INDOT Research

TECHNICAL *Summary*

Technology Transfer and Project Implementation Information

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Development of a Strategy for Preparing an INDOT Storm Water Quality Management Plan

Introduction

U.S. EPA regulations (40 CFR parts 9, 122, 123 and 1214) promulgated December 8, 1999 (FR 58721) require small, municipal, separate, storm sewer systems (MS4s) to obtain National Pollutant Discharge Elimination System (NPDES) permits for storm water discharges. State transportation agencies are regulated by the EPA rule as MS4s.

The focus of the research was on providing documentation and data that (1) could be submitted to the Indiana Department of Environmental Management (IDEM) as part of its permit application and (2) would substantiate the decisions of INDOT officials concerning the attributes of its Storm Water Quality Management Plan which, because of the size, statewide authority and complexities of the organization, are substantially different than those of a municipality.

Findings

The report and its findings are organized by research topic relevant to selected sections of the Storm Water Quality Management Plan defined in the Scope of Work:

I. Identification of the entities [maintenance facilities and highways] included in the MS4 areas.

Fifty-nine of INDOT's 142 facility locations (42%) are located within MS4 areas and approximately 1,812 centerline miles (16%) of the 11,216 centerline miles maintained by the state are also within MS4 areas. Tables are included that show the number of facility locations and centerline miles by INDOT district and MS4 area.

II. List of all known receiving waters or, if the discharge is to another MS4, the name of the MS4 and the initial receiving water.

Receiving waters for direct discharge of storm water from state maintained highways are identified and MS4 operators of combined sanitary and storm sewer and separate storm sewer systems to which INDOT discharges are also identified, along with the receiving waters of the operator's discharge.

III. Identification of Known Sensitive [Water] Areas

All state-maintained highway segments -- within and outside MS4 areas -- are identified by "sensitivity level;" i.e., a scoring system based on the four criteria stated in Rule 13 [327IAC15-13-5(70)], and mileage is estimated for each of the four levels in each INDOT district.

IV. Monitoring Data for the MS4 Area Receiving Waters

Water quality monitoring data from INDOT's monitoring program, in the summer of 2003, at 87 bridges on sensitivity ("priority") level 1 and 2 highways has been tabularized and provided at a publicly-accessible website [www.ecn.purdue.edu/CMTI/stormwater/SWQMP_FSWQM.htm]. USGS Real-time Flow Gauge and Fixed Surface Water Quality Monitoring Station data for these and all other state waters are also available at this website.

V. Assessment of Selected Structural and Non-Structural Best Management Practices (BMPs) Currently Implemented by INDOT

Various highway structural and non-structural maintenance BMPs are identified and discussed,

including those pertaining to: application of deicers, prototype salt storage buildings, brinemaking, use of alternative anti-caking agents in road salts, Operating Procedures and other documents governing deicing operations, drainage systems, street sweeping, bridge cleaning, bridge painting, construction and maintenance in karst areas and in the region of the state having a sole-source aquifer, and constructed wetlands.

Implementation

Recommendations for implementation within each of the five research topic areas are:

I. Identification of the entities [maintenance facilities and highways] included in the MS4 areas.

Greenfield (14) and LaPorte (12) have the greatest number of maintenance facility locations within MS4 areas. Greenfield (469) and LaPorte (452) are the two districts with the greatest number of centerline miles in MS4 area and, also, the greatest number of "sensitive" miles, 246 and 317, respectively.

LaPorte District, with 84 percent of the Level 1 sensitive highway segments and 85 percent of the Level 2 sensitive highway segments, should receive priority attention. Within LaPorte District, priority should be given to municipal MS4s with the greatest "sensitive" highway segment mileage: Porter (24.8), Portage (22.9) and Michigan City (10.8), for Level 1, and Merrillville (12.1), Hobart (8.2) and Lake Station (8.1), for Level 2. Priority attention by INDOT to sensitive highway segments in these six MS4s will address 86.9 (66%) of the 131.4 miles of the combined Level 1 and 2 sensitive highway segments in the state.

II. List of all known receiving waters or, if the discharge is to another MS4, the name of the MS4 and the initial receiving water.

INDOT facilities in MS4 Areas to which priority attention should be directed in each District, because of their proximity to sensitive areas, include:

Crawfordsville

Lafayette Unit: not connected to POTW; 1 mile of recreation waters; 3,000' of vulnerable groundwater; 3,000' of an ETR natural area;

Fort Wayne

Fort Wayne District, Sub and Unit: 3,000' of community public well; 1 mile of recreation waters; 3,000' of vulnerable groundwater; 3,000' of an ETR natural area;

U.S. 27 South Unit: not connected to POTW; 3,000' of community public well; 3,000' of vulnerable groundwater;

Greenfield

Indianapolis Sub and 2 Units: not connected to a POTW; 3,000' of a community public well [replacement facilities being constructed in 2004]

Indianapolis Unit 3 (71st St): not connected to POTW; 3,000' of vulnerable groundwater;

LaPorte

Mishawaka Unit: not connected to POTW; 3,000' of community public well; 1 mile of recreation waters;

Chesterton Unit: not connected to POTW; 3,000' of community public well; 1 mile of high quality and exceptional use waters;

Seymour

Madison Sub: not connected to POTW; 1 mile of recreation water;

Vincennes

Bedford Unit: located in karst area; 3,000' of vulnerable groundwater; 3,000' of an ETR natural area;

Toll Road

Toll Road District: not connected to POTW; 3,000' of community public well; 3,000' of vulnerable groundwater; 3,000' of an ETR natural area;

Elkhart Maintenance: not connected to POTW; 3,000' of community public well; 3,000' of vulnerable groundwater; 3,000' of an ETR natural area;

Porter Maintenance: not connected to POTW; 3,000' of vulnerable groundwater; 3,000' of an ETR natural area.

III. Identification of Known Sensitive [Water] Areas

INDOT, as an MS4 operator, is expected to implement control measures "to ensure that existing…state…operations are performed in ways that will reduce contamination of storm water discharges" [327IAC15-13-17(b)].

INDOT needs to assure the implementation of, at least, the following control measures as BMPs in sensitive areas:

- Covering, or otherwise reducing, the potential for polluted storm water run-off from deicing salt or sand storage piles.
- BMPs for vehicular maintenance areas.
- Prohibition of equipment or vehicle wash waters and concrete or asphalt hydrodemolition wastewaters into storm water run-off, except under the allowance of an appropriate NPDES wastewater permit.
- Minimization of pesticide and fertilizer use. Pesticides shall be used, applied, handled, stored, mixed, loaded, transported, and disposed of via Office of the Indiana State chemist's guidance requirements.

IV. Monitoring Data for the MS4 Area Receiving Waters

INDOT should schedule its water quality monitoring of sensitivity ("Priority") level 1 and 2 highway segments for spring, following the snow/ice operations season, and fall, before the season. Real time USGS flow gauge and fixed surface water quality monitoring data need to be integrated with INDOT's monitoring data to characterize the water quality of receiving streams, thereby avoiding IDEM requirements to sample and conduct laboratory tests to determine water quality.

V. Assessment of Selected Structural and Non-Structural Best Management Practices (BMPs) Currently Implemented by INDOT

INDOT should revise existing policies, purchasing agreements, contracts and Operating Procedures and/or create new ones to promote the adoption and practice of best management practices to -

- continue to connect maintenance facilities to municipal POTWs for the discharge of vehicle washwater;
- increase the number of facilities making and applying brine;
- expand the prototype salt storage building currently at Tipton Unit to other facility locations; identify vendors who offer less-toxic alternatives to ferric ferrocyanide as an anti-caking agent;
- modify Operating Procedure No. 22: Snow and Ice Chemicals - Pollution Control Guidelines (August 24, 1998) so it conforms to current practices and state and federal environmental regulations;
- instruct District directors to establish a schedule for cleaning minor draining structures (inlets and catch basins), pursuant to INDOT Performance Standard Code 2350, and submit the schedules to the Environmental Services Division for inclusion in the storm water permit application;
- communicate to MS4 municipalities that they may "count" the volume or weight of trash from street sweeping in their storm water permit reports to IDEM;
- adopt a procedure requiring the collection or, minimally, the filtering of bridge washwater before discharging to waters of the state;
- amend Standard Specification 619 - Painting Bridge Steel with an INDOT policy requiring that Section 619.06(a) Pollution Control be applied to Section 619.08, Surface Preparation and Section 619.09, Paint Systems, to protect waters under and adjacent to bridges from pollution that may result from surface cleaning or paint application;
- embody the provisions of the October 13, 1993 Karst Agreement, signed by INDOT, IDEM, IDNR and USF&WS in a policy and operating procedure to govern construction and maintenance of state highways in karst terrain;
- prepare operating procedures for the periodic inspection and maintenance of BMPs constructed in karst terrain, namely, peat filters and two chamber detention ponds;
- determine whether highway construction and maintenance operations performed since the 1988 signing of the Sole Source Aquifer Memorandum of Understanding are in conformance with the MOU and, if not, prepare appropriate policies and operating procedures;
- determine the efficiency of the constructed wetlands at the Toll Road Grant Street exit (14A) as a determinant of whether this type of BMP should be replicated elsewhere.

Contacts

For more information:

Dr. Lynn A. Corson
Principal Investigator
Indiana Clean Manufacturing Technology
and Safe Materials Institute
Purdue University
West Lafayette IN 47907
Phone: (765) 463-4749
Fax: (765) 463-3795
E-mail: corsonl@ecn.purdue.edu

Indiana Department of Transportation
Division of Research
1205 Montgomery Street
P.O. Box 2279
West Lafayette, IN 47906
Phone: (765) 463-1521
Fax: (765) 497-1665

Purdue University
Joint Transportation Research Program
School of Civil Engineering
West Lafayette, IN 47907
Phone: (765) 494-9310
Fax: (765) 496-7996
jtrp@ecn.purdue.edu
http://www.purdue.edu/jtrp