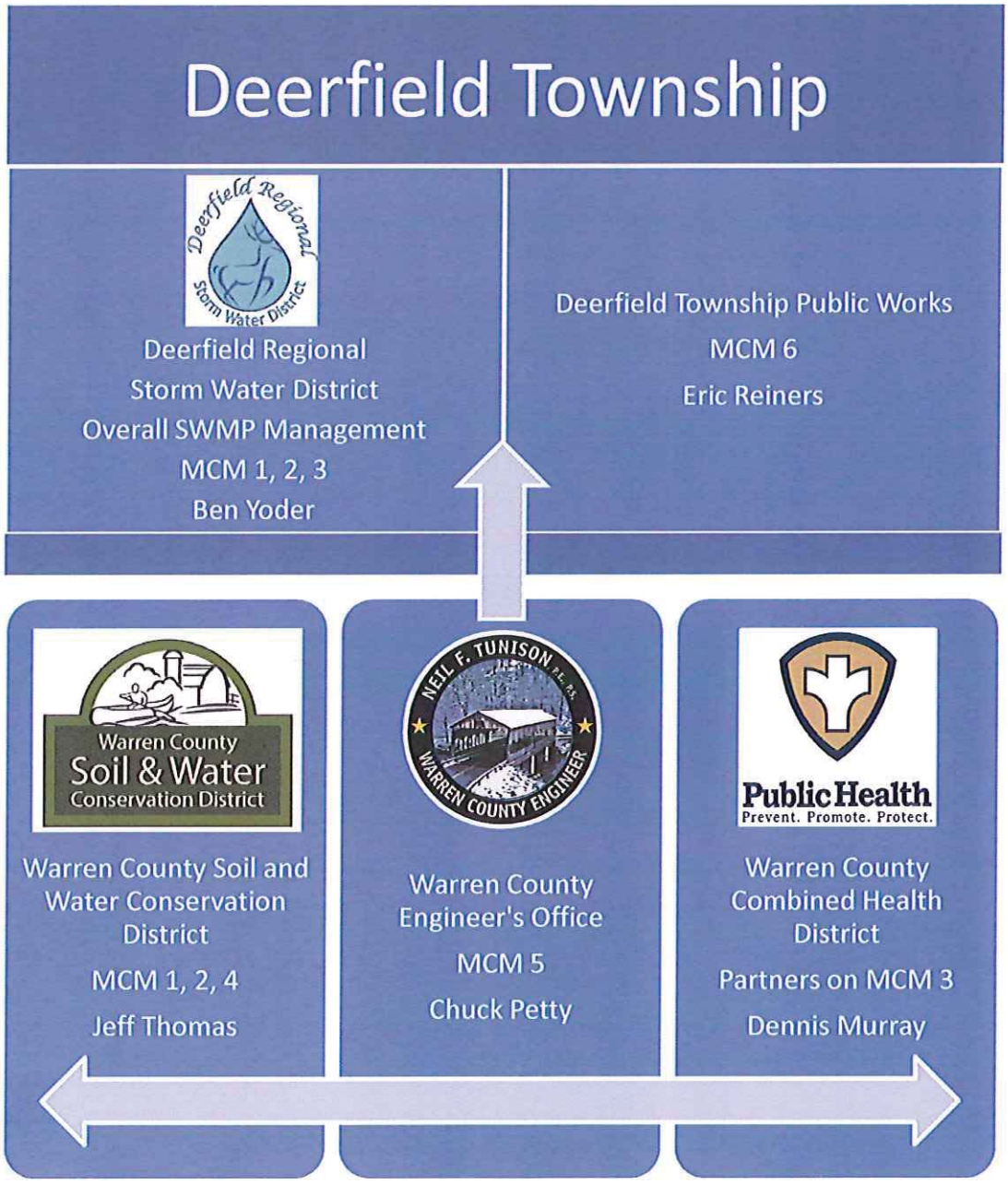
APPENDIX A

Deerfield Regional Storm Water District Organizational Chart

Include or attach a Table of Organization. Indicate who (name and contact information) is responsible for overall management and implementation of your program, and if different, each minimum control measure of your program. Identify how development and implementation across multiple positions, agencies and departments occur. Also, identify any Memorandum of Understandings (MOUs) or other such agreements that exist.

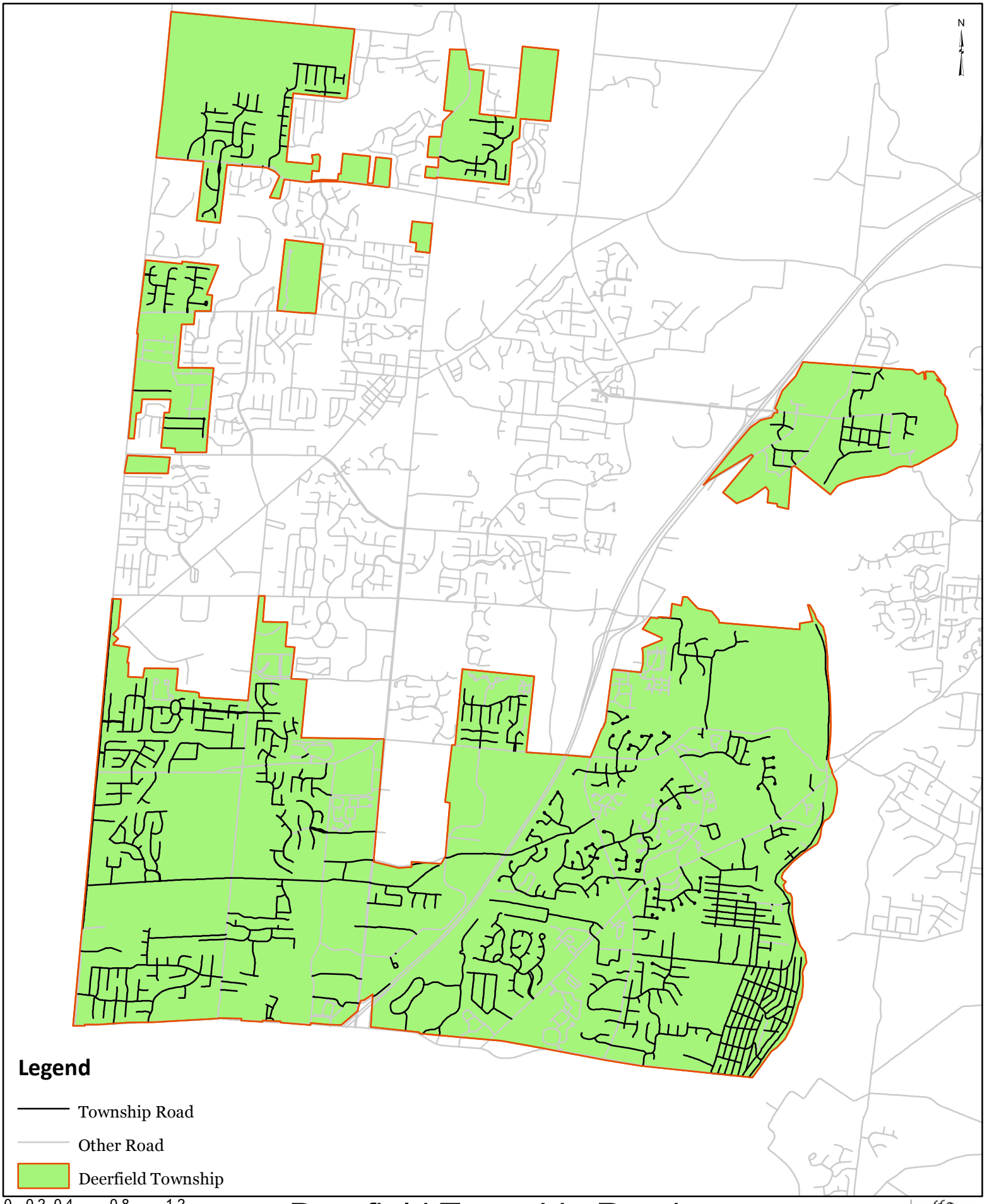


MS4 Table of Organization
Deerfield Township, Ohio

Dennis Murray | WCCHD - 513-695-2941; dennis.murray@co.warren.oh.us
Chuck Petty | WCEO - 513-695-3301; pettce@co.warren.oh.us
Eric Reiners | DTPW - 513-701-6974; erein@deerfieldtwp.com
Jeff Thomas | WCSWCD - 513-695-2763; jeff.thomas@co.warren.oh.us
Ben Yoder | DRSWD - 513-229-8363; admin@deerfieldstormwater.com

APPENDIX B

Map of Affected Township Roads



Deerfield Township Roads

APPENDIX C

Brochure of Programs Offered by WCSWCD

2012-2013 FREE Programs

TOPICS: Water Pollution, Effects of Technology, Non Point Source Pollution, Water Cycle

Enviroscape
A 3-dimentional model is used so that students learn watersheds, point source and non-point sources of pollution and pollution prevention.

Water Cycle Game (Large space needed)
Students make a bracelet while going on a journey through the water cycle.

Fred the Fish, (Grades PreK-2nd)
Take a journey with Fred down the Little Miami River and learn about how to clean up his home.

***NEW* Stream Ecosystem**
Students learn how scientists look to see if a stream is healthy by collecting bugs from a pretend stream.

TOPICS: Soil, Erosion, Rocks, Non Living Resources, Fossils, Maps, Matter and Weathering

Erosion/Stream Table
The *Riverlab* stream model is used to illustrate different erosion and deposition processes on a natural landscape. This may also be borrowed.

Earth Formations
Students visit four stations and do erosion, weathering, physical change and chemical change experiments.

Soil Ingredients
Students make their own simulated soil (play dough) with ingredients that represent soil.

***NEW* Soil Computer Lab(6th and up)**
Students learn about soil types around them, reasons to study soil, and become scientists by mapping soil with the online soil survey.

***NEW* Soil Testing**
Students become soil scientists and test soil with a dichotomous key.

Soil Layers
Students focus on the layers found in soil and do a soil craft to take home.

Rock Cycle Game
Students are minerals in the rock cycle and learn about everyday uses of rocks and minerals.

Topographic Maps
Students will get a topographic map of their school to analyze then will do an activity about contour lines.

***NEW* Geology Stations**
Students work in groups and complete tests to find the name of minerals or rocks.

Physical and Chemical Changes
Students do physical and chemical changes to rocks and see how these changes happen in nature.

TOPICS: Ohio Habitats/Life Cycles/Adaptations/Plants/ Basic Needs

Fossils
Learn about fossils and how they relate to animals and life here today. They also get to make their own fossil imprint to keep.

How Many Bears Can live in this Forest?
Learn about bears by playing a game where students must find their food!

***NEW*Turtle Hurdles** (Students need a large space) Students learn about sea turtles that are endangered and play a survival game

Animal and Plant Address
Students compete by guessing an animal based on life cycle and adaptations clues.

Ohio Habitats
Students will learn Ohio habitats and will have to place animals in their rightful habitat.

Dress like a Beaver, (Grades PreK-3)
Learn about a beaver's habitat and adaptations by dressing like a beaver.

Goble Goble (Grades PreK-3rd)
Students learn about a turkey's habitat, predators, and make a turkey call.

***NEW* Buzzy, Buzzy Bee**
Learn all about our famous pollinator, why we need them, and play a game.

***NEW* Decomposers**
Students discover nature's sanitation crews and why they are important. Students will also get to take a look at some composting worms hard at work.

***NEW* Henry the Great Blue Heron**
Henry the Impatient Heron is read and students learn about beak adaptations in birds.

Wiggling Worms, (PreK– 2nd grade)
Students are read a book then will get to visit with some live worms.

TOPICS: Natural Resources, Sustainability, Limited Resources, Carrying Capacity, Energy

No Water Off a Duck's Back
There has been an oil spill and students must spring into action and clean up their feathers.

Aqua Bodies *fractions or percentages for older grades*
Water is a limited resource. Living organisms are composed of water and we need to protect water.

***NEW* Chip Mining** *Math and Economics*
Learn about the mining industry and earn money for each chip extracted from a cookie. Students will see environmental impacts that can be associated with these changes. (let us know of food allergies a head of time for purchasing safe cookies)

***NEW* Fishing for the Future**
Students learn about limited resources through overfishing.

***NEW* Toil for Oil**
Students experience the increasing difficulty of extracting a limited, nonrenewable resource over several years and will consider and discuss renewable energy sources.

***NEW* Shop Till You Drop!**
Students experience how resources are distributed and used by different people based on access to wealth. Then they will discuss solutions to address the environmental impacts, and to help alleviate poverty.

Warren County Soil & Water Conservation District

Schedule Programs with Amy Pond at amy.pond@co.warren.oh.us or call 513-695-2530 or 513-532-6401

APPENDIX D

Warren County Erosion and Sediment Control Regulations

WARREN COUNTY EROSION AND SEDIMENT CONTROL REGULATIONS

Warren County, Ohio

October 2006

Warren County Board of Commissioners
C. Michael Kilburn
David G. Young
Pat South
406 Justice Drive, Lebanon, Ohio

BOARD OF COUNTY COMMISSIONERS
WARREN COUNTY, OHIO

Resolution *Number 90-490*

Adopted Date -May 1, *1990*

ADOPT RULES TO ABATE SOIL EROSION AND WATER POLLUTION BY SOIL SEDIMENT

WHEREAS, Section *307.79 of* the Ohio Revised Code authorizes a Board of County Commissioners to adopt rules to abate soil erosion and water pollution by soil sediment; and

WHEREAS, public hearings on said revised regulations was held by the Warren County Board of Commissioners on April *3,* April 10, April *19,* and May 1, *1990;* and

NOW THEREFORE BE IT RESOLVED, by the Warren County Board of Commissioners to adopt the revised regulations under the title:

Warren County Erosion and Sediment Control Regulations

BE IT FURTHER RESOLVED, that these regulations shall become effective on June 1, *1990,* and that all prior rules and regulations are hereby rescinded as of this date.

Mr. Kilburn moved for passage of the above resolution, seconded by Mr. Egleston. Upon call of the roll the following vote resulted:

Mr. Terwilleger - yea
Mr. Egleston - yea
Mr. Kilburn - yea

Resolution adopted this 1st day of May, *1990.*

Cindy Madison
Cindy Madison, Clerk

RD OF COUNTY
/R. Price COMMISSIONERS

cc: RAP (file)
Soil S Water Conservation (file)
RZC (file)
File

BOARD OF COUNTY COMMISIONERS
WARREN COUNTY, OHIO

Resolution

Number 05-356 *Adopted Date* March 15 2005

APPROVE FEE INCREASES WITHIN THE EROSION AND SEDIMENT CONTROL REGULATIONS

WHEREAS, this Board met this 22nd day of February 2005, and again this 15tl1 day of March 2005, in the Commissioners' Meeting Room to consider increases in fees within the Erosion and Sediment Control Regulations; and

WHEREAS, this Board has considered all testimony from those present and considered the recommendation presented by the Soil and Water Conservation District Director; and

NOW THEREFORE BE IT RESOLVED, to approve a fee increases within the Erosion and Sediment'Control Regulations as follows:

Single Family Homes:	$50/1ot (no maximum)
Multi-family, Apartments, Condos:	. $15/unit (no maximum)
Commercial/lndustria1:	$lOO/disturbed acre (maximum fee $5000)

BE IT FURTHER RESOLVED, that said fee increases shall be effective May 1, 2005.

Mr. Kilburn moved for adoption of the foregoing resolution, being seconded by Mr. Young. Upon call of the roll, the following vote resulted:

Mrs. South - yea
Mr. Young - yea
Mr. Kilburn - yea

Resolution adopted this 15ili day of March 2005.

BOARD OF COUNTY COMMISSIONERS

Tina Davis, Clerk

BOARD OF COUNTY COMMISSIONERS
BARREN COUNTY, OHIO

Resolution

Number 90-490 *Adopted Date* May 1 , *1990*

ADOPT RULES TO ABATE SOIL EROSION AND WATER POLLUTION BY SOIL SEDIMENT

WHEREAS, Section *307.79* of the Ohio Revised Code authorizes a Board of County Commissioners to adopt rules to abate soil erosion and water pollution by soil sediment; and

WHEREAS, public hearings on said revised regulations was held by the Warren County Board of Commissioners on April *3,* April 10, April *19,* and May 1, 1990; and

NOW THEREFORE BE IT RESOLVED, by the Warren County Board of Commissioners to adopt the revised regulations under the title:

Warren County Erosion and Sediment Control Regulations

BE IT FURTHER RESOLVED, that these regulations shall become effective on June 1, 1990, and that all prior rules and regulations are hereby rescinded as of this date.

Mr. Kilburn moved for passage of the above resolution, seconded by Mr. Egleston. Upon call of the roll the following vote resulted:

Mr. Terwilleger - yea
Mr. Egleston - yea
Mr. Kilburn - yea

Resolution adopted this 1st day of May, 1990.

BOARD OF COUNTY COMMISSIONERS

Cindy Madison

Cindy Madison, Clerk

/R. Price

cc: RPC (file)
Soil & Water Conservation (file)
RZC (file)
File

B0ARD OF COUNTY COMMISSIONERS
WARREN COUNTY, OHIO .

Resolution

Number 90-491 *Adopted Date* May 1. 1990

AUTHORIZE WARREN COUNTY SOIL AND WATER CONSERVATION DISTRICT TO ADMINISTER THE WARREN COUNTY EROSION AND SEDIMENT CONTROL REGULATIONS

WHEREAS, Section 307.79 of the Ohio Revised code authorizes a Board of County Commissioners to adopt rules to abate soil erosion and water pollution by soil sediment; and

WHEREAS, the Warren County Board of Commissioners has adopted such regulations under the title:

Warren County Erosion and Sediment Control Regulations

WHEREAS, Section 307.79 of the Ohio Revised Code authorizes a Board of County Commissioners to delegate the administration of said regulations to other government agencies; and

NOW THEREFORE BE IT RESOLVED, by the Warren County Board of Commissioners to appoint the Warren County Soil and Water Conservation District to administer the Warren County Erosion and Sediment Control Regulations; and

BE IT FURTHER RESOLVED, that the Warren County Soil and Water Conservation District is authorized to modify said regulations in specific cases where unusual or exceptional factors or conditions require such modification.

Mr. Kilburn moved for passage of the above resolution, seconded by Mr. Egleston. Upon call of the roll the following vote resulted:

Mr. Terwilleger - yea
Mr. Egleston - yea
Mr. Kilburn - yea

Resolution adopted this 1st day of May, 1990.

BOARD OF COUNTY COMMISSIONERS

Cindy Madison

Cindy Madison, Clerk

/R. Price

cc: RPC (file)
Soil & Water Conservation District (file)
RZC (file)
File

TABLE OF CONTENTS

WARREN COUNTY EROSION AND SEDIMENT CONTROL REGULATIONS

ARTICLE I
GENERAL PROVISIONS

SECTION 100 TITLE

These regulations shall be cited as the Warren County Erosion and Sediment Control Regulations and may hereinafter be referred to as "these regulations."

SECTION 101 STATUTORY AUTHORIZATION

These regulations, as amended, of Warren County are promulgated in accordance with and pursuant to the legal grant of authority of Ohio Revised Code Section 307.79. whereby a board of county commissioners may adopt, amend, and rescind rules establishing technically feasible and economically reasonable standards to achieve a level of management and conservation practices that will abate wind or water erosion of the soil or abate the degradation of the waters within the State by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed for non farm commercial, industrial, residential, or other non farm purposes, and establish criteria for determination of the acceptability of those management and conservation practices.

SECTION 102 PURPOSE

The Warren County Board of Commissioners adopts and amends its Erosion and Sediment Control Regulations to establish technically feasible and economically reasonable standards to achieve a level of management and conservation practices that will abate wind or water erosion of the soil or abate the degradation of the waters within the State by soil sediment in conjunction with land grading, excavating, filling, or other soil disturbing activities on land used or being developed for non farm commercial, industrial, residential, or other non farm purposes, and establish criteria for determination of the acceptability of those management and conservation practices.

These regulations further intend but are not limited to:

A. Permit development while keeping erosion and sedimentation as close to existing levels as practical.

B. Reduce damage to receiving streams and impairment of their capacity, which may be caused by sedimentation.

C. To implement the applicable area wide waste treatment management plan prepared under section 208 of the "Federal Water Pollution Control Act," 86 Stat. 816 (1972), 33 U.S.C.A. 1228, as amended, and to implement phase II of the storm water program of the national pollutant discharge elimination system established in 40 C.F.R. Part 122.

SECTION 103 SCOPE

These regulations shall apply to all non-farm earth disturbing activities performed on unincorporated lands of Warren County, Ohio except those activities excluded in Section 307.79 of the Ohio Revised Code as follows:

A. Strip mining operations regulated under Section 1513.01 of the Ohio Revised Code;

B. Surface mining operations regulated by Section 1514.01 of the Ohio Revised Code;

C. Public highways, transportation, and drainage improvements or maintenance thereof undertaken by a government agency or political subdivision in accordance with a statement of its standard sediment control policies that has been approved by the Warren County Board of Commissioners or the Chief of the Division of Soil and Water Conservation.

SECTION 104 DISCLAIMER OF LIABILITY

Neither submission of a plan under provisions of these regulations nor compliance with provisions of these regulations shall relieve any person from responsibility for damage to any person or property otherwise imposed by law, nor impose any duty or liability upon the Warren County Board of Commissioners or their agents for damage to any person or property.

SECTION 105 SEVERABILITY

If any clause, section, or provision of these regulations is declared invalid or unconstitutional by a court of competent jurisdiction, validity of the remainder shall not be affected thereby.

SECTION 106 EFFECTIVE DATE

These regulations shall be effective on the 31st day after adoption by the Warren County Board of Commissioners.

ARTICLE II
DEFINITIONS

SECTION 200 INTERPRETATION OF TERMS AND WORDS

For the purpose of these regulations certain rules or word usage apply to the text as follows:

A. Words used in the present tense include the future tense, and the singular includes the plural, unless the context clearly indicates the contrary.

B. The term "shall" is always mandatory and not discretionary; the word "may" is permissive.

C. Words or terms not interpreted or defined by this article shall be used with a meaning of common or standard utilization, so as to give these regulations its most reasonable application.

SECTION 201 WORDS AND TERMS DEFINED

BUILDER

Following the issuance of a building permit the person responsible for the construction of a structure.

CHANNEL

A natural bed that conveys water; a ditch excavated for the flow of water.

DETENTION STRUCTURE

A permanent structure for the temporary storage of runoff, which is designed so as not to create a permanent pool of water.

DEVELOPER

Any individual, subdivider, firm, association, syndicate, partnership, corporation, trust, or any other legal entity commencing proceedings under these regulations to effect a subdivision of land hereunder for himself or for another.

DEVELOPMENT AREA

Any contiguous area owned by one person or operated as one development unit and used or being developed for non-farm commercial, industrial, residential, or other non-farm purposes upon which earth disturbing activities occur.

DITCH

An open channel either dug or natural for the purpose of drainage or irrigation with intermittent flow.

DRAINAGE IMPROVEMENT

As defined in Ohio Revised Code Section 6131.01(C), and/or conservation works of improvement, Ohio Revised Code Sections 1511 and 1515.

DRAINAGE WAY

An area of concentrated water flow other than a river, stream, ditch, or grassed waterway.

DUMPING

Grading, pushing, piling, throwing, unloading or placing.

EARTH-DISTURBING ACTIVITY

Any grading, excavating, filling or other alteration of the earth's surface where natural or man-made ground cover is destroyed and which may result in or contribute to erosion and sediment pollution.

EARTH MATERIAL

Soil, sediment, rock, sand, gravel, and organic material or residue associated with or attached to the soil.

EROSION

The process by which the land surface is worn away by the action of wind, water, ice or gravity.

A. Accelerated Erosion: A process which is much more rapid than natural or geologic erosion, and is primarily a result of the activities of man.

B. Channel Erosion: The erosion process whereby the volume and velocity of a concentrated flow wears away the bed and banks of a well-defined channel.

C. Floodplain Erosion: Abrading and wearing away of the nearly level land situated on either side of a channel due to overflow and flooding.

D. Gully Erosion: The erosion process whereby water accumulates in narrow channels during and immediately after rainfall or snow or ice melt and actively removes the soil from this narrow area to considerable depths, such that the channel would not be obliterated by normal smoothing or tillage operations.

E. Natural Erosion or Geologic Erosion: The wearing away of the earth's surface by water, wind or ice under natural environmental conditions that are undisturbed by man.

F. Rill Erosion: An erosion process in which numerous small channels only several inches deep are formed, which if not corrected can become gullies. Normal tillage operations can remove the rills.

G. Sheet Erosion: The removal of a fairly uniform layer of soil from the land surface as a result of raindrop splash and runoff.

EROSION AND SEDIMENT CONTROL

A system of structural and vegetative measures that minimize soil erosion and offsite sedimentation

EROSION AND SEDIMENT CONTROL PLAN

An erosion and sediment control strategy or plan, to minimize erosion and prevent off-site sedimentation by containing sediment off-site or by passing sediment laden runoff through a sediment control measure, prepared and approved in accordance with the specific requirements of these regulations, and designed in accordance with the handbook "Water Management and Sediment Control for Urbanizing Areas" in Section 302. The erosion and sediment control plan may be referenced to as a sediment control plan.

FARM
Land or water devoted to agriculture.

GRASSED WATERWAY
A broad or shallow natural course or constructed channel covered with erosion-resistant grasses or similar vegetative cover and used to conduct surface water.

IMPERVIOUS

Not allowing infiltration.

LANDSLIDE

Rapid movement downslope of a mass of soil.

OWNER

Any person seized of a freehold estate in land except that person holding easements are not included within such meaning.

PERSON

Any individual, corporation, partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency, the federal government, or any combination thereof.

PUBLIC WATERS

Water within rivers, streams, ditches and lakes except private ponds and lakes wholly within single properties, or waters leaving property on which surface water originates.

RETENTION STRUCTURE

A permanent structure that provides for the storage of runoff by means of a permanent pool of water.

RUNOFF

The portion of rainfall, melted snow or irrigation water that flows across the ground surface and is eventually returned to streams.

SEDIMENT

Soils or other surficial materials transported or deposited by the action of wind, water, ice, or gravity as a product of erosion.

SEDIMENTATION

The process or action of depositing sediment.

SEDIMENT BASIN

A dam or other suitable detention facility built across an area of water flow to settle and retain sediment carried by the runoff waters.

SEDIMENT POLLUTION

Failure to use management or conservation practices to abate wind or water erosion of the soil or to abate the degradation of the waters of the state by soil sediment in conjunction with land grading, excavating, filling, or other soil-disturbing activities on land used or being developed for non-farm commercial, industrial, residential or other non-farm purposes.

SLOUGHING

A slip or downward movement of an extended layer of soil resulting from the undermining action of water or the earth disturbing activity of man.

SOIL CONSERVATION

Using the soil within the limits of its physical characteristics and protecting it from unalterable limitations of climate and topography.

SOIL AND WATER CONSERVATION DISTRICT

As organized under Chapter 1515 of the Ohio Revised Code; referring either to the Soil and Water Conservation District Board, or its designated employee(s), hereinafter referred to as the Warren County Soil and Water Conservation District.

SOIL LOSS

Soil moved from a given site by the forces of erosion.

SOIL STABILIZATION

Measures, which protect soil from the erosive forces of raindrop impact and flowing water.

STOCKPILE

Any deposition of soil to be used for a future purpose.

STORM FREQUENCY

The average period of time within which a storm of a given duration and intensity can be expected to be equaled or exceeded.

STORMWATER MANAGEMENT

Runoff water safely conveyed or temporarily stored and released at an allowable rate to minimize erosion and flooding.

STORMWATER RUNOFF

That portion of the rainfall that exceeds the infiltration capacity of the soil.

STREAM

A body of water running or flowing on the earth's surface. Flow may be seasonally intermittent.

SUBSOIL

That part of the soil below the surface soil or plow layer.

TOPSOIL

The upper layer of soil, which is usually darker and richer in organic matter and nutrients than the subsoil.

WATERSHED

The total drainage area contributing runoff to a single point.

WATERCOURSE

A definite channel with bed and banks within which concentrated water flows, either continuously or intermittently.

ARTICLE III
REGULATIONS

SECTION 300 REQUIREMENTS

No person shall cause or allow earth-disturbing activities on a development area except in compliance with the standards and criteria set out in Section 302 and Sections 303 thru 311 and the applicable item A or B below.

A. When a proposed development area consists of one (1) or more acres and earth-disturbing activities are proposed, the owner of record shall develop and submit for review a sediment control plan. Such a plan shall contain sediment control and water management practices so that compliance with other provisions of these regulations will be achieved during and after development. No earth-disturbing activities shall commence prior to acceptance of the erosion and sediment control plan by the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners.

B. When a proposed development area involves less than one (1) acre, it is not necessary to submit a sediment control plan; however, the responsible person must comply with other provisions in these regulations. All earth disturbing activities shall be subject to surveillance and site investigation by the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners to determine compliance with the standards and regulations.

C. The sediment control plan shall be certified by a professional engineer registered in the State of Ohio.

D. All plans shall be submitted to the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners, with the exception of those prepared by a public agency and shall be accompanied by a filing fee as determined by the Warren County Board of Commissioners.

E. The District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners shall be notified 48 hours prior to commencement of earth disturbing activities. The District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners shall also be notified when the project is completed.

F. All improvements shall be constructed in conformity with approved plans and shall be completed within the time fixed or agreed upon by the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners.

G. In order that the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners has the assurance that the construction of improvements will be completed, the developer shall enter into one of the agreements as stated in Section 402A of these regulations.

H. These regulations are intended as guidelines and may be altered as necessary by the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners.

SECTION 301 EXCEPTIONS

Any person seeking approval to construct or improve a single-family residence shall be exempted from having to prepare an erosion and sediment control plan provided they:

A. Construct upon one lot or parcel at a time, and there is no other construction occurring, simultaneously on land or property within five hundred (500 feet) of the proposed development site; and

B. Do not disrupt, alter, or expose more than fourteen thousand (14,000) square feet of existing natural surface of the total development site at a time; and

C. Follow a standard policy for controlling run-off erosion and sediment impacts foreseeable to result during and from site development, which is acceptable to the Warren County Board of Commissioners.

Exemption under this section of any person for the preparation and submission of a sediment control plan does not, however, exempt them from complying with the other provisions of this regulations. The Warren County Board of Commissioners may require the responsible person to submit information deemed necessary to determine compliance.

SECTION 302 EROSION AND SEDIMENT CONTROL STANDARDS

The standards are contained in the most recent edition of handbook " Rainwater and Land Development" developed by the Soil Conservation Service, U.S. Department of Agriculture and the Ohio Department of Natural Resources Division of Soil and Water Conservation.

1 A copy of the "Rainwater and Land Development" handbook may be obtained from either the Warren County Regional Planning Commission or the Warren County Soil and Water Conservation District.

SECTION 303 STABILIZATION OF DENUDED AREAS AND SOIL STOCKPILES

A. Permanent soil stabilization shall be installed on denuded areas within seven (7) days after final grade is reached on any portion of the site. Stabilization shall be installed within three (3) days on areas immediately adjacent to streams. Application practices include vegetative establishment, mulching, and the early application of gravel base on areas to be paved. Soil stabilization measures should be selected to be appropriate for the time of year, site conditions and estimated time of use.

B. Temporary soil stabilization shall be required on any denuded area which will not be regraded for longer than thirty (30) days. Temporary soil stabilization shall be applied within seven (7) days after rough grading, or three (3) days on areas immediately adjacent to streams.

C. Soil stockpiles shall be stabilized or protected with sediment trapping measures to prevent soil loss.

SECTION 304 ESTABLISHMENT OF PERMANENT VEGETATION

A permanent vegetative cover shall be established on denuded areas not otherwise permanently stabilized after final grading. Permanent vegetation shall not be considered established until a ground cover is achieved which is mature enough to control soil erosion and to survive severe weather conditions.

SECTION 305 PROTECTION OF ADJACENT PROPERTIES

Properties adjacent to the site of a land disturbance shall be protected from sediment deposition. This may be accomplished by preserving a well-vegetated buffer strip around the lower perimeter of the land disturbance, by installing perimeter controls such as sediment barriers, filters or dikes, or sediment basins, or by a combination of such measures.

SECTION 306 TIMING AND STABILIZATION OF SEDIMENT TRAPPING MEASURES

Sediment basins and traps, perimeter dikes, sediment barriers and other measures intended to trap sediment on-site shall be constructed as a first step in grading and be made functional before upslope land disturbance takes place. Earthen structures such as dams, dikes, and diversions shall be seeded and mulched within seven (7) days of completion of installation.

SECTION 307 SEDIMENT BASINS

Where five (5) acres or more of the development area are disturbed in one watershed, stormwater runoff from that watershed shall pass through a sediment basin or other suitable sediment trapping facility with equivalent

other suitable sediment trapping facility with equivalent or greater storage capacity. The Warren County Board of Commissioners may require sediment basins or traps for smaller disturbed areas where deemed necessary. The sediment basin requirement may also be waived, by variance, if the Warren County Board of Commissioners agrees that site conditions do not warrant its construction.
Unless otherwise designed, sediment basins are temporary and shall be removed following final stabilization or other approved methods of stabilization of the contributing watershed.

SECTION 308 CUT AND FILL SLOPES

Cut and fill slopes shall be designed and constructed in a manner which will minimize erosion. Consideration should be given to the length and steepness of the slope, the soil type, upslope drainage area, groundwater conditions and other applicable factors. Slopes which are found to be eroding excessively during the first two (2) years after final grade shall be provided with additional slope stabilizing measures by the owner, developer or builder as appropriate until the problem is corrected. The following guidelines are provided to aid in developing an adequate design.

A. Roughened soil surfaces are generally preferred to smooth surfaces on slopes.
B. Diversions should be constructed at the top of long steep slopes which have significant drainage areas above the slope. Diversions or terraces may also be used to reduce slope length.
C. Concentrated stormwater should not be allowed to flow down cut of fill slopes unless contained within an adequate channel, flume or slope drain structure.
D. Wherever a slope face crosses a water seepage plane which endangers the stability of the slope, adequate drainage or other protection should be provided.

SECTION 309 STABILIZATION OF WATERWAYS AND OUTLETS

All on-site stormwater conveyance channels except roadway ditches shall be designed and constructed to withstand the expected velocity of flow without erosion. Methods adequate to prevent erosion shall also be provided at the outlets of all pipes and. paved channels. Provisions for management of stormwater shall be submitted to the Warren County Engineer for review and approval.

SECTION 310 CONTROL OF WASTE

All waste such as discarded building materials, concrete truck washout, chemicals, litter, and sanitary waste at the construction site that may cause adverse impacts to water quality shall be controlled.

SECTION 311 STORM SEWER INLET PROTECTION

All storm sewer inlets which are made operable during construction shall be protected so that sediment-laden water will not enter the conveyance system without first being filtered or otherwise treated to remove sediment.

SECTION 312 WORKING IN OR CROSSING WATERCOURSES

A. Construction vehicles should be kept out of watercourses to the extent possible. Where in-channel work is necessary, precautions shall be taken to stabilize the work area during construction to minimize erosion. The channel (including bed and banks) shall always be restabilized immediately after in-channel work is completed.

B. Where a live (wet) watercourse will be crossed by construction vehicles regularly during construction, a temporary stream crossing shall be provided.

SECTION 313 DISPOSITION OF TEMPORARY MEASURES

All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved as determined by The Warren County Board of Commissioners or after the temporary measures are no longer needed, unless otherwise authorized by the Warren County Board of Commissioners. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion and sedimentation.

SECTION 314 MAINTENANCE OF TEMPORARY MEASURES

All temporary erosion and sediment control practices shall be maintained and repaired as needed to assure continued performance of their intended function. The OWNER will be responsible for such maintenance until the final inspection by the Warren County Board of Commissioners.

SECTION 315 STATUS OF STANDARDS

The standards are general guidelines and shall not limit the right of the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners to impose additional, requirements, nor shall the standards limit the right of the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners to waive individual requirements.

ARTICLE IV
ADMINISTRATION

SECTION 400 EROSION AND SEDIMENT CONTROL PLAN CONTENT

In compliance with Section 300A, one (1) copy of the erosion and sediment control plan shall be submitted to the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners and shall contain a narrative and a site plan. The narrative information may be included on the site plan. The following information is required.

A. Narrative

1. Project description - nature and purpose of land disturbing activity; acres of grading involved.

2. Approximate acreage of overall site, of each sublot and of right-of-ways.

3. Existing site conditions - topography, vegetation and drainage.

4. Adjacent areas - description of neighboring areas such as streams, lakes, residential areas, roads, etc., which might be affected by the land disturbance.

5. Brief description of the soils on the site giving such information as soil name, erodibility, permeability, depth, texture and structure, and limitations for the proposed use. (Refer to the Soil Survey of Warren County, Ohio, released in March, 1973).

6. Estimated impervious areas, stated in terms of square footage or acreage, whichever is appropriate.

7. Critical areas - a description of areas on the site which have potentially serious erosion problems.

8. Erosion and sediment control measures, to minimize on-site erosion and to minimize off-site sedimentation.

9. Provisions for management of stormwater, derived both on-site and from upper watershed areas shall be submitted to the Warren County , Engineer for review and approval.

10. Details of temporary and permanent stabilization measures, including method of anchoring mulches.

11. Maintenance schedule for inspection and repair of temporary erosion and sediment control structures.

12. Sequence of construction describing implementation and maintenance of controls, temporary and permanent stabilization and earth-disturbance and construction. The sequence of construction shall, as a minimum, include a projected schedule and time frame for the following activities:

    a. Clearing and grubbing for those areas necessary for installation of perimeter controls;

    b. Construction of perimeter controls;

    c. Remaining clearing and grubbing;

    d. Road grading;

    e. Grading for the remainder of the site;

    f. Utility installation;

    g. Final grading, landscaping and stabilization; and

    h. Removal of controls.

13. Design computations and applicable assumptions for all temporary structural measures for erosion and sediment pollution control.

14. Seeding mixtures and rates, lime and fertilizer application rates, and kind and quantity of mulching for both temporary and permanent vegetative control measures.

15. Estimated cost of erosion and sediment control structures and features.

16. Name, address, and telephone number of the plan designer, the owner, and the persons) responsible.

B. Site Plan

1. The site plan shall be drawn at a scale between two hundred (200) feet to the inch and fifty (50) feet to the inch. Site plans shall be on one or more sheets twenty-four (24) by thirty-six (36) inches in size and shall be clearly and legibly drawn.

2. Vicinity map at a scale of not less than two thousand (2,000) feet to the inch locating the site in relation to the surrounding area.

3. Existing topography shown in 2 foot contour intervals and showing drainage patterns and drainage areas showing direction of flow. Also show existing drainage patterns and facilities, road rights-of-way and easements. Also show topography in 5 foot contour intervals on adjacent land within 200 feet of the site unless deemed not necessary by the Warren County Board of Commissioners.

4. Existing vegetation.

5. Location of existing buildings, structures, utilities, water bodies, drainage facilities, vegetative cover, paved areas, road right-of-way and other significant natural and man-made features in the development area, and of adjacent areas which might be affected by the land disturbance.

6. Soil types and boundaries as shown on the Soil Survey of Warren County, Ohio, released in March, 1973.

7. Title, scale, direction, legend and date of all plan maps.

8. Critical erosion areas.

9. Existing and proposed drainage patterns, including the watershed lines, direction of flow, and watershed acreage.

10. Location and elevation of proposed erosion and sediment control structures.

11. Profile of road cut and fill, with original ground profile and proposed grade profile.

12. Areas of excavation, grading and filling.

13. Final contours.

14. Limits of clearing and grading.

15. Location of practices, including erosion and sediment control, construction entrances and designated area(s) for concrete wash-out to be field adjusted as necessary.

16. Bottom width, side slopes and grade of ditches.

17. Location of existing utilities.

18. Location of existing easements.

19. Detail drawings of any structural practices used th are not referenced in “Water Management and Sediment Control for Urbanizing Areas".

20. Signed and sealed by Professional Engineer, the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners may waive specific requirements for plan detail or may require additional information to show that work will conform to the basic requirements of these regulations.

SECTION 401 PLAN REVIEW

If the proposed development is not regulated by the Warren County Subdivision Regulations the erosion and sediment control plan shall be submitted and approved prior to the issuance of a building permit by the Warren County Building Inspection Department. If the proposed development is regulated by the Warren County Subdivision Regulations then the erosion and sediment control plan shall be submitted after the approval of the preliminary plat by the Warren County Regional Planning Commission, and no later than concurrently with the submittal of construction drawings to the Warren County Regional Planning Commission. The erosion and sediment control plan shall be approved before any earth disturbing activity is begun except for soil borings, test pits, and other analysis efforts.

The developer shall submit copies of the erosion and sediment control plan to the Warren County Regional Planning Commission for the Warren County Board of Commissioners. Plans will be distributed to appropriate review agencies by the Warren County Regional Planning Commission.

Within ten (10) working days of receipt of an erosion and sediment control plan, the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners shall indicate its status of compliance or non-compliance to the owner or his appointed representative. Indication of non-compliance shall include specific plan deficiencies and the procedures for filing a revised plan.

At the time of submission of the revised plan, another ten (10) working day period is begun. Approval plans shall remain valid for two (2) years from date of approval unless construction has begun and control measures have been implemented. Renewal is accomplished by the submission of another plan.

SECTION 402 PERMIT

The submission of a letter from the District Director of the Warren Co. Soil and Water Conservation District to the Warren County Regional Planning Commission stating that the Erosion and Sediment Control Plan is approved will serve as the issuance of a permit. Copies of the approval letter will be sent to the responsible parties (owner/developer and consultant). No earth disturbing activities are permitted until the approval letter has been issued.

SECTION 403 BONDING OF IMPROVEMENTS

A. In order that the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners has the assurance-that the construction and installation of required erosion and sediment control structures, features and measures as required by the approved erosion and sediment control plan will be completed, the developer shall enter into following prior to the issuance of the permit

1. A security agreement form promulgated by the Warren County Board of Commissioners and providing a performance bond with the Warren County Board of Commissioners equal to the cost of construction, plus thirty (30)percent of such improvements as shown on plans, and based on an estimate approved by the District Director of the Warren County Soil and Water Conservation District.

B. The security to Warren County Board of Commissioners shall continue for a period of time determined by the District Director of the Warren County Soil and Water Conservation District from date of execution, and shall provide that the subdivider, his heirs, successors and assigns, their agents or servants, will comply with all applicable terms, conditions, provisions and requirements of these regulations, and will faithfully perform and complete the work of constructing, installing and maintaining such facilities or improvements in accordance with such laws and regulations.

C. Before said security is accepted, it shall be approved by the proper administrative officials.

D. Whenever a cash deposit is made, the same shall be made to the Warren County Board of Commissioners.

E. Preceding the acceptance of the developer's security, an itemized list of materials and their cost shall be submitted to the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of Commissioners. This list includes grading and construction of storm water basins which are to be located outside the road right-of-way. Construction cost estimates shall reflect realistic and current bid prices.

F. As required improvements for erosion and sediment control are completed, approved, and accepted, the Warren County Board of Commissioners may, upon a favorable written recommendation of the District Director of the Warren County Soil and Water Conservation District, reduce the amount of the security. The District Director of the Warren County Soil and Water Conservation District shall issue a letter to the Warren County Board of Commissioners, and such letter shall be sufficient evidence for the reduction of the security by Warren County.

G. When the District Administrator of Warren County SWCD, as the designate of Warren County Board of Commissioners, following final inspection of a subdivision, certify to the Warren County Board of Commissioners, that all improvements have been constructed in accordance with County specifications, the Warren County Board of Commissioners may proceed to accept the facilities for which the security was posted.

H. Whenever public improvements have not been constructed in accordance with the agreement, and with specifications as established, the Warren County Board of Commissioners may exercise its rights to declare a default under the security agreement and pursuit of any deficiencies.

SECTION 404 INSPECTION AND COMPLIANCE

The District Administrator and other staff of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners may inspect development areas to determine compliance with these rules and regulations. If it appears that a violation of these regulations has occurred, the owner or his appointed representative shall be notified of the deficiencies or non-compliance by the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners in writing by certified mail. If within two (2) weeks after receipt of such letter, the deficiency or non-compliance has not been corrected or plans have not been approved by the District Administrator of the Warren County Soil & Water Conservation District, as the designate of the Warren County Board of County Commissioners for its correction, said deficiency or non-compliance shall be reported to the Warren County Board of Commissioners for consideration.

If the Warren County Board of Commissioners determines that a violation exists an injunction or other appropriate relief may be sought to abate excessive erosion or sedimentation and secure compliance with these regulations. In granting relief the court may order the construction of sediment control improvements or implementation of other control measures.

A final inspection will upon notification by the developer of the completion of the scope of work being performed under the sediment control plan to determine if the criteria of these regulations have been satisfied.

SECTION 405 FINES, PENALTIES AND STOP WORK ORDERS

A. If the Warren County Board of Commissioners or its duly authorized representative determines that a violation of the rules adopted under this section exists, the board or representative may issue an immediate stop work order if the violator failed to obtain any county permit necessary for sediment and erosion control, earth movement, clearing, or cut and fill activity. In addition, if the board or representative determines such a rule violation exists, regardless of whether or not the violator has obtained the proper permits, the board or representative may authorize the issuance of a notice of violation. If, after a period of not less than thirty days has elapsed following the issuance of the notice of violation, the violation continues, the board or its duly authorized representative shall issue a second notice of violation. Except as provided in division (405 D)of this section, if, after a period of not less than fifteen days has elapsed following the issuance of the second notice of violation, the violation continues, the board or

its duly authorized representative may issue a stop work order after first obtaining the written approval of the prosecuting attorney of the county if, in the opinion of the prosecuting attorney, the violation is egregious.

B. Once a stop work order is issued, the board or its duly authorized representative shall request, in writing, the prosecuting attorney to seek an injunction or other appropriate relief in the court of common pleas to abate excessive erosion or sedimentation and secure compliance with the rules adopted under this section. If the prosecuting attorney seeks an injunction or other appropriate relief, then, in granting relief, the court of common pleas may order the construction of sediment control improvements or implementation of other control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars. Each day of violation of a rule or stop work order issued under this section shall be considered a separate violation subject to a civil fine.

C. The person to whom a stop work order is issued under this section may appeal the order to the court of common pleas of the county in which it was issued, seeking any equitable or other appropriate relief from that order.

D. No stop work order shall be issued under this section against any public highway, transportation, or drainage improvement or maintenance project undertaken by a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the board or the chief of the division of soil and water conservation in the department of natural resources.

SECTION 406 VIOLATIONS

(i) No person shall violate any rule adopted or order issued under this section. Notwithstanding division (405 D) of this section, if Warren County Board of Commissioners determines that a violation of any rule adopted or administrative order issued under this section exists, the board may request, in writing, the prosecuting attorney to seek an injunction or other appropriate relief in the court of common pleas to abate excessive erosion or sedimentation and secure compliance with the rules or order. In granting relief, the court of common pleas may order the construction of sediment control improvements or implementation of other control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars. Each day of violation of a rule adopted or administrative order issued under this section shall be considered a separate violation subject to a civil fine.

SECTION 407 VARIANCE

The Warren County Board of Commissioners shall serve as the “Board of Appeals” to hear and decide variances to these regulations in accordance with the standards of this Section. It may also hear appeals where it is alleged that the District Director of the Warren County Soil & Water Conservation District made an error in any order, requirement, decision or determination in the enforcement of these Regulations.

A variance may be granted by the Board of Appeals where:

(i) exceptional topographic or other physical conditions exist which are peculiar to the particular parcel of land.

(ii) That the peculiar condition in paragraph A did not result from previous actions by the owner.

(iii) That a literal interpretation of these regulations would deprive the owner of rights enjoyed by other property owners.

The request for a variance shall be submitted to the Warren County Board of Commissioners and shall state the specific variances sought and include sufficient data to justify the granting of a variance.

All applications for appeals or variances shall be made on a form provided and accompanied by the fee established by the Board of County Commissioners. Appeals shall be filed within thirty (30) days of the decision of the District Director of the Warren County Soil and Water Conservation District.

Appeals of decisions of the Board of Appeals shall be in accordance with Chapter 2506 of the Ohio Revised Code .

SECTION 408 APPEALS

Any person aggrieved by any order, requirement, determination, or any other action or inaction by the Warren County Board of Commissioners in relation to these regulations may appeal to the court of common pleas. Such an appeal shall be made in conformity with Chapters 2505 and 2506 of the Ohio Revised Code. Written notice of appeal shall be served on the clerk of the Warren County Board of Commissioners.

APPENDIX E

Web-Based Construction Site Inspection Form

Warren County Soil and Water Conservation District

DATATRACKER

Urban Erosion and Sediment Control Projects

Logged in as: caitlin botschner Logout
Change Password

Back to SWCD Projects Page

Search Projects | Create Project | Add Inspection | Admin

Project Number	1
Township/City	Turtlecreek TWP
Project Name	Estates of Keever Creek
Inspection Date	6/17/2013
Inspector	Caitlin Botschner
Inspection Type	Complaint
Stabilization	
Perimeter Controls	
Sediment Basin/Trap	
Inlet Protection	
Concrete Washout	
Sediment on Streets and Inlets	☑
Over-Seed or Re-Seed	☑
Post Construction Water Quality	
Dispose of BMPS and Stabilize	☑
Started Without Permit	☑
Additional Violations	
Generate Letter	☑
Comments (Office Use Only)	

Upload Pictures

Select File

Comments

Add Picture

Save Inspection | Cancel

APPENDIX F

Example Maintenance Letter

Warren County
Soil & Water
Conservation District

November 20, 2012

Test
Soil & Water
320 E. Silver St.
Lebanon,OH 45036

RE: **Example - Lebanon**
EROSION AND SEDIMENT CONTROL MAINTENANCE

Dear Test,

The following items need to be addressed to bring Example into compliance with the Warren County Erosion and Sediment Control Regulations:

1. All bare areas at final grade and all bare areas not subject to re-grading or construction traffic for the next 21 days need to be seeded and mulched using either a permanent or temporary mixture, whichever is pertinent. This would include any on-site soil stockpiles and any areas around the site perimeter which are not vegetated.
2. Perimeter controls as shown on the plans need to be installed.
3. The sediment basin needs to be cleaned out in order to provide adequate storage as noted in the plans.
4. Inlet protection needs to be installed on all catch basins and curb inlets.
5. The concrete washout needs to be installed as noted in the plans.
6. Mud tracked onto the streets and sediment settled around curb inlets needs to be removed and placed where it will not be subject to erosion or concentrated runoff.
7. Over-seeding or re-seeding is required where plant cover is patchy and inadequate.
8. The post-construction water quality features for this site need to be installed.
9. Upon completion of construction, remove and properly dispose of all erosion and sediment control BMPs and stabilize all disturbed areas.
10. As stated in Section 402 of the Warren County Erosion and Sediment Control Regulations no earth disturbing activities are allowed until a permit has been issued. Inspectors have noted that earth disturbing activities greater than one acre have occurred on this property and a permit is required before this activity may continue.

You are hereby notified that this project is out of compliance until the above items are completed. As stated in Section 404 of the Warren County Erosion and Sediment Control Regulations, if within two weeks after the receipt of this letter, the deficiencies or non-compliances have not been corrected, they will be reported to the Warren County Board of Commisioners for consideration. Please notify us when the above items have been completed and contact this office if you have any questions.

Sincerely,

Don Norman
Natural Resource Conservationist

CC: File

APPENDIX G

Warren County Rules and Regulations for the Design of Sewer and Stormwater Management Systems

BOARD OF COUNTY COMMISSIONERS
WARREN COUNTY, OHIO

Resolution

Number 03-1057 *Adopted Date* July 22, 2003

ADOPT RULES AND REGULATIONS FOR THE DESIGN OF STORM SEWER AND STORM WATER MANAGEMENT SYSTEMS

WHEREAS, Sections 307.37, 307.79, 711.10 and 711.01 of the Ohio Revised Code authorizes a Board of County Commissioners to adopt rules and regulations for the design of storm water management, and

WHEREAS, public hearings on said rules and regulations were held by the Warren County Board of Commissioners on July 1, 2003 and July 8, 2003; and after publication in compliance with ORC 307.37.

NOW THEREFORE BE IT RESOLVED, by the Warren County Board of Commissioners to adopt the rules and regulations under the title: "WARREN COUNTY RULES AND REGULATIONS FOR THE DESIGN OF STORM SEWER AND STORM WATER MANAGEMENT SYSTEMS"

BE IT THEREFORE RESOLVED, that these rules and regulations shall become effective on August 22, 2003, being 31 days following the date of adoption; and shall be administered by the County Engineer, as attached hereto and made a part hereof.

Mrs. South moved for adoption of the foregoing resolution, being seconded by Mr. Kilburn. Upon call of the roll, the following vote resulted:

Mr. Crisenbery – yea
Mr. Kilburn – yea
Mrs. South – yea

Resolution adopted this 22nd day of July 2003.

BOARD OF COUNTY COMMISSIONERS

A. Jean Miranda

Tina Davis, Clerk

/lkl

cc: Engineer (file)

WARREN COUNTY RULES AND REGULATIONS FOR THE DESIGN OF STORM SEWER AND STORMWATER MANAGEMENT SYSTEMS

TABLE OF CONTENTS

ARTICLE 600 - STORMWATER MANAGEMENT

CONTROL OF STORM SEWERS

ARTICLE 100

SECTION 101 - CONTROL

All storm sewers in the unincorporated area of Warren County shall be controlled by the Board of County Commissioners, Warren County, Ohio.

SECTION 102 - OWNERSHIP

All public or private storm sewers shall continue to be owned by the respective owners now owning same until such time as the Board of County Commissioners, by resolution agree to accept the private storm sewer system as public.

SECTION 103 - APPROVALS

No storm sewer shall be constructed within the jurisdiction of the Board of County Commissioners without the prior approval of the Warren County Engineer nor shall any final development plan be approved by the Regional Planning Commission until a preliminary drainage plan showing the method of disposition of storm water drainage be first approved by the Warren County Engineer. (See Sections 301 & 302)

SECTION 104 - CONNECTION TO STORM SEWERS

Any connection to a storm sewer within the jurisdiction of the Board of County Commissioners shall be subject to these rules and regulations.

SECTION 105 - EXTENSION / MODIFICATIONS

No extension or modification shall be made to any storm sewer under the jurisdiction of the Board of County Commissioners without the prior approval of the Warren County Engineer.

GENERAL POLICY

ARTICLE 200

SECTION 201 - EXISTING CONTOURS

No building shall be erected on any land nor shall any changes be made in the existing contours of any land, including any change in the course, width or elevation of any water course or drainage channel in any manner that will obstruct, interfere with, or change the drainage of such land, considering future development, without providing adequate drainage in connection therewith.

SECTION 202 - STORM SEWER SYSTEM

Every subdivision shall be provided with a storm water system capable of handling storm waters flowing onto the subdivision site from other areas as well as runoff from precipitation on the site itself. The drainage system shall discharge into a water course, drainage channel or other existing storm water facility without producing any adverse effect on adjacent or downstream properties.

SECTION 203 - GRADING

All parts of the subdivision shall be graded and drained to prevent the standing of storm water, except approved lakes, wetland areas or retention basins. Where necessary, drainage channels or storm sewers shall be provided to convey the water to an existing water course or outlet. The method and means of drainage, both paved and unpaved areas, shall be subject to approval by the County Engineer.

SECTION 204 - REGARD TO TOPOGRAPHY

A storm sewer shall be constructed when its necessity has been determined from topographic data, prepared and presented by the developer's engineer.. Streets and lots shall be platted with appropriate regard for topography and storm water runoff, and in a manner to preserve streams, water courses, lakes, ponds, wooded areas and other natural features, where feasible. Land located in a regulated FEMA flood plain may be platted for any use not endangering the public health, safety or welfare, provided that all requirements of the Warren County Flood Damage Prevention Regulations are met.

SECTION 205 - STORM WATER OUTLET

All storm water shall be carried to an existing stream, watercourse or as close to the property line as practical, without damage to the adjacent property.

SECTION 206 - SANITARY SEWER

The storm water drainage system shall not be combined with any part of a sanitary sewer system, nor shall sanitary sewer water be discharged thereto.

SECTION 207 - EXISTING / PLANNED SYSTEMS

The storm water drainage system shall be designed to fit into existing or planned storm water drainage systems. The design, materials and construction of all parts of the drainage system shall satisfy the specifications of the Warren County Engineer and the Ohio Department of Transportation.

SECTION 208 - FOUNDATION/YARD DRAINS

No person shall install any pump, piping, apparatus, or other such system for discharging sump pump or down spout effluent within ten (10) feet of a public right of way or sidewalk without approval of plans by the County Engineer. The County Engineer may grant approval if the requested plan substantially conforms with one of the following modes of construction:

1) direct connection to a storm sewer or;
2) direct discharge into an approved natural drainage course.

The County Engineer may require the installation of a master sump pump drainage system to ensure the efficient removal of sump pump discharge where connection to storm sewers or discharge into an approved drainage course is not possible. The discharge of sump pump or downspout effluent onto a sidewalk, road surface or gutter is specifically prohibited. For the installation of a master sump pump system the following shall be followed:

1) The main trunk line shall be located no closer than twelve (12) inches behind the back of curb and at an approximate depth of two to three feet, and tied into the nearest catch basin, storm manhole, or storm line. No storm sewer receiving master sump pump drainage shall discharge into an open drainage course within the limits of the proposed development. If a pipe system, sized to carry only the master sump pump drainage, is incorporated into a drainage course, then the drainage course is no longer considered "open".
2) PVC pipe may be used for this installation.
3) Downspouts shall not be tied into this line.

PIPE CAPACITIES:

4" LINE		6" LINE	
GRADE	CONNECTIONS	GRADE	CONNECTION
1%	2	1%	7
2%	3	2%	10
3%	4	3%	12
4%	5	4%	14
5%	5	5%	16
6%	6	6%	18

Standard Y's should be installed where future sump pumps will be connected and marked in the field. Cleanouts should be spaced approximately every two hundred (200) feet.

DRAINAGE PLAN

ARTICLE 300

SECTION 301 - PRELIMINARY DRAINAGE PLAN

A preliminary drainage plan, prepared by a Professional Engineer licensed in the State of Ohio, showing the following information shall be submitted to the County Engineer for preliminary approval.

1) Existing topography with contours shown at an interval of not greater than two (2) feet if the slope of the ground is fifteen (15) percent or less, and not Greater than five (5) feet where the slope is more than fifteen (15) percent.

2) Existing storm sewers, culverts and other physical features.

3) Location and size of all proposed storm water drainage facilities showing their connections with existing systems.

4) Show the routing of storm water through the site to the discharge point. This routing path shall be laid out in such a manner as to direct storm water into the retention or detention area prior to discharge.

SECTION 302 – DETENTION WAIVER

A stormwater detention waiver may be granted if it can be demonstrated that the post-development runoff rates and volumes do not exceed those experienced prior to development. A written request for a waiver of detailed stormwater calculations must include preliminary stormwater calculations, prepared by a Professional Engineer, licensed in the State of Ohio. Preliminary stormwater calculations shall contain:

1) **Calculations of pre-development and post development area-weighted curve numbers (CN).** (This calculation shall be supported by appropriately labeled scaled drawings and/or maps) A waiver may be possible if the area-weighted post-development curve number (CN) is less than or equal to the area-weighted pre-development curve number (CN).

2) **Calculations of pre-development and post development times-of-concentration.** (Appropriately labeled, scaled drawings or maps shall support this calculation.) A waiver may be possible if the post –development time-of-concentration is greater than or equal to the pre-development time-of-concentration.

If only one of the above conditions is true, a stormwater detention waiver may still be possible if the calculated Post-development flows can be shown to be less than the calculated Pre-development flows. NRCS methodology is the preferred approach. Calculations shall cover 1 year, 2 year, 5 year, 10 year, 25 year, 50 year and 100 year storms. Other waiver arguments will be considered, on a case-by–case basis.

SECTION 303 - FINAL DRAINAGE PLAN

After approval of the preliminary drainage plan, the applicant shall submit the final drainage plan prior to or in conjunction with the construction plans along with storm drainage design computations. The plan shall be in compliance with the criteria outlined in these regulations. The County Engineer, prior to construction, must approve any deviation from the final drainage plan.

SECTION 304 - RECORD PLAN INFORMATION REQUIREMENTS

Prior to the release of the Maintenance Obligation (Bond) for a new subdivision or the issuance of a Certificate of Occupancy for a non-residential building, an acceptable record plan shall be prepared. The following information shall be obtained and the record plan prepared accordingly.

STREETS

If applicable, roadside ditches at 100-foot stations and the invert of each driveway culvert. The County Engineer may require the curb and road centerline elevations at 100-foot stations on roads with curb.

STORMWATER INFRASTRUCTURE

Catch basins and manholes – all invert elevations, top-of-casting elevations and all opening elevations.

Detention/Retention Facilities – all orifice invert elevations, all weir crest elevations. Sufficient spot elevations within each basin in order to prepare and show on the record plan a stage-storage table that contains: elevations at 1-foot increments, area at each elevation and volume at each elevation. Sufficient spot elevations along the top of the embankment and the emergency spillway.

Major Flood Routing Paths – sufficient spot elevations along the flood route to verify compliance with the approved grading plan.
As-built plans shall contain the following statement, sealed, signed and dated by a Surveyor or Engineer registered in the State of Ohio:

"I hereby certify that this Record Plan is based on field location of visible facilities and reflects the condition of the improvements as of _____. (Date)

_____
(Surveyor/Engineer)

SUBDIVISION IMPROVEMENT PLAN

ARTICLE 400

SECTION 401 - DRAWING AND SPECIFICATIONS

Detailed drawings and specifications together with storm drainage design computations of the storm drainage system shall be submitted to the County Engineer for approval. Drawings shall be on a standard size sheet, 24" x 36". Locations and profiles of the storm sewers, drainage channels, and structures shall be shown thereon. All existing and proposed topography shall be shown as prescribed in Section 300, Article 301.1, along with existing pavements, driveways, utilities, basins and other structures. Watercourses, marshes, land subject to flooding and any other significant physical items shall be shown in adequate detail. Plans and profiles of proposed storm sewers with grades and pipe dimensions shall be shown. These shall include manholes and connections to outlets, which might be beyond the project boundary. All existing and proposed open watercourses and drainage channels shall be shown in sufficient detail.

SECTION 402 -- FLOOD PLAIN LIMITS

The upper limits of flood plains shown on the flood plain maps adopted by Warren County shall be accurately shown on the plans.

SECTION 403 - STREETS

Streets constructed on land adjoining streams and watercourses shall be constructed a minimum of one and one half (1 ½) feet above the computed one hundred (100) year storm elevations. (BFE – Base Flood Elevation)

SECTION 404 - FILL AREAS

No part of a water course and flood plain cross section may be filled in unless the conveyance of pre-empted cross section is compensated for by an equivalent amount of channel and flood plain excavation either opposite or upstream of the filled area.

SECTION 405 - EASEMENTS

Utility and drainage easements shall be provided where necessary, as determined by the Warren County Engineer. When a storm sewer or drainage structure is located outside a public right of way or public utility easement they shall follow a lot line, where practical, and in all cases be within a minimum of a twenty (20) foot wide drainage easement. No trees, shrub or structure shall be placed within such easement, and the proper authorities may have free access to, and use of, the easement at any time.

SECTION 406 - RELATION TO STREAMS AND WATER COURSES

Where it is deemed necessary, when a proposed street parallels or is located near an existing stream or water course, furnish profiles at the top bank of the stream and compute water elevations and invert elevations of the stream or water course. Show relations of proposed street grade to existing profiles of the stream or watercourse. Street construction shall not enroach on the approved limit of the stream or watercourse.

SECTION 407 - STORM SEWER PROFILES

Storm sewers, when not included in the street profile, shall be shown in profile with the following information:

.01) Profile of existing ground at storm sewer centerline.
.02) Profile of proposed finish grade.
.03) Percent of grade of proposed storm water.
.04) Dimensions of proposed pipe or structure.
.05) Show stations every one hundred (100) feet and at all structures and appurtenances.
.06) Show street inlets with type and manholes, together with proposed elevations.

SECTION 408 - DATUM FOR ELEVATIONS

Give datum reference used for elevations and correlate to U.S.G.S. datum.

SECTION 409 - GRADING PLAN

The grading plan shall show existing contour lines at two (2) foot intervals, proposed finished contour lines, spot elevations and existing and finished contours and elevations on streets to be graded.

SECTION 410 - GRADING AREAS

All graded areas are to be designed and maintained to prevent excessive erosion and runoff. Drainage swales, temporary retention dams and the like are to be installed during the grading operation. All slopes and graded areas are to be seeded in accordance with the Warren County Erosion and Sediment Control Regulations (Section 303 or most current).

SECTION 411 - MUD AND DEBRIS

Until the Board of County Commissioners accepts the subdivision, the developer shall take such measures as are necessary to prevent excessive erosion of graded surfaces, and to prevent the deposit of soil and debris from entering onto public streets, into drainage channels, sewers or onto adjoining land.

SECTION 412 – MAJOR STORM ROUTES

The proposed routing of major storms (100 year frequency and greater) shall be shown on the plan. All major storm routes shall be within an easement of appropriate width. The easement width shall be sufficient to contain the 100 year storm.

BASIC DESIGN CRITERIA

ARTICLE 500

SECTION 501 - QUANTITY OF RUNOFF

.01 Each portion of the storm water drainage system shall be capable of handling the peak flows of runoff as determined by the "Rational Method", (Q=CIA), TR-20, TR-55 or other approved methodology.

The Warren County Engineer may, from time to time, obtain hydrologic studies within the unincorporated areas of the County and developers may be required to participate financially in these hydrologic studies. The amount of financial participation shall be proportional to area of the developer's project in relation to the area of the watershed under study. The Warren County Engineer may submit the approved hydrologic study to the Board of County Commissioners for incorporation into these regulations. Once a study has been incorporated into these regulations the results and recommendations of the study may supersede the minimum requirements specified herein. A list of studies that have been incorporated into these regulations can be found in Appendix B.

SECTION 502 - RUNOFF COEFFICIENT "C"

.01 The following are acceptable coefficients for Warren County.
Slopes-Flat, less than 2% - Steep, greater than 7%

CHARACTERISTICS	**RUNOFF COEFFICIENTS**	
	< 2%	**7%**
Parks, cemeteries, golf courses, Lawns, playgrounds, unimproved land	0.35	0.50
Business	0.70	0.85
Residential (Single Family)	0.50	0.60
Residential (Multi Family)	0.70	0.85
Industrial (Light)	0.70	0.90
Industrial (Heavy)	0.80	1.00
Commercial/Office (Light)	0.70	0.90
Commercial / Office (Heavy)	0.80	1.00
Woodland	0.20	0.40
Grassland (Pasture)	0.25	0.45
Cropland (Row Crops)	0.40	0.50
Impervious Surface	0.90	0.95

The above shall be increased to allow a composite "C" value based on percentage of impervious surface.

SECTION 503 - RAINFALL DATA

Rainfall intensity, duration and frequency data shall be obtained from the " Rainfall Atlas of the Midwest, 1992" (Bulletin 71). Data considered pertinent to Warren County, Ohio is available in Appendix A.

SECTION 504 - STORM SEWERS

.01) Pipe used for storm sewers shall comply with current Ohio Department of Transportation Specifications and shall have a minimum inside diameter of twelve (12) inches.

.02) The pipe shall meet the design specifications for loading and depth of cover.

.03) Storm sewers shall be designed on a minimum of twenty-five (25) year frequency at full flow capacity.

.04) The minimum grade is determined by velocity. Minimum of 2 feet per second.

.05) Inlet spacing shall be a maximum for three hundred (300) feet. The Warren County Engineer may waive this requirement if sufficient information is presented.

SECTION 505 - ROADWAY CULVERTS/BRIDGES

.01) Culverts shall be designed to accomodate a 100 year frequency storm without encroaching onto the roadway. All culverts shall conform to the current Ohio Department of Transportation specifications.

SECTION 506 - HEADWALLS

.01) Standard headwalls or wing walls shall be constructed at the outfall of all storm sewers.

SECTION 507 - DRAINAGE EASEMENTS

.01) When a storm drainage system (pipe or ditch) is outside the road right of way or public Utility easement, a storm drainage easement shall be provided and identified as such on the record plat.

.02) The minimum width of said easement shall be twenty (20) feet.
.03 Easement widths for ditches and natural drainage courses shall be determined by use of the following formula:

Ew = 120DA^0.43 where:

Ew = Easement Width, feet

DA = Drainage Area, square miles

SECTION 508 - OPEN DITCHES / CHANNELS

The Manning Formula (V =(1.486/n) (R^0.667) (S^0.5) in conjunction with Q = AV) may be used to determine flow in open ditches and channels.

.01) The following are acceptable coefficients for "n"

LINING	"n"	LINING	"n
Bare Earth	.02	Concrete	.015
Seeded	.03	bituminous	.018
Sod	.04	Grouted Rip Rap	.02
Jute Mat.	.04	Rock Channel Protection	
Excelsior Mat.	.04	for ditches	.06
		For large channels	.04

.02) Side slopes shall be 2:1 or flatter.

.03) The minimum grade shall be one percent. Where flatter grades are necessary, sewers or paved flow lines may be required.

.04) Ditches along roadway where velocities are five (5) feet per second or less shall be sodded. Ditches with a velocity of over five (5) feet per second shall be lined.

.05) Ditches not along a roadway with a velocity of two (2) feet per second may be seeded.

.06) Natural stream and watercourses throughout the development shall not be disturbed unless permission granted by the County Engineer.

.07) Any channel running through the proposed development shall have the rate of runoff determined on a one hundred (100) year frequency. All proposed buildings affected by the channel flood plain shall be checked such that the minimum building opening elevation is above the one hundred (100) year flood elevation.

SECTION 509 - ROCK CHANNEL PROTECTION

Rock channel protection is used to control erosion at the outlet of culverts and storm sewers, or for lining ditches on steep grades. There are four types of rock channel protection that are used in various situations. The use of the proper type at culvert and storm sewer outlets can be determined from Figure 1107-1. (See Appendix A) Type A is generally used beyond the outlet of the larger conduits having outlet velocities in excess of twelve (12) feet per second and Type B or C for conduits having lesser velocities. Type C and D may be used to line roadside ditches, as required.

STORMWATER RUNOFF CONTROL
IN THE UNINCORPORATED PORTIONS OF
WARREN COUNTY, OHIO

ARTICLE 600

SECTION 601 - FINDINGS AND PURPOSE

.01 The Board of Commissioners of Warren County finds that the stream channels and waters of Warren County are limited resources to be protected and that their natural quality is of primary significance in promoting and maintaining the health, safety and general well-being of all life and inhabitants within its jurisdictional boundaries.

.02 It further finds that such channels and waters may become despoiled due to increased sediment depositions caused by accelerated storm water runoff resulting from the disruption and alteration of the natural surface character of the land site development activities.

.03 Therefore, the purpose of this Resolution is to establish standards, principles and procedures by which Warren County can regulate site development activities which cause or may cause off-site impact potentials at lower elevations and the flooding of watercourses.

.04 Standards in this Resolution are thus intended to protect persons and property from adverse storm water runoff erosion impacts which may result from site development.

SECTION 602 - DEFINITIONS

.01 Approving Agent(s): Warren County Engineer, or other entity or agency so designated.

.02 Channel: a natural stream that conveys water; a ditch or channel excavated for the flow of water.

.03 Construction: the erection, alteration, repair, renovation, demolition or removal of any building or structure; and the clearing, stripping, excavation, filling, grading and regulation of sites in connection therewith.

.04 Developer: Any individual, subdivider, firm, association, syndicate, partnership, corporation, trust or any other legal entity commencing proceedings under this resolution to effect the development of land for himself or for another.

.05 Development: the division of land into two or more parcels, then carrying out of any building, or the making of material change in the use or appearance of any structure above or below ground surface land through activities of construction, erection or alteration.

.06 Development Area: any contiguous area owned by one person or operated as one development unit included within the scope of these regulations, upon which earth-disturbing activities are planned or underway.

.07 Ditch: an open channel either dug or natural, for the purpose of drainage or irrigation with intermittent flow. (See stream, drainage, and grassed waterway.)

.08 Drainageway : an area of concentrated water flow other than a river, stream, ditch or grassed waterway.

.09 Earth-Material : soil, sediment, rock, sand, gravel and organic material or residue associated with or attached to the soil.

.10 Erosion: (1) the wearing away of the land surface by running water, wind, ice or other geological agents, including such processes as gravitational creep; (2) detachment and movement of soil or rock fragments by wind, water, ice or gravity.

.11 Fill: any act by which earth, sand, gravel, rock or any other material is placed, pushed, dumped, pulled, transported or moved to a new location above the natural surface of the ground or on top of the stripped surface and shall include the conditions resulting therefrom. The difference in elevation between a point on the original ground and a designated point of higher elevation on the final grade. The material used to make a fill.

.12 Finished Grade: the final grade or elevation of the ground surface conforming to the approved grading plan.

.13 Floodplain Scour: the abrading and wearing away of the nearly level land situated on either side of a channel due to overflow flooding.

.14 Grading: the stripping, cutting, filling, stockpiling or any combination thereof of earth disturbing activity inclusive of land in its cut or filled conditions.

.15 Hazard : any danger to public health, welfare or safety including exposure to risk or damage to property or liability for personal injury; or risk of harm to land, air or water resulting in environmental degradation. Hazards can include flooding and ponding compaction and settling, landslides, earthquakes, toxic chemicals, radiation, fire and disease.

.16 Mulching : the application of suitable materials on the soil surface to conserve moisture, hold soil in place and aid in establishing plant cover.

.17 Nuisance : a public nuisance as know by common law or in equity jurisprudence.

.18 Permanent Vegetation : producing long term vegetative cover, e.g., bluegrass, tall fescue, crown vetch, etc.

.19 Permittee : any person to whom approval of a site plan according and pursuant to this Resolution is granted, or who is subject to inspection under it.

.20 Person : any individual, corporation, partnership, joint venture, agency, unincorporated association, municipal corporation, county or state agency within Ohio, the federal government or any combination thereof.

.21 Plan: as used this Resolution shall mean the Stormwater Management Plan.

.22 Plans: profiles, typical cross sections, working drawings and supplemental drawings of site, grading, drainage and runoff and sedimentation control plans, vicinity map, soil map, and other plans as approved or exact reproductions thereof, which show the location, character, dimensions and details of the work.

.23 Public Waters: those waters within lakes (except private ponds and lakes on single properties), rivers, streams, ditches, and / or waters leaving that respective property.

.24 Runoff : the portion of rainfall, melted snow or irrigation water that flows across the ground surface and eventually is returned to streams.

a. Accelerated Runoff - increased rate and volume of runoff due to less permeable surface primarily caused by urbanization.
b. Peak Rate of Runoff - the maximum rate of runoff for any 24 Hour storm of a given frequency.

.25 Sediment : solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, gravity or ice and has come to rest on the earth's surface either above or below water.

.26 Site : any lot or parcel of land or a series of lots or parcels of land adjoining or contiguous or joined together under one ownership where clearing, stripping, grading or excavating is performed.

.27 Slope: the face of an embankment or cut section; any ground whose surface makes an angle with the plane of the horizon. Slopes are usually expressed in a percentage based upon vertical differences in feet per 100 feet of horizontal distance.

.28 Storm Frequency : the average period of time in years within which a storm of a given duration and intensity can be expected to be equaled or exceeded.

.29 Stream : a body of water running or flowing on the earth's surface or channel in which such flow occurs. Flow is continuous or seasonally intermittent.

.30 Subdivision : the division of any parcel of land shown as a unit or as contiguous units on the last preceding tax roll, into tow or more parcels, sites, or lots, any one of which is less than five acres for the purpose, whether immediate or future of transfer of ownership; provided, however, that the division or partition of land into parcels of more than five acres not involving any new streets or easement of access, and the sale or exchange of parcels between adjoining lot owners, where such sale or exchange does not create additional building sites, shall be exempted; or the improvement of one or more parcels of land for residential, commercial or industrial structures or groups of structures involving the division or allocation of land for the opening, widening or extension of any street or streets, except private streets serving industrial structures; the division or allocation of land as open spaces for common use by owners, occupants or lease holders or as easements for the extension and maintenance of public sewer, water, storm drainage or other public facilities.

.31 Subsoil : that part of the soil below the surface soil or plow layer.

.32 Surface soil: the uppermost part (5 to 8 inches) of the soil commonly stirred by tillage implements or its equivalent in uncultivated soils.

.33 Swale: a low lying stretch of vegetated land which gathers and carries surface water runoff at a reduced rate of flow and conveys it downstream at less erosive velocities.

.34 Temporary Vegetation : short-term vegetative cover used to stabilize the soil surface until final grading and installation of permanent vegetation i.e., oats rye or wheat.

.35 Topsoil: surface and upper surface soils which presumably are darker colored, fertile soil materials, ordinarily rich in organic matter or humus debris.

.36 Urban Land Use: existing or proposed developments listed within the intent and scope chapter (Article 603) of this resolution.

.37 Watercourse: any natural or artificial waterway (including, but not limited to, streams, rivers, creeks, ditches, channels, canals, conduits, culverts, drains, drainageways, waterways, gullies, ravines or washes) in which waters flow in a definite direction or course either continuously or intermittently and including any area adjacent thereto which is subject to inundation by reason of overflow of flood water.

SECTION 603 SCOPE AND INTENT

.1 This Resolution shall apply to both the development and redevelopment of land proposed for the following types of public and private urban land use : which are,

.01 land used or being developed for residential, commercial office or industrial purposes, including subdivision and land development proposals for non-farm uses in rural areas.

.02 land used or being developed for recreation, wildlife, or natural purposes, including agricultural areas proposed for conversion to such uses.

.2 Any person or persons proposing to develop or redeveloped land within Warren County for any of the uses listed in Section 603.1 shall design and implement a Stormwater Management Plan which:

.01 will yield quantities of surface water runoff from the development site at rates which are the same or less than before development occurred as specified by Section 604 of this Resolution.

.02 will not result in increasing current potentials for flooding of watercourses that are at lower elevations off-site.

.03 has been approved and permitted under Section 605 of this resolution.

.3 No changes subject to regulation under this Resolution shall be made in the existing natural surface composition or subsurface configuration of any land proposed for development or redevelopment within Warren County for land use developments specified under Section 603.1 and approved of a Stormwater Management Plan required according to Section 605 enabling final approval of a proposed development and / or subdivision development shall not be given unless:

.01 a determination is made according to Section 605.3 of this Resolution by the Regional Planning Commission of Warren County and appropriately authorized approving agents that implementation of the stormwater management would not cause runoff and erosion impact that would be harmful or damaging to the existing quality of lands and waters at lower elevations off-site.

.4 Within watersheds regulated under NPDES Phase 2 permits by the Ohio Environmental Protection Agency (OEPA), the Warren County Engineer may require that the stormwater management plan prepared for a subject project include a design that meets any stormwater quality guidelines that may be established by the OEPA.

SECTION 604 STORMWATER RUNOFF CONTROL PLANNING STANDARDS.

.1 To control pollution of public waters by soil sediment from accelerated stream channel erosion and to control flood plain erosion caused by accelerated stormwater runoff from development areas, the increased peak rates and volume of runoff shall be controlled such that:

.01 the peak rate of runoff from the critical storm and all more frequent storms occurring on the development area does not exceed the peak rate of runoff from a one year frequency storm (of 24 hour duration) occurring on the same area under pre-development conditions.

.02 storms of less frequent occurrence than the critical storm, up to the one hundred-year storm, have peak runoff rates no greater than the peak runoff rates from equivalent size storms under pre-development conditions.

.03 the critical storms for a specific development area is determined as follows:

a. Determined by appropriate hydrologic methods the total volumes of runoff from a one-year frequency, 24-hour storm occurring on the development area before and after development.

b. From the volume determined in (a), determine the percentage increase in volume of runoff due to development, and using this percentage, select the 24-hour critical storm from this table.

If the percentage of increase in volume of runoff is:

Equal to or Greater than	and less than	The critical storm for peak rate Control will be
_	10	1 year
10	20	2 year
20	50	5 year
50	100	10 year
100	250	25 year
250	500	50 year
500	-	100 year

c. In general, it shall be assumed that the runoff curve numbers (CN) for the predevelopment condition do not exceed those of "Open Space in fair condition". (i. e. A=49, B=69, C=79, D=84) Post development runoff curve numbers (CN) shall be taken from hydrologic soil group D for all subdivisions with lot sizes of ½ acre and less. For lots greater than ½ acre and less than 3 acres allow ¼ acre of Type D soils per lot when calculating the weighted CN for post development. This allowance is to address soil disturbances and compaction during construction.

.04 A recommended method which may be used to determine changes in rates and volumes of runoff is presented in the United States Department of Agriculture, Natural Resources Conservation Service, Engineering Division,, Urban Hydrology for Small Watersheds, Technical Release No. 55 (TR-55)June, 1986. WinTR-55 (July 1, 2002) is also available.

SECTION 605 - STORMWATER MANAGEMENT PLANNING PROCEDURES

.1 REQUIRED INFORMATION

.01 any person seeking approval of subdivision or land development proposals for land use types listed in Section 603 shall

a. provide mapped information about the location and vicinity of the area proposed for development.

b. furnish three types of information and maps about the proposed land development and site location.

(1) A predevelopment conditions assessment.
(2) A post development conditions assessment; and
(3) A stormwater management plan.

c. shall have the right to request the Regional Planning commission of Warren County and the Warren County Engineer to hold pre-submission conferences and site inspections, as necessary, for assistance in submitting the required site planning information.

.2 PREDEVELOPMENT CONDITIONS ASSESSMENT

.01 The assessment requires quantification in tabular or other approved form of inventory map information by site drainage area and subdrainage areas in order to determine and display the current volume and rate of runoff from the proposed development area, and shall be prepared according to methods prescribed in the SCS text cited in Section 604.1 (04) of this Resolution or others which yield equivalent information about rates and volumes of surface runoff. Information from the assessment is used to evaluate impacts expected to result during and from development of a proposed plan.

.02 the assessment shall:

a. Delineate drainage units, which comprise the area proposed for development.

b. Indicate the hydraulic length of slope per individual drainage unit and the soil type(s) present.

c. Indicate within the legend the average percent slope and runoff curve number (CN) per individual subdrainage unit for a 24 hour storm of a 1,2,5,10,25,50 and 100 year frequency.

.3 DEVELOPMENT PLAN EVALUATION

.01 The evaluation of the proposed site development plan is to provide mapped and tabularized information about the changes in rates and volumes of runoff and erosion, which are expected to result from its implementation and shall be prepared according to methods prescribed in the SCS texts cited in Section 604 and Sections 604.1 (.02) 604.1 (.03) of this Resolution. The Regional Planning Commission of Warren County and agent(s) shall use this evaluation information to determine whether an additional Runoff Control and Sediment Abatement Plan is needed.

.02 The development plan evaluation map shall:

a. depict all permanently proposed structural improvements and installations to be made on the development site, inclusive of buildings, retaining walls, sidewalks, streets, parking lots, driveways and storm drainage impoundment’s, channels and outlets.

b. graphically differentiate the area to be developed from the area to be left undisturbed.

c. Depict all grade changes and areas to be excavated or used for stockpiling on-site during development and provide the timing for their occurrence within an attached schedule of overall construction activities.Be accompanied by a hydrograph for 24 hour storm of the critical frequency to be controlled as determined according to Section 604.1 (.03) and all calculations made pertinent to evaluating the effects of the proposed development plan upon current runoff and erosion conditions of the site.

.4 STORMWATER MANAGEMENT PLAN CONTENT REQUIREMENTS

.01 A stormwater management plan shall identify how increases in surface water runoff induced by development is to be controlled to within the standards of Section 604.1 of this Resolution.

.02 All proposed controls are to be designed in accordance with methods and techniques set forth in the SCS texts cited in Section 604 of this Resolution or others approved by the Planning Commission and appropriately authorized approving agent (s).

.03 A stormwater management plan shall be comprised of, but not limited to, the following information:

a. A map rendered on the appropriate scale which indicates the number, types, dimensions and locations of all stormwater runoff control structures or devices to be utilized either temporarily or permanently on a development site.

b. All pertinent computations made to arrive at the final dimensions of each control device shall be presented along with plan and section view drawings of the same rendered at an appropriate design scale to be agreed upon between the applicant and the approving agent (s).

c. Schedules detailing the timing and cost for the installation and maintenance of each structure or device.

.5 STORMWATER MANAGEMENT PLAN SUBMISSION, REVIEW AND APPROVAL

.01 Submission of a stormwater management plan to the Regional Planning Commission of Warren County and the appropriately authorized approving agent(s) completes ALL site development planning information and impact control planning responsibilities required of an applicant under provisions of this Resolution and initiates final site development plan approval proceedings which are necessary to enable approval of the proposed subdivisions and/or development.

.02 Review of the stormwater management plan required of the applicant shall:

a. be made by the Regional Planning Commission or Warren County and the appropriately authorized approving agent(s) including Warren County Engineer and a representative of the local Soil and Water Conservation District, provided the applicant has prepared and submitted all necessary information according to Section 605.4 of this Resolution.

b. be completed within a period of three (3) weeks before the plan is approved or disapproved by the Regional Planning Commission of Warren County at a regularly scheduled meeting.

.03 The Regional Planning Commission of Warren County and the appropriately authorized approving agent(s) shall upon completing its review of the stormwater management plan either:

a. approve the plan as submitted by the applicant provided it is in compliance with provisions of this Resolution and initial site plan review recommendations, or

b. disapprove the plan until the applicant makes revisions which comply with provisions of this Resolution.

.04 Revisions to a disapproved stormwater management plan shall be prepared and submitted by an applicant to the Regional Planning Commission of Warren county the appropriately authorized approving agent(s) for review and approval according to the same procedures specified by provisions within the above paragraphs of this Section.

.05 Action by the Regional Planning Commission of Warren County and appropriately authorized approving agent(s) approving or disapproving a stormwater management plan is a final order for purpose of judicial review.

.06 Notwithstanding anything to the contrary in this Section 5, any applicant for a site development permit for a subdivision (1) shall submit its initial application (605.3) together with the preliminary plat submissions required by Section 301 of the Subdivision Regulations for Warren County, Ohio and (2) shall submit its stormwater management plan (605.5) together with either the preliminary or final plat submissions required by Section 301 of the Subdivision Regulations for Warren County, Ohio, and all such submissions shall be reviewed pursuant to the subdivision regulations.

.6 OFF SITE STORMWATER MANAGEMENT

.01 Exceptions to requiring permanent control of increased runoff on the development site in all cases shall be considered by the Regional Planning Commission of Warren County and the appropriately authorized approving agent(s) provided the applicant can prove that:

a. Performance objectives and standards of this Resolution for runoff control can be best achieved by installations of off-site abatement control facilities.

Runoff from the development site can be conveyed to off-site control facilities in a manner and by means, which satisfies or surpasses performance objectives of this Resolution.

SECTION 606 COMPLIANCE RESPONSIBILITY

.1 PERFORMANCE LIABILITY

No provisions of this Resolution shall limit, increase or otherwise affect the liabilities of the developer nor impose any liability upon this jurisdiction not otherwise imposed by law.

.2 OPERATIONS AND MANAGEMENT

.01 During site development, a developer is responsible for:

a. carrying out all provisions as approved in plan and required by this Resolution.

.3 ENFORCEMENT

ENFORCEMENT

.01 The Warren County Engineer may, upon identification to the owner or person in charge, enter any land upon obtaining agreement with the owner, tenant or manager of the land in order to determine whether there is compliance with this resolution. If the Warren County Engineer is unable to obtain such an agreement, he may apply for and a judge of the court of common pleas for the County where the land is located may issue an appropriate inspection warrant as necessary to achieve the purposes of this resolution.

.02 If the Warren County Engineer determines that a violation of the rules adopted under this section exists he may issue an immediate stop work order if the violator failed to obtain any federal, state or local permit necessary for sediment and erosion control, earth movement, clearing or cut and fill activity.

.03 In addition, if the Warren County Engineer determines a rule violation exists, regardless of whether or not the violator has obtained the proper permits, he may authorize the issuance of a notice of violation. If, after a period of not less than thirty days has elapsed following the issuance of the notice of violation, the violation continues, he shall issue a second notice of violation.

.04 If after a period of not less than fifteen days has elapsed following the issuance of the second notice of violation, the violation continues, the Warren County Engineer may issue a stop work order after first obtaining the written approval of the prosecuting attorney of the county if, in the opinion of the prosecuting attorney, the violation is egregious.

.05 Once a stop work order is issued, the Warren County Engineer shall request, in writing, the prosecuting attorney of the county to seek ann injunction or other appropriate relief in the court of common pleas to abate excessive ersosion or sedimentation and secure compliance with the rules adopted under this resolution. If the prosecuting attorney seeks an injunction or other appropriate relief, then, in granting relief, the ocurt of common pleas may order the construction of sediment control improvements or implementation of other control measures and may assess a civil fine of not less than one hundred or more than five hundred dollars. Each day of violation of a rule or stop work order issued under this section shall be considered a separate violation subject to a civil fine.

.06 The person to whom a stop work order is issued under this section may appeal the order to the court of common pleas of the ocunty in which it was issued, seeking any equitable or other appropriate relief from that order.

.07 No stop order shall be issued under this section against any public highway, transportation, or drainage improvement or maintenance project undertaken by a government agency or political subdivision in accordance with a statement of its standard sediment control policies that is approved by the board or the chief of the division of soil and water conservation in the department of natural resources.

SECTION 607 OWNERSHIP AND MAINTENANCE

.01 The Regional Planning Commission of Warren County may require the owner and/or the developer to ??????????outlined in Ohio Revised Code, Chapter 6117 of the Ohio Revised Code. The Planning Commission may require of the owner and/or developer any one or all of the following prerequisites:

a. benefit two or more property owners.

b. are designed for cost-effective maintenance.

c. Are determined by the Regional Planning Commission of Warren County or appropriately authorized approving agent(s) to be appropriate additions to this jurisdiction's existing storm drainage systems.

d. Are not better suited for private maintenance by an individual or group of property owner(s), with ultimate responsibility for maintenance in the event of default on the part of the owner(s) remaining jurisdiction.

.02 Permanent runoff control installations which are to be privately owned and maintained by an individual or group of property owner(s) shall be:

a. designed and constructed by the developer with easements sufficient to allow adequate access for inspections and corrective actions, if necessary, by the Warren County Engineer's Office.

b. regularly inspected by the Warren County Engineer's Office to ensure privately owned installations are being properly maintained and, if not, shall be repaired by them at the expense of the responsible owner(s).

c. maintained as installed by the developer according to the approved design and not be altered unless approved by the Warren County Engineer. This covenant shall be enforceable by injunction procedures by the grantors, their heirs, assignees and Warren County.

APPENDIX A

Rainfall Intensity (Inches/Hour)

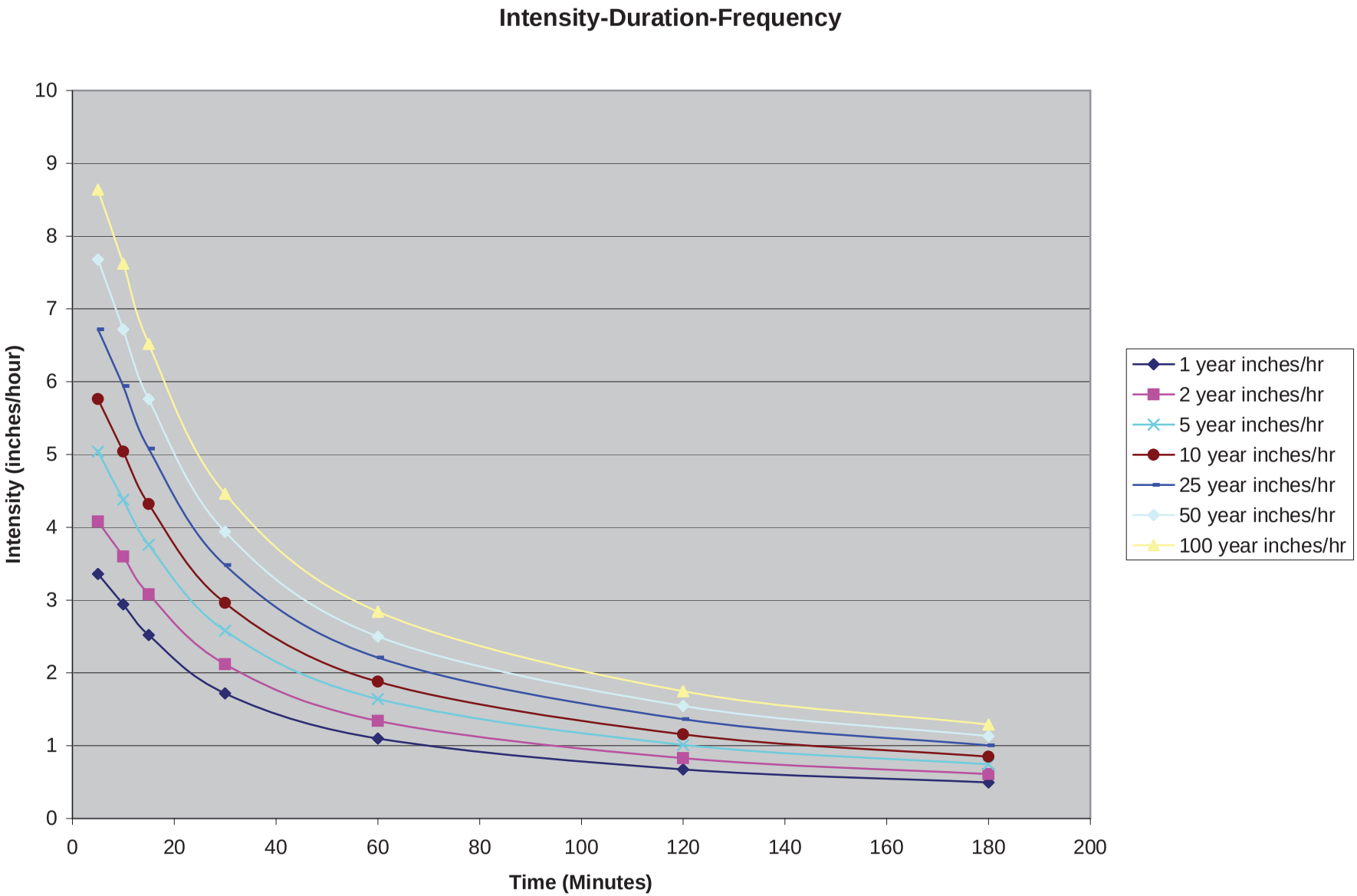
Time (Minutes)	Hours	1-Year Inches/Hour	2-Year Inches/Hour	5-Year Inches/Hour	10-Year Inches/Hour	25-Year Inches/Hour	50-year Inches/Hour	100-Year Inches/Hour
5		3.36	4.08	5.04	5.76	6.72	7.68	8.84
10		2.94	3.60	4.38	5.04	5.94	6.72	7.62
15		2.52	3.08	3.76	4.32	5.08	5.76	6.52
30		1.72	2.12	2.58	2.96	3.48	3.94	4.46
60	1	1.10	1.34	1.64	1.88	2.21	2.50	2.84
120	2	0.68	0.83	1.01	1.16	1.37	1.55	1.75
180	3	0.50	0.61	0.74	0.85	1.00	1.13	1.29
360	6	0.29	0.36	0.44	0.50	0.59	0.67	0.76
720	12	0.17	0.21	0.25	0.29	0.34	0.39	0.44
1080	18	0.12	0.15	0.18	0.21	0.25	0.28	0.32
1440	24	0.10	0.12	0.15	0.17	0.20	0.22	0.25

Data Taken From: "Rainfall Frequency Atlas of the Midwest" "Bulletin 71)

Total Rainfall (Inches)

Time (Minutes)	Hours	1-year Total Inches	2-Year Total Inches	5-Year Total Inches	10-Year Total Inches	25-Year Total Inches	50-Year Total Inches	100-Year Total Inches
5		0.28	0.34	0.42	0.48	0.56	0.64	0.72
10		0.49	0.60	0.73	0.84	0.99	1.12	1.27
15		0.63	0.77	0.94	1.08	1.27	1.44	1.63
30		0.86	1.06	1.29	1.48	1.74	1.97	2.23
60	1	1.10	1.34	1.64	1.88	2.21	2.50	2.84
120	2	1.35	1.66	2.02	2.31	2.73	3.09	3.50
180	3	1.49	1.83	2.23	2.55	3.01	3.40	3.87
360	6	1.75	2.14	2.62	2.99	3.52	3.99	4.53
720	12	2.03	2.49	3.04	3.47	4.09	4.63	5.25
1080	18	2.19	2.69	3.28	3.75	4.42	5.00	5.68
1440	24	2.33	2.86	3.49	3.99	4.70	5.32	6.04

Data Taken From: "Rainfall Frequency Atlas of the Midwest" "Bulletin 71)


Intensity-Duration-Frequency
Intensity (inches/hour)
Time (Minutes)
0
1
2
3
4
5
6
7
8
9
10
0
20
40
60
80
100
120
140
160
180
200
1 year inches/hr
2 year inches/hr
5 year inches/hr
10 year inches/hr
25 year inches/hr
50 year inches/hr
100 year inches/hr

ROCK CHANNEL PROTECTION AT CULVERT AND STORM SEWER OUTLETS

1107-1
METRIC UNITS

REFERENCE SECTION
1107.2

ROCK TYPE

LEGEND

① 1.25 m of 500 mm rock A
② 1.0 m of 500 mm rock A
③ 0.75 m of 300 mm rock B
④ 0.50 m of 150 mm rock C

NOTES

Rock size (150,300, 500 mm) indicates the square opening on which 85% of the material, by weight, will be retained.

The width of protection shall be the width of the headwall, with 1.2 m being the minimum.

(Where a stream bed will withstand the calculated velocity without erosion, no rock channel protection will be required.)

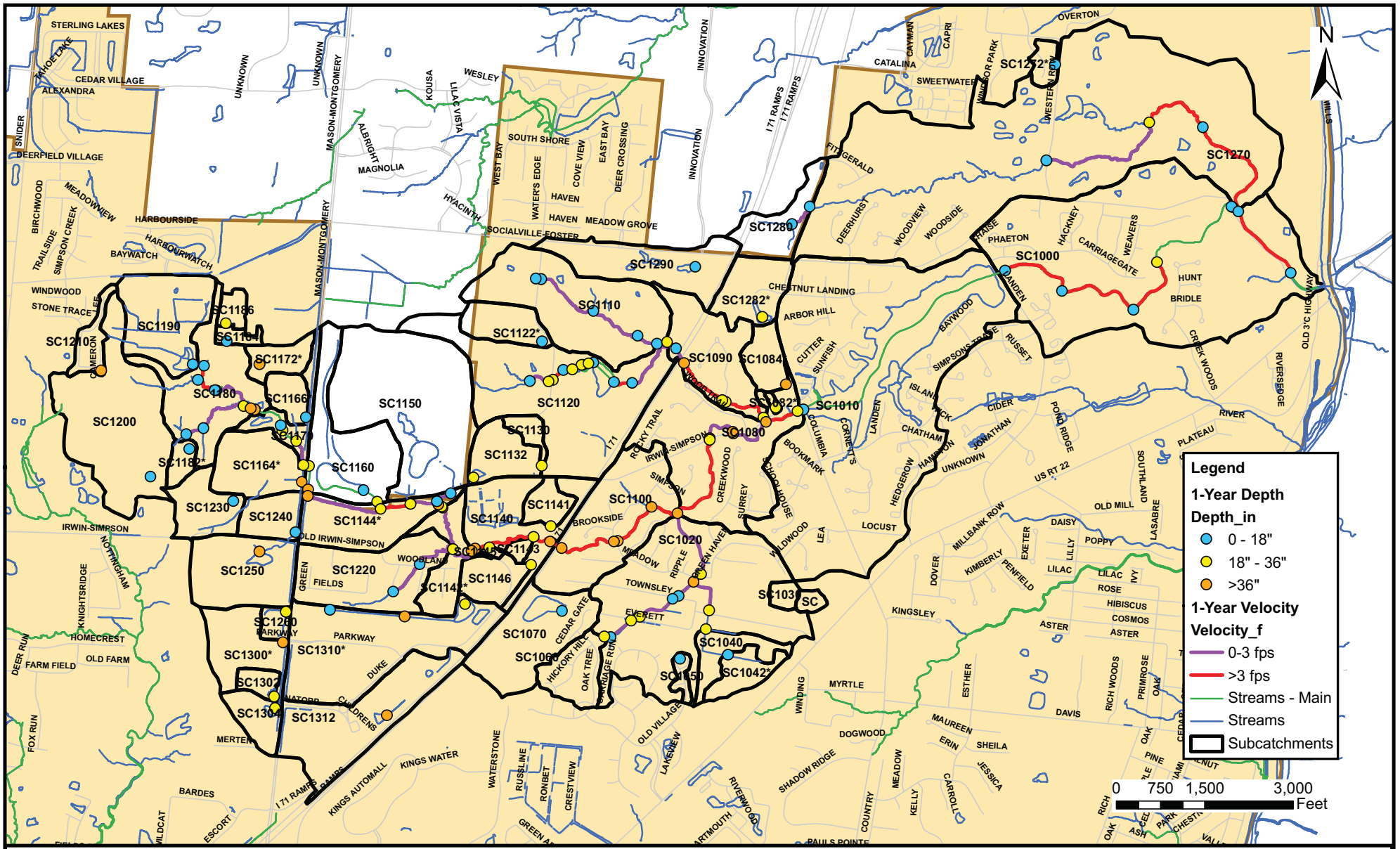
APPENDIX B

HYDROLOGIC STUDIES INCORPORATED INTO THESE REGULATIONS:

1) "Bear Run Watershed Hydrologic Study" by Fuller, Mossbarger, Scott & May Engineers, Inc., January, 2002

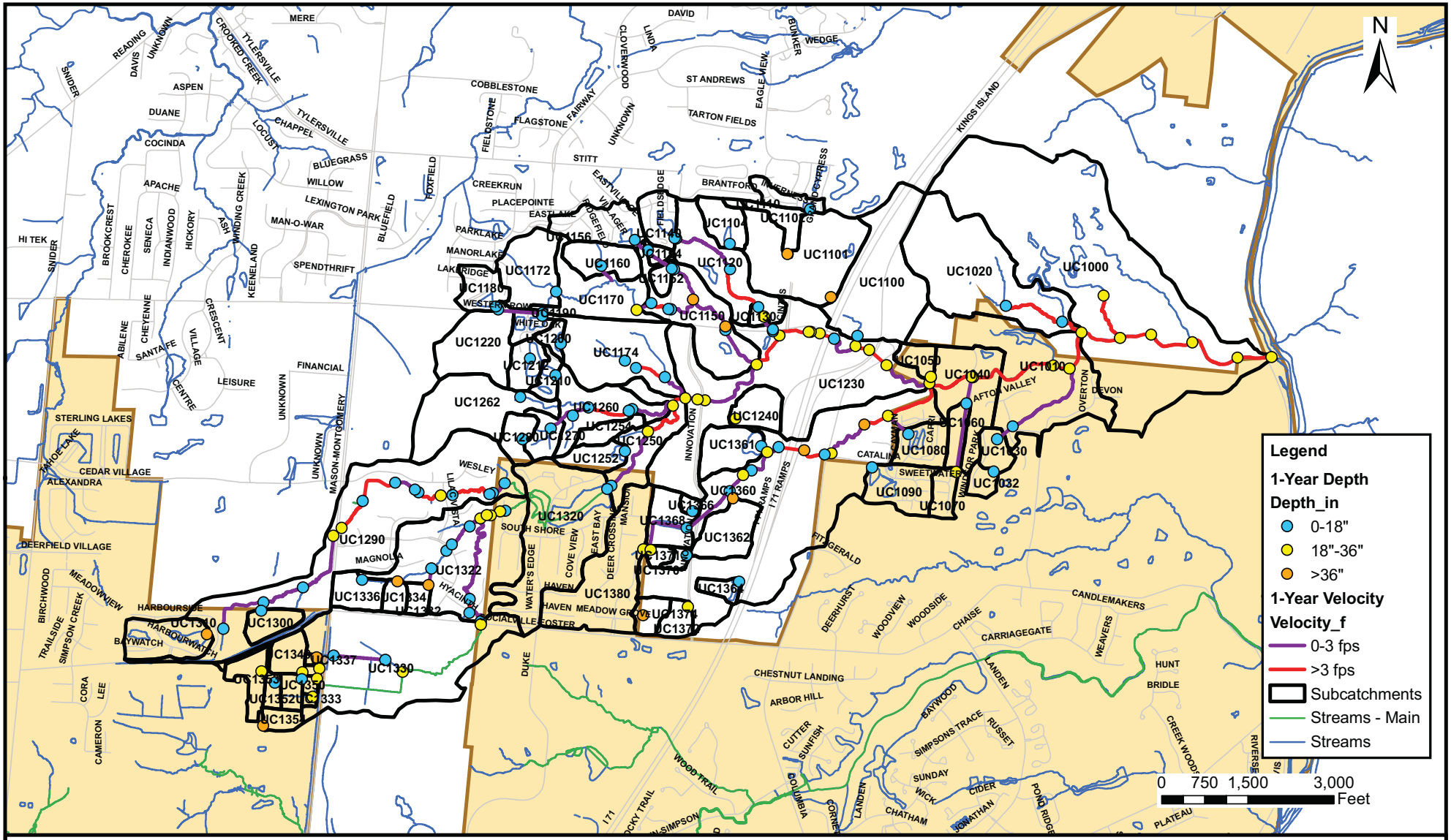
APPENDIX H

Pre-Development and Post-Development Release Rate Tables



Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Simpson Creek Watershed - 1-Year Depths and Velocities

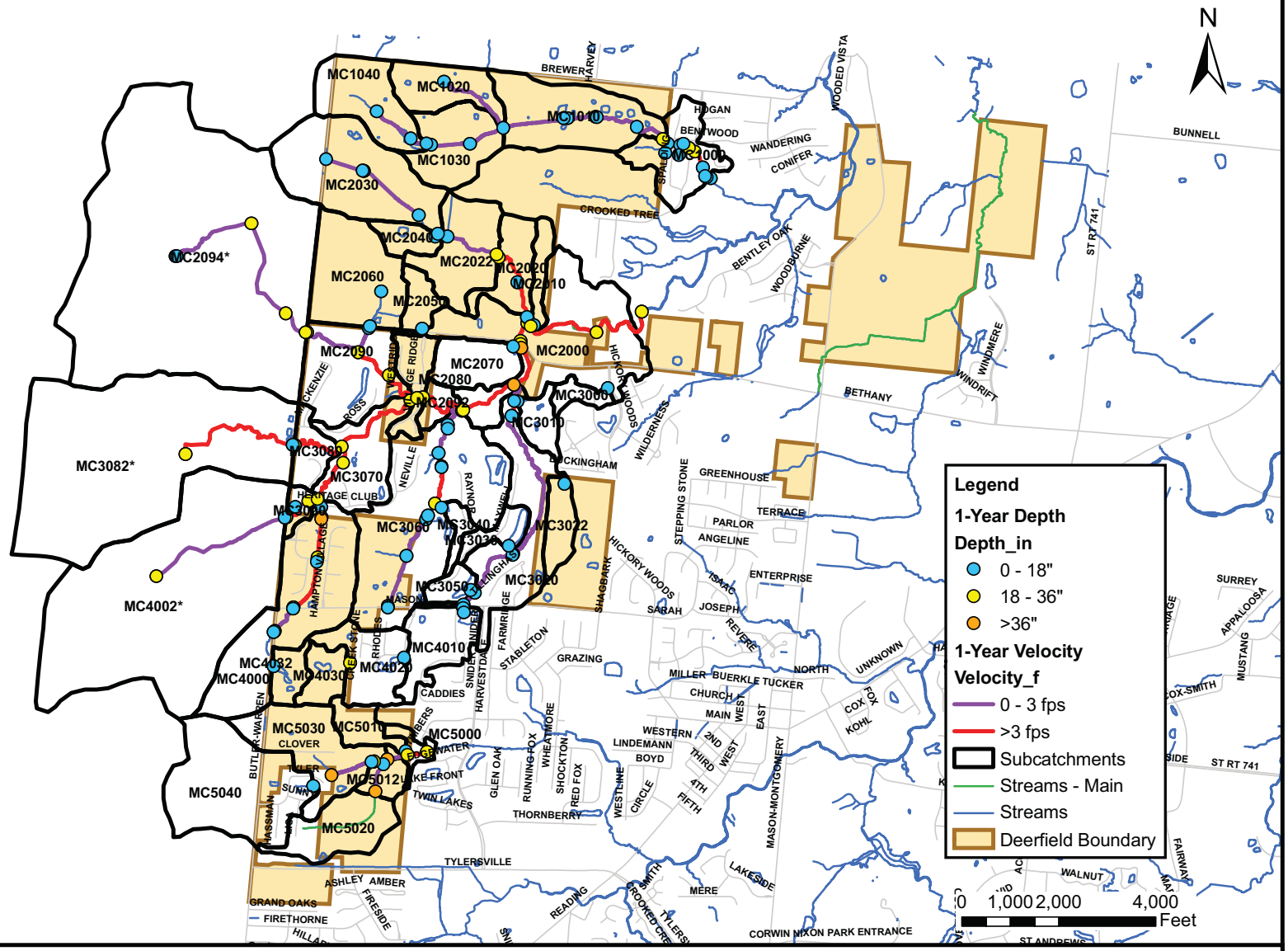
Figure 4-1



CDM

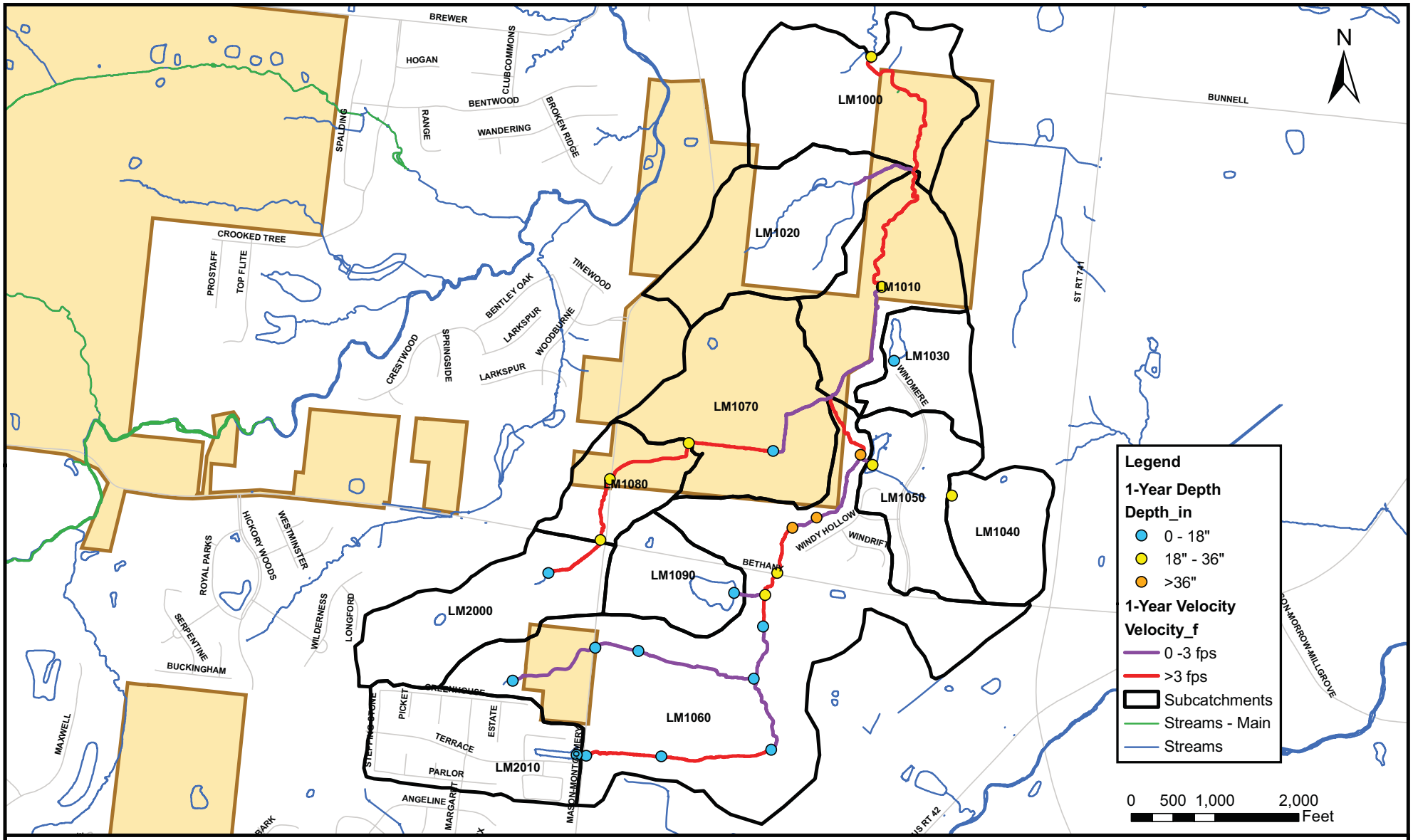
Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Union Creek Watershed - 1 Year Depths and Velocities

Figure 4-4



Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Little Muddy Creek Watershed - 1 Year Depths and Velocities

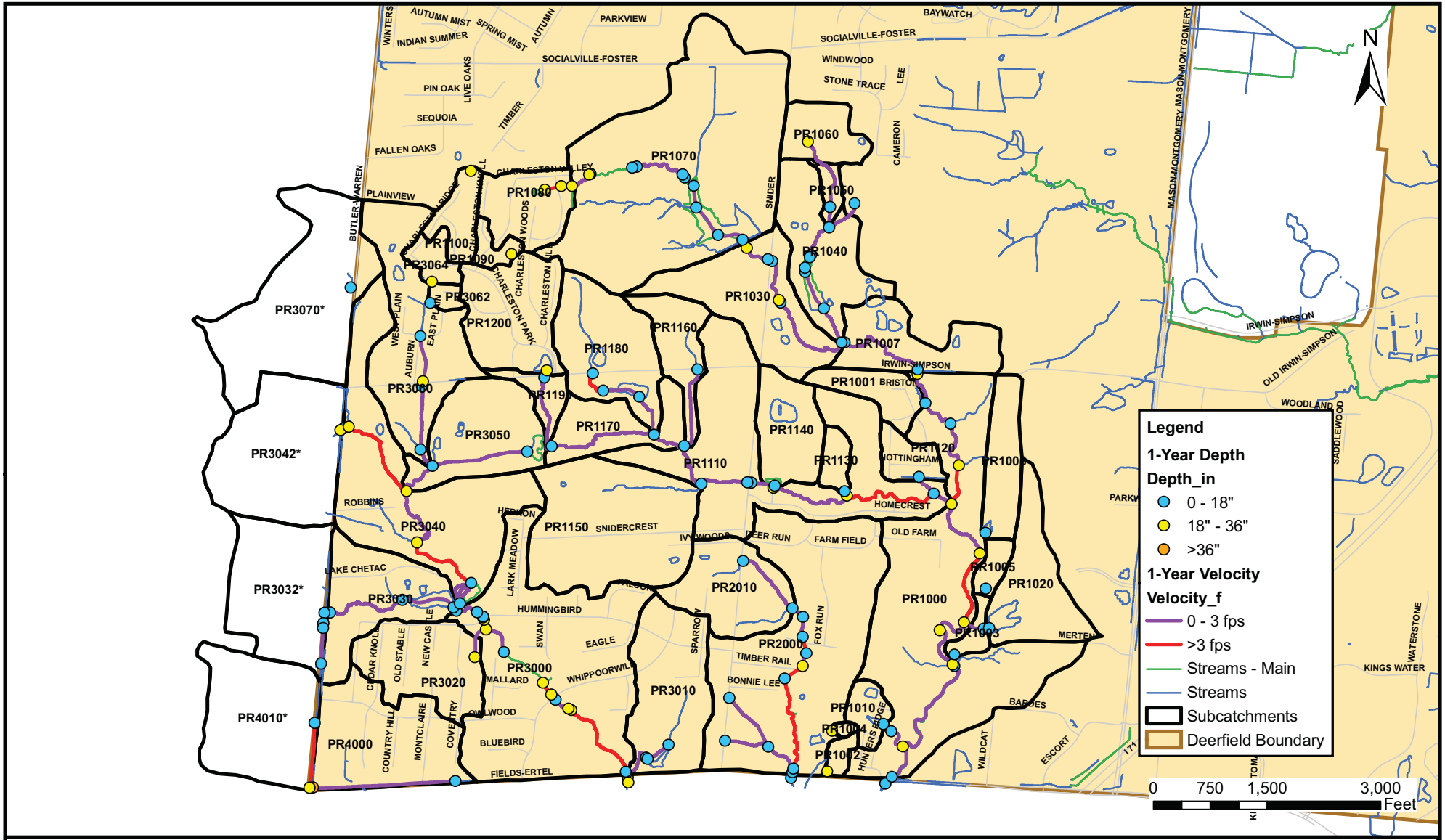
Figure 4-5



CDM

Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Unnamed Tributary to Little Muddy Creek Watershed - 1 Year Depths and Velocities

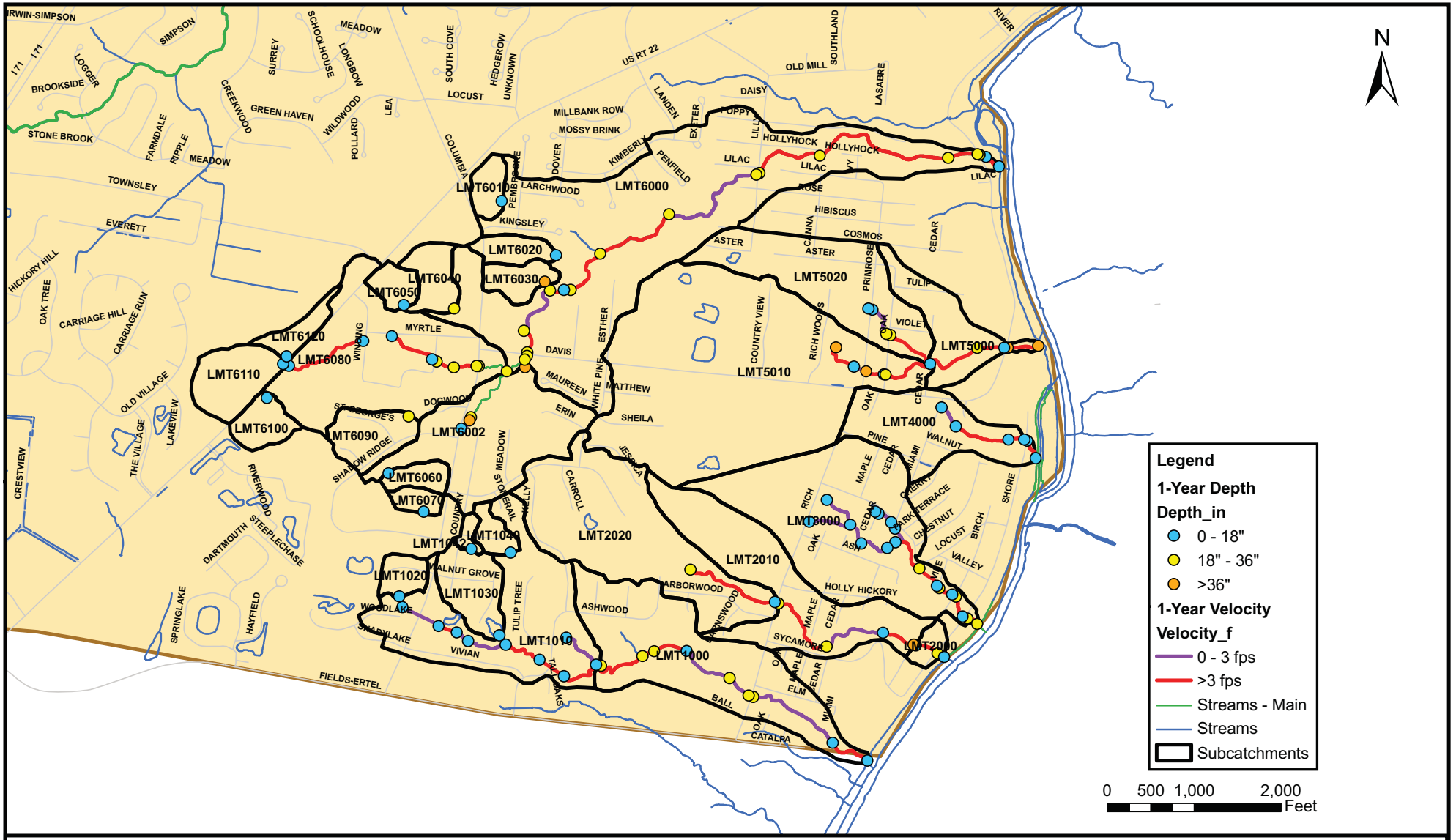
Figure 4-6



CDM

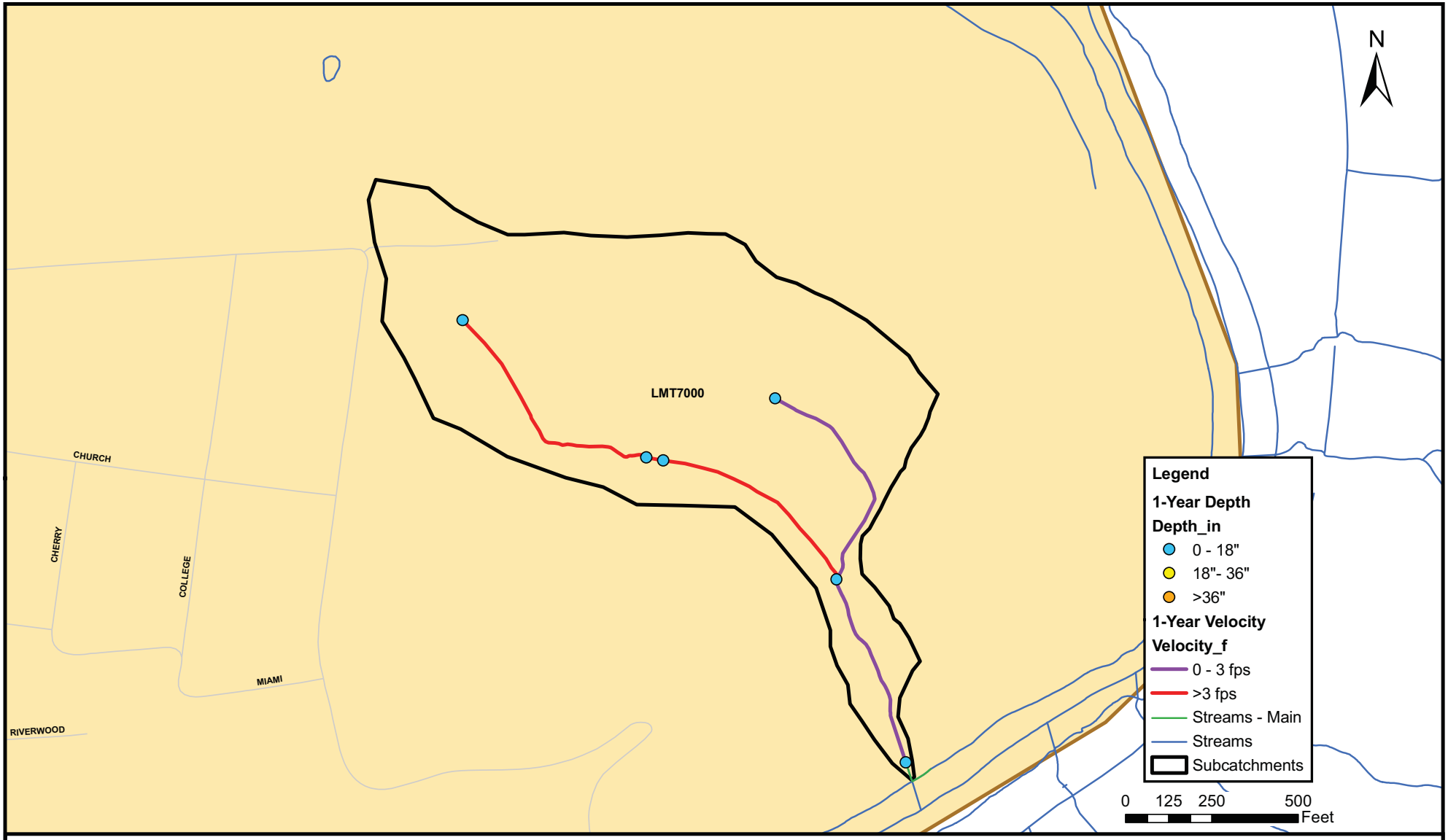
Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Polk Run Watershed - 1 Year Depths and Velocities

Figure 4-7



Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Little Miami Tributaries Watershed - 1 Year Depths and Velocities

Figure 4-8



CDM

Deerfield Regional Storm Water District
Task Order 12 - Stormwater Modeling and System Evaluation Phase I
Little Miami Tributaries Watershed - 1 Year Depths and Velocities

Figure 4-9

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	SC1000	286.30	126.33	0.44	0.38	0.00	155.09	0.54	189.25	0.66	216.34	0.76	254.86	0.89	288.48	1.01	327.50	1.14
2	SC1010	342.00	334.81	0.98	0.86	0.00	412.08	1.20	503.73	1.47	576.33	1.69	684.04	2.00	864.78	2.53	1147.20	3.35
3	SC1020	156.20	72.96	0.47	0.68	0.00	89.58	0.57	129.92	0.83	188.19	1.20	291.08	1.86	392.72	2.51	517.04	3.31
4	SC1030	4.70	5.49	1.17	1.01	0.22	6.74	1.43	8.22	1.75	9.40	2.00	11.08	2.36	14.17	3.01	25.11	5.34
5	SC1040	16.70	28.97	1.73	1.72	0.10	36.45	2.18	45.41	2.72	53.59	3.21	66.69	3.99	78.79	4.72	93.12	5.58
6	SC1042*	14.70	15.35	1.04	1.80	0.12	20.19	1.37	26.24	1.79	31.24	2.13	38.99	2.65	46.33	3.15	55.32	3.76
7	SC1050	4.40	3.88	0.88	0.77	0.17	4.77	1.08	5.82	1.32	6.65	1.51	7.83	1.78	12.44	2.83	21.43	4.87
8	SC1060	22.50	21.19	0.94	1.32	0.06	43.42	1.93	68.82	3.06	86.16	3.83	107.45	4.78	124.34	5.53	142.92	6.35
9	SC1070	53.50	18.02	0.34	0.29	0.01	22.14	0.41	27.03	0.51	32.50	0.61	44.89	0.84	58.66	1.10	77.21	1.44
10	SC1080	102.90	66.72	0.65	0.56	0.01	81.94	0.80	100.00	0.97	114.33	1.11	134.70	1.31	162.56	1.58	225.65	2.19
11	SC1082*	1.10	2.71	2.47	2.14	1.95	3.33	3.03	4.06	3.69	4.65	4.22	5.47	4.97	6.28	5.70	7.40	6.73
12	SC1084*	15.30	19.43	1.27	1.10	0.07	23.87	1.56	29.14	1.90	33.31	2.18	39.25	2.57	44.43	2.90	52.15	3.41
13	SC1090	48.20	20.02	0.42	0.36	0.01	24.57	0.51	29.99	0.62	34.28	0.71	40.38	0.84	45.71	0.95	56.78	1.18
14	SC1100	73.50	26.71	0.36	0.32	0.00	32.79	0.45	40.01	0.54	45.74	0.62	53.88	0.73	72.48	0.99	148.73	2.02
15	SC1110	88.90	27.69	0.31	0.27	0.00	33.99	0.38	41.48	0.47	47.42	0.53	55.86	0.63	63.23	0.71	71.78	0.81
16	SC1120	124.72	83.96	0.67	0.59	0.00	103.18	0.83	125.98	1.01	144.05	1.15	169.74	1.36	192.16	1.54	218.16	1.75
17	SC1122*	19.80	17.99	0.91	0.79	0.04	22.08	1.12	26.95	1.36	30.80	1.56	36.29	1.83	41.08	2.07	68.60	3.46
18	SC1130	6.61	2.57	0.39	0.34	0.05	3.16	0.48	3.86	0.58	4.41	0.67	5.19	0.79	5.88	0.89	6.77	1.02
19	SC1132	21.84	25.39	1.16	1.01	0.05	31.23	1.43	38.15	1.75	43.63	2.00	51.42	2.35	58.22	2.67	66.14	3.03
20	SC1140	43.91	73.88	1.68	1.47	0.03	90.79	2.07	110.87	2.52	126.78	2.89	149.39	3.40	179.31	4.08	228.49	5.20
21	SC1141	11.32	20.56	1.82	1.58	0.14	25.24	2.23	30.81	2.72	35.22	3.11	41.49	3.67	46.97	4.15	58.53	5.17
22	SC1142*	24.20	25.11	1.04	0.90	0.04	30.83	1.27	37.63	1.56	44.75	1.85	65.94	2.72	88.38	3.65	115.05	4.75
23	SC1143	2.99	6.97	2.33	2.03	0.68	8.57	2.86	10.46	3.50	11.98	4.01	15.23	5.09	17.60	5.89	20.09	6.72
24	SC1144*	40.20	31.21	0.78	0.68	0.02	38.36	0.95	46.85	1.17	53.57	1.33	72.53	1.80	96.85	2.41	129.50	3.22
25	SC1145	1.07	2.64	2.47	2.14	2.00	3.24	3.03	3.95	3.69	4.52	4.22	5.58	5.21	6.34	5.93	7.20	6.73
26	SC1146	17.43	38.69	2.22	2.08	0.12	48.30	2.77	62.23	3.57	73.27	4.20	88.30	5.07	100.96	5.79	115.32	6.62
27	SC1150	117.90	179.93	1.53	1.37	0.01	222.20	1.88	272.32	2.31	328.61	2.79	441.76	3.75	547.65	4.65	668.36	5.67
28	SC1160	54.40	49.33	0.91	0.94	0.02	60.61	1.11	80.25	1.48	112.78	2.07	168.18	3.09	218.56	4.02	275.63	5.07
29	SC1164*	33.82	34.69	1.03	1.00	0.03	42.75	1.26	53.58	1.58	67.94	2.01	93.30	2.76	117.90	3.49	147.66	4.37
30	SC1166*	11.54	4.49	0.39	0.34	0.03	5.52	0.48	6.73	0.58	7.69	0.67	9.06	0.79	10.26	0.89	11.65	1.01
31	SC1170	15.90	16.51	1.04	0.90	0.06	20.27	1.27	24.73	1.56	28.27	1.78	33.30	2.09	37.70	2.37	67.66	4.26
32	SC1172*	13.20	29.12	2.21	1.92	0.15	35.75	2.71	43.62	3.30	49.87	3.78	58.75	4.45	66.50	5.04	75.50	5.72
33	SC1180	59.37	61.64	1.04	0.90	0.02	75.67	1.27	92.34	1.56	105.56	1.78	124.36	2.09	140.76	2.37	159.80	2.69
34	SC1182*	6.80	3.53	0.52	0.47	0.07	4.33	0.64	5.32	0.78	11.04	1.62	22.35	3.29	31.16	4.58	39.73	5.84
35	SC1184	4.67	5.46	1.17	1.01	0.22	6.70	1.43	8.17	1.75	11.13	2.38	20.68	4.43	26.19	5.61	30.87	6.61
36	SC1186	6.38	10.76	1.69	1.47	0.23	13.21	2.07	16.12	2.53	20.21	3.17	30.64	4.80	36.84	5.77	42.60	6.68
37	SC1190	48.80	32.93	0.67	0.59	0.01	40.43	0.83	49.33	1.01	56.40	1.16	66.44	1.36	75.20	1.54	85.38	1.75
38	SC1200	94.37	61.24	0.65	0.56	0.01	75.18	0.80	91.73	0.97	104.87	1.11	123.54	1.31	139.84	1.48	158.75	1.68
39	SC1210	11.30	9.97	0.88	0.77	0.07	12.24	1.08	14.94	1.32	17.08	1.51	20.12	1.78	22.77	2.02	29.20	2.58
40	SC1220	59.00	27.57	0.47	0.41	0.01	33.84	0.57	41.29	0.70	47.21	0.80	84.72	1.44	147.87	2.51	227.22	3.85
41	SC1230	24.10	43.75	1.82	1.58	0.07	53.73	2.23	65.58	2.72	74.97	3.11	88.33	3.67	99.99	4.15	118.31	4.91
42	SC1240	17.30	26.45	1.53	1.35	0.08	32.49	1.88	39.75	2.30	51.30	2.97	71.72	4.15	88.76	5.13	106.77	6.17
43	SC1250	47.80	84.27	1.76	1.53	0.03	103.51	2.17	126.34	2.64	144.44	3.02	170.18	3.56	194.35	4.07	245.95	5.15
44	SC1260	6.20	4.67	0.75	0.65	0.11	5.73	0.92	6.99	1.13	7.99	1.29	9.42	1.52	10.66	1.72	14.55	2.35
45	SC1270	398.70	124.17	0.31	0.27	0.00	152.45	0.38	186.03	0.47	212.66	0.53	250.53	0.63	283.58	0.71	321.94	0.81
46	SC1272*	7.10	7.73	1.09	0.95	0.13	9.50	1.34	11.59	1.63	13.26	1.87	18.31	2.58	24.37	3.43	31.91	4.49
47	SC1280	25.00	9.73	0.39	0.34	0.01	11.95	0.48	14.58	0.58	16.67	0.67	19.64	0.79	22.23	0.89	25.23	1.01
48	SC1282*	27.20	41.74	1.53	1.35	0.05	51.48	1.89	63.02	2.32	72.16	2.65	85.14	3.13	96.87	3.56	119.30	4.39
49	SC1290	48.40	13.82	0.29	0.25	0.01	16.97	0.35	20.70	0.43	23.67	0.49	27.88	0.58	31.56	0.65	36.12	0.75
50	SC1300*	31.59	4.10	0.13	0.11	0.00	5.03	0.16	6.14	0.19	7.02	0.22	8.27	0.26	9.36	0.30	17.19	0.54
51	SC1302	6.80	14.97	2.20	1.92	0.28	18.39	2.70	22.45	3.30	26.38	3.88	33.96	4.99	39.59	5.82	45.47	6.69
52	SC1304	15.65	35.10	2.24	2.11	0.13	45.54	2.91	58.04	3.71	67.45	4.31	80.36	5.13	91.39	5.84	104.10	6.65
53	SC1310*	91.82	227.51	2.48	2.10	0.02	289.78	3.16	356.14	3.88	407.56	4.44	480.40	5.23	543.90	5.92	617.58	6.73
54	SC1312	66.60	151.73	2.28	2.09	0.03	192.88	2.90	248.28	3.73	289.14	4.34	344.46	5.17	391.43	5.88	445.38	6.69

Total Area 2896.7
Avg. area 53.64

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	UC1000	262.4	122.59	0.47	0.41	0.00	150.50	0.57	183.65	0.70	209.94	0.80	247.33	0.94	279.95	1.07	323.65	1.23
2	UC1010	88.5	36.75	0.42	0.36	0.00	45.12	0.51	55.06	0.62	62.94	0.71	74.15	0.84	83.93	0.95	95.28	1.08
3	UC1020	84.4	48.19	0.57	0.50	0.01	59.17	0.70	72.20	0.86	82.53	0.98	97.23	1.15	110.14	1.30	147.42	1.75
4	UC1030	8.25	4.50	0.54	0.47	0.06	5.52	0.67	6.74	0.82	7.70	0.93	9.07	1.10	10.51	1.27	12.93	1.57
5	UC1032	5.7	4.44	0.78	0.68	0.12	5.45	0.96	6.65	1.17	7.60	1.33	8.95	1.57	10.14	1.78	11.51	2.02
6	UC1040	35.8	21.37	0.60	0.52	0.01	26.24	0.73	32.02	0.89	36.60	1.02	43.12	1.20	48.81	1.36	55.41	1.55
7	UC1050	7.1	8.64	1.22	1.06	0.15	10.62	1.50	12.97	1.83	14.83	2.09	17.47	2.46	19.78	2.79	22.80	3.21
8	UC1060	7.9	8.29	1.05	0.92	0.12	10.22	1.29	12.51	1.58	14.33	1.81	16.90	2.14	19.15	2.42	21.75	2.75
9	UC1070	8.1	10.72	1.32	1.15	0.14	13.16	1.63	16.06	1.98	18.36	2.27	21.63	2.67	24.49	3.02	27.80	3.43
10	UC1080	14.7	16.03	1.09	0.95	0.06	19.67	1.34	24.01	1.63	27.44	1.87	32.33	2.20	36.60	2.49	41.54	2.83
11	UC1090	20.4	26.48	1.30	1.13	0.06	32.50	1.59	39.66	1.94	45.34	2.22	53.41	2.62	60.46	2.96	68.63	3.36
12	UC1100	65.95	20.54	0.31	0.27	0.00	25.22	0.38	30.77	0.47	35.18	0.53	41.44	0.63	46.91	0.71	53.25	0.81
13	UC1101	59.54	84.98	1.43	1.24	0.02	104.34	1.75	127.33	2.14	145.55	2.44	171.48	2.88	194.10	3.26	220.35	3.70
14	UC1102	8.41	3.49	0.42	0.36	0.04	4.29	0.51	5.23	0.62	5.98	0.71	7.05	0.84	7.98	0.95	9.05	1.08
15	UC1104	12.44	4.84	0.39	0.34	0.03	5.95	0.48	7.26	0.58	8.29	0.67	9.77	0.79	11.06	0.89	12.56	1.01
16	UC1110	7.8	14.57	1.87	1.62	0.21	17.89	2.29	21.83	2.80	24.96	3.20	29.41	3.77	33.29	4.27	37.79	4.84
17	UC1121	37.7	15.66	0.42	0.36	0.01	19.22	0.51	23.45	0.62	26.81	0.71	31.59	0.84	35.75	0.95	40.59	1.08
18	UC1130	2.1	4.20	2.00	1.74	0.83	5.15	2.45	6.29	2.99	7.19	3.42	8.47	4.03	9.98	4.75	11.82	5.63
19	UC1140	12.7	11.87	0.93	0.81	0.06	14.57	1.15	17.78	1.40	20.32	1.60	23.94	1.89	27.10	2.13	30.76	2.42
20	UC1150	44.36	13.82	0.31	0.27	0.01	16.96	0.38	20.70	0.47	23.66	0.53	27.88	0.63	31.55	0.71	35.82	0.81
21	UC1152	3.91	8.62	2.20	1.92	0.49	10.58	2.71	12.92	3.30	14.77	3.78	17.40	4.45	19.70	5.04	22.36	5.72
22	UC1154	2.83	2.94	1.04	0.90	0.32	3.61	1.27	4.40	1.56	5.03	1.78	5.93	2.09	6.71	2.37	7.62	2.69
23	UC1156	21.2	24.76	1.17	1.01	0.05	30.40	1.43	37.09	1.75	42.40	2.00	49.96	2.36	56.55	2.67	64.19	3.03
24	UC1160	16.3	17.34	1.06	0.92	0.06	21.29	1.31	25.98	1.59	29.70	1.82	35.00	2.15	41.77	2.56	52.50	3.22
25	UC1170	30.82	16.00	0.52	0.45	0.01	19.64	0.64	23.97	0.78	27.40	0.89	32.28	1.05	36.54	1.19	41.48	1.35
26	UC1172	27.46	28.47	1.04	0.90	0.03	34.98	1.27	42.69	1.55	48.81	1.78	57.51	2.09	65.10	2.37	73.91	2.69
27	UC1174	50.75	6.59	0.13	0.11	0.00	8.09	0.16	9.87	0.19	11.28	0.22	13.29	0.26	15.04	0.30	17.07	0.34
28	UC1180	12.6	8.83	0.70	0.61	0.05	10.84	0.86	13.23	1.05	15.12	1.20	17.81	1.41	20.16	1.60	22.89	1.82
29	UC1190	7.1	5.53	0.78	0.68	0.10	6.79	0.96	8.28	1.17	9.47	1.33	11.15	1.57	12.63	1.78	14.33	2.02
30	UC1200	4.4	3.20	0.73	0.63	0.14	3.93	0.89	4.79	1.09	5.48	1.24	6.45	1.47	7.30	1.66	8.29	1.88
31	UC1210	6.38	5.96	0.93	0.81	0.13	7.32	1.15	8.93	1.40	10.21	1.60	12.03	1.89	13.61	2.13	15.46	2.42
32	UC1212	10.75	11.16	1.04	0.90	0.08	13.70	1.27	16.72	1.56	19.11	1.78	22.52	2.09	25.49	2.37	28.93	2.69
33	UC1220	31.5	2.45	0.08	0.07	0.00	3.01	0.10	3.67	0.12	4.20	0.13	4.95	0.16	5.60	0.18	6.36	0.20
34	UC1230	140.02	25.44	0.18	0.16	0.00	31.23	0.22	38.11	0.27	43.57	0.31	51.33	0.37	58.10	0.41	65.95	0.47
35	UC1240	12.89	13.38	1.04	0.90	0.07	16.43	1.27	20.05	1.56	22.92	1.78	27.00	2.09	30.56	2.37	34.69	2.69
36	UC1250	27.15	4.93	0.18	0.16	0.01	6.06	0.22	7.39	0.27	8.45	0.31	9.95	0.37	11.27	0.41	12.79	0.47
37	UC1252	10.75	0.56	0.05	0.05	0.00	0.69	0.06	0.84	0.08	0.96	0.09	1.13	0.10	1.27	0.12	1.45	0.13
38	UC1254	7.48	2.33	0.31	0.27	0.04	2.86	0.38	3.49	0.47	3.99	0.53	4.70	0.63	5.32	0.71	6.04	0.81
39	UC1260	28.51	1.48	0.05	0.05	0.00	1.82	0.06	2.22	0.08	2.53	0.09	2.99	0.10	3.38	0.12	3.84	0.13
40	UC1262	44.94	11.66	0.26	0.23	0.01	14.32	0.32	17.47	0.39	19.97	0.44	23.53	0.52	26.64	0.59	30.24	0.67
41	UC1270	9.04	11.33	1.25	1.09	0.12	13.91	1.54	16.98	1.88	19.41	2.15	22.86	2.53	25.88	2.86	29.38	3.25
42	UC1280	9.46	0.49	0.05	0.05	0.00	0.60	0.06	0.74	0.08	0.84	0.09	0.99	0.10	1.12	0.12	1.27	0.13
43	UC1291	144.6	71.30	0.49	0.43	0.00	87.54	0.61	106.82	0.74	122.12	0.84	143.87	0.99	162.84	1.13	184.87	1.28
44	UC1300	9.4	12.20	1.30	1.13	0.12	14.98	1.59	18.28	1.94	20.89	2.22	24.61	2.62	27.86	2.96	31.63	3.36
45	UC1310	22.3	27.78	1.25	1.08	0.05	34.11	1.53	41.62	1.87	47.58	2.13	56.05	2.51	63.44	2.85	72.88	3.27
46	UC1320	78.2	79.02	1.01	0.88	0.01	97.08	1.24	118.51	1.52	135.51	1.73	159.66	2.04	180.74	2.31	205.20	2.62
47	UC1322	83.5	75.86	0.91	0.79	0.01	93.12	1.12	113.64	1.36	129.90	1.56	153.04	1.83	173.22	2.07	196.84	2.36
48	UC1330	112.48	20.44	0.18	0.16	0.00	25.09	0.22	30.62	0.27	35.00	0.31	41.23	0.37	46.67	0.41	52.98	0.47
49	UC1331	1.18	2.76	2.34	2.03	1.72	3.38	2.87	4.13	3.50	4.72	4.00	5.73	4.85	6.54	5.54	7.49	6.35
50	UC1332	4.9	9.54	1.95	1.69	0.34	11.71	2.39	14.29	2.92	16.34	3.33	19.24	3.93	21.78	4.45	24.73	5.05
51	UC1333	1.97	4.09	2.08	1.80	0.92	5.02	2.55	6.13	3.11	7.42	3.76	9.05	4.59	10.42	5.29	12.01	6.10
52	UC1334	5.2	8.77	1.69	1.47	0.28	10.77	2.07	13.14	2.53	15.02	2.89	17.70	3.40	20.03	3.85	23.97	4.61
53	UC1335	1.19	2.78	2.34	2.03	1.70	3.41	2.87	4.16	3.50	4.76	4.00	5.61	4.71	6.48	5.44	7.46	6.27
54	UC1336	12.2	26.84	2.20	1.92	0.16	32.99	2.70	40.28	3.30	46.06	3.78	54.28	4.45	62.06	5.09	71.92	5.90
55	UC1337	1.19	2.84	2.39	2.07	1.74	3.49	2.93	4.26	3.58	4.87	4.09	5.87	4.93	6.69	5.62	7.65	6.42
56	UC1341	9.29	17.93	1.93	1.76	0.19	22.27	2.40	27.43	2.95	31.51	3.39	37.32	4.02	42.37	4.56	48.24	5.19
57	UC1350	5.48	12.06	2.20	1.92	0.35	14.82	2.71	18.10	3.30	20.69	3.78	24.64	4.50	28.61	5.22	33.16	6.05
58	UC1352	5.87	6.09	1.04	0.90	0.15	7.48	1.27	9.13	1.56	10.44	1.78	12.30	2.09	13.92	2.37	15.80	2.69
59	UC1353	10.99	17.07	1.55	1.35	0.12	20.98	1.91	25.62	2.33	29.31	2.67	36.49	3.32	43.64	3.97	52.28	4.76
60	UC1354	5.58	13.19	2.36	2.07	0.37	16.24	2.91	19.87	3.56	22.74	4.08	26.82	4.81	30.38	5.44	34.67	6.21
61	UC1360	170.26	132.07	0.78	0.68	0.00	162.37	0.95	198.32	1.16	226.81	1.33	267.30	1.57	302.62	1.78	343.59	2.02
62	UC1361	17.66	11.46	0.65	0.56	0.03	14.07	0.80	17.17	0.97	19.62	1.11	23.12	1.31	26.17	1.48	29.71	1.68
63	UC1362	19.2	44.73	2.33	2.03	0.11	54.97	2.86	67.12	3.50	76.76	4.00	90.45	4.71	102.39	5.33	116.26	6.06
64	UC1364	5.2	7.42	1.43	1.24	0.24	9.11	1.75	11.12	2.14	12.72	2.45	16.40	3.15	20.13	3.87	24.52	4.72
65	UC1366	2.2	4.57	2.08	1.80	0.82	5.61	2.55	6.84	3.11	7.82	3.56	9.22	4.19	10.43	4.74	11.91	5.42
66	UC1368	15.5	26.08	1.68	1.47	0.09	32.05	2.07	39.14	2.52	44.75	2.89	52.74	3.40	59.74	3.85	69.55	4.49
67	UC1370	2.83	4.78	1.69	1.47	0.52	5.86	2.07	7.15	2.53	8.18	2.89	9.63	3.40	10.96	3.87	13.59	4.80
68	UC1371	3.22	5.85	1.82	1.58	0.49	7.18	2.23	8.76	2.72	10.02	3.11	11.80	3.67	13.36	4.15	15.17	4.71
69	UC1372	7.21	13.06	1.81	1.58	0.22	16.05	2.23	19.60	2.72	22.42	3.11	26.42	3.66	29.91	4.15	33.95	4.71
70	UC1374	7.4	6.71	0.91	0.79	0.11	8.25	1.11	10.07	1.36	11.51	1.56	13.56	1.83	15.35	2.07	17.45	2.36
71	UC1380	56.4	36.60	0.65	0.56	0.01	44.93	0.80	54.82	0.97	62.67	1.11	73.83	1.31	83.57	1.48	94.88	1.68

Total Area 2133.09
Avg. area 30.04

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	PR1000	151.31	58.9	0.39	0.34	0.00	72.32	0.48	88.25	0.58	100.88	0.67	118.85	0.79	134.53	0.89	153.58	1.02
2	PR1001	15.32	9.9	0.65	0.56	0.04	12.20	0.80	14.89	0.97	17.02	1.11	20.06	1.31	22.70	1.48	25.77	1.68
3	PR1002	3.7	4.3	1.17	1.01	0.27	5.31	1.43	6.47	1.75	7.40	2.00	9.51	2.57	12.31	3.33	15.57	4.21
4	PR1003	5.2	9.4	1.82	1.58	0.30	11.60	2.23	14.15	2.72	16.18	3.11	19.06	3.67	21.58	4.15	24.49	4.71
5	PR1004	1.2	1.1	0.91	0.79	0.66	1.34	1.12	1.63	1.36	1.87	1.56	2.20	1.83	2.58	2.15	3.57	2.97
6	PR1005	6.03	1.3	0.21	0.17	0.03	1.54	0.25	1.88	0.31	2.14	0.36	2.53	0.42	2.86	0.47	3.25	0.54
7	PR1006	21.58	15.1	0.70	0.61	0.03	18.57	0.86	22.66	1.05	25.90	1.20	30.51	1.41	34.54	1.60	39.21	1.82
8	PR1007	33.22	8.6	0.26	0.23	0.01	10.59	0.32	12.92	0.39	14.77	0.44	17.40	0.52	19.69	0.59	22.35	0.67
9	PR1010	8.8	6.9	0.78	0.68	0.08	8.41	0.96	10.27	1.17	11.74	1.33	13.82	1.57	15.65	1.78	17.82	2.03
10	PR1020	36.4	34.8	0.96	0.83	0.02	42.76	1.17	52.25	1.44	59.77	1.64	70.45	1.94	79.97	2.20	93.08	2.56
11	PR1030	51.1	15.9	0.31	0.27	0.01	19.54	0.38	23.84	0.47	27.26	0.53	32.11	0.63	36.35	0.71	41.26	0.81
12	PR1040	41.6	8.6	0.21	0.18	0.00	10.61	0.25	12.94	0.31	14.79	0.36	17.43	0.42	19.73	0.47	22.39	0.54
13	PR1050	4.7	0.1	0.03	0.01	0.00	0.15	0.03	0.18	0.04	0.21	0.04	0.25	0.05	0.28	0.06	0.32	0.07
14	PR1060	17.7	4.6	0.26	0.23	0.01	5.64	0.32	6.88	0.39	7.87	0.44	9.27	0.52	10.49	0.59	11.91	0.67
15	PR1070	162.28	33.7	0.21	0.18	0.00	41.37	0.25	50.48	0.31	57.71	0.36	67.98	0.42	76.95	0.47	87.36	0.54
16	PR1080	25.16	52.2	2.08	1.80	0.07	64.14	2.55	78.26	3.11	89.47	3.56	105.40	4.19	119.30	4.74	138.83	5.52
17	PR1090	5.42	8.4	1.56	1.35	0.25	10.36	1.91	12.65	2.33	14.46	2.67	17.03	3.14	19.28	3.56	21.88	4.04
18	PR1100	12.62	18.0	1.43	1.24	0.10	22.12	1.75	26.99	2.14	30.85	2.44	36.35	2.88	41.77	3.31	53.02	4.20
19	PR1110	100.6	39.2	0.39	0.34	0.00	48.08	0.48	58.67	0.58	67.07	0.67	79.02	0.79	89.44	0.89	102.22	1.02
20	PR1120	10.3	5.1	0.49	0.43	0.04	6.24	0.61	7.61	0.74	8.70	0.84	10.25	0.99	11.60	1.13	13.31	1.29
21	PR1130	6.6	1.9	0.29	0.25	0.04	2.31	0.35	2.82	0.43	3.23	0.49	3.80	0.58	4.30	0.65	4.94	0.75
22	PR1140	26.5	7.6	0.29	0.25	0.01	9.29	0.35	11.33	0.43	12.96	0.49	15.26	0.58	17.28	0.65	19.62	0.74
23	PR1150	77.1	22.0	0.28	0.25	0.00	27.00	0.35	32.96	0.43	37.68	0.49	44.40	0.58	50.76	0.66	60.20	0.78
24	PR1160	20.8	5.9	0.29	0.25	0.01	7.29	0.35	8.90	0.43	10.17	0.49	11.98	0.58	13.56	0.65	15.40	0.74
25	PR1170	26.1	1.4	0.05	0.05	0.00	1.66	0.06	2.03	0.08	2.32	0.09	2.73	0.10	3.09	0.12	3.51	0.13
26	PR1180	45.1	2.3	0.05	0.05	0.00	2.87	0.06	3.51	0.08	4.01	0.09	4.72	0.10	5.35	0.12	6.07	0.13
27	PR1190	8.8	3.4	0.39	0.34	0.04	4.21	0.48	5.13	0.58	5.87	0.67	6.91	0.79	7.82	0.89	9.01	1.02
28	PR1200	41.15	42.7	1.04	0.90	0.02	52.45	1.27	64.00	1.56	73.16	1.78	86.19	2.09	97.56	2.37	110.76	2.69
29	PR2000	126.1	45.8	0.36	0.32	0.00	56.25	0.45	68.64	0.54	78.47	0.62	92.45	0.73	104.64	0.83	125.47	1.00
30	PR2010	36.4	13.2	0.36	0.32	0.01	16.24	0.45	19.82	0.54	22.65	0.62	26.69	0.73	30.24	0.83	38.87	1.07
31	PR3000	133.5	58.9	0.44	0.38	0.00	72.32	0.54	88.24	0.66	100.88	0.76	118.84	0.89	138.26	1.04	177.46	1.33
32	PR3010	49.3	15.4	0.31	0.27	0.01	18.85	0.38	23.00	0.47	26.30	0.53	30.98	0.63	35.07	0.71	46.48	0.94
33	PR3020	38.6	19.0	0.49	0.43	0.01	23.37	0.61	28.52	0.74	32.60	0.84	38.40	0.99	50.31	1.30	72.14	1.87
34	PR3030	41.2	17.1	0.42	0.36	0.01	21.01	0.51	25.63	0.62	29.30	0.71	34.52	0.84	42.11	1.02	56.76	1.38
35	PR3032*	52.6	16.0	0.30	0.26	0.01	19.61	0.37	23.93	0.45	27.36	0.52	39.68	0.75	63.25	1.20	96.61	1.84
36	PR3040	93.6	29.2	0.31	0.27	0.00	35.79	0.38	43.67	0.47	49.93	0.53	58.82	0.63	68.58	0.73	90.36	0.97
37	PR3042*	65.7	23.9	0.36	0.32	0.00	29.31	0.45	35.76	0.54	40.88	0.62	48.17	0.73	57.94	0.88	74.93	1.14
38	PR3050	42.7	12.2	0.29	0.25	0.01	14.97	0.35	18.26	0.43	20.88	0.49	24.60	0.58	27.84	0.65	35.42	0.83
39	PR3060	61.97	24.1	0.39	0.34	0.01	29.62	0.48	36.14	0.58	41.32	0.67	48.68	0.79	55.10	0.89	62.55	1.01
40	PR3062	3.21	3.7	1.17	1.01	0.32	4.60	1.43	5.62	1.75	6.42	2.00	7.56	2.36	8.56	2.67	9.72	3.03
41	PR3064	7.89	8.2	1.04	0.90	0.11	10.06	1.27	12.27	1.56	14.03	1.78	16.53	2.09	18.71	2.37	21.24	2.69
42	PR3070*	81.8	29.3	0.36	0.31	0.00	35.97	0.44	43.89	0.54	50.18	0.61	59.11	0.72	66.91	0.82	75.96	0.93
43	PR4000	54.5	24.0	0.44	0.38	0.01	29.52	0.54	36.03	0.66	41.19	0.76	53.04	0.97	67.06	1.23	86.17	1.58
44	PR4010*	55.5	47.8	0.86	0.75	0.01	58.71	1.06	71.64	1.29	81.90	1.48	96.49	1.74	109.21	1.97	128.93	2.32

Total Area 1910.96
Avg. area 43.43

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	MC1000	54.73	36.93	0.67	0.59	0.01	45.34	0.83	55.33	1.01	63.25	1.16	74.51	1.36	84.52	1.54	135.46	2.48
2	MC1010	92.13	31.09	0.34	0.29	0.00	38.16	0.41	46.57	0.51	53.24	0.58	62.72	0.68	70.99	0.77	95.11	1.03
3	MC1020	44.05	3.43	0.08	0.07	0.00	4.21	0.10	5.14	0.12	5.87	0.13	10.74	0.24	22.90	0.52	61.38	1.39
4	MC1030	56.94	19.21	0.34	0.29	0.01	23.59	0.41	28.78	0.51	32.90	0.58	38.76	0.68	47.18	0.83	72.95	1.28
5	MC1040	62.09	4.03	0.06	0.06	0.00	4.95	0.08	6.04	0.10	6.90	0.11	8.13	0.13	9.20	0.15	10.47	0.17
6	MC2000	166.47	73.45	0.44	0.38	0.00	90.18	0.54	110.04	0.66	125.79	0.76	148.19	0.89	167.74	1.01	190.43	1.14
7	MC2010	15.72	17.16	1.09	0.99	0.06	21.30	1.36	26.22	1.67	30.12	1.92	35.66	2.27	40.49	2.58	47.06	2.99
8	MC2020	36.81	5.73	0.16	0.14	0.00	7.04	0.19	8.59	0.23	9.82	0.27	11.57	0.31	13.09	0.36	14.86	0.40
9	MC2022	63.20	41.01	0.65	0.56	0.01	50.35	0.80	61.44	0.97	70.23	1.11	82.74	1.31	93.65	1.48	124.20	1.97
10	MC2030	122.07	9.19	0.08	0.07	0.00	11.28	0.09	13.77	0.11	15.74	0.13	18.54	0.15	20.98	0.17	23.82	0.20
11	MC2040	17.85	5.10	0.29	0.25	0.01	6.26	0.35	7.64	0.43	8.73	0.49	10.28	0.58	11.64	0.65	13.21	0.74
12	MC2050	18.20	8.98	0.49	0.43	0.02	11.02	0.61	13.45	0.74	15.37	0.84	25.56	1.40	57.84	3.18	92.44	5.08
13	MC2060	87.83	36.48	0.42	0.36	0.00	44.78	0.51	54.64	0.62	62.46	0.71	73.59	0.84	83.29	0.95	103.23	1.18
14	MC2070	37.62	28.32	0.75	0.65	0.02	34.76	0.92	42.42	1.13	48.49	1.29	57.13	1.52	64.67	1.72	73.66	1.96
15	MC2080	26.57	16.55	0.62	0.54	0.02	20.32	0.76	24.80	0.93	28.34	1.07	33.39	1.26	54.22	2.04	109.21	4.11
16	MC2091	83.85	39.18	0.47	0.41	0.00	48.09	0.57	58.69	0.70	67.09	0.80	79.03	0.94	89.46	1.07	101.92	1.22
17	MC2092	12.95	4.71	0.36	0.32	0.02	5.78	0.45	7.05	0.54	8.06	0.62	9.49	0.73	10.75	0.83	14.15	1.09
18	MC2094*	564.79	174.03	0.31	0.27	0.00	213.85	0.38	261.11	0.46	298.57	0.53	351.82	0.62	398.27	0.71	477.51	0.85
19	MC3000	11.89	4.63	0.39	0.34	0.03	5.68	0.48	6.94	0.58	7.93	0.67	9.34	0.79	10.57	0.89	13.63	1.15
20	MC3010	19.42	14.62	0.75	0.65	0.03	17.95	0.92	21.90	1.13	25.03	1.29	29.49	1.52	33.38	1.72	46.45	2.39
21	MC3020	94.68	19.66	0.21	0.18	0.00	24.14	0.25	29.45	0.31	33.67	0.36	39.66	0.42	44.90	0.47	126.40	1.33
22	MC3022	24.25	9.44	0.39	0.34	0.01	11.59	0.48	14.14	0.58	16.17	0.67	19.05	0.79	21.56	0.89	24.48	1.01
23	MC3030	16.91	4.39	0.26	0.23	0.01	5.39	0.32	6.58	0.39	7.52	0.44	8.86	0.52	26.37	1.56	67.94	4.02
24	MC3040	10.40	3.24	0.31	0.27	0.03	3.98	0.38	4.85	0.47	5.55	0.53	6.54	0.63	7.40	0.71	8.40	0.81
25	MC3050	13.64	2.83	0.21	0.18	0.01	3.48	0.25	4.24	0.31	4.85	0.36	5.71	0.42	6.47	0.47	16.04	1.18
26	MC3060	190.49	44.50	0.23	0.20	0.00	54.63	0.29	66.66	0.35	76.20	0.40	89.78	0.47	101.62	0.53	115.36	0.61
27	MC3070	60.60	11.01	0.18	0.16	0.00	13.52	0.22	16.49	0.27	18.86	0.31	22.21	0.37	25.14	0.41	30.18	0.50
28	MC3080	23.44	4.87	0.21	0.18	0.01	5.98	0.25	7.29	0.31	8.34	0.36	9.82	0.42	11.12	0.47	12.62	0.54
29	MC3082*	354.89	98.56	0.28	0.24	0.00	121.00	0.34	147.65	0.42	168.79	0.48	198.85	0.56	225.08	0.63	279.08	0.79
30	MC3090	9.65	14.70	1.52	1.57	0.16	22.02	2.28	29.74	3.08	35.26	3.65	42.79	4.43	49.32	5.11	56.92	5.90
31	MC4000	140.38	51.01	0.36	0.85	0.01	70.39	0.50	125.73	0.90	183.20	1.31	276.64	1.97	364.90	2.60	470.29	3.35
32	MC4002*	372.68	86.09	0.23	0.20	0.00	105.69	0.28	128.97	0.35	149.38	0.40	234.12	0.63	348.56	0.94	512.48	1.38
33	MC4010	45.69	14.23	0.31	0.27	0.01	17.47	0.38	21.32	0.47	24.37	0.53	28.71	0.63	71.91	1.57	166.36	3.64
34	MC4020	50.34	20.91	0.42	0.36	0.01	25.67	0.51	31.32	0.62	35.80	0.71	42.18	0.84	47.74	0.95	116.28	2.31
35	MC4030	22.56	20.49	0.91	0.79	0.03	25.16	1.12	30.70	1.36	35.10	1.56	41.35	1.83	46.80	2.07	58.16	2.58
36	MC4032	18.43	16.74	0.91	0.79	0.04	20.55	1.12	25.08	1.36	28.67	1.56	33.78	1.83	38.23	2.07	43.40	2.36
37	MC5000	12.04	3.13	0.26	0.23	0.02	3.84	0.32	4.68	0.39	5.35	0.44	6.31	0.52	7.14	0.59	8.63	0.72
38	MC5010	20.90	18.99	0.91	0.79	0.04	23.31	1.12	28.44	1.36	32.51	1.56	38.31	1.83	43.36	2.07	80.96	3.87
39	MC5012	14.07	10.96	0.78	0.68	0.05	13.45	0.96	16.41	1.17	18.76	1.33	22.10	1.57	25.02	1.78	30.11	2.14
40	MC5020	53.19	48.31	0.91	0.79	0.01	59.31	1.12	72.38	1.36	82.75	1.56	97.48	1.83	110.34	2.07	134.04	2.52
41	MC5030	75.92	23.65	0.31	0.27	0.00	29.03	0.38	35.42	0.47	40.50	0.53	47.71	0.63	54.00	0.71	61.34	0.81
42	MC5040	128.00	49.83	0.39	0.34	0.00	61.18	0.48	74.66	0.58	85.34	0.67	100.54	0.79	113.80	0.89	145.89	1.14

Total Area 3348.33
Avg. area 79.72

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	LM1000	88.31	2.29	0.03	0.02	0.00	2.81	0.03	3.43	0.04	3.93	0.04	4.62	0.05	5.23	0.06	5.97	0.07
2	LM1010	65.18	5.08	0.08	0.07	0.00	6.23	0.10	7.60	0.12	8.69	0.13	10.24	0.16	11.59	0.18	13.16	0.20
3	LM1020	77.3	4.01	0.05	0.05	0.00	4.93	0.06	6.01	0.08	6.87	0.09	8.10	0.10	9.16	0.12	10.40	0.13
4	LM1030	34.02	25.61	0.75	0.65	0.02	31.44	0.92	38.36	1.13	43.85	1.29	51.66	1.52	58.48	1.72	66.39	1.95
5	LM1040	38.17	32.44	0.85	0.77	0.02	40.22	1.05	49.44	1.30	56.75	1.49	67.63	1.77	78.40	2.05	91.87	2.41
6	LM1050	50.73	36.87	0.73	0.63	0.01	45.26	0.89	55.23	1.09	63.14	1.24	74.38	1.47	84.19	1.66	95.58	1.88
7	LM1060	264.75	102.98	0.39	0.34	0.00	126.48	0.48	154.37	0.58	176.49	0.67	207.93	0.79	235.37	0.89	267.21	1.01
8	LM1070	96.21	37.46	0.39	0.34	0.00	45.98	0.48	56.11	0.58	64.15	0.67	75.57	0.79	85.54	0.89	97.11	1.01
9	LM1080	35.11	10.02	0.29	0.25	0.01	12.31	0.35	15.02	0.43	17.17	0.49	20.22	0.58	22.89	0.65	25.99	0.74
10	LM1090	37.88	31.46	0.83	0.72	0.02	38.62	1.02	47.13	1.24	53.88	1.42	63.47	1.68	71.85	1.90	81.80	2.16
11	LM2000	66.73	20.78	0.31	0.27	0.00	25.52	0.38	31.14	0.47	35.59	0.53	41.93	0.63	47.46	0.71	53.88	0.81
12	LM2010	66.04	32.57	0.49	0.43	0.01	39.98	0.61	48.79	0.74	55.77	0.84	65.71	0.99	74.37	1.13	84.43	1.28

Total Area	920.43
Avg. area	76.70

	Subcatchment	Area (acres)	1-year				2-year		5-year		10-year		25-year		50-year		100-year	
			Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Runoff Volume (inches)	Unit Runoff Volume (inches/acre)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)	Peak Discharge (cfs)	Unit Discharge (cfs/ac)
1	LMT1000	63.17	21.32	0.34	0.29	0.00	26.17	0.41	31.93	0.51	36.50	0.58	43.00	0.68	48.68	0.77	60.41	0.96
2	LMT1010	58.08	25.63	0.44	0.38	0.01	31.46	0.54	38.39	0.66	43.89	0.76	51.70	0.89	61.73	1.06	86.40	1.49
3	LMT1020	5.28	7.54	1.43	1.24	0.23	9.25	1.75	11.29	2.14	12.91	2.44	17.41	3.30	21.66	4.10	26.27	4.97
4	LMT1030	13.97	8.34	0.60	0.52	0.04	10.24	0.73	12.49	0.89	14.28	1.02	16.83	1.20	19.21	1.38	27.00	1.93
5	LMT1040	4.51	4.68	1.04	0.90	0.20	5.75	1.27	7.01	1.56	8.02	1.78	9.45	2.09	10.72	2.38	12.93	2.87
6	LMT1042	1.97	1.53	0.78	0.68	0.34	1.88	0.96	2.30	1.17	2.63	1.33	3.10	1.57	3.50	1.78	3.98	2.02
7	LMT2000	3.56	0.92	0.26	0.23	0.06	1.13	0.32	1.38	0.39	1.58	0.44	1.86	0.52	2.11	0.59	2.40	0.67
8	LMT2010	50.39	41.85	0.83	0.72	0.01	51.38	1.02	62.70	1.24	71.67	1.42	84.44	1.68	95.58	1.90	108.63	2.16
9	LMT2020	65.28	37.28	0.57	0.50	0.01	45.76	0.70	55.84	0.86	63.84	0.98	75.20	1.15	85.12	1.30	102.18	1.57
10	LMT3000	77.92	48.54	0.62	0.54	0.01	59.59	0.76	72.71	0.93	83.12	1.07	97.93	1.26	110.84	1.42	131.05	1.68
11	LMT4000	30.52	11.88	0.39	0.34	0.01	14.59	0.48	17.80	0.58	20.35	0.67	23.97	0.79	27.14	0.89	33.51	1.10
12	LMT5000	20.34	4.22	0.21	0.18	0.01	5.19	0.25	6.33	0.31	7.23	0.36	8.52	0.42	9.85	0.48	16.14	0.79
13	LMT5010	141.54	106.53	0.75	0.65	0.00	130.79	0.92	159.60	1.13	182.45	1.29	214.94	1.52	243.29	1.72	280.27	1.98
14	LMT5020	43.26	19.09	0.44	0.38	0.01	23.43	0.54	28.60	0.66	32.69	0.76	38.51	0.89	43.59	1.01	53.17	1.23
15	LMT6000	160.15	124.70	0.78	0.68	0.00	153.09	0.96	186.81	1.17	213.55	1.33	251.59	1.57	284.77	1.78	340.62	2.13
16	LMT6002	46.66	90.04	1.93	1.69	0.04	110.87	2.38	135.56	2.91	155.12	3.32	182.91	3.92	207.69	4.45	241.36	5.17
17	LMT6010	5.49	10.11	1.84	1.60	0.29	12.42	2.26	15.24	2.78	18.32	3.34	22.91	4.17	26.87	4.89	31.42	5.72
18	LMT6020	6.09	5.06	0.83	0.72	0.12	6.21	1.02	7.58	1.24	8.66	1.42	10.21	1.68	12.01	1.97	14.86	2.44
19	LMT6030	6.83	9.04	1.32	1.15	0.17	11.10	1.62	13.54	1.98	15.48	2.27	18.24	2.67	20.72	3.03	24.92	3.65
20	LMT6040	8.88	12.22	1.38	1.20	0.13	15.00	1.69	18.30	2.06	20.92	2.36	24.65	2.78	27.90	3.14	32.21	3.63
21	LMT6050	5.27	6.57	1.25	1.08	0.21	8.06	1.53	9.84	1.87	11.24	2.13	13.36	2.53	16.70	3.17	21.11	4.01
22	LMT6060	4.9	6.49	1.32	1.15	0.23	7.96	1.62	10.08	2.06	12.58	2.57	16.46	3.36	19.93	4.07	23.98	4.89
23	LMT6070	3.5	4.63	1.32	1.15	0.33	5.69	1.63	7.36	2.10	9.52	2.72	12.58	3.59	15.17	4.33	18.12	5.18
24	LMT6080	64.28	30.03	0.47	0.41	0.01	36.87	0.57	44.99	0.70	51.43	0.80	60.59	0.94	69.00	1.07	88.94	1.38
25	LMT6090	12.2	6.02	0.49	0.43	0.04	7.39	0.61	9.01	0.74	10.30	0.84	12.94	1.06	16.62	1.36	21.80	1.79
26	LMT6100	7.61	9.87	1.30	1.13	0.15	12.12	1.59	14.79	1.94	16.91	2.22	19.93	2.62	23.11	3.04	27.44	3.61
27	LMT6110	14.82	3.08	0.21	0.18	0.01	3.78	0.25	4.61	0.31	5.27	0.36	6.21	0.42	7.11	0.48	9.48	0.64
28	LMT6120	5.55	5.47	0.99	0.86	0.15	6.72	1.21	8.20	1.48	9.37	1.69	11.04	1.99	12.50	2.25	14.64	2.64
29	LMT7000	26.72	2.08	0.08	0.07	0.00	2.55	0.10	3.12	0.12	3.56	0.13	4.20	0.16	4.75	0.18	5.39	0.20

Total Area	958.74
Avg. area	33.06

APPENDIX I

Post-Construction Inspection Letters

Warren County
Soil & Water
Conservation District

Jun 03, 2013

4240 IRWIN SIMPSON LLC
118 E MAIN ST
MASON, OH 45040

RE: Governor's Pointe North Section 3 Lot 5

Dear stormwater basin owner,

The Warren County Soil and Water Conservation District in cooperation with the Warren County Engineer's Office, the City of Mason, and the Deerfield Regional Storm Water District recently inspected the stormwater basin serving your community. These inspections occur on a biennial basis for stormwater retention and detention basins or yearly if the basin is designed to treat stormwater quality.

Your basin is privately owned, but was installed as a result of County stormwater requirements; we are offering these inspections as a courtesy to keep you informed of any deficiencies. The purpose of these inspections is not to address aesthetic qualities or issues. Your basin was inspected with regard to function and the inspection report only notes those items which must be repaired to allow the basin to function properly during storm events.

The inspection report is on the second page of this letter and is made up of two sections. First, is a list of items that need immediate attention. These items should be addressed as soon as possible. If nothing is listed in this section then your basin is functioning properly at this time. Secondly, a list of items of future concern is provided. These items are not currently affecting the function of the basin, but they have the potential to affect function in the future. Addressing these issues now may help guard against more costly maintenance in the future.

We will provide assistance to you whenever possible; however, the responsibility for maintenance of the stormwater basin or water quality feature is yours. Please contact Caitlin Botschner at our office if you have questions or concerns about your basin or if you feel you are not the party responsible for this basin. Please reference the Basin ID number shown in the bottom right hand corner of this letter when you call.

Parcel ID #: 16274250011 **Basin ID #:** 140

Warren County
Soil & Water
Conservation District

Basin ID: 140

Description: Governor's Pointe North Section 3 Lot 5

Inspection Date: 07/20/2011

Inspector: Caitlin

Township/City: Deerfield Twp

Type of Basin: detention

Water Quality: No

Survey:

	Description	Relative Elev	Rod Reading
Orifice 1:	8 inch orifice plate	0	0
Orifice 2:	(1) 2 ft X 6 inch window	7	0
Orifice 3:	Top of Box 2X2Grate	8.6	0
Emr Spwy:		0	0
Other:	Top of Dam estimated	8.8	0

Could changes be made to improve water quality?

Retrofit Potential: No

Retrofit Description:

Problem Type (Immediate, Future, Both):

Earth Dam: No
Erosion: No
Not Built to Design: No
Sediment: No
Struct/Pipe Outlet: No
Trash or Debris: No
Vegetation: No

Comments:

Immediate Concerns:

Future Concerns:
Example.

*** If the comments field is blank, no problems were found during the inspection. ***