

Discharge Limits and MAHL Allocation Procedures of Muskegon County

I. Introduction

This document is referred to by name in the Muskegon County Sewer Use Ordinance, Revision IV, Section 2.4, B. Every wastewater treatment plant has its own unique capacity to treat various pollutants. This document relates particularly to the unique capacity of the Muskegon County Wastewater Management System (MCWMS) to treat various pollutants. The purpose of this document is fourfold:

- 1) To discuss briefly how the capacity to treat each pollutant was determined.
- 2) To discuss how this treatment capacity was allocated to domestic users, industrial users, and hauled waste users.
- 3) To publish the limits placed on industrial users and hauled waste users for various pollutants in or characteristics of their wastewaters.
- 4) To describe the efforts of MCWMS to monitor the loadings of pollutants entering the sewage collection system and wastewater treatment plant to help ensure that the plant is not receiving more of a pollutant than can be treated.

II. How the capacity to treat each pollutant was determined

“MAHL” is an abbreviation of Maximum Allowable Headworks Loading. “Headworks” means the point at which the raw wastewater enters the wastewater treatment plant. (Another word for headworks is influent.) “Loading” is the amount of a pollutant entering into the treatment plant through the incoming wastewater. A pollutant loading is usually given in pounds per day. Therefore, the Maximum Allowable Headworks Loading for a pollutant is the maximum pounds of the pollutant that a wastewater treatment plant can receive and treat in a day. MAHL is therefore synonymous with “treatment capacity”. If a treatment plant receives more pounds of a pollutant than it can treat, it could endanger the lives or health of the workers who maintain the sewage collection system, result in the discharge of pollutants that would be damaging to the environment, or temporarily inhibit the plant’s ability to treat wastewater.

In 2009, MCWMS performed a six-month study to determine the MAHLs for a number of pollutants. In the study, MCWMS staff looked at the levels of pollutants coming into the plant compared to levels going out of the plant in order to determine the percentage removed for each pollutant. It also determined the concentration levels at which a pollutant could impact the safety of collection system workers and the concentration levels that could disrupt treatment at the plant. All this information went into establishing MAHLs.

III. MAHL Allocation

The MAHL (or plant treatment capacity) for each pollutant, after a 10% safety factor has been deducted from it, is allocated to domestic sanitary waste, hauled waste, and industrial waste.

The domestic sanitary allocation was determined from data acquired during the MAHL study of 2009. Average pollutant concentrations were measured in samples of sanitary sewage collected from various locations in the county. From the average pollutant concentrations and the average domestic sewage flow rate, the average pollutant loadings received from sanitary waste were calculated. (The values for BOD were updated in 2016.)

Similarly, average pollutant concentrations were determined for the hauled waste flow entering the wastewater treatment plant. Using the average pollutant concentrations and a hauled waste flow of 0.200 million gallons per day (or 6 million gallons per month), loadings were calculated, and a portion of the MAHL equal to these calculated loadings became the treatment capacity allocated to hauled waste. In its daily operation, the WWTP can monitor how close it is to exceeding the treatment capacity reserved for hauled waste by simply comparing the actual hauled waste flow to 6 million gallons per month. This large flow was chosen to provide a safety factor in treating hauled waste.)

After deducting the domestic sanitary and hauled waste allocations from the MAHL, the remaining treatment capacity is allotted to the industries that discharge to MCWMS. This allocation for industrial waste is sometimes referred to as the MAIL, which stands for Maximum Allowable Industrial Loading. A portion of the MAIL is allotted to each industry, and the size of each industry's allotment is proportional to the volume of flow that the industry discharges. The allotment for each pollutant is calculated from the industry's average flow rate (to which 20% is added as a safety factor) and the concentration limit placed on that pollutant in the industry's wastewater discharge permit, which is issued to the industry by MCWMS. If an industry's flow is a limited parameter in its wastewater discharge permit (as in the case of industries whose discharge is associated with groundwater remediation), then that flow limit, without the addition of 20%, is used in the calculation of the wastestream allocation.

MCWMS employs a spreadsheet for a strict accounting of the allocation of the MAIL. The spreadsheet calculates the allocation of each pollutant for each industrial discharge. The allocations for all the industrial wastestreams for a given pollutant are summed up, and the sum is compared to the total MAIL. Any portion of the MAIL not allocated is reserved for industrial growth and for the granting of Specific Alternative Limits if necessary. The following table is an excerpt from the industrial allocation spreadsheet. The "Industrial Allocation Spreadsheet" is available for review on the MCWMS network located at the Administration Building.

TABLE 1: Industrial Allocation Spreadsheet Excerpt

Client ID	Monitor Site ID	Flow + 20% (MGD)	Phosphorus Monthly Average Limit (mg/L)	Phosphorus Monthly Average Allocation (lb/day)
ADAC	ADAC101	0.0036204	125	25.0975875
BDKJ	BDKJ005	0.0662208	18.0	8.202187008
BRCS	BRCS001	0.3221316	18.0	34.68517135
CAMU	CAMU001	0.8770032	18.0	143.4869008
CNNM	CNNM001	0.0068244	18.0	6.009241176
DMMI	DMMI001	0.0026688	50.0	1.6918653
DMMI	DMMI002	0.0150276	18.0	6.514127028
DSCD	DSCD212	0.000102	3055	3.64053963
DSCP	DSCP101	0.0008256	50.0	0.670938

DYNF	DYNF101	0.0015552	18.0	0.251091036
ESCO	ESCO101	0.0716124	18.0	5.930831556
GLFI	GLFI101	0.0218124	18.0	0.941636448
HACK	HACK001	0.024156	18.0	3.62847276
HACK	HACK002	0.024156	18.0	3.62847276
HACK	HACK003	0.024156	18.0	3.62847276
HACK	HACK004	0.024156	18.0	3.62847276
HLNW	HLNW101	0.0124464	104	23.35777517
HLTE	HLTE001	0.0041064	40.0	0.09773664
HOW1	HOW1001	0.0184992	18.0	1.35459378
HOW3	HOW3001	0.0329556	40.0	8.23391136
HOW3	HOW3003	0.0047016	40.0	8.982558
HOW3	HOW3102	0.0333324	18.0	10.96851445
HOW4	HOW4002	0.0423432	18.0	4.000332636
HOW4	HOW4003	0.030132	18.0	4.262779548
HOW4	HOW4101	0.0425844	18.0	1.360722348
HOW5	HOW5002	0.0041976	18.0	8.279695368
HOW5	HOW5101	0.0458616	18.0	1.9467216
HOWO	HOWO001	0.0135144	40.0	23.53129776
HOWT	HOWT001	0.0754152	1750	60.880113
IMCC	IMCC001	0.0031524	40.0	0.09773664
KAYD	KAYD001	0.0334164	60.0	10.034028
KNL2	KNL2101	0.0230916	500	223.277151
L3CO	L3CO001	0.0262284	18.0	1.723930128
LRNI	LRNI101	0.2927112	300	704.4638706
MACI	MACI101	0.0011868	18.0	0.676666008
MCSW	MCSW001	0.0152604	18.0	0.835648272
MCSW	MCSW002	0.0092316	18.0	0.90126
MCSW	MCSW003	0.0523332	18.0	1.261764
MCTC	MCTC201	0.004152	18.0	0.716141196
MFTH	MFTH101	0.0120024	18.0	0.972820044
PCDP	PCDP001	0.005118	50.0	1.5651882
PCDC	PCDC001	0.0074	50.0	3.08765
PHLO	PHLO001	0.0047292	200	7.8930348
PRPR	PRPR101	0.0030432	18.0	0.701000028
QPLT	QPLT101	0.0301272	18.0	3.455791344
SCST	SCST111	0.000006	500	0
TCWC	TCWC001	0.0465708	18.0	2.486936844
THOD	THOD101	0.0000096	0.100	8.0112E-06
TOWR	TOWR101	0.0012696	18.0	0.030102084
WEBB	WEBB001	0.0057408	100	3.274578
WHLL	WHLL101	0.006474	18.0	0.87332094
Groundwater Discharges		Limited Flow (MGD)		
BOFO	BOFO101	0.432	5.00	18.0252

MAHL	MAHL301	0.3	5.00	12.5175
MICH	MICH101	0.216	5.00	9.0126
PPSS	PPSS001	0.266881	5.00	11.13560973
TLVS	TLVS201	0.18	5.00	7.5105

Total Allocation (lb/day):	1435.325051
MAIL (lb/day):	2990.91
% of MAIL Allocated:	47.99%
% of MAIL Reserved:	52.01%

An industry's flow is updated annually in the spreadsheet. The flows are taken from a user's Continued Compliance Report or Semi-Annual Evaluation Report.

IV. Limits for Industrial Dischargers

MCWMS establishes the following standard local limits for industries that discharge to the collection system.

TABLE 2: Local Limits for Industries Discharging to the Collection System

Pollutant	Monthly Avg. Limit (mg/l)	Daily Max Limit (mg/l)	Monthly Avg. Limit (mg/l) Applicable to Groundwater Remediation Sites	Daily Max Limit (mg/l) Applicable to Groundwater Remediation Sites
BOD	300	NA	50.0	NA
TSS	500	NA	100	NA
Phosphorus	18.0	NA	5.00	NA
Cadmium	0.250	0.500	0.0500	0.100
Chromium	8.00	30.0	0.100	0.300
Copper	NA	1.50	NA	0.0500
Lead	0.475	0.750	0.0500	0.100
Nickel	3.50	8.00	0.0500	0.100
Silver	0.0500	0.100	0.0200	0.0500
Zinc	NA	18.0	NA	0.500
Mercury	NA	<0.0002	NA	<0.0002
Cyanide	0.100	0.200	0.0500	0.100
Acetone	NA	25.0	NA	25.0
Aniline	0.0100	NA	0.0100	NA
Benzene	0.0100	NA	0.0100	NA
Bis(2-ethylhexyl)phthalate	0.400	NA	0.400	NA
2-Butanone (MEK)	2.50	NA	2.50	NA
Carbon tetrachloride	0.0100	NA	0.0100	NA
Chlorobenzene	0.0500	NA	0.0500	NA
Chloroethane	NA	0.0500	NA	0.0500
Chloroform	NA	0.0500	NA	0.0500
1,2-Dichlorobenzene	0.0100	NA	0.0100	NA
1,3-Dichlorobenzene	0.0100	NA	0.0100	NA
1,4-Dichlorobenzene	0.100	NA	0.100	NA
1,1-Dichloroethane	NA	0.150	NA	0.150
1,2-Dichloroethane	NA	0.100	NA	0.100
1,1-Dichloroethylene	0.0150	NA	0.0150	NA

cis-1,2-Dichloroethylene	NA	0.100	NA	0.100
trans-1,2-Dichloroethylene	NA	0.100	NA	0.100
Ethylbenzene	0.200	NA	0.200	NA
N-Ethylaniline	0.010	NA	0.010	NA
Methylene chloride	NA	0.200	NA	0.200
Naphthalene	0.0500	NA	0.0500	NA
Tetrachloroethylene	0.100	NA	0.100	NA
Tetrahydrofuran	NA	0.150	NA	0.150
Toluene	0.300	NA	0.300	NA
1,1,1-Trichloroethane	0.0750	NA	0.0750	NA
1,1,2-Trichloroethane	NA	0.100	NA	0.100
Trichloroethylene	NA	0.0250	NA	0.0250
Vinyl chloride	0.0100	NA	0.0100	NA
Total Xylenes	0.300	NA	0.300	NA

It should be noted that Table 2 distinguishes “Groundwater Remediation Sites” from other industrial users. Groundwater Remediation Sites are users whose only discharge to the system is contaminated groundwater. These users have a different set of standard local limits than those users which support production processes that generate wastewater which is discharged to the system.

In cases where the federal government imposes a categorical limit on an industry that is stricter than the standard local limit, MCWMS will impose stricter limit. (These categorical limits for select types of industries are specified in 40 CFR Parts 401 – 471.) Likewise, if a local limit is stricter than a federal categorical limit, the local limit will be imposed.

The Muskegon County Sewer Use Ordinance allows the Wastewater Director to establish limits different than the standard local limits in Table 2. Sometimes these limits are more restrictive than the standard limits and are imposed for the protection of some aspect of the wastewater system. The imposition of such a limit is called a local initiative. A local initiative is defined in the Sewer Use Ordinance as the imposition of a limit in a user permit or order upon a pollutant or flow, which, if not limited, may result in harm to the wastewater collection system, treatment plant, its workers or the environment, or which may interfere with the analysis of other limited parameters. The parameter limited in a local initiative may be a pollutant listed in Table 2 (or in Tables 3 and 4 below), but with a stricter limit than is given for that parameter in the tables, or it may be a parameter different than those listed in the tables.

The Director may also establish limits that are *less* restrictive than the standard local limits in Table 2. A less restrictive limit is called a Specific Alternative Limit (SAL). A SAL may be requested by an industrial user. The MCWMS Industrial Pretreatment Department will approve the request if the following conditions are met:

1. the treatment plant has the excess treatment capacity to treat the additional pollutant loading which may be received by the treatment plant if the SAL is granted
2. the extra pollutant loading will not result in harm to the wastewater collection system, treatment plant, its workers or the environment, or which may interfere with the analysis of other limited parameters.
3. the SAL is not less restrictive than a federal limit (such as for pH or flashpoint) or a federal categorical limit to which the industry is obligated.
4. The MCWMS Industrial Pretreatment Department agrees that the industry’s request is reasonable in light of the industry’s historical or expected future pollutant discharge

concentration and in light of the hardship that would be faced by the industry to install pretreatment to reduce the pollutant concentration at the site.

Some limits for volatile organic compounds were put in place to protect those who work on the collection system from exposure to hazardous levels of volatile organic vapors. In some cases a SAL for a volatile organic compound may be granted to a user in excess of the concentration that could contribute to vapor levels potentially exceeding the exposure limit for collection system workers. In such cases, the municipalities that would be affected will be informed annually concerning which industrial users are permitted to discharge above worker health levels so that workers can take appropriate protective measures when working on the collection system downstream of those users. Notification will be sent to the affected municipalities' public works departments by certified mail or other verifiable means. It will be sent yearly. It will contain the names and addresses of those industries that are permitted to discharge over the worker health limit, the names of the compounds, the permitted discharge concentrations, and, for comparison, the concentration limit that would be considered safe for collection system workers. These conditions were approved by the Muskegon Municipal Wastewater Management Committee.

For BOD (i.e., Biochemical Oxygen Demand), the Director may allow an industry to use a six-month rolling average limit, which is considered a unique case of a SAL in which an industry's average of monthly BOD values for six consecutive monitoring months shall not exceed the established limit authorized by the POTW. The six-month rolling average BOD limit is an option only for users that have monthly BOD monitoring requirements in their permits. Each monthly value used in the calculation of the six-month rolling BOD average may itself be an average of daily values measured within a calendar month. Whether average daily values or monthly values, whenever there is a BOD result reported as less than the method detection limit, the value used in the calculation of an average will be the method detection limit of 2 mg/L raised by the dilution factor of the lowest dilution used in the analysis. (In other words, for analyses reported as less than the method detection limit, a value of zero (0) may not be used in the calculation of an average.) The six-month rolling average BOD is used for compliance only and not for surcharging. BOD surcharges are always based on monthly averages.

The limits for mercury, unlike those for other pollutants in Table 2, are not derived from a technically determined MAHL. Instead they are driven by the fact that MCWMS is not currently meeting the water quality based effluent limit for mercury of 1.3 nanograms per liter. Therefore, MCWMS is under a State-imposed mercury reduction program. Consequently, no discharge of mercury is permitted at or above 0.0002 mg/L, which is a commonly achieved quantification limit for mercury when analyzed by atomic absorption methods.

The limits in Table 3 are federally imposed on all industries that discharge to POTW collection systems.

TABLE 3: Instantaneous Limits for Industries Discharging to the Collection System

Pollutant Property	Instantaneous Limit	Instantaneous Limit Applicable to Groundwater Remediation Sites
Flashpoint, Lower Limit	140°F	140°F
pH, Lower Limit	5.0 s.u.	5.0 s.u.

The limits in Table 4 apply to hauled waste discharged directly at the treatment plant site.

TABLE 4: Instantaneous Limits for Hauled Waste

Pollutant Property	Instantaneous Limit
Flashpoint, Lower Limit	140°F
pH, Lower Limit	3.0 s.u.
pH, Upper Limit	12.5 s.u.

It should be noted that, although Table 4 lists only three limits applying to hauled waste, if any hauled waste should be generated by an industry falling within a federal category as defined in 40 CFR Parts 401-471, all the limits that are assigned to that industry in the federal regulations will be applied to the hauled waste as well.

V. MCWMS Headworks Loading Tracking

Tracking the pollutant loading that enters the wastewater treatment plant requires sampling, testing, and evaluation at the headworks. This is to ensure that the plant does not receive a greater loading than it can treat. To monitor the pollutant loadings received by the wastewater treatment plant, MCWMS generates a monthly report showing the headworks loading for each pollutant. This headworks loading is the combined loading of not only the main sewer influent, but also hauled waste and the three outfalls from Muskegon County Solid Waste, which discharges directly into the MCWMS east storage lagoon. The report shows both the daily loadings and the monthly average loadings for each pollutant so that they can be compared to the respective daily maximum and monthly average MAHLs. The report includes many more pollutants than just those that occur in the table of local limits. MCWMS has developed MAHLs for most of the pollutants for which it routinely tests. Limits were published for only a handful of them.

This report is part of the MCWMS Monthly Operating Report. If the report indicates that a pollutant's loading exceeds its MAHL (or merely comes close to exceeding it), it can be noticed quickly and action can be taken to address the issue. If a daily or monthly average loading exceeds a MAHL, it appears highlighted in the report. A sample portion of this monthly report is shown here.

TABLE 5: Excerpt from the Total Pollutant Loading from the MCWMS Monthly Operating Report

	BOD	Ammonia	Cyanide, Total	Phosphorus, Total	TSS	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron
3/1/2012	45,546	3,059	0.378	639	44,016	330	0.404	0.416	15.24	0.038	30.1
3/2/2012	43,446	3,070	0.371	621	43,216	318	0.389	0.401	14.69	0.037	29.5
3/3/2012	29,376	2,982	0.368	488	30,006	250	0.293	0.299	11.84	0.029	29.5
3/4/2012	25,185	2,931	0.366	448	26,196	229	0.264	0.270	11.04	0.026	29.3
3/5/2012	48,546	3,691	0.378	712	43,916	338	0.414	0.427	15.55	0.039	30.1
3/6/2012	47,446	3,179	0.382	657	48,216	345	0.424	0.437	15.85	0.040	30.4
3/7/2012	51,846	3,252	0.383	786	54,516	433	0.438	0.451	25.11	0.047	26.1
3/8/2012	49,546	3,432	0.404	776	51,316	440	0.432	0.444	25.92	0.047	27.8
3/9/2012	50,946	3,667	0.384	672	44,416	425	0.425	0.437	24.81	0.046	26.1
3/10/2012	29,586	3,383	0.366	460	24,586	313	0.275	0.281	19.86	0.033	25.1
3/11/2012	26,446	3,285	0.359	425	21,816	294	0.252	0.258	18.98	0.030	24.5
3/12/2012	53,146	4,121	0.411	843	43,816	442	0.431	0.442	26.23	0.047	28.5
3/13/2012	55,746	3,225	0.405	758	54,816	478	0.488	0.502	27.46	0.052	27.8
3/14/2012	59,546	3,191	0.401	833	57,716	495	0.514	0.530	28.01	0.054	27.4
3/15/2012	46,346	3,098	0.395	686	46,316	438	0.436	0.449	25.52	0.047	27.0
3/16/2012	40,946	2,819	0.382	598	48,216	407	0.399	0.411	23.97	0.043	26.1
3/17/2012	24,936	2,642	0.371	442	33,156	324	0.287	0.293	20.49	0.034	25.4
3/18/2012	26,306	2,642	0.371	453	34,326	329	0.296	0.303	20.66	0.034	25.4
3/19/2012	43,146	3,623	0.390	737	46,316	423	0.419	0.431	24.84	0.045	26.6
3/20/2012	51,346	2,901	0.387	687	61,316	472	0.491	0.507	26.74	0.051	26.2
3/21/2012	45,546	2,982	0.385	819	51,516	661	0.440	0.453	19.61	0.047	29.7
3/22/2012	50,046	3,000	0.384	756	55,916	686	0.479	0.494	20.75	0.050	29.4
3/23/2012	41,546	3,296	0.393	974	43,916	645	0.398	0.409	18.71	0.044	30.6
3/24/2012	24,166	2,995	0.371	774	27,436	534	0.272	0.278	14.54	0.032	28.7
3/25/2012	25,126	2,955	0.366	772	28,206	530	0.277	0.283	14.61	0.033	28.4
3/26/2012	38,546	3,275	0.380	634	47,316	620	0.384	0.395	17.99	0.042	29.3
3/27/2012	42,846	2,519	0.381	593	42,816	652	0.432	0.445	19.32	0.046	29.3
3/28/2012	45,246	2,590	0.385	660	52,716	677	0.463	0.477	20.33	0.049	29.6
3/29/2012	36,759	2,363	0.368	705	39,616	620	0.413	0.422	18.37	0.044	27.8
3/30/2012	33,659	2,528	0.381	606	33,916	615	0.378	0.386	17.80	0.042	29.2
3/31/2012	20,639	2,298	0.361	464	21,626	524	0.279	0.284	14.53	0.033	27.5
Average	40,436	3,064	0.38	661	42,039	461	0.39	0.40	19.98	0.04	28.02
<i>Daily MAHL</i>		56,867	561			112,238	561	11.2	5,612	561	11,224
<i>Monthly MAHL</i>	123,789	49,501	9.19	4,099	161,950	5,411	37.0	2.59	523	15	3,381

The allocation of treatment capacity given to hauled waste, as already explained, is based upon a flow of 6 million gallons per month and average pollutant concentrations that were determined in 2009. Assuming that the average pollutant concentrations remain fairly constant, the pollutant loadings received from hauled waste are easily monitored by tracking the hauled waste flow for each month. If the hauled waste flow should ever approach 6 million gallons per month, then steps will be taken to regulate the hauled waste flow. These steps may include postponing some discharges when possible or turning some discharges away if necessary. A hauled waste flow is reported weekly so that its loading contribution may be monitored.

In addition to tracking the volume of hauled waste flow, MCWMS also monitors hauled waste through sampling and analysis. Septage and grease loads are randomly sampled approximately weekly. Wastestreams that are not septage or grease are sampled according to the schedules published in the permits of those hauled waste users. The sampling frequency in the permits of hauled waste users is determined according to the following factors. Users with a potential to exceed the surcharge threshold of BOD and TSS for hauled waste are sampled monthly at a minimum in order to accurately determine the surcharges for the user. The sampling frequency for all other parameters is based on the impact that certain expected pollutants would have on the system and the allocated amount of those pollutants. Permits for hauled waste users do not include limits other than for pH and flashpoint. Therefore, if an excessive pollutant concentration is discovered in a hauled waste sample, enforcement response will be based upon the user's discharging a waste other than what was specified in the waste characterization provided in its permit application. Penalties may include letters of noncompliance, notices of violation, fines, or revocation of the permit to discharge.

The average hauled waste pollutant concentrations upon which the hauled waste allocation was based were determined in 2009. These concentrations will be re-evaluated yearly for all inorganic pollutants except cyanide (unless a hauled waste wastestream is known to be a source of cyanide). If an average pollutant concentration from the yearly evaluation is found to change by 20% or more from the average concentration currently being used in calculations, then the new average will be used thereafter to determine the hauled waste pollutant loadings.

To ensure that treatment is occurring as expected, sampling is conducted throughout the treatment plant at various stages. A copy of the current "Metro Sampling Schedule" which contains the sampling schedule and parameters collected is available for review at the administration building.