. There are many commitments insofar as environmental stewardship practices that are regularly implemented and/or promised, but it is up to the project manager to decide if a commitment is of a magnitude such that the PM wants to include it in the CAP.

Increasingly, many environmental commitments are considered a normal part of doing business; e.g. maintaining sediment controls. KYTC's environmental manager reported that, "They (PMs) are pretty picky about what they put in there. Phase II Archaeology or an in lieu fee payment aren't in there, usually. CAP is for commitments they've made externally that might get forgotten. The majority are typically ROW issues, commitments to property owners that an entrance will be done a certain way" (Figure 1). Commitments from a Memorandum of Agreement may not be in a CAP if it does not

directly affect construction or if those commitments will otherwise be reflected in the construction document.

There is no assurance people are using the system and therefore others besides the PM cannot rely on it to locate information or for reporting purposes. Environmental staff and higher-level supervisors cannot use or rely on the system to ensure that individual commitments or a comprehensive set of environmental commitments are being tracked.

Figure 1: Active CAP Commitments to Individuals and School in the Project Vicinity

**syp8162: Previewer**  
File View Help

Page: 1

8 Y P8 162      8 PORTATION CABINET      Page: 1  
18 OCT 2007      ALL PROMISES (CAP)      ACTIVE

Item No.	5-28.1	Project Mgr. JEFF JASPER	
CAP #	Date of Promise	Promise made to:	Location of Promise
1	06-JUN-04	James Maloney	4305 WESTPORT RD. - BETWEEN STATION 41+50 AND STATION 41+70
<b>CAP Description</b>			
THE RUDY CEMETERY IS LOCATED BETWEEN STATION 41+50 AND STATION 41+70 APPROXIMATELY 45 FEET TO THE LEFT. THE CONTRACTOR WILL NOT DISTURB THIS CEMETERY. SEE THE SPECIAL NOTE FOR THE RUDY CEMETERY FOR MORE DETAIL.			
2	15-SEP-04	Walden School Corporation	PARCEL 61
<b>CAP Description</b>			
THE TRANSPORTATION CABINET HAS ENTERED INTO A 'CONSENT AND RELEASE' AGREEMENT WITH WALDEN SCHOOL CORPORATION. WALDEN SCHOOL WILL PROVIDE TEMPORARY CONSTRUCTION EASEMENT IN EXCHANGE FOR A SMOOTHER GRADE ENTRANCE AS IT TRANSITIONS FROM THE PROPOSED ROADWAY. AS PART OF THE AGREEMENT, THE WALDEN SCHOOL SIGN IS NOT TO BE DISTURBED. LANDSCAPE BLOC WILL BE PLACED AROUND THE WALDEN SCHOOL SIGN AS SHOWN ON THE PLANS.			
3	20-SEP-04	Walden School Corporation	PARCEL 61
<b>CAP Description</b>			
MORE INFORMATION CONCERNING THE AGREEMENT BETWEEN THE KENTUCKY TRANSPORTATION CABINET AND THE WALDEN SCHOOL CORPORATION HAS BEEN DELIVERED. KYTC HAS AGREED TO THE FOLLOWING: BOTH ENTRANCES WILL REMAIN OPEN DURING SCHOOL HOURS. THE ELEVATION OF THE ENTRANCES WILL ALLOW SURFACE WATER TO DRAIN TOWARD THE STORM SEWER ALONG THE MAIN ROADWAY. TWO SIGNS WILL BE IMPACTED BY CONSTRUCTION. THE SIGN AT STATION 33+46 WILL BE REMOVED BY PROPERTY OWNER PRIOR TO CONSTRUCTION. THE LARGE SIGN AT STATION 33 WILL REMAIN IN PLACE AND WILL NOT BE DISTURBED. THE ROAD CONTRACTOR WILL ATTEMPT TO STABILIZE THE SIGN FOUNDATION WITH LANDSCAPING BRICKS. (SEE ALSO CAP NOTE #2).			
4	01-OCT-07	Ron Geselden	P-100
<b>CAP Description</b>			
CONTRACTOR AND ENGINEER SHALL COORDINATE WITH PROPERTY OWNER ON PARCEL 100 WITH REGARD TO PRIVACY FENCE RELOCATION PRIOR TO CONSTRUCTION.			
6	01-OCT-07	Ron Geselden	P-39
<b>CAP Description</b>			
DO NOT REMOVE LARGE TREES ALONG EASEMENT LINE. CONTRACTOR AND ENGINEER SHOULD SPEAK WITH THE PROPERTY OWNER PRIOR TO CONSTRUCTION TO MINIMIZE DAMAGE TO THE TREES.			

#	REQUESTOR	LOCATION	REQUEST DATE	CAP
1	James Maloney	4305 WESTPORT RD. - BE	08-JUN-2004	THE RUDY CEMETERY IS
2	Walden School Corporation	PARCEL 61	15-SEP-2004	THE TRANSPORTATION
3	Walden School Corporation	PARCEL 61	20-SEP-2004	MORE INFORMATION
4	Ron Geveden	P-100	01-OCT-2007	CONTRACTOR AND
5	Ron Geveden	P-39	01-OCT-2007	DO NOT REMOVE LARGE

There is no feedback loop or monitoring with regard to commitment implementation. CAP is a list in the construction documents, but there is no way to know if the commitment has been fulfilled. It does not function as a checklist.

Some commitments may extend into Maintenance and Operations, but as yet, there is no mechanism to carry these forward. In addition, the system was intentionally designed such that once a commitment is entered it cannot be taken out or be changed. Modifications can be entered as a subsequent entry. One possible consequence of this “no correction” capability is that it may contribute to some of a project manager’s reluctance to place entries in the system. However, it does simplify the audit trail, as the project manager is the only full user.

## Successes

CAP provides a central location for commitments to be captured and incorporated into construction documents

The CAP system is designed around the needs of the project manager – its strength and its weakness. It does not inconvenience project managers by requiring them to enter anything they do not want to enter. While use of the system is required, PMs can use it more or less at their discretion.

The system is fully integrated with KYTC’s preconstruction project management system for all projects in the 6-Year Plan. CAP screens were add-ons to that system. Thus, none of the PMs had to learn a new system.

The CAP system has been successful insofar as no disasters (e.g. notable missed commitments) have occurred since the system was implemented. PMs understand that they are expected to use the system and they have the responsibility to ensure nothing is missed.

The CAP system is considered to suit its intended purpose and has improved communications among the sections. It was set up to function as a project manager’s

notepad, within a more formal communication process regarding commitments, which placed the PM in a central, responsible role. The system has effectively encouraged more communication among environmental, design, and construction staff.

The CAP is commonly used for unusual or non-standard commitments, especially ROW commitments and commitments to property owners.

KYTC has successfully resolved the issue WSDOT has described as “80 pages of commitments on a single project,” by narrowing those recorded to those most likely to be overlooked or without other “insurance” systems of sorts; e.g. not already incorporated into standard construction documents.

KYTC has successfully built trust with the resource agencies through development and use of the system.

### Lessons Learned

KYTC staff recognize that project manager discretion in determining appropriate entries into the system creates variability in the extent to which the system can be relied upon as a “complete” record of “all” commitments.

The system does not help environmental staff document that a commitment was conveyed to the PM.

Another system remains in use to help environmental staff manage their work and track communications.

### Next Steps

KYTC’s system has been largely static since its initial development; however, plans are now in place to make it a web-based system. KYTC continues outreach to encourage usage that is more consistent.

### Summary

KYTC’s commitment tracking system was built as a tool to bridge the gap between the preconstruction project manager and the construction phase. KYTC is still working on the challenge of inconsistent use by the project managers. This inconsistency has inhibited use of the system for overall agency commitment tracking purposes on a management level. Environmental staff who passed a commitment or recommendation along to a PM have no ability to enter the commitment if the project manager determines that it does not merit entry into the system. The system does not have feedback or tracking functions to “check off” commitments that have been retired or accomplished.

Although not yet utilized to its full capabilities, the CAP has the potential to convey commitments beyond the construction phase to maintenance, where their activities may also have the potential to impact a commitment. The PM's appreciate the commitment tracking system’s integration with their existing project management system. CAP has improved communication across disciplines, phases, and functional areas. In particular, it has generated better understanding of the need to communicate commitments and follow through in construction. The system has also helped KYTC build trust with resource agencies.





## Maryland State Highway Administration Environmental Toolkits

The Maryland State Highway Administration (MDSHA) has a business plan goal to meet or exceed all environmental commitments made during the NEPA and permitting processes, including all terms and conditions. Reporting and tracking systems are increasingly necessary to build comfort levels within and across agencies and to operate within more efficient, trusting relationships. MDSHA's system is unique in that it provides system access to resource agencies, particularly the U.S. Army Corps of Engineers (USACE) and the Maryland Department of Environment (MDE).

### *Vision*

MDSHA's project Independent Environmental Monitors (IEMs) conceptualized and helped design the system to have an easier way to keep track of inspection observations and corrective actions and simultaneously keep stakeholders and project owners informed. The IEM represents all regulatory agencies involved at the project site, though MDSHA mainly uses IEMs for projects that require Clean Water Act Section 404 permits, MDE wetland permits, and design-build projects. MDSHA's earlier experiments with commitment tracking on large projects such as the Woodrow Wilson Bridge received positive reviews from resource agencies and informed the agency's interest in development of a statewide system.

### *Technology*

#### Technology, System Descriptions and Connections to Other Systems

In order to meet its business goals and relationships with other agencies, MDSHA maintains a number of different but inter-related tracking and information systems on environmental matters. MDSHA's system stops short of tracking non-environmental commitments. MDSHA is not currently tracking right-of-way or landowner commitments via a dedicated system.

MDSHA currently has four systems in place to track permits and conditions, primarily for projects with wetland impacts, with a fifth system proposed that would assist with quality assurance functions. The systems are all based in Oracle.

**A desktop permit tracking system** was implemented in fall 2004, **with some commitment tracking capabilities, focused on project development and design** since "a vast number of commitments and conditions are generated in the permitting process, between planning and engineering." These commitments must be tracked by Design and Engineering and incorporated into design details to the maximum extent possible. MDSHA's project tracking system (developed 15 years ago) produces database files that this permit tracking system (in existence for 3-4 years) can import. MDSHA's permit tracking system also interfaces with Microsoft Project, to which the agency is transitioning for project management.

**The Environmental Monitor's Toolkit (EM Toolkit)** system is used for design-build projects and all projects with USACE and MDE wetland permits. Such projects require IEMs, hence the name of the tool. The EM Toolkit is applied statewide, is available via the web, and has been used on all projects requiring IEMs since fall 2006.

Environmental Program Division (EPD) staff and consultant staff utilize the EM Toolkit to ensure compliance on all MDSHA construction and maintenance projects with wetland impacts. Project reviews/monitoring are typically monthly rather than daily, on projects that require IEMs. EPD staff have used the Toolkit for all projects since October 2007. Consultants were required to enter needed information up to that date. The system contains standard permit conditions and the ability to add/tailor conditions. The system also tracks estimated, permitted, and actual impacts. MDSHA also tracks interagency concurrence points in the transportation development process; however, this is not a part of the EM Toolkit or the other systems discussed here. MDSHA will ultimately make this an on-line system, integrated with GIS.

**The EM Toolkit** tracks the permitting process of MDSHA projects that require authorization by MDE's Non-tidal Wetlands and Waterway Division. MDE Non-Tidal consultant reviewers enter some project information.

**A Quality Assurance Toolkit** is proposed for development to be used by MDSHA Office of Construction Quality Assurance Inspectors to document their inspections. When developed, the QA Toolkit could share data between the MDE's Toolkit, EPD's Toolkit, and the EM Toolkit described here.

The Toolkits are all based on the same framework. This allows data to be easily shared between the different applications. The systems are updated on a regular and frequent basis when minor issues are identified and when additional capabilities are approved.

There are on-going discussions about providing a connection between the Toolkits and MDSHA EPD's Workload Database. Workflow could also be controlled between sections and functional areas; e.g., the QA Toolkit would provide a link from the section performing erosion and sedimentation control inspections to the EPD-managed projects.

MDSHA also utilized Access databases to track commitments on two highly controversial, complex projects, the Woodrow Wilson Bridge and the Inter-county Connector.

MDSHA's Project Management system utilizes Microsoft Project and both systems run on an Oracle database, on the same server, to be able to accommodate databases from other legacy systems. Uniquely among the systems examined for this study, the Toolkit system is housed on the developer's server (RAM Consulting Corp.) and is projected to be moved to a designated hosting service for improved reliability and performance. The developer will continue to maintain the system in the new-hosted environment. More information about the systems' interconnections is provided under business process and system operations.

### [Access by Partners and Stakeholders](#)

The web-based toolkits are accessible agency-wide. Those with access to the system include:

MDSHA Environmental Monitors and other MDSHA staff in the field (resident engineers, project managers and design engineers)

MDSHA EPD Environmental Specialists and Environmental Program Division Manager. As soon as a non-compliance occurs, the MDSHA Environmental Program Division Manager receives an email notification. The Environmental Manager notes corrective

actions and a required timeframe, information which also feeds into evaluations of project managers and contractors.

MDSHA planning staff, that are responsible for tracking commitments.

Regulatory agencies: U.S. Corps of Engineers and State Department of Environment.

Individuals have role-based user accounts with access through web-based, password-protected logins. User access is determined by MDSHA EPD based on the needs of each project. Users are assigned to projects and only have access to data associated with that project. In addition, there are different user types that determine the type of access to each project including whether they have read/write access or read-only access and which modules they may view or edit.

Resource agencies can make requests, comments, and/or questions through the EM Toolkit. This allows MDSHA the ability to immediately respond to their needs and ensure all parties involved are up-to-date on agency coordination. MDSHA is considering providing access to other agencies, consultants, contractors, and other project stakeholders as needed and limited by project. No public access is planned.

## **Business Process**

### **Business Process and System Operations**

The EM Toolkit allows the EM to keep key stakeholders informed by updating the following information in the EM Toolkit, for each applicable project:

*Daily inspection reports:* details daily construction activities.

*View inspection status:* provides a mechanism to notify stakeholders manually or automatically through assignment of an inspection status.

*Track project issues:* if issues arise, tracks issue review notes from daily inspections, and how issues are resolved. (Figure 2.)

*Track permit conditions:* ensure each permit condition is met.

*Track project impacts:* ensure that previously unapproved impacts have not occurred.

*Upload any supporting documents:* project photos, construction plans, GIS layers, etc.

**Data Input:** The IEM and EPD Project Manager are responsible for inputting data and monitoring completion of commitments. Templates for USACE and MDE permits have been developed to reduce data input and streamline incorporation of general conditions. Data inputted into the MDE Toolkit during permitting process is shared with the EPD Toolkit for monitoring project compliance during construction. Data from the MDE Toolkit can also be shared with the EM Toolkit, if needed.

**Permit Tracking:** The EM Toolkit also tracks permit status. Permit conditions are identified by type (Special, General, BMP) and number.

**Document Management:** The Toolkit functions as a document management system, allowing uploading of electronic records and authorization documents. All associated documents, in any file format, are uploaded for the project workspace, and are available to all project stakeholders. At MDHSA, *Environmental Impact Reports* document approved and unauthorized

impacts to regulated resources and *Project Issue Reports* detail construction site issues and resolutions. The system incorporates these and other items such as:

- Plan sheets
- Project permits
- FEIS impact plates referenced in a USACE Section 404 permit
- Supporting documents for the items above
- Photos from site visits and the IEM's recommendations to keep the project in compliance
- List of those who can access the system and roles; e.g. QA/QC, stakeholder, etc.

Issues and status; e.g. whether open or closed, documenting what happened, who was there, how MDSHA responded. This information is reported instantly and raises credibility with the public and resource agencies, as it is available to anyone who wants information on a potential non-compliance event.

The Oracle back-end to the system facilitates these document management functions. The EM Toolkit also contains environmental news and important links related to wetland and water regulatory compliance.

**Developing Commitment/Condition Lists and Tracking:** The EM and EPD Toolkits include permit templates, with general conditions pre-loaded in the system for easy selection, accompanied by the ability to add new project-specific conditions. Staff can add a new permit to a project, pick a template, then:

Figure 2: Permit Conditions Reviewed, Issues Report and SHA Action from MDSHA EM Toolkit

Issues						
Number	Station	Offset	Wetland Issue	Recommendation to SHA	Comment	
5	320+00	90	9	At a result of a thunderstorm that dropped 2.25 inches of rain the past weekend - a section of super silt fence failed resulting in a discharge of sediment laden water into the Tributary of Deep Run (Stream Type Use 10). See attached pdf to view the SSF failure and sediment within the channel. The super silt fence is located adjacent to the end wall of the 72" RCP (See sheet 20 and Wetland Plate #2.5.#3). There is evidence of sediment leaving the construction site and entering riprap runoff channel.	Remove saturated mud collected along SSF and backfill with dry dirt. Seed and mulch behind SSF.	The SSF has been fixed. Dave Ryder (MRE Inspector) reviewed the site and determined that the removal of the small amount of sediment in the stream channel would not be necessary.
Total 1						
Supporting Documents						
Type	File Name	Description				
Photo	Pictures 2008-10-30 SSF Failure.pdf	Pictures				
Total 1						
Permit Conditions Reviewed						
U.S. Army Corps of Engineers Standard Permit (95-00787-16)						
Reviewed	Condition	Met	Notes			
✓	No stormwater management facilities shall be placed in waters of the U.S., including jurisdictional wetlands.	✓	Met			
✓	Any excavation for highway construction (i.e., sediment basin/traps, borrow areas, stormwater facilities, ditches, or cut slopes) shall not be placed in or affect the hydrology of the wetlands or other surface waters.	✓	Met			
✓	No stockpiling or storage equipment or materials, staging areas, or erection of auxiliary facilities, such as concrete or asphalt plants, or construction trailers(s), shall be permitted within waters of the U.S., including jurisdictional wetlands.	✓	Met			
✓	Borrow areas for fill material will be located in upland areas and shall not impact waters of the U.S., including jurisdictional wetlands. The disposal of excess excavation shall be monitored by inspection personnel to ensure that it is not placed in a wetland or stream.	✓	Met			
✓	Super silt fence shall be used at all wetlands and stream crossings.	✓	Met			

- Pull in general conditions
- Edit general conditions so that they are/match actual ones for the project
- Add special conditions for a project

An important function of the toolkits is their flexibility to add projects not present in one system or another. Projects with environmental aspects that are not contained within the agency construction and project management systems include maintenance projects; these can be added manually so that the necessary permits and commitments can be tracked.

**Corrective Action and Performance Monitoring:** The EM Toolkit helps track daily environmental monitoring where that is required (design-build projects and/or those with wetland permits). The IEM performs a daily review of commitments using a checklist of permit conditions. He/she coordinates with the construction manager as well as others who desire notification on any corrective action that may be needed and timelines that must be met.

The EPD Toolkit tracks performance monitoring on the remaining projects under construction, including permit conditions and NEPA commitments. Many of these require recurring monitoring, but on a less frequent basis, like every other week. The system is not used to track ROW or landowner commitments.

The systems support impact tracking, issue tracking, and issue resolution. In the future, information from the system may be used for performance evaluations.

**Alerts:** Users can select different options to be notified through email of reports of certain status types (Compliance, Non-Compliance, Under Review, and Accident). In addition, the IEM can select users to be notified through email when a report is created. The communication module allows all users to post comments and notify other users through email notification.

### Process Issues, Limitations, or Obstacles

In 2005, MDSHA commented, “process and people have been the challenge with their desktop permit tracking system, which included some commitment tracking capabilities focused on development and design.” It is “a challenge to get the main people who have ownership of the process, the environmental staff, to keep the data current.” The system “has been around 3-4 years but staff weren’t really using it except for NEPA-phase project management. MDSHA section-wide programs weren’t keeping it up to date so it became unusable.” MDSHA built in the capability for “importing and exporting data at the push of a button, but it (was still) not being used.”

MDSHA made significant progress in the understanding of roles and responsibilities as well as in improving system interoperability and data transfer, in 2006 and 2007. Though the EM Toolkit was initially designed for one particular group, IEMs and their multiple reporting parties are able to use the system for multiple purposes, providing greater assurance that commitments are kept and reducing the need for many individual ad hoc tracking systems.

MDSHA encountered some difficulty in determining additions and improvements. An interdivisional team was created for this purpose; however, as more and more functions were added, the system became overly complex. MDSHA had greater success in

having different user groups decide what changes are needed, such as the IEMs with the EM Toolkit.

### Successes

MDSHA noted that “one of the reasons this (the EM Toolkit) has worked so well is that it was built by (with extensive input) an Environmental Monitor.” It provides:

A way for Environmental Monitors to report in real time. Real-time issue resolution has been a lot quicker and eliminates confusion. Everyone arrives with the same information.

Immediate notification of stakeholders and action when there is a risk of an environmental violation.

The system has standardized the reporting for IEMs assigned to MDSHA projects statewide and led to a more standard IEM inspection and reporting process on all MDSHA projects, facilitating quality improvement overall. Some other notable areas of success include the following.

#### **Documenting inspections in construction and completion of commitments:**

MDSHA excels in its ability to document completion of commitments through a system of regular inspections, either daily by IEMs on design-build and Section 404/wetlands/waterways projects or through a regular series of monthly visits by Environmental Program staff. Connecticut, New Hampshire, North Carolina, Pennsylvania, and Virginia have all examined MDSHA systems for potential application. The EM Toolkit provides the following benefits to SMDHA as well as federal and state wetland regulatory agencies:

- A web-based, versatile method to distribute information in a timely fashion
- One centralized project review document for easy reference and data retrieval
- Search ability by keyword (e.g., Mill Pond)
- Permitting/regulatory agencies may quickly assess impacts and provide comments and recommendations, as required.

Document management functions: all project supportive data are available in one central location, creating effective quality assurance/quality control.

**MDSHA has developed good systems for minimizing the work of data entry.** No one wants to waste time entering data if there is an easier or automatic way to do it, and staff may not enter information if they are not required to do so. This is a very important issue, to ensure that the system contains a reliable minimum set of data that can be used for overall tracking of commitments and agency environmental performance. MDSHA attends to this by assigning responsibilities for data entry, maximizing the ability of systems to talk with each other, and even using data entered by other agencies when it is applicable. MDSHA has typically accommodated differences in systems by building interfaces, creating plug and transfer points between systems so they can import/export to one another. Integration of disparate workflows, such as MDE permit reviews and project creation, into a single data repository reduces redundant data management and improves process collaboration.

**Coming to common understandings with resource agencies, limiting number of commitments and their variance:** Importantly, commitment tracking also enables the agencies to “come to common understandings instead of fighting among each other; for example, they are able to come to consensus on such items as timing restrictions for different species.” This addresses a primary issue multiple states have encountered: an extremely large number of commitments, some with similar intents and/or language. MDSHA does not find they have an unwieldy number of permit conditions; the Environmental Programs Manager notes that preliminary meetings with resource agencies have gone far toward integrating overlapping requirements and eliminating unnecessary redundancy. Joint permitting processes have provided a way for agencies to share draft permit conditions and take care of many of them, building significant trust over the course of this process. The number of special conditions has gotten much smaller. MDSHA’s EM Toolkit has been continually evolving since its development, to maximize its utility for all concerned.

**Notification and tracking features, interfaces with other systems.** MDSHA is satisfied with the ability to track both major and minor projects with wetland impacts. The new system also establishes timelines, identifies when things need to be done, and has the ability to provide notifications for permit conditions. As it is Oracle-based, it can interface easily with other systems, e.g. to produce reports using a Crystal Reports reporting tool. It can track permit determinations, including that a permit is not required, and allows only qualified people to have the capability to make determinations. The system is easy to use and training has not required much time. MDSHA is making progress toward its agency-wide strategy of having GIS serve as an information systems integrator. The system is not currently tied to a GIS, but on-line access has been achieved and permit conditions in the ICC database at least have stationing/location information related to area-specific conditions.

### Lessons Learned

MDSHA found that their main downfall historically in the overall commitment tracking process at MDSHA was often the transfer/communication of environmental requirements from the planning/design phase to the construction phase. The EM and EPD Toolkits are helping improve compliance and ensuring that commitments made during the planning/design process are carried out during construction.

MDSHA’s strategy has been to move forward a number of systems on different timetables, to maximize forward momentum. The Environmental Design Division has a workload tracking system in place and is accomplishing their goal of entering data only once into a single system that tracks permits, conditions, and workload. The commitment tracking system developed by Planning and GIS is coming on-line as a separate system that does not tackle workload management for every office. Occasionally, resolution of the different divisions’ preferences has required higher levels of management involvement and leadership. Development and implementation of the toolkits occurred simultaneously which allowed them to be in use as soon as possible and to be modified based upon user input.

### Next Steps

MDSHA is still honing some aspects of their Toolkit systems.

**Forum for interagency communication:** The communication module is not utilized to its full potential. This module has the ability to further facilitate issue resolution, by storing all the communication related to the project in one central location and offering an area for dialogue by the different agencies.

**MDSHA is adding an activities calendar** to track project activities related to permit compliance including document submittal reviews, meetings and other associated activities. This will function as a workflow management tool, provide a calendar, milestones, and reminders on a daily, weekly, and/or monthly basis.

**A GIS connection is envisioned but not currently available.** Under the direction of Planning, all MDSHA data management projects are pulled into one GIS platform using Oracle. Stationing information is included for many attributes in the Toolkit systems. Furthermore, GIS files as well as any other geographical data can be uploaded and included as project-supporting documents for future integration. Common project numbers and geographic coordinates for projects facilitate linkage to the agency's cash flow system for capital forecasting and in the future into GIS.

### ***Summary***

Use of the EM and EPD Toolkits results in accurate documentation of project compliance, actively helping SHA realize its goal of 100 percent compliance on projects, especially for the important and highly visible set of projects targeted by the system; i.e. projects with water and wetland impacts, occurring within the Chesapeake Bay and much public visibility and concern. Meanwhile, SHA has gone far toward virtual elimination of interagency controversies in certain areas, such as wetland and waterway authorizations, and erosion and sedimentation control compliance, through dedicated, proactive, and transparent accountability mechanisms.



## Texas DOT

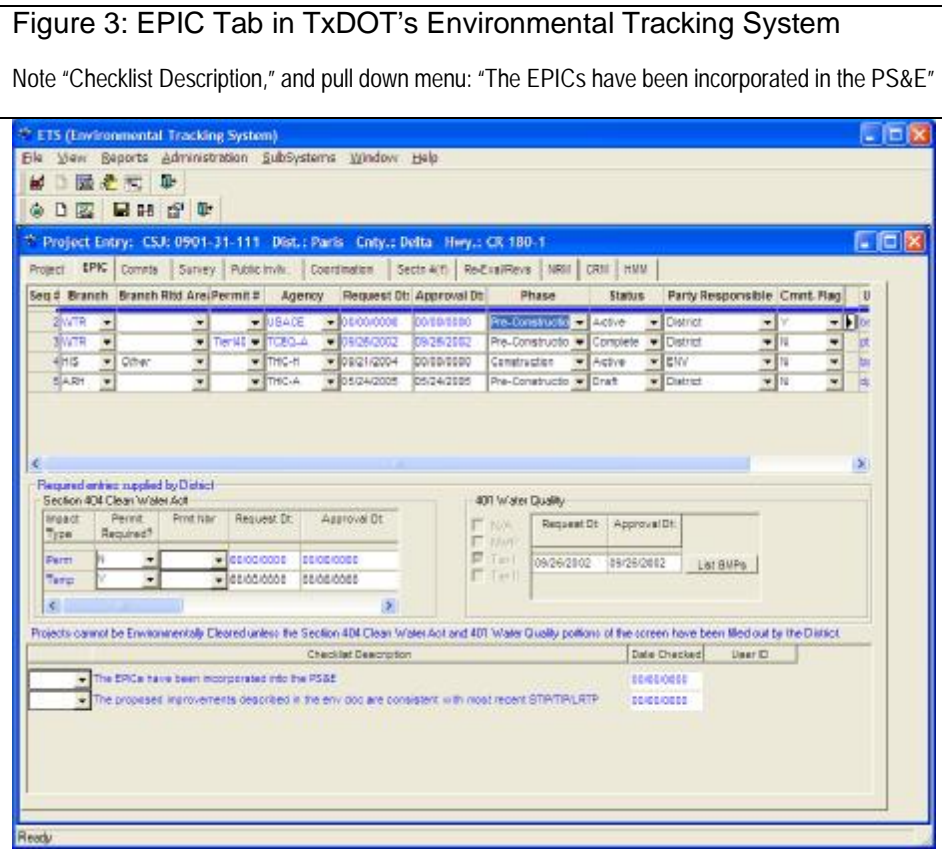
Texas DOT (TxDOT)'s Environmental Tracking System (ETS) tracks projects during project development, focusing on management of NEPA and environmental permitting requirements prior to construction. It helps staff to follow projects throughout the planning stages and ensure that NEPA issues are addressed and environmental permits are coordinated before the project is released for construction. ETS is the main database that records when a project is received, who is reviewing, and what agency coordination is occurring. Through its commitment tracking function, TxDOT design personnel can determine if all environmental permits, issues and commitments (EPIC) are addressed in the project plans; EPIC is a tab in ETS that lists permits, issues, and commitments (Figure 3).

## Technology

### Technology and Vision

TxDOT started developing ETS in 1997, when its initial purpose was to support TEA-21 and to streamline communication between districts and Environmental Affairs, facilitate circulation of documents and reduce the time it would take to gather agency approvals. TxDOT's Environmental Affairs Division (ENV) requested the agency develop an ETS-like tool to help track environmental requirements and activities for projects submitted by the TxDOT districts.

TxDOT's ETS was intended to move the agency toward a paperless office, with streamlined distribution of documents. Project documents can be uploaded electronically with any combination of Microsoft Word, Microsoft Excel, and image files. ETS helps TxDOT ENV act in its capacity as an environmental clearinghouse for construction projects (coordinating among environmental specialty staff at the headquarters level, with all 25



TxDOT District offices, FHWA, various state and federal resource agencies).

Initially ETS replaced a legacy DBIII database. ETS was built in Powerbuilder Version 9, which allowed conversion of all old data into a new database with growth potential. The ETS is based on a two-tiered architecture, separating the client user interface and database server. The difference is that the business logic resides on the client server but is well separated from the Graphical User Interface (GUI), e.g. the application code is partitioned into presentation, business, and data layers. Sybase SQL Server 12 has been used for the database server. Sybase Open Client 11 connects to Sybase SQL Server from the Powerbuilder application. Each of the technical and environmental specialty staff have their own tab. TxDOT plans to move ETS to the web, using Microsoft SQL Server and Microsoft .NET (with C# as the programming language).

TxDOT has a legacy Design Construction Information System, not directly linked to ETS, but which facilitates system updating if the contract advertisement date changes. Project Managers use this system, and a few districts use MS Project. All districts now have a license for Primavera, but use of it has not yet become common. No environmental commitment tracking functions have been added to Primavera.

With future technology integration in mind, TxDOT has been aiming to improve interfaces with other systems in the agency and to make the technology architecture compatible with other systems. In 2004, TxDOT added web portal, ASP pages and JavaScript, for external inquiry access to ETS, with the intention of adding an on-line approval process. However, PowerBuilder is not robust enough to do on-line approvals/applications. TxDOT wants to add GIS functionality as well.

### Access by Partners and Stakeholders

In addition to headquarters environmental staff, district staff access ETS to perform limited project entry and queries about projects in their districts. The web-based system is kept in-house with the Information Systems Division. District staff, environmental staff and/or the project manager have data editing privileges. Design staff in districts may use it, because they fall under the District Transportation Planning Director; however, construction and maintenance staff do not use the system.

The Security Administrator maintains logins. Data is secured by firewalls in place by ISD and TxDOT MS SQL server database security. ISD places triggers on tables to track data changes when there is an issue. When records are deleted or modified, a request is sent to ISD and the Database Administrator retrieves records from the backup server. ISD monitors modifications using security policies and an access criteria form, processed through the security administrator.

Outside of TxDOT, FHWA has read-only access to ETS and EPIC, which allows them to view comments and resource agency coordination and commitments, assisting FHWA in their review of NEPA documents. Consultants receive the appropriate information via hard-copy in their contracts. There are no plans for public access.

## Business Process

### Process and System Operations

ETS enables tracking of issues/commitments, comments, permits requested, public involvement, agency coordination, re-evaluation/revisions and section 4(f) requirements from an easily navigable window. TxDOT developed the system by carefully examining

their project tracking process and workflow from project initiation (as initiated by the districts) to project completion (defined as when a project approval letter is sent by project management to the district), in order to identify core business rules, sub-processes, and commitments that emerged.

**Data Entry:** Currently, data entry is a manual process among project managers and environmental specialists. The system requires entry of information on Section 404 or Section 401 permits and lists BMPs, provides for entry of acres impacted, and credits used. On the EPIC tab, commitment information is not entered except in the comment section. Based on the project type, the most typical specifications will be automatically loaded, with the ability to add or modify the specifications. If an area engineer makes a promise to or a trade with a landowner, or any other promises or commitments, that person can enter the draft commitment into the system and it becomes part of the project record.

**Ensuring Commitment Follow-through:** The transportation planning director must verify that permit issues are incorporated into the plan sheets (see Figure 3); however, a gap is: “how did it (permit issues and conditions) get communicated in the plan set, go into the bid package, because Environmental does not review PS&E.” Engineers are instructed to review EPIC screens and proof review the plan sheets to make sure commitments are included. TxDOT intends to address these issues as an Environmental Management System is developed for the agency.

ETS has a basic search screen with the letting date, NEPA document reviewers, project types, etc. However, TxDOT’s system lacks feedback functions to review and ensure that commitments are retired in design, construction, and maintenance. System developers and environmental staff said, “Once a project is in the system, only rarely will an individual go in and annotate that something is complete.”

ETS and EPIC can generate a monthly report, identify all transportation projects entered within a certain month or other given period, as well as a “Clear Environmental” report. In order for a project to be cleared for letting, preconstruction authorizations must be completed within the system.

**Alerts focused on document circulation:** ETS uses e-mail notifications to alert senders and TxDOT reviewers when a document is sent and when the review is completed. ETS also produces a project Circulation report to identify projects that have exceeded the assigned circulation period within the TxDOT Environmental Division, at FHWA, or at other federal or state agencies.

**Workload and timeline estimation functions:** ETS has a timeline function that estimates total process time for environmental clearance, right-of-way (ROW), and Plans, Specs and Estimates (PS&E). The project type, ROW acquisition, and number of parcels are all factored into the calculation. Given the “received in Environmental date,” the model calculates the PS&E date, letter of authority date, and the month letting will occur. Given the month letting is anticipated, the model calculates the date the document must be received in Environmental to meet that letting date.

The system also supports work tracking and workload allocation; however, staff turnover at TxDOT has worked against using the full capabilities of the system. For example, TxDOT staff said they are more likely to use the tool to track when a survey was done (documentation), but are not using it as a work-planning tool, though staff could do so with more training and encouragement or requirement to use it this way.

## Process Issues, Obstacles, or Limitations

**TxDOT's system lacks feedback functions to review and ensure that commitments are retired in design, construction, and maintenance**, as noted above.

The system is designed to capture (commitment) data, but **there are no requirements for the user to enter commitment information or to log that it has been handled**.

"Consistent use of this function has been the...issue." The EPIC tab is "primarily used proactively, they have to think if there is a commitment and put it in. Nothing is prompting them to check." TxDOT is piloting a checklist (PCE checklist) that does offer some prompts and commitment checklists. All Districts do print and use the Environmental Commitment Checklists generated by the system; they just may not be complete.

TxDOT's original intention was to have the EPIC be a repository, so the EPIC sheet could be printed out and inserted into the plan sheet; however, TxDOT has encountered a failure familiar to other DOTs with environmental commitment tracking systems: because the EPIC sheet is not required, they cannot rely on the EPIC sheet to be complete. **Reports or checklists on commitments generated at the end of the project are attached to the plans and incorporated into specifications, though the comprehensiveness of such a list is unreliable.** TxDOT interviewees suppose that various staff are "probably still keeping a lot of those commitments in a separate database" or informal ad hoc lists and systems. They "realize that they are going to get resistance in eliminating other systems that are being used."

The IT section is gradually eliminating local Access databases and work group applications. A big issue at the Division level has been getting the user to think through all the requirements to keep the project in compliance. That has resulted in Divisions having their own Excel spreadsheets separate from the ETS as well as not adequately outlining the business process and identifying what needs to be done, in a more systematic or statewide fashion.

**Finally, TxDOT noted that ETS is tailored for the project development process as traditionally executed** (e.g. environmental permitting after NEPA, most interagency consultation starting at NEPA) **rather than how it is evolving**. As TxDOT noted, "a lot of projects require early coordination, that don't run through the proper chain. This still needs to be addressed in the future."

## Successes

**Clear environmental and coordination status reports.** TxDOT likes that users can quickly ascertain the issues/concerns of a project and particularly the status of agency coordination. Report functions have been well received. ETS generates a monthly report, identifying all transportation projects entered within a certain month or within a given period or exceeding their circulation period, as well as a "Clear Environmental" report, that identifies all projects cleared by the Division within a certain month or within a given period. It produces a project circulation report to identify projects that have exceeded the assigned circulation period at FHWA or other federal or state agencies. These reports have improved TxDOT's ability to monitor resource agency coordination, mitigation, status of environmental permits, issues and commitments entered into the system, as well as to track the circulation status internally and at FHWA. FHWA has read-only access to ETS and EPIC, which allows them to view comments and resource agency coordination and commitments that TxDOT enters in the system.

**ETS enables TxDOT to involve the entire organization and account for what the agency feels are all critical paths, a first step in development of an Environmental Management System (EMS).** Identification of these environmentally significant aspects, many of which were not immediately obvious at TxDOT, resulted in TxDOT identifying actions and plans that are both more efficient and effective than previous ways of doing things. TxDOT is now piloting an EMS in three districts, including commitment tracking for all environmental responsibilities in construction, clearly defined roles and responsibilities, and improved training and understanding of environmental requirements, prevention, and control procedures. The agency is examining the contractor's role, additional needs in communication requirements, and compensation. TxDOT has identified the environmental aspects of agency activities and is now considering how to expand ETS to support an EMS, through development of additional modules to track environmental training, role assignment, and other EMS elements.

### Lessons Learned

**Assign responsibilities, use quality improvement processes.** TxDOT utilizes the ISO quality improvement process and EMS to rectify some of the shortfalls in its system. For example, in addition to inconsistent usage of the EPIC sheet and entry of items, under an EMS, commitments "will be someone's specific responsibility."

**Take time to understand your business processes.** TxDOT learned from WSDOT (2005 ICF/FHWA practitioner exchange) that business process analysis and understanding user requirements is key, especially to "avoid band-aids over band-aids, disconnected modules." Thinking through the whole system and business process continues to be the most challenging aspect. TxDOT's IT developers are trying to systematically address the needs of various groups that have constructed and are using their own tracking systems or databases, to understand their business processes and what is needed from the system, so they are "not changing screens as managers change."

**Utilize existing systems and processes to the maximum extent.** For EMS, TxDOT examined where they have existing documentation or an existing form they can modify instead of introducing something new, to facilitate organizational change. TxDOT is looking into managing contracts better and ensuring adequate training and qualifications. The agency's new EMS and supporting information systems (PeopleSoft, in this case) will record who is responsible for performing a certain task and if they been trained adequately or have appropriate credentials.

**Data entry is an issue for staff, who feel they do not have time to do their jobs as it is.** TxDOT is working toward automatic population of fields.

TxDOT also learned to:

- Keep the system simple, with consistent screens and functions so that it is easy for the users to use the system.
- Have fewer data collection fields on each screen so that the users do not feel overwhelmed.
- Provide custom reports so that users can access various types of reports.
- Provide adequate help on the screen and ad hoc help, so that a new employee can understand the functionality.

- Incorporate checks and business rules so that users do not enter bad data into the system.

## **Next Steps**

TxDOT would like to see improvements in system flexibility, ability to link projects together, and allow search functions on multiple projects or changes to project numbers. TxDOT is also looking for the ability to not only manage NEPA document distribution and sign off, but also submit comments through ETS. This would enable users to compile all information in one place, comment on a commitment and project via ETS and make the information available for other users to review. In the future, TxDOT will likely use the system in performance evaluation of individuals.

TxDOT is working on more consistent entry of commitments and how to ensure entered commitments are incorporated into plans and construction documents. To address this, in the EMS each project will have its own mini aspects and impacts analysis, and TxDOT has decided they want a “smart system to help us narrow that down.” Narrowing factors will include project type, geographical setting, and urban/rural location. Regulatory requirements feed into specifications related to aspects and actions. The team has been reviewing the spec book to identify typical specs by project types. Right now, on the plan set, a lot of environmental commitments or modifications are handled under special provisions, but they are looking at incorporating more of this into the specs.

In addition to adding GIS functionality, TxDOT wants to use and expand ETS as a primary tool in the agency’s developing environmental management systems. TxDOT envisions adding a central repository for facility surveys with the ability to make compliance updates online; a central repository for environmental policies and procedures as well as Internet links to resource agencies’ policies; and a central repository for job descriptions outlining how to perform environment related job duties. Implementation of the ETS has resulted in the development of tracking software and a web-based environmental process manual. TxDOT is piloting electronic submittals of documents as well. TxDOT intends to continue its strides toward a document management system by connecting ETS to FileNet, an enterprise document management system, in the future.

## **Summary**

While the TxDOT system has shortfalls in its use for environmental commitment tracking, a notable success is its use for circulating documents (e.g. document reviews, sign-off, and management), accompanied by FHWA’s access. With large workloads, this system has helped both agencies keep projects moving. TxDOT will also use the system to support development of Environmental Management Systems.

## Vermont Environmental Database and Construction Erosion Control Database

The Vermont Agency of Transportation (VAOT also known as VTrans) began developing an Environmental Database (EDB) to track NEPA and permit documents/conditions and implemented the EDB 1999, which functions mainly as a permit tracking system. With the creation of two new environmental compliance positions within the Construction Section, VTrans added a separate Erosion Prevention and Sediment Control (EPSC) database.

### *Technology*

#### Connection to Other Systems

The VTrans EDB and EPSC systems are applications in Access XP, with data stored in SQL Server 2005. The two systems are independent of each other; however, staff in the construction section have access to both. The EDB is mainly a permit tracking system with a text box to enter related environmental commitments. The EDB uses information downloaded from the Preconstruction Project Management System (PPMS).

The EPSC database contains on-site NPDES permit compliance information, with emphasis on construction stormwater run-off. Neither system is linked to GIS or has compatible location identifier information. The systems are continually updated manually as needed and by request. VTrans environmental staff have permission to make changes to the EDB fields and are the main users of this permit monitoring system, while VTrans construction environmental staff have permission to update the EPSC fields and are the main users of that system.

#### Access by Partners and Stakeholders

The environmental staff, including environmental specialists and resource personnel, are the most frequent users of EDB and are responsible within their areas of specialty. Program and project managers use the system daily and have view only access. VTrans developed and maintains the application in-house and trains all active users on the system, which is housed on the VTrans' server. There are no differences between the headquarters version and access and use in other areas; however, as with Maryland, the small geographic area of the state is a factor in the agency's centralized structure for addressing environmental needs and factors in transportation planning, development, construction, and maintenance.

The construction EPSC database is not linked to any other database, nor is it accessible by anyone else other than staff in the Construction Office. Construction resident engineers have read-only access but do not participate at this time.

The SQL data is not secured by a firewall; instead AOT uses standard SQL users and groups to control data quality. Only the environmental staff in their specialty area can modify items within the permit tracking system. Other agencies, consultants, and the public do not have access to the system, and no such access is planned.

## Business Process

### Business Process and System Operations

VTrans' EDB Access database tracking system helps control workflow and clears projects for letting. It is accessible by all agency employees and helps facilitate communication between the environmental and construction staffs. All environmental staff are required to keep the EDB system updated; using the system and keeping it updated are job performance expectations. The tracking system is considered user-friendly and most employees have embraced daily use of it (Figure 4).

### Project and Commitment Data Entry

VTrans uses these Access databases for projects in the Preconstruction Project Management System (PPMS)

and draws project information from this system. Construction uses Trans\*port for Construction Projects. A project scheduler, Artemis, schedules activities for preconstruction and draws from the separate mainframe (PPMS). The projects in the Access EDB are downloaded from the TPMS system, automatically populating certain data fields. Likewise the Access database also displays an automatically downloaded due date for NEPA document completion from the Artemis system.

The information for each project in the Construction EPSC Database is entered after the project goes out to construction. Only the two construction environmental specialists, who manually enter plan review comments, waste, borrow and staging plan comments and site visit documentation, use the EPSC database. Vermont has a very strict program in place with regard to waste, borrow, and staging areas and resource specialists in the environmental office clear all such areas.

**Performance Data Entry:** The construction environmental specialists also use the application to fill out a performance evaluation on the contractor and subcontractors, which has 12 environmental questions. This feeds into a rating system (a dozen factors) for prequalification. The performance evaluation for contractors is in a separate

Figure 4: VTrans Environmental Database

Permit Screen, with Responsible Party for Permit, and Text Box that can be used for entry of permit conditions, at the bottom right of the screen.

The screenshot displays a software application window titled 'Environmental - [Permit]'. The interface includes a menu bar (File, Edit, Format, Reports, Help) and a toolbar. Below the menu, there are several input fields and buttons: 'Permit Name' (with a dropdown), 'Permit No.' (with a dropdown), 'Project Manager' (with a dropdown), 'Permit Status' (with a dropdown), 'Permit Type' (with a dropdown), and 'Permit Date' (with a dropdown). A 'Print This Form' button is also present. The main area of the screen is divided into several sections, including 'Permit Details', 'Permit Conditions', and 'Permit History'. At the bottom right, there is a large text box labeled 'Conditions' for entering permit conditions.



database only accessible to the Prequalification Committee and is maintained only within the Construction Office.

**Commitment Tracking and Performance Management:** The construction EPSC database has the ability to do queries within itself to check the consistency or lack of consistency of consultants who develop EPSC plans for contractors. It also allows for review of field visit reports, pictures and permit compliance dates. This is all manually entered information (Figure 5).

The construction EPSC database does not have a commitment tracking function, due to concerns about having the same information in two databases without provisions for keeping the information synchronized. Most projects fall under general permits, which are included in the contract plans. There is a formal hand off procedure from construction to operations, both physically and verbally.

VTrans' Access EDB is not used to track permit conditions out in the field. However, every time a construction environmental engineer does a field visit, they do a report and attach a copy of it in the construction EPSC database. VTrans has a specification requiring the contractor to maintain an on-site erosion and sedimentation control manager or inspector. VTrans' own construction environmental engineers do field inspections randomly, without notice.

**Alerts:** Both systems have user-initiated notifications for permit expiration dates.

### Process Issues and Limitations, and Lessons Learned

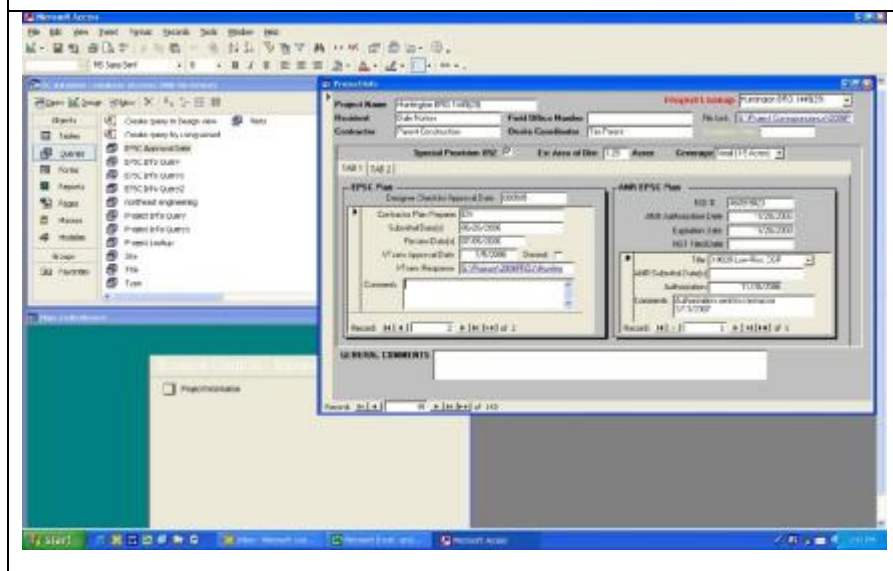
VTrans made some discoveries in the course of implementing their permit tracking system. Some environmental specialists are still not entering special conditions and lack consistency in how they do this.

Construction environmental engineers still have to go back and check permits.

The system has become more cumbersome over time as well, with a proliferation of fields, including three stormwater screens.

The construction staff would like the ability to generate reports and letters on reviews. Contractors may barely meet the letter of the law in terms of some permit specifics and the system does not always rigorously capture performance.

Figure 5: VTrans' Construction EPSC Database Showing EPSC Plan Approval/Permitting Data



## Successes

VTrans' system has successfully assisted the work for which it was intended. The Access EPSC database has the advantage of being built to support the work that the environmental engineers do in the Construction Office. VTrans' EDB provides at-a-glance permit status to program and project managers and ensures all required permits are in place prior to project advertisement.

## Next Steps

VTrans is not actively investing in further development of the system at this time. VTrans has been fostering a high awareness of environmental obligations through other methods, such as use of construction environmental inspectors and through intensive training of engineering staff in the regions and in the field.

## Summary

VTrans' EDB has limited environmental commitment tracking capability relative to the systems which focus more exclusively on that, like MDSHA's WSDOT's, and VDOT's. VTrans also faces common challenges with implementing environmental commitment tracking systems, including getting consistent use, enhancing reliability as a repository for all commitments, and dealing with the very high volume of commitments, some programmatic, some unique to a particular project, with which DOTs must contend.

Still, on an outcome level, VTrans has a record other DOTs can only envy. The agency has had only one violation brought against the agency in 14 years and not one since the construction environmental engineers commenced using the system. VTrans attributes this to the agency's environmental ethic and aggressiveness in conducting environmental training in the districts.

## Virginia's Comprehensive Environmental Data and Reporting (CEDAR)

The Virginia Department of Transportation (VDOT) implemented the Comprehensive Environmental Data and Reporting (CEDAR) system in May 2004 as the culmination of a five-year effort to streamline VDOT's business and technology needs with respect to environmental data.

Virginia developed the tool out of the growing realization of the need for environmental team members to have a consolidated, automated tool to track the work they perform. CEDAR replaced the more than 73 tracking systems previously in use throughout the state and resolved issues of data redundancy and duplicative work. Environmental staff now have a single, centralized data repository that is integrated with GIS databases, offers full integration with VDOT's project management system, provides improved accountability, and improves the documentation and communication of environmental decisions and commitments.

### *Vision*

To address the opportunities for business and technical enhancements, VDOT's Environmental Division embarked on a project to develop an automated environmental data system to:

- Gather and store environmental data
- Document decisions and commitments
- Produce deliverables through a common interface
- Implement solutions (both technical and non-technical) to streamline operations for all projects.

Implemented in May 2004 with iterative development since this initial roll out, all of CEDAR's major modules (from original requirements) are now in place. All projects that require an environmental review are tracked through CEDAR.

### Technology, Connection to Other Systems

VDOT's CEDAR system is a web-accessible Oracle database with a Java front-end that was custom-built to interface with VDOT's other department systems. Housed at VDOT and managed with all other production systems, CEDAR is behind a firewall and has controlled editing.

CEDAR contains an automated interface with the Department's project management system. Information can be sorted and organized in a number of ways, including by District.

CEDAR merges GIS functionality with the system's non-GIS modules to allow users to switch between the map and .html interfaces. Specific GIS requirements identified for CEDAR are being applied to VDOT's GIS Integrator to bolster that tool's utility.

VDOT has also decided that CEDAR needs analysis tools to look across projects for trends. This vision will be implemented over the next year.

## Access by Partners and Stakeholders

VDOT rolled out CEDAR at both headquarters and regional offices. Active users of the system are mainly environmental staff; other non-environmental staff, such as those in Construction and Maintenance, also request environmental reviews. All VDOT environmental staff members access CEDAR. Use of the system is a function of employees' job duties, not the physical location of staff.

Locally administered projects and non-VDOT project managers do not have complete access to CEDAR. VDOT is in the process of creating a standard that will dictate a minimum data requirement that must be met before CEDAR will generate a certification for projects administered by non-DOT entities. VDOT will embark on a pilot with a locality next year to give them access to CEDAR outside the firewall, facilitating future iterations that will allow access by contractors.

Federal Highway Administration officials can access CEDAR, but no resource agencies may at this time. CEDAR's initial focus has been the needs of VDOT staff, but subsequent phases may bring in users from consulting firms or other agencies or local government entities with which VDOT reviews projects. There are no plans to allow the general public to have access at this time, though the public reviews summary environmental performance information on projects through the state's Dashboard.

## Business Process

### Process and System Operations Cover All Projects, All Environmental Commitments

The focus of the CEDAR application is to make it easier for environmental staff to perform their duties, with special attention given to meeting the needs of district staff who handle the majority of the clearance activities.

**History:** Prior to CEDAR's implementation in 2004, VDOT's environmental commitment tracking procedure was localized and redundant. Numerous systems existed that were individually managed by environmental staff, and subsequently, data was input multiple times, wasting time and increasing data entry errors.

**Data Input:** All environmental staff input data in the system, including commitments, roles and permissions (i.e. editing) by program area. Data is also drawn directly from VDOT's project management system. A journal function allows meeting notes to be included and cannot be modified once entered, adding integrity to the system.

**Scoping:** VDOT has an initial project scoping process called the State Environmental Review Process (SERP). When a project is submitted to CEDAR for environmental review, a determination is made, using CEDAR, as to whether the SERP process is applicable. If it is, the SERP process begins. Environmental staff solicit input from agencies following a GIS review of the project; the GIS review and responses from the agencies are compiled in the Preliminary Environmental Inventory (PEI) form, which is the output of the SERP process.

**Commitment Tracking:** VDOT's system is very robust in terms of its commitment tracking capabilities (Figure 6).

The system encompasses all commitments on all projects. Other systems offer the ability to categorize or track commitments that are entered by project and program area (e.g. cultural resources, natural resources, and hazardous materials). However, VDOT's commitment properties include "Identified by", "Deadline", and the "Phase" in which the commitment will need to be satisfied and retired: Pre-Construction (including Project Development, Design and Environment), Construction, or Post-Construction, including wetland monitoring and other follow-up. The commitment module indicates that there is a commitment, who is responsible for it, and whether it is complete; the environmental compliance module captures data relevant to monitoring done in the field during construction. The responsible party can often be staff and/or contractors outside of the environmental division. VDOT is currently adding an environmental certification report under design, which would pull in environmental commitments. VDOT is also starting to write up scopes to connect the system to consultant services and compliance reviews on facilities (the latter is currently captured in an Access database).

Figure 6: Commitments Tab from Virginia's CEDAR Program Showing Individual Commitment Descriptions

Date	Identified By	Desc	End Date
<b>HAZARDOUS MATERIALS</b>			
10/10/2007	4566 Dab & Dev. Mgr.	Review status for handling of hazardous materials	11/30/2007
<b>POLLUTIONS</b>			
11/08/2007	4566 Dab & Dev. Mgr.	The FFS-R-07 will take possession of the FFS-07 stream banks during construction. The contractor shall provide, install, and maintain silt fences, silt fences, and other erosion control measures to prevent sediment from entering the stream.	
<b>NATURAL RESOURCES</b>			
11/09/2007	4566 Dab & Dev. Mgr.	Three year retention from FFS-07 to ensure that the project remains in compliance with the permit.	
<b>WATER QUALITY PERMITS</b>			
11/08/2007	4566 Dab & Dev. Mgr.	Two year retention from FFS-07 to ensure that the project remains in compliance with the permit.	

VDOT is in the process of incorporating general permit provisions and commitments into CEDAR, and developing a commitment matrix to summarize these. Commitment matrices will be components of an environmental certification report that is under development.

**Compliance Reviews and Corrective Action Tracking:** CEDAR has an Environmental Compliance Review console. Environmental compliance reviews cannot be performed or set up until an approved risk assessment has been performed that will determine/recommend and then record approval of a frequency of site reviews. Corrective actions are tagged to a VDOT specification, environmental program, a responsible party and due date, and a description of the issue. The second repeat deficiency is reported as a non-compliance.

**Workflow** is an important component of CEDAR and the larger project management systems to which it is connected. Everyone is expected to use the system. VDOT's project management system is task driven; high-level environmental activities are rolled into project schedules just like other preliminary engineering tasks. CEDAR is connected to that system, incorporates default task assignments, and enables users to set up tasks for others. Each individual user has "Tasks Underway", "New", "My To Do", and "Accomplished" tasks.

**Alerts:** CEDAR contains a variety of automatic notification and alert windows and makes extensive use of symbols, including one for “behind schedule.” Alerts are based on one’s relationship to the project. Journals can be sent as an alert (Figure 7).

Figure 7: Tasks and Environmental Compliance Alerts from VDOT’s CEDAR

The screenshot displays the CEDAR software interface. At the top, there is a navigation bar with icons for PROJECTS, GIS, REPORTS, DOCUMENTS, FORMS, ADMIN, and HELP. The user's name, Angel N. Deem, and the version UAT 2.5.1b are shown in the top right. The main content area is divided into several sections:

- Links and Information:** A sidebar menu with categories like Hyperlinks, Air, Cultural Resources, Documents, E&S, and Hazmat.
- Alerts:** A table listing alerts with columns for Alert Name and Date. Alerts include:
 

Alert Name	Date
54	
ECR Alerts	
ECR Report to be Finalized	11/10/2007
60409	
Upcoming task complete date	
Air Study	09/12/2007
70323	
Critical Project Data Changed	
Critical Project Data Changed	10/26/2007
81778	
- Common Functions:** A sidebar menu with items like Short Cuts, CEDAR Quick Tour, Document Management System, Find A Project, myECR, Email The CEDAR Administrator, Request A Change To CEDAR, Submit An EQ429, Task search, Download CEDARfield UAT, and IACM Management.
- Announcements:** A section titled "No Announcements" with a blank space below it.

**Environmental Asset Management:** CEDAR also tracks environmental assets such as noise walls and wetlands; the asset management portion of the system is expected to expand. Maintenance keeps separate track of roadside assets as part of their “home grown” asset management systems.

**Maintenance:** VDOT’s CEDAR system is currently unique in terms of encompassing environmental review of maintenance projects. VDOT is still systematizing this component and providing more guidance/filtering within CEDAR; currently, environmental staff are finding that Maintenance has the message about consulting with them.

### Process Issues, Obstacles, or Limitations

CEDAR was a fundamental change in the way environmental commitments and other data were collected, entered, and organized throughout VDOT, leading to a few challenges.

The major difficulty of the system thus far has been knowing which commitments should be included and making sure they are entered. The difficulty getting commitments

entered “is mainly a result of a lack of a common understanding of what constitutes a commitment that should be entered as such.”

There has been a lag in the amount of data being input into CEDAR from projects that were just beginning or begun before CEDAR’s rollout.

The state’s emphasis on outsourcing projects to local entities was an unanticipated complication that will be addressed in the future.

#### Lessons Learned and Plans for the Future

**Connecting beyond the DOT.** Leaders in development of VDOT’s CEDAR have decided they need a better understanding of what regulators and other stakeholders want from their commitment tracking system. CEDAR’s initial focus is the needs of VDOT staff, but subsequent phases may bring in users from consulting firms or other agencies or local government entities with which VDOT coordinates project clearances. Interacting with stakeholders online will allow for efficiencies for all parties. Internal support and funding will be needed to pursue this in the future.

**More commitment summary information.** VDOT is in the process of incorporating permit provisions and commitments into CEDAR, and a commitment matrix is being developed to summarize these. A commitment matrix will be a component of an environmental certification report that is under development.

**Integration with maintenance asset management.** VDOT would like to integrate CEDAR with the maintenance asset management system (AMS), with the aim for AMS to notify CEDAR when particular maintenance actions are planned and need to be reviewed. So far, environmental staff have come up with a list of what does not need to be reviewed (an exemption list) but they are still getting requests for review of activities that don’t require review.

**Greater tracking of corrective actions.** CEDAR does not yet track corrective actions, but these would be reflected in the document management system.

**More training for Engineering and Planning.** Engineering and Planning are just in the infancy of training on commitment tracking, to accompany the system.

### **Successes**

CEDAR functions as a central repository for a variety of environmental data not previously housed in one place. The system addresses several critical business objectives, including:

- Improved project management
- Documentation of environmental decisions
- Communication of environmental commitments and project status
- Provide the basis for program management and trend analysis.
- Provide a single tool for all environmental activities. CEDAR also streamlined interagency coordination and reduced duplicate data entry.

- Transition from many individually managed databases to CEDAR. CEDAR's success is important both organizationally and financially.
- Efficient utilization of time and effort now that a single, centralized system acts as a repository for all environmental commitment data.
- Produce more streamlined and consistent reports by prompting environmental staff to add commitments in CEDAR, when appropriate. The majority of VDOT's environmental deliverables are generated through the application and it is their authoritative source for documentation.

CEDAR has also generated a unique degree of success among statewide environmental commitment tracking systems in the degree to which it has begun to standardize commitment names (categorizing titles of different types of commitment descriptions). CEDAR has pull-down menus with the program area and then a long list of commitment names. This helps with reporting and with internal monitoring and process improvement.

### **Summary**

The success section above summarizes VDOT's accomplishments with CEDAR. CEDAR represents a degree of accomplishment not yet attained by the other systems, but required a substantial investment. The total cost for the entire system development was \$2.3 million; the cost for the commitment tracking component cannot be isolated.



## Washington State DOT

Washington State DOT (WSDOT) has been in the top tier of DOTs in terms of demonstrating environmental stewardship and accountability and piloting innovative and effective methods. The department's commitment tracking system (CTS) is one concrete example of these achievements.

### *Vision*

WSDOT saw a CTS as a "fundamental tool if we are going to have an Environmental Management System," especially one focused on compliance, as the agency intended. "It is a fundamental thing to know what we said we are going to do," and see it carried out in contractually enforceable documents.

WSDOT's motivation to develop a commitment tracking system was "to be able to track any individual commitment, from wherever conception is (planning, scoping, NEPA, design) through construction and maintenance" on all projects. CTS is intended to:

- Provide a central repository for commitments
- Help build contracts
- Manage the status of commitments and facilitate project "close out."

WSDOT environmental staff also wanted to "show what it takes to do a project," to efficiently allocate resources, to negotiate with resource agencies, and to pursue streamlining opportunities. WSDOT wanted to address situations where "many times we get a permit condition from multiple agencies that is exactly or nearly like another one. We can show (the resource agencies) 30 pages of commitments on a small project and address with a resource agency the provisions that are really necessary."

Housed at WSDOT, CTS was designed to address the median 80 percent of WSDOT projects (while most of the remaining 20 percent may need little to no tracking, in a few cases some may require much more extensive tracking. Therefore, CTS was designed to address the average project).

WSDOT planned to include several additional capabilities in CTS but had trouble funding some of them. The following components will not be added to CTS per se, but will utilize components of WSDOT's developing Project Management Reporting System. These capabilities include:

- Automatic user notification emails (only user-initiated)
- Incorporation of compliance reporting
- Unique identifiers for all commitments
- GIS compatible location identifier information that will be able to map the commitments as soon as funds are available to integrate with the GIS system
- Workload/flow planning, alerts/notifications, etc.
- Document management

- Enhanced security and building project teams
- Inclusion of tasks, activities, and events spawned from commitments

### Technology, Connection to Other Systems

WSDOT's CTS was custom-built by WSDOT Office of Information & Technology on a Microsoft SQL Server database using the Microsoft.NET programming technology, making it web-based. CTS is connected with WSDOT's current (soon to be upgraded) Capital Project Management System (CPMS), from which it pulls information such as project location, project name, project description, project identification number, and beginning and ending mileposts.

The Project Management Reporting System that WSDOT is developing will ultimately provide workflow, document management, and alert functions that some other states have built into their environmental work and commitment tracking systems. At WSDOT, PMRS is a \$10 million plus effort that will produce a "collection of integrated tools for capital construction project managers to use to perform all the necessary tasks associated with good project management. PMRS is an integration of commercial off-the-shelf software packages, existing WSDOT systems and enhanced approaches to data management to provide web-based access for multi-level reporting and improved business workflows and reporting. Software packages will cover scheduling, cost control and earned value, and cost estimating; enterprise content and document management; and incorporate a variety of existing legacy systems, including CTS and contract management, and coordinate reporting among them. PMRS is expected to improve project delivery and accountability processes as follows:

- Project managers will assume ownership for project delivery and reporting
- Effectively and efficiently compare current/baseline schedules and costs
- Implement earned value and cost at completion
- Improve change control processes
- Reporting will become a by-product of system use (not the primary purpose of the system)
- Bring management activities "on-line" – able to easily view summarized program information
- Web portal will provide "one-stop" information retrieval for project managers
- Integrated systems will feed each other (less redundant data entry)

The CTS is not connected to WSDOT's GIS workbench, a scoping tool for projects that draws upon many environmental data layers. However, it currently has fields for capturing varying location attributes that will one day be accessible when hooked to the GIS workbench. PMRS may build a connection to this tool.

Existing environmental assets (e.g. wildlife crossings, sediment ponds, culverts) that may have particular environmental commitments or maintenance responsibilities are not managed through WSDOT's CTS.

## Access by Partners and Stakeholders and Internal Roll-Out of the System

Access to the database is granted upon receiving training and specific features controlled by setting roles and responsibilities through an administrative feature. WSDOT's system is still very much an internal tool.<sup>71</sup> Consultants that have access to the WSDOT computer network can use CTS, but the agency is still working out security issues for contractors. There is no inter-agency access, and the public may not access the system.

Any WSDOT employee may view commitments but individuals must request access to add/edit/delete data within CTS or be invited by a project leader to join a virtual team. Approximately 150 users are currently using the system. WSDOT regions use CTS for storing project-level commitments, contract building, and managing the status of commitments between Environmental/Design/Construction Offices.

WSDOT headquarters staff use the system for oversight; discussions with resource agencies and compiling large data sets on commitments; and analyzing commonalities between commitments to see if they might be combined, such as common conservation measures under different Endangered Species Act (ESA) issues.

Expanding training and access: The CTS was deployed in August 2005 and a planned implementation for all projects with environmental commitments to be entered starting January 1, 2006. The first year was slow and WSDOT did not meet its' goal, but in 2007 usage improved greatly due to numerous trainings for Region environmental staff. More projects have been added as of 2009, but the percentage of use had not changed.

## Business Process

As early as 2002, the WSDOT environmental team conducted two-day sessions with every region, with every business office represented, to outline needs for a project management system to address processes. This initial inquiry generated a desire for more functionality, particularly related to project management, than the WSDOT environmental team could afford to address and support through their business process. WSDOT recognized that a CTS would ideally be a module of a good project management system, so "you'd have one system tracking your efforts from initial scoping to permits." However, the team decided to focus on tracking the conditions and commitments contained within environmental permits and agreements.

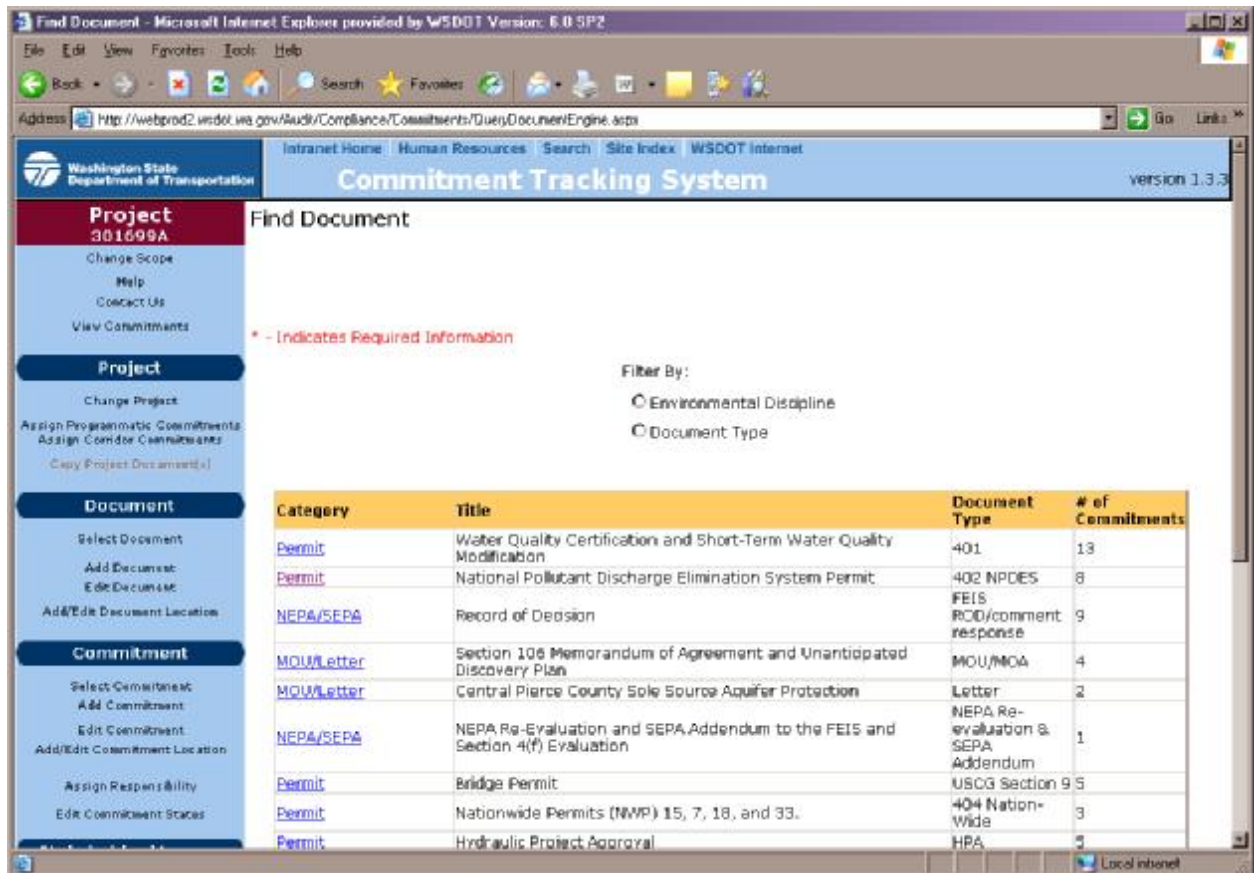
Building the CTS solely for environmental commitments was complicated; "it became clear that with seven regions, things were done at least four different ways. They had a lot of work to do making it sufficiently flexible to fit the regional system." Though regions all had their own independent systems and methods, some highly visible environmental violations and enforcement actions helped the regions come to agreement that more reliable, systematic methods were needed to develop projects and ensure that commitments were/are met.

The commitment tracking system was rolled out in 2005, with the goal of having all projects with environmental permits entered by January 2006. Some regions fully embraced the concept while others were more reluctant. At the end of 2006, 35 WSDOT projects had used CTS to some extent. By the end of 2007, this usage had doubled and even the region with the highest risk projects had started using CTS.

## Process and System Operations Cover All Projects, All Environmental Commitments

All commitments are entered into the commitment system, whether from emails, town hall meetings, or NEPA documents. Commitments are entered from all projects with environmental commitments, whether CEs, EISs, EAs. Only projects that exist in WSDOT's Capital Project Management System can be accessed by CTS, so this excludes maintenance projects (unlike VDOT's CEDAR) (Figure 8).

**Figure 8: Select Permit Screen of WSDOT Commitment Tracking System – Commitment Sources**



## Entering Commitments or Conditions

WSDOT permit coordinators have the primary responsibility for entering data into CTS. However, anyone who is authorized to make a commitment on behalf of the agency and

the project (including environmental specialists in negotiations with resource agencies), is required to make the entry or have another staff person enter it on their behalf. This ensures capture of informal commitments that might be made in meetings or conversations as well as commitments that are more formal.

Since CTS is connected to WSDOT's Capital Project Management System, users do not have to enter the project name, location, and other information because CTS is connected to WSDOT's project management system. This connection therefore saves time, reduces data entry errors, and reduces the effort required to use the system. Otherwise, the system largely relies on manual data entry, with the ability to copy and paste text from other electronic documents. WSDOT estimates that, on average, after the CTS user has evaluated the document and highlighted the actual commitments to enter, the user takes about 30 seconds per commitment to enter from an electronic document. Certain CTS features facilitate and accelerate the process:

The system "remembers" the last categories entered and retains those unless the user selects other categories, thus saving time when entering commitments by environmental category and action type.

CTS asks the user to enter certain mandatory attributes of each commitment, including one or more of WSDOT's 17 environmental areas/categories (air quality, EJ, noise, water quality, wetlands, etc.) and the environmental action (notification, submittal, monitoring). Despite these features that make the process easier, the user must remember to "uncheck" certain pre-checked fields when shifting from entering commitments on one topic to another.

CTS has programmatic permits/agreements and commitments from corridor agreements and/or Tier 1 NEPA decision documents pre-loaded into the system for easier selection and application to multiple projects. However, CTS does not include automated prompts. The user must be aware that a programmatic agreement exists and apply it to the project so that the commitments therein are incorporated. For example, Clean Water Act (CWA) Section 404 Nationwide Permits, general CWA NPDES 402 water quality provisions/BMPs, and state Hydraulic Project Approvals are all frontloaded into CTS. WSDOT estimates that this feature saves two to four hours in entering commitments per permit and provides consistency. Such general conditions can be edited or modified, if needed, after they are applied to a particular project. Likewise, commitments from a Tier 1 EIS on a long corridor may include commitments that can/should be applied to 10 projects contained within that segment.

The CTS is currently used for environmental commitments, but can be modified with minor efforts to accommodate other types, such as utilities and ROW. In fact, a recent statewide evaluation/prioritization effort found that commitment tracking in general was the number one priority in the category of content management for WSDOT. The existing CTS is poised to meet the non-environmental needs for tracking commitments for the agency as well.

### Assigning Responsibility

The CTS has an "assign responsibility" function as a primary feature. The feature currently functions to make assignments at the role level within the DOT or to a contractor, as needed.

The CTS program supports contract writing, essentially assignment of a commitment to a contractor via a legally enforceable document. The agency can generate reports on how commitments are covered in contracts. When doing the contract in final PS&E, if the permit language is not appropriate as contract language, CTS facilitates finding/crosswalking to contract language, if it exists. If appropriate contract language does not exist, the user has the option of drafting new contract language.

In the near future, it will be possible to make assignments to individual staff within WSDOT. This will also add the ability to build teams, which will contribute to greater system security as only members of the team will be able to access and add to a particular project. Individuals from different functional areas may be invited to join teams, and the recipient of such an invitation may be able to decline and invite someone else instead. HQ and managers will still be able to run summary reports drawing from all projects.

WSDOT decided against including in CTS a feature that would label “ownership” of each commitment. This feature would have generated an auditable paper trail of how each individual commitment is passed along from phase to phase or individual to individual. WSDOT felt this feature would be cumbersome and unnecessary, requiring too much “feeding” the system for the benefit it provided.

### Corrective Action/Feedback

WSDOT is examining the possibility of adding or increasing performance reporting, such as the positive or negative confirmation of complying with commitments. Previously CTS only indicated whether a commitment is open, closed, or on hold and does not indicate, for example, whether there have been any violations. Information was in a disconnected database.

In its most recent round of improvements to its commitment tracking system, WSDOT has added environmental activities and events to its commitment provision tracking and responsibility assignment. WSDOT is building the “events” portion of that improvement around the ECAP system, so that CTS is a tool to help implement the Environmental Compliance Assurance Procedure, a communications protocol when a non-compliance event happens. Those improvements will likely be ready later in 2009.

### Developing Decision Support Functions

The complexities, volumes, and sometimes competing permit conditions are a concern for WSDOT because it makes it more challenging for successful project compliance. Although not always possible due to varying project characteristics, predictability and consistency in permit conditions allows WSDOT to develop standard contract language to facilitate compliance in the field.

Achieving this requires communication between WSDOT and permitting agencies. In the near future, CTS will be able to prepare reports that analyze permits and resource agency conditions. These summary reports include the following:

- Number of commitments by region
- Number of commitments by agency/stakeholder
- Use of programmatic permits (how many times was a specific programmatic permit used and on which project, required to be reported annually, manually now)

- Region-managed corridor commitments
- Commitment description by agency/stakeholder

WSDOT managers feel this information will enhance discussions with the resource agencies, by providing solid information as a foundation for discussion.

### Process Issues, Obstacles, or Challenges

The issues and challenges WSDOT faces in adding additional capabilities to CTS include:

- WSDOT is a large organization and CTS replaces existing tools for the same business process. This requires a phased implementation which takes several years.
- Suggestions for system improvements have had to compete against all other IT issues and needs of the organization, a major impediment and delay factor as the agency seeks to evolve the system.
- CTS must wait for selection and implementation of related enterprise software that WSDOT will employ to provide previously-identified commitment tracking functions not built in directly to CTS. These include security and document management, for example.
- Through independent and uncoordinated actions, various environmental programs within ESO have developed databases that collect compliance data, but are not integrated with each other or CTS. This creates silos of information that make communicating performance difficult.
- Ultimately, WSDOT is interested in incorporating performance measurement and reporting into the system as well. Plans are in the works in this area.
- Project commitments can run 80 pages (Figure 9). 30 pages for a simple project is not unusual. Agencies often make similar, only slightly different requirements, and unless/until negotiations can be performed such that some can be combined or dropped, WSDOT is tracking all of them.

### Figure 9: Screenshot of WSDOT Commitment Tracking System

Washington State Department of Transportation		Commitments By Project					
Project Title: SR 16/New Tacoma Narrows Bridge - New Bridge				PIN:301699A			
Document Type:401							
Document Title:Water Quality Certification and Short-Term Water Quality Modification							
Commitment Description	Commitment Approval Date	Document Source Reference	Phases	Disciplines	Actions	Responsible Party	Status
401 Water Quality Certification and all conditions of Order No. 00-N-03 remain in effect through construction and long-term operation and maintenance of the project.	2/25/2005	November 8, 2005 letter from WA Ecology's Kerry Carroll to TND Project's Linnea Land	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Notify, Monitor, Report, Submit, Inspect	Project Engineer	Open
After construction, water quality monitoring and visual observations shall be conducted for the first two (2) years of operation, and shall be conducted at least monthly during storm events or during active runoff into the stormwater treatment systems.	2/25/2005	401 Water Quality Certification Page 8 of 12 Condition J.1.(b).	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Monitor, Report	Operations	Open
All bluff plantings shall be watered, maintained (including weeding) and replaced as needed, for a period of five (5) years after completion of the project.	2/25/2005	401 Water Quality Certification Page 7 of 12 Condition G.5	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Monitor, Other	Operations	Open
All wetland plantings shall be watered and maintained (including weeding) for a period of at least five (5) years after completion of the project. Maintenance may be required beyond five years if there is significant failure of plants within the first five years.	2/25/2005	401 Water Quality Certification Page 7 of 12 Condition H.4.	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Monitor, Other	Operations	Open
Any changes to the wetland mitigation monitoring plan must be approved in writing by Ecology prior to implementing any changes.	1/6/2001	401 Water Quality Certification Condition J	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Report	Contractor	Open
Monitoring of the wetland mitigation site shall be completed at least yearly for a five-year period.	12/30/2005	401 Water Quality Certification Page 9 of 12 Condition J.2.a.(1)	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Monitor	Project Engineer	Open
Notify WA Ecology within seven days after completion of construction at the project.	2/19/2005	Section 401 Water Quality Certification Page 4 of 12 Condition C.1.c.	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Notify	Contractor	Open
Prepare and submit annual monitoring reports to WA Ecology no later than December 30 of each year following the first year of mitigation site work.	12/30/2005	401 Water Quality Certification Page 9 of 12 Conditions J.2.a.(2)	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Report	Project Engineer	Closed
Results of stormwater sampling and analysis shall be sent to WA Ecology within 30 days of each sampling event.	2/25/2005	Section 401 Water Quality Certification Page 9 of 12 Condition J.1(d).	Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Monitor, Report	Operations/Contractor	Open
Sixty (60) days prior to the project becoming operational the Applicant shall submit a Stormwater Facilities Maintenance manual for Ecology's review and approval.	1/6/2001		Post Const. Ops. & Monitor	Water Quality/Surface Water, Groundwater	Submit	Project Engineer	Closed

Page 1 of 11

12/14/2007 9:21:03 AM

## Successes

WSDOT was one of the first state agencies to comprehensively and successfully track environmental commitments on projects, rather than just tracking the permits required to “clear” projects for letting and advertisement. The magnitude of their success is underscored by how the agency has successfully addressed one of their most significant ongoing challenges: the sheer number of environmental requirements WSDOT must meet. Other benefits CTS include:

- The system communicates commitment status (open, closed, on hold) and produces a commitment checklist.
- WSDOT staff appreciate that the system is easy to use and generates crisp, clean reports.

The further definition of the business process that occurred through needs identification and system development was “immensely helpful.” That effort “identified the gaps that exist (in environmental commitment tracking), differences between Regions” and enabled WSDOT to define how they were going to do track commitments in the future. WSDOT found “quite a few gaps in the environmental area” and it was “hard, hard work to bring the regions together. (Without the business process mapping and consensus building) it would have failed miserably otherwise.” Other agencies have learned from WSDOT’s experience. For example, in a 2005 expert practice exchange/review, TxDOT found WSDOT’s effort informative, and TxDOT incorporated more business process identification in their effort.

The CTS program supports contract writing, communicates commitment status fields, and produces a commitment checklist. This contract writing has helped to align contract



language and permit language, improving coordination among the environmental and construction personnel. Again, WSDOT's strides in this area are unsurpassed.

### Lessons Learned

The most difficult and time-consuming part of WSDOT's system development was describing the entire business process from scoping through maintenance and the involvement of all the different business offices. The agency learned that "the absolute key is involvement of the regions, talking to the lowest level staff that you can get to, and really understanding their business process and how they do their work."

WSDOT is working on redundancy in the commitments they manage. For example, requirements from NEPA, and Clean Water Act 404 and 401 permits, and Shoreline permits may be listed separately but make similar requirements, with slight variations. While it can be very daunting for the resource agencies to realize a project may have more than 80 pages of commitments, CTS helps bring this issue to light earlier in the process, thereby giving agencies more time to effectively address all commitments. WSDOT is building functionality in CTS for further analysis of resource agency requests and requirements, as a basis for further interagency dialogue.

### Next Steps

In its most recent round of improvements to its commitment tracking system, WSDOT has added environmental activities and events to its commitment provision tracking and responsibility assignment. WSDOT is building the "events" portion of that improvement around the ECAP system, so that CTS is a tool to help implement the Environmental Compliance Assurance Procedure, a communications protocol when a non-compliance event happens. Those improvements will likely be ready later in 2009.

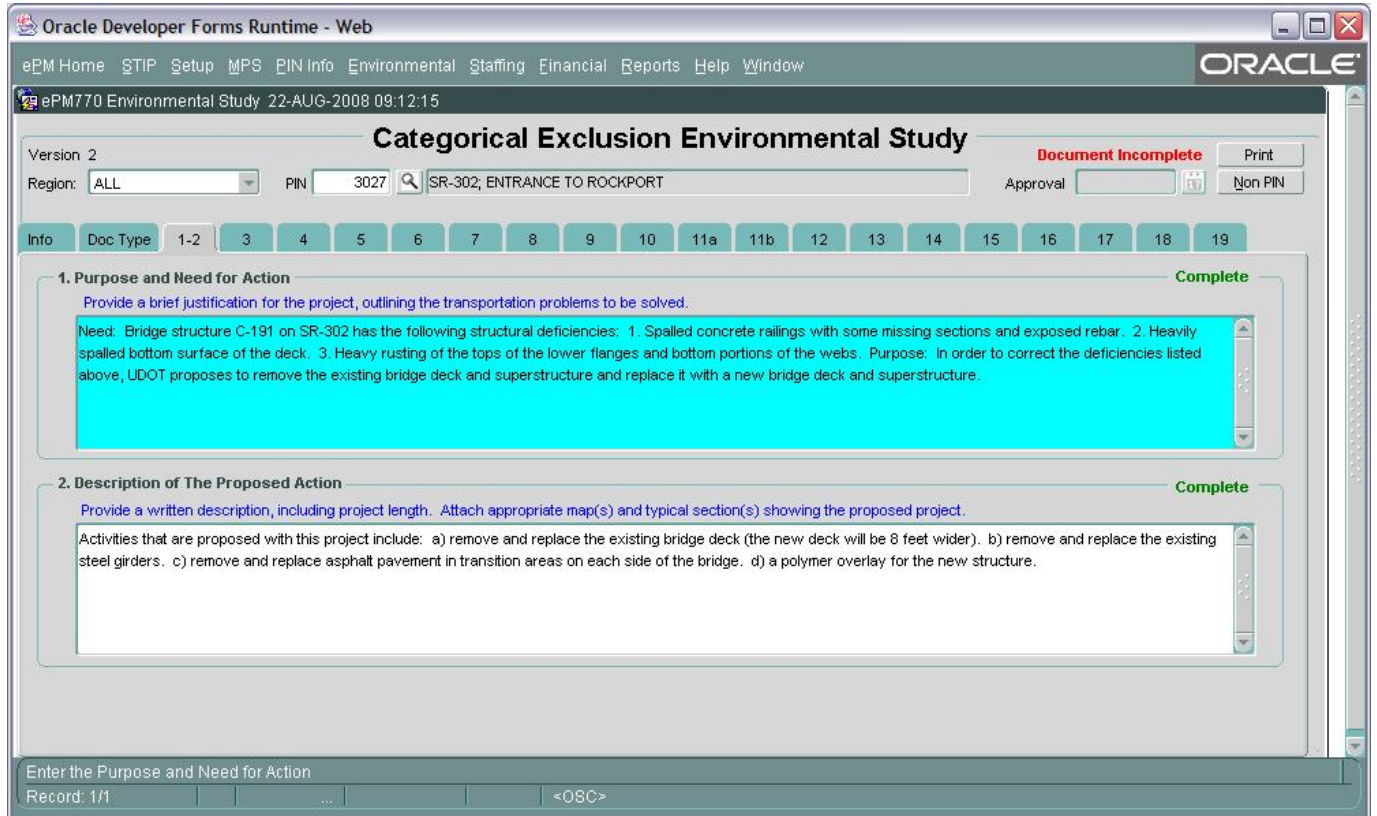
WSDOT is continuing to make improvements to user security, adding ability to track activities and events, whether they are compliant or non-compliant, more information on the methods used to comply, and also track non-compliance events, add some reporting capabilities.

# Appendix D

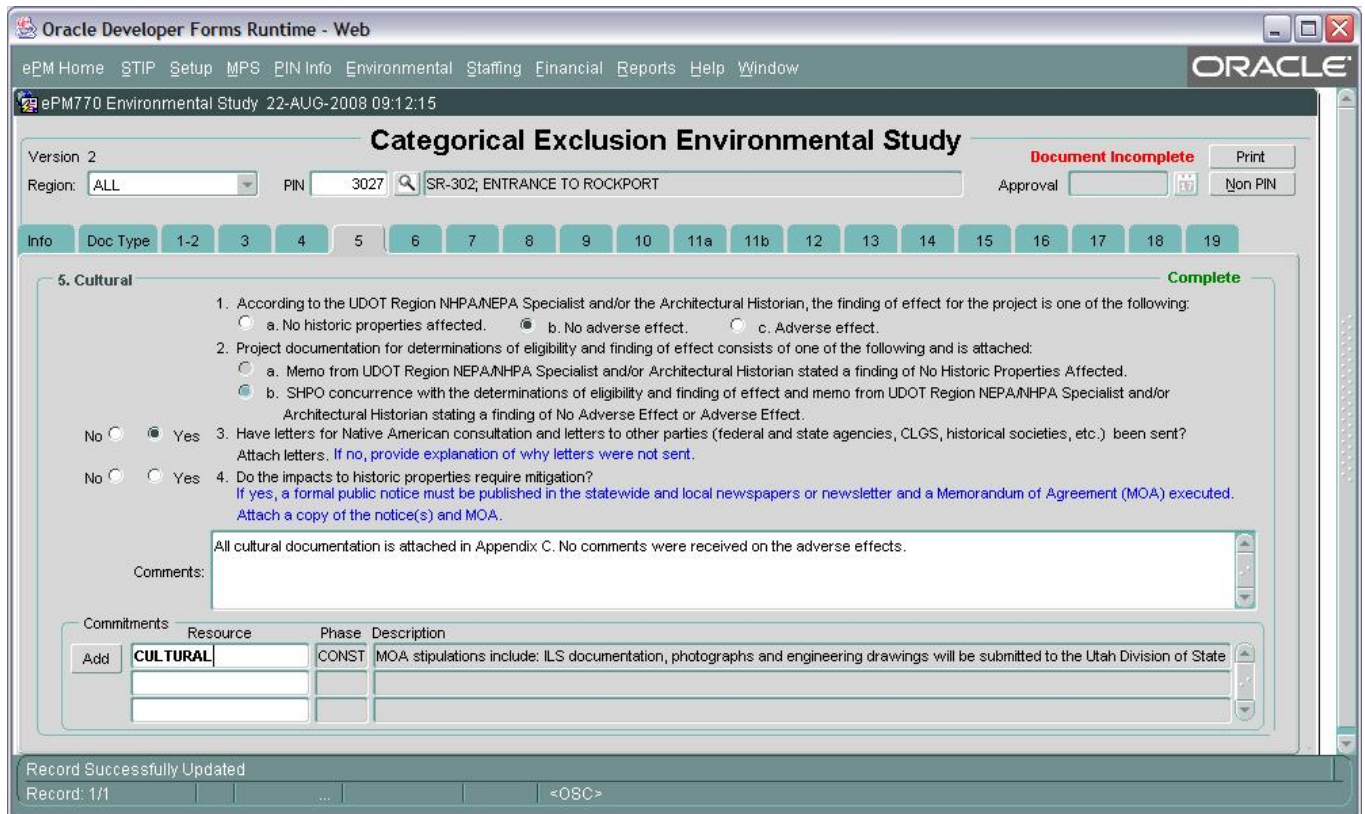
## Utah Commitment Tracking Screenshots - System in Development

# Environmental Study Images from Utah Department of Transportation CatEx Wizard

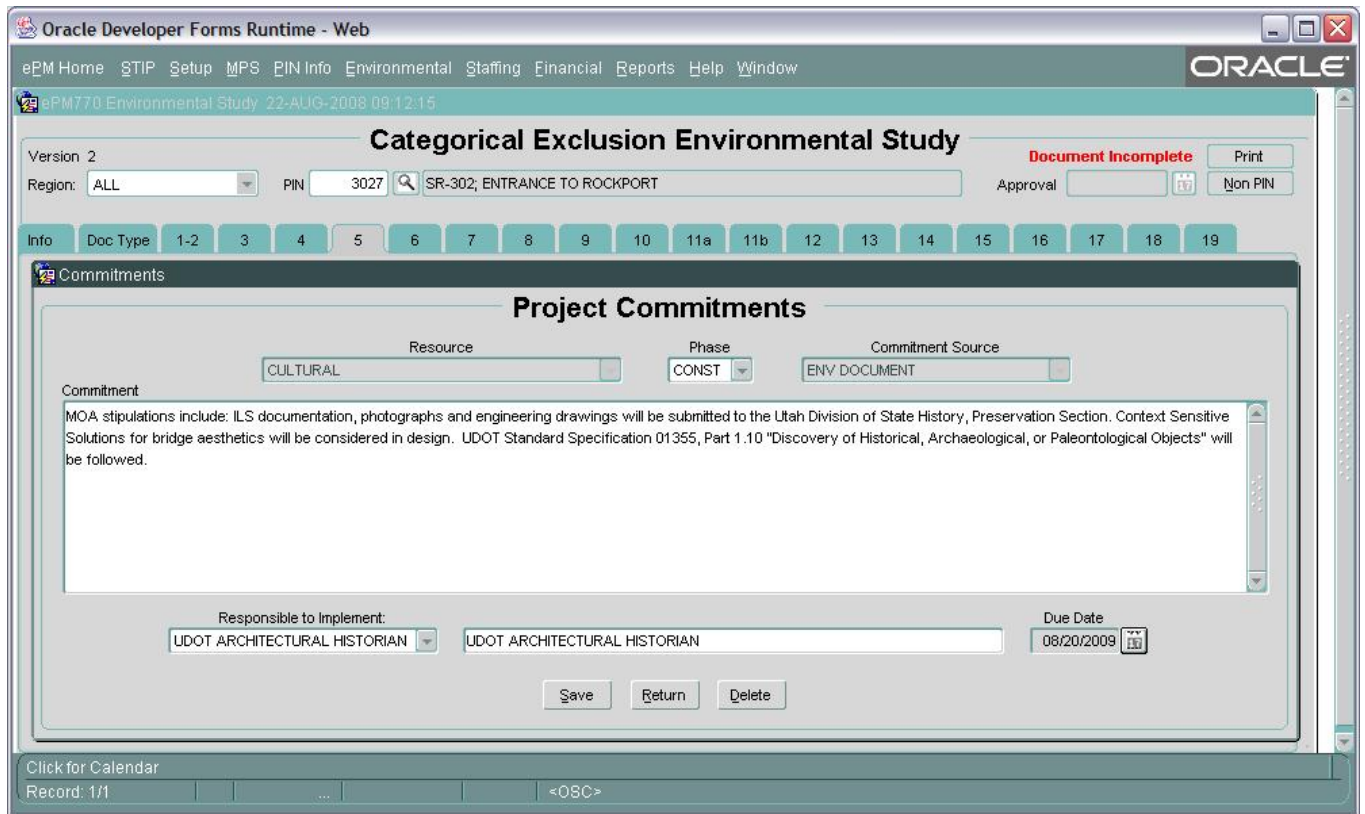
Figure 1: Purpose and Need for a Categorical Exclusion Environmental Study



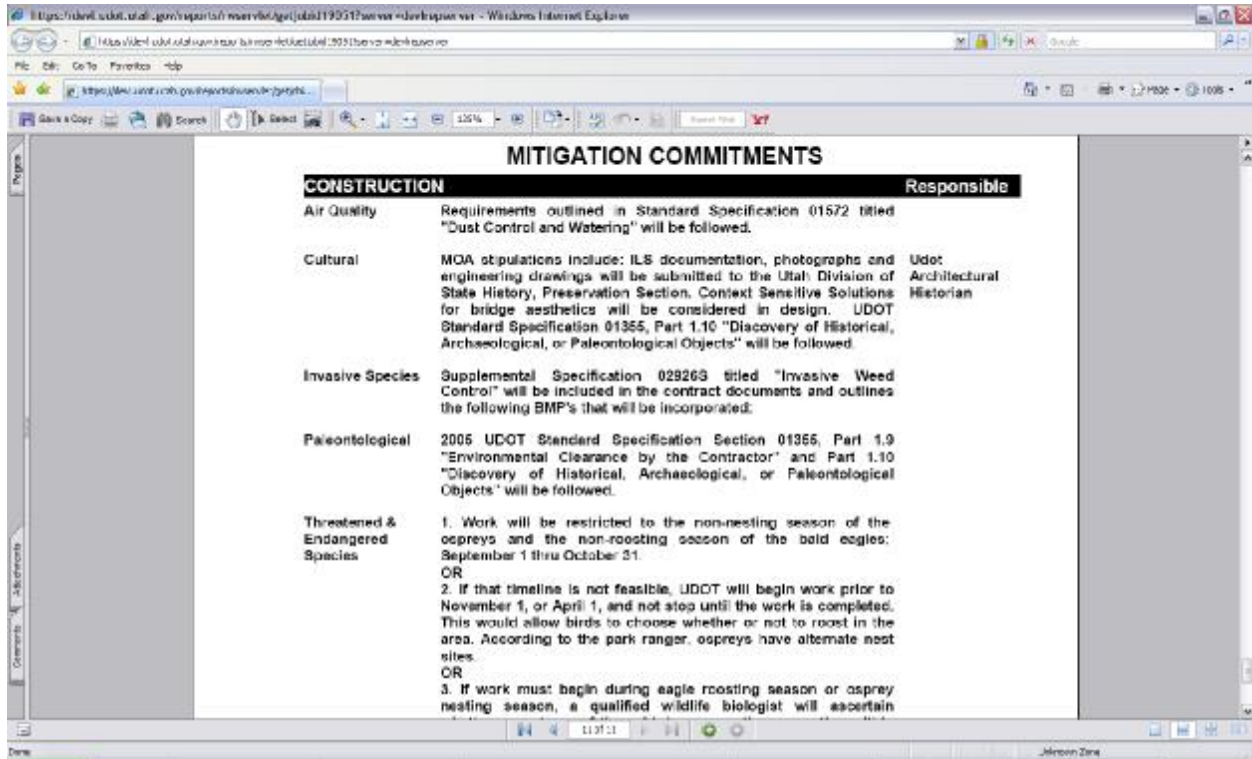
**Figure 2: Cultural Tab of Categorical Exclusion of Environmental Study**



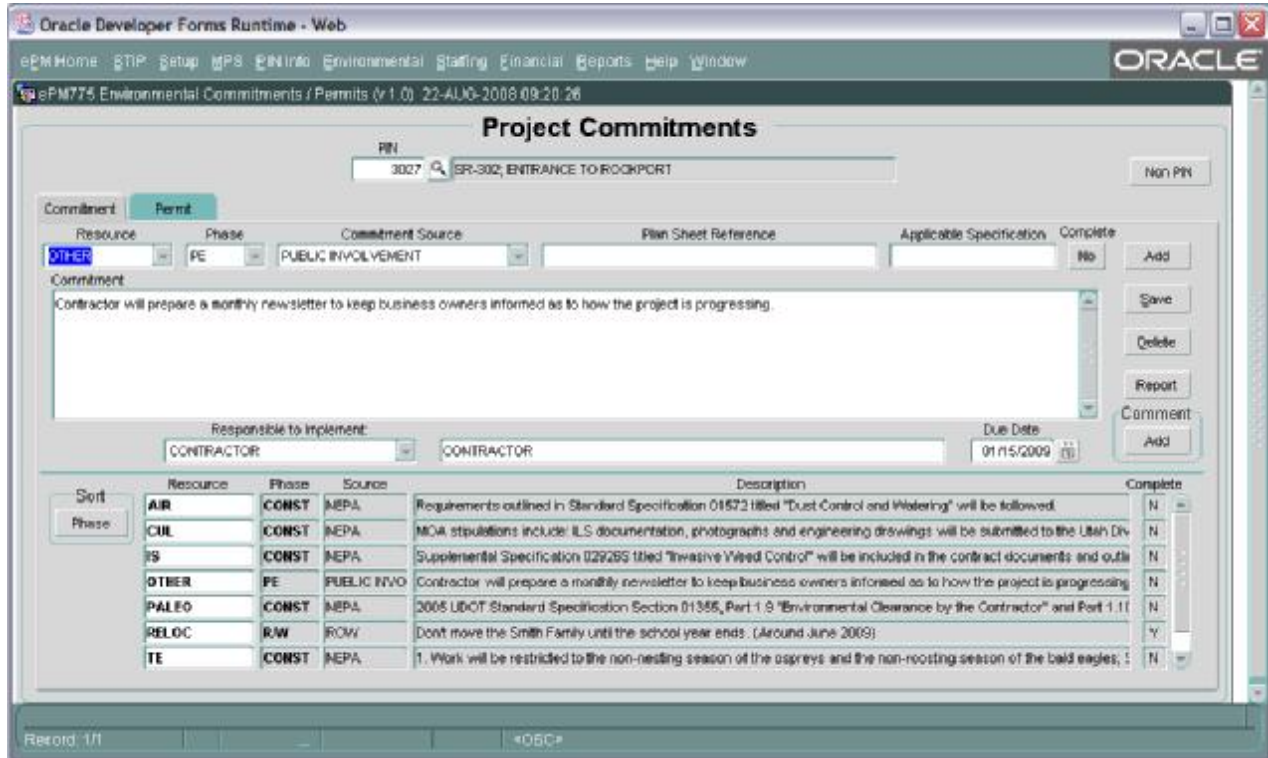
**Figure 3: Detail of Cultural Environmental Commitment**



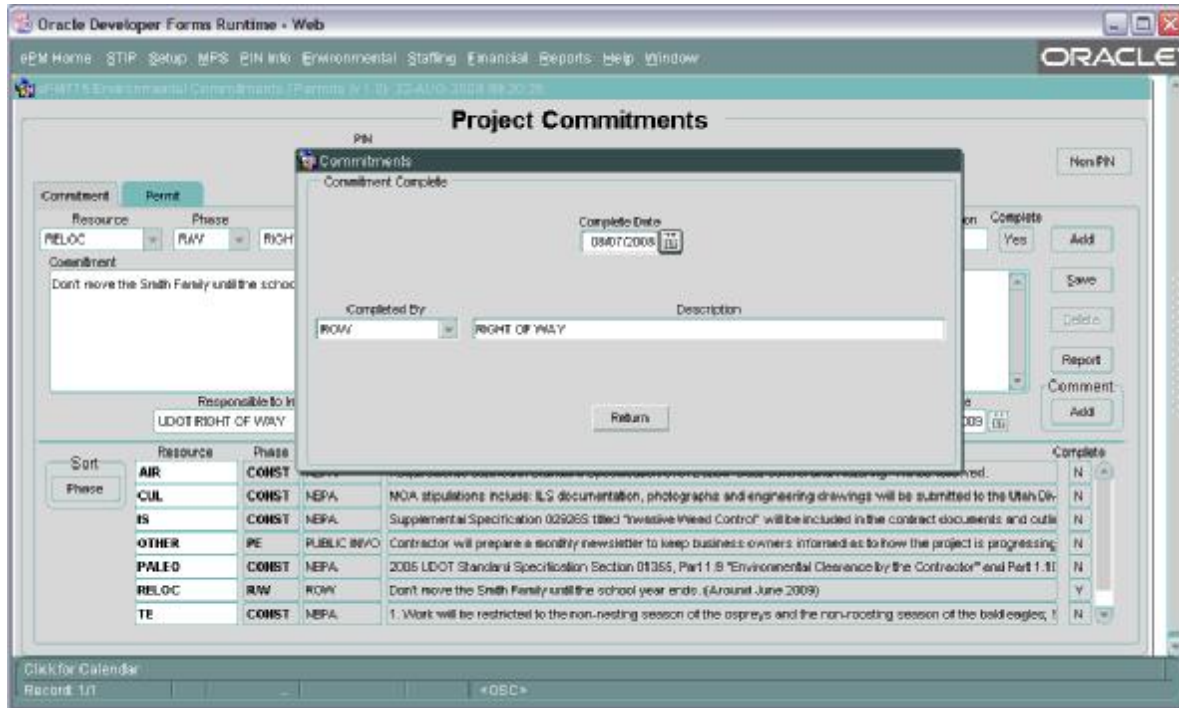
**Figure 4: Sample of Environmental Document. The last page of the Environmental documents summaries all the commitments. This is a pdf report.**



**Figure 5: Project Commitments Screen.** This screen shows the data that is collected for each commitment. The upper portion shows the specific data collected for every commitment. The lower portion shows a summary of all the commitments. The source column shows if it came from the NEPA document or another source such as ROW or Public Involvement.



**Figure 6: Project Commitment Completion Screen. This is where you indicated that a commitment has been completed.**

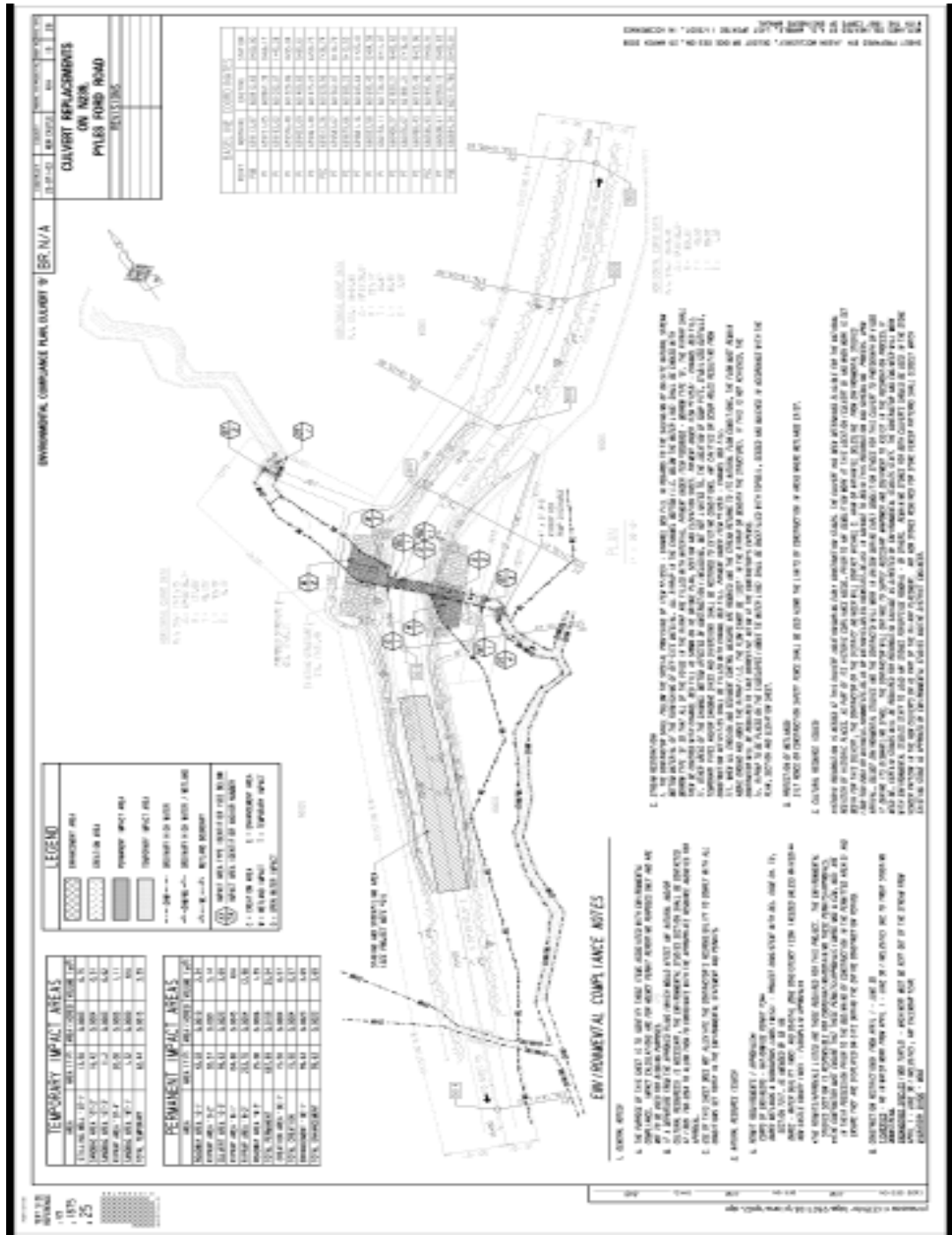




# Appendix E

## Examples of PS&E Commitment Tracking

# Delaware DOT Plan Sheet



## Iowa DOT Green Sheet

**County:** \_\_\_\_\_ **Route:** \_\_\_\_\_  
**Location:** \_\_\_\_\_ **Project No.:** \_\_\_\_\_  
**NEPA Document Manager:** \_\_\_\_\_

The completed environmental document used to select the location for the subject improvement requires IDOT to fulfill the following environmental commitments regarding the location, design, construction and/or maintenance of the transportation facility. This information is being provided to assist project designers, construction staff, maintenance staff and preliminary studies environmental and cultural staff in their efforts regarding the transportation facility and to assure knowledge of the environmental commitments that need to be fulfilled or re-examined during project development and construction.

### Natural Sciences Commitments:

Topic:

Commitment:

Environmental Contact:

### Social Sciences Commitments:

Topic:

Commitment:

Environmental Contact:

### Engineering Commitments:

Topic:

Commitment:

Environmental Contact:

### Cultural Resources Commitments:

Topic:

Commitment:

Environmental Contact:

## Regulated Materials Commitments:

Topic:

Commitment:

Environmental Contact:

## Disposition:

These commitments were compiled and reviewed by the following persons:

Cultural Resource Manager:	_____	Date:	_____
Location Engineer:	_____	Date:	_____
NEPA Document Manager:	_____	Date:	_____
OLE Director:	_____	Date:	_____
Regulated Materials Manager:	_____	Date:	_____
Wetland Resource Manager:	_____	Date:	_____

These commitments were transferred to the following offices:

Road Design Section Engineer:	_____	Date:	_____
District Engineer:	_____	Date:	_____
District Construction Engineer:	_____	Date:	_____
Resident Construction Engineer:	_____	Date:	_____
Consultant Coordination Section:	Dave Skogerboe	Date:	_____
Bridges and Structure:	Dave Claman	Date:	_____
ROW:	Marty Sankey	Date:	_____
Construction:	Tom Jacobson	Date:	_____
Local Systems:	_____	Date:	_____
FHWA:	Becky Hiatt	Date:	_____
Contracts:	Roger Bierbaum	Date:	_____
Specifications:	Donna Buchwald	Date:	_____
Maintenance:	_____	Date:	_____

Additional Comments:

**Michigan DOT Commitments to Environmental Excellence**

Project No: \_\_\_\_\_ Highway: \_\_\_\_\_ Revision Date: **02/01/2005**  
 \_\_\_\_\_ County: \_\_\_\_\_ Page 1 of 1  
 \_\_\_\_\_

\*Value Engineering Study Recommended  Yes  No

Commitments/Requirements	Source of Commitment	Responsible Office	Place on Plans	Requires A Special Provision	Status of Commitment/Requirement

<p><b>All practical and standard procedures and measures, including Best Management practices will be implemented to avoid or minimize impacts.</b></p>					

These commitments should be carried throughout each phase of the project development including Design, Right of Way, Construction, and Maintenance.

\*Value Engineering (VE) Studies are recommended for projects on the NHS System and/or an Intermodal Connector with an estimated project costs approaching \$25 Million

**Colorado DOT Mitigation Tracking Sheet**

SH 16 Phase 2 Construction (15915)

<b>Resource</b>	<b>Mitigation measure</b>	<b>Where/How it is addressed in plans/specs</b>
R-O-W	New access to businesses will be provided before existing access is removed	Construction phasing plans show new accesses provided before existing access is removed Sheets 45-72
R-O-W	Compensate businesses for costs associated with address changes - does this include EPC Parks?	NOT A PLAN OR SPEC ISSUE
EJ	No mitigation needed	N/A
P&R	Willow Springs Road will not be closed until Rice Lane is open	Construction Phasing Plans show Willow Springs Road open at all times Sheet 45 thru 72
P&R	Coordinate with EPC, City of Fountain & TOPS on temporary trails detours & to facilitate use of existing public information mechanisms for advance notice	
Visual	Rdwy lighting kept to minimum & designed to minimize light trespass beyond SH 16 ROW	Special Constr Reqmts pg 199
Traffic Noise	minimize night work near residential areas to extent possible	Sheet 44 overnight closure plan for bridge over SH 85 - residential neighborhood NE: CAN WE RESTRICT PILE DRIVING- OR WILL PILE DRIVING NEED TO BE DONE AT NIGHT?
Traffic Noise	require contractor to use well-maintained equipment to extent possible	Revision of Section 203 combination loader, front end loader, crane and backhoe say "... Shall be furnish and maintained in good operation condition."
AQ	No mitigation needed	N/A
Haz Mat	MMP & HASP will be developed and implemented for the PA	Section 250
Haz Mat	Steel Tractor has potential for contamination need specs to	Section 250



	address	
Constr	Traffic mtce plan will be developed to minimize interference to traffic flow from constr	Traffic control plan ?? Pg 201
Constr	Operations affecting traffic will be scheduled for off-peak whenever reasonable	Traffic control plan - Pg 201 restricts work during peak hours (5am to 9am and 4pm to 7pm)
Constr	CDOT will provide advance notice to FC, Widefield School District #3, emergency service providers & local businesses	Traffic control plan ?? Pg 201
Constr	Constr staging areas will be located in areas that would further minimize disruption to traffic & access when feasible	
Constr	Public access will be maintained for existing uses at all times	Include in Traffic Control plans?? Pg 201 Sheet 44 Full closure of SH 85 during nighttime for new bridge construction
Constr	Operations on the UP and BNSF freight RR lines will not be interrupted	Revision of Section 107 - BNSF, 107.081 "The Contractor's work shall be begun, conducted, and completed in such a manner as to cause no interference whatsoever with the safety or the continuous and uninterrupted use and operation of the track, wire lines, and other facilities belonging to the Railroad Company and its tenants." Revision of Section 107 UPRR 107.082 "This project includes construction work with the ROW and/or properties of the UPRR and adjacent to tracks, wire lines and other facilities. This section describes the special remts for coordination with the UPRR when work by the contractor will be performed upon, over or under the UPRR ROW or may impact current or future UPRR operations...."
Constr	BMPs will be implemented to minimize constr related air pollutant emissions	Special Constr Reqmts pg 199

Constr	Dust suppression such as watering or dust pallatives will be used	Summary of Approximate Quantities shows 2600 gal of mag chloride
Constr	A water truck will be on site when dust generation activities are scheduled	
Constr	Section 107.02 requires contractor to obtain all permits for the lawful prosecution of the contract	
Constr	Construction noise impacts will be minimized by scheduling loudest constr activities to occur during daylight hours	CAN WE MINIMIZE PILE DRIVING AT NIGHT??
History	No mitigation is necessary	N/A
Arch	Spec requiring CDOT staff arch to be notified if arch resources are discovered	
Paleo	Spec requiring CDOT staff paleo to be notified if paleo resources are discovered	
WQ	Use std erosion and sediment control BMPs	
WQ	Stormwater quality basins & similar features will be used to capture 100% of stormwater runoff from hwy See WQ TR	CAN MOSER PREPARE REPORT STATING IF ALL RUN-OFF IS CAPTURED, IF NOT ALL WHY, WHAT MTCE IS REQUIRED
WQ	CDPS permit is required Preveg survey done?	PREVEG SURVEY NEEDS TO BE REDONE - JULY 2002 IS NOTED IN SWMP
WQ	Work must comply with MS4 requirements	CAN MOSER PREPARE REPORT STATING IF ALL RUN-OFF IS CAPTURED, IF NOT ALL WHY, WHAT MTCE IS REQUIRED
Floodplains	no mitigation for this phase	N/A
Wetlands	no mitigation for this phase	N/A
Wildlife & Aquatic Species	Surveys needed for MBTA?	Special Constr Reqmts pg 199
T&E	Raptor surveys?	Special Constr Reqmts pg 199
Veg & Nox Weeds	All CDOT revegetation BMPS & guidelines will be followed	Section 218?

Veg & Nox Weeds	Coordinate with EPC Forestry and Noxious Weed Division regarding County weed mgmt	need to include in Section 218 rewrite
Veg & Nox Weeds	Project activities will be consistent with county policies, procedures & stds for weed mgmt	need to include in Section 218 rewrite
Veg & Nox Weeds	Integrated weed mgmt plan will be developed prior to project constr	Section 218 Noxious Weed Mgmt - ck Phase 1 spec
Veg & Nox Weeds	plan will include ID & Mapping of existing noxious weeds	Section 218 Noxious Weed Mgmt - ck Phase 1 spec
Veg & Nox Weeds	potential impacts from spread of invasive species and prevention and control measures	Section 218 Noxious Weed Mgmt - ck Phase 1 spec

**Federal Highway Administration  
Environmental Commitments Summary Table  
CA FH 114**

No	Commitment	Resources	Agency/Section Responsible	Type of Action	FP/SCR/Plan Sheet/Station#/Comp Date
1	<p>BMP-1 (SWPPP) The FHWA, Trinity County, or the construction contractor will prepare a SWPPP prior to commencement of construction activities. The SWPPP will define measures to be implemented by the construction contractor to mitigate project-related stormwater and point source pollution to project site waterways. It will also identify all hazardous materials used or stored on site and all wastes that may be generated during construction. For the management of unexpected spills during construction activities, the SWPPP will contain an Emergency Spill Containment Plan. The SWPPP will contain, at a minimum, the following:</p> <p>A description of all hazardous materials used on site</p> <p>Methods of managing each hazardous material</p> <p>Soil and water testing methods, if required</p> <p>Methods of transportation, storage, handling, and disposal of hazardous materials</p> <p>Disposal requirements and sites</p> <p>Recycling and waste minimization/reduction plans</p> <p>Emergency Spill Containment Plan</p>	Water Resources, Fish, Amphibians, and Reptiles, Hazardous Materials	Design (FHWA & TCDOT)	Plan report	SCR subsection 107.01 (b)  Plan sheets E1-E21
2	BMP-2 (NPDES) A NPDES Construction Permit will be obtained prior to construction activities to minimize effects from stormwater pollution.	Water Resources	Permitting (FHWA & TCDOT)	Permit	SCR subsection 107.01
3	BMP-3 (Sedimentation) Major ground disturbing activities will be completed within the non-rainy season (May 1 to October 31) to avoid stormwater sedimentation and turbidity effects to Hayfork Creek and its tributaries. Major ground disturbing activities may occur outside the defined dry season based on a forecast of dry weather and permission from NOAA Fisheries. Permission may be granted by email. Ground disturbing activities will not take place when the ground is saturated.	Water Resources, Wetlands, Fish, Amphibians, and Reptiles	Design (FHWA & TCDOT)	Plans/SCRs	SCR subsection 108.01(a)

No	Commitment	Resources	Agency/Section Responsible	Type of Action	FP/SCR/Plan Sheet/ Station#/Comp Date
4	BMP-4 (Sedimentation) Any construction activities proposed within the ordinary high water line of Hayfork Creek or Little Creek and surrounding riparian and wetland habitat, excluding passive vegetation removal activities above ground level (no soil disturbance), will be restricted exclusively to the dry season (May 1 to October 31) or will be separated from the water of the United States by a cofferdam or other appropriate control measure.	Water Resources, Wetlands, Fish, Amphibians, and Reptiles	Design (FHWA & TCDOT)	Plans/SCRs	n/a  This is for Segment 2 and Segment 3 only.

# Appendix F

## Select State DOT Environmental Specifications

## Oregon DOT's Environmental Excellence Financial Incentive for Contractor

### ENVIRONMENTAL EXCELLENCE AWARD

*inadvertently  
left out of award ff.  
specs.*

(c) Award Fee for Environmental Excellence – To reward the Contractor's efforts and accomplishments in minimizing adverse environmental impacts associated with the Project beyond the standards required in the Contract, ODOT will make available for award a total amount not to exceed \$150,000. Provided, however, ODOT's award or failure to award, as well as the amount awarded, if any, shall be within ODOT's sole discretion, and shall not be subject to dispute, appeal, or protest.

*ea. job.*

(1) Evaluation Process - The Department will evaluate the quality of the Contractor's environmental management based upon the criteria set forth in subsections (2) and (3) twice during the term of the Contract.

The first evaluation will be conducted approximately one year after issuance of Notice to Proceed, by means of the following process:

a. The Engineer will name a Fee Determination Board, which will consist of the following persons or their designees: ODOT Region Manager, an ODOT Environmental Manager, and an ODOT Bridge Engineering manager or bridge designer.

b. The Contractor shall submit a self-assessment of the Contractor's performance in environmental management, restricted to the criteria set forth in subsections (2) and (3), not later than 90 calendar days prior to the first anniversary of the date of issuance of Notice to Proceed. The self-assessment will identify with specificity the methods and results of the Contractor's environmental management, and will identify how the methods and results exceed the level of protection required under the Contract.

*Feb '03*

c. The ODOT Project Manager will review the submittal and gather such additional information from the Contractor and other sources as he/she may think appropriate. The ODOT Project Manager will prepare his/her assessment, in response to the Contractor's self-assessment, and submit the assessment, together with the Contractor's self-assessment, to the Fee Determination Board for its consideration. Upon the Board's completion of its consideration, the ODOT Project Manager will either request additional information from the Contractor or forward to the Contractor the ODOT Project Manager's assessment.

d. The ODOT Project Manager may request that the Contractor provide an oral presentation (not to exceed two hours) before the ODOT Project Manager, the Fee Determination Board, and others chosen by the ODOT Project Manager. This presentation may include responses to the ODOT Project Manager's assessment.

The second evaluation will occur approximately 120 calendar days after issuance of Second Notification. The Contractor shall submit a self-assessment of the Contractor's performance in environmental management, restricted to the criteria set forth in subsections (2) and (3), not later than 30 calendar days after issuance of

6-26-02

Proposal become  
part of contract  
thus cant reinsert  
them for doing what  
said they would do.

Bill

Second Notification. The evaluation process will then proceed according to steps c. and d. above.

(2) Evaluation Criteria (Design) – ODOT will consider design as a component of environmental excellence in the following contexts:

- a. Habitat Enhancement - Demonstrate that the design enhances habitat of species present in the area, e.g., bat habitat designed into the replacement structure, no use of riprap, placement of wood in the stream, etc.
- b. Protection of Regulated Areas - Demonstrate that the design minimizes direct impacts (permanent fill impacts) to the Permitted Work Area, through:
  - Minimal numbers of new bents.
  - Reduced area of fill footprint in comparison to current footprint, permitted footprint, and/or reasonable alternative designs considered by the Contractor. (compared to proposal)

Demonstrate that the design minimizes the need for temporary impacts to areas of temporary fill and/or soil disturbance (e.g., access roads) in Permitted Work Areas and in environmentally sensitive areas of the Project Site and adjacent terrain.

Demonstrate that the design for temporary access will not result in filling intermittent channels.

- c. Water Quality - Demonstrate a high likelihood that the design will result in improvement over pre-existing conditions in Permitted Work Areas and in environmentally sensitive areas of the Project Site and adjacent terrain, through:
  - Features that increase the potential for infiltration of the highway runoff (e.g., large pervious surface area and extended period when the water is in contact with the pervious surface before discharge).
  - Water quality treatments designed to have minimal impact on other resources, and which require minimal maintenance.
  - Permanent wetland impacts limited to the footing area.
  - No permanent off-channel habitat loss.

(3) Evaluation Criteria (Construction) - ODOT will consider construction practices as a component of environmental excellence in the following contexts:

- a. Education Efforts - Demonstrate the implementation of an aggressive and comprehensive program to orient all personnel involved in construction on the environmental requirements of the Project, and show that regular crew meetings are conducted to discuss the environmental aspects of the Project.
- b. Implementation of Protective Design Features - Document that construction operations effectively implement environmental design features, by:
  - Minimizing or avoiding actions that require regulatory exemption requests.



- Reducing biological impacts and environmental impacts to wetlands and the active stream channel to a lower level than allowed under applicable permits.
- Fencing off environmentally-sensitive non-wetland areas (including off-site staging and storage areas, if any), such as fisheries and plant habitat, to protect them from environmental disturbance.
- Effective implementation of environmental precautions and preventive measures in bridge demolition beyond the minimum required under the Contract, resulting in exceptionally effective protection of the habitat.
- Installing a no work-zone fence to protect Wetland B.

c. Restoration

- Implement effective restoration of temporarily-impacted areas beyond the minimum required under the Contract.
- Obtain independent testing that documents the superior quality of native seed and plants utilized in restoration.

*May 09* (4) Payment of Environmental Excellence Award - The maximum award for the first evaluation period will not exceed \$60,000. ODOT will make its determination of award, if any, for the first evaluation period, and forward to the Contractor the amount awarded within 30 days of date of award determination.

The maximum award for the second evaluation period will be \$90,000. ODOT will make its determination of award, if any, for the second evaluation period and include the amount awarded with final payment upon completion of the Project.

Notwithstanding the above, the Contractor shall not be entitled to any of the environmental excellence award if the Contractor breaches any material Contract provision.

*Possible <sup>without</sup> net gain at Lower Perry by removing old pier.*

## Washington State DOT - Imposed Restrictions

### Environmental Regulations

Section 1-07.5 is supplemented with the following:  
(OR September 7, 2007)

#### Imposed Restrictions and Requirements

The following provisions summarize the requirements, in addition to those required elsewhere in the contract, imposed upon the Contracting Agency by the various environmental permits referenced in the following section. Throughout the work, the Contractor shall comply with the following requirements:

##### General

The Contractor shall ensure that the Project Manager representing the Prime Contractor has read and understands this Special Provision. Prior to commencing any work on site, the Contractor shall provide the Engineer with a signed statement from the Project Manager stating that the Project Manager has read, understands and will abide by the conditions of this Special Provision.

##### Wetlands and Water Quality

The following restrictions and requirements pertain to work throughout the project limits:

1. A copy of the WSDOT/DOE Implementing Agreement on Surface Water Quality Standards must be kept on site at all times.
2. A mixing zone is established within which the turbidity standard is waived during actual in-water work. The mixing zone is established to only temporarily allow exceeding the turbidity criteria (such as a few hours or days) and is not authorization to exceed the turbidity standard for the entire duration of the construction. The mixing zone shall not exceed (\*\* \$1\$ \$\*\*) feet downstream from the construction area.
3. Extreme care shall be taken to ensure that no petroleum products, hydraulic fluid, fresh concrete, sediments, sediment-laden water, chemicals, or any other toxic or deleterious materials are allowed to enter or leach into waters of the State including wetlands.

All forms used for concrete shall be completely sealed to prevent the possibility of fresh concrete from getting into the stream. All concrete shall be cured a minimum of seven days before contact with waters of the State, including wetlands. Any water that comes into contact with concrete within the first seven days of cure shall be contained and discharged to land with no possible entry to surface waters. Where land is not available for treatment, other methods of water treatment shall be utilized as approved by the Engineer.

OR THE FOLLOWING STATEMENT MAY APPLY INSTEAD:

All concrete placed on the project shall be covered with plastic for a minimum of seven days to prevent stormwater from coming into contact with uncured concrete.

5. If at any time, as a result of project activities, fish are observed in distress, or a fish kill occurs, the local Habitat Biologists with the Department of Fish and Wildlife (\*\*\*) (\$2\$ \$\*\*) and the Department of Ecology (\*\*\*) (\$3\$ \$\*\*) shall be called immediately.
6. Debris accumulation on bridges, road surfaces and within bridge drains shall be collected and properly disposed of off site.
7. Wastewater and water removed from the work area shall be routed to an area landward and contained or placed in such a way that the runoff will not flow directly to waters of the State including wetlands. Temporary sediment traps shall be used to allow the turbid water to settle for a minimum of two hours before discharge. The flow rate of turbid water into the stream shall not exceed one tenth of the natural flow rate of the stream at the time of discharge. Measures developed to bring the turbidity levels of the discharge into compliance with Standards with less than the required detention time will require a plan, with supporting test data showing compliance, to be submitted to the Engineer for approval.
8. No Contractor staging areas will be allowed within 300 feet of any waters of the State including wetlands.
9. If using a diversion system, temporary sediment traps shall be cleaned out and the settled sediments removed from the stream channel before removing the stream diversion system and returning the stream to its natural channel. Settled sediments shall not be allowed to enter the stream due to water or run off flows that may occur after construction is completed.
10. Impacts to bank and shoreline vegetation shall be minimized and replanted immediately per Section 1-07.5(2). Work shall be conducted in a manner to avoid deformation of the streambed.
11. A separate area shall be set aside, that does not have any possibility of draining to waters of the State including wetlands, for wash out of concrete delivery trucks, pumping equipment, and tools.
12. During demolition, materials shall not be stored where high tides, wave action or upland runoff can cause the materials to enter into waters of the State including wetlands.
13. Materials used to construct temporary access roads, where approved or shown on the plans, shall be clean and placed in a manner to prevent erosion and siltation that might result from high water and/or heavy rains. Upon completion of the project, the approach area shall be stabilized and planted to pre-project conditions or as approved by the Engineer.
14. All paved surfaces shall be dry cleaned of debris accumulations prior to fresh water flushing. Flush water shall be clean, without detergents or other cleaning agents.
15. Ditch and culvert cleaning activities shall take place when the ditch or culvert does not contain water whenever possible. If the ditch or culvert is flowing with water at the time of the cleaning activity, temporary sediment traps shall be used to control turbid water created by the activity. Disturbance to bank and wetland vegetation adjacent to the ditch shall be held to a minimum. All materials excavated from roadside ditches or streams shall be completely removed and disposed of at an upland location. No

material shall be side cast into adjacent wetlands or other water conveyances. If material is placed on the upland to dewater, it shall be contained in such a way that the runoff will not flow into nearby storm drains or waters of the State, including wetlands.

16. Decant water resulting from the cleaning of stormwater conveyance systems shall be disposed to municipal decant stations and/or sanitary sewers. The Contractor shall secure approval from the local sewer authority to dispose of decant water. If a municipal decant station or sanitary sewer is not available, the material shall be allowed to settle for a minimum of 30 minutes prior to discharge to either the ground with no discharge to surface waters, or upstream of a regional detention facility.

17. Cleaning of stormwater treatment ponds or swales shall be performed when there is not a possibility of a discharge from the pond for at least 24 hours.

18. During any operation involving saw cutting of concrete, all water generated by the cutting operation shall be controlled and contained, to be disposed of on land with no possibility of entry to waters of the State, including wetlands.

19. End dumping riprap into the water will not be allowed unless approved by the Engineer.

20. All lumber treated with creosote or other protective material shall be completely dry before use in or within 300 feet of any waters of the State, including wetlands.

21. Heavy equipment working in wetlands or mudflats must be placed on mats or other measures taken to minimize soil disturbance as approved by the Engineer.

22. Materials placed below OHW or MHHW may not consist of trash, debris, car bodies, asphalt, or other potentially contaminating materials.

23. Any temporary fills placed \*\*\* \$\$\$\$\$\$ \*\*\* must be removed in their entirety and the affected areas returned to their preexisting elevation. (Choose from the following list to be used for the fill-in information: "below OHW", "below MHHW", or "within wetlands")

24. The Contractor shall notify the Engineer a minimum of 15 calendar days prior to commencing any work in environmentally sensitive areas, mitigation areas, and wetland buffers. Installation of construction fencing is excluded from this notice requirement. At the time of notification, the Contractor shall submit a work plan for review and approval detailing how the work will be performed. Plan detail must be sufficient to verify that work is in conformance with all contract provisions.

25. The Contractor shall be responsible to report to the Engineer any deviation from the contract provisions pertaining to environmental compliance, including but not limited to spills, unauthorized fill in waters of the State including wetlands, water quality standards, noise, air quality, etc.

26. The intentional bypass of stormwater from all or any portion of a stormwater treatment system is prohibited without the approval of the Engineer.

## **Payment**

All costs to comply with this special provision for the imposed restrictions and requirements are incidental to the contract and are the responsibility of the Contractor. The Contractor shall include all related costs in the associated bid prices of the contract.

**State Department of Ecology**

Section 1-07.5(3) is supplemented with the following:

(OR December 19, 2005)

9. When construction activities occur within a waterbody, the natural flow of the waterbody shall be diverted around the construction site.

**Permits and Licenses**

Section 1-07.6 is supplemented with the following:

(OR December 19, 2005)

The Contracting Agency has obtained the below-listed permit(s) for this project. A copy of the permit(s) is attached as an appendix for informational purposes. All contacts with the permitting agency concerning the below-listed permit(s) shall be through the Engineer. The Contractor shall obtain additional permits as necessary. All costs to obtain and comply with additional permits, shall be included in the applicable bid items for the work involved.

NAME OF PERMIT	PERMITTING AGENCY	PERMIT REFERENCE NO.
Department of the Army Section 404 Individual Permit	Corps of Engineers Seattle District	
Department of the Army Section 404 Nationwide	Corps of Engineers Seattle District	
Department of the Army Section 10 Individual Permit	Corps of Engineers Seattle District	
Section 401 Water Quality Certification	Department of Ecology	
Coastal Zone Manage- ment Consistency Certification	Department of Ecology	
Temporary Modification of Water Quality Standards	Department of Ecology	
NPDES Industrial Stormwater Permit for Construction Activities	Department of Ecology	

Hydraulic Project Approval	Department of Fish & Wildlife	
Scientific Collection Permit	Department of Fish & Wildlife	
Shoreline Substantial Development Permit	X County -or- City of X	
Critical Area Ordinance Permit	X County -or- City of X	

## Temporary Water Pollution/Erosion Control

### Spill Prevention, Control and Countermeasures Plan

Section 1-07.15(1) is supplemented with the following:

(OR January 24, 2007)

The Contractor shall address the following items in the SPCC Plan in addition to the requirements of Section 1-07.15(1):

#### Mixing, Transfers, & Storage

1. All oil, fuel or chemical storage tanks or containers shall be diked and located on impervious surfaces so as to prevent spill from escaping.
2. All liquid products shall be stored and mixed on impervious surfaces in a secure water tight environment and provide containment to handle the maximum volume of liquid products on site at any given time.
3. Proper
4. Drip pans or other protective devices shall be required for all transfer operations.

#### Spills

Paint and solvent spills shall be treated as oil spills and shall be prevented from reaching storm drains or other discharges. No cleaning solvents or chemicals used for tool or equipment cleaning may be discharged to the ground or water.

#### Maintenance of Equipment

Fuel hoses, oil drums, oil or fuel transfer valves and fittings, etc, shall be checked regularly for drips or leaks and shall be maintained and stored properly to prevent spills into State waters.

#### Disposal

Spilled waste, chemicals or petroleum products shall be transported off site for disposal at a facility approved by the Department of Ecology. The materials shall not be discharged to any sanitary sewer without approval of the local sewer authority.

## Reporting & Cleanup

The Contractor's designated person for managing and implementing the SPCC Plan shall report hazardous material spills as follows:

Spills into State water (including ponds, ditches, seasonally dry streams, and wetlands)  
– Immediately call all of the following:

- National Response Center 1-800-424-8802
- WA State Div. of Emergency Management (24 hr) 1-800-258-5990
- Ecology SW Regional Office 1-360-407-6300

Spill to Soil (Including encounters of pre-existing contamination):

- Ecology SW Regional Office 1-360-407-6300

Report immediately if threatening to health or environment (i.e., explosive, flammable, toxic vapors, shallow groundwater, nearby creek), otherwise within 90 days

- Underground Storage Tank (confirmed release of material)
- Ecology SW Regional Office 1-360-407-6300

Report within 30 days

Containment and cleanup efforts shall begin immediately and be completed as soon as possible, taking precedence over normal work. Cleanup shall include proper disposal of any spilled material and used cleanup materials. No emulsifiers or dispersants are to be used in waters of the State without written approval from the Department of Ecology. Concentrated waste or spilled chemicals shall be transported off the site for disposal at a facility approved by the Department of Ecology or local County Health Department.

## Vegetation Protection and Restoration

Section 1-07.16(2) is supplemented with the following:

(April 26, 2006)

The Contracting Agency has identified critical environmental areas adjacent to work areas within the project limits. Wetland boundaries as well as surrounding buffer zones are shown in the plans.

A site preservation line has been established as a boundary between work zones and critical environmental areas. As described in the Special Provisions **ORDER OF WORK** and **HIGH VISIBILITY FENCE**, the Contractor shall install high visibility fence along the site preservation line. The preservation zones include critical environmental areas,

buffer zones, and other areas of vegetation to be preserved. The Contractor shall keep the preservation zones identified by the site preservation lines free of construction equipment, construction materials, debris, and runoff. No excavation, clearing, staging, or stockpiling shall be performed inside the preservation zone.

Section 1-08.4 is supplemented with the following:

(OR September 9, 2004)

### **Order of Work**

The first order of work on this project shall be the installation of fencing to delineate all wetland and sensitive areas, as described in the Special Provision **HIGH VISIBILITY FENCE**. No other work shall be performed on the site until the Contracting Agency has accepted the installation of the wetland and sensitive area delineation. The acceptance will be evidenced in writing.

### **Description**

Section 8-01.1 is supplemented with the following:

(OR November 27, 2001)

This work shall consist of preparing a Fugitive Dust Control Plan (FDCP) in conjunction with the Temporary Erosion and Sediment Control (TESC) Plan and preparing for implementation of the plan.

(OR September 9, 2004)

### **High Visibility Fence**

This work shall consist of delineating all wetland and sensitive areas by furnishing, installing, maintaining, and removing high visibility construction fence in accordance with these specifications and as shown in the Plans or as designated by the Engineer.

(OR October 30, 2006)

High visibility fence shall be UV stabilized, orange or yellow high-density polyethylene or polypropylene mesh, and shall be at least four feet in height. The fence shall weigh a minimum of 0.12 pounds per linear foot.

Either wood or steel support posts shall be used. Wood posts shall have minimum dimensions of 1.5 inch by 1.5 inch, and shall be free of defects such as knots, splits, or gouges. Steel posts shall consist of T-bar posts, size No. 6 rebar or larger, ASTM A120 steel pipe with a minimum weight of 1.3 pounds per foot, or other steel posts having equivalent strength and bending resistance to the posts listed.

Section 8-01.3 is supplemented with the following:

(OR March 24, 2008)

### **High Visibility Fence**

As described in the Special Provision **ORDER OF WORK**, the Contractor shall, as the first order of work, install a high visibility fence along the site preservation lines shown in



the Plans. Support posts for the fence shall be placed at six-foot centers or as needed to provide rigidity. The fence shall be attached to the posts every sixteen inches with a polyethylene tie. The fence shall not be fastened to trees.

Upon completion of this work, the Contractor shall request the Engineer to inspect the fence. Contracting Agency acceptance of the material and installation will be based on visual inspection, and acceptance will be evidenced in writing. No other work shall be performed until the Engineer has accepted the fence installation.

Throughout the life of the project, the Contractor shall preserve and protect the delineated area, acting immediately to repair or restore any fencing damaged or removed.

### **General**

Sentences one and two of Section 8-01.3(1) paragraph 5 are replaced by the following:

(OR December 19, 2005)

All sediment control devices including sediment ponds, perimeter silt fencing, and other sediment trapping BMP's shall be installed prior to any ground disturbing activity.

### **Submittals**

Section 8-01.3(1)A is supplemented with the following:

(OR December 19, 2005)

Any TESC plan submitted by the Contractor must meet all requirements of Chapter 6-2 of the current edition of the WSDOT Highway Runoff Manual.

(OR December 19, 2005)

The Contractor shall submit a Fugitive Dust Control Plan(FDCP). This plan shall reflect conditions specific to the Contractor's operation and schedule of work. The Contractor shall base the FDCP on Best Management Practices (BMPs) set forth in the Associated General Contractors of Washington Education Foundation and Fugitive Dust Task Force Pamphlet, "Guide To Handling Fugitive Dust From Construction Projects".

### **Erosion and Sediment Control (ESC) Lead** (for projects outside Kitsap or Pierce County)

In Section 8-01.3(1)B, the second paragraph is supplemented with the following:

(OR March 13, 2007)

3. Updating and maintaining a TESC file on site that includes, but is not limited to:
  - a. Erosion and Sediment Control Inspection Forms.
  - b. Temporary Erosion and Sediment Control (TESC) Plan and narrative.
  - c. National Pollutant Discharge Elimination System construction permit (Notice of Intent).

- d. Other applicable permits.
- e. Contracting Agency-supplied stormwater monitoring reports, if applicable.
- f. Contracting Agency-supplied NPDES permit coverage letter.

Upon request, the file shall be provided to the Engineer for review.

The first sentence of the third paragraph is revised to read:

(OR March 13, 2007)

The Contractor shall inspect all on-site erosion and sediment control BMPs at least once every calendar week and within 24 hours of runoff events in which stormwater discharges from the site.

Section 8-01.3(1)B is supplemented with the following:

(OR March 13, 2007)

In addition to those outlined in Section 8-01.3(1)B, duties of the ESC Lead shall also include, but are not limited to:

1. Being responsible for the preparation of a Temporary Erosion and Sediment Control (TESC) Plan, to be used for the duration of the project, when a TESC Plan is not included in the contract plans.
2. Making Contracting Agency initiated revisions to the approved TESC Plan.
3. Inspecting all stormwater discharge points.

(OR November 27, 2001)

“Temporary Erosion and Sediment Control (TESC) Plan”, lump sum.

The lump sum contract price for the “Temporary Erosion and Sediment Control (TESC) Plan” shall be full pay for all labor, equipment, material and overhead costs associated with the preparation of the TESC Plan and any coordination and preparation needed prior to implementation.

**Erosion and Sediment Control (ESC) Lead** (for projects inside Kitsap or Pierce County)

In Section 8-01.3(1)B, the second paragraph is supplemented with the following:

(OR March 13, 2007)

3. Updating and maintaining a TESC file on site that includes, but is not limited to:
  - a. Erosion and Sediment Control Inspection Forms.
  - b. Temporary Erosion and Sediment Control (TESC) Plan and narrative.
  - c. National Pollutant Discharge Elimination System construction permit (Notice of Intent).
  - d. Other applicable permits.

- e. Contracting Agency-supplied stormwater monitoring reports, if applicable.
- f. Contracting Agency-supplied NPDES permit coverage letter.

Upon request, the file shall be provided to the Engineer for review.

The first sentence of the third paragraph is revised to read:

(OR March 13, 2007)

The Contractor shall inspect all on-site erosion and sediment control BMPs at least once every calendar week and within 24 hours of runoff events in which stormwater discharges from the site.

Section 8-01.3(1)B is supplemented with the following:

(OR March 13, 2007)

In addition to those outlined in Section 8-01.3(1)B, duties of the ESC Lead shall also include, but are not limited to:

1. Being responsible for the preparation of a Temporary Erosion and Sediment Control (TESC) Plan, to be used for the duration of the project, when a TESC Plan is not included in the contract plans.
2. Making Contracting Agency initiated revisions to the approved TESC Plan and Fugitive Dust Control Plan (FDCP), maintaining both in a TESC file.
3. Inspecting all stormwater discharge points.
4. Implementing the FDCP and inspecting the Best Management Practices (BMPs) for proper location and installation.
5. Preparing a FDCP Inspection Report for each inspection. The inspection reports shall be included in the TESC File maintained by the Contractor's ESC Lead. The inspection reports shall be made available to the Engineer upon request and shall include, but not be limited to the following:
  - a. The date and time BMPs are installed, removed, or changed;
  - b. The date and time maintenance is needed and performed;
  - c. The date, time, and person who performs inspection and maintenance, and what, if any maintenance is done;
  - d. Observations of BMP effectiveness and proper placement;
  - e. Recommendations for improving performance of BMPs.

(OR November 27, 2001)

“Temporary Erosion and Sediment Control (TESC) Plan”, lump sum.

The lump sum contract price for the “Temporary Erosion and Sediment Control (TESC) Plan”, which includes the “Fugitive Dust Control Plan (FDCP)”, shall be full pay for all labor, equipment, material and overhead costs associated with the preparation of the

TESC Plan and FDCP and any coordination and preparation needed prior to implementation.

There shall be no other payment for Dust Control Measures other than what is provided for in Section 2-07.

## WSDOT NW Region Process for Incorporating Environmental Permit Requirements into Plans and Specifications

May 2005

*By NW Region Environmental Plans and Specification Process Improvement Team*

Note: this is an excerpt of this document and is available in its entirety at [http://wwwi.wsdot.wa.gov/regions/northwest/RP&S/Environmental/Permits\\_Docs/Incorporating%20Permit%20Requirements%20into%20Plans%20and%20Specifications.pdf](http://wwwi.wsdot.wa.gov/regions/northwest/RP&S/Environmental/Permits_Docs/Incorporating%20Permit%20Requirements%20into%20Plans%20and%20Specifications.pdf)

### Introduction:

During the spring and summer of 2004, the Northwest Region construction program incurred multiple violations of regulatory permits on the SR 18, Maple Valley to Issaquah Hobart Road contract. The violations resulted in unacceptable impacts to the environment and damage to our credibility with other agencies and the public. A large part of the contract was shut down for most of the construction season. The monetary cost to the taxpayers is easily into the millions of dollars.

The department conducted a detailed study of the events that led up to the most significant of the multiple violations. That study identified weaknesses in the methods we use in placing regulatory information in our contract documents.

This team was created by the NW Region Design Guidance Team to provide a forum for addressing the issue and to recommend modifications to our PS&E development process. (See Team Charter in Appendix G) This team consisted of people with a significant level of experience and expertise in all phases of project development (Environmental, Design and Construction).

Our Team Mission was broken into several tasks and products (see Mission Statement in attached Team Charter). In considering these goals, we found it difficult to separate one without affecting the others. To make changes in one portion without considering the whole process and how the participants interact, would not necessarily achieve the desired goal. We determined the best way to address the problem was to look at all parts of the process from start to finish and make recommendations over the entire process.

Our current processes work well for reviewing the engineering elements of projects, they should work equally well for environmental review. Having appropriate staff actively engaged in the review of the environmental elements and how they affect constructability is critical. The coordination by Design and Environmental with Construction needs to improve. There needs to be assurance that this coordination will begin earlier and last through construction of the project.

Administration and Management support is crucial to implement these changes due to their impact on project schedules, personnel assignments/positions and funding aspects of the design and construction processes.

For the purposes of this document “sensitive areas” is defined as wetlands, streams, lakes, shoreline zones, associated buffers and any other resource that is either regulated or protected by environmental regulations, permits or approvals.

## Process Recommendations

The recommendations in this document are intended to expand upon the information contained in the attached "Permit Compliance Design Flow Chart" (Appendix C). This flow chart started as a representation of the existing project development process and was modified to enhance and ensure better communication/coordination of environmental issues.

If implemented these recommendations should result in better understanding of environmental issues and constraints by construction staff and a better understanding by Designers and Environmental staff of the problems associated with completing major construction activities in the proximity of sensitive environmental resources.

As these recommendations are implemented, issues will arise that will test these process changes. However, these recommendations will provide a baseline upon which improvements can be made with the resources and people identified to resolve those problems. This will be an iterative process that will refine itself over time. Those items that prove of value, should ultimately be incorporated into the WSDOT Standard Specifications, Design, Plans Preparation and Construction Manuals as appropriate.

Implementation of these recommendations should result in:

- Early resolution of environmental and constructability problems by all staff.
- Permits which are better suited to construction needs.
- Contract plans that incorporate environmental permit requirements and are constructible.
- Environmental information incorporated into the contract documents consistently from contract to contract. Project Inspectors will know exactly where the information resides before they open the plan set. This consistency will simplify Plan Review for environmental compliance.
- Fewer and less severe compliance problems on projects.

Appendices F, G and H (link to entire document at top of Appendix B) include proposed changes to the Design Manual, Construction Manual and Plans Prep Manual. These changes should be considered by Headquarters for statewide use and should provide for consistency across the state.

## Project Risk Assessments and Level of Effort

Some of the recommendations are tied to the relative level of complexity of the environmental issues surrounding a project. The risk levels are based on the proximity of the project's work to environmental resources and the potential for the project to result in violations of environmental regulations or permit conditions during construction.

How, and when, do we determine the level of risk for WSDOT projects?

## Recommendations:

Level of risk should be identified at the beginning of design, it should be clearly communicated at the Managing Project Delivery (MPD) meeting and/or MPD documentation. It should be identified in all Plans, Specifications & Estimate (PS&E) review requests.

Risk Level should be concurred upon by Design, Environmental and Construction staff. Three risk levels are proposed:

Level 1 (Low Risk), projects with little or no work off of the existing developed roadway prism, that do not require permits or approvals. There are either no regulated resources within the project limits or if they exist, are in areas where there is no foreseeable need to disturb the area.

Level 2 (Moderate Risk), projects with clearing, grading or earthwork, where there are sensitive areas within close proximity to the project limits but do not require regulatory permits or approvals.

Level 3 (High Risk), are projects that have environmental permits/approvals, have temporary or permanent impacts to sensitive areas (streams, wetlands or their regulated buffers, flood plains, ...etc.) or due to close proximity to resources and the nature of the work, are potentially more than a moderate risk of environmental damage.

### **Surveying for Environmental Resources and Clearing Limits/Data Needs**

All environmental resources (streams, wetlands, buffers, flood plains, etc. ...) as well as clearing and clearing limits will be surveyed and/or calculated to an accuracy of +/- 0.1 foot. In addition to using this information for PS&E preparation, the Design PE will transmit this data to the Construction PE in a format that can be used to re-establish the locations of these features in the field.

### **Delineation of Environmental Resources**

Risk Level 2 and 3 Projects: All sensitive areas that are located within or whose buffers extend onto State R/W should be completely delineated, surveyed and identified in the contract documents.

Risk Level 1 Projects: These projects may not need full delineations or surveys. It may be possible to greatly reduce the delineation effort based on the proximity to sensitive areas of activities that disturb vegetation or soils.

A Reconnaissance Level Review could be an option. A reconnaissance level review could require identifying of the beginning and end of a sensitive area and identifying stationing for these points. The plans could identify the area between those points as "sensitive areas not delineated" and prohibit any activity off of the developed roadway in the area, greatly reducing the level of effort expended during design and construction.

The decision not to do less than a full delineation effort should be made by the Construction PE on a case by case basis and concurred upon by Design and Environmental.

Examples:

- Paving projects with no earth disturbing activities.
- Projects where earth disturbance is not in proximity to sensitive areas.

## Construction Staking of Environmental Resources

Risk Level 2 and 3 Projects (See Section 140.05): All sensitive areas that are located within or whose buffers extend onto state right-of-way (or property owned by others, such as temporary easements) and are within the project limits will be completely delineated, surveyed and identified in the contract documents.

Risk Level 1 Projects (See Section 140.05): These projects may not need full delineations or surveys. It may be possible to greatly reduce the delineation effort based on the proximity to sensitive areas of activities that disturb vegetation or soils.

A reconnaissance level review, as a minimum, will be required for low risk (Risk Level 1 Projects). A reconnaissance level review requires identifying the beginning and end of a sensitive area and identifying stationing for these points. The plans will identify, as a minimum, the area between those points as “sensitive areas not delineated” and prohibit any activity off of the developed roadway in the area, greatly reducing the level of effort expended during design and construction.

### Pre Design Phase

Commitments made during the Design/Environmental Process, that could affect the timing of, or how construction is to occur in and around environmental resources should be reviewed by Construction. This would include, but not be limited to commitments made in: SEPA/NEPA documents, Biological Assessments or a result of early coordination with the public or outside agencies.

### Recommendations:

MPD Meeting/MPD documentation, specific agenda item for environmental issues.

Identify Risk Level, permit and permit submittal requirements, mitigation needs, and timing of environmental process. Identify Project Review schedule (will there be reviews at 30%, 60%, 90%....).

Adopt a naming convention for all environmental resources within the project limits, use the same terminology in all documentation throughout the project development process. (See Appendix D, Sensitive Areas Naming Conventions)

### Permit Process

Permit application should be timed with the intent of having all permits in hand in time to incorporate conditions into the PS&E for the Constructability Review or circulation of the 90% PS&E review.

Construction staff should participate at critical points during the permit process and provide input as necessary on how permitting decisions affect the constructability of a project. Construction should review permit data prior to making application, with particular attention to constructability issues, constraints on and access in and around environmental resources, how the work is accomplished, and the timing and staging of the work.

Construction should approve permit applications prior to submittal to agencies.

Permit coordinator is to track, document, distribute, and coordinate review of permits and related issues. Conduct a separate Environmental Compliance meeting with



Management, Construction, Design, Environmental, and Landscape groups. Provide coordination with resource agencies for any changes.

### Comments and Responses

Permitting is an iterative process. Agencies comment on our submittals and we are required to respond with data to support our design or position. This can result in modifications to our design. Prior to making revisions or agreeing to change our application, the Design and Environmental groups will coordinate the revisions with the Construction office.

### Draft Permit Conditions

Some agencies provide a draft of permit conditions for our review prior to issuance and allow us the opportunity to request modifications within certain limitations. Others issue a final permit and our option is to accept the permit, go back for a revision or contest the appropriateness of the conditions and elevate as necessary.

Prior to acceptance and incorporation into the PS&E, the Construction PE will be asked to review and accept the permit(s) terms and conditions or request modifications as necessary.

Once we have accepted the permits, they are finalized and incorporated into PS&E (at 90%).

### **Recommendations:**

Schedule permit applications to have permits in hand by 90% PS&E review or Constructability Review Meeting.

Construction will review and approve permit applications prior to submittal.

Construction will review for conflicts that could adversely affect the timing, staging or the constructability of the project.

Construction will participate in review of agency comments on applications, draft permits or conditions, and assist in developing responses to items that would affect constructability.

### Incorporating Permit Conditions into the Plans and Specials

A team representing the Design PE, Construction PE and Region Environmental

Offices shall work together to complete the incorporation of all environmental permit conditions and terms into the Plans and Specs.

Risk Level: All projects with regulatory permits.

### **Review of Project Design/PS&E**

The current PS&E review process allows the Design PE to circulate the design for review by all disciplines. These reviews typically take place at 30, 60, 90 and 100% (final review prior to submittal to Region Plans Office) completion. This review process varies depending on the project type and complexity. There needs to be greater emphasis on review by Construction Staff during each review opportunity.

**Recommendation:**

Construction should provide documentation at each appropriate review that the plans have been reviewed and provide comments or a statement that there are no comments. A primary focus of the review will be the ability to construct the project within the environmental constraints

30% Plan Review - The footprint of the project and environmental resources are generally defined. The proximity of the work to environmental resources is known.

**Recommendations:**

For projects at Risk Level 2 and 3:

Review by Construction should focus on the ability to construct work with no or minimal additional encroachment on resources. Anticipated impacts or conflicts need to be identified. Discuss construction access issues related to sensitive areas.

60% Plan Review - Impacts to environmental resources are generally well defined, project coordination with resource agencies should be to the point where construction access, staging and timing concerns should have been resolved. The project should have permit applications prepared and submitted at this time (see section titled "Permit Process").

**Recommendations:**

For projects at Risk Level 2 and 3:

Construction reviews to see that their 30% review comments have been incorporated in the contract documents in a manner that allows the project to be constructed in a practical manner and does not unnecessarily constrain construction activities. Provide further comments as necessary.

90% Plan Review - Permit process should be complete, permits should be in hand (if not, will need to defer these steps to 100% PS&E).

**Recommendations:**

For projects at Risk Level 2 and 3:

Environmental (permit coordinator) will complete and submit draft "Environmental Compliance Notebook and Commitment File". The Compliance Notebook and Commitment File will include a copy of all documentation to support the environmental design of the project and the base information used to develop the Environmental Compliance Note sheets.

Construction review status of project to date, review and comment on modifications necessitated by permit process (see section titled "Permit Process").

All commitments affecting the timing, staging or how contract work must be accomplished to be reviewed by Construction for concurrence, prior to finalizing documentation.

100% PS&E - Plan documents complete, all permits in-hand. All permit conditions, environmental considerations and commitments necessary for administering construction are completely incorporated into the contract documents.

**Recommendation:**

For projects at Risk Level 1, 2 and 3: Final check by Construction, Design and Environmental of contract documents and permits to ensure constructability.

Revisions to PS&E

How we incorporate environmental commitments, permit conditions and other regulatory requirements needs revision. The method should be consistent from plan set to plan set. This consistency will better ensure that the information can be readily accessed and understood by Construction staff.

**Recommendations:**

Add new, "Environmental Compliance Plan (ECP)" and "Environmental Compliance Notes (ECN)" plan sheet(s)(see Appendices A and B) to identify each sensitive area, cross-referenced to environmental commitment type (BA, NEPA/SEPA, permit condition...) Each Compliance Note will be re-written into clear contract language.

Identify all sensitive areas on Environmental Compliance plan sheets. (See Appendix E for NWR Designer's Guide for PSUE/Permit Environmental Compliance.)

Add sensitive areas to any plans sheets that identify earth disturbing activities within or adjacent to the resource.

At 100% review, or as soon as the permit process is complete, the Region Environmental Office will coordinate with the Design Project Engineer and prepare an "Environmental Compliance Notebook and Commitment File" for the Construction Project Engineer.

Pre Construction Conference

A Pre Construction Conference should be held for all Risk Level 2 and 3 projects. It is critical that all of the attendees be given adequate notification of the time and location of these meetings. Some project permits require a pre-construction meeting and dictate attendance. The Environmental Coordinator will lead a discussion of the environmental issues/concerns on the project using the Environmental Compliance Plan, Environmental Compliance Notes and Environmental Compliance Notebook and Commitment File as the basis.

**Recommendations:**

Construction and Environmental will coordinate the need, timing and attendance for Pre Construction Conferences.

If regulatory agency staff is required or desired, 30 days notification should be allowed.

**Appendices from this document are not attached but are available at:**

[http://wwwi.wsdot.wa.gov/regions/northwest/RP&S/Environmental/Permits\\_Docs/Incorporating%20Permit%20Requirements%20into%20Plans%20and%20Specifications.pdf](http://wwwi.wsdot.wa.gov/regions/northwest/RP&S/Environmental/Permits_Docs/Incorporating%20Permit%20Requirements%20into%20Plans%20and%20Specifications.pdf)

## Washington State DOT General Provisions

### 1-07.5 Environmental Regulations

#### 1-07.5(1) General

Throughout the work, the Contractor shall comply with all current rules of the resource agencies having jurisdiction over the affected areas. Some, though not all, of these rules are summarized below. Any of these agencies may, without prejudice to the Contracting Agency, add rules as needed to protect game, fish, or the environment.

The following restrictions apply to all work:

1. No work shall occur within the jurisdictional areas unless authorized in the contract provisions and associated permits.
2. No materials shall be placed below the ordinary high water line except as may be specified in the contract.
3. No equipment shall enter waters of the State, except as may be specified in the contract.

#### 1-07.5(2) State Department of Fish and Wildlife

In doing the work, the Contractor shall:

1. Not degrade water in a way that would harm fish. (Criteria: Washington State Water Quality Regulations.)
2. Release any fish stranded by the project into a flowing stream or open water.
3. Replant any stream bank or shoreline area if the project disturbs vegetative cover. Replanted trees, brush, or grasses shall resemble the type and density of surrounding growth, unless the special provisions permit otherwise.
4. Leave, when the work is complete, an open-water channel at the lowest level of any isolated pothole to connect it with the main body of water.
5. Prevent any fish-threatening silt buildup on the bed or bottom of any body of water.
6. Never block stream flow or fish passage.
7. Never remove gravel or other bottom material from the high-water flow channel bed of any stream or from the bottom of any other body of water, except as may be permitted by the special provisions.
8. Dispose of any project debris by removal, burning, or placement above high-water flows.

If the work in (1) through (3) above differs little from what the contract requires, the Contracting Agency will measure and pay for it at unit contract prices. But if contract items do not cover those areas, the Contracting Agency will pay pursuant to [Section 1-09.4](#). Work in (4) through (8) above will be incidental to contract pay items.

#### 1-07.5(3) State Department of Ecology

In doing the work, the Contractor shall:

1. Get a waste discharge permit from the Ecology Department before:
  - a. Washing aggregate; or
  - b. Discharging water from pit sites or excavations into a ground or surface waterway when the water contains turbidity, silt, or foreign materials.
2. Give the Project Engineer a copy of each waste discharge permit before the work begins.
3. Control drainage and erosion in a manner that reduces waterway pollution.
4. Perform work in such a manner that all materials and substances not specifically identified in the contract documents to be placed in the water do not enter waters of the State, including wetlands.
5. Use equipment that is free of external petroleum-based products.
6. Remove accumulations of soil and debris from drive mechanisms (wheels, tracks, tires) and undercarriage of equipment prior to using equipment below the ordinary high water line.
7. Clean loose dirt and debris from all materials placed below the ordinary high water line. No materials shall be placed below the ordinary high water line without the Engineer's approval.
8. Notify the Engineer and Ecology Department immediately should oil, chemicals, or sewage spill into waters of the State

#### **1-07.5(4) Air Quality**

The Contractor shall comply with all rules of local air pollution authorities. If there are none, air-quality rules of the State Department of Ecology shall govern the work. The Washington Clean Air Act requires that rock crushing, rock drilling, asphalt batch plants, and concrete plants receive an air quality permit in advance of the operation.

The air quality permit process may include additional State Environment Policy Act (SEPA) requirements. Contractors or operators should contact the appropriate air pollution control authority well in advance of intended start-up. The permit process may require up to 30 days.

When the work includes demolition of any existing facility, the Contractor shall comply with the requirements of the National Emission Standards for Asbestos. Any requirement included in state or Federal regulations on this subject that applies to the "owner or operator" shall be the responsibility of the Contractor.

#### **1-07.6 Permits and Licenses**

Contractors shall obtain all required permits and licenses and give any notices these call for.

The Contracting Agency will support the Contractor in efforts to obtain a temporary operating permit in its name if:

1. A local rule or an agency policy prevents issuing the permit to a private firm;
2. The Contractor takes all action to obtain the permit;
3. The permit will serve the public interest;
4. The permit applies only to work under the contract;
5. The Contractor agrees in writing: (a) to comply with all the issuing agency requires, and (b) to hold the Contracting Agency harmless for any work-related liability incurred under the permit; and
6. The permit costs the Contracting Agency nothing.

### **1-07.15 Temporary Water Pollution/Erosion Control**

In an effort to prevent, control, and stop water pollution and erosion within the project, thereby protecting the Work, nearby land, streams, and other bodies of water, the Contractor shall perform all Work in strict accordance with all Federal, State, and local laws and regulations governing waters of the State, as well as permits acquired for the project.

The Contractor shall perform all temporary water pollution/erosion control measures shown in the Plans, specified in the Special Provisions, proposed by the Contractor and approved by the Engineer, or ordered by the Engineer as Work proceeds.

#### **1-07.15(1) Spill Prevention, Control and Countermeasures Plan**

The Contractor shall prepare a project specific spill prevention, control and countermeasures (SPCC) plan to be used for the duration of the project. The plan shall be submitted to the Engineer prior to the commencement of any on site construction activities. The Contractor shall maintain a copy of the plan at the work site, including any necessary updates as the work progresses. If hazardous materials are encountered during construction, the Contractor shall do everything possible to control and contain the material until appropriate measures can be taken. Hazardous material, as referred to within this specification, is defined in RCW 70.105.010 under "Hazardous Substances". Occupational safety and health requirements that may pertain to SPCC planning are contained in but not limited to WAC 296-824 and WAC 296-843.

The SPCC plan shall address the following project-specific information:

##### **1. SPCC Plan Elements**

###### **A. Site Information**

Identify general site information useful in construction planning, recognizing potential sources of spills, and identifying personnel responsible for managing and implementing the plan.

###### **B. Project Site Description**

Identify staging, storage, maintenance, and refueling areas and their relationship to drainage pathways, waterways, and other sensitive areas. Specifically address:

- the Contractor's equipment maintenance, refueling, and cleaning activities.

· the Contractor's on site storage areas for hazardous materials.

#### C. Spill Prevention and Containment

For each of the locations identified in B, above, specifically address:

1. Spill prevention and containment measures to be used at each location.
2. The method of collecting and treating, or disposing of runoff from each location.
3. The method of diverting project runoff from each location.

#### D. Spill Response

Outline spill response procedures including assessment of the hazard, securing spill response and personal protective equipment, containing and eliminating the spill source, and mitigation, removal and disposal of the material.

#### E. Standby, On-Site, Material and Equipment

The plan shall identify the equipment and materials the Contractor will maintain on site to carry out the preventive and responsive measures for the items listed.

#### F. Reporting

The plan shall list all federal, state and local agency telephone numbers the Contractor must notify in the event of a spill.

#### G. Program Management

Identify site security measures, inspection procedures and personnel training procedures as they relate to spill prevention, containment, response, management and cleanup.

#### H. Preexisting Contamination

If pre-existing contamination in the project area is described elsewhere in the plans or specifications, the SPCC plan shall indicate measures the Contractor will take to conduct work without allowing release or further spreading of the materials.

#### I. Work Below the Ordinary High Water Line

Identify equipment that will be used below the ordinary high water line. Outline daily inspection and cleanup procedures that ensure equipment is free of all external petroleum-based products. Identify refueling procedures for equipment that cannot be moved from below the ordinary high water line.

#### 2. Attachments

- A. Site plan showing the locations identified in (1. B. and 1. C.) noted previously.
- B. Spill and Incident Report Forms, if any, that the Contractor will be using.

### **Implementation Requirements**

The Contractor shall implement prevention and containment measures identified in the SPCC plan prior to performing any of the following:

1. Placing materials or equipment in staging or storage areas
2. Equipment refueling
3. Equipment washing
4. Stockpiling contaminated materials

### **Payment**

The lump sum contract price for the "SPCC Plan" shall be full pay for:

1. All costs associated with creating the SPCC plan.
2. All costs associated with providing and maintaining on site standby materials and equipment described in the SPCC plan.
3. All costs associated with implementing the prevention and containment measures identified in the approved SPCC plan.

As to other costs associated with spills, the contractor may request payment as provided for in the Contract. No payment shall be made if the spill was caused by or resulted from the Contractor's operations, negligence or omissions.

### **1-07.16(4) Archaeological and Historical Objects**

Archaeological or historical objects, such as ruins, sites, buildings, artifacts, fossils, or other objects of antiquity that may have significance from a historical or scientific standpoint, which may be encountered by the Contractor, shall not be further disturbed.

The Contractor shall immediately notify the Engineer of any such finds. The Engineer will determine if the material is to be salvaged. The Contractor may be required to stop work in the vicinity of the discovery until such determination is made.

The Engineer may require the Contractor to suspend work in the vicinity of the discovery until salvage is accomplished. If the Engineer finds that the suspension of work in the vicinity of the discovery increases or decreases the cost or time required for performance of any part of the work under this contract, the Engineer will make an adjustment in payment or the time required for the performance of the work in accordance with [Sections 1-04.4](#) and [1-08.8](#).

### **1-08.4 Prosecution of Work**

The Contractor shall begin work within 10 calendar days from the date of execution of the contract by the Contracting Agency, unless otherwise approved in writing. The Contractor shall diligently pursue the work to the physical completion date within the time specified in the contract. Voluntary shutdown or slowing of operations by the Contractor shall not relieve the Contractor of the responsibility to complete the work within the time(s) specified in the contract.

### **2-01.3(1) Clearing**

The Contractor shall:

1. Fell trees only within the area to be cleared.



2. Close-cut parallel to the slope of the ground all stumps to be left in the cleared area outside the slope stakes.
3. Close cut all stumps that will be buried by fills 5-feet or less in depth.
4. Follow these requirements for all stumps that will be buried by fills deeper than 5-feet:
  - a. Close-cut stumps under 18-inches in diameter.
  - b. Trim stumps that exceed 18-inches in diameter to no more than 12-inches above original ground level.
5. Leave standing any trees or native growth indicated by the Engineer.
6. Trim all trees to be left standing to the height specified by the Engineer, neatly cutting all limbs close to the tree trunk.
7. Thin clumps of native growth as the Engineer may direct.
8. Protect, by fencing if necessary, all trees or native growth from any damage caused by construction operations.

#### **8-01.3(1) General**

Controlling pollution, erosion, runoff, and related damage requires the Contractor to perform temporary work items including but not limited to:

1. Providing ditches, berms, culverts, and other measures to control surface water;
2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows;
3. Controlling underground water found during construction; or
4. Covering or otherwise protecting slopes until permanent erosion-control measures are working.

To the degree possible, the Contractor shall coordinate this temporary work with permanent drainage and erosion control work the contract requires.

The Engineer may require additional temporary control measures if it appears pollution or erosion may result from weather, the nature of the materials, or progress on the work.

When natural elements rut or erode the slope, the Contractor shall restore and repair the damage with the eroded material where possible, and clean up any remaining material in ditches and culverts. When the Engineer orders replacement with additional or other materials, unit contract prices will cover the quantities needed.

If the Engineer anticipates water pollution or erosion, the Contractor shall schedule the work so that grading and erosion control immediately follows clearing and grubbing.

The Engineer may also require erosion control work to be done with or immediately after grading. Clearing, grubbing, excavation, borrow, or fill within the right of way shall never

expose more erodible earth than as listed below, without written approval by the Engineer:

17 Acres April 1 - October 31 East of the Summit of the Cascade Range

May 1 - September 30 West of the Summit of the Cascade Range

5 Acres November 1 - March 31 East of the Summit of the Cascade Range

October 1 - April 30 West of the Summit of the Cascade Range

The Engineer may increase or decrease the limits in light of project conditions. Erodible earth is defined as any surface where soils, grindings, or other materials are capable of being displaced and transported by rain, wind, or surface water runoff. In western Washington, erodible soil not being worked, whether at final grade or not, shall be covered within the following time period, using an approved soil covering practice, unless authorized otherwise by the Engineer:

October 1 through April 30 - 2 days maximum

May 1 to September 30 - 7 days maximum

If the Engineer, under [Section 1-08.6](#), orders the work suspended for an extended time, the Contractor shall, before the Contracting Agency assumes maintenance responsibility, make every effort to control erosion, pollution, and runoff during shutdown. [Section 1-08.7](#) describes the Contracting Agency's responsibility in such cases. Nothing in this section shall relieve the Contractor from complying with other contract requirements.

### **8-01.3(1)A Submittals**

When a temporary erosion and sediment control (TESC) plan is included in the plans, the Contractor shall either adopt or modify the existing TESC plan. The Contractor shall provide a schedule for TESC plan implementation and incorporate it into the Contractor's progress schedule. The Contractor shall obtain the Engineer's approval of the TESC plan and schedule before any work begins. The TESC plan shall cover all areas the Contractor's work may affect inside and outside the limits of the project (including all Contracting Agency-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water).

The Contractor shall allow at least five working days for the Engineer's review of any original or revised plan. Failure to approve all or part of any such plan shall not make the Contracting Agency liable to the Contractor for any work delays.

### **8-01.3(1)B Erosion and Sediment Control (ESC) Lead**

The Contractor shall identify the ESC Lead at the preconstruction discussions.

The ESC Lead shall have, for the life of the contract, a current Certificate of Training in Construction Site Erosion and Sediment Control from a course approved by WSDOT's Statewide Erosion Control Coordinator.

The ESC Lead shall implement the Temporary Erosion and Sediment Control (TESC) plan. Implementation shall include, but is not limited to:

1. Installing and maintaining all temporary erosion and sediment control Best Management Practices (BMPs) included in the TESC plan to assure continued performance of their intended function. Damaged or inadequate TESC BMPs shall be corrected immediately.
2. Inspecting all on-site erosion and sediment control BMPs at least once every five working days and each working day there is a runoff event. Inspections shall occur within 24 hours of the runoff event. A TESC Inspection Report shall be prepared for each inspection and shall be included in the TESC file. A copy of each TESC Inspection Report shall be submitted to the Engineer no later than the end of the next working day following the inspection. The report shall include, but not be limited to:
  - a. When, where and how BMPs were installed, maintained, modified, and removed;
  - b. Observations of BMP effectiveness and proper placement;
  - c. Recommendations for improving future BMP performance with upgraded or replacement BMPs when inspections reveal TESC plan inadequacies.
3. Updating and maintaining a TESC file on site that includes, but is not limited to:
  - a. TESC Inspection Reports.
  - b. Temporary Erosion and Sediment Control (TESC) plan narrative.
  - c. National Pollutant Discharge Elimination System construction permit (Notice of Intent).
  - d. Other applicable permits.

Upon request, the file shall be provided to the Engineer for review.

### **8-01.3(1)C Water Management**

#### **1. Ground Water**

When ground water is encountered in an excavation, it shall be treated and discharged as follows:

- a. When the ground water conforms to Water Quality Standards for Surface Waters of the State of Washington (Chapter 173-201A WAC), it may bypass detention and treatment facilities and be routed directly to its normal discharge point at a rate and method that will not cause erosion.
- b. When the turbidity of the ground water is similar to the turbidity of the site runoff, the ground water may be treated using the same detention and treatment facilities being used to treat the site runoff and then discharged at a rate that will not cause erosion.
- c. When the turbidity is greater than the turbidity of the site runoff, the ground water shall be treated separately until the turbidity is similar to or better than the site runoff, and then may be combined and treated as in B, above.

#### **2. Process Water**

All water generated on site from construction or washing activities that is more turbid than site runoff shall be treated separately until the turbidity is the same or less than the site runoff, and then may be combined and treated as in 1B, above. Water may be infiltrated upon the approval of the Engineer.

### 3. Offsite Water

The Contractor shall, prior to disruption of the normal watercourse, intercept the offsite stormwater and pipe it either through or around the project site. This water shall not be combined with onsite stormwater and shall be discharged at its pre-construction outfall point in such a manner that there is no increase in erosion below the site. The method for performing this work shall be submitted by the Contractor for the Engineer's approval.

## Connecticut DOT Contract General Provisions

### Connecticut DOT – Section 1.10, Environmental Compliance<sup>72</sup>

1.10.01--General: This Section of the Standard Specifications for Roads, Bridges and Incidental Construction is provided to identify those construction activities or other activities under the Department's control or jurisdiction which may have a negative effect on the environment, including the State's native waters and natural resources, and to prevent or minimize any damage to the environment which might result from such activities, both during and following the completion of any transportation Project.

The Contractor shall be bound to comply with all requirements of permits and permit applications, as though the Contractor were the permittee. If at the time the permit is received, its contents differ from that which is outlined in the application, the permit shall govern. Should the permit be received after the receipt of bids and the permit requirements significantly change the character of the work, adjustment will be made to the Contract in accordance with the appropriate articles in Section 1.04. The requirements and conditions set forth in the permit and permit application shall be binding on the Contractor just as any other specification would be.

This Section reinforces those environmental protection requirements which the Contractor is bound to meet under the terms of the Contract, or under Federal or State laws and regulations. If a Contractor fails to comply with environmental provisions of the Contract or law, the Contractor shall be penalized as provided in this Section and as provided elsewhere in this Contract.

1.10.02--Compliance with Laws and Regulations: The Contractor shall at all times conduct his operations in conformity with all Federal and State permit requirements concerning water, air, or noise pollution or the disposal of contaminated or hazardous materials. Permit requirements include, but are not limited to those established by federal regulations administered by the United States Coast Guard and the U.S. Army Corps of Engineers.

Appropriate permits shall be required for all activities associated with or incidental to the Contractor's operations including, but not limited to, those on the Project site and in all adjacent areas, waste and disposal areas, borrow and gravel banks, storage areas, haul roads, access roads, detours, field offices, and any other temporary staging areas.

The Contractor shall be responsible for, and hold the State harmless from, any penalties or fines which may be assessed by any authority due to the Contractor's failure to comply with the terms of all applicable permit requirements.

The Department will submit all applications and obtain all permits required for Contract work within the limits shown on the plans or identified elsewhere in the Contract documents.

Any request by the Contractor for authorization of activities or methods not specifically called for by the Contract, plans, applications submitted or applicable permits issued for the Project must be submitted by the Contractor in writing to the Engineer, and must include a detailed description of the proposed activities or methods, the justification for those activities and supporting documentation showing that the proposed activity or

method will not create risks of damage to the environment. If such proposal is accepted by the Engineer, the Department will process an application to the appropriate regulatory agency or agencies for any permit amendment, modification, revision or new permit required for the Contractor to carry out the additional activities or implement the changed methods on the Project. The Department does not, however, guarantee that it will be able to obtain the desired permit amendment, modification or revision, and the Department will not be liable for the effects of any inability to do so. No extension of time will be granted as a result of the Contractor's request to perform work not authorized as part of the established permit requirements. If the amendment, modification, or revision of the permit is not necessary for the Contractor to perform the work as required by the original Contract or as subsequently ordered by the Engineer, then no claim may be made by the Contractor based on the amount of time taken by the Department to review the Contractor's proposal, or to apply for or secure the permit amendment, modification or revision. No such proposed additional activity shall commence, nor shall such a changed method be implemented until and unless the Engineer approves in writing the Contractor's request.

In case of failure on the part of the Contractor to perform pollution control work as determined by the Engineer, the Engineer may, upon 24 hours written notice, arrange for the performance of the work by approved forces and the cost thereof will be deducted from any monies due or which may become due the Contractor under the Contract or under any other State contract.

1.10.03--Water Pollution Control: (a) The Contractor shall, throughout the life of the contract, control and abate siltation, sedimentation and pollution of all waters, under ground water systems, inland wetlands, and tidal, coastal or navigable waters for work appearing on the plans. Temporary construction methods proposed by the Contractor shall also conform to all application or permit requirements. The Contractor shall assume responsibility for all obligations and costs incurred under the terms and conditions of such permit applications or permits.

The Contractor shall obtain any permits and pay any fees required for the performance of work which is not included in the original Contract or which is to be done outside the Project limits but which is proposed in the fulfillment of his Contract obligations including, but not limited to, the removal of material from, deposition of materials in, obstruction of, construction within, alteration or pollution of any inland wetland, tidal wetland, coastal or navigable water, streams, ponds, lakes, water supplies or other water bodies.

(b) The following items may be superseded by specific permits from DEP. The Contractor shall not make any design changes in the Contract work which requires a variance from the requirements of the following items until and unless the Contractor has first submitted a detailed written proposal for such changes to the Engineer for review by the Department and for transmittal to and review by the DEP, and then received written approval from the Department of the proposed variances.

### **Best Management Practices**

1. No construction shall proceed until erosion and sedimentation control plans, prepared by the Contractor, have been submitted in writing and approved by the Engineer, and until such controls have been installed as the Engineer directs. Such plans shall be consistent with the Connecticut Council On Soil & Water Conservation document "Connecticut Guidelines for Soil Erosion and Sediment Control," as revised, which is

available from DEP, and with the Department document "On Site Mitigation for Construction Activities," as revised.

2. Refueling of equipment or machinery within 8 m of any wetland or watercourse shall be allowed only with the approval of the Engineer.
3. No construction shall proceed until a written proposal of methods to prevent construction debris, paint, spent blast materials, or other materials from entering the wetland or watercourse has been submitted by the Contractor to the Engineer and approved by the Engineer, and such methods have been implemented as the Engineer directs. These materials shall be collected and disposed of in an environmentally safe manner in accordance with all applicable Federal and State laws and regulations. The Engineer may order the Contractor to cease such activity temporarily if, in the judgment of the Engineer, wind or storm conditions threaten to cause the deposit of such materials into a waterway.
4. No materials resulting from construction activities shall be placed in or allowed to contribute to the degradation of an adjacent wetland or watercourse. Disposal of any material shall be in accordance with Connecticut General Statutes, including, but not limited to, Sections 22a-207 through 22a-209.
5. Forging of streams with equipment shall be prohibited, except as approved by the Engineer. Such equipment travel shall be minimized. Where frequent equipment travel on stream banks and beds is necessary, washed stone shall be placed to minimize erosion, scour, and turbidity, provided no significant grade change will be required for any haul road or temporary structure placed in wetlands or watercourses in accordance with provisions established under Section 1.10.02.
6. All off-site disposal locations for material and debris resulting from the progress of the Project shall be submitted in writing to the Engineer who shall determine whether or not they are acceptable. The Contractor shall ensure that these locations are outside of designated wetlands or watercourses, unless otherwise approved by local, state, or federal agencies with jurisdiction over the matter.
7. A construction sequencing plan and a water handling plan including a contingency plan for flood events must be submitted in writing to the Engineer and approved by the Engineer prior to the commencement of any construction in a waterway. Water shall be kept deep enough in the channel to allow for the passage of fish and the continuous flow of the watercourse as required by the Engineer.
8. When dewatering is necessary, pumps shall not discharge directly into the wetland or watercourse. Prior to dewatering, the Contractor must submit to the Engineer a written proposal for specific methods and devices to be used, and obtain the Engineer's approval of such methods and devices to be used for dewatering activities, including, but not limited to, pumping the water into a temporary sedimentation bowl, providing surge protection at the inlet and outlet of pumps, or floating the intake of the pump, or other methods to minimize and retain the suspended solids. If the Engineer determines that the pumping operation is causing turbidity problems, said operation shall cease until such time as a means of controlling turbidity is submitted by the Contractor, approved by the Engineer and implemented by the Contractor.
9. Work within or adjacent to watercourses shall be conducted during periods of low flow, whenever possible. The Engineer shall remain aware of flow conditions during the

conduct of such work, and shall cause such activity to cease should flow conditions threaten to cause excessive erosion, siltation or turbidity. The Contractor shall make every effort to secure the work site before predicted major storms. A major storm shall be defined as a storm predicted by NOAA Weather Service with warnings of flooding, severe thunderstorms, or similarly severe weather conditions or effects.

10. All temporary fill shall be stabilized during use to prevent erosion and shall be suitably contained to prevent sediment or other particulate matter from reentering a wetland or watercourse. All areas affected by temporary fills must be restored to their original contours or as directed by the Engineer, and revegetated. The areal extent of temporary fill or excavation shall be confined to that area necessary to perform the work, as approved by the Engineer.

11. Seeding is to be accomplished within 7 days of the Contractor's reaching an appropriate grading increment as determined by the Engineer. If the Engineer anticipates and notifies the Contractor, or if the Contractor intends, that a grading operation will be suspended for a period of 30 or more consecutive days, the Contractor shall, within the first 7 days of that suspension period, accomplish seeding, or take such other appropriate measures to stabilize the soil as may be required by the Engineer.

12. Dumping of oil, chemicals or other deleterious materials on the ground is forbidden. The Contractor shall provide a means of catching, retaining, and properly disposing of drained oil, removed oil filters, or other deleterious material. All spills of such materials shall be reported immediately by the Contractor to the DEP.

13. No application of herbicides or pesticides within 8 m of any wetland or watercourse will be allowed. All such applications must be done by a Connecticut licensed applicator. The Contractor shall submit to the Engineer the proposed applicator's name and license number, and must receive the Engineer's approval of the proposed applicator, before such application is carried out.

14. During spawning seasons, as defined in the Contract, discharges and construction activities in spawning areas of State Waters shall be restricted so as not to disturb or inhibit aquatic species which are indigenous to the waters.

If the Contractor wants to make changes in construction operations or scheduling which would affect the use of or necessity for any pollution controls, before beginning to implement those changes it must submit a written proposal detailing them to the Engineer, and must receive the Engineer's approval of those changes. As part of its submission the Contractor must submit a plan showing what erosion and sedimentation controls above and beyond those called for in the plans and specifications would be necessitated by the changes it proposes to make in the sequence or nature of Project construction activities and related operations.

The Contractor shall inspect temporary and permanent erosion and sedimentation controls immediately after each rainfall and at least daily during prolonged rainfall. The Contractor shall maintain all erosion and sedimentation control devices in a functional condition in accordance with the document "Connecticut Guidelines for Soil Erosion and Sediment Control," as revised, and the Department's document "On Site Mitigation for Construction Activities," as revised. In the event the Contractor fails to maintain such devices in accordance with such documents, and the Contractor does not correct those failures within 24 hours after receipt of written notice of such failures from the Engineer, the Department may proceed with its own or other forces to remedy specified failure and



the cost thereof will be deducted from monies due the Contractor under the Contract or under any other State contract.

1.10.04--Air Quality Control: The Contractor shall exercise every reasonable precaution throughout the life of the Contract to safeguard the air resources of the State by controlling or abating air pollution in accordance with the DEP's regulations. These measures shall include the control and abatement of dust, mist, smoke, vapor, gas, aerosol, other particulate matter, odorous substances or any combination thereof arising from construction operations, hauling, storage, or manufacture of materials.

1.10.05--Noise Pollution: The Contractor shall take measures to control the noise intensity caused by his construction operations and equipment, including but not limited to equipment used for drilling, pile driving, blasting, excavation or hauling. All methods and devices employed to minimize noise shall be subject to the continuing approval of the Engineer.

The maximum allowable level of noise at the nearest residence or occupied building shall be 90 decibels on the "A" weighted scale (dBA). Any operation that exceeds this standard will cease until a different construction methodology is developed to allow the work to proceed within the 90 dBA limit.

1.10.06--Protection of Archaeological and Paleontological Remains and Materials: The Contractor shall be alert to the likelihood that, during the prosecution of the work, archaeological or paleontological remains and materials which may be of significance in recording the historic and prehistoric past may be uncovered. When archaeological or paleontological remains are uncovered, the Contractor shall immediately halt operations in the discovery location and shall notify the Engineer. The Contractor shall make every effort to preserve archaeological or paleontological remains intact in their original positions in order to preserve the archaeological or paleontological importance of materials in relation to one another and to the enclosing soil.

The Engineer shall have the authority to suspend the work for the purpose of preserving, documenting and recovering the remains and materials of archaeological or paleontological importance for the State. The Contractor shall carry out all instructions of the Engineer for the protection of archaeological or paleontological remains, including steps to protect the site from vandalism and unauthorized investigations, from accidental damage and from dangers such as heavy rainfall or runoff. The Contractor shall reschedule its work to minimize the loss of time in completing the Project while the State evaluates, records and salvages the archaeological or paleontological information and materials.

Extra work ordered by the Engineer in this connection will be paid for in accordance with Articles 1.04.05 and 1.09.04. Enforced delays caused by archaeological or paleontological preservation and protection, which the Contractor demonstrates have delayed completion of the Project, will be treated under the provisions for extension of time, Article 1.08.08.

1.10.07--Contaminated and/or Hazardous Material: The Department will acquire any "Hazardous Waste Generator Permit(s)" required under the Resource Conservation and Recovery Act, for the management and disposal of all contaminated and/or hazardous material known to exist or discovered during construction operations, provided that:

1. such material is within the construction limits defined in the Contract, and;

2. such material is not comprised of waste materials generated by the Contractor.

If the Department has defined an area of known or suspected contamination within the Project limits, and if contaminated material in that area has not been removed prior to the start of the Project, the disposition of such material shall be arranged for with an appropriate party.

In the event that the Contractor encounters or exposes any material, not previously known or suspected to be contaminated, but which exhibits abnormal properties which may indicate the presence of hazardous or contaminated material, the Contractor shall cease all operations in the vicinity of the abnormal condition, and the Engineer shall be notified immediately. The presence of barrels, discolored earth, metal, wood, visible fumes or smoke, abnormal odors or excessively hot earth may indicate the presence of hazardous or contaminated material, and shall be treated with extreme caution. The proper disposition of the material shall be arranged for with an appropriate party.

Unless otherwise provided for under a specific Contract item, direct Contractor involvement with hazardous or contaminated materials, other than those associated with Contract operations, is neither required nor solicited under this Contract. When the Contractor performs support work incidental to the removal, treatment or disposal of hazardous or contaminated material, payment will be made at the unit prices for applicable pay items in the Contract. When the Contract does not include appropriate pay items, payment will be made in accordance with Article 1.04.05 – Extra Work.

The Contractor shall faithfully observe all security precautions established pursuant to OSHA 29 CFR 1919.120, including all revisions and amendments, and shall not work in any area known to contain or suspected of containing hazardous or contaminated material without prior written approval of the Engineer. The Contractor will assume sole responsibility for the proper storage, handling, management and disposal of all regulated materials and wastes associated with the Contractor's operations, including, but not limited to; lubricants, antifreeze, engine fluids, paints, and solvents. All costs associated with the Contractor's failure to properly manage such materials in accordance with federal and state regulations, and all remedial and punitive costs incurred by the Department as a result of such failure will be borne by the Contractor. Excluded from the requirements under this article are coatings removed by the Contractor for the purpose of painting structural steel or other steel elements. The debris resulting from paint removal shall be tested by the Department to determine whether or not it is contaminated or hazardous material. Once so tested, these materials shall be removed from the site and disposed of by the Contractor in accordance with applicable special provisions.

## Wyoming - General Provisions – Environmental Requirements

### SECTION 111

#### ENVIRONMENTAL REQUIREMENTS

111.01 Surface Water Environment. The work shown on the plans and in the contract shall be completed with a minimal effect on all surface waters. With the acceptance of the contract, the Contractor agrees to conform to the requirements of all statutes, rules, and regulations concerning activities to minimize environmental damage and health concerns. Some of these laws and regulations, but not inclusive, are the Federal Water Pollution Control Act (33 U.S.C. 1251), Clean Air Act (42 U.S.C. 1857), Clean Water Act (33 U.S.C. 1341) and Wyoming Environmental Quality Act (35-11) and amendments to these statutes. The Contractor shall furnish a work plan showing the methods of diverting any surface water, temporary stream crossings, cofferdams, dewatering systems, or any other activity encroaching on surface waters and wetlands or affecting water quality. Work in surface waters and wetlands shall not commence until a satisfactory plan has been submitted. All work shall be done in such a way as to minimize or eliminate water pollution of surface water and wetlands and to minimize soil erosion caused by construction activities. The Contractor shall cooperate and make corrections and changes in the work to be in compliance with the regulatory requirements. The Contractor shall promptly notify the Engineer of any notices or complaints received that indicate noncompliance with any pollution or erosion control requirement. The Contractor shall cooperate with any inspections by Federal or State agencies to determine the status of the project with regards to all environmental issues. The Contractor shall comply with any work restrictions such as for fish migration, fowl nesting, and all protective periods listed in the Contract. Fish trapped by temporary fills, culverts, or other work shall be immediately released into the adjacent unrestricted or open surface waters.

111.02 Surface Water and Wetlands. When it is necessary for the Contractor to work in or adjacent to any surface waters or wetlands, it shall be done with a minimum of construction.

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