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16. Abstract

The objectives of this research were:

1. to identify the source, character, currency and format of environmental, ecological, geological and other data for each existing facility site and organize it in a "hard copy" and/or computerized framework to aid the prioritization and planning process for facility upgrades to protect the environment, for regulatory compliance, and for potential replacement or relocation of existing sites;
2. to identify and assess the criteria currently employed by INDOT to select locations for new and/or relocated facilities, including the ASTM Phase I and II Environmental Site Assessment criteria, and to recommend additional criteria including those required to mitigate potential environmental impacts at new sites, if necessary;
3.-4. to recommend Best Management Practices for implementation at existing sites to protect the environment and for new facilities sited at locations where potential environmental impacts exist, and to provide cost estimates of Best Management Practices involving engineering upgrades for existing and new facilities;
5. to recommend procedures and policies for decommissioning facilities prior to their closure and relocation.

The research entailed a review of available GIS databases from all government, institutional and private sources and the preparation of specific GIS maps depicting locations of INDOT facilities and highways and the publication of a directory and CD-ROM for use by INDOT staff. The GIS database investigation identified nine environmental sensitivity criteria that could be used to prioritize facilities relative to the potential threat they pose to the surrounding environment.

The study included a thorough investigation of the literature concerning best management practices (BMPs) for control of storm water. A CD-ROM was prepared which included documents from 23 public, institutional and private sources and their hyperlinks.

The study concludes with an analysis of the ASTM Phase I and II Standards for Environmental Site Assessments and the recommendation of the RISC Investigation Report format to supplement the use of Phase I and II for assessment of future facility sites and prior to closing existing facilities.

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Final Report

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DEVELOPMENT OF A DATABASE AND SYSTEM FOR ANALYZING THE ACTUAL AND POTENTIAL IMPACTS ON THE ENVIRONMENT OF EXISTING AND PLANNED INDOT SITES

by

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INTRODUCTION

Information on existing INDOT maintenance facilities is needed to allow a ranking and evaluation of which sites are the most environmentally sensitive. This information will allow INDOT to prioritize, when funds are available, the sites that should be closed and/or relocated. Analysis of this information will also identify facilities that require pollution control devices, such as oil/water separators, and those that need to implement storm water runoff controls. This information will also assist the identification of appropriate locations for new facilities, such as the newly-designed salt storage buildings.

PROBLEM STATEMENT

Some of the activities conducted, currently, at INDOT facilities potentially impact the environment in some ways that are subject to environmental regulation and in other ways that are not, yet, regulated. For example, the majority of Unit facilities in the state have floor drains in buildings and surface drains in the "yard" that discharge washwater and storm water (sometimes containing salt, vehicle fluids and other material) through underground pipes or open ditches off-site to a neighboring property, a ditch or a right-of-way culvert and, potentially, to the waters of the state. Also, many "yards" are the location of aggregate piles, metal scrap piles, miscellaneous right-of-way trash and other debris that can potentially add to the contaminant loading of the storm water. Further, INDOT facilities are currently closed and/or relocated without a decommissioning policy or procedures. This can result in abandoned areas of actual or potential contamination and/or the transfer of hazardous and non-hazardous chemicals and wastes to other INDOT facilities without advanced planning and, sometimes, without advanced notification. Also, most future sites for INDOT facilities are currently selected using

criteria based on cost of land acquisition and operational convenience, not the potential impact of those operations on the environment.

The issue of storm water management is currently a significant problem and has the potential to become more of a regulatory concern, for three reasons -

- Indiana formalized the adoption of drinking water standards (Maximum Contaminant Levels - MCLs) as the groundwater quality standards on March 6, 2002.
- Indiana will publish proposed water quality standards for all surface water in the state equivalent to those currently existing for bodies in the Great Lakes Basin, in 2002.
- The EPA Stormwater Phase II regulations define state transportation agencies as operators of "municipal separate storm sewer systems" (MS4) and, as such, INDOT is responsible for "controlling stormwater discharges within its right-of-ways and jurisdiction." Therefore, facilities that discharge to a state ROW ditch, defined as "waters of the state," or drainage system will probably need to implement stormwater control measures. Storm water discharges from INDOT property in designated urbanized areas will be regulated with the adoption of Indiana's proposed Rule 13 in August 2002.

Previous Research Findings

The findings of SPR 2341, Follow-up Study to FHWA/IN/JTRP-92/22: "Development of a Strategy for Compliance with EPA and OSHA Regulations Applicable to INDOT Facilities," includes many examples of the INDOT operational areas that need improvement. These constituted the foundation of this project's research.

Selected findings and conclusions from the previous research are included here as Appendix A.

OBJECTIVES OR PURPOSES

The objectives of this study are:

1. to identify the source, character, currency and format of environmental, ecological, geological and other data for each existing facility site and organize it in a "hard copy" and/or computerized framework to aid the prioritization and planning process for facility upgrades to protect the environment, for regulatory compliance, and for potential replacement or relocation of existing sites;
2. to identify and assess the criteria currently employed by INDOT to select locations for new and/or relocated facilities, including the ASTM Phase I and II Environmental Site Assessment criteria, and to recommend additional criteria including those required to mitigate potential environmental impacts at new sites, if necessary;
3. to recommend Best Management Practices for implementation at existing sites to protect the environment and for new facilities sited at locations where potential environmental impacts exist;
4. to provide cost estimates of Best Management Practices involving engineering upgrades for existing and new facilities.
5. to recommend procedures and policies for decommissioning facilities prior to their closure and relocation;

Because of the nature of INDOT operations, the data research and analysis will address potential impacts to surface and groundwater. The research will access, among other data, the following for existing and potential sites:

- well log data (DNR)
- soil borings (DNR)
- identification of surface water intakes and wellhead protection areas for public drinking water systems (IDEM/DNR)
- identification of high-volume groundwater users (DNR)
- identification of spill, Superfund, Leaking Underground Storage Tank and other contaminated sites (IDEM/EPA)
- locations of groundwater aquifers and surface water bodies (DNR, U.S. Geological Service)
- locations of environmentally sensitive areas (e.g., parks, wetlands, reserves) (DNR, U.S. Department of Interior, U.S. Department of Agriculture)
- locations of urban wet-weather and rural (agricultural) drainage patterns (IDEM, U.S. Department of Agriculture - Soil & Water Conservation Service)

The project will also include the identification of Best Management Practices (BMPs) to control storm water runoff from the various types of sites identified in the data analysis. These BMPs need to account for the more restrictive groundwater and surface water quality standards the state has adopted and will adopt in 2002.

WORK PLAN

The project will proceed along two paths: (1) data identification from primary and secondary sources, and (2) the identification of Best Management Practices from the literature and surveys of other states, as well as those selected from among INDOT's current practices.

The first step in the data gathering process is to survey what already exists from known sources, including INDOT, Purdue University (Professor Bernie Engel, Agricultural and Biological Engineering), Taylor University (Professor Edwin Squiers), Indiana Department of Natural Resources, Soil and Water Conservation Service (USDA), Indiana Department of Environmental Management, U.S. Environmental Protection Agency, and other sources. This survey is critical to prevent the project from duplicating work already completed. Personal interviews with researchers and meetings with research staff will be held.

Specific data pertaining to existing sites will be extracted from three recent surveys conducted by Environmental Services Section. From these data and information gathered from 33 facility site visits during JTRP Project Indiana SPR-2341, "environmental sensitivity" characteristics will be developed. These characteristics will be shared with District Environmental Coordinators who will be asked to rank all facilities in their districts according to the prevalence of these characteristics at or proximate to each site. Those ranked the highest will be the focus of a site visit to ascertain the validity of the ranking and the characteristics. This process will enable the project staff to assign priority among the numerous types of data that may register "environmental sensitivity" to activities and operations of the type performed at INDOT facilities. For example,

factors such as slope, depth to groundwater, proximity to surface water and wetlands, soil type, etc., can be used to identify sites that are suitable for one type of facility (e.g., District Office) but not another (e.g., Unit with salt storage). An analysis of such data will contribute to the identification of criteria that could be used in site selection, as well as aid in determining the type of engineering upgrade of existing facilities (e.g., asphalt, bermed salt/sand mix pad) necessary to avoid potential environmental impacts.

Engineering upgrades and other Best Management Practices (BMPs) will be researched in the literature and surveyed from among other transportation agencies and INDOT districts. BMPs, recommended as environmental protection strategies, will be described, vis-à-vis, the "environmental sensitivity" characteristics described above. And cost estimates of these, particularly the engineering upgrades, will be provided.

Project staff will also survey other transportation agencies, military agencies and other sources for information critical to the preparation of a decommissioning policy and appropriate procedures to be recommended for use by INDOT.

Presentation of deliverables, in draft and final form, resulting from the activities described in this Work Plan will be periodically reviewed with the project Study Advisory Committee, the Environment, Planning and Engineering Division, and other INDOT officials, as appropriate.

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

These two sections of the report are organized by Objective.

Objective 1: to identify the source, character, currency and format of environmental, ecological, geological and other data for each existing facility site and organize it in a "hard copy" and/or computerized framework to aid the prioritization and planning process for facility upgrades to protect the environment, for regulatory compliance, and for potential replacement or relocation of existing sites.

Analysis of the Data

In January 2002, the objective, as stated above, changed: discussions with INDOT officials revealed that a "product" was desired and that the product should be in the form of a directory of GIS databases relevant to and useful for INDOT purposes and that the databases should be in CD-ROM format. Initially, some of these same officials advised against developing a product such as the "INDOT GIS Directory" (Tab 3 of Appendix B) because INDOT was developing its own GIS database and any subsequent "facilities and environmental protection" database would have to be compatible with it. Apparently, development of the department GIS database did not proceed according to schedule and the one enclosed here was recognized as immediately usable, once distributed in a CD-ROM format.

The "GIS Directory and Arcview™ Training Tutorial," enclosed as Appendix B, is the product resulting from the Objective 1 work plan. It has been distributed to District

Environmental Coordinators and staff of the Environmental Services Section and the Research Division.

The "INDOT GIS Directory" is built upon, and has been integrated with, the Purdue University Center for Advanced Applications in GIS (CAAGIS) System database.

The CAAGIS database, in turn, has been created by integrating a number of GIS databases from various sources: U.S. Geological Survey, Indiana Geological Survey, USDA Natural Resources Conservation Service (NRCS), U.S. Federal Emergency Management Administration (FEMA), U.S. Fish and Wildlife Services (F&WS), US. Environmental Protection Agency (EPA), U.S. Census Bureau, Indiana Department of Environmental Management (IDEM), Indiana Department of Natural Resources (IDNR), Environmental Systems Research Institute (ESRI), and Purdue University sources.

The research to create and compile the fifty-five databases in the INDOT GIS Directory (Tab 3) required accessing these and other sources, sometimes converting the databases to a more readable format, "layering" the databases over ones created by project staff of INDOT maintenance facilities and the state highway system, then testing the applicability of the resulting database, through review by the Study Advisory Committee, throughout the project, and the training ("tutorial") of INDOT personnel in February-March 2002.

This "layering" (or "merging") of the source-accessed or created GIS databases and the INDOT facilities and highways databases resulted in the thirty-one database maps included in the "Directory of INDOT and Merged GIS Database Maps" (Tab 2, Appendix B). Half of these 31 database maps were created by study staff and made compatible with the INDOT maintenance facility database. Many of these 31 are representative

only: for example, number 1. "INDOT Facility with Contour Lines" (for estimating slope), is provided for Bartholomew County, but the same can be produced for any of Indiana's 92 counties. Also, number 3. "INDOT Facilities and Groundwater Vulnerability: LaPorte County," is for INDOT facilities in that county, but county level maps can be provided for any county and any of the 143 geographic locations around the state where INDOT has its 160-plus maintenance facilities (Districts, Subdistricts, Units).

The proliferation of GIS databases and the relative ease with which these can be manipulated by a technically competent person, provides an almost limitless array of GIS "mapping" possibilities. Indeed, during the course of the study, a number of seemingly unrelated databases were merged to produce a map which provided a "picture" of the interrelationship between an INDOT facility, for example, and some environmental, geological, topographical or ecological feature nearby.

Using the Public Land Survey System (PLSS) database [p. 12, Appendix B], one can enter the Township, Range and Section (T/R/S) of a known property and merge it with other GIS databases to provide not only an aerial photo of the property, but print on that photo or a map the location of environmental, geological, topographical or ecological features to allow a general assessment of potential impacts on the surrounding area from various INDOT facility operations or future operations. This assessment is also useful when INDOT is considering the purchase of property for a new or relocated facility. Such an examination, as the one described above, can alert planners to potential environmental problems that could result from facility operations.

Description of the Utility of the INDOT and Merged Databases

The environmental protection and regulatory incentive for the study was the need to protect groundwater and surface water from INDOT operations that threaten, or could threaten, water quality. Various federal and state regulations exist and others have been proposed to protect water quality:

- Drinking water standards (Maximum Contaminant Levels - MCLs) were adopted by the state as the groundwater quality standards on March 6, 2002;
- Surface water quality [antidegradation] standards for water bodies in the state's Great Lake Basin will be proposed to apply to all surface water in the state in 2002.
- Storm water discharges from INDOT property (facilities, rest areas and highways) in designated urbanized areas will be regulated with the adoption of Indiana's proposed Rule 13 in August 2002.

INDOT, in preparing its Storm Water Quality Management Plan (SWQMP) required by Rule 13, will need to assess the impact of its operations on storm water quality and implement Best Management Practices (BMPs) to avert any potential negative impacts. A site-by-site and highway segment-by-highway segment assessment will have to be performed, especially in areas where "sensitive water" exists.[1]

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[1]The term "sensitive water," in the draft rule, was changed July 18, 2002 by IDEM, following public hearings, to "sensitive area," meaning "a water body identified as needing priority protection or remediation based on: (A) having threatened or endangered species or their habitat; (B) usage as a public surface water supply intake; (C) usage for full body contact recreation, such as bathing beaches; (D) exceptional use classification as found in 327 IAC 2-1-11(b) [or] outstanding state resource water [also known as "high quality" water] as found in 327 IAC 2-1-2(3) and 327 IAC 2-1.5-19(b)." Draft Rule #01-96 (WPCB), July 18, 2002 Revisions
The "INDOT GIS Directory" [Appendix B] referred to in this study report was prepared prior to the change, using the previous nomenclature, "sensitive waters." The two terms should be read as being synonymous.

The threatened and endangered species, public surface water supply intake, full-body contact recreation and exceptional use and outstanding state resource water databases are among the thirty-one found in Tab 2, Appendix B, the utility of which are described below:[2]

1. INDOT Facility with Contour Lines: Bartholomew County (Aerial or Map)

The contour lines on aerial photos or maps are useful for plotting slopes to predict storm water flow, especially that which may be or could become contaminated with road salt brine or shop floor drain effluent [from motor vehicle repair or fluid changes] if the facility is not connected to a POTW, and migrate to waters of the state[3]. This is also important for siting new facilities on property near "waters of the state."

2. INDOT Facility and Wetlands: Noble County (Aerial or Map)

The database described, here, as map 28 can be used to plot INDOT facilities and wetlands on an aerial photo or GIS map. This U.S. F&WS database has limited value and should only be used for a general assessment of impacts.

3. INDOT Facilities and Groundwater Vulnerability: LaPorte County

Groundwater vulnerability to nitrates was used as a surrogate for chlorides, the chemical constituent of road salt. Obviously, areas with groundwater that is highly

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[2]"full-body contact recreation" was previously termed "relevant community value," which is defined in the draft, "Indiana's Municipal Separate Storm Sewer System (MS4) Rule 13 Guidance," p. 3 of 18 (February 2002) as "an area, both land and water, that is deemed important by local municipal, state or federal governments for their recreational value. These areas can be locally designated for such public activities as swimming, fishing, boating, and [water] skiing." The terms should be read as being synonymous.

[3]"waters of the state" include water in the "side ditches" along state, county and municipal streets and highways.

vulnerable and very highly vulnerable to chlorides are areas to protect, from current operations, or to avoid, for future operations.

4. **SSURGO Soils Data for LaPorte County Showing INDOT Facility Locations**
5. **SSURGO Soils Data for LaPorte County Showing INDOT Facility Location (0.4 Mile Scale)**

The USDA/NRCS County Soil Survey data, currently available for all counties plotted on aerial photos, is being digitized and is available [as of April 2002] for only 15 of the state's 92 counties. Soil scientists, geologists and others planning BMPs to prevent storm water migration from an existing or proposed facility site or highway right-of-way use information in these reports to ascertain permeability, susceptibility to erosion (K factor), high water table depth, depth to bedrock and other geological characteristics. INDOT facility locations and highway segments can be plotted on SSURGO soils maps to better predict operational impacts on soil and groundwater.

6. **INDOT Facilities and Solid Waste Management Facilities**

Facility site visits and environmental impact assessments have revealed storage and disposal problems for solid waste, including construction and demolition waste, at some facilities. This IDEM database, titled "Landfill" in Tab 3, p. 32, includes the locations of municipal solid waste landfills, construction/demolition landfills, transfer stations and Non-Subtitle D landfills (those few that are not approved by IDEM). Maintenance facilities, individually and collectively within a Subdistrict or District, are encouraged to dispose of ROW waste and unusable highway and facility repair/maintenance waste at approved solid waste management facilities.

This database layered over the state highway GIS map would facilitate the identification of collection routes involving multiple maintenance facilities. The appearance of participating facilities would improve and removing piles of waste also removes the potential for contaminants leaching into storm water.

7. INDOT Facilities and Karst Areas

8. INDOT Facilities within Karst Areas

Karst formations, including sinkholes, springs and sinking stream basins, are common in a large, central portion of southern Indiana. A 1993 Memorandum of Agreement between INDOT, IDEM, IDNR and the U.S. Fish and Wildlife Service outlines procedures for limiting the contamination of and monitoring storm water runoff from state highways and highway construction in the area. Maintenance facilities located within the karst region need to be vigilant about controlling storm water migration to avoid contaminating these sensitive ecological features.

9. INDOT Facilities with NPDES Permitted Facilities within 5 Miles: Monroe County

10. INDOT Facilities with NPDES Outfalls within 5 Miles: Monroe County

INDOT may elect or may be required by IDEM to monitor the quality of the waters of the state into which storm water drains from its facilities and highways. If real-time monitoring is conducted by INDOT or contracted personnel or if data from the fixed station surface water quality monitoring sites are used [See Database Maps 22, 23, and 24], it will be important to identify other possible sources of contaminants contributing to levels that may exceed water quality standards. These two databases allow GIS mapping of INDOT facilities and manufacturing and other facilities that have NPDES permits and

the location of their outfalls on rivers and streams. Obviously, non-permitted dischargers will not be identified using these data.

11. INDOT Facilities and Indiana Land and Water Trails

The proximity of INDOT facilities to public (municipal, county, state and federal) recreation areas is a concern, if facility operations could negatively impact such areas. This database and database maps 14, 15, and 16 allow GIS mapping of all such areas in the state and the locations of INDOT maintenance facilities to allow a broad, visual examination of potential impacts.

12. INDOT Facilities and Natural and Scenic Rivers, Exceptional Use Waters and High Quality Waters

The Exceptional Use Waters and Outstanding State Resource Waters are identified in the proposed Rule 13 (storm water rule) as "sensitive waters." Many of these are also designated by the state as Natural and Scenic Rivers. Special attention should be given to these waters to identify potential negative impacts due to storm water migration from INDOT facilities and state highways.

13. INDOT Facilities and Indiana Impaired Waterbodies

Impaired or "limited use" water bodies are those that do not or are not expected to meet the applicable water quality standards. There are 485 river and stream segments and other water bodies in the state listed as impaired by reason of naturally poor physical characteristics (e.g., restricted flow), naturally poor chemical quality, or irreversible "man induced" conditions. Impaired waters are "impaired" because the level of one or more pollutants exceeds the water quality standards. Impaired waters are not allowed to be further impaired by illicit discharges; in fact, the state is mandated to improve the quality

of impaired waters and the establishment of Total Maximum Daily Loads (TMDLs) is intended to assist this effort.

An INDOT facility, like any other discharger to an impaired water body, would be required to have an NPDES permit to ensure that the water quality is not further impaired.

14. INDOT Facilities with Recreational Areas and Parks (federal and state) within 1 Mile

15. INDOT Facilities with Recreational Areas and Parks (federal and state) within 5 Miles

Each of these databases is merged with the INDOT facility database for the reasons given in 11., above.

16. INDOT Facilities and Recreational Areas and Parks with Water Bodies

A subset of the database maps in 14. and 15., above, was used to identify public recreation facilities with water bodies. This subset was selected by the project staff as the identifier of "sensitive water" having "relevant community value," now "full-body contact recreation." "Relevant community value" is defined in the February 2002 Draft Rule 13 Guidance Manual as, "an area, both land and water, that is deemed important by local municipal, state or federal governments for their recreational value." These areas can be designated for such public activities as swimming and other full-body recreational activities, such as water skiing. The inclusion of "land" in a list of water activities is assumed to mean the land bordering the water, such as a beach, picnic and day use area or campground. This definition applies to the replacement terms used in the July 18, 2002 Draft Rule.

17. INDOT Facilities and Community Public Wells (IDEM)

18. INDOT Facilities with Community Public Wells (IDEM) within 3000 feet

Indiana's wellhead protection regulation [327 IAC 8-4.1] requires the management and monitoring of all potential sources of contamination, both regulated and unregulated, of a public water supply system that derives its drinking water from groundwater. INDOT facilities and state highways are included among these potential sources. To simplify GIS mapping, a fixed radius of 3,000 feet about a community public well was established and INDOT facilities were plotted to determine if any are located within that distance. The fixed radius method of determining the wellhead protection area is the least sensitive method for determining the potential for contamination - the regulation requires the use of other methods (e.g., hydrogeological mapping, numerical flow/solute transport modeling, etc.), for delineating wellhead protection areas of "significant" water withdrawal facilities with an average daily withdrawal of over 100,000 gallons. This merged database, then, should only be used to guide the user to further investigation of the potential for contributing contamination to a public drinking water supply system.

19. INDOT Facilities and POTWs within 5 Miles

There are 160-plus INDOT maintenance facilities at 143 geographic locations throughout the state; 52 of these locations are connected to a local Publicly-Owned Treatment Works (POTW), 91 are not connected for the discharge of shop floor drain and [salt truck] wash bay effluent. INDOT facilities located in Rule 13 designated urbanized areas will undoubtedly be required to (1) cease discharging shop floor drain and wash bay effluent that has the potential for migrating offsite as a distinct flow or as a constituent of the storm water flow, or (2) obtain an NPDES permit for such discharge, or (3) connect to

a POTW. This merged database assists the identification of POTWs that are within 5 miles of INDOT maintenance facilities, so that the cost of connecting can be estimated.

20. INDOT Facilities and IDEM Stormwater Rule 13 Designated Areas

Areas designated by Rule 13 included in this database are:

1. urbanized areas, as defined in the Census;
2. municipalities with a population density of 500 or more per square mile and a population of 10,000 or more;
3. municipalities with a population density of 500 or more per square mile and a population of 7,000-10,000 and a positive 10-year population growth percentage of at least 10 percent (Note: municipalities with a population of 7,000-10,000 that have an institution with a daily user population that places the total population at 10,000 or more are also designated areas).

There are 167 "designated areas," including those defined above, and others contiguous to urbanized areas that are the locations of the municipalities identified as the Municipal Separate Storm Sewer System (MS4) operators. INDOT will be required to obtain a storm water [NPDES] permit covering its maintenance facility and highway operations in the MS4 areas.

21. INDOT Facilities Connected/Not Connected to POTWs

This database was derived from a survey of maintenance facilities that are connected or not connected to a POTW for the discharge of other than sanitary waste water; namely, shop floor drain and wash bay effluent. The premise supporting this GIS mapping is that, in terms of storm water migration from a maintenance facility, uncontaminated (or minimally contaminated) storm water "discharge" may not require an

NPDES permit, whereas storm water contaminated (or where there is a potential for contamination) by shop floor drain and [salt truck] wash bay effluent will likely have to be permitted.

Of the 91 facility locations not connected to a POTW, 27 locations are in MS4 designated areas. These 27 [See Objective 2] should receive priority attention by INDOT for controlling storm water discharge.

22. INDOT Facilities and Location of Fixed Station Surface Water Quality Monitoring Sites with Streams and Highways

IDEM and the U.S. Geological Survey maintain 172 fixed station surface water quality monitoring stations on river and stream segments throughout the state. Water quality data are available for approximately 20 parameters. The parameters considered important for monitoring storm water discharge from INDOT operations are chlorides, Total Dissolved Solids (TDS) and Total Suspended Solids (TSS). Any detection of contamination above water quality standards, using these three parameters, does not mean that the INDOT facility is responsible. There may be other permitted discharges or illicit dischargers responsible for the contamination [See discussion of databases 9 and 10]. Such data can, however, alert the user that further investigation and analysis should be pursued. This GIS map shows the locations of INDOT facilities, the proximate rivers and streams and both the "up-stream" and "down-stream" sites of fixed water quality monitoring stations.

23. INDOT Facilities and Location of Fixed Station Surface Water Quality Monitoring Sites with Streams and Highways with Highlighting of Natural

and Scenic Rivers, Exceptional Use Waters and High Quality Waters: INDOT Districts

24. **INDOT Facilities and Locations of Fixed Station Surface Water Quality Monitoring Sites, POTWs and NPDES Outfalls with State Highway Segments within 1 Mile of Exceptional Use (EU), and High Quality (HQ) and Scenic Rivers: INDOT Districts**

These maps extend the attributes described in 22., above, with highlighting of the Natural and Scenic Rivers, Exceptional Use Waters and High Quality Waters (Map 23) that are also depicted in Map 12. Map 24 extends this further by adding locations of POTWs, NPDES outfalls and state highway segments within one mile of these "sensitive waters." These maps can be used to establish parameters for using fixed station water quality monitoring data based on the proximity of highway segments and other potential sources of contaminants (POTWs and NPDES permitted outfalls). These maps can be printed for INDOT districts.

25. **Public Land Survey (Township, Range, Section) Identification of Future INDOT Facility Site and Environmental and Engineered Features: New Linton Subdistrict (Aerial)**

The aerial photo with overlays of environmental (e.g., wetlands) and engineered (e.g., POTWs) features allow an analysis of potential impacts from the siting of an INDOT facility, when the township, range and section of the location is known.

26. **INDOT Facilities and Surface Water Supply Intakes**

Surface water supply intakes from both surface and ground water sources are protected and INDOT should implement extraordinary storm water controls at any

facility within a mile of these "intakes" and avoid siting a new facility within a similar distance.

27. INDOT Facilities Within 3,000 Feet of Endangered, Threatened and Rare Species and High Quality Natural Communities (See J. Osadczuk, Chief, Environment, Planning and Engineering Division, for additional information about this database).

Endangered, threatened and rare species are protected by federal and state law. The sites of such species and other high quality natural areas are identified in a restricted database available only with the permission of IDNR. The location of INDOT facilities within 3,000 feet of these sites is shown in this map.

28. INDOT Facilities and Wetlands

The U.S. Fish and Wildlife Service database, compiled from 1972 to 1992, is neither definitive nor current in its depiction of the location of wetlands. A much-restricted definition of "wetland" imputed to the database still resulted in the plotting of "wetlands" in cornfields, in shopping center parking lots and in developed subdivisions -- obviously, these had been drained. IDNR is developing a GIS database showing high quality natural wetlands that the Indiana Natural Heritage Data Center has documented. This database was used to determine the potential for INDOT facility operations' impact on this type of sensitive environmental attribute.

29. Identification of "Sensitive Waters" and State Highway Segments Within 1 Mile (Priority 1)

30. Identification of "Sensitive Waters" and State Highway Segments Within 1 Mile (Priority 2)

31. Identification of "Sensitive Waters" and State Highway Segments Within 1 Mile (Priority 3)

"Sensitive Waters," as defined in proposed Rule 13, and explained in map 12, were plotted with a one mile "buffer" and overlaid with the state highway system map so that only the highway segments within the one mile buffer are shown.

These maps are useful for determining highway segments where practices, such as reduced road salt and herbicide application, can be implemented.

Priority 1 waters include 21 Exceptional Use, High Quality and Natural and Scenic river and stream segments and the "Indiana portion of the open waters of Lake Michigan" and "all waters incorporated in the Indiana Dunes National Lakeshore." There are 282 miles of state and interstate highway segments within a one-mile buffer of Priority 1 waters.

Priority 2 waters include 11 river and stream segments identified by IDNR as "having outstanding ecological, recreational or scenic importance." There are 176 miles of state and interstate highway segments within a one-mile buffer of Priority 2 waters.

Priority 3 waters include 26 river and stream segments identified by IDNR as "having outstanding ecological importance." There are 609 miles of state and interstate highway segments within a one-mile buffer of Priority 3 waters.

These 58 "priority" river and stream segments are among the 65 included in the "Outstanding Rivers List for Indiana," published by the Indiana Natural Resources Commission. There are 1,067 miles of state and interstate highway segments within a one-mile buffer of these 58 "priority" waters.

Objective 2: to identify and assess the criteria currently employed by INDOT to select locations for new and/or relocated facilities, including the ASTM Phase I and II Environmental Site Assessment criteria, and to recommend additional criteria including those required to mitigate potential environmental impacts at new sites, if necessary.

Background

INDOT typically employs two criteria to select sites for maintenance facilities: (1) the cost of the property (which, usually, cannot exceed the appraised value), and (2) operational convenience (the property should be central to the service area so that highway maintenance can be performed without incurring unnecessary travel expense). Subdistrict sites, now, have to be located, usually, within two miles of a connection to sanitary sewer and public water supply.[4]

Other criteria have probably been used to select, or reject, sites when the potential for an environmental impact resulting from facility operations was obvious, but, generally, environmental "sensitivity" criteria have not been used in site selection. Phase I or II site assessments are performed only if something is suspected.[5] Because no lending institution becomes involved in the property acquisition, the state's Property Transfer Law (IC 13-25-3) [See Appendix C] is not applicable, so no site survey is performed and no documents are filed with the Indiana Department of Environmental Management.

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[4]Steve McAvoy, INDOT Facilities Management. Telephone conversation April 1, 2002.
[5]Ibid. Reference is to ASTM E 1527, Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process, and ASTM E 1903-97, Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process.

In the past, the use of these two criteria has resulted in the selection of sites that pose potential environmental impacts, such as the Shoals Unit (a former town dumping site), Plymouth Subdistrict (a former utility contractor site), Brimfield Unit (a former truck stop and automobile junkyard), among other less than desirable locations.

Some facility sites have been acquired through "swapping" the existing INDOT site for a more desirable parcel.[6] Swapping saves money, but it also restricts choice, especially if environmental "sensitivity" characteristics are not considered.

Analysis of the Data

IDEM's proposed rule, Storm Water Run-Off Associated with Municipal Separate Storm Sewer Systems, [327 IAC 15-13-7(a)] requires "an MS4 operator [to] assess the water quality of all known receiving waters and storm water outfall discharges within the MS4 area [including]:

(1) an investigation of land usage and assessment of structural and non-structural storm water BMP locations;

(2) the identification of known sensitive [water] areas;

(3) a review of known existing and available monitoring data of the MS4 receiving waters,

(4) the identification of areas having a reasonable potential for, or actually causing, storm water quality problems."

[6]The parcel being considered for the new Linton Subdistrict facility, in April 2002, if acquired, will be swapped with the City of Linton for the facility's current site.

INDOT, as an MS4 operator, is expected to identify these "sensitive waters" and to implement minimum control measures "to ensure that existing … state … operations are performed in ways that will reduce contamination of storm water discharges." [327 IAC 15-13-17(b)] The identification of facilities that are not currently connected to a POTW (Publicly-Owned Treatment Plant) is critical to this analysis. Shop floor drain effluent, which could include motor vehicle fluids spilled as a result of vehicle maintenance and repair, and washbay washwater, especially from salt truck and salt bed washing during snow and ice season, at most of these facilities is currently discharged, ultimately, to the "waters of the state," via direct discharge into a side ditch or otherwise in a manner that allows the possibility of migration to the "waters," especially during a stormwater "flush." Some facilities have installed oil/water separators as interceptors; however, these are not effective in removing soluble contaminants such as salt from the discharge.

Section 17(b)(2) of the proposed rule requires the implementation of, "controls for reducing or eliminating the discharge of pollutants from operational areas, including roads, parking lots, maintenance and storage yards, and waste transfer stations," such as:

(A) Covering, or otherwise reducing, the potential for polluted storm water run-off from deicing salt or sand storage piles.

(B) Providing facilities for containment of any accidental losses of concentrated solutions, acids, alkalies, salts, oils, or other polluting materials.

(C) Standard operating procedures for spill prevention and clean up during fueling operations.

(D) BMPs for vehicular maintenance areas.

(E) 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.

(F) Promotion of recycling (to reduce litter).

(G) Minimization of pesticide, herbicide 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.

(H) Proper disposal of animal waste. Canine parks shall be sited at least one hundred fifty (150) feet away from a surface water body.

The identification of known "sensitive waters" is critical to the development of INDOT's Storm Water Quality Management Plan because of its 160-plus maintenance facilities at 143 locations throughout the state and the 11,216 miles of state, U.S., and Interstate highways with numerous rest parks that it oversees.

The four criteria established for identifying "sensitive waters" are described in the draft Rule 13 Guidance Manual published by IDEM. These four criteria, and others, can also be used as facility siting criteria. Each of the four criteria is addressed below:

(A) providing habitat for threatened or endangered species;

Indiana's Department of Natural Resources created a GIS database known as the "Natural Areas and Endangered, Threatened and Rare (ETR) Species" database. The acquisition of this database requires a special arrangement with DNR Natural Heritage Data Center. Species having state or federal designations of endangered, threatened, rare, special concern, extirpated or on a "watch list" are identified by generic descriptor (bird,

mammal, etc.), heritage species code and are located by latitude and longitude in decimal degrees, as well as by county and watershed.

The ETR and INDOT maintenance facilities GIS databases have been merged and, of the 20 facilities that are within 3,000 feet of an ETR location, 12 are not connected to a POTW.

(B) usage as a public surface water supply intake;

A GIS database of public surface water supply intakes has been merged by Purdue with the INDOT facilities and state highways databases to produce a GIS map which readily depicts the proximity of the INDOT properties to the intakes. No INDOT maintenance facilities are within 1,000 feet, 3,000 feet or one mile of a public water intake.

(C) relevant community value [now, "full-body contact recreation"]

"Relevant community value" is not defined in the proposed rule. It is defined in the proposed Guidance Manual (February 2002) as "an area, both land and water, that is deemed important by local municipal, state or federal governments for their recreational value." These areas can be designated for such full-body contact activities, such as swimming and water skiing. A GIS database of state/federal/local public recreation areas with water bodies has been merged with a database of INDOT maintenance facilities, revealing 11 facilities that are within one mile of such a recreational area, 4 of which are not connected to a POTW.

(D) exceptional use classification as found in 327 IAC 2-1-11(b), outstanding state resource water classification [also designated as "high quality waters"] as found in 327 IAC 2-1-2(3) and 327 IAC 2-1.5-19(b).

The Indiana Department of Environmental Management Office of Water Quality maintains GIS databases which identify the river and stream segments included in the above citations. Purdue has merged these databases with the INDOT facilities and highway databases and produced GIS maps that depict the proximity of the INDOT properties to the rivers and streams. Three maintenance facilities are located within one mile of identified segments and one of these is not connected to a POTW. Project staff have also identified the state highway segments that are within one mile of these "sensitive" water segments and the recommendation of a "priority" system approach follows.

"Priority" System

Indiana's Natural Resources Commission, in 1993, promulgated its "Outstanding Rivers List for Indiana." It is the state's "umbrella" list of rivers and streams "which have particular environmental or aesthetic interest." A river or stream is included on the list if it qualifies under one or more of twenty-two categories.

The three tables in Appendix D are constructed from two IDEM GIS databases, one DNR GIS database, and the Outstanding Rivers list (which has no separate GIS database). The available databases account for the 15 river and stream segments referenced in the Rule 13 citation as exceptional use waters or high quality waters. These 15 are included among the 23 segments in the table identified as "INDOT Priority No. 1." The other 8 segments or water bodies listed in this Table are explained in the table notes.

The second table, "INDOT Priority No. 2," is comprised of "rivers identified as having outstanding ecological, recreational or scenic importance." There are 11 segments included on this list. None are currently on the Rule 13 "sensitive waters" lists

cited, but they may be added in the future or, subsequently, be considered by IDEM to be "sensitive waters" for the purpose of NPDES permitting.

The third table, identified as "INDOT Priority No. 3," contains 26 river and stream segments, none of which are currently included in the Rule 13 "sensitive waters" lists cited, but are segments "identified by state natural heritage programs or similar state programs as having outstanding ecological importance." These, too, may be added to the "sensitive waters" list or, subsequently, be considered by IDEM to be such for the purpose of NPDES permitting.

A more thorough analysis of the DNR Natural Areas and Endangered, Threatened and Rare (ETR) Species database could reveal some of the segments in the Priority Nos. 2 and 3 lists being classified -- for purposes of Rule 13 -- as "sensitive waters."

All four criteria used to define "sensitive waters" were applied to the identification of existing INDOT maintenance facility sites located within 3,000 feet or one mile of the "sensitive" river or stream segment or other water body. A corollary criterion, expanding on the exceptional use and high quality waters designation, was used to identify segments of state maintained highways within one mile of most of the "outstanding rivers" of Indiana, designated as such by the Indiana Natural Resources Commission. A total of 1,067 miles of highway segments are located within a one mile buffer of the "outstanding rivers." INDOT should consider prioritizing these highway segments for the implementation of highway construction and maintenance Best Management Practices (BMPs) designed to eliminate or, at least, reduce the potential for contamination of storm and melt water run-off and, also, control the amount of run-off, itself.

The Water Pollution Control Board is expected, in 2002, to extend surface water quality standards, currently applicable to state waters in the Great Lakes Basin, to the entire state. Senate Enrolled Act 431 (PL 140-2000) grants considerable authority to the Board for designating water bodies as exceptional use or outstanding state resource waters (high quality waters) and for establishing water quality standards to ensure the "antidegradation" of outstanding state resource waters. The Board "may designate, by rule, a water body as an outstanding state resource water if [it] determines that the water body has a unique or special ecological, recreational or aesthetic significance."[7] [underline added]

The footnotes to Table 1, preceding, provide definitions of "Exceptional Use Waters," "Outstanding State Resource Waters" (also referred to as "High Quality Waters") and waters identified by numerical code: 7 meaning "outstanding rivers from state inventories or assessments; i.e., rivers identified as having statewide or greater significance;" 17 meaning "miscellaneous rivers identified as having outstanding ecological, recreational or scenic importance;" and 11 (from Table 3) meaning "rivers identified by state natural heritage programs or similar state programs as having outstanding ecological importance."

The statement of the Board's authority pursuant to SEA 431, and the restatement of the definitions of various categories of water bodies having "significance" is to suggest that the Board, in establishing surface water quality standards, will also designate additional water bodies as Exceptional Use Waters and Outstanding State Resource

[7]SEA 431, Section 17

Waters or, perhaps, designate Exceptional Use Waters as Outstanding State Resource Waters.[8]

This discussion is not to suggest that INDOT officials should join the debate over the classification of water bodies; however, vigilance is needed to ensure that, in the development of its Storm Water Quality Management Plan, the department includes strategies for protecting river and stream segments that are currently designated as "outstanding" and other segments that possess all of the requisite elements of such a designation.

State and Interstate Highway Segments Within a One-Mile Buffer of "Sensitive Waters"

Tables 1, 2, and 3 in Appendix E are in GIS format and were derived from the U.S. Bureau of Census rivers and streams database (extracted from the U.S. Geological Survey topographic map database) and the Census Bureau's highway database. Errors exist in the databases "adopted" by the Census Bureau; in fact, neither the East or West Fork of the White River is included by the Census or the U.S.G.S. in their respective databases. Corrections were made where errors were noticed.

The maps produced from the "merger" of these two databases are Maps 29, 30, and 31, described in Tab 2, Appendix B, and the same can be viewed and reproduced with the Directory of INDOT and Merged Databases CD-ROM included with this report.

For reader convenience, the description of the Priority 1, 2 and 3 Waters is repeated here.

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[8]Telephone conversation with Dennis Clark, Chief, Water Quality Standards Section, IDEM, April 30, 2002.

Priority 1 waters include 21 Exceptional Use, High Quality and Natural and Scenic river and stream segments and the "Indiana portion of the open waters of Lake Michigan" and "all waters incorporated in the Indiana Dunes National Lakeshore." There are 282 miles of state and interstate highway segments within a one-mile buffer of Priority 1 waters. [See Table 1].

Priority 2 waters include 11 river and stream segments identified by IDNR as "having outstanding ecological, recreational or scenic importance." There are 176 miles of state and interstate highway segments within a one-mile buffer of Priority 2 waters. [See Table 2].

Priority 3 waters include 26 river and stream segments identified by IDNR as "having outstanding ecological importance." There are 609 miles of state and interstate highway segments within a one-mile buffer of Priority 3 waters. [See Table 3].

A separate, yet related, analysis was performed to identify state-maintained highway segments in Indiana's karst region. Appendix E, Table 4, lists these highway segments, which total 941 miles. This total is independent of Priority 1, 2, and 3 river and stream highway segments also included in this Appendix. The table on the next page summarizes these highway segment data.

Status of State-Maintained (i.e., state, U.S. and Interstate) Highways Relative to the Location of "Sensitive Waters," as defined by Rule 13, and Karst Areas

11,216 miles of state-maintained highways

1,067 miles of state-maintained highway segments within a one-mile buffer of "sensitive waters"

- Priority 1 waters: 282 miles
- Priority 2 waters: 176 miles
- Priority 3 waters: 609 miles

941 miles of state-maintained highway segments within karst areas*

2,008 total miles of state-maintained highway segments within a one-mile buffer of "sensitive waters" and within karst areas (18 percent of the total miles)

*See October 13, 1993 MOU between INDOT, IDNR, IDEM and U.S. F&WS re: construction of transportation projects in karst regions of the state, in Appendix F.

Other Facility Site Selection Criteria

Currently, there are 160-plus INDOT (District, Subdistrict and Unit) maintenance facilities at 143 distinct geographic locations. Fifty-nine of these locations are within the 167 areas designated as Municipal Separate Storm Sewer System (MS4) areas; i.e., municipalities that operate such systems.

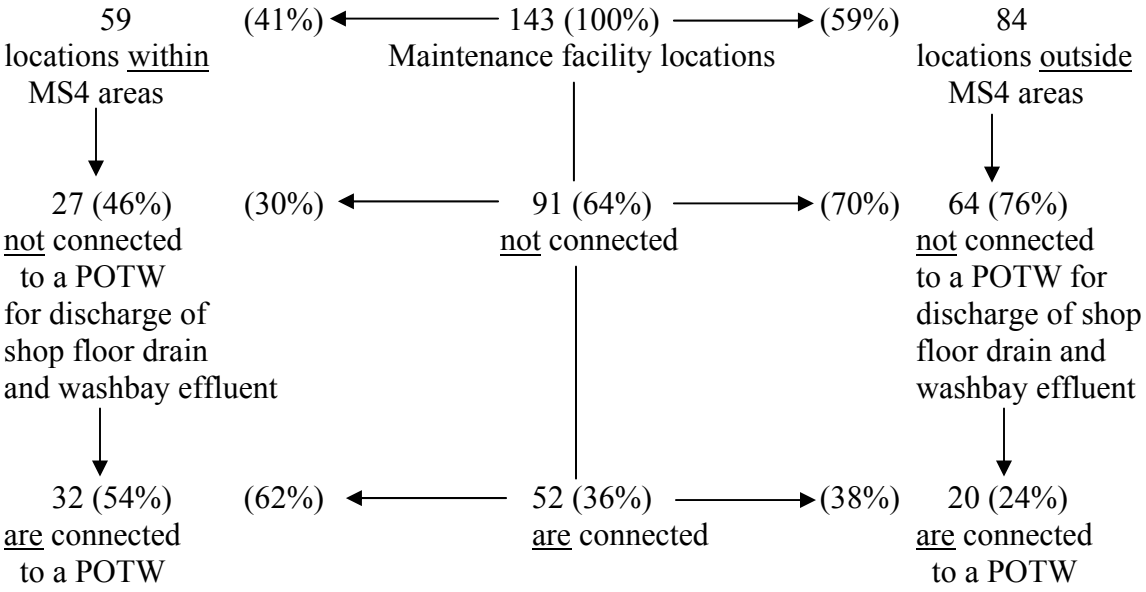
Within the 59 MS4 areas, 27 locations are <u>not</u> connected to a POTW for discharge of shop floor drain and washbay effluent; 32 are connected to a POTW for this discharge.

In the 84 non-MS4 areas, 64 locations are <u>not</u> connected to a POTW for shop floor drain and washbay discharge and 20 are connected.

Only 36 percent of the 143 INDOT facility locations are currently connected to a POTW for discharge of shop floor drain and washbay effluent. A few more are connected for discharge of sanitary sewage, only.

The table below provides a pictorial summary of these data.

Rule 13 Stormwater Quality Management Plan
Status of INDOT Maintenance Facilities
with Respect to Location Within/Outside MS4 Areas
and Connection to POTW for Discharge of Shop Floor Drain and Washbay Effluent



In addition to the four site selection criteria described previously, other criteria evolved from a review of the literature, discussions with INDOT District Environmental Coordinators and Study Advisory Committee members.

The nine criteria used in this study to identify INDOT facilities for priority attention are:

Criteria 1: maintenance facility locations within Rule 13 designated MS4 areas. (An asterisk denotes a facility location NOT connected to a POTW for discharge of shop floor drain and washbay effluent).

Criteria 2: maintenance facility locations within Karst areas.

Criteria 3: maintenance facility locations within 3,000 feet of a community public well.

Criteria 4: maintenance facility locations within (1,000 feet) (3,000 feet) (5,280 feet) of a public surface water intake.

Criteria 5: maintenance facility locations within one mile of high quality and exceptional use waters.

Criteria 6: maintenance facility locations within one mile of federal, state, county, municipal or township recreation facility having a lake, pond, river or stream.

Criteria 7: maintenance facility locations within 3,000 feet of groundwater that is highly vulnerable and very highly vulnerable to contamination by nitrates (as surrogate for chloride).

Criteria 8: maintenance facilities within 3,000 feet of a natural area containing Endangered, Threatened or Rare species.

Criteria 9: maintenance facilities within one mile of the "best remaining examples of natural wetland communities," as determined by IDNR.

The application of these criteria to existing locations was performed to identify those that provide the greatest potential risk to the environment from storm water discharge, locations BOTH within and outside MS4 areas.

The table on the following pages depicts the facility assessment using the nine criteria.

INDOT Maintenance Facility Location Priorities for the SWQMP
Both Within and Outside MS4 Areas

	Criteria								
	1	2	3	4	5	6	7	8	9
Crawfordsville District									
Crawfordsville District	x								
Terre Haute Sub & Unit	x								
Crawfordsville Sub & Unit	x								
Frankfort Sub & Unit	x								
Plainfield Unit	x								
*[Fort Harrison Unit]**	x						x		
Lafayette Unit*	x					x	x	x	
Lebanon Unit*	x								
Carbondale Unit					x				
Fowler Sub & Unit						x		x	
Ashboro Unit								x	
Fort Wayne District									
Fort Wayne District*	x		x			x	x	x	
Goshen Sub*	x								
New Goshen Sub Site*	x						x		
Fort Wayne Sub & Unit*	x								
U.S. 27 South Unit*	x		x				x		
New Haven Unit	x								
Angola Sub	x								
Wabash Sub & Unit	x								
New Paris Unit							x		
Markle Unit			x						
N. Manchester Unit								x	
Waterloo Unit								x	
Orland Unit						x			
Monroe Unit						x			
Greenfield District									
Greenfield District	x								
Unit 2 (Tibbs)	x								
Unit 4 (65th St.)	x								
Unit 5 (Madison)	x								
Greenfield Sub	x								
Anderson Unit	x								
Shelbyville Unit	x								
Richmond Unit	x								
Alexandria Unit	x								
Indianapolis Sub & 2 Units*	x		x						
Unit 3 (71st St.)*	x						x		

	Criteria								
	1	2	3	4	5	6	7	8	9
Greenfield District (Con't)									
Kokomo Unit*	x								
Westfield Unit*	x								
Muncie Unit*	x								
Fortville Unit			x						
Rushville Unit			x						
LaPorte District									
*[Valparaiso Unit]**	x		x						
Chesterton Unit*	x		x		x				
*[Logansport Unit]**	x								
*[South Bend Unit]**	x							x	
*[Old Gary Sub]**	x							x	x
Crown Point Unit*	x							x	
*[Miller Unit]**	x						x		
Michigan City Unit*	x						x		x
*[Mishawaka Unit]**	x		x			x			
LaPorte District	x						x		
LaPorte Sub & Unit	x						x		
New Gary Sub	x								
Monticello Salt Dome			x						
Flora Unit			x						
Medaryville Unit								x	
[Monticello Sub]						x			
Seymour District									
Seymour District	x								
Bloomington Sub & Unit	x								
Columbus Sub & Unit	x								
Sellersburg Sub & Unit	x								
New Albany Unit	x								
Greensburg Unit*	x								
Madison Sub*	x					x			
Amity Unit							x	x	
[North Vernon Unit]		x							
[Versailles Unit]		x							
Salem Unit		x							
Brookville Unit			x		x	x			
Spencer Unit						x		x	
Toll Road District									
Toll Road District*	x		x				x	x	
*[Porter Mtnce. Facility]**	x						x	x	
Elkhart Mtnce. Facility*	x		x				x	x	
Lake Mtnce. Facility	x								

	Criteria								
	1	2	3	4	5	6	7	8	9
Toll Road District (Con't)									
LaGrange Mtnce. Facility						x		x	
Steuben Mtnce. Facility								x	
Vincennes District									
Jasper Unit	x								
Evansville Sub & Unit	x								
Evansville Unit 2	x								
Chandler Unit	x								
Washington Unit	x								
Bedford Unit	x	x					x	x	
Shoals Unit		x							
Grantsburg Unit		x						x	
Paxton Unit								x	
Totals	59(*27)	6	14	0	3	11	16	20	2

Notes:

[Italics]: currently connected for discharge of sanitary only.

Bold: granted approval by POTW to connect and discharge shop floor drain and washbay effluent. Lafayette Unit in Crawfordsville District is the only facility in an MS4 that has been denied permission to connect to the POTW. When Madison Sub moves to the New Madison Sub JPG, it will be outside an MS4 area.

*Facility NOT connected to a POTW for discharge of shop floor drain and washbay effluent.

Below is a summary of the assessment for the 59 facility locations within MS4 areas:

0 facility locations within one mile of a public surface water intake

2 facility locations within one mile of a "natural wetland community"

3 facility locations within one mile of high quality and exceptional use waters

6 facility locations within karst areas

11 facility locations within one mile of a public park with a water body having "recreational value"

14 facility locations within 3,000 feet of a community public well (wellhead protection area)

16 facility locations within 3,000 feet of groundwater highly vulnerable or very highly vulnerable to contamination by nitrates (as surrogate for chlorides)

20 facility locations within 3,000 feet of a natural area containing federal and/or state-designated Endangered, Threatened or Rare species

27 facility locations in MS4 areas not connected to a POTW for discharge of shop floor drain and washbay effluent

Of the 59 facility locations in MS4 areas, 22 locations are identified by one or more of the other environmental "sensitivity" criteria. Nineteen of the 27 facility locations not connected to a POTW, for the specified discharge, are also identified by one or more of the criteria. Also, in the preceding table, there are 24 facility locations, among the 84 not in MS4 areas, that are identified by one or more of these criteria. These, too, should be prioritized by INDOT to ameliorate potential impacts on the environment.

The Use of Soil Characteristics as a Criteria for Facility Siting

From the beginning of discussions concerning the subject proposal, various geological and soil characteristics have been suggested as factors that need to be examined when siting new facilities. Those suggested included depth to groundwater, depth to bedrock, soil permeability, hydraulic conductivity, erosion potential, and others.

The principal investigator is not a geologist or soil scientist, so experts in these disciplines at Purdue University, Department of Agronomy and with the Natural Resources Conservation Service (NRCS) were consulted.[9] The investigator's simple (and naïve) question to each expert was, "what one geological or soil characteristic would you consider most important when siting a [described] INDOT facility"? The response, as could be expected, was that there is no single characteristic; however, the question provided a basis for further discussion.

[9]Professors William McFee and Brad Lee, Department of Agronomy. Telephone discussions April - June 2001, meeting June 25, 2001; Phil McLoud, Tony Bailey, Bruce Neilson and Jim Sell, NRCS. Various telephone and e-mail contacts during April - June 2001.

One expert offered that "soil associations," a classification of soil types by drainage pattern, flooding potential, suitability for septic system, etc., should be examined. Another suggested that "hydrologic groupings," characterized by the infiltration of water when thoroughly wet, as well as depth to water table, depth to bedrock and potential frost action, were relevant factors.

Phyllis Hockett, INDOT Environmental Services Manager and a geologist, stated succinctly the problem of using geological and soil characteristics as criteria for siting INDOT facilities: "It's very hard to generalize geology when you are talking in the order of one to two acres."[10]

The USDA County Soil Surveys presumably are referenced by INDOT authorities when examining potential sites. The accompanying soil maps ("sheets") at a scale of 1:15,840, show outlines of soil type areas printed over aerial photos. NRCS digitized the county soil maps by aggregating soil types into larger units with a minimum mapping size of 1,544 acres at a scale of 1:250,000 [see Appendix B, Tab 3, p. 41]. These STATSGO maps are only suitable for regional scale analysis. The improved digitized maps, SSURGO, are at a scale of 1:24,000, but are currently available for only 15 of Indiana's 92 counties.[11] [See Appendix B, Tab 3, p. 39]

This study's investigation of the relevance of various soil characteristics was based on the premise that the most important environmental objective to be achieved when siting an INDOT facility (or rehabilitating an existing one) is the prevention of

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[10]E-mail communication, April 4, 2001 (4:17 pm)
[11]The status of county soil survey digitizing can be found at http://www.in.nrcs.usda.gov/mlrall/digss.htm

groundwater contamination. The prevention of surface water contamination is a corollary objective, although it is recognized that the attainment of both objectives, vis-a-vis using the same soil characteristic as a determinant, might not be feasible (e.g., soil with a high permeability may prevent runoff to surface water but could threaten groundwater).

The "goal" of Indiana's groundwater quality standards is to "maintain and protect the quality of Indiana's groundwater and ensure that exposure to the groundwater will not pose a threat to human health, any natural resource, or the environment."[12]

The state departments of Environmental Management, Natural Resources and Health and the Offices of State Chemist and State Fire Marshal are mandated to adopt rules to apply the groundwater quality standards established by the Water Pollution Control Board to activities they regulate.[13] The Indiana Department of Health developed a procedure to apply the groundwater quality standards to on-site sewage systems involving the use of soil data to determine the potential of groundwater contamination by nitrogen, a component of wastewater that can result in nitrate (NO_3) contamination of groundwater.[14] Nitrates, in this study, serve as a surrogate for chloride, a constituent of the road salt stored at most INDOT maintenance facilities.

The requirements for groundwater protection are based on Table L-2, Section II-iii-L, Nitrate Leaching Index found in the NRCS Field Office Technical Guide. The table lists the potential for contaminating the groundwater with nitrates for each of the soil map units ("types") in each county of Indiana. The LI was developed using annual precipitation, rainfall distribution data and hydrologic soil groups, mentioned previously.

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[12]327 IAC 2-11-1
[13]IC 13-18-17-5
[14]"Soil Map Units with a Nitrate Leaching Index Greater than Ten" (April 5, 2000)

It's use in agriculture provides a way to determine the degree to which water percolates below the root zone of plants in certain soils. It is also useful for evaluating the potential for contaminating the groundwater with soluble nutrients. The LI ratings are based on a soil profile up to a depth of 80 inches and the percent of slope. The guidance for use of the LI acknowledges that "the depth to the aquifer, type of underlying material and other factors will influence nitrates leaching into the groundwater."[15]

The LI, for agricultural purposes, applies as follows:

- a LI less than 2 will probably not contribute to soluble nutrient leaching below the root zone;
- a LI between 2 and 10 may contribute to soluble nutrient leaching below the root zone;
- a LI greater than 10 will contribute to soluble nutrient leaching below the root zone

When assessing potential parcels for siting an INDOT facility, soil map units with a low LI should be preferred over those with a higher LI, especially an LI greater than 10. A general survey of soil map unit LI's, by county, is shown on the following page. The county map, "Percent of Soil Map Units in Indiana Counties with a Nitrate Leaching Index (LI) Greater than 10," is useful for identifying the percentage of soil types in each county subject to leaching. Individual county percentages of soil map units with a LI greater than 10 that should prompt INDOT officials to thoroughly investigate soil conditions of any parcel, include: LaPorte (89%), Orange (84%), Martin (76%), Harrison

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[15]NRCS Field Office Technical Guide, "Soil Rating for Nitrate and Soluble Nutrients." (December 1992)

(73%), Knox (70%), Posey (69%), Lawrence (66%), Starke (64%), Perry (63%), Pulaski (58%), Putnam (55%) and Washington (54%). The remainder of Indiana's counties have less than 50 percent of their soil map units classified by a LI greater than 10. Fifty-one of the state's 92 counties have 10 percent or less of their soil map units classified with a LI of greater than 10.

The Nitrate Leaching Index, Table L-2, is available for each county from NRCS and, perhaps, other local USDA agency offices.

The relevance of the LI can be shown by reviewing the LI's for soil map units (SMUs) in counties at the extremes of the index: Carroll County, which has 2 percent of its soil map units with a LI over 10 and LaPorte County with 89 percent of its soil map units with a LI over 10. [See Appendix G]

The distribution of Carroll and LaPorte Counties soil map units, by LI, are as follows:

Leaching Index		Number and Percent SMUs Carroll Co.	LaPorte County
3		1	
4		10	
5		65	2
7			8
8			
	Subtotal, <10	76 (93%)	10 (18%)
11			31
13		6	
17			14
	Subtotal, 10>	6 (7%)	45 (82%)
	Total	82 (100%)	55 (100%)

The Leaching Index can be considered a convenient screening tool; obviously, no single geological or soil characteristic should be relied upon. Another simple screening tool for assessing soil and geologic conditions at a potential facility site is found in Appendix H.

Objectives 3 and 4: to recommend Best Management Practices for implementation at existing sites to protect the environment and for new facilities sited at locations where potential environmental impacts exist; to provide cost estimates of Best Management Practices involving engineering upgrades for existing and new facilities.

Introduction

INDOT should consider the operations of its facilities on the environment surrounding those facilities and implement Best Management Practices immediately to reduce or eliminate the negative impacts. The proposed IDEM Rule 13 requiring INDOT to prepare a Storm Water Quality Management Plan (SWQMP) provides only the most recent incentive. Other IDEM (and EPA) regulations have long required facilities, such as those INDOT operates, to obtain National Pollution Discharge Elimination System (NPDES) permits for its discharges -- especially its washbay and shop floor drain effluent discharges -- to the waters of the state. It is only because of its focus on manufacturing facilities that IDEM has not previously required NPDES permits for INDOT operations. Appendix I is an actual IDEM Notice of Violation that cites the relevant sections of the Indiana Code for violations of the NPDES regulations. The case number and name of the "alleged violator" have been removed.

Now, with the promulgation of the EPA Phase II storm water regulation and the responsibility for the oversight of state regulatory agency permitting assumed by EPA, IDEM cannot ignore any violations of INDOT's NPDES permits.

BMPs and Groundwater Contamination of Existing INDOT Sites

This study would be incomplete without including reference to studies undertaken by INDOT of the existing conditions at its facilities that make NPDES permitting a priority.

"Professional Services Bulletin - 1994 - No. 17," dated September 1, 1994, was issued "to contract for engineering services required to evaluate and prepare a report regarding INDOT's salt runoff and brine control at eighteen initial sites listed in [the Bulletin]." Appendix "A" to the Bulletin, titled, "Consultant Responsibilities," listed two and one-half pages of itemized descriptions of tasks under the headings: preparatory work, field work, study, facilities plan and environmental report and plans for each identified problem grouping. The contract was awarded to Blackburn Architects, Inc., Indianapolis. The 784-page report from Blackburn is dated November 26, 1997.[16]

[16]The existence of this report was discovered accidentally by the principal investigator when reading a paper in which two articles published in Public Works magazine (April and May 1998), written by Dwain Thomas, P.E., a Blackburn engineer, and principal investigator of the Blackburn study, were cited. A copy of the report was requested. Blackburn requested and received authorization from Steve McAvoy, INDOT Facilities Management, to provide a copy and the copy was forwarded with a cover letter, citing the authorization, dated April 5, 2001.

On April 30, 2001 this study's principal investigator emailed Phyllis Hockett, INDOT Environmental Services Manager, the following message: "The Blackburn Report (1997) on 'Mitigation of Brine Runoff from 18 salt storage facilities,' recommends (p. 759): 'The sub-district or District Environmental staff should sample these monitoring wells bi-annually, after the last salting operation and on approximately October lst'. Have the wells been sampled and, if so, are the results available?"

Mrs. Hockett replied: "No the wells have not been sampled. The subcontractor that was hired to install the monitoring wells, installed them at the water table without consideration of the groundwater flow direction. The project was poorly designed. What we needed were nested wells at different depths to determine the impact to the aquifer since salt water is denser and slowly sinks to the bottom of the aquifer."

This communication is included here as recognition that INDOT was not, and is, probably, still not satisfied with the study. A comprehensive review of the report by this study's principal investigator revealed some aberrations that should have been corrected and a few "conclusions" that do not appear to derive from the "findings."

Given the apparent misgivings about the report, certain of the "findings" are, however, difficult to dispute and, lacking any other comprehensive study, the Blackburn study has a contribution to make to this study.

Most of the groundwater samples taken by the Blackburn hydrogeologist were from upper-level perched, saturated zones or upper-level soils close to the salt storage and mixing-loading areas. Few of the samples were from a sufficient boring depth to prove, conclusively, that a drinking water aquifer was contaminated: no bedrock wells were installed and no bedrock cores were obtained. The hydrogeologist calculated elevations from the water level data to infer the groundwater flow direction after receiving the site survey data from the study's surveyor. The placement of the soil borings were based on an assumption of what direction was up-gradient (for one boring) and down-gradient (for two borings).[17]

The study's findings may not be dispositive regarding the existence of salt contaminated plumes beneath each site; however, the results of the water sample monitoring are instructive and confirm the suspicions of those INDOT personnel who selected the sites that most were contaminated with salt.

The table on the following page shows the analysis of chloride levels in groundwater samples taken from the 56 test borings at the 18 INDOT facility sites included in the study. Most of the samples revealed a high level of chloride: 39 of the samples (70 percent) exceed the current groundwater standard of 250 ppm and 32 of the 56 samples (57 percent) exceed the standard for direct discharge to the mixing zone of a flowing stream (750 ppm). Only one of the 18 sites, Fort Wayne, had no chloride levels above the groundwater standard's threshold, while two - Westfield and Gary ["old" Gary Subdistrict] – averaged 17,667 and 7,267 ppm, respectively, for the three samples analyzed at each site.

[17]This paragraph paraphrased from the Executive Summary and Approach of the Blackburn Report, November 26, 1997 (pp. 1-6)

Test Boring Data: Blackburn Report
Borings During July - September 1996

Facility Code	Facility	County	Test Borings No.	Depth (ft.)	Cl_2 (ppm)
C-01	Bainbridge	Putnam	B-1NW	24	120
			B-2W	12	59
			B-3E	16	250
C-02	Ashboro	Clay	MW-1SW	34	5,200
			MW-2SE	18	1,500
			MW-3N	17	160
C-03	Carbondale	Warren	MW-1N	18	50
			MW-2SW	16	3,400
			MW-3M	14	1,700
F-01	Fort Wayne	Allen	MW-1E	50	72
			MW-2S	50	8
			MW-3N	52	29
F-02	Shipshewanna	LaGrange	MW-1E	34	22
			MW-2SW	36	15
			MW-3NW	36	970
F-03	Markle	Huntington	B-1NE	40	2,200
			B-2SE	12	1,900
			B-3W	12	1,100
G-01	Five Points	Marion	MW-1SE	28	140
			MW-2SW	20	3,100
			MW-3NE	22	830
G-02	Westfield	Hamilton	MW-1SW	16	7,400
			MW-2S	16	40,000
			MW-3M	20	5,600
G-03	Kokomo	Howard	MW-1N	28	9,000
			MW-2NE	32	130
			MW-3SW	38	260
L-01	LaPorte	LaPorte	MW-1S	24	170
			MW-2NE	10	2,000
			MW-3NW	10	180
			MW-4E	10	100

Facility Code	Facility	County	Test Borings No.	Depth (ft.)	Cl_2 (ppm)
L-02	Gary [old Sub.]	Lake	MW-1S	30	3,200
			MW-2NE	30	4,600
			MW-3NW	28	14,000
L-03	Plymouth	Marshall	MW-1S	26	910
			MW-2NS	12	2,300
			MW-3NE	16	4,500
S-01	Aurora	Dearborn	MW-1M	27	3,900
			B-2S	14	410
			B-3SE	14	160
S-02	Brownstown	Jackson	MW-1W	20	1,100
			MW-2NE	22	69
			MW-3SE	20	310
S-03	Versailles	Ripley	B-1W	16.5	100
			B-2E	6	1,500
			B-3NE	8	1,100
V-01	Poseyville	Posey	MW-1NE	24	530
			MW-2SE	14	1,200
			MW-3S	14	1,100
V-02	Bedford	Lawrence	B-1SE	7	11,000
			B-2SA	14	1,600
			B-3NW	26	790
V-03	Derby	Perry	B-1N	7	1,100
			B-2E	6	340
			B-3M	7.5	1,600
			B-4S	6.5	340

EPA uses two environmental indicators to measure progress toward groundwater remediation at RCRA sites subject to corrective action. Both indicators are included in a modified form as II.,G and H, respectively, in the IDEM RISC Investigation Report, included here as Appendix N. One indicator is controlling the migration of contaminated groundwater plumes and the other is controlling human exposure to contaminated groundwater. Both indicators are relevant for use at INDOT sites where groundwater contamination is known or suspected. The design and implementation of Best Management Practices at these sites needs to be a priority activity of the department to prevent further degradation and, possibly, migration to surface water, including sources of drinking water.

The RCRA environmental indicator for controlling migration of contaminated groundwater requires the following documentation:[18]

1. Consideration of all available, relevant or significant information on known and suspected releases to the groundwater at the facility;
2. Determination whether groundwater is contaminated above appropriately protective levels (i.e., applicable promulgated standards, other appropriate standards, guidelines, guidance, or criteria) anywhere at, or from, the facility;
3. Determination whether the migration of contaminated groundwater has stabilized (remains within the previously determined existing area of contamination);

[18]Modified from "Documentation of Environmental Indicator Determination," RCRA Corrective Action (Interim Final Guidance, 2/5/99), U.S. EPA Office of Solid Waste

4. Determination whether contaminated groundwater discharges to surface water;
5. Determination whether any discharge of contaminated groundwater to surface water is "significant" (the maximum concentration of the contaminant in the surface water is more than 10 times the appropriate groundwater level);
6. Determination whether the discharge of contaminated groundwater into surface water is "acceptable" until a full assessment and a final remedy decision can be made;[19]
7. Decision whether groundwater monitoring measurement data and surface water/sediment/ecological data will be collected in the future to verify that contaminated groundwater has remained within the existing area of contaminated groundwater;

The documentation required for the controlling human exposure indicator includes the following:

1. Consideration of all available relevant or significant information on known and suspected releases to soil, groundwater and surface water at the facility;
2. Determination whether the soil, groundwater or surface water is contaminated above appropriately protective risk-based levels;
3. Determination whether there are complete pathways between contamination and human receptors such that exposures can be reasonably expected under the current land, groundwater and surface water use conditions;

[19]Factors to be considered in the interim assessment include surface water body size, flow, use/classification/habitats, contaminant loading limits, other sources of surface water/sediment contamination, effects on ecological receptors (e.g., via bio-assays, benthic surveys or site specific ecological risk assessments performed by trained specialists).

4. Determination whether the exposures resulting from the complete pathways (in 3.) are "significant;"[20]

This documentation exceeds that required by the Phase I Environmental Site Assessment Standard (ASTM E 1527-00), which may be utilized at some sites, and can serve as the foundation for further, Phase II investigations of "recognized environmental conditions" (RECs) identified during Phase I assessments.

These environmental indicators, supported by the required documentation, should be applied by INDOT where groundwater and/or surface water contamination is known or suspected. The 18 sites included in the 1996-97 Blackburn study - because of the baseline data - should receive priority attention. The monitoring wells drilled for the study could be used, after cleaning and purging, for sampling, even though many are not at the preferred depth. Sampling these wells will determine if near-surface groundwater contamination at these sites persists. If so, remediation should be contemplated.

Identifying the Need for BMPs

Facility Best Management Practices (BMPs), for purposes of this discussion, can be either structural or non-structural. A procedure for performing operational activities, such as salt/sand mixing/loading that requires removal of all salt from the area surface after loading, is a non-structural BMP. The installation of a physical device that alters the release, transport or discharge of pollutants from surface storm or melt water or facility-generated shop floor drain or washbay effluent is a structural BMP.

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[20]"Significant" means: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the "acceptable levels" used to identify the contamination, or 2) the combination of exposure magnitude (perhaps though low) and contaminant concentrations (which may be substantially above the "acceptable levels") that could result in greater than acceptable risk.

Non-Structural BMPs

Three INDOT policies have been identified that can serve as non-structural BMPs relevant to the control of salt and reduction of salt contamination of stormwater as well as ground water and surface water:

- Operating Procedure No. 2: Snow and Ice Control. August 24, 1998;
- Operating Procedure No. 22: Snow and Ice Chemicals - Pollution Control Guidelines. August 24, 1998;
- "INDOT Salt Housekeeping Guidelines for Personnel Involved in Snow Removal." Memorandum From Donald Lucas, Chief Engineer, Through Steve Cecil, Chief, Division of Pre-Engineering and Environment To District Directors. October 2, 1998.

These policies need to be updated and revised to address current regulatory requirements and best practices procedures. Some revisions are:

- Operating Procedure No. 2 contains a provisions absent in No. 22, e.g., the "suggestion" that "a windrow of abrasives [sand] be placed around all outside stockpiles [salt, salt/sand mix piles]. Few such stockpiles observed during recent surveys were bermed; in fact, at one facility, a member of the investigative team suggested this measure and it was accomplished immediately. Windrows of sand are minimally effective as a deterrent to stormwater/meltwater runoff, especially from a sloped surface. On level surfaces it can allow pooling that would otherwise sheet flow around stockpiles causing migration of salt-contaminated stormwater off-site.

- Operating Procedure No. 22 recommends that the exterior pad (to the salt storage building) "be sloped away from the building to its outer limits and the water

retained by means of a curb or slope reversal of the pad itself in order that the runoff may be directed into a collection system. It is important to note at this juncture that collection facilities are a last resort and that time, effort, and money, in most cases, can be better spent on avoiding or minimizing the formation of salt brine. However, it is our plan that all brine runoff is retained in some form of impervious storage and/or evaporation facility and, from that point, safely released into the environment." (pp. 3&4 of 13)

First, the design of the exterior pad (where the mixing/loading operations are performed) should be mandated, not recommended, because it is the lack of exterior pad curbing that creates over half of the salt contaminated stormwater problems observed in recent site visits. The curbing should only be used to allow pooling or to direct stormwater to a collection system. It should not be employed to direct stormwater off-site, as a point source discharge.

Second, collection facilities (holding tanks, retention ponds) should be required at all facilities handling salt as a "first resort," rather than last, because the "time, effort, and money spent on avoiding or minimizing the formation of salt brine" has not proved effective at solving the salt runoff problem.

Third, for the regulatory reasons cited previously, there is no longer any way to "safely release" stormwater contaminated with salt into the environment.

The Draft Final Report of HPR-2040 (the previous, 1990-1992, study) on page 11, quotes a statement made in Operating Procedure No. 22 on p. 4 (p. 5 of the 1998 version) establishing a "target" of "1000 ppm for salt water (brine solution, in free form) being released from IDOH properties into the environment." It is disappointing to discover that

the only change to this critical Operating Procedure policy in eight years was the acronym of the agency -- from IDOH to INDOT.

The statement following that quoted above (in both versions) allows "heavier concentrations [to] be emitted only into sanitary sewer lines or flowing streams when the dilution level prior to leaving IDOH (INDOT) property would exceed 1000." As stated in the earlier study's report, the Indiana Water Quality Standards establishes a limit of 860 ppm [now 750 ppm] **NOT** 1000 ppm for chloride concentration in point-source effluent, even to flowing streams.[21] Further, outside the mixing zone of the flowing stream, the average four-day chloride concentration cannot exceed 230 ppm. The statement encouraging "piping runoff into streams" that occupy state rights of way and others "near enough to be economically practical and large enough to be environmentally acceptable," should be deleted from Operating Procedure 22 -- intentionally discharging any contaminant to the waters of the state without a permit is a federal and state regulatory violation.

■ The Lucas Memorandum is an attempt to address all of the performance elements comprising snow and ice operations. As such, it serves as an excellent foundation document to expand into a snow and ice operations manual. The topics addressed, briefly, in this memorandum include: off-season salt delivery; fall preparation for first snow and ice call-out; containment and use of liquids used to spray loads; pre-season site inspections; salt loading and spraying; salt removal from salt bed and truck

[21]Table 1: Water Quality Criteria for Specific Substances, p. 8 (IAC 327 2-1-6)

prior to washing; salt bed and truck washing; post-season salt storage building area and equipment inspections and maintenance; and emergency spill plan procedures.

Another policy, the Greenfield District Liquid Chemical Application Policy, (December 2001), is a very comprehensive treatment of procedures and best practices for brinemaking and brine application [anti-icing]. The department should review the policy, modify it, if necessary, for relevance to statewide application, and issue it as an Operating Procedure.

Structural BMPs

Structural BMPs have been installed at most INDOT facilities to reduce the offsite impacts of contaminated stormwater/washwater migration. Few BMPs were designed into the construction of new facilities until two or three years ago. Prior to that time and currently at "old" facilities, the design and installation of structural BMPs was an independent, facility-initiated undertaking little influenced by the central office or, in some districts, the district office

INDOT Facilities Management also now has standard specifications for new salt storage buildings with sufficient area for sand storage and salt/sand mixing/loading indoors and for brine making, storage and bulk tank loading outdoors on a pad protected with secondary containment. Other specifications exist for extended roofs to old salt domes to provide a protected area for mixing/loading and for replacement of smaller salt storage facilities.

The design and specification of structural BMPs must originate in the central office - certainly with input from field personnel - and adherence to the specification must be required, not merely recommended or strongly encouraged. Too many facilities exhibit

stormwater/washwater collection/discharge problems exacerbated by years of well-intentioned but, too often, poorly designed engineering projects.

The department needs to conduct a facility-by-facility assessment of stormwater BMP needs. The needs of each facility can then be characterized and categorized, probably, by one of no more than ten facility BMP typologies. The results of the assessment will allow the design of standard BMP specifications to fit the needs of all facilities - with, perhaps, minor modifications - in that typology. A previous version of a survey questionnaire has been recommended for use twice before to Environmental Services staff and is included in this report as Appendix J, again, with the recommendation that the survey be implemented. This questionnaire does not duplicate information gathered from the earlier 1998 "NPDES Survey" or the subsequent (and partial) surveys performed in some, but not all, districts by Environmental Services personnel.

The Need for Stormwater/Washwater BMPs

Surface Stormwater Runoff

Much of the impact from surface stormwater/meltwater runoff can be significantly reduced by removing contaminants from the path of the sheet flow and point discharges. This means that the salt/sand mixing/loading area is swept clean after each load or the area is bermed to contain the material until it can be cleaned or the mixing/loading is performed inside the salt storage facility or under a roof. This means that containers of petroleum and liquid wastes stored outdoors are on a roofed pad enclosed by secondary containment. This means that herbicide and paint mixing and loading is done in designated, bermed areas, preferably on a pad, and that any spill or residue is

immediately cleaned up. This means that right-of-way trash and construction debris is taken to a permitted landfill and not allowed to accumulate on site. This means that salt bed washing is done in a washbay, not outdoors, and that salt bed oiling, paint chipping and painting - if performed at the salt bed rack - is done with the ground protected by a tarpaulin.

Other than the construction of bermed pads, which have and can be done by facility personnel, none of these BMPs require the design or purchase and installation of a control device; these BMPs are operating procedures, similar to Operating Procedure 22, which require only development, review, distribution and enforcement (supervision). Naturally-occurring stormwater runoff from the surface of INDOT facilities doesn't need to be controlled and doesn't require a state stormwater permit if it doesn't contain contaminants. And it won't contain contaminants if it doesn't contact materials that are the source of contamination.

Shop Floor Drain Effluent Discharge

At facilities that do not discharge shop floor drain effluent to a POTW, the most common BMP for intercepting some contaminants from entering stormwater or washwater is an oil/water separator. Oil/water separators are effective at removing non-soluble oil and other petroleum products, but do not remove substance in solution, such as antifreeze and chlorides from road salt. At some facilities, the oil/water separator is connected to a tank, catch basin or holding pond where the washbay effluent collects before being conveyed offsite.

Shop floor drains should be segregated from washbay drains and the flow should terminate at the oil/water separator or, beyond, at a holding tank. Shop floor drains are

intended to capture any spills of automotive fluids occurring during vehicle maintenance. No other liquids, including washwater, should be allowed to enter the drain. The hazardous waste or liquids recycling contractor can pump the contents of the separator or the holding tank, when needed.

Most districts centralize vehicle repair and maintenance at a subdistrict or district shop. Contamination of facility storm water discharge will be most prevalent in districts where this policy is not in effect or is not enforced.

Another preventive measure is to plug shop floor drains and operate a "dry shop," using absorbent materials to clean-up spills. This is strongly recommended for facilities that do not have and will not be purchasing an oil/water separator in the near future.

Washbay Effluent Discharge

Washbay effluent is used as make-up solution for brinemaking at approximately 12 INDOT facilities. At some of these and a few others, some of the effluent is captured to "spray the load" of salt/sand mix and/or to fill saddle tanks for spraying the mix as it passes through the salt spreader. Only 52 of the 160-plus INDOT maintenance facilities (about 33 percent) are connected to POTWs for discharge of washwater, so the control and disposition of washwater is a critical issue.

Catch basins, settling tanks and holding ponds have been installed at a few facilities to capture washwater. These are effective for removing most suspended particles, but nothing else, and certainly not solubles, such as chloride. Structures of this type at INDOT facilities are usually fitted with an inverted "J" tube to drain the overflow (and the precipitation that has collected) to a pipe or other conveyance and, then, offsite.

BMP Options for Washbay Effluent

If sources of contaminants are removed from the path of surface area stormwater runoff and if shop floor drains are connected to oil/water separators and/or holding tanks or plugged, the remaining challenge for INDOT facilities is to properly contain and control washbay effluent from leaving the site. The available options are:

1. reduce the sources of potential contamination throughout the state by centralizing saltbed and truck washing at facilities already connected to POTWs amenable to accepting brine discharge;
2. connect every truck washing facility to an amenable POTW;
3. install brinemaking at every truck washing facility so washwater can be used as "make-up" solution;
4. contain wash water in holding tanks and haul to an amenable POTW;
5. line existing and newly constructed holding ponds with a clay layer or plastic impervious liner and design the structure to hold the maximum volume of meltwater, washwater and precipitation that can conceivably collect while evaporation is depended upon to reduce the volume (no overflow is allowed).

The costs and operational considerations of the above options are:

1. Costs:

   Cost per mile for operating INDOT salt trucks are $2.63 per hour for single axle and $2.86 per hour for tandem axle, including labor, labor additive, depreciation and fuel based on the vehicle traveling 20 miles in an hour. (From Jerry Halperin, Program Coordinator, INDOT Operations Support Division, E-mail July 31, 2002).

Assumptions: each of the 7 salt trucks at a Unit is washed 14 times during the snow/ice season. Each truck is driven 20 miles to a facility with washbay connection to a POTW and 20 miles back to the Unit, for a total of 40 miles. Some of the trucks are single axle and some are tandem, so a mean of $2.75 per mile is used.

Therefore: $2.75 x 40 x 7 x 14 = $10,780 per 7-truck Unit per snow and ice season.

Considerations: POTWs to which washing facilities are connected may have imposed limits on the volume of washwater or the levels of chloride and cyanide discharged from the facility. Washing facilities may be at such a distance from the others that moving trucks for washing is inconvenient or impractical, regardless of the cost.

2. Costs:

Assumptions:

Each of the 7 salt trucks at a Unit is washed 14 times during the snow/ice season. Each wash requires 230 gallons of water. Each Unit, then, generates 22,540 gallons of washwater per S/I season (7 trucks x 14 washes x 230 gallons). The single truck equivalent is 3,220 gallons of washwater per S/I season. (From April 2001 Survey of District Environmental Coordinators)

Connecting to POTW (Source: David Wagner, Millennium Environmental)

- pipe: $30-$50/foot (12-18" line) for excavation and installation. A force main at the facility would allow a 6" pipe if no other connections were made.
- manholes: $1,500 each every 300-400 feet (not necessary with a force main)

- pumping station: $7,500-$30,000. The cost varies with the flow requirements (gals. per minute): the lower the flow, the less the cost.
- discharge fee: $3-$5/1,000 gallons (For 25,000 gallons/season, the cost is $75 - $125)
- average distance of 19 facility locations not currently connected, to nearest POTW less than 3.5 miles: 2.3 miles (There are 14 other facility locations that average 6.4 miles from the nearest POTW)

Costs/Unit

- pipe: 12" pipe, 2.3 miles @ $30/ft.	$342,720
- manholes: 2.3 miles/400 ft = 28 x $1,500	42,000
- pumping station: metered flow	10,000
Estimate	$394,720

Considerations: POTWs may not allow washwater discharge, regardless that it is not harmful to the system. Costs of extending the line might be shared with other dischargers. A few facilities are at too great a distance from a POTW and others are in a remote location that makes connection impractical.

3. Costs:

Brinemaking and Brine Application	Total	Approx. Cost/ Facility
Capital Equipment		
Pressure sprayer and parts	$ 3,665	$ 1,833
Brinemakers (2), brine tanks (3), fill station (2), plumbing kit (2), freight	$18,494	$ 9,247
Brine sprayers (2), recirculation kits (2), vertical tanks (2)	$20,294	$10,147
Non-Capital Equipment		
Assorted plumbing materals	$ 500	$ 250
Sump pump (2)	$ 300	$ 150
Hydrometers (10)	$ 206	$ 103
External Services		
Plumbing	$ 2,100	$ 1,050
Electrical	$ 3,000	$ 1,500
Total	$48,559	$24,280

From: Table, "Current To-Date Project Non-Labor Expenditure Figures," INDOT Winter Salt Truck Wash Water Reuse Implementation Study. James E. Alleman, Professor of Environmental Engineering, School of Civil Engineering, Purdue University. Memorandum (May 21, 2002) to Dr. Barry Partridge, Director, INDOT Division of Research. Reference is to brinemaking and brine application equipment installed at Bainbridge and Bluffton during winter 2001-2002.

Considerations: Proper brine application requires real-time information about meteorological conditions, which cannot be accessed, yet, in some districts. The cost of brinemaking equipment is affordable, but the cost of a brine application unit for every truck that would normally carry salt may be prohibitive. Some districts will continue to spread salt/sand mix, requiring saltbed and truck washing capability.

4. Costs:

Assumptions:

Each of the 7 salt trucks at a Unit is washed 14 times during the snow/ice season. Each wash requires 230 gallons of water. Each Unit, then, generates 22,540 gallons of washwater per S/I season (7 trucks x 14 washes x 230 gallons). The single truck equivalent is 3,220 gallons of washwater per S/I season. (From April 2001 Survey of District Environmental Coordinators)

Store and Haul (Source: Heritage Environmental Services and Sprayer Specialties, Grimes, IA)

- Cost per load: 0-30 miles - $260/5,000 gallons (bulk)
- Storage tank: Polyethylene (upright, free-standing, no supports)

1,000 gals.	$ 300
2,500 gals.	$ 600
5,000 gals.	$1,756

Costs/Unit

- Hauling 25,000 gallons/S/I season @ $260 per 5,000 gallons w/in 30 miles	$1,300
- Storage tank (5,000 gal.)	$1,756
- Pipe and fittings to connect to washbay; plumbing and electrical services	$4,000
Estimate	$7,056

Considerations: This is the most cost effective option for facilities that (1) cannot afford to connect to a POTW; (2) cannot discharge washbay effluent to a

POTW because of prohibitions; (3) will install brinemaking equipment and can use washwater as "make-up" solution or (4) will continue to spread road salt for all or some snow/ice events. INDOT vacuum trucks or bulk tank trucks (with a pump), if available, could be used to reduce hauling costs. Some POTWs will not accept transported liquids. A milk-run" (pick-up service) could possibly be arranged with bulk transporters in each district, if amenable POTWs can be located.

5. Costs:

Assumptions:

The holding pond will need to contain a volume of 25,000 gallons of washwater (3,250 ft^3) generated by a 7-truck Unit (see Assumptions in 4., above), plus precipitation, plus stormwater/meltwater in-flow if the pond is not bermed.

The mean annual precipitation in Indiana is 2.86" (.24'). The surface dimensions of the pond would need to be at least 25' x 25' (if 5' deep) to contain the washwater; therefore, the volume of precipitation could be as much as 150 ft^3. (.24' x 25' x 25')

The volume of stormwater/meltwater in-flow to the pond (if not bermed) from an estimated 1,000 ft^2 area surrounding the pond could be as much as 240 ft^3. (.24' x 1,000 ft^2)

The holding pond should be sized to hold at least 3,600 ft^3 (27,700 gallons) of washwater, precipitation and stormwater in-flow per 12-month period.

The cost of constructing (primarily excavating) a holding pond is estimated to be \$0.40/ft^3. The cost of lining the pond adds \$0.10/ft^3. [From: Rick

Rampone, Earthtech, Indianapolis, through Drew Bender, J. F. New and Associates, Indianapolis. Telephone conversation August 2, 2002].

At \$0.50/ft^3 for excavating and lining a holding pond with a capacity of at least 3,600 ft^3, the estimated total cost is \$1,800.

Considerations: The holding pond has to be sized to hold the maximum volume of washbay effluent, surface area stormwater/meltwater runoff (unless the pond is bermed) and precipitation (roofing over a holding pond retards evaporation). Difficulties are encountered removing sediment from any holding pond, but especially one lined with plastic. Unless properly maintained, holding ponds can collect debris and serve as a harbor for algae blooms, wild fowl and reptiles, none of which are desirable inhabitants of an INDOT maintenance facility.

The attractive cost of constructing a holding pond as a BMP must be weighed against the costs of cleaning and maintenance and the potential for groundwater contamination via a perforated or breached liner. Also, evaporation cannot be relied on to reduce the total volume contained because it is periodically replenished by precipitation. Prohibiting any discharge from a pond will mean that the contents will need to be pumped and hauled to an amenable POTW every other year; a longer cycle will increase the probability that no POTW would accept the contents because of the increased brine concentration. Alternatively, the unevaporated content can be pumped to tanks, if available, and used as brine makeup solution or hauled to another facility for this purpose.

Other BMPs for Facilities and Highways

Appendix K is a CD-Rom prepared by project staff that includes 23 distinct internet and CD-Rom documents and their hyperlinks from federal, other state, private and other public sources. It is probably the most complete compendium of stormwater management documents available in this form. The index to the CD-Rom documents is printed below and is included in Appendix K. The Water Quality and GIS Bibliography of references used in this study, including many of those in the CD-Rom, is found in this report as Appendix L.

Index to CD-ROM Stormwater Management Documents

California Department of Transportation Construction Site BMPs Manual

http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf

California Department of Transportation Statewide Storm Water Management Plan

http://www.dot.ca.gov/hq/env/stormwater/special/final_swmp/final_swmp.pdf

California Department of Transportation Statewide Storm Water Management Plan - Revised 2002

http://www.dot.ca.gov/hq/env/stormwater/annual_report/_swmp/swmp.htm

California Department of Transportation Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual

http://www.dot.ca.gov/hq/construc/SWPPP_WPCP_Preparation.pdf

California Environmental Protection Agency Model Urban Runoff Program

http://www.swrcb.ca.gov/stormwtr/murp.html

City of Indianapolis Drainage Design Standards and Specifications Manual (Chapters 100 & 700)

http://www.indygov.org/dpw/amend_chp100_chp700.pdf

Indiana Drainage Handbook

http://www.ai.org/dnr/water/DrainageHandbook/

Management of Runoff From Surface Transportation Facilities Synthesis and Research Plan - National Cooperative Highway Research Program

http://trb.org/trb/publications/nchrp/nchrp_w37.pdf

Managing Storm Water Runoff to Prevent Contamination of Drinking Water-– EPA Office of Water

http://www.epa.gov/safewater/dwa/electronic/swp/stormwater.pdf

Managing Vehicle Washing to Prevent Contamination of Drinking Water - EPA Office of Water

http://www.epa.gov/safewater/dwa/electronic/swp/vehicle.pdf

Measurable Goals Guidance for Phase II Small MS4s - EPA Office of Wastewater Management

http://www.epa.gov/npdes/stormwater/measurablegoals/index.htm

Methodology for Analysis of Detention Basins for Control of Urban Runoff Quality - EPA Office of Research and Development

http://www.epa.gov/ednnrmrl/repository/epa-440-5-87-001/index.html

National Conference on Retrofit Opportunities for Water Resource Protection in Urban Environments Proceedings

National Menu of Best Management Practices for Storm Water Phase II - EPA Office of Wastewater Management

http://www.epa.gov/npdes/menuofbmps/menu.htm

National Stormwater Best Management Practices (BMP) Database

http://www.bmpdatabase.org/

Storm Water Phase II Compliance Assistance Guide – EPA Office of Water

http://www.epa.gov/npdes/pubs/comguide.pdf

Stormwater Pollution Prevention Handbook - Ontario Ministry of Environment

http://www.ene.gov.on.ca/envision/water/stormwaterPPH.htm

Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures - Urban - EPA Office of Water

http://www.epa.gov/owow/nps/urban.pdf

Urban Hydrology for Small Watersheds – Natural Resources Conservation Service, USDA

http://www.wcc.nrcs.usda.gov/water/quality/common/tr55/tr55.html

Use of Ponds for BMPs

http://www.forester.net/sw_0107_use.html

Washington State Department of Transportation Highway Runoff Manual

http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/Highway.pdf

Washington State Department of Transportation Storm Water Management Plan

http://www.wsdot.wa.gov/eesc/environmental/programs/hazwqec/docs/SWMP1.pdf

Wisconsin Storm Water Manual

1. *Overview and screening criteria*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_1.PDF
2. *Hydrology*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_2.PDF
3. *Infiltration basins and trenches*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_3.PDF
4. *Wet detention basins*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_4.PDF
5. *Artificial wetland storm water management systems*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_5.PDF
6. *Filter strips*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_6.PDF
7. *Grassed swales*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_7.PDF

Evaluating Stormwater BMPs

INDOT personnel should evaluate the application of both structural and non-structural BMPs to maintenance facility and highway operations. A deficiency with most of the documents listed in the CD-ROM is the lack of cost data. Various states (e.g., Georgia, Wisconsin, California, Virginia) are currently conducting studies designed to test the effectiveness of various structural BMPs and investigate the costs of design or purchase, as well as installation and maintenance.

An excellent source of construction project BMP cost/benefit information is the EPA Proposed Rule, "Effluent Limitation Guidelines and New Source Performance Standards for the Construction and Development Category." (June 7, 2002 Federal Register). The options presented address storm water discharges from construction, including highway construction, sites. The proposed rule, which will apply to INDOT and its contactors when finalized, is available at *http://www.epa.gove/waterscience/guide/construction*, and includes: Description of Available Technologies (Section VIII), Determination of Best Practicable Control Technology Currently Available (Section X), Methodology for Estimating Costs (Section XI), and Cost Effectiveness Analysis (Section XIII).

INDOT's evaluation of structural BMPs for controlling storm water contamination and/or flow from facilities and highways needs to be a coordinated effort between the appropriate personnel in the central office and those in the districts who will have the on-site opportunity to install and evaluate such control devices.

The California Department of Transportation (Caltrans) includes as Appendix B to its Statewide Storm Water Management Plan (August 2000), included in the CD-ROM in

Appendix K, a model for BMP evaluation and approval procedures. The general criteria for evaluating "candidate" BMPs are the following:

1. Relative Effectiveness: A recommended BMP should generally demonstrate equal or greater pollution control benefits than existing practices. Effectiveness is assessed in terms of specific pollutants of concern (e.g., sediment or trash) or groups of pollutants.
2. Technical Feasibility: A recommended BMP must be technically feasible. Caltrans must be able to implement the BMP within the context of the state highway system. Feasibility also includes health and safety concerns. BMPs that substantially increase the risk to Caltrans workers or the public will be considered not feasible.
3. Costs and Benefits: The pollution control benefits must have a reasonable relationship to the costs.
4. Legal and Institutional Constraints: The recommended BMP cannot compromise Caltrans compliance with other laws or with its mission. For example, Caltrans must provide drainage under roadways at regular intervals to prevent water from accumulating upgradient and threatening the integrity of the roadbed. Caltrans cannot block these drainage systems even if they carry pollutants from non-Caltrans properties (e.g., runoff from farmland).

As BMPs are evaluated, Caltrans assigns each one to a specific group:

1. Approved: These BMPs have been approved by Caltrans for implementation. Implementation is dependent on conditions/applicability of deployment

described as part of the BMP. In some cases, the conditions of deployment include regional factors.

2. Further research needed: Statewide implementation of BMPs in this grouping is deferred, unless noted otherwise, until further research is completed.
3. Rejected: These BMPs have been evaluated and rejected.

The BMP categories for roadways and facilities maintenance used by Caltrans include:

1. Flexible pavement (asphalt) maintenance and repair activities;
2. Rigid pavement (concrete) maintenance and repair activities;
3. Maintenance/repair of slopes, drainage, vegetation and other elements of the storm water drainage system;
4. Roadbed litter and debris removal;
5. Landscaping activities, including chemical and mechanical weed control;
6. Bridge maintenance activities;
7. Pump maintenance activities;
8. Traffic control equipment maintenance/repair
9. Roadway delineation and pavement marking activities;
10. Snow and ice control;
11. Emergency maintenance of roadways;
12. Management and support, including vehicle maintenance, fueling and washing, building maintenance, materials storage, wastes storage, road maintenance debris storage.

Other major category groupings include:

1. Design of pollution prevention controls;
2. Construction site BMPs;
3. Storm water treatment BMPs.

The roadways and facilities maintenance BMP sub-categories are particularly germane to this study. The descriptions of each sub-category are relevant to the Good Housekeeping and Pollution Prevention Minimum Control Measure strategies that INDOT will need to include in its Storm Water Quality Management Plan. The subcategories and their descriptions follow:

Building and Grounds Maintenance

Permanent maintenance facilities require building and grounds maintenance. Building and grounds maintenance includes care of landscaped areas around each facility, cleaning of parking areas and pavements other than areas of industrial activity, and maintenance of the storm water drainage system. Minimization of water use, proper handling and disposal of waste collected and wash waters used during building and grounds maintenance, and immediate cleanup of spills are key elements in the protection of storm water quality.

Storage of Hazardous Materials (Working Stock)

Maintenance facilities store a variety of products that may be harmful to the environment if they come into contact with surface waters. This BMP is intended to reduce the potential for the discharge of materials from hazardous materials storage sites to drainage systems or watercourses by minimizing exposure of the materials to storm water and by safeguarding against accidental release of materials.

Material Storage Controls (Hazardous Waste)

Maintenance facilities store a variety of products that may be harmful to the environment if they come into contact with surface waters. This BMP is intended to reduce the potential for the discharge of hazardous waste from hazardous waste storage sites to drainage systems or watercourses by providing safeguards against accidental releases and by minimizing exposure to the hazardous waste to storm water. Hazardous waste is to be stored on paved surfaces to the extent possible and spill cleanup supplies will be available at storage sites.

Outdoor Storage of Raw Materials

Maintenance facilities (and activities based out of maintenance facilities) store a variety of products that may be harmful to the environment if they come into contact with storm water runoff. This BMP is intended to reduce the potential for the discharge of products from outdoor raw material storage sites to storm water drainage systems or watercourses by minimizing exposure of the products to storm water. Storage areas are to be located to avoid runoff to drain inlets or watercourses. Storage areas are to be regularly inspected and good housekeeping practices will be promoted.

Vehicle and Equipment Fueling

When vehicle and equipment fueling takes place at a maintenance facility, there is the potential for fuel to be leaked or spilled at the site. The procedures for vehicle and equipment fueling are designed to minimize contact between storm water runoff and spilled fuel, oil or other leaked vehicle fluids at equipment fueling areas. Spill cleanup supplies are to be kept near fueling areas to contain spills. Fueling

instructions must be posted and pumps will be equipped with automatic and manual shutoff valves. Staff are to avoid hosing off the area and should use "dry shop" cleaning practices instead.

Vehicle and Equipment Pressure Washing

When vehicle and equipment pressure washing is conducted at a maintenance facility, it is essential that the wash water not be discharged to the drainage system. Alternative disposal methods include recycling or discharge to a sanitary sewer system. Proper vehicle and equipment pressure washing minimizes contact between storm water runoff and the equipment washing area and ensures that the wash water is not discharged to drainage systems or watercourses. Washing is to occur in designated areas and runoff will be contained.

Vehicle and Equipment Maintenance and Repair

Vehicle and equipment maintenance and repairs may include vehicle fluid removal, engine and parts cleaning, body repair and painting. The BMPs for this activity are intended to reduce the discharge of potential pollutants from areas in which vehicle maintenance and repair activities are conducted by employing controls that minimize contact between storm water and the activity areas and products used in each activity.

Aboveground and Underground Tank Leak and Spill Control

Maintenance facilities may utilize aboveground storage tanks for storage of bulk quantities of liquids. Often the liquids stored are potentially harmful to the environment. This BMP is intended to reduce the discharge of potential pollutants to drainage systems or watercourses from storage tanks by installing safeguards

against accidental releases (including spills or overflows from bulk fueling of underground fuel storage tanks). Tanks will be routinely inspected and maintained. Spill Prevention Controls and Countermeasures (SPCC) Plans are developed for prevention of and responding to accidental releases. Spill supplies are to be stored near aboveground tanks. Rain water in secondary contaminant is to be inspected or tested before it is discharged. Drain valves are closed after releasing clean rain water.

INDOT personnel should access and review the documents included in the CD-ROM in Appendix K. Much can be learned from California and other states.

Objective 5: to recommend procedures and policies for decommissioning facilities prior to their closure and relocation [and investigating sites for possible location of INDOT facilities]

Introduction

The unbracketed portion of this topic heading was included in the previous JTRP study (Indiana SPR-2341) and the recommended policy was included in that report as Appendix B and is included in this report as Appendix M. Further research of the topic in the interim and the relevance of the recommended environmental site assessment procedures for investigating non-INDOT property as potential sites for INDOT facilities [the bracketed portion] prompted the inclusion and expansion of the Objective in this report.

The Environmental Site Assessment and ASTM Phase I and II ESA Standards

The recommended policy, cited above, included in its procedures reference to a "Phase I and II Environmental Site Assessment," but did not provide the proper attribution to the ASTM Standards. That omission is corrected in the footnote below.[22]

The use of both the Phase I and II assessments are recommended in the policy and that recommendation remains, with some clarification added. First, both Phase I and II processes are "intended to constitute all appropriate inquiry into the previous ownership and uses of a property to determine whether hazardous substances or

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[22]ASTM E 1527-00, "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process" (current edition is July 2000, last edition was E 1527-97)
ASTM E 1903-97, "Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process" (February 1998)

petroleum products have been disposed or released there, in order to satisfy one element of the innocent purchaser defense to CERCLA liability." [underline added][23]

The terms "hazardous substances" are underlined above to focus attention on a limitation of the ASTM Standards; that "some substances may be present on a property in quantities and under conditions that may lead to contamination of the property or of nearby properties but are not included in CERCLA's definition of hazardous substances [42USC§9601(14)] or do not otherwise present potential CERCLA liability. In any case, they are beyond the scope of this practice."[24] The decommissioning policy recommended in the previous and in this study report intended to overcome the limited application of the ASTM Standards by defining "hazardous substances" as including "salt, salt/sand mix, and salt brine, with or without wetting agents [e.g., magnesium chloride]; also any chemicals classified as hazardous materials, hazardous waste and petroleum products." This broader definition, then, allows the investigation of impacts of non-CERCLA hazardous substances, such as lead (from lead-based paint), asbestos, salt and other substances that could have been used by, stored at, or were part of the construction of facilities located on, the property.

The broader definition, if adopted, also compels a more thorough investigation by INDOT's site assessment contractors who may be employed to assess a potential site for a future facility.

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[23] 1. Scope, Phase II Standard, February 1998
[24] 12. Non-Scope Considerations, Phase I Standard (February 2000)

Currently, Phase I and/or II assessments of potential sites are conducted only when there is the suspicion of contamination.[25] An argument can be made that if there is a suspicion of contamination, INDOT should abandon any consideration of that site: the costs of the assessment and the potential clean-up and liability may exceed that of another suitable property.

The continued use of Phase I and II site assessments for selecting a property or prior to closing a facility requires a thorough understanding of the purposes and limitations of each Standard. An environmental professional, contracted to INDOT to perform a Phase I and, if requested, Phase II assessment, could, according to these Standards, provide INDOT with a favorable report, yet, because of the limited scope of the Standards, INDOT could dispose of or purchase a property that had serious contamination problems. For example, the ASTM publication, "Technical Aspects of Phase I/II Environmental Site Assessments," states that: "Phase II ESAs are not intended to be full site characterizations. The main reason that the client requests a Phase II ESA is that the information available up to this point [from the Phase I ESA report] is not sufficient to reach a business decision."[26] The environmental assessment is paramount in these standards to the "business decision." The "business decision" is important to INDOT as well -- should it purchase a property, or should it dispose (sell, transfer) a property -- but INDOT's liability exposure and the potential cost of site remediation [e.g., Valparaiso Subdistrict] to a taxpayer-supported entity mandates that a full site characterization, before purchase or disposal of property, be conducted.

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[25]Telephone conversation with Steve McAvoy, INDOT Facilities Management, April 1, 2002

[26]Zdenek Hejzlar. American Society for Testing and Materials, West Conshohocken, PA (1999). pp.99-100.

An Alternative Environmental Site Assessment Method

The Indiana Department of Environmental Management has invested considerable personnel and other resources in the development of the "RISC User's Guide" and "RISC Technical Guide"[27] and both are recognized as excellent documents. The RISC Investigation Report is submitted to IDEM when the Office of Land Quality requires a remediation program for a contaminated site. The reader's immediate reaction may be that to assume that each site to be purchased or sold/transferred is contaminated is to establish a threshold well beyond reality. The format of the investigation report, however, requires information that has been suggested previously should be documented. And, significantly, much of the information, if not known, is retrievable from the GIS database maps included in this report as Appendix B.

As stated in the User's Guide, "the goal of the investigation report is to fully define the vertical and horizontal nature and extent of contamination based on land use-specific closure values [levels]."[28] With the additional IDEM "oversight" of INDOT activities prompted by the NPDES Storm Water regulations, the procedures for closing an INDOT facility will need to be much more rigorous, especially if contamination of ground or surface water is known or suspected. Industrial facilities possessing an NPDES wastewater permit are required to notify IDEM, prior to closure, of any suspected site contamination from industrial activities. INDOT facilities in non-MS4 areas will probably be permitted under the same type of permit. And the same provision will probably be included in the statewide NPDES Stormwater permit to cover facilities in

[27]Available at www.in.gov/idem/land/risc/
[28]"RISC User's Guide," Indiana Department of Environmental Management, Office of Land Quality. September 20, 2000. Appendix 1, p. A.1-2.

MS4 areas. The "decommissioning" and "site investigation" policy and procedures INDOT adopts now can be considered a Best Management Practice and presented to IDEM to demonstrate its proactive stance with respect to compliance with NPDES requirements.

The RISC Investigation Report format (with minor modifications) is included below and as a separate document in Appendix N to this report. Information available from this study's GIS database maps is designated "**(GIS)**" in the version below.

I. Introduction

A. Project Identification

1. Site name, facility identification numbers(s), mailing address, and telephone number
2. Site location clearly marked on appropriate U.S. Geological Survey 1:24,000 scale topographic quadrangle map **(GIS)**
3. Current owner and operator, mailing address, and telephone number
4. Site contact person or group responsible for the investigation

B. Overview of Current Contamination Conditions

1. Date the spill(s), release(s), or other contamination(s) occurred or was discovered
2. How the spill(s), release(s), or other contamination(s) was discovered
3. Remediation or product recovery measures already taken, including the following:
    a. Volume of product(s) recovered
    b. Name of product(s) recovered
4. Suspected source(s) of the spill(s), release(s), or other contamination(s)
5. Estimated volume(s) of the spill(s), release(s), or other contamination(s)
6. Approximate area(s) impacted
7. Date the incident(s) was reported to IDEM and resulting incident number (if assigned)

8. Existing deed restrictions, land-use restrictions, or environmental notice limitations

II. Site Background and Baseline Project Assessment

A. Site History

1. Type of facility, including description of past and current operations
2. Hazardous materials used or stored on site
3. Site ownership and operational history
4. Site spill, release, and contamination history
5. Previously completed investigations, including the following:
    a. Reasons for previously completed investigations
    b. Current status of site conditions that prompted or initiated previously completed investigations
6. Potential chemical(s) of concern

B. Geographic Information

1. Political geographic data
    a. County name(s)
    b. Political township names(s)
    c. Section (1/4, 1/4, 1/4), township, and range locations **(GIS)**
    d. Universal Transverse Mercator (UTM) coordinates **(GIS)**
2. Physical geographic data
    a. Topography and surface water flow and drainage patterns **(GIS)**
    b. Nearby surface waters (including wetlands and surface drainage ways) **(GIS)**
    c. Nearby floodways and flood plains **(GIS)**

C. Geologic Information

1. Surficial and unconsolidated geology
    a. Surface soil descriptions from U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS) **(GIS)**
    b. Type(s) of unconsolidated material **(GIS)**
    c. Thickness of unconsolidated material **(GIS)**
2. Bedrock geology
    a. Depth to bedrock **(GIS)**
    b. Type of bedrock **(GIS)**

c. Description of primary and secondary structural features, such as fractures, jointings, and solution cavities, that could impact contaminant migration and remediation efforts **(GIS)**
d. Current status or future potential of aquifer underlying site as primary source aquifer **(GIS)**

3. Hydrogeology
   a. Identification of regional aquifer(s) **(GIS)**
   b. Identification, location, and copies of the Indiana Department of Natural Resources-Division of Water (IDNR-DOW) well records for all municipal water supply wells and other high-capacity (greater than 70-gallon per minute [gpm] yield) wells within a 2-mile radius of the site **(GIS)**
   c. Identification, location, and copies of IDNR-DOW records for low-volume (less than 70-gpm yield) wells within a 1-mile radius of the site **(GIS)**
   d. Regional depth to ground water and seasonal fluctuations **(GIS)**
   e. Regional ground water flow direction(s) and gradient(s) **(GIS)**
   f. Summary of existing site specific data
   g. Other information, as necessary or appropriate

D. Ecologic Information

1. Potentially affected species of flora and fauna **(GIS)**
2. Potentially affected species of flora and fauna on the Endangered Species List as published by the U.S. Fish and Wildlife Service and IDNR **(GIS)**
3. Potential or observed effects of contamination on Vegetation or wildlife populations **(GIS)**

E. Preliminary Evaluation of Potentially Susceptible Areas

1. Drinking water source and wellhead protection areas **(GIS)**
2. Geologically susceptible areas, such as surface water bodies, karst bedrock areas, and other areas **(GIS)**
3. Socially susceptible areas, such as schools, parks, and hospitals **(GIS)**
4. Ecologically susceptible areas that include habitats of concern, such as wetlands, caves, and parklands **(GIS)**

F. Preliminary Evaluation of Possible Chemicals of Concern

1. Listed or actual chemical(s) of concern, including those with a Hazards Category, those listed on Material Safety Data Sheets (MSDS), and others
2. Suspected chemical(s) of concern based on site operational history
3. Description of hazards categories present
4. Copies of all MSDSs

G. Preliminary Evaluation of Potential Contaminant Transport Mechanisms

1. Discussion of surface water runoff (nonpoint mechanism)
2. Transport mechanisms to surface water, such as drainage ditches, storm sewers, and underground utility trenches
3. Discussion of ground water flow
4. Transport mechanisms to ground water, such as well bores, sewers, underground utility trenches, and karst features **(GIS - some)**
5. Other transport mechanisms, such as windblown particulates and physical tracking of soil by people, animals, or machinery

H. Preliminary Evaluation of Potential Human Exposure Pathways

1. Inhalation exposure pathway
2. Ingestion exposure pathway
3. Dermal absorption exposure pathway

I. Preliminary Evaluation of Potential Ecological Exposure Pathways

1. Potential impacts to aquatic life
2. Potential impacts to wildlife and vegetation

J. Identification of Existing Data Gaps that Must Be Addressed in the Site Investigation(s)

1. Site-specific geologic information
2. Site-specific hydrogeologic information
3. Site-specific ecologic information

K. Supporting Documentation

Full bibliographic information must be provided in the references for all documents used, referenced, and cited.

1. Previous applicable reports prepared for the site or the project
2. Available data and other applicable documentation regarding either the site or the project
3. Conceptual site model(s)

L. Maps and Figures

All maps, figures, drawings, cross-sections, aerial photographs, and other such information must be submitted in Appendix B of the investigation report or work plan. The maps, drawings, and other items must include suitable scales, compass directions, and clearly illustrated legends. Figures must also be provided for sites where the current conditions do not accurately reflect conditions that existed at the time of the spill or release because of building renovations, underground storage tank (UST) system upgrades and other changes. All maps and information on the maps must be legible and reproducible. Maps and figures should provide the information listed below.

1. Site location clearly on indicated U.S. Geological Survey 7.5-minute topographic quadrangle map(s) **(GIS)**
2. Current as well as past locations of physical features of the site, including the following:
    a. Property lines
    b. Building outlines
    c. Sidewalks
    d. Buildings with basements
    e. Underground and overhead utility lines
    f. Raw materials and bulk storage areas
    g. Aboveground storage tanks
    h. USTs
    i. Tank Piping trenches and associated dispenser islands
    j. Roads
    k. Pump island piping
    l. Property access points
    m. Gates and fences
    n. Loading and unloading areas
    o. On-site waste storage, treatment, and disposal areas
    p. Surface water bodies
    q. On-site ground water supply wells
3. Named facilities, property lines, property uses, current land-use status (such as agricultural,

industrial, or commercial), ground water wells, surface water, and other environmentally sensitive areas within a 1-mile radius of the site (underline added) **(GIS)**

4. Locations and identification numbers for all municipal water supply wells and high-capacity (greater than 70-gpm yield) water wells identified in IDNR-DOW well records within a 2-mile radius of the site **(GIS)**
5. Locations and identification numbers for all low-volume (less than 70-gpm yield) wells within a 1-mile radius of the site **(GIS)**
6. Areas where past spills or releases have occurred, where remediation efforts are currently being conducted, or where remediation efforts have been conducted in the past
7. Soil boring and monitoring well locations
8. Horizontal extent of contaminant migration
9. Sampling locations, including sampling depth and analytical results
10. Potentimetric surfaces for all ground water monitoring events
11. Geologic and hydrologic cross sections that define the stratigraphy, vertical extent of contaminant migration, water table, and location of free product plume, if present
12. Environmentally sensitive areas **(GIS)**

The RISC Investigation Report format should be used as a specification for contracting site assessment services when INDOT is contemplating decommissioning a facility or investigating a site for the future location of a facility.

APPENDICES
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APPENDIX A

Appendix A
(Part 1)
Findings of Previous Research Constituting the Foundation for the Current Study*

2. elimination of most vehicle and equipment wash-out/clean-out practices

Facility XXIII
- salt trucks and other vehicles washed on sloping asphalt/concrete pad outside North doors. Considerable erosion west and north of pad from washwater run-off and stormwater flow; both migrate to NW corner of property and under North fence to county roadside ditch. Truck wash-off is the probable cause of the black, oily substance clinging to the vegetation at the fence line.

Facility XXIX
- just inside the west-side gate, on the east side, is another catch basin where the street sweeper and salt trucks are washed; this is also connected to the same ROW side ditch

Facility XXXII
- north of this area is the truck washout area; the surface is encrusted 2" thick with a salt/sand mixture

Facility XXXIII
- catch basin 15' west of the building is at the center of the truck washing area; drains from the shop floor connect to this catch basin and the plastic drain pipe extends all the way diagonally across the surface to the marsh in the SW corner; considerable evidence of salt crust in the truck wash area

A. operations involving salt, especially the mixing/loading operations on the surface adjacent to the salt dome/shed; the containment or control of stormwater and melt-water contaminated with salt, and the washwater from washing salt beds and salt trucks on the surface at some INDOT facilities;

Facility I
- water from brine tank and concrete catch basin discharged after salt "season" to the creek via drain tile; discharge is untested
- surface water run-off ditch from slope north of salt bed rack, drains on to neighboring property (field)

*Joint Transportation Research Project No. C-36-67AAA, File No. 9-10-52, SPR-2341, "Follow-up Study to FHWA/IN/JHRP-92/22: Development of a Strategy for Compliance with EPA and OSHA Regulations Applicable to INDOT Facilities"

Facility XV

- salt boxes resting on cement berms (no rack); a depression south of this area runs beneath the snow plow blades from the NE, beginning at the open salt dome door and extending to the west fence near the pile of sand used for salt mixing *[Note: surface water with salt will drain from this area]*
- east of salt dome is a 5' deep excavated, open ditch that extends north across the surface area. A catch basin on the other side of the access road to the salt dome drains the area between the Unit Building and the Subdistrict Shop, so any salt loading and salt-sand mixing activity has the potential to contaminate surface water that runs off-site.

Facility XVIII

- salt and sand are mixed and stored on the surface south of the dome. No containment structure (e.g., berms) was observed. No berms, even temporary sand berms, are used to restrict the stormwater/salt mixture from migrating, via surface drains, off-site to the industrial park via the network of surface drains.

Facility XXV

- east of center of north property line is a 20'-wide, 1' deep (in places) washout with considerable evidence of salt run-off in the washout which extends off-property to an abandoned RR bed. The origin of the washout and the salt is the mixing-loading area east of the salt dome. Facility has proposed a roofed mixing-loading area, but, in the meantime, the area should be bermed permanently with asphalt or temporarily, during each storm, with sand. The city sewer line is beneath the washout - apparently there has been no discussion with the city regarding whether the salt brine run-off could be collected and connected to the sewer. City does accept washwater from salt truck washing in Wash Bay.
- evidence of salt run-off west of salt dome, down slope to wash area near west fence

Facility XXVI

- grate and catch basin next to the 30-bed salt bed rack; high pressure water used to clean beds, so water and whatever it removes goes down the drain to the large W - E ditch at the northern property border
- two other grates/catch basins are located north of the salt dome and next to the mixing-loading area; these also extend through tiles to the drain from the salt bed racks and on to the W - E ditch

Facility XXVIII

- catch basin just west of south gate drains most of the south and east surface, including outdoors salt truck/bed washing area, to an underground tile west along the state road ¼ mile to a headwall, then under the state road to a ditch in a cornfield, ultimately to a creek. Outdoor salt bed/truck washing is still performed, although more is performed, now, inside the Shop in the area designed as the Wash Bay, which discharges through an oil/water separator to the local POTW.

- salt dome has 4' berm and grass slope on the east and south sides; run-off from salt mixing/loading area on north side migrates under the west fence to the neighboring corn field; dome leaks, as evidenced by the large pool of water inside the dome

Facility XXXII

- the south property line ditch, where another rip-rap surrounded catch basin is located, is approximately 20' south of the salt dome. A 4" corrugated plastic pipe enters the ditch at this point form the NW. A greenish-brownish frothy stream is discharged from the pipe into the ditch and the nearby catch basin. [The Unit Foreman suspects the pipe drains the water from the floor of the salt dome. When the salt was removed two years ago, it was discovered that the floor had subsided about 2' below the surface outside the dome, probably from the weight of the salt on its base, which is a graded-over junkyard of automobiles from an old truck stop, once located at the site, and the steel, concrete and wood debris from replacement of the railroad overpass buried here years ago. When the salt was removed, the floor became covered with a foot of water, according to the Foreman, thus, the reason for the drain].

B. the control of stormwater, generally, that migrates from INDOT facilities to adjacent properties and/or to the waters of the state

Facility II

- all surface water drains to side ditches, then to city tiles to drainage area (remote marsh) two blocks north of Unit

Facility III

- site bordered by three private residences outside the south perimeter fence (INDOT replaced a well for one of them "a few years ago"); on the east, across from the facility is a sloping, agricultural crop field which has been used for application of cow or hog manure. There is a culvert exit near the SE corner of site property in ROW outside the fence but the entrance -- most likely in the field -- was not found. Culvert leads to E-W ditch crossing S end of site property inside fence to side ditch bordering Interstate.
- the entire surface lot was to be paved in early June with a slope so runoff will flow toward a new 12' wide rip-rapped, south-end ditch leading to the Interstate side ditch

Facility IV

- surface stormwater drains connect to state road side ditch, which crosses under state road to a neighboring creek

Facility VI

- remainder of Subdistrict and Unit surface area drains west to a perimeter fence ditch, then to the Interstate side ditch, then to a creek

Facility XI

- northeast corner drains offsite to 4' hole on other side of the northeast corner of the fence line
- 12" metal drain pipe discharges next to storage building midway E-W on North fence line; surface water discharge drains east to 4' hole
- drain culvert next to fence line parallel with the Interstate for conducting surface runoff to side ditch

Facility XV

- depression from a culvert to the SE, under an access drive to the large hot patch piles, continues W then N to the 210 Lot
- at the corner of the W and N fences, outside the property, is a large hole that may be the end of a surface drain pipe. *[Note: the maze of ditches, depressions, and pipes conducting surface water around and off this site need to be charted and controls need to be installed].*
- a ditch originating at the truck parking area continues as a drain tile to the northbound ditch at the W fence line; this ditch is 2' wide, 1' deep and continues beneath the west perimeter fence to a "wetland" area with a lush growth of cattails [there "may" be a creek on the other side of the cattail area]
- at the north point of the property is a 30-40' wide area with numerous run-off depressions under the fence; the apex of the northernmost point has a 1' deep ditch beneath it

Facility XVI

- holes where old fence posts were excavated were not filled in, so they serve to conduct surface water off-site

Facility XIX

- truck parking lot drains west via open cement culvert to Interstate side ditch, to culvert under Northbound rest area entrance road to Interstate, to ditch north of facility, eventually to a creek
- car parking lot drains through grated catch basin at northeast corner of lot to the same ditch north of facility. [Three or four years ago, a diesel truck fuel line broke and the fuel migrated from the truck lot through a gap in the median strip to the grated catch basin in the car lot and then to the ditch. The local, clean-up contractor was called to respond].

Facility XX

- surface drains on facility property discharge to a ditch north of the slightly elevated RR ROW north of the property line and, then, to a depression in the adjoining industrial park property, where it evaporates. There is no constructed retention area on the INDOT or the adjoining property.

- shop drains discharge into a tile that is connected to the surface drain system described above

Facility XXI

- next to the fence is a badly eroded 6' wide, 4' deep gully. The drain tile at the fence line conducts the surface water south to a drain "headwall" on the north side of U.S. highway, then via culvert under the highway to a swale on the south side of the highway.
- southbound tile runs to U.S. highway, then west along the highway to the "headwall," then under the highway
- a natural drain from private property, abutting the east fence line, also drains onto the facility property at the junction of the east fence and a short south fence
- confluence of two, 2' concrete drain pipes is where one catch basin will be constructed; another will be constructed just south of the east door to the salt dome. Both will collect most of the surface water and conduct it south under the south fence line to the U.S. highway culvert when the project is completed.

Facility XXIII

- eroded area under the fence drains stormwater from entire Unit property west of salt storage barn and north of Quonset building into East-West ditch outside perimeter fence along county road. Black, oily substance observed clinging to the grass and weeds at the fence line

Facility XXV

- grated catch basin just outside fence, 10' south of the east gate to property drains east slope of property north and east of Unit 3 Garage into the county road side ditch. The county road side ditch proceeds north 300' along the county road; then run-off surfaces in sown grass area, thence to a culvert in ¼ mile under the county road. The flow meanders in creeks, through pastures and private property, across from the high school; then joins a larger creek which crosses under the county road just south of another county road via a culvert under and to the west side of the state road and terminates in the larger, flowing creek alongside and under the county road near its intersection with the state road.
- northwest corner is the terminus of a surface wash, some of which begins in the salt mixing-loading area and flows to the catch basin near the salt bed rack and is carried by a drain tile to an opening next to the roll-offs. The remainder is surface run-off from the area north of the entrance road accessed via the west gate from the state road. All of the collected and surface water drains to a culvert that extends from the NW corner, off-property, under the old RR bed, and thence to ditches and the creek described previously, along the county road.
- eroded area west of building extends south around the building to a culvert at the base of the slope of the plateau on which the subdistrict garage is located. Culvert continues to the county road side ditch. At the time of the site visit, Department of Corrections personnel were washing-down the

asphalt parking area east of the garage - the wash water ran down the slope at many points, collected in the culvert and was observed flowing in the county road side ditch. Any vehicle fluid spills or other contaminants on the surface of the Subdistrict Garage parking area will migrate to the side ditch via washing-down or stormwater drainage. Most of the subdistrict trucks and heavy equipment are parked on this surface at the "lip" of the slope.

Facility XXVI

- a 10' wide, 4' deep ditch traverses the property west to east near the northern border, on the south side of the entrance road. The ditch turns north beneath the entrance road bridge at the east Subdistrict site fence (west 210 lot fence) into a swale, then proceeds from the swale toward the state road between Wendy's and Days Inn, crosses under the state road to the north side, continues west of Denny's, passes under a levee in a culvert and through two 4' "flapper" gates on the north side of the levee, terminating in a ditch that flows to a 10 acre pond, approximately ½ mile from the Subdistrict site. The "10 acre pond" may be a section of, or the terminus of, a creek. Subdistrict assumes responsibility for opening/closing "flapper" gates to contain/release flood water. The gates were propped open 6" with tree limbs on the day of the site visit.
- close examination of the surface of the water entering the swale revealed a brown-green scum, perhaps from vegetation, perhaps from another source. Also observed was the end of a 12" drain tile cemented into the east headwall of the culvert bridge over the west-east ditch. No one at the facility who was questioned knew what the tile drained.
- a grate and catch basin behind (west) Subdistrict garage captures stormwater and directs it through underground tile to the drain from the salt bed racks. Vehicles and equipment are parked on and near this depressed area.
- another grate and catch basin near the NE corner of the Unit property drains this area to another catch basin on the Subdistrict side of the fence and on to the W - E ditch

Facility XXIX

- the highest pile of street sweepings in Indiana (or so it appears) containing whatever is deposited on the Interstate from passing motorists, pedestrians, accidents, spills, illegal "storage" activities, etc.; contaminates will leach out and migrate with stormwater

Facility XXXII

- a ditch extends 100' further east from the swale, then crosses south in a culvert beneath the facility's east-west gravel road to a larger ditch between two aggregate piles; then to a catch basin, surrounded by rip-rap at the base of the slope to the elevated state road; catch basin is 6' from a headwall and an old drain underpass to the field on the south side of state road. [Neighbor explained that his farm fields drain under state road at this point, across INDOT property and then under the RR embankment to a farm ditch on the north side of the embankment. Subsequent investigation makes his explanation plausible: there is a farm field ditch on the north side of the

embankment about 80' - 100' below the RR track - the slope was not traversed to locate the drain].

- the run-off from the RR ROW to the north migrates south across INDOT property, via two ditches, to the south boundary ditch, then to the headwall where it joins the run-off from the farm fields south of state road and the Unit property; the run-off then migrates, via a main ditch, back north to the large (4th) catch basin at the foot of the RR embankment, passes under the embankment north to the farm field ditch 80' - 100' below the RR tracks.

Facility XXXIII

- 3' high berm at east end of south property line prevents surface area run-off, but directs run-off to ditch at west end of south property line and, then, to a marsh in the southwest corner
- a 12' high, 4' deep manmade ditch originating near an aggregate pile traverses the surface SW about 100' terminating in the SW corner at the marsh
- a 5' wide, 3' deep ditch is the boundary line of the active surface (the actual property line is in the woods 30' further west) this ditch joins the south property line ditch in the marsh and any run-off will meander south to a creek on the north side of the state road about ½ mile south of the Unit

C. the control of spilled automobile and other fluids and salt-contaminated washwater from entering shop floor drains that are not connected to a POTW;

Facility III

- floor drains connecting all four bays discharge to a 1,000-gallon septic tank, which flows to the oil/water separator, which flows to the east perimeter side ditch; vehicle maintenance for all Units is done here, including changing vehicle fluids.

Facility VII

- drains from the garage go to an oil/water separator, then to the Interstate side ditch. [O/W separator was installed after the facility was vacated by INDOT]

Facility XV

- used oil drains from the shop to a 250-gallon underground storage tank just outside the north wall of the shop; there is no oil/water separator. *[Note: an employee explained that the earth over the UST cover is removed periodically and the cover lifted with a fork lift; absorbent "pigs" are thrown into the tank to absorb the oil and are discarded with the used oil filters. No one questioned remembered when the tank cover was last removed. The tank has an overflow pipe that extends northeast toward the east fence line. An employee guided the field team toward the terminus of the pipe, "where that post is sticking up," directly to the location of the black oil "spill" observed earlier].*

- floor drains connect to a plastic pipe outside the north wall of the Unit which extends beneath the north entrance to the building and terminates in a culvert that continues to the 5' excavated ditch and, so, off-site

Facility XXIII
- appears to be the terminus of a drain pipe also in this ditch 10' directly north of the NW corner post of Unit property [later confirmed to be a drain pipe and most likely from the Unit Quonset building or shop floor drain]
- another 18' diameter vertical pipe floor drain that -- it was thought -- is connected to a tile extending west toward the Quonset building and the water "leaches out" in the ground; the drain is "probably not connected" to the Quonset building drain

Facility XXVI
- 2 drain pipes stick out from the slope south of the lab, which is the north bank of the W - E ditch referred to previously; one drain, probably, is connected to the roof gutter downspouts; the other, probably, is connected to the floor drain in the "oven room" of the lab

Facility XXVII
- two drain pipes stick out of this slope: one drains the Unit Building floor and the other is connected to a grated, stormwater catchment in front of the south garage doors to the Unit building that collects stormwater flowing down gradient from the U.S. highway and the southern portion of the Unit site. No provisions have been made for plugging either drain to prevent fluids from a leaking vehicle on site or on the state highway, or another source, from entering these drains.

Facility XXIX
- shop floor drains inside second and third garage doors (from north) connected to catch basins outside these doors which are connected to a tile that runs south next to the west-side gate under the south fence to the ROW ditch bordering the street entrance to the intersecting avenue. There is what appears to be a municipal stormwater manhole just outside the fence, east of the gate, in line with another catch basin inside the fence; couldn't determine if the two are connected.

Facility XXXI
- four 2' diameter floor drains, including the one in the Wash Bay, connect to oil/water separator; the water leaves the separator and flows to the ROW side ditch at the north property line

Facility XXXII
- at the fence line, north of the salt dome where the fence ends, is another, larger swale that extends from the Unit property north to the foot of the RR ROW slope for about 50' east along the north property line. An 8" plastic tile that has brown, frothy water drizzling from it terminates at the west end of this swale. The origin of the pipe and its content is unknown.

- floor drains go to the catch basin at the north property line and then via the drainage system to the farm field ditch; mechanic does oil changes, fluid replacements, brake jobs, spring welding, etc., in this shop.

Facility XXXIII

- an 8" white plastic pipe terminates in the ditch at the edge of the marsh; the floor drains in the Unit Building and the catch basin in the truck washing area west of the Unit Building are connected to this pipe; a payloader was parked over an uncovered floor drain

Appendix A
(Part 2)
Conclusions and Recommendations from Previous Research Constituting the Foundation for the Current Study*

2. elimination of most vehicle and equipment wash-out/clean-out practices;

Conclusion: vehicles and equipment at some facilities are cleaned-out and washed-out in a location that contributes particle and/or contaminant loading to the storm- and washwater migrating from the facility.

Operating Procedure No. 22, in the Mixing/Handling of Deicing Chemicals section, states: "Under no circumstances will equipment (spreaders) be placed in permanent summer storage locations prior to final cleanup, unless the storage area has been constructed on the ice/snow removal operations pad and the cleanup is completed before the pad drainage is diverted away from the brine treatment facility for the summer months."

The recent inspections of salt bed racks (referenced in 1, above) and the observation of salt chunks and salt residue beneath the racks suggests that his procedure is not being followed at some facilities.

This statement (on p. 7 of 13) in Operating Procedure No. 22 should also be included in the Post Winter Operations section (p. 13 of 14) in Operating Procedure No. 2.

Recommendation: the Operating Procedure No. 22 (Mixing/Handling of Deicing Chemicals section) policy restricting vehicle and equipment washing to an "equipment clean and wash area" that is connected to an oil/water separator and/or directly to a

*Joint Transportation Research Project No. C-36-67AAA, File No. 9-10-52, SPR-2341, "Follow-up Study to FHWA/IN/JHRP-92/22: "Development of a Strategy for Compliance with EPA and OSHA Regulations Applicable to INDOT Facilities"

POTW needs to be reinforced with facility managers. Where neither pollution prevention measure can be implemented, an outdoor holding or retention area should be constructed to capture the vehicle/equipment washwater.

The Draft Final Report (JHRP-92/22) of the previously cited, 1990-1992, study recommended (p. 10):

1. Vehicle and equipment washing and clean-out operations should be restricted to one or more areas (pads) specifically designated (with signs posted) for these purposes. Outside (surface) areas should be constructed so that run-off is captured for discharge to a city sewer system or in a catch basin which is later pumped out and transported for discharge to a city sewer system or to a storage structure to be used as salt liquid brine for snow and ice operations. Preferably, such pads would be constructed of concrete to reduce the potential for subsoil and groundwater contamination. Vehicle wash bays should be constructed with a similar collection system and a drain interconnecting with the city sewer system or the catch basin.

Operating Procedure No. 22 recommends the construction of a brine treatment facility or a retention/control device (e.g., buried storage tank) to retain washwater (and other salt-contaminated water) on site. It is recommended that INDOT Building and Grounds prepare a standard design for an aboveground brine storage tank with an in-tank heater.

More oversight by INDOT administrators needs to be applied to enforcing Operating Procedure No. 22.

A. operations involving salt, especially the mixing/loading operations on the surface adjacent to the salt dome/shed; the containment or control of

stormwater and melt-water contaminated with salt, and the washwater from washing salt beds and salt trucks on the surface at some INDOT facilities;

Conclusions: it is an irony of our culture, with its panoply of environmental laws and regulations, that, at least today, local and state transportation departments are allowed to apply road salt for the safety of the motoring public, but are not allowed to store it, mix it, load it, or wash out the vehicles spreading it without incurring severe penalties if the run-off from these activities are determined to "threaten the waters of the United States." In the opinion of the Principal Investigator, the direction of environmental regulation probably will ban the use of road salt in the very near future and, in fact, some states have moved and others are moving toward that "goal" for highways in or near environmentally sensitive areas. INDOT's adoption of the Ice Ban technology on the Tollroad and in other districts is certainly a recognition of the inevitable restrictions on the traditional highway salting operation.

Too many facility managers accept stormwater, meltwater and washwater run-off as an inevitable consequence of operations involving salt, most probably hinging their acceptance on the "cultural irony" described above. Over the years, successive managers have allowed and directed the construction of ditches and the laying of pipe and tile across and under the active surface to facilitate the removal of stormwater off-site. And recognizing the, sometimes, real problems associated with stormwater collecting near the salt dome or in the salt/sand mixing area, the drainage "system" may include ditches, grates, enhanced naturally eroded areas and gullies and pipes or tiles to conduct the salt-contaminated stormwater off-site, as well.

Operating Procedure No. 22 states very well the "problems" associated with "incidents involving salt pollution." Operations involving road salt are responsible for, or

have significantly contributed to, drinking water or groundwater contamination in at least one National Priority List (Superfund) site [Old Gary Subdistrict], one site near a community's drinking water wellfield [Old Valparaiso Subdistrict], one other, now closed, facility site [Old Rushville Unit], and some residential wells adjacent to other INDOT facilities [including Indianapolis Subdistrict and the Westfield Unit]. And there are, probably, other sites - perhaps some described in this report - where the potential exists or the contamination hasn't yet been discovered.

Recommendation: this operational area and the next (B. control of stormwater) are inextricably linked and, together, pose the greatest environmental problem for the department. The issue of stormwater management - especially stormwater contaminated with salt - is a significant problem, now, and has the potential to become a greater regulatory concern in the future, for three reasons -

- Indiana will soon formalize the adoption of drinking water standards (Maximum Contaminant Levels - MCLs) as the groundwater quality standards;
- Indiana will soon establish water quality standards for all surface water in the state equivalent to those currently existing for bodies in the Great Lakes Basin;
- The EPA Stormwater Phase II regulations, promulgated in August 2000, define state transportation agencies as operators of "municipal separate storm sewer systems" (MS4) and, as such, INDOT is responsible for "controlling stormwater discharges within its right-of-ways and jurisdiction." Therefore, transportation facilities that

discharge to a state ROW ditch or drainage system will need to implement stormwater control measures.

The department should, if it hasn't already, prioritize approaches to resolving the salt-contaminated stormwater issues as soon as possible. The prevention of salt-contaminated stormwater begins with the storage, mixing and loading of salt under cover so that the stormwater does not contact the salt. Inadequate storage facilities should be replaced and appurtenances, such as roofs, should be added to other, adequate storage facilities to prevent salt and stormwater mixing and migration. This and other preventive measures will require the allocation of funds, across all districts, to design and install stormwater controls at many facilities. And, the department needs to revise Operating Procedure No. 22 to conform to current federal and state regulations and to require appropriate environmental protection practices; for example:

- Operating Procedure No. 2 contains a provision absent in No. 22; e.g., the "suggestion" that "a windrow of abrasives [sand] be placed around all outside stockpiles [salt, salt/sand mix piles]. Few such stockpiles observed during the recent survey were bermed; in fact, at one facility, a member of the investigative team suggested this measure and it was accomplished immediately. Windrows of sand are minimally effective as a deterrent to stormwater/meltwater runoff, especially from a sloped surface. On level surfaces it can allow pooling that would otherwise sheet flow around stockpiles causing migration of salt-contaminated stormwater off-site.

- Operating Procedure No. 22 (pp. 3, 4 of 13) recommends that the exterior pad (to the salt storage building) "be sloped away from the building to its outer limits and the water retained by means of a curb or slope reversal of the pad itself in order that the runoff may be directed into a collection system. It is important to note at this juncture

that collection facilities are a last resort and that 'time, effort, and money, in most cases, can be better spent on avoiding or minimizing the formation of salt brine.' However, it is our plan that all brine runoff is retained in some form of impervious storage and/or evaporation facility and, from that point, safely released into the environment."

First, the design of the exterior pad (where the mixing/loading operations are performed) should be mandated, not recommended, as it is the lack of exterior pad curbing that creates over half of the salt contaminated stormwater problems observed in the recent survey. The curbing should only be used to allow pooling or to direct stormwater to a collection system. It should not be employed to direct stormwater off-site, as a point source discharge.

Second, collection facilities (holding tanks, retention ponds) should be required at all facilities handling salt as a "first resort," rather than last, because the "time, effort, and money spent on avoiding or minimizing the formation of salt brine" has not proved effective at solving the salt runoff problem.

Third, for the regulatory reasons cited previously, there is no longer any way to "safely release" stormwater contaminated with salt into the environment.

The Draft Final Report of HPR-2040 (the "previous, 1990-1992, study" referred to in this report), on page 11, quotes a statement made in Operating Procedure No. 22 on p. 4 (p. 5 of the 1998 version) establishing a "target" of "1000 ppm for salt water (brine solution, in free form) being released from IDOH properties into the environment." It is disappointing to discover that the only change to this critical Operating Procedure policy in ten years is the acronym of the agency -- from IDOH to INDOT.

The statement following that quoted above (in both versions) allows "heavier concentrations [to] be emitted only into sanitary sewer lines or flowing streams when the

dilution level prior to leaving IDOH (INDOT) property would exceed 1000 ppm. As stated in the earlier study's report, the Indiana Water Quality Standards* establishes a limit of 860 ppm **NOT** 1000 ppm for chloride concentration in point-source effluent, even to flowing streams. Further, outside the mixing zone of the flowing stream, the average four-day chloride concentration cannot exceed 230 ppm. The statement encouraging "piping runoff into streams" that occupy state rights of way and others "near enough to be economically practical and large enough to be environmentally acceptable," should be deleted from the Operating Procedure -- intentionally discharging any contaminant to the waters of the state without a permit is a federal and state regulatory violation.

B. the control of stormwater, generally, that migrates from INDOT facilities to adjacent properties and/or to the waters of the state;

Conclusion: Like older manufacturing facilities, some INDOT facilities were intentionally located near a ditch, creek or river to facilitate the drainage of stormwater and contaminants from the active surface of the facility. Others, located on property previously the location of landfills, truck stops and other similar enterprises, were already "landscaped" to ensure stormwater migration from the facility. And there are not a few facilities that receive stormwater from neighboring properties (residential, manufacturing and agricultural) which, then, mixes with the facility stormwater as it migrates via the myriad ditches, tiles, pipes and gullies across the facility property and off the property to a ditch and, thence, to the "waters of the state."

The regulation of stormwater migration from private and public property is a topic of considerable discussion. Rainfall and snow melt that migrates as stormwater from a

*Table 1: Water Quality Criteria for Specific Substances, p. 8 (IAC 327 2-1-6)

field and flows to a nearby waterway is unregulated, unless synthetic or natural fertilizer and herbicide has been applied as part of an agricultural operation. Likewise, rainfall and snow melt that migrates from the active surface of an INDOT facility as stormwater is also unregulated, unless (1) the stormwater contains, or has the potential to contain, contaminants and/or (2) it flows to a side ditch or highway drain subject to the Phase II regulations previously cited. Segregating uncontaminated from contaminated stormwater at an INDOT facility is an admirable, but probably an impossible objective to achieve, primarily because of the numerous operations performed on the active surface that contribute or have the potential for contributing contaminants.

The maze of ditches, tiles, pipes, catch basins, drains, culverts and headwalls that are found beneath, on or adjacent to the active surface is testimony to the time, money and effort devoted by INDOT to removing stormwater from its premises. Now is the time for viewing the stormwater problem and the solutions through a different -- and, perhaps, more regulatory-focused -- lens.

Recommendation: (refer, first, to the Recommendation section of A., preceding, regarding the three future regulatory "concerns").

Obviously, the department cannot create itself anew, abandon all older facilities and build new ones that pose no threat to surface or groundwater. There are, however, facilities in the INDOT system that acknowledged the stormwater problem and have designed and installed controls to remedy or, at least, partially remedy the problem. The Principal Investigator of the subject project will be surveying the Best Management Practices (BMPs) to control stormwater implemented by various INDOT facilities (pursuant to JTRP Project C-36-68L, SPR-2458); however, the department could accelerate the transfer of information among districts by, among other avenues,

convening a meeting of District Environmental Coordinators and all facility managers to focus, now, on measures to begin addressing the stormwater problem.

Stormwater contamination problems at some facilities are exacerbated by the use of the facility as a storage area for wastes that could be as easily disposed of in a landfill. For example, one facility dumps street sweepings from an Interstate highway on its "back lot;" the Interstate has the second highest truck transport volume in the nation. The contaminant loading from this maintenance activity is probably considerable, even though samples of sweepings from another area of the state tested non-hazardous. Street sweepings should be disposed of in a Subtitle D landfill.

Operating Procedure No. 13 refers to Operating Procedures Nos. 16 and 21 for instructions for "disposal of soil, aggregate, asphalt paving material or broken concrete, removed as part of routine maintenance activities." [The investigator could find no reference to ultimate disposal in either procedure; they refer to using Form M-46 for Right of Entry onto private property for disposal of material and other activities (Right of Entry Agreement) and using material removed in ditching to "flatten slopes" (Cleaning and Reshaping Ditches)].

The "storage" of soil, "scalp," aggregate, and other debris from highway, ROW, and ditch maintenance activities at INDOT facilities is, undoubtedly, not considered disposal. These are considered salvageable materials and, as such, are expected to be used in future maintenance activities to reduce costs. But while such materials are stored at the facility, they leach contaminants into the stormwater.

An Operating Procedure addressing the storage and disposal of salvageable materials should be drafted. The procedure could differentiate between materials to be disposed of and stored based on the quality and characteristics of the materials. [Note:

some road maintenance piles observed contained broken glass and other trash that appeared to be "original" to the pile; in other words, not "added" at the facility]. Also, guidelines could be established that would require the removal and disposal of a material, if not used within a certain period of time. [Note: some material piles observed in the first, 1990-1992, study were observed, again, in the recent study].

Finally, this proposed Operating Procedure should establish very strict standards for the storage of materials, such as (1) on impervious pads or in areas where no threat to groundwater can exist; (2) surrounded by an impervious berm or curb that will contain stormwater, yet allow vehicle access, and (3) connected by pipe or tile to a stormwater collection structure (tank or holding pond) to facilitate the flow of stormwater from the curbed containment area (if evaporation does not adequately reduce the stormwater volume).

APPENDIX B

"ArcView Training Tutorial" CD-ROM is available upon request to the Joint Transportation Research Program jtrp@ecn.purdue.edu. The "Indiana Department of Transportation GIS Directory" CD-ROM is available only upon request to Janice Osadczuk, Division Chief, INDOT Environment, Planning, and Engineering Division, 100 North Senate Avenue, Indianapolis, IN 46204

APPENDIX C

IC 13-25-3

Chapter 3. Responsible Property Transfer Law

IC 13-25-3-1

Sec. 1. (a) In response to an inquiry from a person in connection with this chapter, the department shall provide information that is in the department's possession concerning whether a property meets any of the descriptions set forth in IC 13-11-2-174.

(b) Neither:

(1) the state;

(2) the department; nor

(3) an employee of the department who answers an inquiry under this section;

is liable in a civil action on the grounds that information provided under this section was incomplete or erroneous.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-2

Sec. 2. (a) Except as provided in subsections (b) and (c), a transferor of property shall deliver a disclosure document to each of the other parties to a transfer of property at least thirty (30) days before the transfer. The disclosure document must be in the form set forth in section 7 of this chapter and must include the information elicited by that form. However, the signature of the transferee is not required on the disclosure document delivered to a party involved in the transfer of property as a lender.

(b) If all of the other parties to a transfer of property waive the thirty (30) day deadline set forth in subsection (a) in written waivers that indicate that the parties are aware of the purpose and intent of the disclosure document, the transferor is not required to deliver the disclosure document to the other parties thirty (30) days before the transfer of the property. However, the transferor shall deliver a disclosure document that meets the requirements set forth in subsection (a) to each of the other parties to the transfer of property on or before the date on which the transfer of property is to become final.

(c) If a party involved in a transfer of property as a lender is not identified to the transferor at least thirty (30) days before the transfer, the thirty (30) day deadline set forth in subsection (a) does not apply to the delivery of a disclosure document by the transferor to that lender. However, if a lender is identified to a transferor less than thirty (30) days before the transfer, the transferor shall deliver a disclosure document to the lender immediately after the lender is identified to the transferor.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-3

Sec. 3. If the disclosure document delivered by the transferor to another party to the transfer of property under section 2 of this chapter reveals one (1) or more environmental defects in the property that were previously unknown to the other party, the other party is relieved of an obligation to:

(1) accept the transfer of the property; or

(2) finance the transfer of the property.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-4

Sec. 4. (a) If a transferor:

(1) fails to deliver a disclosure document meeting the requirements set forth in section 2 of this chapter to one (1) or more other parties to the transfer of property before the deadline set forth in section 2(a) of this chapter; and

(2) does not obtain a waiver under section 2(b) of this chapter;

a party that did not receive a disclosure document may demand a disclosure document from the transferor.

(b) A party who demands a disclosure document under this section may void an obligation to accept the transfer of the property or to finance the transfer of the property if:

(1) the party does not receive a disclosure document not later than ten (10) days after demanding a disclosure document; or

(2) the party receives a disclosure document not later than ten (10) days after demanding the disclosure document but the disclosure document reveals one (1) or more environmental defects in the property that were previously unknown to the party.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-5

Sec. 5. (a) If a transferor:

(1) obtains a waiver under section 2(b) of this chapter; but

(2) fails to deliver a disclosure document meeting the requirements set forth in section 2 of this chapter to one (1) or more of the other parties to the transfer of property before the date on which the transfer is scheduled to become final;

a party that did not receive a disclosure document may demand a disclosure document from the transferor.

(b) Subject to section 6 of this chapter, a party who demands a disclosure document under this section may void an obligation to accept the transfer of the property or to finance the transfer of the property if:

(1) the party does not receive a disclosure document not later than ten (10) days after demanding a disclosure document; or

(2) the party receives a disclosure document not later than ten (10) days after demanding the disclosure document but the disclosure document reveals one (1) or more environmental defects in the property that were previously unknown to the party.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-6

Sec. 6. A party to a transfer of property may not void an obligation to:

(1) accept the transfer of the property; or

(2) finance the transfer of property under sections 3 through 5 of this chapter; after the transfer of property has taken place.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-7

Sec. 7. A disclosure document delivered by a transferor of property under this chapter must follow this form:

A WARNING TO THE PARTIES TO A TRANSFER OF PROPERTY: It is highly unlikely that the single act of reading this document would be found to constitute "all appropriate inquiry into the previous ownership and uses of the property" so as to protect you against liability under the "innocent purchaser" provision of the federal Comprehensive Environmental Response, Compensation and Liability Act (42 U.S.C. 9601(35)(B)). You are strongly encouraged not only

to read this document carefully but also to take all other actions necessary to the exercise of due diligence in your inquiry into the previous ownership and uses of the property.

ENVIRONMENTAL DISCLOSURE DOCUMENT FOR

TRANSFER OF REAL PROPERTY

For Use By County Recorder's Office
County
The following information is Date
provided under IC 13-25-3, Doc. No.
the Responsible Property Transfer Law. Vol.
Page
Rec'd by:

I. PROPERTY IDENTIFICATION

A. Address of property: _____

Street_____

City or Town _____ Township _____
Tax Parcel Identification No. (Key Number): _____

B. Legal Description:
Section ___ Township ____ Range ____
Enter or attach complete legal description in this area:

_____

LIABILITY DISCLOSURE

Transferors and transferees of real property are advised that their ownership or other control of such property may render them liable for environmental cleanup costs whether or not they caused or contributed to the presence of environmental problems in association with the property.

C. Property Characteristics:
Lot Size _____ Acreage _____
Check all types of improvement and uses that pertain to the property:
____ Apartment building (6 units or less)
____ Commercial apartment (over 6 units)
____ Store, office, commercial building
____ Industrial building
____ Farm, with buildings
____ Other (specify)

II. NATURE OF TRANSFER

	Yes	No
A. (1) Is this a transfer by deed or other instrument of conveyance of fee title to property?	___	___
(2) Is this a transfer by assignment		

of over 25% of beneficial interest of a land trust? ___ ___

(3) A lease exceeding a term of 40 years? ___ ___

(4) A collateral assignment of beneficial interest? ___ ___

(5) An installment contract for the sale of property? ___ ___

(6) A mortgage or trust deed? ___ ___

(7) A lease of any duration that includes an option to purchase? ___ ___

B. (1) Identify Transferor:

_____

Name and Current Address of Transferor

_____

Trust No. _____

Name and Address of Trustee if this is a transfer of beneficial interest of a land trust.

_____

(2) Identify person who has completed this form on behalf of the Transferor and who has knowledge of the information contained in this form:

_____

Name, Position (if any),
Telephone No.
and Address

C. Identify Transferee:

_____

Name and Current Address of Transferee:

_____

III. ENVIRONMENTAL INFORMATION

A. Regulatory Information During Current Ownership

1. Has the transferor ever conducted operations on the property which involved the generation, manufacture, processing, transportation, treatment, storage, or handling of a "hazardous substance" (as defined by IC 13-11-2-98)? This question does not apply to consumer goods stored or handled by a retailer in the same form and approximate amount, concentration, and manner as they are sold to consumers, unless the retailer has engaged in any commercial mixing (other than paint mixing or tinting of consumer sized containers), finishing, refinishing, servicing, or cleaning operations on the property.

Yes ___
No ___

2. Has the transferor ever conducted operations on the property which involved the processing, storage, or handling of petroleum, other than that which was associated directly with the transferor's vehicle usage?
Yes ___
No ___

3. Has the transferor ever conducted operations on the property which involved the generation, transportation, storage, treatment, or disposal of "hazardous waste" (as defined in IC 13-11-2-99(a))?
Yes ___
No ___

4. Are there any of the following specific units (operating or closed) at the property that are used or were used by the transferor to manage hazardous wastes, hazardous substances, or petroleum?

	YES	NO
Landfill	___	___
Surface Impoundment	___	___
Land Application	___	___
Waste Pile	___	___
Incinerator	___	___
Storage Tank (Above Ground)	___	___
Storage Tank (Underground)	___	___
Container Storage Area	___	___
Injection Wells	___	___
Wastewater Treatment Units	___	___
Septic Tanks	___	___
Transfer Stations	___	___
Waste Recycling Operations	___	___
Waste Treatment Detoxification	___	___
Other Land Disposal Area	___	___

If there are "YES" answers to any of the above items and the transfer of property that requires the filing of this document is other than a mortgage or trust deed or a collateral assignment of beneficial interest in a land trust, you must attach to the copies of this document that you file with the county recorder and the department of environmental management a site plan that identifies the location of each unit.

5. Has the transferor ever held any of the following in regard to this real property?

(A) Permits for discharges of wastewater to waters of Indiana.
Yes __
No __

(B) Permits for emissions to the atmosphere
Yes __
No __

(C) Permits for any waste storage, waste treatment, or waste disposal operation

Yes __
No __

6. Has the transferor ever discharged any wastewater (other than sewage) to a publicly owned treatment works?
Yes __
No __

7. Has the transferor been required to take any of the following actions relative to this property?
Yes __
No __

(A) Filed an emergency and hazardous chemical inventory form pursuant to the federal Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11022).
Yes __
No __

(B) Filed a toxic chemical release form pursuant to the federal Emergency Planning and Community Right-to-Know Act of 1986 (42 U.S.C. 11023).
Yes__
No __

8. Has the transferor or any facility on the property or the property been the subject of any of the following state or federal governmental actions?
(A) Written notification regarding known, suspected, or alleged contamination on or emanating from the property.
Yes __
No __

(B) Filing an environmental enforcement case with a court or the solid waste management board for which a final order or consent decree was entered.
Yes __
No __

(C) If the answer to question (B) was Yes, then indicate whether or not the final order or decree is still in effect for this property.
Yes __
No __

9. Environmental Releases During Transferor's Ownership.
(A) Has any situation occurred at this site which resulted in a reportable "release" of any hazardous substances or petroleum as required under state or federal laws?
Yes__
No __

(B) Have any hazardous substances or petroleum which were released come into direct contact with the ground at this site?
Yes __
No __

If the answer to question (A) or (B) is Yes, have any of the following actions or events been associated with a release on the property?

____Use of a cleanup contractor to remove or treat materials including soils, pavement, or other surficial materials?

____Assignment of in-house maintenance staff to remove or treat materials including soils, pavement, or other surficial materials?

____Sampling and analysis of soils?

____Temporary or more long term monitoring of groundwater at or near the site?

____Impaired usage of an onsite or nearby water well because of offensive characteristics of the water?

____Coping with fumes from subsurface storm drains or inside basements?

____Signs of substances leaching out of the ground along the base of slopes or at other low points on or immediately adjacent to the site?

(C) Is there an environmental defect (as defined in IC 13-11-2-70) on the property that is not reported under question (A) or (B)?

Yes __
No __

If the answer is Yes, describe the environmental defect:

_____

_____

_____

_____

_____

10. Is the facility currently operating under a variance granted by the commissioner of the Indiana department of environmental management?

Yes __
No __

11. Has the transferor ever conducted an activity on the site without obtaining a permit from the U.S. Environmental Protection Agency, the commissioner of the department of environmental management, or another administrative agency or authority with responsibility for the protection of the environment, when such a permit was required by law?

Yes __
No __

If the answer is Yes, describe the activity:

_____

_____

_____

_____

_____

12. Is there any explanation needed for clarification of any of the above answers or responses?

_____

_____

_____

_____

B. Site Information Under Other Ownership Or Operation

1. Provide the following information about the previous owner or about any entity or person to whom the transferor leased the property or with whom the transferor contracted for the management of the property:

Name:

_____

Type of business

_____

or property usage

_____

2. If the transferor has knowledge, indicate whether the following existed under prior ownerships, leaseholds granted by the transferor, or other contracts for management or use of the property:

	YES	NO
Landfill	___	___
Surface Impoundment	___	___
Land Application	___	___
Waste Pile	___	___
Incinerator	___	___
Storage Tank (Above Ground)	___	___
Storage Tank (Underground)	___	___
Container Storage Area	___	___
Injection Wells	___	___
Wastewater Treatment Units	___	___
Septic Tanks	___	___
Transfer Stations	___	___
Waste Recycling Operations	___	___
Waste Treatment Detoxification	___	___
Other Land Disposal Area	___	___

IV. CERTIFICATION

A. Based on my inquiry of those persons directly responsible for gathering the

information, I certify that the information submitted is, to the best of my knowledge and belief, true and accurate.

_____

TRANSFEROR (or on behalf of Transferor)

B. This form was delivered to me with all elements completed on _____ 19 ___

_____.

TRANSFEREE (or on behalf of Transferee)

As added by P.L.1-1996, SEC.15.

IC 13-25-3-8

Sec. 8. (a) Not more than thirty (30) days after the effective date of a transfer of property that requires the preparation of a disclosure document under this chapter:

(1) the transferor or transferee shall record the disclosure document in the office of the county recorder of the county in which the property is located; and

(2) the transferor shall file a copy of the disclosure document with the department.

(b) If a site plan must be attached to the disclosure document under section 7 of this chapter, the site plan shall be recorded and filed under subsection (a) along with the disclosure document to which the site plan must be attached.

(c) The transferor and transferee are jointly responsible for recording a disclosure document in the county recorder's office under this section. However, the recording of a disclosure document by one (1) person referred to in this subsection discharges the responsibility of the other person.

(d) A disclosure document recorded in the county recorder's office or filed with the department:

(1) is a public record under IC 5-14-3; and

(2) must be available for inspection and copying during normal business hours.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-9

Sec. 9. (a) If a disclosure document recorded under section 8(a)(1) of this chapter reports the existence of an environmental defect on a property, a person who has a financial interest in the property may record, in the same county recorder's office in which the disclosure document is recorded, a document that reports that the environmental defect has been eliminated from the property.

(b) A professional engineer registered under IC 25-31-1 who does not have a financial interest in the property must certify a document filed under this section.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-10

Sec. 10. A transferor who fails to deliver a disclosure document to a party in violation of section 2 of this chapter commits a Class B infraction.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-11

Sec. 11. A transferor who knowingly makes a false statement in a disclosure document delivered under this chapter commits a Class A infraction. Each day that the transferor knows of the falsity of the statement made in the disclosure document but fails to correct that statement through the filing, recording, and delivery of a corrected disclosure statement constitutes a separate infraction.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-12

Sec. 12. (a) Except as provided in subsection (b), a person who:

(1) is responsible for filing a disclosure document in the office of the county recorder under section 8(a)(1) and 8(c) of this chapter; and

(2) fails to record the disclosure document;

commits a Class A infraction.

(b) The failure of a transferee to record a disclosure document within the period allowed under section 8(a) of this chapter is not an infraction under this section if the disclosure document:

(1) was not delivered to the transferee within the time allowed under section 2 of this chapter; or

(2) contains one (1) or more false statements about substantive matters.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-13

Sec. 13. (a) The duties imposed by this chapter are subject to the exceptions set forth in this section.

(b) A buyer of property who finances the purchase of the property through a mortgage loan is not required under section 2, 4, or 5 of this chapter to deliver a disclosure document to the mortgagee that provides the mortgage loan.

(c) A person who lends money and takes a mortgage on property to secure the loan is not required under section 8 of this chapter to:

(1) record a disclosure document concerning the property in the office of the county recorder of the county in which the property is located; or

(2) file a copy of the disclosure document with the department.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-14

Sec. 14. In an action based on an alleged commission of an infraction defined in sections 10 through 12 of this chapter, the prosecuting attorney may obtain an order requiring the defendant to comply with this chapter.

As added by P.L.1-1996, SEC.15.

IC 13-25-3-15

IC 13-25-3-15 Sec. 15. A party to a transfer of property may bring a civil action against another party to the transfer of property to recover consequential damages based upon a violation of this chapter. In an action brought under this section, a party may recover reasonable costs and attorney's fees.

As added by P.L.1-1996, SEC.15.

APPENDIX D

INDOT PRIORITY NO. 1
Rivers and Streams

River	Significance	County	GIS Database	Segment
Bear Creek	EUW	Fountain	EUS (IDEM)	C.R. 250W to confluence with the Wabash
Bear Creek Tributary	EUW	Fountain	EUS (IDEM)	Within Portland Arch Nature Preserve
Big Pine Creek	EUW	Warren	EUS (IDEM)	S.R. 18 to confluence with Wabash River
Big Walnut Creek	7	Putnam	N & S (IDNR)	Hendricks/Putnam Co. Line to S.R. 36
Blue River	HQW	Crawford, Harrison, Washington	N & S (IDNR)	U.S. 150 in Fredericksburg to S.F. 462
Blue River	EUW	Washington	EUS (IDEM)	Confluence of West & Middle Forks of Ohio River
Blue, South Fork	EUW	Washington	EUS (IDEM)	S.R. 135 to confluence with Blue River
Cedar Creek	HQW	Allen, DeKalb	N & S (IDNR)	DeKalb C.R. 68 to St. Joseph River
Clifty Creek	EUW	Montgomery	EUS (IDEM)	Headwaters to confluence with Indian Creek
Elkhart River, South Branch	7	Noble	N & S (IDNR)	C.R. 100N to U.S. 6
Fall Creek	EUW	Warren	EUS (IDEM)	U.S. 41 to confluence with Big Pine Creek
Indian Creek	EUW	Montgomery	EUS (IDEM)	C.R. 475W to confluence with Sugar Creek
Lost River	EUW	Martin, Orange	EUS (IDEM)	Potato Road to confluence with East Fork White River
Mud Pine Creek	EUW	Warren	EUS (IDEM)	S.R. 352 to confluence with Big Pine Creek

River	Significance	County	GIS Database	**Priority No. 1** Segment
Rattlesnake Creek	EUW	Fountain	EUS (IDEM)	C.R. 350W to confluence with Bear Creek
Sand Creek	17	Bartholomew, Decatur, Jackson, Jennings	N & S (IDNR)	Westport Covered Bridge to Brewersville Road
Sugar Creek	7	Montgomery, Parke	N & S (IDNR)	Darlington Covered Bridge to confluence with Wabash River
Tippecanoe River	See Notes	Kosciusko Marshall	N & S (IDNR)	Kosciusko Co. C.R. 700W to Marshall Co. Moores Ditch
Whitewater River	7	Dearborn, Fayette, Franklin	N & S (IDNR)	Laurel Feeder Dam to New Trenton Bridge
Wildcat Creek	HQW	Carroll, Tippecanoe	N & S (IDNR)	S.R. 29 to confluence with Wabash River
Wildcat Creek, South Fork	HQW	Clinton, Tippecanoe	N & S (IDNR)	S.R. 38 to confluence with Wildcat Creek,

Indiana portion of the open waters of Lake Michigan (HQW)

All waters incorporated in the Indiana Dunes National Lakeshore (HQW)

Rev. 5/7/02

Notes: "EUW" means "Exceptional Use Waters" (pursuant to 327 IAC 2-1-11(b). "HQW: means "High Quality Waters" (also referred to as "Outstanding State Resource Waters," pursuant to 327 IAC 2-1-2(3) and 327 IAC 2-1.5-19(b). As to numerical codes: 7 means "outstanding rivers from state inventories or assessments; i.e., rivers identified as having statewide or greater significance;" 17 means "miscellaneous rivers identified as having outstanding ecological, recreational or scenic importance. "EUS (IDEM)" means IDEM's Exceptional Use Streams database. "N & S (IDNR)" means DNR's Natural and Scenic Rivers database. The five segments coded 7 or 17 are included in the Priority No. 1 list because other segments on this list coded "EUW" and "HQW" are also coded 7 or 17 in the "Outstanding Rivers List for Indiana." The Tippecanoe River Segment is included in the state's Natural and Scenic Rivers inventory and is designated by the National Park Service as qualified for inclusion in the National Wild and Scenic Rivers System.
Source: "Outstanding Rivers List for Indiana," Indiana Natural Resources Commission, Indiana Register, March 1, 1993 and elsewhere, subsequently.

INDOT PRIORITY NO. 2
Rivers and Streams

River	Significance	County	GIS Database	Segment
Big Creek	17	Jefferson		East side of Jefferson Military Reservation boundary to Graham Creek
Deep River	17	Lake, Porter		1 mile south of U.S. 30 to Little Calumet River
Graham Creek	17	Jefferson, Jennings, Ripley		New Marion to confluence with Big Creek
Indian-Kentuck Creek	17	Jefferson, Ripley		Confluence with Vestal Branch to confluence with Ohio River
Kilmore Creek	17	Clinton		U.S. 421 to confluence with South Fork Wildcat Creek
Little Creek	17	Jefferson		Kent to Big Creek
Mississinewa	17	Miami		Mississinewa Reservoir to confluence with Wabash River
Otter Creek	17	Jennings, Ripley		Covered Bridge North of Holton to confluence with Vernon Fork Muscatatuck
Patoka River	17	Dubois, Gibson, Pike		Patoka Reservoir to confluence with Wabash River
Sugar Mill Creek	17	Fountain, Parke		Wallace to confluence with Sugar Creek
Wildcat Creek, Middle Fork	17	Clinton, Tippecanoe		S.R. 26 (Edna Mills) to confluence with Wildcat Creek, South Fork

Notes: Numerical code 17 means "miscellaneous rivers identified as having outstanding ecological, recreational or scenic importance."
Source: "Outstanding Rivers List for Indiana," Indiana Natural Resources Commission, Indiana Register, March 1, 1993 and elsewhere, subsequently. Rev. 5/702

INDOT PRIORITY NO. 3
Rivers and Streams

River	Significance	County	GIS Database	Segment
Big Blue	11	Johnson, Rush, Shelby		Flatrock River to Carthage
Black River	11	Posey		Confluence with Higginbotham Ditch to confluence with Wabash River
Buck Creek	11	Harrison		Headwaters to confluence with Ohio River
Cypress Slough Creek	11	Posey		Confluence with Castleberry Creek to Southwind Maritime Center
Driftwood	11	Bartholomew		Atterbury Fish and Wildlife Area to Columbus
Fawn	11	Lagrange, Steuben		Nevada Mills to Indiana/Michigan Line and Indiana/Michigan to Indiana/Michigan line
Fish Creek	11	Dekalb, Steuben		Ohio/Indiana line to Indiana/Ohio Line
Fourteen-Mile Creek	11	Clark		Confluence of East and West Forks to confluence with Ohio River
Indian Creek	11	Harrison		Floyd/Harrison Co. Line to confluence with Ohio River

River	Significance	County	GIS Database	Segment
Kankakee	11	LaPorte, Newton, Porter		Upstream boundary of Kingsbury Fish and Wildlife Area through LaSalle State Fish and Wildlife Area to Indiana/Illinois line
Laughery Creek	11	Dearborn, Ohio, Ripley		Source just east of Morris in Ripley Co. to confluence with Ohio River
Little Blue	11	Crawford		Town of English to confluence with Ohio
Little Indian Creek	11	Harrison		Pfrimmer Church to confluence with Indian Creek
Little Mosquito	11	Harrison		Headwaters to confluence with Mosquito Creek
Little Pine Creek	11	Warren		Bridge SW of Green Hill to confluence with Wabash River
Mosquito Creek	11	Harrison		Buena Vista to confluence with East Fork White River
Muscatatuck, Vernon Fork	11	Jackson, Jennings		Zenas to confluence with Muscatatuck Fork
Oil Creek	11	Perry		St. Croix to confluence with Ohio River
Pigeon	11	LaGrange		S.R. 327 to Indiana/ Michigan Line
Rattlesnake Creek	11	Parke		C.R. 400/450S to confluence with Sugar Creek

Priority No. 3

River	Significance	County	GIS Database	Segment
Roaring Creek	11	Parke		1 mile upstream of S.R. 41 to confluence with Sugar Creek
Stinking Fork	11	Crawford		Headwaters to confluence with Little Blue River
Sugar Creek	11	Johnson, Shelby		Inclusive within Johnson and Shelby Counties
Turkey Fork	11	Crawford		I-64 to confluence with Little Blue River
White River, East Fork	11	Bartholomew, Daviess, Dubois, Jackson, Lawrence, Martin, Pike		Columbus to confluence with West Fork
White River, West Fork	11	Daviess, Delaware, Gibson, Knox, Greene, Hamilton, Madison, Marion, Morgan, Owen, Randolph		Farmland to confluence with Wabash River

Rev. 5/7/02

Notes: Numerical code 11 means "rivers identified by state natural heritage programs or similar state programs as having outstanding ecological importance."
Source: "Outstanding Rivers List for Indiana," Indiana Natural Resources Commission, Indiana Register, March 1, 1993 and elsewhere, subsequently.

APPENDIX E

IDENTIFICATION OF "SENSITIVE WATERS" AND STATE HIGHWAY SEGMENTS WITHIN 1 MILE (PRIORITY 1)

Total Mileage: **282.2859**

LENGTH	HWYNAME	FCC	ST	ALT1_NAME	NEAREST_ST	Length (miles)
7122.6976	I 64	A11	18		Blue River(Lower)	4.423
5657.0521	I 65	A11	18		Wildcat Creek, SFK	3.513
4416.5966	I 65	A11	18		Wildcat Creek (Main)	2.743
768.5593	I 65	A11	18		Wildcat Creek, SFK	0.477
356.5042	I 69	A11	18	US HWY 27	Cedar Creek	0.221
222.7020	I 69	A11	18	US HWY 27	Cedar Creek	0.138
3590.9357	I 69	A11	18	US HWY 27	Cedar Creek	2.230
3000.2000	I 69	A11	18	US HWY 27	Cedar Creek	1.863
981.4954	I 74	A11	18		Sugar Creek (Upper)	0.610
1848.7591	I 74	A11	18		Sugar Creek (Upper)	1.148
1445.0531	I 74	A11	18		Sugar Creek (Upper)	0.897
2061.0292	I 90	A11	18		Lake Michigan	1.280
1574.1473	I 94	A11	18		Lake Michigan	0.978
9182.9110	I 94	A11	18		Lake Michigan	5.703
4172.5430	STATE HWY 912	A11	18		Lake Michigan	2.591
157.9400	I 65	A13	18		Wildcat Creek, SFK	0.098
165.7013	I 69	A13	18	US HWY 27	Cedar Creek	0.103
126.9838	I 69	A13	18	US HWY 27	Cedar Creek	0.079
122.7324	I 74	A13	18		Sugar Creek (Upper)	0.076
150.8582	I 74	A13	18		Sugar Creek (Upper)	0.094
13.6626	STATE HWY 37	A20	18		Lost River	0.008
1294.5648	STATE HWY 37	A20	18	STATE HWY 60	Lost River	0.804
3076.4616	STATE HWY 60	A20	18		Lost River	1.910
204.5029	STATE HWY 60	A20	18		Lost River	0.127
2120.7982	STATE HWY 60	A20	18		Lost River	1.317
4679.4267	STATE HWY 60	A20	18	W STATE HWY 60	Lost River	2.906
4594.3999	STATE HWY 60	A20	18	W STATE HWY 60	Lost River	2.853
1174.2313	STATE HWY 63	A20	18		Big Pine Creek	0.729
450.2522	STATE HWY 64	A20	18		Blue River (Upper)	0.280
4580.6272	STATE HWY 64	A20	18	HWY 64 NW	Blue River (Upper)	2.845
1319.6743	STATE HWY 64	A20	18	STATE HWY 66	Blue River (Upper)	0.820
2940.9579	STATE HWY 9	A20	18	N STATE HWY 9	South Branch Elkhart River (Up	1.826
557.9413	US HWY 12	A20	18		Lake Michigan	0.346
551.6276	US HWY 12	A20	18		Lake Michigan	0.343
1129.6214	US HWY 12	A20	18		Lake Michigan	0.701
1492.6110	US HWY 12	A20	18		Lake Michigan	0.927
2062.2622	US HWY 12	A20	18		Lake Michigan	1.281

292.9895	US HWY 12	A20	18		Lake Michigan	0.182
296.0118	US HWY 12	A20	18		Lake Michigan	0.184
4519.8048	US HWY 12	A20	18		Lake Michigan	2.807
3416.1333	US HWY 12	A20	18		Lake Michigan	2.121
212.5489	US HWY 12	A20	18		Lake Michigan	0.132
913.6651	US HWY 12	A20	18	COUNTY LINE RD	Lake Michigan	0.567
7623.7286	US HWY 12	A20	18	DUNES HWY	Lake Michigan	4.734
1045.7916	US HWY 12	A20	18	DUNES HWY	Lake Michigan	0.649
266.2316	US HWY 12	A20	18	DUNES HWY	Lake Michigan	0.165
167.3756	US HWY 12	A20	18	DUNES HWY	Lake Michigan	0.104
229.1855	US HWY 12	A20	18	DUNES HWY	Lake Michigan	0.142
941.0073	US HWY 12	A20	18	DUNES HWY	Lake Michigan	0.584
1392.6941	US HWY 12	A20	18	E 2ND ST	Lake Michigan	0.865
1273.4873	US HWY 12	A20	18	E COLUMBUS DR	Lake Michigan	0.791
2495.2659	US HWY 12	A20	18	E DUNES HWY	Lake Michigan	1.550
256.1780	US HWY 12	A20	18	E MICHIGAN BLVD	Lake Michigan	0.159
5156.9480	US HWY 12	A20	18	E US HWY 12	Lake Michigan	3.202
661.5536	US HWY 12	A20	18	E US HWY 12	Lake Michigan	0.411
514.2439	US HWY 12	A20	18	E US HWY 12	Lake Michigan	0.319
1370.6586	US HWY 12	A20	18	INDUSTRIAL HWY	Lake Michigan	0.851
480.6504	US HWY 12	A20	18	N US HWY 12 E	Lake Michigan	0.298
142.0463	US HWY 12	A20	18	SPRING ST	Lake Michigan	0.088
5702.2214	US HWY 12	A20	18	US HWY 20	Lake Michigan	3.541
693.8398	US HWY 12	A20	18	W 4TH ST	Lake Michigan	0.431
498.1784	US HWY 12	A20	18	W DUNES HWY	Lake Michigan	0.309
1074.1955	US HWY 12	A20	18	W DUNES HWY	Lake Michigan	0.667
832.3224	US HWY 12	A20	18	W HWY 12	Lake Michigan	0.517
972.3317	US HWY 12	A20	18	W MICHIGAN BLVD	Lake Michigan	0.604
644.8928	US HWY 12	A20	18	W MICHIGAN ST	Lake Michigan	0.400
1171.5737	US HWY 136	A20	18		Sugar Creek (Upper)	0.728
277.4733	US HWY 136	A20	18	E MAIN ST	Sugar Creek (Upper)	0.172
132.1726	US HWY 136	A20	18	E MARKET ST	Sugar Creek (Upper)	0.082
116.1547	US HWY 136	A20	18	OAK ST	Sugar Creek (Upper)	0.072
1095.5512	US HWY 136	A20	18	STATE HWY 32	Sugar Creek (Upper)	0.680
90.4915	US HWY 136	A20	18	US HWY 136 W	Sugar Creek (Upper)	0.056
1451.4490	US HWY 136	A20	18	W MARKET ST	Sugar Creek (Upper)	0.901
1544.4249	US HWY 136	A20	18	WAYNETOWN RD	Sugar Creek (Upper)	0.959
8948.5404	US HWY 150	A20	18		Lost River	5.557
5330.9862	US HWY 150	A20	18	E US HWY 150	Lost River	3.311
3022.6049	US HWY 150	A20	18	STATE HWY 56	Lost River	1.877

8424.9818	US HWY 150	A20	18	W US HWY 150	Blue River (Upper)	5.232
809.8618	US HWY 20	A20	18		Lake Michigan	0.503
235.0587	US HWY 20	A20	18		Lake Michigan	0.146
440.0403	US HWY 20	A20	18	E US HWY 20	Lake Michigan	0.273
436.4585	US HWY 20	A20	18	E US HWY 20	Lake Michigan	0.271
38.8458	US HWY 20	A20	18	GARY MICHIGAN CITY HWY	Lake Michigan	0.024
191.6148	US HWY 20	A20	18	GARY MICHIGAN CITY HWY	Lake Michigan	0.119
4502.3972	US HWY 20	A20	18	GARY MICHIGAN CITY HWY	Lake Michigan	2.796
2467.6779	US HWY 20	A20	18	GARY MICHIGAN CITY HWY	Lake Michigan	1.532
30.7491	US HWY 20	A20	18	GARY MICHIGAN CITY HWY	Lake Michigan	0.019
5434.1786	US HWY 20	A20	18	MELTON RD	Lake Michigan	3.375
4070.4729	US HWY 20	A20	18	W US HWY 20	Lake Michigan	2.528
1726.6286	US HWY 20	A20	18	W US HWY 20	Lake Michigan	1.072
364.2211	US HWY 20	A20	18	W US HWY 20	Lake Michigan	0.226
606.5811	US HWY 20	A20	18	W US HWY 20	Lake Michigan	0.377
510.0646	US HWY 20	A20	18	W US HWY 20	Lake Michigan	0.317
1081.9377	US HWY 231	A20	18	STATE HWY 32	Sugar Creek (Upper)	0.672
3906.4487	US HWY 231	A20	18	STATE HWY 43	Sugar Creek (Upper)	2.426
176.1051	US HWY 231	A20	18	STATE HWY 43	Sugar Creek (Upper)	0.109
258.2383	US HWY 231	A20	18	US HWY 231 N	Sugar Creek (Upper)	0.160
700.7056	US HWY 231	A20	18	US HWY 231 N	Sugar Creek (Upper)	0.435
1341.0727	US HWY 35	A20	18	E MICHIGAN BLVD	Lake Michigan	0.833
3376.9521	US HWY 36	A20	18	E US HWY 36	Big Walnut Creek	2.097
4226.7921	US HWY 41	A20	18		Sugar Creek (Lower)	2.625
2474.4142	US HWY 41	A20	18		Big Pine Creek	1.537
3140.0937	US HWY 41	A20	18		Big Pine Creek	1.950
1290.7401	US HWY 41	A20	18	CALUMET AVE	Lake Michigan	0.802
4472.2835	US HWY 41	A20	18	STATE HWY 28	Big Pine Creek	2.777
871.1954	US HWY 41	A20	18	STATE HWY 55	Big Pine Creek	0.541
136.5185	US HWY 421	A20	18	E 4TH ST	Lake Michigan	0.085
1162.0814	US HWY 421	A20	18	FRANKLIN ST	Lake Michigan	0.722
137.2878	US HWY 421	A20	18	PINE ST	Lake Michigan	0.085
4002.6355	US HWY 421	A20	18	STATE HWY 39	Wildcat Creek , NFK	2.486
1684.4726	US HWY 52	A20	18		Whitewater River	1.046
17158.1378	US HWY 52	A20	18		Whitewater River	10.655
5006.3918	US HWY 52	A20	18		Whitewater River	3.109
566.9645	US HWY 52	A20	18	BROOKVILLE AVE	Whitewater River	0.352
3147.5675	US HWY 52	A20	18	HARRISON BROOKVILLE RD	Whitewater River	1.955
9272.4331	US HWY 52	A20	18	STATE HWY 1	Whitewater River	5.758
4502.9180	US HWY 6	A20	18	W US HWY 6	South Branch Elkhart River (Lo	2.796

1857.1420	US HWY 41	A25	18		Big Pine Creek	1.153
2558.7690	STATE HWY 1	A30	18		Whitewater River	1.589
9.9941	STATE HWY 1	A30	18		Whitewater River	0.006
2881.3946	STATE HWY 1	A30	18		Whitewater River	1.789
209.2717	STATE HWY 10	A30	18		Tippecanoe River	0.130
1824.4477	STATE HWY 10	A30	18		Tippecanoe River	1.133
869.0806	STATE HWY 101	A30	18		Whitewater River	0.540
1201.5988	STATE HWY 10	A30	18	W STATE HWY 10	Tippecanoe River	0.746
6583.2435	STATE HWY 121	A30	18		Whitewater River	4.088
1082.6659	STATE HWY 135	A30	18	S STATE HWY 135	Blue River	0.672
2154.7694	STATE HWY 149	A30	18	MAX MOCHAL HWY	Lake Michigan	1.338
3861.9635	STATE HWY 19	A30	18	N STATE HWY 19	Tippecanoe River	2.398
2405.7866	STATE HWY 19	A30	18	S STATE HWY 19	Tippecanoe River	1.494
2707.5322	STATE HWY 1	A30	18	LEO RD	Cedar Creek	1.681
1298.6643	STATE HWY 1	A30	18	LEO RD	Cedar Creek	0.806
133.3464	STATE HWY 1	A30	18	MAIN ST	Whitewater River	0.083
222.4229	STATE HWY 1	A30	18	MAIN ST	Cedar Creek	0.138
334.9377	STATE HWY 1	A30	18	SAINT JOSEPH ST	Cedar Creek	0.208
185.3516	STATE HWY 1	A30	18	ST JOSEPH ST	Cedar Creek	0.115
341.7306	STATE HWY 212	A30	18		Lake Michigan	0.212
64.9270	STATE HWY 212	A30	18	INDIANA HWY 212	Lake Michigan	0.040
1001.5858	STATE HWY 22	A30	18		Wildcat Creek , NFK	0.622
1217.7653	STATE HWY 22	A30	18	7TH ST	Wildcat Creek , NFK	0.756
2319.8533	STATE HWY 229	A30	18		Whitewater River	1.441
2567.2421	STATE HWY 22	A30	18	COUNTY HWY 100 N	Wildcat Creek , NFK	1.594
2956.3043	STATE HWY 22	A30	18	COUNTY HWY 100 N	Wildcat Creek , NFK	1.836
390.5643	STATE HWY 22	A30	18	COUNTY HWY 80	Wildcat Creek , NFK	0.243
673.0437	STATE HWY 22	A30	18	SYCAMORE LN	Wildcat Creek , NFK	0.418
1074.2638	STATE HWY 22	A30	18	W SYCAMORE ST	Wildcat Creek , NFK	0.667
221.7950	STATE HWY 234	A30	18		Sugar Creek	0.138
379.9914	STATE HWY 234	A30	18	STATE HWY 234 W	Sugar Creek	0.236
8888.9389	STATE HWY 234	A30	18	STATE HWY 234 W	Clifty Creek	5.520
2258.4757	STATE HWY 249	A30	18		Lake Michigan	1.403
336.4613	STATE HWY 249	A30	18	CRISMAN RD	Lake Michigan	0.209
763.1168	STATE HWY 252	A30	18		Whitewater River	0.474
703.0311	STATE HWY 252	A30	18	E 4TH ST	Whitewater River	0.437
869.2614	STATE HWY 26	A30	18		Big Pine Creek	0.540
2231.9681	STATE HWY 26	A30	18		Big Pine Creek	1.386
521.4455	STATE HWY 26	A30	18	LAFAYETTE ST	Big Pine Creek	0.324
365.7755	STATE HWY 26	A30	18	STATE HWY 55	Big Pine Creek	0.227

554.3308	STATE HWY 28	A30	18		Big Pine Creek	0.344
287.3501	STATE HWY 28	A30	18	E JACKSON ST	Big Pine Creek	0.178
431.0117	STATE HWY 28	A30	18	E MAIN ST	Big Pine Creek	0.268
249.1875	STATE HWY 29	A30	18		Wildcat Creek , NFK	0.155
2144.7877	STATE HWY 29	A30	18		Wildcat Creek , NFK	1.332
1483.7377	STATE HWY 29	A30	18	MICHIGAN ST	Wildcat Creek , NFK	0.921
757.5288	STATE HWY 312	A30	18	CHICAGO AVE	Lake Michigan	0.470
3761.7591	STATE HWY 327	A30	18	COLDWATER RD	Cedar Creek	2.336
1922.8700	STATE HWY 327	A30	18	OLD STATE HWY 327	Cedar Creek	1.194
3724.5716	STATE HWY 32	A30	18	STATE HWY 32 W	Sugar Creek (Upper)	2.313
704.6608	STATE HWY 32	A30	18	STATE HWY 47	Sugar Creek (Upper)	0.438
2287.5640	STATE HWY 331	A30	18		Tippecanoe River	1.421
2250.6472	STATE HWY 337	A30	18		Lost River	1.398
9794.4938	STATE HWY 337	A30	18	N STATE HWY 337	Lost River	6.082
578.7355	STATE HWY 337	A30	18	N STATE HWY 337	Lost River	0.359
2814.6792	STATE HWY 337	A30	18	S STATE HWY 337	Lost River	1.748
630.7433	STATE HWY 37	A30	18		Lost River	0.392
3752.0847	STATE HWY 37	A30	18		Lost River	2.330
279.5672	STATE HWY 37	A30	18	HWY 37 S	Lost River	0.174
659.3584	STATE HWY 37	A30	18	MAPLE ST	Lost River	0.409
3352.7830	STATE HWY 37	A30	18	N STATE HWY 37	Lost River	2.082
5478.5030	STATE HWY 47	A30	18		Sugar Creek (Lower)	3.402
3328.4804	STATE HWY 47	A30	18	STATE HWY 47 N	Sugar Creek (Upper)	2.067
3570.0096	STATE HWY 47	A30	18	STATE HWY 47 N	Sugar Creek (Upper)	2.217
1143.4745	STATE HWY 47	A30	18	STATE HWY 47 N	Sugar Creek (Upper)	0.710
420.5844	STATE HWY 49	A30	18		Lake Michigan	0.261
1648.6711	STATE HWY 49	A30	18	N STATE HWY 49	Lake Michigan	1.024
335.4695	STATE HWY 49	A30	18	N STATE HWY 49	Lake Michigan	0.208
2433.0821	STATE HWY 55	A30	18		Big Pine Creek	1.511
3017.1341	STATE HWY 55	A30	18		Big Pine Creek	1.874
1502.9386	STATE HWY 55	A30	18		Big Pine Creek	0.933
895.2404	STATE HWY 55	A30	18	MAIN ST	Big Pine Creek	0.556
7460.6857	STATE HWY 56	A30	18		Lost River	4.633
679.4444	STATE HWY 56	A30	18		Lost River	0.422
119.6434	STATE HWY 56	A30	18		Lost River	0.074
1446.3157	STATE HWY 56	A30	18	BROADWAY ST	Lost River	0.898
4464.9605	STATE HWY 56	A30	18	W STATE HWY 56	Lost River	2.773
2542.4245	STATE HWY 56	A30	18	W STATE HWY 56	Lost River	1.579
8369.7669	STATE HWY 62	A30	18		Blue River(Lower)	5.198
6913.3519	STATE HWY 62	A30	18	HWY 62 NW	Blue River(Lower)	4.293

5269.9536	STATE HWY 66	A30	18		Blue River (Upper)	3.273
2872.5585	STATE HWY 66	A30	18		Blue River (Upper)	1.784
29.6379	STATE HWY 66	A30	18	COUNTY HWY 210	Blue River (Upper)	0.018
1502.4740	STATE HWY 66	A30	18	S STATE HWY 66	Blue River (Upper)	0.933
3858.4741	STATE HWY 75	A30	18		Wildcat Creek , NFK	2.396
1056.3023	STATE PARK RD	A30	18		Lake Michigan	0.656
2035.0659	STATE HWY 26	A31	18	STATE HWY 26 E	Wildcat Creek (Main)	1.264
4828.8131	STATE HWY 26	A31	18	STATE HWY 26 E	Wildcat Creek, SFK	2.999
86.8406	STATE HWY 38	A31	18		Wildcat Creek, SFK	0.054
1227.9295	STATE HWY 38	A31	18	STATE HWY 38 E	Wildcat Creek, SFK	0.763
1147.8355	STATE HWY 38	A31	18	STATE HWY 38 E	Wildcat Creek, SFK	0.713
2693.9468	STATE HWY 38	A31	18	STATE HWY 38 E	Wildcat Creek, SFK	1.673
97.3718	STATE HWY 38	A31	18	WALNUT ST	Wildcat Creek, SFK	0.060
91.0819	RAMP	A60	18		Lake Michigan	0.057
268.8469	RAMP	A60	18		Lake Michigan	0.167
53.1387	RAMP	A60	18		Lake Michigan	0.033
193.1409	RAMP	A60	18		Lake Michigan	0.120
130.3727	RAMP	A60	18		Lake Michigan	0.081
129.0236	RAMP	A60	18		Lake Michigan	0.080
327.6914	RAMP	A60	18		Lake Michigan	0.203
59.5080	RAMP	A60	18		Lake Michigan	0.037
110.8982	RAMP	A60	18		Lake Michigan	0.069
117.1465	RAMP	A60	18		Lake Michigan	0.073
175.9045	RAMP	A60	18		Lake Michigan	0.109
73.3258	RAMP	A60	18		Lake Michigan	0.046
79.0884	RAMP	A60	18		Lake Michigan	0.049
610.5919	RAMP	A60	18		Lake Michigan	0.379
574.4088	RAMP	A60	18		Lake Michigan	0.357
104.7953	RAMP	A60	18		Lake Michigan	0.065
35.2313	RAMP	A60	18		Lake Michigan	0.022
152.1182	RAMP	A60	18		Lake Michigan	0.094
296.9737	RAMP	A60	18		Lake Michigan	0.184
260.7431	RAMP	A60	18		Lake Michigan	0.162
361.7079	RAMP	A60	18		Lake Michigan	0.225
275.1181	RAMP	A60	18		Lost River	0.171
448.5490	RAMP	A60	18		Lake Michigan	0.279
103.6227	RAMP	A60	18		Lake Michigan	0.064
77.1215	RAMP	A60	18		Lake Michigan	0.048
79.0157	RAMP	A60	18		Lake Michigan	0.049
72.6280	RAMP	A60	18		Lake Michigan	0.045

236.3112	RAMP	A60 18	Lake Michigan	0.147
152.5375	RAMP	A60 18	Lake Michigan	0.095
92.2751	RAMP	A60 18	Lake Michigan	0.057
82.8044	RAMP	A60 18	Lake Michigan	0.051
597.4787	RAMP	A60 18	Lake Michigan	0.371
77.6597	RAMP	A63 18	Lake Michigan	0.048
218.8887	RAMP	A63 18	Lake Michigan	0.136
208.9286	RAMP	A63 18	Lake Michigan	0.130
169.1479	RAMP	A63 18	Lake Michigan	0.105
89.1558	RAMP	A63 18	Lake Michigan	0.055
78.8575	RAMP	A63 18	Lake Michigan	0.049
353.2204	RAMP	A63 18	Lake Michigan	0.219
24.2445	RAMP	A63 18	Lake Michigan	0.015
461.1214	RAMP	A63 18	Lake Michigan	0.286
48.6748	RAMP	A63 18	Lake Michigan	0.030
28.1874	RAMP	A63 18	Lake Michigan	0.018
602.3706	RAMP	A63 18	Lake Michigan	0.374
473.5550	RAMP	A63 18	Lake Michigan	0.294
35.6960	RAMP	A63 18	Lake Michigan	0.022
31.9178	RAMP	A63 18	Lake Michigan	0.020
185.5078	RAMP	A63 18	Wildcat Creek, SFK	0.115
705.1031	RAMP	A63 18	Wildcat Creek (Main)	0.438
195.0025	RAMP	A63 18	Sugar Creek (Upper)	0.121
139.2893	RAMP	A63 18	Sugar Creek (Upper)	0.086
322.8460	RAMP	A63 18	Sugar Creek (Upper)	0.200
615.5649	RAMP	A63 18	Wildcat Creek (Main)	0.382
155.1764	RAMP	A63 18	Sugar Creek (Upper)	0.096
355.7809	RAMP	A63 18	Sugar Creek (Upper)	0.221
213.4150	RAMP	A63 18	Sugar Creek (Upper)	0.133
94.7876	RAMP	A63 18	Lake Michigan	0.059
144.9833	RAMP	A63 18	Lake Michigan	0.090
1030.2866	RAMP	A63 18	Lake Michigan	0.640
195.7801	RAMP	A63 18	Lake Michigan	0.122
433.2721	RAMP	A63 18	Lake Michigan	0.269
459.0815	RAMP	A63 18	Lake Michigan	0.285
82.2973	RAMP	A63 18	Wildcat Creek, SFK	0.051
121.9247	RAMP	A63 18	Wildcat Creek, SFK	0.076
23.3654	RAMP	A63 18	Lake Michigan	0.015
441.5170	RAMP	A63 18	Lake Michigan	0.274
226.2786	RAMP	A63 18	Lake Michigan	0.141

87.4128 RAMP	A63 18	Lake Michigan	0.054
128.5194 RAMP	A63 18	Lake Michigan	0.080
18.6642 RAMP	A63 18	Lake Michigan	0.012
136.1554 RAMP	A63 18	Lake Michigan	0.085
279.1815 RAMP	A63 18	Lake Michigan	0.173
		Total Miles	**282.286**

IDENTIFICATION OF "SENSITIVE WATERS" AND STATE HIGHWAY SEGMENTS WIHTIN 1 MILE (PRIORITY 2)

Total Miles **176**

LENGTH(meter)	HWYNAME	FCC	ST	ALT1_NAME	NEAREST_ST	HWYLENGTH(miles)
1360.9987	I 65	A11	18		Deep River	0.8452
4743.8344	I 65	A11	18		Deep River	2.9459
3425.5832	I 65	A11	18		Deep River	2.1273
296.0915	I 65	A11	18	DEEP RIVER BR	Deep River	0.1839
716.3215	I 80 94 ACCESS RD	A11	18		Deep River	0.4448
7235.9895	I 80	A11	18	I 94	Deep River	4.4935
3359.4738	I 65	A12	18		Deep River	2.0862
474.7903	STATE HWY 51	A20	18	RIPLEY ST	Deep River	0.2948
3868.5709	STATE HWY 64	A20	18		Patoka River	2.4024
3940.3200	US HWY 231	A20	18		Patoka River	2.4469
709.2347	US HWY 231	A20	18		Patoka River	0.4404
1574.1036	US HWY 231	A20	18	S US HWY 231	Patoka River	0.9775
2126.8667	US HWY 231	A20	18	STATE HWY 56	Patoka River	1.3208
3151.4725	US HWY 30	A20	18	E LINCOLN HWY	Deep River	1.9571
3629.9888	US HWY 30	A20	18	E LINCOLN HWY	Deep River	2.2542
4423.3798	US HWY 41	A20	18		Sugar Mill Creek	2.7469
1731.1493	US HWY 421	A20	18	N US 421	Big Creek	1.0750
9.8932	US HWY 421	A20	18	N US HWY 421	Graham Creek	0.0061
1959.1224	US HWY 421	A20	18	S ADAMS ST	Graham Creek	1.2166
5075.6293	US HWY 421	A20	18	S US 421	Big Creek	3.1520
4399.3157	US HWY 421	A20	18	S US HWY 421	Graham Creek	2.7320
2838.2239	US HWY 421	A20	18	STATE HWY 38	Kilmore Creek	1.7625
4380.6024	US HWY 421	A20	18	STATE HWY 39	Wildcat Creek, Middle Fork	2.7204
1288.2500	US HWY 421	A20	18	STATE HWY 39	Kilmore Creek	0.8000
1856.2938	US HWY 50	A20	18	E US HWY 50	Otter Creek	1.1528
766.7185	US HWY 50	A20	18	US HWY 421	Graham Creek	0.4761
315.6717	US HWY 50	A20	18	W US HWY 50	Graham Creek	0.1960
3174.1658	US HWY 50	A20	18	W US HWY 50	Otter Creek	1.9712
198.8548	US HWY 6	A20	18		Deep River	0.1235
1282.5408	US HWY 6	A20	18	E 37TH AVE	Deep River	0.7965
84.6828	US HWY 6	A20	18	STATE HWY 51	Deep River	0.0526
3339.3308	US HWY 6	A20	18	STATE HWY 51	Deep River	2.0737
3873.0732	STATE HWY 57	A21	18		Patoka River	2.4052
3345.0353	US HWY 30	A25	18	W US HWY 30	Deep River	2.0773
4683.9443	US HWY 41	A25	18		Patoka River	2.9087
4690.2416	US HWY 41	A25	18		Patoka River	2.9126
3002.5191	STATE HWY 124	A30	18		Mississinawa River	1.8646

4796.5389	STATE HWY 124	A30	18		Mississinawa River	2.9787
660.7829	STATE HWY 124	A30	18	COUNTY HWY 200 S	Mississinawa River	0.4103
379.3465	STATE HWY 124	A30	18	COUNTY HWY 625 E	Mississinawa River	0.2356
10.1251	STATE HWY 129	A30	18		Graham Creek	0.0063
5490.5810	STATE HWY 129	A30	18	S STATE HWY 129	Graham Creek	3.4097
640.7903	STATE HWY 130	A30	18	W HWY 130	Deep River	0.3979
2442.0662	STATE HWY 162	A30	18	3RD ST E	Patoka River	1.5165
2003.9129	STATE HWY 164	A30	18	2ND AVE	Patoka River	1.2444
253.2406	STATE HWY 164	A30	18	3RD ST E	Patoka River	0.1573
218.5852	STATE HWY 164	A30	18	E 3RD ST	Patoka River	0.1357
764.9258	STATE HWY 164	A30	18	E STATE HWY 164	Patoka River	0.4750
95.0208	STATE HWY 164	A30	18	W 3RD ST W	Patoka River	0.0590
852.9471	STATE HWY 19	A30	18	STATE HWY 21	Mississinawa River	0.5297
5551.4697	STATE HWY 234	A30	18	COUNTY HWY 1100 S	Sugar Mill Creek	3.4475
766.1371	STATE HWY 250	A30	18		Big Creek	0.4758
1498.7200	STATE HWY 250	A30	18	E STATE HWY 250	Indian-Kentuch Creek	0.9307
2417.6656	STATE HWY 250	A30	18	W STATE HWY 250	Graham Creek	1.5014
3012.7809	STATE HWY 250	A30	18	W STATE HWY 250	Big Creek	1.8709
2010.7765	STATE HWY 250	A30	18	W STATE HWY 250	Graham Creek	1.2487
1724.7178	STATE HWY 256	A30	18		Little Creek	1.0710
1113.0408	STATE HWY 256	A30	18		Little Creek	0.6912
546.6415	STATE HWY 256	A30	18	MAIN ST	Little Creek	0.3395
5927.7644	STATE HWY 257	A30	18		Patoka River	3.6811
549.5237	STATE HWY 257	A30	18		Patoka River	0.3413
114.1195	STATE HWY 257	A30	18	WALNUT ST	Patoka River	0.0709
10.7100	STATE HWY 26	A30	18	STATE HWY 26 E	Wildcat Creek, Middle Fork	0.0067
546.2412	STATE HWY 32	A30	18		Sugar Mill Creek	0.3392
1777.0804	STATE HWY 32	A30	18	STATE HWY 32 W	Sugar Mill Creek	1.1036
1424.6238	STATE HWY 341	A30	18		Sugar Mill Creek	0.8847
2894.3935	STATE HWY 341	A30	18	COUNTY HWY 600 E	Sugar Mill Creek	1.7974
3415.6302	STATE HWY 3	A30	18	N STATE HWY 3	Graham Creek	2.1211
1836.7550	STATE HWY 3	A30	18	S STATE HWY 3	Otter Creek	1.1406
11824.5174	STATE HWY 3	A30	18	S STATE HWY 3	Graham Creek	7.3430
1170.9509	STATE HWY 3	A30	18	STATE HWY 7	Otter Creek	0.7272
224.7691	STATE HWY 3	A30	18	STATE HWY 7	Otter Creek	0.1396
905.4783	STATE HWY 47	A30	18		Sugar Mill Creek	0.5623
579.2307	STATE HWY 51	A30	18	E 10TH ST	Deep River	0.3597
566.4250	STATE HWY 51	A30	18	E 3RD ST	Deep River	0.3517
535.5444	STATE HWY 51	A30	18	E CLEVELAND AVE	Deep River	0.3326
3061.3938	STATE HWY 51	A30	18	GRAND BLVD	Deep River	1.9011

1080.9133	STATE HWY 51	A30	18	LAKE PARK AVE	Deep River	0.6712
32.8003	STATE HWY 51	A30	18	LAKE PARK AVE	Deep River	0.0204
57.7096	STATE HWY 51	A30	18	LILLIAN ST	Deep River	0.0358
674.2130	STATE HWY 51	A30	18	LINCOLN ST	Deep River	0.4187
518.2974	STATE HWY 51	A30	18	MAIN ST	Deep River	0.3219
1622.2699	STATE HWY 51	A30	18	N HOBART RD	Deep River	1.0074
158.7097	STATE HWY 51	A30	18	S ILLINOIS ST	Deep River	0.0986
184.3236	STATE HWY 51	A30	18	S INDIANA ST	Deep River	0.1145
1512.1580	STATE HWY 53	A30	18	BROADWAY	Deep River	0.9391
3651.0708	STATE HWY 53	A30	18	BROADWAY	Deep River	2.2673
4662.1148	STATE HWY 56	A30	18	E STATE HWY 56	Patoka River	2.8952
3411.8496	STATE HWY 56	A30	18	E STATE HWY 56	Indian-Kentuch Creek	2.1188
247.6617	STATE HWY 56	A30	18	STATE HWY 164	Patoka River	0.1538
961.6796	STATE HWY 56	A30	18	W 6TH ST	Patoka River	0.5972
888.5565	STATE HWY 61	A30	18		Patoka River	0.5518
2339.2099	STATE HWY 61	A30	18		Patoka River	1.4526
1347.5032	STATE HWY 61	A30	18	MAIN ST	Patoka River	0.8368
3273.9667	STATE HWY 62	A30	18	E STATE HWY 62	Indian-Kentuch Creek	2.0331
1050.4071	STATE HWY 62	A30	18	N STATE HWY 62	Indian-Kentuch Creek	0.6523
9783.0771	STATE HWY 65	A30	18		Patoka River	6.0753
2677.7067	STATE HWY 75	A30	18		Wildcat Creek, Middle Fork	1.6629
2520.3733	STATE HWY 7	A30	18	S STATE HWY 7	Otter Creek	1.5652
4924.4241	STATE HWY 7	A30	18	S STATE HWY 7	Graham Creek	3.0581
4807.6133	STATE HWY 7	A30	18	STATE HWY 256	Big Creek	2.9855
3242.7780	US HWY 24 BUS	A30	18	US HWY 24 BUSINESS RT	Mississinawa River	2.0138
3203.2072	STATE HWY 26	A31	18		Wildcat Creek, Middle Fork	1.9892
6052.1504	STATE HWY 26	A31	18	COUNTY HWY 900 N	Wildcat Creek, Middle Fork	3.7584
1605.2335	STATE HWY 26	A31	18	COUNTY HWY 900 N	Wildcat Creek, Middle Fork	0.9969
4118.9975	STATE HWY 26	A31	18	COUNTY HWY 900 N	Wildcat Creek, Middle Fork	2.5579
1558.7044	STATE HWY 26	A31	18	COUNTY HWY 900 N	Wildcat Creek, Middle Fork	0.9680
87.8172	STATE HWY 26	A31	18	MAIN ST	Wildcat Creek, Middle Fork	0.0545
6.3807	STATE HWY 26	A31	18	MAIN ST	Wildcat Creek, Middle Fork	0.0040
3963.3907	STATE HWY 26	A31	18	STATE HWY 26 E	Wildcat Creek, Middle Fork	2.4613
4184.8207	STATE HWY 26	A31	18	STATE HWY 26 E	Wildcat Creek, Middle Fork	2.5988
36.3321	STATE HWY 26	A31	18	STATE HWY 29	Wildcat Creek, Middle Fork	0.0226
602.0423	STATE HWY 26	A31	18	W MAIN ST	Wildcat Creek, Middle Fork	0.3739
1515.6009	STATE HWY 29	A31	18	N STATE HWY 29	Wildcat Creek, Middle Fork	0.9412
3586.1863	STATE HWY 29	A31	18	N STATE HWY 29	Kilmore Creek	2.2270
1693.6383	STATE HWY 29	A31	18	N STATE HWY 29	Wildcat Creek, Middle Fork	1.0517
2698.4802	STATE HWY 38	A31	18		Kilmore Creek	1.6758

2849.0892	STATE HWY 38	A31	18	STATE HWY 38 E	Kilmore Creek	1.7693
144.8653	STATE HWY 3	A31	18	STATE HWY 7	Otter Creek	0.0900
4554.8045	STATE HWY 75	A31	18		Kilmore Creek	2.8285
673.4746	STATE HWY 75	A31	18	COUNTY HWY 100 W	Wildcat Creek, Middle Fork	0.4182
250.0789	RAMP	A63	18		Deep River	0.1553
575.1211	RAMP	A63	18		Deep River	0.3572
124.9525	RAMP	A63	18		Deep River	0.0776
164.3559	RAMP	A63	18		Deep River	0.1021
75.9779	RAMP	A63	18		Deep River	0.0472
109.1200	RAMP	A63	18		Deep River	0.0678
253.0003	RAMP	A63	18		Deep River	0.1571
444.7509	RAMP	A63	18		Deep River	0.2762
81.3679	RAMP	A63	18		Deep River	0.0505
622.5372	RAMP	A63	18		Deep River	0.3866
83.2346	RAMP	A63	18		Deep River	0.0517
1024.0556	RAMP	A63	18		Deep River	0.6359
927.1890	RAMP	A63	18		Deep River	0.5758
197.0887	RAMP	A63	18		Deep River	0.1224
409.0991	RAMP	A63	18		Deep River	0.2541
555.5153	RAMP	A63	18		Deep River	0.3450
353.2079	RAMP	A63	18		Deep River	0.2193
58.7457	RAMP	A63	18		Deep River	0.0365
707.8538	RAMP	A63	18		Deep River	0.4396
259.3084	RAMP	A63	18		Deep River	0.1610
777.3154	RAMP	A63	18		Deep River	0.4827
174.2109	RAMP	A63	18		Deep River	0.1082
145.8924	RAMP	A63	18		Deep River	0.0906
709.0198	RAMP	A63	18		Deep River	0.4403
652.9146	RAMP	A63	18		Deep River	0.4055
335.2402	RAMP	A63	18		Deep River	0.2082
738.9519	RAMP	A63	18		Deep River	0.4589
421.9446	RAMP	A63	18		Deep River	0.2620
767.9911	RAMP	A63	18		Deep River	0.4769
					Total Miles	**176**

Identification of "Sensitive Water" and State Highway Segments Within 1 Mile (Priority 3)

TOTAL MILEAGE: 608.9135

LENGTH	HWYNAME	FCC	ST	ALT1_NAME	NEAREST_ST	length (miles)
806.6732	I 65	A11	18		White River East Fork	0.5009
2887.8126	I 65	A11	18		White River East Fork	1.7933
2578.3962	I 65	A11	18		White River East Fork	1.6012
897.2745	I 65	A11	18		White River East Fork	0.5572
117.5976	I 65	A13	18		White River East Fork	0.0730
151.0056	I 65	A13	18		White River East Fork	0.0938
166.4992	I 65	A13	18		White River East Fork	0.1034
1101.1790	STATE HWY 11	A20	18	STATE HWY 46	White River East Fork	0.6838
1279.5050	STATE HWY 37	A20	18		White River East Fork	0.7946
1630.2945	STATE HWY 37	A20	18		White River East Fork	1.0124
269.2854	STATE HWY 46	A20	18	11TH ST	White River East Fork	0.1672
49.6151	STATE HWY 46	A20	18	25TH ST	White River East Fork	0.0308
448.3105	STATE HWY 46	A20	18	JONATHAN MOORE PIKE	White River East Fork	0.2784
105.8828	STATE HWY 46	A20	18	JONATHAN MOORE PIKE	White River East Fork	0.0658
198.1816	STATE HWY 46	A20	18	LINDSAY ST	White River East Fork	0.1231
2681.8312	STATE HWY 46	A20	18	W JONATHAN MOORE PIKE	White River East Fork	1.6654
631.3943	STATE HWY 46	A20	18	W JONATHAN MOORE PIKE	White River East Fork	0.3921
1468.1504	STATE HWY 46	A20	18	WASHINGTON ST	White River East Fork	0.9117
1781.9581	STATE HWY 57	A20	18		White River West Fork	1.1066
271.9124	STATE HWY 57	A20	18		White River West Fork	0.1689
2735.2298	STATE HWY 57	A20	18	STATE HWY 358	White River West Fork	1.6986
1240.0343	US HWY 150	A20	18		White River East Fork	0.7701
117.8489	US HWY 150	A20	18		White River East Fork	0.0732
113.0252	US HWY 150	A20	18		White River East Fork	0.0702
2373.8988	US HWY 231	A20	18		White River East Fork	1.4742
1669.9193	US HWY 231	A20	18	N US HWY 231	White River East Fork	1.0370
48.7592	US HWY 31	A20	18		White River East Fork	0.0303
1823.9149	US HWY 31	A20	18	N US HWY 31	White River East Fork	1.1327
1107.4882	US HWY 31	A20	18	N US HWY 31	White River East Fork	0.6878
2058.9526	US HWY 31	A20	18	S US HWY 31	White River East Fork	1.2786
665.2016	US HWY 50	A20	18		White River East Fork	0.4131
2432.9290	US HWY 50	A20	18		White River East Fork	1.5108
1846.1301	US HWY 50	A20	18		White River East Fork	1.1464
1057.3900	US HWY 50	A20	18		White River East Fork	0.6566
8727.9969	US HWY 50	A20	18		White River East Fork	5.4201
3089.5508	US HWY 50	A20	18		White River East Fork	1.9186
213.8067	US HWY 50	A20	18	COUNTY HWY L2W3 S	White River East Fork	0.1328

12.1180	US HWY 50	A20	18	MAIN ST	White River East Fork	0.0075
53.8136	US HWY 50	A20	18	N MAIN ST	White River East Fork	0.0334
507.1414	US HWY 50	A20	18	STATE HWY 11	White River East Fork	0.3149
4689.7520	US HWY 50	A20	18	STATE HWY 135	White River East Fork	2.9123
625.4141	US HWY 50	A20	18	STATE HWY 31	White River East Fork	0.3884
2365.3079	US HWY 50	A20	18	STATE HWY 37	White River East Fork	1.4689
9330.3401	US HWY 50	A20	18	US HWY 150	White River East Fork	5.7941
364.1451	US HWY 50	A20	18	W COMMERCE ST	White River East Fork	0.2261
1381.6328	US HWY 50	A20	18	W TIPTON ST	White River East Fork	0.8580
733.9111	US HWY 50	A20	18	W TIPTON ST	White River East Fork	0.4558
1224.2557	STATE HWY 37	A21	18		White River East Fork	0.7603
4547.2472	STATE HWY 57	A21	18		White River West Fork	2.8238
2022.5157	STATE HWY 57	A21	18		White River West Fork	1.2560
4683.1079	US HWY 41	A21	18		White River West Fork	2.9082
4384.7672	US HWY 50	A21	18	US HWY 150	White River West Fork	2.7229
59.5872	US HWY 50	A23	18		White River East Fork	0.0370
6493.8724	US HWY 41	A25	18		White River West Fork	4.0327
75.5035	US HWY 50	A27	18	STATE HWY 37	White River East Fork	0.0469
16.1640	STATE HWY 11	A30	18		White River East Fork	0.0100
1982.4899	STATE HWY 11	A30	18		White River East Fork	1.2311
23.6625	STATE HWY 11	A30	18	8TH ST	White River East Fork	0.0147
5681.2890	STATE HWY 11	A30	18	JONESVILLE RD	White River East Fork	3.5281
2137.1538	STATE HWY 11	A30	18	N STATE HWY 11	White River East Fork	1.3272
8998.7577	STATE HWY 11	A30	18	S JONESVILLE RD	White River East Fork	5.5882
298.9500	STATE HWY 11	A30	18	S WALNUT ST	White River East Fork	0.1856
4775.3550	STATE HWY 11	A30	18	STATE HWY 31	White River East Fork	2.9655
413.5308	STATE HWY 135	A30	18		White River East Fork	0.2568
3908.6915	STATE HWY 135	A30	18		White River East Fork	2.4273
417.3069	STATE HWY 235	A30	18		White River East Fork	0.2591
4199.8746	STATE HWY 235	A30	18		White River East Fork	2.6081
242.6561	STATE HWY 235	A30	18	2ND ST	White River East Fork	0.1507
70.7299	STATE HWY 235	A30	18	MILL ST	White River East Fork	0.0439
429.1704	STATE HWY 235	A30	18	PERRY ST	White River East Fork	0.2665
471.4656	STATE HWY 235	A30	18	WASHINGTON ST	White River East Fork	0.2928
213.3697	STATE HWY 241	A30	18		White River West Fork	0.1325
1264.3751	STATE HWY 241	A30	18		White River West Fork	0.7852
750.1401	STATE HWY 241	A30	18	MAIN ST	White River West Fork	0.4658
829.5020	STATE HWY 241	A30	18	OLD DECKER RD	White River West Fork	0.5151
4303.8832	STATE HWY 257	A30	18		White River East Fork	2.6727
4070.0226	STATE HWY 258	A30	18		White River East Fork	2.5275

157.8327	STATE HWY 258	A30	18	E 6TH ST	White River East Fork	0.0980
1498.5326	STATE HWY 258	A30	18	W 6TH ST	White River East Fork	0.9306
3052.4286	STATE HWY 358	A30	18		White River West Fork	1.8956
134.5117	STATE HWY 358	A30	18		White River West Fork	0.0835
948.5110	STATE HWY 358	A30	18		White River West Fork	0.5890
3147.1530	STATE HWY 358	A30	18	COUNTY HWY 1000 N	White River West Fork	1.9544
867.9770	STATE HWY 358	A30	18	COUNTY HWY 300 W	White River West Fork	0.5390
403.9294	STATE HWY 358	A30	18	COUNTY HWY 700 E	White River West Fork	0.2508
4045.5375	STATE HWY 450	A30	18		White River East Fork	2.5123
268.5526	STATE HWY 450	A30	18		White River East Fork	0.1668
1709.0540	STATE HWY 450	A30	18		White River East Fork	1.0613
14470.5253	STATE HWY 450	A30	18		White River East Fork	8.9862
490.7736	STATE HWY 450	A30	18		White River East Fork	0.3048
3412.6564	STATE HWY 450	A30	18		White River East Fork	2.1193
2107.6636	STATE HWY 450	A30	18		White River East Fork	1.3089
4489.0475	STATE HWY 550	A30	18		White River East Fork	2.7877
3015.4120	STATE HWY 550	A30	18		White River East Fork	1.8726
4.0234	STATE HWY 56	A30	18		White River West Fork	0.0025
147.3718	STATE HWY 56	A30	18	E 1ST ST	White River West Fork	0.0915
343.9701	STATE HWY 56	A30	18	E 1ST ST	White River West Fork	0.2136
610.4063	STATE HWY 56	A30	18	E 2ND ST	White River West Fork	0.3791
4143.8860	STATE HWY 56	A30	18	E STATE HWY 56	White River East Fork	2.5734
928.4508	STATE HWY 56	A30	18	HWY 56	White River West Fork	0.5766
2179.0675	STATE HWY 56	A30	18	HWY 56	White River West Fork	1.3532
113.5738	STATE HWY 56	A30	18	N MAIN ST	White River West Fork	0.0705
255.9605	STATE HWY 56	A30	18	S MILL ST	White River West Fork	0.1590
349.2322	STATE HWY 56	A30	18	SOUTH ST	White River West Fork	0.2169
132.6680	STATE HWY 56	A30	18	W 2ND ST	White River West Fork	0.0824
5238.8069	STATE HWY 58	A30	18		White River West Fork	3.2533
2246.0705	STATE HWY 61	A30	18		White River West Fork	1.3948
82.0442	STATE HWY 61	A30	18	9TH ST	White River West Fork	0.0509
1374.9850	STATE HWY 61	A30	18	VINCENNES AVE	White River West Fork	0.8539
1479.0336	STATE HWY 67	A30	18		White River West Fork	0.9185
2306.6161	STATE HWY 67	A30	18		White River West Fork	1.4324
744.6944	STATE HWY 67	A30	18	4TH ST	White River West Fork	0.4625
1258.4253	STATE HWY 7	A30	18	2ND ST	White River East Fork	0.7815
1153.9514	STATE HWY 7	A30	18	3RD ST	White River East Fork	0.7166
100.8263	STATE HWY 7	A30	18	LINDSAY ST	White River East Fork	0.0626
1082.1159	STATE HWY 7	A30	18	STATE ST	White River East Fork	0.6720
375.5555	RAMP	A60	18		White River East Fork	0.2332

278.2495	RAMP	A60	18		White River East Fork	0.1728
196.4238	RAMP	A60	18		White River East Fork	0.1220
345.2541	RAMP	A63	18		White River East Fork	0.2144
91.6669	RAMP	A63	18		White River East Fork	0.0569
85.0786	RAMP	A63	18		White River East Fork	0.0528
249.7088	RAMP	A63	18		White River East Fork	0.1551
811.5706	RAMP	A63	18		White River East Fork	0.5040
56.8459	RAMP	A63	18		White River East Fork	0.0353
74.9539	RAMP	A63	18		White River East Fork	0.0465
4377.1739	I 465	A11	18	US HWY 52	White River	2.7182
3917.2775	I 64	A11	18		Cypress Slough Creek	2.4326
2850.0300	I 64	A11	18		Indian Creek	1.7699
5100.0874	I 64	A11	18		Cypress Slough Creek	3.1672
299.9941	I 64	A11	18		Cypress Slough Creek	0.1863
483.4587	I 64	A11	18		Oil Creek	0.3002
1233.9564	I 64	A11	18		Indian Creek	0.7663
1578.5660	I 64	A11	18	STATE HWY 37	Little Blue River	0.9803
4299.9781	I 64	A11	18	STATE HWY 37	Stinking Fork	2.6703
2168.0566	I 64	A11	18	STATE HWY 37	Oil Creek	1.3464
2579.6081	I 64	A11	18	STATE HWY 66	Little Blue River	1.6019
4422.7672	I 64	A11	18	STATE HWY 66	Turkey Fork	2.7465
304.7034	I 65	A11	18		White River	0.1892
3130.0506	I 65	A11	18		Driftwood River	1.9438
995.0738	I 65	A11	18		Big Blue River	0.6179
1518.7761	I 65	A11	18		Muscatatuck, Vernon Fork	0.9432
2532.8019	I 65	A11	18		Driftwood River	1.5729
2329.6974	I 65	A11	18		Driftwood River	1.4467
501.9016	I 65	A11	18		Muscatatuck, Vernon Fork	0.3117
2611.9125	I 65	A11	18		Driftwood River	1.6220
2310.6655	I 65	A11	18		White River	1.4349
2323.9410	I 65	A11	18		Muscatatuck, Vernon Fork	1.4432
3418.7988	I 65	A11	18		Kankakee	2.1231
241.1251	I 65	A11	18		Kankakee	0.1497
3147.5600	I 65	A11	18		Driftwood River	1.9546
3314.5890	I 65	A11	18	I HWY 65	Big Blue River	2.0584
113.6827	I 65	A11	18	I HWY 65	Big Blue River	0.0706
934.2346	I 65	A11	18	I HWY 65	Sugar Creek	0.5802
3004.3176	I 65	A11	18	I HWY 65	Sugar Creek	1.8657
576.7189	I 65	A11	18	I HWY 65	Sugar Creek	0.3581
40.5564	I 65	A11	18	W 36TH ST	White River	0.0252

2057.1495	I 69	A11	18		White River 1.2775
929.0878	I 69	A11	18	STATE HWY 67	White River 0.5770
3261.4208	I 70	A11	18		Big Blue River 2.0253
1510.0068	I 70	A11	18		Big Blue River 0.9377
2626.4850	I 70	A11	18		Sugar Creek 1.6310
566.9935	I 70	A11	18		Sugar Creek 0.3521
2206.1688	I 70	A11	18		Big Blue River 1.3700
2213.4270	I 74	A11	18		Muscatatuck, Vernon Fork 1.3745
960.2340	I 74	A11	18		Muscatatuck, Vernon Fork 0.5963
4495.6086	I 74	A11	18	I 465	White River 2.7918
331.5130	I 74	A11	18	US HWY 421	Big Blue River 0.2059
4042.0645	I 80	A11	18	I 90	Fawn River 2.5101
555.2930	I 80	A11	18	I 90	Fish Creek 0.3448
3413.5628	I 80	A11	18	I 90	Fawn River 2.1198
1004.6190	I 80	A11	18	I 90	Fawn River 0.6239
2029.9312	I 80	A11	18	I 90	Fawn River 1.2606
4341.8867	I 80	A11	18	I 90	Fawn River 2.6963
641.3441	I 80	A11	18	I 90	Fish Creek 0.3983
2189.6760	I 80	A11	18	I 90	Fawn River 1.3598
700.7515	I 80	A11	18	I 90	Fawn River 0.4352
3630.1234	I 80	A11	18	I 90	Fawn River 2.2543
2343.1968	I 80	A11	18	I 90	Fawn River 1.4551
1732.3335	I 80	A11	18	I 90	Fish Creek 1.0758
167.6545	I 64	A13	18		Cypress Slough Creek 0.1041
66.0838	I 64	A13	18		Oil Creek 0.0410
173.7189	I 64	A13	18		Indian Creek 0.1079
78.4354	I 64	A13	18	STATE HWY 37	Little Blue River 0.0487
63.5092	I 64	A13	18	STATE HWY 37	Oil Creek 0.0394
85.3955	I 64	A13	18	STATE HWY 66	Little Blue River 0.0530
162.1106	I 65	A13	18		Muscatatuck, Vernon Fork 0.1007
129.5458	I 65	A13	18		Driftwood River 0.0804
180.5043	I 65	A13	18		Muscatatuck, Vernon Fork 0.1121
132.2037	I 65	A13	18		Kankakee 0.0821
114.9193	I 65	A13	18		Driftwood River 0.0714
121.4503	I 65	A13	18		Driftwood River 0.0754
166.4992	I 65	A13	18		Driftwood River 0.1034
58.3805	I 65	A13	18	I HWY 65	Big Blue River 0.0363
130.5831	I 65	A13	18	I HWY 65	Sugar Creek 0.0811
145.1938	I 65	A13	18	I HWY 65	Sugar Creek 0.0902
213.1861	I 70	A13	18		Big Blue River 0.1324

208.5880	I 70	A13	18		Big Blue River	0.1295
205.7665	I 70	A13	18		Sugar Creek	0.1278
135.9388	I 74	A13	18		Muscatatuck, Vernon Fork	0.0844
138.0052	I 80	A13	18	I 90	Fawn River	0.0857
114.0902	I 80	A13	18	I 90	Fawn River	0.0709
128.5919	I 80	A13	18	I 90	Fawn River	0.0799
150.5484	I 80	A13	18	I 90	Fawn River	0.0935
116.4285	I 80	A13	18	I 90	Fawn River	0.0723
126.3175	I 80	A13	18	I 90	Fawn River	0.0784
138.4614	I 80	A13	18	I 90	Fish Creek	0.0860
119.4377	I 80	A13	18	I 90	Fawn River	0.0742
129.6879	I 80	A13	18	I 90	Fish Creek	0.0805
9697.3268	I 74	A15	18	US HWY 421	Big Blue River	6.0220
4090.5830	I 74	A15	18	US HWY 421	Sugar Creek	2.5403
4095.5195	I 74	A15	18	US HWY 421	Sugar Creek	2.5433
63.5352	I 65	A17	18	I HWY 65	Big Blue River	0.0395
1101.1790	STATE HWY 11	A20	18	STATE HWY 46	Driftwood River	0.6838
271.0241	STATE HWY 3	A20	18		Big Blue River	0.1683
1583.7871	STATE HWY 37	A20	18		White River	0.9835
9979.5007	STATE HWY 37	A20	18	STATE HWY 37 N	White River	6.1973
502.4225	STATE HWY 3	A20	18	MEMORIAL DR	Big Blue River	0.3120
3305.1247	STATE HWY 3	A20	18	N MEMORIAL DR	Big Blue River	2.0525
2309.2831	STATE HWY 3	A20	18	S MEMORIAL DR	Big Blue River	1.4341
947.0899	STATE HWY 3	A20	18	S MEMORIAL DR	Big Blue River	0.5881
663.3334	STATE HWY 3	A20	18	STATE HWY 67	White River	0.4119
1152.2234	STATE HWY 3	A20	18	STATE HWY 7	Muscatatuck, Vernon Fork	0.7155
616.6440	STATE HWY 431	A20	18	N KEYSTONE AVE	White River	0.3829
1864.0851	STATE HWY 43	A20	18	STATE HWY 46	Fish River	1.1576
6029.0969	STATE HWY 46	A20	18		Fish River	3.7441
46.2200	STATE HWY 46	A20	18		Driftwood River	0.0287
173.7065	STATE HWY 46	A20	18	11TH ST	Driftwood River	0.1079
3331.3397	STATE HWY 46	A20	18	E STATE HWY 46	Muscatatuck, Vernon Fork	2.0688
731.1274	STATE HWY 46	A20	18	JONATHAN MOORE PIKE	Driftwood River	0.4540
105.8828	STATE HWY 46	A20	18	JONATHAN MOORE PIKE	Driftwood River	0.0658
198.1816	STATE HWY 46	A20	18	LINDSAY ST	Driftwood River	0.1231
2681.8312	STATE HWY 46	A20	18	W JONATHAN MOORE PIKE	Driftwood River	1.6654
631.3943	STATE HWY 46	A20	18	W JONATHAN MOORE PIKE	Driftwood River	0.3921
209.6625	STATE HWY 46	A20	18	W STATE HWY 46	Driftwood River	0.1302
3797.7100	STATE HWY 64	A20	18		Little Blue River	2.3584
820.9194	STATE HWY 67	A20	18	W COUNTY HWY 550 S	White River	0.5098

3294.7970	STATE HWY 9	A20	18		Big Blue River	2.0461
317.3705	STATE HWY 9	A20	18	HARRISON ST	Big Blue River	0.1971
494.6931	STATE HWY 9	A20	18	N HARRISON ST	Big Blue River	0.3072
6560.3870	STATE HWY 9	A20	18	N RILEY HWY	Big Blue River	4.0740
2746.0310	STATE HWY 9	A20	18	N STATE HWY 9	Fawn River	1.7053
2698.4332	STATE HWY 9	A20	18	N STATE HWY 9	White River	1.6757
966.8940	STATE HWY 9	A20	18	S HARRISON ST	Big Blue River	0.6004
116.3367	STATE HWY 9	A20	18	S HARRISON ST	Big Blue River	0.0722
334.8818	STATE HWY 9	A20	18	S STATE HWY 9	White River	0.2080
14.4445	STATE HWY 9	A20	18	STATE HWY 109	White River	0.0090
751.4244	STATE HWY 9	A20	18	STATE HWY 109	White River	0.4666
18.4262	STATE HWY 9	A20	18	STATE HWY 44	Big Blue River	0.0114
2894.7170	US HWY 20	A20	18		Fish Creek	1.7976
728.6444	US HWY 231	A20	18	STATE HWY 43	White River	0.4525
2027.4537	US HWY 231	A20	18	STATE HWY 43	White River	1.2590
748.0864	US HWY 231	A20	18	STATE HWY 43	Fish River	0.4646
1377.3536	US HWY 231	A20	18	STATE HWY 46	Fish River	0.8553
126.9833	US HWY 231	A20	18	STATE HWY 53	Little Pine Creek	0.0789
4606.7480	US HWY 231	A20	18	STATE HWY 53	Kankakee	2.8608
2649.5152	US HWY 231	A20	18	STATE HWY 67	White River	1.6453
2055.9494	US HWY 231	A20	18	STATE HWY 67	White River	1.2767
11765.3140	US HWY 231	A20	18	STATE HWY 67	Fish River	7.3063
3892.0452	US HWY 231	A20	18	STATE HWY 67	White River	2.4170
3489.6368	US HWY 231	A20	18	US HWY 231 N	Little Pine Creek	2.1671
3824.1544	US HWY 231	A20	18	US HWY 231 S	Rattlesnake Creek	2.3748
3931.8806	US HWY 27	A20	18		White River	2.4417
3950.2887	US HWY 27	A20	18		White River	2.4531
1669.9856	US HWY 27	A20	18	S US HWY 27	White River	1.0371
1109.8735	US HWY 27	A20	18	S US HWY 27	White River	0.6892
1140.4139	US HWY 30	A20	18		Kankakee	0.7082
928.6265	US HWY 30	A20	18		Kankakee	0.5767
1645.8695	US HWY 30	A20	18	W US HWY 30	Kankakee	1.0221
788.6665	US HWY 31	A20	18		Muscatatuck, Vernon Fork	0.4898
1349.0184	US HWY 31	A20	18		Sugar Creek	0.8377
221.3509	US HWY 31	A20	18		Sugar Creek	0.1375
5437.7182	US HWY 31	A20	18	N MERIDIAN ST	White River	3.3768
2102.1985	US HWY 31	A20	18	N US HWY 31	Muscatatuck, Vernon Fork	1.3055
6346.4653	US HWY 31	A20	18	N US HWY 31	Driftwood River	3.9412
571.7194	US HWY 31	A20	18	N US HWY 31	Driftwood River	0.3550
1266.2302	US HWY 31	A20	18	N US HWY 31	Muscatatuck, Vernon Fork	0.7863

4219.9207	US HWY 31	A20	18	S US HWY 31	Sugar Creek	2.6206
3327.2708	US HWY 31	A20	18	STATE HWY 252	Sugar Creek	2.0662
7.5594	US HWY 35	A20	18		White River	0.0047
3751.3861	US HWY 35	A20	18		Kankakee	2.3296
13.7803	US HWY 35	A20	18		White River	0.0086
364.7830	US HWY 35	A20	18	COUNTY HWY 400 E	Kankakee	0.2265
472.6737	US HWY 35	A20	18	E 29TH ST	White River	0.2935
2929.4527	US HWY 35	A20	18	S US HWY 35	White River	1.8192
4335.7503	US HWY 35	A20	18	STATE HWY 3	White River	2.6925
3315.6503	US HWY 36	A20	18		Big Blue River	2.0590
850.6513	US HWY 40	A20	18	E MAIN ST	Big Blue River	0.5283
2086.6860	US HWY 40	A20	18	NATIONAL RD	Big Blue River	1.2958
295.0236	US HWY 40	A20	18	NATIONAL RD	Big Blue River	0.1832
862.0295	US HWY 40	A20	18	W MAIN ST	Big Blue River	0.5353
4080.0438	US HWY 40	A20	18	W US HWY 40	Sugar Creek	2.5337
146.9293	US HWY 41	A20	18		Kankakee	0.0912
6686.2040	US HWY 41	A20	18		Roaring Creek	4.1521
1683.1923	US HWY 41	A20	18	N US HWY 41	Kankakee	1.0453
1621.3574	US HWY 41	A20	18	WICKER AVE	Kankakee	1.0069
798.7652	US HWY 421	A20	18		Muscatatuck, Vernon Fork	0.4960
62.2365	US HWY 421	A20	18		Laughery Creek	0.0386
1751.2478	US HWY 421	A20	18	COUNTY HWY 1000 W	Kankakee	1.0875
4776.1366	US HWY 421	A20	18	N US HWY 421	Laughery Creek	2.9660
2946.3969	US HWY 421	A20	18	N US HWY 421	Muscatatuck, Vernon Fork	1.8297
219.4814	US HWY 421	A20	18	N US HWY 421	Muscatatuck, Vernon Fork	0.1363
245.2385	US HWY 421	A20	18	S 1000TH W	Kankakee	0.1523
830.5860	US HWY 421	A20	18	S ADAMS ST	Laughery Creek	0.5158
980.0241	US HWY 421	A20	18	S US HWY 421	Kankakee	0.6086
474.0056	US HWY 421	A20	18	S US HWY 421	Kankakee	0.2944
355.5007	US HWY 50	A20	18	BUCKEYE ST	Muscatatuck, Vernon Fork	0.2208
250.1813	US HWY 50	A20	18	BUCKEYE ST	Muscatatuck, Vernon Fork	0.1554
120.5990	US HWY 50	A20	18	BUCKEYE ST	Muscatatuck, Vernon Fork	0.0749
3635.6834	US HWY 50	A20	18	E US HWY 50	Laughery Creek	2.2578
2307.9100	US HWY 50	A20	18	E US HWY 50	Muscatatuck, Vernon Fork	1.4332
209.5874	US HWY 50	A20	18	E US HWY 50 N	Muscatatuck, Vernon Fork	0.1302
102.2393	US HWY 50	A20	18	E US HWY 50 N	Muscatatuck, Vernon Fork	0.0635
366.8748	US HWY 50	A20	18	E WALNUT ST	Muscatatuck, Vernon Fork	0.2278
782.8240	US HWY 50	A20	18	US HWY 421	Laughery Creek	0.4861
251.3722	US HWY 50	A20	18	W US HWY 50	Laughery Creek	0.1561
586.4214	US HWY 50	A20	18	W WALNUT ST	Muscatatuck, Vernon Fork	0.3642

2833.5510	US HWY 52	A20	18		Big Blue River	1.7596
615.9281	US HWY 52	A20	18	E MAIN ST	Sugar Creek	0.3825
539.3283	US HWY 52	A20	18	MAIN ST	Big Blue River	0.3349
4492.7478	US HWY 52	A20	18	US HWY 52 W	Little Pine Creek	2.7900
512.1468	US HWY 52	A20	18	W MAIN ST	Sugar Creek	0.3180
217.9525	US HWY 52	A20	18	W MAIN ST	Big Blue River	0.1353
507.0869	US HWY 52	A20	18	W US HWY 52	Sugar Creek	0.3149
1627.5775	US HWY 52	A20	18	W US HWY 52	Sugar Creek	1.0107
4240.9259	US HWY 6	A20	18		Kankakee	2.6336
1798.6823	STATE HWY 37	A21	18		Oil Creek	1.1170
2150.6103	US HWY 231	A21	18	STATE HWY 67	White River	1.3355
507.5189	US HWY 31	A21	18	N US HWY 31	Driftwood River	0.3152
4963.1918	STATE HWY 1	A30	18		Fish Creek	3.0821
742.5657	STATE HWY 1	A30	18		Fish Creek	0.4611
832.5283	STATE HWY 10	A30	18		Kankakee	0.5170
6474.3646	STATE HWY 103	A30	18		Big Blue River	4.0206
1763.5278	STATE HWY 103	A30	18	N 16TH ST	Big Blue River	1.0952
3927.6038	STATE HWY 104	A30	18		Kankakee	2.4390
2003.6430	STATE HWY 109	A30	18		Big Blue River	1.2443
722.0072	STATE HWY 109	A30	18	N MCCULLUM ST	Big Blue River	0.4484
1289.8764	STATE HWY 11	A30	18		Driftwood River	0.8010
3154.6020	STATE HWY 111	A30	18	HWY 111 SE	Little Mosquito Creek	1.9590
23.6625	STATE HWY 11	A30	18	8TH ST	Driftwood River	0.0147
986.7557	STATE HWY 11	A30	18	JONESVILLE RD	Driftwood River	0.6128
1135.1667	STATE HWY 11	A30	18	W HWY 11 SW	Buck Creek	0.7049
1290.1959	STATE HWY 120	A30	18		Fawn River	0.8012
547.9375	STATE HWY 120	A30	18		Fawn River	0.3403
794.8339	STATE HWY 120	A30	18	TOLEDO ST	Fawn River	0.4936
10.1251	STATE HWY 129	A30	18		Laughery Creek	0.0063
9003.6113	STATE HWY 129	A30	18	S STATE HWY 129	Laughery Creek	5.5912
53.1718	STATE HWY 13	A30	18		White River	0.0330
1298.4617	STATE HWY 13	A30	18		White River	0.8063
555.2190	STATE HWY 13	A30	18		White River	0.3448
1611.7957	STATE HWY 135	A30	18	HWY 135 NE	Indian Creek	1.0009
2982.8970	STATE HWY 135	A30	18	HWY 135 NW	Indian Creek	1.8524
1470.3298	STATE HWY 135	A30	18	HWY 135 NW	Indian Creek	0.9131
2175.0706	STATE HWY 135	A30	18	HWY 135 SW	Indian Creek	1.3507
440.4225	STATE HWY 135	A30	18	OLD STATE HWY 135 N	Indian Creek	0.2735
705.5169	STATE HWY 13	A30	18	N STATE HWY 13	White River	0.4381
439.9158	STATE HWY 13	A30	18	N STATE HWY 13	White River	0.2732

213.1312	STATE HWY 13	A30	18	N STATE HWY 13	White River	0.1324
495.1405	STATE HWY 140	A30	18	S JEFFERSON ST	Big Blue River	0.3075
1913.9339	STATE HWY 157	A30	18		White River	1.1886
305.0495	STATE HWY 157	A30	18	HANNA ST	White River	0.1894
64.4250	STATE HWY 157	A30	18	S JEFFERSON ST	White River	0.0400
1568.7637	STATE HWY 157	A30	18	SMITH FERRY RD	White River	0.9742
4311.5063	STATE HWY 165	A30	18		Cypress Slough Creek	2.6774
719.0144	STATE HWY 1	A30	18	BELFOUNTAIN ST	Fish Creek	0.4465
458.9369	STATE HWY 1	A30	18	COUNTY HWY 800 W	White River	0.2850
3093.8799	STATE HWY 1	A30	18	N STATE HWY 1	White River	1.9213
1338.9051	STATE HWY 1	A30	18	STATE HWY 427	Fish Creek	0.8315
1480.9879	STATE HWY 213	A30	18	STATE HWY 213 N	White River	0.9197
351.9317	STATE HWY 213	A30	18	WALNUT GROVE RD	White River	0.2185
632.6032	STATE HWY 229	A30	18	MAIN ST	Laughery Creek	0.3928
8963.3646	STATE HWY 229	A30	18	N STATE HWY 229	Laughery Creek	5.5662
556.6307	STATE HWY 229	A30	18	W STATE HWY 229	Laughery Creek	0.3457
66.7067	STATE HWY 229	A30	18	W STATE HWY 229	Laughery Creek	0.0414
1125.6104	STATE HWY 232	A30	18	E STATE HWY 232	White River	0.6990
2473.9509	STATE HWY 232	A30	18	MOUNDS RD	White River	1.5363
1365.0997	STATE HWY 232	A30	18	S SHORT ST	White River	0.8477
2438.1041	STATE HWY 236	A30	18		Roaring Creek	1.5141
3778.1434	STATE HWY 236	A30	18		Roaring Creek	2.3462
526.1665	STATE HWY 236	A30	18	GUION RD	Roaring Creek	0.3267
341.2224	STATE HWY 236	A30	18	GUION RD	Roaring Creek	0.2119
63.3404	STATE HWY 236	A30	18	MAIN ST	Roaring Creek	0.0393
4408.9966	STATE HWY 250	A30	18		Muscatatuck, Vernon Fork	2.7380
573.1508	STATE HWY 252	A30	18		Big Blue River	0.3559
7.7692	STATE HWY 252	A30	18		Sugar Creek	0.0048
137.6103	STATE HWY 252	A30	18	E CENTER CROSS ST	Big Blue River	0.0855
319.3262	STATE HWY 252	A30	18	EISENHOWER DR	Big Blue River	0.1983
264.3107	STATE HWY 252	A30	18	N GRANT ST	Big Blue River	0.1641
510.8044	STATE HWY 252	A30	18	SHELBY AVE	Big Blue River	0.3172
313.3461	STATE HWY 252	A30	18	SHELBY AVE	Big Blue River	0.1946
845.2421	STATE HWY 252	A30	18	SHELBYVILLE RD	Big Blue River	0.5249
854.8512	STATE HWY 252	A30	18	W CENTER CROSS ST	Big Blue River	0.5309
1229.0978	STATE HWY 252	A30	18	W STATE HWY 252	Sugar Creek	0.7633
293.9645	STATE HWY 252	A30	18	W STATE HWY 252	Sugar Creek	0.1826
5738.6406	STATE HWY 262	A30	18		Laughery Creek	3.5637
528.7410	STATE HWY 26	A30	18	COUNTY HWY 900 N	Little Pine Creek	0.3283
2356.2032	STATE HWY 3	A30	18		Pigeon Creek	1.4632

2153.0550	STATE HWY 32	A30	18		White River	1.3370
964.9874	STATE HWY 32	A30	18		White River	0.5993
2875.2697	STATE HWY 32	A30	18		White River	1.7855
3207.6203	STATE HWY 32	A30	18		White River	1.9919
1816.2872	STATE HWY 32	A30	18		White River	1.1279
1737.2418	STATE HWY 32	A30	18		White River	1.0788
409.5227	STATE HWY 327	A30	18	N BRONSON RD	Fawn River	0.2543
138.6599	STATE HWY 32	A30	18	ARROW AVE	White River	0.0861
552.8119	STATE HWY 32	A30	18	E 14TH ST	White River	0.3433
169.4733	STATE HWY 32	A30	18	E 18TH ST	White River	0.1052
4480.7213	STATE HWY 32	A30	18	E JACKSON ST	White River	2.7825
1504.4314	STATE HWY 32	A30	18	E SMITH ST	White River	0.9343
1703.7322	STATE HWY 32	A30	18	E STATE HWY 32	White River	1.0580
2817.1625	STATE HWY 32	A30	18	E STATE HWY 32	White River	1.7495
1063.9215	STATE HWY 32	A30	18	E WASHINGTON ST	White River	0.6607
1009.0237	STATE HWY 32	A30	18	KILGORE AVE	White River	0.6266
215.9002	STATE HWY 32	A30	18	MAIN ST	White River	0.1341
609.3532	STATE HWY 32	A30	18	MOUNDS RD	White River	0.3784
3368.2286	STATE HWY 32	A30	18	NICHOL AVE	White River	2.0917
667.0540	STATE HWY 32	A30	18	OHIO AVE	White River	0.4142
617.6068	STATE HWY 32	A30	18	OHIO AVE	White River	0.3835
1922.0960	STATE HWY 32	A30	18	W 14TH ST	White River	1.1936
696.1502	STATE HWY 32	A30	18	W JACKSON ST	White River	0.4323
5072.9101	STATE HWY 32	A30	18	W KILGORE AVE	White River	3.1503
282.2929	STATE HWY 32	A30	18	W STATE HWY 32	White River	0.1753
794.0486	STATE HWY 32	A30	18	W STATE HWY 32	White River	0.4931
8061.7446	STATE HWY 32	A30	18	W STATE HWY 32	White River	5.0063
787.6673	STATE HWY 32	A30	18	W WASHINGTON ST	White River	0.4891
1577.8863	STATE HWY 337	A30	18	HWY 337 N	Indian Creek	0.9799
301.4422	STATE HWY 337	A30	18	HWY 337 N	Indian Creek	0.1872
126.4279	STATE HWY 337	A30	18	HWY 337 NW	Indian Creek	0.0785
379.2365	STATE HWY 337	A30	18	HWY 337 NW	Indian Creek	0.2355
19.5135	STATE HWY 337	A30	18	HWY 337 S	Little Indian Creek	0.0121
484.8307	STATE HWY 337	A30	18	HWY 337 SE	Little Indian Creek	0.3011
4710.7902	STATE HWY 337	A30	18	HWY 337 SE	Buck Creek	2.9254
792.9803	STATE HWY 337	A30	18	N CAPITOL AVE	Indian Creek	0.4924
379.1120	STATE HWY 337	A30	18	N HWY 337	Little Indian Creek	0.2354
175.1752	STATE HWY 337	A30	18	OLD STATE HWY 135	Little Indian Creek	0.1088
656.3211	STATE HWY 337	A30	18	S CAPITOL AVE	Little Indian Creek	0.4076
269.2761	STATE HWY 337	A30	18	S HWY 337	Little Indian Creek	0.1672

2328.0136	STATE HWY 350	A30	18	E STATE HWY 350	Laughery Creek	1.4457
1541.2499	STATE HWY 350	A30	18	W STATE HWY 350	Laughery Creek	0.9571
266.2382	STATE HWY 37	A30	18		Little Blue River	0.1653
11073.4421	STATE HWY 37	A30	18		Little Blue River	6.8766
743.5925	STATE HWY 37	A30	18		Little Blue River	0.4618
85.5952	STATE HWY 37A	A30	18	9TH	White River	0.0532
180.5018	STATE HWY 37A	A30	18	ALLISONVILLE RD	White River	0.1121
619.8601	STATE HWY 37A	A30	18	ALLISONVILLE RD	White River	0.3849
3198.4446	STATE HWY 37A	A30	18	ALLISONVILLE RD	White River	1.9862
567.7240	STATE HWY 37A	A30	18	E 91ST ST	White River	0.3526
2661.5937	STATE HWY 37	A30	18	MAIN ST	Little Blue River	1.6528
9466.6581	STATE HWY 37	A30	18	STATE HWY 37 N	White River	5.8788
23.9344	STATE HWY 38	A30	18		Big Blue River	0.0149
32.1419	STATE HWY 38	A30	18		Big Blue River	0.0200
254.2217	STATE HWY 38	A30	18		Big Blue River	0.1579
174.1249	STATE HWY 38	A30	18	BROAD ST	Big Blue River	0.1081
749.9246	STATE HWY 38	A30	18	BROAD ST	Big Blue River	0.4657
375.0557	STATE HWY 38	A30	18	BROAD ST	Big Blue River	0.2329
1847.4825	STATE HWY 38	A30	18	W STATE HWY 38	Big Blue River	1.1473
3883.7437	STATE HWY 39	A30	18		Kankakee	2.4118
3954.5108	STATE HWY 39	A30	18	COUNTY HWY 200 W	Kankakee	2.4558
1990.2101	STATE HWY 39	A30	18	MORTON AVE	White River	1.2359
2025.8119	STATE HWY 39	A30	18	STATE HWY 39 BYPASS	White River	1.2580
7141.7008	STATE HWY 39	A30	18	STATE HWY 39 N	White River	4.4350
561.2303	STATE HWY 3	A30	18	N STATE HWY 3	Pigeon Creek	0.3485
5866.0627	STATE HWY 3	A30	18	S STATE HWY 3	Muscatatuck, Vernon Fork	3.6428
2547.2774	STATE HWY 3	A30	18	STATE HWY 7	Muscatatuck, Vernon Fork	1.5819
224.7691	STATE HWY 3	A30	18	STATE HWY 7	Muscatatuck, Vernon Fork	0.1396
447.3226	STATE HWY 4	A30	18		Kankakee	0.2778
640.2347	STATE HWY 427	A30	18		Fish Creek	0.3976
330.4678	STATE HWY 427	A30	18		Fish Creek	0.2052
3541.6241	STATE HWY 427	A30	18	E STATE HWY 427	Fish Creek	2.1993
782.1958	STATE HWY 427	A30	18	E STATE HWY 427	Fish Creek	0.4857
1412.7986	STATE HWY 427	A30	18	WAYNE ST	Fish Creek	0.8773
402.3515	STATE HWY 431	A30	18		White River	0.2499
2327.9015	STATE HWY 431	A30	18	N KEYSTONE AVE	White River	1.4456
4250.5042	STATE HWY 431	A30	18	N KEYSTONE AVE	White River	2.6396
243.6748	STATE HWY 44	A30	18		Big Blue River	0.1513
2902.6192	STATE HWY 44	A30	18		Big Blue River	1.8025
4253.9671	STATE HWY 44	A30	18		Sugar Creek	2.6417

910.8708	STATE HWY 44	A30	18	E BROADWAY ST	Big Blue River	0.5657
731.7019	STATE HWY 44	A30	18	E STATE HWY 44	Big Blue River	0.4544
4393.6699	STATE HWY 44	A30	18	FRANKLIN RD	Big Blue River	2.7285
1300.6464	STATE HWY 44	A30	18	OLD STATE HWY 44	Big Blue River	0.8077
989.2424	STATE HWY 44	A30	18	W BRODWAY ST	Big Blue River	0.6143
826.0622	STATE HWY 44	A30	18	W FRANKLIN ST	Big Blue River	0.5130
474.4903	STATE HWY 44	A30	18	W WASHINGTON ST	Big Blue River	0.2947
366.1283	STATE HWY 47	A30	18		Roaring Creek	0.2274
1440.1237	STATE HWY 47	A30	18		Roaring Creek	0.8943
42.9204	STATE HWY 47	A30	18		Rattlesnake Creek	0.0267
2264.8296	STATE HWY 47	A30	18	STATE HWY 47 S	Rattlesnake Creek	1.4065
1405.1153	STATE HWY 47	A30	18	STATE HWY 47 S	Rattlesnake Creek	0.8726
2758.7790	STATE HWY 48	A30	18	E STATE HWY 48	Laughery Creek	1.7132
1752.6717	STATE HWY 48	A30	18	W STATE HWY 48	Laughery Creek	1.0884
1760.6955	STATE HWY 49	A30	18		Kankakee	1.0934
1691.1506	STATE HWY 49	A30	18	N STATE HWY 49	Kankakee	1.0502
2866.7786	STATE HWY 4	A30	18	E STATE HWY 4	Kankakee	1.7803
1353.2987	STATE HWY 55	A30	18	HARRISON ST	Kankakee	0.8404
1906.0664	STATE HWY 55	A30	18	N STATE HWY 55	Kankakee	1.1837
345.9095	STATE HWY 55	A30	18	SHELBY RD	Kankakee	0.2148
617.1805	STATE HWY 5	A30	18	5TH ST	Fawn River	0.3833
5153.9090	STATE HWY 62	A30	18		Turkey Fork	3.2006
5216.0793	STATE HWY 62	A30	18		Little Blue River	3.2392
3755.4556	STATE HWY 62	A30	18		Stinking Fork	2.3321
3343.0593	STATE HWY 62	A30	18		Oil Creek	2.0760
973.8382	STATE HWY 62	A30	18		Laughery Creek	0.6048
1498.8780	STATE HWY 62	A30	18	E CHESTNUT ST	Little Indian Creek	0.9308
5100.3659	STATE HWY 62	A30	18	E STATE HWY 62	Laughery Creek	3.1673
4967.1699	STATE HWY 62	A30	18	HWY 62	Fourteenmile Creek	3.0846
15607.6673	STATE HWY 62	A30	18	HWY 62 NE	Little Indian Creek	9.6924
2222.7789	STATE HWY 62	A30	18	HWY 62 NW	Indian Creek	1.3803
182.8916	STATE HWY 62	A30	18	STATE HWY 337	Indian creek	0.1136
1205.5374	STATE HWY 62	A30	18	W HWY 62	Indian Creek	0.7486
6643.3112	STATE HWY 66	A30	18		Stinking Fork	4.1255
4746.1235	STATE HWY 66	A30	18		Oil Creek	2.9473
3645.5160	STATE HWY 66	A30	18		Turkey Fork	2.2639
3588.6692	STATE HWY 67	A30	18		White River	2.2286
284.2015	STATE HWY 67	A30	18		White River	0.1765
5103.6281	STATE HWY 67	A30	18		White River	3.1694
1485.5411	STATE HWY 67	A30	18	N STATE HWY 67	White River	0.9225

1577.9426	STATE HWY 67	A30	18	N STATE HWY 67	White River	0.9799
2563.6820	STATE HWY 67	A30	18	N STATE HWY 67	White River	1.5920
64.0290	STATE HWY 67	A30	18	N STATE HWY 67	White River	0.0398
330.8036	STATE HWY 67	A30	18	N STATE HWY 67	White River	0.2054
2554.0008	STATE HWY 68	A30	18		Cypress Slough Creek	1.5860
736.5757	STATE HWY 68	A30	18	CYNTHIANA RD	Cypress Slough Creek	0.4574
36.8168	STATE HWY 68	A30	18	STATE HWY 165	Cypress Slough Creek	0.0229
413.3416	STATE HWY 70	A30	18		Oil Creek	0.2567
301.1290	STATE HWY 7	A30	18	2ND ST	Driftwood River	0.1870
394.8521	STATE HWY 7	A30	18	3RD ST	Driftwood River	0.2452
100.8263	STATE HWY 7	A30	18	LINDSAY ST	Driftwood River	0.0626
1841.3802	STATE HWY 7	A30	18	S STATE HWY 7	Muscatatuck, Vernon Fork	1.1435
2183.0403	STATE HWY 8	A30	18		Kankakee	1.3557
2370.6963	STATE HWY 8	A30	18	COUNTY HWY 100 N	Kankakee	1.4722
4259.1945	STATE HWY 9 BUS	A30	18	N BROADWAY ST	White River	2.6450
611.3155	W STATE HWY 256	A30	18		Muscatatuck, Vernon Fork	0.3796
148.0661	STATE HWY 11	A31	18		Buck Creek	0.0919
2947.3429	STATE HWY 11	A31	18	HWY 11	Buck Creek	1.8303
3682.1109	STATE HWY 26	A31	18	STATE HWY 26 W	Little Pine Creek	2.2866
144.8653	STATE HWY 3	A31	18	STATE HWY 7	Muscatatuck, Vernon Fork	0.0900
145.5567	RAMP	A60	18		White River	0.0904
53.9016	RAMP	A60	18		White River	0.0335
63.7592	RAMP	A60	18		White River	0.0396
92.3700	RAMP	A60	18		White River	0.0574
64.5018	RAMP	A60	18		White River	0.0401
247.5535	RAMP	A60	18		White River	0.1537
100.9821	RAMP	A60	18		White River	0.0627
905.0645	RAMP	A60	18		White River	0.5620
198.2060	RAMP	A60	18		White River	0.1231
69.4162	RAMP	A60	18		White River	0.0431
55.8611	RAMP	A60	18		White River	0.0347
216.1082	RAMP	A60	18		White River	0.1342
293.9255	RAMP	A60	18		White River	0.1825
616.7580	RAMP	A60	18		White River	0.3830
1918.4492	RAMP	A60	18		White River	1.1914
264.4205	RAMP	A63	18		Driftwood River	0.1642
454.9779	RAMP	A63	18		Fawn River	0.2825
134.7670	RAMP	A63	18		Fawn River	0.0837
189.6356	RAMP	A63	18		Fawn River	0.1178
320.6062	RAMP	A63	18		Sugar Creek	0.1991

66.0216	RAMP	A63	18	Fawn River 0.0410
382.5220	RAMP	A63	18	Fawn River 0.2375
96.0156	RAMP	A63	18	Fawn River 0.0596
92.6537	RAMP	A63	18	Fawn River 0.0575
343.5879	RAMP	A63	18	Big Blue River 0.2134
964.8741	RAMP	A63	18	White River 0.5992
254.8865	RAMP	A63	18	Big Blue River 0.1583
154.6889	RAMP	A63	18	Big Blue River 0.0961
211.1233	RAMP	A63	18	Big Blue River 0.1311
464.2860	RAMP	A63	18	Driftwood River 0.2883
394.3277	RAMP	A63	18	Sugar Creek 0.2449
477.9965	RAMP	A63	18	Big Blue River 0.2968
244.6675	RAMP	A63	18	Big Blue River 0.1519
64.1190	RAMP	A63	18	Big Blue River 0.0398
81.4341	RAMP	A63	18	White River 0.0506
975.2377	RAMP	A63	18	White River 0.6056
15.5455	RAMP	A63	18	White River 0.0097
16.5309	RAMP	A63	18	White River 0.0103
836.8385	RAMP	A63	18	Little Blue River 0.5197
261.2591	RAMP	A63	18	Big Blue River 0.1622
505.0980	RAMP	A63	18	Sugar Creek 0.3137
1060.4134	RAMP	A63	18	Driftwood River 0.6585
1331.3658	RAMP	A63	18	White River 0.8268
173.6121	RAMP	A63	18	Indian Creek 0.1078
361.6758	RAMP	A63	18	Indian Creek 0.2246
626.5255	RAMP	A63	18	Indian Creek 0.3891
829.9099	RAMP	A63	18	Little Blue River 0.5154
224.6381	RAMP	A63	18	White River 0.1395
50.9003	RAMP	A63	18	White River 0.0316
88.4678	RAMP	A63	18	White River 0.0549
53.6642	RAMP	A63	18	White River 0.0333
73.2818	RAMP	A63	18	Fawn River 0.0455
287.1163	RAMP	A63	18	Fawn River 0.1783
253.1198	RAMP	A63	18	Fawn River 0.1572
345.2541	RAMP	A63	18	Driftwood River 0.2144
91.6669	RAMP	A63	18	Driftwood River 0.0569
85.0786	RAMP	A63	18	Driftwood River 0.0528
27.1139	RAMP	A63	18	White River 0.0168
249.7088	RAMP	A63	18	Driftwood River 0.1551
811.5706	RAMP	A63	18	Driftwood River 0.5040

56.8459	RAMP	A63	18
41.2696	RAMP	A63	18
60.3096	RAMP	A63	18
49.7982	RAMP	A63	18
30.7532	RAMP	A63	18
52.4409	RAMP	A63	18
223.7838	RAMP	A63	18
49.1203	RAMP	A63	18
123.7042	RAMP	A63	18
175.5667	RAMP	A63	18
487.0469	RAMP	A63	18
568.8783	RAMP	A63	18
74.9539	RAMP	A63	18
513.6338	RAMP	A63	18
620.2960	RAMP	A63	18
607.2006	RAMP	A63	18
372.3040	RAMP	A63	18
834.4591	RAMP	A63	18
499.9326	RAMP	A63	18
349.5732	RAMP	A63	18
1453.1610	RAMP	A63	18
436.9950	RAMP	A63	18

Driftwood River	0.0353
White River	0.0256
White River	0.0375
White River	0.0309
White River	0.0191
White River	0.0326
White River	0.1390
White River	0.0305
White River	0.0768
Indian Creek	0.1090
White River	0.3025
Driftwood River	0.3533
Driftwood River	0.0465
Driftwood River	0.3190
Driftwood River	0.3852
Oil Creek	0.3771
White River	0.2312
Oil Creek	0.5182
White River	0.3105
Driftwood River	0.2171
Cypress Slough Creek	0.9024
Cypress Slough Creek	0.2714
Total Miles	**608.9135**

Mileage for State Highways within the Karst Boundary:

LENGTH(meters)	HWYNAME	FCC	ST	ALT1_NAME	Length(miles)
1803.3738	STATE HWY 62	A10	18		1.11989513
5492.0873	I 265	A11	18		3.410586213
3369.5149	I 64	A11	18		2.092468753
690.1825	I 64	A11	18		0.428603333
6588.3386	I 64	A11	18		4.091358271
12338.0294	I 64	A11	18		7.661916257
4494.7561	I 64	A11	18		2.791243538
11169.9992	I 64	A11	18		6.936569503
1400.5198	I 64	A11	18		0.869722796
3106.4956	I 64	A11	18		1.929133768
9048.8844	I 64	A11	18	STATE HWY 37	5.619357212
3294.8796	I 64	A11	18	STATE HWY 66	2.046120232
6467.6883	I 64	A11	18	STATE HWY 66	4.016434434
1322.2768	I 65	A11	18		0.821133893
4238.2910	I 65	A11	18		2.631978711
2514.9113	I 65	A11	18	US HWY 31	1.561759917
7158.9204	I 70	A11	18		4.445689568
904.2893	I 70	A11	18		0.561563655
2207.8147	I 70	A11	18		1.371052929
2691.9511	I 70	A11	18		1.671701633
2024.1506	I 70	A11	18		1.256997523
2856.2786	I 70	A11	18		1.773749011
2802.4614	I 70	A11	18		1.740328529
3412.9307	I 70	A11	18		2.119429965
2.1867	I 74	A11	18	US HWY 421	0.001357941
3432.8643	I 74	A11	18	US HWY 421	2.13180873
3020.2386	I 74	A11	18	US HWY 421	1.875568171
4562.9304	I 74	A11	18	US HWY 421	2.833579778
8.1523	I 65	A12	18	US HWY 31	0.005062578
148.4363	I 64	A13	18		0.092178942
170.5924	I 64	A13	18		0.10593788
58.6699	I 64	A13	18		0.036434008
173.7189	I 64	A13	18		0.107879437
185.1091	I 64	A13	18		0.114952751
78.4354	I 64	A13	18	STATE HWY 37	0.048708383
62.2298	I 64	A13	18	STATE HWY 66	0.038644706
110.5956	I 64	A13	18	STATE HWY 66	0.068679868
85.3955	I 64	A13	18	STATE HWY 66	0.053030606

118.4526	I 70	A13	18		0.073559065
125.3070	I 70	A13	18		0.077815647
114.0632	I 70	A13	18		0.070833247
120.5134	I 70	A13	18		0.074838821
152.7543	I 74	A13	18	US HWY 421	0.09486042
126.4925	I 74	A13	18	US HWY 421	0.078551843
134.7759	I 74	A13	18	US HWY 421	0.083695834
620.2339	I 65	A15	18		0.385165252
51.6703	I 65	A15	18	US HWY 31	0.032087256
4519.7651	I 65	A15	18	US HWY 31	2.806774127
2169.9672	STATE HWY 62	A15	18		1.347549631
57.9676	I 64	A17	18		0.03599788
127.5874	I 64	A17	18		0.079231775
154.6165	I 64	A17	18		0.096016847
114.2983	I 70	A17	18		0.070979244
103.6690	I 70	A17	18		0.064378449
113.6648	I 70	A17	18		0.070585841
1010.3553	STATE HWY 131	A20	18	E STATE HWY 131	0.627430641
1876.5441	STATE HWY 131	A20	18	W STATE HWY 131	1.165333886
7867.0695	STATE HWY 3	A20	18		4.88545016
1279.5050	STATE HWY 37	A20	18		0.794572605
9348.6188	STATE HWY 37	A20	18		5.805492275
9515.8083	STATE HWY 37	A20	18		5.909316954
5513.0867	STATE HWY 37	A20	18	N STATE HWY 37	3.423626841
5854.2152	STATE HWY 37	A20	18	N STATE HWY 37 BYPASS	3.635467639
18396.0494	STATE HWY 37	A20	18	S STATE HWY 37 BYPASS	11.42394668
4909.8199	STATE HWY 37	A20	18	STATE HWY 45	3.048998158
3887.3803	STATE HWY 37	A20	18	STATE HWY 58	2.414063166
1294.5648	STATE HWY 37	A20	18	STATE HWY 60	0.803924741
2939.0490	STATE HWY 3	A20	18	COUNTY HWY 800 W	1.825149429
13309.4985	STATE HWY 3	A20	18	N STATE HWY 3	8.265198569
1663.4612	STATE HWY 3	A20	18	STATE HWY 7	1.033009405
3023.5749	STATE HWY 43	A20	18	STATE HWY 46	1.877640013
5062.4387	STATE HWY 45	A20	18	STATE HWY 46	3.143774433
329.6754	STATE HWY 45	A20	18	W STATE HWY 46 BYPASS	0.204728423
13596.6221	STATE HWY 46	A20	18		8.443502324
13.9870	STATE HWY 46	A20	18		0.008685927
3264.6715	STATE HWY 46	A20	18		2.027361002
6150.2816	STATE HWY 46	A20	18		3.819324874
9.4025	STATE HWY 46	A20	18	ARLINGTON RD	0.005838953
3395.3239	STATE HWY 46	A20	18	ARLINGTON RD	2.108496142
2285.6637	STATE HWY 46	A20	18	E 3RD ST	1.419397158

3081.8203	STATE HWY 46	A20	18	E STATE HWY 46	1.913810406
3306.1544	STATE HWY 46	A20	18	E STATE HWY 46	2.053121882
8032.1971	STATE HWY 46	A20	18	E STATE HWY 46	4.987994399
162.3735	STATE HWY 46	A20	18	E STATE HWY 46 BYPASS	0.100833944
838.6155	STATE HWY 46	A20	18	E TEMPERANCE ST	0.520780226
710.3706	STATE HWY 46	A20	18	N STATE HWY 46 BYPASS	0.441140143
6058.1572	STATE HWY 46	A20	18	W STATE HWY 46	3.762115621
3908.2061	STATE HWY 46	A20	18	W STATE HWY 46	2.426995988
2131.1089	STATE HWY 46	A20	18	W TEMPERANCE ST	1.323418627
2390.0212	STATE HWY 56	A20	18	STATE HWY 60	1.484203165
2713.8130	STATE HWY 60	A20	18		1.685277873
1854.3580	STATE HWY 60	A20	18		1.151556318
18218.8976	STATE HWY 60	A20	18		11.31393541
14199.5643	STATE HWY 60	A20	18		8.81792943
709.8330	STATE HWY 60	A20	18	JACKSON ST	0.440806293
622.0990	STATE HWY 60	A20	18	S JACKSON ST	0.386323479
5775.2695	STATE HWY 60	A20	18	S STATE HWY 60	3.58644236
1874.0386	STATE HWY 60	A20	18	S STATE HWY 60	1.163777971
247.8597	STATE HWY 60	A20	18	STATE HWY 135	0.153920874
274.5266	STATE HWY 60	A20	18	STATE HWY 135	0.170481019
184.6444	STATE HWY 60	A20	18	STATE HWY 135	0.114664172
877.0308	STATE HWY 60	A20	18	STATE HWY 135	0.544636127
16924.8579	STATE HWY 60	A20	18	W STATE HWY 60	10.51033676
21260.0004	STATE HWY 64	A20	18		13.20246025
253.7089	STATE HWY 64	A20	18		0.157553227
532.5430	STATE HWY 64	A20	18		0.330709203
450.2522	STATE HWY 64	A20	18		0.279606616
4383.4688	STATE HWY 64	A20	18	HWY 64	2.722134125
3151.3247	STATE HWY 64	A20	18	HWY 64 NE	1.956972639
11918.5326	STATE HWY 64	A20	18	HWY 64 NE	7.401408745
14592.8874	STATE HWY 64	A20	18	HWY 64 NW	9.062183075
5172.7518	STATE HWY 64	A20	18	STATE HWY 66	3.212278868
584.1506	STATE HWY 9	A20	18		0.362757523
8699.6879	STATE HWY 9	A20	18		5.402506186
288.3319	STATE HWY 9	A20	18		0.17905411
661.7376	STATE HWY 9	A20	18		0.41093905
336.8166	STATE HWY 9	A20	18	E STATE HWY 9	0.209163109
792.9752	STATE HWY 9	A20	18	MAIN ST	0.492437599
9493.9227	STATE HWY 9	A20	18	N STATE HWY 9	5.895725997
3229.3699	STATE HWY 9	A20	18	N STATE HWY 9	2.005438708
991.9785	STATE HWY 9	A20	18	N STATE HWY 9	0.616018649
843.3797	STATE HWY 9	A20	18	N STATE HWY 9	0.523738794

3352.1000	STATE HWY 9	A20	18	S STATE HWY 9	2.0816541
21435.4983	US HWY 150	A20	18		13.31144444
1052.5947	US HWY 150	A20	18		0.653661309
117.8489	US HWY 150	A20	18		0.073184167
113.0252	US HWY 150	A20	18		0.070188649
2399.6270	US HWY 150	A20	18		1.490168367
15693.5257	US HWY 150	A20	18	E US HWY 150	9.74567946
2197.6584	US HWY 150	A20	18	HWY 150	1.364745866
4674.0220	US HWY 150	A20	18	HWY 150	2.902567662
6887.9688	US HWY 150	A20	18	HWY 150 NE	4.277428625
1448.2137	US HWY 150	A20	18	MAIN ST	0.899340708
886.6320	US HWY 150	A20	18	MAIN ST	0.550598472
73.5499	US HWY 150	A20	18	STATE HWY 37	0.045674488
14126.5802	US HWY 150	A20	18	STATE HWY 56	8.772606304
473.8093	US HWY 150	A20	18	STATE HWY 56	0.294235575
16422.6332	US HWY 150	A20	18	W US HWY 150	10.19845522
3208.9285	US HWY 231	A20	18		1.992744599
2796.9883	US HWY 231	A20	18	N US HWY 231	1.736929734
11808.3929	US HWY 231	A20	18	S US HWY 231	7.333011991
3349.7632	US HWY 231	A20	18	S US HWY 231	2.080202947
3510.2224	US HWY 231	A20	18	STATE HWY 43	2.17984811
22552.9259	US HWY 231	A20	18	STATE HWY 43	14.00536698
3814.8916	US HWY 231	A20	18	STATE HWY 43	2.369047684
1377.3536	US HWY 231	A20	18	STATE HWY 46	0.855336586
2649.5152	US HWY 231	A20	18	STATE HWY 67	1.645348939
15558.8919	US HWY 231	A20	18	STATE HWY 67	9.66207187
1077.0556	US HWY 31	A20	18		0.668851528
1680.4098	US HWY 31	A20	18		1.043534486
376.1323	US HWY 31	A20	18		0.233578158
2065.4626	US HWY 31	A20	18	E HWY 131	1.282652275
831.4199	US HWY 31	A20	18	HWY 31 E	0.516311758
205.4202	US HWY 31	A20	18	HWY 31 E	0.127565944
699.1963	US HWY 31	A20	18	HWY 31 E	0.434200902
89.7040	US HWY 31	A20	18	HWY 31 E	0.055706184
448.6632	US HWY 31	A20	18	S INDIANA AVE	0.278619847
7818.5893	US HWY 40	A20	18		4.855343955
14786.9550	US HWY 40	A20	18	E US HWY 40	9.182699055
4794.6321	US HWY 40	A20	18	W US HWY 40	2.977466534
178.8549	US HWY 421	A20	18	2ND ST E	0.111068893
125.0541	US HWY 421	A20	18	BALTIMORE ST	0.077658596
479.8690	US HWY 421	A20	18	HARRISON ST	0.297998649
455.8534	US HWY 421	A20	18	JEFFERSON ST	0.283084961

5172.0098	US HWY 421	A20	18	N US 421	3.211818086
900.1506	US HWY 421	A20	18	N US HWY 421	0.558993523
2080.5162	US HWY 421	A20	18	S ADAMS ST	1.29200056
184.7770	US HWY 421	A20	18	S US HWY 421	0.114746517
455.3753	US HWY 421	A20	18	STATE HWY 56	0.282788061
31682.1619	US HWY 50	A20	18		19.67462254
1297.4631	US HWY 50	A20	18		0.805724585
12924.1551	US HWY 50	A20	18		8.025900317
355.5007	US HWY 50	A20	18	BUCKEYE ST	0.220765935
250.1813	US HWY 50	A20	18	BUCKEYE ST	0.155362587
120.5990	US HWY 50	A20	18	BUCKEYE ST	0.074891979
213.8067	US HWY 50	A20	18	COUNTY HWY L2W3 S	0.132773961
11497.2787	US HWY 50	A20	18	E US HWY 50	7.139810073
16483.6363	US HWY 50	A20	18	E US HWY 50	10.23633814
209.5874	US HWY 50	A20	18	E US HWY 50 N	0.130153775
102.2393	US HWY 50	A20	18	E US HWY 50 N	0.063490605
366.8748	US HWY 50	A20	18	E WALNUT ST	0.227829251
2365.3079	US HWY 50	A20	18	STATE HWY 37	1.468856206
7782.6640	US HWY 50	A20	18	US HWY 150	4.833034344
717.7975	US HWY 50	A20	18	US HWY 421	0.445752248
2750.2664	US HWY 50	A20	18	W US HWY 50	1.707915434
10161.9806	US HWY 50	A20	18	W US HWY 50	6.310589953
251.3722	US HWY 50	A20	18	W US HWY 50	0.156102136
1332.1163	US HWY 50	A20	18	W WALNUT ST	0.827244222
360.6882	STATE HWY 37	A21	18		0.223987372
3869.9408	STATE HWY 37	A21	18		2.403233237
2057.8928	STATE HWY 37	A21	18	N STATE HWY 37	1.277951429
342.9551	STATE HWY 37	A21	18	N STATE HWY 37	0.212975117
1052.8770	STATE HWY 37	A21	18	STATE HWY 58	0.653836617
2150.6103	US HWY 231	A21	18	STATE HWY 67	1.335528996
1004.3023	US HWY 50	A21	18		0.623671728
9403.1752	US HWY 50	A21	18		5.839371799
490.4887	US HWY 50	A21	18		0.304593483
2212.4405	US HWY 50	A21	18	16TH ST	1.373925551
771.1635	US HWY 50	A21	18	M ST	0.478892534
488.9665	US HWY 50	A21	18	Q ST	0.303648197
1476.5449	US HWY 50	A21	18	US HWY 50 E	0.916934383
59.5872	US HWY 50	A23	18		0.037003651
4245.8467	STATE HWY 37	A25	18	N STATE HWY 37	2.636670801
75.5035	US HWY 50	A27	18	STATE HWY 37	0.046887674
4266.1538	STATE HWY 101	A30	18	N STATE HWY 101	2.64928151
2658.0745	STATE HWY 101	A30	18	S STATE HWY 101	1.650664265

8098.3920	STATE HWY 111	A30	18	HWY 111 SE	5.029101432
1802.5413	STATE HWY 111	A30	18	HWY 111 SE	1.119378147
10090.7273	STATE HWY 111	A30	18	HWY 111 SE	6.266341653
384.5295	STATE HWY 11	A30	18	BEECH ST SE	0.23879282
13085.1789	STATE HWY 11	A30	18	E HWY 11 SE	8.125896097
8356.2400	STATE HWY 11	A30	18	N HWY 11 SE	5.18922504
5959.5125	STATE HWY 11	A30	18	S HWY 11 SE	3.700857263
2422.5439	STATE HWY 11	A30	18	W HWY 11 SE	1.504399762
8153.1033	STATE HWY 11	A30	18	W HWY 11 SW	5.063077149
10.1251	STATE HWY 129	A30	18		0.006287687
3506.7766	STATE HWY 129	A30	18	N STATE HWY 129	2.177708269
9468.9713	STATE HWY 129	A30	18	S STATE HWY 129	5.880231177
1605.7154	STATE HWY 129	A30	18	S STATE HWY 129	0.997149263
88.1091	STATE HWY 135	A30	18		0.054715751
575.9546	STATE HWY 135	A30	18		0.357667807
1996.0290	STATE HWY 135	A30	18		1.239534009
9.7697	STATE HWY 135	A30	18		0.006066984
21349.2295	STATE HWY 135	A30	18	HWY 135 NE	13.25787152
2982.8970	STATE HWY 135	A30	18	HWY 135 NW	1.852379037
1470.3298	STATE HWY 135	A30	18	HWY 135 NW	0.913074806
762.3845	STATE HWY 135	A30	18	HWY 135 S	0.473440775
2499.5881	STATE HWY 135	A30	18	HWY 135 SW	1.55224421
11378.6819	STATE HWY 135	A30	18	HWY 135 SW	7.06616146
807.7099	STATE HWY 135	A30	18	N MAIN ST	0.501587848
5309.8230	STATE HWY 135	A30	18	N STATE HWY 135	3.297400083
120.8600	STATE HWY 135	A30	18	N STATE HWY 135	0.07505406
11539.8219	STATE HWY 135	A30	18	N STATE HWY 135	7.1662294
440.4225	STATE HWY 135	A30	18	OLD STATE HWY 135 N	0.273502373
7450.1554	STATE HWY 135	A30	18	OLD STATE HWY 135 S	4.626546503
356.6645	STATE HWY 135	A30	18	S MAIN ST	0.221488655
10118.4559	STATE HWY 135	A30	18	S STATE HWY 135	6.283561114
8342.0735	STATE HWY 135	A30	18	S STATE HWY 135	5.180427644
13.9271	STATE HWY 135	A30	18	VINCENNES TRL	0.008648729
24740.9640	STATE HWY 145	A30	18		15.36413864
564.1541	STATE HWY 145	A30	18		0.350339696
7617.4034	STATE HWY 157	A30	18		4.730407511
1258.0391	STATE HWY 157	A30	18	SMITH FERRY RD	0.781242281
29.3656	STATE HWY 160	A30	18		0.018236038
17.7680	STATE HWY 160	A30	18		0.011033928
762.9243	STATE HWY 160	A30	18		0.47377599
528.9423	STATE HWY 160	A30	18	E MARKET ST	0.328473168
952.7306	STATE HWY 160	A30	18	E STATE HWY 160	0.591645703

5383.0715	STATE HWY 160	A30	18	E STATE HWY 160	3.342887402
8981.0778	STATE HWY 160	A30	18	E STATE HWY 160	5.577249314
5559.1619	STATE HWY 160	A30	18	HWY 160	3.45223954
1131.7957	STATE HWY 160	A30	18	OLD STATE HWY 60 E	0.70284513
2227.7906	STATE HWY 164	A30	18		1.383457963
736.3552	STATE HWY 164	A30	18		0.457276579
5569.3651	STATE HWY 203	A30	18	CORD 350	3.458575727
945.0989	STATE HWY 203	A30	18	LOCUST ST	0.586906417
321.7637	STATE HWY 203	A30	18	S LOCUST ST	0.199815258
254.4669	STATE HWY 203	A30	18	STATE HWY 356	0.158023945
3356.7113	STATE HWY 211	A30	18	HWY 211 SE	2.084517717
10934.9444	STATE HWY 240	A30	18	E STATE HWY 240	6.790600472
771.7709	STATE HWY 240	A30	18	E WASHINGTON ST	0.479269729
2284.0213	STATE HWY 240	A30	18	INDIANAPOLIS RD	1.418377227
2159.2758	STATE HWY 243	A30	18		1.340910272
12927.2741	STATE HWY 243	A30	18	S STATE HWY 243	8.027837216
6714.3027	STATE HWY 246	A30	18		4.169581977
912.3669	STATE HWY 250	A30	18		0.566579845
383.0214	STATE HWY 250	A30	18	CORD 690	0.237856289
51.2707	STATE HWY 250	A30	18	COUNTY HWY 100 E	0.031839105
2108.4813	STATE HWY 250	A30	18	E STATE HWY 250	1.309366887
8030.7601	STATE HWY 250	A30	18	W STATE HWY 250	4.987102022
5984.3712	STATE HWY 250	A30	18	W STATE HWY 250	3.716294515
2757.7814	STATE HWY 250	A30	18	W STATE HWY 250	1.712582249
5269.3168	STATE HWY 250	A30	18	W STATE HWY 250	3.272245733
405.6826	STATE HWY 252	A30	18	COUNTY HWY 200 W	0.251928895
728.0780	STATE HWY 252	A30	18	COUNTY HWY 50 E	0.452136438
269.6178	STATE HWY 252	A30	18	FLAT ROCK RD	0.167432654
4405.6702	STATE HWY 252	A30	18	FLAT ROCK RD	2.735921194
2310.1382	STATE HWY 256	A30	18		1.434595822
7696.9822	STATE HWY 256	A30	18		4.779825946
546.6415	STATE HWY 256	A30	18	MAIN ST	0.339464372
1436.4092	STATE HWY 3	A30	18		0.892010113
2890.2163	STATE HWY 335	A30	18		1.794824322
860.2668	STATE HWY 335	A30	18	HWY 335	0.534225683
7205.9893	STATE HWY 335	A30	18	HWY 335 NE	4.474919355
7448.7954	STATE HWY 335	A30	18	S STATE HWY 335	4.625701943
2250.6472	STATE HWY 337	A30	18		1.397651911
1151.4422	STATE HWY 337	A30	18	E WASHINGTON ST	0.715045606
1961.2750	STATE HWY 337	A30	18	HWY 337 N	1.217951775
301.4422	STATE HWY 337	A30	18	HWY 337 N	0.187195606
126.4279	STATE HWY 337	A30	18	HWY 337 NW	0.078511726

379.2365	STATE HWY 337	A30	18	HWY 337 NW	0.235505867
14727.9489	STATE HWY 337	A30	18	HWY 337 NW	9.146056267
19.5135	STATE HWY 337	A30	18	HWY 337 S	0.012117884
1259.7302	STATE HWY 337	A30	18	HWY 337 S	0.782292454
1141.5143	STATE HWY 337	A30	18	HWY 337 SE	0.70888038
4428.2138	STATE HWY 337	A30	18	HWY 337 SE	2.74992077
7591.6955	STATE HWY 337	A30	18	HWY 337 SE	4.714442906
792.9803	STATE HWY 337	A30	18	N CAPITOL AVE	0.492440766
379.1120	STATE HWY 337	A30	18	N HWY 337	0.235428552
13950.4164	STATE HWY 337	A30	18	N STATE HWY 337	8.663208584
175.1752	STATE HWY 337	A30	18	OLD STATE HWY 135	0.108783799
656.3211	STATE HWY 337	A30	18	S CAPITOL AVE	0.407575403
269.2761	STATE HWY 337	A30	18	S HWY 337	0.167220458
2814.6792	STATE HWY 337	A30	18	S STATE HWY 337	1.747915783
810.5435	STATE HWY 337	A30	18	WISEMAN RD SE	0.503347514
43.5549	STATE HWY 356	A30	18		0.027047593
65.2939	STATE HWY 356	A30	18	E MAIN ST	0.040547512
1342.1636	STATE HWY 356	A30	18	E STATE HWY 356	0.833483596
5947.4331	STATE HWY 356	A30	18	E STATE HWY 356	3.693355955
98.8624	STATE HWY 356	A30	18	MAIN ST	0.06139355
5511.4159	STATE HWY 356	A30	18	W STATE HWY 356	3.422589274
2746.6709	STATE HWY 362	A30	18	E STATE HWY 362	1.705682629
3986.7939	STATE HWY 362	A30	18	W STATE HWY 362	2.475799012
12383.7927	STATE HWY 37	A30	18		7.690335267
4670.1794	STATE HWY 37	A30	18		2.900181407
3752.0847	STATE HWY 37	A30	18		2.330044599
6439.6634	STATE HWY 37	A30	18		3.999030971
536.4056	STATE HWY 37 BUS	A30	18	N STATE HWY 37 BUS	0.333107878
870.3871	STATE HWY 37 BUS	A30	18	N STATE HWY 37 BUS	0.540510389
2879.2230	STATE HWY 37 BUS	A30	18	N STATE HWY 37 BUSINESS	1.787997483
98.9083	STATE HWY 37	A30	18	COURT ST	0.061422054
556.5137	STATE HWY 37	A30	18	HWY 37 N	0.345595008
1036.1701	STATE HWY 37	A30	18	HWY 37 S	0.643461632
2661.5937	STATE HWY 37	A30	18	MAIN ST	1.652849688
659.3584	STATE HWY 37	A30	18	MAPLE ST	0.409461566
1392.1012	STATE HWY 37	A30	18	N GOSPEL ST	0.864494845
5497.5016	STATE HWY 37	A30	18	N STATE HWY 37	3.413948494
2229.0904	STATE HWY 37	A30	18	N STATE HWY 37	1.384265138
123.1787	STATE HWY 37	A30	18	NW 1ST ST	0.076493973
20231.4780	STATE HWY 37	A30	18	S STATE HWY 37	12.56374784
155.0177	STATE HWY 37	A30	18	SW 1ST ST	0.096265992
265.3715	STATE HWY 3	A30	18	HWY 3	0.164795702

3392.1253	STATE HWY 3	A30	18	HWY 3	2.106509811
4287.8749	STATE HWY 3	A30	18	MARKET ST	2.662770313
95.0615	STATE HWY 3	A30	18	N STATE HWY 3	0.059033192
8270.7091	STATE HWY 3	A30	18	N STATE HWY 3	5.136110351
18802.6477	STATE HWY 3	A30	18	S STATE HWY 3	11.67644422
582.0281	STATE HWY 3	A30	18	S STATE HWY 3	0.36143945
4734.7807	STATE HWY 3	A30	18	STATE HWY 56	2.940298815
20261.2911	STATE HWY 3	A30	18	STATE HWY 62	12.58226177
2547.2774	STATE HWY 3	A30	18	STATE HWY 7	1.581859265
224.7691	STATE HWY 3	A30	18	STATE HWY 7	0.139581611
592.4196	STATE HWY 403	A30	18		0.367892572
336.7631	STATE HWY 403	A30	18		0.209129885
6732.6195	STATE HWY 403	A30	18	HWY 403	4.18095671
853.2028	STATE HWY 403	A30	18	HWY 403	0.529838939
389.8531	STATE HWY 403	A30	18	HWY 403	0.242098775
11429.5699	STATE HWY 42	A30	18		7.097762908
2013.1156	STATE HWY 42	A30	18		1.250144788
1536.0027	STATE HWY 42	A30	18	COUNTY HWY 500 N	0.953857677
246.8422	STATE HWY 42	A30	18	COUNTY HWY 900 E	0.153289006
1007.0369	STATE HWY 42	A30	18	E COUNTY HWY 1100 S	0.625369915
2991.5150	STATE HWY 42	A30	18	E STATE HWY 42	1.857730815
1083.3069	STATE HWY 42	A30	18	E STATE HWY 42	0.672733585
3167.3310	STATE HWY 42	A30	18	E STATE HWY 42	1.966912551
6016.9498	STATE HWY 42	A30	18	S STATE HWY 42	3.736525826
368.0581	STATE HWY 43	A30	18		0.22856408
979.3224	STATE HWY 43	A30	18		0.60815921
3974.4048	STATE HWY 43	A30	18		2.468105381
627.6124	STATE HWY 43	A30	18		0.3897473
7391.4018	STATE HWY 43	A30	18		4.590060518
7800.2905	STATE HWY 43	A30	18		4.843980401
709.9146	STATE HWY 43	A30	18		0.440856967
10291.2136	STATE HWY 43	A30	18		6.390843646
271.6948	STATE HWY 43	A30	18	COUNTY HWY 1100 E	0.168722471
524.1664	STATE HWY 43	A30	18	COUNTY HWY 1290 E	0.325507334
371.9322	STATE HWY 43	A30	18	COUNTY HWY 200 E	0.230969896
167.6688	STATE HWY 43	A30	18	COUNTY HWY 400 E	0.104122325
1275.6754	STATE HWY 43	A30	18	COUNTY HWY 750 S	0.792194423
1373.1982	STATE HWY 43	A30	18	COUNTY HWY 750 S	0.852756082
447.5412	STATE HWY 43	A30	18	W STATE HWY 48	0.277923085
681.5774	STATE HWY 43	A30	18	WHITE RD	0.423259565
2167.0288	STATE HWY 445	A30	18		1.345724885
13898.4751	STATE HWY 446	A30	18		8.630953037

8336.7774	STATE HWY 446	A30	18	S STATE HWY 446	5.177138765
8453.8291	STATE HWY 446	A30	18	S STATE HWY 446	5.249827871
12138.8646	STATE HWY 45	A30	18		7.538234917
9190.9794	STATE HWY 45	A30	18		5.707598207
40743.5705	STATE HWY 450	A30	18		25.30175728
3051.3080	STATE HWY 450	A30	18	16TH ST	1.894862268
259.1136	STATE HWY 45	A30	18	E STATE HWY 45	0.160909546
12123.8048	STATE HWY 45	A30	18	E STATE HWY 45	7.528882781
811.9088	STATE HWY 45	A30	18	N STATE HWY 45	0.504195365
1265.3894	STATE HWY 45	A30	18	N STATE HWY 45	0.785806817
12022.7748	STATE HWY 45	A30	18	S STATE HWY 45	7.466143151
228.1766	STATE HWY 45	A30	18	STATE HWY 54	0.141697669
7300.2477	STATE HWY 45	A30	18	STATE HWY 58	4.533453822
1303.8531	STATE HWY 48	A30	18	W 3RD ST	0.809692775
8456.6042	STATE HWY 48	A30	18	W STATE HWY 48	5.251551208
13887.7270	STATE HWY 54	A30	18		8.624278467
20162.4438	STATE HWY 54	A30	18		12.5208776
8479.9204	STATE HWY 54	A30	18	STATE HWY 58	5.266030568
10015.7617	STATE HWY 550	A30	18		6.219788016
13967.4993	STATE HWY 56	A30	18		8.673817065
679.4444	STATE HWY 56	A30	18		0.421934972
649.3255	STATE HWY 56	A30	18		0.403231136
1446.3157	STATE HWY 56	A30	18	BROADWAY ST	0.89816205
3865.0806	STATE HWY 56	A30	18	CLIFTY HOLLOW RD	2.400215053
1464.9480	STATE HWY 56	A30	18	E HACKBERRY ST	0.909732708
110.8770	STATE HWY 56	A30	18	E MAIN ST	0.068854617
260.5541	STATE HWY 56	A30	18	E MAIN ST	0.161804096
929.1662	STATE HWY 56	A30	18	E MCCLAIN ST	0.57701221
8462.8634	STATE HWY 56	A30	18	E STATE HWY 56	5.255438171
12274.0253	STATE HWY 56	A30	18	E STATE HWY 56	7.622169711
5500.3089	STATE HWY 56	A30	18	E STATE HWY 56	3.415691827
669.6415	STATE HWY 56	A30	18	INDIANA AVE	0.415847372
2148.4437	STATE HWY 56	A30	18	MAIN ST W	1.334183538
154.6736	STATE HWY 56	A30	18	NE 3RD ST	0.096052306
498.2924	STATE HWY 56	A30	18	PARK AVE	0.30943958
245.8662	STATE HWY 56	A30	18	SERING ST	0.15268291
2643.5222	STATE HWY 56	A30	18	STATE HWY 62	1.641627286
6474.2115	STATE HWY 56	A30	18	W STATE HWY 56	4.020485342
17791.2012	STATE HWY 56	A30	18	W STATE HWY 56	11.04833595
2375.7542	STATE HWY 56	A30	18	W STATE HWY 56	1.475343358
13796.7277	STATE HWY 56	A30	18	W STATE HWY 56	8.567767902
626.5990	STATE HWY 56	A30	18	WELLS AVE	0.389117979

10982.2253	STATE HWY 58	A30	18		6.819961911
12302.2262	STATE HWY 58	A30	18		7.63968247
1434.6856	STATE HWY 58	A30	18		0.890939758
1872.2218	STATE HWY 58	A30	18	5TH ST	1.162649738
557.5116	STATE HWY 58	A30	18	5TH ST	0.346214704
280.5076	STATE HWY 58	A30	18	BROADWAY ST	0.17419522
525.3648	STATE HWY 58	A30	18	COUNTY HWY 50 E	0.326251541
13.4287	STATE HWY 58	A30	18	H ST	0.008339223
973.6991	STATE HWY 58	A30	18	HELTONVILLE RD	0.604667141
153.8189	STATE HWY 58	A30	18	HILTONVILLE RD	0.095521537
733.0793	STATE HWY 58	A30	18	MACKEY ST	0.455242245
10507.4334	STATE HWY 58	A30	18	STATE HWY 58 E	6.525116141
3435.7969	STATE HWY 58	A30	18	W STATE HWY 58	2.133629875
901.5336	STATE HWY 60	A30	18		0.559852366
32296.4279	STATE HWY 62	A30	18		20.05608173
98.9978	STATE HWY 62	A30	18		0.061477634
674.2544	STATE HWY 62	A30	18		0.418711982
1891.7036	STATE HWY 62	A30	18		1.174747936
149.5389	STATE HWY 62	A30	18		0.092863657
164.2835	STATE HWY 62	A30	18		0.102020054
216.1431	STATE HWY 62	A30	18		0.134224865
68.5417	STATE HWY 62	A30	18		0.042564396
309.3333	STATE HWY 62	A30	18		0.192095979
510.5675	STATE HWY 62	A30	18		0.317062418
2449.7300	STATE HWY 62	A30	18	CORYDON PIKE	1.52128233
1498.8780	STATE HWY 62	A30	18	E CHESTNUT ST	0.930803238
363.9461	STATE HWY 62	A30	18	E STATE HWY 62	0.226010528
4387.8845	STATE HWY 62	A30	18	E STATE HWY 62	2.724876275
3454.3241	STATE HWY 62	A30	18	E STATE HWY 62	2.145135266
2168.3798	STATE HWY 62	A30	18	E STATE HWY 62	1.346563856
6469.5676	STATE HWY 62	A30	18	HWY 62	4.01760148
1909.1311	STATE HWY 62	A30	18	HWY 62	1.185570413
362.1233	STATE HWY 62	A30	18	HWY 62	0.224878569
6227.3426	STATE HWY 62	A30	18	HWY 62	3.867179755
5546.2090	STATE HWY 62	A30	18	HWY 62	3.444195789
6671.4741	STATE HWY 62	A30	18	HWY 62	4.142985416
16012.9619	STATE HWY 62	A30	18	HWY 62 NE	9.94404934
14194.5808	STATE HWY 62	A30	18	HWY 62 NW	8.814834677
2726.4898	STATE HWY 62	A30	18	N STATE HWY 62	1.693150166
9766.0360	STATE HWY 62	A30	18	S STATE HWY 62	6.064708356
1438.7463	STATE HWY 62	A30	18	S STATE HWY 62	0.893461452
182.8916	STATE HWY 62	A30	18	STATE HWY 337	0.113575684

1205.5374	STATE HWY 62	A30	18	W HWY 62	0.748638725
7145.1264	STATE HWY 66	A30	18		4.437123494
2399.4744	STATE HWY 66	A30	18		1.490073602
26415.1019	STATE HWY 66	A30	18		16.40377828
5269.9536	STATE HWY 66	A30	18		3.272641186
14097.1146	STATE HWY 66	A30	18		8.754308167
165.5949	STATE HWY 66	A30	18		0.102834433
2872.5585	STATE HWY 66	A30	18		1.783858829
29.6379	STATE HWY 66	A30	18	COUNTY HWY 210	0.018405136
591.2605	STATE HWY 66	A30	18	MAIN ST	0.367172771
615.2287	STATE HWY 66	A30	18	PLEASANT AVE	0.382057023
3155.7474	STATE HWY 66	A30	18	S STATE HWY 66	1.959719135
20.5257	STATE HWY 66	A30	18	UNION ST	0.01274646
8729.9257	STATE HWY 67	A30	18		5.42128386
1369.8557	STATE HWY 70	A30	18		0.85068039
2408.2200	STATE HWY 70	A30	18		1.49550462
1559.7022	STATE HWY 7	A30	18	CRAGMONT ST	0.968575066
12300.9436	STATE HWY 7	A30	18	N STATE HWY 7	7.638885976
11529.6607	STATE HWY 7	A30	18	S STATE HWY 7	7.159919295
11466.1108	STATE HWY 7	A30	18	STATE HWY 256	7.120454807
1024.2258	STATE HWY 11	A31	18		0.636044222
155.1567	STATE HWY 11	A31	18		0.096352311
365.5715	STATE HWY 11	A31	18	HWY 11	0.227019902
4810.7251	STATE HWY 11	A31	18	HWY 11	2.987460287
2415.7402	STATE HWY 11	A31	18	HWY 11	1.500174664
633.0601	STATE HWY 11	A31	18	N HWY 11 SE	0.393130322
4429.6190	STATE HWY 335	A31	18	HWY 335	2.750793399
144.8653	STATE HWY 3	A31	18	STATE HWY 7	0.089961351
132.1574	STATE HWY 101	A35	18	S STATE HWY 101	0.082069745
29.0973	RAMP	A60	18		0.018069423
135.1211	RAMP	A60	18		0.083910203
40.2332	RAMP	A60	18		0.024984817
540.6359	RAMP	A60	18		0.335734894
375.5555	RAMP	A60	18		0.233219966
121.2218	RAMP	A60	18		0.075278738
137.7218	RAMP	A60	18		0.085525238
248.0840	RAMP	A60	18		0.154060164
275.1181	RAMP	A60	18		0.17084834
278.2495	RAMP	A60	18		0.17279294
761.0524	RAMP	A60	18		0.47261354
291.3411	RAMP	A60	18		0.180922823
25.7993	RAMP	A60	18		0.016021365

32.6644	RAMP	A60	18	0.020284592
24.3112	RAMP	A60	18	0.015097255
23.2340	RAMP	A60	18	0.014428314
328.6468	RAMP	A60	18	0.204089663
249.9114	RAMP	A60	18	0.155194979
196.4238	RAMP	A60	18	0.12197918
999.9836	RAMP	A60	18	0.620989816
253.3547	RAMP	A63	18	0.157333269
278.0311	RAMP	A63	18	0.172657313
51.3619	RAMP	A63	18	0.03189574
262.1188	RAMP	A63	18	0.162775775
39.2201	RAMP	A63	18	0.024355682
349.4669	RAMP	A63	18	0.217018945
184.5787	RAMP	A63	18	0.114623373
333.4183	RAMP	A63	18	0.207052764
380.4581	RAMP	A63	18	0.23626448
261.0129	RAMP	A63	18	0.162089011
91.6508	RAMP	A63	18	0.056915147
187.7707	RAMP	A63	18	0.116605605
280.8586	RAMP	A63	18	0.174413191
255.6923	RAMP	A63	18	0.158784918
799.4131	RAMP	A63	18	0.496435535
205.9082	RAMP	A63	18	0.127868992
164.2090	RAMP	A63	18	0.101973789
129.6338	RAMP	A63	18	0.08050259
651.1734	RAMP	A63	18	0.404378681
1163.4038	RAMP	A63	18	0.72247376
1489.7920	RAMP	A63	18	0.925160832
587.3136	RAMP	A63	18	0.364721746
37.2022	RAMP	A63	18	0.023102566
2162.1408	RAMP	A63	18	1.342689437
836.8385	RAMP	A63	18	0.519676709
283.7919	RAMP	A63	18	0.17623477
51.9083	RAMP	A63	18	0.032235054
874.2547	RAMP	A63	18	0.542912169
68.5995	RAMP	A63	18	0.04260029
180.4726	RAMP	A63	18	0.112073485
743.4278	RAMP	A63	18	0.461668664
370.8528	RAMP	A63	18	0.230299589
848.5351	RAMP	A63	18	0.526940297
330.4393	RAMP	A63	18	0.205202805
173.6121	RAMP	A63	18	0.107813114

361.6758	RAMP	A63	18	0.224600672
626.5255	RAMP	A63	18	0.389072336
829.9099	RAMP	A63	18	0.515374048
282.0597	RAMP	A63	18	0.175159074
67.3198	RAMP	A63	18	0.041805596
721.6984	RAMP	A63	18	0.448174706
228.7956	RAMP	A63	18	0.142082068
175.5667	RAMP	A63	18	0.109026921
603.4175	RAMP	A63	18	0.374722268
522.8202	RAMP	A63	18	0.324671344
329.3863	RAMP	A63	18	0.204548892
37.3475	RAMP	A63	18	0.023192798
204.0463	RAMP	A63	18	0.126712752
128.9522	RAMP	A63	18	0.080079316
941.2790	RAMP	A63	18	0.584534259
			Total Miles:	**1240.210152**
			Miles that match with Priority 1,2,3 streams=	**299.3308604**
			Total Miles within karst area:	**940.8792919**

APPENDIX F

MEMORANDUM OF UNDERSTANDING

(Reprinted for clarity, original on file)

THIS MEMORANDUM OF UNDERSTANDING IS MADE AND ENTERED INTO THIS THIRTEENTH DAY OF OCTOBER, 1993 BETWEEN THE INDIANA DEPARTMENT OF TRANSPORTATION (INDOT), THE INDIANA DEPARTMENT OF NATURAL RESOURCES (IDNR), THE INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT (IDEM), AND THE U.S. FISH AND WILDLIFE SERVICE (USFWS) FOR THE PURPOSE OF DELINEATING GUIDELINES FOR CONSTRUCTION OF TRANSPORTATION PROJECTS IN KARST REGIONS OF THE STATE.

WHEREAS, INDOT, IDNR, IDEM AND THE USFWS WISH TO COOPERATE IN THE IDENTIFICATION, STUDY AND TREATMENT OF DRAINAGE IN KARST REGIONS RELATED TO THE CONSTRUCTION OF TRANSPORTATION PROJECTS AND,

WHEREAS, INDOT, IDNR, IDEM AND THE USFWS ACCEPT RESPONSIBILITY TO ENSURE THE TRANSPORTATION NEEDS OF INDIANA ARE MET IN AN ENVIRONMENTALLY SENSITIVE MANNER THAT PROTECTS THE HABITAT OF ALL SPECIES AND,

WHEREAS, DESIGN AND CONSTRUCTION PRACTICES MUST PROTECT GROUND WATER QUALITY, PUBLIC HEALTH AND SAFETY, AND THE ENVIRONMENT.

WHEREAS, IDNR WILL CONFORM TO THE TERMS AND CONDITIONS OF THIS MOU ON THEIR TRANSPORTATION PROJECTS. LIKEWISE, IT WILL BE IDNR'S RESPONSIBILITY TO PROVIDE STANDARD BIOLOGICAL REVIEW FOR PROJECTS IN THE KARST REGION.

THEREFORE, IN CONSIDERATION OF THE TERMS AND CONDITIONS SET FORTH HEREIN THE INDOT, IDNR, IDEM AND USFWS AGREE AS FOLLOWS:

1. INDOT IN COOPERATION WITH THE IDNR, IDEM AND USFWS SHALL DETERMINE THE LOCATION OF SINKHOLES, CAVES, UNDERGROUND STREAMS, AND OTHER RELATED KARST FEATURES AND THEIR RELATIONSHIP PRIOR TO PROPOSED ALTERATIONS OR CONSTRUCTION IN KARST REGIONS OF THE STATE. A CONSULTANT WITH EXPERTISE IN KARST GEOLOGY/HYDROLOGY MAY ASSIST IN THE IDENTIFICATION AND CHARACTERIZATION OF THE KARST FEATURES. THE CHOICE OF THE CONSULTANT RETAINED BY INDOT WILL BE SUBJECT TO THE REVIEW OF IDNR, USFWS AND IDEM.

2. TASKS TO ACCOMPLISH THIS WORK WILL INCLUDE:

RESEARCH AVAILABLE FROM PUBLIC AND PRIVATE SOURCES FOR INFORMATION RELATIVE TO KARST FEATURES.

FIELD CHECK KARST AND CAVE FEATURES THAT APPEAR FROM THE FIRST TASK AND IDENTIFY ANY ADDITIONAL KARST FEATURES.

PREPARE A DRAFT REPORT, WITH PHOTOGRAPHS AND MAPS, DRAINAGE AREAS, AND LAND USE OF THAT DRAINAGE AREA FOR EACH SINKHOLE OR KARST FEATURE. DYE-TRACING AND/OR OTHER GEOTECHNICAL INFORMATION TO DETERMINE SUBSURFACE FLOW OF WATER IN THE PROJECT AREA AND SURFACE WATER DRAINAGE PATTERNS OF THE AREA. CALCULATIONS OF ESTIMATES OF ANNUAL POLLUTANT LOADS FROM THE HIGHWAY AND DRAINAGE WITHIN THE RIGHT-OF-WAY WILL BE MADE, INCLUDING PRIOR TO, DURING AND POST CONSTRUCTION ESTIMATES. THE DESIGN OF THE TREATMENT OF THE KARST FEATURES WILL TAKE INTO CONSIDERATION TREATMENTS NECESSARY TO MEET THE STANDARDS OF THE MONITORING AND MAINTENANCE PLAN.

THAT REPORT WILL BE USED AS A TOOL TO ASSIST IN DETERMINING THE PROPOSED HIGHWAY ALIGNMENT. THE INTENT OF INDOT IS TO AVOID KARST AREAS AND USE ALTERNATE DRAINAGE WHERE POSSIBLE.

3. IDNR, IDEM AND USFWS WILL BE REQUESTED TO REVIEW AND COMMENT ON THE FINDINGS AT THE EARLY COORDINATION PHASE OF PROJECT DEVELOPMENT.

4. INDOT, USING THE INPUT FROM IDNR, IDEM, AND USFWS WILL BEGIN TO FORMULATE APPROPRIATE MEASURES TO OFFSET UNAVOIDABLE IMPACTS TO THE KARST FEATURES. IT IS UNDERSTOOD BY ALL PARTIES THAT SOME OF THE METHODS PROPOSED AT THIS TIME WILL BE GENERIC AND COULD BE APPLIED THROUGHOUT THE LENGTH OF THE CORRIDOR. OTHER METHODS MAY BE SPECIFIC TO A PARTICULAR CAVE OR KARST FEATURE. SOME OF THE APPROACHES MAY REQUIRE ADDITIONAL INVESTIGATIONS TO DETERMINE THEIR NECESSITY AND/OR THEIR FEASIBILITY. A REVISED DRAFT REPORT WILL BE PREPARED BY INDOT'S CONSULTANT AND PROVIDED TO THE IDNR, IDEM, AND THE USFWS AS PART OF THE DESIGN REVIEW PROCESS.

5. DRAINAGE ENTERING FROM BEYOND THE RIGHT-OF-WAY WILL BE TREATED ACCORDING TO THE SAME PROCESS AS DRAINAGE GENERATED BY THE PROJECT.

6. AS THE PROJECT PROGRESSES FURTHER INTO THE DESIGN PHASE, THE IDNR, IDEM AND USFWS WILL BE INVITED AND WILL ATTEND FIELD CHECKS AND MEETINGS DEALING WITH EFFORTS TO NEGATE OR MINIMIZE ADVERSE IMPACTS.

7. HAZARDOUS MATERIALS TRAPS (HMT'S) WILL BE CONSTRUCTED AT STORMWATER OUTFALLS AND OTHER LOCATIONS THAT WILL PROTECT KARST FEATURES FROM SPILL CONTAMINATION.

8. INDOT AGREES TO DEVELOP A MONITORING AND MAINTENANCE PLAN FOR THE AFFECTED KARST FEATURES. IDNR, IDEM AND USFWS WILL BE PROVIDED AN OPPORTUNITY TO REVIEW THIS PLAN. THE ESTABLISHMENT OF WATER QUALITY AND A POINT AT WHICH A STANDARD IS ESTABLISHED FOR REMEDIATION WILL BE A PART OF EACH MONITORING PLAN. THE RESULTS OF THE MONITORING WILL BE SUBMITTED TO IDNR, USFWS, AND IDEM ON A REGULAR BASIS.

9. A LOW SALT, AND NO SPRAY STRATEGY WILL BE DEVELOPED FOR EACH FUTURE PROJECT. A SIGNING STRATEGY FOR THESE ITEMS WILL ALSO BE DEVELOPED FOR EACH PROJECT.

10. PRIOR TO ACCEPTANCE OF THE FINAL DESIGN PLANS AN AGREEMENT WILL BE DEVELOPED WHICH WILL SET OUT THE APPROPRIATE AND PRACTICABLE MEASURES TO OFFSET UNAVOIDABLE IMPACTS TO KARST FEATURES. THIS AGREEMENT WILL BE SIGNED BY THE DEPARTMENT DIRECTOR OF IDNR. THE COMMISSIONER OF THE IDEM, THE COMMISSIONER OF INDOT AND THE SUPERVISOR OF THE USFWS BLOOMINGTON, INDIANA FIELD OFFICE. THE AGREEMENT WILL BECOME A PART OF THE CONTRACT DOCUMENTS FOR THE PROJECT, WILL BE DISCUSSED AT THE PRE-CONSTRUCTION CONFERENCE AND WILL BE ON FILE AT THE OFFICE OF THE PROJECT ADMINISTRATOR.

11. INDOT WILL ASSURE THAT THE TERMS OF THE AGREEMENT WILL BE COMPLETED WITH ALL SAFEGUARDS GIVEN TO THE KARST AREA. SPECIAL PROVISIONS, WHICH ARE BINDING PROVISIONS THAT ARE A PART OF THE CONTRACT, WILL BE INCLUDED OUTLINING THE PRECAUTIONS TO BE TAKEN. CONSTRUCTION AND DESIGN STRATEGIES FOR HANDLING KARST FEATURE WILL BE DISCUSSED WITH THE CONTRACTOR(S) AND PROJECT ADMINISTRATOR DURING THE PRE-CONSTRUCTION CONFERENCE. PROJECT ADMINISTRATOR SHALL ENSURE THAT THE CONTRACTOR IS FOLLOWING THE NEW EROSION CONTROL STANDARDS THAT MEET RULE 5 OF 327 IAC 15 AND ANY SPECIAL PRECAUTIONS OUTLINED IN THE DESIGN PLANS THAT THE SINKHOLE TREATMENT IS BEING HANDLED CORRECTLY. THE EROSION CONTROL PLAN MUST BE AVAILABLE AT THE PROJECT ADMINISTRATOR'S OFFICE. AN EMERGENCY RESPONSE PLAN WILL BE MADE A PART OF THE

CONTRACT DOCUMENTS. IN ADDITION, THE CONTRACT DOCUMENTS WILL CONTAIN A STRATEGY FOR SIGNING TO ALERT THE PUBLIC TO THE FACT THAT ALL TYPES OF SPILLS ARE POTENTIALLY HAZARDOUS TO THE KARST ENVIRONMENT. FOR INDOT, THIS PLAN WOULD BE PROCEDURE 20 OF THE FIELD OPERATIONS MANUAL DATED 6/24/92 (ATTACHED).

12. THE LOCATION AND NATURE OF THE SINKHOLES AND DRAINAGE SCHEMATIC WILL BE PROVIDED TO THE IDEM. THEY WILL PROVIDE THE INFORMATION TO THE APPROPRIATE LOCAL AUTHORITIES AND THE HAZMAT TEAMS. AN EMERGENCY RESPONSE PLAN WILL BE FOLLOWED. THIS CONSTITUTES PROCEDURE 20. INCLUDED IN THIS INFORMATION IS AN UNDERSTANDING THAT ALL TYPES OF SPILLS ARE POTENTIALLY HAZARDOUS TO KARST REGIONS.

13. IDNR, IDEM AND USFWS PERSONNEL WILL MONITOR CONSTRUCTION AND MAINTENANCE TO THE AGREED UPON TERMS, AS DEEMED NECESSARY.

14. IF DURING CONSTRUCTION IT IS FOUND THAT THE MITIGATION AGREEMENT MUST BE ALTERED, ALL OF THE AGENCIES WILL BE CONTACTED AND AGREEMENT REACHED PRIOR TO WORK CONTINUING IN THAT SPECIFIC AREA OF THE PROJECT. IN ORDER TO NOT UNDULY DELAY PROJECTS, A TWO WORKING DAYS RESPONSE TIME IS NEEDED FROM THE RESOURCE AGENCIES.

15. TREATMENTS WILL BE MAINTAINED DURING CONSTRUCTION BY MEANS OF A VISUAL INSPECTION ON A WEEKLY BASIS OR AFTER EVERY RAIN. CORRECTIVE ACTION WILL BE TAKEN AS NEEDED.

16. IF AFTER THE ABOVE PROCEDURE IS FOLLOWED AND A STATE/FEDERAL ENDANGERED/THREATENED SPECIES IS FOUND DURING CONSTRUCTION, WORK IN THAT AREA OF THE PROJECT WILL STOP. THE IDNR, AND USFWS WILL BE IMMEDIATELY NOTIFIED. THE IDNR AND USFWS WILL PROMPTLY INVESTIGATE THE SITUATION, ADVISE THE PROJECT ADMINISTRATOR AND ASSUME RESPONSIBILITY FOR PROTECTING THE ENDANGERED SPECIES AND TAKING THE APPROPRIATE ACTION.

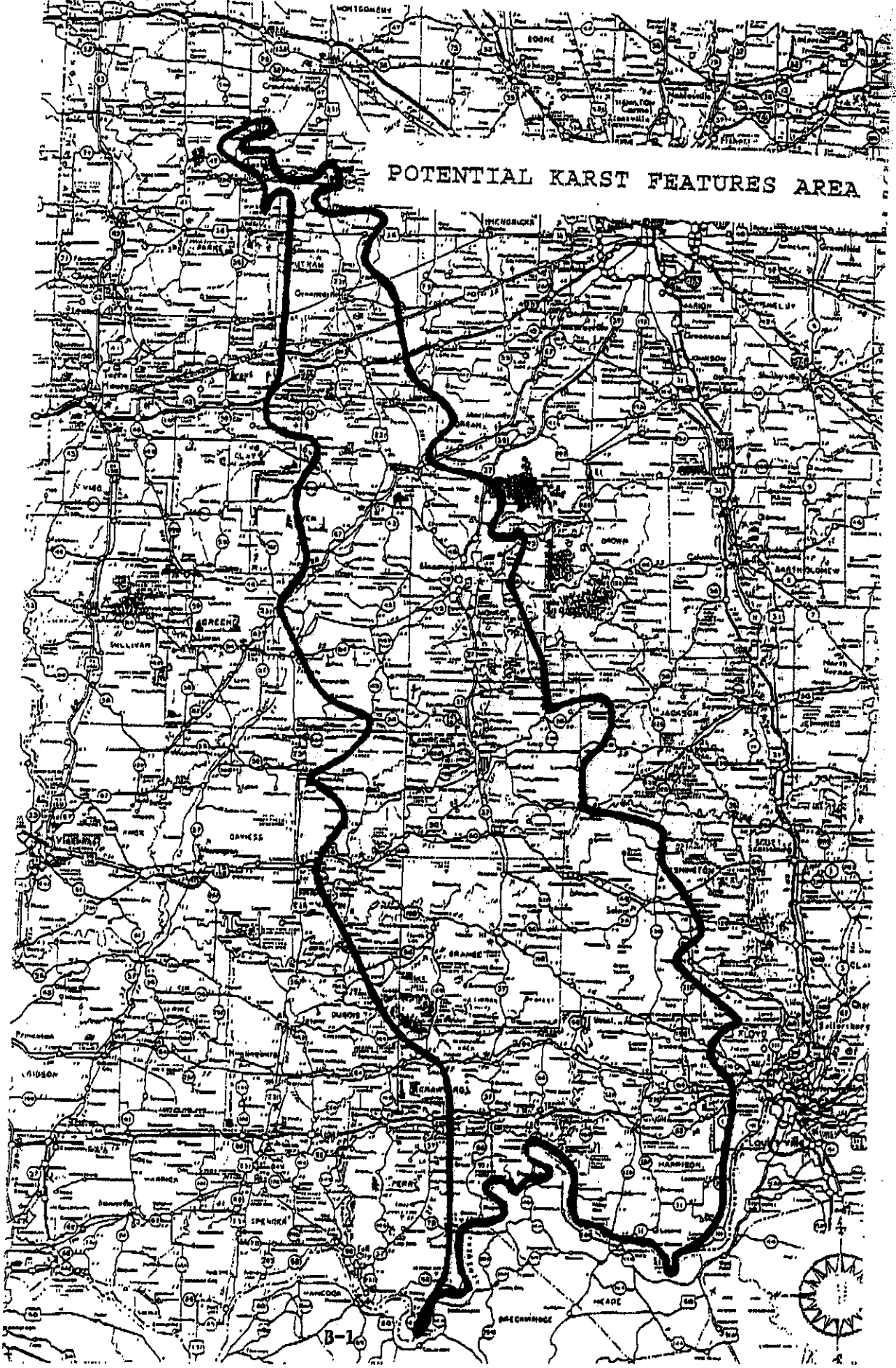
17. THIS DOCUMENT WILL BE REVIEWED ANNUALLY OR MORE FREQUENTLY AT THE REQUEST OF ANY OF THE FOREGOING AGENCIES.

(SIGNED)
MR. FREDERICK C. P'POOL, COMMISSIONER
INDIANA DEPARTMENT OF TRANSPORTATION

(SIGNED)
MR. PATRICK R. RALSTON, DIRECTOR
INDIANA DEPARTMENT OF NATURAL RESOURCES

(SIGNED)
MS. KATHY PROSSER, COMMISSIONER
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

(SIGNED)
MR. DAVID C. HUDAK, FIELD SUPERVISOR, BLOOMINGTON FIELD OFFICE
U.S. FISH AND WILDLIFE SERVICE


POTENTIAL KARST FEATURES AREA
B-1

APPENDIX G

NITRATE LEACHING INDEX
Carroll County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INN03 Leach Index
Carroll County, Indiana	AsB2	Alvin fine sandy loam, 2 to 8 percent slopes, eroded	Alvin	8
Carroll County, Indiana	At	Armiesburg silty clay loam, occasionally flooded	Armiesburg	8
Carroll County, Indiana	Ba	Beaucoup silty clay loam, rarely flooded	Beaucoup	8
Carroll County, Indiana	Bb	Beaucoup silt loam, frequently flooded	Beaucoup	8
Carroll County, Indiana	CaA	Camden silt loam, 0 to 1 percent slopes	Camden	8
Carroll County, Indiana	CaB2	Camden silt loam, 2 to 6 percent slopes, eroded	Camden	8
Carroll County, Indiana	CeG	Casco-Hennepin loams, 30 to 70 percent slopes	Casco	8
Carroll County, Indiana	Cg	Ceresco fine sandy loam, occasionally flooded	Ceresco	8
Carroll County, Indiana	Ck	Ceresco variant fine sandy loam, occasionally flooded	Ceresco variant	8
Carroll County, Indiana	Cn	Cohoctah loam, occasionally flooded	Cohoctah	8
Carroll County, Indiana	Cp	Cohoctah loam, gravelly substratum, occasionally flooded	Cohoctah	8
Carroll County, Indiana	Cr	Cohoctah variant very fine sandy loam, frequently flooded	Cohoctah variant	8
Carroll County, Indiana	CtB	Coloma loamy sand, 2 to 10 percent slopes	Coloma	13
Carroll County, Indiana	CvA	Crosby silt loam, 0 to 2 percent slopes	Crosby	4
Carroll County, Indiana	CwB	Crosby-Fincastle silt loams, 1 to 3 percent slopes	Crosby	4
Carroll County, Indiana	CyB	Crosier-Whitaker, till substratum, complex, 1 to 3 percent slopes	Crosier	4
Carroll County, Indiana	Cz	Cyclone silty clay loam	Cyclone	8
Carroll County, Indiana	FaA	Fincastle-Starks silt loams, 0 to 1 percent slopes	Fincastle	4
Carroll County, Indiana	FbB	Fincastle-Starks silt loams, 1 to 3 percent slopes	Fincastle	4
Carroll County, Indiana	FsA	Fox sandy loam, 0 to 2 percent slopes	Fox	8
Carroll County, Indiana	FsB2	Fox sandy loam, 2 to 6 percent slopes, eroded	Fox	8
Carroll County, Indiana	FtC3	Fox gravelly clay loam, 6 to 15 percent slopes, severely eroded	Fox	8
Carroll County, Indiana	HkG	Hennepin loam, 30 to 70 percent slopes	Hennepin	8
Carroll County, Indiana	HnG	Hennepin-Rock outcrop complex, 30 to 90 percent slopes	Hennepin	8
Carroll County, Indiana	Hw	Houghton muck, drained	Houghton	13
Carroll County, Indiana	Jr	Jules silt loam, frequently flooded	Jules	8

NATURAL RESOURCES CONSERVATION SERVICE XXX 00/00/99

NITRATE LEACHING INDEX--Continued
Carroll County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INN03 Leach Index
Carroll County, Indiana	Js	Jules-Stonelick complex, frequently flooded	Jules	8
Carroll County, Indiana	KcA	Kalamazoo loam, 0 to 2 percent slopes	Kalamazoo	8
Carroll County, Indiana	KcB2	Kalamazoo loam, 2 to 6 percent slopes, eroded	Kalamazoo	8
Carroll County, Indiana	KfA	Kendall silt loam, 0 to 1 percent slopes	Kendall	8
Carroll County, Indiana	KgA	Kendall-Fincastle silt loams, 0 to 1 percent slopes	Kendall	8
Carroll County, Indiana	KgA	Kendall-Fincastle silt loams, 0 to 1 percent slopes	Fincastle	8
Carroll County, Indiana	Ld	Landes fine sandy loam, rarely flooded	Landes	8
Carroll County, Indiana	Lo	Landes loam, moderately wet, occasionally flooded	Landes	8
Carroll County, Indiana	Ls	Landes-Moundhaven complex,	Landes	8

Indiana		occasionally flooded		
Carroll County, Indiana	Ma	Mahalasville silty clay loam, gravelly substratum	Mahalasville	8
Carroll County, Indiana	Mb	Mahalasville silty clay loam, till substratum	Mahalasville	8
Carroll County, Indiana	Mc	Mahalasville-Treaty silt loams	Mahalasville	8
Carroll County, Indiana	MdB2	Martinsville, till substratum-Miami loams, 2 to 6 percent slopes, eroded	Martinsville	8
Carroll County, Indiana	MfC3	Martinsville, till substratum-Miami clay loams, 6 to 12 percent slopes, severely eroded	Martinsville	8
Carroll County, Indiana	MfC3	Martinsville, till substratum-Miami clay loams, 6 to 12 percent slopes, severely eroded	Miami	8
Carroll County, Indiana	MhD3	Miami clay loam, 15 to 20 percent slopes, severely eroded	Miami	8
Carroll County, Indiana	MkB2	Miami-Crosier complex, 2 to 6 percent slopes, eroded	Miami	8
Carroll County, Indiana	MkB2	Miami-Crosier complex, 2 to 6 percent slopes, eroded	Crosier	8
Carroll County, Indiana	Mm	Milford silty clay loam	Milford	8
Carroll County, Indiana	Mo	Milford silt loam, pothole	Milford	8
Carroll County, Indiana	Mp	Milford silty clay loam, occasionally flooded	Milford	8
Carroll County, Indiana	Mt	Millsdale loam	Millsdale	8
Carroll County, Indiana	MuB	Milton variant, channery silt loam, 1 to 4 percent slopes, flaggy	Milton variant	3
Carroll County, Indiana	Mv	Moundhaven-Landes variant complex, frequently flooded	Moundhaven	13
Carroll County, Indiana	MwB	Mudlavia gravelly sandy loam, 1 to 3 percent slopes	Mudlavia	8

NITRATE LEACHING INDEX--Continued
Carroll County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INN03 Leach Index
Carroll County, Indiana	MxA	Mudlavia variant gravelly loam, 0 to 2 percent slopes	Mudlavia variant	8
Carroll County, Indiana	OdA	Ockley silt loam, 0 to 2 percent slopes	Ockley	8
Carroll County, Indiana	OdB2	Ockley silt loam, 2 to 6 percent slopes, eroded	Ockley	8
Carroll County, Indiana	OfB2	Ockley loam, till substratum, 2 to 6 percent slopes, eroded	Ockley	8
Carroll County, Indiana	OgA	Ockley-Rush silt loams, till substrata, 0 to 2 percent slopes	Ockley	8
Carroll County, Indiana	OhC3	Ockley, till substratum-Kendallville clay loams, 6 to 12 percent slopes, severely eroded	Ockley	8
Carroll County, Indiana	OrA	Ormas loamy sand, 0 to 2 percent slopes	Ormas	8
Carroll County, Indiana	OrB	Ormas loamy sand, 2 to 6 percent slopes	Ormas	8
Carroll County, Indiana	Pb	Palms muck, drained	Palms	13
Carroll County, Indiana	Pd	Palms muck, cobbly substratum, drained	Palms	13
Carroll County, Indiana	Pe	Palms variant muck, drained	Palms variant	13
Carroll County, Indiana	Pg	Patton silty clay loam	Patton	8
Carroll County, Indiana	Pk	Pella silty clay loam	Pella	8
Carroll County, Indiana	PnB	Piankeshaw variant gravelly sandy loam, rarely flooded, 2 to 8 percent slopes	Piankeshaw variant	8
Carroll County, Indiana	Pp	Pits, gravel	Pits	0
Carroll County, Indiana	Pr	Pits, quarry	Pits	0
Carroll County, Indiana	RmB2	Riddles-Miami loams, 2 to 6 percent slopes, eroded	Riddles	8
Carroll County, Indiana	RmD2	Riddles-Miami loams, 12 to 18 percent slopes, eroded	Riddles	8
Carroll County, Indiana	RnC3	Riddles-Miami complex, 6 to 12 percent slopes, severely eroded	Riddles	8
Carroll County, Indiana	RoA	Rockfield silt loam, 0 to 2 percent slopes	Rockfield	8
Carroll County, Indiana	RrB2	Rockfield-Williamstown complex, 1 to 6 percent slopes, eroded	Rockfield	8
Carroll County, Indiana	Rt	Ross fine sandy loam, protected	Ross	8

Carroll County, Indiana	Ru	Ross loam, rarely flooded	Ross	8
Carroll County, Indiana	RwA	Rush silt loam, 0 to 2 percent slopes	Rush	8
Carroll County, Indiana	Sn	Sloan silt loam, rarely flooded	Sloan	8

NATURAL RESOURCES CONSERVATION SERVICE

XXX 00/00/99

NITRATE LEACHING INDEX--Continued
Carroll County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INNO3 Leach Index
Carroll County, Indiana	So	Sloan silt loam, occasionally flooded	Sloan	8
Carroll County, Indiana	Ss	Sloan silt loam, bedrock substratum, occasionally flooded	Sloan	8
Carroll County, Indiana	StA	Starks silt loam, 0 to 1 percent slopes	Starks	4
Carroll County, Indiana	Ud	Udorthents, loamy	Udorthents	0
Carroll County, Indiana	W	Water	Water	0
Carroll County, Indiana	Wd	Wallkill silt loam	Wallkill	8
Carroll County, Indiana	We	Warners variant silt loam, 2 to 8 percent slopes, undrained	Warners variant	8
Carroll County, Indiana	Wk	Washtenaw silt loam	Washtenaw	4
Carroll County, Indiana	WoA	Waynetown silt loam, 0 to 2 percent slopes	Waynetown	4
Carroll County, Indiana	WpA	Waynetown-Sleeth silt loams, till substrata, 0 to 1 percent slopes	Waynetown	4
Carroll County, Indiana	Wr	Westland loam	Westland	8
Carroll County, Indiana	Ws	Westland loam, shale substratum	Westland	8
Carroll County, Indiana	WvB2	Williamstown silt loam, 2 to 6 percent slopes, eroded	Williamstown	4

NITRATE LEACHING INDEX
LaPorte County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INN03 Leach Index
LaPorte County, Indiana	Ad	Adrian muck, drained	Adrian	17
LaPorte County, Indiana	BsA	Blount silt loam, 0 to 3 percent slopes	Blount	7
LaPorte County, Indiana	Br	Bourbon sandy loam	Bourbon	11
LaPorte County, Indiana	BtA	Brems fine sand, 0 to 3 percent slopes	Brems	17
LaPorte County, Indiana	Cd	Cheektowaga fine sandy loam	Cheektowaga	5
LaPorte County, Indiana	ChB	Chelsea fine sand, 2 to 6 percent slopes	Chelsea	17
LaPorte County, Indiana	ChC	Chelsea fine sand, 6 to 12 percent slopes	Chelsea	17
LaPorte County, Indiana	ChD	Chelsea fine sand, 12 to 18 percent slopes	Chelsea	17
LaPorte County, Indiana	Ck	Cohoctah sandy loam	Cohoctah	11
LaPorte County, Indiana	CoA	Coupee silt loam, 0 to 2 percent slopes	Coupee	11
LaPorte County, Indiana	CoB	Coupee silt loam, 2 to 6 percent slopes	Coupee	11
LaPorte County, Indiana	Du	Duneland	Duneland	0
LaPorte County, Indiana	Ed	Edwards muck, drained	Edwards	11
LaPorte County, Indiana	EsA	Elston loam, 0 to 2 percent slopes	Elston	11
LaPorte County, Indiana	EsB	Elston loam, 2 to 6 percent slopes	Elston	11
LaPorte County, Indiana	Fh	Fluvaquents, loamy	Fluvaquents	0
LaPorte County, Indiana	Gf	Gilford fine sandy loam	Gilford	11
LaPorte County, Indiana	HaA	Hanna sandy loam, 0 to 3 percent slopes	Hanna	11
LaPorte County, Indiana	Hh	Histosols and Aquolls	Histosols	0
LaPorte County, Indiana	Hh	Histosols and Aquolls	Aquolls	0
LaPorte County, Indiana	Hk	Homer loam	Homer	11
LaPorte County, Indiana	Hm	Houghton muck	Houghton	5
LaPorte County, Indiana	Ho	Houghton muck, drained	Houghton	17
LaPorte County, Indiana	Md	Martisco muck, drained	Martisco	11
LaPorte County, Indiana	Mm	Maumee loamy fine sand	Maumee	17
LaPorte County, Indiana	Mn	Maumee variant loamy sand	Maumee variant	17
LaPorte County, Indiana	Mp	Milford silty clay loam	Milford	11
LaPorte County, Indiana	MrB2	Morley silt loam, 2 to 6 percent slopes, eroded	Morley	7
LaPorte County, Indiana	MrC2	Morley silt loam, 6 to 12 percent slopes, eroded	Morley	7
LaPorte County, Indiana	MrD2	Morley silt loam, 12 to 18 percent slopes, eroded	Morley	7
LaPorte County, Indiana	Mx	Morocco loamy fine sand	Morocco	11
LaPorte County, Indiana	Mz	Muskego muck, drained	Muskego	17

NITRATE LEACHING INDEX--Continued
LaPorte County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INN03 Leach Index
LaPorte County, Indiana	Nf	Newton loamy fine sand	Newton	17
LaPorte County, Indiana	OaC	Oakville fine sand, 4 to 12 percent slopes	Oakville	17
LaPorte County, Indiana	OaE	Oakville fine sand, 12 to 25	Oakville	17

Indiana		percent slopes			
LaPorte County, Indiana	Pa	Palms muck, sandy substratum	Palms	17	
LaPorte County, Indiana	Pe	Pewamo silty clay loam	Pewamo	7	
LaPorte County, Indiana	Ph	Pinhook loam	Pinhook	11	
LaPorte County, Indiana	Qu	Quinn loam	Quinn	11	
LaPorte County, Indiana	RlA	Riddles loam, 0 to 2 percent slopes	Riddles	11	
LaPorte County, Indiana	RlB2	Riddles loam, 2 to 6 percent slopes, eroded	Riddles	11	
LaPorte County, Indiana	RlC2	Riddles loam, 6 to 12 percent slopes, eroded	Riddles	11	
LaPorte County, Indiana	RlD2	Riddles loam, 12 to 18 percent slopes, eroded	Riddles	11	
LaPorte County, Indiana	RlF	Riddles loam, 25 to 45 percent slopes	Riddles	11	
LaPorte County, Indiana	Sa	Saugatuck-Pipestone complex	Saugatuck	7	
LaPorte County, Indiana	Sb	Sebewa loam, shaly sand substratum	Sebewa	11	
LaPorte County, Indiana	SeA	Selfridge loamy fine sand, 0 to 2 percent slopes	Selfridge	11	
LaPorte County, Indiana	SeB	Selfridge loamy fine sand, 2 to 6 percent slopes	Selfridge	11	
LaPorte County, Indiana	So	Suman silty clay loam	Suman	11	
LaPorte County, Indiana	TcA	Tracy sandy loam, 0 to 2 percent slopes	Tracy	11	
LaPorte County, Indiana	TcB	Tracy sandy loam, 2 to 6 percent slopes	Tracy	11	
LaPorte County, Indiana	TcC2	Tracy sandy loam, 6 to 12 percent slopes, eroded	Tracy	11	
LaPorte County, Indiana	TcD2	Tracy sandy loam, 12 to 18 percent slopes, eroded	Tracy	11	
LaPorte County, Indiana	TcF	Tracy sandy loam, 25 to 45 percent slopes	Tracy	11	
LaPorte County, Indiana	Tr	Troxel silt loam	Troxel	11	
LaPorte County, Indiana	TyA	Tyner loamy sand, 0 to 2 percent slopes	Tyner	17	
LaPorte County, Indiana	Ua	Udorthents, loamy	Udorthents, loamy	0	
LaPorte County, Indiana	Uc	Urban land-Coupee complex	Coupee	11	
LaPorte County, Indiana	UoC	Urban land-Oakville complex, 1 to 10 percent slopes	Oakville	17	
LaPorte County, Indiana	Uv	Urban land-Morocco complex	Morocco	11	

NITRATE LEACHING INDEX--Continued
LaPorte County, Indiana

County	Mapunit Symbol	Mapunit Name	Compname	INN03 Leach Index
LaPorte County, Indiana	W	Water	Water	0
LaPorte County, Indiana	Wa	Wallkill silt loam	Wallkill	11
LaPorte County, Indiana	We	Warners silt loam	Warners	7
LaPorte County, Indiana	Wh	Washtenaw silt loam	Washtenaw	7

APPENDIX H

A Site Evaluation Tool*

This tool is provided for use as an initial screening tool by District personnel involved in reviewing/recommending potential sites for future INDOT facilities. It is a simple tool and its use assumes the user is not a geologist, but can access and interpolate data from the county soil survey report found at the Cooperative Extension Service (CES), Natural Resource Conservation Service (NRCS) or the Soil and Water Conservation District (SWCD) offices.

Step 1. Locate the property on the detailed soil map sheets (those with an aerial photo background) in the County Soil Survey, note the soil map unit indicated on the photo and look up information related to that soil in the written survey report.

Don't skip any parts of the survey. If you are not familiar with using a soil survey, you may need help completing Part 1. Ask the county extension educator or the NRCS specialist to help you find the following information:

- Location of the property on the map and aerial photographs provided in the soil survey report.
- The soil mapping unit and soil series from the legend provided in the soil survey report.
- The soil series and/or soil mapping unit, including the Classification of the Soils (soil description), as well as any other information in the report regarding organic matter (Table 17) and depth to bedrock, depth to high water table (Table 18).

*Adapted from "Indiana Farmstead Assessment for Drinking Water Protection, Survey 11: Site Evaluation," Joe Yahner, Extension Agronomist, and Sarah Brichford, Extension Water Quality Specialist; Department of Agronomy, Cheri Janssen, Department of Agronomy, ed. (undated)

loamy fine sandy,
fine, sandy loam.....4

sand, loamy sand,
sandy loam organic
materials, and all textural
classes with coarse fragment
modifiers (such as
"gravelly loam").....1

Score _____

3. Organic matter
(A or Ap horizon; or
upper 6-10 inches)

If the surface texture is muck
or peat, or soil is less than
20 inches to bedrock.....1

OR

If the soil does not fall into the above groups, obtain the following information either from a soil test report, or from the Physical and Chemical Properties table (Table 17) in the soil survey, or from the NRCS office.

Organic Matter (%)	Organic Carbon	
high (4-10%)	2.32-5.8	10
medium (2-4%)	1.16-2.32	7
moderately low (1-2%)	0.58-1.16	5
low (0.5-1%)	0.29-0.58	3
very low (less than 0.5%)	less than 0.29	1

(Lower the score by one level if the soil mapping unit description in the soil survey indicates moderate or severe erosion, unless you find organic matter or carbon in soil test results).

Score _____

Step 2. With this information in hand, you are ready to rank the soil according to seven characteristics. For each of the seven characteristics in the left column, find information about the soil in the soil survey. Then, match the soil description to the description in the middle column to determine the score in the right column. (For example, if the soil survey tells you that the surface texture of your soil is a clay loam, your score for that category would be 8). Enter the score in the space indicated.

SOIL CHARACTERISTICS

1. Texture of surface (A horizon or upper 6-10 inches)	loam, silt loam, sandy clay loam, silt.....9	
	clay, silty clay, clay loam, silty clay loam, sandy clay.....8	
	loamy very fine sand, very fine sandy loam, loamy fine sand, fine sandy loam.....4	
	sand, loamy sand, sandy loam, organic materials, and all textural classes with coarse fragment class modifiers (such as "gravelly loam").....1	
		Score _____
2. Texture of subsoil (the most clayey B horizon)	clay, silty clay, sandy clay, silt.....10	
	sandy clay loam, loam, silt loam, clay loam, silty clay loam.....7	
	loamy very fine sand, very fine sandy loam,	

Step 4. In the box below, find the "Total Score" in the listed ranges in the left column. Then identify the soil's "potential to protect groundwater" and find the rank number assigned to the score.

Total Score	Soil's potential to protect groundwater	Rank
>51	Best	5
41 - 50	Good	4
31 - 40	Marginal/Good	3
21 - 30	Marginal	2
0 - 20	Poor	1

Step 5. Enter this rank number here:

Soil Rank: _____

Step 6. Understand the soil's ranking:

- A soil with more than 50 points (ranking 5) probably is a deep, medium or fine textured, well-drained soil which contains 4-10% organic matter. Potential contaminants move slowly through the soil, allowing them to become attached to soil particles. Sunlight, air and microorganisms then have time to break down the contaminant into harmless compounds. The groundwater contamination risk level is low.
- A soil with a score less than 20 (ranking 1) is probably a coarse-textured, (sandy) extremely well-drained soil with less than 1% organic matter. Such a soil would enable most contaminants to move rapidly down toward the water table.

  Overall, the higher the rank, the more likely that the soil conditions will help to reduce the risk of groundwater contamination.

Part 2: Evaluating subsurface and geologic materials on the property

This part looks at the subsurface and geologic materials beneath the property's soils. Completing the survey will provide a much clearer picture of the site's potential for preventing pollutants from reaching groundwater.

For example, the soil evaluation might have indicated a moderate potential for protecting groundwater. However, if the soils are fairly shallow and lie over fractured bedrock, the potential for groundwater contamination at the site is probably higher than indicated by the soil evaluation alone.

This part requires two items of information: (1) about the site's subsurface geologic material and (2) the depth to groundwater. Unfortunately, information on subsurface geologic material as well as depth to water is often difficult to obtain.

- It is sometimes available from the soil survey report, although this differs from county to county.
- You may also obtain this information from a well driller's report for this or neighboring sites.*
- Some Indiana river basins have reports published by the Indiana Department of Natural Resources (IDNR). These are generalized maps, though, and may not accurately reflect the depth to groundwater or direction of flow at the property.
- If there is a published geological report for your county, it may show the type of geologic material in your area.

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*INDOT personnel can access the iLITH database prepared by the Indiana Geological Survey. The water-well database provides the location, description of the soil profile, depth of the well, static water depth and other information. The Microsoft Access database containing GIS capabilities is available from the District Environmental Coordinator.

4. pH-Surface (A horizon) Table 17 column headed "Soil Reaction"	6.6 or greater	6
	less than 6.6	4
5. Depth of soil solum (In the "Classification of Soils" section of a soil survey. It is often in the text below the profile description).	greater than 60 in.	10
	40-60 in.	8
	30-40 in.	5
	less than 30 in.	1

(Lower your score one level when rock is present at 30-40 inches below the soil surface. Consult the profile description in the soil survey report to learn about depth to rock. You may wish to subtract the inches of surface erosion from the depth to bedrock).

Score _____

6. Permeability of the slowest subsoil horizon (In Table 17: "Physical and Chemical Properties of the Soils" of the County Soil Survey).	0.06 to 0.6 in./hour	10
	0.6 to 2.0 in./hour	8
	2 to 20 in./hour	3
	greater than 20 in./hour	1

Score _____

7. Natural soil drainage class (In the "General Soil Map Units" section in the front of the County Soil Survey).	well drained	10
	moderately well drained	4
	somewhat poorly drained, poorly, and very poorly drained; somewhat excessively and excessively drained	1

Score _____

Step 3. Add your seven scores together

TOTAL SCORE _____

If the information for this part is not available, you may skip to Part 3. The instructions will tell you have to proceed without it.

Step 1. Find the information you need - from soil surveys, well construction reports or geological survey reports - to identify: the geologic materials beneath the property and depth to groundwater.

Step 2. Match the information on the site's geology to one of the descriptions in the left column below. (You will be choosing only one description from the entire table that follows).

Step 3. When you have chosen the description that best matches the site's geology, read across to the right until you get to the appropriate "depth to groundwater" for that site and circle that score.

For example, you may determine from your well driller's report that geologic material beneath the property consists of 30 feet of coarse-textured, unconsolidated material over fractured limestone bedrock, and that depth to groundwater is 15 feet. Looking down the felt column to find the category, and then going across to the right, you see that your rank is "1."

Geologic Material	Depth to Groundwater	
	0-30 ft.	>30 ft.
Loam, clay loam, glacial till, loess deposits, fine textured lakebed deposits	3	4
Sandy loam till, interbedded with sands and gravel	2	3
Coarse texture, sand and gravel outwash	1	1
Fractured limestone bedrock, sink holes present	1	1
Sandstone, shale bedrock	3	4

Step 4. Enter the circled number here:

Subsurface Rank _____

Step 5. Understand the subsurface and geology ranking. The table below shows what the rank means.

Rank	Subsurface Potential to Protect Groundwater	Level of Risk
4	Best	Low
3	Good	Low/moderate
2	Marginal	High/moderate
1	Poor	High

A ranking of "4" shows that the subsurface material has small pore spaces, groundwater is at least 10 feet from the soil surface, and the risk of groundwater contamination is low.

A ranking of "1" indicates a material with large pore spaces that allow contaminants to move downward easily, increasing the risk of groundwater contamination. In highly fractured rock or in very coarse-textured, unconsolidated materials (e.g., sands, gravels), the depth to groundwater doesn't seem to matter because some contaminants will flow through the pore spaces with very little slowdown.

Overall, the higher the ranking number, the more likely that the property's geologic conditions and depth to groundwater will help to reduce the risk of groundwater contamination.

Part 3. Combining the property's soil and subsurface geologic rankings

Combining the rankings from parts 1 and 2 will provide a good overall ranking of the property's potential to prevent pollutants from contaminating groundwater.

Step 1. Transfer the contaminating boxed rankings from the soil evaluations (Part 1) and the subsurface/geologic evaluation (Part 2) to the two boxes below:

Soil Rank_____ Subsurface Rank_____

Step 2. The table below shows the overall level of groundwater contamination risk associated with the property's conditions. Find the two numbers written in the correct sequence (soils rank-subsurface rank; for example 4-2) and circle the sequence.

Level of Risk			
Low (Rank 4)	Low-Moderate (Rank 3)	High-Moderate (Rank 2)	High (Rank 1)
1-4	2-3	1-3	1-1
2-4	4-2	3-2	1-2
3-3		5-1	2-1
3-4			2-2
4-3			3-1
4-4			4-1
5-3			

Step 3. Look above the sequence you circle to find the risk level and your ranking. (For example, if the numbers are 2-3, the site is in the low-moderate risk column and the ranking is 3).

Step 4. Enter the combined ranking and level of risk here:

Combined Ranking _____

Level of Risk _____

APPENDIX I

NOTICE OF VIOLATION

Via Certified Mail #

TO:

Case No. 2001 -

Based on an investigation by designated representatives of the Indiana Department of Environmental Management (IDEM) on _____, 2001, _____ _____, located at _____, County, Indiana ("the Site"), is in violation of the following environmental statutes, rules, and permit:

A. Pursuant to 327 IAC 2-1-6(a)(1), all waters at all times and at all places, including the mixing zone, shall meet the minimum conditions of being free from substances, materials, floating debris, oil, or scum attributable to municipal, industrial, agricultural, and other land use practices, or other discharges that will settle to form putrescent or otherwise objectionable deposits, that are in amounts sufficient to be unsightly or deleterious, that produce color, visible oil sheen, odor, or other conditions in such degree as to create a nuisance, which are in amounts sufficient to be acutely toxic to, or to otherwise severely injure or kill aquatic life, other animals, plants, or humans, and which are in concentrations or combinations that will cause or contribute to the growth of aquatic plants or algae to such a degree as to create a nuisance, be unsightly, or otherwise impair the designated uses.

B. Pursuant to 327 IAC 2-6.1-7, any person who operates, controls or maintains any mode of transportation or facility from which a spill occurs shall, upon discovery of a reportable spill to the soil or surface waters of the state contain the spill, if possible, to prevent additional spilled materials from entering the waters of the state, undertake or cause others to undertake activities needed to accomplish a spill response, and as soon as possible, but within two (2) hours of discovery, communicate a spill report to the Department of Environmental Management, Office of Response.

C. Pursuant to 327 IAC 5-2-2, any discharge of pollutants into waters of the state as a point source discharge, except for exclusions made in 327 IAC 5-2-4, is prohibited unless in conformity with a valid NPDES permit obtained prior to the discharge.

D. Pursuant to IC 13-18-4-5, a person may not throw, run, drain, or otherwise dispose into any of the streams or waters of Indiana, or cause, permit, or suffer to be thrown, run drained, allowed to seep, or otherwise disposed into any waters, any organic or inorganic matter that causes or contributes to a polluted condition of any waters, as determined by a rule of the board adopted under sections 1 and 3 of IC 13-8-4.

E. Pursuant to IC 13-30-2-1, no person may discharge, emit, cause, allow, or threaten to discharge, emit, cause, or allow any contaminants or waste including any noxious odor, either alone or in combination with contaminants from other sources, into the environment or into any publicly owned treatment works in any form which causes or would cause pollution which violates rules, standards or discharge of emission requirements adopted by the appropriate board pursuant to this article.

In accordance with IC 13-30-3-3l, the Commissioner is required to notify an alleged violator in writing that a violation may exist and offer an opportunity to enter into an Agreed Order providing for the actions required to correct the violations and for the payment of a civil penalty. The Commissioner is not required to extend this offer for more than sixty (60) days.

Entering into an Agreed Order will prevent the issuance of a Notice and Order of the Commissioner under IC 13-30-3-4, or the filing of a civil court action under IC 13-14-2-6. IDEM encourages settlement by Agreed Order, thereby saving time and resources. Timely settlement by Agreed Order may result in a reduced civil penalty. Settlement discussions will also allow the opportunity to present any mitigating factors that may be relevant to the violations. In addition, as provided in IC 13-30-3-3, an alleged violator may enter into an Agreed Order without admitting that the violation occurred.

If settlement is not reached within sixty (60) days of receipt of this Notice of Violation, the Commissioner may issue a Notice and Order containing the actions that must be taken to achieve compliance, the required time frames, and an appropriate civil penalty. Pursuant to IC 13-30-4-1, the Commissioner may assess penalties of up to $25,000 per day for each violation.

To discuss this matter further, please contact _____ within fifteen (15) days after receipt of this Notice to request a conference. If settlement is reached, an Agreed Order will be prepared and sent for review and signature.

For the Commissioner:

Date: _____ Signed_____

Felicia A. Robinson
Assistant Commissioner
Office of Enforcement

cc: _____County Health Department
Public File

APPENDIX J

INDOT Facility Stormwater and Washwater Effluent Drainage Assessment

Surface Water

1. Does any area of the active surface collect storm water or facility-generated wash water (such as from washing trucks outdoors)?_____

   _____

2. Is there any movement of surface water from one area to another on-site by ditch, drain tile or natural channel? _____
3. Is there any movement of surface water off-site beneath the perimeter fence, via sheet flow, ditch, pipe or channel to neighboring property? _____

   _____

4. Does facility allow the discharge of surface water directly to -

   ☐ drainage ditch or roadside ditch

   ☐ a nearby creek, river or other water body

   ☐ lagoon or holding pond

   ☐ settling basin, catch basin, or other constructed retention structure

   ☐ underground tank

   ☐ municipal storm sewer Owner_____

   ☐ municipal combined storm/sanitary sewer Owner_____

   ☐ POTW Owner: _____

   POTW Discharge Requirements/Restrictions: _____

   _____

   _____

5. If surface water is discharged, other than to a municipal storm, sanitary or combined sewer, does it ultimately reach a waterbody, such as a lake, stream, creek, river or ditch? If yes, name of nearest water body.

   _____

Shop Floor Drain & Wash Bay Effluent

1. Are there drains in shop floors and wash bays that remove liquids and wash water from the building(s)? _____
2. Do liquids and wash water flow to -
   - ☐ aboveground oil/water separator
   - ☐ aboveground tank
   - ☐ below ground oil/water separator
   - ☐ below ground tank
   - ☐ settling basin, catch basin, lagoon, holding pond or other constructed retention structure
3. Are liquids captured by the devices in 2., above, contained until pumped and hauled to a POTW or evaporated, or do they overflow to a drainage system? _____
4. If to a drainage system, is the system above or below ground? _____
   _____
5. If to a drainage system, does the flow mix with storm water?_____
6. If flow does mix with storm water, see "Surface Water" section (preceding page, #4 and #5) for discharge.
7. If the flow doesn't mix with storm water, is it discharged to -
   - ☐ subsurface soils
   - ☐ on-site septic system
   - ☐ drainage ditch or roadside ditch
   - ☐ a nearby creek, river or other water body
   - ☐ lagoon or holding pond
   - ☐ municipal storm sewer Owner_____
   - ☐ municipal combined storm/sanitary sewer Owner_____
   - ☐ municipal POTW Owner_____
8. If shop floor drain and washbay effluent is discharged, other than to a municipal storm, sanitary or combined sewer, does it ultimately reach "waters of the state?" If yes, name of the nearest water body: _____

Activity Areas (check those that apply and describe drains and their locations in the activity areas)

- ☐ salt storage (pads or domes) _____
- ☐ salt/sand mixing _____
- ☐ salt bed loading/wetting _____
- ☐ salt bed washout _____
- ☐ salt bed storage _____
- ☐ vehicle and equipment washing (inside) _____
- ☐ vehicle and equipment washing (outside) _____
- ☐ asphalt equipment clean-out _____
- ☐ herbicide mixing and tank rinsing _____
- ☐ traffic paint mixing and transfer _____
- ☐ bulk tank off-loading and storage _____
- ☐ waste piles (e.g., ROW trash) _____
- ☐ truck/equipment parking _____
- ☐ materials storage (210 lot, fencing, etc.) _____
- ☐ aggregate storage _____
- ☐ hot/cold patch storage _____
- ☐ storage of "scalp" and dirt from R/W maintenance _____

Step 5. Understand the combined ranking.

In general, a site with a combined ranking of 4 (low groundwater pollution risk) will have a soil with a good capacity to hold and break down contaminants before reaching the water table. Under certain conditions, however, such as spills, poor management, and heavy rainfall, contaminants may reach groundwater.

On the other hand, if you carefully manage a site with a combined ranking of 1 (high groundwater pollution risk), you may still protect groundwater. Both site characteristics and your management practices are of equal importance.

APPENDIX K

Index to CD-ROM Sormwater Management Documents

California Department of Transportation Construction Site BMPs Manual

http://www.dot.ca.gov/hq/construc/Construction_Site_BMPs.pdf

California Department of Transportation Statewide Storm Water Management Plan

http://www.dot.ca.gov/hq/env/stormwater/special/final_swmp/final_swmp.pdf

California Department of Transportation Statewide Storm Water Management Plan - Revised 2002

http://www.dot.ca.gov/hq/env/stormwater/annual_report/_swmp/swmp.htm

California Department of Transportation Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual

http://www.dot.ca.gov/hq/construc/SWPPP_WPCP_Preparation.pdf

California Environmental Protection Agency Model Urban Runoff Program

http://www.swrcb.ca.gov/stormwtr/murp.html

City of Indianapolis Drainage Design Standards and Specifications Manual (Chapters 100 & 700)

http://www.indygov.org/dpw/amend_chp100_chp700.pdf

Indiana Drainage Handbook

http://www.ai.org/dnr/water/DrainageHandbook/

Management of Runoff From Surface Transportation Facilities Synthesis and Research Plan - National Cooperative Highway Research Program

http://trb.org/trb/publications/nchrp/nchrp_w37.pdf

Managing Storm Water Runoff to Prevent Contamination of Drinking Water— EPA Office of Water

http://www.epa.gov/safewater/dwa/electronic/swp/stormwater.pdf

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http://www.epa.gov/ednnrmrl/repository/epa-440-5-87-001/index.html

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http://www.epa.gov/npdes/menuofbmps/menu.htm

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http://www.bmpdatabase.org/

Storm Water Phase II Compliance Assistance Guide – EPA Office of Water

http://www.epa.gov/npdes/pubs/comguide.pdf

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http://www.ene.gov.on.ca/envision/water/stormwaterPPH.htm

Techniques for Tracking, Evaluating, and Reporting the Implementation of Nonpoint Source Control Measures - Urban - EPA Office of Water

http://www.epa.gov/owow/nps/urban.pdf

Urban Hydrology for Small Watersheds – Natural Resources Conservation Service, USDA

http://www.wcc.nrcs.usda.gov/water/quality/common/tr55/tr55.html

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Washington State Department of Transportation Highway Runoff Manual

http://www.wsdot.wa.gov/fasc/EngineeringPublications/Manuals/Highway.pdf

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1. *Overview and screening criteria*
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3. *Infiltration basins and trenches*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_3.PDF
4. *Wet detention basins*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_4.PDF
5. *Artificial wetland storm water management systems*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_5.PDF
6. *Filter strips*
   http://www1.uwex.edu/ces/pubs/pdf/G3691_6.PDF
7. *Grassed swales*
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De-icing and Brinemaking

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"Low Impact Development Hydrologic Analysis," Prince George's Co., MD Dept. of Environmental Resources. July 1999 (39 pp. plus 3 appendices)

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"Stressor Identification Guidance Document," (December 2000), U.S. EPA, Office of Research and Development [EPA/822/B-00/025]

"Thinking Beyond NEPA: Building Better Projects Through Community Involvement," (December 1, 2000) Center for Transportation and the Environment, North Carolina State University, National Teleconference Series, Program #TC-19 (video)

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"National Stormwater Best Management Practices (BMP) Database," ASCE and EPA (Version 1.0, June 1999) [CD with User's Guide]

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ds, April 26, 2002

APPENDIX M

RECOMMENDED POLICY FOR THE DEACTIVATION AND DECOMMISSIONING OF INDOT FACILITIES

Introduction

This policy is intended to guide INDOT officials responsible for suspending operations at, and temporarily or permanently closing facilities on, state-owned property in anticipation of (1) transfer of the property or (2) removal of the property from its inventory of active sites.

For purposes of this policy, the terms used have the following meanings[1]:

"Facility:" the land, buildings and other stationary and mobile structures situated on the land; the equipment, machines and furnishings within such structures; site development features on top of and beneath the surface of the land, including landscaping, roads, parking areas, fencing, lighting, and utility systems for communications, power, sanitary and stormwater collection and/or distribution, and other physical plant features.

"Deactivation:" the process of placing a facility in a safe and stable condition, including the removal of hazardous materials, to minimize the long-term costs of a surveillance and maintenance program and to protect the public and the environment.

"Decommissioning:" takes place after deactivation and may include surveillance and maintenance, decontamination or dismantlement.

"Decontamination:" the removal or reduction of residual hazardous materials by mechanical, chemical or other techniques to achieve a stated objective or condition.

"Dismantlement:" the disassembly or demolition or removal of any structure, system or component, and satisfactory interim or long-term disposal of the residue from the facility.

"Hazardous and Other Substances:" for the purposes of this policy, include salt, salt/sand mix, and salt brine, with or without the wetting agents; also any chemicals classified as hazardous materials, hazardous waste, and petroleum products.

Procedure for Preparing a Facility for Closing

1. The closing date, once determined by INDOT officials, shall be announced to managers and employees in the affected district.

2. The announcement shall be followed by a directive to facility managers and employees in the affected facility, instructing them to prepare -

   a. an inventory of all hazardous and other substances by product name or description, amount or volume (including number of containers), and storage location. The inventory shall be used to control the disposition of hazardous and other substances used by facility employees in the period before actual closing and the inventory adjusted according to that disposition.

   b. the inventory shall differentiate hazardous and other substances as (1) salt and salt/sand mix stockpiles (with and without additives); (2) hazardous materials; (3) hazardous waste, and (4) petroleum products.*

   c. the inventory of salt and salt/sand mix stockpiles, hazardous materials and

*Note: products such as Black Beauty and glass beads that present a physical hazard to the environment and animal life shall also be inventoried.

petroleum products shall be distributed within the district to alert other facilities as to the availability of the material for removal; guidance on proper removal, transport and storage shall be provided.

d. The inventory of hazardous waste shall be forwarded to the QPA contractor with a request for immediate pickup.

3. The same or another directive to the facility manager shall direct him/her to assemble or prepare the following documents for subsequent use in the Environmental Site Assessment:

a. most recent site survey form requested by Environmental Services Division;

b. aerial photos of the site;

c. blueprints or diagrams of facility buildings showing locations of (1) floor drains and drain pipes; (2) oil/water separators; (3) oil storage locations; (4) hazardous waste storage locations, (5) hazardous materials storage locations;

d. schematic showing location of all surface and subsurface stormwater, washwater, product storage and sanitary collection devices and distribution structures, including grates, vaults, catch basins, holding tanks, oil and gasoline storage tanks, drinking water wells, septic tanks, tiles, pipes, ditches, eroded channels, leach fields, drywells, etc.;

e. copies of any state or local environmental permits for the facility;

f. a description of hazardous and other substance management practices and environmental "events" known to employees at the facility (e.g., previous location of the hazardous waste storage area; location of past tar kettle clean-out area; location of past diesel fuel spill, etc.);

g. a description of the known and suspected impacts of the facility's past and current operation on adjacent properties;

h. copies of spill incident reports, correspondence from local or state authorities regarding inspections of facility operations (e.g., discharges to POTW, IDEM inspections, etc.),

i. other documents and information that could assist the Environmental Site Assessment.

4. The documentation in 3., above shall be secured with information available from the District and headquarters offices, including, but not limited to -

a. relevant information from a review of the recorded chain of title documents regarding the property, especially concerning prior ownership and uses that could reasonably have contributed to environmental degradation at the site,

b. other documentation concerning activities at the site during INDOT ownership (e.g., subdistrict constructed in 1990 on a site owned by INDOT on which salt was stored beginning in 1960).

Procedure for Closing a Facility

1. A Phase I and II Environmental Site Assessment (ESA) shall be conducted at each site as soon as reasonable after the decision to close the facility and before the facility is actually closed;

2. Phase I and II Environmental Site Assessments shall be conducted by environmental professionals, preferably staff of environmental engineering firms, recognized by the state and their peers as experienced and competent in the skills necessary to effectuate an accurate and comprehensive assessment;

3. Based on the assessment report, the department and the consultant will categorize the site, as follows:[2]

Category 1: site where release, disposal, and/or migration of hazardous and other substances has occurred and all required removal or remedial actions to protect human health and the environment have been completed.

Category 2: site where release, disposal and/or migration of hazardous and other substances has occurred and reside in concentrations and/or amounts requiring removal and/or remedial actions;

Category 3: site where release, disposal and/or migration of hazardous and other substances has occurred and required removal or remedial actions are underway, but have not been completed,

Category 4: site where release, disposal and/or migration of these substances has occurred, but at concentrations that do not require removal or remedial response;

Category 5: site where no release or disposal of hazardous and other substances has occurred, including no migration of these substances from/to adjacent properties;

4. Decisions concerning the disposition of each site, based on its assessment categorization, will be made as follows:

Category 1: eligible for immediate transfer or removal of the property from the INDOT inventory of active sites; Environmental Disclosure Document for Transfer of Real Property to be completed;

Category 2: not eligible for transfer or removal from property inventory list until removal and remedial actions required by state and federal law are completed,

pursuant to Indiana's Voluntary Remediation Program regulations. Environmental Disclosure Document completed following IDEM and EPA approval of site remediation;

Category 3: same as Category 2, above,

Category 4: eligible for transfer or removal of the property from the INDOT inventory of active sites after completing Environmental Disclosure Document for Transfer of Real Property; IDEM will probably require filing of Environmental Site Assessment reports;

Category 5: eligible for immediate transfer or removal of the property from the INDOT inventory of active sites; Environmental Disclosure Document for Transfer of Real Property to be completed;

5. Decisions concerning the use of Category 1, 2 and 3 properties shall be supported by an Analysis of Intended Use document that includes a listing of specific recommended restrictions on the property, if any, to protect human health and the environment. For properties remediated pursuant to CERCLA, such restrictions would include those documented in the Record of Decision (ROD) under the National Oil and Hazardous Substances Contingency Plan (NCP) or equivalent decision documents.[3]

Note: The covenant required by CERCLA Section 120(h)(3) regarding hazardous and other substances must be based on either (1) a determination that no remedial action is required or (2) a determination that all remedial action necessary to protect human health and the environment has been taken. The determination that no remedial action is required or that all remedial action has been taken shall be supported by the appropriate documentation required by the program (e.g., CERCLA, RCRA, UST, state law) under which the property was evaluated and addressed. Such decision document may include a

CERCLA Record of Decision (ROD), No Further Action ROD, No Further Response Action Planned (NFRAP), or other such similar RCRA, UST, or state law documentation, or other documentation that describes agreement of the lead regulatory agency. The intent is to use the processes under existing cleanup authorities and programs, and not create an additional separate process, to determine whether property requires remedial action or can be transferred as is. For property that requires remedial action, whether or not an NPL site and regardless of which cleanup authority is used, the covenant that all remedial action has been taken may only be made after a demonstration to EPA that an approved remedy is installed and operating properly and successfully.[4]

Footnotes

[1]Modified from "Cost-Effective Facility Disposition Planning" (DOE/EH-0568), U.S. Department of Energy (May 1998), p.v.

[2]Modified from "DoD Guidance on the Environmental Review Process to Reach a Finding of Suitability to Transfer (FOST), Step 2: Evaluate the Property for Transfer," U.S. Department of Defense (Fall 1996), p. 1 of 3.

[3]Ibid, p. 3 (modified)

[4]Ibid, p. 3 (modified)

APPENDIX N

RISC Investigation Report Format

I. Introduction

A. Project Identification

1. Site name, facility identification numbers(s), mailing address, and telephone number
2. Site location clearly marked on appropriate U.S. Geological Survey 1:24,000 scale topographic quadrangle map
3. Current owner and operator, mailing address, and telephone number
4. Site contact person or group responsible for the investigation

B. Overview of Current Contamination Conditions

1. Date the spill(s), release(s), or other contamination(s) occurred or was discovered
2. How the spill(s), release(s), or other contamination(s) was discovered
3. Remediation or product recovery measures already taken, including the following:
    a. Volume of product(s) recovered
    b. Name of product(s) recovered
4. Suspected source(s) of the spill(s), release(s), or other contamination(s)
5. Estimated volume(s) of the spill(s), release(s), or other contamination(s)
6. Approximate area(s) impacted
7. Date the incident(s) was reported to IDEM and resulting incident number (if assigned)
8. Existing deed restrictions, land-use restrictions, or environmental notice limitations

II. Site Background and Baseline Project Assessment

A. Site History

1. Type of facility, including description of past and current operations
2. Hazardous materials used or stored on site
3. Site ownership and operational history
4. Site spill, release, and contamination history
5. Previously completed investigations, including the

following:

a. Reasons for previously completed investigations
b. Current status of site conditions that prompted or initiated previously completed investigations

6. Potential chemical(s) of concern

B. Geographic Information

1. Political geographic data
   a. County name(s)
   b. Political township names(s)
   c. Section (1/4, 1/4, 1/4), township, and range locations
   d. Universal Transverse Mercator (UTM) coordinates
2. Physical geographic data
   a. Topography and surface water flow and drainage patterns
   b. Nearby surface waters (including wetlands and surface drainage ways
   c. Nearby floodways and flood plains

C. Geologic Information

1. Surficial and unconsolidated geology
   a. Surface soil descriptions from U.S. Department of Agriculture (USDA) Soil Conservation Service (SCS)
   b. Type(s) of unconsolidated material
   c. Thickness of unconsolidated material
2. Bedrock geology
   a. Depth to bedrock
   b. Type of bedrock
   c. Description of primary and secondary structural features, such as fractures, jointings, and solution cavities, that could impact contaminant migration and remediation efforts
   d. Current status or future potential of aquifer underlying site as primary source aquifer
3. Hydrogeology
   a. Identification of regional aquifer(s)
   b. Identification, location, and copies of the Indiana Department of Natural Resources-Division of Water (IDNR-DOW) well records for all municipal water supply wells and other high-capacity (greater than 70-gallon per

minute [gpm] yield) wells within a 2-mile radius of the site

c. Identification, location, and copies of IDNR-DOW records for low-volume (less than 70-gpm yield) wells within a 1-mile radius of the site
d. Regional depth to ground water and seasonal fluctuations
e. Regional ground water flow direction(s) and gradient(s)
f. Summary of existing site specific data
g. Other information, as necessary or appropriate

D. Ecologic Information

1. Potentially affected species of flora and fauna
2. Potentially affected species of flora and fauna on the Endangered Species List as published by the U.S. Fish and Wildlife Service and IDNR
3. Potential or observed effects of contamination on vegetation or wildlife populations

E. Preliminary Evaluation of Potentially Susceptible Areas

1. Drinking water source and wellhead protection areas
2. Geologically susceptible areas, such as surface water bodies, karst bedrock areas, and other areas
3. Socially susceptible areas, such as schools, parks, and hospitals
4. Ecologically susceptible areas that include habitats of concern, such as wetlands, caves, and parklands

F. Preliminary Evaluation of Possible Chemicals of Concern

1. Listed or actual chemical(s) of concern, including those with a Hazards Category, those listed on Material Safety Data Sheets (MSDS), and others
2. Suspected chemical(s) of concern based on site operational history
3. Description of hazards categories present
4. Copies of all MSDSs

G. Preliminary Evaluation of Potential Contaminant Transport Mechanisms

1. Discussion of surface water runoff (nonpoint mechanism)
2. Transport mechanisms to surface water, such as

drainage ditches, storm sewers, and underground utility trenches
3. Discussion of ground water flow
4. Transport mechanisms to ground water, such as well bores, sewers, underground utility trenches, and karst features
5. Other transport mechanisms, such as windblown particulates and physical tracking of soil by people, animals, or machinery

H. Preliminary Evaluation of Potential Human Exposure Pathways

1. Inhalation exposure pathway
2. Ingestion exposure pathway
3. Dermal absorption exposure pathway

I. Preliminary Evaluation of Potential Ecological Exposure Pathways

1. Potential impacts to aquatic life
2. Potential impacts to wildlife and vegetation

J. Identification of Existing Data Gaps that Must Be Addressed in the Site Investigation(s)

1. Site-specific geologic information
2. Site-specific hydrogeologic information
3. Site-specific ecologic information

K. Supporting Documentation

Full bibliographic information must be provided in the references for all documents used, referenced, and cited.

1. Previous applicable reports prepared for the site or the project
2. Available data and other applicable documentation regarding either the site or the project
3. Conceptual site model(s)

L. Maps and Figures

All maps, figures, drawings, cross-sections, aerial photographs, and other such information must be submitted in Appendix B of the investigation report or work plan. The maps, drawings, and other items must include suitable scales, compass directions, and clearly illustrated legends. Figures must also be provided for

sites where the current conditions do not accurately reflect conditions that existed at the time of the spill or release because of building renovations, underground storage tank (UST) system upgrades and other changes. All maps and information on the maps must be legible and reproducible. Maps and figures should provide the information listed below.

1. Site location clearly on indicated U.S. Geological Survey 7.5-minute topographic quadrangle map(s)
2. Current as well as past locations of physical features of the site, including the following:
    a. Property lines
    b. Building outlines
    c. Sidewalks
    d. Buildings with basements
    e. Underground and overhead utility lines
    f. Raw materials and bulk storage areas
    g. Aboveground storage tanks
    h. USTs
    i. Tank Piping trenches and associated dispenser islands
    j. Roads
    k. Pump island piping
    l. Property access points
    m. Gates and fences
    n. Loading and unloading areas
    o. On-site waste storage, treatment, and disposal areas
    p. Surface water bodies
    q. On-site ground water supply wells
3. Named facilities, property lines, property uses, current land-use status (such as agricultural, industrial, or commercial), ground water wells, surface water, and other environmentally sensitive areas within a 1-mile radius of the site (underline added)
4. Locations and identification numbers for all municipal water supply wells and high-capacity (greater than 70-gpm yield) water wells identified in IDNR-DOW well records within a 2-mile radius of the site
5. Locations and identification numbers for all low-volume (less than 70-gpm yield) wells within a 1-mile radius of the site
6. Areas where past spills or releases have occurred, where remediation efforts are currently being

conducted, or where remediation efforts have been conducted in the past

7. Soil boring and monitoring well locations
8. Horizontal extent of contaminant migration
9. Sampling locations, including sampling depth and analytical results
10. Potentimetric surfaces for all ground water monitoring events
11. Geologic and hydrologic cross sections that define the stratigraphy, vertical extent of contaminant migration, water table, and location of free product plume, if present
12. Environmentally sensitive areas