RULE 13 STORM WATER QUALITY MANAGEMENT PLAN (SWQMP) - PART B: BASELINE CHARACTERIZATION AND REPORT CERTIFICATION CHECKLIST

State Form 51275 (R / 6-03)
INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

For questions regarding this form, contact:
IDEM – Rule 13 Coordinator
100 North Senate Avenue, Rm 1255
P.O. Box 6015
Indianapolis, IN 46206-6015
Phone: (317) 234-1601 or
(800) 451-6027, ext. 41601 (within Indiana)
Web Access:
http://www.in.gov/idem/water/npdes/permits/wetwthr/storm/rule13.html

NOTE:

- This form must be used for compliance with a general NPDES permit pursuant to 327 IAC 15-13.
- Submit this completed form with a complete "SWQMP – Part B: Baseline Characterization and Report" in accordance with 327 IAC 15-13-7.
- Return this form, and any required addenda by mail to the IDEM Rule 13 Coordinator at the address listed in the box on the upper-right.

PART A: SWQMP CHECKLIST

☐ **Please check the appropriate box when the requirements for each numbered item have been met, or check "NA" if an item is not applicable. For some of the numbered items, the requirements must be met and "not applicable" is not provided as an option.**

X	NA	ITEM
☒		1. Plan submitted within one hundred eighty (180) days of the NOI letter submittal or the expiration date of the previous 5-year permit term
		2. Baseline characterization includes:
☒		a) An investigation of land usage within the MS4 area
☒		b) The identification and assessment of structural and nonstructural storm water BMP locations
☒		c) The identification of known sensitive water areas
☒		d) A review of known existing and available monitoring data of the MS4 area receiving waters
☒		e) The identification of areas having a reasonable potential for, or actually causing, storm water quality problems
☐	☒	f) Other (please specify):
		3. Characterization report includes:
☒		a) Conclusions, such as key observations or monitoring points in the MS4 conveyances, derived from the land usage investigation
☒		b) Characterization results of BMP locations and, as appropriate, the structural condition of the BMP, related to the BMP's potential or actual effectiveness in improving storm water quality
☒	☐	c) The characterization includes recommendations for placement and implementation of additional BMPs
☒		d) Identification of areas, such as public beaches or surface drinking water sources, that potentially or actually require added water quality protection considerations
☒	☐	e) Any correlative conclusions that can be drawn from a review of existing monitoring data that assists the MS4 Operator in identifying potential or actual storm water quality problem areas
☒	☐	f) The identification of areas or sources potentially or actually causing storm water quality problems
☐	☒	g) Other (please specify):
☒		4. SWQMP - Part B: Baseline Characterization and Report has been signed by a Qualified Professional and the MS4 Operator

PART B: CERTIFICATION AND SIGNATURE

☐ The Qualified Professional and the MS4 Operator (referenced in Part A, Item #4 of this form) must sign the following certification statement:

"By signing this checklist, I hereby certify under penalty of law that this protocol was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Name of Qualified Professional: David L. Pilz
(typed or printed)

Signature of Qualified Professional: David L. Pilz **Date:** 04/30/04
(mm/dd/year)

Name of MS4 Operator: Matthew J. Kras
(typed or printed)

Signature of MS4 Operator: Matthew J. Kras **Date:** 5/2/04
(mm/dd/year)

City of Valparaiso

Storm Water Quality Management Plan
Part B
Baseline Characterization Report
327 IAC 15-13-7

May 4, 2004

Part B Baseline Characterization Report
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Section One
Summary of Data Collection and Evaluation

A. Summary of General Data on MS4 Entity and System

The following describes the MS4 entity in general, providing a context for the evaluation of the water quality data and other data sources in the preparation of this report.

The City of Valparaiso is located in Porter County, which is in the northwest corner of the state of Indiana with a population of approximately 29,000. Valparaiso is a rapidly expanding city with a large variety of commercial and industrial businesses while still maintaining an abundance of open land and greenspace in part, which are home to 17 parks (650+ acres) and 3 golf courses. The City is also home to Valparaiso University, which enrolls approximately 3,700 students annually. Valparaiso sits at an elevation of 640 ft above sea level with prevailing westerly winds and an average annual precipitation of 42 inches. The City of Valparaiso encompasses 12.38 sq. miles that drain to 3 major receiving waters, which are Beauty Creek, Salt Creek and Sager Run. These 3 receiving waters are all part of the Lake Michigan Watershed.

Hutton Ditch was identified as a fourth receiving water in Valparaiso's Notice of Intent letter to IDEM in November of 2003. This identification was based on USGS maps showing it as a solid blue line, but upon further investigation of its drainage area and flowrate it has been taken off. Hutton Ditch only drains approximately 0.06mi^2 and only has water in it approximately 3 months (March, April, May) of the year. The rest of the year the ditch runs dry, except during large storm events.

**Note for the purposes of this document the terms "receiving waters" and "waters of the state" mean the same and are used interchangeably.*

B. Summary of Baseline Data Collection and Evaluation

The following describes the process utilized to identify, gather, and evaluate data for this Baseline Characterization Report.

Data was requested from the following sources:

1. IDNR-Hoosier Riverwatch
2. IDNR-Lake and River Enhancement (LARE) program
3. U.S. Geological Survey
4. Valparaiso University – *Dr. Laurie Eberhardt*
5. IDEM – Biological Studies Section
    a. *Water Chemistry*
    b. *Fish Community*
    c. *Macroinvertebrat*

d. *Fish Tissue and Sediment*

Data was available on the "receiving waters" for the City of Valparaiso from Dr. Laurie Eberhardt and from IDEM's Biological Studies Section.

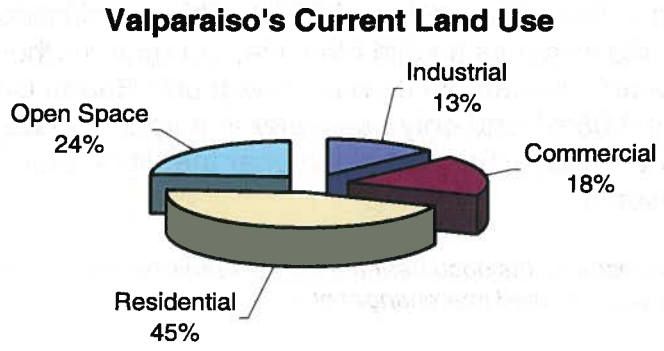
Dr. Eberhardt provided stream-monitoring data regarding macroinvertebrate community along with temperature, turbidity, pH, dissolved oxygen, and some chemical analysis.

IDEM – Biological Studies Section provided information on water chemistry, fish community, macroinvertebrate community, and fish tissue and sediment.

C. *Summary of Evaluation Approach*

1. Land-use evaluation

The area within city limits, including Valparaiso University, is approximately 12.38 square miles. This area was evaluated and grouped into 4 categories using aerial maps. The four categories are industrial, commercial, residential, and open space. Polylines were drawn around the perimeter of each property within each category, the areas were then computed using AutoCAD and added together giving a total area for each category. For the City of Valparaiso the final areas came out to be 1.61 square miles of industrial space or about 13%, 2.23 square miles of commercial space or 18%, 5.57 square miles of residential space or 45%, and 2.97 square miles of open space or 24%.



(See City of Valparaiso Land Use Map with Industrial Storm Water Dischargers on Page 20)

The City of Valparaiso currently has 29 industrial storm water dischargers that are permitted under IDEM's Rule 6. These dischargers are located primarily in the industrially zoned area of Valparaiso, with some exceptions falling in the commercially zoned area. A complete list of Valparaiso's 29 industrial dischargers is included on page 20 of this report. These industrial storm water dischargers are subject to more stringent standards including:

- New facilities must submit to IDEM a NOI form at least 180 days prior to start of operations, existing facilities which discover that they lack a required storm water runoff permit must submit an NOI as soon as possible.
- Include a $50 application fee with the NOI
- Develop a storm water pollution prevention plan
- Submit storm water sampling for 3 precipitation events
- Submit 2 visual inspection reports per calendar year
- Pay an annual fee of $100

2. Evaluation of Structural/Nonstructural BMPs and Potential Sites For Additional BMPs

Catchbasins – Valparaiso's catchbasins are cleaned by the Utility Department on a priority basis developed from past cleanings.

Roadside Swales – good condition; maintained and cleaned as needed by Valparaiso's Public Works.

Detention Basins – good condition; maintained and cleaned as needed(grass mowed, debris picked up) by Valparaiso's Public Works Department.

City Owned and Operated Detention Basins

a. Candlewood Pond – Investigate design and construction of a controlled outlet (standpipe) to restrict flow and extend the time stormwater runoff is detained in the pond. At present the discharge form the pond flows directly to the 36" sewer constructed by the City to alleviate flooding in the development.
b. Fairgrounds Park – Sizeable basin that only has water in it during very large storm events. May be impacted more as Valparaiso Street project is completed.
c. Hotter Lagoon – Wetland area used to naturally filter and detain storm water runoff. A study of the area may be beneficial to determine added water quality benefits of modifications to the pond to improve water quality (i.e. spill protection, wet detention)
d. Knode Creek Basin #2 – This basin was recently completed (October 2003) as part of the Chicago Street extension project. The basin is used to detain storm water from Knode Creek during large storm events
e. Knode Creek Basin #1 – Also referred to as *Thorgren Pond*, this basin needs to be evaluated to maximize its usefulness. Installing a standpipe will detain more runoff from smaller rain events.

leveling bottom of the pond to outlets invert elevation will allow for some wetlands that with proper vegetation can filter runoff. Leveling bottom of the pond will also add 14 acre-feet of storage capacity.

f. Wall Street Basin – Detention basin in good condition; standpipe may be reevaluated to decrease release rate.

Street Sweeping – The entire city is swept, at least once, annually by the public works Department. This includes streets and parking lots. Additional sweeping is done on an as needed basis.

Public Participation/Education/Involvement – Storm Water Advisory Committee (S.W.A.C.) formed in June 2003 to advise and review Storm Water and Rule 13 issues. The City of Valparaiso plans to enter into an agreement with NIRPC to have them manage public education and involvement issues for storm water quality.

Erosion Control Ordinance – Valparaiso's erosion control ordinance is currently being reviewed and will be modified to ensure less erosion coming off of construction sites and better efficiency with rule enforcement.

3. Identification of Sensitive Waters

Salt Creek is identified as a sensitive water needing priority protection. Steelhead Salmon are fished for regularly in the Spring and Fall when the Salmon make their runs from Lake Michigan to spawn. Salt Creek is identified on IDEM's 303(d) list as impaired for E. coli contamination. A TMDL(Total Maximum Daily Load) study was started in 2001 for the creek and is almost complete. A draft of the Salt Creek TMDL was released January 19, 2004, and, within the draft, Rule 13 is addressed. The draft indicates that a 55% decrease in nonpoint source load allocations may need to be attained in order to reach the appropriate reduction in E. coli contamination. This will be partially achieved through Valparaiso's incorporation of the six minimum control measures required in Rule 13.

4. Review of Existing/Available Water Quality Data:

Water quality data was requested from Hoosier Riverwatch, DNR, U.S. Geological Service, and IDEM. IDEM is the only agency that had data on Valparaiso's receiving waters. IDEM's office of water quality – assessment branch – biological studies section was able to provide some data on fish communities in Beauty Creek and Salt Creek and macroinvertebrate data in Sager Run and Salt Creek.

Summaries of fish community and macroinvertebrate data for Valparaiso's "Waters of the State" are shown in the tables below.

FISH COMMUNITY

Receiving Water:	Beauty Creek
Location:	S.R. 130
Date of Sampling:	8/30/90
Sample #:	90202
Bluegill	4
Brown Trout	1
Central Mudminnow	2
Chinook Salmon	1
Common Carp	1
Creek Chub	4
Golden Shiner	1
Grass Pickerel	9
Green Sunfish	62
Largemouth Bass	4
White Sucker	2

TOTAL IBI SCORE: 34

Note: One monitoring point downstream of the city may be sufficient for Beauty Creek due to branching of the creek within the city.

Receiving Water:	Sager Run
Location:	Sager Rd.
Date of Sampling:	11/10/90
Sample #:	90322
Black Bullhead	2
Black Crappie	2
Blackstripe Topminnow	2
Bluegill	16
Brook Silverside	3
Central Mudminnow	1
Central Stoneroller	1
Creek Chub	3
Golden Shiner	2
Green Sunfish	2
Lake Chubsucker	1
Largemouth Bass	1
Longear Sunfish	1
Pumpkinseed	1

Receiving Water:	Sager Run
Location:	S.R. 2
Date of Sampling:	11/10/90
Sample #:	90323
Blackstripe Topminnow	1
Brook Silverside	6
Creek Chub	5
Fathead Minnow	1
Green Sunfish	2
Johnny Darter	6
Lake Chubsucker	1
Largemouth Bass	1
Starhead Topminnow	1

TOTAL IBI SCORE: 23

TOTAL IBI SCORE: 38

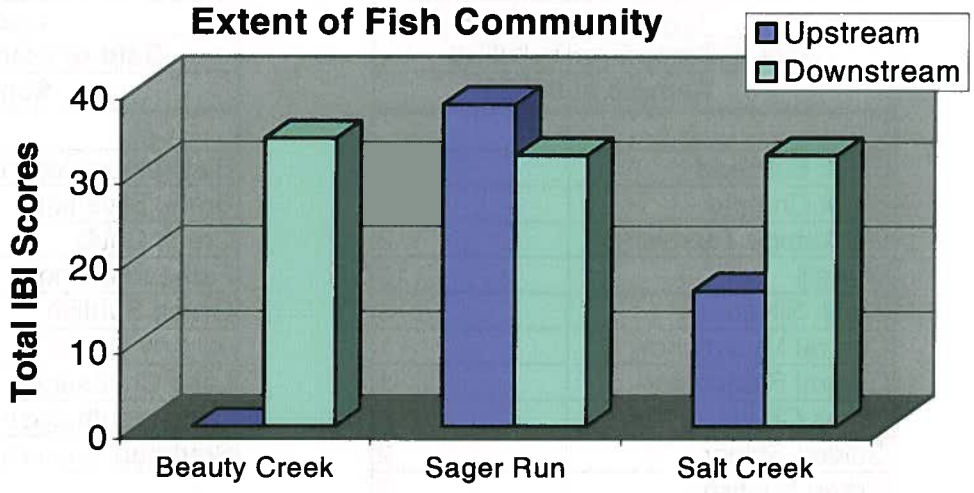
Receiving Water:	Salt Creek
Location:	C.R. 250W
Date of Sampling:	8/29/90
Sample #:	90203
Black Bullhead	1
Bluegill	4
Brook Silverside	1
Central Mudminnow	13
Creek Chub	23
Green Sunfish	44
Johnny Darter	2
Largemouth Bass	4
Pumpkin Seed	2
Whitesucker	1

TOTAL IBI SCORE: 32

Receiving Water:	Salt Creek
Location:	S.R. 2
Date of Sampling:	8/29/90
Sample #:	90204
Bluegill	3
Central Mudminnow	2
Common Carp	2
Johnny Darter	1
White Sucker	1

TOTAL IBI SCORE: 16

Fish community data is graphed below showing upstream and downstream IBI scores. However, data was not available for an upstream count on Beauty Creek. Also, the downstream monitoring of Salt Creek occurred approximately 2.25 miles outside the city limits therefore because of dilution and other factors the measurement may not reflect Valparaiso's impact on the water quality of the creek.



*Note: The **Index of Biotic Integrity (IBI)** is used to calculate the results of fish community data. The IBI is composed of 12 metrics that assess the communities species and trophic composition*

(feeding and reproductive guilds) and fish condition and health. The total IBI score, integrity class, and attributes help define fish community characteristics (see chart below). When fish community data (IBI) is plotted against habitat data (QHEI) areas of impairment, as well as areas with excellent water quality and habitat, become clear.

Total IBI Score	Integrity Class	Attributes
58-60	Excellent	Comparable to pristine conditions, exceptional assemblage of species.
48-52	Good	Decreased species richness, intolerant species in particular: sensitive species present.
40-44	Fair	Intolerant and sensitive species absent; skewed trophic structure.
28-34	Poor	Top carnivores and many expected species absent or rare: omnivores and tolerant species dominant
12-22	Very Poor	Few species and individuals present; tolerant species dominant; diseased fish frequent.
	No Fish	Repeated sampling finds no fish.

MACROINVERTEBRATE

Receiving Water:	Salt Creek
Location:	U/S Valparaiso POTW
Date of Sampling:	9/25/90
Sample ID:	900925203
TAXA	MACROCOUNT
Asellidae	17
Baetidae	14
Hydropsychidae	24
Heptageniidae	4
Simuliidae	11
Oligochaeta	9
Chironomidae(all other)	12

TOTAL MIBI SCORE: 3.2

Receiving Water:	Sager Run
Location:	Outfall of Sager's Lake
Date of Sampling:	9/19/90
Sample ID:	900919103
TAXA	MACROCOUNT
Asellidae	5
Baetidae	9
Caenidae	3
Hydroptilidae	2
Hydropsychidae	125
Elmidae	9
Chironomidae(all other)	74
Empididae	1
Simuliidae	1
Turbellaria	17

TOTAL MIBI SCORE: 4.0

*Note: The **Macroinvertebrate Index of Biotic Integrity (MIBI)** scoring cutoff for impairment is based on the KICK artificial substrate samples. Based on this index, a score of <2.2 indicates impairment and a score of ≥ 2.2 indicates unimpaired.*

5. Identification of Potential Areas of Concern

Valparaiso's Salt Creek Watershed consists of a great deal of commercial area. This area is of particular concern due to the size of the watershed and the land usage within it. The downtown area is largely combined sewers that flow to the WWTP and the treatment plant's Long Term Control Plan(LTCP) addresses combined sewer overflows (CSOs). However, public education and outreach along with erosion control measures and strict stormwater release rates for new developments in the area should help remedy CSOs and improve water quality with the Salt Creek Watershed.

Note: Salt Creek has been identified on IDEM's 303(d) list as being impaired for E.Coli. A TMDL study was started in 2001 and is almost completed.

D. Definition of MS4 System and Waters of the State

The City of Valparaiso is regarding open ditches as a conveyance; meaning a structural process for transferring storm water between at least two (2) points.

The City of Valparaiso is continuing to define its "Waters of the State" (receiving waters) as those shown as a solid blue line on a United States Geological Survey 7.5-minute quadrangle map. Therefore, the City of Valparaiso has no new "Waters of the State" to report at this time.

E. Report on New Data

The following new data sources were created in order to provide additional information on water quality conditions within this community.

Valparaiso University has agreed to do annual monitoring of the city's "Waters of the State" to provide regular water quality conditions and check for the maintenance or improvement of said water. The results of the monitoring will be submitted to the City's operator. An undergraduate biology lab class, under the supervision of their university instructor, will conduct the monitoring.

Valparaiso University biology professor Dr. Laurie Eberhardt and one of her classes completed a trial monitoring of both Sager Run and Salt Creek in late October of 2003. Results of the trial run included a pollution tolerance index of macroinvertebrates in the stream, and a measure of various abiotic factors. Sampling occurred near the iron bridge next to the Applebee's parking lot for Salt Creek, and the area behind Schlotsky's Deli for Sager Run. The class was divided into four groups and their results are shown below.

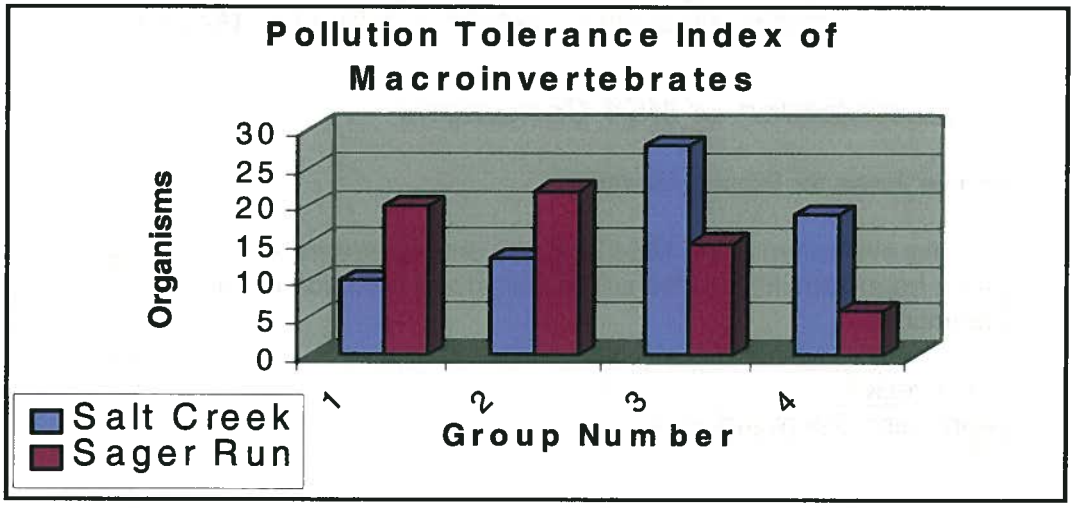


Chart showing macroinvertebrate trends

Results of the macroinvertebrate data appear inconclusive and may be due to inaccuracies and inconsistencies in sampling technique. The degree of these errors should improve as sampling goes on and a familiarity with the procedures transpires.

The abiotic factors measured are as follows:

Abiotic Factor Measured	*Salt Creek*	*Sager Run*
Dissolved Oxygen	9.8 mg/L	9.3 mg/L
PH	5.76	7.89
Temperature	14.7 C	15.0 C
Turbidity	74 NTU	45 NTU
Calcium	88.1 mg/L	8.22 mg/L
Chloride	10.8 mg/L	unavailable

Section Two
Results of Data Evaluation

A. Characterization of MS4 Conditions

1. Sensitive Areas for Priority Attention:

Based on the evaluation of the MS4 land use and other data sources, the following areas have been identified as "sensitive" for priority attention during permit implementation:

1	Salt Creek
2	Valparaiso Downtown Area
3	
4	
5	

Note: Salt Creek has been identified on IDEM's 303(d) list as being impaired for E.Coli. A TMDL study was started in 2001 and is almost completed.

2. Areas with Potential for Storm Water Quality Problems

The following list represents areas with potential for storm water quality problems based on land use data evaluation as well as other information gathered during this process.

1	Valparaiso Downtown Area
2	
3	
4	
5	

B. Characterization of Water Quality Data

1. Key Observations on Water Quality

The following key observations were developed during the data review and evaluation process regarding the existing water quality conditions in the MS4 area.

The principal observation from reviewing the obtainable data and evaluating the existing water quality conditions for the "Waters of the State" that Valparaiso drains to is that there is insufficient data with monitoring at specific sites directly upstream and downstream of city limits. This decreases the accuracy of the data with respect to the city's influence on water quality and BMP effectiveness. However, the data is relevant as a starting point and provides a baseline characterization. A goal for our future monitoring will be to have specific sampling locations immediately upstream and

downstream of where our creeks enter and leave the city, or where data analysis will provide the most valuable information.

2. Conclusions from Data Analysis

The following conclusions have been drawn from the analysis of the existing/available data.

Based on existing water quality data, the City of Valparaiso's receiving waters appear to have a diverse fish community. The macroinvertebrate index of integrity also suggests that Sager Run and Salt Creek are supporting a variety of water dwelling organisms. Fish community and macroinvertebrates are two good indicators of water quality and will continue to be used as a way of monitoring the "Waters of the State" that flow through Valparaiso.

As stated above, a goal for our future monitoring will be to have specific sampling locations immediately upstream and downstream of where our creeks enter and leave the city, or where data analysis will provide the most valuable information. This will provide for a better analysis of how Valparaiso's BMPs and overall stormwater quality control is working.

C. Strategy for Continued Characterization Efforts

The following strategy is being considered for inclusion in the SWQMP for on-going water quality characterization efforts during the life of the permit.

Valparaiso University has agreed to do annual monitoring of the city's "Waters of the State" to provide regular water quality conditions and check for the maintenance or improvement of said water. The results of the monitoring will be submitted to the City's operator. The monitoring will be conducted by an undergraduate biology lab class under the supervision of their university instructor and will occur at least once annually on each receiving water body at locations mutually agreed upon by the City of Valparaiso and Valparaiso University.

D. Follow-up Work Prior to Submittal of Storm Water Quality Management Plan – Part C

The following approach will be taken during the first year of the permit to continue efforts to characterize general and specific water quality conditions in the MS4 area and will help guide the development of the SWQMP.

A Storm Water Advisory Committee (S.W.A.C.) was formed and began meeting in June of 2003. The purpose of the committee is to provide an arena for the introduction of various comments, concerns, and criticisms in regards to Valparaiso's application and selection of minimum control measures and best management practices implicated with Rule 13. The committee is composed of members representing various facets of the community, but all holding a common share in the communities environmental well

being. Entities having representation in the committee include Valparaiso schools, citizens, industry, construction, Valparaiso University, and engineering consulting.

Valparaiso University will begin to do annual monitoring of Valparaiso's "receiving waters" (Waters of the State) as acknowledged in Section Two Part C.

The City of Valparaiso has begun mapping of the city's outlet structures that discharge into "Waters of the State" and will continue to do so as required by the permit.

Appendices

Appendix A: Data Sources Utilized
Appendix B: Updated List of "Waters of the State"
Appendix C: Inventory of BMPs Evaluated and Potential New Sites for Structural BMP Implementation
Appendix D: Land Use Characterization by Residential, Commercial, Industrial, Open Space

Appendix A
Data Sources Utilized

	List of Data Sources Utilized in this Report
1	IDNR-Hoosier Riverwatch; (317) 541-0617; riverinfo@dnr.state.in.us
2	IDNR-LARE; (317) 233-3870; soilconservation@dnr.state.in.us
3	U.S. Geological Survey; (317) 290-3333; http://in.water.usgs.gov
4	IDEM's Surveys and Biological Studies Section; (317) 308-3173
5	Valparaiso University; Dr. Laurie Eberhardt professor of biology; Laurie.Eberhardt@valpo.edu
6	Valparaiso Utilities; Steve Poulos – Valparaiso Utilities Manager (219) 464-4973; vwwtp@netnitco.net
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15	

Appendix B
Updated List of Waters of the State

The following is a complete list of Waters of the State (receiving waters of discharges from MS4), including the original list submitted in the NOI and updated based on the data evaluation completed for the Characterization Report.

	Waters of the State (Receiving Discharges from MS4)
1	Beauty Creek
2	Sager Run
3	Salt Creek
4	
5	
6	
7	
8	
9	
10	

Appendix C
List of BMPs Evaluated and Potential New Sites for Structural and Non-structural BMPs

E= Existing P= Proposed S= Structural N=Non-structural

	BMP Location	E	P	S	N	Condition
1	Candlewood Pond	X	X	X	☐	Smaller release rate available
2	Fairgrounds Park Basin	X	☐	X	☐	good
3	Hotter Lagoon	X	X	X	☐	Good; vulnerable to spills
4	Knode Creek Basin #1	X	☐	X	☐	Has potential for more detention
5	Knode Creek Basin #2	X	☐	X	☐	New
6	Wall Street Basin	X	☐	X	☐	good
7	Catch Basins	X	☐	X	☐	Maintained as prioritized/needed
8	Roadside Swales	X	☐	X	☐	Maintained as needed
9	Street Sweeping	X	☐	☐	X	Annually
10	Public Education/Involvement/Outreach	X	X	☐	X	S.W.A.C.; NIRPC
11	Erosion Control Ordinance	X	X	☐	X	Under review; will be revised
12		☐	☐	☐	☐	
13		☐	☐	☐	☐	
14		☐	☐	☐	☐	
15		☐	☐	☐	☐	
16		☐	☐	☐	☐	
17		☐	☐	☐	☐	
18		☐	☐	☐	☐	
19		☐	☐	☐	☐	
20		☐	☐	☐	☐	
21		☐	☐	☐	☐	
22		☐	☐	☐	☐	
23		☐	☐	☐	☐	
24		☐	☐	☐	☐	
25		☐	☐	☐	☐	

Appendix D
Land Use Characterization by Residential, Commercial, Industrial, Open Space

The following data represents the land use by the categories of residential, commercial, industrial and open space by percent of total community.

Land Use Category	Percent
Residential (including multifamily)	45
Commercial (light and heavy)	18
Industrial (light and heavy)	13
Open Space	24