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WATER PROTECTION PROGRAM

Wentzville

The Crossroads Of The Nation

City of Wentzville, Missouri

STORMWATER MANAGEMENT PROGRAM

NPDES MS4 Permit MO-R040054

Permit Period
2013-2018

STORM WATER MANAGEMENT PROGRAM

WENTZVILLE

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INTRODUCTION

PURPOSE

The City of Wentzville implements a Stormwater Management Program (SWMP) to protect water quality and effectively reduce pollutants in stormwater runoff to the maximum extent practicable. This five-year plan was developed in accordance with Clean Water Act Phase II requirements outlined in Permit MO-R040054, state regulation 10 CSR 20-6.200 and federal regulation 40 CRF Part 122 for discharges from small regulated Municipal Separate Storm Sewer Systems (MS4s).

This document updates the SWMP for the permit period of June 13, 2013 through June 12, 2018. It is divided into the six Minimum Control Measures (MCMs) as outlined in Section 4.2 of the City's MS4 Permit. For each MCM, it contains Best Management Practices (BMPs) and measurable goals. Measurable goals are selected to evaluate the effectiveness of individual control measures and the stormwater management program as a whole. This plan will be reviewed on an annual basis and updated as necessary. MS4 permit language is shown in **bold text** along with permit section numbering.

BACKGROUND

The City of Wentzville is located in St. Charles County, Missouri in the metropolitan St. Louis area. Major highways include Interstate 70 and 64, and U.S. Highway 61. The City of Wentzville has a population of 29,070 based on the 2010 census, a 321% increase in the last decade. The City's land mass encompasses 19 miles (see Appendix B for a municipal boundary map). Wentzville's planning area covers 44 square miles, with 47% population growth projected by 2020. Development has increased over the last decade as population in the metropolitan area moves west. Approximately 98% of the population lives in developed, more urbanized areas of the City as opposed to rural or larger lot properties.

The City of Wentzville operates and maintains a Municipal Separate Storm Sewer System (MS4) that consists of approximately 4,700 storm drain inlets and drainage structures, 150 miles of storm drain pipe. Additionally, there are over 200 privately maintained stormwater facilities owned by subdivision associations and commercial developments and an unknown quantity of private stormwater systems primarily serving commercial and industrial developments. There are three publicly owned stormwater basins that are maintained by the City.

As an MS4 operator, the City of Wentzville became regulated under the National Pollutant Discharge Elimination System (NPDES) Stormwater Phase II Rule in 2002. Soon after, the City of Wentzville developed a Stormwater Management Program (SWMP) for the 2003-2008 permit period, and later the 2008-2013 permit period. In the first two permit cycles, the City educated the public with 63 articles; over 39,000 brochures; 126 targeted trainings; and 271 school programs reaching over 12,700 students and teachers. An internet presence was developed resulting in roughly 5,800 visits. Public involvement activities also progressed, with over 120 activities and 8,000 volunteers removing more than 72,000 pounds of trash from streams and marking 2,831 storm drains.

Since becoming regulated, the City has also eliminated 24 illicit discharges, inspected 100% of outfalls and stormwater facilities, and passed 7 ordinances that help improve water quality. To address post-construction stormwater management, structural and non-structural BMPs are required at eligible new development and redevelopment under the City's Engineering Design Criteria. Planning and zoning strategies also assess site characteristics prior to construction and help buffer sensitive areas and maintain/increase open space. Under the City's Operations & Maintenance Program, roughly 385 employees have participated in pollution prevention training and roughly 1,000,000 pounds of trash and

debris have been removed from streets and gutters with the Street Sweeping Program, effectively keeping this material out of local streams.

CLIMATE & HYDROLOGY

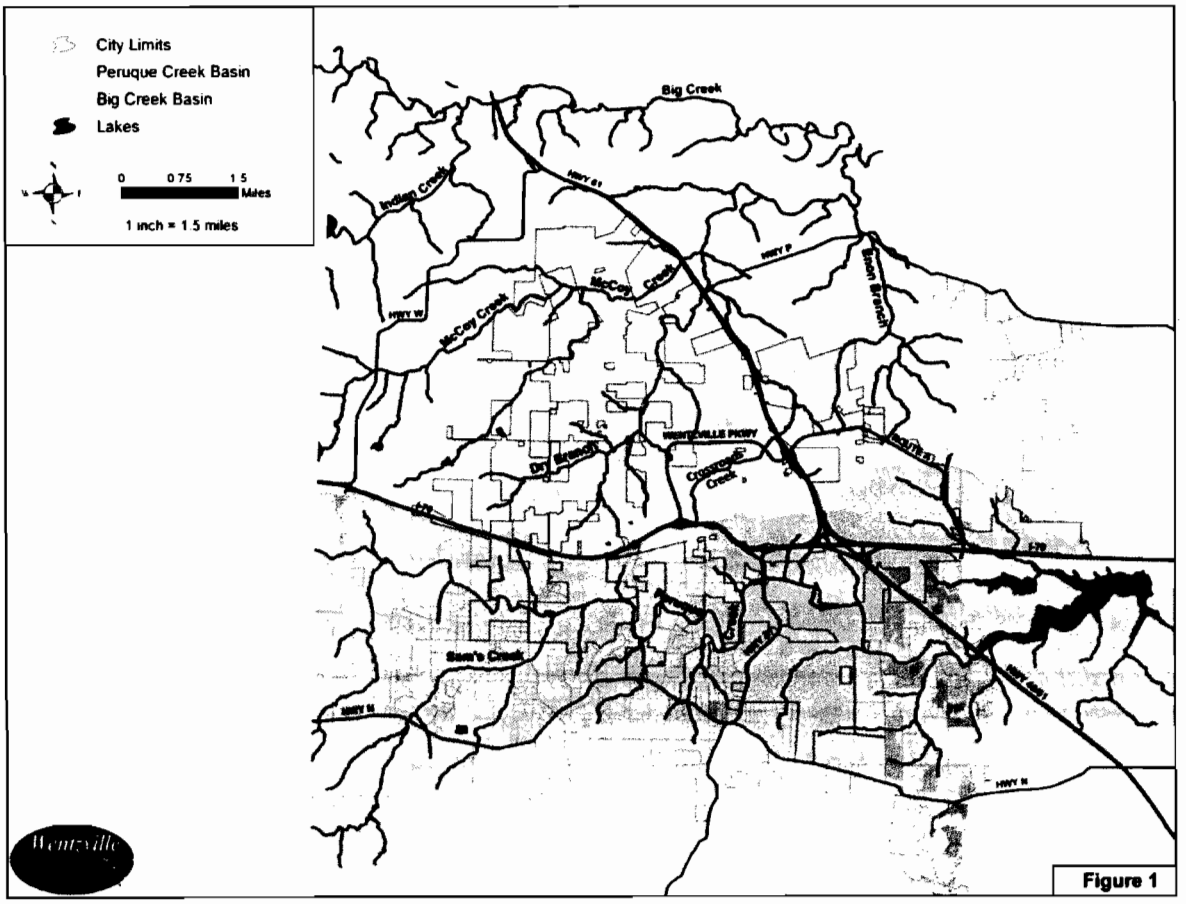
Climate in the region is temperate, with average monthly temperatures ranging from 30° F in January to 78° F in July (St. Louis 1874 to present). The highest recorded temperature of 115° F occurred on July 14, 1954 (National Oceanic and Atmospheric Administration).

The total annual precipitation is 39 inches. Monthly average rainfall is highest in May and June at 4.7 and 4.5 inches. The lowest average rainfall occurs December through February with 1.8 to 2.0 inches. The wettest year with 57.96" of precipitation occurred in 2008. The average relative humidity in mid-afternoon is about 60%.

The City of Wentzville is located in two watersheds that are split predominately by Interstate 70. The Big Creek Watershed (drainage basin) is on the north side of I-70. Major tributaries within the City include McCoy Creek, Dry Branch Creek, Crossroads Creek, Spring Creek, and Enon Branch. Nine tributaries were recently named through the City's Stream Naming Contest and received approval from the U.S. Board on Geographic Names. There are approximately 21.5 miles of stream through Wentzville within the Big Creek watershed. This includes Spring Creek's 2.8 miles of gaining streams where the channel bottom is lower than the groundwater table and 17.4 miles of permanent or intermittent flow. Tributaries discharge into McCoy (HUC 071100080408) and then Big Creek outside City limits.

The Peruque Creek Watershed (HUC 071100090102) is mostly south of I-70. Peruque Creek is a permanently flowing stream that runs roughly 9.6 miles east from Foristell into Lake St. Louis, then north to the Mississippi River. Sam's Creek is the only named tributary in this area.

FIGURE 1. WENTZVILLE WATERSHED MAP



GIS data was provided by CARES and the City of Wentzville and was the most current available as of May 2013

FIGURE 2. WENTZVILLE'S MAJOR STREAMS

Stream Name	*Stream Length through Wentzville (Miles)*
Peruque Creek	9.6
Dry Branch	5.67
Crossroads Creek	4.5
Enon Branch Tributary	1.3
McCoy Creek	1.5
Spring Creek	1.32
Total	**19.39**

WATER QUALITY

Peruque Creek is listed on the 2012 EPA-approved 303(d) List of Impaired Waters for inorganic sediment (source unknown) from the headwaters to Lake St. Louis. Water quality data used for this state and federal determination dates before 2002. According to the Missouri Department of Natural Resources (MDNR), Peruque Creek had been listed in the past because it did not support warm water aquatic life; although other beneficial uses such as secondary contact recreation, whole body contact, and livestock and wildlife watering remained unimpaired. In 2012, MDNR assessed Peruque Creek as unimpaired for all uses. Based upon the 303(d) listing methodology, it was determined the stream was not impaired and sediment was not significantly different from a control stream. EPA requested, however, that Peruque Creek be maintained on the 2012 303d List.

In accordance with Section 303(d) of the Clean Water Act, once a waterbody is listed, a Total Maximum Daily Load (TMDL) must be developed to set the maximum amount of pollution that can enter the stream and still maintain water quality standards. To date, a TMDL has not been developed for Peruque Creek.

Very little water quality data exists for the watershed areas north of I-70 in Wentzville. In 2011, the City was the recipient of a $748,015 grant from US EPA Region 7 through MDNR under the Clean Water Act. This four-year grant helps address nonpoint source water pollution (i.e. oil, trash, and other contaminants that stormwater picks up along its route to drainage ways) as opposed to point source pollution that flows directly from a pipe or easily identifiable location. Because nonpoint source pollution comes from a variety of sources over a wide area, preventing it from getting into our waterways is particularly challenging.

The Dry Branch Watershed: Clear Stormwater and Green Parks Project covers 6,800 acres draining to the confluence of McCoy Creek. Through development of a Watershed Management Plan, the Dry Branch Project has already identified target pollutants, sources, and prioritized solutions for our community. Seasonal water quality data is being collected at five locations and will be incorporated in the plan. The 319 project works to improve water quality by retrofitting existing several stormwater facilities and installing green infrastructure at Heartland Park. Pervious pavement, athletic field biofilters, a native meadow, and parking lot bioswales will help clean stormwater runoff before it gets to the park's lake. Another upstream feature called a forebay will help trap mud and trash from the runoff from 500 acres of development along I-70 and Wentzville Parkway. Project details can be found at www.wentzvillemo.org/319.aspx.

SPECIAL CONDITIONS

3.1 DISCHARGES TO WATER QUALITY IMPAIRED WATERS

3.1.1.1 Determine whether stormwater discharges from any part of the MS4 significantly contributes measurable pollutants directly or indirectly to a 303(d) listed (i.e. impaired) waterbody. If the permittee has discharges meeting this criteria, the permittee shall comply with Section 3.1.2. If the permittee does not, Section 3.1 does not apply to the permittee.

There are stormwater discharges from the City of Wentzville's MS4 that discharge to Peruque Creek. Within the City of Wentzville, Peruque Creek is listed on the 303(d) List with 1) the pollutant identified as inorganic sediment and 2) the comment "Assessed as unimpaired but expected to be retained by EPA. As discussed in the Introduction - Water Quality section, MDNR assessed Peruque Creek as unimpaired in 2012 (based on 303(d) listing methodology) and DNR has determined the stream was not impaired and sediment was not significantly different from a control stream. Stormwater discharges from the MS4 have not been determined to significantly contribute measurable pollutants to Peruque Creek.

See Appendix C for a copy of the 2012 EPA Approved 303(d) List and Total Maximum Daily Load Information Sheet for Peruque Creek.

3.1.1.2 Determine whether a Total Maximum Daily Load (TMDL) has been developed by the department and approved by EPA for the listed waterbody. If there is a TMDL, the permittee shall comply with both Sections 3.1.2 and 3.1.3. If no TMDL has been finalized, Section 3.1.3 will apply when the TMDL is finalized.

The Missouri Department of Natural Resources has produced a Total Maximum Daily Load Information Sheet, however a TMDL for Peruque Creek has not been developed. The City will work with the Missouri Department of Natural Resources to incorporate specific TMDL measurement procedures should the TMDL status change. See Appendix C for a copy of the Total Maximum Daily Load Information Sheet for Peruque Creek.

3.1.2 *Water Quality Controls for Discharges to Impaired Waterbodies.* The permittee's stormwater management program (SWMP) required under Section 4 shall include a description of how the permittee's program will control the discharge of measurable pollutants of concern and ensure the permittee's discharges will not cause or contribute to instream exceedances of the water quality standards. This discussion shall specifically identify measures and BMPs that will collectively control the discharge of the pollutants of concern.

While stormwater discharges from the MS4 have not been determined to significantly contribute measurable pollutants to Peruque Creek, the City takes a pro-active role in preventing pollutants. Almost every BMP in the Wentzville's Stormwater Management Program is designed to reduce pollutants in Wentzville's receiving streams. A brief description follows of how BMPs address pollutants. See Section 4.2 for more details on the Stormwater Management Plan.

MCM I – Public Outreach and Education

The following BMPs educate the public on the proper disposal of wastes, litter prevention, the use of riparian buffers along streams, pollution detection and reporting, and/or proper erosion and sediment control for developments:

- Stormwater Website
- Brochures/Fact Sheets
- School-Aged Educational Programs
- Training Workshops
- Stormwater Articles

MCM II – Public Involvement and Participation

The Concern Hotline and 24-hour online Concern Reporting allow the public to conveniently report pollution, illicit discharges, or issues with construction site sediment controls. Stream Teams and volunteer litter pickups directly remove solid wastes from streets, neighborhoods and streams. These activities also provide opportunities for volunteers to detect and report other illicit discharges.

MCM III – Illicit Discharge Detection and Elimination

- Stormwater Pollution Control Ordinance and Inspections - includes visual field screenings of storm sewer outfalls and water quality BMPs to locate potential illicit discharges such as large amounts of sediment, auto fluids, restaurant grease, or paint.
- Storm Sewer Mapping - aids visual field screening of storm sewer outfalls and illicit discharge response by providing a GPS-based survey
- Alternative Disposal Options are promoted for yard waste, recycling, seasonal large item pickups, and household hazardous waste to provide convenient alternatives to improper disposal or dumping in storm drains or near streams.

MCM IV – Construction Site Stormwater Runoff Control

The following BMPs help control erosion and sediment for land disturbance activities and provide guidance to developers and contractors:

- Erosion/Sediment Control Ordinance, Plan Review, Permitting, and Inspections using "Protecting Water Quality" field manual as a guide for sediment and erosion practices
- Sediment and Erosion Control Training for construction site operators
- Concern Hotline – allows the public to notify the city of issues
- Storm Drain Marking – referenced in the Engineering Design Criteria to encourage installation with new developments

MCM V – Post-Construction Stormwater Management

- Post Construction Ordinance and Engineering Design Criteria - requires proper stormwater management, treatment, and long-term maintenance so the hydrology and quality coming into receiving streams mimics pre-development hydrology. Stream assessments are also required for stream crossings and energy dissipation at storm sewer outfalls to reduce stream bank and channel erosion.

- Planned Growth Ordinances – the Comprehensive Land Use Plan and municipal code updates help direct development and conserve key resources such as riparian areas and tree canopy that help reduce runoff and filter pollutants before reaching streams.

- BMP Inspections and Enforcement - includes review of stormwater quality controls to ensure continual operation and maintenance.

MCM VI - Pollution Prevention/Good Housekeeping for Municipal Operations

The following BMPs help prevent and control pollutants such as sediment, trash, herbicides and fertilizers, hazardous waste, and petroleum products.

- Operations and Maintenance (O&M) Program
- O&M Training
- Street Sweeping on Public Streets
- Flood Management Projects
- Alternative Disposal Options for yard waste, recycling, large items, and household hazardous waste.

4.1 Requirements. The permittee shall develop, implement, and enforce a stormwater management program and plan (SWMP) designed to reduce the discharge of pollutants from the permittee's regulated small MS4 to the maximum extent practicable, to protect water quality, and to satisfy the appropriate water quality requirements of the Missouri Clean Water Law. The SWMP should include best management practices; control techniques and system, design, and engineering methods; and such other provisions as the permitting authority determines appropriate for the control of such pollutants. The permittee's SWMP document shall include the following information for each of the six minimum control measures described in Section 4.2 of this permit:

4.1.1 A description of the best management practices (BMPs) that the permittee will implement for each of the stormwater minimum control measures;

4.1.2 The measurable goals for each of the BMPs including, as appropriate, the months and years in which the permittee will undertake required actions, including interim milestones and the frequency of the action;

4.1.3 The person primarily responsible for the SWMP, and the person(s) responsible for each minimum control measure if different from the primary responsible person; and

4.1.4 The permittee shall implement a program designed to protect water quality in potentially affected waters and ensure that the permitted activities do not cause a violation of the Water Quality Standards

> **4.1.4.1 Discharges to waters of the state shall not cause a violation of water quality standards rule under 10 CSR 20-7.031, including both specific and general criteria; and**
>
> **4.1.4.2 To the extent required by the law, the following general water quality criteria shall be applicable to all waters of the state at all times including mixing zones. No water contaminant, by itself or in combination with other substances, shall prevent the waters of the state from meeting the following conditions:**
>
> > **4.1.4.2.1 Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly or harmful bottom deposits or prevent full maintenance of beneficial uses;**
> >
> > **4.1.4.2.2 Waters shall be free from oil, scum and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses;**
> >
> > **4.1.4.2.3 Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses;**
> >
> > **4.1.4.2.4 Waters shall be free from substances or conditions in sufficient amounts to result in toxicity to human, animal or aquatic life;**
> >
> > **4.1.4.2.5 There shall be no significant human health hazard from incidental contact with the water;**
> >
> > **4.1.4.2.6 There shall be no acute toxicity to livestock or wildlife watering;**

4.1.4.2.7 Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community; and

4.1.4.2.8 Waters shall be free from used tires, car bodies, appliances, demolition debris, used vehicles or equipment and solid waste as defined in Missouri's Solid Waste Law, section 260.200, RSMo, except as the use of such materials is specifically permitted pursuant to section 260.200-260.247.

4.1.5 For facilities under the control of the permittee good housekeeping practices shall be maintained to keep solid waste from entry into waters of the state to the maximum extent practicable;

4.1.6 All fueling facilities under the control of the permittee shall adhere to applicable federal and state regulations concerning underground storage, above ground storage, and dispensers, including spill prevention, control and counter measures;

4.1.9 In addition to the requirements listed above, the permittee shall document the decision process for each minimum control measure and include rationale statements for each BMP and measurable goal defined;

4.1.10 The permittee shall inspect any structures that function to prevent pollution of stormwater or to remove pollutants from stormwater and the facility in general to ensure that all BMPs are continually implemented and effective, and a monitoring schedule shall be specified in the SWMP document;

4.1.11 The SWMP document shall include interim milestones, measurable goals, an implementation schedule and measures for success; and

4.1.12 The permittee shall develop and fully implement each minimum control measure within five (5) years of receipt of its first MS4 permit. At each reissuance of this MS4 permit, the permittee shall comply with new or revised standards as soon as practicable, but no later than 5 years from the date of reissuance.

The City of Wentzville has made tremendous strides to achieve Clean Water Act compliance since 2003. The 2013-2018 Stormwater Management Program (SWMP) has been developed to continue to build on those accomplishments and meet the above conditions to the maximum extent practicable.

The Public Works Department is the primary responsible party for plan management and implementation in the City of Wentzville. This document includes the following for each Minimum Control Measure:

- MS4 permit language is shown in **bold text** along with permit section numbering.
- Best Management Practices (BMPs) – includes descriptions and decision process with rational statements for each BMP, measures for success, and why target audiences were selected, as appropriate.
- Appendix A: Implementation Schedule for BMPs including target pollutants and sources, individual responsible, measurable goals and interim milestones to help evaluate the success for each Minimum Control Measure.

With regard to permit condition 4.1.5, good housekeeping practices for facilities under the City's control are outlined in MCM 6: Pollution/Good Housekeeping for Municipal Operations

With regard to permit condition 4.1.6, the City has eliminated the use of City owned fuel storage tanks for fleet vehicles. Municipal vehicles now use commercial fuel stations. MCM 6 outlines tasks related to municipally-owned fueling facilities to adhere to federal and state regulations for spill prevention, control, and counter measures.

With regard to permit condition 4.1.10, MCM 5 outlines the City's strategy for ensuring that stormwater pollution prevention or treatment structures are continually implemented and effective. Most water quality treatment facilities are, and it is anticipated that they will be, privately-owned and maintained with a maintenance covenant. Annual inspection and maintenance reports are requested to be submitted to the City annually in accordance with the Operations & Maintenance Plan. There are currently two publicly-owned stormwater treatment controls in operation (i.e. the Public Works Facility BMP and the Mexico Road Widening Basin) that are maintained by the City in accordance with maintenance plans.

MINIMUM CONTROL MEASURE 1:
PUBLIC EDUCATION AND OUTREACH ON STORMWATER IMPACTS

4.2.1.1 Permit requirement. **The permittee shall implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies, the steps the public can take to reduce pollutants in stormwater runoff, and how the public can become involved in the stormwater program.**

The City's public education outreach strategy employs a multi-faceted approach to inform the public about common stormwater pollutants, their effects on receiving waters, the extent and magnitude of the problem, and corrective actions the public can take to prevent non-point source (NPS) pollution. The outreach strategy relies on a variety of methods to reach various age groups, ethnic groups, and socio-economic classes.

The City will continue to investigate outreach programs being used or developed by other local, state, or federal entities. The City will continue to primarily use existing stormwater educational resources created internally or provided by neighboring MS4 communities, the Department of Natural Resources, the Department of Conservation, EPA, the Soil and Water Conservation District, and local universities or colleges. In the interest of regional continuity and efficiency, support may be sought from these and other local interest groups and volunteers to perform outreach activities and distribute educational materials.

TARGET AUDIENCE & POLLUTANT SOURCES

The Public Education and Outreach Program is designed to reach at least 15,000 people over the course of this permit term. Target audiences include the general public, businesses, residents, trustees, and students and parents. Target pollutant sources include household activities such as the improper disposal of lawn chemicals, yard waste, household hazardous waste and used auto fluids; construction activities such as improper erosion or sediment control or improper disposal of construction waste; illegal dumping and littering. The target audience groups were selected for their ability to prevent or improve stormwater impacts, serve a majority of the target population, and because the City has successfully established modes of communication for reaching these audiences (such as newsletters, website, civic events, service learning programs, and at city facilities.)

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) and measurable goals for MCM 1 – Public Education and Outreach have been selected based on the City's existing and developing partnerships and the last permit cycle's water quality observations, stakeholder participation and interest, and regional outreach opportunities. The decision process has evolved over the last five years and has involved discussions with City staff; the Stormwater Advisory Committee; stakeholders; neighboring MS4s including the City of O'Fallon, Lake St. Louis, and St. Charles County; guidance from Missouri Department of Natural Resources and EPA websites; successes from the previous permit cycle; and available resources and funding.

The public outreach strategy outlined below and in Appendix A relies on a variety of methods to reach a wide audience in a variety of ages, ethnic groups, and socio-economic classes. The public has the opportunity to recommend changes to the program and provide feedback through online comment forms, public meetings, and surveys and/or program evaluations. BMPs are described in detail below and are summarized in Appendix A along with interim milestones and measures for success. *Coordination with other MCMs is listed in italics.*

1. **Stormwater Management Website** – Webpages will be maintained and expanded as needed to provide a primary and current source of information for all aspects of the City's Stormwater Management Program including how to get involved, information on what citizens can do to address stormwater pollution, what an illicit discharge looks like and what to do about it, the Concerns Hotline and 24-hour online pollution reporting, upcoming seminars, stormwater related regulations, design requirements for storm drainage facilities, erosion and sediment control design requirements, etc. Many target audiences already use the City's website to find local information. Up to 28% of survey respondents indicated that they found the City's website beneficial as a form of outreach. This BMP was selected to reach a wide range of people and to be able to provide a variety of information when it is convenient for them. Measurable goals were selected based on meeting or exceeding the number of visits and/or page views from the previous permit cycle. *MCM 2, 3, 4, 5*

2. **Brochures/Fact Sheets** – The City has created many stormwater educational resources over the last five years based on water quality needs, applicability to target audiences, and to take advantage of public interests. Some materials are provided by the Department of Natural Resources, EPA, and the Soil and Water Conservation District. The City currently uses brochures/fact sheets on the following topics.

   - Storm Drain Marking
   - Detention/Retention Basin Maintenance
   - Stream Care
   - Discover Stormwater & Protecting the Planet Coloring Books
   - Wentzville Trash & Recycling
   - Stormwater Pollution Found Doorknockers
   - Native Plant Rain Gardens

   These publications provide educational information on best practices for pollution prevention; how to report pollution or illegal dumping; and alternatives for yard waste, litter, and household chemicals disposal. Brochures/fact sheets target trustees, residents, students, and property and business owners. Flyers for specific programs or events provide a way for residents to sign up and become involved in improving local water quality. The brochures and/or fact sheets may be made available at Public Works, City Hall, on the City's website and through direct outreach programs. Other brochures or fact sheets that are applicable to the City may be investigated as needed.

   Since the public is accustomed to finding information on various topics at the locations listed above, inclusion of stormwater pollution brochures at these locations will be a successful means to reach the public. Measurable goals were selected to achieve and build on accomplishments of the previous permit cycle. *MCM 2, 3, 5*

FIGURE 3: WENTZVILLE STUDENTS LEARN BY TESTING STREAMS

3. **School-Aged Educational Programs** – Educational programs for school-aged children will continue to be develop and implemented at public and private schools, and for youth organizations (i.e. scouts, church, service, etc.) in the Wentzville MS4 area. Programs may be provided in partnership with St. Charles County, the St. Charles County Soil and Water Conservation District, Department of Conservation and other community organizations.

   This BMP enables educational institutions and youth organizations an opportunity to learn about and improve local issues. Age-appropriate educational programs provide information to children in a format they can understand, give them a chance to ask questions, and helps them learn how to become involved in community-based projects or efforts. Program and curriculum content is discussed with teachers and leaders in advance, using their input to sculpt lessons that meet core standards, Stormwater Management Plan objectives, and meaningful hands-on opportunities for students. Programs that have been successfully used and will continue to be provided include:

   - GM Global Rivers Environmental Education Network (GREEN): Protecting Water Quality & Community Action Problem Solving Curriculum (Earth Force)
   - Project WET (Water Education for Teachers)
   - Discover Nature Curriculum (Mo. Dept. of Conservation) and
   - Stream Habitats & Local Water Quality

   The GM GREEN partnership includes an "Awareness to Action" component that allows students to research local water quality issues and select a civic action project. One middle school and one high school currently participate; another middle school completes the Discover Nature curriculum including stream ecology field trips. Project WET curriculum training is usually offered annually to teachers and Project WET lessons and other activities are provided to elementary schools on a request-basis. In addition, the City promotes an Educator's Resource List online of local educational programs and contacts who are available to talk with classrooms, schools or youth groups about stormwater issues. Feedback from teachers, leaders, and students in the previous term has indicated that this BMP is highly valuable to connect this audience to current topics and opportunities. Measurable goals were selected to achieve and build on accomplishments of the previous permit cycle. *MCM 2, 3, 4, 5*

4. **Targeted Seminars and Training** – Specific seminars and training opportunities will be promoted via flyers, e-mail, the stormwater website, mailing, and/or through direct communication. Potential audiences include volunteers, engineers, builders, developers, neighborhood associations, property owners, and City employees, among others.

   Training will be in coordination with other MCMs (listed below in italics) to take advantage of regional opportunities or collaboration when possible. Training objectives focus on the reduction of target pollutants and will be determined annually based on need and will be implemented as practicable. Seminar topics include, but are not limited to:

   - Volunteer water quality monitoring (Stream Team), *MCM 2 – Public Involvement and Participation*
   - Stormwater pollution detection and elimination, *MCM 3 – Illicit Discharge Detection and Elimination*
   - Erosion and sediment controls (design, inspection, and maintenance), *MCM 4 – Construction Site Stormwater Runoff Control*
   - Stormwater facility design and water quality treatment, *MCM 5 – Post Construction Stormwater Management*
   - Stormwater quality BMP operation and maintenance for neighborhood associations and/or property owners, *MCM 5 – Post Construction Stormwater Management*
   - Operations and maintenance (O&M) training for City employees, *MCM 6 – Pollution Prevention and Good Housekeeping*

   If the seminar or training is focused on a particular department or division of the City, the Department Director or Division Supervisor will be responsible for implementation of the seminar and submitting a Training Report including the attendance, the agenda or course outline, and any comments or staff feedback provided during or after the seminar or training.

5. **Stormwater Articles** – Articles on the Stormwater Management Program, pollution prevention tips, events, and programs are featured in the *Vision* (the City's bi-monthly newsletter), *Noteworthy* (the utility bill newsletter), local newspapers, and/or in partner mailings. Information includes how to get involved in volunteer activities, what citizens can do to address stormwater pollution, and how to report illegal dumping or other stormwater concerns. Public surveys have shown that articles in the Vision and utility bills rank among the top places people have seen information about water quality in Wentzville (indicated by 51% to 79% of respondents in the 2013 and 2009 surveys). *MCM 2, 3, 4, 5*

Please also refer to the following BMPs listed under MCM 2 – Public Involvement and Participation for additional ways the public will become informed about the Stormwater Management Program and ways they can prevent stormwater pollution:

- Wentzville Stormwater Advisory Committee
- Volunteer Programs (Stream Teams. Litter Pickups, and Storm Drain Marking)
- Concern Hotline
- Stormwater Management Program Survey

4.2.1.1.6 [The program shall include the following information] A plan to evaluate the success of this minimum measure.

The measurable goals outlined in Appendix A were selected to provide both quantitative and qualitative indication of the effectiveness of the Public Education and Outreach program and to make use of City employees, supporting partner organizations and volunteers. The effectiveness of this BMP will be evaluated by the number or breadth of programs/materials and the ability to meet or exceed the measurable goals, reach target audiences, and receive positive feedback overall from education programs, training participants, or comment forms. Qualitative observations of decreased amounts of litter or other target pollutants in storm sewers or on stream banks by staff or volunteers also provide insight to evaluate long-term success with the public education and outreach program.

MINIMUM CONTROL MEASURE 2:
PUBLIC INVOLVEMENT / PARTICIPATION

4.2.2.1 ***Permit requirement.*** **The permittee shall implement a public involvement/participation program that complies with State and local public notice requirements, and involve the public in the development and oversight of the SWMP, policies, and procedures. As part of the SWMP document, the public involvement/participation program shall include the following information, at a minimum:**

4.2.2.1.1 How the permittee has involved the public in the development and submittal of the application and SWMP document.

Over the past five years, the City has welcomed public input regarding the SWMP, and related programs and regulations. Examples include public events, notices and meetings for the Stormwater Advisory Committee, Mission: Clean Stream, and updates to the Engineering Design Criteria, natural watercourse protection and sediment and erosion control ordinances. This feedback has helped sculpt the 2013-2018 Stormwater Management Program. Public input continues to be solicited by accepting comment forms online, through the Stormwater Advisory Committee, and by distributing the 2013-2018 draft plan to stakeholders, elected officials, and through public meetings.

4.2.2.1.2 The target audiences for the permittee's public involvement program, including a description of the types of ethnic and economic groups engaged. The permittee is encouraged to actively involve all potentially affected stakeholder groups, including commercial and industrial businesses, trade associations, environmental groups, homeowners associations, and educational organizations, among others.

TARGET AUDIENCE

The City's Public Involvement Program targets the following groups:

- Stakeholders potentially affected by the SWMP. This includes, but is not limited to commercial and industrial businesses, trade associations, environmental groups, homeowners associations, trustees, educational organizations, and City government.
- Volunteers and service groups participating in the SWMP. This includes residents, educators, students, civic and business leaders, scout/youth groups, and environmental organizations.
- Businesses or people living, working, or driving through Wentzville that may generate or help report pollution.

Target audiences include a variety of ages, ethnic groups and socio-economic classes. In Wentzville, 97% of the people speak English and 1% speaks Spanish. For this reason, materials and programs will be provided in English. The types of ethnic and economic groups engaged are provided in Table 1, Demographics in Wentzville.

FIGURE 4: DEMOGRAPHICS IN WENTZVILLE

Wentzville, Missouri Demographics				
Category		Wentzville	Missouri	National
Population, 2010		29,070	5,988,927	308,745,538
Race	White	84.1%	87.2%	82.8%
	African American	12.8%	9.3%	8.4%
	Asian	0.3%	0.7%	1.9%
	Mixed	2.3%	1.5%	2.1%
Speak English		97.0%	96.0%	88.0%
Speak Spanish		1.0%	2.0%	7.0%
Persons under 5 years		11.0%	7.0%	7.0%
Persons under 18 years		34.0%	24.0%	24.0%
Persons 19-64 years		47.0%	55.0%	56.0%
Persons 65 and older		8.0%	14.0%	13.0%
Completed High School (age 25+)		94%	87%	85%
Completed Bachelor's Degree		32%	25%	28%
Completed Graduate Degree		8%	9%	10%
School Enrollment (pre-K to college)		7,864	1,551,053	
Income Per Capita		$27,930	$25,371	$27,915
Median Household Income		$70,642	$47,202	$52,762
Median Home Value		$203,200	$138,900	$186,200
Homeownership rate, 2007-2011		87%	70%	66%

Source U.S. Census Bureau: 2000 census and 2007-2011 American Community Survey

BEST MANAGEMENT PRACTICES

The City strives to achieve demographic representation and continue community involvement in SWMP development and implementation. The BMPs selected will address the viewpoints and concerns of a variety of audiences and stakeholder groups. The Best Management Practices (BMPs) listed have been selected with regard to: water quality needs; applicability to the City of Wentzville; reaching a wide range of target audiences including residential communities, educators, businesses, commercial property owners, the development community and other specific industries; taking advantage of related events and resident interest; and to build on existing and developing programs and partnerships.

Best Management Practices (BMPs) and measurable goals for MCM 2 – Public Involvement/Participation have been selected based on the City's existing and developing partnerships and programs, observations of target audience interest and engagement, successes from the previous permit cycle to efficiently reach a wide range of people, and projected resources and funding. The decision process has evolved over the last five years with discussions among the Stormwater Advisory Committee, volunteer program participants, City staff, and target stakeholder groups.

The public involvement strategy outlined below and in Appendix A focuses on providing convenient ways for people to 1) get connected with information (i.e. through the stormwater website, advertisements, and the advisory committee), and 2) get connected with issues firsthand (i.e. via litter pickups, stream monitoring, and concern reporting).

In the end, we will conserve only what we love, love only what we understand, and understand only what we are taught.

~Daba Dioum, Ecologist

The City actively involves the public in the development and implementation of their program with the BMPs described in detail below and summarized with interim milestones and measures for success in Appendix A. *Coordination with other MCMs is listed in italics.*

1. **Stormwater Management Plan Feedback** – Comments will be solicited by posting the plan and annual reports online along with a form for providing feedback. The City will continue to promote the Plan, goals, key messages, and/or website at public events, targeted trainings, and on promotional materials. This BMP was not frequently used during the last reporting period; however, this BMP remains valuable as an opportunity for anonymous and even 24-hour feedback if needed. Comments will continue to be summarized at Stormwater Committee meetings and/or in the MS4 annual reports. *MCMs 1-6*

2. **Stormwater Advisory Committee** – A panel of citizen and stakeholder representatives was established in 2008 and continues to bring a variety of potentially affected stakeholder groups into the Stormwater Management Program's development and assessment process. The Committee's primary focus is to discuss the effectiveness of the SWMP, propose changes, review and comment on Annual Reports and the next five-year plan. The Committee currently consists of six members with staff support. Four members are appointed by the Mayor with the consent of the Board of Aldermen (BOA) and one BOA liaison is selected by the Board. Meetings comply with State and local public notice requirements to encourage involvement from the general public and media. Agendas and minutes are posted on the City's website and archived with the City Clerk. The meeting schedule has been revised with a goal of more productive meetings and more efficient use of staff time. The current schedule is meetings every other month from February through October. If frequency needs to be adjusted, meetings will be held bi-yearly at a minimum. *MCMs 1-6*

3. **Volunteer Programs** – Citizen volunteers have proven to be invaluable in amplifying pollution prevention and outreach efforts. This BMP is an integral part of the SWMP for several reasons. Volunteering gives the community a sense of ownership in the program. From a practical standpoint, volunteers are needed manpower to make the SWMP effective. Partnerships continue to been developed with Stream Teams, local and regional service organizations, and non-profits with similar interests. Volunteers have indicated that their firsthand experience testing a creek, picking up trash, and marking storm drains has had much more of an impact than someone simply stating there is a problem. Those volunteers are usually compelled to spread the word to get more people on board with changing behaviors or taking action. The City organizes and supports volunteer programs including, but are not limited to:

- Stream Team Water Quality Monitoring – Trained volunteers, staff and/or students monitoring creeks or conduct cleanup or educational activities at self-selected locations. The City of Wentzville currently sponsors three active stream teams, in addition to resident and school Stream Teams:
    - #1062 Water/Wastewater Departments – stream cleanup and testing on McCoy Creek near the Water Reclamation Center
    - #3614 Wentzville Wellness Team – litter pickups
    - #4096 Wentzville Clean Stream Crew – public and volunteer monitoring in the Peruque and Dry Branch Watersheds and cleanup events organized by the City

  Stream Teams are encouraged to conduct monitoring or other outreach activities to help the City evaluate the effectiveness of the overall Stormwater Management Program. Stream Teams report to the City and/or state with the dates and types of Stream Team activity, number of volunteers involved, amount of trash collected, results of water quality tests and observations of the overall condition of their reach of stream including physical, chemical, and biological indicators. Historical data is tracked and referenced online with the Missouri Stream Team program's interactive map. *MCM 1 and 3.*

- Mission: Clean Stream – For the past decade, the City has partnered with Greenway Network, the City of Lake St. Louis, St. Charles County and local businesses to host this stream and lake litter pickup at four to fifteen sites each year, *MCM 1 and 3.*
- Adopt-A-Street – Roadside litter pickups at volunteer-selected locations, *MCM 1 and 3.*
- Storm Drain Marking Program – Since 2007, volunteers have installed permanent metal markers noting "Dump No Waste, Drains to Streams" on existing storm drains across the City. Fact sheets with the "Top Five Pollutants" and ways to reduce them were simultaneously delivered to every home where marking occurred. The City will continue to provide materials and resources to install and/or replace markers as needed to maintain 85% coverage in right-of-ways. *MCM 1, 3, 4, and 5*

The following methods of soliciting input will be used to generate interest and recruit the public for involvement. The public has the opportunity to provide feedback or recommend changes through online comment forms, in person at events, and through surveys and/or program evaluations.

- Advertising on the City website, in newsletters, and at civic meetings
- Postings flyers at municipal buildings, schools, and/or libraries
- Telephone and e-mail notification
- Volunteer sign-ups at civic events
- SWMP Survey

4. **Concerns Hotline** – The City has a dedicated phone number for citizens to use for any concerns. A concern tracking system categorizes concerns and ensure concerns are routed the appropriate department and addressed in a timely manner. Examples of concerns addressed include dumping, storm sewer blockages, construction site issues, and erosion. The hotline is advertised on the City website, in City newsletters, on City vehicles, and in the City's "Welcome to Wentzville" packet for new utility customers. This BMP was

selected and continues to be used because it is a common and easy way for the public to notify the City of issues. *MCM 3, 4, and 5*

5. **Stormwater Survey** – In the previous permit cycle, the City conducted three public surveys, at the beginning, middle and end. The purpose was to gauge attitudes and concerns regarding stormwater and water quality issues and to evaluate the effectiveness of the SWMP. This data will be used as a baseline to compare changes over this permit cycle.

   In 2017 (tentative), a survey will again be distributed to all utility customers (i.e. residents, business and commercial property owners in the City of Wentzville) and will also be available on the website. The stormwater survey will help evaluate outreach efforts and public perception of post-construction BMPs that have been installed to address water quality in newer developments. The results will be analyzed, reviewed with the Stormwater Advisory Committee, and reported in MS4 reports. *MCM 1, 3, 4, and 5*

4.2.5.1.7 How the permittee will evaluate the success of this minimum measure.

The measurable goals listed in Appendix A provide both quantitative and qualitative indication of the effectiveness of the Public Involvement and Participation program. Further, the effectiveness of this BMP will be assessed using the following parameters:

- Type of stakeholder groups represented on committees, in programs, and at events;
- The number and nature of comments and concerns received at meetings, events, and online;
- Ability to track and use water quality data to show improvements in water quality or physical condition due to the SWMP and/or to identify potential illicit discharges or other pollutant sources that require attention; and
- Survey data analysis and use of results.

FIGURE 5: VOLUNTEERS HELPED REMOVE OVER 72,000 POUNDS OF TRASH FROM ROADS AND STREAMS IN THE LAST FIVE YEARS.

MINIMUM CONTROL MEASURE 3:
ILLICIT DISCHARGE DETECTION AND ELIMINATION

4.2.3.1 *Permit requirement*. **The permittee shall develop, implement and enforce a program to detect and eliminate illicit discharges (as defined in 10 CSR 20-6.200) into the permittee's regulated small MS4...the program shall include development and implementation of, at a minimum:**

4.2.3.1.1 A storm sewer system map showing the locations of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls;

See Appendix D for the most current Storm System Map. The City began mapping the storm system (pipes, structures, and outfalls) in 2000. Since then, information has been compiled from field surveys, as-built surveys and archived drawings. Storm system data is incorporated into the City's Geographic Information System (GIS) for ease of analysis and updating. The City has verified and continues to update the information with newer constructed systems. The goal for this permit period is to continue to verify and regularly update the GIS map with infrastructure constructed up to 2013.

Illicit discharge:
(per 10 CSR 20-6.200(1)(C)7)

"any discharge to a municipal separate storm sewer that is not composed entirely of storm water, except discharges pursuant to a state operating permit...and discharges from firefighting activities."

4.2.3.1.2 An ordinance or other regulatory mechanism to effectively prohibit non-storm water discharges into the permittee's storm sewer system, and implement appropriate enforcement procedures and actions;

See Appendix E for the Stormwater Pollution Control Ordinance.

4.2.3.1.3 A plan and schedule to detect and address non-stormwater discharges, including illegal dumping, to the permittee's system. The plan shall include dry-weather field screening for non-stormwater flows and field tests of selected chemical parameters as indicators of discharge sources. The plan shall also address on-site sewage disposal systems that flow into the permittee's storm drainage system. As part of the SWMP, the program shall include development and implementation of, at a minimum:

Illicit discharge detection and elimination continues to be addressed through a variety of BMPs as described below and scheduled in Appendix A. BMPs have been selected based on national and state regulations along with discussions with City staff, neighboring MS4s communities, guidance from MO Department of Natural Resources and EPA websites, successes from the previous permit cycle, and available funding. (*Coordination with other MCMs is listed in italics*).

1. **Stormwater Pollution Control Ordinance** – This regulatory mechanism directly prohibits illicit discharges into municipal separate storm sewers. It includes procedures for inspection, monitoring, abatement, and enforcement measures, in

addition to remediation cost recovery. This BMP is a regulatory requirement; ordinance language was selected from national models and for regional consistency. *MCM 4 and 5*

2. **Illicit Discharge Detection & Enforcement** – The City will conduct visual field screenings of all major outfalls and industrial/commercial enterprises in accordance with the schedule provided in Appendix A. In addition, potential illicit discharges may be reported through: volunteer programs, stream team visual surveys, the concern hotline, and online reporting form. The stormwater website offers information on what an illicit discharge looks like and reporting procedures. This BMP was been based on discussions with City staff, successes from the previous permit cycle, and available funding. *MCMs 1, 2, 4, 5, and 6*

4.2.3.1.3.1 Procedures for locating priority areas with higher likelihood of illicit connections (e.g., areas with older sanitary sewer lines) or ambient sampling to locate impacted reaches:

During dry-weather field screening of representative and major outfalls, priority will be given for residential and commercial areas with older sanitary lines and/or known safety/health compliance issues. Additional information to locate priority areas can also be provided by the concern hotline, stream teams, or litter pickup volunteers noting visual location of potential problem areas. Once an illicit discharge is located, that area will become a priority area for additional screening by the City. *MCM 2*

4.2.3.1.3.2 Procedures for tracing the source of an illicit discharge:

When the City is alerted to a potential illicit discharge, the City will address the concern in accordance with the Stormwater Pollution Control Ordinance, or other pertinent city codes. An inspector may investigate to verify the existence of an illicit discharge. Methods available for the inspection program include visual inspection, smoke and dye tests and closed circuit television. Investigations may include visible evidence or chemical tests to indicate contamination. Once an illicit discharge is found, a field survey with testing will take place, working upstream until the source of origin is located. During the inspection process, the City will seek permission and access private property to the extent allowable by law. Details on the location and removal of illicit discharges will be documented in the concern tracking system and/or on file with the Stormwater Coordinator.

4.2.3.1.3.3 Procedures for removing the source of the illicit discharge.

Details on the location and removal of illicit discharges will be documented in the concern tracking system and/or on file with the Stormwater Coordinator. The City will work with the source of the illicit discharge to remedy the situation. Discharges shall be removed by the party responsible for the violation, at no expense to the City. Violators may be required to:

- Perform monitoring, analysis and reporting;
- Implement source control or treatment BMPs to prevent violations from recurring; and
- Remediate or restore property affected by stormwater pollution.

Should the responsible party refuse to cooperate; the penalty provisions included in the Stormwater Pollution Control or other related ordinances will be enforced.

Should the source of a violation not be identified, the City will remediate and curtail the violation to the maximum extent practicable, taking into account cost, manpower requirements and the availability of state and federal funding. Volunteer programs such as Stream Teams, Adopt-a-Street, or Mission: Clean Stream may also be recruited to help remove illicit discharges such as floatables and litter.

3. **Stormwater Treatment BMP Inspection** – *MCM 5 Post-Construction Stormwater Management in New Development and Redevelopment* requires installation of structural water quality controls in affected developments. Maintenance plans and agreements with template inspection reports are required in the permitting process. The City will perform biennial reviews of BMP inspection reports submitted by property owners and/or inspections of stormwater treatment BMPs as needed to ensure proper operation, maintenance, and effectiveness. This BMP was chosen based discussions with City staff, neighboring MS4s communities, guidance from national resources, and available funding.

4. **Stormwater Pollution Prevention Outreach** – Public employees, businesses, and the public are informed of the hazards associated with illegal discharges and improper disposal of waste through the stormwater website, brochures/fact sheets, school educational programs, targeted training, and at city facilities. When pollution is found, stormwater doorknockers are used to inform surrounding residents or businesses of the issue and how to prevent it. This practice continues to be used for its ability to reach target audiences, successes from the previous permit cycle, and available funding. *MCM 1, 2, 4, 5, and 6*

5. **Storm System Mapping** – Storm system infrastructure data (i.e. pipes, inlets, outfalls, etc.) is incorporated into the City's Geographic Information System (GIS) maps for ease of analysis and updating. The goal for this permit period is to continue to verify and regularly update the GIS map with infrastructure constructed up to 2013 using field surveys, as-built surveys and archived drawings. See Appendix D for the most current Storm System Map.

6. **Concern Hotline** – The City has a dedicated phone number for citizens to use for any concerns. A concern tracking system categorizes concerns and ensure concerns are routed the appropriate department and addressed in a timely manner. Examples of concerns addressed include illegal dumping, construction site issues, and erosion. The hotline is advertised on the City website, in City newsletters, on City vehicles, and in the "Welcome to Wentzville" packet for new utility customers. This BMP was selected and continues to be used because it is a common and easy way for the public to notify the City of issues. *MCM 2, 4, and 5*

7. **Alternative Disposal Options** – The following programs exist to provide disposal options for target pollutants and sources. This BMP was chosen based on availability of local and regional programs, guidance from state and national websites, successes from the previous permit cycle, and available funding.

   - Curbside Residential Waste, Recycling, and Yard Waste Collection – To divert the potential for promiscuous litter and improper yard waste disposal, the City of Wentzville contracts with a licensed solid waste hauler for curbside solid waste, yard waste, and recycling pickup. Residents are can subscribe to services, giving them a means for proper disposal of materials. The recycling service is mandatory, meaning cost for recycling is built into the base fee whether they use the service or not.

     The municipal waste contract stipulates that the City can assess administrative charges, or deduct or withhold money due, for issues such as: failure to resolve a complaint within a given time frame; failure to clean up spills or litter; failure to maintain equipment in a clean, safe, and sanitary manner; etc. This language helps ensure that services are delivered and consistent with permit goals.

     Wentzville also conducts two free special trash pickups per year in the spring and fall. Households can put out large bulky items, electronic items and construction/remodeling waste at these pickups. Waste collection information is posted online and advertised in the *Vision* community newsletter and *Noteworthy* utility bill inserts. *MCM 1 and 5*

   - Household Hazardous Waste Collection – Residential hazardous chemical collection is available through St. Charles County. The Division of Environmental Services operates two recycling drop-off centers for all county residents, including residents of the City of Wentzville. Recycle Works West is located in Wentzville and accepts a variety of household wastes that are also target pollutants: antifreeze, transmission and hydraulic fluid, motor oil, batteries, oil-based paints, pool chemicals, appliances, and computers and electronic equipment, among others. Recycle Works Central accepts hazardous household chemicals such as lawn chemicals, solvents, etc. during the months of April through October. The chemicals collected are recycled, used to produce energy, or packaged for safe disposal in a hazardous waste landfill.

8. **Storm Drain Marking** – Since 2007, volunteers have installed permanent metal markers noting "Dump No Waste, Drains to Streams" on existing storm drains across the City. Fact sheets with common pollutants and ways to reduce them were simultaneously delivered to every home where marking occurred. The City will continue to provide materials and resources to install and/or replace markers as needed to maintain 85% coverage in right-of-ways. In addition, developers will be encouraged to mark highly-visible drains in new developments. *MCM 1, 2, 4, and 5.*

9. **Private Sewage Systems** – The City of Wentzville does not allow new septic or private package treatment plants within the municipal boundaries. In addition, as an area is incorporated into the City limits, that area is converted to the public sanitary system where practicable. There are currently only six private sewage systems in the City limits.

4.2.3.1.3.6 Procedures for program evaluation and assessment.

The measurable goals in Appendix A provide quantitative and qualitative indication of the effectiveness of the Illicit Discharge Detection and Elimination Program. These milestones will be reported on annually. Further, the following parameters can help assess the effectiveness of this BMP:

- The number and nature of illicit discharges located and removed;
- Enforcement and remediation actions taken;
- Ability of procedures to identify and remove illicit discharges; and
- Number of tons of household chemicals collected by St. Charles County.

4.2.3.1.4 Address the thirteen categories of non-storm water discharges or flows, identified in this section of the permit, only if the permittee identifies any of them as significant contributors of pollutants to the permittee's small MS4;

The City has not identified any listed categories of non-stormwater discharge as significant contributors of pollutants to the MS4. Should any of the listed categories or other occasional non-stormwater discharges be found to contribute significant pollutants, action will be initiated to effectively prohibit or control such discharges using existing ordinance provisions and enforcement actions.

4.2.3.1.5 ...a list, of other similar occasional incidental non-storm water discharges that the permittee has determined will not be addressed as illicit discharges, subject to the conditions in Section 4.2.3.1.5 of the permit.

Non-commercial or charity car washes are considered allowable incidental non-stormwater discharges as they have not been found to be significant sources of pollutants to the MS4. Under the existing program, any incidental non-stormwater discharge that becomes a source of significant pollutants, appropriate local controls or conditions will be placed on such discharges.

4.2.3.1.6 The permittee should inventory, inspect and have enforcement authority for industries and commercial enterprises within their boundary that may contribute pollutants via storm water to the MS4.

Commercial and industrial properties were inventoried and inspected in the last permit cycle. Properties were prioritized for potential to generate pollution and for future inspection. Very few areas were verified sources of pollution or had a high pollution potential rating. Therefore, to be efficient with staff time and resources, the City

intends to prioritize future inspections based on this rating and may perform inventory updates and random inspections as needed. The following City ordinances continue to provide enforcement authority:

- Chapter 215: Nuisances – addresses human excrement, junked or abandoned motor vehicles, animal or vegetable matter that has become putrid, offensive or unhealthy, filth, garbage, ashes, foul, nauseous or unclean water, etc.

- Chapter 240: Garbage and Rubbish

- Chapter 510: Streets, Sidewalks and other Public Places –addresses depositing dirt, rocks, etc. from land disturbance activities or hauling in or around storm drain structures.

- Chapter 720: Wastewater Pretreatment – Article I – which addresses the use of the wastewater system for discharges from businesses such as restaurants, laundries, car washes, etc. and requires the use of oil separators and grease traps and/or sand interceptors.

- Chapter 725: Stormwater Pollution Control

These ordinances are maintained and updated on the City's website under Municipal Code.

MINIMUM CONTROL MEASURE 4:
CONSTRUCTION SITE STORMWATER RUNOFF CONTROL

4.2.4.1 ***Permit requirement*****. The permittee shall develop, implement, and enforce a program to reduce pollutants in any stormwater runoff to their regulated small MS4 from construction activities that result in a land disturbance of greater than or equal to one acre. Reduction of stormwater discharges from construction activity disturbing less than one acre shall be included in the program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. The program shall include the development and implementation of, at a minimum:**

The target audience for MCM 4 includes developers, contractors, and the City of Wentzville. As the Wentzville area has experienced extensive growth, the targeted pollutants include sediment, litter, concrete truck washout, sanitary waste, and hazardous materials from construction sites.

Best Management Practices for this MCM are numbered under the regulatory permit language below. The decision process to use the mechanisms described below involved continuity with existing programs, discussions with City departments, neighboring MS4s, the Home Builders' Association, and evaluation of available resources and funding. The measurable goals were selected to provide both quantitative and qualitative indication of the effectiveness of the Construction Site Stormwater Runoff Control program and to make efficient use of existing procedures.

4.2.4.1.1 An ordinance or other regulatory mechanism to require operators to implement erosion and sediment control BMPs at construction sites; to include sanctions to ensure compliance, to the extent allowable under State or local law;

1. **Erosion and Sediment Control Ordinance** (see Appendix E) – requires erosion and sediment controls, as well as sanctions to ensure compliance. The Protecting Water Quality Field Guide is referenced in the ordinance as best practices operators should follow.

4.2.4.1.2 Requirements for construction site operators to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality;

The Protecting Water Quality Field Guide includes the following design guidance for BMPs: SWPPP contents, contractor inspection and maintenance procedures, and proper handling requirements for construction waste such as discarded building materials, concrete truck washouts, chemicals, litter, and sanitary waste.

The following regulatory mechanisms (city policies or ordinances in Wentzville Municipal Code) also support these requirements:

- Demolition Permit (includes information on proper disposal of demolition wastes)
- Chapter 215: Nuisance Ordinance
- Chapter 240: Garbage and Rubbish Ordinance
- Chapter 510: Streets, Sidewalks and other Public Places
- Chapter 725: Stormwater Pollution Control Ordinance

4.2.4.1.3 Procedures to consider and review all pre-construction site plans for potential water quality impacts;

2. **Pre-Construction Site Plan Review** – The goal for this permit period is to continue the site plan review process including the review of erosion and sediment control plans. The City reviews all site plans disturbing 20,000 square feet or more. Chapter 520 of the Wentzville Municipal Code, entitled Erosion and Sediment Control, requires that "*any person, firm, corporation, or business proposing to develop land within the City of Wentzville shall apply to the designated official for approval of required erosion control plans and issuance of a grading permit*." See Appendix E for a copy of the ordinance.

   Provisions are required to address increased runoff caused by changed soil and surface conditions during and after grading activities. The *Protecting Water Quality Field Guide* is incorporated into ordinance language by reference and requires the use of erosion and sediment Best Management Practices (BMPs) to prevent adverse water quality impacts. The Sediment and Erosion Control Plan must assure that sediment is not transported from the site by a 15-year (frequency), 20-minute (duration) storm event or less. The ordinance includes standards for vegetative re-establishment, finished grades, and development along natural watercourses. If a Land Disturbance Permit issued by the Missouri Department of Natural Resources is required, the permit number shall be required prior to issuance of a grading permit.

   City engineers review all plans to determine the site conditions before, during and after construction. This includes the phasing of construction, erosion and sediment control BMPs, and a list of the responsible parties involved with construction. Responsible parties are required to post a Performance Guarantee with the City to ensure that all BMPs are working and the site is protected against sediment runoff.

   Grading operations 20,000 square feet or larger conducted by the City of Wentzville also include an erosion and sediment control plan, and go through the same review process and meet all local, state and federal requirements.

3. **Storm Drain Marking** – Through standards in the City's Engineering Design Criteria, developers will be encouraged to mark highly-visible storm drains in new developments with permanent markings noting "Dump No Waste, Drains to Streams." The City will continue to provide materials and resources to replace markers as needed after installation to maintain 85% coverage in right-of-ways. *MCM 1, 2, and 5.*

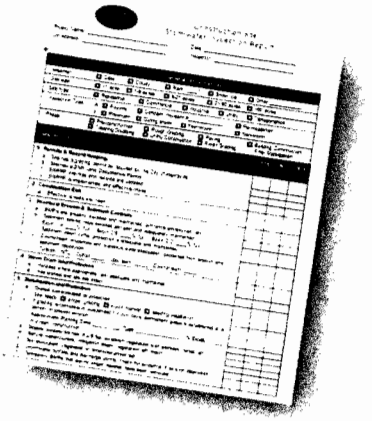
4.2.4.1.4 Procedures for the permittee to receive and consider information submitted by the public; including coordination with the permittee's public education program;

BMPs described in MCM 2 - Public Involvement and Participation offer procedures for receipt and consideration of information submitted by the public:

- Concerns Hotline
- Stormwater Advisory Committee
- Stormwater Management Program Survey
- Stormwater Management Webpage Contact Us Form

4.2.4.1.5 Procedures for the permittee to inspect sites and enforce control measures, including prioritization of site inspections;

4. **Construction Site Inspections and Enforcement** – Inspection and enforcement procedures follow Municipal Code Chapter 515: Erosion and Sediment Control. Inspections of sediment/erosion control measures are routinely performed during site inspections of other infrastructure. Inspections are also typically conducted after major rain events and/or on a complaint-driven basis. Builders/developers may submit routine Stormwater Pollution Prevention Plan (SWPPP) reports to the Engineering Department for review. Staff use a template Construction Site Stormwater Runoff Inspection Report for consistency. This report also provides a mechanism for inspectors to identify what the site's future inspection priority is; this is based on site size, history of non-compliance, severity of issues, proximity to surface waters, etc. Contractors are be required to make the following items available upon request:



   - A copy of the grading permit and most current erosion and sediment control plan
   - Inspection and maintenance logs from routine and heavy rain event inspections
   - A copy of the Land Disturbance Permit issued by the Missouri Department of Natural Resources, if required

   Municipal construction projects will also be required to follow the requirements outlined herein. The Engineering Division's measures for compliance and enforcement include inspections, verbal and written notices to correct, citations, stop work orders, fines, and use of a Performance Guarantee. Inspections provide enforcement of the erosion and sediment control BMPs employed on each site. If the BMPs are not being followed or are not working as intended, a notice to correct is issued. By ordinance, the Notice to Correct requires a 30-day compliance period unless an imminent hazard or emergency exists. If compliance is not met within the allocated time, a citation or Stop Work Order can be issued. At this point fines can be issued to the violator. Fines not to exceed five hundred dollars ($500.00) per violation per day could be levied against the violator. If the fines are ignored and compliance is not met, the monies provided by the performance guarantee can be used to correct the violation and return the site to compliance.

5. **Sediment and Erosion Control Training** – The goal of this permit period is to continue the erosion and sediment control inspector/operator training programs. The Engineering Division currently has six staff members trained in erosion and sediment control; all have a minimum of three years' experience. The builder/developer community continues to change with the changes in the economy over the last five years. Additional on-site training and/or periodic refresher courses will be conducted or promoted biennially or as needed for new inspectors and/or construction site operators on BMP design, installation, maintenance, compliance inspections, etc. *MCM 2 Public Outreach and Education*

4.2.4.1.6 A plan to ensure compliance with the permittee's erosion and sediment control regulatory mechanism, including the sanctions and enforcement mechanisms they will use to ensure compliance and procedures for when certain sanctions will be used. Possible sanctions include non-monetary penalties (such as stop work orders), fines, bonding requirements, and/or permit denials for non-compliance; and

This is described above in Section 4.2.4.1.5.

4.2.4.1.7 Describe how the permittee will evaluate the success of this minimum measure, including how the permittee selected the measurable goals for each of the BMPs.

The measurable goals in Appendix A provide quantitative and qualitative indication of the effectiveness of construction site stormwater runoff control measures. Milestones will be reported on annually. Further, the following parameters can help evaluate the success of BMPs:

- The number and nature of construction site runoff concerns received;
- Feedback from inspectors, the public, and/or construction site operators as to improvements in erosion and sediment control measures on construction sites; and
- Qualitative observation of water quality during outfall field screenings near construction sites.
- Number and type of correction notices and enforcement procedures used

MINIMUM CONTROL MEASURE 5: POST-CONSTRUCTION STORMWATER MANAGEMENT IN NEW DEVELOPMENT AND REDEVELOPMENT

4.2.5.1 ***Permit requirement*. The permittee shall develop, implement, and enforce a program to address the quality of stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the permittee's regulated small MS4. The permittee's program shall ensure that controls are in place that have been designed or implemented to prevent or minimize water quality impacts by reasonably mimicking pre-construction runoff conditions on all affected new development projects and by effectively utilizing water quality strategies and technologies on all affected redevelopment projects, to the maximum extent practicable. The permittee shall assess site characteristics at the beginning of the construction design phase to ensure adequate planning for stormwater program compliance. The purpose for this approach is to arrive at designs and practices that provide for most effective water quality treatment through infiltration, flow rates and similar site-design opportunities. As part of the SWMP document, the program shall include the following information, at a minimum:**

4.2.5.1.1 A strategy to minimize water quality impacts, by reasonably mimicking pre-construction runoff conditions in affected new development and incorporating water quality protection in affected redevelopment projects to the maximum extent practicable, and include a combination of structural and/or non-structural BMPs appropriate for the permittee's community;

4.2.5.1.2 An ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment projects to the extent allowable under State, or local law;

The City will continue to implement and build on the Post-Construction Stormwater Management Program that combines structural and non-structural strategies and regulatory mechanisms to address post-construction runoff from development projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan of development or sale, that discharge into the Wentzville MS4.

The Best Management Practices (BMPs) and measurable goals described below have all been selected based on regional, state, and national regulations, local water quality needs, successes and observations in the last permit cycle, and applicability to the population of Wentzville. The decision process involved an evaluation of existing City codes, discussions with City departments, public hearings, and evaluations of neighboring MS4 post-construction programs including the St. Louis Metropolitan Sewer District, the City of O'Fallon and Lake St. Louis, St. Charles County, and the City of Columbia.

1. **Post-Construction Runoff Ordinance** (**Engineering Design Criteria**) – The City continues to implement and update Engineering Design Criteria (adopted by City Ordinance #3276) which includes detention and water quality treatment specifications that are designed to prevent or minimizes water quality impacts. Post-construction design requirements for stormwater facilities were enacted in 2008 and revised in 2013 to meet the requirements of the General State Operating MS4 Permit. Requirements were open for public comment and a stakeholder's meeting was held to discuss comments prior to approval.

In accordance with MS4 permit requirements, all new affected developments over one acre must reasonably mimicking pre-construction runoff conditions to the maximum extent practicable. The Engineering Design Criteria targets the storage and treatment of 90% of the recorded daily rainfall events. In numerical terms, this is equivalent to 1.14" of rainfall multiplied by the site area and runoff coefficient. Water quality strategies and technologies shall be effectively used on all redevelopment projects more than an acre.

Structural water quality BMP groups include items in the table below. The non-structural credits offered also encourage low-impact development options.

FIGURE 6: WATER QUALITY BMPS

Structural BMPs	Non-structural Credits
Stormwater Ponds	Natural Area Conservation
Stormwater Wetlands	Disconnection of Rooftop Runoff
Infiltration Practices	Disconnection of Non-rooftop Impervious Area
Filtering Practices	Sheet Flow to Buffer
Open Channel Practices	Open Channel Use
Riparian Buffer Widening	Environmentally-sensitive Development
	Impervious Cover Reduction

New development and re-development projects must provide stormwater channel protection and flood detention if they are determined to have a differential runoff greater than 2 cubic feet per second (cfs) for the 15-year, 20-minute storm event. If required, 24-hour extended detention of the 1-year, 24-hour storm is required to protect stream channels from erosion. The rationale for this criterion is that runoff will be stored and released in such a gradual manner that critical erosive velocity during bankfull and near-bankfull events will seldom be exceeded in downstream channels. A Channel Assessment and Channel Condition Scoring Matrix are also completed for projects crossing over or under a natural channel in order to inform the crossing design. To reduce sedimentation and stream degradation, grade controls are used in receiving streams at crossings and pipe outfalls.

If flood detention is required, runoff shall be detained so that the post-developed peak flow from the site does not exceed the existing peak flow for the 2-year, 24-hour event and the 25-year, 24-hour event. In addition, erosion protection is required in engineered channels and at pipe outfalls to reduce or eliminate sediment generation in these high stress areas.

Per Wentzville's Engineering Design Criteria (EDC), all public or private sewerage, public water mains, drainage works or other public improvements proposed to be constructed, altered or reconstructed within the City must be reviewed by the Engineering division. This includes altering of any storm drainage channel, site drainage or flood plain. Pre-site design meetings, site plan reviews, retrofitting, and long-term operations and maintenance plans continue to be required for projects.

Municipal Capital Improvement Projects such as roadway widening and new municipal buildings and parking lots that meet the requirements for stormwater management will also be designed in accordance with the EDC requirements.

Criteria updates will be under review for possible revisions for consistency or other improvements in the next permit cycle. See Appendix E for relevant sections of the design criteria. The entire criteria are available at: http://www.wentzvillemo.org/engineering-design-criteria.aspx.

2. **Post-Construction Plan Reviews** – The goal for this permit period is to continue the site plan review process including the review of structural BMPs and non-structural BMP credits and incentives at all affected developments. Chapter 405 of the Wentzville Municipal Code, entitled Engineering Division Approval, requires that *"All applicants who receive final approval of a site plan shall file a completed application with the City's Engineering Division for grading and/or site improvement plans for review and approval of established engineering design criteria and/or standard specifications and construction details, as applicable."*

   City engineers review all plans to determine the site conditions before, during and after construction. This includes the pre- and post-construction hydrology, BMP selection, phasing of BMP installation and maintenance, and review of long-term maintenance plans and covenants as described below. Municipal improvements and development also go through the same review process to meet all local, state and federal requirements.

4.2.5.1.3 A plan to ensure adequate long-term operation and maintenance of selected BMPs, including types of agreements between the permittee and other parties such as the post-development landowners or regional authorities;

3. **BMP Operations & Maintenance Plan** – To ensure adequate long-term operation and maintenance of stormwater control BMPs, the Engineering Design Criteria (EDC) requires developers to submit a BMP Maintenance Plan and record a Stormwater Maintenance Covenant prior to construction permit issuance. The plan includes:

   - The person(s) or entity responsible for maintenance;
   - Drawing and description of the Detention or BMP facility(s) including all components integral to the operation of the facility
   - Routine seasonal and annual inspection and maintenance procedures
   - Non-routine maintenance procedures (less frequent and generally more expensive such as pond dredging or major repairs to structures)
   - Inspection and maintenance logs and record keeping procedures to track and record compliance with the Operation and Maintenance Plan.

The Stormwater Maintenance Covenant is recorded with reserved easement areas and requires long-term operation and maintenance. This is transferred to the property owner or neighborhood association in perpetuity. Staff uses a Stormwater Facility O&M Flow Chart to navigate this process. The City keeps agreements and maintenance plans on file for 100% of installed BMPs to help track compliance. For municipally-owned and operated water quality BMPs, the City has Operations and Maintenance Plans on file and currently uses the General Revenue fund for inspection and maintenance of BMPs.

4. **BMP Inspections & Enforcement** – In accordance with the Maintenance Covenant, the subdivision association or property owner is responsible for routine inspections (which are annual typically) and any required maintenance or repairs. The City may correct violations at the property owner's expense if owners fail to comply. The City will review inspection reports at all water quality control BMPs biennially at a minimum. Inspection, maintenance, and enforcement priorities may be modified based on need.

4.2.5.1.4 Specific priority areas for this program; and

The City's program to address stormwater runoff from new development and redevelopment projects is described above under BMP 1. Post-Construction Runoff Ordinance (Engineering Design Criteria.

4.2.5.1.5 Any non-structural BMPs in the permittee's program, including, as appropriate:

4.2.5.1.5.1 Policies and ordinances that provide requirements and standards to direct growth to identified areas, protect sensitive areas such as wetlands and riparian areas, maintain and/or increase open space (including a dedicated funding source for open space acquisition), provide buffers along sensitive water bodies, minimize impervious surfaces, and minimize disturbance of soils and vegetation;

4.2.5.1.5.2 Policies or ordinances that encourage infill development in higher density urban areas, and areas with existing storm sewer infrastructure, and redevelopment of Brownfield sites or grayfields which may include abandoned malls or similar properties;

The City's Public Works and Community Development Departments have a number of policies and ordinances that serve as non-structural Best Management Practices to help direct growth to identified areas and protect sensitive areas. These BMPs are described below.

5. **City of Wentzville Planned Growth Policies and Ordinances**

- **Engineering Design Criteria and Land Use Plan Reviews** – The standards in the City's Engineering Design Criteria are designed to minimize impervious surfaces and incentivize redevelopment (by reducing or eliminating detention/channel protection requirements). In addition, Land Use Plan Reviews and Policy promote minimizing soil/vegetation disturbance and impervious surfaces, and increasing green space near sensitive areas.

- **Comprehensive Land Use Plan** – The City of Wentzville adopts a Comprehensive Plan to provide for organized and sustainable growth within the Planning Boundary (adopted 2006, updated 2010 and 2013). The Comprehensive Plan includes areas designated for development, as well as areas of open space for floodplain, parks and recreation. The areas designated for development are: Commercial; Office; Industrial; Institutional; Transitional; Neighborhood Commercial; and Residential, including high density, medium to high density, medium density and low density.

  The goals and objectives of the Comprehensive Plan are far-reaching and varied. The entire plan including goals, objectives, and action steps are available is available on the City's website at: www.wentzvillemo.org/new_planning/comprehensive_plan.pdf The following goals and objectives have a particular applicability to this MCM:

  - Encourage infill development, as appropriate, to maximize utilization of existing infrastructure and land resources.

  - Preserve natural physiographic features, i.e., woods, prairie lands, stream valleys, and contours to the greatest extent possible through creative site planning.

  - Use natural areas, creek channels, and associated floodplain areas, drainage areas and stormwater structures/basins, existing parks and play fields, streetscapes, and underutilized lands to create an integrated city wide open space system. An action item is included to acquire public pedestrian easements within common ground areas of Wentzville subdivisions, under the plat approval process, which connect to public sidewalks for the construction and maintenance of a public pedestrian trail network.

  - Preservation and conservation of mature trees and existing tree masses and canopies in order to protect existing natural resources, minimize damage and destruction via development, provide shade, protect wildlife habitat, reduce air pollution, stabilize existing soils, buffer and screen, and generally enhance the City of Wentzville's physical and aesthetic environment, thereby generally protecting and enhancing the quality of life of the City's residents. A Municipal Tree Preservation Ordinance has been approved (see below) and a Natural Resources Map has been created to indicate preservation and conservation areas, waterways, wetlands, etc.

  In accordance with the Comprehensive Plan, Zoning Ordinances have been and will continue to be reviewed and modified to meet the plan's goals and objectives. Ordinances with particular applicability to this MCM include:

- **Natural Watercourse Protection Ordinance**: In 2008, the City approved this ordinance to help protect natural watercourses and provide minimum standards and setbacks for riparian buffers identified on the Natural Watercourse Protection Map (25', 50', or 100' buffer) based on stream size. These regulations and standards help prevent or minimize water quality impacts to sensitive areas by promoting the protection of natural watercourses and riparian buffers, minimizing encroachment, reducing impervious area, absorbing peak flows, and filtering or settling pollutants in stormwater runoff.

- **Tree Preservation, Planned Developments, and Parks**: In 2009, the City approved Ordinance #2999 that created a Tree Board and guides the planting, maintenance, and removal of trees and other vegetation on public lands. Ordinance #3001 was also adopted for tree preservation in affected developments. Currently, all non-exempt subdivisions having:

  - 15% to 50% of the total site in woodlands must preserve a minimum of fifteen percent (15%) of the total site in woodlands.

  - More than 50% of the total site in woodlands must preserve a minimum of twenty-five percent (25%) of the total site in woodlands.

  Tree preservation areas and landmark trees are delineated on preliminary plats and located in common ground or tree preservation easements. Performance guarantees are established by the developer and protective methods and signage are also used during construction activities. Floodway and Floodway Fringe Districts (Municipal Code Chapter 415) also restrict certain land uses in the floodplain and floodway.

  Planned zoning regulations and existing overlay zoning districts ordinances (Municipal Code Chapter 405) also require a minimum amount of open space in new developments in the City's commercial districts. This is accomplished through enhanced buffers, 25% of open space being reserved for tracts one acre or more, 20% of lots greater than four acres, and replacement or new deciduous tree canopy. (Chapters 405.165 and 405.170)

  Planned development zoning maintains or increases open space and preserve existing natural features by providing greater flexibility in site design and development techniques that are not possible with conventional zoning. This offers opportunities to:

  - Encourage more imaginative or innovative project designs;
  - Embrace, promote, preserve and enhance the public and private urban forest; and
  - Adapt the development to existing land features during construction.

  Flexibility is in relation to lot size, dwelling size, and property line setbacks upon demonstration of achievement of functional and beneficial uses of open space areas and preservation and protection of natural features. This includes preserving, protecting, planting, maintaining, and restoring desirable tree canopy areas within a development site.

  Wentzville's parklands provide a combination of benefits to the City, including the preservation of open space, stormwater management, and recreation. The City will continue to purchase property for its Parks & Recreation program and actively preserve land along streams for trails by requiring common ground to be platted as a public pedestrian easement. Additional opportunities exist by partnering with private or public groups. The City will continue to seek partnerships with municipalities and/or non-profits such as: Greenway Network, St. Charles Soil and Water Conservation District, Great Rivers Greenway District, etc.

  These planning policies, ordinances, and programs continue to be in place and reviewed and updated biennially or as needed. The Wentzville Municipal Code is available at: http://www.wentzvillemo.org/municipal-code.aspx

4.2.5.1.5.3 Education programs for developers and the public about project designs that minimize water quality impacts; and

6. **Post-Construction BMP Training** – Education programs will be promoted and/or conducted annually and as needed for developers, City staff, and/or the public about designs and BMPs that minimize water quality impacts. This is also accomplished through BMPs listed under *MCM I – Public Outreach and Education*:

    - Stormwater Website
    - Brochures and Fact Sheets
    - School Educational Programs
    - Targeted Training Workshops
    - Stormwater Press Releases and Articles

4.2.5.1.5.4 Other measures such as minimization of the percentage of impervious area after development, use of measures to minimize directly connected impervious areas, site designs that provide for integration of a variety of infiltration practices and source control measures often thought of as good housekeeping, preventive maintenance and spill prevention.

4.2.5.1.6 Any structural BMPs in the permittee's program, including, as appropriate:

4.2.5.1.6.1 Practices that provide infiltration, evapotranspiration or re-use such as grassed swales, bioretention cells, cisterns and green roofs; and

4.2.5.1.6.2 Redevelopment practices such as planter boxes, street retrofits, parking-lot infiltration and green roofs.

Practices and structural water quality BMPs listed are described above under Post-Construction Runoff Ordinance and Engineering Design Criteria. The practices listed in these permit sections are available for use by developers, property owners, and the City to decrease runoff, treat water quality, and ultimately, save money by reducing the storage volumes required. Non-structural BMP Credits facilitate site design considerations that reduce the generation of stormwater runoff from development, thereby reducing the size and cost of structural BMPs. Seven categories of credits and incentives are offered to developments that use progressing site planning techniques such as disconnection of impervious areas, grass channel credits, and environmentally-sensitive developments.

Other source control measures (i.e. good housekeeping, preventive maintenance and spill prevention) are addressed with the following BMPs:

- Pre-Construction Site Plan Reviews, *MCM 4*
- Alternative Disposal Options, *MCM 3*
- Storm Drain Marking, *MCMs 3 and 4*
- Operations and Maintenance (O&M) Program and Training, *MCM 6*

4.2.5.1.7 How the permittee will evaluate the success of this minimum measure.

The measurable goals in Appendix A provide quantitative and qualitative indication of the effectiveness of post-construction stormwater management in new and re-development. Milestones will be reported on annually. Further, the following parameters may also be used to help evaluate the success of BMPs:

- The number and nature of construction site runoff concerns received;
- Feedback from plan review engineers, inspectors, property owners, the development community, and/or the public as to improvements stormwater control measures or maintenance. This can be received through Stormwater Advisory Committee meetings, training seminars, surveys, inspection forms, evaluations, etc.; and
- Qualitative observation of water quality during inspections or through inspection reports.
- Number of acres of riparian areas and/or open space preserved

MINIMUM CONTROL MEASURE 6:
POLLUTION PREVENTION / GOOD HOUSEKEEPING FOR MUNICIPAL OPERATIONS

4.2.6.1 ***Permit requirement.*** **The permittee shall develop and implement an operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from municipal operations. As part of the SWMP, the pollution prevention/good housekeeping program shall include the following information, at a minimum:**

4.2.6.1.1 A list of all municipal operations that are impacted by this operation and maintenance program. The permittee shall also include a list of industrial facilities the permittee owns or operates that are subject to NPDES permits for discharges of stormwater associated with industrial activity that ultimately discharge to the permittee's MS4. The permittee shall include the permit number or a copy of the industrial application form for each facility;

4.2.6.1.2 Maintenance BMPs, maintenance schedules, and long-term inspection procedures for controls to reduce floatables and other pollutants to the permittee's regulated small MS4;

4.2.6.1.3 Controls for reducing or eliminating the discharge of pollutants from streets, roads, highways, municipal parking lots, maintenance and storage yards, waste transfer stations, fleet or maintenance shops with outdoor storage areas, and salt/sand storage locations and snow disposal areas the permittee operates;

4.2.6.1.4 Controls described in Sections 4.1.5 through 4.1.8 of this permit *(listed on page 10)*;

4.2.6.1.5 Procedures for the proper disposal of waste removed from the permittee's MS4 and area of jurisdiction, including dredged material, accumulated sediments, floatables, and other debris;

4.2.6.1.6 Procedures to ensure that new flood management projects are assessed for impacts on water quality and existing projects are assessed for incorporation of additional water quality protection devices or practices;

4.2.6.1.7 A government employee training program to prevent and reduce stormwater pollution from activities such as park and open space maintenance, fleet and building maintenance, new construction and land disturbances, and stormwater system maintenance. The permittee shall describe any existing, available materials the permittee plans to use such as those available from EPA, State or other organizations; and

The City will continue existing and develop new pollution prevention/good housekeeping BMPs to prevent or reduce pollutant runoff from municipal operations. The program includes training of City employees and encompasses all departments and divisions that have roles pertinent to stormwater pollution controls and good housekeeping. The list of municipal operations impacted by this program is provided in BMP 1 below.

The City of Wentzville does not operate any industrial facilities that are subject to NPDES permits for stormwater discharges. The Wentzville Water Reclamation Center and Wentzville Langtree Estates are wastewater treatment facilities covered by Permit #MO-0093599 and #MO-0117498 for wastewater discharges. Therefore, wastewater department discharges are

not covered under this MS4 permit, per Section 1.3. The Wastewater Department's permit and independent reporting address reduction of inflow and infiltration and discharge monitoring, etc. The department also conducts employee trainings annually and maintains operator certification through the Department of Natural Resources.

The targeted pollutants for this MCM are those generated by municipal operations including: sediment, fertilizers, pesticides, petroleum hydrocarbons, solid and hazardous wastes, nutrients, sodium chloride, organic materials, litter and debris, and bacteria. Water quality monitoring may help refine or prioritize target pollutants over the permit term.

The Best Management Practices (BMPs) and measurable goals described in this section have been selected based on national and state regulations, water quality and operational needs observed in the last permit cycle, and applicability to the City of Wentzville's municipal operations. The decision process involved existing operation & maintenance procedures, staff input, and available training materials and resources.

1. **Operations and Maintenance (O&M) Program** – The goal of this BMP is to continue to prevent or reduce pollutant runoff from municipal operations through the use of O&M Programs tailored to specific City departments and facilities. Directors or supervisors in the following departments are responsible for evaluating their current O&M program, or having none, develop a specific O&M Program for that department's operations and facilities to minimize or prevent stormwater pollutants:

   - City Administration
   - Parks and Recreation
   - Police
   - Public Works, including the following divisions:
     - Building Services
     - Engineering
     - Solid Waste & Recycling
     - Stormwater Management
     - Streets
     - Vehicle Maintenance
     - Wastewater
     - Water

   The programs continue to address the following municipal operations and categories. The department(s) currently responsible is noted.

   Land Disturbance – Engineering

   - Municipal projects (i.e. roadway widening, new buildings or parking lots) are planned for minimum disturbance, are reviewed and designed in accordance with city codes and Engineering Design Criteria
   - Procedures established for city-performed construction activities that follow municipal codes

   Building and Grounds Maintenance – Building Services

   - Routine assessment of municipally-operated sites
   - Material storage and control
   - Proper use and application of materials
   - Sediment and erosion control
   - Projects to improve soil stability
   - Periodic inspection for illicit discharges
   - Proper operation of irrigation systems

Parking Lots and Stormwater System Maintenance – Streets & Stormwater

- Inspection and cleaning of stormwater systems on a complaint-driven basis
- Periodic outfall or system inspections for illicit discharges

Park and Open Space Maintenance – Park & Service Departments

- Use of native and low-maintenance plant species
- Material storage and control
- Proper use and application of materials
- Sediment and erosion control

Licensed & Off-Road Vehicle Maintenance – Vehicle Maintenance Department

- Performed by a competent vendor in a protected facility
- Routine operator inspections before use
- Vehicle wash-out procedures
- Proper disposal of used chemicals
- Spill containment and removal of off-road equipment from service when fluid leaks are significant or near storm drains or surface waters

Outdoor Bulk Material Storage – Public Works & Parks

- Covered material storage areas
- Short-term uncovered storage areas

Waste Disposal – All Departments

- All wastes disposed per federal, state, and local regulations
- Provide recycling alternatives to reduce conventional waste disposal

Spill Prevention, Control and Countermeasure (SPCC) – All Departments

- Safe handling procedures
- Spill containment procedures
- All spills handled per federal, state, and local regulations

Maintenance Schedules and Inspection Procedures – Public Works & Parks

- Inspection schedule and checklists
- Routine maintenance
- Non-routine maintenance
- Record-keeping

The development or evaluation of existing O&M programs, each applicable department will assess their municipal operations for associated stormwater impacts, expanding on the categories listed above as necessary. The assessment will identify existing and potential pollutant sources and methods of reduction or elimination of identified pollutants. The following decision process will be used to change existing municipal operations to meet this objective:

1. Review current operation methods, associated pollutants, and possible alternatives
2. Determine feasibility of operational changes
3. Estimate probable cost of implementation
4. Departmental review of Cost/Benefit Analysis
5. Implement changes if budget allows
6. Request additional funds if necessary
7. Financial appropriation if necessary

The various O&M Programs will be collected and reviewed by the Public Works Department for adherence to the details of this BMP and for consistency and overlap. This input will be used to develop a Pollution Prevention/Good Housekeeping Manual in this permit cycle to serve as a guidance document for staff and departments to outline Best Management Practices, typical inspection and maintenance schedules, and checklists to help with recordkeeping.

Departments submit annual reports (in June) of activities to the Public Works Director with specific trainings conducted, number of participants, status of O&M operations and categories, feedback, and any changes to their O&M Program. Any new parks, city properties, or changes in operations should be provided to the Public Works Director to update to the O&M Program as needed.

2. **Operations and Maintenance (O&M) Training** – Each department creates and implements a training program tailored for their operations. The training program shall consist of new staff orientation and refresher components related to pollution prevention. The training offers an opportunity for feedback from employees regarding the applicability and effectiveness of the O&M program. The goal for this permit cycle is to promote and/or conduct trainings biennially or as needed in accordance with the department's O&M Program. Training programs will also be updated to incorporate new parks, city properties, or operations as needed.

   The Public Works department will assist individual departments by compiling the Pollution Prevention/Good Housekeeping Manual and training resources from St. Charles County, EPA, Missouri Department of Natural Resources, Center for Watershed Protection, or other applicable authorities; and coordinating inter-departmental training opportunities.

   The Stormwater Management Coordinator will seek opportunities to coordinate the training programs with the outreach programs developed for MCM 1 – Public Education and Outreach and MCM 3 – Illicit Discharge Detection and Elimination.

3. **Pollution Prevention/Good Housekeeping Inspections & Maintenance** – Responsible departments perform inspections and maintenance activities in accordance with their O&M Program schedule. Inspections and maintenance activities are tracked annually and kept on file for the permit term (through July 2018). Municipal construction projects go through the design review process and also receive construction inspections.

4. **Fuel Facilities** – The City has eliminated the use and removed City-owned fuel storage tanks for municipal vehicles. Vehicles now use commercial fuel stations. For any remaining fuel storage facilities (underground/above ground tanks or dispensers used for maintenance equipment), the goal is to adhere to all applicable federal and state regulations for spill prevention, control, and counter measures in accordance with Permit Section 4.1.6. In the event that deficiencies are found, the decision process outlined in BMP 1: O&M Programs will be used to bring facilities into compliance.

5. **Street Sweeping** – The City continues to implement a street-sweeping program to help prevent pollutants from entering the storm system. The schedule is based on the snow route. Currently, the Elgin Eagle brush sweeper is in use daily except when maintenance takes it offline 1 to 4 days per month. The sweeping schedule is as follows, but changes as needed for weather and construction cleanup:

    - Main streets twice per month
    - Subdivision streets once per quarter

6. **Flood Management Projects** – Engineering reviews all municipal stormwater/flood management projects for water quality impacts through the Engineering Design Criteria and plan review process. Water quality protection device(s) or practice(s) are recommended as necessary. The Engineering Division also acquires any necessary floodplain development permits and develops Stormwater Pollution Prevention Plans (SWPPP) as required by Missouri Department of Natural Resources. The SWPPP includes inspection and maintenance procedures for erosion and sediment controls and good housekeeping practices. As mentioned in MCM 5, a Channel Assessment and Channel Condition Scoring Matrix are required for projects crossing over or under a natural channel. To reduce sedimentation and stream degradation, grade controls and erosion protection are used in receiving streams at crossings and pipe outfalls.

    Through the plan review process, existing projects are evaluated for incorporation of water quality protection practices or for bringing infrastructure/BMPs into compliance with the current Engineering Design Criteria if problems are found, capital improvements are planned, and/or as resources allow.

In addition to the BMPs described above, procedures for the proper disposal of waste removed from the City's MS4 and jurisdiction (i.e. dredged material, accumulated sediments, floatables, and other debris) is addressed with the following:

- Stormwater Pollution Control Ordinance, *MCM 3*
- Alternative Disposal Options, *MCM 3*
- Construction Site Stormwater Runoff Control Ordinance/Enforcement, *MCM 4*
- BMP Operations & Maintenance Plan and Agreements, *MCM 5*

4.2.6.1.8 How the permittee will evaluate the success of this minimum control measure.

The measurable goals in Appendix A provide quantitative and qualitative indication of the effectiveness of the pollution prevention/good housekeeping program for municipal operations. Milestones will be reported on annually. Further, the following parameters may also be used to help evaluate the success of BMPs:

- Feedback from staff, supervisors, contractors, and the public. This can be received through Stormwater Advisory Committee meetings, training seminars, surveys, inspection forms, etc.;
- Observations from inspection and maintenance logs; and
- The number and nature of complaints.

OTHER PERMIT CONDITIONS

4.3 SHARING RESPONSIBILITY

Implementation of one or more of the minimum measures may be shared with another entity, or another entity assume responsibility for the measure if the other entity implements the control measure; the particular control measure or component is at least as stringent as the corresponding permit requirement; and the other entity agrees to implement the control measure on permittee's behalf. Written acceptance of this obligation is required. This obligation shall be maintained as part of the description of the permittee's stormwater management program.

St. Charles County Government implements some Alternative Disposal Options listed under MCM 3. This includes Recycle Works facilities and Household Chemical Collections. These locations and programs are promoted and open to all residents in St. Charles County, including those in Wentzville. Written validation is available on their website at http://health.sccmo.org/health

5.2 RECORDKEEPING

The permittee shall retain records of all activities requiring recordkeeping by the SWMP and monitoring information, including, all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, copies of Discharge Monitoring Reports (DMRs), a copy of the NPDES permit, a copy of all ordinances, policies and formal procedures for all six minimum control measures and records of all data used to complete the application for this permit, for a period of at least three years from the date of the sample, measurement, report or application, or for the term of this permit, whichever is longer...The permittee shall retain a written description of the SWMP required by this permit (including a copy of the permit language) at a location accessible to the department. The permittee shall make the permittee's records, including the application and the description of the SWMP, available to the public if requested to do so in writing.

Records for the Stormwater Management Program remain on file at the Wentzville Public Works Department, with the City Clerk, and on the City's website (ordinances) and are available upon written request through the City Clerk.

5.3 REPORTING

The permittee shall submit annual reports to the Director by July 28 of each year of the permit term. The report shall include: the status of the permittee's compliance, an assessment of the appropriateness of identified BMPs, progress towards achieving the statutory goal of reducing the discharge of pollutants to the MEP and measurable goals for each of the MCMs, results of information collected and analyzed, summary of the stormwater activities the permittee plans to undertake during the next reporting cycle, and proposed changes to the permittee's SWMP.

The City will continue to provide annual reports and updates to the measurable goals using forms provided and the Implementation Status Report at the end of Appendix A.

APPENDIX A

Implementation Schedule for Minimum Control Measures

Best Management Practices

MCM 1: Public Education and Outreach on Stormwater Impacts

Target Audiences: General public, businesses, residents, trustees, and students

Target Pollutants and Sources: Trash from littering/dumping and the improper use or disposal of lawn chemicals, yard waste, hazardous wastes, business and construction waste

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Maintain **stormwater website** and advertise web address	Track 2,500 visits Track 5,000 pageviews	Track at least 500 visits yearly Track at least 1,000 pageviews yearly	June 2018	Jamie Paige
Maintain supply of stormwater **brochures** or fact sheets at City Hall and/or Public Works and distribute to interested citizens	Distribute 2,000 brochures	Distribute 400 brochures annually Replenish quarterly or as needed	May 2018	Jamie Paige
Conduct and promote **school-aged educational programs** about stormwater impacts and how to prevent pollution	Impact 4,000 students and teachers	Create 800 impressions yearly	May 2018	Jamie Paige
Conduct or promote **training workshops**	Conduct or promote 25 seminars or trainings	Advertise and/or conduct 5 training opportunities yearly	April 2018	Jamie Paige
Submit stormwater **press releases and articles**	Publish 10 articles	Submit 2 articles or press releases annually	May 2018	Jamie Paige
Advertise development of the 2018-2023 stormwater management program in local publications	Submit one press release and track at least 50 hits to the SWMP website after notification	Advertisement developed and submitted by May 2018	June 2018	Jamie Paige

Implementation Schedule for Minimum Control Measures

Best Management Practices

MCM 2: Public Involvement/Participation

Target Audiences: Commercial/industrial businesses, homeowner's associations, citizens, educators, youth/service organizations, City officials, and property owners

Target Pollutants and Sources: Trash from littering/dumping and the improper use or disposal of lawn chemicals, yard waste, hazardous wastes, business and construction waste

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Post the Stormwater Management Plan and comment form online	Plan is available online and track at least 100 hits to the website	Update the plan and/or annual reports yearly	June 2014	Jamie Paige
Stormwater Advisory Committee	Host bi-yearly public meetings at a minimum.	Post public notice of agendas and minutes for meetings	June 2018	Jamie Paige
Advertise volunteer opportunities through website, press releases and flyers	Advertise 10 opportunities and track at least 500 volunteer sign-ups	Advertise at least 2 opportunities and get 100 volunteer sign-ups each year	June 2018	Jamie Paige
Volunteer Programs: Stream Teams, Litter Pickups, and Storm Drain Marking	At least 500 volunteers Remove 15,000 pounds of litter from roads and streams Annual monitoring by local clubs/teams	Receive 100 volunteer signups yearly Clean up 3,000 lbs. of trash yearly Track monitoring sites and data annually	June 2018	Jamie Paige
Concern Hotline	Advertise and maintain hotline with concern tracking system for citizens to report pollution or stormwater issues	Annually track the number of concerns received and their follow-up	June 2018	Vi Skillman
Stormwater Survey	Distribute survey to customers and receive 500 responses	Distribute survey around Oct. 2017 Compile responses in winter 2018	February 2018	Jamie Paige

Implementation Schedule for Minimum Control Measures

Best Management Practices

MCM 3: Illicit Discharge Detection and Elimination

Target Audiences: Businesses, property owners, city employees, and the general public

Target Pollutants and Sources: The improper use or disposal of lawn chemicals, yard waste, hazardous wastes, trash/litter, and business and construction waste

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Stormwater Pollution Control Ordinance	Maintain ordinance(s) with provision for enforcement to prohibit non-stormwater discharges to the MS4	Regulatory mechanism with sanctions for enforcement continues to be in place and updated as needed to reflect new permit conditions	August 2013	Jamie Paige
Illicit Discharge Detection & Enforcement	Conduct dry weather field screenings of all major outfalls and industrial/commercial enterprises Document all concerns and locations and removals of illicit discharges	Field screen representative outfalls and priority areas with older sanitary lines Field screen other major outfalls Update inventory and inspections for industrial/commercial enterprises Screen interior outfalls on a concern-basis and/or as staff time permits Respond to concerns received and track follow-	December 2014 December 2015 December 2017 December 2018	Jamie Paige
Stormwater Treatment BMP Inspection	Inspect all stormwater treatment BMPs to ensure operation and effectiveness	Biennial review of BMP inspection reports	September 2017	Jamie Paige
Stormwater Pollution Prevention Outreach	Inform target public employees and businesses about illicit discharges and the hazards of improper waste disposal Post pollution detection information, alternative disposal options, and 24-hour reporting form online Stormwater doorknockers used in areas of concern	Offer training opportunities and/or pollution prevention flyers for targeted staff online, through outreach programs and at city buildings Information updated biennially or as needed Track number of doorknockers used over the permit term	February 2015 November 2017 June 2018	Jamie Paige

Implementation Schedule for Minimum Control Measures

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Storm System Mapping	Continue to update GIS map with storm system and water quality BMPs installed up to 2013 at a minimum	Annually track the total number of structures and BMPs on the map	April 2018	Jason Robertson
Concern Hotline	Advertise and maintain a hotline with tracking system for citizens and staff to report concerns	Annually track the number of concerns received and follow-up	June 2018	Vi Skillman
Advertise **Alternative Disposal Options** for Trash, Household Hazardous Wastes (HHW), and Yard Waste	Promote alternative disposal options for target pollutants online and in three press releases or articles	Information submitted annually and website updated as needed	June 2018	Marilyn Broering/ Lisa Etling
Storm Drain Marking	Replace markers in existing subdivisions as needed to maintain 85% coverage in right-of-ways Encourage developers to use mark highly-visible storm drains in all new developments	Track the number of markers replaced annually Continue to include a standard detail/recommendation in Engineering Design Criteria	June 2018	Jamie Paige
Private Sewage Systems	Continue to prohibit new private sewer systems and package treatment plants within municipal boundaries. As areas incorporate, convert private sewage systems to the public sanitary system where practical.	Regulatory mechanism continues to be in place Track the number of systems taken offline or converted annually	June 2018	Gary Miller

Implementation Schedule for Minimum Control Measures

Best Management Practices

MCM 4: Construction Site Stormwater Runoff Control

Target Audiences: Developers, builders, other construction site operators, and municipal inspectors

Target Pollutants and Sources: Sediment, litter, concrete truck washout, sanitary waste and hazardous materials from construction sites

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Construction Site Stormwater Runoff Control **Ordinance(s)**	Maintain ordinance(s) with sanctions to require site operators to implement, and maintain BMPs to reduce pollutants to the MS4	Regulatory mechanism continues to be in place and defines sanctions for enforcement Update ordinance to reflect new permit conditions as needed	August 2013	Scott Hitchcock
Training for Operators and/or City Staff	Promote or conduct trainings for staff and/or contractors biennially and as needed	Track the number of trainings promoted/conducted and participation	April 2018	Jamie Paige
Pre-Construction Site **Plan Reviews**	Continue to review 100% of plans for construction projects >1 acre or smaller sites part of a larger common plan	Track the number of reviews annually	June 2018	Scott Hitchcock
Construction Site **Inspections & Enforcement**	Inspect all active construction sites Document concerns and follow up	Respond to concerns received Annual review of inspection reports; modify inspection priorities or enforcement based on need	June 2018	Scott Hitchcock
Concern Hotline	Advertise and maintain a hotline with concern tracking system for citizens to report construction site runoff issues	Annually track the number of concerns received and follow-up	June 2018	Vi Skillman
Storm Drain Marking	Encourage developers to use mark highly-visible storm drains in all new developments	Continue to include a standard detail/recommendation in Engineering Design Criteria	June 2018	Scott Hitchcock

Implementation Schedule for Minimum Control Measures

Best Management Practices

MCM 5: Post-Construction Stormwater Management in New Development and Redevelopment

Target Audiences: Developers, builders, other construction site operators, and municipal inspectors

Target Pollutants and Sources: Sediment, litter, concrete truck washout, sanitary waste and hazardous materials from construction sites

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Post-Construction Runoff **Ordinance**	Maintain ordinance(s) that ensure controls to prevent or minimize water quality impacts in accordance with permit conditions	Regulatory mechanism continues to be in place and defines maintenance responsibilities Update ordinance to reflect new permit conditions as needed	August 2013	Scott Hitchcock
Planned Growth Ordinances and Policies	Maintain and create policies and/or incentives to: 1) Direct growth to re-development, infill, and brownfields 2) Protect sensitive areas (stream riparian corridors and wetlands) 3) Maintain/increase open space 4) Minimize impervious surfaces and disturbance of soil/vegetation	The following planning policies & incentives continue to be in place and reviewed biennially or as needed: Wentzville Comprehensive Plan Natural Watercourse Protection Ord. (25' buffer or more based on size) and Floodway Districts Parks & Recreation Programs, Tree Preservation and Planned District Ordinances with preservation or open space minimums Engineering Design Criteria and Land Use Plan Reviews and Policy promote reduced impervious areas and land disturbance, and increased greenspace near sensitive areas	March 2014	Doug Forbeck
Post-Construction BMP Training for developers, City Staff, and/or the public	Promote or conduct education programs about designs and BMPs that minimize water quality impacts annually and as needed	Track the number of trainings promoted/conducted and participation	December 2017	Jamie Paige

Implementation Schedule for Minimum Control Measures

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Stormwater Plan Reviews	Continue to review 100% of plans for post-construction BMPs at affected developments	Track the number of reviews annually	June 2018	Scott Hitchcock
BMP **Operations & Maintenance Plans and Agreements**	Agreements and maintenance plans on file for 100% of BMPs constructed in affected developments	Staff continue to follow Stormwater Facility O&M Plan Flow Chart and receive plans prior to construction permit issuance	June 2018	Scott Hitchcock
Stormwater Control BMP **Inspections & Enforcement**	Review inspection reports and/or perform inspections at all water quality control BMPs biennially at a minimum	Biennial review of inspection reports; modify inspection priorities or enforcement based on need	June 2018	Jamie Paige
Advertise **Alternative Disposal Options** for Trash, Household Hazardous Wastes (HHW), and Yard Waste	Promote alternative disposal options for target pollutants online and in three press releases or articles	Information submitted annually and website updated as needed	June 2018	Marilyn Broering/ Lisa Etling
Storm Drain Marking	Replace markers in existing subdivisions as needed to maintain 85% coverage in right-of-ways Encourage developers to use mark highly-visible storm drains in all new developments	Track the number of markers replaced annually Continue to include a standard detail/recommendation in Engineering Design Criteria	June 2018	Jamie Paige

Implementation Schedule for Minimum Control Measures

Best Management Practices

MCM 6: Pollution Prevention/Good Housekeeping for Municipal Operations

Target Audiences: Municipal employees and contractors

Target Pollutants and Sources: Sediment and the improper use or disposal of paint, solvents, petroleum products, herbicides, fertilizers, solid and hazardous waste, and concrete truck washout from maintenance of city properties

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Operations & Maintenance (O&M) Program	Continue to track operations that may have water quality impacts	Program continues to be in place with pollution prevention controls/maintenance schedules, inspection procedures Update program to reflect new parks, properties, or operations as needed Develop PP/GH Guide of BMPs	August 2014 February 2016 June 2016	Sue Mueller
O&M Training for City Staff and/or contractors	Promote or conduct trainings biennially or as needed in accordance with the O&M Program and in concert with MCM 1 & 3	Continue to track the number of trainings promoted/conducted and participation Provide spill prevention and response flyers at facilities involved in the O&M Program	June 2018	Department Supervisors and Jamie Paige
PP/GH Inspections & Maintenance	Perform scheduled maintenance activities and inspections at municipal facilities and construction projects in accordance with the O&M Program	Track maintenance schedules and activities annually; keep on file through July 2018 Provide O&M Program updates as needed to the PW Director	June 2018	Department Supervisors
Fueling Facilities under the City's control	Adhere to applicable federal and state regulations for spill prevention, control, and counter measures	Research updates to regulations that pertain to the City Evaluate the need for and funding mechanism for any necessary improvements Install necessary improvements	January 2014 September 2014 December 2016	Mary Jo Dessieux and Sue Mueller

Implementation Schedule for Minimum Control Measures

Task / BMP	Measurable Goal(s)	Interim Milestones	Implementation Schedule	Individual(s) Responsible
Street Sweeping	Sweep main streets twice monthly and subdivision streets quarterly, weather permitting	Track frequency of street sweeping operations, and estimated amount of debris removed	June 2018	Dave Kralemann
Flood Management Projects	Assess all new flood/stormwater projects for water quality impacts Assess existing projects for incorporation of water quality protection practices or devices	Procedures continue to be in place to review all projects and recommend water quality protection practices	December 2013	Scott Hitchcock

Year _____
Implementation Status

Minimum Control Measure:

1. Implementation Status

Summary

Status of Measurable Goals

Task / BMP	Measurable Goal(s)	Implementation Schedule	Goal Complete?			Accomplishments	If not met, briefly explain reason, status, or new date for meeting goal
			Yes	No	On-track		

2. Overall Compliance with Permit Conditions

Assessment of the Appropriateness of the Identified BMPs

Progress Towards the Statutory Goal of Reducing the Discharge of Pollutants to the Maximum Extent Practicable (MEP)

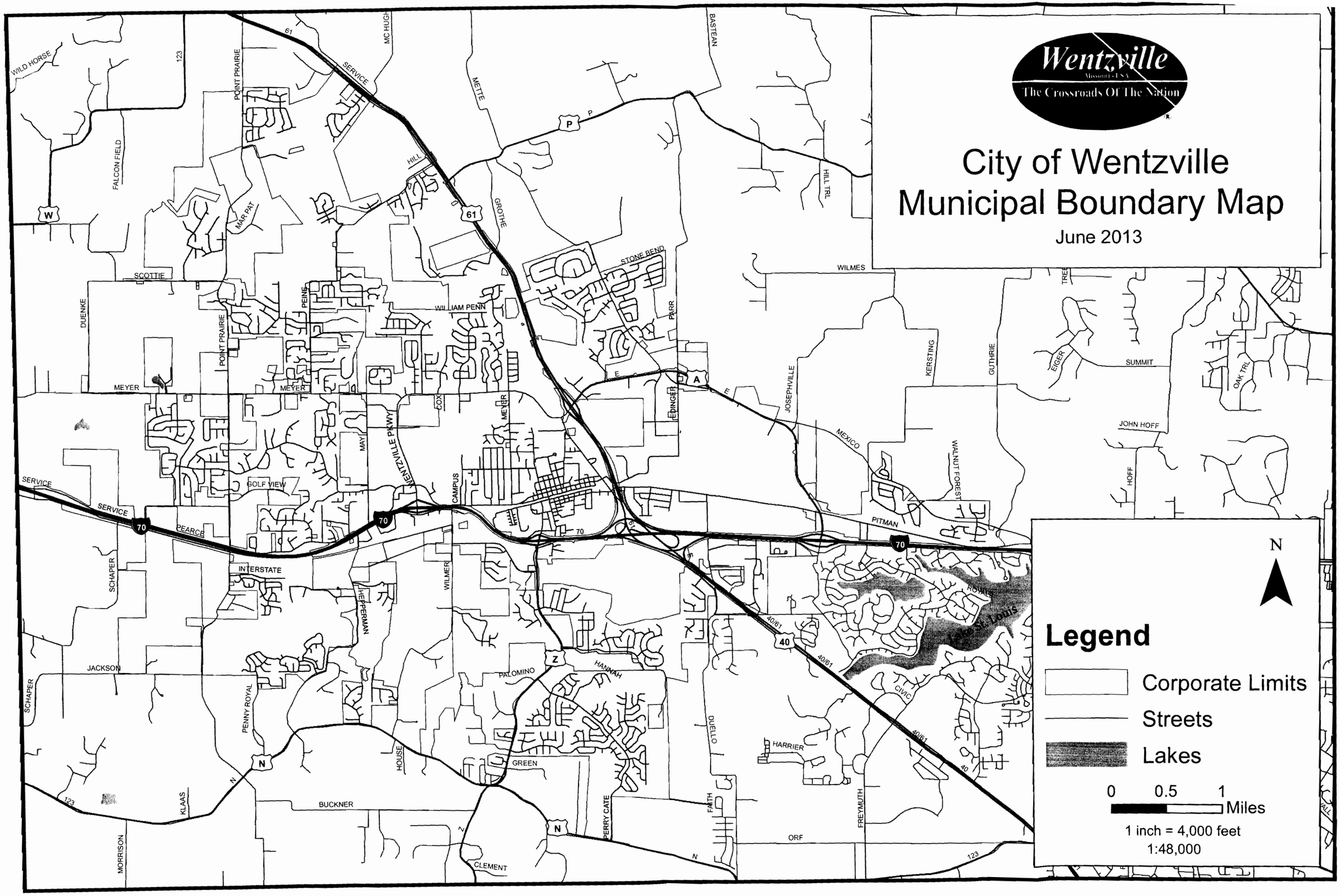
3. Results of Information Collected and Analyzed, if any, During the Reporting Period

4. Brief Summary of Planned Activities for the next Reporting Period

5. Proposed Changes (to BMPs or measurable goals)

6. Notice (if applicable) that the City is relying on another government entity to satisfy permit oblications

APPENDIX B


Wentzville
Missouri • USA
The Crossroads Of The Nation
City of Wentzville
Municipal Boundary Map
June 2013
Legend
Corporate Limits
Streets
Lakes
0 0.5 1 Miles
1 inch = 4,000 feet
1:48,000
N
WILD HORSE
FALCON FIELD
POINT PRAIRIE
SERVICE
MC HUGH
METTE
BASTEAN
HILL
GROTHE
HILL TRL
MAR PAT
SCOTTIE
DUENKE
WILLIAM PENN
PEINE
STONE BEND
PARR
WILMES
KERSTING
GUTHRIE
EIGER
SUMMIT
OAK TRL
MEYER
COX
MAY
WENTZVILLE PKWY
EDINGER
JOSEPHVILLE
MEXICO
JOHN HOFF
HOFF
WALNUT FOREST
GOLF VIEW
CAMPUS
PITMAN
PEARCE
INTERSTATE
SCHAPER
HEPPERMAN
WILMER
ROYAL
Lake St. Louis
JACKSON
PALOMINO
HANNAH
CIVIC
PENNY ROYAL
DUELLO
HARRIER
HOUSE
GREEN
KLAAS
BUCKNER
PERRY CATE
FAITH
FREYMUTH
ORF
MORRISON
CLEMENT
61
70
40
40/61
123
W
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N

APPENDIX C

2012 EPA Approved 303(d) List

(Streams within the jurisdiction of Wentzville are highlighted.)

Year*	WBID	Water Body Name**	Class	MDNR Proposed Impairment Size	MDNR Water Body Size	EPA Approved Impairment Size	Size Units*	Pollutant	Source*	Impaired Uses*	Other (Unimpaired) Uses*	Upstream X*	Upstream Y*	Downstream X*	Downstream Y*	County Upstream/ Downstream	EPA Approved Water Body Name	Comment*
2012	2188.00	Antire Cr.	P	1.9	1.9	1.9	Mi.	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	712454	4264477	710077	4264450	St. Louis	Antire Cr	1
2012	2188.00	Antire Cr.	P	1.9	1.9	1.9	Mi.	pH	Source Unknown	AQL	LWW, WBC B	712454	4264477	710077	4264450	St. Louis	Antire Cr	1
2012	752.00	Bass Cr.	C	4.4	4.4	4.4	Mi	Escherichia coli	Source Unknown	WBC A	AQL, LWW	565032	4297418	561523	4298649	Boone	Bass Cr.	1
2012	3240.00	Baynham Br.	P	4	4	4	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	379681	4092596	374809	4091661	Newton	Baynham Br.	1
2012	3265.00	Beaver Br.	P	2	2.0	2.0	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	371102	4059675	371030	4056963	McDonald	Beaver Br.	1
2006	2760.00	Bee Fk.	C	1.4	8.7	8.7	Mi	Lead	Fletcher Lead Mine/Mill	AQL	CLF, LWW, WBC A	668832	4145688	678196	4147796	Reynolds	Bee Fk.	1
2008	3966.00	Bee Fk.	U	0.8	n/a	n/a	Mi	Lead (S)	Fletcher Lead Mine/Mill	GEN		667504	4145795	668836	4145688	Reynolds	Bee Fk.	1,5
2006	7365.00	Belcher Branch Lake	L3	55	55	55	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC B			351274	4382886	Buchanan	Belcher Branch Lake	1
2006	444.00	Big Cr	P	1	22	22	Mi	Ammonia, Total	Bethany WWTP	AQL	DWS, LWW, WBC B	410564	4457922	405532	4431091	Harrison	Big Cr.	1
2006	444.00	Big Cr	P	6	22	22	Mi	Oxygen, Dissolved	Bethany WWTP	AQL	DWS, LWW, WBC B	410564	4457922	405532	4431091	Harrison	Big Cr.	1
2012	1250.00	Big Cr	P	70.5	70.5	70.5	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, LWW	384118	4301049	422204	4249326	Jackson/Henry	Big Cr.	1
2012	2673.00	Big Cr	P	28.7	28.7	28.7	Mi.	Oxygen, Dissolved	Source Unknown	AQL	CLF, LWW, WBC B	602877	4121486	623387	4141670	Texas/Shannon	Big Cr.	1
2010	2916.00	Big Cr	P	1.8	34.1	34.1	Mi.	Cadmium (S)	Glover smelter	AQL	CLF, LWW, SCR, WBC A	704350	4156086	721134	4123934	Iron	Big Cr.	1
2010	2916.00	Big Cr.	P	1.8	34.1	34.1	Mi.	Lead (S)	Glover smelter	AQL	CLF, LWW, SCR, WBC A	704350	4156086	721134	4123934	Iron	Big Cr.	1
2010	1578.00	Big Piney R.	P	4	8	8	Mi.	Oxygen, Dissolved	Source Unknown	AQL	DWS, LWW, SCR, WBC A	579840	4108439	585281	4116805	Texas	Big Piney R.	1
2006	2080.00	Big R.	P	18.6	68	68	Mi.	Cadmium (S)	Old Lead Belt tailings	AQL	IND, LWW, WBC A	686672	4181275	701036	4226038	St. Francois	Big R.	1
2006	2080.00	Big R.	P	18.6	68	68	Mi.	Zinc (S)	Old Lead Belt tailings	AQL	IND, LWW, WBC A	686672	4181275	701036	4226038	St. Francois	Big R.	1
2012	111.00	Black Cr.	C	19.4	19.4	19.4	Mi.	Escherichia coli	Shelbyville WWTF, Nonpoint Source	WBC B	AQL, LWW	581883	4405278	593138	4393283	Shelby	Black Cr.	1
2012	111.00	Black Cr.	C	19.4	19.4	19.4	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	581883	4405278	593138	4393283	Shelby	Black Cr	1
2012	3825.00	Black Cr.	P	1.6	1.6	1.6	Mi.	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR, WBC B	731266	4278180	732023	4276834	St. Louis	Black Cr.	1
2012	3825.00	Black Cr.	P	1.6	1.6	1.6	Mi	Escherichia coli	Urban Runoff/Storm Sewers	SCR, WBC B	AQL, LWW, WBC B	731266	4278180	732023	4276834	St. Louis	Black Cr.	1
2002	2769.00	Black R.	P	47.1	47.1	47.1	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, DWS, IRR, LWW, SCR, WBC A	729886	4078610	729372	4042276	Butler	Black R.	1
2008	2784.00	Black R.	P	39	39.0	39.0	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, DWS, IRR, LWW, SCR, WBC A	697890	4112203	729886	4078610	Wayne/Butler	Black R.	1
2006	3184.00	Blackberry Cr.	C	3.5	6.5	6.5	Mi.	Chloride	Asbury Power Plant	AQL	LWW, WBC B	360861	4132404	362347	4123848	Jasper	Blackberry Cr.	1
2008	3184.00	Blackberry Cr.	C	3.5	6.5	6.5	Mi.	Sulfate + Chloride	Asbury Power Plant	AQL	LWW, WBC B	360861	4132404	362347	4123848	Jasper	Blackberry Cr	1
2006	417.00	Blue R.	P	4	4	4	Mi.	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, IND, LWW	371184	4329015	373047	4332253	Jackson	Blue R.	2
2006	418.00	Blue R.	P	9	9	9	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, IND, LWW, SCR	368400	4319633	371184	4329015	Jackson	Blue R.	1
2006	419.00	Blue R.	P	9	9	9	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC A	AQL, LWW, SCR	364588	4312669	368400	4319633	Jackson	Blue R.	1
2006	421.00	Blue R.	C	11	11	11	Mi	Escherichia coli	Runoff from Forest/Grassland/Parkland, Rural, Residential Areas, Urban Runoff/Storm Sewers	WBC B	AQL, LWW, SCR	360459	4301385	364588	4312669	Jackson	Blue R.	1
2012	1701.00	Bonhomme Cr.	C	2.5	2.5	2.5	Mi.	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	709512	4282258	711491	4284301	St. Louis	Bonhomme Cr.	1
2012	1701.00	Bonhomme Cr.	C	2.5	2.5	2.5	Mi.	pH	Source Unknown	AQL	LWW, WBC B	709512	4282258	711491	4284301	St. Louis	Bonhomme Cr.	1
2006	750.00	Bonne Femme Cr.	P	7.8	7.8	7.8	Mi	Escherichia coli	Source Unknown	WBC A	AQL, LWW	560346	4298772	553749	4294435	Boone	Bonne Femme Cr.	1
2012	753.00	Bonne Femme Cr.	C	7	7	7	Mi	Escherichia coli	Source Unknown	WBC B	AQL, LWW	565633	4303361	560346	4298772	Boone	Bonne Femme Cr.	1
2002	2034.00	Bourbeuse R.	P	136.7	136.7	136.7	Mi.	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, DWS, IRR, LWW, SCR, WBC A	622849	4221417	684343	4252206	Phelps/Franklin	Bourbeuse R.	1
2012	7003.00	Bowling Green (Old) Lake	L1	28.2*	28.2*	28.2*	Ac.	Nitrogen, Total	Nonpoint Source	AQL	DWS, LWW, WBC B			658502	4356562	Pike	Bowling Green (Old) Lake	1
2012	7003.00	Bowling Green (Old) Lake	L1	28.2*	28.2*	28.2*	Ac.	Phosphorus, Total	Nonpoint Source	AQL	DWS, LWW, WBC B			658502	4356562	Pike	Bowling Green (Old) Lake	1
2012	1796.00	Brazeau Cr	C	10.8	10.8	10.8	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, LWW	798229	4172491	807335	4172833	Perry	Brazeau Cr.	1
2002	1371.00	Brush Cr.	P	4	4	4	Mi.	Oxygen, Dissolved	Humansville WWTP	AQL	LWW, WBC B	448632	4182404	444769	4187320	Polk/St. Clair	Brush Cr	1
2012	3273.00	Buffalo Cr	P	8	8	8	Mi.	Fishes Bioassessments	Source Unknown	AQL	CLF, IRR, LWW, SCR, WBC A	369204	4075685	363942	4068061	Newton/McDonald	Buffalo Cr	1
2006	1865.00	Burgher Branch	C	2	2	2	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	610212	4200283	611960	4199017	Phelps	Burgher Branch	1
2012	968.00	Burris Fork	P	13.2	13.2	13.2	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC A	528329	4260804	539733	4270189	Moniteau	Burris Fork	1
2006	7057.00	Busch Lake #35	L3	51	51	51	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B			697821	4288225	St. Charles	Busch Lake #35	1
2010	7627.00	Busch Lake #37		34	34	34	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	GEN				691967	4287291	St. Charles	Busch Lake #37	1
2006	3234.00	Capps Cr.	P	5	5	5	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CDF, IRR, LWW, SCR	408562	4082428	402563	4083044	Barry	Capps Cr.	1
2010	2288.00	Castor R.	P	7.5	7.5	7.5	Mi	Escherichia coli	Rural NPS	WBC A	AQL, IRR, LWW, SCR	760131	4115294	766484	4110895	Bollinger	Castor River	1
2008	737.00	Cedar Cr.	C	7.9	37.4	37.4	Mi.	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, SCR, WBC B	575155	4324241	571598	4289794	Boone	Cedar Cr	1
2010	1344.00	Cedar Cr.	P	10	31	31	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	IRR, LWW, SCR, WBC A	419820	4170283	427580	4189524	Cedar	Cedar Cr.	1
2008	1344.00	Cedar Cr.	P	10	31	31	Mi.	Oxygen, Dissolved	Source Unknown	AQL	IRR, LWW, SCR, WBC A	419820	4170283	427580	4189524	Cedar	Cedar Cr.	1
2010	1357.00	Cedar Cr.	C	16.2	16.2	16.2	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	412791	4154079	419820	4170283	Cedar	Cedar Cr.	1
2008	1357.00	Cedar Cr.	C	16.2	16.2	16.2	Mi.	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	412791	4154079	419820	4170283	Cedar	Cedar Cr.	1
2006	3203.00	Center Cr	P	19	26.8	26.8	Mi.	Cadmium (S)	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A	383685	4107350	356376	4112852	Jasper	Center Cr.	1
2006	3203.00	Center Cr.	P	19	26.8	26.8	Mi	Cadmium	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A	383685	4107350	356376	4112852	Jasper	Center Cr.	1
2006	3203.00	Center Cr.	P	19	26.8	26.8	Mi	Lead (S)	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A	383685	4107350	356376	4112852	Jasper	Center Cr.	1
2006	3203.00	Center Cr.	P	19	26.8	26.8	Mi	Zinc (S)	Tri-State Mining District	AQL	CLF, IND, IRR, LWW, SCR, WBC A	383685	4107350	356376	4112852	Jasper	Center Cr.	1
2008	3210.00	Center Cr.	P	21	21	21	Mi	Escherichia coli	Rural NPS	WBC A	AQL, IND, IRR, LWW, SCR	404365	4099517	383685	4107350	Newton/Jasper	Center Cr.	1
2010	3214.00	Center Cr	P	4.9	4.9	4.9	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CDF, IND, IRR, LWW, SCR	410298	4100642	404365	4099517	Lawrence/Newton	Center Cr.	1
2006	3168.00	Chat Cr.	C	2.1	2.1	2.1	Mi.	Cadmium	Baldwin Park Mine	AQL	LWW, SCR, WBC B	436448	4092563	432983	4092649	Lawrence	Chat Cr.	1
2012	1781.00	Cinqne Hommes Cr.	C	8.3	17.1	17.1	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	779350	4178434	793643	4183954	Perry	Cinque Hommes Cr.	1
2006	1333.00	Clear Cr	P	15.5	15.5	15.5	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC A	402340	4186711	417795	4205727	Vernon/St.Clair	Clear Cr.	1
2006	1336.00	Clear Cr	C	15	15	15	Mi.	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	391921	4172771	402340	4186711	Vernon	Clear Cr.	1
2006	3238.00	Clear Cr.	P	11.1	11.1	11.1	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, LWW	410980	4088931	397639	4088517	Barry/Newton	Clear Cr.	1
2002	3239.00	Clear Cr	C	3.5	3.5	3.5	Mi	Nutrient/Eutrophication Biological Indicators	Monett WWTP	AQL	LWW, WBC B	415495	4086458	410980	4088931	Barry/Newton	Clear Cr.	1
2002	3239.00	Clear Cr.	C	3.5	3.5	3.5	Mi	Oxygen, Dissolved	Monett WWTP	AQL	LWW, WBC B	415495	4086458	410980	4088931	Barry/Newton	Clear Cr.	1
2002	7326.00	Clearwater Lake	L2	1635	1635	1635	Ac.	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC A			697889	4112199	Reynolds/Wayne	Clearwater Lake	1

Year*	WBID	Water Body Name**	Class	MDNR Proposed Impairment Size	MDNR Water Body Size	EPA Approved Impairment Size	Size Units*	Pollutant	Source*	Impaired Uses*	Other (Unimpaired) Uses*	Upstream X*	Upstream Y*	Downstream X*	Downstream Y*	County Upstream/ Downstream	EPA Approved Water Body Name	Comment*
2006	1706.00	Coldwater Cr	C	5.5	5.5	5.5	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	IND, LWW, WBC B	735014	4299849	741449	4301962	St. Louis	Coldwater Cr	1
2008	1706.00	Coldwater Cr	C	5.5	5.5	5.5	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, IND, LWW	735014	4299849	741449	4301962	St. Louis	Coldwater Cr	1
2006	1706.00	Coldwater Cr.	C	5.5	5.5	5.5	Mi	Oxygen, Dissolved	Source Unknown	AQL	IND, LWW, WBC B	735014	4299849	741449	4301962	St. Louis	Coldwater Cr	1
2012	2177.00	Coonville Cr.	C	1.3	1.3	1.3	Mi	Lead	Source Unknown	AQL	LWW, WBC B	717474	4206559	716589	4204963	St. Francois	Coonville Cr	1
2006	1943.00	Courtois Cr	P	2.6	32	32	Mi	Lead (S)	Doe Run Viburnum Division Lead mine	AQL	CLF, LWW, SCR, WBC A	670500	4180050	656941	4210294	Washington	Courtois Cr.	1
2006	1943.00	Courtois Cr	P	2.6	32	32	Mi	Zinc (S)	Doe Run Viburnum Division Lead mine	AQL	CLF, LWW, SCR, WBC A	670500	4180050	656941	4210294	Washington	Courtois Cr	1
2012	2382.00	Crane Cr	P	13.2	13.2	13.2	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	CDF, LWW, SCR, WBC A	445954	4088238	456895	4081483	Stone	Crane Cr	1
2012	2816.00	Craven Ditch	C	11.6	11.6	11.6	Mi	Oxygen, Dissolved	Source Unknown	AQL	IRR, LWW	730995	4068609	730736	4052473	Butler	Craven Ditch	1
2006	1703.00	Creve Coeur Cr	C	2	2	2	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	718172	4283167	718455	4287491	St. Louis	Creve Coeur Cr	1
2006	1703.00	Creve Coeur Cr	C	2	2	2	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	718172	4283167	718455	4287491	St. Louis	Creve Coeur Cr	1
2010	1703.00	Creve Coeur Cr	C	2	2	2	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	718172	4283167	718455	4287491	St. Louis	Creve Coeur Cr	1
2006	1928.00	Crooked Cr	P	3.5	3.5	3.5	Mi	Cadmium (S)	Buick Lead Smelter	AQL	CLF, LWW, WBC A	662216	4173989	658201	4175646	Dent/Crawford	Crooked Cr	2
2006	1928.00	Crooked Cr	P	3.5	3.5	3.5	Mi	Cadmium	Buick Lead Smelter	AQL	CLF, LWW, WBC A	662216	4173989	658201	4175646	Dent/Crawford	Crooked Cr	1
2006	1928.00	Crooked Cr	P	3.5	3.5	3.5	Mi	Lead (S)	Buick Lead Smelter	AQL	CLF, LWW, WBC A	662216	4173989	658201	4175646	Dent/Crawford	Crooked Cr	2
2008	3961.00	Crooked Cr	H	5.2	n/a	n/a	Mi	Cadmium	Doe Run Buick Lead Smelter	GEN		665048	4167501	662236	4174014	Iron/Dent	Crooked Cr.	1
2010	3961.00	Crooked Cr	H	5.2	n/a	n/a	Mi	Copper	Doe Run Buick Lead Smelter	GEN		665048	4167501	662236	4174014	Iron/Dent	Crooked Cr.	1
2006	2636.00	Current R	P	124	124	124	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, IRR, LWW, SCR, WBC A	628633	4137638	696834	4041519	Shannon/Ripley	Current R	1
2006	219.00	Dardenne Cr	P1	7	7	7	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	708078	4300264	713786	4304316	St. Charles	Dardenne Cr	1
2010	221.00	Dardenne Cr	P	15	15	15	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	692485	4289827	708078	4300264	St. Charles	Dardenne Cr	1
2006	222.00	Dardenne Cr.	C	6	6	6	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	683270	4288804	692485	4289827	St. Charles	Dardenne Cr	1
2006	221.00	Dardenne Cr	P	15	15	15	Mi	Inorganic Sediment	Source Unknown	AQL	LWW, SCR, WBC B	692485	4289827	708078	4300264	St. Charles	Dardenne Cr	3
2002	221.00	Dardenne Cr.	P	15	15	15	Mi	Unknown	Source Unknown	AQL	LWW, SCR, WBC B	692485	4289827	708078	4300264	St. Charles	Dardenne Cr	3
2006	690.00	Dark Cr	C	9.1	9.1	9.1	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	535636	4374111	531829	4365642	Randolph	Dark Cr.	1
2012	3826.00	Deer Cr.	P	1.6	1.6	1.6	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR, WBC B	732023	4276834	733741	4275807	St. Louis	Deer Cr	1
2012	3826.00	Deer Cr	P	1.6	1.6	1.6	Mi	Escherichia coli	Urban Runoff/Storm Sewers	SCR, WBC B	AQL, LWW, WBC B	732023	4276834	733741	4275807	St. Louis	Deer Cr	1
2002	7015.00	Deer Ridge Lake	L3	48	48	48	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC B			692465	4289831	Lewis	Deer Ridge Lake	1
2008	36.00	Des Moines R.	P	29	29.0	29.0	Mi	Escherichia coli	Upstream/Downstream Source	WBC A	AQL, LWW, SCR	607478	4496675	633915	4471240	Clark	Des Moines R.	1
2006	3169.00	Ditch # 36	P	7	7	7	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	770137	4018408	767863	4007224	Dunklin	Ditch # 36	1
2006	3810.00	Douger Branch	C	3.1	3.1	3.1	Mi	Lead (S)	Aurora lead mining district	AQL	LWW	432983	4092649	428971	4092384	Lawrence	Douger Branch	1
2006	3810.00	Douger Branch	C	3.1	3.1	3.1	Mi	Zinc (S)	Aurora lead mining district	AQL	LWW	432983	4092649	428971	4092384	Lawrence	Douger Branch	1
2006	1180.00	Dousinbury Cr	P	3.5	3.5	3.5	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	506028	4158604	501716	4160952	Dallas	Dousinbury Cr	1
2012	3178.00	Dry Fork	C	3.4	3.4	3.4	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	420017	4116479	420475	4111828	Lawrence	Dry Fork	1
2008	3189.00	Dry Fork	C	10.2	10.2	10.2	Mi	Escherichia coli	Rural NPS	WBC A	AQL, LWW	391617	4123451	379518	4128240	Jasper	Dry Fork	1
2012	1314.00	Drywood Cr	P	3.8	29.9	29.9	Mi	Sulfate + Chloride	Acid Mine Drainage	AQL	LWW, WBC B	361691	4158071	369320	4189862	Barton	Drywood Cr	1
2006	3569.00	Dutro Carter Cr	P	0.6	1.5	1.5	Mi	Oxygen, Dissolved	Rolla SE WWTP	AQL	LWW, WBC B	610611	4198782	612773	4199008	Phelps	Dutro Carter Cr	1
2010	372.00	East Fk. Crooked R	P	14	14	14	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	418043	4367620	423049	4349970	Ray	East Fk. Crooked R	1
2006	457.00	East Fk. Grand R	P	25	25	25	Mi	Escherichia coli	Nonpoint Source	WBC A	AQL, DWS, IRR, LWW, SCR	388817	4483394	384234	4450462	Worth/Gentry	East Fk. Grand R	2
2008	608.00	East Fk. Locust Cr	P	13	13	13	Mi	Escherichia coli	Municipal Point Source Discharges, Nonpoint Source	WBC B	AQL, LWW	490788	4450893	485177	4432656	Sullivan	East Fk. Locust Cr	1
2008	610.00	East Fk. Locust Cr	C	0.4	13	13	Mi	Escherichia coli	Municipal Point Source Discharges, Nonpoint Source	WBC B	AQL, LWW	492641	4468112	490788	4450893	Sullivan	East Fk. Locust Cr	1
2008	610.00	East Fk. Locust Cr	C	12.6	13	13	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	492641	4468112	490788	4450893	Sullivan	East Fk. Locust Cr	1
2006	1282.00	East Fk. Tebo Cr	C	10.4	14.5	14.5	Mi	Oxygen, Dissolved	Windsor SW WWTP	AQL	LWW, WBC B	452766	4267493	446906	4257221	Henry	East Fk. Tebo Cr	1
2006	2166.00	Eaton Branch	C	0.9	1.2	1.2	Mi	Cadmium (S)	Leadwood tailings pond	AQL	LWW, WBC B	710945	4193695	712097	4194409	St. Francois	Eaton Branch	1
2006	2166.00	Eaton Branch	C	0.9	1.2	1.2	Mi	Cadmium	Leadwood tailings pond	AQL	LWW, WBC B	710945	4193695	712097	4194409	St. Francois	Eaton Branch	1
2006	2166.00	Eaton Branch	C	0.9	1.2	1.2	Mi	Lead (S)	Leadwood tailings pond	AQL	LWW, WBC B	710945	4193695	712097	4194409	St. Francois	Eaton Branch	1
2006	2166.00	Eaton Branch	C	0.9	1.2	1.2	Mi	Zinc (S)	Leadwood tailings pond	AQL	LWW, WBC B	710945	4193695	712097	4194409	St. Francois	Eaton Branch	1
2006	2166.00	Eaton Branch	C	0.9	1.2	1.2	Mi	Zinc	Leadwood tailings pond	AQL	LWW, WBC B	710945	4193695	712097	4194409	St. Francois	Eaton Branch	1
2002	2593.00	Eleven Point R	P	22.7	22.7	22.7	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, IRR, LWW, SCR, WBC A	638823	4067446	663687	4040687	Oregon	Eleven Point R	1
2006	2597.00	Eleven Point R	P	11.4	11.4	11.4	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CDF, LWW, SCR, WBC A	648216	4073792	638823	4067446	Oregon	Eleven Point R	1
2008	2601.00	Eleven Point R	P	22.3	22.3	22.3	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, LWW, SCR, WBC A	626147	4076649	648216	4073792	Oregon	Eleven Point R	1
2006	1283.00	Elm Branch	C	3	3	3	Mi	Oxygen, Dissolved	Windsor SE WWTP	AQL	LWW, SCR, WBC B	455758	4264046	455816	4261489	Henry	Elm Branch	1
2012	1704.00	Fee Fee (new) Cr	P	1.5	1.5	1.5	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	720613	4290506	718639	4290795	St. Louis	Fee Fee (new) Cr	1
2012	1704.00	Fee Fee (new) Cr	P	1.5	1.5	1.5	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	720613	4290506	718639	4290795	St. Louis	Fee Fee (new) Cr	1
2012	7237.00	Fellows Lake	L1	800	800	800	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	DWS, LWW, SCR, WBC A			479590	4129881	Greene	Fellows Lake	1
2012	3595.00	Fenton Cr	P	0.5	0.5	0.5	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	723865	4265429	724629	4265304	St. Louis	Fenton Cr	1
2012	2186.00	Fishpot Cr	P	2	2	2	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	715611	4270777	718256	4269401	St. Louis	Fishpot Cr	1
2008	2186.00	Fishpot Cr.	P	2	2	2	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	715611	4270777	718256	4269401	St. Louis	Fishpot Cr	1
2010	2168.00	Flat River Cr	C	5	9	9	Mi	Cadmium	Old Lead Belt tailings	AQL	LWW, WBC B	711080	4188129	719846	4196774	St. Francois	Flat River Cr	1
2010	7151.00	Forest Lake	L1	573	573	573	Ac	Chlorophyll-a	Source Unknown	AQL	DWS, LWW, WBC A			529115	4446668	Adair	Forest Lake	1
2010	7151.00	Forest Lake	L1	573	573	573	Ac	Nitrogen, Total	Source Unknown	AQL	DWS, LWW, WBC A			529115	4446668	Adair	Forest Lake	1
2010	7151.00	Forest Lake	L1	573	573	573	Ac	Phosphorus, Total	Source Unknown	AQL	DWS, LWW, WBC A			529115	4446668	Adair	Forest Lake	1
2006	747.00	Fowler Cr	C	6	6	6	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	567705	4291358	568085	4285215	Boone	Fowler Cr	1
2012	1842.00	Fox Cr	P	7.2	7.2	7.2	Mi	Unknown	Source Unknown	AQL	LWW, WBC B	698956	4266805	702113	4258893	St. Louis	Fox Cr	1
2008	38.00	Fox R	P	42	42.0	42.0	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW, SCR	591716	4495662	619844	4469932	Clark	Fox R	1
2010	7008.00	Fox Valley Lake	L3	89	89	89	Ac	Phosphorus, Total	Rural NPS	AQL	LWW, SCR, WBC B			604598	4483661	Clark	Fox Valley Lake	1
2010	7382.00	Foxboro Lake	L3	22	22	22	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC B			644963	4249580	Franklin	Foxboro Lake	1
2002	7280.00	Frisco Lake	L3	5	5	5	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B			608340	4201511	Phelps	Frisco Lake	1
2012	1094.00	Gans Cr.	C	5.5	5.5	5.5	Mi	Escherichia coli	Source Unknown	WBC A	AQL, LWW	562859	4305362	558288	4303469	Boone	Gans Cr.	1
2002	1455.00	Gasconade R	P	249	249	249	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	CLF, DWS, LWW, SCR, WBC A	543608	4120607	626331	4281831	Gascon /Wright	Gasconade R	1
2006	2184.00	Grand Glaize Cr	C	4	4	4	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	720447	4272244	721056	4270200	St. Louis	Grand Glaize Cr	1
2010	2184.00	Grand Glaize Cr	C	4	4	4	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B	720447	4272244	721056	4270200	St. Louis	Grand Glaize Cr	1
2002	2184.00	Grand Glaize Cr	C	4	4	4	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	720447	4272244	721056	4270200	St. Louis	Grand Glaize Cr	1
2006	593.00	Grand R	P	60	60	60	Mi	Escherichia coli	Rural NPS	SCR, WBC B	AQL, DWS, IRR, LWW, WBC A	454151	4399076	490791	4359355	Livin /Chariton	Grand R	1
2008	1712.00	Gravois Cr	P	2	2	2	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	735408	4269269	737783	4270129	St. Louis	Gravois Cr	1
2006	1712.00	Gravois Cr	P	2	2	2	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	735408	4269269	737783	4270129	St. Louis	Gravois Cr	2

Year*	WBID	Water Body Name**	Class	MDNR Proposed Impairment Size	MDNR Water Body Size	EPA Approved Impairment Size	Size Units*	Pollutant	Source*	Impaired Uses*	Other (Unimpaired) Uses*	Upstream X*	Upstream Y*	Downstream X*	Downstream Y*	County Upstream/ Downstream	EPA Approved Water Body Name	Comment*
2006	1713.00	Gravois Cr	C	4	4	4	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	731101	4269870	735408	4269269	St. Louis	Gravois Cr	1
2006	1713.00	Gravois Cr	C	4	4	4	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	731101	4269870	735408	4269269	St. Louis	Gravois Cr	2
2006	1009.00	Grindstone Cr	C	1.5	1.5	1.5	Mi	Escherichia coli	Runoff from Forest/Grassland/Parkland, Rural, Residential Areas, Urban Runoff/Storm Sewers	WBC A	AQL, LWW	561336	4309115	558769	4308985	Boone	Grindstone Cr	1
2012	97.00	Hays Cr	C	2	2	2	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	629827	4365293	630116	4368021	Ralls	Hays Cr.	1
2010	7152.00	Hazel Creek Lake	L1	151	151	151	Ac	Chlorophyll-a	Rural NPS	AQL	DWS, LWW, WBC B			531549	4461110	Adair	Hazel Creek Lake	1
2008	7152.00	Hazel Creek Lake	L1	151	151	151	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	DWS, LWW, WBC B			531549	4461110	Adair	Hazel Creek Lake	1
2008	848.00	Heath's Cr.	P	21	21.0	21.0	Mi	Oxygen, Dissolved	Source Unknown	AQL	WBC B, LWW	481311	4306305	498383	4308084	Pettis	Heath's Cr	1
2006	3226.00	Hickory Cr	P	4.9	4.9	4.9	Mi	Escherichia coli	Source Unknown	WBC A	AQL, LWW	381782	4079307	377855	4083987	Newton	Hickory Cr	1
2006	1008.00	Hinkson Cr	C	18	18	18	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW, SCR	567735	4324925	557334	4308969	Boone	Hinkson Cr.	1
2012	1011.00	Hommy Br	C	1	1.0	1.0	Mi	Escherichia coli	Runoff from Forest/Grassland/Parkland, Rural, Residential Areas, Urban Runoff/Storm Sewers	WBC B	AQL, LWW, SCR	561244	4310832	560154	4310816	Boone	Hommy Br	1
2010	3169.00	Honey Cr	P	16.5	16.5	16.5	Mi	Escherichia coli	Rural NPS runoff	WBC B	AQL, LWW	441810	4098909	423404	4104604	Lawrence	Honey Cr	1
2010	3170.00	Honey Cr.	C	2.7	2.7	2.7	Mi	Escherichia coli	Rural NPS runoff	WBC B	AQL, LWW	443610	4095816	441810	4098909	Lawrence	Honey Cr	1
2008	1348.00	Horse Cr	P	27.7	27.7	27.7	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	IRR, LWW, WBC B	405029	4166750	422134	4180183	Cedar	Horse Cr	1
2010	1348.00	Horse Cr	P	27.7	27.7	27.7	Mi	Oxygen, Dissolved	Source Unknown	AQL	IRR, LWW, WBC B	405029	4166750	422134	4180183	Cedar	Horse Cr	1
2002	7388.00	Hough Park Lake	L3	7	7	7	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B			571190	4266070	Cole	Hough Park Lake	1
2012	7029.00	Hunnewell Lake	L3	228	228	228	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC B			597510	4395781	Shelby	Hunnewell Lake	1
2010	420.00	Indian Cr.	C	3	3	3	Mi	Chloride	Road/Bridge Runoff, Non-construction	AQL	IND, LWW, WBC A	360621	4311182	364588	4312669	Jackson	Indian Cr	1
2002	420.00	Indian Cr	C	3	3	3	Mi	Escherichia coli	Leawood, KS WWTP, Urban Runoff/Storm Sewers	WBC A	AQL, IND, LWW	360621	4311182	364588	4312669	Jackson	Indian Cr	1
2012	1946.00	Indian Cr.	P	1.9	1.9	1.9	Mi	Lead (S)	Doe Run Viburnum Division Lead mine	AQL	LWW, WBC B	668798	4178896	669872	4183483	Washington	Indian Cr	1
2012	1946.00	Indian Cr.	P	1.9	1.9	1.9	Mi	Zinc (S)	Doe Run Viburnum Division Lead mine	AQL	LWW, WBC B	668798	4178896	669872	4183483	Washington	Indian Cr	1
2006	3256.00	Indian Cr.	P	9.7	30.8	30.8	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CLF, IRR, LWW, SCR	390081	4072821	370244	4049428	Newton/McDonald	Indian Cr	1
2008	7389.00	Indian Creek Lake	L3	192	192	192	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC B			440543	4416535	Livingston	Indian Creek Lake	1
2012	3223.00	Jacobs Br	P	1.6	1.6	1.6	Mi	Zinc	Tri-State Mining District	AQL	LWW, WBC B	365485	4095641	365862	4097558	Newton	Jacobs Br.	1
2012	3207.00	Jenkins Cr	P	2.8	2.8	2.8	Mi	Escherichia coli	Rural NPS	WBC A	AQL, LWW	389303	4103152	386194	4105401	Newton/Jasper	Jenkins Cr	1
2012	3205.00	Jones Cr.	P	7.5	7.5	7.5	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CLF, LWW	388104	4099353	385685	4107750	Newton/Jasper	Jones Cr	1
2012	3592.00	Kiefer Cr	P	1.2	1.2	1.2	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	713475	4270033	714845	4269588	St. Louis	Kiefer Cr	1
2010	3592.00	Kiefer Cr	P	1.2	1.2	1.2	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	713475	4270033	714845	4269588	St. Louis	Kiefer Cr	1
2002	7196.00	Knob Knoster St. Park Lakes**	L3	10	10	10	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B			449403	4289099	Johnson	Knob Knoster St. Park Lakes (Lake Bueto)	1
2012	2171.00	Koen Cr	C	1	1	1	Mi	Fishes Bioassessments	Source Unknown	AQL	LWW	720089	4193029	719760	4194283	St. Francois	Koen Cr.	1
2002	7436.00	Lake of the Woods	L3	3	3	3	Ac.	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B			565549	4314857	Boone	Lake of the Woods	1
2008	7629.00	Lake of the Woods	U	7	7	7	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	GFN				368318	4317421	Jackson	Lake of the Woods	1
2010	7054.00	Lake St. Louis	L3	525	525	525	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	WBC B, LWW			694076	4297716	St. Charles	Lake St. Louis	1
2010	7212.00	Lake Winnebago	L3	350	350	350	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC A			382262	4297476	Cass	Lake Winnebago	1
2006	847.00	Lamine R	P	54	54	54	Mi	Escherichia coli	Rural NPS	WBC A	AQL, IRR, LWW, SCR	504073	4279987	513022	4314616	Morgan/Cooper	Lamine R	1
1998	3105.00	Lat. #2 Main Ditch	P	11.5	11.5	11.5	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	774316	4075750	773639	4058046	Stoddard	Lat. #2 Main Ditch	2
2008	3105.00	Lat. #2 Main Ditch	P	11.5	11.5	11.5	Mi	Temperature, water	Channelization	AQL	LWW, WBC B	774316	4075750	773639	4058046	Stoddard	Lat. #2 Main Ditch	1
2012	3137.00	Lee Rowe Ditch	C	2.3	6	6	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	824366	4076900	824243	4068035	Mississippi	Lee Rowe Ditch	1
2002	7026.00	Lewistown Lake	L1	29	29	29	Ac	Atrazine	Agriculture	DWS	AQL			660674	4439277	Lewis	Lewistown Lake	3
2012	3575.00	Line Cr	C	7	7	7	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	358975	4343373	360133	4335563	Platte	Line Cr	1
2008	1529.00	Little Beaver Cr	C	3.4	3.5	3.5	Mi	Sedimentation/Siltation (S)	Smith Sand and Gravel	AQL	LWW, WBC A	602527	4199503	600308	4195828	Phelps	Little Beaver Cr	1
2012	422.00	Little Blue R	P	35.1	35.1	35.1	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW, SCR	372712	4309259	394916	4340608	Jackson	Little Blue R	1
2012	1003.00	Little Bonne Femme Cr	P	9	9	9	Mi	Escherichia coli	Source Unknown	WBC B	AQL, LWW	558288	4303469	553242	4296685	Boone	Little Bonne Femme Cr	1
2006	1863.00	Little Dry Fk	P	1	5	5	Mi	Oxygen, Dissolved	Rolla SE WWTP	AQL	LWW, SCR, WBC B	612773	4199008	618873	4198236	Phelps	Little Dry Fk	1
2006	1864.00	Little Dry Fk	C	0.6	4.5	4.5	Mi	Oxygen, Dissolved	Rolla SE WWTP	AQL	LWW, WBC B	613005	4192817	612773	4199008	Phelps	Little Dry Fk	1
2008	1864.00	Little Dry Fk	C	3.9	4.5	4.5	Mi	Oxygen, Dissolved	Unknown	AQL	LWW, WBC B	613005	4192817	612773	4199008	Phelps	Little Dry Fk	1
2006	1325.00	Little Drywood Cr	P	17	17	17	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	376904	4174682	376746	4191482	Vernon	Little Drywood Cr	1
2010	1326.00	Little Drywood Cr	C	10	10	10	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	379798	4162808	376904	4174682	Barton/Vernon	Little Drywood Cr	1
2010	3279.00	Little Lost Cr	P	5.8	5.8	5.8	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	362556	4080613	355717	4078288	Newton	Little Lost Cr	1
2006	623.00	Little Medicine Cr	P	40	40	40	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	464025	4492224	467988	4439145	Mercer/Grundy	Little Medicine Cr	1
2006	623.00	Little Medicine Cr	P	20	40	40	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	464025	4492224	467988	4439145	Mercer/Grundy	Little Medicine Cr.	1
2006	1189.00	Little Niangua R	P	20	43	43	Mi	Oxygen, Dissolved	Source Unknown	AQL	CLF, LWW, SCR, WBC A	499864	4188139	508561	4212655	Dallas/Camden	Little Niangua R	1
2008	3652.00	Little Osage R	C	16	16	16	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	358279	4206140	378073	4204995	Vernon	Little Osage R	2
2012	2229.00	Little Whitewater R	P	24.2	24.2	24.2	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC A	759234	4159953	782136	4144237	Cape G/Bollinger	Little Whitewater Cr	1
2006	606.00	Locust Cr.	P	36.4	84	84	Mi	Escherichia coli	Rural NPS	SCR, WBC B	AQL, DWS, LWW, WBC B	488062	4492445	475478	4390818	Putnam/Sullivan	Locust Cr.	1
2012	2763.00	Logan Cr	P	6.1	36.0	36.0	Mi	Lead (S)	Sweetwater Lead Mine/Mill	AQL	LWW, SCR, WBC A	666297	4135279	693973	4115642	Reynolds	Logan Cr	1
2006	696.00	Long Branch Cr	C	2	13	13	Mi	Oxygen, Dissolved	Atlanta WWTP	AQL	LWW, SCR, WBC B	541793	4427514	542604	4408569	Macon	Long Branch Cr.	1
2002	7097.00	Longview Lake	L2	930	930	930	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC A			372708	4309235	Jackson	Longview Lake	1
2006	3278.00	Lost Cr	P	8.5	8.5	8.5	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CLF, LWW, SCR	365739	4083856	355717	4078288	Newton	Lost Cr	1
2006	2814.00	Main Ditch	C	13	13.0	13.0	Mi	pH	Poplar Bluff WWTP	AQL	IRR, LWW, WBC B	732529	4068029	728374	4048617	Butler	Main Ditch	1
2006	2814.00	Main Ditch	C	13	13.0	13.0	Mi	Temperature, water	Channelization	AQL	IRR, LWW, WBC B	732529	4068029	728374	4048617	Butler	Main Ditch	1
2012	1709.00	Maline Cr	C	0.6	0.6	0.6	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR, WBC B	741069	4291198	741513	4290475	St. Louis	Maline Cr.	1
2012	1709.00	Maline Cr	C	0.6	0.6	0.6	Mi	Escherichia coli	Urban Runoff/Storm Sewers	SCR, WBC B	AQL, LWW, WBC B	741069	4291198	741513	4290475	St. Louis	Maline Cr.	1
2012	3839.00	Maline Cr	C	0.5	0.5	0.5	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR	741513	4290475	743767	4287000	St. Louis	Maline Cr	1
2012	3839.00	Maline Cr	C	0.5	0.5	0.5	Mi	pH	Source Unknown	AQL	LWW, SCR	741513	4290475	743767	4287000	St. Louis	Maline Cr	1
2010	3140.00	Maple Slough Ditch	C	16	16	16	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	820609	4090553	816878	4062805	Miss/New Madrid	Maple Slough Ditch	1
2002	7033.00	Mark Twain Lake	L2	18600	18600	18600	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	DWS, LWW, SCR, WBC A			616549	4375850	Monroe/Ralls	Mark Twain Lake	1
2006	619.00	Medicine Cr	P	36	36	36	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	471740	4492250	467988	4439145	Putnam/Grundy	Medicine Cr.	1
2010	2183.00	Meramec R	P	22	22	22	Mi	Escherichia coli	Municipal Point Source Discharges, Nonpoint Source	WBC A	AQL, DWS, IND, LWW, SCR	718256	4269401	732150	4252184	St. Louis	Meramec R	1
2008	2183.00	Meramec R	P	22	22	22	Mi	Lead (S)	Old Lead belt tailings	AQL	DWS, IND, LWW, SCR, WBC A	718256	4269401	732150	4252184	St. Louis	Meramec R.	1
2008	2185.00	Meramec R	P	15.7	26	26	Mi	Lead (S)	Old Lead Belt tailings	AQL	CLF, DWS, IND, LWW, SCR, WBC A	707821	4260833	718256	4269401	St. Louis	Meramec R.	1
1994	1299.00	Miami Cr	P	18	18	18	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	372360	4240637	383003	4222753	Bates	Miami Cr	1

Year*	WBID	Water Body Name**	Class	MDNR Proposed Impairment Size	MDNR Water Body Size	EPA Approved Impairment Size	Size Units*	Pollutant	Source*	Impaired Uses*	Other (Unimpaired) Uses*	Upstream X*	Upstream Y*	Downstream X*	Downstream Y*	County Upstream/ Downstream	EPA Approved Water Body Name	Comment*
2012	2744.00	Middle Fk. Black R.	P	2.5	21	21	Mi.	Aquatic Macroinvertebrate Bioassessments	Buick Lead Mine/Mill	AQL	CLF, LWW, WBC A	676243	4167324	690022	4146556	Reynolds	Middle Fk. Black R.	1
2006	468.00	Middle Fk. Grand R.	P	25	25	25	Mi	Escherichia coli	Rural NPS	WBC A	AQL, IRR, LWW, SCR	385572	4488578	381803	4452419	Worth/Gentry	Middle Fk. Grand R.	1
2010	3262.00	Middle Indian Cr.	C	3.5	3.5	3.5	Mi.	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	400092	4074869	395454	4074061	Newton	Middle Indian Cr	1
2008	3263.00	Middle Indian Cr.	P	2.2	2.2	2.2	Mi.	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	395454	4074061	392652	4075387	Newton	Middle Indian Cr	1
2010	3263.00	Middle Indian Cr.	P	2.2	2.2	2.2	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, LWW	395454	4074061	392652	4075387	Newton	Middle Indian Cr.	1
2010	226.00	Missouri R.	P	179	179	179	Mi.	Escherichia coli	Mult. Pt & NPS	SCR, WBC B	AQL, DWS, IND, IRR, LWW, WBC B	265899	4496416	361019	4330707	Atchison/Jackson	Missouri R.	1
2012	356.00	Missouri R	P	129	129	129	Mi	Escherichia coli	Mult. Pt & NPS	SCR, WBC B	AQL, DWS, IND, IRR, LWW, WBC B	361019	4330707	503487	4351401	Jackson/Saline	Missouri R.	1
2008	1604.00	Missouri R.	P	100	100	100	Mi.	Escherichia coli	Mult. Pt & NPS	WBC B	AQL, DWS, IND, IRR, LWW, SCR	626331	4281831	750287	4299152	Gasconade/St. Charles	Missouri R.	1
2010	7402.00	Mozingo Lake	L1	1000	1000	1000	Ac.	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	DWS, LWW, SCR, WBC B, GEN			348772	4467994	Nodaway	Mozingo Lake	1
2006	853.00	Muddy Cr.	P	1.8	62.2	62.2	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	458149	4281754	495127	4299752	Pettis	Muddy Cr.	1
2008	853.00	Muddy Cr	P	62.2	62.2	62.2	Mi.	Chloride	Sedalia Central WWTP	AQL	LWW, WBC B	458149	4281754	495127	4299752	Pettis	Muddy Cr.	1
2006	674.00	Mussel Fork Cr.	C	29	29	29	Mi	Escherichia coli	Rural NPS	WBC B	AQL, DWS, LWW	509539	4450637	513872	4410410	Sullivan/Macon	Mussel Fork	1
2006	1170.00	Niangua R	P	51	51	51	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CLF, LWW, SCR	507117	4144345	512225	4176338	Webster/Dallas	Niangua R.	1
2006	550.00	No Cr.	P	22.5	22.5	22.5	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	461790	4446877	451131	4415226	Grundy/Livin.	No Cr.	1
2010	550.00	No Cr.	P	22.5	22.5	22.5	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	461790	4446877	451131	4415226	Grundy/Livin.	No Cr.	1
2002	7316.00	Noblett Lake	L3	26	26	26	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC A			579891	4085042	Douglas	Noblett Lake	1
2010	279.00	Nodaway R.	P	60	60	60	Mi	Escherichia coli	Rural NPS	WBC B	AQL, IRR, LWW, SCR	328881	4493666	331916	4418596	Nodaway	Nodaway R.	1
2010	7109.00	North Bethany Lake	L3	78	78	78	Ac.	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC A			412397	4463019	Harrison	North Bethany Lake	1
2006	170.00	North Fk. Cuivre R	C	8	8	8	Mi	Fecal Coliform	Source Unknown	WBC B	AQL, LWW	651658	4345253	656791	4337025	Pike	North Fk. Cuivre R.	1
2006	170.00	North Fk. Cuivre R	C	8	8	8	Mi.	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	651658	4345253	656791	4337025	Pike	North Fk. Cuivre R.	1
2008	3186.00	North Fk. Spring R.	P	17.4	17.4	17.4	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, LWW, SCR	379518	4128240	363884	4125753	Barton	North Fk. Spring R.	1
2006	3188.00	North Fk. Spring R.	C	1.1	55.9	55.9	Mi.	Ammonia, Total	Lamar WWTP	AQL	LWW, SCR, WBC B	408705	4131497	379518	4128240	Barton	North Fk. Spring R.	1
2008	3188.00	North Fk. Spring R.	C	55.9	55.9	55.9	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW, SCR	408705	4131497	379518	4128240	Dade/Jasper	North Fk. Spring R.	1
2006	3188.00	North Fk. Spring R.	C	55.9	55.9	55.9	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	408705	4131497	379518	4128240	Dade/Jasper	North Fk. Spring R.	1
2008	3260.00	North Indian Cr.	P	5.2	5.2	5.2	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC B	395488	4077540	390081	4072821	Newton	North Indian Cr	1
2008	3260.00	North Indian Cr.	P	5.2	5.2	5.2	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, LWW	395488	4077540	390081	4072821	Newton	North Indian Cr.	1
2010	1293.00	Osage R.	P	39.3	39.3	39.3	Mi.	Oxygen, Dissolved	Source Unknown	***	***	453701	4183192	444285	4187603	Vernon/St.Clair	Osage R.	1
2006	1373.00	Panther Cr.	C	7.8	7.8	7.8	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	453742	4183206	444279	4187593	St.Clair/Polk	Panther Cr.	1
2006	2373.00	Pearson Cr.	P	8	8	8	Mi.	Escherichia coli	Livestock,Grazing or Feeding Operations, Urban Runoff/Storm Sewers	WBC A	AQL, LWW	486612	4121328	482571	4113045	Greene	Pearson Cr	1
2008	7628.00	Perry Phillips Lake	U	32	32	32	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	GEN				561277	4305658	Boone	Perry Phillips Lake	1
2012	215.00	Peruque Cr.	P1	9.6	9.6	9.6	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	700317	4301742	705352	4308025	St. Charles	Peruque Cr.	1
2012	216.00	Peruque Cr.	P	0.3	10.3	10.3	Mi	Unknown	Lake St. Louis Dam	AQL	LWW, SCR, WBC B	693920	4297084	700317	4301742	St. Charles	Peruque Cr.	1
2006	217.00	Peruque Cr.	P	9.6	9.6	9.6	Mi.	Inorganic Sediment	Source Unknown	AQL	LWW, SCR, WBC B	686322	4296816	690798	4295430	St. Charles	Peruque Creek	3
2006	218.00	Peruque Cr.	P	0.3	10.3	10.3	mi.	Inorganic Sediment	Source Unknown	AQL	LWW, SCR, WBC B	674302	4297979	686322	4296816	St. Charles	Peruque Creek	3
2006	1755.00	Pickle Cr.	P	7	7	7	Mi.	pH	Atmospheric Deposition - Acidity	AQL	LWW, WBC B	738455	4187974	746104	4191429	Ste. Genevieve	Pickle Cr.	1
2010	2815.00	Pike Cr.	C	6	6.0	6.0	Mi	Oxygen, Dissolved	Source Unknown	AQL	IRR, LWW	727556	4074154	732529	4068029	Butler	Pike Cr.	1
2010	312.00	Platte R.	P	138	138	138	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, DWS, IRR, LWW, SCR	370620	4492569	341432	4347540	Worth/Platte	Platte R.	1
2012	1327.00	Pleasant Run Cr	C	7.6	7.6	7.6	Mi.	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	381362	4169529	376904	4174682	Vernon	Pleasant Run Cr.	1
2006	3120.00	Pole Cat Slough	P	12	12	12	Mi.	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	763796	4013691	755748	3998563	Dunklin	Pole Cat Slough	1
2006	2038.00	Red Oak Cr	C	10	10	10	Mi.	Oxygen, Dissolved	Owensville WWTP	AQL	LWW, WBC B	631423	4239850	642015	4246717	Gasconade	Red Oak Cr	1
2006	1710.00	River des Peres	C	2.6	2.6	2.6	Mi.	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR	736562	4271521	738968	4268398	St. Louis	River des Peres	1,5
2012	1710.00	River des Peres	C	2.6	2.6	2.6	Mi.	Escherichia coli	Urban Runoff/Storm Sewers	SCR	AQL, LWW	736562	4271521	738968	4268398	St. Louis	River des Peres	1,5
2012	3827.00	River des Peres	P	3.7	3.7	3.7	Mi.	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR	733741	4275807	736562	4271521	St. Louis	River des Peres	1,6
2012	3827.00	River des Peres	P	3.7	3.7	3.7	Mi.	Escherichia coli	Urban Runoff/Storm Sewers	SCR	AQL, LWW	733741	4275807	736562	4271521	St. Louis	River des Peres	1,6
2012	3972.00	River des Peres	U	6.5	6.5	6.5	Mi.	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, SCR	733742	4275819	736561	4271521	St. Louis	River des Peres	1
2010	594.00	Salt Cr.	C	14	14.0	14.0	Mi.	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	491540	4377934	485852	4365132	Livin./Chariton	Salt Cr.	1
2012	2113.00	Salt Pine Cr.	C	1.2	1.2	1.2	Mi.	Aquatic Macroinvertebrate Bioassessments	Barite tailings pond	AQL	LWW, WBC B	698656	4214467	697844	4216050	St. Francois	Salt Pine Cr.	1
2008	91.00	Salt R.	P	29	29	29	Mi.	Oxygen, Dissolved	Mark Twain Lake re-regulation dam	AQL	DWS, IRR, LWW, SCR, WBC A	622770	4380470	654484	4376225	Ralls/Pike	Salt R	1
2002	103.00	Salt R.	P1	9.3	9.3	9.3	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	DWS, IRR, LWW, SCR, WBC A	616554	4375853	622770	4380500	Ralls	Salt R.	1,7
2006	2170.00	Shaw Branch	C	2	2	2	Mi.	Cadmium (S)	Federal tailings pond	AQL	LWW, WBC B	718506	4190246	718459	4191845	St. Francois	Shaw Branch	1
2008	3222.00	Shoal Cr.	P	41.1	41.1	41.1	Mi.	Escherichia coli	Rural NPS	WBC A	AQL, CLF, DWS, IND, IRR, LWW, SCR	401984	4083455	356098	4099733	Newton	Shoal Cr.	1
2006	399.00	Sni-a-bar Cr.	P	32	32	32	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	398859	4311016	416463	4333103	Jackson/Lafayette	Sni-a-bar Cr.	1
2006	655.00	South Blackbird Cr.	C	5	13	13	Mi	Ammonia, Un-ionized	Source Unknown	AQL	LWW, WBC B	503682	4475363	518712	4469745	Putnam	South Blackbird Cr.	2
2010	71.00	South Fabius R.	P	80.6	80.6	80.6	Mi	Escherichia coli	Nonpoint Source	WBC B	AQL, IRR, LWW	572794	4444457	627750	4417637	Knox/Marion	South Fabius R	1
1994	142.00	South Fk. Salt R	C	20.1	32	32	Mi	Oxygen, Dissolved	Mexico WWTP, Source Unknown	AQL	LWW, SCR, WBC B	600363	4322879	601283	4355209	Callaway/Audrain	South Fk. Salt R.	1
2006	1249.00	South Grand R.	P	62.5	62.5	62.5	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW, SCR	366728	4281000	429978	4242884	Cass/Henry	South Grand R.	1
2012	3259.00	South Indian Cr.	P	8.7	8.7	8.7	Mi.	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	CDF, LWW, WBC B	399208	4067538	390081	4072821	McDonald/Newton	South Indian Cr.	1
2008	3259.00	South Indian Cr.	P	8.7	8.7	8.7	Mi.	Escherichia coli	Rural NPS	WBC B	AQL, CDF, LWW	399208	4067538	390081	4072821	Newton/McDonald	South Indian Cr.	1
2012	224.00	Spencer Cr.	C	1.5	1.5	1.5	Mi.	Chloride	St. Peters WWTP, Urban Runoff/Storm Sewers	AQL	LWW	708205	4298105	709432	4300121	St. Charles	Spencer Cr.	1
2006	3160.00	Spring R.	C	61.7	61.7	61.7	Mi.	Escherichia coli	Rural NPS	WBC A	AQL, CLF, IND, IRR, LWW, SCR	420405	4108691	356380	4117694	Lawrence/Jasper	Spring R.	1
2010	3164.00	Spring R.	P	8.8	8.8	8.8	Mi.	Escherichia coli	Rural NPS	WBC A	AQL, CDF, IND, IRR, LWW, SCR	425936	4100897	420405	4108691	Lawrence	Spring R.	1
2010	3165.00	Spring R.	P	11.9	11.9	11.9	Mi.	Escherichia coli	Rural NPS	WBC A	AQL, LWW, SCR	430983	4088423	425936	4100897	Lawrence	Spring R.	1
2012	2835.00	St Francis R	P	8.4	93.1	93.1	Mi	Temperature, water	Source Unknown	CLF	AQL, IRR, LWW, SCR, WBC A	712410	4180045	726667	4108428	St. Francois	St. Francis R.	1

Year*	WBID	Water Body Name**	Class	MDNR Proposed Impairment Size	MDNR Water Body Size	EPA Approved Impairment Size	Size Units*	Pollutant	Source*	Impaired Uses*	Other (Unimpaired) Uses*	Upstream X*	Upstream Y*	Downstream X*	Downstream Y*	County Upstream/ Downstream	EPA Approved Water Body Name	Comment*
2006	3138.00	St. John's Ditch	P	15.3	15.3	15.3	Mi	Escherichia coli	Rural NPS, Urban Runoff/Storm Sewers	WBC B	AQL, LWW, SCR	807943	4079163	817828	4057590	New Madrid	St. John's Ditch	1
2006	3138.00	St. John's Ditch	P	15.3	15.3	15.3	Mi	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC B	807943	4079163	817828	4057590	New Madrid	St. John's Ditch	1
2006	3135.00	Stevenson Bayou	C	14	14	14	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	833337	4094443	831489	4086239	Mississippi	Stevenson Bayou	1
2006	959.00	Straight Fk	C	2.5	6	6	Mi	Oxygen, Dissolved	Versailles WWTP	AQL	LWW, WBC B	513048	4255154	514134	4262987	Morgan	Straight Fk	1
2006	959.00	Straight Fk	C	2.5	6	6	Mi	Chloride	Versailles WWTP	AQL	LWW, WBC B	513048	4255154	514134	4262987	Morgan	Straight Fk	3
2008	2751.00	Strother Cr	P	6	6.0	6.0	Mi	Lead (S)	Buick Lead Mine/Mill	AQL	CLF, LWW, WBC B	672401	4162649	680292	4163603	Iron	Strother Cr	1
2010	2751.00	Strother Cr	P	6	6.0	6.0	Mi	Lead	Buick Lead Mine/Mill	AQL	CLF, LWW, WBC B	672401	4162649	680292	4163603	Iron	Strother Cr	1
2008	2751.00	Strother Cr	P	6	6.0	6.0	Mi	Nickel (S)	Buick Lead Mine/Mill	AQL	CLF, LWW, WBC B	672401	4162649	680292	4163603	Iron	Strother Cr	1
2006	2751.00	Strother Cr	P	6	6.0	6.0	Mi	Zinc (S)	Buick Lead Mine/Mill	AQL	CLF, LWW, WBC B	672401	4162649	680292	4163603	Iron	Strother Cr	1
2010	2751.00	Strother Cr	P	6	6.0	6.0	Mi	Zinc	Buick Lead Mine/Mill	AQL	CLF, LWW, WBC B	672401	4162649	680292	4163603	Iron	Strother Cr	1
2008	3965.00	Strother Cr	U	0.9	n/a	n/a	Mi	Arsenic (S)	Buick Lead Mine/Mill	GEN		671138	4161740	672405	4162651	Reynolds/Iron	Strother Cr	1
2008	3965.00	Strother Cr	U	0.9	n/a	n/a	Mi	Lead (S)	Buick Lead Mine/Mill	GEN		671138	4161740	672405	4162651	Reynolds/Iron	Strother Cr	1
2008	3965.00	Strother Cr	U	0.9	n/a	n/a	Mi	Nickel (S)	Buick Lead Mine/Mill	GEN		671138	4161740	672405	4162651	Reynolds/Iron	Strother Cr	1
2006	3965.00	Strother Cr	U	0.9	n/a	n/a	Mi	Zinc (S)	Buick Lead Mine/Mill	GEN		671138	4161740	672405	4162651	Reynolds/Iron	Strother Cr	1
2012	3965.00	Strother Cr	U	0.9	n/a	n/a	Mi	Zinc	Buick Lead Mine/Mill	GEN		671138	4161740	672405	4162651	Reynolds/Iron	Strother Cr	1
2006	686.00	Sugar Cr	P	6.8	6.8	6.8	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	544656	4369584	538213	4368067	Randolph	Sugar Cr	1
2006	7399.00	Sunset Lake	L3	6	6	6	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, WBC B			569912	4268414	Cole	Sunset Lake	1
2002	7313.00	Table Rock Lake, James, Kings and Long Cr Arms	L2	24507	24507	24507	Ac	Nutrient/Eutrophication Biological Indicators	Mult Pt & NPS	AQL	WBC B,LWW,SCR			472162	4050084	Barry/Taney	Table Rock Lake, James, Kings and Long Cr Arms	2
2010	7313.00	Table Rock Lake, White River Arm	L2	17240	17240	17240	Ac	Chlorophyll	Mult Pt & NPS	AQL	WBC B,LWW,SCR			472162	4050084	Barry/Taney	Table Rock Lake, James, Kings and Long Cr Arms	1
2010	7313.00	Table Rock Lake, White River Arm	L2	17240	17240	17240	Ac	Nitrogen	Mult Pt & NPS	AQL	WBC B,LWW,SCR			472162	4050084	Barry/Taney	Table Rock Lake, James, Kings and Long Cr Arms	1
2010	7297.00	Terre Du Lac Lakes****	L3	103	103	103	Ac	Chlorophyll-a	Terre du Lac Subdivision	AQL	LWW, SCR, WBC A			708556	4197147	St. Francois	Terre Du Lac Lakes (Lac Capri)	1
2010	7297.00	Terre Du Lac Lakes****	L3	103	103	103	Ac	Nitrogen, Total	Terre du Lac Subdivision	AQL	LWW, SCR, WBC A			708556	4197147	St. Francois	Terre Du Lac Lakes (Lac Capri)	1
2008	549.00	Thompson R	P	5	65	65	Mi	Escherichia coli	Rural NPS	WBC B	AQL, DWS, IRR, LWW	432171	4492131	447462	4401719	Harrison	Thompson R	1
2012	3243.00	Thurman Cr	P	3	3	3	Mi	Escherichia coli	Rural and suburban NPS	WBC B	AQL, LWW	369319	4099003	367458	4097252	Newton	Thurman Cr	1
2012	3763.00	Tiff Cr	P	2.1	2.1	2.1	Mi	Fishes Bioassessments	Source Unknown	AQL	LWW, WBC B	710826	4212440	708985	4214913	Jefferson	Tiff Cr	1
2006	1225.00	Trib. To Big Otter Cr	C	1	1	1	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	437073	4228823	436270	4229863	Henry	Trib. To Big Otter Cr	1
2012	3963.00	Trib. To Chat Cr	U	0.9	0.9	0.9	Mi	Cadmium	Baldwin Park mine	GEN		437568	4092534	436376	4092428	Lawrence	Trib. To Chat Cr	1
2010	3963.00	Trib. To Chat Cr	U	0.9	0.9	0.9	Mi	Zinc	Baldwin Park mine	GEN		437568	4092534	436376	4092428	Lawrence	Trib. To Chat Cr	1
2010	133.00	Trib. To Coon Cr	C	1	1	1	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	552198	4364074	554325	4364132	Randolph	Trib. To Coon Cr	2
2010	3938.00	Trib. To Flat River Cr	U	0.3	0.3	0.3	Mi	Zinc	Mill tailings (Ahan.)	AQL		717159	4191123	717606	4190862	St. Francois	Trib. To Flat River Cr	1
2008	3943.00	Trib. To Foster Br	U	0.7	2.0	2.0	Mi	Ammonia, Un-Ionized	Ashland WWTP	GEN		564699	4290776	656255	4290007	Boone	Trib. To Foster Br	1
2010	1420.00	Trib. To Goose Cr	C	3	3.0	3.0	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	437166	4110190	440767	4112989	Lawrence	Trib. To Goose Cr	1
2006	3490.00	Trib. To Little Muddy Cr	C	1	1.0	1.0	Mi	Chloride	Tyson Foods	AQL	LWW, WBC B	475618	4290951	474708	4291640	Pettis	Trib. To Little Muddy Cr	1
2010	2114.00	Trib. To Old Mines Cr	C	1.5	1.5	1.5	Mi	Sedimentation/Siltation (S)	Barite tailings pond	GEN	AQL, LWW, WBC B	699696	4215163	698452	4216961	St. Francois	Trib. To Old Mines Cr	1
2006	3360.00	Trib. To Red Oak Cr	C	0.5	0.5	0.5	Mi	Oxygen, Dissolved	Owensville WWTP	AQL	LWW, WBC B	635575	4245150	636297	4244762	Gasconade	Trib. To Red Oak Cr	1
2006	3361.00	Trib. To Red Oak Cr	C	1.1	1.9	1.9	Mi	Oxygen, Dissolved	Nonpoint Source	AQL	LWW	632983	4245771	635575	4245150	Gasconade	Trib. To Red Oak Cr	1
2006	3361.00	Trib. To Red Oak Cr	C	0.8	1.9	1.9	Mi	Oxygen, Dissolved	Owensville WWTP	AQL	LWW	632983	4245771	635575	4245150	Gasconade	Trib. To Red Oak Cr	1
2006	956.00	Trib. To Willow Fk	C	0.5	0.5	0.5	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW	520018	4276045	520577	4275439	Moniteau	Trib. To Willow Fk	1
2006	3589.00	Trib. To Wolf Cr	C	1.5	1.5	1.5	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	727181	4185394	729121	4184284	St. Francois	Trib. To Wolf Cr	2
2006	74.00	Troublesome Cr	C	6.1	41.3	41.3	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, SCR, WBC B	581617	4441608	613693	4417997	Knox	Troublesome Cr	1
2006	74.00	Troublesome Cr	C	35.3	41.3	41.3	Mi	Unknown	Source Unknown	AQL	WBC B,LWW	581617	4441608	613693	4417997	Knox/Marion	Troublesome Cr	1
2010	3175.00	Truitt Cr	C	6.4	6.4	6.4	Mi	Bacteria	Rural NPS	WBC A	AQL, LWW	429512	4115867	424213	4108968	Lawrence	Truitt Creek	3
2012	751.00	Turkey Cr	C	6.3	6.3	6.3	Mi	Escherichia coli	Source Unknown	WBC A	AQL, LWW	365489	4300829	360346	4298772	Boone	Turkey Cr	1
2006	3216.00	Turkey Cr	P	7.7	7.7	7.7	Mi	Cadmium (S)	Tri-State Mining District	AQL	LWW, WBC B	366144	4107717	356267	4109959	Jasper	Turkey Cr	1
2006	3216.00	Turkey Cr	P	7.7	7.7	7.7	Mi	Cadmium	Tri-State Mining District	AQL	LWW, WBC B	366144	4107717	356267	4109959	Jasper	Turkey Cr	1
2006	3216.00	Turkey Cr	P	7.7	7.7	7.7	Mi	Escherichia coli	Rural and suburban NPS	WBC B	AQL, LWW	366144	4107717	356267	4109959	Jasper	Turkey Cr	1
2008	3216.00	Turkey Cr	P	7.7	7.7	7.7	Mi	Lead (S)	Tri-State Mining District	AQL	LWW, WBC B	366144	4107717	356267	4109959	Jasper	Turkey Cr	1
2008	3216.00	Turkey Cr	P	7.7	7.7	7.7	Mi	Zinc (S)	Tri-State Mining District	AQL	LWW, WBC B	366144	4107717	356267	4109959	Jasper	Turkey Cr	1
2008	3217.00	Turkey Cr	P	6.1	6.1	6.1	Mi	Cadmium (S)	Tri-State Mining District	AQL	LWW, WBC A	373143	4104208	366144	4107717	Jasper	Turkey Cr	1
2008	3217.00	Turkey Cr	P	6.1	6.1	6.1	Mi	Escherichia coli	Rural and suburban NPS	WBC A	AQL, LWW	373143	4104208	366144	4107717	Jasper	Turkey Cr	1
2008	3217.00	Turkey Cr	P	6.1	6.1	6.1	Mi	Lead (S)	Tri-State Mining District	AQL	LWW, WBC A	373143	4104208	366144	4107717	Jasper	Turkey Cr	1
2008	3217.00	Turkey Cr	P	6.1	6.1	6.1	Mi	Zinc (S)	Tri-State Mining District	AQL	LWW, WBC A	373143	4104208	366144	4107717	Jasper	Turkey Cr	1
2006	3282.00	Turkey Cr	P	2.4	2.4	2.4	Mi	Cadmium	Bonne Terre chat pile	AQL	LWW, WBC B	715493	4200128	714636	4203638	St. Francois	Turkey Cr	1
2006	3282.00	Turkey Cr	P	2.4	2.4	2.4	Mi	Lead	Bonne Terre chat pile	AQL	LWW, WBC B	715493	4200128	714636	4203638	St. Francois	Turkey Cr	1
2006	3282.00	Turkey Cr	P	1.2	2.4	2.4	Mi	Zinc	Bonne Terre chat pile	AQL	LWW, WBC B	715493	4200128	714636	4203638	St. Francois	Turkey Cr	1
2010	1414.00	Turnback Cr	P	14	14.0	14.0	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CDF, LWW, SCR	445684	4108548	432264	4127720	Lawrence/Dade	Turnback Cr	1
2006	2579.00	Warm Fk. Spring R	P	13.8	13.8	13.8	Mi	Fecal Coliform	Source Unknown	WBC A	AQL, IRR, LWW, SCR	627789	4054485	631878	4040300	Oregon	Warm Fk. Spring R	1
2006	1708.00	Watkins Cr	C	3.5	3.5	3.5	Mi	Chloride	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	744084	4294764	745936	4294861	St. Louis	Watkins Cr	1
2006	1708.00	Watkins Cr	C	3.5	3.5	3.5	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	744084	4294764	745936	4294861	St. Louis	Watkins Cr	1
2012	1708.00	Watkins Cr	C	3.5	3.5	3.5	Mi	pH	Urban Runoff/Storm Sewers	AQL	LWW, WBC B	744084	4294764	745936	4294861	St. Louis	Watkins Cr	1
2010	7071.00	Weatherby Lake	L3	194	194	194	Ac	Chlorophyll-a	Urban Runoff/Storm Sewers	AQL	LWW, SCR, WBC A			363437	4175258	Platte	Weatherby Lake	1
2010	7071.00	Weatherby Lake	L3	194	194	194	Ac	Mercury In Fish Tissue (T)	Atmospheric Deposition - Toxics	AQL	LWW, SCR, WBC A			363437	4175258	Platte	Weatherby Lake	1
2010	7071.00	Weatherby Lake	L3	194	194	194	Ac	Nitrogen, Total	Urban Runoff/Storm Sewers	AQL	LWW, SCR, WBC A			363437	4175258	Platte	Weatherby Lake	1
2006	560.00	Weldon R	P	42	42	42	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	448318	4492214	444714	4439341	Mercer/Grundy	Weldon R	1
2008	2755.00	West Fk. Black R	P	2.1	32.3	32.3	Mi	Lead (S)	West Fork Mine	AQL	CLF, LWW, WBC A	656850	4154383	690022	4146556	Reynolds	West Fk. Black R	1
2008	2755.00	West Fk. Black R	P	2.1	32.3	32.3	Mi	Nickel (S)	West Fork Lead Mine/Mill	AQL	CLF, LWW, WBC A	656850	4154383	690022	4146556	Reynolds	West Fk. Black R	1
2006	1317.00	West Fk. Drywood Cr	C	8.1	8.1	8.1	Mi	Oxygen, Dissolved	Source Unknown	AQL	LWW, WBC B	357350	4172196	363431	4175252	Vernon	West Fk. Drywood Cr	1
2008	1504.00	Whetstone Cr	P	12.2	12.2	12.2	Mi	Oxygen, Dissolved	Livestock,Grazing or Feeding Operations	AQL	CLF, LWW, WBC B	556418	4116032	553965	4129663	Wright	Whetstone Cr	1
2010	3964.00	Whetstone Cr	U	0.6	n/a	n/a	Mi	Ammonia, Total	Mountain Grove Lagoon	GEN		565106	4111076	564339	4111470	Wright	Whetstone Cr	3
2010	3182.00	White Oak Cr	C	18	18	18	Mi	Escherichia coli	Rural NPS runoff	WBC A	AQL, IRR, LWW	415932	4124150	396440	4113581	Lawrence/Jasper	White Oak Cr	1
2012	1700.00	Wildhorse Cr	C	3.9	3.9	3.9	Mi	Escherichia coli	Runoff from Forest/Grassland/Parkland, Rural, Residential Areas	WBC B	AQL, LWW	699002	4276141	699384	4279922	St. Louis	Wildhorse Cr.	1
2010	3171.00	Williams Cr	P	1	1	1	Mi	Escherichia coli	Rural NPS	WBC A	AQL, CDF, LWW	421759	4107281	420777	4107593	Lawrence	Williams Cr	1
2010	3172.00	Williams Cr.	P	8.5	8.5	8.5	Mi	Aquatic Macroinvertebrate Bioassessments	Source Unknown	AQL	LWW, WBC A	432044	4105526	421759	4107281	Lawrence	Williams Cr	1
2010	3172.00	Williams Cr.	P	8.5	8.5	8.5	Mi	Escherichia coli	Rural NPS	WBC A	AQL, LWW	432044	4105526	421759	4107281	Lawrence	Williams Cr	1
2012	3594.00	Williams Cr	P	1	1.0	1.0	Mi	Escherichia coli	Urban Runoff/Storm Sewers	WBC B	AQL, LWW	716804	4268162	716672	4269382	St. Louis	Williams Cr	1
2012	3594.00	Williams Cr	P	1	1.0	1.0	Mi	pH	Source Unknown	AQL	LWW, WBC B	716804	4268162	716672	4269382	St. Louis	Williams Cr	1
2010	3280.00	Willow Br	P	2.2	2.2	2.2	Mi	Escherichia coli	Rural NPS	WBC B	AQL, LWW	366154	4086266	364028	4084114	Newton	Willow Br	1
2006	955.00	Willow Fk	C	6.5	6.5	6.5	Mi	Oxygen, Dissolved	Tipton WWTP, Source Unknown	AQL	LWW, WBC B	515565	4276527	522997	4273676	Moniteau	Willow Fk	1

Year*	WBID	Water Body Name**	Class	MDNR Proposed Impairment Size	MDNR Water Body Size	EPA Approved Impairment Size	Size Units*	Pollutant	Source*	Impaired Uses*	Other (Unimpaired) Uses*	Upstream X*	Upstream Y*	Downstream X*	Downstream Y*	County Upstream/ Downstream	EPA Approved Water Body Name	Comment*
2006	2375 00	Wilsons Cr	P	11 9	14	14	Mi	Escherichia coli	Nonpoint Source	WBC B	AQL, LWW	471023	4115738	464366	4102525	Greene/Christian	Wilsons Cr	1

Comment
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1 2012 Assessment indicates mipairment
2 Insufficient cause to delist
3 Assessed as unimpaired, expected to be retained by EPA
5 Previously listed as WBID 1711
6 Previously listed as WBID 1711U
7 Previously listed erroneously as WBID 0091

Uses AQL= Aq. Life Protection, WBC A & WBC B=WBC Recreation, DWS= Public Drinking Water Supply LWW= Livestock and Wildlife Watering SCR= Secondary Contact Recreation
IRR= Irrigation IND= Industrial Uses
Upstream X = X coordinate of upstream end of impaired water body (in UTMs)
Upstream Y = Y coordinate of upstream end of impaired water body (in UTMs)
Downstream X = X coordinate of downstream end of impaired water body (in UTMs)
Downstream Y = Y coordinate of downstream end of impaired water body (in UTMs)

* Misidentified in WQ Standards as Bowling Green New Lake. Acres shown on list are the actual acres.
** Lake Buteo is the only one of the Knob Noster S.P. Lakes on this list
*** This section of the Osage River inadvertently left out of WQ Standards thus there are no designated beneficial uses.
**** Lac Capri is the only one of the Terre du Lac lakes on the list

Missouri Department of Natural Resources Water Protection Program
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Missouri Department of Natural Resources

Total Maximum Daily Load Information Sheet

Peruque Creek (above Lake St. Louis)

Water Body Segment at a Glance:

State map showing location of watershed

County:	Warren and St. Charles
Nearby Cities:	Foristell and Lake St. Louis
12-Digit Watershed[1]:	071100090101
Water Body ID:	0217 (4.0 miles)
Water Body ID:	0218 (10.9 miles)
Pollutant:	Inorganic Sediment
Pollutant Sources:	Urban and Rural Nonpoint Sources

Scheduled for TMDL development: 2017

Description of the Problem

Beneficial uses of Peruque Creek

- Livestock and Wildlife Watering
- Protection of Warm Water Aquatic Life
- Protection of Human Health (Fish Consumption)
- Secondary Contact Recreation
- Whole Body Contact Recreation – Category B

Use that is impaired

- Protection of Warm Water Aquatic Life
- General Criteria

Standards that apply

- All waterbodies in Missouri are protected by the general criteria contained in Missouri's Water Quality Standards. These criteria, also called narrative criteria, list substances that all waters "shall be free from." The sections of the general criteria at 10 CSR 20-7.031(3) that apply to Peruque Creek are (A), (C) and (G), which state:

  (A) Waters shall be free from substances in sufficient amounts to cause the formation of putrescent, unsightly, or harmful bottom deposits or prevent full maintenance of beneficial uses.

[1] Watersheds are delineated by the U.S. Geological Survey using a nationwide system based on hydrologic features. This system divides the country into approximately 100,000 12-digit hydrologic unit codes, or HUCs.

(C) Waters shall be free from substances in sufficient amounts to cause unsightly color or turbidity, offensive odor or prevent full maintenance of beneficial uses.

(G)Waters shall be free from physical, chemical or hydrologic changes that would impair the natural biological community.

Background information and water quality data

Rapid rates of sedimentation in upper Lake St. Louis suggest that excess erosion and high sediment loads are a problem in Peruque Creek upstream of the lake. This was the basis for adding Peruque Creek to the 303(d) List of impaired waters in 2002. At that time, the pollutant was listed as non-volatile suspended solids, or NVSS. For the current 2012 listing, the pollutant name has been changed to inorganic sediment to better indicate that the impairment is due to the proportion of those solids that are silt, sand or gravel and are associated with erosion and sedimentation. When these solids enter a stream, they can settle onto the bottom, covering natural substrates and reduce the amount of available habitat for aquatic life. Additionally, these solids can cause direct harm to aquatic life by smothering bottom dwelling organisms and fish eggs. This also results in the loss of an available food source for other organisms that were not directly affected.

Based on sediment deposition data from 2002, the department had proposed to delist these two water bodies for inorganic sediment in 2012, because comparisons of Peruque Creek data with sediment data from a control stream showed no statistical difference. This same action was proposed by the department previously in both the 2008 and 2010 Section 303(d) List submittals. However, the U.S. Environmental Protection Agency retained these listings in all cases citing fisheries data from the Missouri Department of Conservation that showed there to be a reduction in some benthic fish species.

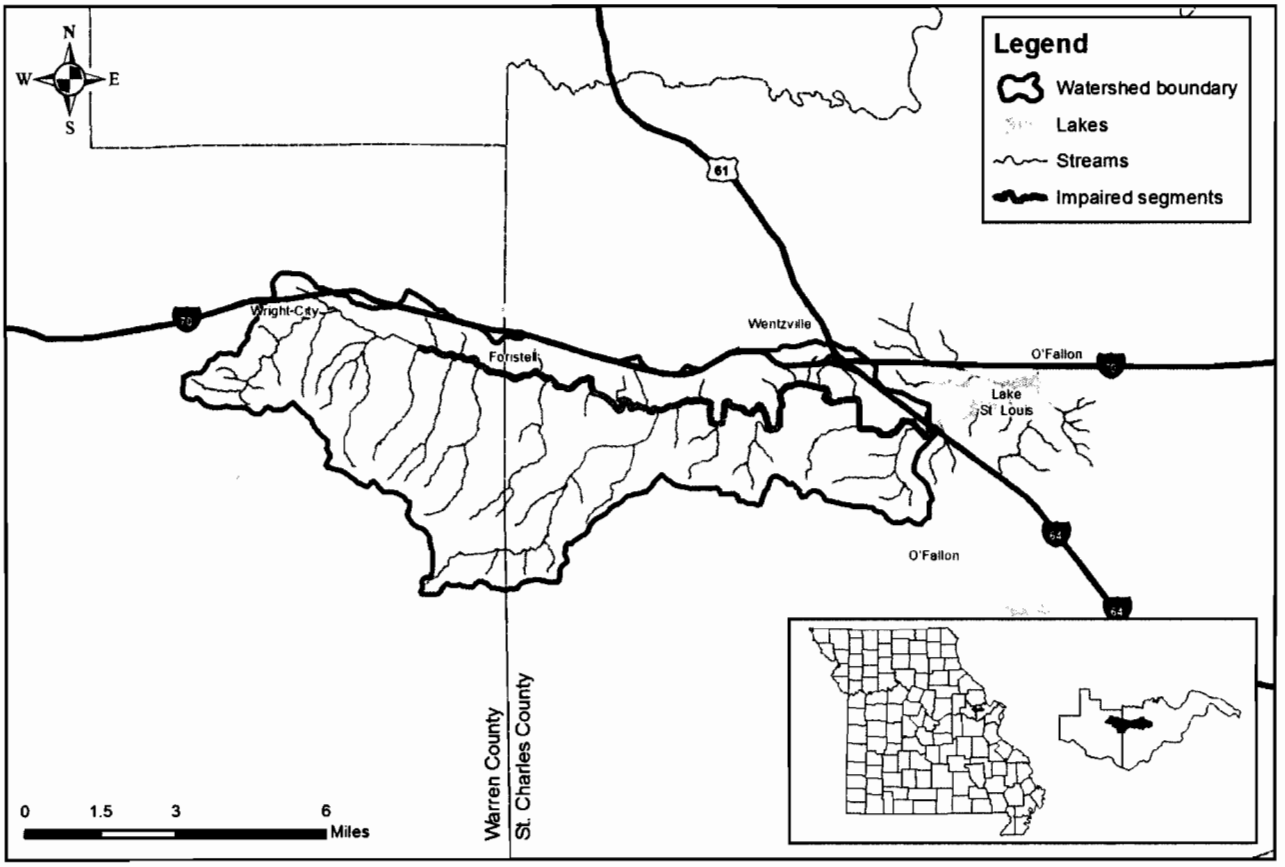
Percent Fine Sediment Deposition Data (Peruque Creek and Control Stream)

Site 6	Site 5	Site 4	Site 3	Site 2	Site 1	Control 2	Control 1
100	100	30	0	0	0	90	55
70	40	45	85	10	0	100	30
75	95	50	5	5	50	100	15
10	20	30	5	5	0	100	0
45	5	100	0	5	0	80	10
100	5	85	15	10	20	100	15
75	5	5	70	5		90	5
50	10	10	35	0		5	5
20	15	5	15	100		0	5
35	5	20	100	0		5	20
30	0	80	100	5		30	0
40	0	10	100	0		100	15
100	30	5	5	0			5
100	100	10	0	0			5
85	5	60	5	0			5
100	0	5	0	0			0
5	50	15	5	0			0
100	25	95	0	0			5

Control Mean = 33.16 Control Standard Deviation = 39.75

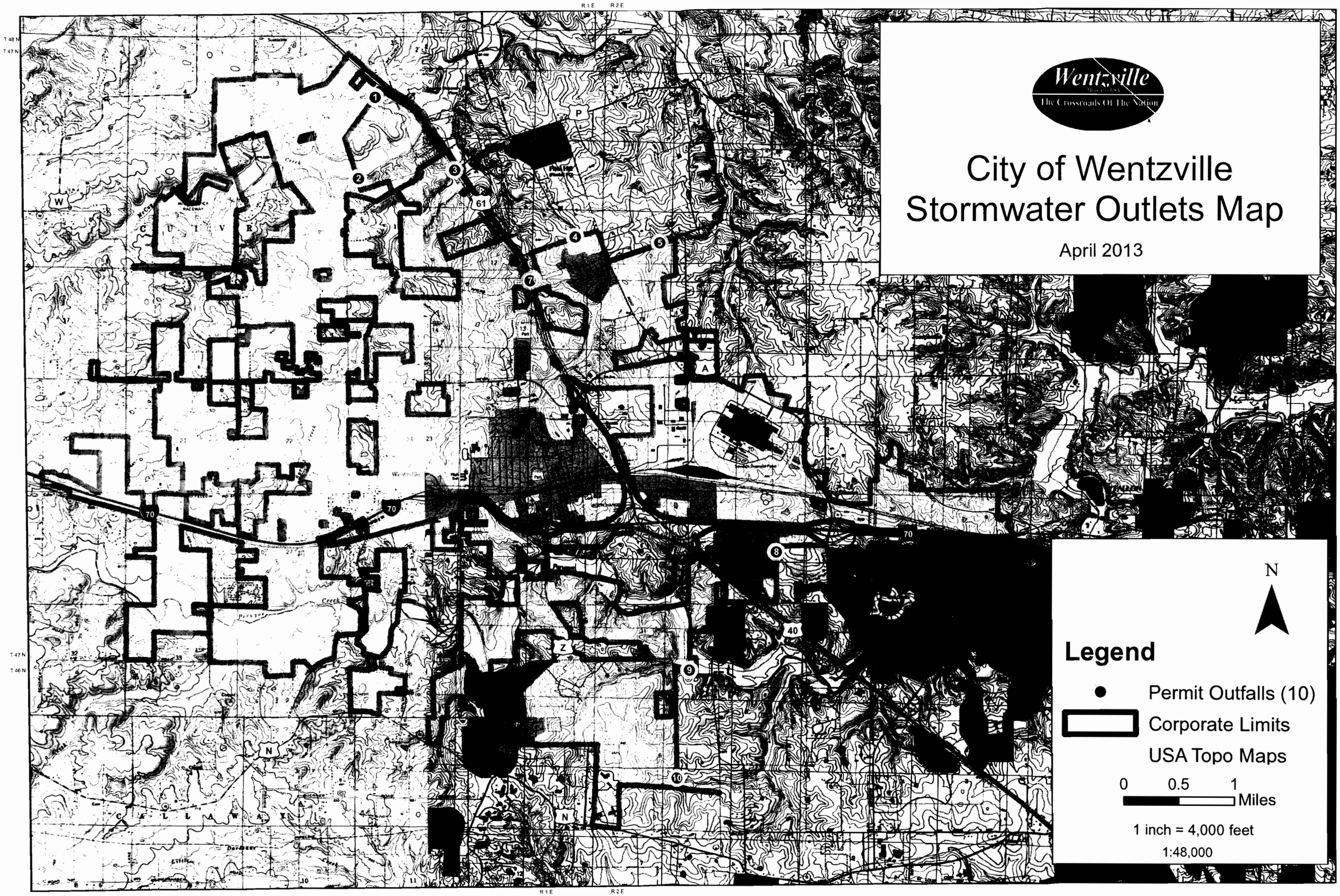
Peruque Cr. Mean = 31.98 Peruque Cr. Standard Deviation = 37.02

Map Showing the Location of the Peruque Creek Watershed



For more information call or write:
Missouri Department of Natural Resources
Water Protection Program
P.O. Box 176, Jefferson City, MO 65102-0176
Ph: 1-800-361-4827 or (573) 751-1300 office
Fax: (573) 526-6802
Email: TMDL@dnr.mo.gov
Program Home Page: www.dnr.mo.gov/env/wpp/index.html

APPENDIX D


Wentzville
The Crossroads Of The Nation
City of Wentzville
Stormwater Outlets Map
April 2013
Legend
Permit Outfalls (10)
Corporate Limits
USA Topo Maps
0 0.5 1
Miles
1 inch = 4,000 feet
1:48,000
N
R1E
R2E
T48N
T47N
T46N
61
70
40

APPENDIX E

CHAPTER 725: STORMWATER POLLUTION CONTROL

SECTION 725.010: PURPOSE

The intent of this Stormwater Pollution Control Code ("code") is to comply with the City's NPDES permit to protect the quality of the State's and the nation's watercourses, water bodies, and wetlands in a manner pursuant to and consistent with the Clean Water Act. Specifically, the purpose of this Chapter is to provide for the health, safety, and general welfare of the City of Wentzville citizens by:

1. Regulating non-stormwater discharges to a stormwater drainage system to the maximum extent practicable as required by Federal and State law;

2. Prohibiting stormwater pollution discharges and illicit connections to stormwater drainage systems; and

3. Establishing the authority to carry out all inspection, surveillance and monitoring procedures necessary to ensure compliance with this Chapter. (Ord. No. 2010-3096 §1, 9-20-10)

SECTION 725.020: DEFINITIONS

For the purposes of this code, the following terms shall mean:

AUTHORIZED ENFORCEMENT AGENCY: The City of Wentzville or any agency or political subdivision authorized to regulate the discharge or control of stormwater.

BEST MANAGEMENT PRACTICES (BMPs): Activities, maintenance procedures, prohibitions of practices, general good housekeeping practices, pollution prevention and educational practices, and other management practices to prevent or reduce the discharge of pollutants directly or indirectly to stormwater, receiving waters, or stormwater conveyance systems. BMPs also include treatment practices, operating procedures, and practices to control site runoff, spillage or leaks, sludge or water disposal, or drainage from raw materials storage.

CONSTRUCTION ACTIVITY: Activities subject to NPDES land disturbance permits. These include construction projects resulting in land disturbance of one (1) acre or more. Such activities include, but are not limited to, clearing and grubbing, grading, excavating, and demolition.

DIRECTOR: The Director of Public Works of the City of Wentzville, Missouri or his or her designee.

EPA: The Federal Environmental Protection Agency.

HAZARDOUS MATERIALS: Any material, including any substance, waste, or combination thereof, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may cause, or significantly contribute to, a substantial present or potential hazard to human health, safety, property, or the environment when improperly treated, stored, transported, disposed of, or otherwise managed.

ILLICIT CONNECTION: Either of the following:

1. Any drain or conveyance, whether on the surface or subsurface, which allows an illicit discharge to enter stormwater drainage system. This includes, but is not limited to, any conveyances which allow any non-stormwater discharge including sewage, process wastewater, and wash water to enter stormwater drainage systems; and any connections to such systems from indoor drains and sinks, regardless of whether said drain or connection had been previously allowed, permitted, or approved by the City of Wentzville; or

2. Any drain or conveyance connected from a commercial or industrial land use to a stormwater drainage system which has not been documented in plans, maps, or equivalent records and approved by the City of Wentzville.

ILLICIT DISCHARGE: Any direct or indirect discharge to the stormwater drainage system that is not composed entirely of stormwater, except discharges exempted in Section 725.080 of this Chapter. This includes, but is not limited to, pollutants, or waters containing any pollutants, that cause or contribute to a violation of applicable water quality standards.

INDUSTRIAL ACTIVITY: Activities subject to NPDES industrial permits as defined in 40 CFR Section 122.26(b)(14), as amended.

NON-STORMWATER DISCHARGE: Any discharge to a stormwater drainage system that is not composed entirely of stormwater except discharges exempted in Section 725.080.

NPDES PERMIT: A National Pollutant Discharge Elimination System permit issued by EPA (or by a State under authority delegated pursuant to 33 U.S.C. Section 1342(b)) authorizing the discharge of pollutants to waters of the United States, whether the permit is applicable on an individual, group, or general area-wide basis.

PERSON: Any individual, association, organization, partnership, firm, corporation, company, or other entity recognized by law and acting as either the owner or as the owner's agent.

POLLUTANT: Anything which causes or contributes to contamination that is pollution (as defined in 10 CSR Section 20-2, as amended, on file with the City Clerk). Pollutants may include, but are not limited to: paints, varnishes, and solvents; oil and other automotive fluids; non-hazardous liquid and solid wastes; hazardous materials; yard wastes; refuse, rubbish, garbage, litter, or other discarded or abandoned objects; floatables; pesticides, herbicides, and fertilizers; sewage, animal waste, fecal coliform and pathogens; dissolved and particulate metals; animal wastes; wastes or residues that result from constructing a building or structure; and noxious or offensive matter of any kind.

PREMISES: Any building, lot, parcel of land, or portion of land whether improved or unimproved including adjacent walks and parking areas.

RESPONSIBLE PERSON(S): Those chargeable, jointly or severally, with violations of this code, who have violated or knowingly continue to violate the code or after receiving notice of violations fail to abate or correct said violations or comply with a notice of violation, and shall include, but are not limited to, the following:

1. Those who commit or otherwise assist or participate in violations;

2. The owner or other persons who maintain the building, premises, property or other place where the violation has been committed or exists;

3. The owner's agent or person in charge of the building, premises, property or other place where the violation has been committed or exists;

4. The lessee or tenant of all or part of the building, premises, property or other place where the violation has been committed or exists; or

5. The developer, agent, architect, contractor, subcontractor, or any other person who performs work or enters into a contract for work in violation of this code.

STORMWATER: Any surface flow, runoff, and drainage consisting entirely of water from any form of natural precipitation, and resulting from such precipitation.

STORMWATER DRAINAGE SYSTEM: The system of stormwater collection facilities and conveyances, whether publicly or privately owned, including, but not limited to, any roads with drainage systems, streets, curbs, gutters, storm drains and pipes, pumping facilities, catch basins, retention and detention basins, natural and human-made or altered drainage channels, and other drainage structures.

STORMWATER POLLUTION PREVENTION PLAN: A document which describes the best management practices and activities to be implemented by a person or business to identify sources of pollution or contamination at a site and the actions to eliminate or reduce pollutant discharges to stormwater, stormwater conveyance systems, and/or receiving waters to the maximum extent practicable.

WASTEWATER: Any water or other liquid discharged from a premises that is "wastewater" (as defined in 10 CSR Section 20-2.010(79), as amended, on file with the City Clerk).

WATERCOURSE(S): All natural watercourses depicted on the most current United States Geological Survey 7.5 Minute Series (Topographic) Maps and/or the City of Wentzville's Natural Watercourse and Riparian Buffer Protection Map. (Ord. No. 2010-3096 §2, 9-20-10)

SECTION 725.030: APPLICABILITY

This code shall apply to all discharges entering the stormwater drainage system generated on any developed and undeveloped lands. (Ord. No. 2010-3096 §3, 9-20-10)

SECTION 725.040: RESPONSIBILITY FOR ADMINISTRATION

The Director shall administer, implement, and enforce the provisions of this code. (Ord. No. 2010-3096 §4, 9-20-10)

SECTION 725.050: SEVERABILITY

The provisions of this code are hereby declared to be severable. If any provision, clause, sentence, or paragraph of this code or the application thereof to any person, establishment, or circumstances shall be

held invalid, such invalidity shall not affect the other provisions or application of this Code. (Ord. No. 2010-3096 §5, 9-20-10)

SECTION 725.060: MINIMUM STANDARDS

The standards set forth herein and promulgated pursuant to this Code are minimum standards; therefore this Code does not intend or imply that compliance by any person will ensure that there will be no contamination, pollution, or unauthorized discharge of pollutants. (Ord. No. 2010-3096 §6, 9-20-10)

SECTION 725.070: DISCHARGE PROHIBITIONS

A. *Prohibition Of Illicit Discharges.*

1. No person shall cause or allow illicit discharges to stormwater drainage systems or watercourses.

2. Throwing, depositing, leaving, abandoning, or keeping materials or wastes on public or private lands in a manner and place where they may result in an illicit discharge is prohibited.

B. *Prohibition Of Illicit Connections.*

1. The construction, use, maintenance or continued existence of illicit connections to the storm drainage system is prohibited. A person is considered to be in violation of this code if the person connects a line conveying any non-stormwater discharge to the stormwater drainage system, or allows such a connection to continue.

2. This prohibition expressly includes, without limitation, illicit connections made in the past, regardless of whether the connection was permissible under law or practices applicable or prevailing at the time of connection. (Ord. No. 2010-3096 §7, 9-20-10)

SECTION 725.080: EXCEPTIONS TO DISCHARGE PROHIBITIONS

The following discharges are exempt from discharge prohibitions established by this code:

1. Discharges from the following activities, which do not cause or contribute to a violation of any water quality standard:

a. Water line flushing or other potable water sources,

b. Landscape irrigation or lawn watering,

c. Diverted stream flows,

d. Natural riparian habitat or wetland flows,

e. Rising ground water, springs, ground water infiltration to stormwater drainage systems, or uncontaminated pumped ground water,

f. Foundation or footing drains (not including active ground water dewatering systems), crawl space pumps,

g. Air-conditioning condensation,

h. Non-commercial or charity washing of vehicles (exclusive of commercial vehicles),

i. De-chlorinated swimming pool water (typically less than one (1) PPM chlorine),

j. Fire-fighting activities,

k. Any discharge caused by flooding or other natural disaster, which could not have been reasonably foreseen or mitigated for in advance, as determined by the enforcement official,

l. Any other water source not containing pollutants, and

m. Stormwater runoff from private streets and parking lots, as long as the paved surfaces are routinely cleaned.

2. Discharges specified in writing by the Director or another authorized enforcement agency as being necessary to protect public health and safety.

3. Dye testing is an allowable discharge, but requires a written notification to the City of Wentzville prior to the time of the test.

4. Any non-stormwater discharge or connection permitted under an NPDES permit, waiver, or waste discharge order issued to the discharger and administered under the authority of the EPA, provided that the discharger is in full compliance with all requirements of the permit, waiver, or order and other applicable laws and regulations, and provided that written approval has been granted by the Missouri Department of Natural Resources for any discharge to stormwater drainage systems. (Ord. No. 2010-3096 §8, 9-20-10)

SECTION 725.090: CONCEALMENT AND ABETTING

Causing, permitting, aiding, abetting or concealing a violation of any provision of this Chapter shall constitute a violation of this Chapter. (Ord. No. 2010-3096 §9, 9-20-10)

SECTION 725.100: SUSPENSION OF ACCESS TO STORMWATER DRAINAGE SYSTEMS

A. *Suspension Due To Illicit Discharges In Emergency Situations.* The Director may, without prior notice, suspend discharge access to stormwater drainage systems by any responsible person when such suspension is necessary to stop an actual or threatened discharge which presents or may present imminent and substantial danger to the environment, or to the public health or welfare or other affected persons, or to stormwater drainage systems or to waters of the United States. If the responsible person fails to comply with a suspension order issued in an emergency, the Director may take such steps as deemed necessary to prevent or minimize damage to the stormwater drainage system or waters of the State (as defined in 10 CSR Section 20-2.010 (82), as amended, on file with

the City Clerk), or to minimize danger to other persons. This includes immediate termination of a premise's water supply, sewer connection, or other municipal utility services. The Director may allow the person to recommence its discharge when it has demonstrated to the satisfaction of the Director that the period of endangerment has passed, unless further suspension/termination proceedings are initiated against the responsible person under this code.

B. *Suspension Due To The Detection Of Illicit Discharge.* The Director may, temporarily or permanently, terminate the access to the stormwater drainage systems of a person discharging in violation of this code if the Director determines that such termination would abate or reduce the illicit discharge. The Director will notify the responsible person of the proposed termination of its access to a stormwater drainage system.

C. *No Reinstatement Without Prior Approval.* A person is in violation of this code if the person, without the prior approval of the authorized enforcement agency, reinstates access to the stormwater drainage system for a premises where access has been terminated pursuant to this Section. (Ord. No. 2010-3096 §10, 9-20-10)

SECTION 725.110: INDUSTRIAL OR CONSTRUCTION ACTIVITY DISCHARGES

Any person subject to an industrial or construction activity NPDES permit shall comply with all provisions of such permit. Proof of compliance with said permit may be required in a form acceptable to the Director prior to or as a condition of a site development plan, improvement plan, or building permit:

1. Upon inspection of the facility;

2. During any enforcement proceeding or action; or

3. For any other reasonable cause. (Ord. No. 2010-3096 §11, 9-20-10)

SECTION 725.120: REQUIREMENT TO PREVENT, CONTROL AND REDUCE STORMWATER POLLUTANTS BY THE USE OF BEST MANAGEMENT PRACTICES

The City of Wentzville may require Best Management Practices (BMPs) for any activity, operation or premises which is, or may cause or contribute to stormwater pollution. Commercial and industrial establishments shall provide, at the owner or operator's expense, reasonable protection from discharges of pollutants into the municipal stormwater drainage system or watercourses through the use of structural and/or non-structural BMPs. Further, any person responsible for premises, which are, or may be, the source of an illicit discharge, may be required to implement, at said person's expense, additional BMPs to prevent the further discharge of pollutants to the stormwater drainage system. Compliance with all terms and conditions of a valid NPDES permit authorizing the discharge of stormwater associated with industrial activity, to the extent practicable, shall be deemed compliant with the provisions of this Section. These BMPs shall be part of a Stormwater Pollution Prevention Plan (SWPPP) as necessary for compliance with requirements of the NPDES permit. (Ord. No. 2010-3096 §12, 9-20-10)

SECTION 725.130: NATURAL WATERCOURSE PROTECTION

Pursuant to the City's regulations for the protection of natural watercourses set forth in Article VIII of Chapter 410 (Subdivision Regulations) of the Municipal Code, every person owning or leasing property through which a watercourse passes shall keep and maintain that part of the watercourse within the property free of trash, excessive vegetative waste, and other debris that would pollute, or significantly retard the flow of water through the watercourse. In addition, the owner or lessee shall maintain property within or adjacent to a watercourse so that privately-owned structures, other materials, or conditions will not impair the beneficial use, function, or physical integrity of the watercourse. (Ord. No. 2010-3096 §13, 9-20-10)

SECTION 725.140: CONTAINMENT AND NOTIFICATION OF ILLICIT DISCHARGES

A. *Containment Of Illicit Discharges.* Notwithstanding other requirements of law, as soon as any person responsible for a facility or operation, or responsible for emergency response for a facility or operation, has information of any known or suspected release of materials which are resulting or may result in illicit discharges discharging into stormwater, stormwater drainage systems, or waters of the State, said person shall take all necessary steps to ensure the discovery, containment, and cleanup of such release. In the event of such a release of hazardous materials, said person shall immediately notify emergency response agencies of the occurrence via emergency dispatch services.

B. *Notification Of Illicit Discharges.* In the event of a release of non-hazardous, illicit discharges that causes or will cause a violation of State water quality standards (10 CSR Section 20-7.031, on file with the City Clerk), said person shall notify the Director in person or by phone or facsimile no later than the next business day. Notifications in person or by phone shall be confirmed by written notice addressed and mailed to the Director or his or her designee within three (3) business days of the phone notice. If the discharge of prohibited materials emanates from a commercial or industrial establishment, the owner or operator of such establishment shall also submit to the Director a written record of the discharge and the actions taken to prevent its recurrence. Such records shall be retained for at least three (3) years. (Ord. No. 2010-3096 §14, 9-20-10)

SECTION 725.150: INSPECTION AND MONITORING OF DISCHARGES

A. *Applicability.* This Section applies to all premises that have stormwater discharges associated with industrial or construction activity.

B. *Right Of Entry.*

1. The Director shall be permitted to enter and inspect premises subject to regulation under this code as often as may be necessary to determine compliance with this code. If security measures are in force which require proper identification and clearance before entry into its premises, the owner or person shall make the necessary arrangements to allow access to representatives of the authorized enforcement agency.

2. Any temporary or permanent obstruction to safe and easy access to the premises to be inspected and/or sampled shall be promptly removed by the responsible person at the written or oral request of the City, and shall not be replaced without permission of the Director. The costs of clearing such access shall be borne by the responsible person.

3. Unreasonable delays in allowing the City or other authorized enforcement agency to access premises for the purpose of conducting any activity authorized or required by this code, or

State or Federal law are a violation of this code.

4. In non-emergency situations, if the Director has been refused access to any part of the premises from which stormwater is discharged, and the Director is able to demonstrate probable cause to believe that there may be a violation of this code, or that there is a need to inspect and/or sample as part of a routine inspection and sampling program designed to verify compliance with this code or any order issued hereunder, or to protect the overall public health, safety, and welfare of the community, then the City may seek issuance of an administrative search warrant from any court of competent jurisdiction. In the case of an emergency or other exigent circumstances, it shall be unlawful for any person, owner or person in possession of any premises to refuse to allow the Director to enter upon the premises to protect the health, safety and welfare of the public.

C. *Inspection And Monitoring Authority.*

1. NPDES-permitted facility operators shall allow the Director ready access to all parts of the premises for the purposes of inspection and sampling, examination and copying of records that must be kept under the conditions of an NPDES permit to discharge stormwater, and the performance of any additional duties as defined by State and Federal law.

2. The Director shall have the right to set up on any NPDES-permitted facility such devices as are necessary in the opinion of the authorized enforcement agency to conduct monitoring and/or sampling of the facility's stormwater discharge.

3. The Director has the right to require the responsible person to install monitoring equipment as necessary. The facility's sampling and monitoring equipment shall be maintained at all times in a safe and proper operating condition by the responsible person at his or her own expense. All devices used to measure stormwater flow and quality shall be calibrated to ensure their accuracy. (Ord. No. 2010-3096 §15, 9-20-10)

SECTION 725.160: ENFORCEMENT

A. *Notice Of Violation.* Whenever the Director finds that a person or premises has violated a prohibition or failed to meet a requirement of this code, the Director may order compliance by written notice of violation ("NOV") to the responsible person. Such notice may require without limitation:

1. The performance of monitoring, analyses, and reporting;

2. The elimination of illicit connections or discharges to the maximum extent practicable;

3. That violating discharges, practices, or operations shall cease and desist;

4. Implementing source control or treatment BMPs to prevent a continued or potential violation from occurring;

5. The abatement or remediation of stormwater pollution or contamination hazards and the restoration of any affected property; and

6. Submission of the NOV requirements shall in no way relieve the person of liability for any violation before or after receipt of the NOV.

B. *Non-Compliance After Notice Of Violation.*

1. Any responsible person who shall fail or refuse to correct the violation pursuant to the requirements set forth in the notice of violation shall be deemed guilty of an offense and, upon conviction, shall be punished as provided in Section 100.190 of the Municipal Code.

2. In addition to the penalties hereinabove authorized and established, the Director may take such other actions at law or in equity as may be required to abate the violation and/or restore property affected by the violation.

3. Any person judicially determined to have violated any provision of these regulations shall pay the City's actual costs, including attorneys' fees, court costs, environmental consulting, testing, sampling and monitoring expenses, and other expenses associated with enforcing these regulations.

C. *Abatement--Cost Of Abatement.*

1. In non-emergency situations, if abatement of a violation and/or restoration of affected property is required, the NOV shall set forth a deadline within which such remediation or restoration must be completed which shall not be less than seven (7) days of receiving notice or, upon failure to pursue the removal or abatement, without unnecessary delay. Said notice shall further advise that, should the violator fail to remediate or restore within the established deadline, a citation may be issued or that the work may be completed by the City (or its contractor) at the expense of the violator.

2. If the Director causes such condition to be removed or abated, the cost of such removal or abatement shall be certified to the City Clerk or officer in charge of finance who shall cause the certified cost to be included in a special tax bill or added to the annual real estate tax bill, at the collecting official's option, for the property and the certified cost shall be collected by the City Collector or other official collecting taxes in the same manner and procedure for collecting real estate taxes. If the certified cost is not paid, the tax bill shall be considered delinquent, and the collection of the delinquent bill shall be governed by the laws governing delinquent and back taxes. The tax bill from the date of its issuance shall be deemed a personal debt against the owner and shall also be a lien on the property until paid. (Ord. No. 2010-3096 §16, 9-20-10)

SECTION 725.170: ENFORCEMENT -- OTHER RELIEF

A. *Equitable Relief And Sanctions.* It shall be unlawful for any person to violate any provision or fail to comply with any of the requirements of this code. If a person has violated or continues to violate the provisions of this code, in addition to any other civil or criminal penalties established or imposed for violations of this code, the City may apply to a court of competent jurisdiction for such legal or equitable relief as may be necessary to enforce compliance with or restrain or enjoin violations of the provisions of this code, to remedy any violation hereunder and prevent further illegal acts, conduct, or discharges in or about such premises. As part of any judgment and order granting equitable relief in favor of the City, the court shall award the City its actual costs and fees, including attorneys' fees, expended in the enforcement of this code. The court may also grant all

other necessary and proper relief including revocation of any permit governing the subject premises.

B. *Compensatory Action.* In lieu of enforcement proceedings, penalties, and remedies authorized by this code, the City and the responsible person may agree to, or the court may order, an alternative compensatory action, such as litter pickups, storm drain marking, attendance at compliance workshops, creek cleanup, etc.

C. *Violations Deemed A Public Nuisance.* In addition to the enforcement processes and penalties provided, any condition caused or permitted to exist in violation of any of the provisions of this code is a threat to public health, safety, and welfare, and is declared and deemed a nuisance, and may be summarily abated or restored at the violator's expense, and/or a civil action to abate, enjoin, or otherwise compel the cessation of such nuisance may be taken.

D. *Remedies Not Exclusive.* The remedies listed in this code are not exclusive of any other remedies available under any applicable Federal, State or local law and it is within the discretion of the authorized enforcement agency to seek cumulative remedies. (Ord. No. 2010-3096 §17, 9-20-10)

SECTION 725.180: APPEALS

A. Any person aggrieved by any final decision of the Director or other City Official under this code may seek a hearing before the City Administrator within five (5) days of the decision by following the submission requirements set forth in Subsection (C) below. The appeal shall not stay any suspension or termination.

B. To the fullest extent permitted by law, the review procedures herein shall be exhausted before any action may be filed in any court against the City or its officers, employees, boards, officials, or commissions.

C. All applications for appeals shall be made in writing to and filed with the City Administrator. At the time of filing any such appeal a copy thereof shall be filed by the appellant with the Director. Application for appeals shall include a copy of the NOV, order or decision (the "decision") being appealed, a statement of the facts concerning the decision, and shall state wherein the decision was incorrect or in violation of any protectable right or property interest. The application for appeal shall be accompanied by a written description of:

1. The precise final action to be reviewed, including the date, the decision maker, and copies of all documentation of the decision;

2. The protectable right or property interest claimed to be affected, including a statement of any claimed or threatened damages and the basis for such computation; and

3. A detailed description of the factual and legal grounds for the claim that the final action is incorrect, unlawful or, if claimed, constitutes an unconstitutional taking, without just compensation.

D. On behalf of the City Administrator, the City Clerk shall fix a time and place for the City Administrator to hear the appeal and shall direct a written notice of the hearing date and time to be served upon the appellant to provide that information. The City Clerk shall give notice to the

Director who shall be entitled to appear in defense of his or her decision. At the hearing, reasonable opportunity shall be given for the presentation of evidence bearing on the appeal. Where issues are heard without objection or by consent, such issues shall be deemed to have been properly before the City Administrator. Formalities of procedure shall be deemed waived unless an objection is made. (Ord. No. 2010-3096 §18, 9-20-10)

SECTION 725.190: ADOPTION OF CHAPTER

This Chapter is not intended to modify or repeal any other ordinance, rule, regulation, or other provision of law. The requirements of this Chapter are in addition to the requirements of any other ordinance, rule, regulation, or other provision of law, and where any provision of this Chapter imposes restrictions different from those imposed by any other ordinance, rule, regulation, or other provision of law, whichever provision is more restrictive or imposes higher protective standards for human health or the environment shall control. (Ord. No. 2010-3096 §19, 9-20-10)

CHAPTER 515: EROSION AND SEDIMENT CONTROL

SECTION 515.010: FINDINGS -- TITLE

These sediment and erosion control regulations for urban development, as proposed by the St. Charles Soil and Water Conservation District, present a reasonable method for controlling sediment and erosion. It is hereby revised and adopted as the Model Sediment and Erosion Control Regulations of the City of Wentzville, Missouri. (R.O. 2006 §520.010; CC 1988 §6-151; Ord. No. 1125 §1, 9-18-91)

SECTION 515.020: GENERAL PROVISIONS

A. *Purpose.* The purpose of this Chapter is to control soil erosion on land that is undergoing development for non-agricultural uses and to preserve the natural terrain and waterways of land within the City of Wentzville. Soil erosion scars the land and creates sediment that clogs storm sewers and road ditches, chokes streams, and creates silt lakes, all of which pose a threat to public health and safety. The provisions in this regulation are intended to provide a natural community environment, to prevent soil erosion and to reduce costly repairs to gullies, washed out fills, water conveyance systems, roads and embankments. Application of the regulations in this document will effectively control soil erosion and sedimentation.

B. *Scope Of Authority.* Any person, firm, corporation or business proposing to develop land within the City of Wentzville shall apply to the designated official for approval of required erosion control plans and issuance of a grading permit as specified in this regulation.

C. *Performance Guarantee.* Upon approval of the required erosion control plan and the issuance of a grading permit, the designated official shall require the developer to post an escrow agreement, lender's agreement, or certified check in the amount of all work to be done under the erosion control plan. Ninety percent (90%) of the funds will be released after all erosion control measures are in place and approved by the designated official. Ten percent (10%) will be held until the public improvements are accepted by the City to insure that the erosion control measures are maintained. If there are no public improvements (site plans) the final ten percent (10%) will be held until released by the designated official. (R.O. 2006 §520.020; CC 1988 §10-152; Ord. No. 1125 §2, 9-18-91)

SECTION 515.030: DEFINITIONS

For the purposes of this Chapter, the following words and phrases shall have the meanings respectively ascribed to them by this Section:

BOCA: Refers to the Building Codes as adopted by the City; please note these regulations are designed to be used with the Building Codes as adopted by the City as a reference for minimum performance standards.

DEBRIS OR SEDIMENT BASIN: A barrier or dam built across a waterway or at other suitable locations to retain rock, sand, gravel, silt or other materials.

DESIGNATED OFFICIAL: The Director of Public Works or his/her assignee.

DIVERSION: A channel with or without a supporting ridge on the lower side constructed across or at the bottom of a slope.

EROSION: The wearing away of the land surface by the action of wind, water or gravity.

EXCAVATION OR CUT: The removal, stripping or disturbance of soil, earth, sand, rock, gravel or other similar substances from the ground.

EXISTING GRADE: The vertical location of the existing ground surface prior to excavation or filing.

FEMA: Federal Emergency Management Agency.

FILL OR FILLING: The placing of any soil, earth, sand, rock, gravel, or other substance on the ground.

FINISHED GRADE: The final grade or elevation of the ground surface conforming to the proposed design.

GRADING: Any excavation or filling or combination thereof.

NATURAL WATERCOURSE: A channel formed in the existing surface topography of the earth prior to changes made by unnatural conditions.

OPEN CHANNEL: A constructed ditch or channel designed for water flow.

SEDIMENT: Solid material, mineral or organic, that has been moved by erosion and deposited in a location other than the point of origin.

SILT TRAPS OR FILTERS: Staked bales or silt fencing systems that function as a filter and a velocity check to trap fine-grained sediment while allowing satisfactory passage of stormwater runoff.

SITE: A lot or parcel of land, or a contiguous combination thereof, where grading work is performed as a single unified operation.

SITE DEVELOPMENT: Altering terrain and/or vegetation and constructing improvements.

SOIL AND WATER CONSERVATION DISTRICT (SWCD): Section 278.070(5), RSMo., defines a Soil and Water Conservation District. The St. Charles S.W.C.D. is a locally organized and operated unit of government functioning under Missouri law, to promote protection, maintenance, improvement, and wise use of the soil and water within the County. (R.O. 2006 §520.030; CC 1988 §6-153; Ord. No. 1125 §5, 9-18-91)

SECTION 515.040: REGULATIONS

A. *Required Erosion And Sedimentation Control Plan Content.* Grading plans, site plans, preliminary plat or subdivision, or the subdivision improvement plans for grading land areas twenty thousand (20,000) square feet or more shall include the following additional information:

1. Erosion and sediment control plans submitted to the designated official shall include three (3) sets of maps and plans with specifications showing proposed excavation, grading or filling and will include the following:

a. Full name and address of property owner;

b. Designation of property address and a location map;

c. Portion of the property that is to be excavated, graded or filled with excavated material;

d. Location of any sewerage disposal system or underground utility line, any part of which is within fifty (50) feet of the proposed excavation, grading or filling area and the location of any pipe line operated at a maximum service pressure in excess of two hundred (200) p.s.i.g., any part of which is within one hundred (100) feet of the proposed excavation, grading or filling area;

e. Existing grade and topography of the premises and the proposed finished grade and final contour elevation at a contour interval of not more than two (2) feet on United States Geological Survey datum;

f. Location and present status of any previous permitted grading operations on the property;

g. Details of any temporary drainage system proposed to be installed and maintained by the applicant and a comprehensive drainage plan designed to safely handle surface water, streams or other natural drains following heavy rains during grading operations;

h. Details of proposed water impoundment structures, embankments, sediment or debris basins, grass or lined waterways and diversions with the details and locations of proposed stable outlets and the location of any downstream impoundments which could be affected by the proposed grading;

i. Details of soil preparation and revegetation of the finished grade and of other methods of soil erosion control;

j. Proposed truck and equipment access ways to the work site;

k. Delineation of the 100-year flood plain and floodway; and

l. A statement from the property owner or his/her agent assuming full responsibility for the performance of the operation as stated in the application. This statement shall also contain assurance that all City property or roads will be adequately protected.

2. The proposed phasing of development of the site, including clearing, rough grading and construction, and final grading and landscaping. Phasing should identify the expected date on which clearing will begin, the estimated duration of exposure of cleared areas and the sequence of clearing, installation of temporary sediment control measures, installation of storm drainage, paving streets and parking areas, and establishment of temporary and permanent vegetative cover. The designated official may waive specific requirements for the content of submissions upon finding that the information submitted is sufficient to show that the work will comply with the objectives and principles of these regulations.

B. *Sediment And Erosion Control Plan Approval.*

1. The sediment and erosion control plan must define the measures to be taken to meet erosion control principles and standards as defined in these regulations. The plan must be designed with the goal of assuring that sediment is not transported from the site by a storm event of the 15-year (frequency), 20-minute (duration) or less. The plan shall include appropriate Best Management Practices (BMPs) per the most recent "Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri and Kansas" guide or other manual or method approved by the City Engineer.

2. *Comments.* When a plan is submitted by the designated official to the Soil and Water Conservation District, the district may make comments and recommendations. All such comments and recommendations shall be made within fifteen (15) days of receipt by the district. Such comments may pertain, but need not be limited to:

a. Erosion and sedimentation control.

b. Soil use limitations.

c. Environmental considerations.

C. *Principles And Standards.*

1. All excavation, grading, or filling shall have a finished grade not to exceed a 3:1 slope thirty-three percent (33%). Steeper grades may be approved by the designated official if the excavation is through rock or the excavation or the fill is adequately protected (a designated head wall or toe wall may be required). Retaining walls that exceed a height of four (4) feet shall require the construction of safety guards as identified in the appropriate Section(s) of the Building Codes as adopted by the City and must be approved by the Director of Public Works. Permanent safety guards will be constructed in accordance with the appropriate Section(s) of the Building Codes as adopted by the City.

2. Sediment and erosion control plans for sites that exceed twenty thousand (20,000) square feet of

grading shall provide for sediment or debris basins, silt traps or filters, staked straw bales or other approved measures to remove sediment from runoff waters. The design shall be approved by the designated official before improvements begin. Temporary siltation control measures (structural) shall be maintained until vegetative cover is established at a sufficient density to provide erosion control on the site. (Refer to Appendix A.)

3. Where natural vegetation is removed during grading, vegetation shall be reestablished in such a density as to prevent erosion. Permanent type grasses shall be established as soon as possible or during the next seeding period after grading has been completed. (Refer to Appendix A.)

4. When grading operations are completed or suspended for more than thirty (30) days permanent grass must be established at sufficient density to provide erosion control on the site. Between permanent grass seeding periods, temporary cover shall be provided according to the designated official's recommendation and/or approval. (Refer to Appendix A.)

All finished grades (areas not to be disturbed by future improvement) in excess of twenty percent (20%) slopes (5:1) shall be mulched and tacked at the rate of one hundred (100) pounds per thousand (1,000) square feet when seeded.

5. Provisions shall be made to accommodate the increased runoff caused by changed soil and surface conditions during and after grading. Unvegetated open channels shall be designed so that gradients result in velocities of two (2) fps (feet per second) or less. Open channels shall be designed so that gradients result in velocities of two (2) fps (feet per second) or less. Open channels with velocities more than two (2) fps and less than five (5) fps shall be established in permanent vegetation by use of commercial erosion control blankets or lined with rock riprap or concrete or other suitable materials as approved by the designated official. Detention basins, diversion, or other appropriate structures shall be constructed to prevent velocities above five (5) fps. (Refer to Appendices B, C, D, E and F.)

6. The adjoining ground to development sites (lots) shall be provided with protection from accelerated and increased surface water, silt from erosion, and any other consequences of erosion. Runoff water from developed areas (parking lots, paved sites and buildings) above the area to be developed shall be directed to diversions, detention basins, concrete gutters and/or underground outlet systems.

A three (3) foot buffer strip shall be maintained at the property line in an undisturbed condition unless otherwise approved.

Sufficiently anchored straw bales may be temporarily substituted with the approval of the designated official. (References to Appendices B, C, D, E and F.)

7. Development along natural watercourses shall comply in all respects with the requirements of Chapter 410, pertaining to protection of natural watercourses.

8. All lots shall be seeded and mulched at the rates defined in Appendix A or sodded before an occupancy permit shall be issued except that a temporary occupancy permit may be issued by the Director of Public Works in cases of undue hardship because of unfavorable ground conditions. (R.O. 2006 §520.040; CC 1988 §6-154; Ord. No. 1125 §3, 9-18-91; Ord. No. 2910 §1, 8-13-08; Ord. No. 3146 §1, 4-14-11)

SECTION 515.050: INSPECTION AND VIOLATION

A. *Inspections.* By applying for a grading permit, the applicant consents to the City inspecting the development of a site that is subject to a sediment and erosion control plan and all work in progress (the "work"). Inspection records as required by the Missouri Department of Natural Resources Land Disturbance Permit may be requested and available for review during normal business hours by City staff.

B. *Corrections.* The City may inspect the work (the "initial inspection") and, if the Inspector determines that there is a potential failure to comply with the requirements of this Article, notify the permittee or the permittee's

representative (the "permittee") in writing of the items that need to be corrected (the "notice to correct"). The notice to correct shall at a minimum state the nature of the non-compliance, any practice or approved plan deficiency, required corrective action, and compliance time. The time limit for making the corrections shall be a minimum of thirty (30) days unless, in the opinion of the Director of Public Works, an imminent hazard and/or emergency exists, in which injury to persons or significant property damage is imminent (an "emergency"), at which time the City shall immediately notify the permittee of such hazard and/or emergency and shall require corrective work to begin immediately.

The permittee, if not present on the site during the initial inspection, shall have a reasonable opportunity to accompany the City's inspector on a subsequent site visit (the "site visit") to discuss the items in the notice to correct. A permittee desiring to accompany the inspector on a site visit shall make him/herself available for the site visit no later than ten (10) days of the date of issuance of the notice to correct; failure to do so will waive the site visit. After any site visit, the inspector may amend the notice to correct to reflect any agreements by the inspector and the permittee at the site visit pertaining to corrective action or compliance time and shall send such amended notice to correct to the permittee.

Upon the sooner of:

1. The permittee's completion of the corrections set forth in the notice of correction and notification of the inspector of same, or

2. The expiration of the time for compliance set forth in the notice to correct, the Director of Public Works or his designee (the "Director of Public Works") shall cause the work to be re-inspected to determine the status of compliance (the "compliance inspection"). If the compliance inspection shows that the items on the notice to correct have been corrected, the inspector shall notify the permittee of same. Written notification that the matter is corrected and the matter is closed may be provided to the permittee upon his/her request. If the compliance inspection reveals a failure to correct some or all of the items on the notice to correct, the Director of Public Works shall notify the permittee of the deficient items that were not corrected in violation of this Chapter. The City may then proceed with all remedies for such violations set forth in Subsections (C) and (D) below.

C. *Violations.* All persons failing to comply with such notice to correct within the time period stated therein shall be deemed in violation of this Section. Notwithstanding the foregoing and except in the case of an emergency, failure of the City to give the permittee an opportunity to accompany the inspector on a site visit as set forth in Subsection (B) above shall prohibit any further enforcement action or penalty being imposed by the City on the permittee with respect to any notice to correct arising from such initial inspection. Nothing herein shall be construed to limit the City's ability to immediately respond to complaints or concerns regarding erosion and/or stormwater control for compliance with its MS4 Permit.

D. *Penalties.* Anyone violating any of the provisions of this Chapter shall be subject to the general penalty provisions of Section 100.190. In addition to the penalties hereinabove authorized and established, the City Attorney is authorized to take such other actions at law or in equity as may be required to halt, terminate, remove, or otherwise eliminate any violation of this Chapter. The Director of Public Works, subject to the appeal procedure set forth in Subsection (E), may seize any performance guarantee established to ensure compliance with this Chapter including bringing the site into compliance with the approved sediment and erosion control plan.

E. *Appeals.*

1. Any aggrieved person, firm, corporation, or any governmental officer, department, board or bureau may appeal a final decision of the Director of Public Works before the Board of Appeals as established and in conformance with the requirements of the applicable ordinance of the City of Wentzville, subject to the further requirements of this Section.

2. *Grounds for granting a variance.* The Board of Appeals may grant variances from Sections 515.010 through 515.050 where there is alleged error in any order, requirement, decision, or determination made by the designated official or his/her assignee and where the applicant would be subject to undue hardship. Undue hardship is not considered the loss of possible advantage, economic loss or gain, or mere inconvenience to the applicant. Notwithstanding anything herein, no variance shall be granted where the requested variance would:

a. Be in violation of the Federal Clean Water Act or other Federal law or regulation, or any State law or regulation, or

b. Cause the City to violate any enforcement duties under its MS4 Permit or the Clean Water Act.

3. Appeals from decisions of the Board of Appeals shall be to the Circuit Court in conformance with the requirements of the applicable ordinances of the City of Wentzville and Missouri Statutes. (R.O. 2006 §520.050; CC 1988 §10-155; Ord. No. 1125 §4, 9-18-91; Ord. No. 3146 §2, 4-14-11)

APPENDIX A. VEGETATIVE ESTABLISHMENT

For Urban Sites

Seeding rates:

Permanent:

Tall; Fescue--30 lbs./ac.
Smooth Brome--20 lbs./ac.
Combined: Fescue @15 lbs./ac. and Brome @10 lbs./ac.

Temporary:

Wheat or Rye--150 lbs./ac. (3.5 lbs. per square foot)
Oats--120 lbs./ac. (2.75 lbs. per square foot)

Seeding periods:

Fescue or Brome--March 1 to June 1
August 1 to October 1
Wheat or Rye--March 15 to November 1
Oats--March 15 to September 15

Mulch rates: 100 lbs. per 1,000 square feet (4,356 lbs. per acre)

Fertilizer rates: Nitrogen 30 lbs./ac.
Phosphate 30 lbs./ac.
Potassium 30 lbs./ac.
Lime 600 lbs./ac. ENM*

*ENM = effective neutralizing material as per State evaluation of quarried rock.

(R.O. 2006 App. A)

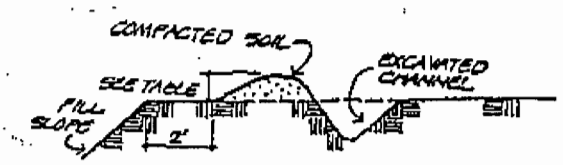
APPENDIX B. DIVERSIONS

For Urban Development Sites

Outlets for diversions must be stable. Stable outlets consist of grass waterways, earthen channels with capacity adequate to prevent gully erosion, grade stabilization structures or other practices as approved by the designated official.

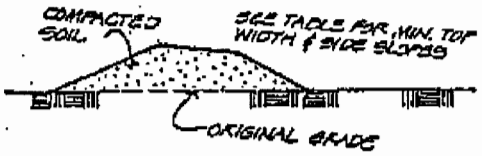
Combination Diversion

Used at the top of a fill slope.



Earth Ridge Diversion

Used around the perimeter of a construction site.

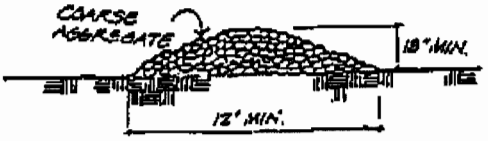


Combination Diversion

General use.

Gravel Ridge Diversion

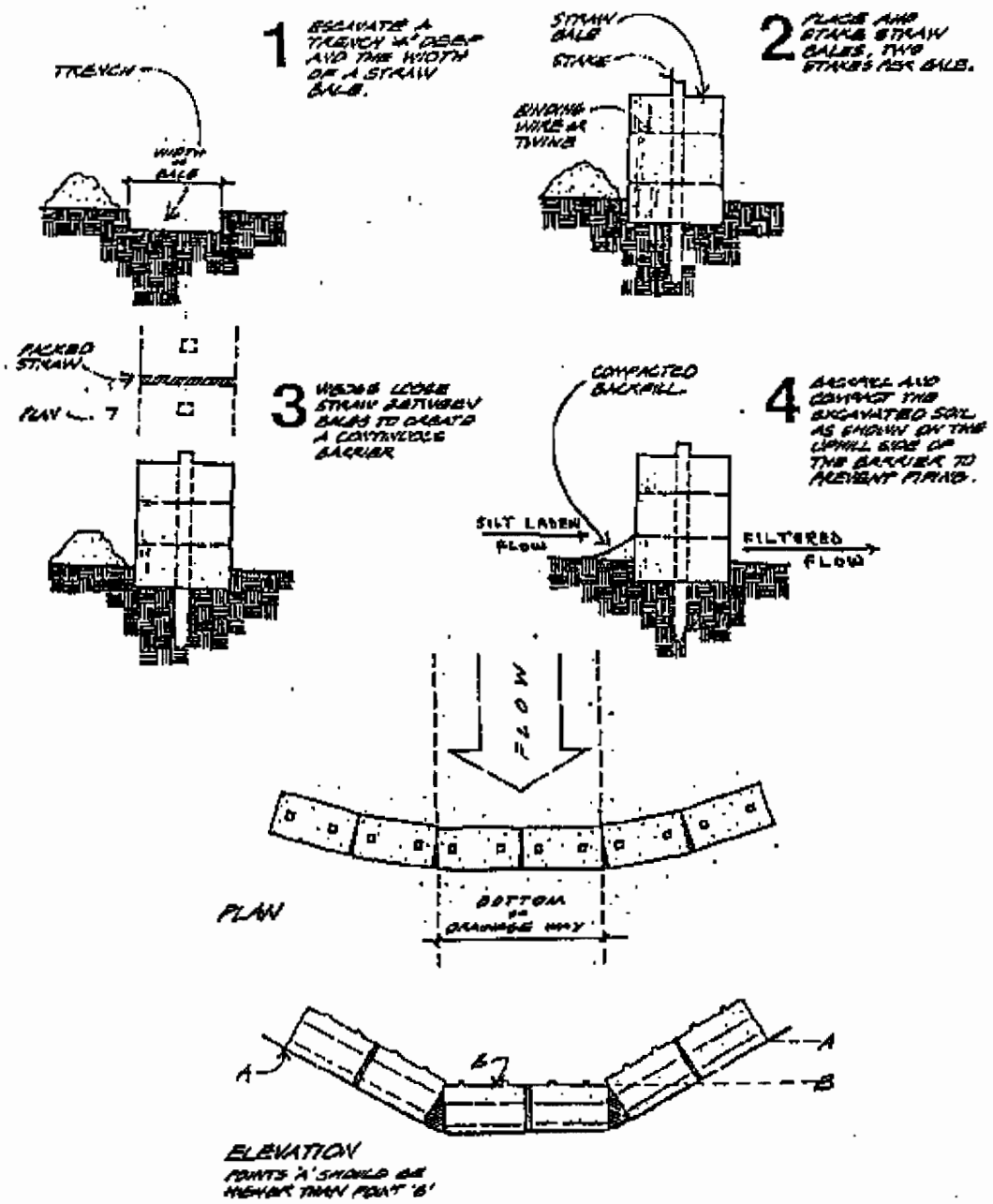
General use.



(R.O. 2006 App. B)

APPENDIX C. STRAW BALE BARRIERS

For Urban Development Sites



Placement and Construction of a Straw Bale Barrier

(R.O. 2006 App. C)

APPENDIX D. SYNTHETIC FILTER BARRIERS

For Urban Development Sites

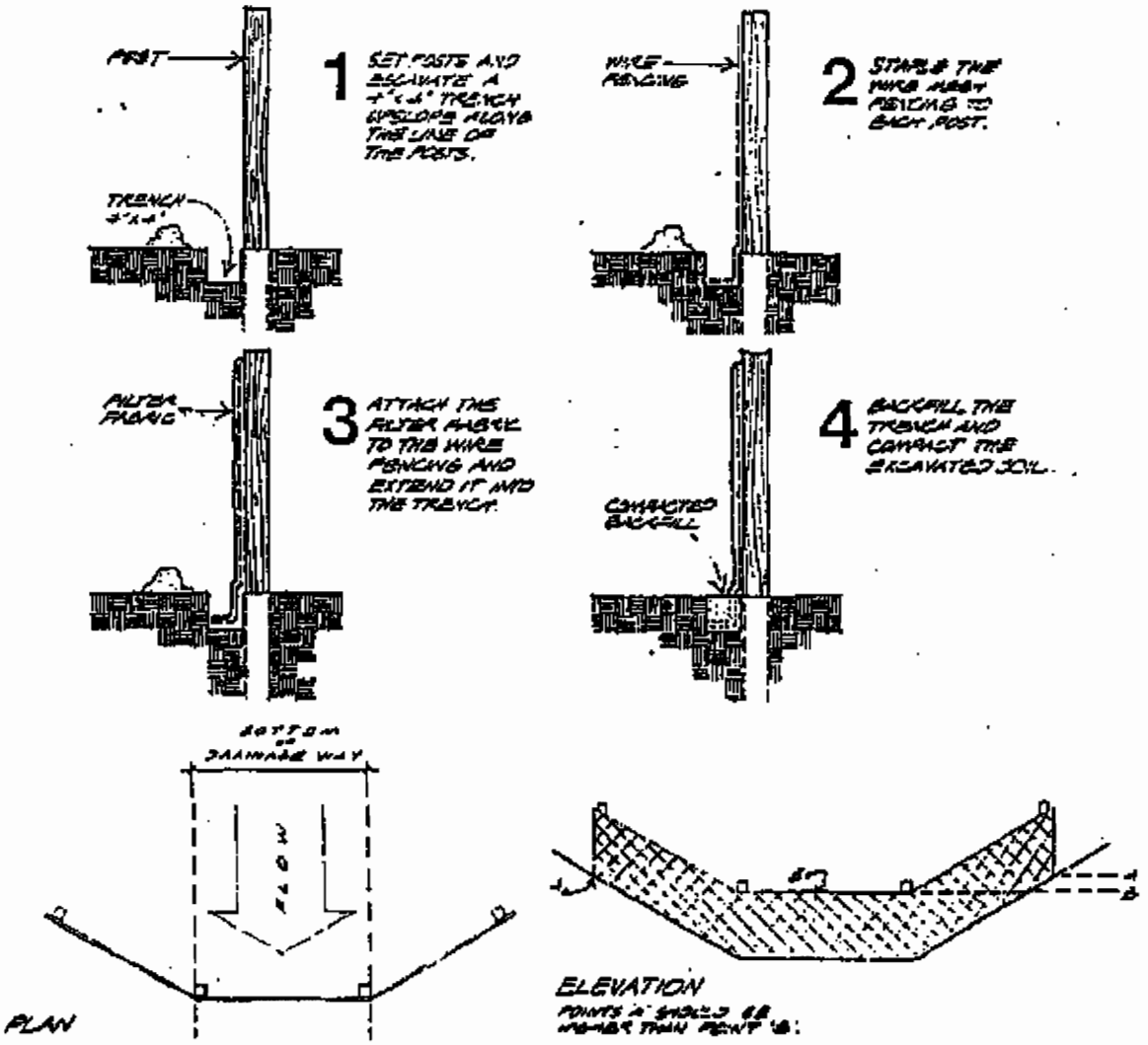
Maintenance.

4. Filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.

5. Should the fabric decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

6. Sediment deposits should be removed after each storm event. They must be removed when deposits reach approximately half (½) the height of the barrier.

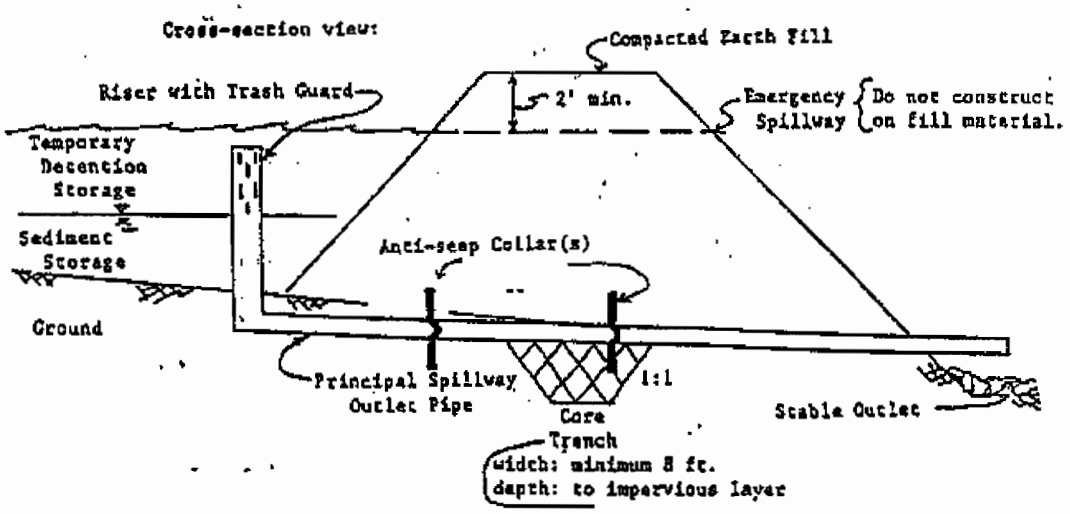
7. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared and seeded.



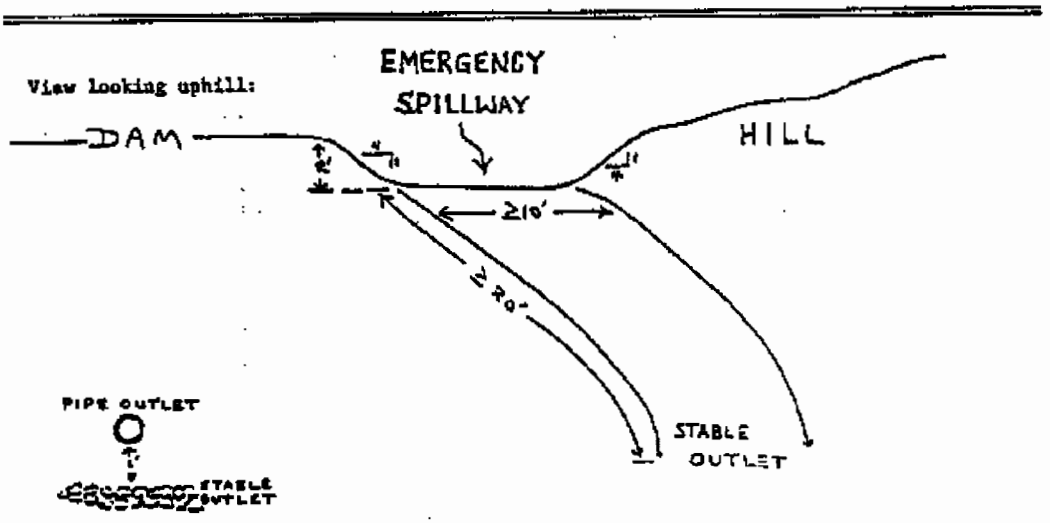
(R.O. 2006 App. D)

APPENDIX E. SEDIMENT BASIN

For Urban Development Sites



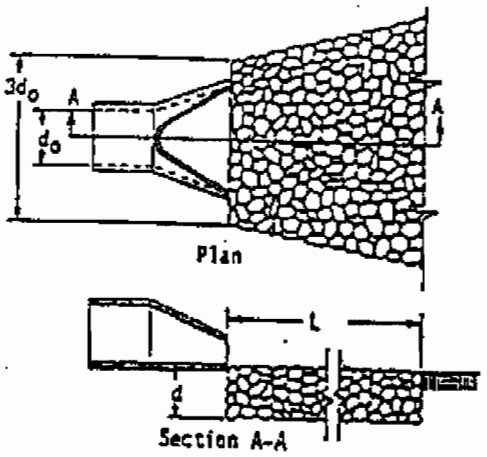
** Retention basin construction is identical with principal spillway pipe installed at an elevation that allows additional water storage.



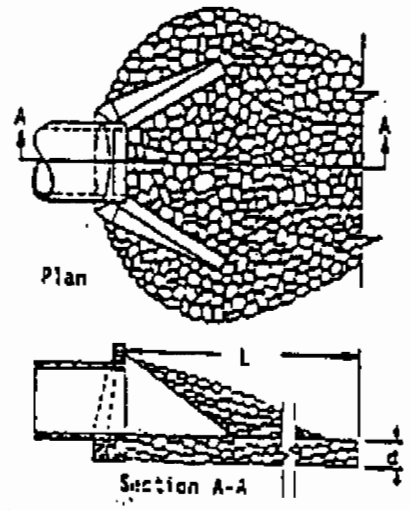
(R.O. 2006 App. E)

APPENDIX F. OUTLET PROTECTION

For Urban Development Sites



Pipe Outlet To Flat Area With No Defined Channel



Pipe Outlet To Well-Defined Channel

Notes

1. Apron lining may be riprap, or concrete.
2. L is the length of the riprap.
3. d = 1.5 times the maximum stone diameter but not less than 6 inches.
4. Apron lining must extend into a stable channel.

PIPE OUTLET CONDITIONS

(R.O. 2006 App. F)

Ordinance (~~ID # 4317~~)
3276

Bill No. 3438, an Ordinance Adopting Engineering Design Criteria and Matters Relating Thereto:

WHEREAS, the City of Wentzville Board of Aldermen, by Ordinance 2483 approved on March 22, 2006 the City of Wentzville Engineering Design Criteria and the City of Wentzville Standard Specifications and Construction Details, as well as approving by Ordinance 2878 on May 28, 2008 and Ordinance 3000 on June 10, 2009 revisions to these documents; and,

WHEREAS, the Department of Public Works after consultation and review recommends that the Board approve certain amendments to its Engineering Design Criteria pertaining to stormwater handling, so as to more closely align with the City's Municipal Separate Storm Sewer (MS4) permit language, as well as for regional consistency; and,

WHEREAS, the City of Wentzville Board of Aldermen wishes to adopt the amended criteria for use in the City.

NOW THEREFORE, BE IT ORDAINED BY THE BOARD OF ALDERMEN OF THE CITY OF WENTZVILLE, MISSOURI AS FOLLOWS:

SECTION 1: Section 505.190, "Adoption of Specifications and Design Criteria for the Installation of Roads, Sanitary Sewers, Water Mains, Storm Water Drainage Facilities and Other Improvements," is hereby repealed in its entirety and a new Section 505.190 is added in its place, to read as follows:

SECTION 505.190 ADOPTION OF SPECIFICATIONS AND DESIGN CRITERIA FOR THE INSTALLATION OF ROADS, SANITARY SEWERS, WATER MAINS, STORM WATER DRAINAGE FACILITIES AND OTHER IMPROVEMENTS

1. There is hereby adopted by the Board of Aldermen of the City of Wentzville, Missouri, for the purpose of regulating the construction, design, alteration, enlargement, repair, demolition, removal, conversion, modification and maintenance of roads, sewerage, water mains, storm water drainage facilities and their appurtenant facilities within and under the jurisdiction of the City of Wentzville, certain documents which are known as:

    a. City of Wentzville Engineering Design Criteria, and

    b. City of Wentzville Standard Specifications and Construction Details.

2. The most recent editions of the documents listed above are incorporated by reference herein, along with any amendments, insertions, and deletions as may be approved by the Board of Aldermen by resolution from time to time and which shall be maintained by

the Director of Public Works. These documents shall be posted on the City's Web Site, and shall be kept on file with the Director of Public Works and the City Clerk.

SECTION 2: Section 6.05.02, *Detention and Water Quality, When Required*, and Section 6.05.03.3.b.5-6, *Stormwater Detention and Water Quality Sizing Criteria*, of the City of Wentzville Engineering Design Criteria and Standard Construction Specifications and Details, are hereby amended as set forth on Exhibit A and are hereby adopted and the Director of Public Works is directed to incorporate these amendments into the official City of Wentzville Engineering Design Criteria.

SECTION 3: This ordinance shall be in full force and effective immediately upon its passage and approval.

READ TWO TIMES AND PASSED BY THE BOARD OF ALDERMEN OF THE CITY OF WENTZVILLE, MISSOURI THIS 13 DAY OF February, 2013.

Mayor, Nickolas Guccione

Attest:

City Clerk, Vitula Skillman

APPROVED BY THE MAYOR OF THE CITY OF WENTZVILLE, MISSOURI THIS 13 DAY OF February, 2013.

Mayor, Nickolas Guccione

Attest:

City Clerk, Vitula Skillman

Approved as to Form:

Attorney

Amendments to Engineering Design Criteria
January 16, 2013

Amendment No. 1

Date Issued: January ___, 2013
Affected Parts: 1.07, 6.05.02-1.a.
Subject: Stormwater Detention and Water Quality Sizing Criteria
Abstract: Revise criteria to incorporate permit language, define redevelopment, and to incentivize redevelopment that meet certain standards by reducing flood control and/or channel protection requirements for projects.

Amendment No. 2

Date Issued: January ___, 2013
Affected Part: 6.05.02
Subject: Detention and Water Quality, When Required
Abstract: Revise text to incorporate MS4 permit requirements to mimic pre-construction runoff on all affected new development projects.

Amendment No. 3

Date Issued: January ___, 2013
Affected Parts: 6.05.02 and 6.05.03-3.b.5
Subject: Detention and Water Quality, When Required
Abstract: Revise requirements for when stormwater detention and channel protection is required from 1 cubic feet per second (cfs) in differential runoff to 2 cfs.

Amendment No. 4

Date Issued: January ___, 2013
Affected Part: 6.05.03-3.b.6
Subject: Stormwater Detention and Water Quality Sizing Criteria
Abstract: Revise requirements for minimum size of an orifice for channel protection volumes.

1.07 Definitions

Redevelopment – removing an existing development or improvements and replacing with a new development or improvements.

Subsequent development – adding to an existing development.

6.05.02 Detention and Water Quality, When Required

1. Stormwater detention and water quality requirements shall be evaluated for all projects. Specifically, stormwater detention and water quality shall be required for projects as outlined below:

   a. Water quality treatment is required for all development projects that disturb greater than or equal to one acre, including projects less than one acre that are part of a larger common plan or development, as follows.

      i. For all new development projects, controls shall be designed and implemented to prevent or minimize water quality impacts by reasonably mimicking pre-construction runoff conditions to the maximum extent practicable. This including practices that reduce runoff volume through infiltration, evapotranspiration and/or rainwater harvesting.

      ii. For all redevelopment projects, water quality strategies and technologies, including those that reduce runoff volume, shall be effectively used to the maximum extent practicable.

      iii. The existence of downstream stormwater problems may require water quality treatment, regardless of disturbance size, at the discretion of the City.

   b. Channel protection and flood protection are required as follows. The differential runoff is calculated by the Modified Rational Method per Section 6.01.07, sub-section 1.

      i. Channel protection and flood protection is required for all projects which have a differential runoff of 2 cfs or more for the 15-year, 20-minute event.

      ii. Subsequent development of sites without prior stormwater detention that have a cumulative differential runoff since January 1, 2007 that equals 2 cfs or more require channel and flood protection.

      iii. Redevelopments and subsequent development with prior stormwater detention are exempt from providing additional channel protection and flood protection for the existing runoff. These projects are only required to provide channel and flood protection for the increase in runoff. When existing stormwater management facilities will be used to accommodate the increase in runoff from subsequent development or redevelopment,

the facilities shall be retrofitted to meet the current stormwater management requirements for the additional runoff.

iv. The existence of downstream stormwater problems may require subsequent development or redevelopment projects to provide additional detention, regardless of differential runoff at the discretion of the City.

6.05.03 Stormwater Detention and Water Quality Sizing Criteria

3. Channel Protection Storage Volume Requirements (Cp_v)

b. 5) Cp_v is not required at sites if the one-year post development peak discharge is less than or equal to 2.0 cfs for the entire site.

b. 6) A Cp_v orifice diameter of less than 1 ½" is not allowed. A Cp_v orifice diameter between 1 ½" and 3" will require internal orifice protection as approved by the City Engineer. Orifice diameters greater than 3" require orifice protection such as screens, baffles, or as approved by the City Engineer.

Visit www.wentzvillemo.org/engineering-design-criteria.aspx for complete criteria.

5. Design Requirements For Potable Water Distribution Facilities

5.01	General		5-1
5.02	General Requirements for Potable Water Main Construction		5-1
	5.02.01	Size and Shape	5-1
	5.02.02	Materials	5-1
	5.02.03	Bedding	5-1
	5.02.04	Pipe or Conduit Under Streets or Pavement	5-2
	5.02.05	Alignment	5-2
	5.02.06	Location	5-2
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6. Design Requirements for Storm Drainage Facilities

6.01 General

6.01.01 Introduction and Mission Statement

The mission of these stormwater design criteria is to:

- Protect property and infrastructure
- Prevent environmental degradation
- Protect natural waterways
- Accommodate growth by offering a variety of design tools
- Meet the City's State and Federal regulation requirements
- Achieve this mission in a cost effective manner to the City

The City of Wentzville recognizes that natural waterways are an integral part of our stormwater conveyance system. Therefore, a major component of the stormwater design criteria is to use stormwater best management practices (BMP) in each development to more closely imitate natural hydrologic function. By doing so, we are delivering cleaner stormwater in a natural flow regime to our receiving natural channels.

Portions of this criterion have been adapted from the Metropolitan St. Louis Sewer District, "Rules, Regulations, and Engineering Design Requirements for Sanitary Sewer and Stormwater Drainage Facilities" February 2006 manual.

The criteria set forth in this document are minimum standards and design professionals are encouraged to provide stormwater system designs that go beyond these standards.

6.01.02 Prevailing Law

All design must conform to prevailing Federal, State and County requirements in addition to these criteria. Agencies with jurisdiction include, but are not limited to the following:

- Federal Emergency Management Agency (FEMA)
- Federal Highway Administration (FHA)
- U S. Army Corps of Engineers (USACE)
- Missouri Department of Natural Resources (MoDNR)
- Missouri Department of Transportation (MoDOT)
- St. Charles County

6.01.03 Companion Documents

The following documents have been included in these criteria by reference:

- The Municipal Code of the City of Wentzville (latest revision)
- City of Wentzville Construction Specifications and Standard Details (latest revision)
- Maryland Stormwater Design Manual, Volume I and II (latest revision)
- City of Wentzville Comprehensive Plan

Each document has requirements pertaining to development and contains information regarding stormwater systems. The designer is expected to understand and follow these documents as applicable.

6.01.04 Construction Alternatives

This section gives the minimum technical design requirements of the City of Wentzville storm water drainage facilities. In general, the methods presented herein for stormwater design represent acceptable procedures, not necessarily to the exclusion of other sound and technically supportive methods. Any departure from these design requirements should be discussed before submission of plans for approval and should be justified.

Variance to these requirements will NOT be entertained unless the reasons for doing so can be shown to enhance the stated mission of these criteria.

6.01.05 Escrow

Escrow release associated with stormwater facilities shall conform to Section 9 of this design criteria manual.

6.01.06 Quick Reference Guide

Following is a quick reference guide to the performance criteria included in this section. Section 6 must be read in its entirety to fully understand these criteria.

6.01.06 Quick Reference Guide

Facility Type	Design Storm	Tc	Accepted Methodology for Peak Flow or Volume Calculation	Freeboard, Ponding Limits and Other Requirements	Design Criteria Section
Enclosed Systems					6.02
Street Gutters, Curb and Area Inlets	15 year	20 min	Modified Rational Equation	8' maximum spread	6.02.02
Storm Sewers	15 year	20 min	Modified Rational Equation	3' maximum head; 6" freeboard to inlet sill, 1' freeboard to top of manhole	6.02.03
Overland Flow System	100-yr, 24-hr with design system blocked	Compute	NRCS Unit Hydrograph	Low sill of any adjacent structure shall be above	6.02.04
Engineered Channels					6.03
Engineered Channels (DA < 20 acres and Tc ≤ 20 min)	15-yr with 100-yr, 24-hr check	20 min	Modified Rational Equation for 15-yr, NRCS Unit Hydrograph for 100-yr	Design - 6 inches to top of bank.	6.03
Engineered Channels (DA ≥ 20 acres or Tc > 20 min)	15-yr, 24-hr with 100-yr, 24-hr check	Compute	NRCS Unit Hydrograph	Check - 1-foot to low sill of adjacent structure.	6.03
Culverts, Bridges and Natural Channel Crossings					6.04
Culverts - Under driveways along roadside ditches	15 year	20 min	Modified Rational Equation	1-foot to edge of pavement	6.04.03
Culverts - In Natural Channels	Low Flow: 1-yr, 24-hr Full Capacity: 100-yr, 24-hr	Compute	NRCS Unit Hydrograph	1-foot to edge of pavement	6.04.04
Bridges	Low Flow: 1-yr, 24-hr Full Capacity: 100-yr, 24-hr	Compute	NRCS Unit Hydrograph	1-foot to bottom chord	6.04.05
Grade Controls	Rock size: 100-yr, 24-hr Height of rock to top of bank or 10-yr, 24-hr elevation	Compute	NRCS Unit Hydrograph		6.04.07
Detention and Water Quality					6.05
Water Quality Volume WQ_v	1.14 inches	NA	$WQ_v = [(P/12)(R_v)(A*43,560)]$	BMP to treat	6.05.03.2
Channel Protection Volume Cp_v	1 year, 24 hour	Compute	NRCS Unit Hydrograph	24-hour extended detention	6.05.03.3
Flood Protection Qp_2 and Qp_{25}	2-yr, 24-hr and 25-yr, 24-hr	Compute	NRCS Unit Hydrograph	Proposed, routed peak flow ≤ existing peak flow unless allowable release rate has been established for the watershed.	6.05.03.4
Limits of Maximum Ponding	100 year, 24 hour with lower outlets blocked	Compute	NRCS Unit Hydrograph	Ponds: 30' horizontal and 2' vertical distance to low sill of any building. Parking lots: 10' feet horizontal and 1' vertical distance to low sill elevation of any building. 1' freeboard to top of the basin.	6.05.04

Rainfall Data (Rainfall Frequency Atlas of the Midwest, Bulletin 71)

Design Storm	Rainfall (inches)	Design Storm	Rainfall (inches)
1 year, 24 hour	2.50	25-year, 24 hour	5.60
2 year, 24 hour	3.10	50-year, 24 hour	6.38
10 year, 24 hour	4.64	100 year, 24 hour	7.21
15 year, 24 hour	5.03		

6.01.07 Flow Quantities

1. Modified Rational Method

Flow quantities for street gutters, inlets and pipe systems shall be calculated by the Modified Rational Method in which:

$$Q = API$$

where:

Q = runoff in cubic feet per second
A = tributary area in acres.
I = Average intensity of rainfall (inches per hour) for a given period and a given frequency.
P = runoff factor based on runoff from pervious and impervious surfaces.

P (Runoff Factors) for various impervious conditions are shown in Table 6-1.

PI values for various impervious conditions are shown in Tables 6-2, 6-3 and 6-4.

a. Impervious Percentages and Land Use

Minimum impervious percentages to be used are as follows:

1) For manufacturing and industrial areas, 100% *

2) For business and commercial areas, 100% *

3) For residential areas, including all areas for roofs of dwellings and garages; for driveways, streets, and paved areas; for public and private sidewalks; with adequate allowance in area for expected or contingent increases in imperviousness:

In apartment, condominium and multiple dwelling areas:	75%*
In single family areas:	
1/4 Acre or less	50%
1/4 Acre to 1/2 Acre	40%
1/2 Acre to One Acre	35%
One Acre or larger	Calculate Impervious Percentage*
Playgrounds (non-paved)	20-35%*

4) For small, non-perpetual charter cemeteries 30%

5) For parks and large perpetual charter cemeteries 5%

***NOTE**: Drainage areas may be broken into component areas, with the appropriate run-off factor applied to each component, i.e.; a proposed development may show 100% impervious for paved areas and 5% impervious for grassed areas.

The design engineer shall provide adequate detailed computations for any proposed, expected or contingent increases in imperviousness and shall make adequate allowances for changes in zoning use. If consideration is to be given to any other value than the above for such development, the request must be made at the beginning of the project, must be reasonable, fully supported, and adequately presented, and must be approved in writing before its use is permitted.

Although areas generally will be developed in accordance with current zoning requirements, recognition must be given to the fact that zoning ordinances can be amended to change the currently proposed types of development, and any existing use. Under these circumstances the possibility and the probability of residential areas having lot sizes changed or re-zoned to business, commercial, or light manufacturing uses shall be given careful consideration.

b. Limitations of the Modified Rational Method

The Modified Rational Method is only valid if the time of concentration is less than twenty (20) minutes and the tributary area is less than twenty (20) acres. If the time of concentration or acreage limit is exceeded for a drainage structure, the NRCS Unit Hydrograph method shall be used to calculate peak flow rates. See Section 2, below for more information on the NRCS Unit Hydrograph method.

2. NRCS Unit Hydrograph Method

Flow quantities for engineered channels, culverts, bridges, detention, and channel protection volume shall be determined by using NRCS Unit Hydrograph methodology. The hydrograph shall be developed based on the actual flow and timing characteristics upstream of the design point. The rainfall distribution shall be Type II. The rainfall quantities to be used are from the Rainfall Frequency Atlas of the Midwest, Bulletin 71, developed by the Midwest Climate Center and Illinois State Water Survey. For use in the modeling of the 24 year storm, the applicable rainfall quantities shall be as follows: 1-year = 2.50 inches; 2-year = 3.10 inches; 10 year = 4.64 inches; 15 year = 5.03 inches; 25 year = 5.60 inches; 50 year = 6.38 inches; 100 year = 7.21 inches.

Applicable SCS Curve Numbers are shown in Table 6-5

6.04 Culverts, Bridges and Natural Channel Crossings

6.04.01 General

Natural Channels are defined as natural watercourses that are protected under the City of Wentzville Municipal Code, Title IV, Regulation for the Protection of Natural Watercourses, Ordinance #2863. In general, natural channels are channels protected by riparian corridor buffers. Buffers are as identified by the City or required because the channel is determined to be jurisdictional waters of the United States by the U. S. Army Corps of Engineers.

This section sets forth requirements for management and maintenance of riparian buffers during the allowable construction and alteration activities within the buffers as presented in Title IV, Article IV.

6.04.02 Channel Assessment and Channel Condition Scoring Matrix

If construction is proposed within a natural channel's riparian corridor buffer for a culvert, bridge or other natural channel crossing, the channel shall be assessed. The assessment has 4 components as follows, which are described in detail in this section:

1) Longitudinal Profile and Channel Cross Section Survey
2) Channel Condition Scoring Matrix, which rates the condition of 15 natural channel parameters
3) Bank-Full, Plan-Form Ratios and Critical Shear Stress Calculations
4) Natural Channel Plan, Profile and Section Exhibits

The channel assessment and Channel Condition Scoring Matrix provides a framework for engineers to gather natural channel data needed to develop a general indication of the natural channel's condition and to guide design.

1. Longitudinal Channel Profile and Channel Cross Section Survey

   a. Longitudinal Channel Profile Survey

      The longitudinal profile survey is a detailed string of survey shots of the channel bottom to define the pools and riffles in profile and the low flow channel sinuosity in plan. The profile survey shall include as many survey shots as necessary to clearly define every pool and riffle. In segments where the channel is flat and apparently without pools and riffles, a minimum of one shot shall be taken every 20 feet at the lowest point in the channel. The minimum length of profile survey shall be as follows (centered at the proposed crossing):

Buffer Width	Minimum Profile Survey Length
25	500
50	1,000
100	2,000

Plan Profile sheets of the profile survey shall be created per the Natural Channel Plan, Profile and Section Exhibits requirements of sub-section 4.

b. Channel Cross Section Survey

A minimum of 4 channel cross sections shall be surveyed. All channel cross sections shall be located on riffles and/or at any significant change in section area. Minimum spacing between sections shall be no greater than 4 times the buffer width as follows:

Buffer Width	Minimum Cross Section Spacing
25	100
50	200
100	400

The cross sections shall be plotted to an appropriate scale per the Natural Channel Plan, Profile and Section Exhibits requirements of sub-section 4.

2. Channel Condition Scoring Matrix

The length of channel surveyed shall be walked for the purpose of completing the Channel Condition Scoring Matrix (Form 6-1) and photographing existing conditions. The matrix includes 15 parameters, 12 of which can be determined during the field visit. The remaining 3 parameters will be determined using survey done as part of the Natural Channel Plan, Profile and Section Exhibits described in sub-section 4 and calculations as described in sub-section 3. The parameters are described in Form 6-1.

Two photographs shall be taken at each cross section location and at each proposed crossing location, one facing upstream and one facing downstream. This will produce a minimum of 8 photographs.

The Channel Condition rating shall be used as follows:

a. A rating of under 12 indicates a natural channel of moderate stability, therefore the criteria outlined in this section for culverts, bridges and other natural channel crossings shall be followed, at a minimum.

b. A rating between 12 and 18 indicates that special measures may be necessary, at the discretion of the City, to address those issues rated as poor in the assessment.

c. A rating greater than 18 indicates a natural channel with significant system-wide instability. The design of culverts, bridges and other channel crossings in unstable natural channels shall include a detailed fluvial geomorphic study. A firm with demonstrated expertise in river engineering and fluvial geomorphology shall perform the study and make recommendations.

3. Bank-full, Plan-Form Ratios, and Critical Shear Stress Calculations

Using the survey, data collected during the field visit and other available information, the following shall be calculated:

a. Bank-full Discharge, Width, and Depth

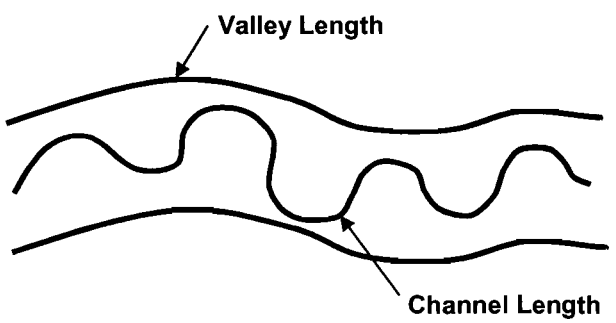
b. The bank-full discharge shall be estimated as the 1-yr, 24-hour storm using the NRCS Unit Hydrograph method. See Section 6.01.07, sub-section 2. for more information on calculating the discharge using the NRCS Unit Hydrograph method.

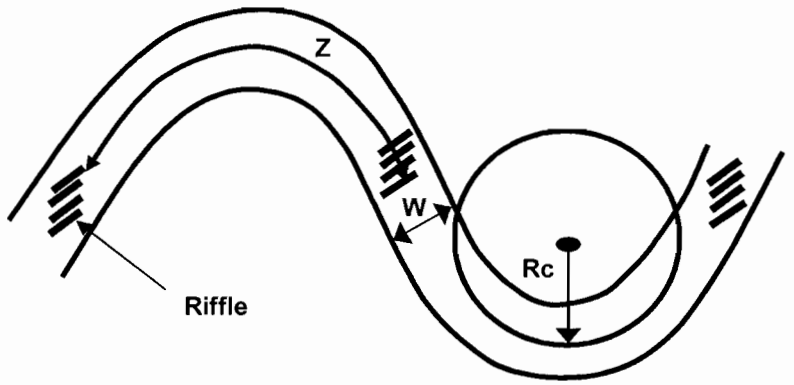
The bank-full depth and width shall be the depth and width of the bank-full discharge in the existing channel as calculated by Manning's Equation. See Section 6.03.04 for more information on Manning's Equation.

c. Plan-Form Ratios

The following ratios shall be calculated, and those that lie outside the typical range shall be noted. See the definition sketches below for plan-form terminology.

Ratio	Typical Range
Sinuosity (channel length / valley length)	1.1 to 1.5
Radius of curvature / Bank-full width	2 to 5
Riffle Spacing / Bank-full width	5 to 7





Rc = radius of curvature
W = bank-full width
Z = riffle spacing

d. Critical Shear Stress Analysis

The type of rock and/or soil exposed in the bed and banks shall be identified at each riffle. Bank soils shall be reported by Uniform Soil Classification using the visual-manual procedures (ASTM D 2488-00). The median (D_{50}) particle size shall be determined visually for each reach where the bed material changes. A shear stress ratio shall be calculated for each location based on the applied shear at bank-full flow divided by the critical shear of the D_{50} particle in the riffle, using methods and tables described below.

The average applied shear stress (τ_o) shall be calculated from the hydraulic data as follows:

$$\tau_o = \gamma RS$$

where: γ is the specific weight of water (62.4 pcf),

R is the hydraulic radius at bank-full flow, and

S is the water surface slope (in ft/ft) along the main channel bank-full flow, averaged over several bends in the area of the intervention.

The critical shear stress, τ_c, is that at which particles in the bed or bank are entrained and scour ensues.

Critical shear stresses are listed in Table 6-7. This table presents critical shear for sediment-laden water and where noted, clear water. The user must exercise judgment as to future conditions. Clear water values are only applicable below a heavily piped area, concrete channels designed to contain the future flows or immediately below a managed detention pond.

The ratio of average boundary stress to critical stress is the shear stress ratio:

shear stress ratio = τ_o / τ_c

If bed and bank materials are different, then the shear stress ratio should be calculated for each.

If the shear stress ratio of either streambed or bank is greater than one, the channel is prone to near-term adjustment and any interventions should be designed to prevent accelerated erosion. If the bed consists of rock, then the shear stress ratio is not applicable, unless the rock is prone to fracturing, slaking, or break-up, in which case the median size of particle should be used for calculation of the ratio.

4. Natural Channel Plan, Profile and Section Exhibits

A plan and profile sheet(s) and cross section sheets of the longitudinal profile and channel cross section surveys shall be plotted to an appropriate scale. The project name and the City of Wentzville Engineering Project Number shall appear in the lower right corner of the sheets. Example Natural Channel Plan, Profile and Section Exhibits are shown in Figures 6-4A and 6-4B.

a. The following items shall be shown and clearly labeled in the plan view:

1) Stationed longitudinal profile survey
2) Ground contours (if available). Aerial photographs or planning-level aerial survey may be used.
3) Riparian buffer limit along each bank.
4) Location of the proposed construction within the buffer.
5) Locations of differing bed and bank soil or rock materials. Indicate the D_{50} of the material as determined during the field visit.
6) Using the plan form of the longitudinal profile survey, draw circles to closely fit the stream meanders. Label the radius of curvature for each bend.
7) Locations of photographs. These photographs shall be printed (maximum of 4 photos per 8 ½ x 11 sheet) and submitted with the Exhibit.
8) North arrow and scale

b. The following items shall be shown and clearly labeled in the profile view:

1) Stationed profile survey
2) Hydraulic Grade Line (HGL) of the 1-yr, 24-hour storm.
3) Average channel slope(s) including any major changes in overall slope (use top of riffle to top of riffle to determine slopes).
4) Label the spacing between riffles.
5) Vertical and horizontal scale

by the City. See Section 6.04.07, sub-section 3.e, for more information on rock sizing. Rock shall be well graded. Shotrock with sufficient fines to fill voids may be used. The use of filter fabric and uniform gradations of stone are discouraged in natural channel beds. The depth of rock revetments shall be a minimum of 1.5 times the largest rock size in the gradation.

b. Articulated Concrete Block (ACB).

c. Modular Block Retaining Walls

d. Bio-engineered revetments – Soil bioengineering involves the use of living vegetation in combination with soil reinforcing agents such as geogrids to provide bank stabilization.

e. Composite revetments - Composite revetments are a combination of techniques. For example, vegetated rock, vegetated ACB, etc.

f. Vegetation shall be appropriate to local conditions and shall be native Missouri riparian species. Planting plans and palettes shall be prepared by an experienced professional with a degree or certification that qualifies them to develop the planting palettes and plans.

6.05 Detention and Water Quality

6.05.01 General

1. All projects shall be submitted to the City for review and approval.

2. Detention and water quality facilities shall be provided and designed in accordance with the requirements of this section.

6.05.02 When Required

1. Stormwater detention and water quality requirements shall be evaluated for all projects. Specifically, stormwater detention and water quality shall be required for projects as follows:

   a. All new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than 1 acre that are part of a larger common parcel or project that is greater than one acre.

   b. Projects which have a differential runoff of 1 cfs or greater for the 15-year, 20-minute event. The differential runoff is calculated by the Modified Rational Method per Section 6.01.07, sub-section 1.

   c. Subsequent development or redevelopment of sites without prior stormwater detention or water quality features, when cumulative differential increase since January 1, 2007 equals 1 cfs or greater.

d. When existing stormwater management facilities are going to be used to accommodate additional runoff from building or parking lot expansions or subdivision additions, the facilities shall be retrofitted to meet the current stormwater management requirements for the drainage area, served by the facility.

e. Subsequent development or redevelopment projects with prior detention and/or water quality shall provide additional detention and/or water quality, regardless of disturbance size or differential runoff, at the discretion of the City.

6.05.03 Stormwater Detention and Water Quality Sizing Criteria

1. General

This section presents the sizing criteria for stormwater facilities to meet pollutant removal goals, reduce channel erosion, prevent flooding, and pass extreme floods. A very brief summary is listed below.

SUMMARY OF THE KEY COMPONENTS AND STORMWATER CRITERIA

Stormwater Volume	**General Criteria and Calculation Method**
Water Quality Volume (WQ_v) (ft^3)	WQ_v shall be treated using one of the allowable BMPs. **WQ_v = [(P/12)(R_v)(A*43,560)]** P = rainfall depth = 1.14in R_v = volumetric runoff coefficient A = area in acres
Channel Protection Storage Volume (Cp_v)	Cp_v = 24 hour extended detention of post-developed one-year, 24 hour storm event
Flood Protection Volume (Qp_2 & Qp_{25})	The post-developed routed peak flow from the site may not exceed the existing routed peak flow for the 2-year and 25-year, 24-hour events, or the allowable release rates for applicable watersheds. Calculated using NRCS unit hydrograph method routed through the detention basin(s).

Subtraction for Non-structural Practices: When non-structural practices are employed in the site design, the WQ_v volume and to a lesser extent the Cp_v and Q_p can be reduced in accordance with the conditions outlined in Section 6.05.07 and 6.08.

The following sub-sections provide more expanded information, directories, explanations and resource references.

2. Water Quality Volume (WQ_v)

a. WQ_v is the storage needed to capture and treat the runoff from 90% of the recorded daily rainfall events. In numerical terms, it is equivalent to

1.14 inches of rainfall multiplied by the volumetric runoff coefficient (R_v) and site area. The WQ_v is directly related to the amount of impervious cover created at a site. A minimum WQ_v of 0.2 inches per acre shall be met at all sites where WQ_v is required. The following equations are used to determine WQ_v:

$$WQ_v = [(P/12)(R_v)(A*43,560)]$$

Where:
WQ_v = water quality volume (in ft^3)
P = 1.14 inches of rainfall
$R_v = 0.05 + 0.009\ (I)$
I = percent impervious cover (in percent.
Eg 100% = 100, 75%=75,...). See table below for minimum impervious percentages.
A =area in acres

b. Percent Impervious Cover (I) can be calculated by breaking drainage areas into component areas, with the appropriate percent impervious applied to each component, i.e.; a proposed development may show 100% impervious for paved areas and 5% impervious for grassed areas and producing a weighted average.

If a weighted average is not calculated, the minimum I to be used is as follows:

For manufacturing and industrial areas	100%
For business and commercial areas	100%
For residential areas, including all areas for roofs of dwellings and garages; for driveways, streets, and paved areas; for public and private sidewalks; with adequate allowance in area for expected or contingent increases in imperviousness:	
In apartment, condominium and multiple dwelling areas:	75%
In single family areas:	
1/4 Acre or less	50%
1/4 Acre to 1/2 Acre	40%
1/2 Acre to One Acre	35%
One Acre or larger	Calculate Impervious Percentage
Playgrounds (non-paved)	20-35%
For small, non-perpetual charter cemeteries	30%
For parks and large perpetual charter cemeteries	5%

c. As a basis for determining water quality treatment volume the following assumptions may be made:

1) The water quality volume WQ_v for offsite areas is not required if the offsite flows bypass the water quality facilities. If offsite runoff flows into a water quality facility, the WQ_v calculation must include the offsite area. Offsite areas are defined as those areas that are not a part of the proposed development but produce runoff that flows to the proposed development.

2) Measuring Impervious Cover: The measured area of a site plan that does not have vegetative or permeable cover shall be considered total impervious cover.

3) Multiple Drainage Areas: When a project contains or is divided by multiple drainage areas, the entire WQ_v shall be addressed for each drainage area within that drainage area (i.e. you cannot increase the WQ_v in one BMP to compensate for no or reduced WQ_v in another). The City may waive this requirement for extreme situations in remote lots. However, the sum of these waived areas may not exceed 5% of the total disturbed area (not including common ground or conservation easements) of the proposed development.

4) BMP Treatment: The final WQ_v shall be treated by an acceptable BMP(s) from the list presented in Section 6.05.06.

5) Extended Detention (ED) for Water Quality Volume: The water quality requirements can be met by providing 24-hour extended detention of **up to half** of the water quality volume (WQ_v) in conjunction with a stormwater pond or wetland system. If the same pond or wetland is used for the Cp_v, the ED portion of the WQ_v may be included when routing the Cp_v.

6) All water quality facilities shall include a separate landscaping plan prepared by an experienced professional with a degree or certification that qualifies them to develop the planting palettes and plans.

7) Water quality portions of a BMP may not serve as a sediment control device during the site construction phase. In addition, the erosion and sediment control plan for the site must clearly indicate how sediment will be prevented from entering the BMP.

3. Channel Protection Storage Volume Requirements (Cp_v)

a. To protect channels from erosion, a 24-hour extended detention of the 1-year, 24-hour storm event shall be provided. The rationale for this criterion is that runoff will be stored and released in such a gradual manner that critical erosive velocity during bankfull and near-bankfull events will seldom be exceeded in downstream channels. A detention pond or underground vault is normally needed to meet the Cp_v requirement (and subsequent flood protection criteria Qp_2 and Qp_{25}).

b. As a Basis for determining Channel Protection Storage Volume the following assumptions may be made:

1) NRCS Unit Hydrograph method shall be used for determining peak discharge rates.

2) The rainfall depth for the one-year, 24-hour storm event is 2.50 inches. Use Type II rainfall distribution.

3) The length of overland sheet flow used in time of concentration (t_c) calculations is limited to no more than 100 feet for post project conditions.

4) The 24-hour extended detention is defined as providing a 24-hour detention lag time (T) for the one-year storm. The lag time is defined as the interval between the center of mass of the inflow hydrograph and the center of mass of the outflow hydrograph.

5) Cp_v is not required at sites where the one-year post development peak discharge is less than or equal to 1.0 cfs for the entire site.

6) A Cp_v orifice diameter of less than 3.0" is not allowed.

7) Multiple Drainage Areas: When a project contains or is divided by multiple drainage areas, the entire Cp_v shall be addressed for each drainage area within that drainage area. You cannot increase the Cp_v in one facility to compensate for no or reduced Cp_v in another, except in the following areas:
   1. Where the WQ_v is treated by widening the riparian buffer as described in Section 6.05.06
   2. Where a Sheet Flow to Buffer non-structural BMP credit for WQ_v is used as described in Section 6.05.07
   3. Where the WQ_v requirement has been waived under Section 6.05.03, sub-section 2.c.3.

8) Extended detention storage provided for the Cp_v does not fully meet the WQ_v requirement (that is Cp_v and WQ_v should be treated separately).

9) The stormwater storage needed for Cp_v may be provided above the WQ_v storage in stormwater ponds and wetlands; thereby meeting all storage criteria in a single facility with appropriate hydraulic control structures for each storage requirement.

10) Infiltration is not recommended for Cp_v control because of large storage requirements. If proven effective, appropriate and desirable however, in some rare situations it may be permissible.

4. Flood Protection Volume Requirement (Qp_2 & Qp_{25})

a. To protect downstream areas from flooding stormwater shall be detained on site or offsite as approved and released at a rate not to exceed the existing peak flow for the 2-year and 25-year 24-hour events, or the allowable release rates for applicable watersheds as determined by the City.

   Note that stormwater pipes, downstream from the control structure, shall be sized to carry the runoff from the 15-year 20-minute design storm for the total tributary upstream watershed. No reduction in outfall pipe size shall be permitted because of detention.

b. As a Basis for Determining the Flood Protection Volume the following assumptions may be made:

   1) The 2-year and 25-year, 24-hour inflow hydrographs shall be determined by using NRCS Unit Hydrograph method as described in Section 6.01.07, sub-section 2.

   2) The volume of detention may be provided through permanent detention facilities such as dry basins or ponds, permanent ponds or lakes, underground storage facilities or in parking lots. The engineer shall make every effort to locate the detention facility at or near the lowest point of the project such that all of the onsite runoff will be directed into the detention facility. Multiple use of detention basins is encouraged. Multiple use may include parking lots, ball fields, tennis courts, play grounds and picnic areas.

   3) Flows from offsite, upstream areas should be bypassed around the detention facility to ensure that the proposed detention facility will function as designed and will provide effective control of downstream flows with development in place. If offsite flows are directed into a detention facility, the allowable release rates shall not be modified. The bypass system shall be designed for the 100-year, 24-hour storm using future developed conditions.

   4) Detention basin volume will be based on routing the post-developed 2-year and 25-year, 24-hour inflow hydrographs through the detention facility while satisfying the appropriate allowable release rate. The routing computations shall be based on an application of the continuity principle, (i.e., level pool routing).

   5) Multiple Drainage Areas: When a project contains or is divided by multiple drainage areas, the Qp_2 & Qp_{25} may be addressed for the entire site in one basin for the entire site, as long as all areas are tributary to the same stream. This does not alleviate the need to provide WQ_v (BMPs) and/or Cp_v for each separate discharge point.

6) Pond routing shall be modeled using a nationally recognized computer program using industry standard methodologies, including, but not limited to:
   1. Pondpack by Haested
   2. Hydraflow Hydrographs by inteliSolve
   3. HEC-HMS by the U.S. Corps of Engineers
   4. Others as approved by the City

6.05.04 Limits of Maximum Ponding

1. The maximum ponding elevation shall be calculated based on a routing of the 100-year, 24-hour event assuming all outlet weirs and orifices are blocked, except for the highest overflow structure. The routing shall begin assuming water is ponded to the overflow structure's sill.

2. The limits of maximum ponding in dry basins or ponds and permanent lakes or ponds shall not be closer than thirty (30) feet horizontally to any building, and not less than two (2) feet vertically below the lowest sill elevation of any building.

3. The limits of maximum ponding in parking lots shall not be closer than ten (10) feet horizontally from any building and not less than (1) foot vertically below the lowest sill elevation of any building

4. A minimum of one (1) foot of freeboard shall be provided from the top of the basin to the maximum ponding elevation.

6.05.05 General Stormwater Basin Design Requirements

1. Underground Basins Special Requirements:

   a. Adequate access for basin maintenance and inspection shall be provided. A means of visual inspection from the ground surface of the low flow device, overflow weir, and outlet structure is necessary. Access shall also be provided to allow for cleaning of the low flow device from the ground surface.

   b. The basin should have sufficient volume and spillway capacity to pass/contain the 100-year 24-hour event with the low flow outlet blocked. The routing shall begin assuming water is ponded to the overflow structure's sill. In some situations it may be desirable to have control structures with at least 2 outlet openings, one above the other.

   c. Underground basins shall be acceptable for non-residential projects only. Upon City approval, underground basins may be allowed on condominium or apartment projects if maintenance is provided by a management company.

   d. Provide immediate manhole access from ground surface for both sides of the low flow device. Also provide a manhole at upstream end of underground basins, for access, inspection, to facilitate maintenance, and air release.

e. Adequate flowline spot elevations, sections and profiles including pipe length and slope shall be labeled to define basin and pipe geometry.

2. For detention ponds that do not contain water quality features, all ends of pipes discharging into a dry basin shall be connected with the low flow pipe or control structure, by means of a permeable swale. The swale shall have a minimum 4:1 lateral (25%) slope to the center, a minimum 1.0% longitudinal slope to ensure positive drainage and a maximum 2.0% longitudinal slope. Swales shall be a minimum of six (6) inches deep and four (4) feet wide or shall match the capacity of the low flow outlet works, whichever results in the greater capacity. The bottom of the basin shall be sloped a minimum of two percent (2%) towards the edge of the swale.

   No concrete swales will be allowed unless approved by the City.

   Permanent erosion control protection must be provided at the ends of discharging pipes into the pond to protect against the 15 year – 20 minute storm event.

3. See Section 6.02.03, sub-section 12 for erosion protection criteria for outflow pipes.

4. Railroad tie walls cannot be used.

5. Permanent detention ponds or lakes are to be designed to minimize fluctuating lake levels. Maximum fluctuation from the permanent pool elevation to the maximum ponding elevation shall be six (6) feet.

6. The maximum side slopes for dry basins or ponds, and the fluctuating area of permanent ponds or lakes shall be 3:1 (three feet horizontal, one foot vertical) without fencing.

7. Dry basins or ponds and the fluctuating areas of permanent ponds or lakes are to be appropriately vegetated to the maximum high water elevation. Areas above that elevation shall be appropriately stabilized and vegetated. Sod and mowing above that elevation may be approved and is required for dam embankment slopes and downstream toe areas for wet basins where riprap is not appropriate. All vegetation shall be approved by the City.

8. Control structures and overflow structures are to be reinforced concrete, including precast.

9. Accepted materials for use in baffles, grates, screens, hoods and pipe, which is normally submerged or is located in a normally wet environment shall be composed of aluminum, stainless steel, concrete, or other like material that is not subject to corrosion. Galvanized or coated steel is not acceptable. HDPE is not allowed for inlet or outlet piping in detention basins.

10. The outflow pipe shall be sized for the developed flow rate.

11. In basins with concrete walls or riprap covered slopes, provisions should be made for mowing equipment to reach the bottom (ramps, etc.).

12. Maximum Depths:

    a. The maximum depth of water in a dry detention basin shall not exceed ten (10) feet. The design of detention basin embankment must be sealed and certified by a Professional Engineer registered in the State of Missouri with demonstrated expertise in geotechnical engineering.

    b. Parking lots used for automobiles shall have a maximum depth of eight (8) inches of water.

    c. Parking lots used for trucks or truck trailers shall have a maximum ponding depth of water of twelve (12) inches.

13. Detention Basin Fencing

    A four (4) foot (minimum height) approved fence shall be provided around the perimeter of any basin where the side slopes exceed 3H:1V. Fencing such as post and rail, or fencing which prevents easy observation of detention basin, such as tall privacy fencing, should not be used.

14. Detention Basin Elevation

    a. If the detention basin discharges to a piped sewer system, no detention volume may be calculated below the 15-year, 20-minute hydraulic elevation of the receiving storm system.

    b. If the detention basin discharges to an open channel, or to a piped sewer system affected by flood levels in a nearby downstream open channel, then the low elevation of the detention storage shall be above the 100-year flood elevation in the open channel as established by the FEMA Flood Insurance Study.

6.05.06 Acceptable Urban BMP Options

1. This section sets forth six acceptable groups of BMPs that can be used to meet the Water Quality volume criteria (WQ_v). The design and selection of these BMPs shall generally conform to the criteria contained in the Maryland Stormwater Design Manual, Volumes I & II (latest revision), as prepared by the Center for Watershed Protection and the State of Maryland Department of the Environment (MDE). The Manual can be purchased through MDE's website. A simple search for Maryland Stormwater Design Manual will provide a direct link. Performance criteria adapted from the Maryland Stormwater Design Manual are provided in Section 6.07.

   Acceptable uses of the BMPs are summarized in Table 6-8 and Physical Feasibility Factors are summarized in Table 6-9.

a. The acceptable BMP designs are assigned into six general categories for stormwater quality control (WQ_v):

BMP Group 1 Stormwater Ponds
BMP Group 2 Stormwater Wetlands
BMP Group 3 Infiltration Practices
BMP Group 4 Filtering Practices
BMP Group 5 Open Channel Practices
BMP Group 6 Riparian Buffer Widening

b. A combination of BMPs and/or credits is normally required at most development sites to meet all three stormwater sizing criteria.

c. New structural BMP designs are continually being developed, including many proprietary designs. To be considered an effective BMP for stand-alone treatment of WQ_v, current or new BMP design variants cannot be accepted for inclusion on the list until independent pollutant removal performance and monitoring data determine that they can meet the following:
   1) Capturing and treating the required water quality volume (WQ_v)
   2) Reducing the average total load of total suspended solids (TSS) by 80%, and
   3) Having an acceptable longevity rate in the field

   Contact the City for a list of approved proprietary BMPs and testing criteria.

<u>BMP Group 1. Stormwater Ponds</u>

a. Practices that have a combination of permanent pool, extended detention or shallow wetland equivalent to the entire WQ_vs include:

P-1	Micropool extended detention pond
P-2	Wet pond
P-3	Wet extended detention (ED) pond
P-4	Multiple pond system
P-5	Pocket Ponds

<u>BMP Group 2. Stormwater Wetlands</u>

a. Practices that include significant shallow wetland areas to treat urban stormwater but often may also incorporate small permanent pools and/or extended detention storage to achieve the full WQ_v include (Modification of existing wetland areas will require a Corps 404 permit):

W-1	Shallow wetland
W-2	ED shallow wetland
W-3	Pond/wetland system
W-4	Pocket wetland

b. Wetlands may be used for Cpv and WQv, but shall not be used for control of the flood protection volume.

c. Wetlands shall be designed by a professional with a degree or certification that qualifies them to design wetlands.

BMP Group 3. Infiltration Practices

a. Practices that capture and temporarily store the WQ_v before allowing it to infiltrate into the soil over a two day period include:

I-1	infiltration trench
I-2	infiltration basin

b. Infiltration practices will be allowed on sites where it is proven that infiltration will work to the satisfaction of the City. This must be supported by a soils report.

BMP Group 4. Filtering Practices

a. Practices that capture and temporarily store the WQ_v and pass it through a filter bed of sand, organic matter, soil or other media are considered to be filtering practices. Filtered runoff may be collected and returned to the conveyance system. Design variants include:

F-1	Surface sand filter
F-2	Underground sand filter*
F-3	Perimeter sand filter
F-4	Organic filter
F-5	Pocket sand filter
F-6	Bioretention**

*not allowed on residential projects
**may also be used for infiltration

b. A maintenance agreement and maintenance schedule shall be required.

BMP Group 5. Open Channel Practices

a. Vegetated open channels that are explicitly designed to capture and treat the full WQ_v within the dry or wet cells formed by checkdams or other means include:

O-1	Dry swale
O-2	Wet swale

b. Open channel practices shall be designed with the proper plantings. They are not allowed on single-family residential projects with the exception that dry swales will be allowed on common ground. Upon City approval, open channel practices may be allowed on condominium or apartment projects if maintenance is provided by a management company.

c. An open channel practices BMP is different than engineered channels used for stormwater conveyance. See Section 6.03 for engineered channel design criteria.

BMP Group 6. Riparian Buffer Widening

This BMP shall be used only with the approval of the City and shall generally meet the following:

a. Riparian buffer widening is applicable for residential developments only.

b. Riparian buffer widening shall not be used for roadway drainage.

c. Riparian buffer widening may be approved if the development meets ALL of the following criteria:

1) The development is contiguous to an existing riparian buffer as described in the City of Wentzville Municipal Code, Ordinance #2863 Regulation for the Protection of Natural Watercourses.

2) Topography is such that stormwater runoff cannot gravity flow to a BMP.

3) Stormwater runoff from the area sheet flows directly into the existing riparian buffer and does not cross an impervious area.

4) Stormwater runoff from the area does not cross from one property onto another before entering the riparian buffer.

d. If approved, the WQ_v can be met by:

1) Widening the existing riparian buffer by a minimum of 25 feet per effected side as measured from the edge of the existing buffer away from the channel.

2) The widened riparian buffer shall meet all the requirements of the existing riparian buffer.

3) The new buffer width shall be platted as a riparian buffer conservation easement granted to the City and shall be in common ground.

4) If approved, the channel protection (Cpv) and the flood protection volumes (Qp2 and Qp25) shall be accommodated elsewhere in the development.

2. Additional resources for BMP design

In addition to the Maryland Stormwater Design Manual, the following resources may be useful to the design engineer:

a. Georgia Stormwater Management Manual, Volume 2 Technical Handbook, Chapter 3 and Appendixes D and E (latest revision) http://www.georgiastormwater.com

b. Stormwater Best Management Practices in an Ultra-Urban Setting: Selection and Monitoring, Federal Highway Administration Publication No. FHWA-EP-00-002, http://www.fhwa.dot.gov/environment/ultraurb

6.05.07 Non-structural BMP Credits

Non-structural BMPs are increasingly recognized as a critical feature of stormwater BMP plans, particularly with respect to site design. In most cases, non-structural BMPs will be combined with structural BMPs to meet all stormwater volume requirements. The key benefit of non-structural BMPs is that they can reduce the generation of stormwater from the development, thereby reducing the size and cost of structural BMPs. In addition, they can provide partial removal of many pollutants. The non-structural BMPs have been classified into seven broad categories. To promote greater use of non-structural BMPs, a series of credits and incentives are provided for developments that use these progressive site planning techniques. For a complete description of the credits and how to determine if a credit is applicable, see Section 6.08, which has been adapted from Chapter 5 of the Maryland Stormwater Design Manual, Volume I (2000).

1. Natural area conservation
2. Disconnection of rooftop runoff (only available for R-1A, commercial and industrial zones)
3. Disconnection of non-rooftop impervious area
4. Sheet flow to buffer
5. Open channel use
6. Environmentally sensitive development
7. Impervious cover reduction – This is not a credit, per se, but is a means of reducing the WQ_v.

6.05.08 Easements Required

The detention basin and BMPs in non-residential developments shall be located in easements per Section 8. Detention basin and BMPs in residential developments shall be located in easements on common ground, except for BMPs treating stormwater from an individual lot in a development satisfying Credit 6: Environmentally Sensitive Development Credit, which may be located in an easement in that individual lot. Variances to allow BMP placement in easements on private property will be considered. Justification must be provided for consideration.

6.05.09 Maintenance Agreement

Prior to plan approval the property owner(s) of the detention basin and BMP site(s) shall execute a City Maintenance Agreement for the BMPs and the detention basin or pond to insure the BMPs and the detention area will be kept in working order, to the satisfaction of the City. The City will not be responsible for maintenance of detention basins or BMPs.

The Maintenance Agreement shall include the Detention and BMP Operation and Maintenance Plan by reference (see Section 6.06.02 for more information regarding the Detention and BMP Operation and Maintenance Plan).

6.05.10 As-Built Certification for Detention/BMP Facilities

An as-built survey is required for all detention/BMP facilities. The design engineer shall submit the Professional Engineer's Construction/As-Built Certification for Detention/BMP Facilities as required in Section 11.

Grading tolerances should be kept at ±0.1 foot. In the event that the tolerance requirement is not met, the design engineer shall prepare and submit a revised Detention and BMP Design Report to demonstrate that the system still meets the performance requirements of these criteria.

6.05.11 Dam Permit Requirements

Dams with a height of thirty-five (35) feet or greater will require approval from the Missouri Department of Natural Resources.

6.06 Stormwater Design Submittal Requirements

6.06.01 Construction Plans

Stormwater structures and features shall be shown in the project construction plans to the extent necessary to fully describe the design intent and adherence to these criteria. At a minimum, the construction plans shall include all information required in Chapter 1. General Instructions.

6.06.02 Stormwater Design Report

1. The engineer shall submit two copies of the Stormwater Design Report.

2. The Stormwater Design Report shall be signed, dated and sealed by the Missouri Professional Engineer who is responsible for its preparation. If the report is prepared by another person, a note on the cover shall state the preparer's name and that he or she is under the direct supervision of the Missouri Professional Engineer who's seal is shown.

3. The Stormwater Design Report shall be bound with each section separated by a labeled tab.

4. The Stormwater Design Report shall at a minimum contain the following:

   a. Table of Contents

   b. Soils data for the site used to determine curve numbers and infiltration rates (if applicable).

   c. City of Wentzville Stormwater Design Summary (Form 6-2)

d. A City of Wentzville Discharge Summary (Form 6-3) shall be completed for every discharge location leaving the site.

e. Detention, channel protection and water quality BMP design calculations, including but not limited to:

1) A City of Wentzville Detention and BMP Summary (Form 6-4) shall be completed for the entire site.

2) A City of Wentzville Water Quality (BMP) Design Summary (Form 6-5) shall be completed for each BMP facililty.

3) A City of Wentzville Detention/Retention Pond Design Summary (Form 6-6) shall be completed for each detention facility.

4) Storm routing calculations for all storm frequencies including time, inflow, outflow and elevation.

5) Calculations to demonstrate 24-hour draw down for Cpv and ED portion of WQv (if applicable).

6) Elevation vs Discharge tables or curves for each basin for 1-yr, 2-yr and 25-yr, 24-hour design storms.

7) Elevation vs Storage tables or curves for each basin for 1-yr, 2-yr and 25-yr, 24-hour design storms.

8) Hydraulic grade line computations for pipes entering and leaving the basin(s) for 1-yr, 2-yr and 25-yr, 24-hour design storms and the 15-yr, 20-minute design storm.

9) If the embankment contains fill material a geotechnical report may be required.

10) Existing Drainage Area Map plotted to a readable scale

i. City of Wentzville Engineering Project Number in the lower right corner
ii. Existing contours (2' intervals for residential projects, 1' intervals for commercial projects)
iii. Existing drainage areas
iv. For each drainage area, label: Area, CN, Flow Path, Tc and Q1, Q2 and Q25
v. North arrow.
vi. Graphic scale

11) Detention Basin and BMP Drainage Area Map plotted to a readable scale

i. City of Wentzville Engineering Project Number in the lower right corner.

ii. Proposed contours (2' intervals for residential projects, 1' intervals for commercial projects)
iii. Drainage areas to each detention basin and BMP
iv. For each drainage area, label: Area, CN, Flow Path, Tc and Q_1, Q_2, Q_{25} and WQ_v
v. Calculated routed flow from each drainage basin and BMP outlet.
vi. North arrow.
vii. Graphic scale.

12) Structural calculations for the outlet control structures (if required).

13) Cross sections defining the size, shape and depth of the detention basin(s) and other BMP features. At a minimum, three sections, one at each end and one in the middle of the basin will be required.

14) Detention and BMP Operation and Maintenance Plan

A Detention and BMP Operation and Maintenance Plan shall be submitted for approval.

The Detention and BMP Operation and Maintenance Plan shall include:

i. The person(s) or organization(s) responsible for maintenance (subdivision trustees, property owner, etc,)
ii. Drawing and description of the Detention or BMP facility(s) including all components integral to the operation of the facility.
iii. Routine seasonal and annual inspection procedures (such as plantings, replacing mulch)
iv. Routine seasonal and annual maintenance procedures
v. Non-routine maintenance procedures (less frequent and generally more expensive such as pond dredging or major repairs to structures)
vi. Repair procedures
vii. Inspection and maintenance logs and record keeping procedures to track and record compliance with the Operation and Maintenance Plan. These records shall be available upon request of the City.

In addition to the Maryland Stormwater Design Manual, the following resources may be useful in developing the Operation and Maintenance Plan:

i. Georgia Stormwater Management Manual, Volume 2 Technical Handbook, Chapter 3 and Appendix E (latest revision) http://www.georgiastormwater.com
ii. Stormwater Manager's Resource Center webpage http://www.stormwatercenter.net/. Go to Program Resources => STP Maintenance
iii. Contra Costa Clean Water Program: Stormwater Quality Requirements for Development Applications, Stormwater C.3

Guidebook, 3rd Edition, October, 2006 http://www.ci.concord.ca.us/pw/stormwater/stormwaterC3guidebook3rd.pdf. Appendix F contains a step-by-step guide to preparing an Operation and Maintenance Plan

f. Enclosed system design calculations, including but not limited to:

1) Calculation of the 15-yr, 20-min design flow to every inlet

2) Calculation of the 15-yr, 20-min flow in every pipe reach

3) Hydraulic grade line calculations for the 15-yr, 20-min design storm in all pipes including head loss

4) Calculations for all pipe outfalls including outlet velocity

5) Overland flow path calculations including the 100-yr, 24-hr flow quantity and high-water elevation at critical sections

6) Enclosed system drainage area map

i. City of Wentzville Engineering Project Number in the lower right corner.
ii. Proposed contours (2' intervals for residential projects, 1' intervals for commercial projects)
iii. For each inlet label tributary area, PI factor and flow.
iv. For each pipe reach, label accumulative flow.
v. 100 year 24 hour overland flow path, showing width and depth of flow.
vi. North arrow.
vii. Graphic scale.

g. Engineered channel design calculations, including but not limited to:

1) Calculation of 15-yr, 20-min and 100-yr, 24-hr design storms to all open channels

2) Hydraulic calculations for engineered channels including depth, velocity and boundary shear for the 15-yr, 20-min design storm and the depth for the 100-yr, 24-hr design storm at critical locations. Include backwater calculations as applicable.

3) Engineered channel lining calculations including sizing of rock and permissible shear stress of lining materials as applicable

4) Energy dissipation calculations for all engineered channel outfalls including outlet velocity and rock sizing for the 100-yr, 24-hr flow in the receiving channel.

h. Culvert design calculations, including but not limited to:

1) Calculation of the 15-yr, 20-min design storm flow to roadside swale culverts, 100-yr, 24-hr storm flow to other culverts

2) Calculation of the 1-yr, 24-hr storm flow at the culvert location for culverts in natural channels

3) Calculation of the depth of the 1-yr, 24-hr flow in the natural channel and in the culvert low flow barrel.

4) Hydraulic calculations for culverts including inlet and outlet control, headwater and tailwater depth and outlet velocity for the 1-yr, 24-hour, 15-yr, 20-min and/or 100-yr, 24-hr design storms as applicable

5) Energy dissipation calculations for all culvert outfalls including outlet velocity and rock sizing for the design storm of 15-year, 20-minutes for driveway culverts or 100-year, 24-hours for all other culverts

i. Bridge design calculations, including but not limited to:

1) Calculation of the 1-yr, 24-hr and 100-yr, 24-hr design storm flows

2) Existing condition HEC-RAS input and output including:

i. Plan view with cross section locations
ii. Cross sections showing HGL and EGL for all storm events
iii. Profile view with HGL and EGL for all storm events
iv. Output table including flow, velocity, channel shear and HGL and EGL elevation for all storm events

3) Proposed condition HEC-RAS input and output including:

i. Plan view with cross section locations
ii. Cross sections showing HGL and EGL for all storm events
iii. Profile view with HGL and EGL for all storm events
iv. Output table including flow, velocity, channel shear and HGL and EGL elevation for all storm events

j. Natural channel crossing design calculations, including but not limited to:

1) Channel Condition Scoring Matrix (Form 6-1)

2) Bank-full and critical shear stress calculations, including:

i. Bank-full discharge for the 1-yr, 24-hr storm event
ii. Bank-full width and depth calculations
iii. Critical shear stress ratio calculations

3) Natural Channel Plan, Profile and Section Exhibits

4) Calculations for the existing and proposed HGL and EGL a sufficient distance upstream and downstream to show where existing and proposed converge for the 1-yr, 24-hour and 15-yr, 20-min design storms

5) Grade control rock sizing for the 100-yr, 24-hr storm flow

6.07 Performance Criteria for Urban BMP Design, from the Maryland Stormwater Design Manual, Chapter 3.0

Note: The text from this section has been adapted from the *Maryland Stormwater Design Manual, Volumes I & II (2000)* [1]. Adaptations have been made for local natural conditions and criteria. Additional adaptations may be necessary but shall be as approved by the City.

(1) Schueler, T. and Claytor, R. 2000. *2000 Maryland Stormwater Design Manual Volumes 1&2*. Prepared for the Maryland Department of the Environment Water Management Administration. Center for Watershed Protection. Ellicott City, MD.

Performance Criteria for Urban BMP Design

This section outlines performance criteria for five groups of structural water quality stormwater BMPs that include ponds, wetlands, infiltration practices, filtering systems and open channels.

Each set of BMP performance criteria, in turn, is based on six factors:

- General Feasibility
- Conveyance
- Pretreatment
- Treatment/Geometry
- Environmental/Landscaping
- Maintenance

IMPORTANT NOTE: The criteria represent a set of conditions that ensure an effective and durable BMP. In this section, *mandatory* performance criteria are distinguished from suggested design criteria (the former is required at all sites, while the latter are only recommended for most sites and conditions). Thus, in the text, mandatory performance criteria are indicated by *italics*, whereas suggested design criteria are shown in normal typeface.

From: JAMIE PAIGE

CITY OF WENTZVILLE

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WATER PROTECTION PROGRAM

To: RUTH WALLACE

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