Appendix R:
STORMWATER MITIGATION PLAN
(Exhibit A-6.4)

EXHIBIT A-6.4:
STORMWATER MITIGATION PLAN

RIVERBEND WIND ENERGY FACILITY

Submitted by Atwell, LLC

On behalf of

MI Energy Developments, LLC
575 5th Ave, Suite 2501
New York, NY 10017

July 16, 2025

TABLE OF CONTENTS

APPENDICES

ACRONYMS AND ABBREVIATIONS

Atwell	Atwell, LLC
BMP	Best Management Practices
EGLE	Michigan Department of Environment, Great Lakes and Energy
MPSC	Michigan Public Service Commission
PA 233	Michigan's Public Act 233
SCDC	Sanilac County Drain Commissioner
SESC	Soil Erosion and Sedimentation Control
WTG	Wind Turbine Generators

1 INTRODUCTION

The Applicant is proposing to construct a wind energy facility consisting of approximately 50 wind turbine generators (WTG) in Speaker and Freemont Townships, Sanilac County, Michigan. Per Michigan PA 233 of 2023, the Michigan Public Service Committee (MPSC) state siting Application Filing Instructions and Procedures for proposed renewable energy facilities includes guidance related to Stormwater Mitigation that requests the following documentation as part of this Exhibit:

4. **Exhibit A-6.4 Stormwater Mitigation Plan.**

   i. Conduct a stormwater assessment and prepare a plan that describes measures to minimize, mitigate, and repair any drainage impacts. The assessment and plan may be preliminary.

   ii. The Plan shall address any guidance from consultation with the county drain commissioner and shall include the date and time the consultation took place, who participated in the consultation, and copies of correspondence listing necessary permits, next steps, and associated timeline for each consultation.

This document serves as Exhibit A-6.4 and is provided for MPSC Application compliance and is described in further detail below:

1.1 STORMWATER ASSESSMENT & MITIGATION PLAN

The existing properties for the WTG sites are all utilized for agricultural crop production and are not native undisturbed land. Each site generally consists of the following characteristics, each of which are important in assessing stormwater impacts due to changes in land use:

- Land Use: Agricultural crop production
- Impervious cover: None
- Topography: Relatively flat
- Soils: Varies by location, refer to Hydrologic Soil Groups data [*Appendix A.3*]
- Drainage features: Surface runoff to downstream lands and drains.

The proposed WTG sites will consist of the following site improvements:

- Land Use: WTG structure and gravel access driveway
- Impervious cover: Gravel/cement stabilized access driveways (to be removed at end of project life)
  Temporary gravel area for construction laydown
- Topography: Match existing topography and drainage path

- Soils: See above – existing soils to remain except as disturbed for construction
- Drainage features: Culverts as necessary to cross ditches or County Drains – see below:

The replacement of land used for agricultural crop production with limited impervious materials may result in a change in stormwater runoff that should be properly mitigated to avoid impacts to neighboring parcels and downstream drainage systems. Common best management practices (BMPs) to address changes in runoff include stormwater detention (temporarily capturing an increase in runoff volume and restricting outflow to acceptable rates to the downstream drainage system) and stormwater retention (capturing and retaining stormwater with no outflow other than by infiltration to the soil, evaporation, and transpiration).

The WTG sites, with their flat topography and lack of direct access to a County Drain or natural watercourse are not well suited for a stormwater detention BMP. Additionally, with only a slight change in land cover from cropland to gravel, the change in runoff would not be expected to adversely impact neighboring parcels or waterways. Therefore, as typical for other WTG projects in the region, permanent stormwater runoff management BMPs are not proposed to be implemented. This assessment is made in conjunction with consultation with the Sanilac County Drain Commissioner (SCDC) in January 2025. A summary of the meeting with SCDC is provided in Section ii for reference.

Typical for a project of this type, stormwater management will consist of proper soil erosion and sedimentation control (SESC) measures implemented during construction until final vegetation is established. A SESC permit will be necessary at each WTG site prior to commencing construction. In areas where access roads will cross established County drains, culverts will be installed and sized in accordance with SCDC and/or EGLE requirements to ensure no adverse impacts on the capacity of the Drain systems.

Refer to SCDC documentation in the Appendices.

1.2 COUNTY DRAIN COMMISSIONER CONSULTATION

To demonstrate compliance of coordination with the local County Drain Commissioner (SCDC), Atwell researched SCDC publications to review stormwater management requirements. No documentation was found online, however a meeting and follow-up email from SCDC provided their “Development Drainage Rules” (“Rules,” latest edition January 2024). The Rules [Section IV.C] discuss Storm Water Detention Basins and the right of the SCDC to waive detention where warranted, provided that easements and water quality issues are addressed.

In addition to the document review, Atwell contacted SCDC to confirm the proper stormwater management criteria:

Doug Sweet	Angela Kramer
Drain Commissioner	Deputy Drain Commissioner
dsweet@sanilaccounty.net	akramer@sanilaccounty.net
Phone: 810-648-4900	Phone: 810-648-4900

Below is a summary of the communication and coordination with SCDC:

December 12, 2024: Atwell contacted SCDC requesting information regarding stormwater management rules for a wind energy project. With several existing facilities in operation, requested confirmation that no new rules have been enacted that would require a different approach to site stormwater design. [*Appendix B.1*]

December 17, 2024: SCDC response email requesting virtual meeting with SCDC and their support team (Engineer – BMJ and legal counsel). Meeting set for January 6, 2025.

January 6, 2025: Meeting held with SCDC & support team, Atwell, and developer (MI Energy Developments, LLC). Meeting notes and attendees are provided. [*Appendix B.2*]

January 6, 2025: Received SCDC Rules from BMJ via email. [*Appendix B.3*]

February 14, 2025: Provided preliminary site layout plan to SCDC for reference. [*Appendix A.1*]

1.3 CONCLUSION

Based on the cited research and communication performed to date, Atwell has provided a preliminary assessment of the existing and proposed site conditions to determine appropriate measures for stormwater management control and coordinated with the governing stormwater agency – SCDC. It is Atwell's understanding that SCDC stormwater requirements for this project would consist of BMPs necessary to satisfy SCDC SESC permit requirements during construction. No permanent stormwater runoff volume BMPs would be necessary for the placement of each WTG site. Where access driveways cross drainage facilities (County Drains, ditches, or streams), appropriate culvert sizing would be provided to ensure no adverse impact on the drainage course or adjacent properties. Impacts to existing drain tiles would need to be addressed as part of the engineering and construction efforts, subject to SCDC review and approval.

APPENDIX A.1

PRELIMINARY PROJECT MAP

CONFIDENTIAL: DO NOT DISTRIBUTE

ATWELL

MI Energy Developments, LLC
Riverbend Wind Energy Facility
24006759
May 16, 2025
Preliminary

0 4,000 8,000 Feet

Project Area (~34,860 acres)
1,000-foot Buffer
Town/Village
Township
County

Proposed MET
Proposed Turbine
Proposed Collection Route
Proposed Access Road

Proposed Intersection Improvements
Proposed Laydown Yard
Proposed O&M Facility
Proposed Switching Station
Proposed Substation

Source: Esri Topographic Basemap

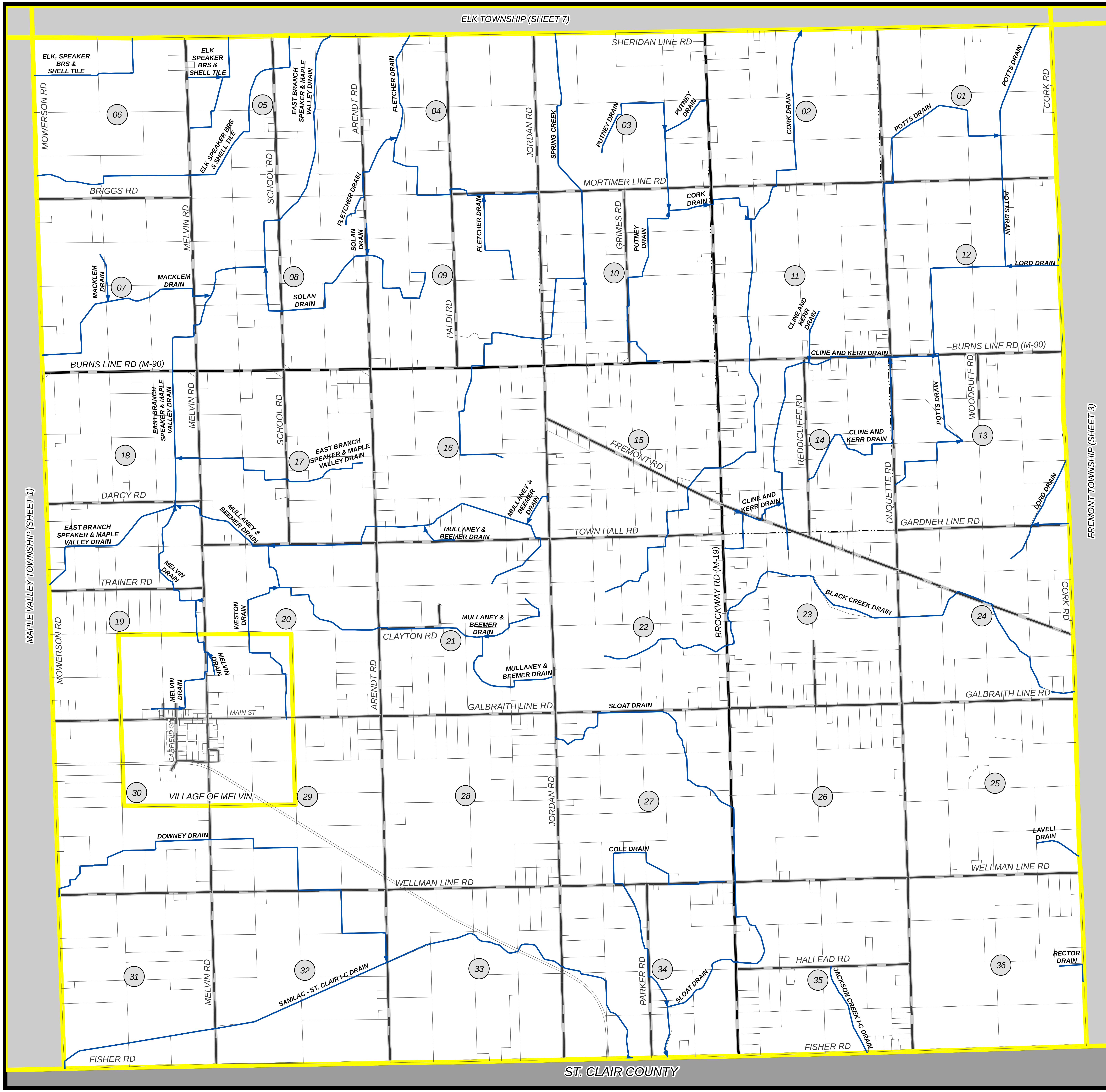
Figure 1
Site Location Map
Elk, Speaker, and Fremont Townships
Sanilac County, Michigan

G:\Jobs2400\T24006759_Riverbend_SanilacCo_MI\Projects\ProjectTemplate\T24006759_Riverbend.aprx 5/16/2025

APPENDIX A.2

SCDC DRAIN MAPS (SPEAKER AND FREMONT TOWNSHIPS)

CONFIDENTIAL: DO NOT DISTRIBUTE


ELK TOWNSHIP (SHEET 7)
SHERIDAN LINE RD
MORTIMER LINE RD
BRIGGS RD
BURNS LINE RD (M-90)
DARCY RD
TRAINER RD
TOWN HALL RD
GARDNER LINE RD
CLAYTON RD
GALBRAITH LINE RD
MAIN ST
GARFIELD ST
VILLAGE OF MELVIN
DOWNEY DRAIN
WELLMAN LINE RD
HALLEAD RD
FISHER RD
ST. CLAIR COUNTY
MAPLE VALLEY TOWNSHIP (SHEET 1)
FREMONT TOWNSHIP (SHEET 3)
MOWERSON RD
MELVIN RD
SCHOOL RD
ARENDT RD
PALDI RD
JORDAN RD
GRIMES RD
PARKER RD
BROCKWAY RD (M-19)
REDDICLIFFE RD
DUQUETTE RD
WOODRUFF RD
CORK RD
FREMONT RD
ELK, SPEAKER BRS & SHELL TILE
ELK SPEAKER BRS & SHELL TILE
EAST BRANCH SPEAKER & MAPLE VALLEY DRAIN
FLETCHER DRAIN
SPRING CREEK
PUTNEY DRAIN
CORK DRAIN
POTTS DRAIN
LORD DRAIN
MACKLEM DRAIN
SOLAN DRAIN
CLINE AND KERR DRAIN
MULLANEY & BEEMER DRAIN
MELVIN DRAIN
WESTON DRAIN
BLACK CREEK DRAIN
SLOAT DRAIN
COLE DRAIN
LAVELL DRAIN
RECTOR DRAIN
SANILAC - ST. CLAIR I-C DRAIN
JACKSON CREEK I-C DRAIN
N
0
1,000
2,000
4,000
FEET
LEGEND
COUNTY DRAINS
RAILROADS
STATE ROADS
COUNTY ROADS
LOCAL ROADS
#
SECTIONS
PARCELS
MUNICIPALITY BOUNDARY

SPEAKER TOWNSHIP
T.9N.-R.14E.

SANILAC COUNTY DRAIN COMMISSIONER
DOUG SWEET

BY	MARK	REVISIONS	DATE

THE WORK REPRESENTED BY THIS DRAWING WAS DESIGNED BY THE ENGINEER FOR THIS SPECIFIC APPLICATION AND SPECIFIC LOCATION DESCRIBED HEREON IN ACCORDANCE WITH THE CONDITIONS PREVALENT AT THE TIME THE DESIGN WAS DONE. THE ENGINEER DOES NOT GUARANTEE AND WILL NOT BE LIABLE FOR ANY OTHER LOCATION, CONDITION, DESIGN OR PURPOSE.

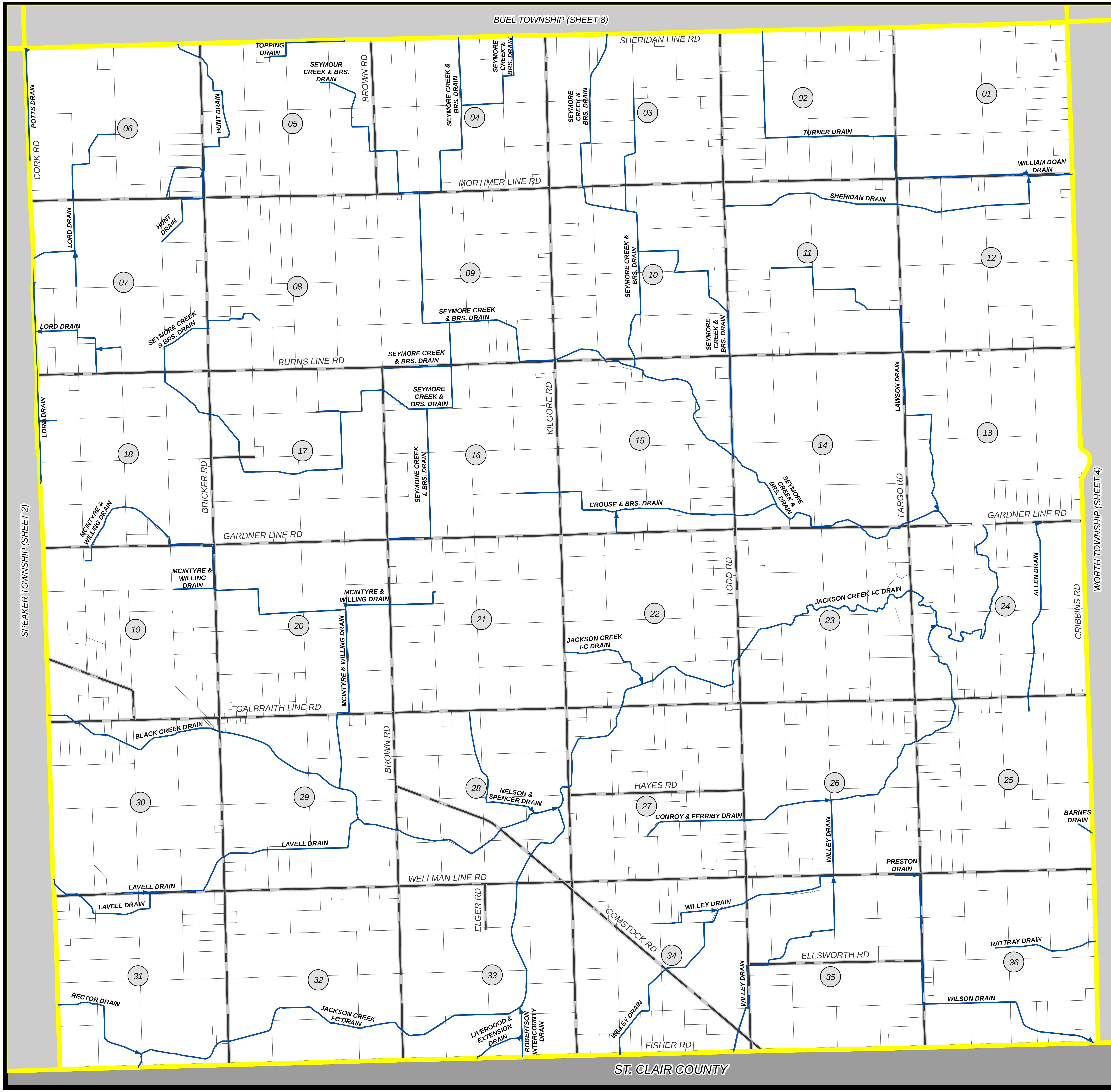
SANILAC COUNTY, MICHIGAN

COUNTY DRAIN MAP

Spicer group

SAGINAW OFFICE
230 S Washington Ave
Saginaw, MI 48607
Tel. 989-754-4747
www.SpicerGroup.com

DE. BY: LDO
DR. BY: JMY
CH. BY: LDO
APP. BY: RBH
PROJECT NO. 125938SG2018
STDS.
SHEET 2 OF 28
DATE OCTOBER 2020
SCALE AS SHOWN
FILE NO.



N

0 1,000 2,000 4,000 FEET

LEGEND

- COUNTY DRAINS
- RAILROADS
- STATE ROADS
- COUNTY ROADS
- LOCAL ROADS
- # SECTIONS
- PARCELS
- MUNICIPALITY BOUNDARY

FREMONT TOWNSHIP

T.9N.-R.15E.

SANILAC COUNTY DRAIN COMMISSIONER
DOUG SWEET

BY	MARK	REVISIONS	DATE

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SANILAC COUNTY, MICHIGAN

COUNTY DRAIN MAP

Spicer group

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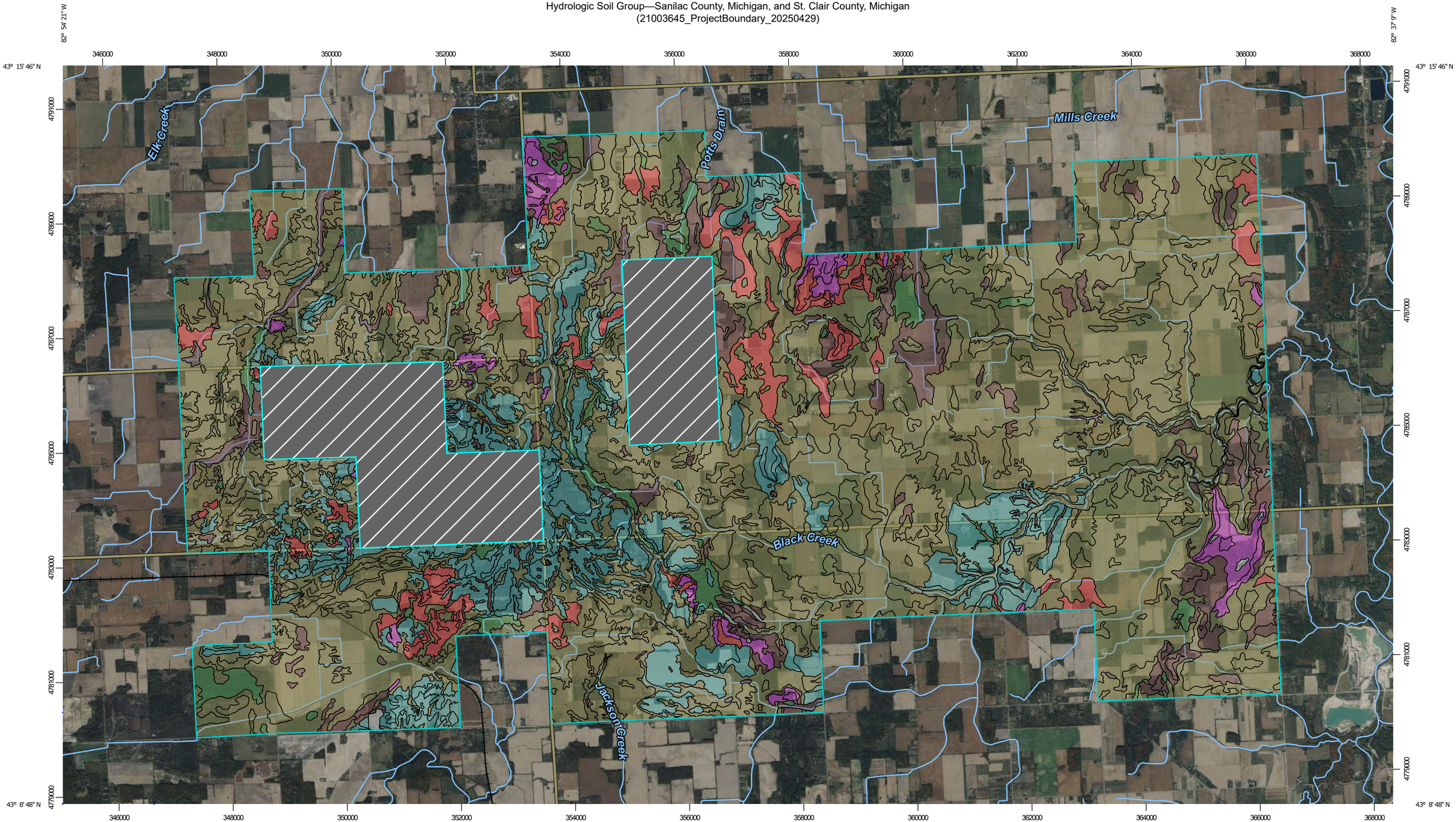
DE. BY: LDO	CH. BY: LDO	PROJECT NO. 125938SG2018	
DR. BY: JMY	APP. BY: RBH		
STDS.		SHEET 3 OF 28	
DATE OCTOBER 2020		FILE NO.	
SCALE AS SHOWN			

PATH: Q:\PROJ2018\125938SG2018 - BLACK RIVER ICD - 13\7GEODATA\SANILAC COUNTY DRAIN MAPS\SANILAC_DRAIN_MAPS_SHEET_3_LETTERSIZE.MXD, PRINTED ON: 10/23/2020, BY: LUKEO

APPENDIX A.3

HYDROLOGIC SOIL GROUP CLASSIFICATIONS



Map Scale: 1:62,700 if printed on B landscape (17" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 3000 6000 12000 18000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 17N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:20,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Sanilac County, Michigan
Survey Area Data: Version 21, Aug 28, 2024

Soil Survey Area: St. Clair County, Michigan
Survey Area Data: Version 20, Aug 28, 2024

Your area of interest (AOI) includes more than one soil survey area. These survey areas may have been mapped at different scales, with a different land use in mind, at different times, or at different levels of detail. This may result in map unit symbols, soil properties, and interpretations that do not completely agree across soil survey area boundaries.

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Oct 11, 2022—Oct 21, 2022

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
CcA0	Carlisle muck, 0 to 2 percent slopes	A/D	6.0	0.0%
CdA0	Carlisle and Linwood mucks, 0 to 2 percent slopes	A/D	64.7	0.2%
CgA1	Covert loamy sand, 0 to 2 percent slopes, slightly eroded	A	32.2	0.1%
CvrabA	Conover loam, 0 to 3 percent slopes	C/D	10,798.6	27.9%
CvracB	Conover-Williamstown loams, 0 to 6 percent slopes	C/D	357.4	0.9%
EeA0	Epoufette and Ronald sandy loams, 0 to 2 percent slopes	A/D	21.1	0.1%
GbA0	Gladwin and Palo sandy loams, 0 to 2 percent slopes	A/D	1.0	0.0%
Gc	Gravel pit		31.4	0.1%
IbA0	Iosco and Winegars sandy loams, 0 to 2 percent slopes	B/D	228.6	0.6%
IcA0	Iosco sandy loam and Covert loamy sand, 0 to 2 percent slopes	B/D	303.3	0.8%
IcB1	Iosco sandy loam and Covert loamy sand, 2 to 7 percent slopes, slightly eroded	B/D	8.1	0.0%
JaA0	Jeddo silty clay loam, 0 to 2 percent slopes	D	919.8	2.4%
Jd	Jeddo silt loam	C/D	28.8	0.1%
LdA0	Linwood muck, 0 to 2 percent slopes	A/D	306.8	0.8%
LeA0	Linwood and Timakwa mucks, 0 to 2 percent slopes	A/D	417.0	1.1%
Lm	Lamson fine sandy loam	B/D	33.6	0.1%
MaB1	McBride fine sandy loam, 2 to 6 percent slopes, slightly eroded	D	7.3	0.0%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MbA1	McBride sandy loam and Montcalm loamy sand, 0 to 3 percent slopes, slightly eroded	D	319.8	0.8%
MbB1	McBride sandy loam and Montcalm loamy sand, 3 to 8 percent slopes, slightly eroded	D	389.4	1.0%
MbB3	McBride sandy loam and Montcalm loamy sand, 3 to 8 percent slopes, severely eroded	D	22.5	0.1%
MbC1	McBride sandy loam and Montcalm loamy sand, 8 to 15 percent slopes, slightly eroded	D	107.4	0.3%
MbC2	McBride sandy loam and Montcalm loamy sand, 8 to 15 percent slopes, moderately or severely eroded	D	1.4	0.0%
MbD1	McBride sandy loam and Montcalm loamy sand, 15 to 25 percent slopes, slightly eroded	D	48.1	0.1%
MbE3	McBride sandy loam and Montcalm loamy sand, 15+ percent slopes, moderately or severely eroded	D	12.2	0.0%
MeA1	Mancelona loamy sand, 0 to 3 percent slopes, slightly eroded	A	165.2	0.4%
MeB1	Mancelona loamy sand, 3 to 8 percent slopes, slightly eroded	A	30.9	0.1%
MeB2	Mancelona loamy sand, 3 to 8 percent slopes, moderately eroded	A	15.1	0.0%
MeC1	Mancelona loamy sand, 8 to 15 percent slopes, slightly eroded	A	15.6	0.0%
MfA1	Marlette loam, 0 to 2 percent slopes, slightly eroded	C	1,651.0	4.3%
MfB1	Marlette loam, 2 to 6 percent slopes, slightly eroded	C	1,185.1	3.1%
MfB2	Marlette loam, 2 to 6 percent slopes, moderately eroded	C	29.2	0.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MfB3	Marlette loam, 2 to 6 percent slopes, severely eroded	C	25.4	0.1%
MfC1	Marlette loam, 6 to 12 percent slopes, slightly eroded	C	268.9	0.7%
MfC2	Marlette loam, 6 to 12 percent slopes, moderately eroded	C	61.7	0.2%
MfC3	Marlette loam, 6 to 12 percent slopes, severely eroded	C	10.6	0.0%
MfD1	Marlette loam, 12 to 18 percent slopes, slightly eroded	C	39.4	0.1%
MfD2	Marlette loam, 12 to 18 percent slopes, moderately eroded	C	1.1	0.0%
MfD3	Marlette loam, 12 to 18 percent slopes, severely eroded	C	6.9	0.0%
MgA1	Marlette silt loam and loam, 0 to 2 percent slopes, slightly eroded	C	1,407.0	3.6%
MgB1	Marlette silt loam and loam, 2 to 6 percent slopes, slightly eroded	C	567.8	1.5%
MgB2	Marlette silt loam and loam, 2 to 6 percent slopes, moderately eroded	C	123.5	0.3%
MgC1	Marlette silt loam and loam, 6 to 12 percent slopes, slightly eroded	C	31.3	0.1%
MgC2	Marlette silt loam and loam, 6 to 12 percent slopes, moderately eroded	C	11.4	0.0%
MhA1	Melita and Arenac loamy sands, 0 to 2 percent slopes, slightly eroded	A	61.1	0.2%
MIA	Metamora sandy loam, 0 to 2 percent slopes	C/D	7.8	0.0%
MnA1	Montcalm loamy sand, 0 to 2 percent slopes, slightly eroded	A	28.6	0.1%
MnB1	Montcalm loamy sand, 2 to 6 percent slopes, slightly eroded	A	36.6	0.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MnC1	Montcalm loamy sand, 6 to 12 percent slopes, slightly eroded	A	9.2	0.0%
MnC2	Montcalm loamy sand, 6 to 12 percent slopes, moderately eroded	A	1.0	0.0%
MnD1	Montcalm loamy sand, 12 to 18 percent slopes, slightly eroded	A	45.1	0.1%
MoB	Miami-Dighton sandy loams, 2 to 6 percent slopes	C	0.8	0.0%
NaA1	Newaygo sandy loam, 0 to 2 percent slopes, slightly eroded	C	3.5	0.0%
OaA0	Otisco loamy sand, 0 to 2 percent slopes	A/D	1.7	0.0%
PcA0	Parkhill loam, 0 to 1 percent slopes	C/D	8,435.2	21.8%
PdA0	Parkhill loam and clay loam, 0 to 2 percent slopes	C/D	6,581.1	17.0%
PeA0	Parkhill loam and mucky loam, 0 to 2 percent slopes	B/D	1,305.9	3.4%
RdA0	Roscommon mucky loamy sand, 0 to 2 percent slopes	A/D	36.4	0.1%
ReA1	Grattan sand, 0 to 2 percent slopes, slightly eroded	A	107.9	0.3%
ReB1	Grattan sand, 2 to 7 percent slopes, slightly eroded	A	133.0	0.3%
ReC1	Grattan sand, 7 to 14 percent slopes, slightly eroded	A	67.3	0.2%
ReD1	Grattan sand, 14+ percent slopes, slightly eroded	A	2.6	0.0%
SbA0	Saverine and Iosco fine sandy loams, 0 to 2 percent slopes	B/D	453.7	1.2%
SbB1	Saverine and Iosco fine sandy loams, 2 to 7 percent slopes, slightly eroded	B/D	59.3	0.2%
SbB2	Saverine and Iosco fine sandy loams, 2 to 7 percent slopes, moderately eroded	B/D	29.5	0.1%

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
SloacA	Sloan, frequently flooded, and Ceresco, occasionally flooded, soils, 0 to 3 percent slopes	C/D	418.5	1.1%
TbA0	Tappan mucky loam, 0 to 2 percent slopes	B/D	303.7	0.8%
TgA0	Tonkey and Bach fine sandy loams, 0 to 2 percent slopes	B/D	190.4	0.5%
W	Water		25.2	0.1%
WaA0	Wallkill loam, 0 to 2 percent slopes	B/D	90.2	0.2%
WcA0	Washtenaw loam and silt loam, 0 to 2 percent slopes	B/D	96.9	0.3%
WdA0	Washtenaw sandy loam and loam, 0 to 2 percent slopes	B/D	30.9	0.1%
WpB	Wasepi-Boyer complex, loamy substratum, 0 to 6 percent slopes	A/D	4.2	0.0%
Subtotals for Soil Survey Area			**38,681.1**	**100.0%**
Totals for Area of Interest			**38,682.2**	**100.0%**

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
Pc	Parkhill loam, 0 to 1 percent slopes	C/D	0.9	0.0%
Subtotals for Soil Survey Area			**0.9**	**0.0%**
Totals for Area of Interest			**38,682.2**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B.1

SCDC COORDINATION EMAIL

CONFIDENTIAL: DO NOT DISTRIBUTE

From: Michael W. Quaine <mquaine@bmjinc.com>
Sent: Monday, January 6, 2025 4:47 PM
To: Craig Kantola; Benjamin Sanford
Cc: Doug Sweet; Ross Bower
Subject: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project
Attachments: Sanilac County Drainage Rules 010624.pdf

Per our conversations. These are the only contacts I have for this project. Please forward to those requiring a copy

Regards,

Michael W. Quaine, P.E.
Senior Project Engineer
mquaine@bmjinc.com

BMJ Engineers and Surveyors, Inc.
519 Huron Avenue
Port Huron, MI 48060
Ph: (810) 984-5596
Fax: (810) 984-8760
Visit our website www.bmjinc.com

From: Angela Kramer <akramer@sanilaccounty.net>
Sent: Wednesday, December 18, 2024 9:04 AM
To: Amanda M. Pentico <apentico@bmjinc.com>
Cc: Doug Sweet <dsweet@sanilaccounty.net>; Michael W. Quaine <mquaine@bmjinc.com>; Ross Bower <rbower@fsbrlaw.com>; Craig Kantola <ckantola@atwell.com>; bsanford@atwell.com
Subject: Re: Sanilac County Drain and Stormwater Permit requirements - wind energy project

Amanda, can you send us a link and invite for the meeting via Teams or Zoom? 1/6/25 at 2 pm. Everyone on this e-mail chain should get the link and invite.

Thanks,

Angela Kramer
Deputy Drain Commissioner / Drain Assessment Clerk
810-648-4900, ext. #1

From: "Ross Bower" <rbower@fsbrlaw.com>
Sent: 12/18/24 8:53 AM
To: "akramer@sanilaccounty.net" <akramer@sanilaccounty.net>
Cc: Doug Sweet <dsweet@sanilaccounty.net>, Michael Quaine<mquaine@bmjinc.com>, "Amanda M. Pentico" <apentico@bmjinc.com>, Michael Quaine <mquaine@bmjinc.com>
Subject: Re: Sanilac County Drain and Stormwater Permit requirements - wind energy project

Yes, teams or zoom at 2pm on 1/6 will work for me - thank you!

-Ross
517.974.2390

Sent from my iPhone

> On Dec 18, 2024, at 8:45 AM, Angela Kramer <akramer@sanilaccounty.net> wrote:
>
> Ross,
> Does January 6 at 2 pm work for you to do a kick off meeting via Teams or Zoom? This is for Speaker & Fremont Twp. wind farm. If this works, I will have Amanda set up a link for the meeting.
>
> Thanks,
>
> **Angela Kramer**
> Deputy Drain Commissioner / Drain Assessment Clerk

810-648-4900, ext. #1

From: "Doug Sweet" <dsweet@sanilaccounty.net>
Sent: 12/17/24 10:51 AM
To: "Michael W. Quaine" <mquaine@bmjinc.com>, "akramer@sanilaccounty.net"<akramer@sanilaccounty.net>, Ross Bower <rbower@fsbrlaw.com>
Subject: RE: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project

All,

Lets plan on 1-6 at 2.

Doug Sweet
Sanilac County Drain Commissioner
810-648-4900, ext. 3

From: "Michael W. Quaine" <mquaine@bmjinc.com>
Sent: 12/17/24 10:39 AM
To: "akramer@sanilaccounty.net" <akramer@sanilaccounty.net>, Ross Bower<rbower@fsbrlaw.com>, Doug Sweet <dsweet@sanilaccounty.net>
Subject: RE: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project

I'll be in your office on January 6. That would be best. We could do the meeting after lunch, say 2 pm. I will not be available January 7. January 8, 9 , 10 that week would be open too. Drain school is 1/9 – 1/10?

Michael W. Quaine, P.E.

Senior Project Engineer

mquaine@bmjinc.com

BMJ Engineers and Surveyors, Inc.

519 Huron Avenue

Port Huron, MI 48060

Ph: (810) 984-5596

Fax: (810) 984-8760

Visit our website www.bmjinc.com (-> linkprotect.cudasvc.com)

From: Angela Kramer <akramer@sanilaccounty.net>
Sent: Tuesday, December 17, 2024 10:15 AM
To: Ross Bower <rbower@fsbrlaw.com>; Michael W. Quaine <mquaine@bmjinc.com>; Doug Sweet <dsweet@sanilaccounty.net>
Subject: FWD: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project

Hello,

When would you be available for a zoom or teams meeting for the wind project in Fremont and Speaker Townships? Please see e-mails below.

Angela Kramer

Deputy Drain Commissioner / Drain Assessment Clerk

810-648-4900, ext. #1

From: "Craig Kantola" <ckantola@atwell.com>
Sent: 12/17/24 9:26 AM
To: "dsweet@sanilaccounty.net" <dsweet@sanilaccounty.net>,"akramer@sanilaccounty.net" <akramer@sanilaccounty.net>
Cc: Benjamin Sanford <bsanford@atwell.com>
Subject: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project

Doug,

Thanks for the response. I'll be back on January 2 & 3 but assume that many will still be out so let's shoot for a time that works for all early the following week – here are my openings:

Monday 1/6: 10AM to 4PM

Tuesday 1/7: 8AM to 4PM

If those don't work, the rest of week is open for me also:

Wed-Thu: 8AM to 4PM

Per the MPSC application checklist, we are preparing a Stormwater Mitigation Plan that "***Describes measures to minimize, mitigate, and repair any drainage impacts***" (this plan should address guidance from consultation with the County Drain Commissioner). Ideally if there was a published document we would reference specific sections of the document and get your confirmation of their applicability to the proposed project, along with the permitting process. Without a document to reference, we'd like to understand how the County will be involved in the review and permitting process so the Mitigation Plan for MPSC will be consistent with SCDC stormwater requirements.

We appreciate your assistance and look forward to discussing with you in 2025.

Happy Holidays,

Craig Kantola, PE
Senior Project Engineer
ATWELL, LLC
734.994.4000 Office
517.672.9456 Mobile

From: Doug Sweet <dsweet@sanilaccounty.net>
Sent: Tuesday, December 17, 2024 8:38 AM
To: Craig Kantola <ckantola@atwell.com>; akramer@sanilaccounty.net
Cc: Benjamin Sanford <bsanford@atwell.com>
Subject: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project

Craig,

Good Morning, I've reached out to my Engineer and Legal team and we would like to set up a Teams meeting for after the first of the year to discuss your project. Will you provide me with a couple of dates and times that work for you.

Thanks

Doug Sweet

Sanilac County Drain Commissioner

810-648-4900, ext. 3

From: "Craig Kantola" <ckantola@atwell.com>
Sent: 12/17/24 7:01 AM
To: "dsweet@sanilaccounty.net" <dsweet@sanilaccounty.net>,"akramer@sanilaccounty.net" <akramer@sanilaccounty.net>
Cc: Benjamin Sanford <bsanford@atwell.com>
Subject: RE: Sanilac County Drain and Stormwater Permit requirements - wind energy project

Good morning,

I will be taking time off for the holidays starting tomorrow and wanted to check back in to see if there are any questions or comments related to the request below. We are hoping to have SCDC feedback and guidance for use in preparing a summary in early January so any information you can provide prior to the holidays would be very helpful and greatly appreciated.

Copied to this email is Ben Sanford who is also working on this project, for coordination while I'm out of office.

Thanks again for your assistance and enjoy the holidays,

Craig Kantola, PE
Senior Project Engineer
ATWELL, LLC
734.994.4000 Office
517.672.9456 Mobile

From: Craig Kantola
Sent: Thursday, December 12, 2024 10:19 AM
To: 'dsweet@sanilaccounty.net' <dsweet@sanilaccounty.net>; 'akramer@sanilaccounty.net' <akramer@sanilaccounty.net>
Subject: Sanilac County Drain and Stormwater Permit requirements - wind energy project

SCDC,

Good morning, this is a general request for information regarding stormwater requirements for a proposed wind energy project in Sanilac County. As part of the newly adopted State of Michigan MPSC PA233 State Siting application package (Checklist Exhibit A-6.4 - attached), consultation with the County Drain office is required to document the stormwater design and permitting requirements. The project could consist of approximately 50 wind turbines in Fremont and Speaker Townships. Similar to other wind energy facilities in the area, each turbine would typically be located on land currently farmed for crop production and would be accessed by a gravel driveway. The second attachment shows an existing typical turbine site in the area for reference.

Our experience on these types of projects has been that the County Drain Commissioners have jurisdiction and require permits for the following activities:

- Crossing County Drain with an access driveway
  - **Drain Crossing Permit** - Culvert sizing to comply with County Drain authority requirements – See Note 1 below
  - EGLE Part 31 where tributary area exceeds 2 square miles
- Crossing County Drain with electrical lines
  - **Drain Crossing Permit** - Depth and length of burial is subject to County drain authority - See Note 2 below
- General overall turbine site & driveway
  - **Soil erosion control permit** for excavation, foundation construction, temporary construction disturbance and restoration - See Note 3 below
  - Stormwater detention has not been required due to the small footprint and distributed placement of the wind turbines with minimal gravel / impervious area - See Note 4 below

We would like to request your confirmation and input for our understanding of the County Drain stormwater review and permit process regarding the questions listed below:

1. Is the attached Drain Crossing permit application applicable to culvert installation or just utilities? Is there a document that provides guidance for County Drain crossing culvert sizing (i.e. 10-year, 25-year, methodology, etc.)? At this time we're not sure if any will be necessary as the site design typically seeks to avoid larger drain crossings, but having the proper requirements would be necessary if required for the Project.
2. Depth of burial is provided on the permit application – is that depth required for the bottom bank width, top bank width or entire easement? (This isn't really a stormwater-specific issue but will be helpful for the overall design and permitting understanding)
3. Confirmation that SCDC is not the permitting authority (looks like there's a separate Sanilac County Dept of Construction SESC Agency), and wouldn't be part of the formal SESC review.
4. Permanent stormwater management (i.e. detention or retention basins) wouldn't be necessary for the turbine sites. This is based on a review of existing sites and our experience on other projects in the area. For larger areas of permanent disturbance with impervious surfacing (i.e. maintenance facility with parking lot), additional stormwater runoff mitigation design could be required. At this time it's not determined but would like to understand what requirements may apply if a maintenance building or similar facility is proposed.

Your assistance and guidance regarding the SCDC stormwater design and permitting procedures is greatly appreciated, and if it would be beneficial to set up a call or meeting to discuss in more detail please let me know your availability and we can arrange that.

Thanks in advance for your time!

Craig Kantola, PE
Senior Project Engineer
ATWELL, LLC
734.994.4000 Office
517.672.9456 Mobile
311 N. Main Street | Ann Arbor, MI 48104
www.atwell.com (-> linkprotect.cudasvc.com) (-> linkprotect.cudasvc.com)
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APPENDIX B.2

MEETING NOTES – JANUARY 6, 2025

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MEETING NOTES:

PROJECT NAME:	Riverbend Wind	**NOTES BY:**	Ben Sanford
PROJECT #:	24006759	**LOCATION:**	TEAMS (Virtual)
SUBJECT:	County Stormwater Requirements	**DATE/TIME:**	January 6, 2025, 2:00PM ET

☒ Meeting ☐ Phone Conversation ☐ Incoming Call ☐ Outgoing Call

ATTENDEE | PHONE | EMAIL:

Copies to attendees (check all that apply)

☒	Ben Sanford (Atwell)	☒	Doug Sweet (Sanilac County)
☒	Craig Kantola (Atwell)	☒	Angela Kramer (Sanilac County)
☒	Gabriella Kovacs (Liberty)	☐	Amanda Pentico (BMJ Inc.)
☐	Nelson Moleiro (Liberty)	☒	Michael Quaine (BMJ Inc.)
☒	Rob Nadolny (Liberty)	☒	Ross Bower (FSBR Law)
☒	Irene Bezuidenhout (Liberty)		

TOPICS DISCUSSED:

- Wind turbines and access roads, County may consider on a case-by-case basis allowing access roads within the drain right of way. May require additional matching easement from property owner for width of road – determined also case-by-case.
- Instead of individual permits, one agreement per drainage district for large projects with multiple of crossings. Blanket agreement for all crossings of a particular drain.Temporary and permanent crossings could be included on the same agreement.
  - Includes: Permanent (road crossings, culverts, utilities) and Temporary (crane walk and delivery turning radii roads & culverts that will be removed).
- Will have to plan for the possibility of landowners wanting access roads/improvements that were initially intended to be temporary become permanent (i.e. crane walk culverts)
  - Permanent structures will have a maintenance fee – amount TBD; temporary would not

- Intercounty drains would be subject to review/approval by intercounty drain board.
  - 2 Intercounty drains in area include Jackson Creek and Willey Drain
- Could potentially assume a standard setback distance for placement of infrastructure.
- Sanilac County will share stormwater development rules via email. Use as guidance for stormwater design, however due to limited impact of wind turbine gravel roads there should be no onerous stormwater management required. Mainly will need to comply with NPDES / construction SESC requirements. In cases where drain tile is impacted by the project (moving, etc), would need to comply with SCDC regulations.
- 10 feet below designed bottom of drain for underground collection crossings. Depth should be maintained for the width of the right of way. SCDC has a detail for this condition.
- SCDC requested a schematic map of the project area / turbine locations. Liberty OK'd to provide noting that they are still preliminary at this stage and subject to change.
- Two types of agreements are anticipated:
  - Cooperation Agreement
  - Drain Crossing / Impact Agreement – Liberty requested a template and SCDC can provide

APPENDIX B.3

SCDC DEVELOPMENT DRAINAGE RULES

CONFIDENTIAL: DO NOT DISTRIBUTE

Appendix B.3

DEVELOPMENT DRAINAGE RULES

DOUG SWEET

SANILAC COUNTY DRAIN COMMISSIONER
60 WEST SANILAC, ROOM 201
SANDUSKY, MICHIGAN 48471
PHONE: (810) 648-4900

JANUARY, 2024

Deputy Drain Commissioner
Angela Kramer

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DEVELOPMENT DRAINAGE RULES

SANILAC COUNTY DRAIN COMMISSIONER

Michigan Law, including but not limited to, the Subdivision Control Act, the Michigan Constitution, the Michigan Environmental Protection Act, and the Michigan Drain Code, requires or permits the County Drain Commissioner to publish rules governing the storm water drainage of proposed Platted subdivisions. The rules are intended to assist land developers by providing uniform procedures to be followed in the processing of preliminary and final Plats and construction plans.

While the Drain Commissioner is not directly responsible for developments other than Plats, these rules are also applicable for site condominiums, mobile home parks, commercial, industrial and residential parcels and all other types of real estate development.

IT IS HEREBY ORDERED that the "Development Drainage Rules" promulgated pursuant to Section 105 of Act 288 of the Public Acts of Michigan of 1967, the Michigan Environmental Protection Act, M.C.L.A. 324.101 et seq., the Michigan Constitution, and the Michigan Drain Code, MC.G.A. 280.1 et seq., are hereby adopted and shall be followed in the processing of all Platted development.

IN ADDITION, all non-Platted developments (including but not limited to, mobile home parks, site condominiums, commercial, industrial, and residential parcels, and all other types of real estate development, for the improvement(s) of all storm water drainage) to be reviewed and approved by the Drain Commission will adhere to the "Development Drainage Rules".

IT IS HEREBY FURTHER ORDERED that the effective dates of the following rules shall be the 1st day of March, 2007.

James Bowerman County Drain Commissioner

DEVELOPMENT DRAINAGE RULES

I. PURPOSE

A. Act 288 of the Public Acts of 1967 (Section 560) is known as the Subdivision Control Act of 1967. All plats to be recorded with the Register of Deeds shall be in conformity with this act. The following rules are issued to guide land developers interested in subdividing land and to provide for a uniform method of preparing plats submitted to the Office of the Drain Commissioner for processing in accordance with said act.

B. The Drain Commissioner, through legislative enactment, has jurisdiction over established county drains, and may, under the terms of this act, acquire jurisdiction of drainage systems within subdivided lands and drains external to the proposed subdivision. In accordance with the provisions of the Subdivision Control Act, the Michigan Constitution, the Michigan Environmental Protection Act and the Michigan Drain Code, the Drain Commissioner has the right to require that county drains and natural watercourses, both within and without the plat, be improved to the standards established by the Drain Commissioner.

C. Whereas the conservation and development of the natural resources of the County are of paramount and public concern in the interest of health, safety and general welfare of the people, the Drain Commissioner shall provide for the protection of the natural resources from pollution, impairment and destruction resulting from storm water.

D. The Drain Commissioner will, at the request of County Board of Commissioners, review the following developments and make recommendations concerning storm water drainage. Site Condominiums, Commercial Sites, Industrial Sites, Mobile Home Parks, Residential Sites, and all other real estate developments. The Drain Commissioner will review these developments; however, the ultimate approval on all developments, with the exception of platted developments, remains with the referring agency.

II. APPLICABILITY TO ALL REAL ESTATE DEVELOPMENT

The DEVELOPMENT DRAINAGE RULES are applicable to the processing of subdivision plats and to all other types of real estate development, including but not limited to, mobile home parks, site condominiums, commercial, industrial and residential development, and all other types of real estate development.

III. DEFINITIONS

A. Commissioner: The Drain Commissioner of the County of Sanilac, State of Michigan.

B. Proprietor: Any person, entity, firm, association, partnership, corporation, or combination of any of them, who submits a plat for processing under the Subdivision Control Act or plans and drawings otherwise subject to these Rules for processing by the Drain Commissioner.

C. Plat: Where the term "plat" is used in the following Rules, it shall be deemed to mean the corresponding map, plan, or drawing applicable to the project development, be it a subdivision plat or document related to other types of real estate development.

IV. PRELIMINARY PLAT REQUIREMENTS

A. Submission of Preliminary Plat Layout

1. **General Information:** In order that subdivision plats may be prepared in conformity with the Subdivision Control Act of 1967 and all projects are in conformity with these rules; the Proprietor shall have prepared a preliminary plat showing the layout of the area intended to be developed. This plat shall be prepared under the direction of a registered engineer or registered land surveyor, and shall be drawn to a scale not smaller than 1 inch to 200 feet.

2. **Plat Location:** The preliminary plat shall give the location of the proposed subdivision with reference to the section and part of the section in which the parcel is situated and the name of the township, city, or village. The plat shall show the proposed street and alley layouts, lot and plat dimensions, and all pertinent factors such as adjoining roads and subdivisions, rivers, railroads, high tension power lines, or underground transmission lines, cemeteries, parks, natural watercourses, county drains, sewers, easements, wetlands, or any other feature, the existence, location or description of which might be of value in determining the overall requirements for the subdivision or project.

3. **Contour Requirements for Existing Facilities:** With the preliminary plat a topographical map must be submitted showing contours no greater than two (2) foot intervals for land area inside the plat, and at no greater than five (5) foot intervals for the entire drainage area affecting the subdivision or project. The map will show the delineation of the drainage boundary and the acres inside the boundary. The map shall be legibly drawn to datum determined by USGS and shall show the north arrow and scale.

4. **Drainage Requirements for Proposed Facilities**

   a) The preliminary plat must include the general drainage scheme proposed for the subdivision or project. The general drainage scheme shall indicate how storm drainage will be provided including the description

and location of the outlet. The route to the outlet shall be mapped. The effect of proposed additional flow should be calculated and mitigating measures provided.

b) Drainage proposed for a subdivision or a project shall conform to established county drainage districts, or if there are not established drainage districts, then the proposed drainage system shall conform to the natural drainage basin.

c) The preliminary plat shall indicate, in general, any proposed on-site and/or offsite facilities required to convey the drainage to an adequate outlet.

d) The preliminary plat shall indicate any drainage originating outside of the subdivision or project limits which has previously flowed onto or across the subdivision or project, as well as any natural water courses and/or county drains that traverse or abut the subdivision or project.

e) The proposed drainage facilities shall conform to community stormwater master plan, if available. If none is available, the design shall meet the requirements specified herein.

f) In addition to other such requirements, the Drain Commissioner may require additional necessary and beneficial requirements to address unique and specialized circumstances found to affect a drainage district.

5. **Public Utility Easements:** Easements for public utilities shall be shown on the preliminary plat. The Proprietor should consult with the respective utility companies before presenting the preliminary plat for approval.

6. **Staged Development:** In the case where the Proprietor wishes to begin with only a portion of the total area, the original plat shall include the proposed general layout for the entire area. The part, which is to be developed first, shall be superimposed clearly upon the overall plan to show the sequence of development, which the proprietor intends to follow. Each subsequent part of the development shall follow the same procedure until the entire area controlled by the Proprietor is developed. The final acceptance of a subdivision or project, which is a partial development of a larger general layout, does not automatically insure the final acceptance of the overall layout. The intent is to permit some flexibility in the overall layout if future conditions make it desirable or necessary to make any changes.

7. **Information Required on Preliminary Plat:** Two prints of the preliminary plat layout prepared in accordance with the above requirements shall be

submitted together with a letter of transmittal requesting that the preliminary plat be reviewed and, if found satisfactory, approved. The names of the Proprietor and engineering or surveying firm, with mailing addresses and telephone numbers for each, shall be included with the transmittal. See "Appendix A" for the checklist of information, which shall be included on all preliminary plats, submitted for approval by the Drain Commissioner.

8. **Approval of Preliminary Plats:** If the proposed plat, as submitted, meets all the requirements, one approved copy of the preliminary plat will be returned. Approval of the preliminary plat is required before proceeding with the preparation of construction plans. If the preliminary plat is not approved as originally submitted, the Commissioner will notify the Proprietor or the Proprietor's Engineer/Surveyor in writing, setting forth the reasons for withholding approval and requesting that the necessary changes be made and a revised preliminary plat be submitted.

9. **Changes to Approved Preliminary Plats:** Approval of the preliminary plat is not intended to be final approval. If the Proprietor and/or the Drain Commissioner find it advantageous to make changes before the final plat is presented to the Drain Commissioner for signature, such changes can be made, provided that the same procedures outlined above are repeated with each change in the layout.

10. **Approval of Other Governing Bodies:** Approval of the proposed subdivision or project by the local governing body is also required under the Subdivision Control Act. Further, the approval of federal agencies, state agencies and/or the local unit government may also be required. Should the approval of a federal agency, state agency or local unit of government require changes to the proposed plat layout or the proposed drainage facilities, such changes shall be incorporated into a new preliminary plat and shall be resubmitted for review by the Drain Commissioner. The resubmission is required even though the Drain Commissioner may have already approved the original preliminary plat.

11. **Expiration Date of Preliminary Approvals:** If the Proprietor does not present his final plat to the Drain Commissioner for approval within a period of two (2) years after receiving approval of the preliminary plat, the approval will have expired. The preliminary plat is no longer valid and a new submittal is required.

B. Right-of-Way Requirements (R.O.W.)

1. The following minimum rights-of-ways are required for established county drains and natural watercourses that will be utilized and lie within the confines of the proposed subdivision or project.

a) **R.O.W. for Open Drains:** Open drains and watercourses shall have a minimum right-of-way equal to the extreme top width of channel, plus maintenance path(s). The maintenance path shall be 30 feet wide and continuous across the property from one roadway to another. If the property lines are not contiguous with road right-of-ways then a maintenance path shall be provided on both sides of the drain. A permanent crossing of the drain may be used in lieu of a second maintenance path.

b) **R.O.W. for Enclosed Drains:** Enclosed drains shall have a minimum right-of-way of 30 feet centered on the centerline of the enclosure, without exception. No structures shall be constructed or placed over enclosed drains. This includes swimming pools, sheds, garages, patios, decks, shrubs, or any other permanent structure or landscaping feature that may interfere with the structural integrity of the enclosed drain.

c) **Private Easement for Surface Drainage:** Private easements for drainage are for the benefit of upland lots within the subdivision or project. A minimum easement width of 20 feet shall be provided centered on the center of the swale. Any improper construction, development, or grading that occurs within these easements will interfere with the drainage rights of those upland lots. Private easements for drainage are for the continuous passage of surface drainage and each lot owner will be responsible for maintaining the surface drainage system across his property. No construction is permitted within a Private Easement for Drainage. This includes swimming pools, sheds, garages, patios, decks, shrubs, or any other permanent structure or landscaping feature that may interfere with surface drainage.

d) **R.O.W. for Floodways:** Floodway easements for surface drainage are for the benefit of upland lots within the subdivision. A minimum easement width of 20 feet is required. The floodway elevations shall be shown on construction plans and must be maintained during construction of the plat. No construction is permitted within a Floodway Easement for surface drainage. This includes swimming pools, sheds, garages, patios, decks, shrubs, or any other permanent structure or landscaping feature that may interfere with surface drainage.

e) **Other facilities** (e.g. detention basins) shall have sufficient easements for the access and maintenance of the facility.

f) **Easement Forms:** Easements for enclosed drains and overland floodways shall be granted to a Drainage District. A sample Drainage Easement is provided in Appendix D. If the easements are to be recorded

before the final plat, the instrument number of the recorded easement shall be shown on the final plat.

2. **Additional R.O.W. Required:** The above widths generally govern, however, if the Drain Commissioner determines that additional right-of-way is required for proper construction, or because of special circumstances, such facts shall be made known to the Proprietor after a review of the preliminary layout by the Drain Commissioner. Reductions of the above right-of-way requirements may be made only at the discretion of the Drain Commissioner

3. **Work within Drainage R.O.W.:** All work performed in the rights-of-ways of county drains shall be in accordance with the Drain Commissioner's approval and/or direction.

   a) All trees, stumps, and brush shall be removed from the proposed rights-of-way of the drains within the limits of the subdivisions, unless otherwise permitted by the Commissioner.

   b) If any utilities are to be located within the drainage rights-of-way of the proposed subdivision or project, the Proprietor and his/her engineer shall present plans of such utilities to the Commissioner for his approval as to the location. Such plans shall be presented at the same time as drainage plans so that all details of construction and location may be checked and properly oriented with each other. In order to avoid conflict, it is important that a careful investigation be made where underground utilities are in close proximity to proposed storm sewers, or where they cross each other.

C. Storm Water Detention Basins

1. **General Requirements:** All new land developments within Sanilac County are required to be equipped with detention facilities for stormwater. This requirement may be waived if it can be demonstrated to the Drain Commissioner's satisfaction that it is in the interest of the county not to provide them or that the off-site drainage facilities exist and area adequate. This is provided that easements and water quality issues have been addressed.

2. **Acceptance By Drain Commissioner:** The Sanilac County Drain Commissioner will consider, for acceptance only, those detention basins, which serve a minimum drainage area of five (5) acres. Effort should be made to limit the number of detention basins within a development. A large number of small detention basins serving a development may be cause for the Commissioner's refusal to accept the drainage system for operation and maintenance.

3. **Design Criteria:** The stormwater detention facility shall be designed in accordance with criteria established by the County Drain Commissioner and set forth in "Appendix B". The Commissioner may determine the need to incorporate more stringent design requirements into the stormwater drainage system for either water quantity control or water quality control in response to local need.

4. **Culverts:** Culverts are to be designed for a minimum 10-year storm in the developed watershed. Inlet submergence head may be permitted if this does not back water out of the easement. The effect of 100-year storm will be reviewed for acceptable flooding. For a replacement culvert, there shall be no increase in headwater condition.

V. DRAINAGE DISTRICTS

A. Establishment of Drainage Districts: If deemed necessary to insure adequate maintenance of the proposed stormwater facilities, the Commissioner may require the Proprietor to establish, in whole or in part, the proposed storm water facilities as a county drain upon their completion. Under Section 280.433 of the Michigan Drain Code (Act 40 of the Public Acts 1956, as amended) a private drain may be established as a county drain by agreement between the Landowner and the Commissioner. A sample agreement is provided in Appendix C.

B. Maintenance Fee: With the establishment of a county drain the Proprietor shall deposit with the Drain Commissioner 5% of the cost of the drain but not more than $2,500.00 which shall be used for future maintenance of the drain. An itemized cost estimation shall be submitted for approval. The cost estimation shall include grading, stabilization, storm sewer, and installation.

C. Digital Copies: Provide digital copies of the description of the route and course and of the drainage district.

D. Drain Commissioner shall defer the signing of said plat until all provisions of Section 280.433 of the Michigan Drain Code have been met.

VI. CONSTRUCTION PLANS

A. Criteria: The plans which are presented by the Proprietor's engineer shall clearly show how the surface drainage will be collected and conveyed to an adequate outlet. The plans shall be supplemented with hydraulic and hydrologic calculations for each inlet, the cumulative flow calculations for the system and design data for structures and basins, as described in Appendix B.

B. Partial Development: In the event the proposed subdivision is a partial development of a larger area, it will be necessary for each subdivision to be self-sufficient from the standpoint of surface drainage and not be dependent upon work planned to be performed in the next subdivision.

C. Minimum Opening Elevations: Minimum building opening elevations shall be established for all lots to eliminate the potential of structural damage due to flooding and backyard surface drainage. Minimum building opening elevations shall be incorporated as a part of the restrictive covenants for the plat, including bench mark references.

D. Culverts: Culverts shall be designed in accordance with FHWA, HDS No. 5.

VII. REQUIREMENTS FOR FINAL PLAT APPROVAL (see Appendix A for final plat checklist)

A. Prior to signing of the Final Mylar, the Commissioner shall require that one of the following provisions is met:

1. **Record Drawings:** The county drains, stormwater detention, and watercourses shown on the plat have been improved in accordance with the approved construction plans and is certified with Record Drawings with an engineer's certification of the "as-built" condition (See Record Drawing Requirements below); or

2. **Performance Bond/Letter of Credit:** The Proprietor has entered into an agreement with the Commissioner and/or governing body and has posted surety for faithful performance of the agreement.

    a) The surety shall consist of a cash deposit, certified check, performance bond or an irrevocable letter of credit in the amount of 115% of the uncompleted portion of the project. Estimates of costs of the uncompleted portion of the project shall be submitted with this surety.

    b) Valid existing contracts for the construction of drains, watercourses and detention/ retention basins executed between the Proprietor and his contractor shall be the basis for establishing the portion of the contract to be covered by surety.

    c) In the event the owner has not contracted for the construction of the drains, watercourses, and detention/retention basins (e.g. contractor is the owner) then the Proprietor's engineer shall estimate the cost of said construction. The estimate of cost as approved by the Commissioner shall be basis for the amount of surety.

d) A rebate shall be made to the Proprietor, as the work progresses, of the amounts of any cash deposits equal to the ratio of the work completed to the entire project.

B. 433-Agreement and Drainage Easements: If and when a drainage district is deemed necessary, present all original documents to be recorded prior to final plat approval. See Section V for Drainage District requirements.

C. Offsite Drainage Easements: If drainage improvements are required beyond the limits of the subdivision, easements shall be acquired by the Proprietor, in the name of the drainage district, for the construction and maintenance of said improvements. Should this requirement prove to be an unreasonable hardship to the developer, he may make an appeal to the Drain Commissioner to waive this requirement.

D. Inspection by Drain Office: An inspection of the storm sewer system of the proposed plat will be completed by the Drain Commissioner's Office prior to final plat approval or release of the surety bond. Inspections by the Drain Office shall not relieve the Proprietor's engineer to whom will be certifying the project "As-Built" of his obligation. Spot inspections by the Commissioner's inspector are to verify the proper construction of the drain in their various stages of completion.

E. Proprietor Responsibility for Improvement: The Proprietor should take whatever precautions he deems necessary in direct relation with his contractor in order to assure the work performed by the contractor meets the approval of the Commissioner. The Proprietor shall be held totally responsible for the fulfillment of his obligations to the Commissioner.

1. **Cleaning:** The Proprietor shall be responsible for cleaning and removing sediment form all sewers, manholes, catch basins, or other structures affected by the development both on-site and off-site before final release.

2. **Stabilization of Site**: All unpaved areas shall have an established ground cover before final release. Sodding or seeding and mulch shall be done in accordance with current MDOT standard construction specifications.

F. Floodway Certification: Prior to final plat approval, all floodways shall be established and certified by a registered engineer.

G. Temporary Staking of Easement: After final grading is completed, place temporary stakes along the length on both sides of all dedicated drainage and floodway easements to identify and protect their location (Label stakes as drainage and/or floodway easements). The stakes must be placed on the easement lines and spaced not more than 25 feet apart. The stakes can be removed after the house is constructed and landscaping is in.

H. Repair Bond and/or Maintenance Agreement: Upon completion of the project, the Drain Commissioner may request the Proprietor to coming into a maintenance agreement and/or post a nominal bond with the Commissioner to guarantee repairs of any defects that may show as a result of poor workmanship or defective materials within one to five years after completion and approval of the improvements. Should no defects occur within this period of one year and should no adjustments be required, this bond will be returned to the Proprietor in its entirety.

I. Record Drawings: Upon project completion, but pior to the final release of surety money, the Proprietor's engineer shall submit a complete set of "record drawings" certified by a registered engineer. The following shall be recorded as built.

1. All storm sewer top and invert elevations, length, and slope.
2. Pond, detention outlet top and invert grades shall be recorded as built.
3. All floodway critical elevations.

The record drawings will be kept on file with the Drain Commissioner for permanent public record. If work has been done on a county drain or a county drain is established with the construction a Mylar copy of the as built drawings are required.

J. Engineer's Certification: At the time the final plat is submitted to the Commissioner for approval, the Proprietor's engineer shall furnish a certificate bearing a clear statement that all the drainage facilities within subject plat have been constructed in accordance with the approved plans and specifications.

K. 24"x36" Drain District Map: Plats submitted that are to become a County Drain under Section 280.433 of the Michigan Drain Code (Act 40 of the Public Acts 1956, as amended) shall be accompanied by a 24" X 36" Drain District map showing the route and course of the drain as well as the legal description of the route and course.

L. Restrictive Covenants, Block Grading and Grading Plan: Place within the plat's restrictive covenants, the Drain Commissioner's restrictions on private drainage easements recorded with the plat. A copy of the approved grading plan and a block grading plan shall be incorporated as a part of the restrictive covenants of the plat to ensure that the designed grading will not be altered. The block grading plan must show the direction of flow of the surface drainage for all lots. A copy of both the approved grading plan and the block grading plan shall be provided to the city/township building inspector.

It is the property owner's responsibility to ensure that the final grading of the property is in conformance with the approved grading and block grading plan. During the final grading and landscaping, the owner shall ensure that the installation of fences, plantings, trees, and shrubs and any placement of fill do not violate the easement requirements.

VIII. SEVERABILITY CLAUSE

If any part of these regulations is found to be invalid, such invalidity shall not affect the remaining portions of the regulations, which can be given effect without the invalid portion, and to this end the regulations are declared to be severable.

IX. CONFLICT WITH LOCAL STORMWATER OR STORMWATER MANAGEMENT ORDINANCES

If any part of these regulations is found to contradict requirements set forth in local ordinances, than the most stringent requirements shall govern.

Appendix A: Submittal Checklists

A.1 Preliminary Plat Checklist

A.2 Final Plat Checklist

Appendix A.1

DESIGN CHECKLIST FOR PRELIMINARY PLATS AND DEVELOPMENTS

Development Name:_____ Date:_____

Location:_____ Reviewed by:_____

Developer/Owner:_____

Address:_____

City:_____State:_____Zip:_____Telephone:_____

Design Engineer:_____

Address:_____

City:_____State:_____Zip:_____Telephone:_____

	Provided/ Satisfactory	Comments
General		
1. Development name	_____	_____
2. Description of location (including section and fractional portion thereof, Town/City, Range and County, Michigan)	_____	_____
3. Location Map	_____	_____
4. Name, address, and telephone number of proprietor	_____	_____
5. Name, address, and telephone number of engineer or surveyor	_____	_____
6. North arrow and scale	_____	_____
7. Legend	_____	_____
8. Development boundary	_____	_____
9. Identification of all adjoining parcels (for subdivision show lot number, subdivision name, liber and page numbers. For meets and bounds parcels show permanent parcel number.)	_____	_____
12.Overall property description metes and		

bounds _____ _____
13.Lot dimensions _____ _____
14.Lot numbers _____ _____
15.Building setbacks _____ _____

Topographical

16.Existing roads (with name, r/w width and type of surface) _____ _____
17.Proposed roads (with name, r/w widths) _____ _____
18.Existing contours (no greater than a 2' interval) _____ _____
19.Proposed contours _____ _____
20.Typical lot or block grading plan _____ _____
21.Available soils data, soil boring logs, and locations (include ground elevation and water table information) _____ _____

Drainage

22.Offsite watershed area (map with boundaries and acreage) _____ _____
23.All existing drainage courses and structures (with proper labeling as to type, size, and invert elevations) _____ _____
24.County Drains (Permit required to connect) _____ _____
25.Proposed drainage systems (clearly identify all open and enclosed portions) _____ _____
26.Floodplain contour (existing and proposed) _____ _____
27.Wetlands (existing and proposed) _____ _____
28.Proposed location and outlet of storm water detention facilities (one detention allowed per development) _____ _____

Storm Water Management System Design

28.Grading Plan (2-sets) _____ _____
29.Improvement Plans (profile of storm 2-sets) _____ _____
30.Drainage Study Map (showing contributing areas to each component in the storm sewer network) _____ _____
31.Pipe sizing calculations
   a) Pipes shall be sized for 10-year event in roads; for backyard 10-year with floodway, 100-year if no floodway _____ _____
   *check that no surcharging occurs outside top of manhole structure for 10-year storm
32.Detention basin calculations
   a) Storage for at least 25-yr event (provide elevation vs storage table) _____ _____
   b) Restrict outlet for 0.13cfs/ac _____ _____
   c) Emergency spillway sized for 10-yr event _____ _____

35. Required slopes for detention and swales _____ _____
36. Soil Erosion Controls _____ _____

Easements

37. Existing and proposed easements (with dimensions, utility and drain easements) _____ _____
38. Offsite drain easements or rights-of-way _____ _____

Maintenance

39. Identification of agency proposed to assume ownership of the storm water management system _____ _____

Fee

40. Development fee _____ _____

COMMENTS: _____

_____

_____

_____

41. If Wastewater treatment within the plat is on-site, submit a copy of the site report furnished to the Sanilac County Health Department

Appendix A.2

CHECKLIST FOR FINAL PLATS SUBMITTAL

Name of Development
Sanilac County Drain Commissioner File No. _____

Items required for final approval:

Submitted	Accepted	
☐	☐	All items specified in the preliminary approval letter
☐	☐	Revised construction and grading plans if a final acceptance has not yet been granted on previously submitted plans
☐	☐	$200 final inspection fee
☐	☐	Block grading plan (Gets recorded to restrictive covenants)
☐	☐	Copy of the restrictive covenants *See appendix F
☐	☐	Final Plat (Mylar Copy)
☐	☐	Letter of Credit or Engineer's Certification of Completion with As-built plans

If a county drain is being established…

☐	☐	⇓.433 agreement with Engineer's Certification of adequate outlet *See appendix C
☐	☐	Detention basin easements/piping/floodway easements *See appendix D&E
☐	☐	$2,500 Deposit for the future maintenance of the established county drain
☐	☐	24" x 36" Drain District Map
☐	☐	All fees required for recording by the Register of Deeds
☐	☐	Email route&course and Description of Drain District in word format (angie.latvaitis@kentcounty.org)
☐	☐	Floodway Certification

STANDARD DESIGN CRITERIA

1 GENERAL

These technical specifications address the design criteria necessary for stormwater management. The purpose of stormwater management is to prevent flooding, minimize property damage, prevent erosion, eliminate nuisance conditions, lower overall costs, and improve overall water quality. Stormwater management is required to provide protection from flooding by limiting the post-developed peak rate of discharge (volume, velocity, & concentration shall also be considered); recharge where possible by allowing for retention of runoff where soils are compatible; and pollution abatement by retention with percolation or detention without infiltration (wet detention).

2 DEVELOPMENT WITHIN AREAS OF THE 100-YEAR FLOODPLAIN

2.1 NATIONAL FLOOD INSURANCE PROGRAM

Projects located within the 100-year floodplain of a river or stream come under the jurisdiction of the Flood Hazard Regulatory Authority as found in Part 31, Water Resources Protection of the Natural Resource and Environmental Protection Act, Act 451 of the Public Acts of 1994. A permit needs to be filed with the Department of Environmental Quality (DEQ) for projects that involve construction, filling, and grading within a floodplain area.

The objectives of Part 31 are:

a. to ensure that the flood carrying capabilities of the rivers and streams is maintained such that the floodways are not obstructed and that flood elevations are not increased or flow diverted, and

b. to ensure that the floodway portion of floodplains are not inhabited.

Only one community in Sanilac County participates in the National Flood Insurance Program (NFIP). The program makes flood insurance available in those communities agreeing to regulate future floodplain construction. Associated with the program are community floodplain mapping, building standards, federal lending restriction, and flood insurance rates supportive of local floodplain regulation. In order for a community to participate in the NFIP local regulations must be in force to:

1. Require that new construction and substantial improvements in flood prone areas be designed and anchored to prevent flotation, collapse, or lateral movement, be constructed with materials and utility equipment resistant to flood damage, and be constructed by methods and practices to minimize flood damages.

2. Require, where flood elevation data are available, that
   a. All new construction and substantial improvements of residential

structures located in flood hazard areas have the lowest floor (including basement) elevated to or above the 100-year flood level.

b. All new construction and substantial improvements of nonresidential structures in flood hazard areas have the lowest floor (including basement) elevated or dry floodproofed to or above the 100-year flood level. A registered professional engineer or architect must certify Floodproofing.

3. Require anchoring of mobile homes in flood prone areas.

4. Maintain a record of all lowest floor elevations to which new buildings have been constructed or existing buildings have been floodproofed when the structures are located in a flood hazard area.

Floodplains are mapped for most communities that participate in the FIPF. Floodplain maps are available for inspection in city, village, and township offices, or may be obtained from the Department of Environmental Quality (DEQ). The DEQ may also be able to provide estimates of flood elevations in many streams, and in communities where maps do not exist.

In Sanilac County, the following communities participate in the NFIP and may have a floodplain map:
Cities of: Croswell
Townships of: None

2.2 FLOODPLAIN MITIGATION

Natural floodway filling or alteration shall not be allowed without review and approval by the Sanilac County Drain Commission and compliance with the Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA) on watercourses with contributing drainage area of 2 square miles or greater. If a floodway has not been mapped, the applicant's consultant shall provide the floodway delineation to the Sanilac County Drain Commission for approval.
Natural floodway fringe filling or alteration shall not be allowed without review and approval by the Sanilac County Drain Commission and compliance with the Floodplain Regulatory Authority found in Part 31, Water Resources Protection, of the Natural Resources and Environmental Protection Act, 1994

PA 451, as amended (NREPA) on watercourses with contributing area of 2 square miles or greater. If a floodplain has not been mapped, the applicant's

consultant shall provide the floodplain delineation including the floodway to the Sanilac County Drain Commission for approval.
To provide for streambank stability a buffer zone is to be established and called out on a recorded plat, an approved block grading plan, a site plan, or an improvement plan. This zone shall consist of existing natural tree and vegetation slope protection within a minimum of 25 feet from the ordinary high water mark. This buffer zone shall be maintained as is, that is, no earth change or disturbance is to take place.

Replacement of lost floodplain shall meet the following criteria.

1. Replacement of the loss of floodplain storage volume at a 1 to 1 ratio unless watershed conditions warrant a higher ratio. This applies to floodplain associated with rainfall events up to a 100-year frequency. The grading plan shall provide for an equivalent volume of storage for floodplains associated with more frequent events such as 10 and 25 year frequencies.

2. Storm water detention does not apply toward the replacement volume.

3. Floodplain storage volume shall be computed above the seasonal high ground water level only.

4. The inflow and outflow rates to the area shall be consistent with predevelopment rates.

5. Up to 50 percent of the floodplain mitigation storage volume may be used for snow storage.

6. The proximity of the floodplain mitigation area shall provide for an equivalent hydrologic impact to the receiving stream and adjacent parcels.

DESIGN CRITERIA

The basis of design for the stormwater management facilities are governed by the following criteria:

3.1 DESIGN STORM DURATION AND DISTRIBUTION

The design storm serves as the basis for design. The selection of the storm duration and distribution affects the resulting runoff volume and peak discharge rate. Total storm volume and distribution has been selected to produce total runoff volume and peak runoff rates that are independent of the tributary area. The following characteristics of the design storm have been selected:

- The duration of the rainfall event shall be dependent on the time of concentration for the individual site. Section 5.3.7 provides information for calculating the time of concentration.

- Rainfall distribution for the design storm used for any stormwater management facilities must be in accordance with the U.S. Department of Agriculture, Soil Conservation Service (SCS) Type II Rainfall Distribution. Total rainfall volume and the distribution of that rainfall per SCS Type II are provided in Table 1. The distribution is provided at one-half hour intervals for a variety of return intervals.

3.2 DESIGN STORM VOLUME

The design of all facilities must be based on the design storm return interval that is the probability that the storm will occur in any one year. For example, the 100-year storm has a 1 percent probability of being met or exceeded in any one year. The 25-year storm has a 4 percent probability of being met or exceeded in any one year. The following are the return interval design criteria for stormwater related facilities:

- **Bridges for major roads**
  - 100-year with no backwater for new crossings
  - 100-year with no greater than a 0.1 foot increase or reduction in backwater for existing crossings.

- **Ditches and bridges/culverts for drainage external to a development**
  - 100-year storm if no floodway channel is available
  - 10-year storm may be used otherwise

- **Storm Sewers**
  - 10-year storm flow capacity, using gravity flow, if floodway available
  - 100-year flow capacity required if no floodway channel available

- **Floodways**
  - 100-year flow capacity

- **Roadside swales for drainage internal to the development**
  - 10-year flow capacity

- **Detention/retention basin primary discharge control volume**
  - 10-year flow capacity

- **Detention/retention basin emergency floodway capacity**
  - Provisions shall be made to convey the 25-year storm flow over the emergency spillway without damaging the containment berm

3.3 BASIN DISCHARGE CONTROLS

- The peak release rate shall be 0.20 cfs/acre

- The first 0.5" of runoff shall be held for not less than 12 hours or more than 24 hours.

3.4 REQUIRED CALCULATION METHODS

A variety of methods can be used to calculate the peak runoff rate and to estimate runoff volume for a development. Three alternative methods are provided each with certain limits on their usage. Any of these three methods may be used subject to the development size limitations set forth. Alternative generally accepted engineering calculation methods are allowed, but will require additional review prior to acceptance. The permissible calculation methods are described as follows:

- **Developments with tributary areas that are less than 40 acres:**
  - The Rational Method – (Section 5)

- **Developments with tributary areas that are between 40 and 200 acres:**
  - The SCS TR55 method – (Section 6)

- **Developments with tributary areas that are over 200 acres:**
  - Suttons Drainage Curves or HEC-HMS AND HEC-RAS
    Other acceptable Hydrologic and Hydraulic Computer Models may be used with prior permission of the Drain Commissioner

  - Other computer models may be used in lieu of those mentioned above if the complete input data and output data sets are furnished. Also provided that the data fields, column headings, etc. are described in text format.

TABLE 1 -Design Storms– SCS Method						
Type II 24-Hour Distribution						
Frequency:	2year	5year	10year	25year	50year	100year
Duration :	24 Hour	24 Hour	24 Hour	24 Hour	24 Hour	24 Hour
Depth	2.14	2.65	3.05	3.56	3.97	4.40

4.0 HYDRAULIC DESIGN

A variety of design criteria are provided for the design of stormwater control facilities. These govern the basis of design for each type of facility.

4.1 STORM SEWER DESIGN **(For design storm volume of storm sewer see section 3.2 on page 22)**

4.1.1 PEAK RUNOFF RATE DETERMINATION

The peak runoff rates for which the system must be designed will be determined from one of the appropriate methods provided above, depending on the tributary area served by the facility.

4.1.2 CAPACITY CALCULATIONS

The Manning's equation must be used for calculating the pipe capacity unless the conduit is backwater affected or surcharges. In this case, the appropriate calculation techniques must be used to account for backwater and pressure flow. The Manning's equation is defined as:

$$Q = \frac{1.49}{n} A R^{2/3} S^{1/2}$$

Q = Flow capacity of open channel

n = Manning friction coefficient

A = Cross sectional area of open channel

R = Hydraulic Radius (area/wetted perimeter)

S = Average slope of drainage channel

The following Manning's n friction coefficients provided in Table 2 must be used for calculations of conduit capacity.

4.1.3 Construction Standards for Storm Sewer

4.1.3.1 All backyard yard basins and manholes shall be 4' in diameter, if the depth is equal to or greater than 4 feet; otherwise a 2' diameter is acceptable.

4.1.3.2 Storm sewer placed between houses shall have sealed (O-Ring) joints.

4.1.3.3 A minimum easement width of 30 feet is required for all underground storm sewer and a 20 feet width for all overland drainage swales.

4.1.4 An overland floodway shall be constructed to serve all trapped yard basins and low areas in the road to prevent flooding should the storm sewer fail or be inadequate to handle runoff from a severe storm.

4.1.4.1 The floodway shall be sized to convey the 100-yr storm.

4.1.4.2 Provide a profile of the floodway, and establish a critical elevation. Establish all affected lots minimum building openings so that they are at least 1 foot above the critical elevation of the floodway.

4.1.4.3 Establish the easements as floodways to regulate the floodway elevations. These easements shall be dedicated to a drainage district. A minimum easement width of 20 feet will be required.

TABLE 2
Conduit Manning's n Values

Manning's n	Conduit Material
0.012	Smooth PVC & PE Plastic Pipe
0.013	Concrete Pipe
0.024	Corrugated Metal & Plastic Pipe

4.2 OPEN CHANNELS

4.2.1 PEAK RUNOFF RATE DETERMINATION

The peak runoff rates for which the system must be designed will be determined from one of the appropriate methods provided above, depending on the tributary area served by the facility.

4.2.2 CAPACITY CALCULATIONS

The capacity shall be calculated for the design condition (e.g. bare earth bottom with dense grass 6" to 12" on banks)
The normal depth and velocity shall be determined for the 1-year storm under the fresh cut or bare earth conditions. Temporary controls are to be installed to reduce the velocity so that it is non-erosive. The Manning equation, as defined above, will be used to determine the discharge capacity for an open channel. The following Manning's n friction coefficients provided in Table 3 must be used for calculation of open channel capacity.

TABLE 3

Open Channel Manning's n Values

Manning's n	Channel Material
0.02	Grouted cobble or rough concrete lined ditches
0.02	Artificial channels in earth of regular form free from weeds and other growth
0.02	Smooth rubble
0.03	Sandy soils and gravel
0.04	Jagged rock and rough rubble
0.04	Well maintained grass, depth of flow over 4 inches
0.04	Fairly regular channels in earth with average growth of weeds and aquatic plants
0.05	Natural streams of irregular form badly grown up with willows, weeds, and brush
0.05	Well maintained grass, depth of flow under 4 inches
0.06	Heavy grass not maintained

4.3 ALLOWABLE VELOCITIES

The peak allowable velocities are necessary to prevent soil erosion and siltation of drainage channels and retention ponds. The allowable velocities for a variety of open channel materials are provided in Table 4.

TABLE 4

Allowable Open Channel Velocities

Type of Lining	Allowable Velocity
Ordinary earth	1 to 2 fps
Clay and gravel	4 fps
Coarse gravel	4 fps
Good sod	5 to 6 fps
Riprap & reinforced turf	10 fps
Concrete or grouted riprap	no limit

4.4 CHANNEL SPECIFICATIONS

An established ground cover over the side slopes is required

The steepest permissible side slope for channels that are not county drains shall be 3 to 1 (horizontal to vertical) if vegetation cover requires no maintenance. If regular mowing is required, the side slope shall be 4 to 1.

A minimum of 1 foot of freeboard is required above the design water level.

4.5 DETENTION POND – GENERAL

4.5.1 DESIGN CRITERIA

4.5.1.1 PEAK DISCHARGE RATE – The peak discharge rate is 0.13 cfs/acre for all areas where stormwater ordinance zoning does not apply. Release pipe size shall be calculated using the orifice equation.

$$Q = 0.6 * A_{pipe} * (2gh)^{0.5}$$ - Orifice Equation

A_{pipe} = cross sectional area of pipe (4" minimum diameter)
g = 32.2 ft/sec^2 – gravitational constant
h = depth of water at design volume (difference between water surface and pipe centerline)

In areas where a city, township, or village stormwater ordinance has been established, the guidelines and zoning established in the ordinance will supercede the standards in this document and will be applied when reviewing developments.

4.5.1.2 EMERGENCY SPILLWAY DESIGN An emergency spillway shall be designed for every detention basin. It shall be sized to safely pass the peak runoff from the 25-year storm recurrence interval (4% annual chance) from the total contributing drainage area, as ultimately developed. Spillway design shall extend from the berm crest to the outfall channel.

The following equations and details provide guidance for designing emergency spillways:

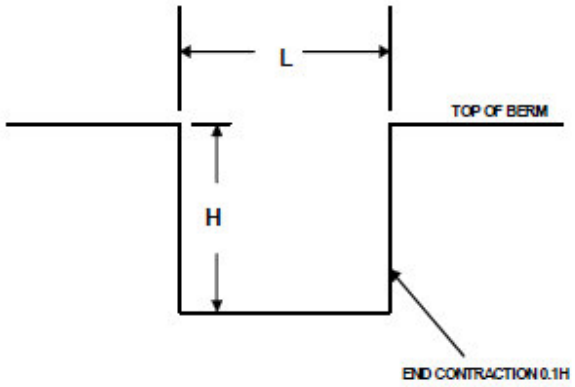
Design Equation for Rectangular Weir

$$Q = CLH^{3/2}$$

where C = 3.3 for sharp crested weirs (e.g. sheet piling)
C = 3.0 for broad crested weirs (e.g. earth berm)

$$Q = C(L - 0.2H)H^{3/2}$$

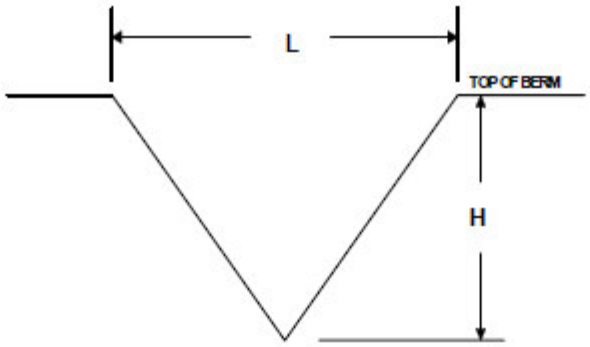
when vertical sidewalls are present (see illustration)



Design Equation for V-notch Weir

$$Q = 1.28LH^{3/2}$$

(see illustration)

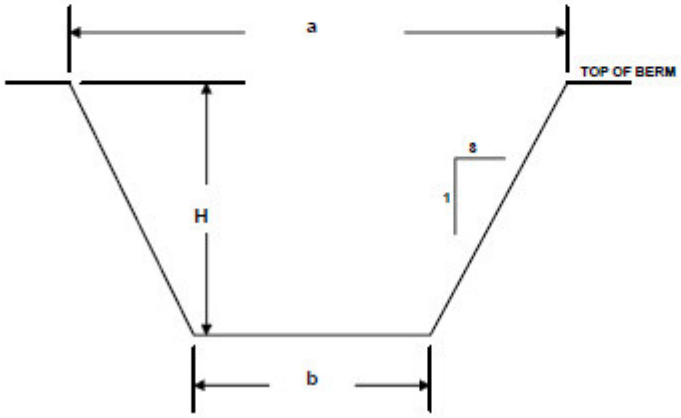


Design Equation for Trapezoidal Weir (normally used with earthen berms)

$$Q = C\left(\frac{(a+b)}{2} - 0.2H\right)H^{3/2}$$

(see illustration)

where C = 3.0 for broad crested (earth berm)
a = width of weir at design high water elevation
b = width of weir at base
s = minimum of 4 for grass weirs



4.5.1.3 DETENTION STORAGE

The requirement for detention volume may be determined using " A Simple Method of Retention Basin Design as published by Warren and Yrjanainen known as the "Oakland County Method" or the modified rational method.

CONSTRUCTION STANDARDS

4.5.1.4 Only one detention basin is allowed per development or original parcel, unless field considerations dictate otherwise. (e.g. the site is divided by a ridge line)

4.5.1.5 Configurations include wet detention basins, dry detention basins, infiltration basins, underground storage, roof top storage, porous pavement, and parking lot storage (12" maximum depth on lot) with a restricted outlet. (Subsequent sections of this document provide design criteria for the methods listed above.)

4.5.1.6 It is imperative that during the construction phase of development the detention storage facility is constructed first. The pond shall be graded,

topsoiled, seeded, and stabilized before any final approval is granted.

4.5.1.7 Erosion blanket shall be placed on all detention basin slopes and pond bottom before final approval.

4.5.1.8 Detention storage must be provided during the construction phase. If the permanent detention facility cannot be built during the start of construction (e.g. roof top storage), then an approved temporary facility shall be constructed and maintained.

4.5.1.9 Integration of detention storage for the site in question with the drainage from upland areas must satisfy the NO INCREASE IN FLOOD ELEVATION requirement for the developed watershed. Hydrographs for the existing and future conditions shall be determined.

4.6 DETENTION PONDS – DRY DETENTION CRITERIA

4.6.1 CONSTRUCTION STANDARDS

Dry detention basins must be built to minimize operation and maintenance efforts after the basin has been constructed. To ensure that the detention basins are designed and built properly, the following general guidelines must be used.

The pond must be designed to contain runoff from the 10 – year rainfall event. (10% annual chance).

Provide a flat maintenance shelf with a minimum width of 15-ft shall be provided around the perimeter of the basin. The pond must provide load bearing capability for maintenance vehicles.

Adequate underdrainage must be provided to allow normal turf maintenance.

The pond slopes must be sufficiently gradual to allow accessibility. The maximum allowable slope shall be 1 Vertical : 4 Horizontal

Minimum buffer/setback for the detention basin shall be 25 feet from the basin easement to any dwelling.

The channels to and from the basin must have appropriate transitions into and out of the original channel.

Paved or permeable material may be used.

4.6.2 DETENTION BASIN GRADES

Banks – 25% maximum allowed anywhere.

Bottom Cross Slopes - 1% minimum allowed anywhere.

Bottom Longitudinal Slopes - 1% minimum allowed anywhere.

An acceptable alternative to the required grading is to install an under-drain. With the installation on an under-drain, a required minimum bottom grade of .5% shall be constructed. The under-drain shall be constructed in the following manner:

The under-drain shall be one of the last items to be installed to eliminate any

sediment build-up that would cause the under-drain to not function properly.
A non-woven geo-textile fabric shall be laid in the excavated trench first.
The perforated drainpipe shall be covered with washed stone.
Both stone and drain shall then be wrapped with the non-woven geo-textile and backfilled with sandy porous material.

4.6.3 LOW FLOW/EXTENDED RELEASE

A low flow channel or subsurface under-drain is required when the pond bottom may be subject to non-storm flow from groundwater, footing drainage, storm sewer acting as under-drain, and sump discharge such that vegetation will not grow across the bottom of the pond. An infiltration trench, or similar device, shall be used to limit the time of inundation to 24 hours.

4.6.4 OUTLET STRUCTURE AND EMERGENCY SPILLWAY

- Emergency spillways must be constructed of riprap over geo-textile of sufficient size to withstand the design velocities. The spillway must extend down the back slope of the dike to form an inlet section and outward from the toe of the fore slope to form an apron with the outfall channel. Where desirable, turf reinforced with a three-dimensional root mat or geo-grids may be used in lieu of riprap in non-traffic areas. Natural or synthetic materials will be allowed for construction of emergency spillways if it can be demonstrated that the structures will not fail and will have significant longevity.

- All edges of riprap must be toed in a minimum of 12 inches.

- Erosion protection shall be provided for changes in cross section of the outlet channel and for transition from critical to subcritical flow.

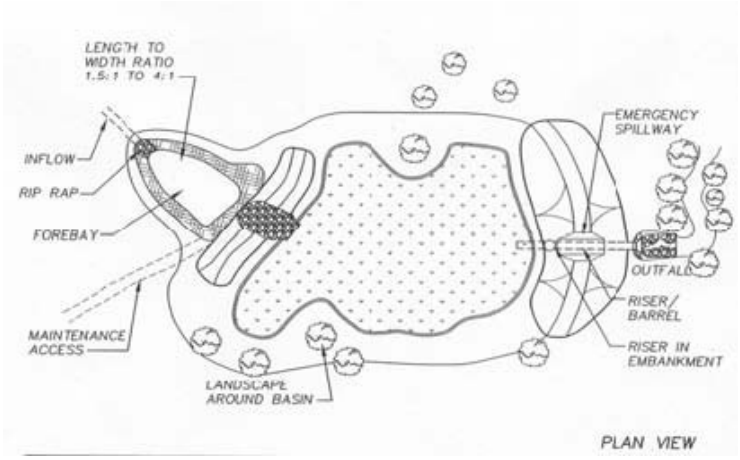
4.6.5 RECEIVING STREAM

- In general, the receiving stream is to be left in its original state, except that erosion control measures may be required due to site specific conditions.

- Should the existing drainage onto adjacent land consist of sheet runoff, concentrated flows shall be diffused. A level area of riprap or reinforced turf sufficient for spreading the flow shall be provided.

- The Drain Commissioner may require the receiving stream to be cleaned of debris to ensure an adequate stormwater outlet for a proposed development.

DRY DETENTION BASIN EXAMPLE



4.7 DETENTION PONDS – WET DETENTION CRITERIA

4.7.1 CONSTRUCTION STANDARDS

Wet detention facilities must be built to optimize the filtration and nutrient uptake of marsh type wetland plants. To insure that the detention basin is designed and built properly, the following general guidelines must be used.

- The pond must be designed to contain runoff from the 10 – year rainfall event. (10% annual chance).

- Minimum buffer/setback for the wet detention basin shall be 50 feet from the basin easement to any dwelling.

- Adequate access must be provided for the removal of sediment.

- Baffles may be required to prevent short circuiting the hold time of the basin.

4.7.2 DETENTION BASIN GRADES

- Banks – 25% maximum allowed anywhere
  - Near normal waterline – 7% maximum from 10.0" above to 24.0" below the normal waterline. Below this point, slopes must be no steeper than 1 vertical to 4 horizontal.

- NOTE: PERMANENT IMPOUNDMENTS OR OPEN PIT PONDS DESIGNED AS SITE AMENITIES HAVE AN INHERENT RISK, WHICH MUST BE ASSUMED BY THE LANDOWNER. THE LANDOWNER IS THE PARTY RESPONSIBLE FOR POLICING HIS PROPERTY. THESE TYPES OF SITE AMENITIES WILL ONLY BE ALLOWED IF THE DISTRICT IS HELD

HARMLESS BY THE LANDOWNER.

- Bottom Grades
  - Dikes may be used as baffles to lengthen the flow line through the basin. The height of the dikes shall not exceed ¼ of the design depth.

4.7.3 LOW FLOW/EXTENDED RELEASE

The criteria are the same as for dry ponds. See section 4.6.3

4.7.4 OUTLET STRUCTURE AND EMERGENCY SPILLWAY

The criteria are the same as for dry ponds. See section 4.6.4

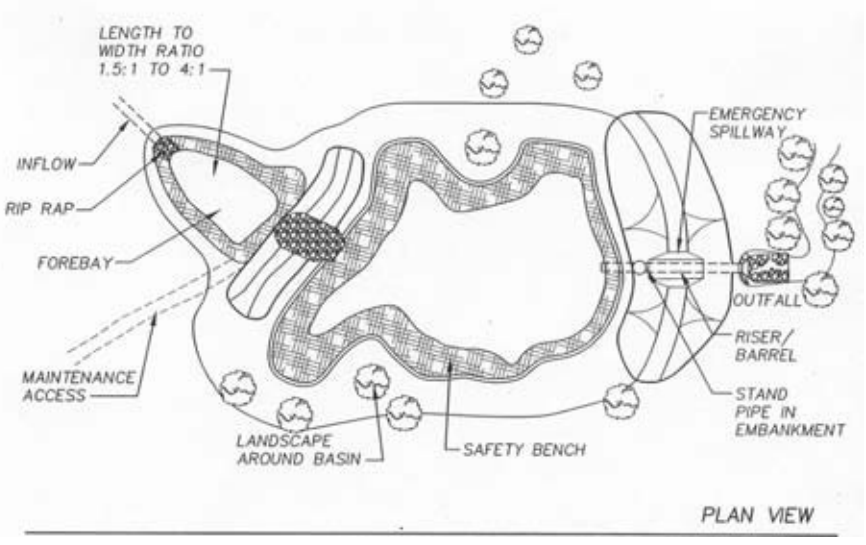
4.7.5 RECEIVING STREAM

The criteria are the same as for dry ponds. See section 4.6.5

4.7.6 PLANTING PLAN

A landscape plan shall be submitted identifying the wetland plants to be established, the limits of turf maintenance and the placement of shrubs and bushes between the maintenance and non-maintenance areas.

WET DETENTION BASIN EXAMPLE



4.8 RETENTION PONDS – INFILTRATION BASIN CRITERIA

4.8.1 CONSTRUCTION STANDARDS

The infiltration basin shall be designed to store runoff from 2 back-to-back 100-yr rainfall events (1% annual chance) if no positive outlet is available. If a positive outlet is available for an emergency spillway, the pond shall be sized to store runoff for a single 100-yr event (1% annual chance). Note: The large majority of Sanilac County soils and ground water conditions are not suitable for infiltration basins. The developer shall be responsible for demonstrating the suitability of this option on his site.

- Construction of the infiltration basin shall be within a remote location to provide easy maintenance access as well as eliminate a potential nuisance for future home owners.

- When sizing the basin, infiltration cannot be accounted for to reduce the required volume.

- The bottom of the infiltration system shall be a minimum of 4 feet above the highest known water table elevation.

- Minimum buffer/setback for the infiltration basin shall be 25 feet from the basin easement to any dwelling.

- The infiltration system shall be designed to drain completely within 72 hours. Soil borings and infiltration rates shall be submitted as backup for the proposed infiltration facility.

- A design infiltration rate of 0.5 times the infiltration rate determined by geotechnical investigation, or an infiltration rate of 0.52 in/hr, shall be used to estimate the maximum time to drain by the equation:

  $$72 \geq 12D / I$$

  Where: 72 = Maximum allowable drain time (hours)
  12 = Factor to convert inches to feet
  D = Basin depth (feet)
  I = Design infiltration rate (in/hr)

- The contractor shall avoid compaction the soil in the infiltration basin area during excavation and grading. The final 2 feet of depth shall be removed by excavating to finish grade.

- A treatment forebay or equivalent storm water filter shall be included with any infiltration basin design. This forebay shall store the "first flush" of pollutants and sediment found in stormwater runoff. This forebay should be sized to store the first 0.5" of runoff for the site for 12 to 24

hours. This volume can be included in the overall required storage volume.

- The outlet structure from the treatment forebay shall be designed as a spillway to release water when the treatment forebay volume has been reached.

- All accumulated sediment shall be removed from the infiltration basin and the bottom scarified 4" to 6" prior to final approval.

- A flat maintenance shelf with a minimum width of 15-ft shall be provided around the perimeter of the basin.

- The Developer/Owner shall sign a maintenance agreement that requires that the retention basin be monitored for 3-years or until the last homesite has been construed and the lawn is established. The basin shall be inspected every two weeks or within 24 hours after a significant storm event during the growing season or while the soil in the basin is exposed. Any accumulation of sediment on the bottom of the basin shall be clean out and disk the soil in the bottom if necessary. A performance bond shall be submitted to ensure the work will be completed.

4.8.2 INFILTRATION BASIN GRADES

- Banks – 25% maximum allowed anywhere

- Bottom Grades – The bottom of the basin shall be as flat as possible to encourage uniform infiltration.

NOTE: PERMANENT IMPOUNDMENTS OR OPEN PIT PONDS DESIGNED AS SITE AMENITIES HAVE AN INHERENT RISK, WHICH MUST BE ASSUMED BY THE LANDOWNER. THE LANDOWNER IS THE PARTY RESPONSIBLE FOR POLICING HIS PROPERTY. THESE TYPES OF SITE AMENITIES WILL ONLY BE ALLOWED IF THE DISTRICT IS HELD HARMLESS BY THE LANDOWNER.

4.8.3 OUTLET STRUCTURE AND EMERGENCY SPILLWAY

The criteria are the same as for dry ponds. See section 4.6.4

4.8.4 RECEIVING STREAM

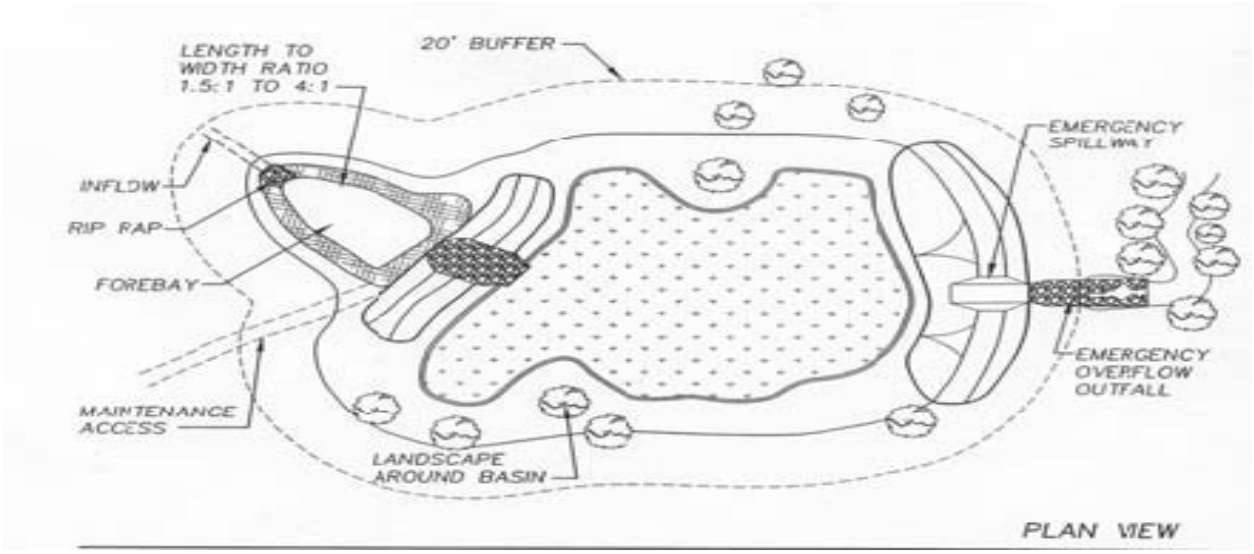
If a receiving stream is utilized, the criteria are the same as for dry ponds. See section 4.6.5

4.8.5 ADDITIONAL ITEMS

The Drain Commission may require the following items in some instances where infiltration basins are to be used:

- Leaching Basins
- Perforated Underdrain
- Filter Strips
- Level Spreaders

RETENTION/INFILTRATION BASIN EXAMPLE



5.0 DISCHARGE RATE - RATIONAL METHOD

The Rational Method shall be used only in cases where the tributary area is 40 acres or less. The Rational Method is a standard method for calculating the peak runoff rate for a parcel. The results of its use are very sensitive to the coefficients selected. As a result the method is best suited for use on small parcels where the additional time that may be required to use another method may not be justified. Larger parcels should utilize more accurate methods.

5.1 The Rational Method is based on three assumptions:

- The peak runoff at any design location is a function of the average rainfall intensity during the time of concentration to that location.
- The frequency of peak discharge is the same as the frequency of the average rainfall intensity.
- The Time of Concentration is the time required for the runoff from the most remote part of the drainage area to become established and flow to the point under design.

5.2 The Rational Method is an empirical method based on the following equation:

$Q = C \bullet i \bullet A$

C - Runoff coefficient, is a constant (dimensionless) which represent the fraction of rainfall which will result in the peak runoff rate from the land into a storm drainage system.

A - Area (acres) of the sub-basin upstream from the point of design, and must include upstream tributary areas not part of the development.

i - Rainfall intensity (in/hr) of the storm which represents the duration and frequency of rainfall which will create the maximum peak runoff. Typically, the intensity over the time of concentration for the sub-basin will result in the peak flow for a particular return period.

5.3 PROCEDURE FOR DETERMINING PEAK DISCHARGE

5.3.1 Delineate and determine the drainage area, (A), in acres, of the watershed upstream of the point of the storm drainage system in question. If the watershed drainage area is less then 1 acre or greater than 40 acres this method should not be used. The upstream area must be considered completely developed.

5.3.2 Identify the primary drainage channel(s) of the sub-basin area.

5.3.3 Identify any sub-channels and flow paths flowing into the main channel from available topographical maps. Using the sub-channels and contours divide the drainage area sub-basin into sub-basins.

5.3.4 Determine the land uses and zoning classifications for the entire drainage area and the respective percentages of each classification or land use within the drainage area.

5.3.6 Determine the appropriate Runoff Coefficient, "C, for each land use in the

drainage area from Table 6.

5.3.7 Determine the overland time flow, t_o, from the following equation:

$$t_o = \left[\frac{2 \bullet L \bullet n}{3 \bullet \sqrt{S}}\right]^{(1/2.14)}$$

L - Distance of the overland flow path with the longest overland flow time for that sub-basin. The path follows a direction parallel to the slope of the sub-basin. Several flow times will have to be calculated for various paths to determine which path actually has the maximum flow time. n - Friction coefficient (Manning's n) can be taken from Table 7. S - Slope is the difference in elevation between the extreme edge of the flow path to the point of entry into the defined channel divided by the length of the flow path.

TABLE 5

Runoff Coefficients Rational Method

Type of Land Use	2-year Storm	10-year Storm	25-year Storm	100-year Storm
Residential 1-2	0.29	0.43	0.45	0.47
Multi-family residential	0.35	0.46	0.47	0.47
Mobile home	0.37	0.53	0.55	0.56
CBD/Shopping	0.43	0.57	0.58	0.58
Comm/Business	0.39	0.51	0.51	0.52
Industrial	0.45	0.58	0.59	0.60
Industrial Park	0.37	0.53	0.55	0.56
Forest	0.1	0.24	0.27	0.32
Agriculture	0.16	0.3	0.33	0.37
Water	1.0	1.0	1.0	1.0
Extractive	0.12	0.27	0.3	0.34
Airport	0.22	0.31	0.32	0.34
Rural Residential	0.15	0.3	0.33	0.37

TABLE 6

Manning's n Overland Flow Ground cover	Manning's n
Smooth asphalt or concrete	0.012
Rough asphalt or concrete	0.014
Packed clay	0.030
Light turf	0.200
Dense turf	0.350
Dense shrubbery	0.500

5.3.8 Determine the stream (channel) flow time, t_s, if stream flow is achieved within the sub-basin.

$$t_s = L \div V$$

and

$$V = 1.49 \bullet R^{2/3} \bullet s^{1/2} \div n$$

Where:

L = Channel Length (ft)
V = Velocity (ft/s)
R = Hydraulic Radius (ft)
s = Channel Slope (ft/ft)
n = Composite Manning's n for channel

For an open channel the hydraulic radius can be approximated as:

R = 0.6 for small streams (less than 100 Ac drained)
R = 1.5 for medium streams (100 Ac to 1 sq. mile)
R = 2.5 for large streams (more than 1 sq. mile)

For flow in a closed conduit (storm sewer) the conduit can be assumed to be flowing full and R = A ÷ P, where A is the flow area and P is the wetted perimeter.

5.3.9 Determine the pipe flow time;

$$t_p = L \div V$$

Where L is the pipe length, and V is the average pipe velocity.

5.3.10 The time of concentration, tc, is the sum of the overland flow time, the stream flow time, and the pipe flow time.

$$t_c = t_o + t_s + t_p$$

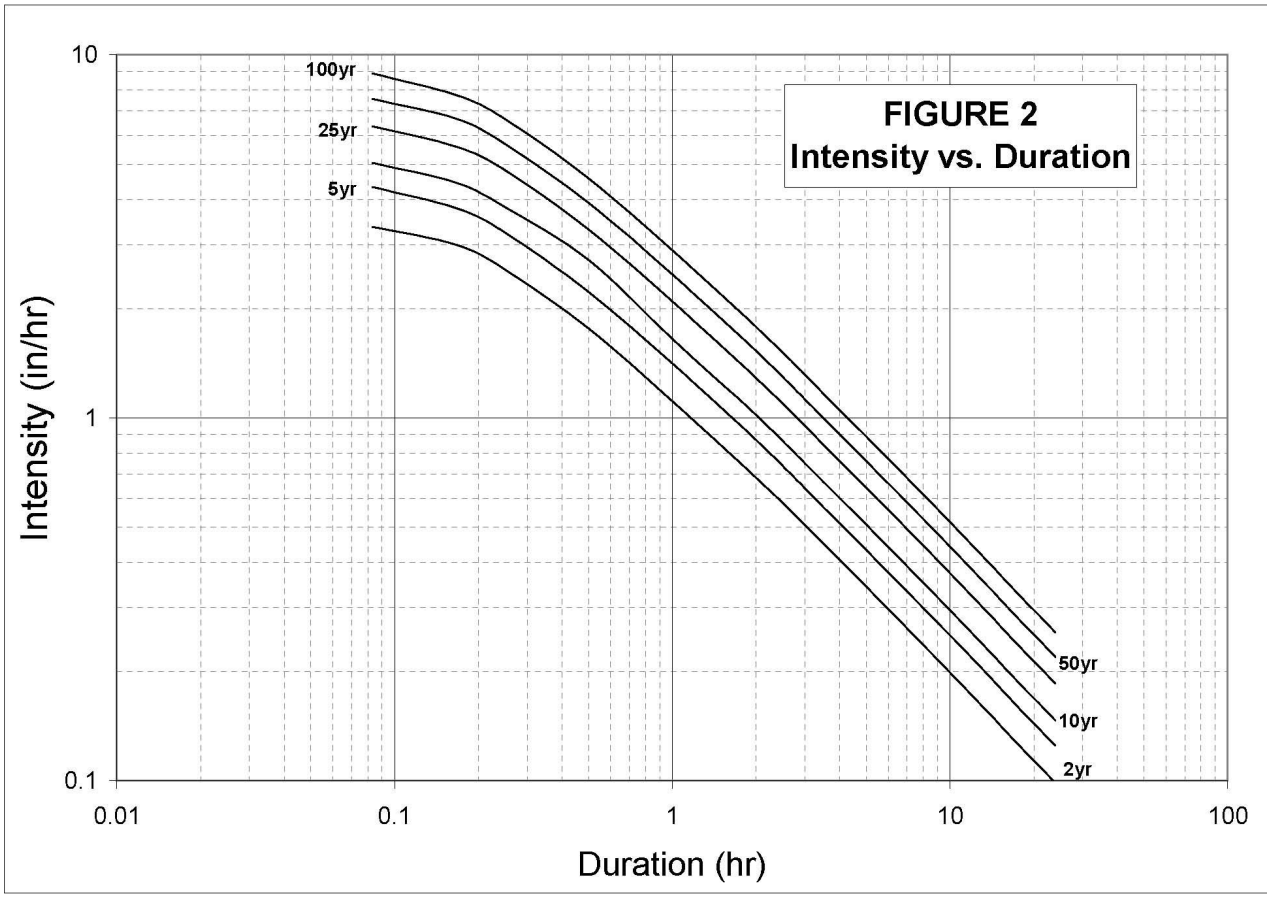
5.3.11 The time of concentration indicates the duration of a storm that will cause the maximum peak runoff rate to be reached. Using the return period from step 5 and the time of concentration as duration, the average intensity of the storm can be found using Figure 2.

5.3.12 The Peak Runoff Rate, Q, is then calculated using:

$$Q = C \bullet i \bullet A$$

Where:

Q = Peak Runoff Rate (cfs)
C = Composite Runoff Coefficient
i = Average Rainfall Intensity (in/hr)
A = Drainage Area (acres)



6.0 PEAK DISCHARGE RATE - SCS METHOD

The SCS Method can be used for calculation of peak discharge for tributary areas between 40 and 200 acres.
The SCS Method is based on use of TR-20 for calculation of the peak runoff from urban areas. The method uses composite land use types within a sub-basin. Land use is used as an indicator within this method of the percent impervious. Because of this, the method has been modified so that the land uses provided are specific to the percent impervious for these land uses in Sanilac County.

6.1 Following are the steps that need to be followed to use this method:

6.1.1 Delineate and determine the drainage area (A), in acres, of the sub-basin upstream of the point of the storm drainage system in question. If the watershed drainage area is less than 5 acres or greater than 200 acres this method should not be used.

6.1.2 List the future land uses and zoning classifications for the entire drainage area. Determine the percentages of each land use classification for the drainage area.

6.1.3 Determine the appropriate runoff curve number (CN) from Table 8 for each land use classification in the drainage area. Calculate the area-weighed CN (A •CN) for the watershed. Round off the weighted CN to the nearest CN divisible by 5.

6.1.4 Select a 24 hour duration rainfall depth, P, with the appropriate return period from Table 9. The return period depends on the highest value zoning classification in the watershed and should be as follows:

10 years for residential areas;
25 years for commercial or industrial and other high value areas; and
100 years for flood protection works.

TABLE 7

% Impervious and Runoff Curve Numbers for Zoning Districts

Zoning District	Average Percent of Impervious Area	Runoff Curve Number by Hydrologic Soil Group			
		A	B	C	D
Residential 1-2	25%	54	70	80	85
Residential Multi-Family	50%	69	80	86	89
Mobile Homes	35%	60	74	82	86
CBD / Shopping	55%	71	81	87	90
Commercial / Business	85%	89	92	94	95
Industrial Park	72%	81	88	91	93
Forest	1%	45	66	77	83
Agricultural	14%	51	66	76	81
Water	100%	100	100	100	100
Extractive	14%	51	66	76	81
Airport	20%	51	68	79	84
Rural Residential	20%	51	68	79	84
Parks and Idle Land	5%	49	69	79	84

TABLE 8

SCS Rainfall Depth 24 Hour Storm Duration

Return Period (Years)	Rainfall Depth (Inches)
2	2.14
5	2.65
10	3.05
25	3.56
50	3.97
100	4.40

6.1.5 Using Figure 3 and the rainfall depth, P (inches), from Step 4, determine the runoff depth, Q (inches), for the watershed using the curve number (CN)

determined from step 3.

6.1.6 Determine the unit peak discharge, q_u (cfs/inch), for the watershed drainage area, A, Figure 4.

6.1.7 Calculate the peak discharge (design flow), q, in cfs as follows: $q = P \bullet q_u$

FIGURE 3
RUNOFF (Q) VS: RAINFALL (P)

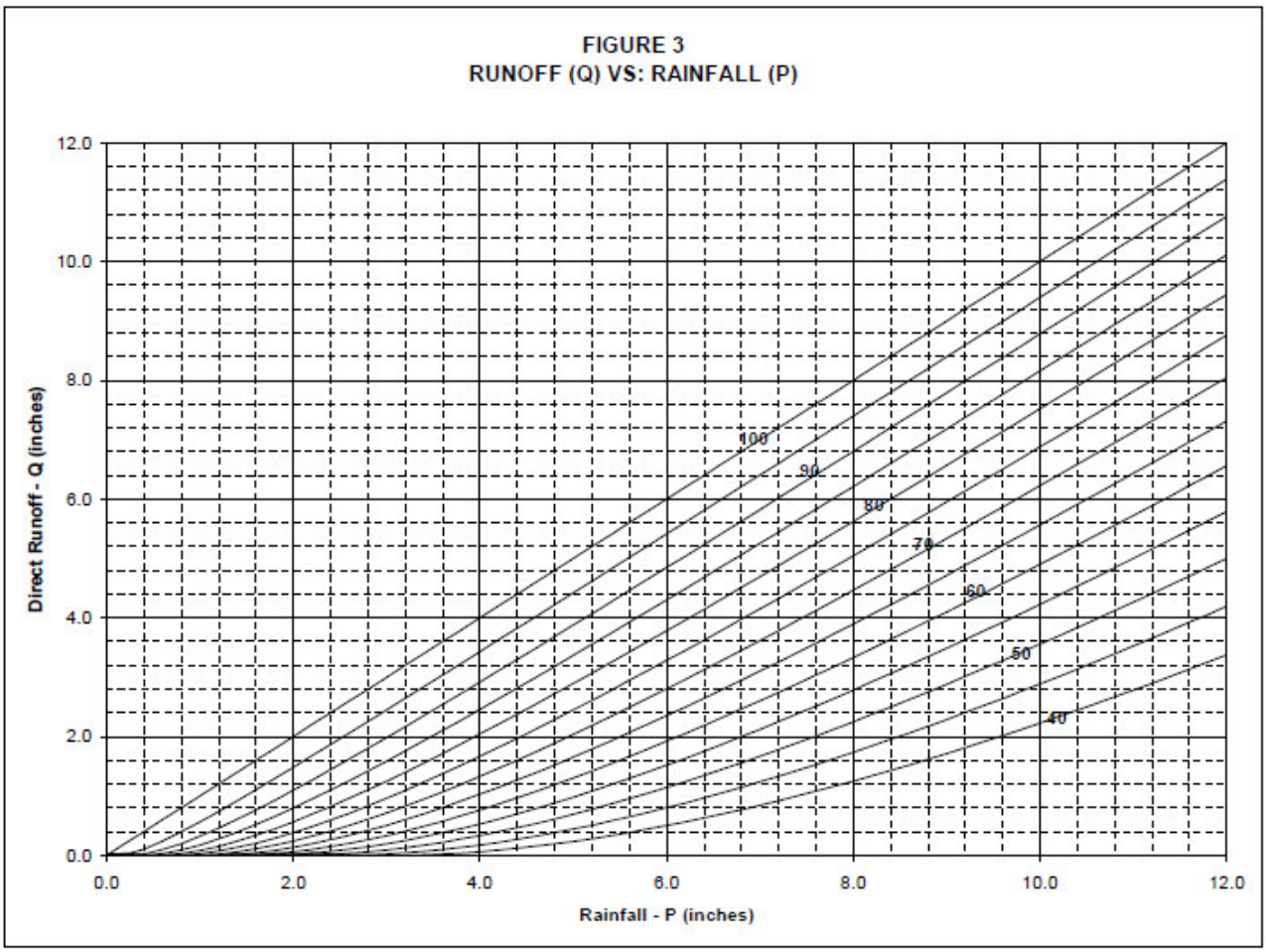
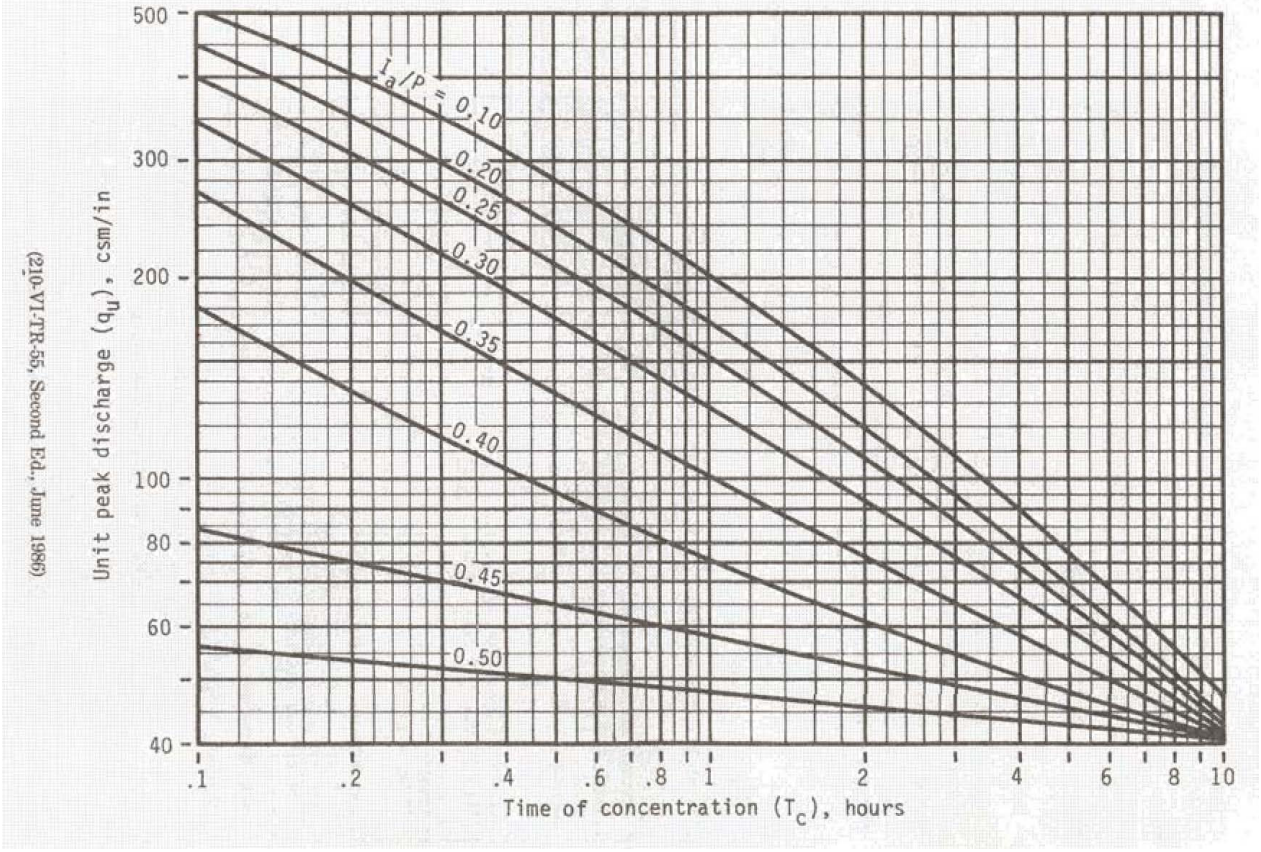
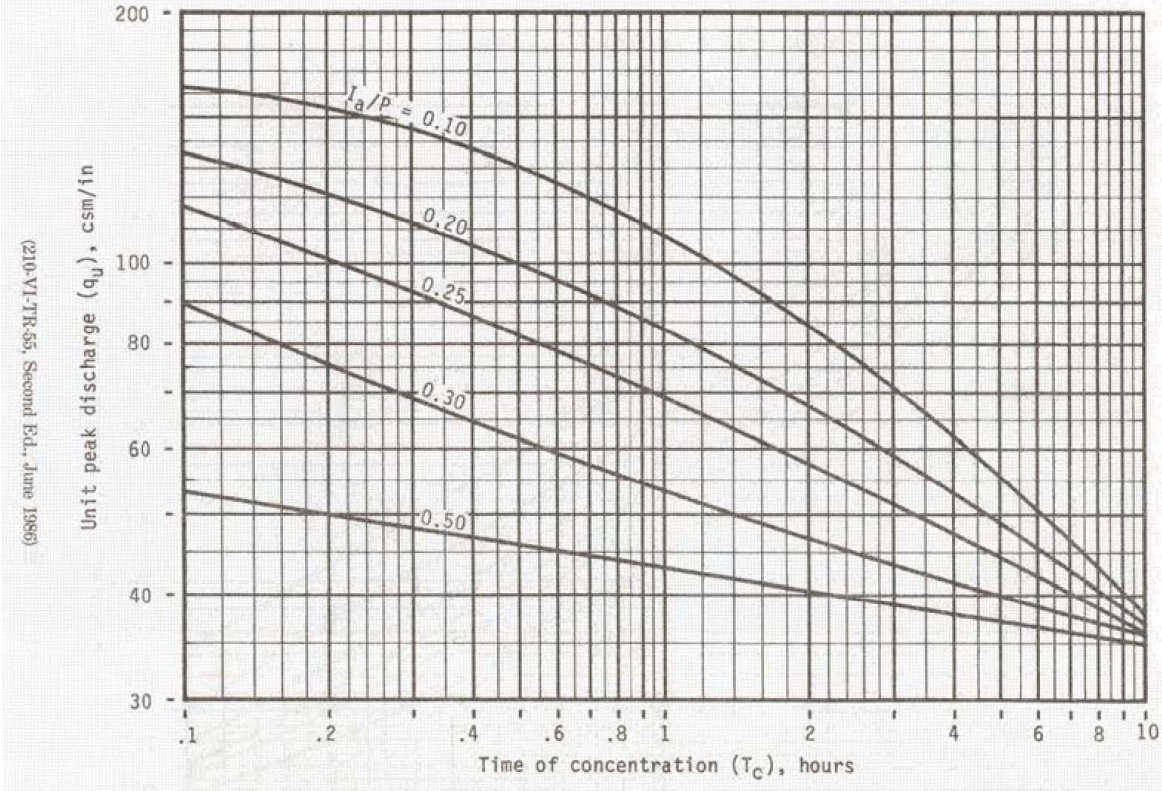


Exhibit 4-I: Unit peak discharge (q_u) for SCS type I rainfall distribution



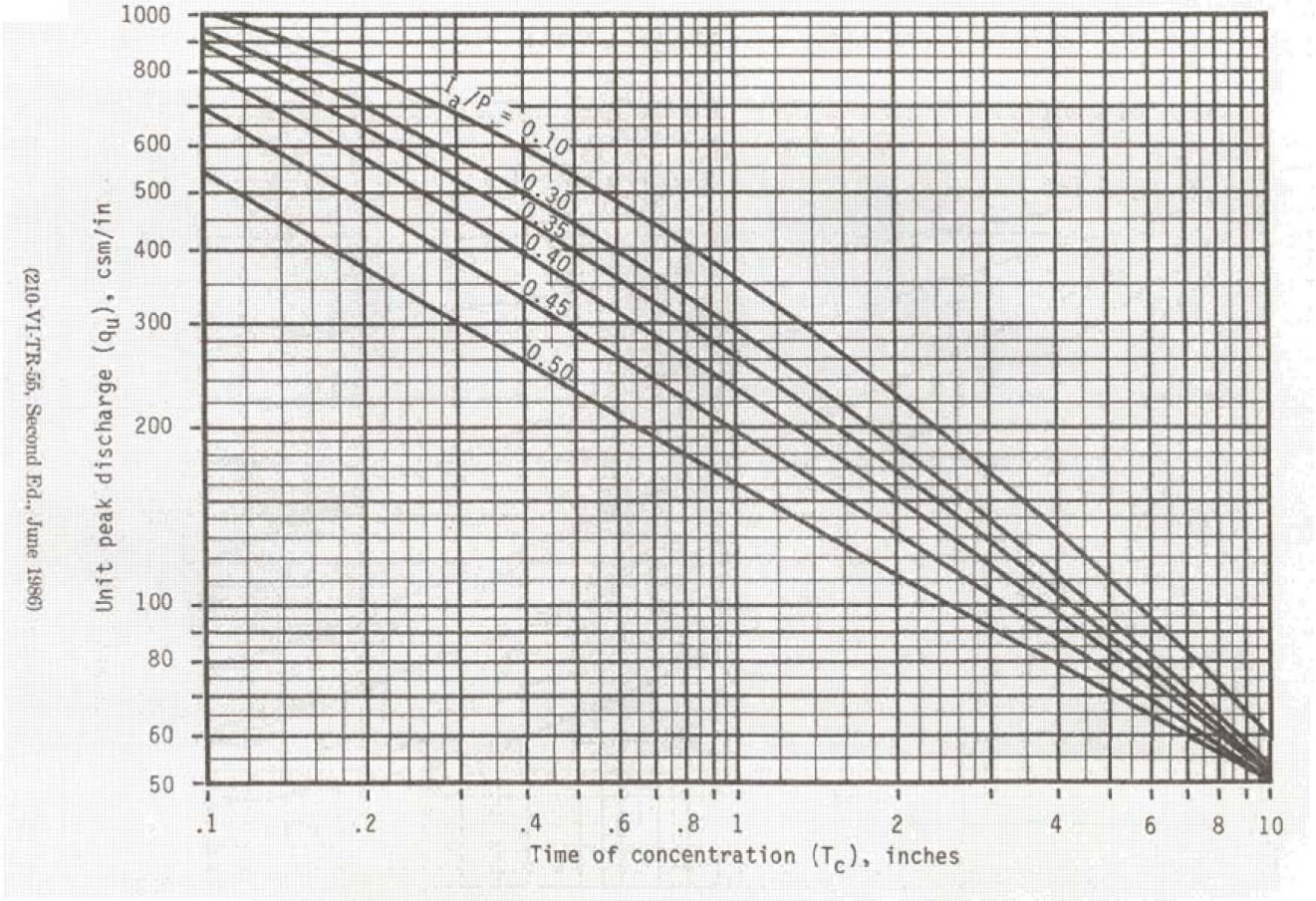
(210-VI-TR-55, Second Ed., June 1986)

Exhibit 4-IA: Unit peak discharge (q_u) for SCS type IA rainfall distribution



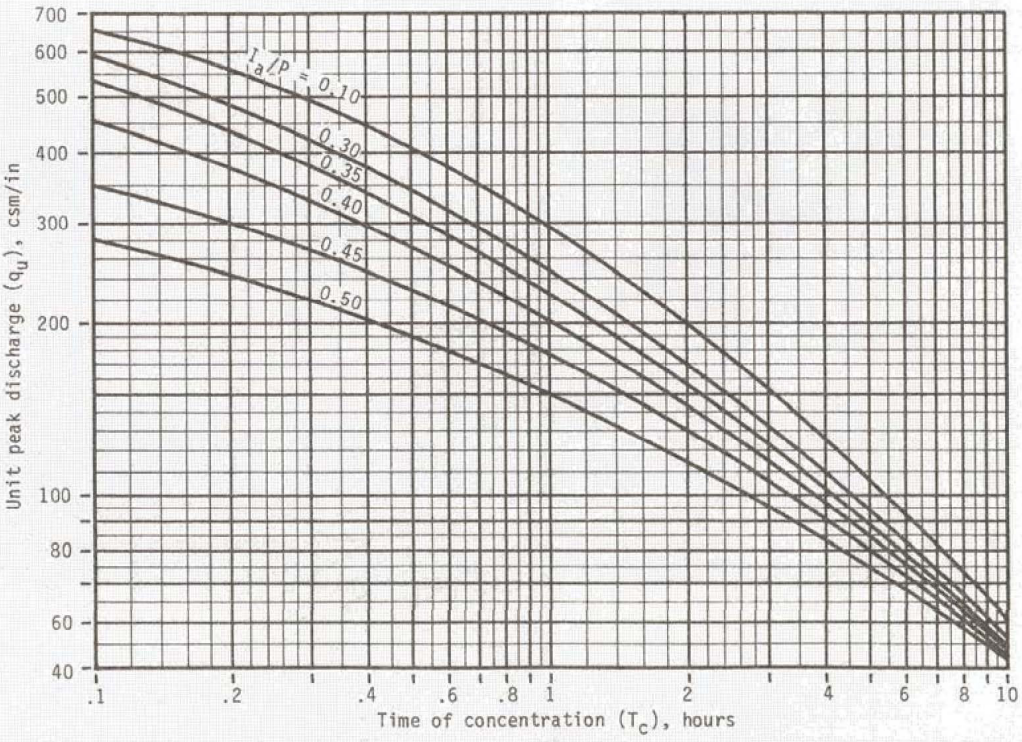
(210-VI-TR-55, Second Ed., June 1986)

Exhibit 4-II: Unit peak discharge (q_u) for SCS type II rainfall distribution



(210-VI-TR-55, Second Ed., June 1986)

Exhibit 4-III: Unit peak discharge (q_u) for SCS type III rainfall distribution



(210-VI-TR-55, Second Ed., June 1986)

7.0 PEAK DISCHARGE – HEC-HMS & HEC-RAS or SUTTON'S DRAINAGE CURVES

For drainage areas greater than 200 acres, use HEC-HMS AND HEC-RAS or Suttons drainage curves where the terrain is not rolling, for modeling the watershed. The HEC programs can be downloaded for free at:

HEC-HMS:
http://www.hec.usace.army.mil/software/hec-hms/hechms-hechms.html

HEC-RAS:
http://www.hec.usace.army.mil/software/hec-ras/hecras-hecras.html

SUTTON'S CURVES:

These should be used only in areas that are predominantly agricultural in land use character and the terrain is not rolling.

Where:

Q = Peak flow at design point (cubic feet per second)
M = Drainage Area through design point (square miles)

A Curve – 25 year return period

$Q = 150 * M^{0.6}$

B Curve – 10 year return period

$Q = 72.6 * M^{0.7}$

C & D Curve – Do not use.

APPENDIX C: 433-Agreements

C.1 433-Agreement to Establish a New Drain
C.2 433-Agreement to Add Branches and Lands to Existing Drainage District
C.3 433-Agreement to Add Lands to Existing Drainage District
C.4 Engineer's Certification for Adequate Outlet
C.5 Example of Route and Course Exhibit

Appendix C.1

AGREEMENT TO ESTABLISH AN EXISTING PRIVATE DRAIN UNDER SECTION 280.433 (5), OF THE DRAIN CODE OF 1956, ACT 40

For the consideration of less than one hundred dollars ($100.00) this agreement was entered into on the _____ day of_____, 20_____, between _____ _____ and _____ (hereinafter referred to as the “Owner”), whose address is _____ _____ , _____, whose address is _____ (hereinafter referred to as the “Developer”) and the Sanilac County Drain Commissioner, whose address is 60 W. Sanilac, Room 201, Sandusky, MI 48471, (hereafter referred to as the "Drain Commissioner").

WHEREAS, the Developer's plan for a _____ calls for the construction of certain drainage facilities, and

WHEREAS, the only lands to be served by the proposed drainage facilities are those held entirely by the Owner and described as follows:

_____
_____
_____
_____
_____
,and

WHEREAS, it is desirable that proposed drainage facilities be established as a county drain, upon their completion, in accordance with Section 280.433 (5), of the Drain Code of 1956, State of Michigan.

NOW THEREFORE, it is agreed that the Drain Commissioner shall establish the county drain, the route and course of which is described as follows: SEE “EXHIBIT A”, and

---

IT IS FURTHER agreed that a certificate from a professional engineer to the effect that the existing outlet for the drain is the only reasonable available outlet for the drain and that there is sufficient capacity in the outlet for the existing drain to serve as an adequate outlet without detriment to or diminution of the drainage service which the outlet presently provides, (see attached certification that shall be signed and recorded with agreement)

IT IS FURTHER agreed that the Developer shall construct at his expense the proposed drain in accordance with the plans and specifications prepared by _____and approved by the Drain Commissioner, and IT IS FURTHER agreed that the Developer shall obtain in the name of the drainage district the necessary right-of-ways for the construction and maintenance of the drain, and forward the same, including necessary fees, to the Drain Commissioner for

recording with the Sanilac County Register of Deeds. Easements shall be in a form acceptable to the Drain Commissioner.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed as of the _____ day of _____, 20___ .
OWNER:
DEVELOPER:

(STATE OF MICHIGAN)
) ss:
(COUNTY OF SANILAC)

On this _____day of_____, 20___ , before me, a Notary Public in and for said County, personally appeared and to me to be the same person(s) who signed and is described in the above instrument, and acknowledged the same to be their free act and deed.

Notary Public,
_____County, MI
My commission expires:

STATE OF MICHIGAN

On this_____day of_____, 20 , before me, a Notary Public in and for said County, personally appeared _____, the Sanilac County Drain Commissioner, to me known to be the same person who signed, and is described in the above instrument, and acknowledged the same to be his free act and deed.

Notary Public, Sanilac County, MI
My commission expires:

Prepared by:

Return to: James Bowerman, Office of the Drain Commissioner 60 W. Sanilac, Room 201, Sandusky, MI 48471

Appendix C.2

AGREEMENT TO ADD BRANCHES OF AN EXISTING COUNTY DRAIN UNDER SECTION 280.433 (1-3), OF THE DRAIN CODE OF 1956, ACT 40

For the consideration of less than one hundred dollars ($100.00) this agreement was entered into on the _____ day of _____, 20___, between _____and _____ (hereinafter referred to as the "Owner"), whose address is _____ _____ , _____, whose address is _____ (hereinafter referred to as the "Developer") and the Sanilac County Drain Commissioner, whose address is 60 W. Sanilac, Room 201, Sandusky, MI 48471, (hereafter referred to as the "Drain Commissioner").

WHEREAS, the Developer's plans for a (residential subdivision, condominium development, commercial, etc) calls for the construction of certain drainage facilities to add branches to the _____ County Drain, and

WHEREAS, it is desirable that the proposed drainage facilities be established as part of the _____ County Drain upon completion, in accordance with Section 280.433, (1-3) of the Drain Code of 1956, State of Michigan,

NOW THEREFORE, it is agreed that the following described lands shall be added to the _____ Drainage District, which is described as follows:

NOW THEREFORE, it is agreed that the Drain Commissioner shall add branches to the _____ County Drain, the route and course of which is described as follows:

, and

IT IS FURTHER agreed that a certificate from a professional engineer to the effect that the existing outlet for the drain is the only reasonable available outlet for the drain and that there is sufficient capacity in the outlet for the existing drain to serve as an adequate outlet without detriment to or diminution of the drainage service which the outlet presently provides, (see attached certification that shall be signed and recorded with agreement)

IT IS FURTHER agreed that the Developer shall construct at his expense the proposed drain in accordance with the plans and specifications prepared by and approved by the Drain Commissioner, and

IT IS FURTHER agreed that the Developer shall obtain in the name of the drainage district the necessary right-of-ways for the construction and maintenance of the drain, and forward the same, including necessary fees, to the Drain Commissioner for recording with the Sanilac County Register of Deeds. Easements shall be in a form acceptable to the Drain Commissioner.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed as of the_____day of _____ , 20___ .
OWNER:
DEVELOPER:

(STATE OF MICHIGAN)
) ss:
(COUNTY OF SANILAC)

On this_____day of _____, 20__, before me, a Notary Public in and for said County, personally appeared and to me to be the same person(s) who signed and is described in the above instrument, and acknowledged the same to be their free act and deed.

Notary Public, Sanilac County, MI My commission expires:

STATE OF MICHIGAN

On this _____day of _____ , 20___, before me, a Notary Public in and for said County, personally appeared _____, the Sanilac County Drain Commissioner, to me known to be the same person who signed, and is described in the above instrument, and acknowledged the same to be his free act and deed.

Notary Public, Sanilac County, MI
My commission expires:

Prepared by:

Return to: James Bowerman, Office of the Drain Commissioner 60 W. Sanilac, Room 201, Sandusky, MI 48471

Appendix C.3

AGREEMENT TO ESTABLISH AN EXISTING PRIVATE DRAIN UNDER SECTION 280.433 (5), OF THE DRAIN CODE OF 1956, ACT 40

For the consideration of less than one hundred dollars ($100.00) this agreement was entered into on the _____ day of _____, 20___, between _____and _____ (hereinafter referred to as the “Owner”), whose address is _____ _____ , _____, whose address is _____ (hereinafter referred to as the “Developer”) and the Sanilac County Drain Commissioner, whose address is 60 W. Sanilac, Room 201, Sandusky, MI 48471, (hereafter referred to as the "Drain Commissioner").

WHEREAS, the Developer's plan for a (residential subdivision, condominium development, commercial development, etc.) calls for the construction to enlarge the district of the _____County Drain, and;

NOW THEREFORE, it is agreed that the following described lands shall be added to the _____Drainage District, which is described as follows:

, and

IT IS FURTHER agreed that a certificate from a professional engineer to the effect that the existing outlet for the drain is the only reasonable available outlet for the drain and that there is sufficient capacity in the outlet for the existing drain to serve as an adequate outlet without detriment to or diminution of the drainage service which the outlet presently provides, (see attached certification that shall be signed and recorded with agreement)

IT IS FURTHER agreed that the Developer shall assume payment of all expenses incurred by the Drain Commissioner to enlarge the existing drainage district, and

IT IS FURTHER agreed that the Developer shall obtain in the name of the _____ Drainage District the necessary right-of-ways for the construction and maintenance of the drain, and forward the same, including necessary fees, to the Drain Commissioner for recording with the Sanilac County Register of Deeds. Easements shall be in a form acceptable to the Drain Commissioner.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed as of the_____ day of _____, 20_____ .
OWNER:

DEVELOPER:

(STATE OF MICHIGAN)
) ss:
(COUNTY OF SANILAC)

On this_____day of _____, 20__, before me, a Notary Public in and for said County, personally appeared and to me to be the same person(s) who signed and is described in the above instrument, and acknowledged the same to be their free act and deed.

Notary Public, Sanilac County, MI
My commission expires:

STATE OF MICHIGAN

On this_____day of_____, 20____, before me, a Notary Public in and for said County, personally appeared _____, the Sanilac County Drain Commissioner, to me known to be the same person who signed, and is described in the above instrument, and acknowledged the same to be his free act and deed.

Notary Public, Sanilac County, MI
My commission expires:

Prepared by:

Return to: James Bowerman, Office of the Drain Commissioner 60 W. Sanilac,
Room 201, Sandusky, MI 48471

Appendix C.4: Engineer's Certification

A sample certification letter is displaced below. This certification shall be recorded with the 433-agreement:

Date

Sanilac County Drain Commissioner 60 W. Sanilac, Room 201, Sandusky, MI 48471

RE: Plat Name

"I,_____ , a Licensed Professional Engineer in the State of Michigan, certify that:

1 The lands to be developed naturally drain into the area served by the existing drain, or that the existing drain is the only reasonably available outlet for the drainage from the lands to be developed.

2 There is adequate capacity in the existing drain to service lands to be developed without detriment or diminution of drainage service provided or to be provided in the foreseeable future to the area in the proposed district.

_____, P.E.

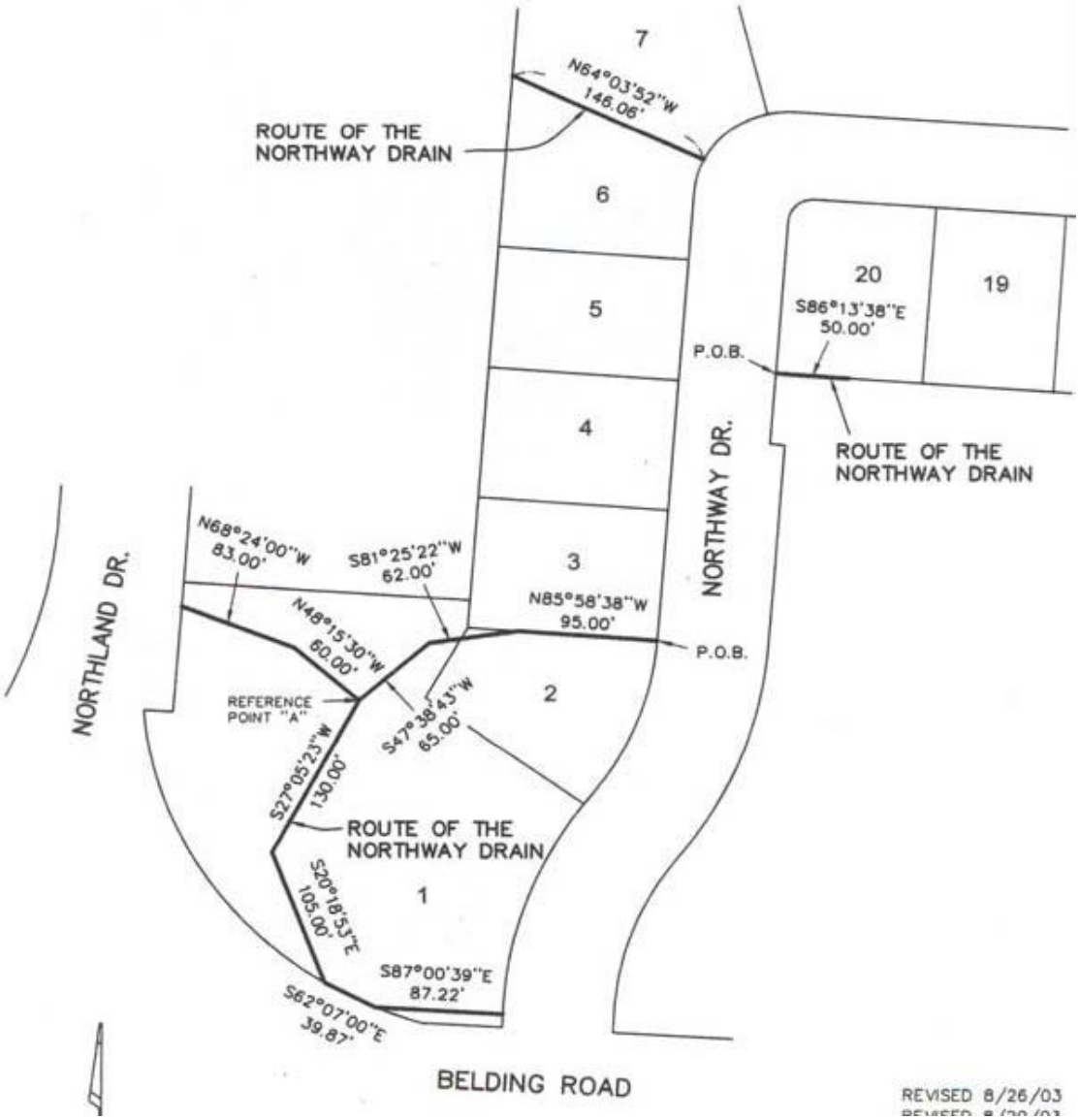
Registration No. _____

Appendix C.5

EXHIBIT "A"

Description of the Route of the Northway Drain:

Part of Lots 1, 2, 3, 6, 7, and 20, Northway Estates, part of the SE 1/4, Section 12, T8N, R11W, Plainfield Township, Kent County, Michigan, described as: BEGINNING at the NE corner of said Lot 2; thence N85°58'38"W 95.00 feet along the North line of said Lot 2; thence S81°25'22"W 62.00 feet; thence S47°38'43"W 65.00 feet to Reference Point "A"; thence S27°05'23"W 130.00 feet; thence S20°18'53"E 105.00 feet; thence S62°07'00"E 39.87 feet; thence S87°00'39"E 87.22 feet to the East line of Northway Drive and the place of ending of the route of the Northway Drain. Also, re-commencing at Reference Point "A"; thence N48°15'30"W 60.00 feet; thence N68°24'00"W 83.00 feet to the East line of Northland Drive and the place of ending of the route of the Northway Drain. Also, BEGINNING at the SW corner of said Lot 20; thence S86°13'38"E 50.00 feet along the South line of said Lot 20 to the place of ending of the route of the Northway Drain. Also, BEGINNING at the NE corner of said Lot 6, thence N64°03'52"W 146.06 feet to the NW corner of said Lot 6 and the place of ending of the route of the Northway Drain.



APPENDIX D

GRANT OF EASEMENT

IN CONSIDERATION OF LESS THAN ONE HUNDRED DOLLARS ($100.00), _____ and the Grantor(s), whose address is_____, conveys and releases to _____*Drainage District*, whose address is 60 W. Sanilac, Room 201, Sandusky, MI 48471 (the "District"), an irrevocable easement and right-of-way for drainage and/or drainage and floodway in which to construct, operate, maintain, repair, replace, and/or remove drains, sewers, storm drainage facilities, overland floodway, or any combination thereof, over, across, under and through the following parcel of land situated in Section _____ of _____ Township T__N, R__ E , Sanilac County, Michigan with a street address of _____, and legally described as follows:

LEGAL DESCRIPTION OF EASEMENT AND RIGHT-OF-WAY

The conditions of this easement are such that:

The District's rights and obligations are limited to the maintenance, repair, and replacement of the drainage facilities, in accordance with the provisions of the Drain Code. The cost of which may be assessed to the benefiting properties as shown on Exhibit MAP OF THE DRAINAGE DISTRICT.

No buildings, fences, shrubs, decorative landscaping or construction of any kind or nature shall be placed upon the easement and right-of-way without the prior written consent of the District.

The District, at its expense, shall have the right to remove or demolish any existing buildings, structures or fences on the parcel described above required by the reasonable exercise of the foregoing powers. By this conveyance the Grantor releases the District from any and all claims for damage arising from or incidental to the exercise of any of the foregoing powers, except that if the District shall disturb the parcel described above in the exercise of its foregoing powers, then the District shall restore the parcel with topsoil and seed. Fences, landscaping, structures or other obstructions installed, after the grant of the easement, within the easement by the property owner shall be replaced by the property owner at the expense of the property owner.

Should the District in the reasonable discharge of its obligations be required to enter upon the Parent Parcel it shall have the right to do so. If the District shall in the exercise of its foregoing powers disturb the Parent Parcel described above, then the District shall restore it to its original condition.

Prior to each exercise of rights granted herein, the District shall make reasonable

efforts to serve notice on the Grantor of its intent to enter upon the easement and right-of-way. In cases of emergency no prior notice need be given.

By this conveyance the Grantor releases the District from any and all claims for damage arising from or incidental to the exercise of any of the foregoing powers.

This Grant of Easement is intended to run with the land and shall be binding upon and shall inure to the benefit of the parties hereto, their respective heirs, personal representatives, successors and assigns and may not be amended or modified without prior written approval of the District. Any amendment or modification to this Grant of Easement shall be by an instrument in recordable form executed by both the Grantor and the District and recorded at the office of the Sanilac County Register of Deeds

Dated this ____day of_____, 20____ .
GRANTORS:
*

*
STATE OF MICHIGAN)

) ss.
COUNTY OF SANILAC)

The foregoing instrument was acknowledged before me this_____day of_____ , 20____ by and.

My Commission expires
Notary Public Sanilac County, MI

Drafted by:

APPENDIX E

DRAINAGE AND DETENTION BASIN EASEMENT

NAME OF PLAT

THIS INDENTURE, entered into this_____day of _____, 20___ by *DEVELOPER*, a Michigan Corporation, (hereafter referred to as the "Grantor"), and the *NAME OF PLAT* Drainage District, a public body corporate, 60 W. Sanilac, Room 201, Sandusky, MI 48471 (hereafter referred to as the "District")

WITNESSETH: WHEREAS, the Grantor is

developing certain property located in the *CITYorTWP*, County of Sanilac,

to be known as *NAME OF PLAT*, and

WHEREAS, the Grantor, in order to develop said property in the manner it desires, finds it necessary to construct a stormwater detention basin for the benefit of the property and to give the District certain easement rights therein.

NOW THEREFORE, in consideration of the respective convents contained herein, the parties agree as follows:

1 In consideration of less than one hundred dollars ($100.00), the receipt of which is hereby acknowledged, the Grantor does hereby grant, and convey to the District, an easement for stormwater detention over, across and within the following described land in the *CITY or TWP*, County of Sanilac, State of Michigan, described as follows:

2 The Grantor agrees for itself, it's heirs, administrators, successors, and assigns, that it shall be the property owner's responsibility to maintain the easement area grounds including the removal of debris in such a manner that the proper functioning of the detention basin is not interfered with, and that the property owner will not make any changes in size, shape, capacity, rate of flow, rate of outflow, or changes in any other characteristics of the detention pond without the prior written approval of the District, which approval can only be given by the way of amendment to this instrument, properly recorded. ***Also that no buildings, construction, fences, shrubs or decorative landscaping of any kind or nature shall be placed within the easement and right-of-way described above.***

3 The Drainage district shall be responsible for the maintenance and control of the hydraulic functioning of the detention basin pursuant to MPA 40, DRAIN CODE OF 1956, as amended, or successor statute. Cost for maintenance by the *NAME OF PLAT* DRAINAGE DISTRICT may be charged against the property owners within the plat pursuant to MPA 40, DRAIN CODE OF 1956, as amended, or its successor statute. The property owner on whose parcel the easement rests is responsible for the turf maintenance.

4 The Grantor, it's heirs, administrators, successors, and assigns, shall save and hold the District, it's officers, employees, and agents harmless and indemnify the District against any claim or suit which seeks damages for an injury, death, or damage resulting from the construction, operation and existence of the detention pond.

5 The District agrees to maintain the detention basin outlet in accordance with the

provisions under MPA 40, Drain Code of 1956, as amended.

6 It is further understood that a provision of these statutes allow the District to specially assess the property owners in the plat if it so chooses.

LEGAL DESCRIPTION of STORM WATER DETENTION EASEMENT

7 In the event the basin grounds are not properly maintained, or changes are made to the easement area pursuant to paragraph 2 above, which impair the function of the detention basin or drainage easement, the District may order the property owner(s), upon whose property the changes are located, or improper maintenance has occured, to make the necessary repairs or maintenance immediately. If such ordered repairs or maintenance are not completed within five (5) days, the District shall perform such maintenance or have such repairs made at the property owner's expense. All costs incurred by the District shall be billed to the property owner(s) and shall become a lien against the property(ies) in accordance with MPA 40, Drain Code of 1956, as amended.

Dated this ___ day of _____, 20__.

GRANTORS:
*

*
STATE OF MICHIGAN)

) ss.
COUNTY OF SANILAC)

The foregoing instrument was acknowledged before me this _____ day of _____ , 20__ by _____and _____ .

My Commission expires
Notary Public Sanilac County, MI

Drafted by:

APPENDIX F

RESTRICTIONS PURSUANT TO THE REQUIREMENTS
OF THE SANILAC COUNTY DRAIN COMMISSIONER

I. In accordance with Section 280.433 of the Michigan Drain Code (Act 40 of the Public Acts 1956, as amended) a special assessment drainage district has been created to provide for the maintenance of the county drain. The Drainage District consists of all lots within the plat. At some time in the future, the lots within the drainage district will be subject to a special assessment for the improvement or maintenance of the county drain. The drainage district boundary is shown on **Exhibit "A"** attached hereto.

II. Private Easements for the county drain have been granted to the Drainage District. The rights and obligations of said easements are recorded with the Sanilac County Register of Deeds office.

III. Critical drainage and overland floodway swales have been constructed through the rear yards of Lots ____ through ___. The floodways have been designed to carry storm water runoff overland in an emergency situation where the storm sewer system fails or has exceeded its capacity. Critical elevations have been established with the floodways. Minimum building opening elevations have been placed a foot above these critical floodway elevations. Any alteration of the grade could cause a potential flooding hazard to the home. **The elevations established in the design of these emergency overland drainage and floodway swales must be preserved**. Any alteration of the grade shall be restored to its original condition and design elevations. The direction of surface water drainage and critical floodway elevations are shown on the grading plan, **Exhibit "B"** attached hereto.

IV. Some of the lots in the subdivision are subject to private easements for drainage. Private easements for drainage are for the benefit of upland lots within the subdivision and any improper construction, development, or grading that occurs within these easements will interfere with the drainage rights of those upland lots. Private easements for drainage are for the continuous passage of surface drainage and each lot owner will be responsible for maintaining the surface drainage system across his property. No construction is permitted within a private easement for drainage. This includes swimming pools, sheds, garages, patios, decks or any other permanent structure or landscaping feature that may interfere with surface drainage. Further, during the final lot grading and landscaping the owner shall take care to ensure that the installation of fences, plantings, trees, and shrubs does not interfere with the surface drainage.

V. The direction of flow for the surface drainage for all lots is shown on the grading plan and block grading plan, **Exhibit "B"** attached hereto. A more detailed grading plan is available at the Drain Commissioner's Office at 1500 Scribner, Grand Rapids, MI 49504. It is the lot owner's responsibility to ensure that the final grading of the lot is in accordance with the grading plan.

VI. Minimum building opening elevations for the following lots are:

LOT NUMBER MINIMUM OPENING ELEVATION

VII. To eliminate the potential of structural damage due to flooding and back yard surface drainage the lot owner shall keep the lowest door or window sill above the minimum opening elevations listed above. The elevations are based on N.G.V. Datum, and bench mark described as follows:

VIII. BENCH MARK (*number*) ELEVATION (*number*)

i. (description)

IX. Each lot owner waives his claim against the Sanilac County Drain Commissioner, his employees and agents, the (*local unit of government),* and the Plattor from any and all claims, damage and obligation arising from the existence or operation of the drainage system.

APPENDIX G

APPLICATION AND PERMIT

For Crossing of __ or Connecting to __ an established County Drain (Check one)

Project Name: _____ Permit No. _____

(Office use only)

APPLICANT INFORMATION

Contact Name: _____

Agency Name: _____ Phone No. Home: _____

Address: _____ Phone No. Work: _____

City: _____ State: _____ Zip: _____

CONTRACTOR INFORMATION Name:

_____ Phone No. Work: _____ Agency Name:

_____ Address: _____

City: _____ State: _____ Zip: _____ ENGINEER INFORMATION

Name: _____ Phone No. Work: _____

Agency Name: _____

Address: _____

City: _____ State: _____ Zip: _____

LOCATION

Drain Name:

City/Township: _____ Section ___, T___N, R___W

Is there an access road to the project? Yes __ No __

If yes, type of road: Private __ Public __ Gravel __ Paved

Name of closest road intersections: _____

Is there a house/building or address visible from the road? (If so describe)

Describe the best and nearest visible landmark to the project site:

PROJECT DESCRIPTION

Provide a general description of the project (attach extra sheets if necessary): _____

PROJECT CONDITIONS

1 A **PERMIT FEE** in the amount of $10.00 must accompany the application. This fee does not guarantee a permit. Make checks payable to SANILAC COUNTY DRAIN COMMISSIONER.

2 The crossing/connection/relocation shall be constructed at the location, elevation, and manner shown on the drawing attached hereto, which is, hereby, made a part of this agreement.

3 All work done in connection with said construction shall be done in a good and workmanlike manner, and said drain shall be left in a good condition. Upon the completion of said construction, the contour shall be, as near as possible, the same as that which existed prior to the start of construction.

4 Care shall be exercised such that the drain shall be maintained and left unobstructed during construction so as to prevent the backing up of water which would cause flooding of adjacent land.

5 The applicant agrees to assume all liability for any loss or damage sustained by any person or property as a result of the operations performed under this permit. Further, the applicant agrees to repair any damage to said drain the cause of which might be the result of the construction herein described.

6 The applicant agrees that within 30 days after completion of the work described herein, the applicant will deliver to the Drain Commissioner a certificate stating that the work has been performed in accordance with the terms thereof.

7 The applicant agrees to notify the Drain Commissioner when the work described herein will commence so an inspector may be present, if necessary.

I certify, as applicant, I am the legal owner of the property for which this permit will serve/or I am the owner's authorized agent.

Signature: _____ Date: _____

___ Approved ___ Approved as noted

___ Revise and Resubmit ___ Not Approved Comments:

Signature: _____ Date: _____

APPENDIX H

As of January 30, 2007, review fee for submittals is as follows:

Preliminary Plat: ____ or less lots $_____, ____ or more lots $_____/lot
Resubmittal Fee Expired Preliminary plat $_____
Redesign or conceptual change* $_____

* If there has been a redesign or conceptual change from that of the original submittal which requires an extensive review.

Mobile Home Park $_____
Apartments & Condominiums $_____
Site Condominiums $_____
Industrial/Commercial Development: _____ acres or less $_____
_____ acres or more
$_____
Permit Fee: Permit to cross a county drain with utilities, road, drives, etc.
$ _____**
**If a violation occurs which results in the permit being revoked, a new permit must be obtained and a new fee paid. $_____
Final Inspection Fee - Plats $_____

APPENDIX B.4

SCDC DRAIN CROSSING PERMIT APPLICATION

CONFIDENTIAL: DO NOT DISTRIBUTE

Sanilac County Drain Commissioner
60 W. Sanilac Avenue, Room 201, Sandusky, MI 48471 (810) 648-4900

PERMIT FOR CROSSING A COUNTY DRAIN AND/OR COUNTY DRAIN EASEMENT

NAME OF DRAIN				APPLICATION DATE	
PERMIT NUMBER		DATE ISSUED		CONSTRUCTION EXPIRATION DATE	
MUNICIPALITY		SECTION		PARCEL ID AFFECTED	
FEE PAID		DEPOSIT PAID		RECEIPT #	

AUTHORITY IS HEREBY GRANTED TO:

PERMITTEE / OWNER:		**CONTRACTOR / ENGINEERS**	

SCOPE OF WORK SUMMARY:

APPROVED PLAN REFERENCE:

WORK TO BE DONE UNDER AUTHORITY OF THIS PERMIT IS SUBJECT TO THE FOLLOWING CONDITIONS:

1.	Permittee/Owner agrees that Work shall not commence on the Drain or in the Drain Easement without payment of the **$250.00 permit application fee** and prior notice of at least ten (10) business days to the Sanilac County Drain Commissioner's Office.
2.	Permittee/Owner shall not commence the Work within the Drain without a Sanilac County Drain Office inspector present. Permittee/Owner is responsible for all costs incurred by the Drain Commissioner for the inspection. A **$1,000.00 deposit** shall be placed with the Drain Commissioner prior to the commencement of the Work. The Drain Commissioner may require an additional deposit prior to the acceptance of the Work if the costs incurred exceed the initial deposit amount. Any unused portion of the deposit shall be returned to Permittee/Owner one (1) year after completion and acceptance of the Work. Checks shall be made out to the Drainage District.
3.	Permittee/Owner shall post at the entrance of the work site, a copy of the issued Permit, which shall be available for inspection at all times during the course of the Work on the Drain or within the Drain Easement.
4.	Permittee/Owner agrees to provide the Drain Commissioner with one copy of *as-built drawings* of the Work performed on the Drain and in the Drain Easement within 30 days after the Work in this Permit is completed. The as-built drawings shall be sealed by a professional engineer licensed in the State of Michigan and shall indicate location and elevations of any Drain crossings, show the Drain Easement, and all other relevant information for the authorized encroachment of the Drain Easement. The as-built drawings shall be submitted on paper and in digital format (CD/AutoCAD). If Permittee/Owner fails to provide the as-built drawings within the required time, the Drainage District are authorized to have the as-built drawings prepared, and the Permittee/Owner agrees to be responsible for all costs involved.
5.	Permittee/Owner agrees to hold harmless, indemnify and pay the costs to defend the Drainage District, the Drain Commissioner and their agents, employees and/or contractors from any and all actual damages arising out of the Work and the existence of the Utility within the Drain Easement and all actual damages or claims for damages to person or property arising from the Work on and/or use of the Utility in the Drain Easement.
6.	Permittee/Owner shall be responsible for payment of the application fee, together with any costs incurred by the Drainage District arising from this Permit, including but not limited to, engineering, inspection, legal, enforcement and administrative fees, incurred in the preparation of this Permit, and any services rendered attendant thereto. Payment shall be due upon receipt of invoices.
7.	***This Permit does not waive the necessity for Permittee/Owner to obtain all other required federal, state, or local permits, specifically including any Soil Erosion and Sedimentation Control permits issued by***

the Sanilac County Department of Construction SESC Agency. May require permission from land owner(s).

8. ***Specific conditions to the Permit include the following:***

A. Permittee/Owner will install proposed utility **10'** below the side slope and historic bottom of an open drain and/or **10'** below the bottom of a culvert or tile drain.

B. All construction work and restoration shall meet the soil erosion and sedimentation requirements of the Soil Erosion & Sedimentation Control Agency. All work shall be done in accordance with the Michigan Association of County Drain Commissioner's Soil Erosion and Sedimentation Control, Authorized Public Agency Procedures Manual.

C. Restoration of open drains shall be done using non-woven filter fabric and plain stone rip-rap stone to protect the trench from erosion. Rip rap shall meet MDOT specifications.

9. Permittee/Owner shall contact Michigan MISS DIG SYSTEM prior to the commencement of Work and shall follow all MISS DIG SYSTEM requirements in performing the Work. The MISS DIG SYSTEM date of call and docket number shall be furnished to the Drain Commissioner's Office before the Work commences.

10. There is to be no obstruction of flow of water in the Drain as defined in Sections 421 and 422 of the Drain Code, MCL 280.421 and 280.422, during performance of the Work unless specifically authorized by the Drainage District in writing consistent with the approvals granted under this Permit.

11. Upon completion of the Work by Permittee/Owner, Permittee/Owner shall notify the Drain Commissioner. Prior to approval of the Work as complete, Permittee/Owner agrees to perform any restoration activities required by the Drain Commissioner. If, in the Drain Commissioner's discretion, the Work is complete, the Drain Commissioner shall notify Permittee/Owner of the acceptance of the Work as complete.

12. Unless specified by this Permit, Permittee/Owner shall not make any other improvements, or perform any other activities, on the Drain or in the Drain Easement, without the prior written consent of the Drain Commissioner.

13. Permittee/Owner shall furnish the Drainage District with evidence of liability insurance in the amount of at least One Million Dollars ($1,000,000.00) per occurrence covering the Work performed by Permittee/Owner under this Permit, which may be accomplished by way of excess or umbrella policies. The insurance shall be written by a company rated by A.M. Best Company requiring an "A-" or better rating. The Certificate of Insurance shall be provided to the Drain Commissioner before the commencement of any Work. The insurance policy shall provide for a ten (10) day "Prior Notice Termination" provision in favor of the Drainage District. The Drainage District, the Sanilac County Drain Commissioner, and Sanilac County shall be named as additional insureds on the policy. Such insurance may be only be terminated upon written approval of the Drain Commissioner.

14. Permittee/Owner agrees that should the Drain require maintenance or improvement in the future that requires the relocation of the Utility within the Drain or the Drain Easement, the Utility shall be relocated in a timely manner upon the written request of the Drain Commissioner at the sole cost of Permittee/Owner, unless the Permittee/Owner and the Drain Commissioner otherwise agreed to by the Drain Commissioner. The Permittee/Owner shall pay for all additional costs incurred by the Drainage District for the maintenance and improvement of the Drain as a result of the Utility's location within the Drain and/or Drain Easement.

15. Permittee/Owner is responsible for any increased costs to the Drainage District for the operation, maintenance or improvement of the Drain due to the existence of the Encroachments in the Drain Easement. Permittee/Owner further agrees that should the Drain require maintenance or improvement in the future that requires the relocation of the Encroachments or the Drain Easement, the Encroachments shall be relocated in a timely manner upon the written request of the Drain Commissioner at the sole cost of Permittee/Owner.

16. This Permit is binding on Permittee/Owner, its heirs, assigns, and successors in interest. This Permit is not assignable without the written consent of the Drain Commissioner, which shall not be unreasonably withheld.

17. Violation of any of these specified terms and conditions shall constitute a breach of this Permit to which the Drainage District and/or the Drain Commissioner may direct the relocation or reconstruction of the Work within the Drain Easement to comply with the terms of this Permit, with all reasonable and necessary costs, including but not limited to construction, engineering, legal, inspection and enforcement, to be paid by Permittee/Owner.

18. The commencement of the Work under this Permit shall constitute an acceptance by Permittee/Owner of the terms and conditions set forth in this Permit.

DATE	DOUG SWEET, DRAIN COMMISSIONER