Illinois Environmental Protection Agency

Bureau of Water • 1021 N. Grand Avenue E. • P.O. Box 19276 • Springfield • Illinois • 62794-9276

Division of Water Pollution Control
ANNUAL FACILITY INSPECTION REPORT
for NPDES Permit for Storm Water Discharges from Separate Storm Sewer Systems (MS4)

This fillable form may be completed online, a copy saved locally, printed and signed before it is submitted to the Compliance Assurance Section at the above address. Complete each section of this report.

Report Period: From March, 2017 To March, 2018

Permit No. ILR40 0664

MS4 OPERATOR INFORMATION: (As it appears on the current permit)

Name: Village of Tilton

Mailing Address 1: 1001 Tilton Road

Mailing Address 2:

County: Vermilion

City: Tilton State: IL Zip: 61833 Telephone: 217-477-0800

Contact Person: David Phillips, Mayor
(Person responsible for Annual Report)

Email Address: dphillips@tilton.com

Name(s) of governmental entity(ies) in which MS4 is located: (As it appears on the current permit)

Village of Tilton, Illinois

THE FOLLOWING ITEMS MUST BE ADDRESSED.

A. Changes to best management practices (check appropriate BMP change(s) and attach information regarding change(s) to BMP and measurable goals.) (See Attachment A)

1. Public Education and Outreach	☑	4. Construction Site Runoff Control	☑
2. Public Participation/Involvement	☑	5. Post-Construction Runoff Control	☑
3. Illicit Discharge Detection & Elimination	☑	6. Pollution Prevention/Good Housekeeping	☑

B. Attach the status of compliance with permit conditions, an assessment of the appropriateness of your identified best management practices and progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP, and your identified measurable goals for each of the minimum control measures. (See Attachment B)

C. Attach results of information collected and analyzed, including monitoring data, if any during the reporting period. (See Attachment C)

D. Attach a summary of the storm water activities you plan to undertake during the next reporting cycle (including an implementation schedule.)

E. Attach notice that you are relying on another government entity to satisfy some of your permit obligations (if applicable).

F. Attach a list of construction projects that your entity has paid for during the reporting period.

Any person who knowingly makes a false, fictitious, or fraudulent material statement, orally or in writing, to the Illinois EPA commits a Class 4 felony. A second or subsequent offense after conviction is a Class 3 felony. (415 ILCS 5/44(h))

Owner Signature: Date:

David Phillips Mayor

Printed Name: Title:

EMAIL COMPLETED FORM TO: epa.ms4annualinsp@illinois.gov

or Mail to: ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
WATER POLLUTION CONTROL
COMPLIANCE ASSURANCE SECTION #19
1021 NORTH GRAND AVENUE EAST
POST OFFICE BOX 19276
SPRINGFIELD, ILLINOIS 62794-9276

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APPENDIX Public Outreach/Education Materials

ATTACHMENT A

NARRATIVE REGARDING ADDITIONAL REQUIREMENTS OF GENERAL NPDES IL R40 FOR MS4

On May 16, 2016 received the Illinois Environmental Protection Agency reissued the General National Pollutant Discharge Elimination System (NPDES) ILR40 for the discharge of storm water from Small Municipal Separate Storm Sewer Systems (MS4). Tasks were completed. The following is a summary list of items the Village achieved presented in addition to information in previous Annual Reports:

- **Updated the Village Storm Water Management website to include additional links to EPA websites regarding Best Management Practices, Climate Change, Environmental Justice and Total Maximum Daily Load (TMDL).**

- **Expanded format of Village website regarding "WHAT YOU CAN DO AS A TILTON RESIDENT." To include information regarding:**
  - **request residents and businesses keep a lid closed on solid waste cans and dumpsters**

- **Updated digital version of the Storm and Sanitary Sewer Base Map system:**
  - **Numbering of sanitary and storm sewer manholes and drainage outfall structures.**
  - **Plotted locations of Village wash-down facilities also private truck and car wash facilities.**
  - **Included new drainage facilities known to be added to the Village.**
  - **Included found drainage facilities found within Village & immediately upstream.**
  - **Charted and plotted discharge testing location analytical data.**
  - **Plotted sanitary sewer flow metering data.**

- **Continue to monitored and inspected storm water management facilities by conducting visual inspection, photograph condition and documented color, odor, clarity, floating solids, suspended solids, foam, oil sheen or other obvious indicators of storm water pollution at storm sewer outfall structures in Village and Grape Creek Bridges. Prepare photographic inspection reports including suggestions and recommendations. Improve measurement of facilities for addition to digital mapping systems.**

- **The Illinois State Map regarding Section 303(d) of the Clean Water Act lists the Vermilion River upstream, through and downstream of Tilton as "Medium" priority for**

Total Maximum Daily Load (TMDL) cause of polychlorinated biphenyls, mercury and fecal coliform. Areas of Tilton drain to this river; consequently the in 2016 Village consultant grab sampled discharge for testing from four storm sewer outfalls also immediately upstream and downstream of the Village along the Vermilion River were performed. Results were reported and posted on the Village Storm and Sanitary Drainage Map.

- **During 2017 Engineer for Village grab sampled storm water discharges from seventeen stormwater outfalls along Grape Creek. Engineers report of results are reported and posted on Village storm and sanitary drainage map.**

- **Consulting Engineer advertised for, prepared for and was available at public meetings presenting the Village Storm Water Management Plan & Website, Environmental Justice and Best Management Practices. Invited local school officials, contractors, public, Village staff and Trustees. Meeting was to update, train and educate regarding Tilton NPDES MS4.**

- **Reviewed Village Stormwater Ordinances per requirements of the reissued General Permit. Erosion, Sediment Control and Storm Water ordinance exist.**

- **On several occations during report period consulting engineer reviewed Village facilities by 1) visual inspections, 2) photography and 3) documentations. Included in Annual Reporting of the Village equipment wash-down system, salt storage, chemical & fertilizer storage areas, oil & fuel systems, street sweeping, Vactor truck and solid waste operations. Engineer provides improvement suggestions and recommendations to Village.**

- **2016 began development of process to access the water quality impacts of Grape Creek flood control project. In early March, Gleisner Engineering coordinated with Danville Township to preform lead and arsenic soil testing in area near the Hegeler Superfund site. This area is upstream of Grape Creek through Tilton. Sediment was also sampled & tested near Washington Avenue Bridge & Grape Creek. Results were reported and logged on Village mapping system.**

- **Village held community drop-off clean-up at Public Works facility and pick-up seniors Summer 2017.**

ATTACHMENT B
Annual Facility Inspection Report
MS4 PHASE 2 NPDES Permit No. IL400664
Village of Tilton, Illinois
(Reporting Period March 2017/2018)

2017/2018 MS4 PHASE 2 NPDES STORM WATER ACTIVITY SUMMARY

BMP #	BMP	Category	Description	Proposed Activity
A	Public education and outreach	A.1	Distributed paper material	Distributed public education material and made available at Village Hall and post on Village Storm Water Management website for interested public and also review by regulating agencies.
		A.5	Classroom education materials	Distributed public education and outreach material to interest public & e-mail to school district.
		A.6	Other Public Education	Public meeting/training held; invited Village Staff, contractors, trustees, school officials and public regarding Village MS4 Best Management Practices, discharge outfall monitoring , Environmental Justice and Village Erosion Control and Storm Water Ordinances.
B	Public participation\involvemen	B.2	Educational volunteer	Provided education materials to local schools to raise awareness on types of green infrastructure and how it benefits in reducing such pollution.
		B.7	Other public involvement	Distribution of EPA flyers and Village posts education material and flyers on website. Engineer performed a screen iteration using mapping tools on EPA Environmental Justice website, generated report then shared information with Village at council meeting of Trustees. Engineer reached out to City of Danville, Danville Township, Bismarck districts and Vermilion County per IEPA request regarding Storm Water Management.
C	Illicit discharge detection and elimination	C.1	Sewer map preparation updated	Updated digital storm and sanitary sewer facilities Village Drainage Map continued numbering of manholes and drainage outfall structures. Added identified new & found facilities. Printed hard copy for posting at Village Public Works facility.
		C.3	Detection/Elimination Prioritization Plan	Continued communication to develop plan to inspect solid waste transportation equipment mobilizing through Village jurisdiction to identify sources of storm water pollution. Village has smoke blower & video camera for sewer inspections. Village purchase Vactor truck also pole camera.
		C.7	Visual dry weather screening	Preformed observation/screening of storm sewer outlets along Grape Creek and Vermilion River. Photographic document Reported.
		C.8	Pollutant Field Testing	Sampled storm water discharge flowing toward Grape Creek then tested for concentrations of chloride, oil & grease, total suspended solids, nitrates, phosphates and fecal coliform. Also Sampled sediment along Grape Creek and tested. for concentrations of lead, arsenic and zinc. Analytical document reported.
		C.10	Illicit Discharge Controls	Continued review of mapping for potential areas to detain and treat water run-off from major fires. Consultant Engineer attended training for digital aerial data base and contour mapping then reviewed terrain for Village and adjacent areas regarding capability for water retention.
D	Construction site runoff control	D.2	Erosion and Sediment Control BMPs	Implement Village Erosion and Sediment Control Ordinances into construction projects.

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MS4 PHASE 2 NPDES Permit No. IL400664
Village of Tilton, Illinois
(Reporting Period March 2017/2018)

2017/2018 MS4 PHASE 2 NPDES STORM WATER ACTIVITY SUMMARY- (CONTINUED)

BMP #	BMP	Category	Description	Proposed Activity
		D.7	Other Construction Site Run-off Controls	Reviewed Village Erosion, Sediment Control and Storm Water Ordinance regarding permit requirements.
E	Post-Construction runoff control	E.4	Pre-Construction Review of BMP Design	Inspection of erosion and sediment control measures are conducted by the Village officials and consulting engineer at pre and post-construction stages of the construction projects within the Village. Engineer takes photographs of erosion conditions near site visits.
		E.6	Post-Construction Inspections	Village and consulting engineer to perform post-construction visual observation of construction sites regarding Storm Water Management BMPs.
		E.7	Other Post-Construction Run-off Controls	Conducted Annual Training for Village Staff & Contractors on low impact design techniques.
F	Pollution Prevention/ Good Housekeeping	F.1	Employee Training Program	Continued training for Village public works personnel regarding proper street sweeping operations, sewer video inspection, smoking & location operations and debris disposal also snow and ice control operations.
		F.2	Inspection and Maintenance Program	Inspected inlet and outlet drainage facilities within Village thence remove debris and address erosion. Continue to sweep streets, separate material and document progress. Video inspect & smoke sewers. Engineer coordinated with DECO then Village contractor to remove sediment immediately upstream of Washington and Grape Creek.
		F.3	Municipal Operations Storm Water Control	Performed visual inspection of streams within Village jurisdiction for accumulated debris or erosion.
		F.4	Municipal Operation Waste Disposal	Improved operational plans to separate debris from stream, drainage system and various public works clean-ups into recyclables, landscape waste and garbage. Identify appropriate locations to dispose or recycle materials in manner avoiding storm water pollution.
		F.5	Flood Management/Access Guidelines	Inspected Grape Creek through Village on several occasions to assess, photograph and coordinate for removal of debris build-up obstructing or potentially restricting channel and/or bridges. In order to evaluate impacts of flood control projects, consulting engineer sampled sediment at King Street, CSX Railroad and Kingsdale Avenue Bridges over Grape Creek for lead, arsenic & zinc concentrations. Analytical data included in report.
		F.6	Other Municipal Operation Controls	Inspected, photographed and measured drainage facilities immediately upstream of Village and plotted on digital drainage upgrade map.

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MS4 PHASE 2 NPDES Permit No. IL400664
Village of Tilton, Illinois
(Reporting Period March 2017/2018)

LIST OF ACTUAL 2017/2018 CONSTRUCTION & MAINTENANCE PROJECTS PAID FOR BY TILTON

Project	Item #	Item	Status
GRAPE CREEK IMPROVEMENTS	I	KEEGAN BR. DEBRIS REMOVAL AND EROSION MITIGATION	DEBRIS REMOVAL PREFORMED AND EROSION RESISTANT MATERIAL PLACED
MFT MAINTENANCE	II	SEAL COAT PAVEMENT VARIOUS STREETS	IMPLEMENT FALL 2017. PREPARATION & SWEEPING REFORMED BY VILLAGE STAFF
EAST 1rst STREET CHANNEL CLEARING	III	DEBRIS REMOVAL, GRADING & DRAINAGE MAINTENANCE	IMPROVED & REGULAR INSPECTIONS THROUGHOUT WINTER & SPRING 2017
WEST ROSS LANE	IV	CONCRETE PAVEMENT PATCHING	PATCHING FALL 2017
KING STREET DRAINAGE SEWER	V	DRAINAGE IMPROVEMENT	NEW STORM SEWER INSTALLED
VOTEC TREATMENT PLANT DEACTIVATION SITE GRADING	VI	DEMOLITION & SITE GRADING	PROPERTY TRANSFFERED TO TILTON. MATERIAL STOCKPILED NEAR FILL AREAS 2017
WASHINGTON STREET BRIDGE SEDIMENT BUILD-UP REMOVAL & DISPOSAL	VII	REMOVE SEDIMENT OBSTRUCTING FLOW	EXCAVATED AND DISPOSED OF 25 CUBIC YARDS OF SEDIMENT
HERSCHEL LAKE	VIII	DREDGING, CULVERT REPLACEMENT, DOCK & BOAT ACCESS RELOCATION	DREDGING & CULVERT REPLACEMENT FALL 2017

ATTACHMENT

C

SECTION DIVIDER

GLEISNER ENGINEERING

327 Fletcher Drive
Danville, Illinois 61832
217-213-2022
josephgleisner@att.net

January 8, 2018

Honorable Mayor David Phillips
Village of Tilton
1001 Tilton Road
Tilton, Illinois 61833

RE: NARATIVE REGARDING STORM SEWER OUTFALL AND SEDIMENT ANALYTICAL SAMPLE TESTING ALONG GRAPE CREEK REGARDING SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, VERMILION COUNTY, ILLINOIS

A significant area of the Village storm sewer drainage system flows with gravity toward Grape Creek.

In striving toward compliance with requirements of the Illinois Environmental Protection Agency reissued General NPDES Permit ILR40 for Small Municipal Separate Storm Sewer Systems (MS4); we obtained a total of seventeen (17) storm water discharge samples; six (6) June 30th, six (6) August 11th and five (5) October 19th at outfall structures flowing into Grape Creek. In addition, on August 11th three (3) sediment samples were collected along the creek in beds. Included is a chart summary and location map of where the tests were taken following rain events. The laboratory analytical reports are included. Results are logged on the Gleisner Engineering's digital Storm and Sanitary Sewer Base Map.

I've included and reviewed documentation of benchmark limits developed by the EPA and LaMotte Company "The Monitor Handbook" for:

- **Chloride**
  - 860 mg/L

- **Oil & Grease**
  - 15 mg/L

- **Total Suspended Solids**
  - 100 mg/L

- **Nitrate + Nitrite Nitrogen**
  - 0.68 mg/L

- **Phosphorus**
  - 2.0 mg/L

- **Fecal Coliform** ***(from LaMotte Company's "The Monitor Handbook" in colony forming units)***
  - Drinking Water level should be zero
  - Swimming Water desired level less than 200 CFU/100ml
  - Boating or Fishing desired level less than 1,000 CFU/100ml

Based on these references and analytical results for **fecal coliform** an additional thirteen (13) storm storms segments along Grape Creek are of concern in addition to four the segments toward Vermilion River identified during 2016 testing. Also fifteen (15) segment of discharge to Grape Creek reported excessive for nitrogen compounds. Results suggest illicit discharges are connected to these storm sewers and/or cross connections exist between the sanitary and storm sewers. In addition to depreciating storm water discharge quality, these illicit connections are probably significantly contributing to the excessive peak flow conditions witnessed at Village sanitary sewer lift stations and the waste water treatment plant during wet weather. This will increase sewer operating and maintenance costs. Unfortunately this inundation of the storm water into the sanitary system has potential to backup into structures, residence and/or facilities serviced by these Village sewers. This could cause property damage and health issues. Animal waste not properly treated and/or contained can also contribute to high fecal coliform.

Sources of excessive **nitrogen** results in storm water run-off are often from fertilizers; pet, animal and yard waste. Also sewer cross connections and septic systems negatively contribute to nitrogen discharge. Properly engineered green infrastructure techniques can be used to reduce nitrogen discharge concentrations into waterways.

Recommend Village submit this report to the IL EPA for review and further comments, regarding quality of storm water discharge.

The Village is required to develop, implement and enforce a program to detect and eliminate illicit connections or discharges into the storm drainage system. In order to achieve this I recommend the following general tasks:

I. Communicate with animal facilities and pet owners to contain then properly dispose of or treat pet and animal waste.

II. Communicate with public regarding green infrastructure techniques and require storm water retention and detention basins be properly engineered to filter and reduce nutrient pollution.

III. Communicate with public regarding proper management and sparing application of pesticides and fertilizers.

IV. Require developers, engineers, contractors and Village staff to quarterly submit sufficient information of new and found sewers. Also submit corrections to the existing mapping system when identified. Continue to update the Storm and Sanitary Sewer digital mapping system. File then replace with updated copies posted at the Public Works facility yearly.

V. Continue development of a numbering system on the maps of storm and sanitary sewer structures.

VI. Utilize mapping system in conjunction with field work to measure and inventory sizes, types & lengths of storm and sanitary sewer system.

VII. Utilize storm water analytical testing results and sewer maps to engineer details for thorough field inspection operation logistics then prioritize areas for inspection, in order to:

i. Permanently label sanitary and storm sewer structures in the field corresponding to labeling system on mapping.

ii. Obtain GPS coordinates of all storm sewer structures including Northing, Easting, Rim Elevation and Invert Pipe Elevations; then plot information accurately on the sewers digital drainage mapping system.

iii. Field inspect storm and sanitary sewer systems by:

a) Use Vactor Truck or similar equipment to safely clean lines.
b) Use sewer televising equipment to visually inspect line and record video footage also maintain digital file corresponding to sewer map labeling and date inspected.
c) Communicate and coordinate with residence and fire department then preform supervised smoke testing of the

sewers while documenting illicit discharges and cross connections between storm & sanitary sewers.

VIII. Require illicit connections to storm sewer to be mitigated and eliminate cross connections between storm and sanitary sewers.

IX. Obtain samples and again perform analytical testing to quantify water quality improvements.

The 2017/2018 laboratory cost was $215.45 per grab sample location for the General Permit minimum discharge analysis parameters for total suspended solids, total nitrogen, total phosphorus, fecal coliform, chlorides also oil and grease.

In addition, I sampled sediment at three (3) locations along Grape Creek for Arsenic, Lead and Zinc due to proximity of Hegler Superfund site upstream. Limits set by Illinois Table A Tier 1 Soil Remediation Objectives section 742, Appendix A General Table G Concentration of Inorganic Chemicals in Background Soils within and outside Metropolitan Statistical Areas Respectively are as follows:

- Arsenic 13.0 – 11.0
- Lead 36.0 – 20.9
- Zinc 95 – 60.2

It appears several sediment samples are near or above these limits. Recommend these results be submitted to US EPA and IL EPA requesting review, comments and recommendations. Further recommend Village immediately communicate to engineering supervised workforce the following:

Health and Safety Best Practices

The best way to protect the workers and their families is to practice good hygiene by washing hands before eating and avoid bring home dirty work clothes. It's also suggested to keep down the dust when in contact with contaminated soils as well as implement an in-the-field routine boot wash to avoid tracking it back home.

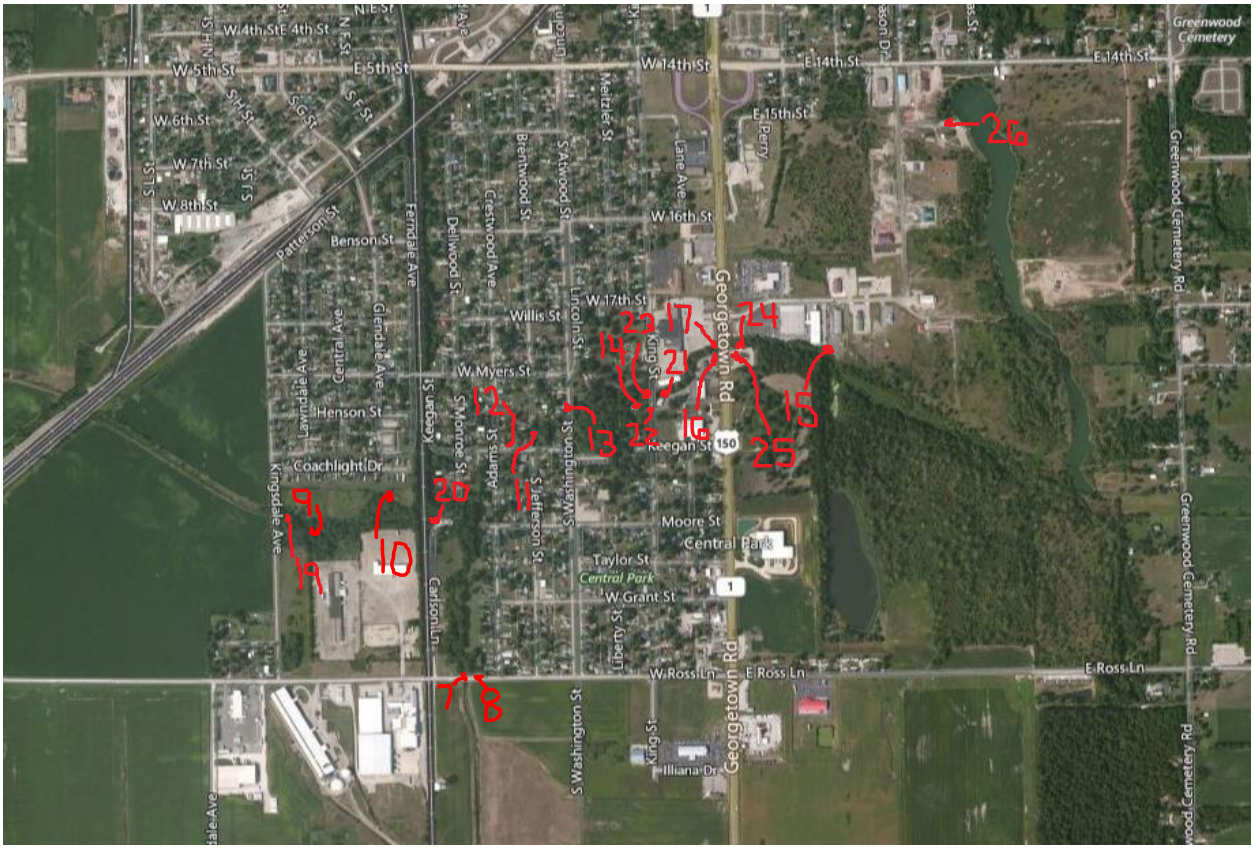
Analytical reports and references are bound to this report including sample location map for reference.

Thank you for the continued opportunities to be of service to our communities and looking forward to striving with you to improve the quality of our water systems.

Respectfully Submitted,

Joseph J. Gleisner, P.E.

LOCATION MAP OF STORM WATER & SEDIMENT GRAB SAMPLING 2017 / 2018 VILLAGE OF TILTON NPDES MS4



LEGEND

11 Sample # & location

N. Scale

CHART SUMMARY of 2017 / 2018 TILTON NPDES MS4 SAMPLE ANALYTICAL DATA OF DISCHARGE ALONG GRAPE CREEK

								From TEIR 1 SOIL REMEDIATION APPEDIX A, TABLE G Outside & Within Metropolitan Statistical Area		
	DATE GRAB SAMPLE	CHLORIDE mg/L	FECAL COLIFORM CFU/100ml	OIL & GREASE mg/L	TOTAL SUSPENDED SOLIDS mg/L	NITRATE + NITRITE NITROGEN mg/L	PHOSPHORUS mg/L	ARESENIC mg/kg	LEAD mg/kg	ZINC mg/kg
BENCHMARK LEVEL FOR IMPAIRED WATERS		860	200	15	100	0.68	2	11.3 - 13	20.9 - 36	60.2 - 95
7) 7065408-01	6/30/2017	63	600	<5.8	<4.0	13	1.3			
8) 7065408-02	6/30/2017	89	45	<6.8	<4.0	9.6	<0.10			
9) 7065408-03	6/30/2017	150	4600	<5.9	95	6.5	<0.10			
10) 7065408-04	6/30/2017	39	2000	<5.6	45	5.4	<0.10			
11) 7065408-05	6/30/2017	63	400	<6.9	<4.0	7.9	0.4			
12) 7065408-06	6/30/2017	41	6000	<5.8	12	8.4	0.56			
13) 7082724-01	8/11/2017	84	45	<5.3	<4.0	7.2	<0.1			
14) 7082724-02	8/11/2017	48	2900	<5.3	<4.0	2.7	<0.1			
15) 7082724-03	8/11/2017	32	400	<6.0	6	<1.0	<0.1			
16) 7082724-04	8/11/2017	230	36	<5.9	<4.0	3	<0.1			
17) 7082724-05	8/11/2017	250	180	<6.0	6.8	1.1	<0.1			
18) 7082724-06	8/11/2017	240	2700	<6.4	21	3	0.16			
19) 7082725-01	8/11/2017							4.1	9.3	60
20) 7082725-02	8/11/2017							11	29	87
21) 7082725-03	8/11/2017							7.4	140	1300
22) 71014234-01	10/6/2017	40	12,000	<5.7	<4.0	4	0.1			
23) 71014234-02	10/6/2017	42	3100	<5.8	14	2	0.2			
24) 71014234-03	10/6/2017	12	33000	<5.3	11	1.9	0.13			
25) 71014234-04	10/6/2017	5	4800	<5.3	6	1.7	0.14			
26) 71014234-05	10/6/2017	5.2	29000	<5.8	130	<1.2	0.12			

Note: Results anotated in green are in excess of benchmark levels for impaired waters

RECORD PREPARED BY GLEISNER ENGINEERING (SEE PDC LABORATORY REPORTS ATTACHED)

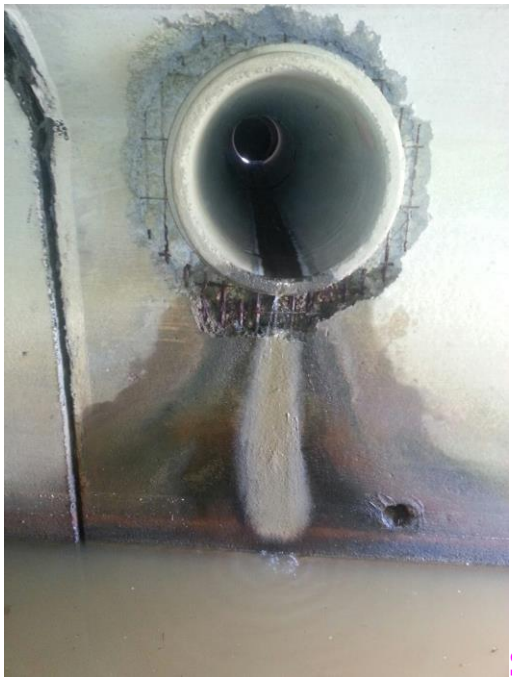
GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

RE: JUNE 30, 2017 GRAPE CREEK STORM SEWER OUTFALL & PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Storm Structure K2

Look West at discharge sample location number 7 at Grape Creek and West Ross Lane within concrete box culvert. Patch joint around concrete pipe with high strength hydraulic mortar compound approved by Engineer. Analytical data shows excess discharge of Fecal Coliform and Nitrogen concentrations. Coordinate with Engineer to communicate extension of Village sanitary sewer to connect facilities West of this discharge. Contain fertizilzers, chemicals and pesticides!



Storm Structure L2

Look East at test location number 8 at Grape Creek and West Ross Lane within concrete box culvert. Patch joint around concrete pipe with high strength hydraulic mortar compound approved by Engineer. Analytical data shows excess discharge of Nitrogen concentrations. Village regularly sweep pavement in manner preventing dust along West Ross Lane and properly dispose of waste debris .

Storm Structure C1

Look Northerly at 18 inch culvert sample location 9 at Grape Creek South of Coachlight Mobile Home Park Lot number 39.

Storm Structure J1

Look at test location number 10 on the north side of Adams Street at Grape Creek. Clear vegegation away from discharge and use Village Vactor truck to clean drainage tile regularly.

Storm Structure H1

Look at sample location number 11 on North End of Jefferson into Grape Creek

July 21, 2017

Joseph Gleisner
Gleisner Engineering
327 Fletcher Drive
Danville, Il 61832

Dear Joseph Gleisner:

Please find enclosed the analytical results for the sample(s) the laboratory received on **6/30/17 4:17 pm** and logged in under work order **7065408**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Janet Clutters

Project Manager
(309) 692-9688 x1743
jclutters@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7065408-01
Name: 7
Matrix: Waste Water - Regular Sample

Sampled: 06/30/17 10:45
Received: 06/30/17 16:17

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	63	mg/L		07/06/17 16:43	07/06/17 16:43	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.8	mg/L		07/11/17 09:22	07/11/17 14:31	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		07/07/17 08:55	07/07/17 14:37	KNS/I	SM 2540D
Total Nitrogen	13	mg/L		07/19/17 10:03	07/20/17 10:14	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	600	CFU/100 ml		06/30/17 16:50	06/30/17 16:50	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	10	mg/L		07/14/17 11:27	07/14/17 13:05	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	1.3	mg/L		07/05/17 12:45	07/05/17 12:45	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	3.0	mg/L		07/19/17 10:03	07/20/17 10:14	TAS	OIA/PAI-DK03 & EPA 351.2

Sample: 7065408-02
Name: 8
Matrix: Waste Water - Regular Sample

Sampled: 06/30/17 11:00
Received: 06/30/17 16:17

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	89	mg/L		07/06/17 17:01	07/06/17 17:01	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 6.8	mg/L		07/11/17 09:22	07/11/17 14:31	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		07/07/17 08:55	07/07/17 14:37	KNS/I	SM 2540D
Total Nitrogen	9.6	mg/L		07/19/17 10:03	07/20/17 10:20	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	45	CFU/100 ml		06/30/17 16:50	06/30/17 16:50	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	9.6	mg/L		07/14/17 11:27	07/14/17 13:06	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		07/05/17 12:46	07/05/17 12:46	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/19/17 10:03	07/20/17 10:20	TAS	OIA/PAI-DK03 & EPA 351.2

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7065408-03
Name: 9
Matrix: Waste Water - Regular Sample

Sampled: 06/30/17 11:40
Received: 06/30/17 16:17

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	150	mg/L		07/06/17 17:19	07/06/17 17:19	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.9	mg/L		07/11/17 09:22	07/11/17 14:31	DNJ	EPA 1664
Solids - total suspended solids (TSS)	95	mg/L		07/07/17 08:55	07/07/17 14:37	KNS/I	SM 2540D
Total Nitrogen	6.5	mg/L		07/19/17 10:03	07/20/17 10:22	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	4600	CFU/100 ml		06/30/17 16:50	06/30/17 16:50	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	5.3	mg/L		07/14/17 11:27	07/14/17 13:06	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		07/05/17 12:46	07/05/17 12:46	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		07/19/17 10:03	07/20/17 10:22	TAS	OIA/PAI-DK03 & EPA 351.2

Sample: 7065408-04
Name: 10
Matrix: Waste Water - Regular Sample

Sampled: 06/30/17 12:01
Received: 06/30/17 16:17

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	39	mg/L		07/06/17 17:38	07/06/17 17:38	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.6	mg/L		07/11/17 09:22	07/11/17 14:32	DNJ	EPA 1664
Solids - total suspended solids (TSS)	45	mg/L		07/07/17 08:55	07/07/17 14:37	KNS/I	SM 2540D
Total Nitrogen	5.4	mg/L		07/19/17 10:03	07/20/17 10:23	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	2000	CFU/100 ml		06/30/17 16:50	06/30/17 16:50	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	5.4	mg/L		07/14/17 11:27	07/14/17 13:07	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		07/05/17 12:47	07/05/17 12:47	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		07/19/17 10:03	07/20/17 10:23	TAS	OIA/PAI-DK03 & EPA 351.2

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ANALYTICAL RESULTS

Sample: 7065408-05
Name: 11
Matrix: Waste Water - Regular Sample

Sampled: 06/30/17 12:12
Received: 06/30/17 16:17

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	63	mg/L		07/06/17 17:56	07/06/17 17:56	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 6.9	mg/L		07/11/17 09:22	07/11/17 15:20	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		07/07/17 08:55	07/07/17 14:37	KNS/I	SM 2540D
Total Nitrogen	7.9	mg/L		07/19/17 10:03	07/20/17 10:25	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	4000	CFU/100 ml		06/30/17 16:50	06/30/17 16:50	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	6.6	mg/L		07/14/17 11:27	07/14/17 13:08	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.40	mg/L		07/05/17 12:48	07/05/17 12:48	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		07/19/17 10:03	07/20/17 10:25	TAS	OIA/PAI-DK03 & EPA 351.2

Sample: 7065408-06
Name: 12
Matrix: Waste Water - Regular Sample

Sampled: 06/30/17 12:22
Received: 06/30/17 16:17

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	41	mg/L		07/06/17 18:15	07/06/17 18:15	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.8	mg/L		07/11/17 09:22	07/11/17 15:20	DNJ	EPA 1664
Solids - total suspended solids (TSS)	12	mg/L		07/07/17 08:55	07/07/17 14:37	KNS/I	SM 2540D
Total Nitrogen	8.4	mg/L		07/19/17 10:03	07/20/17 10:26	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	6000	CFU/100 ml		06/30/17 16:50	06/30/17 16:50	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	6.7	mg/L	Q4	07/14/17 11:27	07/14/17 13:09	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.56	mg/L		07/05/17 12:48	07/05/17 12:48	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.7	mg/L		07/19/17 10:03	07/20/17 10:26	TAS	OIA/PAI-DK03 & EPA 351.2

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NOTES

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Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO
USEPA DMR-QA Program

STL - St. Louis, MO
TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
Drinking Water Certifications: Missouri (1050)
Missouri Department of Natural Resources

* Not a TNI accredited analyte

Qualifiers

Q4 The matrix spike recovery result is unusable since the analyte concentration in the sample is greater than four times the spike level. The associated blank spike was acceptable.

Certified by: Janet Clutters, Project Manager

CHAIN OF CUSTODY RECORD

PDC LABORATORIES, INC.
2231 WEST ALTORFER DRIVE
PEORIA, IL 61615

PHONE # 800-752-6651
FAX # 309-692-9689

State where samples collected IL

*ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - **(SAMPLE ACCEPTANCE POLICY ON REVERSE)***

1 CLIENT: Gleisner Engineering
ADDRESS: 327 Fletcher Dr.
CITY, STATE, ZIP: Danville, IL 61832
CONTACT PERSON: Joseph Gleisner

PROJECT NUMBER: Tilton SW
P.O. NUMBER:
MEANS SHIPPED:
PHONE NUMBER: (217) 213-2022
FAX NUMBER:
DATE SHIPPED:
SAMPLER: (PLEASE PRINT) Joseph J. Gleisner
SAMPLER'S SIGNATURE:

MATRIX TYPES:
WW-WASTEWATER
DW-DRINKING WATER
GW-GROUND WATER
WWSL-SLUDGE
NAS-SOLID
LCHT-LEACHATE
OTHER:

2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	3 ANALYSIS REQUESTED: Chloride by IC EPA 300.0	Fecal Coliform SM 9222D	Phosphate EPA 365.1 or SM 4500-P BF	Nitrogen	Oil & Grease SPE EPA 1664	Suspended Solids SM 2540D	REMARKS
7) Discharge W. side Box Culvert @ Grape CK & W. Ross Ln	6/30/17	10:45am	X				X	X	X	X	X	X	Rain Previos Night
8) Discharge E. side Box Culvert @ Grape CK & W. Ross Ln	6/30/17	11:00am	X				X	X	X	X	X	X	
9) Discharge S. of Coachlight MHP @ Grape CK lot 39	6/30/17	11:40am	X				X	X	X	X	X	X	
10) Discharge N. End Adams @ Grape CK	6/30/17	12:01pm	X				X	X	X	X	X	X	
11) Discharge N. End Jefferson @ Grape CK	6/30/17	12:12pm	X				X	X	X	X	X	X	
12) Discharge SW. Corner Keegan @ Grape CK	6/30/17	12:22pm	X				X	X	X	X	X	X	

4 (FOR LAB USE ONLY)
LOGIN # 36 57686
LOGGED BY: M
LAB PROJ. #
TEMPLATE:
PROJ. MGR.:

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH
(RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)
DATE RESULTS NEEDED
RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE E-MAIL
FAX # PHONE # EMAIL ADDRESS

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area you allow the lab to proceed with analytical testing regardless of the sample temperature.* _____

7
RELINQUISHED BY: (SIGNATURE) Joseph J. Gleisner — DATE 6/30/17 — TIME 1:17pm — RECEIVED BY: (SIGNATURE) — DATE — TIME
RELINQUISHED BY: (SIGNATURE) — DATE — TIME — RECEIVED BY: (SIGNATURE) — DATE — TIME
RELINQUISHED BY: (SIGNATURE) — DATE — TIME — RECEIVED AT LAB BY: (SIGNATURE) — DATE 6/30/17 — TIME 1617

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT	21 °C	
CHILL PROCESS STARTED PRIOR TO RECEIPT	Y OR N	
SAMPLE(S) RECEIVED ON ICE	Y OR N	
PROPER BOTTLES RECEIVED IN GOOD CONDITION	Y OR N	
BOTTLES FILLED WITH ADEQUATE VOLUME	Y OR N	
SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS)	Y OR N	
DATE AND TIME TAKEN FROM SAMPLE BOTTLE		

PAGE ____ OF ____

Copies: white should accompany samples to PDC Labs. **Yellow copy to be retained by the client.**

C16

GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

RE: AUGUST 11, 2017 GRAPE CREEK STORM SEWER OUTFALL & PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Storm Structure G1

Look southerly at discharge at southwest wing wall of Grape Creek & Washington Avenue. Sample Location 13

Storm Structure S1

Look southeasterly at discharge into Grape Creek 100 feet upstream of King Street Bridge over Grape Creek. Sample Location 14. Regularly inspect and remove debris and garbage from Grape Creek.

Storm Structure P1

Look northerly at discharge behind Big R and Todd's Auto Body. Sample Location 15. End section collapse and significant erosion exists at Village 36" diameter storm sewer discharge. Coordinate with Engineer to unseize end section from muck, prepare plan & estimate to reinstall end section and place permanent erosion control dissipation.

Look southeasterly at Southwest corner of triple barrel box culvert at Route 1 and Grape Creek. Sample Location 16. This is discharge from IDOT storm sewer.

Look northeasterly at discharge at northwest corner of IL Rt 1 and Grape Creek Triple barrel box culvert. Sample Location 17. This is IDOT storm sewer. Regularly remove trash and debris. Consider removing a few pieces of stones to allow full capacity flow of discharge.

Storm Structure R7

Look Westerly at downstream side of King Street Bridge over Grape Creek at sediment sample location 19

Storm Structure R11

Look Westerly at downstream side of CSX Railroad Bridge over Grape Creek at sediment sample location 20. Report concern of Lead and Zinc sediment results to IL & US EPA.

Storm Structure R14

Look Westerly toward downstream side of Kingsdale Bridge over Grape Creek at sediment sample location 21. Report concern of Lead and Zinc sediment results to IL & US EPA.

August 24, 2017

Joseph Gleisner
Gleisner Engineering
327 Fletcher Drive
Danville, Il 61832

Dear Joseph Gleisner:

Please find enclosed the analytical results for the sample(s) the laboratory received on **8/12/17 10:45 am** and logged in under work order **7082724**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Janet Clutters

Project Manager
(309) 692-9688 x1743
jclutters@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7082724-01
Name: Discharge
Alias: SW Headwall @ Grape CK & Washington Ave.

Sampled: 08/11/17 15:41
Received: 08/12/17 10:45
Matrix: Storm Water - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	84	mg/L		08/17/17 00:02	08/17/17 00:02	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.3	mg/L		08/15/17 08:45	08/15/17 14:52	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		08/16/17 07:55	08/16/17 09:02	SAH	SM 2540D
Total Nitrogen	7.2	mg/L		08/16/17 09:39	08/17/17 10:17	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	45	CFU/100 ml	H	08/14/17 09:20	08/14/17 09:20	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	7.2	mg/L		08/16/17 09:39	08/16/17 13:27	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		08/16/17 12:52	08/16/17 12:52	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/14/17 12:04	08/17/17 10:17	TAS	OIA/PAI-DK03 & EPA 351.2

Sample: 7082724-02
Name: Discharge
Alias: 100' W. of SW Side King St. Bridge @ Grape CK

Sampled: 08/11/17 16:02
Received: 08/12/17 10:45
Matrix: Storm Water - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	48	mg/L		08/17/17 00:20	08/17/17 00:20	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.3	mg/L		08/15/17 08:45	08/15/17 14:52	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		08/16/17 07:55	08/16/17 09:02	SAH	SM 2540D
Total Nitrogen	2.7	mg/L		08/16/17 09:39	08/17/17 10:19	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	2900	CFU/100 ml	H	08/14/17 09:20	08/14/17 09:20	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	2.7	mg/L		08/16/17 09:39	08/16/17 13:27	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		08/16/17 12:52	08/16/17 12:52	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/14/17 12:04	08/17/17 10:19	TAS	OIA/PAI-DK03 & EPA 351.2

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ANALYTICAL RESULTS

Sample: 7082724-03
Name: Discharge
Alias: 700' E. Rt. 1 & 400' S. Southgate Dr.

Sampled: 08/11/17 16:20
Received: 08/12/17 10:45
Matrix: Storm Water - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	32	mg/L		08/17/17 00:39	08/17/17 00:39	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 6.0	mg/L		08/15/17 08:45	08/15/17 14:53	DNJ	EPA 1664
Solids - total suspended solids (TSS)	6.0	mg/L		08/16/17 07:57	08/16/17 12:06	SAH	SM 2540D
Total Nitrogen	< 1.0	mg/L		08/16/17 09:39	08/17/17 10:20	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	400	CFU/100 ml	H	08/14/17 09:20	08/14/17 09:20	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	0.25	mg/L		08/16/17 09:39	08/16/17 13:53	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		08/16/17 12:53	08/16/17 12:53	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/14/17 12:04	08/17/17 10:20	TAS	OIA/PAI-DK03 & EPA 351.2

Sample: 7082724-04
Name: Discharge
Alias: SW. Side Culvert @ IL Rt. 1 & Grape CK

Sampled: 08/11/17 16:42
Received: 08/12/17 10:45
Matrix: Storm Water - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	230	mg/L		08/17/17 00:57	08/17/17 00:57	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.9	mg/L		08/15/17 08:45	08/15/17 14:53	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		08/16/17 07:57	08/16/17 12:06	SAH	SM 2540D
Total Nitrogen	3.0	mg/L		08/16/17 09:39	08/17/17 10:22	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	36	CFU/100 ml	H	08/14/17 09:20	08/14/17 09:20	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	3.0	mg/L		08/16/17 09:39	08/16/17 13:29	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		08/16/17 12:54	08/16/17 12:54	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/14/17 12:04	08/17/17 10:22	TAS	OIA/PAI-DK03 & EPA 351.2

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Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7082724-05
Name: Discharge
Alias: NW. Side Culvert @ IL Rt. 1 & Grape CK

Sampled: 08/11/17 16:54
Received: 08/12/17 10:45
Matrix: Storm Water - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	250	mg/L		08/17/17 01:15	08/17/17 01:15	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 6.0	mg/L		08/15/17 08:45	08/15/17 14:53	DNJ	EPA 1664
Solids - total suspended solids (TSS)	6.8	mg/L		08/16/17 07:57	08/16/17 12:06	SAH	SM 2540D
Total Nitrogen	1.1	mg/L		08/16/17 09:39	08/17/17 10:23	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	180	CFU/100 ml	H	08/14/17 09:20	08/14/17 09:20	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	1.1	mg/L		08/16/17 09:39	08/16/17 13:54	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	< 0.10	mg/L		08/16/17 12:54	08/16/17 12:54	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/14/17 12:04	08/17/17 10:23	TAS	OIA/PAI-DK03 & EPA 351.2

Sample: 7082724-06
Name: Discharge
Alias: 33" Culvert Warrington & Vermilion River

Sampled: 08/11/17 17:27
Received: 08/12/17 10:45
Matrix: Storm Water - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	240	mg/L		08/17/17 01:34	08/17/17 01:34	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 6.4	mg/L		08/23/17 09:43	08/23/17 13:17	DNJ	EPA 1664
Solids - total suspended solids (TSS)	21	mg/L		08/16/17 07:57	08/16/17 12:06	SAH	SM 2540D
Total Nitrogen	3.0	mg/L		08/16/17 09:39	08/17/17 10:25	TAS	varies
Microbiology - PIA							
Fecal coliform bacteria	2700	CFU/100 ml	H	08/14/17 09:20	08/14/17 09:20	CEM	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	3.0	mg/L		08/16/17 09:39	08/16/17 13:31	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.16	mg/L		08/16/17 12:55	08/16/17 12:55	lgtth	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.0	mg/L		08/14/17 12:04	08/17/17 10:25	TAS	OIA/PAI-DK03 & EPA 351.2

PDC Laboratories, Inc.
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Peoria, IL 61615
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NOTES

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SPMO - Springfield, MO
USEPA DMR-QA Program

STL - St. Louis, MO
TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
Drinking Water Certifications: Missouri (1050)
Missouri Department of Natural Resources

* Not a TNI accredited analyte

Qualifiers

H Test performed after the expiration of the appropriate regulatory/advisory maximum allowable hold time.

Janet Clutters

Certified by: Janet Clutters, Project Manager

PDC LABORATORIES, INC.
2231 WEST ALTORFER DRIVE
PEORIA, IL 61615

PHONE # 800-752-6651
FAX # 309-692-9689

CHAIN OF CUSTODY RECORD

State where samples collected _____

*ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - **(SAMPLE ACCEPTANCE POLICY ON REVERSE)***

1 CLIENT	PROJECT NUMBER	P.O. NUMBER	MEANS SHIPPED
Gleisner Engineering	Tilton SW		
ADDRESS	**PHONE NUMBER**	**FAX NUMBER**	**DATE SHIPPED**
327 Fletcher Dr.	(217)213-2022		
CITY STATE ZIP	**SAMPLER (PLEASE PRINT)**		
Danville, IL 61832	Joseph J. Gleisner		
CONTACT PERSON	**SAMPLER'S SIGNATURE**		
Joseph Gleisner	Joseph J. Gleisner		

MATRIX TYPES: WW-WASTEWATER, DW-DRINKING WATER, GW-GROUND WATER, WWSL-SLUDGE, NAS-SOLID, LCHT-LEACHATE, OTHER: _____

3 ANALYSIS REQUESTED

4 (FOR LAB USE ONLY)
LOGIN # 7082724-6
LOGGED BY: PBH
LAB PROJ. # _____
TEMPLATE: _____
PROJ. MGR.: _____

2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	Chloride by IC EPA 300.0	Fecal Coliform SM 9222D	Phosphate SM 4500-P F EPA 365.1	Nitrogen	Oil & Grease SGT EPA 1664	Suspended Solids SM 2540D		REMARKS
13) Discharge SW. Headwall @ Grape Ck & Washington Ave.	8/11/17	3:41pm	X			5	X	X	X	X	X	X		Rain Previous Night
14) Discharge 100' W. of SW side Xing @ Grape Ck St. Bridge	8/11/17	4:02pm	X			5	X	X	X	X	X	X		
15) Discharge 700' E. Rt 1 & 400' S. Southgate Dr.	8/11/17	4:20pm	X			5	X	X	X	X	X	X		
16) Discharge SW. side Culvert @ IL RT 1 & Grape Ck	8/11/17	4:42pm	X			5	X	X	X	X	X	X		
17) Discharge NW. side culvert @ IL Rt. 1 & Grape Ck	8/11/17	4:54pm	X			5	X	X	X	X	X	X		
18) Discharge 33" Culvert Warrington & Vermilion River	8/11/17	5:27pm	X			5	X	X	X	X	X	X		

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH — DATE RESULTS NEEDED
(RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)
RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE E-MAIL
FAX # PHONE # EMAIL ADDRESS

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area you allow the lab to proceed with analytical testing regardless of the sample temperature.* _____

7		DATE	TIME		DATE	TIME
RELINQUISHED BY: (SIGNATURE)	Joseph J. Gleisner	8/12/17	10:45am	RECEIVED BY: (SIGNATURE)		
RELINQUISHED BY: (SIGNATURE)				RECEIVED BY: (SIGNATURE)		
RELINQUISHED BY: (SIGNATURE)				RECEIVED AT LAB BY: (SIGNATURE)	8/12/17	1045

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT 3 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT (Y) OR N
SAMPLE(S) RECEIVED ON ICE (Y) OR N
PROPER BOTTLES RECEIVED IN GOOD CONDITION (Y) OR N
BOTTLES FILLED WITH ADEQUATE VOLUME (Y) OR N
SAMPLES RECEIVED WITHIN HOLD TIME(S) (Y) OR N
(EXCLUDES TYPICAL FIELD PARAMETERS)
DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____

Copies: white should accompany samples to PDC Labs. Yellow copy to be retained by the client.

PAGE _____ OF _____

C27

August 25, 2017

Joseph Gleisner
Gleisner Engineering
327 Fletcher Drive
Danville, Il 61832

Dear Joseph Gleisner:

Please find enclosed the analytical results for the sample(s) the laboratory received on **8/12/17 10:45 am** and logged in under work order **7082725**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Janet Clutters

Project Manager
(309) 692-9688 x1743
jclutters@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7082725-01
Name: Downstream Side
Alias: Kingsdale Bg. @ Grape CK

Sampled: 08/11/17 17:52
Received: 08/12/17 10:45
Matrix: Solid - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
General Chemistry - PIA							
Solids - total solids (TS)	79	%		08/15/17 14:09	08/15/17 14:34	SAH	SM 2540G*
Total Metals - PIA							
Arsenic	4.1	mg/kg dry		08/15/17 13:33	08/15/17 19:29	SJW	SW 6010
Lead	9.3	mg/kg dry		08/15/17 13:33	08/15/17 19:29	SJW	SW 6010
Zinc	60	mg/kg dry		08/15/17 13:33	08/15/17 19:29	SJW	SW 6010

Sample: 7082725-02
Name: Downstream Side
Alias: CSX R.R. Bg. @ Grape CK

Sampled: 08/11/17 18:05
Received: 08/12/17 10:45
Matrix: Solid - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
General Chemistry - PIA							
Solids - total solids (TS)	81	%		08/15/17 14:09	08/15/17 14:34	SAH	SM 2540G*
Total Metals - PIA							
Arsenic	11	mg/kg dry		08/23/17 09:30	08/24/17 18:33	SJW	SW 6010
Lead	29	mg/kg dry		08/23/17 09:30	08/24/17 18:33	SJW	SW 6010
Zinc	87	mg/kg dry		08/23/17 09:30	08/24/17 18:33	SJW	SW 6010

Sample: 7082725-03
Name: Downstream Side
Alias: King St. Bg. @ Grape CK

Sampled: 08/11/17 18:21
Received: 08/12/17 10:45
Matrix: Solid - Grab

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
General Chemistry - PIA							
Solids - total solids (TS)	80	%		08/15/17 14:09	08/15/17 14:34	SAH	SM 2540G*
Total Metals - PIA							
Arsenic	7.4	mg/kg dry		08/23/17 09:30	08/24/17 19:07	SJW	SW 6010
Lead	140	mg/kg dry		08/23/17 09:30	08/24/17 19:07	SJW	SW 6010
Zinc	1300	mg/kg dry		08/23/17 09:30	08/24/17 19:07	SJW	SW 6010

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

NOTES

Specific method revisions used for analysis are available upon request.

Certifications

CHI - McHenry, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO
USEPA DMR-QA Program

STL - St. Louis, MO
TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
Drinking Water Certifications: Missouri (1050)
Missouri Department of Natural Resources

* Not a TNI accredited analyte

Janet Clutters

Certified by: Janet Clutters, Project Manager

PDC LABORATORIES, INC.
2231 WEST ALTORFER DRIVE
PEORIA, IL 61615

PHONE # 800-752-6651
FAX # 309-692-9689

State where samples collected _____

CHAIN OF CUSTODY RECORD

*ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - **(SAMPLE ACCEPTANCE POLICY ON REVERSE)***

1 CLIENT: Gleisner Engineering
ADDRESS: 327 Fletcher Dr.
CITY STATE ZIP: Danville, IL 61832
CONTACT PERSON: Joseph Gleisner

PROJECT NUMBER: Tilton SW
PHONE NUMBER: (217)213-2022
P.O. NUMBER:
FAX NUMBER:
MEANS SHIPPED:
DATE SHIPPED:
SAMPLER (PLEASE PRINT): Joseph Gleisner
SAMPLER'S SIGNATURE: Joseph J. Gleisner

MATRIX TYPES:
WW-WASTEWATER
DW-DRINKING WATER
GW-GROUND WATER
WWSL-SLUDGE
NAS-SOLID
LCHT-LEACHATE
OTHER: _____

3 ANALYSIS REQUESTED

4 (FOR LAB USE ONLY)
LOGIN # 7082725-3 PM
LOGGED BY: _____
LAB PROJ. # _____
TEMPLATE: _____
PROJ. MGR.: _____

2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT	SW 3051	Arsenic Total SW 6010	Lead Total SW6010	Zinc Total SW6010				REMARKS
19) Downstream side Kingsdale Bg. @ Grape CK	8/11/17	5:52pm	X			2	X	X	X	X				
20) Downstream side CSX R.R. Bg. @ Grape CK	8/11/17	6:05pm	X			2	X	X	X	X				
21) Downstream side King St. Bg. @ Grape CK	8/11/17	6:21pm	X			2	X	X	X	X				

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH
(RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)
RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE E-MAIL
DATE RESULTS NEEDED
FAX # PHONE # EMAIL ADDRESS

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area you allow the lab to proceed with analytical testing regardless of the sample temperature.* _____

7
RELINQUISHED BY: (SIGNATURE) Joseph J. Gleisner — DATE 8/12/17 — TIME 10:45am
RELINQUISHED BY: (SIGNATURE) — DATE — TIME
RELINQUISHED BY: (SIGNATURE) — DATE — TIME

RECEIVED BY: (SIGNATURE) — DATE — TIME
RECEIVED BY: (SIGNATURE) — DATE — TIME
RECEIVED AT LAB BY: (SIGNATURE) — DATE 8/12/17 — TIME 1045

8 COMMENTS: (FOR LAB USE ONLY)
SAMPLE TEMPERATURE UPON RECEIPT _____ °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
PROPER BOTTLES RECEIVED IN GOOD CONDITION Y OR N
BOTTLES FILLED WITH ADEQUATE VOLUME Y OR N
SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS) Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____

Copies: white should accompany samples to PDC Labs. **Yellow copy to be retained by the client.**

PAGE _____ OF _____

C31

GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

RE: OCTOBER 6, 2017 GRAPE CREEK STORM SEWER OUTFALL & PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Storm Structure M1

Look at sample location 22 water pouring out of corrugated metal pipe at the northwest corner of King Street bridge over Grape Creek. Coordinate with Engineer to remove concrete obstructing outflow of discharge end.

Storm Structure T1

Water trickling out of corrugated HDPE pipe at sample location 23 northeast corner of King Street Bridge over Grape Creek

Look Northerly at sample location 24 at the northeast corner of Route 1 and Grape Creek.

Storm Structure R3

Look West from Downstream side of Northern Concrete culvert under Illinois Route 1 at Grape Creek flowing through. This is IDOT's structure.

Storm Structure R3

Look westerly from Downstream side of South End concrete box Culvert under Route 1 at Grape Creek. This is IDOT's structure

Storm Structure R3

Look Westerly into middle concrete box culvert under Illinois Route 1 from Downstream side at Grape Creek. This is IDOT's Structure.

Look southerly at test location 25 stormwater discharging at the southeast corner of Illinois Route 1 and Grape Creek. This is IDOT storm sewer discharge.

Storm Structure Q4

Look Westerly at test location 26 Hodge Street discharge into Herschel Lake. Ensure proper erosion control is planned and implemented on development sites upstream.

Look northeasterly at water retention in parking lot Northeast of Hershel drive and Hodge Street Tilton October 6th

Look at excavation grading near North End of Herschel Lake October 6th

October 19, 2017

Joseph Gleisner
Gleisner Engineering
327 Fletcher Drive
Danville, Il 61832

Dear Joseph Gleisner:

Please find enclosed the analytical results for the sample(s) the laboratory received on **10/6/17 4:30 pm** and logged in under work order **7101424**. All testing is performed according to our current TNI certifications unless otherwise noted. This report cannot be reproduced, except in full, without the written permission of PDC Laboratories, Inc.

If you have any questions regarding your report, please contact your project manager. Quality and timely data is of the utmost importance to us.

PDC Laboratories, Inc. appreciates the opportunity to provide you with analytical expertise. We are always trying to improve our customer service and we welcome you to contact the Vice President , John LaPayne with any feedback you have about your experience with our laboratory.

Sincerely,

Janet Clutters

Project Manager
(309) 692-9688 x1743
jclutters@pdclab.com

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7101424-01
Name: NW CORNER KING ST. BG. @ GRAPE CK
Matrix: Waste Water - Grab

Sampled: 10/06/17 10:17
Received: 10/06/17 16:30

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	40	mg/L		10/13/17 16:50	10/13/17 16:50	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.7	mg/L		10/18/17 09:54	10/18/17 16:51	DNJ	EPA 1664
Solids - total suspended solids (TSS)	< 4.0	mg/L		10/10/17 07:51	10/10/17 10:12	SAH/C	SM 2540D
Total Nitrogen	4.0	mg/L		10/11/17 06:23	10/19/17 09:52	JMD	varies
Microbiology - PIA							
Fecal coliform bacteria	12000	CFU/100 ml		10/06/17 17:00	10/06/17 17:00	HAW	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	2.7	mg/L	Q2	10/09/17 09:15	10/09/17 11:02	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.10	mg/L		10/09/17 08:50	10/11/17 13:05	TTH	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		10/11/17 06:23	10/19/17 09:52	JMD	OIA/PAI-DK03 & EPA 351.2

Sample: 7101424-02
Name: NE CORNER KING ST. BG @ GRAPE CK
Matrix: Waste Water - Grab

Sampled: 10/06/17 10:32
Received: 10/06/17 16:30

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	42	mg/L		10/13/17 17:08	10/13/17 17:08	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.8	mg/L		10/18/17 09:54	10/18/17 16:52	DNJ	EPA 1664
Solids - total suspended solids (TSS)	14	mg/L		10/10/17 07:51	10/10/17 10:12	SAH/C	SM 2540D
Total Nitrogen	2.0	mg/L		10/11/17 06:23	10/19/17 09:53	JMD	varies
Microbiology - PIA							
Fecal coliform bacteria	3100	CFU/100 ml		10/06/17 17:00	10/06/17 17:00	HAW	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	0.54	mg/L		10/09/17 09:15	10/09/17 11:25	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.20	mg/L		10/09/17 08:50	10/11/17 13:05	TTH	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.5	mg/L		10/11/17 06:23	10/19/17 09:53	JMD	OIA/PAI-DK03 & EPA 351.2

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: 7101424-03
Name: NE CORNER IL RT 1 @ GRAPE CK
Matrix: Waste Water - Grab

Sampled: 10/06/17 10:46
Received: 10/06/17 16:30

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	12	mg/L		10/13/17 17:27	10/13/17 17:27	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.3	mg/L		10/18/17 09:54	10/18/17 17:11	DNJ	EPA 1664
Solids - total suspended solids (TSS)	11	mg/L		10/10/17 07:51	10/10/17 10:12	SAH/C	SM 2540D
Total Nitrogen	1.9	mg/L		10/11/17 06:23	10/19/17 09:55	JMD	varies
Microbiology - PIA							
Fecal coliform bacteria	33000	CFU/100 ml		10/06/17 17:00	10/06/17 17:00	HAW	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	0.63	mg/L		10/09/17 09:15	10/09/17 11:26	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.13	mg/L		10/09/17 08:50	10/11/17 13:06	TTH	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.3	mg/L		10/11/17 06:23	10/19/17 09:55	JMD	OIA/PAI-DK03 & EPA 351.2

Sample: 7101424-04
Name: SE CORNER IL RT 1 @ GRAPE CK
Matrix: Waste Water - Grab

Sampled: 10/06/17 10:58
Received: 10/06/17 16:30

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	5.0	mg/L		10/16/17 13:39	10/16/17 13:39	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.3	mg/L		10/18/17 09:54	10/18/17 17:12	DNJ	EPA 1664
Solids - total suspended solids (TSS)	6.0	mg/L		10/10/17 07:53	10/10/17 10:51	SAH	SM 2540D
Total Nitrogen	1.7	mg/L		10/13/17 08:01	10/19/17 10:29	JMD	varies
Microbiology - PIA							
Fecal coliform bacteria	4800	CFU/100 ml		10/06/17 17:00	10/06/17 17:00	HAW	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	0.49	mg/L		10/09/17 09:15	10/09/17 11:27	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.14	mg/L		10/09/17 08:50	10/11/17 13:07	TTH	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	1.2	mg/L		10/13/17 08:01	10/19/17 10:29	JMD	OIA/PAI-DK03 & EPA 351.2

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

ANALYTICAL RESULTS

Sample: **7101424-05**
Name: DISCHARGE HODGE ST. INTO HERSCHEL LK
Matrix: Waste Water - Grab

Sampled: 10/06/17 11:14
Received: 10/06/17 16:30

Parameter	Result	Unit	Qualifier	Prepared	Analyzed	Analyst	Method
Anions - PIA							
Chloride	5.2	mg/L		10/16/17 13:57	10/16/17 13:57	LAM	EPA 300.0
General Chemistry - PIA							
Oil & Grease - total	< 5.8	mg/L		10/18/17 09:54	10/18/17 17:12	DNJ	EPA 1664
Solids - total suspended solids (TSS)	130	mg/L		10/10/17 07:53	10/10/17 10:51	SAH	SM 2540D
Total Nitrogen	< 1.2	mg/L		10/13/17 08:01	10/19/17 10:22	JMD	varies
Microbiology - PIA							
Fecal coliform bacteria	29000	CFU/100 ml		10/06/17 17:00	10/06/17 17:00	HAW	SM 9222D*
Nutrients - PIA							
Nitrate/Nitrite-N	0.21	mg/L		10/09/17 09:15	10/09/17 11:28	ALS	EPA 353.2 - SM 4500-NO3 F - QC 10-107-04-1-C*
Phosphorus - total as P	0.12	mg/L		10/09/17 08:50	10/11/17 13:07	TTH	EPA 365.1 - SM 4500-P B F*
Total Kjeldahl Nitrogen (TKN)	< 1.2	mg/L		10/13/17 08:01	10/19/17 10:22	JMD	OIA/PAI-DK03 & EPA 351.2

PDC Laboratories, Inc.
2231 West Altorfer Drive
Peoria, IL 61615
(800) 752-6651

NOTES

Specific method revisions used for analysis are available upon request.

Certifications

CHI - McHenry, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100279
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17556

PIA - Peoria, IL
TNI Accreditation for Drinking Water, Wastewater, Hazardous and Solid Wastes Fields of Testing through IL EPA Lab No. 100230
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 17553
Wastewater Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)
Hazardous/Solid Waste Certifications: Arkansas (88-0677); Iowa (240); Kansas (E-10338)

SPMO - Springfield, MO
USEPA DMR-QA Program

STL - St. Louis, MO
TNI Accreditation for Wastewater, Hazardous and Solid Wastes Fields of Testing through KS Lab No. E-10389
Illinois Department of Public Health Bacteriological Analysis in Drinking Water Approved Laboratory Registry No. 171050
Drinking Water Certifications: Missouri (1050)
Missouri Department of Natural Resources

* Not a TNI accredited analyte

Qualifiers

Q2 Matrix Spike Duplicate failed % Recovery

Janet Clutters

Certified by: Janet Clutters, Project Manager

PDC LABORATORIES, INC.
2231 WEST ALTORFER DRIVE
PEORIA, IL 61615

PHONE # 800-752-6651
FAX # 309-692-9689

State where samples collected _____

CHAIN OF CUSTODY RECORD

*ALL HIGHLIGHTED AREAS MUST BE COMPLETED BY CLIENT (PLEASE PRINT) - **(SAMPLE ACCEPTANCE POLICY ON REVERSE)***

1 CLIENT	PROJECT NUMBER	P. O. NUMBER	MEANS SHIPPED
Gleisner Engineering	Tilton NPDES MS4		
ADDRESS: 327 Fletcher Dr.	PHONE NUMBER: (217)213-2022	FAX NUMBER	DATE SHIPPED
CITY STATE ZIP: Danville, IL 61832	SAMPLER (PLEASE PRINT): Joseph J. Gleisner		
CONTACT PERSON: Joseph Gleisner	SAMPLER'S SIGNATURE: Joseph J. Gleisner		

MATRIX TYPES:
WW-WASTEWATER
DW-DRINKING WATER
GW-GROUND WATER
WWSL-SLUDGE
NAS-SOLID
LCHT-LEACHATE
OTHER: SW-storm water

2 SAMPLE DESCRIPTION AS YOU WANT ON REPORT	DATE COLLECTED	TIME COLLECTED	SAMPLE TYPE GRAB	SAMPLE TYPE COMP	MATRIX TYPE	BOTTLE COUNT
22) NW Corner King St. Bg. @ Grape CK	10/6/17	10:17am	X		SW	5
23) NE Corner King St. Bg. @ Grape CK		10:32am	X		SW	5
24) NE Corner IL Rt 1 @ Grape CK		10:46am	X		SW	5
25) SE Corner IL Rt 1 @ Grape CK		10:58am	X		SW	5
26) Discharge Hodge St. into Herschel LK		11:14am	X		SW	5

3 ANALYSIS REQUESTED

Chloride by IC EPA 300.0	Fecal Coliform SM 9222D	Phosphate EPA 365.1 SM 4500-PmF	Nitrogen	Oil & Grease SPE EPA 1664	Suspended Solids	
X	X	X	X	X	X	
X	X	X	X	X	X	
X	X	X	X	X	X	
X	X	X	X	X	X	
X	X	X	X	X	X	

4 (FOR LAB USE ONLY)
LOGIN # 7101424-5
LOGGED BY: RM
LAB PROJ. # _____
TEMPLATE: _____
PROJ. MGR.: _____

REMARKS: Morning Rain

5 TURNAROUND TIME REQUESTED (PLEASE CIRCLE) NORMAL RUSH
(RUSH TAT IS SUBJECT TO PDC LABS APPROVAL AND SURCHARGE)
DATE RESULTS NEEDED
RUSH RESULTS VIA (PLEASE CIRCLE) FAX PHONE E-MAIL
FAX # PHONE # EMAIL ADDRESS

6 *The sample temperature will be measured upon receipt at the lab. By initialing this area you request that the lab notify you, before proceeding with analysis, if the sample temperature is outside of the range of 0.1-6.0°C. By not initialing this area you allow the lab to proceed with analytical testing regardless of the sample temperature.* _____

7	DATE	TIME
RELINQUISHED BY: (SIGNATURE) Joseph J. Gleisner	10/6/17	4:30pm
RELINQUISHED BY: (SIGNATURE)		
RELINQUISHED BY: (SIGNATURE)		

RECEIVED BY: (SIGNATURE)	DATE	TIME
RECEIVED BY: (SIGNATURE)		
RECEIVED AT LAB BY: (SIGNATURE)	10/6/17	16:30

8 COMMENTS: (FOR LAB USE ONLY)

SAMPLE TEMPERATURE UPON RECEIPT 21 °C
CHILL PROCESS STARTED PRIOR TO RECEIPT Y OR N
SAMPLE(S) RECEIVED ON ICE Y OR N
PROPER BOTTLES RECEIVED IN GOOD CONDITION Y OR N
BOTTLES FILLED WITH ADEQUATE VOLUME Y OR N
SAMPLES RECEIVED WITHIN HOLD TIME(S) (EXCLUDES TYPICAL FIELD PARAMETERS) Y OR N
DATE AND TIME TAKEN FROM SAMPLE BOTTLE _____

Copies: white should accompany samples to PDC Labs. **Yellow copy to be retained by the client.**

PAGE _____ OF _____

C43

Expected Levels

Standards for fecal coliform differ from state to state. For specific requirements, it is best to contact your state or regional health department. Standards for fecal coliform are considerably more strict if the water is used for total body contact such as swimming, rather than used only for boating with minimal direct contact.

When interpreting data from fecal coliform tests, it is important to remember that there can be a high degree of randomness of distribution within a sample. A large number of data points are necessary to obtain statistically significant data. Fecal coliform is measured in *colony forming units* per 100 mL, CFU/100 mL, of water tested.

Table 1[1]

Water use	Desired level (CFU/100mL)	Permissible level (CFU/100mL)
drinking	0	0
swimming	<200	<1,000
boating or fishing	<1,000	<5,000

Summary of Method

This test uses the membrane filtration technique to measure quantity of fecal coliform bacteria present in a water sample. Samples are obtained from a water source, such as a river or stream, using Whirlpak containers. Water is then filtered through sterile 47 mm filters. The filters are placed in petri dishes containing mFC broth and incubated for a period of 24 hours at 44.5°C. Following incubation, the petri dishes are removed from the incubator and each dish is counted for fecal coliform colonies.

[1] CFU values in this chart were obtained from the LaMotte Company's "*The Monitor Handbook.*" These values are meant to be used as guidelines. Consult your local or state health department or your regional USEPA or USGS office for specific values for your region.

Benchmark limits developed by EPA

The "benchmarks" are the pollutant concentrations above which EPA determined represent a level of concern. The level of concern is a concentration at which a storm water discharge could potentially impair, or contribute to impairing, water quality or affect human health from ingestion of water of fish. The "benchmarks" are also viewed by EPA as a level that, if below, a facility presents little potential for water quality concern. As such, the benchmarks also provide an appropriate level to determine whether a facility's storm water pollution prevention measures are successfully implemented. The benchmark concentrations are not effluent limitations and should not be interpreted or adopted as such. These values are merely levels which EPA has used to determine if a storm water discharge from any given facility merits further monitoring to ensure that the facility has been successful in implementing SWPPP. As such these levels represent a target concentration for a facility to achieve through implementation of pollution prevention measures at the facility. Table 3 lists the parameter benchmark values and the sources used for the benchmarks.

Table 3.--Parameter Benchmark Values

Parameter name	Benchmark level	Source
Biochemical Oxygen Demand (5 day)	30 mg/L	4
Chemical Oxygen Demand	120 mg/L	5
Total Suspended Solids	100 mg/L	7
Oil and Grease	15 mg/L	8
Nitrate + Nitrite Nitrogen	0.68 mg/L	7
Total Phosphorus	2.0 mg/L	6
pH	6.0-9.0 s.u.	4
Acrylonitrile (c)	7.55 mg/L	2
Aluminum, Total (pH 6.5-9)	0.75 mg/L	1
Ammonia	19 mg/L	1
Antimony, Total	0.636 mg/L	9
Arsenic, Total (c)	0.16854 mg/L	9
Benzene	0.01 mg/L	10
Beryllium, Total (c)	0.13 mg/L	2
Butylbenzyl Phthalate	3 mg/L	3
Cadmium, Total (H)	0.0159 mg/L	9
Chloride	860 mg/L	1
Copper, Total (H)	0.0636 mg/L	9
Cyanide, Total	0.0636 mg/l	9
Dimethyl Phthalate	1.0 mg/L	11
Ethylbenzene	3.1 mg/L	3
Fluoranthene	0.042 mg/L	3
Fluoride	1.8 mg/L	6
Iron, Total	1.0 mg/L	12
Lead, Total (H)	0.0816 mg/L	1
Magnesium, Total	0.0636 mg/l	9
Manganese	1.0 mg/L	13
Mercury, Total	0.0024 mg/L	1
Nickel, Total (H)	1.417 mg/L	1
PCB-1016 (c)	0.000127 mg/L	9 0.127ug/L
PCB-1221 (c)	0.10 mg/L	10 100ug/L
PCB-1232 (c)	0.000318 mg/L	9 0.318ug/L
PCB-1242 (c)	0.00020 mg/L	10 0.2ug/L
PCB-1248 (c)	0.002544 mg/L	9 2.55ug/L
PCB-1254 (c)	0.10 mg/L	10 100ug/L
PCB-1260 (c)	0.000477 mg/L	9 0.477ug/L
Phenols, Total	1.0 mg/L	11
Pyrene (PAH,c)	0.01 mg/L	10
Selenium, Total (*)	0.2385 mg/L	9
Silver, Total (H)	0.0318 mg/L	9
Toluene	10.0 mg/L	3
Trichloroethylene (c)	0.0027 mg/L	3
Zinc, Total (H)	0.117 mg/L	1

Sources:

1. ``EPA Recommended Ambient Water Quality Criteria.'' Acute Aquatic Life Freshwater.
2. ``EPA Recommended Ambient Water Quality Criteria.'' LOEL Acute Freshwater.
3. ``EPA Recommended Ambient Water Quality Criteria.'' Human Health Criteria for Consumption of Water and Organisms.
4. Secondary Treatment Regulations (40 CFR 133).
5. Factor of 4 times BOD5 concentration--North Carolina benchmark.
6. North Carolina storm water benchmark derived from NC Water Quality Standards.
7. National Urban Runoff Program (NURP) median concentration.
8. Median concentration of Storm Water Effluent Limitation Guideline (40 CFR Part 419).
9. Minimum Level (ML) based upon highest Method Detection Limit (MDL) times a factor of 3.18.
10. Laboratory derived Minimum Level (ML).
11. Discharge limitations and compliance data.
12. ``EPA Recommended Ambient Water Quality Criteria.'' Chronic Aquatic Life Freshwater.
13. Colorado--Chronic Aquatic Life Freshwater--Water Quality Criteria.

Notes:

(*) Limit established for oil and gas exploration and production facilities only.
(c) carcinogen.
(H) hardness dependent.
(PAH) Polynuclear Aromatic Hydrocarbon.

Assumptions:

Receiving water temperature -20 C.
Receiving water pH -7.8.
Receiving water hardness CaCO3 100 mg/L.
Receiving water salinity 20 g/kg
Acute to Chronic Ratio (ACR) -10.

Section 742.APPENDIX A General

Section 742.TABLE G Concentrations of Inorganic Chemicals in Background Soils

Chemical Name	Counties Within Metropolitan Statistical Areas (mg/kg)	Counties Outside Metropolitan Statistical Areas (mg/kg)
Aluminum	9,500	9,200
Antimony	4.0	3.3
Arsenic	13.0	11.3
Barium	110	122
Beryllium	0.59	0.56
Cadmium	0.6	0.50
Calcium	9,300	5,525
Chromium	16.2	13.0
Cobalt	8.9	8.9
Copper	19.6	12.0
Cyanide	0.51	0.50
Iron	15,900	15,000
Lead	36.0	20.9
Magnesium	4,820	2,700
Manganese	636	630
Mercury	0.06	0.05
Nickel	18.0	13.0
Potassium	1,268	1,100
Selenium	0.48	0.37
Silver	0.55	0.50
Sodium	130	130.0
Sulfate	85.5	110
Sulfide	3.1	2.9
Thallium	0.32	0.42
Vanadium	25.2	25.0
Zinc	95.0	60.2

BOARD NOTE: Counties within Metropolitan Statistical Areas: Boone, Champaign, Clinton, Cook, DuPage, Grundy, Henry, Jersey, Kane, Kankakee, Kendall, Lake, Macon, Madison, McHenry, McLean, Menard, Monroe, Peoria, Rock Island, Sangamon, St. Clair, Tazewell, Will, Winnebago and Woodford.

GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

August 13, 2017

RE: AUGUST 13, 2017 VERMILION RIVER PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look southeasterly from Upstream toward Downstream at Tilton Arch Railroad Bridge over the Vermilion River August 13th

Look from Downstream towards Upstream side of Tilton Arch Railroad Bridge over Vermilion River August 13th

Look south-easterly at Village of Tilton wastewater treatment plant discharging treated water steady into Vermilion River August 13th

Look southeasterly toward Illinois Route 1 Bridge over Vermilion River August 13th

Look downstream along Vermilion River at Low Head dam downstream of Tilton August 13th

Look from the downstream side of Vermilion River Dam at water pouring over crevice in Dam during low-flow season instead of through the fish ladder

Look from the west side at Dam on Vermilion River water pouring over opposite side of fish ladder during low season September 4th 2017

GLEISNER ENGINEERING

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August 16, 2017

RE: AUGUST 16 & 25th, 2017 GRAPE CREEK STORM SEWER OUTFALL & PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look easterly at foundation demolition concrete placed to stabilize erosion at bend on Grape Creek downstream of Keegan St

Look south at Keegan St bridge along Grape Creek Aug 16th

Look at Pond Side of breached damn Herschel Lake August 25th 2017

GLEISNER ENGINEERING

217-213-2022
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RE: JANUARY 22, 2018 GRAPE CREEK STORM SEWER OUTFALL & PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look Northerly at Herschel Lake from Bluff

Storm Structure Q2

Look Southeast early at recently placed riprap and inlet screen on pipe through Herschel Lake dam. Pile driven to hold screen

Storm Structure Q1

Look southeasterly at outfall of Herschel Lake into Grape Creek

Look North from East Ross Lane Bridge over Grape Creek at cattle guard with debris caught in it. Coordinate with engineer and property owner to regularly clear debris and reinstall cattle guard. Regularly use pool leaf rake screen with telescoping pole to safely remove and dispose of trash and scum from stream.

GLEISNER ENGINEERING

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RE: JANUARY 22, 2018 VERMILION RIVER STORM SEWER OUTFALL & PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Storm Structure A3

Look East at bar rack under railroad spur to General Motors site north of East 1st Street. Clear bar rack of debris regularly.

Look Southeast at intersection of railroad spurs drain and discharge from East 1st Street near 74 ramps

Storm Structure A4

Look at 42 inch concrete discharge at the northeast corner of East 1st Street

Storm Structure A71

Look southerly at discharge east of F Street at north side of alley between E. 2nd and E. 3rd Streets

Storm Structure A60

Look West at discharge on the east end of E. 3rd Street east of N. F Street. Coordinate with the engineer and consider erosion control improvement at discharge.

Storm Structure U1

Look at discharge on 14th Street West of Hodge Street across from Lynch fire station

Storm Structure B1

Look southerly at steel pipe under McVey Street. Inside of pipe collapsed. Coordinate with engineer to mitigate condition.

Storm Structure B3

Look at outfall from under I-74 towards ravine east of Tilton ball field area

Look at erosion at end of concrete lined swale near IDOT I 74 Right-of-Way near ball fields. Communicate with IDOT to remove tire then coordinate with Engineer to stabilize erosion.

GLEISNER ENGINEERING

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RE: JANUARY 30, 2018 GRAPE CREEK INSPECTION PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Storm Structure R4

Look easterly at Upstream side of triple barrel box culvert at Illinois Route 1 and Grape Creek. Coordinate with IDOT to clear debris obstructing flow. Communicate with adjacent property owners to regularly police ground to remove loose trash and contain.

Look from King Street towards Downstream at Grape Creek. Communicate with adjacent property owner and remove fallen tree trunk from riverbed and dispose of off-site.

Look Westerly from Washington Street Bridge toward Upstream of Grape Creek

Look easterly at tree and limb debris on lot near northeast corner of Jefferson and Grape Creek. Coordinate with engineer to dispose of debris out of floodplain prior to flooding.

Look east from Jefferson Street pedestrian bridge. Saw tree stumps flush with bank on the Southeast corner of bridge and Creek. Leave root system.

Look Westerly from Jefferson Street pedestrian bridge upstream towards bank riprap stabilization along the bend of Grape Creek

Look northerly from Keegan Street Bridge toward Downstream of Grape Creek where Bank debris build-up was previously removed and riprap placed on Bend. Establish turf and/or erosion control on along west bank.

Look East at retaining wall failure near the north east corner of Keegan Street bridge over Grape Creek

Look down stream easterly at fallen tree trunk and Limbs debris on the North Bank of Grape Creek west of the dead end of Monroe Street. Obtain permission from property owner then remove dead limb tree trunk debris from floodplain in dispose of outside flood area.

Storm Structure R12

Look easterly toward downstream at upstream side of CSX Bridge at Grape Creek vegetation built up. Obtain permission from CSX railroad then use pool screen rakes or other safe devices to remove trash and scum from stream regularly.

Storm Structure R14

Look toward East Downstream at Kingsdale bridge over Grape Creek

Storm Structure R15

Look southerly toward downstream side of double barrel box culvert on West Ross Lane

Storm Structure R16

Look northerly at the at double barrel concrete box Culvert on West Ross Lane February 1st

Look southerly at Grape Creek from box culvert on West Ross Lane

GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

RE: JANUARY 30, 2018 GRAPE CREEK UPSTREAM OF TILTON INSPECTION PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look from upstream side of eastern corrugated metal culvert under Norfolk Southern Railroad north of west end of West Ross Lane at Grape Creek

Look from upstream side of corrugated metal culvert at the West Culvert under Norfolk Southern Railroad north of west end of West Ross Lane at Grape Creek

Look southerly from upstream towards downstream at eastern culvert under Norfolk Southern Railroad

Look southerly through western culvert under Norfolk Southern Railroad toward downstream

Look northwesterly at steel culvert at farm crossing on Grape Creek upstream of west end of West Ross Lane

Look northerly at beaver dam upstream of bridge railroad upstream of Grape Creek

Look down at beaver dam on Grape Creek at upstream CSX railroad of arch bridge

Look westerly downstream towards upstream at concrete arch bridge culvert at CSX railroad and Grape Creek. Beaver dam is visible on upstream side of bridge.

Water leaching from embankment southeast abutment could be due to water elevation from beaver dam upstream of concrete bridge. Communicate with railroad to investigate.Consider methods to lower water elevation though do not release sludge or sediment.

Look westerly at upstream side of culvert ends on the east side of Coultas Auto Salvage facility

Look easterly northside of witty radio station at drainage swale and culvert crossing

Look westerly at culvert crossing abandon railroad right away embankment between Coultas Auto Salvage & W I T Y radio station

Look northernly at swale discharge along North 5th Street from Spelter Avenue upstream of Tilton

Look easterly at concrete discharge from IDOT's Illinois Route 1 north of Spelter Avenue. Communication with IDOT to ensure Illinois Route 1 Right-of-Way through Tilton is regularly policed for loose trash removal. Inspect solid waste transport equipment along road and ensure dumpsters cantain trash.

GLEISNER ENGINEERING

Phone: 217-213-2022
e-mail: josephgleisner@att.net

OBSERVATION REPORT

PROJECT: **Debris (Sediment) Removal & Disposal, Grape Creek Infrastructure Improvements Associated With Flood Control, Washington Street Bridge, Village of Tilton, IL Department of Commerce & Economic Opportunity funds # 12-203094**

REPORT DATE: **June 8, 2017**

WEATHER: Sunny 58-70 degrees morning

WORKFORCE: **Thomas Excavation:** two equipment operators

REPORTED BY: Joseph J. Gleisner, P.E.

OBSERVATIONS & DISCUSSIONS

1. Gleisner on-site near 7:30am.
2. Thomas Excavation had two operators equipped with single axil dump truck & backhoe on easement prepared for excavation.
3. 4 truckloads or near 25 cubic yards of sediment excavated within inches of concrete bank on the upstream northerly side of Washington Avenue Bridge over Grape Creek and hauled to deactivate sewage disposal lagoon and dumped on bank to dry for future grading. Deactivated lagoon void located near cemetery along Songer Cemetery Road.
4. Gleisner asked Thomas if he was aware of the June 5$^{th, 2017}$ IL Vermilion County wage sheets. Thomas submitted certified payroll and billing statement to Gleisner for review thence Tilton for payment processing with DECO Grant Funds.

END OF OBSERVATION REPORT (Attached: **Photo Images by JJG**)

Copies: **Distributed to Mayor David Phillips of Tilton, AJ Wright of Danville Township, Mickey Harris of IL DECO, NPDES MS 4 annual report; Joseph Thomas Excavating, Inc.**

Look westerly at backhoe operator removing sediment build upstream of Washington Avenue Bridge along Grape Creek north concrete bank

Look southeasterly at backhoe operator loading dump truck with sediment upstream of Washington Avenue Bridge at Grape Creek

Look westerly at ton truck dumping sediment on top of bank at deactivated Sludge Lagoon void from previous sewage treatment plant now reported to Tilton

Look easterly at backhoe removing sediment obstructing Tilton drainage along Grape Creek upstream of Washington Avenue Bridge

Look westerly from Washington Avenue Bridge over Grape Creek after 25 cubic yards sediment removed from northern bank

Look easterly along Grape Creek Upstream of Washington Avenue Bridge where 25 cubic yards sediment removed along northern concrete bank

General view northeasterly at deactivated sludge lagoon where 4 loads or near 25 cubic yards of sediment dumped on bank for future grading

GLEISNER ENGINEERING

217-213-2022
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RE: FEBRUARY 15, 2018 PUBLIC WORKS FACILITY PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look at barrels and oil containment also chemical shelving in Tilton Public Works garage

Look at chemical barrel stockpile in Tilton Public Works garage

Look at dump truck equipped with snow and ice control plow and spreader in Tilton wash down equipment bay

Look on the Northside of Village Public Works garage at rubber tire stockpile and garbage container

Look at fuel tank in dispenser area near Public Works facility in Tilton

Look North East early at Village sweeping and aggregates stockpile area include recycle steel pieces

Look Westerly at Village salt shed door opening

GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

RE: FEBRUARY 15, 2018 WEST END TILTON UPSTREAM OF VERMILION RIVER PHOTOGRAPHIC REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look westerly at North ditch along Catlin Tilton Road West of animal shelter. Communicate in coordinate to apply seed to ditch and establish turf and prevent erosion.

Look northerly at drainage Swale west of animal shelter near agricultural land. Communicate with land owner to ensure erosion is controlled and better investigate and barricade and repair sinkholes possibly due to failed drainage pipe below grade

Look southwesterly at dumpster on Vermilion County Animal Shelter property. Communicate and coordinate with shelter staff and waste Handler to ensure waste is picked up and contained in container and Lids are closed.

Look at sinkholes along drainage way west of Vermilion County Animal Shelter. Barricade sinkholes, communicate with a property owner to inspect drainage tile and repair tile and mitigate sinkholes

Look northerly at upstream side of culvert west of Vermilion County Animal shelter. Remove garbage repair sinkholes and improve erosion in a manner that allows regular inspection and eliminate hazards.

Look southerly at the downstream side of covert under Farm excess crossing west of animal shelter

Look easterly at concrete headwall and storm sewer discharge between deactivated Vo-Tech sewer treatment plant and expansion of Songer Cemetery

Look Northerly at the upstream side of concrete box Culvert under Songer Cemetery Road

Look southerly at concrete box Culvert Downstream side under Songer Cemetery Road. Ice on ponding water at downstream side

Village of Tilton Street Sweeping Log

Sweeper

Location	Driver	Date	Status
G ST, 5TH ST, 14TH ST, ROSSLANE	DOUG	5-11-17	✓
L ST, SOUTH GATE, KING ST	DOUG	5-11-17	✓
(SAME AS ABOVE)	TJ	5-29-17	✓
" "	TJ	5-29-17	✓
G ST, 5TH ST 14TH ST L ST	TJ	6-13-17	✓
ROSSLANE, CATLIN TILTON RD	TJ	7-7-17	✓
SOUTH GATE KING ST	TJ	7-7-17	✓
(SAME AS ABOVE DATE)	DOUG	7-25-17	✓
SOUTH GATE, ROSSLANE	DOUG	8-17-17	✓
14TH ST, 5TH ST.	DOUG	9-7-17	✓
G ST, CATLIN-TILTON RD.,	TJ	9-28-17	✓
L ST, 5TH ST., 14TH ST	TJ	9-28-17	✓
G ST, 5TH ST, 14TH, ROSSLANE	DOUG	10-12-17	✓
L ST, SOUTH GATE, KING ST.	DOUG	10-12-17	✓
"SAME AS ABOVE"	DOUG	11-2-17	✓
CATLIN TILTON RD, 14TH	DOUG	1-23-18	✓
SOUTH GATE	DOUG	1-23-18	✓
5TH, 14TH, L ST, ROSSLANE	DOUG	2-28-18	✓
KING ST, SOUTH GATE	DOUG	2-28-18	✓

Notes:

2017 - 2018

GLEISNER ENGINEERING

217-213-2022
josephgleisner@att.net

RE: 2017 / 2018 SOLID WASTE PHOTOGRAPHIC INSPECTION REPORT, MONITORING OF SMALL MUNICIPAL SEPARATE STORM SEWER (MS4), VILLAGE OF TILTON, ILLINOIS

Look at solid waste collection equipment loading waste from container into transport vehicle on auto maintenance facility lot Upstream of Southgate Drive. Contain all solid waste!

Look Southwest at dumpster at gas station along Route 1 May 1st 2017. Dumpster lids do not appear to be sealing to properly contain solid waste and prevent rain from mixing with solid waste and spilling. Contain solid waste and prevent mixing of storm water with waste!

Look at rear loading truck collecting Solid Waste along Kingsdale Avenue the three man crew contains all waste. Safely contain all solid waste!

ATTACHMENT D

Annual Facility Inspection Report
MS4 PHASE 2 NPDES Permit No. IL400664
Village of Tilton, Illinois
(Reporting Period March 2017/2018)

PROPOSED 2018/2019 MS4 PHASE 2 NPDES STORM WATER ACTIVITY SUMMARY

BMP #	BMP	Category	Description	Proposed Activity
A	Public education and outreach	A.1	Distributed paper material	Distribute public education material and make available at Village Hall and post on Village Storm Water Management website for interested public.
		A.5	Classroom education materials	Distribute public education and outreach material to interest public & schools.
		A.6	Other Public Education	Conduct public meeting/training for Village Staff, contractors, trustees, school officials and public regarding Village MS4 Best Management Practices, discharge outfall monitoring, Environmental Justice and Village Erosion Control and Storm Water Ordinances. Continue regular communication with public regarding Pollution prevention and clean-up.
B	Public participation\involvement	B.2	Educational volunteer	Provide education materials to local schools to raise awareness on types of green infrastructure and how it benefits in reducing such pollution.
		B.7	Other public involvement	Distribution of EPA flyers and Village intends to post education material and flyers on website. Review Environmental Justice at meetings and continue reach out to adjacent drainage area responsible personnel.
C	Illicit discharge detection and elimination	C.1	Sewer map preparation Update	Update digital storm and sanitary sewer facilities on map of Village facilities on Drainage Map including numbering of manholes and drainage outfall strucrtures also washdown facilities. Print hard copy and post at Village Public Works facility. Village document sewer smoking progress on map & record video inspections for filing.
		C.3	Detection/Elimination Prioritization Plan	Continue to further inspect of solid waste transportation equipment mobilizing through Village jurisdiction to identify sources of storm water pollution and contain waste from polluting. Village smoke and video inspect prioritized sewer areas.
		C.7	Visual dry weather screening	Preform observation/screening/monitoring of storm sewer outlets along Grape Creek and Vermilion River.
		C.10	Illicit Discharge Controls	Continue review of mapping for potential areas to detain and treat water run-off from major fires.
D	Construction site runoff control	D.2	Erosion and Sediment Control BMPs	Implement Village Erosion and Sediment Control Ordinances into construction projects. Remove sediment build-up along Grape Creek.
		D.7	Other Construction Site Run-off Controls	Review Village Erosion, Sediment Control and Storm Water Ordinance. Consider improvements.

ATTACHMENT D
Annual Facility Inspection Report
MS4 PHASE 2 NPDES Permit No. IL400664
Village of Tilton, Illinois
(Reporting Period March 2017/2018)

PROPOSED 2018/2019 MS4 PHASE 2 NPDES STORM WATER ACTIVITY SUMMARY (continued)

BMP #	BMP	Category	Description	Proposed Activity
E	Post-Construction runoff control (continue)	E.4	Pre-Construction Review of BMP Design	Inspection of erosion and sediment control measures are being conducted by the Village officials and consulting engineers at pre and post-construction stages of the construction projects within the Village.
		E.6	Post-Construction Inspections	Village and consulting engineer perform post-construction visual observation of construction sites regarding Storm Water Management BMPs.
		E.7	Other Post-Construction Run-off Controls	Conduct Annual Training for Village Staff & Contractors on low impact design techniques.
F	Pollution Prevention/ Good Housekeeping	F.1	Employee Training Program	Continue training for Village public works personnel regarding proper street sweeping operations, sewer video inspection & location operations and debris disposal also snow and ice control operations. General equipment operations and maintenance.
		F.2	Inspection and Maintenance Program	Inspect inlet and outlet drainage facilities within Village thence remove debris and address erosion. Continue to sweep streets, manage road maintenance material and document progress. Video inspect sewer piping & perform sewer smoking. <u>List of maintenance:</u> 1) Remove discharge obstruction at northwest corner King St Bridge & Grape Creek 2) Video & smoke inspect sewers near Keegan St & Grape Creek then prepare improvement plans, estimates, specifications. 3) Survey, plan, specify and estimate then implement erosion mitigation at discharge of Southgate Dr storm sewer into Grape Creek. 4) Video inspect culvert under McVey Ave then prepare plans, specification and estimate to implement improvement. 5) Survey, plan, specify and estimate then implement improvements for access to maintain bar racks near discharge at northwest bend of West 1rst. 6) Video inspect drain pipes near sink holes that exist west of county animal shelter. 7) Communicate to prepare plan, specifications and estimates to regularly clear & dispose of debris on cattle guard strung across Grape Creek at East Ross Lane. 8) Communicate with IDOT for clearing vegitation, stabilizing erosion and repairing fence at discharge near baseball fields and I74 9) Communicate with IDOT to inspect all drainage facilitie of I74 and IL Rt 1 through village are flowing at engineere capacity.
		F.3	Municipal Operations Storm Water Control	Perform visual inspection of streams within Village jurisdiction for accumulated debris or erosion.
		F.4	Municipal Operation Waste Disposal	Improve operational plans to separate debris from stream, drainage system and various public works clean-ups into recyclables, landscape waste and garbage.

				Dispose or recycle materials in manner avoiding storm water pollution.

PROPOSED 2018/2019 MS4 PHASE 2 NPDES STORM WATER ACTIVITY SUMMARY (continued)

BMP #	BMP	Category	Description	Proposed Activity
		F.4		remove debris build-up obstructing or potentially restricting channel and/or bridges. Address erosion along creek allowing water to flow consistently and naturally through Village in manner minimizing flooding potential.
		F.6	Other Municipal Operation Controls	Inspect and estimate capacity of drainage facilities immediately upstream of Village and plot on digital map.

ATTACHMENT D
Annual Facility Inspection Report
MS4 PHASE 2 NPDES Permit No. IL400664
Village of Tilton, Illinois
(Reporting Period March 2017/2018)

TENTATIVE LIST OF 2018/2019 CONSTRUCTION & MAINTENANCE PROJECTS

Project	Item #	Item	Status
GRAPE CREEK IMPROVEMENTS	I	TREE & DEBRIS REMOVAL AND EROSION MITIGATION	PROPOSED FOR 2018 SPRING & SUMMER IMPLEMENTATION
KEEGAN STREET STORM SEWER	II	DRAINAGE IMPROVEMENT	VIDEO INSPECT STORM & SMOKE SANITARY PREPARE PLAN, SPECIFICATION AND COST ESTIMATE SUMMER 2018
EAST 1rst STREET CHANNEL CLEARING	III	DEBRIS REMOVAL, GRADING & DRAINAGE MAINTENANCE	CURRENTLY BEING IMPROVED, FURTHER INSPECTIONS & ENGINEERING SUMMER & FALL 2018
McVEY STREET CULVERT	IV	INSPECT & MITIGATE CULVERT CONDITIONS	VIDEO INSPECT, PREPARE PLAN, SPECIFICATION & COST ESTIMATE THEN IMPLEMENT IMPROVEMENT
SOUTHGATE STORM SEWER	V	DISCHARGE EROSION MITIGATION	SURVEY, PREPARE PLAN, SPECIFICAITON & ESTIMATE THEN IMPLEMENT IMPROVEMENT SUMMER FALL 2018
VOTEC TREATMENT PLANT DEACTIVATION SITE GRADING	VI	DEMOLITION & SITE GRADING	ELIMINATE HAZARDS AND GRADE SITE
1rst, LANE, SOUTHGATE STREETS EXCAVATIONS, GRADING & PAVEING	VII	DRAINAGE, GRADING & PAVING	CONSTRUCTION SUMMER & FALL 2018
WEST 1rst STREET STORM SEWER	VIII	IMPROVE MAINTENANCE ACCESS	COMMUNICATION, PLAN, SPECIFICATIONS & ESTIMATE SUMMER 2018

PUBLIC OUTREACH/EDUCATION MATERIALS

No.	Title	Published	Publication No.	Remarks
1	"After the Storm: Storm Water Pollution'	USEPA	EPA833-B-03-002	Copy Attached
2	Clean Water - 10 Things You Can Do to Prevent Stormwater Runoff Pollution"	USEPA	-	Copy Attached
3	"Stormwater and the Construction Industries"	USEPA	-	Copy Attached
4	"Make you home the Solution to Stormwater Pollution"	USEPA	EPA883-B-03003	Copy Attached
5	"Water-Efficient Landscaping: Preventing Pollution & Using Resources Wisely"	USEPA	EPA832-F-02-002	Copy Attached
6	"Pick Up After Your Pet"	MARC		Copy Attached

ATTACHMENT

E

SECTION DIVIDER

Subject:	Re: Public Education Outreach Regarding Tilton, IL Storm Water Pollution Prevention Program
From:	Joseph Gleisner (josephgleisner@att.net)
To:	HartJ@danville118.org;
Cc:	dphillips@tiltonil.com;
Bcc:	tjones@tiltonil.com;
Date:	Thursday, February 22, 2018 1:46 PM

Mr. John Hart
Danville District 118 School

Thank You for the district material review and e-mailed response. I intend to include your statement that existing curriculum covers topics of storm water pollution prevention in EPA required future Tilton Annual Reports. I'm currently labeling drainage facilities on Gleisner Engineering's comprehensive drainage map of the region school district 118 is within. In the future, I'd like to further discuss with the school district, what grade levels could potentially be appropriate for the stencil contest(s) that I mentioned during our previous phone conversations. These stencils might be utilized for permanently tag marking drainage facilities in the field on the actual visible surfaces corresponding to map. Flyer is attached with regard to a Public Meeting scheduled for Wed. Feb. 28th at 6pm to discuss the status of Tilton's Storm Water Management Program; in case a school district representative is available to attend. If rain fall storm events made issues with district 118 facilities drainage conveyance apparent; this is opportune for the school district to discuss concerns with Tilton in addition learning of various drainage inspection and test results. Gleisner Engineering is licensed to prepare required plans, specifications and cost

estimates also to execute construction of drainage and other engineering improvements should your need arise.

I appreciate district communication regarding the pollution prevention outreach measures .

Respectfully Submitted,

Joseph J. Gleisner, P.E.
Gleisner Engineering
217-213-2022
josephgleisner@att.net

On Thursday, February 22, 2018 11:04 AM, John P. Hart <HartJ@danville118.org> wrote:

Good morning, Mr. Gleisner:

I have shared the documents on storm water and pollution with the Southwest Principal, the South View Principal and the district Director of Curriculum. We have examined the materials and analyzed their use in our current science curriculum. Unfortunately, we

believe that the materials you provided would be too difficult for our elementary students. Please know that we have thoroughly reviewed our elementary curriculum and you can rest assure that the topics provided in your materials are covered in our schools.

Respectfully,

John

John Paul Hart, Ed.S.
Assistant Superintendent of Elementary Education
Danville School District No. 118
217-444-1023

From: Joseph Gleisner [mailto:josephgleisner@att.net]
Sent: Friday, January 26, 2018 2:58 PM
To: John P. Hart <HartJ@danville118.org>
Cc: Lakesha D. Robinson <RobinsonL1@danville118.org>
Subject: Fw: Public Education Outreach Regarding Tilton, IL Storm Water Pollution Prevention Program

Joseph J. Gleisner, P.E.
Gleisner Engineering
217-213-2022
josephgleisner@att.net

On Thursday, January 25, 2018 4:49 PM, Joseph Gleisner <josephgleisner@att.net> wrote:

E4

John, per our conversation this afternoon, attached should be the e-mail and attachment information I sent last year. I'm requesting an update of the status of the outreach within the schools in the Tilton area regarding storm water pollution prevention?

Thanks for returning my call,

Joseph J. Gleisner, P.E.
Gleisner Engineering
217-213-2022
josephgleisner@att.net

On Monday, February 20, 2017 12:19 PM, Joseph Gleisner <josephgleisner@att.net> wrote:

Mr. John Hart
District 118 Schools

Per our conversation Thursday afternoon attached are outreach printable materials and web links regarding storm water pollution prevention. Please review these and consider for tools to further educate Tilton area students with regard to storm water & pollution prevention.

List of PDF Attachments of materials:
After the Storm
Clean Water + 10 Things You Can Do
Make Your Home the Solution To Pollution
Storm Water and the Construction Industry
Water Efficient Landscape to Prevent Pollution

also ***web links to Climate Change, Tilton's Storm Water Management site also EPA Environmental Justice:***

Climate Change: Basic Information | Climate Change | US EPA

Climate Change: Basic Information | Climate Change | US EPA

By US EPA,OAR,OAP,CCD

STORM WATER MANAGEMENT

STORM WATER MANAGEMENT

E5

By Administrator
Tilton, Illinois - the official site for the village of Tilton, Illinois

Environmental Justice | US EPA

Environmental Justice | US EPA

By US EPA,OA

I've attached a flyer regarding Tilton's Public meeting to discuss topics on Tilton's drainage program Feb. 22, 2017 at 6:30pm. Please review and contact me to discuss.

Respectfully Submitted,

Joseph J. Gleisner, P.E.
Gleisner Engineering
217-213-2022
josephgleisner@att.net

Attachments

- Tilton NPDES MS4 2018 Public Meeting Notice.pdf (475.63KB)

E6

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DANVILLE IL 61832

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Total STD7 17.00
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Rate: NGLG — Cost: 18.74
Affidavits: 1

Contact: JOE GLEISNER
Phone:
Fax#:
Email: josephgleisner@att.net
Agency:

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Given by: *
Created: pkill 02/20/18 09:19
Last Changed: pkill 02/20/18 09:21

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AUTHORIZATION

Under this agreement rates are subject to change with 30 days notice. In the event of a cancellation before schedule completion, I understand that the rate charged will be based upon the rate for the number of insertions used.

_____ Name (print or type)

_____ Name (signature)

.

PUBLIC NOTICE
A public outreach meeting for Tilton's Storm Water Management Program is Wednesday; February 28, 2018; 6:00 pm at Village Hall, 1001 Tilton Road, Tilton, Illinois 61833.
Topics included: pollution prevention, drainage inspection review, website summary, management practices & environmental justice.

1374892 02/21

PUBLIC INPUT, EDUCATION AND OUTREACH MEETING REGARDING VILLAGE OF TILTON STORM WATER MANAGEMENT PROGRAM

A public meeting is scheduled for Wednesday; February 28, 2018 at 6:00 pm at the Village Hall, 1001 Tilton Road, Tilton, Illinois 61833.

Topics of Discussion included:

- **Status of Tilton's National Pollution Discharge Elimination System Separate Storm Sewer System**
- **Village Storm Water Management website**
- **Review Annual Inspection Photographic Documentation**
- **Review Storm Water Pollution Prevention Management Practices**
- **Environmental Justice**

APPENDIX

SECTION DIVIDER

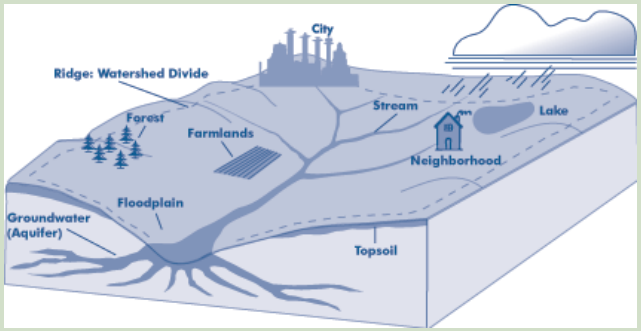
What is a Watershed?

A watershed is an area of land that drains to a common point, such as a nearby creek, stream, river or lake. Every small watershed drains to a larger watershed that eventually flows to the ocean.

Watersheds support a wide variety of plants and wildlife and provide many outdoor recreation opportunities. By protecting the health of our watersheds we can preserve and enhance the quality of life for Kansas City area residents.

What is Stormwater Runoff?
Stormwater is water from rain or melting snow. It flows from rooftops, over paved streets, sidewalks and parking lots, across bare soil, and through lawns and storm drains. As it flows, runoff collects and transports soil, pet waste, salt, pesticides, fertilizer, oil and grease, litter and other pollutants. This water drains directly into nearby creeks, streams and rivers, without receiving treatment at sewage plants.

Polluted stormwater contaminates streams, rivers and lakes. It can kill or damage plants, fish and wildlife, while degrading the quality of our water.



A typical watershed system

For more information, visit www.marc.org/Environment/Water or call 816/474-4240.

MARC
Mid-America Regional Council
600 Broadway, Suite 300
Kansas City, Missouri 64105
www.marc.org

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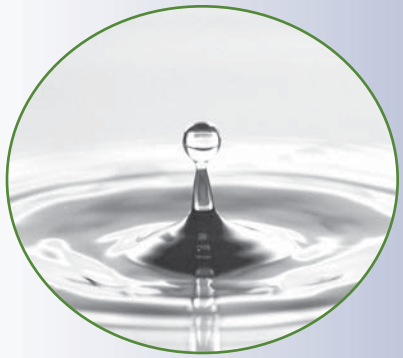
Pick Up After Your Pet

Summer Watershed Tip

If not disposed of properly, pet waste flows directly into waterways, untreated



Clean Water. Healthy Life.

Clean Water. Healthy Life.

Facts About Pet Waste

Every time it rains the potential exists for thousands of pounds of pet waste to wash down storm drains and into streams, rivers and lakes. If not disposed of properly, pet waste flows directly into nearby streams and creeks without being treated at wastewater treatment facilities.

Pet waste can contain bacteria that threaten the health of animals and people, especially children. Pet waste also contains nutrients that encourage excess weed and algae growth. This water then becomes cloudy and green — unattractive for swimming, boating and fishing. Excess nutrients are a major cause of water quality decline.

When pet waste is washed into lakes and streams, the waste decays, using up oxygen and sometimes releasing ammonia. Low oxygen levels and ammonia combined with warm temperatures can kill fish and other aquatic life.

Clean Water.
Healthy Life.

What's the Problem?

A recent USGS study of streams and creeks in the Kansas City region showed that bacteria associated with pet waste was the source of approximately one-quarter of the bacteria in samples collected from local waterways.

When pet waste is disposed of improperly, water quality isn't the only thing that suffers — your health may be at risk, too.

Pets, children playing outside, and adults gardening are most at risk for infection from some of the bacteria and parasites found in pet waste. Diseases that can be transmitted from pet waste include the following:

Salmonellosis: the most common bacterial infection transmitted to humans by other animals. Symptoms include fever, muscle aches, headache, vomiting and diarrhea.

Toxocariasis: roundworms usually transmitted from dogs to humans, often without noticeable symptoms, but may cause vision loss, a rash, fever or cough.

Toxoplasmosis: a parasite carried by cats that can cause birth defects if a woman becomes infected during pregnancy, and can also be a problem for people with depressed immune systems.

Many of our local waterways do not meet state water quality bacteria standards for recreational use. Pet waste is one of the components of non-point source pollution that contributes to our water quality problems, and is one that each of us can help correct.

Pet waste should never enter storm drains and surface water. Many local communities require pet owners to pick up after pets when away from their property, and to pick up waste from their property if it attracts flies and can pose a health risk.

What Can You Do?

Fortunately, there are actions pet owners can take to help keep our water clean:

- Pick up pet waste from your yard. It is not a fertilizer.
- Carry disposable bags while walking your dog to pick up and dispose of waste properly. If you dispose of pet waste in the trash, wrap it carefully to avoid spillage during collection.
- Flush your pet's waste down the toilet, so it can be treated at a sewage treatment plant.
- Bury pet waste in your yard, at least 12 inches deep and cover with at least eight inches of soil to let it decompose slowly. Bury the waste in several different locations and keep it away from vegetable gardens.
- Communities are encouraged to provide pet waste disposal bags at local parks, along trails and in public places where people frequently walk their dogs.

For more information, visit

www.marc.org/Environment/Water or call 816/474-4240.

MARC
Mid-America Regional Council

After the Storm

A Citizen's Guide to Understanding Stormwater

WHEN IT RAINS IT DRAINS

EPA United States Environmental Protection Agency

EPA 833-B-03-002

January 2003

THE YEAR OF CLEAN WATER
Celebration & Recommitment

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For more information contact:

or visit
www.epa.gov/npdes/stormwater
www.epa.gov/nps

What is stormwater runoff?

Stormwater runoff occurs when precipitation from rain or snowmelt flows over the ground. Impervious surfaces like driveways, sidewalks, and streets prevent stormwater from naturally soaking into the ground.

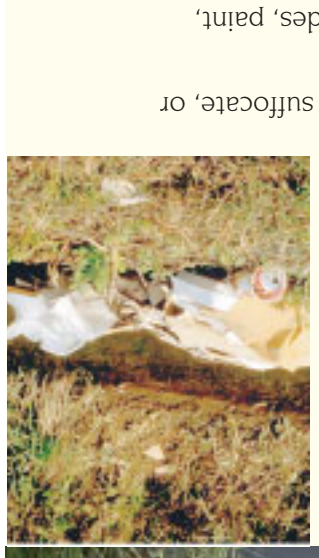
Stormwater can pick up debris, chemicals, dirt, and other pollutants and flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water.

Why is stormwater runoff a problem?

The effects of pollution

Polluted stormwater runoff can have many adverse effects on plants, fish, animals, and people.

- Sediment can cloud the water and make it difficult or impossible for aquatic plants to grow. Sediment also can destroy aquatic habitats.
- Excess nutrients can cause algae blooms. When algae die, they sink to the bottom and decompose in a process that removes oxygen from the water. Fish and other aquatic organisms can't exist in water with low dissolved oxygen levels.
- Bacteria and other pathogens can wash into swimming areas and create health hazards, often making beach closures necessary.
- Debris—plastic bags, six-pack rings, bottles, and cigarette butts—washed into waterbodies can choke, suffocate, or disable aquatic life like ducks, fish, turtles, and birds.
- Household hazardous wastes like insecticides, pesticides, paint, solvents, used motor oil, and other auto fluids can poison aquatic life. Land animals and people can become sick or die from eating diseased fish and shellfish or ingesting polluted water.
- Polluted stormwater often affects drinking water sources. This, in turn, can affect human health and increase drinking water treatment costs.



Stormwater Pollution Solutions

Residential

Recycle or properly dispose of household products that contain chemicals, such as insecticides, pesticides, paint, solvents, and used motor oil and other auto fluids. Don't pour them onto the ground or into storm drains.

Lawn care

Excess fertilizers and pesticides applied to lawns and gardens wash off and pollute streams. In addition, yard clippings and leaves can wash into storm drains and contribute nutrients and organic matter to streams.

- Don't overwater your lawn. Consider using a soaker hose instead of a sprinkler.
- Use pesticides and fertilizers sparingly. When use is necessary, use these chemicals in the recommended amounts. Use organic mulch or safer pest control methods whenever possible.
- Compost or mulch yard waste. Don't leave it in the street or sweep it into storm drains or streams.
- Cover piles of dirt or mulch being used in landscaping projects.

Septic systems

Leaking and poorly maintained septic systems release nutrients and pathogens (bacteria and viruses) that can be picked up by stormwater and discharged into nearby waterbodies. Pathogens can cause public health problems and environmental concerns.

- Inspect your system every 3 years and pump your tank as necessary (every 3 to 5 years).
- Don't dispose of household hazardous waste in sinks or toilets.

Auto care

Washing your car and degreasing auto parts at home can send detergents and other contaminants through the storm sewer system. Dumping automotive fluids into storm drains has the same result as dumping the materials directly into a waterbody.

- Use a commercial car wash that treats or recycles its wastewater, or wash your car on your yard so the water infiltrates into the ground.
- Repair leaks and dispose of used auto fluids and batteries at designated drop-off or recycling locations.

Pet waste

Pet waste can be a major source of bacteria and excess nutrients in local waters.

- When walking your pet, remember to pick up the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Education is essential to changing people's behavior. Signs and markers near storm drains warn residents that pollutants entering the drains will be carried untreated into a local waterbody.

Residential landscaping

Permeable Pavement—Traditional concrete and asphalt don't allow water to soak into the ground. Instead these surfaces rely on storm drains to divert unwanted water. Permeable pavement systems allow rain and snowmelt to soak through, decreasing stormwater runoff.

Rain Barrels—You can collect rainwater from rooftops in mosquito-proof containers. The water can be used later on lawn or garden areas.

Rain Gardens and Grassy Swales—Specially designed areas planted with native plants can provide natural places for rainwater to collect and soak into the ground. Rain from rooftop areas or paved areas can be diverted into these areas rather than into storm drains.

Vegetated Filter Strips—Filter strips are areas of native grass or plants created along roadways or streams. They trap the pollutants stormwater picks up as it flows across driveways and streets.

Commercial

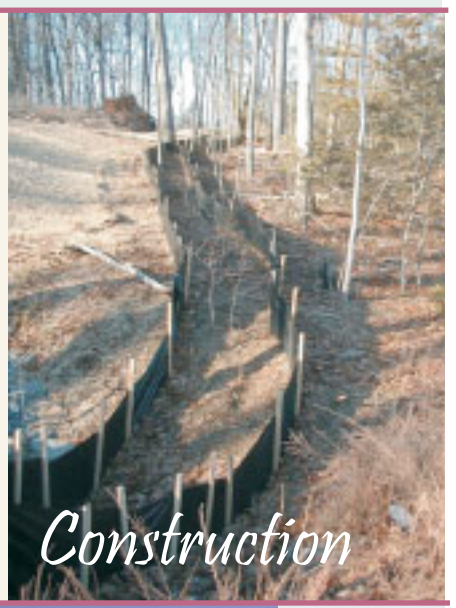
Dirt, oil, and debris that collect in parking lots and paved areas can be washed into the storm sewer system and eventually enter local waterbodies.

- Sweep up litter and debris from sidewalks, driveways and parking lots, especially around storm drains.
- Cover grease storage and dumpsters and keep them clean to avoid leaks.
- Report any chemical spill to the local hazardous waste cleanup team. They'll know the best way to keep spills from harming the environment.

Construction

Erosion controls that aren't maintained can cause excessive amounts of sediment and debris to be carried into the stormwater system. Construction vehicles can leak fuel, oil, and other harmful fluids that can be picked up by stormwater and deposited into local waterbodies.

- Divert stormwater away from disturbed or exposed areas of the construction site.
- Install silt fences, vehicle mud removal areas, vegetative cover, and other sediment and erosion controls and properly maintain them, especially after rainstorms.
- Prevent soil erosion by minimizing disturbed areas during construction projects, and seed and mulch bare areas as soon as possible.



Agriculture

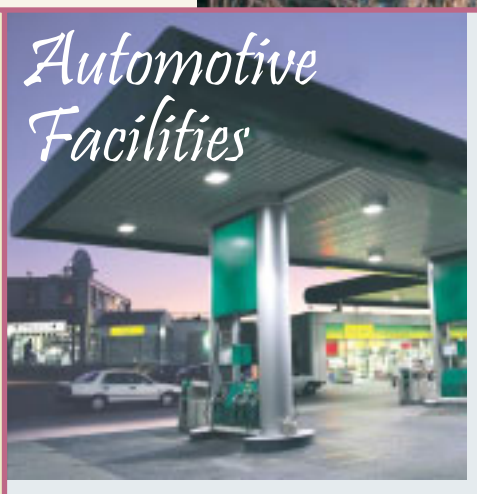
Lack of vegetation on streambanks can lead to erosion. Overgrazed pastures can also contribute excessive amounts of sediment to local waterbodies. Excess fertilizers and pesticides can poison aquatic animals and lead to destructive algae blooms. Livestock in streams can contaminate waterways with bacteria, making them unsafe for human contact.

- Keep livestock away from streambanks and provide them a water source away from waterbodies.
- Store and apply manure away from waterbodies and in accordance with a nutrient management plan.
- Vegetate riparian areas along waterways.
- Rotate animal grazing to prevent soil erosion in fields.
- Apply fertilizers and pesticides according to label instructions to save money and minimize pollution.

Forestry

Improperly managed logging operations can result in erosion and sedimentation.

- Conduct preharvest planning to prevent erosion and lower costs.
- Use logging methods and equipment that minimize soil disturbance.
- Plan and design skid trails, yard areas, and truck access roads to minimize stream crossings and avoid disturbing the forest floor.
- Construct stream crossings so that they minimize erosion and physical changes to streams.
- Expedite revegetation of cleared areas.



Automotive Facilities

Uncovered fueling stations allow spills to be washed into storm drains. Cars waiting to be repaired can leak fuel, oil, and other harmful fluids that can be picked up by stormwater.

- Clean up spills immediately and properly dispose of cleanup materials.
- Provide cover over fueling stations and design or retrofit facilities for spill containment.
- Properly maintain fleet vehicles to prevent oil, gas, and other discharges from being washed into local waterbodies.
- Install and maintain oil/water separators.

Clean Water

Everybody's Business

10 Things You Can Do to Prevent Stormwater Runoff Pollution

- Use fertilizers sparingly and sweep up driveways, sidewalks, and gutters
- Never dump anything down storm drains or in streams
- Vegetate bare spots in your yard
- Compost your yard waste
- Use least toxic pesticides, follow labels, and learn how to prevent pest problems
- Direct downspouts away from paved surfaces; consider starting a rain garden
- Take your car to the car wash instead of washing it in the driveway
- Check your car for leaks and recycle your motor oil
- Pick up after your pet
- Have your septic tank pumped and system inspected regularly

EPA United States Environmental Protection Agency

For more information, visit www.epa.gov/nps or www.epa.gov/npdes/stormwater

Stormwater and the **Construction Industry**

Protect Natural Features

Bad

Good

- Minimize clearing.
- Minimize the amount of exposed soil.
- Identify and protect areas where existing vegetation, such as trees, will not be disturbed by construction activity.
- Protect streams, stream buffers, wild woodlands, wetlands, or other sensitive areas from any disturbance or construction activity by fencing or otherwise clearly marking these areas.

Construction Phasing

Bad

Good

- Sequence construction activities so that the soil is not exposed for long periods of time.
- Schedule or limit grading to small areas.
- Install key sediment control practices before site grading begins.
- Schedule site stabilization activities, such as landscaping, to be completed immediately after the land has been graded to its final contour.

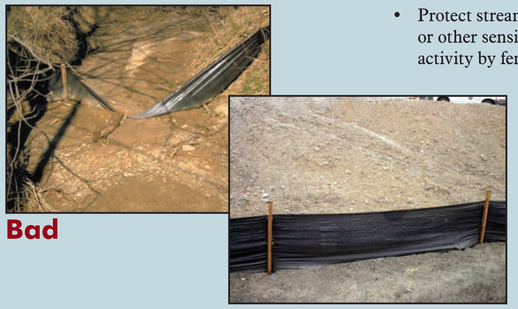
Vegetative Buffers

Bad

Good

- Protect and install vegetative buffers along waterbodies to slow and filter stormwater runoff.
- Maintain buffers by mowing or replanting periodically to ensure their effectiveness.

Silt Fencing



Bad

Good

- Inspect and maintain silt fences after each rainstorm.
- Make sure the bottom of the silt fence is buried in the ground.
- Securely attach the material to the stakes.
- Don't place silt fences in the middle of a waterway or use them as a check dam.
- Make sure stormwater is not flowing around the silt fence.

Maintain your BMPs!

www.epa.gov/npdes/menuofbmps

Site Stabilization

Bad

Good

- Vegetate, mulch, or otherwise stabilize all exposed areas as soon as land alterations have been completed.

Construction Entrances

Bad

Good

- Remove mud and dirt from the tires of construction vehicles before they enter a paved roadway.
- Properly size entrance BMPs for all anticipated vehicles.
- Make sure that the construction entrance does not become buried in soil.

Slopes

Bad

Good

- Rough grade or terrace slopes.
- Break up long slopes with sediment barriers, or under drain, or divert stormwater away from slopes.

Dirt Stockpiles

Bad

Good

- Cover or seed all dirt stockpiles.

Storm Drain Inlet Protection

Bad

Good

- Use rock or other appropriate material to cover the storm drain inlet to filter out trash and debris.
- Make sure the rock size is appropriate (usually 1 to 2 inches in diameter).
- If you use inlet filters, maintain them regularly.

Stormwater and the Construction Industry

Planning and Implementing Erosion and Sediment Control Practices

The construction industry is a critical participant in the nation's efforts to protect streams, rivers, lakes, wetlands, and oceans. Through the use of best management practices (BMPs), construction site operators are the key defense against erosion and sedimentation.

As stormwater flows over a construction site, it picks up pollutants like sediment, debris, and chemicals. High volumes of stormwater can also cause stream bank erosion, and destroy downstream aquatic habitat. Preventing soil erosion and sedimentation is an important responsibility at all construction sites.

In addition to the environmental impact, uncontrolled erosion can have a significant financial impact on a construction project. It costs money and time to repair gullies, replace vegetation, clean sediment-clogged storm drains, replace poorly installed BMPs, and mitigate damage to other people's property or to natural resources.

Best Management Practice (BMP)
A BMP is a method used to prevent or control stormwater runoff and the discharge of pollutants, including sediment, into local waterbodies. Silt fences, inlet protection, and site-stabilization techniques are typical BMPs on a construction site.

Operator
An operator is someone who has control over and the ability to modify construction plans and specifications (e.g. owner, general contractor)

or

Someone who has control over the day-to-day operations at a site (e.g., owner, general contractor) that are necessary to ensure compliance with the permit requirements. It is the responsibility of a construction site owner or operator to contain stormwater runoff and prevent erosion during **all** stages of a project.

There may be more than one person at a site who meets these definitions and must apply for permit coverage. (States may have different definitions of the term "operator.")

So what's being done about polluted runoff?

The Clean Water Act includes the National Pollutant Discharge Elimination System (NPDES) permitting program. As of January 2003, 44 states and territories are authorized to issue NPDES stormwater permits. If your state isn't authorized to operate the NPDES stormwater permit program, EPA issues the permits. Permits vary from state to state, so contact your state or EPA for specific information. Your permitting authority has specific information on your state's NPDES stormwater permit program. In general, construction permits require construction operators to do all of the following:

- Develop and implement a stormwater pollution prevention plan
- Submit a permit application or notice of intent (NOI)
- Comply with the permit, including maintaining BMPs and inspecting the site

Under the NPDES program, construction activities that disturb 1 or more acres are required to obtain stormwater permit coverage. States have different names for the plans that construction operators must develop, such as

- Stormwater pollution prevention plan
- Erosion and sediment control plan
- Erosion control and stormwater management plan
- Stormwater management plan
- Water pollution control plan
- Pollution prevention plan

This document uses the term "*Plan*."

I think I need a permit... Where do I start?

All land-disturbing activities, including clearing, grading, and excavation, that disturb **1 or more acres** are required to be covered under a state or EPA-issued NPDES construction stormwater permit **prior to land disturbance**. Permit requirements vary by state. Begin by researching the specific requirements in your state. You might already be subject to local erosion and sediment control requirements, but that doesn't release you from the requirements of the NPDES program at the state or EPA level. Although you must comply with both sets of requirements, in most cases they have been designed to be complementary. Contact your permitting authority to find out exactly what you need to do. A good place to start your search is the Construction Industry Compliance Assistance web site at http://www.envcap.org/cica.

The NPDES permit requirements include small construction activities that are part of a larger common plan of development or sale, such as a single lot within a larger subdivision. For developments with multiple operators, all operators must have permit coverage for their individual parts of the larger development, no matter how large or small each operation happens to be. When there are multiple operators at one site, they're encouraged to develop and share one comprehensive Plan and obtain permit coverage as co-permitees.

Construction sites that discharge unpermitted stormwater are in violation of the Clean Water Act and may be subject to fines of up to $27,500 a day per violation.

The **owner or operator** of the construction site is responsible for complying with the requirements of the permit. Responsibilities include developing a Plan, obtaining permit coverage, implementing BMPs, and stabilizing the site at the end of the construction activity.

Determine your eligibility

All construction activity that disturbs 1 or more acres of land, as well as activity that disturbs less than 1 acre but is part of a larger common plan of development, must obtain permit coverage.

Read and understand your stormwater permit requirements

Get a copy of the permit for construction activities and a permit application (or notice of intent form) from your state or EPA permitting authority.

Develop a Plan

Most states do not require you to submit your Plan. However, you do need to keep the Plan on site. If that's impractical, you may post a notice that tells where the Plan is kept so it can be accessed by the permitting authority and other interested parties.

You'll need to post a copy of your completed application on site. Put it in a place where the public can see it so they'll know your site is covered by an NPDES permit!

Apply for permit coverage

Once you understand your permit requirements and have developed a Plan, you can submit a stormwater permit application (or notice of intent) to your permitting authority. This must be done before beginning any land disturbance on the site. Some states require a few days of lead time, so check with your permitting authority. Once you've submitted the application, you must satisfy the conditions of the permit.

Implement the Plan

Be prepared to implement the BMPs in your Plan before construction begins. Ensure that BMPs are properly maintained, and upgrade and repair them as necessary.

Developing and Implementing a Plan

You must have a Plan that includes erosion and sediment control and pollution prevention BMPs. These Plans require

- Advance planning and training to ensure proper implementation of the BMPs
- Erosion and sediment control BMPs in place until the area is permanently stabilized
- Pollution prevention BMPs to keep the construction site "clean"
- Regular inspection of the construction site to ensure proper installation and maintenance of BMPs

Fortunately, the practices and measures that must be included in your Plan are already part of the standard operating procedures at many construction sites.

Six steps are associated with developing and implementing a stormwater Plan. There's a wealth of information available on developing pollution prevention plans. Please contact your permitting authority for help in finding additional guidance materials, or visit www.epa.gov/npdes/stormwater. A sample construction plan is available at www.epa.gov/npdes/pubs/sample_swppp.pdf.

1. Site Evaluation and Design Development

- **Collect site information**
- **Develop site plan design**
- **Prepare pollution prevention site map**

The first step in preparing a Plan is to define the characteristics of the site and the type of construction that will occur. This involves collecting site information, identifying natural features that should be protected, developing a site plan design, describing the nature of the construction activity, and preparing a pollution prevention site map.

2. Assessment

- **Measure the site area**
- **Determine the drainage areas**
- **Calculate the runoff coefficient**

The next step is assessing the impact the project will have on stormwater runoff. Determine the drainage areas and estimate the runoff amounts and velocities. For more information on calculating the runoff coefficient, go to www.epa.gov/npdes/pubs/chap02_conguide.pdf, page 11.

3. Control Selection and Plan Design

- **Review and incorporate state or local requirements**
- **Select erosion and sediment controls**
- **Select other controls**
- **Select stormwater management controls**
- **Indicate the location of controls on the site map**
- **Prepare an inspection and maintenance plan**
- **Coordinate controls with construction activity**
- **Prepare sequence of major activities**

In the third step you'll actually document your procedures to prevent and control polluted stormwater runoff. You must delineate areas that will not be disturbed, including critical natural areas like streamside areas, floodplains, and trees. You must also identify the measures (or BMPs) you'll use to protect these areas.

Phasing your project to minimize the amount of exposed soil at any given time is a highly effective way to prevent erosion. Erosion control measures designed to prevent soil from being mobilized include diversions to route stormwater away from exposed soils and stabilization with vegetation, mulch, and geotextiles. Sedimentation control measures designed to remove sediment from stormwater or prevent it from leaving the site include silt fences, sediment traps, and diversions.

You'll need to select erosion and sediment controls—including stabilization measures for protecting disturbed areas and structural controls for diverting runoff and removing sediment—that are appropriate for your particular site. The appropriateness of the control measures will depend on several factors, but will be influenced most directly by the site characteristics. Some stabilization measures you might consider are temporary seeding, permanent seeding, and mulching. Structural control measures include earth dikes, silt fences, and sediment traps. No single BMP will meet all of the erosion and sedimentation control needs of a construction site. A combination of BMPs is necessary. For more information on the types of BMPs appropriate for your construction site, see the BMP fact sheet series available at www.epa.gov/npdes/menuofbmps.

Soil erosion control tips...

- Design the site to infiltrate stormwater into the ground and to keep it out of storm drains. Eliminate or minimize the use of stormwater collection and conveyance systems while maximizing the use of stormwater infiltration and bioretention techniques.
- Minimize the amount of exposed soil on site.
  - To the extent possible, plan the project in stages to minimize the amount of area that is bare and subject to erosion. The less soil exposed, the easier and cheaper it will be to control erosion.
  - Vegetate disturbed areas with permanent or temporary seeding immediately upon reaching final grade.
  - Vegetate or cover stockpiles that will not be used immediately.
- Reduce the velocity of stormwater both onto and away from the project area.
  - Interceptors, diversions, vegetated buffers, and check dams are a few of the BMPs that can be used to slow down stormwater as it travels across and away from the project site.
  - Diversion measures can also be used to direct flow away from exposed areas toward stable portions of the site.
  - Silt fences and other types of perimeter filters should never be used to reduce the velocity of runoff.
- Protect defined channels immediately with measures adequate to handle the storm flows expected.
  - Sod, geotextile, natural fiber, riprap, or other stabilization measures should be used to allow the channels to carry water without causing erosion. Use softer measures like geotextile or vegetation where possible to prevent downstream impacts.
- Keep sediment on site.
  - Place aggregate or stone at construction site vehicle exits to accommodate at least two tire revolutions of large construction vehicles. Much of the dirt on the tires will fall off before the vehicle gets to the street.
  - Regular street sweeping at the construction entrance will prevent dirt from entering storm drains. Do not hose paved areas.
  - Sediment traps and basins are temporary structures and should be used in conjunction with other measures to reduce the amount of erosion.
- Maintaining all BMPs is critical to ensure their effectiveness during the life of the project.
  - Regularly remove collected sediment from silt fences, berms, traps, and other BMPs.
  - Ensure that geotextiles and mulch remain in place until vegetation is well established.
  - Maintain fences that protect sensitive areas, silt fences, diversion structures, and other BMPs.

Other BMPs and Activities to Control Polluted Runoff

You'll need to select other controls to address potential pollutant sources on your site. Construction materials, debris, trash, fuel, paint, and stockpiles become pollution sources when it rains. Basic pollution prevention practices can significantly reduce the amount of pollution leaving construction sites. The following are some simple practices that should be included in the Plan and implemented on site:

- Keep potential sources of pollution out of the rain as practicable (e.g., inside a building, covered with plastic or tarps, or sealed tightly in a leak-proof container).
- Clearly identify a protected, lined area for concrete truck washouts. This area should be located away from streams, storm drain inlets, or ditches and should be cleaned out periodically.
- Park, refuel, and maintain vehicles and equipment in one area of the site to minimize the area exposed to possible spills and fuel storage. This area should be well away from streams, storm drain inlets, or ditches. Keep spill kits close by and clean up any spills or leaks immediately, including spills on pavement or earthen surfaces.
- Practice good housekeeping. Keep the construction site free of litter, construction debris, and leaking containers. Keep all waste in one area to minimize cleaning.
- Never hose down paved surfaces to clean dust, debris, or trash. This water could wash directly into storm drains or streams. Sweep up materials and dispose of them in the trash. Never bury trash or debris!
- Dispose of hazardous materials properly.

4. Certification and Notification

- **Certify the Plan**
- **Submit permit application or notice of intent**

Once the Plan has been developed, an authorized representative must sign it. Now is the time to submit the permit application or notice of intent. Your permit might require that the Plan be kept on site, so be sure to keep it available for the staff implementing the Plan.

Erosion and sedimentation control practices are only as good as their installation and maintenance.

5. Implementing and Maintaining a Plan

- **Implement controls**
- **Inspect and maintain controls**
- **Update/change the Plan**
- **Report releases of hazardous materials**

A Plan describes the practices and activities you'll use to prevent stormwater contamination and meet the NPDES permit requirements. Make sure that the Plan is implemented and that the Plan is updated as necessary to reflect changes on the site.

Erosion and sedimentation control practices are only as good as their installation and maintenance. Train the contractors that will install the BMPs and inspect immediately to ensure that the BMPs have been installed correctly.

Regularly inspect the BMPs (especially before and after rain events) and perform any necessary repairs or maintenance immediately. Many BMPs are designed to handle a limited amount of sediment. If not maintained, they'll become ineffective and a source of sediment pollution.

It's also important to keep records of BMP installation, implementation, and maintenance. Keep track of major grading activities that occur on the site, when construction activities cease (temporarily or permanently), and when a site is temporarily or permanently stabilized.

If construction plans change at any time, or if more appropriate BMPs are chosen for the site, update the Plan accordingly.

6. Completing the Project: Final Stabilization and Termination of the Permit

- **Final stabilization**
- **Notice of Termination**
- **Record retention**

Many states and EPA require a Notice of Termination (NOT) or other notification signifying that the construction activity is completed. An NOT is required when

- Final stabilization has been achieved on all portions of the site for which the permittee is responsible.
- Another operator has assumed control over all areas of the site that have not been finally stabilized. That operator would need to submit a new permit application to the permitting authority.
- For residential construction only, temporary stabilization of a lot has been completed prior to transference of ownership to the homeowner, with the homeowner being made aware of the need to perform final stabilization.

Permittees must keep a copy of their permit application and their Plan for at least 3 years following final stabilization. This period may be longer depending on state and local requirements.

Preconstruction Checklist

- A site description, including
  - Nature of the activity
  - Intended sequence of major construction activities
  - Total area of the site
  - Existing soil type and rainfall runoff data
  - A site map with:
    - Drainage patterns
    - Approximate slopes after major grading
    - Area of soil disturbance
    - Outline of areas which will not be disturbed
    - Location of major structural and nonstructural soil erosion controls
    - Areas where stabilization practices are expected to occur
    - Surface waters
    - Stormwater discharge locations
  - Name of the receiving water(s)
- A description of controls:
  - Erosion and sediment controls, including
    - Stabilization practices for all areas disturbed by construction
    - Structural practices for all drainage/discharge locations
  - Stormwater management controls, including
    - Measures used to control pollutants occurring in stormwater discharges after construction activities are complete
    - Velocity dissipation devices to provide nonerosive flow conditions from the discharge point along the length of any outfall channel
  - Other controls, including
    - Waste disposal practices that prevent discharge of solid materials
    - Measures to minimize offset tracking of sediments by construction vehicles
    - Measures to ensure compliance with state or local waste disposal, sanitary sewer, or septic system regulations
  - Description of the timing during the construction when measures will be implemented
- State or local requirements incorporated into the Plan
- Inspection and maintenance procedures for control measures identified in the Plan
- Contractor certification and Plan certification

Implementation Checklist

- Maintain records of construction activities, including
  - Dates when major grading activities occur
  - Dates when construction activities temporarily cease on the site or a portion of the site
  - Dates when construction activities permanently cease on the site or a portion of the site
  - Dates when stabilization measures are completed on the site
- Prepare inspection reports summarizing
  - Name of person conducting BMP inspections
  - Qualifications of person conducting BMP inspections
  - BMPs/areas inspected
  - Observed conditions
  - Necessary changes to the Plan
- Report releases of reportable quantities of oil or hazardous materials
  - Notify the National Response Center at 800-424-8802 immediately
  - Report releases to your permitting authority immediately, or as specified in your permit. You must also provide a written report within 14 days.
  - Modify the Plan to include
    - The date of release
    - Circumstances leading to the release
    - Steps taken to prevent reoccurrence of the release
- Modify Plan as necessary
  - Incorporate requests of the permitting authority to bring the Plan into compliance
  - Address changes in design, construction operation, or maintenance that affect the potential for discharge of pollutants

An ounce of prevention is worth a pound of cure! It's far more efficient and cost-effective to prevent pollution than it is to try to correct problems later. Installing and maintaining simple BMPs and pollution prevention techniques on site can greatly reduce the potential for stormwater pollution and can also save you money!

Visit www.epa.gov/npdes/stormwater for more information.

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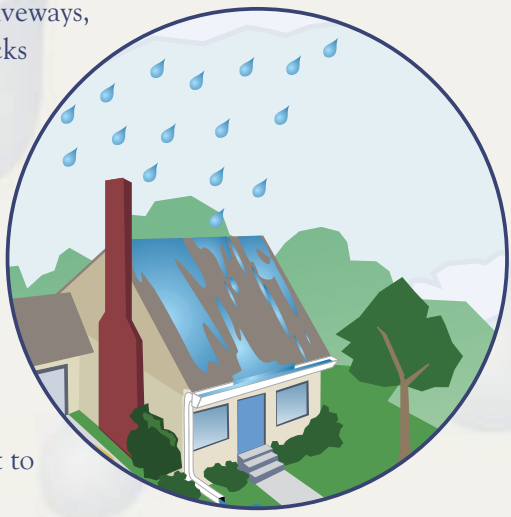
THE YEAR OF CLEAN WATER
Celebration & Commitment

As stormwater flows over driveways, lawns, and sidewalks, it picks up debris, chemicals, dirt, and other pollutants. Stormwater can flow into a storm sewer system or directly to a lake, stream, river, wetland, or coastal water. Anything that enters a storm sewer system is discharged untreated into the waterbodies we use for swimming, fishing, and providing drinking water. Polluted runoff is the nation's greatest threat to clean water.



By practicing healthy household habits, homeowners can keep common pollutants like pesticides, pet waste, grass clippings, and automotive fluids off the ground and out of stormwater. Adopt these healthy household habits and help protect lakes, streams, rivers, wetlands, and coastal waters. Remember to share the habits with your neighbors!

Healthy Household Habits for Clean Water

Vehicle and Garage

- Use a commercial car wash or wash your car on a lawn or other unpaved surface to **minimize** the amount of dirty, soapy water flowing into the storm drain and eventually into your local waterbody.

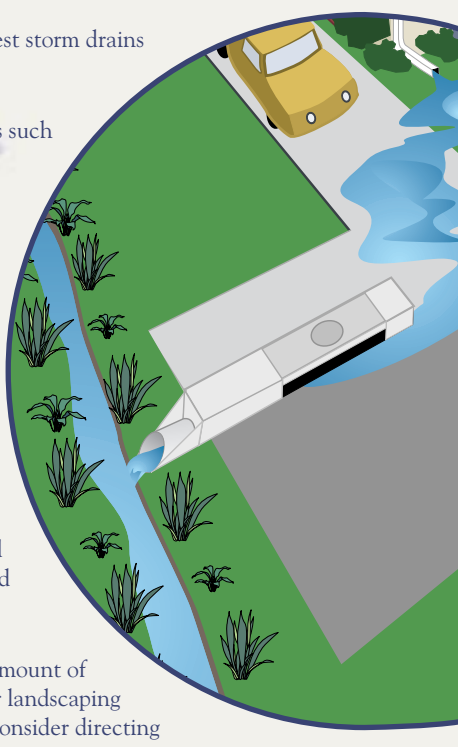
- Check your car, boat, motorcycle, and other machinery and equipment for leaks and spills. Make repairs as soon as possible. Clean up **spilled fluids** with an absorbent material like kitty litter or sand, and don't rinse the spills into a nearby storm drain. Remember to properly dispose of the absorbent material.
- **Recycle** used oil and other automotive fluids at participating service stations. Don't dump these chemicals down the storm drain or dispose of them in your trash.

Lawn and Garden

- Use pesticides and fertilizers **sparingly**. When use is necessary, use these chemicals in the recommended amounts. Avoid application if the forecast calls for rain; otherwise, chemicals will be washed into your local stream.
- Select **native** plants and grasses that are drought- and pest-resistant. Native plants require less water, fertilizer, and pesticides.
- **Sweep up** yard debris, rather than hosing down areas. Compost or recycle yard waste when possible.
- Don't overwater your lawn. Water during the **cool** times of the day, and don't let water run off into the storm drain.
- Cover piles of dirt and mulch being used in landscaping projects to prevent these pollutants from blowing or washing off your yard and into local waterbodies. **Vegetate** bare spots in your yard to prevent soil erosion.

Home Repair and Improvement

- Before beginning an outdoor project, locate the nearest storm drains and **protect** them from debris and other materials.
- **Sweep up** and properly dispose of construction debris such as concrete and mortar.
- Use hazardous substances like paints, solvents, and cleaners in the **smallest amounts possible**, and follow the directions on the label. Clean up spills **immediately**, and dispose of the waste safely. Store substances properly to avoid leaks and spills.
- Purchase and use **nontoxic**, **biodegradable**, **recycled**, and **recyclable** products whenever possible.
- **Clean** paint brushes in a sink, not outdoors. Filter and reuse paint thinner when using oil-based paints. Properly dispose of excess paints through a household hazardous waste collection program, or donate unused paint to local organizations.



- **Reduce** the amount of paved area and increase the amount of vegetated area in your yard. Use native plants in your landscaping to reduce the need for watering during dry periods. Consider directing downspouts away from paved surfaces onto lawns and other measures to increase infiltration and reduce polluted runoff.

Pet Care

- When walking your pet, remember to **pick up** the waste and dispose of it properly. Flushing pet waste is the best disposal method. Leaving pet waste on the ground increases public health risks by allowing harmful bacteria and nutrients to wash into the storm drain and eventually into local waterbodies.

Swimming Pool and Spa

- **Drain** your swimming pool only when a test kit does not detect chlorine levels.
- Whenever possible, drain your pool or spa into the **sanitary** sewer system.
- Properly store pool and spa chemicals to **prevent** leaks and spills, preferably in a covered area to avoid exposure to stormwater.

Septic System Use and Maintenance

- Have your septic system **inspected** by a professional at least every 3 years, and have the septic tank **pumped** as necessary (usually every 3 to 5 years).
- Care for the septic system drainfield by **not** driving or parking vehicles on it. Plant only grass over and near the drainfield to avoid damage from roots.
- Flush responsibly. Flushing household chemicals like paint, pesticides, oil, and antifreeze can **destroy** the biological treatment taking place in the system. Other items, such as diapers, paper towels, and cat litter, can **clog** the septic system and potentially damage components.

Storm drains connect to waterbodies!

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January 2003

THE YEAR OF CLEAN WATER
Celebrate • Rejuvenate!

www.epa.gov/nps

Contact name
Contact organization
Contact address
Contact address1
Contact phone and e-mail

Remember: Only rain down the drain!

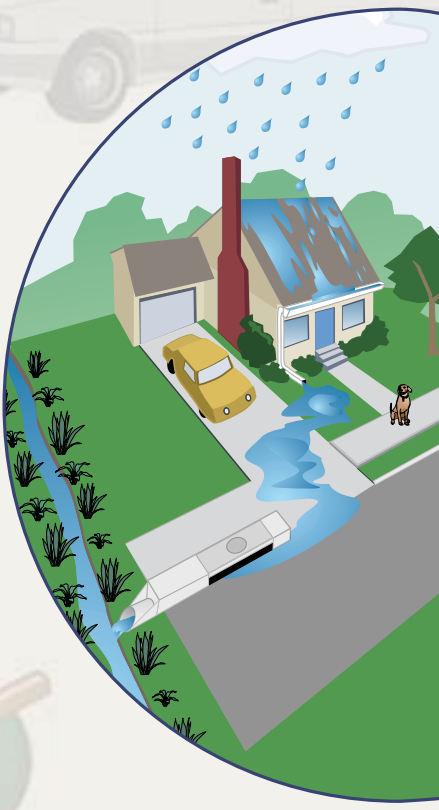
For more information, visit
www.epa.gov/npdes/stormwater
or

Make your home

The

SOLUTION TO STORMWATER POLLUTION!

A homeowner's guide to healthy habits for clean water



United States Environmental Protection Agency

Water-Efficient Landscaping:

Preventing Pollution & Using Resources Wisely

A Message from the Administrator

Christine Todd Whitman

I believe water is the biggest environmental issue we face in the 21st Century in terms of both quality and quantity. In the 30 years since its passage, the Clean Water Act has dramatically increased the number of waterways that are once again safe for fishing and swimming. Despite this great progress in reducing water pollution, many of the nation's waters still do not meet water quality goals. I challenge you to join with me to finish the business of restoring and protecting our nation's waters for present and future generations.

United States Environmental Protection Agency
Office of Water (4204M)
EPA832-F-02-002
September 2002
www.epa.gov/owm/water-efficiency/index.htm

Contents

What is Water-efficient Landscaping?

Water, many agree, is our most precious natural resource; without it, life ceases. Yet judging by our water use and consumption practices, many of us in the United States seem to take it for granted. A typical household uses approximately 260 gallons of water per day. "Water conscious" individuals often install high-efficiency shower heads and toilets and wash only full loads of clothes and dishes to reduce consumption. But in the summer, the amount of water used outdoors by a household can exceed the amount used for all other purposes in the entire year. This is especially true in hot, dry climates.

Gardening and lawn care account for the majority of this seasonal increase, but other outdoor activities, such as washing cars and filling swimming pools, also contribute. According to the U.S. Geological Survey, of the 26 billion gallons of water consumed daily in the United States[1], approximately 7.8 billion gallons, or 30 percent[2], is devoted to outdoor uses. The majority of this is used for landscaping. In fact, it is estimated that the typical suburban lawn consumes 10,000 gallons of water above and beyond rainwater each year (Vickers, p 140).

Many mistakenly believe that stunning gardens and beautiful lawns are only possible through extensive watering, fertilization, and pesticide application. As this booklet will demonstrate, eye-catching gardens and landscapes that save water, prevent pollution, and protect the environment are, in fact, easily achieved by employing water-efficient landscaping. Water-efficient landscaping produces attractive landscapes because it utilizes designs and plants suited to local conditions.

This booklet describes the benefits of water-efficient landscaping. It includes several examples of successful projects and programs, as well as contacts, references, and a short bibliography. For specific information about how to best apply water-efficient landscaping principles to your geographical area, consult with your county extension service and local garden and nursery centers. Local governments and water utilities also possess a wealth of information and suggestions for using water more efficiently in all aspects of your life, including landscaping.

Xeriscape garden at Denver Water

1 W.B. Solley, R.R. Pierce, and H.A. Perlman. 1998. *Estimated Use of Water in the United States in 1995* (USGS Circular 1200). USGS. Reston, VA. p.27.

2 Amy Vickers. 2001. *Handbook of Water Use and Conservation*. WaterPlow Press. Amherst, MA. p. 140.

Xeriscaped front yard in Colorado Springs

Many terms and schools of thought have been used to describe approaches to water-efficient landscaping. Some examples include "water-wise," "water-smart," "low-water," and "natural landscaping." While each of these terms varies in philosophy and approach, they are all based on the same principles and are commonly used interchangeably. One of the first conceptual approaches developed to formalize these principles is known as "Xeriscape[3] landscaping." Xeriscape landscaping is defined as "quality landscaping that conserves water and protects the environment." The word "Xeriscape" was coined and copyrighted by Denver Water Department in 1981 to help make water conserving landscaping an easily recognized concept. The word is a combination of the Greek word "*xeros*," which means "dry," and "landscape."

The seven principles upon which Xeriscape landscaping is based are:

- Proper planning and design
- Soil analysis and improvement
- Appropriate plant selection
- Practical turf areas
- Efficient irrigation
- Use of mulches
- Appropriate maintenance

The eight fundamentals of water-wise landscaping, below, illustrate the similarities in the underlaying concepts and principles of Xeriscape landscaping and other water-efficient approaches.

- Group plants according to their water needs.
- Use native and low-water-use plants.
- Limit turf areas to those needed for practical uses.
- Use efficient irrigation systems.
- Schedule irrigation wisely.
- Make sure soil is healthy.
- Remember to mulch.
- Provide regular maintenance.

In short, plan and maintain your landscape with these principles of water efficiency in mind and it will continue to conserve water and be attractive.

3 Denver Water welcomes the use of the term Xeriscape in books, articles, and speeches promoting water conserving landscape. EPA is using this term with permission from Denver Water. For permission to use "Xeriscape" in your publications, call Denver Water at 303 628-6330.

Why Use Water-efficient Landscaping?

Proper landscaping techniques not only create beautiful landscapes, but also benefit the environment and save water. In addition, attractive, water-efficient, low-maintenance landscapes can increase home values.

Water-efficient landscaping offers many economic and environmental benefits, including:

- Lower water bills from reduced water use.
- Conservation of natural resources and preservation of habitat for plants and wildlife such as fish and waterfowl.
- Decreased energy use (and air pollution associated with its generation) because less pumping and treatment of water is required.
- Reduced home or office heating and cooling costs through the careful placement of trees and plants.
- Reduced runoff of stormwater and irrigation water that carries top soils, fertilizers, and pesticides into lakes, rivers, and streams.
- Fewer yard trimmings to be managed or landfilled.
- Reduced landscaping labor and maintenance costs.
- Extended life for water resources infrastructure (e.g., reservoirs, treatment plants, groundwater aquifers), thus reduced taxpayer costs.

Meadow Sage (Salvia pratensis) *is the background for New Mexico Evening Primrose* (Oenothera berlandieri 'siskiyou')

How is Water-efficient Landscaping Applied?

Landscaping that conserves water and protects the environment is not limited to arid landscapes with only rocks and cacti. Through careful planning, landscapes can be designed to be both pleasing to the senses and kind to the environment. One simple approach to achieving this is applying and adopting the basic principles of water-efficient landscaping to suit your climatic region. The seven principles of Xeriscape landscaping are used below to describe these basic concepts in greater detail.

Dragon's Blood Sedum (Sedum spurium) *under Honeylocust Trees* (Gleditsia triaconthos)

Proper planning and design

Developing a landscape plan is the first and most important step in creating a water-efficient landscape. Your plan should take into account the regional and microclimatic conditions of the site, existing vegetation, topography, intended uses of the property, and most importantly, the grouping of plants by their water needs. Also consider the plants' sun or shade requirements and preferred soil conditions. A well-thought-out landscape plan can serve as your roadmap in creating beautiful, water-efficient landscapes and allow you to continually improve your landscape over time.

Soil analysis and improvements

Because soils vary from site to site, test your soil before beginning your landscape improvements. Your county extension service can analyze the pH levels; nutrient levels (e.g., nitrogen, phosphorus, potassium); and the sand, silt, clay, and organic matter content of your soil. It can also suggest ways to improve your soil's ability to support plants and retain water (e.g., through aeration or the addition of soil amendments or fertilizers).

Appropriate plant selection

Your landscape design should take into account your local climate as well as soil conditions. Focus on preserving as many existing trees and shrubs as possible because established plants usually require less water and maintenance. Choose plants native to your region. Native plants, once established, require very little to no additional water beyond normal rainfall. Also, because they are adapted to local soils and climatic conditions, native plants commonly do not require the addition of fertilizers and are more resistant to pests and disease.

When selecting plants, avoid those labeled "hard to establish," "susceptible to disease," or "needs frequent attention," as these types of plants frequently require large amounts of supplemental water, fertilizers, and pesticides. Be careful when selecting non-indigenous species as some of them may become invasive. An invasive plant might be a water guzzler and will surely choke out native species. Your state or county extension service or local nursery can help you select appropriate plants for your area.

The key to successful planting and transplanting is getting the roots to grow into the surrounding soil as quickly as possible. Knowing when and where to plant is crucial to speeding the establishment of new plants. The best time to plant will vary from species to species. Some plants will thrive when planted in a dormant or inactive state. Others succeed when planted during the season when root generation is highest and sufficient moisture is available to support new growth (generally, spring is the best season, but check plant tags or consult with your local nursery for specific species).

Wine Cup (Callirhoe involucrata) *and Sunset Hyssop* (Agastache rupestris) *in the Denver Water Xeriscape Garden*

Practical turf areas

How and where turf is placed in the landscape can significantly reduce the amount of irrigation water needed to support the landscape. Lawns require a large amount of supplemental water and generally greater maintenance than other vegetation. Use turf where it aesthetically highlights the house or buildings and where it has practical function, such as in play or recreation areas. Grouping turf areas can increase watering efficiency and significantly reduce evaporative and runoff losses. Select a type of grass that can withstand drought periods and become dormant during hot, dry seasons. Reducing or eliminating turf areas altogether further reduces water use.

Efficient irrigation

Efficient irrigation is a very important part of using water efficiently outdoors, and applies in any landscape—whether Xeriscape or conventional. For this reason, an entire section of this booklet addresses efficient irrigation; it can be found on page 6.

Use of mulches

Mulches aid in greater retention of water by minimizing evaporation, reducing weed growth, moderating soil temperatures, and preventing erosion. Organic mulches also improve the condition of your soil as they decompose. Mulches are typically composed of wood bark chips, wood grindings, pine straws, nut shells, small gravel, or shredded landscape clippings. Avoid using rock mulches in sunny areas or around non-arid climate plants, as they radiate large amounts of heat and promote water loss that can lead to scorching. Too much mulch can restrict water flow to plant roots and should be avoided.

Appropriate maintenance

Water and fertilize plants only as needed. Too much water promotes weak growth and increases pruning and mowing requirements. Like any landscape, a water-efficient yard will require regular pruning, weeding, fertilization, pest control, and irrigation. As your water-efficient landscape matures, however, it will require less maintenance and less water. Cutting turf grass only when it reaches two to three inches promotes deeper root growth and a more drought-resistant lawn. As a rule of thumb, mow your turf grass before it requires more than one inch to be removed. The proper cutting height varies, however, with the type of grass, so you should contact your county extension service or local nursery to find out the ideal cutting height for your lawn. Avoid shearing plants or giving them high nitrogen fertilizers during dry periods because these practices encourage water-demanding new growth.

Water-efficient Landscape Irrigation Methods

With common watering practices, a large portion of the water applied to lawns and gardens is not absorbed by the plants. It is lost through evaporation, runoff, or being pushed beyond the root zone because it is applied too quickly or in excess of the plants' needs. The goal of efficient irrigation is to reduce these losses by applying only as much water as is needed to keep your plants healthy. This goal is applicable whether you have a Xeriscape or a conventional landscape.

To promote the strong root growth that supports a plant during drought, water deeply and only when the plant needs water. For clay soils, watering less deeply and more often is recommended. Irrigating with consideration to soil type, the condition of your plants, the season, and weather conditions—rather than on a fixed schedule—significantly increases your watering efficiency. Grouping plants according to similar water needs also makes watering easier and more efficient.

Purple Fountain Grass (Pennisetum setaceum "Rubrum") *and Marigolds* (Calendula officinalis) *in planter bed*

Irrigating lawns, gardens, and landscapes can be accomplished either manually or with an automatic irrigation system. Manual watering with a hand-held hose tends to be the most water-efficient method. According to the AWWA Research Foundation's outdoor end use study, households that manually water with a hose typically use 33 percent less water outdoors than the average household. The study also showed that households with in-ground sprinkler systems used 35 percent more water, those with automatic timers used 47 percent more water, and those with drip irrigation systems used 16 percent more water than households without these types of systems. These results show that in-ground sprinkler and drip irrigation systems must be operated properly to be water-efficient.

You can use a hand-held hose or a sprinkler for manual irrigation. To reduce water losses from evaporation and wind, avoid sprinklers that produce a fine mist or spray high into the air. Soaker hoses can also be very efficient and effective when used properly. Use a hand-held soil moisture probe to determine when irrigation is needed.

To make automatic irrigation systems more efficient, install system controllers such as rain sensors that prevent sprinkler systems from turning on during and immediately after rainfall, or soil moisture sensors that activate sprinklers only when soil moisture levels drop below pre-programmed levels. You can also use a weather-

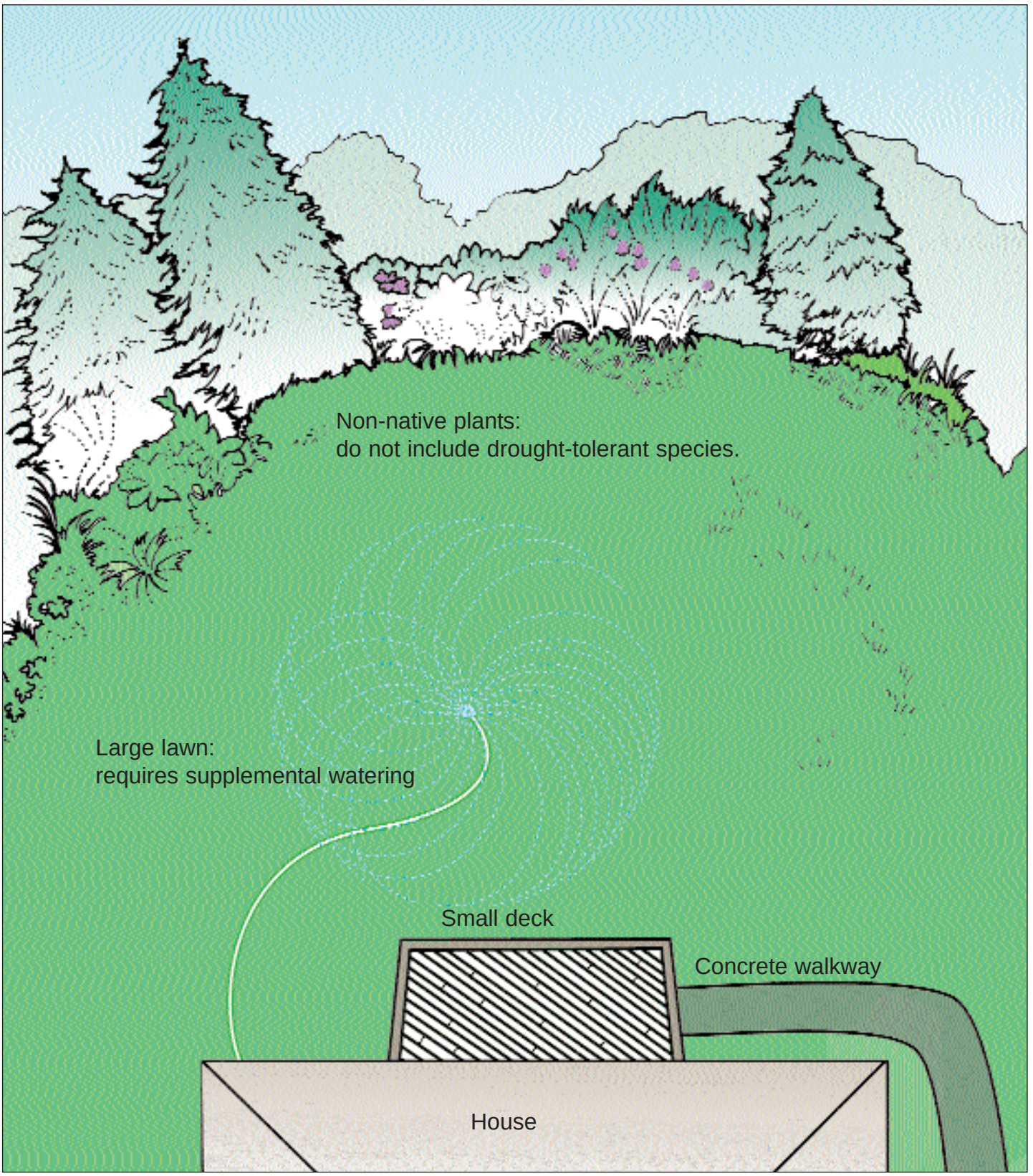
driven programming system. Drip-type irrigation systems are considered the most efficient of the automated irrigation methods because they deliver water directly to the plants' roots. It is also important to revise your watering schedule as the seasons change. Over-watering is most common during the fall when summer irrigation schedules have not been adjusted to the cooler temperatures.

To further reduce your water consumption, consider using alternative sources of irrigation water, such as gray water, reclaimed water, and collected rainwater. According to the AWWA Research Foundation, homes with access to alternative sources of irrigation reduce their water bills by as much as 25 percent.[4] Graywater is untreated household waste water from bathroom sinks, showers, bathtubs, and clothes washing machines. Graywater systems pipe this used water to a storage tank for later outdoor watering use. State and local graywater laws and policies vary, so you should investigate what qualifies as gray water and if any limitations or restrictions apply. Reclaimed water is waste water that has been treated to levels suitable for nonpotable uses. Check with local water officials to determine if it is available in your area. Collected rainwater is rainwater collected in cisterns, barrels, or storage tanks. Commercial rooftop collection systems are available, but simply diverting your downspout into a covered barrel is an easy, low-cost approach. When collecting rainwater, cover all collection vessels to prevent animals and children from entering and to prevent mosquito breeding. Some states might have laws which do not allow collection of rainwater, so be sure to check with your state's water resource agency before implementing a rainwater collection system.

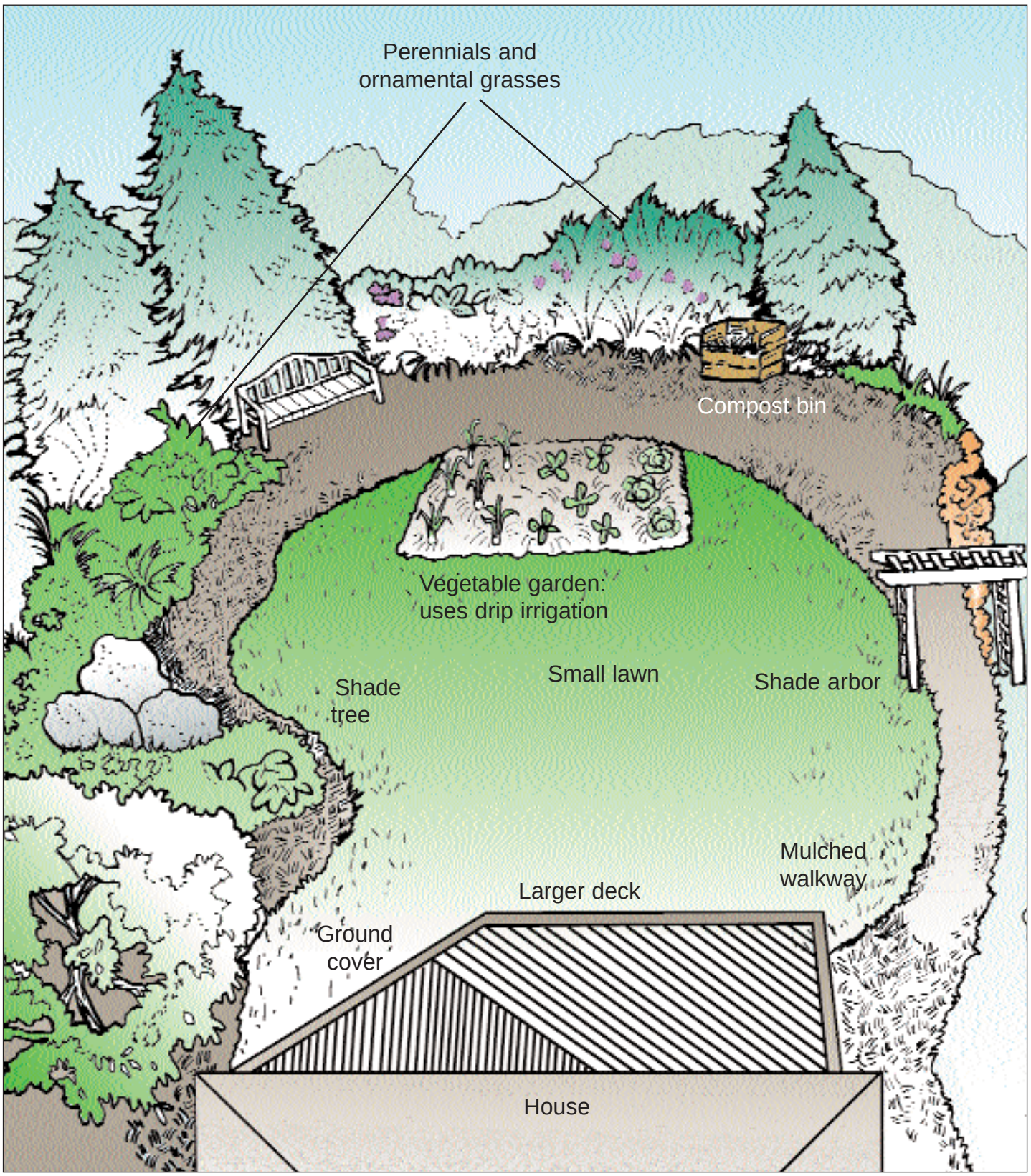
Red Valerian (Centranthus ruber)

4 AWWA Research Foundation. 1999. *Residential End Uses of Water*. <www.waterwiser.org>

Non-xeriscaping



Xeriscaping



Examples of Successful Water-efficient Landscaping Projects

Water-efficient landscaping techniques can be used by individuals, companies, state, tribal, and local governments, and businesses to physically enhance their properties, reduce long-term maintenance costs, and create environmentally conscious landscapes. The following examples illustrate how water-efficient landscapes can be used in various situations.

Oriental Poppies (Paparer orientale)

Homeowner–public/private partnership

- The South Florida Water Management District, the Florida Nurserymen and Growers Association, the Florida Irrigation Society, and local businesses worked together to produce a television video called "Plant It Smart with Xeriscape." The video shows how a typical Florida residential yard can be retrofitted with Xeriscape landscaping to save energy, time, and money. The showcase yard (selected from 70 applicants) had a history of heavy water use—more than 90,000 gallons per month. After the retrofit, the yard's aesthetic value was enhanced; plus it now uses 75 percent less water and relies on yard trimmings for mulch and compost.
- The Southwest Florida Water Management District (SWFWMD), the City of St. Petersburg, and Pinellas County, Florida, produced a video called "Xeriscape It!" It shows a landscape being installed using the seven Xeriscape principles. The SWFWMD also funded several Xeriscape demonstration sites and maintains a Xeriscape demonstration garden at its Brooksville, Florida, headquarters. The garden features a variety of native and non-native plants and is available for public viewing, along with a landscape plant identification guide.
- Residents of Glendale, Arizona, can receive a $100 cash rebate for installing or converting more than half of their landscapable area to non-grass vegetation. The Glendale Water Conservation Office conducts an inspection of the converted lawn to ensure compliance with rebate requirements and then issues a rebate check to the homeowner. The purpose of the Landscape Rebate Program is to permanently reduce the amount of water used to irrigate grass throughout Glendale.

State government

- Although perceived as a water-rich state, Florida became the first to enact a statewide Xeriscape law. Florida's legislature recognized that its growing population and vulnerable environment necessitated legal safeguards for its water resources. The Xeriscape law requires Florida's Departments of Management Ser-

vices and Transportation to use Xeriscape landscaping on all new public properties and to develop a 5-year program to phase in Xeriscape on properties constructed before July 1992. All local governments must also consider requiring the use of Xeriscape and offering incentives to install Xeriscaping.

- Texas also developed legislation requiring Xeriscape landscaping on new construction projects on state property beginning on or after January 1994. Additional legislation, enacted in 1995, requires the Department of Transportation to use Xeriscape practices in the construction and maintenance of roadside parks. All municipalities may consider enacting ordinances requiring Xeriscape to conserve water.

City government

In Las Vegas, Nevada, homeowners can receive up to $1,000 for converting their lawn to Xeriscape, while commercial landowners can receive up to a $50,000 credit on their water bill. The city and several other surrounding communities hope these eye-catching figures will help Las Vegas meet its goal of saving 25 percent of the water it would otherwise have used by the year 2010; to date, it has saved 17 percent. Local officials plan to reach the target with the assistance of incentive programs encouraging Xeriscape, a city ordinance limiting turf to no more than 50 percent of new landscapes, grassroots information programs, and a landscape awards program specifically for Xeriscaped properties. Preliminary results of a five-year study show that residents who converted a portion of their lawns to Xeriscape reduced total water consumption by an average of 33 percent. The xeric vegetation required less than a quarter of the water typically used and one-third the maintenance (both in labor and expenditures) compared to traditional turf.

Yellow Ice Plant (Delosperma nubigenum) *close-up*

Developers

Howard Hughes Properties (HHP), a developer and manager of more than 25,000 acres of residential, commercial, and office development property, has enthusiastically used drought tolerant landscaping on all of its properties since 1990. Most of the company's properties are located in Las Vegas, one of the country's fastest growing metropolitan areas. To conserve resources, the city and county have implemented regulations requiring developers to employ certain Xeriscape principles in new projects. Specifically, a limited percentage of grass can be used on projects, and it must be kept away from streets. As the area's first large-scale developer to recognize the need and value in incorporating drought tolerant landscaping in parks, streetscapes, and open spaces, HHP uses native and desert-adaptive plants that survive and thrive in the Las Vegas climate with minimal to moderate amounts of water.

Drip system irrigation controllers are linked to weather stations that monitor the evapotranspiration rate. This allows HHP to determine the correct amount of water to be applied to plants at any given time. HHP tests the irrigation systems regularly and adds appropriate soil amendments to promote healthy plant growth. The maintenance program also includes pest management, the use of mulching mowers, and the use of rock mulch top dressing on all non-turf planting areas. These measures combine to ensure a beautiful, healthy, and responsible landscape.

Public/private partnerships

Even the most water-conscious homeowners in Southern California are over-watering by 50 to 70 gallons per day. The excess water washes away fertilizers and pesticides, which pollute natural waterways. The quantity of water wasted (and the dollars that pay for it) are even more substantial for large-scale commercial properties and developments.

An innovative partnership in Orange County links landscape water management, green material management, and non-point source pollution prevention goals into one program—the Landscape Performance Certification Program. This program emphasizes efficient landscape irrigation and features a "landscape irrigation budget" based on a property's landscape area, type, and the daily weather. The Municipal Water District monitors actual water use through a system of 12,000 dedicated water meters installed by participating landscape managers.

Participants, including landscapers, property managers, and homeowner associations, can compare the actual cost of water used on their property with the calculated budget. Those staying within budget are awarded certification, a proven marketing tool. This new voluntary program is implemented by the Municipal Water District with input from the California Landscape Contractors' Association, the Orange County Integrated Management Department, the Metropolitan Water District of Southern California, and local nurseries and has the support of 32 retailing water suppliers. The program is already credited with increasing the use of arid-climate shrubs and landscaping to accommodate drip irrigation, and has resulted in cost savings to water customers.

Miscanthus sinensis (Miscanthus grass, also called Maiden grass) *variety with leaves turning yellow for fall.*

For More Information

The following list of organizations can provide more information on water-efficient landscaping. This is not meant to be an exhaustive list, rather it is intended to help you locate local information sources and possible technical assistance.

Turkish Speedwell (Veronica liwanensis) *in background and tulips in foreground.*

Water Management Districts or Utilities

Your local water management district often can provide information on water conservation, including water efficient landscaping practices. Your city, town, or county water management district can be found in the Blue Pages section of your local phone book or through your city, town, or county's Web site if it has one. If you do not know your city, town, or county's Web site, check for a link on your state's Web site. URLs for state Web sites typically follow this format: <www.state.(two letter state abbreviation).us>.

State/County Extension Services

Your state or county extension service is also an excellent source of information. Many extension services provide free publications and advice on home landscaping issues including tips on plant selection and soil improvement. Some also offer a soil analysis service for a nominal fee. Your county extension service can be found in the Blue Pages section of your local phone book under the county government section or through your county's Web site if it has one. The U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service (www.reeusda.gov/statepartners/usa.htm) provides an online directory of land-grant universities which can help you locate your state extension service. Government Guide (www.governmentguide.com) is yet another online resource that might prove helpful in locating state or local agencies.

Organizations

The following is a partial list of organizations located across the United States that provide helpful information on water-efficient landscaping.

American Water Works Association (AWWA)
6666 West Quincy Avenue
Denver, CO 80235
Telephone: 303 794-7711
and
1401 New York Avenue, NW, Suite 640
Washington, DC 20005
Telephone: 202 628-8303
Web: <www.awwa.org>

Arizona Municipal Water Users Association (AMWUA)
Web: <www.amwua.org/program-xeriscape.htm>

BASIN
City of Boulder Environmental Affairs
P.O. Box 791
Boulder, CO 80306
Phone: 303 441-1964
E-mail: basin@bcn.boulder.co. us
Web: <bcn.boulder.co.us/basin/local/seven.html>

Denver Water
1600 West 12th Avenue
Denver, CO 80204
Phone: 303 628-6000
Fax: 303 628-6199
TDDY: 303 534-4116
Office of Water Conservation hotline:
303 628-6343
E-mail: jane.earle@denverwater.org
Web: <www.water.denver.co.gov/conservation/conservframe.html>

New Mexico Water Conservation Program/Water Conservation Clearinghouse
P. O. Box 25102
Santa Fe, NM 87504
Phone: 800 WATER-NM
E-mail: waternm@ose.state.nm.us
Fax: 505 827-3813
Web: <www.ose.state.nm.us/water-info/conservation/index.html>

Project WET - Water Education for Teachers
201 Culbertson Hall
Montana State University
Bozeman, MT 59717
Phone: 406 994-5392
Web: <www.montana.edu/wwwwet>

Rocky Mountain Institute
1739 Snowmass Creek Road
Snowmass, CO 81654-9199
Phone: 970 927-3851
Web: <www.rmi.org>

Southern Nevada Water Authority
1001 S. Valley View Boulevard, Mailstop #440
Las Vegas, NV 89153
Phone: 702 258-3930
Web: <www.snwa.com>

Southwest Florida Water Management District
2379 Broad Street
Brooksville, FL 34604-6899
Phone: 352 796-7211 or 800 423-1476 (Florida only)
Web: <www.swfwmd.state.fl.us/watercon/xeris/swfxeris.html>

Sustainable Sources Green Building Program: Sustainable Building Source Book
E-mail: info@greenbuilder.com
Web: <www.greenbuilder.com/sourcebook/xeriscape.html>

Water Conservation Garden – San Diego County
12122 Cuyamaca College Drive West
El Cajon, CA 92019
Phone: 619 660-0614
Fax: 619 660-1687
E-mail: info@thegarden.org
Web: <www.thegarden.org/garden/xeriscape/index.html> and <www.sdcwa.org/manage/conservation-xeriscape.phtml>\

WaterWiser: The Water Efficiency Clearing House
(Operated by AWWA in cooperation with the U.S. Bureau of Reclamation)
6666 West Quincy Avenue
Denver, CO 80235
Phone: 800 559-9855
Fax: 303 794-6303
E-mail: bewiser@waterwiser.org
Web: <www.waterwiser.org>

Xeriscape Colorado!, Inc.
P.O. Box 40202
Denver, CO 80204-0202
Web: <www.xeriscape.org>

Resources

The following is a partial list of publications on resource efficient landscaping. For even more information, particularly on plants suited to your locale, consult your local library, county extension service, nursery, garden clubs, or water utility.

Ball, Ken and American Water Works Association Water Conservation Committee. *Xeriscape Programs for Water Utilities*. Denver: American Water Works Association, 1990.

Bennett, Jennifer. *Dry-Land Gardening: A Xeriscaping Guide for Dry-Summer, Cold-Winter Climates*. Buffalo: Firefly, 1998.

Bennett, Richard E. and Michael S. Hazinski. *Water-Efficient Landscape Guidelines*. Denver: American Water Works Association, 1993.

Brenzel, Kathleen N., ed. *Western Garden Book*, 2001 Edition. Menlo Park: Sunset Publishing Corporation, 2001.

City of Aurora, Colorado Utilities Department. *Landscaping for Water Conservation: Xeriscape!* Aurora: Colorado Utilities Department, 1989.

Johnson, Eric and Scott Millard. *The Low-Water Flower Gardener: 270 Unthirsty Plants for Color, Including Perennials, Ground Covers, Grasses & Shrubs*. Tucson: Ironwood Press, 1993.

Knopf, James M. *The Xeriscape Flower Gardener*. Boulder: Johnson Books, 1991.

Knopf, James M., ed. *Waterwise Landscaping with Trees, Shrubs, and Vines: A Xeriscape Guide for the Rocky Mountain Region, California, and the Desert Southwest*. Boulder: Chamisa Books, 1999.

Knox, Kim, ed. *Landscaping for Water Conservation: Xeriscape*. Denver: City of Aurora and Denver Water, 1989.

Nellis, David W. *Seashore Plants of South Florida and the Caribbean: A Guide to Identification and Propagation of Xeriscape Plants*. Sarasota: Pineapple Press, Inc., 1994.

Perry, Bob. *Landscape Plants for Western Regions: An Illustrated Guide to Plants for Water Conservation*. Claremont: Land Design Publishing, 1992.

Phillips, Judith. *Natural by Design: Beauty and Balance in Southwest Gardens*. Santa Fe: Museum of New Mexico Press, 1995.

Phillips, Judith. *Plants for Natural Gardens: Southwestern Native & Adaptive Trees, Shrubs, Wildflowers & Grasses*. Santa Fe: Museum of New Mexico Press, 1995.

Robinette, Gary O. *Water Conservation in Landscape Design and Maintenance*. New York: Nostrand Reinhold, 1984.

Rumary, Mark. *The Dry Garden*. New York: Sterling Publishing Co., Inc., 1995.

Springer, Lauren. *The Undaunted Garden: Planting for Weather-Resilient Beauty*. Golden: Fulcrum Publishing, 1994.

Springer, Lauren. *Waterwise Gardening*. New York: Prentice Hall Gardening, 1994.

Stephens, Tom, Doug Welsh, and Connie Ellefson. *Xeriscape Gardening, Water Conservation for the American Landscape*. New York: Macmillan Publishing, 1992.

Sunset Books, eds. *Waterwise Gardening: Beautiful Gardens with Less Water*. Menlo Park: Lane Publishing Company, 1989.

Vickers, Amy. *Handbook of Water Use and Conservation*. Amherst, MA: WaterPlow Press, 2001.

Weinstein, Gayle. *Xeriscape Handbook : A How-To Guide to Natural, Resource-Wise Gardening*. Golden: Fulcrum Publishing, 1998.

Williams, Sara. *Creating the Prairie Xeriscape*. Saskatchewan: University Extension Press, 1997.

Winger, David, ed. *Xeriscape Plant Guide: 100 Water-Wise Plants for Gardens and Landscapes*. Golden: Fulcrum Publishing, 1998.

Winger, David, ed. *Xeriscape Color Guide*. Golden: Fulcrum Publishing, 1998.

Winger, David, ed. *Evidence of Care: The Xeriscape Maintenance Journal, 2002, Vol. 1*, Colorado WaterWise Council, 2001.

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For copies of this publication contact:
EPA Water Resources Center (RC-4100)
U.S. Environmental Protection Agency
Ariel Rios Building, 1200 Pennsylvania Avenue, NW.
Washington, DC 20460

For more information regarding water efficiency, please contact:
Water Efficiency Program (4204M)
U.S. Environmental Protection Agency
Ariel Rios Building, 1200 Pennsylvania Avenue, NW.
Washington, DC 20460
<www.epa.gov/OWM/water-efficiency/index.htm>

United States
Environmental Protection Agency (4204M)
Washington, DC 20460

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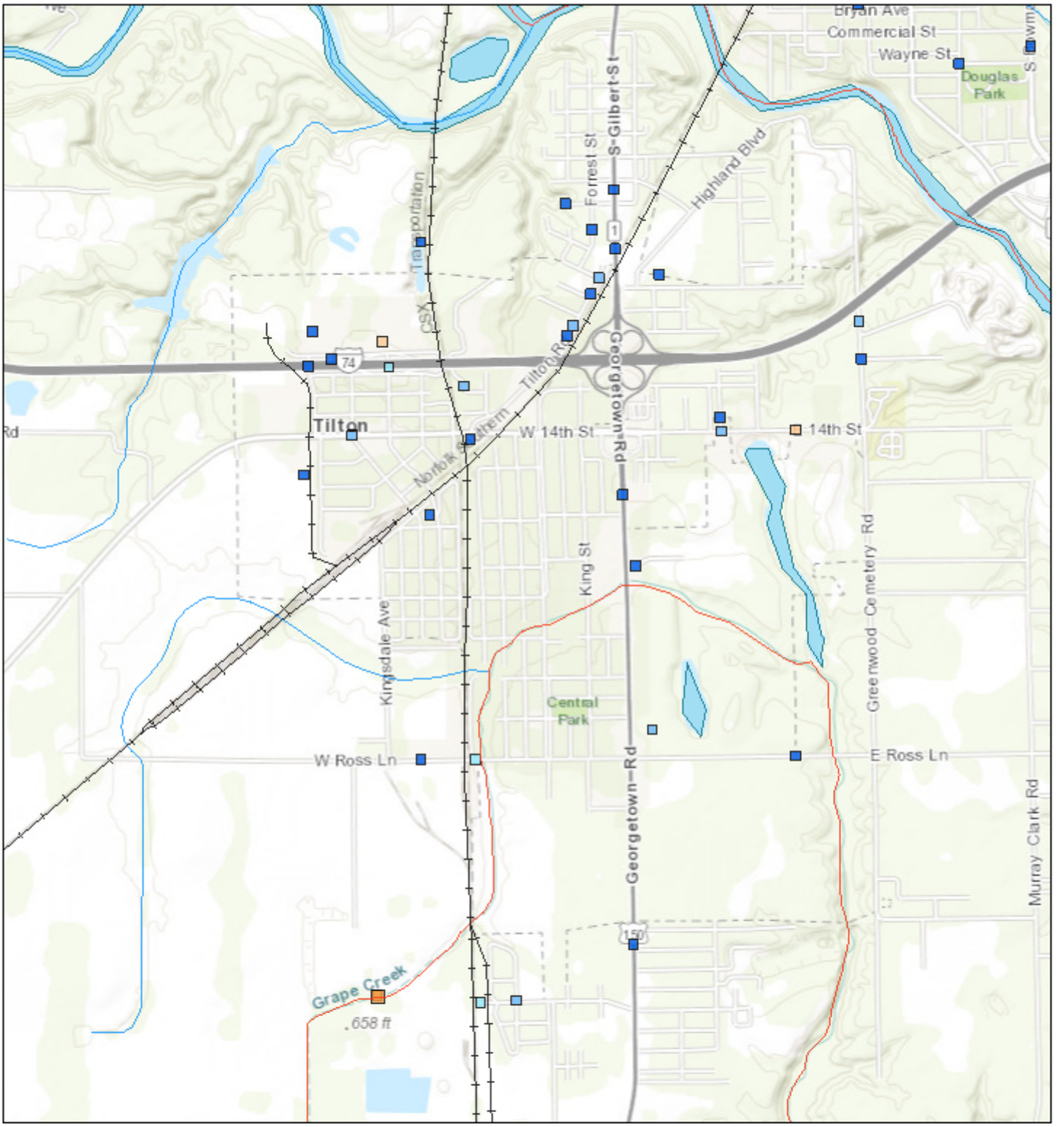
ENVIRONMENTAL JUSTICE SCREEN MAP OF TILTON AREA 2018



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- Railroads
- Streams
- Water Bodies
- Sole Source Aquifers
- Hazardous waste (TSDF)
- Superfund (NPL)
- Superfund
- Toxic releases
- Water dischargers
- Air pollution
- Brownfields

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, © OpenStreetMap contributors, and the GIS User Community
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