



MEMO

To: Valerie Mellon, P.E., City of Manitowoc Director of Public Works
From: Gina Droessler & Eric Thompson, P.E., MSA Professional Services, Inc.
Subject: Custer Street Pond (Pond 148) TSS Reduction Efficiency
Date: March 2, 2010

Introduction

In October 2007, the City of Manitowoc completed a Stormwater Quality Plan which determined that the City's existing stormwater management system was capable of removing only 11.4% of the (NR216-regulated) annual Total Suspended Solids (TSS) load in stormwater runoff from the City. Since this level of TSS reduction fell short of the NR216 requirement that the City achieve a 40% TSS reduction (by 2013), the plan identified several procedural and structural improvements which if constructed would achieve the required TSS requirement. Since completion of the 2007 plan, the City has constructed and continued analyzing several of the structure improvements recommended in the plan. This memo documents the findings of an analysis conducted for one of these improvements; wet detention pond number 148, also known as the Custer Street pond. This pond has not yet been constructed, but is planned to be built in 2010.

Actual vs. Regulatory TSS loads and removal by 30th Street Pond

The construction plans for the Custer Street pond were completed by MSA Professional Services. MSA completed the analysis of the TSS reduction performance for this pond using the WDNR-approved P8 model (necessary because of some complicated hydraulics in the collection system that WinSLAMM and WinDETPOND cannot accommodate), but applied the TSS-reduction performance efficiency predicted by P8 to the WinSLAMM modeling data prepared as part of the 2007 Stormwater Quality Plan. As a result the estimated TSS load captured by the pond can be directly applied to the City's TSS reduction requirement as determined by the 2007 plan. This pond was also analyzed to see the type of treatment it is providing for the actual land use conditions. Tables 1 and 2 below report the Master Plan data determined by MSA through the modeling of construction plans for Custer Street Pond.

Table 1: TSS Loading Comparisons for Pond 148 - Custer Street

Model Condition	Drainage Area (ac)	Annual TSS Load (tons/yr)
Master Plan MSA Design – Actual Conditions	102.6	23.9
Master Plan MSA Design – NR 216 Conditions	102.6	19.1

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Table 2: TSS Removal Rate Comparison for Pond 148 – Custer Street

Model Condition	Annual TSS Load (tons/yr)	TSS Removal Efficiency	Annual TSS Load Captured (tons/yr)
Master Plan MSA Design – Actual Conditions	23.9	66.2%	15.8
Master Plan MSA Design – NR 216 Conditions	19.1	66.2%	12.6

Citywide Regulated TSS Load Reduction

In addition to construction of several structural BMPs, the City has also implemented a high-efficiency street sweeping program. To determine the amount of regulated TSS reduction that can be attributed to the Custer Street pond it is necessary to account for TSS reduction achieved by the City's street sweeping program. Table 3 below reflects this calculation (in the style of table 2 of the 2007 Stormwater Quality Master Plan).

Table 3: Citywide Regulated TSS Removal Rates

Modeled Design	Annual TSS Load (tons/yr)	Standalone TSS Removal Efficiency	Street Sweeping TSS Removal Efficiency	Net BMP Removal Efficiency After Street Sweeping	TSS Load Trapped by BMP after Street Sweeping (tons/yr)
Master Plan MSA Design – Actual Conditions	23.9	66.2%	21.4%	44.8%	10.7
Master Plan MSA Design – NR 216 Regulated Conditions	19.1	66.2%	21.4%	44.8%	8.6

The 2007 Stormwater Quality Master Plan determined the City of Manitowoc's citywide annual regulatory TSS load to be 924.6 tons/yr. ***The Custer Street Pond is estimated to trap 8.6 tons/yr of regulated TSS annually or 0.93% of the City's total regulated load.***

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City of Manitowoc, WI Stormwater Quality Analysis

Stormwater Pond
Drainage Area,
Infrastructure, and Regulated
Land Use Conditions

*Pond-148
Custer Street*

Legend

- City Limits
- Study Area
- Existing Pond
- Storm Sewer
- City Parcels

Watersheds

- Proposed Drainage Area

NR-216 Exempt Areas

- Exempt
- Partially Exempt
- Proposed Pond 148

600 300 0 Feet

