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IDENTIFICATION AND IMPLEMENTATION OF BEST MANAGEMENT PRACTICES FOR EROSION AND SEDIMENT CONTROL THAT CONFORM TO INDIANA STORM WATER QUALITY REGULATIONS AND GUIDANCE

by

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The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the Indiana Department of Transportation and Federal Highway Administration. This report does not constitute a standard, specification or regulation.

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Technical Report Standard Title Page (Form DOT F 1700.7 [8-69]) 16. Abstract

The study identifies the best management practices (BMPs) for erosion and sediment control that conform to Indiana storm water quality regulations and the Indiana Storm Water Quality Manual. Recommendations are made for modification of the Indiana Department of Transportation (INDOT) Standard Specifications and other documents, consistent with the proposed BMPs.

The INDOT NPDES storm water permit application, originally prepared in September 2003 and submitted to the Indiana Department of Environmental Management, was to have been revised and resubmitted during this study period, but was not. The study, instead, focuses on INDOT storm water quality issues attendant to the revision and makes recommendations for addressing these issues.

Recommendations are made for the organization and content of an erosion and sediment control certification and training program for INDOT and contractor personnel.

The Kentucky Erosion Prevention and Sediment Control Field Guide was modified, with the approval of the Kentucky authors/publishers, for use as an Indiana field guide.

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INTRODUCTION

Storm water run-off from construction sites contributes pollution to surface water, which can pose a risk to public health and the environment. Run-off from construction and other "land-disturbing" activities usually causes erosion and transports soil and contaminants to water bodies which settle as sediment or remain in suspension.

Operations that result in land disturbance of more than one acre are required by state and federal regulations to implement erosion and sediment control best management practices during and following construction.

State departments of transportation, as the owners and operators of highway construction projects, are among those entities regulated.

The Indiana Department of Environmental Management (IDEM) administers the Indiana statute titled "Rule 5. Storm Water Runoff Associated with Construction Activity" (327 IAC 15-5-1), which includes a requirement for a general permit, pursuant to the National Pollution Discharge Elimination Systems (NPDES) regulation; the development of a Storm Water Pollution Prevention Plan (SWPPP) for both construction and post-construction as part of a construction plan; a Notice Of Intent letter, including an operator's certification that the stormwater quality measures in the construction plan comply with the SWPPP requirements and that the implementation of the storm water quality measures will be inspected by trained individuals, among other requirements.

The "Indiana Storm Water Quality Manual, Planning and Specification Guide for Effective Erosion and Sediment Control and Post Construction Water Quality," published by the Indiana Department of Environmental Management (October, 2007) and found at http://www.in.gov/idem/4899.htm,

"provides guidelines and specific water quality measures for controlling soil erosion; controlling and treating non-point source pollution associated with sediment-laden runoff; and the management and treatment of pollutants associated with post-construction land uses."

The guidance manual includes over 303 pages of various erosion and sediment control measures associated with construction activities and over 155 pages of structural storm water quality measures associated with post-construction reduction of storm water pollutants; however, the control measures are not compared one to another in terms of efficiency or cost/benefit.

A previous Joint Transportation Research Project (JTRP) study titled,
"Assessment and Selection of Stormwater Best Management Practices for Highway

Construction, Retrofitting, and Maintenance" (FHWA/IN/JTRP-2006-5), October 2006,
identified as SPR-2853 (found at

http://rebar.ecn.purdue.edu/jtrp_redesign/Home/default.aspx) [Under Research & Reports click Completed Research and Publications; enter 2853 in the box and click Project Number and click Find Publications to view report], contains recommendations for updating Indiana Department Of Transportation (INDOT) Standards and provides a matrix of information useful for selecting appropriate structural erosion and sediment control structures. Some of the report's recommendations were implemented by INDOT following the study's publication. The previous study's recommendations, along with additional measures, were compared in this study to the Indiana Storm Water Quality Manual guidance.

PROBLEM STATEMENT

Controlling erosion and sediment deposition as a result of storm water run-off at highway construction sites is required by federal and state regulations. Failure to exert control, by implementing appropriate best management practices (BMPs), delays construction, adds cost and can result in unnecessary financial penalties. INDOT officials have expressed concern that the erosion and sediment control strategies and specifications contained in the department's various Standards, design specifications and other contract documents do not conform to the guidance in the IDEM manual. This study compared the requirements of the department's current standards and those of the IDEM manual and made recommendations to ensure INDOT's policies and practices conform with the IDEM guidelines. Though measured improvements have been made in recent years, INDOT: (1) has yet to receive approval of its NPDES permit application submitted to IDEM September 24, 2003; (2) operates using standards, design specifications, standard drawings and permit requirements that, with few exceptions, do not match the recently updated IDEM Storm Water Quality Manual; (3) could benefit from improved consistency in its administration of erosion and sediment control provisions in contracts from one contractor to another and from site to site; (4) lacks a compendium of recommended erosion and sediment control BMPs within standards that conform to Rule 5; and (5) employs staff that need additional knowledge and tools to select the appropriate BMPs for site conditions.

It is estimated that approximately 50 IDEM inspection reports ("On-site Evaluation for Erosion and Sediment Control") are filed with INDOT each year. It is estimated that over 30 highway construction projects per year are in violation of Rule 5.

A review of a sampling of these reports reveals that a majority of the evaluations are "unsatisfactory" for most of the following items –

- installation of appropriate erosion and sediment control measures;
- implementation of perimeter control measures;
- protection of conveyance channels with appropriate control measures;
- proper installation of control measures;
- protection of storm drain inlets;
- stabilization of storm drain outlets;
- proper maintenance of existing control measures.

In some of the reports, IDEM Rule 5 inspectors commented about encountering "numerous incidents of inappropriate measures" and that "many of these inappropriate measures do not meet any design or construction standards."

The INDOT Construction Evaluation Review (Updated January 2008) [Janssen & Spaans Engineering, Inc.] confirms this observation. One of the "Ideas for Improvement" included in that report is:

"INDOT needs to develop recurring special provisions and standard details for erosion control items. Each designer is basically required to develop their own special provisions and some non-standard details for each project assignment."

The Review reports that for the 1999-2007 period, nine percent of the projects were rated as requiring major and moderate changes for "Environmental Considerations" and six percent as requiring this level of change for "Erosion Control."

On August 6, 2008, the INDOT Commissioner signed an Agreed Order with the IDEM regarding violations of Rule 5 on a project site in Terre Haute. The Agreed Order issued August 18, 2008 cites 11 violations observed by IDEM inspectors during the period September 29, 2006 through December 10, 2007. Failure to meet the terms and conditions of five specific provisions of the Agreed Order could result in stipulated penalties ranging from \$250 to \$500 per week for each provision. The Order is in effect for one year from date of issuance or until the project is terminated and accepted by IDEM.

Failure to correct deficiencies can result in Notices Of Violation and, ultimately, civil penalties up to \$27,500 per day. The cost savings to the department is, in part, the avoidance of potential costs associated with regulatory non-compliance.

As part of the Federal Highway Administration's (FHWA) Stewardship role, it initiated, with INDOT, a review of waterway permits in 2007 and repeated the review in 2008. The permit review focused on construction field reviews to determine how well permit conditions were being met. The review report, dated September 30, 2008, included the "findings" found in Appendix A.

The deliverables identified in this study are intended to assist INDOT's compliance with Rule 5, IDEM orders and FHWA recommendations by ensuring standardized contract administration from one construction site to another and the implementation of BMPs that conform to Rule 5.

OBJECTIVES OR PURPOSES

The study was intended to result in changes in INDOT standards, policies and procedures to reduce construction costs due to delays, conflicts over specification requirements or penalties associated with regulatory non-compliance. A compendium of BMPs that are cost effective and conform to IDEM-accepted strategies for erosion and sediment control were prepared. The policies, procedures and strategies, together, are intended to improve communication and uniformity between INDOT and its contractors, resulting in adherence to construction management schedules and environmental protection objectives. The objectives of the study were to –

- update the BMP list, descriptions and matrix in SPR-2853 to comport with the IDEM Storm Water Quality Manual and submit to the 205 Committee for review and approval;
- review the recommendations in SPR-2853 for revision of INDOT Standard
 Specifications and other documents and recommend changes to the Standards
 Committee;
- 3. revise INDOT's Rule 13 NPDES Stormwater permit application to IDEM;
- 4. develop, adapt or adopt from other sources an Erosion and Sediment Control training curriculum;
- 5. prepare of a field manual of BMPs and pertinent INDOT standards that have been revised as a result of objective 1. and 2., above.

WORK PLAN

The JTRP study was initially administered by the Clean Manufacturing

Technology Institute at Purdue University. The Principal Investigator (PI) was the

Director of the Institute. The BMP and INDOT standards research and update of the

BMP matrix was contracted to Christopher B. Burke Engineering, Ltd. (CBBEL), the

contractor for the SPR-2853 JTRP study. Following the closing of the Institute on June

30, 2009, the study was contracted to CBBEL and the PI sub-contracted to that firm.

CBBEL's previous involvement in the SPR-2853 study, its immediate access to relevant research and databases and its role as a reviewer of the IDEM Storm Water Quality Manual, reduced the duration of the project from 24 to 18 months and its expertise on the storm water regulations and erosion and sediment control strategies was a definite asset to the study.

The PI assisted with the preparation of the original NPDES permit application submitted to IDEM in 2003; he has expertise in training curriculum development and has authored or co-authored compliance and other manuals similar to the field manual proposed here.

The PI worked closely with the Study Advisory Committee (SAC) because (1) some INDOT members of the SAC are those responsible for implementing the products and findings of the research study; (2) these same INDOT members are the subject matter experts in the department and (3) the "outside" (non-INDOT) SAC members are the most knowledgeable resource people for the subject area.

The PI solicited general information, data, records, regulatory and engineeringspecific information from identified or known sources via telephone, personal or email request. Records of such requests were maintained. Requests for confidentiality were respected and attribution to all sources was provided when not otherwise restricted.

Benefits and Cost Savings

The deliverables described in the next section will improve the management of storm water-related aspects of highway projects while reducing costs and the number and duration of construction delays, improving regulatory compliance and protecting the environment through improved control of erosion and sediment deposition.

The revised standards and design specifications for BMPs will provide uniformity from one construction project to the next while allowing for differences in site conditions and character. This will reduce the frequency and, therefore, the cost of change orders resulting from discrepancies or lack of uniformity in construction contracts. The cost of change orders for FY 2008, derived from a partial review of project files, was estimated by an INDOT staff person to be \$150,000.

The cost of active construction temporary BMP installation, maintenance and removal in new highway construction is paid for by the construction contract, which has federal share, while the cost of BMP maintenance is paid from INDOT's operating budget. The selection and installation of the most cost-effective BMPs should reduce capital costs and those that have lower maintenance demands will reduce operating budget expenses for this activity.

¹ Note: this figure is undoubtedly a gross underestimate. The Janssen & Spaans INDOT "Construction Evaluation Review, Updated January 2008" (for projects completed from 1999 to 2007) cites one underdrain flow line change order cost of \$141,000 (p. 22). In the Summary of Constructability Screening Questions, "drainage plans" rank third after "Quantities" and "Pay Items" in the "magnitude of the changes needed" for all three levels: major, moderate and minor. Environmental Related "Reasons" for Change Orders Caused by Errors and Omissions, Constructability and Changed Field Conditions constituted about \$5 million of the \$113 million (4.4%) in change orders for the period July 2007 to June 2009. (E-mail, August 12, 2009 from Ron Heustis re: "Summary of Cost Data.")

Deliverables

- 1. The matrix of BMPs contained in SPR-2853 includes the type, installation and maintenance costs, maintenance requirements and water quality or quantity benefits. This was expanded during this study's research to include a review of the BMPs referenced in the IDEM Manual (Chapters 7 and 8) and other sources. IDEM reports of Rule 5 compliance inspections were also analyzed to determine the BMP strategies recommended or required by IDEM inspectors. Cost information for the installation and maintenance of each BMP were researched and included in the matrix. The recommended BMPs will be reviewed by the Design and Construction Management divisions and they will submit their recommendations to the Section 205 Committee.
- 2. Project staff, with guidance by the SAC, updated the recommendations of the previously published SPR-2853 report. This report reviews every manual, compendium and report of stormwater BMPs extant during the study period (January 1, 2004 June 30, 2006) and organizes the BMPs extracted from those documents in various matrices, as described previously. Each selected BMP is described in another section of the report, according to its use, advantages and limitations and a description and diagram of the BMP is provided. The previous JTRP study also reviewed 45 INDOT documents related to the design, construction and maintenance of state highways and the final section of the Study includes approximately 185 recommendations for updating those documents to comport with the storm water regulations. The current study compared the recommendations in the SPR-2853 report against the guidance in the Indiana Storm Water Quality Manual. The

- resulting recommendations for change to the documents were made to the INDOT Section 205 Standards Committee.
- INDOT's Rule 13 NPDES Storm water permit application, submitted September 24,
 2003 to IDEM, will be revised based, in part, on the recommendations of this study.
- 4. An Erosion and Sediment Control training curriculum was to be developed, adapted or adopted from other sources for INDOT design and construction management staff and construction contractor employees. Rule 5 requires INDOT and its contractors to employ a "trained individual" on the construction project. This person is defined in Section 4 (41) of the Rule as:

"an individual who is trained and experienced in the principles of storm water quality, including erosion and sediment control as may be demonstrated by state registration, professional certification, experience or completion of course-work that enable the individual to make judgments regarding storm water control or treatment and monitoring."

U.S. EPA guidance states that regular construction site inspections must occur and that inspectors [the "trained individual"] "must be familiar with the location, design specifications, maintenance procedures and performance expectations of each BMP." [NPDES Fact Sheet: "Construction Site Operator BMP Inspection and Maintenance" found at:

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=factsheet_resu lts&view=specific&bmp=110] This study recommended the satisfactory completion of a training program and certification as the minimum requirement for a "trained individual" on INDOT highway construction projects. The training requirements are further defined for both INDOT and contractor personnel.

Existing certification and training programs, such as the Certified Professional in Erosion and Sediment ControlTM (CPESC), the National Highway Institute's "Design and Implementation of Erosion and Sediment Control" course (Number 142054) and those developed by other states and organizations were reviewed.

5. The content of a field manual containing relevant BMP information was recommended for INDOT and contractor personnel to aid decision-making about the design, selection and installation of the appropriate BMP for specified site conditions. The recommended content conforms to the updated BMP matrix and relevant INDOT standards and design specifications which meet the IDEM requirements, as discussed above.

ANALYSIS OF THE DATA, CONCLUSIONS AND RECOMMENDATIONS, INCLUDING STRATEGIES FOR IMPLEMENTATION

This section of the report is organized by each study objective:

- I. Update the BMP list, descriptions and matrix in SPR-2853 to comport with the IDEM
 Storm Water Quality Manual;
- II. Review the recommendations in SPR-2853 for revisions of INDOT Standard Specifications and other documents;
- III. Revise INDOT's Rule 13 NPDES Storm water permit application;
- IV. Develop, adapt or adopt from other sources an Erosion and Sediment Control training curriculum;
- V. Prepare a field manual of BMPs and pertinent INDOT Standard Specifications useful to INDOT and contractor personnel.
- I. Update the BMP list, descriptions and matrix in SPR-2853 to comport with the IDEM Storm Water Quality Manual, and
- II. Review the recommendations in SPR-2853 for revisions of INDOT Standard Specifications and other documents

Staff of CBBEL reviewed the recommendations it made in the previous JTRP study - - SPR-2853, published October 2006 - - and made modifications to conform to the Indiana Storm Water Quality Manual, published the following year (October 2007). The revisions were posted on CBBEL's ftp website two weeks in advance of the June 18, 2009 SAC meeting. Most of that meeting was devoted to review and discussion of the revisions. From this meeting and subsequent communication with SAC members and

INDOT personnel, CBBEL staff compiled comments and additional information for further revision. The second round of recommended revisions were made to the BMP list and descriptions and the Standard Specifications and, again, posted to the ftp website. At its September 21 meeting, the SAC referred the recommended revisions to the Section 205 Standards Committee.

The revisions include:

- BMP Selection Criteria includes water quantity and quality data to aid in the selection of Construction and Post-Construction BMPs;
- BMP Standard Specifications includes the "Construction BMP List 2009" and the "Post-Construction BMP List" which identifies the recommended changes to the Standard Specifications, by section, chapter or drawing;
- Construction BMP List (SAC) identifies the BMPs recommended to be included in the Field Manual.

III. Revise INDOT's NPDES Stormwater permit application

Background

U.S. Environmental Protection Agency (EPA) regulations (40 CFR Parts 9, 122, 123 and 124) promulgated December 8, 1999 (Federal Register, p. 68721) www.gpoaccess.gov/fr/index.html require small, municipal, separate storm sewer systems (identified as "MS4s") to obtain National Pollutant Discharge Elimination System (NPDES) permits for storm water discharges. State transportation agencies are regulated by EPA as MS4s.

Indiana's authority to enforce the federal, and any more stringent state, regulation derives from the Indiana Administrative Code (IAC) 15-13: Storm Water Run-Off

Associated with Municipal Separate Storm Sewer System Conveyances (filed July 7, 2003: 26 Indiana Register 3577).

www.in.gov/legislative/iac/xml/old-ir/Vol26/11Aug/00FRONT.PDF

Section 15 of IAC 15-13 requires an MS4 operator to develop a Storm Water Quality Management Plan (SWQMP) "that includes a commitment to develop, implement, manage and enforce an erosion and sediment control program for construction activities that disturb one (1) or more acres of land..."

Section 16 requires that the SWQMP include "a commitment to develop, implement, manage and enforce a program to address discharges of post construction storm water run-off from new development...areas that disturb one (1) or more acres of land..."

Both Sections 15 and 16 of IAC 15-13 (Rule 13) incorporate provisions of IAC 15-5 (Rule 5), Storm Water Run-Off Associated With Construction Activity (filed October 27, 2003: 27 Indiana Register 833).

www.in.gov/legislative/iac/xml/old-ir/Vol27/03Dec/00FRONT.PDF

INDOT, as a regulated MS4, is required to obtain a permit incorporating the provisions of Rule 13 and its construction projects exceeding one acre are required to be permitted pursuant to Rule 5. IDEM decided in 2004 to issue INDOT an individual storm water permit pursuant to 327 IAC 5-4-6 (filed July 7, 2003: 16 Indiana Register 1764), but to include the requirements of Rule 13.

www.in.gov/legislative/iac/ir/old-

ir/Vol26/11Aug/02F327010096.PDF?type=xx&vol=26&mes=08

The Rule 13 storm water permit application, which was originally submitted to IDEM on September 24, 2003, but never acted upon, resulted from a related JTRP study conducted by this study's Principal Investigator and published in November 2004 (See SPR-2752, Appendix A, found at

http://rebar.ecn.purdue.edu/jtrp_redesign/Home/default.aspx). [Under Research & Reports click Completed Research and Publications; enter 2752 in the box and click Project Number and click Find Publications to view report.]

Rule 13 Permit Development

OES staff convened a Rule 13 Permit Development committee meeting on July 29, 2009. The purpose of the meeting was to review the previous NPDES permit application submitted to IDEM and define the tasks and timeline necessary for the revision and updating of the application. The original deadline of October 31 for revision was considered too soon for involvement of other INDOT interests and for management review. Consideration was given to adjusting the timeline, given IDEM's expectation that the revision would be submitted before the end of 2009. INDOT continues to work with IDEM on the method and plan to implement NPDES requirements.

The remainder of this report on Objective III. will address issues attendant to the revision of the permit application.

Environmental Sensitivity Analysis for Establishing Priorities Among State-Maintained Highway Segments

Rule 13, Section 7(a) requires an MS4 operator to "characterize the water quality of all known waters that receive storm water outfall discharges within the MS4 areas." The primary criteria for performing this task is in (a)(2): identify "known sensitive areas,

such as public swimming areas, surface drinking water intakes, waters containing threatened or endangered species and their habitat, or state outstanding resource and exceptional use waters."

During the period 2002-2004, the Principal Investigator researched and created a Water Quality Monitoring and Characterization Model for State-maintained Highways. The majority of this research is reported in the previously cited SPR-2752. A four-level "sensitivity" ranking system was created to classify all waters of the State, using the (a)(2) criteria.

The waters (waterways, waterbodies) were classified as Sensitivity Level 1, 2, 3 and 4 and the highways, likewise, were classified as "Priority" 1, 2, 3 and 4 to correspond to their proximity to these sensitive waters, using the (a)(2) criteria singularly and in combination. Another criteria was added by the researcher to identify highway segments within one mile of the sensitive waters, but not otherwise prioritized by the (a)(2) criteria.

The INDOT highway GIS database was not complete during the above period, necessitating the use of the U.S. Bureau of the Census database. Of the 12,065 miles of state highway recorded (there were 11,216 actual miles, according to INDOT), 5,327 were classified by the four-level system:

Level	Miles	Percent Total Miles
1	365	3.0
2	175	1.5
3	588	4.9
4	4199	34.8

The INDOT committees established during this period by the Environmental Services Section reviewed the proposed priority system and subsequently decided to focus on the Priority 1 and 2 highway segments, both within and outside the MS4 areas and, with this decision, broadened the scope of INDOT's Rule 13 permit application beyond MS4 areas; the rationale being that any policies, procedures and practices implemented by a state agency needed to apply state-wide, not only to the relatively limited MS4 geographic areas.

During the current study, the Principal Investigator recommended that the Rule 13 permit application revision focus on the Priority 1 and 2 highway segments, to conform to the previous INDOT decision. The reason for this recommendation was two-fold: (1) the focus on relatively fewer highway miles allows INDOT to "pilot-test" its policies, procedures and practices pertaining to storm water control, and (2) when the original permit application was submitted to IDEM in 2003, it was uncertain whether INDOT would be required to monitor storm water quality; the revised permit application will, undoubtedly, have to address monitoring as a permit requirement and the scope of the monitoring program - - for <u>all</u> sensitive waters proximate to <u>all</u> priority highways - - would be overwhelming.

To further narrow the focus, the recommendation included only those highway segments within one mile of a sensitivity level 1 or 2 waterway both within and outside karst areas - - the focus can, subsequently, be broadened to include segments identified by the other (a)(2) criteria.

The inclusion of karst areas pertains to an October 13, 1993 agreement between INDOT, IDEM, Indiana Department of Natural Resources and the U.S. Fish and Wildlife

Service imposing special conditions on storm water controls for construction within the state's identified karst areas.

The narrowed recommendation based on the one-mile proximity criteria, only, applies to 82 of the total 365 Priority 1 miles (22%) and 64 of the total 175 Priority 2 miles (37%) shown in the previous table. The next table shows the distribution of these miles in and outside of MS4 areas and within and outside karst areas:

	Total Miles	In MS4 Areas	Outside MS4s
Dui onity, 1	82	11	71
Priority 1	82	11	/1
Within Karst	40	0	40
Outside Karst	42	11	31
Priority 2	64	13	51
Within Karst	5	0	5
Outside Karst	59	13	46
Combined	146	24	122
Within Karst	45	0	45
Outside Karst	101	24	77

The identification and length of the Priority 1 and 2 highway segments within and outside MS4 areas are found in Appendix B. Over 20 of the 24 combined MS4 miles are in the LaPorte District and 94 percent of the combined Priority 1 and 2 miles are about equally distributed between the Crawfordsville, LaPorte, Seymour and Vincennes Districts.

The Principal Investigator, through Larry Theller, GIS Technician, Purdue
University Department of Agricultural and Biological Engineering, requested and
received INDOT's "statewide asset layer for the drainage features [from] the work
management system," from the GeoSpatial Solutions Supervisor, Joel Bump. Combining
this layer (for underdrain outlets, culverts, ditches) with a public layer for bridges and the
"buffer" layers for Priority 1 and 2 highways, a series of GIS maps have been produced
for the priority highways. No GIS outfall (termini of highway point-source drainage at or
near a state waters) database has been completed by INDOT, so the culvert, ditch and
bridge locations along the priority highway segments, within the one-mile "buffer" along
a Sensitivity Level 1 or 2 waterway will have to be used, albeit with some interpretation,
to determine the location of outfalls for storm water monitoring and sampling, if required.

The culverts, underdrain outlets, ditches and bridges for priority 1 and 2 highways within and outside of MS4 areas and within karst areas are shown on a statewide map that can be accessed at: http://cobweb.ecn.purdue.edu/~caagis/jtrp_SPR2752/culverts.pdf. The number of culverts, underdrain outlets and bridges and the miles of ditch are included in a table on the map, for priority 1, 2 and 3 highways and are presented below for Priority 1 and 2 highways:

<u>Highways</u>	<u>Culverts</u>	<u>Underdrain</u> <u>Outlets</u>	<u>Ditches</u> (Miles)	<u>Bridges</u>
Priority 1	1545	265	369	165
In MS4s	357	2	40	64
In Karst	434	10	196	22
Priority 2	931	97	254	100
In MS4s	275	43	31	44
In Karst	94	13	81	11

An index webpage for the statewide map of highway structures is found at: http://cobweb.ecn.purdue.edu/~caagis/jtrp_SPR2752/index.pdf. The index map segments the state into 23 areas, each of which can be accessed to show the details of highway drainage structures for that area.

Another map at:

http://cobweb.ecn.purdue.edu/~caagis/jtrp_SPR2752/roadsMS4.pdf, shows priority 1 and 2 highway segments within and outside MS4s, including those in karst areas, as well as all state highways within MS4s.

Storm Water Outfall Location Identification

The "surrogate" outfall mapping procedure described above will require some interpretation by INDOT users; for example:

• the point source discharge from side ditches or other drainage structures that terminate at bridges over sensitive waters can be considered an "outfall." 327 IAC 15-13-5(52) defines "outfall" as "a point source discharge via a

- conveyance of storm water run-off into a water of the state." Section 5(54) defines "point source" as "any discernable, confined and discrete conveyance, including a pipe, ditch, channel, tunnel, conduit, well or discrete fissure." Section 5(10) includes "ditches, swales, curbs, gutters, catch basins, channels, storm drains and roadways" as "conveyances [used] for transferring storm water between at least two (2) points."
- therefore leading to an obvious conclusion about the termini being "outfalls," however, on-site inspections are advised because there may be natural (topographic, geological, vegetative) and constructed features that exist in the area between the designated highway segment and the sensitive waterbody that could prevent or reduce the quantity of storm water drainage from reaching the waterbody and/or reduce the contaminant loading (e.g., by filtering) of the storm water. Guidance and forms are provided in the previously cited SPR-2752 report (pp. 47-52) for conducting the on-site assessment to determine if the storm water run-off or discharge can reach the sensitive waterbody;
- the termini of culverts under highways that transfer storm water drainage from the highway, median or side ditch to waterways are definitely point sources and can be considered "outfalls," though "culverts" are not included in the Rule 13 lists of "point sources" or "conveyances." Most culverts, however, function only to conduct water from a waterway or waterbody on one side of a highway to the other side - - these are not storm water outfalls. The

previously referenced GIS database does not distinguish between the two categories of culverts, so an on-site inspection is required (or by reference to INDOT documents);

- underdrain outlets to the side ditch or other drainage structures are designated
 in the GIS database, so the on-site inspection should begin at the map's
 underdrain outlet locations (or by reference to INDOT documents);
- the INDOT GIS database does not include "inlets," "storm drains" and "catch basins," which would have been more useful in identifying storm water collection and, by inference, storm water discharge.

Storm Water Outfall Sampling/Monitoring

Undoubtedly, storm water sampling and/or monitoring will be a permit requirement. Monitoring was performed in 2003 at 87 selected sites (bridges and other locations) on sensitive waters proximate to Priority 1 and 2 highway segments as part of the water quality characterization (Part B of the Rule 13 requirements) and to provide a baseline for future monitoring/sampling. The data reported for this activity and the locations from which it was performed are found in the previously cited SPR-2752 study, Appendix M (CD-Rom), "Location and Results (2003) for INDOT SWM (Storm Water Monitoring) Sample Sites and description of selected [10 mile radius] sample sites from IDEM & USGS (United States Geological Survey) (4/15/04)." The monitoring data, by water body, highway designation, date and time, are found in Appendix B to the September 24, 2003 permit application identified as Appendix A of the previously cited SPR-2752 report (pp. 113-117).

The parameters monitored with YSI Sondes were temperature, conductivity, dissolved oxygen, pH, Oxidation Reduction Potential (ORP) and turbidity. The Sondes were not calibrated to monitor chloride concentration.

Rule 13, Section 7(a) requires MS4 operators, like INDOT, to "characterize the water quality of all known waters that receive storm water outfall discharges within the MS4 area." The water quality characterization, in the language of this Section, "must utilize existing or new information that may describe the chemical, biological or physical condition of the MS4 area water quality." The following sentence, which begins, "If monitoring is conducted...," appears to allow the option of monitoring; however, existing water quality data - - if current - - may not be for the "receiving waters at or in proximity to all known or representative storm water outfall discharges," as required by that same provision, so INDOT, as an MS4 operator, may need to initiate a monitoring program, if required by IDEM and/or if the data are not available from other sources.

State Highway Drainage to Municipalities

During this study, a 1992 INDOT Operations Memorandum pertaining to maintenance responsibilities for drainage structures was reviewed and determined to require a modification to be consistent with IC 8-23-6-3(d), "Construction and maintenance of streets surrounding railway tracks, pipe and conduits, drainage facilities, and sidewalks; regulation of traffic." www.in.gov/legislative/ic/code/title8/ar23/ch6.html The draft document assigns responsibility to INDOT for maintaining catch basins and inlets within the limits of the highway; the municipality is responsible for the connecting drainage facilities, which include: the sewer main, manholes, connectors between

INDOT-maintained inlets and catch basins, and other related appurtenances to the main sewer line.

The clarification of this policy is important, also, to define INDOT's relationship to MS4s to which it discharges storm water. IAC 15-13-6(a)(2) requires MS4s to submit a Notice of Intent (NOI) letter which includes, "List of all known receiving waters or, if the discharge is to another MS4, the name of the MS4 entity and the initial receiving water." An "initial receiving water" is defined in Section 5(34) of Rule 13 as "a water that is the direct recipient of a discharge from an MS4 area after the discharge passes [has passed] through another MS4 conveyance." INDOT will need to identify the MS4s to which it discharges, per the Operations Memorandum cited above, and the initial receiving waters to which those MS4s discharge. Likewise, the receiving MS4s are required to identify all discharges to their storm water and drainage systems and U.S. and state highways - - if connected - - to the MS4 system will be identified. It is critical for INDOT to identify these MS4s to resolve disputes, should they occur, regarding pollutant loading of the receiving (MS4) storm water, the volume of storm water discharged to the local POTW and its discharge to the initial receiving water.

INDOT contributes to the pollutant loading of the highway storm water that discharges to another MS4 and, if determined to be responsible for loading in excess of the permitted levels, it will need to install/implement structural and/or non-structural BMPs to improve the storm water quality.

The Indiana Design Manual (2010 edition) Chapter 36-2.13, Storm Drainage Agreement Policy www.in.gov/dot/div/contracts/standards/dm requires an agreement to be drafted by the Legal Services Division if "a new or reconstructed INDOT drainage

facility is <u>designed to accommodate</u> storm water from a sewer controlled by a local public agency (LPA). This is applicable regardless of whether the <u>shared drainage</u> <u>facility</u> is constructed within or outside the INDOT right of way." (underline added)

This policy, which also cites IC 8-23-6-2, is relevant for INDOT-municipal storm water connections where INDOT is the owner/operator, but the only reference found to such connections where the municipality is the owner/operator is Chapter 36-7.04, Sanitary Sewer and Water Utility Coordination, which states that, "Coordination with each utility [assumed to include municipally-owned] should begin as soon as possible once it is determined that the proposed construction will impact existing utility facilities."

The INDOT connection to a municipally-owned combined sewer system is a critical issue because of the potential for an increased volume of storm water that could exceed the capacity of the local treatment plant causing combined sewer overflows and/or the contribution of pollutants (e.g., chloride from road salt) which could cause the plant to exceed its permit limits. About half of the 107 Indiana municipalities with combined sewer systems (CSSs) are within MS4 and urbanized areas. Operators of CSSs are required by federal and state statutes to implement and maintain a Long Term Control Plan (LTCP) for controlling combined sewer overflows. The Plan, among other purposes, is to determine:

- the response of the CSS to various precipitation events;
- the characteristics of overflows from the CSS; and
- the water quality impacts that result from the CSS overflows.

Waters in "sensitive areas" impacted by CSO discharges are given the highest priority for discharge elimination, relocation or control. The criteria for identifying

"sensitive areas" are those used in the SPR-2752 study for designating Level 1, 2, 3, 4 Sensitive Waters and Priority 1, 2, 3, 4 highways:

- habitat for threatened or endangered species;
- full-body contact recreational waters;
- drinking water supply sources;
- Outstanding State or National Resource Waters

IDEM strictly enforces the LTCP requirements as a condition of a municipality's NPDES permit, including the use of state or federal consent orders with stipulated monetary penalties. INDOT needs to be aware of the magnitude of the problems it can cause a municipality by discharging storm water to its system without adequate planning and coordination.

INDOT is the owner/operator of a MS4 system of storm water conveyances, "including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels or storm drains...that discharges into waters of the state," according to 327 IAC 15-13-5(43). This definition is fairly consistent with IC 8-23-6-3(d) which also assigns INDOT responsibility for maintaining "the roadway of the street, including the curbs and gutters, catch basins and inlets within the limits of the street or highway that form integral parts of the street or highway." The relationship between the two provisions is that, typically, the municipality is the owner/operator of the MS4 system and INDOT discharges to the municipal system which, then, discharges to waters of the state. The municipalities that discharge storm water to an INDOT-owned/operated collection system that, then, discharges to waters of the state need to be identified because some of the NPDES permit requirements will have a different application.

Total Maximum Daily Load (TMDL) Allocation

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards.

327 IAC 15-13-10 requires the MS4 operator to "modify Parts B and C of their SWQMP if the TMDL includes requirements for control of storm water discharges under the jurisdiction of the MS4 operator." No such requirement has, yet, been imposed on INDOT nor are any of the impairments noted in the current (2008) Indiana 303(d) list of Impaired Waters attributed to discharges from INDOT's storm water collection system. See www.in.gov/idem/4679.htm

A review of this list reveals the impairments, noted in Appendix C, for the Sensitivity Level 1 and 2 waterways that are within one mile of Priority 1 and 2 highway segments.

INDOT is advised to review the TMDL reports and inquire of IDEM regarding the suspected source(s) of the discharge(s) requiring the establishment of the TMDLs for the waters into which it discharges to ensure that INDOT activity (e.g., storage and application of roadsalt) is not identified as a potential source.

Monitoring for Illicit Discharge Detection and Elimination

327 IAC 15-13-14 includes the requirement to map the storm sewer system "showing the location of all outfalls and MS4 conveyances ...and the names and locations of all waters that receive discharges from those outfalls."

INDOT, as an MS4 operator, is required to "prohibit illicit discharges into MS4 conveyances and establish appropriate enforcement procedures and actions." The key term, here, to controlling illicit discharges to highway rights-of-way is "conveyances,"

defined in Section 5(10) of Rule 13 as including "curbs, gutters, catch basins, channels, storm drains and roadways." INDOT currently lacks a "regulatory mechanism" to prohibit these discharges. An example of statutes granting this authority to the Illinois Department of Transportation can be found at:

 $\underline{www.ilga.gov/legislation/legisnet90/hbgroups/hb/900HB2754LV.html} \ (90_HB2754)$ and

http://www.ilga.gov/legislation/fulltext.asp?DocName=09300HB2301&GA=93&Session Id=3&DocTypeId=HB&LegID=&DocNum=2301&GAID=3&Session= (093_HB2301)

Until INDOT has regulatory authority to prohibit any point source discharge to its conveyances that is not, first, treated to remove pollutants, its only requirement is to notify the appropriate regulatory authority when an illicit discharge is found. Section 36-2.13 of the 2010 Indiana Design Manual states that "if the discharge to the INDOT right-of-way is in the form of sheet flow, INDOT will accept it as a matter of public policy." INDOT is advised to periodically monitor or screen sheet flow because it may include point sources on the Rule 5 list of illicit discharges.

The monitoring - - or dry weather screening, as it is referred to in the Rule - - is to be conducted "using a field testing kit or similar method to analyze for pollutants of concern and other parameters." A "pollutant of concern" is defined in Section 5(55) of the Rule as "any pollutant that has been documented via analytical data as a cause of impairment in any waterbody, or to another MS4, to which the MS4 discharges." The sources of illicit discharges, according to Section 5(28) "include sanitary wastewater, septic tank effluent, car wash wastewater, oil disposal, radiator flushing disposal, laundry

wastewater, roadway accident spillage and household hazardous waste." These are assumed to be examples and not an exhaustive list.

The responsibility for illicit discharge detection and elimination on state and U.S. highways within MS4 and urbanized areas depends on whether INDOT or the municipality has responsibility for maintenance.

IC 8-23-6-3 (previously cited) assigns INDOT responsibility for maintaining "the roadway of the street, including curbs and gutters, catch basins and inlets within the limits of the street or highway that form integral parts of the street or highway. The city or town shall maintain the sidewalks, grass plats and the connecting drainage facilities."

Some state highways have segments that have been transferred to local operational control, including maintenance. All road transfers are recorded by INDOT's Planning Department. A survey, by District, should be undertaken to confirm these records so that the responsibility for monitoring illicit discharges on these highway segments can be properly assigned to INDOT or the local MS4.

As to those state highways in MS4 and urbanized areas for which INDOT is the "operator," the "MS4 conveyances" (piping, ditches, swales, curbs, gutters, catch basins, channels, storm drains and roadways) will need to be inventoried so that illicit discharges can more readily be detected and eliminated.

The primary illicit discharges affecting state, U.S. and interstate highways outside MS4s and urbanized areas will be roadway accident spillage, fuel spillage and other discharges from commercial facilities at, for example, these highway intersections and discharges from commercial and industrial developments along these highways. INDOT is also responsible for controlling storm water run-off and discharge from its rest areas

and maintenance facilities along the priority highway segments; it follows, then, that INDOT's illicit discharge detection and elimination program will include its own facilities. The boundaries of the MS4 areas will need to be included in subsequent GPS databases and maps to ensure accurate regulation of illicit discharges by INDOT.

Summary of Information Needed to Revise NPDES Stormwater Permit

- identify outfalls from storm water drainage systems on Priority 1 and 2
 highways that discharge to waters of the state;
- 2. update water quality data from IDEM and other sources for waters that receive the discharges, referenced in 1., above;
- identify the municipally-owned storm water drainage systems to which INDOT-operated highway drainage systems are connected in municipal MS4 and urbanized areas;
- identify municipalities where Storm-Drainage Agreements exist allowing municipal storm water systems to discharge to INDOT-owned systems that, then, discharge to waters of the state;
- 5. review the 2010 Impaired Waterbodies [Section 303(d)] reports to ensure that INDOT activity is not identified as a source of impairment of waters to which it discharges storm water;
- investigate whether INDOT, in fact, lacks the regulatory authority to prohibit illicit discharges and, if confirmed, propose statutory, regulatory or administrative procedures to correct;

- 7. identify state highways that have transferred ownership to local control and examine the agreements to ensure that INDOT's responsibility for monitoring illicit discharges is properly assigned;
- 8. inventory the MS4 conveyances on INDOT-operated state highways in MS4 areas to assist detection of illicit discharges.

IV. Develop, adapt or adopt from other sources an Erosion and Sediment Control training curriculum

327 IAC 15-5-1, Storm Water Run-Off Associated with Construction Activity (Rule 5), in Section 7(b)(18), requires construction projects to have a self-monitoring program which requires a written evaluation of the project site prepared by a "trained individual," "by the end of the next business day following each measurable storm event and at a minimum of one (1) time per week." The written evaluation must "address the maintenance of existing storm water quality measures to ensure they are functioning properly and identify additional measures necessary to remain in compliance with all applicable statutes and rules." The written evaluation must also include "problems identified at the site and details of corrective actions recommended and completed."

The trained individual is also required by Rule 5 -

- to inspect the implementation of storm water quality measures [Sec. 5(a)(11)(E)], and
- to provide guidance to the design and installation of storm water quality measures [Sec. 7 (b)(12)]

The "trained individual" is defined in Section 4(41) of Rule 5 as -

"an individual who is trained and experienced in the principles of storm water quality, including erosion and sediment control, as may be demonstrated by state registration [e.g., PE - Professional Engineer], professional certification, experience, or completion of coursework that enable the individual to make judgments regarding storm water control or treatment and monitoring."

INDOT's 2008 Standard Specification 205.03, Control Measures, assigns responsibility for installation, inspection and maintenance of temporary erosion and sediment control measures to a Contractor's "designated individual." The revised, current Standard Specification 205.04 requires temporary erosion and sediment control measures to be inspected by the Contractor's Erosion Control Supervisor once every seven days and after each rain activity [equal to or greater than 0.50" of precipitation].

The Recurring Special Provision (RSP) 108-C-192 (Revised 3/20/08) requires the Contractor to "designate one or more of its employees as an Erosion Control Supervisor (ECS), responsible for the preparation, submittal and ensuring receipt of the approval of the amended erosion control plan [submitted by the Contractor]." The ECS is responsible for overseeing "the installation of all erosion control measures," conducting "weekly and post-event [rain event] inspections" and performing "all other tasks related to the installation, maintenance and removal of erosion control measures."

The broad responsibility and knowledge base required of the ECS is best reflected in the detailed description of the erosion control plan that the Contractor must prepare and submit, signed by the Supervisor:

- locations of all proposed soil stockpiles, borrow areas or disposal areas;

- locations of all proposed vehicle and equipment parking areas, vehicle and equipment fueling locations, placement of the site construction trailers, location of all on-site batch plants and designated concrete truck washout areas;
- proposed construction sequence and phasing of erosion control measures;
- location of all construction entrances where vehicles and equipment will enter and exit the site;
- material handling and spill prevention plan, which shall include a list of
 expected materials that may be present on the site during construction
 operations, as well as a written description of how these materials will be
 handled to minimize the potential that the materials may enter the storm water
 runoff from the site;
- statements that the erosion control measures for the project shall, at a minimum, be inspected on a weekly basis and within 24 h of every 1/2 in. (13 mm) rain event;
- monitoring and maintenance plan for erosion control measures.

There are no requirements or qualifications specified in Indiana statute or regulation or INDOT Standard Specifications for the position of ECS, other than the general definition of "trained individual" in Section 4(41) of Rule 5. By comparison, INDOT Standard Specification 203.08, Borrow or Disposal, requires the inspection of areas outside the construction limits to be conducted by a "qualified wetland professional," who "is prequalified with the Department to perform Environmental Services work type 5.4 Ecological Surveys, or is certified by the Society of Wetland Scientists, SWS, as a wetland professional-in-training or professional wetland scientist."

The Standard refers to its "list of prequalified consultants" at its "eligible firms" website where 31 firms are listed with a specialty in "Wetland Mitigation." In contrast, the "eligible firms" list includes, by specialty and (number) -

- Erosion Control Planting Design (1)
- Storm Water Engineering (2)
- Storm Water and Floodplain Engineering (1)
- Wastewater and Storm Water Facility Planning (1)

This does not mean that erosion and/or sediment control services are not provided by other "eligible firms," only that absent the definition of this as a "specialty area," firms do not declare it as such.

Without a statement of required qualifications in the statute or Standard, contractors can appoint any employee to the ECS position and can substantiate the claim that the person is qualified by their experience, alone. And, a person with state registration or professional certification or one who has completed coursework is eligible, regardless that their education or training may not have included specific erosion and sediment control subjects.

Contractors that rely on a qualified and competent individual or firm to provide erosion and sediment control services are often competing with other contractors for those services. Delayed site inspections following a "measurable storm event," as required by Rule 5, can occur because of the comparatively few individuals or firms that serve a much larger contractor clientele.

This study's Advisory Committee and a committee of the SAC discussed this topic at length and agreed that INDOT could readily and should, as soon as possible,

revise Standard 205.03 to require professional certification in erosion and sediment control for the Erosion Control Supervisor.

Minnesota DOT Specification 2573.3, A1, provides an excellent model for INDOT to reference in making related changes to its Standards:

A1 Erosion Control Supervisor

The contractor shall provide an Erosion Control Supervisor with a valid certification to direct the Contractor and subcontractor(s) operations and insure compliance with Federal, State and Local ordinances and regulations. The certification is obtained by completing a two (2) day Erosion/Sediment Control Site Management training class and passing the required test, from a Mn/DOT approved provider as listed in the Mn/DOT certification schedule.

The Erosion Control Supervisor shall implement the SWPPP and conduct the Contractor's erosion and sediment quality control program. In addition, the Erosion Control Supervisor shall be available to be on the Project within 24 hours at all times from initial disturbance to final stabilization as well as perform the following duties:

- 1. Coordinate and schedule the work of subcontractors such that erosion and sediment control measures are fully executed for each operation and in a timely manner over the duration of the Contract.
- Oversee the work of subcontractors so that appropriate erosion and sediment preventive measures are undertaken at each stage of the work.
- 3. Prepare the required weekly erosion control schedules and present it to the engineer.
- 4. Attend all weekly construction meetings to discuss the findings of the NPDES inspection log and other related issues.
- 5. Prepare the erosion/sediment control site plans requested by the Engineer.
- 6. Provide for erosion/sediment control methods for contractor's temporary work not shown on the plans, such as work platforms, temporary construction, pumping operations, plant and storage yards, and cofferdams.
- 7. Ensure that applicable permits are acquired and complied with for borrow pits, dewatering and any temporary work conducted by the Contractor in rivers, lakes and streams.
- 8. Ensure that all erosion/sediment control work is conducted in a timely manner.
- 9. Ensure that erosion/sediment control work is installed to the fullest extent prior to suspension of the work.

- 10. Coordinate with Federal, State and Local Regulatory agencies on resolution of erosion/sediment control issues due to the Contractor's operations.
- 11. Ensure that proper cleanup occurs from vehicle tracking on paved surfaces and/or any location where sediment leaves the Right-of-Way. If the Contractor fails to provide a certified Erosion Control Supervisor for the Project, the engineer shall issue a written order to the Contractor. The contractor shall respond within 24 hours and provide the required Erosion Control Supervisor or be subject to a \$1000 per calendar day deduct for noncompliance.

Survey of Other States

Early in the course of this study (September 8, 2008), the Principal Investigator, through the INDOT Division of Research Director, surveyed other state DOTs asking for copies of Construction Site Erosion and Sediment Control training curricula and resource material. Eleven states and two Canadian provinces replied, a few with statements that they did not offer such training and others providing website addresses or CD-ROMs containing training curricula materials. (See Appendix D: Contact Information for Erosion and Sediment Control Manuals and Training Materials from other states.)

Subsequently, on February 18, 2009, other state DOTs' were surveyed again, asking specific questions about their training program; ten states and three Canadian provinces responded and the results are provided in Appendix E.

Of the states responding to the survey, Kentucky, Maine, Georgia and Alaska have certification programs and requirements and each requires contractors to attend and be certified. Certification programs for DOT and contractor employees also exist in Tennessee, California, Idaho and Nebraska.

Current INDOT Erosion and Sediment Control Training

INDOT, through its OES, offered training to interested INDOT District and Central Office employees during 2007, 2008 and 2009 and, with the cooperation of

IDEM Office of Water Quality, it offered training in 2010 to District Offices and INDOT Design staff. Through a contractor approved by the FHWA National Highway Institute (NHI), INDOT offered the NHI course, "Design and Implementation of Erosion and Sediment Control" (FHWA-NHI-142054), which is a joint effort of FHWA and the U.S. EPA (www.fhwa.dot.gov/environment/h2otrnops.htm) and

"reflects the agencies' commitment to providing education and training on planning, design, implementation, enforcement, inspection, and maintenance strategies to control erosion and sediment on highway construction projects, as well as to ensure that regulatory issues are addressed accurately and uniformly. Each discipline involved in a highway construction project has a different set of priorities. Reflecting NHI's commitment to learner-centered training, the course offers participants opportunities for discussion and joint problem solving, through which they will gain information about the roles and responsibilities of other team members.

After completing the course, participants will be able to: describe the components of an erosion and sediment control (ESC) plan, list the sources of information for the ESC plan, identify management practices and related management measures that are appropriate for typical situations and for a case example, list typical construction and inspection problems, describe both suitable prevention strategies and remedies for failure, and link Federal and State environmental regulations to the components of the ESC plan."

NHI charges \$350 per participant and the consultant/trainer cost is additional. The course curriculum is in the public domain and can be used by other than an approved contractor; however, such offerings are not considered "official," no Continuing Education Units (CEUs) are given and the NHI exam is not provided. FHWA does not provide certification to those successfully completing the course, but states are not restricted by FHWA from offering certification.

Certification Programs

This study's Advisory Committee and a subcommittee reviewed some of the nationwide certification programs relevant to the erosion and sediment control topic:

- Certified Professional in Erosion and Sediment Control (CPESC), EnviroCert, Intl.
 www.cpesc.org
- Certified Professional in Storm Water Quality (CPSWQ), EnviroCert, Intl.
 www.cpswq.org
- Certified Erosion, Sediment and Stormwater Inspector (CESSWI), EnviroCert, Intl.
 www.cesswi.org
- Certified Inspector of Sediment and Erosion Control (CISEC), CISEC, Inc.
 www.cisecinc.org
- Certified Compliance Inspector of Stormwater (CCIS), Stormwater U.S.A.

 www.stormwaterusa.com
- Certified Preparer of SWPPP (CPSWPPP), Stormwater U.S.A. www.stormwaterusa.com
- Certification in Erosion and Sediment Control, National Institute for Certification in Engineering Technologies www.nicet.org

Some members of the Committee have CPESC and CESSWI certifications and there was strong support for these two.

At its June 18, 2009 meeting, the SAC agreed to adopt the proposal presented by Michelle Allen, Manager, INDOT Office of Environmental Services (OES), for a certification requirement for INDOT construction contractors to satisfy the Rule 5 and INDOT Erosion Control Supervisor provisions:

INDOT Sediment and Erosion Control Trained Inspector Proposal

INDOT has been researching different training options for contractors for several months. The Certified Erosion Sediment and Storm Water Inspector Certification Program (CESSWI) appears to be best suited to INDOT's needs. This certification requires candidates to have at least three years of directly related experience, and complete a written examination. I would like to propose INDOT revise current specifications to require the contractor to have a CESSWI In-Training assigned to all projects involving greater than one (1) acre of soil disturbance. In three years, INDOT will require the contractor to have a CESSWI Certified Technician assigned to all projects involving greater than one (1) acre of soil disturbance.

In addition, INDOT and IDEM will offer several training opportunities each year for contractors to increase their knowledge on sediment and erosion control.

It was also discussed to have at least one person in each District obtain the CESSWI certification, along with several OES staff. These

trained individuals could provide assistance to the PE/PS when issues arise on project sites.

The final proposal adopted by the Committee included the language "or equivalent certification," following "CESSWI In-training" and "CESSWI Certified Technician," to broaden the requirement to include other similar certifications in this area of expertise.

The CESSWI In-Training certification requires one year of experience and 16 hours of related training; therefore, INDOT should promulgate this requirement as soon as possible to allow contractors who do not, currently, have qualified employees, to satisfy this requirement within a year.

The CESSWI certification, as with most certifications in the storm water and erosion and sediment control subject area, is promoted by a non-profit, professional association of practitioners. There is no federal or state regulation of these certifications, but some state agencies - - as INDOT is planning - - may specify a certification requirement in its standards and/or administrative rules to satisfy the EPA requirement in the federal NPDES permit regulations that construction activity storm water inspections be performed by "qualified personnel."

"Qualified personnel" is defined by EPA as -

"a person who is knowledgeable in the principles and practices of erosion and sediment control and who possesses the skills to assess conditions at a construction site that could impact storm water quality and to assess the effectiveness of any sediment and erosion control measures selected to control the quality of the storm water discharges from the construction activity."

(www.epa.gov/npdes/pubs/cgp2008_finalpermit.pdf)

Each applicant for most of these certifications is required to meet the eligibility requirements in education, experience and knowledge, and references are usually required. Applicants must pay a fee, be approved for and take and pass an exam and subscribe to a code of ethics. A non-mandatory exam preparation class is often offered the day before the exam at the same location. After certification the person, usually, is required to pay an annual certification maintenance fee and earn continuing education credits.

The construction industry representatives on the SAC thought certification of contractor personnel only made sense if the certified person had the authority to implement and make changes to [the erosion and sediment control] BMPs without having to, first, secure INDOT approval. This proposal will, undoubtedly, be the focus of discussion when the certification requirement is promulgated.

The construction industry representatives also urged INDOT to carefully consider the following in developing a certification requirement:

- phasing-in certification over a multiple-year period to allow all contractors a reasonable opportunity to get personnel trained and certified;
- 2. providing training at multiple sites around the state and at various times during the year, particularly during the winter months;
- assure that any exam that must be passed to gain certification relates directly to the responsibilities under the INDOT specifications for the contractor's certified individual;

- 4. rather than only requiring certification under one specific program, allow other certification programs to be recognized as "equal" to the designated program.
 The construction industry encouraged INDOT and IDEM to jointly develop such a program that is based on Indiana-specific requirements; and
- 5. the potential costs of certification.

There was general consensus at the June 18 SAC meeting that erosion and sediment control was not being supervised uniformly by INDOT personnel from site-to-site and that there is a need for training and certification of INDOT personnel, as well as contractor employees.

The one-day exam preparation class is not adequate training for INDOT and contractor personnel who have little or no experience or knowledge of erosion and sediment control. The INDOT training "program" exists as various, relatively independent, activities:

- continuing to offer NHI-142054: "Design and Implementation of Erosion and Sediment Control," through a FHWA-approved contractor once or twice during the year;
- occasional review sessions in the Districts conducted by OES staff;
- occasional training offered by IDEM Office of Water Quality personnel in the Districts.

The scheduling of erosion and sediment control training for INDOT employees continues to compete with other (perhaps considered more important) training for budget support, management coordination and employee time away from regular duties. NHI

training, to date, has only been offered to INDOT employees; no other formal training has, yet, been offered by INDOT for contractor employees.

Review of Other State DOT Erosion and Sediment Control Training Programs

Many of the states replying to a survey in September 2008 provided access to websites or forwarded CD-ROMs of training materials (See Appendix D). Some of the websites and CD-ROMS offer an assortment of PowerPoint presentations delivered by instructors and "speakers" at various training sessions primarily focused on installation of BMPs, the state's DOT Standards and a review of federal and state permit and other regulations.

Few states offer standardized training programs with stated learning objectives, identification of the target audience and description of the participant evaluation tools (e.g., examinations) to be used. Notable exceptions include those described in Appendix F.

INDOT should consider elements of these courses in constructing its Erosion and Sediment Control training curriculum.

Recommendation

To create a comprehensive erosion and sediment control training program, INDOT should:

- 1. identify Central Office and District staff positions required to have the training;
- assign an employee of the OES to work with the Human Resources Training
 Division to identify the specific classes/courses needed and a tentative schedule;
- 3. solicit from and develop proposals with training providers to satisfy the identified needs [Note: meetings were held during this study to discuss the development of a

training curriculum with faculty of the Department of Construction Engineering and Technology at Indiana University - Purdue University - Indianapolis (IUPUI).

OES staff were subsequently informed by INDOT's contract office that such a proposal "would have to go out for bid."]

- estimate the number of contractor employees that would enroll in classes/courses and the enrollment fees that would be generated to help offset the costs of training provider services;
- 5. estimate the total cost of training and submit a budget request to INDOT management [Note: for the two-year budget period ending June 30, 2009, approximately \$690,000 was allocated by INDOT for "purchased training," which included payment of continuing education courses and tuition for job-related courses; approximately \$400,000 of the allocation was spent during the FY '08-'09 biennium. The NHI training, referenced previously, was funded in 2008-09 primarily from the OES budget for both Central Office and District personnel. Districts had the option of enrolling additional staff in the training at their own cost, but did not have or did not choose to allocate available funding for this purpose.]

V. Prepare a field manual of BMPs and pertinent INDOT Standard Specifications useful to INDOT and contractor personnel

The need for an easily accessible, yet comprehensive BMP field guide for INDOT and contractor personnel must be evident to those responsible for assessing site characteristics and installing/maintaining erosion and sediment control measures using the Indiana Design Manual (Chapter 37 - Temporary Erosion and Sediment Control) with

its many references to the INDOT Standard Specifications and Standard Drawings in addition to the "figures" at the back of the Manual. Consolidating all relevant erosion and sediment control BMP information in one document will be beneficial to the users.

This study objective, initially, was considered as a means of publishing the BMP information from the previous SPR-2853 study (reconciled with the Indiana Storm Water Quality Manual, from this study) and relevant INDOT Standards.

Subsequently, Office of Environmental Services staff shared copies of the Minnesota field guide obtained from a peer exchange in 2008. The guide is a narrow, spiral-bound "pocketbook guide" of, primarily, photos/schematics depicting proper BMP installation and describing related site conditions and includes reference to Minnesota DOT Standard Specifications. The SAC reviewed this format and agreed that it would be more useful for INDOT and contractor personnel in the field because of its size and focus on BMP selection/installation based on site characteristics. Links to websites where information from Standards and regulations is provided would allow access electronically from the construction trailer, hand-held devices or an office.

The Principal Investigator reviewed field manuals/guides submitted by other DOTs in response to the September 2008 survey (Appendix C) and others that could be accessed electronically, using the Minnesota format as guidance.

Some state DOTs publish "manuals" that serve as "field guides," but are considered "contract documents." The incorporation of references to and language from Standards and other DOT documents and provisions in these manuals, then, are given the full force and effect of law in that they are to be considered as if they are included in their entirety. This legal provision is avoided, in some states, by reference to the publication

as a "guide" and by others with a statement that it is not a contract document. INDOT needs to observe this precaution.

Other State DOT Field Guides/Manuals

Michigan Soil Erosion and Sedimentation Control Manual (2006)

The 97-page, 8 1/2" X 11", 3-hole punched manual is intended "to aid MDOT personnel in the selection and application of adequate and efficient soil erosion and sedimentation control measures during project development and delivery." The manual and its revisions are subject to approval by the Michigan Department of Environmental Quality, pursuant to state statutes and rules governing an Authorized Public Agency (APA).

Part 6 of the Manual, "SESC Measures (E & S Details)" provides a five-page table of 37 soil erosion and sedimentation control measures. The table includes a small schematic of the measure, a generalized statement characterizing its use and seven columns defining the applicable site characteristics: A = Slopes; B = Streams and Waterways; C = Surface Drainageways; D = Enclosed Drainage (Inlet & Outlet control); E = Large Flat Surface Areas; F = Borrow and Stockpile Areas; and G = MDEQ Permit May Be Required.

The table is followed by a SESC Detail sheet for each of the 37 measures. Each sheet provides a detailed schematic and a description of its Use, Installation and Maintenance, Optional Measures, Related SESC Measures and Measurement and Payments. The majority of the "Use" descriptions refer the reader to the "Drainage Manual for additional design considerations when specifying this device," an

acknowledgement that the intent of the Manual is to provide general guidance for the selection of SESC measures.

Minnesota Erosion and Sediment Control Pocketbook Guide (2006)

The "Erosion and Sediment Control Pocketbook Guide", published by the University of Minnesota, Erosion and Sediment Control Program, is a 66-page "pocket book intended for inspectors and installers of erosion and sediment control devices." The introduction clearly defines the "guidance" nature of the publication by referring users to MnDOT's Standard Specifications, a project's special provisions and MnDOT's website for detailed and contract-specific information. The Guide is a publication for sale by the University and its contents are not accessible via the internet.

The Guide is comprised of five sections, listed below with the number of erosion and sediment control devices noted for each:

- Sediment Control (10)
- Erosion control (10)
- Seeding (5)
- Sod (5)
- General Operations (4)

The Standard Specification reference numbers are cited for each control device.

The two or more pages devoted to each device includes a description from the Specifications, the Materials needed, instructions for Installation, Maintenance and Removal, and MnDOT's Payment method. Photos and/or schematics to aid installation are included for most of the devices. The written content of the Guide includes

abbreviated, "bullet-point" statements of the Specifications. For example, Specification 2573.3, C3, description of the "Super Duty" Silt Fence states:

The bottom edge of the geotextile shall be placed 100-150 mm (4 to 6 inches) underneath the face of the median barrier exposed to direct storm water runoff. The median barriers shall be placed end to end in such a way to minimize the gap between each barrier. The geotextile shall be attached to the face of the barrier with wire or plastic zip tie inserted into the top 200 mm (8 inches) of the geotextile and tied to each eyelet on the barrier.

The Guide content summarizes:

- ☑ Place bottom edge of geotextile 4" to 6" underneath the face of the median barrier that receives runoff.
- ☑ Place barriers end-to-end to minimize the gap.
- ✓ Attach geotextile to face of barrier at each barrier's eyelets using wire or plastic zip ties within the top 8" of the fabric.

The summary accurately conveys the requirements of the Specification.

Kentucky Erosion Prevention and Sediment Control Field Guide (Revised October 2009)

The Guide is published by the Technology Transfer Program, Kentucky

Transportation Center at the University of Kentucky. The Principal Investigator first

notified SAC members of the 2004 edition of the manual in January 2009 available via a

link on an EPA website. The appeal of the Kentucky manual is its convenient "backpocket" size, well-organized format, "thumbs-up/thumbs-down" photo depictions of

BMP installations and restriction of most references to statutes, regulations and Standards to the last chapter and Appendices.

In August 2009, the Principal Investigator contacted University of Kentucky officials who, from the beginning, were very willing to allow INDOT to adapt the Kentucky manual for Indiana, with the stipulation that attribution be given to the authors and publisher. Kentucky was awaiting the publication of the 2009 revised edition so the current version was not accessible until late November 2009.

The Indiana-relevant portion of the manual is comprised of eleven chapters, beginning with "Pre-Construction Planning" and "Overview of Construction Phase Operations," followed by eight chapters containing descriptions of 30 erosion and sediment control measures and ending with "Maintaining and Closing Out Your Construction Project."

The Principal Investigator's non-technical review of the Kentucky manual suggested content areas that should be reviewed and, if necessary, modified for the Indiana version:

- replacement of residential development photos with linear construction photos,
 where needed;
- replacing references in the text to Kentucky statutes, regulations and Standards with Indiana and INDOT citations;
- comparing tables of and references to Kentucky Standards for "slopes," "seeding rates," "stone size," "application rates," etc., to INDOT's requirements;

 consolidating detailed information from Indiana statutes, regulations and INDOT Standards in one or more website links to eliminate the need for Appendices.

The Indiana version also includes eight erosion and sediment control measures, not included in the Kentucky manual, that the SAC earlier recommended be included in the Indiana manual, in whatever format it would be published.

CBBEL staff reviewed the Kentucky manual and made recommended revisions to conform to INDOT Standards and preferences, incorporating changes suggested by the Principal Investigator. The PI and his Assistant, Gail A. Mills, finalized the Indiana version presented as a product of this JTRP study.

APPENDICES

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APPENDIX A

FHWA Permit Review Findings (September 30, 2008)

- Permits are not usually posted at the work site. Often the Project Engineer/Project Supervisor (PE/PS) knew nothing of this requirement.
- Knowledge of the requirements of the permits ranged from slight to thorough.
 Most commonly, the PE/PS were only somewhat familiar with permit conditions.
- 3. For the vast majority of the projects, the NEPA document was not at the project office. Neither were the environmental commitments forms. The letting packages are now provided (mostly) on-line. However, it is unclear whether the NEPA document is included on-line. Likewise, in one instance, only the first page of a permit was placed on-line. The Commitments Form included in the letting should also be placed on-line.
- 4. Failure to fully meet permit conditions in the field was a common occurrence especially Rule 5 erosion and sediment control. Rule 5 requires that water leaving the construction site be as clean of sediment as water entering the construction site. There seemed to be a lack of understanding of the various erosion and sediment control features by the designer, the contractor and the PE/PS. 404, 401 and construction in a waterway permit conditions were more commonly met usually because they are very prescriptive. However, on several projects the contractor went beyond the 404/401 permit conditions and illegally filled portions of a waters of the U.S.
- Usually projects had erosion and sediment control plans which greatly varied on quality of design.

- 6. Most projects had an Erosion and Sediment Control Supervisor (ECS) assigned by the contractor. Some of the ECSs had no erosion and sediment control training and lacked the knowledge needed to properly fulfill the responsibilities of this position. In other cases, the ECSs seemed to at least have some experience, if not specific training. Required weekly reports and post rain-event reports were conducted and provided to the PE/PS for some, but not all of the projects.
- 7. Locating, constructing and maintaining proper erosion and sediment control measures nearly always needed improvement. The reasons for this were varied:
 - lack of knowledge of what permits or addenda were needed. Riprap had been placed in waters of U.S. for a couple of projects (not included in the design) for which no permit or permit modification had been obtained. It would help if waters of the U.S. were labeled on plans;
 - lack of training or desire for more training for the designer, the PE/PS, the contractor, the erosion and sediment control supervisor and the INDOT project inspectors;
 - lack of a sequencing plan and understanding of why it is needed and what it is supposed to do. If it existed, it was at times poorly designed. For example, one sequencing plan lacked perimeter controls. The contractor is required to develop this;
 - lack of understanding how erosion and sediment control features function;
 - lack of appropriate design of the erosion and sediment control features many
 PEs felt the design plans were either over or under designed without regard to the terrain;

- lack of timely inspections and maintenance of the erosion and sediment control
 features to ensure proper performance. It can take one week or more to get a
 subcontractor to the site to maintain or place erosion and sediment control
 features;
- lack of knowledge of how to construct, locate and maintain the features;
- perceived lack of a means to force the contractor to make changes when needed;
- lack of control of utilities utilities often used little, if any, erosion and sediment control features, and left the sediment problem for the construction project. Utilities are paid to include erosion and sediment control, but often fail to include it. The utilities had not completed their work on a couple of the projects under construction and were causing erosion and sediment control problems. One recommendation from the PE was to change the way we work with utilities by providing the PE with an option to assign fines or other penalties.
- 8. The staging area for borrow/waste as well as the concrete washout area were located in conformance with the specifications.
- 9. Expired permits when projects let. The PE had to obtain an extension as soon as he started on the project. Likewise, there was a lack of knowledge when permits expired. A soon-to-expire permit was found on one project. The PE was unaware of it.
- 10. The erosion and sediment control plan often lacks specific pay items for erosion and sediment control features. The standard drawings should include all pay

- items for all materials needed to construct erosion and sediment control features shown on the drawings.
- 11. There are often insufficient quantities of erosion and sediment control features in the plan. Erosion and sediment control features should be included as undistributed quantities to give the PE the flexibility he needs on the project site. One contract had only a lump sum of \$2700 for environmental control. This came no where near what was needed.
- 12. The pre-construction conference needs someone from either Office of Environmental Service (OES) or district environmental to describe the permits, conditions, sensitive areas and mitigation. Although OES is now invited, they indicate that they lack the manpower or time to attend. They are currently down one permitter with no near term possibility of being replaced. Likewise, OES is not able to conduct site visits for guidance because of this limitation of manpower. Their focus has been on obtaining permits.
- 13. The letting packages are now provided (mostly) on-line. However, it is unclear whether the NEPA document is included on-line. Likewise, in one instance, only the first page of a permit was placed on-line. The Commitments Forms included in the letting should also be placed on-line. The PE also suggested the parcel list information should be placed on the electronic letting list. [Substantially the same as 3.]
- 14. A good field manual for erosion and sediment control measures would be very helpful. For example, there are all kinds of erosion and sediment control

mats/blankets available, with little to no guidance on the best type for existing conditions and various life spans.

APPENDIX B

HWY NAME	ALT NAME	STREAM	PLACE NAME	DIST NAME	FINAL MILE
1 B 8. State Road	ds in MS4 Areas, Pri	ority 1. No Karst			
1.D.o. Glate Road		only 1, 110 Harst			
174		Sugar Creek	Crawfordsville	Crawfordsville	0.015
174		Sugar Creek	Crawfordsville	Crawfordsville	0.013
174		Sugar Creek	Crawfordsville	Crawfordsville	0.212
l 74		Sugar Creek	rural	Crawfordsville	0.000
RAMP		Sugar Creek	Crawfordsville	Crawfordsville	0.193
RAMP		Sugar Creek	Crawfordsville	Crawfordsville	0.087
RAMP		Sugar Creek	Crawfordsville	Crawfordsville	0.113
RAMP		Sugar Creek	Crawfordsville	Crawfordsville	0.001
RAMP		Sugar Creek	rural	Crawfordsville	0.000
RAMP		Cowles Bog	Porter	LaPorte	0.016
RAMP		Cowles Bog	Porter	LaPorte	0.081
RAMP		Cowles Bog	Porter	LaPorte	0.120
RAMP		Cowles Bog	Porter	LaPorte	0.095
RAMP		Cowles Bog	Porter	LaPorte	0.034
RAMP		Cowles Bog	Porter	LaPorte	0.057
RAMP		Dunes Creek	Porter	LaPorte	0.071
RAMP		Dunes Creek	Porter	LaPorte	0.034
RAMP		Dunes Creek	Porter	LaPorte	0.057
RAMP		Dunes Creek	Porter	LaPorte	0.016
RAMP		Munson Ditch	Porter	LaPorte	0.057
RAMP RAMP		Munson Ditch Munson Ditch	Porter Porter	LaPorte LaPorte	0.167 0.033
RAMP		Munson Ditch	Porter	LaPorte	0.033
RAMP		Munson Ditch	Porter	LaPorte	0.057
RAMP		Munson Ditch	Porter	LaPorte	0.037
RAMP		Munson Ditch	Porter	LaPorte	0.032
RAMP		Munson Ditch	Porter	LaPorte	0.109
RAMP		Munson Ditch	Porter	LaPorte	0.069
RAMP		Munson Ditch	Porter	LaPorte	0.073
RAMP		Munson Ditch	Porter	LaPorte	0.049
RAMP		Munson Ditch	Porter	LaPorte	0.045
RAMP		Munson Ditch	Porter	LaPorte	0.048
RAMP		Munson Ditch	Porter	LaPorte	0.037
STATE HWY 49	N STATE HWY 49	Cowles Bog	Porter	LaPorte	0.119
	N STATE HWY 49	Dunes Creek	Porter	LaPorte	0.070
	N STATE HWY 49	Munson Ditch	Porter	LaPorte	0.649
	N STATE HWY 49	Munson Ditch	Chesterton	LaPorte	0.153
	N STATE HWY 49	Munson Ditch	rural	LaPorte	0.061
STATE HWY 49	N STATE HWY 49	Munson Ditch	rural	LaPorte	0.143
US HWY 12	E DUNES HWY	Long Lake & Wetlands	Gary	LaPorte	0.894
US HWY 12	W DUNES HWY	Dunes Creek	Porter	LaPorte	0.123
US HWY 12	W DUNES HWY	Dunes Creek	Porter	LaPorte	0.924
US HWY 12	W DUNES HWY	Dunes Creek	rural	LaPorte	0.000
US HWY 12		Cowles Bog	Porter	LaPorte	0.123
US HWY 12		Cowles Bog	Porter	LaPorte	0.924
US HWY 12 US HWY 12		EB Little Calumet River Trib		LaPorte	0.315
US HWY 12 US HWY 12			Porter	LaPorte	0.625
US HWY 12 US HWY 12		Pond Cowles Reg	Porter	LaPorte	0.236
US HWY 12 US HWY 20	E US HWY 20	Cowles Bog Cowles Bog	rural Porter	LaPorte LaPorte	0.000
US HWY 20	MELTON RD	SALT CR	Porter Portage	LaPorte	0.370
US HWY 20	MELTON RD	SALT CR	Portage	LaPorte	0.149
US HWY 20	INICLIONIND	Munson Ditch	Portage	LaPorte	0.007
US HWY 20		Munson Ditch	rural	LaPorte	0.003
US HWY 231	US HWY 231 N	Sugar Creek	Crawfordsville	Crawfordsville	0.523
STATE HWY 22		WILDCAT CR	Kokomo	Greenfield	0.040
STATE HWY 22		WILDCAT CR	rural	Greenfield	1.522
		WILDCAT CR	rural	Greenfield	0.138
STATE HWY 22			ı 		
STATE HWY 22 STATE HWY 26	STATE HWY 26 E	WILDCAT CR, S FK	rural	Crawfordsville	0.215

2.B.8. State Roads in MS4 Areas, Priority 2, No Karst								
I 65	DEEP RIVER BR	Deep River	Crown Point	LaPorte	1.748			
I 65	DEEP RIVER BR	Deep River	Merrillville	LaPorte	1.199			
l 65	DEEP RIVER BR	Deep River	Merrillville	LaPorte	1.827			
I 65	DEEP RIVER BR	Deep River	Gary	LaPorte	0.386			
RAMP		Deep River	Merrillville	LaPorte	0.636			
RAMP		Deep River	Merrillville	LaPorte	0.576			
RAMP		Deep River	Merrillville	LaPorte	0.483			
STATE HWY 162	3RD ST E	Patoka River	Jasper	Vincennes	0.277			
STATE HWY 51	GRAND BLVD	Deep River	Hobart	LaPorte	0.302			
STATE HWY 53	BROADWAY	Deep River	Merrillville	LaPorte	1.546			
STATE HWY 53	BROADWAY	Deep River	Crown Point	LaPorte	0.939			
US HWY 30	W US HWY 30	Deep River	Merrillville	LaPorte	1.492			
US HWY 30	W US HWY 30	Deep River	Hobart	LaPorte	0.664			
US HWY 30	W US HWY 30	Deep River	Merrillville	LaPorte	0.098			
US HWY 30	W US HWY 30	Deep River	Hobart	LaPorte	0.220			
US HWY 30	W US HWY 30	Deep River	Merrillville	LaPorte	0.670			

Crawfordsville District State Roads

SENSITIVITY 1

1b-8

Category 1a-8 not present in this district

Category 1b-8	
ROADS ONLY within 1 m	ile of PRIORITY 1 STREAMS

10-8	RUADS UNLY WITHIN I MILE OF PRIORITY I STREAMS					
						Category
1b-8	Highway name	Alternate name		<u>Stream</u>	Miles	<u>Total</u>
1b-8	I 65		HQW	Wildcat Creek, S FK	4.1	18.1
1b-8	l 74		7	Sugar Creek	1.8	
1b-8	RAMP		7	Sugar Creek	0.9	
1b-8	STATE HWY 234	STATE HWY 234 W	EUW	Clifty Creek	1.1	
1b-8	STATE HWY 234	STATE HWY 234 W	EUW	Indian Creek	3.2	
1b-8	STATE HWY 26		EUW	Mud Pine Creek	0.8	
1b-8	STATE HWY 26	STATE HWY 26 E	HQW	Wildcat Creek, S FK	8.0	
1b-8	STATE HWY 32	STATE HWY 47	7	Sugar Creek	0.3	
1b-8	STATE HWY 352		EUW	Mud Pine Creek	0.0	
1b-8	STATE HWY 47	STATE HWY 47 N	7	Sugar Creek	8.0	
1b-8	STATE HWY 55		EUW	Big Pine Creek	0.7	
1b-8	STATE HWY 63		EUW	Fall Creek	8.0	
1b-8	US HWY 136		7	Sugar Creek	1.0	
1b-8	US HWY 231	US HWY 231 N	7	Sugar Creek	1.0	
1b-8	US HWY 41		EUW	Mud Pine Creek	0.9	

SENSITIVITY 2

Category 2a-8 not present in this district

Category 2b-8 ROADS ONLY within 1 mile of PRIORITY 2 STREAMS

2b-8 ROADS ONLY within 1 mile of PRIORITY 2 STREAMS					
					Category
2b-8	Highway name	Alternate name	<u>Stream</u>	Miles	<u>Total</u>
2b-8	STATE HWY 234	COUNTY HWY 1100 S	Sugar Mill Creek	1.1	18.2
2b-8	STATE HWY 26	COUNTY HWY 900 N	Middle Fork Wildcat Creek	6.3	
2b-8	STATE HWY 29	N STATE HWY 29	Kilmore Creek	0.1	
2b-8	STATE HWY 29	N STATE HWY 29	Middle Fork Wildcat Creek	0.9	
2b-8	STATE HWY 32		Sugar Mill Creek	1.4	
2b-8	STATE HWY 341	COUNTY HWY 600 E	Sugar Mill Creek	0.5	
2b-8	STATE HWY 38	STATE HWY 38 E	Kilmore Creek	3.4	
2b-8	STATE HWY 75		Kilmore Creek	1.8	
2b-8	US HWY 421	STATE HWY 39	Kilmore Creek	2.6	

63

Fort Wayne District State Roads

SENSITIVITY 1

1b-8

2b-8

Category 1a-8 not present in this district

Category 1b-8
ROADS ONLY within 1 mile of PRIORITY 1 STREAMS

						Category
1b-8	Highway name	Alternate name		<u>Stream</u>	Miles	<u>Total</u>
1b-8	I 69	US HWY 27	HQW	Cedar Creek	0.0	1.9
1b-8	STATE HWY 19	S STATE HWY 19	NWSR	Tippecanoe River	0.0	
1b-8	STATE HWY 9	N STATE HWY 9	7	Elkhart River, South Branch	1.8	
1b-8	US HWY 6	W US HWY 6	7	Elkhart River, South Branch	0.0	

SENSITIVITY 2

Category 2a-8 not present in this district

Category 2b-8

ROADS ONLY within 1 mile of PRIORITY 2 STREAMS

					Category
2b-8	Highway name	Alternate name	<u>Stream</u>	<u>Miles</u>	<u>Total</u>
2b-8	STATE HWY 124		Mississinewa River	0.1	0.7
2b-8	STATE HWY 19	STATE HWY 21	Mississinewa River	0.5	

Greenfield District State Roads

SENSITIVITY 1

Category 1a-8 not present in this district

Category 1b-8

1b-8 ROADS ONLY within 1 mile of PRIORITY 1 STREAMS

10-0	ROADO ONET WILLIET THING OF TRIORITY TO TREAMO						
						Category	
1b-8	Highway name	Alternate name		<u>Stream</u>	<u>Miles</u>	<u>Total</u>	
1b-8	STATE HWY 22	7TH ST	HQW	Wildcat Creek	6.1	6.2	
1b-8	STATE HWY 29	MICHIGAN ST	HQW	Wildcat Creek	0.1		

SENSITIVITY 2

Category 2a-8 not present in this district Category 2b-8 not present in this district

LaPorte District State Roads

SENSITIVITY 1

Category 1a-8 not present in this district

Category 1b-8 ROADS ONLY within 1 mile of PRIORITY 1 STREAMS

1b-8	8 ROADS ONLY within 1 mile of PRIORITY 1 STREAMS					
						Category
1b-8	Highway name	Alternate name		<u>Stream</u>	Miles	<u>Total</u>
1b-8	I 94		HQW	Beverly Shores Canals	1.0	15
1b-8	I 94		HQW	Little Calumet River	0.0	
1b-8	I 94		HQW	Salt Creek	0.0	
1b-8	RAMP		HQW	Beverly Shores Canals	0.4	
1b-8	RAMP		HQW	Cowles Bog	0.4	
1b-8	RAMP		HQW	Dunes Creek	0.2	
1b-8	RAMP		HQW	Munson Ditch	0.9	
1b-8	STATE HWY 22	7TH ST	HQW	Wildcat Creek	0.0	
1b-8	STATE HWY 29	MICHIGAN ST	HQW	Wildcat Creek	2.3	
1b-8	STATE HWY 49	N STATE HWY 49	HQW	Cowles Bog	0.1	
1b-8	STATE HWY 49	N STATE HWY 49	HQW	Dunes Creek	0.1	
1b-8	STATE HWY 49	N STATE HWY 49	HQW	Munson Ditch	1.0	
1b-8	STATE HWY 75		HQW	Wildcat Creek	2.4	
1b-8	US HWY 12	DUNES HWY	HQW	Beverly Shores Canals	0.4	
1b-8	US HWY 12		HQW	Cowles Bog	1.1	
1b-8	US HWY 12	W DUNES HWY	HQW	Dunes Creek	1.1	
1b-8	US HWY 12		HQW	EB Little Calumet River Trib.	0.3	
1b-8	US HWY 12		HQW	Little Calumet River	0.6	
1b-8	US HWY 12	E DUNES HWY	HQW	Long Lake & Wetlands	0.9	
1b-8	US HWY 12		HQW	Pond	0.2	
1b-8	US HWY 12	DUNES HWY	HQW	Salt Creek	0.0	
1b-8	US HWY 20	GARY MICHIGAN CITY	HQW	Beverly Shores Canals	0.6	
1b-8	US HWY 20	GARY MICHIGAN CITY	HQW	Brown Ditch	0.0	
1b-8	US HWY 20	E US HWY 20	HQW	Cowles Bog	0.4	
1b-8	US HWY 20		HQW	Munson Ditch	0.4	
1b-8	US HWY 20	MELTON RD	HQW	Salt Creek	0.2	

SENSITIVITY 2

Category 2a-8 not present in this district

Category 2b-8
ROADS ONLY within 1 mile of PRIORITY 2 STREAMS

2b-8	8 ROADS ONLY within 1 mile of PRIORITY 2 STREAMS				
2b-8	Highway name	Alternate name	Stream	Miles	Category <u>Total</u>
	Highway hame			willes	
2b-8	I 65	DEEP RIVER BR	Deep River	5.2	18.7
2b-8	RAMP		Deep River	1.7	
2b-8	STATE HWY 26	COUNTY HWY 900 N	Middle Fork Wildcat Creek	0.0	
2b-8	STATE HWY 29	N STATE HWY 29	Middle Fork Wildcat Creek	1.1	
2b-8	STATE HWY 51	GRAND BLVD	Deep River	0.3	
2b-8	STATE HWY 53	BROADWAY	Deep River	2.5	
2b-8	STATE HWY 75		Middle Fork Wildcat Creek	2.1	
2b-8	US HWY 30	W US HWY 30	Deep River	3.7	
2b-8	US HWY 421	STATE HWY 39	Middle Fork Wildcat Creek	2.2	

Seymour District State Roads

SENSITIVITY 1

		Catego	-				
1a-8			within the K				
1a-8	and within 1 mile of PRIORITY 1 STREAMS						
1a-8	Highway name	Alternate name		Stream	Miles	Category Total	
1a-0 1a-8	STATE HWY 135	S STATE HWY 135	EUW	Blue River, South Fork	2.7	14.5	
1a-8	STATE HWY 337	S STATE HWY 337	EUW	Lake	0.0		
1a-8	STATE HWY 56	W STATE HWY 56	EUW	Lake	2.3		
1a-8	STATE HWY 56	W STATE HWY 56	EUW	South Fork Lost River Trib.	2.0		
1a-8	STATE HWY 60	W STATE HWY 60	EUW	Carters Creek	2.8		
1a-8	STATE HWY 60	W STATE HWY 60	EUW	Lost River	1.0		
1a-8	STATE HWY 60	W STATE HWY 60	EUW	North Fork Lost River	1.6		
1a-8	STATE HWY 60	W STATE HWY 60	EUW	Retention Pond	2.0		
14 0	OTATE THAT GO	W 01/X1211W1 00	2011	rtotoniion i ond	2.0		
		Catego	ry 1b-8				
		ROADS ONLY with	hin 1 mile of	PRIORITY 1 STREAMS			
				_		Category	
	Highway name	Alternate name		<u>Stream</u>	<u>Miles</u>	<u>Total</u>	
1b-8	STATE HWY 1		7	Whitewater River	0.1	0.3	
1b-8	STATE HWY 229		7	Whitewater River	0.0		
1b-8	US HWY 52		7	Whitewater River	0.1		
	SENSITIVITY 2						
		Catego	ry 2a-8				
2a-8		-	within the K	ARST AREA			
2a-8	and within 1 mile of PRIORITY 2 STREAMS						
						Category	
2a-8	Highway name	Alternate name		<u>Stream</u>	Miles	<u>Total</u>	
2a-8	STATE HWY 129	S STATE HWY 129		Graham Creek	0.4	4.7	
2a-8	STATE HWY 250			Big Creek	0.0		
2a-8	STATE HWY 256			Little Creek	2.1		
2a-8	STATE HWY 7	S STATE HWY 7		Graham Creek	0.2		
2a-8	STATE HWY 7	S STATE HWY 7		Otter Creek	0.4		
2a-8	US HWY 421	S US HWY 421		Graham Creek	0.8		
2a-8	US HWY 50	W US HWY 50		Otter Creek	0.7		
		Catego	nı 2h 0				
2b-8		-	-	PRIORITY 2 STREAMS			
200						Category	
2b-8	Highway name	Alternate name		<u>Stream</u>	Miles	Total	
2b-8	STATE HWY 250	E STATE HWY 250		Indian Kentuck Creek	0.9	10.9	
2b-8	STATE HWY 62	N STATE HWY 62		Indian Kentuck Creek	2.7		
2b-8		0.110.404		Dia Casali	4.2		
	US HWY 421	S US 421		Big Creek	4.2		
2b-8	US HWY 421 US HWY 421	S US HWY 421		Graham Creek	2.6		
2b-8 2b-8				•			
	US HWY 421	S US HWY 421		Graham Creek	2.6		

APPENDIX C

Impairments of Sensitivity Level 1 and 2 Waterways within One Mile of Priority 1

and 2 Highway Segments

Priority 1 Streams

Sensitive State Maintained Highways: By Stream (Alpha Order) and TMDL

Waterway	<u>TMDLs</u>	<u>District</u>	
Beverly Shores Canals	None	LaPorte	
Big Pine Creek	E. coli, PCBs	Crawfordsville	
Big Walnut Creek	E. coli	Crawfordsville	
Blue River	E. coli, PCBs	Seymour	
Blue River	E. coli, IBC	Vincennes	
Blue River, South Fork	None	Seymour	
Brown Ditch	IBC	LaPorte	
Burns Ditch	PCBs	LaPorte	
Carters Creek	None	Seymour	
Carters Creek	None	Vincennes	
Cedar Creek	E. coli, PCBs, IBC, Hg	Fort Wayne	
Clifty Creek	E. coli	Crawfordsville	
Cowles Bog	None	LaPorte	
Dunes Creek	E. coli, IBC	LaPorte	
E. Brch. Little Calumet Rvr. Trib.	None	LaPorte	
Elkhart River, South Branch	E. coli	Fort Wayne	
Fall Creek	E. coli, PCBs	Greenfield	
Indian Creek	E. coli	Crawfordsville	
Kintzele Ditch	E. coli	LaPorte	
(Scattered segments of Lost River	r) None	Vincennes	
Lake	E. coli	Seymour	
Lake Michigan	PCBs, Hg	LaPorte	
Little Calumet River CN,	PCBs, Chlorides, DO, IBC	LaPorte	
Long Lake & Wetlands	P, Hg, PCBs	LaPorte	
Lost River	E. coli	Seymour	
Lost River	E. coli	Vincennes	
Lost River, North Fork	E. coli	Seymour	
Lost River, South Fork	E. coli	Vincennes	
Mud Pine Creek	PCBs	Crawfordsville	
Munson Ditch	E. coli, IBC	LaPorte	
Pond (near US 12)	None	LaPorte	
Retention Pond (near SR 60)	None	Seymour	
Salt Creek	E. coli, IBC	LaPorte	
Stampers Creek	None	Vincennes	
Stampers Creek Tributary 1	None	Vincennes	

Stampers Creek Tributary 2	None	Vincennes
Sugar Creek E. coli, Hg, P	CBs, DO, Sulfates, TDS	Crawfordsville
Tippecanoe River	E. coli, PCBs	Fort Wayne
Tippecanoe River	E. coli, PCBs	LaPorte
Wetlands (near SR 249 & US 12)	None	LaPorte
Whitewater River	E. coli, PCBs, Hg	Seymour
Whitewater River	E. coli, PCBs, Hg	Greenfield
Wildcat Creek	E. coli, PCBs, IBC, Hg, CN	LaPorte
Wildcat Creek	E. coli, PCBs, IBC, Hg, CN	Greenfield
Wildcat Creek, South Fork	E. coli, N ₂ , P, TSS	Crawfordsville
Wolf Creek	None	Vincennes
Wolf Creek Tributary	None	Vincennes

Note: IBC (Impaired Biotic Community); Hg (Mercury); CN (Cyanide); P (Phosphorus)

Priority 2 Streams

Sensitive State Maintained Highways: By Stream (Alpha Order) and TMDL

Waterway	<u>TMDLs</u>	<u>District</u>
Big Creek	E. coli	Seymour
Deep River	E. coli, IBC, Siltation	LaPorte
Graham Creek	None	Seymour
Indian Kentuck Creek	E. coli, IBC	Seymour
Kilmore Creek	E. coli, IBC	Crawfordsville
Little Creek	E. coli	Seymour
Middle Fork Wildcat Creek	E. coli, PCBs	Crawfordsville
Middle Fork Wildcat Creek	E. coli, PCBs	LaPorte
Mississinewa River	E. coli, PCBs, Hg	Fort Wayne
Otter Creek	IBC	Seymour
Patoka River	PCBs, Hg, Sulfates, TDS, IBC	Vincennes
Sugar Mill Creek	None	Crawfordsville

Note: IBC (Impaired Biotic Community); Hg (Mercury); CN (Cyanide); P (Phosphorus)

APPENDIX D

Contact Information: Erosion and Sediment Control Manuals

and Training Materials

(The size of the combined files is too large to include in this report, so the contact information or internet link is provided.)

Texas

CD-Rom including material for 3-day E & SC class and the Field Guide

[Contact: afoster@dot.state.tx.us]

Also, at www.txdot.gov (search for "erosion"):

www.txdot.gov/txdot_library/consultants_contractors/publications/environmental

_resources.htm

Scroll to "Storm Water Management Guidelines for Construction Activities" and click.

Iowa

Resource Guide for Inspection Staff and Erosion Control PowerPoint for training

[Contact: Rhonda.Andresen@dot.iowa.gov]

Also, at www.iowadot.gov (search for "erosion"):

www.iowadnr.gov/water/stormwater/index.html

Scroll to "Construction Site Erosion Control and Streambank Erosion Control

Manuals" and click; scroll to "Iowa Construction Site Erosion Control Manual"

and click.

British Columbia

Manual of Control of Erosion and Shallow Slope Movement

[Contact: Al.Planiden@gov.bc.ca]

Also, at www.gov.bc.ca/tran (search for "erosion"):

http://datafind.gov.bc.ca/query.html?qp=&style=tran&qt=erosion

Scroll to "Surface Stabilization" and click.

Alaska

Currently revising program to include electronic delivery method

[Contact: clint.adler@alaska.gov]

Also, at www.state.ak.us (search for "erosion"):

www.dot.state.ak.us/stwddes/desenviron/assets/pdf/nwp/NWP_BMPs.pdf

Goes to "General Best Management Practice (BMP) for Projects in Waters of the U.S."

Maine

Voluntary Contractor Certification Program

[Go to: www.maine.gov/dep/blwq/docstand/escbmps/index.htm]

New Mexico

National Pollution Discharge Elimination System (NPDES) Manual

[Go to: http://nmshtd.state.nm.us/main.asp?secid=11161]

Missouri

Construction Site Erosion and Sediment Control training program

[Contact: Randy.Morris@modot.mo.gov]

Also, at www.modot.mo.gov (search for "erosion"): ["Engineering Policy

Guide"]

http://epg.modot.mo.gov/index.php?title-

Category:806_Pollution%2C_Erosion_and_Sediment_Control (click at 800 Roadside

Development on left sidebar, then Category 806)

Pennsylvania

Select subject areas on left sidebar by Functional Area (click): Design, Hydraulics

and Hydrology

Go to:

www.dotdom1.state.pa.us/ECMS/ECMS_Training_Calendar.nsf/Frameset?Open

Minnesota

University of Minnesota Erosion and Sediment Control training courses

Go to: www.erosion.umn.edu

Go to:

www.mnltap.umn.edu/Events/DrainageErosionControl/StormWaterErosion.html

Washington

Training Manual

Go to: www.wsdot.wa.gov/Environment/WaterQuality/ErosionControl.htm

Alberta

Erosion and Sediment Control Manual and Field Handbook

[Go to: www.transportation.alberta.ca/686.htm]

Michigan

Soil Erosion and Sedimentation Control Manual

Go to: www.michigan.gov/documents/2006_SESC_Manual_165226_7.pdf

APPENDIX E

Question	МО	IL	AR	MT	(SAS)	KY	ME	NV	(BC)	(ALB)	GA	IA	AK
4 Dans			l' t <i>t</i>	2 1 1				-4' 4-	41		-1-4- 41-		
1. Does your Er	osion a	na Sec	iment (ontroi	training	•		ation to	tnose v	vno com		e progra	
Yes						Х	Х				Х		Х
No	Χ	Χ	Х	Χ	Х				X	Х		Χ	
Explanation			1	1		1	1	1	1	1			
2. Who are the i	individu	ials tha	t nartic	inate in	the trai	ning?							
State DOT	Haivia	X	T partio	ipate ii	l tile tidi	illig.						Х	
Contractor													
Both	Χ		X	Х	Χ	Х	Χ	Х	X	X			Х
	^		2	2	^	2	^	^	2	2			
Explanation										2			
3. Are contracto	r perso	nnel re	guired	to atte	nd?								
Yes	•					Х	Х				Χ		Х
No		Χ	Х	Χ	Х			Х		Х	- •	Χ	
Explanation	3	- ' '		3	3				3	- 1			3
4. Is the training			state DC	OT staf	f or an c		entity?						
DOT Staff	X	Х				Χ						Χ	
Outside Entity													
Both			Х	Х	Х		Х	Χ		Х	Χ		Х
Explanation				4					4				
5. Do you use th	ne curri	culum	develor	ed by:	[check a	all that	apply]						
Your Agency	Х	Х	X	Х	X	Χ	, , .	Х	Х	Х	Χ	Χ	
Other		Х		Х	Х		Х		Х				Х
Explanation		5		5	5		5	5	5				5
·													
6. Is your course	e offere	d as in	teractiv	e (web	-based)	training	g?						
Yes				Ì									
No	Х	Х	Х	Х	Х	Х	Х	Χ	Х	Х	Χ	Х	Х
Explanation		6						6					
7. Is interactive	(web-b	ased) t	raining		as a su	ıpplem	ent to yo	our traini	ng?				
Yes				Х									
No	Χ	Χ	Х			Х	X	Χ	Х	X	Χ	Х	X
Explanation	7	7		7	7								
8. Is your Erosic	n and	Sadim	ant Con	trol tro	ining rec	udarkyo	chodula	243					
Yes	ni allu .	Sediffe	JIK 0011	נוטו נומ	X	juiaity S	X	,u:			Х		Х
			X	V	^		^		~		^		
No	0	X 8	Λ_	X		Χ	0	Х	X	Х		X	
Explanation	8	ď		8			8						
9. If you answer	ed "ves	s" to au	estion !	l 3. what	is the fr	egueno	cv of voi	ır trainin	a?				
Weekly	, , , ,	-19		,		1							
Monthly											Χ		
Quarterly											^		
Semi-Annually													Х
Explanation	9	9	9		9		9					9	
LAPIAHAUUH	9	9	3		3		9					9	

Question	МО	IL	AR	MT	(SAS)	KY	ME	NV	(BC)	(ALB)	GA	IA	AK
10. What is the	duratio	n of ea	ch trair	ing pro	gram?								
1 day	Х	Х	Х	Х			X	X			Х		
2 days					Х								X
3 days										Х			
More													
Explanation		10				10		10		10			
Missouri Expla													
3. The contracto							l	<u>!</u>		41 1			1.
7. There is a list							esentat	ion avai	lable on	the dep	artmen	t's inter	<u>nal</u>
website for the			er to, b	ut it isr	i't intera	ctive.							
8. Scheduled as													
9. Have training	at leas	st annu	ally.										
Illinois Explana	ations												
5. Currently und		sion											+
6. One of the cu			s is to n	rovide	web-ha	sed acc	L Cess						+
7. See 6.	Ontil	7 101011	5 13 10 p	Tovide	WOD Da	Jou au							+
8. Recurring, bu	it not re	aularh	, schedi	uled									
9. Training was					Lone ani	aually (Designa	re in the	- Winter	/Spring :	and Co	netructi	on in
the Winter) but													J11 111
schedules.	lullibe	01 363	5510115,			IIOIIS W		Teeded t	Desta		Juaie U		+
10. Currently, tv	io cons	rata a		COLIFCO	L Howe	wor ac	the cla	ecoc ar	a baina	rodovolo	nod an	d with	+
additional issue							lile cia			Legevelo	peu an	With	
additional issue	S to aut	uress,			ay Criari	ge.							
Arkansas Expl	anatio	าร											+
1. We are worki			rsity of	Arkans	as to de	velop a	trainin	g and ce	ertificatio	n course	- which	will	
hopefully begin						. С.Ср							
2. Separate train			to con	tractors	s and D0	OT pers	sonnel	Once th	ne cours	e mentic	ned in	item 1	is
complete, both													1
9. We offer train	<u> </u>						ersonne	 					
						мете. р		 					
Montana Expla	nation	s											
1. See 3. below													
2. The majority		ina is ii	nternal	for MD	T persoi	nnel: ho	wever	MDT do	es have	an F &	SC Tra	ining	
Program availal													s on
our internet site									With GOO	0.00.2	u 00	Tidilidai	J, 011
3. The Montana							 ossihilit	v of dev	elonina	a require	d traini	ina &	
certification pro													en
4. MDT has bro	•												T.
training is devel													within
the Environmen												101 01111	VV 1C1 111 1
5. See 4. above		VIOCO E	Jaroau l	11at 13 V	VOIKING	o addit			U dilill	ig riecus	·		+
7. MDT's Traini		lules o	e availa	hla thr	Ough th	e follow	ing web	link.					+
www.mdt.mt.go	•				•		ing wet	אווות. 					+
			•				E & SC	iceuco	during o	ur oppus	l Conc	truction	
8. MDT used to				•									
Conference whi													<u></u>
other training av	renues	are be	⊪g exp	iorea.	at this ti	me, no	regula	uıy scne ⊺	aulea" t	raining is	in piac	;e. ⊤	+

Province of Saskatch	ewan	Explan	ations									
3. Although it is not ma					end, the	y are er	courage	ed to att	end the t	raining	session	١.
5. Training is developed by DOT Staff and Ministry Consultants based on information from other agencies and												
organizations.											<u> </u>	
7. Ministry Staff and C	onsulta	nts are	made :	aware o	f web-b	ased tra	ainina m	aterial v	where the	ev can d	o to red	ceive
additional information.										, , , , ,	,	
9. Normally, formal tra	inina is	provide	ed anni	ıallv at a	a two-da	av works	shop					
or Hormany, Torritar tra		provide	o armi									
Kentucky Explanatio	ns											
1. All KY DOT project		ers and	inspec	tors alo	ng with	contrac	tor perso	onnel ai	re require	ed to be	Grade	
Level II certified. This												
2. KY Division of Water requires that all contractors have personnel that are KEPSC certified inspectors on												n
construction jobs that require a KPDES permit.												
10. Grade Level II is a one-day erosion prevention and sediment control class and KEPSC is a two-day												
course in erosion prevention and sediment control.												
,												
Maine Explanations												
1. The staff of the Surf	ace Wa	ater Qua	alitv Ur	nit at Ma	ineDO	are ins	structors	in the N	Maine De	partme	nt of	
Environmental Protect										•)
preparer of the SWPP												
draft spec will require a												
http://www.state.me.us						1.00						
In addition, we have a					am for o	our M &	O staff.					
2. See 1. above.				9 1.09.								
3. See 1. above.												
4. See 1. above.												
5. The curriculum was	develo	ned to a	address	s all con	structio	n activi	ties We	rely or	one-on-	one ins	truction	(we
are a relatively small s												
and our BMP manual.												
would rather specifical												
(with Maine DEP).	ly addit	000 00.	- Cilitiati			10000					, progra	
8. See 1. above.												
Contractor training of the state of the	offered	durina v	vinter s	season	We tra	in M &	Ω in late	winter/	early spr	ina		
or contractor training t		uumig i				🗴				9.		
Nevada Explanations												
1. To date, we have or		ided so	me lim	ited trai	nina on	the use	of our v	vater di	ıalitv maı	nuals	The ma	nuals
provide guidance on se												
to our field personnel of						11011401		IIICIIG		io addit	ona no	9
5. Our manuals were v						ho also	helped	provide	initial tra	ainina	NDOT 9	staff
has also provided train							lioipou	p. 0 1. d 0	I III III II II I	g.		J.C.I.I
6. Our manuals are av						training						
10. When we had the t							·					
TO: WHOM WO HAD UTO		, it was	0110 00		j							
Province of British C	olumb	ia Exnla	anatio	ns								
1. We do not formally					is som	L Lethina t	hat can	he unde	⊥ ertaken h	v staff	as need	led
through courses offere												100
involved with this work		•			_ •		•	•				
address specific proble												
												<u> </u>
2. Many of our large projects are now delivered through a design-build or private public partnership model. Project deliverables are "end result" oriented and environmental aspects must be dealt with in a manner that												
addresses all relative concerns and requirements. Contractor personnel would either have or receive												
	addresses all relative concerns and requirements. Contractor personnel would either have or receive appropriate training per the contract requirements and any Ministry personnel involved with monitoring, etc.,											r:
appropriate training pe		111 UUL 1	24an C		a arry		, 2013011		.voa wid		y, Ut	<i>∽.</i> ,

would need to have the same qualifications.													
3. See 2. above													
4. See 1. above													
5. We have developed one ministry document in conjunction with a major highway project a number of years													
ago - "The Manual of Control of Erosion and Shallow Slope Movement." This is accessible by anyone throug												ough	
our ministry website. A number of our personnel have taken courses offered by various organizations such a												ch as	
the International Erosion Control Association and on any number of topics. The course developed by the													
Transportation Association of Canada based the "National Guide to Erosion and Sediment Control on													
Roadway Projects" is excellent.													
Province of All													
1. We provide a "certificate of completion" which acknowledges someone has completed the training course												rse	
but we do not have a certification program requirement.													
2. We have done a number of combined classroom and field training courses which are attended by our staff,											staff,		
consultants, contractors, other government staff and regulators.													
8. The courses are focused on bio-engineering solutions to erosion and sediment control. The field portion											n		
requires that we											ave. Tl	he timin	g is
dependant on o	ur regu	lated fi	sh winc	low and	d sched	uling wi	th the a	ssigned	contrac	tor.			
10. We do one	day of o	classro	om-bas	ed traii	ning to r	eview E	BMPs ar	nd theory	y, and tv	vo days	of hand	s-on	
field-based train	ing for	particip	oants to	fully a	ppreciat	te the in	nplicatio	ns and p	oractica	lity of the	eir desig	gns.	
Georgia Explai	nations	8											
None offered.													
lowa Explanati	ons												
No formal tra	ining of	ffered; t	topics s	ometin	nes incl	uded in	other tr	aining se	essions	i			
Alaska Explana	ations												
Contractors a				ertified	Erosio	n and S	edimen	t Contro	l Lead (CESCL)	certific	ation.	
Course devel	oped b	y privat	te firm.										

APPENDIX F

Review of Other State DOT Erosion and Sediment Control Training Programs Minnesota DOT

The Erosion and Sediment Control Certification Program offers classes with and without certification exams and procedures. The University of Minnesota Department of Bioproducts and Biosystems Engineering administers the program and its faculty and contracted instructors deliver the one or two-day courses at many locations throughout the state. The program began in 2002. Certification and recertification courses are offered for -

- Erosion/Sediment Control Inspector/Installer
- Erosion/Sediment Control Site Management
- Design of Storm Water Pollution Prevention Plans

Non-certification classes are offered in related areas, such as NPDES regulatory compliance, small site stormwater management, designing for infiltration volume control storm water BMPs, BMP assessment and illicit discharge detection and elimination.

The Minnesota certification program is driven by the MnDOT Standard Specifications, which require a minimum of one certified individual per project and one for each type of work; i.e., grading, bridge construction, turf establishment, culvert replacement and utility construction. Certification must be renewed every three years.

Washington State DOT

The Washington State Department of Ecology (state environmental regulatory agency) developed requirements for a two-day certification course in Construction Site Erosion and Sediment Control. WSDOT offers a one-day course for its personnel

responsible for designing and inspecting a temporary erosion and sediment control plan, but it does not meet the two-day certification requirements.

Contractors on WSDOT projects are required to provide an Erosion and Sediment Control Lead, per WSDOT Standards, achieved through successful completion of the course approved by the Department of Ecology.

The two-day class (including one day in the field installing BMPs) addresses the federal and state laws, the state erosion control program, water quality sampling, basic principles of the erosion/sedimentation process, Temporary Erosion and Sediment Control plan development and implementation and a review of WSDOT Standard Specifications, Special Provisions and Plans. It appears from the course outline that about half of the two-day class is focused on BMP description/installation.

Texas DOT

TxDOT design and construction staff, field inspectors and environmental coordinators are required to attend the first day of a two-day Stormwater Erosion and Sediment Control class and pass an exam "to demonstrate proficiency." Day two covers subjects specific to designers of storm water plans. Upon the completion of day one, participants should be able to -

- discuss the basic storm water erosion and sediment control regulations;
- apply the basic principles of erosion and sediment control;
- select and apply appropriate BMPs for surface protection, velocity reduction,
 flow control and run-off management;
- utilize techniques for inspection and maintenance of storm water erosion and sediment control.

And, day two participants should be able to -

- apply hydrology methods, including the rational method, TP-40 and the 90th percentile method;
- access and use the approved product list for slope and channel protection;
- design effective sediment traps and basins;
- design an effective Storm Water Pollution Prevention Plan.

The Texas DOT course is not a certification course and contractors are not required to attend; however, Texas is moving toward establishing a standard to change both.

Kentucky Transportation Cabinet

Kentucky's Erosion Prevention and Sediment Control (KEPSC) Program,
Inspector Qualification Training and Testing Course, offered by the University of
Kentucky Transportation Center, is designed to assist developers, contractors and
governmental agencies in complying with the Kentucky Pollution and Discharge
Elimination System (KPDES) General Permit for Construction. The course provides
students with the information necessary to properly inspect construction sites and
document inspections required by the permit. Qualification is established through testing
at the completion of the course.

The course is intended for individuals with a firm, basic understanding of the KPDES Stormwater Permit requirements for construction sites and familiarity with the principles of erosion and sediment control.

Applicants for the course should have:

• Site Plans and Standard Details - a clear understanding of how to read and understand the site plans and how they relate to conditions in the field. The

ability to understand legends, scales, contour lines, notes and standard details is essential;

- Soils basic knowledge of various soil types and physical properties and understand the difference in clays, silts, etc., and soil properties as they relate to nutrient content, i.e., fertilizers and pH;
- Erosion Processes basic knowledge of the various types of erosion, i.e., rain drop impact, sheet erosion, rill and gulley, and stream bank erosion;
- Construction Terms and Methods a familiarity with the construction industry and have a basic knowledge of construction equipment and procedures.

Topics include Erosion Prevention and Sediment Control Best Management Practices, Good Housekeeping Best Management Practices, Liabilities for Non-compliance and Project Closeout. Participants also experience hands-on classroom activities such as reviewing sample environmental plans and completing inspection forms.

Michigan DOT

The Michigan Department of Environmental Quality (MDEQ) offers two training programs to satisfy requirements of state statutes:

- Comprehensive Soil Erosion and Sedimentation Control (SESC)
- Certified Storm Water Operator/SESC Inspector (CSWO/SESC Inspector)

The one-day courses are followed by exams which participants must pass to be certified. Those successfully completing the Comprehensive SESC course can order or suggest other, more effective measures for soil erosion and sedimentation control than those indicated in the SESC plan; the SESC Inspector is limited to ensuring that SESC measures are implemented and maintained per the SESC plan and that the prescribed

measures are effective. The Certified Storm Water Operators typically conduct weekly site inspections and inspections within 24 hours of a rain event. Both the Inspectors and Operators must pass the CSWO/SESC Inspector exam to be certified.

The Comprehensive Soil Erosion and Sedimentation Control course includes 12 units:

- Erosion and Sedimentation Goals and Principles
- Controlling Runoff and Erosion on Construction Sites
- Vegetative Stabilization
- Controlling Sediment
- Developing a SESC Plan and Inspecting the Installation
- Legislation and Administrative Rules
- Soils and Runoff
- Revised Universal Soil Loss Equation (RUSLE)
- Sedimentation Basins
- Diversions
- Map Interpretation and Plan Development and Review
- Michigan's Stormwater Program for Construction Sites

The ten units comprising the CSWO/SESC Inspector training curriculum include essentially the same topics as the Comprehensive SESC course.

Attendance at MDEQ training is not mandatory, but taking and passing the exam is, so the agency recommends "self study" using the appropriate training manual.