

**Center for Environmental Excellence by AASHTO  
Stormwater Management Community of Practice (CoP)**

**STATE-OF-THE-PRACTICE REPORT:  
Stormwater Program Effectiveness Assessment**

**July 2012**



## **ACKNOWLEDGMENTS**

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## **DISCLAIMER**

This State-of-the-Practice Report summarizes the discussions of Stormwater Management Community of Practice members who spoke as individual members of the community and did not necessarily represent their agency's views or positions. In addition, the contents of the report do not necessarily represent the views or positions of AASHTO or the Center for Environmental Excellence.

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## EXECUTIVE SUMMARY

This Community of Practice (CoP) report includes an overview of the State-of-the-Practice for Program Effectiveness Assessment (PEA). Program Effectiveness Assessment is a process of evaluating how well a Department of Transportation (DOT) stormwater program is meeting its objectives and determining what modifications they need for improvement.

### Metrics Used to Define Effectiveness

PEAs are used by DOTs to measure the performance and effectiveness of their stormwater management programs. By conducting a comprehensive assessment strategy, managers can determine what tools are necessary to adjust their programs to use the highest-performing activities, including non-structural and source control best management practices (BMPs), including judicious use of treatment controls, to improve their programs' stormwater management practices.

DOTs generally reported that the effectiveness of their stormwater programs were consistent with the requirements of their municipal separate storm sewer (MS4) permits. Each DOT had its own unique program and methodology of PEA. Among the methods used were real-time data collection systems to measure specific performance parameters; regularly scheduled inspections; measurement of individual performance objectives; application of post-construction metrics; evaluation of levels of service using grades; field sampling; inventories; runoff characterization; use of environmental management systems; periodic progress reporting; and, in some cases, just following the dictates of the MS4 permit.

Barriers affecting the ability of DOTs to perform effectiveness assessments of their stormwater programs include the large number of environmental inputs; difficulty measuring outfall and receiving water quality, and the effects of source controls; defining target audiences; dealing with sources of pollution not under the DOT's control; characterization of complex discharges; and overall limited resources for program implementation.

It was generally agreed that long-term stormwater program costs for the DOT could be reduced by prioritizing the use of a well thought-out PEA.

### Audits: Primary Lessons Learned

The U.S. Environmental Protection Agency (EPA) or state agencies with Clean Water Act authority delegated by the EPA may conduct audits of DOTs to assess compliance with their NPDES permits pursuant to the authority vested in the Administrator of the EPA. The EPA grants authority to states for inspections, monitoring and entry relative to determining compliance with an NPDES permit. Audits are generally carried out by EPA staff, and they may include the services of an EPA contractor, as well as representatives from the State department charged with environmental compliance, especially in the case where the state has been delegated authority for implementation of the CWA. After an inspection, if the audit determines that the DOT does not comply with the requirements of its NPDES Permit, an Order for Compliance may be issued, requiring that the DOT take corrective action and prepare a compliance schedule for completion.

DOTs that have undergone an EPA audit include Arizona, California, Delaware, Hawaii, Minnesota, Nevada, New York State, Pennsylvania, and Washington. Colorado has had a State audit, and an EPA audit is pending.

Overall lessons learned from the EPA audit process include primarily preparation for the audit. The DOT should be able to convey the importance of statewide consistency in program implementation. DOT staff must be made available to verify knowledge of their DOT's stormwater program, how it operates, location of key construction and maintenance sites, and an understanding of best management practices (BMPs) in operation. DOT staff should be attuned to the training and communication process, i.e., how the DOT communicates from the top (executive management) down (personnel in the field). The DOT should be able to provide assurance to the auditing body of the DOT's ability and capacity to correct any deficiencies in a timely manner.

### **Best Structure for a DOT Stormwater Program**

DOT stormwater programs are housed generally in design, project delivery or environmental divisions. For smaller DOT stormwater programs, the responsible party for permitting is often the chief engineer. Several DOTs have some form of a steering committee, cross-functional teams, or a policy committee to assist in administering the stormwater program across functional divisions. Based on the discussion, the two main DOT stormwater management organizational models include (1) the committee structure, which works on a cooperative basis to implement the program on a "volunteer" basis and (2) the hierarchical structure, where certain people who have authority rights at the top of the organization. These two models work with various efficacies, depending on personalities and the amount of pressure the program is under.

Some DOTs also fund positions at the regulatory agency to improve service and response time, and improve the technical understanding of the unique conditions DOTs face in design and operation of their facilities. DOT stormwater programs that have a formal lead, with a position relatively high in the hierarchy of the organization appear to have the best communication with the regulatory agency. Strategies that integrate responsibility for implementation of the stormwater program appear to be the most successful by creating ownership throughout the organization.

## **INTRODUCTION\***

The Center for Environmental Excellence by AASHTO has established a Stormwater Management Community of Practice (CoP). The purpose of the Stormwater Management CoP is to create a forum where State Department of Transportation (DOT) practitioners can engage in facilitated discussions on emerging issues, research data needs, and innovative stormwater quality compliance solutions. The CoP has two primary goals, the first of which is to extend each state DOT's network and contacts, enabling them to share experiences and engage in technology transfer. The second goal is to develop a State-of-the-Practice Report (this document) on a selected focus topic. The Stormwater Management CoP consists of representatives from 16 state DOTs, and the Federal Highway Administration (FHWA). The Stormwater Management CoP members agreed that the Program Effectiveness Assessment (PEA) should be the top priority for this phase of the CoP.

This State-of-the-Practice discusses Program Effectiveness Assessment strategies and tools DOTs will need to evaluate and identify deficiencies in their stormwater management programs, overcome these deficiencies and other obstacles, and improve their stormwater management programs. This report also discusses DOT stormwater program audits lessons learned.

## **PROGRAM EFFECTIVENESS ASSESSMENT**

### ***Background***

Program Effectiveness Assessment is the act of evaluating how well a DOT stormwater program is meeting its objectives, and more importantly, identifying modifications to improve them. The municipal separate storm sewer system (MS4) program is set up as an iterative process, based on continuous program improvement through evaluation of performance metrics. A comprehensive assessment strategy can provide managers the tools to focus their program on high-performing activities, and to determine whether results are being achieved efficiently and cost-effectively. The ultimate goal is to translate stormwater program activities into improvement in the conditions in runoff and receiving waters. Effectiveness assessment is a difficult process due to the sheer number of environmental inputs and the difficulty in discerning marginal improvement in outfall and receiving water quality. The assessment of pollution sources is the first and most important step in the assessment process.

DOT stormwater programs categorically address most major sources of stormwater pollution, including construction sites, roadway runoff, operations, illicit discharges and illegal connections, and trash and litter. Few of the sources of pollution are under the direct control of a DOT, however. Successful implementation of many elements depends on the unique behavioral responses of the people to whom they are directed. Programs and target audiences must be well defined and the program refined as information on response is obtained.

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Another feature of DOT programs is that they tend to focus predominantly on the use of non-structural or source control best management practices (BMPs), e.g., good housekeeping practices at maintenance facilities and during highway operations, pesticide use reduction, and public litter pickup/prevention campaigns. Treatment controls are also important, but DOTs must prioritize the use for critical areas. Source controls is also an effective BMP with the least cost, but their effect can often be difficult to measure, the individual impact of many of them is negligible, and it is difficult to paint a clear picture of their collective performance.

DOTs must also consider the overall characteristics of discharges within and from their MS4s. Aerial deposition can introduce pollutants from outside of the right-of-way, and runoff to the DOT system can carry pollutants. DOTs must focus on the sources that they can most effectively control, as well as those constituents that are causing the most environmental damage in the watershed. This places a high importance on effectiveness assessment but also increases the complexity of the task many-fold.

## ***Discussion***

### ***Metrics Used to Define Effectiveness***

The Community of Practice teleconferences on PEA were designed to determine the primary areas DOT stormwater programs are focusing on for water quality improvement. Successful effectiveness assessment techniques were the focus of the discussion with the objective of transferring effective program approaches to other DOTs.

DOTs generally report the effectiveness of their programs consistent with the requirements of their MS4 Permit. General requirements include mass emissions and receiving water data, data on litter pickup, progress on total maximum daily loads (TMDLs) (if any), illicit discharge and illegal dumping information and information on public education programs. Some DOTs have unique programs or reporting methods that will be discussed by state.

### **California DOT**

California DOT (Caltrans) has adopted the California Stormwater Quality Association™ (CASQA) approach to assessing program effectiveness<sup>1</sup>. The six program effectiveness assessment (PEA) outcome levels describe and categorize the desired goals and results for each stage of the program. To determine the effectiveness of the overall Stormwater Management Program, Caltrans conducts an effectiveness assessment for each primary program element. The assessment is contained in the Caltrans Stormwater Management Program Annual Report. The program effectiveness assessment is conducted for implementation of program tasks (Level 1); increased awareness of program requirements among targeted audiences (Level 2); behavior change (Level 3); and decreased pollutant loads (Level 4). A summary of each level of analysis is provided below.




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<sup>1</sup> Per the CASQA Municipal Stormwater Program Effectiveness Assessment Guidance, May 2007



### Outcome Level 1 (Program Implementation)

Caltrans conducts an outcome level 1 assessment for each major program element. The analysis is designed to show that Caltrans successfully implements the components of its Statewide Stormwater Management Plan (SWMP). Some of the key SWMP program areas and outputs assessed include:

- District Work Plans – The Districts implement District Work Plans (DWPs) that support SWMP goals. The effectiveness assessment reports the percentage of the defined activities that were initiated and/or completed.
- Airspace leases – Caltrans documents that new or renewed airspace leases include stormwater language for compliance with the SWMP. The effectiveness assessment tracks the number of leases that include stormwater language.
- Local Agency Coordination – Caltrans coordinates with local agencies to effectively and consistently communicate stormwater issues, track key technical issues and implement the SWMP and TMDLs. The effectiveness assessment tracks the number of coordination meetings held with local agencies.
- BMP Evaluation – Caltrans evaluates permanent BMPs for implementation at all of its projects and documents the evaluation process in its Stormwater Data Reports (SWDR). The effectiveness assessment tracks the number of BMPs included with capital projects.
- Pre-construction meetings – The Districts hold pre-construction meetings for all construction projects that require a Stormwater Pollution Prevention Plan. The effectiveness assessment tracks the number of projects and pre-construction meetings held.
- Drainage facility inspection and cleaning – The Caltrans SWMP requires drain inlets to be inspected and cleaned if necessary. The effectiveness assessment documents the number of inlets inspected and cleaned annually.
- Maintenance Facilities – Caltrans documents the inspection of maintenance facilities, as well as corrective actions noted in the inspections.
- Training – Caltrans trains its employees, providing overall and task-level training for the planning and design, construction, and maintenance functional groups, and tracks the number and type of training courses held as a part of the effectiveness assessment.
- TMDLs – Caltrans participated in compliance for over 50 developing total maximum daily loads (TMDLs) and implemented compliance measures for nearly 40 TMDLs. Caltrans documents completion of TMDL-related activities, including water quality studies, collaboration with other stakeholders, inspections, and implementation projects as a part of the Level 1 effectiveness assessment.

### Outcome Level 2 (Knowledge and Awareness)

Caltrans conducts an outcome level 2 assessment for Project Delivery, Training, and Public Education. Key item:

- Documenting implementation of Stormwater Pollution Prevention Plans (SWPPPs) and Water Pollution Control Plans (WPCPs) for construction projects

### Outcome Level 3 (Behavior Change)

Caltrans conducts an outcome Level 3 assessment for Project Delivery and Maintenance. It shows whether several of the SWMP programs have resulted in significant behavior change (e.g., increased implementation of BMPs, decreased number of problems reported, etc.). Some key program findings include:

- The overall direction of stormwater management compliance and BMP implementation is positive. Caltrans has effectively decreased the number of construction sites with major or critical deficiencies during both dry and wet seasons, indicating increased awareness and behavior change.
- The number of maintenance facilities in compliance remains high, indicating that the necessary BMPs are being implemented and maintained.

### Outcome Level 4 (Load Reduction)

Caltrans conducts an outcome Level 4 assessment for several program elements, demonstrating a significant decrease in pollutant loadings to the storm drain system. Some of the key program findings include:

- Caltrans documents a decrease in potential pollutant loadings to the storm drain system and local waterways as part of its landscaping program. This finding is supported by tracking the applied herbicide active ingredient over time, showing a reduction in the total amount of herbicides applied since the baseline year.
- Caltrans documents the results of the Adopt-A-Highway program through an estimate of the cubic yards of materials from the highways that potentially could have ended up in storm drains and/or receiving waters
- Caltrans tracks compliance with TMDLs, such as achieving 67% of the 70% reduction goal in trash for the Ballona Creek Trash TMDL and 48% of the 60% reduction goal in trash for the Los Angeles Trash TMDL, using both structural and non-structural BMPs.
- Caltrans tracks the use of other BMPs, such as sweeping and cleaning of sand traps and catch basins, to recapture traction sand, decreasing the amount of these materials applied and reducing the amount of material that could potentially end up in the storm drain system and/or local waterways.

### Colorado DOT

Colorado DOT (CDOT) developed a software application to collect compliance data real-time on construction projects. Annually, CDOT reviews its program objectives, how the inspection results demonstrate program effectiveness for the DOT, and then determines what modifications to the program the regulator will accept. Under the construction sites program, CDOT looks at the most prevalent types of noncompliance, and the risk those findings pose for a non-compliant discharge. CDOT developed an inspection tool that correlates with the specifications, rules and regulations. Currently there are almost 2,000 potential findings available to the inspector on a project. The following is information relative to the inspection protocols for construction projects and post-construction BMPs for CDOT.

### Frequency/Category of Inspections

- Daily – Erosion Control Supervisor (ECS)
- 14-Day – Project Engineer/ECS
- Post-Storm – Project Engineer/ECS
- Monthly – Water Pollution Control Manager (WPCM)
  - Inspection results are recorded in the Erosion and Sediment Control Assessment Notebook (ESCAN) for automated report generation and tracking
- Periodic (10 per Region per year) – Region Erosion Control Assessment Team (RECAT)
- Individual Performance Objectives (IPO) – Related to number or percentage of noncompliant findings identified during inspections (optional)

### Responses to Findings

- Chief Engineers Objective 6B – 100% of noncompliant findings addressed within 48 hours
- Documentation of response uploaded into the Corrective Action Response Log (CARL) and verified by the WPCM

### Reporting

- Monthly to Chief Engineer and Regional Planning and Environmental Managers – number of findings and time required to address findings
- Quarterly to Chief Engineer and Regional Planning and Environmental Managers – number of findings and time to address findings with trend and project risk analysis
- Semi-annual to State Regulatory Authority – number of findings, documentation of responses to findings, time to address findings with trend and programmatic strengths/weakness analysis

### Post-Construction Metrics

- New Development/Re-Development as designed project analysis to determine the Permanent Water Quality Structure (PWQS) requirement
- As built certification submitted with plans by Contractor
- Final Walkthrough Inspection – Maintenance Manuals developed
- Annual Inspections – Recorded in the Stormwater Inspection Tool (SWIT) and results sent to Maintenance
- Maintenance performed and costs/labor hours recorded in CDOT's accounting database, SAP ERP (Systems, Applications, and Products Enterprise Resource Planning)
- Limited stormwater runoff monitoring to assess PWQS pollutant removal effectiveness
- Annual Report to State Regulatory Authority – number of PWQS inspected, total maintenance expenditures and monitoring results

### North Carolina DOT

North Carolina DOT (NCDOT) has been administering a state and federally mandated Erosion and Sedimentation Control Program since the early 1970s. By the mid 1980s, the program had been formalized, and the first automated recordkeeping came into existence, using a mainframe application. Today, this database is known as ERCON and it provides a variety of features.

The ERCON Database is designed to provide the DOT Roadside Environmental Unit (REU) with data collection and reporting capability for efficient production of all Erosion and Sedimentation Control inspection reports. Information collected is stored and immediately available for electronic mailing to appropriate recipients. ERCON data is available at any time for on-line review and report analysis. Roadside Environmental personnel are responsible for data collection and entry into this system. The ERCON application has an improved ability to synchronize field data with the data in the main database. An expanding list of queries and reports are available.

### Key Features of ERCON

- Erosion and Sediment Control Inspection Reports
  - If an overall grade is “6” or below, an Immediate Corrective Action (ICA) is issued to alert project personnel that the project is out of compliance with the Sedimentation Pollution Control Act or National Pollutant Discharge Elimination System (NPDES) permit.
- Erosion Control (EC) Plan Evaluation for Maintenance Projects – EC plan evaluations are made using a form in ERCON to ensure plans are being designed correctly. These evaluations are sent to the designers to assist with the EC plan design.

Reclamation Plan Evaluation – Certain guidelines must be met with waste/borrow sites. This Evaluation form allows the REU to approve or recommend items that are needed or missing.

### Reporting

Many reporting tools are available to report project performance, workload, or personnel performance. Information can be displayed based on division, project type, evaluator, or contractor for any date range or month. Some key reports are below.

- Erosion and Sediment Control Inspection Report Grades by Division or Engineer (These grades are used for the Internal Management Dashboard)
- Monthly Inspections by Evaluator
- Active Projects for each Evaluator

NCDOT also has a system for evaluating the Level of Service (LOS) for post-construction BMPs. The LOS rating for Stormwater Control Measures was created to establish a score for stormwater control measures being considered an asset to NCDOT and to gauge the maintenance needed for individual devices. A rating scale was developed from A to F. An “A” rating would be given to a device that shows some aging and wear but no structural deterioration or maintenance needs, and that is functioning properly. An “F” rating would be given to a device that is no longer functional due to the general or complete failure of a major structural component and/or the lack of adequate maintenance. A related percentage rating was also developed and seen on the attached tables. Individual LOS ratings are taken at least once a year for all stormwater control measures. These ratings are averaged for division, counties, and road types and provided to the Asset Management Group within NCDOT every two years. In addition, based on these average rating, the Division Roadside Environmental Engineer (DREE) from each division is given a does not meet, meets, exceeds rating that is found on their individual Performance Dashboard Appraisal (PDA). Any rating below “C” indicates to the DREE that maintenance is needed on that particular device. Additional information on the NCDOT Programs can be found in Appendix A.

### **Oregon DOT**

The Oregon DOT (ODOT) Environmental Management System (EMS) is one of several ODOT statewide programs that have been developed to meet a variety of environmental rules and regulations (including stormwater management requirements). The program includes effectiveness assessment measures that were developed to assess the program in regards to ODOT sustainability efforts. The EMS program is aimed at providing guidance to ODOT Maintenance workers on how to manage all materials stored at ODOT Maintenance yard facilities. This guidance includes non-structural and source control BMPs that protect water quality. The EMS also dictates parameters and frequencies for yard inspections, which are conducted by local crews monthly and by District management and technical staff once every three years.

Two metrics aimed at assessing the EMS program are tracked:

- 1) A percent measure of ODOT maintenance yards following seven priority EMS procedures that have been chosen to assess the program overall; and
- 2) The amount of hazardous waste generated at each maintenance yard and truck shop each year.

These measures are tracked to report on implementation of the ODOT Sustainability program (rather than ODOT water quality efforts). Again, the EMS was not developed exclusively for ODOT MS4 permit compliance, although many EMS management practices do benefit water quality.

ODOT is still operating under its first MS4 permit that was issued in 2000 and has been administratively extended by Oregon Department of Environmental Quality (DEQ). While the permit requires tracking and reporting on certain ODOT stormwater management efforts, program assessment is not emphasized in the 2000 permit. Programs such as the ODOT EMS did not exist when this permit was issued. ODOT expects program assessment to play a bigger role in ODOT MS4 permit requirements once DEQ renews the ODOT 2000 MS4 permit.

### **Washington State DOT**

The Washington State DOT (WSDOT) MS4 permit is very prescriptive, directs the actions of the stormwater program, and itself serves as the effectiveness assessment program. The DOT submits an annual progress report on implementation, and a second annual report on monitoring, which are required by the permit. Permit reporting elements are dictated by the State Department of Ecology. Monitoring completed by the DOT is primarily characterization of runoff and effectiveness of BMPs. First flush toxicity monitoring is also included.

WSDOT has a sophisticated Illicit Discharge Detection and Elimination (IDDE) program. As part of the Annual Progress Report, WSDOT “Annually summarizes and reports on tracking/remediation activities for illicit discharges and illegal connections.” In the most recent annual report (dated October 2011), the IDDE section was two pages long and included paragraphs describing the program and this summary paragraph:

### “New Reported Illicit Discharges

WSDOT discovered 12 illegal connections and 1 illicit discharge during this reporting period. We resolved the discharge, removed 5 illegal connections, and permitted 3 connections. We are still working to remove or permit 4 of the illegal connections found in this reporting period. A detailed table describing the discharges and connections, actions WSDOT took to eliminate them, the status of the issues appears in Appendix 2, at the end of this report.”

The following table is taken from Appendix 2, Table 12 of the WSDOT 2011 Stormwater Report:

**Table 12 Summary of IDDE Issues and Remediation Activities**

Region	Date Identified	Type of Discharge	Discovery	Location	Action Taken	Other Information	Current Status
Northwest	9/7/2010	Connection	Found by nearby construction crew	Highway: 900 Milepost: 21.75	Contacted landowner	Parking lot of private business cut gap in curb to connect with WSDOT stormwater system	Permitted
Northwest	9/8/2010	Connection	Found by nearby construction crew	Highway: 900 Milepost: 21.75	Contacted landowner	Parking lot of private business cut gap in curb to connect with WSDOT stormwater system	Permitted
Northwest	1/25/2011	Discharge/Spill	Discovered while performing inventory	Highway: 525 Milepost: 8.42	Worked with city and WSF to resolve	A private business placed a dumpster near WSDOT catch basin, used cooking oil and other trash leaked into the structure.	Resolved
Northwest	3/1/2011	Connection	Discovered while performing inventory	Highway: 9 Milepost: 5.103	Contacted landowner	Incoming ditch from private residence to WSDOT MS4	In Progress
Northwest	6/1/2011	Connection	Discovered while performing inventory	Hwy: 99 MP: 47.02	Contacted county and city	Private business discharges to WSDOT MS4	In Progress
Northwest	6/16/2011	Connection	Found during maintenance activity	Hwy: 531 MP: 4.4	Contacted county	Private residence connected to WSDOT ditch	In Progress
Olympic	11/14/2010	Connection	Discovered while performing inventory	Hwy: 167 MP: 4.5	Worked with land owner to get resolved	Private residence connected to WSDOT property	Removed
Olympic	11/16/2010	Connection	Discovered while performing inventory	Hwy: 16 MP: 12.20	Worked with city and WSDOT maintenance	Private residence connected to WSDOT property	Removed
Olympic	11/16/2011	Connection	Discovered while performing inventory	Hwy: 512 and Hwy: 7	Contacted landowner	Private residence connected to WSDOT property	Removed
Olympic	3/29/2011	Connection	Found during utility work	Hwy: 512 MP: 2.3	Contacted landowner	Private business discharges to WSDOT MS4	Removed
Olympic	3/29/2011	Connection	Found during utility work	Hwy: 512 MP: 2.3	Contacted landowner	Private business discharges to WSDOT MS4	Removed
Olympic	3/29/2011	Connection	Found during utility work	Hwy: 512 MP: 2.3	Contacted landowner	Private business discharges to WSDOT MS4	In Progress
Olympic	5/23/2011	Connection	Discovered while performing inventory	Hwy: 410 MP: 20	Worked with City of Buckley to get permit issued	Private business pond discharges to WSDOT MS4	Permitted

Source: Washington State Department of Transportation NPDES Municipal Stormwater Permit Annual Report for Fiscal Year 2010-2011, October 2011

WSDOT discovers illicit discharges and illegal connections with a variety of field crews (construction, inventory, utilities) along their transportation facilities all times during the year. The field crews are trained to know what to look for and how to report their findings. The strategy is to take advantage of crews that are out in the field for other reasons.

WSDOT has developed and conducted their training in-house. The training is daylong and taken out to different parts of the state where the field crews are stationed. Many connections are drainage points discharging onto the DOT’s right-of-way, e.g., parking lots, private businesses adjacent to their right-of-way, drain outlets from private residences, etc.

For more information on WSDOT's Annual Report and performance indicators, see the WSDOT Municipal Stormwater NPDES General Permit, <http://www.ecy.wa.gov/programs/wq/stormwater/municipal/wsdot.html>

WSDOT has started field sampling, including characterizing highway runoff and runoff from maintenance facilities, park and ride lots, ferry terminals, and rest areas. No laboratory results are available to date.

WSDOT is conducting a stormwater features and outfall inventory required by their Permit to be completed at the end of the five-year term. The inventory consists of all known outfalls, and stormwater BMPs constructed across the state in the last 10–15 years. WSDOT has put together an extensive program of scanning and digitizing as-built plan sheets and identifying outfalls that appear on them, putting them in the inventory. They have legacy inventory information from various past efforts that are also considered known outfalls.

An outfall is defined as a point where the storm sewer system discharges to waters of the state or otherwise off state right of way. WSDOT maintains drywells that discharge into the ground, which are also considered outfalls. If the WSDOT system discharges to another MS4, it is not considered an outfall but rather an interconnection, and must be inventoried. The DOT also tracks data on dumping, considered illicit discharges.

The other major requirement of the permit is to annually maintain (inspect, clean, repair) all (about 30,000) catch basins and (about 2,000) stormwater BMPs in the permit area. This requirement has necessitated a significant ramp-up and acquisition of resources to implement, and WSDOT is still coming into full compliance with this permit requirement.

### ***Barriers to Program Effectiveness for DOTs***

Barriers to implementing program effectiveness appear to be the limited resources DOTs have for program implementation. It is difficult to expand the program beyond specific permit requirements, since funding is allocated for specifically required programs.

## **DOT STORMWATER PROGRAM AUDITS**

### ***Background***

The USEPA or state agencies with Clean Water Act authority delegated by the EPA may conduct audits to assess compliance with an NPDES permit pursuant to the authority vested in the Administrator of the U.S. Environmental Protection Agency (EPA) under Sections 308(a) and 309(a)(3), (a)(4), and (a)(5)(A) of the Clean Water Act (CWA), as amended, 33 U.S.C. §§ 1318(a) and 1319(a)(3), (a)(4), and (a)(5)(A). The EPA grants authority to states for inspections, monitoring and entry relative to determining compliance with an NPDES permit through the following protocol:

“Each State may develop and submit to the Administrator procedures under State law for inspection, monitoring, and entry with respect to point sources located in such State. If the Administrator finds that the procedures and the law of any State relating to inspection, monitoring, and entry are applicable to at least the same extent as those required by this section [CWA 308a], such State is authorized to apply and enforce its procedures for inspection, monitoring, and entry with respect to point sources located in such State (except with respect to point sources owned or operated by the United States).”

Subsequent to an inspection, the EPA may issue a “Findings of Violation and Order for Compliance,” if the audit determines that the DOT does not comply with the requirements of its NPDES Permit. The Order for Compliance will generally require the DOT to take corrective actions, detailed in the Findings of Violation, and provide a compliance schedule for completion of the corrections.

Audits are generally carried out by EPA staff, and they may include the services of an EPA contractor, as well as representatives from the State department charged with environmental compliance, especially in the case where the state has been delegated authority for implementation of the CWA.

Phase I DOT stormwater programs are entering their 20th year of existence, and Phase II programs have about eight years of implementation experience. Accordingly, the states and the EPA are interested in using the audit process to assess compliance and enforce NPDES permit requirements. DOTs have experience in completing the auditing process and can improve their performance on future audits by incorporating audit feedback into their stormwater programs.

### ***Discussion***

Four DOTs participating in the Community of Practice, California, Delaware, New York State, and Washington State, have had EPA audits. Colorado has had a State audit, and an EPA audit is pending. Table 1 provides an overview of audit history by EPA Region based on available data. EPA and or their State Regulators may have audited other DOTs and not described below.



**Table 1: USEPA/State DOT Program Audits by EPA Region**

<b>EPA Region</b>	<b>DOT Programs Audited (in Bold)</b>
1	Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont
2	New Jersey, <b>New York</b> , Puerto Rico, U.S. Virgin Islands
3	<b>Delaware</b> , District of Columbia, Maryland, <b>Pennsylvania</b> , Virginia, West Virginia
4	Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee
5	Illinois, Indiana, Michigan, <b>Minnesota</b> , Ohio, Wisconsin
6	Arkansas, Louisiana, New Mexico, Oklahoma, Texas
7	Iowa, Kansas, Missouri, and Nebraska
8	Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming
9	<b>Arizona</b> , <b>California</b> , <b>Hawaii</b> , <b>Nevada</b> , Pacific Islands, Tribal Nations
10	Alaska, Idaho, Oregon, <b>Washington</b>

**California DOT**

California DOT (Caltrans) is organized with twelve Districts responsible for project delivery, and the day-to-day maintenance and operations. Headquarters is responsible for developing and setting statewide policy, guidance and training statewide. In October 2009, Caltrans Headquarters and its Districts 1-4 were audited for NPDES permit compliance. The audit was completed by EPA Region 9 through their contractor. The audit team included EPA and the State and Regional Water Quality Control Boards, who are the delegated authority in California with implementation of the Clean Water Act.

EPA Region 9 indicated that the probable sites of interest could include sites near 303(d) listed water bodies, having past enforcement issues or having other water permitting activities. Caltrans took proactive steps in anticipation of the audit. Headquarters staff communicated with each District and explained the audit process, and reviewed some of the potential maintenance and construction sites.

Fifty-five construction, maintenance stations and material storage locations were inspected during the seven-day inspection. A portion of the time was also spent reviewing DOT records and documentation. On October 26, 2010, Caltrans received an Administrative Order from the EPA in the form of a “*Findings of Violation and Order for Compliance.*”

US EPA continued the audit in the summer and fall of 2011, visiting 12 sites (ten construction and two maintenance) within six districts, including a follow up visit to a previous district.

### Findings

The findings of the audit were generally classified into three categories. Corrective actions were prescribed in each of the categories where EPA found compliance issues:

1. Stormwater Management Plan. The audit found that the Caltrans Stormwater Management Plan (SWMP) should be updated to enhance the program management, training, tracking and inspection programs as well as provide for municipal coordination.
2. Maintenance Program. Ensure that all maintenance and material storage facilities have a Facility Pollution Prevention Plan, and that all inspections are completed and documented. Develop a more robust IC/ID program, and improve training.
3. Construction Program. Implement an inventory of all construction sites, improve training program.

The primary lessons learned from the audit process were:

1. Auditors will only review program requirements that are explicit in the Permit
2. The auditors focus on the six minimum control measures
3. Statewide consistency is important in program implementation
4. Auditors will interview DOT staff to verify training and program knowledge
5. Construction and maintenance sites (physical implementation of the permit) should receive the most attention.
6. EPA wants to know how you get your consistent message statewide from executive management on down to boots on the ground.
7. EPA wants a designated responsible charge that can correct deficiencies in the field.

### **Delaware DOT**

Delaware DOT (DelDOT), which is a Phase I co-permittee with Newcastle County, was audited by EPA in 2006, the year the original permit was set to expire. The County, along with two smaller cities was audited along with DelDOT. The audit was conducted by EPA representatives and a consulting firm, SAIC over two days. It was an extensive process with the EPA, and there were several lessons learned. DelDOT received an audit report about a few months after the field visit containing the findings.

The auditors indicated that their main objective was to strengthen the stormwater program. DelDOT and EPA negotiated for about a year at monthly meetings discussing the enforcement action. Presumably, the findings of the audit will be incorporated into the reissued DelDOT Permit, which is pending.

### Findings

The EPA listed the following as major non-compliance issues from the audit:

- Failure to assess the need to modify the Storm Water Pollution Prevention and Management Plan (SWPP&MP) to meet water quality standards
- Failure to require appropriate BMPs (i.e., Significant Materials) at construction sites
- Failure to maintain BMPs (i.e., erosion and sediment controls) at inspected construction Site
- Failure to provide training to construction site operators
- Failure to provide complete annual report

### Mitigation/corrective actions

The EPA identified “next steps” and corrective actions in their audit report, along with compliance assistance tasks:

- Compliance assistance
  - Assess extent to which controls meet water quality standards
  - Assess the need to modify SWPP&MP
  - Annual report compilation
- Recommendations for MS4 permit
  - More useful monitoring requirements
  - Watershed approach for a better return on investment of resources
  - Clear deliverables and deadlines
  - Semiannual meetings with Department of Natural Resources and Environmental Control (DNREC)
- Appropriate enforcement response
  - Failure to maintain BMPs at the State Route (SR) 141 construction site
  - Education and Training of Operators
  - Failure to require appropriate BMPs (Significant Material Management) at construction sites

### Lessons learned

DelDOT developed several “lessons learned” as a result of the audit:

- Preparation is critical. Know where all of the documentation is and have it assembled for each of the six minimum control measures, and documentation for any other required Permit elements.
- Enlist personnel in other divisions to be ready to assist during the audit. Brief them ahead of the audit on what to expect, and what to be prepared to discuss.

- Include director level personnel. It is important that the director level personnel understand the ramifications of an underperforming program.
- Some questions and requests may be very detailed, be prepared to produce in-depth documentation.
- Ensure that construction sites near the audit locations (DOT headquarters or district offices) are in compliance with NPDES permits.
- Auditors will compare the DOT program to the permit requirements. Do not expect “credit” for program areas that exceed permit requirements.

### **Washington DOT**

Washington State DOT (WSDOT) is in EPA Region 10 (greater Pacific Northwest: AK, ID, OR, WA), and has a DOT-only municipal permit that applies in Phase I, Phase II, and TMDL areas. WSDOT was officially notified by EPA Region 10 via letter on December 16, 2011 of an audit to be conducted on January 31 and February 1, 2012. WSDOT took the following proactive steps to prepare for the audit:

1. WSDOT contacted other state DOTs, such as Arizona DOT (ADOT), California DOT (Caltrans), and Minnesota DOT (MNDOT), to understand the audit process as it applies to state DOTs and to find out “lessons learned” from those DOTs.
2. WSDOT formed an ad-hoc committee of headquarters and regional office personnel to prepare for the audit. Washington State Ferries is part of WSDOT and has environmental auditors who conduct routine audits on their vessels and ferry terminals. Washington State Ferries was used to conduct “mock audits” at the maintenance facilities within the geographic regions where EPA was likely to conduct field visits (based on the EPA audit-notification letter).
3. WSDOT ensured that the likely audit locations for inspections were prepared for the audit by assessing the construction projects and maintenance facilities against their SWPPPs, e.g., had good housekeeping practices implemented including materials stored, covered, and protected from coming into contact with stormwater. Active construction sites within the area of interest were inspected by headquarters, regional, and project office personnel to make sure all erosion and sediment control BMPs were installed, and being properly maintained. A key aspect for both construction and maintenance was to involve in the preparations field staff that were likely to be asked questions by the auditors.

The audit consisted of office-based document reviews and field inspections at construction sites and maintenance facilities. Auditors did not focus on post-construction BMPs that WSDOT had constructed as a part of Capital Improvement Program (CIP) projects, but looked at a few while traveling to construction and maintenance locations. The audit team consisted of EPA Region 10 and the state regulator (Department of Ecology). The audit was lead by EPA’s contractor, PG Environmental (based in Colorado), which had conducted prior DOT audits in other western states.

WSDOT has not yet received the EPA's audit report. WSDOT recommends following the preparatory steps listed above and approaching the audit as an opportunity to improve the program.

### **New York State DOT**

EPA conducted a three-day audit of a region of New York State DOT (NYSDOT) in the Chesapeake Bay Watershed. Staff from EPA Region 2 and their consultant conducted the audit. A representative from the state regulatory agency was present during the audit. The audit focused on NYSDOT procedures for maintenance facilities and construction sites. Three construction sites were audited, as well as two maintenance facilities and another site where deer carcass composting is conducted, where street sweepings are stockpiled, and where asphalt fillings are being stockpiled. The DOT expects to receive a letter from EPA with the results of the audit and instructions on follow-up activities, possibly to improve on programmatic procedures.

## **BEST STRUCTURE FOR A DOT STORMWATER PROGRAM**

### ***Background***

The effectiveness of a DOT stormwater program is affected by the organization structure of the DOT staff. DOT stormwater program managers have broad responsibilities that include environmental and program planning, design, permitting, construction and operation and maintenance. The CoP determined that several organizational attributes support a strong stormwater program. These attributes, when merged into the various organizational structures, are the key to a high performing organization that promotes surface water quality protection:

- Integrating the stormwater program and its responsibilities into the organization creates ownership.
- DOT funded positions at the regulatory agency can assist the DOT in improving inter-agency communication and streamlining regulatory review. The agreement must clearly spell the role and responsibility of the funded position. For example, DOT funded position agreements should be written/structured to foster inter-agency communication and facilitate timely regulatory review and program improvement.
- The permit structure (single statewide or multiple permits) and whether the DOT operates in a delegated or non-delegated state.
- Support from the highest levels of the organization.
- Exceptional communication throughout the chain of command.

### ***Discussion***

The stormwater program structures for a cross section of DOTs are discussed below. Appendix B includes a reference document with the general DOT organization structure to aid the reader in understanding how the DOT stormwater program relates to each DOT organization.

### **Alabama DOT**

The ALDOT organizational structure accommodates an environmental program that integrates environmental awareness and stewardship into all areas of function. ALDOT created a small Office of Environmental Coordination in 2010 to promote communication of environmental responsibilities, provide coordination, support accountability, and lead the ALDOT Environmental Program. Central office bureaus and nine regional divisions contain positions with environmental responsibilities representing planning, design, construction and maintenance activities related to both transportation facilities (roads and bridges) and support facilities (buildings and grounds).

Generally, environmental policy creation, policy communication and quality assurance are roles of bureaus within the central office. Policy implementation and quality control generally take place at the division level. The Office of Environmental Coordination promotes ALDOT's efforts externally as it learns the expectations of regulators, environmental advocacy groups, facility users and taxpayers. Internally, the Office ensures that environmental commitments and expectations are known and are addressed by offices and bureaus with designated tasks related to specific responsibilities. The Office facilitates a monthly meeting of an environmental leadership group made up of midlevel influencers from each area of environmental responsibility. The group discusses current issues and leadership.

ALDOT's Design Bureau Stormwater Section is responsible for permit documentation responsibilities for both MS4 and construction stormwater permits. The Environmental Technical Section of the Design Bureau coordinates environmental planning responsibilities including NEPA, environmental studies and USACOE permitting. Regulatory compliance for materials handling and disposal as well as stormwater management is the responsibility of the Hazardous Materials Section of the Bureau of Materials and Tests. Environmental policy creation and communication related to transportation facility construction, maintenance operations and transportation facility post-construction stormwater, and support facility construction and operation is provided by the Construction, Maintenance and Equipment Bureaus, respectively.

Currently, offices with the bulk of environmental responsibilities fall under two Assistant Chief Engineers that serve the Chief Engineer who works for the ALDOT Transportation Director. The Bureau of Materials and Tests, the Construction, Maintenance Bureau and Equipment Bureaus organizationally fall under the Assistant Chief Engineer for Operations. The Assistant Chief Engineer for Preconstruction oversees the work of the Design Bureau. The Office of Environmental Coordination answers directly to the Chief Engineer. An ALDOT organizational chart showing only those offices with stormwater responsibilities is provided in Appendix B. Legislation has recently been passed creating three deputy director positions. It is unknown how the environmental program and structure will be affected as these positions are filled.

### **California DOT**

California DOT (Caltrans) is a large DOT consisting of 12 Districts operating within nine state Regional Water Quality Control Boards or Regional Boards. There is a District Director at the top level, below which there are various Deputy Directors. The Caltrans stormwater program includes coordination with virtually every division within the Department. The primary focus includes Maintenance, Traffic Operations, and Project Delivery, which includes Construction,

Design, Environmental, Project Management and Right of Way, as well as Engineering Services. The stormwater program also interfaces regularly with the State Department of Finance due to changes in the stormwater program budget. Caltrans is investing more resources in asset management to improve the effectiveness of capital outlays. The structure of the stormwater program continues to evolve to ensure good communication and improve problems encountered with the matrix management structure that includes line authority as well as functional responsibility.

The Chief Environmental Engineer (CEE) position was created as a focal point for all the stormwater program requirements, and as a means to ensure compliance with the DOT's permit and Stormwater Management Plan (SWMP). The CEE is charged with coordination between all of the functional units so the program will be consistent statewide. The CEE is responsible for negotiating and resolving issues with external entities, political matters, partnerships, litigation, and other stakeholders.

During the recent EPA audit, EPA requested that Caltrans show communication protocols between the Executive Management (the Caltrans Director) and the Deputy Directors, and the Field Staff regarding stormwater program issues and priorities. In response, the CEE has created a Water Quality Management Assurance Team (WQMAT). The WQMAT is sponsored by the two main Deputies, Maintenance Operations and Delivery, which have authority over those functions that report to the Caltrans Director. Caltrans is holding a monthly (eventually quarterly) WQMAT meetings to ensure a consistent understanding relative to the stormwater program goals and requirements at the highest level of management.

Caltrans has also created a Headquarters Stormwater Management Team, run by the CEE, which includes all of the functional Office Chiefs (Design, Construction, Maintenance, Traffic Operations, Environmental, etc.) to have regular meetings. This team also chairs the statewide Stormwater Advisory Teams (SWATs).

Caltrans has funded positions in different areas with the nine Regional Boards. Caltrans has not funded a position with the State Board, the body that sets regulatory policy. The funded positions help reduce review times for stormwater permits.

### **Colorado DOT**

The Colorado DOT (CDOT) stormwater program is housed in the Environmental Programs Branch, along with a water quality section (Hydrologic Resources and Ecological Design Section). The Environmental Programs Branch is housed under the Division of Transportation Development, along with Multimodal Planning, Information Management, and Research.

As a result of a Consent Decree, a Stormwater Executive was designated, and instead of creating a new position, this responsibility was added to the Chief Engineer who oversees the Division of Highway Operation and Maintenance and the Division of Engineering, Design and Construction.

### **Delaware DOT**

The Delaware DOT (DelDOT) Stormwater Group is under the Division of Transportation Solutions, which covers Design and Construction. There is also a separate section to provide regulatory permitting services. DelDOT is a delegated agency under the Delaware Department of

Natural Resources and Environmental Control (DNREQ), responsible for implementation of the stormwater permit. Accordingly, the Stormwater Group approves all stormwater management and erosion and sediment control plans. The Maintenance Division houses the NPDES Group, which handles the NPDES permit program.

The NPDES Group includes a Program Manager, an Environmental Scientist, and an Environmental Engineer who manage the entire permit for the statewide program. Roadside Environmental (under Maintenance and Operations) is responsible for pesticide and herbicide application, and works with the NPDES Group on this issue. The DOT would like to consolidate all environmental and permitting responsibilities under a single division in the future.

### **Florida DOT**

Florida DOT (FDOT) has developed a cross-discipline team to implement the stormwater program. The team meets monthly via conference call. The central office team is comprised of Environmental, Hydraulics, and Legal. The team is charged with monitoring program implementation at the District level. Program implementation has been assisted by hiring a former state regulator with a strong NPDES background.

The Districts report directly to the Chief Engineer, who is over Design, Construction, and Maintenance but not Environmental. This direct communication to the highest level of the organization has been effective for program implementation. FLDOT is a co-permittee with local MS4 stormwater programs. The Districts work directly with their co-permittees.

The DOT is working with multiple groups within its regulatory agency to ensure that regulations are practical and economical, including erosion and sediment control.

### **Michigan DOT**

The Michigan DOT (MDOT) stormwater program is operated from the Environmental Services Section under the Bureau of Highway Development, under the Chief Operations Officer. The Stormwater Program Manager was previously in the Construction Field Services Division, and still coordinates with other Divisions and Bureaus. All stormwater program elements are in the Environmental Services Section: the Hydraulics Unit, NEPA compliance, and the Stormwater Program. MDOT has established a steering committee that brings in regional representation from the various areas of the Department to improve communication on stormwater program issues.

### **New Hampshire DOT**

New Hampshire DOT (NHDOT) is split into two primary Divisions: Operations and Project Development. The Stormwater Program is under the Project Development Division, which is in the Bureau of Environment, which includes NEPA work; wetlands, Corps and state permitting; historical resources; and hazardous materials technical services. The DOT developed a Compliance Office with the Commissioner's Office, which includes stormwater program enforcement.

### **New York State DOT**

The New York State DOT (NYSDOT) stormwater program is coordinated by the Environmental Science Bureau, which is in the Engineering Division. The Chief Engineer, who is head of the Engineering Division, is the Principal Executive Officer in terms of the MS4 permit. The Bureau



Director has the title of “Local Stormwater Public Contact.” At headquarters, one person—the Stormwater Management Program Coordinator—has responsibility for coordination of the stormwater program. The Stormwater Management Program Coordinator works with other positions at the main office in geotechnical engineering, construction, maintenance, and information technology.

There are 11 NYSDOT Regions. At the regional level, the environmental units in the Engineering Division are responsible for all the environmental permitting, including stormwater program implementation. Some regions assign designers to develop the Stormwater Pollution Prevention Plans (SWPPPs), and other regions assign environmental personnel to complete SWPPPs. The DOT has dedicated environmental staff in the maintenance and construction regional offices to conduct inspections, complete quality control of the SWPPPs, and provide constructability reviews. The regional offices control asset management regarding maintenance of the facilities and practices. There is a diversity of ownership of stormwater in the regional offices.

### **Oregon DOT**

The Oregon DOT (ODOT) stormwater program resides in the Highway Division, and it is divided between Technical Services, the Office of Maintenance and Operations, and the five Regions. The Geo/Environmental Section in Technical Services is responsible for Stormwater policy and procedure, technical assistance, manuals and training for Erosion and Sediment Control, Water Resources Environmental Analysis and Permitting, and Stormwater Hydraulic Design. Review and approval of project Stormwater Management Plans for CWA Section 401 Water Quality Certification for Pre-Certified Nationwide 404 permits is also the responsibility of Geo/Environmental. The NPDES MS4 and facility stormwater permits, and water quality related maintenance activities are handled by the Office of Maintenance and Operation’s Maintenance Environmental Program. Project design and permitting is done in the ODOT Regions.

ODOT has experience with funded positions at many of the regulatory and resource agencies. There is an Intergovernmental Agreement with the DEQ to hire a new liaison focused on permit development, program compliance, and similar items.

### **Virginia DOT**

Virginia DOT (VDOT) oversees the operation and maintenance of roadways differently than some states. They have nine District offices that oversee Project Deliver and Maintenance Operations within their areas. A central office develops policies procedures, guidance and training and provides quality control and oversight of District office operations. The Program Administrator for the statewide stormwater program is located in the Central Office Location and Design Division under that Chief Engineer and is a single staff member, with one additional person to oversee implementation of the construction permit program and to manage consultant services associated with the MS4 Program. The Central Office Environmental Division is under the Chief of Policy and the Environment. The Environmental Division oversees 401 certifications, and other associated water quality permits. The construction permit and MS4 permit programs are administered by the State Stormwater Program Administrator.

VDOT created a Stormwater Policy Committee in 2005, which is comprised of several of the Central Office Division Administrators that have responsibility for various aspects of the Stormwater Program. The DOT also created an MS4 Steering Committee with representatives from several divisions within the central office. They meet quarterly to discuss progress on the MS4 permit and future program requirements. They also meet quarterly with their oversight agency, the Department of Conservation and Recreation to discuss the stormwater program.

The steering committee has had a positive influence on moving the DOT's stormwater program forward. The committee includes representatives from the Divisions of Environmental, Location and Design, Maintenance, Traffic Engineering, Contract and Scheduling, and even Public Affairs. They assign oversight responsibilities for various portions of the stormwater program to appropriate committee members. About nine different divisions are represented on the steering committee with three divisions, Environmental, Location and Design, and Maintenance having major roles in the stormwater program. . The Environmental Division oversees all TMDL studies and development of implementation plans.

### **Washington State DOT**

The Washington State DOT (WSDOT) stormwater organization is somewhat similar to ODOT. The Environmental Services Office (ESO) is part of the Development Division, whose Director is also the State Design Engineer and reports to the office of the Secretary of Transportation. The Development Division also includes the Design Office, Real Estate Services, Utilities, and Consultant Services—many of the offices that make up what would commonly be referred to as the Project Development portion of the agency. Most of the agency's stormwater staff is in the ESO Stormwater & Watersheds Program, which has a major role in implementing the WSDOT NPDES municipal stormwater and construction activities permits. This role includes monitoring, mapping/inventory, TMDL and IDDE programs, and annual reporting. There is also a small environmental staff in the Maintenance and Operations Division, which has (with their region counterparts) the responsibility for inspecting and maintaining catch basins and stormwater BMPs on the highway system. Each of WSDOT's six regions and Washington State Ferries has environmental staff, some of whom also support permit implementation.

WSDOT believes the best organizational structure to successfully implement the DOT's NPDES stormwater permit needs to include shared responsibility and ownership for permit implementation. This responsibility must go to the highest level of the organization, including the Secretary of Transportation. The approach to sharing responsibility with respect to implementing the permit is embedded throughout the agency and is a key to the success of the WSDOT stormwater program. The DOT meets regularly with all the internal groups that have implementation responsibilities, including the Maintenance and Operations Division and Washington State Ferries (a division of WSDOT).

The Development Division also houses the Hydraulics and Highway Runoff sections, which are comprised of hydraulic and stormwater engineers. These two sections contribute significantly to the implementation of the program in terms of maintaining, deploying and updating the agency's *Highway Runoff Manual*, providing technical assistance on BMP design to project offices, and leading stormwater research.

WSDOT constituted a Stormwater Policy Committee comprised of representatives that broadly represent headquarters, regions, and functional areas of the agency. This group meets quarterly to discuss and consider policy issues relative to stormwater management, which includes the permit.

### **Wisconsin DOT**

The Wisconsin DOT (WisDOT) stormwater program is under the Environmental Services Section, which falls under the Bureau of Technical Services, within the Division of Transportation System Development. WisDOT has two environmental sections: One focuses primarily on NEPA and Cultural Resources, and the other Physical Resources. One position serves as a half-time stormwater engineer and another position provides for erosion and sediment control, TMDLs, and other permit programs.

There are five regions in the state, each of which has at least one Stormwater Engineer and could have additional ones or an erosion and sediment control specialist. These positions in the regions do construction inspection and troubleshooting on an as needed/advisory/random basis. Project field staff is responsible to do the weekly and other required inspections.

A quarterly meeting with all of the staff level people who work on ESC, stormwater and drainage issues is held; DOT management, FHWA, and WDNR representatives are invited and they usually attend.

WisDOT funds some positions at the Department of Natural Resources. This has reduced the time for regulatory project review somewhat; however, there are many small improvements going on to develop a more consistent and quicker review statewide. The funded personnel spend time visiting DOT construction sites and performing inspections as well. WisDOT and WDNR are jointly reviewing the interagency Memorandum of Understanding (MOU) to more clearly define roles for the funded positions.

It is clear that more involvement from the highest level of the organization brings an improved organizational culture for implementation of the stormwater program. Communication is also critical to ensure agency leaders understand the resource needs to operate the stormwater program.

### ***Other Considerations***

Growing workloads within the DOTs may warrant additional management measures and technology tools. Technology tools that may enhance performance include centralized electronic databases for reports, accounting projection/tracking for maintenance, and digitized mapping. Such tools can be customized to facilitate the unique needs of all disciplines and tasks involved with stormwater management, from planning to maintenance and keep pace with changing requirements and regulatory expectations.

Program Management will continue to improve as communication between DOT staff, managers, departments and divisions becomes more efficient, including documenting compliance, evaluation of corrective measures, maintenance and program evaluation metrics.

## ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this report:

AASHTO	American Association of Highway and Transportation Officials
ADOT	Arizona Department of Transportation
ALDOT	Alabama Department of Transportation
BMP	Best Management Practice
Caltrans	California Department of Transportation
CARL	Corrective Action Response Log
CASQA	California Stormwater Quality Association
CDOT	Colorado Department of Transportation
CEE	Chief Environmental Engineer
CIP	Capital Improvement Program
CoP	Community of Practice
CWA	Clean Water Act
DelDOT	Delaware Department of Transportation
DNREC	Department of Natural Resources and Environmental Control
DOT	Department of Transportation
DREE	Division Roadside Environmental Engineer
DWP	District Workplan
EC	Erosion Control
ECS	Erosion Control Supervisor
EMS	Environmental Management System
EPA	Environmental Protection Agency
ERCON	Automated recordkeeping database application for data collection and reporting
ESCAN	Erosion and Sediment Control Assessment
ESO	Environmental Services Office
FDOT	Florida Department of Transportation
FHWA	Federal Highway Administration
ICA	Immediate Corrective Action
IDDE	Illicit Discharge Detection and Elimination
IPO	Individual Performance Objectives
LOS	Level of Service
MDOT	Michigan Department of Transportation
MS4	Municipal Separate Storm Sewer System
NCDOT	North Carolina Department of Transportation
NHDOT	New Hampshire Department of Transportation
NPDES	National Pollutant Discharge Elimination System
NYSDOT	New York State Department of Transportation
ODOT	Oregon Department of Transportation
PEA	Program Effectiveness Assessment
PWQS	Permanent Water Quality Structure
RECAT	Region Erosion and Sediment Control Team
REU	Roadside Environmental Unit
SAP ERP	Systems, Applications, and Products Enterprise Resource Planning

SR	State Route
SWDR	Stormwater Data Report
SWIT	Stormwater Inspection Tool
SWMP	Stormwater Management Plan
SWPP&MP	Storm Water Pollution Prevention and Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TMDL	Total Maximum Daily Load
VDOT	Virginia Department of Transportation
WisDOT	Wisconsin Department of Transportation
WPCM	Water Pollution Control Manager
WPCP	Water Pollution Control Plan
WQMAT	Water Quality Management Assurance Team
WSDOT	Washington State Department of Transportation

## RESOURCES

### Effectiveness Assessment

1. California Stormwater Quality Association, Stormwater Program Effectiveness Assessment Guidance, January 2007, <http://www.casqa.org/>
2. Center for Environmental Excellence by AASHTO, <http://environment.transportation.org>
3. Center for Environmental Excellence by AASHTO, Practitioner's Handbooks Webinar: 13. Developing and Implementing a Stormwater Management Program in a Transportation Agency, [http://environment.transportation.org/center/products\\_programs/webinar\\_handbook\\_13.aspx](http://environment.transportation.org/center/products_programs/webinar_handbook_13.aspx) Description: Assists transportation agencies in developing and/or implementing a stormwater management program that satisfies the requirements of the Clean Water Act
4. Center for Watershed Protection, <http://www.cwp.org/>
5. Center for Watershed Protection, Guide for Building an Effective Post-Construction Program, [http://www.cwp.org/documents/cat\\_view/76-stormwater-management-publications/90-managing-stormwater-in-your-community-a-guide-for-building-an-effective-post-construction-program.html](http://www.cwp.org/documents/cat_view/76-stormwater-management-publications/90-managing-stormwater-in-your-community-a-guide-for-building-an-effective-post-construction-program.html)
6. Center for Watershed Protection, IDDE Manual, <http://cfpub1.epa.gov/npdes/stormwater/idde.cfm>
7. Center for Watershed Protection, National Pollutant Removal Database (free), [http://www.cwp.org/documents/cat\\_view/76-stormwater-management-publications.html](http://www.cwp.org/documents/cat_view/76-stormwater-management-publications.html)
8. EPA, BMP Performance webcast, [http://cfpub2.epa.gov/npdes/outreach.cfm?program\\_id=0&otype=1](http://cfpub2.epa.gov/npdes/outreach.cfm?program_id=0&otype=1)
9. EPA, Evaluating the Effectiveness of Municipal Stormwater Programs, January 2007, <http://nepis.epa.gov/Adobe/PDF/P1001QY0.PDF>
10. EPA, IDDE Webcasts, [http://cfpub2.epa.gov/npdes/outreach.cfm?program\\_id=0&otype=1](http://cfpub2.epa.gov/npdes/outreach.cfm?program_id=0&otype=1)
11. EPA, Post-Construction Overview and Introduction to Smart Growth and Low Impact Development (Post Construction 101) [http://cfpub2.epa.gov/npdes/courseinfo.cfm?program\\_id=0&outreach\\_id=279&schedule\\_id=911](http://cfpub2.epa.gov/npdes/courseinfo.cfm?program_id=0&outreach_id=279&schedule_id=911)
12. EPA, Management Measures for Urban Areas, [http://www.epa.gov/owow\\_keep/NPS/urban.html](http://www.epa.gov/owow_keep/NPS/urban.html)

13. EPA, MS4 Program Evaluation Guidance,  
<http://cfpub.epa.gov/npdes/stormwater/munic.cfm>
14. EPA, National Menu of BMPs,  
<http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>
15. EPA, Stormwater Program, [http://cfpub.epa.gov/npdes/home.cfm?program\\_id=6](http://cfpub.epa.gov/npdes/home.cfm?program_id=6)
16. EPA, Stormwater Webcast on Municipal Program Effectiveness,  
[http://cfpub2.epa.gov/npdes/outreach.cfm?program\\_id=0&otype=1](http://cfpub2.epa.gov/npdes/outreach.cfm?program_id=0&otype=1)
17. EPA, Urban BMP Performance Tool,  
[http://cfpub.epa.gov/npdes/newsemails.cfm?news\\_release\\_id=122](http://cfpub.epa.gov/npdes/newsemails.cfm?news_release_id=122)
18. International Stormwater BMP Database, <http://www.bmpdatabase.org/>
19. Washington State, Low Impact Development – Technical Guidance Manual for Puget Sound, [http://www.psp.wa.gov/downloads/LID/LID\\_manual2005.pdf](http://www.psp.wa.gov/downloads/LID/LID_manual2005.pdf)
20. Water Environment Research Foundation, Using Rainwater to Grow Livable Communities, <http://www.werf.org/liveablecommunities/index.htm>

#### Audits

1. EPA, Audit and Self Auditing and Audit Protocols – Policy and Guidance – Compliance and Enforcement: <http://cfpub.epa.gov/compliance/resources/policies/incentives/auditing/>
2. EPA, MS4 Program Audits in EPA Region 9:  
[www.epa.gov/region9/water/npdes/ms4audits.html](http://www.epa.gov/region9/water/npdes/ms4audits.html)

## **APPENDIX A:**

### **North Carolina DOT Program Information**



## **Background**

The Department of Transportation has been administering a state and federally mandated Erosion and Sedimentation Control Program since the early 1970's. By the mid 1980's, the program had been formalized and the first automated record keeping came into existence utilizing a mainframe application. The move to a client/server platform started in the late 1990's with a MS-Access application. An increase in data demands and functionality proved the MS-Access version too difficult to maintain with the needed levels of security. The new implementation, based on an Oracle and Oracle Lite backend, not only improves upon the earlier drawbacks, but also provides a variety of new features.

ERCON is designed to provide the DOT Roadside Environmental Unit with data collection and reporting capability for efficient production of all Erosion and Sedimentation Control inspection reports. Information collected is stored and immediately available for electronic mailing to appropriate recipients. ERCON data is available at any time for on-line review and report analysis. Roadside Environmental personnel are responsible for data collection and entry into this system. The ERCON application has an improved ability to synchronize field data with the data in the main database. An expanding list of queries and reports are available.

## **Key Features of ERCON**

- Erosion and Sediment Control Inspection Reports
  - If an overall grade is 6 or below, an Immediate Corrective Action (ICA) is issued to alert project personnel that the project is out of compliance with the Sedimentation Pollution Control Act or NPDES permit.
- EC Plan Evaluation for Maintenance Projects – EC plan evaluations are made using a form in ERCON to ensure plans are being designed correctly. These evaluations are sent to the designers to assist with the EC plan design.
- Reclamation Plan Evaluation – Certain guidelines must be met with waste/borrow sites. This Evaluation form allows REU to approve or recommend items that are needed or missing.

## **Reporting**

Many reporting tools are available to report project performance, workload, or personnel performance. Information can be displayed based on division, project type, evaluator, or contractor for any date range or month. Some key reports are below.

- E&SC Inspection Report Grades by Division or Engineer (These grades are used for the Internal Management Dashboard)
- Monthly Inspections by evaluator
- Active Projects for each Evaluator

North Carolina Department of Transportation  
Erosion and Sedimentation Control/Stormwater Report

I. C. A.

Roadside Environmental Unit

Immediate Corrective Action

Resident Engineer

Project Number:

Date of Inspection:

Evaluator:

Location:

Project Type: Contract

County:

Division:

TIP Number:

Length of Project: 4.40

Disturbed Acreage: 15

The Project is Located in a

HQW Zone: N

Trout Zone: N

Project Evaluation

Length	Section Description	Installation of Measures	Maintenance of Measures	Effectiveness of Measures	Plan Implementation	Overall Project Evaluation
3.80	Remainder of Project	8	6	6	7	6
0.60	Permitted Area(s)	8	6	6	6	6

This project does not comply with the North Carolina Erosion and Sedimentation Control Laws. Immediate Corrective Action is needed to resolve the situation to full compliance with the Law: (T15A: 04B.0000)

Grade Scale:

10: Excellent 9: V. Good 8: Good 7: Fair

6-0: Immediate Corrective Action Needed

#### Permit Consultation Comments:

A PCN is being issued to document the loss of sediment and other material into permitted areas. Two days of high intensity rainfall late last week resulted in loss of material. DWQ has been notified of the loss of silt and other material. Please notify this office when sites are restored.

#### Remarks and Recommendations:

Found the project to be out of compliance due to lack of maintenance and lack of adequate measures to retain sediment onsite. Primary needs are maintenance and installation of measures, as per approved e.c. plans and sufficient to retain sediment onsite. There is also the need for the contractor to start and finish pipe work in permitted areas in a continuous manner. 54" pipe at permit site 5, sta 88+00, was started without sufficient material on hand to complete construction of pipe. It has sat half completed for several weeks. This is unacceptable!

There is offsite sediment at permit sites # 1 @ sta 23+00 rt of L, permit site # 2 @ sta 14+50 lt of ramp b, permit site 3 @ sta 13+65 rt of ramp c, permit site # 4 @ sta 39+50 lt of Y, @ sta 54+00 L & @ sta 62+50 rt of L and permit site # 5 @ sta 88+00 lt & rt of L. There is also offsite at non jurisdictional areas at sta 69+00 rt of L and sta 74+80 rt of L. Some of this has been addressed by contractor on Friday and Saturday this past week.

Contractor is presently and has been working on repair and maintenance needs since Friday of last week.

Note the following corrective actions:

- 1) sta 14+50 rt of ramp c- run slope drain to bottom of ditch with class-b dissipater pad at outlet end of pipe.
- 2) sta 39+50 lt of Y- repair silt fence along perimeters. Needs to be keyed in!
- 3) sta 22+25 rt of Y- repair dam at skimmer basin.
- 4) sta 57+90 lt of L- need more substantial offsite measure.
- 5) sta 69+00 rt of L and sta 74+80 rt of L- Offsite sediment and rock. Need to retrieve lost material and maintain measures(type-a checks) across grade. Install adequate size basin prior to offsite measures.
- 6) sta 105+00 lt of L- need to regrade ditch to skimmer basin. Water not draining to basin. If this does not work may need to lower skimmer basin.
- 7) sta 98+00 to sta 103+00 rt of L- seed and mulch fill slopes and PDE.
- 8) sta 112+00 to 119+00- active fill section- install measures, as per plans, in a timely manner. Start stage seeding of slopes in a timely manner.
- 9) Access road off Cotton road- need to maintain measures, asap. Outlet device is at failure.
- 10) Maintain all type a and b checks in td's and ditches throughout project.
- 11) Add metal stakes at perimeter silt fences and reinforced outlets as directed by Land Quality.
- 12) Need to use hardware cloth as per specs. Needs to be 1/4"!

North Carolina Department of Transportation  
Erosion and Sedimentation Control/Stormwater Report

I. C. A.

Roadside Environmental Unit

Immediate Corrective Action

Permit areas:

- 1) sta 20+35rt of ramp c- seed/mat bare area between safety fence and rock energy dissipater pad.  
- basin needs maintenance- baffles need work.
- 2) sta 14+50 to sta 22+50lt of ramp b- Inadequate measures to retain sediment onsite. Need to protect rock lined ditch. Need to clean up rock lined ditch. Sta 14+50- need to protect inlet end of pipe, asap. Redo lining at lower end of ditch. Install adequate staples to hold liner in place. Sta 14+50 to sta 18+00- install sscf as outlets in low points of silt fence. Repair seed/mat cut slope.
- 3) sta 23+20lt of L- Need to provide protection around stockpile of dirt. Need to tie silt fence into wingwall, N. side of pipe. Need to clean up liner from skimmer basin to inlet end of pipe. Use adequate tacks to secure liner.
- 4) sta 54+00- Install steel posts in failed areas of sscf. Devices still need work- additional 57 stone on sscf, adequate weirs on rock checks & dams. Reseed and mulch bare areas.
- 5) sta 62+75rt of L- Repair failure lt of skimmer basin at creek and repair seed/mat bare areas. Repair failed td. Seed/mulch all bare areas around skimmer.
- 6) sta 88+00L- skimmer basin needs maint. on lt. side, n. of creek. Need to maintain diversions across access rd. both sides of creek. Install rock dam prior to pipe instead of earthen dam. Complete installation of pipe and stabilize both ends, asap.
- 7) sta 105+20- Stream crossing needs immediate attention! Perform general maintenance to basins. Check skimmer for proper flow on rt. side. Diversions across haul rd. need maintenance both sides of creek.
- 8) sta 120+57- Complete td to skimmer basin. Clean up silt from diversion channel. Seed/mat bare areas around diversion channel. Complete installation of basin and install skimmer, E. of creek.
- 9) sta 176+00- clearing work has started from sta 176+00 to sta 205+00- install measures at creek, asap.

NPDES was reviewed. Need to complete all sections of SDO sheet. Ensure offsite and urgent columns are addressed. Need to complete reviews within 24 hours of 1/2 inch rain event. Ensure that E.C. plans are updated and marked at end end of each day. Continue to work on NPDES record keeping.

Project will be reviewed again for compliance in 5 working days.

North Carolina Department of Transportation  
Erosion and Sedimentation Control/Stormwater Report  
Roadside Environmental Unit

Resident Engineer

Project Number:

Date of Inspection:

Evaluator:

Location:

Project Type: Contract

County:

Division:

TIP Number:

Length of Project: 7.60

Disturbed Acreage: 24

The Project is Located in a

HQW Zone: N

Trout Zone: N

Project Evaluation

Length	Section Description	Installation of Measures	Maintenance of Measures	Effectiveness of Measures	Plan Implementation	Overall Project Evaluation
0.40	*Permitted Area(s)	8	8	9	8	8
7.20	Remainder of Project	8	9	9	7	8

Grade Scale:

10: Excellent 9: V. Good 8: Good 7: Fair

6-0: Immediate Corrective Action Needed

Permit Consultation Comments:

Remarks and Recommendations:

Contractor continues to clear/grub project.

BOP to sta.140+00 at Archie Rd.- perimeter e. c. measures have been installed and perimeter temp. seeded/mulched. Need to temp. seed/mulch remaining disturbed areas Rt. of -L-/LREV1- to meet 21 day seeding requirement.

From Archie Rd.(Y5) to Beulah Hill Church Rd.(Y12) - temp. seed/mulch disturbed areas from Y5 to sta.163+00 Rt. Sta.146+00 Rt.- infiltration basin(14.1i) - need to direct runoff to basin. Sta.150+00 Rt. at infiltration basin(14.2i) - need to install temp. diversion

across grade to ensure runoff is directed into basin. \*Sta.245+00 at culvert(site 1) - contractor is constructing culvert at this time.

Temp. pipe diversion looks good. Continue to utilize proper BMP's during construction. Skimmer basin(21.2) - need to install berm

to ensure runoff is directed into skimmer basin. \*Sta.270+00 Lt.(site 2) - contractor has cleared/grubbed and installed basin. Need

to seed/mat basins, install baffles, and temp. seed/mulch disturbed areas. \*Sta.275+00 to sta.279+00 at culvert(site 3) - contractor

is undercutting Rt. of -L- at future culvert extension. At this time, silt bag needs maint. Recommend PAM be utilized and ensure

proper BMP's are being utilized during pumping operation. \*Approx. sta.280+00 Lt.- contractor is clearing in this area. Ensure

perimeter e. c. measures are installed in a timely manner. Need to temp. seed/mulch disturbed areas Rt. of -L-.

From Beulah Hill Church Rd.(Y12) to Traffic Circle - temp. seed/mulch small disturbed areas Rt. of -L-. \*Sta.340+50 at culvert(site 4) - no work in this area.

Borrow site - contractor is constructing riser basin at this time. Need to ensure skimmer is at least 1-2 feet off bottom of

level basin. Once complete, seed/mulch/mat basin. Also, ensure TSD is constructed around site before grubbing and removing

material from site. Contractor has calculated storage requirements for 2 additional basins until TSD can direct runoff to riser basin.

Ensure haul road is protected and wetlands are identified in this area.

General comments: Continue to install perimeter e. c. measures in a timely manner, as clearing/grubbing operations continue.

Contractor has done an excellent job of seeding/mulching perimeter of project; however, there is a large number of disturbed acres

that need to be temp. seeded/mulched at this time to meet 21 day seeding requirement. Continue to perform maint. to e. c.

measures, as per NPDES regulations.

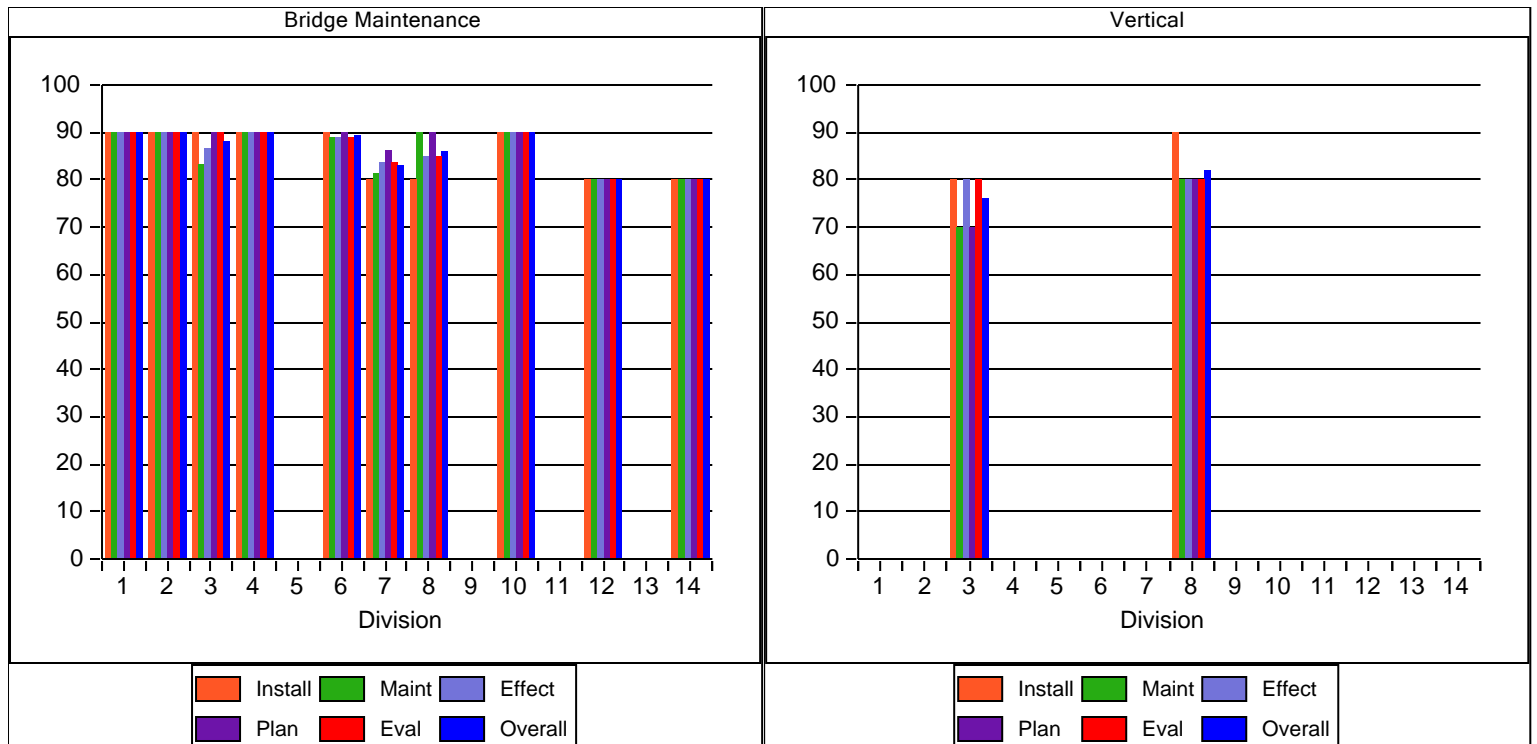
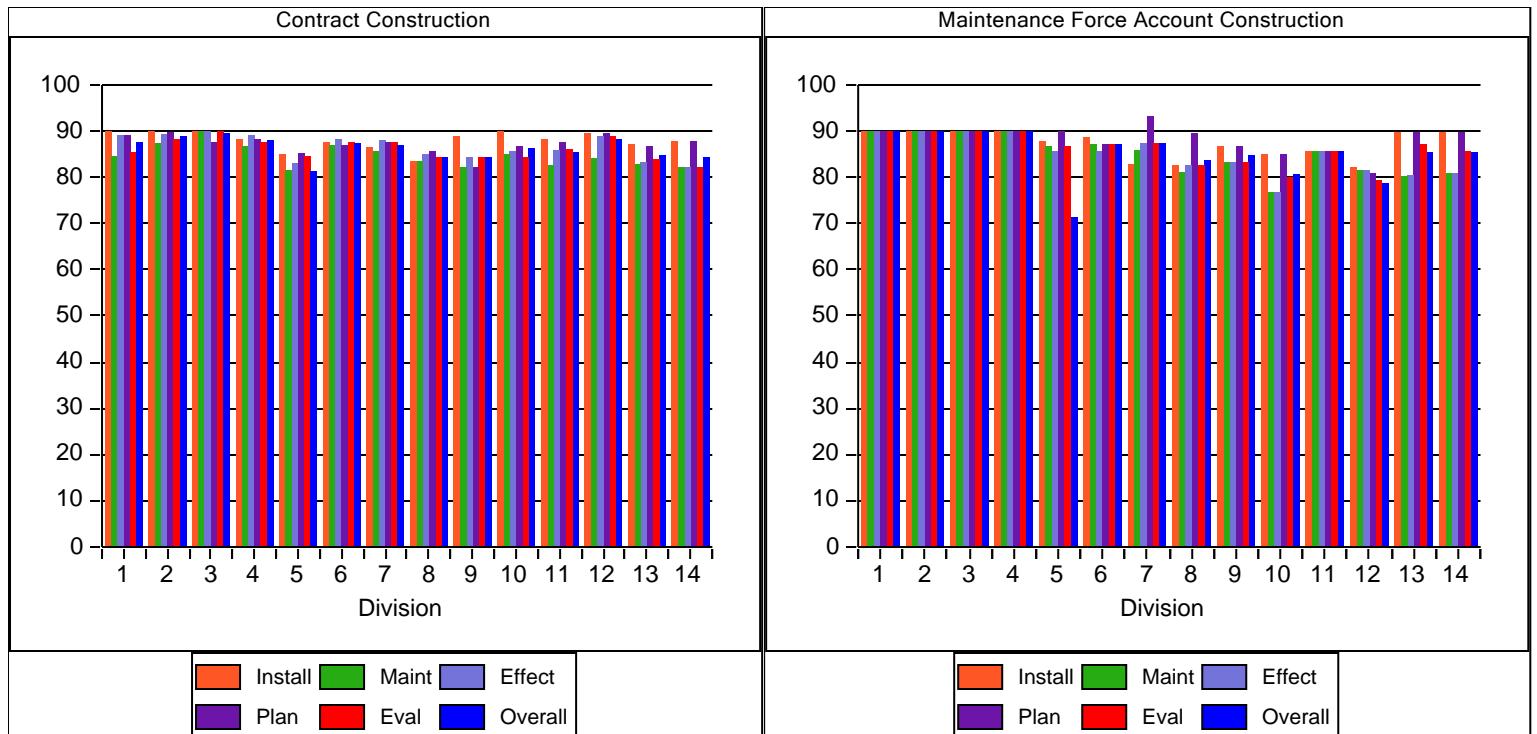
NPDES documentation was not reviewed. Ensure inspections are performed on a weekly basis and after a .5" rainfall event within

24 hrs. Also, ensure e. c. plans are updated on a daily basis.

# Erosion and Sedimentation Control/Stormwater Evaluations

NCDOT Roadside Environmental Unit - Field Operations Section

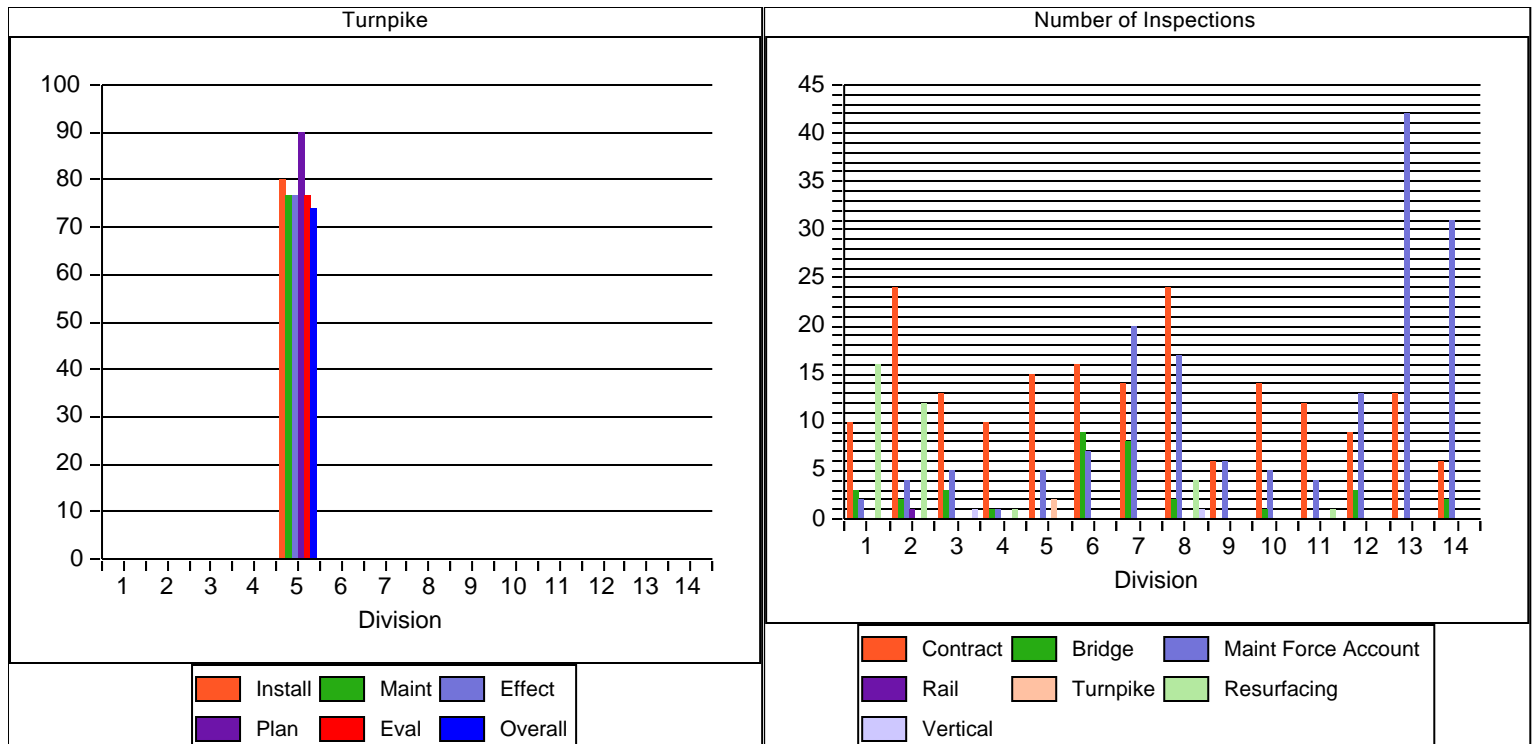
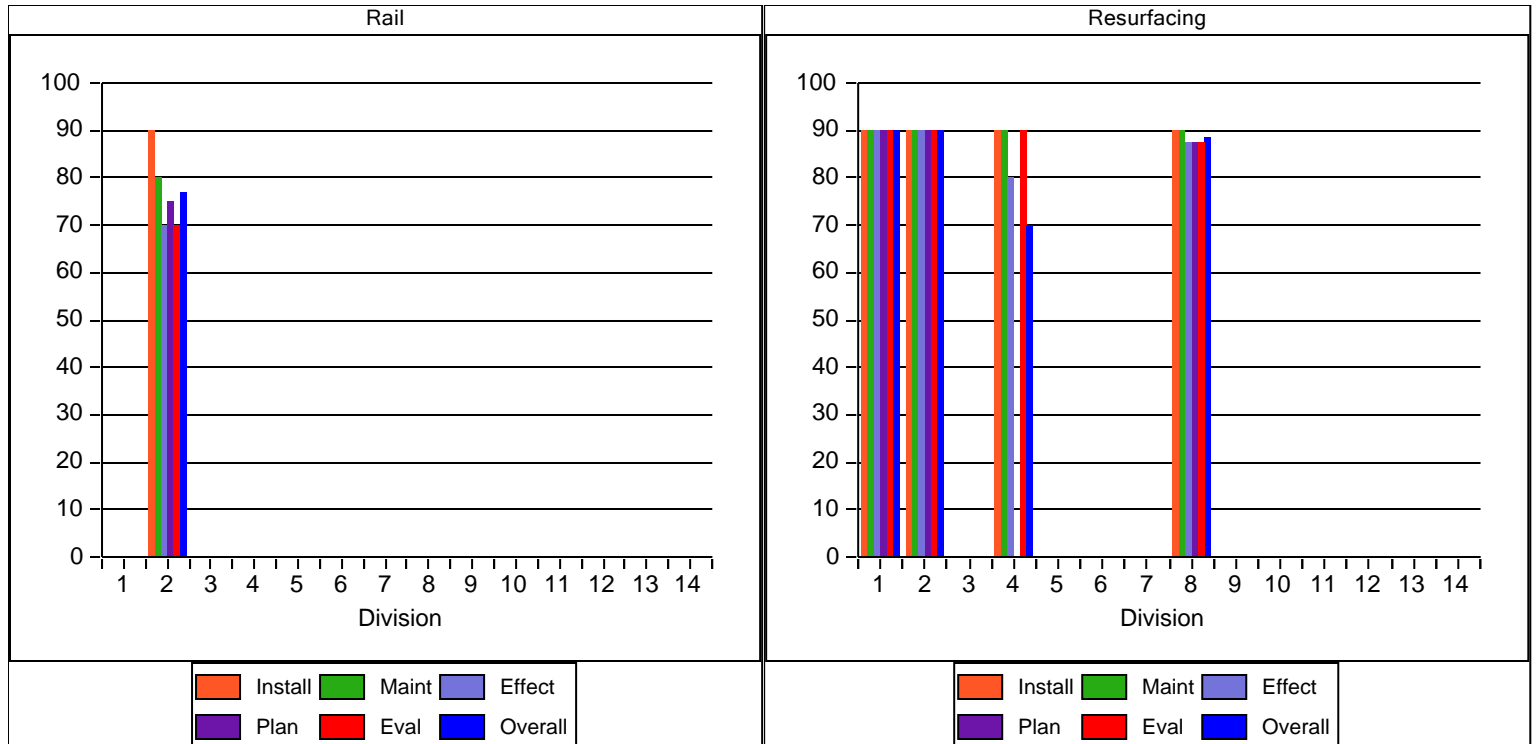
Jan 2011



# Erosion and Sedimentation Control/Stormwater Evaluations

NCDOT Roadside Environmental Unit - Field Operations Section

Jan 2011





NCDOT NPDES PERMIT

HIGHWAY STORMWATER PROGRAM

**ILLICIT DISCHARGE DETECTION AND ELIMINATION PROGRAM\***  
**FIELD REPORT (FORMALLY ILLICIT CONNECTION & ILLEGAL DISCHARGE)**

DATE: \_\_\_\_\_

**Instructions:** A DOT supervisory personnel shall investigate, fill in date above, complete information below, and forward it to Roadside Environmental Unit – Environmental Operations Section. Telephone Number: (919) 733-2920; Mailing Address: NCDOT Roadside Environmental Unit, 1557 Mail Service Center, Raleigh, NC 27699-1557; Fax: (919) 733-9810

**Pollution Source Observed By:**☐ NCDOT Personnel ☐ NCDOT Contractor ☐ Adopt-A-HighwayDate Identified: \_\_\_\_\_ ☐ General Public, Name & Phone: \_\_\_\_\_

Notes from Reporter: \_\_\_\_\_

**Investigator**

Name: \_\_\_\_\_

**Information:**

(Last)

(First)

Phone: \_\_\_\_\_ Agency: \_\_\_\_\_ Position: \_\_\_\_\_

**Location:** NCDOT Division: \_\_\_\_\_ County: \_\_\_\_\_ City: \_\_\_\_\_

Highway or Site: \_\_\_\_\_ Nearest Intersection or Mile Post: \_\_\_\_\_

Specific Location Info.: \_\_\_\_\_

Latitude Longitude (optional) \_\_\_\_\_

**Type of Stormwater Structure with Illicit Connection or Illegal Dumping (Check One):**☐ Ditch (Size, Type) \_\_\_\_\_ ☐ Pipe (Size, Type) \_\_\_\_\_ ☐ Catch Basin☐ Manhole ☐ Grated Inlet ☐ Other: \_\_\_\_\_**Physical Observations:**☐ Dump ☐ Discharge Flow: ☐ Yes ☐ NoOdor: ☐ Sewage ☐ Rotten Eggs ☐ Fishy ☐ Skunk  
☐ Petroleum ☐ Other: \_\_\_\_\_Vegetation Condition (If applicable):  
☐ None ☐ Normal ☐ Excessive Growth ☐ Inhibited GrowthColor: ☐ Black ☐ Brown ☐ Yellow ☐ Green ☐ Gray  
☐ White ☐ Other: \_\_\_\_\_Land Use:  
☐ Residential ☐ Commercial ☐ Industrial ☐ RuralAppearance: ☐ Oily Sheen ☐ Sewage ☐ Chemical  
☐ Detergent ☐ Other: \_\_\_\_\_Source: ☐ Residential ☐ Sanitary Sewer ☐ Spill Release  
☐ Commercial/Industrial ☐ Other: \_\_\_\_\_

Comments: \_\_\_\_\_

**FOR ROADSIDE ENVIRONMENTAL UNIT STAFF USE ONLY**

Date Received: \_\_\_\_\_ Processed By: \_\_\_\_\_

(Last)

(First)

Forward Report to NCDENR-DWQ: ☐ Yes; Date: \_\_\_\_\_ Whom: \_\_\_\_\_☐ No; Why Not? \_\_\_\_\_

Database ID Number: \_\_\_\_\_ River Basin: \_\_\_\_\_ Database Entry Date: \_\_\_\_\_

(Division)

(County)

#

Follow Up and Remarks: \_\_\_\_\_

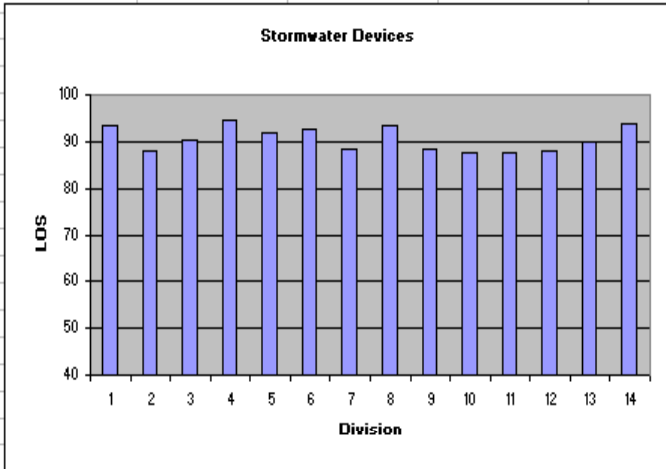
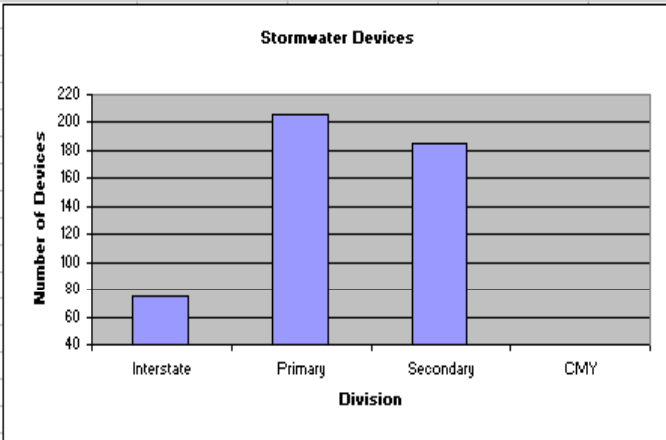
\* Illegal Discharges also include Illegal Dumping as defined as significant materials that are soluble or easily transported by stormwater runoff, such as used oil, chemical solvents, septic waste, etc. Solid materials not easily transported by stormwater are addressed through other DOT programs and should not be reported on this form.

Version 3/21/05

## **Level of Service (LOS) Rating for Stormwater Control Measures**

The Level of Service (LOS) rating for Stormwater Control Measures was created to establish a score for stormwater control measures being considered an asset to NCDOT and to gauge the maintenance needed for individual devices. A rating scale was developed from A to F. "A" = being a device with some aging and wear has occurred but no structural deterioration or maintenance needs were found. Device is functioning properly. "F" = being a device no longer functional due to the general or complete failure of a major structural component and/or the lack of adequate maintenance. A related percentage rating was also developed and seen on the attached tables. Individual LOS ratings are taken at least once a year for all stormwater control measures. These ratings are averaged for division, counties, and road types and provided to the Asset Management Group within NCDOT every two years. Also, based on these average rating, the DREE from each division is given a does not meet, meets, exceeds rating that is found on their individual PDA. Any rating below "C" indicates to the DREE that maintenance is needed on that particular device.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N																														
1																																												
2		ASSET: STORMWATER DEVICES																																										
3		ELEMENT 4			Service Level					Acceptable Level of Service																																		
4		Roadside Environmental Unit			A	B	C	D	F																																			
5		Activities	Condition Indicators	Performance Measures	Threshold	Threshold	Threshold	Threshold	Threshold																																			
6		Stormwater Control Device	NPDES Permit	Condition of Device	100-95%	94-89%	88-85%	84-80%	<79%	B																																		
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10		2008 MCAP ASSESSMENT: Stormwater Devices																																										
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A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
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## STORMWATER DEVICE LOS RATING METHODOLOGY

### DATABASE

							First	Score	Second	Score	Total	A. Score	%
Div	BMP Code	BMP Type	County	Nearest Town	GPS Date	Install	D. Inspect	LOS	D. Inspect	LOS	LOS	LOS	LOS
1	01_BB_01	Bioretention Basin	Hertford	Murfreesboro	6/19/2006	2003	10/19/2006	A	04/17/2008	A	5		
1	01_IB_01	Infiltration Basin	Dare	Manteo	None		10/20/2006	B	04/18/2008	A	5		
1	01_IB_02	Infiltration Basin	Dare	Manteo	None		10/20/2006	C	04/18/2008	A	5		
1	01_IB_03	Infiltration Basin	Dare	Manteo	None		10/20/2006	C	04/18/2008	C	3		
1	01_PSH_01	Preformed Scour Hole	Martin	Williamston	None	2005	06/19/2007	C	04/18/2008	C	3		
1	01_S_01	Swale	Currituck	Sligo	6/19/2006	2002	10/19/2006	A	04/17/2008	A	5		
										6	26	4.33	93.5

### CALCULATION

Add Individual Scores/ Number of Devices = Average Score for All Devices; Then Conversion to LOS Percentage

### TABLES

#### SCORE

(Based on a 5 point system)

A	equals	5
B	equals	4
C	equals	3
D	equals	2
F	equals	1

#### CONVERSION TO PERCENTAGE

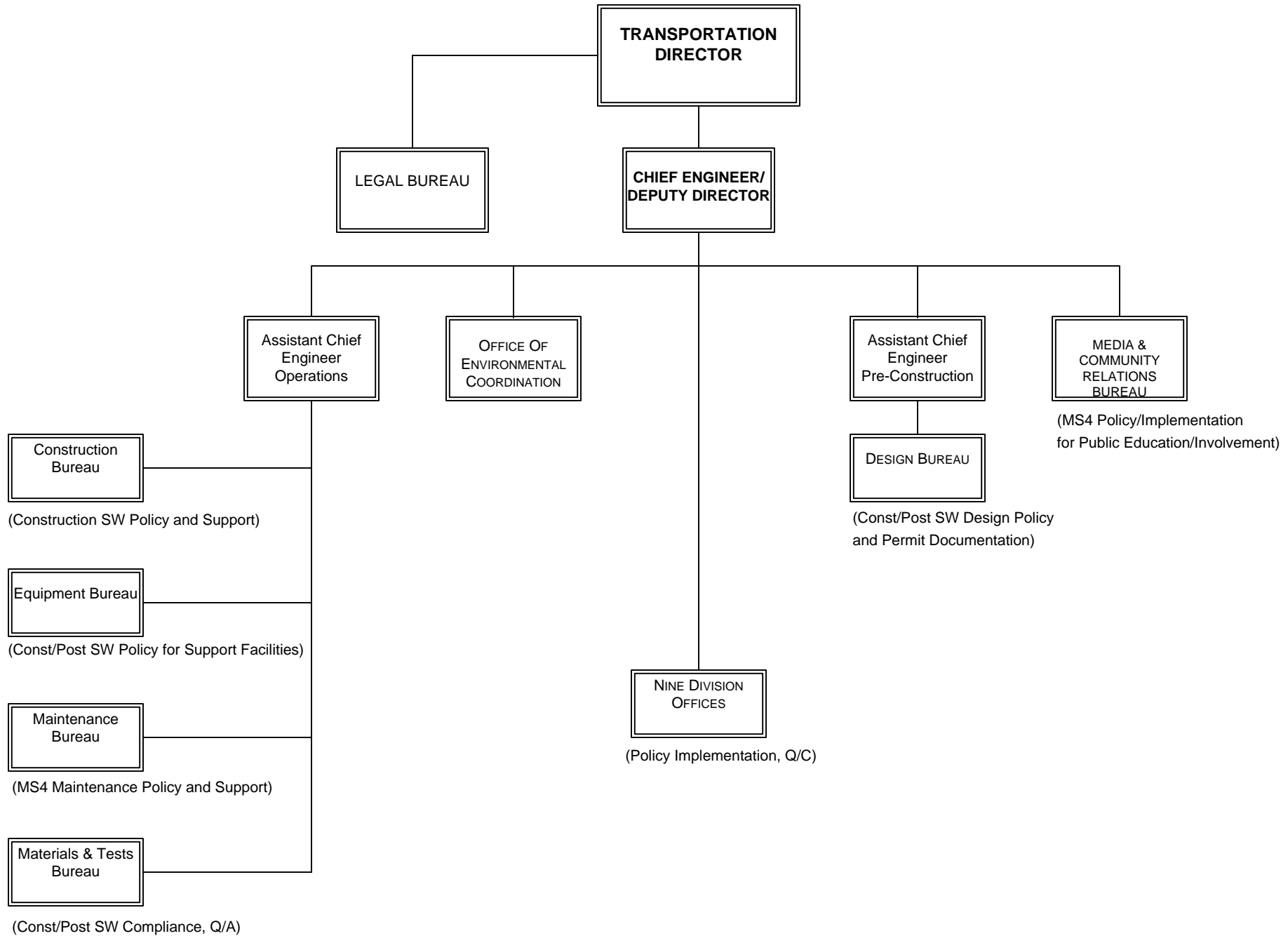
##### Letter

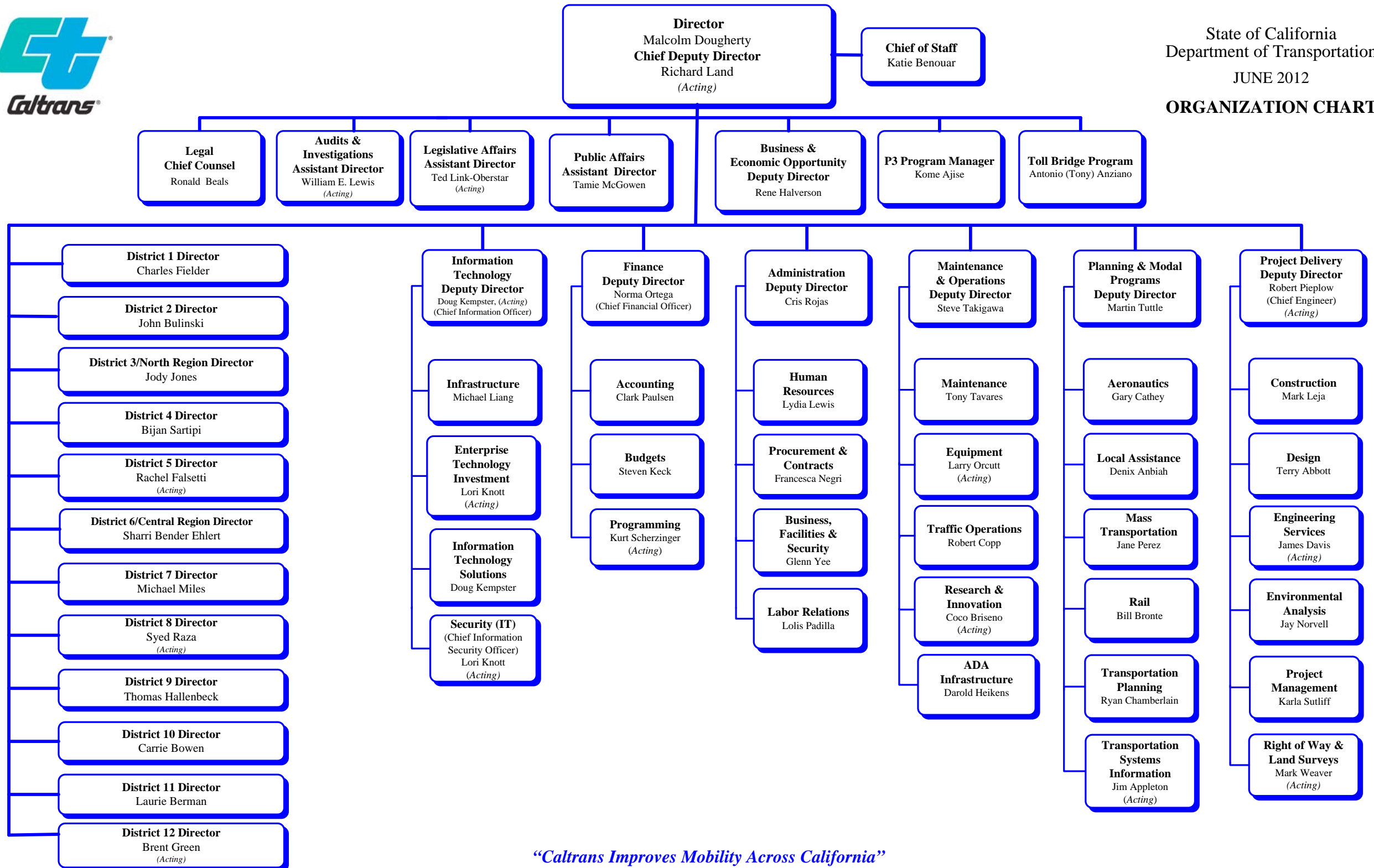
Score	Average Score	Percentage
A	5.000	100
A	4.900	99
A	4.800	98
A	4.700	97
A	4.600	96
A	4.500	95
B	4.400	94
B	4.175	93
B	3.950	92
B	3.725	91
B	3.500	90
B	3.400	89
C	3.175	88
C	2.950	87
C	2.725	86
C	2.500	85
D	2.400	84
D	2.175	83
D	1.950	82
D	1.725	81
D	1.500	80

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	<b>NCDOT STORMWATER BMP - LOS ASSESSMENT - October 1, 2008</b>												
2													
3	<b>(New devices are in bold print since last report date)</b>						<b>Date</b>	<b>First</b>	<b>First</b>	<b>Second</b>	<b>Sec.</b>		
4	<b>Div</b>	<b>BMP Code</b>	<b>BMP Type</b>	<b>County</b>	<b>Nearest Town</b>	<b>GPS Date</b>	<b>Install</b>	<b>D. Inspect</b>	<b>LOS</b>	<b>D. Inspect</b>	<b>LOS</b>	<b>Score</b>	<b>Latitude (US)</b>
5													
6	1	01_BB_01	Bioretention Basin	Hertford	Murfreesboro	6/19/2006	2003	10/19/2006	A	4/17/2008	A	5	N 985527.637
7	1	01_IB_01	Infiltration Basin	Dare	Manteo	None		10/20/2006	B	4/18/2008	A	5	
8	1	01_IB_02	Infiltration Basin	Dare	Manteo	None		10/20/2006	C	4/18/2008	A	5	
9	1	01_IB_03	Infiltration Basin	Dare	Manteo	None		10/20/2006	C	4/18/2008	C	3	
10	1	01_PSH_01	Preformed Scour Hole	Martin	Williamston	None	2005	6/19/2007	C	4/18/2008	C	3	
11	1	01_S_01	Swale	Currituck	Sligo	6/19/2006	2002	10/19/2006	A	4/17/2008	A	5	N 996416.22
12											6	26	4.33
13	2	02_BB_01	Bioretention Basin	Craven	New Bern	6/19/2006	2002	5/18/2006	B	1/28/2008	B	4	N 498627.211
14	2	02_FB_01	Filtration Basin	Craven	New Bern	6/19/2006	2003	5/18/2006	A	1/28/2008	B	4	N 496044.795
15	2	02_FB_03	Filtration Basin	Carteret	Morehead City	9/13/2006	1993	5/18/2006	F	5/18/2006	F	1	N 361820.538
16	2	02_IB_01	Infiltration Basin	Carteret	Swansboro	7/14/2006		5/18/2006	B	6/16/2008	B	4	N 344485.323
17	2	02_IB_02	Infiltration Basin	Carteret	Swansboro	7/14/2006		2/8/2007	C	6/16/2008	B	4	N 344377.069
18	2	02_IB_03	Infiltration Basin	Carteret	Swansboro	7/14/2006		2/8/2007	B	6/16/2008	B	4	N 344266.260
19	2	02_IB_04	Infiltration Basin	Carteret	Swansboro	7/14/2006		2/8/2007	B	6/16/2008	B	4	N 344142.904
20	2	02_IB_05	Infiltration Basin	Carteret	Swansboro	7/14/2006		2/8/2007	B	6/16/2008	B	4	N 344142.904
21	2	02_IB_06	Infiltration Basin	Carteret	Swansboro	7/14/2006		2/8/2007	B	6/16/2008	C	3	N 344142.904
22	2	02_LS_01	Level Spreader	Pitt	Bethel	None		10/12/2006	D	6/16/2008	D	2	
23	2	02_LS_02	Level Spreader	Pitt	Bethel	None		10/12/2006	C	6/16/2008	C	3	
24	2	02_LS_03	Level Spreader	Pitt	Bethel	None		10/12/2006	C	6/16/2008	D	2	
25	2	02_PSH_01	Preformed Scour Hole	Beaufort	Washington	None	2002	7/18/2007	B	6/16/2008	B	4	
26	2	02_PSH_02	Preformed Scour Hole	Craven	Clayton	None	2006	4/23/2007	C	6/16/2008	D	2	
27	2	02_PSH_03	Preformed Scour Hole	Jones	Pollocksville	None	2004	7/18/2007	B	6/16/2008	C	3	
28	2	02_PSH_04	Preformed Scour Hole	Greene	Snow Hill	None	2004	7/18/2007	C	6/16/2008	D	2	
29											16	50	3.13
30	3	03_BS_01	Bioretention Basin	Duplin	Warsaw	6/22/2006	2003	5/9/2006	A	12/04/2007	B	4	N 452107.431
31	3	03_DDB_01	Dry Detention Basin	New Hanover	Castle Hayne	6/21/2006	2002	5/9/2006	C	6/13/2007	B	4	N 221325.801
32	3	03_DDB_02	Dry Detention Basin	Pender	Scotts Hill	9/13/2006		5/9/2006	A	10/14/2007	A	5	N 208525.256
33	3	03_HSB_01	Hazardous Spill Basin	Brunswick	Shallotte	6/21/2006		5/15/2006	A	9/24/2007	A	5	N 82224.798
34	3	03_HSB_02	Hazardous Spill Basin	New Hanover	Wilmington	6/21/2006	1990	5/9/2006	A	6/11/2007	B	4	N 171946.631
35	3	03_HSB_03	Hazardous Spill Basin	Duplin	Warsaw	6/22/2006	1985-89	5/9/2006	B	9/26/2007	B	4	N 452817.818
36	3	03_IB_01	Infiltration Basin	Pender	Surf City	7/27/2006	2005	5/7/2007	B	2/14/2008	B	4	
37	3	03_IB_02	Infiltration Basin	Pender	N. Topsail Beach	7/27/2006	2005	5/7/2007	C	2/14/2008	C	3	
38	3	03_IB_03	Infiltration Basin	Pender	Surf City	6/20/2006	2005	5/7/2007	B	2/14/2008	B	4	
39	3	03_IB_04	Infiltration Basin	Pender	N. Topsail Beach	7/27/2006	2005	5/7/2007	D	2/14/2008	D	2	
40	3	03_IB_05	Infiltration Basin	Pender	N. Topsail Beach	7/27/2006	2005	5/7/2007	D	2/14/2008	D	2	

## **APPENDIX B: DOT Organization Structures**

# ALDOT Offices with Stormwater Responsibilities

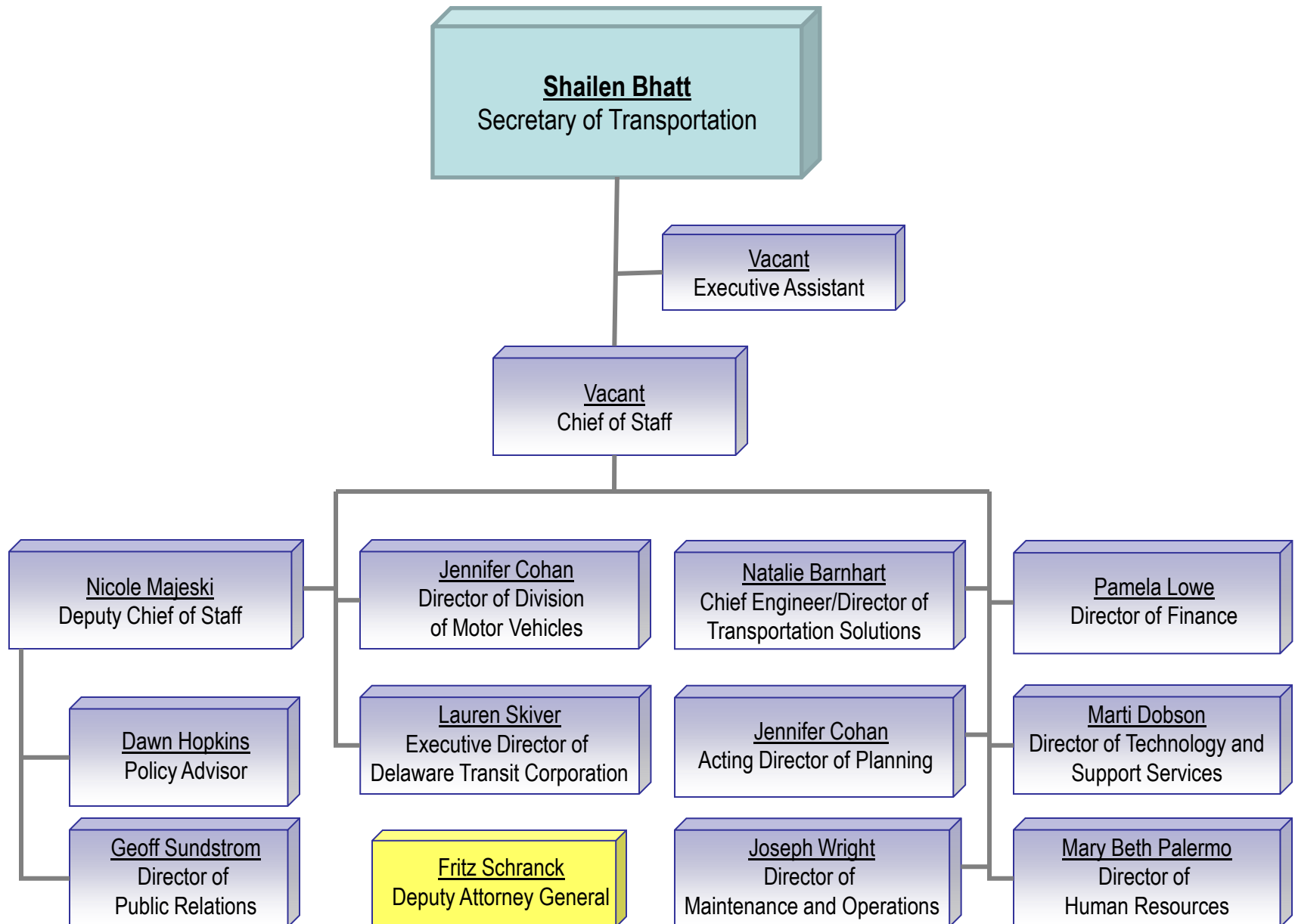




# Organizational Functions

# Office of the Secretary

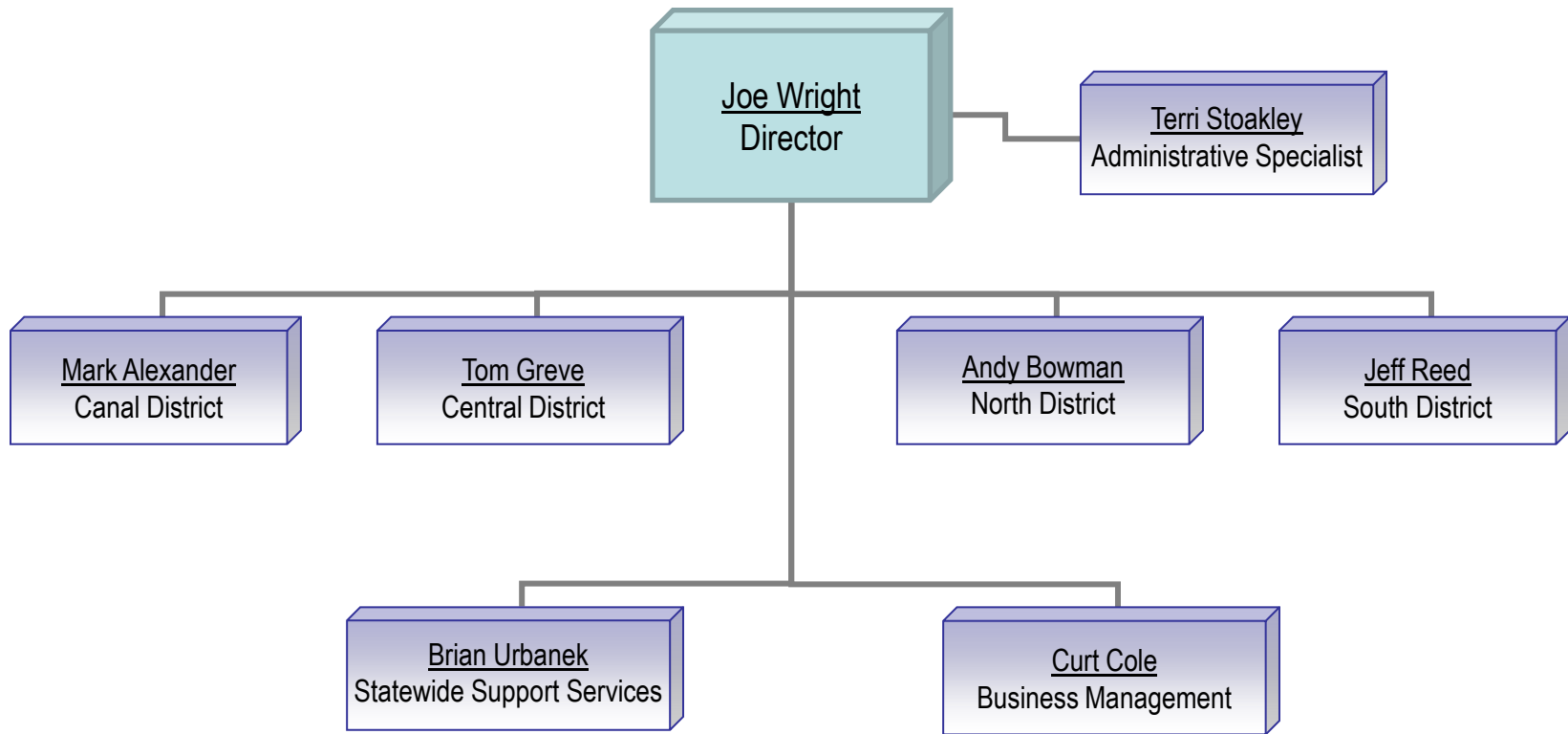
May 2012



## Organizational Functions

## Delaware Department Of Transportation Maintenance & Operations

May 2012

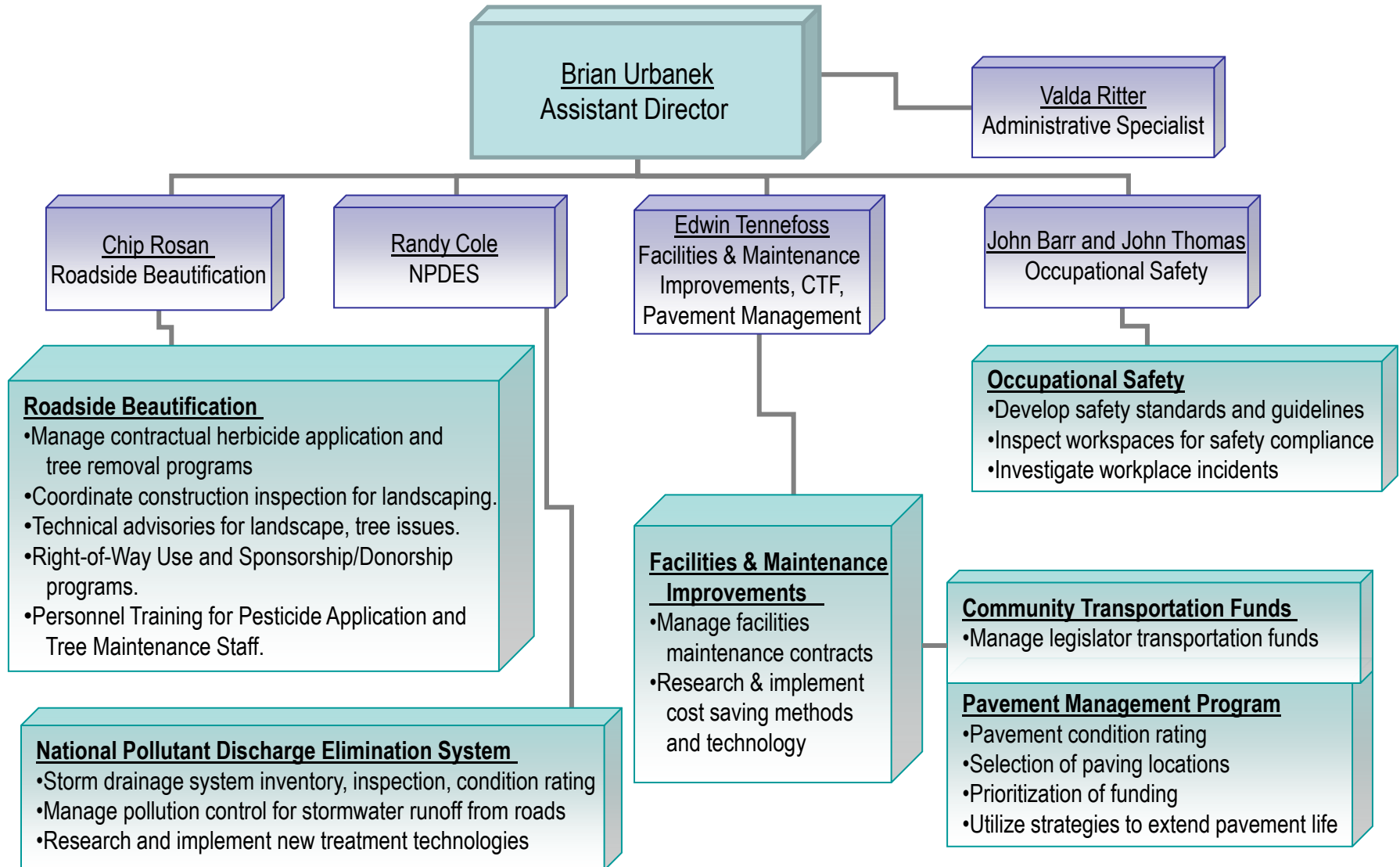




# Organizational Functions

## Delaware Department Of Transportation Maintenance & Operations Statewide Support Services

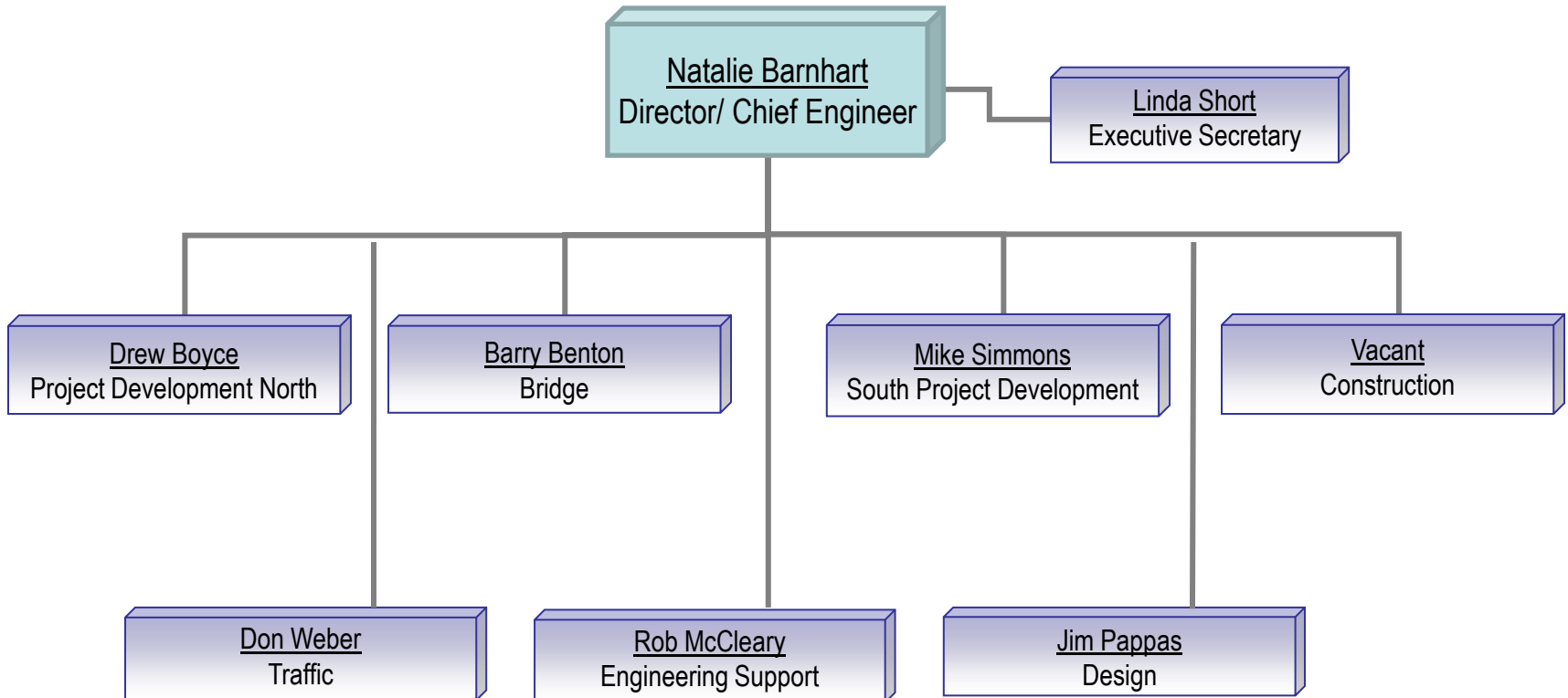
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# Organizational Functions

## Delaware Department Of Transportation Transportation Solutions

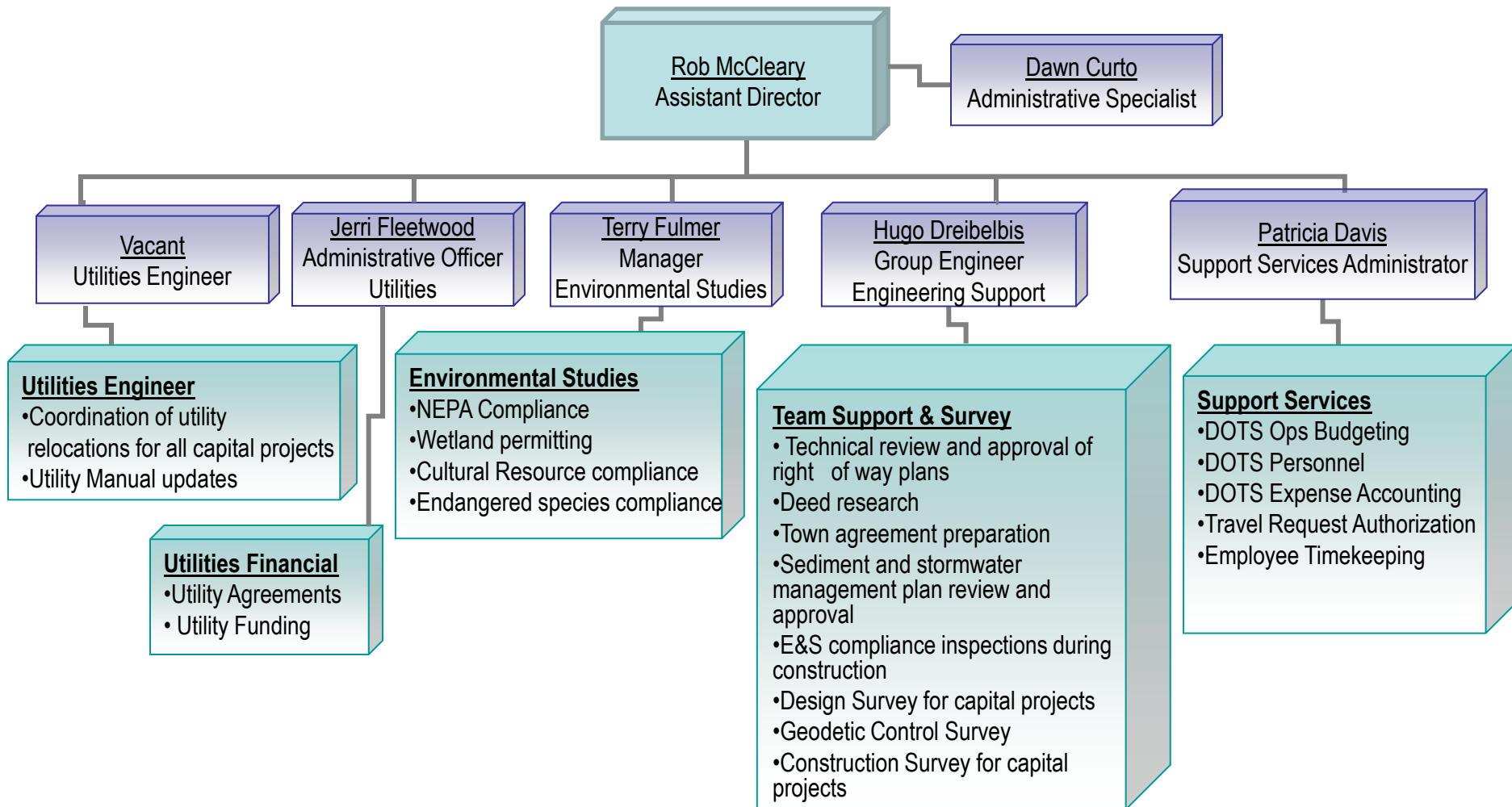
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# Organizational Functions

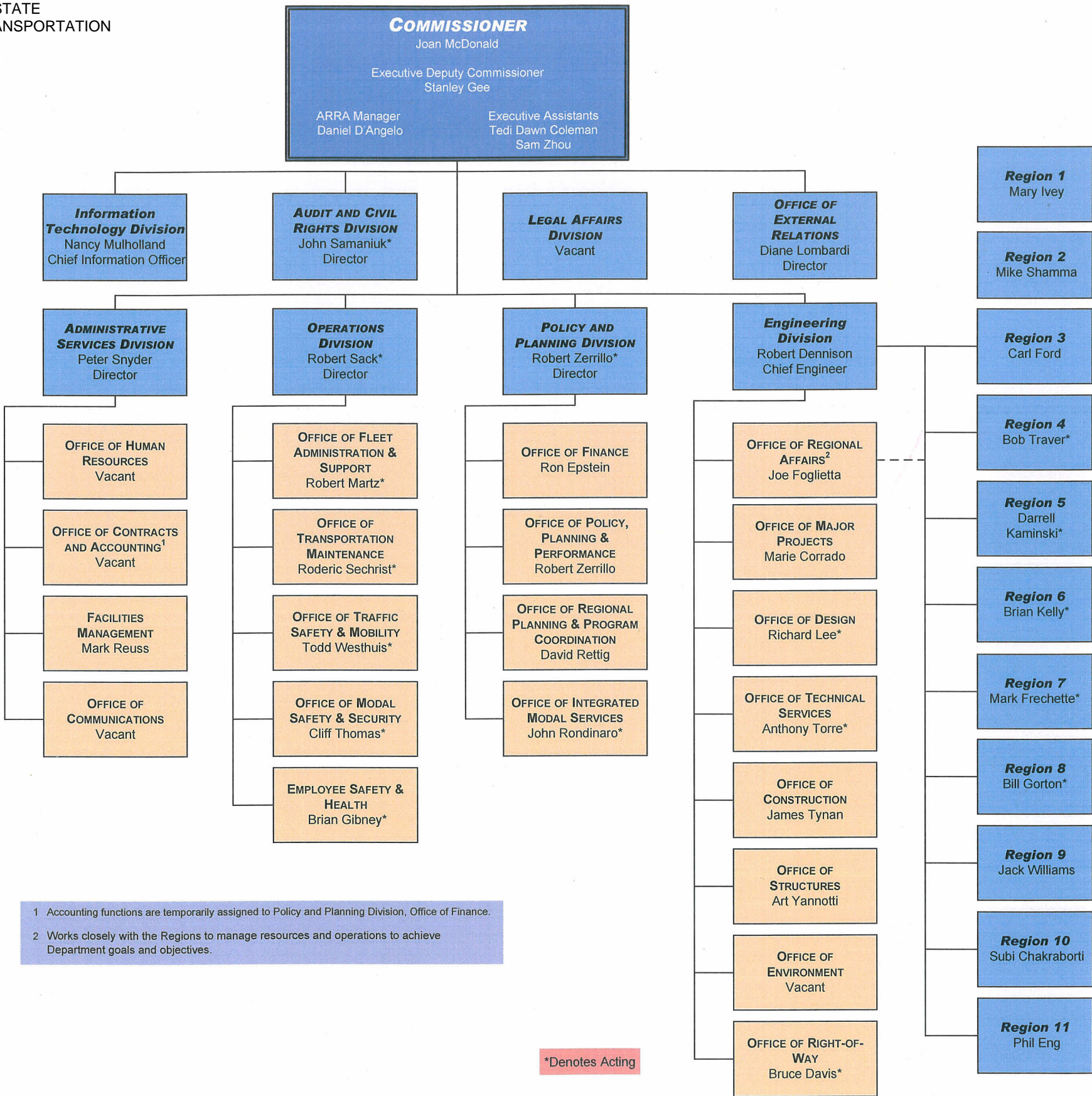
## Delaware Department Of Transportation Transportation Solutions Engineering Support

May 2012





NEW YORK STATE  
DEPARTMENT OF TRANSPORTATION

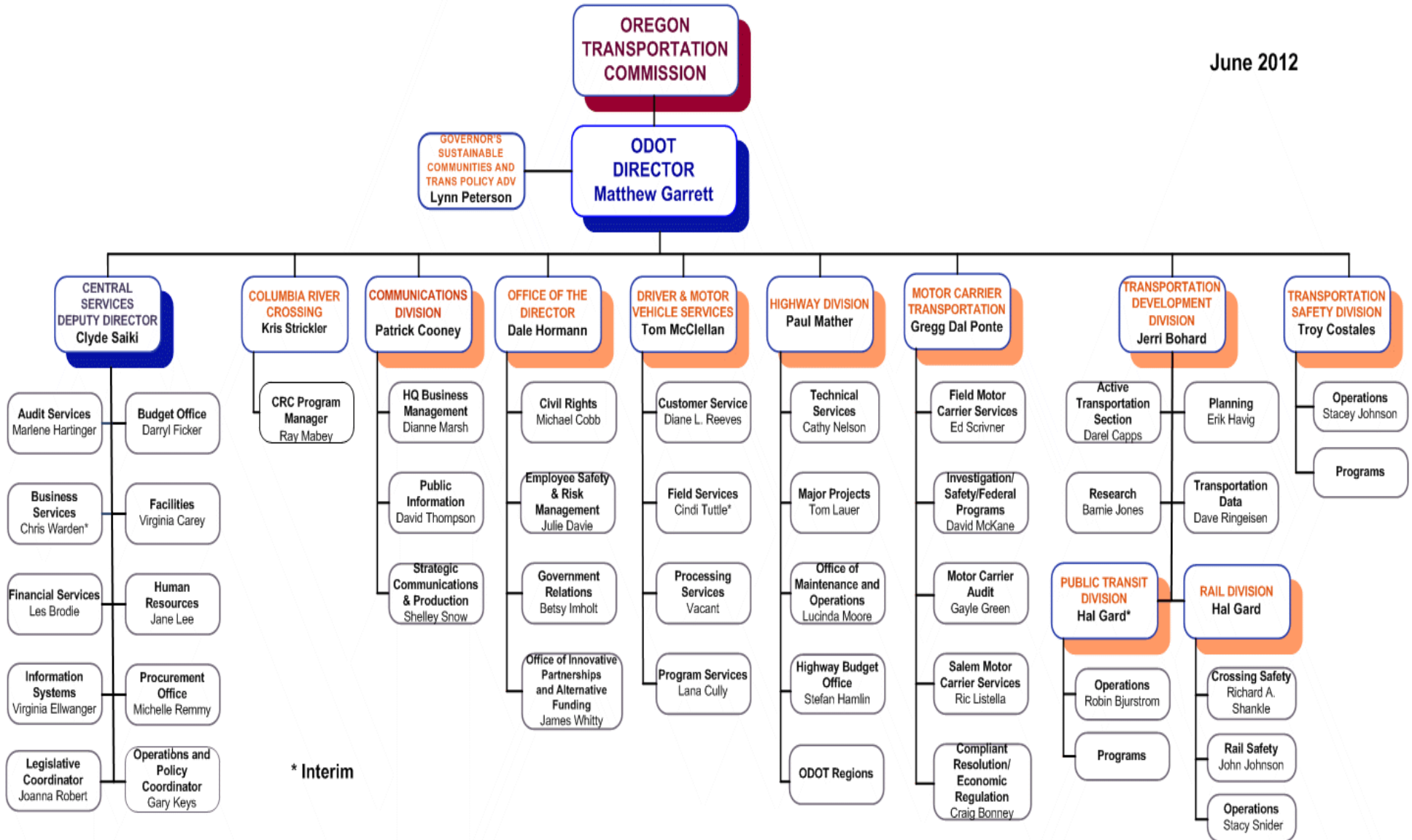


Approved Stanley Gee 4/18/11  
Stanley Gee Date  
Executive Deputy Commissioner

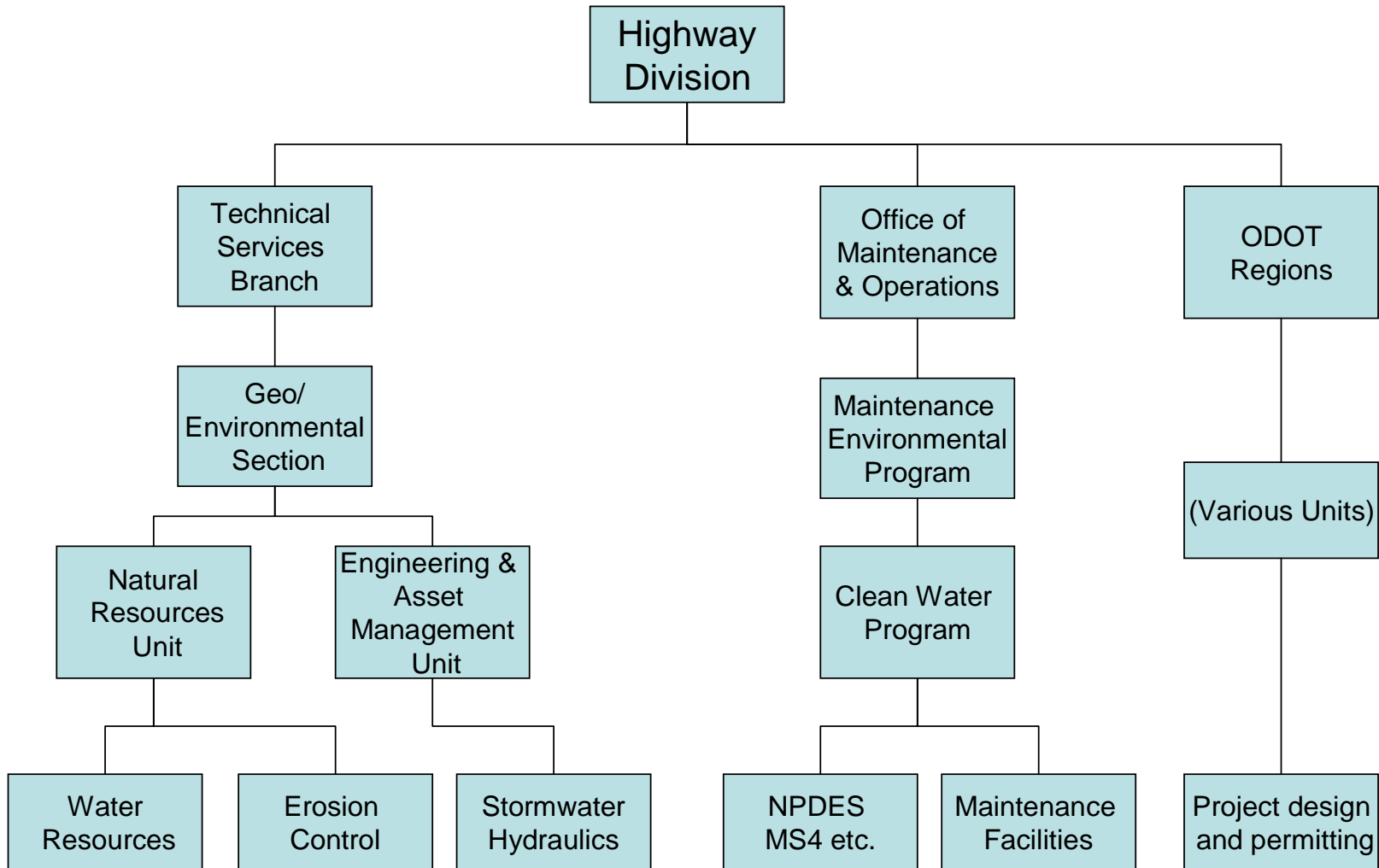


# Oregon Department of Transportation

June 2012



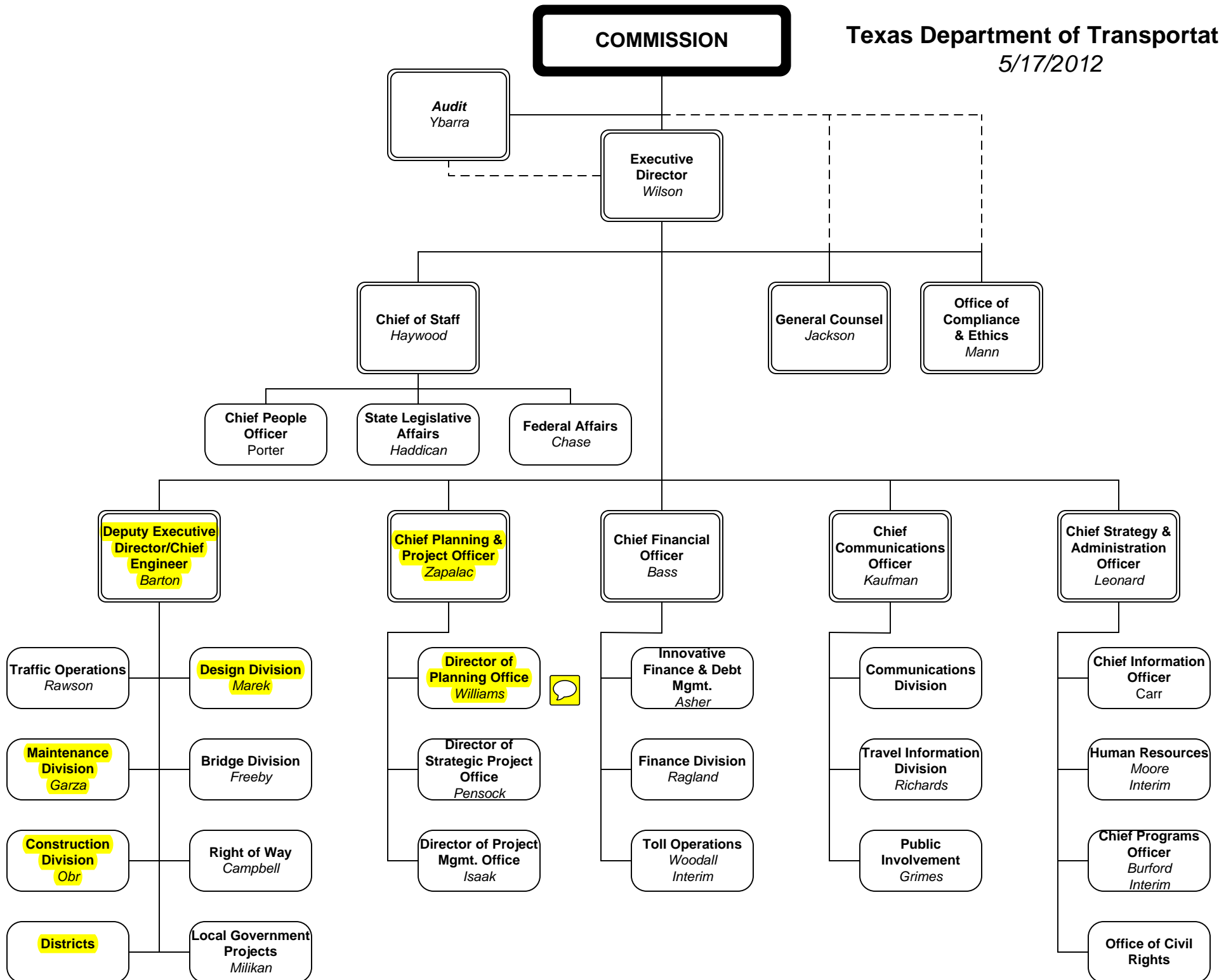
## Oregon DOT Stormwater Organization Chart



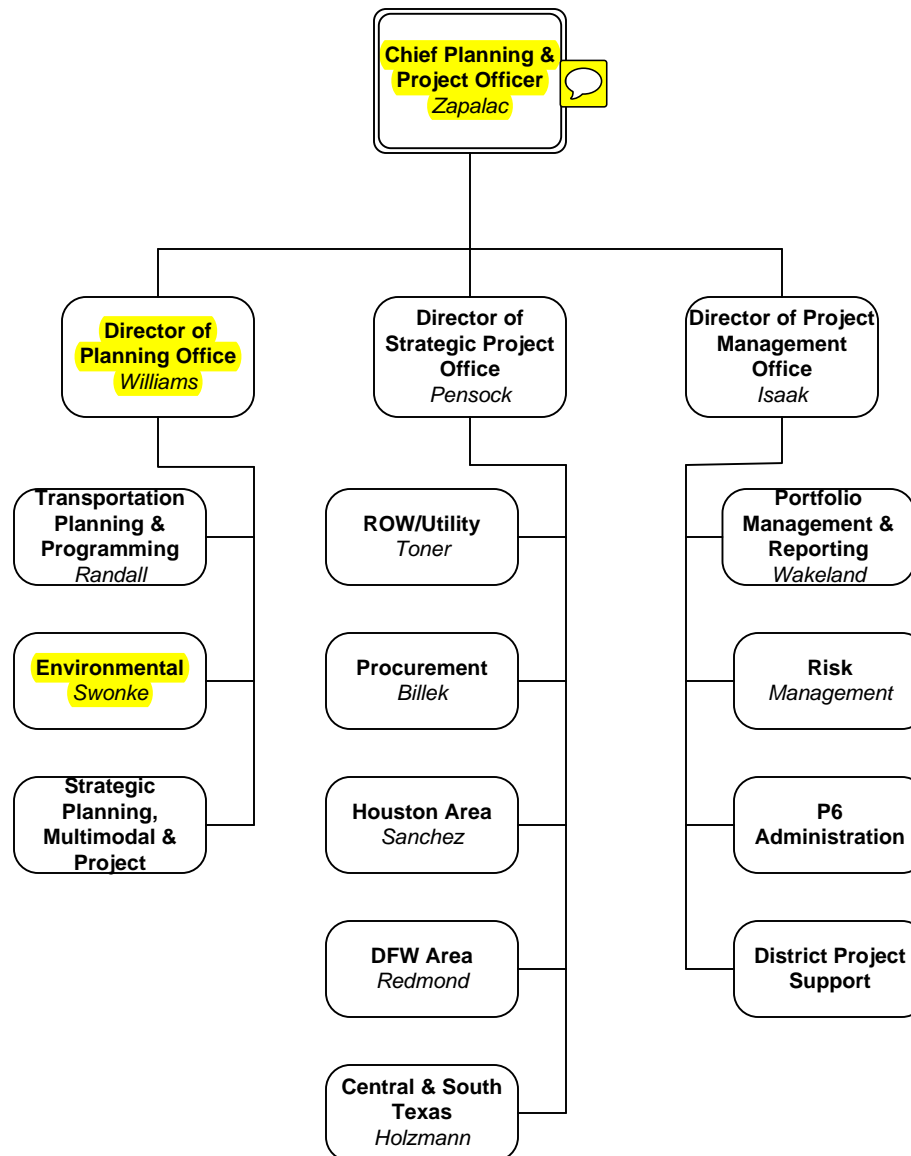
# COMMISSION

Texas Department of Transportation

5/17/2012

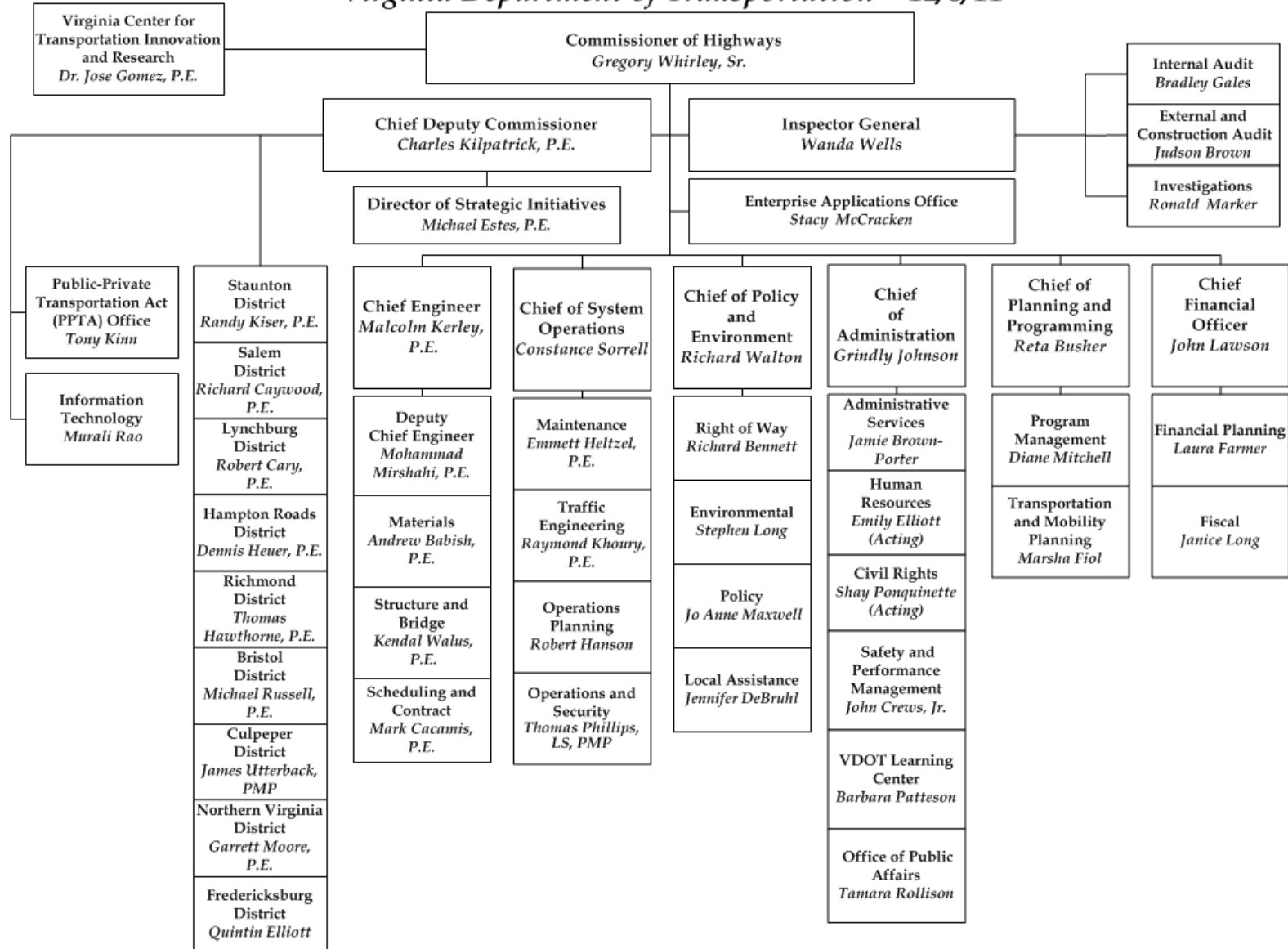


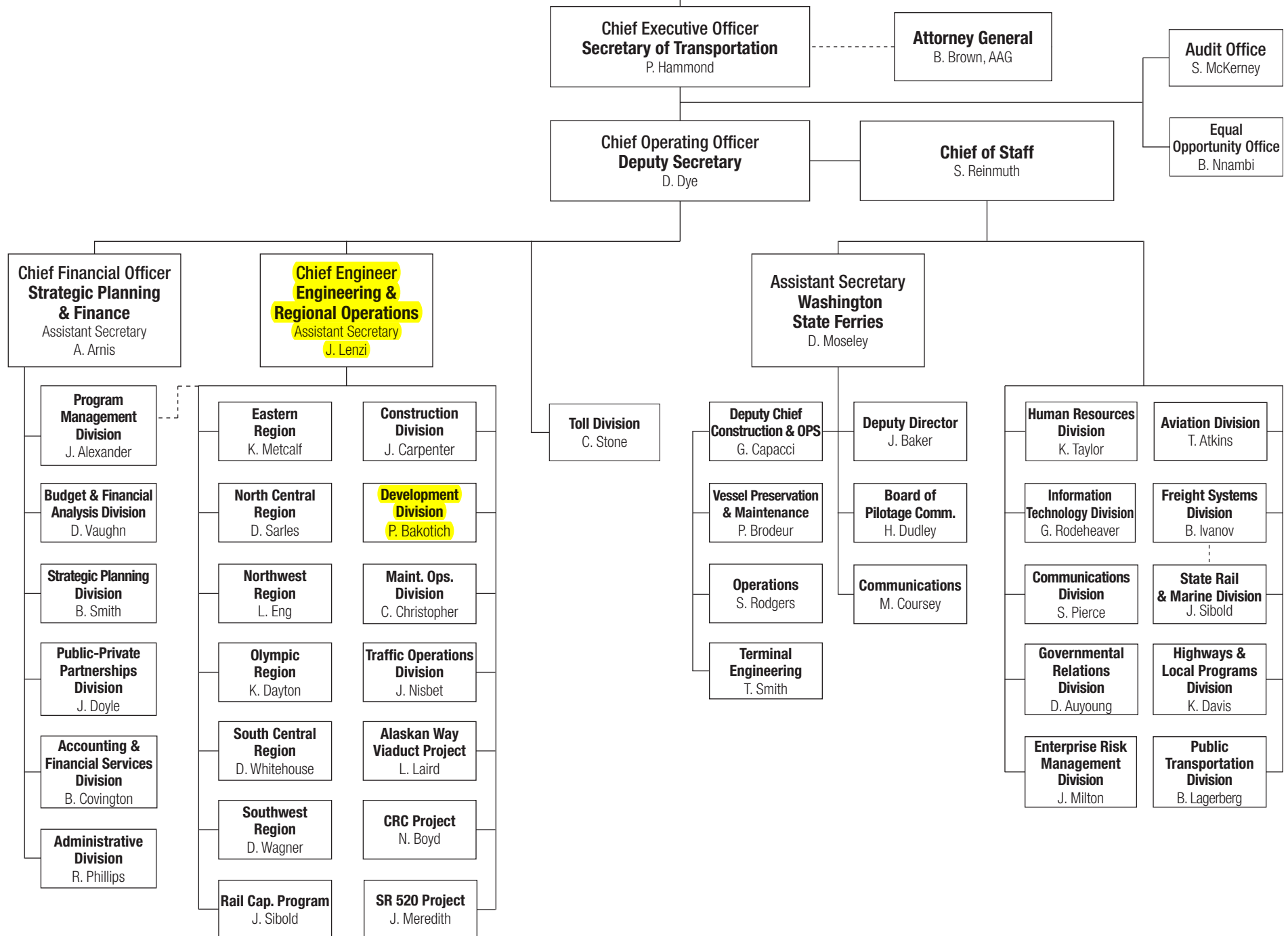
**TxDOT Chief Planning & Project Office**  
5/17/2012



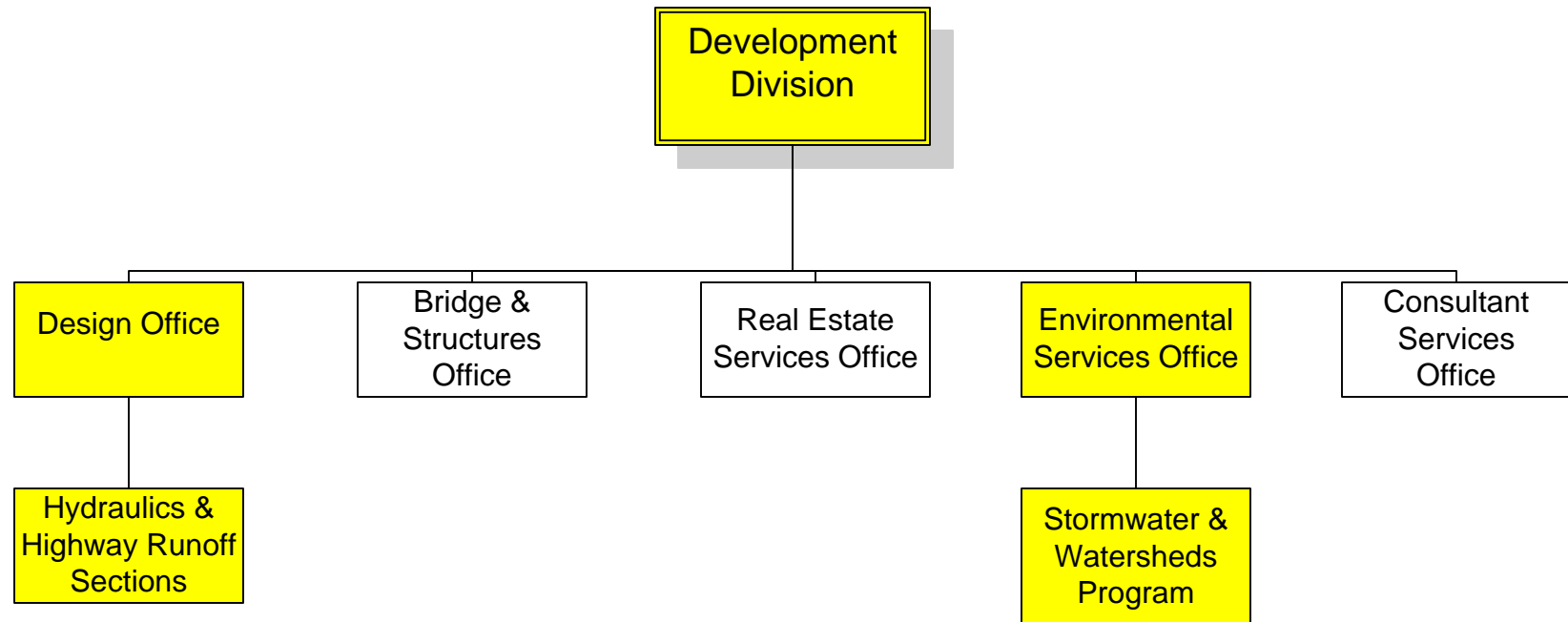


# Virginia Department of Transportation - 12/5/11





# Washington State Department of Transportation Sub-Executive Level Organization for Stormwater





# Wisconsin Department of Transportation Organizational Chart with environmental positions highlighted as of June 2012

