City of Moore

Stormwater Management Program

Small Municipal Separate Storm Sewer System (MS4) ODEQ General Permit OKR04

City of Moore
301 N. Broadway
Moore, Oklahoma 73160-5130
(405)793-5000

January 2016

SIGNATURES OF RESPONSIBLE OFFICIALS

City of Moore, Oklahoma

The statements made in this Storm Water Management Program document, and the programs described herein, are hereby declared to be accurate and fulfill the intent of the City of Moore to comply with the requirements of the State of Oklahoma's Phase II Small Municipal Separate Storm Sewer System Discharges Within the State of Oklahoma Storm Water General Permit No. OKR04 for municipalities.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

_____

Mayor Date

_____

City Manager Date

_____

Public Works Director Date

_____

Community Development Director Date

ATTEST:

_____

City Clerk Date

City of Moore
Small Municipal Separate Storm Sewer System
Stormwater Management Program

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ATTACHMENTS

Definitions

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Construction Site Operator means the party or parties that meet one or more of the following descriptions:

(1) Has operational control over construction plans and specifications, including the ability to make modifications to those plans and specifications or;

(2) Has day-to-day operational control of those activities at a project that are necessary to ensure compliance with a Storm Water Pollution Prevention Plan for the site or other permit conditions (e.g., they are authorized to direct workers at a site to carry out activities required by the SWP3 or comply with other permit conditions).

Control Measure as used in this permit, refers to any Best Management Practice or other method used to prevent or reduce the discharge of pollutants to waters of the State.

CWA or The Act means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub.L. 92-500, as amended Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483 and Pub. L. 97-117, 33 U.S.C. 1251 *et.seq.*

Director means the Executive Director or chief administrator of the Department of Environmental Quality or an authorized representative.

Discharge, when used without a qualifier, refers to "discharge of a pollutant" as defined at 40 CFR §122.2.

Illicit Connection means any man-made conveyance connecting an illicit discharge directly to a municipal separate storm sewer.

Illicit Discharge is defined at 40 CFR §122.26(b)(2) and refers to any discharge to a municipal separate storm sewer that is not entirely composed of storm water, except discharges authorized under an OPDES or NPDES permit (other than the OPDES permit for discharges from the SMS4) and discharges resulting from fire fighting activities.

MEP is an acronym for "Maximum Extent Practicable," the technology-based discharge standard for Municipal Separate Storm Sewer Systems to reduce pollutants in storm water discharges that was established by CWA §402(p). A discussion of MEP as it applies to SMS4s is found at 40 CFR § 122.34.

Municipal Separate Storm Sewer System (MS4) is defined at 40 CFR § 122.26(b)(8) and means a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains): (i) Owned or operated by a state, city, town, borough, county, parish, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or an Indian tribe or an authorized Indian tribal organization, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the United States; (ii) Designed or used for collecting or conveying storm water; (iii) Which is not a combined sewer; and (iv) Which is not part of a Publicly Owned Treatment Works (POTW) as defined at 40 CFR §122.2.

NOI is an acronym for "Notice of Intent" to be covered by this permit and is the mechanism used to "register" for coverage under a general permit.

National Pollutant Discharge Elimination System (NPDES) is a National program for issuing, modifying, revoking and reissuing, terminating, imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of CWA.

Outfall is a point where a municipal separate storm sewer discharges to waters of the United States.

Redevelopment is any alterations of a property that change the footprint of a site or building in such a way that results in the disturbance of equal to or greater than 1 acre of land.

Small Municipal Separate Storm Sewer System is defined at 40 CFR §122.26(b)(16) and refers to all separate storm sewers that are owned or operated by the United States, a state, city, town, county, district, association, or other public body (created by or pursuant to State law) having jurisdiction over disposal of sewage, industrial wastes, storm water, or other wastes, including special districts under State law such as a sewer district, flood control district or drainage district, or similar entity, or a designated and approved management agency under section 208 of the CWA that discharges to waters of the State, but is not defined as "large"' or "medium" municipal separate storm sewer system. This term includes systems similar to separate storm sewer systems in municipalities, such as systems at military bases, large hospital or prison complexes, and highways and other thoroughfares. The term does not include separate storm sewers in very discrete areas, such as individual buildings.

Storm Water is defined at 40 CFR §122.26(b)(13) and means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm Water Management Program (SWMP) refers to a comprehensive program to manage the quality of storm water discharged from the municipal separate storm sewer system.

SWMP is an acronym for "Storm Water Management Program."

"You" and "Your" as used in this permit is intended to refer to the permittee, the operator, or the discharger as the context indicates and that party's responsibilities (e.g., the city, the country, the flood control district, the U.S. Air Force, etc.).

Waters of the United States – (a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide; (b) All interstate waters, including interstate "wetlands"; (c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands," sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters: (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes; (2)From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; (3) Which are used or could be used for industrial purposes by industries in interstate commerce; (d) All impoundments of waters otherwise defined as waters of the United States under this definition; (e) Tributaries of waters identified in paragraphs (a) through (d) of this definition; (f) The territorial sea; and (g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition. Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States. This exclusion applied only to man-made bodies of water which neither were originally created in waters of the United Sates (such as disposal area in wetlands) nor resulted from the impoundment of waters of the United States. Waters of the United States do not include prior converted cropland. Notwithstanding the determination of an area's status as prior converted croplands by any other federal agency, for the purpose of the Clean Water Act, The final authority regarding Clean Water act jurisdiction remains with EPA.

Acronyms

BMP – Best Management Practice

CGP – Construction General Permit

CWA - Clean Water Act

GPS – Global Positioning System

IDDE – Illicit Discharge Detection and Elimination

LID – Low Impact Development

LPST – Leaking Petroleum Storage Tanks

MCM – Minimum Control Measures

MEP – Maximum Extent Practicable

MS4 – Municipal Separate Storm Sewer System

NOC – Notice of Change

NOI – Notice of Intent

NPDES – National Pollutant Discharge Elimination System

POC – Pollutant of Concern

RP – Responsible Party

SWMP – Stormwater Management Program

SWPPP or SW3P or SWP3 – Stormwater Pollution Prevention Plan

ODEQ – Oklahoma Commission on Environmental Quality

TMDL – Total Maximum Daily Load

OPDES – Oklahoma Pollutant Discharge Elimination System

Introduction

The City of Moore (City) has updated this Stormwater Management Program (SWMP) in accordance with the requirements of the Oklahoma Department of Environmental Quality (ODEQ), Oklahoma Pollutant Discharge Elimination System (OPDES) General Permit No. OKR04 Phase II Small Municipal Separate Storm Sewer System (MS4) permit. The purpose of the SWMP is to describe the Minimum Control Measures (MCM) and Best Management Practices (BMP) for implementation of specific programs, controls and activities with the intent of reducing the potential discharge of pollutants from the MS4 that could reach Waters of the United States.

Regarding the quality of stormwater runoff associated with City activities, it is the intent of the City to maintain a comprehensive SWMP that establishes applicable pollution prevention criteria and guidelines, to comply with specific OPDES requirements, and to continue its proactive stance regarding water quality issues.

The City will be implementing its program on a fiscal year basis, and will submit its annual reports as specified in Part V.C of the Phase II Small MS4 General Permit OKR04.

Purpose of the SWMP

This SWMP includes specific pollution prevention measures, treatment or pollutant removal techniques, stormwater monitoring, use of legal authority and other appropriate means to control the quality of stormwater discharged from the City MS4 to the Maximum Extent Practicable (MEP). The SWMP incorporates measurable goals, whenever practicable, and includes controls necessary to prohibit the discharge of non-stormwater into the MS4. The SWMP covers the term of the permit and will be updated as necessary to ensure compliance.

The SWMP presents the City's effort in complying with its environmental policy as well as implementing a successful stormwater program. The SWMP includes the relevant OPDES permit language (depicted in italic) for each MCM. It describes and defines BMP for each of the MCM, measurable goals for each BMP, and an implementation schedule for all activities. Attachment A provides a Summary Table of individual BMP for each MCM. The City will evaluate the need for revision of the SWMP at least annually. Additional BMP may be included, and equivalent BMP substituted, based on these evaluations. The City understands that elimination of a BMP, without the inclusion of an equivalent BMP, requires the City to submit a notice of change (NOC) to ODEQ.

1.0 MCM 1 - Public Education and Outreach Program

1.1 Permit Requirements

You must revise and update your existing public education and outreach program. The revision of the program shall be completed within the first year after effective date of this Permit. You must continue to implement a public education and outreach program to distribute information and educational materials to the community or conduct equivalent outreach activities to promote behavior change by the public to reduce pollutants in stormwater runoff and eliminate illicit discharges. The public education or equivalent outreach activities shall be tailored, using a mix of locally appropriate strategies, to target specific audiences and communities. You must:

(1) Include education and outreach efforts for the following audiences:

- *(a) Traditional municipalities such as cities, counties, etc. must address the general public being served by the MS4;*
- *(b) Non-traditional municipalities such as universities, hospital complexes, prisons, special districts, etc. and federal facilities must address the community served by the MS4. For example, at a university it would be the faculty, other staff, students, and visitors, while at a military base, it would include military personnel (and dependents) contractors, employees, tenants, visitors, etc.; and*
- *(c) Departments of transportation must address the community working on or served by the transportation network within the MS4 including employees, contractors, and the general public.*

(2) Establish or revise (as necessary) measurable goals for each BMP, including target milestones (month and year), frequency of action(s) and identify responsible persons.

(3) Assess your education and outreach program annually as required by Part V.C of this Permit.

1.2 MCM 1 Program Implementation and Objectives

The City uses the appropriate number of public education BMP to inform individuals and groups about the steps they can take to reduce stormwater pollution and become involved in the stormwater program.

Individuals and/or groups are encouraged to volunteer and participate in City events. Efforts utilized to fulfill this control measure will be documented and records of these activities will be summarized in the annual reports.

The City has several programs, publications and forums for educating and involving City employees, businesses, contractors, and the general public on issues affecting stormwater

quality. Elements of the program focus on general public programs and education on environmental issues, such as proper handling and application of pesticides and fertilizers, proper handling of used oil and toxic materials and improvement and awareness of construction and maintenance activities.

1.2.1 Target Audience

Businesses, the general public, contractors, and City employees will be targeted to help reduce potential pollution. For residential chemical (pesticides and herbicides) use and disposal, the City will target education programs to individual homeowners and multi-family residents. For commercial chemical use and disposal, the City will target education programs to commercial retailers and those businesses that store and use chemicals, including construction sites.

1.2.2 Target Pollutant Sources

The City's Public Education program will primarily address household pollutants by educating individual homeowners on the proper use and disposal of:

- Pesticides
- Fertilizers
- Detergents
- Solvents
- Motor oil
- Antifreeze
- Other motor and engine fluids
- Household trash
- Yard waste

Through use of a City contracted recycling program, and household pollutant collection events, the discharge of pollutants will be diminished.

1.2.3 Outreach Strategy

The Tables below will be used to address this MCM for the permit term. Each BMP lists the activity description, schedule of implementation (frequency), target dates, and annual Measurable Goals for the BMP.

The City's public education program will target:

- Homeowners will be educated on the proper use and disposal of fertilizers and other household chemicals as well as proper septic system maintenance, where needed.
- Homeowners will be educated on how to properly dispose of pet waste.
- The City will promote citizen participation in area-wide stream and city cleanup events, use of recycling centers in the vicinity, and participation in pollutant collection events.
- Primary and/or Secondary education grades will learn about water quality and urban sources of pollution through the Blue Thumb's "Storm Sewer In a Suitcase" classroom program, or similar adopted programs, for school children.
- The City's education program will develop brochures and posters that target residential, commercial and construction activities that may negatively impact the stormwater quality of the MS4.

The City's Public Education program has a goal of providing stormwater education material to all homeowners in the City by the end of the permit cycle. This will be accomplished through the distribution of brochures, the display of posters at City Hall, and water bill inserts.

1.3 MCM 1: Public Education and Outreach Program BMP

1.3.1 Brochures

City brochures will be distributed to specific target audiences. The City will update its distribution list to include the number of brochures to be sent, the specific audiences, as well as the appropriate brochures for specific activities, such as retail gasoline outlets, car washes, restaurants, residents and schoolchildren. The City will distribute brochures to 50 percent of the target audience every 2 years and follow-up with inspection activities to determine the need to modify brochures in years 3 and 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify specific brochure target audiences	Year 1	5/2016	Number of target audiences
Develop a list of the number of brochures/ handouts to be created	Year 2	8/2016	Number of brochures/handouts to be created by audience
Create and/or update brochures/handouts	Year 2	11/2016	Number of brochures and handouts created
Distribute brochures and/or handouts	Year 2	2/2017	Meet 50% distribution of target audience
Follow-up inspections	Year 3	2/2018	Number of inspections performed and targets that retained message
Effectiveness of materials assessed and documented	Year 3	5/2018	Overall effectiveness based on follow-up inspections
Evaluate need for modification of brochures and/or handouts	Year 3	11/2018	Number of new brochures/handouts recommended
Re-distribute brochures/handouts	Year 4	2/2019	Meet 50% distribution of target audience
Follow-up inspections	Year 5	2/2020	Number of inspections performed and targets that retained message
Evaluate need for modification of brochures and/or handouts	Year 5	8/2020	Number of new brochures/handouts recommended

Responsible Party: Stormwater Manager or his/her designee

1.3.2 Water Bill Inserts

The City will include a stormwater educational message on 100% of City water bills once annually. The City will then determine the need to modify the message in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Create and distribute an educational stormwater message to be included on 100% of City water bills once during the year	Annually	July	Number of water bills distributed
Evaluate the need for modification of the educational message	Year 4	2-2019	Record the new message and an estimate of water bills to be distributed the following year.

Responsible Party: Stormwater Manager or his/her designee

1.3.3 City Stormwater Webpage

The City will continue to use and update its stormwater webpage created in the previous permit term. The City will review the webpage annually and make necessary changes. It will also use the webpage to advertise stormwater-related events, such as annual waste disposal and recycling, construction permits and current programs and updates.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater webpage	Annually	August	Record updates made to the webpage

Responsible Party: Stormwater Manager or his/her designee

1.3.4 School Programs

The City will continue to provide a "School Education Program" by creating awareness in the community about protecting water quality from nonpoint source pollution. The City will identify local schools for participation. The program will be evaluated annually; as well as establishing new goals and identify additional schools.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify benefits of a School Education Program	Year 1	5/2016	Identify beneficial programs
Establish program goals	Year 1	10/2016	Target student audience
Establish schools for distribution	Year 2	2/2017	Number of schools
Implement school program	Year 2-5	May	Dates program(s) presented
Evaluate program and establish new goals	Year 4	2/2019	Receive teacher evaluations
Add additional schools, as needed	Year 4	5/2019	Number of schools added
Assess benefits of program	Year 5	2/2020	Report benefit assessment

Responsible Party: Stormwater Manager or his/her designee

1.3.5 Phase II Program Meeting

The City will discuss its Small Phase II SWMP in one public City Council meeting per year. At the meeting, there will be an opportunity for the public to discuss and provide recommendations to the SWMP. The City will comply with state and local public notice requirements related to each meeting.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop program requirements and commitments and present at meetings	Annually	May	Number of Council and citizens in attendance
Stormwater program status presentation at City Council meeting	Annually	May	Number of Council and citizens in attendance

Responsible Party: Stormwater Manager or his/her designee

1.3.6 Recycling/Pollutant Collection

The City will continue to promote pollutant collection and recycling at its facility and semi-annual Citywide recycling events. This information will be made available in handouts and on the Recycle Moore website. The City will perform a cost effectiveness evaluation in year 5 to determine benefits of the program.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify best way to sponsor and/or promote recycling/pollutant collection	Year 1	4/2016	Method identified
Develop appropriate messages and distribute information	Year 1	5/2016	Group(s) participating
Quantify amount of messages/information hits	Year 1	8/2016	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 2	8/2017	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 3	8/2018	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 4	8/2019	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 5	8/2020	Messages distributed/hits on website
Determine benefits of program	Year 5	9/2020	Cost effectiveness evaluation

Responsible Party: Stormwater Manager or his/her designee

1.3.7 Household Hazardous Waste Collection

The City will continue to promote household hazardous waste collection and recycling. This information will be made available in handouts and on the City of Moore Household Hazardous Waste Collection website. The City will perform a cost effectiveness evaluation in year 5 to determine benefits of the program.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify best way to sponsor and/or promote household hazardous waste collection	Year 1	4/2016	Method identified
Develop appropriate messages and distribute information	Year 1	5/2016	Group(s) participating
Quantify amount of messages/information hits	Year 1	8/2016	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 2	8/2017	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 3	8/2018	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 4	8/2019	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 5	8/2020	Messages distributed/hits on website
Determine benefits of program	Year 5	9/2020	Cost effectiveness evaluation

Responsible Party: Stormwater Manager or his/her designee

1.3.8 Storm Drain Markers

The City will develop a new stencil program to present water quality messages on storm drain inlets. The messages will be specific to particular watersheds and may contain messages regarding TMDL's and/or impaired waters. The stencils will serve as an educational reminder to keep the drains clean.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Install message on storm drain, as necessary	Year 1	5/2016	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 2	5/2017	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 3	5/2018	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 4	5/2019	Total number of storm drains installed/re-installed
Review system and determine future updates/needs	Year 5	4/2020	Updates and assessment

Responsible Party: Stormwater Manager or his/her designee

2.0 MCM 2 – Public Participation and Involvement

2.1 Permit Requirements

Your public participation and involvement program must be reviewed and updated within the first year after the effective date of this Permit, then reviewed annually and revised, if necessary. This program must encourage public involvement and participation in the development and implementation of your SWMP. This must:

(1) Include a process by which public comments on the SWMP are received and reviewed by the person(s) responsible for the SWMP;

(2) Comply with State and local public notice requirements when implementing your public participation and involvement program.

(3) Establish or revise (as necessary) measurable goals for each BMP, including target milestones (month and year), frequency of action(s) and identify responsible persons; and

(4) Assess your public participation and involvement program annually as required by Part V.C of this Permit.

2.2 MCM 2 Program Implementation and Objectives

Some of the activities under the Public Education MCM also apply to the Public Participation and Involvement MCM. These include the use of recycling centers, participation in household pollutant collection events, and community cleanup events. Appendix A summarizes each Public Participation BMP, including implementation schedules, and Measurable Goals for each BMP.

The Public Participation MCM is different from the Public Education MCM in that the residents of the City of Moore will actively participate in a program component such as stream cleanups or recycling events. By participating, citizens not only learn about the urban stormwater quality issues but contribute towards improving water quality in the community.

The City will use several public participation BMPs to involve individuals and groups in activities and programs to reduce stormwater pollution and become involved in the stormwater program.

2.2.1 Public Involvement in Program Development

The City will take appropriate steps to inform and include the public in understanding and providing input for the development of the Phase II program. This may include the City:

- Presenting information about the Phase II program in City Council public meetings;
- Making formal presentations to the City Council in a regular open meeting, outlining the regulatory requirements as well as how the public will be affected by the Phase II program;
- Responding to questions from the public, and distributing information to the community upon request;
- Placing notices at City Hall and other available facilities, about the stormwater program that includes requests for citizen input.

2.2.2 Public Involvement in Program Implementation

Throughout the permit cycle, the City will use several methods to educate the public about the Phase II program and opportunities for participation, including:

- Development and distribution of Public Education brochures on how individuals and organizations can become more fully informed and participate in water quality improvement efforts under the Phase II program.
- Development and distribution of information about local and regional activities for citizens.
- City Council agenda discussions related to the stormwater MS4 program (e.g. budget approvals, events, approval of program activities) will be open to the community to receive public comment.
- Establishing procedures (hotline) for receiving public input of reports of illegal dumping and discharges. This hotline will be advertised locally to provide the public with appropriate reporting telephone numbers and procedures.

2.2.3 Target Audience

The public participation program will primarily target community residents, public school classes and organizations, non-profit organizations, and civic organizations. For school-age children, the participation program will focus on utilizing Blue Thumb resources. Local and regional waste collection events and community / stream cleanups will target individual residents in the City by encouraging their participation, and providing event information. All ethnic and socio-economic groups will be encouraged to participate. The Phase II MS4 program for the City of Moore will benefit all city residents and local enterprises.

2.2.4 Public Involvement Activities

The City will use the following types of activities for Public Participation:

- Distribution of brochures to encourage proper use and disposal of household chemicals;
- Distribution of information about local events;
- Promoting recycling, annual cleanup events, and pollutant collection in the city limits;
- Encouraging local schools to participate in Blue Thumb school education, or similar adopted programs;
- Educating the community regarding recycling stations in the vicinity.

The City's public participation program will rely upon its efforts to promote and educate the community about opportunities to play an active role in water quality improvement efforts.

2.2.5 Management Responsibility

The City of Moore Community Development Department has overall project management responsibility. City staff will coordinate all local activities and implementation of all program elements.

2.2.6 Evaluating Program Effectiveness

Measurable Goals will be established for each Public Participation BMP. These are summarized in Appendix A. BMP effectiveness will be demonstrated by keeping records of contacts from individuals and stakeholders. Each contact from the public (email, phone call, fax, letter or personal visit) will be recorded as to the nature of the request and any follow-up action taken by City staff to address problems or concerns. If pollution sources are abated as a result of the contact, then the abatement action will be logged as a BMP success for public education as well as reduction of pollution.

2.3 MCM2: Public Participation and Involvement Program BMP

2.3.1 Phase II Program Meeting

The City will discuss its Phase II SWMP in one public City Council meeting per year. At the meeting, there will be an opportunity for the public to discuss and provide recommendations to the SWMP. The City will comply with state and local public notice requirements related to each meeting.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop program requirements and commitments and present at meetings	Annually	May	Number Council and Citizens in attendance
Storm water program status presentation at City Council meeting	Annually	May	Number Council and Citizens in attendance

Responsible Party: Stormwater Manager or his/her designee

2.3.2 Public Information Hotline

The City's existing reporting hotline will continue to be used for citizen complaint and reporting. Advertisement of the hotline will also serve public involvement, and will be accomplished through the use of the City Stormwater Website at http://www.cityofmoore.com/stormwatersavvy. Funding for the hotline will be assessed in years 2 and 4. The City will evaluate the effectiveness of the program in year 3. Necessary changes to the program will be made in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Advertising of Hotline on Stormwater Website	Year 1	4/2016	Report date and nature of advertisement
Assessment of Hotline funding	Year 1	5/2016	Report amount of funding
Continue implementation of hotline	Year 1	8/2016	Report number of calls received and website hits
Continue implementation of hotline	Year 2	8/2017	Report number of calls received and website hits
Hotline effectiveness assessment	Year 3	5/2018	Report findings
Continue implementation of hotline	Year 3	8/2018	Report number of calls received and website hits
Assessment of Hotline funding	Year 4	10/2018	Report amount of funding
Continue implementation of hotline	Year 4	8/2019	Report number of calls received and website hits
Continue implementation of hotline	Year 5	8/2020	Report number of calls received and website hits
Changes to Hotline Program made (as necessary)	Year 5	As Needed	Report changes to program

Responsible Party: Stormwater Manager or his/her designee

2.3.3 Recycling/Pollutant Collection

The City will continue to sponsor and/or conduct semi-annual City wide clean-up events, as well as continue operations of its recycling center. After each event, the City will quantify the amount of refuse/material collected. The City will maintain the quantity of recyclable material collected annually. The City will perform a cost effectiveness evaluation in year 5 to determine benefits of the program.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Sponsor and/or promote City wide clean-up events	Year 1	4/2016	Method identified
Develop appropriate activities and solicit specific groups	Year 1	5/2016	Group(s) participating
Quantify amount of refuse/material collected	Year 1	8/2016	Quantity collected
Quantify amount of refuse/material collected	Year 2	8/2017	Quantity collected
Quantify amount of refuse/material collected	Year 3	8/2018	Quantity collected
Quantify amount of refuse/material collected	Year 4	8/2019	Quantity collected
Quantify amount of refuse/material collected	Year 5	8/2020	Quantity collected
Determine benefits of program	Year 5	9/2020	Cost effectiveness evaluation

Responsible Party: Stormwater Manager or his/her designee

2.3.4 School Programs

The City will continue to present a "School Education Program" in the community about protecting water quality from nonpoint source pollution. The City will continue to identify groups such as elementary and middle schools, as well as other groups such as the Boy and Girl scout programs. The program will be evaluated annually; as well as establishing new goals and identification of additional audiences.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Establish program goals	Year 1	5/2016	Target audiences
Establish curriculum to be delivered	Year 1	10/2016	Types and number of messages
Implement school program	Year 2	5/2017	Dates program(s) presented
Implement school program	Year 3	5/2018	Dates program(s) presented
Implement school program	Year 4	5/2019	Dates program(s) presented
Evaluate program and establish new goals	Year 4	8/2019	Receive teacher evaluations
Add additional schools, as needed	Year 4	10/2019	Number of schools added
Implement school program	Year 5	2/2020	Dates program(s) presented
Assess benefits of program	Year 5	5/2020	Report benefit assessment

Responsible Party: Stormwater Manager or his/her designee

3.0 MCM 3 – Illicit Discharge Detection and Elimination (IDDE)

3.1 Permit Requirements

You must review and revise your existing illicit discharge detection and elimination program, as necessary. The revision of this program shall be completed within the first year after the effective date of this Permit, then as needed. You must develop new elements, as necessary, and continue to implement and enforce the program to detect and eliminate illicit discharges into your small MS4, including a dry weather field screening program to identify non-stormwater flows. You must:

(1) Enforce ordinances or other regulatory mechanisms that you utilize to effectively prohibit illicit discharges into your small MS4. If your ordinance or regulatory mechanism is already developed, include a copy of the relevant sections with your illicit discharge detection and elimination program.

(2) Continue to implement a dry weather field screening plan to detect, investigate, and eliminate illicit discharges. Rely on visual indicators and simple field test kits for most work where you are looking for indications of a problem. Laboratory methods can be reserved for situations where you have identified a problem and need to enforce on a suspected illicit discharger. Your field screening program must address the following, at a minimum:

(a) Procedures for locating priority areas within your MS4 likely to have illicit discharges (e.g., areas with older sanitary sewer lines), or ambient sampling to locate impacted reaches;

(b) Procedures to address on-site sewage disposal systems that may flow into your storm drainage system;

(c) Procedures for tracing the source of an illicit discharge, including the specific techniques you will use to detect the location of the source;

(d) Procedures for removing the source of the illicit discharge; and

(e) Procedures for illicit discharge detection and elimination program evaluation and assessment.

(3) Develop (if necessary), maintain and regularly update a storm sewer system map, showing the location of all outfalls and the names and location of all waters of the State that receive discharges from those outfalls.

(4) To the extent allowable under State or local law, effectively prohibit, through ordinance or other regulatory mechanism, non-stormwater discharges into

your storm sewer system and implement appropriate enforcement procedures and actions. If you lack legal authority for direct enforcement action, you must include procedures to notify DEQ when a party fails to comply with the requirements. You may rely on DEQ for assistance in enforcement of this provision of the permit in these cases.

(5) Develop (if necessary) and implement a plan to detect and address non-stormwater discharges, including illegal dumping to your system.

(6) Inform public employees, businesses, and the general public of hazards associated with illegal discharges and improper disposal of waste. Promote, publicize and facilitate the reporting of illicit discharges.

(7) Maintain a list of occasional incidental non-stormwater discharges or flows as allowed in Part I - B2 that will not be addressed as illicit discharges. These non-stormwater discharges must not be reasonably expected (based on information available to you) to be significant sources of pollutants to the small MS4, because of either the nature of the discharges or conditions you have established for allowing these discharges to your small MS4 (e.g., a charity car wash with appropriate controls on frequency, proximity to sensitive waterbodies, BMPs on the wash water, etc.). You must document in your SWMP any local controls or conditions placed on the discharges. You must include a provision prohibiting any individual non-stormwater discharge that is determined to be contributing significant amounts of pollutants to your MS4.

(8) Establish or revise (as necessary) measurable goals for each BMP, including target milestones (month and year), frequency of action(s) and identify responsible persons.

(9) Evaluate the appropriateness of your identified BMPs for this minimum control measure. Your evaluation shall verify compliance with permit requirements and more importantly, document that efforts have been made towards achieving your identified measurable goals and reducing the impacts of stormwater runoff from the small MS4. Document the evaluation of your illicit discharge detection and elimination program annually as required by Part V.C of this Permit.

3.2 MCM 3 Program Implementation and Objectives

The City will implement a comprehensive program to detect and eliminate illicit discharges following the requirements in the OPDES General Permit OKR04. The program will rely upon accepted methods of pollutant detection; specifically the EPA Cooperative Agreement No. X-82907801-0 Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments.

There are two categories of pollutants that will be addressed in different ways.

The first category is pollutants introduced into the MS4 from individuals in a one-time distinct episode at a discrete point of entry. Examples of these are dumping of yard waste, motor oil, antifreeze or trash onto the ground. These types of pollutants, when discovered in the MS4, cannot be effectively investigated as to the source (i.e. the individual causing the pollution). Also, they are not normally discovered using a City-wide MS4 inspection program. One of the best means of discovery will be through input from residents, City crews, police and fire workers, business, and area agency field crews. Prevention of future isolated pollution episodes will rely upon implementation of the Public Education and Public Participation programs presented above.

The second category is pollutants from sources that have a chronic or frequently repeating discharge that can be traced using visual inspections, and possibly, chemical field test kits. Pollutants from these sources are typically dispersed downstream as a detectable odor, visual color, increased turbidity, excessive algae growth, or changes in water chemistry (e.g. pH or conductivity) when compared to uncontaminated water in the MS4. These chronic pollutants are amenable to "source tracking" inspections, and the sources are more likely to be found and mitigated.

The City will implement an effective illicit discharge detection and elimination program through utilization of the following procedures:

- Ensure that maps and field procedures are effective by performing reconnaissance surveys to verify accuracy and effectiveness;
- Evaluate existing and near-future land uses in the City, and delineate priority areas that have the greatest potential to discharge pollutants;
- Collect illicit discharge and pollution information, as applicable, from citizens, police and fire units, City public works crews, other municipalities, non-profit organizations, volunteer stream monitors, students and educational institutions, construction contractors and workers, local building officials and floodplain administrator, and State and Federal agencies as applicable;
- Investigate, as necessary, and take follow-up action, as appropriate, for different types of pollutants and discharges;
- If source tracking is necessary for chronic or frequently occurring sources, conduct field monitoring to locate the pollutant source, relying upon visual inspections, and simple field test kits (e.g. chlorine residual, pH, dissolved oxygen, temperature, conductivity, etc.) whenever possible, or using contract professionals when necessary;
- Ensure that field and facility data are compiled in a manner that facilitates the inspection process (e.g. information about possible pollutants and/or sources are provided to inspectors in a timely fashion);
- For sources of known origin and having a designated responsible party, take appropriate remediation/enforcement action to mitigate the pollutant source;
- Develop Quality Assurance training for inspectors and managers;
- Assign authority to a key City staff person to evaluate program effectiveness and ensure data quality;
- Implement procedures for enforcement, including how to approach owners of potential sources during on-sight inspections, how to present field data to owners confirming the source, and what procedures the owner must take to remove the discharge; and

- Periodically evaluate, using the City's management and field staff, the inspection and enforcement program, and make modifications as necessary to improve program effectiveness.

3.2.1 Allowable Non-Stormwater Discharges

The following non-stormwater sources are allowed, and which the City has determined to not be substantial contributors of pollutants to the MS4:

- Water line flushing
- Landscape irrigation
- Diverted stream flows
- Rising ground waters
- Residential building wash water without detergents
- Uncontaminated pumped ground water
- Uncontaminated ground water infiltration
- Discharges from potable water sources
- Foundation drains
- Air conditioning condensate
- Springs
- Water from crawl space pumps
- Footing drains
- Lawn watering
- Individual residential car washing
- De-chlorinated swimming pool discharges
- Street wash water
- Fire hydrant flushing
- Non-commercial or charity car washes
- Discharges from riparian areas and wetlands
- Discharges in compliance with a separate OPDES or National Pollutant Discharge Elimination System (NPDES) NPDES permit
- Discharges or flows from firefighting activities (firefighting activities do not include washing of trucks, run-off water from training activities, test water from fire suppression systems, and similar activities)
- Other allowable non-stormwater discharges listed in 40 CFR ' 122.26(d)(2)(iv)(B)(1). Discharges in compliance with a separate Oklahoma Pollutant Discharge Elimination

System (OPDES) or National Pollutant Discharge Elimination System (NPDES) NPDES permit

The list of all allowable non-stormwater discharges will be maintained by City administrative staff. Any local controls required by the City on these incidental discharges will be placed in the SWMP by written amendment.

3.2.2 MS4 Map Development and Update

To the greatest extent possible, map data will rely upon available GIS, with common attributes to facilitate data development within the City and preparing Annual Reports. Mapping will involve:

- Receiving updates of existing records to determine the extent of available map data;
- Updating common map attributes;
- Collecting field data using City crews/contractors to verify locations and descriptions of MS4 attributes;
- Periodic review of MS4 system map data by staff for possible updates;
- Updating the GIS map database, as necessary;
- Global Positioning System (GPS) will be used, when needed, to provide coordinate data for the MS4 system, facility locations and sampling sites when required;
- Digital and paper aerial photography, and USGS 7.5 Minute Quadrangle maps will be used to assist with development of the GIS map layers; and
- The City will maintain available GIS data and digital and paper aerial photos of the City's MS4.

The City will keep records of map deficiencies and errors, and technical staff will periodically update map data as necessary.

3.2.3 Education and Training for City Field Staff

The City trains pubic employees who are directly responsible for MS4 operations as well as staff who may come into contact with, or otherwise observe, an illicit discharge or illicit connection to the MS4. Personnel who perform MS4 operations are provided with training that contains information on preventing and reducing potential stormwater pollution from the City MS4.

3.2.3.1 Inform Employees and the Public

The City may use the following types of activities when informing the public and City employees about the hazards associated with illegal discharges and improper disposal of waste:

- Place posters at City Hall to encourage proper use and disposal of household chemicals, maintenance of on-site sewage disposal systems, and recycling;
- Discuss the Phase II program in a City council meeting open to the public;
- Support regional household pollutant collection events; and
- Support local and regional recycling of wastes.

3.2.4 Public Reporting of Illicit Discharges, Illicit Dumping and Spills

Specific emphasis on educating the public and training City personnel are important and integral aspects of the SWMP. Many pollution problems can be avoided by having an informed populous willing to participate in improving stormwater quality. The City is committed to establishing a Program to promote, publicize and facilitate public reporting of the presence of illicit discharges or water quality impacts associated with discharges from the MS4.

3.2.5 Procedure for Spill Prevention and Response to Illicit Discharges and Spills

The City will continue to implement and improve, as necessary, programs that prevent, contain, and respond to spills that may discharge into the MS4. Where discharge of material resulting from a spill is necessary to prevent loss of life, personal injury or severe property damage, the City will ensure the parties responsible for the spill take all reasonable steps to minimize or prevent any adverse effects to human health or the environment. The program will rely upon accepted methods of pollutant detection; specifically the EPA Cooperative Agreement No. X-82907801-0 Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments.

3.2.5.1 Ordinance

The City will update, as necessary, its ordinance prohibiting illicit discharges to the MS4 and periodically evaluate the need for modifications. This will involve:

- During the first twelve months of the permit, compare model stormwater pollution ordinances to existing City ordinances and make modifications to local codes, if needed;
- During the first year of the permit, evaluate staffing needs and during the second year acquire additional resources, if needed, to ensure that the City will be able to comply with all provisions and perform all required responsibilities in the ordinance;
- Delegate management authority to key City staff to manage all inspection and enforcement activities; and
- Periodically evaluate program effectiveness and make changes, as appropriate, to the ordinance and/or City resources and manpower.

3.2.6 Source Investigation and Elimination

The City requires the elimination of illicit discharges and improper disposal practices as expeditiously as possible. If the responsible party (RP) is identified, the City will notify the RP that a proposed plan of action must be submitted to the City within a reasonable amount of time depending on the situation (usually two weeks). In the interim, the City will require the operator of the illicit discharge to take all reasonable and prudent measures to minimize the discharge of pollutants to the MS4.

Where elimination of an illicit discharge within 30 days is not possible, the City will request an expeditious schedule for removal of the discharge. If the City does not agree with the corrective measure(s) and/or the time schedule, the City will initiate enforcement procedures, and/or may refer the case to the ODEQ for further action and/or enforcement.

3.2.6.1 Notification of Observed Illicit Discharges

Upon detection of a potential illicit connection, dumping, other illegal activity or accidental spills, the City will investigate on-site and then report the problem as appropriate. In the event that a possible illicit discharge is identified, the City will trace the flow upstream to the point of origin. The City will report flows origination to the appropriate RP or the adjacent MS4 operator within 72 hours of discharge confirmation for further action. In the event the flow appears to create a hazard or contain toxic or noxious substances, the City will report the flow to the ODEQ within 24 hours orally or by fax, and by written report within five (5) working days.

3.2.7 Inspections

When episodic incidental pollution is reported to the City (e.g. motor oil dumped into a storm drain), the City's stormwater staff will perform inspections and record the date, location, information source, and description of the event. If necessary, a public works crewman will be sent to investigate and determine if the site should be cleaned (e.g. removal of yard waste, containment of oil, etc.). After inspection and/or cleanup, the City will keep a record of all actions taken regarding the pollution incident. The incident data will be included in the City's Annual Report and used to evaluate program effectiveness.

When chronic pollution is reported, the same incident information will be recorded, and a public works crewman will be sent to investigate. If the source is not immediately obvious, the City will initiate the visual inspection investigation of the site and attempt to track the source upstream from the pollutant incident. If the source is located, the City will contact the owner/RP to request that the source be mitigated within a reasonable time.

The City will perform a follow-up inspection to confirm that the source of pollution has been mitigated. If mitigation has not occurred, then the City will take increasingly more strict action leading up to enforcement action by the City, and possibly to include ODEQ and EPA enforcement as well. Throughout the administrative and investigative process, the City will document all major actions in writing to permanent City files. Data from all such incidents will be included in the City's Annual Report and used to evaluate program effectiveness.

The source tracking inspections for chronic sources will consist of a visual inspection program performed by City crews, and may include one or more field test kits for parameters that monitor the most likely type of stormwater pollution that is indicated (e.g. chlorine residual, pH, dissolved oxygen, conductivity, etc.). The visual inspection will describe and/or quantify the extent of pollution (e.g. floatables, excess algae growth, dead or stressed stream vegetation and organisms, color of water, odors, sediments, etc.). If source tracking requires more technically sophisticated methods, then the City may use contract professionals to conduct appropriate sampling and information gathering to locate sources.

Standard paper field forms and/or electronic field data recording devices will be used to make data collection systematic. Data may be entered and/or downloaded into computer databases for analysis, sharing and reporting. As needed, field data will be linked to the City's available GIS of the MS4.

3.3 MCM 3: Illicit Discharge Detection and Elimination Program BMP

3.3.1 Storm Sewer Map Update

The City will update the existing storm sewer map, showing the location of all outfalls and the names and locations of all waters of the U.S. that receive discharges from those outfalls within the MS4. The map may be developed with GIS. Outfalls may be located with GPS field survey equipment. The final map will become a printed atlas for IDDE and spill response use.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Update 20% of the MS4 map	Year 1	10/2016	Total number of outfalls
Update 20% of the MS4 map	Year 2	10/2017	Total number of outfalls
Update 20% of the MS4 map	Year 3	10/2018	Total number of outfalls
Update 40% of the MS4 map	Year 4	10/2019	Total number of outfalls
Review map and determine future updates/needs	Year 5	2/2020	Map updates and assessment

Responsible Party: Stormwater Manager or his/her designee

3.3.2 Education and Training for City Field Staff

Specific emphases on educating and training City personnel are important and integral aspects of the SWMP. Many pollution problems can be avoided by having an informed populous willing to participate in improving stormwater quality. The City is committed to establishing training classes to facilitate the proper management and disposal of used oil and potentially hazardous materials.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
City to develop training classes for IDDE	Year 1	10/2016	Record the name of each training class developed
City staff to attend training classes developed for IDDE	Annually	May	Record the number of participants attending each training class
City to review and update training classes for IDDE	Year 5	2/2020	Record the updates and/or new training classes developed

Responsible Party: Stormwater Manager or his/her designee

3.3.3 Illicit Discharge/Illegal Dumping Hotline

The City's existing reporting hotline will continue to be used for citizen complaint and reporting. Advertisement of the hotline will also serve public involvement, and will be accomplished through the use of the City Stormwater Website at http://www.cityofmoore.com/stormwatersavvy. Funding for the hotline will be assessed in years 2 and 4. The City will evaluate the effectiveness of the program in year 3. Necessary changes to the program will be made in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Advertising of Hotline on Stormwater Website	Year 1	4/2016	Report date and nature of advertisement
Assessment of Hotline funding	Year 1	5/2016	Report amount of funding
Continue implementation of hotline	Year 1	8/2016	Report number of calls received and website hits
Continue implementation of hotline	Year 2	8/2017	Report number of calls received and website hits
Hotline effectiveness assessment	Year 3	5/2018	Report findings
Continue implementation of hotline	Year 3	8/2018	Report number of calls received and website hits
Assessment of Hotline funding	Year 4	10/2018	Report amount of funding
Continue implementation of hotline	Year 4	8/2019	Report number of calls received and website hits
Continue implementation of hotline	Year 5	8/2020	Report number of calls received and website hits
Changes to Hotline Program made (as necessary)	Year 5	As Needed	Report changes to program

Responsible Party: Stormwater Manager or his/her designee

3.3.4 Procedures for Responding to Illicit Discharges and Spills

To address procedures for responding to illicit discharges and spills, the City will utilize the EPA Cooperative Agreement No. X-82907801-0 Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments. In addition to the Guidance Manual the City will develop field forms and provide training on field inspection and inspection for utilization.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review EPA Manual and develop field forms as necessary	Year 1	8/2016	Report the number of forms developed for field use
Develop training class for field inspections	Year 1	10/2016	Report number and content of training classes developed
Conduct Training Classes	Year 1	11/2016	Report number of inspectors and staff in attendance
Conduct Training Classes	Year 2	11/2017	Report number of inspectors in attendance
Conduct Training Classes	Year 3	11/2018	Report number of inspectors in attendance
Conduct Training Classes	Year 4	11/2019	Report number of inspectors in attendance
Re-Evaluate Training Classes	Year 5	8/2020	Report number of training classes needing update

Responsible Party: Stormwater Manager or his/her designee

3.3.5 Ordinance

The City will review and update, as necessary, the existing stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit. The City will present the ordinance for public comment and then move to adopt and implement the ordinance. The City will review the ordinance in years 3-5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit	Year 2	8/2017	Date ordinance reviewed and finding of acceptability
Present ordinance for public comment, if required	Year 3	2/2018	Date of public review and any comments received
Adopt ordinance, if necessary	Year 3	10/2018	Date adopted, if necessary
Implement new ordinance	Year 4	11/2019	Date implemented
Review ordinance and revise as necessary	Year 5	8/2020	Date reviewed

Responsible Party: Stormwater Manager or his/her designee

3.3.6 MS4 IDDE Source Investigation and Elimination

The City will respond to, identify, and screen for the presence of illicit discharges. During the screening activity, if the RP is identified, the City will notify the RP that a proposed plan of action must be submitted to the City within a reasonable amount of time depending on the situation (usually two weeks). In the interim, the City will require the operator of the illicit discharge to take all reasonable and prudent measures to minimize the discharge of pollutants to the MS4. All outfalls in the MS4 will be screened at least once per permit term.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
MS4 Screening	Year 1	5/2016	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 2	5/2017	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 3	5/2018	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 4	5/2019	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 5	5/2020	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.

Responsible Party: Stormwater Manager or his/her designee

3.3.7 Complaint Inspections

The City will conduct inspections, as determined appropriate, in response to complaints, and shall conduct follow-up inspections as needed to ensure that corrective measures have been implemented by the RP. If a RP is identified: the City will notify the RP that a proposed plan of action must be submitted to the department within a reasonable amount of time depending on the situation (usually 2 weeks); the City will require the operator of the illicit discharge to take all reasonable and prudent measures to minimize the discharge of pollutants to the MS4; where elimination of an illicit discharge within 30 days is not possible, the City will request an expeditious schedule for removal of the discharge; and if the City does not agree with the corrective measure(s) and/or the time schedule, the City will begin enforcement procedures, and/or refer the case to the ODEQ for further action and/or enforcement.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
MS4 Inspections	Year 1	As Requested	Report the number of illicit discharges /connections inspected and the number of enforcement actions
MS4 Inspections	Year 2	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions
MS4 Inspections	Year 3	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions
MS4 Inspections	Year 4	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions
MS4 Inspections	Year 5	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions

Responsible Party: Stormwater Manager or his/her designee

3.3.8 Data Management

The City will update existing databases, and perform assessments to identify the best way to manage Phase II permit information. The City may continue to utilize existing off-the-shelf GIS software for data development and retention, or its own developed spreadsheets. The City will also utilize the database to develop reports for submission to ODEQ.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify database needs	Year 1	5/2016	Record needs and establish goals
Evaluate database standards	Year 1	10/2016	Provide database update needs
Obtain database funding	Year 2	8/2017	Date funding obtained
Implement database operations	Year 2-5	Ongoing	Date implemented
Review database benefits	Year 4	10/2019	Date reviewed
Establish new goals and funding needs	Year 5	8/2020	Provide dates of funding and new goals

Responsible Party: Stormwater Manager or his/her designee

4.0 MCM 4 - Construction Site Stormwater Runoff Control

4.1 Permit Requirements

You must review and revise your existing construction site stormwater runoff control program, as necessary. The revision shall be completed within the first year after the effective date of this Permit, then as needed. You must develop new elements, as necessary, and continue to implement and enforce the program to reduce pollutants in any stormwater runoff to your 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 must be included in your program if that construction activity is part of a larger common plan of development or sale that would disturb one acre or more. You must:

(1) Develop (if necessary), implement and enforce an ordinance or other regulatory mechanism to require erosion and sediment controls, as well as sanctions to ensure compliance, to the extent allowable under State or local law. Review and revise your existing ordinance to meet the permit requirements. If you lack legal authority for direct enforcement action, you must include procedures to notify DEQ if a construction site operator fails to comply with your construction site stormwater runoff control program. You may rely on DEQ for assistance in enforcement of this provision of the permit in these cases;

(2) Develop (if necessary), implement and enforce requirements for construction site operators to implement appropriate BMPs for erosion and sediment control;

(3) Develop (if necessary), implement and enforce requirements for construction site operators to select and implement appropriate erosion and sediment control measures to reduce or eliminate the impacts to receiving waters, and control waste at the construction site that may cause adverse impacts to water quality such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste;

(4) Develop (if necessary), implement and enforce procedures for site plan review which incorporate consideration of potential water quality impacts including erosion and sediment controls, controls of other wastes, and any other impacts that must be examined according to the requirements of the local ordinance or other regulatory mechanism;

(5) Develop (if necessary), implement and enforce procedures for receipt and consideration of information submitted by the public;

(6) Develop (if necessary), implement and enforce procedures for site inspection and enforcement of control measures including enforcement escalation procedures for recalcitrant or repeat offenders. Document inspection findings and take all necessary follow-up actions (i.e., re-inspection, enforcement) to ensure site compliance;

(7) Establish or revise (as necessary) measurable goals for each BMP, including target milestones (month and year), frequency of action(s) and identify responsible persons; and

(8) Evaluate the appropriateness of your identified BMPs for this MCM. Your evaluation shall verify compliance with permit requirements and more importantly, documents that efforts have been made towards achieving your identified measurable goals and reducing the impacts of stormwater runoff from the small MS4 (as required by Part V.C of this Permit).

4.2 MCM 4 Program Implementation and Objectives

The City will continue to implement a comprehensive inspection and enforcement program to address the pollution of stormwater runoff from active construction sites of one acre or more. The City will review, and update as necessary, an ordinance prohibiting the discharge of pollutants and sediment from construction sites one acre or more, and require the deployment of adequate erosion control measures. The City's building inspector will perform periodic inspections of compliance with local codes while on site during other construction inspections.

The City will also rely upon the existing statewide OPDES general permit for construction activities (OKR10), presently administered by the ODEQ, to fulfill requirements of this MCM. The City will perform, as needed, periodic inspections of construction sites for compliance with OKR10 requirements. The City will perform inspections on construction sites one acre or more, and record any apparent non-compliance related activities. The City will enact enforcement remedies as necessary to mitigate non-compliant activities.

Measurable goals will be established for each Construction Site Runoff Control BMP. BMP effectiveness will be demonstrated by compiling and evaluating data from inspections performed. If pollution sources are mitigated as a result of the inspection and enforcement program, then the mitigation action will be recorded as a BMP success. Data from the stormwater inspections will be used to verify successful implementation of on-site construction BMP.

The City will continue to develop a program to control construction site runoff by taking the following measures:

- Review and/or update as necessary an ordinance to require erosion and sediment controls, as well as sanctions to ensure compliance;
- Require construction site operators to implement appropriate erosion and sediment control BMP;
- Require construction site operators to control waste such as discarded building materials, sanitary waste and chemicals;
- Review and continue to implement, as necessary, a program to receive and consider information submitted from the public;

- Continue to implement procedures, such as site plan review, that incorporates consideration of potential water quality impacts; and
- Continue to implement a construction site inspection and enforcement program.

4.2.1 Ordinance

The City will update, as necessary, an effective ordinance prohibiting construction related discharges to the MS4 and periodically evaluate the need for modifications. This will involve:

- During the first 12 months of the permit, compare model construction ordinances to existing City ordinances and evaluate necessary modifications to City codes, if needed;
- The ordinance will include at least the following prohibited discharges:
    - Wastewater from washout of concrete and wastewater from water well drilling operations, unless managed by an appropriate control;
    - Wastewater from washout and cleanout of stucco, paint, from release oils, and other construction materials;
    - Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
    - Soaps or solvents used in vehicle and equipment washing; and
    - Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, unless managed by appropriate BMP.
- During the second year of the permit, evaluate staffing needs and acquire additional resources, if needed, to ensure that the City will be able to inspect and enforce all provisions in the ordinance;
- Delegate management authority to key City staff to manage inspection and enforcement activities; and
- Periodically evaluate program effectiveness and make changes, as appropriate, to the ordinance and/or City resources and manpower.

4.2.2 Plan to Ensure Compliance

The City will continue to implement a comprehensive program to address construction related activities to ensure compliance with erosion and sediment control measures at construction sites. These will include:

- Construction sites will be required through City ordinance to establish erosion and sediment controls;
- The ordinance will have enforcement provisions to ensure that the necessary controls are implemented. This may include non-monetary penalties, fines, bonding requirements, and permit denial;
- The City will establish guidelines and requirements for erosion and sediment control BMP and methods to control waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste; and
- Enforcement measures will be used as appropriate to take corrective actions. Escalated enforcement may be used when egregious conditions exist.

4.2.3 Procedures for Site Plan Review

The administrative review process will include consideration of water quality issues for these activities. The City will continue to:

- Implement administrative procedures for site plan review to ensure consistency with City erosion and sediment control requirements; and
- Ensure that construction activities are in compliance with local floodplain ordinances.

4.2.4 Procedures for Public Input

The City will continue to use an administrative process for receiving input from the public. This includes:

- Educating administrative staff on how to document public input from email, letters, faxes, phone calls and personal contacts;
- Documenting response actions tied to each request for assistance; and
- Evaluating success and taking follow-up action on unresolved problems.

4.2.5 Construction Site Inspections

The City will continue to implement a program for inspection of construction activities one acre or more. Stormwater control inspections will be performed by the City staff or their designees and integrated into their normal construction inspection activities.

- A stormwater inspection form will be used to document inspection results of site visits;
- Stormwater inspections will be conducted during the routine construction inspections by the City designated inspector, or other designee;
- The stormwater inspection form documents the adequacy of the erosion and sediment control measures being used and note any deficiencies and remedial actions necessary;
- Inspection data from the forms will be retained in paper form or entered into a computer database;
- Best professional judgment of the designated inspector and/or City Engineer will be used to determine stormwater inspection frequency, taking into account local site-specific conditions and activities;
- Enforcement will rely upon initially encouraging mitigation by the owner/operator, followed by a written warning to mitigate within a reasonable time, followed by issuance of a fine under authority of the local ordinance; and
- Any immediate and significant threat to health and safety will be enforced immediately.

4.2.6 Target Audience

The target audience for MCM 3 will focus on construction site operators and City administration, developers, and builders.

4.3 MCM 4: Construction Site Stormwater Runoff Control Program BMP

4.3.1 Construction Site Inspections

The City will continue to utilize its Construction Site Inspections program, which receives notification of new construction sites that have an area of at least one acre or more soil disturbance. The program will include site inspections for the proper use of BMP for erosion, sediment and waste control. Fifty percent of all construction sites of one acre or more will be inspected. The program will also include review of the Stormwater Pollution Prevention Plan (SWPPP) and procedures for receiving and considering public comment. The city will train 100 percent of construction inspectors by year 2.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop construction notification program to include requirements for construction site operators to implement appropriate BMP for erosion and sediment controls and control waste	Year 1	5/2016	Report date program adopted
Utilize procedures for SWPPP receipt for proposed construction sites one acre or more	Year 1	6/2016	Report date procedures adopted
Maintain and use inspection procedures for the BMP	Year 1	8/2016	Report date procedures adopted
Develop Construction Inspector training program	Year 1	10/2016	Report date program adopted
Train Construction Site Inspectors	Year 2	2/2017	Report number of Training sessions conducted and inspectors trained
Inspect 50% of construction sites one acre or more	Year 2-5	May	Number of inspections and finding
Inspect 100% of complaint driven sites one acre or more	Year 2-5	As Required	Number of inspections and finding
Evaluate the need for training program revisions	Year 5	2/2020	Number of training programs revised

Responsible Party: Stormwater Manager or his/her designee

4.3.2 Ordinance

The City will adopt an effective ordinance prohibiting construction related discharges to the MS4 and periodically evaluate the need for modifications. During the first twelve months of the permit, the City will compare model construction ordinances to existing City ordinances and evaluate necessary modifications to local codes, if needed. The City will evaluate staffing needs and acquire additional resources, if needed, to ensure the City will be able to inspect and enforce all provisions in the ordinance during year 2. The City will delegate management authority to a key City staff person to manage all inspection and enforcement activities. The City will periodically evaluate program effectiveness and make changes, as appropriate to the ordinance and/or City resources and manpower.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit	Year 2	8/2017	Date ordinance reviewed and finding of acceptability
Present ordinance for public comment if required	Year 3	2/2018	Date of public review and any comments received
Revise ordinance, if necessary	Year 3	10/2018	Date revised, if necessary
Implement ordinance	Year 4	11/2019	Date implemented
Review ordinance and revise as necessary	Year 5	8/2020	Date reviewed

Responsible Party: Stormwater Manager or his/her designee

4.3.3 Public Information Receipt

The City's existing reporting hotline will continue to be used for citizen complaint and reporting. Advertisement of the hotline will also serve public involvement, and will be accomplished through the use of the City Stormwater Website at http://www.cityofmoore.com/stormwatersavvy. Funding for the hotline will be assessed in years 2 and 4. The City will evaluate the effectiveness of the program in year 3. Necessary changes to the program will be made in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Advertising of Hotline on Stormwater Website	Year 1	4/2016	Report date and nature of advertisement
Assessment of Hotline funding	Year 1	5/2016	Report amount of funding
Continue implementation of hotline	Year 1	8/2016	Report number of calls received and website hits
Continue implementation of hotline	Year 2	8/2017	Report number of calls received and website hits
Hotline effectiveness assessment	Year 3	5/2018	Report findings
Continue implementation of hotline	Year 3	8/2018	Report number of calls received and website hits
Assessment of Hotline funding	Year 4	10/2018	Report amount of funding
Continue implementation of hotline	Year 4	8/2019	Report number of calls received and website hits
Continue implementation of hotline	Year 5	8/2020	Report number of calls received and website hits
Changes to Hotline Program made (as necessary)	Year 5	As Needed	Report changes to program

Responsible Party: Stormwater Manager or his/her designee

4.3.4 Site Plan Review

The City will continue to use its building site review checklist for site plan review of construction sites one acre or more. The City will continue to implement plan review, and review all site plans annually. The City will evaluate the effectiveness of the program and modify as necessary.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop administrative procedures for site plan review	Year 1	5/2016	Report date procedures adopted
Implement plan review	Year 1-3	Ongoing	Report number reviews
Evaluate effectiveness of program	Year 3	8/2018	Report findings
Modify program as necessary	Year 3	10/2018	Report updates
Implement plan review	Year 3-5	Ongoing	Report number of reviews
Evaluate effectiveness of program	Year 5	8/2020	Report findings
Modify program as necessary	Year 5	10/2020	Report updates

Responsible Party: Stormwater Manager or his/her designee

5.0 MCM 5 - Post-Construction Management in New Development and Redevelopment

5.1 Permit Requirements

You must review and revise your existing new development and redevelopment post-construction management program, as necessary. The revision shall be completed within the first year after the effective date of this Permit, then as needed. You must develop new elements, as necessary, and continue to implement and enforce a program to address stormwater runoff from new development and redevelopment projects that disturb greater than or equal to one acre, including projects less than one (1) acre that are part of a larger common plan of development or sale, that discharge into your small MS4. Your program must attempt to maintain pre-development runoff conditions and ensure that controls are in place that would prevent or minimize water quality impacts. You must:

(1) Develop (if necessary), implement and enforce strategies which include a combination of structural and/or non-structural BMPs appropriate for your community;

(2) Develop (if necessary), implement and enforce 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;

(3) Review local ordinances and regulations, and identify any legal/regulatory barriers to Low Impact Development (LID). Develop a schedule to remove those barriers that prohibit LID practices selected by the MS4, or provide a justification for each barrier not removed;

(4) Develop (if necessary), implement and enforce procedures to ensure adequate long-term operation and maintenance of BMPs that are installed during and left in place after the completion of a construction project, including inspections of each BMP;

(5) Participate in an education program for developers and the public about project designs that minimize water quality impacts, including LID strategies. This would coordinate with your public education MCM and your pollution prevention and good housekeeping MCM programs;

(6) Establish or revise (as necessary) measurable goals for each BMP, including target milestones (month and year), frequency of action(s) and identify responsible persons; and

(7) Evaluate the appropriateness of your identified BMPs for this MCM. Your evaluation shall verify compliance with permit requirements and, more importantly, document that efforts have been made towards achieving your identified measurable goals and reducing the impacts of stormwater runoff from the small MS4 (as required by Part V.C of this Permit).

5.2 MCM 5 Program Implementation and Objectives

This MCM will require, through City ordinance, all operators of construction activities, that disturb one acre or more, to develop and implement structural and/or non-structural BMPs based on the local site conditions that minimize water quality impacts, as well as the development of procedures to inspect post-construction runoff from new development and redevelopment projects and development of a mechanism to ensure the long-term operation and maintenance of the BMP.

The post-construction program will be developed to address local conditions within the City. Factors that will be considered in developing the local post-construction program are:

- Proximity of the site to impaired waterbodies on the State's 303(d) list;
- Erosivity of the site (e.g. slope, soil type, vegetative cover, etc.);
- Size of construction activities and site disturbance;
- Receiving water characteristics (flows, depths, riparian cover, etc.)

The post-construction ordinance may require contractors to implement BMP to prevent erosion and non-stormwater runoff from sites after construction has ceased. The ordinance will provide options for ensuring long-term operation and maintenance of the site.

The City's existing floodplain management strategy may be developed to establish post-runoff flow rates not to exceed pre-development runoff flow rates. The City may require that any flow reduction structures in new development or re-development areas (e.g. on-site or regional stormwater detention) will consider impacts on downstream water quality.

Specific water quality needs will be identified and addressed through administrative procedures when local zoning codes and floodplain management codes are amended. All public comments concerning water quality issues will be considered during amendment of zoning and floodplain management codes. The City will encourage protection of sensitive water quality areas (e.g. wetlands, riparian areas, etc.) and encourage use of buffers along sensitive waterbodies.

5.2.1 Non-Structural BMP

The City will implement and encourage the use of the following non-structural City policies and BMP at new development and redevelopment sites:

- Utilization of the most recent Comprehensive Plan for the City to direct growth to identified areas and protect sensitive water resources such as local wetlands and riparian zones;
- Encourage new development and re-development projects to maintain open spaces, provide buffers along sensitive waterbodies and minimize impervious surfaces and disturbance of soils and vegetation wherever practical;
- Develop education brochures for builders and the public about project designs that minimize water quality impacts; and
- Encourage developers to implement source control measures as good housekeeping practices.

5.2.2 Structural BMP

The City will implement and encourage the use of the following structural BMP at new development and redevelopment sites:

- Encourage contractors to use stormwater storage structures such as wet ponds and detention basins; and
- Encourage contractors to use filtration practices such as grassy swales and filter strips and infiltration practices such as infiltration basins and infiltration trenches.

5.2.3 Ordinance

The City will update as necessary and adopt an ordinance to address the post-construction policies and BMP described above.

5.2.4 Long-Term Operation & Maintenance

The City will ensure long-term operation and maintenance (O&M) of the BMP by requiring that developers either transfer ownership of structural BMP (storm sewer infrastructure, detention basins, etc.) to the City or provide for third-party ownership and maintenance responsibility (e.g. transfer ownership to a homeowner's association).

5.2.5 Low Impact Development/Green Infrastructure

Low Impact Development (LID) is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles, such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional, and safe site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles, such as bio-retention facilities, vegetated

swales, xeriscape landscaping, and permeable pavements. By implementing LID principles and practices where safe, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within a watershed.

Green Infrastructure (GI) is a relatively new and flexible EPA term, and it has been used differently in different contexts. However, EPA intends the term to generally refer to systems and practices that use or mimic natural processes to infiltrate, evapotranspirate (the return of water to the atmosphere either through evaporation or by plants), or reuse stormwater or runoff on the site where it is generated. GI can be used at a wide range of landscape scales in place of, or in addition to, more traditional stormwater control elements to support the principles of LID. GI approaches currently in use include green roofs, vegetated swales, vegetated median strips, and protection and enhancement of riparian buffers and floodplains. GI can be used almost anywhere where soil and vegetation can be safely worked into the City landscape. GI also allows stormwater to be absorbed and cleansed by soil and vegetation and allowed to flow back into groundwater or surface water resources. The LID/GI strategies that the City may employ are as follows:

- Structural Controls may include the following:
    - Retention/irrigation ponds
    - Extended detention (wet/dry basins)
    - Vegetative filter strips
    - Vegetated swales
    - Constructed wetlands
    - Sedimentation ponds/traps
    - Infiltration ponds
    - Catch basins
    - Grated inlets
    - Outfall velocity dissipation controls
- Non-Structural Controls may include the following:
    - Street sweeping
    - Litter collection
    - "No Mow" areas
    - Storm drain markers

5.2.6 Identification and Selection of Structural Controls

The hydraulics and necessary structural controls for stormwater runoff will be identified by the City during the plan review phase for construction or redevelopment projects located within the City. The City maintains a number of manuals and guidance documents that will be relied upon both during the plan review phase of projects one acre or more and during the maintenance activities that follow completion of the projects requiring post-construction controls.

The City will maintain copies of the most recent guidance manuals in locations readily accessible to staff and contractors.

Post-construction inspections will be conducted at least once at project sites requiring post-construction controls after construction has ceased. The inspection of these sites will be used to evaluate the effectiveness of the post-construction BMP. Information gathered will be used to evaluate the measurable goals for the permit's annual report.

5.2.7 Target Areas

The City has determined that certain construction activities, under some circumstances, have a greater potential to cause water quality problems. The following areas are hereby designated as high priority and will be targeted:

- Post-construction sites that have had larger than 5 acres disturbed at the time of active construction;
- Construction sites of one acre or more that have not had any post-construction BMP or other effective controls implemented to control post-construction runoff; and
- Construction sites that are within a watershed of an impaired stream as indicated on the State's 303(d) list and have the potential to discharge pollutants that could cause violations of State Water Quality Standards.

5.3 MCM 5: Post-Construction Management in New Development and Redevelopment Program BMP

5.3.1 Post-Construction Ordinance

The City will update, as necessary, its Post-Construction ordinance section consistent with the requirements of the SWMP and OPDES permit related to post-construction control measures. The City will present the ordinance for public comment, update the ordinance as necessary, implement the ordinance, and review the ordinance in years 3-5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit	Year 2	8/2017	Date ordinance reviewed and finding of acceptability
Present ordinance for public comment	Year 3	2/2018	Date of public review and any comments received
Adopt ordinance, if necessary	Year 4	10/2018	Date adopted, if necessary
Implement new ordinance	Year 4	11/2019	Date implemented
Review ordinance and revise as necessary	Year 5	8/2020	Date reviewed

Responsible Party: Stormwater Manager or his/her designee

5.3.2 Long-Term Operation and Maintenance of Post-Construction Stormwater Controls

The City will identify the type of long-term operation and maintenance procedures for adopted post-construction structural and/or non-structural controls. Long-term operation and maintenance procedures for adopted post-construction structural and/or non-structural controls that would be most effective for the City will be evaluated and documented. Effectiveness of controls will be measured as the amount of pollutants removed. The City will evaluate the benefits of controls and modify as necessary.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify the type of long-term operation and maintenance procedures for structural and/or non-structural controls	Year 1	10/2016	List of available controls
Evaluation and documentation of long-term operation and maintenance procedures	Year 2	5/2017	List of adopted procedures
Review existing ordinance and regulations, and develop a schedule to remove barriers that prohibit LID practices in the permit term	Year 2	10/2017	Identification of barriers and resolution
Ordinance incorporation	Year 3	10/2018	Date adopted, if necessary
Implement the type of long-term operation and maintenance procedures for structural and/or non-structural controls	Year 3	11/2018	Number of sites affected and cost to implement
Evaluate benefits of controls and modify as necessary	Year 4	5/2019	Report any modifications
Implement the type of long-term operation and maintenance procedures for structural and/or non-structural controls	Year 5	11/2019	Number of sites affected and cost to implement

Responsible Party: Stormwater Manager or his/her designee

5.3.3 Post-Construction Stormwater Control Program

The City will utilize structural and/or non-structural controls needed to promote effective post-construction stormwater management that would prevent or minimize water quality impacts and attempt to maintain pre-development runoff conditions. Evaluation of controls that are appropriate and most effective for the City. The effectiveness of controls will be measured as the amount of pollutants removed (i.e. cubic yards of sediment). Evaluate the benefits of controls. The City will modify controls as necessary.

ACTIVITY	IMPLEMENT	TARGET DATE	MEASURABLE GOAL
Identify structural and/or non-structural controls needed to promote effective post-construction stormwater management	Year 1	10/2016	List of controls
Implement Post-construction BMP in areas of construction one acre or more	Year 1-3	May	Report number of sites and types of controls used
Evaluate benefits of controls and modify as necessary	Year 4	2/2019	Report any modifications
Implement Post-construction BMPs in areas of construction one acre or more	Year 4-5	May	Report number of sites and types of controls used

Responsible Party: Stormwater Manager or his/her designee

5.3.4 Post-Construction Education

The City will review and modify as needed appropriate brochures for specific development and/or re-development sites. The City will distribute appropriate post-construction brochures to construction contractors filing for permits. The City will follow-up brochure distribution with inspection activities to determine effectiveness and modify brochures as necessary.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and modify, as necessary, post-construction educational materials such as brochures, specifications, and/or requirements	Year 1	10/2016	Report educational materials utilized
Review and modify, as needed, post-construction inspection procedures for City inspectors	Year 2	5/2017	Report inspection procedures utilized
Distribute post-construction educational materials	Year 2-5	Ongoing	Number and types of materials distributed
Train post-construction inspectors	Year 2	10/2017	Number of inspectors training and training presented
Review benefit of educational materials	Year 4	8/2019	Report Cost Benefit analysis
Continue distribution of post-construction educational materials	Year 5	Ongoing	Date implemented

Responsible Party: Stormwater Manager or his/her designee

5.3.5 Post-Construction Notification and Inspection Program

The City will update its program to receive notification of post-construction stormwater implementation devices to the City Stormwater Program for comment. The City will provide training to 100 percent of post-construction inspectors by end of Year 1. The program will include site inspections of 50 percent of the post-construction BMP annually, beginning in Year 2 for the proper use of BMP erosion, sediment, and waste control.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Update the post-construction notification program to promote effective post-construction stormwater management, and that would prevent or minimize water quality impacts and attempt to maintain pre-development runoff conditions	Year 1	10/2016	Report date notification activities developed
Implement post-construction notification program	Year 2	2/2017	Number of notifications distributed
Inspect 50% of post-construction sites one acre or more	Year 2-5	Ongoing	Number of inspections and finding
Inspect 100% of complaint driven post-construction sites one acre or more	Year 2-5	As Needed	Number of inspections and finding

Responsible Party: Stormwater Manager or his/her designee

6.0 MCM 6 - Pollution Prevention/Good Housekeeping for MS4 Operations

6.1 Permit Requirements

You must review and revise your existing pollution prevention and good housekeeping program, as necessary. The revision shall be completed within the first year after the effective date of this Permit, then as needed. You must develop new elements, as necessary, and continue to implement and enforce the operation and maintenance program that includes a training component and has the ultimate goal of preventing or reducing pollutant runoff from MS4 operations. You must:

(1) *Use training materials that you develop or that are available from EPA, DEQ, or other reputable organizations. Your pollution prevention and good housekeeping program must include employee training 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;*

(2) *Implement a municipal employee training and education program that you will use to prevent and reduce stormwater pollution from MS4 activities. Describe any existing, available materials you plan to use. Describe how this training program will be coordinated with the outreach programs developed for the public information minimum measure and the illicit discharge MCM;*

(3) *Maintain a list of industrial facilities you own or operate that are subject to the DEQ Multi-Sector General Permit or individual OPDES or NPDES permits for discharges of stormwater associated with industrial activity that ultimately discharge to your small MS4. Include the authorization number or a copy of the Industrial NOI form for each facility. You must review this inventory annually and update as necessary;*

(4) *Implement procedures for controlling, reducing or eliminating the discharge of pollutants from streets, roads, highways, 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 you operate;*

(5) *Implement procedures to ensure that new flood management projects are assessed for impacts on water quality;*

(6) *Implement inspection/maintenance for structural and non-structural BMPs, including maintenance activities, maintenance schedules and long term inspection procedures for controls to reduce floatables and other pollutants discharged to your small MS4;*

(7) *List and define the BMPs that you or another entity will implement in the pollution prevention and good housekeeping program. You must include, as appropriate, the months and years in which you will undertake required actions, including interim milestones and the frequency of the action. Also you must identify who will be responsible for implementing or coordinating the BMPs in this program;*

(8) Establish or revise (as necessary) measurable goals for each BMP, including target milestones (month and year), frequency of action(s) and identify responsible persons; and

(9) Evaluate the appropriateness of your identified BMPs for this MCM. Your evaluation shall verify compliance with permit requirements and more importantly, document that efforts have been made towards achieving your identified measurable goals and reducing the impacts of stormwater runoff from the small MS4 (as required by Part V.C of this Permit).

6.2 MCM 6 Program Implementation and Objectives

The City's goal is to perform municipal activities in a careful and proper manner that prevents and/or reduces pollutant runoff. Municipal operations include parks and open space maintenance, fleet and building maintenance, new construction and land disturbances, building oversight and stormwater system maintenance.

6.2.1 Operation and Maintenance Program (O&M)

The following operations and facilities are owned by the City and are subject to the requirements of this MCM:

- Maintenance yard located at 512 NW. 27th St.;
- Storage yard located at 601 Vermeer Dr.;
- Recycling facility located at 220 N. Telephone Rd.; and,
- Parks and Recreation storage area located at 1561 NE. 12th St.

6.2.2 Municipal Permitted Facilities

The following facilities are owned/operated by the City and subject to the EPA Multi-Sector General Permit (MSGP) for stormwater:

- Moore Municipal Landfill, OPDES Permit No. 3555028.

The following facilities are owned/operated by the City and subject to NPDES/OPDES discharge permits:

- Moore wastewater treatment plant, OPDES Permit No. OK00279391; and,
- Moore water treatment plant, OPDES Permit No. PWSID2001412.

6.2.3 Employee Training Program

The City will update and implement a training program for City employees. The program will address MS4 maintenance and prevention of stormwater pollution from City activities. Areas to be addressed by the training program include:

- Park and open space maintenance;
- Fleet and building maintenance;
- New construction and land disturbance; and
- Stormwater system maintenance.

6.2.4 Pollutant Control Program

The City will implement a program to control and reduce floatables and other pollutants to the MS4, including maintenance activities and schedules as well as long-term inspection procedures. The following areas will be addressed:

- City streets and roads;
- Municipal parking lots;
- City maintenance and storage yards;
- City operated recycling stations;
- City fleet maintenance shops with outdoor storage areas; and,
- Municipal salt/sand storage locations.

The City will implement structural BMP where appropriate to control contaminated runoff from City-owned storage areas for vehicles, equipment, and materials exposed to rainfall. These may include silt fencing, grassy swales, sediment ponds and/or others as deemed appropriate.

The City will rely upon public education to reduce the amount of trash and chemical pollutants placed on City streets.

City Public Works crews will be instructed to report observed pollution problems and/or trash buildup on City streets or in the City's stormwater collection system. City Public Works crews will remove debris and trash from streets and the MS4 system as necessary.

The City will store materials in areas that have sufficient berms and other flow control structures to prevent excess runoff of salt into local streams. The City will dispose of removed materials in a proper manner.

6.2.5 Flood Management Projects

The City will ensure that new flood management projects are assessed for impacts on water quality and existing projects are assessed for incorporation of water quality protection devices or practices.

6.2.6 Target Audience

The City operations and facilities are owned by the City and are subject to the requirements of this MCM training and implementation of MCM 5 will focus on City employees and their contractors.

6.3 MCM 6 Pollution Prevention/Good Housekeeping for MS4 Operations BMP

6.3.1 Storm Drain Markers

The City will develop a new stencil program to present water quality messages on storm drain inlets. The messages will be specific to particular watersheds and may contain messages regarding TMDL's and/or impaired waters. The stencils will serve as an educational reminder to keep the drains clean.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop specific message(s) for storm drain, as necessary	Year 1	10/2016	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 2	5/2017	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 3	5/2018	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 4	5/2019	Total number of storm drains installed/re-installed
Review system and determine future updates/needs	Year 5	10/2020	Updates and assessment

Responsible Party: Stormwater Manager or his/her designee

6.3.2 Survey Municipal Operations and Implement Necessary BMP

City staff will perform a complete survey of City municipal operations to determine if any BMP needs to be updated and/or implemented. The City will research the type of controls needed to obtain the best results for stormwater quality and obtain necessary funding to implement the controls. The City will continue to implement BMP at designated locations, and will develop training procedures for implementation of BMP. City staff will inspect BMP for proper implementation.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Survey of municipal/industrial operations	Year 1	5/2016	Report findings of survey
Develop a list of City facilities, as necessary, subject to the DEQ Multi-Sector General Permit or individual OPDES or NPDES permits for discharges of storm water associated with industrial activity that ultimately discharge to the City SMS4.	Year 1	8/1016	Report list
Assess the need of specific BMP required	Year 1	10/2010	Report BMPs selected
Develop training for BMP implementation	Year 2	5/2017	Report on training program developed
Train City personnel on BMP implementation	Year 2	8/2017	Report number of personnel trained and training program presented
Implement necessary BMPs where applicable	Year 2-5	Ongoing	Report the number and type of BMPs utilized, and their location
Re-survey municipal/industrial operations for additional BMP utilization	Year 3-5	May	Number of surveys completed and findings

Responsible Party: Stormwater Manager or his/her designee

6.3.3 City Employee/Contractor Training

The City will provide training to identified City employees, and contractors hired by the City, who are responsible for municipal and industrial stormwater operations. The training will be an annual requirement. The training program will include education on preventing and reducing stormwater pollution. Attendees will receive a certificate for completion of the program and the City will document trained employees and/or contractors. The City of Moore will annually send appropriate staff members to the MS4 Stormwater Conference when held in the U.S. EPA Region 6 area and/or other areas when funding allows.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop training programs	Year 1	10/2016	Report training programs developed
Perform training	Year 2	2/2017	Report training program presented and number and type of personnel
Perform training	Year 3	2/2018	Report training program presented and number and type of personnel
Perform training	Year 4	2/2019	Report training program presented and number and type of personnel
Assess effectiveness of training	Year 4	8/2019	Provide results of assessment
Perform training	Year 5	2/2020	Report training program presented and number and type of personnel

Responsible Party: Stormwater Manager or his/her designee

6.3.4 Good Housekeeping Maintenance Program

The City will inspect and assess current structural controls and maintenance efforts to reduce floatables and other pollutants to include street sweeping, catch basin, and ditch/swale cleaning efforts. City staff will determine if the controls are effective and develop an ongoing schedule for good housekeeping maintenance activities. City staff will perform annual inspections of facilities, structural controls, and maintenance efforts.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Waste oil recycling	Annually	As Needed	Record the number of gallons of oil waste recycled from City activities
Develop inspection and assessment procedures.	Year 1	8/2016	Report inspection and assessment procedures developed
Perform inspection on 20% of the MS4 and repair as necessary	Annually	10/2016	Report findings and repairs
Inspect and assess 20 % of current MS4 structural controls and maintenance efforts	Annually	10/2016	Develop report of findings
Perform street sweeping on major streets, as required	Year 1-5	Ongoing	Report number of miles swept
Perform street sweeping on residential streets, as required	Year 1-5	Ongoing	Report number of miles swept
Perform catch-basin cleaning, as required	Year 1-5	Ongoing	Report number of basins cleaned
Perform ditch/swale cleaning as required	Year 1-5	Ongoing	Report linear feet of ditch/swale cleaning performed
Assess effectiveness of maintenance program	Year 4	8/2019	Provide results of assessment

Responsible Party: Stormwater Manager or his/her designee

7.0 Impaired Waterbodies and Total Maximum Daily Load (TMDL) Requirements

7.1 Permit Requirements

III. B Established Total Maximum Daily Load Allocations

1. If a TMDL or watershed plan in lieu of a TMDL is established for any waterbody into which a MS4 discharges prior to the date that the MS4 submits a NOI, and if that TMDL includes a wasteload allocation (WLA) or load allocation (LA) for a parameter likely to be discharged by the MS4, the MS4's discharges must meet any limitations, conditions, or other requirements of the implementation plan associated with that WLA, LA and/or TMDL within any timeframes established in the TMDL or watershed plan.

Monitoring and reporting of the discharges may also be required as appropriate to ensure compliance with the TMDL, or watershed plan. The MS4 must adopt any WLAs assigned to its discharges specified in the TMDL, or similar targets in the watershed plan, as measurable goals in the SWMP. If the TMDL or watershed plan relies on a BMP-based approach, effective implementation of additional TMDL or watershed plan-related BMPs will be sufficient to implement applicable WLAs. This BMP-based approach is consistent with EPA memoranda dated November 22, 20121 (EPA 2002) and November 26, 20142 (EPA 2014). If the TMDL or watershed plan specifies additional requirements, the MS4 must also meet these additional requirements.

7.2 TMDL Program Implementation and Objectives

Lake Thunderbird is on Oklahoma's 2012 303(d) list for impaired beneficial uses of public/private water supply and warm water aquatic community life. Causes of impairment have been identified in the Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs, approved by the EPA on November 13, 2013, as low oxygen levels, high levels of chlorophyll-*a*, and high turbidity (DEQ, 2010a). Lake Thunderbird is designated by the Oklahoma Water Quality Standards (OWRB 2011) as a Sensitive Water Supply (SWS) since the Lake serves as the primary public water supply source for the cities of Norman, Midwest City and Del City. There are three municipalities within the Lake Thunderbird watershed: the City of Moore, the City of Norman and Oklahoma City.

The City of Moore Compliance Plan is a plan for achieving the required 35% waste load (WL) reduction of total suspended solids (TSS), total nitrogen (TN), total phosphorous (TP), and carbonaceous biological oxygen demand (CBOD) established in the TMDL. The "waste load" (WL) reduction activities are also included as minimum control measures in the City of Moore Oklahoma Pollutant Discharge Elimination System (OPDES) Phase II Small MS4 permit required Storm Water Management Plan.

The CP presents the strategies to meet the WL reductions and TMDL goals as specified in the TMDL and current MS4 permit. Specifically, the CP will provide the basis for the City to:

1. Provide Best Management Practices (BMPs) to achieve an equivalent of 35% WL reductions of its contributing watershed which stormwater runoff is managed to the maximum extent practicable (MEP).
2. Meet TMDL Waste load Allocations (WLAs) approved by the Oklahoma Department of Environmental Quality (DEQ) and EPA.
3. Educate and involve residents, businesses, and stakeholder groups in achieving measurable water quality improvements.
4. Establish a reporting framework that will be used for annual reporting as required in the City's OPDES MS4 Permit.
5. Identify necessary maintenance, adaptive management, staffing, and financial strategies to implement the CP.

7.3 TMDL Program BMP

To meet the 35% reduction goal, the City will utilize a diverse and comprehensive approach for meeting the TMDL requirements as needed. This includes:

- Implementing stormwater management projects, including traditional BMPs and LID practices where applicable, and Educational BMP;
- Employing a variety of programs to improve water quality, including mechanical street sweeping, construction site inspections, and IDDE; and
- Fostering partnerships to encourage private development of stormwater management practices.

Finally, the City believes that by implementing stormwater management projects, employing a variety of programs, and fostering partnerships, it will be on track to meet the TMDL goals. Implementing these practices will provide a reduction of 35% of its current WL to meet the TMDL requirement of 205.1 Kg/day of TN, 44.5 Kg/day of TP, 781.3 Kg/day of CBOD, and 16,236.0 Kg/day of TSS by the end of the third MS4 permit period. Education and enforcement programs focused on illicit discharges, in concert with water and sanitary sewer infrastructure improvements, will also result in a reduction of nutrients. A monitoring program focused on illicit discharges will address the TMDL for TSS and nutrients from construction and industrial permittees.

7.4 TMDL Implementation Report

The City of Moore will include a TMDL implementation report as part of its MS4 annual report. The TMDL implementation report will include the status and actions taken by the City to implement the TMDL compliance plan and monitoring program. The TMDL implementation report will document relevant actions taken by the City that affect MS4 stormwater discharges to the waterbody segments that are the subject of the TMDL. This TMDL implementation report will also identify the status of any applicable TMDL implementation schedule milestones, monitoring data, and BMP implementation.

7.5 Evaluating Progress with the TMDL

Compliance with the TMDL and progress toward achieving the wasteload allocations and load reduction goals will be evaluated at each renewal of the MS4 permit, generally every 5 years. Consideration will be given to:

- Water quality data and results from the pollutant monitoring and tracking program;
- The status of achieving milestones and accomplishing items in the current compliance plan;
- Any revisions that have been made to or proposed for the compliance plan; and,
- Any proposed enhancements to the compliance plan for the next permit term.

If sufficient progress is not demonstrated, an updated compliance plan and implementation schedule will be required to be submitted within 6 months. Noncompliance may subject the permittee to enforcement action.

8.0 Deadlines for SWMP Compliance

Full implementation of the SWMP will be developed and implemented as included in individual MCM BMP.

9.0 Roles and Responsibilities

Per OPDES permit requirements, the SWMP, together with any local agreements, must clearly identify the roles and responsibilities of the City. Roles and responsibilities for the City's OPDES Permit requirements are included in individual MCM BMP.

10.0 SWMP Resources

The City provides adequate funds, staff, equipment and support capabilities to implement its activities under the SWMP. The cost of the SWMP and permit implementation is funded by the City.

If warranted, additional controls will be developed and implemented in accordance with the City's OPDES permit.

Current Staff

Community Development Director - Elizabeth Jones

Stormwater Manager - Mike Harlan

Stormwater Contractor - _____

11.0 SWMP Review and Updates

The SWMP will be evaluated annually to determine the plan's effectiveness and efficiency. The SWMP will be revised as necessary to support needed changes based on the SWMP evaluation and/or requests made through permit requirements. The annual review of the current SWMP will be conducted in conjunction with the preparation of the annual report required under this permit.

If required, the SWMP will be revised by the City during the term of the permit in accordance with the approved permit procedures. Though not anticipated, the City will implement the SWMP on all new areas added to their portion of the MS4 (or for which they become responsible for implementation of stormwater quality controls) as expeditiously as practicable, but not later than three years from addition of the new areas. Within 90 days of a transfer of ownership, operational authority or responsibility for SWMP implementation, the City will create a plan for implementing the SWMP on all affected areas.

If warranted, additional controls will be developed and implemented in accordance with the City's OPDES Permit.

12.0 Retention of SWMP Records

The City retains the SWMP and all associated records for at least three years after coverage under this permit terminates.

If warranted, additional controls will be developed and implemented in accordance with the City's OPDES permit.

ATTACHMENT A

BMP Summary Tables

1.0 MCM 1 - Public Education, Outreach Program BMP

1.3.1 Brochures

City brochures will be distributed to specific target audiences. The City will update its distribution list to include the number of brochures to be sent, the specific audiences, as well as the appropriate brochures for specific activities, such as retail gasoline outlets, car washes, restaurants, residents and schoolchildren. The City will distribute brochures to 50 percent of the target audience every 2 years and follow-up with inspection activities to determine the need to modify brochures in years 3 and 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify specific brochure target audiences	Year 1	5/2016	Number of target audiences
Develop a list of the number of brochures/ handouts to be created	Year 2	8/2016	Number of brochures/handouts to be created by audience
Create and/or update brochures/handouts	Year 2	11/2016	Number of brochures and handouts created
Distribute brochures and/or handouts	Year 2	2/2017	Meet 50% distribution of target audience
Follow-up inspections	Year 3	2/2018	Number of inspections performed and targets that retained message
Effectiveness of materials assessed and documented	Year 3	5/2018	Overall effectiveness based on follow-up inspections
Evaluate need for modification of brochures and/or handouts	Year 3	11/2018	Number of new brochures/handouts recommended
Re-distribute brochures/handouts	Year 4	2/2019	Meet 50% distribution of target audience
Follow-up inspections	Year 5	2/2020	Number of inspections performed and targets that retained message
Evaluate need for modification of brochures and/or handouts	Year 5	8/2020	Number of new brochures/handouts recommended

Responsible Party: Stormwater Manager or his/her designee

1.3.2 Water Bill Inserts

The City will include a stormwater educational message on 100% of City water bills once annually. The City will then determine the need to modify the message in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Create and distribute an educational stormwater message to be included on 100% of City water bills once during the year	Annually	July	Number of water bills distributed
Evaluate the need for modification of the educational message	Year 4	2-2019	Record the new message and an estimate of water bills to be distributed the following year.

Responsible Party: Stormwater Manager or his/her designee

1.3.3 City Stormwater Webpage

The City will continue to use and update its stormwater webpage created in the previous permit term. The City will review the webpage annually and make necessary changes. It will also use the webpage to advertise stormwater-related events, such as annual waste disposal and recycling, construction permits and current programs and updates.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater webpage	Annually	August	Record updates made to the webpage

Responsible Party: Stormwater Manager or his/her designee

1.3.4 School Programs

The City will continue to provide a "School Education Program" by creating awareness in the community about protecting water quality from nonpoint source pollution. The City will identify local schools for participation. The program will be evaluated annually; as well as establishing new goals and identify additional schools.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify benefits of a School Education Program	Year 1	5/2016	Identify beneficial programs
Establish program goals	Year 1	10/2016	Target student audience
Establish schools for distribution	Year 2	2/2017	Number of schools
Implement school program	Year 2-5	May	Dates program(s) presented
Evaluate program and establish new goals	Year 4	2/2019	Receive teacher evaluations
Add additional schools, as needed	Year 4	5/2019	Number of schools added
Assess benefits of program	Year 5	2/2020	Report benefit assessment

Responsible Party: Stormwater Manager or his/her designee

1.3.5 Phase II Program Meeting

The City will discuss its Small Phase II SWMP in one public City Council meeting per year. At the meeting, there will be an opportunity for the public to discuss and provide recommendations to the SWMP. The City will comply with state and local public notice requirements related to each meeting.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop program requirements and commitments and present at meetings	Annually	May	Number of Council and citizens in attendance
Stormwater program status presentation at City Council meeting	Annually	May	Number of Council and citizens in attendance

Responsible Party: Stormwater Manager or his/her designee

1.3.6 Recycling/Pollutant Collection

The City will continue to promote pollutant collection and recycling at its facility and semi-annual Citywide recycling events. This information will be made available in handouts and on the Recycle Moore website. The City will perform a cost effectiveness evaluation in year 5 to determine benefits of the program.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify best way to sponsor and/or promote recycling/pollutant collection	Year 1	4/2016	Method identified
Develop appropriate messages and distribute information	Year 1	5/2016	Group(s) participating
Quantify amount of messages/information hits	Year 1	8/2016	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 2	8/2017	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 3	8/2018	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 4	8/2019	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 5	8/2020	Messages distributed/hits on website
Determine benefits of program	Year 5	9/2020	Cost effectiveness evaluation

Responsible Party: Stormwater Manager or his/her designee

1.3.7 Household Hazardous Waste Collection

The City will continue to promote household hazardous waste collection and recycling. This information will be made available in handouts and on the City of Moore Household Hazardous Waste Collection website. The City will perform a cost effectiveness evaluation in year 5 to determine benefits of the program.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify best way to sponsor and/or promote household hazardous waste collection	Year 1	4/2016	Method identified
Develop appropriate messages and distribute information	Year 1	5/2016	Group(s) participating
Quantify amount of messages/information hits	Year 1	8/2016	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 2	8/2017	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 3	8/2018	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 4	8/2019	Messages distributed/hits on website
Quantify amount of messages/information hits	Year 5	8/2020	Messages distributed/hits on website
Determine benefits of program	Year 5	9/2020	Cost effectiveness evaluation

Responsible Party: Stormwater Manager or his/her designee

1.3.8 Storm Drain Markers

The City will develop a new stencil program to present water quality messages on storm drain inlets. The messages will be specific to particular watersheds and may contain messages regarding TMDL's and/or impaired waters. The stencils will serve as an educational reminder to keep the drains clean.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Install message on storm drain, as necessary	Year 1	5/2016	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 2	5/2017	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 3	5/2018	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 4	5/2019	Total number of storm drains installed/re-installed
Review system and determine future updates/needs	Year 5	4/2020	Updates and assessment

Responsible Party: Stormwater Manager or his/her designee

2.0 MCM 2 – Public Participation and Involvement Program BMP

2.3.1 Phase II Program Meeting

The City will discuss its Phase II SWMP in one public City Council meeting per year. At the meeting, there will be an opportunity for the public to discuss and provide recommendations to the SWMP. The City will comply with state and local public notice requirements related to each meeting.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop program requirements and commitments and present at meetings	Annually	May	Number Council and Citizens in attendance
Storm water program status presentation at City Council meeting	Annually	May	Number Council and Citizens in attendance

Responsible Party: Stormwater Manager or his/her designee

2.3.2 Public Information Hotline

The City's existing reporting hotline will continue to be used for citizen complaint and reporting. Advertisement of the hotline will also serve public involvement, and will be accomplished through the use of the City Stormwater Website at http://www.cityofmoore.com/stormwatersavvy. Funding for the hotline will be assessed in years 2 and 4. The City will evaluate the effectiveness of the program in year 3. Necessary changes to the program will be made in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Advertising of Hotline on Stormwater Website	Year 1	4/2016	Report date and nature of advertisement
Assessment of Hotline funding	Year 1	5/2016	Report amount of funding
Continue implementation of hotline	Year 1	8/2016	Report number of calls received and website hits
Continue implementation of hotline	Year 2	8/2017	Report number of calls received and website hits
Hotline effectiveness assessment	Year 3	5/2018	Report findings
Continue implementation of hotline	Year 3	8/2018	Report number of calls received and website hits
Assessment of Hotline funding	Year 4	10/2018	Report amount of funding
Continue implementation of hotline	Year 4	8/2019	Report number of calls received and website hits
Continue implementation of hotline	Year 5	8/2020	Report number of calls received and website hits
Changes to Hotline Program made (as necessary)	Year 5	As Needed	Report changes to program

Responsible Party: Stormwater Manager or his/her designee

2.3.3 Recycling/Pollutant Collection

The City will continue to sponsor and/or conduct semi-annual City wide clean-up events, as well as continue operations of its recycling center. After each event, the City will quantify the amount of refuse/material collected. The City will maintain the quantity of recyclable material collected annually. The City will perform a cost effectiveness evaluation in year 5 to determine benefits of the program.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Sponsor and/or promote City wide clean-up events	Year 1	4/2016	Method identified
Develop appropriate activities and solicit specific groups	Year 1	5/2016	Group(s) participating
Quantify amount of refuse/material collected	Year 1	8/2016	Quantity collected
Quantify amount of refuse/material collected	Year 2	8/2017	Quantity collected
Quantify amount of refuse/material collected	Year 3	8/2018	Quantity collected
Quantify amount of refuse/material collected	Year 4	8/2019	Quantity collected
Quantify amount of refuse/material collected	Year 5	8/2020	Quantity collected
Determine benefits of program	Year 5	9/2020	Cost effectiveness evaluation

Responsible Party: Stormwater Manager or his/her designee

2.3.4 School Programs

The City will continue to present a "School Education Program" in the community about protecting water quality from nonpoint source pollution. The City will continue to identify groups such as elementary and middle schools, as well as other groups such as the Boy and Girl scout programs. The program will be evaluated annually; as well as establishing new goals and identification of additional audiences.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Establish program goals	Year 1	5/2016	Target audiences
Establish curriculum to be delivered	Year 1	10/2016	Types and number of messages
Implement school program	Year 2	5/2017	Dates program(s) presented
Implement school program	Year 3	5/2018	Dates program(s) presented
Implement school program	Year 4	5/2019	Dates program(s) presented
Evaluate program and establish new goals	Year 4	8/2019	Receive teacher evaluations
Add additional schools, as needed	Year 4	10/2019	Number of schools added
Implement school program	Year 5	2/2020	Dates program(s) presented
Assess benefits of program	Year 5	5/2020	Report benefit assessment

Responsible Party: Stormwater Manager or his/her designee

3.0 MCM 3 – Illicit Discharge Detection and Elimination (IDDE) Program BMP

3.3.1 Storm Sewer Map Update

The City will update the existing storm sewer map, showing the location of all outfalls and the names and locations of all waters of the U.S. that receive discharges from those outfalls within the MS4. The map may be developed with GIS. Outfalls may be located with GPS field survey equipment. The final map will become a printed atlas for IDDE and spill response use.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Update 20% of the MS4 map	Year 1	10/2016	Total number of outfalls
Update 20% of the MS4 map	Year 2	10/2017	Total number of outfalls
Update 20% of the MS4 map	Year 3	10/2018	Total number of outfalls
Update 40% of the MS4 map	Year 4	10/2019	Total number of outfalls
Review map and determine future updates/needs	Year 5	2/2020	Map updates and assessment

Responsible Party: Stormwater Manager or his/her designee

3.3.2 Education and Training for City Field Staff

Specific emphases on educating and training City personnel are important and integral aspects of the SWMP. Many pollution problems can be avoided by having an informed populous willing to participate in improving stormwater quality. The City is committed to establishing training classes to facilitate the proper management and disposal of used oil and potentially hazardous materials.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
City to develop training classes for IDDE	Year 1	10/2016	Record the name of each training class developed
City staff to attend training classes developed for IDDE	Annually	May	Record the number of participants attending each training class
City to review and update training classes for IDDE	Year 5	2/2020	Record the updates and/or new training classes developed

Responsible Party: Stormwater Manager or his/her designee

3.3.3 Illicit Discharge/Illegal Dumping Hotline

The City's existing reporting hotline will continue to be used for citizen complaint and reporting. Advertisement of the hotline will also serve public involvement, and will be accomplished through the use of the City Stormwater Website at http://www.cityofmoore.com/stormwatersavvy. Funding for the hotline will be assessed in years 2 and 4. The City will evaluate the effectiveness of the program in year 3. Necessary changes to the program will be made in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Advertising of Hotline on Stormwater Website	Year 1	4/2016	Report date and nature of advertisement
Assessment of Hotline funding	Year 1	5/2016	Report amount of funding
Continue implementation of hotline	Year 1	8/2016	Report number of calls received and website hits
Continue implementation of hotline	Year 2	8/2017	Report number of calls received and website hits
Hotline effectiveness assessment	Year 3	5/2018	Report findings
Continue implementation of hotline	Year 3	8/2018	Report number of calls received and website hits
Assessment of Hotline funding	Year 4	10/2018	Report amount of funding
Continue implementation of hotline	Year 4	8/2019	Report number of calls received and website hits
Continue implementation of hotline	Year 5	8/2020	Report number of calls received and website hits
Changes to Hotline Program made (as necessary)	Year 5	As Needed	Report changes to program

Responsible Party: Stormwater Manager or his/her designee

3.3.4 Procedures for Responding to Illicit Discharges and Spills

To address procedures for responding to illicit discharges and spills, the City will utilize the EPA Cooperative Agreement No. X-82907801-0 Illicit Discharge Detection and Elimination - A Guidance Manual for Program Development and Technical Assessments. In addition to the Guidance Manual the City will develop field forms and provide training on field inspection and inspection for utilization.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review EPA Manual and develop field forms as necessary	Year 1	8/2016	Report the number of forms developed for field use
Develop training class for field inspections	Year 1	10/2016	Report number and content of training classes developed
Conduct Training Classes	Year 1	11/2016	Report number of inspectors and staff in attendance
Conduct Training Classes	Year 2	11/2017	Report number of inspectors in attendance
Conduct Training Classes	Year 3	11/2018	Report number of inspectors in attendance
Conduct Training Classes	Year 4	11/2019	Report number of inspectors in attendance
Re-Evaluate Training Classes	Year 5	8/2020	Report number of training classes needing update

Responsible Party: Stormwater Manager or his/her designee

3.3.5 Ordinance

The City will review and update, as necessary, the existing stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit. The City will present the ordinance for public comment and then move to adopt and implement the ordinance. The City will review the ordinance in years 3-5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit	Year 2	8/2017	Date ordinance reviewed and finding of acceptability
Present ordinance for public comment, if required	Year 3	2/2018	Date of public review and any comments received
Adopt ordinance, if necessary	Year 3	10/2018	Date adopted, if necessary
Implement new ordinance	Year 4	11/2019	Date implemented
Review ordinance and revise as necessary	Year 5	8/2020	Date reviewed

Responsible Party: Stormwater Manager or his/her designee

3.3.6 MS4 IDDE Source Investigation and Elimination

The City will respond to, identify, and screen for the presence of illicit discharges. During the screening activity, if the RP is identified, the City will notify the RP that a proposed plan of action must be submitted to the City within a reasonable amount of time depending on the situation (usually two weeks). In the interim, the City will require the operator of the illicit discharge to take all reasonable and prudent measures to minimize the discharge of pollutants to the MS4. All outfalls in the MS4 will be screened at least once per permit term.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
MS4 Screening	Year 1	5/2016	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 2	5/2017	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 3	5/2018	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 4	5/2019	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.
MS4 Screening	Year 5	5/2020	Report the number of illicit discharges and/or connections, and the approximate area of the MS4 screened.

Responsible Party: Stormwater Manager or his/her designee

3.3.7 Complaint Inspections

The City will conduct inspections, as determined appropriate, in response to complaints, and shall conduct follow-up inspections as needed to ensure that corrective measures have been implemented by the RP. If a RP is identified: the City will notify the RP that a proposed plan of action must be submitted to the department within a reasonable amount of time depending on the situation (usually 2 weeks); the City will require the operator of the illicit discharge to take all reasonable and prudent measures to minimize the discharge of pollutants to the MS4; where elimination of an illicit discharge within 30 days is not possible, the City will request an expeditious schedule for removal of the discharge; and if the City does not agree with the corrective measure(s) and/or the time schedule, the City will begin enforcement procedures, and/or refer the case to the ODEQ for further action and/or enforcement.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
MS4 Inspections	Year 1	As Requested	Report the number of illicit discharges /connections inspected and the number of enforcement actions
MS4 Inspections	Year 2	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions
MS4 Inspections	Year 3	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions
MS4 Inspections	Year 4	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions
MS4 Inspections	Year 5	As Requested	Report the number of illicit discharges / connections inspected and the number of enforcement actions

Responsible Party: Stormwater Manager or his/her designee

3.3.8 Data Management

The City will update existing databases, and perform assessments to identify the best way to manage Phase II permit information. The City may continue to utilize existing off-the-shelf GIS software for data development and retention, or its own developed spreadsheets. The City will also utilize the database to develop reports for submission to ODEQ.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify database needs	Year 1	5/2016	Record needs and establish goals
Evaluate database standards	Year 1	10/2016	Provide database update needs
Obtain database funding	Year 2	8/2017	Date funding obtained
Implement database operations	Year 2-5	Ongoing	Date implemented
Review database benefits	Year 4	10/2019	Date reviewed
Establish new goals and funding needs	Year 5	8/2020	Provide dates of funding and new goals

Responsible Party: Stormwater Manager or his/her designee

4.0 MCM 4 - Construction Site Stormwater Runoff Control Program BMP

4.3.1 Construction Site Inspections

The City will continue to utilize its Construction Site Inspections program, which receives notification of new construction sites that have an area of at least one acre or more soil disturbance. The program will include site inspections for the proper use of BMP for erosion, sediment and waste control. Fifty percent of all construction sites of one acre or more will be inspected. The program will also include review of the Stormwater Pollution Prevention Plan (SWPPP) and procedures for receiving and considering public comment. The city will train 100 percent of construction inspectors by year 2.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop construction notification program to include requirements for construction site operators to implement appropriate BMP for erosion and sediment controls and control waste	Year 1	5/2016	Report date program adopted
Utilize procedures for SWPPP receipt for proposed construction sites one acre or more	Year 1	6/2016	Report date procedures adopted
Maintain and use inspection procedures for the BMP	Year 1	8/2016	Report date procedures adopted
Develop Construction Inspector training program	Year 1	10/2016	Report date program adopted
Train Construction Site Inspectors	Year 2	2/2017	Report number of Training sessions conducted and inspectors trained
Inspect 50% of construction sites one acre or more	Year 2-5	May	Number of inspections and finding
Inspect 100% of complaint driven sites one acre or more	Year 2-5	As Required	Number of inspections and finding
Evaluate the need for training program revisions	Year 5	2/2020	Number of training programs revised

Responsible Party: Stormwater Manager or his/her designee

4.3.2 Ordinance

The City will adopt an effective ordinance prohibiting construction related discharges to the MS4 and periodically evaluate the need for modifications. During the first twelve months of the permit, the City will compare model construction ordinances to existing City ordinances and evaluate necessary modifications to local codes, if needed. The City will evaluate staffing needs and acquire additional resources, if needed, to ensure the City will be able to inspect and enforce all provisions in the ordinance during year 2. The City will delegate management authority to a key City staff person to manage all inspection and enforcement activities. The City will periodically evaluate program effectiveness and make changes, as appropriate to the ordinance and/or City resources and manpower.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit	Year 2	8/2017	Date ordinance reviewed and finding of acceptability
Present ordinance for public comment if required	Year 3	2/2018	Date of public review and any comments received
Revise ordinance, if necessary	Year 3	10/2018	Date revised, if necessary
Implement ordinance	Year 4	11/2019	Date implemented
Review ordinance and revise as necessary	Year 5	8/2020	Date reviewed

Responsible Party: Stormwater Manager or his/her designee

4.3.3 Public Information Receipt

The City's existing reporting hotline will continue to be used for citizen complaint and reporting. Advertisement of the hotline will also serve public involvement, and will be accomplished through the use of the City Stormwater Website at http://www.cityofmoore.com/stormwatersavvy. Funding for the hotline will be assessed in years 2 and 4. The City will evaluate the effectiveness of the program in year 3. Necessary changes to the program will be made in year 5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Advertising of Hotline on Stormwater Website	Year 1	4/2016	Report date and nature of advertisement
Assessment of Hotline funding	Year 1	5/2016	Report amount of funding
Continue implementation of hotline	Year 1	8/2016	Report number of calls received and website hits
Continue implementation of hotline	Year 2	8/2017	Report number of calls received and website hits
Hotline effectiveness assessment	Year 3	5/2018	Report findings
Continue implementation of hotline	Year 3	8/2018	Report number of calls received and website hits
Assessment of Hotline funding	Year 4	10/2018	Report amount of funding
Continue implementation of hotline	Year 4	8/2019	Report number of calls received and website hits
Continue implementation of hotline	Year 5	8/2020	Report number of calls received and website hits
Changes to Hotline Program made (as necessary)	Year 5	As Needed	Report changes to program

Responsible Party: Stormwater Manager or his/her designee

4.3.4 Site Plan Review

The City will continue to use its building site review checklist for site plan review of construction sites one acre or more. The City will continue to implement plan review, and review all site plans annually. The City will evaluate the effectiveness of the program and modify as necessary.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop administrative procedures for site plan review	Year 1	5/2016	Report date procedures adopted
Implement plan review	Year 1-3	Ongoing	Report number reviews
Evaluate effectiveness of program	Year 3	8/2018	Report findings
Modify program as necessary	Year 3	10/2018	Report updates
Implement plan review	Year 3-5	Ongoing	Report number of reviews
Evaluate effectiveness of program	Year 5	8/2020	Report findings
Modify program as necessary	Year 5	10/2020	Report updates

Responsible Party: Stormwater Manager or his/her designee

5.0 MCM 5 – Post-Construction Management in New Development and Redevelopment Program BMP

5.3.1 Post-Construction Ordinance

The City will update, as necessary, its Post-Construction ordinance section consistent with the requirements of the SWMP and OPDES permit related to post-construction control measures. The City will present the ordinance for public comment, update the ordinance as necessary, implement the ordinance, and review the ordinance in years 3-5.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and update the stormwater ordinance section consistent with the requirements of the SWMP and OPDES permit	Year 2	8/2017	Date ordinance reviewed and finding of acceptability
Present ordinance for public comment	Year 3	2/2018	Date of public review and any comments received
Adopt ordinance, if necessary	Year 4	10/2018	Date adopted, if necessary
Implement new ordinance	Year 4	11/2019	Date implemented
Review ordinance and revise as necessary	Year 5	8/2020	Date reviewed

Responsible Party: Stormwater Manager or his/her designee

5.3.2 Long-Term Operation and Maintenance of Post-Construction Stormwater Controls

The City will identify the type of long-term operation and maintenance procedures for adopted post-construction structural and/or non-structural controls. Long-term operation and maintenance procedures for adopted post-construction structural and/or non-structural controls that would be most effective for the City will be evaluated and documented. Effectiveness of controls will be measured as the amount of pollutants removed. The City will evaluate the benefits of controls and modify as necessary.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Identify the type of long-term operation and maintenance procedures for structural and/or non-structural controls	Year 1	10/2016	List of available controls
Evaluation and documentation of long-term operation and maintenance procedures	Year 2	5/2017	List of adopted procedures
Review existing ordinance and regulations, and develop a schedule to remove barriers that prohibit LID practices in the permit term	Year 2	10/2017	Identification of barriers and resolution
Ordinance incorporation	Year 3	10/2018	Date adopted, if necessary
Implement the type of long-term operation and maintenance procedures for structural and/or non-structural controls	Year 3	11/2018	Number of sites affected and cost to implement
Evaluate benefits of controls and modify as necessary	Year 4	5/2019	Report any modifications
Implement the type of long-term operation and maintenance procedures for structural and/or non-structural controls	Year 5	11/2019	Number of sites affected and cost to implement

Responsible Party: Stormwater Manager or his/her designee

5.3.3 Post-Construction Stormwater Control Program

The City will utilize structural and/or non-structural controls needed to promote effective post-construction stormwater management that would prevent or minimize water quality impacts and attempt to maintain pre-development runoff conditions. Evaluation of controls that are appropriate and most effective for the City. The effectiveness of controls will be measured as the amount of pollutants removed (i.e. cubic yards of sediment). Evaluate the benefits of controls. The City will modify controls as necessary.

ACTIVITY	IMPLEMENT	TARGET DATE	MEASURABLE GOAL
Identify structural and/or non-structural controls needed to promote effective post-construction stormwater management	Year 1	10/2016	List of controls
Implement Post-construction BMP in areas of construction one acre or more	Year 1-3	May	Report number of sites and types of controls used
Evaluate benefits of controls and modify as necessary	Year 4	2/2019	Report any modifications
Implement Post-construction BMPs in areas of construction one acre or more	Year 4-5	May	Report number of sites and types of controls used

Responsible Party: Stormwater Manager or his/her designee

5.3.4 Post-Construction Education

The City will review and modify as needed appropriate brochures for specific development and/or re-development sites. The City will distribute appropriate post-construction brochures to construction contractors filing for permits. The City will follow-up brochure distribution with inspection activities to determine effectiveness and modify brochures as necessary.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Review and modify, as necessary, post-construction educational materials such as brochures, specifications, and/or requirements	Year 1	10/2016	Report educational materials utilized
Review and modify, as needed, post-construction inspection procedures for City inspectors	Year 2	5/2017	Report inspection procedures utilized
Distribute post-construction educational materials	Year 2-5	Ongoing	Number and types of materials distributed
Train post-construction inspectors	Year 2	10/2017	Number of inspectors training and training presented
Review benefit of educational materials	Year 4	8/2019	Report Cost Benefit analysis
Continue distribution of post-construction educational materials	Year 5	Ongoing	Date implemented

Responsible Party: Stormwater Manager or his/her designee

5.3.5 Post-Construction Notification and Inspection Program

The City will update its program to receive notification of post-construction stormwater implementation devices to the City Stormwater Program for comment. The City will provide training to 100 percent of post-construction inspectors by end of Year 1. The program will include site inspections of 50 percent of the post-construction BMP annually, beginning in Year 2 for the proper use of BMP erosion, sediment, and waste control.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Update the post-construction notification program to promote effective post-construction stormwater management, and that would prevent or minimize water quality impacts and attempt to maintain pre-development runoff conditions	Year 1	10/2016	Report date notification activities developed
Implement post-construction notification program	Year 2	2/2017	Number of notifications distributed
Inspect 50% of post-construction sites one acre or more	Year 2-5	Ongoing	Number of inspections and finding
Inspect 100% of complaint driven post-construction sites one acre or more	Year 2-5	As Needed	Number of inspections and finding

Responsible Party: Stormwater Manager or his/her designee

6.0 MCM 6 – Pollution Prevention and Good Housekeeping for MS4 Operations Program BMP

6.3.1 Storm Drain Markers

The City will develop a new stencil program to present water quality messages on storm drain inlets. The messages will be specific to particular watersheds and may contain messages regarding TMDL's and/or impaired waters. The stencils will serve as an educational reminder to keep the drains clean.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop specific message(s) for storm drain, as necessary	Year 1	10/2016	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 2	5/2017	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 3	5/2018	Total number of storm drains installed/re-installed
Install message on storm drain, as necessary	Year 4	5/2019	Total number of storm drains installed/re-installed
Review system and determine future updates/needs	Year 5	10/2020	Updates and assessment

Responsible Party: Stormwater Manager or his/her designee

6.3.2 Survey Municipal Operations and Implement Necessary BMP

City staff will perform a complete survey of City municipal operations to determine if any BMP needs to be updated and/or implemented. The City will research the type of controls needed to obtain the best results for stormwater quality and obtain necessary funding to implement the controls. The City will continue to implement BMP at designated locations, and will develop training procedures for implementation of BMP. City staff will inspect BMP for proper implementation.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Survey of municipal/industrial operations	Year 1	5/2016	Report findings of survey
Develop a list of City facilities, as necessary, subject to the DEQ Multi-Sector General Permit or individual OPDES or NPDES permits for discharges of storm water associated with industrial activity that ultimately discharge to the City SMS4.	Year 1	8/1016	Report list
Assess the need of specific BMP required	Year 1	10/2010	Report BMPs selected
Develop training for BMP implementation	Year 2	5/2017	Report on training program developed
Train City personnel on BMP implementation	Year 2	8/2017	Report number of personnel trained and training program presented
Implement necessary BMPs where applicable	Year 2-5	Ongoing	Report the number and type of BMPs utilized, and their location
Re-survey municipal/industrial operations for additional BMP utilization	Year 3-5	May	Number of surveys completed and findings

Responsible Party: Stormwater Manager or his/her designee

6.3.3 City Employee/Contractor Training

The City will provide training to identified City employees, and contractors hired by the City, who are responsible for municipal and industrial stormwater operations. The training will be an annual requirement. The training program will include education on preventing and reducing stormwater pollution. Attendees will receive a certificate for completion of the program and the City will document trained employees and/or contractors. The City of Moore will annually send appropriate staff members to the MS4 Stormwater Conference when held in the U.S. EPA Region 6 area and/or other areas when funding allows.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Develop training programs	Year 1	10/2016	Report training programs developed
Perform training	Year 2	2/2017	Report training program presented and number and type of personnel
Perform training	Year 3	2/2018	Report training program presented and number and type of personnel
Perform training	Year 4	2/2019	Report training program presented and number and type of personnel
Assess effectiveness of training	Year 4	8/2019	Provide results of assessment
Perform training	Year 5	2/2020	Report training program presented and number and type of personnel

Responsible Party: Stormwater Manager or his/her designee

6.3.4 Good Housekeeping Maintenance Program

The City will inspect and assess current structural controls and maintenance efforts to reduce floatables and other pollutants to include street sweeping, catch basin, and ditch/swale cleaning efforts. City staff will determine if the controls are effective and develop an ongoing schedule for good housekeeping maintenance activities. City staff will perform annual inspections of facilities, structural controls, and maintenance efforts.

ACTIVITY	FREQUENCY	TARGET DATE	MEASURABLE GOAL
Waste oil recycling	Annually	As Needed	Record the number of gallons of oil waste recycled from City activities
Develop inspection and assessment procedures.	Year 1	8/2016	Report inspection and assessment procedures developed
Perform inspection on 20% of the MS4 and repair as necessary	Annually	10/2016	Report findings and repairs
Inspect and assess 20 % of current MS4 structural controls and maintenance efforts	Annually	10/2016	Develop report of findings
Perform street sweeping on major streets, as required	Year 1-5	Ongoing	Report number of miles swept
Perform street sweeping on residential streets, as required	Year 1-5	Ongoing	Report number of miles swept
Perform catch-basin cleaning, as required	Year 1-5	Ongoing	Report number of basins cleaned
Perform ditch/swale cleaning as required	Year 1-5	Ongoing	Report linear feet of ditch/swale cleaning performed
Assess effectiveness of maintenance program	Year 4	8/2019	Provide results of assessment

Responsible Party: Stormwater Manager or his/her designee

ATTACHMENT B

OPDES Permit No. OKR04 Fact Sheet

ATTACHMENT C

OPDES Permit No. OKR04

CITY OF MOORE MS4 AND LAKE THUNDERBIRD TMDL COMPLIANCE PLAN

November 2015 - Final

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ACRONYMS / GLOSSARY

ACOG - Association of Central Oklahoma Governments

BMP – Best Management Practice(s)

CP - Lake Thunderbird Compliance Plan, document that sets the way the City of Moore will meet the regulatory requirements.

DEQ – Oklahoma Department of Environmental Quality

LID- Low Impact Development , comprehensive strategy for maintaining predevelopment runoff characteristics by integrating site design, natural hydrology, and smaller controls to capture and treat runoff at the source.

EPA – Environmental Protection Agency

Impervious Surface-surfaces that prevent stormwater from infiltrating to below the ground, includes rooftops, pavement, and gravel.

MS4 – Municipal Separate Storm Sewer System

OPDES – Oklahoma Pollutant Discharge Elimination System

Nutrients – Total phosphorus and total nitrogen

TMDL – Total Maximum Daily Load, the maximum amount of a pollutant a water body can receive and still meet water quality standards.

TN – Total Nitrogen

TP – Total Phosphorus

TSS – Total Suspended Solids

CBOD - Carbonaceous Oxygen Demand

Watershed – an area of land that drains down slope to the lowest point, discharging to a river, river system or other body of water.

WL - Load Allocation

WLA – Waste Load Allocations

EXECUTIVE SUMMARY

The City of Moore (City) Municipal Separate Storm Sewer System (MS4) and Lake Thunderbird Total Maximum Daily Load (TMDL) Compliance Plan (CP) is required by Section 303(d) of the federal Clean Water Act (CWA) and U.S. Environmental Protection Agency (EPA) Water Quality Planning and Management Regulations (40 Code of Federal Regulations [CFR] Part 130); which requires development of "total maximum daily loads" (TMDLs) for waterbodies not meeting designated uses where technology-based controls are in place. TMDLs establish the allowable loadings of pollutants or other quantifiable parameters for a waterbody based on the relationship between pollution sources and in-stream water quality conditions to implement water quality-based controls to reduce pollution from point and nonpoint sources and restore and maintain water quality (EPA, 1991a).

Lake Thunderbird is on Oklahoma's 2012 303(d) list for impaired beneficial uses of public/private water supply and warm water aquatic community life. Causes of impairment have been identified in the Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs, approved by the EPA on November 13, 2013, as low oxygen levels, high levels of chlorophyll-*a*, and high turbidity (DEQ, 2010a). Lake Thunderbird is designated by the Oklahoma Water Quality Standards (OWRB 2011) as a Sensitive Water Supply (SWS) since the Lake serves as the primary public water supply source for the cities of Norman, Midwest City and Del City. There are three municipalities within the Lake Thunderbird watershed: the City of Moore, the City of Norman and Oklahoma City.

The CP is a plan for achieving the 35% waste load (WL) reduction of total suspended solids (TSS), total nitrogen (TN), total phosphorous (TP), and carbonaceous biological oxygen demand (CBOD) established in the TMDL. The "waste load" (WL) reduction activities are also included as minimum control measures in the City of Moore Oklahoma Pollutant Discharge Elimination System (OPDES) Phase II Small MS4 permit required Storm Water Management Plan.

The CP presents the strategies to meet the WL reductions and TMDL goals as specified in the TMDL and current MS4 permit. Specifically, the CP will provide the basis for the City to:

1. Provide Best Management Practices (BMPs) to achieve an equivalent of 35% WL reductions of its contributing watershed which stormwater runoff is managed to the maximum extent practicable (MEP).
2. Meet TMDL Waste load Allocations (WLAs) approved by the Oklahoma Department of Environmental Quality (DEQ) and EPA.
3. Educate and involve residents, businesses, and stakeholder groups in achieving measurable water quality improvements.
4. Establish a reporting framework that will be used for annual reporting as required in the City's OPDES MS4 Permit.
5. Identify necessary maintenance, adaptive management, staffing, and financial strategies to implement the CP.

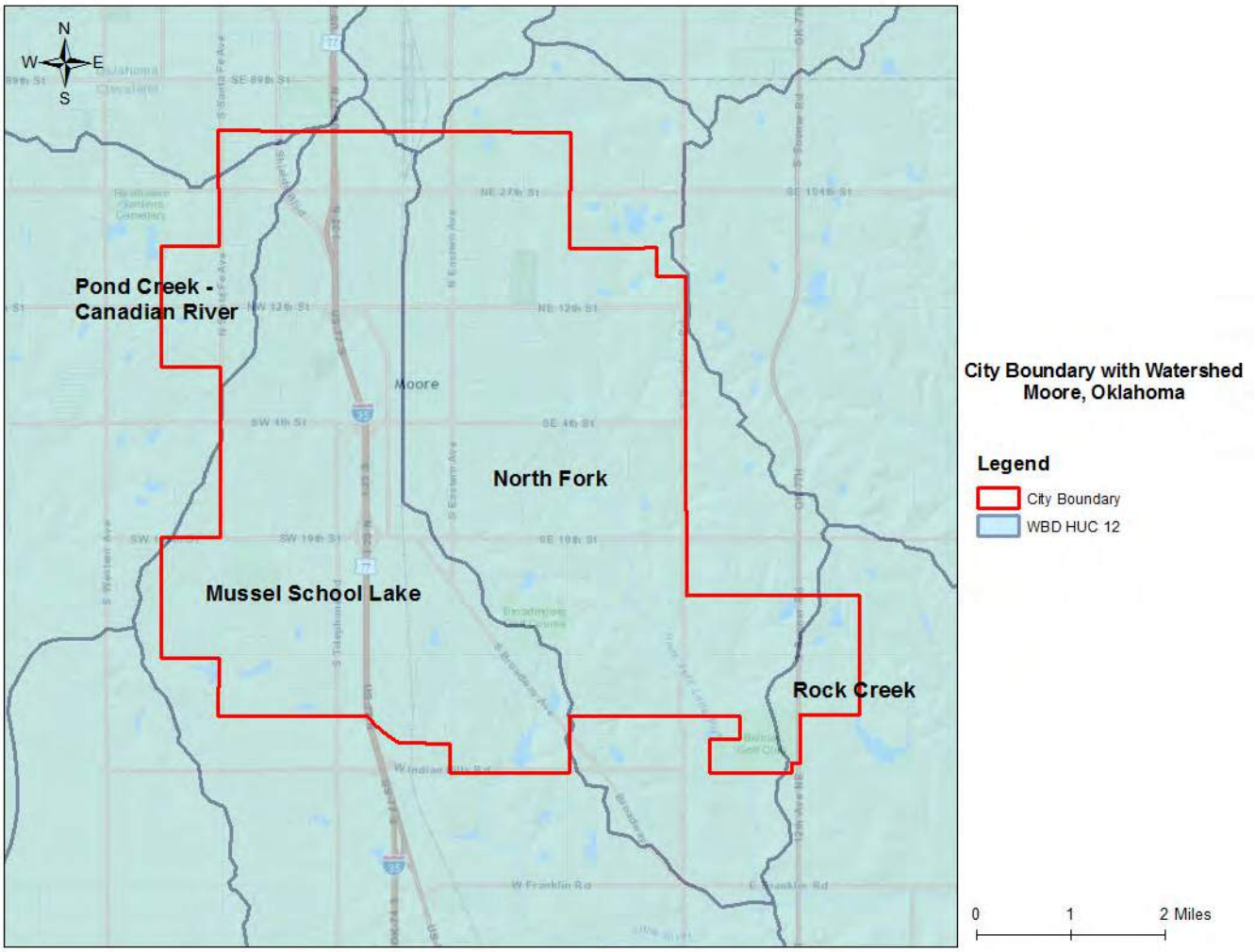
City of Moore: Existing Conditions and Challenges

The City's MS4 permit coverage area includes the land within the legal City boundary, see Figure 1 below, discharging to and associated with runoff to Little River and its tributaries. For the purposes of the WL reduction and TMDL compliance conditions of the MS4 permit, the CP will concentrate on the area within the City limits, which includes the following watersheds, as defined by the Department of Natural Resources:

1. Little River
2. North Fork of the Little River

Although neither of the above watersheds are listed as impaired, they contribute flow to Lake Thunderbird and are assigned a TMDL associated with nutrients and sediment. The City is part of the Lake Thunderbird watershed, and therefore subject to the TMDL for nutrients and sediments. The Lake Thunderbird TMDL available guidance documents were focused on the pollutant loadings based on construction, industrial, and MS4 permittee contributions and their correlation of BMPs to quantified reductions of nutrients and sediment. Illicit discharge detection and elimination (IDDE) programs will be used to reduce the loadings of the other potential contributors.

Figure 1: Legal City Boundary



Meeting the TMDL Goals

To meet the 35% reduction goal, the City will utilize a diverse and comprehensive approach for meeting the TMDL requirements as needed. This includes:

- Implementing stormwater management projects, including traditional Best Management Practice(s) (BMP), Low Impact Development Design (LID) practices where applicable, and Educational BMP;
- Employing a variety of programs to improve water quality, including mechanical street sweeping, construction site inspections, and IDDE; and
- Fostering partnerships to encourage private development of stormwater management practices.

Finally, the City believes that by implementing stormwater management projects, employing a variety of programs, and fostering partnerships, we will be on track to meet the TMDL goals. Implementing these practices will provide a reduction of 35% of our current WL to meet the TMDL requirement of 205.1 Kg/day of TN, 44.5 Kg/day of TP, 781.3 Kg/day of CBOD, and 16,236.0 Kg/day of TSS by the end of the third MS4 permit period. Education and enforcement programs focused on illicit discharges, in

concert with water and sanitary sewer infrastructure improvements, will also result a reduction of nutrients. A monitoring program focused on illicit discharges will address the TMDL for TSS and nutrients from construction and industrial permittees.

Public Outreach

In order for the CP to be successful, it will need an informed public and engaged partners to review and provide advice on the Plan as well as identify needs and issues that will need to be addressed. The City recognizes and is committed to the role that public outreach and stewardship will play if improved water quality conditions are going to be achieved. This will require engaging diverse set of stakeholders who can serve as the leaders and champions for clean water in their communities, including greater participation from business groups, schools, and neighborhood associations. Additionally, this approach requires working collaboratively with other City agencies to look for better and more efficient ways to communicate messages, cross-train, and create synergies that result in greater engagement, greater awareness, and sustained changes in behavior.

Maintenance

Having a successful TMDL program does not stop with the implementation of BMPs; in order to improve maintenance of current facilities, as well as meet the stormwater management practices that will be implemented to meet the Small MS4 Permit and TMDL requirements, the City will focus on BMP maintenance and implementation. The City has designated personnel, as identified in the City of Moore SWMP that will maintain all city-owned BMP, regardless of the agency that installed or is responsible for the BMP.

1 INTRODUCTION

On October 18, 2015, The Oklahoma Department of Environmental Quality (DEQ) reissued an Oklahoma Pollutant Discharge Elimination System (OPDES) Small Municipal Separate Storm Sewer (MS4) General Permit, which takes effect November 1, 2015. The City initially submitted a Notice of Intent (NOI) on March 8, 2005 for permit coverage under OKR04 and is currently updating its Stormwater Management Program (SWMP) as required by the newly reissued permit. This permit lasts for 5 years and covers stormwater discharges from the MS4 owned or operated by the City.

In order to reduce potentially contaminated stormwater runoff and improve water quality, the City's MS4 permit requires that the City develop a compliance plan (CP) by November 13, 2015 to reduce by 35% its contribution of Total Nitrogen, Total Phosphorus, Carbonaceous Biological Oxygen Demand (CBOD), and total suspended solids (TSS) as required in the Lake Thunderbird TMDL. Thirty-five percent restoration represents a significant commitment by the City to reduce potential pollutants through educational activities, construction inspection, identification, review, and possible implementation of low impact development (LID) standards, and good housekeeping procedures and implementation.

The MS4 Permit requires that the City manage, implement, and enforce a stormwater management program in accordance with the Clean Water Act (CWA) and corresponding stormwater OPDES regulations, 40 CFR Part 122, to meet the following requirements:

1. Effectively prohibit pollutants in stormwater discharges or other unauthorized discharges into the MS4 as necessary to comply with DEQ's receiving water quality standards;
2. Attain applicable waste load allocations (WLA) for each established or approved TMDL for each receiving water body, consistent with Title 33 of the U.S. Code (USC) §1342(p)(3)(B)(iii); 40 CFR §122.44(k)(2); and
3. Comply with all other provisions and requirements contained in the MS4 permit, and in plans and schedules developed in fulfillment of the MS4 permit such as the Lake Thunderbird TMDL.

One condition of the City's MS4 Permit is to make progress toward implementation of TMDL load reduction allocations in the City watersheds.

Understanding the physical, economic, social, hydrologic, and organizational conditions of the City provides necessary guidance to craft a CP that best achieves the established restoration goals. The CP is divided into 6 Sections and an Appendix:

1. Background – this section establishes the CP strategy, identifying the existing conditions, current initiatives, and other information that form the basis of decision making.
2. Projects, Programs, and Partnerships – this section includes a brief description of the strategy for implementing the CP, including public outreach and maintenance.

3. Milestones – this section summarizes year-by-year goals to track progress within the permit periods. Progress of the milestones will be included in Annual MS4 Reports submitted to the DEQ.
4. Adaptive Management –this section includes the plan for evaluating and adjusting the CP.
5. Financial Strategy – this section identifies the funding sources and strategies for financing, implementing, and maintaining the projects and programs identified in the CP.
6. Resources – this section includes a list of resources, publications, and website referenced.
7. Appendix B – this appendix includes a detailed chart for tracking proposed best management practice(s) (BMP). Status summaries of the charts will be developed and updated during the new 2015 OKR04 Small Phase II MS4 General Permit cycle (referred to as the first Permit term relating to implementation of this CP) and included in the Annual MS4 Reports submitted to DEQ.

2 BACKGROUND

2.1 Existing Conditions

2.1.1 Geography

The City is located just south of Oklahoma City and north of Norman, in central Oklahoma. The City has a total area of 22.2 square miles of which 21.8 square miles is land and 0.35 square miles or 1.52%, is water.

The City lies in the Cross Timbers region of the Southern Plains. The soil types associated with this area, according to the Natural Resources Conservation Service, are designated:

- Phy (approximately 45% of the City)- HENNESSEY FORMATION (Permian) Shale and siltstone, poorly exposed, mostly moderate reddish brown (10R4/6), moderate red (5R4/6), to moderate reddish orange (10R6/6) with conspicuous light greenish gray (5GY8/1) iron-reduction spots. The lower 20 - 30 ft is predominantly a blocky-weathering, silty shale and clayshale that exhibits good paleosol development; locally with lenticular beds of sandstone and siltstone-pebble conglomerate and fine- to very fine grained sandstone. Shale typically unstratified and highly fractured; rarely with small-scale slickensides that are evidence of paleosol development. Above the lower part, thinbedded to laminated, stratified to well stratified siltstones and very fine grained sandstones are more common. Siltstone moderately to well stratified. Sandstone locally cross-stratified on large and small scale, uncommonly trough-cross-stratified and/or ripple marked. Trace fossils and shale rip-up clasts very rare. Sandstone rarely forms channelform deposits. Shale outcrops locally weather to blocky, very fractured, or “hackly” appearance; form bare, rounded outcrops and/or “badlands”-type topography. In other places, shale weathers to muddy soil with abundant small calcareous nodules. Calcite veinlets uncommon. Interbedded siltstone and shale weather to bench-and-slope topography. Siltstone and sandstone exhibit platy to flaggy weathering. Siltstone and sandstone beds with small-scale cross-stratification and ripples. Moderately indurated, occur as resistant beds capping tops of hills and ridges. Overall, unit is expressed as highly weathered, muddy soil. Thickness: 0 - 220 ft, top not exposed.
- Qcs (approximately 25% of the City) - COVER SAND (Pleistocene) Very fine grained to coarse-grained silt and clay, moderately to poorly sorted. Consists mainly of rounded to subrounded quartz grains, with abundant silt and clay-size material. Forms extensive nearly flat topographic surfaces as much as 50 ft above modern alluvial valleys. Probably represents eolian reworking of older Pleistocene-aged terrace deposits. Thickness: from a thin veneer to as much as 10 ft, averages closer to 3 ft.
- Qglo (approximately 20% of the City) - REMNANTS OF OLDER TERRACE DEPOSITS (Pleistocene) Clay, silt, sand, and gravel adjacent to flood plain of Little River. Sand commonly is medium- to coarse-grained and very light colored; gravel locally consists of concentrations of distally derived pebbles and cobbles, mostly well rounded and sub-discoidal quartz and metaquartzites. Base of unit is about 30 ft to 60 ft above the modern flood plain and ranges in elevation from

1130 ft to 1190 ft above sea level. The top of the unit is as much as 70 ft above the modern flood plain and is as high as 1230 ft above sea level. The majority of these deposits occur along the north side of Little River. Thickness: 0 to 35 ft, averages about 10 ft.

- Qal (approximately 10% of the City) - ALLUVIUM (Holocene) Clay, silt, sand, and gravel in channels and on flood plains of modern streams. Includes terrace deposits of similar composition located directly above and adjacent to modern channels and flood plains. Thickness: 0 to about 30 ft.

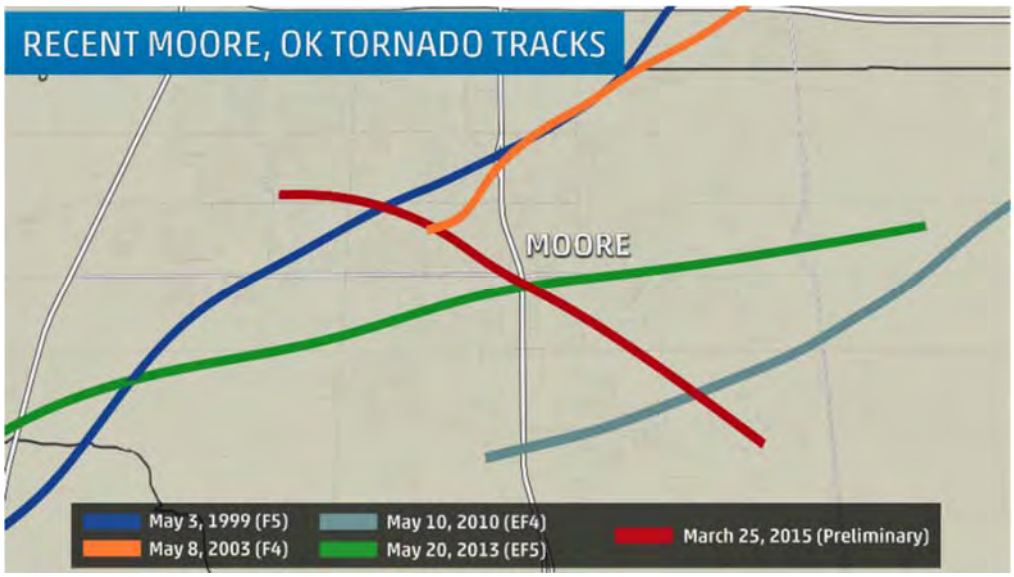
As indicated by the soil types listed above the City is located on soil that is naturally predisposed to excessive soil runoff during storm events. This predisposition to natural erosion places a greater burden on the City to control the amount of total suspended solids from entering Little River and other un-named tributaries discharging to Lake Thunderbird.

2.1.2 History

The City of Moore has seen ten tornadoes between 1998 and 2015, three of them big enough to claim lives and cause catastrophic damage. The City was damaged by significant tornadoes on October 4, 1998; May 3, 1999; May 8, 2003; May 10, 2010; and May 20, 2013, with weaker tornadoes striking at other times, notably May 31, 2013 and March 25, 2015. The most significant tornadoes to hit the City occurred in 1999 and 2013. The tracks of the tornadoes can be seen in Figure 2 below,

After the May 31, 2013 tornado the City saw two schools, a school administration building, a regional hospital, 90-businesses and over 2,400-housing units damaged or destroyed. The figure is important as it relates to disaster recovery in the City related to rebuilding significant structures. This disaster rebuilding may, in part, relate to abnormally higher instances of TSS contribution.

Figure 2: Tornado Tracks



The City is currently working with consultants to prepare the Comprehensive Storm Water Management and Drainage Plan with the goal to develop a comprehensive, integrated storm water plan for the City, The plan will evaluate existing and potential drainage and flooding problems within the City and recommend capital improvement projects and/or programmatic measures to correct or avoid such problems. The projects will include streambank stabilization to reduce the potential for erosion within the City.

2.1.3 Potential Sources of TSS, Nutrients, and CBOD

An investigation to determine potential sources of TSS, nutrients and CBOD deposition was conducted within the City. Each area of the city was inspected by on-ground investigation and utilization of existing GIS data. An inventory of outfalls from existing GIS records was utilized to determine contributing areas within each of the established watersheds within the City.

The City consists of three Wards, each with its own characteristics, see Figures 3,4,5, and 6 below.

- Ward 1 is a mix of light commercial, minor industrial, single and multi-family residential and maintains the largest amount of open space and agricultural activities. Ward 1 discharges mainly to the North Fork of the Little River.
- Ward 2 is a mix of light commercial along IH-35, minor industrial, single and multi-family residential. Ward 2 discharges to both the North Fork of the Little River in the east and Little River to the west.
- Ward 3 is a mix of commercial, some minor industrial and single and multi-family residential. Ward three also has constructed water amenities that contain waterfowl populations.

Figure 3: City Wards

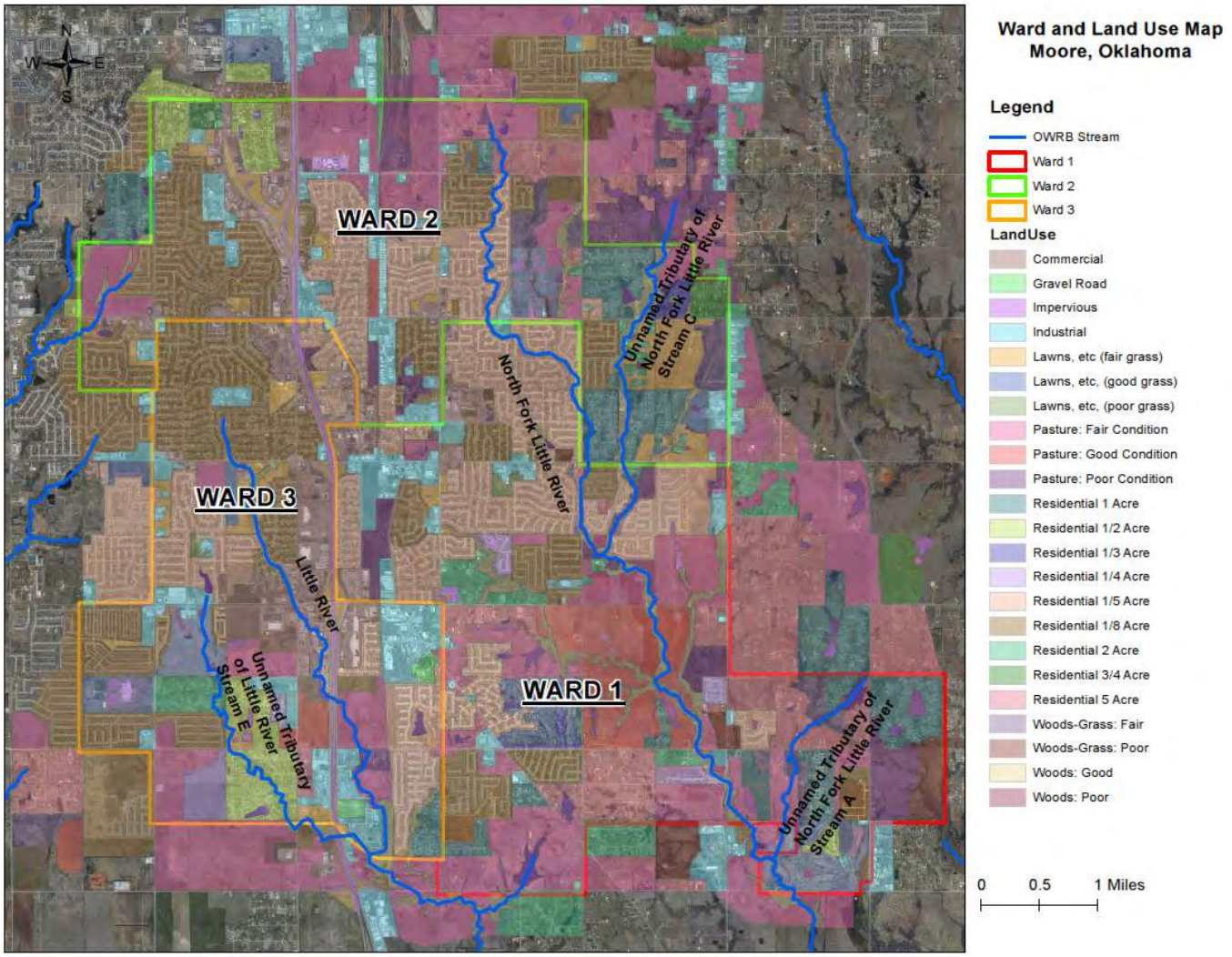


Figure 4: Ward 1

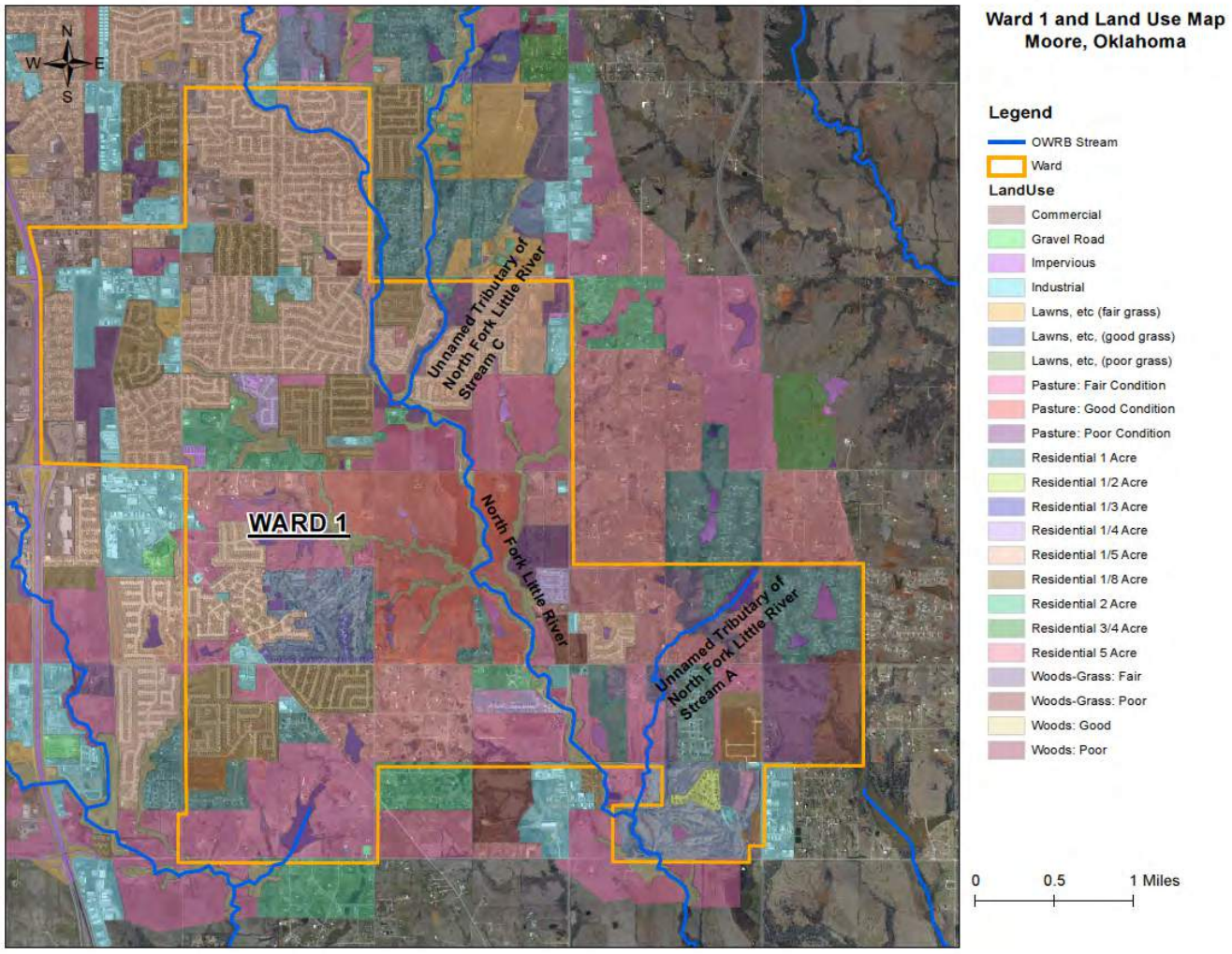


Figure 5: Ward 2

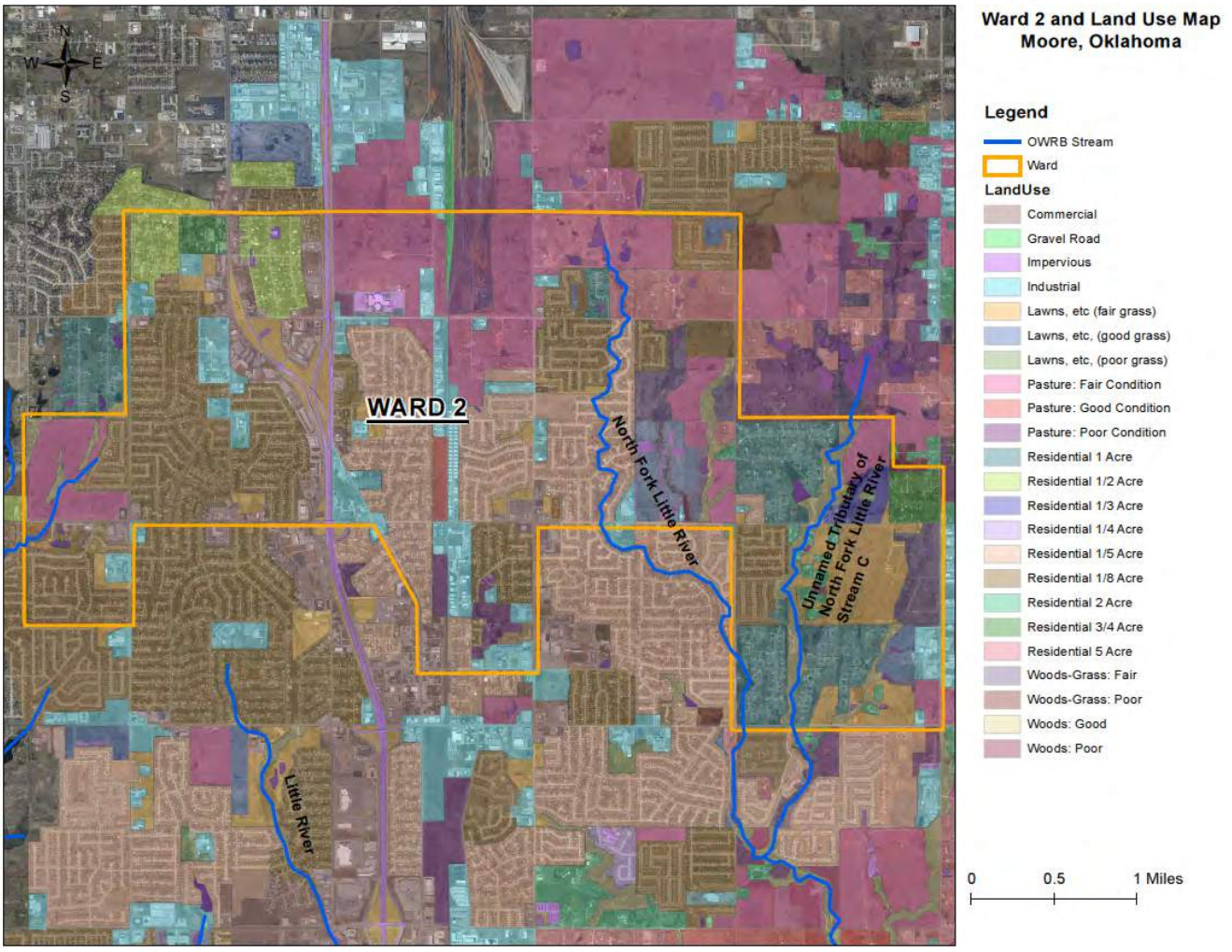
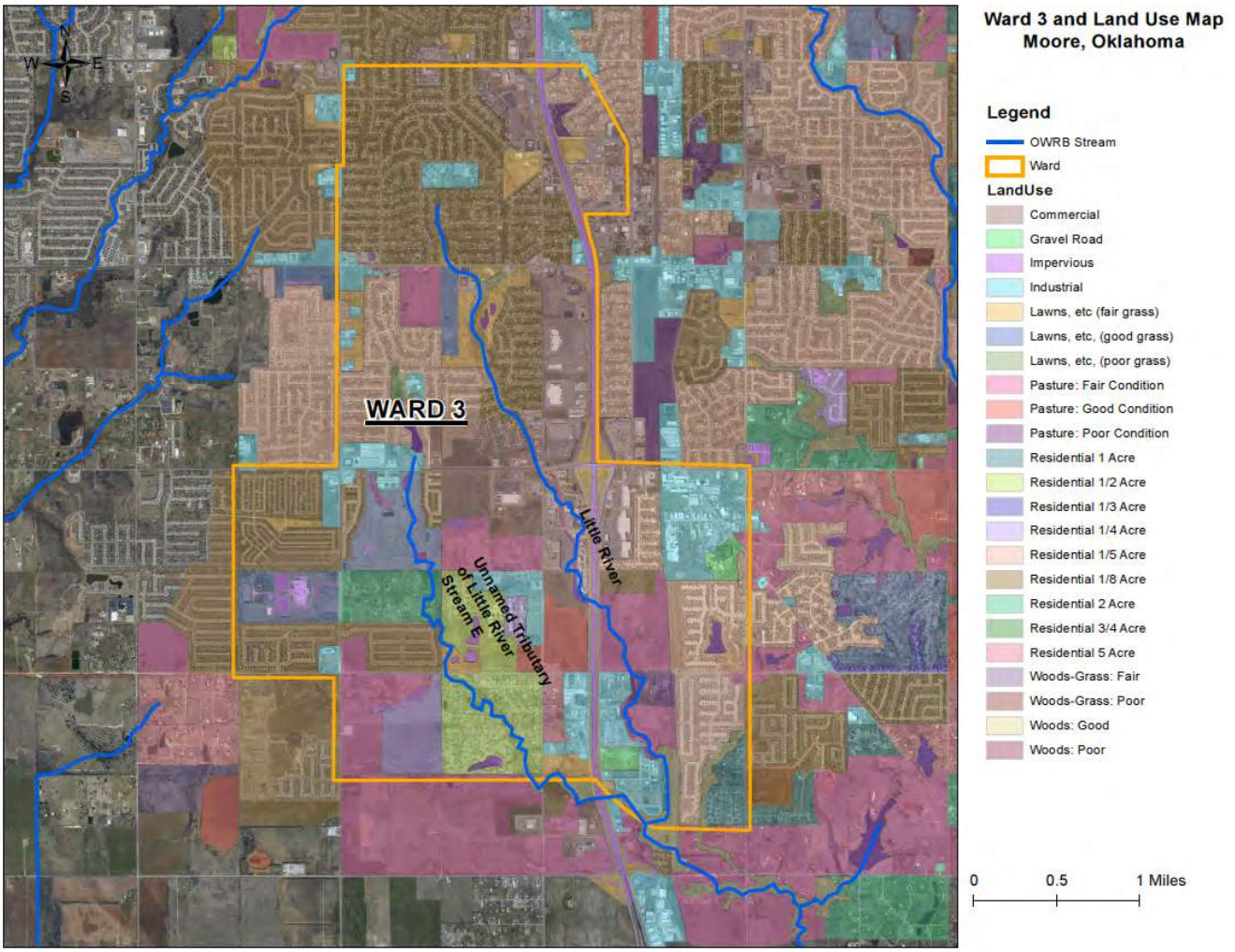


Figure 6: Ward 3



After inspecting the three wards for potential pollutant sources, it has been determined that following sources, in order suspected contribution, have the greatest potential to contribute. A detailed evaluation of sources will be performed during the first permit term.

1. Construction sites: construction within the City will continue as the City grows at its current rate, but as indicated above; the City has seen increased construction activities due to tornado destruction. Construction activities can contribute TSS, which in the case of the Lake Thunderbird TMDL is used as a surrogate that has the potential to carry nutrients along with the potential TSS discharges.
2. Pet, Waterfowl, and Livestock Waste: Pet waste continues to be a significant source of potential nutrients that can enter the Lake Thunderbird watershed, along with livestock mainly located in Ward 2. Waterfowl, located within Ward 3 at the constructed water amenities, can contribute significant levels of nutrients as the population grows and becomes domesticated. Waterfowl problems in urban and suburban areas are primarily caused by giant Canada geese, which are probably the most adaptable of all waterfowl. If left undisturbed, these geese can readily establish nesting territories on constructed water amenities, in residential yards, golf courses, condominium complexes, city parks, or on agricultural areas. Waterfowl can soon turn from visual amenity to pest, however. A pair of geese can, in 5 to 7 years, easily become 50 to 100 birds that can then foul constructed water amenities and surrounding greenbelts and damage landscaping, gardens, and golf courses.
3. Fertilizer Application: Fertilizer application in the spring can potentially contribute to nutrient loadings within the City.
4. Natural Soil Runoff: As stated above in Section 2.1.1, the City lies on very sandy soil that very easily and naturally erodes through storm event runoff. Natural soil runoff includes streambank stabilization within the channels and streams of the City. Currently the City is conducting a study of potential streambank stabilization opportunities through hydro-geomorphology improvements. This may be the most difficult potential contribution to reduce, but can be minimized through the use of low impact development (LID) and streambank stabilization techniques.
5. Sanitary Sewer Overflows: Sanitary sewer overflows can potentially contribute to the nutrient loading within the Lake Thunderbird watershed.

2.1.4 Stormwater Infrastructure and Streams

The City has about 18.8 miles of streams, and consist of the Little River and North Fork of Little River and their unnamed tributaries. However, the open network of the City MS4 (natural ditches, improved ditches, natural channels, improved channels, and constructed open conveyances is approximately 183 linear miles and are all part of the City's MS4. The storm drain system includes:

- 23 miles of storm drain pipes
- 900 storm drain inlets

- 5,432 manholes
- 43 outfalls
- 4 outfalls 36 inches or greater

2.1.5 Land Usage

DEMOGRAPHIC ANALYSIS

The City's population grew from 41,699 in 2000 to 55,081 in 2010, over 32%, a faster pace than Cleveland County, the Oklahoma City Metropolitan Statistical Area (MSA), and the State of Oklahoma. According to the Oklahoma Department of Commerce, the population of Cleveland County is projected to grow an additional 14.5% in the next ten years from 262,862 in 2012 to 303,105 in 2022.

- Households grew at an even faster rate than population, increasing almost 36% from 2000 to 2010. Non-family households make up 26.7% of the households in Moore, and nearly 80% are one-person households. The City's highly regarded school system has been largely credited for the attraction of family households to Moore.

HOUSING ANALYSIS

Based on data obtained from the Cleveland County real property tax assessment database, the City contains a total of 21,199 residential dwelling units comprising single family detached, mobile homes, duplexes, and garden apartments.

- In 2012, the City housing inventory comprised 69% owner occupied homes, compared to 59% of owner occupied homes in the State of Oklahoma and 66% in the nation. The renter occupied inventory in the City was 26% in the same year, compared to 29% in the state and 34% in the nation. The percentage of rental occupied homes rose from 22% in 2000 to 26% in 2012, following a national trend. Based on an inventory of 1,899 apartments and 853 duplexes/triplexes of which 90%, or 768, are probably rentals, the balance of approximately 2,845 renter occupied dwellings comprise single family detached units.
- Based on the preceding analysis, rental housing can be broken out as follows:
    - Total rental occupied units: 5,512
    - Purpose built rental units: 2,667
        - Apartments: 1,899
        - Duplexes: 768
        - Estimated single family rentals: 2,845
- Since 2012, 702 apartment units, 110-duplexes, and 337 single family homes have been constructed. An examination of proposed development in the City (as of Nov. 1 2015) shows a

diverse mix of residential use types in the planning stages, including 80 duplex units, approximately 400 single-family homes, and 264 apartment units.

- Most of the remaining developable land in the City falls into the Rural Residential and Urban Residential/Low Density zoning designations, with only small amounts of acreage that could be developed to Medium Density or High Density Residential. In total, vacant and underutilized land could support a range of 2,123 to 16,478 residential units at full build out, with a midpoint of 9,300 units. The minimum build out of 2,123 units is estimated at approximately 4- 7 years, the maximum build out of 16,478 units is estimated at 34-55 years, and the midpoint of 9,300 units is estimated at 19-31 years.
- The May 2013 F5 tornado, nearly a mile wide, directly impacted almost 10% of the City's entire housing stock by either damaging or completely destructing housing units. Of a total of 1,776 single family homes impacted, 696 were damaged and 1,080 were destroyed. Approximately 247 apartment units were destroyed in the event. Approximately 700 single family residential building permits have been issued for rebuilds and 450 have been issued for remodels.

HOUSING BUILDOUT ESTIMATES

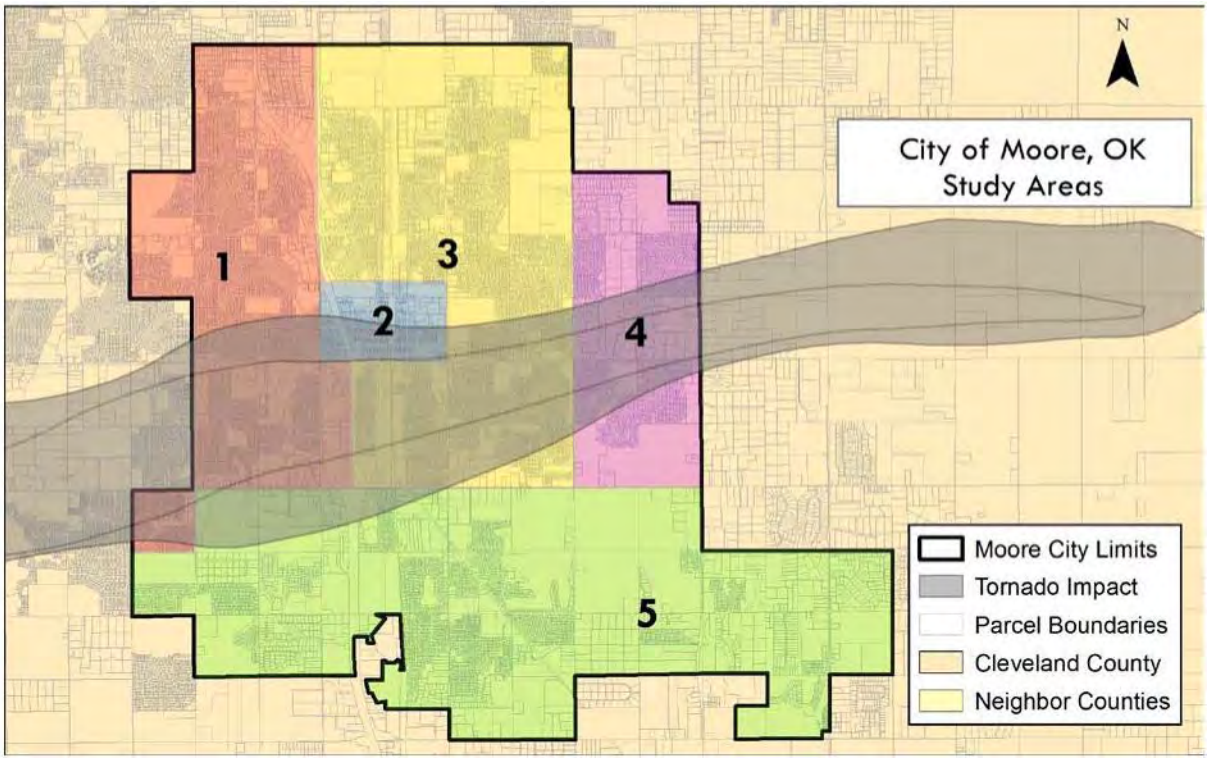
The City's future residential development is constrained by its relatively limited land area of 22 square miles, in stark contrast to the 621 square miles of Oklahoma City and 190 square miles of Norman. Given the finite and limited amount of land remaining for residential development the potential for construction impacts is limited. Most of the remaining developable land in the City falls into the Rural Residential and Urban Residential/Low Density land use designations, with only small amounts of acreage that could be developed to Medium Density of High Density Residential. The 1,082 acres slated for Rural Residential development could support a maximum of 811 residential units, assuming full build out at one unit per 0.75 acres. The 2,402 acres of Urban Residential/Low Density land could support in the range of 811 to 14,413 units at full build out, based on densities of one unit per 0.75 acres to six units per acre. Medium Density land is estimated to equal approximately 39 acres, allows 6 to 14 units per acre, and could support a range of 231 to 578 units. High Density land is estimated to equal approximately 45 acres, allows 6 to 14 units per acre as well, and could support a range of 270 to 675 units. In total, vacant and underutilized land could support a range of 2,123 to 16,478 residential units at full build out, with a midpoint of 9,300 units.

TORNADO IMPACT AREA

This section places specific focus on the housing directly impacted by the May 2013 F5 tornado and the necessity to rebuild at higher than normal rate which may have had an arbitrary effect on potential pollutants such as suspended solids that may have discharged during the development of the Lake Thunderbird TMDL. This potential effect may have contributed to higher than normal discharges of suspended solids and requires that a baseline pollutant study be performed to assure that proper levels are considered to determine what is an elevated level of potential pollutant discharge. The path of the tornado is shown in Figure 7 below. The May 2013 tornado directly impacted almost 10% of Moore's

entire housing stock either by damage or total destruction. Of a total of 1,776 single family homes impacted, 696 were damaged and 1,080 were destroyed.

Figure 7: May 2013 F5 Tornado Path



Source: City of Moore; RKG Associates 2013

2.2 MS4 Permit Coverage

On December 8, 1999, EPA published final regulations that address urban stormwater runoff from cities under 100,000 population and counties that lie within the Urbanized Area as defined by the latest US Bureau of Census designation. These "Phase II" cities and counties must develop a comprehensive Stormwater Management Program that addresses six "Minimum Control Measures" (MCMs). These are:

1. Public Education and Outreach
2. Public Participation and Involvement
3. Illicit Discharge Detection and Elimination
4. Construction Site Stormwater Runoff Control
5. Post Construction Management in New Development and Re-Development
6. Pollution Prevention and Good Housekeeping

The Oklahoma Department of Environmental Quality (DEQ) presently has primary jurisdiction over permitting and enforcement of the Phase II Stormwater Program for Oklahoma. The DEQ has developed

a General Permit (OKR04) for “Phase II Municipal Separate Storm Sewer System Discharges for Small Cities Within the State of Oklahoma” that was re-issued on October 1, 2015. The Phase II regulations require that the regulated community submit a Notice of Intent (NOI) to apply for coverage under the Oklahoma Stormwater General Permit (OKR04) along with a Stormwater Management Program document (SWMP) that specifies, for each MCM, what activities will be performed (Best Management Practices – BMP), along with schedules and measurable goals for each BMP.

The City is updating its existing SWMP document which provides descriptions of all activities that will be conducted on behalf of the City to meet its obligations under the DEQ General Permit for Phase II Municipal Separate Storm Sewer System (MS4) Discharges for Small Cities Within the State of Oklahoma (OKR04). The existing SWMP was submitted on May 8, 2005 along with the Notice of Intent (NOI) that together constitute the application for coverage under the OKR04 general permit; the new NOI and SWMP is due to DEQ by February 1, 2016. All six Minimum Control Measures (MCMs) were addressed in previous SWMP. In addition, the City of Moore will include the requirements of the Lake Thunderbird TMDL into the new SWMP in which the city will have continuous coverage for all MS4 activities. Each MCM has a number of BMP that constitute the core activities pertaining to each MCM. The SWMP Appendices will summarize the BMP and provide Measurable Goals for each BMP, along with descriptions, implementation schedules and estimated annual costs. Every reasonable effort has been, and will be, made to comply with all requirements in the State’s OKR04 general permit for small MS4.

2.2.1 Watersheds

The City has two 8-digit watersheds as designated by the USGS:

1. Little River - 11090203
2. Lower Canadian-Walnut - 11090202

Only the Little River Watershed contributes flow to Lake Thunderbird. The drainage area and features can be found in the Final *"Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs"* Attached as Appendix A.

2.3 Local Government

Implementing the CP and maintaining compliance with the City's MS4 permit requires a collaborative effort among city departments, local non-profit activities such as recycling centers, community partners, and the private sector. This collaboration will focus on the planning, design, construction, implementation, and maintenance of projects and programs.

Community Development

The mission of the Community Development Department is to plan and guide the orderly growth and development of the City, to enforce compliance with applicable legislation in order to meet the quality of life, health, and safety needs of the community, and to deliver to its customers courteous,

efficient, and competent services. The Community Development Department is made of the following separate but related divisions:

- Building Inspections and Permits - The Inspections staff provides inspections and review of residential, commercial and industrial building permits. They provide construction applications within the City and issue MS4 SWMP BMP information requirements such as required DEQ construction permits, City building code standards, and any necessary low impact development requirements adopted.
- Code Enforcement - The Code Enforcement Division works to reduce neighborhood nuisances and residential deterioration within the city. Typical violations include overgrown grass and weeds, parking in the yard, junked vehicles, trash and debris.
- Planning - Planning is an essential service provided by the City to promote the health, safety, and welfare of its residents. The following are the main functions of the planning division:
    - Building ordinances
    - Floodplain administration
    - Geographic Information Systems (GIS)
    - Comprehensive Plan Development
    - Subdivision Development
    - Traffic Impacts
    - Zoning
- Environmental Services - The City's Environmental Services Division is dedicated to improving the environment by offering safe ways to dispose of hazardous waste, convenient options for recycling, and educating the public on the effects of wrongful disposal of liquids into our city sewer system. These values are important in promoting a healthy environment for all residents and visitors alike. The Environmental Services Divison operates the following functions:
    - Household Hazardous Waste Collection
    - Recycling
    - Stormwater Management

Parks and Recreation

The City Parks and Recreation Department works to provide quality recreational opportunities for all citizens of Moore. The Department strives to provide environmentally safe and beneficial areas for recreational purposes, and to coordinate efforts to maximize the use of existing parks utilizing approved methods for maintenance, such as fertilizer application, and use.

Public Utilities

The City of Moore has 230 miles of water line, 34 active water wells, 5 water towers, one ground storage pump station, 2,000 fire hydrants, and two new water booster stations. The Public Utilities Department is made of the following divisions:

- Water
- Sewer and Waste Treatment
- Trash Collection

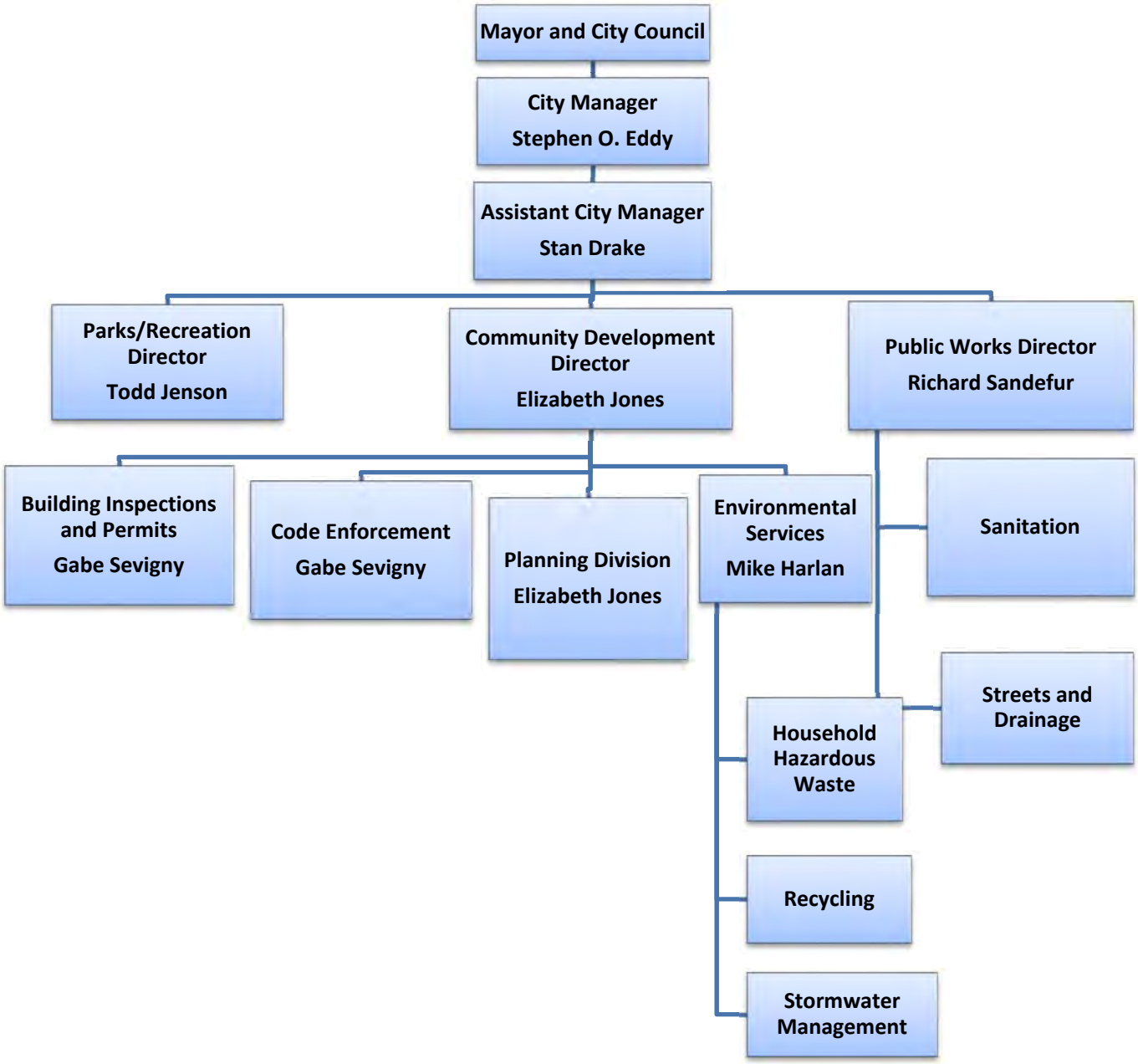
Public Works

The City of Moore Public Works Department has 48 employees who manage:

- Residential Sanitation
- Animal Welfare
- Streets Maintenance
- Fleet Maintenance
- Facilities Maintenance

An organizational chart of the City's departments is presented below in Figure 8.

Figure 8: Organization Chart



Responsibilities and duties of personnel and departments are as follows:

City Manager

- Development of design standards and specifications for stormwater management and erosion and sediment control, as used in the City's capital projects
- Compliance with NPDES General Construction permit of all MS4 capital projects

Community Development Director

- Final approval of proposed policy, financial planning, rate structure and budget recommendations related to this CP to be submitted to the Assistant City Manager, then to the City Manager before presentation to the Mayor and / or City Council for adoption
- Final approval of proposed CP and other MS4 deliverables to be submitted to Environmental Services for review and agreement
- Oversight of outreach and education materials for the City Stormwater Management Program
- Coordination of City and other utility capital improvement projects to reduce land (soil) disturbance

Stormwater Management Division

- Point of contact for the MS4 permit
- CP development and annual reporting for the MS4 permit
- Partnership coordination for grant funding, community engagement, education content
- Stormwater management and erosion and sediment control program for development (plans reviews and inspections)
- Response and investigation for erosion and sediment control and polluted surface waters response
- Surface water quality monitoring - sampling and analysis
- Illicit discharge detection and elimination (IDDE) program

GIS/ IT

- Maintenance of GIS information related to the public storm drain system.
- Maintenance of GIS information related to planned and completed Stormwater management facilities

Public Works Director

- Immediate response to repair and replace infrastructure as it relates to flooding, sewer overflows, and water main breaks

Streets and Roads Division

- Mechanical street sweeping
- Inlet cleaning
- Stream debris removal and disposal

Parks and Recreation

- Fertilizer storage, application, and disposal

2.4 Regional Stormwater Program

The City participates in a regional stormwater program sponsored by the Association of Central Oklahoma Governments (ACOG), a sub-state planning agency in Oklahoma City, Oklahoma. Stakeholders in the ACOG Regional Stormwater Program consists of the voluntary association of Phase II cities and counties that collectively fund specific SWMP activities that are suitable for regional approaches. The ACOG regional activities include public education and participation.

2.5 TMDL

2.5.1 Lake Thunderbird TMDL for Nutrient, Turbidity, and Dissolved Oxygen

Lake Thunderbird is a 6,070-acre reservoir located 13 miles east of downtown Norman in Cleveland County, Oklahoma. The Lake is located within a 256 square mile drainage area of the upper Little River watershed (HUC, 11090203). The Lake, owned by the U.S. Bureau of Reclamation, was constructed to provide flood control, municipal water supply, recreation and wildlife habitat. The Lake serves as the primary public water supply for the cities of Norman, Midwest City, and Del City with water usage governed by the Central Oklahoma Master Conservancy District (COMCD). Lake Thunderbird is on Oklahoma's 2010 303(d) list for impaired beneficial uses of public/private water supply and warm water aquatic community (WWAC).

The purpose of the TMDL is to establish waste load allocations (WLA) and load allocations (LA) determined to be necessary for reducing turbidity and chlorophyll-*a* levels and maintaining sufficient oxygen levels in the Lake to attain water quality targets to restore impaired beneficial uses and protect public health. TMDLs determine the pollutant loading that a waterbody, such as Lake Thunderbird, can assimilate without exceeding applicable water quality standards. TMDLs also establish the pollutant load allocation necessary to meet the water quality standards established for a waterbody based on the relationship between pollutant sources and water quality conditions in the waterbody. A TMDL consists of a waste load allocation (WLA), load allocation (LA), and a margin of safety (MOS). The WLA is the fraction of the total pollutant load apportioned to point sources, and includes stormwater discharges regulated under the National Pollutant Discharge Elimination System (NPDES) as point sources. Additional information can be found in the Final *"Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs"* Appendix A.

2.5.2 TMDL Identification and Water Quality Targets

Designated uses of Lake Thunderbird are flood control, municipal water supply, recreation, and fish and wildlife propagation. Lake Thunderbird is designated as a Category 5a lake on the Oklahoma 303(d) list with a Priority 1 ranking. Category 5 defines a waterbody where, since the water quality standard is not attained, the waterbody is impaired or threatened for one or more designated uses by a pollutant(s), and the water body requires a TMDL. DEQ has determined that Lake Thunderbird, designated as a Sensitive Water Supply (SWS) lake, is not supporting its designated uses for (a) Fish & Wildlife Propagation (FWP) for a Warm Water Aquatic Community because of excessive levels of turbidity and low dissolved oxygen; and (b) Public Water Supply because of excessive chlorophyll-*a* levels. High levels of both turbidity and chlorophyll-*a* can have deleterious effects on the raw water quality, such as taste and odor complaints and treatment costs of drinking water. The water quality targets established for Lake Thunderbird, based on statistics of the most recent 10 years of record, are defined as the long-term average in-lake surface concentration of 10 µg/L for chlorophyll-*a* and the 90th percentile of the in-lake surface concentration of 25 NTU for turbidity.

2.5.3 Watershed and Lake Modeling

A model framework was developed to establish the cause-effect linkage between pollutant loading from the watershed (the HSPF model) and water quality conditions in the lake (the EFDC model). Flow and pollutant loading from the watershed to the Lake was simulated for a one year period from April 2008 to April 2009 with the public domain HSPF watershed model. Watershed model results were used to estimate the relative contributions of point and nonpoint sources of pollutant loading. The three cities of Moore, Norman and Oklahoma City accounted for the dominant share of total pollutant loading from the watershed. The EFDC model was developed to simulate water quality conditions in Lake Thunderbird for sediments, nutrients, organic matter, dissolved oxygen and chlorophyll-*a*.

The linked watershed (HSPF) and lake (EFDC) model framework was used to calculate average annual suspended solids, CBOD, nitrogen and phosphorus loads (kg/yr) that, if achieved, should meet the water quality targets established for turbidity, chlorophyll-*a*, and dissolved oxygen. For reporting purposes, the final TMDLs, according to EPA guidelines, are expressed as daily loads (kg/day). The waste load allocation (WLA) for the TMDL for Lake Thunderbird is assigned to regulated NPDES point source discharges under three MS4 stormwater permits for Moore, Norman and Oklahoma City. The WLA, split among the three MS4 permits, includes pollutant discharges regulated under NPDES stormwater permits for Construction Sites and Multi-Sector General Permit (MSGP) for various industrial facilities located within the MS4 areas of the watershed. The load allocation (LA) for the TMDL is assigned to the small land area of the watershed not included in the land area for the three MS4 permits and is set at the existing loading during the calibration period.

2.5.4 TMDL, Waste Load Allocation, Load Allocation and Margin of Safety

The calibrated lake model (EFDC) was used to evaluate the water quality response to reductions in watershed loading of sediment and nutrients. Load reduction scenario model runs were performed to determine if water quality targets for turbidity and chlorophyll could be attained with watershed-based load reductions based on 35% removal of loading for sediment and nutrients. The long-term model results indicated that compliance with water quality criteria for turbidity, dissolved oxygen and chlorophyll could be achieved within a reasonable time frame. The calibrated model results thus supported the development of TMDLs for sediments, CBOD, TN and TP to achieve compliance with water quality standards for turbidity, chlorophyll and dissolved oxygen.

The load allocation (LA) is computed as the difference from the total maximum daily load (TMDL) and the total WLA load. The TMDL load is split between three WLAs for the three MS4 cities, the LA for the unincorporated area of the watershed and the implicit MOS as shown in Table 1 below.

Table 1: Load Allocations

Water Quality Constituent	TMDL	LA	WLA				MOS
			Total	Moore	Norman	OKC	
	(Kg/day)	(Kg/day)	(Kg/day)	(Kg/day)	(Kg/day)	(Kg/day)	(Kg/day)
Total Nitrogen (TN)	807.7	21.3	786.4	205.1	319.4	261.8	Implicit
Total Phosphorus (TP)	158.4	4.4	154.0	44.5	60.1	49.4	Implicit
CBOD	2,480.8	57.4	2,423.4	781.3	955.6	686.5	Implicit
Suspended solids (TSS)	76,950.8	2,068.7	74,882.1	16,236.0	31,596.1	27,049.9	Implicit

Additional information regarding MOS can be found in the Final *"Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs"* Appendix A.

2.6 Comprehensive Storm Water Management and Drainage Plan

The City is working with consultants to prepare the Comprehensive Storm Water Management and Drainage Plan with the goal to develop a comprehensive, integrated storm water plan for the City. The plan will evaluate existing and potential drainage and flooding problems within the City and recommend capital improvement projects and/or programmatic measures to correct or avoid such problems.

2.7 Other Regulatory Factors

2.7.1 Oklahoma Pollutant Discharge Elimination System (OPDES) Permits

As authorized by the Clean Water Act, the OPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Industrial,

municipal, and other facilities must obtain permits if their discharges go directly to surface waters. The OPDES permit program is administered by DEQ. In addition to the MS4 Permit, three NPDES permits regulate activities in the City:

- OPDES Stormwater Discharges from Construction Activities Permit OKR10

  Stormwater discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb one or more acres, or smaller sites that are part of a larger common plan of development or sale, are regulated under the OPDES stormwater program. Prior to discharging stormwater, construction operators must obtain coverage under an NPDES permit. The General Construction Permit, with its increased regulations, will result in less sediment entering the City's waters. However, the burden of pollutant contribution from these permitted sites has been assigned to the City, and as such the City must now assume the responsibility of reducing the impacts from the permitted sources.

- OPDES Multi-Sector General Permit for Industrial Activities Permit OKR05

  DEQ authorizes the discharge of stormwater associated with industrial activities to waters of the state under the OPDES General Permit Number OKR05. The permit contains provisions that require industrial facilities in 26 different industrial sectors to, among other things, implement control measures and develop site-specific stormwater pollution prevention plans (SWPPP) to comply with OPDES requirements. Again, the burden of pollutant contribution from these permitted sites has been assigned to the City, and as such the City must now assume the responsibility of reducing the impacts from the permitted sources.

- Wastewater Treatment Plant Discharge Permits

  The operations of the City Wastewater Treatment Plant is permitted by DEQ. The permit contains general operating restrictions as well as limitations on the contents of the plants' effluent. Compliance with these numeric effluent limits is determined by regular sampling and reporting to the DEQ. There is no discharge from the treatment plant into the Lake Thunderbird watershed. Sanitary sewer overflows within the City are responded to immediately and reported to DEQ as they occur.

2.7.2 Planning, Zoning, and Development Standards

The City Planning, Zoning and Development Standards (Standards) are the regulations and process by which the City will ensure the design and construction of buildings for public and private development. Updated in 2009, the Standards are based on the National Municipal Code (MuniCode) program, which has been adapted and customized to fit the development conditions, local market and sustainability goals of the City and surrounding environment. Meeting the Standards requires addressing a range of sustainable practices, including stormwater management.

3 CP DEVELOPMENT

As established in Section 3 of the Final *"Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs"* Appendix A, urban stormwater related discharges are the main sources of controllable pollutants to Lake Thunderbird. The three main municipalities in the watershed are therefore required to undertake certain pollutant reduction measures within the terms of their MS4 permits under the OPDES system. These measures are designed to achieve progress toward meeting the reduction goals established in the TMDL. These stormwater BMP based requirements are as follows:

1. Perform an evaluation to identify potential significant sources of TSS, nutrients and organic matter entering the MS4.
    a. Such an evaluation should include an enhanced plan for illicit discharge screening and remediation.
        i. Following the evaluation and using guidelines outlined below, each permittee shall develop (or modify an existing program as necessary) and implement a program to reduce the discharge of TSS, nutrients and organic matters in municipal stormwater contributed by all significant sources identified in the evaluation.

    This evaluation is described in Section 2.1.3 of this CP.

2. An MS4 should demonstrate, in the TMDL Compliance Plan, that it understands the TMDL requirements and that it has a strategy for meeting the WLAs. The City's understanding of the TMDL requirements is presented in Section 2.5 of this CP.
    a. There are several ways for an MS4 to meet a TMDL waste load allocation (WLA) using BMPs and other approaches, including but not limited to:
        i. Retrofitting developed areas and other suitable sites with structural stormwater BMPs (e.g. infiltration BMPs in built out areas).
        ii. Implementing BMPs that prevent additional stormwater TSS, nutrients and organic matter pollution associated with new development and re-development; (e.g. promoting Low Impact Development and green infrastructure, installing infiltration BMPs in areas converting from one land use to another).
        iii. Implementing non-structural BMPs designed for source control (e.g. fertilizer application restrictions or soil nutrient testing requirements, and riparian buffer protection requirements) by considering ordinances or other regulatory mechanisms to require TSS, nutrients and organic matter pollution control, as well as enforcement procedures for noncompliance.
        iv. Implementing non-structural BMPs designed to treat existing loads (e.g. more frequent street sweeping).
        v. Developing and implementing water quality trading: water quality trading among the MS4 permittees may be considered as a tool to achieve the overall WLA of the

TMDLs. As the authorization and enforcement agency of Oklahoma's MS4 permits, the DEQ reserves the authority for the final approval of any trades or trading programs that may be considered in the Lake Thunderbird watershed.

3. Implementing enhanced or more frequent construction site stormwater compliance inspections and considering adopting ordinance that allows "stop work" orders and other enhanced enforcement for construction permit violators.

4. Determining a schedule for achieving the WLA: This schedule can be general in nature, discussing groups of activities to be implemented within permit cycles or based on funding cycles. Specific activities need not be included in this section of the TMDL Compliance Plan. For example:

   "MS4 X" will achieve necessary pollutant reductions within four permit cycles. During the first permit cycle, "MS4 X" will evaluate its existing stormwater program in relation to the TMDL compliance plan, determine if the program requires modification, outline a process for develop the TMDL compliance plan, and implement BMP if opportunities arise. In the second permit cycle, "MS4 X" will modify its stormwater program as necessary, implement non-structural BMP, develop a system to evaluate the effectiveness of these BMPs and implement structural BMP if opportunities arise. In the third permit cycle, "MS4 X" will evaluate the effectiveness of non-structural BMP, determine if structural BMPs (through retrofits) are needed, identify where and which structural BMP will achieve the needed pollutant load reductions, and implement structural BMP if opportunities arise. In the fourth permit cycle, "MS4 X" will implement structural BMP as needed.

5. Implementing and Tracking BMPs

   BMP Summary Sheets should be prepared for both structural and non-structural BMP. For BMP for which pollutant reductions can be calculated or modeled, BMP sheets should include any information used to make the calculations, BMP efficiencies, and maintenance information for the BMP (e.g. to ensure the efficiency used in the calculation is valid into the future or determine if it needs to be adjusted). Include references to support the calculations or modeling.

   BMP Sheets can be prepared for ordinances, resources, or other tools needed for implementation of BMP. Load reductions may be difficult to quantify with these BMP, but these tools may be needed to implement BMP that reduce loading.

6. Educational programs directed at reducing TSS, nutrients and organic matter pollution. Implement a public education program to reduce the discharge of TSS, nutrients and organic matter in municipal stormwater contributed (if applicable) by construction activities, recreational and agricultural activities, etc.

3.1 MS4 Public Meetings

Two Public meetings were held for the Lake Thunderbird TMDL. The first was held on May 24, 2012 and the second on July 23, 2013. These meetings were an opportunity to help educate people about the TMDL modeling and the requirement for development and implementation of the CP, Monitoring Plan (MP, and update of the Phase II Small MS4 SWMP.

The Public Notices can be viewed on http://www.deq.state.ok.us/wqdnew/tmdl/thunderbird/index.html, which also contains presentations, reports, and comments.

3.2 Technical Advisory Committee (TAC) Meetings

Three TAC meetings were conducted during the development of the TMDL. These meeting occurred as follows:

1. September 22, 2011
2. January 17, 2012
3. April 24, 2012

The purpose of the TAC was to inform Stakeholders of technical issues, provide advice on technical issues, and to act as a bridge between DEQ and Stakeholders.

Meeting agendas, presentations, and attendee lists can be viewed on http://www.deq.state.ok.us/wqdnew/tmdl/thunderbird/index.html

4 PROCEDURES TO ACHIEVE WASTE LOAD ALLOWCATION (WLA), BEST MANAGEMENT PRACTICES (BMP)

Given the mainly urban nature of the City of Moore, a diverse and comprehensive approach for meeting the 35% WL reduction and TMDL requirements is needed. This will include:

- Evaluating the need to restore streams (hydro-geomorphology);
- Evaluating, establishing through ordinance, and Installing "low impact development" (LID) stormwater management practices like stormwater retention in public right-of-ways, parking lots, and vacant lots, as well as construction LID practices;
- Evaluating the need to retrofit and/or install ponds or wetlands;
- Evaluating the need to disperse waterfowl populations in water amenities (wildlife management);
- Inspecting and eliminating illicit discharges into the storm sewer system;
- Reducing trash and litter with street sweeping and inlet cleaning;
- Updating ordinances as necessary, such as:
    - Stream Setbacks;
    - Fertilizer application;
    - LID Standards for new and post construction activities;
- Educating the public about what they can do to reduce polluted runoff, including:
    - Pet waste;
    - Livestock waste;
    - Fertilizer application
    - Septic System Discharge

To best achieve the identified WL reduction of 35%, the City intends to implement a strategy that allows for the best identification, placement, and implementation of BMP. The City currently implements stormwater BMP that reduces the contribution of pollutants to Lake Thunderbird, but the City still needs a better understanding of the background contributions from its streams and watersheds. We have divided our approach into three categories:

1. **Watershed Background Assessment** - As indicated in the Final *"Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs" Section 2.2*, the background concentrations of pollutant levels was determined from a special study conducted by Oklahoma Water Resources Board (OWRB); the Oklahoma Conservation Commission (OCC) conducted a special monitoring program for the Lake and its tributaries from April 2008 through April 2009. The City intends to conduct an ambient background concentration study during the first Small MS4 permit term (five years) to better understand the pollutant concentrations that may discharge

from the City. The City believes that this level of analysis will provide the necessary background levels to model pollutant reduction of the established TMDL constituents more effectively. This Background Assessment is presented in the Monitoring Plan attached in Appendix C.

2. **Project BMP** – Capital projects like stormwater retention, bio-swales, and LID standards will be evaluated during the first Small MS4 permit term to develop standards and establish reasonable costs and identify funding mechanisms, resulting in definable asset that can be implemented. The City will be the lead for the evaluation and implementation of these projects and will work in collaboration with DEQ to target available funding and technical assistance to support implementation of pollution controls and management measures. Project BMP to be assessed and selected are presented in Appendix D.
3. **Program BMP** – City support services and operations, including street cleaning, IDDE inspections, and public outreach and education. Program BMP to be assessed and selected are presented in Appendix D.
4. **Partnerships** – Watershed practices that are established as required by regulation or through voluntary implementation by private and non-profit entities such as ACOG.

The following is a description of the strategies and goals for each of the above categories. It should be noted that, while the 35% reduction goal is established, the following strategies are based on reducing the WL to meet the TMDL goals. Identifying more projects than is needed will accommodate changes due to projects and programs being determined not feasible, too expensive, or delayed. It also accommodates assumptions made for changes in allowable WL reductions that are being made for any stream restoration, LID practices, wildlife management IDDE, erosion and sediment control, and public education.

4.1 Baseline Monitoring

The primary goal of the monitoring program is to obtain baseline data on receiving streams in the City for use in determining long-term water quality trends. Baseline monitoring utilized in the determination of the Lake Thunderbird TMDL consisted of monitoring data from one monitoring location from Little River at its crossing of 17th Street in the City. The monitoring consisted of water samples collected for a one year period from April 2008 to April 2009. Though a baseline was reported in the final Lake Thunderbird TMDL a true ambient baseline contribution from the City cannot be determined from one sample location within a one year period. Establishing baseline data requires a multi-year (typically a minimum of five (5) years, *EPA841-R-97-006, May 1997*) monitoring program that provides for variations in drought, above annual average rainfall, and natural disasters such as tornadoes. The baseline utilized in the development of the Lake Thunderbird TMDL should be augmented with additional data to establish actual trends. The City seeks to continue documenting water quality improvements resulting from BMP effectiveness as they have over the past several years encompassing the previous Small MS4 permit term. The City intends to perform baseline monitoring in order to provide: 1) more coordinated and comprehensive baseline water

quality sampling; 2) more sound and reliable ambient baseline data collection; 3) to ensure greater cost effectiveness for proposed BMP; and 4) to establish a truer assessment of the City's impact on stream and watershed water quality.

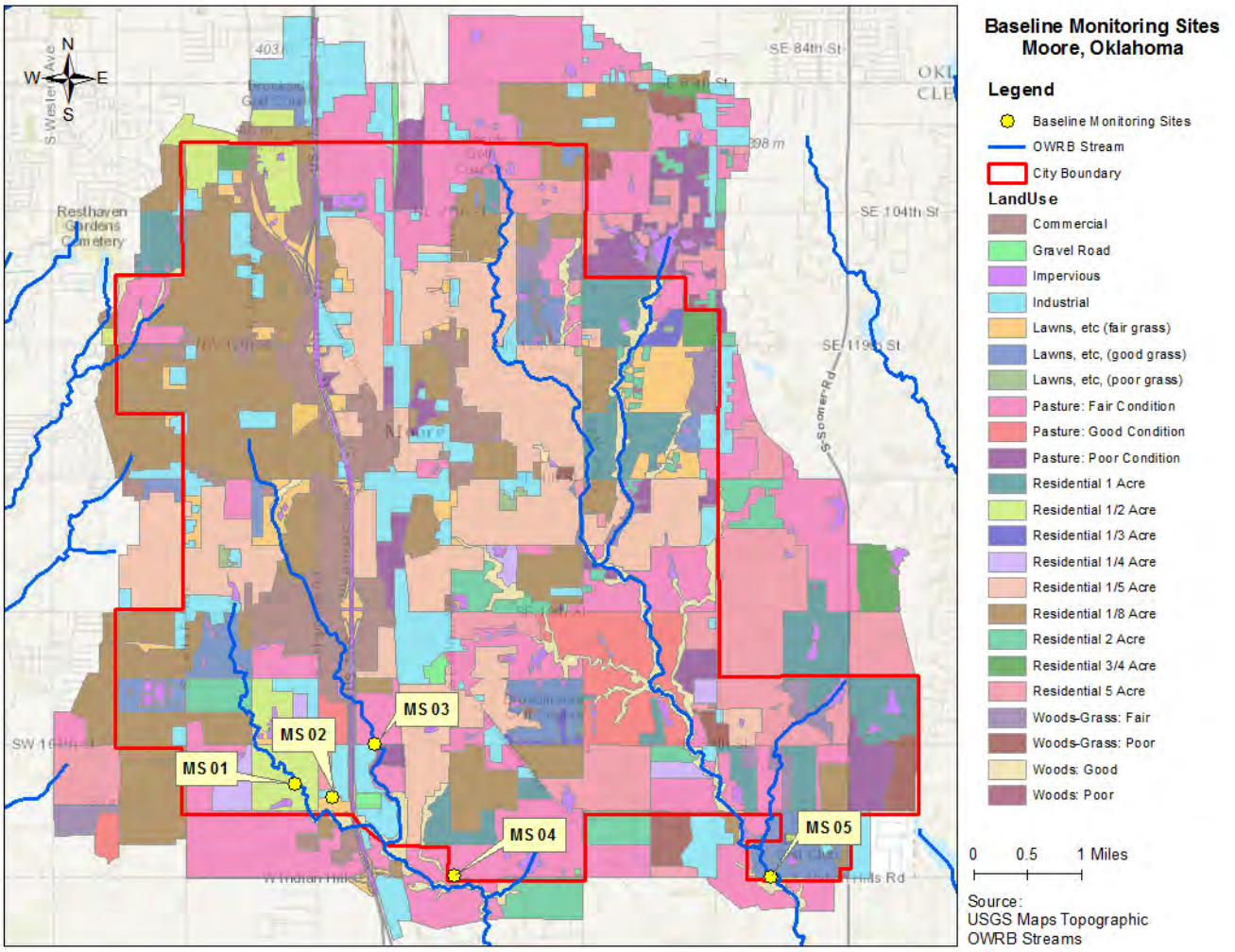
The City has created a Monitoring Plan (MP), see Appendix C, that will effectively monitor each stream at its point of discharge from its jurisdictional area, as well as in-stream locations based on land use, by the end of the permit term. This extent of jurisdictional coverage will allow a reasonable assessment of the City's contribution to the Lake Thunderbird watershed while striving to achieve a balance among the various goals of obtaining valid ambient baseline data, meeting permit compliance, and addressing what is practicable for the City. This plan proposes in-stream baseline watershed monitoring, but seeks to obtain greater statistical robustness of ambient data by sampling quarterly at each monitoring location a minimum of five years to coincide with the City Small MS4 permit which began November 1, 2015. Again, the primary goal of the baseline monitoring during this permit term will be to continue the assessment of the City's impact on receiving stream water quality and to document any improvement resulting from BMP implementation. The data collected during this permit term will build upon the set of TMDL data from each site for a more meaningful trend analysis. The City will identify a capable tracking program and/or develop a database for tracking specific BMP, both project and program; the selected tracking program will have the capability of storing montioring data and will be used for projection analysis and level of current conditions.

A map indicating the monitoring locations is shown in Figure 9 below. Specific locations of sampling sites will be evaluated prior to each sampling year and may be modified to accommodate better access, laminar flow deficiencies, and safety, and will be updated in its Small MS4 Annual report.

Monitoring and sampling metrics and procedures are presented in the City of Moore Lake Thunderbird TMDL Monitoring Plan.

Data that is collected by others, such as Central Oklahoma Master Conservancy District (COMCD) monitoring data obtained in Lake Thunderbird and any additional monitoring data made available from the City of Oklahoma City and the City of Norman will be compared to ambient data collected in the City of Moore to verify pollutant reductions. Additional data may include studies and monitoring performed by the Oklahoma Conservation Commission (OCC).

Figure 9: Baseline Monitoring Locations



4.2 Project BMP

Project BMP consist of three types: Traditional BMP, LID Practices, and Alternative BMP. It is projected that these projects will help reduce the WL by 35%. Types of BMP to be considered can be found in Appendix D, and when implemented will reduce potential pollutant loads by 35% over the three permit terms established in this plan.

Identifying and Prioritizing Project BMP Locations

Project BMP locations are a combination of specific locations (streams, commercial and residential developments, parks, streets, and stormwater infrastructure) and targeted Wards, and will be selected during the first Small MS4 permit cycle using data collected in the attached Monitoring Plan. Additional data may be utilized from other completed TMDL plans such as:

- BMP identified in other DEQ TMDL Reports and Assessments, including the Cobb Creek Watershed and Neosho River Basin.
- Other plans and studies, including the Greater Trinity River Implementation Plan.
- City of Moore Comprehensive Plan (Moore Vision 20/20) project budget assessment for FY2015 – FY2020.

4.2.1 Traditional BMP

For the purposes of the CP, Traditional BMP, also known as structural BMP, are typically practices that treat drainage areas of 5 acres or more, such as stormwater ponds, wetlands, detention basins, and infiltration swales. Unfortunately, the City has very few stormwater management ponds, and limited space to install new ponds or large practices. However, there may be some that were developed prior to 2010 that will be evaluated as candidates for retrofitting. These include the stormwater containment at the Little River shopping area located between S. Telephone Rd. and IH 35 south of SW 19th St.

Opportunities for installing new ponds, wetlands, and large bio-retention facilities are typically in parks or major right-of-ways and will be evaluated and identified during the first Small MS4 permit cycle.

4.2.2 LID Practices

LID practices are small stormwater facilities that treat 5 acres or less, including bio-retention, bio-swales, permeable paving, and rain barrels. Given the small size of these practices, they fit well into the City's urban environment of streets, parking lots, small parks, and school grounds. Unfortunately, they can be expensive to install, limited by existing conduits, utilities, and soil conditions, and conflict with right-of-way needs like on-street parking or community acceptance. LID practices will be evaluated and identified during the first Small MS4 permit cycle using a community planning process led by the Community Development Department. Potential projects will be developed for each of the three Wards and will be assigned a prioritization level if applicable and appropriate. The locations in the Wards will be selected based on a combination of the following criteria:

1. Adjacent to and/or upland from stream restoration projects
2. Adjacent to and/or upland from flood prone areas
3. Adjacent to City storm drain projects or other City initiatives (street sweeping, recycling stations, etc)
4. Other identified stormwater projects, partnerships, and initiatives (new and renovated schools, park master plans, new communities, etc)
5. CIP project locations by other agencies. In particular, The City will coordinate with the Department of Transportation as they develop streetscape and highway plans.

Figure 10: Bioretention cell for street/yard drainage, Los Angeles, CA.
Source: Bill DePoto

4.2.3 Alternative BMP

Alternative BMP, include stream restoration, pervious surface placement and greening.

The City's streams are moderately degraded, with eroding banks and shifting bottoms due to the nature of the soil within the City. Stream restoration may be an opportunity to reduce erosion and sedimentation, increase natural channel flow, and improve the health of the stream and adjacent riparian areas . Stream restoration projects will be evaluated and identified during the first Small MS4 permit cycle. A prioritization matrix will be developed as needed and appropriate.

As noted in the Section 2.1.5 of the CP, many of the City's neighborhoods have been destroyed by tornadoes. While this destruction of properties is catastrophic to the families that inhabited them, they may offer an opportunity as locations for pervious surface placement, small stormwater management practices, and tree planting; although, the available funding available through Disaster Recovery may not allow such practices. Types of BMP to be considered can be found in Appendix D.

4.3 Program BMP

Programs are operations and services that reduce pollutants in stormwater runoff. It is projected that implementation of the BMP will reduce the level of potential pollutants. The following are BMP that the City is currently implementing or will be undertaking:

4.3.1 Street Sweeping

The City currently maintains one street sweeper and sweeps central areas of the City and many of the main commuter routes and corridors on a daily schedule. Other streets in neighborhoods and commercial areas of the City are swept on an as-needed/as-requested basis. The City collects on average six (6) 40 yard dumpsters of street sweeping debris monthly and disposes of it in a contracted landfill.

The City will evaluate the need for additional scheduled cleaning and the need for additional mechanical sweeper purchase during the first permit term of the Small MS4 permit, where the mechanical sweepers can be the most effective. If it determined to be appropriate and successful, the City will look to expand the street sweeping programs.

With increased public education and outreach, the City expects the amount of trash and debris collected by the mechanical street sweeping program to decrease over the course of the permit. A peak amount collected will be established and attributed to the mechanical street sweeping program. Any decrease will be monitored and attributed to the education and outreach programs.

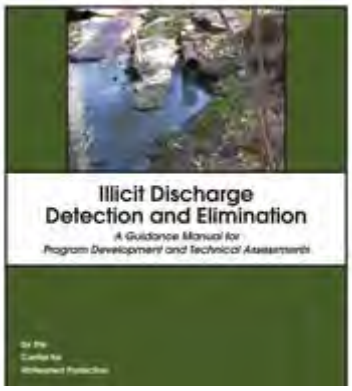
4.3.2 Catch Basins and Inlet Cleaning

The City currently performs catch basin and inlet cleaning on as as-needed basis. The City will evaluate the need for additional scheduled cleaning and the possible need for catch basin/inlet filter placement during the first permit term of the Small MS4 permit, where the filters can be the most cost effective. If it is determined to be appropriate and successful, the City will look to expand the catch basin/inlet filter programs.

4.3.3 Illicit Discharge Detection and Elimination (IDDE) Program

The City's Stormwater Management Office under the Environmental Services Department is responsible for monitoring the quality of the streams and MS4 in the City. Source tracking inspections for chronic sources consist of a visual inspections performed by City crews, and may include one or more field test kits for parameters that monitor the most likely type of stormwater pollution that is indicated (e.g. chlorine residual, pH, dissolved oxygen, conductivity, etc.). The visual inspection will describe and/or quantify the extent of pollution (e.g. floatables, excess algae growth, dead or stressed stream vegetation and organisms, color of water, odors, sediments, etc).

When episodic incidental pollution is reported to the City (e.g. motor oil dumped into a storm drains), the City's stormwater staff will record the date, location, information source, and description of the event. If necessary, a public works crewman will be sent to investigate and determine if the site should be cleaned (e.g. removal of yard waste, containment of oil, etc.). After inspection and/or cleanup, the City keeps a record of all actions taken regarding the incident. Any data collected is included in the City's Annual Report and used to evaluate program effectiveness.



4.3.4 Erosion and Sediment Control Practices

In 2007, the City adopted a new ordinance for erosion and sediment control (Moore City Code, Chapter 15 Article C). The ordinance updates the City's erosion and sediment control law, provides clear guidance to developers and property owners, and provides additional authority to enforce violations. The City also provides continued education and training to developers, contractors and homeowners regarding erosion and sediment control through its Stormwater SAVVY online program. Finally, the City has implemented Service Request system that allows citizens to report any erosion problems, whether construction sites, street work, or from properties by phone and email. Through implementation of ordinances, standards, and inspections the City will be able to quantify benefits related to TMDL pollutant reduction. Metrics for quantified benefits will be developed as baseline pollutant concentrations are established.

4.3.5 Public Education and Enforcement

The City recognizes that meeting the MS4 and TMDL requirements cannot be done solely by government – residents, organizations, schools, and businesses each play a role. In order to facilitate and expand public education and enforcement of stormwater BMP, the City will develop and provide educational material and training in support of the Small Phase II MS4 permit, this CP, and the City's stormwater management efforts, and assist in the promotion and dissemination of this information. When identifying BMP for public education and outreach for trash and litter reduction, pet and agricultural waste, and illegal dumping, the City will provide additional focus and training in target areas where baseline monitoring information indicates higher than expected levels of pollutants. Encouraging the reduction of stormwater runoff from private properties will target those activities "upland" of stream ambient monitoring locations.

4.4 Proposed Methods for WL Reductions

The eligible BMP approved by the City may be limited and can be very expensive in its applicability to urban environments. In order to offset some of the significant costs of the City's TMDL Phase II MS4 and CP Strategy, the City will conduct studies within the first Small MS4 permit term to quantify the nutrient and sediment removal efficiencies of new, nontraditional BMPs, which may include but are not limited to:

- Debris collection systems
- Additional street sweeping
- Public education
- Eroded slope stabilization
- Infrastructure replacement (inflow/infiltration)
- Sanitary sewer overflow (SSO) program
- Pet waste management programs

- Wildlife management programs
- Ordinance updates
- Fertilizer application standards
- Increased IDDE program

4.5 Partnerships

Partnerships are BMP that are installed by the public, private and non-profit sectors, whether as a requirement for development, projects by environmental non-profits, or participation in local sub-state organizations such as ACOG. It is projected that these BMP will reduce the WL to the watershed.

4.5.1 Development Requirements

No person shall conduct, allow or permit land disturbing activity, whether temporary or permanent, on any premises within The City of Moore until a land disturbing permit has been issued allowing such activity pursuant to the provisions of the Stormwater Ordinance. Land disturbance activities are required to meet stormwater management regulations – including City departments, public and private institutions, and developers. Acceptable stormwater management projects include bio-retention, swales, pervious pavement where applicable and appropriate, and impervious surface removal if appropriate.

4.6 Suitability of BMP

Although the City may be considered small in area compared to other MS4 jurisdictions, the variability of the land use conditions, population/development density, and age/size/density of infrastructure have determined the practicality of the implementation of BMP for the Lake Thunderbird watershed. Table 6 illustrates the distribution of where BMP will be targeted.

Table 2: Suitability of BMP

Little River	North Fork of Little River
Develop LID Standards and Implement	Develop LID Standards and Implement
Streambank Stabilization Assessment	Streambank Stabilization Assessment
Street Sweeping	Street Sweeping
Catch Basins and Inlet Cleaning	Catch Basins and Inlet Cleaning
IDDE	IDDE
Erosion and Sediment Control Practices	Erosion and Sediment Control Practices
Public Education and Enforcement	Public Education and Enforcement
Pet and Livestock Waste Management	Pet and Livestock Waste Management
Wildlife Management	Wildlife Management
Fertilizer application standards	Fertilizer application standards
Partnerships	Partnerships
Development Standards	Development Standards

4.7 Prioritization and Benefits

Not all of the BMP identified in Appendix D will be implemented. The City has identified more BMP than what is needed to meet the current TMDL and MS4 permit conditions. As part of the adaptive management process, BMP will be selected after they are prioritized based on several factors, including:

- Equitable distribution of implementation across City watersheds, neighborhoods, and demographics and potential to address environmental conditions;
- Cost effectiveness of practice compared to load reduction capability;
- Collaboration opportunity with other environmental initiatives within the City
- Social and economic benefits to areas surrounding BMP location;
- Public outreach and stewardship opportunities to modify behaviors (increase secondary activity-based BMPs for pollution prevention) and decrease maintenance needs;
- Stream restoration, beyond simple reductions of identified pollutants.

Additionally, while new neighborhoods may be targeted for the location of LID practices, other neighborhoods may be considered during the course of the first Small MS4 Permit period. These adjustments will be made as part of the Adaptive Management process.

Table 3: Benefits of LID, Alternative, and Program BMP

HIGH BENEFIT SOME BENEFIT NO BENEFIT	Pollutant Reduction	Community Engagement	Job Creation	Habitat Restoration	Reduced Flooding	Neighborhood Enhancement	Recreation / Open Space	Public-Private Partnership / Funding Diversity
Stream Restoration								
Tree Planting								
Using vacant land for stormwater management								
Removing impervious surfaces where practicable								
Bio-retention - public space								
Bio-retention - private								
Erosion and Sediment Control								
Permeable Paving								
Street Sweeping								
Inlet Cleaning								
Illicit Discharge Detection and Elimination								
Public Education								
Fertilizer application standards								
Erosion and sediment control enforcement								
Pet and Livestock Waste Management								
Wildlife Management								

4.8 Public Outreach

In order for the MS4 CP to be successful, it will need an informed public and engaged partners to review and provide advice on the Plan as well as identify needs and issues that will need to be addressed. The City recognizes and is committed to the role that public outreach and stewardship will play if improved water quality conditions are going to be achieved. This will require engaging a broader and more diverse set of stakeholders who can serve as leaders and champions for clean water in their neighborhoods, including greater participation from minority and faith-based groups, business groups, schools, and neighborhood associations. Additionally, this approach requires working collaboratively with other City departments to look for better and more efficient ways to communicate messages,

cross-train, and create teamwork that results in greater engagement, greater awareness, and sustained changes in behavior.

In order to facilitate and lead public outreach and education for the MS4 CP, the City identified the Community Development Department as the lead department for stormwater quality management. The responsibilities of the Community Development Department are:

- Provide community planning and outreach to neighborhoods where stormwater BMP are to be located;
- Coordinate with other City departments, non-profits, and community partners on the planning and implementation of stormwater BMP;
- Serve as the City's "point person" with other City initiatives, such as contracting with Trifecta Communications to produce informational videos for the community and City Hall. Videos such as "Inside Moore" can be seen monthly on television, and involve the people, places and events that make up Moore, Oklahoma. Each month programs covering topics from local government and economic development to unique people and local events appear;
- Coordinate and staff the Environmental Services Division;
- Coordinate and host regular outreach meetings with stakeholder groups;
- Serve on partner-led committees and work groups, including the Moore Vision 20/20 Plan and Comprehensive Stormwater Management and Drainage Plan;
- Develop educational and training material in support of the MS4 CP and the Department's stormwater management efforts, and assist in the promotion and dissemination of this information;
- Provide outreach and tracking for the stormwater BMP implementation;
- Collect and track information on stormwater management projects by industrial and construction General permit holders; and
- Coordinate grant development and administration for Federal, State, and private foundation funding, as well as administer any City grant programs.

The Community Development Department will work closely with other departments within the City, including Public Works and Parks and Recreation.

As outlined above, public outreach will consist of a variety of methods, some led by the City and others as a partner with other agencies, and other identifiable and practicable non-profit led efforts.

4.8.1 Leadership and Engagement

The following efforts will be led by the Community Development Department:

Technical Work Group - The City will be forming a work group in 2016. The purpose of this work group is to share information, resolve issues, and foster collaboration concerning the implementation of stormwater management projects. Members of the work group will be from City Departments who are actively working on putting stormwater projects in the ground, and/or implementing specified BMP. While this group is independent of the SWAC, it will report to the Committee at least once a year.

Annual Public Progress Meeting - Beginning in FY2016, the City will hold a public meeting to present progress on the MS4 CP. The presentation will be a summary of our Annual Report, as well as a look at projects, programs, and partnerships for the coming year.

4.8.2 Partnering and Collaborating

In addition to leading outreach efforts, the City will continue to serve on partner-led initiatives and work groups, including:

Association of Central Oklahoma Governments - ACOG's Water Resources Division helps local governments to maximize the use of ground and surface water resources. This includes planning, management, protection and research of potable water supplies.

4.8.3 Community / School Outreach and Education

The City Maintains the website http://www.cityofmoore.com/stormwatersavvy Stormwater Management and addresses and provides an overview of the City's stormwater program and initiatives – including compliance with the City's current Small Phase II MS4 Stormwater Permit. The web site includes updates on capital projects, events, public meetings, information on how to reduce stormwater pollution, and customer support. MS4 public meetings, plans, and annual reports are also presented. Information posted on the web site is also posted on City's Facebook page and Twitter account.

In addition to web and social media, the City's Community Development Department regularly provides presentations at community and civic meetings, including information on stormwater methods that residents can undertake to reduce stormwater runoff. Increased attention may be given for outreach to minority communities, faith-based organizations, and businesses – not the typical water quality groups – as well as to young adults (ages 25-34) who tend to be more environmentally active. This will be accomplished by:

1. Providing regular outreach to community associations, merchant groups, and faith-based organizations; and
2. Attending non-traditional events like the Moore Pride Red Ribbon Parade and other City Council and special meetings and events.

The Community Development Department will also assist the City's Community Partners with educational programs and outreach to public schools, including information on trash reduction, recycling, pet waste, and storm drains, with the connection between these efforts and the health of the Lake Thunderbird watershed. In order to support these outreach efforts, the Environmental Services Division will implement the following:

1. Create a "one-stop shop" for resources and information on reducing stormwater pollutants on the City website.
2. Implement a stormwater planning and outreach team in the Community Development Department.
3. Create a consistent set of informational sheets, messages, and signage for reducing stormwater pollutants. Given the number of BMP that may be installed across the City, the Community Development Department will focus on helping people understand:
    a. How the BMP is reducing and cleaning stormwater;
    b. Other community and environmental benefits;
    c. How the BMP is being paid. In addition signage can recognize any funding partners as well as who to contact if there are any problems;
    d. Create a pet waste campaign. Pet waste contributes to increased bacteria levels in stormwater runoff. The campaign will include community outreach and developing signage and educational information.

4.9 Maintenance

Having a successful CP does not stop with the installation and implementation of the BMP. Maintaining public stormwater BMP is critical to their ability to function as designed. This was one of the top considerations during the development of the CP.

While EPA guidance focuses on the function of BMP, a majority of these practices will be very visible to public, so they need to look good as well. Thus, maintenance can be classified as aesthetic and functional.

- Aesthetic maintenance focuses on how the stormwater facility looks, making sure that it is litter and trash free and that the plants are healthy and attractive. This includes routine maintenance like removing litter and debris, weeding, and mulching. Aesthetic maintenance provides opportunities for collaboration with residents, businesses, and civic groups.
- Functional maintenance makes sure that the facility is properly removing pollutants and filtering stormwater. This includes sediment removal, soil and medium replacement, and inspecting and repairing structural integrity. Functional maintenance requires a broader skill set; it is more than mowing or landscaping.

4.9.1 Current Maintenance Practices

Multiple departments have installed, and are responsible for, stormwater BMP, including the Community Development, Public Utilities, Public Works, and Parks and Recreation. The responsibility for maintaining the BMP rests with each Department. Some departments have their own crews who maintain the BMP, while other departments use outside contractors to provide these services.

In meetings with city departments, the following was identified:

- Need for an accurate list of facilities and corresponding responsible departments;
- Need for maintenance standards; and
- Need for specific training on stormwater BMP maintenance for City staff, contractors, community groups, and partners.

The current system can be more effective and efficient. In order to improve maintenance of current BMP, as well as meet the growing number of stormwater BMP that may be utilized to meet our MS4 and TMDL requirements, the City will establish a Stormwater BMP Maintenance Team that will maintain all city-owned BMP, regardless of the department that installed or is responsible for the facility.

With each set of BMP, more crews may need to be hired for preventative maintenance. To determine the number of maintenance staff needed, the City will determine in the first MS4 permit term number and size of crew that can maintain large BMP and/or small BMP, and the watershed size served per year.

Depending on the length of time needed to establish the Stormwater BMP Maintenance Team, the consolidated maintenance might be contracted.

The goal is to have a Stormwater BMP Maintenance Plan approved by 2020.

4.9.2 Stewardship

As identified in Appendices B - D, the City's BMP may be installed at parks and schools, in the public right-of-way, and on vacant lots – highly visible locations that are in communities and neighborhoods. While the City recognizes that the responsibility of these stormwater facilities lies with the city, they also offer opportunities for community partnership and stewardship for aesthetic maintenance.

The City will work to identify and potentially partner with organizations to promote existing BMP, like Stormwater SAVVY as well as identify education and training needs to help communities adopt maintenance practices. To further support community stewardship, the creation of BMP education and training curriculums may be studied.

The Environmental Services Division may offer community members free or subsidized materials useful to the mitigation of polluted urban runoff, including, but not limited to: mulch, plants, soil media, leaf bags, rain barrels, etc. The Community Development Department will also offer design

assistance and advice for LID and other stormwater remediation measures after establishing and adopting standards.

Additionally, the City will explore developing a program that will give community groups incentives to become stewards of BMP in their neighborhood. This will be modeled on successful Adopt-A-Stream and Adopt-A-Highway programs. Target groups will include corporate partners, local businesses, churches, neighborhood associations, and concerned individuals that are willing to commit to maintain and monitor one or more BMP.

5 MILESTONE SCHEDULE

To promote continual progress, the City has established the following milestone increments to meet the TMDL WL requirements. There are two categories of milestones:

1. Program enhancement are actions needed to increase resources and improve the implementation processes to accelerate meeting the WL.
2. Implementation actions are on-the-ground activities that will result in nutrient and sediment load reductions.

The City submits this CP Milestones to DEQ describing how it plans to reduce pollution from sources within its watershed.

The City's milestones are programmatic (staffing, policies and guidelines, program enhancement, etc.) and projects (stream restorations, LID, etc).

Table 4: Milestones Schedule

Permit Term	Description
	Program Milestones
2015-2020	Complete the City of Moore Comprehensive Storm Water Management and Drainage Plan
	Identify education needs and cost for, and begin program issuance: o Pet waste; o Livestock waste; o Fertilizer application o Septic System Discharge
	Perform Ambient Background Assessment monitoring program
	Establish and implement Lake Thunderbird specific IDDE protocols and procedures and begin increased performance as appropriate
	Evaluate the need to restore streams (hydro-geomorphology) and establish design standards and requirements
	Evaluate and establish need to update ordinance "low impact development" (LID) stormwater management practices, and develop standards as appropriate
	Identify need for increased staff • Establish staff qualification criteria • Develop budget requirements for additional staff
	Evaluate the need to disperse waterfowl populations in water amenities (wildlife management) and develop standard procedures as necessary

Permit Term	Description
	Program Milestones
2015-2020	Evaluate the need to retrofit and/or install ponds or wetlands and begin development of design standards as appropriate.
	Identify the need for increased preventative inlet cleaning in targeted neighborhoods of the City. The effort will be in collaboration with inlet screen installation and expanded street sweeping operations. • Develop costs for performance • Identify funding sources
	Establish and perform increased Construction site inspection schedules in coordination with DEQ
	Develop the protocols for the Technical Work Group. • Identify members of the Technical Work Group • Establish goals • Conduct development meetings with identified City departments
	Identify members and form the Technical Work Group • Establish protocols for participation as necessary • Identify members as appropriate • Approve members • Conduct meetings
	Perform cost to benefit analysis of TMDL program to date

Permit Term	Description
	Program Milestones
2020-2025	Develop Ambient Background Assessment Monitoring Program Report and submit to DEQ for review and consideration
	Develop feasibility studies for private participation incentive programs
	Complete feasibility study for the use of recycled materials in BMP construction as a sustainable alternative to material disposal.
	Assess performance of BMP implementation based on monitoring data collected in the City as well as monitoring data from sampling and analysis on Lake
	Increase staff as appropriate by hiring or contracting for utility maintenance
	Begin installing LID practices as appropriate
	Begin installation of Retrofit projects as appropriate
	Begin restoration of streams (hydro-geomorphology) as appropriate
	Adopt new ordinance for: • LID • Erosion and sediment control • Pet waste • Wildlife management • Vehicle washing
	Create a consistent set of informational sheets, messages, and signage for reducing stormwater pollutants.
	Establish capital projects like stormwater retention, bio-swales, and LID standards evaluated and identified during the first Small MS4 permit term along with reasonable costs and the identification of funding mechanisms that result in definable assets that can be implemented as appropriate
	Increase staff by hiring or contracting as appropriate
	Complete an analysis of city-owned facilities for possible stormwater retrofits
	Create an MOU with Moore Beautiful to incorporate trees and landscaping into stormwater BMP projects
	Perform cost to benefit analysis of TMDL program to date

Fiscal Year	Description
	Project Milestones
2020-2030	Develop new monitoring program as appropriate
	Reassess BMP Practices
	Update Ordinance as necessary
	Perform cost to benefit analysis of TMDL program to date
	Continue BMP implementation as appropriate
	Update the Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs

5.1 Tracking Mechanisms

The City will track all BMP (both planned, implemented, and/or constructed) using an acceptable database and GIS tracking tool. The tracked data will coincide with MS4 permit OKR04 reporting requirements. A majority of BMP implementation will be reported through the permitting process for construction activities.

The Program and BMP milestones will also be updated as per the TMDL CP and Phase II MS4 permit requirements.

5.2 Staffing

Under this CP, the pace of implementation is required to increase. Meeting the MS4 and TMDL requirements may require an increase in the design and construction of stormwater capital projects, inspection of facilities, water quality testing and analysis, community outreach, and maintenance. This again may require increased staffing and/or contractual services. New employees may include engineers, scientists, inspectors, technicians, community planners, and maintenance staff (Table 5).

The most significant increases will be for inspections (in order to increase the number of construction and industrial site inspections, as well as installed BMP), BMP implementation (providing dedicated project management and in-house design and engineering), and education and outreach (build community capacity by targeting new partner groups that provide the necessary leadership, oversight, and sustained effort to change behaviors and foster stewardship).

Table 5: Anticipated Staffing Related to the CP

Program	Current	Future Increase
Plan Review & Inspections	1	TBD
Water Quality Monitoring & IDDE	1	TBD
Project Implementation (Engineering & Construction)	1	TBD
Education & Outreach	1	TBD
Stormwater BMP Maintenance	0	TBD
Inlet Cleaning	1	TBD
MS4 Monitoring and Sample Collection	1	TBD
TBD - To be determined		

6 ADAPTIVE MANAGEMENT

Sound CP implementation strategies require ongoing assessment and effective adaptation to respond to changing conditions, new technologies, and lessons learned. This will be the basis of the plan that will be used when WLA are not met and the projected funding is inadequate.

Adaptive management requires monitoring of a variety of measures that can be used to determine whether progress is being made towards meeting the MS4 and TMDL water quality objectives. Ultimately, it is the in-stream water quality and the loading limits with respect to the TMDL that determine the success of implementation; however, there are many interim measures that can also be correlated to success, which are worth pursuing.

If a TMDL is established for any waterbody into which a MS4 (City) discharges prior to the date that the MS4 submits a NOI, and if that TMDL includes a wasteload allocation (WLA) or load allocation (LA) for a parameter likely to be discharged by the City, the City's discharges must meet any limitations, conditions, or other requirements of this CP associated with that WLA, LA and/or TMDL within any timeframes established in the TMDL. Monitoring and reporting of the discharges may also be required as appropriate to ensure compliance with the TMDL. The City must adopt any WLAs assigned to its discharges specified in the TMDL as measurable goals in the SWMP. If the TMDL relies on a BMP-based approach, effective implementation of additional TMDL related BMP will be sufficient to implement applicable WLAs. This BMP-based approach is consistent with EPA memoranda dated November 22, 20121 (EPA 2002) and November 26, 20142 (EPA 2014). If the TMDL or watershed plan specifies additional requirements, the MS4 must also meet these additional requirements.

For many TMDL CP strategies, it may be difficult to formulate individual effectiveness in terms of pollutant load reductions, but collectively, the monitoring and tracking that occurs should provide adequate insight into the overall effectiveness of the CP strategy. In addition to the monitoring and assessment, the City will be reporting results on an annual basis as part of their OPDES MS4 Permit annual report. The MS4 Permit requires annual reporting of the following:

- The status of the City's compliance with permit conditions, an assessment of the appropriateness of the identified best management practices, progress towards achieving the statutory goal of reducing the discharge of pollutants to the Maximum Extent Practicable (MEP), and progress toward achieving the measurable goals for each of the MCMs;
- Results of information collected and analyzed, if any, during the reporting period, including monitoring data used to assess the success of the SWMP at reducing the discharge of pollutants to the MEP;
- A summary of the stormwater activities the City plans to undertake during the next reporting cycle (including an implementation schedule);

- Proposed changes to the SWMP, including changes to any BMP or any identified measurable goals that apply to the SWMP elements;
- Description and schedule for implementation of any additional BMP or monitoring that may be necessary to reduce/eliminate the discharges of the pollutant of concern into impaired waters on the 303(d) list;
- Description and schedule for implementation of any additional BMP or monitoring that may be necessary to ensure compliance with any applicable TMDL or watershed plan in lieu of a TMDL;
- Notice that you are relying on another government entity to satisfy some of your permit obligations (if applicable) and a copy of the written agreement with that entity.

The City will build upon annual reporting that has historically occurred to meet permit requirements and will supplement this reporting with tracking table summaries that quantify implementation activities for the range of strategies pursued during that year so that the following can be incorporated and evaluated:

- Adherence to the TMDL CP and project schedule
- Meeting milestones
- New technology and innovative practices
- Changes to any stormwater laws, rules and regulations
- Resource availability
- Monitoring results

If sufficient progress is not demonstrated in this evaluation, you will be required to submit an updated compliance plan and implementation schedule within 6 months. Noncompliance may subject the permittee to enforcement action.

As described in the Public Outreach section, the Stormwater Advisory Committee will review the MS4 Permit Annual Report and the adaptive management plan on an annual basis. Any changes to the CP as a result of adaptive management will be shared through the Stormwater Advisory Committee members and on http://www.cityofmoore.com/stormwatersavvy.

7 FINANCIAL STRATEGY

7.1 Stormwater Utility

The estimated cost for capital projects will be developed during the first MS4 permit cycle. In order to fund identified projects and the operations to comply with this CP and the MS4 permit, the City will assess and may propose Stormwater Utility Fee assignment. It provides:

- A more equitable system: contributors to stormwater runoff share based on a metric directly connected with the service provided.
- A stable level of funding: ensures that stormwater management receives adequate support, independent of the City's tax rate and General Fund.
- A dedicated fund: revenues are used solely for stormwater management purposes.

The Stormwater Fee provides a sustainable, dedicated revenue source for maintaining, operating, and improving the City's stormwater management system, with the ultimate goal of reducing flooding and erosion, and keeping our waterways cleaner.

7.2 Water Quality Trading

The City will evaluate the benefit of any water quality trading program during the implementation of this CP. At this time no water quality trading considered as a tool to achieve the overall WLA of the TMDL.

8 REFERENCES

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City of Moore, 2005, Comprehensive Plan (Moore Plan 21). http://www.cityofmoore.com/sites/default/files/main-site/CompPlanUpdate2005-Final%282%29.pdf

Center for Watershed Protection, 2013, Restoration Manual 3 and 9. http://www.cwp.org/online-watershed-library/cat_view/64-manuals-and-plans/80-urban-subwatershed-restoration-manual-series

APPENDIX A

"Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs"

Appendix A is hereby included by reference. The Report may be obtained at,
http://www.deq.state.ok.us/WQDnew/tmdl/thunderbird/LakeThunderbirdFinalTMDL_ReportNov2013.pdf

APPENDIX B

Summary of BMP

The City will assess and determine within the first Small MS4 Permit term, appropriate and cost effective BMP to mitigate and reduce the level of potential pollutants contributing to the Lake Thunderbird TMDL.

The Appendices attached in Appendix B will be used to report and track BMP identification, implementation, design, construction, and associated cost.

APPENDIX B: Summary of Projects

CP Project ID	BMP Type	Watershed	Location	Estimated Pollutant (lbs/yr) Removal			Estimated Capital Cost	Schedule to Implement	Schedule to Design	Start Construction FY
				TN	TP	TSS				
Baseline Monitoring										
Subtotal Baseline Monitoring:										

APPENDIX B: Summary of Projects

BMP Type	Watershed	Location	Estimated Pollutant (lbs/yr) Removal			Estimated Capital Cost	Schedule to Implement	Schedule to Design	Start Construction FY
			TN	TP	TSS				
Project BMP									
Traditional BMP									
LID Practices									
Alternative BMP									
Subtotal Project BMP:									

APPENDIX B: Summary of Projects

BMP Type	Watershed	Location	Estimated Pollutant (lbs/yr) Removal			Estimated Capital Cost	Schedule to Implement	Schedule to Design	Start Construction FY
			TN	TP	TSS				
Program BMP									
Street Sweeping									
Catch Basin and Inlet Cleaning									
Illicit Discharge Detection and Elimination (IDDE) Program									
Erosion and Sediment Control Practices									
Public Education and Enforcement									
Subtotal Program BMP:									

APPENDIX C

Monitoring Plan

APPENDIX D

BMP for Evaluation and Selection

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CITY OF MOORE MS4 AND LAKE THUNDERBIRD TMDL MONITORING PLAN

November 2015 - Final

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1.0 Introduction

Lake Thunderbird is on Oklahoma's 2012 303(d) list for impaired beneficial uses of public/private water supply and warm water aquatic community life. Causes of impairment have been identified in the Oklahoma Department of Environmental Quality (DEQ) Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs, approved by the EPA on November 13, 2013, as low oxygen levels, high levels of chlorophyll-*a*, and high turbidity (DEQ, 2010a). Lake Thunderbird is designated by the Oklahoma Water Quality Standards (OWRB 2011) as a Sensitive Water Supply (SWS) since the Lake serves as the primary public water supply source for the cities of Norman, Midwest City and Del City. There are three municipalities within the Lake Thunderbird watershed: the City of Moore, the City of Norman and Oklahoma City.

Stormwater discharges are highly variable both in terms of flow and pollutant concentration, and the relationships between discharges and water quality can be complex. For municipal stormwater discharges in particular, the current use of system-wide permits and a variety of jurisdiction-wide BMPs, including educational and programmatic BMPs, does not easily lend itself to the existing methodologies for deriving numeric water quality-based effluent limitations. These methodologies were designed primarily for process wastewater discharges which occur at predictable rates with predictable pollutant loadings under low flow conditions in receiving waters.

The United States Environmental Protection Agency (EPA) has recognized these problems and developed permitting guidance for stormwater permits. [See "Interim Permitting Approach for Water Quality-Based Effluent Limitations in Stormwater Permits" (EPA-833-D-96-00, Date published: 09/01/1996)] Due to the nature of stormwater discharges, and the typical lack of information on which to base numeric water quality-based effluent limitations (expressed as concentration and mass), EPA recommends an interim permitting approach for NPDES stormwater permits which is based on BMPs. "The interim permitting approach uses best management practices (BMPs) in first-round stormwater permits, and expanded or better-tailored BMPs in subsequent permits, where necessary, to provide for the attainment of water quality standards." (*ibid.*)

A monitoring component is also included in the recommended BMP approach. "Each stormwater permit should include a coordinated and cost-effective monitoring program to gather necessary information to determine the extent to which the permit provides for attainment of applicable water quality standards and to determine the appropriate conditions or limitations for subsequent permits." (*ibid.*)

The goals of the monitoring program is to; 1) establish the effectiveness of the selected BMPs and, 2) demonstrate progress toward achieving the waste load allocations (WLA) and load allocations (LA) reduction goals of the TMDL and eventually attaining water quality standards in

Lake Thunderbird. The monitoring results should also be used to refine TSS, nutrient and organic matter controls in the future. With three permitted MS4 entities in the watershed, it is likely that a cooperative monitoring program would be more cost effective than three individual programs. Individual permittees are not required to participate in a coordinated program and are free to develop their own program if desired. Specific requirements for an effective monitoring and tracking program are as follows:

A. Within 24 months of EPA approval of this TMDL, each permittee shall prepare and submit to the DEQ either a TMDL monitoring plan or a commitment to participate in a coordinated regional monitoring program. Unless disapproved by the Director within 60 days of submission, the plan shall be approved and then implemented by the permittee. The plan or program shall include:

    a. Evaluation of any existing stormwater monitoring program in relation to TMDL reduction goals.

    b. A detailed description of the goals, monitoring, and sampling and analytical methods.

    c. A map that identifies discharge points, stormwater drainage areas contributing to discharge points, and within each such drainage area, mapping the conveyance system.

    d. A list and map of the selected TMDL monitoring sites, which may include sites on receiving water bodies.

    e. Consideration of methods for evaluating pollutant loading in stormwater discharges from construction and industrial sites, such as monitoring requirements for site operators or small drainage monitoring for multiple construction sites.

    f. The frequency of sample collection to occur at each station or site: at a minimum, sample collection shall include at least one representative sample of a stormwater discharge from at least 50% of the major discharge points discharging directly to surface waters of the state within the portion of the TMDL watershed in the MS4 area. A major discharge point is a pipe or open conveyance measuring 36 inches or more at its widest cross section.

    g. The parameters to be measured, as appropriate for and relevant to the TMDL: at a minimum, the sample shall be analyzed for total phosphorus (TP), total nitrogen (TN), total suspended solids(TSS), and CBOD20.

    h. A Quality Assurance Project Plan that complies with EPA requirements [EPA Requirements for QA Project Plans (QA/R-5)].

B. The monitoring program shall be fully implemented within three years of EPA approval of this TMDL.

C. With the obtained monitoring and tracking data, periodically evaluate the effectiveness of individual BMPs if possible and the effectiveness of the overall TMDL compliance plan to ensure progress toward attainment of the waste load allocations. If progress cannot be shown, the MS4 permittee must revise its TMDL compliance plan to further its load reduction efforts.

2.0 Lake Thunderbird TMDL Monitoring Plan Requirement

This Monitoring Plan (MP) addresses the obligation of the City of Moore (City) to submit to the DEQ and implement the MP to establish the effectiveness of the selected BMP and demonstrate progress toward achieving the reduction goals of the TMDL and eventually attaining water quality standards in Lake Thunderbird. The monitoring results will also be used to refine TSS, nutrient and organic matter controls in the future.

This MP addresses the requirements and goals to implement a TMDL monitoring program providing the data necessary to review and update the Lake Thunderbird TMDL including:

1. A City watershed-wide MP to determine baseline ambient levels of interim and/or final Total nitrogen, Total phosphorus, TSS, and CBOD20 used in WLAs and LAs.
2. A City watershed-wide MP to determine compliance with the Lake Thunderbird TMDL, including meeting the established WLAs and LAs.

3.0 City of Moore TMDL Monitoring Plan

The MP described herein is consistent with the Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs, approved by the EPA on November 13, 2013, requirements and considers monitoring recommendations presented by the EPA and DEQ to track compliance with the TMDL's and associated load allocations, as well as, measuring compliance to numeric water quality targets defined as WLA and LA. However, due to budgetary and staffing considerations, as well as, significant gaps in information required to understand in-stream and watershed processes this MP considers a phased approach. This approach will enable the City to focus resources on the most prominent data gaps and limitations to the TMDL calculation, while maintaining the prescribed minimum level of compliance monitoring.

The MP is proposed to be conducted in two general phases. Phase 1 of this program focuses on data issues regarding ambient baseline concentration processes and the "linkage analysis" relating external pollutant loading to in-lake response and the associated predicted TMDL concentrations compared to numeric water quality targets. This key point, ambient and/or baseline concentrations in the TMDL calculation is not well understood and has a direct influence on the assessment of the required external load reductions to Lake Thunderbird. Additionally, in consideration of wet-weather events during this phase of TMDL MP implementation, the City will be prepared to perform wet-weather watershed monitoring. Phase 1 monitoring is not a requirement of the TMDL, and though it is suggested as a BMP in the City of Moore Compliance Plan (CP) as well as this MP, it will be performed only as deemed necessary and appropriate by the City. If Phase 1 monitoring is not financially feasible or practicable for the City, it may be discontinued at the City's discretion.

Phase 2 will be performed concurrently with Phase I, and focuses on intensive study in the watershed. Specifically, sample collection will include the collection of at least one representative sample annually of a stormwater discharge from at least 50% of the major discharge points discharging directly to surface waters of the state within the portion of the TMDL watershed of the City. A major discharge point is a pipe or open conveyance measuring 36 inches or more at its widest cross-section.

The duration of Phase 1 monitoring is anticipated to be approximately 5-10 years depending on the completion of in-stream studies and the amount of data collected under Phase 1 and establishment of data trends. Since the implementation schedule of the Lake Thunderbird TMDL allows a multi-year approach, it is envisioned that the results of Phase 1 monitoring will be used for the possible review and revision of the TMDL. The process of conducting the more intensive in-stream monitoring program while proceeding with the Phase 1 intensive watershed monitoring program is reflective of the adaptive management approach in addressing the Lake Thunderbird TMDL.

3.1 Phase 1: Watershed Baseline Assessment

Phase 1 monitoring extends the previous TMDL data collection effort for trend analysis, and also focuses on collecting key information to address identified data gaps. Phase 1 monitoring sites within the Lake Thunderbird watershed are consistent with those performed during the development of the Lake Thunderbird TMDL. Sampling methods at the stream monitoring sites will be consistent with existing Quality Assurance Project Plans (QAPPs); a QAPP has been developed, but may be modified after selection of a private contractor to perform the actual monitoring. Frequency of sampling is to be performed quarterly, with sampling occurring from January through December. Baseline sampling will be pre-scheduled to occur on specific dates within the each quarter. However, during the Spring (March - May) and Winter (November-February) quarters, the sampling events will be based on wet-weather events. A wet weather event is generally defined as storm events that are greater than 0.1 inch and at least 72 hours from the previously measurable storm event. The City however intends to utilize a 168 hour timeframe as the cutoff for the antecedent dry period because at 168 hours, a pollutant build-up time of one week has occurred, thus providing a more robust statistical representation. If wet-weather events cannot be collected due to lack of rainfall, safety, or inability to collect, samples will be collected as ambient samples on the last day of the quarter.

Monitoring is scheduled to begin November 2016. This will provide the City adequate time to select a contractor to perform monitoring, provide baseline data collection, purchase the necessary monitoring and sampling equipment, and select a laboratory with DEQ accreditation.

Monitoring sites for the baseline assessment are presented in Figure 3-1. Sub-watershed contributions are presented in Figure 3-2. Individual monitoring site locations are presented in Figures 3-3 through 3-7 respectively. Consistent with TMDL recommendations and the EPA Urban Stormwater BMP Performance Monitoring, 2009, sampling for Phase 1 includes multiple samples (5 samples for general water quality and TMDL constituents) for two storms per year and two ambient scheduled samples.

Table 3-1 includes a summary of the watershed monitoring sites. Sections 3.1.1 and 3.1.2 provide additional discussion of the monitoring components, including the specific parameters to be measured, and summarizes the investment required for implementation of each of the components of the monitoring plan.

Figure 3-1. TMDL Baseline Monitoring Sites for Phase 1 Watershed Monitoring

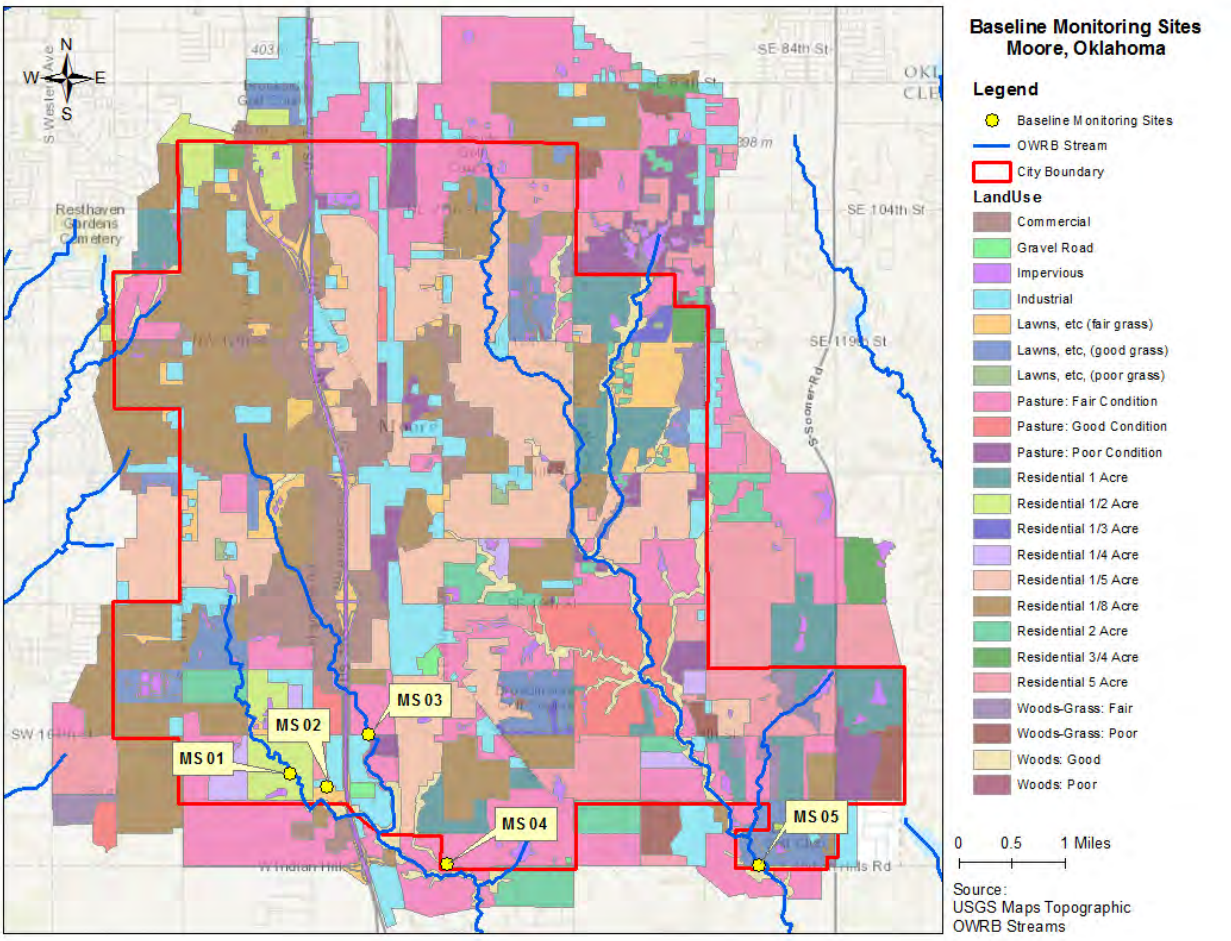


Figure 3-2 TMDL Sub-watershed Contributions

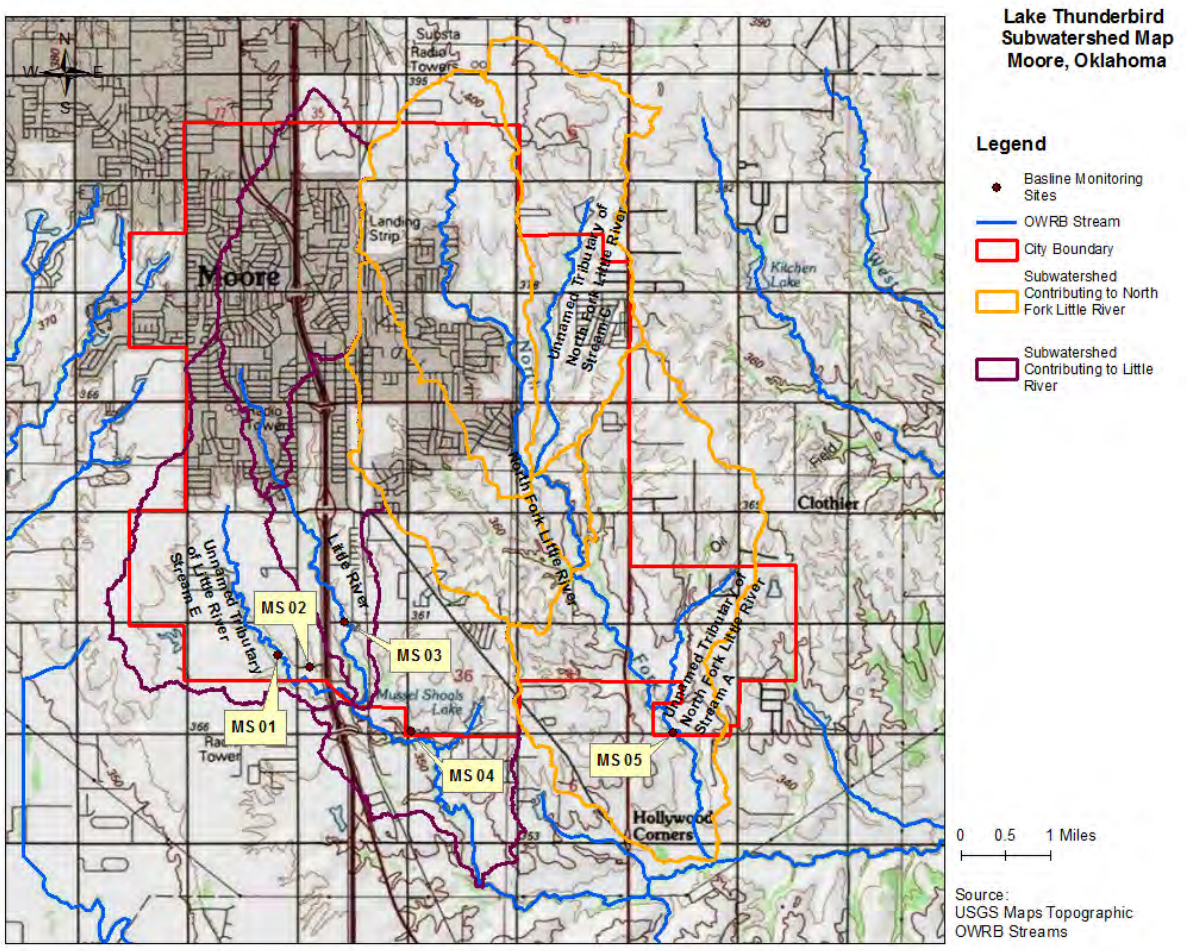


Figure 3-3 Baseline Monitoring Site 01

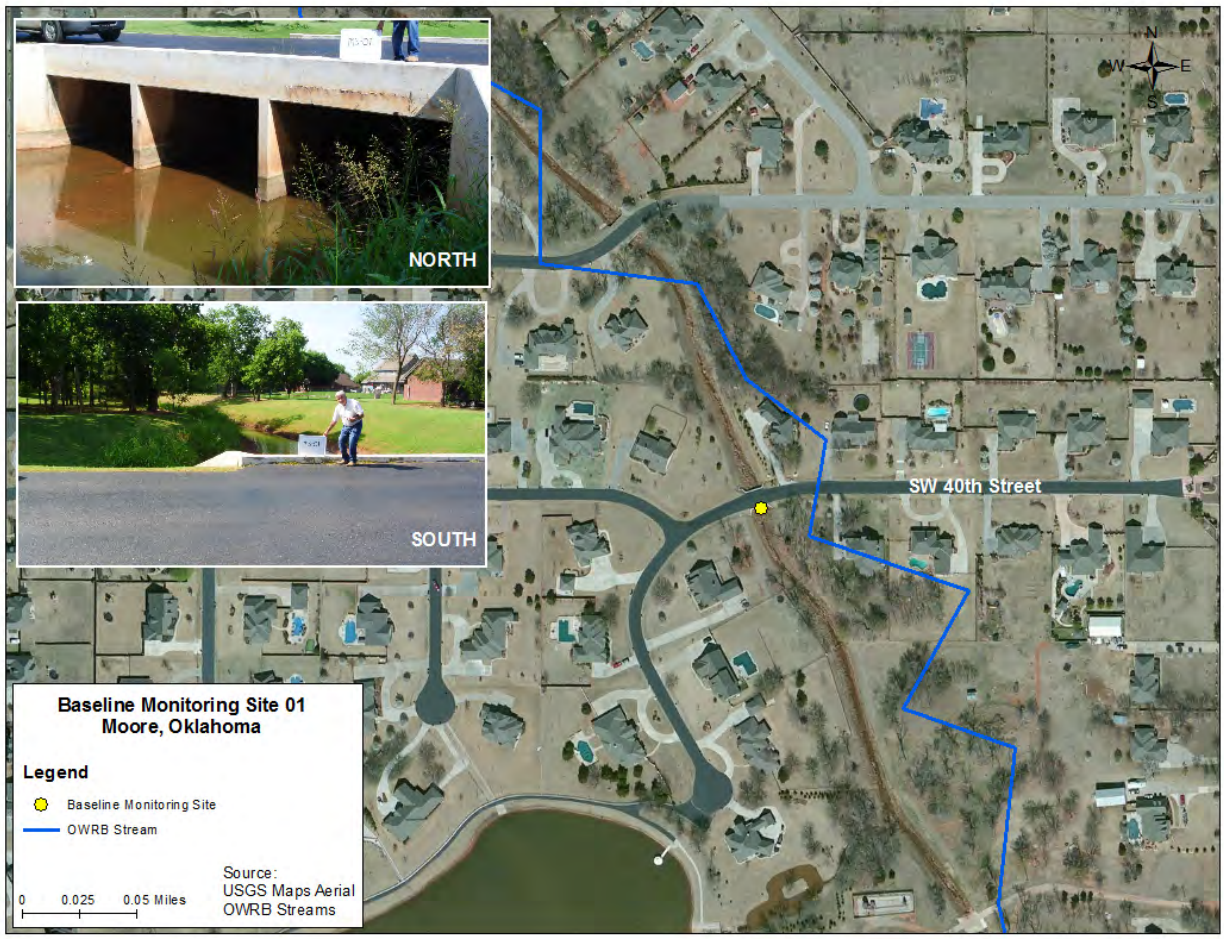


Figure 3-4 Baseline Monitoring Site 02

Figure 3-5 Baseline Monitoring Site 03

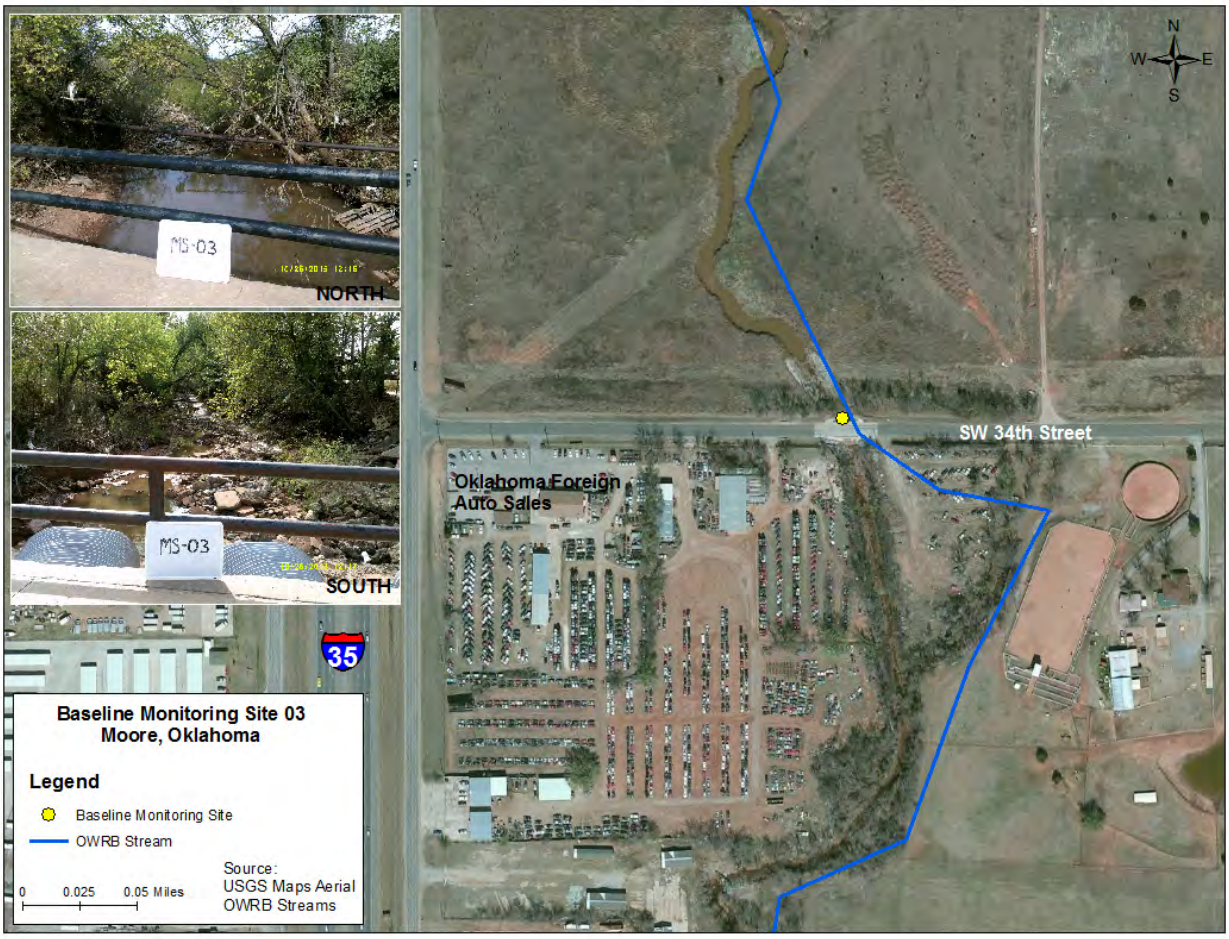


Figure 3-6 Baseline Monitoring Site 04

Figure 3-7 Baseline Monitoring Site 05

Table 3-1. Summary of Phase 1

DESCRIPTION	MONITORING SITE NUMBER	Frequency	DATA COLLECTED
Residential	01	Quarterly	Temp, pH, DO, Conductivity, TDS, Turbidity, ORP, Total N, Total P, TSS, CBOD20
Park/Greenspace, Commercial	02	Quarterly	Temp, pH, DO, Conductivity, TDS, Turbidity, ORP, Total N, Total P, TSS, CBOD20
Commercial	03	Quarterly	Temp, pH, DO, Conductivity, TDS, Turbidity, ORP, Total N, Total P, TSS, CBOD20
Residential, Undeveloped	04	Quarterly	Temp, pH, DO, Conductivity, TDS, Turbidity, ORP, Total N, Total P, TSS, CBOD20
Agricultural and Residential	05	Quarterly	Temp, pH, DO, Conductivity, TDS, Turbidity, ORP, Total N, Total P, TSS, CBOD20

3.1.1 Phase 1: Laboratory Analyses

Separate laboratory analyses are required for watershed samples. The following sections discuss parameters to be measured for each sample and the total cost of laboratory analyses. All laboratory analyses will be performed according to 40 CFR 136 or its approved standard methods.

3.1.2: Watershed Samples

For all samples collected from the watershed TMDL monitoring sites, Both Phase 1 and Phase 2, the following parameters are recommended for laboratory analyses:

- Water temperature
- pH
- Dissolved oxygen
- Specific conductance
- Total Dissolved Solids
- Turbidity
- Total nitrogen
- Total Phosphorous
- Total suspended solids (TSS)
- Carbonaceous Biological Oxygen Demand (20 day)

3.1.3 Phase 1Flow Measurement

Stream flow, or discharge, is the volume of water that moves over a designated point over a fixed period of time. It will be measured as cubic feet per second (ft^3/sec).

The flow of a stream is directly related to the amount of water moving off the watershed into the stream channel. It is affected by weather, increasing during rainstorms and decreasing during dry periods.

Flow is a function of water volume and velocity. Stream velocity, which increases as the volume of the water in the stream increases, determines the kinds of organisms that can live in the stream (some need fast-flowing areas; others need quiet pools). It also affects the amount of silt and sediment carried by the stream. Sediment introduced to quiet, slow-flowing streams will settle quickly to the stream bottom. Fast moving streams will keep sediment suspended longer in the water column. Lastly, fast-moving streams generally have higher levels of dissolved oxygen than slow streams because they are better aerated.

This section describes the method for estimating flow in a specific area or reach of the streams monitored in the Lake Thunderbird watershed. It is adapted from techniques used by several monitoring programs and uses a float (an object such as an orange, ping-pong ball, etc.) to measure stream velocity. Calculating flow involves solving an equation that examines the relationship among several variables including stream cross-sectional area, stream length, and water velocity. Flow will be measured by solving the following equation:

Flow = ALC / T

Where:

- A = Average cross-sectional area of the stream (stream width multiplied by average water depth).
- L = Length of the stream reach measured (usually 20 ft.)
- C = A coefficient or correction factor (0.8 for rocky-bottom streams or 0.9 for muddy-bottom streams). This allows you to correct for the fact that water at the surface travels faster than near the stream bottom due to resistance from gravel, cobble, etc. Multiplying the surface velocity by a correction coefficient decreases the value and gives a better measure of the stream's overall velocity.

T = Time, in seconds, for the float to travel the length of L

Procedures for measuring flow at Phase 1 monitoring locations is presented in the attached Quality Assurance Project Plan (QAPP).

Flow

Flow is required at all routine stream monitoring sites. Flow values will be reported in cubic feet per second (ft3 /s).

Considerations when Measuring Flow

When measuring flow two things will be kept in mind.

1. Flow will be measures first in order to delay collection of chemical and biological water samples with limited holding times.
2. If flow is measured first, care will be taken to not to deploy a multi-probe instrument or to collect water samples in the area disturbed during flow measurement.

Exceptions to Flow-Reporting Requirements

There are two exceptions to the flow-reporting requirements:

1. ***No flow and pools.*** If there is no flow at a stream site, and accessible, isolated pools remain in the stream bed, collect and report the required field data and laboratory samples from the pools and report instantaneous flow. Under these conditions, report flow (ft3 /s) as zero.
2. ***Dry.*** If the stream bed holds no water, no sampling is required. Report that the stream was —dry in the. No value is reported for flow since there is no water.

3.1.4. Wet Weather Monitoring Event

The City will be prepared to monitor wet weather events at monitoring sites during the spring and fall quarters. Data collected during this event will provide information required to verify hydrologic and pollutant transport processes established within the watershed model for the Lake Thunderbird watershed.

3.1.5 Monitoring of Dry-weather Runoff Flows and Water Quality

In order to develop the best understanding of the influences of dry-weather runoff on stream water quality, it is necessary to quantify the dry-weather inputs from surrounding land uses and major tributaries; this was how each of the monitoring sites were selected. These will be analyzed for the constituents identified in Table 3.1. Also, any flow will be measured at the time of sample collection.

Monitoring of the dry weather flows will help identify major inputs of nutrients, organics, and sediments to the watershed during the warmer growing season. Further, a more complete description of contributions to the watershed during the dry season will complement monitoring data from wet-weather monitoring. Together, these data will allow the most complete understanding of influences on the watershed to be addressed. This knowledge will then facilitate the most efficient use of limited resources in mitigation of these impacts through best management practices (BMP) and use of other available technologies.

3.1.6 Study to Evaluate Benefits from Watershed BMP

Based on data collected from baseline watershed monitoring outlined above, analyses will be performed to evaluate benefits observed from implemented BMP. Established BMP are identified in the City of Moore Lake Thunderbird Compliance Plan.

3.1.7 Study to Re-evaluate Site-specific Nutrient Targets

For the Lake Thunderbird TMDL development, watershed-specific numeric targets were established based on reference conditions when beneficial uses of the lake were not met. Continued study of these conditions can further refine the cause-and-effect relationship between nutrient levels and impairments to beneficial uses, including assessment of nuisance algae levels and dissolved oxygen variability that can be influenced by nutrient levels and biological activity.

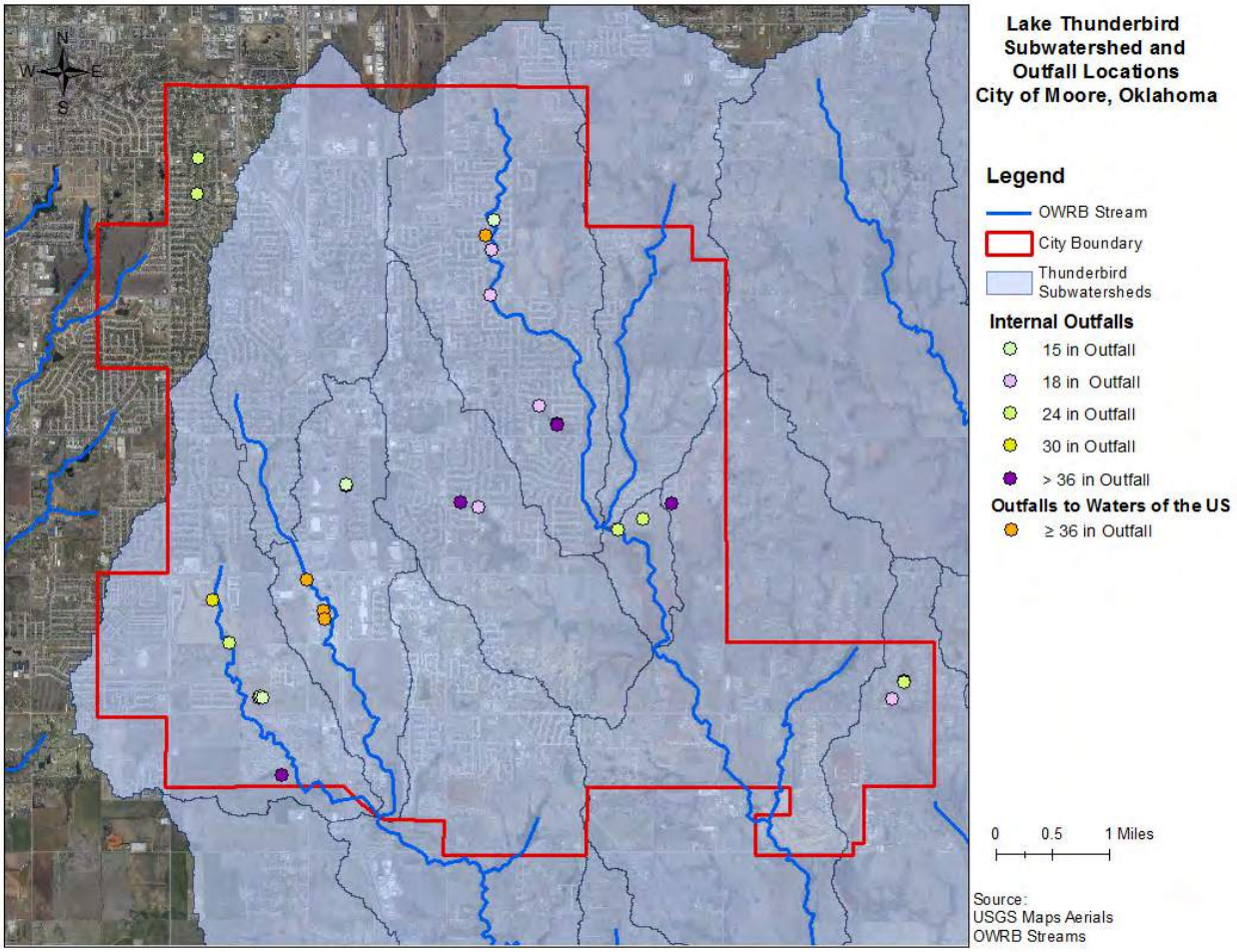
Analysis of previous and current monitoring data can provide sufficient data for assessment. In addition, development of dynamic models that provide full simulation of eutrophic processes can assist in understanding cause-and-effect relationships. However, if model results are to assist in analysis, associated model development is assumed to be performed in separate studies after data is collected.

3.2 Phase 2: Outfall Monitoring

This data collection strategy, outlined in Appendix E of the Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs, requires the collection of at least one representative sample of a stormwater discharge from at least 50% of the major discharge points discharging directly to surface waters of the state within the portion of the TMDL watershed in the MS4 area. A major discharge point is a pipe or open conveyance measuring 36 inches or more at its widest cross section.

There are four outfalls that meet the criteria established in Appendix E of the Final Lake Thunderbird Report for Nutrient, Turbidity, and Dissolved Oxygen TMDLs. These outfalls are as follows presented in Figure 3-8 along with the current location of identified outfalls, both internal (does not discharge directly to Waters of the U.S. and those 36 inches or greater that discharge to Waters of the U.S.

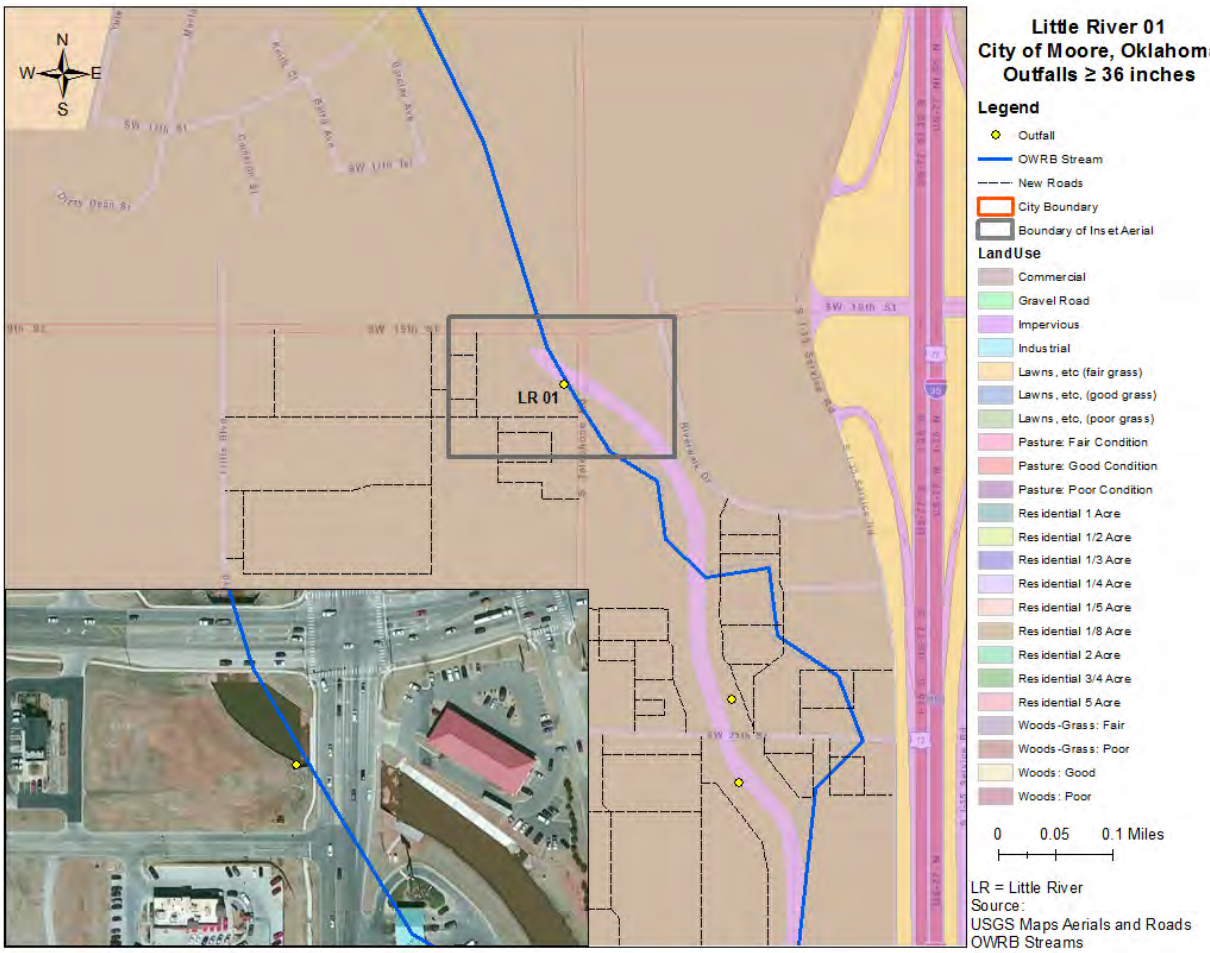
Figure 3-8


N
W
E
S
Lake Thunderbird Subwatershed and Outfall Locations City of Moore, Oklahoma
Legend
OWRB Stream
City Boundary
Thunderbird Subwatersheds
Internal Outfalls
15 in Outfall
18 in Outfall
24 in Outfall
30 in Outfall
> 36 in Outfall
Outfalls to Waters of the US
≥ 36 in Outfall
0 0.5 1 Miles
Source:
USGS Maps Aerials
OWRB Streams

Individual outfall monitoring locations are presented in Figures 3-9 through Figure 3-12.

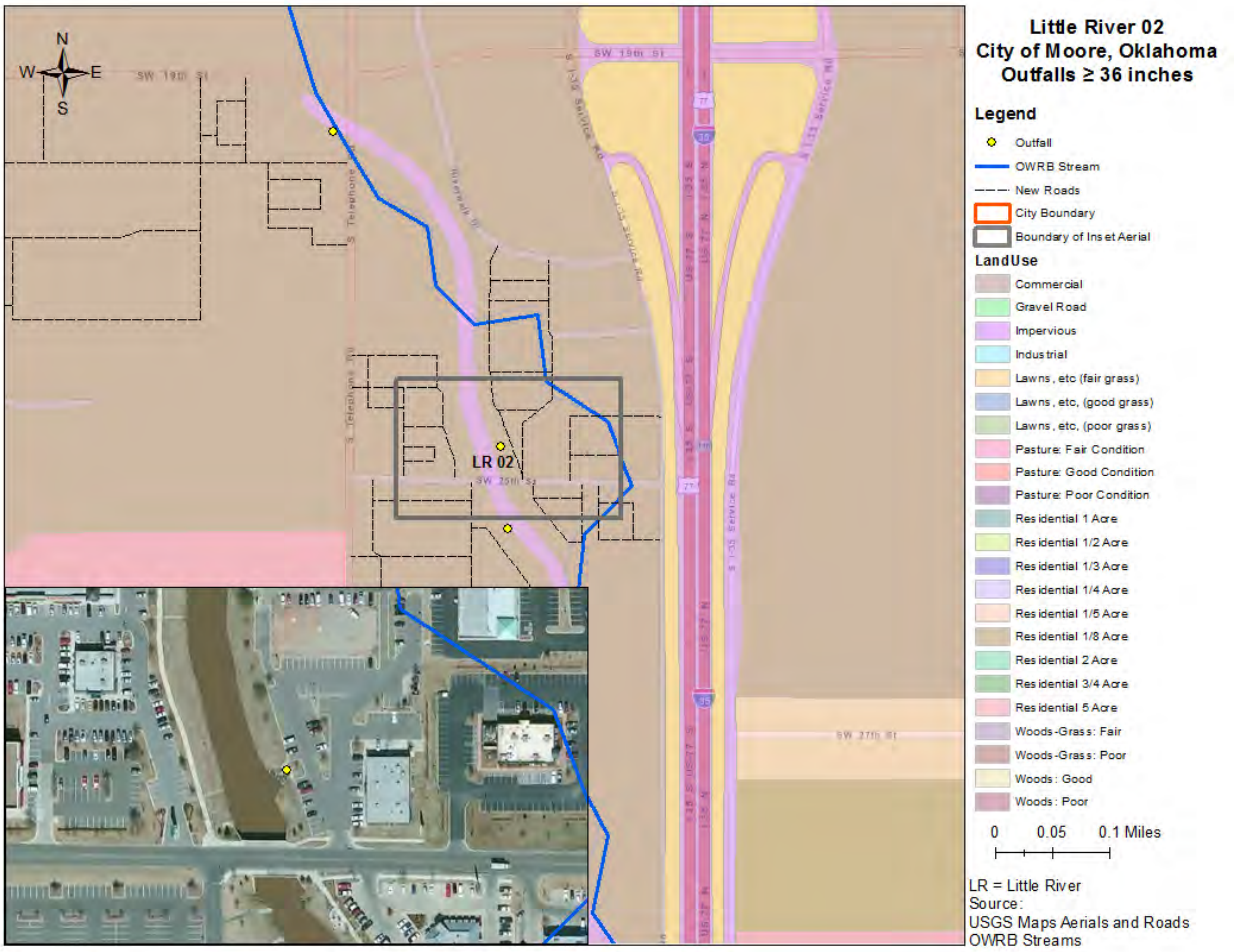
Little River Outfall 01 (LR01) - is a 55 inch reinforced concrete box that collects runoff from a commercial development area. The outfall location is presented in Figure 3-9 below.

Figure 3-9 LR01



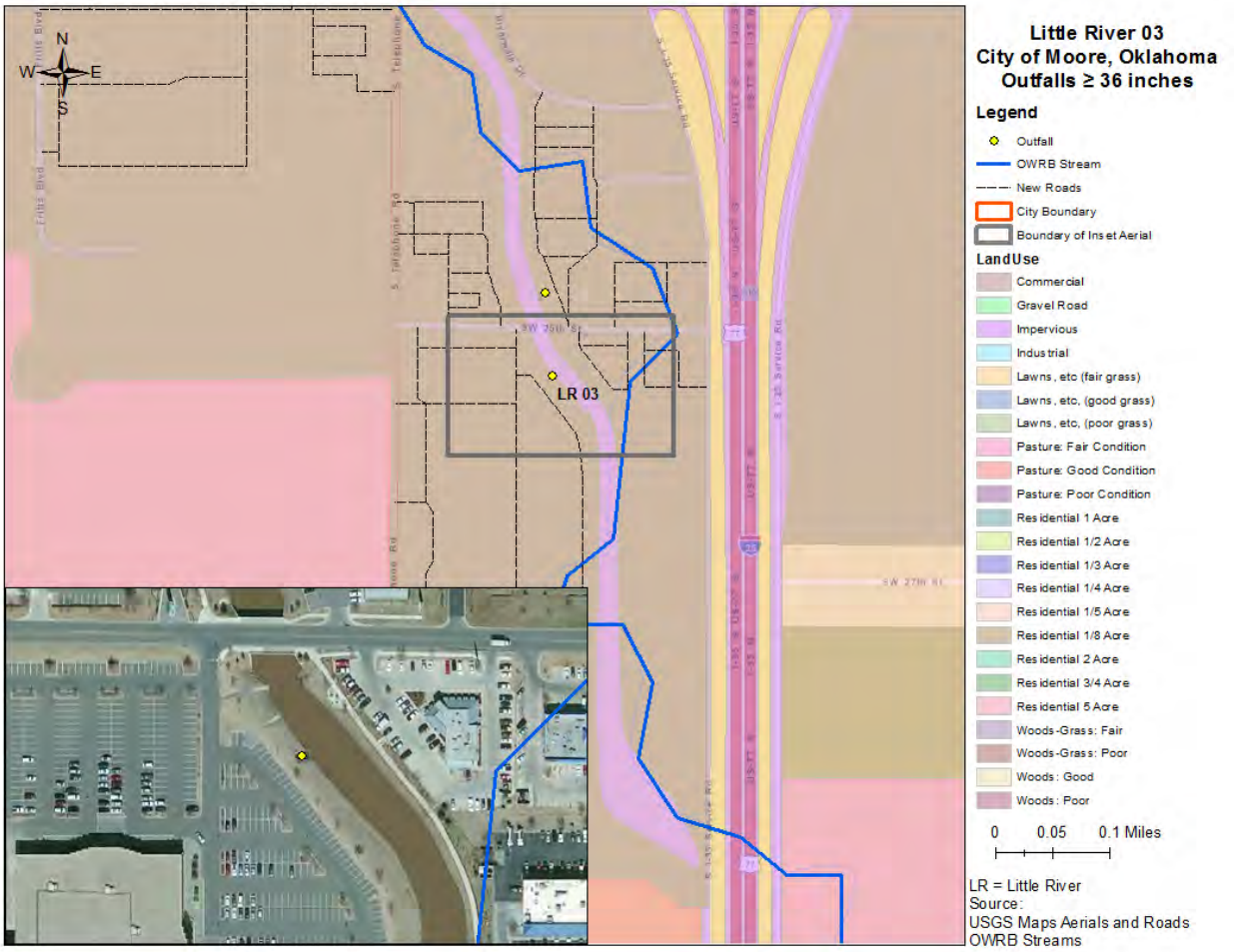
Little River Outfall 02 (LR02) - is a 96 inch reinforced concrete box that collects runoff from a commercial development area. The outfall location I presented in Figure 3-10 below.

Figure 3-10 LR02



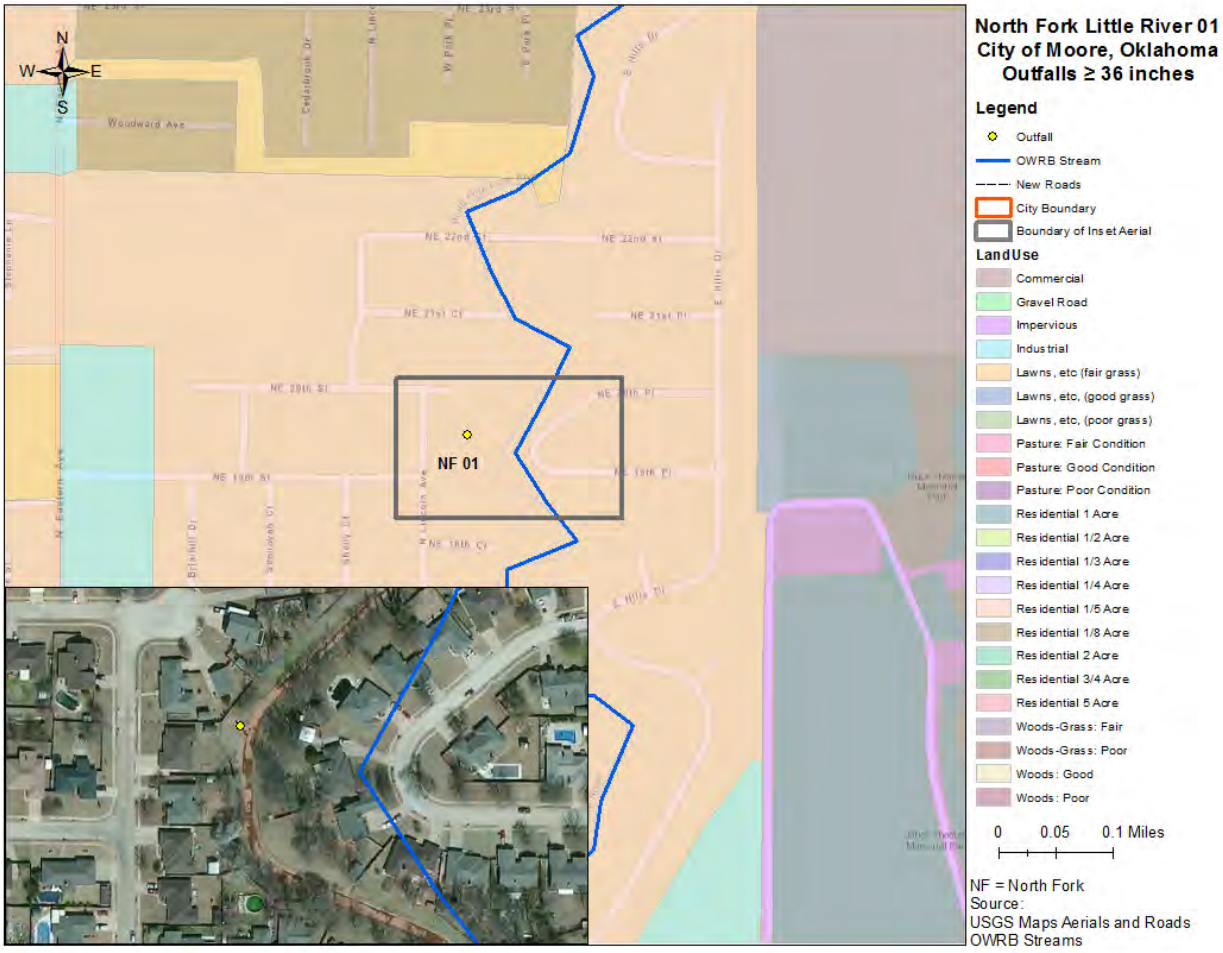
Little River Outfall 03 (LR03) - is a 36 inch reinforced concrete pipe that collects runoff from a commercial development area. The outfall location I presented in Figure 3-11 below.

Figure 3-11 LR03



North Fork Little River Outfall 01 (NF01) - is a 72 inch corrugated metal pipe (CMP) that collects runoff from a commercial development area. The outfall location I presented in Figure 3-12 below.

Figure 3-12 NF01



Phase 2 monitoring will be performed semi-annually on 50 percent of the identified outfalls. Sampling methods at the outfall monitoring sites will be consistent with existing Quality Assurance Performance Plans (QAPPs); a QAPP has been developed, but may be modified after selection of a private contractor to perform the actual monitoring. Frequency of sampling is to be performed semi-annually, with sampling occurring from January through December. Outfall sampling will be pre-scheduled to occur on specific dates within the semi-annual period. The sampling events will be based on wet-weather events. A wet weather event is generally defined as storm events that are greater than 0.1 inch and at least 72 hours from the previously measurable storm event. If wet-weather events cannot be collected due to lack of rainfall, safety, or inability to collect, samples will be collected during the next rotational semi-annual period.

Table 3-2 includes a summary of the outfall monitoring sites. Sections 3.2.1 and 3.2.3 provide additional discussion of the monitoring components, including the specific parameters to be

measured, and summarizes the investment required for implementation of each of the components of the monitoring plan.

Table 3.2 Summary of Phase 2

DESCRIPTION	MONITORING SITE NUMBER	Frequency	DATA COLLECTED
Commercial	LR01	Annually	Temp, pH, DO, Conductivity, TDS, Turbidity, Total N, Total P, TSS, CBOD20
Commercial	LR02	Annually	Temp, pH, DO, Conductivity, TDS, Turbidity, Total N, Total P, TSS, CBOD20
Commercial	LR03	Annually	Temp, pH, DO, Conductivity, TDS, Turbidity, Total N, Total P, TSS, CBOD20
Residential	NF01	Annually	Temp, pH, DO, Conductivity, TDS, Turbidity, Total N, Total P, TSS, CBOD20

Phase 2 monitoring will be performed to address potential data gaps not answered through typical watershed monitoring, as well as establishing potential WLA and LA pollutant contribution from subwatersheds, particular land uses, agricultural management practices, and to determine the efficiencies of BMP.

3.2.1 Laboratory Analyses

Laboratory analyses is required for Phase 1 and Phase 2 samples, methods are presented in the attached QAPP.

For all samples collected from the Phase 1 and Phase 2 TMDL monitoring sites, the following parameters will be submitted for laboratory analyses:

- Total nitrogen
- Total Phosphorous
- Total suspended solids (TSS)
- Carbonaceous biological oxygen demand (20 day) (CBOD)

3.2.2 Phase 2 Outfall Flow Measurement

Flow monitoring of outfalls identified in Table 3.2 will be performed using cost effective water current meters. The water current meter offers two unique methods for determining average water velocity: 1) For small stream flows and pipes, the current velocity meter may be moved smoothly and uniformly throughout the stream flow profile until a steady average reading is displayed. This steady reading is the true average velocity for the stream flow. 2) For larger streams, the current velocity meter may be used to measure a vertical profile of water velocity at several points across a stream channel. The stream flow measurement for the profile is the sum of the average velocity of each subsection of stream flow times its cross-sectional area.

3.2.3 Field Analyses

Field analyses is required for Phase 1 and Phase 2 samples, methods are presented in the attached QAPP.

For all samples collected from the Phase 1 and Phase 2 TMDL monitoring sites, the following parameters will be analyzed in the field:

- Water temperature
- pH
- Dissolved oxygen
- Specific conductance
- Total Dissolved Solids
- Turbidity

Field analysis of identified parameters will be performed using a Horiba® U-50 Series multi-parameter water quality meter that is equipped to measure and log data for the parameters identified simultaneously with one single probe. The U-50 meter is equipped with a 10 meter cable that will allow direct deployment to the streams and outfalls monitored. If no flow conditions exist the U-50 meter comes with a sample container to collect and observe direct measurement of each of the parameters selected.

References

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Appendix A - QAPP