

Storm Water Management Plan

Chippewa Falls, Wisconsin

SEH No. A-CFCIT0404.00

April 2006

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Chippewa Falls, Wisconsin

Prepared for:
City of Chippewa Falls, Wisconsin

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Executive Summary

Short Elliott Hendrickson Inc. (SEH[®]) has prepared a storm water management plan designed to meet the goals of the City's MS4 WPDES Permit #WI-S049981-1 and the requirements of NR 216, Storm Water Discharge Permits. The plan summarizes the elements required by the permit for Monitoring Requirements, Pollutant Loading Calculations, Storm Water Management Program, Effluent Limitations, and Assessment of Controls.

To meet the permit compliance schedule, the Monitoring Program and other Storm Water Management Programs have been submitted, accepted, and implemented earlier as individual plan elements. Those program plans are redocumented in this plan.

The majority of effort was in the Pollutant Loading Calculations, steps necessary to meet the Effluent Limitations which includes the Assessment of Controls to determine the potential efficacy converting existing facilities to Best Management Practices (BMP) that will help meet the Effluent Limitations. The Source Loading and Management Model (SLAMM) was used to evaluate both the no-controls and with-controls scenarios.

The first BMP considered is street sweeping. The permit, under part E. (5), (a), 3. Street Sweeping requires that all streets be swept a minimum of at least once every month minimum for critical areas, once every two months elsewhere. The analysis done by this study used a frequency of once every two weeks. This is the frequency now used by the City.

Prior to October 1, 2004 the City of Chippewa Falls constructed several storm water basins including infiltration basins, wet detention basins, and dry detention basins for future use. The infiltration basins will retain all TSS for the contributing area as these facilities do not have a pathway to the surface waters of the state.

The existing street sweeping program and storm water facilities reduce TSS by over 30%, exceeding the 2008 20% reduction goal permit requirement. Additional study was necessary to find the steps required to meet the 2013 pollutant reduction goal requirement of 40%.

A retrofit analysis was performed to evaluate the feasibility of modifying existing flood control facilities. Two existing dry detention basins were analyzed as infiltration ponds by raising the outlet opening above the floor elevation of the basin. SLAMM analysis did not yield any substantial capture of TSS. Next, an outfall was introduced into the Wet Detention Basin module of SLAMM. Pollutant reduction was substantial.

Upon determining the remaining TSS reduction necessary after the above steps were completed, additional new BMP's were modeled to determine the most cost efficient strategy for meeting permit requirements.

Increased street sweeping frequency was ruled as impractical. It would require additional equipment and a new hire. Watersheds were prioritized by total pollutant load. High loads were targeted for treatment. Of the high load watersheds, those selected for treatment had vacant land available for wet detention pond installation.

Pollutant Loading Analysis and Effluent Limit Goals

Area	New Practice	Particulate Solids Yield (lbs)		Reduction	% Reduction	Cumulative % Reduction	Estimated cost	Cost per # of reduction
		No controls	W/Controls					
Citywide Total		1,500,918						
Citywide (except Freeway)	Street Sweeping	1498509	1,215,889	282,620	18.83%	18.8%		
Freeway	Drainage Swale	2409	542	1,866	0.12%	19.0%		
		*						
CW30		43,392	0	43,392	2.89%	21.8%		
CW31		30,925	0	30,925	2.06%	23.9%		
NC1		6,577	0	6,577	0.44%	24.3%		
NC3		102,215	0	102,215	6.81%	31.2%		
NC2		84	0	84	0.01%	31.2%		
NC5		4,727	0	4,727	0.31%	31.5%		
NC6		3,580	0	3,580	0.24%	31.7%		
NC7		2,985	0	2,985	0.20%	31.9%		
2008 Reduction Goal								
						20.0%	Goal Exceeded	
Retrofit Analysis								
NEW8	Wet Detention	22,823	4490	18,333	1.22%	33.1%	\$35,000	\$1.91
SEW1	Wet Detention	42623	8728	33,895	2.26%	35.4%	\$30,000	\$0.89
Potential New BMP's								
CW17	Wet Detention	27,980	6995	20,985	1.40%	36.8%	\$120,000	\$5.72
CW18	Wet Detention	36,793	9198	27,595	1.84%	38.6%	\$170,000	\$6.16
CW4SS	Wet Detention	14,793	3698	11,095	0.74%	37.5%	\$70,000	\$6.31
CW3	Wet Detention	48,471	10968	37,503	2.50%	40.0%	\$240,000	\$6.40
CW15	Wet Detention	12,424	3106	9,318	0.62%	40.6%	\$60,000	\$6.44
CW16	Wet Detention	23,264	5816	17,448	1.16%	41.8%	\$130,000	\$7.45
CW5SCOMSB	Wet Detention	11,526	2833	8,693	0.58%	42.4%	\$65,000	\$7.48
CW1	Wet Detention	9,323	2331	6,992	0.47%	42.9%	\$55,000	\$7.87
2013 Reduction Goal								
						40.0%		

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Storm Water Management Plan

Prepared for City of Chippewa Falls

1.0 Introduction

Short Elliott Hendrickson Inc. (SEH[®]) has prepared a storm water management plan designed to meet the goals of the City's MS4 WPDES Permit #WI-S049981-1 and the requirements of NR 216, Storm Water Discharge Permits. The plan summarizes the elements required by the permit for Monitoring Requirements, Pollutant Loading Calculations, Storm Water Management Program, Effluent Limitations, and Assessment of Controls.

1.1 Storm Water Management Programs

The WPDES MS4 permit requires specific programs addressing key areas of concern ranging from Road Salt Management to Nutrient Management Plans for open spaces owned and operated by the City. These programs are a part of the overall Storm Water Management Plan. Although each of these programs operates as a stand-alone program they are included in this comprehensive Storm Water Plan.

Along with the individual programs, the City of Chippewa Falls has passed several ordinances to manage construction site erosion, post-construction storm water management, manage runoff from pet waste, and enable a storm water utility that dedicates funds to finance the City storm water system on a user pays basis. Chapter 30 Construction Site Erosion Control and Chapter 31 Post-Construction Runoff were adopted by the City in November 2004.

1.2 Background

1.2.1 History

The City of Chippewa Falls was designated as a MS4 WPDES municipality under Phase One of the Nonpoint program originating by order of the EPA. The City was required to apply for a WPDES Permit by WI-DNR in June of 1999. Chippewa Falls is a part of the Urbanized Area including Chippewa Falls, Altoona, and Eau Claire which included two Priority Watershed Projects, Duncan Creek and Lowes Creek.

1.2.2 Purpose

Chippewa Falls was subsequently issued a permit which included a list of requirements that frame the outline of this Storm Water Plan.

The purpose of this plan is to document the manner by which the City will meet the WPDES requirements.

2.0 Legal Authority

In order to comply with WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. B.1 (a) (b)), the City of Chippewa Falls has enacted the following guidelines in relationship to the legal authority to implement the storm water management and construction site erosion control ordinances.

3.0 Industrial Source Survey

In order to comply with the WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. B. 2), the City of Chippewa Falls have identified and enclosed with this document the following industrial sources that are discharging into the City of Chippewa Falls municipal storm sewer system. Also included are guidelines that the City of Chippewa Falls will follow in regards to locating and handling other undisclosed discharges into the municipal storm water system.

3.1 Guidelines for Location and Handling of Undisclosed Discharges

- All known discharges from the City of Chippewa Falls municipal storm water system shall be examined.
- During the course of examination if any unknown discharges are located they shall be examined and determined what is attached and discharging.
- Upon determination of what is connected and discharging, appropriate action (if needed) will be taken to protect the municipal storm system and surrounding ecosystems.
- Existing outfalls will be checked periodically to examine if the discharge has any substances that might cause environmental problems at the outfalls and the surrounding areas.
- If anything is found upon examination the appropriate actions (if any) will be taken by City of Chippewa Falls Staff.
- Any new developments will be checked for discharges at the time a building permit is issued, and added to the industrial source discharge list if necessary.

4.0 Monitoring Program Proposal

In order to comply with WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. C. (1)), the City of Chippewa Falls proposes the following monitoring program.

4.1 Purpose

- Screening of storm water quality to identify areas that may be significant contributors of contaminants to the City of Chippewa Falls municipal storm water collection system.

4.2 Monitoring Program Parameters

- The City of Chippewa Falls storm water collection system will be divided into three areas; of these three areas the major outfalls located in each one will be tested to varying degrees for contamination.
- Of the major outfalls in the area to be tested, three will be selected for chemical analysis of the samples. (The major outfalls were identified in the City of Chippewa Falls Municipal Storm Water Permit Application.)
- The remainder of the outfalls will be qualitatively analyzed and the parameters will be highlighted later in this proposal.

4.3 Location of Sampling

- The municipal storm water collection system will be broken down into three areas. Annually one of the three areas will be sampled to identify any problematic areas that may exist. Within the selected area three of the major outfalls will be selected for complete chemical analysis. (See attached map)

4.4 Testing Parameters

- The three annual samples for one rain event that are collected for chemical analysis will be tested for the following parameters:
 1. Total Suspended Solids (TSS)
 2. Total Dissolved Solids
 3. COD
 4. BOD (five day)
 5. Chloride
 6. Total Kjeldahl Nitrogen
 7. Nitrate + Nitrite Nitrogen
 8. Ammonia Nitrogen
 9. Dissolved Phosphorus
 10. Total Phosphorus
- The copper, lead, and zinc that were excluded from the contaminant list because the tests would provide little useful data, and because if the best management practices are removing solids the metals will most likely be removed with them.
- The City of Chippewa Falls engineering staff will test the remaining major outfalls in the selected zone qualitatively. The samples will be examined for the following features:
 1. Solids
 2. Odor
 3. Color
 4. Oil or grease
 5. pH

4.5 Sampling Procedures

- Sampling will be consistent will accepted sampling methods and be in conformance with NR 216.6 (e - g).
- All samples will be collected by an approved grab sample method.
- Sampling will be done within the first hour of full contribution of the selected outfall's drainage area.
- Sampling will occur on an event that is the first event in the previous 48 hours.

5.0 Pollutant Loading Evaluation

5.1 Method of Evaluation

5.1.1 Modeling Software

SEH employed WinSLAMM 9.1.1 issued September 25, 2005 in the effort to evaluate pollutant loading. The analyses of with-controls also employed this same version.

5.1.1.1 SLAMM Files

Standard Land Use (SLU) and parameter files available from the USGS website <http://wi.water.usgs.gov/slammm/index.html>.

5.1.1.2 Standard Land Use Files

The Standard Land Use files noted as new July 11, 2005 were the basis of all data files used in the evaluation of the no-controls scenario. The with-controls scenario used these files modified for the BMP to be employed using the same parameter files as the no-controls including rainfall, pollutant selection, and output options. Street sweeping captures some of the solids before the effluent reaches the outfall BMP's. Therefore, when evaluating subsequent with-controls scenarios, the SLU files were modified to include the street sweeping BMP.

5.1.1.3 Parameter Files

The parameter files used were from USGS for the June 1 2005 update. The rainfall file MPS1959.ran was modified and renamed MPS1959c.ran. The file truncated the events outside of the period March 13 – November 4, 1959. This was a time saving measure to reduce the time necessary to modify all of the required SLU files for this rainfall period. A comparison of a data file executed with both of the rainfall files showed no significant differences.

The street delivery file used was named "Wi_Res and Other Urban May05.std". All other parameter files followed the files listed in http://wi.water.usgs.gov/slammm/slammm_web_doc.htm. The street dirt coefficients were modified to follow the above.

5.1.1.4 June 6, 2005 DNR Guidance Memo

SEH reviewed the DNR Guidance found in the June 6, 2005 Memorandum to Regional Water Leaders from Russ Rasmussen. The modeling followed the guidance outlined therein.

5.2 SLAMM Evaluation Findings

The SLAMM analysis was conducted for the no-controls condition, for existing controls, for including retrofitted facilities, and for those additional BMP's required to meet the goals of the permit. See Table X for a summary of the findings.

No-controls uses defaults for disconnectedness as found in the SLU files. The drainage system is set to Curb and Gutter in good condition or undeveloped roadside in the case of the Freeway land use.

No BMP's are included in the evaluation. The results derived are the basis of comparison to achieve the percent reduction required by the permit.

5.2.1 Existing BMP's

Existing BMP's included street sweeping, the swales found along the freeway, and infiltration basins and wet detention ponds in place prior to October 1, 2004.

5.2.1.1 Street Sweeping

Chippewa Falls Street Sweeping Program which amounts to sweeping all streets once every two weeks. The Freeway section is not included. All street source areas for all SLU files were set up accordingly.

5.2.1.2 Freeway Swales

Freeway areas originally modeled with the drainage system set at undeveloped roadside were modified to drain to swales. The NRCS soil survey Permeability data for soils found in the Freeway land use area was averaged and halved as input for the infiltration rate in the SLAMM program.

5.2.1.3 Infiltration Basins

Prior to October 1, 2004 the City of Chippewa Falls constructed several storm water basins including infiltration basins, wet detention basins, and dry detention basins for future use. The infiltration basins will retain all TSS for the contributing area as these facilities do not have a pathway to the surface waters of the state.

5.2.1.4 Wet Detention Basins

Existing Wet Detention Basins were modeled in SLAMM data files for areas draining to the existing wet detention basins. The basins were not found effective as constructed. A retrofit analysis was performed as discussed below.

5.2.2 BMP Retrofit Analysis

Two existing dry detention basins were analyzed as infiltration ponds by raising the outlet opening above the floor elevation of the basin. SLAMM analysis did not yield any substantial capture of TSS. Next, an outfall was introduced into the Wet Detention Basin module of SLAMM. Pollutant reduction was substantial.

5.2.3 BMP Alternatives Analysis

Upon determining the remaining TSS reduction necessary after the above steps were completed, additional new BMP's were modeled to determine the most cost efficient strategy for meeting permit requirements.

Increased street sweeping frequency was ruled as impractical. It would require additional equipment and a new hire. Watersheds were prioritized by total pollutant load. High loads were targeted for treatment. Of the high load watersheds, those selected for treatment had vacant land available for wet detention pond installation.

6.0 Catch Basin Inspection And Monitoring Program Implementation

In order to comply with the WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. E.5 (a)), the City of Chippewa Falls has implemented the following guidelines in relationship to cleaning and maintaining catch basins that are functioning as an active part of the City of Chippewa Falls storm water collection system.

- Locate and identify all catch basins and inlets that are currently attached to the storm water collection system.
- Of the located catch basins clean all the ones that are filled to 45% or more of capacity.
- Record the date, size, amount of material removed, and other pertinent data after each catch basin has been cleaned.
- Properly dispose of all materials collected while cleaning catch basins.

All of the following items shall be in progress starting on January 1, 2006.

- All catch basins that were identified in 2004 shall be cleaned a minimum of once per year in all subsequent years.
- Six months from the last cleaning the catch basins shall be inspected again and if they are filled to 45% or more of capacity the cleaning will be repeated.
- Annual catch basin cleaning reports will be prepared and filed with the Wisconsin Department of Natural Resources outlining the catch basins that were cleaned.
- From these reports critical areas will be identified and monitored more closely in an attempt to limit the sediment loading of catch basins.

7.0 Road Maintenance Program Salting And Deicing Policies

In order to comply with the WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. E. 5 (5), the City of Chippewa Falls has enacted the following items that pertain to salting and deicing roadways.

- The City of Chippewa Falls has maintained and erected enclosed storage facilities for road salt to help limit the contamination of storm water.

-
- Elimination of inlets near the doors of the salt storage facility to help reduce the levels of salt that enter the storm water conveyance system.
 - The salt loading area is swept regularly after loading to help reduce the amount of salt entering the storm water conveyance system.
 - The deicing mixture that is utilized is dependent upon road and temperature conditions.
 - Deicing mixture is applied after storm events that cause hazardous road conditions. The Street Manger is responsible for inspecting roads and determining when conditions warrant deicing measures to be utilized.

8.0 Public Works Yards Evaluation

8.1 Location Description and Use

The City of Chippewa Falls public works yard is located at 5 Riverside drive Chippewa Falls, WI. The site is located on the banks of the Chippewa River just downstream of the Lower Chippewa Falls Xcel Energy dam. Site activities include but are not limited too; dirt storage, machinery and other equipment storage, miscellaneous pipe storage, and street maintenance and repair activities.

8.2 Mapping

Included with this document is the site layout for the City of Chippewa Falls public works yard. The map includes building layouts, soil pile locations, storage areas, storm sewer inlet layout, drainage data, and other pertinent information.

8.3 Site Information

Approximate Size = 20 Acres
Approximate Impervious Area = 5.6 Acres
Percent Impervious = 28%
Storm water inlets - See site map
Storm water outfalls - See site map

8.4 Problem Identification/ Remediation

8.4.1 Runoff from the salt storage shed

The facility that is utilized for salt storage is a completely enclosed unit. Due to the enclosure the amount of contamination that is generated from storm water reacting with the salt is minimal. Further steps that will be taken to reduce any exposure of the salt will be to extensively clean the immediate area after loading and unloading of salt, and covering of nearby storm water inlet during loading and unloading periods to allow for cleanup of the salt and isolating it from the storm sewer.

8.4.2 Machinery washing and other cleaning activities

The Chippewa Falls street department washes all of its machinery indoors and catches all the cleaning water in interior drains. These interior drains convey the water to the Chippewa Falls wastewater treatment plant for treatment.

8.4.3 Dirt and material storage piles

Due to its close proximity to the Chippewa River the material storage piles could pose a contamination threat. Piles currently being utilized are being set back from the riverbank to reduce the sediment loading due to runoff from the piles. The existing landscaping and vegetation buffer zone between the piles and the river also act as protection from excess sediment loading due to the storage piles. All future sediment piles will be located where storm water drainage will not directly enter the adjacent river, and the vegetation buffer zone will be maintained.

8.4.4 Vehicle Maintenance

All vehicular and machinery maintenance is performed in the main shop building. All materials that pose a contamination threat (i.e. oil, anti-freeze) are dealt with properly and disposed of accordingly.

8.5 Conclusions

The problem areas that were identified by this evaluation will be studied further to determine the plan of remediation for the City of Chippewa Falls. Any further problems that are identified will also be examined and addressed to further reduce or eliminate situations that could lead to storm water contamination or excess sediment loading. All remediation plans will involve best management practices outlined in the City of Chippewa Falls construction site erosion control ordinance.

8.6 Other Public Works Areas, Parks and Recreations Areas, and the Chippewa Falls Water Utility Shop

Other areas that are operated by the City of Chippewa Falls and the public utility were examined to determine if they posed any storm water related threats. The areas examined are highlighted below.

8.6.1 Public Works Areas

The other areas that were examined include storage areas, general properties, and other various areas owned and operated by the City of Chippewa Falls. The areas in question are managed with regards to the safety of the local environment and best management practices are followed to reduce the effect of storm water on the local environment.

8.6.2 Parks and Recreation Areas

One area of concern in this category is Irvine Park, which encompasses both sides of the Duncan Creek as it enters the City of Chippewa Falls. Fortunately, most of the land is maintained in semi-natural state with little development on the banks. The City of Chippewa Falls Parks and Recreation Department does not store or maintain any material in the park, and all of the materials that are needed are stored at the Public Works Yard located at 5 Riverside Drive and is addressed previously in this report. All vehicle maintenance for the Parks and Rec. Department is also performed off-site. Any construction that is undertaken in the park areas will utilize best management practices to minimize the effects it has on storm water.

8.6.3 The Water Utility Shop Area

The Water utility shop is located at 1100 West River Street and is utilized for storage of material that is needed for the water system. The equipment maintenance and cleaning is performed indoors and is contained in drains that empty the material in the sanitary sewer and is treated at the Chippewa Falls Municipal Wastewater Treatment Plant. There is little material stored in this yard and does not pose a significant storm water contamination threat.

9.0 Illicit Discharge Program Proposal

In order to comply with WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. E. (6) (a)), the City of Chippewa Falls proposes the following illicit discharge program.

9.1 Purpose

- Screening of storm water, and system outfalls to identify possible illicit connections to the municipal storm water conveyance system.

9.2 Program Guidelines

- All inspections of the municipal storm water conveyance system for illicit discharges will be done during a low-flow period. (No rain events for the previous 72 hours).
- All known outfalls will be inspected on a periodic basis by City Staff under the low flow conditions to determine if any unknown cross connections are present.
- The inspection reports will be logged and analyzed for changes that are occurring within the system.

9.3 Detection Procedures

During the annual inspections, if any unusual flow, or possible contaminated discharge is observed, the following steps will be taken:

- Identify the outfall, and possible connections to conveyance system.
- If needed, collect a grab sample of the discharge and make observations that are pertinent for determination of the discharge.
- If feasible, identify the cross connection point, or business and notify the appropriate person of the cross connection.
- Determine a remediation process or method, and at this point the Wisconsin Department of Natural Resources will be advised of the illicit connection.
- If someone can be held responsible for the illicit connections, they will have to take the appropriate actions or steps to correct the problem, if no person or group can be identified, the City or appropriate agency will begin the remediation process.

9.4 Public Awareness

- Pamphlets will be made available in the Engineering Office on what to do when a member of the public finds an illicit discharge.
- Building inspections and general inspections will be done in areas where possible illicit connections could be present.
- During the building permit process, builders and contractors will be advised to contact the Engineering Department if any illicit connections are found during the course of the projects.

10.0 Industrial/ High Risk Runoff Program Proposal

The City of Chippewa Falls in an effort to comply with the WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. E (7)(a)) propose the following guidelines in relationship to an Industrial/ High Risk Runoff program.

10.1 Purpose

To identify, monitor, and address pollutants in storm water discharges from industrial facilities and high-risk runoff discharges described in NR 216.

10.2 Program Proposal

- City staff will inspect areas of concern that were identified in the WPDES permit application, and facilities that are currently permitted by the WDNR for storm water or other discharging conditions annually.
- These inspections will include sites visits, monitoring (if necessary), as well as an analysis of monitoring data that the permitted facility is required to collect.

10.3 Program Results and Implementation

- During the course of the annual facility inspections, if something or some practice is found that requires remediation or an improved BMP the City will notify the WDNR, and the facility that remediation is necessary to bring the discharge into compliance.

11.0 Information And Education Program Implementation

The City of Chippewa Falls, in an effort to comply with the WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. E. 9 (a) (b)) have enacted the following guidelines in relationship to an information and educational program to inform and educate the public in regards to storm water related issues:

- One public information meeting regarding the storm water management and construction site erosion control ordinances including a short presentation and public discussion.
- Public meetings for the first and second readings of the two ordinances.
- Continue the stenciling of inlets that discharge into nearby bodies of water to alert the public of potential dumping hazards.

-
- Utilize information packets available through the University Extension Office and the Chippewa County Land Conservation Department on storm water related topics. Examples of public information to be made available to the public are included with this program.

12.0 Spills Program Implementation

In order to comply with the WPDES Municipal Storm Water Permit (WI-S049981-1, Special Conditions. E.10 (b) 2), the City of Chippewa Falls has enacted the following items that pertain to spills and emergencies resulting therefore.

- The City of Chippewa Falls has established an emergency response team that can respond to a Level B release.
- The City of Chippewa Falls emergency response team has been designated as the Chippewa Falls Hazardous Materials Team that is responsible for responding to any Level B spills in Chippewa County.
- The Hazardous Materials Team is composed of members of the Chippewa Falls Fire Department.

**Table 1
Pollutant Loading Analysis and Effluent Limit Goals**

Area	New Practice	Particulate Solids Yield (lbs)		Reduction	% Reduction	Cumulative % Reduction	Estimated cost	Cost per # of reduction
		No controls	W/Controls					
Citywide Total		1,500,918						
Citywide (except Freeway)	Street Sweeping	1498509	1,215,889	282,620	18.83%	18.8%		
Freeway	Drainage Swale	2409	542	1,866	0.12%	19.0%		
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CW30		43,392	0	43,392	2.89%	21.8%		
CW31		30,925	0	30,925	2.06%	23.9%		
NC1		6,577	0	6,577	0.44%	24.3%		
NC3	Existing Infiltration Basins- Total.	102,215	0	102,215	6.81%	31.2%		
NC2	Capture	84	0	84	0.01%	31.2%		
NC5		4,727	0	4,727	0.31%	31.5%		
NC6		3,580	0	3,580	0.24%	31.7%		
NC7		2,985	0	2,985	0.20%	31.9%		
2008 Reduction Goal						20.0%	Goal Exceeded	
Retrofit Analysis								
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SEW1	Wet Detention	42623	8728	33,895	2.26%	35.4%	\$30,000	\$0.89
Potential New BMP's								
CW17	Wet Detention	27,980	6995	20,985	1.40%	36.8%	\$120,000	\$5.72
CW18	Wet Detention	36,793	9198	27,595	1.84%	38.6%	\$170,000	\$6.16
CW4SS	Wet Detention	14,793	3698	11,095	0.74%	37.5%	\$70,000	\$6.31
CW3	Wet Detention	48,471	10968	37,503	2.50%	40.0%	\$240,000	\$6.40
CW15	Wet Detention	12,424	3106	9,318	0.62%	40.6%	\$60,000	\$6.44
CW16	Wet Detention	23,264	5816	17,448	1.16%	41.8%	\$130,000	\$7.45
CW5SCOMSB	Wet Detention	11,526	2833	8,693	0.58%	42.4%	\$65,000	\$7.48
CW1	Wet Detention	9,323	2331	6,992	0.47%	42.9%	\$55,000	\$7.87
2013 Reduction Goal						40.0%		

SLAMM Model File Index

Files\Directory Naming Code

Initially, the SLAMM files are generated from a batch file. The batch file is a text file with the "pla" extension. It produces a data file for each record of the batch file. The SLAMM batch processor creates the data files and executes each file, summarizing the pollutant loading results in a csv file.

The batch file uses the Standard Land Use (SLU) files to operate. It is important to note that the SLU files for the Chippewa Falls analysis utilize parameter files. The following pages show a screen capture from the SLAMM "Current File Data" screen which shows the path and file name for parameter files.

The batch processor was only used for the No-Controls and Street Sweeping scenarios. Subsequent analysis uses only selected watershed file groups.

Condition	Directory	Typical File Name	SLU Directory	Parameter Directory
No-Controls	Cfcitbase2	CW1INSTA.DAT	west wi slu	WEB_PAR_FILES
Street Sweeping	cfssbmp	CW1INSTSA.DAT	W Wi SS2	
Freeway Swales	cfswbmp	CW17FRESWA.DAT		
Retrofit	cftrofit	new8.dat		
Wet Detention Basins	cfnewbmp	CW3_newbmp.dat		

CFCITBASE2 SLU Typical Parameter file locations

Current File Data	
SLAMM Data File Name:	
C:\Program Files\WinSLAMM\west wi slu\SLU Agriculture Sand.dat	
Edit	Site Descript: SLU/SAND-AGRI-Agricultural Land Use within City Limits
Edit	Seed: -42
Edit	Rain File: C:\Program Files\WinSLAMM\Rain Files\MPS1959c.RAN
Edit	Start Date: 03/13/59 <input type="checkbox"/> Winter Season Range
Edit	End Date: 11/04/59 Start of Winter (mm/dd) _____ End of Winter (mm/dd) _____
Edit	Pollutant Probability Distribution File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_GEO01.PPD
Edit	Runoff Coefficient File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_SL01.RSV
Edit	Particulate Solids Concentration File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_AVG01.PSC
Edit	Particulate Residue Delivery File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_DLV01.PRR
Edit	Street Delivery File (Select LU) C:\Program Files\WinSLAMM\Web_par_files\WI_Res and Other Urban May05.std
	<input checked="" type="radio"/> Residential LU <input type="radio"/> Industrial LU <input type="radio"/> Institutional LU <input type="radio"/> Other Urban LU <input type="radio"/> Commercial LU <input type="radio"/> Freeways
	<input type="checkbox"/> Use Cost Estimation Option <input type="checkbox"/> Select Cost Data File
Edit	Drainage System: Data Entered
<input type="button" value="Cancel"/> <input type="button" value="Continue"/>	

cfssbmp SLU Typical Parameter file locations

Current File Data	
SLAMM Data File Name:	
C:\Program Files\WinSLAMM\W_WI_SS2\SLU CemSS Clay.dat	
<input type="button" value="Edit"/>	Site Descript.: SLU/CLAY-CEMSS-Cemetery wSS2with no drainage system
<input type="button" value="Edit"/>	Seed: -3
<input type="button" value="Edit"/>	Rain File: C:\Program Files\WinSLAMM\Rain Files\MPS1959c.RAN
<input type="button" value="Edit"/>	Start Date: 03/13/59 <input type="checkbox"/> Winter Season Range
<input type="button" value="Edit"/>	End Date: 11/04/59 Start of Winter (mm/dd): End of Winter (mm/dd):
<input type="button" value="Edit"/>	Pollutant Probability Distribution File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_GE001.PPD
<input type="button" value="Edit"/>	Runoff Coefficient File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_SL01.RSV
<input type="button" value="Edit"/>	Particulate Solids Concentration File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_AVG01.PSC
<input type="button" value="Edit"/>	Particulate Residue Delivery File: C:\PROGRAM FILES\WINSLAMM\WEB_PAR_FILES\WI_DL01.PRR
<input type="button" value="Edit"/>	Street Delivery File (Select LU)
<input checked="" type="radio"/> Residential LU <input type="radio"/> Industrial LU <input type="radio"/> Institutional LU <input type="radio"/> Other Urban LU <input type="radio"/> Commercial LU <input type="radio"/> Freeways	
<input type="button" value="Change all Street Delivery Files to Match the Current File"/>	
<input type="checkbox"/> Use Cost Estimation Option	<input type="button" value="Select Cost Data File"/>
<input type="button" value="Edit"/>	Drainage System: Data Entered
<input type="button" value="Cancel"/> <input type="button" value="Continue"/>	