Final Report
Pheasant Branch Watershed Study

City of Madison, WI
October 26, 2022

Table of Contents

List of Figures 7
Appendices 9
List of Abbreviations 10
Executive Summary 12
Background 12
City's Flood Mitigation Targets 12
Existing Conditions Results 13
Proposed Solutions and Cost 13
Proposed Solutions Results 14
Section 1 Introduction 16
1.1 Project Background and Purpose 16
1.2 Historic Flooding in the Watershed 16
1.3 Flood Mitigation Targets 17
Section 2 Water Resources Inventory 18
2.1 Study Setting 18
2.2 Topography 18
2.3 Constructed Drainage System 18
2.4 Existing Natural Drainage and Storage 19
2.5 Runoff Conditions 19
2.5.1 Land Use 19
2.5.2 Impervious Area 20
2.5.3 Soil Types and Noted Geologic Formations 21
Section 3 Guidance and Data Sources 22
3.1 City of Madison Model Guidance 22
3.2 List Data Sources 22
Section 4 Model Development 24
4.1 Modeling Software 24
4.2 Rainfall Files 24
4.2.1 Design Rain Events 24
4.2.2 Measured Rain Events 24
4.3 Hydrologic Model Development 25
4.3.1 SWMM Runoff Description 25

4.3.2 Subwatershed Input Data 26
4.4 Hydraulic Model Development 29
4.4.1 Open Channel Conveyance System 29
4.4.2 Closed Conduit Conveyance System–Storm Sewers and Culverts 29
4.4.3 Existing Inlet Capacity 30
4.4.4 Existing Detention Ponds 30
4.4.5 Open Water/Backwater Effects 30
4.5 2D Hydraulic Model Development 30
4.5.1 Description of Areas Modeled in 2D 30
4.5.2 Topographic Data 30
4.5.3 2D Grid 31
4.5.4 2D Land Use and Roughness Values 31
4.5.5 Inactive Areas 31
4.5.6 1D/2D Interface 31
4.5.7 2D Boundary Conditions 32
4.5.8 Model Review No. 1 32
4.6 Existing Conditions Non-Calibrated Model Results 32
Section 5 Model Calibration 33
5.1 Monitored Pond Level and Flow Data 33
5.2 Selected Runoff Events 34
5.2.1 August 2018 Storm Event 34
5.2.2 2019 Monitoring Storm Events 34
5.3 Calibration Process 34
Blackhawk Neighborhood 35
Target Area 35
Sauk Creek Greenway 35
Continued Monitoring 36
5.4 Calibration Results 36
5.5 Review No. 2 36
5.6 Calibration Conclusions 36
Section 6 Model Results 37
6.1 Existing Conditions Calibrated Model Results 37
6.2 Model Results Evaluation 37

6.2.1 Comparison to City Flood Control Targets 37
6.2.2 Comparison to Known Flooding in Watershed 38
6.2.3 Comparison to Focus Group Flooding Reports 38
6.4 Model Uncertainty 38
Section 7 Public Engagement 40
7.1 Public Information Meetings 40
7.2 Focus Group Meetings 41
7.3 Public Comment Period 41
Section 8 Proposed Solutions Considerations 42
Section 9 Proposed Solutions Development 43
9.1 Overall Evaluation Process Methodology 43
9.1.1 Data Review 43
9.1.2 Solution Brainstorming 43
9.1.3 Evaluation of Potential Solutions 43
9.1.4 Discussion of Potential Solutions with City Engineering Staff 45
9.1.5 Convergence on Solutions 45
9.1.6 City Agency Meetings 45
9.1.7 Finalization of Solutions 45
9.1.8 Proposed Solutions Model Quality Assurance/Quality Control (QA/QC) 45
9.2 Description of Solutions Considered 45
9.2.1 Big Picture/Theoretical 46
9.2.2 Solutions Reviewed–Not Recommended 48
9.2.3 Solutions Reviewed–Recommended 49
Section 10 Recommended Solutions 52
10.1 Local Storm Sewer Improvements 52
Detailed Project Description 52
Associated Flood Reduction Benefits 52
Project Constraints/Considerations 52
Water Quality Benefits 53
Additional Notes/Information 53
10.2 Terrance Inlets 53
Detailed Project Description 53
Associated Flood Reduction Benefits 53

Project Constraints/Considerations 53
Water Quality Benefits 53
Additional Notes/Information 53
10.3 Old Sauk Trails Business Park Ponds and Greenway Reconstruction 54
10.3.1 Detailed Project Description 54
10.3.2 Associated Flood Reduction Benefits 54
10.3.3 Project Constraints/Considerations 54
10.3.4 Water Quality Benefits 55
10.4 Pleasant View Road Reconstruction 55
10.4.1 Detailed Project Description 55
10.4.2 Associated Flood Reduction Benefits 55
10.4.3 Project Constraints/Considerations 55
10.4.4 Water Quality Benefits 55
10.5 Swallowtail Pond Reconstruction 56
10.5.1 Detailed Project Description 56
10.5.2 Associated Flood Reduction Benefits 56
10.5.3 Project Constraints/Considerations 56
10.5.4 Water Quality Benefits 56
10.6 Blackhawk Pond Reconstruction 56
10.6.1 Detailed Project Description 56
10.6.2 Associated Flood Reduction Benefits 56
10.6.3 Project Constraints/Considerations 56
10.6.4 Water Quality Benefits 57
10.7 Wexford Pond and Greenway Reconstruction 57
10.7.1 Detailed Project Description 57
10.7.2 Associated Flood Reduction Benefits 57
10.7.3 Project Constraints/Considerations 57
10.7.4 Water Quality Benefits 57
10.8 Sauk Creek Greenway Stabilization 58
10.8.1 Detailed Project Description 58
10.8.2 Associated Flood Reduction Benefits 58
10.8.3 Project Constraints/Considerations 58
10.8.4 Water Quality Benefits 58

10.9 Target Area Relief Sewer 59
10.9.1 Detailed Project Description 59
10.9.2 Associated Flood Reduction Benefits 59
10.9.3 Project Constraints/Considerations 59
10.9.4 Water Quality Benefits 59
10.10 Old Sauk Road/Westfield Road Intersection Reconstruction 59
10.10.1 Detailed Project Description 59
10.10.2 Associated Flood Reduction Benefits 59
10.10.3 Project Constraints/Considerations 59
10.10.4 Water Quality Benefits 60
10.11 Greenway Crossing Reconstruction 60
10.11.1 Detailed Project Description 60
10.11.2 Associated Flood Reduction Benefits 60
10.11.3 Project Constraints/Considerations 60
10.11.4 Water Quality Benefits 60
10.12 Review No. 3 60
Section 11 Evaluation of Model Results with Recommended Solutions Implemented 61
11.1 Comparison to City Flood Control Targets with Recommended Solutions 61
11.1.1 Pipe Capacity 61
11.1.2 Inlet Capacity 61
11.1.3 Street Flooding 61
11.1.4 Structure Flooding 62
11.1.5 Greenway Crossings 62
11.2 Improvements to Known Flooding in Watershed from Recommended Solutions 62
Section 12 Areas Flood Control Targets are Not Met 65
Section 13 Cost Estimating 67
Section 14 Implementation Sequence 69
14.1 Technical Implementation Needs 69
14.2 Citywide Implementation Prioritization 69
Section 15 References 70

List of Figures

Figure ES-1. Streets not Meeting Target; Existing Conditions; 4 percent Chance Event

Figure ES-2. Streets not Meeting Target; Proposed Conditions; 4 percent Chance Event

Figure 1-1. Study Location

Figure 1-2. Watershed

Figure 1-3. Flood Report Locations

Figure 1-4. City Staff Flood Report Locations

Figure 2-1. Land Use

Figure 2-2. Impervious Area Delineation Data

Figure 2-3. Hydrologic Soil Groups

Figure 2-4. Prairie du Chien Geologic Group

Figure 4-1. Rain Gage Locations

Figure 4-2. Subwatersheds

Figure 4-3. Stormwater Conveyance System

Figure 4-4. 2D Model Roughness

Figure 4-5. Model Results Reporting Locations

Figure 5-1. Flow and Level Monitoring Locations

Figure 5-2. August 2018 Recorded High Water Mark Locations

Figure 6-1. Existing Conditions 100 Percent Chance Event Inundation Mapping

Figure 6-2. Existing Conditions 50 Percent Chance Event Inundation Mapping

Figure 6-3. Existing Conditions 20 Percent Chance Event Inundation Mapping

Figure 6-4. Existing Conditions 10 Percent Chance Event Inundation Mapping

Figure 6-5. Existing Conditions 4 Percent Chance Event Inundation Mapping

Figure 6-6. Existing Conditions 2 Percent Chance Event Inundation Mapping

Figure 6-7. Existing Conditions 1 Percent Chance Event Inundation Mapping

Figure 6-8. Existing Conditions 0.5 Percent Chance Event Inundation Mapping

Figure 6-9. Existing Conditions 0.2 Percent Chance Event Inundation Mapping

Figure 6-10. Streets not meeting 10 Percent Chance Event Target

Figure 6-11. Streets not meeting 4 Percent Chance Event Target

Figure 7-1. Focus Group Areas

Figure 7-2. Public Outreach Summary

Figure 9-1. Solutions Evaluated but Not Recommended

Figure 9-2. Recommended Solutions (Overview)

Figure 10-1. Proposed Local Sewer Upgrades
Figure 10-2. Terrace Inlet Reconstruction Locations
Figure 10-3. Old Sauk Trails Business Park Pond and Greenway Reconstruction
Figure 10-4. Pleasant View Road and Swallowtail Park Pond Reconstruction
Figure 10-5. Blackhawk Pond Reconstruction
Figure 10-6. Wexford Pond Reconstruction
Figure 10-7. Sauk Creek Greenway Stabilization
Figure 10-8. Target Area Relief Sewer
Figure 10-9. Old Sauk Road/Westfield Road Intersection Reconstruction
Figure 10-10. Greenway Crossing Improvement Overview
Figure 10-11. Sauk Creek to N High Point Road and Wexford Pond (Greenway Crossing)
Figure 10-12. S High Point Road South of Tree Lane (Greenway Crossing)
Figure 10-13. N High Point Road West of Wexford Pond (Greenway Crossing)
Figure 10-14. Old Sauk Road South of Wexford Pond (Greenway Crossing)
Figure 10-15. Tree Lane East of S High Point Road (Greenway Crossing)
Figure 10-16. Tree Lane West of S High Point Road (Greenway Crossing)
Figure 10-17. Westfield Road (Greenway Crossing)
Figure 10-18. Beltline Downstream of Wexford Pond (Greenway Crossing)
Figure 11-1. Proposed Conditions Reporting Locations
Figure 11-2. Proposed Conditions 100 Percent Chance Event Inundation Mapping
Figure 11-3. Proposed Conditions 50 Percent Chance Event Inundation Mapping
Figure 11-4. Proposed Conditions 20 Percent Chance Event Inundation Mapping
Figure 11-5. Proposed Conditions 10 Percent Chance Event Inundation Mapping
Figure 11-6. Proposed Conditions 4 Percent Chance Event Inundation Mapping
Figure 11-7. Proposed Conditions 2 Percent Chance Event Inundation Mapping
Figure 11-8. Proposed Conditions 1 Percent Chance Event Inundation Mapping
Figure 11-9. Proposed Conditions 0.5 Percent Chance Event Inundation Mapping
Figure 11-10. Proposed Conditions 0.2 Percent Chance Event Inundation Mapping

Appendices

Appendix A. Model Guidance

Appendix B. Hydrologic Factors

Appendix C. Hydraulic Input Factors

Appendix D. Existing Conditions Flood Depths and Peak Flow Results

Appendix E. Focus Group Summaries

Appendix F. Green Infrastructure Analysis

Appendix G. Meeting Summary – Meeting with Parks regarding Blackhawk Pond Reconstruction

Appendix H. Water Quality Modeling Information

Appendix I. Proposed Watershed Peak Water Surface Elevations and Peak Flows

Appendix J. Planning Level Cost Estimates

Appendix K. Public Comments and Response to Comments

List of Abbreviations

1D	One-Dimensional
2D	Two-Dimensional
ATC	American Transmission Company
CMP	corrugated metal pipe
cfs	cubic feet per second
CIP	Capital Improvement Plan
City	City of Madison
DCIA	directly connected impervious area
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
H&H	hydrologic and hydraulic
GI	Green Infrastructure
GIS	Geographic Information System
gpm	gallons per minute
HERCP	horizontal elliptical reinforced concrete pipe
HSG	hydrologic soil group
LiDAR	light detecting and ranging
LOS	Level of Service
MG&E	Madison Gas and Electric
MPO	Metropolitan Planning Organization
MSE	Midwest/Southeast States
NAVD88	North American Vertical Datum of 1988
NOAA	National Oceanographic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
PFCI	Peak Flow Control Infrastructure
PIM	Public Information Meeting
QA/QC	quality assurance/quality control
RCP	reinforced concrete pipe
ROW	right-of-way
SAS	storm access structure
SLU	standard land use
STH	State Highway

SWMP	stormwater management plan
TIN	triangular irregular network
USGS	United States Geological Survey
UW	University of Wisconsin
VC	Volume Control
WDNR	Wisconsin Department of Natural Resources
WSE	Water Surface Elevation
WisDOT	Wisconsin Department of Transportation
WPDES	Wisconsin Pollutant Discharge Elimination System
XP-SWMM	Autodesk (formally XP-Solutions) Stormwater Management Model

Executive Summary

Background

Recognizing the changing rain patterns, and likelihood of more frequent future large rain events, the City of Madison (City) is conducting a multifaceted approach to address stormwater flooding. As one component of that approach, the City is developing comprehensive stormwater management studies for each watershed within the City. The comprehensive watershed studies are conducted in two phases. Throughout both phases, the City incorporates multiple opportunities for public involvement and interaction.

Phase 1: Development of a hydrologic/hydraulic stormwater runoff model representing the physical and drainage properties of the watershed under existing conditions. The model is then calibrated to measured runoff events and used to identify the areas of the watershed most likely to flood under various rain conditions.

Phase 2: Using the model, alternative methods and/or infrastructure improvements are evaluated to eliminate or reduce flooding impacts from large rain events.

It should be noted that the improvements documented in this report are not meant to be full design-level efforts; they are conceptual solutions that help the City's Engineering Division understand the magnitude of solution needed in a given area to meet the targets. As projects are looked at further, and if they move to the point they are contemplated for programming, then projects will then go into a more detailed design phase. This project phase collects detailed data needed for design and looks at refined design, permitting, and environmental issues associated with the particular project.

This document reports the methods, procedures, and results from Phase 1 of the Pheasant Branch Watershed project. The project area covers approximately 3,300 acres (5.2 square miles). The watershed consists of three distinct areas: 1) Blackhawk, 2) Old Sauk Trails, and 3) Wexford.

Figure 1 shows the extent of the project area.

City's Flood Mitigation Targets

The analyses conducted for the watershed studies referred back to the City's flood mitigation targets to understand where targets were being met and where there is room for improvement. The City has the following flood mitigation targets. Please note, these targets may change in the future as more information becomes available.

1. No home or business flooding during the 1 percent chance, 24-hour design storm event (6.6 inches).
2. Eliminate flooding (surcharging of the storm sewer system onto the municipal streets) for up to the 10 percent chance, 24-hour design storm event (4.1 inches), with the exception of road low points.
3. Allow no more than 0.5 feet of stormwater ponding above storm sewer inlet rim elevations at inlet-restricted low points for the 10 percent chance, 24-hour design storm event (4.1 inches).
4. Maintain drivability of municipal streets (center of the street with no more than 0.2 feet of water) for the 4 percent chance, 24-hour design storm event (5.0 inches).

5. Enclosed depressions should provide safe storage, or overflow, of stormwater during the 1 percent chance, 24-hour design storm event (6.6 inches). Flooding should be contained within public lands (streets, greenways, easements, etc.).
6. Where greenways cross streets, there should be no road overtopping during the 1 percent chance, 24-hour design storm event (6.6 inches).
7. Flooding solutions should not negatively impact downstream properties.

Existing Conditions Results

The results of the existing conditions analysis indicates there are numerous locations where the City's flood mitigation targets are not met:

1. 10 percent chance storm event (10-year design storm)
   a. 10.3 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 19 percent of the streets in the watershed.
2. 4 percent chance storm event (25-year design storm)
   a. 2.9 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 6 percent of the streets in the watershed.
3. 1 percent chance storm event (100-year design storm)
   a. 118 structures out of 2,920 structures in the watershed do not meet the target. This equates to 4 percent of the structures in the watershed.
   b. 14 out of 14 greenway crossings in the watershed do not meet the target. This equates to 100 percent of the greenway crossings in the watershed.

Figure ES-1 shows surface flooding locations under the 4 percent chance storm event and how the performance of the stormwater conveyance system compares to the City's flood mitigation targets.

Proposed Solutions and Cost

Following the existing conditions analysis, an extensive process was conducted to brainstorm, evaluate, and ultimately identify solutions to meet the City's flood mitigation targets. The following table lists the solutions that were recommended, along with estimated design and construction cost for each. Figures depicting each solution can be found later in this report.

Table ES-1. Proposed Solution Design and Construction Cost

Project Name	**Design and Construction Cost ($)**
Old Sauk Trails (OSTr) Business Park Pond and Greenways	$9,178,000
Old Sauk Trails Ponds	*$3,074,000*
Old Sauk Trails East Greenway	*$1,714,000*
Old Sauk Trails West Greenway	*$475,000*
Deming Way west of OSTr Ponds (Culverts)	*$570,000*
Driveway to OSTr Ponds (Culverts)	*$145,000*
Deming Way north of OSTr Ponds (Culverts)	*$1,570,000*
In OSTr Ponds (Culverts)	*$580,000*
Fourier Drive east of OSTr Ponds (Culverts)	*$1,050,000*

Swallowtail Pond Reconstruction	$2,373,000
Swallowtail Pond	*$2,203,000*
*Pleasant View Road (Greenway Crossing)**	*$170,000*
Blackhawk Pond Reconstruction	$6,990,000
Blackhawk Pond	*$5,326,000*
Blackhawk Outlet Structure and Overflow	*$1,665,000*
Wexford Pond and Greenway Reconstruction	$4,784,000
Sauk Creek Greenway Reconstruction	$4,000,000
Target Pond Relief Sewer	$11,105,000
Old Sauk Trail/Westfield Intersection Reconstruction	$1,938,000
High Point Road west of Wexford Pond (Greenway Crossing)	$739,000
High Point Road from Sauk Creek to Wexford Pond (Greenway Crossing)	$9,768,000
Old Sauk Road (Greenway Crossing)	$664,000
Westfield Road (Greenway Crossing)	$416,000
Tree Lane east of High Point Road (Greenway Crossing)	$1,167,000
High Point Road south of Tree Lane (Greenway Crossing)	$769,000
Tree Lane west of High Point Road (Greenway Crossing)	$711,000
Beltline downstream of Wexford Pond (Greenway Crossing)	$5,390,000
Local sewer upgrades	$15,086,000
Total	**$75,079,000**

Note: Italics indicate sub-projects within a larger, overall project.

Proposed Solutions Results

As the proposed solutions were being evaluated, they were compared to the flood mitigation targets. The proposed conditions analysis found the following when compared to the City's flood mitigation targets:

1. 10 percent chance storm event
   a. 1.0 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 2 percent of the streets in the watershed. This is a reduction of 17 percent.
2. 4 percent chance storm event
   a. 0.8 lane-miles out of the 52.1 lane-miles of streets in the watershed do not meet the target. This equates to 2 percent of the streets in the watershed. This is a reduction of 4 percent.
3. 1 percent chance event
   a. 57 structures out of 2,920 structures in the watershed do not meet the target. This equates to 2 percent of the structures in the watershed. This is a reduction of 2 percent.
   b. 14 out of 14 greenway crossings in the watershed meet the target. This equates to 100 percent of the greenway crossings in the watershed. This is a reduction of 100 percent.

There are still locations where the flood mitigation targets are not met. The targets cannot be met for various reasons including lack of physical space, topographic relief limitations, and land use change concerns. Information can be found in Section 12 of this report.

Figure ES-2 depicts the flood control summary within the watershed with the recommended solutions implemented. It shows surface flooding locations under the 4 percent change storm event and how the performance of the improved stormwater conveyance system compares to City's flood mitigation targets with the recommended solutions in place.

Section 1 Introduction

1.1 Project Background and Purpose

The City of Madison (City) has experienced increased frequency and intensity of rainfall events over the past ten to 15 years. In August 2018, an unprecedented rainfall event occurred on the City's west side. A nearby United States Geological Survey (USGS) rain gauge recorded 10.5 inches of rain over a 12-hour period. For reference, National Oceanographic and Atmospheric Administration (NOAA) Atlas 14 statistics show the 12-hour, 0.1-percent chance recurrence interval storm at 8.92 inches for the Madison area. This event caused flash flooding, most significantly across the western half of the City, and prompted the City to begin a comprehensive watershed planning process.

This process began with watersheds hardest hit by 2018 flooding and included the area identified as the Pheasant Branch Watershed. The City began the Pheasant Branch Watershed study in April 2019.

The overall purpose of this study is to develop a comprehensive stormwater management plan (SWMP) for the Pheasant Branch Watershed that will guide the City in meeting its flood mitigation targets. This document describes the study's methodology, approach, and results. It documents the following:

1. Development of input parameters for the watershed's hydrologic and hydraulic (H&H) model,
2. Construction of the stormwater H&H model,
3. Calibration process for that model,
4. Modeling results showing flooding under the watershed's existing physical conditions,
5. Analyses of alternative flood mitigation measures,
6. Flood reductions that can be expected from those mitigation measures, and
7. Specific recommendations for flood reduction actions.

Figure 1-1 shows the location of the study area within the City. Figure 1-2 provides a more detailed view of the watershed.

1.2 Historic Flooding in the Watershed

Within the Pheasant Branch Watershed, there are several areas that have experienced flooding in the past. Figure 1-3 depicts known flooding reports provided by the City in the Pheasant Branch watershed. The known flooding locations include flood reports from a variety of data sources, including resident reports, emergency services reports, operations staff reports, and inlets with repetitive clogging history. These flood reports are limited to areas within the City (City of Middleton areas are not included).

Known flooding locations from the August 2018 storm event were discussed with City staff at a meeting on February 27, 2020. Figure 1-4 identifies the locations that were discussed during the meeting. A summary of the flooding locations discussed at the meeting are described below:

1. Intersection of Watts Road and Plaza Drive – Commerce Park Pond overtopped
2. Intersection of Commerce Avenue and Plaza Drive – Flooding approximately 3 feet deep
3. Menards Parking Lot – Flooding approximately 1 to 2 feet deep
4. Trek Store – 1 to 2 feet of water inside store
5. Elderberry Road and Augusta Drive flooded
6. Woodstone Ponds overtopped

7. Willows pond overtopped into enclosed depression
8. Greystone Pond, Southwest Blackhawk Pond, and the farm field south of Old Sauk Road all had the same water surface elevation (equalized across all areas)
9. Westfield Road and Old Sauk Road flooded
10. Sawmill Road and Tramore Trail flooded
11. N High Point Road flooded
12. Old Sauk Trails Business Park – Culverts at Fourier Drive and Deming Way overtopped. Several buildings within the business park flooded.
13. Cemetery by Mineral Point Road and Westfield Road – drained onto adjacent property and caused flooding

1.3 Flood Mitigation Targets

The City established consistent targets for stormwater management flood control (Level of Service or [LOS]) throughout the City. It is the City's policy to meet the LOS with reconstruction and new construction of its municipal stormwater conveyance system. Specifically, the LOS stormwater flood management targets are:

1. No home or business flooding during the 1 percent chance, 24-hour design storm event (6.6 inches).
2. Eliminate flooding (surcharging of the storm sewer system onto the municipal streets) for up to the 10 percent chance, 24-hour design storm event (4.1 inches), with the exception of road low points.
3. Allow no more than 0.5 feet of stormwater ponding above storm sewer inlet rim elevations at inlet-restricted low points for the 10 percent chance, 24-hour design storm event (4.1 inches).
4. Maintain drivability of municipal streets (center of the street with no more than 0.2 feet of water) for the 4 percent chance, 24-hour design storm event (5.0 inches).
5. Enclosed depressions should provide safe storage, or overflow, of stormwater during the 1 percent chance, 24-hour design storm event (6.6 inches). Flooding should be contained within public lands (streets, greenways, easements, etc.).
6. Where greenways cross streets, there should be no road overtopping during the 1 percent chance, 24-hour design storm event (6.6 inches).
7. Flooding solutions should not negatively impact downstream properties.

It should be noted that although the City strives to meet the above targets with each of its stormwater infrastructure projects, fully achieving these targets is not always feasible because of specific site conditions or other factors which cannot be controlled.

Section 2 Water Resources Inventory

2.1 Study Setting

The Pheasant Branch Watershed is located on the far west side of the City and extends into the city of Middleton (see Figure 1-1) and covers approximately 3,300 acres. The extent of the watershed is shown on Figure 1-2. The watershed project area is made up of three main drainage systems that come together near the outlet of the watershed as described below.

1. Blackhawk - The west/northwest area of the watershed starts just north of Elderberry Road, drains north and crosses Old Sauk Road, then drains through Blackhawk Pond. It then drains through Swallowtail Pond, crosses Pleasant View Road, and drains through the greenway to the Old Sauk Trails Business Park Ponds.
2. Old Sauk Trails - The middle portion of the watershed also starts at Elderberry Road by Pleasant View Road, drains northeast through the greenway to the Attic Angels pond, then north and crosses Old Sauk Road. It continues north along the ditch on the west side of the Beltline to the greenway on the east side of the Old Sauk Trails Business Park Ponds.
3. Wexford - The far east portion of the watershed drains into the Wexford greenway and flows north through the Wexford Pond. Discharge from Wexford pond flows west through the greenway, under the Beltline, and into the Old Sauk Trails Business Park ponds. The southern portion of the watershed drains east and eventually all discharges into the Target Area pond. Drainage from the Target Area pond flows east under the Beltline to the Sauk Creek greenway. The Sauk Creek greenway flows east and then north and eventually drains into Wexford Pond.

The land cover is approximately half agriculture and half urban. The urban areas consist of residential areas and commercial business parks. Other significant land uses include parks or open space, multi-family residential, and commercial. More detail on the watershed's land use is provided in Section 2.5.

2.2 Topography

The topographic data was compiled from light detecting and ranging (LiDAR) data on the North American Vertical Datum of 1988 (NAVD88). It should be noted that some data available for the project (such as past construction drawings) are in the previously used City vertical datum. The conversion factor from the historical City datum to NAVD88 was to add 845.6 feet to the City datum elevation. Data provided included 2-foot contours, a digital elevation model (raster format), and LiDAR point clouds.

The lowest elevations in the watershed are approximately 953 feet at the outlet of the watershed just downstream of the Old Sauk Trails Business Park Ponds. The highest elevations are along the extreme southern border of the watershed just north of Applewood Drive at approximately 1,194 feet.

2.3 Constructed Drainage System

Approximately half of the Pheasant Branch Watershed is developed and thus has a constructed drainage system. This system generally consists of open channels, storm sewers, and detention facilities,

A summary of the constructed system components in the watershed and in the model are shown in Table 2-1. Note there are less components in the model than in the watershed. The components not

included are generally the smallest diameter storm sewer in the upstream areas; these components are not included to improve model construction efficiency and reduce model run time.

Table 2-1. Constructed System Components

Constructed System Component	Quantity in Watershed	Quantity in Model
Public Stormwater Inlets and Access Structures	2,500	1,800
Public Storm Sewer Pipes	2,200 segments; 31.4 miles	1,452 segments; 27.4 miles
Public Open Channels	90 segments; 6.7 miles	90 segments; 6.7 miles
Detention Ponds	50	44

2.4 Existing Natural Drainage and Storage

The remaining portion of Pheasant Branch Watershed is currently undeveloped, primarily agricultural land use with typical agricultural natural drainage (some farm ditches and some natural drainage ways through farm fields.)

These agricultural areas store significant water during storm events. The agricultural areas currently store a total of approximately 135 acre-feet during the 1 percent chance storm event. The agricultural storage areas were represented by the model's 2D surface topography (see Section 4.5).

2.5 Runoff Conditions

Stormwater runoff generated from a land surface will vary depending upon several factors including land use, impervious surfaces, soil types, and topography. The factors within the Pheasant Branch Watershed are discussed in this section.

2.5.1 Land Use

The Pheasant Branch Watershed includes a mix of land uses, including residential, commercial, and agricultural. Land use data for the area categorizes the watershed into ten different land uses. Table 2-2 provides a generalized breakdown of the land use within the watershed. A map of the generalized land use categories is shown on Figure 2-1.

Table 2-2. Existing Land Use

Land Use Type	Total	
	Area (acres)	Percent (%)
Cemetery	**25**	**1**
Commercial	**449**	**14**
Highway	**84**	**3**
Industrial	**18**	**1**
Institutional	**61**	**2**
Open/Undeveloped	**771**	**23**
Park	**313**	**9**
Residential	**1,164**	**35**
Street	**395**	**12**
Water	**29**	**1**
Total	**3,308**	**100**

For developing hydrologic factors, more detailed land use categories were used, and a detailed breakdown of the categories is provided in Appendix B. The detailed land use categories were used to determine the amount of impervious area within each watershed and the portion of the impervious area that is directly connected to the municipal stormwater conveyance system.

See Section 4.3.2 for further description of the land use categories and how the land use data was used in the development of the XPSWMM™.

2.5.2 Impervious Area

Impervious area data for various land uses was references from existing datasets. They include the following: residential, nonresidential, and right-of-way (ROW) areas. The data provided for each area is summarized below.

- For residential parcels, the percent impervious of each parcel is referenced from the stormwater utility database. This data reported a square footage of impervious area by parcel but was not delineated within residential parcels.
- For nonresidential parcels (industrial, commercial, etc.), the impervious areas are delineated, and thus, this information was used directly for hydrologic conditions. See Figure 2-2 for a map of the commercial impervious areas.
- The impervious area within ROW areas was estimated by offsetting the street centerline based on the width of the street and any sidewalk present along the roadway.

For the areas outside the City, no impervious area delineations were available. The impervious area factors were estimated from existing land use data and ROW information.

2.5.3 Soil Types and Noted Geologic Formations

Soils in the Pheasant Branch Watershed are predominantly hydrologic soil group (HSG) B soils. The HSG classifications were used to estimate the infiltration parameters for pervious surfaces within the watershed (see Section 4.3.2). Table 2-3 shows the areas for each soil group in the watershed and the extent of soil group areas are shown on Figure 2-3. This data is based on the Natural Resources Conservation Service (NRCS) Soil Survey for Dane County.

Table 2-3. Hydrologic Soil Groups

HSG	Area (acres)	Percent (%)
A	20	0.6
B	3,178	96.1
C	109	3.3
W	2	0.0
Total	3,309	100

This watershed is partially underlain by the Prairie du Chien geologic formation. This formation can contain karst features. Evidence of karst features in the watershed is found in documentation describing the rapid drainage of Blackhawk Pond three times between 2000 and 2005. Figure 2-4 shows the location of the Prairie du Chien geologic formation in the watershed.

Section 3 Guidance and Data Sources

3.1 City of Madison Model Guidance

As part of this study a Modeling Guidance document was developed by the City, Brown and Caldwell (BC) (City consultant for the Stricker's/Mendota and Wingra West Watershed studies), and Advanced Engineering and Environmental Services, Inc (AE2S) (City consultant for Spring Harbor Watershed study). This document was used to define consistent modeling parameters across the various watersheds that are being analyzed. The Modeling Guidance was developed at the onset of the project and updated throughout the study. The version of the Modeling Guidance dated December 6, 2019, was used as part of this report. A copy of the Modeling Guidance as of the date of this report is included in Appendix A.

3.2 List Data Sources

The Pheasant Branch Watershed study relies on a variety of data sources. A summary of the data sources is provided below.

1. Various datasets from the City's geographic information system (GIS) - GIS data includes: land use, storm sewer (including associated structures), city limits, greenways and ponds, parcels, roads, and other pertinent data sets.
2. The City's GT-Viewer system - This system contains mapping of various City infrastructure including storm sewer, sanitary sewer, and water main. In some cases, this system contained information (such as pipe size or invert elevation) that was missing from the City's GIS data.
3. Construction and as-built drawings.
4. Photographs of various drainage features taken during field visits and surveys.
5. Field surveys of selected items and locations within the watershed. Examples of survey locations include missing storm sewer or culvert inverts at key locations, pond overflow elevations, and cross sections of open channels.
6. Monitoring data to support this study was collected by the City and USGS. Monitoring data included rainfall, flow, and water level data at select locations. Additional information about the data collected and how the data was collected is provided in Section 4.2.2 for rainfall data and Section 5.1 for flow and water level data.

The Pheasant Branch Watershed in the City outlets to the South Fork of Pheasant Branch in the City of Middleton. Some City of Middleton information was collected to understand downstream drainage conditions. Data includes:

1. WinSLAMM land use coverage from the City of Middleton's GIS system.
2. The City of Middleton's storm sewer system as defined in the GIS system.

It should be noted that the City previously used a City vertical datum and the City is in the process of transitioning all data into the NAVD88. The watershed study was conducted in NAVD88. Data that was in the City datum was converted to NAVD88. The City provided the appropriate conversion of adding 845.6 feet to the City datum.

The specific file name and date of the file is listed in Table 3-1.

Table 3-1. Source Files

Data Type	File Name	File Date
Land Use	WinSLAMM Landuse.mdb	4/16/2019
LiDAR	Citywide_Raster_small_cell	3/12/2019
Storm Sewer	Storm_Sewer_Pipes	3/21/2019
	Storm_Sewer_Structures	3/11/2019
	Storm_Pipes_Private	1/24/2019
	Storm_Structures_Private	1/24/2019
	STO_E_PVT Graphic Line	3/19/2019
	STO_E_PVT Graphic Cell	3/19/2019
Culverts	Storm_Sewer_Pipes	3/21/2019
	Storm_Sewer_Structures	3/11/2019
Greenways	Greenways_and_Ponds	1/11/2019
	PondGwayPipes	3/14/2019
	PondGwayStructures	3/14/2019
Planimetric Data	Street_Centerlines_and_Pavement_Data	3/11/2019
	Lakes_and_Rivers	10/3/2018
	Greenways_and_Ponds	1/11/2019
	Pond_Contours	1/24/2019
	Stormwater_Impervious_Areas	2/15/2019
Aerial Imagery	WICMAD18_ReDelivery_Gen3_RDG.sid	12/3/2018

Section 4 Model Development

4.1 Modeling Software

To evaluate flooding and stormwater conveyance system capacity within the Pheasant Branch Watershed, an XPSWMM™ version 2019 model was created to simulate the hydrology and hydraulics within the watershed. XPSWMM™ is a proprietary software product of Innovyze® (see www.innovyze.com/en-us). The model created for the Pheasant Branch Watershed is a combination one-dimensional (1D)/two-dimensional (2D) H&H model.

4.2 Rainfall Files

The analyses included an evaluation of both design storms and recorded rainfall events. A series of storm events were evaluated as part of this study to identify which event(s) result in flooding, and the severity of that flooding. Both theoretical "design storms", as well as measured local storm events were considered as part of the study. The rainfall events that were used in the analysis are described in the following sections.

4.2.1 Design Rain Events

The watershed flooding analysis included a series of different recurrence interval design storms (100, 50, 20, 10, 4, 2, 1, and 0.2 percent chance) with a 24-hour duration. The design storm events used rainfall depths from the NOAA Atlas 14. The Midwest/Southeast states (MSE4) rainfall distribution, developed by the NRCS, was used for the rainfall. Table 4-1 lists the rainfall depth that were used in the H&H modeling of this study.

Table 4-1 Design Rain Events

Recurrence Interval	Rainfall Depth* (inches)
100 percent chance	2.49
50 percent chance	2.84
20 percent chance	3.45
10 percent chance	4.09
4 percent chance	5.02
2 percent chance	5.74
1 percent chance	6.66
0.2 percent chance	8.94

4.2.2 Measured Rain Events

Rainfall data was collected from June 2019 through October 2019, across the west-side of Madison in support of the watershed studies. The gauges were installed by the City with support from the USGS. Additionally, existing USGS rain gauges provided data for model input. The Pheasant Branch Watershed study utilized a combination of five rain gauges within and near the watershed to characterize actual, measured rainfall events. The City provided a Thiessen polygon map showing areas within the Pheasant Branch Watershed influenced by the five gauges. Rain gauges used as part of the study and their locations are provided in Table 4-2. Figure 4-1 shows the locations of each station.

Table 4-2 Rain Gage Locations

Gauge Location	Operated By
Memorial High School Detention Pond	USGS
Sauk Heights Pond	City
Stricker's Pond Forebay (off Longmeadow Drive near Stricker's Pond)	City
Swallowtail Park	City
UW Agricultural Research Station	University of Wisconsin - Madison

For gauges operated by the City, rainfall data was obtained from the Trimble Unity web site, the City's partner for providing the monitoring data. Rainfall data from gauges operated by the USGS was provided via email from the USGS. Rainfall data from the University of Wisconsin (UW) Agricultural Research Station was downloaded from the UW Agricultural Research Station web site.

From the monitoring period, three measured rainfall events were selected to be utilized as part of the calibration process under this study. The events selected are provided in Table 4-3.

These events are the largest rain events that were successfully measured and had good corresponding flow and/or water surface elevation measurements at the monitoring stations (see Sections 5.1 and 5.2). The events were selected as part of a meeting with City staff at which available rainfall and monitoring data was reviewed. A consensus was drawn for the events to be used based on the size of the storm events and successfully collected monitoring data.

Table 4-3 Rain Events Selected for Calibration Process

Event Date	Rain Depth (inches)*	Rain Duration (hours)	Approximate Annual Exceedance Probability (percent chance)
August 5 to 6, 2019	1.1 to 1.3	3.5	> 100%
August 11, 2019	1.2 to 2.0	4.5	> 100%
October 1 to 2, 2019	2.8 to 3.4	19	50% to 10%

*rain depth varied by station

The October storm event was the largest event that was successfully measured in 2019, at the relevant rain gauges. The October event (total rain depth and duration) falls in the range of a 50 to 10 percent recurrence interval based on NOAA Atlas 14 Volume 8 Version 2 data. Both August 2019 events (total rain depth and duration) were greater than a 100 percent recurrence interval.

4.3 Hydrologic Model Development

This section describes the steps taken to generate the hydrologic factors used in the XPSWMM™ model.

4.3.1 SWMM Runoff Description

Hydrologic calculations were performed in the XPSWMM™ model using Storm Water Management Model (SWMM) runoff methodology. SWMM hydrology uses a combination of drainage area size and

shape, slope, land cover (pervious, impervious not connected, and impervious connected), and soil infiltration parameters to generate runoff from a rain event. Discussions with City staff concluded that the SWMM hydrologic method was preferred over the "curve number" approach because of the urban land cover conditions. Although the curve number method is used in urban settings, it was originally developed for application in rural or agricultural watersheds.

The SWMM runoff methodology and associated parameters is defined in the Modeling Guidance document and is found in Appendix A. The calculations were performed for each subwatershed that was delineated within the watershed. The model developed a runoff hydrograph based on the model input parameters and this is entered by the model into the hydraulic portion of the software.

4.3.2 Subwatershed Input Data

The Pheasant Branch Watershed was divided into 451 subwatersheds. The subwatersheds are shown on Figure 4-2. Subwatersheds were delineated based on the storm sewer maps, drainage features (such as open channel versus storm sewer), land use, and topography. For each subwatershed, hydrologic input parameters were calculated. Each subwatershed included three subcatchments based on the land use within the subwatershed. The subcatchments were defined as:

1. Directly connected impervious area - Impervious areas that drain directly to the conveyance system
2. Indirectly connected impervious area - Impervious areas that drain over a pervious surface prior to entering the conveyance system
3. Pervious area - Vegetated land surfaces or areas with no impervious surface

The input parameters and calculation methodology for hydrologic input parameters are described below. The XPSWMM™ model input parameters for each subwatershed are listed in Table B-1.

4.3.2.1 Subwatershed and Subcatchment Areas

The area for each subwatershed was calculated using the GIS data developed for the project. Subsequently, the areas for each of the three subcatchments were calculated for each subwatershed. Subcatchment areas were calculated using the impervious area information provided by the City (see Section 2.5.2). How each subcatchment area was calculated is described below.

1. For areas in the City, the total impervious area for each subwatershed was calculated based on the impervious area data from the City. For areas outside the City, the total impervious area was calculated based on the estimated WinSLAMM standard land use files (SLU). Impervious area delineations were not available from the City of Middleton. The percent impervious from the WinSLAMM SLU files was used to calculate the total impervious area in a subwatershed based on the composite land use within a subwatershed. The SLU files estimate the source areas for typical land cover conditions for a variety of land uses. The SLU impervious area conditions were originally developed based on extensive aerial photographic analyses and field verifications of urban land cover in several Wisconsin cities.
    a. The directly connected impervious area (DCIA) was estimated using WinSLAMM SLU files. As part of the source area data, the SLU files identified whether a source area was directly or indirectly connected to the municipal stormwater conveyance system. For each land use, the percentage of DCIA was calculated (see Table B-1). Based on the land use present in a subwatershed, the total DCIA was calculated.

b. Indirectly connected impervious area was calculated by subtracting the DCIA from the total impervious area in a subwatershed.

2. Pervious area was calculated by subtracting the total impervious area from the subwatershed area.

It should be noted that the WinSLAMM SLU files incorporate the street ROW as part of the land use category. For example, Medium Density Single Family Residential (No Alleys) SLU data includes the impervious areas of the associated streets and sidewalks. The City's GIS land use coverage did not include street ROWs under a land use category, and treated street ROWs as a separate "land use". This meant that the calculated directly connected and disconnected impervious areas for each land use had to account for this difference between the WinSLAMM and City's GIS land use categories. As such, the street areas were subtracted from the DCIA and total impervious area in the SLU files. The percentage of DCIA was calculated based on the impervious areas outside of the street areas.

Within XPSWMM™, the indirectly connected impervious area was routed onto the pervious area within each subwatershed.

4.3.2.2 Subwatershed and Subcatchment Width

In SWMM hydrology, "width" refers to the general shape of a hydrologic unit (subwatershed) and the relationship of the surface flow path to the shape of the subwatershed. A line was drawn to represent the longest typical flow path for each subwatershed. The length of this line was calculated and the subwatershed area was divided by the flow path length to calculate the overall width. This width was then prorated based on the DCIA of each subwatershed. The prorated width for indirectly connected impervious area and pervious area was the same and was equal to the overall width minus the DCIA width. For example, if a total subwatershed width of 100 feet was calculated and the directly connected impervious areas were 25 percent of the subwatershed, the DCIA width was 25 feet, and the width of the indirectly connected impervious area and pervious area was 75 feet.

It should be noted that the subwatershed width was used as a calibration parameter. See Section 5 for modifications that were made to develop the calibrated existing conditions model.

4.3.2.3 Slope

A slope for the flow path described under in Section 4.3.2.2 was calculated. The elevation at the upstream and downstream end of the flow path was assigned based on the topographic data provided by the City. The elevations were used with the flow path length to calculate the slope.

4.3.2.4 Soils and Infiltration

Soils within the watershed are classified by the HSG. HSG mapping provided by the City as part of the City's "Curve Number Generator" tool was utilized in the project. The soils conditions of the watershed are represented in the hydrologic calculations through the infiltration parameters selected for the study.

The Horton soil infiltration methodology was used within XPSWMM™, and this approach is consistent with the City's Modeling Guidance. This methodology establishes a maximum infiltration rate, a minimum infiltration rate, and the decay rate of infiltration for each HSG. Input parameters were developed for each of HSG and Table 4-4 provides the infiltration values.

Table 4-4 Hydrologic Soil Groups and Associated Infiltration Values

HSG[1]	Maximum Infiltration Rate (in/hr)	Minimum Infiltration Rate (in/hr)	Decay Rate (1/hr)	Dry Days (day)
A	4.0	1.0	4.0	3.1
B	2.0	0.5	4.0	4.4
C	1.0	0.2	4.0	7.0
D	0.5	0.1	4.0	9.9
Water	0.0	0.0	0.0	0.0

[1]Where soils are classified as A/D, B/D, or C/D a HSG D was assumed.
Note: in/hr = inches/hour

The area within each subwatershed was classified by HSG. For each subwatershed composite, infiltration parameters were developed by area-weighting by each parameter based on the amount of each HSG within a subwatershed. For example, if a subwatershed is 50 percent HSG A and 50 percent HSB B, the maximum infiltration rate would be 3.0 inches/hour.

It should be noted that the values shown in Table 4-4 are the "base conditions" values. Infiltration rates that were used as a calibration parameter may be modified to better represent actual conditions. See Section 5 for modifications that were made to develop the "calibrated existing conditions" model.

4.3.2.5 Antecedent Runoff Conditions

The antecedent moisture condition represents whether there are saturated or exceptionally dry soil conditions at the start of a storm event. In saturated conditions, the maximum infiltration rate of soils would be decreased and the depressional storage may be reduced. In dry conditions, the maximum infiltration rate may be higher than typical. For this analysis, typical antecedent moisture conditions were used and are represented by the parameters listed in Table 4-4.

4.3.2.6 Depressional Storage

Within a subwatershed, there are surface depressions that collect runoff (puddles) and reduce the amount of runoff generated from a rainfall. Depressional storage is incorporated into the runoff calculations to account for these areas. For each subwatershed, a depression storage of 0.05 inches for impervious areas and 0.15 inches for pervious areas was included. These values meet the criteria defined in the City's Modeling Guidance.

4.3.2.7 Internally Drained Areas

Within the watershed, there is only one internally drained area located near Haen Park. Because this internally drained area is essentially hydraulically separated, stormwater does not discharge from it onto the surface and stormwater does not overflow from other parts of the watershed into it; the internally drained area and its subwatershed are removed from the model.

There are additional depressional areas that do not have internally drained subwatersheds delineated. These areas may consist of backyards or other small, local depressions. These depressions are accounted for in the hydrology calculations through the depressional storage parameters described in Section 4.3.2.6. It is possible that small depressions not incorporated may have localized flooding conditions

(such as individual back yards); however, the scope of this study did not allow for the evaluation of each individual area.

4.4 Hydraulic Model Development

The 1D hydraulic portion of the XPSWMM™ model represents the storm sewers and culverts that comprise the drainage system within the Pheasant Branch Watershed. The 2D hydraulic portion of the XPSWMM™ model represents the open channels and ponds within the watershed. The hydraulic input parameters required by XPSWMM™ vary depending on the different parts of the drainage system. The source data used to compile the hydraulic model input data is summarized below. Table C-1 in Appendix C provides hydraulic input parameters from the XPSWMM™ model. Figure 4-3 depicts the hydraulic conveyance system.

4.4.1 Open Channel Conveyance System

Open channels that are part of the City's stormwater conveyance system within the Pheasant Branch watershed are generally included as part of the 2D hydraulic model. If a modeled pipe discharges into an open channel, that channel is included as part of the 2D hydraulic model. Other channels (generally smaller channels and those located upslope from the storm sewer system) are also simulated as part of the 2D hydraulic model (see Section 4.5).

Survey data was collected for open channels at selected locations within the watershed. The survey data was used in conjunction with LiDAR data, City GIS data, and available construction plans to develop cross sections and longitudinal invert elevations for open channels. Aerial photography and site photographs were used to select Manning's n values (roughness coefficients) for the open channels.

4.4.2 Closed Conduit Conveyance System–Storm Sewers and Culverts

City-owned storm sewer mains 18-inches in diameter or greater were included in the XPSWMM™ model, per the project's scope of work. Additionally, selected storm sewers that were smaller than 18-inches were included if they were deemed critical to representing the conveyance systems performance. Smaller storm sewers, private storm sewers, and inlet leads were not included in the model because this phase of the project is focused on identifying and resolving major flooding issues on public property or as a result of stormwater leaving public property. Future phases of the process will likely incorporate smaller components of the conveyance system to aid in the design of specific management infrastructure.

Each storm sewer "link" requires upstream and downstream invert elevations, pipe length, and Manning's n (roughness). Additionally, hydraulic minor losses were added to the model.

The source of the closed conduit conveyance system data for the model included GIS data provided by the City, and information from the City's GT-Viewer system, construction plans, and field surveys at select locations. Where missing data remained, assumptions were developed to fill data gaps. The assumptions made are listed below.

1. Missing invert elevations were obtained by interpolating between the nearest upstream and downstream invert elevations. Where known bounding inverts were unavailable (as in the upper most reaches of the storm sewer), the next downstream slope was continued upstream.
2. Where pipe sizes were unknown, the size of the nearest upstream pipe was used.

3. Missing pipe material was assumed to be the same as the nearest upstream pipe.

Entrance and exit losses (minor losses) were added to storm sewers and culverts based on the Modeling Guidance document. Losses were split evenly between the entry pipe and exit pipe at a storm access structure (SAS). (For example, a total loss of 0.5 was assigned at a 90-degree SAS.) An exit loss of 0.25 was assigned to the influent pipe, and an entry loss of 0.25 was assigned to the effluent pipe. At a tee, or cross SAS structures, a loss of 0.5 was applied to each pipe.

4.4.3 Existing Inlet Capacity

Inlet capacity was not included explicitly in the computer modeling for this watershed. If areas are known flooding areas, but the computer modeling showed no flooding, then the parameters for that specific area were modified to reflect observations. In all other areas, the parameters were left to their original values.

4.4.4 Existing Detention Ponds

The XPSWMM™ model incorporated 24 existing detention ponds that were identified within the watershed. The stage-storage data for the ponds was defined by the 2D topography (further described in section 4.5). The inlet and outlet structures for the ponds were described using the link-node similar to storm sewer and culverts.

A combination of available site plans, aerial photography, LiDAR data, and site visits were used to determine the appropriate model input data for the detention ponds. Input data included the stage-area relationship to represent the storage in the pond and data to represent the pond outlet.

4.4.5 Open Water/Backwater Effects

The Pheasant Branch Watershed does not discharge to an open water (for example, Lake Mendota), thus, there are no backwater effects from this.

4.5 2D Hydraulic Model Development

The 2D portion of the hydraulic model is utilized to represent the overland flow across the land's surface. The 2D model uses topographic data to simulate the overland flow which may occur throughout the watershed in areas, such as along streets, between buildings, or over undeveloped lands. The 2D model is connected to the 1D model to allow runoff to pass from the 1D elements in the model into the 2D part of the model and vice-versa. The components of the 2D model are further described in the sections below.

4.5.1 Description of Areas Modeled in 2D

Except for the storm sewer, culverts, and detention pond inlet and outlet structures, all of Pheasant Branch Watershed is modeled in 2D.

Specific information on how the 2D area is modeled is provided below.

4.5.2 Topographic Data

A triangular irregular network (TIN) was created within XPSWMM™ to represent the topography within the study area. The City-provided elevation raster (Citywide_Raster_small) was used as the basis for the

TIN creation. This raster file was clipped to the approximate project extents. It was converted to an Environmental Systems Research Institute (ESRI) grid format and imported into the XPSWMM™ model.

4.5.3 2D Grid

XPSWMM™ uses a grid comprised of squares to complete the 2D model calculations. Water enters the grid and is transferred between grid cells. Elevations are assigned to the vertices and center of each grid cell from the topographic data. The grid size for this project is 10 by 10 feet. The 2D grid covers the entire area model in 2D (as described in Section 4.5.1).

4.5.4 2D Land Use and Roughness Values

As part of the 2D model, the land cover is defined, and each land use is assigned a Manning's n. This factor represents the roughness of the land's surface and ability to impede flow. For the Pheasant Branch Watershed, the land cover was divided into five categories and each category was assigned a unique Manning's n value. The land cover categories were water, impervious, pervious, wooded greenways, and grassed greenways. The land cover was imported to XPSWMM™ from GIS data developed for the watershed.

The Manning's n corresponding to each land use is provided in Table 4-5. The land use for the 2D roughness is shown in Figure 4-4. It should be noted that the 2D Manning's n values are the final calibrated values for the computer modeling. As will be described later in this report (Section 5.3), the water surface elevations in the greenways are sensitive to the 2D Manning's n value.

Table 4-5 2D Manning's Roughness

2D Land Use	Manning's n
Grassed Greenways*	0.027 to 0.24
Impervious	0.016
Pervious	0.085
Water	0.01
Wooded Greenways*	0.027 to 0.085

*Value changes based on depth of water in channel

4.5.5 Inactive Areas

Inactive areas are defined as areas where surface water cannot flow because of physical barriers (such as buildings) or areas already represented by the 1D model. Inactive areas were identified and added to the 2D model to represent building footprints. These are areas where the 2D modeled flow will not occur. Building footprints were imported from the Dane County GIS data.

4.5.6 1D/2D Interface

The 1D and 2D models interfaced in two types of areas: model nodes and 1D/2D interface lines. The interface configurations are described below:

1. Model Nodes - Runoff can be transferred from the 1D storm sewer network onto the 2D grids at selected nodes within the model.

2. 1D/2D Interface Lines - Interface lines are included around the perimeter of open channels and detention ponds that are modeled in 1D. Because all open channels and ponds are being modeled in 2D, there are not 1D/2D interface lines in this computer model.

4.5.7 2D Boundary Conditions

The boundary of the 2D model (the perimeter of the 2D grid defined for the study) is created in the model to be closed and acts as a vertical wall. The model results were reviewed, and overland flow outfalls were added (termed by XPSWMM™ as "head boundaries") where overland flow leaves the study area.

4.5.8 Model Review No. 1

Following the construction of the Existing Conditions computer model, the City contracted with AE2S, a firm conducting the Spring Harbor Watershed Study, to review the computer model. This review occurred in February 2020. The review checked the model for consistency with the City's Modeling Guidance and general modeling professional practice. City staff reviewed the comments and revised the computer model accordingly.

4.6 Existing Conditions Non-Calibrated Model Results

The XPSWMM™ model was constructed and executed for each of the design storms (identified in Section 4.2.1), and the measured storm events (identified in Section 4.2.2) under the existing land use and conveyance system conditions. Table D-1 in Appendix D summarizes the peak water surface elevation and the duration of flooding at selected locations throughout the Pheasant Branch Watershed during the design storms. Figure 4-5 provides the location of each of the reporting locations in Table D-1.

Section 5 Model Calibration

The calibration process focused on identifying consistent model input parameters that would provide reasonably comparable results for each of the three storm events identified in Section 4.2 and also the major storm event that occurred in August 2018.

It is understood that the hydrologic conditions and how runoff is generated from the land surface will vary from storm to storm. Also, it is commonly found that hydrologic factors that best represent larger rain events may not be appropriate for use in smaller rain events. As a result, the focus of the calibration effort was placed on the largest monitored storm event (October 1 to 2, 2019) and the August 2018 event because the target of this study is to assess flooding from large storm events.

If this model is used in the future to analyze smaller rain events, additional review of the calibration parameters should be conducted, and modifications should be considered to better represent the expected runoff from smaller storms.

As part of the model calibration process, the following steps were taken:

1. The data collected from the monitoring equipment and the data collected after the August 2018 storm event were compared to the modeling output in the same location.
2. Where the modeling results did not match the monitoring data collected (for this study, "match" is defined as within +/- 25 percent), model parameters were modified within the range of professional judgement.
3. Where model parameters could not be adjusted within the range of professional judgement, the area was noted.
4. Where model parameters could be adjusted within the range of professional judgement, each parameter was adjusted until the modeling results matched the monitoring data.

5.1 Monitored Pond Level and Flow Data

There are six monitoring locations within the Pheasant Branch Watershed that were used as part of the calibration process. Figure 5-1 shows the monitoring locations.

1. Deming Way Culvert Level and Velocity: The culvert under Deming Way just upstream of the outlet for the watershed was monitored by the City (data obtained from Trimble Unity web site.)
2. Fourier Drive Channel Level: The level in the channel just east of Fourier Drive and west of the Beltline was monitored by the City (data obtained from Trimble Unity web site.)
3. Pleasant View Road Level and Velocity: The culvert under Pleasant View Road just south of Elderberry Road was monitored by the City (data obtained from Trimble Unity web site.)
4. Southwest Blackhawk Pond Level: The level of the pond was monitored by City (data obtained from Trimble Unity web site.)
5. Tree Lane Level and Velocity: The culvert under Tree Lane between S High Point Road and Randolph Drive was monitored by the City (data obtained from Trimble Unity web site.)
6. Wexford Pond Level: The level of the pond was monitored by the City (data obtained from Trimble Unity web site.)

5.2 Selected Runoff Events

The following events were used for model calibration.

5.2.1 August 2018 Storm Event

A historical storm event occurred in August 2018. In the Pheasant Branch Watershed, radar rainfall data indicated that between 10 to15 inches fell during that event. This type of event equates to more than a 1,000-year storm or more than a 0.1 percent chance of occurring in any one year. Although the City did not have flow and level monitoring equipment in place during this event, the City collected topographic survey elevations of high water marks from the storm. The City also collected photographs and flood reporting information from residents in the watershed.

5.2.2 2019 Monitoring Storm Events

The rain events selected for the calibration process are defined in Section 4.2.2. The events were selected based on the completeness of recorded data and the severity of the rain event. As mentioned previously, significant flooding events did not occur during the monitoring period. The October 1 to 2, 2019 event was the largest rain (2.8 to 3.4 inches over 19 hours). This event (based on total rainfall depth and duration) falls within the range of a 50 to 10 percent recurrence interval based on NOAA Atlas 14 Volume 8 Version 2 data. Both August 2019 events (total rain depth and duration) were greater than a 100 percent annual exceedance probability.

5.3 Calibration Process

The City did not use the monitored data collected above for its calibration process. The data was found to be unavailable or unreliable for the following reasons:

1. The City's monitoring program was in its infancy, and calibration and maintenance protocols had not been implemented
2. In some instances, batteries had died before to the storm and the City was not made aware until after the storm when the data was missing.
3. At two locations, the equipment was installed after the initial monitoring events and adequate monitoring events were not available after installation.
4. Some data appeared to be unreliable when comparing it to the rain gauge data in the watershed or the data from adjacent watersheds.

Instead of the monitoring data, the City utilized surveyed high water marks from the August 2018 event and anecdotal information collected throughout the study. Following the August 2018 storm event, City survey staff collected high water marks in various locations in the watershed. Additionally, City staff spoke with residents and business owners in the watershed.

When the August 2018 storm event was evaluated in the initial model, the water surface elevations were being over-predicted in certain locations and spot on in others. Because the over-prediction was not homogenous across the watershed, adjusting the hydrologic parameters for all the subwatersheds was deemed not appropriate. Instead, locations where the over-prediction occurred were reviewed in more detail.

Because the City's flood reduction targets are aimed at the larger storm events, using the data collected during the August 2018 event seemed reasonable.

Blackhawk Neighborhood

The Blackhawk neighborhood experienced devastating flooding during the August 2018 event. The large pond in the development is known as Blackhawk Pond and has a drainage area of approximately 500 acres of both agricultural and residential land uses.

A homeowner adjacent to Blackhawk Pond recorded the depth of water at their home. Because the pond is adjacent to their home, the elevation of water at their home is the elevation of water in the pond. When comparing the recorded peak water surface elevation to the peak modeled water surface elevation, the results were within a couple hundredths of a foot. This indicated the hydrologic parameters and conveyance system were replicating the stormwater system in this area well.

Target Area

The model was reporting 3 feet of flooding in the Target Area (the northwest corner of the intersection of State Highway [STH] 12/18 and Mineral Point Road). Based on flood reports and discussion with the Trek Store (adjacent to Target and next to the large pond serving the commercial area), flood waters were approximately 1.5 feet outside the store and approximately 1 foot inside the store at the peak of the event.

A significant part of the drainage area to this location is agricultural with historically good infiltration characteristics and known karst features. A site investigation was conducted in May 2020. The drainage channels in the agricultural areas were walked in an attempt to observe karst features. Only one karst feature was found and that was outside the area. The conclusion is that the infiltration in this area is higher than the default model parameters utilized in the study. The infiltration parameters for the subwatersheds discharging to this area were modified and the model results came more in line with the reported results.

Sauk Creek Greenway

The Sauk Creek Greenway is an open channel system that starts just east of the Target Pond and STH 12/18, flows north, northeast through the west side of the City and eventually discharges into Wexford Pond. The City plans to reconstruct this greenway in the near future, and as such, a City staff surveyor was sent to collect highwater marks at various locations in the greenway following the August 2018 event.

The highwater mark elevations were compared to the peak water surface elevations in the model and it was found that the model was over-predicting peak water surface elevations throughout the greenway. Because this area also has known karst features, the greenway was walked to look for signs of karst features; no indications were found.

The greenway is heavily forested, one of the few forested areas in this watershed. The infiltration parameters for the forested area were revised; this resulted in some reduction in the modeled peak water surface elevations, but not a significant amount.

Following discussions with City staff regarding observed flow conditions, the Manning's n values of the greenway were modified. The model was re-run and the results were reviewed. The results indicate the model is sensitive to the Manning's n values in the greenway. The values went from their starting value of a Manning's n with normal wooded channel to a variable Manning's n where the Manning's n changes with depth; a higher Manning's n was used for the lowest depths and transitioned to a lower

Manning's n for the higher depths. Iterations were performed on the variable Manning's n until the peak water surface elevations were within an acceptable range of each other and the Manning's n values were in an acceptable range for their channel type.

Continued Monitoring

An item to note is that the monitoring equipment has been reinstalled in key locations and the watershed is being continuously monitored. The data will be used to understand the effectiveness of the proposed flood control solutions.

5.4 Calibration Results

Calibration results are provided in Table 5-1. Figure 5-2 shows the locations of the August 2018 recorded high WSEs.

Table 5-1. August 2018 Recorded High WSEs and Modeled Peak WSEs

Location	Recorded Peak Water Surface Elevation (ft)	Initial Modeled Peak Water Surface Elevation (ft)	Calibrated Modeled Peak Water Surface Elevation (ft)
Blackhawk Pond	1,080.91	1,081.08	1,080.95
Target Pond	1,054.35	1,055.94	1,054.84
Sauk Creek Greenway			
Near Building off Tree Lane	1,046.22	1,047.42	1,047.02
Upstream of S High Point Road	1,045.74	1,047.23	1,046.86
Downstream of Tree Lane	1,039.37	1,040.48	1,040.27
In Greenway by Red Fox Trail	1,016.80	1,019.63	1,018.29
By Bus Stop on Old Sauk Road	993.34	994.19	994.10

Note: ft = feet

5.5 Review No. 2

Following model calibration, the City contracted with AE2S again to review the modeling. This review occurred in late July and early August 2020. The review evaluated the assumptions made during calibration and corresponding modeling results. City staff reviewed the comments and revised the computer model accordingly.

5.6 Calibration Conclusions

The peak water surface elevations predicted by the model for the August 2018 event match the surveyed high water elevations within +/- 1.0 feet. Given the magnitude of the event, the model is representing this event.

For the monitored events in 2019, the shape and timing of the modeled results compares well to the monitored data.

Section 6 Model Results

6.1 Existing Conditions Calibrated Model Results

The calibrated XPSWMM™ model executed for each of the design storms. Table D-1 in Appendix D summarizes the peak water surface elevation and the duration of flooding at selected locations throughout the Pheasant Branch Watershed. Figure 4-4 provided the location of each of the reporting locations in Table D-1.

The Existing "Maximum Water Depth" maps for each modeled event are found in Figures 6-1 to 6-9 (rain events from the 100 percent chance to the 0.2 percent chance storms). As expected, widespread surface flooding is shown for the larger rain events (2, 1, and 0.2 percent chance events). It should also be noted that presence of shallow water (0 to 0.25 feet) in the street ROW under the smallest modeled event (100 percent chance), does not necessarily indicate "flooding" or a stormwater conveyance capacity problem. Runoff water is expected in the streets during rain events.

6.2 Model Results Evaluation

By reviewing the 20 and 10 percent chance events, the most flood-prone areas can begin to be identified. Flooding depths greater than one-half foot in the 20 and 10 percent chance events are indications of flood-prone areas. The areas that appear to be most flood-prone, based on a review of the 10 percent chance rain include:

1. Winding Way between Coneflower Street and Bear Claw Way
2. Various segments of Deming Way, Excelsior Drive, and Fourier Drive in the Old Sauk Trails Business Park
3. Tramore Trail and Sawmill Road
4. N Highpoint Road between Old Sauk Road and Tramore Trail
5. Old Sauk Road and Westfield Road
6. Westfield Road between Whitacre Road and Old Sauk Road
7. Commerce Drive between Watts Road and Mineral Point Road

Several conditions can influence the flooding including inlet capacity, storm sewer capacity, overland flow from other sources, or a combination of all of these conditions. During Phase 2 of the project, these areas will be further evaluated to assess the causes and develop mitigation measures.

6.2.1 Comparison to City Flood Control Targets

The existing conditions flooding results were compared to the City's flood control targets to quantify the performance of the stormwater conveyance system in the Pheasant Branch Watershed. The performance of the system relative to greenway crossings, pipe capacity, inlet capacity, and street flooding were considered.

6.2.1.2 Pipe Capacity

The City's target is to eliminate surcharging from the storm sewer system onto City streets for up to the 10 percent chance, 24-hour design storm event. The pipe capacity was determined to be exceeded if ponding occurs on the street during the 10 percent chance, 24-hour design storm event. Figure 6-10 graphically shows the streets where the 10 percent chance target is not met. Within the watershed, there are a total of 52.1 miles of streets, of which 10.3 miles have water ponding during the 10-percent chance event. This equates to 19 percent of the streets not meeting this target.

6.2.1.3 Inlet Capacity

For inlet capacity, the flood mitigation target is to allow no more than 0.5-feet of stormwater ponding above storm sewer inlet rim elevations at inlet-restricted low points for the 10 percent chance, 24-hour design storm event. Inlet was not reviewed explicitly in this study. Areas with known flooding were reviewed for additional inlets. Additionally, all proposed storm sewer is assumed to have sufficient inlets to fill the storm sewer pipe.

6.2.1.4 Street Flooding

Within streets, the City's target is to maintain drivability of municipal streets for the 4 percent chance, 24-hour design storm event. Drivability is defined as having no more than 0.2 feet of flooding at the center of the street. Within the watershed, there are a total of 52.1 miles of streets, of which 2.9 miles have a water depth of more than 0.2 feet at the street centerline during the 4-percent chance event. This equates to 6 percent of the streets not meeting the drivability target. Street areas where the flood mitigation target is not met are identified on Figure 6-11.

6.2.1.5 Structure Flooding

The City's target is to eliminate structure flooding during the 1 percent chance event. Structure flooding is defined as having 0.5 feet or more water within 5 feet of a building. During the 1 percent chance event in existing conditions there are 118 out of 2,920 structures at risk of flooding (4 percent of the structures in the watershed).

6.2.1.1 Greenway Crossings

At locations where a greenway crosses under a street, the City's target is to safely pass the 1 percent chance, 24-hour design storm event without overtopping the street. The crossing was determined to be overtopped if the elevation at the upstream side of the culvert is above the street crossing elevation. There are 14 greenway crossings within the Pheasant Branch Watershed; two of them cross under the Beltline (STH 12/18). None of the greenway crossings in the Pheasant Branch Watershed meet the City targets.

6.2.2 Comparison to Known Flooding in Watershed

In Section 1-2, known flooding areas in the watershed, were identified based on City staff accounts. The areas that were identified are shown on Figure 1-4. The model results were reviewed for these known flooding areas. In general, the model results mimic what was reported by City staff and residents.

6.2.3 Comparison to Focus Group Flooding Reports

As part of the public engagement effort for this project, "focus group" meetings were conducted (see Section 7 for additional information). The initial focus group meetings were focused on allowing City staff gain an understanding on past flooding conditions that were experienced by residents. Subsequent focus group meetings during Public Information Meeting (PIM) No. 2 were focused on confirming that the flooding depicted by the model matched the residents observations from past storm events. The flooding described by residents during focus group meetings is similar to what is depicted on the flood inundation mapping.

6.4 Model Uncertainty

In general, all models are approximations, and as such, there is a certain amount of uncertainty in the results. This uncertainty is due to approximations in the input data, simplification of the methods used

to calculate flow and level, uncertainty in the measured flow and level data, etc. This model is built following the City's Modeling Guidance document and is calibrated to monitored storm events as described in previous sections. The model was constructed at the watershed level and is intended to identify flooding problems at that scale. It can be used to determine if the City's flood control targets are met within the watershed. Caution should be exercised when evaluating flooding problems at finer scales as additional refinement of model input parameters may be required.

The model calibration was focused on developing a single set of input parameters that would represent large storm events. Additionally, only a limited amount of calibration data was available for this study. The number of field monitoring locations and the length of the monitoring period were limited. If this model is used in the future to analyze smaller rain events, additional review of the calibration parameters should be conducted, and modifications should be considered to better represent the expected runoff from smaller storms (storm events smaller than the design storms considered in this analysis, such as the August 2018 storm events included as part of the calibration).

It is believed that the calibrated model accurately depicts the impacts of flooding from large storm events because the input parameters are within accepted ranges and the model results correlate to anecdotal flooding information from both City staff and residents.

As part of the design and implementation of flood mitigation solutions, the City may wish to further evaluate the model uncertainty and consider how mitigation solutions could be impacted.

1. Design Flexibility - To address model uncertainty, as well as uncertainty associated with changing future conditions, design flexibility could be considered. An example of design flexibility is to consider increases (or decreases) in pipe sizes as part of a storm sewer improvement flood mitigation measure. For instance, a 48-inch diameter storm sewer may be identified as the required size to provide the desired level of service (elimination of surcharging from the 10 percent chance event). Increased pipe sizes could be considered to determine the added LOS that is provided (i.e., is surcharging prevented in the 4 percent chance event?). This can then be evaluated to determine if it provides a cost-effective factor of safety or increase in LOS.

2. Sensitivity Analysis - A sensitivity analysis could be conducted to determine how changes to model input parameters impact the model results and performance of mitigation measures. If changes to input parameters result in only limited impacts, the level of uncertainty associated with the model would be decreased.

Section 7 Public Engagement

As part of the Pheasant Branch Watershed study, the City carried out an extensive public information effort. In addition to various social media and web-based communication methods, public meetings were held as summarized below. Figure 7-2 shows a summary of the outreach for the study.

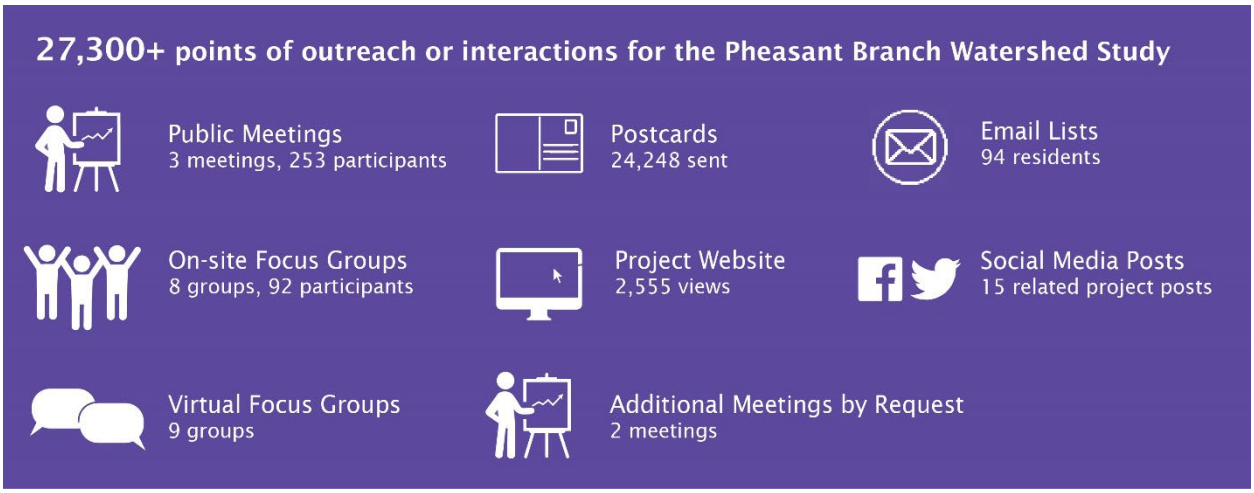


Figure 7-2. Public Outreach Summary

7.1 Public Information Meetings

An initial Public Information Meeting (PIM) was held on May 4, 2019, at Edgewood College – Deming Way Campus. According to the sign-in sheet, 35 residents attended the meeting. The purpose of this meeting was to inform the public of the initiation of the study, provide an overview of what will be accomplished during the study, and to collect feedback from residents on flooding experienced. Residents also had the opportunity to request a neighborhood focus group meeting with City staff. Based on resident requests, focus group meetings were held with smaller groups in specific geographic areas that have experienced flooding. Additional information on the PIM and the watershed is provided on the City's project web site: https://www.cityofmadison.com/engineering/projects/madison-pheasant-branch-watershed-study

A second PIM was held virtually on June 16, 2020 and 66 residents registered for the virtual meeting. The purpose of this meeting was to update the public on the status of the study, provide an overview of the work conducted to date, and to display flood inundation mapping for the watershed. The PIM included an open house at the start, a presentation, question and answer session, and focus group break-out meetings. The focus group breakout meetings were held for each of the initial focus group areas listed in Section 7.2. Flood inundation mapping for the 10 percent, 1 percent, and August 2018 storm events were shared with the focus groups. A copy of the PIM #2 presentation is available on the City's project web site listed above.

The third PIM was held virtually on February 10, 2022. The PIM was attended by approximately 152 residents (based on a count of people during the presentation). At this meeting, information on the recommended solutions were shared with residents. The PIM included a presentation, question and answer session, and focus group break-out meetings. The focus group break-out meetings were held for the stand-alone flood mitigation solutions described in Section 10. These focus group meetings were

held simultaneously. A copy of the PIM No. 3 presentation is available on the City's project web site listed above.

7.2 Focus Group Meetings

During the initial phase of the Pheasant Branch Watershed study, nine focus group meetings were held. The meetings discussed flooding issues that residents have experienced and allowed for additional information to be collected. A summary of each focus group meeting is included in Appendix E. The location of each meeting is provided below and shown on Figure 7-1.

1. Southwest Blackhawk Pond, 7 to 8 p.m., September 4, 2019
2. North Blackhawk Pond, 7 to 8 p.m., September 5, 2019
3. Menards Area, 11 a.m. to 12 p.m., September 17, 2019
4. Old Sauk Road and Westfield Road, 11 a.m. to 12 p.m., September 18, 2019
5. Wexford Village, 3 to 4 p.m., September 25, 2019
6. Junction Ridge, Attic Angel, 3 to 4 p.m., September 26, 2019
7. Old Sauk Trails Business Park, 11 a.m.to 12 p.m., September 26, 2019
8. Tamarack Trails, 9 to 10 a.m., September 27, 2019

As part of PIM No. 2, focus group meetings were held. These meetings were held for each of the nine areas listed above, along with a focus group for the remaining areas of the watershed (residents not located in one of the areas shown on Figure 7-1). These meetings were held via virtual break-out rooms following the PIM No. 2 presentation and general question and answer session. Flood inundation mapping for the 10 percent, 1 percent, and August 2018 storm events was shared with the focus groups. In general, the inundation mapping shown to the participants reflected what they observed during large flood events.

7.3 Public Comment Period

A 30-day Public Comment Period was held for the public to review and comment on the Final Draft Pheasant Branch Watershed Study Report. The Public Comment Period ended September 2, 2022. The public comments and response to comments can be found in Appendix K.

Section 8 Proposed Solutions Considerations

Upon completion of the existing conditions portion of this project, the project moved onto developing and evaluation the proposed solutions. The proposed solutions tasks are listed below. These tasks outline the general type of proposed solutions that were considered and evaluated in this study.

1. Evaluate Flood Mitigation Alternatives
    a. Volume Control (VC) - The use of VC infrastructure, also commonly referred to as Green Infrastructure (GI), was evaluated. These measures would be distributed throughout the watershed to provide infiltration of stormwater and ultimately work towards meeting the LOS targets for the Pheasant Branch watershed. The technical report describing this analysis is included in Appendix F.
    b. Peak Flow Control Infrastructure (PFCI) - PFCI, or "grey" infrastructure, was evaluated to understand what would be needed to achieve the targeted LOS for stormwater management within the Pheasant Branch Watershed. Peak flow control includes a variety of approaches to convey or store runoff that is currently not being managed to the City's performance targets. Specific components and approaches are described in detail in Section 9.
2. Public Engagement - During this phase of the project, additional opportunities for public interaction were conducted.
3. City Agency Engagement - Engineering staff met with numerous City agencies during the proposed solutions evaluation process. The purpose was to understand the impacts the solutions would have on other City agencies and summarize their support and/or concerns.

Section 9 Proposed Solutions Development

The proposed solutions development process described in the body of this report focuses on identifying PFCI solutions to resolve flooding. PFCI solutions are defined by the City as any stormwater control measure that has the ability to store or convey water but not infiltrate water.

An evaluation of the flood control benefits of VC measures, commonly referred to as GI, was completed as a separate, but parallel effort. That effort is described in Appendix F.

9.1 Overall Evaluation Process Methodology

The process utilized to evaluate potential solutions, and ultimately to select solutions proposed for implementation, is described in the following sections. Section 9.1 includes the process used for solution development. Section 9.2 describes various processes considered, for both solutions that were recommended and not recommended.

9.1.1 Data Review

To commence the solutions development process, the existing conditions results were further reviewed to identify constriction points within the watershed. Constriction points were identified by considering existing flooding conditions and identifying the cause, or causes, of flooding at individual areas. Constriction points identified included the following types of areas: where a larger storm sewer discharges into a smaller sewer, a storm sewer that is undersized, inadequate inlet capacity, and/or the lack of an overland flow path.

Additionally, pertinent data within the watershed was reviewed to further determine restrictions to implementation of potential solutions. No major restrictions, such as Madison Gas and Electric (MG&E) high-pressure gas mains, American Transmission Company (ATC) overhead power lines, or archaeological sites were identified.

9.1.2 Solution Brainstorming

Numerous informal meetings were held with City Engineering staff to consider various constriction points across the watershed, discuss conceptual scenarios, and identify potential opportunities for flood mitigation measures.

9.1.3 Evaluation of Potential Solutions

Following the solutions brainstorming, various potential solutions to flooding were evaluated. The calibrated existing conditions XPSWMM™ model developed as part of Phase I of this study was utilized to evaluate the flood control performance of the various potential solutions. Within the XPSWMM™ model, the hydraulic input parameters for various components of the stormwater conveyance system were modified to simulate potential improvements. The evaluation of various potential solutions is described below.

1. Local Storm Sewers - Throughout the Pheasant Branch Watershed there is flooding caused by insufficient storm sewer capacity. An initial step of the evaluation of potential solutions was to identify proposed “local” storm sewer improvements. Improvements to these storm sewers can have an impact on the sizing of other mitigation measures, such as pond improvements. Enlarged upstream storm sewers can result in increased peak flow rates into a pond and impact the pond’s peak water surface elevation.

For the purposes of the Pheasant Branch watershed, the majority of storm sewers within the system were considered local storm sewers. As part of this study, local storm sewers were defined as those that are not impacted by upstream flood solutions (such as a pond improvement).

To determine potential improvements to these areas, the following steps were taken:

a. Based on the layout of the storm sewer system within the watershed, individual sections of storm sewer were isolated and evaluated for improvements.
b. Improvements were incorporated into the isolated section of storm sewer with a target of meeting the City's 10 percent chance event LOS target.
c. After the 10 percent chance event target was met, the 1 percent chance event was executed in the XPSWMM™ model, and the results were reviewed. Additional storm sewer enhancements were made until the 1 percent chance event target of maintaining flooding within the ROW was met. In cases where the 1 percent chance event could not be maintained within the ROW, an alternative target of preventing structure flooding was considered.
d. Subsequent sections of the storm sewer system were then analyzed until all areas of local storm sewer were evaluated.
e. The local storm sewer improvements were consolidated into an overall watershed XPSWMM™ model where the impacts of the local improvements, in conjunction with regional improvements, were considered. Local storm sewers were then modified iteratively with regional improvements.

2. Big Picture/Theoretical Improvements - Much of the flooding in the Pheasant Branch Watershed is interconnected. To isolate issues, "big picture", or, "theoretical" solutions were evaluated. The likelihood of these solutions being implemented is very low; however, they provide key insights to what solutions could have an effect. These solutions included things such as:
   a. Creating free outfalls for some areas. This provides insight on if the tailwater from certain areas is causing water to back-up and flood upstream areas.
   b. "Turning off" portions of the watershed so that no water is discharging from it. This provides insight on whether the downstream conveyance system is simply too small to convey all the water.

3. Regional Stormwater Detention Improvements - At various locations in the watershed (described in Section 9.2) additional stormwater detention volume was considered. The detention improvements were evaluated within the XPSWMM™ model by modifying the stage-area relationship and outlet structure of an existing pond and adding pertinent pond characteristics for a new pond. The detention improvements were considered after local storm sewer improvements (limited initial evaluation was started before local storm sewer sizing).

Conceptual grading developed by City staff were used for the detention approximations. In addition to considering detention improvements, the downstream storm sewer was also considered.

4. Relief/Mainline Sewer Improvements - After initial regional detention improvements were considered, relief storm sewer and mainline storm sewer improvements were examined. These improvements were considered in conjunction within detention improvements, as the size of relief of mainline sewer improvements are generally tied to detention improvements, and local storm sewer improvements, within the watershed.

9.1.4 Discussion of Potential Solutions with City Engineering Staff

Throughout the proposed solutions development, numerous informal meetings were held with City Engineering staff to discuss the solutions evaluated and the corresponding modeling results.

9.1.5 Convergence on Solutions

As the evaluation progressed, a set of solutions (described below) were determined to provide what appeared to be the most viable path towards meeting the flood control targets for the project. This convergence of solutions was based upon performance of the solutions, technical feasibility, and the input from City Engineering Staff.

9.1.6 City Agency Meetings

Following the convergence on solutions for the Pheasant Branch Watershed, City Engineering staff met with various City agencies to discuss the potential solutions and challenges/obstacles to implementation of those solutions. Input for the solutions was gained via email correspondence from the Mayor's Office, Water Utility, Parks Department, Fire Department, Metro Transit, Planning Department, Operations Department, Streets/Forestry Division, Transportation Engineering, and Streets Design Division. Additionally, individual meetings were held with the Parks Department, Planning Department, and the Mayor's Office. Feedback from the various agencies is included in the discussion for each individual solution below.

9.1.7 Finalization of Solutions

Modifications to the solutions were not required following the meetings with the agencies. Therefore, the solutions discussed with the agencies were considered the final solutions.

9.1.8 Proposed Solutions Model Quality Assurance/Quality Control (QA/QC)

As a final step of the solutions development process, a QA/QC review of the proposed solutions model was completed by Strand Associates, Inc® (Strand). The model was reviewed and comments were provided to City staff. Model revisions were completed and the proposed solutions model was finalized.

9.2 Description of Solutions Considered

Stormwater control measures were considered in various locations across the Pheasant Branch Watershed. Ultimately, a variety of solutions were recommended for implementation, and there were a number of solutions that were reviewed, but not recommended. The following sections provide information about all solutions that were considered.

9.2.1 Big Picture/Theoretical

The solutions described in this section (9.2.1) are not realistic or feasible to implement. However, they provide insights to the causes of flooding and what solutions would have an impact to reduce flooding.

9.2.1.1 Tailwater Removed

Removing the existing conditions tailwater from current stormwater management control measures allows the stormwater to leave the control measure with minimal impediments. The results indicate how much of the flooding is caused by downstream conditions.

Old Sauk Trails Business Park Ponds

Issue: The structures around the Old Sauk Trails Business Parks Ponds flood during large storm events.

Theoretical Solution - The outlet for the Old Sauk Trails Business Park Ponds was disconnected from the downstream channel and given a "free outfall." Additionally, the outlet was "opened up" so that the stormwater could leave the ponds easier. With these conditions, stormwater can leave the ponds without constriction from the pond's outlet structure and without influence from the tailwater in the downstream channel.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 2 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 4 feet to remove all the structures in the business park from the 1 percent chance storm flood risk. Therefore, this solution does have impact, but not enough meet the 1 percent chance storm target. This indicates additional storage in the Old Sauk Trails Business Park Ponds is also needed.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. This has the potential to created adverse impacts downstream. Therefore, caution should be used when trying to incorporate aspects of this theoretical solution into the realistic solution.

Target Area Pond

Issue - The structures upstream of the Target Area Pond floods during large storm events.

Theoretical Solution - The outlet for the Target Area Pond was disconnected from the downstream channel and given a "free outfall." Additionally, the outlet was "opened up" so that stormwater could leave the pond easier. With these conditions, stormwater can leave the ponds without constriction from the pond's outlet structure and without influence from the tailwater in the downstream channel.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 2.5 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 2 feet to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution indicates the outlet and downstream conditions (Beltline culverts and Sauk Creek Greenway) are contributing to the flooding issues in the Target Area.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. Computer modeling indicates the sections of the Sauk Creek Greenway just downstream of the Beltline culverts do not have capacity for the additional stormwater that would come from this solution. The flooding experienced in the Target Area would be moved downstream to the properties adjacent to the upstream sections of the Sauk Creek Greenway. Therefore, if aspects of this solution are to be

implemented, the design should account for the capacity of the downstream Sauk Creek Greenway sections.

Blackhawk Pond

Issue - Some structures around Blackhawk Pond flood during large storm events.

Theoretical Solution - The outlet for the Blackhawk Pond was disconnected from the downstream channel and given a "free outfall." It was not increased in size due to the previous restrictions placed upon the outlet pipe when it was first constructed. With these conditions, stormwater can leave the ponds without influence from the tailwater in the downstream pipe.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 0.2 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 1 foot to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution indicates the downstream conditions are not significantly contributing to the flooding issues in the structures around the Blackhawk Pond.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. Swallowtail Pond is downstream of this pond. Structures around Swallowtail Pond have experienced flooding during large events. Therefore, if aspects of this solution are to be implemented, the design should account for the drainage conditions around Swallowtail Pond.

Beltline Culverts downstream of Wexford Pond

Issue - Some structures on Sawmill Road and Tramore Trail flood during large storm events.

Theoretical Solution - The culverts under the Beltline downstream of Wexford Pond were disconnected from the downstream channel and given a "free outfall." Additionally, the culverts were "opened up" so that stormwater could leave the channel easier. With these conditions, stormwater can leave the channel just downstream of Wexford Pond without constriction from the Beltline culverts or without influence from the tailwater in the downstream channel.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 0.7 feet in the channel between the culverts under High Point Road and the Beltline culverts just downstream of Wexford Pond. The 1 percent chance storm event peak water surface elevation must be lowered by at least 2 feet to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution indicates the downstream conditions are partially contributing to the flooding issues on Sawmill Road and Tramore Trail.

Solution Caution - If this solution could be implemented, it would send stormwater downstream faster. Old Sauk Trails Business Park is downstream of this pond. Structures around Old Sauk Trails Business Park Ponds have experienced flooding during large events. Therefore, if aspects of this solution are to be implemented, the design should account for the drainage conditions around Old Sauk Trails Business Park Pond.

9.2.1.2 Farmland Subwatersheds "Turned Off"

Turning area "off" means the area does not generate any stormwater. This could be thought of as building a holding area large enough to store all the water from the area that is turned off.

Target Area Pond

Issue - The structures upstream of the Target Area Pond floods during large storm events.

Theoretical Solution - There is a large area of farmland upstream of the Target Area pond. This land will eventually be developed. This land was "turned off" in the model; in other words, no stormwater discharged from this area.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 1.0 foot. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 2 feet to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution shows that significantly restricting discharge (restrictions above and beyond the existing ordinance) from the farmland when it develops would have a positive impact on flood risk, but it will not completely remove the structures from the 1 percent chance event flood risk. Because the structures would still be at flood risk, the solution also indicates the current pond and outlet is not sized for the existing development that discharges to it.

Solution Caution - Because the existing pond and outlet is not sized for the existing development that discharges to it, additional development that has a discharge will likely increase flood risk.

Blackhawk Pond

Issue - Some structures around Blackhawk Pond flood during large storm events.

Theoretical Solution - There is a large area of farmland upstream of the Blackhawk Pond. This land will eventually be developed. This land was "turned off" in the model; in other words, no stormwater discharged from this area.

Theoretical Solution Result - This solution lowered the 1 percent chance storm event peak water surface elevation by approximately 0.1 feet. The 1 percent chance storm event peak water surface elevation must be lowered by approximately 1 foot to remove all the structures in the area from the 1 percent chance storm flood risk. Therefore, this solution shows that significantly restricting discharge from the farmland when it develops may not have a positive impact on flood risk. Because the structures would still be at flood risk, the solution also indicates the current pond and outlet is not sized for the existing development that discharges to it.

Solution Caution - Because the existing pond and outlet is not sized for the existing development that discharges to it, additional development that has a discharge will likely increase flood risk.

9.2.2 Solutions Reviewed–Not Recommended

The following flood mitigation measures were considered as part of the evaluation process; however, they were not recommended for implementation. The locations of such measures are shown on Figure 9-1. It should be noted that the potential solutions which were reviewed but eliminated from consideration were not evaluated in as much detail as the recommended solutions. It may be possible that, if the recommended solutions cannot be implemented, these solutions could be implemented. However, there may be barriers to implementation that were not identified as a result of the less thorough evaluation.

9.2.2.1 Wexford to Old Sauk Trails Relief Pipe

1. Conceptual Project Description - The structures around Wexford Pond (Sawmill Road and Tramore Trail) flood during large storm events. Currently the Sauk Creek Greenway is routed into Wexford Pond through a pipe that runs from south to north under High Point Road. Wexford Pond eventually discharges to the Old Sauk Trails Business Park Ponds. This solution would route one-half of the water leaving the Sauk Creek Greenway west on Old Sauk Road, under the Beltline, then north on Excelsior Drive directly into the Old Sauk Trails Ponds.

2. Reason for Exclusion - The solution resulted in very little decrease for the flooding that occurs near Sawmill Road and Tramore Trail and increased peak water surface elevations at Old Sauk Trails Ponds. Because structures around the Old Sauk Trails Park Ponds are already at risk of flooding in the 1 percent chance event, a solution that increases the peak water surface elevations was found to not be acceptable.

9.2.2.2 Sauk Creek Greenway to Wexford Pond Double Box Culvert

1. Conceptual Project Description - Significant water floods High Point Road and ponds in the greenway between the Beltline and Wexford Pond. This occurs because the conveyance system in the southern portions of the watershed east of the Beltline is not sized to convey the stormwater and when the conveyance system overflows, it naturally flows north (downstream). Additionally the pipe carrying Sauk Creek to Wexford Pond is not sized to carry all the stormwater leaving the Sauk Creek Greenway. This solution would install two 6' x 12' box culverts from Sauk Creek Greenway, north under High Point Road and east into Wexford Pond.

2. Reason for Exclusion- This solution reduces peak water surface elevations, although not as much as the recommended solution (the recommended solution is described in the next section).

9.2.2.3 Reconstruction of Target Area Pond Outlet Structure and Downstream Culverts under Beltline

1. Conceptual Project Description - Structures upstream of the Target Area Pond and sections of Mineral Point Road flood during larger storm events because water in the Target Area Pond causes stormwater backups. This occurs because the pond is not sized for all the stormwater it receives and the pond outlet structure and downstream culverts under the Beltline restrict the flow. This solution reconstructs the Target Area Pond outlet structure and adds additional culverts under the Beltline just downstream of Target.

2. Reason for Exclusion - The sections of Sauk Creek Greenway just downstream of the beltline and Target Area Pond are not large enough to convey the additional capacity from the improvement.

9.2.3 Solutions Reviewed–Recommended

This section provides a brief description of solutions that are recommended for implementation as flood mitigation measures in the Pheasant Branch Watershed. The locations of the various solutions are displayed on Figure 9-2. Further detail for each of the proposed solutions is provided in Section 10. The recommended solutions generally fall into two categories: (1) local storm sewer improvements that are

dispersed across the watershed and will be implemented as part of street reconstruction projects, and (2) stand-alone solutions that will be implemented as individual Capital Improvement Plan (CIP) projects.

9.2.3.1 Local Storm Sewer Improvements

1. Conceptual Project Description - Improve storm sewers along various streets throughout the watershed. Improvements include increasing pipe size and/or modifying pipe elevations and slopes.

2. Iterations Considered - Various pipe sizes were considered.

9.2.3.2 Terrance Inlets

1. Conceptual Project Description - Improve inlet capacity at various locations throughout the watershed. Improvements may include increasing the number of inlets and/or modifying the type of inlets.

2. Iterations Considered - None.

9.2.3.3 Old Sauk Trails Business Park Ponds and Greenway Reconstruction

1. Conceptual Project Description - Regrade the current stormwater ponds to increase storage volume. Modify the outlet structure to improve outflow while not increasing peak flows downstream. Regrade the greenways in the business park to increase capacity. Enlarge the existing greenway crossings within the business park.

2. Iterations Considered - Various pond sizes, shapes, and normal water levels. Various pond outlet structures.

9.2.3.4 Pleasant View Road Reconstruction

1. Conceptual Project Description - Size the storm sewer in the reconstruction project to meet the City's watershed study targets.

2. Iterations Considered - Various storm sewer pipe sizes.

9.2.3.5 Swallowtail Pond Reconstruction

1. Conceptual Project Description - Regrade the current stormwater pond to increase storage volume. Lower the pond normal water level to increase the storage volume. Replace the culverts under Pleasant View Road to increase capacity.

2. Iterations Considered - Various pond normal water levels and outlet pipe sizes.

9.2.3.6 Blackhawk Pond Reconstruction

1. Conceptual Project Description - Regrade the current stormwater pond to increase storage volume. Lower the pond normal water level to increase the storage volume. Expand the wet weather storage into the adjacent park. Replace the outlet structure. Replace the storm sewer from Blackhawk Pond to Swallowtail Pond to allow for the lowering of the pond normal water surface elevation.

2. Iterations Considered - Various pond sizes, shapes, and normal water levels. Various pond outlet structures.

9.2.3.7 Wexford Pond and Greenway Reconstruction

1. Conceptual Project Description - Regrade the current stormwater pond to increase storage volume. Add a pump to draw down the pond between storm events to allow for more storage. Replace the outlet structure.

2. Iterations Considered - Various pond sizes, shapes, and normal water levels. Various pond outlet structures.

9.2.3.8 Sauk Creek Greenway Stabilization

1. Conceptual Project Description - Regrade the stormwater greenway to decrease erosion and improve channel capacity.

2. Iterations Considered - Various channel shapes and storage areas.

9.2.3.9 Target Area Relief Sewer

1. Conceptual Project Description - Install a box culvert within Mineral Point Road that intersects two inlets that discharge into the Target Area Pond. The new box culvert would drain west to High Point Road, then turn north and discharge into the greenway just downstream of High Point Road.

2. Iterations Considered - Various sizes of box culverts.

9.2.3.10Old Sauk Road/Westfield Road Intersection Reconstruction

1. Conceptual Project Description – Raise the intersection by 1 to 2 feet. Install a larger storm sewer from the intersection under Old Sauk Road west to the greenway.

2. Iterations Considered - Various storm sewer sizes.

9.2.3.11Greenway Crossings

1. Conceptual Project Description - Increase the size of greenway crossings to eliminate road overflow.

2. Iterations Considered - Various box culvert sizes and configurations.

Section 10 Recommended Solutions

The recommended solutions were introduced in Section 9 of this report. Figure 9-2 shows an overall proposed improvement map for the Pheasant Branch Watershed identifying the locations of the various recommended solutions.

In Sections 10.1 through 10.11, the proposed improvements included for the Pheasant Branch Watershed are described in detail. Included is pertinent information regarding the nature of the proposed solutions, the flood reduction benefits, and other considerations.

It should be noted that the improvements documented in this report are not meant to be full design-level efforts; they are conceptual solutions that help the City's Engineering Division understand the magnitude of solution needed in a given area to meet the targets. As projects are looked at further, and if they move to the point they are contemplated for programming, then projects will then go into a more detailed design phase. This project phase collects detailed data needed for design and looks at refined design, permitting, and environmental issues associated with the particular project.

10.1 Local Storm Sewer Improvements

Detailed Project Description

During this study it was found that many of the flooding issues throughout the Pheasant Branch Watershed are a result of undersized local storm sewers. These storm sewers are incapable of conveying peak flows during intense rainfall events. During these events, the undersized pipes operate in a surcharged condition, which pushes stormwater to the ground surface and results in overland flow and flood impacts.

Pipes were upsized iteratively until the 10 percent chance event met the City's target of no surface flooding. Pipes were also lowered and slopes were modified as needed to meet the flood control targets.

After verifying the proposed pipes continued to meet the 10 percent chance storm event design target of no street surcharging in the combined model, the model was run for the 4 percent and 1 percent chance event. Where the proposed pipes did not meet the 4 percent and 1 percent chance event targets, they were further modified until City targets were generally met. It should be noted that there are some locations where targets were not met. These are described in further detail in Section 12.

Locations of local storm sewer improvements are shown on Figure 10-1.

Associated Flood Reduction Benefits

The level of flood reduction associated with the local storm sewer improvements varies. The local sewer improvements are spread across the watershed and the benefits related to these improvements are best described by the comparison to the City's flood reduction targets as documented in Section 11.

Project Constraints/Considerations

Because local storm sewer improvements involve the replacement of storm sewer in its existing alignment, there are relatively few project constraints. Work will be contained within City-owned ROW and will not impact privately owned property.

Potential conflicts with existing utilities may occur in some locations where upsized pipes must be lowered to maintain cover requirements. As part of this, there are likely to be conflicts with existing water mains and water laterals, which would need to be lowered. There were not sanitary sewer conflicts identified as clearance between storm sewer improvements and sanitary sewer was attempted to be maintained. However, it is anticipated that there will likely be sanitary sewer conflicts that are encountered due to the widespread nature of the local storm sewer improvements. Conflicts encountered can be resolved by lowering sanitary sewer, if feasible, or installing a sanitary sewer siphon.

Water Quality Benefits

Local storm sewer improvements will not provide water quality benefits.

Additional Notes/Information

Local storm sewer improvements will increase peak flows to downstream discharge locations. The impact of these improvements on downstream flows have been considered and are incorporated into the recommended solutions discussed later in this section.

10.2 Terrance Inlets

Detailed Project Description

The existing conditions model indicated that in some locations, insufficient inlet capacity is a factor that contributes to flooding. Where feasible, terrace inlets were constructed in these locations.

Construction occurred in summer 2021. The locations where terrace inlets were reconstructed is shown in Figure 10-2.

Associated Flood Reduction Benefits

Eliminating inlet capacity restrictions improved flooding within the watershed. However, additional improvements, such as storm sewer improvements, are typically needed to meet the City's targets.

The level of flood reduction associated with the inlet capacity improvements varies based on the ponding at each location.

Project Constraints/Considerations

Inlet capacity improvements were contained within City ROW and did not impact nearby property owners.

Water Quality Benefits

Inlet capacity improvements will not provide water quality benefits.

Additional Notes/Information

As with local storm sewer improvements, inlet capacity improvements will increase peak flows downstream as water is moved through the system more efficiently. The impact of these improvements is factored into the recommended solutions described later in this section.

10.3 Old Sauk Trails Business Park Ponds and Greenway Reconstruction

10.3.1 Detailed Project Description

The Old Sauk Trails Business Park Ponds and Greenways will be reconstructed. The project includes combining and enlarging the existing wet pools to create one large contiguous greenway wet storage area. The outlet structure of the north pond will be reconstructed. The north pond permanent pool elevation will remain approximately the same. Approximately 70 acre-feet of additional storage will be created from the ponds' reconstruction.

The east and west greenways will be reconstructed to allow for additional capacity and reduce channel erosion. The Fourier Drive section will be lowered and become an extension of the south pond. The STH 12 sections will be lowered and widened to provide additional flow capacity.

The existing culverts under Deming Way at the north end of the greenway, under the walking path between the south wet pool and the north wet pool, and under Fourier Drive to the east will be replaced. The culverts under Fourier Drive will be 3 – 6' x 14' box culverts. The culverts between the revised ponds and under Deming Way will be 3 – 6' x 16' box culverts. The existing culvert connecting the west branch inlet north of Excelsior Drive to the pond will be replaced with a 5' x 12' box culvert. The existing culvert draining to the STH 12 north-south section of the east greenway from the south will be extended with a section of 5' x 12' box culvert. The storm sewer along Deming Way east of Blackhawk Road that drains into the open channel west of the pond will be upsized with storm sewer ranging in size from 54" reinforced concrete pipe (RCP) to 53" x 83" horizontal elliptical reinforced concrete pipe (HERCP).

The walking paths will be reconstructed around the new ponds.

The elements of the project are displayed graphically on Figure 10-3.

10.3.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 7.0 feet for the 10 percent chance storm event and by approximately 4 feet for the 1 percent chance storm event.

10.3.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. This project is the downstream most recommended solution in the Pheasant Branch Watershed Study. It should be constructed before solutions that increase capacity (such as a greenway crossing) are constructed as to not increase the existing flood risk. Solutions that increase storage, such as Swallowtail Pond or Sauk Creek Greenway, can be constructed prior to this solution; modeling results indicate solutions that add storage help reduce flood risk in this location.
2. As stated above, this project is the downstream most recommended solution in the Pheasant Branch Watershed Study. As the solutions upstream are implemented and the watershed further develops, the drainage conditions will change. The outlet structure for the North Pond will need to account for changing conditions. This may include restrictions in the outlet structure that can be manually added or removed or an automated outlet

structure that can adjust based on upstream conditions. The outlet structure will also need to be design so that peak flows are not increased downstream.

3. An existing sanitary sewer is located under what will be the berm separated the future north and south ponds. The berm design and culvert through the pond will need to accommodate this sewer.
4. An existing sanitary sewer is located under Fourier Drive where the future 6' x 14' culverts will be constructed. It is likely that that sanitary sewer will need to be relocated, or, a siphon constructed, to accommodate the box culverts.
5. Wetland delineations were conducted for the ponds and greenways. Wetlands are present in the project area.
6. The pond and greenway reconstruction will result in removal of existing trees that surround the pond.
7. The business park owners and tenants have been supportive and involved with the concept of this solution. It is expected that their input will continue during design and construction.

10.3.4 Water Quality Benefits

The reconstructed ponds would provide increased stormwater pollution trapping. The existing detention basins have filled in with sediment and currently have shallow pools. The conceptual layout for the reconstruction of the south pond includes an 8 foot deep permanent pool consistent with City design standards. As described previously, these ponds and greenways are the most downstream ponds and greenways in the watershed and the water quality evaluation should account for the stormwater control measures upstream of this location.

10.4 Pleasant View Road Reconstruction

10.4.1 Detailed Project Description

Pleasant View Road will be reconstructed from Mineral Point Road to STH 14 as part of a joint project with the City of Middleton. The proposed project will include reconstruction of the existing roadway as an urban four-lane arterial with new pavement and gravel as well as the addition of curb and gutter, a raised median, new multiuse path/sidewalk in selected areas, storm sewer, sanitary sewer and water main. Other improvements include new retaining walls, street lighting, pavement marking, signing, and stormwater detention ponds.

The elements of the project are displayed graphically on Figure 10-4.

10.4.2 Associated Flood Reduction Benefits

During the stormwater design process, the storm sewer was sized using the City's watershed study targets. Both the 10 percent chance storm and the 1 percent chance storm targets are met in the City in the Phase I project area. It is anticipated that these same targets will be used during Phase II.

10.4.3 Project Constraints/Considerations

Project constraints and considerations were addressed during the design process.

10.4.4 Water Quality Benefits

The water quality standards for road reconstruction were met in the design for this project. Water quality improvements include the reconstruction of Swallowtail Pond (described in section 10.5) and the installation of a screen structure.

10.5 Swallowtail Pond Reconstruction

10.5.1 Detailed Project Description

Swallowtail Pond will be reconstructed. The project includes regrading the pond and lowering the permanent pool to create additional storage for flood events. The outlet structure will be reconstructed. Additionally, the greenway crossing from the pond under Pleasant View Road will be reconstructed. The permanent pool elevation will be lowered to 1,009.0 (2.7 feet lower than existing). Approximately 9 acre-feet of additional storage will be created from the pond's reconstruction.

The elements of the project are displayed graphically on Figure 10-4. Construction documents are available for the solution and can be provided upon request. The pond will be reconstructed as part of the Pleasant View Road project reconstruction occurring in 2022 and 2023.

10.5.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 2.0-feet for the 10 percent chance storm event and by approximately 0.9 feet for the 1 percent chance storm event.

10.5.3 Project Constraints/Considerations

Project constraints and considerations were addressed during the design process.

10.5.4 Water Quality Benefits

The reconstructed pond will provide increased stormwater pollution trapping. Computer modeling conducted during the design process indicates the reconstructed pond will provide an additional 5.1 pounds (lb) of total phosphorus and an additional 0.5 tons of total suspended solids removal per year, above what it currently provides.

10.6 Blackhawk Pond Reconstruction

10.6.1 Detailed Project Description

Blackhawk Pond will be reconstructed. The project includes regrading the current pond and lowering the permanent pool. Additionally, the pond will be extended into the adjacent park to add additional stormwater storage. The existing pond has no emergency overflow; an overflow will be added during the reconstruction. The outlet structure will be reconstructed. The storm sewer from Blackhawk Pond to Swallowtail Pond will be relayed and enlarged. The permanent pool elevation will be lowered to 1,068.0 (2.8 feet lower than existing). Approximately 82 acre-feet of additional storage will be created from the pond's reconstruction.

The elements of the project are displayed graphically on Figure 10-5.

10.6.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 3.7 feet for the 10 percent chance storm event and by approximately 2.0 feet for the 1 percent chance storm event.

10.6.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. The pond is proposed to be expanded Park land. Preliminary discussions were held with City Parks Division staff and no red flags were raised during the meeting. A copy of the meeting

summary can be found in Appendix G. City Parks Division staff should be involved during the design and construction process.
2. The proposed emergency overflow will involve some sidewalk reconstruction and may involve some driveway reconstruction.
3. Wetland delineations will need to be conducted for the project.
4. The pond reconstruction will result in removal of existing trees that surround the pond.

10.6.4 Water Quality Benefits

The reconstructed pond would provide similar water quality as the existing pond. There are some other stormwater management practices that provide water quality benefits upstream of this pond. As described previously, the water quality evaluation for this pond should account for the stormwater control measures upstream of this location.

10.7 Wexford Pond and Greenway Reconstruction

10.7.1 Detailed Project Description

The Wexford Pond and Greenway will be reconstructed. The project includes combining the current wet pools and maximizing the pond footprint on the Stormwater Utility-owned land. The outlet structure will be reconstructed. The pond permanent pool elevation will be lowered approximately 3 feet using a stormwater pump which will pump down the pond's permanent pool elevation between rainfall events. Approximately 20 acre-feet of additional storage will be created from the pond's reconstruction.

1. The greenway will be reconstructed to allow for additional capacity and reduce channel erosion.
2. The walking paths will be reconstructed around the new pond.
3. The elements of the project are displayed graphically on Figure 10-6.

Note: This solution is different than the dredging project that will occur in late 2022 and early 2023. This solution is a complete reconstruction of the pond and will occur farther out into the future.

10.7.2 Associated Flood Reduction Benefits

The pond peak WSE for the 10 percent chance and 1 percent chance event will not change significantly.

10.7.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. Wetland delineations were conducted for the ponds and greenway. Wetlands are present in the project area.
2. No utility conflicts were identified in the area around the pond footprint
3. Potential permitting includes an artificial wetland exemption, Wisconsin Department of Natural Resources (WDNR) Chapter 30, and WDNR Chapter 31.

10.7.4 Water Quality Benefits

The reconstructed pond would provide increased stormwater pollution trapping. The conceptual layout for the reconstructed pond includes a larger permanent pool surface area and at least a 5 foot deep permanent pool consistent with City design standards. Pertinent information to allow the City to conduct a detailed evaluation of the increased water quality benefits is provided in Appendix H. This

pond and greenway has stormwater management practices upstream of it that provide water quality benefits; the water quality evaluation should account for the stormwater control measures upstream of this location.

10.8 Sauk Creek Greenway Stabilization

10.8.1 Detailed Project Description

The channel within the Sauk Creek Greenway is badly eroded. The wooded farm ditch was not engineered when it was turned over to the City. It has been actively eroding for years. The erosion is adding significant sediment to the downstream Wexford Pond. As a result, Wexford pond is filling up and needs to be dredged to restore it to its original capacity.

Additionally, as the watershed that discharges to Sauk Creek greenway develops, and, as stormwater infrastructure is improved in the developed areas, runoff to the Sauk Creek Greenway will increase.

Also, climate change is resulting in larger, more intense storm events. These storm events also increase the runoff to the City's stormwater system, including Sauk Creek Greenway.

The proposed project both stabilizes the greenway and provides additional capacity.

The project includes regrading the channel to stabilize it, providing construction and maintenance access, and improving the two pond areas to improve the storage capacity and water quality effectiveness.

The Sauk Creek Greenway was budgeted for reconstruction prior to the August 2018 flood event and prior to the watershed study due to the need to remediate the active erosion. This watershed study evaluated the flood control benefits of the Sauk Creek Greenway.

The elements of the project are displayed graphically on Figure 10-7.

Note: The project information used in this study is planning level information; the design project will use design-level information.

10.8.2 Associated Flood Reduction Benefits

The stabilized greenway will provide effective conveyance of stormwater flows and reduced maintenance of downstream facilities.

10.8.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. The greenway contains many high quality trees. The design will want to minimize removal of high quality trees where possible.
2. Wetlands are present in the greenway.

10.8.4 Water Quality Benefits

The stabilized greenway will result in a reduction of erosion.

10.9 Target Area Relief Sewer

10.9.1 Detailed Project Description

A 6' x 12' relief sewer would be installed from just south of the Target Area pond to Sauk Creek Greenway just east of S. High Point Road. The box culvert would be placed under Mineral Point Road and then turn north under S High Point Road until it reaches the greenway.

The elements of the project are displayed graphically on Figure 10-8.

10.9.2 Associated Flood Reduction Benefits

The pond peak WSE is reduced by approximately 2.2 feet for the 10 percent chance storm event and by approximately 4 feet for the 1 percent chance storm event.

10.9.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. Considerable fiber-optic and electrical utilities are likely present under Mineral Point Road. These will need to be located, and if necessary, relocated during construction.
2. A section of the box culvert will be constructed under the Beltline. This will likely require specialized equipment.
3. Coordination will be required with the Wisconsin Department of Transportation for areas of the project located within their right-of-way.
4. The commercial areas may be achieving water quality requirements through use of the Target Area Pond. An analysis of if low flows should still be routed to the pond should be completed during design.
5. Traffic control may be a major component of the project during reconstruction and should be accounted for accordingly.

10.9.4 Water Quality Benefits

There are no water quality benefits associated with this project.

10.10 Old Sauk Road/Westfield Road Intersection Reconstruction

10.10.1 Detailed Project Description

The intersection at Old Sauk Road and Westfield Road will be reconstructed. The intersection will be raised approximately 2 feet. This will allow the intersection to naturally drain towards the greenway cross to the west of the intersection. Storm sewer will be replaced from the intersection to the greenway.

The elements of the project are displayed graphically on Figure 10-9.

10.10.2 Associated Flood Reduction Benefits

The peak depths will be reduced from approximately 0.5 to almost 0.0 feet in the 10 percent chance storm event and from approximately 1.5 feet to almost 0.0 feet in the 1 percent chance storm event.

10.10.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. The project will likely require a full street reconstruction which includes sidewalks, curb and gutter, street light and traffic signal bases, and could potentially require some temporary land acquisitions.
2. Traffic control may be a major component of the project during reconstruction and should be accounted for accordingly.
3. Additional catch basins with sumps or a screen structure could be added for water quality purposes.

10.10.4 Water Quality Benefits

There are no water quality benefits associated with this project.

10.11 Greenway Crossing Reconstruction

10.11.1 Detailed Project Description

Each greenway crossing will be reconstructed.

Each greenway crossing and the elements of each project are displayed graphically on Figures 10-10 through 10-18.

10.11.2 Associated Flood Reduction Benefits

The 1 percent chance storm event would not flow out of the greenway over the road.

10.11.3 Project Constraints/Considerations

The following potential project constraints were identified and need to be considered as part of future project implementation.

1. Utilities may need to be relocated.

10.11.4 Water Quality Benefits

There are no water quality benefits associated with these projects.

10.12 Review No. 3

Following the completion of the proposed conditions model with the recommended solutions, the City contracted with Strand to review the modeling. This review occurred in May 2022. The review encompassed examination of the proposed conditions model to check that the proposed solutions were modeled appropriately and checked that the model results found from the model matched what is described in this report. City staff reviewed the comments and revised the computer model accordingly.

Section 11 Evaluation of Model Results with Recommended Solutions Implemented

The XPSWMM™ model that included all of the recommended solutions ("Proposed Conditions") was executed for each of the design storms. Table J-1 in Appendix I summarizes the peak water surface elevation and the peak flows at selected locations throughout the Pheasant Branch watershed. Figure 11-1 provides the location of each of the reporting locations in Table J-1. The "Maximum Water Depth" with the recommended solutions implemented maps for each modeled event are found on Figures 11-2 through 11-10 (rain events from the 100 percent chance to the 0.2 percent chance events).

11.1 Comparison to City Flood Control Targets with Recommended Solutions

The proposed conditions flooding results were compared to the City's flood control targets to quantify the performance of the recommended solutions in the Pheasant Branch Watershed. The performance of the system relative to greenway crossings, pipe capacity, inlet capacity, and street flooding were considered.

11.1.1 Pipe Capacity

The City's target is to eliminate surcharging from the storm sewer system onto city streets for up to the 10 percent chance event. The pipe capacity was determined to be exceeded if ponding occurs on the street during the 10 percent chance, 24-hour design storm event. Under existing conditions 10.3 out of the 52.1 miles of streets have water ponding during the 10 percent chance event; this 19 percent of the streets are not meeting the target.

Within the proposed conditions XPSWMM™ model, 1.0 out of 52.1 miles of streets have water ponding during the 10-percent chance event. This equates to 2 percent of the streets not meeting the target.

11.1.2 Inlet Capacity

For inlet capacity, the flood mitigation target is to allow no more than 0.5 feet of stormwater ponding above storm sewer inlets or rim elevations at inlet restricted low-points for the 10 percent chance event. Existing inlet capacity was not evaluated as part of this study.

As part of the proposed solutions, it is assumed that inlet capacity improvements are incorporated such that the inlet capacity is not the limiting factor, and thus this target would be met in all locations. Further detailed analysis is required to determine the exact number, type, and location of inlets required to be implemented.

11.1.3 Street Flooding

Within streets, the City's target is to maintain drivability of municipal streets for the 4 percent chance event. Drivability is defined as having no more than 0.2 feet of flooding at the center of the street. Within the watershed there are a total of 52.1 miles of streets. Under existing conditions, 2.9 miles (6 percent) of the streets do not meet the street flooding target.

With the recommended solutions implemented, the length of street that do not meet the street flooding target is reduced to 0.8 miles (2 percent).

11.1.4 Structure Flooding

The City's target is to eliminate structure flooding during the 1 percent chance event. Structure flooding is defined as having 0.5 feet or more water within 5 feet of a building. During the 1 percent chance event in existing conditions there are 118 out of 2,920 structures at risk of flooding (4 percent of the structures in the watershed).

In proposed conditions, there are 57 out of the 2,910 structures (2 percent) at risk of flooding during the 1 percent chance event.

11.1.5 Greenway Crossings

At locations where a greenway crosses under a street the City's target is to safely pass the 1 percent chance event without overtopping the street. The crossing was determined to be overtopped if the elevation at the upstream side of the culvert is above the street crossing elevation. Within the Pheasant Branch watershed there are 14 greenway crossings.

The existing conditions modeling indicates that all fourteen greenway crossing do not meet City targets. Once all proposed solutions have been implemented, all 14 greenway crossings would meet City targets.

11.2 Improvements to Known Flooding in Watershed from Recommended Solutions

In Section 1-2, known flooding areas in the watershed, based on City staff information, were identified. The areas that were identified are shown on Figure 1-4. Additionally, focus group meetings were held in various areas of the watershed that were impacted by flooding. The location of each focus group meeting is shown on Figure 7-1. The locations of the focus groups corresponded with areas of known flooding that were reported by City staff.

The recommended solutions were generally targeted at meeting the City's flood control targets throughout the Pheasant Branch Watershed. Known flooding locations were considered as part of the development of solutions. The following text summarizes how known flooding locations, identified by City staff, are impacted by recommended solutions.

1. Intersection of Watts Road and Plaza Drive – Commerce Park Pond overtopped
    a. Solutions that Benefit Area - The local sewer near the pond has been increased in size to allow the pond to discharge more efficiently
    b. Flood Reductions Observed - The pond no longer overtops during the 1 percent chance event
2. Intersection of Commerce Avenue and Plaza Drive – Flooding approximately 3 feet deep
    a. Solutions that Benefit Area - The local conveyance system (series of culverts and channels) was replaced with a box culvert for the full length. This greatly reduces the inefficiencies in the system.
    b. Flood Reductions Observed - The street now meets the 10 percent and 4 percent targets.
3. Menards Parking Lot – Flooding approximately 1 to 2 feet deep
    a. Solutions that Benefit Area - The local conveyance system (series of culverts and channels) along Commerce Drive was replaced with a box culvert for the full length. This greatly reduces the inefficiencies in the system.
    b. Flood Reductions Observed - The ponding in the Menards parking lot is reduced.
4. Trek Store – 1 to 2 feet of water inside store

a. Solutions that Benefit Area - The Target Area Relief Pipe diverts stormwater from the Target Area pond, thus allowing it to have adequate capacity for the remaining stormwater discharging to it.
b. Flood Reductions Observed - The Target Area pond no longer overtops and backs up into the Trek Store.

5. Elderberry Road and Augusta Drive flooded
   a. Solutions that Benefit Area - Local sewer upgrades and inlet maintenance
   b. Flood Reductions Observed - The modeling found the main reason for the flooding was due to clogged inlets. The local sewers were upsized slightly so the area would meet the targets.
6. Woodstone Ponds overtopped
   a. Solutions that Benefit Area – None; the ponds overtop due to stormwater entering them beyond their design capacity. The outlet is currently an agricultural drainage ditch. When the area downstream of the ponds is developed, the developer will need to account for all the water leaving Woodstone Ponds.
   b. Flood Reductions Observed - None.
7. Willows Pond overtopped into enclosed depression
   a. Solutions that Benefit Area – None; the ponds overtop due to stormwater entering them beyond their design capacity. The outlet is currently an enclosed depression. If the area downstream of the pond is developed, the developer will need to account for all the water leaving the pond.
   b. Flood Reductions Observed - None.
8. Greystone Pond, Southwest Blackhawk Pond, and farm field south of Old Sauk Road all had same water surface elevation (equalized across all areas)
   a. Solutions that Benefit Area – None; this was used as a calibration factor for the computer modeling.
   b. Flood Reductions Observed - None.
9. Westfield Road and Old Sauk Road flooded
   a. Solutions that Benefit Area - Reconstruction of the intersection of Westfield Road and Old Sauk Road.
   b. Flood Reductions Observed - The area now meets the City's targets.
10. Sawmill Road and Tramore Trail flooded
    a. Solutions that Benefit Area - Reconstruction of the Old Sauk Trails Business Park Ponds and Greenways, reconstruction of the culverts under the Beltline just upstream of Old Sauk Trails Business Park, reconstruction of Wexford Pond, reconstruction of the pipes into box culverts from Sauk Creek Greenway to Wexford Pond and the greenway downstream of Wexford Pond, and local sewer upgrades.
    b. Flood Reductions Observed - With all of the recommended proposed solutions are implemented, the flood risk of the structures will be lower, but will still not be below a 1 percent chance flood risk.
11. N High Point Road flooded
    a. Solutions that Benefit Area - Reconstruction of the Old Sauk Trails Business Park Ponds and Greenways, reconstruction of the culverts under the Beltline just upstream of Old Sauk Trails Business Park, reconstruction of Wexford Pond,

reconstruction of the pipes into box culverts from Sauk Creek Greenway to Wexford Pond and the greenway downstream of Wexford Pond, and local sewer upgrades.

b. Flood Reductions Observed - With all of the recommended proposed solutions are implemented, the ponding risk on N High Point will be lower, but it will still not meet City targets for the 10 percent or 4 percent chance event.

12. Old Sauk Trails Business Park – Culverts at Fourier Drive and Deming Way overtopped. Several buildings within the business part flooded.
    a. Solutions that Benefit Area - Reconstruction of the Old Sauk Trails Business Park Ponds and Greenways
    b. Flood Reductions Observed - The greenway crossings will meet the flood targets and all structures will be removed from flood risk.
13. Cemetery by Mineral Point Road and Westfield Road - drained onto adjacent property and caused flooding.
    a. Solutions that Benefit Area – None; public infrastructure improvements are not effective in this location.
    b. Flood Reductions Observed - None.

Section 12 Areas Flood Control Targets are Not Met

In most of the Pheasant Branch Watershed, the City's flood control targets are met. In limited locations there are cases where the targets are not met. Further consideration of areas not meeting the 1 percent chance event structure flooding target is provided in this section.

As noted in Section 11.1.4, there are 57 structures that have risk of flooding during the 1 percent chance event under the recommended solutions scenario. It is believed that, for the majority of these structures, the identification that they are flooded is due to specific topographic conditions within the XPSWMM™ model. The locations were evaluated in greater detail to determine the nature of the flooding.

Model limitations were found to be the trigger for identifying the majority of the structures as having flood risk during the 1 percent chance event:

1. The results were observed to show that shallow overland flow becomes trapped against a building and results in triggering the flooding criteria. The 2D model uses a 10-foot grid system to simulate overland flow. The grid size is reflective of a watershed study of this nature. However, it does not have the ability to capture, and simulate, all of the nuances within an urban area. For instance, the detailed grading surrounding a building may not be captured by the grid, or the 6-inch curb depth of a road might not be fully captured.
2. In some locations, there may be private storm sewer present that is not incorporated into the model. The private storm sewer may prevent flooding if accounted for in the model.

During the design phase of each solution, the following can be carried out to more accurately determine flood risk in these areas:

1. Refinement of the model during subsequent planning, design and implementation phases for solutions can verify pipe sizing and confirm whether structures are flooded or not. Refining the model could include revising topographic data (such as supplementing LiDAR data with survey data), decreasing the grid size in specific locations of interest, splitting subwatersheds, and/or adding additional storm sewer such as inlets, inlet leads, smaller storm sewer, or private storm sewer. Additionally, further structure elevation data (such as first floor or low opening elevations) could be obtained to verify where the structure would be flooded.
2. The storm sewer improvements could be refined, and sizes potentially increased to provide a greater level of flood protection.

Locations where flood risk is not being reduced include:

1. The Sawmill Road/Tramore Trail/ N High Point Road area continues to show structure flood risk in the 1 percent chance event. The location of the structures compared to the drainage system is relatively low. Additionally, the drainage system has very little topographic relief. These two factors combine to create conditions where reducing flood risk is challenging. The recommended projects will provide some flood risk relief. To fully reduce flood risk, even more significant solutions would need to be evaluated such as filling the area and raising the structures or installing large pumping systems. These options were not

evaluated as part of this study. If they are to be evaluated in the future, attention would need to be paid to the flood risk in the immediate area as well as downstream.

2. Structures in the Tamarack Trails condominiums adjacent to the drainage way that discharges to Sauk Creek Greenway are showing flood risk in the 1 percent chance event. The condominium association is aware of this flood risk and is working with a consultant to evaluate the private property drainage conditions.

Section 13 Cost Estimating

During the course of this study, planning level cost estimates were prepared for each of the stand-alone solutions described in Section 10. The following sections describe the methodology used for estimating costs.

Cost estimates were not prepared for local storm sewer or inlet capacity improvements. In general, these improvements will be implemented in conjunction with street resurfacing projects. The costs associated with these storm sewer improvements will be developed by the City as they are scheduled for implementation in the City's five-year CIP.

To prepare the cost estimates, estimated quantities were developed for the project. The City provided average units costs for typical bid items included as part of storm water improvement projects. The standard unit costs were adjusted based on specific project conditions that may result in higher, or lower, than average unit costs.

The total estimated cost for each of the stand-alone projects is provided in Table 13-1. Detailed breakdowns of the cost estimates for each project are included in Appendix J.

Table 13-1. Stand-Alone Project Cost Estimates

Project Name	**Construction Cost ($)**
Old Sauk Trails Business Park Pond and Greenways	$9,178,000
Old Sauk Trails Ponds	*$3,074,000*
Old Sauk Trails East Greenway	*$1,714,000*
Old Sauk Trails West Greenway	*$475,000*
Deming Way west of OSTr Ponds (Culverts)	*$570,000*
Driveway to OSTr Ponds (Culverts)	*$145,000*
Deming Way north of OSTr Ponds (Culverts)	*$1,570,000*
In OSTr Ponds (Culverts)	*$580,000*
Fourier Drive east of OSTr Ponds (Culverts)	*$1,050,000*
Swallowtail Pond Reconstruction	$2,373,000
Swallowtail Pond	*$2,203,000*
Pleasant View Road (Greenway Crossing)	*$170,000*
Blackhawk Pond Reconstruction	$6,990,000
Blackhawk Pond	*$5,326,000*
Blackhawk Outlet Structure and Overflow	*$1,665,000*
Wexford Pond and Greenway Reconstruction	$4,784,000
Sauk Creek Greenway Stabilization	$4,000,000
Target Pond Relief Sewer	$11,105,000
Old Sauk Trail/Westfield Intersection Reconstruction	$1,938,000
High Point Road west of Wexford Pond (Greenway Crossing)	$739,000
High Point Road from Sauk Creek to Wexford Pond (Greenway Crossing)	$9,768,000

Old Sauk Road (Greenway Crossing)	$664,000
Westfield Road (Greenway Crossing)	$416,000
Tree Lane east of High Point Road (Greenway Crossing)	$1,167,000
High Point Road south of Tree Lane (Greenway Crossing)	$769,000
Tree Lane west of High Point Road (Greenway Crossing)	$711,000
Beltline downstream of Wexford Pond (Greenway Crossing)	$5,390,000
Local sewer upgrades	$15,086,000
Total	**$75,079,000**

Italics indicate subprojects of a larger, overall project.

Section 14 Implementation Sequence

14.1 Technical Implementation Needs

Implementation of individual recommended solutions in the watershed can impact other parts of the watershed. For instance, implementing a conveyance improvement project could have a negative impact on a downstream area by increasing peak flows to the downstream area. Within the Pheasant Branch Watershed there is some flexibility with implementing the various recommended solutions. The following guidelines for implementation are provided.

1. Storm sewer improvements should generally be implemented from downstream to upstream to prevent increased downstream flooding. However, these improvements will typically be implemented with road reconstruction projects. A variety of other factors contribute to the scheduling road reconstruction projects. These factors may dictate that projects be implemented outside of the preferred sequence. As part of this approach, the specific improvements can be reviewed as part of the design process to determine if any temporary measures, such as bulkheads or restriction plates, are needed to offset downstream concerns.
2. The Old Sauk Trails Business Park Pond and Greenway improvements should be implemented before any conveyance improvements, such as the Target Area Relief Sewer or the Greenway Crossings. The conveyance improvements will allow for water to flow downstream more efficiently, and if constructed first, have the potential to increase the existing flood risk of downstream areas.
3. The Sauk Creek Greenway reconstruction should occur before, or within a short time frame of when, Wexford Pond is dredged. The current erosive conditions of the Sauk Creek Greenway would cause any downstream improvements to fill with sediment, thus reducing their maintenance lifecycle.

14.2 Citywide Implementation Prioritization

The City is conducting similar watershed studies for all the watersheds in the City. All watersheds are expected to have numerous recommendations resulting from the studies. The City is developing a process to rank and prioritize the order in which the solutions might be implemented if and when funding and public support are obtained. Information on this process will be shared by the City when it is available.

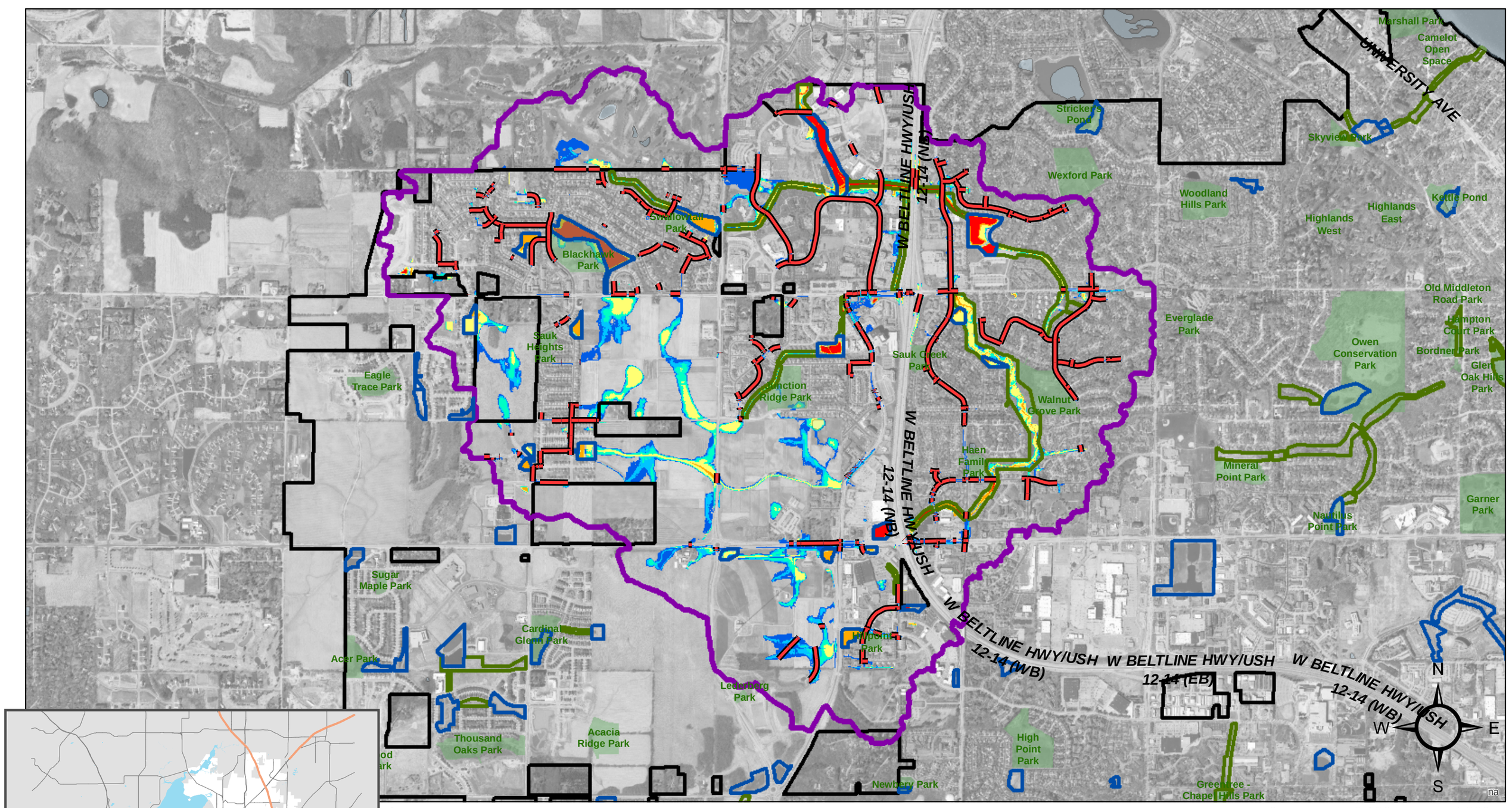
Section 15 References

Section 3 describes the specific files and data sources used in the development of the XPSWMM™ model. The Model Guidance Document includes a list of references used in creation of that document. Below is a list of additional sources of information consulted or referenced during this study.

University of Wisconsin-Madison. Wisconsin Geological Geologic and Natural History Survey. Soil Survey of Dane County, Wisconsin, 1917. https://wgnhs.wisc.edu/pubs/000057/

Wisconsin Department of Natural Resources. Surface Water Data Viewer. https://dnr.wi.gov/topic/surfacewater/swdv/

Figures



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

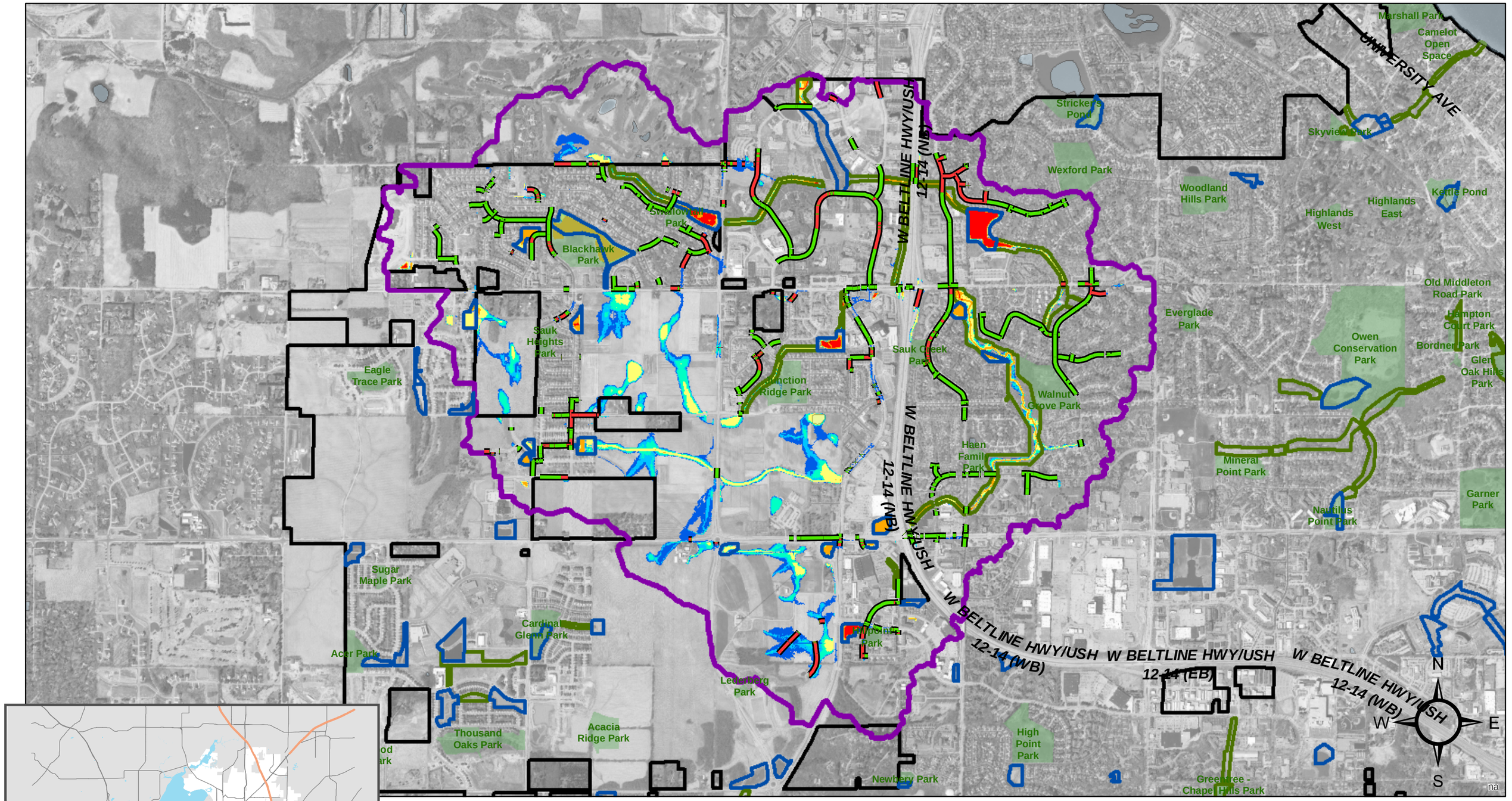
- Street Segments not Meeting Target

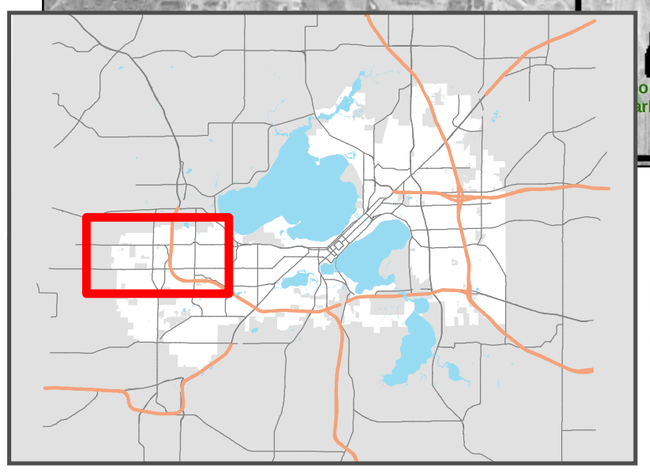
Figure ES-1
Streets not Meeting Target
Existing Conditions; 4% Chance Event
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\FigureES_1_Existing4PerChanceFloodedSt
User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

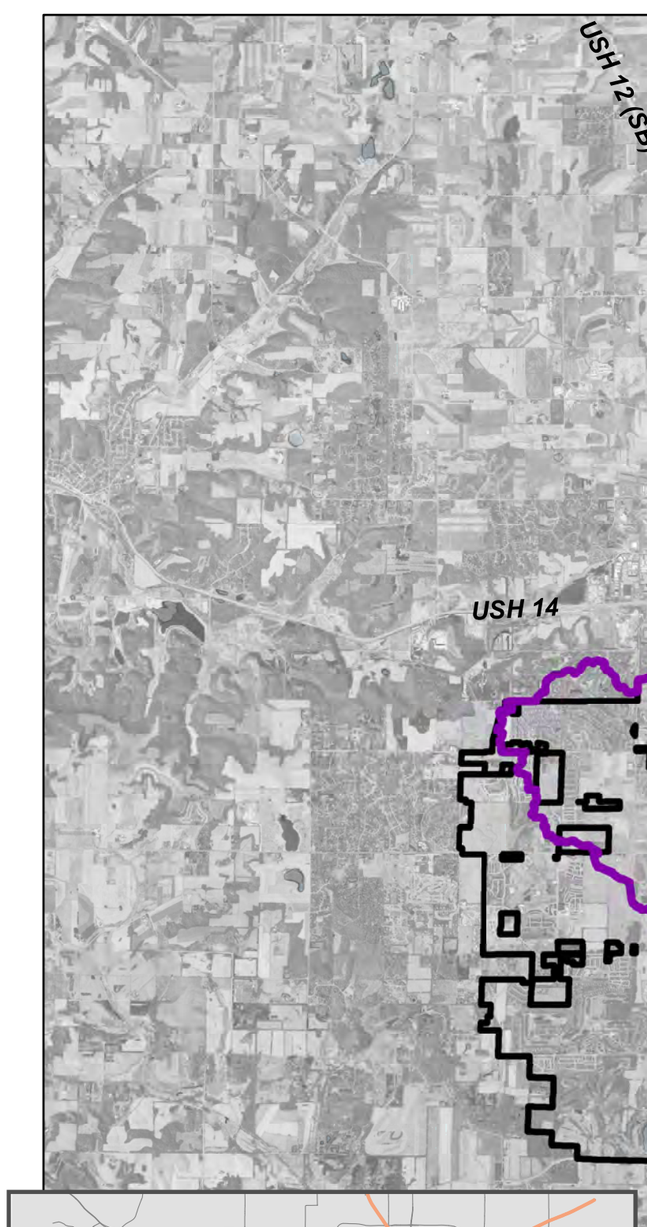
- Street Segments not Meeting Target
- Street Segments now Meeting Target

Figure ES-2
Streets not Meeting Target
Proposed Conditions; 4% Chance Event
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\FigureES_2_Proposed4PerChanceFlooded.mxd
User Name: encjb



Legend

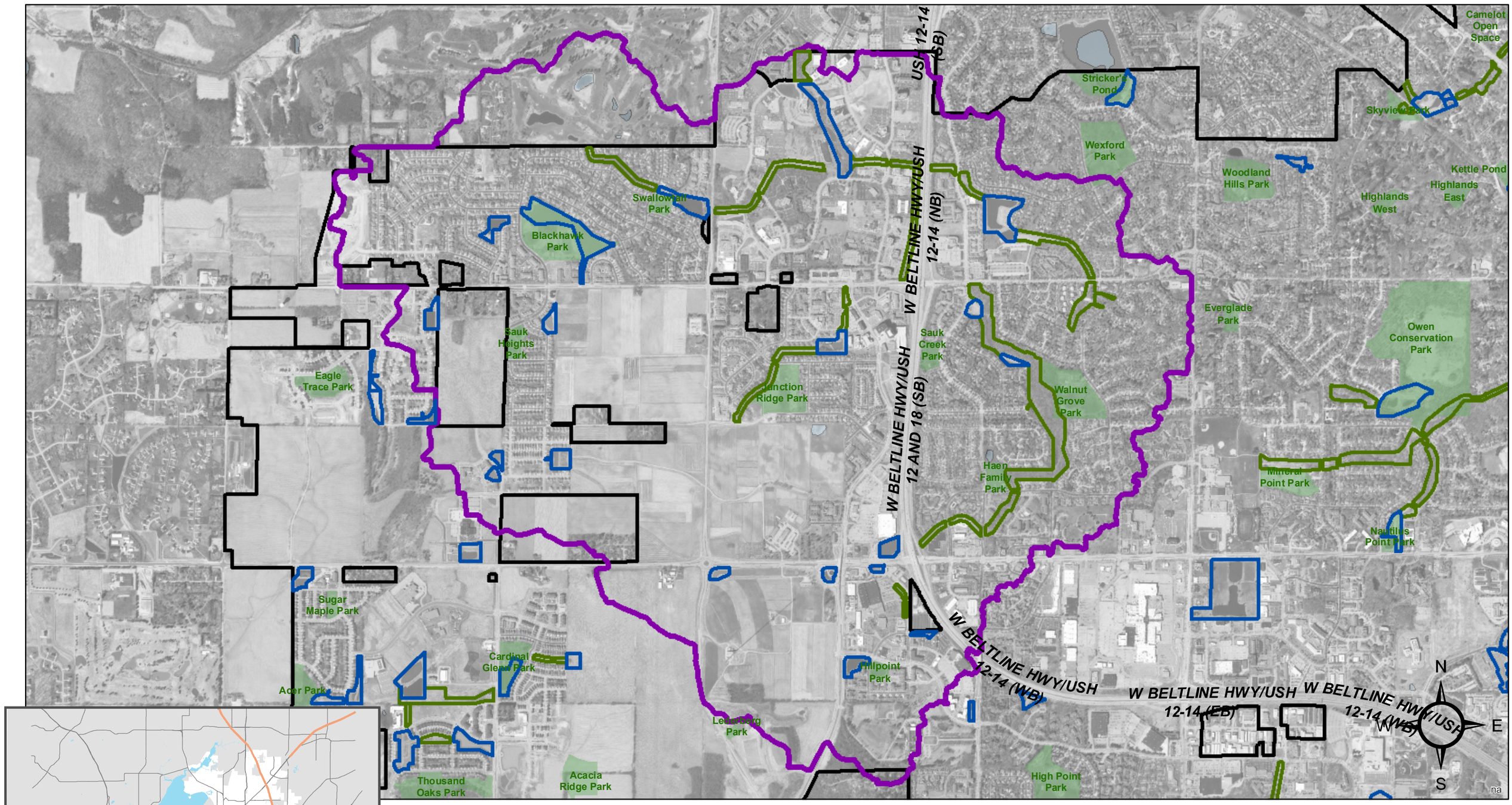
- Municipal Limits
- Watershed Boundary

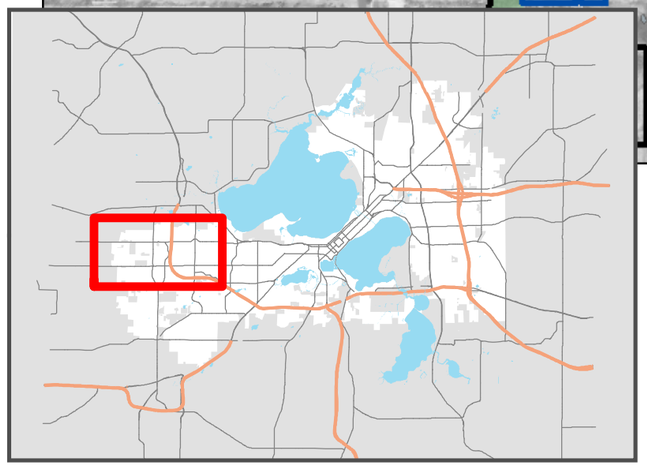
Figure 1-1
Study Location
Pheasant Branch Watershed

0 8,750 17,500 Feet

Date: 4/29/2021

User Name: encjb
Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure1_1_Study_Location.mxd





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

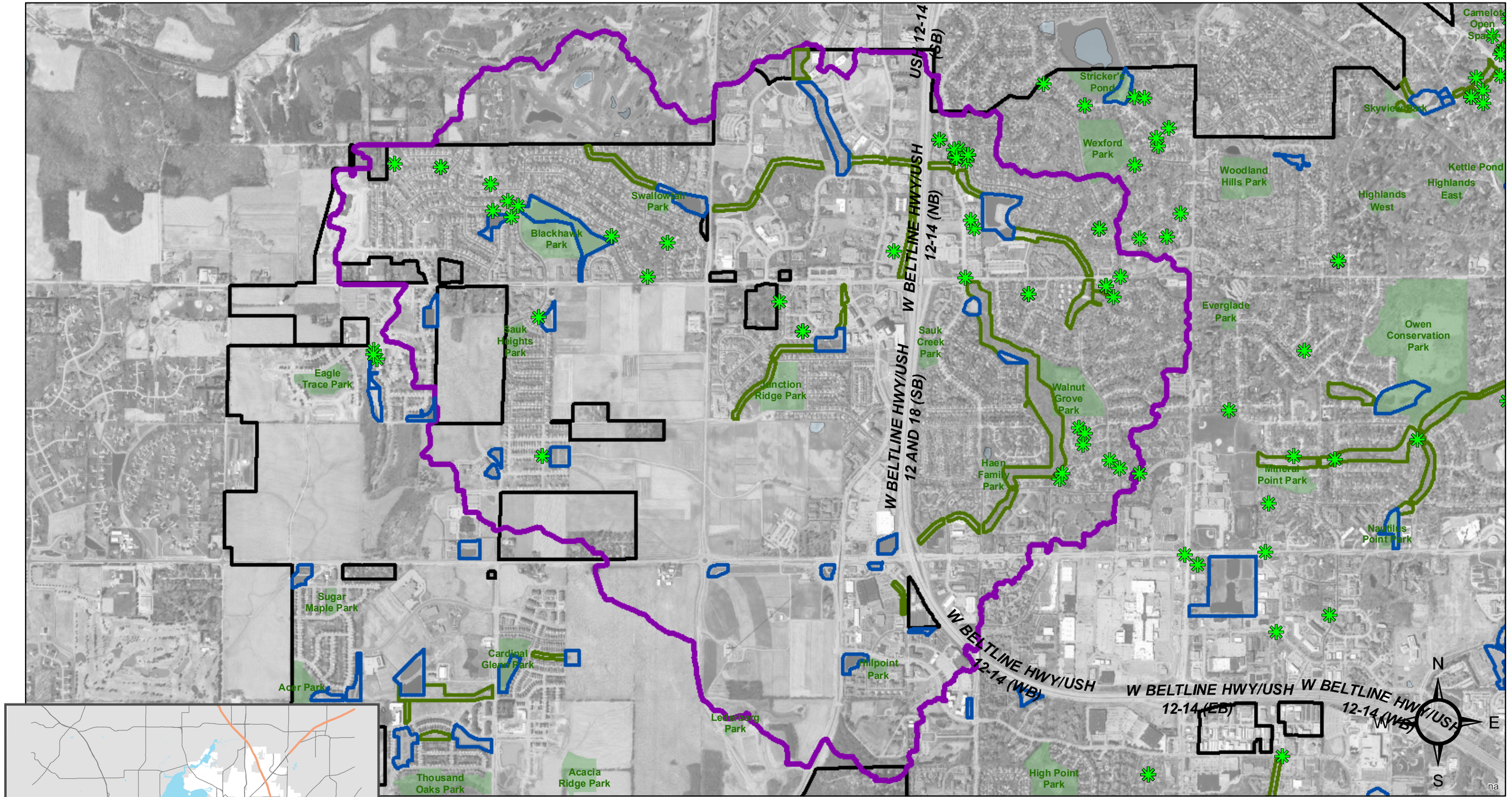
Figure 1-2
Watershed
Pheasant Branch Watershed

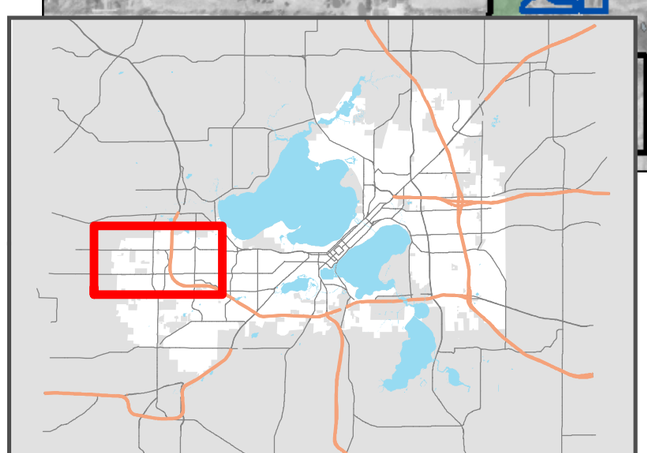
0 1,875 3,750 Feet

Date: 4/29/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure1_2_PheasantBranchWatershed.mxd

User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary
- Flood Report Locations

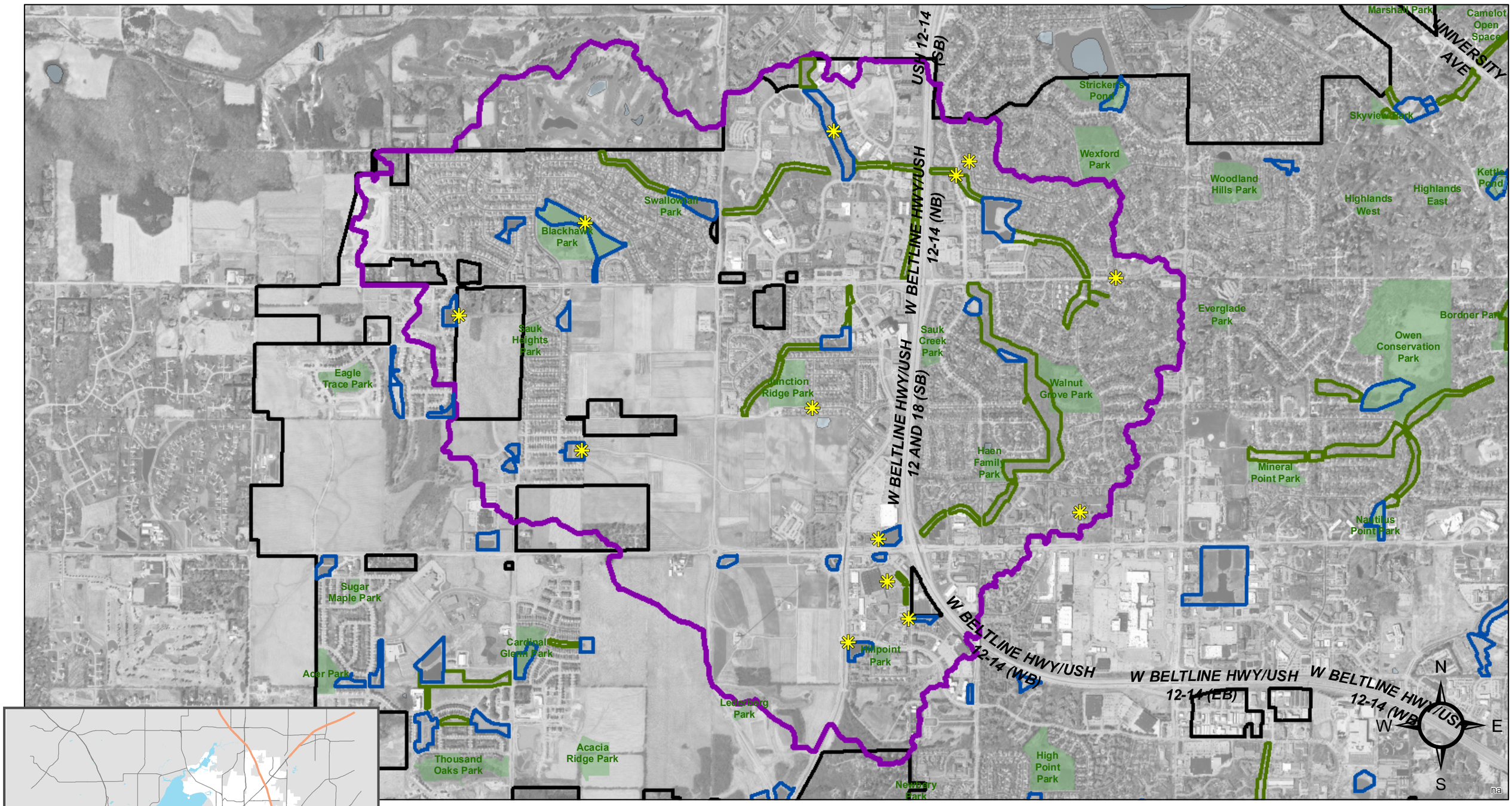
Figure 1-3
Flood Report Locations
Pheasant Branch Watershed

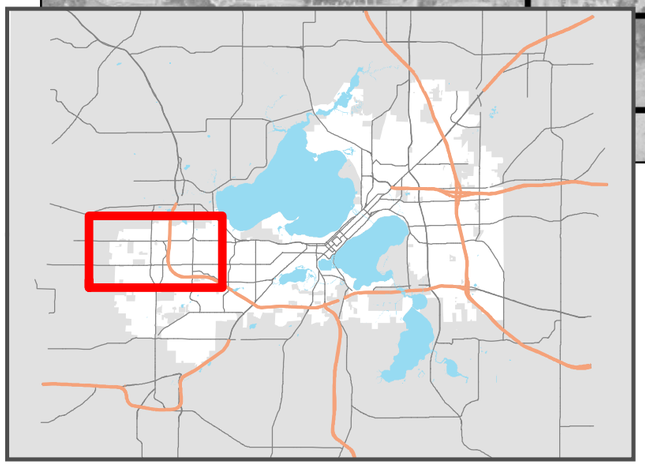
0 1,875 3,750 Feet

Date: 4/29/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure1_3_FloodReports.mxd

User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary
- Flood_History

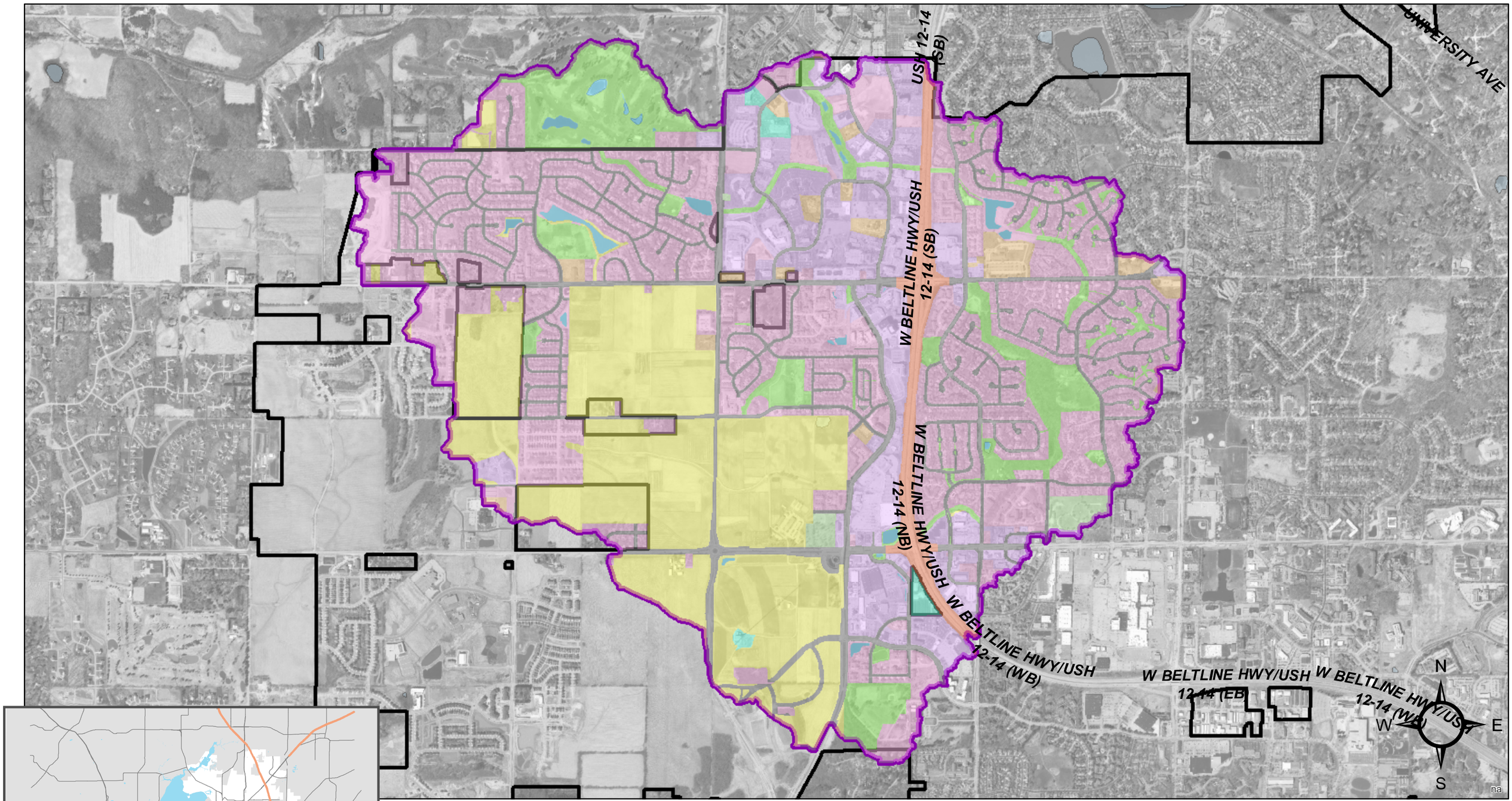
Figure 1-4
Flood Locations Reported by City Staff
Pheasant Branch Watershed

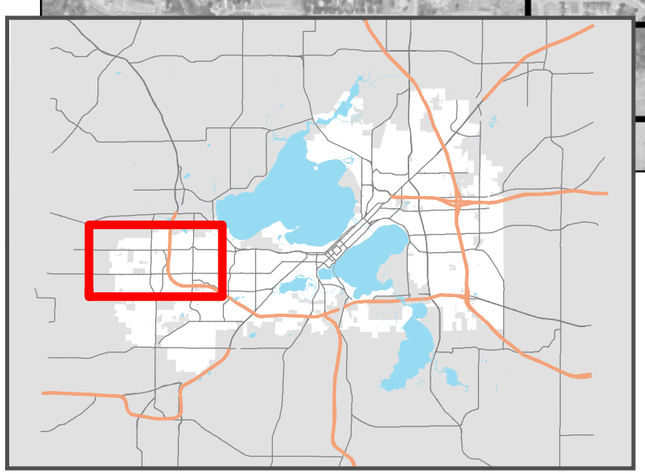
0 1,950 3,900 Feet

Date: 4/29/2021

User Name: encjb

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure1_4_StaffknownFlooding.mxd





Legend

- Municipal Limits
- Watershed Boundary

Land Use

- Cemetary
- Commercial
- Highway
- Industrial
- Institutional
- Open
- Park
- Residential
- Street
- Water

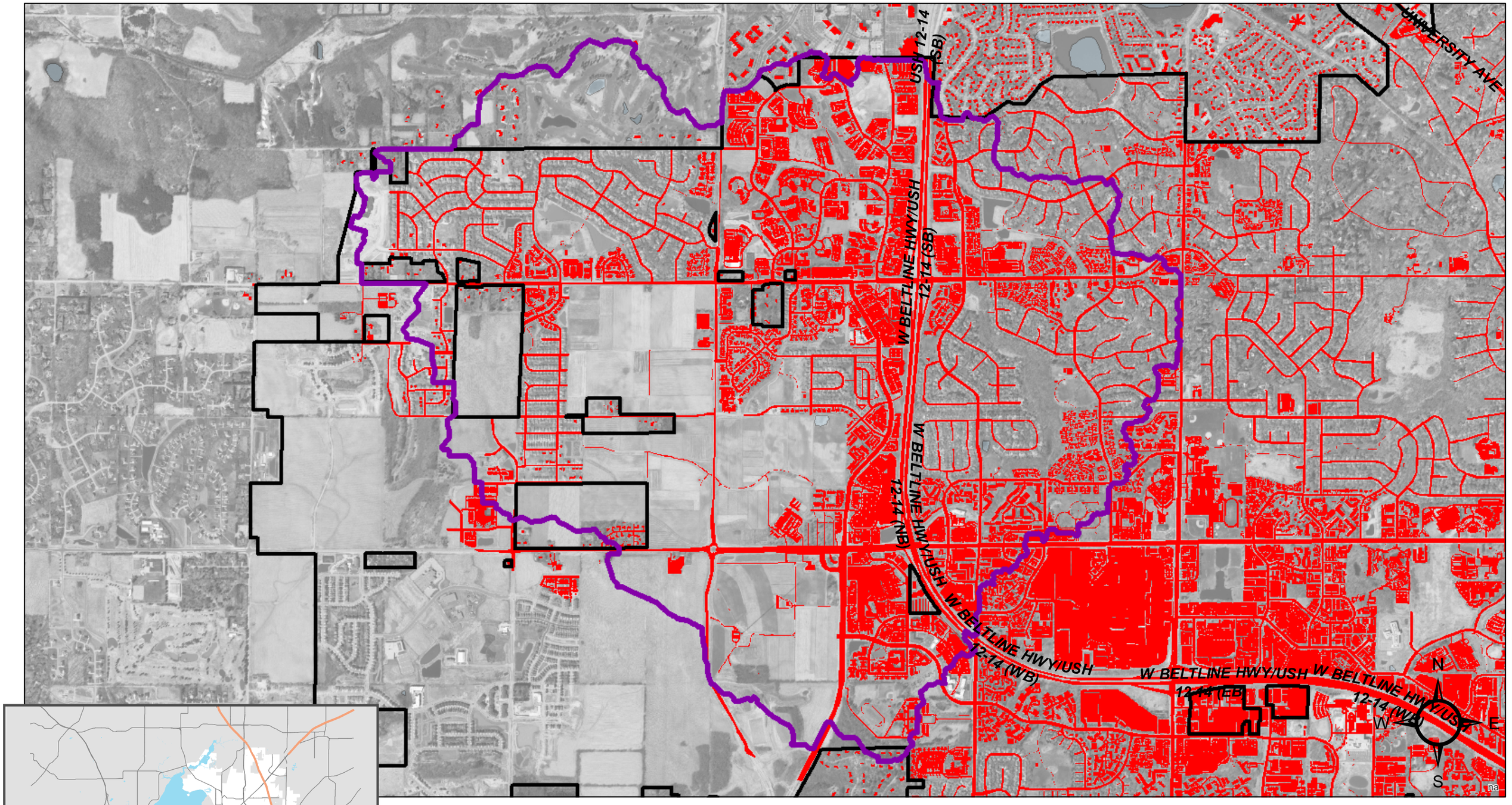
Figure 2-1
Land Use
Pheasant Branch Watershed

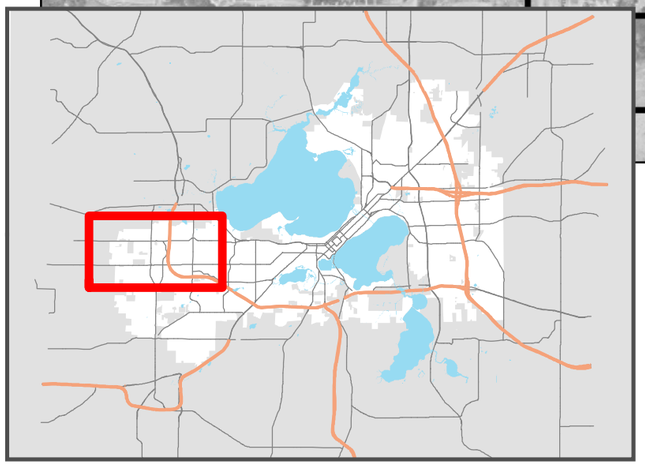
0 1,950 3,900 Feet

Date: 4/29/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure2_1_LandUse.mxd

User Name: encjb





Legend

- Municipal Limits
- Watershed Boundary
- Delineated Impervious Areas

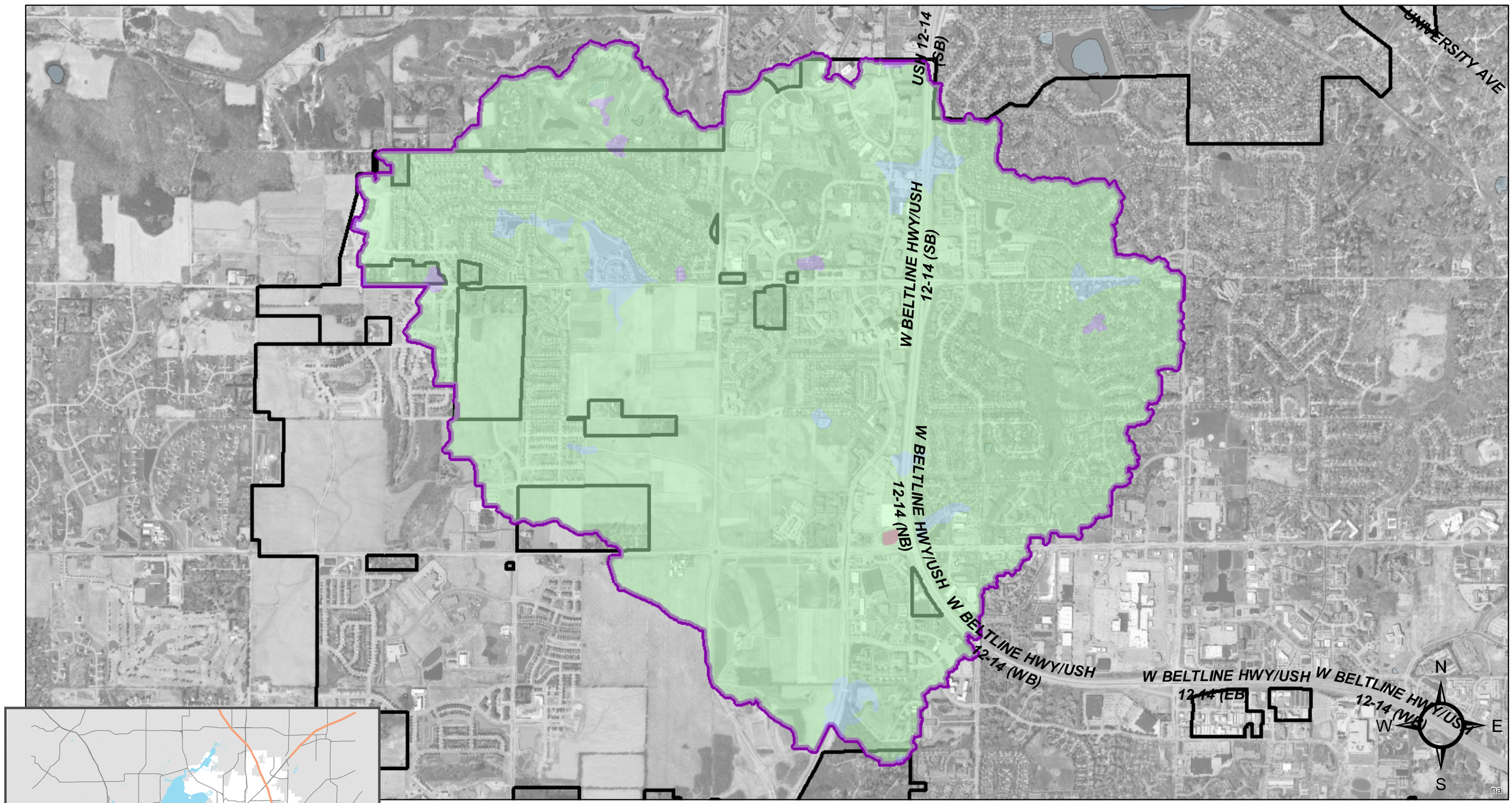
Figure 2-2
Delineated Impervious Areas
Pheasant Branch Watershed

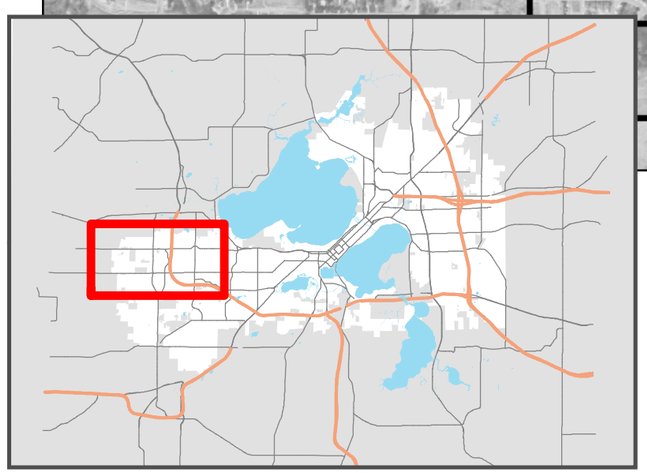
0 1,950 3,900 Feet

Date: 4/30/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure2_2_ImperviousAreas.mxd

User Name: encjb





Legend

- Municipal Limits
- Watershed Boundary

Hydrologic Soil Group

- A
- B
- C
- W

Figure 2-3
Hydrologic Soil Group
Pheasant Branch Watershed

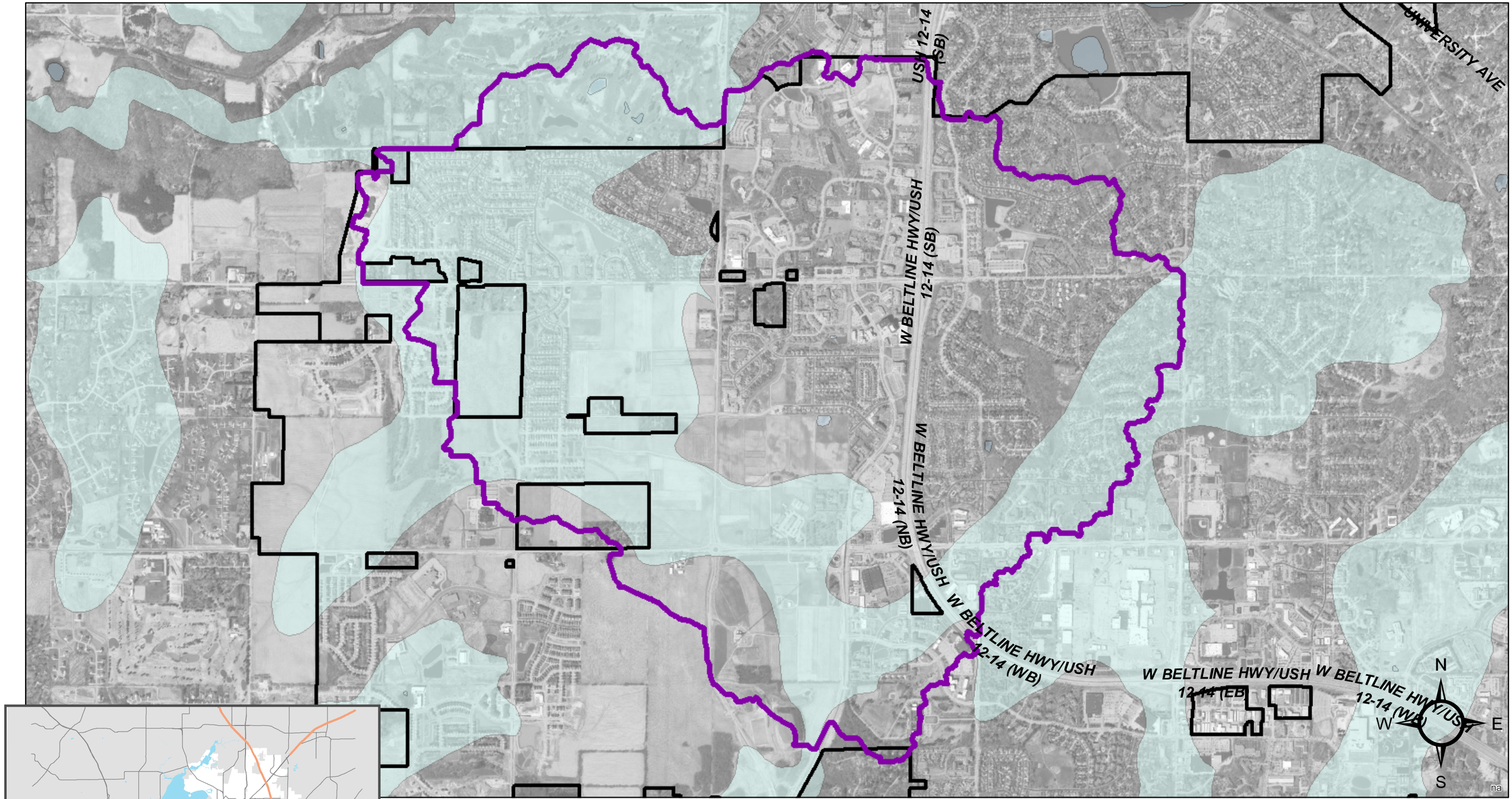
CITY OF MADISON ENGINEERING

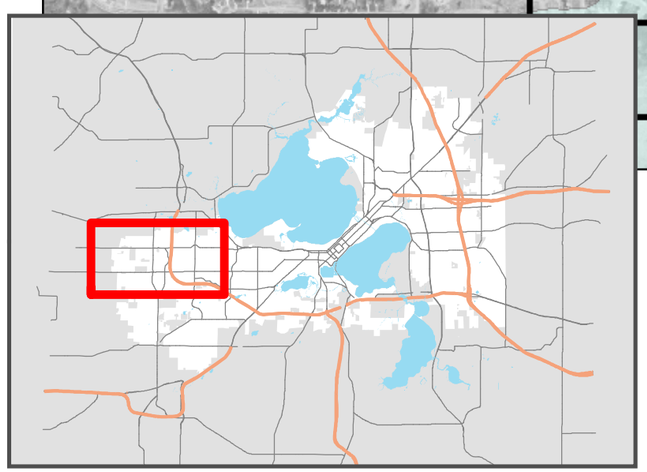
0 1,950 3,900 Feet

Date: 4/30/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure2_3_SCSSoilsData.mxd

User Name: encjb





Legend

- Municipal Limits
- Watershed Boundary
- Prairie du Chien Group (Op)

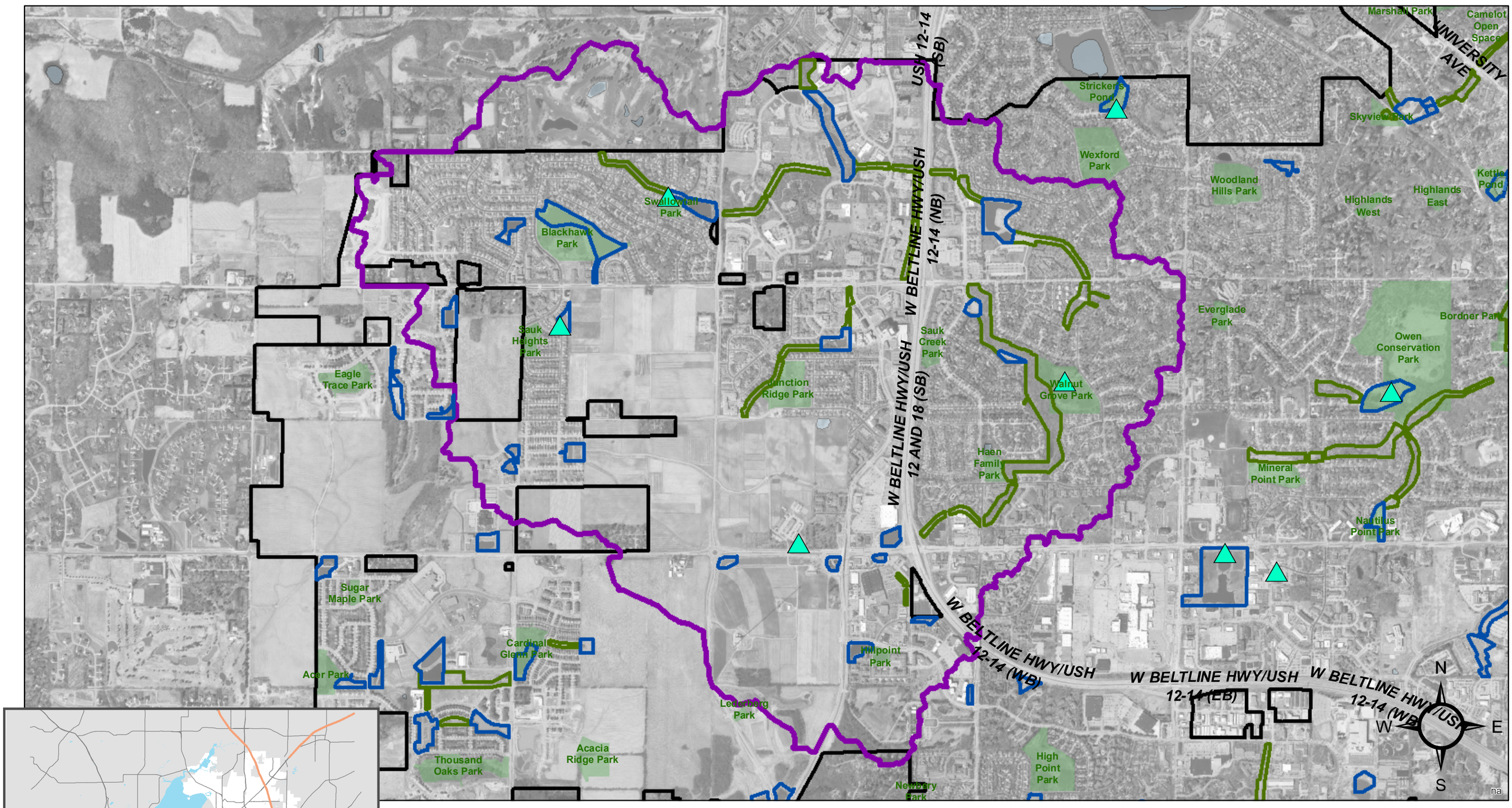
Figure 2-4
Geological Mapping - Prairie du Chien Group
Pheasant Branch Watershed

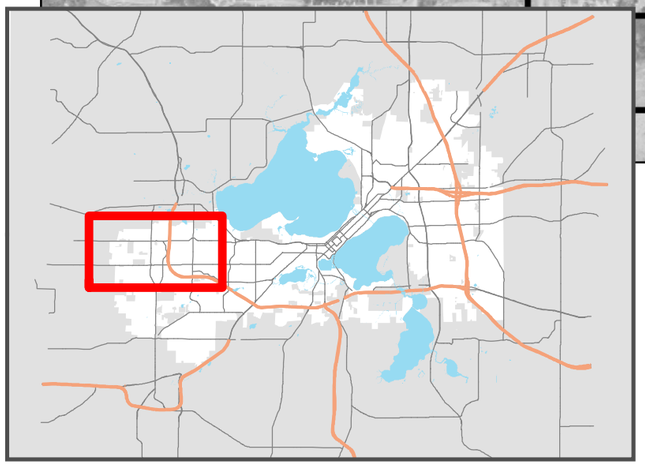
CITY OF MADISON ENGINEERING

0 1,950 3,900 Feet

Date: 4/30/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure2_4_GeologicData.mxd
User Name: encjb





Legend

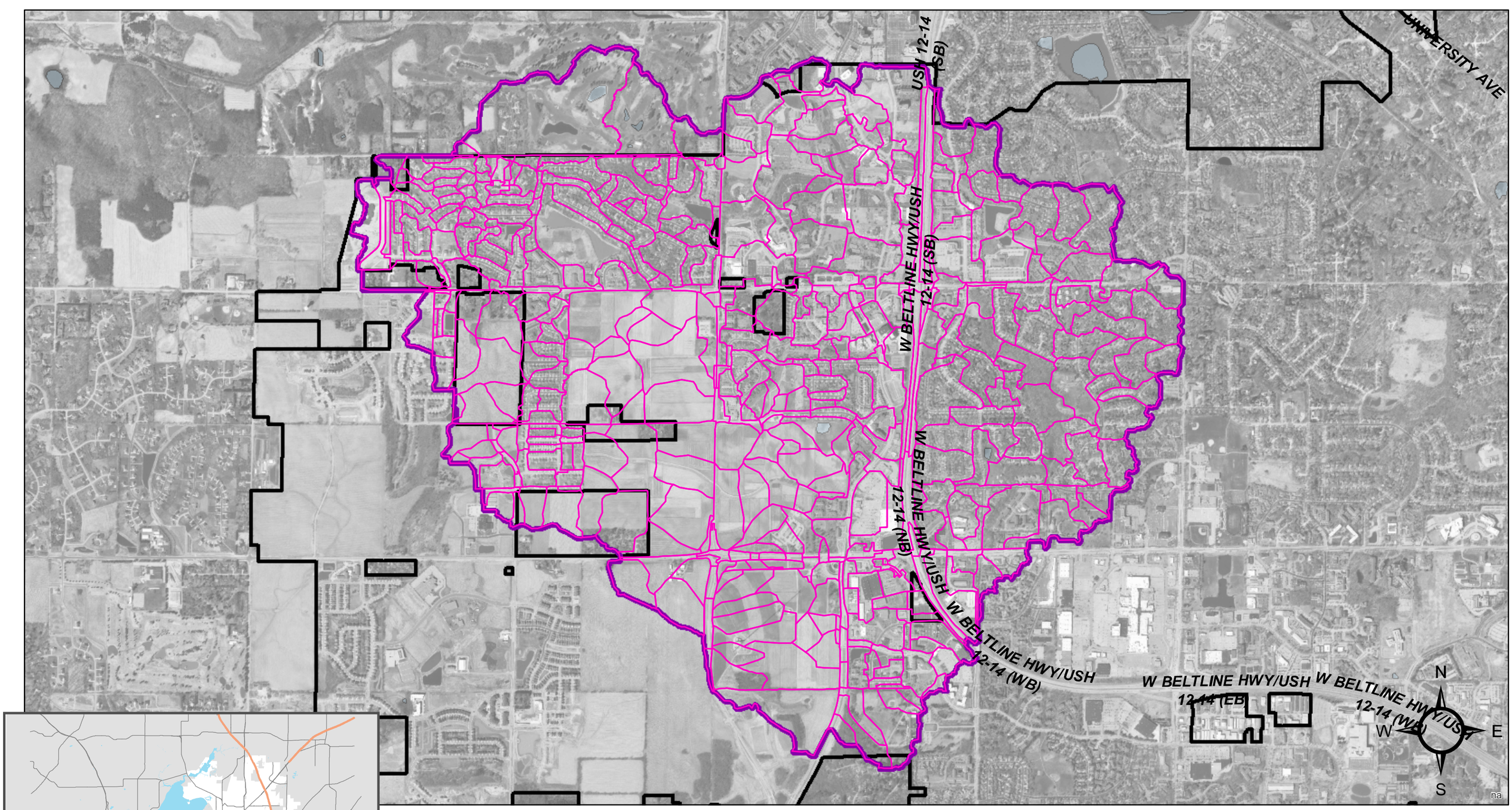
- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary
- Rain Gage

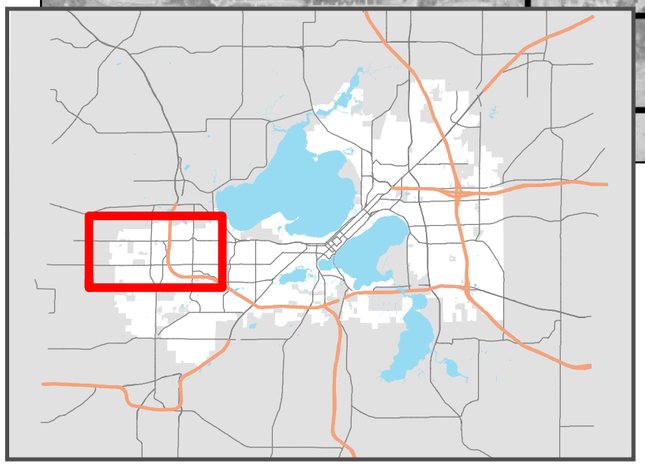
Figure 4-1
Rain Gage Locations
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_1_MonitoringLocations.mxd
User Name: encjb





Legend

- Municipal Limits
- Watershed Boundary
- Subwatershed

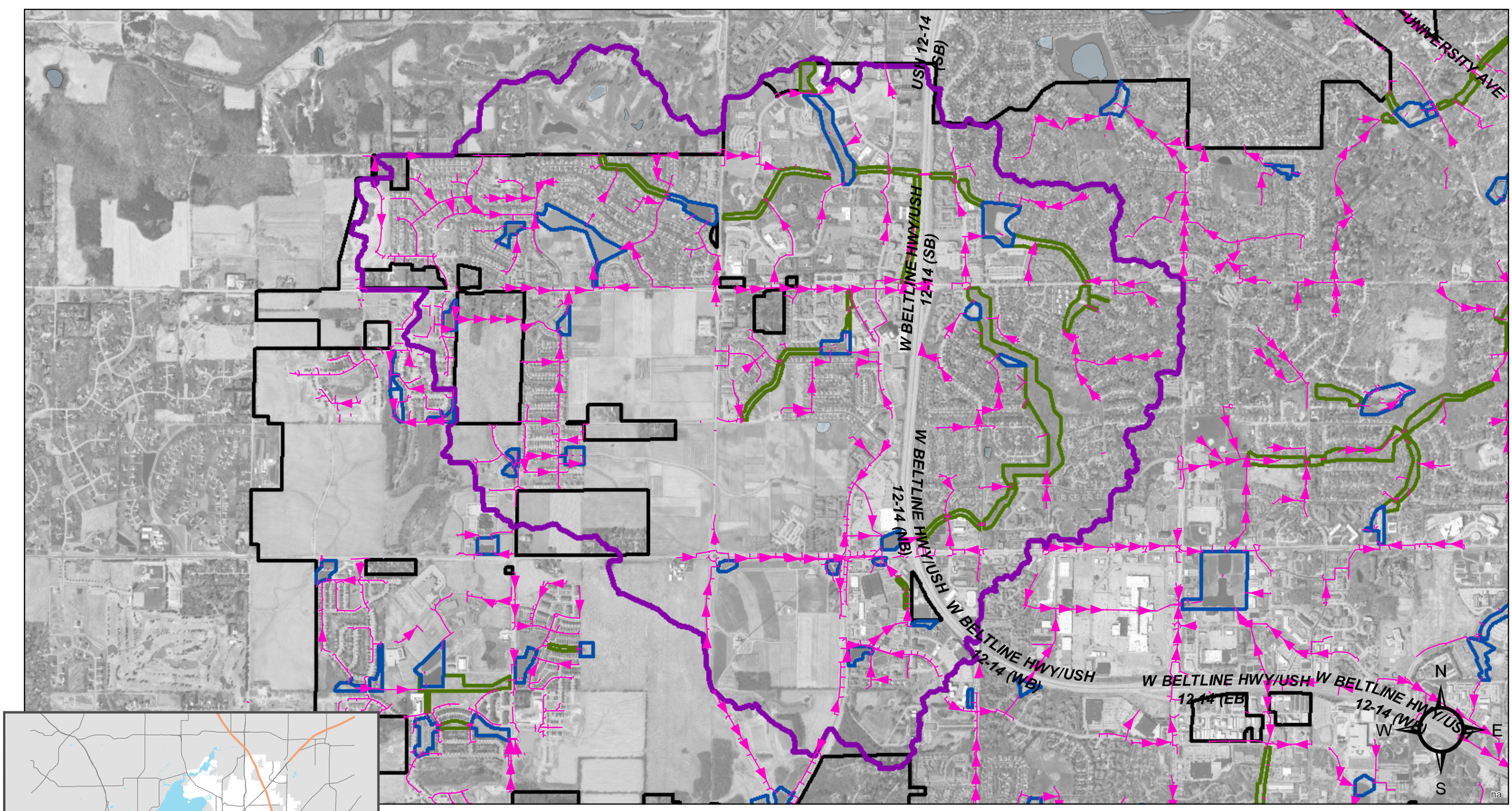
Figure 4-2
Subwatersheds
Pheasant Branch Watershed

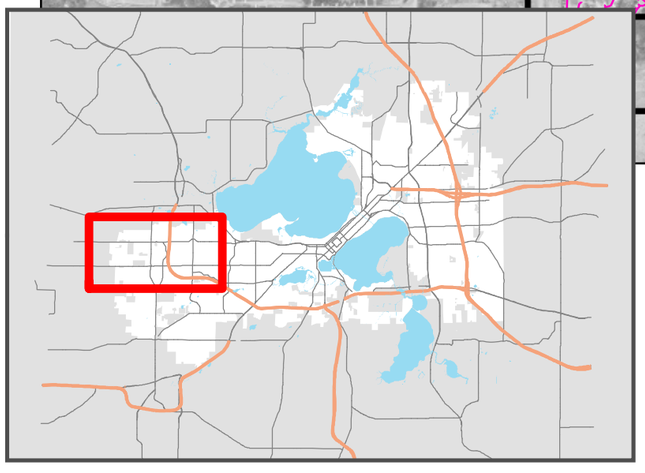
0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_2_Subbasins.mxd

User Name: encjb





Legend

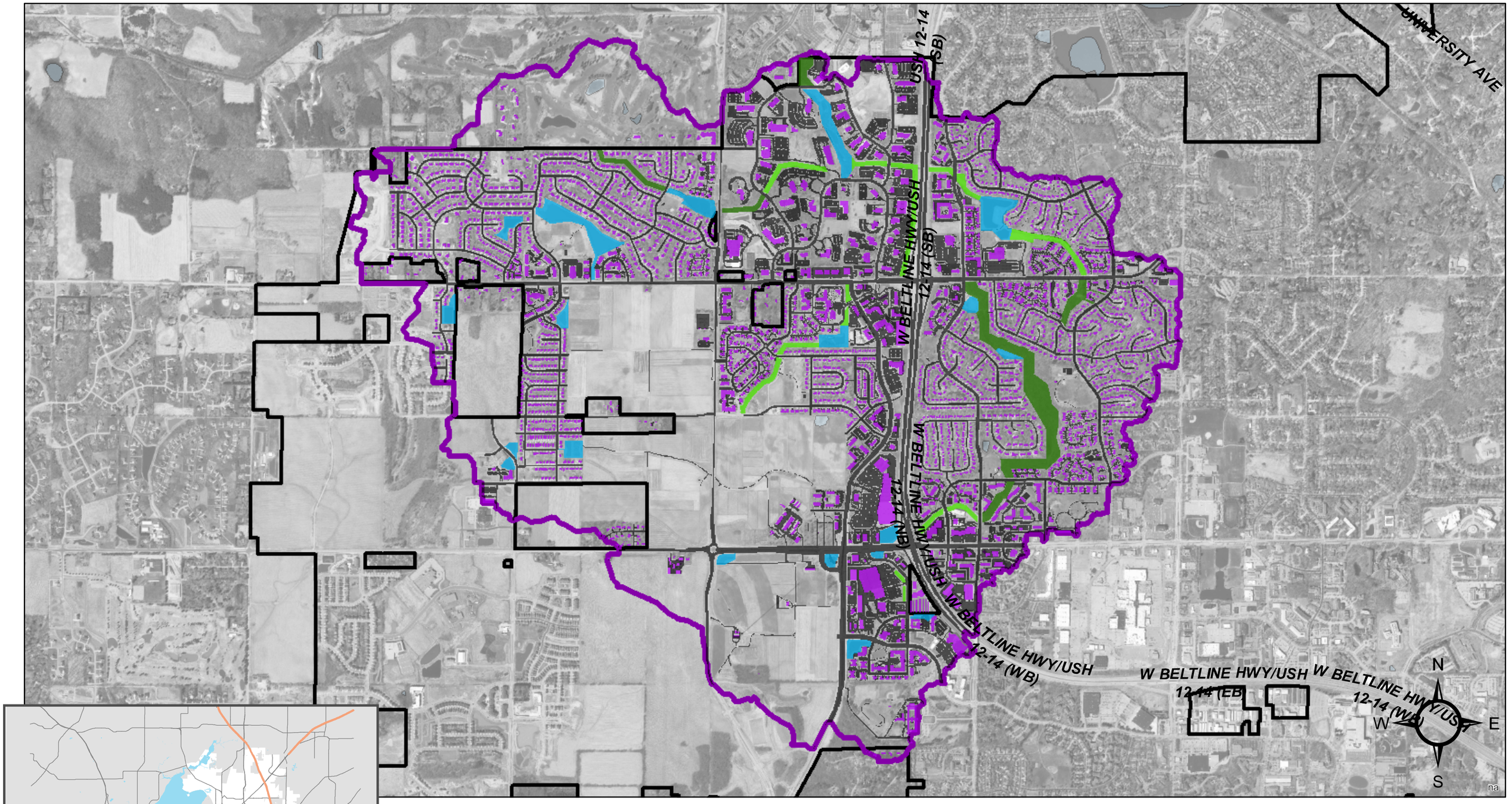
- Greenway
- Pond
- Storm Pipe
- Municipal Limits
- Watershed Boundary

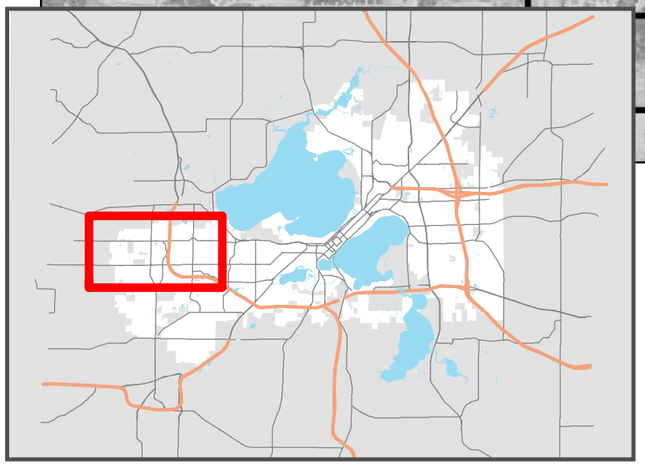
Figure 4-3
Stormwater Conveyance System
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

User Name: encjb Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_3_StormwaterConveyanceSystem.mxd





Legend

- Municipal Limits
- Watershed Boundary
- Water
- Grassed Greenway
- Wooded Greenway
- Impervious
- Building

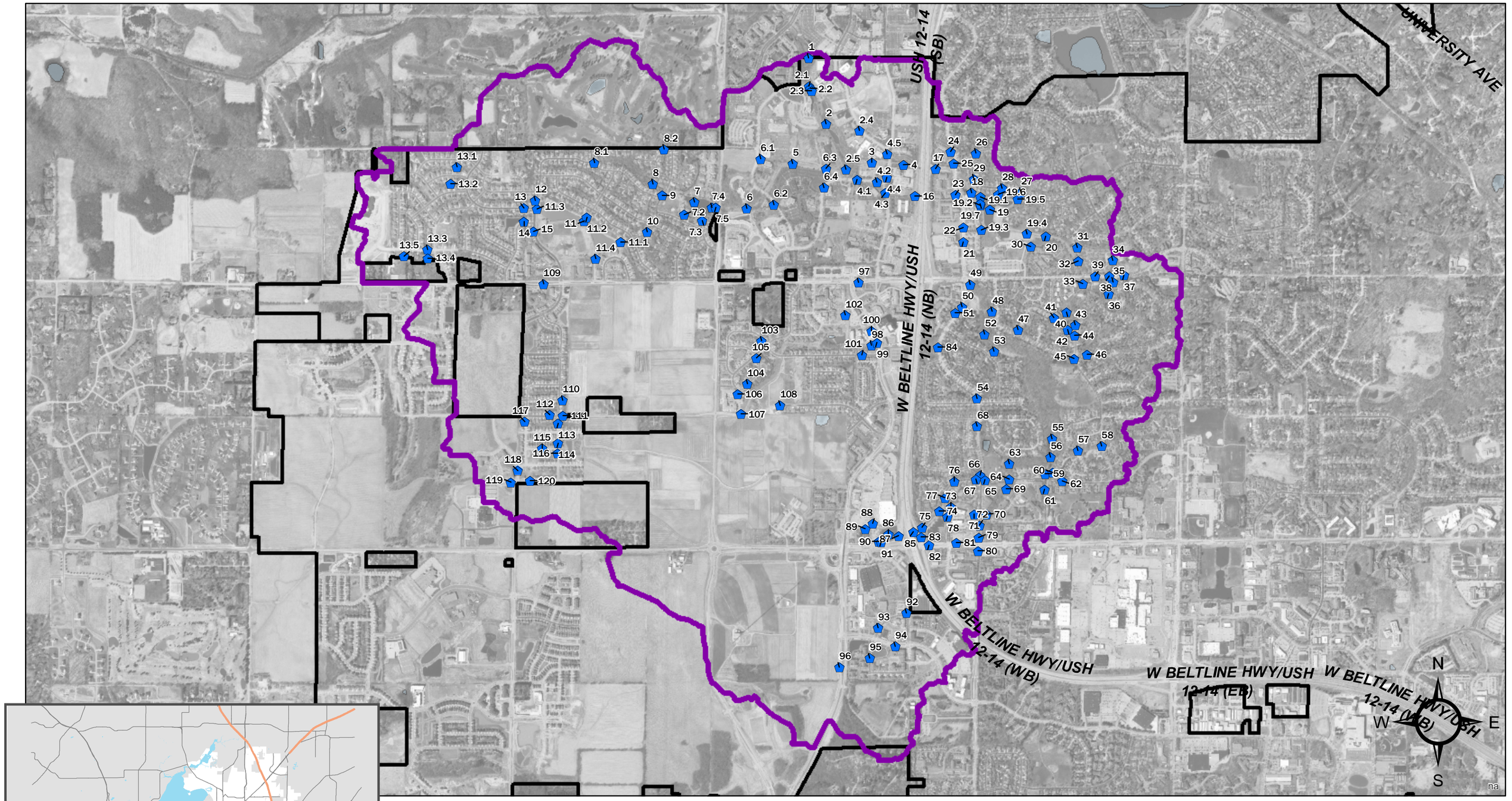
Figure 4-4
2D Model Roughness
Pheasant Branch Watershed

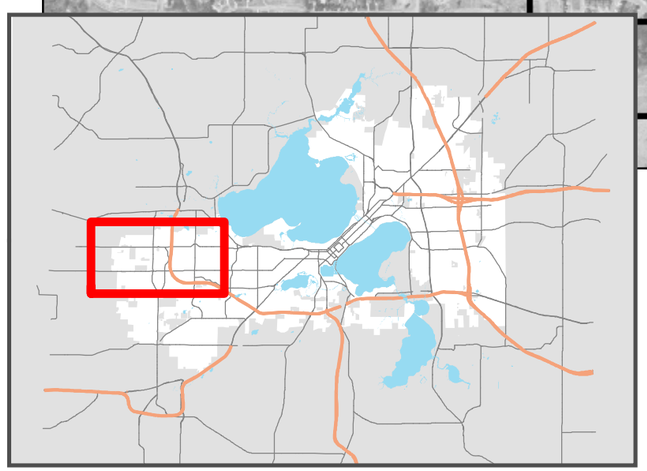
0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_4_2DRoughness.mxd

User Name: encjb





Legend

- Municipal Limits
- Watershed Boundary
- Results Reporting Locations

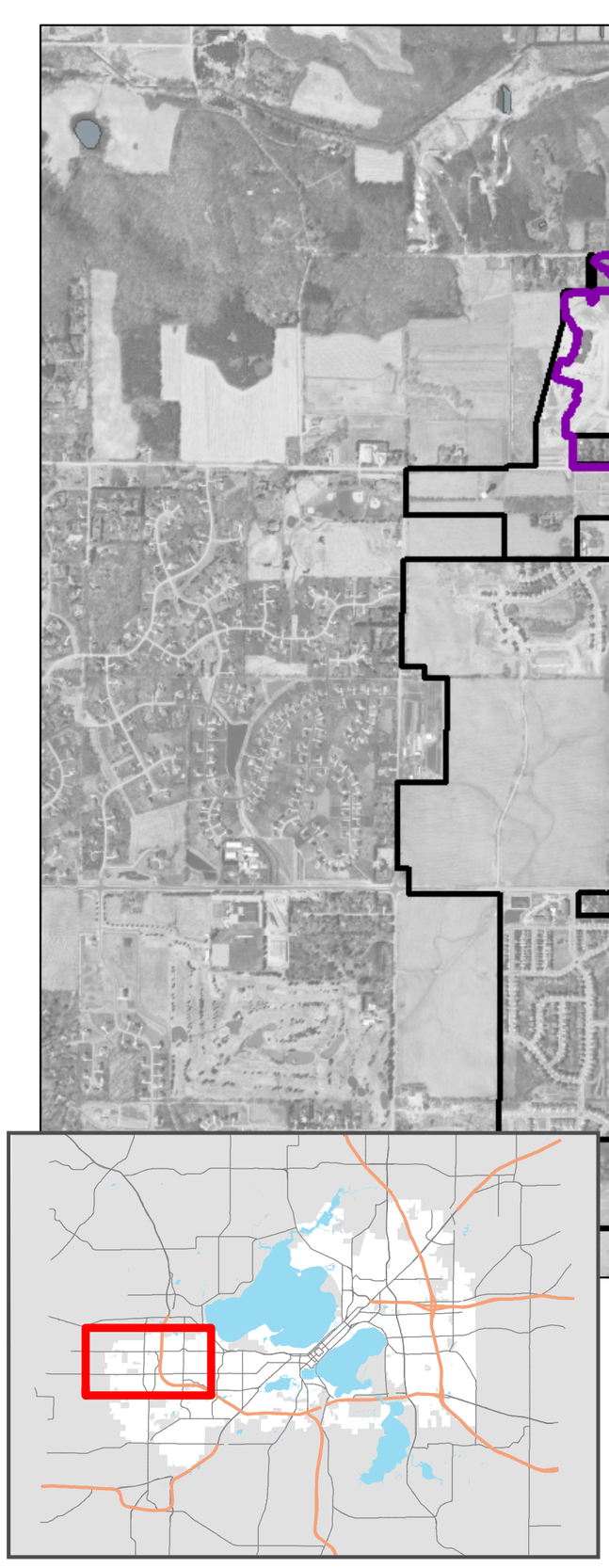
Figure 4-5
Reporting Locations
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure4_5_ReportingLocations.mxd

User Name: encjb



Legend

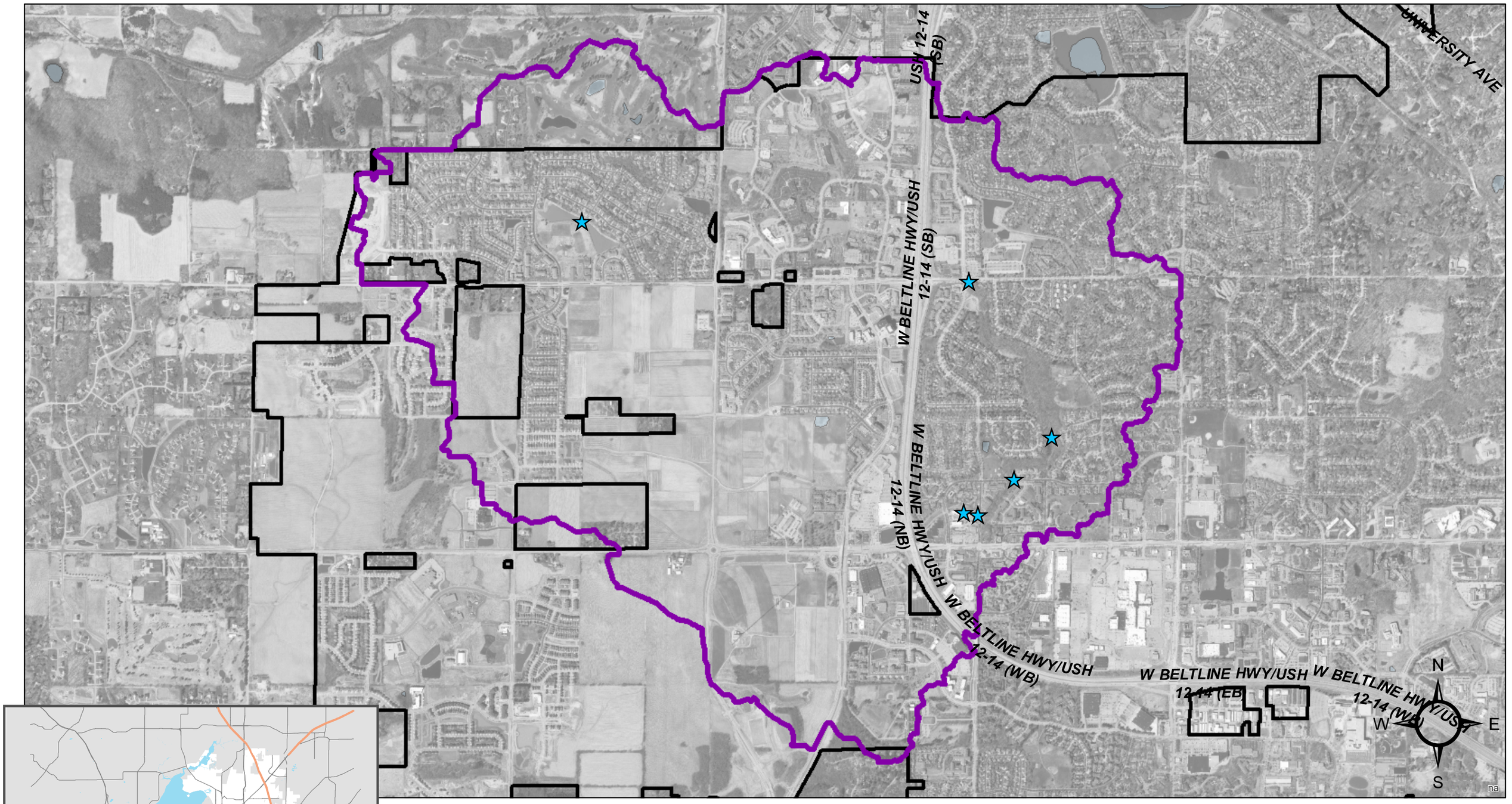
- Municipal Limits
- Watershed Boundary
- Monitoring Locations

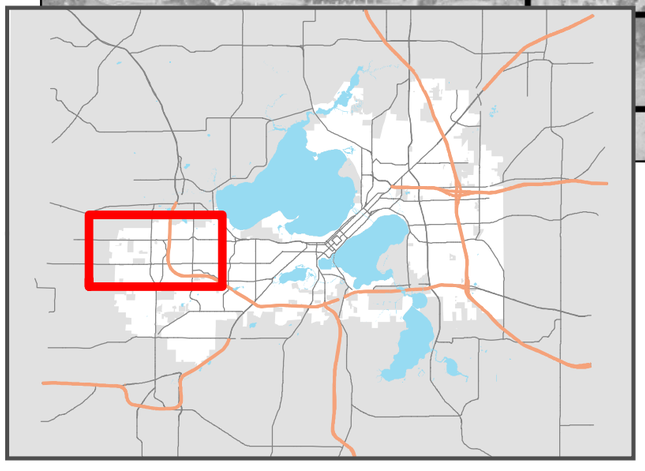
Figure 5-1
Monitoring Locations
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/4/2021

User Name: encjb
Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure5_1_MonitoringLocations.mxd





Legend

- Municipal Limits
- Watershed Boundary
- High Water Marks

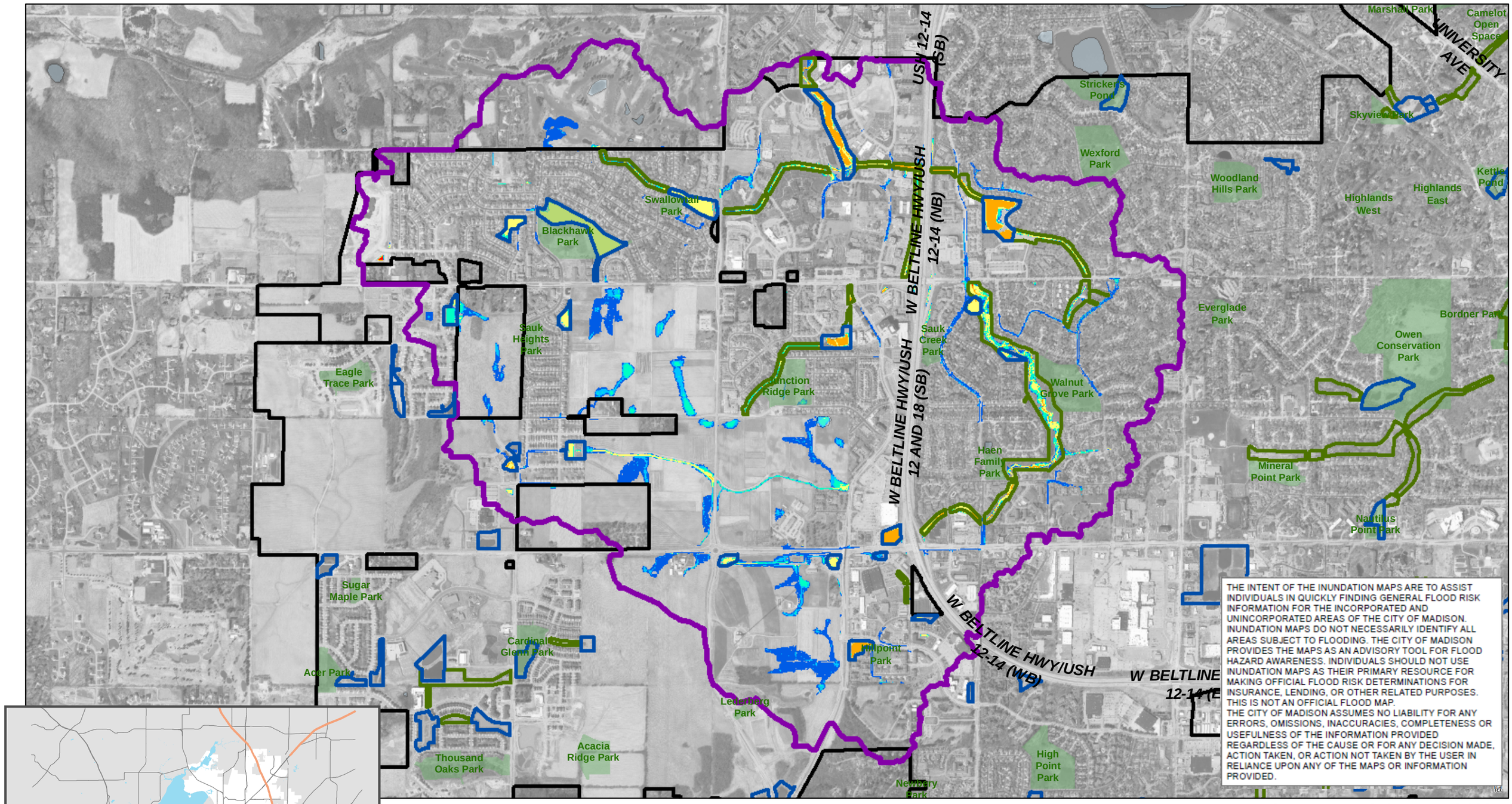
Figure 5-2
August 2018 Recorded High Water Surface Elevations Pheasant Branch Watershed

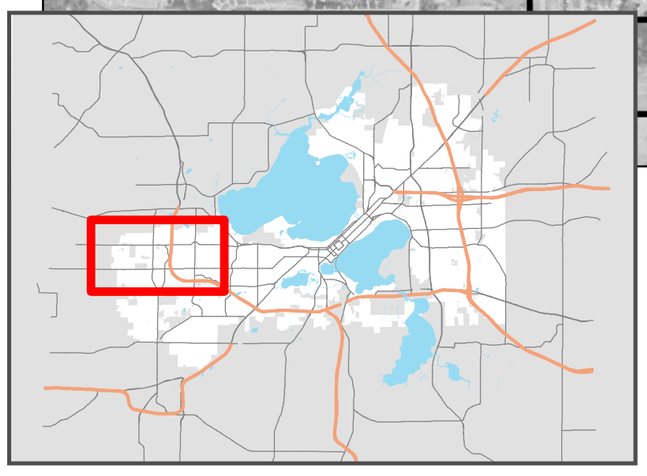
0 1,950 3,900 Feet

Date: 5/4/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure5_2_RecordedHighWaterMarks.mxd

User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

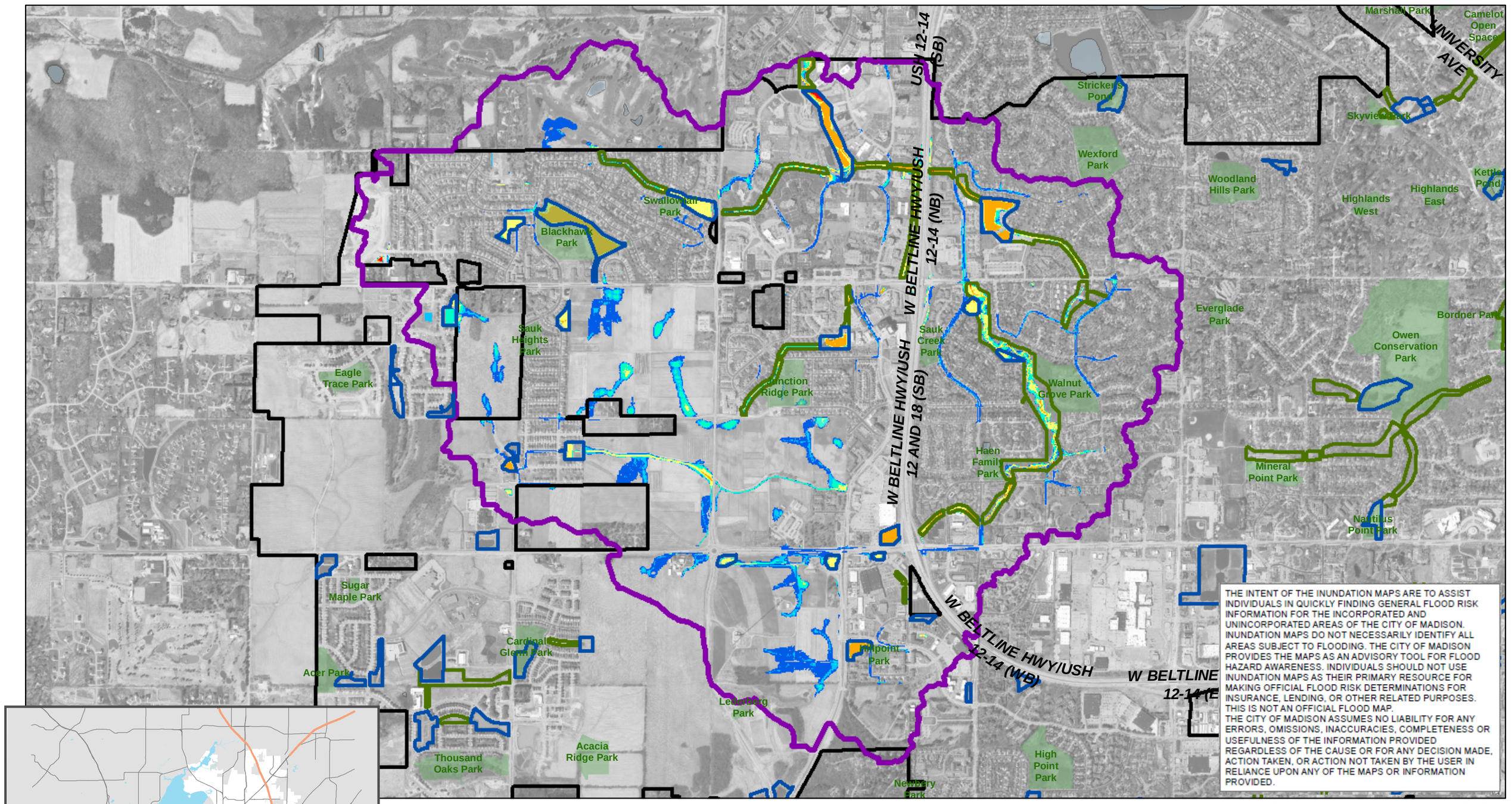
Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

Figure 6-1
Existing Conditions Inundation Mapping
100% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure1_1_Existing100PerChance.mxd
User Name: encjb



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

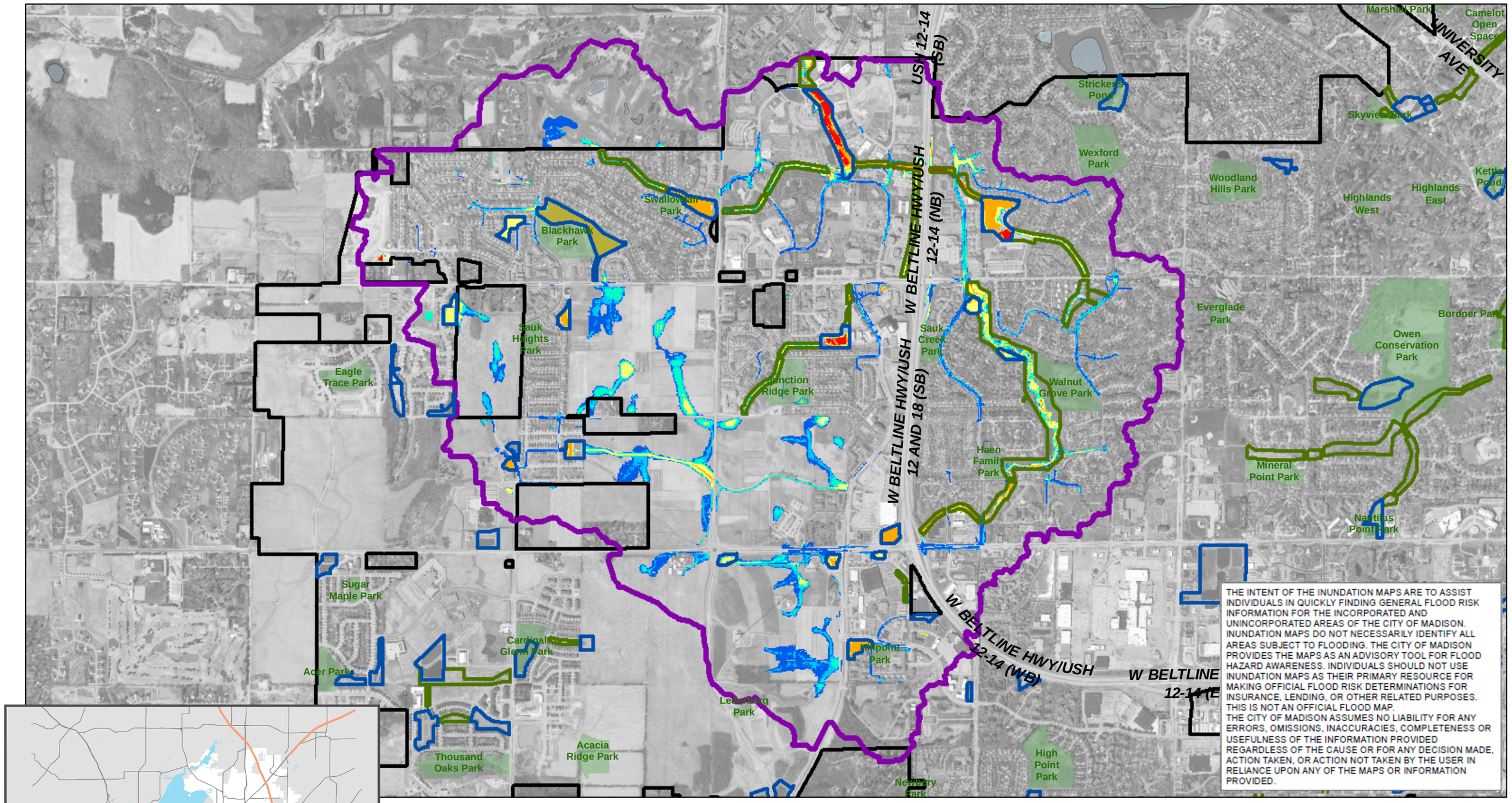
Maximum Depth (ft)

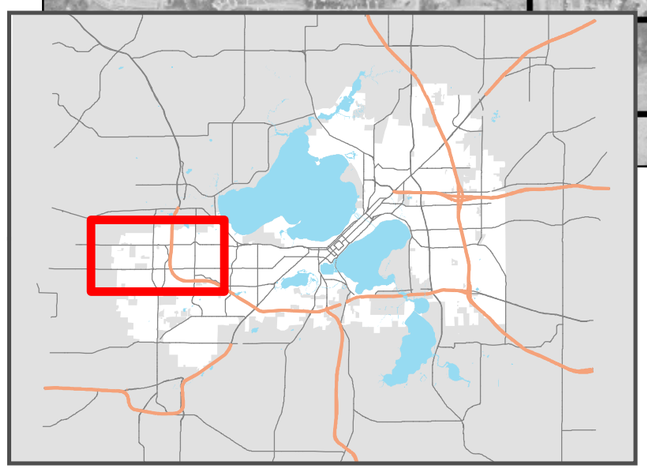
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

Figure 6-2
Existing Conditions Inundation Mapping
50% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_2_Existing50PerChance.mxd
User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

Figure 6-3
Existing Conditions Inundation Mapping
20% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_3_Existing20PerChance.mxd
User Name: encjb

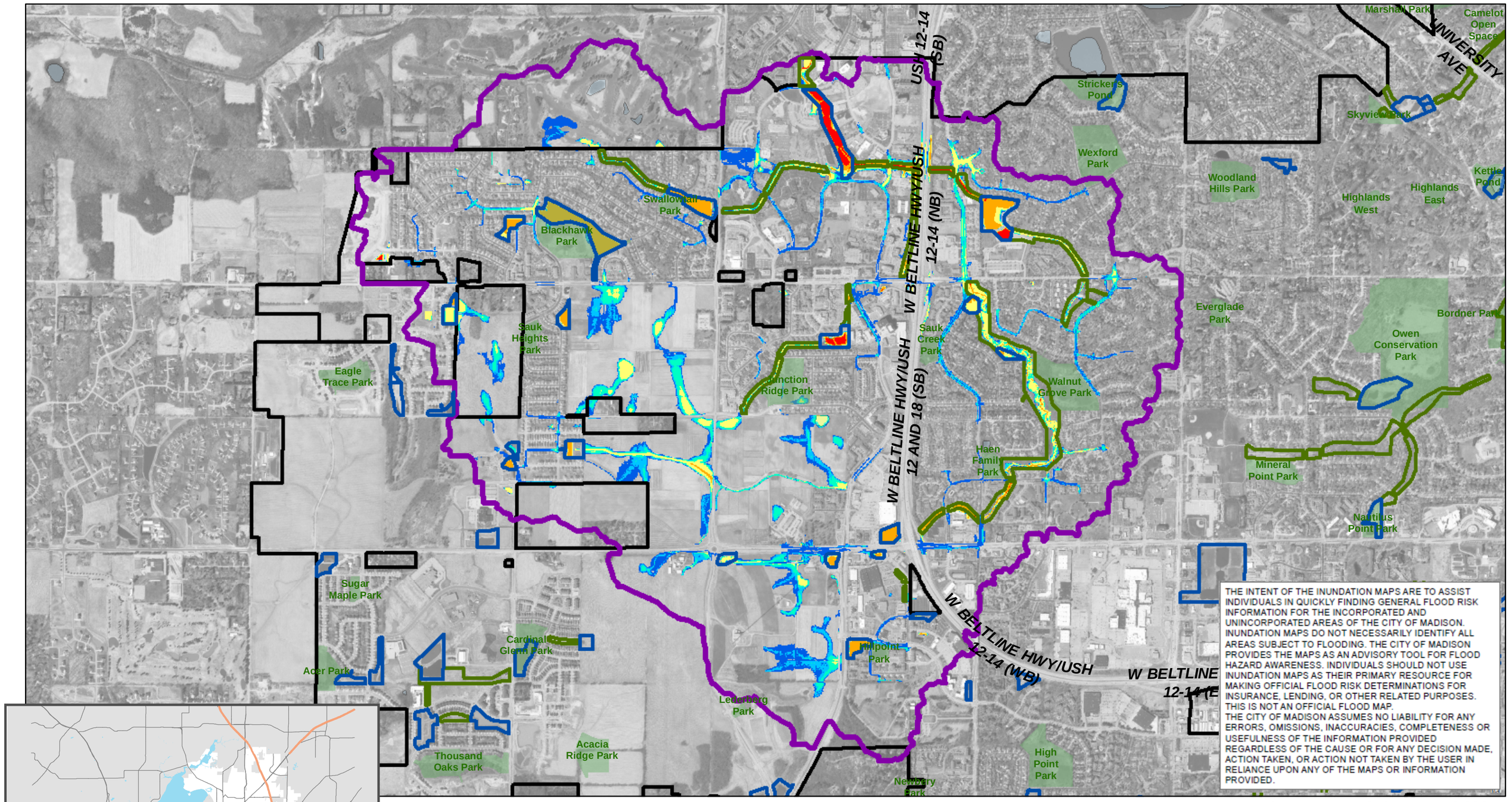


Figure 6-4
Existing Conditions Inundation Mapping
10% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

User Name: encjb
Document Path: \\Gisserver\dDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_4_Existing10PerChance.mxd

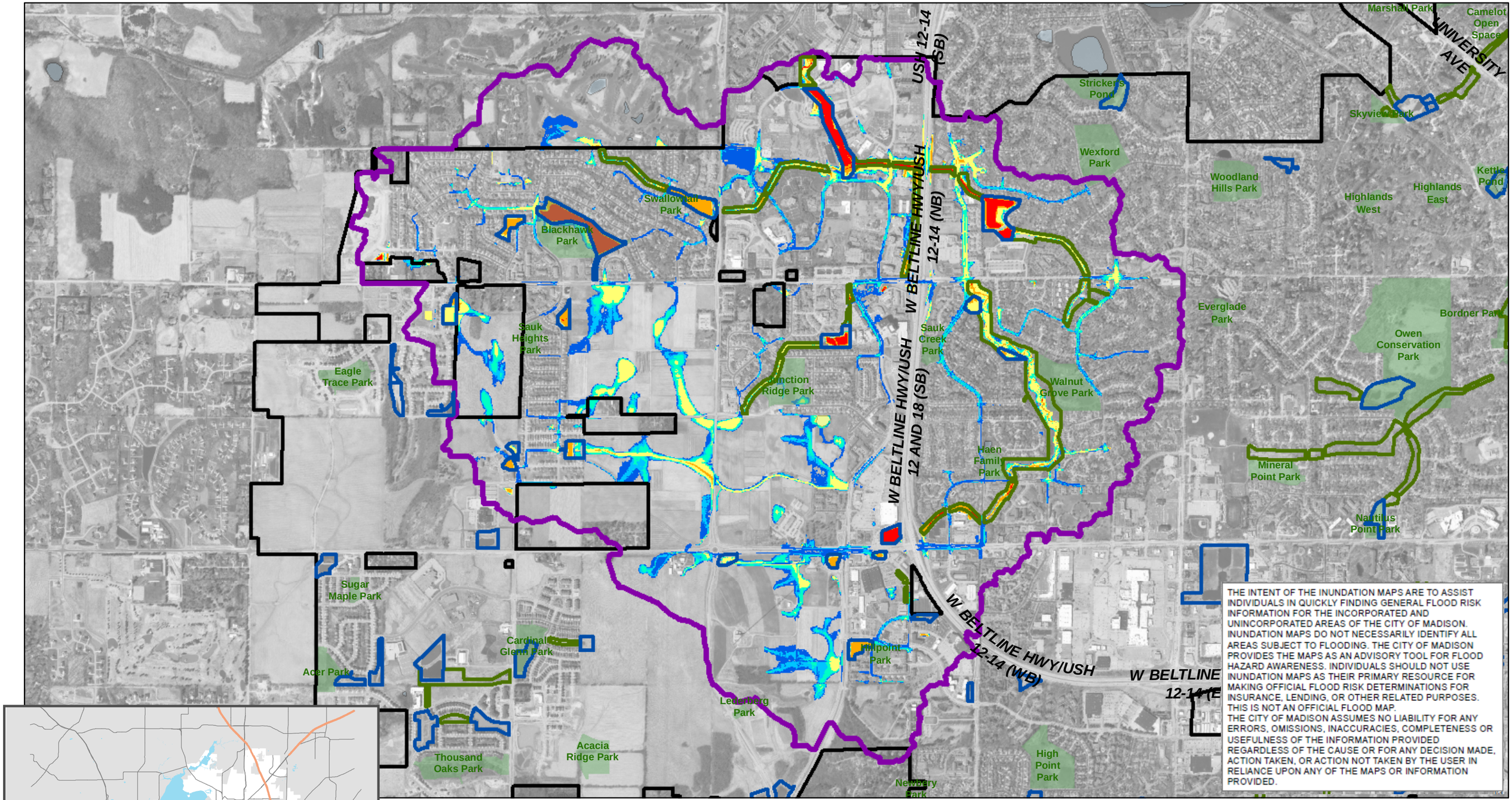


Figure 6-5
Existing Conditions Inundation Mapping
4% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_5_Existing4PerChance.mxd
User Name: encjb

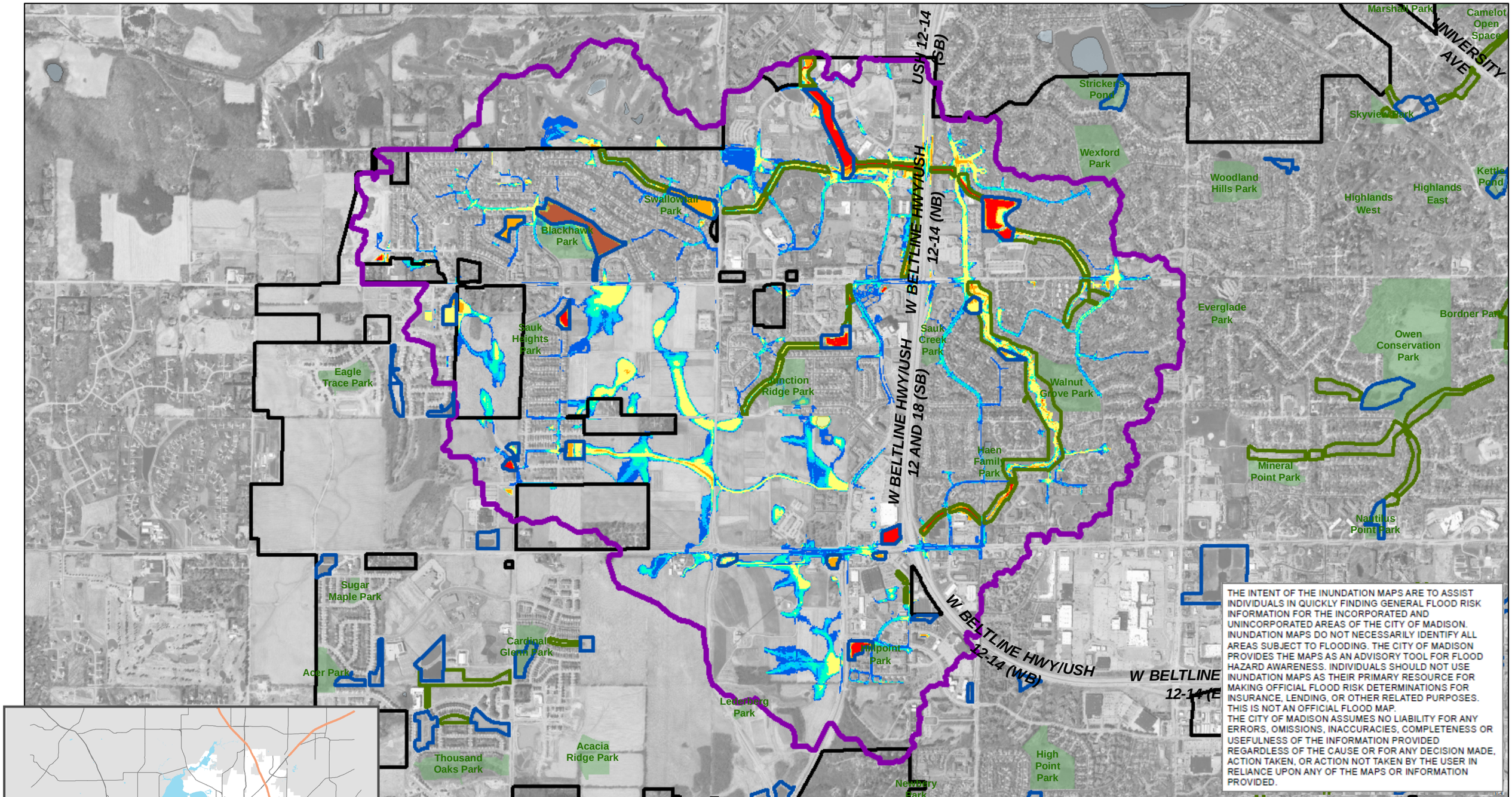


Figure 6-6
Existing Conditions Inundation Mapping
2% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

User Name: encjb
Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_6_Existing2PerChance.mxd

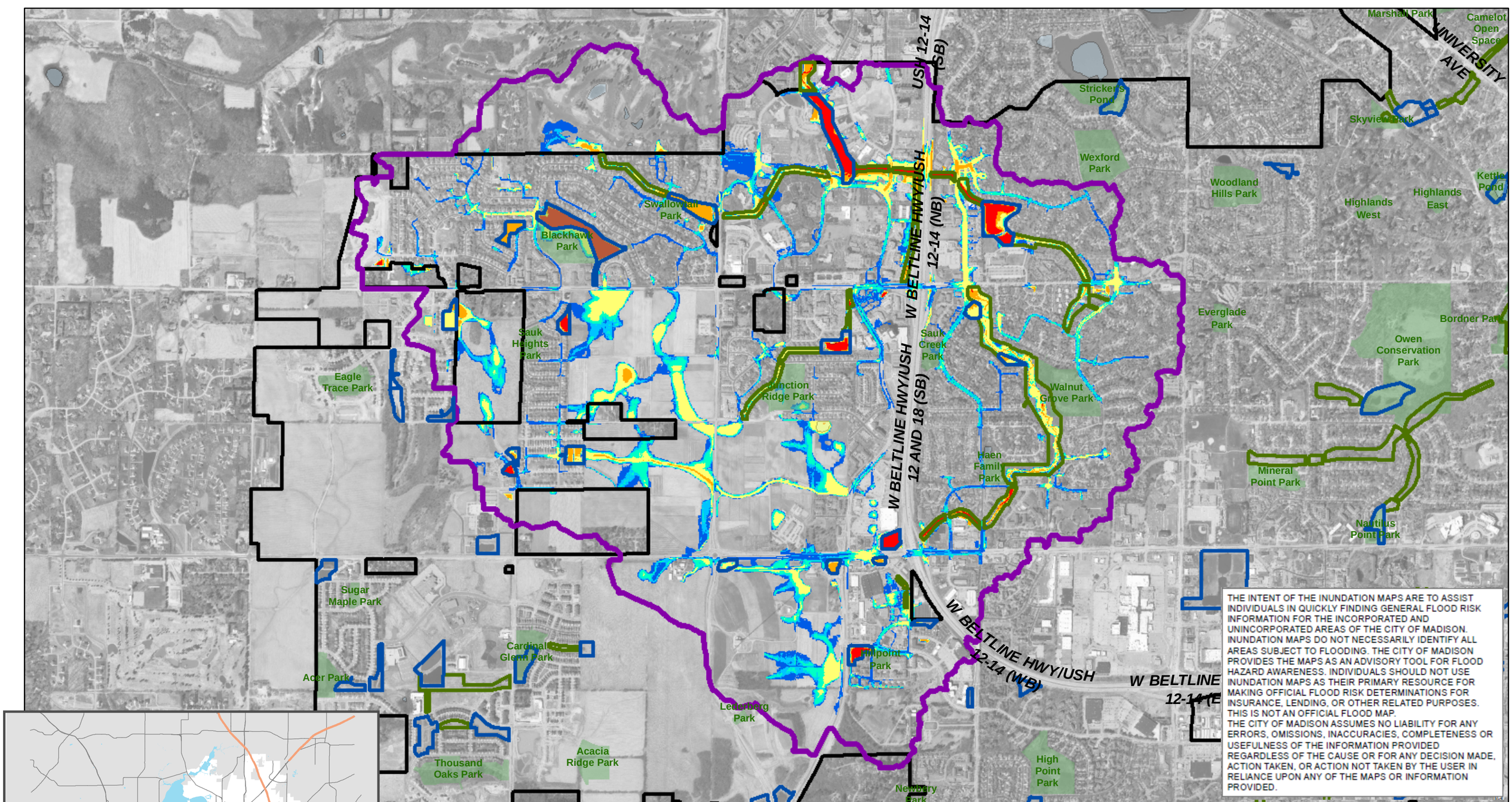


Figure 6-7
Existing Conditions Inundation Mapping
1% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_7_Existing1PerChance.mxd

User Name: encjb

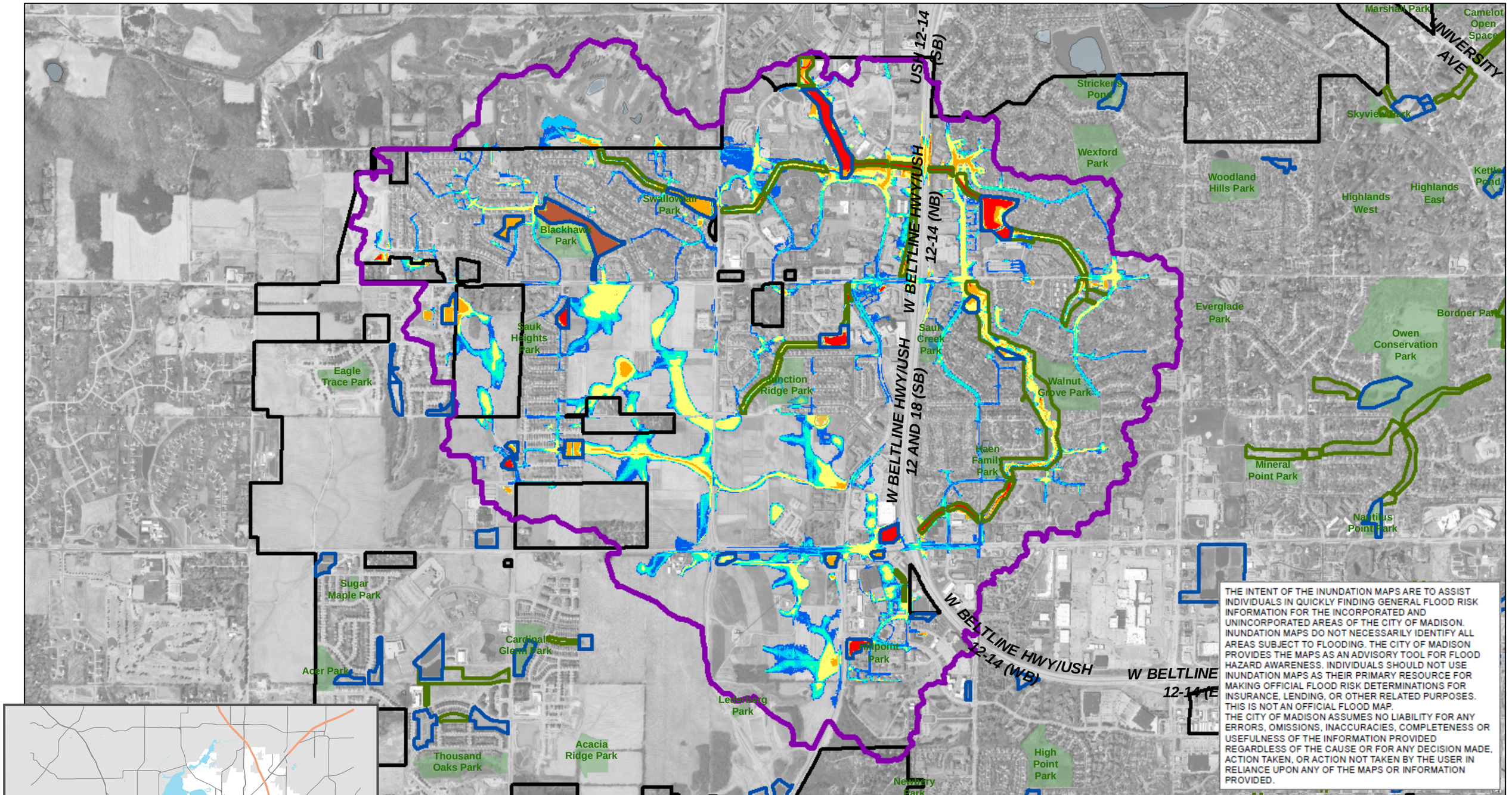
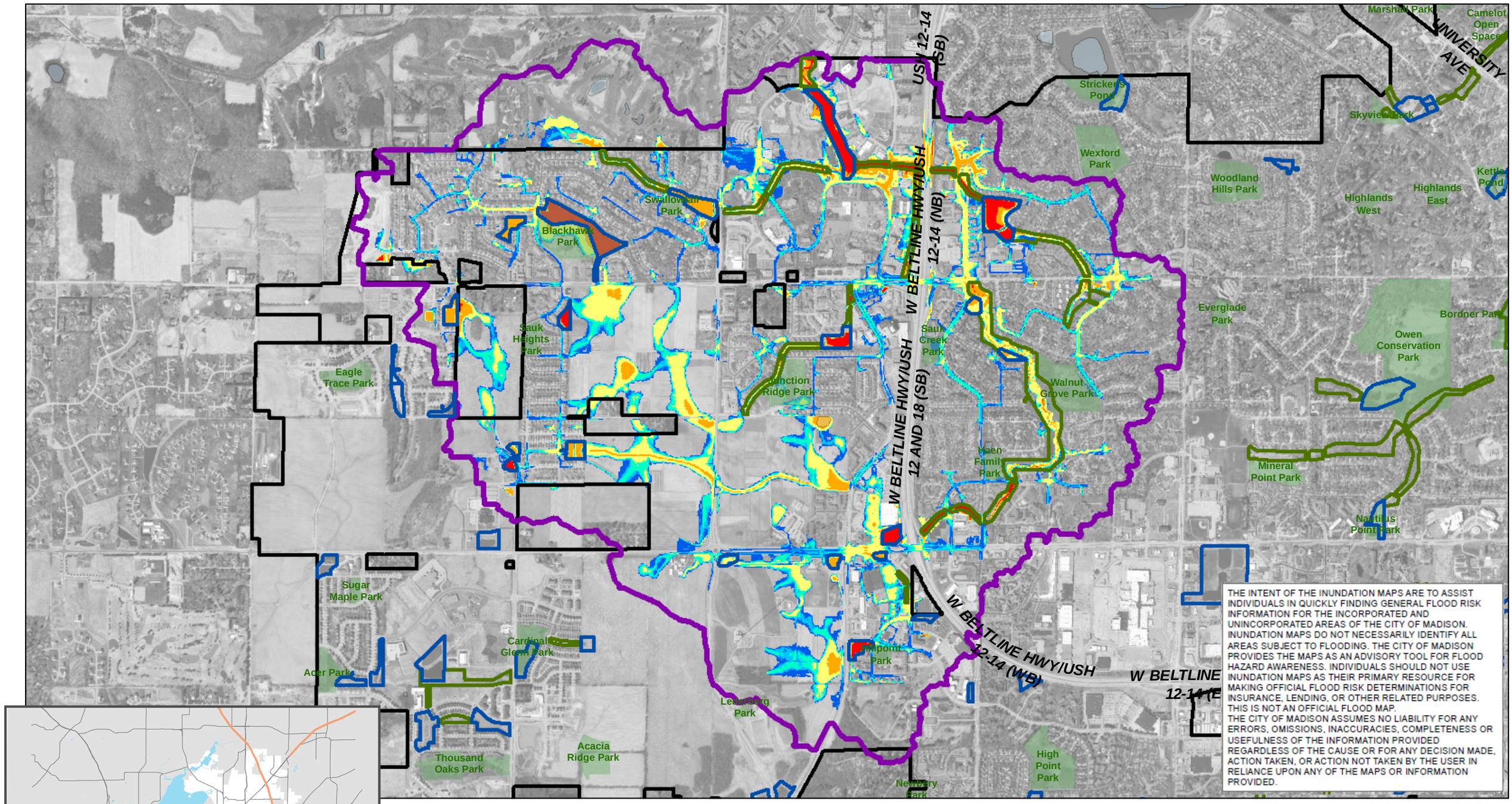
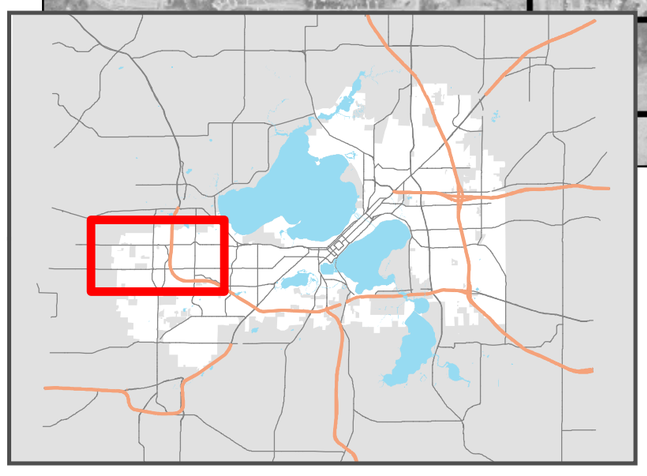


Figure 6-8
Existing Conditions Inundation Mapping
0.5% Chance Event
Pheasant Branch Watershed

Date: 5/6/2021

Document Path: \\Gisserver\d\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_8_ExistingPoint5PerChance.mxd
User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

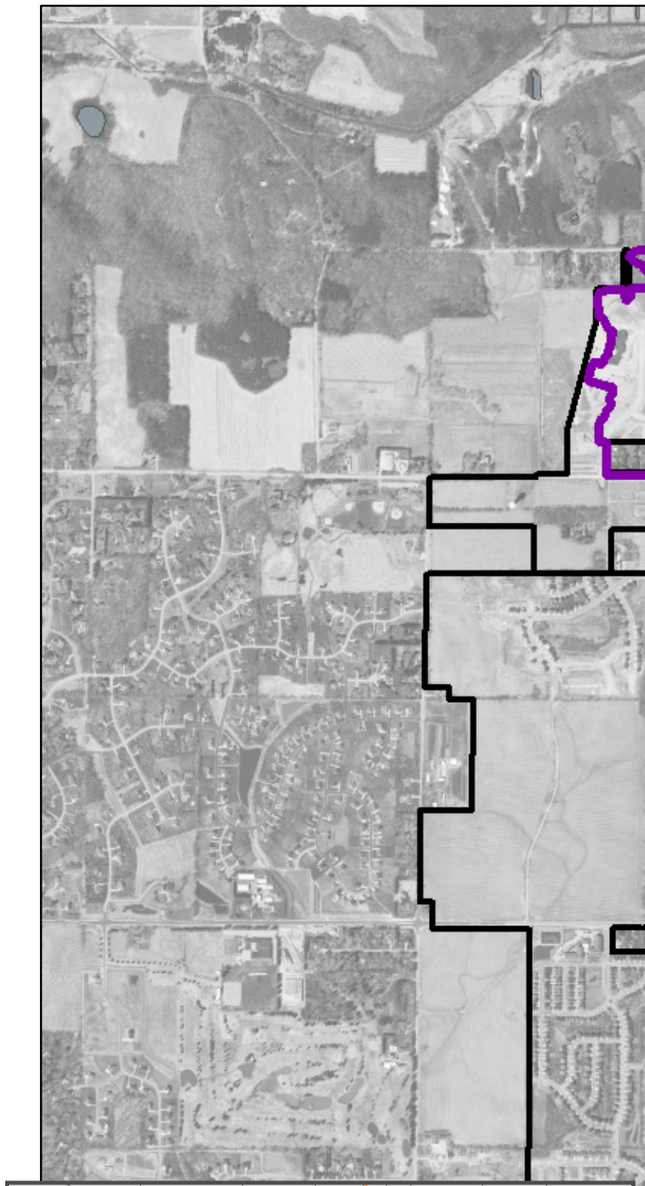
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

Figure 6-9
Existing Conditions Inundation Mapping
0.2% Chance Event
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 5/6/2021

Document Path: \\Gisserver\dlDESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_9_ExistingPoint2PerChance.mxd
User Name: encjb



Legend

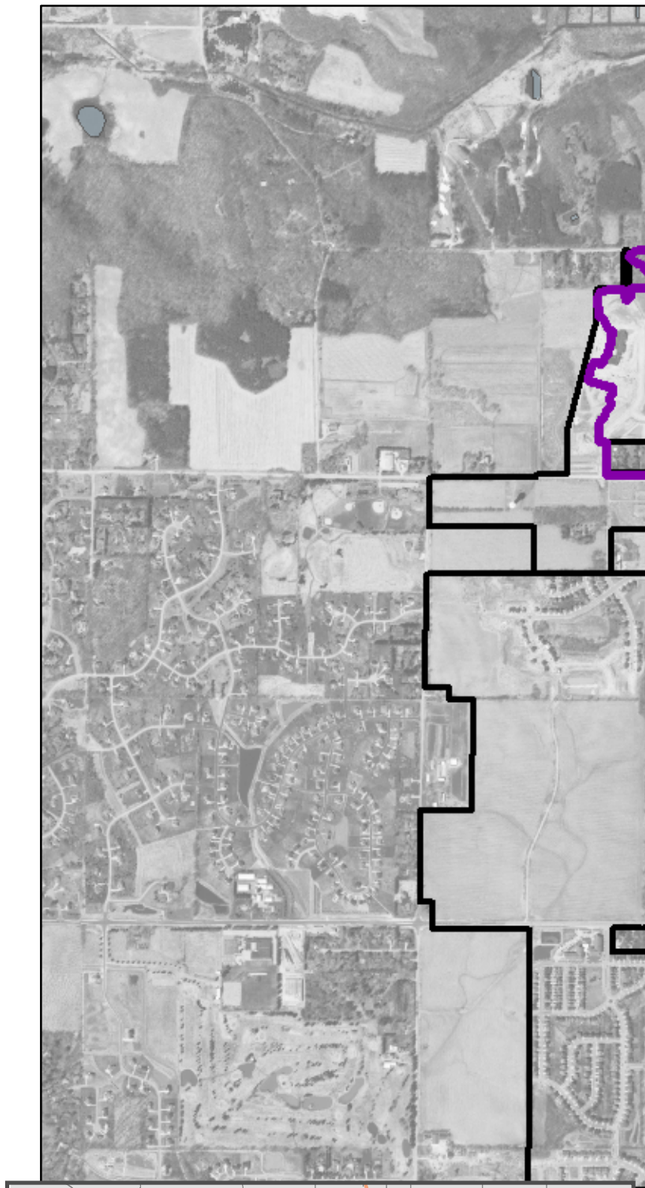
- Municipal Limits
- Watershed Boundary
- Streets Not Meeting 10% Chance Target

Figure 6-10
Streets Not Meeting 10% Chance Target
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

User Name: encjb
Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_10_Streets_10yr.mxd



Legend

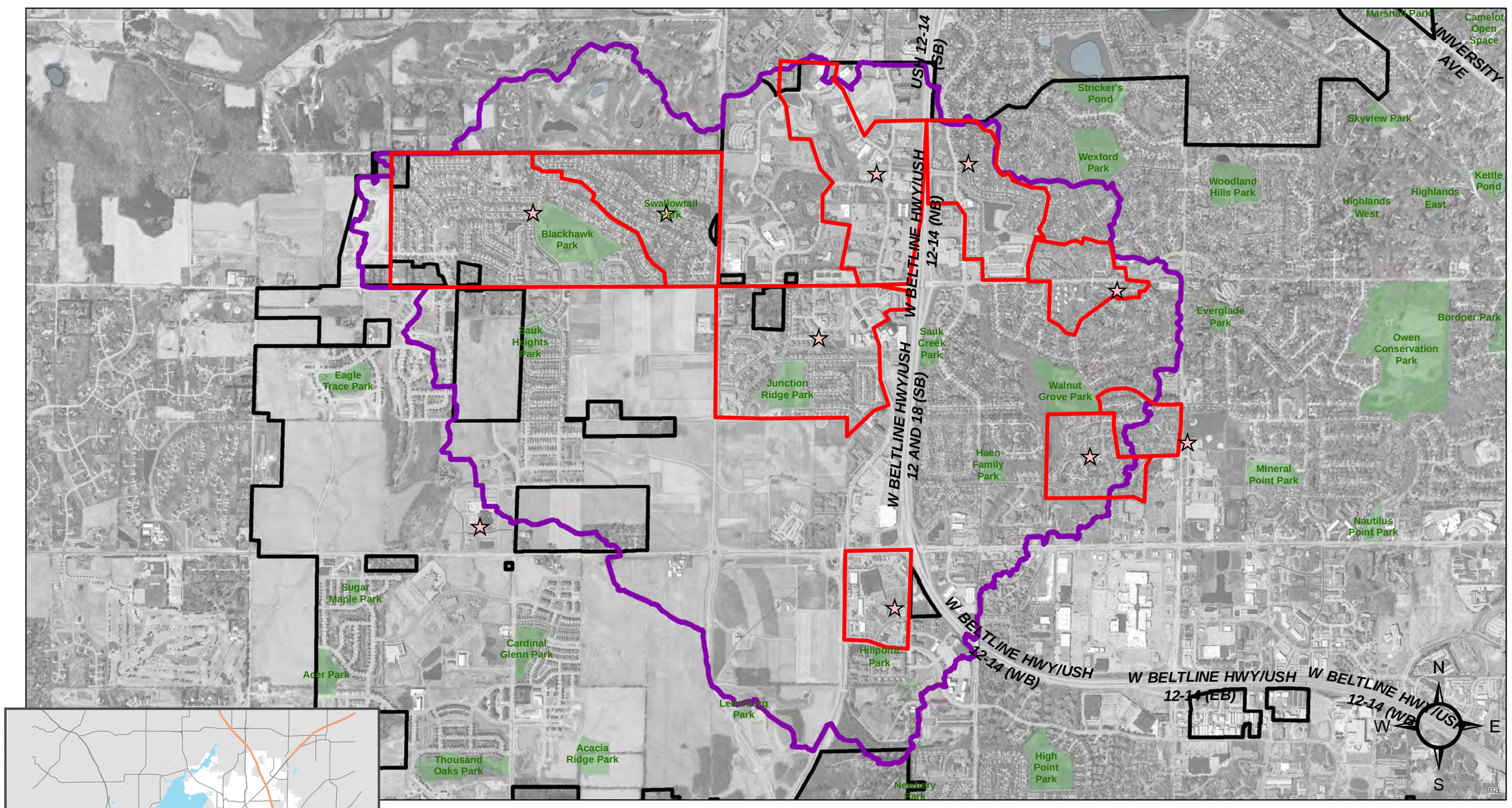
- Municipal Limits
- Watershed Boundary
- Streets Not Meeting 4% Chance Target

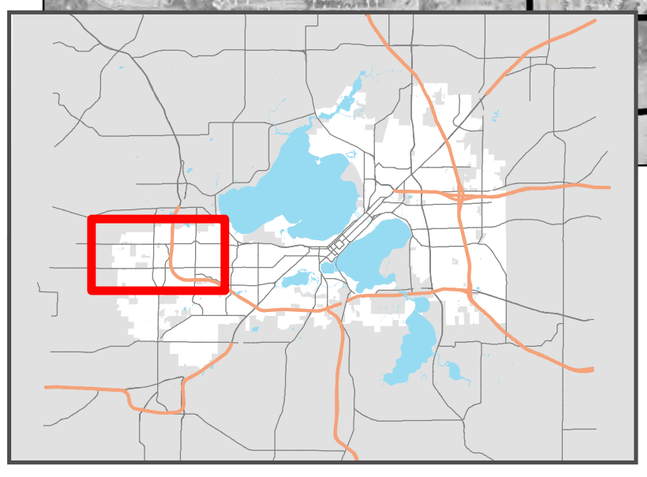
Figure 6-11
Streets Not Meeting 4% Chance Target
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure6_11_Streets_25yr.mxd
User Name: encjb





Legend

- Municipal Limits
- Park
- Watershed Boundary
- Meeting Location
- Focus Group Area

Figure 7-1
Focus Group Meetings
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 5/6/2021

Document Path: \\Gisserver\dDESIGN\Projects\11981\GIS\MXDs\Figures\Figure7_1_FocusGroupMeetings.mxd

User Name: encjb

Sauk Creek Greenway to Wexford Pond Double Box Culvert

Wexford Area Relief Sewer

Target Area Pond Outlet Structure Reconstruction

Project Location

Greenway

Pond

Ownership Parcels

Municipal Limits

Watershed Boundary

Figure 9-1
Solutions Evaluated but Not Recommended
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 1,950 3,900 Feet

Date: 8/1/2022

User Name: encjb

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure9_1_SolutionsNotSelected.mxd

Old Sauk Trails Business Park and Greenway Reconstruction

Pleasant View Road Reconstruction

Blackhawk Pond Reconstruction

Swallowtail Pond Reconstruction

Greenway Crossing Reconstruction

Wexford Pond Reconstruction

Old Sauk Road and Westfield Road Reconstruction

Sauk Creek Greenway Stabilization

Greenway Crossing Reconstruction

Greenway Crossing Reconstruction

Greenway Crossing Reconstruction

Target Area Relief Sewer

USH 12-14 (SB)

W BELTLINE HWY/USH 12-14 (NB)

W BELTLINE HWY/USH 12-14 (WB)

W BELTLINE HWY/USH 12-14 (EB)

W BELTLINE HWY/USH 12-14 (WB)

UNIVERSITY AVE

Marshall Park

Camelot Open Space

Skyview Park

Wexford

Woodland Hills Park

Highlands West

Highlands East

Kettle Pond

Everglade Park

Bordner Park

Owen Conservation Park

Sauk Creek Park

Walnut Grove Park

Haen Family Park

Point Park

Nautilus Point Park

Swallowtail Park

Blackhawk Park

Sauk Heights Park

Eagle Trace Park

Junction Ridge Park

Sugar Maple Park

Cardinal Glenn Park

Acer Park

Tellurium Park

Thousand Oaks Park

Acacia Ridge Park

Millpoint Park

Newbury Park

High Point Park

Project Location

Legend

- Greenway
- Pond
- Storm Pipe
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Municipal Limits
- Park
- Upgraded Storm Sewer
- Proposed Contours

Figure 9-2
Recommended Solutions
Pheasant Branch Watershed

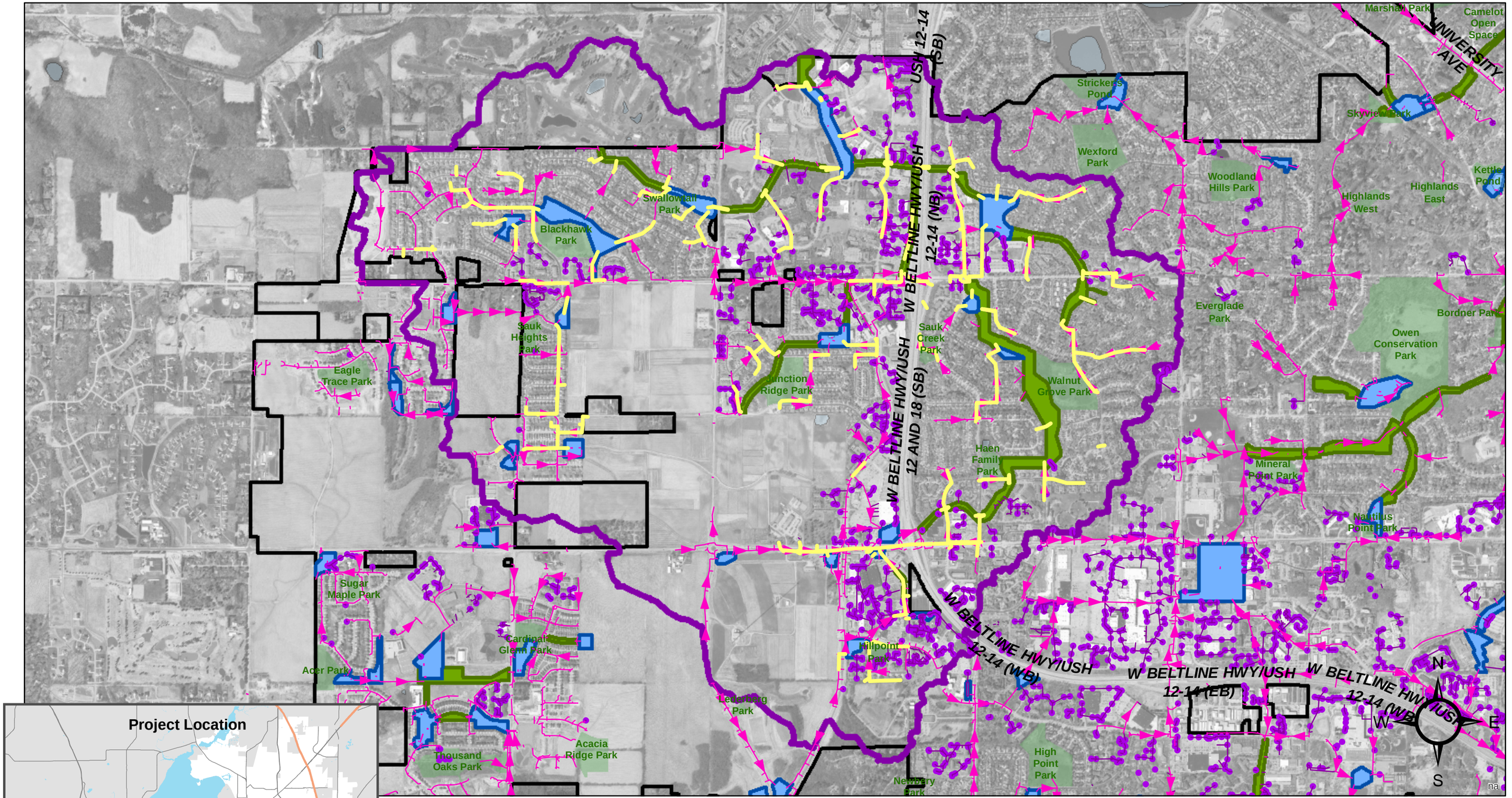
0 1,950 3,900 Feet

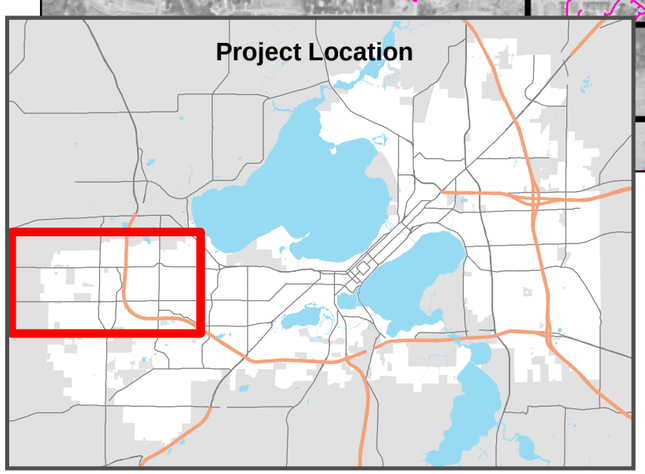
Date: 8/1/2022

N S E W

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure9_2_SolutionsSelected.mxd

User Name: encjb





Legend

- Greenway
- Pond
- Storm Pipe
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Municipal Limits
- Park
- Upgraded Storm Sewer

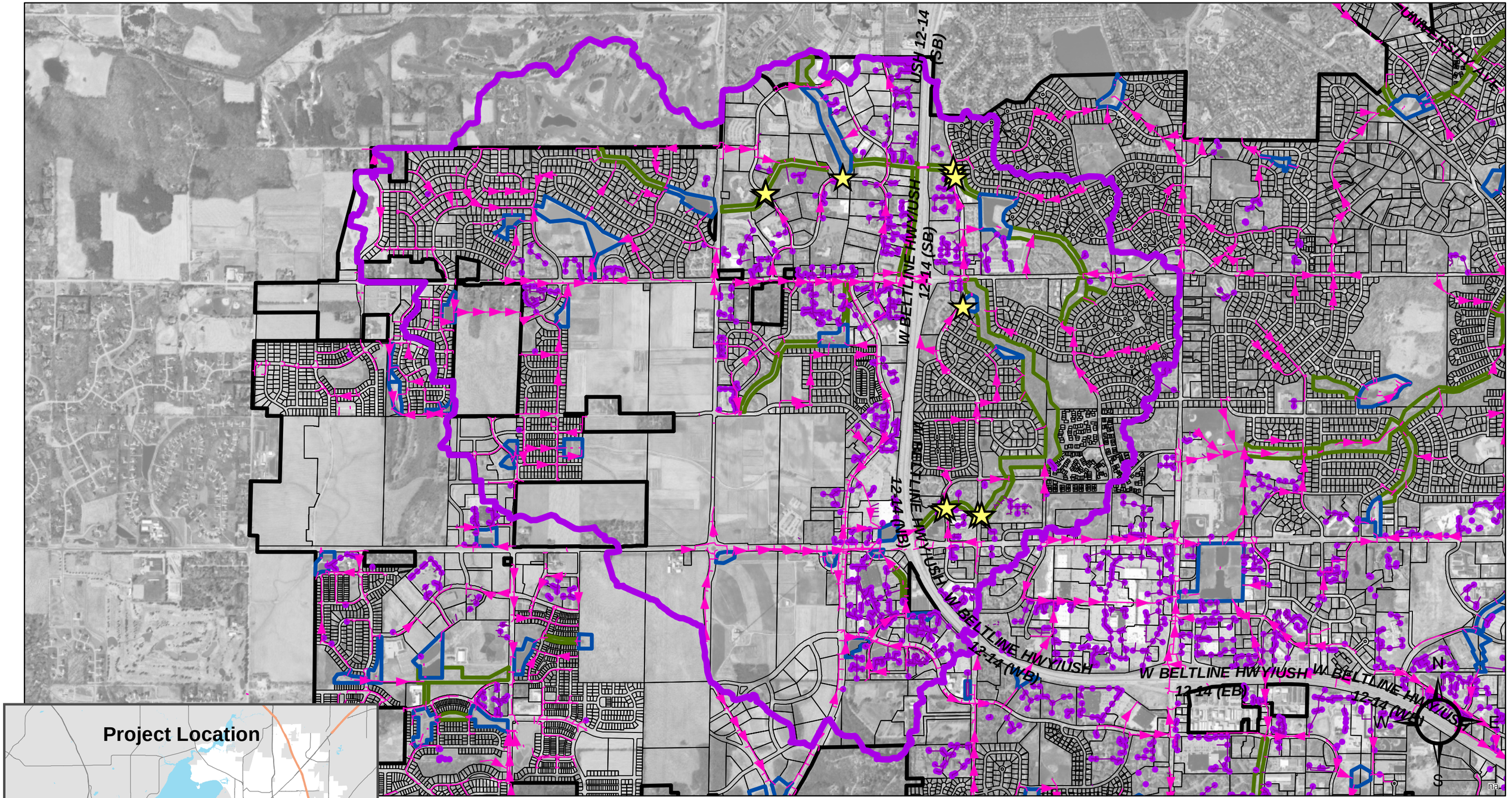
Figure 10-1
Proposed Local Sewer Upgrades
Pheasant Branch Watershed

0 1,950 3,900 Feet

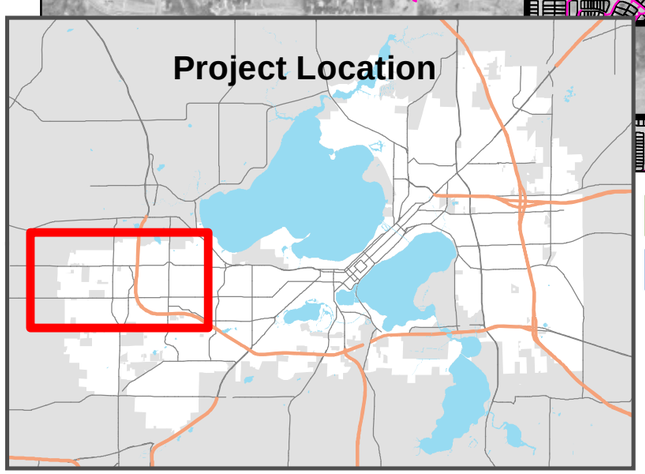
Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_1_ProposedLocalSewer.mxd

User Name: encjb



Project Location



- Greenway
- Pond
- Storm Pipe
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Ownership Parcels
- Municipal Limits
- Watershed Boundary
- Proposed Terrace Inlets

Figure 10-2
Terrace Inlet Reconstruction Locations
Pheasant Branch Watershed

0 1,950 3,900 Feet

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_2_TerraceInlets.mxd

User Name: encjb

3 - 6' x 16' Box Culverts

3 - 6' x 16' Box Culverts

Regrade Ponds

3 - 6' x 14' Box Culverts

1 - 5' x 12' Box Culverts

Regrade Greenways

1 - 5' x 10' Box Culverts

New Terrace Inlets

Pleasant View Road
Greenway Boulevard
DEMING WAY
FOURIER DR
JOHN Q HAMMONS DR
RAMP
N High Point Road
HIGH POINT RD
BLACKHAWK RD
FOXGLOVE CIR
N PLEASANT VIEW RD
EXCELSIOR DR
W BELTLINE HWY/USH 12-14 (NB)

Project Location

Greenway
Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Municipal Limits
Park
Upgraded Storm Sewer
Proposed Contours
Proposed Box Culverts

Figure 10-3
Old Sauk Trails Business Park
Pond and Greenway Reconstruction
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 365 730 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT MPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\ProposedSolutions\PBSolutionFigure_OSTrBusinessPark.mxd

User Name: encjb

Pleasant View Road

Lower normal water elevtion and expand storage area

Replace outlet structure

HAWK FEATHER CIR
FOXGLOVE CIR
ASPEN GROVE LN
MONARCH CIR
SWALLOWTAIL DR
Swallowtail Park
TIMBER WOLF TRL
BOULDER CREEK CIR
DEER HOLLOW CT
SETTLERS RD
N PLEASANT VIEW RD

N
W
E
S

na

Project Location

Greenway
Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Municipal Limits
Parks
Proposed Grading
Proposed Pipe Upgrades

Figure 10-4
Pleasant View Road and Swallowtail Pond Reconstruction
Pheasant Branch Watershed

0 137.5 275 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figure10_4_PVR_and_SwallowtailPond.mxd

User Name: encjb

Lower permanent pool to add more flood storage

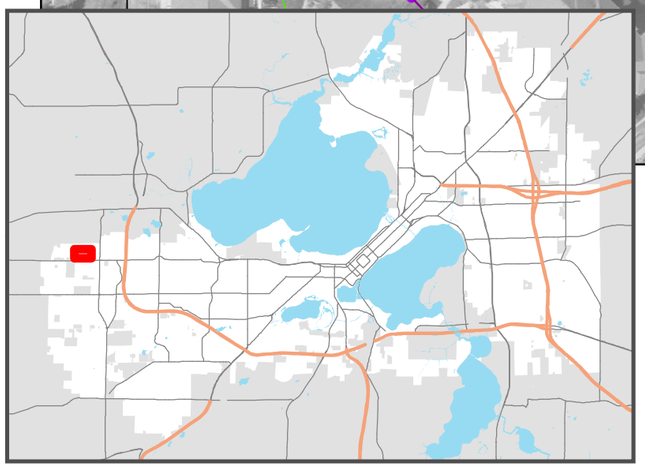
Add flood storage area

Add overflow

Reconstruct outlet structure

HIDDEN CAVE TRL
STAGECOACH TRL
SETTLERS RD
MONARCH CIR
BEAR CLAW WAY
WINDING WAY
CRICKET LN
HIDDEN CAVE RD
SWALLOWTAIL DR
WATERSIDE ST
Blackhawk Park

N
W
E
S



Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Park
Upgraded Storm Sewer
Proposed Contours

Figure 10-5
Blackhawk Pond Reconstruction
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 180 360 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_5_BlackhawkPond.mxd

User Name: encjb

Replace outlet structure

New 6'x12' box culvert replacing existing pipes and diverting water around Wexford Pond

Lower normal water elevation and expand storage.

Additional 84" pipe added to existing 78" pipe

New 6'x12' box culvert routing water into Wexford Pond

Project Location

Greenway
Pond
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Other
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
FYI-Water Utility Restrictions
Restriction
No large scale GI
Water Main
Water Valve
Ownership Parcels
Parks
Proposed Grading
Proposed Pipe Upgrades

Figure 10-6
Wexford Pond Reconstruction
Pheasant Branch Watershed

0 285 570 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/12/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_6_WexfordPond.mxd

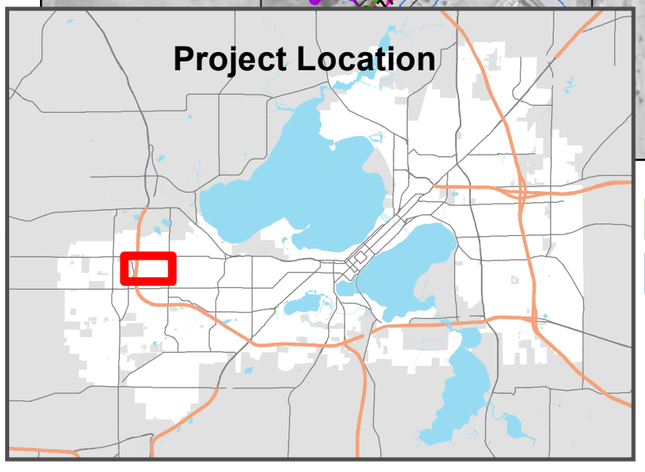
User Name: encjb

Greenway stabilization

Walnut Grove Park

Sauk Creek Park

Haen Family Park



Greenway
Pond
Storm Pipe
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
MMSD Mains
MMSD SAS
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Parks
Proposed Grading

Figure 10-7
Sauk Creek Greenway Stabilization
Pheasant Branch Watershed

0 500 1,000 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 8/1/2022

Document Path: M:\DESIGN\Projects\119811\GIS\MXDs\ProposedSolutions\PBSolutionFigure_SCGreenwayModerate.mxd

User Name: encjb

6' x 12' Box Relief Sewer
Intercepts flow from Mineral Point Road and South of Mineral Point Road
Discharges at Greenway Crossing on S. High Point Road

RAMP
RAMP
TREE LN
TREE LN
S HIGH POINT RD
S HIGH POINT RD
MINERAL POINT RD
MINERAL POINT RD
MINERAL POINT RD
MINERAL POINT RD
MINERAL POINT RD
W BELTLINE HWY/USH 12-14 (NB)
W BELTLINE HWY/USH 12-14 (SB)
RAMP
RAMP
BIG SKY DR
S HIGH POINT RD
N
W
E
S

Project Location

- Greenway
- Pond
- Storm Pipe
- Other Storm Structure
- Access Structures
- Apron
- Inlet
- Private Stormwater Pipes--Approx
- Private Stormwater Structures--A...
- Sanitary Mains
- SAS
- Sanitary Laterals
- Water Main
- Water Valve
- Water Hydrant
- Ownership Parcels
- Municipal Limits
- Proposed Circular Pipe
- Proposed Rectangular Box

Figure 10-8
Target Area Relief Sewer
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

0 180 360 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_8_TargetRelief.mxd

User Name: encjb

Saukdale Way

Saukdale Dr

Saukdale Tr

Saukdale Way

N WESTFIELD RD

Install upsized storm sewer

OLD SAUK RD

OLD SAUK RD

Raise intersection to create positive drainage towards greenway

N WESTFIELD RD

WALNUT GROVE DR

WALNUT GROVE DR

FOXBORO CIR

N WESTFIELD RD

N

W

E

S

na

Project Location

Greenway

Storm Pipe

Other Storm Structure

Access Structures

Apron

Inlet

Private Stormwater Pipes--Approx

Private Stormwater Structures--A...

Sanitary Mains

SAS

Sanitary Laterals

Water Main

Water Valve

Water Hydrant

Ownership Parcels

Proposed Grading

Old Sauk Westfield Intersection

Proposed PIpe Upgrade

Figure 10-9
Old Sauk Road/Westfield Road Intersection
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 7/5/2022

0 50 100 200 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_9_OldSaukWestfield.mxd

User Name: encjb

3 - 6' x 16' Box Culverts

3 - 6' x 16' Box Culverts

3 - 6' x 14' Box Culverts

1- 5' x 12' Box Culvert

3 - 6' x 12' Box Culverts

1 New 4' x 10' Box Culvert
2 Existing 4' x 8' Box Culverts

1- 5' x10' in Box Culvert

1 - 6' x 12' Box Culvert

1 parellel 84" to 1 - 6' x 12' Box Culvert

1 New 5' x 12' Box Culvert
1 Existing 42" RCP

4' x 6' Box Culvert

2 - 6' x 10' Box Culverts

1- 6' x 10' Box Culvert

1 New 6' x 10' Box Culvert
2 Existing 54" RCP

Project Location

Greenway
Pond
Storm Pipe
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Watershed Study Boundary
Municipal Limits
Parks
Railroad ROW Lines
Proposed Storm Sewer/Culvert

Figure 10-10
Greenway Crossing Improvement Overview
Pheasant Branch Watershed

0 1,150 2,300 Feet

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_10_GreenwayCrossingOverview.mxd

User Name: encjb

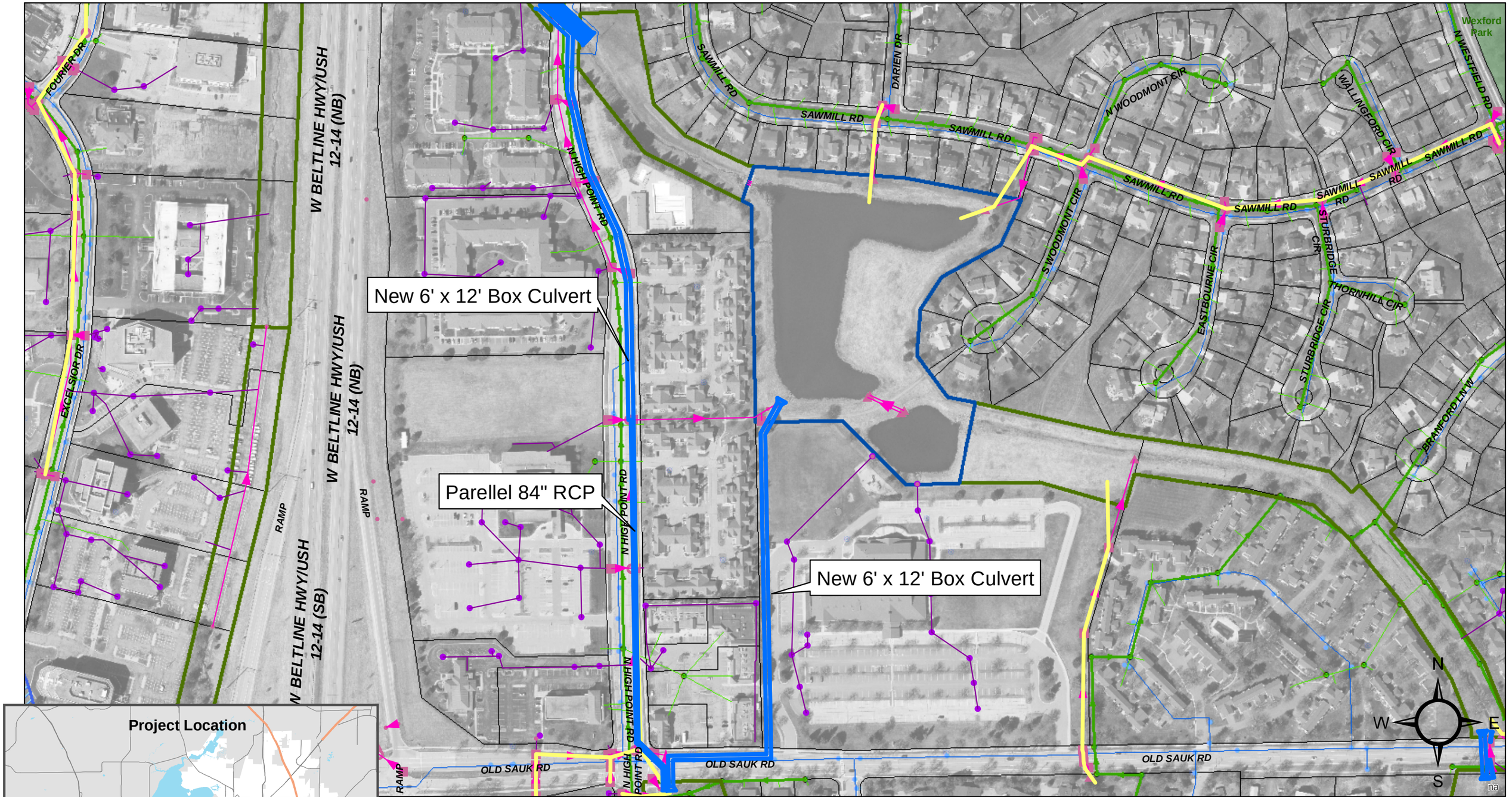


Figure 10-11
Sauk Creek to N Highpoint Road and Wexford Pond
Pheasant Branch Watershed

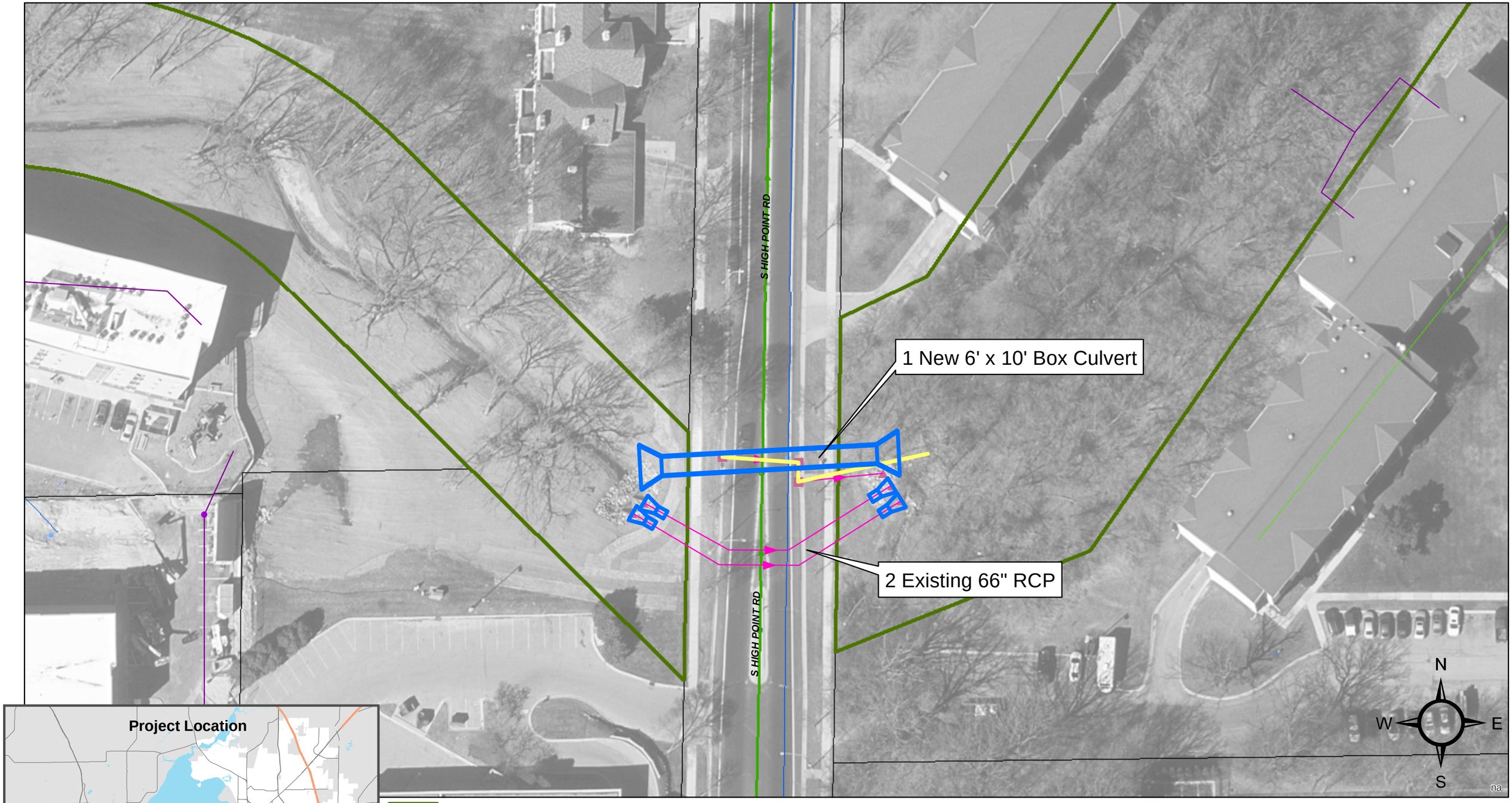
0 275 550 Feet

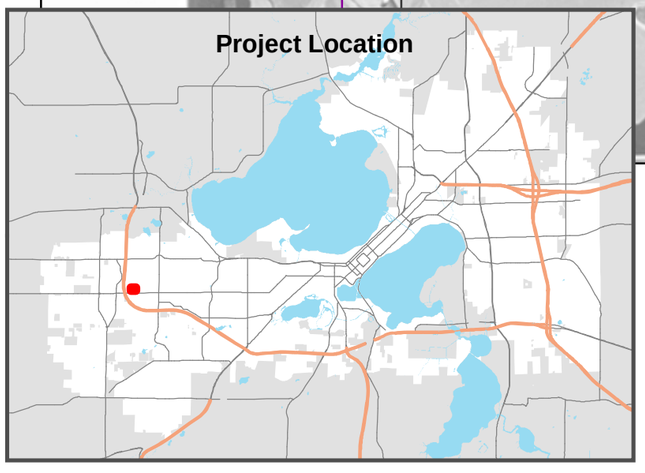
SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DES\GN\Projects\11981\GIS\MXDs\Figures\Figure10_11_HighPointfromSCtoWexford.mxd

User Name: encjb





Greenway
Storm Pipe
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Box Culverts

Figure 10-12
S High Point Road South of Tree Lane
Pheasant Branch Watershed

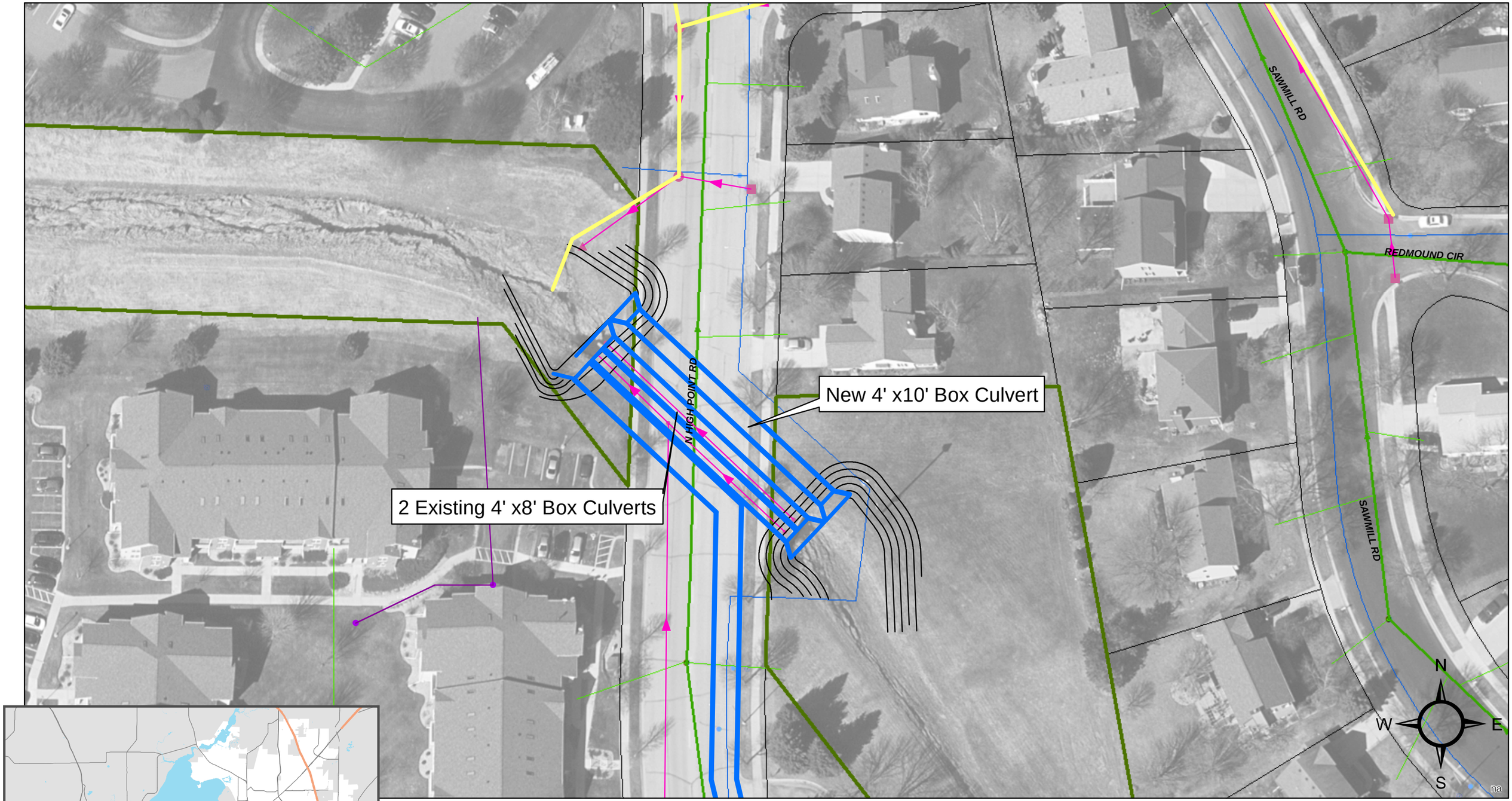
0 55 110 Feet

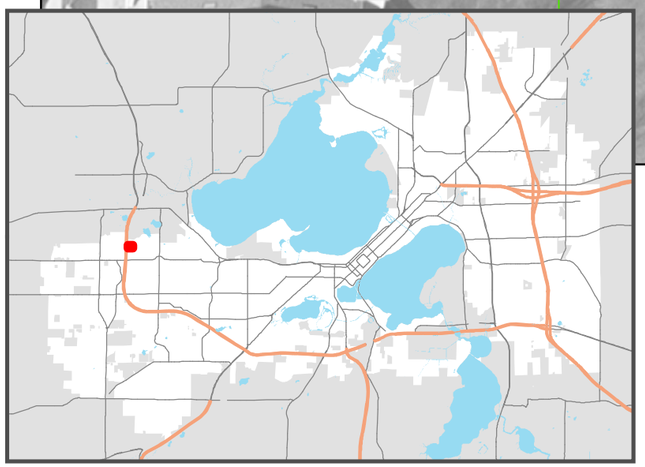
SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 7/1/2022

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_12_HighPointRdSofTreeLn.mxd

User Name: encjb





Greenway
Storm Pipe
Other Storm Structure
Access Structures
Apron
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Contours
Proposed Box Culverts

Figure 10-13
N High Point Road West of Wexford Pond
Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: M:\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_13_HighPointRdWestofWexford.mxd
User Name: encjb

New 5' x12' Box Culvert

Existing 42" RCP

OLD SAUK RD

N

W

E

S

na

Project Location

Greenway

Storm Pipe

Other Storm Structure

Apron

Inlet

Private Stormwater Pipes--Approx

Private Stormwater Structures--A...

Sanitary Mains

SAS

Sanitary Laterals

Water Main

Water Valve

Water Hydrant

Ownership Parcels

Upgraded Storm Sewer

Proposed Contours

Proposed Box Culverts

Figure 10-14
Old Sauk Road South of Wexford Pond
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

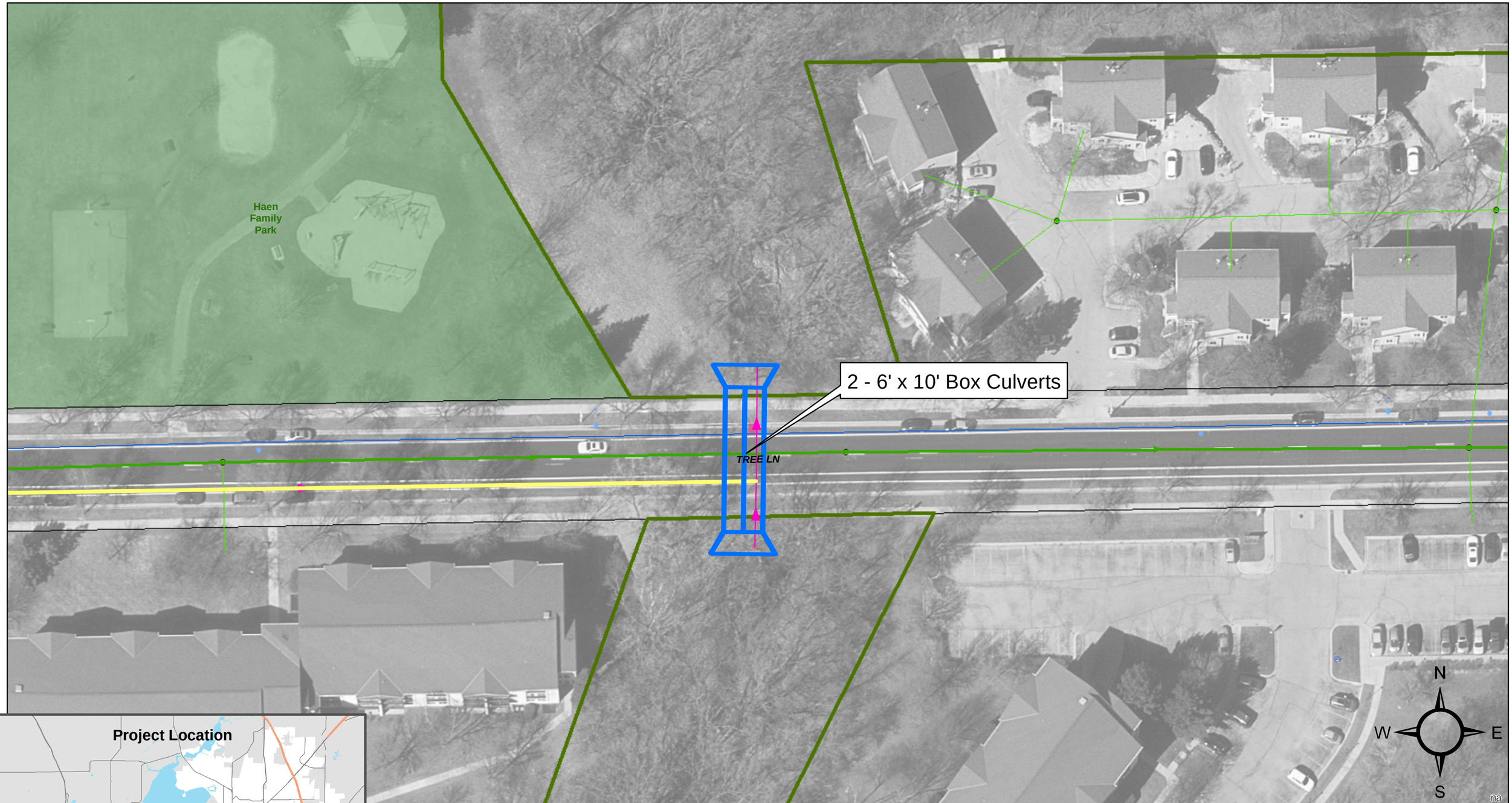
0 55 110 Feet

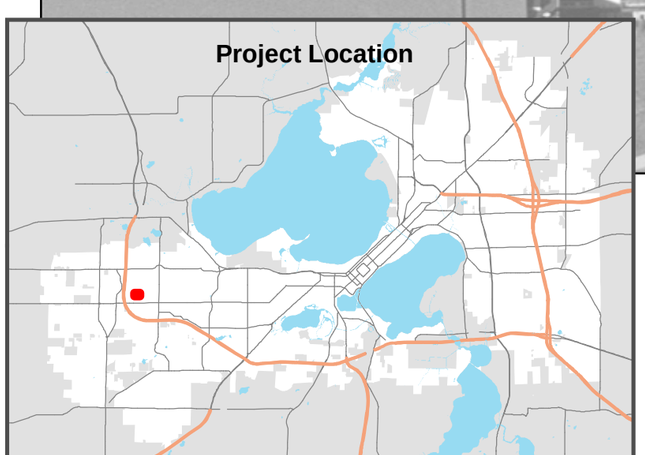
SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_14_OldSaukRdGWCrossing.mxd

User Name: encjb





Greenway
Storm Pipe
Other Storm Structure
Inlet
Other
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Park
Upgraded Storm Sewer
Proposed Box Culverts

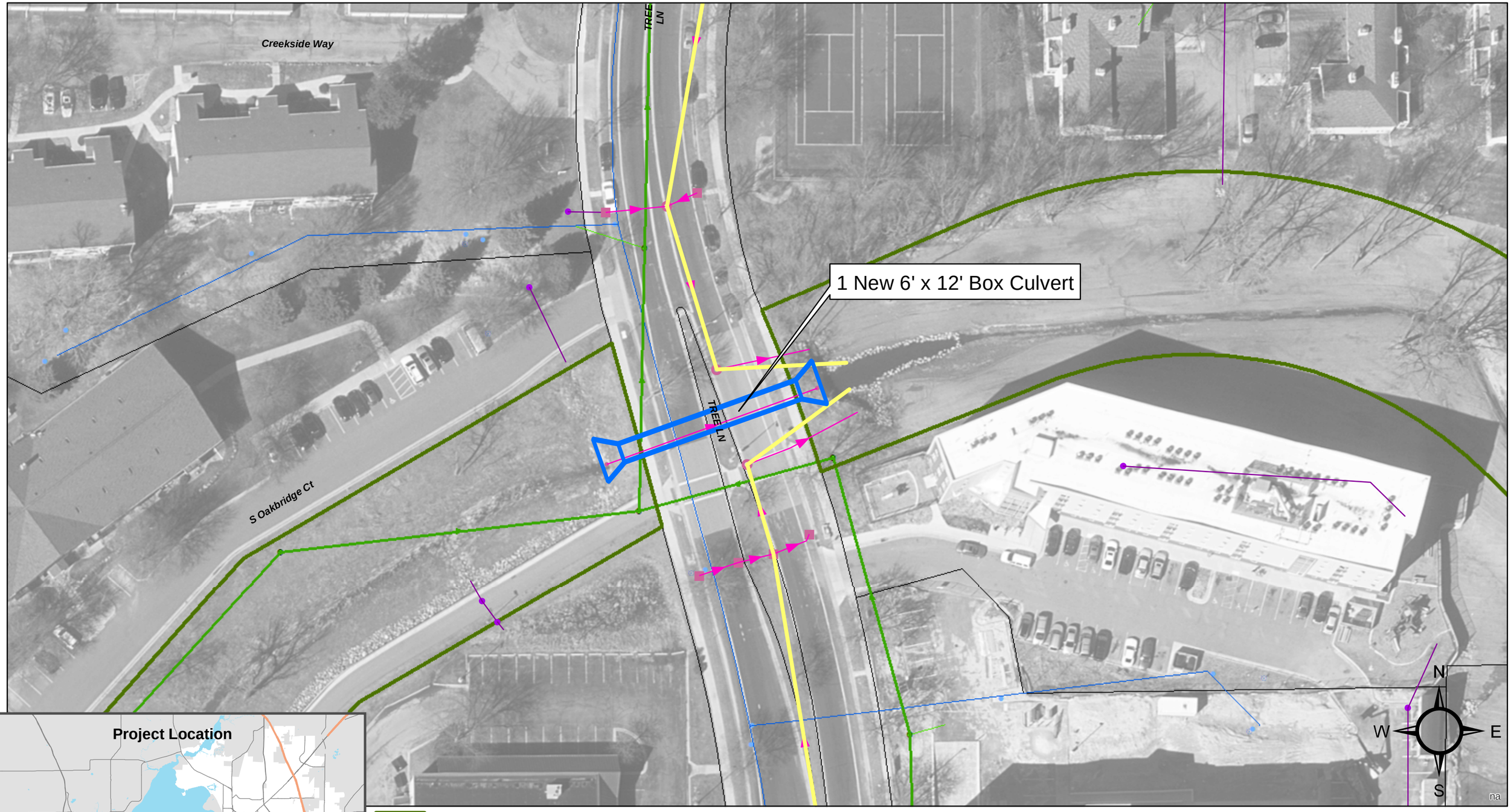
Figure 10-15
Tree Lane East of S High Point Road
Pheasant Branch Watershed

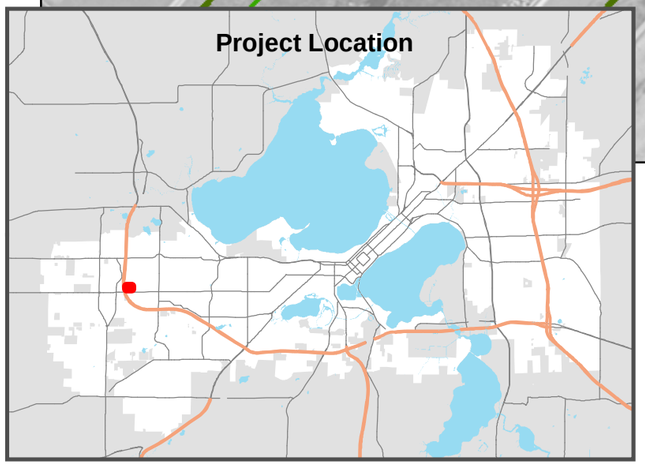
0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_15_TreeLnEofHighPoint.mxd
User Name: encjb





Greenway
Storm Pipe
Other Storm Structure
Access Structures
Inlet
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
Sanitary Mains
SAS
Sanitary Laterals
Water Main
Water Valve
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Box Culverts

Figure 10-16
Tree Lane West of S High Point Road
Pheasant Branch Watershed

0 55 110 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 7/5/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_16_TreeLnWofHighPointRd.mxd

User Name: encjb

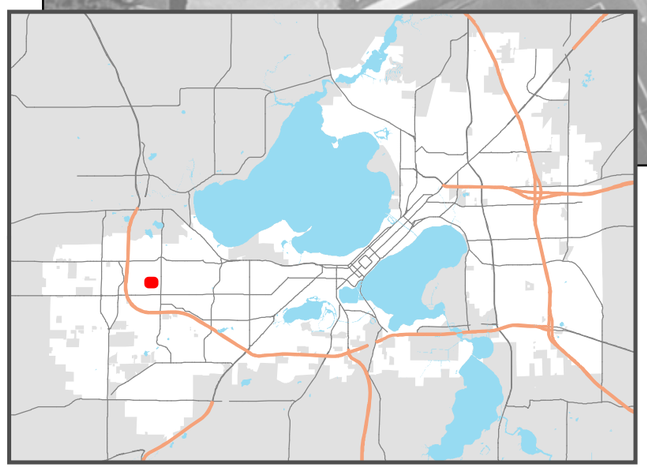
S WESTFIELD RD

4' x 6' Box Culvert

N

W E

S



Storm Pipe

Access Structures

Apron

Inlet

SAS

Sanitary Laterals

Water Main

Water Valve

Water Hydrant

Ownership Parcels

Proposed Box Culverts

Figure 10-17
Westfield Road Greenway Crossing
Pheasant Branch Watershed

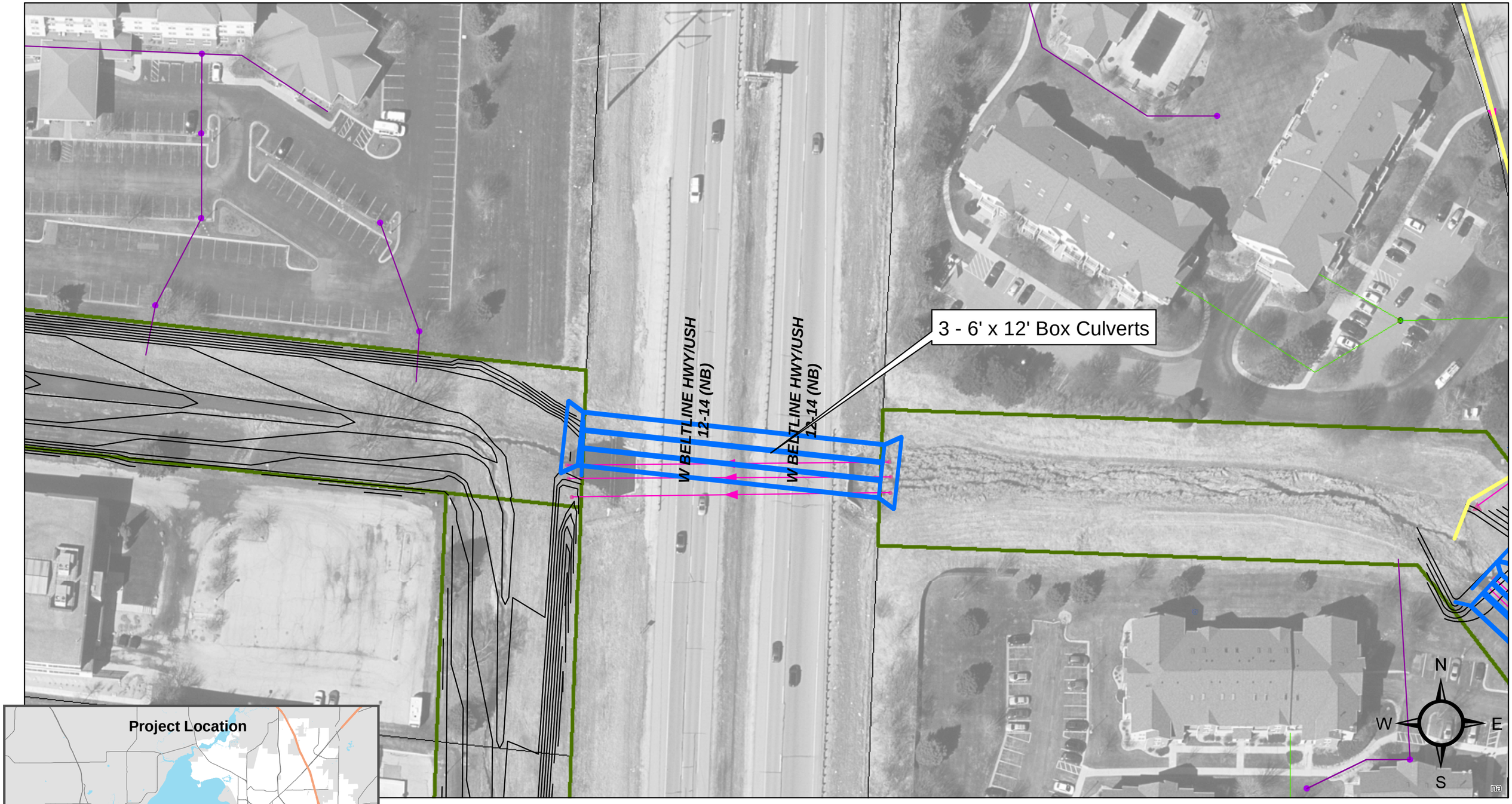
0 55 110 Feet

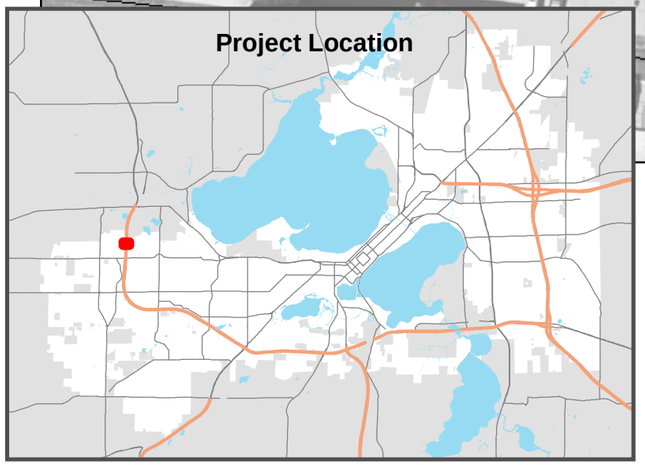
SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_17_WestfieldRdGWCrossing.mxd

User Name: encjb





Greenway
Storm Pipe
Other Storm Structure
Apron
Private Stormwater Pipes--Approx
Private Stormwater Structures--A...
SAS
Sanitary Laterals
Water Main
Water Hydrant
Ownership Parcels
Upgraded Storm Sewer
Proposed Contours
Proposed Box Culverts

Figure 10-18
Beltline Downstream of Wexford Pond
Pheasant Branch Watershed

0 70 140 Feet

SEE REPORT FOR ITEMS THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure10_18_BeltlineDSofWexford.mxd

User Name: encjb

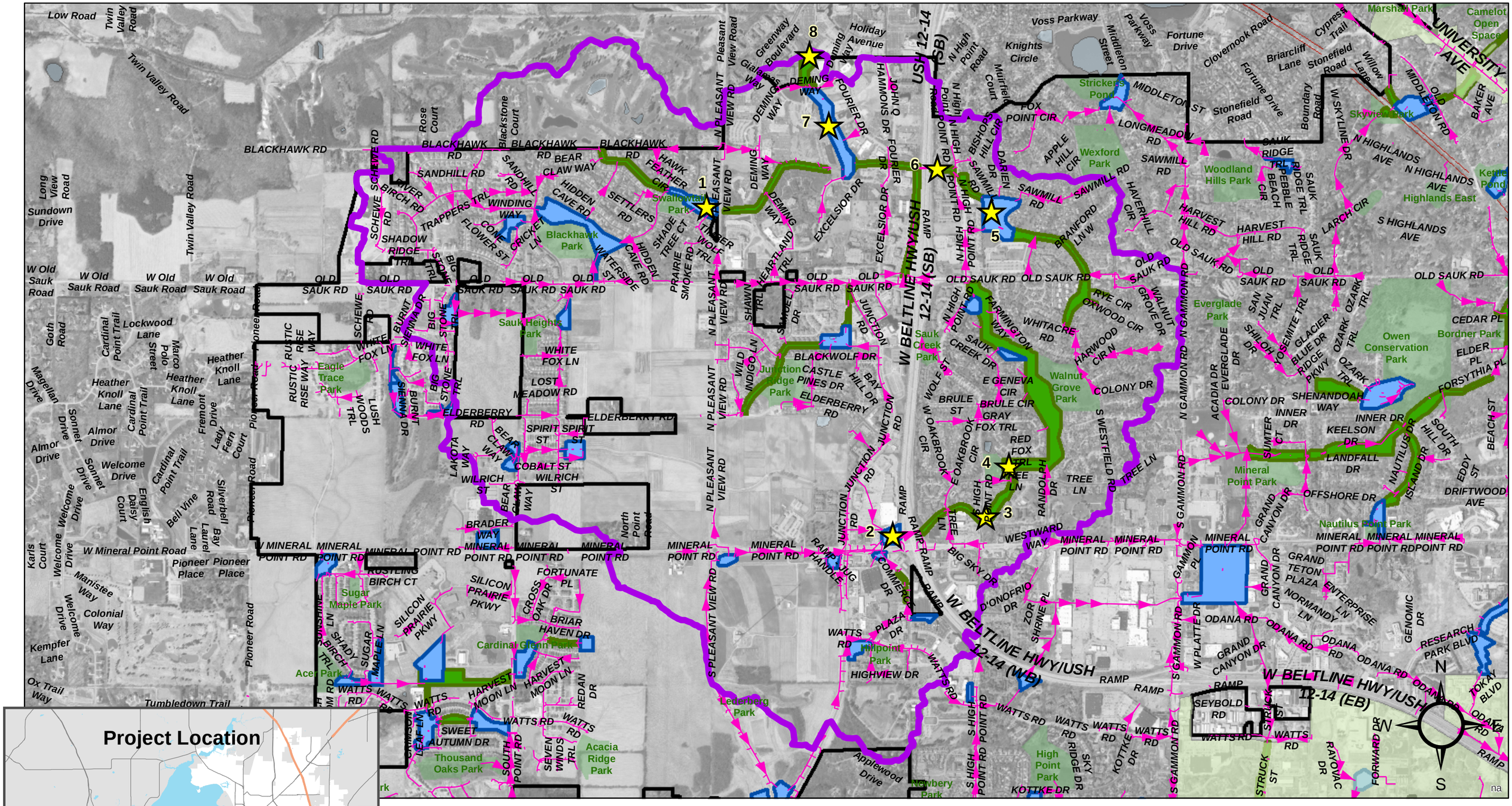


Figure 11-1
Proposed Conditions Reporting Locations
Pheasant Branch Watershed

*SEE REPORT FOR ADDITIONAL NOTES THAT IMPACT PROJECT IMPLEMENTATION

Date: 4/13/2022

User Name: encjb

Document Path: M:\DES\GIS\MXDs\Figures\Figure11_1_ProposedConditionsReportingLocations.mxd

M:\DES\GIS\Projects\11981\GI

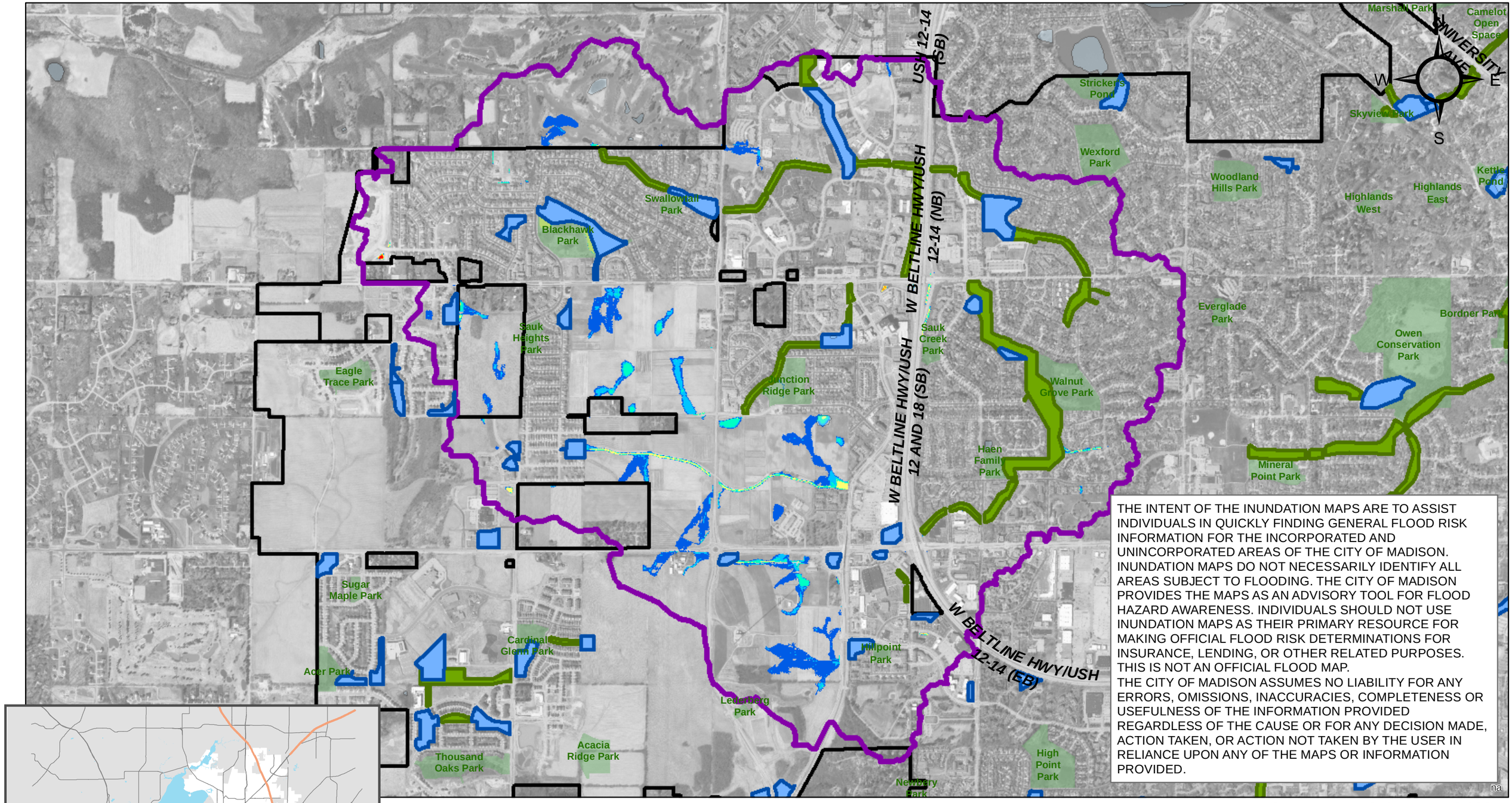
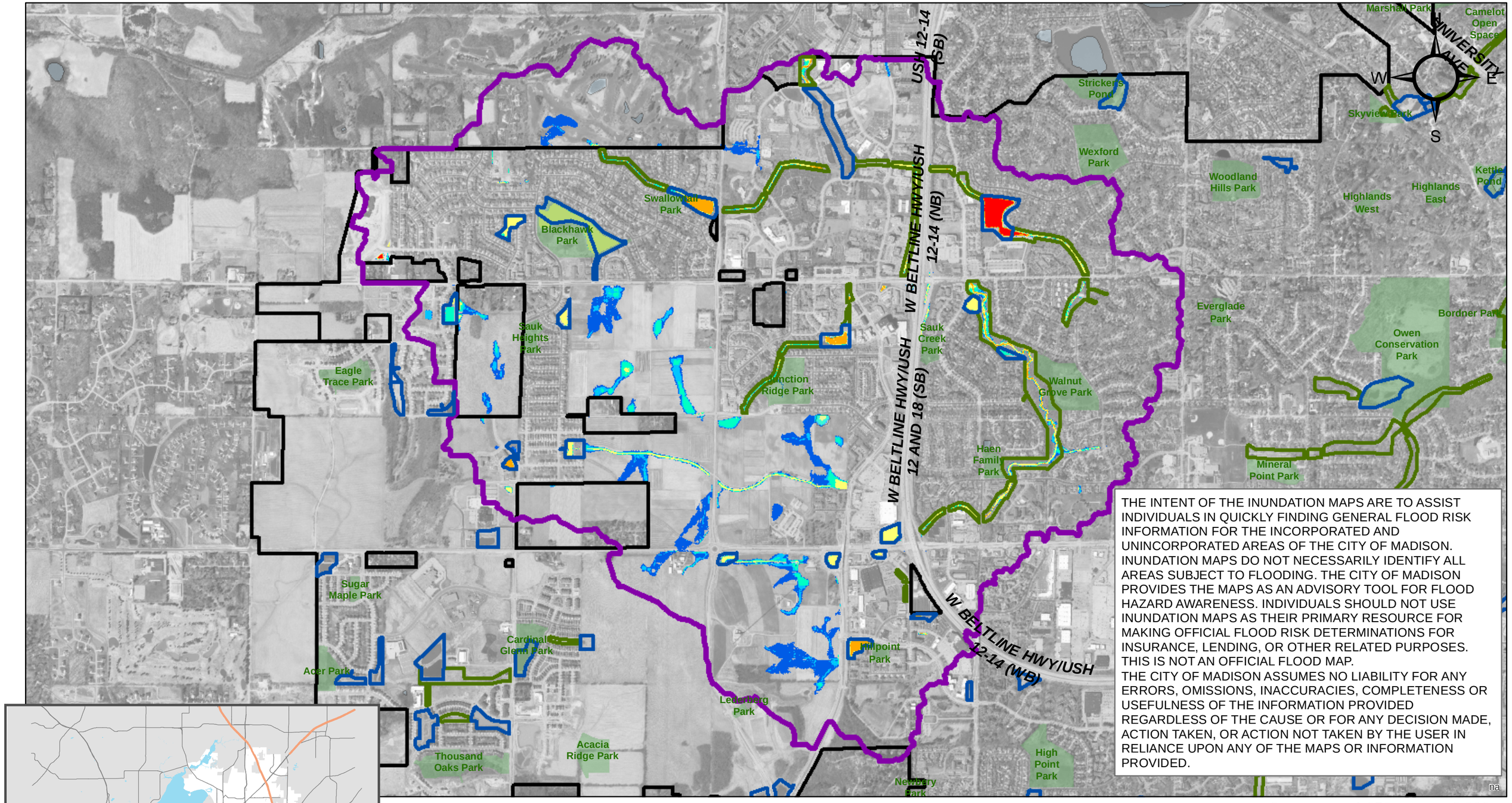
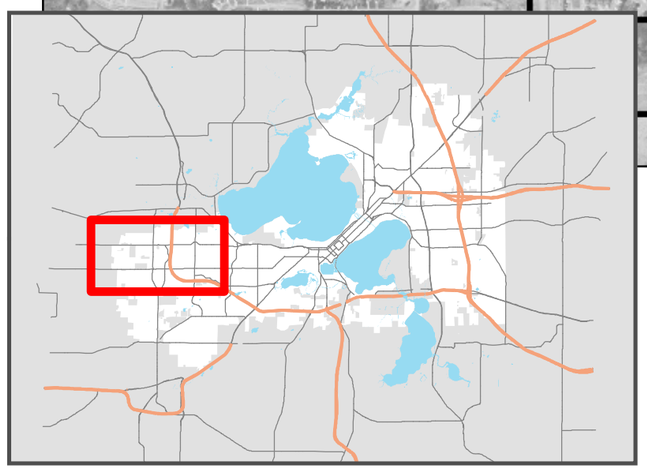


Figure 11-2
Proposed Conditions Inundation Mapping
100% Chance Event
Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_2_Proposed100PerChance.mxd
User Name: encjb





Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

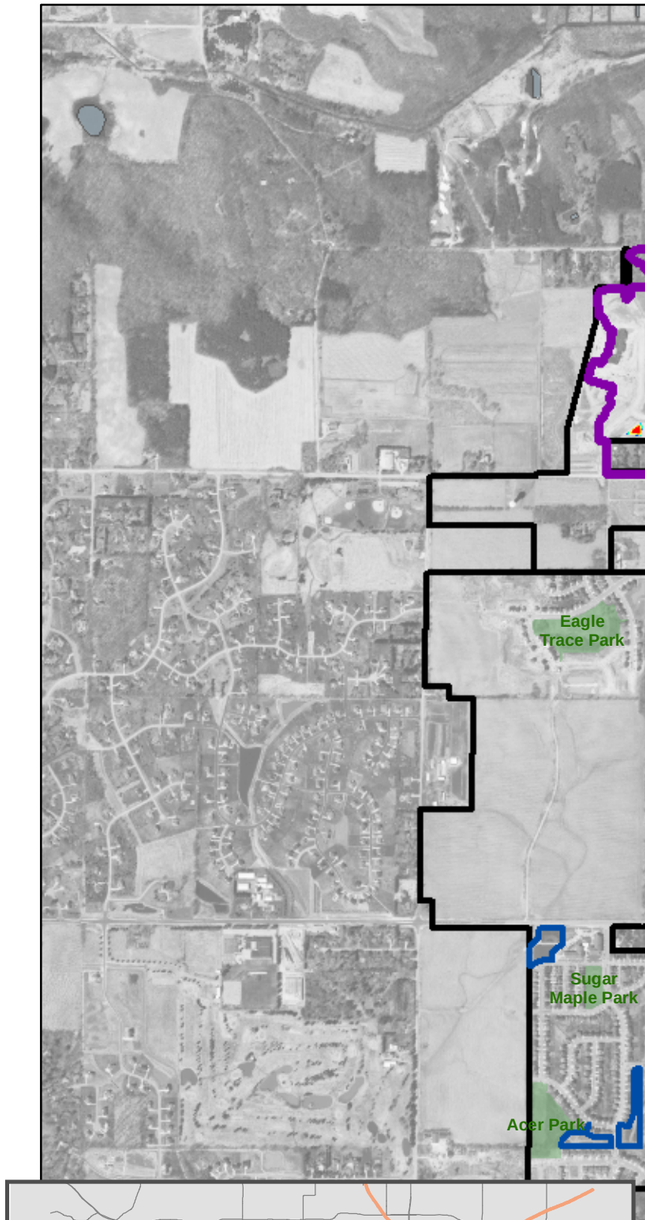
Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

Figure 11-3
Proposed Conditions Inundation Mapping
50% Chance Event
Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_3_Proposed50PerChance.mxd
User Name: encjb



THE INTENT OF THE INUNDATION MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD RISK INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. INUNDATION MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE INUNDATION MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD RISK DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.
THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.

Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

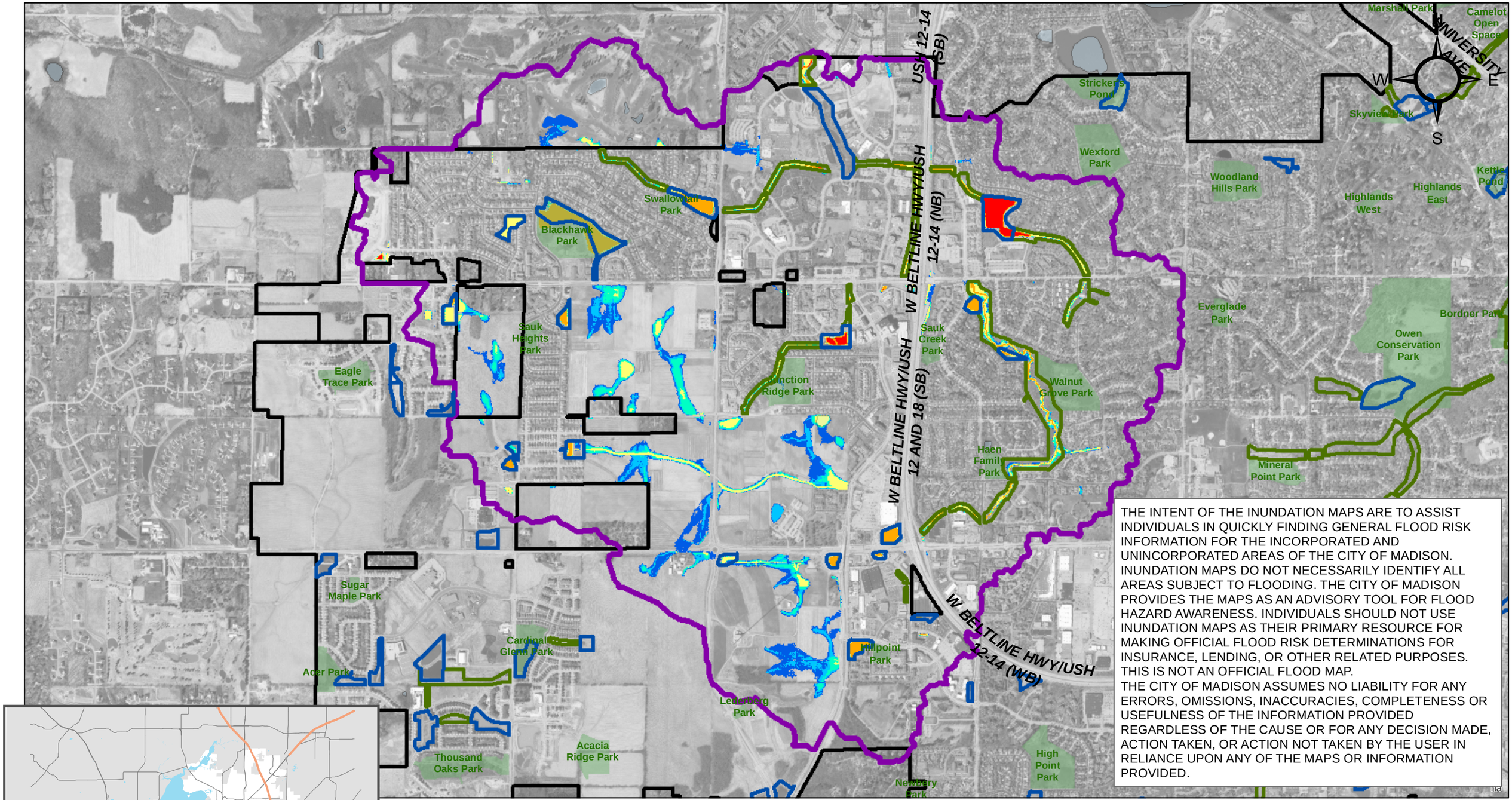
0 1,950 3,900 Feet

Figure 11-4
Proposed Conditions Inundation Mapping
20% Chance Event
Pheasant Branch Watershed

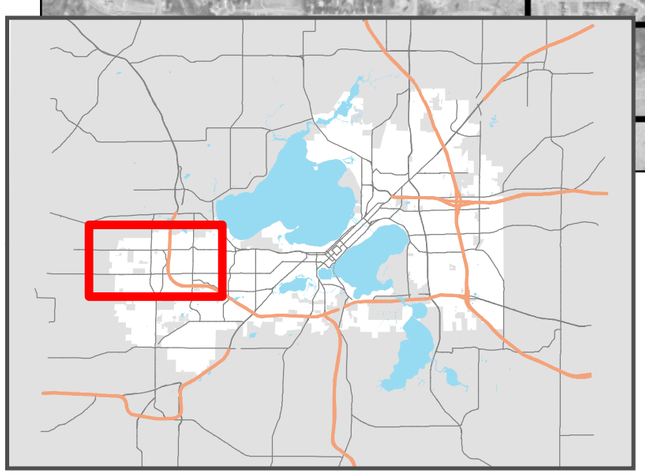
Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_4_Proposed20PerChance.mxd

User Name: encjb



THE INTENT OF THE INUNDATION MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD RISK INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. INUNDATION MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE INUNDATION MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD RISK DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.
THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

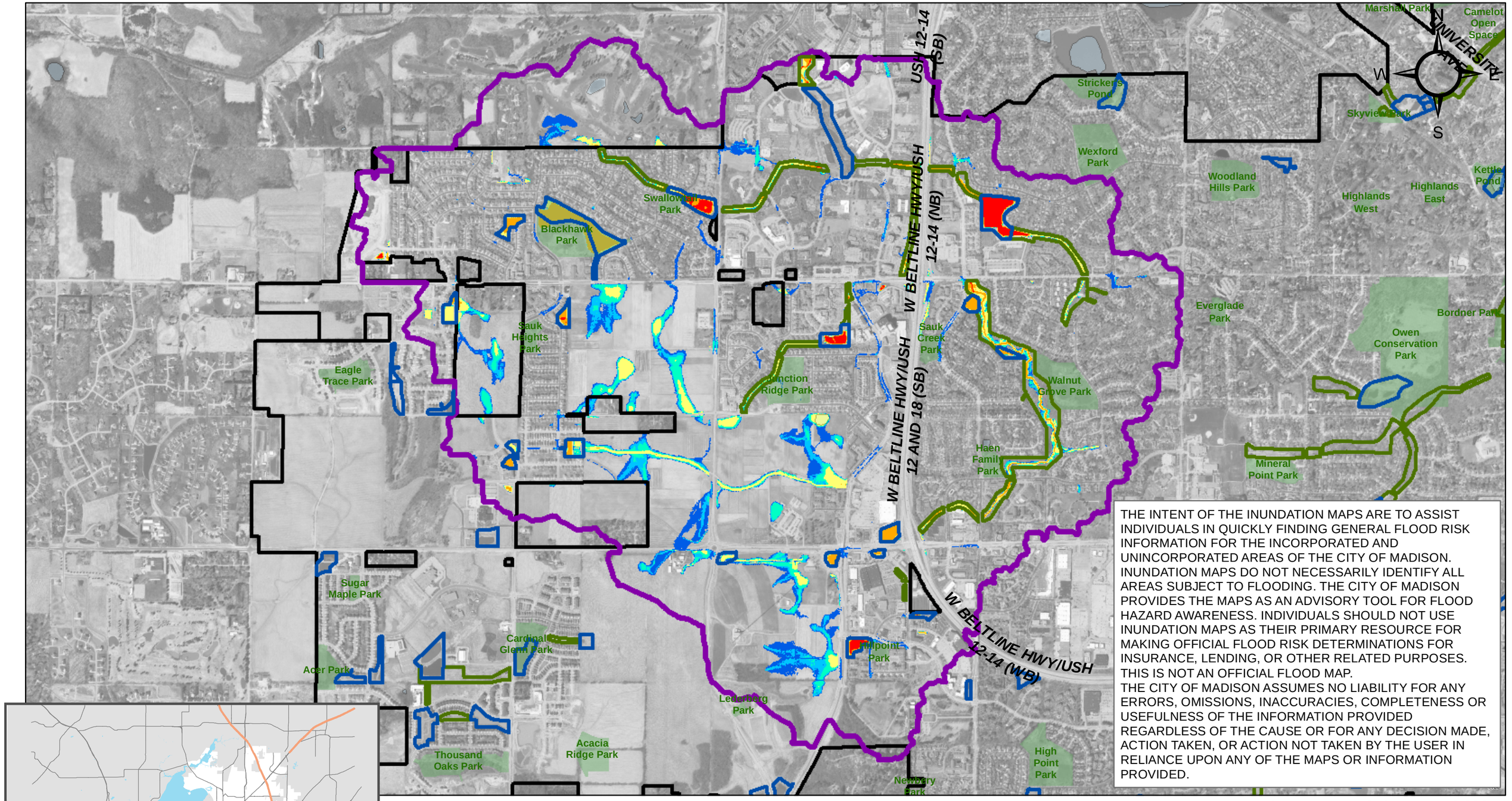
Figure 11-5
Proposed Conditions Inundation Mapping
10% Chance Event
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

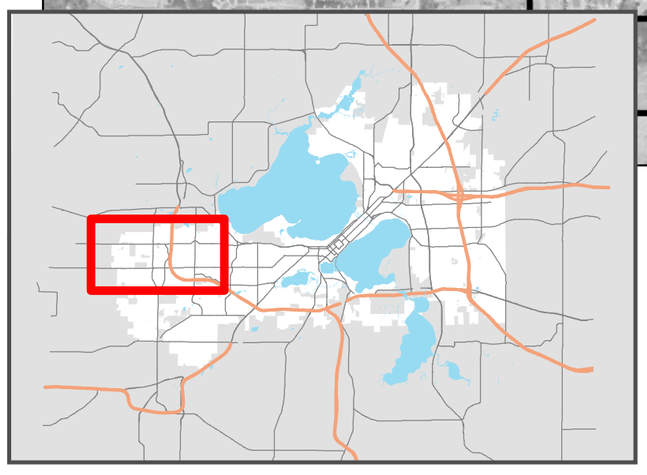
Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_5_Proposed10PerChance.mxd

User Name: encjb



THE INTENT OF THE INUNDATION MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD RISK INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. INUNDATION MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE INUNDATION MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD RISK DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.
THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

Figure 11-6
Proposed Conditions Inundation Mapping
4% Chance Event
Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_6_Proposed4PerChance.mxd

User Name: encjb

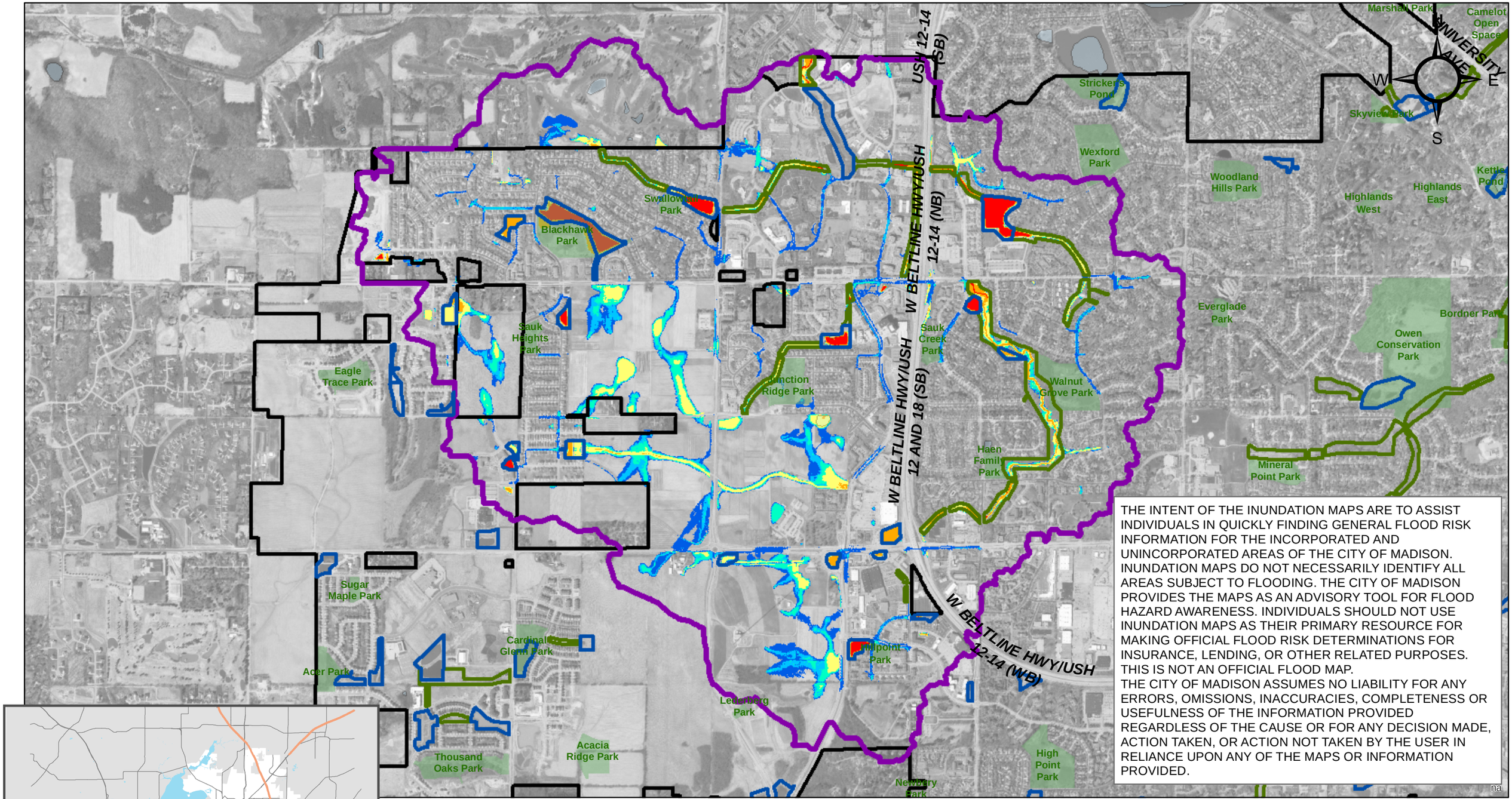
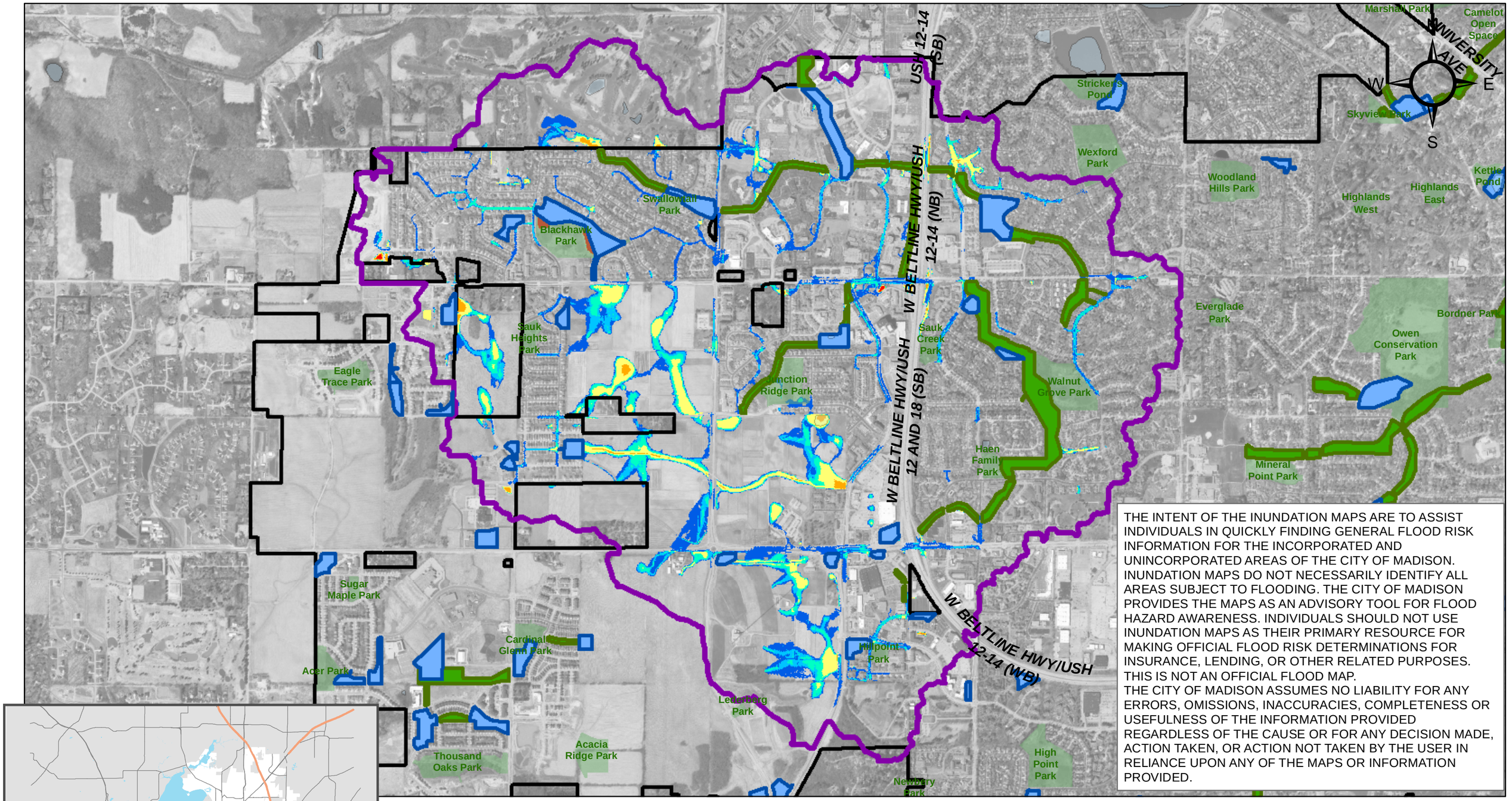


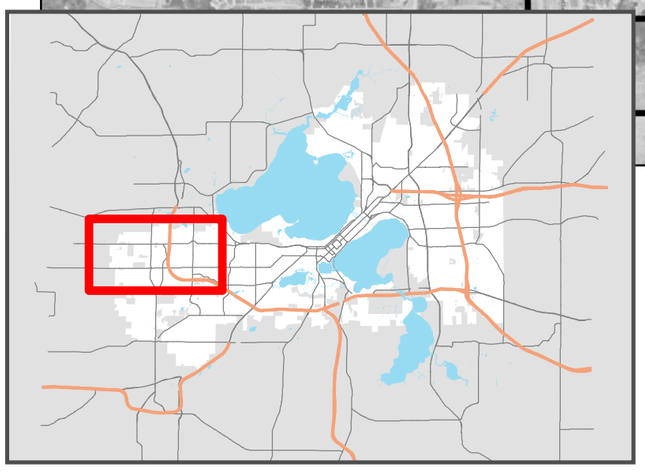
Figure 11-7
Proposed Conditions Inundation Mapping
2% Chance Event
Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_7_Proposed2PerChance.mxd
User Name: encjb



THE INTENT OF THE INUNDATION MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD RISK INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. INUNDATION MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE INUNDATION MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD RISK DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.
THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

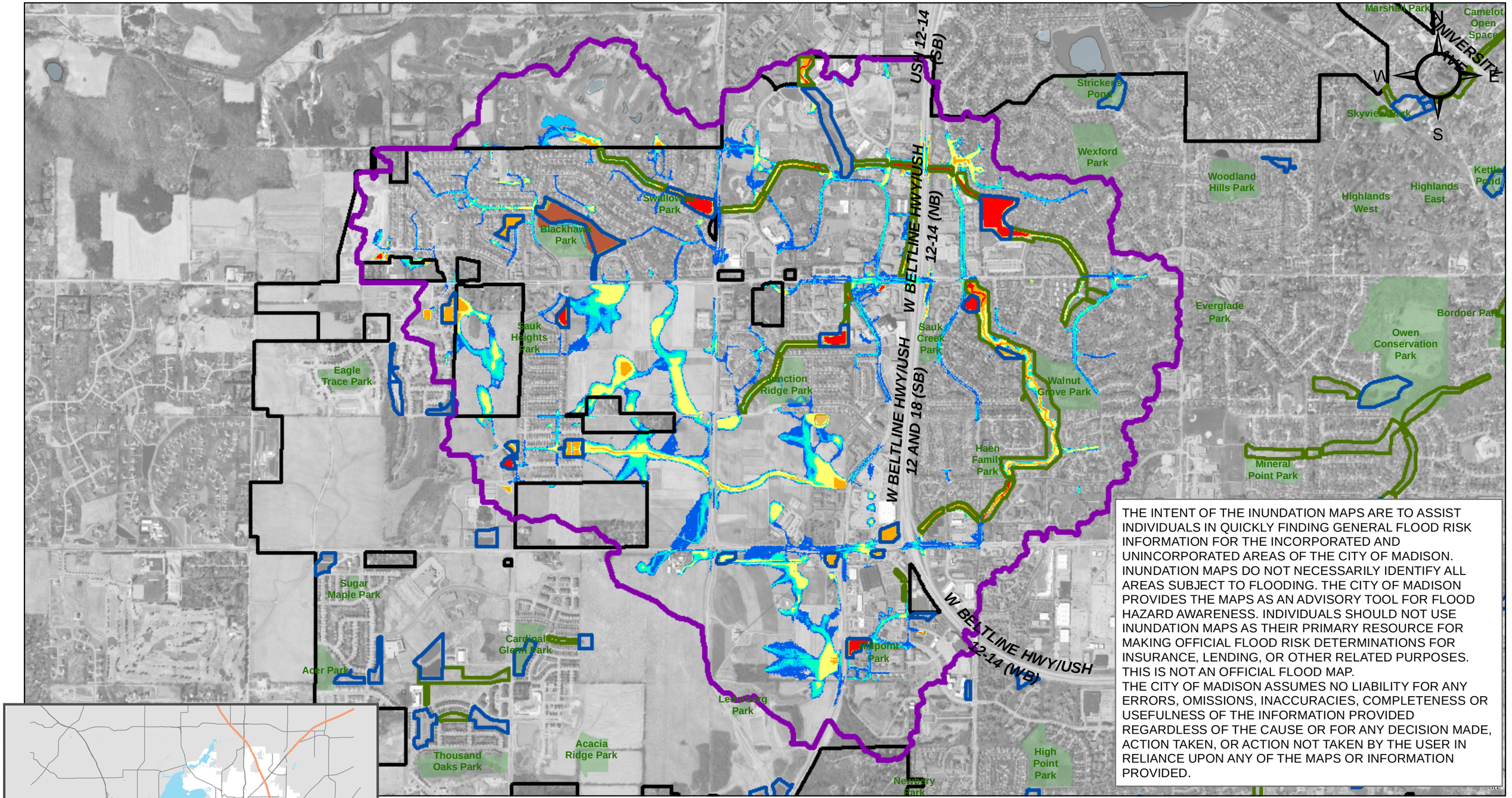
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

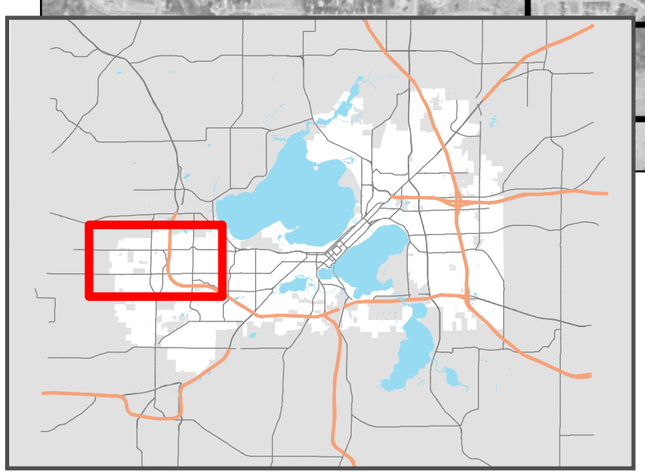
Figure 11-8
Proposed Conditions Inundation Mapping
1% Chance Event
Pheasant Branch Watershed

Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_8_Proposed1PerChance.mxd
User Name: encjb



THE INTENT OF THE INUNDATION MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD RISK INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. INUNDATION MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE INUNDATION MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD RISK DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.
THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

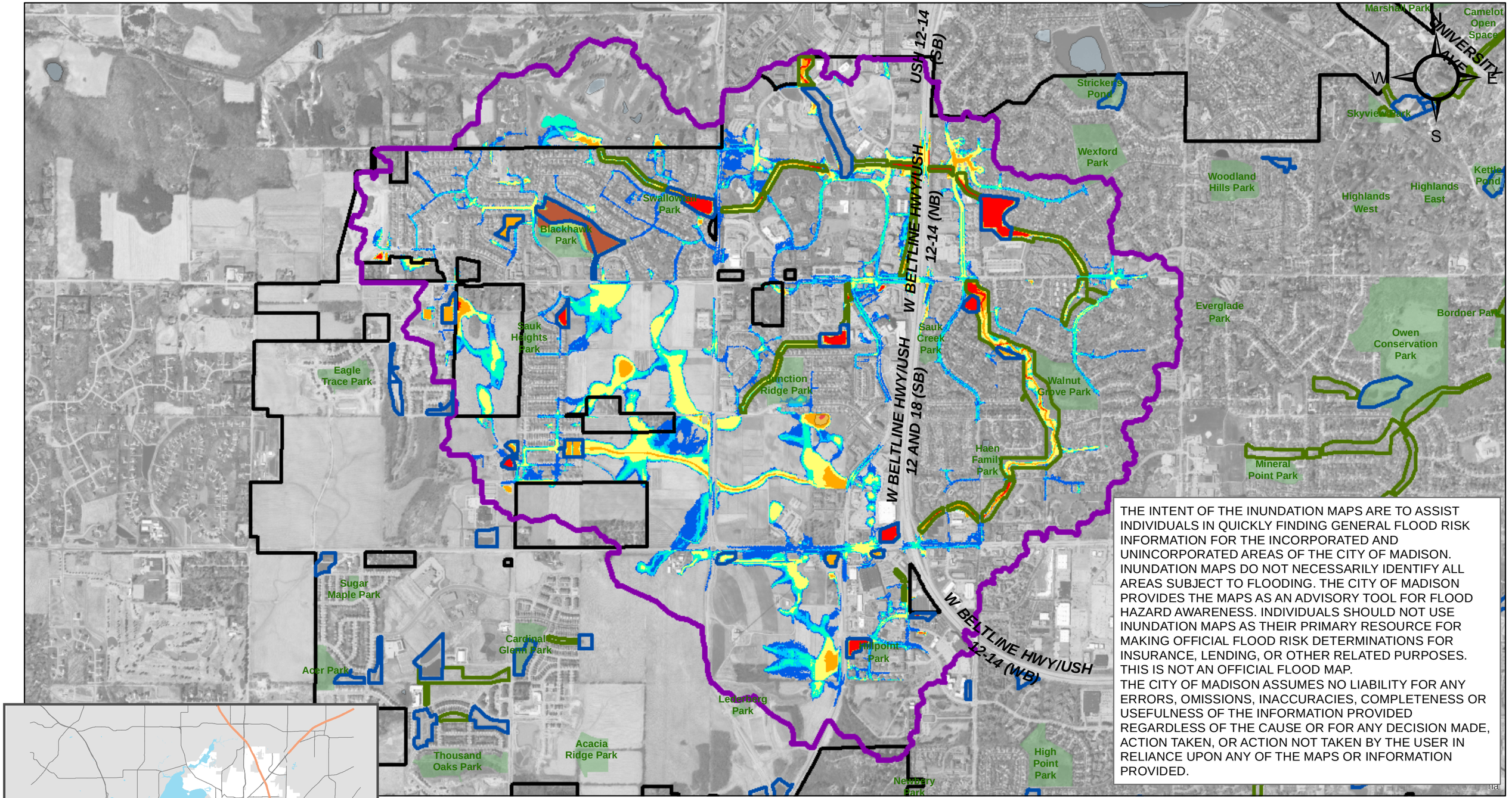
- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

Figure 11-9
Proposed Conditions Inundation Mapping
0.5% Chance Event
Pheasant Branch Watershed

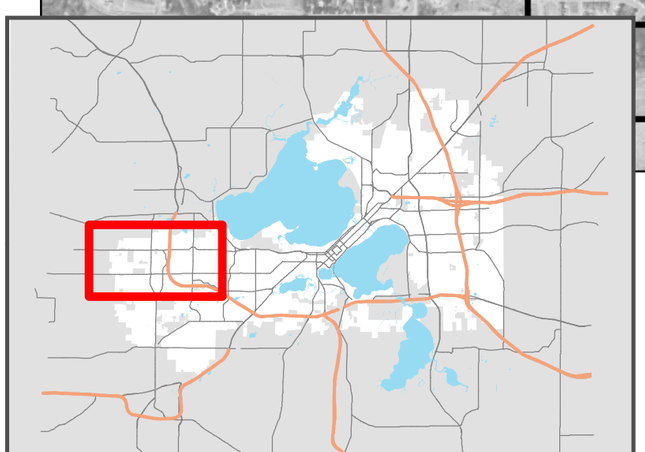
Date: 4/13/2022

Document Path: \\Gisserver\data\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_9_ProposedPoint5PerChance.mxd
User Name: encjb



THE INTENT OF THE INUNDATION MAPS ARE TO ASSIST INDIVIDUALS IN QUICKLY FINDING GENERAL FLOOD RISK INFORMATION FOR THE INCORPORATED AND UNINCORPORATED AREAS OF THE CITY OF MADISON. INUNDATION MAPS DO NOT NECESSARILY IDENTIFY ALL AREAS SUBJECT TO FLOODING. THE CITY OF MADISON PROVIDES THE MAPS AS AN ADVISORY TOOL FOR FLOOD HAZARD AWARENESS. INDIVIDUALS SHOULD NOT USE INUNDATION MAPS AS THEIR PRIMARY RESOURCE FOR MAKING OFFICIAL FLOOD RISK DETERMINATIONS FOR INSURANCE, LENDING, OR OTHER RELATED PURPOSES. THIS IS NOT AN OFFICIAL FLOOD MAP.

THE CITY OF MADISON ASSUMES NO LIABILITY FOR ANY ERRORS, OMISSIONS, INACCURACIES, COMPLETENESS OR USEFULNESS OF THE INFORMATION PROVIDED REGARDLESS OF THE CAUSE OR FOR ANY DECISION MADE, ACTION TAKEN, OR ACTION NOT TAKEN BY THE USER IN RELIANCE UPON ANY OF THE MAPS OR INFORMATION PROVIDED.



Legend

- Greenway
- Pond
- Municipal Limits
- Park
- Watershed Boundary

Maximum Depth (ft)

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1
- 1 - 3
- 3 - 6
- > 6

0 1,950 3,900 Feet

Figure 11-10
Proposed Conditions Inundation Mapping
0.2% Chance Event
Pheasant Branch Watershed

CITY OF MADISON ENGINEERING

Date: 4/13/2022

Document Path: \\Gisserver\data1\DESIGN\Projects\11981\GIS\MXDs\Figures\Figure11_10_ProposedPoint2PerChance.mxd

User Name: encjb

Appendix A. Modeling Guidance

MODELING GUIDANCE

Version 2019-12-06 (DRAFT)

Latest Draft to Round 1 and Round 2 Study Consultants

The City recognizes that an important aspect of modeling is professional judgement; and it will be up to the Consultant to appropriately define parameters, variables, and methodology. However, it is in the City's best interest to aim for relative uniformity amongst all City models. Therefore, the Consultant may be expected to justify, document, and in some instances, modify various model inputs and assumptions.

City of Madison Flood Mitigation Goals

1. No home or business will be flooded during the 100-year design storm.
2. Eliminate flooding from the storm sewer system for up to the 10-year design storm; all water shall be contained within the pipes and structures (exception: low points).
3. Allow no more than 0.5 feet of water above storm sewer inlet rim at inlet-restricted low points for up to the 10-year design storm.
4. Centerline of street to remain passable during 25-year design storm with no more than 0.2 feet of water at the centerline.
    a. Note that the Watershed Study modeling approach will not explicitly account for cross flow conditions where more gutter flow on one side of the street can overtop the crown.
5. Enclosed depressions to be served to the 100-year design storm (which can include safe overland flow within street, easements, greenways or other public lands).
6. Greenway crossings at streets to be served to the 100-year design storm.
7. Provide flooding solutions that do not negatively impact downstream properties.
8. For the purpose of the watershed studies "deficiencies" in the system shall be defined as existing infrastructure, drainage capacity or system limitations that fail to meet the goals stated in 1-7 above.

Guidance for Solutions

1. Watershed deficiencies will be reviewed, and solutions will be provided up to the 100-yr design storm.
2. In areas where flooding occurs in events exceeding the 100-year storm, those areas will not be prioritized for engineering solutions, but will be identified in existing conditions model for 500-year event storms.
3. Proposed solutions will be identified for only the publicly owned drainage system. Drainage issues that are private (water from the public infrastructure such as streets, greenways, ponds and/or easements is not the cause of the drainage issue) will not require modeling solutions but should be identified where possible in the existing conditions analysis so staff may work with property owners if necessary. (See Also Hydraulics section of Modeling Guidance for discussion on private system existing conditions modeling.)

DATA SOURCES:

In the report, document the file name and date for the following data sources:

- Land Use
- LiDAR
- Storm Sewer
- Culverts
- Greenways
- Planimetric Data
- Aerial Imagery

MODELING PARAMETERS:

Initial model parameters are the following items:

1. Model all storm sewer and culvert segments 18 inches in diameter (or equivalent) and larger, noting that the model will be required to identify all watershed deficiencies, including inlet capacity. Inclusion of smaller diameter pipes may be required to meet the goals of the model.
2. Street inlets are to be aggregated within the model to the 18-inch diameter (or equivalent) storm sewer level.
3. Incorporate existing storm water management facilities (public and private) into the model.
4. Subdivide provided outfall basins into smaller watersheds as needed in order to properly execute the model.
5. Coordinate System and Vertical Datum
    a. Horizontal Coordinate System: Wisconsin County Coordinate System – Dane Zone NAD83 (HARN).
    b. Vertical Datum: NAVD88 (pre 2007 adjustment) ft (City of Madison Datum + 845.6)
6. Naming convention
    a. Names are limited to 20 characters
    b. Subcatchments:
        i. Begin with Subcatchments naming convention provided by the City in the Outfall Basin feature class.
            1. Add a three-digit designator to the end of the name, beginning with 000
            2. As subcatchments are subdivided, increase the added designator by 1.
            3. Example: ME04-A-0014-H *(Provided by City)* → ME04-A-0014-H-MAD-C-000 *(For the original basin)* → ME04-A-0014-H-001 *(For first subdivision)*
        ii. Final outfall basin feature class file, including supporting files used to compute runoff timing and volume parameters shall be part of the deliverables provided to the City of Madison.
    c. Structures and Junctions:
        i. Node (Junction/Storage/Outfall) names for existing structures shall retain the asset identification provided by the City.
        ii. Proposed Structure names are to be determined by the Consultant but shall be given a “logical” name that reflects general location, function, or other.
        iii. For junctions that need to be added that are storm sewer tees as constructed, use the downstream manhole / structure with “_01” added in increasing order moving from downstream to upstream. For example, the first junction added for a tee upstream of MI3350-001 would be MI3350-001_01
    d. Pipes:
        i. Conduit names for existing pipes shall retain the asset identification provided by the City, except that:
            1. The first two letters (i.e AE, IN, etc) will be removed
            2. Leads with an asset ID that takes up all 20 characters can be shortened to the corresponding assigned ID. For example, 3350-032_3350-007_3350-001 can be changed to 3350-032_3350-001_01
        ii. Proposed Pipe names are to be determined by the Consultant but shall be named in a manner similar to the City pipe naming convention, which includes the upstream and downstream structure names.
    e. Channel/Street Flow Segments:
        i. Conduit names for drainage-ways shall be named in a manner that identifies the greenway segment it represents by Greenway Node Number and the distance from the upstream end. Example: GR7541-062_125 would represent a channel segment that begins 125 feet into the North Door Creek Greenway – Sprecher Road Section.
        ii. Conduit names for streets shall be named with “Rd_”[US_Node_Name]_[DS_Node_Name] and remove the first two letters in the node name similar to how pipes are named.
    f. Natural Channels:
        i. Natural channel transects shall be named with the same ID as the conduit name.

ii. Street models as natural channels shall be named in a manner that is easily identifiable for the street or street type it represents.
iii. A shapefile shall be created documenting where natural channel transects are cut.

g. Other SWMM Features (Weirs, orifices, etc)
   i. Other SWMM features shall have readily identifiable names corresponding to the type of feature they are trying to model. For example, an orifice for a detention pond should have an ID that is "<Detention Pond ID>_ORIF_01", keeping within a 20 character limit.

h. Ponds
   i.

7. Rainfall
   a. MSE4 24-hour Distribution and NOAA Atlas 14 Depths

Recurrence Interval (years)	Rainfall Depth (inches)
2	2.8
5	3.5
10	4.1
25	5.0
50	5.7
100	6.6
500	8.8

   b. Long-Duration Storm – Two 24-hour, 100-year MSE4 storm events with the time between peak rainfalls shorted from 24 hours to 12 hours.

8. Hydrology (SWMM Method with Horton Infiltration) (References: A, B, C)
   - Parameters listed are default parameters and may need to be adjusted based on calibration data.

   a. Subcatchment Detail for Street Drainage
      i. Contributing area to the existing storm sewer system that is to be modeled (Determined on a watershed by watershed basis)
      ii. Provides information that there is or is not an issue with upstream street flooding / storm sewer capacity that would be detailed out as part of a future street improvement design project.

   b. SWMM Routing Parameters (if calibration is not available to adjust parameters)
      i. Percent Impervious - Follow Step 1 (pages 1-3) of the "HowTo_CalculateCN" document.
      ii. DCIA – Reference WinSLAMM Standard Land Use DCIA Spreadsheet
      iii. Width – Estimated based on subcatchment shape. Estimation methodology shall be documented.
      A single width shall be calculated for the entire subcatchment. The single width with then be prorated based on sub area acreage for each sub area. DCIA will be prorated based on the area of the DCIA sub area compared to the total subcatchment area. The prorated width for the non-DCIA sub area and pervious sub area will be the same; it will be based on the sum of the non-DCIA plus the pervious area compared to the total subcatchment area.
      It is expected Width is one of the first calibration parameters for peak flow.
      iv. Slope – Computed manually or estimated based on LiDAR. Computation or estimation methodology shall be documented.
      v. Each subcatchment is to be split into area of (1) DCIA, (2) non-DCIA, and (3) pervious area. Within the model, the non-DCIA shall be routed to the pervious area.

   c. Horton Infiltration

i. For typical urban pervious area (Based on range of values for different soil types, moisture conditions, and vegetation conditions found in Reference A):

HSG Group[a]	Max Infil. Rate (in/hr)	Min Infil. Rate (in/hr)	Decay Rate (1/hr)	Dry Days[b]
A	4.0	1.0	4.0	3.1
B	2.0	0.5	4.0	4.4
C	1.0	0.2	4.0	7.0
D	0.5	0.1	4.0	9.9
Water	0	0	0	0

[a]For HSG listed as A/D, B/D, C/D, the default approach will be to assume the HSG associated with the lower infiltration rate (HSG D).
[b]Use equation 4-12, pg 99, SWMM Reference Manual Volume 1 – Hydrology (Revised), January 2016

ii. Impervious Manning's n – 0.016
iii. Pervious Manning's n – 0.20
iv. Depression Storage for Impervious – 0.05 inches
v. Depression Storage for Pervious – 0.15 inches
vi. Factors for adjusting
    1. Forest – Multiply max and min infiltration rates by 2.
    2. Farmland – Divide max and min infiltration rates by 2.
    3. Other land uses – see reference
vii. Area-weight the Horton Infiltration parameters for each subcatchment based on the area of each soil type within a subcatchment.
viii. It is understood the NRCS/SCS updates the soil mapping at various times. The project teams will identify a date the soils data will be downloaded and that will be the data used for the duration of the project.

Commented [BC1]: Add maximum infiltration volume in inches

9. 1D Hydraulics (References: A, B, D, E, F)
    - Dynamic mode with constant / variable timestep sufficient to model system accurately.
    - Conduit lengthening shall not be used unless prior approval from City on reason.
    - Parameters are default parameters and may need to be adjusted based on calibration data.
    - This list is not intended to be exhaustive.

    a. System to be Modeled
        i. Public
            1. Standard: 18" Pipes and Larger
            2. Process for Exceptions: Provide justification for reason that a pipe 18" and larger does not need to be modeled.
            3. Process for requiring inclusion of pipes less than 18": Necessary when they are the only pipes draining parts of the street or drainage system. For example, a 15" pipe stubbing out to a greenway from the street or a long trunk-line that is less than 18".
        ii. Private
            1. Standard: Not included
            2. Process for requiring inclusion of private pipes:
                a. Stormwater management detention facilities
                b. When necessary to understand the functioning of the public system. For example, the West Towne Mall parking lot drainage system.
        iii. All greenways and major surface drainages
        iv. All stormwater detention facilities (public and private). Private systems may be simplified if serving a single site.
        v. Street surface drainage, but not necessary to the block level unless needed to understand major overflow routes

    b. Loss Coefficients
        i. Entry

1. Culverts – Select Inlet Type based on the Help File or HEC-RAS Hydraulic Reference Manual
2. Storm Sewer (internal at MHs) = 0.1
3. Storm Drainage Structures (MH) at 45 degree bend = 0.25
4. Storm Drainage Structures (MH) at 90 degree bend = 0.5
5. For culverts and entrances to storm sewer from an open channel or pond, both the energy loss coefficient and the inlet control (culvert code) shall be used.

ii. Exit
1. Culverts –
   a. Exit closed conduit to open channel = 0.5
   b. Exit closed conduit to lake or pond = 1.0
2. Storm Sewer (internal at MHs) = 0.05
3. Storm Drainage Structures (MH) at 45 degree bend = 0.25
4. Storm Drainage Structures (MH) at 90 degree bend = 0.5

c. Coefficient of Discharge
i. Weirs
1. Sharp Crested – 3.0
2. Roadway embankment – 2.6
3. Flatter overflow – Use engineering judgment

ii. Orifices
1. 0.6

d. Manning's n
i. Pipes
1. Concrete Pipe: 0.013
2. All other n values shall be chosen within generally acceptable ranges.

ii. Channels
1. Use Chow's Open Channel Hydraulics, Reference E

iii. Bank Flow, including developed urban areas
1. Use Chow's Open Channel Hydraulics, Reference E

e. Transect Placement and Modifiers
i. Splitting long open channels
1. Changes in cross section
2. Significant changes in slope and roughness
3. Overflow points

ii. Segment Lengths
iii. Channel Geometry
iv. Provide shapefile where natural channel transects are selected along with XS Identifier

f. Tailwater Conditions:
i. Lake Mendota: one foot over Summer Maximum – 851.10
ii. Lake Wingra:

g. Inlet Clogging Factors
i. Continuous Slopes
1. Street slope < 1% - 25% Clogging
2. Street slope >= 1% - No Clogging

ii. Sags – 50% Clogging

10. 2D Data
a. Surface Roughness – The average Manning's n may vary by land cover / land use. Referencing TR-55, the following roughness shall be used:
i. Impervious areas - 0.1
ii. Turf grass areas - 0.24
iii. Wooded – 0.4
iv. Prairie – 0.15
v. Other – reference TR-55

There is not currently a city-wide impervious area layer. The consultant may choose to delineate the impervious area for the watershed.
Or, the existing data may be utilized. The following assumptions can be made using the existing land use data:

i. For non-residential parcels, impervious and pervious area is available, therefore, that shall be used.
ii. A percent impervious is available for residential parcels. Calculate a composite roughness using the percent impervious area. Remove roofs from the composite roughness calculation – reference the Dane County land use for residential roofs. (roofs will be entered as blocked obstructions)
iii. Average the roughness within the ROW based impervious and pervious area.

b. Blocked Obstructions – enter roofs as blocked obstructions
   i. Non-residential – use City impervious area data for roofs
   ii. Residential – use Dane County roof layer

11. Non-Modeling Data
    a. In the Notes field, include the sources of data

12. Scenarios
    a. Scenarios shall be set up as follows:
       a. 'Children' of the BASE scenario:
          i. EXISTING
             (grandchildren of BASE scenario, children of EXISTING)
             1. EXISTING_002_YR
             2. EXISTING_005_YR
             3. EXISTING_010_YR
             4. EXISTING_025_YR
             5. EXISTING_050_YR
             6. EXISTING_100_YR
             7. EXISTING_500_YR
             8. EXISTING_100YR_LONG_STORM
          ii. PROP_ALT1
             (grandchildren of BASE scenario, children of PROP_ALT1)
             1. PROP_ALT1_002_YR
             2. PROP_ALT1_005_YR
             3. PROP_ALT1_010_YR
             4. PROP_ALT1_025_YR
             5. PROP_ALT1_050_YR
             6. PROP_ALT1_100_YR
             7. PROP_ALT1_500_YR
             8. PROP_ALT1_100YR_LONG_STORM
          iii. PROP_ALT2
             (grandchildren of BASE scenario, children of PROP_ALT2)
             1. PROP_ALT2_002_YR
             2. PROP_ALT2_005_YR
             3. PROP_ALT2_010_YR
             4. PROP_ALT2_025_YR
             5. PROP_ALT2_050_YR
             6. PROP_ALT2_100_YR
             7. PROP_ALT2_500_YR
             8. PROP_ALT2_100YR_LONG_STORM
          iv. PROP_ALT3
             (grandchildren of BASE scenario, children of PROP_ALT3)

             1. PROP_ALT3_002_YR

Commented [BC2]: Do we know if the scenario manager works for XP-SWMM? Otherwise we can come up with a model naming convention and use global storms.

2. PROP_ALT3_005_YR
3. PROP_ALT3_010_YR
4. PROP_ALT3_025_YR
5. PROP_ALT3_050_YR
6. PROP_ALT3_100_YR
7. PROP_ALT3_500_YR
8. PROP_ALT3_100YR_LONG_STORM

b. Facility for children of the BASE scenario is defined via database queries. Facility for grandchildren of the BASE scenario are defined by inheritance.
c. Data sets for children of the BASE scenario should be BASE except where needed to define different datasets. Data sets for the grandchildren of the BASE scenario shall be defined by inheritance except for the raingage, which should be set as defined below.
    i. Data set naming convention should match the children of the BASE scenario. For example, if a different junction data set is needed for PROP_ALT2, the junction data set should be called "PROP_ALT2".
    ii. Data set naming convention for raingage sets should be based on the event used in the scenario naming convention, e.g. 002_YR, 005_YR…100YR_LONGSTORM.

REFERENCES

A. Help File
B. Storm Water Management Model version 5.1 User's Manual. (Available at: https://www.epa.gov/water-research/storm-water-management-model-swmm-version-51-users-manual)
C. SWMM reference manual volume I – hydrology (Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100NYRA.txt)
D. SWMM reference manual volume volume II – hydraulics (Available at: https://nepis.epa.gov/Exe/ZyPDF.cgi/P100S9AS.PDF?Dockey=P100S9AS.PDF)
E. Chow, Open Channel Hydraulics, 1959
F. HEC-RAS Hydraulic Reference Manual. (Available at: https://www.hec.usace.army.mil/software/hec-ras/documentation/HEC-RAS%205.0%20Reference%20Manual.pdf)

Appendix B. Hydrologic Factors

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AE1547-035	1	1	1	0.24	242.577	100	0.032	SWMM Methods 64	AE1547-035	0	AE1547-035	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1547-035	2		1	0.097	242.577	100	0.032	SWMM Methods 64	AE1547-035	1	AE1547-035	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1547-035	3		1	3.435	242.577	0	0.032	SWMM Methods 64	AE1547-035	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1549-012	1	1	1	0.615	544.748	100	0.023	SWMM Methods 64	AE1549-012	0	AE1549-012	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1549-012	2		1	0.442	544.748	100	0.023	SWMM Methods 64	AE1549-012	1	AE1549-012	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1549-012	3		1	11.385	544.748	0	0.023	SWMM Methods 64	AE1549-012	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1549-015	1	1	1	0.114	406.049	100	0.01	SWMM Methods 64	AE1549-015	0	AE1549-015	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1549-015	2		1	0.149	406.049	100	0.01	SWMM Methods 64	AE1549-015	1	AE1549-015	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1549-015	3		1	4.817	406.049	0	0.01	SWMM Methods 64	AE1549-015	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1550-029	1	1	1	0.259	80.182	100	0.024	SWMM Methods 64	AE1550-029	0	AE1550-029	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1550-029	2		1	0.032	80.182	100	0.024	SWMM Methods 64	AE1550-029	1	AE1550-029	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1550-029	3		1	0.286	80.182	0	0.024	SWMM Methods 64	AE1550-029	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1647-038	1	1	1	0.188	183.21	100	0.007	SWMM Methods 64	AE1647-038	0	AE1647-038	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1647-038	2		1	0.223	183.21	100	0.007	SWMM Methods 64	AE1647-038	1	AE1647-038	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1647-038	3		1	0.835	183.21	0	0.007	SWMM Methods 64	AE1647-038	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1652-001	1	1	1	0.111	97.041	100	0.01	SWMM Methods 64	AE1652-001	0	AE1652-001	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1652-001	3		1	0.078	97.041	0	0.01	SWMM Methods 64	AE1652-001	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1653-022	1	1	1	0.242	122.015	100	0.013	SWMM Methods 64	AE1653-022	0	AE1653-022	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1653-022	3		1	0.866	122.015	0	0.013	SWMM Methods 64	AE1653-022	0		SubCatchment 1	No Redirection	
AE1747-023	1	1	1	0.692	417.814	100	0.072	SWMM Methods 64	AE1747-023	0	AE1747-023	SubCatchment 3	No Redirection	Sauk Heights Pond
AE1747-023	2		1	0.407	417.814	100	0.072	SWMM Methods 64	AE1747-023	1	AE1747-023	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1747-023	3		1	3.153	417.814	0	0.072	SWMM Methods 64	AE1747-023	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AE1846-003	1	1	1	4.664	1682.033	100	0.025	SWMM Methods 64	AE1846-003	0	AE1846-003	SubCatchment 3	No Redirection	Swallowtail Park
AE1846-003	2		1	2.06	1682.033	100	0.025	SWMM Methods 64	AE1846-003	1	AE1846-003	SubCatchment 3	No Redirection	Swallowtail Park 18
AE1846-003	3		1	102.461	1682.033	0	0.025	SWMM Methods 64	AE1846-003	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AE1946-011	1	1	1	0.973	968.79	100	0.037	SWMM Methods 64	AE1946-011	0	AE1946-011	SubCatchment 3	No Redirection	Swallowtail Park
AE1946-011	2		1	0.332	968.79	100	0.037	SWMM Methods 64	AE1946-011	1	AE1946-011	SubCatchment 3	No Redirection	Swallowtail Park 18
AE1946-011	3		1	37.672	968.79	0	0.037	SWMM Methods 64	AE1946-011	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AE2052-041	1	1	1	0.004	178.254	100	0.06	SWMM Methods 64	AE2052-041	0	AE2052-041	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2052-041	2		1	0.004	178.254	100	0.06	SWMM Methods 64	AE2052-041	1	AE2052-041	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2052-041	3		1	1.765	178.254	0	0.06	SWMM Methods 64	AE2052-041	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AE2156-075	1	1	1	0.098	521.917	100	0.032	SWMM Methods 64	AE2156-075	0	AE2156-075	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2156-075	3		1	7.854	521.917	0	0.032	SWMM Methods 64	AE2156-075	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2156-078	1	1	1	0.294	249.832	100	0.028	SWMM Methods 64	AE2156-078	0	AE2156-078	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2156-078	3		1	2.691	249.832	0	0.028	SWMM Methods 64	AE2156-078	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2250-053	1	1	1	9.16	219.336	100	0.021	SWMM Methods 64	AE2250-053	0	AE2250-053	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2250-053	2		1	0.119	219.336	100	0.021	SWMM Methods 64	AE2250-053	1	AE2250-053	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2250-053	3		1	7.476	219.336	0	0.021	SWMM Methods 64	AE2250-053	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2250-055	1	1	1	4.475	497.733	100	0.026	SWMM Methods 64	AE2250-055	0	AE2250-055	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2250-055	3		1	3.401	497.733	0	0.026	SWMM Methods 64	AE2250-055	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2256-010	1	1	1	2.887	424.391	100	0.01	SWMM Methods 64	AE2256-010	0	AE2256-010	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2256-010	3		1	1.317	424.391	0	0.01	SWMM Methods 64	AE2256-010	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2256-083	1	1	1	2.821	514.375	100	0.026	SWMM Methods 64	AE2256-083	0	AE2256-083	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2256-083	2		1	0.008	514.375	100	0.026	SWMM Methods 64	AE2256-083	1	AE2256-083	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2256-083	3		1	2.983	514.375	0	0.026	SWMM Methods 64	AE2256-083	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2257-001	1	1	1	1.943	735.866	100	0.017	SWMM Methods 64	AE2257-001	0	AE2257-001	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2257-001	2		1	0.075	735.866	100	0.017	SWMM Methods 64	AE2257-001	1	AE2257-001	SubCatchment 3	No Redirection	UW Ag Research 2018

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AE2257-001	3		1	2.414	735.866	0	0.017	SWMM Methods 64	AE2257-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2350-026	1	1	1	0.396	111.279	100	0.027	SWMM Methods 64	AE2350-026	0	AE2350-026	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2350-026	3		1	0.477	111.279	0	0.027	SWMM Methods 64	AE2350-026	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2351-002	1	1	1	2.288	146.78	100	0.023	SWMM Methods 64	AE2351-002	0	AE2351-002	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2351-002	2		1	0.082	146.78	100	0.023	SWMM Methods 64	AE2351-002	1	AE2351-002	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2351-002	3		1	5.17	146.78	0	0.023	SWMM Methods 64	AE2351-002	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2449-003	1	1	1	2.493	942.107	100	0.061	SWMM Methods 64	AE2449-003	0	AE2449-003	SubCatchment 3	No Redirection	Strickers Pond Foreb
AE2449-003	2		1	0.395	942.107	100	0.061	SWMM Methods 64	AE2449-003	1	AE2449-003	SubCatchment 3	No Redirection	Strickers Forebay 18
AE2449-003	3		1	7.231	942.107	0	0.061	SWMM Methods 64	AE2449-003	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AE2450-022	1	1	1	5.227	750.194	100	0.017	SWMM Methods 64	AE2450-022	0	AE2450-022	SubCatchment 3	No Redirection	Strickers Pond Foreb
AE2450-022	2		1	0.104	750.194	100	0.017	SWMM Methods 64	AE2450-022	1	AE2450-022	SubCatchment 3	No Redirection	Strickers Forebay 18
AE2450-022	3		1	4.201	750.194	0	0.017	SWMM Methods 64	AE2450-022	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AE2452-014	1	1	1	1.31	1749.984	100	0.031	SWMM Methods 64	AE2452-014	0	AE2452-014	SubCatchment 3	No Redirection	Memorial High School
AE2452-014	2		1	0.93	1749.984	100	0.031	SWMM Methods 64	AE2452-014	1	AE2452-014	SubCatchment 3	No Redirection	Memorial HS 2018
AE2452-014	3		1	18.54	1749.984	0	0.031	SWMM Methods 64	AE2452-014	0		SubCatchment 3	No Redirection	Memorial HS 2018
AE2454-006	1	1	1	1.755	1699.62	100	0.061	SWMM Methods 64	AE2454-006	0	AE2454-006	SubCatchment 3	No Redirection	Memorial High School
AE2454-006	2		1	0.426	1699.62	100	0.061	SWMM Methods 64	AE2454-006	1	AE2454-006	SubCatchment 3	No Redirection	Memorial HS 2018
AE2454-006	3		1	11.207	1699.62	0	0.061	SWMM Methods 64	AE2454-006	0		SubCatchment 3	No Redirection	Memorial HS 2018
AE2553-003	1	1	1	4.531	838.458	100	0.036	SWMM Methods 64	AE2553-003	0	AE2553-003	SubCatchment 3	No Redirection	Memorial High School
AE2553-003	2		1	0.391	838.458	100	0.036	SWMM Methods 64	AE2553-003	1	AE2553-003	SubCatchment 3	No Redirection	Memorial HS 2018
AE2553-003	3		1	6.695	838.458	0	0.036	SWMM Methods 64	AE2553-003	0		SubCatchment 3	No Redirection	Memorial HS 2018
AS1547-003	1	1	1	0.686	836.031	100	0.03	SWMM Methods 64	AS1547-003	0	AS1547-003	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1547-003	2		1	0.209	836.031	100	0.03	SWMM Methods 64	AS1547-003	1	AS1547-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1547-003	3		1	1.232	836.031	0	0.03	SWMM Methods 64	AS1547-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1547-029	1	1	1	1.02	303.346	100	0.059	SWMM Methods 64	AS1547-029	0	AS1547-029	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1547-029	2		1	0.31	303.346	100	0.059	SWMM Methods 64	AS1547-029	1	AS1547-029	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1547-029	3		1	1.655	303.346	0	0.059	SWMM Methods 64	AS1547-029	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1548-014	1	1	1	1.112	393.432	100	0.032	SWMM Methods 64	AS1548-014	0	AS1548-014	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1548-014	2		1	0.483	393.432	100	0.032	SWMM Methods 64	AS1548-014	1	AS1548-014	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1548-014	3		1	2.463	393.432	0	0.032	SWMM Methods 64	AS1548-014	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1548-031	1	1	1	1.795	811.713	100	0.03	SWMM Methods 64	AS1548-031	0	AS1548-031	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1548-031	2		1	0.942	811.713	100	0.03	SWMM Methods 64	AS1548-031	1	AS1548-031	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1548-031	3		1	4.574	811.713	0	0.03	SWMM Methods 64	AS1548-031	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1548-039	1	1	1	0.855	275.83	100	0.045	SWMM Methods 64	AS1548-039	0	AS1548-039	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1548-039	2		1	0.245	275.83	100	0.045	SWMM Methods 64	AS1548-039	1	AS1548-039	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1548-039	3		1	1.169	275.83	0	0.045	SWMM Methods 64	AS1548-039	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1549-002	1	1	1	0.777	317.658	100	0.027	SWMM Methods 64	AS1549-002	0	AS1549-002	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1549-002	2		1	0.273	317.658	100	0.027	SWMM Methods 64	AS1549-002	1	AS1549-002	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1549-002	3		1	1.565	317.658	0	0.027	SWMM Methods 64	AS1549-002	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1549-034	1	1	1	0.677	128.962	100	0.005	SWMM Methods 64	AS1549-034	0	AS1549-034	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1549-034	2		1	0.077	128.962	100	0.005	SWMM Methods 64	AS1549-034	1	AS1549-034	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1549-034	3		1	0.944	128.962	0	0.005	SWMM Methods 64	AS1549-034	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1549-042	1	1	1	1.247	710.514	100	0.033	SWMM Methods 64	AS1549-042	0	AS1549-042	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1549-042	2		1	0.682	710.514	100	0.033	SWMM Methods 64	AS1549-042	1	AS1549-042	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1549-042	3		1	8.039	710.514	0	0.033	SWMM Methods 64	AS1549-042	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-018	1	1	1	0.81	301.646	100	0.022	SWMM Methods 64	AS1647-018	0	AS1647-018	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1647-018	2		1	0.27	301.646	100	0.022	SWMM Methods 64	AS1647-018	1	AS1647-018	SubCatchment 3	No Redirection	Sauk Heights Pond 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS1647-018	3		1	1.46	301.646	0	0.022	SWMM Methods 64	AS1647-018	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-027	1	1	1	1.32	1325.052	100	0.029	SWMM Methods 64	AS1647-027	0	AS1647-027	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1647-027	2		1	0.489	1325.052	100	0.029	SWMM Methods 64	AS1647-027	1	AS1647-027	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-027	3		1	2.37	1325.052	0	0.029	SWMM Methods 64	AS1647-027	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-048	1	1	1	0.413	327.853	100	0.03	SWMM Methods 64	AS1647-048	0	AS1647-048	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1647-048	2		1	0.159	327.853	100	0.03	SWMM Methods 64	AS1647-048	1	AS1647-048	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-048	3		1	0.936	327.853	0	0.03	SWMM Methods 64	AS1647-048	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-052	1	1	1	0.647	424.342	100	0.033	SWMM Methods 64	AS1647-052	0	AS1647-052	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1647-052	2		1	0.208	424.342	100	0.033	SWMM Methods 64	AS1647-052	1	AS1647-052	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1647-052	3		1	1.18	424.342	0	0.033	SWMM Methods 64	AS1647-052	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-006	1	1	1	0.662	236.613	100	0.074	SWMM Methods 64	AS1648-006	0	AS1648-006	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1648-006	2		1	0.243	236.613	100	0.074	SWMM Methods 64	AS1648-006	1	AS1648-006	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-006	3		1	1.339	236.613	0	0.074	SWMM Methods 64	AS1648-006	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-014	1	1	1	0.544	335.883	100	0.028	SWMM Methods 64	AS1648-014	0	AS1648-014	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1648-014	2		1	0.151	335.883	100	0.028	SWMM Methods 64	AS1648-014	1	AS1648-014	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-014	3		1	0.935	335.883	0	0.028	SWMM Methods 64	AS1648-014	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-022	1	1	1	1.964	707.151	100	0.022	SWMM Methods 64	AS1648-022	0	AS1648-022	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1648-022	2		1	0.979	707.151	100	0.022	SWMM Methods 64	AS1648-022	1	AS1648-022	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-022	3		1	4.532	707.151	0	0.022	SWMM Methods 64	AS1648-022	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-043	1	1	1	0.688	390.3	100	0.021	SWMM Methods 64	AS1648-043	0	AS1648-043	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1648-043	2		1	0.263	390.3	100	0.021	SWMM Methods 64	AS1648-043	1	AS1648-043	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1648-043	3		1	1.675	390.3	0	0.021	SWMM Methods 64	AS1648-043	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1747-002	1	1	1	0.665	232.989	100	0.062	SWMM Methods 64	AS1747-002	0	AS1747-002	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1747-002	2		1	0.112	232.989	100	0.062	SWMM Methods 64	AS1747-002	1	AS1747-002	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1747-002	3		1	0.722	232.989	0	0.062	SWMM Methods 64	AS1747-002	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1747-010	1	1	1	1.323	247.655	100	0.007	SWMM Methods 64	AS1747-010	0	AS1747-010	SubCatchment 3	No Redirection	Swallowtail Park
AS1747-010	2		1	0.383	247.655	100	0.007	SWMM Methods 64	AS1747-010	1	AS1747-010	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1747-010	3		1	2.125	247.655	0	0.007	SWMM Methods 64	AS1747-010	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1748-011	1	1	1	0.452	483.37	100	0.019	SWMM Methods 64	AS1748-011	0	AS1748-011	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1748-011	2		1	0.113	483.37	100	0.019	SWMM Methods 64	AS1748-011	1	AS1748-011	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1748-011	3		1	0.796	483.37	0	0.019	SWMM Methods 64	AS1748-011	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1748-024	1	1	1	0.86	363.148	100	0.015	SWMM Methods 64	AS1748-024	0	AS1748-024	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1748-024	2		1	0.217	363.148	100	0.015	SWMM Methods 64	AS1748-024	1	AS1748-024	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1748-024	3		1	1.825	363.148	0	0.015	SWMM Methods 64	AS1748-024	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1750-024	1	1	1	1.018	424.577	100	0.019	SWMM Methods 64	AS1750-024	0	AS1750-024	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1750-024	2		1	0.022	424.577	100	0.019	SWMM Methods 64	AS1750-024	1	AS1750-024	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1750-024	3		1	0.997	424.577	0	0.019	SWMM Methods 64	AS1750-024	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1753-005	1	1	1	0.846	1016.012	100	0.019	SWMM Methods 64	AS1753-005	0	AS1753-005	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1753-005	2		1	1.001	1016.012	100	0.019	SWMM Methods 64	AS1753-005	1	AS1753-005	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1753-005	3		1	5.309	1016.012	0	0.019	SWMM Methods 64	AS1753-005	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1754-010	1	1	1	0.494	254.518	100	0.033	SWMM Methods 64	AS1754-010	0	AS1754-010	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1754-010	2		1	0.572	254.518	100	0.033	SWMM Methods 64	AS1754-010	1	AS1754-010	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1754-010	3		1	2.633	254.518	0	0.033	SWMM Methods 64	AS1754-010	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1754-028	1	1	1	0.243	407.194	100	0.049	SWMM Methods 64	AS1754-028	0	AS1754-028	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1754-028	2		1	0.192	407.194	100	0.049	SWMM Methods 64	AS1754-028	1	AS1754-028	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1754-028	3		1	7.68	407.194	0	0.049	SWMM Methods 64	AS1754-028	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1847-009	1	1	1	1.422	330.317	100	0.048	SWMM Methods 64	AS1847-009	0	AS1847-009	SubCatchment 3	No Redirection	Swallowtail Park

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS1847-009	2		1	0.601	330.317	100	0.048	SWMM Methods 64	AS1847-009	1	AS1847-009	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1847-009	3		1	3.324	330.317	0	0.048	SWMM Methods 64	AS1847-009	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1848-003	1	1	1	0.432	148.268	100	0.047	SWMM Methods 64	AS1848-003	0	AS1848-003	SubCatchment 3	No Redirection	Swallowtail Park
AS1848-003	2		1	0.096	148.268	100	0.047	SWMM Methods 64	AS1848-003	1	AS1848-003	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1848-003	3		1	0.648	148.268	0	0.047	SWMM Methods 64	AS1848-003	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1848-018	1	1	1	2.601	357.914	100	0.021	SWMM Methods 64	AS1848-018	0	AS1848-018	SubCatchment 3	No Redirection	Swallowtail Park
AS1848-018	2		1	0.946	357.914	100	0.021	SWMM Methods 64	AS1848-018	1	AS1848-018	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1848-018	3		1	5.616	357.914	0	0.021	SWMM Methods 64	AS1848-018	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1848-027	1	1	1	2.646	614.536	100	0.019	SWMM Methods 64	AS1848-027	0	AS1848-027	SubCatchment 3	No Redirection	Swallowtail Park
AS1848-027	2		1	1.21	614.536	100	0.019	SWMM Methods 64	AS1848-027	1	AS1848-027	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1848-027	3		1	6.739	614.536	0	0.019	SWMM Methods 64	AS1848-027	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1849-009	1	1	1	1.054	559.704	100	0.041	SWMM Methods 64	AS1849-009	0	AS1849-009	SubCatchment 3	No Redirection	Swallowtail Park
AS1849-009	2		1	0.36	559.704	100	0.041	SWMM Methods 64	AS1849-009	1	AS1849-009	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1849-009	3		1	2.273	559.704	0	0.041	SWMM Methods 64	AS1849-009	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1849-026	1	1	1	1.679	442.132	100	0.02	SWMM Methods 64	AS1849-026	0	AS1849-026	SubCatchment 3	No Redirection	Swallowtail Park
AS1849-026	2		1	0.188	442.132	100	0.02	SWMM Methods 64	AS1849-026	1	AS1849-026	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1849-026	3		1	2.023	442.132	0	0.02	SWMM Methods 64	AS1849-026	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1849-053	1	1	1	4.025	718.806	100	0.019	SWMM Methods 64	AS1849-053	0	AS1849-053	SubCatchment 3	No Redirection	Sauk Heights Pond
AS1849-053	2		1	0.07	718.806	100	0.019	SWMM Methods 64	AS1849-053	1	AS1849-053	SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1849-053	3		1	2.353	718.806	0	0.019	SWMM Methods 64	AS1849-053	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
AS1946-004	1	1	1	4.391	466.577	100	0.042	SWMM Methods 64	AS1946-004	0	AS1946-004	SubCatchment 3	No Redirection	Swallowtail Park
AS1946-004	2		1	0.412	466.577	100	0.042	SWMM Methods 64	AS1946-004	1	AS1946-004	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1946-004	3		1	9.122	466.577	0	0.042	SWMM Methods 64	AS1946-004	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1947-009	1	1	1	0.473	63.215	100	0.027	SWMM Methods 64	AS1947-009	0	AS1947-009	SubCatchment 3	No Redirection	Swallowtail Park
AS1947-009	2		1	0.013	63.215	100	0.027	SWMM Methods 64	AS1947-009	1	AS1947-009	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1947-009	3		1	0.659	63.215	0	0.027	SWMM Methods 64	AS1947-009	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1948-004	1	1	1	1.185	571.287	100	0.039	SWMM Methods 64	AS1948-004	0	AS1948-004	SubCatchment 3	No Redirection	Swallowtail Park
AS1948-004	2		1	0.624	571.287	100	0.039	SWMM Methods 64	AS1948-004	1	AS1948-004	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1948-004	3		1	3.895	571.287	0	0.039	SWMM Methods 64	AS1948-004	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1948-017	1	1	1	1.252	360.841	100	0.085	SWMM Methods 64	AS1948-017	0	AS1948-017	SubCatchment 3	No Redirection	Swallowtail Park
AS1948-017	2		1	0.431	360.841	100	0.085	SWMM Methods 64	AS1948-017	1	AS1948-017	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1948-017	3		1	2.777	360.841	0	0.085	SWMM Methods 64	AS1948-017	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1949-007	1	1	1	2.881	575.906	100	0.055	SWMM Methods 64	AS1949-007	0	AS1949-007	SubCatchment 3	No Redirection	Swallowtail Park
AS1949-007	2		1	1.39	575.906	100	0.055	SWMM Methods 64	AS1949-007	1	AS1949-007	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1949-007	3		1	9.726	575.906	0	0.055	SWMM Methods 64	AS1949-007	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1949-032	1	1	1	1.437	269.246	100	0.012	SWMM Methods 64	AS1949-032	0	AS1949-032	SubCatchment 3	No Redirection	Swallowtail Park
AS1949-032	2		1	0.186	269.246	100	0.012	SWMM Methods 64	AS1949-032	1	AS1949-032	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1949-032	3		1	2.169	269.246	0	0.012	SWMM Methods 64	AS1949-032	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1951-005	1	1	1	1.926	423.426	100	0.013	SWMM Methods 64	AS1951-005	0	AS1951-005	SubCatchment 3	No Redirection	Swallowtail Park
AS1951-005	2		1	0.974	423.426	100	0.013	SWMM Methods 64	AS1951-005	1	AS1951-005	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1951-005	3		1	8.122	423.426	0	0.013	SWMM Methods 64	AS1951-005	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2045-006	1	1	1	5.452	468.558	100	0.032	SWMM Methods 64	AS2045-006	0	AS2045-006	SubCatchment 3	No Redirection	Swallowtail Park
AS2045-006	2		1	0.79	468.558	100	0.032	SWMM Methods 64	AS2045-006	1	AS2045-006	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2045-006	3		1	6.49	468.558	0	0.032	SWMM Methods 64	AS2045-006	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2046-011	1	1	1	6.758	499.497	100	0.032	SWMM Methods 64	AS2046-011	0	AS2046-011	SubCatchment 3	No Redirection	Swallowtail Park
AS2046-011	2		1	0.378	499.497	100	0.032	SWMM Methods 64	AS2046-011	1	AS2046-011	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2046-011	3		1	4.806	499.497	0	0.032	SWMM Methods 64	AS2046-011	0		SubCatchment 3	No Redirection	Swallowtail Park 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2047-006	1	1	1	2.949	707.258	100	0.051	SWMM Methods 64	AS2047-006	0	AS2047-006	SubCatchment 3	No Redirection	Swallowtail Park
AS2047-006	2		1	0.019	707.258	100	0.051	SWMM Methods 64	AS2047-006	1	AS2047-006	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2047-006	3		1	3.058	707.258	0	0.051	SWMM Methods 64	AS2047-006	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2048-010	1	1	1	6.357	1069.009	100	0.029	SWMM Methods 64	AS2048-010	0	AS2048-010	SubCatchment 3	No Redirection	Swallowtail Park
AS2048-010	2		1	0.043	1069.009	100	0.029	SWMM Methods 64	AS2048-010	1	AS2048-010	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2048-010	3		1	3.879	1069.009	0	0.029	SWMM Methods 64	AS2048-010	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2049-002	1	1	1	7.95	755.235	100	0.057	SWMM Methods 64	AS2049-002	0	AS2049-002	SubCatchment 3	No Redirection	Swallowtail Park
AS2049-002	2		1	0.123	755.235	100	0.057	SWMM Methods 64	AS2049-002	1	AS2049-002	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2049-002	3		1	14.29	755.235	0	0.057	SWMM Methods 64	AS2049-002	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2049-005	1	1	1	0.582	194.077	100	0.053	SWMM Methods 64	AS2049-005	0	AS2049-005	SubCatchment 3	No Redirection	Swallowtail Park
AS2049-005	2		1	0.006	194.077	100	0.053	SWMM Methods 64	AS2049-005	1	AS2049-005	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2049-005	3		1	0.37	194.077	0	0.053	SWMM Methods 64	AS2049-005	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2050-012	1	1	1	2.316	651.346	100	0.088	SWMM Methods 64	AS2050-012	0	AS2050-012	SubCatchment 3	No Redirection	Swallowtail Park
AS2050-012	2		1	0.291	651.346	100	0.088	SWMM Methods 64	AS2050-012	1	AS2050-012	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2050-012	3		1	6.139	651.346	0	0.088	SWMM Methods 64	AS2050-012	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2050-024	1	1	1	1.521	201.89	100	0.019	SWMM Methods 64	AS2050-024	0	AS2050-024	SubCatchment 3	No Redirection	Swallowtail Park
AS2050-024	2		1	0.027	201.89	100	0.019	SWMM Methods 64	AS2050-024	1	AS2050-024	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2050-024	3		1	0.949	201.89	0	0.019	SWMM Methods 64	AS2050-024	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2051-023	1	1	1	1.875	470.706	100	0.03	SWMM Methods 64	AS2051-023	0	AS2051-023	SubCatchment 3	No Redirection	Swallowtail Park
AS2051-023	2		1	0.752	470.706	100	0.03	SWMM Methods 64	AS2051-023	1	AS2051-023	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2051-023	3		1	2.628	470.706	0	0.03	SWMM Methods 64	AS2051-023	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2051-041	1	1	1	0.541	183.275	100	0.007	SWMM Methods 64	AS2051-041	0	AS2051-041	SubCatchment 3	No Redirection	Swallowtail Park
AS2051-041	2		1	0.092	183.275	100	0.007	SWMM Methods 64	AS2051-041	1	AS2051-041	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2051-041	3		1	0.261	183.275	0	0.007	SWMM Methods 64	AS2051-041	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2051-051	1	1	1	1.541	746.898	100	0.011	SWMM Methods 64	AS2051-051	0	AS2051-051	SubCatchment 3	No Redirection	Swallowtail Park
AS2051-051	2		1	0.363	746.898	100	0.011	SWMM Methods 64	AS2051-051	1	AS2051-051	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2051-051	3		1	2.103	746.898	0	0.011	SWMM Methods 64	AS2051-051	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2145-001	1	1	1	5.754	571.1	100	0.021	SWMM Methods 64	AS2145-001	0	AS2145-001	SubCatchment 3	No Redirection	Swallowtail Park
AS2145-001	2		1	0.969	571.1	100	0.021	SWMM Methods 64	AS2145-001	1	AS2145-001	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2145-001	3		1	6.155	571.1	0	0.021	SWMM Methods 64	AS2145-001	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2147-001	1	1	1	9.768	1503.883	100	0.024	SWMM Methods 64	AS2147-001	0	AS2147-001	SubCatchment 3	No Redirection	Swallowtail Park
AS2147-001	2		1	0.161	1503.883	100	0.024	SWMM Methods 64	AS2147-001	1	AS2147-001	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2147-001	3		1	7.911	1503.883	0	0.024	SWMM Methods 64	AS2147-001	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2148-007	1	1	1	7.44	1035.736	100	0.04	SWMM Methods 64	AS2148-007	0	AS2148-007	SubCatchment 3	No Redirection	Swallowtail Park
AS2148-007	2		1	0.067	1035.736	100	0.04	SWMM Methods 64	AS2148-007	1	AS2148-007	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2148-007	3		1	12.359	1035.736	0	0.04	SWMM Methods 64	AS2148-007	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2150-012	1	1	1	5.716	399.036	100	0.023	SWMM Methods 64	AS2150-012	0	AS2150-012	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2150-012	2		1	0.925	399.036	100	0.023	SWMM Methods 64	AS2150-012	1	AS2150-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2150-012	3		1	4.796	399.036	0	0.023	SWMM Methods 64	AS2150-012	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2150-014	1	1	1	2.175	603.819	100	0.015	SWMM Methods 64	AS2150-014	0	AS2150-014	SubCatchment 3	No Redirection	Swallowtail Park
AS2150-014	2		1	0.222	603.819	100	0.015	SWMM Methods 64	AS2150-014	1	AS2150-014	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2150-014	3		1	2.033	603.819	0	0.015	SWMM Methods 64	AS2150-014	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2150-027	1	1	1	0.724	143.323	100	0.029	SWMM Methods 64	AS2150-027	0	AS2150-027	SubCatchment 3	No Redirection	Swallowtail Park
AS2150-027	2		1	0.018	143.323	100	0.029	SWMM Methods 64	AS2150-027	1	AS2150-027	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2150-027	3		1	0.592	143.323	0	0.029	SWMM Methods 64	AS2150-027	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2150-032	1	1	1	2.03	297.832	100	0.035	SWMM Methods 64	AS2150-032	0	AS2150-032	SubCatchment 3	No Redirection	Swallowtail Park
AS2150-032	2		1	0.158	297.832	100	0.035	SWMM Methods 64	AS2150-032	1	AS2150-032	SubCatchment 3	No Redirection	Swallowtail Park 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2150-032	3		1	2.31	297.832	0	0.035	SWMM Methods 64	AS2150-032	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2151-004	1	1	1	0.812	244.076	100	0.01	SWMM Methods 64	AS2151-004	0	AS2151-004	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2151-004	2		1	0.206	244.076	100	0.01	SWMM Methods 64	AS2151-004	1	AS2151-004	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2151-004	3		1	1.33	244.076	0	0.01	SWMM Methods 64	AS2151-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2151-009	1	1	1	0.512	356.703	100	0.036	SWMM Methods 64	AS2151-009	0	AS2151-009	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2151-009	2		1	0.214	356.703	100	0.036	SWMM Methods 64	AS2151-009	1	AS2151-009	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2151-009	3		1	1.22	356.703	0	0.036	SWMM Methods 64	AS2151-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-005	1	1	1	1.16	145.052	100	0.029	SWMM Methods 64	AS2152-005	0	AS2152-005	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2152-005	2		1	0.037	145.052	100	0.029	SWMM Methods 64	AS2152-005	1	AS2152-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-005	3		1	1.388	145.052	0	0.029	SWMM Methods 64	AS2152-005	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AS2152-010	1	1	1	0.393	166.118	100	0.013	SWMM Methods 64	AS2152-010	0	AS2152-010	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2152-010	2		1	0.212	166.118	100	0.013	SWMM Methods 64	AS2152-010	1	AS2152-010	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-010	3		1	1.184	166.118	0	0.013	SWMM Methods 64	AS2152-010	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-022	1	1	1	1.566	393.904	100	0.017	SWMM Methods 64	AS2152-022	0	AS2152-022	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2152-022	2		1	0.628	393.904	100	0.017	SWMM Methods 64	AS2152-022	1	AS2152-022	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-022	3		1	3.475	393.904	0	0.017	SWMM Methods 64	AS2152-022	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AS2155-011	1	1	1	3.014	384.855	100	0.02	SWMM Methods 64	AS2155-011	0	AS2155-011	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2155-011	3		1	3.609	384.855	0	0.02	SWMM Methods 64	AS2155-011	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-017	1	1	1	0.846	177.75	100	0.041	SWMM Methods 64	AS2156-017	0	AS2156-017	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2156-017	2		1	0.004	177.75	100	0.041	SWMM Methods 64	AS2156-017	1	AS2156-017	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-017	3		1	0.824	177.75	0	0.041	SWMM Methods 64	AS2156-017	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-020	1	1	1	1.737	214.306	100	0.028	SWMM Methods 64	AS2156-020	0	AS2156-020	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2156-020	3		1	1.426	214.306	0	0.028	SWMM Methods 64	AS2156-020	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-028	1	1	1	1.086	145.764	100	0.01	SWMM Methods 64	AS2156-028	0	AS2156-028	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2156-028	3		1	0.06	145.764	0	0.01	SWMM Methods 64	AS2156-028	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-036	1	1	1	1.379	335.515	100	0.021	SWMM Methods 64	AS2156-036	0	AS2156-036	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2156-036	3		1	0.308	335.515	0	0.021	SWMM Methods 64	AS2156-036	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2245-005	1	1	1	16.338	1221.809	100	0.02	SWMM Methods 64	AS2245-005	0	AS2245-005	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2245-005	2		1	1.804	1221.809	100	0.02	SWMM Methods 64	AS2245-005	1	AS2245-005	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2245-005	3		1	15.887	1221.809	0	0.02	SWMM Methods 64	AS2245-005	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2247-001	1	1	1	12.241	1211.903	100	0.017	SWMM Methods 64	AS2247-001	0	AS2247-001	SubCatchment 3	No Redirection	Swallowtail Park
AS2247-001	2		1	0.194	1211.903	100	0.017	SWMM Methods 64	AS2247-001	1	AS2247-001	SubCatchment 3	No Redirection	Swallowtail Park 18
AS2247-001	3		1	14.885	1211.903	0	0.017	SWMM Methods 64	AS2247-001	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS2249-005	1	1	1	0.682	227.761	100	0.019	SWMM Methods 64	AS2249-005	0	AS2249-005	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2249-005	2		1	0.058	227.761	100	0.019	SWMM Methods 64	AS2249-005	1	AS2249-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2249-005	3		1	0.524	227.761	0	0.019	SWMM Methods 64	AS2249-005	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-016	1	1	1	1.064	217.68	100	0.017	SWMM Methods 64	AS2250-016	0	AS2250-016	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2250-016	2		1	0.007	217.68	100	0.017	SWMM Methods 64	AS2250-016	1	AS2250-016	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-016	3		1	0.588	217.68	0	0.017	SWMM Methods 64	AS2250-016	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-019	1	1	1	1.606	235.466	100	0.024	SWMM Methods 64	AS2250-019	0	AS2250-019	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2250-019	2		1	0.015	235.466	100	0.024	SWMM Methods 64	AS2250-019	1	AS2250-019	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-019	3		1	1.024	235.466	0	0.024	SWMM Methods 64	AS2250-019	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-038	1	1	1	5.629	826.3	100	0.02	SWMM Methods 64	AS2250-038	0	AS2250-038	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2250-038	2		1	0.108	826.3	100	0.02	SWMM Methods 64	AS2250-038	1	AS2250-038	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-038	3		1	0.894	826.3	0	0.02	SWMM Methods 64	AS2250-038	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2251-008	1	1	1	7.995	1474.956	100	0.031	SWMM Methods 64	AS2251-008	0	AS2251-008	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2251-008	2		1	0.816	1474.956	100	0.031	SWMM Methods 64	AS2251-008	1	AS2251-008	SubCatchment 3	No Redirection	UW Ag Research 2018

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2251-008	3		1	6.277	1474.956	0	0.031	SWMM Methods 64	AS2251-008	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2251-018	1	1	1	4.806	810.73	100	0.028	SWMM Methods 64	AS2251-018	0	AS2251-018	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2251-018	2		1	1.292	810.73	100	0.028	SWMM Methods 64	AS2251-018	1	AS2251-018	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2251-018	3		1	8.336	810.73	0	0.028	SWMM Methods 64	AS2251-018	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2252-008	1	1	1	4.523	428.376	100	0.015	SWMM Methods 64	AS2252-008	0	AS2252-008	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2252-008	2		1	0.149	428.376	100	0.015	SWMM Methods 64	AS2252-008	1	AS2252-008	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2252-008	3		1	2.154	428.376	0	0.015	SWMM Methods 64	AS2252-008	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2253-012	1	1	1	4.866	348.296	100	0.006	SWMM Methods 64	AS2253-012	0	AS2253-012	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2253-012	2		1	0.009	348.296	100	0.006	SWMM Methods 64	AS2253-012	1	AS2253-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2253-012	3		1	2.405	348.296	0	0.006	SWMM Methods 64	AS2253-012	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2254-005	1	1	1	6.985	658.765	100	0.005	SWMM Methods 64	AS2254-005	0	AS2254-005	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2254-005	2		1	0.192	658.765	100	0.005	SWMM Methods 64	AS2254-005	1	AS2254-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2254-005	3		1	3.819	658.765	0	0.005	SWMM Methods 64	AS2254-005	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2254-024	1	1	1	7.294	696.522	100	0.017	SWMM Methods 64	AS2254-024	0	AS2254-024	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2254-024	2		1	0.117	696.522	100	0.017	SWMM Methods 64	AS2254-024	1	AS2254-024	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2254-024	3		1	5.229	696.522	0	0.017	SWMM Methods 64	AS2254-024	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2255-006	1	1	1	3.854	1011.526	100	0.036	SWMM Methods 64	AS2255-006	0	AS2255-006	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2255-006	2		1	0.036	1011.526	100	0.036	SWMM Methods 64	AS2255-006	1	AS2255-006	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2255-006	3		1	5.983	1011.526	0	0.036	SWMM Methods 64	AS2255-006	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2255-046	1	1	1	2.962	732.689	100	0.004	SWMM Methods 64	AS2255-046	0	AS2255-046	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2255-046	2		1	0.096	732.689	100	0.004	SWMM Methods 64	AS2255-046	1	AS2255-046	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2255-046	3		1	0.619	732.689	0	0.004	SWMM Methods 64	AS2255-046	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2256-017	1	1	1	8.712	380.99	100	0.005	SWMM Methods 64	AS2256-017	0	AS2256-017	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2256-017	3		1	0.698	380.99	0	0.005	SWMM Methods 64	AS2256-017	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2256-077	1	1	1	0.073	138.995	100	0.098	SWMM Methods 64	AS2256-077	0	AS2256-077	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2256-077	3		1	0.172	138.995	0	0.098	SWMM Methods 64	AS2256-077	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2257-004	1	1	1	11.696	1122.615	100	0.015	SWMM Methods 64	AS2257-004	0	AS2257-004	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2257-004	2		1	0.024	1122.615	100	0.015	SWMM Methods 64	AS2257-004	1	AS2257-004	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2257-004	3		1	3.81	1122.615	0	0.015	SWMM Methods 64	AS2257-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2257-012	1	1	1	1.164	150.889	100	0.022	SWMM Methods 64	AS2257-012	0	AS2257-012	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2257-012	2		1	0.004	150.889	100	0.022	SWMM Methods 64	AS2257-012	1	AS2257-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2257-012	3		1	0.328	150.889	0	0.022	SWMM Methods 64	AS2257-012	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-001	1	1	1	1.051	404.262	100	0.007	SWMM Methods 64	AS2258-001	0	AS2258-001	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2258-001	3		1	0.361	404.262	0	0.007	SWMM Methods 64	AS2258-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-048	1	1	1	2.582	249.122	100	0.02	SWMM Methods 64	AS2258-048	0	AS2258-048	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2258-048	2		1	0.069	249.122	100	0.02	SWMM Methods 64	AS2258-048	1	AS2258-048	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-048	3		1	0.951	249.122	0	0.02	SWMM Methods 64	AS2258-048	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-056	1	1	1	3.87	531.194	100	0.086	SWMM Methods 64	AS2258-056	0	AS2258-056	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2258-056	2		1	1.179	531.194	100	0.086	SWMM Methods 64	AS2258-056	1	AS2258-056	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-056	3		1	5.988	531.194	0	0.086	SWMM Methods 64	AS2258-056	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2259-001	1	1	1	2.878	557.37	100	0.047	SWMM Methods 64	AS2259-001	0	AS2259-001	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2259-001	2		1	1.07	557.37	100	0.047	SWMM Methods 64	AS2259-001	1	AS2259-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2259-001	3		1	16.236	557.37	0	0.047	SWMM Methods 64	AS2259-001	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AS2347-001	1	1	1	4.983	763.296	100	0.022	SWMM Methods 64	AS2347-001	0	AS2347-001	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2347-001	2		1	0.2	763.296	100	0.022	SWMM Methods 64	AS2347-001	1	AS2347-001	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2347-001	3		1	3.621	763.296	0	0.022	SWMM Methods 64	AS2347-001	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2347-010	1	1	1	2.774	446.348	100	0.013	SWMM Methods 64	AS2347-010	0	AS2347-010	SubCatchment 3	No Redirection	Strickers Pond Foreb

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2347-010	2		1	0.195	446.348	100	0.013	SWMM Methods 64	AS2347-010	1	AS2347-010	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2347-010	3		1	3.691	446.348	0	0.013	SWMM Methods 64	AS2347-010	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2347-018	1	1	1	2.6	538.203	100	0.009	SWMM Methods 64	AS2347-018	0	AS2347-018	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2347-018	2		1	1.163	538.203	100	0.009	SWMM Methods 64	AS2347-018	1	AS2347-018	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2347-018	3		1	8.141	538.203	0	0.009	SWMM Methods 64	AS2347-018	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2348-005	1	1	1	10.876	1021.535	100	0.033	SWMM Methods 64	AS2348-005	0	AS2348-005	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2348-005	2		1	0.16	1021.535	100	0.033	SWMM Methods 64	AS2348-005	1	AS2348-005	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2348-005	3		1	5.038	1021.535	0	0.033	SWMM Methods 64	AS2348-005	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2349-008	1	1	1	0.752	59.57	100	0.021	SWMM Methods 64	AS2349-008	0	AS2349-008	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2349-008	3		1	0.357	59.57	0	0.021	SWMM Methods 64	AS2349-008	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2351-015	1	1	1	5.941	1301.748	100	0.045	SWMM Methods 64	AS2351-015	0	AS2351-015	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2351-015	2		1	2.39	1301.748	100	0.045	SWMM Methods 64	AS2351-015	1	AS2351-015	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2351-015	3		1	17.133	1301.748	0	0.045	SWMM Methods 64	AS2351-015	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2353-005	1	1	1	3.323	373.735	100	0.024	SWMM Methods 64	AS2353-005	0	AS2353-005	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2353-005	2		1	1.199	373.735	100	0.024	SWMM Methods 64	AS2353-005	1	AS2353-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2353-005	3		1	8.05	373.735	0	0.024	SWMM Methods 64	AS2353-005	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2354-006	1	1	1	3.842	637.588	100	0.014	SWMM Methods 64	AS2354-006	0	AS2354-006	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2354-006	2		1	1.621	637.588	100	0.014	SWMM Methods 64	AS2354-006	1	AS2354-006	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2354-006	3		1	12.394	637.588	0	0.014	SWMM Methods 64	AS2354-006	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2355-001	1	1	1	3.961	597.222	100	0.024	SWMM Methods 64	AS2355-001	0	AS2355-001	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2355-001	2		1	0.109	597.222	100	0.024	SWMM Methods 64	AS2355-001	1	AS2355-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2355-001	3		1	3.649	597.222	0	0.024	SWMM Methods 64	AS2355-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2355-016	1	1	1	4.026	429.687	100	0.028	SWMM Methods 64	AS2355-016	0	AS2355-016	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2355-016	2		1	0.053	429.687	100	0.028	SWMM Methods 64	AS2355-016	1	AS2355-016	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2355-016	3		1	1.381	429.687	0	0.028	SWMM Methods 64	AS2355-016	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2356-032	1	1	1	12.536	414.401	100	0.025	SWMM Methods 64	AS2356-032	0	AS2356-032	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2356-032	2		1	0.205	414.401	100	0.025	SWMM Methods 64	AS2356-032	1	AS2356-032	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2356-032	3		1	5.956	414.401	0	0.025	SWMM Methods 64	AS2356-032	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2448-012	1	1	1	3.398	865.683	100	0.035	SWMM Methods 64	AS2448-012	0	AS2448-012	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2448-012	2		1	1.519	865.683	100	0.035	SWMM Methods 64	AS2448-012	1	AS2448-012	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2448-012	3		1	10.134	865.683	0	0.035	SWMM Methods 64	AS2448-012	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2450-026	1	1	1	3.427	838.016	100	0.011	SWMM Methods 64	AS2450-026	0	AS2450-026	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2450-026	2		1	0.748	838.016	100	0.011	SWMM Methods 64	AS2450-026	1	AS2450-026	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2450-026	3		1	6.199	838.016	0	0.011	SWMM Methods 64	AS2450-026	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2451-015	1	1	1	4.588	531.086	100	0.014	SWMM Methods 64	AS2451-015	0	AS2451-015	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2451-015	2		1	1.284	531.086	100	0.014	SWMM Methods 64	AS2451-015	1	AS2451-015	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2451-015	3		1	10.348	531.086	0	0.014	SWMM Methods 64	AS2451-015	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2452-001	1	1	1	2.478	1101.479	100	0.055	SWMM Methods 64	AS2452-001	0	AS2452-001	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2452-001	2		1	0.935	1101.479	100	0.055	SWMM Methods 64	AS2452-001	1	AS2452-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2452-001	3		1	6.414	1101.479	0	0.055	SWMM Methods 64	AS2452-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2454-001	1	1	1	1.006	314.625	100	0.015	SWMM Methods 64	AS2454-001	0	AS2454-001	SubCatchment 3	No Redirection	Memorial High School
AS2454-001	2		1	0.019	314.625	100	0.015	SWMM Methods 64	AS2454-001	1	AS2454-001	SubCatchment 3	No Redirection	Memorial HS 2018
AS2454-001	3		1	0.926	314.625	0	0.015	SWMM Methods 64	AS2454-001	0		SubCatchment 3	No Redirection	Memorial HS 2018
AS2455-004	1	1	1	5.81	523.364	100	0.03	SWMM Methods 64	AS2455-004	0	AS2455-004	SubCatchment 3	No Redirection	Memorial High School
AS2455-004	2		1	0.147	523.364	100	0.03	SWMM Methods 64	AS2455-004	1	AS2455-004	SubCatchment 3	No Redirection	Memorial HS 2018
AS2455-004	3		1	9.901	523.364	0	0.03	SWMM Methods 64	AS2455-004	0		SubCatchment 3	No Redirection	Memorial HS 2018
AS2548-001	1	1	1	4.672	806.285	100	0.008	SWMM Methods 64	AS2548-001	0	AS2548-001	SubCatchment 3	No Redirection	Strickers Pond Foreb

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2548-001	2		1	1.625	806.285	100	0.008	SWMM Methods 64	AS2548-001	1	AS2548-001	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2548-001	3		1	13.836	806.285	0	0.008	SWMM Methods 64	AS2548-001	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2548-013	1	1	1	2.53	859.069	100	0.009	SWMM Methods 64	AS2548-013	0	AS2548-013	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2548-013	2		1	1.252	859.069	100	0.009	SWMM Methods 64	AS2548-013	1	AS2548-013	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2548-013	3		1	9.261	859.069	0	0.009	SWMM Methods 64	AS2548-013	0		SubCatchment 1	No Redirection	Strickers Forebay 18
AS2550-016	1	1	1	1.927	432.899	100	0.07	SWMM Methods 64	AS2550-016	0	AS2550-016	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2550-016	2		1	0.625	432.899	100	0.07	SWMM Methods 64	AS2550-016	1	AS2550-016	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2550-016	3		1	4.475	432.899	0	0.07	SWMM Methods 64	AS2550-016	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2551-008	1	1	1	2.551	922.52	100	0.02	SWMM Methods 64	AS2551-008	0	AS2551-008	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2551-008	2		1	0.981	922.52	100	0.02	SWMM Methods 64	AS2551-008	1	AS2551-008	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2551-008	3		1	8.457	922.52	0	0.02	SWMM Methods 64	AS2551-008	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2551-020	1	1	1	2.419	1682.477	100	0.037	SWMM Methods 64	AS2551-020	0	AS2551-020	SubCatchment 3	No Redirection	Memorial High School
AS2551-020	2		1	0.682	1682.477	100	0.037	SWMM Methods 64	AS2551-020	1	AS2551-020	SubCatchment 3	No Redirection	Memorial HS 2018
AS2551-020	3		1	15.561	1682.477	0	0.037	SWMM Methods 64	AS2551-020	0		SubCatchment 3	No Redirection	Memorial HS 2018
AS2552-004	1	1	1	1.123	326.686	100	0.029	SWMM Methods 64	AS2552-004	0	AS2552-004	SubCatchment 3	No Redirection	Memorial High School
AS2552-004	2		1	0.419	326.686	100	0.029	SWMM Methods 64	AS2552-004	1	AS2552-004	SubCatchment 3	No Redirection	Memorial HS 2018
AS2552-004	3		1	2.922	326.686	0	0.029	SWMM Methods 64	AS2552-004	0		SubCatchment 1	No Redirection	Memorial HS 2018
ATTIC_ANGEL_E_POND	1	1	1	0.733	770.877	100	0.134	SWMM Methods 64	ATTIC_ANGEL_E	0	ATTIC_ANGEL_E	SubCatchment 3	No Redirection	UW Ag Research Stati
ATTIC_ANGEL_E_POND	2		1	0.113	770.877	100	0.134	SWMM Methods 64	ATTIC_ANGEL_E	1	ATTIC_ANGEL_E	SubCatchment 3	No Redirection	UW Ag Research 2018
ATTIC_ANGEL_E_POND	3		1	1.872	770.877	0	0.134	SWMM Methods 64	ATTIC_ANGEL_E	0		SubCatchment 3	No Redirection	UW Ag Research 2018
ATTIC_ANGEL_POND_IN	1	1	1	1.605	2197.561	100	0.131	SWMM Methods 64	ATTIC_ANGEL_P	0	ATTIC_ANGEL_P	SubCatchment 3	No Redirection	UW Ag Research Stati
ATTIC_ANGEL_POND_IN	2		1	0.818	2197.561	100	0.131	SWMM Methods 64	ATTIC_ANGEL_P	1	ATTIC_ANGEL_P	SubCatchment 3	No Redirection	UW Ag Research 2018
ATTIC_ANGEL_POND_IN	3		1	5.606	2197.561	0	0.131	SWMM Methods 64	ATTIC_ANGEL_P	0		SubCatchment 3	No Redirection	UW Ag Research 2018
ATTIC_ANGEL_W_POND	1	1	1	0.454	870.025	100	0.118	SWMM Methods 64	ATTIC_ANGEL_W	0	ATTIC_ANGEL_W	SubCatchment 3	No Redirection	UW Ag Research Stati
ATTIC_ANGEL_W_POND	2		1	0.245	870.025	100	0.118	SWMM Methods 64	ATTIC_ANGEL_W	1	ATTIC_ANGEL_W	SubCatchment 3	No Redirection	UW Ag Research 2018
ATTIC_ANGEL_W_POND	3		1	2.53	870.025	0	0.118	SWMM Methods 64	ATTIC_ANGEL_W	0		SubCatchment 3	No Redirection	UW Ag Research 2018
BH_APARTMENTS	1	1	1	3.071	386.505	100	0.025	SWMM Methods 64	BH_APARTMENT	0	BH_APARTMENT	SubCatchment 3	No Redirection	Swallowtail Park
BH_APARTMENTS	2		1	0.084	386.505	100	0.025	SWMM Methods 64	BH_APARTMENT	1	BH_APARTMENT	SubCatchment 3	No Redirection	Swallowtail Park 18
BH_APARTMENTS	3		1	4.183	386.505	0	0.025	SWMM Methods 64	BH_APARTMENT	0		SubCatchment 3	No Redirection	Swallowtail Park 18
BH_CHURCH_PR	1	1	1	1.1	869.858	100	0.068	SWMM Methods 64	BH_CHURCH_PR	0	BH_CHURCH_PR	SubCatchment 3	No Redirection	
BH_CHURCH_PR	2		1	0.425	869.858	100	0.068	SWMM Methods 64	BH_CHURCH_PR	1	BH_CHURCH_PR	SubCatchment 3	No Redirection	
BH_CHURCH_PR	3		1	4.055	869.858	0	0.068	SWMM Methods 64	BH_CHURCH_PR	0		SubCatchment 1	No Redirection	
CAPE_SILVER_WAY_DRY_POND	1	1	1	0.26	738.78	100	0.069	SWMM Methods 64	CAPE_SILVER_W	0	CAPE_SILVER_W	SubCatchment 3	No Redirection	Sauk Heights Pond
CAPE_SILVER_WAY_DRY_POND	2		1	0.161	738.78	100	0.069	SWMM Methods 64	CAPE_SILVER_W	1	CAPE_SILVER_W	SubCatchment 3	No Redirection	Sauk Heights Pond 18
CAPE_SILVER_WAY_DRY_POND	3		1	1.436	738.78	0	0.069	SWMM Methods 64	CAPE_SILVER_W	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
CAPE_SILVER_WAY_WET_POND	1	1	1	0.646	830.436	100	0.056	SWMM Methods 64	CAPE_SILVER_W	0	CAPE_SILVER_W	SubCatchment 3	No Redirection	Sauk Heights Pond
CAPE_SILVER_WAY_WET_POND	2		1	0.765	830.436	100	0.056	SWMM Methods 64	CAPE_SILVER_W	1	CAPE_SILVER_W	SubCatchment 3	No Redirection	Sauk Heights Pond 18
CAPE_SILVER_WAY_WET_POND	3		1	1.412	830.436	0	0.056	SWMM Methods 64	CAPE_SILVER_W	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
CEM_SWALE	1	1	1	0.506	459.427	100	0.011	SWMM Methods 64	CEM_SWALE	0	CEM_SWALE	SubCatchment 3	No Redirection	Memorial High School
CEM_SWALE	2		1	0.051	459.427	100	0.011	SWMM Methods 64	CEM_SWALE	1	CEM_SWALE	SubCatchment 3	No Redirection	Memorial HS 2018
CEM_SWALE	3		1	4.974	459.427	0	0.011	SWMM Methods 64	CEM_SWALE	0		SubCatchment 1	No Redirection	Memorial HS 2018
CH_BIO_BASIN_1	1	1	1	1.303	639.293	100	0.006	SWMM Methods 64	CH_BIO_BASIN_	0	CH_BIO_BASIN_1	SubCatchment 3	No Redirection	Sauk Heights Pond
CH_BIO_BASIN_1	2		1	1.212	639.293	100	0.006	SWMM Methods 64	CH_BIO_BASIN_	1	CH_BIO_BASIN_1	SubCatchment 3	No Redirection	Sauk Heights Pond 18
CH_BIO_BASIN_1	3		1	7.664	639.293	0	0.006	SWMM Methods 64	CH_BIO_BASIN_	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
COMMERCE_SQUARE_POND	1	1	1	3.913	559.767	100	0.033	SWMM Methods 64	COMMERCE_SQ	0	COMMERCE_SQU	SubCatchment 3	No Redirection	UW Ag Research Stati
COMMERCE_SQUARE_POND	2		1	0.106	559.767	100	0.033	SWMM Methods 64	COMMERCE_SQ	1	COMMERCE_SQU	SubCatchment 3	No Redirection	UW Ag Research 2018
COMMERCE_SQUARE_POND	3		1	3.322	559.767	0	0.033	SWMM Methods 64	COMMERCE_SQ	0		SubCatchment 3	No Redirection	UW Ag Research 2018

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
DT1853-003	1	1	1	0.307	338.532	100	0.017	SWMM Methods 64	DT1853-003	0	DT1853-003	SubCatchment 3	No Redirection	Sauk Heights Pond
DT1853-003	2		1	0.098	338.532	100	0.017	SWMM Methods 64	DT1853-003	1	DT1853-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
DT1853-003	3		1	2.549	338.532	0	0.017	SWMM Methods 64	DT1853-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
DT1947-007	1	1	1	0.305	211.367	100	0.035	SWMM Methods 64	DT1947-007	0	DT1947-007	SubCatchment 3	No Redirection	Swallowtail Park
DT1947-007	2		1	0.003	211.367	100	0.035	SWMM Methods 64	DT1947-007	1	DT1947-007	SubCatchment 3	No Redirection	Swallowtail Park 18
DT1947-007	3		1	0.832	211.367	0	0.035	SWMM Methods 64	DT1947-007	0		SubCatchment 3	No Redirection	Swallowtail Park 18
DT2349-022	1	1	1	0.349	94.163	100	0.031	SWMM Methods 64	DT2349-022	0	DT2349-022	SubCatchment 3	No Redirection	Strickers Pond Foreb
DT2349-022	3		1	0.921	94.163	0	0.031	SWMM Methods 64	DT2349-022	0		SubCatchment 3	No Redirection	Strickers Forebay 18
E_INF_BASIN	1	1	1	0.09	115.348	100	0.064	SWMM Methods 64	E_INF_BASIN	0	E_INF_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond
E_INF_BASIN	2		1	0.13	115.348	100	0.064	SWMM Methods 64	E_INF_BASIN	1	E_INF_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond 18
E_INF_BASIN	3		1	0.69	115.348	0	0.064	SWMM Methods 64	E_INF_BASIN	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
ELD_FARM_S1	3	1	1	6.424	377.506	0	0.036	SWMM Methods 64	ELD_FARM_S1	0		SubCatchment 1	No Redirection	
ELD_FARM_S2	1	1	1	0.062	846.913	100	0.027	SWMM Methods 64	ELD_FARM_S2	0	ELD_FARM_S2	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_FARM_S2	3		1	14.364	846.913	0	0.027	SWMM Methods 64	ELD_FARM_S2	0		SubCatchment 1	No Redirection	
ELD_FARM_S3	1	1	1	0.051	710.294	100	0.027	SWMM Methods 64	ELD_FARM_S3	0	ELD_FARM_S3	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_FARM_S3	3		1	6.163	710.294	0	0.027	SWMM Methods 64	ELD_FARM_S3	0		SubCatchment 1	No Redirection	
ELD_N_DEP	1	1	1	0.156	442.82	100	0.01	SWMM Methods 64	ELD_N_DEP	0	ELD_N_DEP	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_N_DEP	2		1	0.113	442.82	100	0.01	SWMM Methods 64	ELD_N_DEP	0	ELD_N_DEP	SubCatchment 3	No Redirection	
ELD_N_DEP	3		1	4.192	442.82	0	0.01	SWMM Methods 64	ELD_N_DEP	0		SubCatchment 1	No Redirection	
ELD_N_DITCH	3	1	1	1.867	186.536	0	0.009	SWMM Methods 64	ELD_N_DITCH	0		SubCatchment 1	No Redirection	
ELD_N_FARM1	1	1	1	1.23	1121.859	100	0.022	SWMM Methods 64	ELD_N_FARM1	0	ELD_N_FARM1	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM1	2		1	0.268	1121.859	100	0.022	SWMM Methods 64	ELD_N_FARM1	0	ELD_N_FARM1	SubCatchment 3	No Redirection	
ELD_N_FARM1	3		1	18.948	1121.859	0	0.022	SWMM Methods 64	ELD_N_FARM1	0		SubCatchment 1	No Redirection	
ELD_N_FARM10	1	1	1	0.094	969.461	100	0.021	SWMM Methods 64	ELD_N_FARM10	0	ELD_N_FARM10	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM10	3		1	12.207	969.461	0	0.021	SWMM Methods 64	ELD_N_FARM10	0		SubCatchment 1	No Redirection	
ELD_N_FARM11	1	1	1	0.134	529.055	100	0.009	SWMM Methods 64	ELD_N_FARM11	0	ELD_N_FARM11	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM11	2		1	0.148	529.055	100	0.009	SWMM Methods 64	ELD_N_FARM11	0	ELD_N_FARM11	SubCatchment 3	No Redirection	
ELD_N_FARM11	3		1	8.253	529.055	0	0.009	SWMM Methods 64	ELD_N_FARM11	0		SubCatchment 1	No Redirection	
ELD_N_FARM12	1	1	1	0.12	961.197	100	0.014	SWMM Methods 64	ELD_N_FARM12	0	ELD_N_FARM12	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM12	2		1	0.123	961.197	100	0.014	SWMM Methods 64	ELD_N_FARM12	0	ELD_N_FARM12	SubCatchment 3	No Redirection	
ELD_N_FARM12	3		1	19.295	961.197	0	0.014	SWMM Methods 64	ELD_N_FARM12	0		SubCatchment 1	No Redirection	
ELD_N_FARM13	1	1	1	0.122	1121.491	100	0.047	SWMM Methods 64	ELD_N_FARM13	0	ELD_N_FARM13	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM13	2		1	0.077	1121.491	100	0.047	SWMM Methods 64	ELD_N_FARM13	0	ELD_N_FARM13	SubCatchment 3	No Redirection	
ELD_N_FARM13	3		1	16.018	1121.491	0	0.047	SWMM Methods 64	ELD_N_FARM13	0		SubCatchment 1	No Redirection	
ELD_N_FARM14	1	1	1	0.514	553.095	100	0.032	SWMM Methods 64	ELD_N_FARM14	0	ELD_N_FARM14	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM14	2		1	0.185	553.095	100	0.032	SWMM Methods 64	ELD_N_FARM14	0	ELD_N_FARM14	SubCatchment 3	No Redirection	
ELD_N_FARM14	3		1	8.371	553.095	0	0.032	SWMM Methods 64	ELD_N_FARM14	0		SubCatchment 1	No Redirection	
ELD_N_FARM15	1	1	1	0.348	490.695	100	0.025	SWMM Methods 64	ELD_N_FARM15	0	ELD_N_FARM15	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM15	2		1	0.216	490.695	100	0.025	SWMM Methods 64	ELD_N_FARM15	0	ELD_N_FARM15	SubCatchment 3	No Redirection	
ELD_N_FARM15	3		1	7.029	490.695	0	0.025	SWMM Methods 64	ELD_N_FARM15	0		SubCatchment 1	No Redirection	
ELD_N_FARM16	3	1	1	4.69	350.691	0	0.017	SWMM Methods 64	ELD_N_FARM16	0		SubCatchment 1	No Redirection	
ELD_N_FARM17	1	1	1	0.039	563.217	100	0.029	SWMM Methods 64	ELD_N_FARM17	0	ELD_N_FARM17	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM17	3		1	4.966	563.217	0	0.029	SWMM Methods 64	ELD_N_FARM17	0		SubCatchment 1	No Redirection	
ELD_N_FARM2	1	1	1	0.464	831.07	100	0.046	SWMM Methods 64	ELD_N_FARM2	0	ELD_N_FARM2	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM2	2		1	0.01	831.07	100	0.046	SWMM Methods 64	ELD_N_FARM2	0	ELD_N_FARM2	SubCatchment 3	No Redirection	
ELD_N_FARM2	3		1	5.669	831.07	0	0.046	SWMM Methods 64	ELD_N_FARM2	0		SubCatchment 1	No Redirection	
ELD_N_FARM3	1	1	1	0.272	1011.467	100	0.027	SWMM Methods 64	ELD_N_FARM3	0	ELD_N_FARM3	SubCatchment 3	No Redirection	Sauk Heights Pond

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
ELD_N_FARM3	2		1	0.014	1011.467	100	0.027	SWMM Methods 64	ELD_N_FARM3	0	ELD_N_FARM3	SubCatchment 3	No Redirection	
ELD_N_FARM3	3		1	17.732	1011.467	0	0.027	SWMM Methods 64	ELD_N_FARM3	0		SubCatchment 1	No Redirection	
ELD_N_FARM4	1	1	1	0.866	1278.902	100	0.025	SWMM Methods 64	ELD_N_FARM4	0	ELD_N_FARM4	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM4	3		1	21.872	1278.902	0	0.025	SWMM Methods 64	ELD_N_FARM4	0		SubCatchment 1	No Redirection	
ELD_N_FARM5	1	1	1	0.97	2117.459	100	0.03	SWMM Methods 64	ELD_N_FARM5	0	ELD_N_FARM5	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM5	2		1	0.03	2117.459	100	0.03	SWMM Methods 64	ELD_N_FARM5	0	ELD_N_FARM5	SubCatchment 3	No Redirection	
ELD_N_FARM5	3		1	30.36	2117.459	0	0.03	SWMM Methods 64	ELD_N_FARM5	0		SubCatchment 1	No Redirection	
ELD_N_FARM6	1	1	1	0.286	1089.791	100	0.022	SWMM Methods 64	ELD_N_FARM6	0	ELD_N_FARM6	SubCatchment 3	No Redirection	Swallowtail Park
ELD_N_FARM6	2		1	0.01	1089.791	100	0.022	SWMM Methods 64	ELD_N_FARM6	0	ELD_N_FARM6	SubCatchment 3	No Redirection	
ELD_N_FARM6	3		1	13.715	1089.791	0	0.022	SWMM Methods 64	ELD_N_FARM6	0		SubCatchment 1	No Redirection	
ELD_N_FARM7	3	1	1	9.506	739.389	0	0.022	SWMM Methods 64	ELD_N_FARM7	0		SubCatchment 1	No Redirection	
ELD_N_FARM8	1	1	1	0.077	1321.493	100	0.008	SWMM Methods 64	ELD_N_FARM8	0	ELD_N_FARM8	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM8	2		1	0.01	1321.493	100	0.008	SWMM Methods 64	ELD_N_FARM8	0	ELD_N_FARM8	SubCatchment 3	No Redirection	
ELD_N_FARM8	3		1	26.945	1321.493	0	0.008	SWMM Methods 64	ELD_N_FARM8	0		SubCatchment 1	No Redirection	
ELD_N_FARM9	1	1	1	0.003	266.898	100	0.016	SWMM Methods 64	ELD_N_FARM9	0	ELD_N_FARM9	SubCatchment 3	No Redirection	Sauk Heights Pond
ELD_N_FARM9	3		1	2.033	266.898	0	0.016	SWMM Methods 64	ELD_N_FARM9	0		SubCatchment 1	No Redirection	
ELD_PLEAS_DEP	1	1	1	0.372	973.335	100	0.042	SWMM Methods 64	ELD_PLEAS_DEP	0	ELD_PLEAS_DEP	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_PLEAS_DEP	3		1	14.422	973.335	0	0.042	SWMM Methods 64	ELD_PLEAS_DEP	0		SubCatchment 1	No Redirection	
ELD_RD _PLEAS_V_DEP	1	1	1	0.721	946.361	100	0.02	SWMM Methods 64	ELD_RD _PLEAS	0		SubCatchment 1	No Redirection	UW Ag Research Stati
ELD_RD _PLEAS_V_DEP	2		1	0.04	946.361	100	0.02	SWMM Methods 64	ELD_RD _PLEAS	1	ELD_RD _PLEAS_	SubCatchment 3	No Redirection	UW Ag Research 2018
ELD_RD _PLEAS_V_DEP	3		1	17.434	946.361	0	0.02	SWMM Methods 64	ELD_RD _PLEAS	0		SubCatchment 3	No Redirection	UW Ag Research 2018
ELD_TO_BW1	1	1	1	0.054	556.832	100	0.078	SWMM Methods 64	ELD_TO_BW1	0	ELD_TO_BW1	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_TO_BW1	2		1	0.064	556.832	100	0.078	SWMM Methods 64	ELD_TO_BW1	0	ELD_TO_BW1	SubCatchment 3	No Redirection	
ELD_TO_BW1	3		1	1.491	556.832	0	0.078	SWMM Methods 64	ELD_TO_BW1	0		SubCatchment 1	No Redirection	
ELD_TO_BW2	1	1	1	0.255	410.049	100	0.042	SWMM Methods 64	ELD_TO_BW2	0	ELD_TO_BW2	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_TO_BW2	2		1	0.223	410.049	100	0.042	SWMM Methods 64	ELD_TO_BW2	0	ELD_TO_BW2	SubCatchment 3	No Redirection	
ELD_TO_BW2	3		1	3.829	410.049	0	0.042	SWMM Methods 64	ELD_TO_BW2	0		SubCatchment 1	No Redirection	
ELD_TO_BW3	1	1	1	0.08	224.887	100	0.029	SWMM Methods 64	ELD_TO_BW3	0	ELD_TO_BW3	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_TO_BW3	2		1	0.071	224.887	100	0.029	SWMM Methods 64	ELD_TO_BW3	0	ELD_TO_BW3	SubCatchment 3	No Redirection	
ELD_TO_BW3	3		1	2.901	224.887	0	0.029	SWMM Methods 64	ELD_TO_BW3	0		SubCatchment 1	No Redirection	
ELD_TO_BW4	1	1	1	0.354	542.321	100	0.018	SWMM Methods 64	ELD_TO_BW4	0	ELD_TO_BW4	SubCatchment 3	No Redirection	UW Ag Research Stati
ELD_TO_BW4	2		1	0.273	542.321	100	0.018	SWMM Methods 64	ELD_TO_BW4	0	ELD_TO_BW4	SubCatchment 3	No Redirection	
ELD_TO_BW4	3		1	7.517	542.321	0	0.018	SWMM Methods 64	ELD_TO_BW4	0		SubCatchment 1	No Redirection	
EMPB_GW_LOSR2	1	1	1	4.9	638.022	100	0.016	SWMM Methods 64	EMPB_GW_LOS	0	EMPB_GW_LOSR	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_LOSR2	2		1	0.13	638.022	100	0.016	SWMM Methods 64	EMPB_GW_LOS	1	EMPB_GW_LOSR	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_LOSR2	3		1	6.598	638.022	0	0.016	SWMM Methods 64	EMPB_GW_LOS	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_MPR1	1	1	1	5.199	265.395	100	0.014	SWMM Methods 64	EMPB_GW_MPI	0	EMPB_GW_MPR	SubCatchment 3	No Redirection	UW Ag Research Stati
EMPB_GW_MPR1	3		1	4.488	265.395	0	0.014	SWMM Methods 64	EMPB_GW_MPI	0		SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_NHPR1	1	1	1	7.537	429.875	100	0.028	SWMM Methods 64	EMPB_GW_NHP	0	EMPB_GW_NHP	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_NHPR1	3		1	6.679	429.875	0	0.028	SWMM Methods 64	EMPB_GW_NHP	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_NHPR2	1	1	1	1.734	624.082	100	0.038	SWMM Methods 64	EMPB_GW_NHP	0	EMPB_GW_NHP	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_NHPR2	2		1	0.046	624.082	100	0.038	SWMM Methods 64	EMPB_GW_NHP	1	EMPB_GW_NHP	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_NHPR2	3		1	2.94	624.082	0	0.038	SWMM Methods 64	EMPB_GW_NHP	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_NTL3	1	1	1	0.696	830.13	100	0.045	SWMM Methods 64	EMPB_GW_NTL	0	EMPB_GW_NTL3	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_NTL3	2		1	0.233	830.13	100	0.045	SWMM Methods 64	EMPB_GW_NTL	1	EMPB_GW_NTL3	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_NTL3	3		1	5.239	830.13	0	0.045	SWMM Methods 64	EMPB_GW_NTL	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_NTL6	1	1	1	2.28	974.887	100	0.061	SWMM Methods 64	EMPB_GW_NTL	0	EMPB_GW_NTL6	SubCatchment 3	No Redirection	Memorial High School

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
EMPB_GW_NTL6	2		1	0.529	974.887	100	0.061	SWMM Methods 64	EMPB_GW_NTL	1	EMPB_GW_NTL6	SubCatchment 3	No Redirection	Memorial HS 2018
EMPB_GW_NTL6	3		1	9.472	974.887	0	0.061	SWMM Methods 64	EMPB_GW_NTL	0		SubCatchment 3	No Redirection	Memorial HS 2018
EMPB_GW_NTL7	1	1	1	2.474	478.761	100	0.049	SWMM Methods 64	EMPB_GW_NTL	0	EMPB_GW_NTL7	SubCatchment 3	No Redirection	MSE4
EMPB_GW_NTL7	2		1	0.292	478.761	100	0.049	SWMM Methods 64	EMPB_GW_NTL	1	EMPB_GW_NTL7	SubCatchment 3	No Redirection	Memorial HS 2018
EMPB_GW_NTL7	3		1	4.437	478.761	0	0.049	SWMM Methods 64	EMPB_GW_NTL	0		SubCatchment 3	No Redirection	Memorial HS 2018
EMPB_GW_NTL8	1	1	1	0.33	1979.517	100	0.044	SWMM Methods 64	EMPB_GW_NTL	0	EMPB_GW_NTL8	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_NTL8	2		1	0.39	1979.517	100	0.044	SWMM Methods 64	EMPB_GW_NTL	1	EMPB_GW_NTL8	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_NTL8	3		1	10.67	1979.517	0	0.044	SWMM Methods 64	EMPB_GW_NTL	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_OSR1	1	1	1	1.888	642.199	100	0.038	SWMM Methods 64	EMPB_GW_OSR	0	EMPB_GW_OSR1	SubCatchment 3	No Redirection	UW Ag Research Stati
EMPB_GW_OSR1	2		1	0.015	642.199	100	0.038	SWMM Methods 64	EMPB_GW_OSR	1	EMPB_GW_OSR1	SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_OSR1	3		1	1.84	642.199	0	0.038	SWMM Methods 64	EMPB_GW_OSR	0		SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_STL1	1	1	1	4.918	1217.985	100	0.014	SWMM Methods 64	EMPB_GW_STL1	0	EMPB_GW_STL1	SubCatchment 3	No Redirection	UW Ag Research Stati
EMPB_GW_STL1	2		1	0.111	1217.985	100	0.014	SWMM Methods 64	EMPB_GW_STL1	1	EMPB_GW_STL1	SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_STL1	3		1	5.366	1217.985	0	0.014	SWMM Methods 64	EMPB_GW_STL1	0		SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_UOSR1	1	1	1	0.646	487.185	100	0.026	SWMM Methods 64	EMPB_GW_UOS	0	EMPB_GW_UOS	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_UOSR1	2		1	0.446	487.185	100	0.026	SWMM Methods 64	EMPB_GW_UOS	1	EMPB_GW_UOS	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_UOSR1	3		1	3.582	487.185	0	0.026	SWMM Methods 64	EMPB_GW_UOS	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WBH1	1	1	1	3.898	1100.22	100	0.042	SWMM Methods 64	EMPB_GW_WB	0	EMPB_GW_WBH	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_WBH1	2		1	0.036	1100.22	100	0.042	SWMM Methods 64	EMPB_GW_WB	1	EMPB_GW_WBH	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WBH1	3		1	2.189	1100.22	0	0.042	SWMM Methods 64	EMPB_GW_WB	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WBH2	1	1	1	2.482	166.891	100	0.007	SWMM Methods 64	EMPB_GW_WB	0	EMPB_GW_WBH	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_WBH2	3		1	4.155	166.891	0	0.007	SWMM Methods 64	EMPB_GW_WB	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WBH3	1	1	1	3.851	383.51	100	0.013	SWMM Methods 64	EMPB_GW_WB	0	EMPB_GW_WBH	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_WBH3	2		1	0.035	383.51	100	0.013	SWMM Methods 64	EMPB_GW_WB	1	EMPB_GW_WBH	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WBH3	3		1	3.637	383.51	0	0.013	SWMM Methods 64	EMPB_GW_WB	0		SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WR1	1	1	1	1.226	1050.006	100	0.064	SWMM Methods 64	EMPB_GW_WR	0	EMPB_GW_WR1	SubCatchment 3	No Redirection	Strickers Pond Foreb
EMPB_GW_WR1	2		1	0.18	1050.006	100	0.064	SWMM Methods 64	EMPB_GW_WR	1	EMPB_GW_WR1	SubCatchment 3	No Redirection	Strickers Forebay 18
EMPB_GW_WR1	3		1	4.736	1050.006	0	0.064	SWMM Methods 64	EMPB_GW_WR	0		SubCatchment 3	No Redirection	Strickers Forebay 18
FARGO_COBALT_CHANNEL_JCT	1	1	1	0.108	944.257	100	0.1	SWMM Methods 64	FARGO_COBALT	0	FARGO_COBALT_	SubCatchment 3	No Redirection	Sauk Heights Pond
FARGO_COBALT_CHANNEL_JCT	2		1	0.122	944.257	100	0.1	SWMM Methods 64	FARGO_COBALT	1	FARGO_COBALT_	SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARGO_COBALT_CHANNEL_JCT	3		1	2.355	944.257	0	0.1	SWMM Methods 64	FARGO_COBALT	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARGO_COBALT_W_POND	1	1	1	0.511	994.202	100	0.051	SWMM Methods 64	FARGO_COBALT	0	FARGO_COBALT_	SubCatchment 3	No Redirection	Sauk Heights Pond
FARGO_COBALT_W_POND	2		1	0.339	994.202	100	0.051	SWMM Methods 64	FARGO_COBALT	1	FARGO_COBALT_	SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARGO_COBALT_W_POND	3		1	1.898	994.202	0	0.051	SWMM Methods 64	FARGO_COBALT	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARM_BD_DEP	1	1	1	0.381	383.199	100	0.035	SWMM Methods 64	FARM_BD_DEP	0	FARM_BD_DEP	SubCatchment 3	No Redirection	UW Ag Research Stati
FARM_BD_DEP	3		1	8.521	383.199	0	0.035	SWMM Methods 64	FARM_BD_DEP	0		SubCatchment 1	No Redirection	
FARM_DEP1	1	1	1	0.368	600.894	100	0.018	SWMM Methods 64	FARM_DEP1	0	FARM_DEP1	SubCatchment 3	No Redirection	UW Ag Research Stati
FARM_DEP1	2		1	0.039	600.894	100	0.018	SWMM Methods 64	FARM_DEP1	0	FARM_DEP1	SubCatchment 3	No Redirection	
FARM_DEP1	3		1	4.266	600.894	0	0.018	SWMM Methods 64	FARM_DEP1	0		SubCatchment 1	No Redirection	
FARM_DEP2	1	1	1	0.917	899.792	100	0.035	SWMM Methods 64	FARM_DEP2	0	FARM_DEP2	SubCatchment 3	No Redirection	UW Ag Research Stati
FARM_DEP2	2		1	0.444	899.792	100	0.035	SWMM Methods 64	FARM_DEP2	1	FARM_DEP2	SubCatchment 3	No Redirection	UW Ag Research 2018
FARM_DEP2	3		1	10.512	899.792	0	0.035	SWMM Methods 64	FARM_DEP2	0		SubCatchment 1	No Redirection	UW Ag Research 2018
FARM_DITCH1	1	1	1	1.245	442.308	100	0.02	SWMM Methods 64	FARM_DITCH1	0	FARM_DITCH1	SubCatchment 3	No Redirection	UW Ag Research Stati
FARM_DITCH1	2		1	0.225	442.308	100	0.02	SWMM Methods 64	FARM_DITCH1	0	FARM_DITCH1	SubCatchment 3	No Redirection	
FARM_DITCH1	3		1	10.778	442.308	0	0.02	SWMM Methods 64	FARM_DITCH1	0		SubCatchment 1	No Redirection	
FARM_DITCH2	1	1	1	1.022	667.007	100	0.037	SWMM Methods 64	FARM_DITCH2	0	FARM_DITCH2	SubCatchment 3	No Redirection	Sauk Heights Pond
FARM_DITCH2	2		1	0.554	667.007	100	0.037	SWMM Methods 64	FARM_DITCH2	0	FARM_DITCH2	SubCatchment 3	No Redirection	

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
FARM_DITCH2	3		1	20.965	667.007	0	0.037	SWMM Methods 64	FARM_DITCH2	0		SubCatchment 1	No Redirection	
FARM_DITCH3	1	1	1	0.047	578.875	100	0.041	SWMM Methods 64	FARM_DITCH3	0	FARM_DITCH3	SubCatchment 3	No Redirection	Sauk Heights Pond
FARM_DITCH3	2		1	0.027	578.875	100	0.041	SWMM Methods 64	FARM_DITCH3	0	FARM_DITCH3	SubCatchment 3	No Redirection	
FARM_DITCH3	3		1	15.021	578.875	0	0.041	SWMM Methods 64	FARM_DITCH3	0		SubCatchment 1	No Redirection	
FARM_DITCH4	3	1	1	6.201	486.844	0	0.026	SWMM Methods 64	FARM_DITCH4	0		SubCatchment 1	No Redirection	
FARM_DITCH5	1	1	1	0.084	525.333	100	0.075	SWMM Methods 64	FARM_DITCH5	0	FARM_DITCH5	SubCatchment 3	No Redirection	UW Ag Research Stati
FARM_DITCH5	2		1	0.002	525.333	100	0.075	SWMM Methods 64	FARM_DITCH5	0	FARM_DITCH5	SubCatchment 3	No Redirection	
FARM_DITCH5	3		1	1.042	525.333	0	0.075	SWMM Methods 64	FARM_DITCH5	0		SubCatchment 1	No Redirection	
FARM_DITCH6	3	1	1	2.105	240.667	0	0.031	SWMM Methods 64	FARM_DITCH6	0		SubCatchment 1	No Redirection	
FARMRD_SW4	1	1	1	1.583	864.86	100	0.039	SWMM Methods 64	FARMRD_SW4	0	FARMRD_SW4	SubCatchment 3	No Redirection	UW Ag Research Stati
FARMRD_SW4	3		1	11.701	864.86	0	0.039	SWMM Methods 64	FARMRD_SW4	0		SubCatchment 3	No Redirection	UW Ag Research 2018
FARMRD_SW5	1	1	1	0.354	1266.896	100	0.044	SWMM Methods 64	FARMRD_SW5	0	FARMRD_SW5	SubCatchment 3	No Redirection	UW Ag Research Stati
FARMRD_SW5	3		1	12.049	1266.896	0	0.044	SWMM Methods 64	FARMRD_SW5	0		SubCatchment 1	No Redirection	
FARMRD_SW6	1	1	1	0.218	463.261	100	0.059	SWMM Methods 64	FARMRD_SW6	0	FARMRD_SW6	SubCatchment 3	No Redirection	UW Ag Research Stati
FARMRD_SW6	2		1	0.001	463.261	100	0.059	SWMM Methods 64	FARMRD_SW6	0	FARMRD_SW6	SubCatchment 3	No Redirection	
FARMRD_SW6	3		1	4.116	463.261	0	0.059	SWMM Methods 64	FARMRD_SW6	0		SubCatchment 1	No Redirection	
FARMRD_SWALE1	1	1	1	4.114	1338.369	100	0.017	SWMM Methods 64	FARMRD_SWAL	0	FARMRD_SWALE	SubCatchment 3	No Redirection	Sauk Heights Pond
FARMRD_SWALE1	2		1	0.104	1338.369	100	0.017	SWMM Methods 64	FARMRD_SWAL	1	FARMRD_SWALE	SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARMRD_SWALE1	3		1	27.288	1338.369	0	0.017	SWMM Methods 64	FARMRD_SWAL	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARMRD_SWALE2	1	1	1	0.342	1411.606	100	0.039	SWMM Methods 64	FARMRD_SWAL	0	FARMRD_SWALE	SubCatchment 3	No Redirection	Sauk Heights Pond
FARMRD_SWALE2	3		1	12.007	1411.606	0	0.039	SWMM Methods 64	FARMRD_SWAL	0		SubCatchment 1	No Redirection	
FARMRD_SWALE3	1	1	1	0.948	777.053	100	0.041	SWMM Methods 64	FARMRD_SWAL	0	FARMRD_SWALE	SubCatchment 3	No Redirection	UW Ag Research Stati
FARMRD_SWALE3	3		1	17.829	777.053	0	0.041	SWMM Methods 64	FARMRD_SWAL	0		SubCatchment 1	No Redirection	
FS-10	1	1	1	1.974	541.188	100	0.04	SWMM Methods 64	FS-10	0	FS-10	SubCatchment 3	No Redirection	Strickers Pond Foreb
FS-10	2		1	0.991	541.188	100	0.04	SWMM Methods 64	FS-10	1	FS-10	SubCatchment 3	No Redirection	Strickers Forebay 18
FS-10	3		1	7.128	541.188	0	0.04	SWMM Methods 64	FS-10	0		SubCatchment 3	No Redirection	Strickers Forebay 18
FS-13	1	1	1	2.346	715.892	100	0.051	SWMM Methods 64	FS-13	0	FS-13	SubCatchment 3	No Redirection	Memorial High School
FS-13	2		1	1.086	715.892	100	0.051	SWMM Methods 64	FS-13	1	FS-13	SubCatchment 3	No Redirection	Memorial HS 2018
FS-13	3		1	7.813	715.892	0	0.051	SWMM Methods 64	FS-13	0		SubCatchment 3	No Redirection	Memorial HS 2018
FS-15	1	1	1	1.676	463.683	100	0.04	SWMM Methods 64	FS-15	0	FS-15	SubCatchment 3	No Redirection	Memorial High School
FS-15	2		1	0.69	463.683	100	0.04	SWMM Methods 64	FS-15	1	FS-15	SubCatchment 3	No Redirection	Memorial HS 2018
FS-15	3		1	5.054	463.683	0	0.04	SWMM Methods 64	FS-15	0		SubCatchment 3	No Redirection	Memorial HS 2018
GANSER_HEIGHTS_POND	1	1	1	6.717	300.577	100	0.039	SWMM Methods 64	GANSER_HEIGH	0	GANSER_HEIGHT	SubCatchment 3	No Redirection	UW Ag Research Stati
GANSER_HEIGHTS_POND	2		1	0.001	300.577	100	0.039	SWMM Methods 64	GANSER_HEIGH	1	GANSER_HEIGHT	SubCatchment 3	No Redirection	UW Ag Research 2018
GANSER_HEIGHTS_POND	3		1	3.545	300.577	0	0.039	SWMM Methods 64	GANSER_HEIGH	0		SubCatchment 3	No Redirection	UW Ag Research 2018
GR2145-003	1	1	1	2.683	966.511	100	0.048	SWMM Methods 64	GR2145-003	0	GR2145-003	SubCatchment 3	No Redirection	Swallowtail Park
GR2145-003	2		1	0.488	966.511	100	0.048	SWMM Methods 64	GR2145-003	1	GR2145-003	SubCatchment 3	No Redirection	Swallowtail Park 18
GR2145-003	3		1	6.744	966.511	0	0.048	SWMM Methods 64	GR2145-003	0		SubCatchment 3	No Redirection	Swallowtail Park 18
GR2256-019	1	1	1	4.138	544.889	100	0.009	SWMM Methods 64	GR2256-019	0	GR2256-019	SubCatchment 3	No Redirection	UW Ag Research Stati
GR2256-019	2		1	0.003	544.889	100	0.009	SWMM Methods 64	GR2256-019	1	GR2256-019	SubCatchment 3	No Redirection	UW Ag Research 2018
GR2256-019	3		1	1.473	544.889	0	0.009	SWMM Methods 64	GR2256-019	0		SubCatchment 3	No Redirection	UW Ag Research 2018
GR2355-009	1	1	1	4.194	873.139	100	0.015	SWMM Methods 64	GR2355-009	0	GR2355-009	SubCatchment 3	No Redirection	UW Ag Research Stati
GR2355-009	2		1	0.1	873.139	100	0.015	SWMM Methods 64	GR2355-009	1	GR2355-009	SubCatchment 3	No Redirection	UW Ag Research 2018
GR2355-009	3		1	5.676	873.139	0	0.015	SWMM Methods 64	GR2355-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
GR2550-020	1	1	1	1.476	449.457	100	0.034	SWMM Methods 64	GR2550-020	0	GR2550-020	SubCatchment 3	No Redirection	Strickers Pond Foreb
GR2550-020	2		1	0.056	449.457	100	0.034	SWMM Methods 64	GR2550-020	1	GR2550-020	SubCatchment 3	No Redirection	Strickers Forebay 18
GR2550-020	3		1	3.965	449.457	0	0.034	SWMM Methods 64	GR2550-020	0		SubCatchment 3	No Redirection	Strickers Forebay 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
GREYSTONE_POND	1	1	1	1.561	1169.492	100	0.065	SWMM Methods 64	GREYSTONE_PO	0	GREYSTONE_POI	SubCatchment 3	No Redirection	Sauk Heights Pond
GREYSTONE_POND	2		1	0.58	1169.492	100	0.065	SWMM Methods 64	GREYSTONE_PO	1	GREYSTONE_POI	SubCatchment 3	No Redirection	Sauk Heights Pond 18
GREYSTONE_POND	3		1	3.89	1169.492	0	0.065	SWMM Methods 64	GREYSTONE_PO	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
HD2249-033_INSERT	1	1	1	3.969	1269.165	100	0.008	SWMM Methods 64	HD2249-033_IN	0	HD2249-033_INS	SubCatchment 3	No Redirection	Strickers Pond Foreb
HD2249-033_INSERT	2		1	0.033	1269.165	100	0.008	SWMM Methods 64	HD2249-033_IN	1	HD2249-033_INS	SubCatchment 3	No Redirection	Strickers Forebay 18
HD2249-033_INSERT	3		1	1.945	1269.165	0	0.008	SWMM Methods 64	HD2249-033_IN	0		SubCatchment 3	No Redirection	Strickers Forebay 18
HD2454-017	1	1	1	11.274	1190.635	100	0.03	SWMM Methods 64	HD2454-017	0	HD2454-017	SubCatchment 3	No Redirection	UW Ag Research Stati
HD2454-017	2		1	0.343	1190.635	100	0.03	SWMM Methods 64	HD2454-017	1	HD2454-017	SubCatchment 3	No Redirection	UW Ag Research 2018
HD2454-017	3		1	14.016	1190.635	0	0.03	SWMM Methods 64	HD2454-017	0		SubCatchment 3	No Redirection	UW Ag Research 2018
HIGHVIEW_PR	1	1	1	0.374	91.424	100	0.021	SWMM Methods 64	HIGHVIEW_PR	0	HIGHVIEW_PR	SubCatchment 3	No Redirection	UW Ag Research Stati
HIGHVIEW_PR	2		1	0.072	91.424	100	0.021	SWMM Methods 64	HIGHVIEW_PR	1	HIGHVIEW_PR	SubCatchment 3	No Redirection	UW Ag Research 2018
HIGHVIEW_PR	3		1	0.559	91.424	0	0.021	SWMM Methods 64	HIGHVIEW_PR	0		SubCatchment 3	No Redirection	UW Ag Research 2018
HOMEWOOD_WAY_POND	1	1	1	2.979	287.953	100	0.049	SWMM Methods 64	HOMEWOOD_W	0	HOMEWOOD_W	SubCatchment 3	No Redirection	UW Ag Research Stati
HOMEWOOD_WAY_POND	2		1	0.054	287.953	100	0.049	SWMM Methods 64	HOMEWOOD_W	1	HOMEWOOD_W	SubCatchment 3	No Redirection	UW Ag Research 2018
HOMEWOOD_WAY_POND	3		1	0.303	287.953	0	0.049	SWMM Methods 64	HOMEWOOD_W	0		SubCatchment 3	No Redirection	UW Ag Research 2018
HV_BLUFF_1	1	1	1	0.59	304.12	100	0.07	SWMM Methods 64	HV_BLUFF_1	0	HV_BLUFF_1	SubCatchment 3	No Redirection	UW Ag Research Stati
HV_BLUFF_1	2		1	0.126	304.12	100	0.07	SWMM Methods 64	HV_BLUFF_1	1	HV_BLUFF_1	SubCatchment 3	No Redirection	UW Ag Research 2018
HV_BLUFF_1	3		1	4.532	304.12	0	0.07	SWMM Methods 64	HV_BLUFF_1	0		SubCatchment 1	No Redirection	UW Ag Research 2018
HV_BLUFF2	1	1	1	0.136	180.12	100	0.082	SWMM Methods 64	HV_BLUFF2	0	HV_BLUFF2	SubCatchment 3	No Redirection	UW Ag Research Stati
HV_BLUFF2	2		1	0.026	180.12	100	0.082	SWMM Methods 64	HV_BLUFF2	1	HV_BLUFF2	SubCatchment 3	No Redirection	UW Ag Research 2018
HV_BLUFF2	3		1	2.37	180.12	0	0.082	SWMM Methods 64	HV_BLUFF2	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN1547-006	1	1	1	0.613	240.236	100	0.042	SWMM Methods 64	IN1547-006	0	IN1547-006	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-006	2		1	0.163	240.236	100	0.042	SWMM Methods 64	IN1547-006	1	IN1547-006	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-006	3		1	0.944	240.236	0	0.042	SWMM Methods 64	IN1547-006	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-009	1	1	1	0.28	338.383	100	0.049	SWMM Methods 64	IN1547-009	0	IN1547-009	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-009	2		1	0.331	338.383	100	0.049	SWMM Methods 64	IN1547-009	1	IN1547-009	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-009	3		1	1.439	338.383	0	0.049	SWMM Methods 64	IN1547-009	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-010	1	1	1	0.481	359.155	100	0.064	SWMM Methods 64	IN1547-010	0	IN1547-010	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-010	2		1	0.568	359.155	100	0.064	SWMM Methods 64	IN1547-010	1	IN1547-010	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-010	3		1	2.681	359.155	0	0.064	SWMM Methods 64	IN1547-010	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-011	1	1	1	0.591	284.16	100	0.015	SWMM Methods 64	IN1547-011	0	IN1547-011	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-011	2		1	0.094	284.16	100	0.015	SWMM Methods 64	IN1547-011	1	IN1547-011	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-011	3		1	0.719	284.16	0	0.015	SWMM Methods 64	IN1547-011	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-020	1	1	1	0.84	361.415	100	0.033	SWMM Methods 64	IN1547-020	0	IN1547-020	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-020	2		1	0.383	361.415	100	0.033	SWMM Methods 64	IN1547-020	1	IN1547-020	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-020	3		1	3.043	361.415	0	0.033	SWMM Methods 64	IN1547-020	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-024	1	1	1	0.153	204.535	100	0.088	SWMM Methods 64	IN1547-024	0	IN1547-024	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-024	2		1	0.046	204.535	100	0.088	SWMM Methods 64	IN1547-024	1	IN1547-024	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-024	3		1	1.334	204.535	0	0.088	SWMM Methods 64	IN1547-024	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1548-005	1	1	1	0.835	367.844	100	0.068	SWMM Methods 64	IN1548-005	0	IN1548-005	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1548-005	2		1	0.283	367.844	100	0.068	SWMM Methods 64	IN1548-005	1	IN1548-005	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1548-005	3		1	1.992	367.844	0	0.068	SWMM Methods 64	IN1548-005	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1548-007	1	1	1	1.014	283.907	100	0.055	SWMM Methods 64	IN1548-007	0	IN1548-007	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1548-007	2		1	0.62	283.907	100	0.055	SWMM Methods 64	IN1548-007	1	IN1548-007	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1548-007	3		1	3.762	283.907	0	0.055	SWMM Methods 64	IN1548-007	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1549-016	1	1	1	1.241	408.605	100	0.02	SWMM Methods 64	IN1549-016	0	IN1549-016	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1549-016	2		1	0.692	408.605	100	0.02	SWMM Methods 64	IN1549-016	1	IN1549-016	SubCatchment 3	No Redirection	Sauk Heights Pond 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1549-016	3		1	2.85	408.605	0	0.02	SWMM Methods 64	IN1549-016	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1549-024	1	1	1	1.782	433.295	100	0.048	SWMM Methods 64	IN1549-024	0	IN1549-024	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1549-024	2		1	0.818	433.295	100	0.048	SWMM Methods 64	IN1549-024	1	IN1549-024	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1549-024	3		1	4.59	433.295	0	0.048	SWMM Methods 64	IN1549-024	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-014	1	1	1	0.327	702.184	100	0.032	SWMM Methods 64	IN1550-014	0	IN1550-014	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1550-014	2		1	0.387	702.184	100	0.032	SWMM Methods 64	IN1550-014	1	IN1550-014	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-014	3		1	0.651	702.184	0	0.032	SWMM Methods 64	IN1550-014	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-017	1	1	1	0.376	242.925	100	0.016	SWMM Methods 64	IN1550-017	0	IN1550-017	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1550-017	2		1	0.445	242.925	100	0.016	SWMM Methods 64	IN1550-017	1	IN1550-017	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-017	3		1	1.118	242.925	0	0.016	SWMM Methods 64	IN1550-017	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-027	1	1	1	0.052	181.689	100	0.042	SWMM Methods 64	IN1550-027	0	IN1550-027	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1550-027	2		1	0.062	181.689	100	0.042	SWMM Methods 64	IN1550-027	1	IN1550-027	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-027	3		1	0.327	181.689	0	0.042	SWMM Methods 64	IN1550-027	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
IN1550-028	1	1	1	0.07	201.091	100	0.04	SWMM Methods 64	IN1550-028	0	IN1550-028	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1550-028	2		1	0.083	201.091	100	0.04	SWMM Methods 64	IN1550-028	1	IN1550-028	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-028	3		1	0.413	201.091	0	0.04	SWMM Methods 64	IN1550-028	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
IN1551-005	1	1	1	0.74	746.916	100	0.014	SWMM Methods 64	IN1551-005	0	IN1551-005	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1551-005	2		1	0.876	746.916	100	0.014	SWMM Methods 64	IN1551-005	1	IN1551-005	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1551-005	3		1	2.47	746.916	0	0.014	SWMM Methods 64	IN1551-005	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1551-023	1	1	1	1.142	733.379	100	0.037	SWMM Methods 64	IN1551-023	0	IN1551-023	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1551-023	2		1	1.35	733.379	100	0.037	SWMM Methods 64	IN1551-023	1	IN1551-023	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1551-023	3		1	3.331	733.379	0	0.037	SWMM Methods 64	IN1551-023	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1646-001	1	1	1	0.346	183.205	100	0.034	SWMM Methods 64	IN1646-001	0	IN1646-001	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1646-001	2		1	0.081	183.205	100	0.034	SWMM Methods 64	IN1646-001	1	IN1646-001	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1646-001	3		1	1.883	183.205	0	0.034	SWMM Methods 64	IN1646-001	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-003	1	1	1	0.527	444.633	100	0.02	SWMM Methods 64	IN1647-003	0	IN1647-003	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1647-003	2		1	0.176	444.633	100	0.02	SWMM Methods 64	IN1647-003	1	IN1647-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-003	3		1	1.078	444.633	0	0.02	SWMM Methods 64	IN1647-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-007	1	1	1	0.425	195.153	100	0.025	SWMM Methods 64	IN1647-007	0	IN1647-007	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1647-007	2		1	0.12	195.153	100	0.025	SWMM Methods 64	IN1647-007	1	IN1647-007	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-007	3		1	0.722	195.153	0	0.025	SWMM Methods 64	IN1647-007	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-011	1	1	1	1.19	292.494	100	0.039	SWMM Methods 64	IN1647-011	0	IN1647-011	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1647-011	2		1	0.361	292.494	100	0.039	SWMM Methods 64	IN1647-011	1	IN1647-011	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-011	3		1	2.078	292.494	0	0.039	SWMM Methods 64	IN1647-011	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-041	1	1	1	0.195	192.42	100	0.061	SWMM Methods 64	IN1647-041	0	IN1647-041	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1647-041	2		1	0.115	192.42	100	0.061	SWMM Methods 64	IN1647-041	1	IN1647-041	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-041	3		1	1.245	192.42	0	0.061	SWMM Methods 64	IN1647-041	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-064	1	1	1	0.17	146.733	100	0.023	SWMM Methods 64	IN1647-064	0	IN1647-064	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1647-064	2		1	0.035	146.733	100	0.023	SWMM Methods 64	IN1647-064	1	IN1647-064	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-064	3		1	0.553	146.733	0	0.023	SWMM Methods 64	IN1647-064	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-068	1	1	1	0.43	113.894	100	0.027	SWMM Methods 64	IN1647-068	0	IN1647-068	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1647-068	2		1	0.237	113.894	100	0.027	SWMM Methods 64	IN1647-068	1	IN1647-068	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-068	3		1	1.64	113.894	0	0.027	SWMM Methods 64	IN1647-068	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-011	1	1	1	0.452	203.463	100	0.102	SWMM Methods 64	IN1648-011	0	IN1648-011	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1648-011	2		1	0.192	203.463	100	0.102	SWMM Methods 64	IN1648-011	1	IN1648-011	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-011	3		1	1.323	203.463	0	0.102	SWMM Methods 64	IN1648-011	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-028	1	1	1	0.599	257.678	100	0.019	SWMM Methods 64	IN1648-028	0	IN1648-028	SubCatchment 3	No Redirection	Sauk Heights Pond

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1648-028	2		1	0.097	257.678	100	0.019	SWMM Methods 64	IN1648-028	1	IN1648-028	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-028	3		1	0.831	257.678	0	0.019	SWMM Methods 64	IN1648-028	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-041	1	1	1	1.157	440.497	100	0.103	SWMM Methods 64	IN1648-041	0	IN1648-041	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1648-041	2		1	0.457	440.497	100	0.103	SWMM Methods 64	IN1648-041	1	IN1648-041	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-041	3		1	2.732	440.497	0	0.103	SWMM Methods 64	IN1648-041	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-048	1	1	1	0.32	163.068	100	0.039	SWMM Methods 64	IN1648-048	0	IN1648-048	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1648-048	2		1	0.379	163.068	100	0.039	SWMM Methods 64	IN1648-048	1	IN1648-048	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1648-048	3		1	1.756	163.068	0	0.039	SWMM Methods 64	IN1648-048	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-002	1	1	1	1.049	442.024	100	0.057	SWMM Methods 64	IN1649-002	0	IN1649-002	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1649-002	2		1	0.603	442.024	100	0.057	SWMM Methods 64	IN1649-002	1	IN1649-002	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-002	3		1	3.107	442.024	0	0.057	SWMM Methods 64	IN1649-002	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-003	1	1	1	3.351	770.34	100	0.047	SWMM Methods 64	IN1649-003	0	IN1649-003	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1649-003	2		1	0.302	770.34	100	0.047	SWMM Methods 64	IN1649-003	1	IN1649-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-003	3		1	3.127	770.34	0	0.047	SWMM Methods 64	IN1649-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-011	1	1	1	1.778	312.1	100	0.038	SWMM Methods 64	IN1649-011	0	IN1649-011	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1649-011	2		1	0.508	312.1	100	0.038	SWMM Methods 64	IN1649-011	1	IN1649-011	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-011	3		1	3.512	312.1	0	0.038	SWMM Methods 64	IN1649-011	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-016	1	1	1	1.128	194.515	100	0.038	SWMM Methods 64	IN1649-016	0	IN1649-016	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1649-016	2		1	0.126	194.515	100	0.038	SWMM Methods 64	IN1649-016	1	IN1649-016	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1649-016	3		1	1.758	194.515	0	0.038	SWMM Methods 64	IN1649-016	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1650-009_DEPRESSION	1	1	1	0.949	517.074	100	0.019	SWMM Methods 64	IN1650-009_DE	0	IN1650-009_DEP	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1650-009_DEPRESSION	2		1	0.009	517.074	100	0.019	SWMM Methods 64	IN1650-009_DE	1	IN1650-009_DEP	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1650-009_DEPRESSION	3		1	10.07	517.074	0	0.019	SWMM Methods 64	IN1650-009_DE	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1653-007	1	1	1	0.605	186.841	100	0.02	SWMM Methods 64	IN1653-007	0	IN1653-007	SubCatchment 1	No Redirection	UW Ag Research 2018
IN1653-007	2		1	0.006	186.841	100	0.02	SWMM Methods 64	IN1653-007	1	IN1653-007	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1653-007	3		1	0.802	186.841	0	0.02	SWMM Methods 64	IN1653-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1653-014	1	1	1	0.319	254.496	100	0.027	SWMM Methods 64	IN1653-014	0	IN1653-014	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1653-014	3		1	0.415	254.496	0	0.027	SWMM Methods 64	IN1653-014	0		SubCatchment 1	No Redirection	
IN1653-018	1	1	1	0.348	203.461	100	0.041	SWMM Methods 64	IN1653-018	0	IN1653-018	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1653-018	3		1	1.022	203.461	0	0.041	SWMM Methods 64	IN1653-018	0		SubCatchment 1	No Redirection	
IN1653-026	1	1	1	0.41	415.279	100	0.007	SWMM Methods 64	IN1653-026	0	IN1653-026	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1653-026	3		1	3.222	415.279	0	0.007	SWMM Methods 64	IN1653-026	0		SubCatchment 1	No Redirection	
IN1654-006	1	1	1	1.039	204.048	100	0.026	SWMM Methods 64	IN1654-006	0	IN1654-006	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1654-006	2		1	0.23	204.048	100	0.026	SWMM Methods 64	IN1654-006	1	IN1654-006	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1654-006	3		1	0.721	204.048	0	0.026	SWMM Methods 64	IN1654-006	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1747-026	1	1	1	0.781	237.879	100	0.042	SWMM Methods 64	IN1747-026	0	IN1747-026	SubCatchment 3	No Redirection	Swallowtail Park
IN1747-026	2		1	0.443	237.879	100	0.042	SWMM Methods 64	IN1747-026	1	IN1747-026	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1747-026	3		1	2.551	237.879	0	0.042	SWMM Methods 64	IN1747-026	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1747-028	1	1	1	0.239	410.287	100	0.068	SWMM Methods 64	IN1747-028	0	IN1747-028	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1747-028	2		1	0.159	410.287	100	0.068	SWMM Methods 64	IN1747-028	1	IN1747-028	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1747-028	3		1	2.03	410.287	0	0.068	SWMM Methods 64	IN1747-028	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1749-003	1	1	1	5.245	414.36	100	0.016	SWMM Methods 64	IN1749-003	0	IN1749-003	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1749-003	2		1	0.118	414.36	100	0.016	SWMM Methods 64	IN1749-003	1	IN1749-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1749-003	3		1	5.798	414.36	0	0.016	SWMM Methods 64	IN1749-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-003	1	1	1	2.893	441.338	100	0.038	SWMM Methods 64	IN1750-003	0	IN1750-003	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1750-003	2		1	0.242	441.338	100	0.038	SWMM Methods 64	IN1750-003	1	IN1750-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-003	3		1	4.373	441.338	0	0.038	SWMM Methods 64	IN1750-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1750-004	1	1	1	0.868	369.932	100	0.022	SWMM Methods 64	IN1750-004	0	IN1750-004	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1750-004	2		1	0.1	369.932	100	0.022	SWMM Methods 64	IN1750-004	1	IN1750-004	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-004	3		1	2.509	369.932	0	0.022	SWMM Methods 64	IN1750-004	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-008	1	1	1	1.815	358.3	100	0.032	SWMM Methods 64	IN1750-008	0	IN1750-008	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1750-008	2		1	0.385	358.3	100	0.032	SWMM Methods 64	IN1750-008	1	IN1750-008	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-008	3		1	1.477	358.3	0	0.032	SWMM Methods 64	IN1750-008	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-019	1	1	1	1.311	372.25	100	0.038	SWMM Methods 64	IN1750-019	0	IN1750-019	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1750-019	2		1	0.273	372.25	100	0.038	SWMM Methods 64	IN1750-019	1	IN1750-019	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-019	3		1	1.861	372.25	0	0.038	SWMM Methods 64	IN1750-019	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-034	1	1	1	1.457	352.449	100	0.033	SWMM Methods 64	IN1750-034	0	IN1750-034	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1750-034	2		1	0.031	352.449	100	0.033	SWMM Methods 64	IN1750-034	1	IN1750-034	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1750-034	3		1	0.777	352.449	0	0.033	SWMM Methods 64	IN1750-034	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1751-006	1	1	1	1.852	590.591	100	0.019	SWMM Methods 64	IN1751-006	0	IN1751-006	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1751-006	2		1	0.582	590.591	100	0.019	SWMM Methods 64	IN1751-006	1	IN1751-006	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1751-006	3		1	4.158	590.591	0	0.019	SWMM Methods 64	IN1751-006	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1751-016	1	1	1	1.195	308.408	100	0.024	SWMM Methods 64	IN1751-016	0	IN1751-016	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1751-016	2		1	0.47	308.408	100	0.024	SWMM Methods 64	IN1751-016	1	IN1751-016	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1751-016	3		1	2.585	308.408	0	0.024	SWMM Methods 64	IN1751-016	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1751-023	1	1	1	2.101	392.629	100	0.031	SWMM Methods 64	IN1751-023	0	IN1751-023	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1751-023	2		1	0.831	392.629	100	0.031	SWMM Methods 64	IN1751-023	1	IN1751-023	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1751-023	3		1	3.543	392.629	0	0.031	SWMM Methods 64	IN1751-023	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1752-011	1	1	1	1.948	546.869	100	0.048	SWMM Methods 64	IN1752-011	0	IN1752-011	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1752-011	2		1	0.632	546.869	100	0.048	SWMM Methods 64	IN1752-011	1	IN1752-011	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1752-011	3		1	2.754	546.869	0	0.048	SWMM Methods 64	IN1752-011	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1752-022	1	1	1	0.987	651.078	100	0.066	SWMM Methods 64	IN1752-022	0	IN1752-022	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1752-022	2		1	0.446	651.078	100	0.066	SWMM Methods 64	IN1752-022	1	IN1752-022	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1752-022	3		1	1.771	651.078	0	0.066	SWMM Methods 64	IN1752-022	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1752-029	1	1	1	1.569	350.197	100	0.019	SWMM Methods 64	IN1752-029	0	IN1752-029	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1752-029	2		1	0.506	350.197	100	0.019	SWMM Methods 64	IN1752-029	1	IN1752-029	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1752-029	3		1	2.514	350.197	0	0.019	SWMM Methods 64	IN1752-029	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-007	1	1	1	0.622	215.747	100	0.03	SWMM Methods 64	IN1753-007	0	IN1753-007	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-007	2		1	0.558	215.747	100	0.03	SWMM Methods 64	IN1753-007	1	IN1753-007	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-007	3		1	1.411	215.747	0	0.03	SWMM Methods 64	IN1753-007	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-009	1	1	1	0.609	161.396	100	0.016	SWMM Methods 64	IN1753-009	0	IN1753-009	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-009	2		1	0.721	161.396	100	0.016	SWMM Methods 64	IN1753-009	1	IN1753-009	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-009	3		1	1.044	161.396	0	0.016	SWMM Methods 64	IN1753-009	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-010	1	1	1	0.34	154.39	100	0.013	SWMM Methods 64	IN1753-010	0	IN1753-010	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-010	2		1	0.403	154.39	100	0.013	SWMM Methods 64	IN1753-010	1	IN1753-010	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-010	3		1	1.227	154.39	0	0.013	SWMM Methods 64	IN1753-010	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
IN1753-015	1	1	1	0.325	143.339	100	0.013	SWMM Methods 64	IN1753-015	0	IN1753-015	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-015	2		1	0.381	143.339	100	0.013	SWMM Methods 64	IN1753-015	1	IN1753-015	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-015	3		1	0.596	143.339	0	0.013	SWMM Methods 64	IN1753-015	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-018	1	1	1	0.578	100.822	100	0.018	SWMM Methods 64	IN1753-018	0	IN1753-018	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-018	2		1	0.264	100.822	100	0.018	SWMM Methods 64	IN1753-018	1	IN1753-018	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-018	3		1	0.898	100.822	0	0.018	SWMM Methods 64	IN1753-018	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
IN1753-023	1	1	1	0.311	197.036	100	0.019	SWMM Methods 64	IN1753-023	0	IN1753-023	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-023	2		1	0.369	197.036	100	0.019	SWMM Methods 64	IN1753-023	1	IN1753-023	SubCatchment 3	No Redirection	Sauk Heights Pond 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1753-023	3		1	1.27	197.036	0	0.019	SWMM Methods 64	IN1753-023	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
IN1753-026	1	1	1	0.248	195.619	100	0.019	SWMM Methods 64	IN1753-026	0	IN1753-026	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-026	2		1	0.33	195.619	100	0.019	SWMM Methods 64	IN1753-026	1	IN1753-026	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-026	3		1	1.191	195.619	0	0.019	SWMM Methods 64	IN1753-026	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-040	1	1	1	0.864	882.349	100	0.034	SWMM Methods 64	IN1753-040	0	IN1753-040	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1753-040	2		1	1.023	882.349	100	0.034	SWMM Methods 64	IN1753-040	1	IN1753-040	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1753-040	3		1	4.071	882.349	0	0.034	SWMM Methods 64	IN1753-040	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1754-021	1	1	1	0.139	102.323	100	0.009	SWMM Methods 64	IN1754-021	0	IN1754-021	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1754-021	2		1	0.164	102.323	100	0.009	SWMM Methods 64	IN1754-021	1	IN1754-021	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1754-021	3		1	0.65	102.323	0	0.009	SWMM Methods 64	IN1754-021	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1754-023	1	1	1	0.232	182.976	100	0.031	SWMM Methods 64	IN1754-023	0	IN1754-023	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1754-023	2		1	0.1	182.976	100	0.031	SWMM Methods 64	IN1754-023	1	IN1754-023	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1754-023	3		1	0.536	182.976	0	0.031	SWMM Methods 64	IN1754-023	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1754-030	1	1	1	0.625	193.508	100	0.058	SWMM Methods 64	IN1754-030	0	IN1754-030	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1754-030	3		1	2.37	193.508	0	0.058	SWMM Methods 64	IN1754-030	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1847-003	1	1	1	0.829	378.294	100	0.042	SWMM Methods 64	IN1847-003	0	IN1847-003	SubCatchment 3	No Redirection	Swallowtail Park
IN1847-003	2		1	0.255	378.294	100	0.042	SWMM Methods 64	IN1847-003	1	IN1847-003	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1847-003	3		1	1.476	378.294	0	0.042	SWMM Methods 64	IN1847-003	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1847-017	1	1	1	2.774	396.18	100	0.041	SWMM Methods 64	IN1847-017	0	IN1847-017	SubCatchment 3	No Redirection	Swallowtail Park
IN1847-017	2		1	1.255	396.18	100	0.041	SWMM Methods 64	IN1847-017	1	IN1847-017	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1847-017	3		1	6.222	396.18	0	0.041	SWMM Methods 64	IN1847-017	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1848-004	1	1	1	0.078	103.46	100	0.044	SWMM Methods 64	IN1848-004	0	IN1848-004	SubCatchment 3	No Redirection	Swallowtail Park
IN1848-004	2		1	0.093	103.46	100	0.044	SWMM Methods 64	IN1848-004	1	IN1848-004	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1848-004	3		1	0.404	103.46	0	0.044	SWMM Methods 64	IN1848-004	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN1848-007	1	1	1	0.371	605.863	100	0.086	SWMM Methods 64	IN1848-007	0	IN1848-007	SubCatchment 3	No Redirection	Swallowtail Park
IN1848-007	2		1	0.336	605.863	100	0.086	SWMM Methods 64	IN1848-007	1	IN1848-007	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1848-007	3		1	2.137	605.863	0	0.086	SWMM Methods 64	IN1848-007	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN1848-010	1	1	1	0.073	105.128	100	0.064	SWMM Methods 64	IN1848-010	0	IN1848-010	SubCatchment 3	No Redirection	Swallowtail Park
IN1848-010	2		1	0.093	105.128	100	0.064	SWMM Methods 64	IN1848-010	1	IN1848-010	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1848-010	3		1	0.636	105.128	0	0.064	SWMM Methods 64	IN1848-010	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN1849-004	1	1	1	0.766	249.527	100	0.023	SWMM Methods 64	IN1849-004	0	IN1849-004	SubCatchment 3	No Redirection	Swallowtail Park
IN1849-004	2		1	0.28	249.527	100	0.023	SWMM Methods 64	IN1849-004	1	IN1849-004	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1849-004	3		1	1.633	249.527	0	0.023	SWMM Methods 64	IN1849-004	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1849-018	1	1	1	3.477	312.981	100	0.016	SWMM Methods 64	IN1849-018	0	IN1849-018	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1849-018	2		1	0.213	312.981	100	0.016	SWMM Methods 64	IN1849-018	1	IN1849-018	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1849-018	3		1	1.279	312.981	0	0.016	SWMM Methods 64	IN1849-018	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1947-008	1	1	1	0.553	267.841	100	0.069	SWMM Methods 64	IN1947-008	0	IN1947-008	SubCatchment 3	No Redirection	Swallowtail Park
IN1947-008	2		1	0.374	267.841	100	0.069	SWMM Methods 64	IN1947-008	1	IN1947-008	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1947-008	3		1	2.458	267.841	0	0.069	SWMM Methods 64	IN1947-008	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1947-013	1	1	1	0.813	390.426	100	0.034	SWMM Methods 64	IN1947-013	0	IN1947-013	SubCatchment 3	No Redirection	Swallowtail Park
IN1947-013	2		1	0.552	390.426	100	0.034	SWMM Methods 64	IN1947-013	1	IN1947-013	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1947-013	3		1	2.919	390.426	0	0.034	SWMM Methods 64	IN1947-013	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1947-016	1	1	1	1.043	299.982	100	0.031	SWMM Methods 64	IN1947-016	0	IN1947-016	SubCatchment 3	No Redirection	Swallowtail Park
IN1947-016	2		1	0.571	299.982	100	0.031	SWMM Methods 64	IN1947-016	1	IN1947-016	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1947-016	3		1	4.152	299.982	0	0.031	SWMM Methods 64	IN1947-016	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN1947-018	1	1	1	0.591	161.865	100	0.069	SWMM Methods 64	IN1947-018	0	IN1947-018	SubCatchment 3	No Redirection	Swallowtail Park
IN1947-018	2		1	0.162	161.865	100	0.069	SWMM Methods 64	IN1947-018	1	IN1947-018	SubCatchment 3	No Redirection	Swallowtail Park 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1947-018	3		1	0.967	161.865	0	0.069	SWMM Methods 64	IN1947-018	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN1947-019	1	1	1	0.415	214.614	100	0.02	SWMM Methods 64	IN1947-019	0	IN1947-019	SubCatchment 3	No Redirection	Swallowtail Park
IN1947-019	2		1	0.028	214.614	100	0.02	SWMM Methods 64	IN1947-019	1	IN1947-019	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1947-019	3		1	0.426	214.614	0	0.02	SWMM Methods 64	IN1947-019	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1948-002	1	1	1	1.096	392.572	100	0.05	SWMM Methods 64	IN1948-002	0	IN1948-002	SubCatchment 3	No Redirection	Swallowtail Park
IN1948-002	2		1	0.468	392.572	100	0.05	SWMM Methods 64	IN1948-002	1	IN1948-002	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1948-002	3		1	2.659	392.572	0	0.05	SWMM Methods 64	IN1948-002	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1949-004	1	1	1	1.344	302.493	100	0.074	SWMM Methods 64	IN1949-004	0	IN1949-004	SubCatchment 3	No Redirection	Swallowtail Park
IN1949-004	2		1	0.348	302.493	100	0.074	SWMM Methods 64	IN1949-004	1	IN1949-004	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1949-004	3		1	3.141	302.493	0	0.074	SWMM Methods 64	IN1949-004	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1949-010	1	1	1	2.509	306.983	100	0.056	SWMM Methods 64	IN1949-010	0	IN1949-010	SubCatchment 3	No Redirection	Swallowtail Park
IN1949-010	2		1	0.116	306.983	100	0.056	SWMM Methods 64	IN1949-010	1	IN1949-010	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1949-010	3		1	3.157	306.983	0	0.056	SWMM Methods 64	IN1949-010	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1949-039	1	1	1	1.865	526.308	100	0.052	SWMM Methods 64	IN1949-039	0	IN1949-039	SubCatchment 3	No Redirection	Swallowtail Park
IN1949-039	3		1	1.572	526.308	0	0.052	SWMM Methods 64	IN1949-039	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1950-010	1	1	1	0.245	211.69	100	0.021	SWMM Methods 64	IN1950-010	0	IN1950-010	SubCatchment 3	No Redirection	Swallowtail Park
IN1950-010	3		1	1.207	211.69	0	0.021	SWMM Methods 64	IN1950-010	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1955-001	1	1	1	0.858	116.254	100	0.029	SWMM Methods 64	IN1955-001	0	IN1955-001	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1955-001	3		1	0.638	116.254	0	0.029	SWMM Methods 64	IN1955-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-003	1	1	1	1.044	446.918	100	0.08	SWMM Methods 64	IN1956-003	0	IN1956-003	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1956-003	3		1	1.516	446.918	0	0.08	SWMM Methods 64	IN1956-003	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-007	1	1	1	1.364	426.678	100	0.076	SWMM Methods 64	IN1956-007	0	IN1956-007	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1956-007	3		1	2.584	426.678	0	0.076	SWMM Methods 64	IN1956-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-014	1	1	1	1.415	401.256	100	0.043	SWMM Methods 64	IN1956-014	0	IN1956-014	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1956-014	2		1	0.053	401.256	100	0.043	SWMM Methods 64	IN1956-014	1	IN1956-014	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-014	3		1	7.459	401.256	0	0.043	SWMM Methods 64	IN1956-014	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-014-2	1	1	1	0.259	743.725	100	0.049	SWMM Methods 64	IN1956-014-2	0	IN1956-014-2	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1956-014-2	3		1	16.284	743.725	0	0.049	SWMM Methods 64	IN1956-014-2	0		SubCatchment 1	No Redirection	
IN1956-017	1	1	1	2.127	329.188	100	0.026	SWMM Methods 64	IN1956-017	0	IN1956-017	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1956-017	2		1	0.002	329.188	100	0.026	SWMM Methods 64	IN1956-017	1	IN1956-017	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-017	3		1	7.382	329.188	0	0.026	SWMM Methods 64	IN1956-017	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1956-017-2	1	1	1	0.03	812.259	100	0.028	SWMM Methods 64	IN1956-017-2	0	IN1956-017-2	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1956-017-2	2		1	0.035	812.259	100	0.028	SWMM Methods 64	IN1956-017-2	0	IN1956-017-2	SubCatchment 3	No Redirection	
IN1956-017-2	3		1	12.894	812.259	0	0.028	SWMM Methods 64	IN1956-017-2	0		SubCatchment 1	No Redirection	
IN1958-001	1	1	1	0.787	95.758	100	0.003	SWMM Methods 64	IN1958-001	0	IN1958-001	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1958-001	2		1	0.007	95.758	100	0.003	SWMM Methods 64	IN1958-001	1	IN1958-001	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1958-001	3		1	0.843	95.758	0	0.003	SWMM Methods 64	IN1958-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2047-023	1	1	1	3.635	746.675	100	0.032	SWMM Methods 64	IN2047-023	0	IN2047-023	SubCatchment 3	No Redirection	Swallowtail Park
IN2047-023	2		1	0.019	746.675	100	0.032	SWMM Methods 64	IN2047-023	1	IN2047-023	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2047-023	3		1	10.744	746.675	0	0.032	SWMM Methods 64	IN2047-023	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2050-009	1	1	1	1.036	452.87	100	0.03	SWMM Methods 64	IN2050-009	0	IN2050-009	SubCatchment 3	No Redirection	Swallowtail Park
IN2050-009	2		1	0.071	452.87	100	0.03	SWMM Methods 64	IN2050-009	1	IN2050-009	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2050-009	3		1	3.695	452.87	0	0.03	SWMM Methods 64	IN2050-009	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2051-008	1	1	1	1.13	396.135	100	0.013	SWMM Methods 64	IN2051-008	0	IN2051-008	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2051-008	2		1	0.21	396.135	100	0.013	SWMM Methods 64	IN2051-008	1	IN2051-008	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2051-008	3		1	1.235	396.135	0	0.013	SWMM Methods 64	IN2051-008	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2051-048	1	1	1	0.459	275.348	100	0.021	SWMM Methods 64	IN2051-048	0	IN2051-048	SubCatchment 3	No Redirection	Swallowtail Park

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2051-048	2		1	0.04	275.348	100	0.021	SWMM Methods 64	IN2051-048	1	IN2051-048	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2051-048	3		1	0.555	275.348	0	0.021	SWMM Methods 64	IN2051-048	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2051-056	1	1	1	2.444	498.931	100	0.01	SWMM Methods 64	IN2051-056	0	IN2051-056	SubCatchment 3	No Redirection	Swallowtail Park
IN2051-056	2		1	1.26	498.931	100	0.01	SWMM Methods 64	IN2051-056	1	IN2051-056	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2051-056	3		1	5.222	498.931	0	0.01	SWMM Methods 64	IN2051-056	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2052-004	1	1	1	1.322	304.142	100	0.023	SWMM Methods 64	IN2052-004	0	IN2052-004	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2052-004	2		1	0.779	304.142	100	0.023	SWMM Methods 64	IN2052-004	1	IN2052-004	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2052-004	3		1	1.766	304.142	0	0.023	SWMM Methods 64	IN2052-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2052-009	1	1	1	2.002	734.448	100	0.017	SWMM Methods 64	IN2052-009	0	IN2052-009	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2052-009	2		1	0.932	734.448	100	0.017	SWMM Methods 64	IN2052-009	1	IN2052-009	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2052-009	3		1	2.89	734.448	0	0.017	SWMM Methods 64	IN2052-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2052-026	1	1	1	2.034	402.283	100	0.037	SWMM Methods 64	IN2052-026	0	IN2052-026	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2052-026	2		1	1.352	402.283	100	0.037	SWMM Methods 64	IN2052-026	1	IN2052-026	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2052-026	3		1	1.772	402.283	0	0.037	SWMM Methods 64	IN2052-026	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2053-004	1	1	1	0.989	190.496	100	0.018	SWMM Methods 64	IN2053-004	0	IN2053-004	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2053-004	2		1	0.267	190.496	100	0.018	SWMM Methods 64	IN2053-004	1	IN2053-004	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2053-004	3		1	1.636	190.496	0	0.018	SWMM Methods 64	IN2053-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2055-007	1	1	1	1.135	384.902	100	0.049	SWMM Methods 64	IN2055-007	0	IN2055-007	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2055-007	3		1	0.8	384.902	0	0.049	SWMM Methods 64	IN2055-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2056-009	1	1	1	0.817	253.414	100	0.029	SWMM Methods 64	IN2056-009	0	IN2056-009	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2056-009	3		1	0.266	253.414	0	0.029	SWMM Methods 64	IN2056-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2056-039	1	1	1	0.409	97.474	100	0.021	SWMM Methods 64	IN2056-039	0	IN2056-039	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2056-039	3		1	0.116	97.474	0	0.021	SWMM Methods 64	IN2056-039	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2056-043	1	1	1	0.957	203.629	100	0.041	SWMM Methods 64	IN2056-043	0	IN2056-043	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2056-043	3		1	0.81	203.629	0	0.041	SWMM Methods 64	IN2056-043	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2145-012	1	1	1	3.673	363.291	100	0.003	SWMM Methods 64	IN2145-012	0	IN2145-012	SubCatchment 3	No Redirection	Swallowtail Park
IN2145-012	2		1	1.849	363.291	100	0.003	SWMM Methods 64	IN2145-012	1	IN2145-012	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2145-012	3		1	5.987	363.291	0	0.003	SWMM Methods 64	IN2145-012	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2150-021	1	1	1	1.727	585.731	100	0.061	SWMM Methods 64	IN2150-007	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN2150-021	2		1	0.714	585.731	100	0.061	SWMM Methods 64	IN2150-007	1	IN2150-021	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2150-021	3		1	10.725	585.73	0	0.061	SWMM Methods 64	IN2150-007	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2150-045	1	1	1	5.292	743.768	100	0.001	SWMM Methods 64	IN2150-045	0	IN2150-045	SubCatchment 3	No Redirection	Swallowtail Park
IN2150-045	2		1	0.064	743.768	100	0.001	SWMM Methods 64	IN2150-045	1	IN2150-045	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2150-045	3		1	2.23	743.768	0	0.001	SWMM Methods 64	IN2150-045	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2152-007	1	1	1	1.343	191.372	100	0.011	SWMM Methods 64	IN2152-007	0	IN2152-007	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2152-007	2		1	0.326	191.372	100	0.011	SWMM Methods 64	IN2152-007	1	IN2152-007	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2152-007	3		1	2.089	191.372	0	0.011	SWMM Methods 64	IN2152-007	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2152-016	1	1	1	1.009	174.595	100	0.009	SWMM Methods 64	IN2152-016	0	IN2152-016	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2152-016	2		1	0.228	174.595	100	0.009	SWMM Methods 64	IN2152-016	1	IN2152-016	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2152-016	3		1	1.529	174.595	0	0.009	SWMM Methods 64	IN2152-016	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2155-007	1	1	1	3.544	355.041	100	0.014	SWMM Methods 64	IN2155-007	0	IN2155-007	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2155-007	2		1	0.013	355.041	100	0.014	SWMM Methods 64	IN2155-007	1	IN2155-007	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2155-007	3		1	5.888	355.041	0	0.014	SWMM Methods 64	IN2155-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2156-072	1	1	1	2.342	173.634	100	0.008	SWMM Methods 64	IN2156-072	0	IN2156-072	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2156-072	2		1	0.001	173.634	100	0.008	SWMM Methods 64	IN2156-072	1	IN2156-072	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2156-072	3		1	0.416	173.634	0	0.008	SWMM Methods 64	IN2156-072	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2158-009	1	1	1	1.398	288.817	100	0.022	SWMM Methods 64	IN2158-009	0	IN2158-009	SubCatchment 3	No Redirection	UW Ag Research Stati

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2158-009	3		1	0.415	288.817	0	0.022	SWMM Methods 64	IN2158-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2158-017	1	1	1	0.843	233.989	100	0.05	SWMM Methods 64	IN2158-017	0	IN2158-017	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2158-017	2		1	0.277	233.989	100	0.05	SWMM Methods 64	IN2158-017	1	IN2158-017	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2158-017	3		1	6.897	233.989	0	0.05	SWMM Methods 64	IN2158-017	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2159-002	1	1	1	1.197	344.305	100	0.065	SWMM Methods 64	IN2159-002	0	IN2159-002	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2159-002	2		1	0.247	344.305	100	0.065	SWMM Methods 64	IN2159-002	1	IN2159-002	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2159-002	3		1	9.008	344.305	0	0.065	SWMM Methods 64	IN2159-002	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2159-009	1	1	1	0.654	261.336	100	0.084	SWMM Methods 64	IN2159-009	0	IN2159-009	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2159-009	3		1	3.7	261.336	0	0.084	SWMM Methods 64	IN2159-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2246-002	1	1	1	3.41	515.767	100	0.016	SWMM Methods 64	IN2246-002	0	IN2246-002	SubCatchment 3	No Redirection	Swallowtail Park
IN2246-002	2		1	0.258	515.767	100	0.016	SWMM Methods 64	IN2246-002	1	IN2246-002	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2246-002	3		1	2.28	515.767	0	0.016	SWMM Methods 64	IN2246-002	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2247-013	1	1	1	3.412	378.973	100	0.008	SWMM Methods 64	IN2247-013	0	IN2247-013	SubCatchment 3	No Redirection	Swallowtail Park
IN2247-013	2		1	0.057	378.973	100	0.008	SWMM Methods 64	IN2247-013	1	IN2247-013	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2247-013	3		1	2.592	378.973	0	0.008	SWMM Methods 64	IN2247-013	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2249-003	1	1	1	11.062	698.991	100	0.037	SWMM Methods 64	IN2249-003	0	IN2249-003	SubCatchment 3	No Redirection	Swallowtail Park
IN2249-003	2		1	0.148	698.991	100	0.037	SWMM Methods 64	IN2249-003	1	IN2249-003	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2249-003	3		1	8.719	698.991	0	0.037	SWMM Methods 64	IN2249-003	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2249-024	1	1	1	0.568	243.777	100	0.01	SWMM Methods 64	IN2249-024	0	IN2249-024	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2249-024	3		1	0.219	243.777	0	0.01	SWMM Methods 64	IN2249-024	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2249-028	1	1	1	2.142	249.336	100	0.021	SWMM Methods 64	IN2249-028	0	IN2249-028	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2249-028	3		1	1.693	249.336	0	0.021	SWMM Methods 64	IN2249-028	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2250-026	1	1	1	1.556	242.211	100	0.012	SWMM Methods 64	IN2250-026	0	IN2250-026	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2250-026	2		1	0.152	242.211	100	0.012	SWMM Methods 64	IN2250-026	1	IN2250-026	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2250-026	3		1	0.43	242.211	0	0.012	SWMM Methods 64	IN2250-026	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2251-024	1	1	1	0.9	168.137	100	0.018	SWMM Methods 64	IN2251-024	0	IN2251-024	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2251-024	2		1	0.04	168.137	100	0.018	SWMM Methods 64	IN2251-024	1	IN2251-024	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2251-024	3		1	0.605	168.137	0	0.018	SWMM Methods 64	IN2251-024	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2251-027	1	1	1	1.912	390.443	100	0.021	SWMM Methods 64	IN2251-027	0	IN2251-027	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2251-027	2		1	1.452	390.443	100	0.021	SWMM Methods 64	IN2251-027	1	IN2251-027	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2251-027	3		1	1.703	390.443	0	0.021	SWMM Methods 64	IN2251-027	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2255-002	1	1	1	15.441	1386.713	100	0.013	SWMM Methods 64	IN2255-002	0	IN2255-002	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2255-002	3		1	2.56	1386.713	0	0.013	SWMM Methods 64	IN2255-002	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2256-023	1	1	1	0.201	90.622	100	0.01	SWMM Methods 64	IN2256-023	0	IN2256-023	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2256-023	3		1	0.076	90.622	0	0.01	SWMM Methods 64	IN2256-023	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2256-048	1	1	1	2.414	293.681	100	0.013	SWMM Methods 64	IN2256-048	0	IN2256-048	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2256-048	3		1	0.751	293.681	0	0.013	SWMM Methods 64	IN2256-048	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2256-053	1	1	1	1.718	319.925	100	0.014	SWMM Methods 64	IN2256-053	0	IN2256-053	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2256-053	2		1	0.001	319.925	100	0.014	SWMM Methods 64	IN2256-053	1	IN2256-053	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2256-053	3		1	0.476	319.925	0	0.014	SWMM Methods 64	IN2256-053	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2257-028	1	1	1	1.766	467.355	100	0.054	SWMM Methods 64	IN2257-028	0	IN2257-028	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2257-028	2		1	0.169	467.355	100	0.054	SWMM Methods 64	IN2257-028	1	IN2257-028	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2257-028	3		1	2.743	467.355	0	0.054	SWMM Methods 64	IN2257-028	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2258-025	1	1	1	1.145	351.796	100	0.027	SWMM Methods 64	IN2258-025	0	IN2258-025	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-025	2		1	0.038	351.796	100	0.027	SWMM Methods 64	IN2258-025	1	IN2258-025	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2258-025	3		1	1.484	351.796	0	0.027	SWMM Methods 64	IN2258-025	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2258-027	1	1	1	1.516	791.64	100	0.01	SWMM Methods 64	IN2258-027	0	IN2258-027	SubCatchment 3	No Redirection	UW Ag Research Stati

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2258-027	2		1	0.046	791.64	100	0.01	SWMM Methods 64	IN2258-027	1	IN2258-027	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2258-027	3		1	1.991	791.64	0	0.01	SWMM Methods 64	IN2258-027	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2258-054	1	1	1	1.061	380.798	100	0.028	SWMM Methods 64	IN2258-054	0	IN2258-054	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-054	2		1	0.047	380.798	100	0.028	SWMM Methods 64	IN2258-054	1	IN2258-054	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2258-054	3		1	1.018	380.798	0	0.028	SWMM Methods 64	IN2258-054	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2258-074	1	1	1	1.98	186.974	100	0.005	SWMM Methods 64	IN2258-074	0	IN2258-074	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-074	3		1	0.394	186.974	0	0.005	SWMM Methods 64	IN2258-074	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2347-005	1	1	1	3.175	629.731	100	0.005	SWMM Methods 64	IN2347-005	0	IN2347-005	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2347-005	2		1	0.816	629.731	100	0.005	SWMM Methods 64	IN2347-005	1	IN2347-005	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2347-005	3		1	7.257	629.731	0	0.005	SWMM Methods 64	IN2347-005	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2347-020	1	1	1	1.49	374.458	100	0.01	SWMM Methods 64	IN2347-020	0	IN2347-020	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2347-020	2		1	0.561	374.458	100	0.01	SWMM Methods 64	IN2347-020	1	IN2347-020	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2347-020	3		1	4.065	374.458	0	0.01	SWMM Methods 64	IN2347-020	0		SubCatchment 1	No Redirection	Strickers Forebay 18
IN2348-003	1	1	1	2.374	369.142	100	0.027	SWMM Methods 64	IN2348-003	0	IN2348-003	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2348-003	2		1	0.046	369.142	100	0.027	SWMM Methods 64	IN2348-003	1	IN2348-003	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2348-003	3		1	3.872	369.142	0	0.027	SWMM Methods 64	IN2348-003	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2349-002	1	1	1	3.739	478.94	100	0.026	SWMM Methods 64	IN2349-002	0	IN2349-002	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2349-002	2		1	0.045	478.94	100	0.026	SWMM Methods 64	IN2349-002	1	IN2349-002	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2349-002	3		1	2.854	478.94	0	0.026	SWMM Methods 64	IN2349-002	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2350-004	1	1	1	3.501	263.521	100	0.022	SWMM Methods 64	IN2350-004	0	IN2350-004	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2350-004	2		1	0.063	263.521	100	0.022	SWMM Methods 64	IN2350-004	1	IN2350-004	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2350-004	3		1	1.856	263.521	0	0.022	SWMM Methods 64	IN2350-004	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2350-029	1	1	1	2.513	349.385	100	0.029	SWMM Methods 64	IN2350-029	0	IN2350-029	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2350-029	2		1	0.454	349.385	100	0.029	SWMM Methods 64	IN2350-029	1	IN2350-029	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2350-029	3		1	3.81	349.385	0	0.029	SWMM Methods 64	IN2350-029	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2351-006	1	1	1	0.31	185.338	100	0.026	SWMM Methods 64	IN2351-006	0	IN2351-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2351-006	2		1	0.091	185.338	100	0.026	SWMM Methods 64	IN2351-006	1	IN2351-006	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2351-006	3		1	1.075	185.338	0	0.026	SWMM Methods 64	IN2351-006	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2353-006	1	1	1	2.546	399.588	100	0.011	SWMM Methods 64	IN2353-006	0	IN2353-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2353-006	2		1	0.605	399.588	100	0.011	SWMM Methods 64	IN2353-006	1	IN2353-006	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2353-006	3		1	6.677	399.588	0	0.011	SWMM Methods 64	IN2353-006	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2355-006	1	1	1	3.331	672.943	100	0.013	SWMM Methods 64	IN2355-006	0	IN2355-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2355-006	2		1	0.092	672.943	100	0.013	SWMM Methods 64	IN2355-006	1	IN2355-006	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2355-006	3		1	0.932	672.943	0	0.013	SWMM Methods 64	IN2355-006	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2355-040	1	1	1	1.393	189.717	100	0.03	SWMM Methods 64	IN2355-040	0	IN2355-040	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2355-040	3		1	0.505	189.717	0	0.03	SWMM Methods 64	IN2355-040	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2356-006	1	1	1	4.717	261.772	100	0.033	SWMM Methods 64	IN2356-006	0	IN2356-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2356-006	2		1	0.066	261.772	100	0.033	SWMM Methods 64	IN2356-006	1	IN2356-006	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2356-006	3		1	1.754	261.772	0	0.033	SWMM Methods 64	IN2356-006	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2356-025	1	1	1	4.581	145.503	100	0.023	SWMM Methods 64	IN2356-025	0	IN2356-025	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2356-025	3		1	2.362	145.503	0	0.023	SWMM Methods 64	IN2356-025	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2358-013	1	1	1	3.901	409.377	100	0.022	SWMM Methods 64	IN2358-013	0	IN2358-013	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2358-013	2		1	0.005	409.377	100	0.022	SWMM Methods 64	IN2358-013	1	IN2358-013	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2358-013	3		1	1.532	409.377	0	0.022	SWMM Methods 64	IN2358-013	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2358-020	1	1	1	0.534	168.854	100	0.062	SWMM Methods 64	IN2358-020	0	IN2358-020	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2358-020	3		1	1.525	168.854	0	0.062	SWMM Methods 64	IN2358-020	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2447-001	1	1	1	1.373	433.573	100	0.016	SWMM Methods 64	IN2447-001	0	IN2447-001	SubCatchment 3	No Redirection	Strickers Pond Foreb

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2447-001	2		1	0.547	433.573	100	0.016	SWMM Methods 64	IN2447-001	1	IN2447-001	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2447-001	3		1	3.952	433.573	0	0.016	SWMM Methods 64	IN2447-001	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2449-002	1	1	1	1.824	284.313	100	0.03	SWMM Methods 64	IN2449-002	0	IN2449-002	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2449-002	2		1	0.049	284.313	100	0.03	SWMM Methods 64	IN2449-002	1	IN2449-002	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2449-002	3		1	2.102	284.313	0	0.03	SWMM Methods 64	IN2449-002	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2451-009	1	1	1	2.191	651.232	100	0.019	SWMM Methods 64	IN2451-009	0	IN2451-009	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2451-009	2		1	1.168	651.232	100	0.019	SWMM Methods 64	IN2451-009	1	IN2451-009	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2451-009	3		1	8.779	651.232	0	0.019	SWMM Methods 64	IN2451-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2452-009	1	1	1	1.276	984.543	100	0.028	SWMM Methods 64	IN2452-009	0	IN2452-009	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2452-009	2		1	0.454	984.543	100	0.028	SWMM Methods 64	IN2452-009	1	IN2452-009	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2452-009	3		1	3.287	984.543	0	0.028	SWMM Methods 64	IN2452-009	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2453-004	1	1	1	1.437	294.822	100	0.039	SWMM Methods 64	IN2453-004	0	IN2453-004	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2453-004	2		1	0.441	294.822	100	0.039	SWMM Methods 64	IN2453-004	1	IN2453-004	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2453-004	3		1	4.363	294.822	0	0.039	SWMM Methods 64	IN2453-004	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2453-009	1	1	1	1.879	383.086	100	0.04	SWMM Methods 64	IN2453-009	0	IN2453-009	SubCatchment 3	No Redirection	Memorial High School
IN2453-009	2		1	0.65	383.086	100	0.04	SWMM Methods 64	IN2453-009	1	IN2453-009	SubCatchment 3	No Redirection	Memorial HS 2018
IN2453-009	3		1	5.922	383.086	0	0.04	SWMM Methods 64	IN2453-009	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN2454-009	1	1	1	3.253	588.564	100	0.015	SWMM Methods 64	IN2454-009	0	IN2454-009	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2454-009	2		1	0.044	588.564	100	0.015	SWMM Methods 64	IN2454-009	1	IN2454-009	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2454-009	3		1	2.632	588.564	0	0.015	SWMM Methods 64	IN2454-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2455-017	1	1	1	2.992	326.672	100	0.032	SWMM Methods 64	IN2455-017	0	IN2455-017	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2455-017	2		1	0.039	326.672	100	0.032	SWMM Methods 64	IN2455-017	1	IN2455-017	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2455-017	3		1	1.047	326.672	0	0.032	SWMM Methods 64	IN2455-017	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2455-021	1	1	1	5.505	355.922	100	0.036	SWMM Methods 64	IN2455-021	0	IN2455-021	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2455-021	2		1	0.065	355.922	100	0.036	SWMM Methods 64	IN2455-021	1	IN2455-021	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2455-021	3		1	2.138	355.922	0	0.036	SWMM Methods 64	IN2455-021	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2456-003	1	1	1	3.981	407.481	100	0.04	SWMM Methods 64	IN2456-003	0	IN2456-003	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2456-003	2		1	0.25	407.481	100	0.04	SWMM Methods 64	IN2456-003	1	IN2456-003	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2456-003	3		1	2.712	407.481	0	0.04	SWMM Methods 64	IN2456-003	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2550-001	1	1	1	2.424	528.683	100	0.045	SWMM Methods 64	IN2550-001	0	IN2550-001	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2550-001	2		1	1.151	528.683	100	0.045	SWMM Methods 64	IN2550-001	1	IN2550-001	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2550-001	3		1	9.16	528.683	0	0.045	SWMM Methods 64	IN2550-001	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2550-021	1	1	1	2.366	257.309	100	0.025	SWMM Methods 64	IN2550-021	0	IN2550-021	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2550-021	2		1	0.063	257.309	100	0.025	SWMM Methods 64	IN2550-021	1	IN2550-021	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2550-021	3		1	2.224	257.309	0	0.025	SWMM Methods 64	IN2550-021	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN2552-007	1	1	1	2.041	288.746	100	0.039	SWMM Methods 64	IN2552-007	0	IN2552-007	SubCatchment 3	No Redirection	Memorial High School
IN2552-007	2		1	0.721	288.746	100	0.039	SWMM Methods 64	IN2552-007	1	IN2552-007	SubCatchment 3	No Redirection	Memorial HS 2018
IN2552-007	3		1	5.143	288.746	0	0.039	SWMM Methods 64	IN2552-007	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN2552-010	1	1	1	4.418	704.752	100	0.038	SWMM Methods 64	IN2552-010	0	IN2552-010	SubCatchment 3	No Redirection	Memorial High School
IN2552-010	2		1	1.375	704.752	100	0.038	SWMM Methods 64	IN2552-010	1	IN2552-010	SubCatchment 3	No Redirection	Memorial HS 2018
IN2552-010	3		1	10.316	704.752	0	0.038	SWMM Methods 64	IN2552-010	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN2554-002	1	1	1	1.796	267.387	100	0.034	SWMM Methods 64	IN2554-002	0	IN2554-002	SubCatchment 3	No Redirection	Memorial High School
IN2554-002	2		1	0.222	267.387	100	0.034	SWMM Methods 64	IN2554-002	1	IN2554-002	SubCatchment 3	No Redirection	Memorial HS 2018
IN2554-002	3		1	2.429	267.387	0	0.034	SWMM Methods 64	IN2554-002	0		SubCatchment 1	No Redirection	Memorial HS 2018
IN2650-005	1	1	1	2.75	592.679	100	0.035	SWMM Methods 64	IN2650-005	0	IN2650-005	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN2650-005	2		1	0.239	592.679	100	0.035	SWMM Methods 64	IN2650-005	1	IN2650-005	SubCatchment 3	No Redirection	Strickers Forebay 18
IN2650-005	3		1	6.573	592.679	0	0.035	SWMM Methods 64	IN2650-005	0		SubCatchment 3	No Redirection	Strickers Forebay 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
JB2256-060	1	1	1	3.157	441.107	100	0.01	SWMM Methods 64	JB2256-060	0	JB2256-060	SubCatchment 3	No Redirection	UW Ag Research Stati
JB2256-060	3		1	1.147	441.107	0	0.01	SWMM Methods 64	JB2256-060	0		SubCatchment 3	No Redirection	UW Ag Research 2018
JCT_CT_POND_OUT	1	1	1	5.586	360.821	100	0.017	SWMM Methods 64	JCT_CT_POND_(	0	JCT_CT_POND_C	SubCatchment 3	No Redirection	UW Ag Research Stati
JCT_CT_POND_OUT	2		1	0.084	360.821	100	0.017	SWMM Methods 64	JCT_CT_POND_(	1	JCT_CT_POND_C	SubCatchment 3	No Redirection	UW Ag Research 2018
JCT_CT_POND_OUT	3		1	2.856	360.821	0	0.017	SWMM Methods 64	JCT_CT_POND_(	0		SubCatchment 3	No Redirection	UW Ag Research 2018
JUNCTION_LOOP_POND	1	1	1	1.966	381.673	100	0.038	SWMM Methods 64	JUNCTION_LOO	0	JUNCTION_LOOP	SubCatchment 3	No Redirection	UW Ag Research Stati
JUNCTION_LOOP_POND	3		1	2.753	381.673	0	0.038	SWMM Methods 64	JUNCTION_LOO	0		SubCatchment 3	No Redirection	UW Ag Research 2018
JUNCTION_RIDGE_POND	1	1	1	9.902	870.593	100	0.012	SWMM Methods 64	JUNCTION_RIDG	0	JUNCTION_RIDG	SubCatchment 3	No Redirection	UW Ag Research Stati
JUNCTION_RIDGE_POND	2		1	0.121	870.593	100	0.012	SWMM Methods 64	JUNCTION_RIDG	1	JUNCTION_RIDG	SubCatchment 3	No Redirection	UW Ag Research 2018
JUNCTION_RIDGE_POND	3		1	4.398	870.593	0	0.012	SWMM Methods 64	JUNCTION_RIDG	0		SubCatchment 3	No Redirection	UW Ag Research 2018
MENARDS_POND_BIOFILTER	1	1	1	0.629	258.725	100	0.033	SWMM Methods 64	MENARDS_PON	0	MENARDS_POND	SubCatchment 3	No Redirection	UW Ag Research Stati
MENARDS_POND_BIOFILTER	3		1	0.704	258.725	0	0.033	SWMM Methods 64	MENARDS_PON	0		SubCatchment 3	No Redirection	UW Ag Research 2018
MINPT_RD_SW1	1	1	1	0.002	159.903	100	0.041	SWMM Methods 64	MINPT_RD_SW1	0	MINPT_RD_SW1	SubCatchment 3	No Redirection	UW Ag Research Stati
MINPT_RD_SW1	3		1	3.382	159.903	0	0.041	SWMM Methods 64	MINPT_RD_SW1	0		SubCatchment 1	No Redirection	
MINPT_RD_SW2	1	1	1	0.042	110.621	100	0.036	SWMM Methods 64	MINPT_RD_SW2	0	MINPT_RD_SW2	SubCatchment 3	No Redirection	UW Ag Research Stati
MINPT_RD_SW2	3		1	1.649	110.621	0	0.036	SWMM Methods 64	MINPT_RD_SW2	0		SubCatchment 1	No Redirection	
MINPT_RD_SW3	1	1	1	0.066	132.426	100	0.03	SWMM Methods 64	MINPT_RD_SW3	0	MINPT_RD_SW3	SubCatchment 3	No Redirection	UW Ag Research Stati
MINPT_RD_SW3	3		1	1.324	132.426	0	0.03	SWMM Methods 64	MINPT_RD_SW3	0		SubCatchment 1	No Redirection	
N_PV_ROAD_DS2	1	1	1	6.673	1408.733	100	0.083	SWMM Methods 64	N_PV_ROAD_DS	0	N_PV_ROAD_DS	SubCatchment 3	No Redirection	Swallowtail Park
N_PV_ROAD_DS2	2		1	0.057	1408.733	100	0.083	SWMM Methods 64	N_PV_ROAD_DS	1	N_PV_ROAD_DS	SubCatchment 3	No Redirection	Swallowtail Park 18
N_PV_ROAD_DS2	3		1	14.735	1408.733	0	0.083	SWMM Methods 64	N_PV_ROAD_DS	0		SubCatchment 3	No Redirection	Swallowtail Park 18
N_PV_ROAD_US	1	1	1	0.211	243.79	100	0.12	SWMM Methods 64	N_PV_ROAD_US	0	N_PV_ROAD_US	SubCatchment 3	No Redirection	Swallowtail Park
N_PV_ROAD_US	2		1	0.063	243.79	100	0.12	SWMM Methods 64	N_PV_ROAD_US	1	N_PV_ROAD_US	SubCatchment 3	No Redirection	Swallowtail Park 18
N_PV_ROAD_US	3		1	2.036	243.79	0	0.12	SWMM Methods 64	N_PV_ROAD_US	0		SubCatchment 3	No Redirection	Swallowtail Park 18
N_WEXFORD_POND	1	1	1	6.663	2033.252	100	0.046	SWMM Methods 64	N_WEXFORD_P(	0	N_WEXFORD_PO	SubCatchment 3	No Redirection	Strickers Pond Foreb
N_WEXFORD_POND	2		1	0.435	2033.252	100	0.046	SWMM Methods 64	N_WEXFORD_P(	1	N_WEXFORD_PO	SubCatchment 3	No Redirection	Strickers Forebay 18
N_WEXFORD_POND	3		1	7.725	2033.252	0	0.046	SWMM Methods 64	N_WEXFORD_P(	0		SubCatchment 3	No Redirection	Strickers Forebay 18
NORTH_BLACKHAWK_POND	1	1	1	3.971	1351.498	100	0.045	SWMM Methods 64	NORTH_BLACKH	0	NORTH_BLACKHA	SubCatchment 3	No Redirection	Swallowtail Park
NORTH_BLACKHAWK_POND	2		1	0.648	1351.498	100	0.045	SWMM Methods 64	NORTH_BLACKH	1	NORTH_BLACKHA	SubCatchment 3	No Redirection	Swallowtail Park 18
NORTH_BLACKHAWK_POND	3		1	9.039	1351.498	0	0.045	SWMM Methods 64	NORTH_BLACKH	0		SubCatchment 3	No Redirection	Swallowtail Park 18
NW_INF_BASIN	1	1	1	0.151	168.144	100	0.011	SWMM Methods 64	NW_INF_BASIN	0	NW_INF_BASIN	SubCatchment 1	No Redirection	Sauk Heights Pond
NW_INF_BASIN	2		1	0.2	168.144	100	0.011	SWMM Methods 64	NW_INF_BASIN	1	NW_INF_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond 18
NW_INF_BASIN	3		1	0.961	168.144	0	0.011	SWMM Methods 64	NW_INF_BASIN	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
OLD_SAUK_BELTLINE_NE	1	1	1	0.688	146.436	100	0.03	SWMM Methods 64	OLD_SAUK_BEL	0	OLD_SAUK_BELT	SubCatchment 3	No Redirection	Strickers Pond Foreb
OLD_SAUK_BELTLINE_NE	3		1	1.231	146.436	0	0.03	SWMM Methods 64	OLD_SAUK_BEL	0		SubCatchment 3	No Redirection	Strickers Forebay 18
OLD_SAUK_BELTLINE_SE	1	1	1	0.944	138.623	100	0.029	SWMM Methods 64	OLD_SAUK_BEL	0	OLD_SAUK_BELT	SubCatchment 3	No Redirection	UW Ag Research Stati
OLD_SAUK_BELTLINE_SE	3		1	1.117	138.623	0	0.029	SWMM Methods 64	OLD_SAUK_BEL	0		SubCatchment 3	No Redirection	UW Ag Research 2018
OLD_SAUK_GW3_US	1	1	1	1.238	325.739	100	0.037	SWMM Methods 64	OLD_SAUK_GW	0	OLD_SAUK_GW3	SubCatchment 3	No Redirection	Swallowtail Park
OLD_SAUK_GW3_US	2		1	0.038	325.739	100	0.037	SWMM Methods 64	OLD_SAUK_GW	1	OLD_SAUK_GW3	SubCatchment 3	No Redirection	Swallowtail Park 18
OLD_SAUK_GW3_US	3		1	2.14	325.739	0	0.037	SWMM Methods 64	OLD_SAUK_GW	0		SubCatchment 3	No Redirection	Swallowtail Park 18
OSR_BL_SERAMP_US	1	1	1	2.497	400.535	100	0.021	SWMM Methods 64	OSR_BL_SERAM	0	OSR_BL_SERAMP	SubCatchment 3	No Redirection	UW Ag Research Stati
OSR_BL_SERAMP_US	2		1	0.055	400.535	100	0.021	SWMM Methods 64	OSR_BL_SERAM	1	OSR_BL_SERAMP	SubCatchment 3	No Redirection	UW Ag Research 2018
OSR_BL_SERAMP_US	3		1	3.739	400.535	0	0.021	SWMM Methods 64	OSR_BL_SERAM	0		SubCatchment 3	No Redirection	UW Ag Research 2018
OSTP_POND_SYSTEM_JCT_1	1	1	1	1.497	301.567	100	0.028	SWMM Methods 64	OSTP_POND_SY	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park
OSTP_POND_SYSTEM_JCT_1	2		1	0.014	301.567	100	0.028	SWMM Methods 64	OSTP_POND_SY	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_1	3		1	2.419	301.567	0	0.028	SWMM Methods 64	OSTP_POND_SY	0		SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_11	1	1	1	1.436	258.252	100	0.038	SWMM Methods 64	OSTP_POND_SY	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
OSTP_POND_SYSTEM_JCT_11	2		1	0.088	258.252	100	0.038	SWMM Methods 64	OSTP_POND_SY	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_11	3		1	1.507	258.252	0	0.038	SWMM Methods 64	OSTP_POND_SY	0		SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_13	1	1	1	4.016	1213.742	100	0.04	SWMM Methods 64	OSTP_POND_SY	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park
OSTP_POND_SYSTEM_JCT_13	2		1	0.038	1213.742	100	0.04	SWMM Methods 64	OSTP_POND_SY	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_13	3		1	3.798	1213.742	0	0.04	SWMM Methods 64	OSTP_POND_SY	0		SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_3	1	1	1	4.752	733.589	100	0.021	SWMM Methods 64	OSTP_POND_SY	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park
OSTP_POND_SYSTEM_JCT_3	2		1	0.733	733.589	100	0.021	SWMM Methods 64	OSTP_POND_SY	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_3	3		1	7.05	733.589	0	0.021	SWMM Methods 64	OSTP_POND_SY	0		SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_6	1	1	1	3.637	594.039	100	0.045	SWMM Methods 64	OSTP_POND_SY	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park
OSTP_POND_SYSTEM_JCT_6	2		1	0.069	594.039	100	0.045	SWMM Methods 64	OSTP_POND_SY	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_6	3		1	7.479	594.039	0	0.045	SWMM Methods 64	OSTP_POND_SY	0		SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_8A	1	1	1	2.034	650.91	100	0.032	SWMM Methods 64	OSTP_POND_SY	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park
OSTP_POND_SYSTEM_JCT_8A	2		1	0.083	650.91	100	0.032	SWMM Methods 64	OSTP_POND_SY	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	Swallowtail Park 18
OSTP_POND_SYSTEM_JCT_8A	3		1	5.254	650.91	0	0.032	SWMM Methods 64	OSTP_POND_SY	0		SubCatchment 3	No Redirection	Swallowtail Park 18
PARAGON_FF1	3	1	1	1.391	253.815	0	0.021	SWMM Methods 64	PARAGON_FF1	0		SubCatchment 1	No Redirection	
PARAGON_FF2	3	1	1	3.907	240.548	0	0.015	SWMM Methods 64	PARAGON_FF2	0		SubCatchment 1	No Redirection	
PARAGON_FF3	1	1	1	0.27	507.316	100	0.013	SWMM Methods 64	PARAGON_FF3	0	PARAGON_FF3	SubCatchment 3	No Redirection	Sauk Heights Pond
PARAGON_FF3	3		1	8.768	507.316	0	0.013	SWMM Methods 64	PARAGON_FF3	0		SubCatchment 1	No Redirection	
PARAGON_INF_BASIN	1	1	1	0.006	350.257	100	0.03	SWMM Methods 64	PARAGON_INF_	0	PARAGON_INF_E	SubCatchment 3	No Redirection	Sauk Heights Pond
PARAGON_INF_BASIN	3		1	4.395	350.257	0	0.03	SWMM Methods 64	PARAGON_INF_	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
PARAGON_WET_POND	1	1	1	4.326	706.323	100	0.042	SWMM Methods 64	PARAGON_WET	0	PARAGON_WET_	SubCatchment 3	No Redirection	Sauk Heights Pond
PARAGON_WET_POND	2		1	0.02	706.323	100	0.042	SWMM Methods 64	PARAGON_WET	1	PARAGON_WET_	SubCatchment 3	No Redirection	Sauk Heights Pond 18
PARAGON_WET_POND	3		1	5.178	706.323	0	0.042	SWMM Methods 64	PARAGON_WET	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
PF_E_INF_BASIN	1	1	1	0.308	112.195	100	0.024	SWMM Methods 64	PF_E_INF_BASIN	0	PF_E_INF_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond
PF_E_INF_BASIN	2		1	0.364	112.195	100	0.024	SWMM Methods 64	PF_E_INF_BASIN	1	PF_E_INF_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond 18
PF_E_INF_BASIN	3		1	1.982	112.195	0	0.024	SWMM Methods 64	PF_E_INF_BASIN	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
PF_S_WP	1	1	1	1.641	221.836	100	0.022	SWMM Methods 64	PF_S_WP	0	PF_S_WP	SubCatchment 3	No Redirection	Sauk Heights Pond
PF_S_WP	2		1	1.943	221.836	100	0.022	SWMM Methods 64	PF_S_WP	1	PF_S_WP	SubCatchment 3	No Redirection	Sauk Heights Pond 18
PF_S_WP	3		1	5.624	221.836	0	0.022	SWMM Methods 64	PF_S_WP	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
PF-S38	1	1	1	1.765	368.122	100	0.01	SWMM Methods 64	PF-S38	0	PF-S38	SubCatchment 3	No Redirection	Sauk Heights Pond 18
PF-S38	2		1	2.09	368.122	100	0.01	SWMM Methods 64	PF-S38	1	PF-S38	SubCatchment 3	No Redirection	
PF-S38	3		1	9.254	368.122	0	0.01	SWMM Methods 64	PF-S38	0		SubCatchment 1	No Redirection	
PL1951-004	1	1	1	0.259	55.865	100	0.014	SWMM Methods 64	PL1951-004	0	PL1951-004	SubCatchment 3	No Redirection	Swallowtail Park
PL1951-004	3		1	0.242	55.865	0	0.014	SWMM Methods 64	PL1951-004	0		SubCatchment 3	No Redirection	Swallowtail Park 18
PLEAS_V_DITCH1	1	1	1	0.155	828.909	100	0.021	SWMM Methods 64	PLEAS_V_DITCH	0	PLEAS_V_DITCH1	SubCatchment 3	No Redirection	UW Ag Research Stati
PLEAS_V_DITCH1	3		1	23.547	828.909	0	0.021	SWMM Methods 64	PLEAS_V_DITCH	0		SubCatchment 1	No Redirection	
PLEAS_V_DITCH2	1	1	1	0.055	411.531	100	0.066	SWMM Methods 64	PLEAS_V_DITCH	0	PLEAS_V_DITCH2	SubCatchment 3	No Redirection	UW Ag Research Stati
PLEAS_V_DITCH2	3		1	1.367	411.531	0	0.066	SWMM Methods 64	PLEAS_V_DITCH	0		SubCatchment 1	No Redirection	
PLEAS_V_FF_1	1	1	1	0.809	1437.793	100	0.04	SWMM Methods 64	PLEAS_V_FF_1	0	PLEAS_V_FF_1	SubCatchment 3	No Redirection	UW Ag Research Stati
PLEAS_V_FF_1	3		1	15.981	1437.793	0	0.04	SWMM Methods 64	PLEAS_V_FF_1	0		SubCatchment 1	No Redirection	
PLEASANT_V_MINERAL_PT_P	1	1	1	0.518	507.112	100	0.12	SWMM Methods 64	PLEAS_V_MIN_I	0	PLEASANT_V_MI	SubCatchment 3	No Redirection	UW Ag Research Stati
PLEASANT_V_MINERAL_PT_P	3		1	1.121	507.112	0	0.12	SWMM Methods 64	PLEAS_V_MIN_I	0		SubCatchment 3	No Redirection	UW Ag Research 2018
S105	1	1	1	0.8	279.654	100	0.019	SWMM Methods 64	S105	0	S105	SubCatchment 3	No Redirection	Sauk Heights Pond
S105	2		1	0.28	279.654	100	0.019	SWMM Methods 64	S105	1	S105	SubCatchment 3	No Redirection	Sauk Heights Pond 18
S105	3		1	1.5	279.654	0	0.019	SWMM Methods 64	S105	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
S33	1	1	1	0.21	168.3	100	0.017	SWMM Methods 64	S33	0		SubCatchment 1	No Redirection	Swallowtail Park 18
S33	2		1	0.03	168.3	100	0.017	SWMM Methods 64	S33	1	S33	SubCatchment 3	No Redirection	Swallowtail Park 18

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
S33	3		1	0.19	168.3	0	0.017	SWMM Methods 64	S33	0		SubCatchment 1	No Redirection	Swallowtail Park 18
SAUK_CREEK_LOWER_STORAGE	1	1	1	0.916	1064.072	100	0.048	SWMM Methods 64	SAUK_CREEK_LO	0	SAUK_CREEK_LO	SubCatchment 3	No Redirection	Strickers Pond Foreb
SAUK_CREEK_LOWER_STORAGE	2		1	0.745	1064.072	100	0.048	SWMM Methods 64	SAUK_CREEK_LO	1	SAUK_CREEK_LO	SubCatchment 3	No Redirection	Strickers Forebay 18
SAUK_CREEK_LOWER_STORAGE	3		1	11.617	1064.072	0	0.048	SWMM Methods 64	SAUK_CREEK_LO	0		SubCatchment 3	No Redirection	Strickers Forebay 18
SAUK_CREEK_UPPER_STORAGE	1	1	1	0.193	659.609	100	0.109	SWMM Methods 64	SAUK_CREEK_U	0	SAUK_CREEK_UP	SubCatchment 3	No Redirection	Strickers Pond Foreb
SAUK_CREEK_UPPER_STORAGE	2		1	0.228	659.609	100	0.109	SWMM Methods 64	SAUK_CREEK_U	1	SAUK_CREEK_UP	SubCatchment 3	No Redirection	Strickers Forebay 18
SAUK_CREEK_UPPER_STORAGE	3		1	2.309	659.609	0	0.109	SWMM Methods 64	SAUK_CREEK_U	0		SubCatchment 3	No Redirection	Strickers Forebay 18
SAUK_HEIGHTS_POND	1	1	1	0.977	999.322	100	0.062	SWMM Methods 64	SAUK_HEIGHTS_	0	SAUK_HEIGHTS_	SubCatchment 3	No Redirection	Sauk Heights Pond
SAUK_HEIGHTS_POND	2		1	0.239	999.322	100	0.062	SWMM Methods 64	SAUK_HEIGHTS_	1	SAUK_HEIGHTS_	SubCatchment 3	No Redirection	Sauk Heights Pond 18
SAUK_HEIGHTS_POND	3		1	1.906	999.322	0	0.062	SWMM Methods 64	SAUK_HEIGHTS_	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
SE_BIO_BASIN	1	1	1	0.19	205.35	100	0.063	SWMM Methods 64	SE_BIO_BASIN	0	SE_BIO_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond
SE_BIO_BASIN	2		1	0.25	205.35	100	0.063	SWMM Methods 64	SE_BIO_BASIN	1	SE_BIO_BASIN	SubCatchment 3	No Redirection	Sauk Heights Pond 18
SE_BIO_BASIN	3		1	0.99	205.35	0	0.063	SWMM Methods 64	SE_BIO_BASIN	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
SMPB_BW_AAC1	1	1	1	2.266	286.18	100	0.034	SWMM Methods 64	SMPB_BW_AAC	0	SMPB_BW_AAC1	SubCatchment 3	No Redirection	UW Ag Research Stati
SMPB_BW_AAC1	2		1	0.223	286.18	100	0.034	SWMM Methods 64	SMPB_BW_AAC	1	SMPB_BW_AAC1	SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_BW_AAC1	3		1	2.347	286.18	0	0.034	SWMM Methods 64	SMPB_BW_AAC	0		SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_GW_AAP	1	1	1	1.929	391.685	100	0.03	SWMM Methods 64	SMPB_GW_AAP	0	SMPB_GW_AAP	SubCatchment 3	No Redirection	UW Ag Research Stati
SMPB_GW_AAP	2		1	0.83	391.685	100	0.03	SWMM Methods 64	SMPB_GW_AAP	1	SMPB_GW_AAP	SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_GW_AAP	3		1	2.572	391.685	0	0.03	SWMM Methods 64	SMPB_GW_AAP	0		SubCatchment 3	No Redirection	UW Ag Research 2018
SW_BLACKHAWK_PD	1	1	1	9.835	3129.803	100	0.03	SWMM Methods 64	SW_BLACKHAW	0	SW_BLACKHAWK	SubCatchment 3	No Redirection	Sauk Heights Pond
SW_BLACKHAWK_PD	2		1	1.626	3129.803	100	0.03	SWMM Methods 64	SW_BLACKHAW	1	SW_BLACKHAWK	SubCatchment 3	No Redirection	Sauk Heights Pond 18
SW_BLACKHAWK_PD	3		1	29.664	3129.803	0	0.03	SWMM Methods 64	SW_BLACKHAW	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
SW_FF_1	1	1	1	0.112	1298.588	100	0.016	SWMM Methods 64	SW_FF_1	0	SW_FF_1	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_1	2		1	0.005	1298.588	100	0.016	SWMM Methods 64	SW_FF_1	0	SW_FF_1	SubCatchment 3	No Redirection	
SW_FF_1	3		1	36.944	1298.588	0	0.016	SWMM Methods 64	SW_FF_1	0		SubCatchment 1	No Redirection	
SW_FF_10	1	1	1	0.047	164.9	100	0.01	SWMM Methods 64	SW_FF_10	0	SW_FF_10	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_10	3		1	0.478	164.9	0	0.01	SWMM Methods 64	SW_FF_10	0		SubCatchment 1	No Redirection	
SW_FF_11	3	1	1	0.555	238.784	0	0.009	SWMM Methods 64	SW_FF_11	0		SubCatchment 1	No Redirection	
SW_FF_12	3	1	1	7.375	253.204	0	0.061	SWMM Methods 64	SW_FF_12	0		SubCatchment 1	No Redirection	
SW_FF_13	1	1	1	0.026	127.274	100	0.074	SWMM Methods 64	SW_FF_13	0	SW_FF_13	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_13	3		1	2.211	127.274	0	0.074	SWMM Methods 64	SW_FF_13	0		SubCatchment 1	No Redirection	
SW_FF_14	1	1	1	0.112	313.566	100	0.059	SWMM Methods 64	SW_FF_14	0	SW_FF_14	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_14	3		1	10.044	313.566	0	0.059	SWMM Methods 64	SW_FF_14	0		SubCatchment 1	No Redirection	
SW_FF_15	1	1	1	0.54	870.274	100	0.025	SWMM Methods 64	SW_FF_15	0	SW_FF_15	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_15	3		1	14.455	870.274	0	0.025	SWMM Methods 64	SW_FF_15	0		SubCatchment 1	No Redirection	
SW_FF_2	1	1	1	0.215	404.218	100	0.065	SWMM Methods 64	SW_FF_2	0	SW_FF_2	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_2	2		1	0.006	404.218	100	0.065	SWMM Methods 64	SW_FF_2	0	SW_FF_2	SubCatchment 3	No Redirection	
SW_FF_2	3		1	11.53	404.218	0	0.065	SWMM Methods 64	SW_FF_2	0		SubCatchment 1	No Redirection	
SW_FF_3	1	1	1	0.451	278.124	100	0.083	SWMM Methods 64	SW_FF_3	0	SW_FF_3	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_3	2		1	0.042	278.124	100	0.083	SWMM Methods 64	SW_FF_3	0	SW_FF_3	SubCatchment 3	No Redirection	
SW_FF_3	3		1	5.99	278.124	0	0.083	SWMM Methods 64	SW_FF_3	0		SubCatchment 1	No Redirection	
SW_FF_4	1	1	1	0.233	924.196	100	0.046	SWMM Methods 64	SW_FF_4	0	SW_FF_4	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_4	2		1	0.008	924.196	100	0.046	SWMM Methods 64	SW_FF_4	0	SW_FF_4	SubCatchment 3	No Redirection	
SW_FF_4	3		1	27.801	924.196	0	0.046	SWMM Methods 64	SW_FF_4	0		SubCatchment 1	No Redirection	
SW_FF_5	1	1	1	0.043	677.162	100	0.013	SWMM Methods 64	SW_FF_5	0	SW_FF_5	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_5	3		1	7.497	677.162	0	0.013	SWMM Methods 64	SW_FF_5	0		SubCatchment 1	No Redirection	
SW_FF_6	1	1	1	0.829	335.08	100	0.06	SWMM Methods 64	SW_FF_6	0	SW_FF_6	SubCatchment 3	No Redirection	UW Ag Research Stati

Existing Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
SW_FF_6	2		1	0.056	335.08	100	0.06	SWMM Methods 64	SW_FF_6	0	SW_FF_6	SubCatchment 3	No Redirection	
SW_FF_6	3		1	12.426	335.08	0	0.06	SWMM Methods 64	SW_FF_6	0		SubCatchment 1	No Redirection	
SW_FF_7	1	1	1	0.559	344.602	100	0.058	SWMM Methods 64	SW_FF_7	0	SW_FF_7	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_7	3		1	10.881	344.602	0	0.058	SWMM Methods 64	SW_FF_7	0		SubCatchment 1	No Redirection	
SW_FF_8	1	1	1	0.056	666.883	100	0.012	SWMM Methods 64	SW_FF_8	0	SW_FF_8	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_8	3		1	6.079	666.883	0	0.012	SWMM Methods 64	SW_FF_8	0		SubCatchment 1	No Redirection	
SW_FF_9	1	1	1	0.012	397.379	100	0.006	SWMM Methods 64	SW_FF_9	0	SW_FF_9	SubCatchment 3	No Redirection	UW Ag Research Stati
SW_FF_9	3		1	3.384	397.379	0	0.006	SWMM Methods 64	SW_FF_9	0		SubCatchment 1	No Redirection	
TAMARACK_TRAILS	1	1	1	5.101	875.069	100	0.035	SWMM Methods 64	TAMARACK_TRA	0	TAMARACK_TRA	SubCatchment 3	No Redirection	MSE4
TAMARACK_TRAILS	2		1	1.084	875.069	100	0.035	SWMM Methods 64	TAMARACK_TRA	1	TAMARACK_TRA	SubCatchment 3	No Redirection	Memorial HS 2018
TAMARACK_TRAILS	3		1	7.738	875.069	0	0.035	SWMM Methods 64	TAMARACK_TRA	0		SubCatchment 3	No Redirection	Memorial HS 2018
TP2549-008	1	1	1	5.651	857.999	100	0.032	SWMM Methods 64	TP2549-008	0	TP2549-008	SubCatchment 3	No Redirection	Strickers Pond Foreb
TP2549-008	2		1	0.232	857.999	100	0.032	SWMM Methods 64	TP2549-008	1	TP2549-008	SubCatchment 3	No Redirection	Strickers Forebay 18
TP2549-008	3		1	7.568	857.999	0	0.032	SWMM Methods 64	TP2549-008	0		SubCatchment 3	No Redirection	Strickers Forebay 18
TREE_LN	1	1	1	2.031	582.057	100	0.028	SWMM Methods 64	TREE_LN	0	TREE_LN	SubCatchment 3	No Redirection	Memorial High School
TREE_LN	2		1	0.186	582.057	100	0.028	SWMM Methods 64	TREE_LN	1	TREE_LN	SubCatchment 3	No Redirection	Memorial HS 2018
TREE_LN	3		1	4.293	582.057	0	0.028	SWMM Methods 64	TREE_LN	0		SubCatchment 1	No Redirection	Memorial HS 2018
WEXFORD_POND_IN	1	1	1	0.178	511.19	100	0.032	SWMM Methods 64	WEXFORD_PON	0	WEXFORD_POND	SubCatchment 3	No Redirection	Strickers Pond Foreb
WEXFORD_POND_IN	2		1	0.179	511.19	100	0.032	SWMM Methods 64	WEXFORD_PON	1	WEXFORD_POND	SubCatchment 3	No Redirection	Strickers Forebay 18
WEXFORD_POND_IN	3		1	3.694	511.19	0	0.032	SWMM Methods 64	WEXFORD_PON	0		SubCatchment 3	No Redirection	Strickers Forebay 18
WEXFORD_SOUTH_POND	1	1	1	8.288	1048.128	100	0.04	SWMM Methods 64	WEXFORD_SOU	0	WEXFORD_SOUT	SubCatchment 3	No Redirection	Strickers Pond Foreb
WEXFORD_SOUTH_POND	2		1	0.605	1048.128	100	0.04	SWMM Methods 64	WEXFORD_SOU	1	WEXFORD_SOUT	SubCatchment 3	No Redirection	Strickers Forebay 18
WEXFORD_SOUTH_POND	3		1	9.837	1048.128	0	0.04	SWMM Methods 64	WEXFORD_SOU	0		SubCatchment 3	No Redirection	Strickers Forebay 18
WILRICH_FF	1	1	1	0.08	511.568	100	0.025	SWMM Methods 64	WILRICH_FF	0	WILRICH_FF	SubCatchment 3	No Redirection	Sauk Heights Pond
WILRICH_FF	2		1	0.095	511.568	100	0.025	SWMM Methods 64	WILRICH_FF	0	WILRICH_FF	SubCatchment 3	No Redirection	
WILRICH_FF	3		1	12.631	511.568	0	0.025	SWMM Methods 64	WILRICH_FF	0		SubCatchment 1	No Redirection	
WMPB_GW_DW3	1	1	1	11.36	3124.513	100	0.061	SWMM Methods 64	WMPB_GW_DW	0	WMPB_GW_DW	SubCatchment 3	No Redirection	Swallowtail Park
WMPB_GW_DW3	2		1	0.562	3124.513	100	0.061	SWMM Methods 64	WMPB_GW_DW	1	WMPB_GW_DW	SubCatchment 3	No Redirection	Swallowtail Park 18
WMPB_GW_DW3	3		1	13.812	3124.513	0	0.061	SWMM Methods 64	WMPB_GW_DW	0		SubCatchment 3	No Redirection	Swallowtail Park 18
WMPB_GW_TRANSFER2	1	1	1	0.894	2160.563	100	0.115	SWMM Methods 64	WMPB_GW_TR	0	WMPB_GW_TRA	SubCatchment 3	No Redirection	Swallowtail Park
WMPB_GW_TRANSFER2	2		1	1.059	2160.563	100	0.115	SWMM Methods 64	WMPB_GW_TR	1	WMPB_GW_TRA	SubCatchment 3	No Redirection	Swallowtail Park 18
WMPB_GW_TRANSFER2	3		1	8.183	2160.563	0	0.115	SWMM Methods 64	WMPB_GW_TR	0		SubCatchment 3	No Redirection	Swallowtail Park 18
WS-3	1	1	1	3.345	448.796	100	0.05	SWMM Methods 64	WS-3	0	WS-3	SubCatchment 3	No Redirection	Strickers Pond Foreb
WS-3	2		1	1.561	448.796	100	0.05	SWMM Methods 64	WS-3	1	WS-3	SubCatchment 3	No Redirection	Strickers Forebay 18
WS-3	3		1	10.736	448.796	0	0.05	SWMM Methods 64	WS-3	0		SubCatchment 3	No Redirection	Strickers Forebay 18

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AE1547-035	1	1	1	0.24	242.577	100	0.032	SWMM Method	AE1547-035	0	AE1547-035	SubCatchment 3	No Redirection	UW Ag Research Stati
AE1547-035	2		1	0.097	242.577	100	0.032	SWMM Method	AE1547-035	1	AE1547-035	SubCatchment 3	No Redirection	UW Ag Research 2018
AE1547-035	3		1	3.435	242.577	0	0.032	SWMM Method	AE1547-035	0		SubCatchment 3	No Redirection	
AE1549-012	1	1	1	0.615	544.748	100	0.023	SWMM Method	AE1549-012	0	AE1549-012	SubCatchment 3	No Redirection	
AE1549-012	2		1	0.442	544.748	100	0.023	SWMM Method	AE1549-012	1	AE1549-012	SubCatchment 3	No Redirection	
AE1549-012	3		1	11.385	544.748	0	0.023	SWMM Method	AE1549-012	0		SubCatchment 3	No Redirection	
AE1549-015	1	1	1	0.114	406.049	100	0.01	SWMM Method	AE1549-015	0	AE1549-015	SubCatchment 3	No Redirection	
AE1549-015	2		1	0.149	406.049	100	0.01	SWMM Method	AE1549-015	1	AE1549-015	SubCatchment 3	No Redirection	UW Ag Research Stati
AE1549-015	3		1	4.817	406.049	0	0.01	SWMM Method	AE1549-015	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE1550-029	1	1	1	0.259	80.182	100	0.024	SWMM Method	AE1550-029	0	AE1550-029	SubCatchment 3	No Redirection	
AE1550-029	2		1	0.032	80.182	100	0.024	SWMM Method	AE1550-029	1	AE1550-029	SubCatchment 3	No Redirection	
AE1550-029	3		1	0.286	80.182	0	0.024	SWMM Method	AE1550-029	0		SubCatchment 3	No Redirection	
AE1647-038	1	1	1	0.188	183.514	100	0.002	SWMM Method	AE1647-038	0	AE1647-038	SubCatchment 3	No Redirection	
AE1647-038	2		1	0.223	183.514	100	0.002	SWMM Method	AE1647-038	1	AE1647-038	SubCatchment 3	No Redirection	Swallowtail Park
AE1647-038	3		1	0.835	183.514	0	0.002	SWMM Method	AE1647-038	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AE1652-001	1	1	1	0.111	97.041	100	0.01	SWMM Method	AE1652-001	0	AE1652-001	SubCatchment 3	No Redirection	Swallowtail Park 18
AE1652-001	3		1	0.078	97.041	0	0.01	SWMM Method	AE1652-001	0		SubCatchment 3	No Redirection	
AE1653-022	1	1	1	0.242	122.015	100	0.013	SWMM Method	AE1653-022	0	AE1653-022	SubCatchment 3	No Redirection	
AE1653-022	3		1	0.866	122.015	0	0.013	SWMM Method	AE1653-022	0		SubCatchment 1	No Redirection	
AE1747-023	1	1	1	0.692	417.814	100	0.072	SWMM Method	AE1747-023	0	AE1747-023	SubCatchment 3	No Redirection	
AE1747-023	2		1	0.407	417.814	100	0.072	SWMM Method	AE1747-023	1	AE1747-023	SubCatchment 3	No Redirection	
AE1747-023	3		1	3.153	417.814	0	0.072	SWMM Method	AE1747-023	0		SubCatchment 3	No Redirection	
AE1846-003	1	1	1	4.664	1682.033	100	0.025	SWMM Method	AE1846-003	0	AE1846-003	SubCatchment 3	No Redirection	
AE1846-003	2		1	2.06	1682.033	100	0.025	SWMM Method	AE1846-003	1	AE1846-003	SubCatchment 3	No Redirection	
AE1846-003	3		1	102.461	1682.033	0	0.025	SWMM Method	AE1846-003	0		SubCatchment 3	No Redirection	
AE1946-011	1	1	1	0.973	968.79	100	0.037	SWMM Method	AE1946-011	0	AE1946-011	SubCatchment 3	No Redirection	
AE1946-011	2		1	0.332	968.79	100	0.037	SWMM Method	AE1946-011	1	AE1946-011	SubCatchment 3	No Redirection	
AE1946-011	3		1	37.672	968.79	0	0.037	SWMM Method	AE1946-011	0		SubCatchment 3	No Redirection	
AE2052-041	1	1	1	0.004	178.254	100	0.06	SWMM Method	AE2052-041	0	AE2052-041	SubCatchment 3	No Redirection	
AE2052-041	2		1	0.004	178.254	100	0.06	SWMM Method	AE2052-041	1	AE2052-041	SubCatchment 3	No Redirection	
AE2052-041	3		1	1.765	178.254	0	0.06	SWMM Method	AE2052-041	0		SubCatchment 1	No Redirection	
AE2156-075	1	1	1	0.098	521.917	100	0.032	SWMM Method	AE2156-075	0	AE2156-075	SubCatchment 3	No Redirection	
AE2156-075	3		1	7.854	521.917	0	0.032	SWMM Method	AE2156-075	0		SubCatchment 3	No Redirection	
AE2156-078	1	1	1	0.294	249.832	100	0.028	SWMM Method	AE2156-078	0	AE2156-078	SubCatchment 3	No Redirection	
AE2156-078	3		1	2.691	249.832	0	0.028	SWMM Method	AE2156-078	0		SubCatchment 3	No Redirection	Swallowtail Park
AE2250-053	1	1	1	9.16	219.336	100	0.021	SWMM Method	AE2250-053	0	AE2250-053	SubCatchment 3	No Redirection	Swallowtail Park 18
AE2250-053	2		1	0.119	219.336	100	0.021	SWMM Method	AE2250-053	1	AE2250-053	SubCatchment 3	No Redirection	Swallowtail Park 18
AE2250-053	3		1	7.476	219.336	0	0.021	SWMM Method	AE2250-053	0		SubCatchment 3	No Redirection	
AE2250-055	1	1	1	4.475	497.733	100	0.026	SWMM Method	AE2250-055	0	AE2250-055	SubCatchment 3	No Redirection	
AE2250-055	3		1	3.401	497.733	0	0.026	SWMM Method	AE2250-055	0		SubCatchment 3	No Redirection	
AE2256-010	1	1	1	2.887	424.391	100	0.01	SWMM Method	AE2256-010	0	AE2256-010	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AE2256-010	3		1	1.317	424.391	0	0.01	SWMM Method	AE2256-010	0		SubCatchment 3	No Redirection	
AE2256-083	1	1	1	2.821	514.375	100	0.026	SWMM Method	AE2256-083	0	AE2256-083	SubCatchment 3	No Redirection	
AE2256-083	2		1	0.008	514.375	100	0.026	SWMM Method	AE2256-083	1	AE2256-083	SubCatchment 3	No Redirection	
AE2256-083	3		1	2.983	514.375	0	0.026	SWMM Method	AE2256-083	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AE2257-001	1	1	1	1.943	735.866	100	0.017	SWMM Method	AE2257-001	0	AE2257-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2257-001	2		1	0.075	735.866	100	0.017	SWMM Method	AE2257-001	1	AE2257-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2257-001	3		1	2.414	735.866	0	0.017	SWMM Method	AE2257-001	0		SubCatchment 3	No Redirection	
AE2350-026	1	1	1	0.396	111.279	100	0.027	SWMM Method	AE2350-026	0	AE2350-026	SubCatchment 3	No Redirection	
AE2350-026	3		1	0.477	111.279	0	0.027	SWMM Method	AE2350-026	0		SubCatchment 3	No Redirection	
AE2351-002	1	1	1	2.288	146.78	100	0.023	SWMM Method	AE2351-002	0	AE2351-002	SubCatchment 3	No Redirection	
AE2351-002	2		1	0.082	146.78	100	0.023	SWMM Method	AE2351-002	1	AE2351-002	SubCatchment 3	No Redirection	
AE2351-002	3		1	5.17	146.78	0	0.023	SWMM Method	AE2351-002	0		SubCatchment 3	No Redirection	
AE2449-003	1	1	1	2.493	942.107	100	0.061	SWMM Method	AE2449-003	0	AE2449-003	SubCatchment 3	No Redirection	
AE2449-003	2		1	0.395	942.107	100	0.061	SWMM Method	AE2449-003	1	AE2449-003	SubCatchment 3	No Redirection	
AE2449-003	3		1	7.231	942.107	0	0.061	SWMM Method	AE2449-003	0		SubCatchment 3	No Redirection	
AE2450-022	1	1	1	5.227	750.194	100	0.017	SWMM Method	AE2450-022	0	AE2450-022	SubCatchment 3	No Redirection	
AE2450-022	2		1	0.104	750.194	100	0.017	SWMM Method	AE2450-022	1	AE2450-022	SubCatchment 3	No Redirection	
AE2450-022	3		1	4.201	750.194	0	0.017	SWMM Method	AE2450-022	0		SubCatchment 3	No Redirection	
AE2452-014	1	1	1	1.31	1749.984	100	0.031	SWMM Method	AE2452-014	0	AE2452-014	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2452-014	2		1	0.93	1749.984	100	0.031	SWMM Method	AE2452-014	1	AE2452-014	SubCatchment 3	No Redirection	UW Ag Research 2018
AE2452-014	3		1	18.54	1749.984	0	0.031	SWMM Method	AE2452-014	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AE2454-006	1	1	1	1.755	1699.62	100	0.061	SWMM Method	AE2454-006	0	AE2454-006	SubCatchment 3	No Redirection	
AE2454-006	2		1	0.426	1699.62	100	0.061	SWMM Method	AE2454-006	1	AE2454-006	SubCatchment 3	No Redirection	
AE2454-006	3		1	11.207	1699.62	0	0.061	SWMM Method	AE2454-006	0		SubCatchment 3	No Redirection	
AE2553-003	1	1	1	4.531	838.458	100	0.036	SWMM Method	AE2553-003	0	AE2553-003	SubCatchment 3	No Redirection	
AE2553-003	2		1	0.391	838.458	100	0.036	SWMM Method	AE2553-003	1	AE2553-003	SubCatchment 3	No Redirection	UW Ag Research Stati
AE2553-003	3		1	6.695	838.458	0	0.036	SWMM Method	AE2553-003	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1547-003	1	1	1	0.686	836.031	100	0.03	SWMM Method	AS1547-003	0	AS1547-003	SubCatchment 3	No Redirection	
AS1547-003	2		1	0.209	836.031	100	0.03	SWMM Method	AS1547-003	1	AS1547-003	SubCatchment 3	No Redirection	
AS1547-003	3		1	1.232	836.031	0	0.03	SWMM Method	AS1547-003	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS1547-029	1	1	1	1.02	303.346	100	0.059	SWMM Method	AS1547-029	0	AS1547-029	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1547-029	2		1	0.31	303.346	100	0.059	SWMM Method	AS1547-029	1	AS1547-029	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1547-029	3		1	1.655	303.346	0	0.059	SWMM Method	AS1547-029	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS1548-014	1	1	1	1.112	393.432	100	0.032	SWMM Method	AS1548-014	0	AS1548-014	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1548-014	2		1	0.483	393.432	100	0.032	SWMM Method	AS1548-014	1	AS1548-014	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1548-014	3		1	2.463	393.432	0	0.032	SWMM Method	AS1548-014	0		SubCatchment 3	No Redirection	
AS1548-031	1	1	1	1.795	811.713	100	0.03	SWMM Method	AS1548-031	0	AS1548-031	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1548-031	2		1	0.942	811.713	100	0.03	SWMM Method	AS1548-031	1	AS1548-031	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1548-031	3		1	4.574	811.713	0	0.03	SWMM Method	AS1548-031	0		SubCatchment 3	No Redirection	
AS1548-039	1	1	1	0.855	275.83	100	0.045	SWMM Method	AS1548-039	0	AS1548-039	SubCatchment 3	No Redirection	
AS1548-039	2		1	0.245	275.83	100	0.045	SWMM Method	AS1548-039	1	AS1548-039	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS1548-039	3		1	1.169	275.83	0	0.045	SWMM Method	AS1548-039	0		SubCatchment 3	No Redirection	
AS1549-002	1	1	1	0.777	317.658	100	0.027	SWMM Method	AS1549-002	0	AS1549-002	SubCatchment 3	No Redirection	Swallowtail Park
AS1549-002	2		1	0.273	317.658	100	0.027	SWMM Method	AS1549-002	1	AS1549-002	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1549-002	3		1	1.565	317.658	0	0.027	SWMM Method	AS1549-002	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1549-034	1	1	1	0.677	128.962	100	0.005	SWMM Method	AS1549-034	0	AS1549-034	SubCatchment 3	No Redirection	
AS1549-034	2		1	0.077	128.962	100	0.005	SWMM Method	AS1549-034	1	AS1549-034	SubCatchment 3	No Redirection	
AS1549-034	3		1	0.944	128.962	0	0.005	SWMM Method	AS1549-034	0		SubCatchment 3	No Redirection	
AS1549-042	1	1	1	1.247	710.514	100	0.033	SWMM Method	AS1549-042	0	AS1549-042	SubCatchment 3	No Redirection	
AS1549-042	2		1	0.682	710.514	100	0.033	SWMM Method	AS1549-042	1	AS1549-042	SubCatchment 3	No Redirection	
AS1549-042	3		1	8.039	710.514	0	0.033	SWMM Method	AS1549-042	0		SubCatchment 3	No Redirection	
AS1647-018	1	1	1	0.806	301.646	100	0.022	SWMM Method	AS1647-018	0	AS1647-018	SubCatchment 3	No Redirection	
AS1647-018	2		1	0.272	301.646	100	0.022	SWMM Method	AS1647-018	1	AS1647-018	SubCatchment 3	No Redirection	
AS1647-018	3		1	1.46	301.646	0	0.022	SWMM Method	AS1647-018	0		SubCatchment 3	No Redirection	
AS1647-027	1	1	1	1.32	1325.052	100	0.029	SWMM Method	AS1647-027	0	AS1647-027	SubCatchment 3	No Redirection	
AS1647-027	2		1	0.489	1325.052	100	0.029	SWMM Method	AS1647-027	1	AS1647-027	SubCatchment 3	No Redirection	
AS1647-027	3		1	2.37	1325.052	0	0.029	SWMM Method	AS1647-027	0		SubCatchment 3	No Redirection	
AS1647-048	1	1	1	0.413	327.853	100	0.03	SWMM Method	AS1647-048	0	AS1647-048	SubCatchment 3	No Redirection	
AS1647-048	2		1	0.159	327.853	100	0.03	SWMM Method	AS1647-048	1	AS1647-048	SubCatchment 3	No Redirection	Swallowtail Park
AS1647-048	3		1	0.936	327.853	0	0.03	SWMM Method	AS1647-048	0		SubCatchment 3	No Redirection	Swallowtail Park 18
AS1647-052	1	1	1	0.647	424.342	100	0.033	SWMM Method	AS1647-052	0	AS1647-052	SubCatchment 3	No Redirection	Swallowtail Park 18
AS1647-052	2		1	0.208	424.342	100	0.033	SWMM Method	AS1647-052	1	AS1647-052	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1647-052	3		1	1.18	424.342	0	0.033	SWMM Method	AS1647-052	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1648-006	1	1	1	0.662	236.613	100	0.074	SWMM Method	AS1648-006	0	AS1648-006	SubCatchment 3	No Redirection	
AS1648-006	2		1	0.243	236.613	100	0.074	SWMM Method	AS1648-006	1	AS1648-006	SubCatchment 3	No Redirection	
AS1648-006	3		1	1.339	236.613	0	0.074	SWMM Method	AS1648-006	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS1648-014	1	1	1	0.544	335.883	100	0.028	SWMM Method	AS1648-014	0	AS1648-014	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1648-014	2		1	0.151	335.883	100	0.028	SWMM Method	AS1648-014	1	AS1648-014	SubCatchment 3	No Redirection	
AS1648-014	3		1	0.935	335.883	0	0.028	SWMM Method	AS1648-014	0		SubCatchment 3	No Redirection	
AS1648-022	1	1	1	1.964	707.151	100	0.022	SWMM Method	AS1648-022	0	AS1648-022	SubCatchment 3	No Redirection	
AS1648-022	2		1	0.979	707.151	100	0.022	SWMM Method	AS1648-022	1	AS1648-022	SubCatchment 3	No Redirection	
AS1648-022	3		1	4.532	707.151	0	0.022	SWMM Method	AS1648-022	0		SubCatchment 3	No Redirection	
AS1648-043	1	1	1	0.688	390.3	100	0.021	SWMM Method	AS1648-043	0	AS1648-043	SubCatchment 3	No Redirection	
AS1648-043	2		1	0.263	390.3	100	0.021	SWMM Method	AS1648-043	1	AS1648-043	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1648-043	3		1	1.675	390.3	0	0.021	SWMM Method	AS1648-043	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1747-002	1	1	1	0.665	232.989	100	0.062	SWMM Method	AS1747-002	0	AS1747-002	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1747-002	2		1	0.112	232.989	100	0.062	SWMM Method	AS1747-002	1	AS1747-002	SubCatchment 3	No Redirection	
AS1747-002	3		1	0.722	232.989	0	0.062	SWMM Method	AS1747-002	0		SubCatchment 3	No Redirection	
AS1747-010	1	1	1	1.323	247.655	100	0.007	SWMM Method	AS1747-010	0	AS1747-010	SubCatchment 3	No Redirection	
AS1747-010	2		1	0.383	247.655	100	0.007	SWMM Method	AS1747-010	1	AS1747-010	SubCatchment 3	No Redirection	
AS1747-010	3		1	2.125	247.655	0	0.007	SWMM Method	AS1747-010	0		SubCatchment 3	No Redirection	
AS1748-011	1	1	1	0.452	483.37	100	0.019	SWMM Method	AS1748-011	0	AS1748-011	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS1748-011	2		1	0.113	483.37	100	0.019	SWMM Method	AS1748-011	1	AS1748-011	SubCatchment 3	No Redirection	
AS1748-011	3		1	0.796	483.37	0	0.019	SWMM Method	AS1748-011	0		SubCatchment 3	No Redirection	
AS1748-024	1	1	1	0.86	363.148	100	0.015	SWMM Method	AS1748-024	0	AS1748-024	SubCatchment 3	No Redirection	
AS1748-024	2		1	0.217	363.148	100	0.015	SWMM Method	AS1748-024	1	AS1748-024	SubCatchment 3	No Redirection	
AS1748-024	3		1	1.825	363.148	0	0.015	SWMM Method	AS1748-024	0		SubCatchment 3	No Redirection	
AS1750-024	1	1	1	1.018	424.577	100	0.019	SWMM Method	AS1750-024	0	AS1750-024	SubCatchment 3	No Redirection	
AS1750-024	2		1	0.022	424.577	100	0.019	SWMM Method	AS1750-024	1	AS1750-024	SubCatchment 3	No Redirection	
AS1750-024	3		1	0.997	424.577	0	0.019	SWMM Method	AS1750-024	0		SubCatchment 3	No Redirection	
AS1753-005	1	1	1	0.846	1016.012	100	0.019	SWMM Method	AS1753-005	0	AS1753-005	SubCatchment 3	No Redirection	
AS1753-005	2		1	1.001	1016.012	100	0.019	SWMM Method	AS1753-005	1	AS1753-005	SubCatchment 3	No Redirection	
AS1753-005	3		1	5.309	1016.012	0	0.019	SWMM Method	AS1753-005	0		SubCatchment 3	No Redirection	
AS1754-010	1	1	1	0.494	254.518	100	0.033	SWMM Method	AS1754-010	0	AS1754-010	SubCatchment 3	No Redirection	
AS1754-010	2		1	0.572	254.518	100	0.033	SWMM Method	AS1754-010	1	AS1754-010	SubCatchment 3	No Redirection	
AS1754-010	3		1	2.633	254.518	0	0.033	SWMM Method	AS1754-010	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS1754-028	1	1	1	0.243	407.194	100	0.049	SWMM Method	AS1754-028	0	AS1754-028	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1754-028	2		1	0.192	407.194	100	0.049	SWMM Method	AS1754-028	1	AS1754-028	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1754-028	3		1	7.68	407.194	0	0.049	SWMM Method	AS1754-028	0		SubCatchment 3	No Redirection	
AS1847-009	1	1	1	1.422	330.317	100	0.048	SWMM Method	AS1847-009	0	AS1847-009	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1847-009	2		1	0.601	330.317	100	0.048	SWMM Method	AS1847-009	1	AS1847-009	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1847-009	3		1	3.324	330.317	0	0.048	SWMM Method	AS1847-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1848-003	1	1	1	0.432	148.268	100	0.047	SWMM Method	AS1848-003	0	AS1848-003	SubCatchment 3	No Redirection	
AS1848-003	2		1	0.096	148.268	100	0.047	SWMM Method	AS1848-003	1	AS1848-003	SubCatchment 3	No Redirection	
AS1848-003	3		1	0.648	148.268	0	0.047	SWMM Method	AS1848-003	0		SubCatchment 3	No Redirection	
AS1848-018	1	1	1	2.601	357.914	100	0.021	SWMM Method	AS1848-018	0	AS1848-018	SubCatchment 3	No Redirection	
AS1848-018	2		1	0.946	357.914	100	0.021	SWMM Method	AS1848-018	1	AS1848-018	SubCatchment 3	No Redirection	
AS1848-018	3		1	5.616	357.914	0	0.021	SWMM Method	AS1848-018	0		SubCatchment 3	No Redirection	
AS1848-027	1	1	1	2.646	614.536	100	0.019	SWMM Method	AS1848-027	0	AS1848-027	SubCatchment 3	No Redirection	
AS1848-027	2		1	1.21	614.536	100	0.019	SWMM Method	AS1848-027	1	AS1848-027	SubCatchment 3	No Redirection	
AS1848-027	3		1	6.739	614.536	0	0.019	SWMM Method	AS1848-027	0		SubCatchment 3	No Redirection	
AS1849-009	1	1	1	1.054	559.704	100	0.041	SWMM Method	AS1849-009	0	AS1849-009	SubCatchment 3	No Redirection	
AS1849-009	2		1	0.36	559.704	100	0.041	SWMM Method	AS1849-009	1	AS1849-009	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1849-009	3		1	2.273	559.704	0	0.041	SWMM Method	AS1849-009	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1849-026	1	1	1	1.679	442.132	100	0.02	SWMM Method	AS1849-026	0	AS1849-026	SubCatchment 3	No Redirection	
AS1849-026	2		1	0.188	442.132	100	0.02	SWMM Method	AS1849-026	1	AS1849-026	SubCatchment 3	No Redirection	
AS1849-026	3		1	2.023	442.132	0	0.02	SWMM Method	AS1849-026	0		SubCatchment 3	No Redirection	
AS1849-053	1	1	1	4.025	718.806	100	0.019	SWMM Method	AS1849-053	0	AS1849-053	SubCatchment 3	No Redirection	
AS1849-053	2		1	0.07	718.806	100	0.019	SWMM Method	AS1849-053	1	AS1849-053	SubCatchment 3	No Redirection	
AS1849-053	3		1	2.353	718.806	0	0.019	SWMM Method	AS1849-053	0		SubCatchment 3	No Redirection	
AS1946-004	1	1	1	1.474	178.17	100	0.053	SWMM Method	AS1946-004	0	AS1946-004	SubCatchment 3	No Redirection	
AS1946-004	2		1	0.113	178.17	100	0.053	SWMM Method	AS1946-004	1	AS1946-004	SubCatchment 3	No Redirection	
AS1946-004	3		1	0.844	178.17	0	0.053	SWMM Method	AS1946-004	0		SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS1947-009	1	1	1	0.473	63.215	100	0.027	SWMM Method	AS1947-009	0	AS1947-009	SubCatchment 3	No Redirection	
AS1947-009	2		1	0.013	63.215	100	0.027	SWMM Method	AS1947-009	1	AS1947-009	SubCatchment 3	No Redirection	
AS1947-009	3		1	0.659	63.215	0	0.027	SWMM Method	AS1947-009	0		SubCatchment 3	No Redirection	
AS1948-004	1	1	1	1.183	553.55	100	0.043	SWMM Method	AS1948-004	0	AS1948-004	SubCatchment 3	No Redirection	
AS1948-004	2		1	0.623	553.55	100	0.043	SWMM Method	AS1948-004	1	AS1948-004	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1948-004	3		1	3.72	553.55	0	0.043	SWMM Method	AS1948-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1948-017	1	1	1	1.252	360.841	100	0.085	SWMM Method	AS1948-017	0	AS1948-017	SubCatchment 3	No Redirection	
AS1948-017	2		1	0.431	360.841	100	0.085	SWMM Method	AS1948-017	1	AS1948-017	SubCatchment 3	No Redirection	
AS1948-017	3		1	2.777	360.841	0	0.085	SWMM Method	AS1948-017	0		SubCatchment 3	No Redirection	
AS1949-007	1	1	1	2.881	575.906	100	0.055	SWMM Method	AS1949-007	0	AS1949-007	SubCatchment 3	No Redirection	UW Ag Research Stati
AS1949-007	2		1	1.39	575.906	100	0.055	SWMM Method	AS1949-007	1	AS1949-007	SubCatchment 3	No Redirection	UW Ag Research 2018
AS1949-007	3		1	9.726	575.906	0	0.055	SWMM Method	AS1949-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS1949-032	1	1	1	1.45	269.246	100	0.012	SWMM Method	AS1949-032	0	AS1949-032	SubCatchment 3	No Redirection	
AS1949-032	2		1	0.186	269.246	100	0.012	SWMM Method	AS1949-032	1	AS1949-032	SubCatchment 3	No Redirection	
AS1949-032	3		1	2.16	269.246	0	0.012	SWMM Method	AS1949-032	0		SubCatchment 3	No Redirection	
AS2045-006	1	1	1	5.45	467.18	100	0.032	SWMM Method	AS2045-006	0	AS2045-006	SubCatchment 3	No Redirection	
AS2045-006	2		1	0.79	467.18	100	0.032	SWMM Method	AS2045-006	1	AS2045-006	SubCatchment 3	No Redirection	
AS2045-006	3		1	6.45	467.18	0	0.032	SWMM Method	AS2045-006	0		SubCatchment 3	No Redirection	
AS2046-011	1	1	1	6.51	475.536	100	0.032	SWMM Method	AS2046-011	0	AS2046-011	SubCatchment 3	No Redirection	
AS2046-011	2		1	0.378	475.536	100	0.032	SWMM Method	AS2046-011	1	AS2046-011	SubCatchment 3	No Redirection	
AS2046-011	3		1	4.109	475.536	0	0.032	SWMM Method	AS2046-011	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS2047-007	1	1	1	2.45	273.95	100	0.044	SWMM Method	AS2047-007	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AS2047-007	2		1	0.19	273.95	100	0.044	SWMM Method	AS2047-007	1	AS2047-007	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2047-007	3		1	1.529	273.95	0	0.044	SWMM Method	AS2047-007	0		SubCatchment 1	No Redirection	UW Ag Research Stati
AS2048-010	1	1	1	6.357	1069.009	100	0.029	SWMM Method	AS2048-010	0	AS2048-010	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2048-010	2		1	0.043	1069.009	100	0.029	SWMM Method	AS2048-010	1	AS2048-010	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2048-010	3		1	3.879	1069.009	0	0.029	SWMM Method	AS2048-010	0		SubCatchment 3	No Redirection	
AS2049-002	1	1	1	7.95	755.235	100	0.057	SWMM Method	AS2049-002	0	AS2049-002	SubCatchment 3	No Redirection	
AS2049-002	2		1	0.123	755.235	100	0.057	SWMM Method	AS2049-002	1	AS2049-002	SubCatchment 3	No Redirection	
AS2049-002	3		1	14.29	755.235	0	0.057	SWMM Method	AS2049-002	0		SubCatchment 3	No Redirection	
AS2049-005	1	1	1	0.582	194.077	100	0.053	SWMM Method	AS2049-005	0	AS2049-005	SubCatchment 3	No Redirection	
AS2049-005	2		1	0.006	194.077	100	0.053	SWMM Method	AS2049-005	1	AS2049-005	SubCatchment 3	No Redirection	
AS2049-005	3		1	0.37	194.077	0	0.053	SWMM Method	AS2049-005	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS2050-012	1	1	1	2.316	651.346	100	0.088	SWMM Method	AS2050-012	0	AS2050-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2050-012	2		1	0.291	651.346	100	0.088	SWMM Method	AS2050-012	1	AS2050-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2050-012	3		1	6.139	651.346	0	0.088	SWMM Method	AS2050-012	0		SubCatchment 3	No Redirection	
AS2050-024	1	1	1	1.45	348.05	100	0.03	SWMM Method	AS2050-024	0	AS2050-024	SubCatchment 3	No Redirection	
AS2050-024	2		1	0.025	348.05	100	0.03	SWMM Method	AS2050-024	1	AS2050-024	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2050-024	3		1	0.803	348.05	0	0.03	SWMM Method	AS2050-024	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2051-023	1	1	1	1.875	470.706	100	0.03	SWMM Method	AS2051-023	0	AS2051-023	SubCatchment 3	No Redirection	
AS2051-023	2		1	0.752	470.706	100	0.03	SWMM Method	AS2051-023	1	AS2051-023	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2051-023	3		1	2.628	470.706	0	0.03	SWMM Method	AS2051-023	0		SubCatchment 3	No Redirection	
AS2051-041	1	1	1	0.541	183.275	100	0.006	SWMM Method	AS2051-041	0	AS2051-041	SubCatchment 3	No Redirection	
AS2051-041	2		1	0.092	183.275	100	0.006	SWMM Method	AS2051-041	1	AS2051-041	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2051-041	3		1	0.261	183.275	0	0.006	SWMM Method	AS2051-041	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2051-051	1	1	1	0.39	313.68	100	0.01	SWMM Method	AS2051-051	0	AS2051-051	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2051-051	2		1	0.34	313.68	100	0.01	SWMM Method	AS2051-051	1	AS2051-051	SubCatchment 3	No Redirection	
AS2051-051	3		1	0.949	313.68	0	0.01	SWMM Method	AS2051-051	0		SubCatchment 3	No Redirection	
AS2145-001	1	1	1	5.754	571.1	100	0.021	SWMM Method	AS2145-001	0	AS2145-001	SubCatchment 3	No Redirection	
AS2145-001	2		1	0.969	571.1	100	0.021	SWMM Method	AS2145-001	1	AS2145-001	SubCatchment 3	No Redirection	
AS2145-001	3		1	6.155	571.1	0	0.021	SWMM Method	AS2145-001	0		SubCatchment 3	No Redirection	
AS2147-001	1	1	1	9.768	1503.883	100	0.024	SWMM Method	AS2147-001	0	AS2147-001	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2147-001	2		1	0.161	1503.883	100	0.024	SWMM Method	AS2147-001	1	AS2147-001	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2147-001	3		1	7.911	1503.883	0	0.024	SWMM Method	AS2147-001	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2148-007	1	1	1	7.44	1035.736	100	0.04	SWMM Method	AS2148-007	0	AS2148-007	SubCatchment 3	No Redirection	
AS2148-007	2		1	0.067	1035.736	100	0.04	SWMM Method	AS2148-007	1	AS2148-007	SubCatchment 3	No Redirection	
AS2148-007	3		1	12.359	1035.736	0	0.04	SWMM Method	AS2148-007	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2150-012	1	1	1	5.716	399.036	100	0.023	SWMM Method	AS2150-012	0	AS2150-012	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2150-012	2		1	0.925	399.036	100	0.023	SWMM Method	AS2150-012	1	AS2150-012	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2150-012	3		1	4.796	399.036	0	0.023	SWMM Method	AS2150-012	0		SubCatchment 3	No Redirection	
AS2150-014	1	1	1	2.175	603.819	100	0.015	SWMM Method	AS2150-014	0	AS2150-014	SubCatchment 3	No Redirection	
AS2150-014	2		1	0.222	603.819	100	0.015	SWMM Method	AS2150-014	1	AS2150-014	SubCatchment 3	No Redirection	
AS2150-014	3		1	2.033	603.819	0	0.015	SWMM Method	AS2150-014	0		SubCatchment 3	No Redirection	
AS2150-027	1	1	1	0.724	143.323	100	0.029	SWMM Method	AS2150-027	0	AS2150-027	SubCatchment 3	No Redirection	
AS2150-027	2		1	0.018	143.323	100	0.029	SWMM Method	AS2150-027	1	AS2150-027	SubCatchment 3	No Redirection	
AS2150-027	3		1	0.592	143.323	0	0.029	SWMM Method	AS2150-027	0		SubCatchment 3	No Redirection	
AS2150-032	1	1	1	2.03	297.832	100	0.035	SWMM Method	AS2150-032	0	AS2150-032	SubCatchment 3	No Redirection	
AS2150-032	2		1	0.158	297.832	100	0.035	SWMM Method	AS2150-032	1	AS2150-032	SubCatchment 3	No Redirection	
AS2150-032	3		1	2.31	297.832	0	0.035	SWMM Method	AS2150-032	0		SubCatchment 3	No Redirection	
AS2151-004	1	1	1	0.812	244.076	100	0.01	SWMM Method	AS2151-004	0	AS2151-004	SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2151-004	2		1	0.206	244.076	100	0.01	SWMM Method	AS2151-004	1	AS2151-004	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2151-004	3		1	1.33	244.076	0	0.01	SWMM Method	AS2151-004	0		SubCatchment 3	No Redirection	Strickers Forebay 18
AS2151-009	1	1	1	0.512	356.703	100	0.036	SWMM Method	AS2151-009	0	AS2151-009	SubCatchment 3	No Redirection	
AS2151-009	2		1	0.214	356.703	100	0.036	SWMM Method	AS2151-009	1	AS2151-009	SubCatchment 3	No Redirection	
AS2151-009	3		1	1.22	356.703	0	0.036	SWMM Method	AS2151-009	0		SubCatchment 3	No Redirection	
AS2152-005	1	1	1	1.16	145.052	100	0.029	SWMM Method	AS2152-005	0	AS2152-005	SubCatchment 3	No Redirection	
AS2152-005	2		1	0.037	145.052	100	0.029	SWMM Method	AS2152-005	1	AS2152-005	SubCatchment 3	No Redirection	
AS2152-005	3		1	1.388	145.052	0	0.029	SWMM Method	AS2152-005	0		SubCatchment 1	No Redirection	
AS2152-010	1	1	1	0.393	166.118	100	0.013	SWMM Method	AS2152-010	0	AS2152-010	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2152-010	2		1	0.212	166.118	100	0.013	SWMM Method	AS2152-010	1	AS2152-010	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-010	3		1	1.184	166.118	0	0.013	SWMM Method	AS2152-010	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-022	1	1	1	1.566	393.904	100	0.017	SWMM Method	AS2152-022	0	AS2152-022	SubCatchment 3	No Redirection	UW Ag Research Stati

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2152-022	2		1	0.628	393.904	100	0.017	SWMM Method	AS2152-022	1	AS2152-022	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2152-022	3		1	3.475	393.904	0	0.017	SWMM Method	AS2152-022	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AS2155-011	1	1	1	3.014	384.855	100	0.02	SWMM Method	AS2155-011	0	AS2155-011	SubCatchment 3	No Redirection	
AS2155-011	3		1	3.609	384.855	0	0.02	SWMM Method	AS2155-011	0		SubCatchment 3	No Redirection	
AS2156-017	1	1	1	0.846	177.75	100	0.041	SWMM Method	AS2156-017	0	AS2156-017	SubCatchment 3	No Redirection	
AS2156-017	2		1	0.004	177.75	100	0.041	SWMM Method	AS2156-017	1	AS2156-017	SubCatchment 3	No Redirection	
AS2156-017	3		1	0.824	177.75	0	0.041	SWMM Method	AS2156-017	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS2156-020	1	1	1	1.737	214.306	100	0.028	SWMM Method	AS2156-020	0	AS2156-020	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-020	3		1	1.426	214.306	0	0.028	SWMM Method	AS2156-020	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2156-028	1	1	1	1.086	145.764	100	0.01	SWMM Method	AS2156-028	0	AS2156-028	SubCatchment 3	No Redirection	
AS2156-028	3		1	0.06	145.764	0	0.01	SWMM Method	AS2156-028	0		SubCatchment 3	No Redirection	
AS2156-036	1	1	1	1.379	335.515	100	0.021	SWMM Method	AS2156-036	0	AS2156-036	SubCatchment 3	No Redirection	
AS2156-036	3		1	0.308	335.515	0	0.021	SWMM Method	AS2156-036	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS2245-005	1	1	1	16.338	1221.809	100	0.02	SWMM Method	AS2245-005	0	AS2245-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2245-005	2		1	1.804	1221.809	100	0.02	SWMM Method	AS2245-005	1	AS2245-005	SubCatchment 3	No Redirection	
AS2245-005	3		1	15.887	1221.809	0	0.02	SWMM Method	AS2245-005	0		SubCatchment 3	No Redirection	
AS2247-001	1	1	1	12.241	1211.903	100	0.017	SWMM Method	AS2247-001	0	AS2247-001	SubCatchment 3	No Redirection	
AS2247-001	2		1	0.194	1211.903	100	0.017	SWMM Method	AS2247-001	1	AS2247-001	SubCatchment 3	No Redirection	
AS2247-001	3		1	14.885	1211.903	0	0.017	SWMM Method	AS2247-001	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS2249-005	1	1	1	0.682	227.761	100	0.019	SWMM Method	AS2249-005	0	AS2249-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2249-005	2		1	0.058	227.761	100	0.019	SWMM Method	AS2249-005	1	AS2249-005	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2249-005	3		1	0.524	227.761	0	0.019	SWMM Method	AS2249-005	0		SubCatchment 3	No Redirection	
AS2250-016	1	1	1	1.064	217.68	100	0.017	SWMM Method	AS2250-016	0	AS2250-016	SubCatchment 3	No Redirection	
AS2250-016	2		1	0.007	217.68	100	0.017	SWMM Method	AS2250-016	1	AS2250-016	SubCatchment 3	No Redirection	
AS2250-016	3		1	0.588	217.68	0	0.017	SWMM Method	AS2250-016	0		SubCatchment 3	No Redirection	
AS2250-019	1	1	1	1.606	235.466	100	0.024	SWMM Method	AS2250-019	0	AS2250-019	SubCatchment 3	No Redirection	
AS2250-019	2		1	0.015	235.466	100	0.024	SWMM Method	AS2250-019	1	AS2250-019	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2250-019	3		1	1.024	235.466	0	0.024	SWMM Method	AS2250-019	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2250-038	1	1	1	5.629	826.3	100	0.02	SWMM Method	AS2250-038	0	AS2250-038	SubCatchment 3	No Redirection	
AS2250-038	2		1	0.108	826.3	100	0.02	SWMM Method	AS2250-038	1	AS2250-038	SubCatchment 3	No Redirection	
AS2250-038	3		1	0.894	826.3	0	0.02	SWMM Method	AS2250-038	0		SubCatchment 3	No Redirection	
AS2251-008	1	1	1	7.995	1474.956	100	0.031	SWMM Method	AS2251-008	0	AS2251-008	SubCatchment 3	No Redirection	
AS2251-008	2		1	0.816	1474.956	100	0.031	SWMM Method	AS2251-008	1	AS2251-008	SubCatchment 3	No Redirection	
AS2251-008	3		1	6.277	1474.956	0	0.031	SWMM Method	AS2251-008	0		SubCatchment 3	No Redirection	
AS2251-018	1	1	1	4.806	810.73	100	0.028	SWMM Method	AS2251-018	0	AS2251-018	SubCatchment 3	No Redirection	
AS2251-018	2		1	1.292	810.73	100	0.028	SWMM Method	AS2251-018	1	AS2251-018	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2251-018	3		1	8.336	810.73	0	0.028	SWMM Method	AS2251-018	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2252-008	1	1	1	4.523	428.376	100	0.015	SWMM Method	AS2252-008	0	AS2252-008	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2252-008	2		1	0.149	428.376	100	0.015	SWMM Method	AS2252-008	1	AS2252-008	SubCatchment 3	No Redirection	
AS2252-008	3		1	2.154	428.376	0	0.015	SWMM Method	AS2252-008	0		SubCatchment 3	No Redirection	
AS2253-012	1	1	1	4.866	348.296	100	0.006	SWMM Method	AS2253-012	0	AS2253-012	SubCatchment 3	No Redirection	UW Ag Research Stati

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2253-012	2		1	0.009	348.296	100	0.006	SWMM Method	AS2253-012	1	AS2253-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2253-012	3		1	2.405	348.296	0	0.006	SWMM Method	AS2253-012	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2254-005	1	1	1	6.985	658.765	100	0.005	SWMM Method	AS2254-005	0	AS2254-005	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2254-005	2		1	0.192	658.765	100	0.005	SWMM Method	AS2254-005	1	AS2254-005	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2254-005	3		1	3.819	658.765	0	0.005	SWMM Method	AS2254-005	0		SubCatchment 3	No Redirection	
AS2254-024	1	1	1	7.294	696.522	100	0.017	SWMM Method	AS2254-024	0	AS2254-024	SubCatchment 3	No Redirection	
AS2254-024	2		1	0.117	696.522	100	0.017	SWMM Method	AS2254-024	1	AS2254-024	SubCatchment 3	No Redirection	
AS2254-024	3		1	5.229	696.522	0	0.017	SWMM Method	AS2254-024	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2255-006	1	1	1	3.854	1011.526	100	0.036	SWMM Method	AS2255-006	0	AS2255-006	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2255-006	2		1	0.036	1011.526	100	0.036	SWMM Method	AS2255-006	1	AS2255-006	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2255-006	3		1	5.983	1011.526	0	0.036	SWMM Method	AS2255-006	0		SubCatchment 3	No Redirection	
AS2255-046	1	1	1	2.962	732.689	100	0.004	SWMM Method	AS2255-046	0	AS2255-046	SubCatchment 3	No Redirection	
AS2255-046	2		1	0.096	732.689	100	0.004	SWMM Method	AS2255-046	1	AS2255-046	SubCatchment 3	No Redirection	
AS2255-046	3		1	0.619	732.689	0	0.004	SWMM Method	AS2255-046	0		SubCatchment 3	No Redirection	
AS2256-017	1	1	1	8.712	380.99	100	0.005	SWMM Method	AS2256-017	0	AS2256-017	SubCatchment 3	No Redirection	
AS2256-017	3		1	0.698	380.99	0	0.005	SWMM Method	AS2256-017	0		SubCatchment 3	No Redirection	
AS2256-077	1	1	1	0.073	138.995	100	0.098	SWMM Method	AS2256-077	0	AS2256-077	SubCatchment 3	No Redirection	
AS2256-077	3		1	0.172	138.995	0	0.098	SWMM Method	AS2256-077	0		SubCatchment 3	No Redirection	
AS2257-004	1	1	1	11.696	1122.615	100	0.015	SWMM Method	AS2257-004	0	AS2257-004	SubCatchment 3	No Redirection	
AS2257-004	2		1	0.024	1122.615	100	0.015	SWMM Method	AS2257-004	1	AS2257-004	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2257-004	3		1	3.81	1122.615	0	0.015	SWMM Method	AS2257-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2257-012	1	1	1	1.164	150.889	100	0.022	SWMM Method	AS2257-012	0	AS2257-012	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2257-012	2		1	0.004	150.889	100	0.022	SWMM Method	AS2257-012	1	AS2257-012	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2257-012	3		1	0.328	150.889	0	0.022	SWMM Method	AS2257-012	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-001	1	1	1	1.051	404.262	100	0.007	SWMM Method	AS2258-001	0	AS2258-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-001	3		1	0.361	404.262	0	0.007	SWMM Method	AS2258-001	0		SubCatchment 3	No Redirection	
AS2258-048	1	1	1	2.582	249.122	100	0.02	SWMM Method	AS2258-048	0	AS2258-048	SubCatchment 3	No Redirection	Memorial High School
AS2258-048	2		1	0.069	249.122	100	0.02	SWMM Method	AS2258-048	1	AS2258-048	SubCatchment 3	No Redirection	Memorial HS 2018
AS2258-048	3		1	0.951	249.122	0	0.02	SWMM Method	AS2258-048	0		SubCatchment 3	No Redirection	Memorial HS 2018
AS2258-056	1	1	1	3.87	531.194	100	0.086	SWMM Method	AS2258-056	0	AS2258-056	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2258-056	2		1	1.179	531.194	100	0.086	SWMM Method	AS2258-056	1	AS2258-056	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2258-056	3		1	5.988	531.194	0	0.086	SWMM Method	AS2258-056	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2259-001	1	1	1	2.878	557.37	100	0.047	SWMM Method	AS2259-001	0	AS2259-001	SubCatchment 3	No Redirection	
AS2259-001	2		1	1.07	557.37	100	0.047	SWMM Method	AS2259-001	1	AS2259-001	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2259-001	3		1	16.236	557.37	0	0.047	SWMM Method	AS2259-001	0		SubCatchment 1	No Redirection	UW Ag Research 2018
AS2347-001	1	1	1	4.983	763.296	100	0.022	SWMM Method	AS2347-001	0	AS2347-001	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2347-001	2		1	0.2	763.296	100	0.022	SWMM Method	AS2347-001	1	AS2347-001	SubCatchment 3	No Redirection	
AS2347-001	3		1	3.621	763.296	0	0.022	SWMM Method	AS2347-001	0		SubCatchment 3	No Redirection	
AS2347-010	1	1	1	2.774	446.348	100	0.013	SWMM Method	AS2347-010	0	AS2347-010	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2347-010	2		1	0.195	446.348	100	0.013	SWMM Method	AS2347-010	1	AS2347-010	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2347-010	3		1	3.691	446.348	0	0.013	SWMM Method	AS2347-010	0		SubCatchment 3	No Redirection	UW Ag Research 2018

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2347-018	1	1	1	2.6	538.203	100	0.009	SWMM Method	AS2347-018	0	AS2347-018	SubCatchment 3	No Redirection	UW Ag Research Stati
AS2347-018	2		1	1.163	538.203	100	0.009	SWMM Method	AS2347-018	1	AS2347-018	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2347-018	3		1	8.141	538.203	0	0.009	SWMM Method	AS2347-018	0		SubCatchment 3	No Redirection	UW Ag Research 2018
AS2348-005	1	1	1	10.876	1021.535	100	0.033	SWMM Method	AS2348-005	0	AS2348-005	SubCatchment 3	No Redirection	
AS2348-005	2		1	0.16	1021.535	100	0.033	SWMM Method	AS2348-005	1	AS2348-005	SubCatchment 3	No Redirection	
AS2348-005	3		1	5.038	1021.535	0	0.033	SWMM Method	AS2348-005	0		SubCatchment 3	No Redirection	
AS2349-008	1	1	1	0.752	59.57	100	0.021	SWMM Method	AS2349-008	0	AS2349-008	SubCatchment 3	No Redirection	
AS2349-008	3		1	0.357	59.57	0	0.021	SWMM Method	AS2349-008	0		SubCatchment 3	No Redirection	
AS2351-015	1	1	1	5.941	1301.748	100	0.045	SWMM Method	AS2351-015	0	AS2351-015	SubCatchment 3	No Redirection	
AS2351-015	2		1	2.39	1301.748	100	0.045	SWMM Method	AS2351-015	1	AS2351-015	SubCatchment 3	No Redirection	
AS2351-015	3		1	17.133	1301.748	0	0.045	SWMM Method	AS2351-015	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2353-005	1	1	1	3.323	373.735	100	0.024	SWMM Method	AS2353-005	0	AS2353-005	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2353-005	2		1	1.199	373.735	100	0.024	SWMM Method	AS2353-005	1	AS2353-005	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2353-005	3		1	8.05	373.735	0	0.024	SWMM Method	AS2353-005	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2354-006	1	1	1	3.842	637.588	100	0.014	SWMM Method	AS2354-006	0	AS2354-006	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2354-006	2		1	1.621	637.588	100	0.014	SWMM Method	AS2354-006	1	AS2354-006	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2354-006	3		1	12.394	637.588	0	0.014	SWMM Method	AS2354-006	0		SubCatchment 3	No Redirection	Memorial High School
AS2355-001	1	1	1	3.961	597.222	100	0.024	SWMM Method	AS2355-001	0	AS2355-001	SubCatchment 3	No Redirection	Memorial HS 2018
AS2355-001	2		1	0.109	597.222	100	0.024	SWMM Method	AS2355-001	1	AS2355-001	SubCatchment 3	No Redirection	Memorial HS 2018
AS2355-001	3		1	3.649	597.222	0	0.024	SWMM Method	AS2355-001	0		SubCatchment 3	No Redirection	Memorial High School
AS2355-016	1	1	1	4.026	429.687	100	0.028	SWMM Method	AS2355-016	0	AS2355-016	SubCatchment 3	No Redirection	Memorial HS 2018
AS2355-016	2		1	0.053	429.687	100	0.028	SWMM Method	AS2355-016	1	AS2355-016	SubCatchment 3	No Redirection	Memorial HS 2018
AS2355-016	3		1	1.381	429.687	0	0.028	SWMM Method	AS2355-016	0		SubCatchment 3	No Redirection	
AS2356-032	1	1	1	12.536	414.401	100	0.025	SWMM Method	AS2356-032	0	AS2356-032	SubCatchment 3	No Redirection	
AS2356-032	2		1	0.205	414.401	100	0.025	SWMM Method	AS2356-032	1	AS2356-032	SubCatchment 3	No Redirection	
AS2356-032	3		1	5.956	414.401	0	0.025	SWMM Method	AS2356-032	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
AS2448-012	1	1	1	3.398	865.683	100	0.035	SWMM Method	AS2448-012	0	AS2448-012	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2448-012	2		1	1.519	865.683	100	0.035	SWMM Method	AS2448-012	1	AS2448-012	SubCatchment 3	No Redirection	Strickers Forebay 18
AS2448-012	3		1	10.134	865.683	0	0.035	SWMM Method	AS2448-012	0		SubCatchment 3	No Redirection	
AS2450-026	1	1	1	3.427	838.016	100	0.011	SWMM Method	AS2450-026	0	AS2450-026	SubCatchment 3	No Redirection	
AS2450-026	2		1	0.748	838.016	100	0.011	SWMM Method	AS2450-026	1	AS2450-026	SubCatchment 3	No Redirection	
AS2450-026	3		1	6.199	838.016	0	0.011	SWMM Method	AS2450-026	0		SubCatchment 3	No Redirection	UW Ag Research Stati
AS2451-015	1	1	1	4.588	531.086	100	0.014	SWMM Method	AS2451-015	0	AS2451-015	SubCatchment 3	No Redirection	UW Ag Research 2018
AS2451-015	2		1	1.284	531.086	100	0.014	SWMM Method	AS2451-015	1	AS2451-015	SubCatchment 3	No Redirection	
AS2451-015	3		1	10.348	531.086	0	0.014	SWMM Method	AS2451-015	0		SubCatchment 3	No Redirection	
AS2452-001	1	1	1	2.478	1101.479	100	0.055	SWMM Method	AS2452-001	0	AS2452-001	SubCatchment 3	No Redirection	
AS2452-001	2		1	0.935	1101.479	100	0.055	SWMM Method	AS2452-001	1	AS2452-001	SubCatchment 3	No Redirection	
AS2452-001	3		1	6.414	1101.479	0	0.055	SWMM Method	AS2452-001	0		SubCatchment 3	No Redirection	
AS2454-001	1	1	1	1.006	314.625	100	0.015	SWMM Method	AS2454-001	0	AS2454-001	SubCatchment 3	No Redirection	
AS2454-001	2		1	0.019	314.625	100	0.015	SWMM Method	AS2454-001	1	AS2454-001	SubCatchment 3	No Redirection	
AS2454-001	3		1	0.926	314.625	0	0.015	SWMM Method	AS2454-001	0		SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
AS2455-004	1	1	1	5.81	523.364	100	0.03	SWMM Method	AS2455-004	0	AS2455-004	SubCatchment 3	No Redirection	
AS2455-004	2		1	0.147	523.364	100	0.03	SWMM Method	AS2455-004	1	AS2455-004	SubCatchment 3	No Redirection	
AS2455-004	3		1	9.901	523.364	0	0.03	SWMM Method	AS2455-004	0		SubCatchment 3	No Redirection	
AS2548-001	1	1	1	4.672	806.285	100	0.008	SWMM Method	AS2548-001	0	AS2548-001	SubCatchment 3	No Redirection	
AS2548-001	2		1	1.625	806.285	100	0.008	SWMM Method	AS2548-001	1	AS2548-001	SubCatchment 3	No Redirection	
AS2548-001	3		1	13.836	806.285	0	0.008	SWMM Method	AS2548-001	0		SubCatchment 3	No Redirection	
AS2548-013	1	1	1	2.53	859.069	100	0.009	SWMM Method	AS2548-013	0	AS2548-013	SubCatchment 3	No Redirection	
AS2548-013	2		1	1.252	859.069	100	0.009	SWMM Method	AS2548-013	1	AS2548-013	SubCatchment 3	No Redirection	
AS2548-013	3		1	9.261	859.069	0	0.009	SWMM Method	AS2548-013	0		SubCatchment 1	No Redirection	
AS2550-016	1	1	1	1.927	432.899	100	0.07	SWMM Method	AS2550-016	0	AS2550-016	SubCatchment 3	No Redirection	
AS2550-016	2		1	0.625	432.899	100	0.07	SWMM Method	AS2550-016	1	AS2550-016	SubCatchment 3	No Redirection	
AS2550-016	3		1	4.475	432.899	0	0.07	SWMM Method	AS2550-016	0		SubCatchment 3	No Redirection	
AS2551-008	1	1	1	2.551	922.52	100	0.02	SWMM Method	AS2551-008	0	AS2551-008	SubCatchment 3	No Redirection	
AS2551-008	2		1	0.981	922.52	100	0.02	SWMM Method	AS2551-008	1	AS2551-008	SubCatchment 3	No Redirection	
AS2551-008	3		1	8.457	922.52	0	0.02	SWMM Method	AS2551-008	0		SubCatchment 3	No Redirection	
AS2551-020	1	1	1	2.419	1682.477	100	0.037	SWMM Method	AS2551-020	0	AS2551-020	SubCatchment 3	No Redirection	
AS2551-020	2		1	0.682	1682.477	100	0.037	SWMM Method	AS2551-020	1	AS2551-020	SubCatchment 3	No Redirection	
AS2551-020	3		1	15.561	1682.477	0	0.037	SWMM Method	AS2551-020	0		SubCatchment 3	No Redirection	
AS2552-004	1	1	1	1.123	326.686	100	0.029	SWMM Method	AS2552-004	0	AS2552-004	SubCatchment 3	No Redirection	
AS2552-004	2		1	0.419	326.686	100	0.029	SWMM Method	AS2552-004	1	AS2552-004	SubCatchment 3	No Redirection	
AS2552-004	3		1	2.922	326.686	0	0.029	SWMM Method	AS2552-004	0		SubCatchment 1	No Redirection	
ATTIC_ANGEL_E_POND	1	1	1	0.733	770.877	100	0.134	SWMM Method	ATTIC_ANGE	0	ATTIC_ANGEL_E_	SubCatchment 3	No Redirection	
ATTIC_ANGEL_E_POND	2		1	0.113	770.877	100	0.134	SWMM Method	ATTIC_ANGE	1	ATTIC_ANGEL_E_	SubCatchment 3	No Redirection	
ATTIC_ANGEL_E_POND	3		1	1.872	770.877	0	0.134	SWMM Method	ATTIC_ANGE	0		SubCatchment 3	No Redirection	
ATTIC_ANGEL_POND_IN	1	1	1	1.605	2197.561	100	0.131	SWMM Method	ATTIC_ANGE	0	ATTIC_ANGEL_P(	SubCatchment 3	No Redirection	
ATTIC_ANGEL_POND_IN	2		1	0.818	2197.561	100	0.131	SWMM Method	ATTIC_ANGE	1	ATTIC_ANGEL_P(	SubCatchment 3	No Redirection	Swallowtail Park
ATTIC_ANGEL_POND_IN	3		1	5.606	2197.561	0	0.131	SWMM Method	ATTIC_ANGE	0		SubCatchment 3	No Redirection	Swallowtail Park 18
ATTIC_ANGEL_W_POND	1	1	1	0.454	870.025	100	0.118	SWMM Method	ATTIC_ANGE	0	ATTIC_ANGEL_W	SubCatchment 3	No Redirection	Swallowtail Park 18
ATTIC_ANGEL_W_POND	2		1	0.245	870.025	100	0.118	SWMM Method	ATTIC_ANGE	1	ATTIC_ANGEL_W	SubCatchment 3	No Redirection	Swallowtail Park
ATTIC_ANGEL_W_POND	3		1	2.53	870.025	0	0.118	SWMM Method	ATTIC_ANGE	0		SubCatchment 3	No Redirection	Swallowtail Park 18
BeltineNUS2	1	1	1	7.537	429.875	100	0.028	SWMM Method	EMPB_GW_N	0	EMPB_GW_NHPI	SubCatchment 3	No Redirection	Swallowtail Park 18
BeltineNUS2	3		1	6.679	429.875	0	0.028	SWMM Method	EMPB_GW_N	0		SubCatchment 3	No Redirection	
BeltlineNDS2	1	1	1	2.482	166.891	100	0.007	SWMM Method	EMPB_GW_V	0	EMPB_GW_WBH	SubCatchment 3	No Redirection	UW Ag Research Stati
BeltlineNDS2	3		1	4.155	166.891	0	0.007	SWMM Method	EMPB_GW_V	0		SubCatchment 3	No Redirection	UW Ag Research 2018
BH_CHURCH_PR	1	1	1	1.1	869.858	100	0.068	SWMM Method	BH_CHURCH	0	BH_CHURCH_PR	SubCatchment 3	No Redirection	UW Ag Research 2018
BH_CHURCH_PR	2		1	0.425	869.858	100	0.068	SWMM Method	BH_CHURCH	1	BH_CHURCH_PR	SubCatchment 3	No Redirection	
BH_CHURCH_PR	3		1	4.055	869.858	0	0.068	SWMM Method	BH_CHURCH	0		SubCatchment 1	No Redirection	
CAPE_SILVER_WAY_DRY_POND	1	1	1	0.26	738.78	100	0.069	SWMM Method	CAPE_SILVER	0	CAPE_SILVER_W/	SubCatchment 3	No Redirection	Swallowtail Park
CAPE_SILVER_WAY_DRY_POND	2		1	0.161	738.78	100	0.069	SWMM Method	CAPE_SILVER	1	CAPE_SILVER_W/	SubCatchment 3	No Redirection	Swallowtail Park 18
CAPE_SILVER_WAY_DRY_POND	3		1	1.436	738.78	0	0.069	SWMM Method	CAPE_SILVER	0		SubCatchment 3	No Redirection	Swallowtail Park 18
CAPE_SILVER_WAY_WET_POND	1	1	1	0.646	830.436	100	0.056	SWMM Method	CAPE_SILVER	0	CAPE_SILVER_W/	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
CAPE_SILVER_WAY_WET_POND	2		1	0.765	830.436	100	0.056	SWMM Method	CAPE_SILVER	1	CAPE_SILVER_W	SubCatchment 3	No Redirection	Swallowtail Park
CAPE_SILVER_WAY_WET_POND	3		1	1.412	830.436	0	0.056	SWMM Method	CAPE_SILVER	0		SubCatchment 3	No Redirection	Swallowtail Park 18
CEM_SWALE	1	1	1	0.506	459.427	100	0.011	SWMM Method	CEM_SWALE	0	CEM_SWALE	SubCatchment 3	No Redirection	Swallowtail Park 18
CEM_SWALE	2		1	0.051	459.427	100	0.011	SWMM Method	CEM_SWALE	1	CEM_SWALE	SubCatchment 3	No Redirection	
CEM_SWALE	3		1	4.974	459.427	0	0.011	SWMM Method	CEM_SWALE	0		SubCatchment 1	No Redirection	Swallowtail Park
CH_BIO_BASIN_1	1	1	1	1.303	639.293	100	0.006	SWMM Method	CH_BIO_BAS	0	CH_BIO_BASIN_1	SubCatchment 3	No Redirection	Swallowtail Park 18
CH_BIO_BASIN_1	2		1	1.212	639.293	100	0.006	SWMM Method	CH_BIO_BAS	1	CH_BIO_BASIN_1	SubCatchment 3	No Redirection	Swallowtail Park 18
CH_BIO_BASIN_1	3		1	7.664	639.293	0	0.006	SWMM Method	CH_BIO_BAS	0		SubCatchment 3	No Redirection	
COMMERCE_SQUARE_POND	1	1	1	3.913	559.767	100	0.033	SWMM Method	COMMERCE_	0	COMMERCE_SQU	SubCatchment 3	No Redirection	
COMMERCE_SQUARE_POND	2		1	0.106	559.767	100	0.033	SWMM Method	COMMERCE_	1	COMMERCE_SQU	SubCatchment 3	No Redirection	Swallowtail Park
COMMERCE_SQUARE_POND	3		1	3.322	559.767	0	0.033	SWMM Method	COMMERCE_	0		SubCatchment 3	No Redirection	Swallowtail Park 18
DT1853-003	1	1	1	0.307	338.532	100	0.017	SWMM Method	DT1853-003	0	DT1853-003	SubCatchment 3	No Redirection	Swallowtail Park 18
DT1853-003	2		1	0.098	338.532	100	0.017	SWMM Method	DT1853-003	1	DT1853-003	SubCatchment 3	No Redirection	
DT1853-003	3		1	2.549	338.532	0	0.017	SWMM Method	DT1853-003	0		SubCatchment 3	No Redirection	
DT2349-022	1	1	1	0.349	94.163	100	0.031	SWMM Method	DT2349-022	0	DT2349-022	SubCatchment 3	No Redirection	Swallowtail Park
DT2349-022	3		1	0.921	94.163	0	0.031	SWMM Method	DT2349-022	0		SubCatchment 3	No Redirection	Swallowtail Park 18
E_INF_BASIN	1	1	1	0.09	115.348	100	0.064	SWMM Method	E_INF_BASIN	0	E_INF_BASIN	SubCatchment 3	No Redirection	Swallowtail Park 18
E_INF_BASIN	2		1	0.125	115.348	100	0.064	SWMM Method	E_INF_BASIN	1	E_INF_BASIN	SubCatchment 3	No Redirection	
E_INF_BASIN	3		1	0.689	115.348	0	0.064	SWMM Method	E_INF_BASIN	0		SubCatchment 3	No Redirection	
ELD_FARM_S1	3	1	1	6.424	377.506	0	0.036	SWMM Method	ELD_FARM_S	0		SubCatchment 1	No Redirection	Swallowtail Park
ELD_FARM_S2	1	1	1	0.062	846.913	100	0.027	SWMM Method	ELD_FARM_S	0	ELD_FARM_S2	SubCatchment 3	No Redirection	Swallowtail Park 18
ELD_FARM_S2	3		1	14.364	846.913	0	0.027	SWMM Method	ELD_FARM_S	0		SubCatchment 1	No Redirection	Swallowtail Park 18
ELD_FARM_S3	1	1	1	0.051	710.294	100	0.027	SWMM Method	ELD_FARM_S	0	ELD_FARM_S3	SubCatchment 3	No Redirection	
ELD_FARM_S3	3		1	6.163	710.294	0	0.027	SWMM Method	ELD_FARM_S	0		SubCatchment 1	No Redirection	
ELD_N_DEP	1	1	1	0.156	442.82	100	0.01	SWMM Method	ELD_N_DEP	0	ELD_N_DEP	SubCatchment 3	No Redirection	
ELD_N_DEP	2		1	0.113	442.82	100	0.01	SWMM Method	ELD_N_DEP	0	ELD_N_DEP	SubCatchment 3	No Redirection	
ELD_N_DEP	3		1	4.192	442.82	0	0.01	SWMM Method	ELD_N_DEP	0		SubCatchment 1	No Redirection	
ELD_N_DITCH	3	1	1	1.867	186.536	0	0.009	SWMM Method	ELD_N_DITCH	0		SubCatchment 1	No Redirection	
ELD_N_FARM1	1	1	1	1.23	1121.859	100	0.022	SWMM Method	ELD_N_FARM	0	ELD_N_FARM1	SubCatchment 3	No Redirection	
ELD_N_FARM1	2		1	0.268	1121.859	100	0.022	SWMM Method	ELD_N_FARM	0	ELD_N_FARM1	SubCatchment 3	No Redirection	
ELD_N_FARM1	3		1	18.948	1121.859	0	0.022	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM10	1	1	1	0.094	969.461	100	0.021	SWMM Method	ELD_N_FARM	0	ELD_N_FARM10	SubCatchment 3	No Redirection	
ELD_N_FARM10	3		1	12.207	969.461	0	0.021	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM11	1	1	1	0.134	529.055	100	0.009	SWMM Method	ELD_N_FARM	0	ELD_N_FARM11	SubCatchment 3	No Redirection	
ELD_N_FARM11	2		1	0.148	529.055	100	0.009	SWMM Method	ELD_N_FARM	0	ELD_N_FARM11	SubCatchment 3	No Redirection	
ELD_N_FARM11	3		1	8.253	529.055	0	0.009	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM12	1	1	1	0.12	961.197	100	0.014	SWMM Method	ELD_N_FARM	0	ELD_N_FARM12	SubCatchment 3	No Redirection	
ELD_N_FARM12	2		1	0.123	961.197	100	0.014	SWMM Method	ELD_N_FARM	0	ELD_N_FARM12	SubCatchment 3	No Redirection	
ELD_N_FARM12	3		1	19.295	961.197	0	0.014	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM13	1	1	1	0.122	1121.491	100	0.047	SWMM Method	ELD_N_FARM	0	ELD_N_FARM13	SubCatchment 3	No Redirection	
ELD_N_FARM13	2		1	0.077	1121.491	100	0.047	SWMM Method	ELD_N_FARM	0	ELD_N_FARM13	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
ELD_N_FARM13	3		1	16.018	1121.491	0	0.047	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM14	1	1	1	0.514	553.095	100	0.032	SWMM Method	ELD_N_FARM	0	ELD_N_FARM14	SubCatchment 3	No Redirection	
ELD_N_FARM14	2		1	0.185	553.095	100	0.032	SWMM Method	ELD_N_FARM	0	ELD_N_FARM14	SubCatchment 3	No Redirection	
ELD_N_FARM14	3		1	8.371	553.095	0	0.032	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM15	1	1	1	0.348	490.695	100	0.025	SWMM Method	ELD_N_FARM	0	ELD_N_FARM15	SubCatchment 3	No Redirection	
ELD_N_FARM15	2		1	0.216	490.695	100	0.025	SWMM Method	ELD_N_FARM	0	ELD_N_FARM15	SubCatchment 3	No Redirection	
ELD_N_FARM15	3		1	7.029	490.695	0	0.025	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM16	3	1	1	4.69	350.691	0	0.017	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM17	1	1	1	0.039	563.217	100	0.029	SWMM Method	ELD_N_FARM	0	ELD_N_FARM17	SubCatchment 3	No Redirection	
ELD_N_FARM17	3		1	4.966	563.217	0	0.029	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM2	1	1	1	0.464	831.07	100	0.046	SWMM Method	ELD_N_FARM	0	ELD_N_FARM2	SubCatchment 3	No Redirection	
ELD_N_FARM2	2		1	0.01	831.07	100	0.046	SWMM Method	ELD_N_FARM	0	ELD_N_FARM2	SubCatchment 3	No Redirection	
ELD_N_FARM2	3		1	5.669	831.07	0	0.046	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM3	1	1	1	0.272	1011.467	100	0.027	SWMM Method	ELD_N_FARM	0	ELD_N_FARM3	SubCatchment 3	No Redirection	
ELD_N_FARM3	2		1	0.014	1011.467	100	0.027	SWMM Method	ELD_N_FARM	0	ELD_N_FARM3	SubCatchment 3	No Redirection	
ELD_N_FARM3	3		1	17.732	1011.467	0	0.027	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM3	2		1	0.014	1011.467	100	0.027	SWMM Method	ELD_N_FARM	0	ELD_N_FARM3	SubCatchment 3	No Redirection	
ELD_N_FARM3	3		1	17.732	1011.467	0	0.027	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM4	1	1	1	0.92	1252.54	100	0.025	SWMM Method	ELD_N_FARM	0	ELD_N_FARM4	SubCatchment 3	No Redirection	Sauk Heights Pond 18
ELD_N_FARM4	3		1	21.354	1252.54	0	0.025	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM5	1	1	1	0.55	2070.85	100	0.03	SWMM Method	ELD_N_FARM	0	ELD_N_FARM5	SubCatchment 3	No Redirection	
ELD_N_FARM5	2		1	0.003	2070.85	100	0.03	SWMM Method	ELD_N_FARM	0	ELD_N_FARM5	SubCatchment 3	No Redirection	
ELD_N_FARM5	3		1	30.115	2070.85	0	0.03	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM6	1	1	1	0.29	1089.791	100	0.022	SWMM Method	ELD_N_FARM	0	ELD_N_FARM6	SubCatchment 3	No Redirection	
ELD_N_FARM6	2		1	0.01	1089.791	100	0.022	SWMM Method	ELD_N_FARM	0	ELD_N_FARM6	SubCatchment 3	No Redirection	
ELD_N_FARM6	3		1	13.715	1089.791	0	0.022	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM7	3	1	1	9.506	739.389	0	0.022	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM8	1	1	1	0.077	1321.493	100	0.008	SWMM Method	ELD_N_FARM	0	ELD_N_FARM8	SubCatchment 3	No Redirection	
ELD_N_FARM8	2		1	0.01	1321.493	100	0.008	SWMM Method	ELD_N_FARM	0	ELD_N_FARM8	SubCatchment 3	No Redirection	
ELD_N_FARM8	3		1	26.945	1321.493	0	0.008	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_N_FARM9	1	1	1	0.003	266.898	100	0.016	SWMM Method	ELD_N_FARM	0	ELD_N_FARM9	SubCatchment 3	No Redirection	
ELD_N_FARM9	3		1	2.033	266.898	0	0.016	SWMM Method	ELD_N_FARM	0		SubCatchment 1	No Redirection	
ELD_PLEAS_DEP	1	1	1	0.01	912.65	100	0.042	SWMM Method	ELD_PLEAS_I	0	ELD_PLEAS_DEP	SubCatchment 3	No Redirection	
ELD_PLEAS_DEP	3		1	13.865	912.65	0	0.042	SWMM Method	ELD_PLEAS_I	0		SubCatchment 1	No Redirection	
ELD_TO_BW1	1	1	1	0.054	556.832	100	0.078	SWMM Method	ELD_TO_BW	0	ELD_TO_BW1	SubCatchment 3	No Redirection	
ELD_TO_BW1	2		1	0.064	556.832	100	0.078	SWMM Method	ELD_TO_BW	0	ELD_TO_BW1	SubCatchment 3	No Redirection	
ELD_TO_BW1	3		1	1.491	556.832	0	0.078	SWMM Method	ELD_TO_BW	0		SubCatchment 1	No Redirection	
ELD_TO_BW2	1	1	1	0.255	410.049	100	0.042	SWMM Method	ELD_TO_BW	0	ELD_TO_BW2	SubCatchment 3	No Redirection	
ELD_TO_BW2	2		1	0.223	410.049	100	0.042	SWMM Method	ELD_TO_BW	0	ELD_TO_BW2	SubCatchment 3	No Redirection	
ELD_TO_BW2	3		1	3.829	410.049	0	0.042	SWMM Method	ELD_TO_BW	0		SubCatchment 1	No Redirection	
ELD_TO_BW3	1	1	1	0.08	224.887	100	0.029	SWMM Method	ELD_TO_BW	0	ELD_TO_BW3	SubCatchment 3	No Redirection	
ELD_TO_BW3	2		1	0.071	224.887	100	0.029	SWMM Method	ELD_TO_BW	0	ELD_TO_BW3	SubCatchment 3	No Redirection	
ELD_TO_BW3	3		1	2.901	224.887	0	0.029	SWMM Method	ELD_TO_BW	0		SubCatchment 1	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
ELD_TO_BW4	1	1	1	0.354	542.321	100	0.018	SWMM Method	ELD_TO_BW4	0	ELD_TO_BW4	SubCatchment 3	No Redirection	
ELD_TO_BW4	2		1	0.273	542.321	100	0.018	SWMM Method	ELD_TO_BW4	0	ELD_TO_BW4	SubCatchment 3	No Redirection	
ELD_TO_BW4	3		1	7.517	542.321	0	0.018	SWMM Method	ELD_TO_BW4	0		SubCatchment 1	No Redirection	
EMPB_GW_LOSR2	1	1	1	4.9	638.022	100	0.016	SWMM Method	EMPB_GW_L	0	EMPB_GW_LOSR	SubCatchment 3	No Redirection	
EMPB_GW_LOSR2	2		1	0.13	638.022	100	0.016	SWMM Method	EMPB_GW_L	1	EMPB_GW_LOSR	SubCatchment 3	No Redirection	
EMPB_GW_LOSR2	3		1	6.598	638.022	0	0.016	SWMM Method	EMPB_GW_L	0		SubCatchment 3	No Redirection	
EMPB_GW_MPR1	1	1	1	5.199	265.395	100	0.014	SWMM Method	EMPB_GW_M	0	EMPB_GW_MPR	SubCatchment 3	No Redirection	Swallowtail Park
EMPB_GW_MPR1	3		1	4.488	265.395	0	0.014	SWMM Method	EMPB_GW_M	0		SubCatchment 3	No Redirection	Swallowtail Park 18
EMPB_GW_NHPR2	1	1	1	1.734	624.082	100	0.038	SWMM Method	EMPB_GW_M	0	EMPB_GW_NHPI	SubCatchment 3	No Redirection	
EMPB_GW_NHPR2	2		1	0.046	624.082	100	0.038	SWMM Method	EMPB_GW_M	1	EMPB_GW_NHPI	SubCatchment 3	No Redirection	
EMPB_GW_NHPR2	3		1	2.94	624.082	0	0.038	SWMM Method	EMPB_GW_M	0		SubCatchment 3	No Redirection	
EMPB_GW_NTL3	1	1	1	0.696	830.13	100	0.045	SWMM Method	EMPB_GW_M	0	EMPB_GW_NTL3	SubCatchment 3	No Redirection	
EMPB_GW_NTL3	2		1	0.233	830.13	100	0.045	SWMM Method	EMPB_GW_M	1	EMPB_GW_NTL3	SubCatchment 3	No Redirection	
EMPB_GW_NTL3	3		1	5.239	830.13	0	0.045	SWMM Method	EMPB_GW_M	0		SubCatchment 3	No Redirection	
EMPB_GW_NTL6	1	1	1	2.28	974.887	100	0.061	SWMM Method	EMPB_GW_M	0	EMPB_GW_NTL6	SubCatchment 3	No Redirection	Sauk Heights Pond
EMPB_GW_NTL6	2		1	0.529	974.887	100	0.061	SWMM Method	EMPB_GW_M	1	EMPB_GW_NTL6	SubCatchment 3	No Redirection	Sauk Heights Pond 18
EMPB_GW_NTL6	3		1	9.472	974.887	0	0.061	SWMM Method	EMPB_GW_M	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
EMPB_GW_NTL7	1	1	1	2.474	478.761	100	0.049	SWMM Method	EMPB_GW_M	0	EMPB_GW_NTL7	SubCatchment 3	No Redirection	
EMPB_GW_NTL7	2		1	0.292	478.761	100	0.049	SWMM Method	EMPB_GW_M	1	EMPB_GW_NTL7	SubCatchment 3	No Redirection	
EMPB_GW_NTL7	3		1	4.437	478.761	0	0.049	SWMM Method	EMPB_GW_M	0		SubCatchment 3	No Redirection	Swallowtail Park 18
EMPB_GW_NTL8	1	1	1	0.33	1979.517	100	0.044	SWMM Method	EMPB_GW_M	0	EMPB_GW_NTL8	SubCatchment 3	No Redirection	Swallowtail Park 18
EMPB_GW_NTL8	2		1	0.39	1979.517	100	0.044	SWMM Method	EMPB_GW_M	1	EMPB_GW_NTL8	SubCatchment 3	No Redirection	Swallowtail Park 18
EMPB_GW_NTL8	3		1	10.67	1979.517	0	0.044	SWMM Method	EMPB_GW_M	0		SubCatchment 3	No Redirection	UW Ag Research Stati
EMPB_GW_OSR1	1	1	1	1.888	642.199	100	0.038	SWMM Method	EMPB_GW_O	0	EMPB_GW_OSR1	SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_OSR1	2		1	0.015	642.199	100	0.038	SWMM Method	EMPB_GW_O	1	EMPB_GW_OSR1	SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_OSR1	3		1	1.84	642.199	0	0.038	SWMM Method	EMPB_GW_O	0		SubCatchment 3	No Redirection	
EMPB_GW_STL1	1	1	1	4.918	1217.985	100	0.014	SWMM Method	EMPB_GW_S	0	EMPB_GW_STL1	SubCatchment 3	No Redirection	UW Ag Research Stati
EMPB_GW_STL1	2		1	0.111	1217.985	100	0.014	SWMM Method	EMPB_GW_S	1	EMPB_GW_STL1	SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_STL1	3		1	5.366	1217.985	0	0.014	SWMM Method	EMPB_GW_S	0		SubCatchment 3	No Redirection	UW Ag Research 2018
EMPB_GW_UOSR1	1	1	1	0.646	487.185	100	0.026	SWMM Method	EMPB_GW_U	0	EMPB_GW_UOSI	SubCatchment 3	No Redirection	
EMPB_GW_UOSR1	2		1	0.446	487.185	100	0.026	SWMM Method	EMPB_GW_U	1	EMPB_GW_UOSI	SubCatchment 3	No Redirection	
EMPB_GW_UOSR1	3		1	3.582	487.185	0	0.026	SWMM Method	EMPB_GW_U	0		SubCatchment 3	No Redirection	
EMPB_GW_WBH1	1	1	1	3.898	1100.22	100	0.042	SWMM Method	EMPB_GW_W	0	EMPB_GW_WBH	SubCatchment 3	No Redirection	
EMPB_GW_WBH1	2		1	0.036	1100.22	100	0.042	SWMM Method	EMPB_GW_W	1	EMPB_GW_WBH	SubCatchment 3	No Redirection	
EMPB_GW_WBH1	3		1	2.189	1100.22	0	0.042	SWMM Method	EMPB_GW_W	0		SubCatchment 3	No Redirection	
EMPB_GW_WBH3	1	1	1	3.851	383.51	100	0.013	SWMM Method	EMPB_GW_W	0	EMPB_GW_WBH	SubCatchment 3	No Redirection	
EMPB_GW_WBH3	2		1	0.035	383.51	100	0.013	SWMM Method	EMPB_GW_W	1	EMPB_GW_WBH	SubCatchment 3	No Redirection	
EMPB_GW_WBH3	3		1	3.637	383.51	0	0.013	SWMM Method	EMPB_GW_W	0		SubCatchment 3	No Redirection	
EMPB_GW_WR1	1	1	1	1.226	1050.006	100	0.064	SWMM Method	EMPB_GW_W	0	EMPB_GW_WR1	SubCatchment 3	No Redirection	
EMPB_GW_WR1	2		1	0.18	1050.006	100	0.064	SWMM Method	EMPB_GW_W	1	EMPB_GW_WR1	SubCatchment 3	No Redirection	
EMPB_GW_WR1	3		1	4.736	1050.006	0	0.064	SWMM Method	EMPB_GW_W	0		SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
FARGO_COBALT_CHANNEL_JCT	1	1	1	0.108	944.257	100	0.1	SWMM Method	FARGO_COB	0	FARGO_COBALT_	SubCatchment 3	No Redirection	
FARGO_COBALT_CHANNEL_JCT	2		1	0.122	944.257	100	0.1	SWMM Method	FARGO_COB	1	FARGO_COBALT_	SubCatchment 3	No Redirection	
FARGO_COBALT_CHANNEL_JCT	3		1	2.355	944.257	0	0.1	SWMM Method	FARGO_COB	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
FARGO_COBALT_W_POND	1	1	1	0.511	994.202	100	0.051	SWMM Method	FARGO_COB	0	FARGO_COBALT_	SubCatchment 3	No Redirection	Strickers Forebay 18
FARGO_COBALT_W_POND	2		1	0.339	994.202	100	0.051	SWMM Method	FARGO_COB	1	FARGO_COBALT_	SubCatchment 3	No Redirection	Strickers Forebay 18
FARGO_COBALT_W_POND	3		1	1.898	994.202	0	0.051	SWMM Method	FARGO_COB	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
FARM_BD_DEP	1	1	1	0.381	383.199	100	0.035	SWMM Method	FARM_BD_D	0	FARM_BD_DEP	SubCatchment 3	No Redirection	Strickers Forebay 18
FARM_BD_DEP	3		1	8.521	383.199	0	0.035	SWMM Method	FARM_BD_D	0		SubCatchment 1	No Redirection	Strickers Forebay 18
FARM_DEP1	1	1	1	0.368	600.894	100	0.018	SWMM Method	FARM_DEP1	0	FARM_DEP1	SubCatchment 3	No Redirection	
FARM_DEP1	2		1	0.039	600.894	100	0.018	SWMM Method	FARM_DEP1	0	FARM_DEP1	SubCatchment 3	No Redirection	
FARM_DEP1	3		1	4.266	600.894	0	0.018	SWMM Method	FARM_DEP1	0		SubCatchment 1	No Redirection	
FARM_DEP2	1	1	1	0.917	899.792	100	0.035	SWMM Method	FARM_DEP2	0	FARM_DEP2	SubCatchment 3	No Redirection	
FARM_DEP2	2		1	0.444	899.792	100	0.035	SWMM Method	FARM_DEP2	1	FARM_DEP2	SubCatchment 3	No Redirection	
FARM_DEP2	3		1	10.512	899.792	0	0.035	SWMM Method	FARM_DEP2	0		SubCatchment 1	No Redirection	Swallowtail Park
FARM_DITCH1	1	1	1	1.245	442.308	100	0.02	SWMM Method	FARM_DITCH	0	FARM_DITCH1	SubCatchment 3	No Redirection	Swallowtail Park 18
FARM_DITCH1	2		1	0.225	442.308	100	0.02	SWMM Method	FARM_DITCH	0	FARM_DITCH1	SubCatchment 3	No Redirection	Swallowtail Park 18
FARM_DITCH1	3		1	10.778	442.308	0	0.02	SWMM Method	FARM_DITCH	0		SubCatchment 1	No Redirection	
FARM_DITCH2	1	1	1	1.022	667.007	100	0.037	SWMM Method	FARM_DITCH	0	FARM_DITCH2	SubCatchment 3	No Redirection	
FARM_DITCH2	2		1	0.554	667.007	100	0.037	SWMM Method	FARM_DITCH	0	FARM_DITCH2	SubCatchment 3	No Redirection	
FARM_DITCH2	3		1	20.965	667.007	0	0.037	SWMM Method	FARM_DITCH	0		SubCatchment 1	No Redirection	Swallowtail Park
FARM_DITCH3	1	1	1	0.047	578.875	100	0.041	SWMM Method	FARM_DITCH	0	FARM_DITCH3	SubCatchment 3	No Redirection	Swallowtail Park 18
FARM_DITCH3	2		1	0.027	578.875	100	0.041	SWMM Method	FARM_DITCH	0	FARM_DITCH3	SubCatchment 3	No Redirection	Swallowtail Park 18
FARM_DITCH3	3		1	15.021	578.875	0	0.041	SWMM Method	FARM_DITCH	0		SubCatchment 1	No Redirection	
FARM_DITCH4	3	1	1	6.201	486.844	0	0.026	SWMM Method	FARM_DITCH	0		SubCatchment 1	No Redirection	
FARM_DITCH5	1	1	1	0.084	525.333	100	0.075	SWMM Method	FARM_DITCH	0	FARM_DITCH5	SubCatchment 3	No Redirection	
FARM_DITCH5	2		1	0.002	525.333	100	0.075	SWMM Method	FARM_DITCH	0	FARM_DITCH5	SubCatchment 3	No Redirection	Sauk Heights Pond
FARM_DITCH5	3		1	1.042	525.333	0	0.075	SWMM Method	FARM_DITCH	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
FARM_DITCH6	3	1	1	2.105	240.667	0	0.031	SWMM Method	FARM_DITCH	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
FARMRD_SW4	1	1	1	1.583	864.86	100	0.039	SWMM Method	FARMRD_SW	0	FARMRD_SW4	SubCatchment 3	No Redirection	
FARMRD_SW4	3		1	11.701	864.86	0	0.039	SWMM Method	FARMRD_SW	0		SubCatchment 3	No Redirection	UW Ag Research Stati
FARMRD_SW5	1	1	1	0.354	1266.896	100	0.044	SWMM Method	FARMRD_SW	0	FARMRD_SW5	SubCatchment 3	No Redirection	UW Ag Research 2018
FARMRD_SW5	3		1	12.049	1266.896	0	0.044	SWMM Method	FARMRD_SW	0		SubCatchment 1	No Redirection	UW Ag Research 2018
FARMRD_SW6	1	1	1	0.218	463.261	100	0.059	SWMM Method	FARMRD_SW	0	FARMRD_SW6	SubCatchment 3	No Redirection	UW Ag Research Stati
FARMRD_SW6	2		1	0.001	463.261	100	0.059	SWMM Method	FARMRD_SW	0	FARMRD_SW6	SubCatchment 3	No Redirection	UW Ag Research 2018
FARMRD_SW6	3		1	4.116	463.261	0	0.059	SWMM Method	FARMRD_SW	0		SubCatchment 1	No Redirection	UW Ag Research 2018
FARMRD_SWALE1	1	1	1	4.114	1338.369	100	0.017	SWMM Method	FARMRD_SW	0	FARMRD_SWALE	SubCatchment 3	No Redirection	
FARMRD_SWALE1	2		1	0.104	1338.369	100	0.017	SWMM Method	FARMRD_SW	1	FARMRD_SWALE	SubCatchment 3	No Redirection	Sauk Heights Pond
FARMRD_SWALE1	3		1	27.288	1338.369	0	0.017	SWMM Method	FARMRD_SW	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARMRD_SWALE2	1	1	1	0.342	1411.606	100	0.039	SWMM Method	FARMRD_SW	0	FARMRD_SWALE	SubCatchment 3	No Redirection	Sauk Heights Pond 18
FARMRD_SWALE2	3		1	12.007	1411.606	0	0.039	SWMM Method	FARMRD_SW	0		SubCatchment 1	No Redirection	Sauk Heights Pond
FARMRD_SWALE3	1	1	1	0.28	700.33	100	0.041	SWMM Method	FARMRD_SW	0	FARMRD_SWALE	SubCatchment 3	No Redirection	Sauk Heights Pond 18

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
FARMRD_SWALE3	3		1	16.639	700.33	0	0.041	SWMM Method	FARMRD_SW	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
FS-10	1	1	1	1.974	541.188	100	0.04	SWMM Method	FS-10	0	FS-10	SubCatchment 3	No Redirection	Sauk Heights Pond
FS-10	2		1	0.991	541.188	100	0.04	SWMM Method	FS-10	1	FS-10	SubCatchment 3	No Redirection	Sauk Heights Pond 18
FS-10	3		1	7.128	541.188	0	0.04	SWMM Method	FS-10	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
FS-13	1	1	1	2.346	715.892	100	0.051	SWMM Method	FS-13	0	FS-13	SubCatchment 3	No Redirection	UW Ag Research Stati
FS-13	2		1	1.086	715.892	100	0.051	SWMM Method	FS-13	1	FS-13	SubCatchment 3	No Redirection	UW Ag Research 2018
FS-13	3		1	7.813	715.892	0	0.051	SWMM Method	FS-13	0		SubCatchment 3	No Redirection	UW Ag Research 2018
FS-15	1	1	1	1.676	463.683	100	0.04	SWMM Method	FS-15	0	FS-15	SubCatchment 3	No Redirection	UW Ag Research Stati
FS-15	2		1	0.69	463.683	100	0.04	SWMM Method	FS-15	1	FS-15	SubCatchment 3	No Redirection	UW Ag Research 2018
FS-15	3		1	5.054	463.683	0	0.04	SWMM Method	FS-15	0		SubCatchment 3	No Redirection	UW Ag Research 2018
GANSER_HEIGHTS_POND	1	1	1	6.717	300.577	100	0.039	SWMM Method	GANSER_HEI	0	GANSER_HEIGHT	SubCatchment 3	No Redirection	Sauk Heights Pond
GANSER_HEIGHTS_POND	2		1	0.001	300.577	100	0.039	SWMM Method	GANSER_HEI	1	GANSER_HEIGHT	SubCatchment 3	No Redirection	Sauk Heights Pond 18
GANSER_HEIGHTS_POND	3		1	3.545	300.577	0	0.039	SWMM Method	GANSER_HEI	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
GR2145-003	1	1	1	2.683	966.511	100	0.048	SWMM Method	GR2145-003	0	GR2145-003	SubCatchment 3	No Redirection	
GR2145-003	2		1	0.488	966.511	100	0.048	SWMM Method	GR2145-003	1	GR2145-003	SubCatchment 3	No Redirection	Sauk Heights Pond
GR2145-003	3		1	6.744	966.511	0	0.048	SWMM Method	GR2145-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
GR2256-019	1	1	1	4.138	544.889	100	0.009	SWMM Method	GR2256-019	0	GR2256-019	SubCatchment 3	No Redirection	Sauk Heights Pond 18
GR2256-019	2		1	0.003	544.889	100	0.009	SWMM Method	GR2256-019	1	GR2256-019	SubCatchment 3	No Redirection	UW Ag Research Stati
GR2256-019	3		1	1.473	544.889	0	0.009	SWMM Method	GR2256-019	0		SubCatchment 3	No Redirection	UW Ag Research 2018
GR2355-009	1	1	1	4.194	873.139	100	0.015	SWMM Method	GR2355-009	0	GR2355-009	SubCatchment 3	No Redirection	UW Ag Research 2018
GR2355-009	2		1	0.1	873.139	100	0.015	SWMM Method	GR2355-009	1	GR2355-009	SubCatchment 3	No Redirection	Sauk Heights Pond
GR2355-009	3		1	5.676	873.139	0	0.015	SWMM Method	GR2355-009	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
GR2550-020	1	1	1	1.476	449.457	100	0.034	SWMM Method	GR2550-020	0	GR2550-020	SubCatchment 3	No Redirection	Sauk Heights Pond 18
GR2550-020	2		1	0.056	449.457	100	0.034	SWMM Method	GR2550-020	1	GR2550-020	SubCatchment 3	No Redirection	Sauk Heights Pond
GR2550-020	3		1	3.965	449.457	0	0.034	SWMM Method	GR2550-020	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
GREYSTONE_POND	1	1	1	1.561	1169.492	100	0.065	SWMM Method	GREYSTONE_	0	GREYSTONE_PON	SubCatchment 3	No Redirection	Sauk Heights Pond 18
GREYSTONE_POND	2		1	0.58	1169.492	100	0.065	SWMM Method	GREYSTONE_	1	GREYSTONE_PON	SubCatchment 3	No Redirection	UW Ag Research Stati
GREYSTONE_POND	3		1	3.89	1169.492	0	0.065	SWMM Method	GREYSTONE_	0		SubCatchment 3	No Redirection	UW Ag Research 2018
HD2249-033_INSERT	1	1	1	3.969	1269.165	100	0.008	SWMM Method	HD2249-033	0	HD2249-033_INS	SubCatchment 3	No Redirection	UW Ag Research Stati
HD2249-033_INSERT	2		1	0.033	1269.165	100	0.008	SWMM Method	HD2249-033	1	HD2249-033_INS	SubCatchment 3	No Redirection	UW Ag Research 2018
HD2249-033_INSERT	3		1	1.945	1269.165	0	0.008	SWMM Method	HD2249-033	0		SubCatchment 3	No Redirection	UW Ag Research 2018
HD2454-017	1	1	1	11.274	1190.635	100	0.03	SWMM Method	HD2454-017	0	HD2454-017	SubCatchment 3	No Redirection	UW Ag Research Stati
HD2454-017	2		1	0.343	1190.635	100	0.03	SWMM Method	HD2454-017	1	HD2454-017	SubCatchment 3	No Redirection	UW Ag Research 2018
HD2454-017	3		1	14.016	1190.635	0	0.03	SWMM Method	HD2454-017	0		SubCatchment 3	No Redirection	Swallowtail Park
HIGHVIEW_PR	1	1	1	0.374	91.424	100	0.021	SWMM Method	HIGHVIEW_P	0	HIGHVIEW_PR	SubCatchment 3	No Redirection	Swallowtail Park 18
HIGHVIEW_PR	2		1	0.072	91.424	100	0.021	SWMM Method	HIGHVIEW_P	1	HIGHVIEW_PR	SubCatchment 3	No Redirection	Swallowtail Park 18
HIGHVIEW_PR	3		1	0.559	91.424	0	0.021	SWMM Method	HIGHVIEW_P	0		SubCatchment 3	No Redirection	Sauk Heights Pond
HOMEWOOD_WAY_POND	1	1	1	2.979	287.953	100	0.049	SWMM Method	HOMEWOOD	0	HOMEWOOD_W	SubCatchment 3	No Redirection	Sauk Heights Pond 18
HOMEWOOD_WAY_POND	2		1	0.054	287.953	100	0.049	SWMM Method	HOMEWOOD	1	HOMEWOOD_W	SubCatchment 3	No Redirection	Sauk Heights Pond 18
HOMEWOOD_WAY_POND	3		1	0.303	287.953	0	0.049	SWMM Method	HOMEWOOD	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
HV_BLUFF_1	1	1	1	0.59	304.12	100	0.07	SWMM Method	HV_BLUFF_1	0	HV_BLUFF_1	SubCatchment 3	No Redirection	Strickers Forebay 18

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
HV_BLUFF_1	2		1	0.126	304.12	100	0.07	SWMM Method	HV_BLUFF_1	1	HV_BLUFF_1	SubCatchment 3	No Redirection	Strickers Forebay 18
HV_BLUFF_1	3		1	4.532	304.12	0	0.07	SWMM Method	HV_BLUFF_1	0		SubCatchment 1	No Redirection	Strickers Pond Foreb
HV_BLUFF2	1	1	1	0.136	180.12	100	0.082	SWMM Method	HV_BLUFF2	0	HV_BLUFF2	SubCatchment 3	No Redirection	Strickers Forebay 18
HV_BLUFF2	2		1	0.026	180.12	100	0.082	SWMM Method	HV_BLUFF2	1	HV_BLUFF2	SubCatchment 3	No Redirection	UW Ag Research Stati
HV_BLUFF2	3		1	2.37	180.12	0	0.082	SWMM Method	HV_BLUFF2	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN1547-006	1	1	1	0.613	240.236	100	0.042	SWMM Method	IN1547-006	0	IN1547-006	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-006	2		1	0.163	240.236	100	0.042	SWMM Method	IN1547-006	1	IN1547-006	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-006	3		1	0.944	240.236	0	0.042	SWMM Method	IN1547-006	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-009	1	1	1	0.28	338.383	100	0.049	SWMM Method	IN1547-009	0	IN1547-009	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-009	2		1	0.331	338.383	100	0.049	SWMM Method	IN1547-009	1	IN1547-009	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-009	3		1	1.439	338.383	0	0.049	SWMM Method	IN1547-009	0		SubCatchment 3	No Redirection	
IN1547-010	1	1	1	0.481	359.155	100	0.064	SWMM Method	IN1547-010	0	IN1547-010	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-010	2		1	0.568	359.155	100	0.064	SWMM Method	IN1547-010	1	IN1547-010	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-010	3		1	2.681	359.155	0	0.064	SWMM Method	IN1547-010	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-011	1	1	1	0.591	284.16	100	0.015	SWMM Method	IN1547-011	0	IN1547-011	SubCatchment 3	No Redirection	
IN1547-011	2		1	0.094	284.16	100	0.015	SWMM Method	IN1547-011	1	IN1547-011	SubCatchment 3	No Redirection	
IN1547-011	3		1	0.719	284.16	0	0.015	SWMM Method	IN1547-011	0		SubCatchment 3	No Redirection	
IN1547-020	1	1	1	0.84	361.415	100	0.033	SWMM Method	IN1547-020	0	IN1547-020	SubCatchment 3	No Redirection	
IN1547-020	2		1	0.383	361.415	100	0.033	SWMM Method	IN1547-020	1	IN1547-020	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1547-020	3		1	3.043	361.415	0	0.033	SWMM Method	IN1547-020	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-024	1	1	1	0.153	204.535	100	0.088	SWMM Method	IN1547-024	0	IN1547-024	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1547-024	2		1	0.046	204.535	100	0.088	SWMM Method	IN1547-024	1	IN1547-024	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1547-024	3		1	1.334	204.535	0	0.088	SWMM Method	IN1547-024	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1548-005	1	1	1	0.835	367.844	100	0.068	SWMM Method	IN1548-005	0	IN1548-005	SubCatchment 3	No Redirection	
IN1548-005	2		1	0.283	367.844	100	0.068	SWMM Method	IN1548-005	1	IN1548-005	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1548-005	3		1	1.992	367.844	0	0.068	SWMM Method	IN1548-005	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN1548-007	1	1	1	1.014	283.907	100	0.055	SWMM Method	IN1548-007	0	IN1548-007	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1548-007	2		1	0.62	283.907	100	0.055	SWMM Method	IN1548-007	1	IN1548-007	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1548-007	3		1	3.762	283.907	0	0.055	SWMM Method	IN1548-007	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN1549-016	1	1	1	1.241	408.605	100	0.02	SWMM Method	IN1549-016	0	IN1549-016	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1549-016	2		1	0.692	408.605	100	0.02	SWMM Method	IN1549-016	1	IN1549-016	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1549-016	3		1	2.85	408.605	0	0.02	SWMM Method	IN1549-016	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1549-024	1	1	1	1.782	433.295	100	0.048	SWMM Method	IN1549-024	0	IN1549-024	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1549-024	2		1	0.818	433.295	100	0.048	SWMM Method	IN1549-024	1	IN1549-024	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1549-024	3		1	4.59	433.295	0	0.048	SWMM Method	IN1549-024	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-014	1	1	1	0.327	702.184	100	0.032	SWMM Method	IN1550-014	0	IN1550-014	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-014	2		1	0.387	702.184	100	0.032	SWMM Method	IN1550-014	1	IN1550-014	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1550-014	3		1	0.651	702.184	0	0.032	SWMM Method	IN1550-014	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-017	1	1	1	0.376	242.925	100	0.016	SWMM Method	IN1550-017	0	IN1550-017	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-017	2		1	0.445	242.925	100	0.016	SWMM Method	IN1550-017	1	IN1550-017	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1550-017	3		1	1.118	242.925	0	0.016	SWMM Method	IN1550-017	0		SubCatchment 3	No Redirection	Strickers Forebay 18

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1550-027	1	1	1	0.052	181.689	100	0.042	SWMM Method	IN1550-027	0	IN1550-027	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1550-027	2		1	0.062	181.689	100	0.042	SWMM Method	IN1550-027	1	IN1550-027	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1550-027	3		1	0.327	181.689	0	0.042	SWMM Method	IN1550-027	0		SubCatchment 1	No Redirection	Sauk Heights Pond 18
IN1550-028	1	1	1	0.07	201.091	100	0.04	SWMM Method	IN1550-028	0	IN1550-028	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1550-028	2		1	0.083	201.091	100	0.04	SWMM Method	IN1550-028	1	IN1550-028	SubCatchment 3	No Redirection	
IN1550-028	3		1	0.413	201.091	0	0.04	SWMM Method	IN1550-028	0		SubCatchment 1	No Redirection	
IN1551-005	1	1	1	0.74	746.916	100	0.014	SWMM Method	IN1551-005	0	IN1551-005	SubCatchment 3	No Redirection	
IN1551-005	2		1	0.876	746.916	100	0.014	SWMM Method	IN1551-005	1	IN1551-005	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1551-005	3		1	2.47	746.916	0	0.014	SWMM Method	IN1551-005	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1551-023	1	1	1	1.142	733.379	100	0.037	SWMM Method	IN1551-023	0	IN1551-023	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1551-023	2		1	1.35	733.379	100	0.037	SWMM Method	IN1551-023	1	IN1551-023	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1551-023	3		1	3.331	733.379	0	0.037	SWMM Method	IN1551-023	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1646-001	1	1	1	0.346	183.205	100	0.034	SWMM Method	IN1646-001	0	IN1646-001	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1646-001	2		1	0.081	183.205	100	0.034	SWMM Method	IN1646-001	1	IN1646-001	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1646-001	3		1	1.883	183.205	0	0.034	SWMM Method	IN1646-001	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-003	1	1	1	0.527	444.633	100	0.02	SWMM Method	IN1647-003	0	IN1647-003	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1647-003	2		1	0.176	444.633	100	0.02	SWMM Method	IN1647-003	1	IN1647-003	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1647-003	3		1	1.078	444.633	0	0.02	SWMM Method	IN1647-003	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1647-007	1	1	1	0.437	195.153	100	0.025	SWMM Method	IN1647-007	0	IN1647-007	SubCatchment 3	No Redirection	Swallowtail Park
IN1647-007	2		1	0.108	195.153	100	0.025	SWMM Method	IN1647-007	1	IN1647-007	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1647-007	3		1	0.722	195.153	0	0.025	SWMM Method	IN1647-007	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1647-011	1	1	1	1.19	292.494	100	0.039	SWMM Method	IN1647-011	0	IN1647-011	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1647-011	2		1	0.361	292.494	100	0.039	SWMM Method	IN1647-011	1	IN1647-011	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1647-011	3		1	2.078	292.494	0	0.039	SWMM Method	IN1647-011	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1647-041	1	1	1	0.196	192.42	100	0.061	SWMM Method	IN1647-041	0	IN1647-041	SubCatchment 3	No Redirection	
IN1647-041	2		1	0.114	192.42	100	0.061	SWMM Method	IN1647-041	1	IN1647-041	SubCatchment 3	No Redirection	
IN1647-041	3		1	1.245	192.42	0	0.061	SWMM Method	IN1647-041	0		SubCatchment 3	No Redirection	
IN1647-064	1	1	1	0.172	146.733	100	0.023	SWMM Method	IN1647-064	0	IN1647-064	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1647-064	2		1	0.033	146.733	100	0.023	SWMM Method	IN1647-064	1	IN1647-064	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1647-064	3		1	0.553	146.733	0	0.023	SWMM Method	IN1647-064	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1647-068	1	1	1	0.43	113.894	100	0.027	SWMM Method	IN1647-068	0	IN1647-068	SubCatchment 3	No Redirection	
IN1647-068	2		1	0.237	113.894	100	0.027	SWMM Method	IN1647-068	1	IN1647-068	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1647-068	3		1	1.64	113.894	0	0.027	SWMM Method	IN1647-068	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-011	1	1	1	0.452	203.463	100	0.102	SWMM Method	IN1648-011	0	IN1648-011	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-011	2		1	0.192	203.463	100	0.102	SWMM Method	IN1648-011	1	IN1648-011	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1648-011	3		1	1.323	203.463	0	0.102	SWMM Method	IN1648-011	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-028	1	1	1	0.599	257.678	100	0.019	SWMM Method	IN1648-028	0	IN1648-028	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-028	2		1	0.097	257.678	100	0.019	SWMM Method	IN1648-028	1	IN1648-028	SubCatchment 3	No Redirection	
IN1648-028	3		1	0.831	257.678	0	0.019	SWMM Method	IN1648-028	0		SubCatchment 3	No Redirection	
IN1648-041	1	1	1	1.157	440.497	100	0.103	SWMM Method	IN1648-041	0	IN1648-041	SubCatchment 3	No Redirection	
IN1648-041	2		1	0.457	440.497	100	0.103	SWMM Method	IN1648-041	1	IN1648-041	SubCatchment 3	No Redirection	UW Ag Research Stati

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1648-041	3		1	2.732	440.497	0	0.103	SWMM Method	IN1648-041	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-048	1	1	1	0.32	163.068	100	0.039	SWMM Method	IN1648-048	0	IN1648-048	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-048	2		1	0.379	163.068	100	0.039	SWMM Method	IN1648-048	1	IN1648-048	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1648-048	3		1	1.756	163.068	0	0.039	SWMM Method	IN1648-048	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1649-002	1	1	1	1.049	442.024	100	0.057	SWMM Method	IN1649-002	0	IN1649-002	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1649-002	2		1	0.603	442.024	100	0.057	SWMM Method	IN1649-002	1	IN1649-002	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1649-002	3		1	3.107	442.024	0	0.057	SWMM Method	IN1649-002	0		SubCatchment 3	No Redirection	Memorial High School
IN1649-003	1	1	1	3.351	770.34	100	0.047	SWMM Method	IN1649-003	0	IN1649-003	SubCatchment 3	No Redirection	Memorial HS 2018
IN1649-003	2		1	0.302	770.34	100	0.047	SWMM Method	IN1649-003	1	IN1649-003	SubCatchment 3	No Redirection	Memorial HS 2018
IN1649-003	3		1	3.127	770.34	0	0.047	SWMM Method	IN1649-003	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1649-011	1	1	1	1.778	312.1	100	0.038	SWMM Method	IN1649-011	0	IN1649-011	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1649-011	2		1	0.508	312.1	100	0.038	SWMM Method	IN1649-011	1	IN1649-011	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1649-011	3		1	3.512	312.1	0	0.038	SWMM Method	IN1649-011	0		SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1649-016	1	1	1	1.128	194.515	100	0.038	SWMM Method	IN1649-016	0	IN1649-016	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1649-016	2		1	0.126	194.515	100	0.038	SWMM Method	IN1649-016	1	IN1649-016	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1649-016	3		1	1.758	194.515	0	0.038	SWMM Method	IN1649-016	0		SubCatchment 3	No Redirection	
IN1650-009_DEPRESSION	1	1	1	0.949	517.074	100	0.019	SWMM Method	IN1650-009_	0	IN1650-009_DEP	SubCatchment 3	No Redirection	Memorial High School
IN1650-009_DEPRESSION	2		1	0.009	517.074	100	0.019	SWMM Method	IN1650-009_	1	IN1650-009_DEP	SubCatchment 3	No Redirection	Memorial HS 2018
IN1650-009_DEPRESSION	3		1	10.07	517.074	0	0.019	SWMM Method	IN1650-009_	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN1653-007	1	1	1	0.605	186.841	100	0.02	SWMM Method	IN1653-007	0	IN1653-007	SubCatchment 1	No Redirection	
IN1653-007	2		1	0.006	186.841	100	0.02	SWMM Method	IN1653-007	1	IN1653-007	SubCatchment 3	No Redirection	Memorial High School
IN1653-007	3		1	0.802	186.841	0	0.02	SWMM Method	IN1653-007	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN1653-014	1	1	1	0.319	254.496	100	0.027	SWMM Method	IN1653-014	0	IN1653-014	SubCatchment 3	No Redirection	Memorial HS 2018
IN1653-014	3		1	0.415	254.496	0	0.027	SWMM Method	IN1653-014	0		SubCatchment 1	No Redirection	
IN1653-018	1	1	1	0.348	203.461	100	0.041	SWMM Method	IN1653-018	0	IN1653-018	SubCatchment 3	No Redirection	
IN1653-018	3		1	1.022	203.461	0	0.041	SWMM Method	IN1653-018	0		SubCatchment 1	No Redirection	Strickers Pond Foreb
IN1653-026	1	1	1	0.41	415.279	100	0.007	SWMM Method	IN1653-026	0	IN1653-026	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1653-026	3		1	3.222	415.279	0	0.007	SWMM Method	IN1653-026	0		SubCatchment 1	No Redirection	Strickers Forebay 18
IN1654-006	1	1	1	1.039	204.048	100	0.026	SWMM Method	IN1654-006	0	IN1654-006	SubCatchment 3	No Redirection	
IN1654-006	2		1	0.23	204.048	100	0.026	SWMM Method	IN1654-006	1	IN1654-006	SubCatchment 3	No Redirection	
IN1654-006	3		1	0.721	204.048	0	0.026	SWMM Method	IN1654-006	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN1747-026	1	1	1	0.781	237.879	100	0.042	SWMM Method	IN1747-026	0	IN1747-026	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1747-026	2		1	0.443	237.879	100	0.042	SWMM Method	IN1747-026	1	IN1747-026	SubCatchment 3	No Redirection	
IN1747-026	3		1	2.551	237.879	0	0.042	SWMM Method	IN1747-026	0		SubCatchment 3	No Redirection	
IN1747-028	1	1	1	0.239	410.287	100	0.068	SWMM Method	IN1747-028	0	IN1747-028	SubCatchment 3	No Redirection	
IN1747-028	2		1	0.159	410.287	100	0.068	SWMM Method	IN1747-028	1	IN1747-028	SubCatchment 3	No Redirection	
IN1747-028	3		1	2.03	410.287	0	0.068	SWMM Method	IN1747-028	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN1749-003	1	1	1	5.245	414.36	100	0.016	SWMM Method	IN1749-003	0	IN1749-003	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1749-003	2		1	0.118	414.36	100	0.016	SWMM Method	IN1749-003	1	IN1749-003	SubCatchment 3	No Redirection	Swallowtail Park
IN1749-003	3		1	5.798	414.36	0	0.016	SWMM Method	IN1749-003	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN1750-003	1	1	1	2.893	441.338	100	0.038	SWMM Method	IN1750-003	0	IN1750-003	SubCatchment 3	No Redirection	Swallowtail Park 18

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1750-003	2		1	0.242	441.338	100	0.038	SWMM Method	IN1750-003	1	IN1750-003	SubCatchment 3	No Redirection	
IN1750-003	3		1	4.373	441.338	0	0.038	SWMM Method	IN1750-003	0		SubCatchment 3	No Redirection	
IN1750-004	1	1	1	0.868	369.932	100	0.022	SWMM Method	IN1750-004	0	IN1750-004	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1750-004	2		1	0.1	369.932	100	0.022	SWMM Method	IN1750-004	1	IN1750-004	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1750-004	3		1	2.509	369.932	0	0.022	SWMM Method	IN1750-004	0		SubCatchment 3	No Redirection	
IN1750-008	1	1	1	1.815	358.3	100	0.032	SWMM Method	IN1750-008	0	IN1750-008	SubCatchment 3	No Redirection	
IN1750-008	2		1	0.385	358.3	100	0.032	SWMM Method	IN1750-008	1	IN1750-008	SubCatchment 3	No Redirection	
IN1750-008	3		1	1.477	358.3	0	0.032	SWMM Method	IN1750-008	0		SubCatchment 3	No Redirection	
IN1750-019	1	1	1	1.311	372.25	100	0.038	SWMM Method	IN1750-019	0	IN1750-019	SubCatchment 3	No Redirection	
IN1750-019	2		1	0.273	372.25	100	0.038	SWMM Method	IN1750-019	1	IN1750-019	SubCatchment 3	No Redirection	
IN1750-019	3		1	1.861	372.25	0	0.038	SWMM Method	IN1750-019	0		SubCatchment 3	No Redirection	
IN1750-034	1	1	1	1.457	352.449	100	0.033	SWMM Method	IN1750-034	0	IN1750-034	SubCatchment 3	No Redirection	
IN1750-034	2		1	0.031	352.449	100	0.033	SWMM Method	IN1750-034	1	IN1750-034	SubCatchment 3	No Redirection	
IN1750-034	3		1	0.777	352.449	0	0.033	SWMM Method	IN1750-034	0		SubCatchment 3	No Redirection	
IN1751-006	1	1	1	1.852	590.591	100	0.019	SWMM Method	IN1751-006	0	IN1751-006	SubCatchment 3	No Redirection	
IN1751-006	2		1	0.582	590.591	100	0.019	SWMM Method	IN1751-006	1	IN1751-006	SubCatchment 3	No Redirection	
IN1751-006	3		1	4.158	590.591	0	0.019	SWMM Method	IN1751-006	0		SubCatchment 3	No Redirection	
IN1751-016	1	1	1	1.195	308.408	100	0.024	SWMM Method	IN1751-016	0	IN1751-016	SubCatchment 3	No Redirection	
IN1751-016	2		1	0.47	308.408	100	0.024	SWMM Method	IN1751-016	1	IN1751-016	SubCatchment 3	No Redirection	
IN1751-016	3		1	2.585	308.408	0	0.024	SWMM Method	IN1751-016	0		SubCatchment 3	No Redirection	
IN1751-023	1	1	1	2.101	392.629	100	0.031	SWMM Method	IN1751-023	0	IN1751-023	SubCatchment 3	No Redirection	
IN1751-023	2		1	0.831	392.629	100	0.031	SWMM Method	IN1751-023	1	IN1751-023	SubCatchment 3	No Redirection	
IN1751-023	3		1	3.543	392.629	0	0.031	SWMM Method	IN1751-023	0		SubCatchment 3	No Redirection	
IN1752-011	1	1	1	1.948	546.869	100	0.048	SWMM Method	IN1752-011	0	IN1752-011	SubCatchment 3	No Redirection	
IN1752-011	2		1	0.632	546.869	100	0.048	SWMM Method	IN1752-011	1	IN1752-011	SubCatchment 3	No Redirection	
IN1752-011	3		1	2.754	546.869	0	0.048	SWMM Method	IN1752-011	0		SubCatchment 3	No Redirection	
IN1752-022	1	1	1	0.987	651.078	100	0.066	SWMM Method	IN1752-022	0	IN1752-022	SubCatchment 3	No Redirection	
IN1752-022	2		1	0.446	651.078	100	0.066	SWMM Method	IN1752-022	1	IN1752-022	SubCatchment 3	No Redirection	
IN1752-022	3		1	1.771	651.078	0	0.066	SWMM Method	IN1752-022	0		SubCatchment 3	No Redirection	
IN1752-029	1	1	1	1.569	350.197	100	0.019	SWMM Method	IN1752-029	0	IN1752-029	SubCatchment 3	No Redirection	
IN1752-029	2		1	0.506	350.197	100	0.019	SWMM Method	IN1752-029	1	IN1752-029	SubCatchment 3	No Redirection	
IN1752-029	3		1	2.514	350.197	0	0.019	SWMM Method	IN1752-029	0		SubCatchment 3	No Redirection	
IN1753-007	1	1	1	0.622	215.747	100	0.03	SWMM Method	IN1753-007	0	IN1753-007	SubCatchment 3	No Redirection	
IN1753-007	2		1	0.558	215.747	100	0.03	SWMM Method	IN1753-007	1	IN1753-007	SubCatchment 3	No Redirection	
IN1753-007	3		1	1.411	215.747	0	0.03	SWMM Method	IN1753-007	0		SubCatchment 3	No Redirection	
IN1753-009	1	1	1	0.609	161.396	100	0.016	SWMM Method	IN1753-009	0	IN1753-009	SubCatchment 3	No Redirection	
IN1753-009	2		1	0.721	161.396	100	0.016	SWMM Method	IN1753-009	1	IN1753-009	SubCatchment 3	No Redirection	
IN1753-009	3		1	1.044	161.396	0	0.016	SWMM Method	IN1753-009	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN1753-010	1	1	1	0.34	154.39	100	0.013	SWMM Method	IN1753-010	0	IN1753-010	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1753-010	2		1	0.403	154.39	100	0.013	SWMM Method	IN1753-010	1	IN1753-010	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1753-010	3		1	1.227	154.39	0	0.013	SWMM Method	IN1753-010	0		SubCatchment 1	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1753-015	1	1	1	0.325	143.339	100	0.013	SWMM Method	IN1753-015	0	IN1753-015	SubCatchment 3	No Redirection	
IN1753-015	2		1	0.381	143.339	100	0.013	SWMM Method	IN1753-015	1	IN1753-015	SubCatchment 3	No Redirection	
IN1753-015	3		1	0.596	143.339	0	0.013	SWMM Method	IN1753-015	0		SubCatchment 3	No Redirection	
IN1753-018	1	1	1	0.578	100.822	100	0.018	SWMM Method	IN1753-018	0	IN1753-018	SubCatchment 3	No Redirection	
IN1753-018	2		1	0.264	100.822	100	0.018	SWMM Method	IN1753-018	1	IN1753-018	SubCatchment 3	No Redirection	
IN1753-018	3		1	0.898	100.822	0	0.018	SWMM Method	IN1753-018	0		SubCatchment 1	No Redirection	
IN1753-023	1	1	1	0.311	197.036	100	0.019	SWMM Method	IN1753-023	0	IN1753-023	SubCatchment 3	No Redirection	
IN1753-023	2		1	0.369	197.036	100	0.019	SWMM Method	IN1753-023	1	IN1753-023	SubCatchment 3	No Redirection	
IN1753-023	3		1	1.27	197.036	0	0.019	SWMM Method	IN1753-023	0		SubCatchment 1	No Redirection	
IN1753-026	1	1	1	0.248	195.619	100	0.019	SWMM Method	IN1753-026	0	IN1753-026	SubCatchment 3	No Redirection	
IN1753-026	2		1	0.33	195.619	100	0.019	SWMM Method	IN1753-026	1	IN1753-026	SubCatchment 3	No Redirection	
IN1753-026	3		1	1.191	195.619	0	0.019	SWMM Method	IN1753-026	0		SubCatchment 3	No Redirection	
IN1753-040	1	1	1	0.864	882.349	100	0.034	SWMM Method	IN1753-040	0	IN1753-040	SubCatchment 3	No Redirection	
IN1753-040	2		1	1.023	882.349	100	0.034	SWMM Method	IN1753-040	1	IN1753-040	SubCatchment 3	No Redirection	
IN1753-040	3		1	4.071	882.349	0	0.034	SWMM Method	IN1753-040	0		SubCatchment 3	No Redirection	
IN1754-021	1	1	1	0.139	102.323	100	0.009	SWMM Method	IN1754-021	0	IN1754-021	SubCatchment 3	No Redirection	
IN1754-021	2		1	0.164	102.323	100	0.009	SWMM Method	IN1754-021	1	IN1754-021	SubCatchment 3	No Redirection	
IN1754-021	3		1	0.65	102.323	0	0.009	SWMM Method	IN1754-021	0		SubCatchment 3	No Redirection	
IN1754-023	1	1	1	0.232	182.976	100	0.031	SWMM Method	IN1754-023	0	IN1754-023	SubCatchment 3	No Redirection	
IN1754-023	2		1	0.1	182.976	100	0.031	SWMM Method	IN1754-023	1	IN1754-023	SubCatchment 3	No Redirection	
IN1754-023	3		1	0.536	182.976	0	0.031	SWMM Method	IN1754-023	0		SubCatchment 3	No Redirection	
IN1754-030	1	1	1	0.625	193.508	100	0.058	SWMM Method	IN1754-030	0	IN1754-030	SubCatchment 3	No Redirection	
IN1754-030	3		1	2.37	193.508	0	0.058	SWMM Method	IN1754-030	0		SubCatchment 3	No Redirection	
IN1847-003	1	1	1	0.829	378.294	100	0.042	SWMM Method	IN1847-003	0	IN1847-003	SubCatchment 3	No Redirection	
IN1847-003	2		1	0.255	378.294	100	0.042	SWMM Method	IN1847-003	1	IN1847-003	SubCatchment 3	No Redirection	
IN1847-003	3		1	1.476	378.294	0	0.042	SWMM Method	IN1847-003	0		SubCatchment 3	No Redirection	
IN1847-017	1	1	1	2.774	396.18	100	0.041	SWMM Method	IN1847-017	0	IN1847-017	SubCatchment 3	No Redirection	
IN1847-017	2		1	1.255	396.18	100	0.041	SWMM Method	IN1847-017	1	IN1847-017	SubCatchment 3	No Redirection	
IN1847-017	3		1	6.222	396.18	0	0.041	SWMM Method	IN1847-017	0		SubCatchment 3	No Redirection	
IN1848-004	1	1	1	0.078	103.46	100	0.044	SWMM Method	IN1848-004	0	IN1848-004	SubCatchment 3	No Redirection	
IN1848-004	2		1	0.093	103.46	100	0.044	SWMM Method	IN1848-004	1	IN1848-004	SubCatchment 3	No Redirection	
IN1848-004	3		1	0.404	103.46	0	0.044	SWMM Method	IN1848-004	0		SubCatchment 1	No Redirection	
IN1848-007	1	1	1	0.371	605.863	100	0.086	SWMM Method	IN1848-007	0	IN1848-007	SubCatchment 3	No Redirection	
IN1848-007	2		1	0.336	605.863	100	0.086	SWMM Method	IN1848-007	1	IN1848-007	SubCatchment 3	No Redirection	
IN1848-007	3		1	2.137	605.863	0	0.086	SWMM Method	IN1848-007	0		SubCatchment 1	No Redirection	
IN1848-010	1	1	1	0.073	105.128	100	0.064	SWMM Method	IN1848-010	0	IN1848-010	SubCatchment 3	No Redirection	
IN1848-010	2		1	0.093	105.128	100	0.064	SWMM Method	IN1848-010	1	IN1848-010	SubCatchment 3	No Redirection	
IN1848-010	3		1	0.636	105.128	0	0.064	SWMM Method	IN1848-010	0		SubCatchment 1	No Redirection	
IN1849-004	1	1	1	0.766	249.527	100	0.023	SWMM Method	IN1849-004	0	IN1849-004	SubCatchment 3	No Redirection	
IN1849-004	2		1	0.28	249.527	100	0.023	SWMM Method	IN1849-004	1	IN1849-004	SubCatchment 3	No Redirection	
IN1849-004	3		1	1.633	249.527	0	0.023	SWMM Method	IN1849-004	0		SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1849-018	1	1	1	3.477	312.981	100	0.016	SWMM Method	IN1849-018	0	IN1849-018	SubCatchment 3	No Redirection	
IN1849-018	2		1	0.213	312.981	100	0.016	SWMM Method	IN1849-018	1	IN1849-018	SubCatchment 3	No Redirection	
IN1849-018	3		1	1.279	312.981	0	0.016	SWMM Method	IN1849-018	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN1947-008	1	1	1	0.553	267.841	100	0.069	SWMM Method	IN1947-008	0	IN1947-008	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1947-008	2		1	0.374	267.841	100	0.069	SWMM Method	IN1947-008	1	IN1947-008	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1947-008	3		1	2.458	267.841	0	0.069	SWMM Method	IN1947-008	0		SubCatchment 3	No Redirection	
IN1947-013	1	1	1	0.813	390.426	100	0.034	SWMM Method	IN1947-013	0	IN1947-013	SubCatchment 3	No Redirection	Sauk Heights Pond
IN1947-013	2		1	0.552	390.426	100	0.034	SWMM Method	IN1947-013	1	IN1947-013	SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1947-013	3		1	2.919	390.426	0	0.034	SWMM Method	IN1947-013	0		SubCatchment 3	No Redirection	Sauk Heights Pond 18
IN1947-016	1	1	1	1.043	299.982	100	0.031	SWMM Method	IN1947-016	0	IN1947-016	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1947-016	2		1	0.571	299.982	100	0.031	SWMM Method	IN1947-016	1	IN1947-016	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1947-016	3		1	4.152	299.982	0	0.031	SWMM Method	IN1947-016	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN1947-018	1	1	1	0.591	161.865	100	0.069	SWMM Method	IN1947-018	0	IN1947-018	SubCatchment 3	No Redirection	
IN1947-018	2		1	0.162	161.865	100	0.069	SWMM Method	IN1947-018	1	IN1947-018	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1947-018	3		1	0.967	161.865	0	0.069	SWMM Method	IN1947-018	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN1947-019	1	1	1	0.415	214.614	100	0.02	SWMM Method	IN1947-019	0	IN1947-019	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1947-019	2		1	0.028	214.614	100	0.02	SWMM Method	IN1947-019	1	IN1947-019	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1947-019	3		1	0.426	214.614	0	0.02	SWMM Method	IN1947-019	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1948-002	1	1	1	1.096	392.572	100	0.05	SWMM Method	IN1948-002	0	IN1948-002	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1948-002	2		1	0.468	392.572	100	0.05	SWMM Method	IN1948-002	1	IN1948-002	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1948-002	3		1	2.659	392.572	0	0.05	SWMM Method	IN1948-002	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1949-004	1	1	1	1.344	302.493	100	0.074	SWMM Method	IN1949-004	0	IN1949-004	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1949-004	2		1	0.348	302.493	100	0.074	SWMM Method	IN1949-004	1	IN1949-004	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1949-004	3		1	3.141	302.493	0	0.074	SWMM Method	IN1949-004	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1949-010	1	1	1	2.42	306.983	100	0.056	SWMM Method	IN1949-010	0	IN1949-010	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1949-010	2		1	0.116	306.983	100	0.056	SWMM Method	IN1949-010	1	IN1949-010	SubCatchment 3	No Redirection	
IN1949-010	3		1	2.943	306.983	0	0.056	SWMM Method	IN1949-010	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN1949-039	1	1	1	2.22	545.23	100	0.051	SWMM Method	IN1949-039	0	IN1949-039	SubCatchment 3	No Redirection	UW Ag Research 2018
IN1949-039	3		1	1.341	545.23	0	0.051	SWMM Method	IN1949-039	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN1950-010	1	1	1	0.529	240.71	100	0.022	SWMM Method	IN1950-010	0	IN1950-010	SubCatchment 3	No Redirection	
IN1950-010	3		1	1.121	240.71	0	0.022	SWMM Method	IN1950-010	0		SubCatchment 3	No Redirection	Memorial High School
IN1956-003	1	1	1	1.044	446.918	100	0.08	SWMM Method	IN1956-003	0	IN1956-003	SubCatchment 3	No Redirection	Memorial HS 2018
IN1956-003	3		1	1.516	446.918	0	0.08	SWMM Method	IN1956-003	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN1956-007	1	1	1	1.364	426.678	100	0.076	SWMM Method	IN1956-007	0	IN1956-007	SubCatchment 3	No Redirection	
IN1956-007	3		1	2.584	426.678	0	0.076	SWMM Method	IN1956-007	0		SubCatchment 3	No Redirection	
IN1956-014	1	1	1	1.415	401.256	100	0.043	SWMM Method	IN1956-014	0	IN1956-014	SubCatchment 3	No Redirection	Memorial High School
IN1956-014	2		1	0.053	401.256	100	0.043	SWMM Method	IN1956-014	1	IN1956-014	SubCatchment 3	No Redirection	Memorial HS 2018
IN1956-014	3		1	7.459	401.256	0	0.043	SWMM Method	IN1956-014	0		SubCatchment 3	No Redirection	Memorial HS 2018
IN1956-014-2	1	1	1	0.259	743.725	100	0.049	SWMM Method	IN1956-014-2	0	IN1956-014-2	SubCatchment 3	No Redirection	Memorial High School
IN1956-014-2	3		1	16.284	743.725	0	0.049	SWMM Method	IN1956-014-2	0		SubCatchment 1	No Redirection	Memorial HS 2018
IN1956-017	1	1	1	2.127	329.188	100	0.026	SWMM Method	IN1956-017	0	IN1956-017	SubCatchment 3	No Redirection	Memorial HS 2018

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN1956-017	2		1	0.002	329.188	100	0.026	SWMM Method	IN1956-017	1	IN1956-017	SubCatchment 3	No Redirection	Strickers Pond Foreb
IN1956-017	3		1	7.382	329.188	0	0.026	SWMM Method	IN1956-017	0		SubCatchment 3	No Redirection	Strickers Forebay 18
IN1956-017-2	1	1	1	0.03	812.259	100	0.028	SWMM Method	IN1956-017-2	0	IN1956-017-2	SubCatchment 3	No Redirection	Strickers Forebay 18
IN1956-017-2	2		1	0.035	812.259	100	0.028	SWMM Method	IN1956-017-2	0	IN1956-017-2	SubCatchment 3	No Redirection	Swallowtail Park
IN1956-017-2	3		1	12.894	812.259	0	0.028	SWMM Method	IN1956-017-2	0		SubCatchment 1	No Redirection	Swallowtail Park 18
IN1958-001	1	1	1	0.787	95.758	100	0.003	SWMM Method	IN1958-001	0	IN1958-001	SubCatchment 3	No Redirection	Swallowtail Park 18
IN1958-001	2		1	0.007	95.758	100	0.003	SWMM Method	IN1958-001	1	IN1958-001	SubCatchment 3	No Redirection	UW Ag Research Stati
IN1958-001	3		1	0.843	95.758	0	0.003	SWMM Method	IN1958-001	0		SubCatchment 3	No Redirection	UW Ag Research 2018
IN2047-005	1	1	1	0.47	79.05	100	0.047	SWMM Method	IN2047-005	0		SubCatchment 1	No Redirection	UW Ag Research 2018
IN2047-005	3		1	0.202	79.05	0	0.047	SWMM Method	IN2047-005	0		SubCatchment 1	No Redirection	UW Ag Research Stati
IN2047-023	1	1	1	3.44	763.72	100	0.029	SWMM Method	IN2047-023	0	IN2047-023	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2047-023	2		1	0.019	763.72	100	0.029	SWMM Method	IN2047-023	1	IN2047-023	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2047-023	3		1	11.263	763.72	0	0.029	SWMM Method	IN2047-023	0		SubCatchment 3	No Redirection	
IN2050-009	1	1	1	1.036	452.87	100	0.03	SWMM Method	IN2050-009	0	IN2050-009	SubCatchment 3	No Redirection	
IN2050-009	2		1	0.071	452.87	100	0.03	SWMM Method	IN2050-009	1	IN2050-009	SubCatchment 3	No Redirection	
IN2050-009	3		1	3.695	452.87	0	0.03	SWMM Method	IN2050-009	0		SubCatchment 3	No Redirection	
IN2051-008	1	1	1	1.13	396.135	100	0.013	SWMM Method	IN2051-008	0	IN2051-008	SubCatchment 3	No Redirection	
IN2051-008	2		1	0.21	396.135	100	0.013	SWMM Method	IN2051-008	1	IN2051-008	SubCatchment 3	No Redirection	
IN2051-008	3		1	1.235	396.135	0	0.013	SWMM Method	IN2051-008	0		SubCatchment 3	No Redirection	
IN2051-048	1	1	1	0.44	181.14	100	0.01	SWMM Method	IN2051-048	0	IN2051-048	SubCatchment 3	No Redirection	
IN2051-048	2		1	0.04	181.14	100	0.01	SWMM Method	IN2051-048	1	IN2051-048	SubCatchment 3	No Redirection	
IN2051-048	3		1	0.216	181.14	0	0.01	SWMM Method	IN2051-048	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2051-056	1	1	1	2.444	498.931	100	0.01	SWMM Method	IN2051-056	0	IN2051-056	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2051-056	2		1	1.26	498.931	100	0.01	SWMM Method	IN2051-056	1	IN2051-056	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2051-056	3		1	5.222	498.931	0	0.01	SWMM Method	IN2051-056	0		SubCatchment 3	No Redirection	
IN2052-004	1	1	1	1.322	304.142	100	0.023	SWMM Method	IN2052-004	0	IN2052-004	SubCatchment 3	No Redirection	
IN2052-004	2		1	0.779	304.142	100	0.023	SWMM Method	IN2052-004	1	IN2052-004	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2052-004	3		1	1.62	304.142	0	0.023	SWMM Method	IN2052-004	0		SubCatchment 3	No Redirection	
IN2052-009	1	1	1	2.002	734.448	100	0.017	SWMM Method	IN2052-009	0	IN2052-009	SubCatchment 3	No Redirection	
IN2052-009	2		1	0.932	734.448	100	0.017	SWMM Method	IN2052-009	1	IN2052-009	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2052-009	3		1	2.89	734.448	0	0.017	SWMM Method	IN2052-009	0		SubCatchment 3	No Redirection	
IN2052-026	1	1	1	2.034	402.283	100	0.037	SWMM Method	IN2052-026	0	IN2052-026	SubCatchment 3	No Redirection	
IN2052-026	2		1	1.352	402.283	100	0.037	SWMM Method	IN2052-026	1	IN2052-026	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2052-026	3		1	1.772	402.283	0	0.037	SWMM Method	IN2052-026	0		SubCatchment 3	No Redirection	
IN2053-004	1	1	1	0.24	106.04	100	0.024	SWMM Method	IN2053-004	0	IN2053-004	SubCatchment 3	No Redirection	
IN2053-004	2		1	0.069	106.04	100	0.024	SWMM Method	IN2053-004	1	IN2053-004	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2053-004	3		1	0.08	106.04	0	0.024	SWMM Method	IN2053-004	0		SubCatchment 3	No Redirection	
IN2055-007	1	1	1	1.13	384.902	100	0.049	SWMM Method	IN2055-007	0	IN2055-007	SubCatchment 3	No Redirection	
IN2055-007	3		1	0.8	384.902	0	0.049	SWMM Method	IN2055-007	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2056-009	1	1	1	0.817	253.414	100	0.029	SWMM Method	IN2056-009	0	IN2056-009	SubCatchment 3	No Redirection	
IN2056-009	3		1	0.266	253.414	0	0.029	SWMM Method	IN2056-009	0		SubCatchment 3	No Redirection	Sauk Heights Pond

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2056-039	1	1	1	0.409	97.474	100	0.021	SWMM Method	IN2056-039	0	IN2056-039	SubCatchment 3	No Redirection	
IN2056-039	3		1	0.116	97.474	0	0.021	SWMM Method	IN2056-039	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2056-043	1	1	1	0.957	203.629	100	0.041	SWMM Method	IN2056-043	0	IN2056-043	SubCatchment 3	No Redirection	
IN2056-043	3		1	0.81	203.629	0	0.041	SWMM Method	IN2056-043	0		SubCatchment 3	No Redirection	
IN2145-012	1	1	1	3.673	363.291	100	0.003	SWMM Method	IN2145-012	0	IN2145-012	SubCatchment 3	No Redirection	
IN2145-012	2		1	1.849	363.291	100	0.003	SWMM Method	IN2145-012	1	IN2145-012	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2145-012	3		1	5.987	363.291	0	0.003	SWMM Method	IN2145-012	0		SubCatchment 3	No Redirection	
IN2150-021	1	1	1	1.727	585.731	100	0.061	SWMM Method	IN2150-007	0		SubCatchment 1	No Redirection	
IN2150-021	2		1	0.714	585.731	100	0.061	SWMM Method	IN2150-007	1	IN2150-021	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2150-021	3		1	10.725	585.73	0	0.061	SWMM Method	IN2150-007	0		SubCatchment 3	No Redirection	
IN2150-045	1	1	1	5.292	743.768	100	0.001	SWMM Method	IN2150-045	0	IN2150-045	SubCatchment 3	No Redirection	
IN2150-045	2		1	0.064	743.768	100	0.001	SWMM Method	IN2150-045	1	IN2150-045	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2150-045	3		1	2.23	743.768	0	0.001	SWMM Method	IN2150-045	0		SubCatchment 3	No Redirection	
IN2152-007	1	1	1	1.343	191.372	100	0.011	SWMM Method	IN2152-007	0	IN2152-007	SubCatchment 3	No Redirection	
IN2152-007	2		1	0.326	191.372	100	0.011	SWMM Method	IN2152-007	1	IN2152-007	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2152-007	3		1	2.089	191.372	0	0.011	SWMM Method	IN2152-007	0		SubCatchment 1	No Redirection	
IN2152-016	1	1	1	1.009	174.595	100	0.009	SWMM Method	IN2152-016	0	IN2152-016	SubCatchment 3	No Redirection	
IN2152-016	2		1	0.228	174.595	100	0.009	SWMM Method	IN2152-016	1	IN2152-016	SubCatchment 3	No Redirection	UW Ag Research 2018
IN2152-016	3		1	1.529	174.595	0	0.009	SWMM Method	IN2152-016	0		SubCatchment 1	No Redirection	UW Ag Research Stati
IN2155-007	1	1	1	3.544	355.041	100	0.014	SWMM Method	IN2155-007	0	IN2155-007	SubCatchment 3	No Redirection	
IN2155-007	2		1	0.013	355.041	100	0.014	SWMM Method	IN2155-007	1	IN2155-007	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2155-007	3		1	5.888	355.041	0	0.014	SWMM Method	IN2155-007	0		SubCatchment 3	No Redirection	
IN2156-072	1	1	1	2.342	173.634	100	0.008	SWMM Method	IN2156-072	0	IN2156-072	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2156-072	2		1	0.001	173.634	100	0.008	SWMM Method	IN2156-072	1	IN2156-072	SubCatchment 3	No Redirection	
IN2156-072	3		1	0.416	173.634	0	0.008	SWMM Method	IN2156-072	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2158-009	1	1	1	1.398	288.817	100	0.022	SWMM Method	IN2158-009	0	IN2158-009	SubCatchment 3	No Redirection	
IN2158-009	3		1	0.415	288.817	0	0.022	SWMM Method	IN2158-009	0		SubCatchment 3	No Redirection	
IN2158-017	1	1	1	0.843	233.989	100	0.05	SWMM Method	IN2158-017	0	IN2158-017	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2158-017	2		1	0.277	233.989	100	0.05	SWMM Method	IN2158-017	1	IN2158-017	SubCatchment 3	No Redirection	
IN2158-017	3		1	6.897	233.989	0	0.05	SWMM Method	IN2158-017	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2159-002	1	1	1	1.197	344.305	100	0.065	SWMM Method	IN2159-002	0	IN2159-002	SubCatchment 3	No Redirection	
IN2159-002	2		1	0.247	344.305	100	0.065	SWMM Method	IN2159-002	1	IN2159-002	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2159-002	3		1	9.008	344.305	0	0.065	SWMM Method	IN2159-002	0		SubCatchment 3	No Redirection	
IN2159-009	1	1	1	0.654	261.336	100	0.084	SWMM Method	IN2159-009	0	IN2159-009	SubCatchment 3	No Redirection	
IN2159-009	3		1	3.7	261.336	0	0.084	SWMM Method	IN2159-009	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2246-002	1	1	1	3.41	515.767	100	0.016	SWMM Method	IN2246-002	0	IN2246-002	SubCatchment 3	No Redirection	
IN2246-002	2		1	0.258	515.767	100	0.016	SWMM Method	IN2246-002	1	IN2246-002	SubCatchment 3	No Redirection	
IN2246-002	3		1	2.28	515.767	0	0.016	SWMM Method	IN2246-002	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2247-013	1	1	1	3.412	378.973	100	0.008	SWMM Method	IN2247-013	0	IN2247-013	SubCatchment 3	No Redirection	
IN2247-013	2		1	0.057	378.973	100	0.008	SWMM Method	IN2247-013	1	IN2247-013	SubCatchment 3	No Redirection	
IN2247-013	3		1	2.592	378.973	0	0.008	SWMM Method	IN2247-013	0		SubCatchment 3	No Redirection	Sauk Heights Pond

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2249-003	1	1	1	11.062	698.991	100	0.037	SWMM Method	IN2249-003	0	IN2249-003	SubCatchment 3	No Redirection	
IN2249-003	2		1	0.148	698.991	100	0.037	SWMM Method	IN2249-003	1	IN2249-003	SubCatchment 3	No Redirection	
IN2249-003	3		1	8.719	698.991	0	0.037	SWMM Method	IN2249-003	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2249-024	1	1	1	0.568	243.777	100	0.01	SWMM Method	IN2249-024	0	IN2249-024	SubCatchment 3	No Redirection	
IN2249-024	3		1	0.219	243.777	0	0.01	SWMM Method	IN2249-024	0		SubCatchment 3	No Redirection	
IN2249-028	1	1	1	2.142	249.336	100	0.021	SWMM Method	IN2249-028	0	IN2249-028	SubCatchment 3	No Redirection	Sauk Heights Pond
IN2249-028	3		1	1.693	249.336	0	0.021	SWMM Method	IN2249-028	0		SubCatchment 3	No Redirection	
IN2250-026	1	1	1	1.556	242.211	100	0.012	SWMM Method	IN2250-026	0	IN2250-026	SubCatchment 3	No Redirection	
IN2250-026	2		1	0.152	242.211	100	0.012	SWMM Method	IN2250-026	1	IN2250-026	SubCatchment 3	No Redirection	
IN2250-026	3		1	0.43	242.211	0	0.012	SWMM Method	IN2250-026	0		SubCatchment 3	No Redirection	Sauk Heights Pond
IN2251-024	1	1	1	0.9	168.137	100	0.018	SWMM Method	IN2251-024	0	IN2251-024	SubCatchment 3	No Redirection	
IN2251-024	2		1	0.04	168.137	100	0.018	SWMM Method	IN2251-024	1	IN2251-024	SubCatchment 3	No Redirection	
IN2251-024	3		1	0.605	168.137	0	0.018	SWMM Method	IN2251-024	0		SubCatchment 3	No Redirection	Swallowtail Park
IN2251-027	1	1	1	1.912	390.443	100	0.021	SWMM Method	IN2251-027	0	IN2251-027	SubCatchment 3	No Redirection	
IN2251-027	2		1	1.452	390.443	100	0.021	SWMM Method	IN2251-027	1	IN2251-027	SubCatchment 3	No Redirection	
IN2251-027	3		1	1.703	390.443	0	0.021	SWMM Method	IN2251-027	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2255-002	1	1	1	15.441	1386.713	100	0.013	SWMM Method	IN2255-002	0	IN2255-002	SubCatchment 3	No Redirection	
IN2255-002	3		1	2.56	1386.713	0	0.013	SWMM Method	IN2255-002	0		SubCatchment 3	No Redirection	
IN2256-023	1	1	1	0.201	90.622	100	0.01	SWMM Method	IN2256-023	0	IN2256-023	SubCatchment 3	No Redirection	
IN2256-023	3		1	0.076	90.622	0	0.01	SWMM Method	IN2256-023	0		SubCatchment 1	No Redirection	
IN2256-048	1	1	1	2.414	293.681	100	0.013	SWMM Method	IN2256-048	0	IN2256-048	SubCatchment 3	No Redirection	
IN2256-048	3		1	0.751	293.681	0	0.013	SWMM Method	IN2256-048	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2256-053	1	1	1	1.718	319.925	100	0.014	SWMM Method	IN2256-053	0	IN2256-053	SubCatchment 3	No Redirection	
IN2256-053	2		1	0.001	319.925	100	0.014	SWMM Method	IN2256-053	1	IN2256-053	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2256-053	3		1	0.476	319.925	0	0.014	SWMM Method	IN2256-053	0		SubCatchment 3	No Redirection	
IN2257-028	1	1	1	1.766	467.355	100	0.054	SWMM Method	IN2257-028	0	IN2257-028	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2257-028	2		1	0.169	467.355	100	0.054	SWMM Method	IN2257-028	1	IN2257-028	SubCatchment 3	No Redirection	
IN2257-028	3		1	2.743	467.355	0	0.054	SWMM Method	IN2257-028	0		SubCatchment 1	No Redirection	
IN2258-025	1	1	1	1.145	351.796	100	0.027	SWMM Method	IN2258-025	0	IN2258-025	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-025	2		1	0.038	351.796	100	0.027	SWMM Method	IN2258-025	1	IN2258-025	SubCatchment 3	No Redirection	
IN2258-025	3		1	1.484	351.796	0	0.027	SWMM Method	IN2258-025	0		SubCatchment 3	No Redirection	
IN2258-027	1	1	1	1.516	791.64	100	0.01	SWMM Method	IN2258-027	0	IN2258-027	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-027	2		1	0.046	791.64	100	0.01	SWMM Method	IN2258-027	1	IN2258-027	SubCatchment 3	No Redirection	
IN2258-027	3		1	1.991	791.64	0	0.01	SWMM Method	IN2258-027	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-054	1	1	1	1.061	380.798	100	0.028	SWMM Method	IN2258-054	0	IN2258-054	SubCatchment 3	No Redirection	
IN2258-054	2		1	0.047	380.798	100	0.028	SWMM Method	IN2258-054	1	IN2258-054	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-054	3		1	1.018	380.798	0	0.028	SWMM Method	IN2258-054	0		SubCatchment 1	No Redirection	
IN2258-074	1	1	1	1.98	186.974	100	0.005	SWMM Method	IN2258-074	0	IN2258-074	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2258-074	3		1	0.394	186.974	0	0.005	SWMM Method	IN2258-074	0		SubCatchment 3	No Redirection	
IN2347-005	1	1	1	3.175	629.731	100	0.005	SWMM Method	IN2347-005	0	IN2347-005	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2347-005	2		1	0.816	629.731	100	0.005	SWMM Method	IN2347-005	1	IN2347-005	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2347-005	3		1	7.257	629.731	0	0.005	SWMM Method	IN2347-005	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2347-020	1	1	1	1.49	374.458	100	0.01	SWMM Method	IN2347-020	0	IN2347-020	SubCatchment 3	No Redirection	
IN2347-020	2		1	0.561	374.458	100	0.01	SWMM Method	IN2347-020	1	IN2347-020	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2347-020	3		1	4.065	374.458	0	0.01	SWMM Method	IN2347-020	0		SubCatchment 1	No Redirection	
IN2348-003	1	1	1	2.374	369.142	100	0.027	SWMM Method	IN2348-003	0	IN2348-003	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2348-003	2		1	0.046	369.142	100	0.027	SWMM Method	IN2348-003	1	IN2348-003	SubCatchment 3	No Redirection	
IN2348-003	3		1	3.872	369.142	0	0.027	SWMM Method	IN2348-003	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2349-002	1	1	1	3.739	478.94	100	0.026	SWMM Method	IN2349-002	0	IN2349-002	SubCatchment 3	No Redirection	
IN2349-002	2		1	0.045	478.94	100	0.026	SWMM Method	IN2349-002	1	IN2349-002	SubCatchment 3	No Redirection	
IN2349-002	3		1	2.854	478.94	0	0.026	SWMM Method	IN2349-002	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2350-004	1	1	1	3.501	263.521	100	0.022	SWMM Method	IN2350-004	0	IN2350-004	SubCatchment 3	No Redirection	
IN2350-004	2		1	0.063	263.521	100	0.022	SWMM Method	IN2350-004	1	IN2350-004	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2350-004	3		1	1.856	263.521	0	0.022	SWMM Method	IN2350-004	0		SubCatchment 3	No Redirection	
IN2350-029	1	1	1	2.513	349.385	100	0.029	SWMM Method	IN2350-029	0	IN2350-029	SubCatchment 3	No Redirection	
IN2350-029	2		1	0.454	349.385	100	0.029	SWMM Method	IN2350-029	1	IN2350-029	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2350-029	3		1	3.81	349.385	0	0.029	SWMM Method	IN2350-029	0		SubCatchment 3	No Redirection	
IN2351-006	1	1	1	0.31	185.338	100	0.026	SWMM Method	IN2351-006	0	IN2351-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2351-006	2		1	0.091	185.338	100	0.026	SWMM Method	IN2351-006	1	IN2351-006	SubCatchment 3	No Redirection	
IN2351-006	3		1	1.075	185.338	0	0.026	SWMM Method	IN2351-006	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2353-006	1	1	1	2.546	399.588	100	0.011	SWMM Method	IN2353-006	0	IN2353-006	SubCatchment 3	No Redirection	
IN2353-006	2		1	0.605	399.588	100	0.011	SWMM Method	IN2353-006	1	IN2353-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2353-006	3		1	6.677	399.588	0	0.011	SWMM Method	IN2353-006	0		SubCatchment 1	No Redirection	
IN2355-006	1	1	1	3.331	672.943	100	0.013	SWMM Method	IN2355-006	0	IN2355-006	SubCatchment 3	No Redirection	
IN2355-006	2		1	0.092	672.943	100	0.013	SWMM Method	IN2355-006	1	IN2355-006	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2355-006	3		1	0.932	672.943	0	0.013	SWMM Method	IN2355-006	0		SubCatchment 3	No Redirection	
IN2355-040	1	1	1	1.393	189.717	100	0.03	SWMM Method	IN2355-040	0	IN2355-040	SubCatchment 3	No Redirection	
IN2355-040	3		1	0.505	189.717	0	0.03	SWMM Method	IN2355-040	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2356-006	1	1	1	4.717	261.772	100	0.033	SWMM Method	IN2356-006	0	IN2356-006	SubCatchment 3	No Redirection	
IN2356-006	2		1	0.066	261.772	100	0.033	SWMM Method	IN2356-006	1	IN2356-006	SubCatchment 3	No Redirection	
IN2356-006	3		1	1.754	261.772	0	0.033	SWMM Method	IN2356-006	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2356-025	1	1	1	4.581	145.503	100	0.023	SWMM Method	IN2356-025	0	IN2356-025	SubCatchment 3	No Redirection	
IN2356-025	3		1	2.362	145.503	0	0.023	SWMM Method	IN2356-025	0		SubCatchment 3	No Redirection	
IN2358-013	1	1	1	3.901	409.377	100	0.022	SWMM Method	IN2358-013	0	IN2358-013	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2358-013	2		1	0.005	409.377	100	0.022	SWMM Method	IN2358-013	1	IN2358-013	SubCatchment 3	No Redirection	
IN2358-013	3		1	1.532	409.377	0	0.022	SWMM Method	IN2358-013	0		SubCatchment 3	No Redirection	
IN2358-020	1	1	1	0.534	168.854	100	0.062	SWMM Method	IN2358-020	0	IN2358-020	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2358-020	3		1	1.525	168.854	0	0.062	SWMM Method	IN2358-020	0		SubCatchment 3	No Redirection	
IN2447-001	1	1	1	1.373	433.573	100	0.016	SWMM Method	IN2447-001	0	IN2447-001	SubCatchment 3	No Redirection	
IN2447-001	2		1	0.547	433.573	100	0.016	SWMM Method	IN2447-001	1	IN2447-001	SubCatchment 3	No Redirection	UW Ag Research Stati
IN2447-001	3		1	3.952	433.573	0	0.016	SWMM Method	IN2447-001	0		SubCatchment 3	No Redirection	
IN2449-002	1	1	1	1.824	284.313	100	0.03	SWMM Method	IN2449-002	0	IN2449-002	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2449-002	2		1	0.049	284.313	100	0.03	SWMM Method	IN2449-002	1	IN2449-002	SubCatchment 3	No Redirection	
IN2449-002	3		1	2.102	284.313	0	0.03	SWMM Method	IN2449-002	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2451-009	1	1	1	2.191	651.232	100	0.019	SWMM Method	IN2451-009	0	IN2451-009	SubCatchment 3	No Redirection	
IN2451-009	2		1	1.168	651.232	100	0.019	SWMM Method	IN2451-009	1	IN2451-009	SubCatchment 3	No Redirection	
IN2451-009	3		1	8.779	651.232	0	0.019	SWMM Method	IN2451-009	0		SubCatchment 3	No Redirection	UW Ag Research Stati
IN2452-009	1	1	1	1.276	984.543	100	0.028	SWMM Method	IN2452-009	0	IN2452-009	SubCatchment 3	No Redirection	
IN2452-009	2		1	0.454	984.543	100	0.028	SWMM Method	IN2452-009	1	IN2452-009	SubCatchment 3	No Redirection	
IN2452-009	3		1	3.287	984.543	0	0.028	SWMM Method	IN2452-009	0		SubCatchment 1	No Redirection	UW Ag Research Stati
IN2453-004	1	1	1	1.437	294.822	100	0.039	SWMM Method	IN2453-004	0	IN2453-004	SubCatchment 3	No Redirection	
IN2453-004	2		1	0.441	294.822	100	0.039	SWMM Method	IN2453-004	1	IN2453-004	SubCatchment 3	No Redirection	
IN2453-004	3		1	4.363	294.822	0	0.039	SWMM Method	IN2453-004	0		SubCatchment 1	No Redirection	
IN2453-009	1	1	1	1.879	383.086	100	0.04	SWMM Method	IN2453-009	0	IN2453-009	SubCatchment 3	No Redirection	
IN2453-009	2		1	0.65	383.086	100	0.04	SWMM Method	IN2453-009	1	IN2453-009	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2453-009	3		1	5.922	383.086	0	0.04	SWMM Method	IN2453-009	0		SubCatchment 3	No Redirection	Swallowtail Park 18
IN2454-009	1	1	1	3.253	588.564	100	0.015	SWMM Method	IN2454-009	0	IN2454-009	SubCatchment 3	No Redirection	Swallowtail Park 18
IN2454-009	2		1	0.044	588.564	100	0.015	SWMM Method	IN2454-009	1	IN2454-009	SubCatchment 3	No Redirection	
IN2454-009	3		1	2.632	588.564	0	0.015	SWMM Method	IN2454-009	0		SubCatchment 3	No Redirection	
IN2455-017	1	1	1	2.992	326.672	100	0.032	SWMM Method	IN2455-017	0	IN2455-017	SubCatchment 3	No Redirection	
IN2455-017	2		1	0.039	326.672	100	0.032	SWMM Method	IN2455-017	1	IN2455-017	SubCatchment 3	No Redirection	
IN2455-017	3		1	1.047	326.672	0	0.032	SWMM Method	IN2455-017	0		SubCatchment 3	No Redirection	
IN2455-021	1	1	1	5.505	355.922	100	0.036	SWMM Method	IN2455-021	0	IN2455-021	SubCatchment 3	No Redirection	
IN2455-021	2		1	0.065	355.922	100	0.036	SWMM Method	IN2455-021	1	IN2455-021	SubCatchment 3	No Redirection	
IN2455-021	3		1	2.138	355.922	0	0.036	SWMM Method	IN2455-021	0		SubCatchment 3	No Redirection	
IN2456-003	1	1	1	3.981	407.481	100	0.04	SWMM Method	IN2456-003	0	IN2456-003	SubCatchment 3	No Redirection	
IN2456-003	2		1	0.25	407.481	100	0.04	SWMM Method	IN2456-003	1	IN2456-003	SubCatchment 3	No Redirection	
IN2456-003	3		1	2.712	407.481	0	0.04	SWMM Method	IN2456-003	0		SubCatchment 3	No Redirection	
IN2550-001	1	1	1	2.424	528.683	100	0.045	SWMM Method	IN2550-001	0	IN2550-001	SubCatchment 3	No Redirection	
IN2550-001	2		1	1.151	528.683	100	0.045	SWMM Method	IN2550-001	1	IN2550-001	SubCatchment 3	No Redirection	
IN2550-001	3		1	9.16	528.683	0	0.045	SWMM Method	IN2550-001	0		SubCatchment 3	No Redirection	
IN2550-021	1	1	1	2.366	257.309	100	0.025	SWMM Method	IN2550-021	0	IN2550-021	SubCatchment 3	No Redirection	
IN2550-021	2		1	0.063	257.309	100	0.025	SWMM Method	IN2550-021	1	IN2550-021	SubCatchment 3	No Redirection	
IN2550-021	3		1	2.224	257.309	0	0.025	SWMM Method	IN2550-021	0		SubCatchment 3	No Redirection	
IN2552-007	1	1	1	2.041	288.746	100	0.039	SWMM Method	IN2552-007	0	IN2552-007	SubCatchment 3	No Redirection	
IN2552-007	2		1	0.721	288.746	100	0.039	SWMM Method	IN2552-007	1	IN2552-007	SubCatchment 3	No Redirection	
IN2552-007	3		1	5.143	288.746	0	0.039	SWMM Method	IN2552-007	0		SubCatchment 3	No Redirection	
IN2552-010	1	1	1	4.418	704.752	100	0.038	SWMM Method	IN2552-010	0	IN2552-010	SubCatchment 3	No Redirection	
IN2552-010	2		1	1.375	704.752	100	0.038	SWMM Method	IN2552-010	1	IN2552-010	SubCatchment 3	No Redirection	
IN2552-010	3		1	10.316	704.752	0	0.038	SWMM Method	IN2552-010	0		SubCatchment 3	No Redirection	
IN2554-002	1	1	1	1.796	267.387	100	0.034	SWMM Method	IN2554-002	0	IN2554-002	SubCatchment 3	No Redirection	
IN2554-002	2		1	0.222	267.387	100	0.034	SWMM Method	IN2554-002	1	IN2554-002	SubCatchment 3	No Redirection	
IN2554-002	3		1	2.429	267.387	0	0.034	SWMM Method	IN2554-002	0		SubCatchment 1	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
IN2650-005	1	1	1	2.75	592.679	100	0.035	SWMM Method	IN2650-005	0	IN2650-005	SubCatchment 3	No Redirection	
IN2650-005	2		1	0.239	592.679	100	0.035	SWMM Method	IN2650-005	1	IN2650-005	SubCatchment 3	No Redirection	
IN2650-005	3		1	6.573	592.679	0	0.035	SWMM Method	IN2650-005	0		SubCatchment 3	No Redirection	
JB2256-060	1	1	1	3.157	441.107	100	0.01	SWMM Method	JB2256-060	0	JB2256-060	SubCatchment 3	No Redirection	
JB2256-060	3		1	1.147	441.107	0	0.01	SWMM Method	JB2256-060	0		SubCatchment 3	No Redirection	
JCT_CT_POND_OUT	1	1	1	5.586	360.821	100	0.017	SWMM Method	JCT_CT_PON	0	JCT_CT_POND_O	SubCatchment 3	No Redirection	
JCT_CT_POND_OUT	2		1	0.084	360.821	100	0.017	SWMM Method	JCT_CT_PON	1	JCT_CT_POND_O	SubCatchment 3	No Redirection	
JCT_CT_POND_OUT	3		1	2.856	360.821	0	0.017	SWMM Method	JCT_CT_PON	0		SubCatchment 3	No Redirection	
JUNCTION_LOOP_POND	1	1	1	1.966	381.673	100	0.038	SWMM Method	JUNCTION_L	0	JUNCTION_LOOP	SubCatchment 3	No Redirection	
JUNCTION_LOOP_POND	3		1	2.753	381.673	0	0.038	SWMM Method	JUNCTION_L	0		SubCatchment 3	No Redirection	
JUNCTION_RIDGE_POND	1	1	1	9.902	870.593	100	0.012	SWMM Method	JUNCTION_R	0	JUNCTION_RIDG	SubCatchment 3	No Redirection	
JUNCTION_RIDGE_POND	2		1	0.121	870.593	100	0.012	SWMM Method	JUNCTION_R	1	JUNCTION_RIDG	SubCatchment 3	No Redirection	
JUNCTION_RIDGE_POND	3		1	4.398	870.593	0	0.012	SWMM Method	JUNCTION_R	0		SubCatchment 3	No Redirection	
MENARDS_POND_BIOFILTER	1	1	1	0.629	258.725	100	0.033	SWMM Method	MENARDS_P	0	MENARDS_POND	SubCatchment 3	No Redirection	
MENARDS_POND_BIOFILTER	3		1	0.704	258.725	0	0.033	SWMM Method	MENARDS_P	0		SubCatchment 3	No Redirection	
MINPT_RD_SW1	1	1	1	0.002	159.903	100	0.041	SWMM Method	MINPT_RD_S	0	MINPT_RD_SW1	SubCatchment 3	No Redirection	
MINPT_RD_SW1	3		1	3.382	159.903	0	0.041	SWMM Method	MINPT_RD_S	0		SubCatchment 1	No Redirection	
MINPT_RD_SW2	1	1	1	0.042	110.621	100	0.036	SWMM Method	MINPT_RD_S	0	MINPT_RD_SW2	SubCatchment 3	No Redirection	
MINPT_RD_SW2	3		1	1.649	110.621	0	0.036	SWMM Method	MINPT_RD_S	0		SubCatchment 1	No Redirection	
MINPT_RD_SW3	1	1	1	0.066	132.426	100	0.03	SWMM Method	MINPT_RD_S	0	MINPT_RD_SW3	SubCatchment 3	No Redirection	
MINPT_RD_SW3	3		1	1.324	132.426	0	0.03	SWMM Method	MINPT_RD_S	0		SubCatchment 1	No Redirection	
N_PV_ROAD_DS2	1	1	1	6.623	1339.08	100	0.081	SWMM Method	N_PV_ROAD_	0	N_PV_ROAD_DS2	SubCatchment 3	No Redirection	
N_PV_ROAD_DS2	2		1	0.057	1339.08	100	0.081	SWMM Method	N_PV_ROAD_	1	N_PV_ROAD_DS2	SubCatchment 3	No Redirection	
N_PV_ROAD_DS2	3		1	14.117	1339.08	0	0.081	SWMM Method	N_PV_ROAD_	0		SubCatchment 3	No Redirection	
N_WEXFORD_POND	1	1	1	6.663	2033.252	100	0.046	SWMM Method	N_WEXFORD	0	N_WEXFORD_PO	SubCatchment 3	No Redirection	
N_WEXFORD_POND	2		1	0.435	2033.252	100	0.046	SWMM Method	N_WEXFORD	1	N_WEXFORD_PO	SubCatchment 3	No Redirection	
N_WEXFORD_POND	3		1	7.725	2033.252	0	0.046	SWMM Method	N_WEXFORD	0		SubCatchment 3	No Redirection	
NORTH_BLACKHAWK_POND	1	1	1	3.971	1351.498	100	0.045	SWMM Method	NORTH_BLAC	0	NORTH_BLACKHA	SubCatchment 3	No Redirection	
NORTH_BLACKHAWK_POND	2		1	0.648	1351.498	100	0.045	SWMM Method	NORTH_BLAC	1	NORTH_BLACKHA	SubCatchment 3	No Redirection	
NORTH_BLACKHAWK_POND	3		1	9.039	1351.498	0	0.045	SWMM Method	NORTH_BLAC	0		SubCatchment 3	No Redirection	
NW_INF_BASIN	1	1	1	0.153	168.144	100	0.011	SWMM Method	NW_INF_BAS	0	NW_INF_BASIN	SubCatchment 1	No Redirection	
NW_INF_BASIN	2		1	0.198	168.144	100	0.011	SWMM Method	NW_INF_BAS	1	NW_INF_BASIN	SubCatchment 3	No Redirection	
NW_INF_BASIN	3		1	0.961	168.144	0	0.011	SWMM Method	NW_INF_BAS	0		SubCatchment 3	No Redirection	
OLD_SAUK_BELTLINE_NE	1	1	1	0.688	146.436	100	0.03	SWMM Method	OLD_SAUK_B	0	OLD_SAUK_BELT	SubCatchment 3	No Redirection	
OLD_SAUK_BELTLINE_NE	3		1	1.231	146.436	0	0.03	SWMM Method	OLD_SAUK_B	0		SubCatchment 3	No Redirection	
OLD_SAUK_BELTLINE_SE	1	1	1	0.944	138.623	100	0.029	SWMM Method	OLD_SAUK_B	0	OLD_SAUK_BELT	SubCatchment 3	No Redirection	
OLD_SAUK_BELTLINE_SE	3		1	1.117	138.623	0	0.029	SWMM Method	OLD_SAUK_B	0		SubCatchment 3	No Redirection	
OLD_SAUK_GW3_US	1	1	1	1.238	325.739	100	0.037	SWMM Method	OLD_SAUK_C	0	OLD_SAUK_GW3	SubCatchment 3	No Redirection	
OLD_SAUK_GW3_US	2		1	0.038	325.739	100	0.037	SWMM Method	OLD_SAUK_C	1	OLD_SAUK_GW3	SubCatchment 3	No Redirection	
OLD_SAUK_GW3_US	3		1	2.14	325.739	0	0.037	SWMM Method	OLD_SAUK_C	0		SubCatchment 3	No Redirection	
OSR_BL_SERAMP_US	1	1	1	2.497	400.535	100	0.021	SWMM Method	OSR_BL_SER	0	OSR_BL_SERAMP	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
OSR_BL_SERAMP_US	2		1	0.055	400.535	100	0.021	SWMM Method	OSR_BL_SER	1	OSR_BL_SERAMP	SubCatchment 3	No Redirection	
OSR_BL_SERAMP_US	3		1	3.739	400.535	0	0.021	SWMM Method	OSR_BL_SER	0		SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_1	1	1	1	1.497	301.567	100	0.028	SWMM Method	OSTP_POND_	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_1	2		1	0.014	301.567	100	0.028	SWMM Method	OSTP_POND_	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_1	3		1	2.419	301.567	0	0.028	SWMM Method	OSTP_POND_	0		SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_11	1	1	1	1.436	258.252	100	0.038	SWMM Method	OSTP_POND_	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_11	2		1	0.088	258.252	100	0.038	SWMM Method	OSTP_POND_	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_11	3		1	1.507	258.252	0	0.038	SWMM Method	OSTP_POND_	0		SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_13	1	1	1	4.016	1213.742	100	0.04	SWMM Method	OSTP_POND_	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_13	2		1	0.038	1213.742	100	0.04	SWMM Method	OSTP_POND_	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_13	3		1	3.798	1213.742	0	0.04	SWMM Method	OSTP_POND_	0		SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_3	1	1	1	4.752	733.589	100	0.021	SWMM Method	OSTP_POND_	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_3	2		1	0.733	733.589	100	0.021	SWMM Method	OSTP_POND_	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_3	3		1	7.05	733.589	0	0.021	SWMM Method	OSTP_POND_	0		SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_6	1	1	1	3.637	594.039	100	0.045	SWMM Method	OSTP_POND_	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_6	2		1	0.069	594.039	100	0.045	SWMM Method	OSTP_POND_	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_6	3		1	7.479	594.039	0	0.045	SWMM Method	OSTP_POND_	0		SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_8A	1	1	1	2.034	650.91	100	0.032	SWMM Method	OSTP_POND_	0	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_8A	2		1	0.083	650.91	100	0.032	SWMM Method	OSTP_POND_	1	OSTP_POND_SYS	SubCatchment 3	No Redirection	
OSTP_POND_SYSTEM_JCT_8A	3		1	5.254	650.91	0	0.032	SWMM Method	OSTP_POND_	0		SubCatchment 3	No Redirection	
PARAGON_FF1	3	1	1	1.391	253.815	0	0.021	SWMM Method	PARAGON_F	0		SubCatchment 1	No Redirection	
PARAGON_FF2	3	1	1	3.907	240.548	0	0.015	SWMM Method	PARAGON_F	0		SubCatchment 1	No Redirection	
PARAGON_FF3	1	1	1	0.27	507.316	100	0.013	SWMM Method	PARAGON_F	0	PARAGON_FF3	SubCatchment 3	No Redirection	
PARAGON_FF3	3		1	8.768	507.316	0	0.013	SWMM Method	PARAGON_F	0		SubCatchment 1	No Redirection	
PARAGON_INF_BASIN	1	1	1	0.006	350.257	100	0.03	SWMM Method	PARAGON_IN	0	PARAGON_INF_B	SubCatchment 3	No Redirection	
PARAGON_INF_BASIN	3		1	4.395	350.257	0	0.03	SWMM Method	PARAGON_IN	0		SubCatchment 3	No Redirection	
PARAGON_WET_POND	1	1	1	4.326	706.323	100	0.042	SWMM Method	PARAGON_W	0	PARAGON_WET_	SubCatchment 3	No Redirection	
PARAGON_WET_POND	2		1	0.02	706.323	100	0.042	SWMM Method	PARAGON_W	1	PARAGON_WET_	SubCatchment 3	No Redirection	
PARAGON_WET_POND	3		1	5.178	706.323	0	0.042	SWMM Method	PARAGON_W	0		SubCatchment 3	No Redirection	
PF_E_INF_BASIN	1	1	1	0.308	112.195	100	0.024	SWMM Method	PF_E_INF_BA	0	PF_E_INF_BASIN	SubCatchment 3	No Redirection	
PF_E_INF_BASIN	2		1	0.364	112.195	100	0.024	SWMM Method	PF_E_INF_BA	1	PF_E_INF_BASIN	SubCatchment 3	No Redirection	
PF_E_INF_BASIN	3		1	1.982	112.195	0	0.024	SWMM Method	PF_E_INF_BA	0		SubCatchment 3	No Redirection	
PF_S_WP	1	1	1	1.641	221.836	100	0.022	SWMM Method	PF_S_WP	0	PF_S_WP	SubCatchment 3	No Redirection	
PF_S_WP	2		1	1.943	221.836	100	0.022	SWMM Method	PF_S_WP	1	PF_S_WP	SubCatchment 3	No Redirection	
PF_S_WP	3		1	5.624	221.836	0	0.022	SWMM Method	PF_S_WP	0		SubCatchment 3	No Redirection	
PF-S38	1	1	1	1.765	368.122	100	0.01	SWMM Method	PF-S38	0	PF-S38	SubCatchment 3	No Redirection	
PF-S38	2		1	2.09	368.122	100	0.01	SWMM Method	PF-S38	1	PF-S38	SubCatchment 3	No Redirection	
PF-S38	3		1	9.254	368.122	0	0.01	SWMM Method	PF-S38	0		SubCatchment 1	No Redirection	
PLEAS_V_DITCH1	1	1	1	0.03	903.75	100	0.022	SWMM Method	PLEAS_V_DIT	0	PLEAS_V_DITCH1	SubCatchment 3	No Redirection	
PLEAS_V_DITCH1	3		1	23.138	903.75	0	0.022	SWMM Method	PLEAS_V_DIT	0		SubCatchment 1	No Redirection	
PLEAS_V_DITCH2	3	1	1	1.26	139.81	0	0.041	SWMM Method	PLEAS_V_DIT	0		SubCatchment 1	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
PLEAS_V_FF_1	1	1	1	0.65	1392.08	100	0.042	SWMM Method	PLEAS_V_FF_	0	PLEAS_V_FF_1	SubCatchment 3	No Redirection	
PLEAS_V_FF_1	3		1	14.058	1392.08	0	0.042	SWMM Method	PLEAS_V_FF_	0		SubCatchment 1	No Redirection	
PLEASANT_V_MINERAL_PT_P	1	1	1	0.518	507.112	100	0.12	SWMM Method	PLEAS_V_MI	0	PLEASANT_V_MI	SubCatchment 3	No Redirection	
PLEASANT_V_MINERAL_PT_P	3		1	1.121	507.112	0	0.12	SWMM Method	PLEAS_V_MI	0		SubCatchment 3	No Redirection	
Pond B	1	1	1	0.5	937.89	100	0.016	SWMM Method	Pond B	0		SubCatchment 1	No Redirection	
Pond B	2		1	0.04	937.89	100	0.016	SWMM Method	Pond B	1	Pond B	SubCatchment 3	No Redirection	
Pond B	3		1	16.639	937.89	0	0.016	SWMM Method	Pond B	0		SubCatchment 1	No Redirection	
PV211	1	1	1	0.96	162.6	100	0.033	SWMM Method	PV211	0	IN1955-001	SubCatchment 3	No Redirection	
PV211	3		1	0.56	162.6	0	0.033	SWMM Method	PV211	0		SubCatchment 3	No Redirection	
PV218	1	1	1	0.51	83.03	100	0.027	SWMM Method	PV218	0		SubCatchment 1	No Redirection	
PV218	3		1	0.116	83.03	0	0.027	SWMM Method	PV218	0		SubCatchment 1	No Redirection	
PV226	1	1	1	0.94	113.16	100	0.012	SWMM Method	PV226	0		SubCatchment 1	No Redirection	
PV226	3		1	0.236	113.16	0	0.012	SWMM Method	PV226	0		SubCatchment 1	No Redirection	
PV239B.1	1	1	1	1.25	198.05	100	0.004	SWMM Method	PV239B.1	0		SubCatchment 1	No Redirection	
PV239B.1	3		1	0.318	198.05	0	0.004	SWMM Method	PV239B.1	0		SubCatchment 1	No Redirection	
PV250	1	1	1	1.15	241.9	100	0.01	SWMM Method	PV250	0		SubCatchment 1	No Redirection	
PV250	3		1	0.375	241.9	0	0.01	SWMM Method	PV250	0		SubCatchment 1	No Redirection	
PV260	1	1	1	0.89	225.64	100	0.019	SWMM Method	PV260	0		SubCatchment 1	No Redirection	
PV260	3		1	0.217	225.64	0	0.019	SWMM Method	PV260	0		SubCatchment 1	No Redirection	
PV2693	1	1	1	1.45	214.58	100	0.016	SWMM Method	PV2693	0		SubCatchment 1	No Redirection	
PV2693	2		1	0.172	214.58	100	0.016	SWMM Method	PV2693	1	PV2693	SubCatchment 3	No Redirection	
PV2693	3		1	1.006	214.58	0	0.016	SWMM Method	PV2693	0		SubCatchment 1	No Redirection	
PV292	1	1	1	1.07	130.17	100	0.006	SWMM Method	PV292	0		SubCatchment 1	No Redirection	
PV292	3		1	0.976	130.17	0	0.006	SWMM Method	PV292	0		SubCatchment 1	No Redirection	
PV300	1	1	1	1.82	491.36	100	0.001	SWMM Method	PV300	0		SubCatchment 1	No Redirection	
PV300	2		1	0.052	491.36	100	0.001	SWMM Method	PV300	1	PV300	SubCatchment 3	No Redirection	
PV300	3		1	1.452	491.36	0	0.001	SWMM Method	PV300	0		SubCatchment 1	No Redirection	
PV310	1	1	1	1.15	266.13	100	0.008	SWMM Method	PV310	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV310	2		1	0.646	266.13	100	0.008	SWMM Method	PV310	1	PV310	SubCatchment 3	No Redirection	Swallowtail Park 18
PV310	3		1	1.407	266.13	0	0.008	SWMM Method	PV310	0		SubCatchment 1	No Redirection	
PV315	1	1	1	1.03	280.47	100	0.008	SWMM Method	PV315	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV315	2		1	0.299	280.47	100	0.008	SWMM Method	PV315	1	PV315	SubCatchment 3	No Redirection	Swallowtail Park 18
PV315	3		1	0.995	280.47	0	0.008	SWMM Method	PV315	0		SubCatchment 1	No Redirection	
PV320	1	1	1	0.91	396.19	100	0.023	SWMM Method	PV320	0		SubCatchment 1	No Redirection	
PV320	2		1	0.01	396.19	100	0.023	SWMM Method	PV320	1	PV320	SubCatchment 3	No Redirection	Swallowtail Park 18
PV320	3		1	3.641	396.19	0	0.023	SWMM Method	PV320	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV348	1	1	1	0.49	92.26	100	0.014	SWMM Method	PV348	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV348	3		1	0.077	92.26	0	0.014	SWMM Method	PV348	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV358	1	1	1	0.78	178.01	100	0.065	SWMM Method	PV358	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV358	3		1	0.308	178.01	0	0.065	SWMM Method	PV358	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV362	1	1	1	0.623	87.9	100	0.046	SWMM Method	PV360	0		SubCatchment 1	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
PV362	3		1	0.194	87.9	0	0.046	SWMM Method	PV360	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV364	1	1	1	0.666	184.69	100	0.013	SWMM Method	PV365	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV364	2		1	0.005	184.69	100	0.013	SWMM Method	PV365	1	PV364	SubCatchment 3	No Redirection	UW Ag Research 2018
PV364	3		1	0.558	184.69	0	0.013	SWMM Method	PV365	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV375	1	1	1	0.73	189.63	100	0.004	SWMM Method	PV375	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV375	2		1	0.003	189.63	100	0.004	SWMM Method	PV375	1	PV375	SubCatchment 3	No Redirection	
PV375	3		1	0.472	189.63	0	0.004	SWMM Method	PV375	0		SubCatchment 1	No Redirection	
PV380	1	1	1	1.05	160.99	100	0.058	SWMM Method	PV380	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV380	2		1	0.03	160.99	100	0.058	SWMM Method	PV380	1	PV380	SubCatchment 3	No Redirection	UW Ag Research 2018
PV380	3		1	1.046	160.99	0	0.058	SWMM Method	PV380	0		SubCatchment 1	No Redirection	UW Ag Research 2018
PV388	1	1	1	0.305	211.367	100	0.035	SWMM Method	DT1947-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
PV388	2		1	0.003	211.367	100	0.035	SWMM Method	DT1947-007	1	PV388	SubCatchment 3	No Redirection	UW Ag Research 2018
PV388	3		1	0.832	211.367	0	0.035	SWMM Method	DT1947-007	0		SubCatchment 3	No Redirection	UW Ag Research 2018
PV3903	1	1	1	0.56	393.97	100	0.071	SWMM Method	PV3903	0		SubCatchment 1	No Redirection	UW Ag Research 2018
PV3903	2		1	0.007	393.97	100	0.071	SWMM Method	PV3903	1	PV3903	SubCatchment 3	No Redirection	UW Ag Research 2018
PV3903	3		1	0.765	393.97	0	0.071	SWMM Method	PV3903	0		SubCatchment 3	No Redirection	Swallowtail Park 18
PV3905	1	1	1	0.55	181.03	100	0.036	SWMM Method	PV3905	0		SubCatchment 1	No Redirection	UW Ag Research 2018
PV3905	2		1	0.211	181.03	100	0.036	SWMM Method	PV3905	1	PV3905	SubCatchment 3	No Redirection	UW Ag Research 2018
PV3905	3		1	3.439	181.03	0	0.036	SWMM Method	PV3905	0		SubCatchment 1	No Redirection	UW Ag Research 2018
PV392	1	1	1	0.13	72.73	100	0.03	SWMM Method	PV392	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV3921	1	1	1	0.62	178.29	100	0.012	SWMM Method	PV391	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV3921	2		1	0.003	178.29	100	0.012	SWMM Method	PV391	1	PV3921	SubCatchment 3	No Redirection	Swallowtail Park 18
PV3921	3		1	0.26	178.29	0	0.012	SWMM Method	PV391	0		SubCatchment 1	No Redirection	
PV3932	1	1	1	0.25	76.38	100	0.031	SWMM Method	PV3932	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV3932	3		1	0.52	76.38	0	0.031	SWMM Method	PV3932	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV398	1	1	1	2.19	209.88	100	0.054	SWMM Method	PV398	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV398	2		1	0.078	209.88	100	0.054	SWMM Method	PV398	1	PV398	SubCatchment 3	No Redirection	
PV398	3		1	3.202	209.88	0	0.054	SWMM Method	PV398	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV403	1	1	1	0.33	140.49	100	0.056	SWMM Method	PV403	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PV403	3		1	0.504	140.49	0	0.056	SWMM Method	PV403	0		SubCatchment 1	No Redirection	Swallowtail Park 18
PVRdNew_US	1	1	1	0.06	147.83	100	0.095	SWMM Method	PVRdNew_U	0	PVRdNew_US	SubCatchment 3	No Redirection	UW Ag Research 2018
PVRdNew_US	2		1	0.063	147.83	100	0.095	SWMM Method	PVRdNew_U	1	PVRdNew_US	SubCatchment 3	No Redirection	UW Ag Research 2018
PVRdNew_US	3		1	1.157	147.83	0	0.095	SWMM Method	PVRdNew_U	0	PVRdNew_US	SubCatchment 3	No Redirection	UW Ag Research 2018
S105	1	1	1	0.796	279.654	100	0.019	SWMM Method	S105	0	S105	SubCatchment 3	No Redirection	UW Ag Research 2018
S105	2		1	0.283	279.654	100	0.019	SWMM Method	S105	1	S105	SubCatchment 3	No Redirection	UW Ag Research 2018
S105	3		1	1.498	279.654	0	0.019	SWMM Method	S105	0		SubCatchment 3	No Redirection	UW Ag Research 2018
S33	1	1	1	0.207	168.295	100	0.017	SWMM Method	S33	0		SubCatchment 1	No Redirection	
S33	2		1	0.029	168.295	100	0.017	SWMM Method	S33	1	S33	SubCatchment 3	No Redirection	UW Ag Research 2018
S33	3		1	0.193	168.295	0	0.017	SWMM Method	S33	0		SubCatchment 3	No Redirection	UW Ag Research 2018
SAUK_CREEK_LOWER_STORAGE	1	1	1	0.916	1064.072	100	0.048	SWMM Method	SAUK_CREEK	0	SAUK_CREEK_LO	SubCatchment 3	No Redirection	UW Ag Research 2018
SAUK_CREEK_LOWER_STORAGE	2		1	0.745	1064.072	100	0.048	SWMM Method	SAUK_CREEK	1	SAUK_CREEK_LO	SubCatchment 3	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
SAUK_CREEK_LOWER_STORAGE	3		1	11.617	1064.072	0	0.048	SWMM Method	SAUK_CREEK	0		SubCatchment 3	No Redirection	
SAUK_CREEK_UPPER_STORAGE	1	1	1	0.193	659.609	100	0.109	SWMM Method	SAUK_CREEK	0	SAUK_CREEK_UP	SubCatchment 3	No Redirection	
SAUK_CREEK_UPPER_STORAGE	2		1	0.228	659.609	100	0.109	SWMM Method	SAUK_CREEK	1	SAUK_CREEK_UP	SubCatchment 3	No Redirection	
SAUK_CREEK_UPPER_STORAGE	3		1	2.309	659.609	0	0.109	SWMM Method	SAUK_CREEK	0		SubCatchment 3	No Redirection	UW Ag Research 2018
SAUK_HEIGHTS_POND	1	1	1	0.977	999.322	100	0.062	SWMM Method	SAUK_HEIGH	0	SAUK_HEIGHTS_	SubCatchment 3	No Redirection	UW Ag Research 2018
SAUK_HEIGHTS_POND	2		1	0.239	999.322	100	0.062	SWMM Method	SAUK_HEIGH	1	SAUK_HEIGHTS_	SubCatchment 3	No Redirection	Swallowtail Park 18
SAUK_HEIGHTS_POND	3		1	1.906	999.322	0	0.062	SWMM Method	SAUK_HEIGH	0		SubCatchment 3	No Redirection	UW Ag Research 2018
SE_BIO_BASIN	1	1	1	0.191	205.352	100	0.05	SWMM Method	SE_BIO_BASI	0	SE_BIO_BASIN	SubCatchment 3	No Redirection	UW Ag Research 2018
SE_BIO_BASIN	2		1	0.246	205.352	100	0.05	SWMM Method	SE_BIO_BASI	1	SE_BIO_BASIN	SubCatchment 3	No Redirection	
SE_BIO_BASIN	3		1	0.989	205.352	0	0.05	SWMM Method	SE_BIO_BASI	0		SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_BW_AAC1	1	1	1	2.266	286.18	100	0.034	SWMM Method	SMPB_BW_A	0	SMPB_BW_AAC1	SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_BW_AAC1	2		1	0.223	286.18	100	0.034	SWMM Method	SMPB_BW_A	1	SMPB_BW_AAC1	SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_BW_AAC1	3		1	2.347	286.18	0	0.034	SWMM Method	SMPB_BW_A	0		SubCatchment 3	No Redirection	
SMPB_GW_AAP	1	1	1	1.929	391.685	100	0.03	SWMM Method	SMPB_GW_A	0	SMPB_GW_AAP	SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_GW_AAP	2		1	0.83	391.685	100	0.03	SWMM Method	SMPB_GW_A	1	SMPB_GW_AAP	SubCatchment 3	No Redirection	UW Ag Research 2018
SMPB_GW_AAP	3		1	2.572	391.685	0	0.03	SWMM Method	SMPB_GW_A	0		SubCatchment 3	No Redirection	
SW_BLACKHAWK_PD	1	1	1	9.835	3129.803	100	0.03	SWMM Method	SW_BLACKHA	0	SW_BLACKHAWK	SubCatchment 3	No Redirection	UW Ag Research 2018
SW_BLACKHAWK_PD	2		1	1.626	3129.803	100	0.03	SWMM Method	SW_BLACKHA	1	SW_BLACKHAWK	SubCatchment 3	No Redirection	UW Ag Research 2018
SW_BLACKHAWK_PD	3		1	29.664	3129.803	0	0.03	SWMM Method	SW_BLACKHA	0		SubCatchment 3	No Redirection	
SW_FF_1	1	1	1	0.112	1298.588	100	0.016	SWMM Method	SW_FF_1	0	SW_FF_1	SubCatchment 3	No Redirection	
SW_FF_1	2		1	0.005	1298.588	100	0.016	SWMM Method	SW_FF_1	0	SW_FF_1	SubCatchment 3	No Redirection	
SW_FF_1	3		1	36.944	1298.588	0	0.016	SWMM Method	SW_FF_1	0		SubCatchment 1	No Redirection	
SW_FF_10	1	1	1	0.047	164.9	100	0.01	SWMM Method	SW_FF_10	0	SW_FF_10	SubCatchment 3	No Redirection	UW Ag Research 2018
SW_FF_10	3		1	0.478	164.9	0	0.01	SWMM Method	SW_FF_10	0		SubCatchment 1	No Redirection	UW Ag Research 2018
SW_FF_11	3	1	1	0.555	238.784	0	0.009	SWMM Method	SW_FF_11	0		SubCatchment 1	No Redirection	
SW_FF_12	3	1	1	7.375	253.204	0	0.061	SWMM Method	SW_FF_12	0		SubCatchment 1	No Redirection	
SW_FF_13	1	1	1	0.026	127.274	100	0.074	SWMM Method	SW_FF_13	0	SW_FF_13	SubCatchment 3	No Redirection	
SW_FF_13	3		1	2.211	127.274	0	0.074	SWMM Method	SW_FF_13	0		SubCatchment 1	No Redirection	
SW_FF_14	1	1	1	0.112	313.566	100	0.059	SWMM Method	SW_FF_14	0	SW_FF_14	SubCatchment 3	No Redirection	UW Ag Research 2018
SW_FF_14	3		1	10.044	313.566	0	0.059	SWMM Method	SW_FF_14	0		SubCatchment 1	No Redirection	UW Ag Research 2018
SW_FF_15	1	1	1	0.54	870.274	100	0.025	SWMM Method	SW_FF_15	0	SW_FF_15	SubCatchment 3	No Redirection	
SW_FF_15	3		1	14.455	870.274	0	0.025	SWMM Method	SW_FF_15	0		SubCatchment 1	No Redirection	Swallowtail Park
SW_FF_2	1	1	1	0.215	404.218	100	0.065	SWMM Method	SW_FF_2	0	SW_FF_2	SubCatchment 3	No Redirection	
SW_FF_2	2		1	0.006	404.218	100	0.065	SWMM Method	SW_FF_2	0	SW_FF_2	SubCatchment 3	No Redirection	
SW_FF_2	3		1	11.53	404.218	0	0.065	SWMM Method	SW_FF_2	0		SubCatchment 1	No Redirection	
SW_FF_3	1	1	1	0.451	278.124	100	0.083	SWMM Method	SW_FF_3	0	SW_FF_3	SubCatchment 3	No Redirection	
SW_FF_3	2		1	0.042	278.124	100	0.083	SWMM Method	SW_FF_3	0	SW_FF_3	SubCatchment 3	No Redirection	
SW_FF_3	3		1	5.99	278.124	0	0.083	SWMM Method	SW_FF_3	0		SubCatchment 1	No Redirection	
SW_FF_4	1	1	1	0.233	924.196	100	0.046	SWMM Method	SW_FF_4	0	SW_FF_4	SubCatchment 3	No Redirection	
SW_FF_4	2		1	0.008	924.196	100	0.046	SWMM Method	SW_FF_4	0	SW_FF_4	SubCatchment 3	No Redirection	
SW_FF_4	3		1	27.801	924.196	0	0.046	SWMM Method	SW_FF_4	0		SubCatchment 1	No Redirection	

Proposed Hydrologic Parameters

Name	Subcatchment	Active in Runoff Layer	Sub-Catchment Flag	Area (acres)	Width (ft)	Impervious Percentage (%)	Slope (ft/ft)	Hydrology Methods	Infiltration Reference	Runoff Flow Redirection Flag	Runoff Redirection Drain To Node	Runoff Redirection Drain To Subcatchment Number	Runoff Redirection Type	Rainfall Reference
SW_FF_5	1	1	1	0.043	677.162	100	0.013	SWMM Method	SW_FF_5	0	SW_FF_5	SubCatchment 3	No Redirection	
SW_FF_5	3		1	7.497	677.162	0	0.013	SWMM Method	SW_FF_5	0		SubCatchment 1	No Redirection	
SW_FF_6	1	1	1	0.829	335.08	100	0.06	SWMM Method	SW_FF_6	0	SW_FF_6	SubCatchment 3	No Redirection	
SW_FF_6	2		1	0.056	335.08	100	0.06	SWMM Method	SW_FF_6	0	SW_FF_6	SubCatchment 3	No Redirection	
SW_FF_6	3		1	12.426	335.08	0	0.06	SWMM Method	SW_FF_6	0		SubCatchment 1	No Redirection	
SW_FF_7	1	1	1	0.559	344.602	100	0.058	SWMM Method	SW_FF_7	0	SW_FF_7	SubCatchment 3	No Redirection	
SW_FF_7	3		1	10.881	344.602	0	0.058	SWMM Method	SW_FF_7	0		SubCatchment 1	No Redirection	
SW_FF_8	1	1	1	0.056	666.883	100	0.012	SWMM Method	SW_FF_8	0	SW_FF_8	SubCatchment 3	No Redirection	
SW_FF_8	3		1	6.079	666.883	0	0.012	SWMM Method	SW_FF_8	0		SubCatchment 1	No Redirection	
SW_FF_9	1	1	1	0.012	397.379	100	0.006	SWMM Method	SW_FF_9	0	SW_FF_9	SubCatchment 3	No Redirection	
SW_FF_9	3		1	3.384	397.379	0	0.006	SWMM Method	SW_FF_9	0		SubCatchment 1	No Redirection	
TAMARACK_TRAILS	1	1	1	5.101	875.069	100	0.035	SWMM Method	TAMARACK_	0	TAMARACK_TRA	SubCatchment 3	No Redirection	
TAMARACK_TRAILS	2		1	1.084	875.069	100	0.035	SWMM Method	TAMARACK_	1	TAMARACK_TRA	SubCatchment 3	No Redirection	
TAMARACK_TRAILS	3		1	7.738	875.069	0	0.035	SWMM Method	TAMARACK_	0		SubCatchment 3	No Redirection	
TP2549-008	1	1	1	5.651	857.999	100	0.032	SWMM Method	TP2549-008	0	TP2549-008	SubCatchment 3	No Redirection	
TP2549-008	2		1	0.232	857.999	100	0.032	SWMM Method	TP2549-008	1	TP2549-008	SubCatchment 3	No Redirection	
TP2549-008	3		1	7.568	857.999	0	0.032	SWMM Method	TP2549-008	0		SubCatchment 3	No Redirection	
TREE_LN	1	1	1	2.031	582.057	100	0.028	SWMM Method	TREE_LN	0	TREE_LN	SubCatchment 3	No Redirection	
TREE_LN	2		1	0.186	582.057	100	0.028	SWMM Method	TREE_LN	1	TREE_LN	SubCatchment 3	No Redirection	
TREE_LN	3		1	4.293	582.057	0	0.028	SWMM Method	TREE_LN	0		SubCatchment 1	No Redirection	
WEXFORD_POND_IN	1	1	1	0.178	511.19	100	0.032	SWMM Method	WEXFORD_P	0	WEXFORD_POND	SubCatchment 3	No Redirection	
WEXFORD_POND_IN	2		1	0.179	511.19	100	0.032	SWMM Method	WEXFORD_P	1	WEXFORD_POND	SubCatchment 3	No Redirection	
WEXFORD_POND_IN	3		1	3.694	511.19	0	0.032	SWMM Method	WEXFORD_P	0		SubCatchment 3	No Redirection	
WEXFORD_SOUTH_POND	1	1	1	8.288	1048.128	100	0.04	SWMM Method	WEXFORD_S	0	WEXFORD_SOUT	SubCatchment 3	No Redirection	
WEXFORD_SOUTH_POND	2		1	0.605	1048.128	100	0.04	SWMM Method	WEXFORD_S	1	WEXFORD_SOUT	SubCatchment 3	No Redirection	
WEXFORD_SOUTH_POND	3		1	9.837	1048.128	0	0.04	SWMM Method	WEXFORD_S	0		SubCatchment 3	No Redirection	
WILRICH_FF	1	1	1	0.08	511.568	100	0.025	SWMM Method	WILRICH_FF	0	WILRICH_FF	SubCatchment 3	No Redirection	
WILRICH_FF	2		1	0.095	511.568	100	0.025	SWMM Method	WILRICH_FF	0	WILRICH_FF	SubCatchment 3	No Redirection	
WILRICH_FF	3		1	12.631	511.568	0	0.025	SWMM Method	WILRICH_FF	0		SubCatchment 1	No Redirection	
WMPB_GW_DW3	1	1	1	11.36	3124.513	100	0.061	SWMM Method	WMPB_GW_	0	WMPB_GW_DW	SubCatchment 3	No Redirection	
WMPB_GW_DW3	2		1	0.562	3124.513	100	0.061	SWMM Method	WMPB_GW_	1	WMPB_GW_DW	SubCatchment 3	No Redirection	
WMPB_GW_DW3	3		1	13.812	3124.513	0	0.061	SWMM Method	WMPB_GW_	0		SubCatchment 3	No Redirection	
WMPB_GW_TRANSFER2	1	1	1	0.894	2160.563	100	0.115	SWMM Method	WMPB_GW_	0	WMPB_GW_TRA	SubCatchment 3	No Redirection	
WMPB_GW_TRANSFER2	2		1	1.059	2160.563	100	0.115	SWMM Method	WMPB_GW_	1	WMPB_GW_TRA	SubCatchment 3	No Redirection	
WMPB_GW_TRANSFER2	3		1	8.183	2160.563	0	0.115	SWMM Method	WMPB_GW_	0		SubCatchment 3	No Redirection	
WS-3	1	1	1	3.345	448.796	100	0.05	SWMM Method	WS-3	0	WS-3	SubCatchment 3	No Redirection	
WS-3	2		1	1.561	448.796	100	0.05	SWMM Method	WS-3	1	WS-3	SubCatchment 3	No Redirection	
WS-3	3		1	10.736	448.796	0	0.05	SWMM Method	WS-3	0		SubCatchment 3	No Redirection	

Appendix C. Hydraulic Input Parameters

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
18in Pipe	AS1849-013.1	1070.88	Node1910	1070.339	Circular		1	1.5	0.013	0.5	0.5	None (,)	10	Free
24inch	OSTP_POND_SYSTEM_JCT_5	961.6	OSTP_POND_SYSTEM_JCT_4	961.4	Circular		3	2	0.024	0.9	1	Projecting (Circ, Corr Metal)	25	Free
AA_POND_IN_FROM_W_PIPE	ATTIC_ANGEL_POND_IN	1037.35	AA_W_POND_IN	1017.1	Circular		1	5.5	0.013	0.5	1	0	165.924	Free
AE1546-001_AE1546-002	AE1546-001	1110.87	AE1546-002	1110.59	Circular		1	1	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	30.216	Free
AE1546-002_IN1646-001	AE1546-002	1110.59	IN1646-001	1094.69	Trapezoidal		1	1	0.027	0.1	0.5	None (,)	515.629	Free
AE1546-003_AE1546-004	AE1546-003	1127.36	AE1546-004	1127.17	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	27	Free
AE1546-004_AE1546-001	AE1546-004	1127.17	AE1546-001	1110.87	Trapezoidal		1	1	0.027	0.5	0.5	None (,)	749.556	Free
AE1547-035_AE1547-036	AE1547-035	1128.25	AE1547-036	1121.5	Circular		1	1	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	301.651	Free
AE1547-036_IN1647-069	AE1547-036	1121.5	IN1647-069	1097.55	Trapezoidal		1	1	0.027	0.1	0.5	None (,)	1009.9	Free
AE1549-012_AS1549-010	AE1549-012	1105.9	AS1549-010	1105.51	Circular		1	1	0.011	0.2	0.5	Groove End with Headwall (Circ, Conc)	127.19	Free
AE1549-015_AS1549-014	AE1549-015	1107.37	AS1549-014	1106.9	Circular		1	1	0.011	0.2	0.5	Groove End with Headwall (Circ, Conc)	170.68	Free
AE1549-041_IN1549-039	AE1549-041	1109.9	IN1549-039	1109.7	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	29.196	Free
AE1549-043_AS1549-042	AE1549-043	1104.85	AS1549-042	1103.76	Circular		1	1.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	40.001	Free
AE1549-044_AS1549-042	AE1549-044	1105.92	AS1549-042	1103.76	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	17.275	Free
AE1550-029_AE1550-030	AE1550-029	1114.77	AE1550-030	1110.26	Special	Horizontal Ellipse	1	1.91	0.013	0.2	0.5	Elliptical Tapered Inlet, Square Edges (Throat, Conc)	118.144	Free
AE1550-030_AE1550-034	AE1550-030	1110.26	AE1550-034	1103.42	Trapezoidal		1	2	0.027	0	0	None (,)	118.803	Free
AE1550-034_CAPE_SILVER_N	AE1550-034	1103.38	CAPE_SILVER_WAY_DRY_POND	1100	Natural		1	0	0.027	0	0	None (,)	163.666	Free
AE1647-038_IN1647-037	AE1647-038	1076.49	IN1647-037	1075.74	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	30.385	Free
AE1647-066_IN1647-065	AE1647-066	1093.75	IN1647-065	1093.49	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	13.229	Free
AE1648-029_IN1648-028	AE1648-029	1072.6	IN1648-028	1072.59	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	75	Free
AE1648-050_TP1648-049	AE1648-050	1079.6	TP1648-049	1073.99	Circular		1	1	0.011	0.2	0.5	Groove End with Headwall (Circ, Conc)	151.46	Free
AE1649-022_AS1549-042	AE1649-022	1117.1	AE1549-024	1103.76	Trapezoidal		1	1.5	0.035	0	0	None (,)	627.185	Free
AE1649-023_AE1649-022	AE1649-023	1117.4	AE1649-022	1117.1	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	31.958	Free
AE1649-024_AS1549-042	AE1549-024	1104.87	AS1549-042	1103.76	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	18.761	Free
AE1652-001_IN1752-028	AE1652-001	1110.6	IN1752-028	1107.51	Circular		1	1	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	73.289	Free
AE1653-024_IN1653-023	AE1653-024	1105.99	IN1653-023	1105.53	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	74.42	Free
AE1746-001_AE1846-003	AE1746-001	1086	AE1846-003	1063	Trapezoidal		1	0.5	0.027	0	0	0	1126.63	Free
AE1747-023_IN1647-039	AE1747-023	1078.64	IN1647-039	1078.53	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	29.723	Downhill Only
AE1750-026 Pipe	AE1750-026	1080.35	IN1750-017A	1077.6	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	173	Free
AE1750-027 Pipe	AE1750-027	1073.6	IN1750-017	1077.6	Circular		1	3	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	290	Free
AE1846-003_AS1847-021	AE1846-003	1063	AS1847-021	1061.15	Circular		1	3	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	57.007	Free
AE1946-011_AS1947-010	AE1946-011	1047	AS1947-010	1044.15	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	49.006	Free
AE1947-004_AE1947-006	WMPB_GW_BHR1	1016.35	AE1947-005	1014.81	Circular		2	3	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	93	Free
AE1951-006_AS1951-005	AE1951-006	1073.6	AS1951-005	1070.3	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	65.881	Free
AE1951-007_AS1951-005	AE1951-007	1072	AS1951-005	1069.55	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	18.115	Free
AE1952-003_AE1953-002	AE1952-003	1066.4	AE1953-002	1066.1	Special	Horizontal Ellipse	1	2.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	48	Free
AE1954-001_AE2054-001	AE1954-001	1075.14	AE2054-001	1074.27	Circular		1	1.25	0.024	0.2	0.5	Groove End with Headwall (Circ, Conc)	54.977	Free
AE2045-009_IN2045-004	AE2045-009	974.71	IN2045-004	974.71	Circular		1	1.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	36.372	Free
AE2048-001_AE2047-017	AE2048-001	986.84	WMPB_GW_DW5	986.1	Circular		1	5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	73.959	Free
AE2050-017_IN2050-016	AE2050-017	1028.51	IN2050-016	1027.92	Circular		1	2	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	17.002	Free
AE2054-001_AE2254-014	AE2054-001	1074.27	FARMRD_SW4	1064.73	Natural		1	0	0.027	0.2	0	Groove End with Headwall (Circ, Conc)	1200	Free
AE2054-001_AE2254-014.1	FARMRD_SW4	1064.73	AE2054-001_AE2254-014_JCT	1056.18	Natural		1	0	0.027	0.2	0	Groove End with Headwall (Circ, Conc)	875	Free
AE2056-023_SS2056-022	AE2056-023	1090.01	SS2056-022	1090	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	16	Free
AE2150-004_IN2250-030	AE2150-004	1001.08	IN2250-030	1000.82	Circular		1	2	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	25.843	Free
AE2150-022_AE2150-025	SMPB_GW_AAP	1006.1	SMPB_BW_AAC2	1001.6	Special	Horizontal Ellipse	2	4.41	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	130.015	Free
AE2156-063_AS2156-062	AE2156-063	1050	AS2156-062	1049.61	Special	Horizontal Ellipse	1	3.16	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	39	Free
AE2156-074_AE2156-075	AE2156-074	1063.54	AE2156-075	1055.46	Trapezoidal		1	2	0.035	0.1	0.25	0	186.402	Free
AE2156-075_IN2156-006	AE2156-075	1055.46	IN2156-006	1051.07	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	76.133	Free
AE2156-078_AS2156-077	AE2156-078	1061	AS2156-077	1054.9	Circular		1	2	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	42.002	Free
AE2157-018_AE2157-019	AE2157-018	1075.54	AE2157-019	1074.59	Circular		1	1.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	100.004	Free
AE2157-019_AE2156-074	AE2157-019	1074.59	AE2156-074	1063.54	Trapezoidal		1	1	0.035	0.2	0.1	Groove End with Headwall (Circ, Conc)	446.275	Free
AE2158-008_IN2158-007	AE2158-008	1067.55	IN2158-007	1067.55	Special	Horizontal Ellipse	1	2.833	0.013	0.2	0.05	Elliptical Tapered Inlet, Square Edges (Throat, Conc)	47.005	Free
AE2250-053_IN2250-051	AE2250-053	987.22	IN2250-051	987.08	Circular		1	3	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	32.639	Free
AE2250-055_IN2250-054	AE2250-055	986.4	IN2250-054	986.08	Circular		1	2	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	24.462	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AE2254-014_AS2254-015	AE2254-014	1049.11	AS2254-015	1048.53	Circular		1	4	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	91.59	Free
AE2255-033_TO_JCT_POND_OUT	AE2255-033	1049.08	JUNCTION_RIDGE_POND_OUT_JCT1	1043.5	Natural		1	0	0.013	0	0	None (,)	84.217	Free
AE2255-035_AE2255-033	AE2255-035	1049.91	AE2255-033	1049.08	Natural		1	0	0.013	0.1	1	0	7.878	Free
AE2256-010_AE2256-011	AE2256-010	1055.6	AE2256-011	1054.6	Circular		1	4.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	90.96	Free
AE2256-033_AE2256-083	AE2256-033	1051.5	AE2256-083	1051.36	Trapezoidal		1	1.5	0.035	0	0	None (,)	14.631	Free
AE2256-083_IN2256-080	AE2256-083	1051.36	IN2256-080	1050.05	Circular		1	2	0.013	0.05	0.25	0	80.807	Free
AE2349-026_AS2349-025	AE2349-026	988.3	AS2349-025	988.15	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	30.351	Free
AE2350-022_AS2349-008	EMPB_GW_NTL1	986	AS2349-008	981.8	Circular		1	6.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	176.445	Free
AE2350-025_AS2350-024	AE2350-025	987.38	AS2350-024	987.3	Circular		1	4	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	12	Free
AE2350-026_AE2350-027	AE2350-026	987.79	AE2350-027	987.4	Circular		1	4	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	77	Free
AE2351-002_TO_OSRBL_SERAMP	AE2351-002	1009.25	OSR_BL_SERAMP_US	999	Trapezoidal		1	1	0.035	0	0	None (,)	563.472	Free
AE2355-034_AE2455-015	EMPB_GW_STL1	1037.4	EMPB_GW_SHPR1	1035.9	Circular		1	5.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	154	Free
AE2356-034_AS2356-032	AE2356-034	1050.25	AS2356-032	1048.95	Circular		1	3	0.013	0.5	0.25	0	19.001	Free
AE2448-013_MI2448-017	MI2448-017	973.79	AE2448-013	973.6	Circular		1	2.5	0.013	0.25	1	0	26	Free
AE2450-022_IN2450-021	AE2450-022	997.4	IN2450-021	997.3	Circular		1	1.75	0.013	0.5	0.25	0	27.607	Free
AE2553-002_TO_GW	AE2553-002	1043.6	TAMARACK_TRAILS	1032	Trapezoidal		1	1	0.035	0	0	None (,)	700	Free
AE2553-002_TO_GW.1	TAMARACK_TRAILS	1032	EMPB_GW_NTL7	1016.57	Trapezoidal		1	1	0.035	0	0	None (,)	200	Free
AE2553-003_IN2553-005	AE2553-003	1045.84	IN2553-005	1045.6	Circular		1	1.5	0.013	0.5	0.05	0	22.905	Free
AS1547-003_AS1647-044	AS1547-003	1081.82	AS1647-044	1081.03	Circular		1	3	0.013	0.25	0.05	None (,)	156.905	Free
AS1547-018_IN1547-012	AS1547-018	1106.28	IN1547-012	1101.84	Circular		1	2	0.013	0.25	0.05	None (,)	137.473	Free
AS1547-023_IN1547-019	AS1547-023	1115.12	IN1547-019	1108.34	Circular		1	1.5	0.013	0.25	0.25	None (,)	95.884	Free
AS1547-029_IN1548-026	AS1547-029	1115.09	IN1548-026	1101.42	Circular		1	2	0.013	0.5	0.05	None (,)	241.396	Free
AS1547-032_AS1547-029	AS1547-032	1124.5	AS1547-029	1115.09	Circular		1	2	0.013	0.25	0.5	None (,)	160.745	Free
AS1548-014_IN1548-012	AS1548-014	1097.05	IN1548-012	1095.73	Circular		1	4.5	0.013	0.05	0.05	None (,)	179.162	Free
AS1548-031_IN1548-029	AS1548-031	1099.99	IN1548-029	1098.55	Circular		1	4	0.013	0.5	0.05	None (,)	142.71	Free
AS1548-036_AS1548-031	AS1548-036	1102.46	AS1548-031	1099.99	Circular		1	2	0.013	0.25	0.5	None (,)	97.973	Free
AS1548-038_AS1548-036	AS1548-038	1106.07	AS1548-036	1102.46	Circular		1	2	0.013	0.25	0.25	None (,)	98.043	Free
AS1548-039_AS1548-038	AS1548-039	1109.91	AS1548-038	1106.07	Circular		1	2	0.013	0.5	0.25	None (,)	85.617	Free
AS1548-048_AS1548-031	AS1548-048	1101.47	AS1548-031	1099.99	Circular		1	3.5	0.013	0.25	0.5	None (,)	196.245	Free
AS1549-001_MI1548-051	AS1549-001	1103.61	MI1548-051	1102.5	Circular		1	3.5	0.013	0.05	0.05	None (,)	209.008	Free
AS1549-002_AS1549-001	AS1549-002	1103.77	AS1549-001	1103.61	Circular		1	3.5	0.013	0.5	0.05	None (,)	34.652	Free
AS1549-010_AS1549-002	AS1549-010	1105.51	AS1549-002	1103.77	Circular		1	3	0.013	0.05	0.5	None (,)	242.196	Free
AS1549-014_MI1549-013	AS1549-014	1106.9	MI1549-013	1105.51	Circular		1	1.5	0.013	0.05	0.05	None (,)	42.002	Free
AS1549-032_AS1549-014	AS1549-032	1107.63	IN1549-024	1107.33	Circular		1	1.5	0.013	0.25	0.25	None (,)	27.912	Free
AS1549-033_AS1549-032	AS1549-033	1107.76	AS1549-032	1107.63	Circular		1	1.25	0.013	0.25	0.25	None (,)	32.03	Free
AS1549-034_AS1549-033	AS1549-034	1108.02	AS1549-033	1107.76	Circular		1	1.25	0.013	0.25	0.25	None (,)	78.377	Free
AS1549-042_AE1550-034	AS1549-042	1103.76	AE1550-034	1103.42	Special	Horizontal Ellipse	1	3.16	0.013	0.05	0.5	None (,)	67.927	Free
AS1550-004_IN1650-009	AS1550-004	1091.43	IN1650-009	1091.28	Circular		1	2	0.013	0.05	0.05	None (,)	51.548	Free
AS1550-006_AS1550-004	AS1550-006	1096.2	AS1550-004	1091.43	Circular		1	1	0.013	0.5	0.5	None (,)	253.327	Free
AS1550-008_AS1550-004	AS1550-008	1092.02	AS1550-004	1091.43	Circular		1	2	0.013	0.5	0.5	None (,)	199.021	Free
AS1550-009_AS1550-008	AS1550-009	1092.81	AS1550-008	1092.02	Circular		1	2	0.013	0.5	0.5	None (,)	264.423	Free
AS1550-010_AS1550-009	AS1550-010	1093.09	AS1550-009	1092.81	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.5	None (,)	94.342	Free
AS1647-002_IN1647-003	AS1647-002	1092.47	IN1647-003	1088.34	Circular		1	2	0.013	0.5	0.25	None (,)	179.848	Free
AS1647-006_MI1647-055	AS1647-006	1085.6	MI1647-055	1083.9	Circular		1	2.5	0.013	0.05	0.05	None (,)	188.374	Free
AS1647-018_IN1647-023	AS1647-018	1080.39	IN1647-023	1080.16	Circular		1	2.5	0.013	0.05	0.25	None (,)	42.852	Free
AS1647-024_AS1647-027	AS1647-024	1077.6	AS1647-027	1075.26	Circular		1	3	0.013	0.05	0.05	None (,)	350.037	Free
AS1647-027_AS1747-019	AS1647-027	1075.26	NEW_SAS_08_06_19	1074.86	Circular		1	3.5	0.013	0.05	0.05	None (,)	40.044	Free
AS1647-040_IN1647-039	AS1647-040	1078.7	IN1647-039	1078.53	Circular		1	1.5	0.013	0.25	0.25	None (,)	68.215	Free
AS1647-044_AS1647-048	AS1647-044	1081.03	AS1647-048	1080.25	Circular		1	3	0.013	0.05	0.5	None (,)	54.489	Free
AS1647-048_AS1648-014	AS1647-048	1080.25	WINDINGWAY_BLIND_CON	1078.39	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.05	None (,)	232.94	Free
AS1647-049_IN1647-050	AS1647-049	1084.11	IN1647-050	1083.6	Circular		1	3	0.013	0.25	0.05	None (,)	101.2	Free
AS1647-052_AS1647-059	AS1647-052	1081.79	AS1647-059	1080.79	Circular		1	4.5	0.013	0.05	0.25	None (,)	127.648	Free
AS1647-056_AS1647-052	AS1647-056	1083.7	AS1647-052	1081.79	Circular		1	3	0.013	0.25	0.05	None (,)	78.763	Free
AS1647-059_AS1647-048	AS1647-059	1080.79	AS1647-048	1080.25	Circular		1	4.5	0.013	0.25	0.25	None (,)	103.918	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AS1647-062_AS1647-049	AS1647-062	1084.33	AS1647-049	1084.11	Circular		1	3	0.013	0.05	0.25	None (,)	42.004	Free
AS1648-003_AS1648-006	AS1648-003	1079.02	AS1648-006	1076.82	Circular		1	1.5	0.013	0.5	0.5	None (,)	23.056	Free
AS1648-006_AS1648-022	AS1648-006	1076.82	AS1648-022	1074.51	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.05	None (,)	464.578	Free
AS1648-008_AS1648-009	AS1648-008	1078.82	AS1648-009	1078.24	Circular		1	3.5	0.013	0.25	0.05	None (,)	116.269	Free
AS1648-009_AS1648-014	AS1648-009	1078.24	AS1648-014	1078.14	Circular		1	3.5	0.013	0.05	0.5	None (,)	29.003	Free
AS1648-014_AS1648-006	AS1648-014	1078.14	AS1648-006	1076.82	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.25	None (,)	258.686	Free
AS1648-015_AS1648-014	AS1648-015	1080.56	AS1648-014	1078.14	Circular		1	1.5	0.013	0.5	0.5	None (,)	55.818	Free
AS1648-022_TP1648-049	AS1648-022	1074.51	TP1648-049	1073.99	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	None (,)	105.155	Free
AS1648-043_IN1648-044	AS1648-043	1084.01	IN1648-044	1083.33	Circular		1	1.75	0.013	0.25	0.05	None (,)	49.727	Free
AS1650-003_IN1750-036	AS1650-003	1086.84	IN1750-036	1086.6	Circular		1	2	0.013	0.5	0.5	None (,)	15.469	Free
AS1650-004_AS1650-003	AS1650-004	1087.51	AS1650-003	1086.84	Circular		1	2	0.013	0.5	0.5	None (,)	157.006	Free
AS1650-005_AS1650-004	AS1650-005	1087.56	AS1650-004	1087.51	Circular		1	2	0.013	0.5	0.5	None (,)	28.001	Free
AS1650-006_AS1650-005	AS1650-006	1088.51	AS1650-005	1087.56	Circular		1	2	0.013	0.05	0.25	None (,)	310.238	Free
AS1650-007_AS1650-006	AS1650-007	1089.46	AS1650-006	1088.51	Circular		1	2	0.013	0.05	0.05	None (,)	323.329	Free
AS1650-008_AS1650-007	AS1650-008	1090.41	AS1650-007	1089.46	Circular		1	2	0.013	0.05	0.05	None (,)	321.069	Free
AS1653-003_AS1753-054	AS1653-003	1092.03	AS1753-054	1091.84	Circular		1	2.5	0.013	0.5	0.05	0	38.362	Free
AS1653-005_AE1653-006	AS1653-005	1095.03	AE1653-006	1094.5	Circular		1	3	0.013	0.25	1	0	79	Free
AS1747-002_AS1748-014	AS1747-002	1072.9	AS1748-014	1072.36	Circular		1	3.5	0.013	0.25	0.25	None (,)	177.47	Free
AS1747-004_AS1747-002	AS1747-004	1077.72	AS1747-002	1072.9	Circular		1	2	0.013	0.05	0.5	None (,)	44.733	Free
AS1747-007_AS1747-004	AS1747-007	1085.87	AS1747-004	1077.72	Circular		1	1.75	0.013	0.25	0.05	None (,)	276.033	Free
AS1747-010_AS1747-007	AS1747-010	1086.72	AS1747-007	1085.87	Circular		1	1.75	0.013	0.5	0.5	None (,)	282.03	Free
AS1747-019_AS1747-002	AS1747-019	1073.05	AS1747-002	1072.9	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	None (,)	48.107	Free
AS1748-003_AE1748-006	AS1748-003	1071.9	WW_TO_POND_BLIND_TAP	1071.77	Special	Horizontal Ellipse	1	6.33	0.013	0.25	0.05	None (,)	23.314	Free
AS1748-007_AS1748-003	AS1748-007	1072.1	AS1748-003	1071.9	Special	Horizontal Ellipse	1	6.33	0.013	0.05	0.25	None (,)	40.004	Free
AS1748-011_AS1748-003	AS1748-011	1072.06	AS1748-003	1071.9	Special	Horizontal Ellipse	1	5	0.013	0.25	0.5	None (,)	57.482	Free
AS1748-014_AS1748-011	AS1748-014	1072.36	AS1748-011	1072.06	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	None (,)	92.506	Free
AS1748-024_AS1748-003	AS1748-024	1075.18	AS1748-003	1071.9	Circular		1	2	0.013	0.05	0.5	None (,)	257.932	Free
AS1750-024_IN1850-003	AS1750-024	1076.04	IN1850-003	1073.62	Circular		1	3	0.013	0.05	0.5	None (,)	485.052	Free
AS1751-010_IN1751-016	AS1751-010	1086.67	IN1751-016	1084.8	Circular		1	2.5	0.013	0.05	0.05	None (,)	376.631	Free
AS1752-001_IN1751-025	AS1752-001	1089.68	IN1751-025	1088.29	Circular		1	2	0.013	0.05	0.05	None (,)	278.032	Free
AS1753-003_IN1753-040	AS1753-003	1087.21	IN1753-040	1085.59	Circular		1	1.75	0.013	0.05	0.05	0	58.319	Free
AS1753-004_AS1753-003	AS1753-004	1088.72	AS1753-003	1087.21	Circular		1	1.75	0.013	0.05	0.05	0	305.454	Free
AS1753-005_AS1753-004	AS1753-005	1090.2	AS1753-004	1088.72	Circular		1	1.75	0.013	0.25	0.05	0	261.402	Free
AS1753-044_IN1753-006	AS1753-044	1091.5	IN1753-006	1090.5	Circular		1	1.5	0.013	0.05	0.25	0	140.006	Free
AS1753-045_AE1753-046	AS1753-045	1087.65	AE1753-046	1086	Special	Horizontal Ellipse	1	4.41	0.013	0.5	1	0	29	Free
AS1753-045_AS1853-004	AS1753-045	1087.65	AS1853-004	1086.64	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	292.641	Free
AS1753-048_AS1754-009	AS1753-048	1091.42	AS1754-009	1090.59	Special	Horizontal Ellipse	1	5.66	0.013	0.5	0.5	0	279.397	Free
AS1753-054_AS1753-048	AS1753-054	1091.84	AS1753-048	1091.42	Special	Horizontal Ellipse	1	3.16	0.013	0.05	0.05	0	24.507	Free
AS1754-002_AS1753-044	AS1754-002	1093.1	AS1753-044	1091.5	Circular		1	1.5	0.013	0.5	0.05	0	113.032	Free
AS1754-007_MI1753-047	AS1754-007	1088.58	MI1753-047	1088	Circular		1	4.5	0.013	0.5	0.5	0	111.811	Free
AS1754-008_AS1754-007	AS1754-008	1090.28	AS1754-007	1088.58	Circular		1	4.5	0.013	0.05	0.5	0	568.022	Free
AS1754-009_AS1754-008	AS1754-009	1090.59	AS1754-008	1090.28	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.05	0	95.004	Free
AS1754-010_IN1753-051	AS1754-010	1097	IN1753-051	1085.59	Circular		1	1.5	0.013	0.05	0.05	0	151.08	Free
AS1754-014_AS1754-007	AS1754-014	1098.25	AS1754-007	1091.08	Circular		1	2	0.013	0.05	0.05	0	67.003	Free
AS1754-015_AS1754-014	AS1754-015	1105.38	AS1754-014	1098.25	Circular		1	2	0.013	0.05	0.05	0	115.005	Free
AS1754-018_AS1754-015	AS1754-018	1115.5	AS1754-015	1105.38	Circular		1	2	0.013	0.05	0.05	0	146.5	Free
AS1754-019_AS1754-018	AS1754-019	1115.7	AS1754-018	1115.5	Circular		1	2	0.013	0.5	0.05	0	38.001	Free
AS1754-028_IN1754-027	AS1754-028	1104.6	IN1754-027	1104	Circular		1	2	0.013	0.5	0.25	0	111.116	Free
AS1847-002_IN1847-003	AS1847-002	1073.63	IN1847-003	1069	Circular		1	1.25	0.013	0.05	0.05	0	246.557	Free
AS1847-009_TE1848-012	AS1847-009	1031.14	TE1848-012	1029.19	Circular		1	1.5	0.013	0.05	0.05	0	25.396	Free
AS1847-018_AE1847-019	AS1847-018	1060.12	AE1847-019	1055.98	Special	Horizontal Ellipse	1	1.91	0.013	0.5	0.5	0	190	Free
AS1847-021_AE1847-020	AS1847-021	1061.15	AE1847-020	1059.87	Circular		1	4	0.013	0.5	0.5	0	55.007	Free
AS1847-022_IN1847-025	AS1847-022	1064.09	IN1847-025	1062.91	Circular		1	1.75	0.013	0.05	0.05	0	54.671	Free
AS1848-003_AS1848-002	AS1848-003	1078.32	AS1847-002	1073.63	Circular		1	1.25	0.013	0.05	0.05	0	251.253	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AS1848-013_IN1848-019	AS1848-013	1068.56	IN1848-019	1057.87	Circular		1	2	0.013	0.25	0.05	0	202.577	Free
AS1848-018_AS1948-012	AS1848-018	1057.13	AS1948-012	1053.75	Circular		1	2	0.013	0.05	0.25	0	93.116	Free
AS1848-027_IN1848-026	AS1848-027	1075.84	IN1848-026	1075.69	Circular		1	2	0.013	0.05	0.25	None (,)	33.871	Free
AS1849-001_MI1848-034	AS1849-001	1069.73	MI1848-034	1069.22	Circular		1	2	0.013	0.05	0.05	None (,)	161.835	Free
AS1849-008_IN1849-005	AS1849-008	1072.13	IN1849-005	1072.11	Circular		1	2	0.013	0.5	0.05	None (,)	5.727	Free
AS1849-009_AS1849-008	AS1849-009	1073.11	AS1849-008	1072.13	Circular		1	2	0.013	0.05	0.5	0	326.036	Free
AS1849-011_IN1849-010	AS1849-011	1075.08	IN1849-010	1074.09	Circular		1	2	0.013	0.25	0.25	None (,)	198.481	Free
AS1849-013_AS1849-001	AS1849-013	1071.206	AS1849-013.1	1070.88	Circular		1	1.5	0.02	1	0.5	None (,)	74	Free
AS1849-013_AS1849-001.1	Node1910	1070.339	AS1849-001	1069.73	Circular		1	2	0.013	0.05	0.05	None (,)	214	Free
AS1849-023_AS1849-048	AS1849-023	1072.48	AS1849-048	1071.98	Circular		1	2	0.013	0.05	0.05	None (,)	68.09	Free
AS1849-026_AS1849-058	AS1849-026	1074.65	AS1849-058	1073.28	Circular		1	2	0.013	0.5	0.05	None (,)	274.849	Free
AS1849-047_IN1849-018	AS1849-047	1071.93	IN1849-018	1071.34	Circular		1	2	0.013	0.05	0.5	None (,)	118.012	Free
AS1849-048_AS1849-047	AS1849-048	1071.98	AS1849-047	1071.93	Circular		1	2	0.013	0.05	0.05	None (,)	11.892	Free
AS1849-053_AS1849-023	AS1849-053	1072.6	AS1849-023	1072.48	Circular		1	2	0.013	0.05	0.05	None (,)	49.05	Free
AS1849-058_MI1849-055	AS1849-058	1073.28	MI1849-055	1072.7	Circular		1	2	0.013	0.05	0.05	None (,)	141.135	Free
AS1849-059_AS1849-026	AS1849-059	1074.75	AS1849-026	1074.65	Circular		1	1.25	0.013	0.05	0.5	None (,)	10.448	Free
AS1853-004_AE1853-005	AS1853-004	1086.64	FARGO_COBALT_LEVEL_SPREADER	1086.2	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.5	0	130.074	Free
AS1946-002_MI2046-007	AS1946-002	1012.75	MI2046-007	1012.47	Circular		1	2	0.013	0.5	0.05	0	37.789	Free
AS1946-004_AS1946-002	AS1946-004	1014	AS1946-002	1012.75	Circular		1	1.75	0.013	0.5	0.5	0	65.166	Free
AS1947-009_IN1947-008	AS1947-009	1043.84	IN1947-008	1026.4	Circular		1	3	0.013	0.5	0.25	0	255.03	Free
AS1947-010_AS1947-009	AS1947-010	1044.15	AS1947-009	1043.84	Circular		1	3	0.013	2	0.5	0	37.07	Free
AS1947-017_IN1947-019	AS1947-017	1016.41	IN1947-019	1015.35	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	209.895	Free
AS1947-029_AS1947-010	AS1947-029	1047.68	AS1947-010	1044.15	Circular		1	1.5	0.013	2	0.05	0	106.777	Free
AS1948-004_IN1948-005	AS1948-004	1016.45	IN1948-005	1012.1	Circular		1	3	0.013	0.25	0.05	0	134.153	Free
AS1948-012_AS1948-013	AS1948-012	1053.75	AS1948-013	1037.1	Circular		1	2	0.013	0.25	0.25	0	160.733	Free
AS1948-013_IN1948-016	AS1948-013	1037.1	IN1948-016	1023.78	Circular		1	2	0.013	0.25	0.25	0	185.8	Free
AS1948-017_AE1947-002	AS1948-017	1016.5	AE1947-002	1014.35	Circular		1	3	0.013	0.05	0.5	0	191	Free
AS1949-007_AS1949-029	AS1949-007	1032.43	AS1949-029	1031.46	Circular		1	1.75	0.013	0.5	0.05	0	131.662	Free
AS1949-009_IN1948-011	AS1949-009	1030.11	IN1948-011	1019.3	Circular		1	2.5	0.013	0.5	0.05	0	181.311	Free
AS1949-015_AS1849-011	AS1949-015	1075.58	AS1849-011	1075.08	Circular		1	2	0.013	0.25	0.25	None (,)	99.594	Free
AS1949-019_AS1949-015	AS1949-019	1075.8	AS1949-015	1075.58	Circular		1	2	0.013	0.5	0.25	None (,)	140.548	Free
AS1949-029_IN1949-004	AS1949-029	1031.46	IN1949-004	1031.46	Circular		1	1.75	0.013	0.05	0.25	0	48.376	Free
AS1949-032_IN1949-031	AS1949-032	1077.03	IN1949-031	1076.28	Circular		1	1.5	0.013	0.25	0.25	None (,)	76.053	Free
AS1949-033_AS1949-032	AS1949-033	1079.42	AS1949-032	1077.03	Circular		1	1.5	0.013	0.25	0.25	None (,)	238.949	Free
AS1949-035_IN1949-011	AS1949-035	1052.17	IN1949-011	1048.26	Circular		1	1.5	0.013	0.25	0.25	0	74.92	Free
AS1949-041_IN1949-039	AS1949-041	1072.29	IN1949-039	1067.6	Circular		1	1.5	0.013	0.05	0.05	0	276.186	Free
AS1951-005_IN2051-066	AS1951-005	1069.55	IN2051-066	1069.3	Circular		1	2.25	0.013	0.5	0.05	0	48.451	Free
AS2045-006_AS2045-007	AS2045-006	973.47	AS2045-007	969.45	Circular		1	1.75	0.013	0.5	0.15	None (,)	152.281	Free
AS2045-007_AS2145-001	AS2045-007	969.45	AS2145-001	965.1	Circular		1	2	0.013	0.05	0.05	None (,)	369.364	Free
AS2046-010_IN2046-001	AS2046-010	985.3	IN2046-001	985.3	Circular		1	2	0.013	0.5	0.5	0	8.045	Free
AS2046-011_AS2046-010	AS2046-011	986.02	AS2046-010	985.3	Circular		1	2	0.013	0.5	0.5	0	143.999	Free
AS2047-002_AS2047-006	AS2047-002	1009	AS2047-006	992.16	Circular		1	2.5	0.013	0.5	0.05	0	314.425	Free
AS2047-003_AS2047-002	AS2047-003	1010	AS2047-002	1009	Circular		1	2	0.013	0.5	0.5	0	201.285	Free
AS2047-006_AS2047-007	AS2047-006	992.16	AS2047-007	983.36	Circular		1	2.5	0.013	0.05	0.05	0	286.251	Free
AS2047-007_AS2047-008	AS2047-007	983.36	AS2047-008	983.03	Circular		1	3	0.013	0.05	0.05	None (,)	87.203	Free
AS2047-008_AS2047-011	AS2047-008	983.03	AS2047-011	982.4	Circular		1	3	0.013	0.5	0.5	0	152.932	Free
AS2047-011_AE2047-016	AS2047-011	982.4	AE2047-016	979.6	Circular		1	3	0.013	0.5	0.5	0	461.551	Free
AS2048-004_AE2047-018	AS2048-004	988.48	WMPB_GW_DW5	987.67	Circular		1	3	0.013	0.5	0.5	0	41.66	Free
AS2048-005_AS2048-004	AS2048-005	989.47	AS2048-004	988.48	Circular		1	3	0.013	0.05	0.5	0	212.596	Free
AS2048-010_AS2048-005	AS2048-010	990.43	AS2048-005	989.47	Circular		1	3	0.013	0.05	0.05	0	181.417	Free
AS2049-001_AS2049-005	AS2049-001	1025.6	AS2049-005	1010.2	Circular		1	1.75	0.013	0.5	0.25	0	348.509	Free
AS2049-002_AS2149-002	AS2049-002	1005.7	AS2149-002	1003.18	Circular		1	2.25	0.013	0.25	0.25	0	145.093	Free
AS2049-005_AS2049-002	AS2049-005	1010.2	AS2049-002	1005.7	Circular		1	1.75	0.013	0.25	0.25	0	197.307	Free
AS2050-004_AS2150-027	AS2050-004	1026.37	AS2150-027	1019.65	Circular		1	2.5	0.013	0.05	0.05	0	352.344	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AS2050-012_AS2050-004	AS2050-012	1027.11	AS2050-004	1026.37	Circular		1	2	0.013	0.05	0.05	0	123.032	Free
AS2050-015_AS2050-012	AS2050-015	1027.72	AS2050-012	1027.11	Circular		1	2	0.013	0.05	0.05	0	122.013	Free
AS2050-018_AS2050-015	AS2050-018	1040.59	AS2050-015	1027.72	Circular		1	2	0.013	0.05	0.05	0	285.926	Free
AS2050-024_AS2050-018	AS2050-024	1066.5	AS2050-018	1040.59	Circular		1	2	0.013	0.5	0.05	0	316.831	Free
AS2051-005_IN2051-006	AS2051-005	1055.6	IN2051-006	1054.73	Circular		1	4	0.013	0.05	0.05	0	131.397	Free
AS2051-023_MI2051-022	AS2051-023	1057.34	MI2051-022	1056.6	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.05	0	138.162	Free
AS2051-029_IN2051-026	AS2051-029	1057.93	IN2051-026	1057.47	Special	Horizontal Ellipse	1	4.41	0.013	0.25	0.05	0	92.177	Free
AS2051-038_AS2051-029	AS2051-038	1058.28	AS2051-029	1057.93	Special	Horizontal Ellipse	1	4.41	0.013	0.25	0.25	0	69.441	Free
AS2051-041_IN2051-039	AS2051-041	1066.85	IN2051-039	1062.56	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.25	0	225.762	Free
AS2051-051_IN2051-042	AS2051-051	1069.1	IN2051-042	1068.05	Circular		1	2.25	0.013	0.05	0.5	0	181.856	Free
AS2051-063_MI2051-062	AS2051-063	1069.67	MI2051-062	1068.99	Circular		1	2.25	0.013	0.05	0.05	0	32.935	Free
AS2052-006_MI2052-021	AS2052-006	1062.34	MI2052-021	1061.81	Circular		1	1.5	0.013	0.25	0.05	0	66.621	Free
AS2052-022_IN2052-026	AS2052-022	1061.52	IN2052-026	1059.33	Circular		1	2	0.013	0.25	0.25	0	280.632	Free
AS2056-007_AE2056-008	AS2056-007	1095.84	AE2056-008	1092	Circular		1	2	0.013	0.5	1	0	56	Free
AS2056-031_AS2156-036	AS2056-031	1068.12	AS2156-036	1062.55	Circular		1	1.5	0.013	0.05	0.05	0	158.971	Free
AS2056-044_AS2056-045	AS2056-044	1078.3	AS2056-045	1066.26	Special	Horizontal Ellipse	1	5	0.013	0.05	0.25	0	265.028	Free
AS2056-045_AS2156-040	AS2056-045	1066.26	AS2156-040	1058.76	Special	Horizontal Ellipse	1	5	0.013	0.15	0.15	0	185.464	Free
AS2145-001_TP2145-007	AS2145-001	965.1	TP2145-007	961.11	Circular		1	2	0.013	0.05	0.6	None (,)	99.499	Free
AS2145-011_IN2145-010	AS2145-011	971.23	IN2145-010	970.05	Circular		1	1.5	0.013	0.25	0.25	None (,)	61.128	Free
AS2146-003_AE2146-004	AS2146-003	970.6	OSTP_POND_SYSTEM_JCT_6	965.6	Circular		1	1.75	0.013	0.05	0.05	None (,)	33.759	Free
AS2147-001_AS2147-006	AS2147-001	970.76	AS2147-006	969.77	Circular		1	3	0.013	0.25	0.25	0	164.526	Free
AS2147-006_AS2147-007	AS2147-006	969.77	AS2147-007	968.62	Circular		1	3	0.013	0.25	0.05	0	235.519	Free
AS2147-007_AE2147-012	AS2147-007	968.62	AE2147-012	968.2	Circular		1	3	0.013	0.5	1	0	60.941	Free
AS2147-013_AE2147-014	AS2147-013	971.7	WMPB_GW_DW2	971.7	Circular		1	2	0.011	0.5	0.5	0	94.832	Free
AS2147-015_AE2147-016	AS2147-015	977.08	WMPB_GW_DW3	976.98	Circular		1	1.5	0.011	0.5	0.5	0	91.01	Free
AS2148-004_AS2147-001	AS2148-004	972.3	AS2147-001	970.76	Circular		1	2.5	0.013	0.25	0.25	0	193.656	Free
AS2148-007_AS2148-004	AS2148-007	976.6	AS2148-004	972.3	Circular		1	2	0.013	0.5	0.25	0	432.627	Free
AS2148-009_AS2148-010	AS2148-009	994.57	AS2148-010	992.63	Circular		1	2.5	0.013	0.25	0.25	0	249.651	Free
AS2148-010_AS2048-010	AS2148-010	992.63	AS2048-010	990.43	Circular		1	2.5	0.013	0.25	0.05	0	347.835	Free
AS2149-001_AS2148-009	AS2149-001	998.83	AS2148-009	994.57	Circular		1	2.5	0.013	0.5	0.25	0	248.358	Free
AS2149-002_AS2149-001	AS2149-002	1003.18	AS2149-001	998.83	Circular		1	2.25	0.013	0.25	0.5	0	133.589	Free
AS2150-012_AS2150-014	AS2150-012	1007.29	AS2150-014	1003.41	Circular		1	4	0.013	0.05	0.05	0	339.863	Free
AS2150-014_AS2150-015	AS2150-014	1003.41	AS2150-015	1004.03	Circular		1	4	0.013	0.05	0.05	0	21.183	Free
AS2150-015_IN2150-044	AS2150-015	1004.03	IN2150-044	998.04	Circular		1	4	0.013	0.05	0.05	0	279.123	Free
AS2150-027_IN2150-009	AS2150-027	1019.65	IN2150-009	1013.42	Circular		1	2.5	0.013	0.05	0.05	0	49.317	Free
AS2150-032_AS2150-012	AS2150-032	1008.36	AS2150-012	1007.29	Circular		1	3.5	0.013	0.05	0.05	0	58.333	Free
AS2151-003_AS2151-004	AS2151-003	1049.6	AS2151-004	1049.15	Circular		1	3	0.013	0.05	0.5	0	90.933	Free
AS2151-004_AS2151-009	AS2151-004	1049.15	AS2151-009	1044.55	Circular		1	3	0.013	0.5	0.5	0	350.382	Free
AS2151-009_AS2151-010	AS2151-009	1044.55	AS2151-010	1026.8	Circular		1	3	0.013	0.5	0.25	0	157.644	Free
AS2151-010_AE2151-020	AS2151-010	1026.8	AE2151-020	1017.35	Circular		1	3	0.013	0.25	1	0	75	Free
AS2151-029_AE2151-030	AS2151-029	1018.14	AE2151-030	1018	Circular		1	3	0.013	0.5	1	0	83	Free
AS2152-005_AS2152-008	AS2152-005	1055.11	AS2152-008	1054.16	Circular		1	1.75	0.013	0.5	0.5	0	317.086	Free
AS2152-008_TE2152-009	AS2152-008	1054.16	TE2152-009	1053.85	Circular		1	2.25	0.013	0.5	0.05	0	75.569	Free
AS2152-010_AS2152-015	AS2152-010	1053.02	AS2152-015	1052.31	Circular		1	3	0.013	0.05	0.05	0	185.832	Free
AS2152-015_AS2152-022	AS2152-015	1052.31	AS2152-022	1050.68	Circular		1	3	0.013	0.05	0.05	0	322.254	Free
AS2152-022_AS2151-003	AS2152-022	1050.68	AS2151-003	1049.6	Circular		1	3	0.013	0.05	0.05	0	214.251	Free
AS2152-023_TE2152-009	AS2152-023	1053.83	TE2152-009	1053.85	Circular		1	1.75	0.013	0.5	0.5	0	49.546	Free
AS2156-017_IN2156-016	AS2156-017	1051.03	IN2156-016	1050.87	Circular		1	2	0.013	0.5	0.05	0	12.002	Free
AS2156-020_AS2156-017	AS2156-020	1054	AS2156-017	1051.03	Circular		1	2	0.013	0.05	0.5	0	195.18	Free
AS2156-028_AS2156-020	AS2156-028	1057.29	AS2156-020	1054	Circular		1	2	0.013	0.05	0.05	0	326.289	Free
AS2156-036_AS2156-028	AS2156-036	1062.55	AS2156-028	1057.29	Circular		1	2	0.013	0.15	0.15	0	372.39	Free
AS2156-040_AS2156-041	AS2156-040	1058.76	AS2156-041	1053.41	Special	Horizontal Ellipse	1	5	0.013	0.15	0.15	0	349.44	Free
AS2156-041_AS2156-042	AS2156-041	1053.41	AS2156-042	1052.35	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	0	105.011	Free
AS2156-042_AS2156-043	AS2156-042	1052.35	AS2156-043	1049.42	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	264.396	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AS2156-043_AS2156-044	AS2156-043	1049.42	AS2156-044	1047.17	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	232.857	Free
AS2156-044_AS2256-036	AS2156-044	1047.17	AS2256-036	1046.59	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	416.44	Free
AS2156-062_IN2156-061	AS2156-062	1049.61	IN2156-061	1047.77	Special	Horizontal Ellipse	1	3.16	0.013	0.25	0.05	0	85.985	Free
AS2156-077_AS2156-041	AS2156-077	1054.9	AS2156-041	1053.41	Circular		1	2	0.013	0.05	0.05	None (,)	30.594	Free
AS2245-003_TO2244-001	AS2245-003	953.57	TO_MIDDLETON_SS	951.67	Circular		1	2	0.013	0.25	0.05	None (,)	73.936	Free
AS2245-004_AS2245-003	AS2245-004	958.38	AS2245-003	953.57	Circular		1	2.25	0.013	0.05	0.25	None (,)	187.253	Free
AS2245-005_AS2245-004	AS2245-005	958.4	AS2245-004	958.38	Circular		1	2.25	0.013	0.05	0.05	None (,)	123.371	Free
AS2245-012_AS2245-005	AS2245-012	965.9	AS2245-005	958.4	Circular		1	2	0.013	0.25	0.05	None (,)	325.011	Free
AS2247-001_AS2247-005	AS2247-001	966.22	AS2247-005	965.78	Circular		1	3.5	0.013	0.5	0.25	None (,)	230.248	Free
AS2247-005_AS2247-006	AS2247-005	965.78	AS2247-006	965.34	Circular		1	3.5	0.013	0.25	0.25	None (,)	199.575	Free
AS2247-006_AE2247-016	AS2247-006	965.34	EMPB_GW_FD1	965.25	Circular		1	3.5	0.013	0.25	0.5	0	33.237	Free
AS2248-001_IN2248-003	IN2248-001	970.25	IN2248-003	968.1	Circular		1	2.5	0.013	0.05	0.05	0	330	Free
AS2248-004_AS2247-001	AS2248-004	967.52	AS2247-001	966.22	Circular		1	3	0.013	0.25	0.5	None (,)	226.504	Free
AS2249-004_AS2249-005	AS2249-004	992.98	AS2249-005	991.84	Circular		1	4	0.013	0.25	0.25	0	74.698	Free
AS2249-005_AS2249-006	AS2249-005	991.84	AS2249-006	988.26	Circular		1	4	0.013	0.25	0.05	0	89.275	Free
AS2249-006_AE2249-007	AS2249-006	988.26	EMPB_GW_OSR1	985.35	Special	Horizontal Ellipse	1	5	0.013	0.05	0.5	0	418.678	Free
AS2250-006_AS2250-020	AS2250-006	993.31	AS2250-020	991.68	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.5	0	25.433	Free
AS2250-016_TP2250-010	AS2250-016	997.91	TP2250-010	997.35	Circular		1	2.5	0.013	0.05	0.5	0	33.571	Free
AS2250-019_AS2250-020	AS2250-019	992.93	AS2250-020	991.68	Rectangular		1	4	0.013	0.05	0.05	0	18.459	Free
AS2250-020_IN2250-044	AS2250-020	991.68	IN2250-044	991.67	Rectangular		1	4	0.013	0.05	0.05	0	106.51	Free
AS2250-021_AS2250-045	AS2250-021	990.21	AS2250-045	987.79	Rectangular		1	4	0.013	0.05	0.5	0	251.623	Free
AS2250-031_AS2250-032	AS2250-031	1009.91	AS2250-032	1008	Circular		1	3	0.013	0.5	0.05	0	112.012	Free
AS2250-032_AS2250-033	AS2250-032	1008	AS2250-033	1006.78	Circular		1	3	0.013	0.05	0.05	0	64.007	Free
AS2250-033_AS2250-034	AS2250-033	1006.78	AS2250-034	1003.85	Circular		1	3	0.013	0.05	0.5	0	133.017	Free
AS2250-034_AS2250-035	AS2250-034	1003.85	AS2250-035	999.88	Circular		1	3	0.013	0.5	0.05	0	203.02	Free
AS2250-035_AS2250-036	AS2250-035	999.88	AS2250-036	998.26	Circular		1	3	0.013	0.05	0.25	0	102.011	Free
AS2250-036_AS2250-037	AS2250-036	998.26	AS2250-037	997.39	Circular		1	3	0.013	0.25	0.25	0	43.005	Free
AS2250-037_AS2250-038	AS2250-037	997.39	AS2250-038	994.6	Circular		1	3	0.013	0.25	0.25	0	98.035	Free
AS2250-038_AS2250-006	AS2250-038	994.6	AS2250-006	993.31	Circular		1	3	0.013	0.25	0.05	0	220	Free
AS2250-045_DT2249-014	AS2250-045	987.79	EMPB_GW_OSR1	985.29	Rectangular		1	4	0.013	0.5	0.5	0	310.299	Free
AS2251-007_AS2251-008	AS2251-007	1025	AS2251-008	1024.72	Circular		1	2	0.013	0.25	0.5	0	40.152	Free
AS2251-008_AS2251-034	AS2251-008	1024.72	AS2251-034	1019.11	Circular		1	3	0.013	0.05	0.5	0	214.561	Free
AS2251-010_AS2251-008	AS2251-010	1028.1	AS2251-008	1024.72	Circular		1	2.5	0.013	0.05	0.05	0	155.851	Free
AS2251-018_AS2251-021	AS2251-018	1038.5	AS2251-021	1035.17	Circular		1	1.75	0.013	0.5	0.25	0	200.942	Free
AS2251-021_AS2251-022	AS2251-021	1035.17	AS2251-022	1034.87	Circular		1	1.75	0.013	0.25	0.25	0	38.316	Free
AS2251-022_TP2251-032	AS2251-022	1034.87	TP2251-032	1027.8	Circular		1	1.75	0.013	0.25	0.05	0	286.033	Free
AS2251-031_AS2250-031	AS2251-031	1013.75	AS2250-031	1009.91	Circular		1	3	0.013	0.25	0.5	0	206.023	Free
AS2251-035_AS2151-029	AS2251-035	1019.03	AS2151-029	1018.14	Circular		1	3	0.013	0.05	0.25	0	538.057	Free
AS2251-035_AS2251-034	AS2251-034	1019.11	AS2251-035	1019.03	Special	Horizontal Ellipse	1	3.75	0.013	0.5	0.05	0	51.005	Free
AS2252-008_IN2252-009	AS2252-008	1048.9	IN2252-009	1037.24	Circular		1	1.75	0.013	0.5	0.05	0	380.932	Free
AS2253-012_AS2253-018	AS2253-012	1054.89	AS2253-018	1054.04	Circular		1	2	0.013	0.5	0.05	0	122.822	Free
AS2253-013_AS2253-018	AS2253-013	1054.44	AS2253-018	1054.04	Circular		1	1.75	0.013	0.05	0.5	0	65.984	Free
AS2253-015_AS2253-013	AS2253-015	1055.42	AS2253-013	1054.44	Circular		1	1.75	0.013	0.05	0.05	0	154.257	Free
AS2253-016_AS2253-015	AS2253-016	1056.9	AS2253-015	1055.42	Circular		1	1.75	0.013	0.05	0.05	0	300.064	Free
AS2253-017_AS2253-016	AS2253-017	1057.5	AS2253-016	1056.9	Circular		1	1.5	0.013	0.5	0.05	0	112.263	Free
AS2253-018_AS2254-004	AS2253-018	1054.04	AS2254-004	1053.27	Circular		1	2	0.013	0.05	0.05	0	156.074	Free
AS2254-004_AS2254-005	AS2254-004	1053.27	AS2254-005	1052.66	Circular		1	2	0.013	0.05	0.05	0	126.098	Free
AS2254-005_IN2254-012	AS2254-005	1052.66	IN2254-012	1048.64	Circular		1	2.25	0.013	0.05	0.05	0	357.354	Free
AS2254-013_AS2254-016	AS2254-013	1048.92	AS2254-016	1047.78	Circular		1	4.5	0.013	0.05	0.25	0	238.017	Free
AS2254-013_IN2254-009	AS2254-013	1048.92	IN2254-009	1048.77	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	0	21.384	Free
AS2254-015_IN2254-021	AS2254-015	1048.53	IN2254-021	1048.3	Circular		1	4.5	0.013	0.05	0.05	0	77.206	Free
AS2254-016_AS2254-017	AS2254-016	1047.78	AS2254-017	1046.71	Circular		1	4.5	0.013	0.25	0.05	0	216.103	Free
AS2254-017_IN2255-001	AS2254-017	1046.71	IN2255-001	1045.58	Circular		1	4.5	0.013	0.05	0.25	0	227.691	Free
AS2254-024_AS2255-008	AS2254-024	1047.55	AS2255-008	1046.82	Circular		1	4.5	0.013	0.05	0.05	0	243.438	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AS2255-006_AE2255-005	AS2255-006	1045.31	AE2255-005	1043.6	Circular		1	4.5	0.013	0.5	1	0	707	Free
AS2255-008_AS2255-009	AS2255-008	1046.82	AS2255-009	1046.07	Circular		1	4.5	0.013	0.05	0.05	None (,)	55.592	Free
AS2255-009_AS2255-055	AS2255-009	1046.07	AS2255-055	1045.8	Circular		1	4.5	0.013	0.05	0.05	None (,)	113.015	Free
AS2255-046_MI2255-047	AS2255-046	1044.85	MI2255-047	1044.75	Rectangular		1	5	0.013	0.05	0.05	0	28.638	Free
AS2255-054_AS2255-006	AS2255-054	1045.38	AS2255-006	1045.31	Circular		1	4.5	0.013	0.05	0.5	0	37.082	Free
AS2255-055_AS2255-054	AS2255-055	1045.8	AS2255-054	1045.38	Circular		1	4.5	0.013	0.05	0.05	0	173.144	Free
AS2256-017_IN2256-071	AS2256-017	1051.04	IN2256-071	1049.83	Circular		1	2.5	0.013	0.5	0.25	0	199.029	Free
AS2256-036_AS2256-037	AS2256-036	1046.59	AS2256-037	1046.17	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	137.973	Free
AS2256-037_AS2256-042	AS2256-037	1046.17	AS2256-042	1045.74	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	144.179	Free
AS2256-042_AS2256-047	AS2256-042	1045.74	AS2256-047	1045.29	Special	Horizontal Ellipse	1	5	0.013	0.05	0.25	0	151.198	Free
AS2256-047_AS2255-046	AS2256-047	1045.29	AS2255-046	1044.85	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	0	121.055	Free
AS2256-055_AS2256-056	AS2256-055	1047.49	AS2256-056	1047.3	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	58.498	Free
AS2256-056_AS2256-057	AS2256-056	1047.3	AS2256-057	1046.93	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	128.005	Free
AS2256-057_JB2256-058	AS2256-057	1046.93	JB2256-058	1046.5	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	147.826	Free
AS2256-073_AE2256-074	AS2256-073	1052.5	AE2256-074	1052.5	Circular		1	1.25	0.013	0.25	1	0	10	Free
AS2256-077_JB2256-065	AS2256-077	1048.89	JB2256-065	1046.92	Circular		1	1.5	0.013	0.5	0.5	0	44.031	Free
AS2257-003_AE2257-001	AS2257-003	1056.47	AE2257-001	1054.6	Special	Horizontal Ellipse	1	6.33	0.013	0.5	0.5	0	302.62	Free
AS2257-004_AS2257-003	AS2257-004	1057.79	AS2257-004.1	1056.695	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.5	0	201.051	Free
AS2257-004_AS2257-003.1	AS2257-004.1	1056.695	AS2257-003	1056.47	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.5	0	41.353	Free
AS2257-008_AS2257-004	AS2257-008	1059.24	AS2257-004	1057.79	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.25	0	289.71	Free
AS2257-012_TE2257-014	AS2257-012	1057.87	TE2257-014	1057.35	Circular		1	2	0.013	0.5	0.05	0	34.125	Free
AS2258-001_AS2257-008	AS2258-001	1061.85	AS2257-008	1059.24	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	0	390.36	Free
AS2258-011_IN2258-067	AS2258-011	1065.13	IN2258-067	1062.68	Circular		1	2.5	0.013	0.5	0.05	0	270.185	Free
AS2258-014_AE2258-015	AS2258-014	1066.19	AE2258-015	1065	Circular		1	3.5	0.013	0.25	1	0	42	Free
AS2258-014_AS2258-017	AS2258-014	1067.69	AS2258-017	1065.59	Circular		1	2.5	0.013	0.5	0.05	0	272.669	Free
AS2258-017_AS2258-011	AS2258-017	1065.59	AS2258-011	1065.13	Circular		1	2.5	0.013	0.05	0.5	0	64.094	Free
AS2258-030_IN2258-028	AS2258-030	1064.04	IN2258-028	1063.36	Circular		1	2.25	0.013	0.25	0.25	0	116.143	Free
AS2258-031_AS2258-030	AS2258-031	1065.1	AS2258-030	1064.04	Circular		1	2.25	0.013	0.05	0.25	0	52.006	Free
AS2258-048_AS2258-031	AS2258-048	1066.28	AS2258-031	1065.1	Circular		1	2.25	0.013	0.25	0.05	0	235.689	Free
AS2258-052_IN2258-025	AS2258-052	1080.75	IN2258-025	1069.43	Circular		1	2.5	0.013	0.5	0.05	0	349.298	Free
AS2258-056_IN2258-049	AS2258-056	1070.77	IN2258-049	1068.06	Circular		1	2.25	0.013	0.05	0.05	0	125.066	Free
AS2259-001_IN2258-023	AS2259-001	1092.6	IN2258-023	1086.91	Circular		1	1.75	0.013	0.5	0.25	0	113.938	Free
AS2347-001_TP2347-023	AS2347-001	971.55	TP2347-023	969.5	Circular		1	2.5	0.013	0.05	0.5	0	221.715	Free
AS2347-010_AE2347-012	AS2347-010	969.6	EMPB_GW_NHPR2	969.1	Circular		1	2.5	0.013	0.25	0.5	0	65.46	Free
AS2347-011_AS2347-010	AS2347-011	970.15	AS2347-010	969.6	Special	Horizontal Ellipse	1	2.5	0.013	0.05	0.05	None (,)	82.019	Free
AS2347-018_IN2347-034	AS2347-018	970.95	IN2347-034	970.35	Special	Horizontal Ellipse	1	2.5	0.013	0.05	0.05	None (,)	168.898	Free
AS2348-005_MI2348-010	AS2348-005	975.3	MI2348-010	974.1	Circular		1	6.5	0.013	0.5	0.25	0	389.526	Free
AS2349-006_AS2349-008	AS2349-006	986	AS2349-008	984.59	Circular		1	2	0.013	0.25	0.25	0	70.462	Free
AS2349-008_AS2349-011	AS2349-008	981.8	AS2349-011	978.1	Circular		1	6.5	0.013	0.25	0.05	0	503.102	Free
AS2349-011_AS2348-005	AS2349-011	978.1	AS2348-005	975.3	Circular		1	6.5	0.013	0.05	0.5	0	410.042	Free
AS2349-025_IN2349-027	AS2349-025	988.15	IN2349-027	986.62	Circular		1	2	0.013	0.25	0.05	None (,)	259.636	Free
AS2350-024_IN2250-054	AS2350-024	987.3	IN2250-054	986.08	Special	Horizontal Ellipse	1	5	0.013	0.5	0.25	None (,)	304.088	Free
AS2351-003_AE2351-002	AS2351-003	1010.53	AE2351-002	1009.25	Circular		1	2	0.013	0.5	0.5	0	269.638	Free
AS2351-015_IN2351-014	AS2351-015	1013	IN2351-014	1012.86	Circular		1	2	0.013	0.5	0.05	0	26.34	Free
AS2353-005_IN2352-004	AS2353-005	1030.7	IN2352-004	1024.9	Circular		1	1.75	0.013	0.5	0.5	0	303.067	Free
AS2354-006_AS2354-012	AS2354-006	1048.04	AS2354-012	1045.6	Circular		1	2	0.013	0.5	0.5	0	282.089	Free
AS2354-012_IN2354-020	AS2354-012	1045.6	IN2354-020	1044.97	Circular		1	2.25	0.013	0.5	0.05	0	118.019	Free
AS2354-015_AS2355-001	AS2354-015	1044.02	AS2355-001	1043.16	Circular		1	2.5	0.013	0.05	0.25	0	180.227	Free
AS2355-001_AS2355-062	AS2355-001	1043.16	AS2355-062	1042.14	Circular		1	2.5	0.013	0.25	0.25	0	93.216	Free
AS2355-016_IN2355-051	AS2355-016	1055.63	IN2355-051	1052.87	Circular		1	2.5	0.013	0.25	0.25	0	58.462	Free
AS2355-019_AS2355-016	AS2355-019	1058	AS2355-016	1056.63	Circular		1	1.5	0.013	0.05	0.25	0	25.111	Free
AS2355-021_AS2355-016	AS2355-021	1058.75	AS2355-016	1055.63	Circular		1	2.5	0.013	0.05	0.25	0	242.937	Free
AS2355-059_AE2355-058	AS2355-059	1043.43	EMPB_GW_MPR1	1041.5	Circular		1	3.5	0.013	0.5	0.5	0	169.153	Free
AS2355-060_AS2355-059	AS2355-060	1044.94	AS2355-059	1043.43	Circular		1	3	0.013	0.25	0.5	0	50.599	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
AS2355-062_AE2355-063	AS2355-062	1042.14	EMPB_GW_STL2	1041	Circular		1	2.5	0.013	0.5	0.5	0	52.002	Free
AS2355-064_AE2355-065	AS2355-064	1041.61	EMPB_GW_STL2	1041	Circular		1	3	0.013	0.5	0.5	0	67.106	Free
AS2356-032_IN2356-033	AS2356-032	1048.95	IN2356-033	1048.95	Circular		1	3	0.013	0.25	0.05	0	21.467	Free
AS2448-003_AS2448-007	AS2448-003	979.87	AS2448-007	977.12	Circular		1	2.5	0.013	0.05	0.05	None (,)	406.48	Free
AS2448-006_AS2448-012	AS2448-006	976.95	AS2448-012	976.25	Circular		1	2.5	0.013	0.05	0.05	None (,)	147.663	Free
AS2448-007_AS2448-006	AS2448-007	977.12	AS2448-006	976.95	Circular		1	2.5	0.013	0.05	0.05	None (,)	28.559	Free
AS2448-012_IN2448-008	AS2448-012	976.25	IN2448-008	975.95	Circular		1	2.5	0.013	0.05	0.05	None (,)	9.015	Free
AS2450-026_IN2450-024	AS2450-026	992.29	IN2450-024	992.22	Circular		1	2	0.013	0.5	0.05	0	11.279	Free
AS2450-027_AS2450-026	AS2450-027	993.31	AS2450-026	992.29	Circular		1	2	0.013	0.25	0.5	0	188.022	Free
AS2451-004_AS2451-010	AS2451-004	1011.2	AS2451-010	1004.01	Circular		1	2.5	0.013	0.25	0.5	0	219.165	Free
AS2451-010_IN2451-009	AS2451-010	1004.01	IN2451-009	1003.86	Circular		1	3	0.013	0.5	0.05	0	22.358	Free
AS2451-012_AS2450-027	AS2451-012	994.21	AS2450-027	993.31	Circular		1	2	0.013	0.25	0.25	0	162.018	Free
AS2451-015_AS2451-012	AS2451-015	995.88	AS2451-012	994.21	Circular		1	1.75	0.013	0.5	0.25	0	322.205	Free
AS2452-001_AS2452-008	AS2452-001	1022.9	AS2452-008	1018.8	Circular		1	2	0.013	0.5	0.05	0	310.35	Free
AS2452-008_IN2452-009	AS2452-008	1018.8	IN2452-009	1016.2	Circular		1	2.5	0.013	0.05	0.05	0	321.95	Free
AS2454-001_IN2454-019	AS2454-001	1034.6	IN2454-019	1033.78	Circular		1	2	0.013	0.05	0.05	0	55.519	Free
AS2454-010_TP2454-013	AS2454-010	1039.2	TP2454-013	1029.33	Circular		1	1.5	0.013	0.25	0.5	0	493.555	Free
AS2454-020_AS2454-001	AS2454-020	1034.65	AS2454-001	1034.6	Circular		1	1.5	0.013	0.05	0.05	0	290.091	Free
AS2455-004_AS2454-020	AS2455-004	1042.11	AS2454-020	1039.74	Circular		1	1.5	0.013	0.5	0.05	0	113	Free
AS2455-024_AS2355-021	AS2455-024	1061.5	AS2355-021	1058.75	Circular		1	2	0.013	0.5	0.05	0	288.025	Free
AS2548-001_AS2548-009	AS2548-001	985.71	AS2548-009	984.21	Circular		1	2	0.013	0.05	0.05	None (,)	293.289	Free
AS2548-003_AS2548-001	AS2548-003	986.1	AS2548-001	985.71	Circular		1	2	0.013	0.05	0.05	None (,)	59.847	Free
AS2548-009_AS2548-013	AS2548-009	984.21	AS2548-013	982.22	Circular		1	2	0.013	0.05	0.05	None (,)	217.646	Free
AS2548-013_AS2448-003	AS2548-013	982.22	AS2448-003	979.87	Circular		1	2.25	0.013	0.05	0.05	None (,)	265.988	Free
AS2549-001_TP2549-008	AS2549-001	993.34	TP2549-008	992.18	Circular		1	4	0.013	0.05	0.05	0	238.529	Free
AS2549-003_AS2549-001	AS2549-003	993.81	AS2549-001	993.34	Circular		1	4	0.013	0.5	0.05	0	37.612	Free
AS2550-012_AS2549-003	AS2550-012	994.81	AS2549-003	993.81	Circular		1	3	0.013	0.05	0.5	0	86.232	Free
AS2550-016_AS2550-012	AS2550-016	997.5	AS2550-012	994.81	Circular		1	1.75	0.013	0.5	0.05	0	153.141	Free
AS2551-004_AS2551-008	AS2551-004	1010.64	AS2551-008	1005.55	Circular		1	2.5	0.013	0.5	0.5	0	292.068	Free
AS2551-008_AE2551-009	AS2551-008	1005.55	AE2551-009	1004.9	Circular		1	3	0.013	0.5	0.5	0	62.549	Free
AS2551-010_AS2551-004	AS2551-010	1016.56	AS2551-004	1010.64	Circular		1	2.5	0.013	0.05	0.5	0	410.957	Free
AS2551-020_AS2551-010	AS2551-020	1020.91	AS2551-010	1017.23	Circular		1	2	0.013	0.25	0.05	0	215.763	Free
AS2552-004_AS2551-020	AS2552-004	1027.31	AS2551-020	1020.91	Circular		1	2	0.013	0.05	0.25	0	418.326	Free
AS2552-005_AS2552-004	AS2552-005	1030.94	AS2552-004	1027.31	Circular		1	2	0.013	0.25	0.05	0	301.975	Free
AS2649-008_AS2549-003	AS2649-008	996.6	AS2549-003	993.81	Circular		1	1.5	0.013	0.5	0.05	0	68.139	Free
AS2650-004_MI2650-010	AS2650-004	997.19	MI2650-010	996.94	Circular		1	2	0.013	0.25	0.25	0	37.097	Free
ATTIC_ANGEL_LOW_FLOW_OUT	AA_POND_OUT	1017.6	ATTIC_ANGEL_PONDS_OUTLET	1017.59	Circular		1	1.5	0.013	0.5	0.05	None (,)	68	Free
ATTIC_ANGEL_PONDS_GRATE_OU	AA_POND_OUT		ATTIC_ANGEL_PONDS_OUTLET											
ATTIC_ANGEL_PONDS_OUT_PIPE	ATTIC_ANGEL_PONDS_OUTLET	1017.6	ATTIC_ANGEL_POND_OUT	1016.85	Circular		1	5.5	0.013	0.5	0.5	0	73.385	Free
Attic_Angle_E-W_Pipes	AA_W_POND_OUT	1017.35	AA_EAST_POND	1017.1	Special	Horizontal Ellipse	2	3.75	0.013	1	1	0	45	Free
BEAR_CLAW_WAY_ST	BEAR_CLAW_APARTMENTS_DEP	1086	IN1749-002	1081.648	Natural		1	0	0.02	0	0	None (,)	498.601	Free
BeltlineSCulv1	BeltlineSUS1	1043.5	BeltlineSDS1	1041.39	Circular		1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	396	Free
BeltlineSCulv2	BeltlineSUS2	1043.5	BeltlineSDS2	1041.39	Circular		1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	396	Free
CAPE_SILVER_N_POND_GRATE	CAPE_INF_OUT		IN1550-007											
CAPE_SILVER_N_POND_GRATE_OU	IN1550-005		CAPE_SILVER_WAY_POND_OUT											
CAPE_SILVER_N_POND_UNDERDR/	CAPE_INF_OUT	1096.5	IN1550-007	1096.29	Circular		1	0.5	0.013	1	0.5	None (,)	102.168	Free
CAPE_SILVER_S_GRATE	CAPE_WP_OUT		CAPE_SILVER_WAY_WP_TO_DP_US											
CAPE_SILVER_S_POND_ORI	CAPE_WP_OUT		CAPE_SILVER_WAY_WP_TO_DP_US											
CAPE_SILVER_WAY_WP_ORIFICE	IN1550-005		CAPE_SILVER_WAY_POND_OUT											
CAPE_SILVER_WAY_WP_TO_DP_PI	CAPE_SILVER_WAY_WP_TO_DP	1099.01	CAPE_INF_IN	1099	Circular		1	1	0.013	0.5	1	None (,)	49.95	Free
CAPE_SILVER_WP_PIPE_OUT	CAPE_SILVER_WAY_POND_OUT	1096	AS1550-004	1095.15	Circular		1	1	0.013	0.5	0.05	None (,)	27.597	Free
CB2553-007_AE2553-002	CB2553-007	1044.91	AE2553-002	1043.6	Circular		1	1.5	0.013	0.05	0.5	0	27.003	Free
CDT_11	IN1653-027	1105.69	IN1653-026	1105.37	Circular		1	1.5	0.013	0.5	0.25	0	66.453	Free
CDT_15	PL1447-001	1133	IN1547-033	1129.6	Circular		1	1.5	0.013	0.5	0.5	None (,)	103.255	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
CDT_17	PL1548-052	1116.09	IN1548-045	1115.84	Circular		1	1.5	0.013	0.5	0.5	None (,)	47.998	Free
CDT_27	IN1550-017	1100.87	IN1550-014	1099.04	Circular		1	2	0.013	0.05	0.5	None (,)	244.629	Free
CDT_29	IN1550-023	1101.52	IN1550-022	1101.02	Circular		1	1.5	0.013	0.5	0.25	None (,)	103.522	Free
CDT_33	IN1550-014	1099.04	AE1550-016	1098	Circular		1	3.5	0.013	0.5	1	0	48	Free
CDT_43	IN1551-005	1103.87	IN1551-002	1101.79	Circular		1	2.5	0.013	0.05	0.25	None (,)	215.705	Free
CDT_55	PL1651-001	1093.28	IN1751-004	1093.04	Circular		1	1.5	0.013	0.5	0.05	None (,)	69.005	Free
CDT_59	EMPB_GW_NTL7	1016.57	EMPB_GW_NTL6	1010.77	Natural		1	0	0.013	0	0	None (,)	747.778	Free
CDT_63	OSTP_POND_SYSTEM_JCT_8A	963.17	OSTP_POND_SYSTEM_JCT_7	963.27	Natural		1	0	0.013	0	0	None (,)	292.634	Free
CDT_67	EMPB_GW_NTL8	998.97	AE2451-002	995.96	Natural		1	0	0.013	0	0	None (,)	514.596	Free
CDT_69	WMPB_GW_TRANSFER1	1055.42	WMPB_GW_TRANSFER2	1049.47	Natural		1	0	0.013	0	0	None (,)	291.274	Free
CDT_71	WMPB_GW_TRANSFER2	1049.47	WMPB_GW_BHR1	1016.35	Natural		1	0	0.013	0	0	0	1131.729	Free
CDT_73	WINDINGWAY_BLIND_CON	1078.39	AS1648-014	1078.14	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.25	None (,)	31.124	Free
CDT_81	IN1549-016	1106.01	AS1549-010	1105.51	Circular		1	3	0.013	0.05	0.05	None (,)	102.03	Free
CDT_83	IN1549-024	1107.33	AS1549-014	1106.9	Circular		1	1.5	0.013	0.05	0.05	None (,)	88.29	Free
CDT_85	NEW_SAS_08_06_19	1074.86	AS1747-019	1073.05	Circular		1	3.5	0.013	0.05	0.05	None (,)	213.606	Free
CH-S21_CH-S20	CH-S21	1097.84	CH_BIO_BASIN_1	1097.5	Circular		1	2.25	0.013	0.25	1	0	35.726	Free
CH-S22A_CH-S22	CH-S22A	1102.83	CH-S22	1102.61	Circular		1	2	0.013	0.5	0.05	None (,)	32.626	Free
CH_BIO_BASIN1_12IN	CH_BIO_BASIN_1	1098.1	CH_BIO_BASIN1_OUT2	1098	Circular		1	1	0.013	0.5	0.5	None (,)	13.397	Free
CH_BIO_BASIN1_ORI	CH_BIO_BASIN1_OUT2		CH_BIO_BASIN1_OUT											
CH_BIO_BASIN1_OUT_IN1550-011	CH_BIO_BASIN1_OUT	1095	IN1550-011	1093.57	Circular		1	1	0.013	0.5	0.05	None (,)	23.676	Free
CH_BIO_BASIN1_UNDERDRAIN	CH_BIO_BASIN_1	1095.1	CH_BIO_BASIN1_OUT	1095	Circular		1	0.5	0.011	0.5	0.5	None (,)	35.857	Free
CH_S31A_CH_S31	CH_S31A	1099.74	CH_S31	1099.51	Circular		1	2	0.013	0.5	0.05	None (,)	34.66	Free
CH_S33A_CH_S33	CH_SAS33	1105.69	CH_S33	1105.44	Circular		1	1	0.013	0.5	0.5	None (,)	26.843	Free
COMMERCE_SQUARE_POND_GRA	COM_SQ_P_OUT		COMMERCE_SQUARE_POND_OUT											
COMMERCE_SQUARE_POND_LOW	COM_SQ_P_OUT		COMMERCE_SQUARE_POND_OUT											
COMMERCE_SQUARE_POND_OUT	COMMERCE_SQUARE_POND_OU	1062.88	IN2258-034	1062.36	Special	Horizontal Ellipse	1	5.66	0.013	0.5	0.05	0	54.042	Free
CV_BIO_BASIN1_WEIR	CH_BIO_BASIN1_OUT2		CH_BIO_BASIN1_OUT											
DT1947-007_MI2047-004	DT1947-007	1012	MI2047-004	1011.14	Circular		1	2	0.024	0.5	0.05	0	37.497	Free
DT2349-022_DT2349-021	DT2349-022	991	DT2349-021	990	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	35.208	Free
E_M_PB_GW_COM_DR_CTR_SECT	AE2256-011	1054.6	GR2256-019	1049.74	Natural		1	0	0.013	0	0	None (,)	262.726	Free
E_M_PB_GW_COM_DR_S_SECTION	AE2257-001	1054.6	AE2256-010	1055.6	Natural		1	0	0.013	0	0	None (,)	302.114	Free
E_M_PB_GW_EXCELSIOR_DR_SECT	HD2248-006	973.6	EMPB_GW_WBH3	966.94	Natural		1	0	0.013	0	0	None (,)	1030.759	Free
E_M_PB_GW_FOURIER_DR_SECTIO	EMPB_GW_FD1	965.1	OSTP_POND_SYSTEM_JCT_13	964.7	Natural		1	0	0.013	0	0	None (,)	654.035	Free
E_M_PB_GW_LOW_OLD_SAUK_RD	AE2449-003	982.42	WEXFORD_POND_IN	978.1	Natural		1	0	0.013	0	0	None (,)	462.988	Free
E_M_PB_GW_LOW_OLD_SAUK_RD	EMPB_GW_LOSR1	991.7	EMPB_GW_LOSR2	989.4	Natural		1	0	0.013	0	0	None (,)	617	Free
E_M_PB_GW_LOW_OLD_SAUK_RD	EMPB_GW_LOSR2	989.4	AE2449-003	982.42	Natural		1	0	0.027	0	0	None (,)	745	Free
E_M_PB_GW_MIN_PT_RD_SECTIO	EMPB_GW_MPR1	1041.39	GR2355-009	1040.41	Natural		1	0	0.013	0	0	None (,)	616.744	Free
E_M_PB_GW_N_HIGH_PT_RD_SEC	EMPB_GW_NHPR2	969.14	EMPB_GW_NHPR1	967.6	Natural		1	0	0.013	0	0	None (,)	450.56	Free
E_M_PB_GW_N_TREE_LN_SECTION	EMPB_GW_NTL3	987.56	EMPB_GW_NTL1	986	Natural		1	0	0.013	0	0	None (,)	207.838	Free
E_M_PB_GW_N_TREE_LN_SECTION	EMPB_GW_NTL5	991.37	EMPB_GW_NTL3	987.56	Natural		1	0	0.013	0	0	None (,)	615.681	Free
E_M_PB_GW_N_TREE_LN_SECTION	AE2451-002	995.96	SAUK_CREEK_LOWER_STORAGE	992.62	Natural		1	0	0.013	0	0	None (,)	901.726	Free
E_M_PB_GW_N_TREE_LN_SECTION	AE2452-014	1004.06	EMPB_GW_NTL8	998.97	Natural		1	0	0.013	0	0	None (,)	844.309	Free
E_M_PB_GW_N_TREE_LN_SECTION	EMPB_GW_NTL6	1010.77	AE2452-014	1004.06	Natural		1	0	0.013	0	0	None (,)	1169.991	Free
E_M_PB_GW_N_TREE_LN_SECTION	AE2454-006	1019.44	EMPB_GW_NTL7	1016.57	Natural		1	0	0.013	0	0	None (,)	306.861	Free
E_M_PB_GW_N_TREE_LN_SECTION	HD2454-016	1030.1	AE2454-006	1019.44	Natural		1	0	0.013	0	0	None (,)	1129.403	Free
E_M_PB_GW_OLD_SAUK_RD_SECT	EMPB_GW_OSR3	983.7	HD2249-033	983.16	Natural		1	0	0.013	0	0	None (,)	103.36	Free
E_M_PB_GW_OLD_SAUK_RD_SECT	EMPB_GW_OSR1	985.29	EMPB_GW_OSR3	983.7	Natural		1	0	0.013	0	0	None (,)	180.275	Free
E_M_PB_GW_OLD_SAUK_RD_SECT	EMPB_GW_OSR2	985.3	EMPB_GW_OSR3	983.7	Natural		1	0	0.013	0	0	None (,)	218.158	Free
E_M_PB_GW_S_HP_RD_SECTION1	EMPB_GW_SHPR1	1035.9	HD2454-017	1030.59	Natural		1	0	0.013	0	0	None (,)	902.564	Free
E_M_PB_GW_S_TREE_LN_SECTION	EMPB_GW_STL2	1039.78	EMPB_GW_STL1	1037.4	Natural		1	0	0.013	0	0	None (,)	638.699	Free
E_M_PB_GW_UPPER_OLD_SAUK_F	WEXFORD_POND_OUT	972.68	EMPB_GW_UOSR1	969.1	Natural		1	0	0.013	0	0	None (,)	609.715	Free
E_M_PB_GW_W_BELTLINE_SECTIO	EMPB_GW_WBH3	966.94	EMPB_GW_WBH1	965.35	Natural		1	0	0.013	0	0	None (,)	456.732	Free
E_M_PB_GW_W_BELTLINE_SECTIO	EMPB_GW_WBH2	966	EMPB_GW_WBH3	966.94	Natural		1	0	0.013	0	0	None (,)	118.224	Free
E_M_PB_GW_WHITACRE_RD_SECT	EMPB_GW_WR1	998.45	GR2550-020	992.8	Natural		1	0	0.013	0	0	None (,)	382.785	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
E_M_PB_GW_WHITACRE_RD_SECT	AE2551-009	1004.9	EMPB_GW_WR1	998.45	Natural		1	0	0.013	0	0	None (,)	599.775	Free
FARGO_COBALT_E_POND_OUT_PI	FARGO_COBALT_E_POND_OUT_	1086.4	FARGO_COBALT_LEVEL_SPREADER	1086.2	Circular		1	2	0.013	1	0.5	None (,)	44	Free
FARGO_COBALT_W_TO_E_PIPE	FAR_CO_WP_OUT	1086.6	FARGO_COBALT_W_TO_E_DS	1086.4	Circular		1	1.25	0.013	0.05	0.05	0	48	Free
GANSER_HEIGHTS_LOW_FLOW_OF	GAN_H_P_OUT		IN2357-008											
GANSER_HEIGHTS_POND_LOW_W	GAN_H_P_OUT		IN2357-008											
GANSER_HEIGHTS_WEIR_HIGH	GAN_H_P_OUT		IN2357-008											
GR2247-017_TP2247-019	EMPB_GW_WBH1	965.35	TP2247-019	965.15	Rectangular		2	4	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	58.363	Free
GR2256-019_MI2256-075	GR2256-019	1049.74	PD2256-019_AE2256-015	1048.343	Circular		1	4.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	204.979	Free
GR2256-019_MI2256-075.1	PD2256-019_AE2256-015	1048.343	MI2256-075	1046.93	Circular		1	4.5	0.013	0.05	0.05	0	207.227	Free
GR2347-021_TP2347-023	EMPB_GW_UOSR1	969.1	TP2347-023	969.5	Rectangular		1	4	0.013	0.2	0.05	Square Edge with Headwall (Circ, Conc)	92.365	Free
GR2347-025_GR2247-023	EMPB_GW_NHPR1	967.6	EMPB_GW_WBH2	966	Circular		1	5.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	237	Free
GR2347-026_GR2347-027	HighPointUS1	969.1	EMPB_GW_NHPR2	968.6	Rectangular		1	4	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	145.425	Free
GR2355-009_GR2355-008	GR2355-009	1040.41	EMPB_GW_STL2	1039.78	Special	Horizontal Ellipse	1	9.41	0.013	0.2	0.05	Square Edge with Headwall (Circ, Conc)	122.193	Free
GR2550-020_IN2550-021	GR2550-020	992.8	IN2550-021	992.7	Circular		1	3.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	35.717	Free
HD2051-014_HD2051-015	HD2051-014	1052.35	SMPB_GW_BWD	1051.35	Rectangular		1	4	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	101.216	Free
HD2249-033_HD2248-006	HD2249-033	983.16	HD2249-033_INSERT	978.692	Rectangular		1	4	0.013	0.5	0.05	0	394.076	Free
HD2249-033_HD2248-006.1	HD2249-033_INSERT	978.692	HD2248-006	973.6	Rectangular		1	4	0.013	0.05	0.5	0	449.159	Free
HD2454-017_TP2454-013	HD2454-017	1030.59	TP2454-013	1030.4	Special	Horizontal Ellipse	1	9.41	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	35.81	Free
IN1547-004_AS1547-003	IN1547-004	1085.82	AS1547-003	1083.57	Circular		1	1.25	0.013	0.5	0.25	None (,)	82.739	Free
IN1547-005_AS1547-003	IN1547-005	1082.56	AS1547-003	1081.82	Circular		1	3	0.013	0.25	0.25	None (,)	147.066	Free
IN1547-005_IN1548-003	IN1547-005	1082.56	IN1548-003	1081.02	Circular		1	3.5	0.013	0.5	0.5	None (,)	313.171	Free
IN1547-006_AS1647-062	IN1547-006	1088.12	AS1647-062	1084.33	Circular		1	1.25	0.013	0.33	0.05	None (,)	111.612	Free
IN1547-007_IN1547-006	IN1547-007	1089.77	IN1547-006	1088.12	Circular		1	1	0.013	0.5	0.33	None (,)	32.077	Free
IN1547-008_AS1647-062	IN1547-008	1086.22	AS1647-062	1086.08	Circular		1	1.25	0.013	0.25	0.25	None (,)	25.339	Free
IN1547-009_IN1547-004	IN1547-009	1088.12	IN1547-004	1085.82	Circular		1	1	0.013	0.5	0.5	None (,)	147.845	Free
IN1547-010_IN1547-008	IN1547-010	1088.42	IN1547-008	1086.22	Circular		1	1	0.013	0.5	0.25	None (,)	146.363	Free
IN1547-011_IN1548-009	IN1547-011	1101.32	IN1548-009	1092.78	Circular		1	2	0.013	0.05	0.05	None (,)	273.133	Free
IN1547-012_IN1547-011	IN1547-012	1101.84	IN1547-011	1101.32	Circular		1	2	0.013	0.05	0.05	None (,)	51.451	Free
IN1547-013_IN1547-011	IN1547-013	1101.73	IN1547-011	1101.32	Circular		1	1.5	0.013	0.05	0.5	None (,)	51.527	Free
IN1547-014_1547-013	IN1547-014	1102.28	IN1547-013	1101.73	Circular		1	1	0.013	0.5	0.05	None (,)	11.413	Free
IN1547-015_IN1547-013	IN1547-015	1102.14	IN1547-013	1101.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.878	Free
IN1547-016_IN1547-015	IN1547-016	1102.43	IN1547-015	1102.14	Circular		1	1	0.013	0.5	0.5	None (,)	6.26	Free
IN1547-017_IN1547-012	IN1547-017	1103.31	IN1547-012	1101.84	Circular		1	1	0.013	0.5	0.5	None (,)	27.751	Free
IN1547-019_AS1547-018	IN1547-019	1108.34	AS1547-018	1106.28	Circular		1	2	0.013	0.25	0.25	None (,)	77.931	Free
IN1547-020_IN1547-019	IN1547-020	1109.52	IN1547-019	1108.34	Circular		1	1.5	0.013	0.05	0.5	None (,)	52.613	Free
IN1547-021_IN1547-020	IN1547-021	1109.92	IN1547-020	1109.52	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.473	Free
IN1547-022_IN1547-021	IN1547-022	1110.37	IN1547-021	1109.92	Circular		1	1	0.013	0.5	0.5	None (,)	9.802	Free
IN1547-024_AS1547-023	IN1547-024	1116.39	AS1547-023	1115.12	Circular		1	1	0.013	0.5	0.5	None (,)	4.721	Free
IN1547-025_AS1547-023	IN1547-025	1116.39	AS1547-023	1115.12	Circular		1	1	0.013	0.5	0.5	None (,)	23.526	Free
IN1547-027_IN1547-020	IN1547-027	1112.18	IN1547-020	1109.52	Circular		1	1.25	0.013	0.5	0.05	None (,)	95.352	Free
IN1547-028_IN1547-027	IN1547-028	1112.58	IN1547-027	1112.18	Circular		1	1	0.013	0.5	0.5	None (,)	27.021	Free
IN1547-030_AS1547-029	IN1547-030	1116.79	AS1547-029	1115.09	Circular		1	1	0.013	0.5	0.5	None (,)	11.761	Free
IN1547-031_AS1547-029	IN1547-031	1116.79	AS1547-029	1115.09	Circular		1	1	0.013	0.5	0.5	None (,)	14.537	Free
IN1547-033_AS1547-032	IN1547-033	1129.6	AS1547-032	1124.5	Circular		1	2	0.013	0.05	0.25	None (,)	149.298	Free
IN1547-034_IN1547-033	IN1547-034	1131.36	IN1547-033	1129.6	Circular		1	1	0.013	0.5	0.5	None (,)	26.984	Free
IN1548-001_IN1547-005	IN1548-001	1089.59	IN1547-005	1082.56	Circular		1	4.5	0.013	0.25	0.25	None (,)	211.05	Free
IN1548-002_IN1548-001	IN1548-002	1093.59	IN1548-001	1089.59	Circular		1	1	0.013	0.5	0.5	None (,)	28.147	Free
IN1548-003_IN1648-027	IN1548-003	1081.02	IN1648-027	1079.81	Circular		1	3.5	0.013	0.25	0.25	None (,)	93.337	Free
IN1548-004_IN1548-003	IN1548-004	1090.72	IN1548-003	1081.02	Circular		1	1	0.013	0.5	0.5	None (,)	26.909	Free
IN1548-005_IN1548-003	IN1548-005	1103.56	IN1548-003	1081.02	Circular		1	1.5	0.013	0.25	0.25	None (,)	184.485	Free
IN1548-006_IN1548-005	IN1548-006	1105.06	IN1548-005	1103.56	Circular		1	1	0.013	0.5	0.5	None (,)	27.417	Free
IN1548-007_IN1548-001	IN1548-007	1090.05	IN1548-001	1089.59	Circular		1	4.5	0.013	0.05	0.25	None (,)	52.554	Free
IN1548-008_IN1548-007	IN1548-008	1092.73	IN1548-007	1090.05	Circular		1	2	0.013	0.05	0.5	None (,)	51.181	Free
IN1548-009_IN1548-008	IN1548-009	1092.78	IN1548-008	1092.73	Circular		1	2	0.013	0.05	0.05	None (,)	10.126	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1548-010_IN1548-008	IN1548-010	1093.85	IN1548-008	1092.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	29.843	Free
IN1548-011_IN1548-010	IN1548-011	1094.15	IN1548-010	1093.85	Circular		1	1	0.013	0.5	0.5	None (,)	8.173	Free
IN1548-012_IN1548-007	IN1548-012	1095.73	IN1548-007	1090.05	Circular		1	4.5	0.013	0.05	0.05	None (,)	148.674	Free
IN1548-013_IN1548-012	IN1548-013	1099.39	IN1548-012	1095.73	Circular		1	1	0.013	0.5	0.5	None (,)	29.114	Free
IN1548-016_AS1548-014	IN1548-016	1099.76	AS1548-014	1097.05	Circular		1	1.5	0.013	0.25	0.5	None (,)	26.421	Free
IN1548-017_IN1548-016	IN1548-017	1100.31	IN1548-016	1099.76	Circular		1	1	0.013	0.5	0.25	None (,)	11.104	Free
IN1548-018_IN1548-016	IN1548-018	1100.16	IN1548-016	1099.76	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.618	Free
IN1548-019_IN1548-018	IN1548-019	1100.61	IN1548-018	1100.16	Circular		1	1	0.013	0.5	0.5	None (,)	11.47	Free
IN1548-020_AS1548-014	IN1548-020	1099.08	AS1548-014	1097.05	Circular		1	2	0.013	0.5	0.05	None (,)	48.969	Free
IN1548-021_IN1548-020	IN1548-021	1099.12	IN1548-020	1099.08	Circular		1	2	0.013	0.5	0.25	None (,)	11.671	Free
IN1548-023_IN1548-020	IN1548-023	1099.98	IN1548-020	1099.08	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.307	Free
IN1548-025_IN1548-023	IN1548-025	1100.28	IN1548-023	1099.98	Circular		1	1	0.013	0.5	0.5	None (,)	10.687	Free
IN1548-026_IN1548-021	IN1548-026	1101.42	IN1548-021	1099.12	Circular		1	2	0.013	0.05	0.05	None (,)	96.232	Free
IN1548-029_MI1548-028	IN1548-029	1098.55	MI1548-028	1097.73	Circular		1	4	0.013	0.05	0.05	None (,)	125.612	Free
IN1548-030_IN1548-029	IN1548-030	1101.65	IN1548-029	1098.55	Circular		1	1	0.013	0.5	0.5	None (,)	27.314	Free
IN1548-032_AS1548-031	IN1548-032	1102.93	AS1548-031	1099.99	Circular		1	1	0.013	0.5	0.5	None (,)	24.521	Free
IN1548-033_AS1548-031	IN1548-033	1102.17	AS1548-031	1099.99	Circular		1	1.5	0.013	0.05	0.05	None (,)	23.482	Free
IN1548-034_IN1548-033	IN1548-034	1102.75	IN1548-033	1102.17	Circular		1	1	0.013	0.5	0.5	None (,)	16.744	Free
IN1548-035_IN1548-033	IN1548-035	1102.94	IN1548-033	1102.17	Circular		1	1	0.013	0.5	0.5	None (,)	23.456	Free
IN1548-037_AS1548-036	IN1548-037	1104.28	AS1548-036	1102.46	Circular		1	1.25	0.013	0.5	0.25	None (,)	26.809	Free
IN1548-040_AS1548-039	IN1548-040	1111.86	AS1548-039	1109.91	Circular		1	1	0.013	0.5	0.5	None (,)	47.513	Free
IN1548-041_AS1548-039	IN1548-041	1110.85	AS1548-039	1109.91	Circular		1	1.5	0.013	0.5	0.5	None (,)	28.191	Free
IN1548-042_IN1548-041	IN1548-042	1111.04	IN1548-041	1110.85	Circular		1	1.5	0.013	0.5	0.5	None (,)	28.501	Free
IN1548-043_IN1548-042	IN1548-043	1111.44	IN1548-042	1111.04	Circular		1	1.25	0.013	0.05	0.5	None (,)	36.812	Free
IN1548-044_IN1548-043	IN1548-044	1111.87	IN1548-043	1111.44	Circular		1	1	0.013	0.5	0.05	None (,)	39.589	Free
IN1548-045_IN1548-005	IN1548-045	1115.84	IN1548-005	1103.56	Circular		1	1.5	0.013	0.5	0.25	None (,)	220.741	Free
IN1549-004_AS1549-002	IN1549-004	1106.2	AS1549-002	1103.77	Circular		1	1.25	0.013	0.5	0.25	None (,)	3.759	Free
IN1549-005_IN1549-004	IN1549-005	1106.5	IN1549-004	1106.2	Circular		1	1	0.013	0.5	0.5	None (,)	8.708	Free
IN1549-007_AS1549-001	IN1549-007	1106.59	AS1549-001	1103.61	Circular		1	1	0.013	0.5	0.5	None (,)	33.29	Free
IN1549-008_AS1549-001	IN1549-008	1106.68	AS1549-001	1103.61	Circular		1	1	0.013	0.5	0.5	None (,)	49.164	Free
IN1549-017_IN1547-016	IN1549-017	1106.02	IN1549-016	1106.01	Circular		1	3	0.013	0.05	0.05	None (,)	89.589	Free
IN1549-018_IN1549-017	IN1549-018	1106.78	IN1549-017	1106.02	Circular		1	3	0.013	0.05	0.05	None (,)	69.279	Free
IN1549-021_IN1549-016	IN1549-021	1108.02	IN1549-016	1106.01	Circular		1	1	0.013	0.5	0.5	None (,)	48.538	Free
IN1549-023_IN1549-017	IN1549-023	1107.11	IN1549-017	1106.02	Circular		1	1	0.011	0.5	0.5	None (,)	130.208	Free
IN1549-025_IN1549-024	IN1549-025	1107.96	IN1549-024	1107.33	Circular		1	1.25	0.013	0.5	0.05	None (,)	75.96	Free
IN1549-026_IN1549-024	IN1549-026	1107.87	IN1549-024	1107.33	Circular		1	1.25	0.013	0.25	0.25	None (,)	56.69	Free
IN1549-027_IN1549-026	IN1549-027	1108.03	IN1549-026	1107.87	Circular		1	1	0.013	0.5	0.25	None (,)	29.093	Free
IN1549-028_IN1549-025	IN1549-028	1108.12	IN1549-025	1107.96	Circular		1	1	0.013	0.5	0.5	None (,)	28.225	Free
IN1549-029_AS1549-032	IN1549-029	1107.75	AS1549-032	1107.63	Circular		1	1.25	0.013	0.25	0.05	None (,)	9.624	Free
IN1549-02_IN1549-021	IN1549-022	1108.43	IN1549-021	1108.02	Circular		1	1	0.013	0.5	0.5	None (,)	28.764	Free
IN1549-030_IN1549-029	IN1549-030	1107.91	IN1549-029	1107.75	Circular		1	1	0.013	0.5	0.25	None (,)	28.649	Free
IN1549-035_IN1549-034	IN1549-035	1108.25	AS1549-034	1108.02	Circular		1	1.25	0.013	0.25	0.25	None (,)	82.872	Free
IN1549-036_IN1549-035	IN1549-036	1108.95	IN1549-035	1108.25	Circular		1	1.25	0.013	0.25	0.25	None (,)	198.071	Free
IN1549-038_IN1549-036	IN1549-038	1109.3	IN1549-036	1108.95	Circular		1	1.25	0.013	0.25	0.25	None (,)	105.011	Free
IN1549-039_IN1549-038	IN1549-039	1109.7	IN1549-038	1109.3	Circular		1	1.25	0.013	0.5	0.25	None (,)	125.932	Free
IN1549-040_IN1549-039	IN1549-040	1109.85	IN1549-039	1109.7	Circular		1	1	0.013	0.5	0.5	None (,)	28.295	Free
IN1550-007_AS1550-006	IN1550-007	1096.29	AS1550-006	1096.2	Circular		1	1	0.013	0.5	0.05	None (,)	31.319	Free
IN1550-011_AS1550-010	IN1550-011	1093.57	AS1550-010	1093.09	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.5	None (,)	160.039	Free
IN1550-012_IN1550-013	IN1550-012	1101.4	IN1550-013	1100.21	Circular		1	3	0.011	0.25	0.05	None (,)	148.501	Free
IN1550-013_IN1550-014	IN1550-013	1100.21	IN1550-014	1099.04	Circular		1	3	0.013	0.05	0.5	None (,)	91.833	Free
IN1550-015_IN1550-014	IN1550-015	1102.85	IN1550-014	1099.04	Circular		1	1	0.013	0.5	0.05	None (,)	27.421	Free
IN1550-018_IN1550-017	IN1550-018	1103.84	IN1550-017	1100.87	Circular		1	1.5	0.013	0.25	0.05	None (,)	76.038	Free
IN1550-019_IN1550-018	IN1550-019	1104.54	IN1550-018	1103.84	Circular		1	1	0.013	0.5	0.5	None (,)	27.978	Free
IN1550-020_IN1550-018	IN1550-020	1106.37	IN1550-018	1103.84	Circular		1	1.25	0.013	0.5	0.25	None (,)	126.193	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1550-021_IN1550-020	IN1550-021	1106.78	IN1550-020	1106.37	Circular		1	1	0.013	0.5	0.5	None (,)	27.412	Free
IN1550-022_IN1550-017	IN1550-022	1101.02	IN1550-017	1100.87	Circular		1	1.5	0.013	0.25	0.5	None (,)	57.585	Free
IN1550-024_IN1550-025	IN1550-024	1102.27	IN1550-023	1101.52	Circular		1	1	0.013	0.5	0.5	None (,)	24.182	Free
IN1550-025_IN1550-013	IN1550-025	1100.35	IN1550-013	1100.21	Circular		1	1.25	0.011	0.05	0.5	None (,)	27.722	Free
IN1550-026_IN1550-025	IN1550-026	1100.93	IN1550-025	1100.35	Circular		1	1.25	0.011	0.5	0.05	None (,)	118.54	Free
IN1550-027_IN1550-026	IN1550-027	1101.93	IN1550-026	1100.93	Circular		1	1	0.011	0.5	0.5	None (,)	151.164	Free
IN1550-028_IN1550-026	IN1550-028	1102.03	IN1550-026	1100.93	Circular		1	1	0.011	0.5	0.5	None (,)	173.655	Free
IN1551-002_IN1550-012	IN1551-002	1101.79	IN1550-012	1101.4	Circular		1	3	0.011	0.25	0.25	None (,)	69.684	Free
IN1551-003_IN1551-002	IN1551-003	1103.9	IN1551-002	1101.79	Circular		1	1.25	0.011	0.5	0.5	None (,)	66.971	Free
IN1551-004_IN1551-003	IN1551-004	1104.28	IN1551-003	1103.9	Circular		1	1	0.011	0.5	0.5	None (,)	25.162	Free
IN1551-006_IN1551-005	IN1551-006	1105.57	IN1551-005	1103.87	Circular		1	1	0.011	0.5	0.25	None (,)	33.36	Free
IN1551-007_IN1551-005	IN1551-007	1104.85	IN1551-005	1103.87	Circular		1	2.5	0.013	0.25	0.05	None (,)	134.539	Free
IN1551-008_IN1551-007	IN1551-008	1105.24	IN1551-007	1104.85	Circular		1	2.5	0.013	0.05	0.25	None (,)	79.876	Free
IN1551-009_IN1551-008	IN1551-009	1107.16	IN1551-008	1105.24	Circular		1	1.25	0.011	0.5	0.5	None (,)	58.7	Free
IN1551-010_IN1551-009	IN1551-010	1107.67	IN1551-009	1107.16	Circular		1	1	0.011	0.5	0.5	None (,)	41.723	Free
IN1551-011_IN1551-008	IN1551-011	1105.25	IN1551-008	1105.24	Circular		1	2	0.013	0.05	0.05	None (,)	109.718	Free
IN1551-012_IN1551-011	IN1551-012	1107.74	IN1551-011	1105.24	Circular		1	1	0.011	0.5	0.5	None (,)	27.606	Free
IN1551-014_IN1551-008	IN1551-014	1105.34	IN1551-008	1105.24	Circular		1	1.25	0.011	0.25	0.5	None (,)	44.786	Free
IN1551-015_IN1551-014	IN1551-015	1105.53	IN1551-014	1105.34	Circular		1	1	0.011	0.5	0.25	None (,)	75.956	Free
IN1551-016_IN1551-015	IN1551-016	1105.64	IN1551-015	1105.53	Circular		1	1	0.011	0.05	0.5	None (,)	42.544	Free
IN1551-017_IN1551-016	IN1551-017	1105.75	IN1551-016	1105.64	Circular		1	0.667	0.011	0.5	0.05	None (,)	22.242	Free
IN1551-018_IN1551-002	IN1551-018	1102.12	IN1551-002	1101.79	Circular		1	1.25	0.011	0.25	0.5	None (,)	100.344	Free
IN1551-019_IN1551-018	IN1551-019	1102.65	IN1551-018	1102.12	Circular		1	1	0.011	0.5	0.25	None (,)	152.852	Free
IN1551-020_IN1551-019	IN1551-020	1102.78	IN1551-019	1102.65	Circular		1	1	0.011	0.5	0.5	None (,)	24.34	Free
IN1551-021_IN1551-019	IN1551-021	1102.79	IN1551-019	1102.65	Circular		1	1	0.011	0.5	0.5	None (,)	28.435	Free
IN1551-023_IN1551-011	IN1551-023	1108.48	IN1551-011	1105.24	Circular		1	2	0.013	0.05	0.05	None (,)	191.098	Free
IN1551-024_IN1551-023	IN1551-024	1112.31	IN1551-023	1108.48	Circular		1	1	0.013	0.5	0.05	None (,)	75.961	Free
IN1551-025_IN1551-024	IN1551-025	1112.76	IN1551-024	1112.31	Circular		1	1	0.013	0.5	0.5	None (,)	29.606	Free
IN1551-026_IN1551-023	IN1551-026	1109.58	IN1551-023	1108.48	Circular		1	1.5	0.013	0.05	0.5	None (,)	28.003	Free
IN1551-027_IN1551-026	IN1551-027	1110.35	IN1551-026	1109.58	Circular		1	1.5	0.013	0.5	0.05	None (,)	43.428	Free
IN1551-028_IN1551-027	IN1551-028	1110.82	IN1551-027	1110.35	Circular		1	1	0.013	0.5	0.5	None (,)	10.258	Free
IN1551-029_IN1551-027	IN1551-029	1110.89	IN1551-027	1110.35	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.834	Free
IN1551-030_IN1551-029	IN1551-030	1111.21	IN1551-029	1110.89	Circular		1	1	0.013	0.5	0.5	None (,)	9.786	Free
IN1646-001_IN1647-067	IN1646-001	1094.69	IN1647-067	1094.5	Circular		1	1	0.013	0.5	0.5	None (,)	43.69	Free
IN1647-003_IN1647-004	IN1647-003	1088.34	IN1647-004	1086.5	Circular		1	2	0.013	0.25	0.05	None (,)	153.121	Free
IN1647-004_AS1647-006	IN1647-004	1086.5	AS1647-006	1085.6	Circular		1	2.25	0.013	0.05	0.05	None (,)	48.591	Free
IN1647-005_IN1647-004	IN1647-005	1088.86	IN1647-004	1086.5	Circular		1	1	0.013	0.5	0.5	None (,)	30.911	Free
IN1647-007_AS1647-006	IN1647-007	1087.37	AS1647-006	1085.6	Circular		1	1.5	0.013	0.05	0.5	None (,)	25.084	Free
IN1647-008_IN1647-007	IN1647-008	1088.07	IN1647-007	1087.37	Circular		1	1	0.013	0.5	0.05	None (,)	10.093	Free
IN1647-009_IN1647-007	IN1647-009	1087.77	IN1647-007	1087.37	Circular		1	1.25	0.013	0.5	0.5	None (,)	27.745	Free
IN1647-010_IN1647-009	IN1647-010	1088.07	IN1647-009	1087.77	Circular		1	1	0.013	0.5	0.5	None (,)	8.681	Free
IN1647-011_AS1647-006	IN1647-011	1087.37	AS1647-006	1085.6	Circular		1	1.5	0.013	0.5	0.05	None (,)	61.407	Free
IN1647-012_IN1647-011	IN1647-012	1088.07	IN1647-011	1087.37	Circular		1	1	0.013	0.5	0.05	None (,)	7.785	Free
IN1647-013_IN1647-011	IN1647-013	1087.77	IN1647-011	1087.37	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.061	Free
IN1647-014_IN1647-013	IN1647-014	1088.02	IN1647-013	1087.77	Circular		1	1	0.013	0.5	0.5	None (,)	8.337	Free
IN1647-016_IN1647-017	IN1647-016	1082.86	IN1647-017	1082.45	Circular		1	1	0.013	0.5	0.5	None (,)	25.555	Free
IN1647-017_AS1647-018	IN1647-017	1082.45	AS1647-018	1080.39	Circular		1	1.25	0.013	0.5	0.25	None (,)	42.166	Free
IN1647-019_AS1647-018	IN1647-019	1081.63	AS1647-018	1080.39	Circular		1	1.5	0.013	0.5	0.5	None (,)	43.849	Free
IN1647-020_IN1647-019	IN1647-020	1082.32	IN1647-019	1081.63	Circular		1	1	0.013	0.5	0.05	None (,)	11.115	Free
IN1647-021_IN1647-019	IN1647-021	1082.03	IN1647-019	1081.63	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.54	Free
IN1647-022_IN1647-021	IN1647-022	1082.33	IN1647-021	1082.03	Circular		1	1	0.013	0.5	0.5	None (,)	12.147	Free
IN1647-023_AS1647-024	IN1647-023	1080.16	AS1647-024	1077.6	Circular		1	2.5	0.013	0.25	0.05	None (,)	314.361	Free
IN1647-025_AS1647-024	IN1647-025	1080.87	AS1647-024	1077.6	Circular		1	1	0.013	0.5	0.5	None (,)	6.5	Free
IN1647-026_AS1647-024	IN1647-026	1080.87	AS1647-024	1077.6	Circular		1	1	0.013	0.5	0.5	None (,)	21.281	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1647-028_AS1647-027	IN1647-028	1079.16	AS1647-027	1075.26	Circular		1	1	0.013	0.5	0.5	None (,)	21.281	Free
IN1647-029_AS1647-027	IN1647-029	1079.12	AS1647-027	1075.26	Circular		1	1	0.013	0.5	0.5	None (,)	8.199	Free
IN1647-030_AS1647-027	IN1647-030	1077.51	AS1647-027	1075.26	Circular		1	1.5	0.013	0.25	0.5	None (,)	49.351	Free
IN1647-032_IN1647-030	IN1647-032	1078.32	IN1647-030	1077.51	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.097	Free
IN1647-033_IN147-032	IN1647-033	1078.62	IN1647-032	1078.32	Circular		1	1	0.013	0.5	0.5	None (,)	7.994	Free
IN1647-034_IN1647-030	IN1647-034	1077.56	IN1647-030	1077.51	Circular		1	1.5	0.013	0.05	0.25	None (,)	11.548	Free
IN1647-037_IN1647-030	IN1647-037	1078.33	IN1647-034	1077.56	Circular		1	1.5	0.013	0.5	0.05	None (,)	110.85	Free
IN1647-039_IN1647-037	IN1647-039	1078.53	IN1647-037	1078.33	Circular		1	1.5	0.013	0.25	0.25	None (,)	53.637	Free
IN1647-041_AS1647-040	IN1647-041	1079.44	AS1647-040	1078.7	Circular		1	1.5	0.013	0.25	0.25	None (,)	147.324	Free
IN1647-042_IN1647-041	IN1647-042	1080.71	IN1647-041	1079.44	Circular		1	1	0.013	0.5	0.5	None (,)	27.372	Free
IN1647-045_AS1647-044	IN1647-045	1082.91	AS1647-044	1081.03	Circular		1	1.25	0.013	0.5	0.5	None (,)	27.506	Free
IN1647-046_IN1647-045	IN1647-046	1083.21	IN1647-045	1082.91	Circular		1	1	0.013	0.5	0.5	None (,)	14.859	Free
IN1647-050_IN1647-051	IN1647-050	1083.6	IN1647-051	1083.56	Circular		1	3	0.013	0.05	0.05	None (,)	9.389	Free
IN1647-051_AS1647-052	IN1647-051	1083.56	AS1647-052	1081.79	Circular		1	3	0.013	0.05	0.5	None (,)	53.432	Free
IN1647-054_IN1647-053	IN1647-054	1085.6	IN1647-053	1084.6	Circular		1	1	0.013	0.5	0.5	None (,)	9.389	Free
IN1647-055_AS1647-056	IN1647-055	1083.9	AS1647-056	1083.7	Circular		1	1	0.013	0.5	0.5	None (,)	15.127	Free
IN1647-058_AS1647-056	IN1647-058	1085.91	AS1647-056	1083.7	Circular		1	1	0.013	0.5	0.5	None (,)	15.411	Free
IN1647-060_AS1647-059	IN1647-060	1084.25	AS1647-059	1080.79	Circular		1	1	0.013	0.5	0.05	None (,)	5.524	Free
IN1647-061_IN1647-060	IN1647-061	1084.25	AS1647-059	1080.79	Circular		1	1	0.013	0.5	0.05	None (,)	26.069	Free
IN1647-063_IN1647-064	IN1647-063	1096.75	IN1647-064	1096.18	Circular		1	1	0.013	0.5	0.05	None (,)	116.148	Free
IN1647-064_IN1647-065	IN1647-064	1096.18	IN1647-065	1093.49	Circular		1	1	0.013	0.05	0.05	None (,)	211.372	Free
IN1647-065_AS1647-002	IN1647-065	1093.49	AS1647-002	1092.47	Circular		1	1.25	0.013	0.05	0.5	None (,)	203.868	Free
IN1647-067_AS1647-002	IN1647-067	1094.5	AS1647-002	1092.47	Circular		1	2	0.013	0.05	0.5	None (,)	83.716	Free
IN1647-068_IN1647-067	IN1647-068	1097.5	IN1647-067	1094.5	Circular		1	2	0.013	0.5	0.05	None (,)	116.012	Free
IN1647-069_IN1647-068	IN1647-069	1097.55	IN1647-068	1097.5	Circular		1	1	0.013	0.5	0.5	None (,)	12.438	Free
IN1648-001_IN1648-002	IN1648-001	1079.4	IN1648-002	1079.1	Circular		1	1	0.013	0.5	0.5	None (,)	10.062	Free
IN1648-002_AS1648-003	IN1648-002	1079.1	AS1648-003	1079.02	Circular		1	1.25	0.013	0.5	0.5	None (,)	13.25	Free
IN1648-004_IN1648-005	IN1648-004	1079.4	IN1648-005	1079.1	Circular		1	1	0.013	0.5	0.5	None (,)	9.981	Free
IN1648-005_AS1648-003	IN1648-005	1079.1	AS1648-003	1079.02	Circular		1	1.25	0.013	0.5	0.5	None (,)	13.32	Free
IN1648-010_AS1648-009	IN1648-010	1080.52	AS1648-009	1078.24	Circular		1	1.25	0.013	0.5	0.5	None (,)	3.414	Free
IN1648-010_WW	IN1648-021	1080.97	WINDINGWAY_BLIND_CON	1080	Circular		1	1	0.013	0.5	0.5	None (,)	14.438	Free
IN1648-011_IN1648-010	IN1648-011	1080.82	IN1648-010	1080.52	Circular		1	1	0.013	0.5	0.5	None (,)	9.04	Free
IN1648-012_IN1648-013	IN1648-012	1080.92	IN1648-013	1080.62	Circular		1	1	0.013	0.5	0.5	None (,)	9.025	Free
IN1648-013_AS1648-009	IN1648-013	1080.62	AS1648-009	1078.24	Circular		1	1.25	0.013	0.5	0.5	None (,)	23.314	Free
IN1648-016_AS1648-015	IN1648-016	1080.85	AS1648-015	1080.56	Circular		1	1.25	0.013	0.5	0.5	None (,)	5.745	Free
IN1648-017_IN1648-016	IN1648-017	1081.15	IN1648-016	1080.85	Circular		1	1	0.013	0.5	0.5	None (,)	9.761	Free
IN1648-018_IN1648-016	IN1648-018	1081.29	IN1648-016	1080.85	Circular		1	1	0.013	0.5	0.5	None (,)	40.406	Free
IN1648-019_AS1648-015	IN1648-019	1080.93	AS1648-015	1080.56	Circular		1	1.25	0.013	0.5	0.5	None (,)	21.74	Free
IN1648-020_IN1648-019	IN1648-020	1081.23	IN1648-019	1080.93	Circular		1	1	0.013	0.5	0.5	None (,)	10.312	Free
IN1648-023_AS1648-022	IN1648-023	1077.22	AS1648-022	1074.51	Circular		1	1	0.013	0.5	0.5	None (,)	21.662	Free
IN1648-024_AS1648-022	IN1648-024	1077.14	AS1648-022	1074.51	Circular		1	1	0.013	0.5	0.5	None (,)	7.527	Free
IN1648-025_AS1648-008	IN1648-025	1079.2	AS1648-008	1078.82	Circular		1	3.5	0.013	0.05	0.25	None (,)	59.781	Free
IN1648-026_IN1648-025	IN1648-026	1082.57	IN1648-025	1079.2	Circular		1	1	0.013	0.5	0.5	None (,)	28.454	Free
IN1648-027_IN1648-025	IN1648-027	1079.81	IN1648-025	1079.2	Circular		1	3.5	0.013	0.05	0.05	None (,)	116.674	Free
IN1648-028_IN1748-025	IN1648-028	1076.4	IN1748-025	1076.25	Circular		1	1.5	0.013	0.5	0.5	None (,)	171.007	Free
IN1648-030_IN1648-031	IN1648-030	1086.9	IN1648-031	1086.71	Circular		1	1.5	0.013	0.25	0.25	None (,)	31.574	Free
IN1648-031_IN1648-032	IN1648-031	1086.71	IN1648-032	1086.26	Circular		1	1.5	0.013	0.25	0.25	None (,)	29.373	Free
IN1648-032_IN1648-033	IN1648-032	1086.26	IN1648-033	1085.26	Circular		1	1.75	0.013	0.25	0.25	None (,)	31.115	Free
IN1648-033_AS1648-043	IN1648-033	1085.26	AS1648-043	1084.01	Circular		1	1.75	0.013	0.25	0.25	None (,)	209.845	Free
IN1648-034_IN1648-030	IN1648-034	1087.33	IN1648-030	1086.9	Circular		1	1.25	0.013	0.5	0.5	None (,)	29.572	Free
IN1648-036_IN1648-037	IN1648-036	1077.21	IN1648-037	1076.45	Circular		1	2	0.013	0.25	0.5	None (,)	68.4	Free
IN1648-037_IN1648-038	IN1648-037	1076.45	IN1648-038	1076.29	Circular		1	2.25	0.013	0.5	0.05	None (,)	27.034	Free
IN1648-038_AE1648-039	IN1648-038	1076.29	AE1648-039	1076.1	Circular		1	2.25	0.013	0.05	1	0	31	Free
IN1648-040_IN1648-030	IN1648-040	1087.85	IN1648-030	1086.9	Circular		1	1	0.013	0.05	0.25	None (,)	73.635	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1648-041_IN1648-040	IN1648-041	1091.11	IN1648-040	1087.85	Circular		1	1	0.013	0.25	0.05	None (,)	66.667	Free
IN1648-042_IN1648-041	IN1648-042	1092.3	IN1648-041	1091.11	Circular		1	1	0.013	0.5	0.25	None (,)	29.829	Free
IN1648-044_AE1648-046	IN1648-044	1083.33	AE1648-046	1076.1	Circular		1	2	0.013	0.05	1	0	184	Free
IN1648-045_IN1648-044	IN1648-045	1084.05	IN1648-044	1083.33	Circular		1	1	0.013	0.5	0.5	None (,)	8.672	Free
IN1648-048_IN1648-027	IN1648-048	1088.13	IN1648-027	1079.81	Circular		1	1	0.013	0.5	0.5	None (,)	153.669	Free
IN1649-001_IN1649-002	IN1649-001	1086.18	IN1649-002	1085.73	Circular		1	1.25	0.013	0.5	0.05	None (,)	26.005	Free
IN1649-002_AE1648-035	IN1649-002	1085.73	AE1648-035	1079.6	Circular		1	1.5	0.013	0.05	1	0	145	Free
IN1649-003_IN1649-004	IN1649-003	1082.5	IN1649-004	1078.98	Circular		1	2	0.013	0.05	0.05	None (,)	57.022	Free
IN1649-004_IN1648-036	IN1649-004	1078.98	IN1648-036	1077.21	Circular		1	2	0.013	0.05	0.05	None (,)	340.117	Free
IN1649-005_IN1649-003	IN1649-005	1088.83	IN1649-003	1082.5	Circular		1	1.75	0.013	0.05	0.25	None (,)	104.342	Free
IN1649-006_IN1649-003	IN1649-006	1084.6	IN1649-003	1082.5	Circular		1	1.25	0.013	0.25	0.5	None (,)	27.705	Free
IN1649-007_IN1649-006	IN1649-007	1086.04	IN1649-006	1084.6	Circular		1	1.25	0.013	0.25	0.25	None (,)	35.016	Free
IN1649-008_IN1649-007	IN1649-008	1087.69	IN1649-007	1086.04	Circular		1	1	0.013	0.25	0.25	None (,)	25.906	Free
IN1649-009_IN1649-008	IN1649-009	1089.19	IN1649-008	1087.69	Circular		1	1	0.013	0.25	0.25	None (,)	33.93	Free
IN1649-010_IN1649-005	IN1649-010	1101.12	IN1649-005	1088.83	Circular		1	1.5	0.013	0.25	0.05	None (,)	208.516	Free
IN1649-011_IN1649-010	IN1649-011	1102.15	IN1649-010	1101.12	Circular		1	1.5	0.013	0.05	0.25	None (,)	31.262	Free
IN1649-012_IN1649-011	IN1649-012	1106.83	IN1649-011	1102.15	Circular		1	1	0.013	0.5	0.25	None (,)	74.57	Free
IN1649-013_IN1649-011	IN1649-013	1103.87	IN1649-011	1102.15	Circular		1	1.5	0.013	0.25	0.25	None (,)	29.775	Free
IN1649-014_IN1649-013	IN1649-014	1104.87	IN1649-013	1103.87	Circular		1	1	0.013	0.25	0.25	None (,)	63.863	Free
IN1649-015_IN1649-014	IN1649-015	1105.54	IN1649-014	1104.87	Circular		1	1	0.013	0.5	0.25	None (,)	46.774	Free
IN1649-016_IN1749-010	IN1649-016	1101.79	IN1749-010	1089.94	Circular		1	1.25	0.013	0.05	0.5	None (,)	275.213	Free
IN1649-017_IN1649-016	IN1649-017	1102.23	IN1649-016	1101.79	Circular		1	1	0.013	0.5	0.5	None (,)	15.104	Free
IN1649-018_IN1649-016	IN1649-018	1102.26	IN1649-016	1101.79	Circular		1	1	0.013	0.5	0.5	None (,)	26.042	Free
IN1649-019_IN1649-016	IN1649-019	1113.18	IN1649-016	1101.79	Circular		1	1	0.013	0.25	0.05	None (,)	350.522	Free
IN1649-020_IN1649-019	IN1649-020	1113.23	IN1649-019	1113.18	Circular		1	1	0.013	0.05	0.5	None (,)	13.062	Free
IN1649-021_IN1649-019	IN1649-021	1114.2	IN1649-019	1113.18	Circular		1	1	0.013	0.5	0.25	None (,)	76.428	Free
IN1650-001_IN1649-018	IN1650-001	1102.44	IN1649-018	1102.26	Circular		1	1	0.013	0.5	0.05	None (,)	14.62	Free
IN1650-002_IN1649-020	IN1650-002	1113.4	IN1649-020	1113.23	Circular		1	1	0.013	0.5	0.05	None (,)	28.168	Free
IN1650-009_AS1650-008	IN1650-009	1091.28	AS1650-008	1090.41	Circular		1	2	0.013	0.05	0.05	None (,)	294.411	Free
IN1650-009_DEP_TRANSFER	IN1650-009_DEPRESSION	1097.72	IN1650-009	1097.71	Trapezoidal		1	1	0.001	0	0	None (,)	27.687	Free
IN1650-010_IN1650-009	IN1650-010	1091.94	IN1650-009	1091.28	Circular		1	1	0.013	0.5	0.5	None (,)	35.999	Free
IN1653-007_AE1653-008	IN1653-007	1095.8	AE1653-008	1094.5	Circular		1	3	0.013	0.05	1	0	47.002	Free
IN1653-009_IN1653-007	IN1653-009	1098.04	IN1653-007	1095.8	Circular		1	1.5	0.013	0.5	0.05	0	45.543	Free
IN1653-010_IN1653-007	IN1653-010	1096.86	IN1653-007	1095.8	Circular		1	3	0.013	0.05	0.5	0	105.372	Free
IN1653-011_IN1653-010	IN1653-011	1100.82	IN1653-010	1096.86	Circular		1	3	0.013	0.05	0.05	0	185.036	Free
IN1653-012_IN1653-011	IN1653-012	1103.8	IN1653-011	1101.82	Circular		1	2	0.013	0.25	0.25	0	36.937	Free
IN1653-013_IN1653-012	IN1653-013	1104.5	IN1653-012	1103.8	Circular		1	1.5	0.013	0.5	0.25	0	31.355	Free
IN1653-014_IN1653-011	IN1653-014	1101.86	IN1653-011	1100.82	Circular		1	3	0.013	0.05	0.25	0	161.22	Free
IN1653-016_IN1653-014	IN1653-016	1102.22	IN1653-014	1101.86	Circular		1	3	0.013	0.05	0.05	0	75.387	Free
IN1653-018_IN1653-016	IN1653-018	1104.2	IN1653-016	1102.22	Circular		1	1.75	0.013	0.15	0.15	0	176.112	Free
IN1653-020_IN1653-018	IN1653-020	1105.28	IN1653-018	1104.2	Circular		1	1.5	0.013	0.05	0.15	0	169.666	Free
IN1653-023_IN1653-020	IN1653-023	1105.53	IN1653-020	1105.28	Circular		1	1.5	0.013	0.25	0.05	0	50.407	Free
IN1653-025_IN1653-012	IN1653-025	1104.6	IN1653-012	1103.8	Circular		1	1.75	0.013	0.25	0.25	0	112.319	Free
IN1653-026_IN1653-025	IN1653-026	1105.37	IN1653-025	1104.6	Circular		1	1.75	0.013	0.25	0.25	0	157.972	Free
IN1654-003_IN1754-026	IN1654-003	1104.84	IN1754-026	1103	Circular		1	1.75	0.013	0.25	0.25	0	82.452	Free
IN1654-004_IN1654_003	IN1654-004	1105.81	IN1654-003	1104.84	Circular		1	1.75	0.013	0.5	0.5	0	35.007	Free
IN1654-005_1654-004	IN1654-005	1108.25	IN1654-004	1105.81	Circular		1	1.5	0.013	0.05	0.5	0	118.67	Free
IN1654-006_IN1654-005	IN1654-006	1113.72	IN1654-005	1108.25	Circular		1	1.5	0.013	0.05	0.05	0	134.342	Free
IN1654-007_IN1754-032	IN1654-007	1120.7	IN1754-032	1112.4	Circular		1	1.5	0.013	0.5	0.05	0	179.264	Free
IN1654-008_IN1654-006	IN1654-008	1117.32	IN1654-006	1113.72	Circular		1	1.25	0.013	0.5	0.05	0	241.778	Free
IN1654-053_IN1647-051	IN1647-053	1084.6	IN1647-051	1083.56	Circular		1	1.25	0.013	0.5	0.5	None (,)	27.083	Free
IN1746-006_IN1750-030	IN1749-006	1089.6	IN1750-030	1088.53	Circular		1	1	0.013	0.5	0.05	None (,)	21.38	Free
IN1747-005_AS1747-004	IN1747-005	1079.56	AS1747-004	1077.72	Circular		1	1	0.013	0.5	0.5	None (,)	6.733	Free
IN1747-006_AS1747-004	IN1747-006	1079.56	AS1747-004	1077.72	Circular		1	1	0.013	0.5	0.5	None (,)	21.705	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1747-009_AS1747-007	IN1747-009	1098	AS1747-007	1085.87	Circular		1	1	0.013	0.5	0.25	None (,)	55.191	Free
IN1747-011_AS1747-010	IN1747-011	1087.14	AS1747-010	1086.72	Circular		1	1.5	0.013	0.25	0.25	None (,)	32.804	Free
IN1747-012_IN1747-011	IN1747-012	1087.19	IN1747-011	1087.14	Circular		1	1.5	0.013	0.05	0.25	None (,)	10.603	Free
IN1747-013_IN1747-012	IN1747-013	1087.73	IN1747-012	1087.19	Circular		1	1	0.013	0.5	0.05	None (,)	9.412	Free
IN1747-014_AS1747-010	IN1747-014	1087	AS1747-010	1086.72	Circular		1	1.5	0.013	0.5	0.5	None (,)	8.795	Free
IN1747-015_IN1747-014	IN1747-015	1087.37	IN1747-014	1087	Circular		1	1.5	0.013	0.05	0.5	None (,)	75.663	Free
IN1747-016_IN1747-015	IN1747-016	1087.91	IN1747-015	1087.37	Circular		1	1	0.013	0.5	0.05	None (,)	10.259	Free
IN1747-020_AS1747-019	IN1747-020	1077.87	AS1747-019	1073.05	Circular		1	1	0.013	0.5	0.5	None (,)	7.61	Free
IN1747-021_AS1747-019	IN1747-021	1077.16	AS1747-019	1073.05	Circular		1	1.25	0.013	0.5	0.5	None (,)	20.622	Free
IN1747-022_IN1747-021	IN1747-022	1077.77	IN1747-021	1077.16	Circular		1	1	0.013	0.5	0.5	None (,)	11.479	Free
IN1747-024_AS1847-022	IN1747-024	1064.15	AS1847-022	1064.09	Circular		1	1.25	0.013	0.05	0.05	0	32.323	Free
IN1747-025_IN1747-024	IN1747-025	1064.25	IN1747-024	1064.15	Circular		1	1.25	0.013	0.05	0.05	0	63.21	Free
IN1747-026_IN1747-025	IN1747-026	1064.53	IN1747-025	1064.25	Circular		1	1.25	0.013	0.5	0.05	0	177.089	Free
IN1747-027_IN1747-026	IN1747-027	1064.54	IN1747-026	1064.53	Circular		1	0.667	0.013	0.5	0.5	0	11.111	Free
IN1747-028_IN1747-029	IN1747-028	1086.75	IN1747-029	1086.33	Circular		1	1	0.013	0.5	0.05	0	50.714	Free
IN1747-029_AE1746-001	IN1747-029	1086.33	AE1746-001	1086	Circular		1	1	0.013	0.5	0.5	0	26.812	Free
IN1748-004_AS1748-003	IN1748-004	1075.3	AS1748-003	1071.9	Circular		1	1	0.013	0.5	0.5	None (,)	37.803	Free
IN1748-008_AS1748-007	IN1748-008	1074.05	AS1748-007	1072.1	Circular		1	1.5	0.013	0.5	0.5	None (,)	23.845	Free
IN1748-009_AS1748-007	IN1748-009	1074.05	AS1748-007	1072.1	Circular		1	1.5	0.013	0.5	0.5	None (,)	10.524	Free
IN1748-012_AS1748-011	IN1748-012	1075.55	AS1748-011	1072.06	Circular		1	1.25	0.013	0.5	0.5	None (,)	8.104	Free
IN1748-013_AS1748-011	IN1748-013	1074.55	AS1748-011	1072.06	Circular		1	1.25	0.013	0.5	0.5	None (,)	24.298	Free
IN1748-015_AS1748-014	IN1748-015	1075.3	AS1748-014	1072.36	Circular		1	1	0.013	0.5	0.5	None (,)	7.211	Free
IN1748-016_AS1748-014	IN1748-016	1075.3	AS1748-014	1072.36	Circular		1	1	0.013	0.5	0.5	None (,)	22.302	Free
IN1748-023_AS1748-024	IN1748-023	1076.4	AS1748-024	1075.18	Circular		1	1.75	0.013	0.25	0.05	None (,)	216.647	Free
IN1748-025_AS1748-024	IN1748-025	1076.25	AS1748-024	1075.18	Circular		1	1.5	0.013	0.5	0.5	None (,)	40.603	Free
IN1748-026_AS1748-024	IN1748-026	1076.25	AS1748-024	1075.18	Circular		1	1	0.013	0.5	0.5	None (,)	23.43	Free
IN1748-027_IN1748-025	IN1748-027	1076.41	IN1748-025	1076.25	Circular		1	1	0.013	0.5	0.5	None (,)	8.665	Free
IN1748-028_IN1748-025	IN1748-028	1076.01	IN1748-025	1076.25	Circular		1	1.5	0.013	0.5	0.5	None (,)	27.159	Free
IN1748-029_IN1748-028	IN1748-029	1076.56	IN1748-028	1076.01	Circular		1	1	0.013	0.5	0.5	None (,)	8.882	Free
IN1748-030_IN1748-028	IN1748-030	1076.67	IN1748-028	1076.01	Circular		1	1	0.013	0.5	0.25	None (,)	33.541	Free
IN1748-031_IN1748-026	IN1748-031	1076.41	IN1748-026	1076.25	Circular		1	1	0.013	0.5	0.5	None (,)	23.179	Free
IN1748-032_IN1748-008	IN1748-032	1074.6	IN1748-008	1074.05	Circular		1	1	0.013	0.5	0.5	None (,)	10.569	Free
IN1748-033_IN1748-009	IN1748-033	1074.6	IN1748-009	1074.05	Circular		1	1	0.013	0.5	0.5	None (,)	10.771	Free
IN1749-001_IN1749-002	IN1749-001	1078.76	IN1749-002	1078.01	Circular		1	1	0.013	0.5	0.5	None (,)	32.394	Free
IN1749-002_IN1749-003	IN1749-002	1078.01	IN1749-003	1077.4	Circular		1	1.75	0.013	0.5	0.25	None (,)	128.925	Free
IN1749-003_IN1748-023	IN1749-003	1077.4	IN1748-023	1076.4	Circular		1	1.75	0.013	0.25	0.25	None (,)	206.225	Free
IN1749-007_IN1750-032	IN1749-007	1088.28	IN1750-032	1088.17	Circular		1	1.5	0.013	0.05	0.05	None (,)	27.22	Free
IN1749-008_IN1749-007	IN1749-008	1088.42	IN1749-007	1088.28	Circular		1	1.5	0.013	0.5	0.05	None (,)	24.796	Free
IN1749-009_IN1749-008	IN1749-009	1088.72	IN1749-008	1088.42	Circular		1	1	0.013	0.5	0.5	None (,)	13.787	Free
IN1749-010_IN1750-035	IN1749-010	1089.94	IN1750-035	1089.72	Circular		1	1.5	0.013	0.25	0.25	None (,)	48.789	Free
IN1749-011_IN1749-010	IN1749-011	1092.59	IN1749-010	1089.94	Circular		1	1	0.013	0.5	0.25	None (,)	14.89	Free
IN1750-001_IN1750-023	IN1750-001	1084.32	IN1750-023	1083.98	Circular		1	2	0.013	0.25	0.25	None (,)	64.997	Free
IN1750-002_IN1750-001	IN1750-002	1084.55	IN1750-001	1084.32	Circular		1	2	0.013	0.25	0.25	None (,)	45.262	Free
IN1750-003_IN1750-002	IN1750-003	1084.81	IN1750-002	1084.55	Circular		1	2	0.013	0.25	0.25	None (,)	53.184	Free
IN1750-004_IN1750-003	IN1750-004	1085.31	IN1750-003	1084.81	Circular		1	2	0.013	0.05	0.25	None (,)	103.426	Free
IN1750-005_IN1750-004	IN1750-005	1101.96	IN1750-004	1085.31	Circular		1	1.25	0.013	0.5	0.5	None (,)	42.91	Free
IN1750-008_IN1750-017	IN1750-008	1085.22	IN1750-017	1077.6	Circular		1	1.75	0.013	0.5	0.5	None (,)	120.718	Free
IN1750-009_IN1750-008	IN1750-009	1086.6	IN1750-008	1085.22	Circular		1	1.5	0.013	0.05	0.5	None (,)	46.631	Free
IN1750-010_IN1750-009	IN1750-010	1088.74	IN1750-009	1086.6	Circular		1	1.5	0.013	0.5	0.05	None (,)	86.802	Free
IN1750-011_IN1750-008	IN1750-011	1086.94	IN1750-008	1085.22	Circular		1	1.5	0.013	0.25	0.25	None (,)	56.936	Free
IN1750-012_IN1750-011	IN1750-012	1087.54	IN1750-011	1086.94	Circular		1	1	0.013	0.5	0.5	None (,)	12.241	Free
IN1750-013_IN1750-011	IN1750-013	1087.42	IN1750-011	1086.94	Circular		1	1.25	0.013	0.5	0.25	None (,)	43.163	Free
IN1750-014_IN1750-013	IN1750-014	1087.72	IN1750-013	1087.42	Circular		1	1	0.013	0.5	0.5	None (,)	10.293	Free
IN1750-015_IN1750-029	IN1750-015	1087.5	IN1750-029	1086.4	Circular		1	1.75	0.013	0.05	0.05	None (,)	109.392	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1750-017_IN1750-018	IN1750-017	1077.6	IN1750-018	1077.32	Circular		1	3	0.013	0.5	0.25	None (,)	30.256	Free
IN1750-018_AS1750-024	IN1750-018	1077.32	AS1750-024	1076.04	Circular		1	3	0.013	0.25	0.5	None (,)	256.7	Free
IN1750-019_IN1750-020	IN1750-019	1082.6	IN1750-020	1079.74	Circular		1	3.5	0.013	0.5	0.05	None (,)	27.072	Free
IN1750-020_AE1750-025	IN1750-020	1079.74	AE1750-025	1076.6	Circular		1	3.5	0.013	0.5	1	None (,)	110	Free
IN1750-021_IN1750-020	IN1750-021	1094.16	IN1750-020	1094	Circular		1	1	0.013	0.5	0.5	None (,)	10.957	Free
IN1750-022_IN1750-019	IN1750-022	1083.66	IN1750-019	1082.6	Circular		1	2	0.013	0.25	0.5	None (,)	212.481	Free
IN1750-023_IN1750-022	IN1750-023	1083.98	IN1750-022	1083.66	Circular		1	2	0.013	0.25	0.25	None (,)	62.731	Free
IN1750-029_AS1750-024	IN1750-029	1086.4	AS1750-024	1076.04	Circular		1	1.75	0.013	0.05	0.05	None (,)	104.938	Free
IN1750-030_IN1750-029	IN1750-030	1088.53	IN1750-029	1086.4	Circular		1	1	0.013	0.05	0.5	None (,)	13.849	Free
IN1750-031_IN1750-015	IN1750-031	1088.04	IN1750-015	1087.5	Circular		1	1.75	0.013	0.05	0.05	None (,)	106.037	Free
IN1750-032_IN1750-031	IN1750-032	1088.17	IN1750-031	1088.04	Circular		1	1.5	0.013	0.05	0.5	None (,)	19.058	Free
IN1750-033_IN1750-031	IN1750-033	1088.09	IN1750-031	1088.04	Circular		1	1.5	0.013	0.05	0.05	None (,)	11.67	Free
IN1750-034_IN1750-033	IN1750-034	1089.56	IN1750-033	1088.09	Circular		1	1.5	0.013	0.25	0.05	None (,)	297.245	Free
IN1750-035_IN1750-034	IN1750-035	1089.72	IN1750-034	1089.56	Circular		1	1.5	0.013	0.25	0.25	None (,)	27.956	Free
IN1750-036_IN1750-004	IN1750-036	1086.6	IN1750-004	1085.31	Circular		1	1.75	0.013	0.5	0.05	None (,)	267.025	Free
IN1751-001_IN1751-006	IN1751-001	1092.6	IN1751-006	1091.58	Circular		1	1.75	0.013	0.05	0.05	None (,)	205.107	Free
IN1751-002_IN1751-001	IN1751-002	1104.58	IN1751-001	1092.6	Circular		1	1.5	0.013	0.25	0.25	None (,)	40.597	Free
IN1751-003_IN1751-002	IN1751-003	1105.13	IN1751-002	1104.58	Circular		1	1.25	0.013	0.5	0.25	None (,)	29.962	Free
IN1751-004_IN1751-001	IN1751-004	1093.04	IN1751-001	1092.6	Circular		1	1.75	0.013	0.05	0.05	None (,)	90.013	Free
IN1751-005_IN1751-004	IN1751-005	1106.04	IN1751-004	1093.04	Circular		1	1.25	0.013	0.5	0.25	None (,)	51.341	Free
IN1751-006_IN1751-008	IN1751-006	1091.58	IN1751-008	1087.6	Circular		1	1.75	0.013	0.05	0.05	None (,)	388.183	Free
IN1751-007_IN1751-006	IN1751-007	1102.37	IN1751-006	1091.58	Circular		1	1.25	0.013	0.5	0.25	None (,)	63.8	Free
IN1751-008_AS1751-010	IN1751-008	1087.6	AS1751-010	1086.67	Circular		1	2	0.013	0.05	0.5	None (,)	33.35	Free
IN1751-009_IN1751-008	IN1751-009	1096.3	IN1751-008	1087.6	Circular		1	1.25	0.013	0.5	0.5	None (,)	44.705	Free
IN1751-011_AS1751-010	IN1751-011	1086.78	AS1751-010	1086.67	Circular		1	2	0.013	0.05	0.05	None (,)	17.172	Free
IN1751-012_IN1751-011	IN1751-012	1094.41	IN1751-011	1086.78	Circular		1	1	0.013	0.5	0.5	None (,)	27.539	Free
IN1751-013_AS1751-010	IN1751-013	1092.9	AS1751-010	1086.67	Circular		1	1	0.013	0.5	0.5	None (,)	160.151	Free
IN1751-014_IN1751-013	IN1751-014	1093.4	IN1751-013	1092.9	Circular		1	1	0.013	0.5	0.5	None (,)	43.342	Free
IN1751-016_IN1751-020	IN1751-016	1084.8	IN1751-020	1084.2	Circular		1	2.5	0.013	0.05	0.25	None (,)	121.539	Free
IN1751-017_IN1751-016	IN1751-017	1095.53	IN1751-016	1084.8	Circular		1	1	0.013	0.5	0.25	0	37.997	Free
IN1751-018_IN1751-016	IN1751-018	1094.62	IN1751-016	1084.8	Circular		1	1.25	0.013	0.25	0.25	None (,)	44.839	Free
IN1751-019_IN1751-018	IN1751-019	1095.17	IN1751-018	1094.62	Circular		1	1	0.013	0.5	0.25	None (,)	26.941	Free
IN1751-020_IN1751-022	IN1751-020	1084.2	IN1751-022	1083.86	Circular		1	2.5	0.013	0.25	0.25	None (,)	68.56	Free
IN1751-021_IN1751-020	IN1751-021	1094.73	IN1751-020	1084.2	Circular		1	1	0.013	0.5	0.5	None (,)	29.776	Free
IN1751-022_IN1750-019	IN1751-022	1083.86	IN1750-019	1082.6	Circular		1	2.5	0.013	0.25	0.5	None (,)	52.173	Free
IN1751-023_MI1751-024	IN1751-023	1087.91	MI1751-024	1087.35	Circular		1	2	0.013	0.05	0.05	None (,)	112.332	Free
IN1751-025_IN1751-023	IN1751-025	1088.29	IN1751-023	1087.91	Circular		1	2	0.013	0.05	0.05	None (,)	74.058	Free
IN1751-026_IN1751-023	IN1751-026	1097.45	IN1751-023	1087.91	Circular		1	1.25	0.013	0.25	0.5	None (,)	64.212	Free
IN1751-027_IN1751-026	IN1751-027	1098	IN1751-026	1097.45	Circular		1	1	0.013	0.5	0.5	None (,)	27.959	Free
IN1751-028_IN1751-023	IN1751-028	1097.45	IN1751-023	1087.91	Circular		1	1.25	0.013	0.25	0.25	None (,)	41.428	Free
IN1751-029_IN1751-028	IN1751-029	1098	IN1751-028	1097.45	Circular		1	1	0.013	0.5	0.25	None (,)	27.119	Free
IN1752-002_AS1752-001	IN1752-002	1089.8	AS1752-001	1089.68	Circular		1	2	0.013	0.05	0.05	None (,)	23.938	Free
IN1752-004_AS1752-001	IN1752-004	1098.9	AS1752-001	1089.68	Circular		1	1	0.013	0.5	0.5	None (,)	139.613	Free
IN1752-005_IN1752-004	IN1752-005	1099.05	IN1752-004	1098.9	Circular		1	1	0.013	0.5	0.5	None (,)	26.776	Free
IN1752-006_AS1752-001	IN1752-006	1100.54	AS1752-001	1089.68	Circular		1	1.25	0.013	0.5	0.5	None (,)	21.644	Free
IN1752-007_IN1752-006	IN1752-007	1100.84	IN1752-006	1100.54	Circular		1	1	0.013	0.5	0.5	None (,)	26.766	Free
IN1752-010_IN1752-011	IN1752-010	1094.23	IN1752-011	1090.92	Circular		1	1.25	0.013	0.25	0.25	None (,)	32.515	Free
IN1752-011_MI1752-008	IN1752-011	1090.92	MI1752-008	1090.37	Circular		1	2	0.013	0.05	0.05	None (,)	109.955	Free
IN1752-012_IN1752-010	IN1752-012	1095.16	IN1752-010	1094.23	Circular		1	1	0.013	0.5	0.25	None (,)	27.253	Free
IN1752-014_IN1752-011	IN1752-014	1095.42	IN1752-011	1090.92	Circular		1	1	0.013	0.5	0.5	None (,)	27.863	Free
IN1752-016_IN1752-011	IN1752-016	1091.95	IN1752-011	1090.92	Circular		1	2	0.013	0.05	0.05	None (,)	74.015	Free
IN1752-018_IN1752-016	IN1752-018	1092.65	IN1752-016	1091.95	Circular		1	2	0.013	0.5	0.05	None (,)	233.033	Free
IN1752-019_IN1752-018	IN1752-019	1094.15	IN1752-018	1092.65	Circular		1	1.75	0.013	0.25	0.25	None (,)	29.003	Free
IN1752-020_IN1752-018	IN1752-020	1093.6	IN1752-018	1092.65	Circular		1	1	0.013	0.5	0.5	None (,)	26.948	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1752-021_IN1752-019	IN1752-021	1094.97	IN1752-019	1094.15	Circular		1	1	0.013	0.5	0.5	None (,)	16.278	Free
IN1752-022_IN1752-019	IN1752-022	1095.9	IN1752-019	1094.15	Circular		1	1.75	0.013	0.05	0.25	None (,)	349.061	Free
IN1752-023_IN1752-022	IN1752-023	1096.72	IN1752-022	1095.9	Circular		1	1	0.013	0.5	0.5	None (,)	17.15	Free
IN1752-024_IN1752-022	IN1752-024	1100.64	IN1752-022	1095.9	Circular		1	1.75	0.013	0.05	0.25	None (,)	196.143	Free
IN1752-025_IN1752-024	IN1752-025	1101.41	IN1752-024	1100.64	Circular		1	1	0.013	0.5	0.05	None (,)	16.336	Free
IN1752-026_IN1752-024	IN1752-026	1101.39	IN1752-024	1100.64	Circular		1	1.5	0.013	0.5	0.25	None (,)	45.228	Free
IN1752-027_IN1752-026	IN1752-027	1102.29	IN1752-026	1101.39	Circular		1	1	0.013	0.5	0.25	None (,)	27.423	Free
IN1752-028_IN1752-024	IN1752-028	1107.51	IN1752-024	1100.64	Circular		1	1	0.013	0.25	0.05	None (,)	191.01	Free
IN1752-029_IN1752-026	IN1752-029	1103.43	IN1752-026	1101.39	Circular		1	1.25	0.013	0.05	0.5	None (,)	120.122	Free
IN1752-030_IN1752-029	IN1752-030	1107.4	IN1752-029	1103.43	Circular		1	1.25	0.013	0.25	0.05	None (,)	115.758	Free
IN1752-031_IN1752-030	IN1752-031	1108.04	IN1752-030	1107.4	Circular		1	1.25	0.013	0.25	0.25	None (,)	32.678	Free
IN1752-032_IN1752-031	IN1752-032	1108.66	IN1752-031	1108.04	Circular		1	1.25	0.013	0.25	0.25	None (,)	27.086	Free
IN1752-033_IN1752-032	IN1752-033	1109.39	IN1752-032	1108.66	Circular		1	1	0.013	0.25	0.25	None (,)	30.2	Free
IN1752-034_IN1752-033	IN1752-034	1109.83	IN1752-033	1109.39	Circular		1	1	0.013	0.5	0.25	None (,)	27.092	Free
IN1753-006_AS1753-005	IN1753-006	1090.5	AS1753-005	1090.2	Circular		1	1.75	0.013	0.5	0.25	0	55.766	Free
IN1753-007_IN1753-006	IN1753-007	1095.12	IN1753-006	1090.5	Circular		1	1.5	0.013	0.05	0.5	0	199.985	Free
IN1753-008_IN1753-040	IN1753-008	1086.11	IN1753-040	1085.59	Circular		1	2	0.013	0.05	0.5	0	175.052	Free
IN1753-009_IN1753-008	IN1753-009	1086.39	IN1753-008	1086.11	Circular		1	2	0.013	0.05	0.05	0	94.077	Free
IN1753-012_IN1753-009	IN1753-012	1088.32	IN1753-009	1086.39	Circular		1	1.5	0.013	0.05	0.05	0	91.486	Free
IN1753-018_IN1753-012	IN1753-018	1088.67	IN1753-012	1088.32	Circular		1	1.5	0.013	0.5	0.05	0	67.769	Free
IN1753-028_IN1753-007	IN1753-028	1099.17	IN1753-007	1095.12	Circular		1	1.5	0.013	0.5	0.05	0	112.394	Free
IN1753-040_AE1753-001	IN1753-040	1085.59	AE1753-001	1085.1	Circular		1	3	0.013	0.5	1	0	195	Free
IN1753-049_IN1753-040	IN1753-049	1085.59	IN1753-040	1085.59	Circular		1	1.75	0.013	0.5	0.05	None (,)	40.046	Free
IN1753-051_IN1753-049	IN1753-051	1085.59	IN1753-049	1085.59	Circular		1	1.5	0.013	0.5	0.05	None (,)	143.692	Free
IN1754-011_AS1754-010	IN1754-011	1100.8	AS1754-010	1097	Circular		1	1.5	0.013	0.05	0.05	0	23.682	Free
IN1754-012_IN1754-011	IN1754-012	1107.97	IN1754-011	1100.8	Circular		1	1.5	0.013	0.05	0.05	0	115.104	Free
IN1754-020_IN1754-012	IN1754-020	1115.87	IN1754-012	1107.97	Circular		1	1.5	0.013	0.25	0.05	0	125.535	Free
IN1754-021_IN1754-020	IN1754-021	1117.19	IN1754-020	1115.87	Circular		1	1.5	0.013	0.5	0.25	0	44.03	Free
IN1754-023_AS1753-054	IN1754-023	1094.8	AS1753-054	1091.84	Circular		1	2.25	0.013	0.05	0.5	0	162.768	Free
IN1754-024_IN1754-023	IN1754-024	1095.3	IN1754-023	1094.8	Circular		1	2.25	0.013	0.05	0.05	0	71.208	Free
IN1754-025_IN1754-024	IN1754-025	1098.7	IN1754-024	1095.3	Circular		1	2.25	0.013	0.05	0.05	0	141.19	Free
IN1754-026_IN1754-025	IN1754-026	1103	IN1754-025	1098.7	Circular		1	2.25	0.013	0.25	0.05	0	87.145	Free
IN1754-027_IN1754-026	IN1754-027	1104	IN1754-026	1103	Circular		1	2	0.013	0.25	0.25	0	45.026	Free
IN1754-030_IN1654-004	IN1754-030	1107.22	IN1654-004	1105.81	Circular		1	1.5	0.013	0.25	0.25	0	39.744	Free
IN1754-032_IN1754-030	IN1754-032	1112.4	IN1754-030	1107.22	Circular		1	1.5	0.013	0.05	0.25	0	116.362	Free
IN1754-033	IN1754-035	1121	IN1654-007	1120.7	Circular		1	1.5	0.013	0.5	0.5	0	29.143	Free
IN1847-001_IN1848-002	IN1847-001	1081.97	IN1848-002	1081.8	Circular		1	1	0.013	0.5	0.5	0	28.972	Free
IN1847-003_IN1847-005	IN1847-003	1069	IN1847-005	1067.1	Circular		1	1.25	0.013	0.05	0.25	0	70.033	Free
IN1847-004_IN1847-003	IN1847-004	1069.5	IN1847-003	1069	Circular		1	1	0.013	0.5	0.25	0	27.858	Free
IN1847-005_AE1847-006	IN1847-005	1067.1	AE1847-006	1054.6	Circular		1	1.25	0.013	0.5	0.5	0	160	Free
IN1847-007_AS1847-009	IN1847-007	1034.16	AS1847-009	1031.14	Circular		1	1	0.013	0.5	0.05	0	37.977	Free
IN1847-008_AS1847-009	IN1847-008	1032.01	AS1847-009	1031.14	Circular		1	1	0.013	0.5	0.5	0	27.085	Free
IN1847-015_1847-016	IN1847-015	1062.59	IN1847-016	1062.44	Circular		1	1.25	0.013	0.5	0.5	0	26.284	Free
IN1847-016_IN1847-017	IN1847-016	1062.44	IN1847-017	1061.77	Circular		1	1.5	0.013	0.5	0.5	0	57.285	Free
IN1847-017_AS1847-018	IN1847-017	1061.77	AS1847-018	1060.12	Circular		1	1.5	0.013	0.5	0.5	0	77.666	Free
IN1847-023_AS1947-009	IN1847-023	1050.89	AS1947-009	1043.84	Circular		1	1.5	0.013	0.5	0.5	0	167.513	Free
IN1847-025_AS1847-021	IN1847-025	1062.91	AS1847-021	1061.15	Circular		1	1.75	0.013	0.05	0.25	0	114.08	Free
IN1848-001_AS1848-003	IN1848-001	1079.25	AS1848-003	1078.32	Circular		1	1	0.013	0.5	0.05	0	33.406	Free
IN1848-002_AS1848-003	IN1848-002	1081.8	AS1848-003	1078.32	Circular		1	1	0.013	0.5	0.5	0	38.782	Free
IN1848-004_IN1848-005	IN1848-004	1060.6	IN1848-005	1053.6	Circular		1	0.833	0.011	0.5	0.5	0	203.011	Free
IN1848-005_IN1848-006	IN1848-005	1053.6	IN1848-006	1032.96	Circular		1	0.833	0.011	0.5	0.05	0	139.279	Free
IN1848-006_IN1848-007	IN1848-006	1032.96	IN1848-007	1032.5	Circular		1	1	0.013	0.05	0.05	0	94.416	Free
IN1848-007_IN1848-009	IN1848-007	1032.5	IN1848-009	1032.13	Circular		1	1	0.013	0.05	0.05	0	67.533	Free
IN1848-008_TE1848-012	IN1848-008	1029.82	TE1848-012	1029.19	Circular		1	1	0.013	0.5	0.5	0	30.1	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1848-009_AS1847-009	IN1848-009	1032.13	AS1847-009	1031.14	Circular		1	1	0.013	0.05	0.5	0	40.819	Free
IN1848-010_IN1848-007	IN1848-010	1037.1	IN1848-007	1032.5	Circular		1	0.833	0.011	0.5	0.5	0	150.565	Free
IN1848-011_IN1948-020	IN1848-011	1026.6	IN1948-020	1017.93	Circular		1	1.5	0.013	0.05	0.5	0	262.044	Free
IN1848-014_IN1848-015	IN1848-014	1061.79	IN1848-015	1060.93	Circular		1	1	0.013	0.5	0.5	0	29.528	Free
IN1848-015_AS1848-018	IN1848-015	1060.93	AS1848-018	1057.13	Circular		1	1.25	0.013	0.05	0.5	0	36.709	Free
IN1848-016_IN1848-015	IN1848-016	1063.04	IN1848-015	1060.93	Circular		1	1	0.013	0.5	0.05	0	17.746	Free
IN1848-019_AS1848-018	IN1848-019	1057.87	AS1848-018	1057.13	Circular		1	2	0.013	0.25	0.05	0	39.825	Free
IN1848-020_IN1848-019	IN1848-020	1058.86	IN1848-019	1057.87	Circular		1	1	0.013	0.5	0.5	0	28.458	Free
IN1848-022_AS1848-027	IN1848-022	1077.72	AS1848-027	1075.84	Circular		1	1	0.013	0.5	0.5	None (,)	25.187	Free
IN1848-023_AS1848-027	IN1848-023	1077.91	AS1848-027	1075.84	Circular		1	1	0.013	0.5	0.5	None (,)	49.276	Free
IN1848-024_IN1848-026	IN1848-024	1077.66	IN1848-026	1075.69	Circular		1	1	0.013	0.5	0.5	None (,)	28.931	Free
IN1848-025_IN1848-026	IN1848-025	1077.79	IN1848-026	1075.69	Circular		1	1	0.013	0.5	0.5	None (,)	30.724	Free
IN1848-026_AE1748-001	IN1848-026	1075.69	AE1748-001	1071.6	Circular		1	2	0.013	0.05	1	0	219	Free
IN1848-028_AS1848-027	IN1848-028	1076.45	AS1848-027	1075.84	Circular		1	1.5	0.013	0.25	0.05	None (,)	19.529	Free
IN1848-029_IN1848-028	IN1848-029	1077.16	IN1848-028	1076.45	Circular		1	1	0.013	0.5	0.25	None (,)	11.843	Free
IN1848-030_IN1848-028	IN1848-030	1076.61	IN1848-028	1076.45	Circular		1	1.5	0.013	0.5	0.5	None (,)	28.074	Free
IN1848-031_IN1848-030	IN1848-031	1077.16	IN1848-030	1076.61	Circular		1	1	0.013	0.5	0.5	None (,)	9.938	Free
IN1848-032_IN1848-033	IN1848-032	1076.6	IN1848-033	1075.6	Circular		1	1	0.013	0.5	0.05	None (,)	10.942	Free
IN1848-033_AS1849-001	IN1848-033	1075.6	AS1849-001	1069.73	Circular		1	1.5	0.013	0.05	0.5	None (,)	24.336	Free
IN1849-002_AS1849-001	IN1849-002	1075.2	AS1849-001	1069.73	Circular		1	1.5	0.013	0.05	0.5	None (,)	49.865	Free
IN1849-003_IN1849-002	IN1849-003	1076.2	IN1849-002	1075.2	Circular		1	1	0.013	0.5	0.05	None (,)	8.372	Free
IN1849-004_IN1849-005	IN1849-004	1074.28	IN1849-005	1072.11	Circular		1	1	0.013	0.5	0.5	None (,)	18.326	Free
IN1849-005_AE1849-014	IN1849-005	1072.11	AE1849-014	1070.032	Circular		1	2	0.013	0.5	1	0	256	Free
IN1849-006_IN1849-005	IN1849-006	1072.79	IN1849-005	1072.11	Circular		1	1.5	0.013	0.05	0.5	None (,)	24.974	Free
IN1849-007_IN1849-006	IN1849-007	1073.94	IN1849-006	1072.79	Circular		1	1	0.013	0.5	0.05	None (,)	11.39	Free
IN1849-010_AS1849-009	IN1849-010	1074.09	AS1849-009	1073.11	Circular		1	2	0.013	0.25	0.05	None (,)	195.004	Free
IN1849-012_IN1949-016	IN1849-012	1077.84	IN1949-016	1077.3	Circular		1	1	0.013	0.5	0.5	None (,)	10.573	Free
IN1849-018_AE1849-030	IN1849-018	1071.34	AE1849-030	1069.6	Circular		1	3	0.013	0.05	1	0	585	Free
IN1849-029_AS1849-026	IN1849-029	1077.64	AS1849-026	1074.65	Circular		1	1	0.013	0.5	0.05	None (,)	73.952	Free
IN1849-031_AS1849-023	IN1849-031	1072.6	AS1849-023	1072.48	Circular		1	2	0.013	0.05	0.5	None (,)	48.302	Free
IN1849-032_IN1849-031	IN1849-032	1074.34	IN1849-031	1072.6	Circular		1	1	0.013	0.5	0.05	None (,)	12.079	Free
IN1849-033_IN1849-031	IN1849-033	1073.8	IN1849-031	1072.6	Circular		1	1.5	0.013	0.5	0.5	None (,)	34.187	Free
IN1849-034_IN1849-033	IN1849-034	1074.34	IN1849-033	1073.8	Circular		1	1	0.013	0.5	0.5	None (,)	9.06	Free
IN1849-035_AS1849-026	IN1849-035	1074.95	AS1849-026	1074.65	Circular		1	2	0.013	0.05	0.5	None (,)	48.029	Free
IN1849-036_IN1849-035	IN1849-036	1076.8	IN1849-035	1074.95	Circular		1	1	0.013	0.5	0.05	None (,)	12.077	Free
IN1849-037_IN1849-035	IN1849-037	1076.24	IN1849-035	1074.95	Circular		1	1.5	0.013	0.5	0.5	None (,)	30.717	Free
IN1849-038_IN1849-037	IN1849-038	1076.8	IN1849-037	1076.24	Circular		1	1	0.013	0.5	0.5	None (,)	10.248	Free
IN1849-049_AS1849-047	IN1849-049	1075.33	AS1849-047	1071.93	Circular		1	1	0.013	0.5	0.5	None (,)	16.075	Free
IN1849-050_AS1849-047	IN1849-050	1072.21	AS1849-047	1071.93	Circular		1	1.5	0.013	0.05	0.5	None (,)	21.196	Free
IN1849-051_IN1849-050	IN1849-051	1075.25	IN1849-050	1072.21	Circular		1	1	0.013	0.5	0.5	None (,)	55.424	Free
IN1849-052_IN1849-051	IN1849-052	1075.5	IN1849-051	1075.25	Circular		1	1	0.013	0.5	0.5	None (,)	10.469	Free
IN1849-056_AS1849-053	IN1849-056	1075.14	AS1849-053	1072.6	Circular		1	1	0.013	0.5	0.5	None (,)	8.158	Free
IN1849-057_AS1849-053	IN1849-057	1073.88	AS1849-053	1072.6	Circular		1	1	0.013	0.5	0.25	None (,)	23.23	Free
IN1849-060_AS1849-059	IN1849-060	1075.89	AS1849-059	1074.75	Circular		1	1	0.013	0.5	0.5	None (,)	219.407	Free
IN1850-003_IN1849-018	IN1850-003	1073.62	IN1849-018	1071.34	Circular		1	3	0.013	0.5	0.05	None (,)	55.385	Free
IN1850-007_IN1849-050	IN1850-007	1073.87	IN1849-050	1072.21	Circular		1	1	0.013	0.5	0.05	None (,)	22.288	Free
IN1850-008_IN1849-056	IN1850-056	1075.39	IN1849-056	1075.14	Circular		1	1	0.013	0.5	0.05	None (,)	15.167	Free
IN1850-009_AS1849-058	IN1850-009	1075.19	AS1849-058	1073.28	Circular		1	1	0.013	0.5	0.5	None (,)	45.249	Free
IN1850-010_AS1849-059	IN1850-010	1075.7	AS1849-059	1074.75	Circular		1	1.5	0.013	0.5	0.05	None (,)	32.932	Free
IN1850-011_AS1849-023	IN1850-011	1072.73	AS1849-023	1072.48	Circular		1	1.5	0.013	0.5	0.5	None (,)	50.895	Free
IN1946-005_AS1946-004	IN1946-005	1013.58	AS1946-004	1014	Circular		1	1.5	0.013	0.5	0.5	0	16.065	Free
IN1947-008_IN1947-012	IN1947-008	1026.4	IN1947-012	1017.41	Circular		1	3.5	0.013	0.05	0.25	0	265.642	Free
IN1947-012_IN1947-013	IN1947-012	1017.41	IN1947-013	1016.55	Special	Horizontal Ellipse	1	4.41	0.013	0.25	0.05	0	172.053	Free
IN1947-013_AS1947-017	IN1947-013	1016.55	AS1947-017	1016.41	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	35.591	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1947-014_IN1947-013	IN1947-014	1018.05	IN1947-013	1016.55	Circular		1	1.5	0.013	0.5	0.5	0	24.906	Free
IN1947-016_AS1947-017	IN1947-016	1017.86	AS1947-017	1016.41	Circular		1	1.75	0.013	0.5	0.5	0	58.074	Free
IN1947-019_AE1947-020	IN1947-019	1015.35	AE1947-020	1015.05	Special	Horizontal Ellipse	1	5	0.013	0.5	0.5	0	65	Free
IN1947-027_AS1947-029	IN1947-027	1054.01	AS1947-029	1047.68	Circular		1	1.5	0.013	0.5	0.05	0	293.462	Free
IN1948-002_AE1948-003	Inlet_IN1948-002	1013.6	AE1948-003	1011.24	Circular		1	1.75	0.013	2	1	0	169	Free
IN1948-005_AE1948-007	IN1948-005	1012.1	AE1948-007	1010.1	Circular		1	3	0.013	0.5	1	0	176	Free
IN1948-006_IN1948-005	IN1948-006	1014.16	IN1948-005	1012.1	Circular		1	1.5	0.013	0.5	0.5	0	10.706	Free
IN1948-009_IN1948-010	IN1948-009	1019.12	IN1948-010	1018.65	Circular		1	1.5	0.013	0.5	0.25	0	28.823	Free
IN1948-010_AS1948-004	IN1948-010	1018.65	AS1948-004	1016.45	Circular		1	1.5	0.013	0.25	0.25	0	43.405	Free
IN1948-011_AS1948-004	IN1948-011	1019.3	AS1948-004	1016.45	Circular		1	2.5	0.013	0.05	0.25	0	101.827	Free
IN1948-014_AS1948-013	IN1948-014	1038	AS1948-013	1037.1	Circular		1	1	0.013	0.5	0.5	0	10.972	Free
IN1948-015_AS1948-013	IN1948-015	1038	AS1948-013	1037.1	Circular		1	1	0.013	0.5	0.5	0	20.46	Free
IN1948-016_AS1948-017	IN1948-016	1023.78	AS1948-017	1016.5	Circular		1	2	0.013	0.25	0.25	0	186.378	Free
IN1948-018_IN1948-019	IN1948-018	1018.63	IN1948-019	1017.69	Circular		1	1	0.013	0.5	0.05	0	15.38	Free
IN1948-019_AS1948-017	IN1948-019	1017.69	AS1948-017	1016.5	Circular		1	1.75	0.013	0.5	0.5	0	51.456	Free
IN1948-020_IN1948-019	IN1948-020	1017.93	IN1948-019	1017.69	Circular		1	1.75	0.013	0.5	0.5	0	26.059	Free
IN1948-021_AS1948-017	IN1948-021	1018.25	AS1948-017	1016.5	Circular		1	1	0.013	0.5	0.5	0	22.2	Free
IN1949-003_AS1949-009	IN1949-003	1030.56	AS1949-009	1030.11	Circular		1	2	0.013	0.05	0.5	0	49.588	Free
IN1949-004_IN1949-003	IN1949-004	1031.46	IN1949-003	1030.56	Circular		1	1.75	0.013	0.25	0.05	0	164.786	Free
IN1949-005_AS1949-007	IN1949-005	1032.63	AS1949-007	1032.43	Circular		1	1.5	0.013	0.5	0.5	0	25.542	Free
IN1949-006_IN1949-005	IN1949-006	1032.94	IN1949-005	1032.63	Circular		1	1.5	0.013	0.5	0.5	0	26.527	Free
IN1949-010_AS1949-009	IN1949-010	1038.47	AS1949-009	1030.11	Circular		1	1.5	0.013	0.25	0.05	0	106.451	Free
IN1949-011_IN1949-010	IN1949-011	1048.26	IN1949-010	1038.47	Circular		1	1.5	0.013	0.25	0.25	0	124.331	Free
IN1949-016_AS1949-015	IN1949-016	1077.3	AS1949-015	1075.58	Circular		1	1.5	0.013	0.5	0.5	None (,)	6.983	Free
IN1949-017_IN1949-018	IN1949-017	1077.84	IN1949-018	1077.3	Circular		1	1	0.013	0.5	0.5	None (,)	11.038	Free
IN1949-018_AS1949-015	IN1949-018	1077.3	AS1949-015	1075.58	Circular		1	1.5	0.013	0.5	0.5	None (,)	20.504	Free
IN1949-021_AS1949-019	IN1949-021	1076.1	AS1949-019	1075.8	Circular		1	2	0.013	0.05	0.5	None (,)	229.602	Free
IN1949-022_IN1949-021	IN1949-022	1076.23	IN1949-021	1076.1	Circular		1	2	0.013	0.05	0.05	None (,)	72.989	Free
IN1949-031_IN1949-022	IN1949-031	1076.28	IN1949-022	1076.23	Circular		1	1.5	0.013	0.25	0.05	None (,)	11.22	Free
IN1949-034_AS1949-033	IN1949-034	1080.13	AS1949-033	1079.42	Circular		1	1	0.013	0.5	0.5	None (,)	20.278	Free
IN1949-036_AS1949-035	IN1949-036	1052.46	AS1949-035	1052.17	Circular		1	1.5	0.013	0.5	0.5	0	35.398	Free
IN1949-037_AS1949-035	IN1949-037	1052.75	AS1949-035	1052.17	Circular		1	1.75	0.013	0.25	0.25	0	51.213	Free
IN1949-039_IN1949-037	IN1949-039	1067.6	IN1949-037	1052.75	Circular		1	1.5	0.013	0.05	0.25	0	317.218	Free
IN1950-001_AS1949-033	IN1950-001	1082.41	AS1949-033	1079.42	Circular		1	1	0.013	0.5	0.25	None (,)	174.469	Free
IN1950-002_AS1949-032	IN1950-002	1077.9	AS1949-032	1077.03	Circular		1	1	0.013	0.5	0.5	None (,)	30.363	Free
IN1950-003_AS1949-033	IN1950-003	1080.13	AS1949-033	1079.42	Circular		1	1	0.013	0.5	0.5	None (,)	31.821	Free
IN1950-004_IN1950-001	IN1950-004	1082.57	IN1950-001	1082.41	Circular		1	1	0.013	0.5	0.5	None (,)	11.751	Free
IN1950-010_AS1949-041	IN1950-010	1074.29	AS1949-041	1072.29	Circular		1	1.5	0.013	0.5	0.05	0	401.101	Free
IN1955-005_IN2055-011	IN1955-005	1100.26	IN2055-011	1099.35	Circular		1	2	0.013	0.5	0.05	None (,)	122.263	Free
IN1955-007_IN1955-005	IN1955-007	1101.2	IN1955-005	1100.26	Circular		1	1.5	0.013	0.5	0.05	None (,)	85.601	Free
IN1955-009_IN1955-007	IN1955-009	1102.1	IN1955-007	1101.2	Circular		1	1.5	0.013	0.5	0.05	None (,)	182.062	Free
IN1955-010_IN1955-009	IN1955-010	1102.24	IN1955-009	1102.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	25.438	Free
IN1956-003_IN2056-006	IN1956-003	1100.41	IN2056-006	1097.63	Circular		1	2	0.013	0.5	0.25	0	74.758	Free
IN1956-004_IN1956-003	IN1956-004	1103.39	IN1956-003	1100.41	Circular		1	2	0.013	0.05	0.5	0	149.283	Free
IN1956-005_IN1956-004	IN1956-005	1105.64	IN1956-004	1103.39	Circular		1	2	0.013	0.05	0.05	0	90.083	Free
IN1956-007_IN1956-005	IN1956-007	1125.64	IN1956-005	1105.64	Circular		1	2	0.013	0.05	0.05	0	400.8	Free
IN1956-011_IN2056-012	IN1956-011	1098.7	IN2056-012	1098.23	Circular		1	1.5	0.013	0.05	0.05	0	50.02	Free
IN1956-012_IN1956-011	IN1956-012	1099.24	IN1956-011	1098.7	Circular		1	1.5	0.013	0.25	0.05	0	31.77	Free
IN1956-013_IN1956-012	IN1956-013	1099.53	IN1956-012	1099.24	Circular		1	1.5	0.013	0.5	0.25	0	60.809	Free
IN1956-016_IN1955-010	IN1956-016	1102.37	IN1955-010	1102.24	Circular		1	1.5	0.013	0.5	0.05	None (,)	29.326	Free
IN1956-017_IN1956-016	IN1956-017	1102.51	IN1956-016	1102.37	Circular		1	1.5	0.013	0.5	0.05	None (,)	25.008	Free
IN1957-001_IN1956-007	IN1957-001	1130.74	IN1956-007	1125.64	Circular		1	2	0.013	0.05	0.05	0	101.103	Free
IN1957-002_IN1957-001	IN1957-002	1142.58	IN1957-001	1130.74	Circular		1	2	0.013	0.05	0.05	0	251.079	Free
IN1957-006_IN1957-002	IN1957-006	1155.58	IN1957-002	1142.58	Circular		1	1.5	0.013	0.05	0.05	0	250.004	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN1957-008_IN1957-006	IN1957-008	1160.58	IN1957-006	1155.58	Circular		1	1.5	0.013	0.05	0.05	0	98.519	Free
IN1958-001_IN1957-008	IN1958-001	1172.52	IN1957-008	1160.58	Circular		1	1.5	0.013	0.5	0.05	0	299.292	Free
IN2045-004_IN2045-005	IN2045-004	974.71	IN2045-005	974.03	Circular		1	1.5	0.013	0.05	0.5	None (,)	41.137	Free
IN2045-005_AS2045-006	IN2045-005	974.03	AS2045-006	973.47	Circular		1	1.75	0.013	0.5	0.5	None (,)	72.962	Free
IN2046-001_IN2046-002	IN2046-001	985.3	IN2046-002	984.9	Circular		1	1.5	0.013	0.5	0.05	0	67.193	Free
IN2046-002_IN2047-010	IN2046-002	984.9	IN2047-010	984.6	Circular		1	1.5	0.013	0.05	0.25	0	75.283	Free
IN2046-005_IN2046-008	IN2046-005	1011.84	IN2046-008	1010.73	Circular		1	2	0.013	0.5	0.05	0	64.298	Free
IN2046-008_AS2047-002	IN2046-008	1010.73	AS2047-002	1009	Circular		1	2	0.013	0.05	0.5	0	52.557	Free
IN2047-005_AS2047-006	IN2047-005	993.2	AS2047-006	992.16	Circular		1	1.5	0.013	0.5	0.5	0	11.179	Free
IN2047-009_AS2047-007	IN2047-009	984.86	AS2047-007	983.36	Circular		1	1.5	0.013	0.25	0.5	0	11.524	Free
IN2047-010_AS2047-008	IN2047-010	984.6	AS2047-008	984.53	Circular		1	1.5	0.013	0.25	0.25	0	16.501	Free
IN2047-019_IN2047-009	IN2047-019	985.05	IN2047-009	984.86	Circular		1	1.5	0.013	0.5	0.25	0	42.174	Free
IN2047-022_AS2047-011	IN2047-022	983.5	AS2047-011	982.4	Circular		1	2	0.013	0.5	0.05	0	10.57	Free
IN2047-023_IN2047-022	IN2047-023	983.72	IN2047-022	983.5	Circular		1	2	0.013	0.5	0.05	0	41.635	Free
IN2048-007_AS2048-005	IN2048-007	991.2	AS2048-005	989.47	Circular		1	1.5	0.013	0.5	0.5	0	30.628	Free
IN2048-008_AS2048-010	IN2048-008	992.78	AS2048-010	990.43	Circular		1	1.5	0.013	0.5	0.5	0	19.831	Free
IN2049-003_AS2049-002	IN2049-003	1006.6	AS2049-002	1005.7	Circular		1	2	0.013	0.5	0.5	0	24.965	Free
IN2050-009_MI2050-008	IN2050-009	1067.19	MI2050-008	1067.07	Circular		1	1.5	0.013	0.5	0.05	0	6.6	Free
IN2050-016_AS2050-015	IN2050-016	1027.92	AS2050-015	1027.72	Circular		1	2	0.013	0.05	0.5	0	6.449	Free
IN2051-001_AS2051-005	IN2051-001	1056.46	AS2051-005	1055.6	Circular		1	2	0.013	0.05	0.05	0	127.817	Free
IN2051-002_IN2051-001	IN2051-002	1056.7	IN2051-001	1056.46	Circular		1	1.5	0.013	0.5	0.5	0	38.154	Free
IN2051-006_IN2051-007	IN2051-006	1054.73	IN2051-007	1053.76	Circular		1	4	0.013	0.15	0.25	0	157.923	Free
IN2051-007_IN2051-008	IN2051-007	1053.76	IN2051-008	1053.55	Circular		1	4	0.013	0.5	0.05	0	35.334	Free
IN2051-008_AE2051-009	IN2051-008	1053.55	SMPB_GW_BWD	1051.6	Circular		1	4	0.013	0.05	0.5	0	60.411	Free
IN2051-010_IN2051-008	IN2051-010	1055.29	IN2051-008	1053.55	Circular		1	1.5	0.013	0.5	0.5	0	38.923	Free
IN2051-016_AS2051-005	IN2051-016	1056.3	AS2051-005	1055.6	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	111.244	Free
IN2051-017_IN2051-016	IN2051-017	1057.3	IN2051-016	1056.3	Circular		1	1.5	0.013	0.5	0.5	0	36.579	Free
IN2051-024_AS2051-023	IN2051-024	1062.19	AS2051-023	1057.34	Circular		1	1.5	0.013	0.5	0.05	0	265.248	Free
IN2051-026_AS2051-023	IN2051-026	1057.47	AS2051-023	1057.34	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	25.045	Free
IN2051-032_AS2051-023	IN2051-032	1058.47	AS2051-023	1057.34	Circular		1	2	0.013	0.05	0.5	0	58.313	Free
IN2051-033_IN2051-032	IN2051-033	1058.52	IN2051-032	1058.47	Circular		1	1.5	0.013	0.05	0.05	0	11.593	Free
IN2051-036_IN2051-033	IN2051-036	1059.22	IN2051-033	1058.52	Circular		1	1.5	0.013	0.25	0.05	0	137.536	Free
IN2051-037_IN2051-036	IN2051-037	1059.74	IN2051-036	1059.22	Circular		1	1.5	0.013	0.25	0.25	0	103.511	Free
IN2051-039_AS2051-038	IN2051-039	1062.56	AS2051-038	1058.28	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.25	0	156.705	Free
IN2051-042_AS2051-041	IN2051-042	1068.05	AS2051-041	1066.85	Circular		1	2.25	0.013	0.5	0.5	0	50.968	Free
IN2051-047_AS2051-041	IN2051-047	1068.33	AS2051-041	1066.85	Circular		1	2.25	0.013	0.5	0.5	0	235.4	Free
IN2051-048_IN2051-047	IN2051-048	1068.69	IN2051-047	1068.33	Circular		1	2.25	0.013	0.05	0.5	0	66.292	Free
IN2051-055_MI2051-054	IN2051-055	1057.79	MI2051-054	1056.7	Circular		1	2	0.013	0.05	0.05	0	72.962	Free
IN2051-056_IN2051-055	IN2051-056	1060.86	IN2051-055	1057.79	Circular		1	2	0.013	0.25	0.05	0	117.098	Free
IN2051-060_IN2051-056	IN2051-060	1063.66	IN2051-056	1060.86	Circular		1	1.75	0.013	0.25	0.25	0	69.386	Free
IN2051-066_AS2051-051	IN2051-066	1069.3	AS2051-051	1069.1	Circular		1	2.25	0.013	0.05	0.05	0	38.815	Free
IN2052-004_AS2052-006	IN2052-004	1063.51	AS2052-006	1062.34	Circular		1	1.5	0.013	0.5	0.25	0	138.409	Free
IN2052-009_IN2051-037	IN2052-009	1060.5	IN2051-037	1059.74	Circular		1	1.5	0.013	0.5	0.25	0	150.266	Free
IN2052-024_AS2052-022	IN2052-024	1062.17	AS2052-022	1061.52	Circular		1	1.5	0.013	0.25	0.5	0	23.029	Free
IN2052-026_TP2052-028	IN2052-026	1059.33	TP2052-028	1059.15	Circular		1	2.5	0.013	0.5	0.5	0	40.697	Free
IN2052-029_IN2052-026	IN2052-029	1060.33	IN2052-026	1059.33	Circular		1	1.75	0.013	0.25	0.25	0	48.17	Free
IN2052-031_IN2052-029	IN2052-031	1060.92	IN2052-029	1060.33	Circular		1	1.5	0.013	0.25	0.25	0	43.83	Free
IN2053-004_IN2052-031	IN2053-004	1064.88	IN2052-031	1060.92	Circular		1	1.5	0.013	0.5	0.25	0	170.007	Free
IN2055-007_IN2055-009	IN2055-007	1095.5	IN2055-009	1095.2	Circular		1	2	0.013	0.5	0.05	None (,)	18.752	Free
IN2055-009_IN2056-014	IN2055-009	1095.2	IN2056-014	1094.66	Circular		1	2	0.013	0.5	0.05	None (,)	21.296	Free
IN2055-010_IN2055-007	IN2055-010	1098.82	IN2055-007	1095.5	Circular		1	2	0.013	0.5	0.05	None (,)	221.203	Free
IN2055-011_IN2055-010	IN2055-011	1099.35	IN2055-010	1098.82	Circular		1	2	0.013	0.5	0.05	None (,)	54.204	Free
IN2056-006_AS2056-007	IN2056-006	1097.63	AS2056-007	1095.84	Circular		1	2	0.013	0.25	0.5	0	37.207	Free
IN2056-009_AS2056-007	IN2056-009	1097.41	AS2056-007	1095.84	Circular		1	2	0.013	0.5	0.5	0	89.832	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN2056-012_IN2056-009	IN2056-012	1098.23	IN2056-009	1097.41	Circular		1	1.5	0.013	0.05	0.5	0	27.029	Free
IN2056-014_IN2056-015	IN2056-014	1094.66	IN2056-015	1094.14	Circular		1	2	0.013	0.5	0.05	None (,)	30.597	Free
IN2056-015_IN2056-016	IN2056-015	1094.14	IN2056-016	1093.48	Circular		1	2	0.013	0.5	0.05	None (,)	28.994	Free
IN2056-016_AE2056-017	IN2056-016	1093.48	AE2056-017	1092	Circular		1	2	0.013	0.25	1	0	77.361	Free
IN2056-021_IN2056-043	IN2056-021	1090.73	IN2056-043	1084.01	Circular		1	2	0.013	0.5	0.05	0	290.539	Free
IN2056-043_AS2056-044	IN2056-043	1084.01	AS2056-044	1078.3	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	186.001	Free
IN2145-004_AS2145-001	IN2145-004	966.25	AS2145-001	965.1	Circular		1	1.5	0.013	0.5	0.5	None (,)	11.63	Free
IN2145-005_AS2145-001	IN2145-005	966.25	AS2145-001	965.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	27.314	Free
IN2145-009_TP2145-006	IN2145-009	968.35	TP2145-006	961.82	Circular		1	1.75	0.013	0.5	0.4	None (,)	182.998	Free
IN2145-010_IN2145-009	IN2145-010	970.05	IN2145-009	968.35	Circular		1	1.5	0.013	0.25	0.25	None (,)	258.921	Free
IN2145-012_AS2145-011	IN2145-012	971.85	AS2145-011	971.23	Circular		1	1.5	0.013	0.25	0.25	None (,)	73.706	Free
IN2145-013_IN2145-012	IN2145-013	972.2	IN2145-012	971.85	Circular		1	1.5	0.013	0.5	0.25	None (,)	39.208	Free
IN2146-001_IN2146-002	IN2146-001	975.04	IN2146-002	974.65	Circular		1	1.5	0.013	0.5	0.25	None (,)	57.404	Free
IN2146-002_IN2246-002	IN2146-002	974.65	IN2246-002	972.96	Circular		1	1.75	0.013	0.25	0.05	None (,)	234.241	Free
IN2147-004_AS2147-006	IN2147-004	971.9	AS2147-006	969.77	Circular		1	1.5	0.013	0.5	0.5	0	28.036	Free
IN2147-008_AS2147-007	IN2147-008	970.22	AS2147-007	968.62	Circular		1	1.75	0.013	0.25	0.25	0	14.984	Free
IN2147-011_IN2147-008	IN2147-011	970.35	IN2147-008	970.22	Circular		1	1.75	0.013	0.5	0.05	0	40.431	Free
IN2148-002_AS2148-004	IN2148-002	973.8	AS2148-004	972.3	Circular		1	1.75	0.013	0.5	0.25	0	33.416	Free
IN2148-005_AS2148-007	IN2148-005	977.36	AS2148-007	976.6	Circular		1	1.75	0.013	0.5	0.05	None (,)	3.933	Free
IN2148-006_AS2148-007	IN2148-006	977.34	AS2148-007	976.6	Circular		1	1.75	0.013	0.5	0.5	0	37.759	Free
IN2148-008_IN2148-006	IN2148-008	979.7	IN2148-006	977.34	Circular		1	1.5	0.013	0.5	0.5	0	108.784	Free
IN2148-011_AS2148-010	IN2148-011	993.9	AS2148-010	992.63	Circular		1	1.5	0.013	0.5	0.5	0	16.814	Free
IN2148-012_AS2148-010	IN2148-012	993.94	AS2148-010	992.63	Circular		1	1.5	0.013	0.5	0.5	0	25.81	Free
IN2149-005_AS2149-001	IN2149-005	999.4	AS2149-001	998.83	Circular		1	1.5	0.013	0.5	0.5	0	21.443	Free
IN2150-007_IN2150-008	IN2150-007	1016.7	IN2150-008	1015.51	Circular		1	1.5	0.013	0.5	0.25	0	68.007	Free
IN2150-008_IN2150-009	IN2150-008	1015.51	IN2150-009	1013.42	Circular		1	1.75	0.013	0.25	0.5	0	69.24	Free
IN2150-009_AS2150-032	IN2150-009	1013.42	AS2150-032	1008.36	Circular		1	3.5	0.013	0.05	0.05	0	285.946	Free
IN2150-019_IN2150-044	IN2150-019	1007.1	IN2150-044	998.04	Rectangular		1	3	0.013	0.5	0.5	0	105.18	Free
IN2150-044_IN2150-045	IN2150-044	998.04	IN2150-045	997.75	Rectangular		1	3	0.013	0.05	0.05	0	32.595	Free
IN2150-045_TP2250-010	IN2150-045	997.75	TP2250-010	997.35	Rectangular		1	3	0.013	0.05	0.05	0	54.043	Free
IN2151-001_AS2151-003	IN2151-001	1053.1	AS2151-003	1049.6	Circular		1	1.5	0.013	0.5	0.5	0	10.675	Free
IN2151-002_AS2151-003	IN2151-002	1053.1	AS2151-003	1049.6	Circular		1	1.5	0.013	0.5	0.5	0	19.398	Free
IN2151-005_AS2151-004	IN2151-005	1053.51	AS2151-004	1049.15	Circular		1	1.5	0.013	0.5	0.5	0	17.883	Free
IN2152-002_AS2152-005	IN2152-002	1055.84	AS2152-005	1055.11	Circular		1	1.5	0.013	0.5	0.5	0	11.078	Free
IN2152-003_AS2152-005	IN2152-003	1056.04	AS2152-005	1055.11	Circular		1	1.5	0.013	0.5	0.5	0	28.896	Free
IN2152-013_AS2152-010	IN2152-013	1055.6	AS2152-010	1053.02	Circular		1	1.5	0.013	0.5	0.5	0	8.538	Free
IN2152-014_AS2152-010	IN2152-014	1055.6	AS2152-010	1053.02	Circular		1	1.5	0.013	0.5	0.5	0	19.553	Free
IN2152-016_AS2152-015	IN2152-016	1056.04	AS2152-015	1052.31	Circular		1	1.5	0.013	0.5	0.5	0	51.49	Free
IN2152-018_AS2152-022	IN2152-018	1054.77	AS2152-022	1050.68	Circular		1	1.5	0.013	0.5	0.5	0	44.443	Free
IN2155-013_IN2255-042	IN2155-013	1049.63	IN2255-042	1047.56	Circular		1	1.75	0.013	0.5	0.05	0	200.187	Free
IN2155-015_AS2255-054	IN2155-015	1049.05	AS2255-054	1045.38	Circular		1	1.5	0.013	0.5	0.25	0	41.291	Free
IN2156-006_AE2156-045	IN2156-006	1051.07	AE2156-045	1049.93	Circular		1	2	0.013	0.5	1	0	153	Free
IN2156-011_AE2156-046	IN2156-011	1050.33	AE2156-046	1049.86	Circular		1	2	0.013	0.5	1	0	43	Free
IN2156-012_2156-011	IN2156-012	1051.67	IN2156-011	1050.33	Circular		1	1.25	0.013	0.5	0.05	0	48.724	Free
IN2156-016_AE2156-047	IN2156-016	1050.87	AE2156-047	1049.9	Circular		1	2	0.013	0.5	1	0	65	Free
IN2156-060_AS2256-055	IN2156-061	1047.77	AS2256-055	1047.49	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	99.906	Free
IN2156-066_IN2156-068	IN2156-066	1069.76	IN2156-068	1069.39	Circular		1	1.5	0.013	0.5	0.05	0	76.94	Free
IN2156-068_IN2156-069	IN2156-068	1069.39	IN2156-069	1069.27	Circular		1	1.5	0.013	0.05	0.05	0	28.944	Free
IN2156-069_IN2156-070	IN2156-069	1069.27	IN2156-070	1068.29	Circular		1	1.5	0.013	0.05	0.05	0	47.068	Free
IN2156-070_IN2156-072	IN2156-070	1068.29	IN2156-072	1064.54	Circular		1	2	0.013	0.05	0.5	0	256.426	Free
IN2156-072_AE2156-074	IN2156-072	1064.54	AE2156-074	1063.54	Circular		1	2	0.013	0.5	0.5	0	50.002	Free
IN2156-076_IN2156-010	IN2156-076	1056.43	IN2156-011	1050.33	Circular		1	1.25	0.013	0.5	0.5	0	166.652	Free
IN2157-013_IN2156-072	IN2157-013	1068.09	IN2156-072	1064.54	Circular		1	2	0.013	0.05	0.5	0	245.181	Free
IN2157-015_IN2157-013	IN2157-015	1071	IN2157-013	1068.09	Circular		1	1.5	0.013	0.5	0.05	0	240.399	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN2158-007_AS2258-014	IN2158-007	1067.55	AS2258-014	1068.19	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.25	0	125.699	Free
IN2158-009_IN2158-007	IN2158-009	1067.98	IN2158-007	1067.55	Circular		1	2	0.013	0.05	0.5	0	98.587	Free
IN2158-010_IN2158-009	IN2158-010	1068	IN2158-009	1067.98	Circular		1	2	0.013	0.05	0.05	0	9.976	Free
IN2158-014_IN2158-010	IN2158-014	1070	IN2158-010	1068	Circular		1	2	0.013	0.05	0.05	0	190.386	Free
IN2158-017_IN2158-014	IN2158-017	1076.66	IN2158-014	1070	Circular		1	2	0.013	0.05	0.05	0	198.093	Free
IN2159-002_IN2158-017	IN2159-002	1084.16	IN2158-017	1076.66	Circular		1	2	0.013	0.05	0.05	0	197.112	Free
IN2159-003_IN2159-002	IN2159-003	1085.37	IN2159-002	1084.16	Circular		1	1.5	0.013	0.05	0.05	0	10.515	Free
IN2159-009_IN2159-003	IN2159-009	1098.99	IN2159-003	1085.37	Circular		1	1.5	0.013	0.5	0.05	0	336.04	Free
IN2245-006_AS2245-005	IN2245-006	959.78	AS2245-005	958.4	Circular		1	1.5	0.013	0.5	0.5	None (,)	9.597	Free
IN2245-008_AS2245-012	IN2245-008	967.81	AS2245-012	965.9	Circular		1	1.5	0.013	0.5	0.25	None (,)	19.094	Free
IN2245-010_AS2245-012	IN2245-010	967.81	AS2245-012	965.9	Circular		1	1.5	0.013	0.5	0.25	None (,)	43.714	Free
IN2246-001_IN2246-002	IN2246-001	973.46	IN2246-002	972.96	Circular		1	1.5	0.013	0.5	0.5	None (,)	39.475	Free
IN2246-002_IN2246-003	IN2246-002	972.96	IN2246-003	972.78	Circular		1	1.75	0.013	0.05	0.5	None (,)	24.317	Free
IN2246-003_IN2246-004	IN2246-003	972.78	IN2246-004	972.6	Circular		1	1.75	0.013	0.5	0.05	None (,)	5.215	Free
IN2246-004_AS2146-003	IN2246-004	972.6	AS2146-003	970.6	Circular		1	1.75	0.013	0.5	1	None (,)	365.694	Free
IN2247-008_AS2247-006	IN2247-008	967.46	AS2247-006	965.34	Circular		1	1.5	0.013	0.5	0.25	None (,)	34.807	Free
IN2247-010_TP2247-019	IN2247-010	967.8	TP2247-019	967.1	Circular		1	1.5	0.013	0.25	0.5	0	22.238	Free
IN2247-011_IN2247-010	IN2247-011	968.52	IN2247-010	967.8	Circular		1	1.5	0.013	0.05	0.25	0	110.634	Free
IN2247-021_AS2247-001	IN2247-021	968.4	AS2247-001	966.22	Circular		1	1.5	0.013	0.5	0.05	None (,)	24.452	Free
IN2247-030_AS2247-006	IN2247-030	967.6	AS2247-006	965.34	Circular		1	1.5	0.013	0.5	0.25	None (,)	7.153	Free
IN2248-002_IN2248-001	IN2248-002	971.8	IN2248-001	970.25	Circular		1	1.5	0.013	0.5	0.5	None (,)	38.11	Free
IN2248-003_AS2248-004	IN2248-003	968.1	AS2248-004	967.52	Circular		1	3	0.013	0.5	0.05	None (,)	116.053	Free
IN2248-005_AS2248-004	IN2248-005	969.27	AS2248-004	967.52	Circular		1	1.5	0.013	0.5	0.5	None (,)	31.985	Free
IN2249-001_IN2249-003	IN2249-001	973.55	IN2249-003	972.7	Circular		1	1.5	0.013	0.5	0.5	None (,)	12.374	Free
IN2249-002_IN2249-003	IN2249-002	973.47	IN2249-003	972.7	Circular		1	1.5	0.013	0.5	0.5	None (,)	26.535	Free
IN2249-003_IN2248-001	IN2249-003	972.7	IN2248-001	970.25	Circular		1	2	0.013	0.5	0.25	None (,)	393.03	Free
IN2249-024_IN2249-030	IN2249-024	986.71	IN2249-030	986.55	Circular		1	3	0.013	0.5	0.05	None (,)	40.09	Free
IN2249-026_IN2249-027	IN2249-026	987.16	IN2249-027	986.32	Circular		1	1.5	0.013	0.5	0.05	None (,)	37.384	Free
IN2249-027_IN2249-028	IN2249-027	986.32	IN2249-028	985.76	Circular		1	2	0.013	0.25	0.25	None (,)	68.908	Free
IN2249-028_AE2249-029	IN2249-028	985.76	EMPB_GW_OSR2	985.3	Circular		1	2	0.013	0.25	0.5	0	81.246	Free
IN2249-030_AE2249-032	IN2249-030	986.55	EMPB_GW_OSR2	985.4	Circular		1	3	0.013	0.5	0.5	0	32.935	Free
IN2250-012_AS2250-016	IN2250-012	999.42	AS2250-016	997.91	Circular		1	1.5	0.013	0.5	0.5	0	12.186	Free
IN2250-013_AS2250-016	IN2250-013	999.02	AS2250-016	997.91	Circular		1	1.5	0.013	0.05	0.5	0	15.7	Free
IN2250-014_IN2250-013	IN2250-014	999.2	IN2250-013	999.02	Circular		1	1.5	0.013	0.05	0.05	0	22.176	Free
IN2250-015_IN2250-014	IN2250-015	999.42	IN2250-014	999.2	Circular		1	1.5	0.013	0.5	0.05	0	26.722	Free
IN2250-022_IN2250-064	IN2250-022	1011.09	IN2250-064	1009.41	Circular		1	2	0.013	0.05	0.05	0	152	Free
IN2250-026_IN2250-030	IN2250-026	1007.6	IN2250-030	1000.82	Circular		1	2	0.013	0.05	0.25	0	217.246	Free
IN2250-030_AS2250-016	IN2250-030	1000.82	AS2250-016	997.91	Circular		1	2.5	0.013	0.25	0.05	0	142.61	Free
IN2250-039_AS2250-019	IN2250-039	997.8	AS2250-019	992.93	Rectangular		1	3	0.013	0.05	0.05	0	202.631	Free
IN2250-044_AS2250-021	IN2250-044	991.67	AS2250-021	990.21	Rectangular		1	4	0.013	0.05	0.05	0	95.606	Free
IN2250-051_IN2249-024	IN2250-051	987.08	IN2249-024	986.71	Circular		1	3	0.013	0.5	0.05	None (,)	72.513	Free
IN2250-054_AE2249-025	IN2250-054	986.08	EMPB_GW_OSR2	985.3	Special	Horizontal Ellipse	1	5	0.013	0.5	0.5	0	187.242	Free
IN2250-056_IN2249-026	IN2250-056	987.9	IN2249-026	987.16	Circular		1	1.5	0.013	0.5	0.05	None (,)	15.463	Free
IN2250-057_IN2249-024	IN2250-057	988.02	IN2249-024	986.71	Circular		1	1.5	0.013	0.5	0.05	None (,)	57.178	Free
IN2250-061_IN2250-022	IN2250-061	1011.59	IN2250-022	1011.09	Circular		1	1.75	0.013	0.05	0.05	0	17.661	Free
IN2250-062_IN2250-061	IN2250-062	1012.23	IN2250-061	1011.59	Circular		1	1.75	0.013	0.05	0.05	0	55.645	Free
IN2250-063_IN2250-062	IN2250-063	1013.65	IN2250-062	1012.23	Circular		1	1.75	0.013	0.05	0.05	0	116.437	Free
IN2250-064_IN2250-026	IN2250-064	1009.41	IN2250-026	1007.6	Circular		1	1.75	0.013	0.05	0.05	0	172.462	Free
IN2251-001_IN2251-002	IN2251-001	1028.15	IN2251-002	1027.33	Circular		1	1.5	0.013	0.5	0.25	0	35.171	Free
IN2251-002_IN2251-003	IN2251-002	1027.33	IN2251-003	1027	Circular		1	1.5	0.013	0.25	0.5	0	16.153	Free
IN2251-003_AS2251-008	IN2251-003	1027	AS2251-008	1024.72	Circular		1	1.5	0.013	0.5	0.25	0	34.611	Free
IN2251-006_AS2251-007	IN2251-006	1026.29	AS2251-007	1025	Circular		1	1.5	0.013	0.5	0.05	None (,)	4.274	Free
IN2251-011_AS2251-010	IN2251-011	1029.6	AS2251-010	1028.1	Circular		1	1.5	0.013	0.5	0.5	0	63.023	Free
IN2251-012_AS2251-010	IN2251-012	1029.6	AS2251-010	1028.1	Circular		1	1.5	0.013	0.5	0.5	0	11.325	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN2251-013_AS2251-031	IN2251-013	1016.72	AS2251-031	1013.75	Circular		1	3	0.013	0.05	0.25	0	100.837	Free
IN2251-017_AS2251-018	IN2251-017	1039.23	AS2251-018	1038.5	Circular		1	1.5	0.013	0.5	0.5	0	37.646	Free
IN2251-024_IN2251-013	IN2251-024	1018.48	IN2251-013	1016.72	Circular		1	3	0.013	0.5	0.05	0	64.279	Free
IN2251-026_IN2251-027	IN2251-026	1018.51	IN2251-027	1014.45	Circular		1	1.5	0.013	0.5	0.05	0	194.069	Free
IN2251-027_IN2250-063	IN2251-027	1014.45	IN2250-063	1013.65	Circular		1	1.75	0.013	0.05	0.05	0	59.969	Free
IN2252-002_AS2252-008	IN2252-002	1049.44	AS2252-008	1048.9	Circular		1	1.5	0.013	0.5	0.5	0	58.108	Free
IN2252-007_AS2252-008	IN2252-007	1049.4	AS2252-008	1048.9	Circular		1	1.5	0.013	0.5	0.5	0	46.975	Free
IN2252-009_IN2252-011	IN2252-009	1037.24	IN2252-011	1030.58	Circular		1	2	0.013	0.25	0.25	0	243.079	Free
IN2252-010_IN2252-009	IN2252-010	1039.02	IN2252-009	1037.24	Circular		1	1.5	0.013	0.5	0.5	0	75.561	Free
IN2252-011_AS2251-010	IN2252-011	1030.58	AS2251-010	1028.1	Circular		1	2.5	0.013	0.25	0.05	0	156.047	Free
IN2254-001_AS2254-004	IN2254-001	1054.31	AS2254-004	1053.27	Circular		1	1.5	0.013	0.5	0.5	0	10.831	Free
IN2254-009_IN2254-012	IN2254-009	1048.77	IN2254-012	1048.64	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.5	0	31.41	Free
IN2254-012_AS2254-015	IN2254-012	1048.64	AS2254-015	1048.53	Circular		1	3	0.013	0.05	0.05	0	109.623	Free
IN2254-021_AS2254-024	IN2254-021	1048.3	AS2254-024	1047.55	Circular		1	4.5	0.013	0.05	0.05	0	249.348	Free
IN2255-001_IN2255-002	IN2255-001	1045.58	IN2255-002	1044.08	Circular		1	4.5	0.013	0.25	0.25	0	304.461	Free
IN2255-002_IN2255-003	IN2255-002	1044.08	IN2255-003	1042.96	Circular		1	4.5	0.013	0.25	0.05	0	230.263	Free
IN2255-003_AE2255-004	IN2255-003	1042.96	AE2255-004	1042.88	Circular		1	4.5	0.013	0.5	1	0	54	Free
IN2255-032_AE2255-033	IN2255-032	1050.2	AE2255-033	1049.08	Circular		1	1.5	0.013	0.25	0.5	0	75.118	Free
IN2255-037_MI2255-034	IN2255-037	1050.37	MI2255-034	1050.25	Circular		1	1.5	0.013	0.05	0.05	0	39.761	Free
IN2255-042_AS2255-006	IN2255-042	1047.56	AS2255-006	1046.31	Circular		1	1.75	0.013	0.05	0.5	0	91.03	Free
IN2255-061_HD2255-060	IN2255-061	1044.3	HD2255-060	1044	Rectangular		1	4	0.013	0.5	1	None (,)	27.226	Free
IN2255-062_IN2255-063	IN2255-062	1049.29	IN2255-063	1049.03	Circular		1	2	0.013	0.05	0.05	0	26.32	Free
IN2255-063_IN2255-064	IN2255-063	1049.03	IN2255-064	1048.3	Circular		1	2	0.013	0.05	0.05	0	58.236	Free
IN2255-064_AE2255-035	IN2255-064	1048.3	AE2255-035	1048.1	Circular		1	2	0.013	0.05	0.05	0	23.667	Free
IN2256-020_IN2256-021	IN2256-020	1053.1	IN2256-021	1052.5	Circular		1	1	0.013	0.5	0.05	None (,)	57.51	Free
IN2256-021_AS2256-073	IN2256-021	1052.5	AS2256-073	1052.5	Circular		1	1.25	0.013	0.5	0.05	None (,)	44.466	Free
IN2256-031_IN2256-032	IN2256-031	1051.81	IN2256-032	1051.88	Circular		1	1.5	0.013	0.5	0.05	0	18.958	Free
IN2256-032_AE2256-033	IN2256-032	1051.88	AE2256-033	1051.5	Circular		1	1.5	0.013	0.05	0.5	0	50.793	Free
IN2256-048_IN2256-049	IN2256-048	1061.97	IN2256-049	1058.56	Circular		1	1.5	0.013	0.5	0.05	0	147.214	Free
IN2256-049_IN2256-050	IN2256-049	1058.56	IN2256-050	1053.121	Circular		1	1.5	0.013	0.05	0.05	0	148.248	Free
IN2256-050_IN2256-088	IN2256-050	1053.121	IN2256-088	1052.63	Circular		1	1.5	0.013	0.05	0.05	0	94.919	Free
IN2256-052_IN2256-053	IN2256-052	1049.66	IN2256-053	1048.5	Circular		1	2	0.013	0.05	0.05	0	121.252	Free
IN2256-054_AS2256-055	IN2256-053	1048.5	AS2256-055	1047.49	Circular		1	2	0.013	0.05	0.25	0	47	Free
IN2256-061_IN2256-062	JB2256-061	1044.39	IN2256-062	1044.31	Rectangular		1	4	0.013	0.05	0.05	0	28.612	Free
IN2256-062_IN2256-063	IN2256-062	1044.31	IN2256-063	1044.3	Rectangular		1	4	0.013	0.5	0.05	None (,)	6.04	Free
IN2256-063_IN2255-061	IN2256-063	1044.3	IN2255-061	1044.3	Rectangular		1	4	0.013	0.05	0.05	0	77.105	Free
IN2256-065_IN2255-037	IN2255-065	1050.7	IN2255-037	1050.37	Circular		1	1.5	0.013	0.5	0.05	0	14.204	Free
IN2256-068_JB2256-060	IN2256-068	1045.29	JB2256-060	1046.02	Circular		1	1	0.013	0.25	0.25	0	25.734	Free
IN2256-069_IN2256-068	IN2256-069	1046.94	IN2256-068	1045.29	Circular		1	1	0.013	0.25	0.05	0	43.048	Free
IN2256-070_IN2256-069	IN2256-070	1047.5	IN2256-069	1046.94	Circular		1	1	0.013	0.5	0.25	0	58.381	Free
IN2256-071_AE2256-072	IN2256-071	1049.83	Node1799	1049.25	Circular		1	2.5	0.013	0.5	1	0	58	Free
IN2256-076_JB2256-065	IN_2256-076	1044.88	JB2256-065	1044.42	Circular		1	1	0.013	0.5	0.05	None (,)	31.538	Free
IN2256-080_IN2255-062	IN2256-080	1050.05	IN2255-062	1049.29	Circular		1	2	0.013	0.25	0.05	0	60.507	Free
IN2256-088_IN2256-051	IN2256-088	1052.63	IN2256-052	1049.66	Circular		1	1.5	0.013	0.05	0.05	0	45.794	Free
IN2257-009_AS2257-012	IN2257-009	1060.02	AS2257-012	1058.87	Circular		1	1	0.013	0.05	0.5	0	47.923	Free
IN2257-034_IN2258-075	IN2257-034	1068.47	IN2258-075	1064.8	Circular		1	2	0.013	0.5	0.05	0	202.596	Free
IN2258-023_AS2258-052	IN2258-023	1086.91	AS2258-052	1080.75	Circular		1	2	0.013	0.25	0.05	0	125.419	Free
IN2258-025_IN2258-028	IN2258-025	1069.43	IN2258-028	1063.36	Circular		1	2.5	0.013	0.05	0.5	0	176.838	Free
IN2258-027_IN2258-034	IN2258-027	1064.38	IN2258-034	1062.36	Circular		1	2	0.013	0.05	0.5	0	81.446	Free
IN2258-028_AE2258-029	IN2258-028	1063.36	AE2258-029	1061.6	Circular		1	4	0.013	0.5	1	0	58.006	Free
IN2258-034_AS2258-001	IN2258-034	1062.36	AS2258-001	1061.85	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	0	19.846	Free
IN2258-039_MI2258-038	IN2258-039	1065.19	MI2258-038	1065.1	Circular		1	1.5	0.013	0.05	0.05	0	23.721	Free
IN2258-040_IN2258-039	IN2258-040	1065.32	IN2258-039	1065.19	Circular		1	1.5	0.013	0.5	0.05	0	25.15	Free
IN2258-049_AS2258-048	IN2258-049	1068.06	AS2258-048	1066.28	Circular		1	2.25	0.013	0.05	0.25	0	280.602	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN2258-053_AS2258-052	IN2258-053	1081.18	AS2258-052	1080.75	Circular		1	1.5	0.013	0.05	0.5	0	26.582	Free
IN2258-054_IN2258-053	IN2258-054	1091.44	IN2258-053	1081.18	Circular		1	1.5	0.013	0.5	0.05	0	374.155	Free
IN2258-057_AS2258-056	IN2258-057	1070.99	AS2258-056	1070.77	Circular		1	1.5	0.013	0.5	0.5	0	39.178	Free
IN2258-067_AS2258-001	IN2258-067	1062.68	AS2258-001	1061.85	Circular		1	2.5	0.013	0.05	0.25	0	151.699	Free
IN2258-074_DT2258-080	IN2258-074	1064.75	COM_SQ_P_IN	1064	Circular		1	2	0.013	0.5	1	0	47.777	Free
IN2258-075_IN2258-074	IN2258-075	1064.8	IN2258-074	1064.75	Circular		1	2	0.013	0.05	0.5	0	11.913	Free
IN2258-076_IN2258-074	IN2258-076	1065.66	IN2258-074	1064.75	Circular		1	1.5	0.013	0.5	0.05	0	38.027	Free
IN2258-078_IN2258-074	IN2258-078	1069.03	IN2258-074	1064.75	Circular		1	1.5	0.013	0.5	0.5	0	159.908	Free
IN2347-002_AS2347-001	IN2347-002	974.31	AS2347-001	971.55	Circular		1	1.5	0.013	0.5	0.05	None (,)	7.685	Free
IN2347-005_IN2347-035	IN2347-005	971.6	IN2347-035	970.15	Circular		1	1.5	0.013	0.5	0.05	None (,)	249.381	Free
IN2347-032_IN2347-017	IN2347-032	971.2	IN2347-017	971.3	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.05	None (,)	37.654	Free
IN2347-034_AS2347-011	IN2347-034	970.35	AS2347-011	970.15	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.05	None (,)	94.335	Free
IN2347-035_AS2347-011	IN2347-035	970.15	AS2347-011	970.15	Circular		1	1.5	0.013	0.5	0.05	None (,)	47.301	Free
IN2348-001_AS2347-001	IN2348-001	974.45	AS2347-001	971.55	Circular		1	2	0.013	0.5	0.05	None (,)	237.564	Free
IN2348-003_IN2348-001	IN2348-003	977.25	IN2348-001	974.45	Circular		1	1.5	0.013	0.5	0.05	None (,)	253.751	Free
IN2348-006_AS2348-005	IN2348-006	979.74	AS2348-005	975.3	Circular		1	1.5	0.013	0.5	0.05	0	60.308	Free
IN2349-001_IN2349-002	IN2349-001	988.72	IN2349-002	988.72	Circular		1	1.5	0.013	0.05	0.5	0	41.012	Free
IN2349-002_AS2349-006	IN2349-002	988.72	AS2349-006	986	Circular		1	1.5	0.013	0.5	0.25	0	206.639	Free
IN2349-005_AS2349-006	IN2349-005	986.3	AS2349-006	986	Circular		1	2	0.013	0.5	0.5	0	13.216	Free
IN2349-007_AS2349-006	IN2349-007	986.1	AS2349-006	986	Circular		1	1.5	0.013	0.05	0.5	0	24.839	Free
IN2349-009_AS2349-011	IN2349-009	979.3	AS2349-011	978.1	Circular		1	2	0.013	0.5	0.5	0	11.557	Free
IN2349-010_AS2349-011	IN2349-010	981.24	AS2349-011	978.1	Circular		1	2	0.013	0.5	0.5	0	57.712	Free
IN2349-023_IN2249-026	IN2349-023	987.66	IN2249-026	987.16	Circular		1	1.5	0.013	0.5	0.5	None (,)	51.601	Free
IN2349-024_AS2349-025	IN2349-024	989.39	AS2349-025	988.15	Circular		1	1.5	0.013	0.5	0.25	None (,)	84.009	Free
IN2349-027_IN2249-027	IN2349-027	986.62	IN2249-027	986.32	Circular		1	2	0.013	0.05	0.25	None (,)	51.904	Free
IN2350-001_IN2350-002	IN2350-001	988.9	IN2350-002	988.85	Circular		1	1.5	0.013	0.5	0.05	0	31.687	Free
IN2350-002_IN2349-001	IN2350-002	988.85	IN2349-001	988.72	Circular		1	1.5	0.013	0.05	0.05	0	42.21	Free
IN2350-003_IN2349-007	IN2350-003	987.32	IN2349-007	986.1	Circular		1	1.5	0.013	0.5	0.05	0	41.689	Free
IN2350-004_IN2350-007	IN2350-004	987.71	IN2350-007	987.6	Circular		1	1.5	0.013	0.5	0.05	0	50.476	Free
IN2350-007_AE2350-011	IN2350-007	987.6	EMPB_GW_NTL1	986.6	Circular		1	1.5	0.013	0.05	0.5	0	50.482	Free
IN2350-008_GR2350-010	IN2350-008	987.9	EMPB_GW_NTL1	987	Circular		1	1.5	0.013	0.5	0.5	0	35.59	Free
IN2350-013_AE2350-016	IN2350-013	994.6	AE2350-016	992.6	Circular		1	1.5	0.013	0.05	1	0	47.689	Free
IN2350-014_IN2350-013	IN2350-014	995.55	IN2350-013	994.6	Circular		1	1.5	0.013	0.25	0.05	0	56.826	Free
IN2350-023_IN2350-028	IN2350-023	988.2	IN2350-028	987.8	Circular		1	1.5	0.013	0.5	0.05	None (,)	36.392	Free
IN2350-028_IN2349-023	IN2350-028	987.8	IN2349-023	987.66	Circular		1	1.5	0.013	0.05	0.5	None (,)	15.518	Free
IN2350-029_IN2350-014	IN2350-029	999.21	IN2350-014	995.55	Circular		1	1.5	0.013	0.5	0.25	0	91.011	Free
IN2351-006_AS2351-003	IN2351-006	1012	AS2351-003	1010.53	Circular		1	2	0.013	0.5	0.5	0	292.038	Free
IN2351-014_IN2351-006	IN2351-014	1012.86	IN2351-006	1012	Circular		1	2	0.013	0.5	0.05	0	172.392	Free
IN2352-004_AS2452-001	IN2352-004	1024.9	AS2452-001	1022.9	Circular		1	2	0.013	0.5	0.5	0	401.824	Free
IN2354-020_AS2354-015	IN2354-020	1044.97	AS2354-015	1044.02	Circular		1	2.25	0.013	0.25	0.05	0	137.958	Free
IN2355-005_IN2355-006	IN2355-005	1045.13	IN2355-006	1042.13	Circular		1	1.5	0.013	0.5	0.5	0	19.8	Free
IN2355-006_AS2355-064	IN2355-006	1042.13	AS2355-064	1041.61	Circular		1	3	0.013	0.05	0.5	0	50.86	Free
IN2355-020_AS2355-019	IN2355-020	1058.03	AS2355-019	1058	Circular		1	1.5	0.013	0.05	0.05	0	10.053	Free
IN2355-037_MI2355-039	IN2355-037	1049.03	MI2355-039	1048.75	Circular		1	1.5	0.013	0.05	0.05	0	29.366	Free
IN2355-038_IN2355-040	IN2355-038	1048.43	IN2355-040	1046.7	Circular		1	1.5	0.013	0.25	0.25	0	48.435	Free
IN2355-040_AS2355-059	IN2355-040	1046.7	AS2355-059	1043.43	Circular		1	1.5	0.013	0.25	0.5	0	92.487	Free
IN2355-042_AS2355-059	IN2355-042	1046.3	AS2355-059	1043.43	Circular		1	2	0.013	0.05	0.5	0	51.263	Free
IN2355-045_MI2355-046	IN2355-045	1046.3	MI2355-046	1046.3	Circular		1	2	0.013	0.05	0.05	0	9.619	Free
IN2355-051_IN2355-052	IN2355-051	1052.87	IN2355-052	1043.37	Circular		1	2.5	0.013	0.25	0.05	0	360.792	Free
IN2355-052_IN2355-006	IN2355-052	1043.37	IN2355-006	1042.13	Circular		1	3	0.013	0.05	0.05	0	206.345	Free
IN2356-006_IN2356-008	IN2356-006	1058.34	IN2356-008	1058.2	Circular		1	1.5	0.013	0.5	0.5	0	52.901	Free
IN2356-008_IN2356-010	IN2356-008	1058.2	IN2356-010	1058.2	Circular		1	1.5	0.013	0.5	0.05	0	33.752	Free
IN2356-010_IN2355-020	IN2356-010	1058.2	IN2355-020	1058.03	Circular		1	1.5	0.013	0.05	0.05	0	13.089	Free
IN2356-021_MI2356-023	IN2356-021	1049.62	MI2356-023	1049.5	Circular		1	1.5	0.013	0.5	0.05	0	16.002	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN2356-022_IN2355-037	IN2356-022	1049.03	IN2355-037	1049.03	Circular		1	1.5	0.013	0.05	0.05	0	16.251	Free
IN2356-024_IN2355-045	IN2356-024	1046.3	IN2355-045	1046.3	Circular		1	2	0.013	0.25	0.05	0	15.146	Free
IN2356-025_IN2356-024	IN2356-025	1046.65	IN2356-024	1046.3	Circular		1	2	0.013	0.5	0.05	0	50.006	Free
IN2356-033_AS2355-060	IN2356-033	1048.95	AS2355-060	1044.94	Circular		1	3	0.013	0.05	0.25	0	150.877	Free
IN2357-008_IN2257-009	IN2357-008	1060.41	IN2257-009	1060.02	Circular		1	1	0.013	0.25	0.05	0	19.102	Free
IN2358-003_AS2258-056	IN2358-003	1072.57	AS2258-056	1070.77	Circular		1	2.25	0.013	0.05	0.05	0	28.665	Free
IN2358-007_IN2358-003	IN2358-007	1078.77	IN2358-003	1072.57	Circular		1	2.25	0.013	0.05	0.05	0	112.847	Free
IN2358-009_IN2358-007	IN2358-009	1083.18	IN2358-007	1078.77	Circular		1	2.25	0.013	0.05	0.05	0	71.211	Free
IN2358-010_IN2358-009	IN2358-010	1087.6	IN2358-009	1083.18	Circular		1	2.25	0.013	0.05	0.05	0	67.959	Free
IN2358-012_IN2358-010	IN2358-012	1091.8	IN2358-010	1087.6	Circular		1	2.25	0.013	0.05	0.05	0	71.475	Free
IN2358-013_IN2358-012	IN2358-013	1096.44	IN2358-012	1091.8	Circular		1	2.25	0.013	0.05	0.05	0	70.754	Free
IN2358-015_IN2358-013	IN2358-015	1100.85	IN2358-013	1096.44	Circular		1	2.25	0.013	0.05	0.05	0	70.609	Free
IN2358-016_IN2358-015	IN2358-016	1105.27	IN2358-015	1100.85	Circular		1	2.25	0.013	0.25	0.05	0	69.644	Free
IN2358-020_IN2358-016	IN2358-020	1118.44	IN2358-016	1105.27	Circular		1	1.75	0.013	0.5	0.25	0	212.708	Free
IN2447-001_IN2448-014	IN2447-001	975.23	IN2448-014	974.8	Circular		1	1.5	0.013	0.5	0.05	None (,)	52.044	Free
IN2448-008_MI2448-017	IN2448-008	975.95	MI2448-017	973.79	Circular		1	2.5	0.013	0.5	0.05	None (,)	212.162	Free
IN2448-014_AE2448-015	IN2448-014	974.8	AE2448-015	973.85	Circular		1	1.5	0.013	0.5	1	0	155	Free
IN2449-001_IN2449-002	IN2449-001	995.82	IN2449-002	990.5	Circular		1	2	0.013	0.25	0.05	0	246.939	Free
IN2449-002_AE2449-003	IN2449-002	990.5	AE2449-003	984.8	Circular		1	2	0.013	0.05	0.5	None (,)	269.596	Free
IN2449-004_IN2449-001	IN2449-004	997.1	IN2449-001	995.82	Circular		1	2	0.013	0.05	0.25	0	322.668	Free
IN2449-009_IN2449-004	IN2449-009	997.2	IN2449-004	997.1	Circular		1	2	0.013	0.05	0.05	0	9.527	Free
IN2450-013_IN2450-014	IN2450-013	993.6	IN2450-014	993.5	Circular		1	1.5	0.013	0.5	0.5	0	8.829	Free
IN2450-014_AS2450-026	IN2450-014	993.5	AS2450-026	992.29	Circular		1	1.5	0.013	0.5	0.05	0	21.468	Free
IN2450-021_IN2450-023	IN2450-021	997.3	IN2450-023	997.25	Circular		1	1.75	0.013	0.25	0.25	0	20.483	Free
IN2450-023_IN2449-009	IN2450-023	997.25	IN2449-009	997.2	Circular		1	2	0.013	0.25	0.25	0	22.794	Free
IN2450-024_AE2450-030	IN2450-024	992.29	EMPB_GW_NTL5	991.37	Circular		1	2	0.013	0.05	0.5	0	216.29	Free
IN2450-025_AE2450-031	IN2450-025	992.15	EMPB_GW_NTL5	991.37	Circular		1	2	0.013	0.5	0.5	0	226.099	Free
IN2451-001_AE2451-002	IN2451-001	995.6	AE2451-002	995.25	Circular		1	2	0.013	0.5	0.05	None (,)	71.032	Free
IN2451-009_IN2451-001	IN2451-009	1003.86	IN2451-001	995.6	Circular		1	3	0.013	0.5	0.05	0	205.455	Free
IN2452-009_AS2451-004	IN2452-009	1016.2	AS2451-004	1011.2	Circular		1	2.5	0.013	0.05	0.25	0	129.088	Free
IN2452-011_AS2452-013	IN2452-011	1007.6	AE2452-014	1006.56	Circular		1	1.5	0.013	0.5	0.5	0	214.406	Free
IN2453-009_AE2553-001	IN2453-009	1025.9	AE2553-001	1012.6	Circular		1	1.5	0.013	0.5	0.5	0	223	Free
IN2454-009_AS2454-010	IN2454-009	1041.01	AS2454-010	1039.2	Circular		1	1.5	0.013	0.25	0.25	0	32.575	Free
IN2454-019_AE2454-006	IN2454-019	1033.78	AE2454-006	1021.6	Circular		1	2	0.013	0.05	0.5	0	300.527	Free
IN2455-017_IN2455-018	IN2455-017	1041.55	IN2455-018	1041.33	Circular		1	1.5	0.013	0.5	0.5	0	42.279	Free
IN2455-018_IN2455-019	IN2455-018	1041.33	IN2455-019	1041.33	Circular		1	1.5	0.013	0.5	0.5	0	10.624	Free
IN2455-019_AE2455-020	IN2455-019	1041.33	EMPB_GW_SHPR1	1036.9	Circular		1	1.5	0.013	0.5	0.5	0	47.005	Free
IN2455-021_AS2455-024	IN2455-021	1063.83	AS2455-024	1061.5	Circular		1	1.5	0.013	0.5	0.05	0	79.865	Free
IN2456-003_IN2456-022	IN2456-003	1065.85	IN2456-022	1062.88	Circular		1	1.75	0.013	0.5	0.05	0	168.877	Free
IN2456-022_AS2455-024	IN2456-022	1062.88	AS2455-024	1061.5	Circular		1	1.75	0.013	0.05	0.5	0	109.98	Free
IN2548-004_AS2548-003	IN2548-004	986.4	AS2548-003	986.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	32.939	Free
IN2548-007_AS2548-003	IN2548-007	986.35	AS2548-003	986.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	9.108	Free
IN2549-009_AE2549-011	IN2549-009	991.8	EMPB_GW_LOSR1	991.7	Circular		1	3.5	0.013	0.05	0.5	0	19.415	Free
IN2549-013_AS2549-001	IN2549-013	997.2	AS2549-001	993.34	Circular		1	1.5	0.013	0.5	0.5	0	10.413	Free
IN2549-014_IN2549-015	IN2549-014	996.93	IN2549-015	996.79	Circular		1	1.5	0.013	0.5	0.05	0	10.521	Free
IN2549-015_AS2549-003	IN2549-015	996.79	AS2549-003	993.81	Circular		1	1.5	0.013	0.05	0.5	0	25.127	Free
IN2550-001_GR2550-006	IN2550-001	1006.46	GR2550-006	1002.86	Circular		1	1.5	0.013	0.5	0.5	0	240	Free
IN2550-021_IN2549-009	IN2550-021	992.7	IN2549-009	991.8	Circular		1	3.5	0.013	0.05	0.05	0	48.53	Free
IN2552-007_AS2552-005	IN2552-007	1032.31	AS2552-005	1030.94	Circular		1	1.5	0.013	0.5	0.5	0	41.541	Free
IN2552-010_AS2552-005	IN2552-010	1032.78	AS2552-005	1030.94	Circular		1	1.5	0.013	0.5	0.25	0	62.051	Free
IN2553-005_IN2553-006	IN2553-005	1045.6	IN2553-006	1045.2	Circular		1	1.5	0.013	0.25	0.25	0	41.893	Free
IN2553-006_CB2553-007	IN2553-006	1045.2	CB2553-007	1044.91	Circular		1	1.5	0.013	0.05	0.05	0	8.508	Free
IN2649-011_AS2649-008	IN2649-011	996.74	AS2649-008	996.6	Circular		1	2	0.013	0.05	0.5	0	18.356	Free
IN2650-005_IN2650-006	IN2650-005	1004.1	IN2650-006	1001.48	Circular		1	2	0.013	0.5	0.05	0	215.008	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
IN2650-006_AS2650-004	IN2650-006	1001.48	AS2650-004	997.19	Circular		1	2	0.013	0.05	0.5	0	349.758	Free
JB2256-058_JB2256-060	JB2256-058	1046.5	JB2256-060	1046.02	Rectangular		1	3	0.013	0.05	0.05	0	167.707	Free
JB2256-060_JB2256-061	JB2256-060	1046.02	JB2256-061	1044.39	Rectangular		1	3	0.013	0.5	0.5	0	165.518	Free
JB2256-065_JB2256-061	JB2256-065	1044.42	JB2256-061	1044.39	Rectangular		1	4	0.013	0.25	0.05	0	47.349	Free
JCT_RIDGE_P_BACK_WEIR_TOP	JCT_RIDGE_POND_OUT		JCT_RIDGE_POND_OUT2											
JCT_RIDGE_POND_BACK_WEIR	JCT_RIDGE_POND_OUT		JCT_RIDGE_POND_OUT2											
JCT_RIDGE_POND_HIGH_WEIR	TARGET_P_OUT		JCT_RIDGE_POND_OUT											
JCT_RIDGE_POND_LO_WEIR	TARGET_P_OUT		JCT_RIDGE_POND_OUT											
JCT_RIDGE_POND_OUTFLOW_CHA	JCT_RIDGE_POND_OUT2	1044.3	JUNCTION_RIDGE_POND_OUT_JCT1	1043.5	Natural		1	0	0.013	0	0	None (,)	23.916	Free
Link1723	WW_TO_POND_BLIND_TAP	1071.77	AE1748-006	1071.37	Special	Horizontal Ellipse	1	6.33	0.013	0.05	1	0	120	Free
Link1728	DT1853-003	1090.9	IN1753-027	1088.83	Circular		1	1	0.013	0.5	0.5	0	98	Free
Link1729	IN1753-027	1088.83	IN1853-001	1088.36	Circular		1	1	0.013	0.5	0.05	0	156	Free
Link1730	IN1853-001	1088.36	IN1753-025	1087.88	Circular		1	1.25	0.013	0.05	0.5	0	161	Free
Link1731	IN1753-025	1087.88	IN1753-015	1086.53	Circular		1	1.25	0.013	0.5	0.25	0	454	Free
Link1732	IN1753-015	1086.53	IN1753-009	1086.39	Circular		1	1.5	0.013	0.25	0.25	0	45	Free
Link1733	IN1753-026	1088.54	IN1853-001	1088.36	Circular		1	1	0.013	0.5	0.5	0	59	Free
Link1737	HOMEWOOD_W_P_OUT	1072	Node1694	1071.9	Circular		1	0.667	0.011	1	0.5	0	86	Free
Link1738	Node1694	1071.9	Node1696	1071.66	Circular		1	0.667	0.011	0.5	0.05	0	48	Free
Link1739	Node1695	1063.33	GAN_H_PRIV_P_IN	1054.6	Circular		1	0.833	0.011	0.5	1	0	263	Free
Link1740	Node1696	1071.66	Node1695	1063.33	Circular		1	0.833	0.011	0.05	0.5	0	106	Free
Link1741	HIGHVIEW_PR	1087.58	Node1698	1087.21	Circular		1	1.5	0.013	0.5	0.25	0	74	Free
Link1742	Node1698	1087.21	IN2258-023	1086.91	Circular		1	1.5	0.013	0.25	0.5	0	58	Free
Link1743	IN1956-014	1100.04	IN1956-013	1099.53	Circular		1	1.25	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	52	Free
Link1744	IN2155-007	1055.82	Node1701	1055.37	Circular		1	1	0.013	0.5	0.05	0	37	Free
Link1745	Node1701	1055.37	Node1702	1055.24	Circular		1	1	0.013	0.05	0.05	0	25	Free
Link1746	Node1702	1055.24	Node1703	1055.15	Circular		1	1.25	0.013	0.05	0.05	0	19	Free
Link1747	Node1703	1055.15	AS2156-020	1054	Circular		1	1.25	0.013	0.05	0.5	0	28	Free
Link1748	IN1955-001	1084.37	AE2055-001	1080.87	Circular		1	1.5	0.013	0.5	0.5	0	175	Free
Link1750	AS2450-026	992.29	IN2450-025	992.15	Circular		1	1.25	0.013	0.5	0.5	0	10	Free
Link1754	WS-3	1005.59	WS-2	1001.5	Circular		1	1.5	0.013	0.5	0.05	0	168	Free
Link1755	WS-2	1001.47	AS2550-016	997.5	Circular		1	1.5	0.013	0.05	0.5	0	196	Free
Link1756	FS-15	1058.68	FS-14	1045.62	Circular		1	1.5	0.013	0.5	0.05	0	258	Free
Link1757	FS-14	1045.62	FS-13	1035.04	Circular		1	1.5	0.013	0.15	0.05	0	341	Free
Link1758	FS-13	1034.46	FS-12	1025.44	Circular		1	1.75	0.013	0.05	0.2	0	308	Free
Link1759	FS-12	1025.44	FS-11	1023.66	Circular		1	1.75	0.013	0.2	0.25	0	108	Free
Link1760	FS-11	1023.66	FS-10	1022.75	Circular		1	1.75	0.013	0.25	0.25	0	51	Free
Link1761	FS-10	1022.5	FS-9	1019.22	Circular		1	2	0.013	0.25	0.05	0	178	Free
Link1762	FS-9	1017.49	FS-8A	1016.68	Special	Horizontal Ellipse	1	5	0.013	0.05	0.25	0	164	Free
Link1763	FS-8A	1016.68	AS2551-010	1016.56	Special	Horizontal Ellipse	1	5	0.013	0.25	0.25	0	29	Free
Link1764	AS2155-011	1059	IN2155-009	1058.87	Circular		1	1	0.013	0.5	0.25	0	25	Free
Link1765	IN2155-009	1058.87	IN2156-034	1058.42	Circular		1	1	0.013	0.25	0.05	0	39	Free
Link1766	IN2156-034	1058.42	IN2156-033	1058.31	Circular		1	1.25	0.013	0.05	0.05	0	22	Free
Link1767	IN2156-033	1058.31	IN2156-031	1058.24	Circular		1	1.25	0.013	0.05	0.15	0	22	Free
Link1768	IN2156-031	1058.24	AS2156-028	1057.29	Circular		1	1.25	0.013	0.05	0.5	0	32	Free
Link1769	BH_APARTMENTS	1008.78	N_PV_ROAD_US	1004.8	Trapezoidal		1	2	0.027	0	0	None (,)	370	Free
Link1770	IN2056-039	1082.69	AS2056-031	1068.12	Circular		1	1	0.013	0.5	0.05	0	350	Free
Link1771	IN2247-013	971.25	IN2247-012	970.05	Circular		1	1.25	0.013	0.5	0.05	0	40	Free
Link1772	IN2247-012	970.05	IN2247-011	968.52	Circular		1	1.25	0.013	0.05	0.05	0	118	Free
Link1774	IN2256-023	1057.6	PD2256-019_AE2256-015	1054	Circular		1	1	0.013	0.5	0.25	0	40	Free
Link1775	IN2347-017	971.3	AS2347-018	970.95	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.5	None (,)	11	Free
Link1776	JCT_CT_POND_OUT	996	IN2250-044	995.17	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	91	Free
Link1777	IN1753-024	1090.8	IN1753-023	1090.05	Circular		1	1	0.013	0.5	0.05	None (,)	43	Free
Link1778	IN1753-023	1090.05	IN1753-022	1089.35	Circular		1	1	0.013	0.05	0.5	None (,)	36	Free
Link1779	IN1753-022	1089.35	IN1753-018	1088.67	Circular		1	1	0.013	0.5	0.5	None (,)	136	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
Link1780	IN1753-010	1088.78	IN1753-008	1086.11	Circular		1	1	0.013	0.5	0.5	None (,)	51	Free
Link1781	AE2052-041	1056.44	AS2152-024	1055.06	Circular		1	1	0.013	0.5	0.5	None (,)	283	Free
Link1782	AS2152-024	1055.06	AS2152-023	1053.83	Circular		1	1	0.013	0.05	0.05	None (,)	372	Free
Link1783	IN2152-007	1057.24	AS2152-008	1054.16	Circular		1	1.25	0.013	0.5	0.25	None (,)	42	Free
Link1784	IN2256-034	1059.64	AE2256-035	1058.85	Circular		1	1	0.013	0.5	0.5	None (,)	79	Free
Link1785	IN2257-028	1058.4	IN2257-029	1057.8	Circular		1	1	0.013	0.5	0.05	None (,)	60	Free
Link1786	IN2257-029	1057.8	AE2257-030	1057.5	Circular		1	1	0.013	0.05	0.5	None (,)	30	Free
Link1787	IN2554-002	1036.7	IN2554-001	1036.01	Circular		1	1	0.013	0.5	0.25	None (,)	22	Free
Link1788	IN2554-001	1036.01	AS2454-001	1034.6	Circular		1	1.25	0.013	0.25	0.5	None (,)	32	Free
Link1789	IN2554-003	1036.71	IN2554-001	1036.01	Circular		1	1	0.013	0.5	0.6	None (,)	15	Free
Link1790	IN2347-020	971.85	IN2347-032	971.2	Circular		1	1	0.013	0.5	0.5	None (,)	200	Free
Link1791	IN1947-018	1021.37	AS1947-017	1016.41	Circular		1	1.25	0.013	0.5	0.05	None (,)	148	Free
Link1792	IN2453-004	1031.4	AS2353-005	1030.7	Circular		1	1.25	0.013	0.5	0.5	None (,)	57	Free
Link1793	IN2353-006	1032.5	AS2353-005	1030.7	Circular		1	1.25	0.013	0.5	0.15	None (,)	70	Free
Link1795	BH_CHURCH_PR	1113.37	IN1654-004	1108.56	Circular		1	1	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	109	Free
Link1796	BL_DITCH_TO_FOURIER_CH	970	BL_D_TO_FOURIER_CH_DS	969.94	Circular		1	1	0.013	0.5	0.5	0	83	Free
Link1798	DT2157-011	1073.04	IN2157-009	1070.32	Circular		1	1	0.013	0.2	0.05	Groove End with Projecting (Circ, Conc)	29	Free
Link1799	IN2157-009	1070.32	IN2157-039	1069.65	Circular		1	1.25	0.013	0.05	0.05	0	71	Free
Link1800	IN2157-039	1069.65	IN2257-036	1068.97	Circular		1	1.25	0.013	0.05	0.05	0	20	Free
Link1801	IN2257-036	1068.97	IN2257-034	1068.47	Circular		1	1.5	0.013	0.05	0.5	0	29	Free
Link1802	AE1653-022	1106.07	IN1653-021	1105.45	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	93	Free
Link1803	IN1653-021	1105.45	IN1653-020	1105.28	Circular		1	1.5	0.013	0.25	0.5	0	32	Free
Link1807	IN2150-021	1024.35	IN2150-020	1022.72	Circular		1	1.25	0.011	0.5	0.5	0	94	Free
Link1808	IN2150-020	1022.72	IN2150-006	1020.86	Circular		1	1.25	0.011	0.5	0.05	0	101	Free
Link1809	IN2150-006	1020.86	IN2150-007	1016.7	Circular		1	1.25	0.014	0.5	0.05	None (,)	98	Free
Link1810	Node1915	1073.81	Node1919	1073.13	Circular		1	1.25	0.013	0.25	0.05	0	136	Free
Link1811	Node1916	1074.7	Node1917	1074.23	Circular		1	1	0.013	0.5	0.25	0	68	Free
Link1812	Node1918	1074.02	Node1915	1073.81	Circular		1	1	0.013	0.25	0.25	0	41	Free
Link1813	Node1917	1074.23	Node1918	1074.02	Circular		1	1	0.013	0.25	0.25	0	42	Free
Link1814	Node1919	1073.13	IN1849-057	1073.88	Circular		1	1.25	0.013	0.05	0.25	0	44	Free
Link1815	Node1920	1075.44	Node1921	1075.09	Circular		1	1	0.013	0.5	0.25	0	70	Free
Link1816	Node1921	1075.09	Node1922	1074.79	Circular		1	1	0.013	0.25	0.25	0	61	Free
Link1818	Node1922	1074.79	Node1924	1074.33	Circular		1	1.25	0.013	0.25	0.25	0	91	Free
Link1819	Node1924	1074.33	AS1849-058	1073.28	Circular		1	1.25	0.013	0.25	0.5	0	147	Free
Link1821	IN1949-001	1031.49	AS1949-009	1030.11	Circular		1	1	0.013	0.5	0.5	0	25	Free
Link1822	IN1949-002	1031.24	IN1949-003	1030.56	Circular		1	1	0.013	0.5	0.5	0	33	Free
Link1823	IN2353-001	0.05	IN2352-002	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1824	IN2352-002	0.05	IN2352-004	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1825	IN2352-003	0.05	IN2352-004	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1826	IN2354-019	0.05	AS2354-006	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1827	IN2354-007	0.05	AS2354-006	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1828	IN2354-014	0.05	AS2354-012	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1829	IN2354-016	0.05	AS2354-015	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1830	IN2355-050	0.05	AS2355-001	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1831	IN2355-049	0.05	AS2355-001	0	Circular		1	0.05	0.014	0	0	None (,)	10	Free
Link1832	IN2253-008	1055.95	AS2253-012	1054.89	Circular		1	1	0.013	0.5	0.5	0	34	Free
Link1833	IN2253-014	1054.2	AS2254-004	1053.27	Circular		1	1.5	0.013	0.5	0.5	0	26	Free
Link1834	IN2254-003	1054.95	IN2254-001	1054.31	Circular		1	1	0.013	0.5	0.5	0	26	Free
Link1835	IN2254-026	1054.25	AS2254-005	1052.66	Circular		1	1	0.013	0.5	0.5	0	42	Free
Link1836	IN2254-025	1054.25	AS2254-005	1052.66	Circular		1	1	0.013	0.5	0.5	0	26	Free
Link1837	IN2254-008	1051.34	IN2254-012	1048.64	Circular		1	2	0.013	0.5	0.5	0	38	Free
Link1838	IN2256-012	1058.8	IN2256-013	1058.2	Circular		1	1	0.013	0.5	0.05	None (,)	60	Free
Link1839	IN2256-013	1058.2	AE2256-014	1056.6	Circular		1	1	0.013	0.05	0.5	None (,)	40	Free
Link1840	MenardsPL1	1055.09	AE2256-016	1054.6	Circular		1	2.5	0.013	0.5	0.5	None (,)	154	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
Link1841	MenardsPL2	1056.12	MenardsPL1	1055.09	Circular		1	1.25	0.013	0.5	0.5	None (,)	80	Free
Link1842	MenardsPL3	1056.63	MenardsPL1	1055.09	Circular		1	1.75	0.013	0.5	0.25	None (,)	258	Free
Link1843	MenardsPL4	1057.33	MenardsDitch	1055.03	Circular		1	2	0.013	0.5	0.5	None (,)	288	Free
Link1845	Node1953	1059.06	TE2257-014	1057.35	Circular		1	1.25	0.013	0.5	0.5	0	42	Free
Link1846	IN2257-005	1060.42	AS2257-004	1060.06	Circular		1	1	0.013	0.5	0.5	0	18	Free
Link1847	IN2257-006	1060.42	AS2257-004	1059.82	Circular		1	1	0.013	0.5	0.5	0	30	Free
Link1848	IN2257-007	1061.9	AS2257-008	1061.64	Circular		1	1	0.013	0.5	0.5	0	13	Free
Link1849	IN2258-071	1065.36	IN2258-070	1065.28	Circular		1	1	0.013	0.5	0.5	0	15	Free
Link1850	IN2258-070	1065.28	IN2258-069	1065.14	Circular		1	1.5	0.013	0.5	0.05	0	29	Free
Link1851	IN2258-069	1065.14	IN2258-068	1065.08	Circular		1	1.5	0.013	0.05	0.05	0	11	Free
Link1852	IN2258-068	1065.08	IN2258-027	1064.38	Circular		1	1.5	0.013	0.05	0.5	0	40	Free
Link1853	IN2258-050	1070	IN2258-049	1068.06	Circular		1	1.5	0.013	0.5	0.5	None (,)	79	Free
Link1854	IN2258-047	1067.82	IN2258-046	1067.6	Circular		1	1	0.013	0.5	0.05	0	31	Free
Link1855	IN2258-046	1067.6	IN2258-045	1067.24	Circular		1	1	0.013	0.05	0.05	0	17	Free
Link1856	IN2258-045	1067.24	IN2258-044	1067.06	Circular		1	1.25	0.013	0.05	0.5	0	35	Free
Link1857	IN2258-044	1067.06	IN2258-040	1065.32	Circular		1	1.25	0.013	0.5	0.05	0	230	Free
Link1858	IN2258-043	1065.71	IN2258-040	1065.32	Circular		1	1	0.013	0.5	0.5	0	79	Free
Link1859	IN2258-032	1065.04	IN2258-033	1064.8	Circular		1	1	0.013	0.5	0.25	0	35	Free
Link1860	IN2258-033	1064.8	IN2258-027	1064.38	Circular		1	1.25	0.013	0.25	0.25	0	44	Free
Link1861	IN2258-026	1070.93	IN2258-025	1069.43	Circular		1	1	0.013	0.5	0.5	0	35	Free
Link1862	IN2249-019	991.04	IN2249-018	990.63	Circular		1	1	0.013	0.5	0.25	0	30	Free
Link1863	IN2249-018	990.63	IN2250-048	990.33	Circular		1	1	0.013	0.25	0.25	0	20	Free
Link1864	IN2250-048	990.33	IN2250-046	989.73	Circular		1	1	0.013	0.25	0.05	0	50	Free
Link1865	IN2250-046	989.73	AS2250-045	988.61	Circular		1	1	0.013	0.05	0.5	0	28	Free
Link1866	AS2250-019	991.93	IN2250-042	992	Circular		1	4	0.013	0.5	0.05	0	10	Free
Link1867	IN2250-042	992	IN2250-017	992.44	Circular		1	4	0.013	0.05	0.05	0	35	Free
Link1868	IN2250-017	992.44	IN2249-013	992.54	Circular		1	4	0.013	0.05	0.05	0	8	Free
Link1869	IN2249-013	992.54	IN2249-017	992.88	Circular		1	4	0.013	0.05	0.05	0	27	Free
Link1870	IN2249-016	996.17	IN2250-041	995.71	Circular		1	1	0.013	0.5	0.25	0	36	Free
Link1871	IN2250-041	995.71	IN2250-040	995.53	Circular		1	1	0.013	0.25	0.05	0	8	Free
Link1872	IN2250-040	995.53	IN2250-039	997.8	Circular		1	1	0.013	0.05	0.5	0	30	Free
Link1873	IN2249-017	992.88	AS2249-004	992.98	Circular		1	4	0.013	0.05	0.05	0	8	Free
Link1874	IN2250-029	1009.33	IN2250-028	1009.14	Circular		1	1	0.013	0.5	0.05	0	27	Free
Link1875	IN2250-028	1009.14	IN2250-027	1008.69	Circular		1	1	0.013	0.05	0.05	0	19	Free
Link1876	IN2250-027	1008.69	IN2250-026	1007.6	Circular		1	1.25	0.013	0.05	0.5	0	27	Free
Link1877	IN2250-025	1012.59	IN2250-059	1012.55	Circular		1	1	0.013	0.5	0.05	0	44	Free
Link1878	IN2250-059	1012.55	IN2250-058	1012.5	Circular		1	1	0.013	0.05	0.05	0	7	Free
Link1879	IN2250-058	1012.5	IN2250-022	1011.09	Circular		1	1	0.013	0.05	0.5	0	29	Free
Link1880	IN2251-030	1015.95	IN2251-029	1015.48	Circular		1	1	0.013	0.5	0.05	0	35	Free
Link1881	IN2251-029	1015.48	IN2251-028	1015.09	Circular		1	1	0.013	0.05	0.05	0	13	Free
Link1882	IN2251-028	1015.09	IN2251-027	1014.45	Circular		1	1	0.014	0.05	0.5	0	29	Free
Link1883	IN2150-050	1008.26	IN2150-038	1007.81	Circular		1	1	0.013	0.5	0.05	0	18	Free
Link1884	IN2150-038	1007.81	AS2150-014	1007.81	Circular		1	1	0.013	0.05	0.5	0	20	Free
Link1885	IN2150-042	1007.25	AS2150-014	1006.85	Circular		1	1	0.013	0.25	0.5	0	10	Free
Link1886	IN2149-016	1012.47	IN2150-033	1012.11	Circular		1	1	0.013	0.5	0.05	0	28	Free
Link1887	IN2150-033	1012.11	IN2150-048	1011.94	Circular		1	1	0.013	0.05	0.05	0	12	Free
Link1888	IN2150-048	1011.94	AS2150-032	1010.74	Circular		1	1	0.013	0.05	0.5	0	30	Free
Link1889	IN2150-035	1011.2	AS2150-032	1010.96	Circular		1	1	0.013	0.5	0.5	0	6	Free
Link1890	IN2251-005	1026.29	AS2251-007	1025.29	Circular		1	1.25	0.013	0.5	0.5	0	25	Free
Link1891	IN2251-023	1036.45	AS2251-022	1035.45	Circular		1	1	0.015	0.5	0.5	0	25	Free
Link1892	IN2251-020	1036.1	AS2251-021	1035.17	Circular		1	1.25	0.013	0.5	0.5	0	25	Free
Link1893	IN2251-019	1036.1	AS2251-021	1035.9	Circular		1	1.25	0.013	0.5	0.5	0	5	Free
Link1894	IN2251-016	1039.85	AS2251-018	1038.85	Circular		1	1.25	0.013	0.5	0.5	0	25	Free
Link1895	IN2252-014	1040.03	IN2251-017	1039.23	Circular		1	1.25	0.013	0.5	0.5	0	30	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
Link1896	IN2052-010	1061.14	IN2052-009	1060.5	Circular		1	1	0.013	0.5	0.5	0	27	Free
Link1897	IN2052-007	1062.96	AS2052-006	1062.34	Circular		1	1	0.013	0.5	0.5	0	23	Free
Link1898	IN2052-036	1058.76	TP2052-028	1058.6	Circular		1	1.25	0.013	0.05	0.25	0	8	Free
Link1899	IN2053-005	1059.62	IN2052-036	1058.76	Circular		1	1	0.013	0.5	0.05	0	43	Free
Link1900	IN2053-002	1061.48	IN2052-031	1060.92	Circular		1	1	0.013	0.5	0.25	0	43	Free
Link1901	IN1653-019	1104.76	IN1653-018	1104.2	Circular		1	1	0.013	0.5	0.5	0	37	Free
Link1902	IN1653-017	1103.02	IN1653-016	1102.22	Circular		1	1.5	0.013	0.5	0.5	0	40	Free
Link1903	IN1653-015	1102.64	IN1653-014	1101.86	Circular		1	1	0.013	0.5	0.5	0	39	Free
Link1904	IN1754-034	1099.46	IN1754-025	1098.7	Circular		1	1	0.013	0.5	0.5	0	38	Free
Link1905	IN1753-043	1091.2	AS1753-005	1090.2	Circular		1	1	0.013	0.5	0.25	0	50	Free
Link1906	IN1753-042	1091.18	IN1753-041	1090.58	Circular		1	1	0.013	0.5	0.25	0	30	Free
Link1907	IN1753-041	1090.58	AS1753-005	1090.2	Circular		1	1	0.013	0.5	0.5	0	19	Free
Link1908	IN1753-052	1087.59	AS1753-003	1087.21	Circular		1	1	0.013	0.5	0.5	0	19	Free
Link1909	IN1753-053	1087.45	AS1753-003	1087.21	Circular		1	1	0.013	0.5	0.5	0	12	Free
Link1910	IN1753-050	1086.21	IN1753-049	1085.59	Circular		1	1	0.013	0.5	0.5	0	31	Free
Link1911	IN1753-011	1089.03	IN1753-010	1088.78	Circular		1	1	0.013	0.5	0.5	0	14	Free
Link1912	IN1753-033	1103.49	IN1753-032	1101.57	Circular		1	1	0.013	0.5	0.25	0	48	Free
Link1913	IN1753-032	1100.91	IN1753-029	1099.82	Circular		1	1.25	0.013	0.25	0.05	0	219	Free
Link1914	IN1753-029	1099.82	IN1753-028	1099.17	Circular		1	1.25	0.013	0.05	0.05	0	77	Free
Link1915	IN1753-035	1100.25	IN1753-029	1099.82	Circular		1	1	0.013	0.5	0.25	0	36	Free
Link1916	IN1753-021	1094.16	IN1753-020	1093.18	Circular		1	1	0.013	0.5	0.25	0	54	Free
Link1917	IN1753-020	1093.18	IN1753-019	1092.35	Circular		1	1	0.013	0.25	0.25	0	58	Free
Link1918	IN1753-019	1092.35	IN1753-018	1088.67	Circular		1	1	0.013	0.25	0.05	0	114	Free
Link1919	IN2155-006	1052.6	IN2156-019	1052.59	Circular		1	1	0.013	0.5	0.05	0	61	Free
Link1920	IN2156-019	1052.29	IN2156-018	1052.25	Circular		1	1	0.013	0.05	0.05	0	8	Free
Link1921	IN2156-018	1052.25	AS2156-017	1051.03	Circular		1	1	0.013	0.05	0.05	0	50	Free
Link1922	IN2156-049	1050.43	IN2155-014	1049.99	Circular		1	1.25	0.013	0.5	0.05	0	87	Free
Link1923	IN2155-014	1049.99	IN2155-013	1049.86	Circular		1	1.25	0.013	0.05	0.25	0	25	Free
Link1924	IN2255-041	1047.35	IN2255-040	1047.11	Circular		1	1	0.013	0.5	0.25	0	48	Free
Link1925	IN2255-040	1047.11	IN2256-039	1046.74	Circular		1	1	0.013	0.25	0.05	0	73	Free
Link1926	IN2256-039	1046.74	IN2256-038	1046.68	Circular		1	1	0.013	0.05	0.05	0	11	Free
Link1927	IN2256-038	1046.68	AS2256-036	1046.59	Circular		1	1	0.013	0.05	0.5	0	17	Free
Link1928	IN2255-044	1046.66	IN2256-041	1046.29	Circular		1	1	0.013	0.5	0.05	0	73	Free
Link1929	IN2256-041	1046.29	IN2256-040	1046.26	Circular		1	1	0.013	0.05	0.05	0	5	Free
Link1930	IN2256-040	1046.26	AS2256-037	1046.17	Circular		1	1	0.013	0.05	0.5	0	17	Free
Link1931	IN2255-045	1046.22	IN2256-044	1045.9	Circular		1	1.5	0.013	0.5	0.25	0	64	Free
Link1932	IN2256-044	1045.9	IN2256-043	1045.83	Circular		1	1.5	0.013	0.25	0.05	0	13	Free
Link1933	IN2256-043	1045.83	AS2256-042	1045.74	Circular		1	1.5	0.013	0.05	0.5	0	17	Free
Link1939	IN2255-052	1045.56	IN2255-051	1045.45	Circular		1	1	0.013	0.5	0.25	0	21	Free
Link1940	IN2255-051	1045.45	IN2255-050	1045.32	Circular		1	1	0.013	0.25	0.05	0	25	Free
Link1941	IN2255-050	1045.32	IN2255-049	1045.18	Circular		1	1.25	0.013	0.05	0.25	0	27	Free
Link1942	IN2255-049	1045.18	IN2255-048	1044.97	Circular		1	1.25	0.013	0.25	0.25	0	42	Free
Link1943	IN2255-048	1044.97	AS2255-046	1044.85	Circular		1	1.25	0.013	0.25	0.5	0	23	Free
Link1944	IN2354-018	1041.47	IN2454-007	1041.4	Circular		1	1.25	0.013	0.25	0.25	0	25	Free
Link1945	IN2454-007	1041.4	IN2454-008	1041.26	Circular		1	1.25	0.013	0.25	0.25	0	45	Free
Link1946	IN2454-008	1041.26	IN2454-009	1041.01	Circular		1	1.25	0.013	0.25	0.25	0	30	Free
Link1947	IN2354-017	1041.84	IN2354-018	1041.47	Circular		1	1	0.013	0.5	0.25	0	40	Free
Link1948	S101	1083.94	S106	1082.37	Circular		1	1	0.011	0.25	0.25	0	80	Free
Link1954	FourierDr_US2	965.15	EMPB_GW_FD1	965.1	Rectangular		1	4	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	77	Free
MENARDS_POND_GRATE_OUT	IN2256-076		IN_2256-076											
MI1548-028_AS1548-014	MI1548-028	1097.73	AS1548-014	1097.05	Circular		1	4	0.013	0.05	0.05	None (,)	48.005	Free
MI1548-051_AS1548-048	MI1548-051	1102.5	AS1548-048	1101.47	Circular		1	3.5	0.013	0.05	0.25	None (,)	216.825	Free
MI1549-013_AS1549-002	MI1549-013	1105.51	AS1549-002	1103.77	Circular		1	1.5	0.013	0.05	0.5	None (,)	181.746	Free
MI1647-055_AS1647-056	MI1647-055	1083.9	AS1647-056	1083.7	Circular		1	2.5	0.013	0.05	0.25	None (,)	16.133	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
MI1748-034_AS1748-007	MI1748-034	1072.91	AS1748-007	1072.1	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	None (,)	145.015	Free
MI1751-024_IN1751-011	MI1751-024	1087.35	IN1751-011	1086.78	Circular		1	2	0.013	0.05	0.05	None (,)	115.013	Free
MI1752-008_IN1752-002	MI1752-008	1090.37	IN1752-002	1089.8	Circular		1	2	0.013	0.05	0.05	None (,)	115.013	Free
MI1753-047_AS1753-045	MI1753-047	1088	AS1753-045	1087.65	Circular		1	4.5	0.013	0.5	0.05	0	200.191	Free
MI1848-034_AS1848-013	MI1848-034	1069.22	AS1848-013	1068.56	Circular		1	2	0.013	0.05	0.25	0	66.187	Free
MI1849-054_AS1849-053	MI1849-055	1072.7	AS1849-053	1072.6	Circular		1	2	0.013	0.05	0.05	None (,)	21.068	Free
MI2046-007_IN2046-005	MI2046-007	1012.47	IN2046-005	1011.84	Circular		1	2	0.013	0.05	0.5	0	38.413	Free
MI2047-004_AS2047-003	MI2047-004	1011.14	AS2047-003	1010	Circular		1	2	0.013	0.05	0.5	0	35.001	Free
MI2050-008_IN2051-060	MI2050-008	1067.07	IN2051-060	1063.66	Circular		1	1.5	0.013	0.05	0.25	0	107.654	Free
MI2051-022_IN2051-016	MI2051-022	1056.6	IN2051-016	1056.3	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	44.005	Free
MI2051-054_IN2051-001	MI2051-054	1056.7	IN2051-001	1056.46	Circular		1	2	0.013	0.05	0.05	0	25.584	Free
MI2051-062_IN2051-048	MI2051-062	1068.99	IN2051-048	1068.69	Circular		1	2.25	0.013	0.05	0.05	0	112.857	Free
MI2052-021_AS2052-022	MI2052-021	1061.81	AS2052-022	1061.52	Circular		1	1.5	0.013	0.05	0.05	0	30.415	Free
MI2255-034_IN2255-032	MI2255-034	1050.25	IN2255-032	1050.2	Circular		1	1.5	0.013	0.05	0.25	0	10.401	Free
MI2255-047_PD2255-023	MI2255-047	1044.75	Node1784	1043.35	Rectangular		1	5	0.013	0.05	1	0	117	Free
MI2256-075_JB2256-065	MI2256-075	1046.93	JB2256-065	1044.42	Circular		1	4.5	0.013	0.05	0.25	0	72.167	Free
MI2258-038_IN2258-027	MI2258-038	1065.1	IN2258-027	1064.38	Circular		1	1.5	0.013	0.05	0.05	0	89.347	Free
MI2348-010_AE2348-007	MI2348-010	974.1	AE2348-007	974	Circular		1	6.5	0.013	0.25	1	0	28.003	Free
MI2355-039_IN2355-038	MI2355-039	1048.75	IN2355-038	1048.43	Circular		1	1.5	0.013	0.05	0.25	0	18.002	Free
MI2355-046_IN2355-042	MI2355-046	1046.3	IN2355-042	1046.3	Circular		1	2	0.013	0.05	0.05	0	51.222	Free
MI2356-023_IN2356-022	MI2356-023	1049.5	IN2356-022	1049.03	Circular		1	1.5	0.013	0.05	0.05	0	31.453	Free
MI2650-010_IN2649-011	MI2650-010	996.94	IN2649-011	996.74	Circular		1	2	0.013	0.25	0.05	0	34.478	Free
Multi_10	PF-S15	1117.2	PF-S18	1114.86	Circular		1	1.5	0.013	0.05	0.25	0	224	Free
Multi_11	PF-S18	1114.36	PF-S21	1113.29	Circular		1	2	0.013	0.25	0.25	0	224	Free
Multi_12	PF-S1	1139.46	PF-S4	1137.92	Circular		1	1	0.013	0.05	0.05	0	153	Free
Multi_13	PF-S26	1112.16	PF-S27	1111.48	Circular		1	2	0.013	0.5	0.05	0	36	Free
Multi_14	PF-S27	1111.48	PF-S28	1110.72	Circular		1	2.5	0.013	0.05	0.05	0	134	Free
Multi_15	PF-S2	1140.69	PF-S1	1139.56	Circular		1	1	0.013	0.5	0.25	0	113	Free
Multi_16	PF-S30	1106.79	PL1549-019	1106.89	Circular		1	3	0.013	0.5	0.05	0	37.165	Free
Multi_17	PF-S4	1137.82	PF-S7	1136.96	Circular		1	1	0.013	0.05	0.25	0	86	Free
Multi_18	PF-S7	1136.86	PF-S8	1125.05	Circular		1	1	0.013	0.25	0.05	0	165	Free
Multi_19	PF-S8	1125.05	PF-S12	1120.3	Circular		1	1.5	0.013	0.05	0.05	0	153	Free
Multi_2	CH-S22	1102.61	CH-S21	1098.09	Circular		1	2	0.013	0.25	0.25	0	185.052	Free
Multi_20	PL1549-019	1106.89	IN1549-018	1106.78	Circular		1	3	0.013	0.05	0.05	0	22.27	Free
Multi_21	S101	1083.94	SE_BIO_BASIN	1083	Circular		1	1	0.013	0.5	1	0	119	Free
Multi_22	S103	1085.5	S106	1082.37	Circular		1	1	0.013	0.25	0.05	0	121	Free
Multi_23	S104	1086.44	S103	1085.5	Circular		1	1	0.013	0.25	0.25	0	33	Free
Multi_24	S105	1086.73	S104	1086.44	Circular		1	1	0.013	0.5	0.25	0	25	Free
Multi_25	S106	1081.87	IN1647-041	1080.38	Circular		1	1.5	0.013	0.05	0.05	0	119	Free
Multi_26	S32	1088.55	S101	1084.19	Circular		1	1	0.013	0.5	0.25	0	128	Free
Multi_27	S33	1088.88	S32	1088.55	Circular		1	1	0.013	0.5	0.5	0	29	Free
Multi_3	CH-S23	1103.55	CH-S22	1103.11	Circular		1	1.5	0.013	0.25	0.25	0	72.616	Free
Multi_4	CH-S24	1105.49	CH-S23	1103.8	Circular		1	1.25	0.013	0.25	0.25	0	171.784	Free
Multi_48	E_INF_BASIN	1084.5	S106	1083.85	Circular		1	0.5	0.011	0.5	0.5	None (,)	32	Free
Multi_5	CH-S25	1106.12	CH-S24	1105.74	Circular		1	1	0.013	0.5	0.25	0	41.54	Free
Multi_58	NW_INF_BASIN	1093.75	IN1647-065	1093.49	Circular		1	0.5	0.011	0.5	0.25	None (,)	42.981	Free
Multi_6	CH_S31	1099.51	CH_BIO_BASIN_1	1097.5	Circular		1	2	0.013	0.5	0.2	0	202.956	Free
Multi_68	IN1549-020	1107.3	IN1549-018	1106.78	Circular		1	1	0.011	0.25	0.5	None (,)	59.464	Free
Multi_7	CH_S32	1101.51	CH_S31	1100.26	Circular		1	1.25	0.013	0.05	0.5	0	42.024	Free
Multi_8	CH_S33	1105.19	CH_S32	1101.51	Circular		1	1.25	0.013	0.5	0.25	0	107.858	Free
Multi_9	PF-S12	1120.2	PF-S15	1117.2	Circular		1	1.5	0.013	0.05	0.05	0	300	Free
N_BL_Crossing2	N_BL_Cross_US2	967.6	N_BL_Cross_DS2	966	Circular		1	5.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	237	Free
N_BL_Crossing3	N_BL_Cross_US3	967.6	N_BL_Cross_DS3	966	Circular		1	5.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	237	Free
N_BLACKHAWK_POND_TO_DS_GW	N_BLACKHAWK_POND_OUT	1010.6	N_PV_ROAD_US	1004.8	Natural		1	0	0.013	0	0	None (,)	80.476	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
N_M-PB_GW_DEMING_WAY_SECT	GR2145-003	959	PB_OUTFALL	952.85	Natural		1	0	0.013	0	0	None (,)	813.581	Free
N_M-PB_GW_DEMING_WAY_SECT	PB_OUTFALL	952.85	PB_END	951.74	Natural		1	0	0.013	0.5	0.5	None (,)	192.15	Free
N_PV_ROAD_PIPE	N_PV_ROAD_US	1004.8	N_PV_ROAD_DS	1003.4	Circular		1	5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	54.643	Free
N_WEXFORD_POND_OUT_WEIR1	Node1769		WEXFORD_POND_OUT											
N_WEXFORD_POND_OUT_WEIR2	Node1769		WEXFORD_POND_OUT											
N_WEXFORD_POND_OUT_WEIR3	Node1769		WEXFORD_POND_OUT											
N_WEXFORD_POND_PIPE_OUT	Node1769	971.95	WEXFORD_POND_OUT	971.85	Circular		3	1.5	0.013	1	0.5	0	10	Free
ND1953-001_ND2053-001	ND1953-001	1064.56	ND2053-001	1063.57	Circular		1	3.5	0.013	0.5	0.5	0	56	Free
ND2053-001_ND2053-002	ND2053-001	1063.57	ND2053-002	1058.85	Natural		1	0	0.013	0	0	None (,)	508.203	Free
ND2053-002_TP2052-028	ND2053-002	1058.85	TP2052-028	1058.6	Rectangular		1	4	0.013	0.2	0.05	Square Edge with Headwall (Circ, Conc)	89.017	Free
NEW_PIPE_08_06_2019	IN1647-037	1075.74	NEW_SAS_08_06_19	1074.86	Special	Horizontal Ellipse	1	3.16	0.011	0.25	0.25	None (,)	172.285	Free
NORTH_BLACKHAWK_POND_OUT	N_BH_P_OUTLET	1011.6	N_BLACKHAWK_POND_OUT	1010.6	Special	Horizontal Ellipse	1	3.75	0.013	1	0.5	0	45	Free
OLD_SAUK_GW1_PIPE	WMPB_GW_DW1	972.23	OSTP_POND_SYSTEM_JCT_14	971.5	Circular		2	4	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	161.959	Free
OLD_SAUK_GW3_PIPE	OLD_SAUK_GW3_US	972.21	OSTP_POND_SYSTEM_JCT_14	972	Circular		1	1.5	0.024	0.5	0.5	0	78.295	Free
OSR_BL_SERAMP	OSR_BL_SERAMP_US	999	OSR_BL_SERAMP_DS	997	Circular		1	2	0.013	0.5	0.5	0	144.304	Free
OSTP_Pipes	OSTP_POND_SYSTEM_JCT_13	964.7	OSTP_POND_SYSTEM_JCT_12	964.1	Circular		2	2	0.011	0.2	1	Square Edge with Headwall (Circ, Conc)	20	Free
OSTP_POND_SYSTEM1_PIPE	OSTP_POND_SYSTEM1_US	965.5	OSTP_POND_SYSTEM1_DS	965.07	Special	Horizontal Ellipse	1	3.75	0.013	0.2	1	Groove End with Projecting (Circ, Conc)	27	Free
OSTP_POND_SYSTEM7_PIPE	OSTP_POND_SYSTEM_JCT_11	969.6	OSTP_POND_SYSTEM_JCT_10	969.5	Circular		2	2	0.024	0.2	1	Headwall (Circ, Corr Metal)	20.833	Free
OSTP_POND_SYSTEM_CHANNEL_1	OSTP_POND_SYSTEM_JCT_7	963.27	OSTP_POND_SYSTEM_JCT_6	963.17	Natural		1	0	0.013	0	0	None (,)	113.806	Free
OSTP_POND_SYSTEM_OUTLET	OSTP_POND_SYSTEM_JCT_1		PD2145-002											
OSTP_POND_SYSTEM_OUTLET2	OSTP_POND_SYSTEM_JCT_1		PD2145-002											
OSTP_POND_SYSTEM_OUTLET3	OSTP_POND_SYSTEM_JCT_1		PD2145-002											
OSTP_POND_SYSTEM_STAGE1	OSTP_POND_SYSTEM_JCT_8	963.8	OSTP_POND_SYSTEM_JCT_8A	963.27	Natural		1	0	0.013	0	0	None (,)	93.2	Free
OSTP_POND_SYSTEM_STAGE2	OSTP_POND_SYSTEM_JCT_6	963.17	OSTP_POND_SYSTEM_JCT_5	961.6	Natural		1	0	0.013	0	0	None (,)	400.076	Free
OSTP_POND_SYSTEM_STAGE3	OSTP_POND_SYSTEM_JCT_4	961.4	OSTP_POND_SYSTEM_JCT_3	959.6	Natural		1	0	0.013	0	0	None (,)	578.714	Free
OSTP_POND_SYSTEM_STAGE4	OSTP_POND_SYSTEM_JCT_2	959.5	OSTP_POND_SYSTEM_JCT_1	959.5	Natural		1	0	0.013	0	0	None (,)	251.565	Free
OSTP_POND_SYSTEM_US_CHANNE	OSTP_POND_SYSTEM_JCT_9	964.42	OSTP_POND_SYSTEM_JCT_8	963.8	Natural		1	0	0.013	0	0	None (,)	121.3	Free
OSTP_POND_SYSTEM_US_CHANNE	OSTP_POND_SYSTEM_JCT_10	969.5	OSTP_POND_SYSTEM_JCT_9	964.42	Natural		1	0	0.013	0	0	None (,)	131.934	Free
OSTP_POND_SYSTEM_US_CHANNE	AE2147-012	968.2	OSTP_POND_SYSTEM_JCT_9	964.42	Natural		1	0	0.013	0	0	None (,)	194.442	Free
OSTP_POND_SYSTEM_US_CHANNE	OSTP_POND_SYSTEM_JCT_12	964.1	OSTP_POND_SYSTEM_JCT_8	963.8	Natural		1	0	0.013	0	0	None (,)	51.323	Free
OSTP_W_GW_TO_POND1_OVERFL	OSTP_POND_SYSTEM_JCT_11	969.9	OSTP_POND_SYSTEM_JCT_8A	966.21	Trapezoidal		1	1	0.035	0	0	None (,)	84.727	Free
P2to3pipes	OSTP_POND_SYSTEM_JCT_3	959.6	OSTP_POND_SYSTEM_JCT_2	959.5	Circular		2	3	0.013	0.2	1	Groove End with Projecting (Circ, Conc)	27	Free
PARAGON_INF_BASIN_ORI	PAR_INF_OUT		PD1653-004											
PARAGON_INF_BASIN_ORIFICE2	PAR_INF_OUT		PD1653-004											
PARAGON_INF_BASIN_WEIR1	PAR_INF_OUT		PD1653-004											
PARAGON_INF_BASIN_WEIR2	PAR_INF_OUT		PD1653-004											
PARAGON_WP_ORIFICE	PAR_WP_OUT		PD1654-010											
PARAGON_WP_V_NOTCH	PAR_WP_OUT		PD1654-010											
PD1653-004_PD1753-055	PD1653-004	1094.5	PD1753-055	1094.42	Circular		1	2.5	0.013	0.5	0.5	0	18.675	Free
PD1654-010_AS1653-005	PD1654-010	1095.78	AS1653-005	1095.03	Circular		1	3	0.013	0.25	0.25	0	130.097	Free
PD1753-055_AS1653-003	PD1753-055	1094.42	AS1653-003	1092.03	Circular		1	2.5	0.013	0.5	0.5	0	183.634	Free
PD2145-002_TP2145-006	PD2145-002	959.55	TP2145-006	959.35	Rectangular		1	6	0.013	0.2	0.5	90 and 15 deg Wingwall Flares (Rect, Conc)	42.005	Free
PF-AES36_PF-S36	PF-AES36	1117.7	PF-S36	1116.52	Circular		1	1	0.013	0.05	0.05	None (,)	36.892	Free
PF-DROPOFF_OUT_PF-S42	PF-DROPOFF	1122.43	PF-S42	1118.99	Circular		1	1.5	0.013	0.5	0.05	None (,)	193.045	Free
PF-LOT1_PF-S2	PF-LOT1	1141.3	PF-S2	1140.79	Circular		1	1	0.013	0.5	0.5	None (,)	51	Free
PF-OFFSITE_PF-S17	POPE_FARMS_OFFSITE	1126	PF-S17	1123.73	Natural		1	0	0.02	0	0	None (,)	188.142	Free
PF-OUTLOT2_PF-S5	PF_OUTLOT2	1137.8	PF-S5	1137.54	Circular		1	1	0.013	0.5	0.05	None (,)	26	Free
PF-OUTLOT3_IN1549-020	PF-OUTLOT3_SAS	1108.5	IN1549-020	1107.6	Circular		1	1	0.013	0.5	0.5	None (,)	12.654	Free
PF-OUTLOT3_TO_SAS	PF_E_INF_BASIN	1111.01	PF_OUTLOT3_GRATE	1111	Circular		1	1	0.013	0.5	0.5	None (,)	13.701	Free
PF-OUTLOT4_PF-S32	PF_S_INF_BASIN	1110.25	PF-OUTLOT4-OUT	1110.26	Circular		1	3	0.013	0.5	0.5	None (,)	13.805	Free
PF-S10_PF-S12	PF-S10	1124.07	PF-S12	1123.96	Circular		1	1	0.013	0.5	0.5	None (,)	8.681	Free
PF-S11_PF-S12	PF-S11	1124.07	PF-S12	1123.44	Circular		1	1	0.013	0.5	0.5	None (,)	48.828	Free
PF-S13_PF-S15	PF-S13	1117.81	PF-S15	1117.7	Circular		1	1	0.013	0.5	0.5	None (,)	11.936	Free
PF-S14_PF-S15	PF-S14	1121.8	PF-S15	1117.7	Circular		1	1	0.013	0.5	0.5	None (,)	47.743	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
PF-S17_PF-S17A	PF-S17	1121.5	PF-S17A	1121.3	Circular		1	1	0.013	0.5	0.25	None (,)	49.51	Free
PF-S17A_TO_SE_WP	PF-S17A	1121.3	PF_SE_WET_POND	1121	Circular		1	1	0.013	0.25	1	None (,)	51.164	Free
PF-S23_PF-S27	PF-S23	1113.2	PF-S27	1112.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	47	Free
PF-S24_PF-S27	PF-S24	1113.02	PF-S27	1112.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	29	Free
PF-S25_PF-S26	PF-S25	1113.34	PF-S26	1113.26	Circular		1	1	0.013	0.5	0.5	None (,)	13	Free
PF-S26_PF-S21	PF-S21	1113.19	PF-S26	1112.16	Circular		1	2	0.013	0.25	0.5	None (,)	123	Free
PF-S28_PF-OUTLOT4	PF-S28	1110.72	PF_S_WP	1110.5	Circular		1	2.5	0.013	0.25	1	0	55	Free
PF-S31_PFS28	PF-S31	1112.4	PF-S28	1112.22	Circular		1	1	0.013	0.5	0.25	None (,)	36	Free
PF-S32_PF-S30	PF-S32	1108	PF-S30	1106.79	Circular		1	3	0.013	0.5	0.5	None (,)	28.394	Free
PF-S34_PF-S35	PF-S34	1116.41	PF-S35	1116.08	Circular		1	1	0.013	0.25	0.25	None (,)	53.179	Free
PF-S35_PF-AES35	PF-S35	1116.08	PF-AES35	1115.9	Circular		1	1	0.013	0.25	1	None (,)	41.588	Free
PF-S36_PF-S34	PF-S36	1116.52	PF-S34	1116.41	Circular		1	1	0.013	0.25	0.25	None (,)	43.969	Free
PF-S38_PF-S18	PF-S38	1115.28	PF-S18	1114.86	Circular		1	1.5	0.013	0.5	0.5	None (,)	45.275	Free
PF-S41_PF-S42	PF-S41	1120.46	PF-S42	1119.24	Circular		1	1.25	0.013	0.25	0.5	None (,)	75.488	Free
PF-S42_PF-S38	PF-S42	1118.89	PF-S38	1115.28	Circular		1	1.5	0.013	0.05	0.5	None (,)	155	Free
PF-S44_PF-S8	PF-S44	1126.31	PF-S8	1125.55	Circular		1	1	0.013	0.5	0.5	None (,)	153	Free
PF-S47_PF-S41	PF-S47	1120.62	PF-S41	1120.56	Circular		1	1.25	0.013	0.05	0.25	None (,)	22.131	Free
PF-S48_PF-S52	PF-S48	1124.9	PF-S52	1123.14	Circular		1	1	0.013	0.05	0.05	None (,)	87.884	Free
PF-S49_PF-S48	PF-S49	1126.76	PF-S48	1125	Circular		1	1	0.013	0.5	0.05	None (,)	72.139	Free
PF-S52_PF-S47	PF-S52	1123.04	PF-S47	1120.97	Circular		1	1	0.013	0.05	0.05	None (,)	83.063	Free
PF-S5_PF-S7	PF-S5	1137.44	PF-S7	1137.13	Circular		1	1	0.013	0.05	0.5	None (,)	31	Free
PF-S60_DROPOFF_IN	PF-S60	1127.5	PF-DROPOFF	1127	Circular		1	1.5	0.013	0.5	0.5	None (,)	52.083	Free
PF-S6_PF-S7	PF-S6	1137.42	PF-S7	1137.31	Circular		1	1	0.013	0.5	0.5	None (,)	11.066	Free
PF-SWALE1	PF_PLAYGROUND_OUT	1141.16	PF_PATH_US	1138.14	Trapezoidal		1	4	0.027	0	0	None (,)	235.468	Free
PF-SWALE2	PF_PATH_DS	1137.82	PF_SE_WET_POND	1124	Trapezoidal		1	4	0.027	0	0	None (,)	911.921	Free
PF_BH_CULVERT	PF_BH_CULV_US	1133.33	PF_BH_CULV_DS	1133	Circular		1	1	0.013	0.5	0.5	None (,)	77.048	Free
PF_E_INF_ORIFICE	PF_OUTLOT3_GRATE		PF-OUTLOT3_SAS											
PF_E_INF_WEIR	PF_OUTLOT3_GRATE		PF-OUTLOT3_SAS											
PF_PATH_CULVERT	PF_PATH_US	1138.14	PF_PATH_DS	1137.82	Circular		1	1	0.013	0.5	0.5	None (,)	35.791	Free
PF_PLAYGROUND_CULVERT	PF_PLAYGROUND_STORAGE	1141.89	PF_PLAYGROUND_OUT	1141.16	Circular		1	1	0.013	0.5	0.5	None (,)	46.392	Free
PF_S_INF_BASIN_ORIFICE	PF-OUTLOT4-OUT		PF-S32											
PF_S_INF_BASIN_PIPE_IN	PF_S_WP_SAS	1110.01	PF_S_INF_BASIN	1110	Circular		2	3.5	0.013	0.5	0.5	None (,)	9.639	Free
PF_S_INF_BASIN_WEIR	PF-OUTLOT4-OUT		PF-S32											
PF_S_WP_ORIFICE	PF_S_WP_OUT		PF_S_WP_SAS											
PF_S_WP_PIPE_OUT	PF_S_WP	1106.01	PF_S_WP_OUT	1106	Circular		2	3.5	0.013	0.5	0.5	None (,)	12.568	Free
PF_S_WP_WEIR	PF_S_WP_OUT		PF_S_WP_SAS											
PF_SE_INF_IN_PIPE	PF_SE_WP_TO_INF_GRATE	1121	PF_SE_INF_BASIN	1121	Circular		1	2	0.013	0.5	0.5	None (,)	38.116	Free
PF_SE_WP_INF_ORIFICE	PF_SE_WP_INF_BASIN_OUTLET		PF_SE_WP_INF_OUT_2											
PF_SE_WP_INF_OUT2	PF_SE_INF_BASIN	1121	PF_SE_WP_INF_BASIN_OUTLET	1119	Circular		1	2	0.013	0.5	0.5	None (,)	34.313	Free
PF_SE_WP_INF_OVERFLOW	PF_SE_INF_BASIN		PF-S36											
PF_SE_WP_INF_PIPE_OUT	PF_SE_WP_INF_OUT_2	1119	PF-S36	1116.52	Circular		1	2	0.013	0.5	0.5	None (,)	44.662	Free
PF_SE_WP_INF_WEIR	PF_SE_WP_INF_BASIN_OUTLET		PF_SE_WP_INF_OUT_2											
PF_SE_WP_PIPE_OUT	PF_SE_WET_POND	1118	PF_SE_WP_TO_INF	1118	Circular		1	2	0.013	0.5	0.5	None (,)	49.26	Free
PF_SE_WP_TO_INF_BASIN_OVERFL	PF_SE_WET_POND		PF_SE_INF_BASIN											
PF_SE_WP_TO_INF_BASIN_WEIR	PF_SE_WP_TO_INF		PF_SE_WP_TO_INF_GRATE											
PL1547-026_AS1547-023	PL1547-026	1124.41	AS1547-023	1115.12	Circular		1	1.5	0.013	0.5	0.25	None (,)	89.806	Free
PL1951-004_AS2051-063	PL1951-004	1070.62	AS2051-063	1069.67	Circular		1	2	0.013	0.5	0.05	0	54.005	Free
PL2052-025_IN2052-024	PL2052-025	1062.35	IN2052-024	1062.17	Circular		1	1.5	0.013	0.5	0.25	0	37.001	Free
PL2052-030_IN2052-029	PL2052-030	1060.47	IN2052-029	1060.33	Circular		1	1.5	0.013	0.5	0.25	0	29.001	Free
PL2257-013_AS2257-012	PL2257-013	1057.97	AS2257-012	1057.87	Circular		1	2	0.013	0.5	0.05	0	15.023	Free
PLEASANT_V_MINERAL_PT_GRATE	AE2056-023		SS2056-022											
RAMP_TO_OSR_BL_SE_STORAGE	OSR_BL_SERAMP_DS	997	OLD_SAUK_BELTLINE_SE	994	Trapezoidal		1	10	0.035	0	0	None (,)	163.663	Free
S_HP_Rd_S_Crossing	S_HP_Rd_US	1037.4	S_HP_Rd_DS	1035.9	Circular		1	5.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	154	Free
S_M_PB_GW_ATTIC_ANGEL_CR_SE	SMPB_BW_AAC1	1005.27	IN2150-019	1007.1	Natural		1	0	0.013	0	0	None (,)	77.677	Free

Existing Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)	Flow Direction Option
S_M_PB_GW_ATTIC_ANGEL_CR_SE	SMPB_BW_AAC2	1001.6	SMPB_BW_AAC1	1005.27	Natural		1	0	0.013	0	0	None (,)	153.85	Free
S_M_PB_GW_ATTIC_ANGEL_P_SE(	ATTIC_ANGEL_POND_OUT	1016.85	SMPB_GW_AAP	1006.1	Natural		1	0	0.013	0	0	None (,)	401.374	Free
S_M_PB_GW_BLACKWOLF_DR_SE(	SMPB_GW_BWD	1051.35	ATTIC_ANGEL_POND_IN	1037.35	Natural		1	0	0.013	0	0	None (,)	823.569	Free
S_M_PB_GW_ELDERBERRY_RD_SE	HD2052-035	1058.27	HD2051-014	1052.35	Natural		1	0	0.013	0	0	None (,)	1328.938	Free
S_TO_N_WEXFORD_POND_PIPES	WEX_SE_POND_OUT	972.2	WEX_NW_POND_IN	971.9	Circular		2	4	0.013	1	1	0	90	Free
S_WEXFORD_POND_IN_WEIR	WEXFORD_POND_IN		WEX_SE_POND_IN											
SAUK_CR_UPPER_IN2451-001	SAUK_CREEK_UPPER_STORAGE	996.85	IN2451-001	995.6	Circular		1	1.5	0.013	0.05	0.05	None (,)	15.208	Free
SAUK_HEIGHTS_LOW_FLOW	IN1750-017A		IN1750-017											
SAUK_HEIGHTS_V_NOTCH	IN1750-017A		IN1750-017											
SC_Pipe1	AE2350-034	990.36	EMPB_GW_NTL3	989.43	Special	Horizontal Ellipse	1	1.91	0.013	1	0.5	0	69	Free
SC_Pipe2	AE2350-034	990.36	EMPB_GW_NTL3	989.43	Special	Horizontal Ellipse	1	3.75	0.013	1	0.5	0	82	Free
SS2056-022_IN2056-021	SS2056-022	1093	IN2056-021	1092.64	Circular		1	1	0.013	0.5	0.5	0	82.624	Free
SW BH Pond Grate.1	AS1849-013.1		Node1910											
SWBHLow	AS1849-013.1		Node1910											
TE1848-012_IN1848-011	TE1848-012	1029.19	IN1848-011	1026.6	Circular		1	1.5	0.013	0.05	0.05	0	28.233	Free
TE2152-009_AS2152-010	TE2152-009	1053.85	AS2152-010	1053.02	Circular		1	2.25	0.013	0.05	0.05	0	102.208	Free
TE2257-014_AS2257-003	TE2257-014	1057.35	AS2257-003	1056.47	Circular		1	2	0.013	0.05	0.05	0	50.434	Free
TO2255-024_TO2355-056	JUNCTION_RIDGE_POND_OUT_J	1043.5	EMPB_GW_MPR1	1041.39	Circular		1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	396.456	Free
TO_AE2254-014	AE2054-001_AE2254-014_JCT	1056.18	AE2254-014	1049.11	Trapezoidal		1	10	0.035	0	0	None (,)	830.893	Free
TP1648-049_MI1748-034	TP1648-049	1073.99	MI1748-034	1072.91	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	None (,)	228.477	Free
TP2052-028_HD2052-035	TP2052-028	1058.6	HD2052-035	1058.27	Rectangular		1	4	0.013	0.5	0.5	0	26.043	Free
TP2145-006_TP2145-007	TP2145-006	959.35	TP2145-007	959.25	Rectangular		1	6	0.013	0.05	0.05	None (,)	15.163	Free
TP2145-007_GR2145-003	TP2145-007	959.25	GR2145-003	959	Rectangular		1	6	0.013	0.05	0.5	None (,)	78.878	Free
TP2247-019_GR2247-018	TP2247-019	965.15	Fourier_DrDS1	965.1	Rectangular		1	4	0.013	0.05	0.5	None (,)	18.646	Free
TP2250-010_IN2250-039	TP2250-010	997.35	IN2250-039	997.8	Rectangular		1	3	0.013	0.05	0.05	0	263.746	Free
TP2251-032_AS2251-007	TP2251-032	1027.8	AS2251-007	1025	Circular		1	1.75	0.013	0.05	0.25	0	101.284	Free
TP2347-023_GR2347-022	TP2347-023	969.5	HighPointDS2	968.6	Rectangular		1	4	0.013	0.5	0.5	0	54.89	Free
TP2454-013_HD2454-016	TP2454-013	1030.4	HD2454-016	1030.1	Special	Horizontal Ellipse	1	9.41	0.013	0.05	0.5	0	63.347	Free
TP2549-008_AE2549-012	TP2549-008	992.18	EMPB_GW_LOSR1	991.11	Circular		1	4	0.013	0.05	0.5	0	283.602	Free
W_M_PB_GW_BLACKHAWK_RD_S	AE1847-020	1059.87	WMPB_GW_TRANSFER1	1055.42	Natural		1	0	0.013	0	0	None (,)	146.146	Free
W_M_PB_GW_DEMING_WAY_SEC	OSTP_POND_SYSTEM_JCT_14	971.5	OSTP_POND_SYSTEM_JCT_11	969.9	Natural		1	0	0.013	0	0	None (,)	221.404	Free
W_M_PB_GW_DEMING_WAY_SEC	WMPB_GW_DW2	971.7	WMPB_GW_DW1	971.3	Natural		1	0	0.013	0	0	None (,)	45.341	Free
W_M_PB_GW_DEMING_WAY_SEC	WMPB_GW_DW3	976.98	WMPB_GW_DW2	971.7	Natural		1	0	0.013	0	0	None (,)	475.267	Free
W_M_PB_GW_DEMING_WAY_SEC	WMPB_GW_DW4	978.8	WMPB_GW_DW3	976.98	Natural		1	0	0.013	0	0	None (,)	211.021	Free
W_M_PB_GW_DEMING_WAY_SEC	AE2047-016	979.6	WMPB_GW_DW4	978.8	Natural		1	0	0.013	0	0	None (,)	131.427	Free
W_M_PB_GW_DEMING_WAY_SEC	WMPB_GW_DW5	986.1	WMPB_GW_DW4	978.8	Natural		1	0	0.013	0	0	None (,)	728.048	Free
W_M_PB_GW_PLEASANT_VIEW_S	N_PV_ROAD_DS	1003.4	N_PV_ROAD_DS2	990.72	Natural		1	0	0.035	0	0	None (,)	703.711	Free
W_M_PB_GW_PLEASANT_VIEW_S	N_PV_ROAD_DS2	990.72	AE2048-001	986.84	Natural		1	0	0.035	0	0	None (,)	339.585	Free
WOODSTONE_TO_AE1954-001	FARGO_COBALT_OUT_JCT	1085.36	FARMRD_SWALE1	1079.66	Natural		1	0	0.027	0	0	None (,)	1600	Free
WOODSTONE_TO_AE1954-001.1	FARMRD_SWALE1	1079.66	AE1954-001	1075.14	Natural		1	0	0.027	0	0	None (,)	1134.91	Free

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
3983.1	EMPB_GW_UOSR1	969.1	HighPointDS2	968.6	Rectangular		1	4	0.013	0.2	0.5	30 to 75 deg Wingwall Flares (Rect, Conc)	145
24inch	OSTP_POND_SYSTEM_J	961.6	OSTP_POND_SYSTEM_JCT_4	961.4	Circular		3	2	0.024	0.9	1	Projecting (Circ, Corr Metal)	25
6x12box	Node2015	968.87	Node2016	968.6	Rectangular		1	6	0.013	0.25	0.5	0	60
AA_POND_IN_FROM_W_PIPE	ATTIC_ANGEL_POND_IN	1037.35	AA_W_POND_IN	1017.1	Circular		1	5.5	0.013	0.5	1	0	165.924
AE1546-001_AE1546-002	AE1546-001	1110.87	AE1546-002	1110.59	Circular		1	1	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	30.216
AE1546-002_IN1646-001	AE1546-002	1110.59	IN1646-001	1094.69	Trapezoidal		1	1	0.027	0.1	0.5	None (,)	515.629
AE1546-003_AE1546-004	AE1546-003	1127.36	AE1546-004	1127.17	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	27
AE1546-004_AE1546-001	AE1546-004	1127.17	AE1546-001	1110.87	Trapezoidal		1	1	0.027	0.5	0.5	None (,)	749.556
AE1547-035_AE1547-036	AE1547-035	1128.25	AE1547-036	1121.5	Circular		1	1	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	301.651
AE1547-036_IN1647-069	AE1547-036	1121.5	IN1647-069	1097.55	Trapezoidal		1	1	0.027	0.1	0.5	None (,)	1009.9
AE1549-015_AS1549-014	AE1549-015	1107.37	AS1549-014	1106.9	Circular		1	1	0.011	0.2	0.5	Groove End with Headwall (Circ, Conc)	170.68
AE1549-041_IN1549-039	AE1549-041	1109.9	IN1549-039	1109.7	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	29.196
AE1549-043_AS1549-042	AE1549-043	1104.85	AS1549-042	1103.76	Circular		1	1.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	40.001
AE1549-044_AS1549-042	AE1549-044	1105.92	AS1549-042	1103.76	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	17.275
AE1550-029_AE1550-030	AE1550-029	1114.77	AE1550-030	1110.26	Special	Horizontal Ellipse	1	1.91	0.013	0.2	0.5	Elliptical Tapered Inlet, Square Edges (Throat, Cor	118.144
AE1550-030_AE1550-034	AE1550-030	1110.26	AE1550-034	1103.42	Trapezoidal		1	2	0.027	0	0	None (,)	118.803
AE1550-034_CAPE_SILVER_N	AE1550-034	1103.38	CAPE_SILVER_WAY_DRY_POND	1100	Natural		1	0	0.027	0	0	None (,)	163.666
AE1647-038_IN1647-037	AE1647-038	1076.49	IN1647-037	1075.74	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	30.385
AE1647-066_IN1647-065	AE1647-066	1093.75	IN1647-065	1093.49	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	13.229
AE1648-029_IN1648-028	AE1648-029	1072.6	IN1648-028	1072.59	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	75
AE1648-050_TP1648-049	AE1648-050	1079.6	TP1648-049	1073.99	Circular		1	1	0.011	0.2	0.5	Groove End with Headwall (Circ, Conc)	151.46
AE1649-022_AS1549-042	AE1649-022	1117.1	AE1549-024	1103.76	Trapezoidal		1	1.5	0.035	0	0	None (,)	627.185
AE1649-023_AE1649-022	AE1649-023	1117.4	AE1649-022	1117.1	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	31.958
AE1649-024_AS1549-042	AE1549-024	1104.87	AS1549-042	1103.76	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	18.761
AE1652-001_IN1752-028	AE1652-001	1110.6	IN1752-028	1107.51	Circular		1	1	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	73.289
AE1653-024_IN1653-023	AE1653-024	1105.99	IN1653-023	1105.53	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	74.42
AE1746-001_AE1846-003	AE1746-001	1086	AE1846-003	1063	Trapezoidal		1	0.5	0.027	0	0	0	1126.63
AE1747-023_IN1647-039	AE1747-023	1078.64	IN1647-039	1078.53	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	29.723
AE1750-026 Pipe	AE1750-026	1080.35	IN1750-017A	1077.6	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	173
AE1750-027 Pipe	AE1750-027	1073.6	IN1750-017	1077.6	Circular		1	3	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	290
AE1846-003_AS1847-021	AE1846-003	1063	AS1847-021	1061.15	Circular		1	3	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	57.007
AE1946-011_AS1947-010	AE1946-011	1047	AS1947-010	1044.15	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	49.006
AE1951-006_AS1951-005	AE1951-006	1073.6	AS1951-005	1070.3	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	65.881
AE1951-007_AS1951-005	AE1951-007	1072	AS1951-005	1069.55	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	18.115
AE1952-003_AE1953-002	AE1952-003	1066.4	AE1953-002	1066.1	Special	Horizontal Ellipse	1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	48
AE1954-001_AE2054-001	AE1954-001	1075.14	AE2054-001	1074.27	Circular		1	1.25	0.024	0.2	0.5	Groove End with Headwall (Circ, Conc)	54.977
AE2045-009_IN2045-004	AE2045-009	974.71	IN2045-004	974.71	Circular		1	1.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	36.372
AE2050-017_IN2050-016	AE2050-017	1028.51	IN2050-016	1027.92	Circular		1	2	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	17.002
AE2054-001_AE2254-014	AE2054-001	1074.27	FARMRD_SW4	1064.73	Natural		1	0	0.027	0.2	0	Groove End with Headwall (Circ, Conc)	1200
AE2054-001_AE2254-014.1	FARMRD_SW4	1064.73	AE2054-001_AE2254-014_JCT	1056.18	Natural		1	0	0.027	0.2	0	Groove End with Headwall (Circ, Conc)	875
AE2056-023_SS2056-022	AE2056-023	1090.01	SS2056-022	1090	Circular		1	1	0.013	1	0.25	Groove End with Headwall (Circ, Conc)	16
AE2150-004_IN2250-030	AE2150-004	1001.08	IN2250-030	1000.82	Circular		1	2	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	25.843
AE2150-022_AE2150-025	SMPB_GW_AAP	1006.1	SMPB_BW_AAC2	1001.6	Special	Horizontal Ellipse	2	4.41	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	130.015
AE2156-063_AS2156-062	AE2156-063	1050	AS2156-062	1049.61	Special	Horizontal Ellipse	1	3.16	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	39
AE2156-074_AE2156-075	AE2156-074	1063.54	AE2156-075	1055.46	Trapezoidal		1	2	0.035	0.1	0.25	0	186.402
AE2156-075_IN2156-006	AE2156-075	1055.46	IN2156-006	1051.07	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	76.133
AE2157-018_AE2157-019	AE2157-018	1075.54	AE2157-019	1074.59	Circular		1	1.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	100.004
AE2157-019_AE2156-074	AE2157-019	1074.59	AE2156-074	1063.54	Trapezoidal		1	1	0.035	0.2	0.1	Groove End with Headwall (Circ, Conc)	446.275
AE2158-008_IN2158-007	AE2158-008	1067.55	IN2158-007	1067.55	Special	Horizontal Ellipse	1	2.833	0.013	0.2	0.05	Elliptical Tapered Inlet, Square Edges (Throat, Cor	47.005

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
AE2250-053_IN2250-051	AE2250-053	987.22	IN2250-051	987.08	Circular		1	3	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	32.639
AE2250-055_IN2250-054	AE2250-055	986.4	IN2250-054	986.08	Circular		1	2	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	24.462
AE2254-014_AS2254-015	AE2254-014	1049.11	AS2254-015	1048.53	Circular		1	4	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	91.59
AE2255-033_TO_JCT_POND_OUT	AE2255-033	1049.08	JUNCTION_RIDGE_POND_OUT_JCT	1043.5	Natural		1	0	0.013	0	0	None (,)	84.217
AE2255-035_AE2255-033	AE2255-035	1049.91	AE2255-033	1049.08	Natural		1	0	0.013	0.1	1	0	7.878
AE2256-033_AE2256-083	AE2256-033	1051.5	AE2256-083	1051.36	Trapezoidal		1	1.5	0.035	0	0	None (,)	14.631
AE2256-083_IN2256-080	AE2256-083	1051.36	IN2256-080	1050.05	Circular		1	2	0.013	0.05	0.25	0	80.807
AE2349-026_AS2349-025	AE2349-026	988.3	AS2349-025	988.15	Circular		1	1.5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	30.351
AE2351-002_TO_OSRBL_SERAMP	AE2351-002	1009.25	OSR_BL_SERAMP_US	999	Trapezoidal		1	1	0.035	0	0	None (,)	563.472
AE2355-034_AE2455-015	EMPB_GW_STL1	1037.4	EMPB_GW_SHPR1	1035.9	Circular		2	5.5	0.013	0.2	0.05	Square Edge with Headwall (Circ, Conc)	154
AE2355-035_AE2455-016	AE2355-035	1037.4	AE2455-016	1035.9	Circular		1	5.5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	154
AE2356-034_AS2356-032	AE2356-034	1050.25	AS2356-032	1048.95	Circular		1	3	0.013	0.5	0.25	0	19.001
AE2553-002_TO_GW	AE2553-002	1043.6	TAMARACK_TRAILS	1032	Trapezoidal		1	1	0.035	0	0	None (,)	700
AE2553-002_TO_GW.1	TAMARACK_TRAILS	1032	EMPB_GW_NTL7	1016.57	Trapezoidal		1	1	0.035	0	0	None (,)	200
AS1547-018_IN1547-012	AS1547-018	1106.28	IN1547-012	1101.84	Circular		1	2	0.013	0.25	0.05	None (,)	137.473
AS1547-023_IN1547-019	AS1547-023	1115.12	IN1547-019	1108.34	Circular		1	1.5	0.013	0.25	0.25	None (,)	95.884
AS1547-029_IN1548-026	AS1547-029	1115.09	IN1548-026	1101.42	Circular		1	2	0.013	0.5	0.05	None (,)	241.396
AS1547-032_AS1547-029	AS1547-032	1124.5	AS1547-029	1115.09	Circular		1	2	0.013	0.25	0.5	None (,)	160.745
AS1548-014_IN1548-012	AS1548-014	1097.05	IN1548-012	1095.73	Circular		1	4.5	0.013	0.05	0.05	None (,)	179.162
AS1548-031_IN1548-029	AS1548-031	1099.99	IN1548-029	1098.55	Circular		1	4	0.013	0.5	0.05	None (,)	142.71
AS1548-036_AS1548-031	AS1548-036	1102.46	AS1548-031	1099.99	Circular		1	2	0.013	0.25	0.5	None (,)	97.973
AS1548-038_AS1548-036	AS1548-038	1106.07	AS1548-036	1102.46	Circular		1	2	0.013	0.25	0.25	None (,)	98.043
AS1548-039_AS1548-038	AS1548-039	1109.91	AS1548-038	1106.07	Circular		1	2	0.013	0.5	0.25	None (,)	85.617
AS1548-048_AS1548-031	AS1548-048	1101.47	AS1548-031	1099.99	Circular		1	3.5	0.013	0.25	0.5	None (,)	196.245
AS1549-001_MI1548-051	AS1549-001	1103.61	MI1548-051	1102.5	Circular		1	3.5	0.013	0.05	0.05	None (,)	209.008
AS1549-002_AS1549-001	AS1549-002	1103.77	AS1549-001	1103.61	Circular		1	3.5	0.013	0.5	0.05	None (,)	34.652
AS1549-010_AS1549-002	AS1549-010	1105.51	AS1549-002	1103.77	Circular		1	3	0.013	0.05	0.5	None (,)	242.196
AS1549-033_AS1549-032	AS1549-033	1107.76	AS1549-032	1107.63	Circular		1	1.25	0.013	0.25	0.25	None (,)	32.03
AS1549-034_AS1549-033	AS1549-034	1108.02	AS1549-033	1107.76	Circular		1	1.25	0.013	0.25	0.25	None (,)	78.377
AS1549-042_AE1550-034	AS1549-042	1103.76	AE1550-034	1103.42	Special	Horizontal Ellipse	1	3.16	0.013	0.05	0.5	None (,)	67.927
AS1550-004_IN1650-009	AS1550-004	1091.43	IN1650-009	1091.28	Circular		1	2	0.013	0.05	0.05	None (,)	51.548
AS1550-006_AS1550-004	AS1550-006	1096.2	AS1550-004	1091.43	Circular		1	1	0.013	0.5	0.5	None (,)	253.327
AS1550-008_AS1550-004	AS1550-008	1092.02	AS1550-004	1091.43	Circular		1	2	0.013	0.5	0.5	None (,)	199.021
AS1550-009_AS1550-008	AS1550-009	1092.81	AS1550-008	1092.02	Circular		1	2	0.013	0.5	0.5	None (,)	264.423
AS1550-010_AS1550-009	AS1550-010	1093.09	AS1550-009	1092.81	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.5	None (,)	94.342
AS1647-002_IN1647-003	AS1647-002	1092.47	IN1647-003	1088.34	Circular		1	2	0.013	0.5	0.25	None (,)	179.848
AS1647-006_MI1647-055	AS1647-006	1085.6	MI1647-055	1083.9	Circular		1	2.5	0.013	0.05	0.05	None (,)	188.374
AS1647-018_IN1647-023	AS1647-018	1080.39	IN1647-023	1080.16	Circular		1	2.5	0.013	0.05	0.25	None (,)	42.852
AS1647-024_AS1647-027	AS1647-024	1077.6	AS1647-027	1075.26	Circular		1	3	0.013	0.05	0.05	None (,)	350.037
AS1647-027_AS1747-019	AS1647-027	1075.26	NEW_SAS_08_06_19	1074.86	Circular		1	3.5	0.013	0.05	0.05	None (,)	40.044
AS1647-049_IN1647-050	AS1647-049	1084.11	IN1647-050	1083.6	Circular		1	3	0.013	0.25	0.05	None (,)	101.2
AS1647-052_AS1647-059	AS1647-052	1081.79	AS1647-059	1080.79	Circular		1	4.5	0.013	0.05	0.25	None (,)	127.648
AS1647-056_AS1647-052	AS1647-056	1083.7	AS1647-052	1081.79	Circular		1	3	0.013	0.25	0.05	None (,)	78.763
AS1647-059_AS1647-048	AS1647-059	1080.79	AS1647-048	1080.25	Circular		1	4.5	0.013	0.25	0.25	None (,)	103.918
AS1647-062_AS1647-049	AS1647-062	1084.33	AS1647-049	1084.11	Circular		1	3	0.013	0.05	0.25	None (,)	42.004
AS1648-003_AS1648-006	AS1648-003	1079.02	AS1648-006	1076.82	Circular		1	1.5	0.013	0.5	0.5	None (,)	23.056
AS1648-015_AS1648-014	AS1648-015	1080.56	AS1648-014	1078.14	Circular		1	1.5	0.013	0.5	0.5	None (,)	55.818
AS1650-003_IN1750-036	AS1650-003	1086.84	IN1750-036	1086.6	Circular		1	2	0.013	0.5	0.5	None (,)	15.469
AS1650-004_AS1650-003	AS1650-004	1087.51	AS1650-003	1086.84	Circular		1	2	0.013	0.5	0.5	None (,)	157.006

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
AS1650-005_AS1650-004	AS1650-005	1087.56	AS1650-004	1087.51	Circular		1	2	0.013	0.5	0.5	None (,)	28.001
AS1650-006_AS1650-005	AS1650-006	1088.51	AS1650-005	1087.56	Circular		1	2	0.013	0.05	0.25	None (,)	310.238
AS1650-007_AS1650-006	AS1650-007	1089.46	AS1650-006	1088.51	Circular		1	2	0.013	0.05	0.05	None (,)	323.329
AS1650-008_AS1650-007	AS1650-008	1090.41	AS1650-007	1089.46	Circular		1	2	0.013	0.05	0.05	None (,)	321.069
AS1653-003_AS1753-054	AS1653-003	1092.03	AS1753-054	1091.84	Circular		1	2.5	0.013	0.5	0.05	0	38.362
AS1653-005_AE1653-006	AS1653-005	1095.03	AE1653-006	1094.5	Circular		1	3	0.013	0.25	1	0	79
AS1747-002_AS1748-014	AS1747-002	1072.9	AS1748-014	1072.36	Circular		1	3.5	0.013	0.25	0.25	None (,)	177.47
AS1747-004_AS1747-002	AS1747-004	1077.72	AS1747-002	1072.9	Circular		1	2	0.013	0.05	0.5	None (,)	44.733
AS1747-007_AS1747-004	AS1747-007	1085.87	AS1747-004	1077.72	Circular		1	1.75	0.013	0.25	0.05	None (,)	276.033
AS1747-010_AS1747-007	AS1747-010	1086.72	AS1747-007	1085.87	Circular		1	1.75	0.013	0.5	0.5	None (,)	282.03
AS1747-019_AS1747-002	AS1747-019	1073.05	AS1747-002	1072.9	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	None (,)	48.107
AS1748-011_AS1748-003	AS1748-011	1072.06	AS1748-003	1071.9	Special	Horizontal Ellipse	1	5	0.013	0.25	0.5	None (,)	57.482
AS1748-014_AS1748-011	AS1748-014	1072.36	AS1748-011	1072.06	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	None (,)	92.506
AS1750-024_IN1850-003	AS1750-024	1076.04	IN1850-003	1073.62	Circular		1	3	0.013	0.05	0.5	None (,)	485.052
AS1753-044_IN1753-006	AS1753-044	1091.5	IN1753-006	1090.5	Circular		1	1.5	0.013	0.05	0.25	0	140.006
AS1753-045_AE1753-046	AS1753-045	1087.65	AE1753-046	1086	Special	Horizontal Ellipse	1	4.41	0.013	0.5	1	0	29
AS1753-045_AS1853-004	AS1753-045	1087.65	AS1853-004	1086.64	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	292.641
AS1753-048_AS1754-009	AS1753-048	1091.42	AS1754-009	1090.59	Special	Horizontal Ellipse	1	5.66	0.013	0.5	0.5	0	279.397
AS1753-054_AS1753-048	AS1753-054	1091.84	AS1753-048	1091.42	Special	Horizontal Ellipse	1	3.16	0.013	0.05	0.05	0	24.507
AS1754-002_AS1753-044	AS1754-002	1093.1	AS1753-044	1091.5	Circular		1	1.5	0.013	0.5	0.05	0	113.032
AS1754-007_MI1753-047	AS1754-007	1088.58	MI1753-047	1088	Circular		1	4.5	0.013	0.5	0.5	0	111.811
AS1754-008_AS1754-007	AS1754-008	1090.28	AS1754-007	1088.58	Circular		1	4.5	0.013	0.05	0.5	0	568.022
AS1754-009_AS1754-008	AS1754-009	1090.59	AS1754-008	1090.28	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.05	0	95.004
AS1754-010_IN1753-051	AS1754-010	1097	IN1753-051	1085.59	Circular		1	1.5	0.013	0.05	0.05	0	151.08
AS1754-014_AS1754-007	AS1754-014	1098.25	AS1754-007	1091.08	Circular		1	2	0.013	0.05	0.05	0	67.003
AS1754-015_AS1754-014	AS1754-015	1105.38	AS1754-014	1098.25	Circular		1	2	0.013	0.05	0.05	0	115.005
AS1754-018_AS1754-015	AS1754-018	1115.5	AS1754-015	1105.38	Circular		1	2	0.013	0.05	0.05	0	146.5
AS1754-019_AS1754-018	AS1754-019	1115.7	AS1754-018	1115.5	Circular		1	2	0.013	0.5	0.05	0	38.001
AS1754-028_IN1754-027	AS1754-028	1104.6	IN1754-027	1104	Circular		1	2	0.013	0.5	0.25	0	111.116
AS1847-002_IN1847-003	AS1847-002	1073.63	IN1847-003	1069	Circular		1	1.25	0.013	0.05	0.05	0	246.557
AS1847-021_AE1847-020	AS1847-021	1061.15	AE1847-020	1059.87	Circular		1	4	0.013	0.5	0.5	0	55.007
AS1847-022_IN1847-025	AS1847-022	1064.09	IN1847-025	1062.91	Circular		1	1.75	0.013	0.05	0.05	0	54.671
AS1848-003_AS1848-002	AS1848-003	1078.32	AS1847-002	1073.63	Circular		1	1.25	0.013	0.05	0.05	0	251.253
AS1848-027_IN1848-026	AS1848-027	1075.84	IN1848-026	1075.69	Circular		1	2	0.013	0.05	0.25	None (,)	33.871
AS1849-008_IN1849-005	AS1849-008	1072.13	IN1849-005	1072.11	Circular		1	2	0.013	0.5	0.05	None (,)	5.727
AS1849-009_AS1849-008	AS1849-009	1073.11	AS1849-008	1072.13	Circular		1	2	0.013	0.05	0.5	0	326.036
AS1849-011_IN1849-010	AS1849-011	1075.08	IN1849-010	1074.09	Circular		1	2	0.013	0.25	0.25	None (,)	198.481
AS1849-026_AS1849-058	AS1849-026	1074.65	AS1849-058	1073.28	Circular		1	2	0.013	0.5	0.05	None (,)	274.849
AS1849-058_MI1849-055	AS1849-058	1073.28	MI1849-055	1072.7	Circular		1	2	0.013	0.05	0.05	None (,)	141.135
AS1849-059_AS1849-026	AS1849-059	1074.75	AS1849-026	1074.65	Circular		1	1.25	0.013	0.05	0.5	None (,)	10.448
AS1853-004_AE1853-005	AS1853-004	1086.64	FARGO_COBALT_LEVEL_SPREADER	1086.2	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.5	0	130.074
AS1947-009_IN1947-008	AS1947-009	1043.84	IN1947-008	1026.4	Circular		1	3	0.013	0.5	0.25	0	255.03
AS1947-010_AS1947-009	AS1947-010	1044.15	AS1947-009	1043.84	Circular		1	3	0.013	2	0.5	0	37.07
AS1947-029_AS1947-010	AS1947-029	1047.68	AS1947-010	1044.15	Circular		1	1.5	0.013	2	0.05	0	106.777
AS1948-012_AS1948-013	AS1948-012	1053.75	AS1948-013	1037.1	Circular		1	2	0.013	0.25	0.25	0	160.733
AS1948-013_IN1948-016	AS1948-013	1037.1	IN1948-016	1023.78	Circular		1	2	0.013	0.25	0.25	0	185.8
AS1949-015_AS1849-011	AS1949-015	1075.58	AS1849-011	1075.08	Circular		1	2	0.013	0.25	0.25	None (,)	99.594
AS1949-019_AS1949-015	AS1949-019	1075.8	AS1949-015	1075.58	Circular		1	2	0.013	0.5	0.25	None (,)	140.548
AS1949-032_IN1949-031	AS1949-032	1077.03	IN1949-031	1076.28	Circular		1	1.5	0.013	0.25	0.25	None (,)	76.053

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
AS1949-033_AS1949-032	AS1949-033	1079.42	AS1949-032	1077.03	Circular		1	1.5	0.013	0.25	0.25	None (,)	238.949
AS1949-035_IN1949-011	AS1949-035	1052.17	IN1949-011	1048.26	Circular		1	1.5	0.013	0.25	0.25	0	74.92
AS1949-041_IN1949-039	AS1949-041	1072.29	IN1949-039	1067.6	Circular		1	1.5	0.013	0.05	0.05	0	276.186
AS1951-005_IN2051-066	AS1951-005	1069.55	IN2051-066	1069.3	Circular		1	2.25	0.013	0.5	0.05	0	48.451
AS2046-010_IN2046-001	AS2046-010	985.3	IN2046-001	985.3	Circular		1	2	0.013	0.5	0.5	0	8.045
AS2047-002_AS2047-006.1	PV3924	1003.62	AS2047-006	992.16	Circular		1	2.5	0.013	0.5	0.05	0	157.21
AS2047-006_AS2047-007	AS2047-006	992.16	AS2047-007	983.36	Circular		1	2.5	0.013	0.05	0.05	0	286.251
AS2047-007_AS2047-008	AS2047-007	983.36	AS2047-008	983.03	Circular		1	3	0.013	0.05	0.05	None (,)	87.203
AS2049-001_AS2049-005	AS2049-001	1025.6	AS2049-005	1010.2	Circular		1	1.75	0.013	0.5	0.25	0	348.509
AS2049-005_AS2049-002	AS2049-005	1010.2	AS2049-002	1005.7	Circular		1	1.75	0.013	0.25	0.25	0	197.307
AS2050-004_AS2150-027	AS2050-004	1026.37	AS2150-027	1019.65	Circular		1	2.5	0.013	0.05	0.05	0	352.344
AS2050-012_AS2050-004	AS2050-012	1027.11	AS2050-004	1026.37	Circular		1	2	0.013	0.05	0.05	0	123.032
AS2050-015_AS2050-012	AS2050-015	1027.72	AS2050-012	1027.11	Circular		1	2	0.013	0.05	0.05	0	122.013
AS2050-018_AS2050-015	AS2050-018	1040.59	AS2050-015	1027.72	Circular		1	2	0.013	0.05	0.05	0	285.926
AS2050-024_AS2050-018	AS2050-024	1066.5	AS2050-018	1040.59	Circular		1	2	0.013	0.5	0.05	0	316.831
AS2051-023.1	AS2051-023	1057.34	MI2051-022	1056.6	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.05	0	138.162
AS2051-029.1	AS2051-029	1057.93	IN2051-026	1057.47	Special	Horizontal Ellipse	1	4.41	0.013	0.25	0.05	0	92.177
AS2051-038.1	AS2051-038	1058.28	AS2051-029	1057.93	Special	Horizontal Ellipse	1	4.41	0.013	0.25	0.25	0	69.441
AS2051-041_IN2051-039	AS2051-041	1066.85	IN2051-039	1062.56	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.25	0	225.762
AS2051-051_IN2051-042	AS2051-051	1069.1	IN2051-042	1068.05	Circular		1	2.25	0.013	0.05	0.5	0	181.856
AS2051-063_MI2051-062	AS2051-063	1069.67	MI2051-062	1068.99	Circular		1	2.25	0.013	0.05	0.05	0	32.935
AS2056-007_AE2056-008	AS2056-007	1095.84	AE2056-008	1092	Circular		1	2	0.013	0.5	1	0	56
AS2056-031_AS2156-036	AS2056-031	1068.12	AS2156-036	1062.55	Circular		1	1.5	0.013	0.05	0.05	0	158.971
AS2056-044_AS2056-045	AS2056-044	1078.3	AS2056-045	1066.26	Special	Horizontal Ellipse	1	5	0.013	0.05	0.25	0	265.028
AS2056-045_AS2156-040	AS2056-045	1066.26	AS2156-040	1058.76	Special	Horizontal Ellipse	1	5	0.013	0.15	0.15	0	185.464
AS2145-011_IN2145-010	AS2145-011	971.23	IN2145-010	970.05	Circular		1	1.5	0.013	0.25	0.25	None (,)	61.128
AS2146-003_AE2146-004	AS2146-003	970.6	OSTP_POND_SYSTEM_JCT_6	965.6	Circular		1	1.75	0.013	0.05	0.05	None (,)	33.759
AS2147-013_AE2147-014	AS2147-013	971.7	WMPB_GW_DW2	971.7	Circular		1	2	0.011	0.5	0.5	0	94.832
AS2147-015_AE2147-016	AS2147-015	977.08	WMPB_GW_DW3	976.98	Circular		1	1.5	0.011	0.5	0.5	0	91.01
AS2150-012_AS2150-014	AS2150-012	1007.29	AS2150-014	1003.41	Circular		1	4	0.013	0.05	0.05	0	339.863
AS2150-014_AS2150-015	AS2150-014	1003.41	AS2150-015	1004.03	Circular		1	4	0.013	0.05	0.05	0	21.183
AS2150-015_IN2150-044	AS2150-015	1004.03	IN2150-044	998.04	Circular		1	4	0.013	0.05	0.05	0	279.123
AS2150-027_IN2150-009	AS2150-027	1019.65	IN2150-009	1013.42	Circular		1	2.5	0.013	0.05	0.05	0	49.317
AS2150-032_AS2150-012	AS2150-032	1008.36	AS2150-012	1007.29	Circular		1	3.5	0.013	0.05	0.05	0	58.333
AS2151-009_AS2151-010	AS2151-009	1044.55	AS2151-010	1026.8	Circular		1	3	0.013	0.5	0.25	0	157.644
AS2151-010_AE2151-020	AS2151-010	1026.8	AE2151-020	1017.35	Circular		1	3	0.013	0.25	1	0	75
AS2152-005_AS2152-008	AS2152-005	1055.11	AS2152-008	1054.16	Circular		1	1.75	0.013	0.5	0.5	0	317.086
AS2152-008_TE2152-009	AS2152-008	1054.16	TE2152-009	1053.85	Circular		1	2.25	0.013	0.5	0.05	0	75.569
AS2152-010_AS2152-015	AS2152-010	1053.02	AS2152-015	1052.31	Circular		1	3	0.013	0.05	0.05	0	185.832
AS2152-015_AS2152-022	AS2152-015	1052.31	AS2152-022	1050.68	Circular		1	3	0.013	0.05	0.05	0	322.254
AS2156-040_AS2156-041	AS2156-040	1058.76	AS2156-041	1053.41	Special	Horizontal Ellipse	1	5	0.013	0.15	0.15	0	349.44
AS2156-041_AS2156-042	AS2156-041	1053.41	AS2156-042	1052.35	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	0	105.011
AS2156-042_AS2156-043	AS2156-042	1052.35	AS2156-043	1049.42	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	264.396
AS2156-062_IN2156-061	AS2156-062	1049.61	IN2156-061	1047.77	Special	Horizontal Ellipse	1	3.16	0.013	0.25	0.05	0	85.985
AS2245-003_TO2244-001	AS2245-003	953.57	TO_MIDDLETON_SS	951.67	Circular		1	2	0.013	0.25	0.05	None (,)	73.936
AS2245-004_AS2245-003	AS2245-004	958.38	AS2245-003	953.57	Circular		1	2.25	0.013	0.05	0.25	None (,)	187.253
AS2245-005_AS2245-004	AS2245-005	958.4	AS2245-004	958.38	Circular		1	2.25	0.013	0.05	0.05	None (,)	123.371
AS2245-012_AS2245-005	AS2245-012	965.9	AS2245-005	958.4	Circular		1	2	0.013	0.25	0.05	None (,)	325.011
AS2249-004_AS2249-005	AS2249-004	992.98	AS2249-005	991.84	Circular		1	4	0.013	0.25	0.25	0	74.698

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
AS2249-005_AS2249-006	AS2249-005	991.84	AS2249-006	988.26	Circular		1	4	0.013	0.25	0.05	0	89.275
AS2249-006_AE2249-007	AS2249-006	988.26	EMPB_GW_OSR1	985.35	Special	Horizontal Ellipse	1	5	0.013	0.05	0.5	0	418.678
AS2250-016_TP2250-010	AS2250-016	997.91	TP2250-010	997.35	Circular		1	2.5	0.013	0.05	0.5	0	33.571
AS2250-020.1	AS2250-020	991.68	IN2250-044	991.67	Rectangular		1	4	0.013	0.05	0.05	0	106.51
AS2250-021.1	AS2250-021	990.21	AS2250-045	987.79	Rectangular		1	4	0.013	0.05	0.5	0	251.623
AS2250-031_AS2250-032	AS2250-031	1009.91	AS2250-032	1008	Circular		1	3	0.013	0.5	0.05	0	112.012
AS2250-032_AS2250-033	AS2250-032	1008	AS2250-033	1006.78	Circular		1	3	0.013	0.05	0.05	0	64.007
AS2250-033_AS2250-034	AS2250-033	1006.78	AS2250-034	1003.85	Circular		1	3	0.013	0.05	0.5	0	133.017
AS2250-034_AS2250-035	AS2250-034	1003.85	AS2250-035	999.88	Circular		1	3	0.013	0.5	0.05	0	203.02
AS2250-035_AS2250-036	AS2250-035	999.88	AS2250-036	998.26	Circular		1	3	0.013	0.05	0.25	0	102.011
AS2250-036_AS2250-037	AS2250-036	998.26	AS2250-037	997.39	Circular		1	3	0.013	0.25	0.25	0	43.005
AS2250-037_AS2250-038	AS2250-037	997.39	AS2250-038	994.6	Circular		1	3	0.013	0.25	0.25	0	98.035
AS2250-045.1	AS2250-045	987.79	EMPB_GW_OSR1	985.29	Rectangular		1	4	0.013	0.5	0.5	0	310.299
AS2251-010_AS2251-008	AS2251-010	1028.1	AS2251-008	1024.72	Circular		1	2.5	0.013	0.05	0.05	0	155.851
AS2251-031_AS2250-031	AS2251-031	1013.75	AS2250-031	1009.91	Circular		1	3	0.013	0.25	0.5	0	206.023
AS2252-008_IN2252-009	AS2252-008	1048.9	IN2252-009	1037.24	Circular		1	1.75	0.013	0.5	0.05	0	380.932
AS2253-012_AS2253-018	AS2253-012	1054.89	AS2253-018	1054.04	Circular		1	2	0.013	0.5	0.05	0	122.822
AS2253-013_AS2253-018	AS2253-013	1054.44	AS2253-018	1054.04	Circular		1	1.75	0.013	0.05	0.5	0	65.984
AS2253-015_AS2253-013	AS2253-015	1055.42	AS2253-013	1054.44	Circular		1	1.75	0.013	0.05	0.05	0	154.257
AS2253-016_AS2253-015	AS2253-016	1056.9	AS2253-015	1055.42	Circular		1	1.75	0.013	0.05	0.05	0	300.064
AS2253-017_AS2253-016	AS2253-017	1057.5	AS2253-016	1056.9	Circular		1	1.5	0.013	0.5	0.05	0	112.263
AS2253-018_AS2254-004	AS2253-018	1054.04	AS2254-004	1053.27	Circular		1	2	0.013	0.05	0.05	0	156.074
AS2254-004_AS2254-005	AS2254-004	1053.27	AS2254-005	1052.66	Circular		1	2	0.013	0.05	0.05	0	126.098
AS2254-013_AS2254-016	AS2254-013	1048.92	AS2254-016	1047.78	Circular		1	4.5	0.013	0.05	0.25	0	238.017
AS2254-013_IN2254-009	AS2254-013	1048.92	IN2254-009	1048.77	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	0	21.384
AS2254-015_IN2254-021	AS2254-015	1048.53	IN2254-021	1048.3	Circular		1	4.5	0.013	0.05	0.05	0	77.206
AS2254-016_AS2254-017	AS2254-016	1047.78	AS2254-017	1046.71	Circular		1	4.5	0.013	0.25	0.05	0	216.103
AS2254-017_IN2255-001	AS2254-017	1046.71	IN2255-001	1045.58	Circular		1	4.5	0.013	0.05	0.25	0	227.691
AS2254-024_AS2255-008	AS2254-024	1047.55	AS2255-008	1046.82	Circular		1	4.5	0.013	0.05	0.05	0	243.438
AS2255-006_AE2255-005	AS2255-006	1045.31	AE2255-005	1043.6	Circular		1	4.5	0.013	0.5	1	0	707
AS2255-008_AS2255-009	AS2255-008	1046.82	AS2255-009	1046.07	Circular		1	4.5	0.013	0.05	0.05	None (,)	55.592
AS2255-009_AS2255-055	AS2255-009	1046.07	AS2255-055	1045.8	Circular		1	4.5	0.013	0.05	0.05	None (,)	113.015
AS2255-046_MI2255-047	AS2255-046	1044.85	MI2255-047	1044.75	Rectangular		1	5	0.013	0.05	0.05	0	28.638
AS2255-054_AS2255-006	AS2255-054	1045.38	AS2255-006	1045.31	Circular		1	4.5	0.013	0.05	0.5	0	37.082
AS2255-055_AS2255-054	AS2255-055	1045.8	AS2255-054	1045.38	Circular		1	4.5	0.013	0.05	0.05	0	173.144
AS2256-017_IN2256-071	AS2256-017	1051.04	IN2256-071	1049.83	Circular		1	2.5	0.013	0.5	0.25	0	199.029
AS2256-047_AS2255-046	AS2256-047	1045.29	AS2255-046	1044.85	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	0	121.055
AS2256-055_AS2256-056	AS2256-055	1047.49	AS2256-056	1047.3	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	58.498
AS2256-056_AS2256-057	AS2256-056	1047.3	AS2256-057	1046.93	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	128.005
AS2256-057_JB2256-058	AS2256-057	1046.93	JB2256-058	1046.5	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	147.826
AS2256-073_AE2256-074	AS2256-073	1052.5	AE2256-074	1052.5	Circular		1	1.25	0.013	0.25	1	0	10
AS2256-077_JB2256-065	AS2256-077	1048.89	JB2256-065	1046.92	Circular		1	1.5	0.013	0.5	0.5	0	44.031
AS2257-008_AS2257-004	AS2257-008	1059.24	AS2257-004	1057.79	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.25	0	289.71
AS2257-012_TE2257-014	AS2257-012	1057.87	TE2257-014	1057.35	Circular		1	2	0.013	0.5	0.05	0	34.125
AS2258-001_AS2257-008	AS2258-001	1061.85	AS2257-008	1059.24	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	0	390.36
AS2258-011_IN2258-067	AS2258-011	1065.13	IN2258-067	1062.68	Circular		1	2.5	0.013	0.5	0.05	0	270.185
AS2258-014_AE2258-015	AS2258-014	1066.19	AE2258-015	1065	Circular		1	3.5	0.013	0.25	1	0	42
AS2258-014_AS2258-017	AS2258-014	1067.69	AS2258-017	1065.59	Circular		1	2.5	0.013	0.5	0.05	0	272.669
AS2258-017_AS2258-011	AS2258-017	1065.59	AS2258-011	1065.13	Circular		1	2.5	0.013	0.05	0.5	0	64.094

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
AS2258-052_IN2258-025	AS2258-052	1080.75	IN2258-025	1069.43	Circular		1	2.5	0.013	0.5	0.05	0	349.298
AS2349-008.1	AS2349-008	981.8	AS2349-011	978.1	Circular		1	6.5	0.013	0.25	0.05	0	503.102
AS2349-011.1	AS2349-011	978.1	AS2348-005	975.3	Circular		1	6.5	0.013	0.05	0.5	0	410.042
AS2349-025_IN2349-027	AS2349-025	988.15	IN2349-027	986.62	Circular		1	2	0.013	0.25	0.05	None (,)	259.636
AS2355-059_AE2355-058	AS2355-059	1043.43	EMPB_GW_MPR1	1041.5	Circular		1	3.5	0.013	0.5	0.5	0	169.153
AS2355-060_AS2355-059	AS2355-060	1044.94	AS2355-059	1043.43	Circular		1	3	0.013	0.25	0.5	0	50.599
AS2356-032_IN2356-033	AS2356-032	1048.95	IN2356-033	1048.95	Circular		1	3	0.013	0.25	0.05	0	21.467
AspenGrPr1	AS1847-018	1059.78	AE1847-019	1055.98	Circular		1	2.5	0.013	0.5	0.5	0	190
AspenGrPr10	TE1848-012	1025.73	IN1848-011	1024.6	Circular		1	2.5	0.013	0.05	0.05	0	28.23
AspenGrPr11	IN1848-009	1027.05	AS1847-009	1026.23	Circular		1	2	0.013	0.05	0.5	0	41
AspenGrPr12	IN1848-007	1028.41	IN1848-009	1027.05	Circular		1	2	0.013	0.05	0.05	0	68
AspenGrPr2	IN1847-017	1061.34	AS1847-018	1059.78	Circular		1	2.5	0.013	0.5	0.5	0	77.67
AspenGrPr3	IN1847-016	1062.44	IN1847-017	1061.34	Circular		1	2	0.013	0.5	0.5	0	57.29
AspenGrPr4	IN1847-005	1065.6	AE1847-006	1054.6	Circular		1	1.5	0.013	0.25	0.5	0	160
AspenGrPr5	AS1847-009	1026.23	TE1848-012	1025.73	Circular		1	2	0.013	0.5	0.05	0	25
AspenGrPr6	IN1847-003	1067	IN1847-005	1065.6	Circular		1	1.5	0.013	0.05	0.25	0	70.03
AspenGrPr7	IN1948-019	1016.29	AS1948-017	1015.26	Circular		1	3	0.013	0.5	0.25	0	51.46
AspenGrPr8	IN1948-020	1016.81	IN1948-019	1016.29	Circular		1	3	0.013	0.5	0.5	0	26.06
AspenGrPr9	IN1848-011	1024.6	IN1948-020	1016.81	Circular		1	2.5	0.013	0.05	0.5	0	262.04
ATTIC_ANGEL_LOW_FLOW_OUT	AA_POND_OUT	1017.6	ATTIC_ANGEL_PONDS_OUTLET	1017.59	Circular		1	1.5	0.013	1	0.5	None (,)	68
ATTIC_ANGEL_PONDS_GRATE_OUT	AA_POND_OUT		ATTIC_ANGEL_PONDS_OUTLET										
ATTIC_ANGEL_PONDS_OUT_PIPE	ATTIC_ANGEL_PONDS_(	1017.6	ATTIC_ANGEL_POND_OUT	1016.85	Circular		1	5.5	0.013	0.5	0.5	0	73.385
Attic_Angle_E-W_Pipes	AA_W_POND_OUT	1017.35	AA_EAST_POND	1017.1	Special	Horizontal Ellipse	2	3.75	0.013	1	1	0	45
BEAR_CLAW_WAY_ST	BEAR_CLAW_APARTME	1086	IN1749-002	1081.648	Natural		1	0	0.02	0	0	None (,)	498.601
BearClawPr1	AS1748-024	1073.18	AS1748-003	1070.23	Circular		1	3	0.013	0.05	0.5	0	257.93
BearClawPr2	IN1748-023	1075.35	AS1748-024	1073.18	Circular		1	2.5	0.013	0.25	0.05	0	216.65
BearClawPr3	IN1749-003	1076.39	IN1748-023	1075.35	Circular		1	2.5	0.013	0.25	0.25	0	206.23
BeltlineSCulv1	BeltlineSUS1	1043.5	BeltlineSDS1	1041.39	Circular		1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	396
BeltlineSCulv2	BeltlineSUS2	1043.5	BeltlineSDS2	1041.39	Circular		1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	396
BHPondInPr1	WW_TO_POND_BLIND_	1070	AE1748-006	1068.8	Rectangular		1	4	0.013	0.05	1	0	120
BHPondInPr2	AS1748-003	1070.23	WW_TO_POND_BLIND_TAP	1070	Rectangular		1	4	0.013	0.1	0.05	0	23
BoulderCrPr1	Inlet_IN1948-002	1011.69	AE1948-003	1010	Circular		1	3	0.013	0.25	1	0	169
BoulderCrPr2	IN1948-002	1014.34	Inlet_IN1948-002	1011.69	Circular		1	2.5	0.013	0.5	0.25	0	268
BYPr1	IN1753-026	1088.44	IN1853-001	1088.44	Circular		1	1.5	0.013	0.5	0.5	0	59
CAPE_SILVER_N_POND_GRATE	CAPE_INF_OUT		IN1550-007										
CAPE_SILVER_N_POND_GRATE_OUT	IN1550-005		CAPE_SILVER_WAY_POND_OUT										
CAPE_SILVER_N_POND_UNDERDRAIN	CAPE_INF_OUT	1096.5	IN1550-007	1096.29	Circular		1	0.5	0.013	1	0.5	None (,)	102.168
CAPE_SILVER_S_GRATE	CAPE_WP_OUT		CAPE_SILVER_WAY_WP_TO_DP_US										
CAPE_SILVER_S_POND_ORI	CAPE_WP_OUT		CAPE_SILVER_WAY_WP_TO_DP_US										
CAPE_SILVER_WAY_WP_ORIFICE	IN1550-005		CAPE_SILVER_WAY_POND_OUT										
CAPE_SILVER_WAY_WP_TO_DP_PIPE	CAPE_SILVER_WAY_WP	1099.01	CAPE_INF_IN	1099	Circular		1	1	0.013	0.5	1	None (,)	49.95
CAPE_SILVER_WP_PIPE_OUT	CAPE_SILVER_WAY_PO	1096	AS1550-004	1095.15	Circular		1	1	0.013	0.5	0.05	None (,)	27.597
CDT_11	IN1653-027	1105.69	IN1653-026	1105.37	Circular		1	1.5	0.013	0.5	0.25	0	66.453
CDT_15	PL1447-001	1133	IN1547-033	1129.6	Circular		1	1.5	0.013	0.5	0.5	None (,)	103.255
CDT_17	PL1548-052	1116.09	IN1548-045	1115.84	Circular		1	1.5	0.013	0.5	0.5	None (,)	47.998
CDT_27	IN1550-017	1100.87	IN1550-014	1099.04	Circular		1	2	0.013	0.05	0.5	None (,)	244.629
CDT_29	IN1550-023	1101.52	IN1550-022	1101.02	Circular		1	1.5	0.013	0.5	0.25	None (,)	103.522
CDT_33	IN1550-014	1099.04	AE1550-016	1098	Circular		1	3.5	0.013	0.5	1	0	48
CDT_43	IN1551-005	1103.87	IN1551-002	1101.79	Circular		1	2.5	0.013	0.05	0.25	None (,)	215.705

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
CDT_55	PL1651-001	1093.28	IN1751-004	1093.04	Circular		1	1.5	0.013	0.5	0.05	None (,)	69.005
CDT_59	EMPB_GW_NTL7	1016.57	EMPB_GW_NTL6	1010.77	Natural		1	0	0.013	0	0	None (,)	747.778
CDT_63	OSTP_POND_SYSTEM_J	963.17	OSTP_POND_SYSTEM_JCT_7	963.27	Natural		1	0	0.013	0	0	None (,)	292.634
CDT_67	EMPB_GW_NTL8	998.97	AE2451-002	995.96	Natural		1	0	0.013	0	0	None (,)	514.596
CDT_69	WMPB_GW_TRANSFER1	1055.42	WMPB_GW_TRANSFER2	1049.47	Natural		1	0	0.013	0	0	None (,)	291.274
CDT_71	WMPB_GW_TRANSFER2	1049.47	WMPB_GW_BHR1	1016.35	Natural		1	0	0.013	0	0	0	1131.729
CDT_81	IN1549-016	1106.01	AS1549-010	1105.51	Circular		1	3	0.013	0.05	0.05	None (,)	102.03
CDT_85	NEW_SAS_08_06_19	1074.86	AS1747-019	1073.05	Circular		1	3.5	0.013	0.05	0.05	None (,)	213.606
CH_BIO_BASIN1_12IN	CH_BIO_BASIN_1	1098.1	CH_BIO_BASIN1_OUT2	1098	Circular		1	1	0.013	0.5	0.5	None (,)	13.397
CH_BIO_BASIN1_ORI	CH_BIO_BASIN1_OUT2		CH_BIO_BASIN1_OUT										
CH_BIO_BASIN1_OUT_IN1550-011	CH_BIO_BASIN1_OUT	1095	IN1550-011	1093.57	Circular		1	1	0.013	0.5	0.05	None (,)	23.676
CH_BIO_BASIN1_UNDERDRAIN	CH_BIO_BASIN_1	1095.1	CH_BIO_BASIN1_OUT	1095	Circular		1	0.5	0.011	0.5	0.5	None (,)	35.857
CH_S31A_CH_S31	CH_S31A	1099.74	CH_S31	1099.51	Circular		1	2	0.013	0.5	0.05	None (,)	34.66
CH_S33A_CH_S33	CH_SAS33	1105.69	CH_S33	1105.44	Circular		1	1	0.013	0.5	0.5	None (,)	26.843
CH-S21_CH-S20	CH-S21	1097.84	CH_BIO_BASIN_1	1097.5	Circular		1	2.25	0.013	0.25	1	0	35.726
CH-S22A_CH-S22	CH-S22A	1102.83	CH-S22	1102.61	Circular		1	2	0.013	0.5	0.05	None (,)	32.626
COMMERCE_SQUARE_POND_GRATE	COM_SQ_P_OUT		COMMERCE_SQUARE_POND_OUT										
COMMERCE_SQUARE_POND_LOW_FLOW	COM_SQ_P_OUT		COMMERCE_SQUARE_POND_OUT										
COMMERCE_SQUARE_POND_OUT_PIPE	COMMERCE_SQUARE_P	1062.88	IN2258-034	1062.36	Special	Horizontal Ellipse	1	5.66	0.013	0.5	0.05	0	54.042
CondoToWexPr1	IN2449-002	990.5	AE2449-003	984.8	Circular		1	3	0.013	0.05	0.5	0	269
CondotoWexPr2	IN2449-001	995.82	IN2449-002	990.5	Circular		1	3	0.013	0.1	0.1	0	245
CondotoWexPr3	IN2449-004	997.1	IN2449-001	995.82	Circular		1	3	0.013	0.05	0.1	0	323
CondotoWexPr4	IN2449-009	997.2	IN2449-004	997.1	Circular		1	3	0.013	0.1	0.1	0	9
CondotoWexPr5	IN2450-023	997.25	IN2449-009	997.2	Circular		1	3	0.013	0.1	0.1	0	23
CondotoWexPr6	IN2450-021	997.3	IN2450-023	997.25	Circular		1	3	0.013	0.15	0.1	0	20
CondotoWexPr8	AE2450-022	997.4	IN2450-021	997.3	Circular		1	3	0.013	1	0.15	0	27
CricketLnPr1	IN1648-038	1076.29	AE1648-039	1076.1	Circular		1	3.5	0.013	0.05	1	0	31
CricketLnPr2	IN1648-037	1076.45	IN1648-038	1076.29	Circular		1	3.5	0.013	0.5	0.05	0	27.03
CricketLnPr3	IN1648-036	1077.21	IN1648-037	1076.45	Circular		1	3	0.013	0.05	0.5	0	68.3
CricketLnPr4	IN1649-004	1078.98	IN1648-036	1077.21	Circular		1	3	0.013	0.1	0.1	0	340.12
CricketPr5	IN1649-003	1082.5	IN1649-004	1078.98	Circular		1	2.5	0.013	0.1	0.1	0	57.02
CV_BIO_BASIN1_WEIR	CH_BIO_BASIN1_OUT2		CH_BIO_BASIN1_OUT										
DeerHoPr1	IN1948-005	1011.76	AE1948-007	1008.24	Circular		1	4	0.013	0.1	1	0	176
DeerHoPr2	AS1948-004	1014.44	IN1948-005	1011.76	Circular		1	3.5	0.013	0.25	0.1	0	134.15
DemingPr1	IN2046-001	982.44	IN2046-002	981.94	Circular		1	4.5	0.013	0.05	0.05	0	67
DemingPr2	IN2046-002	981.94	AS2047-008	981.38	Circular		1	4.5	0.013	0.05	0.05	0	75
DemingPr3	AS2145-001	959.44	DemingDS1	957.46	Circular		1	3	0.013	0.4	0.5	0	99
DemingPr6	IN2045-005	971.32	AS2045-006	969.86	Circular		1	3	0.013	0.5	0.5	0	73
DemingWayPr1	AE2048-001	986.84	WMPB_GW_DW5	986.1	Rectangular		1	5	0.013	0.2	0.5	45 deg Wingwall Flares (Rect, Conc)	74
DemingWayPr4	AS2045-007	966.82	AS2145-001	959.44	Circular		1	3	0.013	0.2	0.3	0	369
DemingWayPr5	AS2045-006	969.86	AS2045-007	966.82	Circular		1	3	0.013	0.5	0.1	0	152
DT2349-022_DT2349-021	DT2349-022	991	DT2349-021	990	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	35.208
E_M_PB_GW_EXCELSIOR_DR_SECTION	HD2248-006	973.6	EMPB_GW_WBH3	966.94	Natural		1	0	0.013	0	0	None (,)	1030.759
E_M_PB_GW_FOURIER_DR_SECTION1	EMPB_GW_FD1	965.1	OSTP_POND_SYSTEM_JCT_13	964.7	Natural		1	0	0.013	0	0	None (,)	654.035
E_M_PB_GW_LOW_OLD_SAUK_RD_SEC1	AE2449-003	982.42	WEXFORD_POND_IN	978.1	Natural		1	0	0.013	0	0	None (,)	462.988
E_M_PB_GW_LOW_OLD_SAUK_RD_SEC2	EMPB_GW_LOSR1	991.7	EMPB_GW_LOSR2	989.4	Natural		1	0	0.013	0	0	None (,)	617
E_M_PB_GW_LOW_OLD_SAUK_RD_SEC2.1	EMPB_GW_LOSR2	989.4	AE2449-003	982.42	Natural		1	0	0.027	0	0	None (,)	745
E_M_PB_GW_MIN_PT_RD_SECTION	EMPB_GW_MPR1	1041.39	GR2355-009	1040.41	Natural		1	0	0.013	0	0	None (,)	616.744
E_M_PB_GW_N_HIGH_PT_RD_SECTION1	EMPB_GW_NHPR2	969.14	BeltineNUS2	967.6	Natural		1	0	0.013	0	0	None (,)	450.56

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
E_M_PB_GW_N_TREE_LN_SECTION1	EMPB_GW_NTL3	987.56	EMPB_GW_NTL1	986	Natural		1	0	0.013	0	0	None (,)	207.838
E_M_PB_GW_N_TREE_LN_SECTION2	EMPB_GW_NTL5	991.37	EMPB_GW_NTL3	987.56	Natural		1	0	0.013	0	0	None (,)	615.681
E_M_PB_GW_N_TREE_LN_SECTION3	AE2451-002	995.96	SAUK_CREEK_LOWER_STORAGE	992.62	Natural		1	0	0.013	0	0	None (,)	901.726
E_M_PB_GW_N_TREE_LN_SECTION4	AE2452-014	1004.06	EMPB_GW_NTL8	998.97	Natural		1	0	0.013	0	0	None (,)	844.309
E_M_PB_GW_N_TREE_LN_SECTION5	EMPB_GW_NTL6	1010.77	AE2452-014	1004.06	Natural		1	0	0.013	0	0	None (,)	1169.991
E_M_PB_GW_N_TREE_LN_SECTION6	AE2454-006	1019.44	EMPB_GW_NTL7	1016.57	Natural		1	0	0.013	0	0	None (,)	306.861
E_M_PB_GW_N_TREE_LN_SECTION7	HD2454-016	1030.1	AE2454-006	1019.44	Natural		1	0	0.013	0	0	None (,)	1129.403
E_M_PB_GW_OLD_SAUK_RD_SECTION1	EMPB_GW_OSR3	983.7	HD2249-033	983.16	Natural		1	0	0.013	0	0	None (,)	103.36
E_M_PB_GW_OLD_SAUK_RD_SECTION2	EMPB_GW_OSR1	985.29	EMPB_GW_OSR3	983.7	Natural		1	0	0.013	0	0	None (,)	180.275
E_M_PB_GW_OLD_SAUK_RD_SECTION3	EMPB_GW_OSR2	985.3	EMPB_GW_OSR3	983.7	Natural		1	0	0.013	0	0	None (,)	218.158
E_M_PB_GW_S_HP_RD_SECTION1	EMPB_GW_SHPR1	1035.9	HD2454-017	1030.59	Natural		1	0	0.013	0	0	None (,)	902.564
E_M_PB_GW_S_TREE_LN_SECTION	EMPB_GW_STL2	1039.78	EMPB_GW_STL1	1037.4	Natural		1	0	0.013	0	0	None (,)	638.699
E_M_PB_GW_UPPER_OLD_SAUK_RD_SEC	WEXFORD_POND_OUT	972.68	EMPB_GW_UOSR1	969.1	Natural		1	0	0.013	0	0	None (,)	609.715
E_M_PB_GW_W_BELTLINE_SECTION1	EMPB_GW_WBH3	966.94	EMPB_GW_WBH1	965.35	Natural		1	0	0.013	0	0	None (,)	456.732
E_M_PB_GW_W_BELTLINE_SECTION2	BeltlineNDS2	966	EMPB_GW_WBH3	966.94	Natural		1	0	0.013	0	0	None (,)	118.224
E_M_PB_GW_WHITACRE_RD_SECTION1	EMPB_GW_WR1	998.45	GR2550-020	992.8	Natural		1	0	0.013	0	0	None (,)	382.785
E_M_PB_GW_WHITACRE_RD_SECTION2	AE2551-009	1004.9	EMPB_GW_WR1	998.45	Natural		1	0	0.013	0	0	None (,)	599.775
EldRdPr1	DT1853-003	1089.31	IN1753-027	1088.33	Circular		1	2.5	0.013	0.5	0.5	0	98
EldRdPr22	IN1752-024	1095.5	IN1752-022	1094.52	Circular		1	2.5	0.013	0.25	0.05	0	196
EldRdPr23	IN1752-026	1095.73	IN1752-024	1095.5	Circular		1	2.5	0.013	0.25	0.25	0	45
EldRdPr24	IN1752-023	1094.76	IN1752-022	1094.67	Circular		1	2.5	0.013	0.5	0.5	0	17
EldTrPr20	IN1752-019	1092.42	IN1752-018	1092.27	Circular		1	3.5	0.013	0.25	0.25	0	29
EldTrPr21	IN1752-022	1094.17	IN1752-019	1092.42	Circular		1	3	0.013	0.05	0.25	0	350
ExcelsDW_Pr	OLD_SAUK_GW3_US	966.56	OSTP_POND_SYSTEM_JCT_14	965	Circular		1	5	0.013	0.5	0.5	0	78
FallenLfPr1	AS1647-044	1081.03	AS1647-048	1080.25	Rectangular		1	4	0.013	0.05	0.5	0	55
FallenLfPr2	AS1547-003	1081.82	AS1647-044	1081.03	Rectangular		1	4	0.013	0.1	0.05	0	157
FallenLfPr3	IN1547-004	1085.82	AS1547-003	1084.17	Circular		1	2	0.013	0.5	0.1	0	82
FallenLfPr4	IN1547-009	1088.12	IN1547-004	1085.82	Circular		1	2	0.013	0.5	0.5	0	147
FARGO_COBALT_E_POND_OUT_PIPE	FARGO_COBALT_E_PON	1086.4	FARGO_COBALT_LEVEL_SPREADER	1086.2	Circular		1	2	0.013	1	0.5	None (,)	44
FARGO_COBALT_W_TO_E_PIPE	FAR_CO_WP_OUT	1086.6	FARGO_COBALT_W_TO_E_DS	1086.4	Circular		1	1.25	0.013	0.05	0.05	0	48
FargoTr15	AS1752-001	1089.48	IN1751-025	1088.09	Circular		1	3.5	0.013	0.05	0.05	0	278.03
FargoTrPr1	IN1753-008	1086.03	IN1753-040	1085.59	Circular		1	2.5	0.013	0.05	0.5	0	175
FargoTrPr10	IN1751-011	1086.58	AS1751-010	1086.49	Circular		1	3.5	0.013	0.05	0.05	0	17
FargoTrPr11	MI1751-024	1087.16	IN1751-011	1086.58	Circular		1	3.5	0.013	0.05	0.05	0	115
FargoTrPr12	IN1751-023	1087.72	MI1751-024	1087.16	Circular		1	3.5	0.013	0.05	0.05	0	112
FargoTrPr14	IN1751-025	1088.09	IN1751-023	1087.72	Circular		1	3.5	0.013	0.05	0.05	0	74
FargoTrPr16	IN1752-002	1089.6	AS1752-001	1089.48	Circular		1	3.5	0.013	0.05	0.05	0	24
FargoTrPr17	MI1752-008	1090.18	IN1752-002	1089.6	Circular		1	3.5	0.013	0.05	0.05	0	115
FargoTrPr18	IN1752-011	1090.73	MI1752-008	1090.18	Circular		1	3.5	0.013	0.05	0.05	0	110
FargoTrPr19	IN1752-016	1091.1	IN1752-011	1090.73	Circular		1	3.5	0.013	0.05	0.05	0	74
FargoTrPr2	IN1753-009	1086.27	IN1753-008	1086.03	Circular		1	2.5	0.013	0.25	0.05	0	94
FargoTrPr20	IN1752-018	1092.27	IN1752-016	1091.1	Circular		1	3.5	0.013	0.25	0.05	0	233
FargoTrPr3	IN1753-015	1086.39	IN1753-009	1086.27	Circular		1	2.5	0.013	0.25	0.25	0	45
FargoTrPr5	IN1751-022	1083.64	IN1750-019	1082.6	Circular		1	3.5	0.013	0.25	0.5	0	52
FargoTrPr6	IN1751-020	1083.99	IN1751-022	1083.64	Circular		1	3.5	0.013	0.05	0.25	0	69
FargoTrPr8	IN1751-016	1084.6	IN1751-020	1083.99	Circular		1	3.5	0.013	0.05	0.05	0	121
FargoTrPr9	AS1751-010	1086.49	IN1751-016	1084.6	Circular		1	3.5	0.013	0.05	0.05	0	377
FarmingPr1	FS-8A	1014.12	AS2551-010	1013.54	Circular		1	4	0.013	0.25	0.25	0	29
FarmingPr10	AS2450-026	992.44	IN2450-024	992.39	Circular		1	3	0.013	0.5	0.5	0	11

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
FarmingPr11	AS2450-027	993.31	AS2450-026	992.44	Circular		1	3	0.013	0.25	0.5	0	188
FarmingPr12	AS2451-012	994.12	AS2450-027	993.31	Circular		1	3	0.013	0.25	0.25	0	162
FarmingPr13	AS2451-015	995.73	AS2451-012	994.12	Circular		1	3	0.013	0.5	0.25	0	322
FarmingPr14	AS2450-026	992.29	IN2450-025	992.15	Circular		1	3	0.013	0.5	0.5	0	10
FarmingPr15	IN2450-025	992.15	EMPB_GW_NTL5	991.3	Circular		1	3	0.013	0.5	0.5	0	226
FarmingPr3	FS-10	1020.96	FS-9	1017.4	Circular		1	4	0.013	0.25	0.1	0	178
FarmingPr4	FS-11	1021.98	FS-10	1020.96	Circular		1	4	0.013	0.25	0.25	0	51
FarmingPr5	FS-12	1024.14	FS-11	1021.98	Circular		1	4	0.013	0.1	0.25	0	108
FarmingPr6	FS-13	1031.47	FS-12	1025.31	Circular		1	3	0.013	0.1	0.1	0	308
FarmingPr7	FS-14	1041.7	FS-13	1031.47	Circular		1	3	0.013	0.1	0.05	0	341
FarmingPr8	FS-15	1052.02	FS-14	1042.2	Circular		1	2	0.013	0.5	0.1	0	258
FarmingPr9	IN2450-024	992.39	EMPB_GW_NTL5	991.3	Circular		1	3	0.013	0.5	0.5	0	217
FarmingtonPr2	FS-9	1017.4	FS-8A	1014.12	Circular		1	4	0.013	0.1	0.25	0	164
FourierCulv1	FourierUS1	961.3	OSTrSouthPond	960.4	Rectangular		1	6	0.013	0.2	1	45 deg Wingwall Flares (Rect, Conc)	95
FourierCulv2	EMPB_GW_WBH1	961.3	OSTrSouthPond	960.4	Rectangular		1	6	0.013	0.2	1	90 deg Headwall with 45 deg Bevels (Rect, Conc)	95
FourierCulv3	FourierUS3	961.3	OSTrSouthPond	960.4	Rectangular		1	6	0.013	0.2	1	45 deg Wingwall Flares (Rect, Conc)	95
FourierPr1	AS2247-006	963.34	OSTrSouthPond	963.17	Circular		1	5	0.013	0.5	1	0	33
Fox_PrP1	IN2453-009	1025.9	AE2553-001	1012.6	Circular		1	2.5	0.013	0.5	0.5	0	223
GANSER_HEIGHTS_LOW_FLOW_ORI	GAN_H_P_OUT		IN2357-008										
GANSER_HEIGHTS_POND_LOW_WEIR	GAN_H_P_OUT		IN2357-008										
GANSER_HEIGHTS_WEIR_HIGH	GAN_H_P_OUT		IN2357-008										
GR2347-021_TP2347-023	HighPointUS3	969.1	TP2347-023	969.5	Rectangular		1	4	0.013	0.2	0.05	30 to 75 deg Wingwall Flares (Rect, Conc)	90
GR2347-026_GR2347-027	HighPointUS1	969.1	EMPB_GW_NHPR2	968.6	Rectangular		1	4	0.013	0.2	0.5	30 to 75 deg Wingwall Flares (Rect, Conc)	145.425
GR2550-020_IN2550-021	GR2550-020	992.8	IN2550-021	992.7	Circular		1	3.5	0.013	0.2	0.05	Groove End with Headwall (Circ, Conc)	35.717
Greystone Pr3	IN1648-033	1085.26	AS1648-043	1084.01	Circular		1	2.5	0.013	0.25	0.25	0	209.85
GreyStonePr1	IN1648-044	1083.33	AE1648-046	1079.65	Circular		1	2.5	0.013	0.25	1	0	184
GreystonePr2	AS1648-043	1084.01	IN1648-044	1083.33	Circular		1	2.5	0.013	0.25	0.25	0	49.73
GreystonePr4	IN1648-032	1086.26	IN1648-033	1085.26	Circular		1	2.5	0.013	0.25	0.25	0	31.12
GreystonePr5	IN1648-031	1086.71	IN1648-032	1086.26	Circular		1	2	0.013	0.25	0.25	0	29.37
GreystonePr6	IN1648-030	1086.9	IN1648-031	1086.71	Circular		1	2	0.013	0.25	0.25	0	31.57
GreystonePr7	IN1648-040	1087.85	IN1648-030	1086.9	Circular		1	2	0.013	0.05	0.25	0	73.64
GreystonePr8	IN1648-041	1091.11	IN1648-040	1087.85	Circular		1	2	0.013	0.25	0.05	0	66.67
HD2051-014_HD2051-015	HD2051-014	1052.35	SMPB_GW_BWD	1051.35	Rectangular		1	4	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	101.216
HighPoint_Pr5	IN2347-035	969.58	AS2347-011	969.34	Circular		1	3	0.013	0.05	0.05	0	47
HighPoint_Pr6	IN2347-005	970.83	IN2347-035	969.58	Circular		1	3	0.013	0.5	0.05	0	249
HighPointGWPr1	HighPointSUS1	1037.4	HighPointSDS1	1035.9	Rectangular		1	6	0.013	0.2	0.5	45 deg Wingwall Flares (Rect, Conc)	154
HighPointPr1	AS2349-011	976.56	AS2348-005	974.51	Circular		1	7	0.013	0.5	0.5	0	410
HighPointPr10	IN2350-013	992.77	AE2350-016	992.3	Circular		1	3	0.013	0.05	1	0	47
HighPointPr11	IN2350-014	993.34	IN2350-013	992.77	Circular		1	3	0.013	0.25	0.05	0	57
HighPointPR12	IN2350-029	995.16	IN2350-014	993.34	Circular		1	3	0.013	0.5	0.25	0	91
HighPointPr2	AS2349-008	980.33	AS2349-011	976.56	Circular		1	7	0.013	0.5	0.5	0	503
HighPointPr20	IN2455-019	1038.37	EMPB_GW_SHPR1	1037.9	Circular		1	3	0.013	0.5	0.5	0	47
HighPointPr21	IN2455-018	1038.47	IN2455-019	1038.37	Circular		1	3	0.013	0.5	0.5	0	10
HighPointPr22	IN2455-017	1038.89	IN2455-018	1038.47	Circular		1	3	0.013	0.5	0.5	0	42
HighPointPr3	SC_Out_Pr1	986	AS2349-008	980.33	Circular		1	7	0.013	0.2	0.5	45 deg Wingwall Flares (Rect, Conc)	176
HighPointPr5	AS2347-001	969.98	Node2015	968.87	Rectangular		1	6	0.013	0.1	0.25	0	221
HighPointPr6	IN2348-001	971.17	AS2347-001	969.98	Rectangular		1	6	0.013	0.1	0.1	None (,)	237
HighPointPr7	AS2347-010	968.93	EMPB_GW_NHPR2	968.6	Circular		1	3	0.013	0.5	0.5	0	65
HighPointPr8	AS2347-011	969.34	AS2347-010	968.93	Circular		1	3	0.013	0.4	0.5	0	82

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
HighPointPr9	IN2348-003	972.44	IN2348-001	971.17	Rectangular		1	6	0.013	0.5	0.1	0	254
HighPtPr20	IN2456-022	1060.8	AS2455-024	1059.7	Circular		1	3	0.013	0.05	0.5	0	110
HighPtPr21	IN2456-003	1064.18	IN2456-022	1060.8	Circular		1	3	0.013	0.5	0.05	0	169
HighPtRelief	Node2009	983.96	AE2348-007	968.8	Rectangular		1	6	0.013	0.5	1	0	1330
HillPrP1	BC_HV_Bluff	1096.939	IN2258-023	1086.91	Circular		1	2	0.013	0.5	0.05	0	65.2
HillPrP2	HV_BLUFF_1	1101.98	BC_HV_Bluff	1096.939	Circular		1	2	0.013	0.05	0.5	0	168.03
HillPrP3	HV_BLUFF2	1105.84	HV_BLUFF_1	1101.98	Circular		1	1.5	0.013	0.05	0.25	0	200
IN1547-005_AS1547-003	IN1547-005	1082.56	AS1547-003	1081.82	Circular		1	3	0.013	0.25	0.25	None (,)	147.066
IN1547-005_IN1548-003	IN1547-005	1082.56	IN1548-003	1081.02	Circular		1	3.5	0.013	0.5	0.5	None (,)	313.171
IN1547-006_AS1647-062	IN1547-006	1088.12	AS1647-062	1084.33	Circular		1	1.25	0.013	0.33	0.05	None (,)	111.612
IN1547-007_IN1547-006	IN1547-007	1089.77	IN1547-006	1088.12	Circular		1	1	0.013	0.5	0.33	None (,)	32.077
IN1547-011_IN1548-009	IN1547-011	1101.32	IN1548-009	1092.78	Circular		1	2	0.013	0.05	0.05	None (,)	273.133
IN1547-012_IN1547-011	IN1547-012	1101.84	IN1547-011	1101.32	Circular		1	2	0.013	0.05	0.05	None (,)	51.451
IN1547-013_IN1547-011	IN1547-013	1101.73	IN1547-011	1101.32	Circular		1	1.5	0.013	0.05	0.5	None (,)	51.527
IN1547-014_1547-013	IN1547-014	1102.28	IN1547-013	1101.73	Circular		1	1	0.013	0.5	0.05	None (,)	11.413
IN1547-015_IN1547-013	IN1547-015	1102.14	IN1547-013	1101.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.878
IN1547-016_IN1547-015	IN1547-016	1102.43	IN1547-015	1102.14	Circular		1	1	0.013	0.5	0.5	None (,)	6.26
IN1547-017_IN1547-012	IN1547-017	1103.31	IN1547-012	1101.84	Circular		1	1	0.013	0.5	0.5	None (,)	27.751
IN1547-019_AS1547-018	IN1547-019	1108.34	AS1547-018	1106.28	Circular		1	2	0.013	0.25	0.25	None (,)	77.931
IN1547-020_IN1547-019	IN1547-020	1109.52	IN1547-019	1108.34	Circular		1	1.5	0.013	0.05	0.5	None (,)	52.613
IN1547-021_IN1547-020	IN1547-021	1109.92	IN1547-020	1109.52	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.473
IN1547-022_IN1547-021	IN1547-022	1110.37	IN1547-021	1109.92	Circular		1	1	0.013	0.5	0.5	None (,)	9.802
IN1547-024_AS1547-023	IN1547-024	1116.39	AS1547-023	1115.12	Circular		1	1	0.013	0.5	0.5	None (,)	4.721
IN1547-025_AS1547-023	IN1547-025	1116.39	AS1547-023	1115.12	Circular		1	1	0.013	0.5	0.5	None (,)	23.526
IN1547-027_IN1547-020	IN1547-027	1112.18	IN1547-020	1109.52	Circular		1	1.25	0.013	0.5	0.05	None (,)	95.352
IN1547-028_IN1547-027	IN1547-028	1112.58	IN1547-027	1112.18	Circular		1	1	0.013	0.5	0.5	None (,)	27.021
IN1547-030_AS1547-029	IN1547-030	1116.79	AS1547-029	1115.09	Circular		1	1	0.013	0.5	0.5	None (,)	11.761
IN1547-031_AS1547-029	IN1547-031	1116.79	AS1547-029	1115.09	Circular		1	1	0.013	0.5	0.5	None (,)	14.537
IN1547-033_AS1547-032	IN1547-033	1129.6	AS1547-032	1124.5	Circular		1	2	0.013	0.05	0.25	None (,)	149.298
IN1547-034_IN1547-033	IN1547-034	1131.36	IN1547-033	1129.6	Circular		1	1	0.013	0.5	0.5	None (,)	26.984
IN1548-001_IN1547-005	IN1548-001	1089.59	IN1547-005	1082.56	Circular		1	4.5	0.013	0.25	0.25	None (,)	211.05
IN1548-002_IN1548-001	IN1548-002	1093.59	IN1548-001	1089.59	Circular		1	1	0.013	0.5	0.5	None (,)	28.147
IN1548-003_IN1648-027	IN1548-003	1081.02	IN1648-027	1079.81	Circular		1	3.5	0.013	0.25	0.25	None (,)	93.337
IN1548-004_IN1548-003	IN1548-004	1090.72	IN1548-003	1081.02	Circular		1	1	0.013	0.5	0.5	None (,)	26.909
IN1548-005_IN1548-003	IN1548-005	1103.56	IN1548-003	1081.02	Circular		1	1.5	0.013	0.25	0.25	None (,)	184.485
IN1548-006_IN1548-005	IN1548-006	1105.06	IN1548-005	1103.56	Circular		1	1	0.013	0.5	0.5	None (,)	27.417
IN1548-007_IN1548-001	IN1548-007	1090.05	IN1548-001	1089.59	Circular		1	4.5	0.013	0.05	0.25	None (,)	52.554
IN1548-008_IN1548-007	IN1548-008	1092.73	IN1548-007	1090.05	Circular		1	2	0.013	0.05	0.5	None (,)	51.181
IN1548-009_IN1548-008	IN1548-009	1092.78	IN1548-008	1092.73	Circular		1	2	0.013	0.05	0.05	None (,)	10.126
IN1548-010_IN1548-008	IN1548-010	1093.85	IN1548-008	1092.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	29.843
IN1548-011_IN1548-010	IN1548-011	1094.15	IN1548-010	1093.85	Circular		1	1	0.013	0.5	0.5	None (,)	8.173
IN1548-012_IN1548-007	IN1548-012	1095.73	IN1548-007	1090.05	Circular		1	4.5	0.013	0.05	0.05	None (,)	148.674
IN1548-013_IN1548-012	IN1548-013	1099.39	IN1548-012	1095.73	Circular		1	1	0.013	0.5	0.5	None (,)	29.114
IN1548-016_AS1548-014	IN1548-016	1099.76	AS1548-014	1097.05	Circular		1	1.5	0.013	0.25	0.5	None (,)	26.421
IN1548-017_IN1548-016	IN1548-017	1100.31	IN1548-016	1099.76	Circular		1	1	0.013	0.5	0.25	None (,)	11.104
IN1548-018_IN1548-016	IN1548-018	1100.16	IN1548-016	1099.76	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.618
IN1548-019_IN1548-018	IN1548-019	1100.61	IN1548-018	1100.16	Circular		1	1	0.013	0.5	0.5	None (,)	11.47
IN1548-020_AS1548-014	IN1548-020	1099.08	AS1548-014	1097.05	Circular		1	2	0.013	0.5	0.05	None (,)	48.969
IN1548-021_IN1548-020	IN1548-021	1099.12	IN1548-020	1099.08	Circular		1	2	0.013	0.5	0.25	None (,)	11.671

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1548-023_IN1548-020	IN1548-023	1099.98	IN1548-020	1099.08	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.307
IN1548-025_IN1548-023	IN1548-025	1100.28	IN1548-023	1099.98	Circular		1	1	0.013	0.5	0.5	None (,)	10.687
IN1548-026_IN1548-021	IN1548-026	1101.42	IN1548-021	1099.12	Circular		1	2	0.013	0.05	0.05	None (,)	96.232
IN1548-029_MI1548-028	IN1548-029	1098.55	MI1548-028	1097.73	Circular		1	4	0.013	0.05	0.05	None (,)	125.612
IN1548-030_IN1548-029	IN1548-030	1101.65	IN1548-029	1098.55	Circular		1	1	0.013	0.5	0.5	None (,)	27.314
IN1548-032_AS1548-031	IN1548-032	1102.93	AS1548-031	1099.99	Circular		1	1	0.013	0.5	0.5	None (,)	24.521
IN1548-033_AS1548-031	IN1548-033	1102.17	AS1548-031	1099.99	Circular		1	1.5	0.013	0.05	0.05	None (,)	23.482
IN1548-034_IN1548-033	IN1548-034	1102.75	IN1548-033	1102.17	Circular		1	1	0.013	0.5	0.5	None (,)	16.744
IN1548-035_IN1548-033	IN1548-035	1102.94	IN1548-033	1102.17	Circular		1	1	0.013	0.5	0.5	None (,)	23.456
IN1548-037_AS1548-036	IN1548-037	1104.28	AS1548-036	1102.46	Circular		1	1.25	0.013	0.5	0.25	None (,)	26.809
IN1548-040_AS1548-039	IN1548-040	1111.86	AS1548-039	1109.91	Circular		1	1	0.013	0.5	0.5	None (,)	47.513
IN1548-041_AS1548-039	IN1548-041	1110.85	AS1548-039	1109.91	Circular		1	1.5	0.013	0.5	0.5	None (,)	28.191
IN1548-042_IN1548-041	IN1548-042	1111.04	IN1548-041	1110.85	Circular		1	1.5	0.013	0.5	0.5	None (,)	28.501
IN1548-043_IN1548-042	IN1548-043	1111.44	IN1548-042	1111.04	Circular		1	1.25	0.013	0.05	0.5	None (,)	36.812
IN1548-044_IN1548-043	IN1548-044	1111.87	IN1548-043	1111.44	Circular		1	1	0.013	0.5	0.05	None (,)	39.589
IN1548-045_IN1548-005	IN1548-045	1115.84	IN1548-005	1103.56	Circular		1	1.5	0.013	0.5	0.25	None (,)	220.741
IN1549-004_AS1549-002	IN1549-004	1106.2	AS1549-002	1103.77	Circular		1	1.25	0.013	0.5	0.25	None (,)	3.759
IN1549-005_IN1549-004	IN1549-005	1106.5	IN1549-004	1106.2	Circular		1	1	0.013	0.5	0.5	None (,)	8.708
IN1549-007_AS1549-001	IN1549-007	1106.59	AS1549-001	1103.61	Circular		1	1	0.013	0.5	0.5	None (,)	33.29
IN1549-008_AS1549-001	IN1549-008	1106.68	AS1549-001	1103.61	Circular		1	1	0.013	0.5	0.5	None (,)	49.164
IN1549-017_IN1547-016	IN1549-017	1106.02	IN1549-016	1106.01	Circular		1	3	0.013	0.05	0.05	None (,)	89.589
IN1549-018_IN1549-017	IN1549-018	1106.78	IN1549-017	1106.02	Circular		1	3	0.013	0.05	0.05	None (,)	69.279
IN1549-02_IN1549-021	IN1549-022	1108.43	IN1549-021	1108.02	Circular		1	1	0.013	0.5	0.5	None (,)	28.764
IN1549-021_IN1549-016	IN1549-021	1108.02	IN1549-016	1106.01	Circular		1	1	0.013	0.5	0.5	None (,)	48.538
IN1549-023_IN1549-017	IN1549-023	1107.11	IN1549-017	1106.02	Circular		1	1	0.011	0.5	0.5	None (,)	130.208
IN1549-027_IN1549-026	IN1549-027	1108.03	IN1549-026	1107.87	Circular		1	1	0.013	0.5	0.25	None (,)	29.093
IN1549-028_IN1549-025	IN1549-028	1108.12	IN1549-025	1107.96	Circular		1	1	0.013	0.5	0.5	None (,)	28.225
IN1549-029_AS1549-032	IN1549-029	1107.75	AS1549-032	1107.63	Circular		1	1.25	0.013	0.25	0.05	None (,)	9.624
IN1549-030_IN1549-029	IN1549-030	1107.91	IN1549-029	1107.75	Circular		1	1	0.013	0.5	0.25	None (,)	28.649
IN1549-035_IN1549-034	IN1549-035	1108.25	AS1549-034	1108.02	Circular		1	1.25	0.013	0.25	0.25	None (,)	82.872
IN1549-036_IN1549-035	IN1549-036	1108.95	IN1549-035	1108.25	Circular		1	1.25	0.013	0.25	0.25	None (,)	198.071
IN1549-038_IN1549-036	IN1549-038	1109.3	IN1549-036	1108.95	Circular		1	1.25	0.013	0.25	0.25	None (,)	105.011
IN1549-039_IN1549-038	IN1549-039	1109.7	IN1549-038	1109.3	Circular		1	1.25	0.013	0.5	0.25	None (,)	125.932
IN1549-040_IN1549-039	IN1549-040	1109.85	IN1549-039	1109.7	Circular		1	1	0.013	0.5	0.5	None (,)	28.295
IN1550-007_AS1550-006	IN1550-007	1096.29	AS1550-006	1096.2	Circular		1	1	0.013	0.5	0.05	None (,)	31.319
IN1550-011_AS1550-010	IN1550-011	1093.57	AS1550-010	1093.09	Special	Horizontal Ellipse	1	2.5	0.013	0.5	0.5	None (,)	160.039
IN1550-012_IN1550-013	IN1550-012	1101.4	IN1550-013	1100.21	Circular		1	3	0.011	0.25	0.05	None (,)	148.501
IN1550-013_IN1550-014	IN1550-013	1100.21	IN1550-014	1099.04	Circular		1	3	0.013	0.05	0.5	None (,)	91.833
IN1550-015_IN1550-014	IN1550-015	1102.85	IN1550-014	1099.04	Circular		1	1	0.013	0.5	0.05	None (,)	27.421
IN1550-018_IN1550-017	IN1550-018	1103.84	IN1550-017	1100.87	Circular		1	1.5	0.013	0.25	0.05	None (,)	76.038
IN1550-019_IN1550-018	IN1550-019	1104.54	IN1550-018	1103.84	Circular		1	1	0.013	0.5	0.5	None (,)	27.978
IN1550-020_IN1550-018	IN1550-020	1106.37	IN1550-018	1103.84	Circular		1	1.25	0.013	0.5	0.25	None (,)	126.193
IN1550-021_IN1550-020	IN1550-021	1106.78	IN1550-020	1106.37	Circular		1	1	0.013	0.5	0.5	None (,)	27.412
IN1550-022_IN1550-017	IN1550-022	1101.02	IN1550-017	1100.87	Circular		1	1.5	0.013	0.25	0.5	None (,)	57.585
IN1550-024_IN1550-025	IN1550-024	1102.27	IN1550-023	1101.52	Circular		1	1	0.013	0.5	0.5	None (,)	24.182
IN1550-025_IN1550-013	IN1550-025	1100.35	IN1550-013	1100.21	Circular		1	1.25	0.011	0.05	0.5	None (,)	27.722
IN1550-026_IN1550-025	IN1550-026	1100.93	IN1550-025	1100.35	Circular		1	1.25	0.011	0.5	0.05	None (,)	118.54
IN1550-027_IN1550-026	IN1550-027	1101.93	IN1550-026	1100.93	Circular		1	1	0.011	0.5	0.5	None (,)	151.164
IN1550-028_IN1550-026	IN1550-028	1102.03	IN1550-026	1100.93	Circular		1	1	0.011	0.5	0.5	None (,)	173.655

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1551-002_IN1550-012	IN1551-002	1101.79	IN1550-012	1101.4	Circular		1	3	0.011	0.25	0.25	None (,)	69.684
IN1551-003_IN1551-002	IN1551-003	1103.9	IN1551-002	1101.79	Circular		1	1.25	0.011	0.5	0.5	None (,)	66.971
IN1551-004_IN1551-003	IN1551-004	1104.28	IN1551-003	1103.9	Circular		1	1	0.011	0.5	0.5	None (,)	25.162
IN1551-006_IN1551-005	IN1551-006	1105.57	IN1551-005	1103.87	Circular		1	1	0.011	0.5	0.25	None (,)	33.36
IN1551-007_IN1551-005	IN1551-007	1104.85	IN1551-005	1103.87	Circular		1	2.5	0.013	0.25	0.05	None (,)	134.539
IN1551-008_IN1551-007	IN1551-008	1105.24	IN1551-007	1104.85	Circular		1	2.5	0.013	0.05	0.25	None (,)	79.876
IN1551-009_IN1551-008	IN1551-009	1107.16	IN1551-008	1105.24	Circular		1	1.25	0.011	0.5	0.5	None (,)	58.7
IN1551-010_IN1551-009	IN1551-010	1107.67	IN1551-009	1107.16	Circular		1	1	0.011	0.5	0.5	None (,)	41.723
IN1551-011_IN1551-008	IN1551-011	1105.25	IN1551-008	1105.24	Circular		1	2	0.013	0.05	0.05	None (,)	109.718
IN1551-012_IN1551-011	IN1551-012	1107.74	IN1551-011	1105.24	Circular		1	1	0.011	0.5	0.5	None (,)	27.606
IN1551-014_IN1551-008	IN1551-014	1105.34	IN1551-008	1105.24	Circular		1	1.25	0.011	0.25	0.5	None (,)	44.786
IN1551-015_IN1551-014	IN1551-015	1105.53	IN1551-014	1105.34	Circular		1	1	0.011	0.5	0.25	None (,)	75.956
IN1551-016_IN1551-015	IN1551-016	1105.64	IN1551-015	1105.53	Circular		1	1	0.011	0.05	0.5	None (,)	42.544
IN1551-017_IN1551-016	IN1551-017	1105.75	IN1551-016	1105.64	Circular		1	0.667	0.011	0.5	0.05	None (,)	22.242
IN1551-018_IN1551-002	IN1551-018	1102.12	IN1551-002	1101.79	Circular		1	1.25	0.011	0.25	0.5	None (,)	100.344
IN1551-019_IN1551-018	IN1551-019	1102.65	IN1551-018	1102.12	Circular		1	1	0.011	0.5	0.25	None (,)	152.852
IN1551-020_IN1551-019	IN1551-020	1102.78	IN1551-019	1102.65	Circular		1	1	0.011	0.5	0.5	None (,)	24.34
IN1551-021_IN1551-019	IN1551-021	1102.79	IN1551-019	1102.65	Circular		1	1	0.011	0.5	0.5	None (,)	28.435
IN1551-023_IN1551-011	IN1551-023	1108.48	IN1551-011	1105.24	Circular		1	2	0.013	0.05	0.05	None (,)	191.098
IN1551-024_IN1551-023	IN1551-024	1112.31	IN1551-023	1108.48	Circular		1	1	0.013	0.5	0.05	None (,)	75.961
IN1551-025_IN1551-024	IN1551-025	1112.76	IN1551-024	1112.31	Circular		1	1	0.013	0.5	0.5	None (,)	29.606
IN1551-026_IN1551-023	IN1551-026	1109.58	IN1551-023	1108.48	Circular		1	1.5	0.013	0.05	0.5	None (,)	28.003
IN1551-027_IN1551-026	IN1551-027	1110.35	IN1551-026	1109.58	Circular		1	1.5	0.013	0.5	0.05	None (,)	43.428
IN1551-028_IN1551-027	IN1551-028	1110.82	IN1551-027	1110.35	Circular		1	1	0.013	0.5	0.5	None (,)	10.258
IN1551-029_IN1551-027	IN1551-029	1110.89	IN1551-027	1110.35	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.834
IN1551-030_IN1551-029	IN1551-030	1111.21	IN1551-029	1110.89	Circular		1	1	0.013	0.5	0.5	None (,)	9.786
IN1646-001_IN1647-067	IN1646-001	1094.69	IN1647-067	1094.5	Circular		1	1	0.013	0.5	0.5	None (,)	43.69
IN1647-003_IN1647-004	IN1647-003	1088.34	IN1647-004	1086.5	Circular		1	2	0.013	0.25	0.05	None (,)	153.121
IN1647-004_AS1647-006	IN1647-004	1086.5	AS1647-006	1085.6	Circular		1	2.25	0.013	0.05	0.05	None (,)	48.591
IN1647-005_IN1647-004	IN1647-005	1088.86	IN1647-004	1086.5	Circular		1	1	0.013	0.5	0.5	None (,)	30.911
IN1647-007_AS1647-006	IN1647-007	1087.37	AS1647-006	1085.6	Circular		1	1.5	0.013	0.05	0.5	None (,)	25.084
IN1647-008_IN1647-007	IN1647-008	1088.07	IN1647-007	1087.37	Circular		1	1	0.013	0.5	0.05	None (,)	10.093
IN1647-009_IN1647-007	IN1647-009	1087.77	IN1647-007	1087.37	Circular		1	1.25	0.013	0.5	0.5	None (,)	27.745
IN1647-010_IN1647-009	IN1647-010	1088.07	IN1647-009	1087.77	Circular		1	1	0.013	0.5	0.5	None (,)	8.681
IN1647-011_AS1647-006	IN1647-011	1087.37	AS1647-006	1085.6	Circular		1	1.5	0.013	0.5	0.05	None (,)	61.407
IN1647-012_IN1647-011	IN1647-012	1088.07	IN1647-011	1087.37	Circular		1	1	0.013	0.5	0.05	None (,)	7.785
IN1647-013_IN1647-011	IN1647-013	1087.77	IN1647-011	1087.37	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.061
IN1647-014_IN1647-013	IN1647-014	1088.02	IN1647-013	1087.77	Circular		1	1	0.013	0.5	0.5	None (,)	8.337
IN1647-016_IN1647-017	IN1647-016	1082.86	IN1647-017	1082.45	Circular		1	1	0.013	0.5	0.5	None (,)	25.555
IN1647-017_AS1647-018	IN1647-017	1082.45	AS1647-018	1080.39	Circular		1	1.25	0.013	0.5	0.25	None (,)	42.166
IN1647-019_AS1647-018	IN1647-019	1081.63	AS1647-018	1080.39	Circular		1	1.5	0.013	0.5	0.5	None (,)	43.849
IN1647-020_IN1647-019	IN1647-020	1082.32	IN1647-019	1081.63	Circular		1	1	0.013	0.5	0.05	None (,)	11.115
IN1647-021_IN1647-019	IN1647-021	1082.03	IN1647-019	1081.63	Circular		1	1.25	0.013	0.5	0.5	None (,)	26.54
IN1647-022_IN1647-021	IN1647-022	1082.33	IN1647-021	1082.03	Circular		1	1	0.013	0.5	0.5	None (,)	12.147
IN1647-023_AS1647-024	IN1647-023	1080.16	AS1647-024	1077.6	Circular		1	2.5	0.013	0.25	0.05	None (,)	314.361
IN1647-025_AS1647-024	IN1647-025	1080.87	AS1647-024	1077.6	Circular		1	1	0.013	0.5	0.5	None (,)	6.5
IN1647-026_AS1647-024	IN1647-026	1080.87	AS1647-024	1077.6	Circular		1	1	0.013	0.5	0.5	None (,)	21.281
IN1647-028_AS1647-027	IN1647-028	1079.16	AS1647-027	1075.26	Circular		1	1	0.013	0.5	0.5	None (,)	21.281
IN1647-029_AS1647-027	IN1647-029	1079.12	AS1647-027	1075.26	Circular		1	1	0.013	0.5	0.5	None (,)	8.199

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1647-032_IN1647-030	IN1647-032	1078.32	IN1647-030	1077.51	Circular		1	1.25	0.013	0.5	0.5	None (,)	28.097
IN1647-033_IN147-032	IN1647-033	1078.62	IN1647-032	1078.32	Circular		1	1	0.013	0.5	0.5	None (,)	7.994
IN1647-042_IN1647-041	IN1647-042	1080.71	IN1647-041	1079.44	Circular		1	1	0.013	0.5	0.5	None (,)	27.372
IN1647-045_AS1647-044	IN1647-045	1082.91	AS1647-044	1081.03	Circular		1	1.25	0.013	0.5	0.5	None (,)	27.506
IN1647-046_IN1647-045	IN1647-046	1083.21	IN1647-045	1082.91	Circular		1	1	0.013	0.5	0.5	None (,)	14.859
IN1647-050_IN1647-051	IN1647-050	1083.6	IN1647-051	1083.56	Circular		1	3	0.013	0.05	0.05	None (,)	9.389
IN1647-051_AS1647-052	IN1647-051	1083.56	AS1647-052	1081.79	Circular		1	3	0.013	0.05	0.5	None (,)	53.432
IN1647-054_IN1647-053	IN1647-054	1085.6	IN1647-053	1084.6	Circular		1	1	0.013	0.5	0.5	None (,)	9.389
IN1647-055_AS1647-056	IN1647-055	1083.9	AS1647-056	1083.7	Circular		1	1	0.013	0.5	0.5	None (,)	15.127
IN1647-058_AS1647-056	IN1647-058	1085.91	AS1647-056	1083.7	Circular		1	1	0.013	0.5	0.5	None (,)	15.411
IN1647-060_AS1647-059	IN1647-060	1084.25	AS1647-059	1080.79	Circular		1	1	0.013	0.5	0.05	None (,)	5.524
IN1647-061_IN1647-060	IN1647-061	1084.25	AS1647-059	1080.79	Circular		1	1	0.013	0.5	0.05	None (,)	26.069
IN1647-063_IN1647-064	IN1647-063	1096.75	IN1647-064	1096.18	Circular		1	1	0.013	0.5	0.05	None (,)	116.148
IN1647-064_IN1647-065	IN1647-064	1096.18	IN1647-065	1093.49	Circular		1	1	0.013	0.05	0.05	None (,)	211.372
IN1647-065_AS1647-002	IN1647-065	1093.49	AS1647-002	1092.47	Circular		1	1.25	0.013	0.05	0.5	None (,)	203.868
IN1647-067_AS1647-002	IN1647-067	1094.5	AS1647-002	1092.47	Circular		1	2	0.013	0.05	0.5	None (,)	83.716
IN1647-068_IN1647-067	IN1647-068	1097.5	IN1647-067	1094.5	Circular		1	2	0.013	0.5	0.05	None (,)	116.012
IN1647-069_IN1647-068	IN1647-069	1097.55	IN1647-068	1097.5	Circular		1	1	0.013	0.5	0.5	None (,)	12.438
IN1648-001_IN1648-002	IN1648-001	1079.4	IN1648-002	1079.1	Circular		1	1	0.013	0.5	0.5	None (,)	10.062
IN1648-002_AS1648-003	IN1648-002	1079.1	AS1648-003	1079.02	Circular		1	1.25	0.013	0.5	0.5	None (,)	13.25
IN1648-004_IN1648-005	IN1648-004	1079.4	IN1648-005	1079.1	Circular		1	1	0.013	0.5	0.5	None (,)	9.981
IN1648-005_AS1648-003	IN1648-005	1079.1	AS1648-003	1079.02	Circular		1	1.25	0.013	0.5	0.5	None (,)	13.32
IN1648-010_AS1648-009	IN1648-010	1080.52	AS1648-009	1078.24	Circular		1	1.25	0.013	0.5	0.5	None (,)	3.414
IN1648-010_WW	IN1648-021	1080.97	WINDINGWAY_BLIND_CON	1080	Circular		1	1	0.013	0.5	0.5	None (,)	14.438
IN1648-011_IN1648-010	IN1648-011	1080.82	IN1648-010	1080.52	Circular		1	1	0.013	0.5	0.5	None (,)	9.04
IN1648-012_IN1648-013	IN1648-012	1080.92	IN1648-013	1080.62	Circular		1	1	0.013	0.5	0.5	None (,)	9.025
IN1648-013_AS1648-009	IN1648-013	1080.62	AS1648-009	1078.24	Circular		1	1.25	0.013	0.5	0.5	None (,)	23.314
IN1648-016_AS1648-015	IN1648-016	1080.85	AS1648-015	1080.56	Circular		1	1.25	0.013	0.5	0.5	None (,)	5.745
IN1648-017_IN1648-016	IN1648-017	1081.15	IN1648-016	1080.85	Circular		1	1	0.013	0.5	0.5	None (,)	9.761
IN1648-018_IN1648-016	IN1648-018	1081.29	IN1648-016	1080.85	Circular		1	1	0.013	0.5	0.5	None (,)	40.406
IN1648-019_AS1648-015	IN1648-019	1080.93	AS1648-015	1080.56	Circular		1	1.25	0.013	0.5	0.5	None (,)	21.74
IN1648-020_IN1648-019	IN1648-020	1081.23	IN1648-019	1080.93	Circular		1	1	0.013	0.5	0.5	None (,)	10.312
IN1648-023_AS1648-022	IN1648-023	1077.22	AS1648-022	1074.51	Circular		1	1	0.013	0.5	0.5	None (,)	21.662
IN1648-024_AS1648-022	IN1648-024	1077.14	AS1648-022	1074.51	Circular		1	1	0.013	0.5	0.5	None (,)	7.527
IN1648-026_IN1648-025	IN1648-026	1082.57	IN1648-025	1079.2	Circular		1	1	0.013	0.5	0.5	None (,)	28.454
IN1648-027_IN1648-025	IN1648-027	1079.81	IN1648-025	1079.2	Circular		1	3.5	0.013	0.05	0.05	None (,)	116.674
IN1648-028_IN1748-025	IN1648-028	1076.4	IN1748-025	1076.25	Circular		1	1.5	0.013	0.5	0.5	None (,)	171.007
IN1648-034_IN1648-030	IN1648-034	1087.33	IN1648-030	1086.9	Circular		1	1.25	0.013	0.5	0.5	None (,)	29.572
IN1648-042_IN1648-041	IN1648-042	1092.3	IN1648-041	1091.11	Circular		1	1	0.013	0.5	0.25	None (,)	29.829
IN1648-045_IN1648-044	IN1648-045	1084.05	IN1648-044	1083.33	Circular		1	1	0.013	0.5	0.5	None (,)	8.672
IN1648-048_IN1648-027	IN1648-048	1088.13	IN1648-027	1079.81	Circular		1	1	0.013	0.5	0.5	None (,)	153.669
IN1649-001_IN1649-002	IN1649-001	1086.18	IN1649-002	1085.73	Circular		1	1.25	0.013	0.5	0.05	None (,)	26.005
IN1649-002_AE1648-035	IN1649-002	1085.73	AE1648-035	1079.6	Circular		1	1.5	0.013	0.05	1	0	145
IN1649-005_IN1649-003	IN1649-005	1088.83	IN1649-003	1082.5	Circular		1	1.75	0.013	0.05	0.25	None (,)	104.342
IN1649-006_IN1649-003	IN1649-006	1084.6	IN1649-003	1082.5	Circular		1	1.25	0.013	0.25	0.5	None (,)	27.705
IN1649-007_IN1649-006	IN1649-007	1086.04	IN1649-006	1084.6	Circular		1	1.25	0.013	0.25	0.25	None (,)	35.016
IN1649-008_IN1649-007	IN1649-008	1087.69	IN1649-007	1086.04	Circular		1	1	0.013	0.25	0.25	None (,)	25.906
IN1649-009_IN1649-008	IN1649-009	1089.19	IN1649-008	1087.69	Circular		1	1	0.013	0.25	0.25	None (,)	33.93
IN1649-010_IN1649-005	IN1649-010	1101.12	IN1649-005	1088.83	Circular		1	1.5	0.013	0.25	0.05	None (,)	208.516

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1649-011_IN1649-010	IN1649-011	1102.15	IN1649-010	1101.12	Circular		1	1.5	0.013	0.05	0.25	None (,)	31.262
IN1649-012_IN1649-011	IN1649-012	1106.83	IN1649-011	1102.15	Circular		1	1	0.013	0.5	0.25	None (,)	74.57
IN1649-013_IN1649-011	IN1649-013	1103.87	IN1649-011	1102.15	Circular		1	1.5	0.013	0.25	0.25	None (,)	29.775
IN1649-014_IN1649-013	IN1649-014	1104.87	IN1649-013	1103.87	Circular		1	1	0.013	0.25	0.25	None (,)	63.863
IN1649-015_IN1649-014	IN1649-015	1105.54	IN1649-014	1104.87	Circular		1	1	0.013	0.5	0.25	None (,)	46.774
IN1649-017_IN1649-016	IN1649-017	1102.23	IN1649-016	1101.79	Circular		1	1	0.013	0.5	0.5	None (,)	15.104
IN1649-018_IN1649-016	IN1649-018	1102.26	IN1649-016	1101.79	Circular		1	1	0.013	0.5	0.5	None (,)	26.042
IN1649-019_IN1649-016	IN1649-019	1113.18	IN1649-016	1101.79	Circular		1	1	0.013	0.25	0.05	None (,)	350.522
IN1649-020_IN1649-019	IN1649-020	1113.23	IN1649-019	1113.18	Circular		1	1	0.013	0.05	0.5	None (,)	13.062
IN1649-021_IN1649-019	IN1649-021	1114.2	IN1649-019	1113.18	Circular		1	1	0.013	0.5	0.25	None (,)	76.428
IN1650-001_IN1649-018	IN1650-001	1102.44	IN1649-018	1102.26	Circular		1	1	0.013	0.5	0.05	None (,)	14.62
IN1650-002_IN1649-020	IN1650-002	1113.4	IN1649-020	1113.23	Circular		1	1	0.013	0.5	0.05	None (,)	28.168
IN1650-009_AS1650-008	IN1650-009	1091.28	AS1650-008	1090.41	Circular		1	2	0.013	0.05	0.05	None (,)	294.411
IN1650-009_DEP_TRANSFER	IN1650-009_DEPRESSIO	1097.72	IN1650-009	1097.71	Trapezoidal		1	1	0.001	0	0	None (,)	27.687
IN1650-010_IN1650-009	IN1650-010	1091.94	IN1650-009	1091.28	Circular		1	1	0.013	0.5	0.5	None (,)	35.999
IN1653-007_AE1653-008	IN1653-007	1095.8	AE1653-008	1094.5	Circular		1	3	0.013	0.05	1	0	47.002
IN1653-009_IN1653-007	IN1653-009	1098.04	IN1653-007	1095.8	Circular		1	1.5	0.013	0.5	0.05	0	45.543
IN1653-010_IN1653-007	IN1653-010	1096.86	IN1653-007	1095.8	Circular		1	3	0.013	0.05	0.5	0	105.372
IN1653-011_IN1653-010	IN1653-011	1100.82	IN1653-010	1096.86	Circular		1	3	0.013	0.05	0.05	0	185.036
IN1653-012.1	IN1653-012	1103.8	IN1653-011	1101.82	Circular		1	2	0.013	0.25	0.25	0	36.937
IN1653-013_IN1653-012	IN1653-013	1104.5	IN1653-012	1103.8	Circular		1	1.5	0.013	0.5	0.25	0	31.355
IN1653-014_IN1653-011	IN1653-014	1101.86	IN1653-011	1100.82	Circular		1	3	0.013	0.05	0.25	0	161.22
IN1653-016_IN1653-014	IN1653-016	1102.22	IN1653-014	1101.86	Circular		1	3	0.013	0.05	0.05	0	75.387
IN1653-018_IN1653-016	IN1653-018	1104.2	IN1653-016	1102.22	Circular		1	1.75	0.013	0.15	0.15	0	176.112
IN1653-020_IN1653-018	IN1653-020	1105.28	IN1653-018	1104.2	Circular		1	1.5	0.013	0.05	0.15	0	169.666
IN1653-023_IN1653-020	IN1653-023	1105.53	IN1653-020	1105.28	Circular		1	1.5	0.013	0.25	0.05	0	50.407
IN1653-025.1	IN1653-025	1104.6	IN1653-012	1103.8	Circular		1	1.75	0.013	0.25	0.25	0	112.319
IN1653-026_IN1653-025	IN1653-026	1105.37	IN1653-025	1104.6	Circular		1	1.75	0.013	0.25	0.25	0	157.972
IN1654-003_IN1754-026	IN1654-003	1104.84	IN1754-026	1103	Circular		1	1.75	0.013	0.25	0.25	0	82.452
IN1654-004_IN1654_003	IN1654-004	1105.81	IN1654-003	1104.84	Circular		1	1.75	0.013	0.5	0.5	0	35.007
IN1654-005_1654-004	IN1654-005	1108.25	IN1654-004	1105.81	Circular		1	1.5	0.013	0.05	0.5	0	118.67
IN1654-006_IN1654-005	IN1654-006	1113.72	IN1654-005	1108.25	Circular		1	1.5	0.013	0.05	0.05	0	134.342
IN1654-007_IN1754-032	IN1654-007	1120.7	IN1754-032	1112.4	Circular		1	1.5	0.013	0.5	0.05	0	179.264
IN1654-008_IN1654-006	IN1654-008	1117.32	IN1654-006	1113.72	Circular		1	1.25	0.013	0.5	0.05	0	241.778
IN1654-053_IN1647-051	IN1647-053	1084.6	IN1647-051	1083.56	Circular		1	1.25	0.013	0.5	0.5	None (,)	27.083
IN1746-006_IN1750-030	IN1749-006	1089.6	IN1750-030	1088.53	Circular		1	1	0.013	0.5	0.05	None (,)	21.38
IN1747-005_AS1747-004	IN1747-005	1079.56	AS1747-004	1077.72	Circular		1	1	0.013	0.5	0.5	None (,)	6.733
IN1747-006_AS1747-004	IN1747-006	1079.56	AS1747-004	1077.72	Circular		1	1	0.013	0.5	0.5	None (,)	21.705
IN1747-009_AS1747-007	IN1747-009	1098	AS1747-007	1085.87	Circular		1	1	0.013	0.5	0.25	None (,)	55.191
IN1747-011_AS1747-010	IN1747-011	1087.14	AS1747-010	1086.72	Circular		1	1.5	0.013	0.25	0.25	None (,)	32.804
IN1747-012_IN1747-011	IN1747-012	1087.19	IN1747-011	1087.14	Circular		1	1.5	0.013	0.05	0.25	None (,)	10.603
IN1747-013_IN1747-012	IN1747-013	1087.73	IN1747-012	1087.19	Circular		1	1	0.013	0.5	0.05	None (,)	9.412
IN1747-014_AS1747-010	IN1747-014	1087	AS1747-010	1086.72	Circular		1	1.5	0.013	0.5	0.5	None (,)	8.795
IN1747-015_IN1747-014	IN1747-015	1087.37	IN1747-014	1087	Circular		1	1.5	0.013	0.05	0.5	None (,)	75.663
IN1747-016_IN1747-015	IN1747-016	1087.91	IN1747-015	1087.37	Circular		1	1	0.013	0.5	0.05	None (,)	10.259
IN1747-020_AS1747-019	IN1747-020	1077.87	AS1747-019	1073.05	Circular		1	1	0.013	0.5	0.5	None (,)	7.61
IN1747-021_AS1747-019	IN1747-021	1077.16	AS1747-019	1073.05	Circular		1	1.25	0.013	0.5	0.5	None (,)	20.622
IN1747-022_IN1747-021	IN1747-022	1077.77	IN1747-021	1077.16	Circular		1	1	0.013	0.5	0.5	None (,)	11.479
IN1747-024_AS1847-022	IN1747-024	1064.15	AS1847-022	1064.09	Circular		1	1.25	0.013	0.05	0.05	0	32.323

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1747-025_IN1747-024	IN1747-025	1064.25	IN1747-024	1064.15	Circular		1	1.25	0.013	0.05	0.05	0	63.21
IN1747-026_IN1747-025	IN1747-026	1064.53	IN1747-025	1064.25	Circular		1	1.25	0.013	0.5	0.05	0	177.089
IN1747-027_IN1747-026	IN1747-027	1064.54	IN1747-026	1064.53	Circular		1	0.667	0.013	0.5	0.5	0	11.111
IN1747-028_IN1747-029	IN1747-028	1086.75	IN1747-029	1086.33	Circular		1	1	0.013	0.5	0.05	0	50.714
IN1747-029_AE1746-001	IN1747-029	1086.33	AE1746-001	1086	Circular		1	1	0.013	0.5	0.5	0	26.812
IN1748-004_AS1748-003	IN1748-004	1075.3	AS1748-003	1071.9	Circular		1	1	0.013	0.5	0.5	None (,)	37.803
IN1748-008_AS1748-007	IN1748-008	1074.05	AS1748-007	1072.1	Circular		1	1.5	0.013	0.5	0.5	None (,)	23.845
IN1748-009_AS1748-007	IN1748-009	1074.05	AS1748-007	1072.1	Circular		1	1.5	0.013	0.5	0.5	None (,)	10.524
IN1748-012_AS1748-011	IN1748-012	1075.55	AS1748-011	1072.06	Circular		1	1.25	0.013	0.5	0.5	None (,)	8.104
IN1748-013_AS1748-011	IN1748-013	1074.55	AS1748-011	1072.06	Circular		1	1.25	0.013	0.5	0.5	None (,)	24.298
IN1748-015_AS1748-014	IN1748-015	1075.3	AS1748-014	1072.36	Circular		1	1	0.013	0.5	0.5	None (,)	7.211
IN1748-016_AS1748-014	IN1748-016	1075.3	AS1748-014	1072.36	Circular		1	1	0.013	0.5	0.5	None (,)	22.302
IN1748-025_AS1748-024	IN1748-025	1076.25	AS1748-024	1075.18	Circular		1	1.5	0.013	0.5	0.5	None (,)	40.603
IN1748-026_AS1748-024	IN1748-026	1076.25	AS1748-024	1075.18	Circular		1	1	0.013	0.5	0.5	None (,)	23.43
IN1748-027_IN1748-025	IN1748-027	1076.41	IN1748-025	1076.25	Circular		1	1	0.013	0.5	0.5	None (,)	8.665
IN1748-028_IN1748-025	IN1748-028	1076.01	IN1748-025	1076.25	Circular		1	1.5	0.013	0.5	0.5	None (,)	27.159
IN1748-029_IN1748-028	IN1748-029	1076.56	IN1748-028	1076.01	Circular		1	1	0.013	0.5	0.5	None (,)	8.882
IN1748-030_IN1748-028	IN1748-030	1076.67	IN1748-028	1076.01	Circular		1	1	0.013	0.5	0.25	None (,)	33.541
IN1748-031_IN1748-026	IN1748-031	1076.41	IN1748-026	1076.25	Circular		1	1	0.013	0.5	0.5	None (,)	23.179
IN1748-032_IN1748-008	IN1748-032	1074.6	IN1748-008	1074.05	Circular		1	1	0.013	0.5	0.5	None (,)	10.569
IN1748-033_IN1748-009	IN1748-033	1074.6	IN1748-009	1074.05	Circular		1	1	0.013	0.5	0.5	None (,)	10.771
IN1749-001_IN1749-002	IN1749-001	1078.76	IN1749-002	1078.01	Circular		1	1	0.013	0.5	0.5	None (,)	32.394
IN1749-002_IN1749-003	IN1749-002	1078.01	IN1749-003	1077.4	Circular		1	1.75	0.013	0.5	0.25	None (,)	128.925
IN1749-007_IN1750-032	IN1749-007	1088.28	IN1750-032	1088.17	Circular		1	1.5	0.013	0.05	0.05	None (,)	27.22
IN1749-008_IN1749-007	IN1749-008	1088.42	IN1749-007	1088.28	Circular		1	1.5	0.013	0.5	0.05	None (,)	24.796
IN1749-009_IN1749-008	IN1749-009	1088.72	IN1749-008	1088.42	Circular		1	1	0.013	0.5	0.5	None (,)	13.787
IN1749-011_IN1749-010	IN1749-011	1092.59	IN1749-010	1089.94	Circular		1	1	0.013	0.5	0.25	None (,)	14.89
IN1750-001_IN1750-023	IN1750-001	1084.32	IN1750-023	1083.98	Circular		1	2	0.013	0.25	0.25	None (,)	64.997
IN1750-002_IN1750-001	IN1750-002	1084.55	IN1750-001	1084.32	Circular		1	2	0.013	0.25	0.25	None (,)	45.262
IN1750-003_IN1750-002	IN1750-003	1084.81	IN1750-002	1084.55	Circular		1	2	0.013	0.25	0.25	None (,)	53.184
IN1750-004_IN1750-003	IN1750-004	1085.31	IN1750-003	1084.81	Circular		1	2	0.013	0.05	0.25	None (,)	103.426
IN1750-005_IN1750-004	IN1750-005	1101.96	IN1750-004	1085.31	Circular		1	1.25	0.013	0.5	0.5	None (,)	42.91
IN1750-008_IN1750-017	IN1750-008	1085.22	IN1750-017	1077.6	Circular		1	1.75	0.013	0.5	0.5	None (,)	120.718
IN1750-009_IN1750-008	IN1750-009	1086.6	IN1750-008	1085.22	Circular		1	1.5	0.013	0.05	0.5	None (,)	46.631
IN1750-010_IN1750-009	IN1750-010	1088.74	IN1750-009	1086.6	Circular		1	1.5	0.013	0.5	0.05	None (,)	86.802
IN1750-011_IN1750-008	IN1750-011	1086.94	IN1750-008	1085.22	Circular		1	1.5	0.013	0.25	0.25	None (,)	56.936
IN1750-012_IN1750-011	IN1750-012	1087.54	IN1750-011	1086.94	Circular		1	1	0.013	0.5	0.5	None (,)	12.241
IN1750-013_IN1750-011	IN1750-013	1087.42	IN1750-011	1086.94	Circular		1	1.25	0.013	0.5	0.25	None (,)	43.163
IN1750-014_IN1750-013	IN1750-014	1087.72	IN1750-013	1087.42	Circular		1	1	0.013	0.5	0.5	None (,)	10.293
IN1750-017_IN1750-018	IN1750-017	1077.6	IN1750-018	1077.32	Circular		1	3	0.013	0.5	0.25	None (,)	30.256
IN1750-018_AS1750-024	IN1750-018	1077.32	AS1750-024	1076.04	Circular		1	3	0.013	0.25	0.5	None (,)	256.7
IN1750-019_IN1750-020	IN1750-019	1082.6	IN1750-020	1079.74	Circular		1	3.5	0.013	0.5	0.05	None (,)	27.072
IN1750-020_AE1750-025	IN1750-020	1079.74	AE1750-025	1076.6	Circular		1	3.5	0.013	0.5	1	None (,)	110
IN1750-021_IN1750-020	IN1750-021	1094.16	IN1750-020	1094	Circular		1	1	0.013	0.5	0.5	None (,)	10.957
IN1750-022_IN1750-019	IN1750-022	1083.66	IN1750-019	1082.6	Circular		1	2	0.013	0.25	0.5	None (,)	212.481
IN1750-023_IN1750-022	IN1750-023	1083.98	IN1750-022	1083.66	Circular		1	2	0.013	0.25	0.25	None (,)	62.731
IN1750-030_IN1750-029	IN1750-030	1088.53	IN1750-029	1086.4	Circular		1	1	0.013	0.05	0.5	None (,)	13.849
IN1750-032_IN1750-031	IN1750-032	1088.17	IN1750-031	1088.04	Circular		1	1.5	0.013	0.05	0.5	None (,)	19.058
IN1750-036_IN1750-004	IN1750-036	1086.6	IN1750-004	1085.31	Circular		1	1.75	0.013	0.5	0.05	None (,)	267.025

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1751-001_IN1751-006	IN1751-001	1092.6	IN1751-006	1091.58	Circular		1	1.75	0.013	0.05	0.05	None (,)	205.107
IN1751-002_IN1751-001	IN1751-002	1104.58	IN1751-001	1092.6	Circular		1	1.5	0.013	0.25	0.25	None (,)	40.597
IN1751-003_IN1751-002	IN1751-003	1105.13	IN1751-002	1104.58	Circular		1	1.25	0.013	0.5	0.25	None (,)	29.962
IN1751-004_IN1751-001	IN1751-004	1093.04	IN1751-001	1092.6	Circular		1	1.75	0.013	0.05	0.05	None (,)	90.013
IN1751-005_IN1751-004	IN1751-005	1106.04	IN1751-004	1093.04	Circular		1	1.25	0.013	0.5	0.25	None (,)	51.341
IN1751-006_IN1751-008	IN1751-006	1091.58	IN1751-008	1087.6	Circular		1	1.75	0.013	0.05	0.05	None (,)	388.183
IN1751-007_IN1751-006	IN1751-007	1102.37	IN1751-006	1091.58	Circular		1	1.25	0.013	0.5	0.25	None (,)	63.8
IN1751-008_AS1751-010	IN1751-008	1087.6	AS1751-010	1086.67	Circular		1	2	0.013	0.05	0.5	None (,)	33.35
IN1751-009_IN1751-008	IN1751-009	1096.3	IN1751-008	1087.6	Circular		1	1.25	0.013	0.5	0.5	None (,)	44.705
IN1751-012_IN1751-011	IN1751-012	1094.41	IN1751-011	1093.31	Circular		1	1	0.013	0.5	0.5	None (,)	27.539
IN1751-013_AS1751-010	IN1751-013	1092.9	AS1751-010	1086.67	Circular		1	1	0.013	0.5	0.5	None (,)	160.151
IN1751-014_IN1751-013	IN1751-014	1093.4	IN1751-013	1092.9	Circular		1	1	0.013	0.5	0.5	None (,)	43.342
IN1751-017_IN1751-016	IN1751-017	1095.53	IN1751-016	1084.8	Circular		1	1	0.013	0.5	0.25	0	37.997
IN1751-018_IN1751-016	IN1751-018	1094.62	IN1751-016	1084.8	Circular		1	1.25	0.013	0.25	0.25	None (,)	44.839
IN1751-019_IN1751-018	IN1751-019	1095.17	IN1751-018	1094.62	Circular		1	1	0.013	0.5	0.25	None (,)	26.941
IN1751-021_IN1751-020	IN1751-021	1094.73	IN1751-020	1084.2	Circular		1	1	0.013	0.5	0.5	None (,)	29.776
IN1751-026_IN1751-023	IN1751-026	1097.45	IN1751-023	1094.88	Circular		1	1.25	0.013	0.25	0.5	None (,)	64.212
IN1751-027_IN1751-026	IN1751-027	1098	IN1751-026	1097.45	Circular		1	1	0.013	0.5	0.5	None (,)	27.959
IN1751-028_IN1751-023	IN1751-028	1097.45	IN1751-023	1095.79	Circular		1	1.25	0.013	0.25	0.25	None (,)	41.428
IN1751-029_IN1751-028	IN1751-029	1098	IN1751-028	1097.45	Circular		1	1	0.013	0.5	0.25	None (,)	27.119
IN1752-005_IN1752-004	IN1752-005	1099.05	IN1752-004	1098.9	Circular		1	1	0.013	0.5	0.5	None (,)	26.776
IN1752-006_AS1752-001	IN1752-006	1100.54	AS1752-001	1099.67	Circular		1	1.25	0.013	0.5	0.5	None (,)	21.644
IN1752-007_IN1752-006	IN1752-007	1100.84	IN1752-006	1100.54	Circular		1	1	0.013	0.5	0.5	None (,)	26.766
IN1752-012_IN1752-010	IN1752-012	1095.16	IN1752-010	1094.23	Circular		1	1	0.013	0.5	0.25	None (,)	27.253
IN1752-014_IN1752-011	IN1752-014	1095.42	IN1752-011	1094.3	Circular		1	1	0.013	0.5	0.5	None (,)	27.863
IN1752-020_IN1752-018	IN1752-020	1093.6	IN1752-018	1092.79	Circular		1	1	0.013	0.5	0.5	None (,)	26.948
IN1752-021_IN1752-019	IN1752-021	1094.97	IN1752-019	1094.15	Circular		1	1	0.013	0.5	0.5	None (,)	16.278
IN1752-025_IN1752-024	IN1752-025	1101.41	IN1752-024	1100.64	Circular		1	1	0.013	0.5	0.05	None (,)	16.336
IN1752-027_IN1752-026	IN1752-027	1102.29	IN1752-026	1101.39	Circular		1	1	0.013	0.5	0.25	None (,)	27.423
IN1752-028_IN1752-024	IN1752-028	1107.51	IN1752-024	1100.64	Circular		1	1	0.013	0.25	0.05	None (,)	191.01
IN1752-030_IN1752-029	IN1752-030	1107.4	IN1752-029	1103.43	Circular		1	1.25	0.013	0.25	0.05	None (,)	115.758
IN1752-031_IN1752-030	IN1752-031	1108.04	IN1752-030	1107.4	Circular		1	1.25	0.013	0.25	0.25	None (,)	32.678
IN1752-032_IN1752-031	IN1752-032	1108.66	IN1752-031	1108.04	Circular		1	1.25	0.013	0.25	0.25	None (,)	27.086
IN1752-033_IN1752-032	IN1752-033	1109.39	IN1752-032	1108.66	Circular		1	1	0.013	0.25	0.25	None (,)	30.2
IN1752-034_IN1752-033	IN1752-034	1109.83	IN1752-033	1109.39	Circular		1	1	0.013	0.5	0.25	None (,)	27.092
IN1753-007_IN1753-006	IN1753-007	1095.12	IN1753-006	1090.5	Circular		1	1.5	0.013	0.05	0.5	0	199.985
IN1753-028_IN1753-007	IN1753-028	1099.17	IN1753-007	1095.12	Circular		1	1.5	0.013	0.5	0.05	0	112.394
IN1753-049_IN1753-040	IN1753-049	1085.59	IN1753-040	1085.59	Circular		1	1.75	0.013	0.5	0.05	None (,)	40.046
IN1753-051_IN1753-049	IN1753-051	1085.59	IN1753-049	1085.59	Circular		1	1.5	0.013	0.5	0.05	None (,)	143.692
IN1754-011_AS1754-010	IN1754-011	1100.8	AS1754-010	1097	Circular		1	1.5	0.013	0.05	0.05	0	23.682
IN1754-012_IN1754-011	IN1754-012	1107.97	IN1754-011	1100.8	Circular		1	1.5	0.013	0.05	0.05	0	115.104
IN1754-020_IN1754-012	IN1754-020	1115.87	IN1754-012	1107.97	Circular		1	1.5	0.013	0.25	0.05	0	125.535
IN1754-021_IN1754-020	IN1754-021	1117.19	IN1754-020	1115.87	Circular		1	1.5	0.013	0.5	0.25	0	44.03
IN1754-023_AS1753-054	IN1754-023	1094.8	AS1753-054	1091.84	Circular		1	2.25	0.013	0.05	0.5	0	162.768
IN1754-024_IN1754-023	IN1754-024	1095.3	IN1754-023	1094.8	Circular		1	2.25	0.013	0.05	0.05	0	71.208
IN1754-025_IN1754-024	IN1754-025	1098.7	IN1754-024	1095.3	Circular		1	2.25	0.013	0.05	0.05	0	141.19
IN1754-026_IN1754-025	IN1754-026	1103	IN1754-025	1098.7	Circular		1	2.25	0.013	0.25	0.05	0	87.145
IN1754-027_IN1754-026	IN1754-027	1104	IN1754-026	1103	Circular		1	2	0.013	0.25	0.25	0	45.026
IN1754-030_IN1654-004	IN1754-030	1107.22	IN1654-004	1105.81	Circular		1	1.5	0.013	0.25	0.25	0	39.744

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1754-032_IN1754-030	IN1754-032	1112.4	IN1754-030	1107.22	Circular		1	1.5	0.013	0.05	0.25	0	116.362
IN1754-033	IN1754-035	1121	IN1654-007	1120.7	Circular		1	1.5	0.013	0.5	0.5	0	29.143
IN1847-001_IN1848-002	IN1847-001	1081.97	IN1848-002	1081.8	Circular		1	1	0.013	0.5	0.5	0	28.972
IN1847-004_IN1847-003	IN1847-004	1069.5	IN1847-003	1069	Circular		1	1	0.013	0.5	0.25	0	27.858
IN1847-007_AS1847-009	IN1847-007	1034.16	AS1847-009	1031.14	Circular		1	1	0.013	0.5	0.05	0	37.977
IN1847-008_AS1847-009	IN1847-008	1032.01	AS1847-009	1031.14	Circular		1	1	0.013	0.5	0.5	0	27.085
IN1847-015_1847-016	IN1847-015	1062.59	IN1847-016	1062.44	Circular		1	1.25	0.013	0.5	0.5	0	26.284
IN1847-023_AS1947-009	IN1847-023	1050.89	AS1947-009	1043.84	Circular		1	1.5	0.013	0.5	0.5	0	167.513
IN1847-025_AS1847-021	IN1847-025	1062.91	AS1847-021	1061.15	Circular		1	1.75	0.013	0.05	0.25	0	114.08
IN1848-001_AS1848-003	IN1848-001	1079.25	AS1848-003	1078.32	Circular		1	1	0.013	0.5	0.05	0	33.406
IN1848-002_AS1848-003	IN1848-002	1081.8	AS1848-003	1078.32	Circular		1	1	0.013	0.5	0.5	0	38.782
IN1848-004_IN1848-005	IN1848-004	1060.6	IN1848-005	1053.6	Circular		1	0.833	0.011	0.5	0.5	0	203.011
IN1848-005_IN1848-006	IN1848-005	1053.6	IN1848-006	1032.96	Circular		1	0.833	0.011	0.5	0.05	0	139.279
IN1848-006_IN1848-007	IN1848-006	1032.96	IN1848-007	1032.5	Circular		1	1	0.013	0.05	0.05	0	94.416
IN1848-008_TE1848-012	IN1848-008	1029.82	TE1848-012	1029.19	Circular		1	1	0.013	0.5	0.5	0	30.1
IN1848-010_IN1848-007	IN1848-010	1037.1	IN1848-007	1032.5	Circular		1	0.833	0.011	0.5	0.5	0	150.565
IN1848-014_IN1848-015	IN1848-014	1061.79	IN1848-015	1060.93	Circular		1	1	0.013	0.5	0.5	0	29.528
IN1848-015_AS1848-018	IN1848-015	1060.93	AS1848-018	1057.13	Circular		1	1.25	0.013	0.05	0.5	0	36.709
IN1848-016_IN1848-015	IN1848-016	1063.04	IN1848-015	1060.93	Circular		1	1	0.013	0.5	0.05	0	17.746
IN1848-020_IN1848-019	IN1848-020	1058.86	IN1848-019	1057.87	Circular		1	1	0.013	0.5	0.5	0	28.458
IN1848-022_AS1848-027	IN1848-022	1077.72	AS1848-027	1075.84	Circular		1	1	0.013	0.5	0.5	None (,)	25.187
IN1848-023_AS1848-027	IN1848-023	1077.91	AS1848-027	1075.84	Circular		1	1	0.013	0.5	0.5	None (,)	49.276
IN1848-024_IN1848-026	IN1848-024	1077.66	IN1848-026	1075.69	Circular		1	1	0.013	0.5	0.5	None (,)	28.931
IN1848-025_IN1848-026	IN1848-025	1077.79	IN1848-026	1075.69	Circular		1	1	0.013	0.5	0.5	None (,)	30.724
IN1848-026_AE1748-001	IN1848-026	1075.69	AE1748-001	1071.6	Circular		1	2	0.013	0.05	1	0	219
IN1848-028_AS1848-027	IN1848-028	1076.45	AS1848-027	1075.84	Circular		1	1.5	0.013	0.25	0.05	None (,)	19.529
IN1848-029_IN1848-028	IN1848-029	1077.16	IN1848-028	1076.45	Circular		1	1	0.013	0.5	0.25	None (,)	11.843
IN1848-030_IN1848-028	IN1848-030	1076.61	IN1848-028	1076.45	Circular		1	1.5	0.013	0.5	0.5	None (,)	28.074
IN1848-031_IN1848-030	IN1848-031	1077.16	IN1848-030	1076.61	Circular		1	1	0.013	0.5	0.5	None (,)	9.938
IN1848-032_IN1848-033	IN1848-032	1076.6	IN1848-033	1075.6	Circular		1	1	0.013	0.5	0.05	None (,)	10.942
IN1848-033_AS1849-001	IN1848-033	1075.6	AS1849-001	1069.73	Circular		1	1.5	0.013	0.05	0.5	None (,)	24.336
IN1849-002_AS1849-001	IN1849-002	1075.2	AS1849-001	1069.73	Circular		1	1.5	0.013	0.05	0.5	None (,)	49.865
IN1849-003_IN1849-002	IN1849-003	1076.2	IN1849-002	1075.2	Circular		1	1	0.013	0.5	0.05	None (,)	8.372
IN1849-004_IN1849-005	IN1849-004	1074.28	IN1849-005	1072.11	Circular		1	1	0.013	0.5	0.5	None (,)	18.326
IN1849-006_IN1849-005	IN1849-006	1072.79	IN1849-005	1072.11	Circular		1	1.5	0.013	0.05	0.5	None (,)	24.974
IN1849-007_IN1849-006	IN1849-007	1073.94	IN1849-006	1072.79	Circular		1	1	0.013	0.5	0.05	None (,)	11.39
IN1849-010_AS1849-009	IN1849-010	1074.09	AS1849-009	1073.11	Circular		1	2	0.013	0.25	0.05	None (,)	195.004
IN1849-012_IN1949-016	IN1849-012	1077.84	IN1949-016	1077.3	Circular		1	1	0.013	0.5	0.5	None (,)	10.573
IN1849-029_AS1849-026	IN1849-029	1077.64	AS1849-026	1074.65	Circular		1	1	0.013	0.5	0.05	None (,)	73.952
IN1849-031_AS1849-023	IN1849-031	1072.6	AS1849-023	1072.48	Circular		1	2	0.013	0.05	0.5	None (,)	48.302
IN1849-032_IN1849-031	IN1849-032	1074.34	IN1849-031	1072.6	Circular		1	1	0.013	0.5	0.05	None (,)	12.079
IN1849-033_IN1849-031	IN1849-033	1073.8	IN1849-031	1072.6	Circular		1	1.5	0.013	0.5	0.5	None (,)	34.187
IN1849-034_IN1849-033	IN1849-034	1074.34	IN1849-033	1073.8	Circular		1	1	0.013	0.5	0.5	None (,)	9.06
IN1849-035_AS1849-026	IN1849-035	1074.95	AS1849-026	1074.65	Circular		1	2	0.013	0.05	0.5	None (,)	48.029
IN1849-036_IN1849-035	IN1849-036	1076.8	IN1849-035	1074.95	Circular		1	1	0.013	0.5	0.05	None (,)	12.077
IN1849-037_IN1849-035	IN1849-037	1076.24	IN1849-035	1074.95	Circular		1	1.5	0.013	0.5	0.5	None (,)	30.717
IN1849-038_IN1849-037	IN1849-038	1076.8	IN1849-037	1076.24	Circular		1	1	0.013	0.5	0.5	None (,)	10.248
IN1849-049_AS1849-047	IN1849-049	1075.33	AS1849-047	1071.93	Circular		1	1	0.013	0.5	0.5	None (,)	16.075
IN1849-050_AS1849-047	IN1849-050	1072.21	AS1849-047	1071.93	Circular		1	1.5	0.013	0.05	0.5	None (,)	21.196

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1849-051_IN1849-050	IN1849-051	1075.25	IN1849-050	1072.21	Circular		1	1	0.013	0.5	0.5	None (,)	55.424
IN1849-052_IN1849-051	IN1849-052	1075.5	IN1849-051	1075.25	Circular		1	1	0.013	0.5	0.5	None (,)	10.469
IN1849-056_AS1849-053	IN1849-056	1075.14	AS1849-053	1072.6	Circular		1	1	0.013	0.5	0.5	None (,)	8.158
IN1849-057_AS1849-053	IN1849-057	1073.88	AS1849-053	1072.6	Circular		1	1	0.013	0.5	0.25	None (,)	23.23
IN1849-060_AS1849-059	IN1849-060	1075.89	AS1849-059	1074.75	Circular		1	1	0.013	0.5	0.5	None (,)	219.407
IN1850-003_IN1849-018	IN1850-003	1073.62	IN1849-018	1071.34	Circular		1	3	0.013	0.5	0.05	None (,)	55.385
IN1850-007_IN1849-050	IN1850-007	1073.87	IN1849-050	1072.21	Circular		1	1	0.013	0.5	0.05	None (,)	22.288
IN1850-008_IN1849-056	IN1850-056	1075.39	IN1849-056	1075.14	Circular		1	1	0.013	0.5	0.05	None (,)	15.167
IN1850-009_AS1849-058	IN1850-009	1075.19	AS1849-058	1073.28	Circular		1	1	0.013	0.5	0.5	None (,)	45.249
IN1850-010_AS1849-059	IN1850-010	1075.7	AS1849-059	1074.75	Circular		1	1.5	0.013	0.5	0.05	None (,)	32.932
IN1850-011_AS1849-023	IN1850-011	1072.73	AS1849-023	1072.48	Circular		1	1.5	0.013	0.5	0.5	None (,)	50.895
IN1947-008_IN1947-012	IN1947-008	1026.4	IN1947-012	1017.41	Circular		1	3.5	0.013	0.05	0.25	0	265.642
IN1947-012_IN1947-013	IN1947-012	1017.41	IN1947-013	1016.55	Special	Horizontal Ellipse	1	4.41	0.013	0.25	0.05	0	172.053
IN1947-013_AS1947-017	IN1947-013	1016.55	AS1947-017	1016.41	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	35.591
IN1947-014_IN1947-013	IN1947-014	1018.05	IN1947-013	1016.55	Circular		1	1.5	0.013	0.5	0.5	0	24.906
IN1947-016_AS1947-017	IN1947-016	1017.86	AS1947-017	1016.41	Circular		1	1.75	0.013	0.5	0.5	0	58.074
IN1947-027_AS1947-029	IN1947-027	1054.01	AS1947-029	1047.68	Circular		1	1.5	0.013	0.5	0.05	0	293.462
IN1948-006_IN1948-005	IN1948-006	1014.16	IN1948-005	1012.1	Circular		1	1.5	0.013	0.5	0.5	0	10.706
IN1948-009_IN1948-010	IN1948-009	1019.12	IN1948-010	1018.65	Circular		1	1.5	0.013	0.5	0.25	0	28.823
IN1948-010_AS1948-004	IN1948-010	1018.65	AS1948-004	1016.45	Circular		1	1.5	0.013	0.25	0.25	0	43.405
IN1948-014_AS1948-013	IN1948-014	1038	AS1948-013	1037.1	Circular		1	1	0.013	0.5	0.5	0	10.972
IN1948-015_AS1948-013	IN1948-015	1038	AS1948-013	1037.1	Circular		1	1	0.013	0.5	0.5	0	20.46
IN1948-016_AS1948-017	IN1948-016	1023.78	AS1948-017	1016.5	Circular		1	2	0.013	0.25	0.25	0	186.378
IN1948-018_IN1948-019	IN1948-018	1018.63	IN1948-019	1017.69	Circular		1	1	0.013	0.5	0.05	0	15.38
IN1948-021_AS1948-017	IN1948-021	1018.25	AS1948-017	1016.5	Circular		1	1	0.013	0.5	0.5	0	22.2
IN1949-005_AS1949-007	IN1949-005	1032.63	AS1949-007	1032.43	Circular		1	1.5	0.013	0.5	0.5	0	25.542
IN1949-006_IN1949-005	IN1949-006	1032.94	IN1949-005	1032.63	Circular		1	1.5	0.013	0.5	0.5	0	26.527
IN1949-011_IN1949-010	IN1949-011	1048.26	IN1949-010	1038.47	Circular		1	1.5	0.013	0.25	0.25	0	124.331
IN1949-016_AS1949-015	IN1949-016	1077.3	AS1949-015	1075.58	Circular		1	1.5	0.013	0.5	0.5	None (,)	6.983
IN1949-017_IN1949-018	IN1949-017	1077.84	IN1949-018	1077.3	Circular		1	1	0.013	0.5	0.5	None (,)	11.038
IN1949-018_AS1949-015	IN1949-018	1077.3	AS1949-015	1075.58	Circular		1	1.5	0.013	0.5	0.5	None (,)	20.504
IN1949-021_AS1949-019	IN1949-021	1076.1	AS1949-019	1075.8	Circular		1	2	0.013	0.05	0.5	None (,)	229.602
IN1949-022_IN1949-021	IN1949-022	1076.23	IN1949-021	1076.1	Circular		1	2	0.013	0.05	0.05	None (,)	72.989
IN1949-031_IN1949-022	IN1949-031	1076.28	IN1949-022	1076.23	Circular		1	1.5	0.013	0.25	0.05	None (,)	11.22
IN1949-034_AS1949-033	IN1949-034	1080.13	AS1949-033	1079.42	Circular		1	1	0.013	0.5	0.5	None (,)	20.278
IN1949-036_AS1949-035	IN1949-036	1052.46	AS1949-035	1052.17	Circular		1	1.5	0.013	0.5	0.5	0	35.398
IN1949-037_AS1949-035	IN1949-037	1052.75	AS1949-035	1052.17	Circular		1	1.75	0.013	0.25	0.25	0	51.213
IN1949-039_IN1949-037	IN1949-039	1067.6	IN1949-037	1052.75	Circular		1	1.5	0.013	0.05	0.25	0	317.218
IN1950-001_AS1949-033	IN1950-001	1082.41	AS1949-033	1079.42	Circular		1	1	0.013	0.5	0.25	None (,)	174.469
IN1950-002_AS1949-032	IN1950-002	1077.9	AS1949-032	1077.03	Circular		1	1	0.013	0.5	0.5	None (,)	30.363
IN1950-003_AS1949-033	IN1950-003	1080.13	AS1949-033	1079.42	Circular		1	1	0.013	0.5	0.5	None (,)	31.821
IN1950-004_IN1950-001	IN1950-004	1082.57	IN1950-001	1082.41	Circular		1	1	0.013	0.5	0.5	None (,)	11.751
IN1950-010_AS1949-041	IN1950-010	1074.29	AS1949-041	1072.29	Circular		1	1.5	0.013	0.5	0.05	0	401.101
IN1955-005_IN2055-011	IN1955-005	1100.26	IN2055-011	1099.35	Circular		1	2	0.013	0.5	0.05	None (,)	122.263
IN1955-007_IN1955-005	IN1955-007	1101.2	IN1955-005	1100.26	Circular		1	1.5	0.013	0.5	0.05	None (,)	85.601
IN1955-009_IN1955-007	IN1955-009	1102.1	IN1955-007	1101.2	Circular		1	1.5	0.013	0.5	0.05	None (,)	182.062
IN1955-010_IN1955-009	IN1955-010	1102.24	IN1955-009	1102.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	25.438
IN1956-003_IN2056-006	IN1956-003	1100.41	IN2056-006	1097.63	Circular		1	2	0.013	0.5	0.25	0	74.758
IN1956-004_IN1956-003	IN1956-004	1103.39	IN1956-003	1100.41	Circular		1	2	0.013	0.05	0.5	0	149.283

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN1956-005_IN1956-004	IN1956-005	1105.64	IN1956-004	1103.39	Circular		1	2	0.013	0.05	0.05	0	90.083
IN1956-007_IN1956-005	IN1956-007	1125.64	IN1956-005	1105.64	Circular		1	2	0.013	0.05	0.05	0	400.8
IN1956-011_IN2056-012	IN1956-011	1098.7	IN2056-012	1098.23	Circular		1	1.5	0.013	0.05	0.05	0	50.02
IN1956-012_IN1956-011	IN1956-012	1099.24	IN1956-011	1098.7	Circular		1	1.5	0.013	0.25	0.05	0	31.77
IN1956-013_IN1956-012	IN1956-013	1099.53	IN1956-012	1099.24	Circular		1	1.5	0.013	0.5	0.25	0	60.809
IN1956-016_IN1955-010	IN1956-016	1102.37	IN1955-010	1102.24	Circular		1	1.5	0.013	0.5	0.05	None (,)	29.326
IN1956-017_IN1956-016	IN1956-017	1102.51	IN1956-016	1102.37	Circular		1	1.5	0.013	0.5	0.05	None (,)	25.008
IN1957-001_IN1956-007	IN1957-001	1130.74	IN1956-007	1125.64	Circular		1	2	0.013	0.05	0.05	0	101.103
IN1957-002_IN1957-001	IN1957-002	1142.58	IN1957-001	1130.74	Circular		1	2	0.013	0.05	0.05	0	251.079
IN1957-006_IN1957-002	IN1957-006	1155.58	IN1957-002	1142.58	Circular		1	1.5	0.013	0.05	0.05	0	250.004
IN1957-008_IN1957-006	IN1957-008	1160.58	IN1957-006	1155.58	Circular		1	1.5	0.013	0.05	0.05	0	98.519
IN1958-001_IN1957-008	IN1958-001	1172.52	IN1957-008	1160.58	Circular		1	1.5	0.013	0.5	0.05	0	299.292
IN2045-004_IN2045-005	IN2045-004	974.71	IN2045-005	974.03	Circular		1	1.5	0.013	0.05	0.5	None (,)	41.137
IN2047-005_AS2047-006	IN2047-005	993.2	AS2047-006	992.16	Circular		1	1.5	0.013	0.5	0.5	0	11.179
IN2047-009_AS2047-007	IN2047-009	984.86	AS2047-007	983.36	Circular		1	1.5	0.013	0.25	0.5	0	11.524
IN2047-010_AS2047-008	IN2047-010	984.6	AS2047-008	984.53	Circular		1	1.5	0.013	0.25	0.25	0	16.501
IN2047-019_IN2047-009	IN2047-019	985.05	IN2047-009	984.86	Circular		1	1.5	0.013	0.5	0.25	0	42.174
IN2047-022.1	IN2047-022	983.5	AS2047-011	982.4	Circular		1	2	0.013	0.5	0.05	0	10.57
IN2048-007_AS2048-005	IN2048-007	991.2	AS2048-005	989.47	Circular		1	1.5	0.013	0.5	0.5	0	30.628
IN2048-008_AS2048-010	IN2048-008	992.78	AS2048-010	990.43	Circular		1	1.5	0.013	0.5	0.5	0	19.831
IN2049-003_AS2049-002	IN2049-003	1006.6	AS2049-002	1005.7	Circular		1	2	0.013	0.5	0.5	0	24.965
IN2050-009_MI2050-008	IN2050-009	1067.19	MI2050-008	1067.07	Circular		1	1.5	0.013	0.5	0.05	0	6.6
IN2050-016_AS2050-015	IN2050-016	1027.92	AS2050-015	1027.72	Circular		1	2	0.013	0.05	0.5	0	6.449
IN2051-002_IN2051-001	IN2051-002	1056.7	IN2051-001	1056.46	Circular		1	1.5	0.013	0.5	0.5	0	38.154
IN2051-010_IN2051-008	IN2051-010	1055.29	IN2051-008	1053.55	Circular		1	1.5	0.013	0.5	0.5	0	38.923
IN2051-016.1	IN2051-016	1056.3	AS2051-005	1055.6	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	111.244
IN2051-017_IN2051-016	IN2051-017	1057.3	IN2051-016	1056.3	Circular		1	1.5	0.013	0.5	0.5	0	36.579
IN2051-024_AS2051-023	IN2051-024	1062.19	AS2051-023	1057.34	Circular		1	1.5	0.013	0.5	0.05	0	265.248
IN2051-026.1	IN2051-026	1057.47	AS2051-023	1057.34	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	25.045
IN2051-039_AS2051-038	IN2051-039	1062.56	AS2051-038	1058.28	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.25	0	156.705
IN2051-042_AS2051-041	IN2051-042	1068.05	AS2051-041	1066.85	Circular		1	2.25	0.013	0.5	0.5	0	50.968
IN2051-047_AS2051-041	IN2051-047	1068.33	AS2051-041	1066.85	Circular		1	2.25	0.013	0.5	0.5	0	235.4
IN2051-048_IN2051-047	IN2051-048	1068.69	IN2051-047	1068.33	Circular		1	2.25	0.013	0.05	0.5	0	66.292
IN2051-056_IN2051-055	IN2051-056	1060.86	IN2051-055	1057.79	Circular		1	2	0.013	0.25	0.05	0	117.098
IN2051-060_IN2051-056	IN2051-060	1063.66	IN2051-056	1060.86	Circular		1	1.75	0.013	0.25	0.25	0	69.386
IN2051-066_AS2051-051	IN2051-066	1069.3	PV3093	1069.189	Circular		1	2.25	0.013	0.05	0.05	0	21.57
IN2051-066_AS2051-051.1	PV3093	1069.19	AS2051-051	1069.1	Circular		1	2.25	0.013	0.05	0.05	0	17.245
IN2052-024_AS2052-022	IN2052-024	1062.17	AS2052-022	1061.52	Circular		1	1.5	0.013	0.25	0.5	0	23.029
IN2052-029_IN2052-026	IN2052-029	1060.33	IN2052-026	1059.33	Circular		1	1.75	0.013	0.25	0.25	0	48.17
IN2052-031_IN2052-029	IN2052-031	1060.92	IN2052-029	1060.33	Circular		1	1.5	0.013	0.25	0.25	0	43.83
IN2053-004_IN2052-031	IN2053-004	1064.88	IN2052-031	1060.92	Circular		1	1.5	0.013	0.5	0.25	0	170.007
IN2055-007_IN2055-009	IN2055-007	1095.5	IN2055-009	1095.2	Circular		1	2	0.013	0.5	0.05	None (,)	18.752
IN2055-009_IN2056-014	IN2055-009	1095.2	IN2056-014	1094.66	Circular		1	2	0.013	0.5	0.05	None (,)	21.296
IN2055-010_IN2055-007	IN2055-010	1098.82	IN2055-007	1095.5	Circular		1	2	0.013	0.5	0.05	None (,)	221.203
IN2055-011_IN2055-010	IN2055-011	1099.35	IN2055-010	1098.82	Circular		1	2	0.013	0.5	0.05	None (,)	54.204
IN2056-006_AS2056-007	IN2056-006	1097.63	AS2056-007	1095.84	Circular		1	2	0.013	0.25	0.5	0	37.207
IN2056-009_AS2056-007	IN2056-009	1097.41	AS2056-007	1095.84	Circular		1	2	0.013	0.5	0.5	0	89.832
IN2056-012_IN2056-009	IN2056-012	1098.23	IN2056-009	1097.41	Circular		1	1.5	0.013	0.05	0.5	0	27.029
IN2056-014_IN2056-015	IN2056-014	1094.66	IN2056-015	1094.14	Circular		1	2	0.013	0.5	0.05	None (,)	30.597

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN2056-015_IN2056-016	IN2056-015	1094.14	IN2056-016	1093.48	Circular		1	2	0.013	0.5	0.05	None (,)	28.994
IN2056-016_AE2056-017	IN2056-016	1093.48	AE2056-017	1092	Circular		1	2	0.013	0.25	1	0	77.361
IN2056-021_IN2056-043	IN2056-021	1090.73	IN2056-043	1084.01	Circular		1	2	0.013	0.5	0.05	0	290.539
IN2056-043_AS2056-044	IN2056-043	1084.01	AS2056-044	1078.3	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	186.001
IN2145-004_AS2145-001	IN2145-004	966.25	AS2145-001	965.1	Circular		1	1.5	0.013	0.5	0.5	None (,)	11.63
IN2145-005_AS2145-001	IN2145-005	966.25	AS2145-001	965.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	27.314
IN2145-009_TP2145-006	IN2145-009	968.35	DemingDS3	961.82	Circular		1	1.75	0.013	0.5	0.4	None (,)	182.998
IN2145-010_IN2145-009	IN2145-010	970.05	IN2145-009	968.35	Circular		1	1.5	0.013	0.25	0.25	None (,)	258.921
IN2145-012_AS2145-011	IN2145-012	971.85	AS2145-011	971.23	Circular		1	1.5	0.013	0.25	0.25	None (,)	73.706
IN2145-013_IN2145-012	IN2145-013	972.2	IN2145-012	971.85	Circular		1	1.5	0.013	0.5	0.25	None (,)	39.208
IN2146-001_IN2146-002	IN2146-001	975.04	IN2146-002	974.65	Circular		1	1.5	0.013	0.5	0.25	None (,)	57.404
IN2146-002_IN2246-002	IN2146-002	974.65	IN2246-002	972.96	Circular		1	1.75	0.013	0.25	0.05	None (,)	234.241
IN2147-004_AS2147-006	IN2147-004	971.9	AS2147-006	969.77	Circular		1	1.5	0.013	0.5	0.5	0	28.036
IN2147-008_AS2147-007	IN2147-008	970.22	AS2147-007	968.62	Circular		1	1.75	0.013	0.25	0.25	0	14.984
IN2147-011_IN2147-008	IN2147-011	970.35	IN2147-008	970.22	Circular		1	1.75	0.013	0.5	0.05	0	40.431
IN2148-002_AS2148-004	IN2148-002	973.8	AS2148-004	972.3	Circular		1	1.75	0.013	0.5	0.25	0	33.416
IN2148-005_AS2148-007	IN2148-005	977.36	AS2148-007	976.6	Circular		1	1.75	0.013	0.5	0.05	None (,)	3.933
IN2148-006_AS2148-007	IN2148-006	977.34	AS2148-007	976.6	Circular		1	1.75	0.013	0.5	0.5	0	37.759
IN2148-008_IN2148-006	IN2148-008	979.7	IN2148-006	977.34	Circular		1	1.5	0.013	0.5	0.5	0	108.784
IN2148-011_AS2148-010	IN2148-011	993.9	AS2148-010	992.63	Circular		1	1.5	0.013	0.5	0.5	0	16.814
IN2148-012_AS2148-010	IN2148-012	993.94	AS2148-010	992.63	Circular		1	1.5	0.013	0.5	0.5	0	25.81
IN2149-005_AS2149-001	IN2149-005	999.4	AS2149-001	998.83	Circular		1	1.5	0.013	0.5	0.5	0	21.443
IN2150-007_IN2150-008	IN2150-007	1016.7	IN2150-008	1015.51	Circular		1	1.5	0.013	0.5	0.25	0	68.007
IN2150-008_IN2150-009	IN2150-008	1015.51	IN2150-009	1013.42	Circular		1	1.75	0.013	0.25	0.5	0	69.24
IN2150-009_AS2150-032	IN2150-009	1013.42	AS2150-032	1008.36	Circular		1	3.5	0.013	0.05	0.05	0	285.946
IN2150-019_IN2150-044	IN2150-019	1007.1	IN2150-044	998.04	Rectangular		1	3	0.013	0.5	0.5	0	105.18
IN2150-044_IN2150-045	IN2150-044	998.04	IN2150-045	997.75	Rectangular		1	3	0.013	0.05	0.05	0	32.595
IN2150-045_TP2250-010	IN2150-045	997.75	TP2250-010	997.35	Rectangular		1	3	0.013	0.05	0.05	0	54.043
IN2151-001_AS2151-003	IN2151-001	1053.1	AS2151-003	1049.6	Circular		1	1.5	0.013	0.5	0.5	0	10.675
IN2151-002_AS2151-003	IN2151-002	1053.1	AS2151-003	1049.6	Circular		1	1.5	0.013	0.5	0.5	0	19.398
IN2151-005_AS2151-004	IN2151-005	1053.51	AS2151-004	1049.15	Circular		1	1.5	0.013	0.5	0.5	0	17.883
IN2152-002_AS2152-005	IN2152-002	1055.84	AS2152-005	1055.11	Circular		1	1.5	0.013	0.5	0.5	0	11.078
IN2152-003_AS2152-005	IN2152-003	1056.04	AS2152-005	1055.11	Circular		1	1.5	0.013	0.5	0.5	0	28.896
IN2152-013_AS2152-010	IN2152-013	1055.6	AS2152-010	1053.02	Circular		1	1.5	0.013	0.5	0.5	0	8.538
IN2152-014_AS2152-010	IN2152-014	1055.6	AS2152-010	1053.02	Circular		1	1.5	0.013	0.5	0.5	0	19.553
IN2152-016_AS2152-015	IN2152-016	1056.04	AS2152-015	1052.31	Circular		1	1.5	0.013	0.5	0.5	0	51.49
IN2152-018_AS2152-022	IN2152-018	1054.77	AS2152-022	1050.68	Circular		1	1.5	0.013	0.5	0.5	0	44.443
IN2155-013_IN2255-042	IN2155-013	1049.63	IN2255-042	1047.56	Circular		1	1.75	0.013	0.5	0.05	0	200.187
IN2155-015_AS2255-054	IN2155-015	1049.05	AS2255-054	1045.38	Circular		1	1.5	0.013	0.5	0.25	0	41.291
IN2156-006_AE2156-045	IN2156-006	1051.07	AE2156-045	1049.93	Circular		1	2	0.013	0.5	1	0	153
IN2156-011_AE2156-046	IN2156-011	1050.33	AE2156-046	1049.86	Circular		1	2	0.013	0.5	1	0	43
IN2156-012_2156-011	IN2156-012	1051.67	IN2156-011	1050.33	Circular		1	1.25	0.013	0.5	0.05	0	48.724
IN2156-060_AS2256-055	IN2156-061	1047.77	AS2256-055	1047.49	Special	Horizontal Ellipse	1	5	0.013	0.05	0.05	0	99.906
IN2156-066_IN2156-068	IN2156-066	1069.76	IN2156-068	1069.39	Circular		1	1.5	0.013	0.5	0.05	0	76.94
IN2156-068_IN2156-069	IN2156-068	1069.39	IN2156-069	1069.27	Circular		1	1.5	0.013	0.05	0.05	0	28.944
IN2156-069_IN2156-070	IN2156-069	1069.27	IN2156-070	1068.29	Circular		1	1.5	0.013	0.05	0.05	0	47.068
IN2156-070_IN2156-072	IN2156-070	1068.29	IN2156-072	1064.54	Circular		1	2	0.013	0.05	0.5	0	256.426
IN2156-072_AE2156-074	IN2156-072	1064.54	AE2156-074	1063.54	Circular		1	2	0.013	0.5	0.5	0	50.002
IN2156-076_IN2156-010	IN2156-076	1056.43	IN2156-011	1050.33	Circular		1	1.25	0.013	0.5	0.5	0	166.652

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN2157-013_IN2156-072	IN2157-013	1068.09	IN2156-072	1064.54	Circular		1	2	0.013	0.05	0.5	0	245.181
IN2157-015_IN2157-013	IN2157-015	1071	IN2157-013	1068.09	Circular		1	1.5	0.013	0.5	0.05	0	240.399
IN2158-017_IN2158-014	IN2158-017	1076.66	IN2158-014	1070	Circular		1	2	0.013	0.05	0.05	0	198.093
IN2159-002_IN2158-017	IN2159-002	1084.16	IN2158-017	1076.66	Circular		1	2	0.013	0.05	0.05	0	197.112
IN2159-003_IN2159-002	IN2159-003	1085.37	IN2159-002	1084.16	Circular		1	1.5	0.013	0.05	0.05	0	10.515
IN2159-009_IN2159-003	IN2159-009	1098.99	IN2159-003	1085.37	Circular		1	1.5	0.013	0.5	0.05	0	336.04
IN2245-006_AS2245-005	IN2245-006	959.78	AS2245-005	958.4	Circular		1	1.5	0.013	0.5	0.5	None (,)	9.597
IN2245-008_AS2245-012	IN2245-008	967.81	AS2245-012	965.9	Circular		1	1.5	0.013	0.5	0.25	None (,)	19.094
IN2245-010_AS2245-012	IN2245-010	967.81	AS2245-012	965.9	Circular		1	1.5	0.013	0.5	0.25	None (,)	43.714
IN2246-001_IN2246-002	IN2246-001	973.46	IN2246-002	972.96	Circular		1	1.5	0.013	0.5	0.5	None (,)	39.475
IN2247-008_AS2247-006	IN2247-008	967.46	AS2247-006	965.34	Circular		1	1.5	0.013	0.5	0.25	None (,)	34.807
IN2247-010_TP2247-019	IN2247-010	966	OSTrSouthPond	965.778	Circular		1	2	0.013	0.25	0.5	0	22.238
IN2247-021_AS2247-001	IN2247-021	968.4	AS2247-001	966.22	Circular		1	1.5	0.013	0.5	0.05	None (,)	24.452
IN2247-030_AS2247-006	IN2247-030	967.6	AS2247-006	965.34	Circular		1	1.5	0.013	0.5	0.25	None (,)	7.153
IN2248-002_IN2248-001	IN2248-002	971.8	IN2248-001	970.25	Circular		1	1.5	0.013	0.5	0.5	None (,)	38.11
IN2248-005_AS2248-004	IN2248-005	969.27	AS2248-004	967.52	Circular		1	1.5	0.013	0.5	0.5	None (,)	31.985
IN2249-001_IN2249-003	IN2249-001	973.55	IN2249-003	972.7	Circular		1	1.5	0.013	0.5	0.5	None (,)	12.374
IN2249-002_IN2249-003	IN2249-002	973.47	IN2249-003	972.7	Circular		1	1.5	0.013	0.5	0.5	None (,)	26.535
IN2249-024_IN2249-030	IN2249-024	986.71	IN2249-030	986.55	Circular		1	3	0.013	0.5	0.05	None (,)	40.09
IN2249-026_IN2249-027	IN2249-026	987.16	IN2249-027	986.32	Circular		1	1.5	0.013	0.5	0.05	None (,)	37.384
IN2249-027_IN2249-028	IN2249-027	986.32	IN2249-028	985.76	Circular		1	2	0.013	0.25	0.25	None (,)	68.908
IN2249-028_AE2249-029	IN2249-028	985.76	EMPB_GW_OSR2	985.3	Circular		1	2	0.013	0.25	0.5	0	81.246
IN2249-030_AE2249-032	IN2249-030	986.55	EMPB_GW_OSR2	985.4	Circular		1	3	0.013	0.5	0.5	0	32.935
IN2250-012_AS2250-016	IN2250-012	999.42	AS2250-016	997.91	Circular		1	1.5	0.013	0.5	0.5	0	12.186
IN2250-013_AS2250-016	IN2250-013	999.02	AS2250-016	997.91	Circular		1	1.5	0.013	0.05	0.5	0	15.7
IN2250-014_IN2250-013	IN2250-014	999.2	IN2250-013	999.02	Circular		1	1.5	0.013	0.05	0.05	0	22.176
IN2250-015_IN2250-014	IN2250-015	999.42	IN2250-014	999.2	Circular		1	1.5	0.013	0.5	0.05	0	26.722
IN2250-022_IN2250-064	IN2250-022	1011.09	IN2250-064	1009.41	Circular		1	2	0.013	0.05	0.05	0	152
IN2250-026_IN2250-030	IN2250-026	1007.6	IN2250-030	1000.82	Circular		1	2	0.013	0.05	0.25	0	217.246
IN2250-030_AS2250-016	IN2250-030	1000.82	AS2250-016	997.91	Circular		1	2.5	0.013	0.25	0.05	0	142.61
IN2250-044.1	IN2250-044	991.67	AS2250-021	990.21	Rectangular		1	4	0.013	0.05	0.05	0	95.606
IN2250-051_IN2249-024	IN2250-051	987.08	IN2249-024	986.71	Circular		1	3	0.013	0.5	0.05	None (,)	72.513
IN2250-056_IN2249-026	IN2250-056	987.9	IN2249-026	987.16	Circular		1	1.5	0.013	0.5	0.05	None (,)	15.463
IN2250-057_IN2249-024	IN2250-057	988.02	IN2249-024	986.71	Circular		1	1.5	0.013	0.5	0.05	None (,)	57.178
IN2250-061_IN2250-022	IN2250-061	1011.59	IN2250-022	1011.09	Circular		1	1.75	0.013	0.05	0.05	0	17.661
IN2250-062_IN2250-061	IN2250-062	1012.23	IN2250-061	1011.59	Circular		1	1.75	0.013	0.05	0.05	0	55.645
IN2250-063_IN2250-062	IN2250-063	1013.65	IN2250-062	1012.23	Circular		1	1.75	0.013	0.05	0.05	0	116.437
IN2250-064_IN2250-026	IN2250-064	1009.41	IN2250-026	1007.6	Circular		1	1.75	0.013	0.05	0.05	0	172.462
IN2251-001_IN2251-002	IN2251-001	1028.15	IN2251-002	1027.33	Circular		1	1.5	0.013	0.5	0.25	0	35.171
IN2251-002_IN2251-003	IN2251-002	1027.33	IN2251-003	1027	Circular		1	1.5	0.013	0.25	0.5	0	16.153
IN2251-003_AS2251-008	IN2251-003	1027	AS2251-008	1024.72	Circular		1	1.5	0.013	0.5	0.25	0	34.611
IN2251-006_AS2251-007	IN2251-006	1026.29	AS2251-007	1025	Circular		1	1.5	0.013	0.5	0.05	None (,)	4.274
IN2251-011_AS2251-010	IN2251-011	1029.6	AS2251-010	1028.1	Circular		1	1.5	0.013	0.5	0.5	0	63.023
IN2251-012_AS2251-010	IN2251-012	1029.6	AS2251-010	1028.1	Circular		1	1.5	0.013	0.5	0.5	0	11.325
IN2251-013_AS2251-031	IN2251-013	1016.72	AS2251-031	1013.75	Circular		1	3	0.013	0.05	0.25	0	100.837
IN2251-017_AS2251-018	IN2251-017	1039.23	AS2251-018	1038.5	Circular		1	1.5	0.013	0.5	0.5	0	37.646
IN2251-024_IN2251-013	IN2251-024	1018.48	IN2251-013	1016.72	Circular		1	3	0.013	0.5	0.05	0	64.279
IN2251-026_IN2251-027	IN2251-026	1018.51	IN2251-027	1014.45	Circular		1	1.5	0.013	0.5	0.05	0	194.069
IN2251-027_IN2250-063	IN2251-027	1014.45	IN2250-063	1013.65	Circular		1	1.75	0.013	0.05	0.05	0	59.969

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN2252-002_AS2252-008	IN2252-002	1049.44	AS2252-008	1048.9	Circular		1	1.5	0.013	0.5	0.5	0	58.108
IN2252-007_AS2252-008	IN2252-007	1049.4	AS2252-008	1048.9	Circular		1	1.5	0.013	0.5	0.5	0	46.975
IN2252-009_IN2252-011	IN2252-009	1037.24	IN2252-011	1030.58	Circular		1	2	0.013	0.25	0.25	0	243.079
IN2252-010_IN2252-009	IN2252-010	1039.02	IN2252-009	1037.24	Circular		1	1.5	0.013	0.5	0.5	0	75.561
IN2252-011_AS2251-010	IN2252-011	1030.58	AS2251-010	1028.1	Circular		1	2.5	0.013	0.25	0.05	0	156.047
IN2254-001_AS2254-004	IN2254-001	1054.31	AS2254-004	1053.27	Circular		1	1.5	0.013	0.5	0.5	0	10.831
IN2254-009_IN2254-012	IN2254-009	1048.77	IN2254-012	1048.64	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.5	0	31.41
IN2254-012_AS2254-015	IN2254-012	1048.64	AS2254-015	1048.53	Circular		1	3	0.013	0.05	0.05	0	109.623
IN2254-021_AS2254-024	IN2254-021	1048.3	AS2254-024	1047.55	Circular		1	4.5	0.013	0.05	0.05	0	249.348
IN2255-001_IN2255-002	IN2255-001	1045.58	IN2255-002	1044.08	Circular		1	4.5	0.013	0.25	0.25	0	304.461
IN2255-002_IN2255-003	IN2255-002	1044.08	IN2255-003	1042.96	Circular		1	4.5	0.013	0.25	0.05	0	230.263
IN2255-003_AE2255-004	IN2255-003	1042.96	AE2255-004	1042.88	Circular		1	4.5	0.013	0.5	1	0	54
IN2255-032_AE2255-033	IN2255-032	1050.2	AE2255-033	1049.08	Circular		1	1.5	0.013	0.25	0.5	0	75.118
IN2255-037_MI2255-034	IN2255-037	1050.37	MI2255-034	1050.25	Circular		1	1.5	0.013	0.05	0.05	0	39.761
IN2255-042_AS2255-006	IN2255-042	1047.56	AS2255-006	1046.31	Circular		1	1.75	0.013	0.05	0.5	0	91.03
IN2255-061_HD2255-060	IN2255-061	1044.3	HD2255-060	1044	Rectangular		1	4	0.013	0.5	1	None (,)	27.226
IN2255-062_IN2255-063	IN2255-062	1049.29	IN2255-063	1049.03	Circular		1	2	0.013	0.05	0.05	0	26.32
IN2255-063_IN2255-064	IN2255-063	1049.03	IN2255-064	1048.3	Circular		1	2	0.013	0.05	0.05	0	58.236
IN2255-064_AE2255-035	IN2255-064	1048.3	AE2255-035	1048.1	Circular		1	2	0.013	0.05	0.05	0	23.667
IN2256-020_IN2256-021	IN2256-020	1053.1	IN2256-021	1052.5	Circular		1	1	0.013	0.5	0.05	None (,)	57.51
IN2256-021_AS2256-073	IN2256-021	1052.5	AS2256-073	1052.5	Circular		1	1.25	0.013	0.5	0.05	None (,)	44.466
IN2256-031_IN2256-032	IN2256-031	1051.81	IN2256-032	1051.88	Circular		1	1.5	0.013	0.5	0.05	0	18.958
IN2256-032_AE2256-033	IN2256-032	1051.88	AE2256-033	1051.5	Circular		1	1.5	0.013	0.05	0.5	0	50.793
IN2256-048_IN2256-049	IN2256-048	1061.97	IN2256-049	1058.56	Circular		1	1.5	0.013	0.5	0.05	0	147.214
IN2256-049_IN2256-050	IN2256-049	1058.56	IN2256-050	1053.121	Circular		1	1.5	0.013	0.05	0.05	0	148.248
IN2256-050_IN2256-088	IN2256-050	1053.121	IN2256-088	1052.63	Circular		1	1.5	0.013	0.05	0.05	0	94.919
IN2256-052_IN2256-053	IN2256-052	1049.66	IN2256-053	1048.5	Circular		1	2	0.013	0.05	0.05	0	121.252
IN2256-054_AS2256-055	IN2256-053	1048.5	AS2256-055	1047.49	Circular		1	2	0.013	0.05	0.25	0	47
IN2256-061_IN2256-062	JB2256-061	1044.39	IN2256-062	1044.31	Rectangular		1	4	0.013	0.05	0.05	0	28.612
IN2256-062_IN2256-063	IN2256-062	1044.31	IN2256-063	1044.3	Rectangular		1	4	0.013	0.5	0.05	None (,)	6.04
IN2256-063_IN2255-061	IN2256-063	1044.3	IN2255-061	1044.3	Rectangular		1	4	0.013	0.05	0.05	0	77.105
IN2256-065_IN2255-037	IN2255-065	1050.7	IN2255-037	1050.37	Circular		1	1.5	0.013	0.5	0.05	0	14.204
IN2256-076_JB2256-065	IN_2256-076	1044.88	JB2256-065	1044.42	Circular		1	1	0.013	0.5	0.05	None (,)	31.538
IN2256-080_IN2255-062	IN2256-080	1050.05	IN2255-062	1049.29	Circular		1	2	0.013	0.25	0.05	0	60.507
IN2256-088_IN2256-051	IN2256-088	1052.63	IN2256-052	1049.66	Circular		1	1.5	0.013	0.05	0.05	0	45.794
IN2257-034_IN2258-075	IN2257-034	1068.47	IN2258-075	1064.8	Circular		1	2	0.013	0.5	0.05	0	202.596
IN2258-027_IN2258-034	IN2258-027	1064.38	IN2258-034	1062.36	Circular		1	2	0.013	0.05	0.5	0	81.446
IN2258-034_AS2258-001	IN2258-034	1062.36	AS2258-001	1061.85	Special	Horizontal Ellipse	1	5.66	0.013	0.05	0.05	0	19.846
IN2258-039_MI2258-038	IN2258-039	1065.19	MI2258-038	1065.1	Circular		1	1.5	0.013	0.05	0.05	0	23.721
IN2258-040_IN2258-039	IN2258-040	1065.32	IN2258-039	1065.19	Circular		1	1.5	0.013	0.5	0.05	0	25.15
IN2258-053_AS2258-052	IN2258-053	1081.18	AS2258-052	1080.75	Circular		1	1.5	0.013	0.05	0.5	0	26.582
IN2258-054_IN2258-053	IN2258-054	1091.44	IN2258-053	1081.18	Circular		1	1.5	0.013	0.5	0.05	0	374.155
IN2258-057_AS2258-056	IN2258-057	1070.99	AS2258-056	1070.77	Circular		1	1.5	0.013	0.5	0.5	0	39.178
IN2258-067_AS2258-001	IN2258-067	1062.68	AS2258-001	1061.85	Circular		1	2.5	0.013	0.05	0.25	0	151.699
IN2258-074_DT2258-080	IN2258-074	1064.75	COM_SQ_P_IN	1064	Circular		1	2	0.013	0.5	1	0	47.777
IN2258-075_IN2258-074	IN2258-075	1064.8	IN2258-074	1064.75	Circular		1	2	0.013	0.05	0.5	0	11.913
IN2258-076_IN2258-074	IN2258-076	1065.66	IN2258-074	1064.75	Circular		1	1.5	0.013	0.5	0.05	0	38.027
IN2258-078_IN2258-074	IN2258-078	1069.03	IN2258-074	1064.75	Circular		1	1.5	0.013	0.5	0.5	0	159.908
IN2347-002_AS2347-001	IN2347-002	974.31	AS2347-001	971.55	Circular		1	1.5	0.013	0.5	0.05	None (,)	7.685

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
IN2349-005_AS2349-006	IN2349-005	986.3	AS2349-006	986	Circular		1	2	0.013	0.5	0.5	0	13.216
IN2349-009_AS2349-011	IN2349-009	979.3	AS2349-011	978.1	Circular		1	2	0.013	0.5	0.5	0	11.557
IN2349-010_AS2349-011	IN2349-010	981.24	AS2349-011	978.1	Circular		1	2	0.013	0.5	0.5	0	57.712
IN2349-023_IN2249-026	IN2349-023	987.66	IN2249-026	987.16	Circular		1	1.5	0.013	0.5	0.5	None (,)	51.601
IN2349-024_AS2349-025	IN2349-024	989.39	AS2349-025	988.15	Circular		1	1.5	0.013	0.5	0.25	None (,)	84.009
IN2349-027_IN2249-027	IN2349-027	986.62	IN2249-027	986.32	Circular		1	2	0.013	0.05	0.25	None (,)	51.904
IN2350-008_GR2350-010	IN2350-008	987.9	EMPB_GW_NTL1	987	Circular		1	1.5	0.013	0.5	0.5	0	35.59
IN2350-023_IN2350-028	IN2350-023	988.2	IN2350-028	987.8	Circular		1	1.5	0.013	0.5	0.05	None (,)	36.392
IN2350-028_IN2349-023	IN2350-028	987.8	IN2349-023	987.66	Circular		1	1.5	0.013	0.05	0.5	None (,)	15.518
IN2355-005_IN2355-006	IN2355-005	1045.13	IN2355-006	1042.13	Circular		1	1.5	0.013	0.5	0.5	0	19.8
IN2355-037_MI2355-039	IN2355-037	1049.03	MI2355-039	1048.75	Circular		1	1.5	0.013	0.05	0.05	0	29.366
IN2355-038_IN2355-040	IN2355-038	1048.43	IN2355-040	1046.7	Circular		1	1.5	0.013	0.25	0.25	0	48.435
IN2355-040_AS2355-059	IN2355-040	1046.7	AS2355-059	1043.43	Circular		1	1.5	0.013	0.25	0.5	0	92.487
IN2355-042_AS2355-059	IN2355-042	1046.3	AS2355-059	1043.43	Circular		1	2	0.013	0.05	0.5	0	51.263
IN2355-045_MI2355-046	IN2355-045	1046.3	MI2355-046	1046.3	Circular		1	2	0.013	0.05	0.05	0	9.619
IN2356-021_MI2356-023	IN2356-021	1049.62	MI2356-023	1049.5	Circular		1	1.5	0.013	0.5	0.05	0	16.002
IN2356-022_IN2355-037	IN2356-022	1049.03	IN2355-037	1049.03	Circular		1	1.5	0.013	0.05	0.05	0	16.251
IN2356-024_IN2355-045	IN2356-024	1046.3	IN2355-045	1046.3	Circular		1	2	0.013	0.25	0.05	0	15.146
IN2356-025_IN2356-024	IN2356-025	1046.65	IN2356-024	1046.3	Circular		1	2	0.013	0.5	0.05	0	50.006
IN2356-033_AS2355-060	IN2356-033	1048.95	AS2355-060	1044.94	Circular		1	3	0.013	0.05	0.25	0	150.877
IN2358-003_AS2258-056	IN2358-003	1072.57	AS2258-056	1070.77	Circular		1	2.25	0.013	0.05	0.05	0	28.665
IN2358-007_IN2358-003	IN2358-007	1078.77	IN2358-003	1072.57	Circular		1	2.25	0.013	0.05	0.05	0	112.847
IN2358-009_IN2358-007	IN2358-009	1083.18	IN2358-007	1078.77	Circular		1	2.25	0.013	0.05	0.05	0	71.211
IN2358-010_IN2358-009	IN2358-010	1087.6	IN2358-009	1083.18	Circular		1	2.25	0.013	0.05	0.05	0	67.959
IN2358-012_IN2358-010	IN2358-012	1091.8	IN2358-010	1087.6	Circular		1	2.25	0.013	0.05	0.05	0	71.475
IN2358-013_IN2358-012	IN2358-013	1096.44	IN2358-012	1091.8	Circular		1	2.25	0.013	0.05	0.05	0	70.754
IN2358-015_IN2358-013	IN2358-015	1100.85	IN2358-013	1096.44	Circular		1	2.25	0.013	0.05	0.05	0	70.609
IN2358-016_IN2358-015	IN2358-016	1105.27	IN2358-015	1100.85	Circular		1	2.25	0.013	0.25	0.05	0	69.644
IN2358-020_IN2358-016	IN2358-020	1118.44	IN2358-016	1105.27	Circular		1	1.75	0.013	0.5	0.25	0	212.708
IN2450-013_IN2450-014	IN2450-013	993.6	IN2450-014	993.5	Circular		1	1.5	0.013	0.5	0.5	0	8.829
IN2450-014_AS2450-026	IN2450-014	993.5	AS2450-026	992.29	Circular		1	1.5	0.013	0.5	0.05	0	21.468
IN2452-011_AS2452-013	IN2452-011	1007.6	AE2452-014	1006.56	Circular		1	1.5	0.013	0.5	0.5	0	214.406
IN2548-004_AS2548-003	IN2548-004	986.4	AS2548-003	986.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	32.939
IN2548-007_AS2548-003	IN2548-007	986.35	AS2548-003	986.1	Circular		1	1.5	0.013	0.5	0.05	None (,)	9.108
IN2549-009_AE2549-011	IN2549-009	991.8	EMPB_GW_LOSR1	991.7	Circular		1	3.5	0.013	0.05	0.5	0	19.415
IN2549-013_AS2549-001	IN2549-013	997.2	AS2549-001	993.34	Circular		1	1.5	0.013	0.5	0.5	0	10.413
IN2549-014_IN2549-015	IN2549-014	996.93	IN2549-015	996.79	Circular		1	1.5	0.013	0.5	0.05	0	10.521
IN2549-015_AS2549-003	IN2549-015	996.79	AS2549-003	993.81	Circular		1	1.5	0.013	0.05	0.5	0	25.127
IN2550-021_IN2549-009	IN2550-021	992.7	IN2549-009	991.8	Circular		1	3.5	0.013	0.05	0.05	0	48.53
IN2650-005_IN2650-006	IN2650-005	1004.1	IN2650-006	1001.48	Circular		1	2	0.013	0.5	0.05	0	215.008
IN2650-006_AS2650-004	IN2650-006	1001.48	AS2650-004	997.19	Circular		1	2	0.013	0.05	0.5	0	349.758
JB2256-058_JB2256-060	JB2256-058	1046.5	JB2256-060	1046.02	Rectangular		1	3	0.013	0.05	0.05	0	167.707
JB2256-065_JB2256-061	JB2256-065	1044.42	JB2256-061	1044.39	Rectangular		1	4	0.013	0.25	0.05	0	47.349
JCT_RIDGE_P_BACK_WEIR_TOP	JCT_RIDGE_POND_OUT		JCT_RIDGE_POND_OUT2										
JCT_RIDGE_POND_BACK_WEIR	JCT_RIDGE_POND_OUT		JCT_RIDGE_POND_OUT2										
JCT_RIDGE_POND_HIGH_WEIR	TARGET_P_OUT		JCT_RIDGE_POND_OUT										
JCT_RIDGE_POND_LO_WEIR	TARGET_P_OUT		JCT_RIDGE_POND_OUT										
JCT_RIDGE_POND_OUTFLOW_CHANNEL	JCT_RIDGE_POND_OUT2	1044.3	JUNCTION_RIDGE_POND_OUT_JCT	1043.5	Natural		1	0	0.013	0	0	None (,)	23.916
JuncOver	AS2251-034		Node2121										

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
L_InlJunc	Node2122	1020	IN2251-024	1019.67	Circular		1	1.5	0.013	0.5	0.25	None (,)	33
L_InlJunc2	Node2123	1020	IN2251-024	1019.67	Circular		1	1.5	0.013	0.5	0.5	None (,)	33
Link1737	HOMEWOOD_W_P_OU	1072	Node1694	1071.9	Circular		1	0.667	0.011	1	0.5	0	86
Link1738	Node1694	1071.9	Node1696	1071.66	Circular		1	0.667	0.011	0.5	0.05	0	48
Link1739	Node1695	1063.33	GAN_H_PRIV_P_IN	1054.6	Circular		1	0.833	0.011	0.5	1	0	263
Link1740	Node1696	1071.66	Node1695	1063.33	Circular		1	0.833	0.011	0.05	0.5	0	106
Link1741	HIGHVIEW_PR	1087.58	Node1698	1087.21	Circular		1	1.5	0.013	0.5	0.25	0	74
Link1742	Node1698	1087.21	IN2258-023	1086.91	Circular		1	1.5	0.013	0.25	0.5	0	58
Link1743	IN1956-014	1100.04	IN1956-013	1099.53	Circular		1	1.25	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	52
Link1770	IN2056-039	1082.69	AS2056-031	1068.12	Circular		1	1	0.013	0.5	0.05	0	350
Link1774	IN2256-023	1057.6	PD2256-019_AE2256-015	1054	Circular		1	1	0.013	0.5	0.25	0	40
Link1776	JCT_CT_POND_OUT	996	IN2250-044	995.17	Circular		1	1	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	91
Link1780	IN1753-010	1088.78	IN1753-008	1086.11	Circular		1	1	0.013	0.5	0.5	None (,)	51
Link1783	IN2152-007	1057.24	AS2152-008	1054.16	Circular		1	1.25	0.013	0.5	0.25	None (,)	42
Link1784	IN2256-034	1059.64	AE2256-035	1058.85	Circular		1	1	0.013	0.5	0.5	None (,)	79
Link1789	IN2554-003	1036.71	IN2554-001	1036.01	Circular		1	1	0.013	0.5	0.6	None (,)	15
Link1791	IN1947-018	1021.37	AS1947-017	1016.41	Circular		1	1.25	0.013	0.5	0.05	None (,)	148
Link1795	BH_CHURCH_PR	1113.37	IN1654-004	1108.56	Circular		1	1	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	109
Link1796	BL_DITCH_TO_FOURIER	970	BL_D_TO_FOURIER_CH_DS	969.94	Circular		1	1	0.013	0.5	0.5	0	83
Link1798	DT2157-011	1073.04	IN2157-009	1070.32	Circular		1	1	0.013	0.2	0.05	Groove End with Projecting (Circ, Conc)	29
Link1799	IN2157-009	1070.32	IN2157-039	1069.65	Circular		1	1.25	0.013	0.05	0.05	0	71
Link1800	IN2157-039	1069.65	IN2257-036	1068.97	Circular		1	1.25	0.013	0.05	0.05	0	20
Link1801	IN2257-036	1068.97	IN2257-034	1068.47	Circular		1	1.5	0.013	0.05	0.5	0	29
Link1802	AE1653-022	1106.07	IN1653-021	1105.45	Circular		1	1.5	0.013	0.2	0.25	Groove End with Headwall (Circ, Conc)	93
Link1803	IN1653-021	1105.45	IN1653-020	1105.28	Circular		1	1.5	0.013	0.25	0.5	0	32
Link1807	IN2150-021	1024.35	IN2150-020	1022.72	Circular		1	1.25	0.011	0.5	0.5	0	94
Link1808	IN2150-020	1022.72	IN2150-006	1020.86	Circular		1	1.25	0.011	0.5	0.05	0	101
Link1809	IN2150-006	1020.86	IN2150-007	1016.7	Circular		1	1.25	0.013	0.5	0.05	None (,)	98
Link1810	Node1915	1073.81	Node1919	1073.13	Circular		1	1.25	0.013	0.25	0.05	0	136
Link1811	Node1916	1074.7	Node1917	1074.23	Circular		1	1	0.013	0.5	0.25	0	68
Link1812	Node1918	1074.02	Node1915	1073.81	Circular		1	1	0.013	0.25	0.25	0	41
Link1813	Node1917	1074.23	Node1918	1074.02	Circular		1	1	0.013	0.25	0.25	0	42
Link1814	Node1919	1073.13	IN1849-057	1073.88	Circular		1	1.25	0.013	0.05	0.25	0	44
Link1815	Node1920	1075.44	Node1921	1075.09	Circular		1	1	0.013	0.5	0.25	0	70
Link1816	Node1921	1075.09	Node1922	1074.79	Circular		1	1	0.013	0.25	0.25	0	61
Link1818	Node1922	1074.79	Node1924	1074.33	Circular		1	1.25	0.013	0.25	0.25	0	91
Link1819	Node1924	1074.33	AS1849-058	1073.28	Circular		1	1.25	0.013	0.25	0.5	0	147
Link1821	IN1949-001	1031.49	AS1949-009	1030.11	Circular		1	1	0.013	0.5	0.5	0	25
Link1822	IN1949-002	1031.24	IN1949-003	1030.56	Circular		1	1	0.013	0.5	0.5	0	33
Link1823	IN2353-001	0.05	IN2352-002	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1824	IN2352-002	0.05	IN2352-004	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1825	IN2352-003	0.05	IN2352-004	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1826	IN2354-019	0.05	AS2354-006	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1827	IN2354-007	0.05	AS2354-006	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1828	IN2354-014	0.05	AS2354-012	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1829	IN2354-016	0.05	AS2354-015	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1830	IN2355-050	0.05	AS2355-001	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1831	IN2355-049	0.05	AS2355-001	0	Circular		1	0.05	0.013	0	0	None (,)	10
Link1832	IN2253-008	1055.95	AS2253-012	1054.89	Circular		1	1	0.013	0.5	0.5	0	34

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
Link1833	IN2253-014	1054.2	AS2254-004	1053.27	Circular		1	1.5	0.013	0.5	0.5	0	26
Link1834	IN2254-003	1054.95	IN2254-001	1054.31	Circular		1	1	0.013	0.5	0.5	0	26
Link1835	IN2254-026	1054.25	AS2254-005	1052.66	Circular		1	1	0.013	0.5	0.5	0	42
Link1836	IN2254-025	1054.25	AS2254-005	1052.66	Circular		1	1	0.013	0.5	0.5	0	26
Link1837	IN2254-008	1051.34	IN2254-012	1048.64	Circular		1	2	0.013	0.5	0.5	0	38
Link1838	IN2256-012	1058.8	IN2256-013	1058.2	Circular		1	1	0.013	0.5	0.05	None (,)	60
Link1839	IN2256-013	1058.2	GR2256-019	1056.6	Circular		1	1	0.013	0.05	0.5	None (,)	40
Link1840	MenardsPL1	1055.09	GR2256-019	1054.6	Circular		1	2.5	0.013	0.5	0.5	None (,)	154
Link1841	MenardsPL2	1056.12	MenardsPL1	1055.09	Circular		1	1.25	0.013	0.5	0.5	None (,)	80
Link1842	MenardsPL3	1056.63	MenardsPL1	1055.09	Circular		1	1.75	0.013	0.5	0.25	None (,)	258
Link1843	MenardsPL4	1057.33	AE2256-035	1055.03	Circular		1	2	0.013	0.5	0.5	None (,)	288
Link1845	Node1953	1059.06	TE2257-014	1057.35	Circular		1	1.25	0.013	0.5	0.5	0	42
Link1846	IN2257-005	1060.42	AS2257-004	1060.06	Circular		1	1	0.013	0.5	0.5	0	18
Link1847	IN2257-006	1060.42	AS2257-004	1059.82	Circular		1	1	0.013	0.5	0.5	0	30
Link1848	IN2257-007	1061.9	AS2257-008	1061.64	Circular		1	1	0.013	0.5	0.5	0	13
Link1849	IN2258-071	1065.36	IN2258-070	1065.28	Circular		1	1	0.013	0.5	0.5	0	15
Link1850	IN2258-070	1065.28	IN2258-069	1065.14	Circular		1	1.5	0.013	0.5	0.05	0	29
Link1851	IN2258-069	1065.14	IN2258-068	1065.08	Circular		1	1.5	0.013	0.05	0.05	0	11
Link1852	IN2258-068	1065.08	IN2258-027	1064.38	Circular		1	1.5	0.013	0.05	0.5	0	40
Link1853	IN2258-050	1070	IN2258-049	1068.06	Circular		1	1.5	0.013	0.5	0.5	None (,)	79
Link1854	IN2258-047	1067.82	IN2258-046	1067.6	Circular		1	1	0.013	0.5	0.05	0	31
Link1855	IN2258-046	1067.6	IN2258-045	1067.24	Circular		1	1	0.013	0.05	0.05	0	17
Link1856	IN2258-045	1067.24	IN2258-044	1067.06	Circular		1	1.25	0.013	0.05	0.5	0	35
Link1857	IN2258-044	1067.06	IN2258-040	1065.32	Circular		1	1.25	0.013	0.5	0.05	0	230
Link1858	IN2258-043	1065.71	IN2258-040	1065.32	Circular		1	1	0.013	0.5	0.5	0	79
Link1859	IN2258-032	1065.04	IN2258-033	1064.8	Circular		1	1	0.013	0.5	0.25	0	35
Link1860	IN2258-033	1064.8	IN2258-027	1064.38	Circular		1	1.25	0.013	0.25	0.25	0	44
Link1861	IN2258-026	1070.93	IN2258-025	1069.43	Circular		1	1	0.013	0.5	0.5	0	35
Link1862	IN2249-019	991.04	IN2249-018	990.63	Circular		1	1	0.013	0.5	0.25	0	30
Link1863	IN2249-018	990.63	IN2250-048	990.33	Circular		1	1	0.013	0.25	0.25	0	20
Link1864	IN2250-048	990.33	IN2250-046	989.73	Circular		1	1	0.013	0.25	0.05	0	50
Link1865	IN2250-046	989.73	AS2250-045	988.61	Circular		1	1	0.013	0.05	0.5	0	28
Link1866	AS2250-019	991.93	IN2250-042	992	Circular		1	4	0.013	0.5	0.05	0	10
Link1867	IN2250-042	992	IN2250-017	992.44	Circular		1	4	0.013	0.05	0.05	0	35
Link1868	IN2250-017	992.44	IN2249-013	992.54	Circular		1	4	0.013	0.05	0.05	0	8
Link1869	IN2249-013	992.54	IN2249-017	992.88	Circular		1	4	0.013	0.05	0.05	0	27
Link1870	IN2249-016	996.17	IN2250-041	995.71	Circular		1	1	0.013	0.5	0.25	0	36
Link1871	IN2250-041	995.71	IN2250-040	995.53	Circular		1	1	0.013	0.25	0.05	0	8
Link1872	IN2250-040	995.53	IN2250-039	997.8	Circular		1	1	0.013	0.05	0.5	0	30
Link1873	IN2249-017	992.88	AS2249-004	992.98	Circular		1	4	0.013	0.05	0.05	0	8
Link1874	IN2250-029	1009.33	IN2250-028	1009.14	Circular		1	1	0.013	0.5	0.05	0	27
Link1875	IN2250-028	1009.14	IN2250-027	1008.69	Circular		1	1	0.013	0.05	0.05	0	19
Link1876	IN2250-027	1008.69	IN2250-026	1007.6	Circular		1	1.25	0.013	0.05	0.5	0	27
Link1877	IN2250-025	1012.59	IN2250-059	1012.55	Circular		1	1	0.013	0.5	0.05	0	44
Link1878	IN2250-059	1012.55	IN2250-058	1012.5	Circular		1	1	0.013	0.05	0.05	0	7
Link1879	IN2250-058	1012.5	IN2250-022	1011.09	Circular		1	1	0.013	0.05	0.5	0	29
Link1880	IN2251-030	1015.95	IN2251-029	1015.48	Circular		1	1	0.013	0.5	0.05	0	35
Link1881	IN2251-029	1015.48	IN2251-028	1015.09	Circular		1	1	0.013	0.05	0.05	0	13
Link1882	IN2251-028	1015.09	IN2251-027	1014.45	Circular		1	1	0.013	0.05	0.5	0	29

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
Link1883	IN2150-050	1008.26	IN2150-038	1007.81	Circular		1	1	0.013	0.5	0.05	0	18
Link1884	IN2150-038	1007.81	AS2150-014	1007.81	Circular		1	1	0.013	0.05	0.5	0	20
Link1885	IN2150-042	1007.25	AS2150-014	1006.85	Circular		1	1	0.013	0.25	0.5	0	10
Link1886	IN2149-016	1012.47	IN2150-033	1012.11	Circular		1	1	0.013	0.5	0.05	0	28
Link1887	IN2150-033	1012.11	IN2150-048	1011.94	Circular		1	1	0.013	0.05	0.05	0	12
Link1888	IN2150-048	1011.94	AS2150-032	1010.74	Circular		1	1	0.013	0.05	0.5	0	30
Link1889	IN2150-035	1011.2	AS2150-032	1010.96	Circular		1	1	0.013	0.5	0.5	0	6
Link1890	IN2251-005	1026.29	AS2251-007	1025.29	Circular		1	1.25	0.013	0.5	0.5	0	25
Link1891	IN2251-023	1036.45	AS2251-022	1035.45	Circular		1	1	0.013	0.5	0.5	0	25
Link1892	IN2251-020	1036.1	AS2251-021	1035.17	Circular		1	1.25	0.013	0.5	0.5	0	25
Link1893	IN2251-019	1036.1	AS2251-021	1035.9	Circular		1	1.25	0.013	0.5	0.5	0	5
Link1894	IN2251-016	1039.85	AS2251-018	1038.85	Circular		1	1.25	0.013	0.5	0.5	0	25
Link1895	IN2252-014	1040.03	IN2251-017	1039.23	Circular		1	1.25	0.013	0.5	0.5	0	30
Link1896	IN2052-010	1061.14	IN2052-009	1060.5	Circular		1	1	0.013	0.5	0.5	0	27
Link1897	IN2052-007	1062.96	AS2052-006	1062.34	Circular		1	1	0.013	0.5	0.5	0	23
Link1898	IN2052-036	1058.76	TP2052-028	1058.6	Circular		1	1.25	0.013	0.05	0.25	0	8
Link1899	IN2053-005	1059.62	IN2052-036	1058.76	Circular		1	1	0.013	0.5	0.05	0	43
Link1900	IN2053-002	1061.48	IN2052-031	1060.92	Circular		1	1	0.013	0.5	0.25	0	43
Link1901	IN1653-019	1104.76	IN1653-018	1104.2	Circular		1	1	0.013	0.5	0.5	0	37
Link1902	IN1653-017	1103.02	IN1653-016	1102.22	Circular		1	1.5	0.013	0.5	0.5	0	40
Link1903	IN1653-015	1102.64	IN1653-014	1101.86	Circular		1	1	0.013	0.5	0.5	0	39
Link1904	IN1754-034	1099.46	IN1754-025	1098.7	Circular		1	1	0.013	0.5	0.5	0	38
Link1905	IN1753-043	1091.2	AS1753-005	1090.2	Circular		1	1	0.013	0.5	0.25	0	50
Link1906	IN1753-042	1091.18	IN1753-041	1090.58	Circular		1	1	0.013	0.5	0.25	0	30
Link1907	IN1753-041	1090.58	AS1753-005	1090.2	Circular		1	1	0.013	0.5	0.5	0	19
Link1908	IN1753-052	1087.59	AS1753-003	1087.21	Circular		1	1	0.013	0.5	0.5	0	19
Link1909	IN1753-053	1087.45	AS1753-003	1087.21	Circular		1	1	0.013	0.5	0.5	0	12
Link1910	IN1753-050	1086.21	IN1753-049	1085.59	Circular		1	1	0.013	0.5	0.5	0	31
Link1911	IN1753-011	1089.03	IN1753-010	1088.78	Circular		1	1	0.013	0.5	0.5	0	14
Link1912	IN1753-033	1103.49	IN1753-032	1101.57	Circular		1	1	0.013	0.5	0.25	0	48
Link1913	IN1753-032	1100.91	IN1753-029	1099.82	Circular		1	1.25	0.013	0.25	0.05	0	219
Link1914	IN1753-029	1099.82	IN1753-028	1099.17	Circular		1	1.25	0.013	0.05	0.05	0	77
Link1915	IN1753-035	1100.25	IN1753-029	1099.82	Circular		1	1	0.013	0.5	0.25	0	36
Link1916	IN1753-021	1094.16	IN1753-020	1093.18	Circular		1	1	0.013	0.5	0.25	0	54
Link1917	IN1753-020	1093.18	IN1753-019	1092.35	Circular		1	1	0.013	0.25	0.25	0	58
Link1918	IN1753-019	1092.35	IN1753-018	1090.07	Circular		1	1	0.013	0.25	0.05	0	114
Link1919	IN2155-006	1052.6	IN2156-019	1052.59	Circular		1	1	0.013	0.5	0.05	0	61
Link1920	IN2156-019	1052.29	IN2156-018	1052.25	Circular		1	1	0.013	0.05	0.05	0	8
Link1921	IN2156-018	1052.25	AS2156-017	1051.03	Circular		1	0.16	0.013	0.05	0.05	0	50
Link1922	IN2156-049	1050.43	IN2155-014	1049.99	Circular		1	1.25	0.013	0.5	0.05	0	87
Link1923	IN2155-014	1049.99	IN2155-013	1049.86	Circular		1	1.25	0.013	0.05	0.25	0	25
Link1924	IN2255-041	1047.35	IN2255-040	1047.11	Circular		1	1	0.013	0.5	0.25	0	48
Link1925	IN2255-040	1047.11	IN2256-039	1046.74	Circular		1	1	0.013	0.25	0.05	0	73
Link1926	IN2256-039	1046.74	IN2256-038	1046.68	Circular		1	1	0.013	0.05	0.05	0	11
Link1927	IN2256-038	1046.68	AS2256-036	1046.59	Circular		1	1	0.013	0.05	0.5	0	17
Link1928	IN2255-044	1046.66	IN2256-041	1046.29	Circular		1	1	0.013	0.5	0.05	0	73
Link1929	IN2256-041	1046.29	IN2256-040	1046.26	Circular		1	1	0.013	0.05	0.05	0	5
Link1930	IN2256-040	1046.26	AS2256-037	1046.17	Circular		1	1	0.013	0.05	0.5	0	17
Link1931	IN2255-045	1046.22	IN2256-044	1045.9	Circular		1	1.5	0.013	0.5	0.25	0	64

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
Link1932	IN2256-044	1045.9	IN2256-043	1045.83	Circular		1	1.5	0.013	0.25	0.05	0	13
Link1933	IN2256-043	1045.83	AS2256-042	1045.74	Circular		1	1.5	0.013	0.05	0.5	0	17
Link1939	IN2255-052	1045.56	IN2255-051	1045.45	Circular		1	1	0.013	0.5	0.25	0	21
Link1940	IN2255-051	1045.45	IN2255-050	1045.32	Circular		1	1	0.013	0.25	0.05	0	25
Link1941	IN2255-050	1045.32	IN2255-049	1045.18	Circular		1	1.25	0.013	0.05	0.25	0	27
Link1942	IN2255-049	1045.18	IN2255-048	1044.97	Circular		1	1.25	0.013	0.25	0.25	0	42
Link1943	IN2255-048	1044.97	AS2255-046	1044.85	Circular		1	1.25	0.013	0.25	0.5	0	23
Link1944	IN2354-018	1041.47	IN2454-007	1041.4	Circular		1	1.25	0.013	0.25	0.25	0	25
Link1947	IN2354-017	1041.84	IN2354-018	1041.47	Circular		1	1	0.013	0.5	0.25	0	40
Link1983	PV292	1070.75	PV294	1070.24	Circular		1	1.5	0.013	0.45	0.45	0	76
Link1994	PV226	1074.36	PV228	1074.2	Special	Horizontal Ellipse	1	1.91	0.013	0.5	0.05	0	80
Link1998	S101	1083.94	S106	1081.87	Circular		1	1	0.011	0.25	0.25	0	80
Link2010	OSTP_POND_SYSTEM_J	965	OSTrSouthPond	964.75	Rectangular		2	5	0.013	0.25	1	0	20
Link2011	OSTP_POND_SYSTEM_J	976	OSTrSouthPond	975	Trapezoidal		1	5	0.013	0	0	None (,)	33
Link2012	OSTP_POND_SYSTEM_J	976	OSTrSouthPond	975	Trapezoidal		1	5	0.013	0	0	None (,)	33
Link2013	OSTP_POND_SYSTEM_J	976	OSTrSouthPond	975	Trapezoidal		1	5	0.013	0	0	None (,)	33
Link2014	OSTP_POND_SYSTEM_J	976	OSTrSouthPond	975	Trapezoidal		1	5	0.013	0	0	None (,)	33
Link2015	OSTP_POND_SYSTEM_J	976	OSTrSouthPond	975	Trapezoidal		1	5	0.013	0	0	None (,)	33
Link2051	PV35812	1003.52	PV3582	1003	Circular		1	1.5	0.013	0.05	0.5	0	52
Link2052	PV3594	1003.15	PV3593	1003	Circular		1	4	0.013	0.05	0.5	0	68
Link2053	PV391	1011.4	PV3921	1010.17	Circular		1	2	0.013	0.1	0.1	0	41
Link2054	PV3922	1007	PV3924	1003.62	Circular		1	2.5	0.013	0.05	0.05	0	71
LittleBearPr1	IN1752-029	1096.33	IN1752-026	1095.73	Circular		1	2.5	0.013	0.05	0.25	0	120
LostMwPr1	IN1752-004	1098.9	AS1752-001	1093.3	Circular		1	1	0.013	0.5	0.5	0	140
MENARDS_POND_GRATE_OUT	IN2256-076		IN_2256-076										
MI1548-028_AS1548-014	MI1548-028	1097.73	AS1548-014	1097.05	Circular		1	4	0.013	0.05	0.05	None (,)	48.005
MI1548-051_AS1548-048	MI1548-051	1102.5	AS1548-048	1101.47	Circular		1	3.5	0.013	0.05	0.25	None (,)	216.825
MI1647-055_AS1647-056	MI1647-055	1083.9	AS1647-056	1083.7	Circular		1	2.5	0.013	0.05	0.25	None (,)	16.133
MI1753-047_AS1753-045	MI1753-047	1088	AS1753-045	1087.65	Circular		1	4.5	0.013	0.5	0.05	0	200.191
MI1849-054_AS1849-053	MI1849-055	1072.7	AS1849-053	1072.6	Circular		1	2	0.013	0.05	0.05	None (,)	21.068
MI2050-008_IN2051-060	MI2050-008	1067.07	IN2051-060	1063.66	Circular		1	1.5	0.013	0.05	0.25	0	107.654
MI2051-022.1	MI2051-022	1056.6	IN2051-016	1056.3	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	44.005
MI2051-062_IN2051-048	MI2051-062	1068.99	IN2051-048	1068.69	Circular		1	2.25	0.013	0.05	0.05	0	112.857
MI2255-034_IN2255-032	MI2255-034	1050.25	IN2255-032	1050.2	Circular		1	1.5	0.013	0.05	0.25	0	10.401
MI2255-047_PD2255-023	MI2255-047	1044.75	Node1784	1043.35	Rectangular		1	5	0.013	0.05	1	0	117
MI2258-038_IN2258-027	MI2258-038	1065.1	IN2258-027	1064.38	Circular		1	1.5	0.013	0.05	0.05	0	89.347
MI2355-039_IN2355-038	MI2355-039	1048.75	IN2355-038	1048.43	Circular		1	1.5	0.013	0.05	0.25	0	18.002
MI2355-046_IN2355-042	MI2355-046	1046.3	IN2355-042	1046.3	Circular		1	2	0.013	0.05	0.05	0	51.222
MI2356-023_IN2356-022	MI2356-023	1049.5	IN2356-022	1049.03	Circular		1	1.5	0.013	0.05	0.05	0	31.453
MinPrPr1	AS2355-016	1053.4	IN2355-051	1052.24	Circular		1	4	0.013	0.25	0.25	0	58
MinPt_Pr2	IN2256-069	1046.94	IN2256-068	1046.29	Circular		1	2	0.013	0.25	0.25	0	43
MinPt_Pr20	IN2256-068	1045.29	JB2256-060	1045.26	Circular		1	3	0.013	0.25	0.5	0	25
MinPt_Pr22	IN2256-070	1047.5	IN2256-069	1046.94	Circular		1	2	0.013	0.5	0.25	0	58
MinPtPr10	IN2455-021	1060.1	AS2455-024	1059.7	Circular		1	3	0.013	0.5	0.05	0	80
MinPtPr2	AS2355-021	1058.26	AS2355-016	1053.4	Circular		1	4	0.013	0.05	0.25	0	243
MinPtPr3	AS2455-024	1059.7	AS2355-021	1058.26	Circular		1	3	0.013	0.5	0.05	0	288
MinPtPr40	AS2256-042	1045.74	AS2256-047	1045.29	Special	Horizontal Ellipse	1	6.33	0.013	0.05	0.25	0	151
MinPtPR41	AS2256-037	1046.17	AS2256-042	1045.74	Special	Horizontal Ellipse	1	6.33	0.013	0.05	0.05	0	144
MinPtPr42	AS2256-036	1046.59	AS2256-037	1046.17	Special	Horizontal Ellipse	1	6.33	0.013	0.05	0.05	0	138

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
MinPtPr43	AS2156-044	1047.17	AS2256-036	1046.59	Special	Horizontal Ellipse	1	6.33	0.013	0.1	0.1	0	416
MinPtPr44	AS2156-043	1049.42	AS2156-044	1047.17	Special	Horizontal Ellipse	1	6.33	0.013	0.05	0.1	0	233
MinPtPr5	AS2355-019	1053.9	AS2355-016	1053.4	Circular		1	3	0.013	0.05	0.25	0	25
MinPtPr6	IN2355-020	1054.1	AS2355-019	1053.9	Circular		1	3	0.013	0.05	0.05	0	10
MinPtPr7	IN2356-010	1054.36	IN2355-020	1054.1	Circular		1	3	0.013	0.05	0.05	0	13
MinPtPr8	IN2356-008	1055.04	IN2356-010	1054.36	Circular		1	3	0.013	0.25	0.05	0	34
MinPtPr9	IN2356-006	1056.1	IN2356-008	1055.04	Circular		1	3	0.013	0.5	0.25	0	53
Multi_10	PF-S15	1117.2	PF-S18	1114.86	Circular		1	1.5	0.013	0.05	0.25	0	224
Multi_11	PF-S18	1114.36	PF-S21	1113.29	Circular		1	2	0.013	0.25	0.25	0	224
Multi_12	PF-S1	1139.46	PF-S4	1137.92	Circular		1	1	0.013	0.05	0.05	0	153
Multi_13	PF-S26	1112.16	PF-S27	1111.48	Circular		1	2	0.013	0.5	0.05	0	36
Multi_14	PF-S27	1111.48	PF-S28	1110.72	Circular		1	2.5	0.013	0.05	0.05	0	134
Multi_15	PF-S2	1140.69	PF-S1	1139.56	Circular		1	1	0.013	0.5	0.25	0	113
Multi_16	PF-S30	1106.79	PL1549-019	1106.89	Circular		1	3	0.013	0.5	0.05	0	37.165
Multi_17	PF-S4	1137.82	PF-S7	1136.96	Circular		1	1	0.013	0.05	0.25	0	86
Multi_18	PF-S7	1136.86	PF-S8	1125.05	Circular		1	1	0.013	0.25	0.05	0	165
Multi_19	PF-S8	1125.05	PF-S12	1120.3	Circular		1	1.5	0.013	0.05	0.05	0	153
Multi_2	CH-S22	1102.61	CH-S21	1098.09	Circular		1	2	0.013	0.25	0.25	0	185.052
Multi_20	PL1549-019	1106.89	IN1549-018	1106.78	Circular		1	3	0.013	0.05	0.05	0	22.27
Multi_21	S101	1084.19	SE_BIO_BASIN	1083	Circular		1	1	0.013	0.5	1	0	120.664
Multi_26	S32	1088.55	S101	1084.19	Circular		1	1	0.013	0.5	0.25	0	128
Multi_27	S33	1088.88	S32	1088.55	Circular		1	1	0.013	0.5	0.5	0	29
Multi_3	CH-S23	1103.55	CH-S22	1103.11	Circular		1	1.5	0.013	0.25	0.25	0	72.616
Multi_4	CH-S24	1105.49	CH-S23	1103.8	Circular		1	1.25	0.013	0.25	0.25	0	171.784
Multi_48	E_INF_BASIN	1084.5	S106	1083.35	Circular		1	0.5	0.011	0.5	0.5	None (,)	32
Multi_5	CH-S25	1106.12	CH-S24	1105.74	Circular		1	1	0.013	0.5	0.25	0	41.54
Multi_58	NW_INF_BASIN	1093.75	IN1647-065	1093.49	Circular		1	0.5	0.011	0.5	0.25	None (,)	42.981
Multi_6	CH_S31	1099.51	CH_BIO_BASIN_1	1097.5	Circular		1	2	0.013	0.5	0.2	0	202.956
Multi_68	IN1549-020	1107.3	IN1549-018	1106.78	Circular		1	1	0.011	0.25	0.5	None (,)	59.464
Multi_7	CH_S32	1101.51	CH_S31	1100.26	Circular		1	1.25	0.013	0.05	0.5	0	42.024
Multi_8	CH_S33	1105.19	CH_S32	1101.51	Circular		1	1.25	0.013	0.5	0.25	0	107.858
Multi_9	PF-S12	1120.2	PF-S15	1117.2	Circular		1	1.5	0.013	0.05	0.05	0	300
N_3645.1	IN2155-007	1055.82	Node1701	1055.37	Circular		1	2.5	0.013	0.5	0.05	0	37
N_3646.1	Node1701	1055.37	Node1702	1055.24	Circular		1	2.5	0.013	0.05	0.05	0	25
N_3647.1	Node1702	1055.24	Node1703	1055.15	Circular		1	2.5	0.014	0.05	0.05	0	19
N_3648.1	Node1703	1055.15	AS2156-020	1054	Circular		1	2.5	0.013	0.05	0.5	0	28
N_3664.1	AS2155-011	1059	IN2155-009	1058.87	Circular		1	2	0.013	0.5	0.25	0	25
N_3665.1	IN2155-009	1058.87	IN2156-034	1058.42	Circular		1	2	0.013	0.25	0.05	0	39
N_3666.1	IN2156-034	1058.42	IN2156-033	1058.31	Circular		1	2	0.013	0.05	0.05	0	22
N_3667.1	IN2156-033	1058.31	IN2156-031	1058.24	Circular		1	2	0.013	0.05	0.15	0	22
N_3668.1	IN2156-031	1058.24	AS2156-028	1057.29	Circular		1	2	0.013	0.05	0.5	0	32
N_3671.1	IN2247-013	968.75	IN2247-012	968.49	Circular		1	2	0.013	0.05	0.05	0	40
N_3672.1	IN2247-012	968.49	IN2247-011	967.72	Circular		1	2	0.013	0.05	0.05	0	118
N_3677.1	IN1753-024	1089.8	IN1753-023	1089.5	Circular		1	1.5	0.013	0.5	0.05	0	43
N_3678.1	IN1753-023	1089.5	IN1753-022	1089.35	Circular		1	1.5	0.013	0.05	0.5	0	36
N_3679.1	IN1753-022	1089.35	IN1753-018	1088.67	Circular		1	2	0.013	0.5	0.5	0	136
N_3681.1	AE2052-041	1056.44	AS2152-024	1055.06	Circular		1	1.75	0.013	0.5	0.5	0	283
N_3682.1	AS2152-024	1055.06	AS2152-023	1053.85	Circular		1	1.75	0.013	0.05	0.05	0	372
N_3685.1	IN2257-028	1057.18	IN2257-029	1057.06	Special	Horizontal Ellipse	1	2.5	0.013	0.05	0.05	0	60

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
N_3686.1	IN2257-029	1057.06	AE2257-030	1057	Special	Horizontal Ellipse	1	2.5	0.013	0.05	0.5	0	30
N_3694.1	IN2248-001	968.75	IN2248-003	966.6	Circular		1	4	0.013	0.05	0.05	0	330
N_4214.1	AS2250-038	994.6	AS2250-006	991.98	Circular		1	4	0.013	0.25	0.05	0	220
N_AE2156-078.1	AE2156-078	1061	AS2156-077	1054.9	Circular		1	3	0.013	0.05	0.05	0	42.002
N_AE2256-010.1	AE2256-010	1055	AE2256-011	1054.6	Rectangular		1	4	0.013	0.05	0.05	None (,)	90.96
N_AS2046-011.1	AS2046-011	984.123	IN2046-001	983.547	Circular		1	3	0.013	0.05	0.05	0	143.999
N_AS2047-008.1	AS2047-008	981.381	AS2047-011	980.754	Circular		1	4.5	0.013	0.5	0.5	0	152.932
N_AS2047-011.1	AS2047-011	980.754	AE2047-016	979.6	Special	Horizontal Ellipse	1	6.91	0.013	0.5	0.5	0	461.551
N_AS2048-004.1	AS2048-004	987.48	WMPB_GW_DW5	986.1	Circular		1	4.5	0.013	0.5	0.5	0	41.66
N_AS2048-005.1	AS2048-005	988.47	AS2048-004	987.48	Circular		1	4	0.013	0.05	0.5	0	212.596
N_AS2048-010.1	AS2048-010	989.43	AS2048-005	988.47	Circular		1	4	0.013	0.05	0.05	0	181.417
N_AS2049-002.1	AS2049-002	1005.7	AS2149-002	1001.6	Circular		1	3	0.013	0.25	0.25	0	145.093
N_AS2051-005.1	AS2051-005	1055.1	IN2051-006	1053.73	Circular		1	5	0.013	0.05	0.05	0	131.397
N_AS2052-006.1	AS2052-006	1062.34	MI2052-021	1061.81	Circular		1	2	0.013	0.25	0.05	0	66.621
N_AS2052-022.1	AS2052-022	1061.52	IN2052-026	1059.33	Circular		1	2	0.013	0.25	0.25	0	280.632
N_AS2147-001.1	AS2147-001	970.76	AS2147-006	969.77	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.25	0	164.526
N_AS2147-006.1	AS2147-006	969.77	AS2147-007	968.62	Special	Horizontal Ellipse	1	5.66	0.013	0.25	0.05	0	235.519
N_AS2147-007.1	AS2147-007	968.62	OSTrSouthPond	968.2	Special	Horizontal Ellipse	1	5.66	0.013	0.05	1	0	60.941
N_AS2148-004.1	AS2148-004	972.3	AS2147-001	970.76	Circular		1	3.5	0.013	0.25	0.25	0	193.656
N_AS2148-007.1	AS2148-007	976.6	AS2148-004	972.3	Circular		1	3.5	0.013	0.5	0.25	0	432.627
N_AS2148-009.1	AS2148-009	993.57	AS2148-010	991.63	Circular		1	3.5	0.013	0.25	0.25	0	249.651
N_AS2148-010.1	AS2148-010	991.63	AS2048-010	989.43	Circular		1	4	0.013	0.25	0.05	0	347.835
N_AS2149-001.1	AS2149-001	997.83	AS2148-009	993.57	Circular		1	3.5	0.013	0.5	0.25	0	248.358
N_AS2149-002.1	AS2149-002	1001.6	AS2149-001	997.83	Circular		1	3	0.013	0.25	0.5	0	133.589
N_AS2151-003.1	AS2151-003	1048.697	AS2151-004	1047.843	Circular		1	3.5	0.013	0.05	0.5	0	90.933
N_AS2151-004.1	AS2151-004	1047.843	AS2151-009	1044.55	Circular		1	4	0.013	0.5	0.5	0	350.382
N_AS2151-029.1	AS2151-029	1018.14	AE2151-030	1018	Circular		1	5	0.013	0.25	1	0	83
N_AS2152-022.1	AS2152-022	1050.68	AS2151-003	1048.697	Circular		1	3.5	0.013	0.05	0.05	0	214.251
N_AS2152-023.1	AS2152-023	1053.83	TE2152-009	1053.666	Circular		1	2	0.013	0.5	0.5	0	49.546
N_AS2156-017.1	AS2156-017	1051.03	IN2156-016	1050.87	Circular		1	4	0.013	0.5	0.05	0	12.002
N_AS2156-020.1	AS2156-020	1054	AS2156-017	1051.03	Circular		1	4	0.013	0.05	0.5	0	195.18
N_AS2156-028.1	AS2156-028	1057.29	AS2156-020	1054	Circular		1	4	0.013	0.05	0.05	0	326.289
N_AS2156-036.1	AS2156-036	1062.55	AS2156-028	1057.29	Circular		1	4	0.013	0.05	0.05	0	372.39
N_AS2156-077.1	AS2156-077	1054.9	AS2156-041	1053.41	Circular		1	3	0.013	0.05	0.05	0	30.594
N_AS2247-001.1	AS2247-001	964.7	AS2247-005	964.28	Circular		1	5	0.013	0.5	0.25	0	230.248
N_AS2247-005.1	AS2247-005	964.28	AS2247-006	963.84	Circular		1	5	0.013	0.25	0.25	0	199.575
N_AS2248-004.1	AS2248-004	966.02	AS2247-001	964.7	Circular		1	5	0.013	0.25	0.5	0	226.504
N_AS2250-006.1	AS2250-006	991.98	AS2250-020	991.68	Circular		1	4	0.013	0.05	0.5	0	25.433
N_AS2250-019.1	AS2250-019	991.89	AS2250-020	991.68	Rectangular		1	4	0.013	0.05	0.05	None (,)	18.459
N_AS2251-007.1	AS2251-007	1025	AS2251-008	1024	Circular		1	2.5	0.013	0.25	0.5	0	40.152
N_AS2251-008.1	AS2251-008	1024	AS2251-034	1019.11	Circular		1	4	0.013	0.5	0.5	0	214.561
N_AS2251-018.1	AS2251-018	1038.5	AS2251-021	1035.17	Circular		1	2.5	0.013	0.5	0.25	0	200.942
N_AS2251-021.1	AS2251-021	1035.17	AS2251-022	1034.87	Circular		1	2.5	0.013	0.25	0.25	0	38.316
N_AS2251-022.1	AS2251-022	1034.87	TP2251-032	1027.8	Circular		1	2.5	0.013	0.25	0.05	0	286.033
N_AS2251-035.1	AS2251-035	1019.03	AS2151-029	1018.14	Circular		1	5	0.013	0.05	0.25	0	538.057
N_AS2251-035.2	AS2251-034	1019.11	AS2251-035	1019.03	Special	Horizontal Ellipse	1	6.33	0.013	0.5	0.05	0	51.005
N_AS2254-005.1	AS2254-005	1052.66	IN2254-012	1048.64	Special	Horizontal Ellipse	1	3.75	0.013	0.05	0.5	0	357.354
N_AS2257-003.1	AS2257-003	1056.47	AE2257-001	1055.864	Rectangular		1	4	0.013	0.5	0.05	0	302.62
N_AS2257-004.2	AS2257-004.1	1056.695	AS2257-003	1056.47	Rectangular		1	4	0.013	0.05	0.5	0	41.353

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
N_AS2257-004.3	AS2257-004	1057.79	AS2257-004.1	1056.695	Rectangular		1	4	0.013	0.25	0.05	0	201.051
N_AS2258-030.1	AS2258-030	1064.04	IN2258-028	1063.36	Special	Horizontal Ellipse	1	5	0.013	0.25	0.25	0	116.143
N_AS2258-031.1	AS2258-031	1065.1	AS2258-030	1064.04	Special	Horizontal Ellipse	1	5	0.013	0.05	0.25	0	52.006
N_AS2258-048.1	AS2258-048	1066.28	AS2258-031	1065.1	Special	Horizontal Ellipse	1	5	0.013	0.25	0.05	0	235.689
N_AS2258-056.1	AS2258-056	1070.77	IN2258-049	1068.06	Circular		1	3	0.013	0.05	0.05	0	125.066
N_AS2259-001.1	AS2259-001	1092.6	IN2258-023	1086.91	Circular		1	2	0.013	0.05	0.25	0	113.938
N_AS2351-003.1	AS2351-003	1010.53	AE2351-002	1009.25	Special	Horizontal Ellipse	2	3.5	0.013	0.5	0.5	0	269.638
N_AS2351-015.1	AS2351-015	1013	IN2351-014	1012.86	Special	Horizontal Ellipse	2	3.5	0.013	0.05	0.05	0	26.34
N_ELD_N_Dep	ELD_N_DEP	1055	AS2152-023	1054.5	Circular		1	1	0.013	0.5	0.25	None (,)	50
N_GR2256-019.1	PD2256-019_AE2256-01	1048.343	MI2256-075	1046.93	Rectangular		1	4	0.013	0.05	0.05	0	207.227
N_GR2256-019.2	GR2256-019	1049.76	PD2256-019_AE2256-015	1048.343	Rectangular		1	4	0.013	0.1	0.05	None (,)	204.979
N_HD2249-033.1	HD2249-033_INSERT	978.692	HD2248-006	973.6	Rectangular		1	5	0.013	0.05	0.5	0	449.159
N_HD2249-033.2	HD2249-033	982.16	HD2249-033_INSERT	978.692	Rectangular		1	5	0.013	0.5	0.05	56	394.076
N_IN1753-012.1	IN1753-012	1088.32	IN1753-009	1086.39	Circular		1	2	0.013	0.05	0.05	0	91.486
N_IN1753-018.1	IN1753-018	1088.67	IN1753-012	1088.32	Circular		1	2	0.013	0.5	0.05	0	67.769
N_IN1753-040.1	IN1753-040	1085.56	AE1753-001	1085.1	Special	Horizontal Ellipse	1	5.66	0.013	0.5	1	0	195
N_IN2047-023.1	IN2047-023	983.72	IN2047-022	983.5	Circular		1	3	0.013	0.5	0.05	0	41.635
N_IN2051-001.1	IN2051-001	1055.46	AS2051-005	1055.1	Circular		1	4	0.013	0.05	0.05	0	127.817
N_IN2051-006.1	IN2051-006	1053.73	IN2051-007	1052.76	Circular		1	5	0.013	0.15	0.25	0	157.923
N_IN2051-007.1	IN2051-007	1052.76	IN2051-008	1052.55	Circular		1	5	0.013	0.5	0.05	0	35.334
N_IN2051-008.1	IN2051-008	1052.55	SMPB_GW_BWD	1051.35	Circular		1	5	0.013	0.05	0.5	0	60.411
N_IN2051-032.1	IN2051-032	1057.47	AS2051-023	1057.34	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.5	0	58.313
N_IN2051-033.1	IN2051-033	1057.52	IN2051-032	1057.47	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.05	0	11.593
N_IN2051-036.1	IN2051-036	1058.22	IN2051-033	1057.52	Circular		1	2.5	0.013	0.25	0.05	0	137.539
N_IN2051-037.1	IN2051-037	1058.74	IN2051-036	1058.22	Circular		1	2.5	0.013	0.25	0.25	0	103.511
N_IN2051-055.1	IN2051-055	1056.79	MI2051-054	1055.7	Circular		1	3	0.013	0.05	0.05	0	72.962
N_IN2052-004.1	IN2052-004	1063.51	AS2052-006	1062.34	Circular		1	2	0.013	0.5	0.25	0	138.409
N_IN2052-009.1	IN2052-009	1059.5	IN2051-037	1058.74	Circular		1	2.5	0.013	0.5	0.25	0	150.266
N_IN2156-016.1	IN2156-016	1050.87	AE2156-047	1049.9	Circular		1	4	0.013	0.5	1	0	65
N_IN2158-007.1	IN2158-007	1067.55	AS2258-014	1066.19	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.25	0	125.699
N_IN2158-009.1	IN2158-009	1067.98	IN2158-007	1067.55	Circular		1	3	0.013	0.05	0.5	0	98.587
N_IN2158-010.1	IN2158-010	1068	IN2158-009	1067.98	Circular		1	2.5	0.013	0.05	0.05	0	9.976
N_IN2158-014.1	IN2158-014	1070	IN2158-010	1068	Circular		1	2.5	0.013	0.05	0.05	0	190.386
N_IN2246-002.1	IN2246-002	972.96	IN2246-003	972.78	Circular		1	2.5	0.013	0.05	0.5	0	24.317
N_IN2246-003.1	IN2246-003	972.78	IN2246-004	972.6	Circular		1	3	0.013	0.5	0.05	0	5.215
N_IN2246-004.1	IN2246-004	972.6	OSTrSouthPond	968.083	Circular		1	3	0.013	0.5	1	0	365.694
N_IN2247-011.1	IN2247-011	967.72	IN2247-010	967	Circular		1	2	0.013	0.05	0.25	0	110.634
N_IN2248-003.1	IN2248-003	966.6	AS2248-004	966.02	Circular		1	4	0.013	0.05	0.25	0	116.053
N_IN2249-003.1	IN2249-003	972.7	IN2248-001	968.75	Circular		1	3	0.013	0.05	0.05	0	393.03
N_IN2250-039.1	IN2250-039	994.26	AS2250-019	991.89	Rectangular		1	3	0.013	0.05	0.05	0	202.631
N_IN2256-071.1	IN2256-071	1049.83	Node1799	1049.25	Special	Horizontal Ellipse	1	4.08	0.013	0.5	1	0	58
N_IN2257-009.1	IN2257-009	1059.02	AS2257-012	1057.87	Circular		1	2	0.013	0.05	0.5	0	47.923
N_IN2258-023.1	IN2258-023	1086.91	AS2258-052	1080.75	Circular		1	2.5	0.013	0.5	0.5	0	125.419
N_IN2258-028.1	IN2258-028	1063.36	AE2258-029	1061.6	Special	Horizontal Ellipse	1	6.33	0.013	0.5	1	0	58.006
N_IN2258-049.1	IN2258-049	1068.06	AS2258-048	1066.28	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.25	0	280.602
N_IN2351-006.1	IN2351-006	1012	AS2351-003	1010.53	Special	Horizontal Ellipse	2	3.5	0.013	0.25	0.5	0	292.038
N_IN2351-014.1	IN2351-014	1012.86	IN2351-006	1012	Special	Horizontal Ellipse	2	3.5	0.013	0.05	0.25	0	172.392
N_IN2357-008.1	IN2357-008	1059.41	IN2257-009	1059.02	Circular		1	2	0.013	0.05	0.25	0	19.102
N_Junction	Node2121	1019	IN2251-024	1018.48	Circular		1	3	0.013	0.05	0.05	0	103.86

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
N_MI2051-054.1	MI2051-054	1055.7	IN2051-001	1055.46	Circular		1	3	0.013	0.05	0.05	0	25.584
N_MI2052-021.1	MI2052-021	1061.81	AS2052-022	1061.52	Circular		1	2	0.013	0.05	0.05	0	30.415
N_MI2256-075.1	MI2256-075	1046.93	JB2256-065	1044.42	Rectangular		1	4	0.013	0.05	0.25	0	72.167
N_M-PB_GW_DEMING_WAY_SECTION	GR2145-003	959	PB_OUTFALL	952.85	Natural		1	0	0.013	0	0	None (,)	813.581
N_M-PB_GW_DEMING_WAY_SECTION_DS	PB_OUTFALL	952.85	PB_END	951.74	Natural		1	0	0.013	0.5	0.5	None (,)	192.15
N_N2052-026.1	IN2052-026	1059.33	TP2052-028	1058.6	Circular		1	2.5	0.013	0.5	0.5	0	40.697
N_OSL_BLRamp	OSR_BL_SERAMP_US	999	OSR_BL_SERAMP_DS	997	Special	Horizontal Ellipse	2	3.16	0.013	0.5	0.5	0	144.304
N_PVcon	Node2005	1062.914	AS2156-036	1062.55	Circular		1	3	0.013	0.5	0.5	0	36.46
N_PVcon2	MINPT_RD_SW1	1060.044	AS2156-040	1058.76	Circular		1	3	0.013	0.5	0.5	0	128.48
N_TE2152-009.1	TE2152-009	1053.666	AS2152-010	1053.02	Circular		1	3	0.013	0.5	0.05	0	102.208
N_TP2250-010.1	TP2250-010	997.35	IN2250-039	994.26	Rectangular		1	3	0.013	0.05	0.05	0	263.746
N_TP2251-032.1	TP2251-032	1027.8	AS2251-007	1025	Circular		1	2.5	0.013	0.05	0.05	0	101.284
ND1953-001_ND2053-001	ND1953-001	1064.56	ND2053-001	1063.57	Circular		1	3.5	0.013	0.5	0.5	0	56
ND2053-001_ND2053-002	ND2053-001	1063.57	ND2053-002	1058.85	Natural		1	0	0.013	0	0	None (,)	508.203
ND2053-002_TP2052-028	ND2053-002	1058.85	TP2052-028	1058.6	Rectangular		1	4	0.013	0.2	0.05	Square Edge with Headwall (Circ, Conc)	89.017
New_Box4	AE2256-011	1054.6	GR2256-019	1053.779	Rectangular		1	4	0.013	0.05	0.1	0	241.32
NEW_PIPE_08_06_2019	IN1647-037	1075.74	NEW_SAS_08_06_19	1074.86	Special	Horizontal Ellipse	1	3.16	0.011	0.25	0.25	None (,)	172.285
NewBox	AE2257-001	1055.864	AE2257-030	1055.66	Rectangular		1	4	0.013	0.05	0.05	None (,)	59.94
NewBox2	AE2257-030	1055.66	AE2256-035	1055.173	Rectangular		1	4	0.013	0.05	0.05	None (,)	143.17
NewBox3	AE2256-035	1055.03	AE2256-010	1055	Rectangular		1	4	0.013	0.05	0.05	None (,)	49.55
OakbrookPr1	AS2354-006	1047.12	AS2354-012	1045.71	Circular		1	3	0.013	0.5	0.5	0	282
OldSauk_Pr1	AS2349-006	985.5	AS2349-008	984.8	Circular		1	3	0.013	0.1	0.4	0	70
OldSauk_Pr2	IN2349-002	987.05	AS2349-006	985.5	Circular		1	3	0.013	0.5	0.1	0	207
OldSauk_Pr3	IN2349-001	987.46	IN2349-002	987.05	Circular		1	3	0.013	0.05	0.5	0	41
OldSauk_Pr4	IN2350-002	987.67	IN2349-001	987.46	Circular		1	3	0.013	0.05	0.05	0	42
OldSauk_Pr5	IN2350-001	987.99	IN2350-002	987.67	Circular		1	3	0.013	0.5	0.05	0	32
OldSauk_Pr6	IN2349-007	986	AS2349-006	985.5	Circular		1	3	0.013	0.05	0.5	0	25
OldSauk_Pr8	IN2350-003	986.21	IN2349-007	986	Circular		1	3	0.013	0.5	0.05	0	42
OldSaukGWPr1	Node1993	992.8	Node1994	991.7	Rectangular		1	5	0.013	0.2	0.5	30 to 75 deg Wingwall Flares (Rect, Conc)	103
OldSaukPr1	IN1750-029	1078.14	AS1750-024	1076.04	Circular		1	3	0.013	0.05	0.05	0	104.94
OldSaukPr10	IN1649-016	1101.04	IN1749-010	1091.25	Circular		1	2	0.013	0.05	0.25	0	275.21
OldSaukPr11	IN1849-018	1070.93	AE1849-030	1068	Circular		1	5	0.013	0.5	1	0	585
OldSaukPr12	AS1849-047	1071.52	IN1849-018	1070.93	Circular		1	4	0.013	0.05	0.5	0	118.01
OldSaukPr13	AS1849-048	1071.64	AS1849-047	1071.52	Circular		1	3	0.013	0.05	0.05	0	11.82
OldSaukPr14	TP2549-008	992.18	EMPB_GW_LOSR1	991.11	Circular		1	5	0.013	0.05	0.5	0	284
OldSaukPr15	AS1849-023	1072.32	AS1849-048	1071.64	Circular		1	3	0.013	0.05	0.05	0	68.09
OldSaukPr16	AS1849-053	1072.57	AS1849-023	1072.32	Circular		1	3	0.013	0.05	0.05	0	49.05
OldSaukPr17	AS2549-001	993.34	TP2549-008	992.18	Circular		1	5	0.013	0.05	0.05	0	238
OldSaukPr18	AS2549-003	993.81	AS2549-001	993.34	Circular		1	5	0.013	0.5	0.05	0	37
OldSaukPr19	AS2550-012	994.81	AS2549-003	993.81	Circular		1	4	0.013	0.05	0.5	0	86
OldSaukPr2	IN1750-015	1080.33	IN1750-029	1078.14	Circular		1	3	0.013	0.05	0.05	0	109.39
OldSaukPr20	AS2649-008	995.17	AS2549-003	993.81	Circular		1	3	0.013	0.5	0.05	0	68
OldSaukPr21	IN2649-011	995.53	AS2649-008	995.17	Circular		1	3	0.013	0.05	0.5	0	18
OldSaukPr22	MI2650-010	995.87	IN2649-011	995.53	Circular		1	3	0.013	0.15	0.05	0	34
OldSaukPr23	AS2650-004	996.24	MI2650-010	995.87	Circular		1	3	0.013	0.4	0.1	0	37
OldSaukPr24	IN2250-054	985.4	EMPB_GW_OSR2	984	Special	Horizontal Ellipse	1	6.33	0.013	0.25	0.5	0	187
OldSaukPr25	AS2350-024	986.92	IN2250-054	985.4	Special	Horizontal Ellipse	1	6.33	0.013	0.5	0.25	0	304
OldSaukPr26	AE2350-025	987.04	AS2350-024	986.92	Special	Horizontal Ellipse	1	6.33	0.013	1	0.5	0	12
OldSaukPr27	AE2350-026	987.79	AE2350-027	987.4	Special	Horizontal Ellipse	1	6.33	0.013	0.5	0.5	None (,)	77

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
OldSaukPr28	IN2350-007	986.25	SC_Out_Pr1	986	Special	Horizontal Ellipse	1	3.16	0.013	0.1	0.5	0	50
OldSaukPr29	IN2350-004	986.5	IN2350-007	986.25	Special	Horizontal Ellipse	1	3.16	0.013	0.5	0.1	0	50
OldSaukPr3	IN1750-031	1082.45	IN1750-015	1080.33	Circular		1	3	0.013	0.05	0.05	0	106.04
OldSaukPr4	IN1750-033	1082.69	IN1750-031	1082.45	Circular		1	3	0.013	0.05	0.05	0	11.67
OldSaukPr6	IN1750-034	1088.64	IN1750-033	1082.69	Circular		1	3	0.013	0.25	0.05	0	297.45
OldSaukPr7	IN1750-035	1089.2	IN1750-034	1088.64	Circular		1	3	0.013	0.25	0.25	0	27.96
OldSaukPr9	IN1749-010	1089.94	IN1750-035	1089.2	Circular		1	3	0.013	0.25	0.25	0	48.79
OSTP_Pipes	OSTP_POND_SYSTEM_J	964.7	OSTP_POND_SYSTEM_JCT_12	964.1	Circular		2	2	0.011	0.2	1	Square Edge with Headwall (Circ, Conc)	20
OSTP_POND_SYSTEM_CHANNEL_1_TO_2	OSTP_POND_SYSTEM_J	963.27	OSTP_POND_SYSTEM_JCT_6	963.17	Natural		1	0	0.013	0	0	None (,)	113.806
OSTP_POND_SYSTEM_OUTLET	OSTP_POND_SYSTEM_JCT_1		PD2145-002										
OSTP_POND_SYSTEM_OUTLET2	OSTP_POND_SYSTEM_JCT_1		PD2145-002										
OSTP_POND_SYSTEM_OUTLET3	OSTP_POND_SYSTEM_JCT_1		PD2145-002										
OSTP_POND_SYSTEM_STAGE1	OSTP_POND_SYSTEM_J	963.8	OSTP_POND_SYSTEM_JCT_8A	963.27	Natural		1	0	0.013	0	0	None (,)	93.2
OSTP_POND_SYSTEM_STAGE2	OSTP_POND_SYSTEM_J	963.17	OSTP_POND_SYSTEM_JCT_5	961.6	Natural		1	0	0.013	0	0	None (,)	400.076
OSTP_POND_SYSTEM_STAGE3	OSTP_POND_SYSTEM_J	961.4	OSTP_POND_SYSTEM_JCT_3	959.6	Natural		1	5	0.013	0	0	None (,)	33
OSTP_POND_SYSTEM_STAGE4	OSTP_POND_SYSTEM_J	959.5	OSTP_POND_SYSTEM_JCT_1	959.5	Natural		1	0	0.013	0	0	None (,)	251.565
OSTP_POND_SYSTEM_US_CHANNEL1	OSTP_POND_SYSTEM_J	964.42	OSTP_POND_SYSTEM_JCT_8	963.8	Natural		1	0	0.013	0	0	None (,)	121.3
OSTP_POND_SYSTEM_US_CHANNEL2	OSTP_POND_SYSTEM_J	969.5	OSTP_POND_SYSTEM_JCT_9	964.42	Natural		1	0	0.013	0	0	None (,)	131.934
OSTP_POND_SYSTEM_US_CHANNEL3	AE2147-012	968.2	OSTP_POND_SYSTEM_JCT_9	964.42	Natural		1	0	0.013	0	0	None (,)	194.442
OSTP_POND_SYSTEM_US_CHANNEL4	OSTP_POND_SYSTEM_J	964.1	OSTP_POND_SYSTEM_JCT_8	963.8	Natural		1	0	0.013	0	0	None (,)	51.323
OSTP_POND_SYSTEM1_PIPE	OSTP_POND_SYSTEM1_	965.5	OSTP_POND_SYSTEM1_DS	965.07	Special	Horizontal Ellipse	1	3.75	0.013	0.2	1	Groove End with Projecting (Circ, Conc)	27
OSTP_POND_SYSTEM7_PIPE	OSTP_POND_SYSTEM_J	965	OSTP_POND_SYSTEM_JCT_10	964.75	Rectangular		2	5	0.013	0.2	1	45 deg Wingwall Flares (Rect, Conc)	20.833
OSTP_W_GW_TO_POND1_OVERFLO	OSTP_POND_SYSTEM_J	969.9	OSTP_POND_SYSTEM_JCT_8A	966.21	Trapezoidal		1	1	0.035	0	0	None (,)	84.727
OSTrOut1	OSTP_POND_SYSTEM_J	957.8	DemingDS1	957.46	Rectangular		1	6	0.013	1	0.5	45 deg Wingwall Flares (Rect, Conc)	160
OSTrOut2	OSTP_POND_SYSTEM_J	957.8	GR2145-003	957.46	Rectangular		1	6	0.013	1	0.5	45 deg Wingwall Flares (Rect, Conc)	160
OSTrOut3	OSTP_POND_SYSTEM_J	957.8	DemingDS3	957.46	Rectangular		1	6	0.013	1	0.5	45 deg Wingwall Flares (Rect, Conc)	160
OxwoodCrPr1	IN2550-001	1005.46	GR2550-006	1002	Circular		1	3	0.013	0.5	1	0	240
PARAGON_INF_BASIN_ORI	PAR_INF_OUT		PD1653-004										
PARAGON_INF_BASIN_ORIFICE2	PAR_INF_OUT		PD1653-004										
PARAGON_INF_BASIN_WEIR1	PAR_INF_OUT		PD1653-004										
PARAGON_INF_BASIN_WEIR2	PAR_INF_OUT		PD1653-004										
PARAGON_WP_ORIFICE	PAR_WP_OUT		PD1654-010										
PARAGON_WP_V_NOTCH	PAR_WP_OUT		PD1654-010										
PD1653-004_PD1753-055	PD1653-004	1094.5	PD1753-055	1094.42	Circular		1	2.5	0.013	0.5	0.5	0	18.675
PD1654-010_AS1653-005	PD1654-010	1095.78	AS1653-005	1095.03	Circular		1	3	0.013	0.25	0.25	0	130.097
PD1753-055_AS1653-003	PD1753-055	1094.42	AS1653-003	1092.03	Circular		1	2.5	0.013	0.5	0.5	0	183.634
PD2145-002_TP2145-006	PD2145-002	957.8	TP2145-006	957.46	Rectangular		1	6	0.013	0.2	0.5	90 deg Headwall with 45 deg Bevels (Rect, Conc)	160
PF_BH_CULVERT	PF_BH_CULV_US	1133.33	PF_BH_CULV_DS	1133	Circular		1	1	0.013	0.5	0.5	None (,)	77.048
PF_E_INF_ORIFICE	PF_OUTLOT3_GRATE		PF-OUTLOT3_SAS										
PF_E_INF_WEIR	PF_OUTLOT3_GRATE		PF-OUTLOT3_SAS										
PF_PATH_CULVERT	PF_PATH_US	1138.14	PF_PATH_DS	1137.82	Circular		1	1	0.013	0.5	0.5	None (,)	35.791
PF_PLAYGROUND_CULVERT	PF_PLAYGROUND_STOR	1141.89	PF_PLAYGROUND_OUT	1141.16	Circular		1	1	0.013	0.5	0.5	None (,)	46.392
PF_S_INF_BASIN_ORIFICE	PF-OUTLOT4-OUT		PF-S32										
PF_S_INF_BASIN_PIPE_IN	PF_S_WP_SAS	1110.01	PF_S_INF_BASIN	1110	Circular		2	3.5	0.013	0.5	0.5	None (,)	9.639
PF_S_INF_BASIN_WEIR	PF-OUTLOT4-OUT		PF-S32										
PF_S_WP_ORIFICE	PF_S_WP_OUT		PF_S_WP_SAS										
PF_S_WP_PIPE_OUT	PF_S_WP	1106.01	PF_S_WP_OUT	1106	Circular		2	3.5	0.013	0.5	0.5	None (,)	12.568
PF_S_WP_WEIR	PF_S_WP_OUT		PF_S_WP_SAS										
PF_SE_INF_IN_PIPE	PF_SE_WP_TO_INF_GR/	1121	PF_SE_INF_BASIN	1121	Circular		1	2	0.013	0.5	0.5	None (,)	38.116

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
PF_SE_WP_INF_ORIFICE	PF_SE_WP_INF_BASIN_OUTLET		PF_SE_WP_INF_OUT_2										
PF_SE_WP_INF_OUT2	PF_SE_INF_BASIN	1121	PF_SE_WP_INF_BASIN_OUTLET	1119	Circular		1	2	0.013	0.5	0.5	None (,)	34.313
PF_SE_WP_INF_OVERFLOW	PF_SE_INF_BASIN		PF-S36										
PF_SE_WP_INF_PIPE_OUT	PF_SE_WP_INF_OUT_2	1119	PF-S36	1116.52	Circular		1	2	0.013	0.5	0.5	None (,)	44.662
PF_SE_WP_INF_WEIR	PF_SE_WP_INF_BASIN_OUTLET		PF_SE_WP_INF_OUT_2										
PF_SE_WP_PIPE_OUT	PF_SE_WET_POND	1118	PF_SE_WP_TO_INF	1118	Circular		1	2	0.013	0.5	0.5	None (,)	49.26
PF_SE_WP_TO_INF_BASIN_OVERFLOW	PF_SE_WET_POND		PF_SE_INF_BASIN										
PF_SE_WP_TO_INF_BASIN_WEIR	PF_SE_WP_TO_INF		PF_SE_WP_TO_INF_GRATE										
PF-AES36_PF-S36	PF-AES36	1117.7	PF-S36	1116.52	Circular		1	1	0.013	0.05	0.05	None (,)	36.892
PF-DROPOFF_OUT_PF-S42	PF-DROPOFF	1122.43	PF-S42	1118.99	Circular		1	1.5	0.013	0.5	0.05	None (,)	193.045
PF-LOT1_PF-S2	PF-LOT1	1141.3	PF-S2	1140.79	Circular		1	1	0.013	0.5	0.5	None (,)	51
PF-OFFSITE_PF-S17	POPE_FARMS_OFFSITE	1126	PF-S17	1123.73	Natural		1	0	0.02	0	0	None (,)	188.142
PF-OUTLOT2_PF-S5	PF_OUTLOT2	1137.8	PF-S5	1137.54	Circular		1	1	0.013	0.5	0.05	None (,)	26
PF-OUTLOT3_IN1549-020	PF-OUTLOT3_SAS	1108.5	IN1549-020	1107.6	Circular		1	1	0.013	0.5	0.5	None (,)	12.654
PF-OUTLOT3_TO_SAS	PF_E_INF_BASIN	1111.01	PF_OUTLOT3_GRATE	1111	Circular		1	1	0.013	0.5	0.5	None (,)	13.701
PF-OUTLOT4_PF-S32	PF_S_INF_BASIN	1110.25	PF-OUTLOT4-OUT	1110.26	Circular		1	3	0.013	0.5	0.5	None (,)	13.805
PF-S10_PF-S12	PF-S10	1124.07	PF-S12	1123.96	Circular		1	1	0.013	0.5	0.5	None (,)	8.681
PF-S11_PF-S12	PF-S11	1124.07	PF-S12	1123.44	Circular		1	1	0.013	0.5	0.5	None (,)	48.828
PF-S13_PF-S15	PF-S13	1117.81	PF-S15	1117.7	Circular		1	1	0.013	0.5	0.5	None (,)	11.936
PF-S14_PF-S15	PF-S14	1121.8	PF-S15	1117.7	Circular		1	1	0.013	0.5	0.5	None (,)	47.743
PF-S17_PF-S17A	PF-S17	1121.5	PF-S17A	1121.3	Circular		1	1	0.013	0.5	0.25	None (,)	49.51
PF-S17A_TO_SE_WP	PF-S17A	1121.3	PF_SE_WET_POND	1121	Circular		1	1	0.013	0.25	1	None (,)	51.164
PF-S23_PF-S27	PF-S23	1113.2	PF-S27	1112.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	47
PF-S24_PF-S27	PF-S24	1113.02	PF-S27	1112.73	Circular		1	1.25	0.013	0.5	0.5	None (,)	29
PF-S25_PF-S26	PF-S25	1113.34	PF-S26	1113.26	Circular		1	1	0.013	0.5	0.5	None (,)	13
PF-S26_PF-S21	PF-S21	1113.19	PF-S26	1112.16	Circular		1	2	0.013	0.25	0.5	None (,)	123
PF-S28_PF-OUTLOT4	PF-S28	1110.72	PF_S_WP	1110.5	Circular		1	2.5	0.013	0.25	1	0	55
PF-S31_PFS28	PF-S31	1112.4	PF-S28	1112.22	Circular		1	1	0.013	0.5	0.25	None (,)	36
PF-S32_PF-S30	PF-S32	1108	PF-S30	1106.79	Circular		1	3	0.013	0.5	0.5	None (,)	28.394
PF-S34_PF-S35	PF-S34	1116.41	PF-S35	1116.08	Circular		1	1	0.013	0.25	0.25	None (,)	53.179
PF-S35_PF-AES35	PF-S35	1116.08	PF-AES35	1115.9	Circular		1	1	0.013	0.25	1	None (,)	41.588
PF-S36_PF-S34	PF-S36	1116.52	PF-S34	1116.41	Circular		1	1	0.013	0.25	0.25	None (,)	43.969
PF-S38_PF-S18	PF-S38	1115.28	PF-S18	1114.86	Circular		1	1.5	0.013	0.5	0.5	None (,)	45.275
PF-S41_PF-S42	PF-S41	1120.46	PF-S42	1119.24	Circular		1	1.25	0.013	0.25	0.5	None (,)	75.488
PF-S42_PF-S38	PF-S42	1118.89	PF-S38	1115.28	Circular		1	1.5	0.013	0.05	0.5	None (,)	155
PF-S44_PF-S8	PF-S44	1126.31	PF-S8	1125.55	Circular		1	1	0.013	0.5	0.5	None (,)	153
PF-S47_PF-S41	PF-S47	1120.62	PF-S41	1120.56	Circular		1	1.25	0.013	0.05	0.25	None (,)	22.131
PF-S48_PF-S52	PF-S48	1124.9	PF-S52	1123.14	Circular		1	1	0.013	0.05	0.05	None (,)	87.884
PF-S49_PF-S48	PF-S49	1126.76	PF-S48	1125	Circular		1	1	0.013	0.5	0.05	None (,)	72.139
PF-S5_PF-S7	PF-S5	1137.44	PF-S7	1137.13	Circular		1	1	0.013	0.05	0.5	None (,)	31
PF-S52_PF-S47	PF-S52	1123.04	PF-S47	1120.97	Circular		1	1	0.013	0.05	0.05	None (,)	83.063
PF-S6_PF-S7	PF-S6	1137.42	PF-S7	1137.31	Circular		1	1	0.013	0.5	0.5	None (,)	11.066
PF-S60_DROPOFF_IN	PF-S60	1127.5	PF-DROPOFF	1127	Circular		1	1.5	0.013	0.5	0.5	None (,)	52.083
PF-SWALE1	PF_PLAYGROUND_OUT	1141.16	PF_PATH_US	1138.14	Trapezoidal		1	4	0.027	0	0	None (,)	235.468
PF-SWALE2	PF_PATH_DS	1137.82	PF_SE_WET_POND	1124	Trapezoidal		1	4	0.027	0	0	None (,)	911.921
Pipe Out	Pond A	1074	PV2292	1073.9	Circular		1	1.5	0.013	1	0.5	0	17
PL1547-026_AS1547-023	PL1547-026	1124.41	AS1547-023	1115.12	Circular		1	1.5	0.013	0.5	0.25	None (,)	89.806
PL1951-004_AS2051-063	PL1951-004	1070.62	PV294	1070.243	Circular		1	2	0.013	0.5	0.05	0	21.413
PL1951-004_AS2051-063.1	PV294	1070.243	AS2051-063	1069.67	Circular		1	2	0.013	0.5	0.05	0	32.592

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
PL2052-025_IN2052-024	PL2052-025	1062.35	IN2052-024	1062.17	Circular		1	1.5	0.013	0.5	0.25	0	37.001
PL2052-030_IN2052-029	PL2052-030	1060.47	IN2052-029	1060.33	Circular		1	1.5	0.013	0.5	0.25	0	29.001
PL2257-013_AS2257-012	PL2257-013	1057.97	AS2257-012	1057.87	Circular		1	2	0.013	0.5	0.05	0	15.023
PlazaDrPr1	IN2258-025	1069.43	IN2258-028	1063.36	Circular		1	3	0.013	0.05	0.25	0	176
PLEASANT_V_MINERAL_PT_GRATE	AE2056-023		SS2056-022										
PondA Overflow	Pond A		PV2292										
PondBoxCulv	OSTP_POND_SYSTEM_J	959	OSTP_POND_SYSTEM_JCT_2	958.5	Rectangular		3	6	0.013	1	1	90 deg Headwall with 45 deg Bevels (Rect, Conc)	50
Pr_BH_1	AS1849-013	1068	AS1849-013.1	1067.7	Circular		1	2	0.013	1	0.05	Groove End with Headwall (Circ, Conc)	60
Pr_BH3	Node1910	1067.7	AS1849-001	1063.42	Circular		1	2	0.013	0.5	0.05	0	214
Pr_BH5	AS1849-001	1063.42	MI1848-034	1060.18	Circular		1	2	0.013	0.05	0.05	0	161.84
Pr_BH6	MI1848-034	1060.18	AS1848-013	1058.85	Circular		1	2	0.013	0.05	0.25	0	66.19
Pr_BH7	AS1848-013	1058.85	IN1848-019	1055.75	Circular		1	2	0.013	0.25	0.05	0	202.58
Pr_BH8	IN1848-019	1055.75	AS1848-018	1055.15	Circular		1	2	0.013	0.25	0.05	0	39.83
Pr_BH9	AS1848-018	1055.15	AS1948-012	1053.75	Circular		1	2	0.013	0.05	0.25	0	93.12
Pr_Box_Out	Node1769	971.95	WEXFORD_POND_OUT	971.85	Rectangular		1	6	0.013	1	0.5	45 deg Wingwall Flares (Rect, Conc)	60
Pr24_2	AS1849-013.1	1067.7	Node1910	1067.67	Circular		1	2	0.011	0.5	0.5	0	10
PrBLBox1	BeltineNUS1	967.6	BeltlineNDS1	966	Rectangular		1	6	0.013	0.5	0.5	45 deg Wingwall Flares (Rect, Conc)	237
PrBLBox2	BeltineNUS2	967.6	BeltlineNDS2	966	Rectangular		1	6	0.013	0.5	0.5	45 deg Wingwall Flares (Rect, Conc)	237
PrBLBox3	BeltlineNUS3	967.5	BeltlineNDS3	966	Rectangular		1	6	0.013	0.5	0.5	45 deg Wingwall Flares (Rect, Conc)	237
Proposed Bpx	AS1849-013.1		Node1910										
PVR1	PV403	1016.5	PV398	1013.25	Circular		1	1	0.013	0.5	0.05	0	206
PVR11	PV388	1009.35	PV392	1007.85	Circular		1	1.5	0.013	0.5	0.5	0	200
PVR12	PV380	1009	PV375	1005.75	Circular		1	1.5	0.013	0.5	0.05	0	223
PVR13	PV375	1005.75	PV379	1004.96	Circular		1	1.5	0.013	0.05	0.05	0	125
PVR14	PV379	1004.96	PV364	1004.46	Circular		1	2.5	0.013	0.05	0.05	0	103
PVR16	PV364	1004.46	PV362	1003.72	Circular		1	3.5	0.013	0.05	0.05	0	262
PVR17	PV362	1003.72	PV3592	1003.37	Circular		1	4	0.013	0.05	0.5	0	132
PVR18	PV3592	1003.37	PV3594	1003.15	Circular		1	4	0.013	0.5	0.05	0	99
PVR19	PV3581	1014	PV35812	1013.86	Circular		1	1.5	0.013	0.5	0.05	0	14
PVR2	PV398	1012.75	PV3932	1012	Circular		1	1.5	0.013	0.05	0.05	0	88
PVR20	PV358	1023.5	PV3581	1019	Circular		1	1.5	0.013	0.05	0.5	0	90
PVR21	PV353	1040	PV358	1028	Circular		1	1.5	0.013	0.05	0.05	0	206
PVR22	PV348	1049	PV353	1040.5	Circular		1	1	0.013	0.5	0.05	0	205
PVR23	PV320	1073	PV315	1071.3	Circular		1	1.5	0.013	0.5	0.05	0	258
PVR24	PV315	1071.3	PV310	1069.85	Circular		1	2.25	0.013	0.05	0.05	0	250
PVR25	PV310	1069.85	PV3091	1069.34	Circular		1	2.25	0.013	0.05	0.05	0	155
PVR26	PV3091	1069.34	PV300	1069.08	Circular		1	2.27	0.013	0.05	0.25	0	78
PVR27	PV300	1069.08	Pond G	1069	Circular		1	2.27	0.013	0.25	1	0	51
PVR28	Pond G	1071	Pond G Out	1070.1	Circular		1	2.27	0.013	1	0.75	0	157
PVR29	Pond G Out	1070.1	PV3093	1069.19	Circular		1	2.27	0.013	0.75	0.5	0	182
PVR3	PV3932	1011.5	PV392	1008.3	Circular		1	2	0.013	0.05	0.5	0	86
PVR30	PV2693	1066.11	PV2691	1065.5	Circular		1	1.25	0.013	0.5	0.25	0	46
PVR31	PV2691	1065.5	Pond B	1065	Circular		1	2	0.013	0.25	1	0	84
PVR32	PV260	1065.3	Pond B	1065	Circular		1	2	0.013	0.25	1	0	81
PVR33	Pond B	1065	PV2641	1064	Special	Horizontal Ellipse	1	5	0.013	1	0.5	0	207
PVR34	PV255	1066.75	PV260	1065.3	Circular		1	1.5	0.013	0.05	0.245	0	209
PVR35	PV250	1072.25	PV255	1066.75	Circular		1	1.5	0.013	0.5	0.05	0	220
PVR36	PV239B	1074.75	PV239B.1	1074.382	Special	Horizontal Ellipse	1	5	0.013	0.2	0.05	Groove End with Headwall (Horiz. Ellipse, Conc)	46.483
PVR37	PV239B.1	1074.382	PV2391B	1073	Special	Horizontal Ellipse	1	5	0.013	0.05	0.5	Groove End with Headwall (Horiz. Ellipse, Conc)	174.517

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
PVR38	PV239A	1074.75	PV2391A	1073	Special	Horizontal Ellipse	1	5	0.013	0.2	0.5	Groove End with Headwall (Horiz. Ellipse, Conc)	221
PVR39	PV228	1074.2	Pond A	1074	Special	Horizontal Ellipse	1	1.91	0.013	0.05	1	0	50
PVR4	PV3905	1029.67	PV3903	1015.25	Circular		1	1.5	0.013	0.5	0.05	0	189
PVR41	PV218	1079	PV219	1078	Circular		1	1.5	0.013	0.25	0.5	0	57
PVR42	PV211	1084.69	PV218	1079	Circular		1	1.5	0.013	0.5	0.25	0	156
PVR5	PV3903	1015.25	PV390	1013.5	Circular		1	1.5	0.013	0.05	0.25	0	102
PVR6	PV390	1013.5	PV391	1011.9	Circular		1	1.5	0.013	0.25	0.05	0	78
PVR7	PV3921	1007.85	PV392	1007.8	Circular		1	2	0.013	0.05	0.25	0	10
PVR8	PV392	1007.8	PV3922	1007	Circular		1	2.5	0.013	0.25	0.5	0	32
RAMP_TO_OSR_BL_SE_STORAGE	OSR_BL_SERAMP_DS	997	OLD_SAUK_BELTLINE_SE	994	Trapezoidal		1	10	0.035	0	0	None (,)	163.663
RandolfDrPr2	AS2455-004	1035.62	AS2454-020	1033.36	Circular		1	3	0.013	0.5	0.05	0	113
RandolphDrPr1	AS2454-020	1033.36	AS2454-001	1027.56	Circular		1	3	0.013	0.05	0.05	0	290
RedSky1	IN1547-010	1087.42	IN1547-008	1085.22	Circular		1	2	0.013	0.5	0.25	0	146
RedSkyPr2	IN1547-008	1085.22	AS1647-062	1084.71	Circular		1	2	0.013	0.25	0.25	0	25
S_M_PB_GW_ATTIC_ANGEL_CR_SEC1	SMPB_BW_AAC1	1005.27	IN2150-019	1007.1	Natural		1	0	0.013	0	0	None (,)	77.677
S_M_PB_GW_ATTIC_ANGEL_CR_SEC2	SMPB_BW_AAC2	1001.6	SMPB_BW_AAC1	1005.27	Natural		1	0	0.013	0	0	None (,)	153.85
S_M_PB_GW_ATTIC_ANGEL_P_SEC	ATTIC_ANGEL_POND_O	1016.85	SMPB_GW_AAP	1006.1	Natural		1	0	0.013	0	0	None (,)	401.374
S_M_PB_GW_BLACKWOLF_DR_SECTION	SMPB_GW_BWD	1051.35	ATTIC_ANGEL_POND_IN	1037.35	Natural		1	0	0.013	0	0	None (,)	823.569
S_M_PB_GW_ELDERBERRY_RD_SECTION	HD2052-035	1058.27	HD2051-014	1052.35	Natural		1	0	0.013	0	0	None (,)	1328.938
S_TO_N_WEXFORD_POND_PIPES	WEX_SE_POND_OUT	972.2	WEX_NW_POND_IN	971.9	Circular		2	4	0.013	1	1	0	90
S_WEXFORD_POND_IN_WEIR	WEXFORD_POND_IN		WEX_SE_POND_IN										
SanBerm	OSTP_POND_SYSTEM_JCT_3		OSTP_POND_SYSTEM_JCT_2										
SandhillPr1	S106	1080.63	IN1647-041	1079.44	Circular		1	2	0.013	0.05	0.25	0	119
SandhillPr10	IN1647-030	1076.22	AS1647-027	1075.72	Circular		1	2.5	0.013	0.25	0.6	0	49.35
SandhillPr2	IN1647-041	1079.44	AS1647-040	1078.7	Circular		1	2	0.013	0.25	0.1	0	147.32
SandhillPr3	AS1647-040	1078.7	IN1647-039	1078.53	Circular		1	2.5	0.013	0.25	0.5	0	68.12
SandhillPr4	S103	1082.77	S106	1080.63	Circular		1	2	0.013	0.25	0.05	0	121
SandhillPr5	S104	1083.65	S103	1082.77	Circular		1	2	0.013	0.25	0.25	0	33
SandhillPr6	S105	1084.67	S104	1083.65	Circular		1	2	0.013	0.5	0.25	0	25
SandhillPr7	IN1647-039	1078.53	IN1647-037	1077.45	Circular		1	2.5	0.013	0.5	0.25	0	53.64
SandhillPr8	IN1647-037	1077.45	IN1647-034	1076.34	Circular		1	2.5	0.013	0.25	0.05	0	110.85
SandhillPr9	IN1647-034	1076.34	IN1647-030	1076.22	Circular		1	2.5	0.013	0.05	0.25	0	11.55
SanitaryBerm	OSTrSouthPond		OSTP_POND_SYSTEM_JCT_1										
SAUK_CR_UPPER_IN2451-001	SAUK_CREEK_UPPER_ST	996.85	IN2451-001	995.6	Circular		1	1.5	0.013	0.05	0.05	None (,)	15.208
SAUK_HEIGHTS_LOW_FLOW	IN1750-017A		IN1750-017										
SAUK_HEIGHTS_V_NOTCH	IN1750-017A		IN1750-017										
SawmillPr1	AS2448-006	976.95	AS2448-012	976.25	Circular		2	3	0.013	0.25	0.5	0	148
SawmillPr10	AS2548-003	985.32	AS2548-001	985.02	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.5	0	60
SawmillPr2	AS2448-007	977.12	AS2448-006	976.95	Circular		2	3	0.013	0.5	0.5	0	29
SawmillPr3	AS2448-003	979.87	AS2448-007	977.12	Circular		1	3	0.013	0.05	0.5	0	406
SawMillPr5	AS2347-018	970.65	IN2347-034	969.81	Circular		1	3	0.013	0.5	0.05	0	168
SawMillPr6	IN2347-017	970.71	AS2347-018	970.65	Circular		1	3	0.013	0.5	0.5	0	11
SawmillPr7	AS2548-013	981.2	AS2448-003	979.87	Special	Horizontal Ellipse	1	4.41	0.013	0.1	0.1	0	266
SawmillPr8	AS2548-009	982.83	AS2548-013	981.2	Special	Horizontal Ellipse	1	4.41	0.013	0.05	0.1	0	217
SawmillPr9	AS2548-001	985.02	AS2548-009	982.83	Special	Horizontal Ellipse	1	4.41	0.013	0.5	0.05	0	293
SawMilPr3	IN2347-034	969.81	AS2347-011	969.34	Circular		1	3	0.013	0.5	0.1	0	94
SC_AS2349-008	SC_Out_Pr1	986	AS2349-008	981.8	Circular		1	6.5	0.013	0.5	0.25	Groove End with Headwall (Circ, Conc)	176.445
SC_Dr_Pr1	IN2451-001	995	AE2451-002	994	Circular		1	4	0.013	1	0.5	0	71
SC_Dr_Pr10	IN2353-006	1030.74	AS2353-005	1029.34	Circular		1	2	0.013	0.5	0.25	0	70

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
SC_Dr_Pr11	IN2453-004	1030.48	AS2353-005	1029.34	Circular		1	2	0.013	0.5	0.5	0	57
SC_Dr_Pr3	AS2451-010	999.96	IN2451-009	999.52	Circular		1	4	0.013	0.5	0.05	0	22
SC_Dr_Pr4	AS2451-004	1004.34	AS2451-010	999.96	Circular		1	4	0.013	0.25	0.5	0	219
SC_Dr_Pr5	IN2452-009	1006.92	AS2451-004	1004.34	Circular		1	4	0.013	0.1	0.25	0	129
SC_Dr_Pr6	AS2452-008	1010.14	IN2452-009	1006.92	Circular		1	4	0.013	0.05	0.1	0	322
SC_Dr_Pr7	AS2452-001	1013.24	AS2452-008	1010.14	Circular		1	4	0.013	0.5	0.05	0	310
SC_Dr_Pr8	IN2352-004	1021.28	AS2452-001	1013.24	Circular		1	4	0.013	0.5	0.5	0	402
SC_Dr_Pr9	AS2353-005	1028.34	IN2352-004	1022.28	Circular		1	3	0.013	0.25	0.5	0	303
SC_Lower_Pr1	AE2350-034	988	EMPB_GW_NTL3	987.56	Circular		1	4	0.013	1	0.5	45 deg Wingwall Flares (Rect, Conc)	82
SCDr_Pr2	IN2451-009	999.52	IN2451-001	995.42	Circular		1	4	0.013	0.05	0.25	0	205
SCOut_Pr2	EMPB_GW_NTL1	986	Node2009	983.96	Rectangular		1	6	0.013	0.2	0.5	45 deg Wingwall Flares (Rect, Conc)	102
SettlerRdPr1	IN1949-003	1022.02	AS1949-009	1021.91	Circular		1	3	0.013	0.05	0.5	0	45.59
SettlerRdPr2	IN1949-004	1025.32	IN1949-003	1022.02	Circular		1	3	0.013	0.1	0.05	0	164.79
SettlerRdPr3	AS1949-029	1026.29	IN1949-004	1025.32	Circular		1	3	0.013	0.05	0.1	0	48.38
SettlerRdPr4	AS1949-007	1028.93	AS1949-029	1026.29	Circular		1	3	0.013	0.5	0.05	0	131.66
ShadowRidgePr5	IN1549-026	1107.8	IN1549-024	1107.23	Circular		1	2	0.013	0.25	0.25	0	56
ShadowRiPr1	MI1549-013	1105.51	AS1549-002	1103.77	Circular		1	3	0.013	0.05	0.05	0	181
ShadowRiPr2	AS1549-014	1106.35	MI1549-013	1105.51	Circular		1	3	0.013	0.05	0.05	0	42
ShadowRiPr3	IN1549-024	1107.23	AS1549-014	1106.35	Circular		1	3	0.013	0.05	0.05	0	88
ShadowRiPR4	AE1549-012	1105.9	AS1549-010	1105.51	Circular		1	2	0.013	0.5	0.5	0	121
ShadowRiPr6	IN1549-025	1107.96	IN1549-024	1107.23	Circular		1	2	0.013	0.5	0.05	0	76
ShadowRiPr7	AS1549-032	1107.63	IN1549-024	1107.23	Circular		1	2	0.013	0.25	0.25	0	22
SpiritStPr1	IN1753-025	1087.53	IN1753-015	1086.39	Circular		1	2.5	0.013	0.5	0.25	0	454
SpiritStPr2	IN1853-001	1087.94	IN1753-025	1087.53	Circular		1	2.5	0.013	0.05	0.5	0	161
SpiritStPr3	IN1753-027	1088.33	IN1853-001	1087.94	Circular		1	2.5	0.013	0.5	0.05	0	156
SS2056-022_IN2056-021	SS2056-022	1093	IN2056-021	1092.64	Circular		1	1	0.013	0.5	0.5	0	82.624
StoNCulv	OSTrSouthPond	959	OSTP_POND_SYSTEM_JCT_1	958.5	Rectangular		3	6	0.013	1	1	45 deg Wingwall Flares (Rect, Conc)	50
StonywoodPr1	AS1753-003	1085.87	IN1753-040	1085.56	Circular		1	2.5	0.013	0.05	0.05	0	58
StonywoodPr2	AS1753-004	1088.16	AS1753-003	1085.87	Circular		1	2.5	0.013	0.05	0.05	0	305
StonywoodPr3	AS1753-005	1090.12	AS1753-004	1088.16	Circular		1	2.5	0.013	0.25	0.05	0	261
StonywoodPr4	IN1753-006	1090.45	AS1753-005	1090.17	Circular		1	2.5	0.013	0.25	0.25	None (,)	56
STPond48	N_BH_P_OUTLET	1008.92	PVRdNew_US	1008.62	Circular		2	4	0.013	0.05	0.05	0	60
SwalGWCulvPr	WMPB_GW_BHR1	1016.35	AE1947-005	1014.81	Rectangular		1	4	0.013	0.2	1	30 to 75 deg Wingwall Flares (Rect, Conc)	93
SwallowTPr1	IN1849-005	1071.11	AE1849-014	1069	Circular		1	3	0.013	0.5	1	0	256
SwallowWeir	Node2014		N_BH_P_OUTLET										
SwalPr5	IN1947-019	1014.38	AE1947-020	1014.05	Circular		1	5	0.013	0.5	1	0	65
SwalPr6	AS1947-017	1015.43	IN1947-019	1014.38	Circular		1	5	0.013	0.5	0.5	0	209.9
SwalPr9	AS1948-017	1015.26	AE1947-002	1013.35	Circular		1	4	0.013	0.5	1	0	191
SwP12in	Node2014	1010	N_BH_P_OUTLET	1009.95	Circular		1	1	0.013	1	0.05	Groove End with Headwall (Circ, Conc)	15
SwP15in	Node2014	1009	N_BH_P_OUTLET	1008.92	Circular		1	1.25	0.013	1	0.05	Groove End with Headwall (Circ, Conc)	19
SwP60Inch	PVRdNew_US	1002.85	PVRdNew_DS	1002	Circular		2	5	0.013	0.2	0.5	Groove End with Headwall (Circ, Conc)	180
TarConnect	AS2256-047	1045.29	JB2256-060	1045.26	Special	Horizontal Ellipse	1	6.33	0.013	0.25	0.25	0	10
TargetRe1	JB2256-061	1044.39	Node2003	1043.136	Rectangular		1	6	0.013	0.5	0.05	0	624
TargetRe2	Node2003	1043.136	Node2004	1041.734	Rectangular		1	6	0.013	0.05	0.25	0	701.45
TargetRe3	Node2004	1041.734	N_BC_TargOut	1035.9	Rectangular		1	6	0.013	0.25	0.5	0	1215
TargetRe4	JB2256-060	1045.26	JB2256-061	1044.39	Rectangular		1	4	0.013	0.5	0.5	0	165.518
TE2257-014_AS2257-003	TE2257-014	1057.35	AS2257-003	1056.47	Circular		1	2	0.013	0.05	0.05	0	50.434
TimberWoPr1	IN1948-011	1016.48	AS1948-004	1014.44	Circular		1	3.5	0.013	0.05	0.25	0	101.83
TimberWoPr3	AS1949-009	1021.91	IN1948-011	1016.48	Circular		1	3.5	0.013	0.5	0.05	0	181.31

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
TimberWoPr4	IN1949-010	1026.59	AS1949-009	1023.41	Circular		1	2.5	0.013	0.25	0.05	0	106
TO_AE2254-014	AE2054-001_AE2254-01	1056.18	AE2254-014	1049.11	Trapezoidal		1	10	0.035	0	0	None (,)	830.893
TO2255-024_TO2355-056	JUNCTION_RIDGE_POND	1043.5	EMPB_GW_MPR1	1041.39	Circular		1	5	0.013	0.2	0.5	Square Edge with Headwall (Circ, Conc)	396.456
TP2052-028_HD2052-035	TP2052-028	1058.6	HD2052-035	1058.27	Rectangular		1	4	0.013	0.5	0.5	0	26.043
TP2145-006_TP2145-007	TP2145-006	959.35	TP2145-007	959.25	Rectangular		1	6	0.013	0.05	0.05	None (,)	15.163
TP2145-007_GR2145-003	TP2145-007	959.25	GR2145-003	959	Rectangular		1	6	0.013	0.05	0.5	None (,)	78.878
TP2247-019_GR2247-018	TP2247-019	965.15	EMPB_GW_FD1	965.1	Rectangular		2	4	0.013	0.05	0.5	0	18.646
TP2347-023_GR2347-022	TP2347-023	969.5	HighPointDS3	968.6	Rectangular		1	4	0.013	0.05	1	0	54.89
TramorePr1	IN2347-032	970.9	IN2347-017	970.71	Circular		1	3	0.013	0.5	0.5	0	37
TramorePr2	IN2347-020	971.9	IN2347-032	970.9	Circular		1	3	0.013	0.5	0.5	0	200
TrappersTrPr3	IN1648-025	1079.2	AS1648-008	1078.82	Rectangular		1	4	0.013	0.05	0.25	0	60
TrapperTrPr1	AS1648-009	1078.24	AS1648-014	1078.14	Rectangular		1	4	0.013	0.05	0.5	0	29
TrapperTrPr2	AS1648-008	1078.82	AS1648-009	1078.24	Rectangular		1	4	0.013	0.25	0.05	0	116
TreeLanePr1	IN2454-019	1025.44	AE2454-006	1019.44	Circular		1	4	0.013	0.05	0.5	0	300
TreeLnGWPr1	HD2454-017	1029.51	TP2454-013	1029.33	Rectangular		1	6	0.013	0.2	0.05	45 deg Wingwall Flares (Rect, Conc)	35.81
TreeLnGWPr2	TP2454-013	1029.33	HD2454-016	1029	Rectangular		1	6	0.013	0.05	0.5	0	63.35
TreeLnGWPr3	Node1998	1029.53	Node1999	1029	Rectangular		1	6	0.013	0.2	0.5	45 deg Wingwall Flares (Rect, Conc)	98
TreeLnGWPr4	GR2355-009	1040.41	EMPB_GW_STL2	1039.78	Rectangular		1	6	0.013	0.2	0.5	45 deg Wingwall Flares (Rect, Conc)	122
TreeLnPr10	AS2454-010	1036.74	TP2454-013	1029.33	Circular		1	3	0.013	0.05	0.5	0	494
TreeLnPr11	IN2454-009	1037.24	AS2454-010	1036.74	Circular		1	3	0.013	0.15	0.05	0	33
TreeLnPr12	IN2454-008	1037.69	IN2454-009	1037.24	Circular		1	3	0.013	0.15	0.15	0	30
TreeLnPr14	IN2454-007	1038.37	IN2454-008	1037.69	Circular		1	3	0.013	0.25	0.15	0	45
TreeLnPr16	AS2355-064	1041.45	AE2355-065	1040.78	Circular		1	5	0.013	0.5	0.5	0	67
TreeLnPr17	IN2355-006	1041.96	AS2355-064	1041.45	Circular		1	5	0.013	0.05	0.5	0	51
TreeLnPr18	IN2355-052	1044.02	IN2355-006	1041.96	Special	Horizontal Ellipse	1	6.33	0.013	0.05	0.05	0	206
TreeLnPr19	IN2355-051	1051.24	IN2355-052	1044.02	Circular		1	4	0.013	0.25	0.05	0	361
TreeLnPr2	AS2454-001	1026.56	IN2454-019	1025.44	Circular		1	4	0.013	0.05	0.05	0	56
TreeLnPr20	AS2354-012	1045.71	IN2354-020	1045.12	Circular		1	3	0.013	0.25	0.5	0	118
TreeLnPr21	IN2354-020	1045.12	AS2354-015	1044.43	Circular		1	3	0.013	0.25	0.05	0	138
TreeLnPr22	AS2354-015	1043.43	AS2355-001	1042.51	Circular		1	4	0.013	0.05	0.25	0	180
TreeLnPr23	AS2355-001	1042.51	AS2355-062	1042.04	Circular		1	4	0.013	0.25	0.4	0	93
TreeLnPr25	AS2355-062	1042.04	AE2355-063	1041.78	Circular		1	4	0.013	0.4	0.5	0	52
TreeLnPr3	IN2554-001	1028.2	AS2454-001	1027.56	Circular		1	3	0.013	0.25	0.5	0	32
TreeLnPr4	IN2554-002	1028.64	IN2554-001	1028.2	Circular		1	3	0.013	0.25	0.25	0	22
TreeLnPr5	Node1997	1041.12	IN2554-002	1028.64	Circular		1	3	0.013	0.05	0.25	0	624
TreeLnPr6	TREE_LN	1044.78	Node1997	1042.12	Circular		1	2	0.013	0.5	0.05	0	133
W_M_PB_GW_BLACKHAWK_RD_SECTION	AE1847-020	1059.87	WMPB_GW_TRANSFER1	1055.42	Natural		1	0	0.013	0	0	None (,)	146.146
W_M_PB_GW_DEMING_WAY_SECTION1	OSTP_POND_SYSTEM_JC	971.5	OSTP_POND_SYSTEM_JCT_11	969.9	Natural		1	0	0.013	0	0	None (,)	221.404
W_M_PB_GW_DEMING_WAY_SECTION2	WMPB_GW_DW2	971.7	WMPB_GW_DW1	971.3	Natural		1	0	0.013	0	0	None (,)	45.341
W_M_PB_GW_DEMING_WAY_SECTION3	WMPB_GW_DW3	976.98	WMPB_GW_DW2	971.7	Natural		1	0	0.013	0	0	None (,)	475.267
W_M_PB_GW_DEMING_WAY_SECTION4	WMPB_GW_DW4	978.8	WMPB_GW_DW3	976.98	Natural		1	0	0.013	0	0	None (,)	211.021
W_M_PB_GW_DEMING_WAY_SECTION5	AE2047-016	979.6	WMPB_GW_DW4	978.8	Natural		1	0	0.013	0	0	None (,)	131.427
W_M_PB_GW_DEMING_WAY_SECTION6	WMPB_GW_DW5	986.1	WMPB_GW_DW4	978.8	Natural		1	0	0.013	0	0	None (,)	728.048
W_M_PB_GW_PLEASANT_VIEW_SECTION.1	N_PV_ROAD_DS2	990.72	AE2048-001	986.84	Natural		1	0	0.035	0	0	None (,)	339.585
WalnutGrPr1	WS-2	1001.48	AS2550-016	997.5	Circular		1	2	0.013	0.1	0.5	0	196
WalnutGrPr2	WS-3	1005.59	WS-2	1001.47	Circular		1	2	0.013	0.5	0.1	0	168
WestfieldPr1	AS2550-016	997.5	AS2550-012	994.81	Circular		1	3	0.013	0.5	0.05	0	153
WestfieldPr10	IN2553-005	1045.14	IN2553-006	1044.3	Rectangular		1	4	0.013	0.05	0.05	0	42
WestfieldPr11	AE2553-003	1045.6	IN2553-005	1045.14	Rectangular		1	4	0.013	1	0.05	45 deg Wingwall Flares (Rect, Conc)	23

Proposed Conditions Hydraulic Parameters

Name	Upstream Node Name	Upstream Invert Elevation (ft)	Downstream Node Name	Downstream Invert Elevation (ft)	Shape	Special Conduit Shape	Number of Barrels	Diameter (Height) (ft)	Roughness	Entrance Loss	Exit Loss	Inlet Type	Length (ft)
WestfieldPr2	AS2551-010	1012.54	AS2551-004	1008.44	Circular		1	5	0.013	0.05	0.5	0	410
WestfieldPr3	AS2551-020	1017.84	AS2551-010	1013.54	Circular		1	4	0.013	0.25	0.05	0	215
WestfieldPr4	AS2552-004	1024.11	AS2551-020	1017.84	Circular		1	4	0.013	0.05	0.25	0	418
WestfieldPr5	AS2552-005	1029.64	AS2552-004	1025.11	Circular		1	3	0.013	0.5	0.05	0	302
WestfieldPr6	IN2552-010	1031.38	AS2552-005	1030.14	Circular		1	2.5	0.013	0.5	0.25	0	62
WestfieldPr7	IN2552-007	1030.98	AS2552-005	1030.14	Circular		1	2.5	0.013	0.5	0.5	0	42
WestfieldPr8	CB2553-007	1044.14	AE2553-002	1043.6	Rectangular		1	4	0.013	0.05	0.5	0	27
WestfieldPr9	IN2553-006	1044.3	CB2553-007	1044.14	Rectangular		1	4	0.013	0.05	0.05	0	8
WestGWDrCulvPr	WMPB_GW_DW1	971.3	OSTP_POND_SYSTEM_JCT_14	970	Rectangular		1	5	0.013	0.5	1	Square Edge with Headwall (Circ, Conc)	161.959
Wex_In_Pr	MI2348-010	974.1	AE2348-007	974	Rectangular		1	6	0.013	0.25	1	None (,)	28
Wex_in_Pr3	IN2348-006	976.5	AS2348-005	975.3	Rectangular		2	6	0.013	0.5	0.05	None (,)	60
Wex_In_Pr4	IN2448-008	975.95	MI2448-017	973.9	Circular		4	3	0.013	0.5	0.25	None (,)	212
Wex_In_Pr5	MI2448-017	973.79	AE2448-013	973.6	Circular		4	3	0.013	0.25	1	None (,)	25
Wex_In_Pr6	AS2448-012	976.25	IN2448-008	975.95	Circular		4	3	0.013	0.5	0.1	None (,)	9
Wex_in_Pr7	IN2448-014	974.8	AE2448-015	973.85	Special	Horizontal Ellipse	2	3.5	0.013	0.1	1	0	155
Wex_In_Pr8	IN2447-001	975.23	IN2448-014	974.8	Special	Horizontal Ellipse	2	3.5	0.013	0.5	0.1	0	52
Wex_Re1	AS2348-005	974.51	IN2348-003	972.44	Rectangular		1	6	0.013	0.5	0.25	None (,)	414
WexIn_Pr2	MI2348-010	974.1	WexInPr	974	Rectangular		1	6	0.013	0.25	1	0	28
WhipWayPr1	IN1752-010	1094.23	IN1752-011	1092.91	Circular		1	1.25	0.013	0.25	0.25	0	33
WhitacrePr1	AS2551-008	1005.52	AE2551-009	1004.9	Circular		1	5	0.013	0.5	0.5	0	62
WhitacrePr2	AS2551-004	1008.44	AS2551-008	1005.52	Circular		1	5	0.013	0.5	0.5	0	292
WindingWayPr1	AS1647-048	1080.25	WINDINGWAY_BLIND_CON	1078.39	Rectangular		1	4	0.013	0.5	0.05	0	233
WindingWayPr10	AS1748-007	1070.63	AS1748-003	1070.23	Rectangular		1	4	0.013	0.1	0.1	0	40
WindingWayPr2	WINDINGWAY_BLIND_C	1078.39	AS1648-014	1078.14	Rectangular		1	4	0.013	0.05	0.25	0	31
WindingWayPr5	AS1648-014	1078.14	AS1648-006	1076.82	Rectangular		1	4	0.013	0.25	0.25	0	259
WindingWayPr6	AS1648-006	1076.82	AS1648-022	1074.51	Rectangular		1	4	0.013	0.25	0.05	0	464
WindingWayPr7	AS1648-022	1074.51	TP1648-049	1073.99	Rectangular		1	4	0.013	0.05	0.05	0	105
WindingWayPr8	TP1648-049	1073.99	MI1748-034	1072.08	Rectangular		1	4	0.013	0.05	0.05	0	228
WindingWayPr9	MI1748-034	1072.08	AS1748-007	1070.63	Rectangular		1	4	0.013	0.05	0.2	0	145
WOODSTONE_TO_AE1954-001	FARGO_COBALT_OUT_J	1085.36	FARMRD_SWALE1	1079.66	Natural		1	0	0.027	0	0	None (,)	1600
WOODSTONE_TO_AE1954-001.1	FARMRD_SWALE1	1079.66	AE1954-001	1075.14	Natural		1	0	0.027	0	0	None (,)	1134.91

Appendix D. Existing Condition Flood Depths and Peak Flows

Table D-1
Pheasant Branch Watershed Existing Conditions Flooding Results
Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
City of Madison FY2020 BRIC

				10% Chance Storm				1% Chance Storm			
Point	Location Description	Location Address	Ground Elevation	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)
1	Outlet of watershed	Just downstream of Deming Way at City Boundary	957.6	960.4	2.8	N/A	686.2	962.8	5.2	N/A	1985.8
2	OSTr Business Park Ponds	Middle of OSTr Business Park Ponds	963.0	971.3	8.3	N/A	708.7	973.9	10.9	N/A	1978.5
2.1	Pheasant Branch Outlet under Deming Way	Pheasant Branch Outlet under Deming Way	969.8	968.8	None	647.33	50.8	972.2	2.4	861.5	1124.9
2.2	Outlet of Old Sauk Trail Business Park Ponds	Deming Way	970.5	968.8	None	611.28	50.8	972.2	1.7	689.3	1124.9
2.3	Just upstream of OSTr Pond Outlet	Just upstream of OSTr Pond Outlet	959.9	971.9	12.0	N/A	805.6	974.3	14.4	N/A	1957.2
2.4	Fourier Drive into OSTr Ponds	Fourier Drive between Deming Way and John Q Hammons Drive	977.3	977.7	0.4	13.18	N/A	978.4	1.1	14.4	N/A
2.5	OSTr Ponds in just north of Excelsior Drive	OSTr Ponds in just north of Excelsior Drive	969.2	971.3	2.1	N/A	279.5	973.9	4.7	N/A	494.7
3	Channel between OSTr Business Park Ponds and Fourier Drive	Between OSTr Business Park Ponds and Fourier Drive	965.4	971.3	5.9	N/A	689.6	974.0	8.5	N/A	1652.8
4	Channel between Fourier Drive and Beltline	Between Fourier Drive and Beltline	967.0	973.4	6.3	N/A	696.8	975.1	8.0	N/A	1578.6
4.1	Excelsior overflow mid-Excelsior	Excelsior overflow mid-Excelsior	974.6	N/A	N/A	N/A	14.0	975.1	0.5	N/A	53.3
4.2	Excelsior overflow west to east	Excelsior overflow west to east	972.4	N/A	N/A	N/A	14.2	974.7	2.4	N/A	52.7
4.3	Excelsior from South on East side of ponds	Excelsior from South on East side of ponds	972.7	N/A	N/A	32.23	21.1	974.5	1.8	24.7	130.7
4.4	Fourier going north from Excelsior to Channel	Fourier going north from Excelsior to Channel	971.6	N/A	N/A	54	56.4	974.5	2.9	49.5	199.5
4.5	Fourier Drive going South to Channel	Fourier Drive going South to Channel	972.2	972.9	0.7	8.32	13.5	974.8	2.6	7.5	31.5
5	Channel between OSTr Business Park Ponds and Deming Way	Betweek OSTr Business Park Ponds and Deming Way	978.0	980.6	2.6	N/A	192.1	980.8	2.8	N/A	373.5
6	Channel between Pleasant View Road and Deming Way	Between Deming Way and Pleasant View Road	993.6	993.8	0.2	N/A	55.9	994.6	1.0	N/A	286.5
6.1	Pipe between Deming Way east to Channel	Pipe between Deming Way east to Channel	988.4	989.7	1.3	58.42	20.9	989.0	0.6	63.7	130.6
6.2	Deming north to Channel on west side of business park	Deming north to Channel on west side of business park	995.2	995.6	0.4	59.51	13.1	995.9	0.8	59.5	59.7
6.3	Culvert under 8310 Excelsior Drive	Culvert under 8310 Excelsior Drive	978.4	N/A	N/A	140.93	100.9	976.6	None	169.8	327.1
6.4	Excelsior from West to East enter on west side of ponds	Excelsior from West to East enter on west side of ponds	976.4	977.1	0.7	24.73	28.8	977.8	1.4	23.3	110.0
7	Swallowtail Pond	Just downstream of Swallowtail Drive	1011.5	1016.4	4.9	0	0.0	1017.0	5.5	0.0	0.0
7.2	Boulder Creek Circle	Boulder Creek Circle	1018.3	1017.7	None	10.79	N/A	1018.6	0.3	16.3	N/A
7.3	Deer Hollow Court	Deer Hollow Court	1017.8	1018.4	0.6	73.09	N/A	1021.2	3.4	83.8	N/A
7.4	Swallowtail Pond Outlet	Swallowtail Pond Outlet	1017.3	1016.1	None	60.12	56.2	1016.7	None	79.1	336.1
7.5	Downstream Swallowtail Pond	Downstream Swallowtail Pond	1009.5	1009.3	None	N/A	33.5	1013.4	3.9	N/A	278.0
8	Swallowtail Greenway	Just upstream of Swallowtail Drive	1020.5	1023.2	2.8	N/A	88.6	1023.5	3.0	N/A	141.5
8.1	Aspen Grove Lane	Aspen Grove Lane between Bear Claw Way and Stagecoach Trail	1067.5	1067.3	None	14.32	N/A	1068.1	0.6	17.8	N/A
8.2	Blackhawk Road near Hawk Feather Circle	Blackhawk Road between Hawk Feather Circle and Swallowtail Drive	1051.5	N/A	N/A	0	0.0	N/A	N/A	0.0	0.0
9	Swallowtail Drive	Swallowtail Drive between Aspen Grove Drive and Greenway	1021.4	1021.5	0.1	50.4	10.6	1022.2	0.8	65.3	84.8

Table D-1
Pheasant Branch Watershed Existing Conditions Flooding Results
Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
City of Madison FY2020 BRIC

Point	Location Description	Location Address	Ground Elevation	10% Chance Storm				1% Chance Storm			
				Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)
10	Swallowtail Drive	Swallowtail Drive between Hidden Cave Road and Settlers Road	1068.1	1069.1	1.0	6.82	N/A	1074.2	6.1	29.0	1.7
11	SW Blackhawk Pond	SW Blackhawk Pond	1070.8	1076.4	5.7	0	0.0	1078.1	7.4	0.0	0.0
11.1	SW Blackhawk Pond In from Northeast	SW Blackhawk Pond In from Northeast	1074.3	1076.4	2.2	25.33	N/A	1078.1	3.8	27.5	N/A
11.2	SW Blackhawk Pond in from North	SW Blackhawk Pond in from North	1078.4	1076.4	None	24.89	N/A	1078.1	None	35.2	N/A
11.3	SW Blackhawk Pond in from West	SW Blackhawk Pond in from West	1078.8	1076.4	None	231.29	26.7	1078.1	None	278.8	211.2
11.4	SW Blackhawk Pond in from South	SW Blackhawk Pond in from South	1081.7	1076.4	None	60.24	N/A	1078.1	None	59.9	N/A
12	Bear Claw Way from North	Bear Claw Way between Blue Heron Drive and Winding Way	1078.3	1079.5	1.2	44.16	5.2	1080.1	1.8	47.1	8.4
13	Winding Way from West	Winding Way between Coneflower Street and Bear Claw Way	1078.2	1079.6	1.4	118.61	86.0	1080.4	2.2	122.8	268.9
13.1	Red Sky Drive	Red Sky Drive	1093.1	1092.8	None	6.22	3.4	1093.5	0.3	6.7	12.8
13.2	Fallen Leaf Drive	Fallen Leaf Drive between Meadow Mist Road and Winding Way	1091.7	1092.0	0.3	5.54	N/A	1092.8	1.1	6.1	2.4
13.3	Shadow Ridge Trail	Shadow Ridge Trail between Silver Sage Trail and Big Stone Trail	1110.3	1110.5	0.2	13.711	8.8	1110.7	0.4	13.7	31.3
13.4	Behind homes on Shadow Ridge Trail - east	Behind homes on Shadow Ridge Trail - east	1109.4	1111.9	2.4	3.56	Backflow	1112.1	2.7	4.5	Backflow
13.5	Behind homes on Shadow Ridge Trail - west	Behind homes on Shadow Ridge Trail - west	1107.7	1109.4	1.8	5.92	Backflow	1109.9	2.2	6.1	Backflow
14	Cricket Lane	Cricket Land downstream of Greystone Pond	1079.9	1079.9	None	7.19	7.8	1080.4	0.4	7.0	30.7
15	Bear Claw Way from South	Bear Claw Way between apartments and Cricket Lane	1080.1	1080.6	0.5	14.09	15.0	1080.9	0.7	13.2	43.3
16	Along Beltline from South to Fourier Drive Greenway	Beltline Ditch near Fourier Drive	975.1	975.9	0.8	N/A	329.6	976.1	1.0	N/A	471.6
17	Greenway between High Point Road and Beltline	Greenway between High Point Road and Beltline	968.1	976.0	7.9	N/A	594.9	977.6	9.5	N/A	1315.2
18	Wexford Pond Greenway downstream of Wexford Pond	Wexford Pond Greenway Downstream	970.8	977.5	6.6	N/A	594.5	978.7	7.8	N/A	775.6
19	Wexford Pond	Wexford Pond	971.7	977.6	5.9	0	0.0	978.8	7.1	0.0	0.0
19.1	Wexford Pond Outlet	Wexford Pond Outlet	974.8	977.5	2.7	39.812	421.9	978.8	3.9	39.8	657.9
19.2	Wexford Pond Inlet Overflow NW 1	Wexford Pond Inlet Overflow NW 1	978.6	N/A	N/A	N/A	N/A	981.6	3.0	N/A	17.8
19.3	Wexford Pond Inlet SW	Wexford Pond Inlet SW	982.8	981.6	None	366.55	N/A	982.1	None	391.5	19.5
19.4	Wexford Pond Greenway In	Wexford Pond Greenway In	980.9	983.2	2.3	N/A	280.6	983.7	2.7	N/A	410.8
19.5	Wexford Pond Inlet NE	Wexford Pond Inlet NE	983.0	978.4	None	46.36	N/A	979.8	None	45.7	N/A
19.6	Wexford Pond Inlet N	Wexford Pond Inlet N	982.1	977.6	None	11.73	N/A	978.8	None	11.6	N/A
19.7	Wexford Pond Inlet Overflow NW 2	Wexford Pond Inlet Overflow NW 2	979.2	N/A	N/A	N/A	N/A	980.0	0.8	N/A	1.1
20	Wexford Pond Greenway In Upstream	Wexford Pond Greenway In Upstream	984.1	985.9	1.8	N/A	222.7	986.2	2.1	N/A	313.9
21	High Point Road flowing North Overflow from Pipe to Wexford	High Point Road flowing North 1	985.9	979.4	None	20.05	172.2	980.4	None	18.7	633.6
22	High Point Road flowing North Overflow from Pipe to Wexford 2	High Point Road flowing North 2	983.7	984.4	0.8	N/A	189.6	985.5	1.8	N/A	671.8
23	High Point Road flowing North Overflow from Pipe	High Point Road flowing North 3	978.3	986.3	8.0	355.03	195.8	987.4	9.1	382.1	691.1

Table D-1
Pheasant Branch Watershed Existing Conditions Flooding Results
Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
City of Madison FY2020 BRIC

Point	Location Description	Location Address	Ground Elevation	10% Chance Storm				1% Chance Storm			
				Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)
24	High Point Road flowing South Overflow from Pipe 1	High Point Road flowing South 1	975.7	976.5	0.8	8.57	13.3	977.8	2.1	7.8	36.7
25	High Point Road flowing South Overflow from Pipe 1	High Point Road flowing South 2	974.0	976.5	2.4	8.44	28.3	977.8	3.8	7.5	110.3
26	Tramore Trail	Tramore Trail between Sawmill Road and Bishops Hill Circle	975.7	976.5	0.8	NA	N/A	977.8	2.1	N/A	-11.2
27	Sawmill Road flowing West 1	Sawmill Road between Darien Drive and N Woodmont Circle 1	981.1	981.6	0.4	27.52	10.0	982.1	0.9	26.7	67.1
28	Sawmill Road flowing West 2	Sawmill Road between Darien Drive and N Woodmont Circle 2	979.4	979.5	0.1	N/A	15.6	980.0	0.7	N/A	89.0
29	Sawmill Road flowing West 3	Sawmill Road between Redmound Circle and Darien Drive	976.2	976.5	0.2	N/A	6.7	977.8	1.6	N/A	89.8
30	Old Sauk Road to Wexford Pond Greenway	Old Sauk Road to Wexford Pond Greenway Old Sauk Road to Wexford Pond Greenway	994.6	992.0	None	30.07	N/A	995.8	1.2	41.5	1.4
31	Overflow from condos to Wexford Greenway	Overflow from condos to Wexford Greenway	994.8	N/A	N/A	N/A	N/A	994.7	None	N/A	4.3
32	Wexford Pond Greenway just downstream Old Sauk Road	Wexford Pond Greenway just downstream Old Sauk Road	990.5	992.5	2.0	N/A	205.5	992.8	2.3	N/A	293.7
33	Wexford Pond Greenway just upstream of Old Sauk Road	Wexford Pond Greenway just upstream of Old Sauk Road	997.1	999.1	2.0	N/A	81.9	1001.1	4.0	N/A	108.7
34	Westfield flowing south to Old Sauk Road	Westfield flowing south to Old Sauk Road	1001.4	N/A	N/A	N/A	N/A	1002.4	1.0	N/A	-9.2
35	Westfield flowing north to Old Sauk Road 1	Westfield flowing north to Old Sauk Road 1	1000.7	1001.3	0.6	27.69	99.4	1002.4	1.7	27.6	275.2
36	Westfield flowing north to Old Sauk Road 2	Westfield flowing north to Old Sauk Road 2	1006.5	1006.5	0.0	N/A	92.9	1006.9	0.4	N/A	238.8
37	Old Sauk Road flowing west to Westfield	Old Sauk Road flowing west to Westfield	1002.5	N/A	N/A	N/A	N/A	1002.7	0.2	N/A	14.4
38	Old Sauk Road flowing west to Greenway 1	Old Sauk Road flowing west to Greenway 1	1000.5	1001.1	0.6	100.3	6.0	1002.3	1.8	117.4	160.2
39	Old Sauk Road flowing west to Greenway 2	Old Sauk Road flowing west to Greenway 2	1001.3	N/A	N/A	112.55	N/A	1001.6	0.3	146.8	76.4
40	Wexford Greenway Upstream End	Just downstream of Whitacre Road	1003.5	1004.3	0.7	N/A	68.0	1004.4	0.8	N/A	87.9
41	Whitacre Road flowing east to Greenway	Whitacre Road flowing east to Greenway	1012.0	1012.5	0.4	N/A	26.7	1012.7	0.6	N/A	62.5
42	Whitacre Road flowing west to Greenway	Whitacre Road flowing west to Greenway	1014.4	1014.7	0.3	46.48	28.2	1015.1	0.7	46.4	83.6
43	Westfield Road Overflow north of Whitacre	Westfield Road Overflow north of Whitacre	1014.0	1014.4	0.4	N/A	76.9	1014.9	0.9	N/A	217.2
44	Westfield Road Overflow south of Whitacre	Westfield Road Overflow south of Whitacre	1016.9	1017.4	0.5	50.58	111.9	1017.8	0.9	51.1	283.8
45	Westifled Road Overflow South of Farmington Way	Westifled Road Overflow South of Farmington Way	1024.1	1024.7	0.6	33.34	66.5	1025.0	0.9	31.2	171.9
46	Farmington way Overflow east of Westfield Road	Farmington way Overflow east of Westfield Road	1025.5	1025.3	None	35.48	28.9	1025.6	0.1	35.6	95.7
47	Whitacre Road overflow north of Farmington Way	Whitacre Road overflow north of Farmington Way	1001.8	1001.9	0.1	N/A	23.5	1002.1	0.3	N/A	61.3
48	Farmington Way overflow near Canvas Back Circle	Farmington Way overflow near Canvas Back Circle	998.3	N/A	N/A	22.29	N/A	998.9	0.6	27.9	37.0
49	SC Greenway just downstream of Old Sauk Road	SC Greenway just downstream of Old Sauk Road	987.3	992.7	5.5	N/A	546.0	993.6	6.4	N/A	1068.2
50	High Point Road into Lower Pond	High Point Road into Lower Pond	998.4	N/A	N/A	17.32	N/A	N/A	N/A	17.6	N/A

Table D-1
Pheasant Branch Watershed Existing Conditions Flooding Results
Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
City of Madison FY2020 BRIC

				10% Chance Storm				1% Chance Storm			
Point	Location Description	Location Address	Ground Elevation	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)
51	High Point Road south of Sauk Creek Drive	High Point Road south of Sauk Creek Drive	1003.8	1004.4	0.5	17.55	65.0	1004.8	1.0	18.0	170.3
52	SC Greenway by Whitacre Road	SC Greenway by Whitacre Road	995.6	997.1	1.5	N/A	478.9	997.7	2.1	N/A	840.7
53	Sauk Creek Drive into SC Greenway near Plover Circle	Sauk Creek Drive into SC Greenway near Plover Circle	1005.0	N/A	N/A	77.71	N/A	N/A	N/A	109.9	N/A
54	High Point Road north of Brule Street	High Point Road north of Brule Street	1026.8	1027.1	0.3	N/A	48.9	1027.1	0.3	N/A	115.4
55	SC Greenway between Red and Grey Fox Trail	SC Greenway between Red and Grey Fox Trail	1016.0	1016.9	0.9	N/A	389.5	1017.6	1.6	N/A	651.0
56	SC Greenway south of Red Fox Trail	SC Greenway south of Red Fox Trail	1019.6	1020.6	1.0	N/A	343.2	1020.8	1.3	N/A	550.3
57	Tamarack Trails	Tamarack Trails	1038.7	1039.2	0.5	N/A	23.7	1040.0	1.2	N/A	55.3
58	Westfield Overflow into Tamarack Trails	Westfield Overflow into Tamarack Trails	1049.6	1051.1	1.5	15.79	28.4	1050.5	0.9	15.8	62.2
59	Randolf and Tree Lane into Greenway	Randolf and Tree Lane into Greenway	1035.0	1031.3	None	46.54	22.4	1032.2	None	47.8	81.0
60	Tree Lane overflow through condos	Tree Lane overflow through condos	1037.8	1036.7	None	N/A	2.0	1036.8	None	N/A	7.3
61	Randolf south of Tree Lane	Randolf south of Tree Lane	1042.1	1041.3	None	15.93	23.4	1041.4	None	15.9	64.1
62	Tree Lane east of Randolph	Tree Lane east of Randolph	1044.8	1045.0	0.2	N/A	20.0	1045.2	0.4	N/A	46.8
63	SC greenway downstream of Tree Lane	SC greenway downstream of Tree Lane	1027.6	1029.7	2.1	N/A	316.1	1030.1	2.5	N/A	470.1
64	Tree Lane at Randolph	Tree Lane at Randolph	1038.8	1039.1	0.3	315.56	1.4	1039.4	0.6	470.2	13.4
65	Tree Lane east of High Point	Tree Lane east of High Point	1043.9	1044.2	0.2	14.57	7.3	1044.3	0.4	14.3	22.8
66	High Point north of Tree Lane	High Point north of Tree Lane	1044.0	1043.4	None	N/A	0.6	1043.8	None	N/A	23.7
67	Tree Lane west of High Point	Tree Lane west of High Point	1045.4	N/A	N/A	N/A	N/A	1046.2	0.8	N/A	29.4
68	High Point south of Gray Fox Trail	High Point south of Gray Fox Trail	1037.9	N/A	N/A	N/A	N/A	1037.6	None	N/A	21.6
69	SC greenway upstream of Tree Lane	SC greenway upstream of Tree Lane	1034.0	1036.9	2.8	N/A	304.2	1038.5	4.4	N/A	461.2
70	SC greenway downstream of High Point	SC greenway downstream of High Point	1034.4	1038.0	3.6	N/A	305.5	1039.1	4.7	N/A	462.5
71	SC greenway upstream of High Point	SC greenway upstream of High Point	1037.4	1043.1	5.7	N/A	264.0	1045.1	7.7	N/A	457.2
72	High Point south of SC Greenway	High Point south of SC Greenway	1051.1	1046.5	None	N/A	0.0	1046.6	None	N/A	21.6
73	SC greenway downstream of Tree Lane south	SC greenway downstream of Tree Lane south	1040.8	1043.1	2.3	N/A	310.9	1045.1	4.3	N/A	460.3
74	SC greenway upstream of Tree Lane south	SC greenway upstream of Tree Lane south	1040.6	1048.3	7.7	N/A	264.0	1050.8	10.2	N/A	429.2
75	SC greenway downstream of beltline	SC greenway downstream of beltline	1042.6	1048.3	5.6	N/A	305.0	1050.8	8.2	N/A	479.8
76	Tree Lane east of Oakbrook Circle	Tree Lane east of Oakbrook Circle	1050.5	1049.9	None	N/A	0.0	1050.4	None	N/A	29.6
77	Tree Lane north of SC Greenway	Tree Lane north of SC Greenway	1050.2	1049.7	None	23.96	0.0	1050.0	None	23.9	6.4
78	Tree Lane south of SC Greenway	Tree Lane south of SC Greenway	1049.8	1049.7	None	57.59	3.6	1050.3	0.5	55.7	19.5
79	High Point north of Mineral Point Road	High Point north of Mineral Point Road	1063.7	1061.4	None	N/A	14.7	1061.4	None	N/A	38.6
80	High Point south of Mineral Point Road	High Point south of Mineral Point Road	1067.4	1067.2	None	N/A	3.3	1067.4	None	N/A	25.5
81	Mineral Point Rd east of Tree Lane	Mineral Point Rd east of Tree Lane	1062.3	1062.4	0.1	28.25	15.7	1067.4	5.1	28.1	35.9
82	Mineral Point Road east of the Beltline	Mineral Point Road east of the Beltline	1057.5	1056.5	None	N/A	15.0	1056.7	None	N/A	59.5

Table D-1
Pheasant Branch Watershed Existing Conditions Flooding Results
Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
City of Madison FY2020 BRIC

				10% Chance Storm				1% Chance Storm			
Point	Location Description	Location Address	Ground Elevation	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)
83	Mineral Point Rd to SC Greenway	Mineral Point Rd to SC Greenway	1046.4	1048.5	2.0	56.98	30.1	1050.8	4.4	55.3	109.6
84	High Point North of Wolf St	High Point North of Wolf St	1015.3	1015.7	0.4	N/A	64.6	1016.2	0.8	N/A	1085.6
85	Pipe under beltline north of Mineral Point Road	Pipe under beltline north of Mineral Point Road	1061.2	N/A	N/A	252.84	N/A	N/A	N/A	409.2	N/A
86	Target Pond	Target Pond	1044.3	1049.6	5.3	N/A	N/A	1053.2	8.9	N/A	N/A
87	Target Pond Outfall	Target Pond Outfall	1043.8	1049.5	5.7	8.096	250.7	1053.1	9.4	8.0	411.2
88	Pipe thru Target Parking Lot	Pipe thru Target Parking Lot	1051.5	N/A	N/A	93.87	N/A	1053.2	1.6	140.5	12.4
89	Pipe just south of Target Parking Lot	Pipe just south of Target Parking Lot	1053.7	N/A	N/A	83.23	N/A	N/A	N/A	119.0	N/A
90	Pipe to Target Pond from Southwest	Pipe to Target Pond from Southwest	1051.2	N/A	N/A	21.207	N/A	1053.2	2.0	115.2	74.1
91	Pipe to Target Pond from South	Pipe to Target Pond from South	1049.3	N/A	N/A	187.97	N/A	N/A	N/A	267.0	N/A
92	Commerce Drive just north of Plaza Drive	Commerce Drive just north of Plaza Drive	1062.7	1062.8	0.1	109.92	20.3	1063.8	1.1	124.7	204.1
93	Plaza Drive between Commerce and Watts	Plaza Drive between Commerce and Watts	1065.2	1065.4	0.2	52.05	16.0	1065.7	0.5	126.9	107.3
94	Watts Road between Plaza Drive and Commerce Drive	Watts Road between Plaza Drive and Commerce Drive	1071.8	1072.4	0.6	25.04	40.0	1072.7	0.9	25.1	99.7
95	Plaza Drive south of Watts Road	Plaza Drive south of Watts Road	1076.4	1076.6	0.3	52.01	0.4	1076.8	0.5	63.4	14.9
96	Pleasant View south of Mineral Point Road	Pleasant View south of Mineral Point Road	1075.6	1075.5	None	30.49	10.0	1075.8	0.3	30.6	58.5
97	Old Sauk Road between Junction Road and Beltline	Old Sauk Road between Junction Road and Beltline	1001.8	1002.5	0.7	216.85	21.7	1002.8	1.0	264.3	202.6
98	Pipe into Attic Angels Pond from East	Pipe into Attic Angels Pond from East	1029.5	N/A	N/A	49.97	N/A	N/A	N/A	46.0	N/A
99	Overflow down Junction Rd	Overflow down Junction Rd	1024.8	1025.6	0.8	N/A	73.9	1025.8	1.0	N/A	176.8
100	Flow northwest down Junction Road	Flow northwest down Junction Road	1020.5	1021.2	0.7	10.17	50.6	1021.4	0.9	12.1	148.0
101	Bay Hill to Blackwolf Dr to Junction Rd	Bay Hill to Blackwolf Dr to Junction Rd	1035.8	1036.3	0.5	23.07	16.9	1036.4	0.6	24.6	53.5
102	Channel downstream of Attic Angel Pond	Channel downstream of Attic Angel Pond	1011.7	1010.7	None	N/A	83.6	1011.8	0.1	N/A	217.9
103	Blackwolf Dr between Shawn Trail and Samuel Dr	Blackwolf Dr between Shawn Trail and Samuel Dr	1060.7	1061.1	0.4	28.77	2.7	1062.1	1.4	32.8	28.3
104	Wild Indigo Lane between Samuel Drive	Wild Indigo Lane between Samuel Drive	1064.9	1064.9	None	N/A	N/A	1065.0	0.1	N/A	8.0
105	Wild Indigo Lane between Samuel Drive north	Wild Indigo Lane between Samuel Drive north	1062.2	1062.1	None	12.55	8.5	1062.5	0.3	10.8	33.4
106	Samuel Drive just south of Wild Indigo Lane	Samuel Drive just south of Wild Indigo Lane	1066.4	1066.7	0.3	8.89	N/A	1066.8	0.4	8.8	0.9
107	Greenway Crossing under Elderberry	Greenway Crossing under Elderberry	1064.8	1064.6	None	40.84	0.2	1064.8	None	58.0	4.7
108	Farm runoff Elderberry to Augusta	Farm runoff Elderberry to Augusta	1061.2	N/A	N/A	2.66	N/A	N/A	N/A	2.4	N/A
109	Old Sauk Road between Cricket Ln and Bear Claw Way	Old Sauk Road between Cricket Ln and Bear Claw Way	1092.7	1092.6	None	13.62	6.4	1092.7	0.0	13.6	19.9
110	Whippoorwill Way east of Fargo Trail	Whippoorwill Way east of Fargo Trail	1096.6	N/A	N/A	N/A	N/A	1096.9	0.4	N/A	20.2
111	Elderberry Road east of Fargo Trail flowing west	Elderberry Road east of Fargo Trail flowing west	1096.3	1096.2	None	N/A	20.5	1096.3	0.0	N/A	38.8
112	Elderberry Road west of Fargo Trail	Elderberry Road west of Fargo Trail	1098.4	1098.2	None	14.52	11.8	1098.8	0.5	15.0	34.0
113	Fargo Trail between Elderberry and Spirit St	Fargo Trail between Elderberry and Spirit St	1094.7	1095.2	0.4	4.26	0.5	1095.3	0.6	4.2	34.8

Table D-1
Pheasant Branch Watershed Existing Conditions Flooding Results
Old Sauk Trails Business Park Pond and Greenway Flood Mitigation
City of Madison FY2020 BRIC

				10% Chance Storm				1% Chance Storm			
Point	Location Description	Location Address	Ground Elevation	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)	Peak WSE	Water Depth (feet)	Peak Pipe Flow (cfs)	Peak Overland Flow (cfs)
114	Fargo Trail between Spirit St and Stoneywood Blvd	Fargo Trail between Spirit St and Stoneywood Blvd	1091.8	1092.4	0.6	16.88	10.8	1093.3	1.5	16.1	58.7
115	Stoneywood Blvd between Little Bear Dr and Fargo Trail	Stoneywood Blvd between Little Bear Dr and Fargo Trail	1093.0	1093.0	None	13.64	11.9	1093.4	0.4	13.6	45.6
116	Fargo Trail between Stoneywood and Cobalt St	Fargo Trail between Stoneywood and Cobalt St	1092.9	N/A	N/A	11.64	N/A	1093.7	0.8	17.1	3.1
117	Little Bear Drive between Stoneywood and Cobalt	Little Bear Drive between Stoneywood and Cobalt	1104.5	1096.0	None	1.4	1.1	1096.1	None	7.5	10.0
118	Bear Clay Way between Cobalt St and Wilrich St	Bear Clay Way between Cobalt St and Wilrich St	1100.8	1100.6	None	25.98	1.6	1100.8	None	48.5	16.1
119	Wilrich St just west of Bear Claw Way	Wilrich St just west of Bear Claw Way	1110.8	N/A	N/A	8.78	N/A	1110.2	None	12.4	3.0
120	Wilrich St overflow east of Bear Claw Way	Wilrich St overflow east of Bear Claw Way	1112.4	1113.7	1.3	N/A	8.4	1113.8	1.4	N/A	24.5

Appendix E. Focus Group Summaries

Pheasant Branch Focus Group Summaries

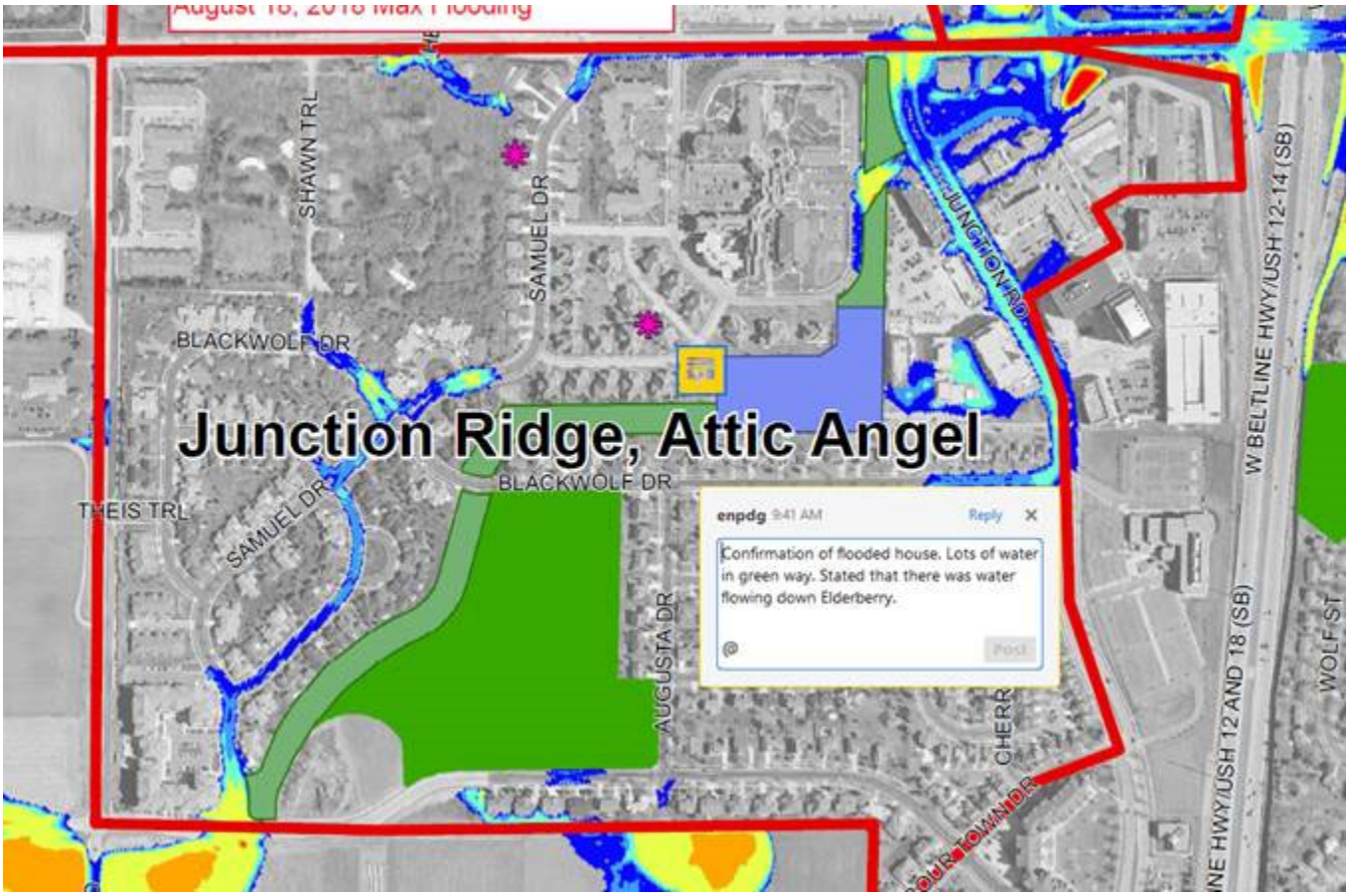
1. Junction Ridge/Attic Angel

Junction Ridge/Attic Angel Focus Group for the Pheasant Branch Watershed Study
In-Person
September 26th, 2019 from 3:00-4:00 pm
Meeting Location: Corner of Reid Drive and McGuffey Drive
Attendees: 11

- During the August 2018 Storm Event:
  - The pond behind Blackwolf Drive overtopped the northern berm and flooded homes
  - The grate for the pond was clogged with debris
  - Runoff from the wooded area west of Samuel Drive caused flooding in the backyards of the homes along Samuel Drive and also damage to one home.

After PIM 2

Virtual
One attendee. They confirmed the mapping at the house with the stone retaining wall looks representative of what was experienced.



2. Menards Area

Menards Area Focus Group for the Pheasant Branch Watershed Study
In Person
September 17th, 2019 from 11:00 am-12:00 pm
Meeting Location: Pet Smart Parking Lot near Tires Plus Parking Lot
Attendees: 3

- During the August 2018 event:
    - Water was ponding in the Menard's Parking Lot and cars in the Employee Parking lot had 2-4 feet of water with some cars being totaled from the damage.
    - Water was coming into the Menard's store
    - Water flooded the Menards Loading docks
    - Rouse Management had reconstructed the driveway into the apartments on Plaza and Commerce. Due to the reconstruction, water did not enter the parking garage and flood the underground parking as it had done in previous years.
- During moderate to large rain events, water ponds in the intersection of Commerce Drive and Mineral Point Road

After PIM 2

Virtual
No attendees

Pheasant Branch Focus Group Summaries

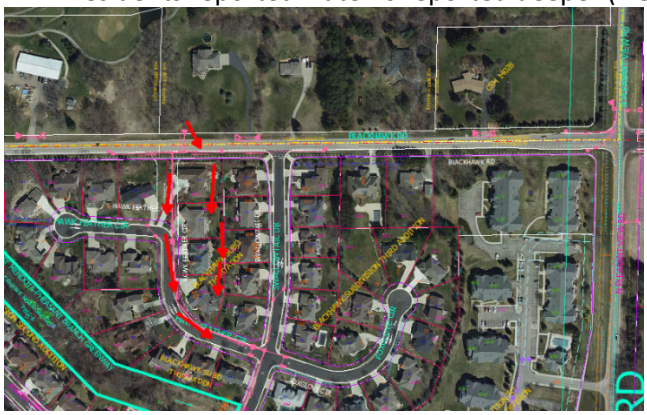
3. North Blackhawk Pond

North Blackhawk Pond Focus Group for the Pheasant Branch Watershed Study
In-Person
September 5th, 2019 from 7:00 - 8:00 pm
Meeting Location: Swallowtail Park
Attendees: 7

- During the August 2018 event:
  - Water was overtopping Swallowtail.
  - Swallowtail had flooded water from Aspen Grove Lane to Hawk's Feather Circle
  - There was water on the back patio at 5 Foxglove Circle
  - Water was up to the base of the tree closest to Swallowtail at 2 Hawk Feather Circle
  - There was water adjacent to the buildings the south side of the buildings at Boulder Creek but it didn't enter the basement
  - Wood logs from a property north of Blackhawk Road flowed south over Blackhawk Road and were found in backwards
  - The intersection of Blackhawk Road and Aspen Grove Lane still has standing water the day after the storm
- During moderate to large rain events, N Pleasant View Road overtops and the gravel shoulders are washed out.

After PIM#2
Virtual

- Residents on Swallowtail Dr just south of Blackhawk Rd reported that in Aug 2018, water flowed through their backyards from Blackhawk Rd on its way to the North BH pond. This was evidenced by the debris trail left behind.
  - The 2018 maps captured a drainage path from Blackhawk Rd through yards to Hawk Feather Cir, but not the path described above. Residents confirmed that this path exists.
  - Residents in this area stated that their yards are generally wet and do not drain well, although 2018 was the worst case.
- One resident noted that the 2018 flood reports looked insufficient (ie there should have been more)
- A resident wanted to know exactly how Pope Farms was accounted for in the models (PB and LBMC). Greg and I answered but we should confirm.
- 2 residents reported water is reported deeper (2.5') rather than 1' on Boulder Court

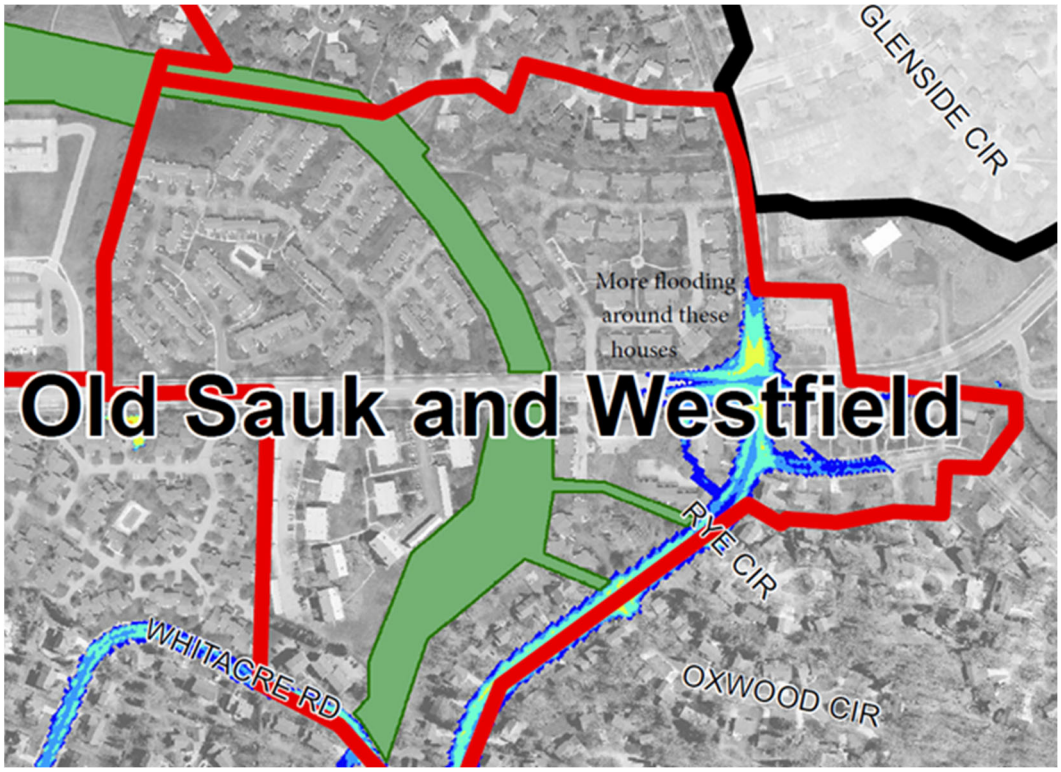


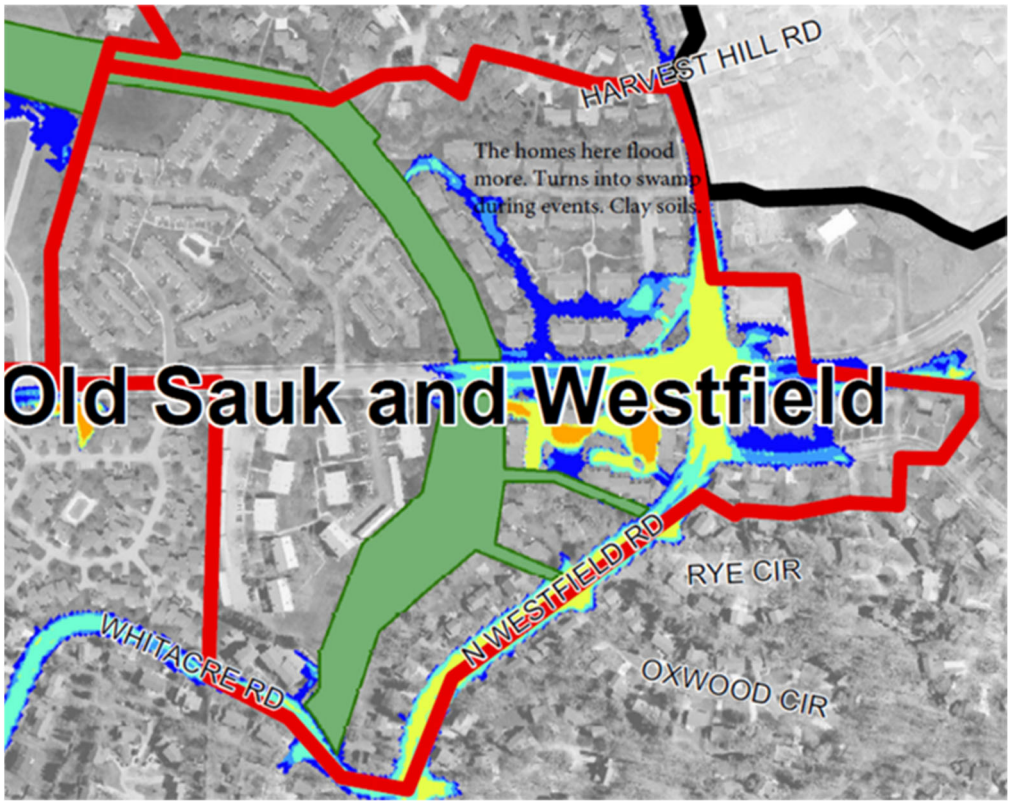
4. Old Sauk and Westfield

Old Sauk and Westfield Focus Group for the Pheasant Branch Watershed Study
In-Person
September 18th, 2019 from 11:00 am-12:00 pm
Meeting Location: Corner of N Westfield Road and Walnut Grove Drive
Attendees: 22

- During moderate to large rain events, the intersection of Old Sauk Trail and Westfield Road has street flooding.
- During large rain events, Old Sauk Road near the greenway overtops.
- During moderate to large rain events, some homes on Saukdale Way, Drive, and Trail and Loon Lane have structure flooding.
- The inlets along Westfield frequently clog with debris.
- The pipe located at the "X" is clogged and will be cleaned out this winter. This work will involve the removal of trees to get large equipment in to haul out the sediment.
- Street trees drop significant debris throughout the year. Forestry trimmed them following the focus group.
- During the August 2018 event, there was significant flooding on Old Sauk Road and Westfield Road.

After PIM2
Virtual
Feedback from attendees indicated maps looked pretty accurate.





A few other notes. Another person mentioned that the greenway below frequently gets full of debris and branches, but there is no property damage in this area. They also said they have lived in the area right by the little pond for 20 years and that that pond has never filled up.

2 StoryMap responses indicated mapping looked reasonable (Elderberry & Samuel and 1109 N High Point Road)

Pheasant Branch Focus Group Summaries

Old Sauk Trails Business Park
Old Sauk Trails Focus Group for the Pheasant Branch Watershed Study
In-Person
September 26th, 2019 from 11:00 am-12:00 pm
Meeting Location: GHC Parking Lot; 8202 Excelsior Drive, Madison
Attendees: 8

- During the August 2018 event:
  - The intersection of Fourier Drive and Excelsior Drive was impassable.
  - The Old Sauk Trails ponds overtopped and in some places the water entered buildings.
  - The greenway between the Beltline and Excelsior Drive overtopped and some water entered the building.
- There is a desire to clean out the dead/dying vegetation in the Old Sauk Trails ponds
- The Old Sauk Trails Ponds are a targeted location for a flood reduction project; the business park owners would not object to removing the trees inside the current walking path, but would prefer to keep some trees between the walking paths and businesses

After PIM2
Virtual
Feedback indicated that generally maps looked okay. Sent maps to Gialamas representative to share with businesses for more verification

5. Southwest Blackhawk Pond

Southwest Blackhawk Pond Focus Group for the Pheasant Branch Watershed Study
In-Person
September 4th, 2019 from 7:00 - 8:00 pm
Meeting Location: Corner of Bear Claw Way and Winding Way
Attendees: 15

- During moderate to large rain events
    - The intersection of Winding Way and Bear Claw Way has street flooding.
    - The yard drain on the north side of Red Sky Drive becomes overwhelmed and water flows on the drainage way between the homes to Red Sky Drive.
    - Sediment laden runoff from the 9th Addition Construction is observed.
- The outlet to the Southwest Blackhawk Pond frequently has debris on it and a resident in the neighborhood cleans it during rainstorms.
- During the August 2018 event, there was significant flooding on Bear Claw Way and Winding Way and at the outlet of the Southwest Blackhawk Pond.

After PIM 2
Virtual
Combined with North Blackhawk Pond group, see notes above

6. Tamarack Trails

Tamarack Trails Focus Group for the Pheasant Branch Watershed Study
In-Person
September 27th, 2019 from 9:00 am-10:00 am
Meeting Location: Tamarack Trails Clubhouse Parking Lot
Attendees: 14

- During the August 2018 Storm Event:
    - The channel from Westfield Road to the Greenway filled but did not flood structures
    - Drainage from the cemetery south of Tamarack Trails flooded some homes south of Tree Lane
    - There was flooding internal to the Tamarack Trails property that is being addressed

After PIM2
Virtual
Feedback indicated generally maps looked reasonable

7. Wexford Ridge

Wexford Learning Session for the Pheasant Branch Watershed Study
In-Person
September 27th, 2019 from 5:30 -7:30 pm
Location: Lussier Community Education Center Community Dinner; 55 South Gammon Road
Attendees: Not counted, Table at event

Focus group was held at a neighborhood dinner; specific flooding experiences were not shared.

After PIM2
Virtual
No attendees

8. Wexford Village

Wexford Ridge Focus Group for the Pheasant Branch Watershed Study
In-Person
September 25th, 2019 from 3:00-4:00 pm
Meeting Location: Corner of Tramore Trail and Sawmill Road
Attendees: 12

- Water was over four feet deep at the intersection of Sawmill Road and Tramore Trail, extending up and down Sawmill Road, Tramore Trail, and High Point Road
- Water was over four feet deep in High Point Road near Sawmill Road
- The water in the Wexford North and South Ponds rose such that it looked like one pond; the "bridge" was fully covered

After PIM2
Virtual
Overall, feedback indicated the maps for the 10, 100, and August 2018 storm event looked accurate.

Other information shared:

- 7641 Sawmill Road: They had water around the house (covered ~1" of their siding), but no water in the house. They do not have basement window wells. They had 2-3 feet of water in the garage. They did report this via the flood reporting page.
- 893 High Point Road: They had 18 – 24" of sewage in their basement, but no stormwater. They did report this via the flood reporting page.
- Although out of our focus group boundary, they said the High Point and Old Sauk intersection flooding looked accurate.

Appendix F. Green Infrastructure Analysis

Green Infrastructure Effectiveness Analysis

v11/16/2021

Table of Contents

Executive Summary 4
Section 1. Introduction 5
Pheasant Branch Watershed 5
City of Madison Flooding Level of Service Goals 6
Volume Control Modeling Goals 7
Section 2. Phase I Analysis 8
Part 1 – Estimate Potential Volume Control Effects per Subcatchment 8
Part 2 – Initial Opportunities Analysis 9
Volume Control Infrastructure Layer 9
Initial Volume Control Infrastructure Scenarios 10
Step 2: Compare the Potential VCI Volume to the Volume Reduction Calculated in Part 1 for each Subcatchment 11
Step 3: Create Max Available Scenario 13
Part 3 – Develop Final VCI Model 13
Phase I Conceptual Cost Estimate 16
Phase I Total Phosphorus Load Reduction Estimate 16
Section 3. Peer Review 17
Section 4. Phase II Analysis 18
Part 1 – Estimate Peak Flow Reductions from 25%, 75%, and 100% DCIA 18
Part 1: Determine 25%, 75%, and 100% DCIA 18
Part 2: Develop full VCI model for 25% DCIA, 75%, and 100% DCIA 18
Progress towards City's Flood Mitigation Targets 21
Part 2 – Expand the Opportunities Analysis 28
Part 3 –Amount of Land Needed for VCI 30
Phase II Conceptual Cost Estimate 34
Phase II Total Phosphorus Load Reduction Estimate 34
Section 5. Reduce Size of Traditional Infrastructure 35
One-Size Infrastructure Reduction 35
Two-Size Infrastructure Reduction 35
Infrastructure Cost Reduction 35
Section 6. Additional Benefits of Volume Control Infrastructure 36
Section 7. City of Madison Initial Agency Comments 37
Traffic Engineering 37
Water Utility 37

Parks 37
Fire Department 37
Section 8. Results of Parallel Watershed Phase I Analysis 38
Wingra West Watershed 38
Willow Creek Watershed 38
Section 9. Additional Analysis – Pervious Area Infiltration Rates 39
Section 10. Green Infrastructure Pilot Study with USGS 41
Section 11. Conclusions and Next Steps 43
Next Steps 43
References 44
Appendix A. WinSLAMM Standard Land Use Source Area Breakdown 46
Appendix B. Phase I Peer Review 47
Appendix C. Phase I Analysis Scope for Consultants 48
Appendix D. Wingra West Phase I Analysis 49
Appendix E. Willow Creek Phase I Analysis 50

Executive Summary

The City of Madison wanted to understand if traditionally-sized green infrastructure (also known as volume control infrastructure (VCI)) can be used for flood control. For purposes of this study, traditionally-sized green infrastructure is stormwater management sized for the small storm events – typically the 1-year or 100% chance storm event.

The computer models created for the watershed studies were utilized for this study. These computer models were used because they were constructed for purposes of flood control and they reflect the current conditions of the watershed study areas.

The majority of the analysis described in this document is for the Pheasant Branch watershed, a 3,300-acre, mixed land use, watershed located on the far west side of the City of Madison.

The computer model hydrology (the component that generates the stormwater runoff) is separated into three parts: 1) directly connected impervious area (DCIA), non-directly connected impervious area (NDCIA), and 3) pervious area. DCIA is impervious that drains to a hard surface (like a street or driveway) and then into the stormwater conveyance system. Non-directly connected impervious area is impervious area than drains to a pervious area (like a lawn) before it reaches the stormwater conveyance system. This separation was initially done to aid in calibration of the models, but, was then taken advantage of for this study.

The analysis was conducted in two phases, with a peer review conducted after phase one.

The first phase evaluated the peak flow reductions for traditionally-sized infrastructure installed at typical levels of DCIA treatment. The levels were 10, 15, 20, and 25% of the DCIA. The results peak flow reduction was between 4 and 10.5%.

The second phase evaluated how much traditionally-sized green infrastructure it would take to achieve 1) 20% reduction in the 100-year (1% chance) event peak flow and 2) the watershed study flood targets. The results found that 75% of the DCIA would need to be treated to achieve a 20% reduction in the 1% chance (100-year) peak flow. The results also found that even if all DCIA was treated (100% DCIA), the watershed study targets would still not be met.

Cost estimates were completed for the various scenarios. Constructing VCI to treat 25% of the DCIA is estimated to cost approximately $78 million. Constructing VCI to treat 75% of the DCIA is estimated to cost $147 million.

The final step in the analysis was to understand how much the grey infrastructure (infrastructure typically installed for peak flow control such as larger pipes, detention basins, etc) could be downsized if the 75% DCIA VCI was also constructed. The results indicated that the grey infrastructure could be reduced by one size if VCI treating 75% of the DCIA was installed. The grey infrastructure cost savings is approximately $7 million.

Section 1. Introduction

The City of Madison, Wisconsin Engineering Division would like to understand the effectiveness of green infrastructure to help meet the City's flood mitigation goals. The City is evaluating traditional flood control solutions (increase pipe capacity, detention basins, etc.), so for simplicity, the City is referring to green infrastructure as "volume control infrastructure". Volume control infrastructure will be infrastructure meant to infiltrate or evapotranspire stormwater. Types of volume control infrastructure includes rain gardens, pervious pavement, green roofs, biofilters, and infiltration basins.

City Engineering conducted a pilot planning level analysis for the Pheasant Branch Watershed known as Phase I. The purpose of the analysis was to understand the data available and how it could efficiently be used to evaluate the effectiveness of volume control infrastructure. Engineering staff conducted the iterative analysis with check-ins and discussion.

Following the Phase I analysis, the City asked for a peer review from a consultant with extensive experience in Green Infrastructure Modeling and Design. Based on feedback, the City revised some components of the analysis. The City conducted the revised analysis known as Phase II.

In parallel, the City contracted with two consultants conducting flood mitigation watershed studies for different watersheds in the city. The consultants were asked to repeat Phase I of the analysis to understand if the results from the Pheasant Branch Watershed Study were repeatable.

Once the City's Phase II and the consultant's Phase I analysis were complete, the City used the results from both to create the analysis all consultants would complete for all watershed studies.

The analysis and results are described in this document.

Pheasant Branch Watershed

Pheasant Branch Watershed is located on the far west side of Madison and comprises approximately 3,300 acres of urban and agricultural land use.

Development in the watershed began in the 1970s and is still occurring today. Areas of the watershed developed after 1983 were subject to the City's stormwater management requirements. From 1983 to present data, stormwater management requirements became more robust, and today's requirements involve some volume control infrastructure.

The hydrologic and hydraulic model for the watershed was built in XP-SWMM 1D/2D. The hydrology and stormwater infrastructure are modeled in 1D while the large open channels and overland flow is modeled in 2D.

The watershed is broken up into 452 subcatchments. The hydrology for the watershed utilizes SWMM hydrology and Horton Infiltration. Each subcatchment is broken into three components: 1) Directly Connected Impervious Area (DCIA), 2) Non-Directly Connected Impervious Area (NDCIA), and 3) Pervious Area.

The percent of DCIA and NDCIA is taken from the WinSLAMM model's standard land uses. The standard

land uses representative the average source areas (roofs, driveways, sidewalks, etc) and connectedness in a typical land use. The standard land uses were developed by aerial photograph and field investigations of over 500 sites. A spreadsheet showing the breakdown of the standard land uses can be found in Appendix A. More information on the WinSLAMM model can be found here: http://www.winslamm.com/.

In each subcatchment, the NDCIA is routed to the pervious area through subcatchment routing. The flow path and slope for all components is the same – that calculated for the overall subcatchment.

City of Madison Flooding Level of Service Goals

The City of Madison has the following level of service goals for flood mitigation:

1. 10-year design storm event:
    a. No surcharging onto the street for up to the 10-year design storm; water shall becontained within the pipes and structures.
    b. There are locations within the City where low points exist that pond water; theselow points are excluded from this goal and will be addressed as streets are redesigned.
    c. For locations limited by known inlet capacity, allow no more than 0.5 feet of waterabove storm sewer inlet rim.
2. 25-year design storm event:
    a. Centerline of street to remain passable during 25-year design storm with no morethan 0.2 feet of water at the centerline.
    b. Note that the Watershed Study modeling approach will not explicitly account for cross flow conditions where more gutter flow on one side of the street can overtopthe crown.
3. 100-year design storm event:
    a. No home or business will be flooded during the 100-year design storm.
    b. Enclosed depressions to be served to the 100-year design storm (which can includesafe overland flow within street, easements, greenways or other public lands).
    c. Greenway crossings at streets to be served to the 100-year design storm.
    d. No more than 0.5 feet of water on the centerline of arterial roads for passage ofemergency vehicles
4. 500-year design storm event:
    a. Safely convey stormwater; i.e. limited impact on private property
5. Provide flooding solutions that do not negatively impact downstream properties.

Table 1-1 provided the Design Storm Depths and Distribution used for evaluating the City's Flood Mitigation goals.

Table 1-1. Design Storm Depths and Distribution

Recurrence Storm	Rainfall Depth (in)	Rainfall Distribution
1-year (100% Chance)	2.49	MSE4 – 24 hour
2-year (50% Chance)	2.84	MSE4 – 24 hour
5-year (20% Chance)	3.45	MSE4 – 24 hour
10-year (10% Chance)	4.09	MSE4 – 24 hour
25-year (4% Chance)	5.02	MSE4 – 24 hour
100-year (1% Chance)	6.66	MSE4 – 24 hour
500-year (0.2% Chance)	8.94	MSE4 – 24 hour

Volume Control Modeling Goals

The purpose of this analysis was to understand the following:

1. Determine the volume of water that would need to be managed if a certain percentage of DCIA were to be treated,
2. Determine if there is a break point/ target for volume control treatment,
3. Assess the watershed to see how much area is available for volume control,
4. Assess the impact of infiltration size for the 1- year event on larger storms,
5. Assess the sensitivity of the existing drainage system to the implementation of volume controlstormwater devices to treat directly connected impervious areas, and
6. Determine if the combination of the peak flow control efforts and volume control efforts canprovide a quantifiable increase in the level of service.

Section 2. Phase I Analysis

The Phase I Analysis was conducted in three parts. First, the volume of water that could be treated for each of the impervious area treatment goals was calculated. Second, the land available for treatment was calculated and compared to the land needed. Finally, a watershed model with the treatment was developed and executed. The results were summarized and an initial conceptual cost estimate was prepared.

A Microsoft Excel spreadsheet (called “GI Analysis Phase I 2020_07_03.xlsx”) accompanies this document and is referred to in numerous locations.

Part 1 – Estimate Potential Volume Control Effects per Subcatchment

Initially, the City wanted to understand if treating a certain percentage of the DCIA would generate a significant reduction in runoff volume or peak flows. 10%, 15%, 20%, and 25% of DCIA in each subcatchment was routed out of the drainage network. To do this, the associated impervious area from the DCIA for each subcatchment was simply removed from the model. The assumption in this step was that each DCIA percentage was fully treated by volume control infrastructure. “Step 1 Calc DCIA Removed” and “Step 1 Areas Table” in the accompanying spreadsheet were used to calculate the areas for each percentage.

The Runoff Block of XP-SWMM was run for 10%, 15%, 20%, and 25% DCIA removed scenarios. The peak flows and runoff volumes for each subcatchment were summarized in the “Step 1 Flow cfs Results” and “Step 1 Volume ac_ft Results” tabs. The results are graphed in the “Flow Results Chart Per”, “Volume Results Chart ac-ft”, and “Volume Results Chart Per” tabs. Figure 2-1 shows a graph of the peak flow results.

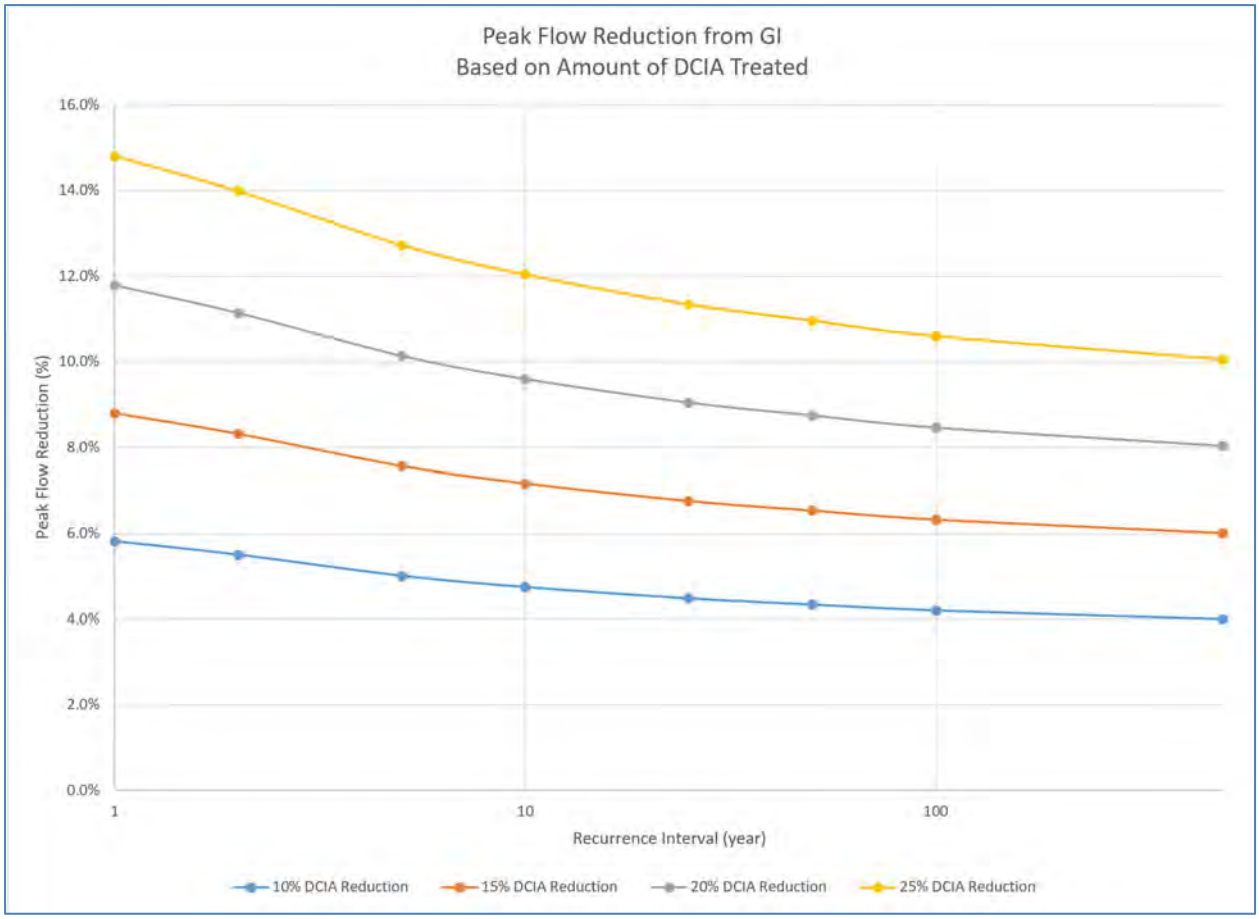


Figure 2-1. Peak flow reduction for each DCIA Scenario

Part 2 – Initial Opportunities Analysis

Volume Control Infrastructure Layer

The City conducted a desktop analysis utilizing available Geographic Information Systems (GIS) data to understand where there are opportunities to install volume control infrastructure. This analysis was conducted over the span of several months and in conjunction with various City agencies including Forestry, Historic & Cultural Resources, Parks, and Water Utility.

Following the inter-agency meetings and review, the following areas were removed from the available area:

- Airports
- Primary building footprints with a 10 foot buffer
- Accessory building footprints
- Buffer of 3 feet along parcel boundaries
- Cemeteries
- Depth to bedrock < 5’
- Depth to groundwater < 5’
- Hydrologic soil group D

- Open water
- Landfills
- Railroads
- Springs
- Wellhead protection zone
- Wetlands
- Salt routes
- Arterial and collector streets (0 < function class < 5)
- Slope > 12 %

The remaining pervious and impervious areas were considered available for volume control infrastructure.

Initial Volume Control Infrastructure Scenarios

The City decided upon three scenarios for the size of volume control infrastructure that could be installed. They are described below:

1. Realistic (sf): The area for green infrastructure assuming realistic size green infrastructure isinstalled
2. Maximize (sf): The area for green infrastructure assuming the realistic sized area is maximized
3. Available GI Space (sf): The area for green infrastructure if all the available space is utilized.

The Table 2-1 below shows the parameters used for each scenario. All scenarios include a 3-foot buffer around the volume control infrastructure as a transition to the existing land cover.

Table 2-1. Scenario Land Use and VCI Area Assumptions

Parcel Land Use	All Available GI Space (sf)	Maximize (sf)	Realistic (sf)
Residential	if >3000 SF	240	120
Residential	If <3000 SF and >1000 SF	120	60
Residential	If <1000 SF and >60 SF	60	30
Commercial/Industrial/ Institutional	Any size	All available	All available
Parks	Any size	10% of available	5% of available
Open space (not parks)	Any size	20% of available	10% of available
Streets	Any size	20% of available	10% of available

This layer was intersected with each subcatchment and the areas for each scenario were calculated for each subcatchment. Tabs"PB_GI_Areas_More_Restrictive" and "PB_GI_Less_Restrictive" show the results of the calculations.

Note, this analysis was done with both a "More Restrictive" layer and a "Less Restrictive" layer. The More Restrictive layer excluded additional areas where volume control infrastructure could be implemented such as areas within the wellhead protection zone, areas with shallow bedrock or

groundwater, and areas with high slope.

The area of available space for volume control infrastructure in the Pheasant Branch Watershed for the more restrictive layer for this initial analysis was calculated to be 1,736 acres and the less restrictive layer's available area was calculated to be 2,197 acres.

After internal discussions, it was decided the "Less Restrictive" layer would be the layer to use in determining the available space in each subbasin for VCI.

Step 1: Calculate the Area needed for Volume Control Infrastructure for each Subcatchment

Using the potential volume that could be infiltrated from Part 1, the area needed to capture that volume was calculated for each subcatchment, for each of the three scenarios. An assumed depth of 1-foot (open area storage) was assumed for each VCI (the potential storage from subgrade porosity was ignored).

Tab "Step 1b Area Needed for GI" shows the results of the calculations.

Please note, this analysis was done for both the 1-year and 10-year storm event volumes. Following internal discussions, it was decided that future calculations would only be done for the 1-year storm event volume.

Step 2: Compare the Potential VCI Volume to the Volume Reduction Calculated in Part 1 for each Subcatchment

The area needed to treat the volume was compared to the area available for each scenario.

Tab "2 Step 5 Compare Areas" shows the results of the comparison. Columns DV-EN summarize the results.

The Figure 2-2 shows the maximum percent of DCIA that can be treated for each subcatchment for the 1- year, 24-event with the land available for the More Restrictive, Realistic Scenario.

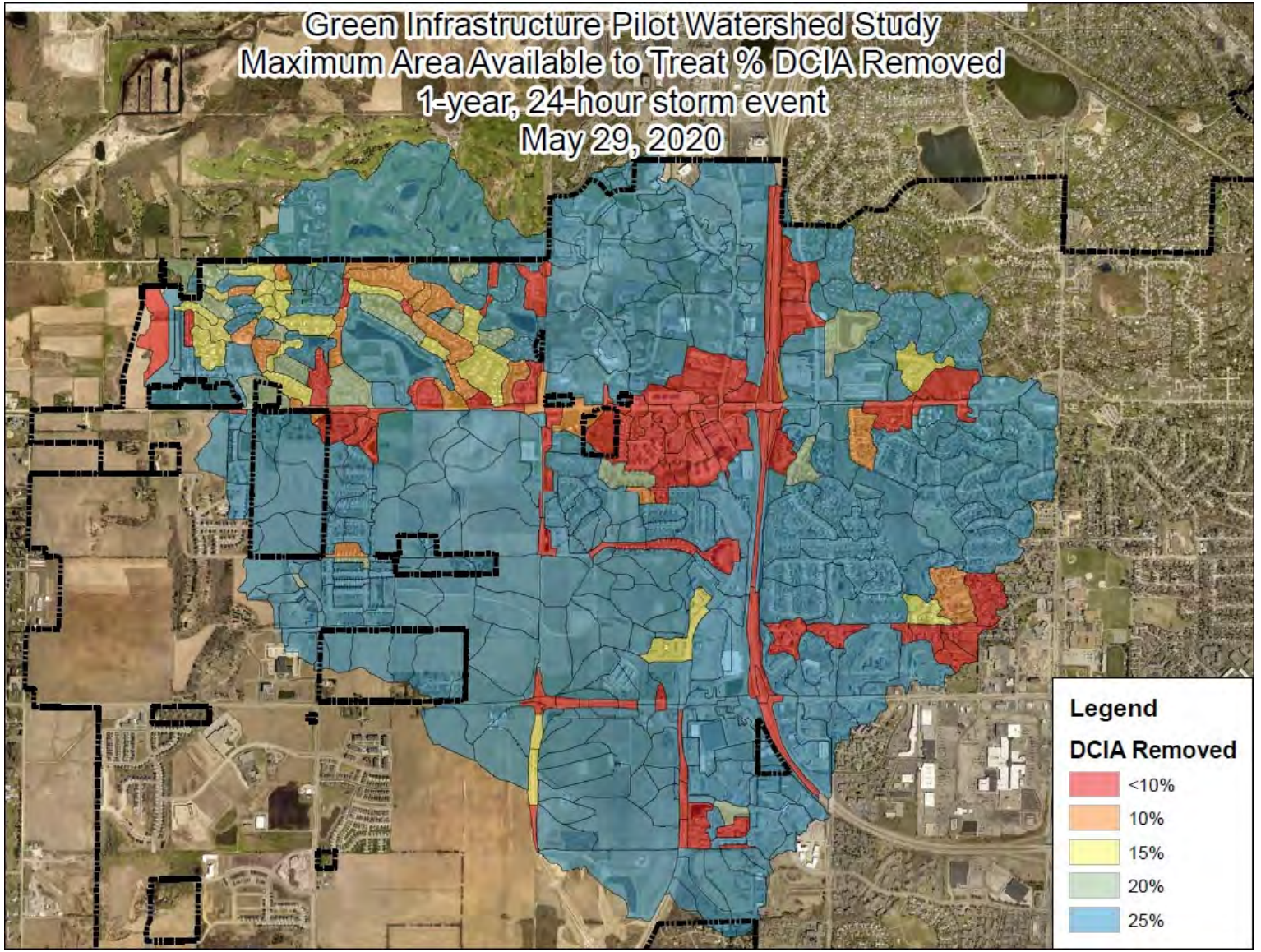


Figure 2-2. Maximum percent of DCIA that can be treated for each subcatchment for the 1-year, 24-event for the More Restrictive, Realistic Scenario

Figure 2-2 indicates that the majority of the watershed has land available to treat 25% of the DCIA.

Additional calculations were conducted to understand if at least ½ inch of runoff volume was being treated from all impervious surfaces. The results of the analysis show that treating 25% of the DCIA equates to treating ½ inch of runoff from all impervious surfaces.

Columns DA – DF of tab "Step 1 Volume ac-ft Results" summarize the results of the impervious surfaces runoff volume calculations.

As a result of this Phase I analysis, the City chose a treatment goal of 25% of the DCIA for Pheasant Branch Watershed. This goal was selected for two reasons:

1. Overall, land is available to treat 25% of the DCIA in the watershed
2. Treating 25% of the DCIA also treats ½ inch of runoff from all impervious surfaces (using a weighted average). ½ inch of runoff is the treatment goal for the City of Milwaukee greeninfrastructure plan and represents the "first flush" of stormwater.

Step 3: Create Max Available Scenario

Step 1 above assumes that land in some subcatchments can be over-treated to account for the subcatchments where land is not available to treat 25% of the DCIA. The Max Available Scenario was created to understand what the impacts of runoff volume and peak flow reduction would be if overtreatment did not occur. This scenario was set up using the maximum DCIA that could be treated given the available area (up to 25%).

Tab "2 Step 5 CA Figure" shows the maximum % DCIA that can be treated (up to 25%). The runoff volume and peak flow calculations from this step are not summarized in the spreadsheet.

Part 3 – Develop Final VCI Model

The final part to the Phase I Analysis evaluates the impact volume control infrastructure has on the conveyance system of the watershed. The volume control infrastructure for this analysis will be sized for the 1-year storm event. For storms in excess of the 1-year event, the volume control infrastructure will overflow. Therefore, a model representing the volume control from the 1-yr volume control infrastructure is needed to understand the net impact from the volume control infrastructure.

Running the full model (hydrology, 1D hydraulics, and 2D) for the work done in Part 1 would overestimate the reductions for storm events above the 1-year storm event. This is because the representative area of DCIA was removed and, as a result, the runoff volume for that sub-area for each storm event was also removed.

To develop the final VCI model, 25% of the DCIA was added to the NDCIA for each subcatchment. Then, the pervious depression storage was adjusted until the 1-year storm event results from Part 1 matched the 1-year storm events from this Part for the subcatchments.

The same methodology was utilized for the Max Available Scenario.

Tabs “Step 2a Move DCIA to NDCIA” and “Step 2a Move DCIA to NDCIA Avai” show the calculations to move the DCIA to the NDCIA. Tabs “Step 2c Pervious Dep Stor Calc” and “Step 2c Pervious Dep Stor C Av” show the calculations to modify the pervious depression storage. Tabs “Step 3 Flow cfs Results” and “Step 3 Volume ac_ft Results” show the results of the analysis for each subcatchment.

The model was then run for both scenarios for the 1-, 10-, and 100-year, 24-hour events. Figures 2-3 and 2-4 show the resulting peak flows at two locations within the watershed.

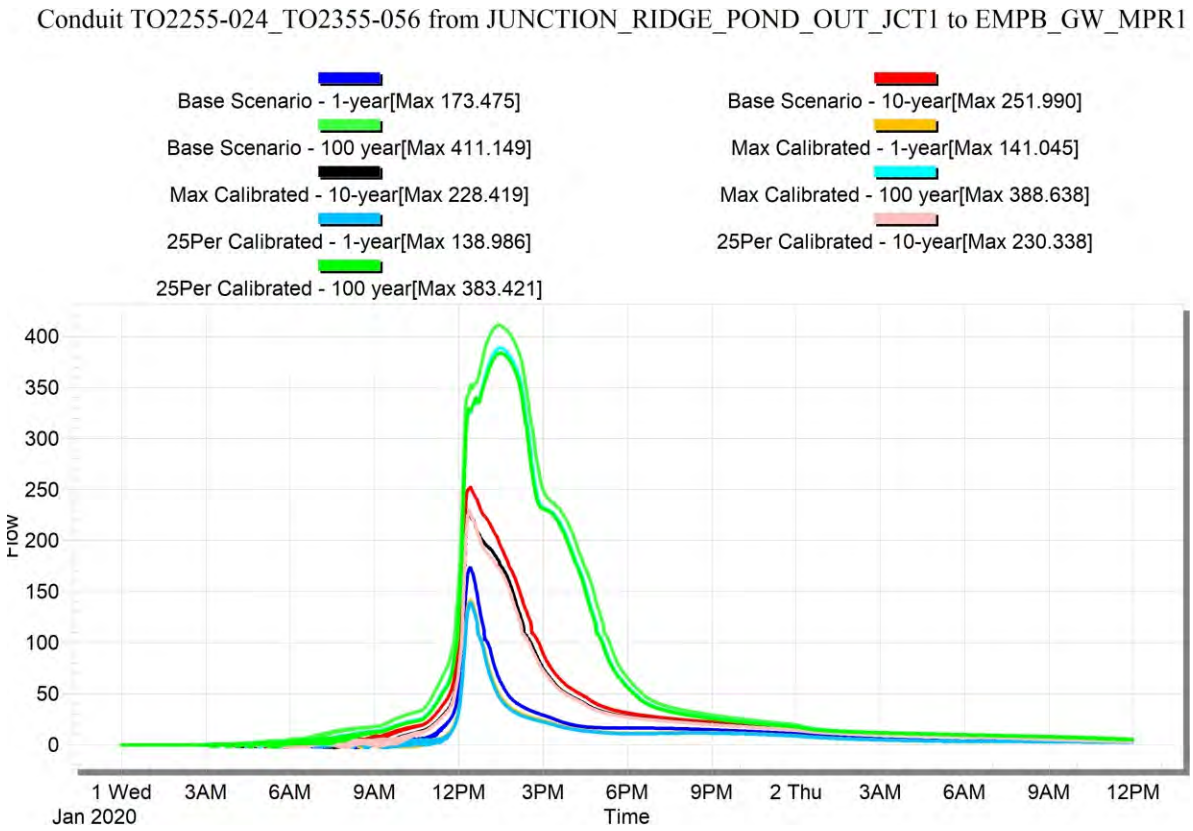


Figure 2-3. XP-SWMM Output at culvert from Target Pond under Beltline to Sauk Creek Greenway

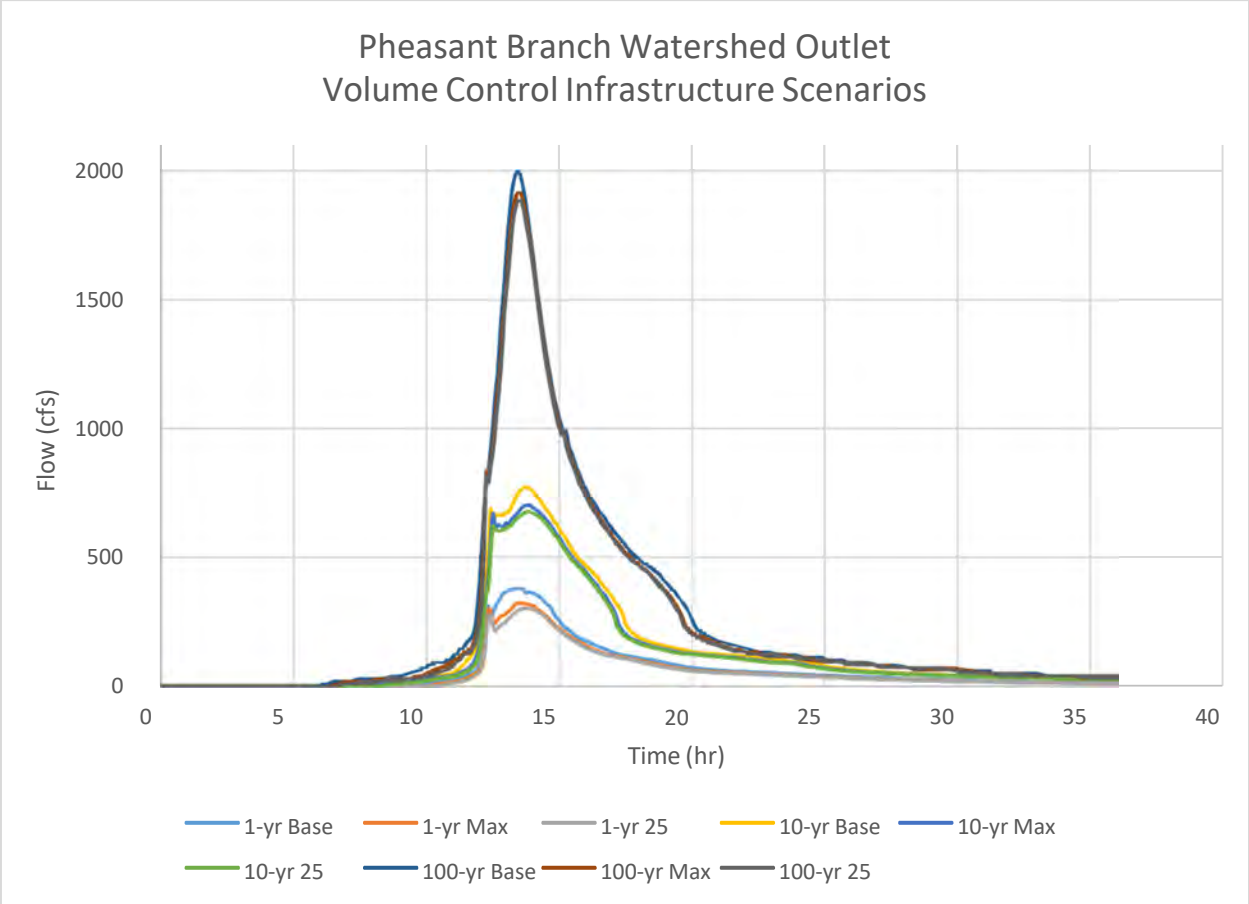


Figure 2-4. Outlet of Pheasant Branch Watershed (Upstream of Greenway Boulevard)

Table 2-2 shows a summary of the peak flows at the outlet of the Pheasant Branch Watershed and the reductions.

Table 2-2. Peak Flow Comparison at Outlet of Pheasant Branch

Storm Event	Base Scenario	25% DCIA Rerouted		Max DCIA Rerouted	
	Peak Flow (cfs)	Peak Flow (cfs)	Percent Reduction (%)	Peak Flow (cfs)	Percent Reduction (%)
1-yr	377	302	20%	322	15%
10-yr	772	677	12%	702	9%
100-yr	1,998	1,889	5%	1,920	4%

As expected the more frequent storm events have a higher peak flow reduction than the less frequentstorm events.

Phase I Conceptual Cost Estimate

The City recently completed construction of volume control infrastructure in a pilot study area in the City. Utilizing the bid tab from that project, construction of the volume control infrastructure is approximately $40 per square foot. The volume control installed in the pilot study area is a mix of residential rain gardens, pervious pavement, and underground storage trenches. This combination of practices is representative of the combination that would be constructed in the Pheasant Branch Watershed.

The City has conducted research regarding the average maintenance cost for volume control infrastructure. The average cost is approximately $3 per square foot of volume control infrastructureper year.

The costs from the pilot study area and maintenance research were applied to the potential treatment area for Pheasant Branch Watershed. Table 2-3 shows the results of the conceptual cost estimate.

Table 2-3. Conceptual Cost Estimate

Scenario	Total Impervious Area Treated (acres)	Total TreatmentArea (ac)	Estimated VCI Construction Cost ($)	Estimated VCI Maintenance Cost ($/yr)
25% DCIA Rerouted	221.2	45.0	$78,359,000	$5,877,000
Max % DCIA Rerouted	164.5	35.0	$60,954,000	$4,572,000

Phase I Total Phosphorus Load Reduction Estimate

Volume control infrastructure can be constructed for several reasons. A common reason is stormwater pollution reduction. The City of Madison has a WPDES Individual MS4 Permit and is part of the Rock River Total Maximum Daily Loads (TMDL). The Rock River TMDL requires reductions in total phosphorus.

A simplified analysis of the total phosphorus that would be removed from the treated area was conducted in WinSLAMM. WinSLAMM is a continuous simulation, water quality model using small storm hydrology. It has the ability to simulate many types of source areas, included directly connected and disconnected impervious areas. It can evalute many types of traditional and volume control infrastructure.

In the model, the treated area was assumed to be half roofs and half streets (streets with an assumed width of 40 feet and intermediate texture) in a residential land use. The roofs and streets were routed to a biofilter with a 1 foot of depth and a native soil seepage rate of 0.3 inch/hr. The, the City estimated that the total phosphorus reduction from the 25% DCIA Rerouted scenario is approximately 382 pounds per year. The total phosphorus reduction from theMaximum Rerouted scenario is approximately 284 pounds per year.

Section 3. Peer Review

The City contracted with Birchline Planning, LLC to revise the City of Madison's ordinances and policies with respect the distributed green infrastructure. Tetra Tech, Inc. is on the Birchline team for the project. Tetra Tech is a leader of green infrastructure analysis and design in the stormwater industry. The City asked Tetra Tech to review the City's Phase I analysis for technical soundness as well as areas where the analysis could be revised/modified to further meet the City's goals. The review can be found in Appendix A.

In general, the peer reviewer found the Phase I Analysis to be technically sound.

Tetra Tech offered ideas to enhance the analysis. After internal discussions, the following were incorporated into the Phase II Analysis discussed in the next section:

- Expand the Opportunities Analysis to include flat roofs that could have green roofs installed
- Because the purpose of the analysis is for flood control, expand the targeted amount of area to be treated. The City thinks that about 20% reduction in peak flows for the 100-year event could result in a decrease in infrastructure size. As such, an analysis was conducted to determine the percentage of DCIA to treat to achieve 20% reduction in peak flow for the 100-year event at the outlet of the watershed.
- Expand the benefits to more than just flood control and water quality improvement. Green infrastructure has many other benefits besides the direct effect on stormwater, including improved aesthetics, reduction in heat island effect, climate resiliency, etc. These additional benefits will be summarized.

Section 4. Phase II Analysis

The Phase II Analysis was conducted in a similar manner as Phase I. First, the reductions in peak flows that could be achieved by routing 25%, 75%, and 100% of the DCIA to appropriately sized green infrastructure was determined. Second, the opportunities analysis was expanded to include sidewalks, flat roofs, and residential streets that are not salt results. Finally, the land needed to treat both the 25%, 75%, and 100% DCIA was overlaid onto the watershed map for Pheasant Branch Watershed. The results were summarized, benefits were documented, and a conceptual cost estimate was prepared.

A Microsoft Excel spreadsheet accompanies this document (called "GI Analysis Phase 2 2021_02_08.xlx") and is referred to in numerous locations.

Part 1 – Estimate Peak Flow Reductions from 25%, 75%, and 100% DCIA

Part 1: Determine 25%, 75%, and 100% DCIA

25%, 75%, and 100% of DCIA in each subcatchment was routed out of the drainage network. To do this, the associated impervious area from the DCIA for each subcatchment was simply removed from the model. The assumption in this step was that each DCIA percentage was fully treated by volume control infrastructure. "Step 1a Calc DCIA Removed" and "Step 1 Areas Table" in the accompanying spreadsheet were used to calculate the areas for each percentage.

The Runoff Block of XP-SWMM was run for 25%, 75%, and 100% DCIA removed scenarios. The peak flows and runoff volumes for each subcatchment were recorded.

Part 2: Develop full VCI model for 25% DCIA, 75%, and 100% DCIA

To develop the full VCI model, 25% of the DCIA was added to the NDCIA for each subcatchment for the 25% DCIA scenario, 75% of the DCIA was added to the NDCIA for each subcatchment for the 75% DCIA scenario, and 100% of the DCIA was added to the NDCIA for each subcatchment for the 100% DCIA scenario. Then, the pervious depression storage was adjusted until the 1-year storm event results from Part 1 matched the 1-year storm events from this Part for the subcatchments.

Tab "Step 2a Move DCIA to NDCIA" shows the calculations to move the DCIA to the NDCIA. Tab "Step 2c Pervious Dep Stor Calc" shows the calculations to modify the pervious depression storage. Tabs "Step 3 Flow cfs Results" and "Step 3 Volume ac_ft Results" show the results of the analysis for each subcatchment.

The model was then run for all scenarios for the 1-, 10-, and 100-year, 24-hour events. Tables 4-1a through 4-1c below show the results for the scenarios for the 1-, 10-, and 100-year, 24-hour events.

Table 4-1a. 25% DCIA Scenario Peak Flow Results and Comparison

		Existing Conditions			25% DCIA Treated					
					1-yr		10-yr (cfs)		100-yr (cfs)	
Recording Location	Location	1-yr (cfs)	10-yr (cfs)	100-yr (cfs)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)
1	Outlet of Swallowtail Pond crossing Pleasant View Road	47	68	359	48	-2%	64	5%	337	6%
2	Target Pond Outlet (3 culverts) West to East Under Beltline	166	292	468	131	21%	245	16%	445	5%
3	Culverts East to West under Beltline just downstream of Wexford Pond	260	646	1,435	214	18%	561	13%	1,342	6%
4	Watershed Outlet	228	744	2,114	220	3%	649	13%	1,998	5%

Table 4-1b. 75% DCIA Scenario Peak Flow Results and Comparison

		Existing Conditions			75% DCIA Treated					
					1-yr		10-yr (cfs)		100-yr (cfs)	
Recording Location	Location	1-yr (cfs)	10-yr (cfs)	100-yr (cfs)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)
1	Outlet of Swallowtail Pond crossing Pleasant View Road	47	68	359	36	24%	48	29%	294	18%
2	Target Pond Outlet (3 culverts) West to East Under Beltline	166	292	468	63	62%	164	44%	396	15%
3	Culverts East to West under Beltline just downstream of Wexford Pond	260	646	1,435	110	58%	419	35%	1,109	23%
4	Watershed Outlet	228	744	2,114	175	23%	515	31%	1,699	20%

Table 4-1c. 100% DCIA Scenario Peak Flow Results and Comparison

		Existing Conditions			100% DCIA Treated					
					1-yr		10-yr (cfs)		100-yr (cfs)	
Recording Location	Location	1-yr (cfs)	10-yr (cfs)	100-yr (cfs)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)
1	Outlet of Swallowtail Pond crossing Pleasant View Road	47	68	359	19	59%	47	31%	211	41%
2	Target Pond Outlet (3 culverts) West to East Under Beltline	166	292	468	34	80%	123	58%	348	26%
3	Culverts East to West under Beltline just downstream of Wexford Pond	260	646	1,435	32	88%	319	51%	862	40%
4	Watershed Outlet	228	744	2,114	112	51%	425	43%	1,346	36%

As an additional scenario, all of the surface cover in each subcatchment was revised to be pervious. This was done as a comparison of the effectiveness of green infrastructure to something that can be visualized. The built conveyance system remained in the model. This scenario was run in the full VCI model. The results provided in Table 4-1d show that treating 100% of the DCIA is very close to a scenario where all the surface cover in a watershed is pervious.

Table 4-1d. 100% Land in Watershed is Pervious Scenario Peak Flow Results and Comparison

		Existing Conditions			Entire Watershed 100% Pervious					
					1-yr		10-yr (cfs)		100-yr (cfs)	
Recording Location	Location	1-yr (cfs)	10-yr (cfs)	100-yr (cfs)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)
1	Outlet of Swallowtail Pond crossing Pleasant View Road	47	68	359	22	54%	46	31%	223	38%
2	Target Pond Outlet (3 culverts) West to East Under Beltline	166	292	468	17	90%	134	54%	384	18%
3	Culverts East to West under Beltline just downstream of Wexford Pond	260	646	1,435	26	90%	286	56%	917	36%
4	Watershed Outlet	228	744	2,114	95	58%	265	64%	1,332	37%

The all-pervious analysis shown in Table 4-1d still resulted in street and structure flooding. This indicates that even if 100% of all impervious surfaces were returned to pervious, the built stormwater conveyance system is not sized large enough.

Progress towards City's Flood Mitigation Targets

The beginning of this document describes the City's Flood Mitigation Level of Service goals. The modeling results were reviewed to understand how the 25% DCIA, 75% DCIA, and 100% DCIA scenarios helped the City meet the goals.

Figures 4-1 and 4-2 below show the impact of the 25% DCIA scenario on the 10-year and 100-year goals. Figures 4-3 and 4-4 below show the impact of the 75% DCIA scenario on the 10-year and 100-year goals. Figures 4-5 and 4-6 below show the impact of the 100% DCIA scenario on the 10-year and 100-year goals.

For purposes of this analysis, streets are considered removed from flooding if there is no longer water along the centerline of the road and structures are considered removed from flooding if there is no longer water touching the 5-foot buffer placed around the building's outline.

Table 4-2 shows the existing streets and structures impacted and how they are reduced for each scenario.

Table 4-2. Street Segments and Structures Removed From Flooding

	Street Segments (miles) 10-year Storm Event			Structures (#) 100-year Storm Event		
Total	52.1			2,920		
Scenario	**Flooded**	**Percent**	**Removed**	**Flooded**	**Percent**	**Removed**
Existing Conditions	9.9	19%	N/A	118	4%	N/A
Grey Infrastructure						
Proposed Conditions	1.0	2%	8.9	57	2%	61
Green Infrastructure						
25% DCIA	8.7	17%	1.1	109	4%	9
75% DCIA	5.8	11%	4.1	79	3%	39
100% DCIA	2.3	4%	7.5	51	2%	67
Both Green and Grey	0.5	1%	9.3	15	1%	103

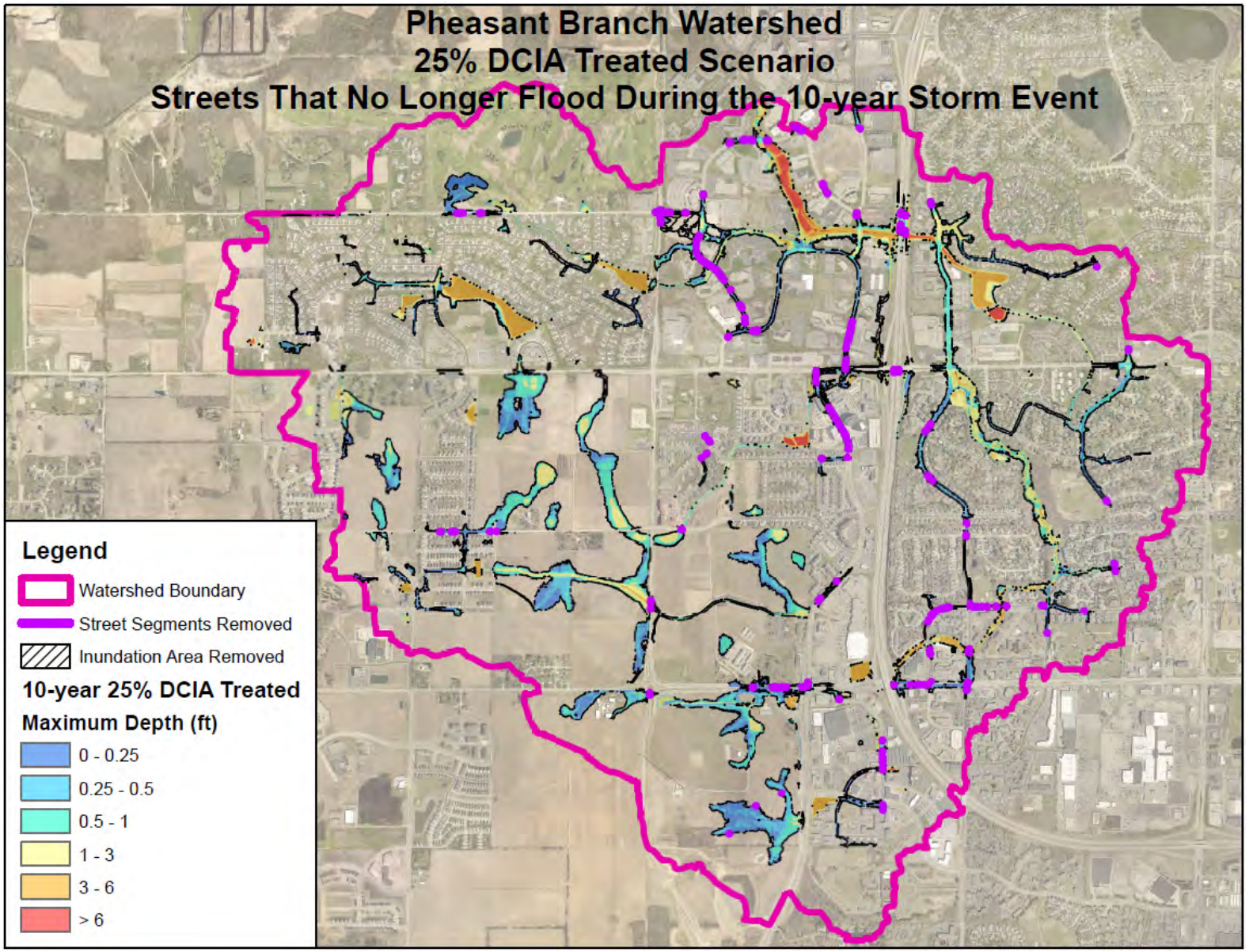


Figure 4-1. 25% DCIA Treated Scenario, 10-year Storm Event

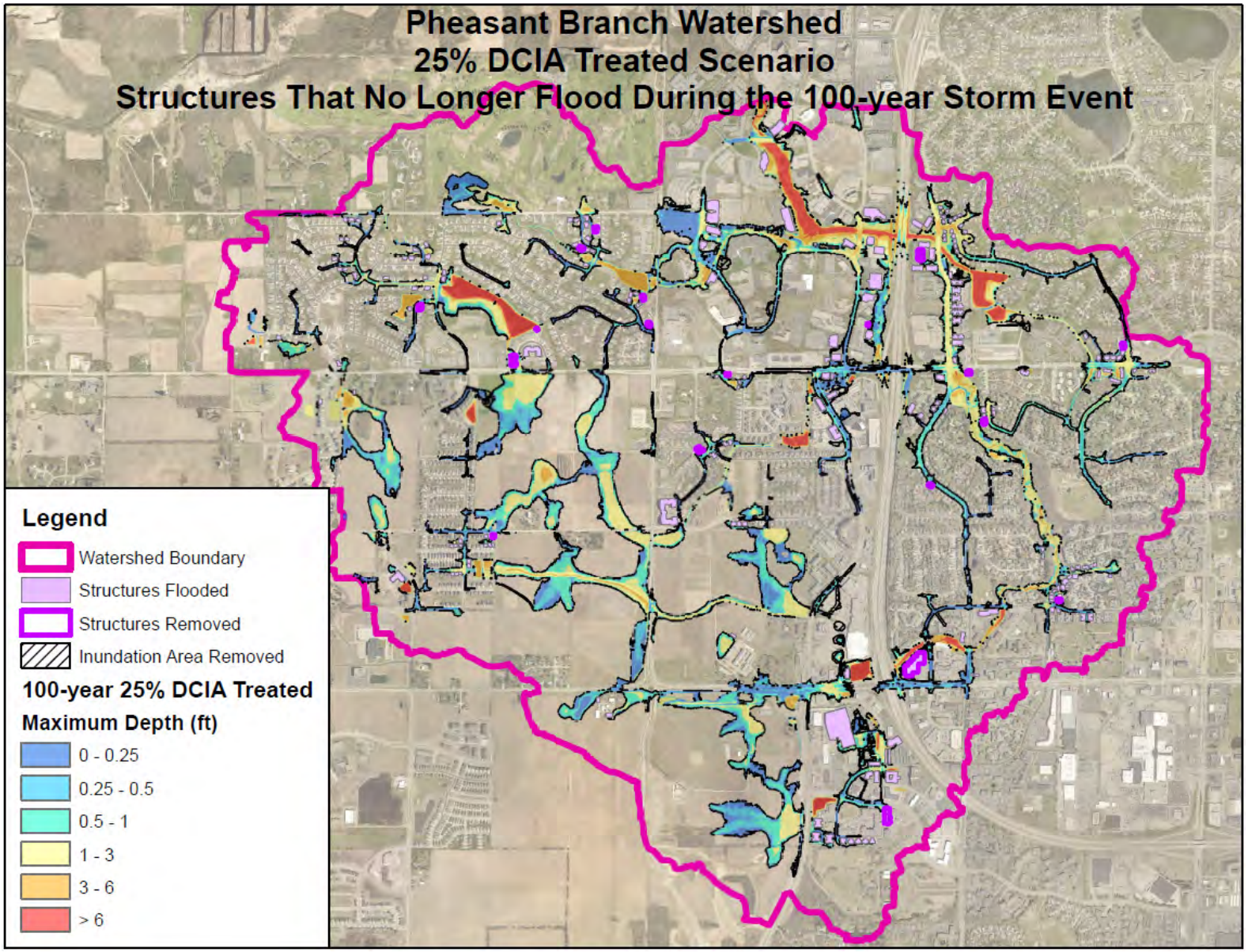


Figure 4-2. 25% DCIA Treated Scenario, 100-year Storm Event

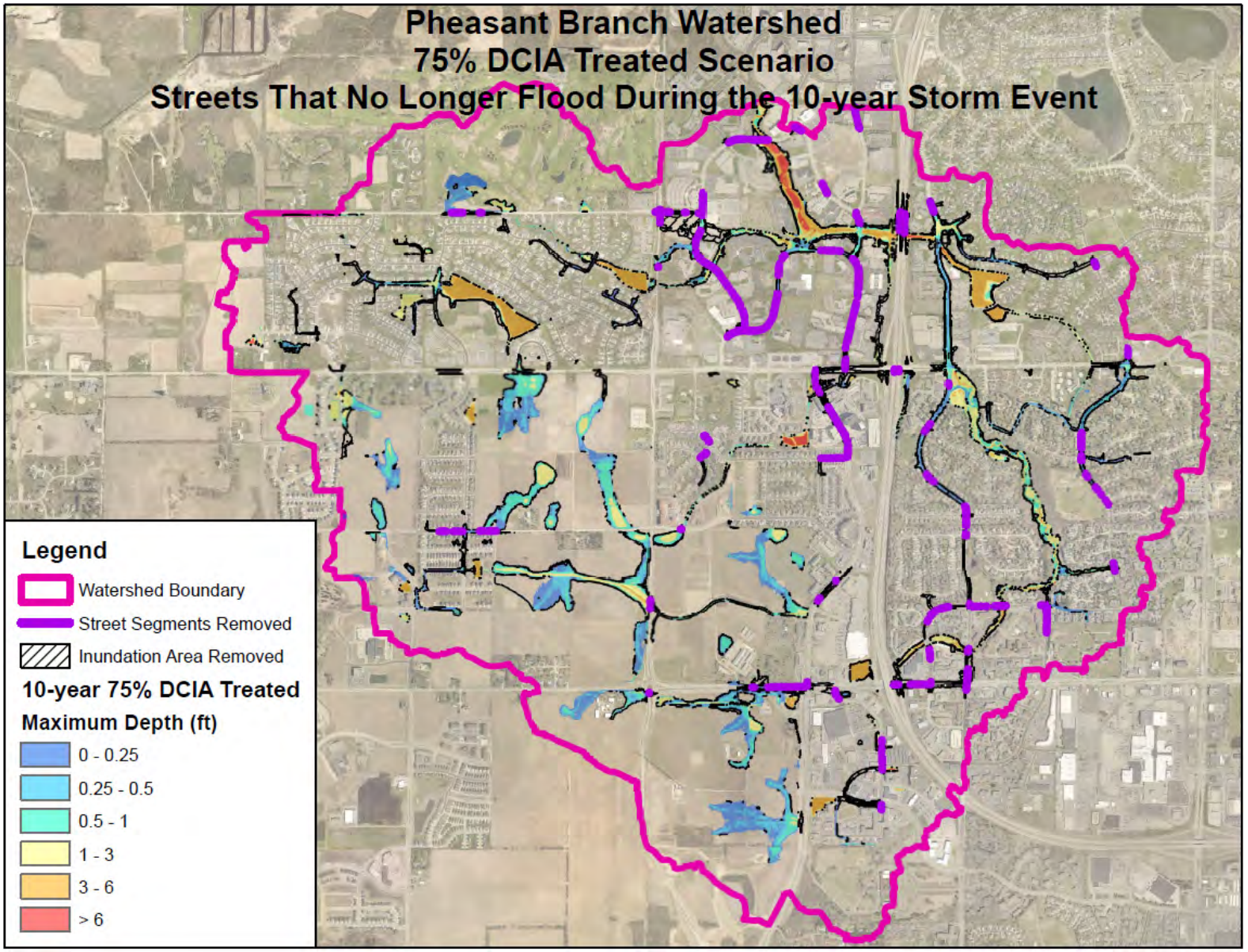


Figure 4-3. 75% DCIA Treated Scenario, 10-year Storm Event

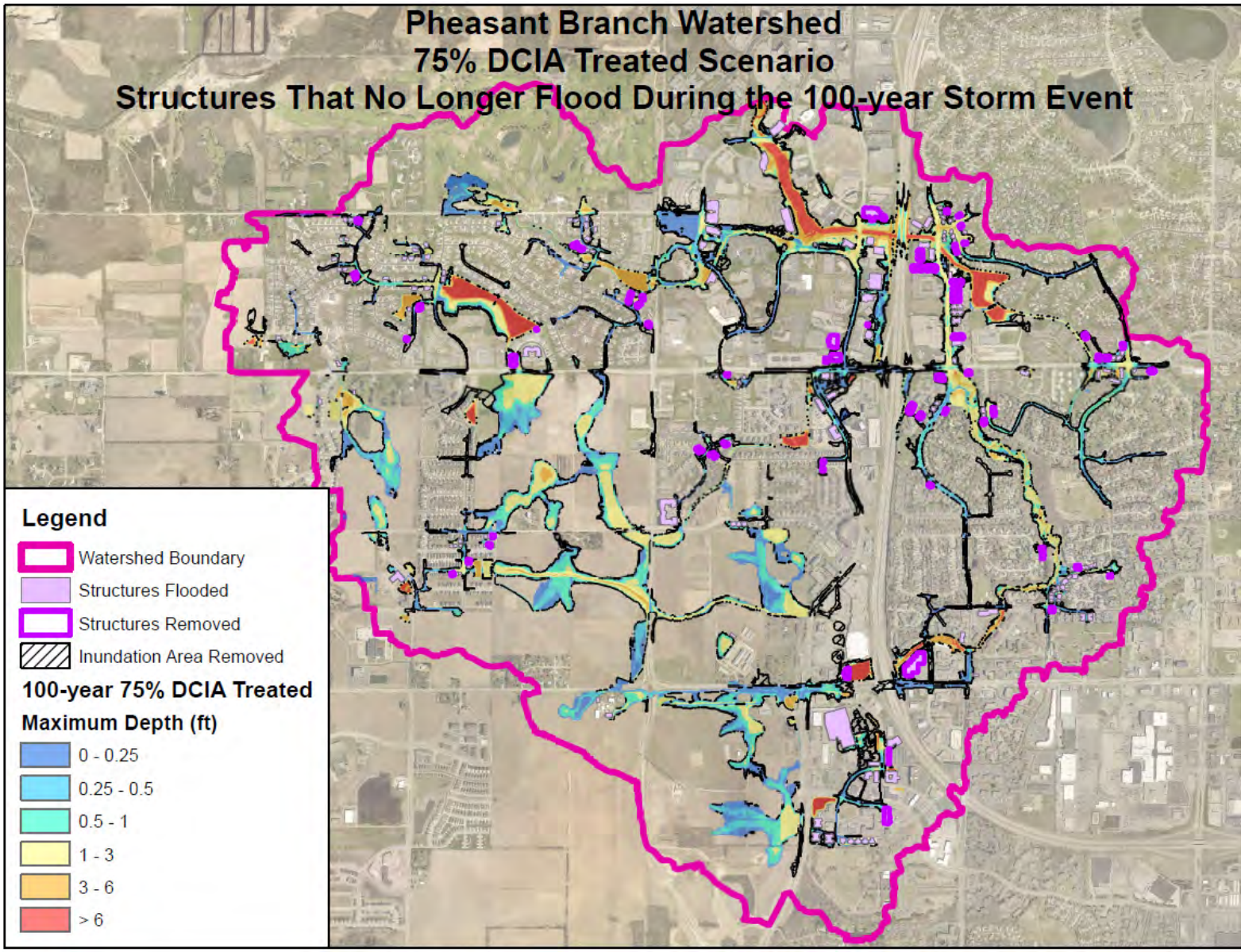


Figure 4-4. 75% DCIA Treated Scenario, 100-year Storm Event

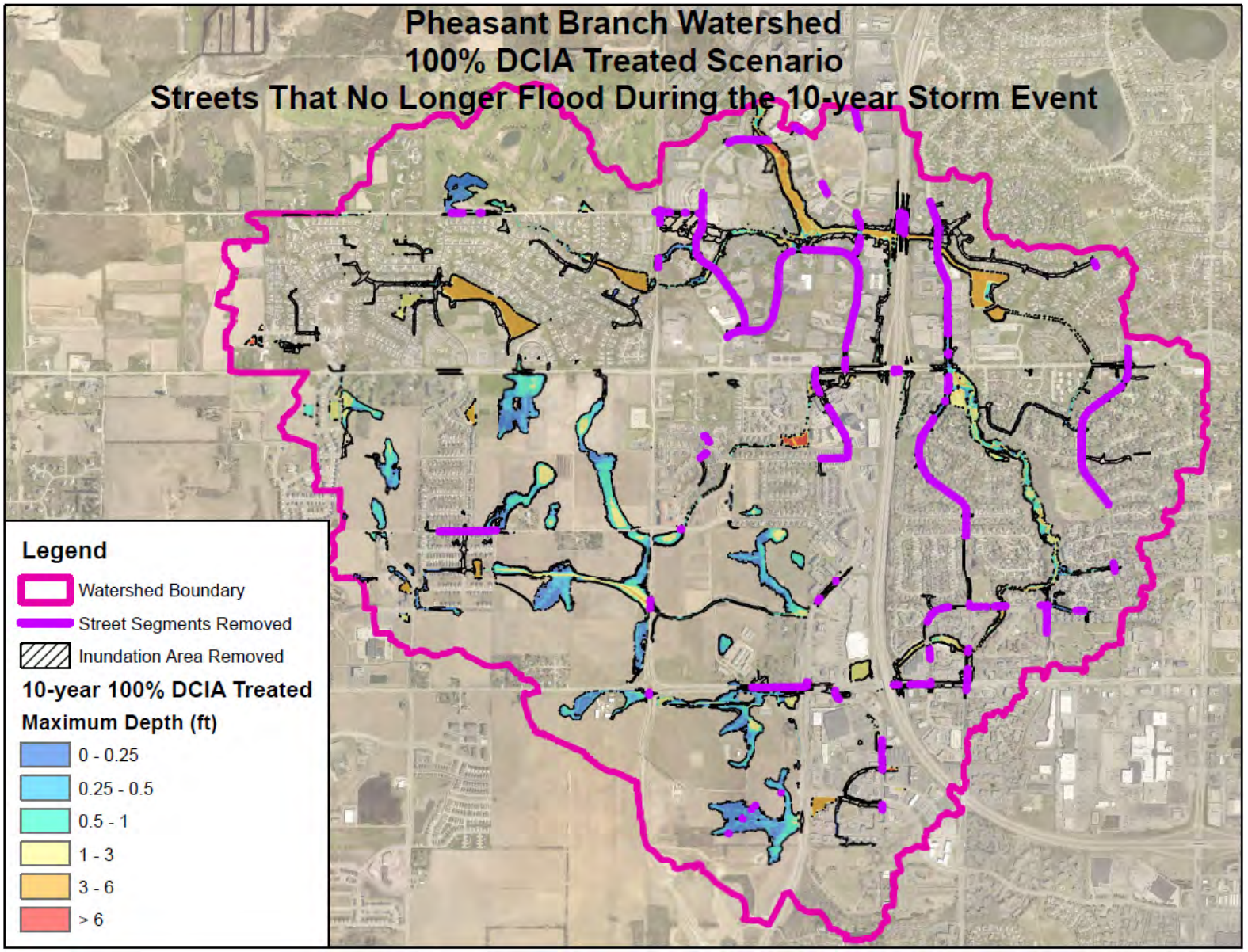


Figure 4-5. 100% DCIA Treated Scenario, 10-year Storm Event

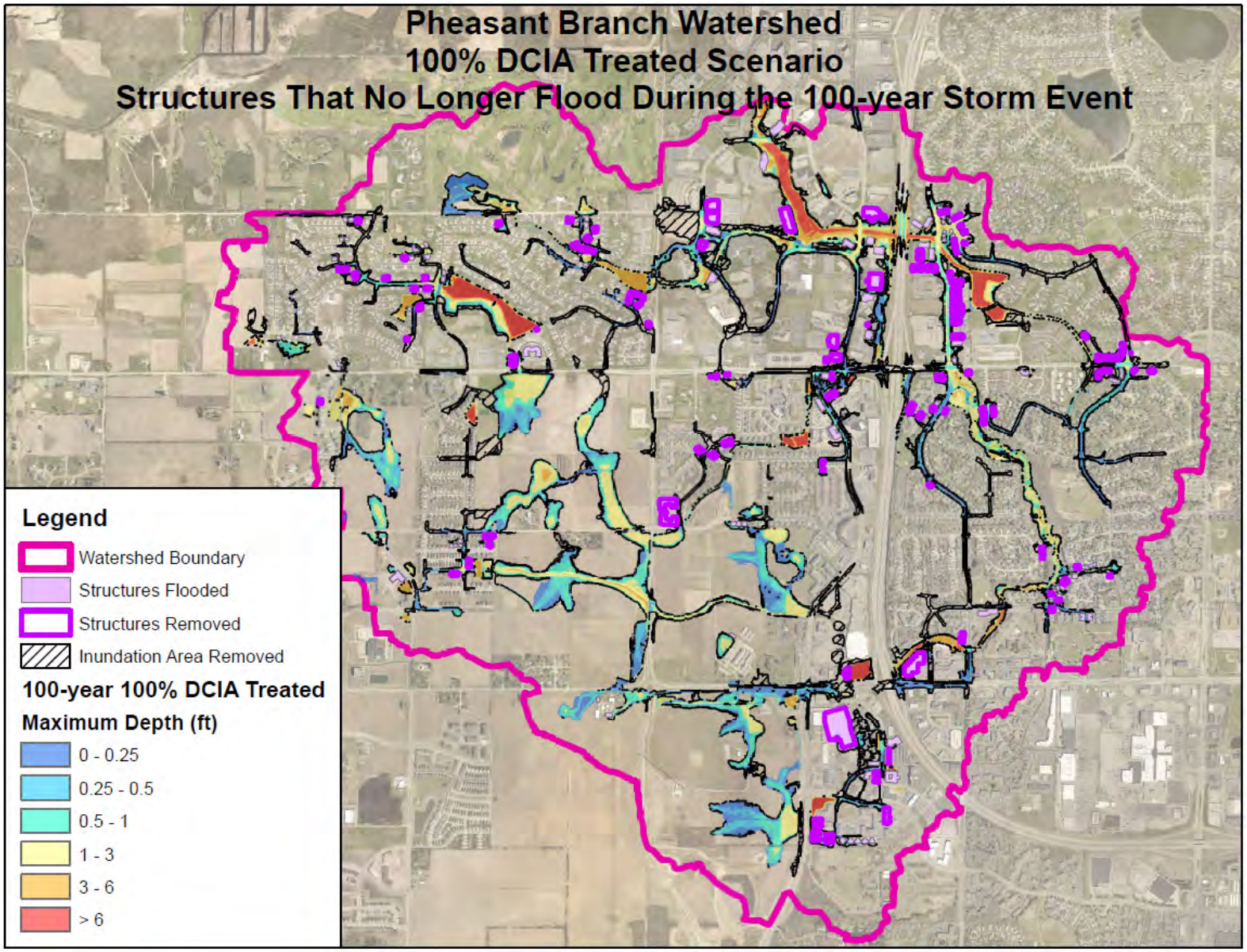


Figure 4-6. 100% DCIA Treated Scenario, 100-year Storm Event

Part 2 – Expand the Opportunities Analysis

The opportunities analysis conducted in Phase I was expanded to include non-residential flat roofs. The analysis was also updated to separately consider pervious areas, streets, and sidewalks available for volume control infrastructure.

The analysis was mostly the same as before except that the three foot buffer was only excluded along parcel boundaries that have residential land use on both sides (instead of along all parcel boundaries). Also, the universal three foot buffer was changed so that there is a three foot buffer around driveways only, and a one foot buffer around the other types of impervious. The potential pervious areas and sidewalks were then calculated separately, and slopes greater than 12 percent were not excluded for pervious areas nor sidewalks.

To find the streets that could potentially be pervious, all of the areas that were excluded as described above were removed from the street polygons along with large areas (greater than 1000 ft^2) of street that had a slope greater than 12 percent.

The area of available space for volume control infrastructure in the Pheasant Branch Watershed for this revised analysis was calculated to be: 2,009 acres.

Figure 4-7 shows the area available for volume control infrastructure.

Note, this is a planning level, desktop analysis. Each site needs a detailed investigation before volume control infrastructure could be installed.

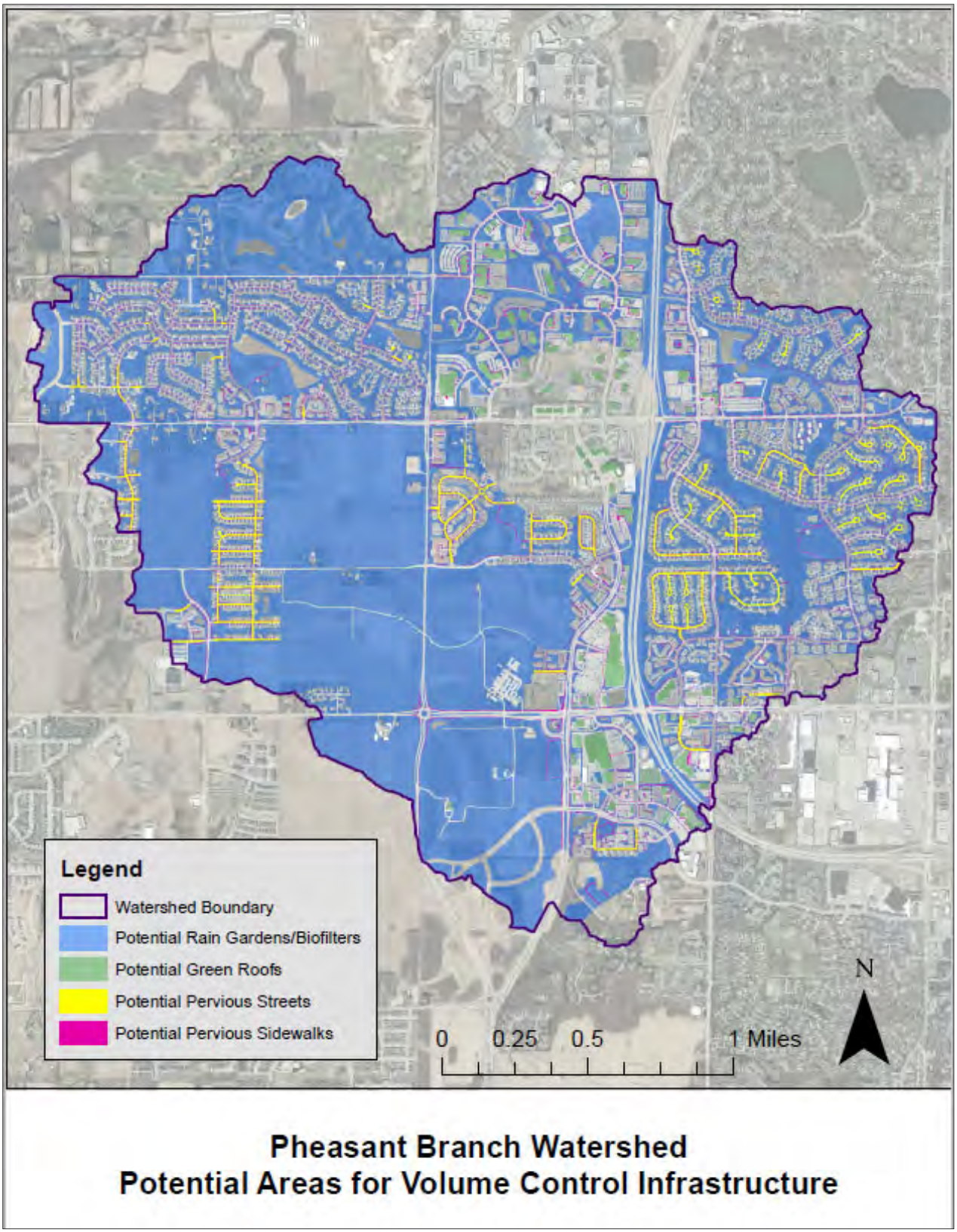


Figure 4-7. Potential Areas for Volume Control Infrastructure

Part 3 –Amount of Land Needed for VCI

Using the potential volume that could be infiltrated from Part 1, the area needed to capture that volume was calculated for each subcatchment, for each of the three scenarios. An assumed depth of 1-foot (open area storage) with an additional foot of rock-filled depth with a porosity of 0.30 was assumed for each VCI. Tab "Step 3 Area Needed for GI" includes the calculation to determine the area for each subcatchment.

Because numbers in a table can be tough to visualize, the area needed was rendered. Figures 4-8, 4-9, and 4-10 show the area needed to treat 25% of the DCIA, 75% of the DCIA, or 100% of the DCIA for each subcatchment.

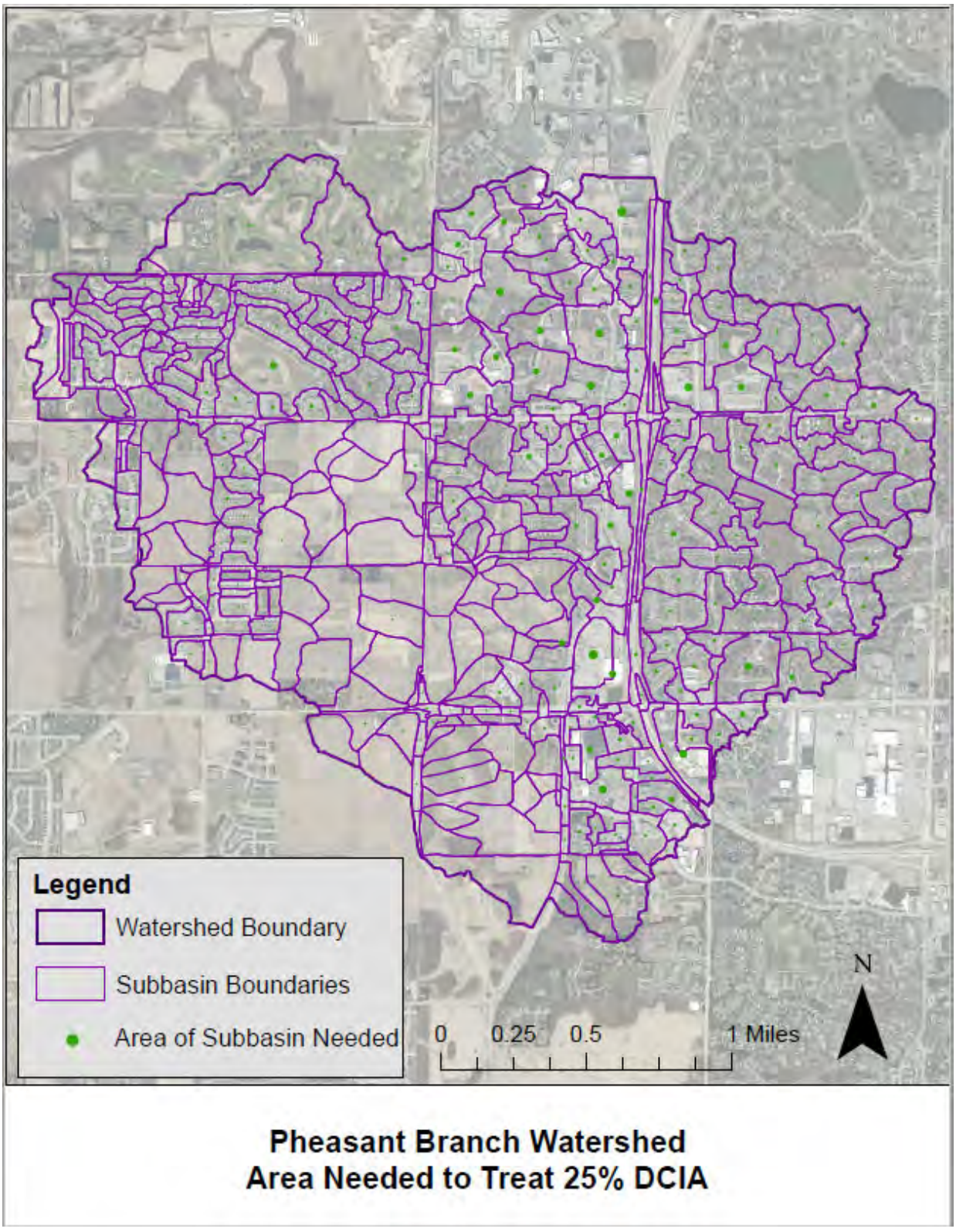


Figure 4-8. Area of Each Subbasin Needed to Treat 25% DCIA

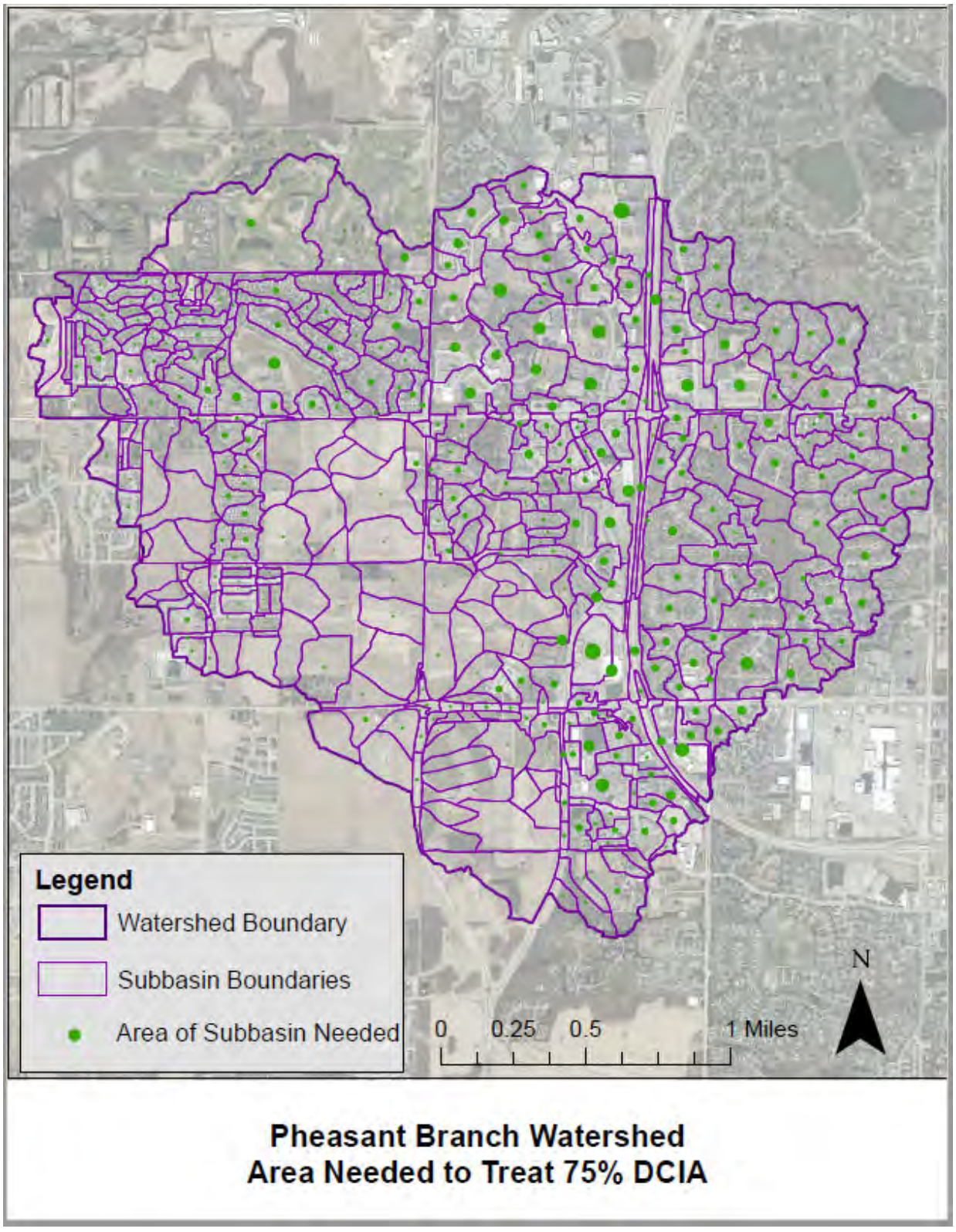


Figure 4-9. Area of Each Subbasin Needed to Treat 75% DCIA

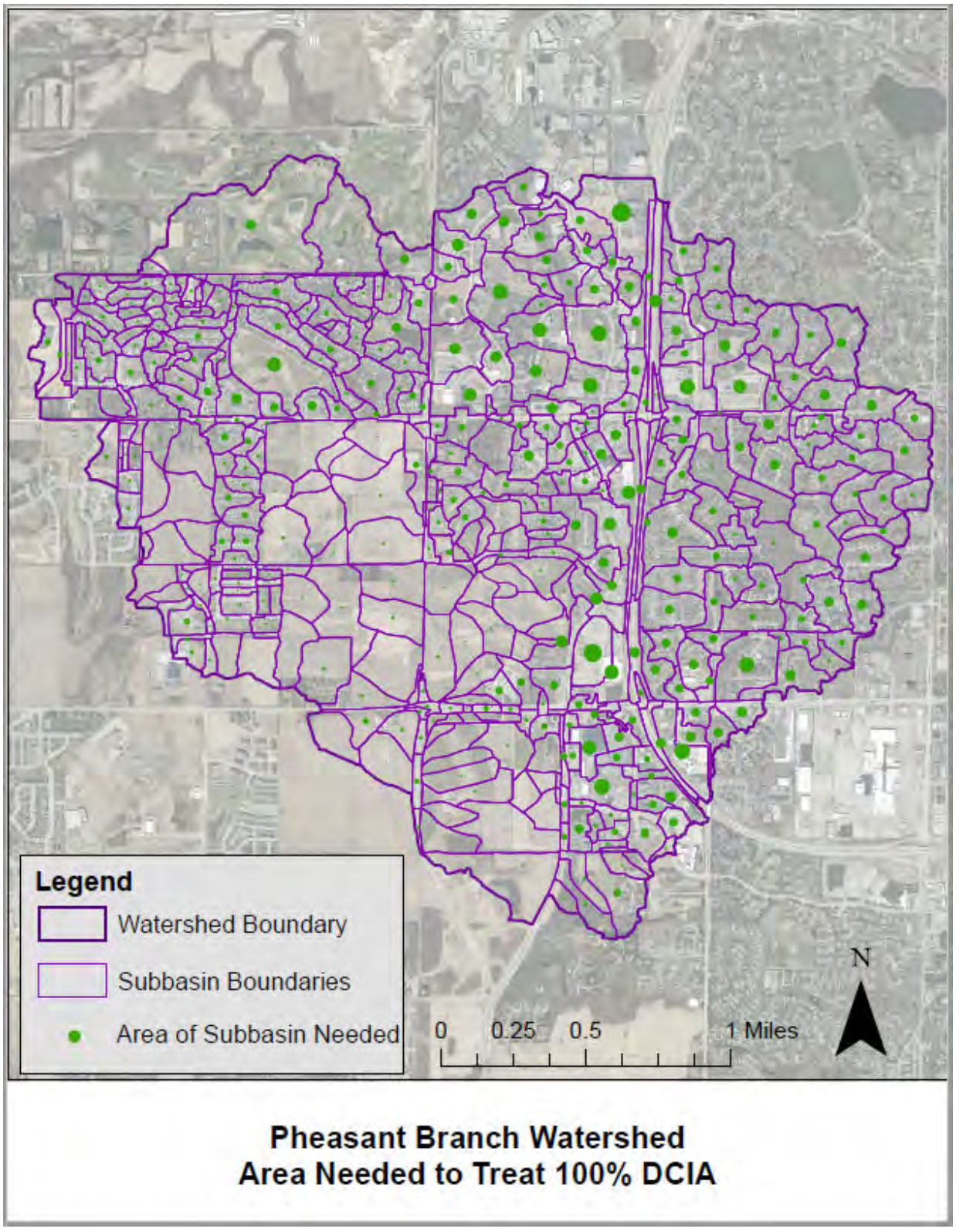


Figure 4-10. Area of Each Subbasin Needed to Treat 100% DCIA

Phase II Conceptual Cost Estimate

Utilizing the unit costs from Phase I, the construction and maintenance costs were estimated for all scenarios. A unit cost for construction of $40 per square foot was used. A unit cost of $3 per square foot was used for maintenance costs.

Table 4-3 shows the results of the conceptual cost estimate.

Table 4-3. Phase II Conceptual Cost Estimates

Scenario	Total Impervious Area Treated (acres)	Total Treatment Area (ac)	Estimated VCI Construction Cost ($)	Estimated VCI Maintenance Cost ($/yr)
25% DCIA Treated	221.4	28.1	$49,025,000	$3,677,000
75% DCIA Treated	664.2	84.4	$147,076,000	$11,031,000
100% DCIA Treated	885.6	112.5	$196,101,000	$14,708,000

Phase II Total Phosphorus Load Reduction Estimate

As noted in Phase I, volume control infrastructure can be constructed for several reasons, including stormwater pollution reduction. Using WinSLAMM, the City estimated that the total phosphorus reduction from the 25% DCIA Treated scenario is approximately 382 pounds per year, the total phosphorus reduction from the 75% Treated scenario is 1,141, and the total phosphorus from the 100% DCIA Treated scenario is 1,528.

Section 5. Reduce Size of Traditional Infrastructure

Following the evaluation in Section 4, Engineering wanted to understand if the traditional flood control infrastructure (storm sewer, detention ponds, etc) could be downsized and still meet flood control goals if the VCI was installed.

The 75% DCIA Scenario was selected for this exercise. This scenario was chosen because it results in a 20% reduction of peak flows at the watershed outlet and it was theorized that a 20% reduction in peak flow could equate to downsizing infrastructure by one size.

The hydrologic parameters from the 75% DCIA Scenario were entered into the computer model with the Ultimate Proposed Conditions solutions. The Ultimate Proposed Conditions solutions are all the infrastructure improvements that need to be made to meet the City's flood control goals, including regional detention, greenway improvements, and local sewer upgrades. The computer model with the traditional infrastructure and VCI was run and the results were summarized.

One-Size Infrastructure Reduction

Next the infrastructure in the Ultimate Proposed Solutions model was downsized by one size. For purposes of this exercise, one size is:

- Circular Pipe = 6 inches from the diameter
- Rectangular Box Culvert = 1 foot from the span, 1 foot from the rise
- Elliptical = 1 size in the Elliptical sizing chart, i.e. 53"x34" went to 49"x32"

The computer model with the downsized infrastructure was run and the results were summarized. This was then compared to the results from the Ultimate Proposed Conditions model. The comparison showed that the downsized infrastructure with the 75% DCIA scenario hydrology could be downsized and still meet results.

Two-Size Infrastructure Reduction

To understand how much the traditional infrastructure could be downsized, the traditional infrastructure was downsized by one more size. The computer model with the VCI and traditional infrastructure that was downsized by two sizes was run and the results were summarized. This time, the results showed that the flood reduction targets could not be met with the two-size down traditional infrastructure and the VCI.

Infrastructure Cost Reduction

The cost estimate for the Ultimate Proposed Conditions traditional infrastructure was compared to the cost of the one-size reduced infrastructure. The one-size reduced infrastructure is approximately $7 million dollars less than the Ultimate Proposed Conditions traditional infrastructure cost. The cost estimate for the 75% DCIA VCI scenario is approximately $147 million. Therefore, the reduction in cost from downsizing the traditional infrastructure in the Ultimate Proposed Conditions solution will not offset the cost of installing VCI.

Section 6. Additional Benefits of Volume Control Infrastructure

Volume control infrastructure has more benefits than traditional grey infrastructure (peak flow control) solutions. The Dane County Office of Energy and Climate Change published a paper in 2020 entitled "Green Infrastructure for Dane County: Benefits Add Up." This paper describes the type of volume control infrastructure, its benefits and challenges, and provides cost information. References from the paper have been included at the end of this document for ease of reference.

Page 3 of the report describes some major findings in the study, including:

1. A green roof installation cost is about $100 per month less than that of the conventional roof considering their lifespans of 50 years and 20 years respectively (GSA, 2011).
2. Employee's health and productivity are strongly linked to the offices' green environment with Green Infrastructure (National Geographic, 2017).
3. A green roof increases solar panels' efficiency to generate electricity by cooling solar panels' micro-climate, ranging from 3 percent to 16 percent (BuildingGreen 2013).
4. Pervious pavements will decrease about 77 percent of annual salt usage during winter maintenance (County Materials Corporation, 2016).

Section IV includes a long list of benefits including:

- Environmental
    - Increases climate resiliency
    - Improves Water Quality
    - Improves Air Quality
    - Reduced Urban Heat Island Effect
    - Less Salt Use Reduce Water Pollution
    - Enhanced Biodiversity/ Habitat Connectivity
- Societal Benefits
    - Improved Health
    - Health Equity in Community Engagement
    - Reduced Crime Rate
    - Improved Aesthetics
    - Increased Public Education with More Exposure to Green Infrastructure and Nature
    - Social Cohesion
    - More Green Jobs
- Economic Benefits
    - Increased Property Value
    - Increased Employee Productivity
    - Increased Green Jobs
    - Energy Savings from GI with Efficiency Measures

Details regarding each benefit can be found in the Dane County Office of Energy and Climate Change. Many other similar publications are available that document the non-stormwater benefits of green infrastructure.

Section 7. City of Madison Initial Agency Comments

As part of the watershed study efforts, Engineering staff met with various agency staff to discuss the proposed peak flow control solutions. During these meetings, green infrastructure was touched on by some agencies. Below are the initial comments. This section will be expanded as more meetings occur specifically regarding implementation of volume control infrastructure citywide.

Traffic Engineering

Some streets in the City of Madison do not lend themselves to volume control infrastructure. Examples include densely urbanized, space-limited, traffic corridors with large traffic counts, such as Atwood Avenue and Winnebago Street.

Water Utility

Water utility staff are supportive of volume control infrastructure in pervious areas and sidewalks. Pervious pavement in streets can cause challenges for water utility infrastructure. Water mains are generally older and have separation requirements from stormwater systems. Installation of pervious pavement could cause watermain replacement and realignment where it would not have been required with typical pavement.

Additionally, water utility wells have a mandatory 400 foot buffer around any well that exempts construction of a stormwater control measures. Beyond this buffer are the wellhead protection zones where infiltration is prohibited for purposes of protecting groundwater quality. Stormwater control measure in the wellhead protection zones require a clay liner, thus allowing no infiltration.

These areas were removed from the opportunities analysis early on in this study.

Parks

In the recent past, City of Madison Parks has installed green infrastructure where possible on Parks projects. Parks is generally supportive of green infrastructure installation.

Fire Department

Engineering discussed use of volume control infrastructure, specifically pervious pavement, in the Fire Lanes with the Madison Fire Department. Some equipment the Fire Department uses, including the ladder trucks, require a strong base to set the equipment supports on. If pervious pavement is to be used in these areas, the Fire Department requests that the load capacity of the pervious pavement is reviewed to ensure Fire Department equipment can be used safely.

Section 8. Results of Parallel Watershed Phase I Analysis

The City of Madison chose two watersheds currently under study to conduct a modified Phase I Analysis. The purpose of the analyses was to understand if watersheds with different development characteristics found the same results as was found for the Pheasant Branch Watershed Phase I Analysis. The scope for the analyses conducted by the watershed study consultants can be found in Appendix C.

Wingra West Watershed

Wingra West Watershed is a 1,763-acre, fully urbanized watershed with a large detention area in approximately the center of the watershed's stormwater conveyance system. Development occurred in this watershed from the 1930's to the 1970's, before many of the City's stormwater management requirements were put in place. This watershed was selected due to the large detention area as opposed to the distributed detention in the Pheasant Branch Watershed. The intent is to understand if that has an effect on the Phase I results.

The analysis found similar results to those found for Pheasant Branch. Some areas had larger peak flow reductions depending upon the storm event and some had smaller peak flow reductions. The outlet of the Wingra West Watershed found a 6.8% reduction in the 100-year peak flow for the 25% DCIA scenario. This is very similar to the 5% found for the Pheasant Branch Watershed.

Details of the Phase I Analysis for the Wingra West Watershed can be found in Appendix D.

Willow Creek Watershed

Willow Creek Watershed is a 1,953-acre, fully urbanized watershed with very few detention areas. Development occurred in this watershed from the 1930's to the 1970's, before many of the City's stormwater management requirements were put in place. This watershed was selected due to the lack of detention areas as opposed to the distributed detention in the Pheasant Branch Watershed.

Additionally, the hydrologic modeling uses for this watershed uses a rain-on-grid method as opposed to the traditional hydrology method of delineating subcatchments and flow paths of the Pheasant Branch and Wingra West Watershed Studies.

The intent is to understand if the differences have an effect on the Phase I results.

The analysis found similar results to those found for Pheasant Branch with a few exceptions. Some areas had larger peak flow reductions depending upon the storm event and some had smaller peak flow reductions. Additionally, some areas saw significance increases in peak flow (the Pheasant Branch and Wingra West Watersheds saw minor increases a few locations, but none were of the magnitude found in the Willow Creek Watershed.) The consultant conducting this analysis indicated the results for these locations are due to the instability in the model calculations in these areas. Therefore, these specific results can be ignored for purposes of this analysis.

Details of the Phase I Analysis for the Willow Creek Watershed can be found in Appendix E.

Section 9. Additional Analysis – Pervious Area Infiltration Rates

Engineering met to discuss the results from Section 4 and 5. Following the discussion, Engineering conducted further analysis. The first analysis involved evaluating the significance of pervious infiltration rates on peak flow reductions. The infiltration rate parameters for the watershed studies generally used the parameters for turf areas in urban environments. Many of the pervious volume control infrastructure will be planted with deep rooted vegetation. Studies have found that deep routed vegetation significantly increase the infiltration rates of the infrastructure (Selbig, W.R., and Balster, Nicholas, 2010).

Two alternatives were evaluated for the 75% DCIA Scenario. The first alternative assumed all pervious areas were planted with deep rooted vegetation, regardless of if it is volume control infrastructure. The second alternative assumed only the pervious volume control infrastructure was planted with deep rooted vegetation. To simulate the deep routed vegetation, the Maximum and Minimum Infiltration Rates for the Horton Infiltration Parameters were doubled.

Tables 9-1 and 9-2 shows the results of the alternatives evaluation.

Table 9-1. 75% DCIA Scenario with Deep Routed Vegetation for All Pervious Area

		Existing Conditions			75% DCIA Treated						75% Modified DCIA - All Pervious Area has Roots that Promote Infiltration					
					1-yr		10-yr (cfs)		100-yr (cfs)		1-yr		10-yr (cfs)		100-yr (cfs)	
Recording Location	Location	1-yr (cfs)	10-yr (cfs)	100-yr (cfs)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)
1	Outlet of Swallowtail Pond crossing Pleasant View Road	47	68	359	36	24%	48	29%	294	18%	9	80%	50	26%	185	48%
2	Target Pond Outlet (3 culverts) West to East Under Beltline	166	292	468	63	62%	164	44%	396	15%	38	77%	129	56%	299	36%
3	Culverts East to West under Beltline just downstream of Wexford Pond	260	646	1,435	110	58%	419	35%	1,109	23%	27	90%	255	61%	808	44%
4	Watershed Outlet	228	744	2,114	175	23%	515	31%	1,699	20%	103	55%	234	68%	1,122	47%

Table 9-2. 75% DCIA Scenario with Deep Routed Vegetation for Pervious Volume Control Infrastructure Only

		Existing Conditions			75% DCIA Treated						75% Modified DCIA - Pervious GI has Roots that Promote Infiltration					
					1-yr		10-yr (cfs)		100-yr (cfs)		1-yr		10-yr (cfs)		100-yr (cfs)	
Recording Location	Location	1-yr (cfs)	10-yr (cfs)	100-yr (cfs)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)	Peak Flow (cfs)	Difference (%)
1	Outlet of Swallowtail Pond crossing Pleasant View Road	47	68	359	36	24%	48	29%	294	18%	39	17%	53	22%	291	19%
2	Target Pond Outlet (3 culverts) West to East Under Beltline	166	292	468	63	62%	164	44%	396	15%	60	64%	157	46%	392	16%
3	Culverts East to West under Beltline just downstream of Wexford Pond	260	646	1,435	110	58%	419	35%	1,109	23%	99	62%	412	36%	1,091	24%
4	Watershed Outlet	228	744	2,114	175	23%	515	31%	1,699	20%	160	30%	507	32%	1,664	21%

The results of the analysis show a minor increase in the reduction of peak flow rates for the alternative where deep rooted vegetation is only evaluated in the pervious volume control infrastructure. The alternative with all pervious vegetation assumed to have deep roots provided a significant reduction in peak flow rates compared to the 75% DCIA Base Scenario, in some instances, almost doubling the reduction.

Section 10. Green Infrastructure Pilot Study with USGS

The City of Madison, in conjunction with the United States Geological Survey (USGS), started a Green Infrastructure Pilot Study in late 2019. Volume control infrastructure was installed with the Toepfer, Holly, Euclid, and St. Clair Street Reconstruction Project completed in late 2020. The following volume control infrastructure was installed:

- Pervious Pavement: installed on the south side of Euclid Ave and St Clair St
- Stormwater Terraces: There are different options for stormwater terraces, and the treatments are rated as a bronze, silver or gold treatment, depending on the anticipated impact of the treatment. All Stormwater Terraces will help improve water quality in the lakes, as well as reduce flooding.
- Rock Cribs: Sited in suitable terraces to infiltrate driveway and sidewalk stormwater runoff. These include pervious pavement and a buried section of rocks with grass over the top.
- Pervious sidewalk panels: Installed on the sidewalk between the driveway and street where rock cribs were installed.

The above is treating 15% of the DCIA in one of the Pilot Study subcatchments.

Figure 10-1 shows the location of the project and the volume control infrastructure.

The USGS began monitoring the pilot study area in late 2019. Monitoring equipment was set up in four locations; 3 locations to measure the volume reduction from the volume control infrastructure, and one as a control site. Fully automated, continuously recording, rain gages and flow monitoring equipment was installed at the four sites.

The initial monitoring of the Pilot Study area shows no measurable reduction in runoff volume at the outlet. Monitoring will continue for the next 4 years to monitoring changes of runoff volume in the subcatchments.

More information on the Pilot Study can be found here:
https://www.cityofmadison.com/engineering/projects/green-infrastructure-study

Figure 10-1. Green Infrastructure Pilot Study Infrastructure Types and Locations

Section 11. Conclusions and Next Steps

Traditionally-sized green infrastructure can be used for flood control, however, it takes a significate amount of it to be successful. Additionally, even though it can be used to help with flood control, traditional infrastructure is also needed to meet the City's watershed study flood targets.

The amount of directly connected impervious area treated to make a measurable difference in peak flows for large storm events is about 75%. This means that 75% of the DCIA in a watershed must be treated with green infrastructure. DCIA makes up a mix of roofs, driveways, sidewalks, and streets.

- In the Medium Density Residential No Alleys (MDRNA) standard land use, roofs are approximately 19 percent, streets make up approximately 53 percent, sidewalks make up approximately 5 percent, and driveways make up approximately 23 percent.
- In the Strip Mall Commercial (STRIPCOM) standard land use, roofs are approximately 22 percent, streets make up approximately 22 percent, sidewalks make up approximately 5 percent, driveways make up approximately 2 percent, and parking makes up approximately 45 percent.

Need to Treat More than Private Property

Table 11-1 below show the average make up for each major land use. The detailed breakdown for each standard land use can be found in Appendix A.

Table 11-1 DCIA Source Area Breakdown per Major Land Use

Source Area	Residential	Institutional	Commercial	Industrial	Other Urban
Roofs	23%	32%	27%	31%	6%
Parking	9%	30%	48%	51%	20%
Driveways	17%	6%	3%	3%	25%
Sidewalks	6%	4%	4%	1%	6%
Streets	45%	17%	17%	14%	40%

This means that for residential and other urban land uses (parks) land uses, the streets will need to be treated if the City wants to achieve the goal of treating 75% DCIA. For commercial, institutional, and industrial areas, if all other DCIA is treated, it is possible to reach the goal without treating the streets.

Next Steps

The next step in this study is to take these results to the various City agencies and the Mayor.

References

BuildingGreen, 2013: Green Roofs Improve Solar Panel Efficiency. https://www.buildinggreen.com/newsbrief/green-roofsimprove-solar-panel-efficiency.

Center for Climate And Energy Solutions, 2018: Maximizing Benefits: Strategies for Community Resilience. p.1-93, https://www.c2es.org/site/assets/uploads/2018/12/strategies-for-community-resilience.pdf.

Center for Neighborhood Technology, 2010: The Value of Green Infrastructure. p.1-80, https://www.cnt.org/sites/default/files/publications/CNT_Value-of-Green-Infrastructure.pdf.

County Materials Corporation, 2016: Case studies for permeable paver systems. https://www.countymaterials.com/en/downloads/case-studies/371-permeable-paver-case-studies-booklet-2/file.

Dane County Office of Energy and Climate Change, 2020: Green Infrastructure for Dane County: Benefits Add Up. p1-51.

High Line, 2019: Celebrate Earth Every Day!. https://www.thehighline.org/blog/2019/04/03/celebrate-earth-every-day/.

Houle, K.M., 2008: Winter Performance Assessment of Permeable Pavements - A Comparative Study of Porous Asphalt, Pervious Concrete, and Conventional Asphalt in a Northern Climate. p.1-142, https://www.unh.edu/unhsc/sites/unh.edu. unhsc/files/pubs_specs_info/unhsc_houle_thesis_9_08.pdf.

Madison Metropolitan Sewerage District, 2019: Chloride Reduction. https://www.madsewer.org/Programs-Initiatives/Chloride-Reduction.

Milwaukee Metropolitan Sewerage District, 2013: Regional Green Infrastructure Plan. p.1-99. https://www.mmsd.com/what-we-do/green-infrastructure/resources/regional-green-infrastructure-plan

National Geographic, 2017: Green Buildings Could Save Our Cities. https://www.nationalgeographic.com/environment/urban-expeditions/green-buildings/benefits-of-green-buildings-human-health-economics-environment/.

Natural Resources Defense Council, 2013: The Green Edge: How Commercial Property Investment in Green Infrastructure Creates Value. p.1-42, https://www.nrdc.org/sites/default/files/commercial-value-green-infrastructure-report.pdf.

The New York Times, 2019: How a Rooftop Meadow of Bees and Butterflies Shows N.Y.C.'s Future. https://www.nytimes. com/2019/10/26/nyregion/green-roofs-nyc.html?smid=nytcore-ios-share.

Oregon Health and Outdoors Initiative, 2018: Green Infrastructure & Health Guide. https://willamettepartnership.org/wp- content/uploads/2018/07/Green-

Infrastructure_final_7_12_18_sm.pdf.

Rosenberg, K., A.M. Dokter, P. Blancher, J. Sauer, A. Smith, P. Smith, J. Stanton, A. Panjabi, L. Helft, M. Parr, and P. Marra, 2019: Decline of the North American Avifauna. American Association for the Advancement of Science, 366 (6461), 120-124,https://doi.org/10.1126/science.aaw1313.

Selbig, W.R., and Balster, Nicholas, 2010, Evaluation of turf-grass and prairie-vegetated rain gardens in a clay and sand soil, Madison, Wisconsin, water years 2004–08: U.S. Geological Survey Scientific Investigations Report 2010–5077, 72 p.

United States Environmental Protection Agency, 2019: Benefits of Green Infrastructure. https://www.epa.gov/green- infrastructure/benefits-green-infrastructure.

United States Bureau of Labor Statistics, 2018: Green Growth: Employment projects in environmentally focused occupations. https://www.bls.gov/careeroutlook/2018/data-on-display/green-growth.htm.

USGBC, 2019: Benefits of Green Building. https://new.usgbc.org/press/benefits-of-green-building.

United States Department of Energy, 2011: Re-Assessing Green Building Performance: A Post Occupancy Evaluation of 22 GSA Buildings. https://www.pnnl.gov/main/publications/external/technical_reports/PNNL-19369.pdf.

University Herald, 2019: New Job Sector for “Green Building” Construction is On the Rise. https://www.universityherald.com/articles/77071/20191213/new-job-sector-green-building-construction-rise.htm.

Vibrant Cities Lab: Philadelphia: A Water Department Reduces Crime. https://www.vibrantcitieslab.com/case-studies/a-water-department-reduces-crime/.

WinSLAMM. http://www.winslamm.com/

Yujiao Chen, Holly W. Samuelson, Zheming Tong, 2016: Rainwater+. Journal of Environmental Management, Volume 180, p45-51.

Appendix A. WinSLAMM Standard Land Use Source Area Breakdown

WinSLAMM Standard Land Use Source Area Breakdown

	Residential										Institutional			Commercial				Industrial		Other Urban		
StandardLandUseCode	SUBR	HDRWA	HDRNA	MOBH	DUPLEX	MDRNA	MDRWA	MFR	LDR	HRR	INST	SCH	HOSP	OFFPARK	STRIPCOM	DOWNTOWN	SHOPCEN	LI	MI	CEM	OPEN	PARK
StandardLandUseDescription	Suburban	High Dens	High Densi	Mobile Hor	Duplex	Medium De	Medium De	Multi Famil	Low Densit	High Rise	Misc. Instit	Schools	Hospital	Office Park	Strip Comr	Downtown	Shopping C	Light Indus	Medium In	Cemetary	Open Spac	Parks
Roof_FlatDirectlyConnected	0	0	0	16.9	0	0	0	3.4	0	19	5.39	15	31.8	13.17	19.7	40.73	21.61	20.51	16.8	0.55	0.55	0.1
Roof_FlatDisconnected	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2.27	4.46	0	0	0
Roof_PitchedDirectlyConnected	0	13.6	10.3	0	4.48	4.5	3.2	14.1	1.9	0	8.44	0	3.92	0	3.7	0	0	2.57	1.85	0	0	0.11
Roof_PitchedDisconnected	2.6	10.6	11.1	0	12.06	10.5	13.6	3.2	6.1	0	0.58	0	0	0	0	0	0	0	0	0.55	0	0.25
PavedParking_DirectlyConnected	0	0.4	0	13.4	0	0.2	0.7	10.8	0.1	21.8	27.21	10.65	20.78	42.87	40.9	23.01	60.68	32.94	34.09	2.24	0	4.19
PavedParking_Disconnected	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
UnpavedParking_DirectlyConnected	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	0	0	0.34	0	0	0	0	0
UnpavedParking_Disconnected	0	0	0	0.6	0	0	0	0	0	0	0	0	0.59	0	1.4	0	0	6.34	14.61	0.07	0	0.22
Driveways_DirectlyConnected	1.6	0.7	14.1	12.3	5.31	5.6	1.6	1.9	3.2	0.9	3	1.98	6.12	4.62	2	1.48	1.81	2.56	1.8	7.67	0	1.21
Driveways_Disconnected	1.2	0	0	0	0	1.9	0.4	0.9	1.3	0	0	0	0	0	0	0	0	0	1	0	0	0
Sidewalks_DirectlyConnected	0	3.2	2	0.5	3.96	1.1	3	2.1	0.35	3.4	2.2	2.91	2.8	1.36	4.3	8.35	0.54	1.28	0.45	0.06	0.58	0.49
Sidewalks_Disconnected	0.1	3.2	2	0.5	0	1.1	2.9	2.1	0.35	1.2	0	0	0	0	0	0	0	0	0.45	0	0	0
Streets1_Area	0.7	5.4	4.5	0.6	0	3.7	0	6.1	2.2	9.1	4	2.68	4.24	3.11	11.5	19.96	4.22	1.84	1.13	0.72	1.72	1
Streets2_Area	3.3	13.2	9	3	13.31	7.6	13.5	8.5	4.2	4.5	6.76	4.33	6.64	8	8.6	2.21	2.17	8.68	6.2	0.72	2.02	2.27
Streets3_Area	0	1.6	0	0	0	1.5	2.2	0	0.6	4.5	1.32	1.64	0	0	0	0	0	0.32	0.22	0	0	0
LargeLandscapedArea	0	0	0	0	0	0.2	0	1.4	0	0	5.34	22.09	5.32	5.82	0	0	0	3.51	2.81	86.4	0.59	77.95
SmallLandscapedArea	84.8	41.5	41	44.7	60.88	57.5	52.5	38	74.8	22.9	26.55	17.43	14.05	18.19	5.8	3.56	4.53	9.86	4	0.23	0	0.85
UndevelopedArea	5.5	0.3	0	4.5	0	0.4	0	3	4.4	9.5	1.83	0.42	0.19	0	0.2	0	2.93	4.34	5.37	0.48	94.54	0
Playgrounds_DirectlyConnected	0	0	0	0	0	0	0	0	0	0	1.7	17.33	0	0	0	0	0	0	0	0	0	0.9
Playgrounds_Disconnected	0	0	0	0	0	0	0	0.1	0	0	1.7	0	0	0	0	0	0	0	0	0	0	0.9
IsolatedAreas	0.1	0	0.1	1	0	0.2	0.1	0.1	0.2	0	0	0	1.05	0	0	0	0	0	0	0.28	0	7.08
WaterBodyAreas	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OtherPerviousAreas	0	6.3	5.9	0	0	4	6.3	3.8	0.2	3.2	2.65	2.19	2.5	2.29	1.9	0.62	0.82	2.77	4.53	0	0	0
OtherDirectlyConnectedImperviousAreas	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0.35	0	0	0	0	0
OtherPartiallyConnectedImperviousAreas	0	0	0	0	0	0	0	0	0.1	0	1.33	1.35	0	0.57	0	0.08	0	0.21	0.23	0.03	0	2.48
Summary																						
Directly Connected Impervious Area	5.6	38.1	39.9	48.7	27.06	24.2	24.2	47.4	12.55	63.2	60.02	56.52	76.3	73.13	90.7	95.74	91.72	70.7	62.54	11.96	4.87	10.27
Disconnected Impervious Area	4	13.8	13.1	1.1	12.06	13.5	16.9	6.3	7.85	1.2	3.61	1.35	0.59	0.57	1.4	0.08	0	8.82	20.75	0.65	0	3.85
Total Impervious Area	9.6	51.9	53	49.8	39.12	37.7	41.1	53.7	20.4	64.4	63.63	57.87	76.89	73.7	92.1	95.82	91.72	79.52	83.29	12.61	4.87	14.12
Pervious Area	90.3	48.1	46.9	49.2	60.88	62.1	58.8	46.2	79.4	35.6	36.37	42.13	22.06	26.3	7.9	4.18	8.28	20.48	16.71	87.11	95.13	78.8
Isolated Area	0.1	0	0.1	1	0	0.2	0.1	0.1	0.2	0	0	0	1.05	0	0	0	0	0	0	0.28	0	7.08
Total	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Source Area DCIA Breakdown																						
Roofs	0%	36%	26%	35%	17%	19%	13%	37%	15%	30%	23%	27%	47%	18%	26%	43%	24%	33%	30%	5%	11%	2%
Parking	0%	1%	0%	28%	0%	1%	3%	23%	1%	34%	45%	19%	27%	59%	45%	24%	66%	47%	55%	19%	0%	41%
Driveways	29%	2%	35%	25%	20%	23%	7%	4%	25%	1%	5%	4%	8%	6%	2%	2%	2%	4%	3%	64%	0%	12%
Sidewalks	0%	8%	5%	1%	15%	5%	12%	4%	3%	5%	4%	5%	4%	2%	5%	9%	1%	2%	1%	1%	12%	5%
Streets	71%	53%	34%	7%	49%	53%	65%	31%	56%	29%	20%	15%	14%	15%	22%	23%	7%	15%	12%	12%	77%	32%

Appendix B. Phase I Peer Review

MEMO

To:	Caroline Burger, Greg Fries, and Janet Schmidt
Cc:	Juli Beth Hinds
From:	Dan Christian and Jim Bachhuber
Date:	October 8, 2020
Subject:	Distributed Green Infrastructure Analysis Review

1.0 INTRODUCTION

1.1 BACKGROUND INFORMATION

Watershed studies for purposes of flood control are being conducted across the City of Madison. Although these studies evaluate a variety of flood control approaches for their performance, the City is particularly interested in the role green infrastructure (GI) can play in stormwater flood control. There is no universal definition of green infrastructure, however the term is generally characterized as non-regional stormwater management measures that are located close to high runoff sources, and promote storage, infiltration and/or evapotranspiration of stormwater. The City conducted a modeling analysis of the impacts of GI utilizing the Pheasant Branch Watershed as a test area. The analysis showed that GI reduced the peak flow from the 1 percent AEP by 4% to 5% at the outlet of the watershed.

The City plans on providing a GI analysis approach for the consultants conducting the first three watershed studies (Spring Harbor, Stricker's/Mendota, and Wingra West) to utilize in their analyses. After studying results from the first three watersheds, the City will determine if this analysis should be conducted in other watersheds being modeled for flood control purposes

1.2 REVIEW OBJECTIVE

City Engineering conducted a pilot planning level analysis of GI performance for the Pheasant Branch Watershed. The purpose of the analysis was to understand the data available and how it could efficiently be used to evaluate the effectiveness of GI to reduce the peak flow during large storm events.

2.0 SCOPE

2.1 REVIEW THE GI ANALYSIS FOR PHEASANT BRANCH WATERSHED

Through an amendment to an existing contract, The City requested Birchline Planning LLC (and the subconsultants Tetra Tech and Jim Bachhuber) to review the modeling analysis information provided by the City (7/14/20) for the Pheasant Branch Watershed. Specifically, the scope of work required a review and comment on the following files:

- GI Analysis 2020_07_03.xls
- GreenInfrastructureEffectivenessAnalysis_PheasantBranchWatershed_v2020_07_14.pdf
- Proposed VCI Scope v2020_07_14_for_Review.pdf

The review addressed the following questions:

1) Is the basis of the analysis technically sound based on current professional standards/methodologies to evaluate the effectiveness of green infrastructure on a large scale?
2) Is the analysis missing something? Should the City look at something additional during this analysis?
3) Is there something in the analysis that is not needed?

4) Does the proposed scope describe the analysis the City is asking for?
5) Is there a better way to do this type of analysis understanding the tools the City has? Tools include a green infrastructure suitability layer, XP-SWMM models using SWMM Hydrology and Horton Infiltration.

2.2 DISCUSS ALTERNATIVE DISTRIBUTED GI MODELING APPROACHES

Based on best professional judgement provide opinions on the additional issues listed below:

6) Within the watersheds being modeled in Madison, is there justification for analyzing multiple locations within a watershed for DGI impacts on large storm peak flow rates as opposed to only evaluating the peak flow rate at the outlet of the watershed? (NOTE: The City uses the term "distributed green infrastructure" – DGI – to describe the concept of using GI at multiple locations throughout a watershed.)
7) What are the benefits and limitations of modeling the "extreme DGI" scenario of converting all non-right-of-way (ROW) impervious surfaces to pervious? The purpose of the analysis is to determine if the City's existing stormwater detention and conveyance system is able to safely pass a target design storm peak flow even under the "extreme DGI" scenario.
8) Should the City evaluate stormwater management scenario(s) that looks at the amount of TSS and TP reduction that could be achieved in the areas where there is no current treatment?

3.0 TECHNICAL REVIEW

The focus of the review is the *Green Infrastructure Planning Level Analysis for Pheasant Branch Watershed* document (v07/14/2020) prepared by the City. The *GI Analysis 2020_07_03.xls* file was used as supplemental information to understand some of the technical details. The City refers to green infrastructure as "volume control infrastructure", which is meant to promote stormwater infiltration. The stated intent of the modeling analysis was to:

1) Determine the volume of water that would need to be managed if a certain percent of the directly connected impervious area (DCIA) were to be treated,
2) Determine if there is a break point or target for volume control treatment
3) Assess the watershed to see how much area is available for volume control,
4) Assess the impact of infiltration (from DGI) sized for the 1-year event on larger storms,
5) Assess the sensitivity of the existing drainage system to the implementation of volume control stormwater devices to treat directly connected impervious areas, and
6) Determine if the combination of the peak flow control efforts and volume control efforts can provide a quantifiable improvement in the level of service.

3.1 CITY'S APPROACH FOR ANALYZING DGI

The City's analysis was conducted in three parts.

Part 1. Determine the resulting flows after assuming complete retention of a certain fraction of DCIA. In this step selected percentages of DCIA (10%, 15%, 20% and 25%) were removed from each subcatchment in the model. For example, if a subcatchment had 1-acre of DCIA, the area would be decreased to 0.90, 0.85, 0.80, and 0.75-acres respectively.

Part 2. This part of the analysis identified potential locations for GI to be conceptually placed. The analysis utilized the City's Geographic Information System (GIS) and was conducted in in conjunction with various City agencies. For each land use type, three scenarios were developed (1) the total available space for GI (meaning 100% placement of GI in all areas. This scenario is not meant to reflect reality, but it represents an idealistic maximum level of control.), (2) the maximum practical space for GI, and (3) a realistic space for GI. Additionally, restricted areas were identified including wellhead protection zones, shallow bedrock, high groundwater and steep slopes. However, the restricted areas were not factored into the final analysis. The runoff reduction volume from Part 1 for

a 1-year storm event was determined and converted to an equivalent total area needed (assuming 1-ft storage depth). The area needed was then compared to the available space determined through the GIS analysis.

Part 3. Using the hydrologic / hydraulic model (SWMM) , 25% of the DCIA for each subcatchment was moved to the non-directly connected impervious area (NDCIA) and depression storage was increased in the NDCIA portion of the subcatchment to offset the increased flow from the 1-year storm event. Hence, this simulates GI sized for the 1-year storm event for 25% of the DCIA. The model was then solved for a range of storm events, up to the 100-year event. An opinion of probable construction and maintenance costs were estimated based on a fixed unit cost. A total phosphorus load reduction was estimated using WinSLAMM.

3.2 MANAGING LARGE STORM PEAK FLOW WITH GI

Results of the City's analysis show a 5% peak flow reduction when rerouting 25% of the DCIA area to NDCIA, and a 4% reduction for the "Max DCIA Rerouted" (to NDCIA) scenario at the outlet of the Pheasant Branch Watershed for a 1% AEP (100-year) event. The principle reason for the relatively low percent removal during a large storm event is that the GI practice (represented by depression storage) is filled by the initial rainfall-runoff so that during the peak intensity of the rainfall the primary mechanism for reducing runoff is infiltration. The selected rainfall distribution plays a significant role in this. It should also be noted that the percent change in peak flow reported under the different scenarios are likely within the error range of the model itself. Hence this means the resulting values from the various scenarios may be considered as "no change" or very little change.

3.3 REVIEW COMMENTS ON THE APPROACH

The following comments and questions are offered as we worked through the analysis approach and results.

Removing Areas in the Model. Part 1 took an overly simplistic approach to determining the impact GI would have on the resulting flows. Removing the area from the model assumes that no runoff, regardless of the storm size, contributes flow to the collection system which is not realistic. However, this does provide a quick and simple first approximation and the approach was improved in Part 3. In the future, if the Part 1 approach is used, we recommend maintaining the total area of the subcatchment and instead shifting the DCIA to NDCIA or pervious area.

GI for DCIA Only. GI was only considered for DCIAs. Implementation of GI for NDCIA should also be considered. NDCIAs can still have a significant runoff contribution, particularly for large storm events. A common example of NDCIA would be a rooftop with disconnected downspouts discharging onto a lawn. A common GI practice to use in this scenario would be to covert a portion of the lawn to bioretention thereby increasing the storage and infiltration of the stormwater.

Types of GI Assumed. The memo did not state what types of GI practices were assumed to be applicable in the analysis. Based on the information presented, it appears that only a common bioretention was conceptually placed on existing vegetated areas. Hence no loss of impervious surface was anticipated. For example, a bioretention system in a bump-out along a road or in the corner of a parking lot was not considered which would reduce the impervious area and provide a level of management. Additionally, it does not appear that any type of porous pavement, tree boxes or green roofs were considered. Water harvesting practices could also be used in place of some of the bioretention areas. Leaching systems are another type of practice which might be considered. These may include discrete systems such as a leaching catch basin or subsurface storage vaults but may also include long linear piped systems designed to exfiltrate water. Leaching systems can be placed under impervious surfaces with no net loss or negative impact to the impervious surface. All these systems could be represented in the model.

Old Sauk Rd
Summit Credit Union
Old Sauk Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Junction Rd
Old Sauk Rd
Old Sauk Rd
Old Sauk

The impact of only considering open green space for GI implementation is that dense commercial areas (e.g. southwest corner of Old Sauk Rd & W Beltline Hwy, shown in Figure 1) are determined to only have a relatively small amount of GI possible (<10% DCIA removed) and yet these types of development are exactly the area's most in need of improved stormwater management. We suggest documenting the analysis to explain the types of GI considered and under what circumstances. This documentation will also provide a consistent approach for subsequent watershed analysis with generic DGI application.

25% DCIA Max Scenario. Part 1 of the analysis limited the maximum amount DCIA removed to 25%. We were unsure why this limit was placed. Part 2 shows that even with the modest 10-25% DCIA reduction more space is needed than available and would suggest that a 25% reduction in DCIA may be physically not feasible. On the other hand, the reason not enough space is shown may be due to the limited types of GI assumed and if a wider range of GI practices was considered (i.e. the previously mentioned green roofs, impervious pavement, etc.) a larger amount of DCIA removal may be possible.

25% DCIA Reduction Target for Pheasant Branch. Part 2 Step 2 of the analysis (bottom of page 5 of the City's memo) states that the City chose a treatment goal of 25% of the DCIA for Pheasant Branch Watershed for two reasons, one of which was that overall, "land is available to treat 25% of the DCIA in the watershed." According the MS Excel worksheet *2 Step 5 Compare Areas* the cumulative area needed for the 1-year event with a 25% DCIA reduction is 1,958,970 square feet (column EK) and the cumulative area still needed (column EL) is shown in Table 1. Unless we're interpreting the information incorrectly, since the cumulative area still needed is greater than zero, this suggests that land is not available to treat the 25% DCIA reduction.

Table 1 25% DCIA Reduction, 1-year Event

Restrictions	GI Area	Cumulative Area Still Needed (sf)
More Restrictive	Realistic	435,108
Less Restrictive	Realistic	275,598
More Restrictive	Maximized	334,975
Less Restrictive	Maximized	208,655
More Restrictive	All Available	203,834
Less Restrictive	All Available	56,161

Size GI for 1-year Event Volume. Part 2 of the analysis initially considered the 1- and 10-year event volumes but then stated that "*future calculations would only be done for the 10-year storm*". If the objective is to manage the peak flow from severe storms, sizing stormwater management practices (including GI) for larger storm events would be beneficial. There is no assessment regarding the feasibility of "upsizing" the standard GI design to capture and hold a larger amount of runoff.

3.4 SCOPE QUESTIONS

The following specific questions were identified in the scope of work to be addressed (refer to Section 2.1 and 2.2). The questions and answers are provided below.

Question 1: Is the basis of the analysis technically sound?

Based on our opinion and professional judgement the methodology followed to evaluate DGI on a large watershed scale is technically sound. Specifically, the approach used in Part 3 of the analysis whereby depression storage on pervious surface was increased to represent an equivalent amount of DGI is a reasonable approach to use in a SWMM model.

Question 2: Is the analysis missing something?

As mentioned in our review comments, we suggest: 1) broadening the type of GI practices considered and 2) including GI for NDCIA. These two changes should result in GI practices possible on more land which then will lead to a reconsideration of the upper "treatable" limit (currently set at 25% of the DCIA).

The current approach focuses only on DGI practices. It is our understanding that the City has already assessed larger scale management measures (i.e. enhancing existing and/or adding new regional stormwater basins) and "grey infrastructure (i.e. larger storm sewers, re-routing, pumps, etc.). If this is the case, the City may wish to combine the "regional" approach, the "DGI approach", and grey infrastructure to assess flood benefits from a comprehensive management scheme. It is very likely that no one solution will achieve the flood control goals.

Green (or living) roofs do not appear to be considered in the analysis and would require a slightly different approach than relying on modeling them as pervious area depression storage. If green roofs are considered in the evaluation, a similar modeling approach would be to increase the impervious area depression storage by the equivalent storage amount provided by a typical green roof design. Although green roofs are designed to drain, during a discrete design storm the use of impervious area depression storage is a reasonable approximation.

We suggest expanding the way in which the benefits of GI are documented. Currently the primary measure of success is the expected peak flow reduction from the 1 percent AEP (100-year) discrete design storm with a MSE 4 distribution at the downstream end of the watershed. This is a very high standard to meet with DGI practices. The peak flow reduction at an intermediate point (for example conduit TO2255-024_TO2355-056 in the memo) was also quantified along with total phosphorus (TP) pollution reduction. We suggest processing the model with a continuous rainfall record and quantifying the reduced magnitude, frequency and duration of flooding as a result of the GI practices to document the improved resiliency of the system. Other additional benefits of GI (such as heat island benefits, pollution reduction, etc.) could be quantified as well for a holistic approach.

Question 3: Is there something in the analysis that is not needed?

Part 1 of the analysis was a good first step to begin to quantify the impact of distributed GI but is not needed moving forward. Quantifying the available space (Part 2) and modeling the impact of GI (Part 3) are still needed.

Question 4: Does the proposed scope describe the analysis the City is asking for?

Our review found the draft scope of work was technically sound to address the analyses. We suggest changing the scope approach to be consistent with the recommendations in this memo such as:

- Part 1 - remove
- Part 2 - expand the opportunity analysis to include other types of DGI and addressing GI management on NDCIA
- Part 3 - solve the model for fractions of the total the total DGI opportunities up to 100%.

We did not review the scope of work for its clarity to carry out the tasks, or legal aspects.

Question 5: Is there a better way to do this type of analysis understanding the tools the City has?

Based on our current review and our understanding of the City's objectives, we do not have a preferred alternative approach to recommended beyond the suggested changes discussed in this memo.

Question 6: Within the watersheds being modeled in Madison, is there justification for analyzing multiple locations within a watershed for DGI impacts on large storm peak flow rates as opposed to only evaluating the peak flow rate at the outlet of the watershed?

We suggest quantifying the benefits at multiple points within the watersheds. Portions of the watershed may be more amenable to GI practices than others and the results of this may not be apparent unless results at intermediate points in the watershed are considered. Key locations for discharge analysis may be identified based upon the drainage areas' density of land use and potential for DGI, important locations from a safety and/or emergency access perspective, or other factors.

Question 7: What are the benefits and limitations of modeling the "extreme DGI" scenario of converting all not right-of-way (ROW) impervious surfaces to pervious.

Modeling any extreme condition provides a boundary for the expected results. Understanding if the municipal collection system can handle just the road rights-of-way (ROWs) may be useful in understanding the scope of the problem. If the existing collection system cannot handle the runoff from the roadway, regardless of what is done on private property, it would then suggest that improvements within the ROW are required regardless of what is done outside of the ROW.

Question 8: Should the City evaluate stormwater management scenario(s) that looks at the amount of TSS and TP reduction that could be achieved get in the areas where there is no current treatment?

When selecting a preferred alternative, we believe it is important to equitably compare the options. This means quantifying a range of benefits, including water quality improvements, for all the options. However, since the focus of the analysis, and primary goal of the program is flood management (i.e. large events), a weighting system or prioritization value should be given to the flood control benefits over water quality.

4.0 IDEAS TO CONSIDER

4.1 MODIFIED GI DESIGN APPROACHES

Traditionally GI practices have been designed and constructed for water quality treatment purposes. For water quality treatment purposes, capturing and treating the initial runoff, and the more frequent storms are the most beneficial. If a primary objective is to manage the peak flow from large storm events, criteria for design and construction of GI practices should be revisited. Presumably the City still wants the water quality improvement benefits of the GI in addition to peak flow control. Some ideas to achieve both a water quality and peak flow control objectives include:

- Increase the size the GI practice to capture more water.
- A multistage outlet control structure whereby small storm events are fully captured, and large storm events receive peak flow control. This approach will require additional storage volume.
- A smart outlet control structure whereby discharge from the practice is automatically regulated by looking at forecasted rainfall and minimizes discharge during times of peak rainfall. Multiple smart outlets may be coordinated to stagger discharge in order to minimize the combined peak discharge.

4.2 ROAD CORRIDORS

Determining where GI practices can fit within roadway corridors is challenging. The City has conducted this approach over several years. One approach to consider is to group roadways into common classes and based on representative block(s) determine the amount of GI that could be constructed. Refer to Figure 2 for of an example GI quantity along a commercial street. The amount of GI can then be presented on a unit basis, e.g. square feet of GI per linear foot of roadway. Refer to Table 2 for an example of GI by typical street (note this is an example for a specific watershed study, not a generic case). The quantity of GI to include for modeling purposes can then be calculated within a GIS once the quality of different roadway typologies is known.

Figure 2 Example GI on a Commercial Street Section

Table 2 Characteristics of Typical Street Sections with Area of Practical Maximum GI

Street Classification	Practice Area (sft)			ROW Width (ft)	Ex. Sidewalk width (ft)	Ex. Street Width (ft)	Street Length (ft)
	Bioretention	Pervious Pavement	Planter Box (Lined)				
Alley		8,100		16			585
Commercial	4,900	11,100		66	5	46	956
Industrial			9,500	66	12	42	1218
Residential	4,400	13,000		66	5	30	722

4.3 ECOSYSTEMS SERVICES ANALYSIS

Another option to consider involves a more holistic approach by incorporating city goals beyond flood control. For example, a multifunctional benefits analysis involving issues such as infrastructure resilience, heat island, air quality, groundwater recharge, erosion, plant biodiversity, tree canopy, habitat, access to greenspace, landscape aesthetics, and social vulnerability. This type of analysis can demonstrate the true benefits of GI over constructing larger storm sewers to only increase conveyance. An analysis of this type often identifies the demand within the study area for various services (based on city goals) and pairs that with potential benefits provided by each type of stormwater management practice.

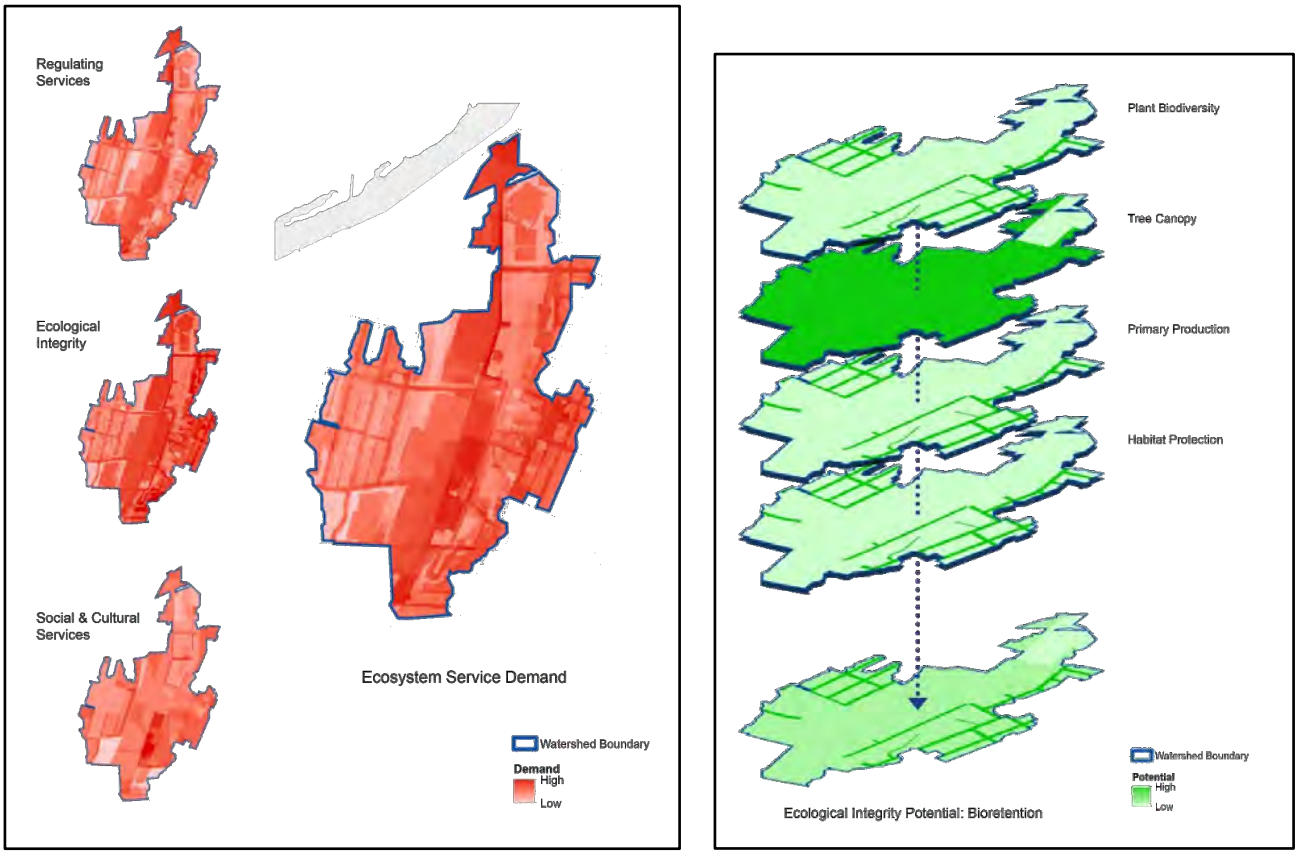


Figure 3 Example Ecosystem Services Analysis

Appendix C. Phase I Analysis Scope for Consultants

Watershed Studies – Phase I Volume Control Proposed Tasks
v10/08/2020

The City has conducted an initial analysis of the effect of distributed green infrastructure (volume control practices) in the Pheasant Branch Watershed. The intent of the analysis is to understand if sizing distributed green infrastructure in the traditional manner (generally the smaller, more frequent events) has an effect on the peak flows for the large storm events (> 10-yr recurrence interval).

The City requests this analysis be repeated in two more watersheds in the City to understand if the results are similar. The two watersheds chosen are Wingra West and Willow Creek.

a. Wingra West was chosen because it's fully urbanized (unlike Pheasant Branch) and it has a large storage area (Odana Hills Golf Course Ponds) in the middle.
b. Willow Creek was chosen because it's a fully urbanized watershed with little to no storage and is being done with rain-on-grid. If The City goes forward with more rain-on-grid, we want to see how the distributed GI analysis would be done with that approach.

The scope below describes Phase 1 of the distributed green infrastructure (volume control) analysis. There may be additional Phases depending upon the results of this analysis and the extended analysis the City is conducting in-house.

The City has also created a working spreadsheet that the Consultant may utilize for this effort if they deem appropriate.

Task 6.1 – Phase I Volume Control Analysis (VC)

<u>Step 1 – Create the models</u>

Determine the effect on peak flows for the 10-year and 100-year, 24-hour events if 1) 10% of the DCIA (Directly Connected Impervious Area) is routed to green infrastructure and 2) 25% of the DCIA is routed to green infrastructure.

To do this, move the %DCIA removed to NDCIA (Non-Directly Connected Impervious Area) for each subcatchment. Then, adjust the pervious area storage based on the assumed sizing of the distributed green infrastructure (DGI). For purposes of this exercise, when adjusting the pervious area storage assume: 1) the DGI has a depth of 1 foot of open air storage, 2) no engineered media, and 3) the porosity of the underlying native soil is not taken into account.

Create one model for the 10% DCIA removed and a second model for the 25% DCIA removed.

Run both models for the 1-yr, 10-yr, and 100-yr events and tabulate results.

Initial deliverable includes:

1) Table noting the flooding depth (ft) and peak flow (cfs) for the 25 locations identified during Task 4.

Step 2 – Meet with the City to go over the results.

Following Step 1, the Consultant will meet with the City to go over the results.

Deliverable includes:

1. Meeting minutes from meeting

Step 3 – Finalize analysis based on meeting with City

Revise the analysis based on feedback from the City.

Deliverables for this step shall include:

1) Color figures showing the maximum extent of flooding during each storm event. The figures shall be color coded to show depth of flooding (typical ranges utilized are: 0.01'-0.25', 0.25'-0.5', 0.5'-1.0', and greater than 1').
2) Table noting the flooding depth (ft) and peak flow (cfs) for the 25 locations identified during Task 4.
3) Model files and documentation.
4) GIS files generated for model development. All files shall be delivered to the City on an external hard drive.

Task 6.1 – Phase II Volume Control Analysis (VC) - TBD

Appendix D. Wingra West Phase I Analysis

Memorandum

8383 Greenway Blvd. # 600
Middleton, WI 53562

Date: April 21, 2021

Prepared for: City of Madison: Caroline Burger, PE, Env SP
Lauren Striegl, PE
Phil Gaebler, PE

Subject: Wingra West Watershed – Green Infrastructure Evaluation
Project No.: City of Madison: 8412, BC: 153394

From: Mike Wegner, PE & Doug Joachim, PE
Copy:

Background

In response to recent flooding events, including an extreme flood event resulting from 10.5 inches of rain over a 12-hour period in August 2018, the City of Madison (City) has begun conducting comprehensive stormwater management studies for each major watershed within the City. The studies are intended to help the City better understand the causes of flooding in each watershed and identify potential improvements to their stormwater management system to mitigate future flooding issues.

The stormwater management studies are conducted in two phases: The first phase includes the development of a hydrologic/hydraulic (H&H) stormwater runoff model that represents the physical and drainage properties of the watershed under existing conditions. The second phase utilizes the model developed in the first phase to evaluate alternative methods and infrastructure improvements that can eliminate or reduce flooding impacts from large rain events.

As part of this program, Brown and Caldwell (BC) is currently completing the Wingra West Watershed Study in western Madison. An existing conditions model was developed and calibrated using XPSWMM™ 2D modeling software. The results of the existing conditions analysis are detailed in a report dated April 17, 2020 entitled "Wingra West Watershed: Existing Conditions Report."

As part of the second phase of the Wingra West Watershed Study, an evaluation of the potential benefits that could be achieved using distributed green infrastructure (GI) for volume control (VC) was conducted. Conceptually, GI will facilitate the infiltration of stormwater runoff, which will reduce peak stormwater flows and reduce downstream flood impacts while also limiting the size and cost of future infrastructure improvements designed for flood control. This tech memo details the modeling process and results obtained from this analysis.

Model Assumptions

A detailed evaluation of GI, and its potential impacts on flooding during larger storm events, was completed for the Pheasant Branch Watershed by the City of Madison. The analysis of GI for the

Wingra West Watershed was completed following the methodology developed by the City for the Pheasant Branch Watershed.

To simplify the GI analysis, the following model assumptions were used:

- GI will be applied uniformly across the watershed.
- Each subcatchment in the watershed has adequate space available to implement GI.
- The GI will be sized to fully contain the 100% chance storm event from the GI contributing area. Infiltration within the GI practices is ignored.
- The effects of GI will be approximated in the model by moving a portion of each subcatchment's directly connected impervious area (DCIA) to non-DCIA and increasing the depth of storage in the subcatchment's pervious area.

Analysis Scenarios

For this analysis, two GI scenarios were analyzed in the Wingra West watershed for the 100%, 10% and 1% chance rainfall events. The scenarios considered the impacts to the watershed if different amount of impervious area within the watershed are directed to GI.

The first scenario assumed 10% of DCIA will be re-directed to GI. The second scenario assumed 25% of the DCIA will be re-directed to GI.

Model Modifications

The Wingra West existing conditions model was modified to incorporate GI through the following steps:

1. A model was created and run for the 100% chance storm event (2.49 inches of rainfall over 24 hours) with 10% and 25% DCIA removed entirely for Scenarios 1 and 2 respectively for each modeled subcatchment. The results of this model run were then compared with the model results from Step 2.
2. A model was created and run for the 100% chance storm event with 10% and 25% DCIA moved to non-DCIA for Scenarios 1 and 2 respectively for each subcatchment. The storage available in each sub-catchment's pervious area was "scaled up" to allow additional storage equal to the 100% chance storm event (2.49 inches) multiplied by the DCIA area moved.
3. Because infiltration occurs as part of the hydrologic calculations within the model in the pervious area, the models created in Step 2 were shown to be reducing peak flows more than the models in Step 1. To rectify this situation, the models in Step 2 were run iteratively by reducing the amount of storage available in the pervious area until the peak flows generated in these models were approximately equal to the peak flows generated in Step 1.

Evaluation of GI Impacts

The final models identified in Step 3 above were executed for the 100%, 10% and 1% chance rainfall events for Scenarios 1 and 2 to determine the resulting impact of GI in the Wingra West watershed. Peak flows and peak water surface elevations at twenty-five locations (key locations identified in the existing conditions report) and at the watershed outlet were compared to existing conditions results. The complete results are summarized in Tables VC-1, VC-2, and VC-3 following this memo. The locations that correspond to the comparison points on the table are shown on Figure 4-6 (excerpted from the Wingra West Watershed: Existing Conditions Report).

The analysis showed larger reductions (measured by percent change) in peak water surface elevations and peak flow rates during the smallest event (100% chance rainfall event) considered.

The impact of GI was more limited during the 10% and 1% chance events. The largest reduction in flow rate observed for the 1% chance event was 8% with reductions of 2% to 3% more typical. At the outfall from the watershed (the outlet from Secret Pond); the reduction in peak flow rate was 6.8%, 5.6%, and 2.4% for the 100%, 10%, and 1% chance storm events, respectively.

N

MINERAL POINT RD

ODANA RD

ODANA RD

SW BIKE PATH

NAKOMA RD

S MIDVALE BLVD

S WHITNEY WAY

MONROE

18

151

Legend

- Results Reporting Locations
- Storm Sewer
- Open Channel
- Wingra West Watershed

Note: See Tables D-1 and D-2 for each Reporting Location's corresponding flood elevation.

2/14/2020

Figure 4-6
Results Reporting Locations
Wingra West Watershed Study:
Existing Conditions Report
City of Madison, WI

0 500 1,000
Feet

Brown AND Caldwell

Air Photo: City of Madison, 2018

Path: P:\Madison, City of\153394 West Wingra Watershed Study\GIS\MXDs\ExCondReportFigures\Fig4-6-ReportingLocations.mxd

Table VC-1 - 100% Chance Storm Event
Volume Control Analysis Results
Wingra West Watershed Study, City of Madison, WI

					Existing Conditions Results			10% DCIA Rerouted to Green Infrastructure						25% DCIA Rerouted to Green Infrastructure					
					100% Chance Storm			100% Chance Storm						100% Chance Storm					
Point	XP-SWMM Node	XPSWMM Link	Location	Flood Elevation	Peak WSE	Flood Depth (ft)	Peak Flow (cfs)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)
	PD_4061-006	MMY_1_WW_OUTFALL_1	Secret Pond Outfall	867.5	860.4	-7.1	229.1	860.4	-7.1	0.0	223.8	-5.4	-2.3%	860.3	-7.2	-0.1	213.5	-15.6	-6.8%
1	WI02-D-0193-H-001	3961-075_3961-076	Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd	862.6	863.1	0.4	41.9	863.0	0.4	-0.1	33.0	-9.0	-21.4%	862.9	0.2	-0.2	19.9	-22.0	-52.4%
2	WI02-D-0193-H-009	3964-009_3964-008	Intersection of Seminole Hwy & Manitou Way	929.3	925.5	-3.8	4.3	925.4	-3.9	-0.1	4.1	-0.2	-4.9%	925.2	-4.1	-0.3	3.7	-0.5	-12.7%
3	WI02-C-0190-H-000	BC_JCT_51_BC_JCT_52	Intersection of Chippewa Dr & Nakoma Rd	873.0	874.7	1.7	284.9	874.5	1.5	-0.2	268.2	-16.7	-5.9%	874.1	1.1	-0.6	239.2	-45.7	-16.0%
4	WI02-C-0188-H-000	3961-050_BC_JCT_50	Intersection of Chippewa Dr & Cherokee Dr	892.8	894.2	1.3	271.8	894.1	1.3	-0.1	256.5	-15.3	-5.6%	894.0	1.2	-0.2	234.0	-37.8	-13.9%
5	AS3862-003	3862-018_3862-003	Intersection of Yuma Dr & Cherokee Dr	912.8	910.8	-2.0	75.5	910.7	-2.1	-0.2	70.7	-4.7	-6.3%	910.4	-2.4	-0.4	61.6	-13.8	-18.3%
6	WI02-C-0188-H-011	3763-008_3763-016	Intersection of Midvale Blvd & Cherokee Dr	967.5	968.0	0.5	28.5	968.0	0.5	0.0	26.5	-2.1	-7.2%	967.9	0.4	-0.1	23.1	-5.4	-19.0%
7	WI02-C-0188-H-017	BC_JCT_140_BC_JCT_142	Intersection of Chippewa Dr & Council Crest	937.9	938.1	0.1	184.8	938.0	0.1	0.0	174.7	-10.1	-5.5%	938.0	0.1	0.0	156.4	-28.4	-15.4%
8	IN3761-056	WAITECIRCLE_3861-045	West end of Waite Circle	956.8	958.4	1.6	174.3	958.2	1.4	-0.1	163.8	-10.4	-6.0%	957.9	1.1	-0.4	146.3	-27.9	-16.0%
9	AS3760-034	3760-034_3760-015	Intersection of Midvale Blvd & Odana Rd	986.9	986.4	-0.5	37.5	986.3	-0.6	-0.2	37.2	-0.3	-0.8%	985.9	-1.0	-0.6	36.7	-0.9	-2.3%
10	AS3762-026	3762-035_3762-026	Intersection of Midvale Blvd & SW Bike Path	972.7	969.1	-3.6	4.4	969.1	-3.6	0.0	4.3	-0.1	-2.4%	969.1	-3.6	-0.1	4.1	-0.3	-6.3%
11	WI02-C-0324-H-000	3765-017_BC_JCT_129	Verona Road, Immediately North of Beltline Highway	1002.7	1002.7	0.0	29.2	1002.7	0.0	0.0	26.0	-3.2	-10.9%	1002.7	0.0	0.0	20.4	-8.8	-30.0%
12	WI02-C-0324-H-005	7645-023_10_BC_JCT_106	Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy	997.2	998.6	1.5	9.7	998.6	1.4	-0.1	8.8	-0.9	-9.4%	998.5	1.3	-0.2	7.5	-2.2	-22.3%
13	STOR_12	3562-001_3662-002	Odana Golf Course - Entrance of 42" Storm Sewer	978.0	979.5	1.5	21.7	979.4	1.4	-0.1	19.8	-1.9	-8.6%	979.2	1.2	-0.3	16.8	-4.9	-22.5%
14	PD_3462-002	PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636	Odana Pond	980.0	979.5	-0.5	111.0	979.4	-0.6	-0.1	87.3	-23.7	-21.4%	979.2	-0.8	-0.3	60.4	-50.6	-45.6%
15	WI01-A-0179-H-001	3460-019_3461-001	Intersection of Milward Dr & Wedgewood Way	982.3	983.5	1.1	13.5	983.3	1.0	-0.1	12.5	-0.9	-6.9%	983.1	0.7	-0.4	10.9	-2.6	-19.2%
16	WI01-A-0179-H-003	3461-007_3461-008	Intersection of Milward Dr & Dearholt Rd	981.3	982.4	1.1	20.2	982.4	1.1	0.0	18.8	-1.5	-7.3%	982.3	1.0	-0.1	16.6	-3.7	-18.2%
17	WI01-A-0179-H-006	3460-002_3460-003	Intersection of Sherwood Rd & Dearholt Rd	989.6	990.5	1.0	8.7	990.5	0.9	-0.1	8.6	-0.1	-0.9%	990.4	0.8	-0.1	8.5	-0.2	-2.3%
18	WI01-A-0180-H-002	3360-020_3360-019	Intersection of Odana Rd & Segoe Rd	1005.9	1006.6	0.7	7.7	1006.5	0.6	-0.1	6.9	-0.8	-10.6%	1006.5	0.6	-0.1	5.3	-2.4	-31.2%
19	WI01-A-0187-H-006	3359-006_3359-008	Intersection of Tokay Blvd & Whitney Way	1018.7	1018.8	0.1	24.6	1018.8	0.1	0.0	21.9	-2.7	-11.1%	1018.8	0.1	0.0	17.7	-6.9	-28.1%
20	WI01-A-0183-H-001	3160-002_BC_JCT_21	Odana Rd, approximately 325-ft west of Medical Circle	1028.6	1029.5	0.9	134.9	1029.4	0.8	-0.1	121.1	-13.8	-10.2%	1029.3	0.7	-0.2	102.9	-32.0	-23.7%
21	PD_3362-020	WW_GW_07_WW_GW_09	Orchard Ridge Valley Park Pond	979.0	979.8	0.8	119.3	979.6	0.6	-0.1	116.0	-3.3	-2.8%	979.4	0.4	-0.4	110.3	-9.0	-7.5%
22	WI01-B-0184-H-010	3261-016_3261-017	Intersection of Shroeder Rd & Shroeder Ct	1002.0	1002.1	0.1	52.2	1002.1	0.1	0.0	48.3	-3.9	-7.6%	1002.1	0.1	0.0	40.7	-11.5	-22.0%
23	WI01-B-0184-H-000	3362-012_3362-015	Intersection of Whitney Way & Gilbert Rd	981.7	982.2	0.5	150.5	982.1	0.5	0.0	141.3	-9.2	-6.1%	982.0	0.4	-0.1	125.4	-25.1	-16.7%
24	WI01-B-0181-H-001	3365-013_3365-024	Tolman Ter low-point, approximately 425-ft east of Gilbert Rd	1038.6	1039.8	1.2	4.5	1039.6	1.1	-0.1	4.3	-0.1	-3.0%	1039.4	0.9	-0.3	4.1	-0.3	-6.9%
25	WI01-B-0182-H-006	3164-028_3164-008	Intersection of Piping Rock Rd & Manhasset Pl	1004.9	1005.1	0.2	23.7	1005.1	0.2	0.0	22.3	-1.4	-6.1%	1005.1	0.2	0.0	20.0	-3.7	-15.4%

Table VC-2 - 10% Chance Storm Event
Volume Control Analysis Results
Wingra West Watershed Study, City of Madison, WI

					Existing Conditions Results			10% DCIA Rerouted to Green Infrastructure						25% DCIA Rerouted to Green Infrastructure					
					10% Chance Storm			10% Chance Storm						10% Chance Storm					
Point	XP-SWMM Node	XPSWMM Link	Location	Flood Elevation	Peak WSE	Flood Depth (ft)	Peak Flow (cfs)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)
	PD_4061-006	MMY_1_WW_OUTFALL_1	Secret Pond Outfall	867.5	860.9	-6.6	302.2	860.9	-6.6	0.0	299.1	-3.1	-1.0%	860.8	-6.7	-0.1	285.4	-16.8	-5.6%
1	WI02-D-0193-H-001	3961-075_3961-076	Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd	862.6	866.2	3.5	138.4	866.1	3.5	-0.1	137.6	-0.8	-0.6%	866.1	3.5	-0.1	138.4	-0.1	-0.1%
2	WI02-D-0193-H-009	3964-009_3964-008	Intersection of Seminole Hwy & Manitou Way	929.3	930.4	1.2	11.5	930.4	1.1	-0.1	11.2	-0.3	-2.7%	930.3	1.0	-0.2	10.6	-1.0	-8.4%
3	WI02-C-0190-H-000	BC_JCT_51_BC_JCT_52	Intersection of Chippewa Dr & Nakoma Rd	873.0	875.9	2.9	489.6	875.9	2.9	0.0	482.8	-6.9	-1.4%	875.8	2.8	-0.1	468.5	-21.1	-4.3%
4	WI02-C-0188-H-000	3961-050_BC_JCT_50	Intersection of Chippewa Dr & Cherokee Dr	892.8	894.9	2.1	503.1	894.9	2.1	0.0	491.6	-11.5	-2.3%	894.8	2.0	-0.1	475.6	-27.5	-5.5%
5	AS3862-003	3862-018_3862-003	Intersection of Yuma Dr & Cherokee Dr	912.8	912.6	-0.2	145.3	912.5	-0.3	-0.1	139.5	-5.7	-4.0%	912.3	-0.5	-0.3	132.4	-12.9	-8.9%
6	WI02-C-0188-H-011	3763-008_3763-016	Intersection of Midvale Blvd & Cherokee Dr	967.5	968.8	1.3	62.3	968.8	1.3	0.0	61.2	-1.1	-1.7%	968.7	1.2	-0.1	59.3	-3.0	-4.8%
7	WI02-C-0188-H-017	BC_JCT_140_BC_JCT_142	Intersection of Chippewa Dr & Council Crest	937.9	938.2	0.3	308.7	938.2	0.3	0.0	302.7	-6.1	-2.0%	938.2	0.2	0.0	294.7	-14.0	-4.5%
8	IN3761-056	WAITECIRCLE_3861-045	West end of Waite Circle	956.8	958.8	2.0	302.6	958.8	2.0	0.0	295.2	-7.4	-2.4%	958.8	2.0	0.0	285.6	-17.1	-5.6%
9	AS3760-034	3760-034_3760-015	Intersection of Midvale Blvd & Odana Rd	986.9	986.9	0.0	44.0	986.9	0.0	-0.1	43.2	-0.8	-1.9%	986.8	-0.1	-0.1	41.9	-2.1	-4.9%
10	AS3762-026	3762-035_3762-026	Intersection of Midvale Blvd & SW Bike Path	972.7	972.3	-0.4	48.1	972.2	-0.5	-0.1	44.5	-3.6	-7.5%	972.0	-0.7	-0.3	40.0	-8.1	-16.9%
11	WI02-C-0324-H-000	3765-017_BC_JCT_129	Verona Road, Immediately North of Beltline Highway	1002.7	1002.8	0.1	45.0	1002.8	0.1	0.0	44.6	-0.4	-1.0%	1002.8	0.1	0.0	43.4	-1.6	-3.6%
12	WI02-C-0324-H-005	7645-023_10_BC_JCT_106	Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy	997.2	999.1	1.9	21.8	999.1	1.9	0.0	21.7	-0.2	-0.7%	999.0	1.9	0.0	21.4	-0.4	-1.8%
13	STOR_12	3562-001_3662-002	Odana Golf Course - Entrance of 42" Storm Sewer	978.0	981.0	3.0	52.2	980.9	2.9	-0.1	50.1	-2.1	-4.0%	980.8	2.8	-0.2	47.2	-5.0	-9.5%
14	PD_3462-002	PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636	Odana Pond	980.0	981.0	1.0	355.6	980.9	0.9	-0.1	338.9	-16.7	-4.7%	980.8	0.8	-0.2	317.7	-37.9	-10.7%
15	WI01-A-0179-H-001	3460-019_3461-001	Intersection of Milward Dr & Wedgewood Way	982.3	984.1	1.8	23.5	984.1	1.8	0.0	23.5	-0.1	-0.3%	984.1	1.7	-0.1	23.4	-0.1	-0.6%
16	WI01-A-0179-H-003	3461-007_3461-008	Intersection of Milward Dr & Dearholt Rd	981.3	983.1	1.8	42.8	983.1	1.8	-0.1	38.4	-4.4	-10.3%	983.0	1.7	-0.1	33.4	-9.5	-22.2%
17	WI01-A-0179-H-006	3460-002_3460-003	Intersection of Sherwood Rd & Dearholt Rd	989.6	991.2	1.6	12.6	991.2	1.6	0.0	12.3	-0.3	-2.7%	991.2	1.6	0.0	11.9	-0.8	-6.1%
18	WI01-A-0180-H-002	3360-020_3360-019	Intersection of Odana Rd & Segoe Rd	1005.9	1007.1	1.2	18.5	1007.0	1.1	-0.1	15.0	-3.5	-18.8%	1006.9	1.0	-0.2	15.0	-3.6	-19.2%
19	WI01-A-0187-H-006	3359-006_3359-008	Intersection of Tokay Blvd & Whitney Way	1018.7	1018.9	0.2	43.3	1018.9	0.2	0.0	39.6	-3.7	-8.5%	1018.9	0.2	0.0	37.2	-6.1	-14.1%
20	WI01-A-0183-H-001	3160-002_BC_JCT_21	Odana Rd, approximately 325-ft west of Medical Circle	1028.6	1029.9	1.4	172.9	1029.9	1.3	-0.1	172.9	0.0	0.0%	1029.7	1.2	-0.2	171.6	-1.2	-0.7%
21	PD_3362-020	WW_GW_07_WW_GW_09	Orchard Ridge Valley Park Pond	979.0	981.8	2.8	181.0	981.7	2.7	-0.1	181.5	0.4	0.2%	981.6	2.6	-0.2	181.8	0.8	0.4%
22	WI01-B-0184-H-010	3261-016_3261-017	Intersection of Shroeder Rd & Shroeder Ct	1002.0	1003.1	1.1	107.4	1003.0	1.0	-0.1	102.3	-5.1	-4.8%	1002.9	0.9	-0.2	93.8	-13.7	-12.7%
23	WI01-B-0184-H-000	3362-012_3362-015	Intersection of Whitney Way & Gilbert Rd	981.7	983.5	1.8	245.2	983.4	1.7	-0.1	245.8	0.6	0.3%	983.3	1.6	-0.2	247.2	2.0	0.8%
24	WI01-B-0181-H-001	3365-013_3365-024	Tolman Ter low-point, approximately 425-ft east of Gilbert Rd	1038.6	1040.9	2.4	6.8	1040.9	2.3	0.0	6.7	-0.1	-1.2%	1040.9	2.3	0.0	6.6	-0.1	-1.9%
25	WI01-B-0182-H-006	3164-028_3164-008	Intersection of Piping Rock Rd & Manhasset Pl	1004.9	1005.3	0.4	59.4	1005.3	0.4	0.0	58.3	-1.1	-1.8%	1005.3	0.4	0.0	56.0	-3.3	-5.6%

Table VC-3 - 1% Chance Storm Event
Volume Control Analysis Results
Wingra West Watershed Study, City of Madison, WI

					Existing Conditions Results			10% DCIA Rerouted to Green Infrastructure						25% DCIA Rerouted to Green Infrastructure					
					1% Chance Storm			1% Chance Storm						1% Chance Storm					
Point	XP-SWMM Node	XPSWMM Link	Location	Flood Elevation	Peak WSE	Flood Depth (ft)	Peak Flow (cfs)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)
	PD_4061-006	MMY_1_WW_OUTFALL_1	Secret Pond Outfall	867.5	861.5	-6.0	447.5	861.5	-6.0	0.0	443.7	-3.7	-0.8%	861.5	-6.0	0.0	436.7	-10.7	-2.4%
1	WI02-D-0193-H-001	3961-075_3961-076	Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd	862.6	866.5	3.9	168.9	866.5	3.9	0.0	169.5	0.6	0.3%	866.5	3.9	0.1	167.4	-1.5	-0.9%
2	WI02-D-0193-H-009	3964-009_3964-008	Intersection of Seminole Hwy & Manitou Way	929.3	931.2	1.9	25.1	931.2	1.9	0.0	24.9	-0.2	-0.7%	931.1	1.9	0.0	24.6	-0.5	-1.9%
3	WI02-C-0190-H-000	BC_JCT_51_BC_JCT_52	Intersection of Chippewa Dr & Nakoma Rd	873.0	876.7	3.7	757.3	876.7	3.7	0.0	748.5	-8.8	-1.2%	876.6	3.7	0.0	747.8	-9.5	-1.2%
4	WI02-C-0188-H-000	3961-050_BC_JCT_50	Intersection of Chippewa Dr & Cherokee Dr	892.8	895.6	2.8	811.7	895.6	2.8	0.0	805.9	-5.8	-0.7%	895.6	2.7	0.0	795.4	-16.4	-2.0%
5	AS3862-003	3862-018_3862-003	Intersection of Yuma Dr & Cherokee Dr	912.8	913.9	1.1	283.8	913.8	1.0	0.0	280.6	-3.1	-1.1%	913.8	1.0	-0.1	276.0	-7.7	-2.7%
6	WI02-C-0188-H-011	3763-008_3763-016	Intersection of Midvale Blvd & Cherokee Dr	967.5	969.4	1.9	109.4	969.4	1.9	0.0	108.9	-0.4	-0.4%	969.4	1.9	0.0	108.3	-1.1	-1.0%
7	WI02-C-0188-H-017	BC_JCT_140_BC_JCT_142	Intersection of Chippewa Dr & Council Crest	937.9	939.4	1.5	423.8	939.4	1.4	0.0	418.5	-5.3	-1.3%	939.3	1.4	-0.1	411.4	-12.3	-2.9%
8	IN3761-056	WAITECIRCLE_3861-045	West end of Waite Circle	956.8	963.1	6.3	400.5	963.0	6.2	-0.1	399.8	-0.6	-0.2%	963.0	6.2	-0.1	398.8	-1.6	-0.4%
9	AS3760-034	3760-034_3760-015	Intersection of Midvale Blvd & Odana Rd	986.9	987.4	0.5	69.3	987.4	0.5	0.0	68.7	-0.6	-0.9%	987.4	0.5	0.0	67.5	-1.8	-2.6%
10	AS3762-026	3762-035_3762-026	Intersection of Midvale Blvd & SW Bike Path	972.7	973.6	0.9	149.2	973.6	0.9	0.0	147.1	-2.1	-1.4%	973.6	0.9	0.0	144.7	-4.5	-3.0%
11	WI02-C-0324-H-000	3765-017_BC_JCT_129	Verona Road, Immediately North of Beltline Highway	1002.7	1003.8	1.1	52.5	1003.8	1.1	0.0	52.4	0.0	-0.1%	1003.7	1.0	-0.1	52.4	0.0	-0.1%
12	WI02-C-0324-H-005	7645-023_10_BC_JCT_106	Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy	997.2	999.5	2.4	22.1	999.5	2.3	0.0	22.2	0.1	0.4%	999.5	2.3	0.0	22.2	0.1	0.5%
13	STOR_12	3562-001_3662-002	Odana Golf Course - Entrance of 42" Storm Sewer	978.0	983.0	5.0	71.4	982.9	4.9	-0.1	71.0	-0.3	-0.5%	982.8	4.8	-0.2	70.6	-0.8	-1.1%
14	PD_3462-002	PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636	Odana Pond	980.0	983.0	3.0	480.3	982.9	2.9	-0.1	468.4	-11.9	-2.5%	982.8	2.8	-0.2	449.2	-31.1	-6.5%
15	WI01-A-0179-H-001	3460-019_3461-001	Intersection of Milward Dr & Wedgewood Way	982.3	984.5	2.2	25.6	984.5	2.2	0.0	25.6	0.0	0.0%	984.5	2.1	0.0	25.6	0.0	0.0%
16	WI01-A-0179-H-003	3461-007_3461-008	Intersection of Milward Dr & Dearholt Rd	981.3	984.0	2.7	110.2	984.0	2.7	0.0	108.3	-2.0	-1.8%	983.9	2.7	0.0	104.7	-5.5	-5.0%
17	WI01-A-0179-H-006	3460-002_3460-003	Intersection of Sherwood Rd & Dearholt Rd	989.6	991.7	2.1	30.9	991.7	2.1	0.0	30.6	-0.4	-1.1%	991.7	2.1	0.0	30.0	-0.9	-2.9%
18	WI01-A-0180-H-002	3360-020_3360-019	Intersection of Odana Rd & Segoe Rd	1005.9	1007.8	1.9	34.6	1007.8	1.9	0.0	33.3	-1.3	-3.9%	1007.7	1.8	-0.1	31.9	-2.8	-8.0%
19	WI01-A-0187-H-006	3359-006_3359-008	Intersection of Tokay Blvd & Whitney Way	1018.7	1019.5	0.7	93.5	1019.4	0.7	0.0	92.8	-0.7	-0.8%	1019.4	0.6	-0.1	90.8	-2.7	-2.9%
20	WI01-A-0183-H-001	3160-002_BC_JCT_21	Odana Rd, approximately 325-ft west of Medical Circle	1028.6	1030.5	2.0	230.0	1030.5	1.9	0.0	228.5	-1.5	-0.6%	1030.4	1.9	-0.1	225.9	-4.1	-1.8%
21	PD_3362-020	WW_GW_07_WW_GW_09	Orchard Ridge Valley Park Pond	979.0	983.9	4.9	201.5	983.9	4.9	-0.1	202.0	0.5	0.3%	983.8	4.8	-0.2	202.8	1.3	0.7%
22	WI01-B-0184-H-010	3261-016_3261-017	Intersection of Shroeder Rd & Shroeder Ct	1002.0	1003.8	1.8	188.0	1003.8	1.8	0.0	185.7	-2.3	-1.2%	1003.7	1.7	-0.1	181.9	-6.1	-3.3%
23	WI01-B-0184-H-000	3362-012_3362-015	Intersection of Whitney Way & Gilbert Rd	981.7	985.2	3.5	268.3	985.1	3.4	0.0	268.9	0.6	0.2%	985.1	3.4	-0.1	269.4	1.1	0.4%
24	WI01-B-0181-H-001	3365-013_3365-024	Tolman Ter low-point, approximately 425-ft east of Gilbert Rd	1038.6	1041.9	3.4	22.5	1041.9	3.4	0.0	22.3	-0.2	-0.7%	1041.9	3.3	0.0	22.0	-0.5	-2.1%
25	WI01-B-0182-H-006	3164-028_3164-008	Intersection of Piping Rock Rd & Manhasset Pl	1004.9	1005.8	0.9	113.0	1005.8	0.9	0.0	112.6	-0.5	-0.4%	1005.8	0.8	-0.1	112.0	-1.1	-1.0%

N

MINERAL POINT RD

ODANA RD

ODANA RD

SW BIKE PATH

NAKOMA RD

S MIDVALE BLVD

S WHITNEY WAY

MONROE

18

151

Legend

- Results Reporting Locations
- Storm Sewer
- Open Channel
- Wingra West Watershed

Note: See Tables D-1 and D-2 for each Reporting Location's corresponding flood elevation.

2/14/2020

Figure 4-6
Results Reporting Locations
Wingra West Watershed Study:
Existing Conditions Report
City of Madison, WI

0 500 1,000
Feet

Brown AND Caldwell

Air Photo: City of Madison, 2018

Path: P:\Madison, City of\153394 West Wingra Watershed Study\GIS\MXDs\ExCondReportFigures\Fig4-6-ReportingLocations.mxd

Table VC-3 - 1% Chance Storm Event
Volume Control Analysis Results
Wingra West Watershed Study, City of Madison, WI

					Existing Conditions Results			10% DCIA Rerouted to Green Infrastructure						25% DCIA Rerouted to Green Infrastructure					
					1% Chance Storm			1% Chance Storm						1% Chance Storm					
Point	XP-SWMM Node	XPSWMM Link	Location	Flood Elevation	Peak WSE	Flood Depth (ft)	Peak Flow (cfs)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)
	PD_4061-006	MMY_1_WW_OUTFALL_1	Secret Pond Outfall	867.5	861.5	-6.0	447.5	861.5	-6.0	0.0	443.7	-3.7	-0.8%	861.5	-6.0	0.0	436.7	-10.7	-2.4%
1	WI02-D-0193-H-001	3961-075_3961-076	Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd	862.6	866.5	3.9	168.9	866.5	3.9	0.0	169.5	0.6	0.3%	866.5	3.9	0.1	167.4	-1.5	-0.9%
2	WI02-D-0193-H-009	3964-009_3964-008	Intersection of Seminole Hwy & Manitou Way	929.3	931.2	1.9	25.1	931.2	1.9	0.0	24.9	-0.2	-0.7%	931.1	1.9	0.0	24.6	-0.5	-1.9%
3	WI02-C-0190-H-000	BC_JCT_51_BC_JCT_52	Intersection of Chippewa Dr & Nakoma Rd	873.0	876.7	3.7	757.3	876.7	3.7	0.0	748.5	-8.8	-1.2%	876.6	3.7	0.0	747.8	-9.5	-1.2%
4	WI02-C-0188-H-000	3961-050_BC_JCT_50	Intersection of Chippewa Dr & Cherokee Dr	892.8	895.6	2.8	811.7	895.6	2.8	0.0	805.9	-5.8	-0.7%	895.6	2.7	0.0	795.4	-16.4	-2.0%
5	AS3862-003	3862-018_3862-003	Intersection of Yuma Dr & Cherokee Dr	912.8	913.9	1.1	283.8	913.8	1.0	0.0	280.6	-3.1	-1.1%	913.8	1.0	-0.1	276.0	-7.7	-2.7%
6	WI02-C-0188-H-011	3763-008_3763-016	Intersection of Midvale Blvd & Cherokee Dr	967.5	969.4	1.9	109.4	969.4	1.9	0.0	108.9	-0.4	-0.4%	969.4	1.9	0.0	108.3	-1.1	-1.0%
7	WI02-C-0188-H-017	BC_JCT_140_BC_JCT_142	Intersection of Chippewa Dr & Council Crest	937.9	939.4	1.5	423.8	939.4	1.4	0.0	418.5	-5.3	-1.3%	939.3	1.4	-0.1	411.4	-12.3	-2.9%
8	IN3761-056	WAITECIRCLE_3861-045	West end of Waite Circle	956.8	963.1	6.3	400.5	963.0	6.2	-0.1	399.8	-0.6	-0.2%	963.0	6.2	-0.1	398.8	-1.6	-0.4%
9	AS3760-034	3760-034_3760-015	Intersection of Midvale Blvd & Odana Rd	986.9	987.4	0.5	69.3	987.4	0.5	0.0	68.7	-0.6	-0.9%	987.4	0.5	0.0	67.5	-1.8	-2.6%
10	AS3762-026	3762-035_3762-026	Intersection of Midvale Blvd & SW Bike Path	972.7	973.6	0.9	149.2	973.6	0.9	0.0	147.1	-2.1	-1.4%	973.6	0.9	0.0	144.7	-4.5	-3.0%
11	WI02-C-0324-H-000	3765-017_BC_JCT_129	Verona Road, Immediately North of Beltline Highway	1002.7	1003.8	1.1	52.5	1003.8	1.1	0.0	52.4	0.0	-0.1%	1003.7	1.0	-0.1	52.4	0.0	-0.1%
12	WI02-C-0324-H-005	7645-023_10_BC_JCT_106	Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy	997.2	999.5	2.4	22.1	999.5	2.3	0.0	22.2	0.1	0.4%	999.5	2.3	0.0	22.2	0.1	0.5%
13	STOR_12	3562-001_3662-002	Odana Golf Course - Entrance of 42" Storm Sewer	978.0	983.0	5.0	71.4	982.9	4.9	-0.1	71.0	-0.3	-0.5%	982.8	4.8	-0.2	70.6	-0.8	-1.1%
14	PD_3462-002	PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636	Odana Pond	980.0	983.0	3.0	480.3	982.9	2.9	-0.1	468.4	-11.9	-2.5%	982.8	2.8	-0.2	449.2	-31.1	-6.5%
15	WI01-A-0179-H-001	3460-019_3461-001	Intersection of Milward Dr & Wedgewood Way	982.3	984.5	2.2	25.6	984.5	2.2	0.0	25.6	0.0	0.0%	984.5	2.1	0.0	25.6	0.0	0.0%
16	WI01-A-0179-H-003	3461-007_3461-008	Intersection of Milward Dr & Dearholt Rd	981.3	984.0	2.7	110.2	984.0	2.7	0.0	108.3	-2.0	-1.8%	983.9	2.7	0.0	104.7	-5.5	-5.0%
17	WI01-A-0179-H-006	3460-002_3460-003	Intersection of Sherwood Rd & Dearholt Rd	989.6	991.7	2.1	30.9	991.7	2.1	0.0	30.6	-0.4	-1.1%	991.7	2.1	0.0	30.0	-0.9	-2.9%
18	WI01-A-0180-H-002	3360-020_3360-019	Intersection of Odana Rd & Segoe Rd	1005.9	1007.8	1.9	34.6	1007.8	1.9	0.0	33.3	-1.3	-3.9%	1007.7	1.8	-0.1	31.9	-2.8	-8.0%
19	WI01-A-0187-H-006	3359-006_3359-008	Intersection of Tokay Blvd & Whitney Way	1018.7	1019.5	0.7	93.5	1019.4	0.7	0.0	92.8	-0.7	-0.8%	1019.4	0.6	-0.1	90.8	-2.7	-2.9%
20	WI01-A-0183-H-001	3160-002_BC_JCT_21	Odana Rd, approximately 325-ft west of Medical Circle	1028.6	1030.5	2.0	230.0	1030.5	1.9	0.0	228.5	-1.5	-0.6%	1030.4	1.9	-0.1	225.9	-4.1	-1.8%
21	PD_3362-020	WW_GW_07_WW_GW_09	Orchard Ridge Valley Park Pond	979.0	983.9	4.9	201.5	983.9	4.9	-0.1	202.0	0.5	0.3%	983.8	4.8	-0.2	202.8	1.3	0.7%
22	WI01-B-0184-H-010	3261-016_3261-017	Intersection of Shroeder Rd & Shroeder Ct	1002.0	1003.8	1.8	188.0	1003.8	1.8	0.0	185.7	-2.3	-1.2%	1003.7	1.7	-0.1	181.9	-6.1	-3.3%
23	WI01-B-0184-H-000	3362-012_3362-015	Intersection of Whitney Way & Gilbert Rd	981.7	985.2	3.5	268.3	985.1	3.4	0.0	268.9	0.6	0.2%	985.1	3.4	-0.1	269.4	1.1	0.4%
24	WI01-B-0181-H-001	3365-013_3365-024	Tolman Ter low-point, approximately 425-ft east of Gilbert Rd	1038.6	1041.9	3.4	22.5	1041.9	3.4	0.0	22.3	-0.2	-0.7%	1041.9	3.3	0.0	22.0	-0.5	-2.1%
25	WI01-B-0182-H-006	3164-028_3164-008	Intersection of Piping Rock Rd & Manhasset Pl	1004.9	1005.8	0.9	113.0	1005.8	0.9	0.0	112.6	-0.5	-0.4%	1005.8	0.8	-0.1	112.0	-1.1	-1.0%

Table VC-2 - 10% Chance Storm Event
Volume Control Analysis Results
Wingra West Watershed Study, City of Madison, WI

					Existing Conditions Results			10% DCIA Rerouted to Green Infrastructure						25% DCIA Rerouted to Green Infrastructure					
					10% Chance Storm			10% Chance Storm						10% Chance Storm					
Point	XP-SWMM Node	XPSWMM Link	Location	Flood Elevation	Peak WSE	Flood Depth (ft)	Peak Flow (cfs)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)
	PD_4061-006	MMY_1_WW_OUTFALL_1	Secret Pond Outfall	867.5	860.9	-6.6	302.2	860.9	-6.6	0.0	299.1	-3.1	-1.0%	860.8	-6.7	-0.1	285.4	-16.8	-5.6%
1	WI02-D-0193-H-001	3961-075_3961-076	Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd	862.6	866.2	3.5	138.4	866.1	3.5	-0.1	137.6	-0.8	-0.6%	866.1	3.5	-0.1	138.4	-0.1	-0.1%
2	WI02-D-0193-H-009	3964-009_3964-008	Intersection of Seminole Hwy & Manitou Way	929.3	930.4	1.2	11.5	930.4	1.1	-0.1	11.2	-0.3	-2.7%	930.3	1.0	-0.2	10.6	-1.0	-8.4%
3	WI02-C-0190-H-000	BC_JCT_51_BC_JCT_52	Intersection of Chippewa Dr & Nakoma Rd	873.0	875.9	2.9	489.6	875.9	2.9	0.0	482.8	-6.9	-1.4%	875.8	2.8	-0.1	468.5	-21.1	-4.3%
4	WI02-C-0188-H-000	3961-050_BC_JCT_50	Intersection of Chippewa Dr & Cherokee Dr	892.8	894.9	2.1	503.1	894.9	2.1	0.0	491.6	-11.5	-2.3%	894.8	2.0	-0.1	475.6	-27.5	-5.5%
5	AS3862-003	3862-018_3862-003	Intersection of Yuma Dr & Cherokee Dr	912.8	912.6	-0.2	145.3	912.5	-0.3	-0.1	139.5	-5.7	-4.0%	912.3	-0.5	-0.3	132.4	-12.9	-8.9%
6	WI02-C-0188-H-011	3763-008_3763-016	Intersection of Midvale Blvd & Cherokee Dr	967.5	968.8	1.3	62.3	968.8	1.3	0.0	61.2	-1.1	-1.7%	968.7	1.2	-0.1	59.3	-3.0	-4.8%
7	WI02-C-0188-H-017	BC_JCT_140_BC_JCT_142	Intersection of Chippewa Dr & Council Crest	937.9	938.2	0.3	308.7	938.2	0.3	0.0	302.7	-6.1	-2.0%	938.2	0.2	0.0	294.7	-14.0	-4.5%
8	IN3761-056	WAITECIRCLE_3861-045	West end of Waite Circle	956.8	958.8	2.0	302.6	958.8	2.0	0.0	295.2	-7.4	-2.4%	958.8	2.0	0.0	285.6	-17.1	-5.6%
9	AS3760-034	3760-034_3760-015	Intersection of Midvale Blvd & Odana Rd	986.9	986.9	0.0	44.0	986.9	0.0	-0.1	43.2	-0.8	-1.9%	986.8	-0.1	-0.1	41.9	-2.1	-4.9%
10	AS3762-026	3762-035_3762-026	Intersection of Midvale Blvd & SW Bike Path	972.7	972.3	-0.4	48.1	972.2	-0.5	-0.1	44.5	-3.6	-7.5%	972.0	-0.7	-0.3	40.0	-8.1	-16.9%
11	WI02-C-0324-H-000	3765-017_BC_JCT_129	Verona Road, Immediately North of Beltline Highway	1002.7	1002.8	0.1	45.0	1002.8	0.1	0.0	44.6	-0.4	-1.0%	1002.8	0.1	0.0	43.4	-1.6	-3.6%
12	WI02-C-0324-H-005	7645-023_10_BC_JCT_106	Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy	997.2	999.1	1.9	21.8	999.1	1.9	0.0	21.7	-0.2	-0.7%	999.0	1.9	0.0	21.4	-0.4	-1.8%
13	STOR_12	3562-001_3662-002	Odana Golf Course - Entrance of 42" Storm Sewer	978.0	981.0	3.0	52.2	980.9	2.9	-0.1	50.1	-2.1	-4.0%	980.8	2.8	-0.2	47.2	-5.0	-9.5%
14	PD_3462-002	PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636	Odana Pond	980.0	981.0	1.0	355.6	980.9	0.9	-0.1	338.9	-16.7	-4.7%	980.8	0.8	-0.2	317.7	-37.9	-10.7%
15	WI01-A-0179-H-001	3460-019_3461-001	Intersection of Milward Dr & Wedgewood Way	982.3	984.1	1.8	23.5	984.1	1.8	0.0	23.5	-0.1	-0.3%	984.1	1.7	-0.1	23.4	-0.1	-0.6%
16	WI01-A-0179-H-003	3461-007_3461-008	Intersection of Milward Dr & Dearholt Rd	981.3	983.1	1.8	42.8	983.1	1.8	-0.1	38.4	-4.4	-10.3%	983.0	1.7	-0.1	33.4	-9.5	-22.2%
17	WI01-A-0179-H-006	3460-002_3460-003	Intersection of Sherwood Rd & Dearholt Rd	989.6	991.2	1.6	12.6	991.2	1.6	0.0	12.3	-0.3	-2.7%	991.2	1.6	0.0	11.9	-0.8	-6.1%
18	WI01-A-0180-H-002	3360-020_3360-019	Intersection of Odana Rd & Segoe Rd	1005.9	1007.1	1.2	18.5	1007.0	1.1	-0.1	15.0	-3.5	-18.8%	1006.9	1.0	-0.2	15.0	-3.6	-19.2%
19	WI01-A-0187-H-006	3359-006_3359-008	Intersection of Tokay Blvd & Whitney Way	1018.7	1018.9	0.2	43.3	1018.9	0.2	0.0	39.6	-3.7	-8.5%	1018.9	0.2	0.0	37.2	-6.1	-14.1%
20	WI01-A-0183-H-001	3160-002_BC_JCT_21	Odana Rd, approximately 325-ft west of Medical Circle	1028.6	1029.9	1.4	172.9	1029.9	1.3	-0.1	172.9	0.0	0.0%	1029.7	1.2	-0.2	171.6	-1.2	-0.7%
21	PD_3362-020	WW_GW_07_WW_GW_09	Orchard Ridge Valley Park Pond	979.0	981.8	2.8	181.0	981.7	2.7	-0.1	181.5	0.4	0.2%	981.6	2.6	-0.2	181.8	0.8	0.4%
22	WI01-B-0184-H-010	3261-016_3261-017	Intersection of Shroeder Rd & Shroeder Ct	1002.0	1003.1	1.1	107.4	1003.0	1.0	-0.1	102.3	-5.1	-4.8%	1002.9	0.9	-0.2	93.8	-13.7	-12.7%
23	WI01-B-0184-H-000	3362-012_3362-015	Intersection of Whitney Way & Gilbert Rd	981.7	983.5	1.8	245.2	983.4	1.7	-0.1	245.8	0.6	0.3%	983.3	1.6	-0.2	247.2	2.0	0.8%
24	WI01-B-0181-H-001	3365-013_3365-024	Tolman Ter low-point, approximately 425-ft east of Gilbert Rd	1038.6	1040.9	2.4	6.8	1040.9	2.3	0.0	6.7	-0.1	-1.2%	1040.9	2.3	0.0	6.6	-0.1	-1.9%
25	WI01-B-0182-H-006	3164-028_3164-008	Intersection of Piping Rock Rd & Manhasset Pl	1004.9	1005.3	0.4	59.4	1005.3	0.4	0.0	58.3	-1.1	-1.8%	1005.3	0.4	0.0	56.0	-3.3	-5.6%

Table VC-1 - 100% Chance Storm Event
Volume Control Analysis Results
Wingra West Watershed Study, City of Madison, WI

					Existing Conditions Results			10% DCIA Rerouted to Green Infrastructure						25% DCIA Rerouted to Green Infrastructure					
					100% Chance Storm			100% Chance Storm						100% Chance Storm					
Point	XP-SWMM Node	XPSWMM Link	Location	Flood Elevation	Peak WSE	Flood Depth (ft)	Peak Flow (cfs)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)	Peak WSE	Flood Depth (ft)	Change in Flood Depth (ft)	Peak Flow (cfs)	Change in Peak Flow (cfs)	Change in Peak Flow (%)
	PD_4061-006	MMY_1_WW_OUTFALL_1	Secret Pond Outfall	867.5	860.4	-7.1	229.1	860.4	-7.1	0.0	223.8	-5.4	-2.3%	860.3	-7.2	-0.1	213.5	-15.6	-6.8%
1	WI02-D-0193-H-001	3961-075_3961-076	Manitou Way Low-Point - Approximately 400-ft south of Nakoma Rd	862.6	863.1	0.4	41.9	863.0	0.4	-0.1	33.0	-9.0	-21.4%	862.9	0.2	-0.2	19.9	-22.0	-52.4%
2	WI02-D-0193-H-009	3964-009_3964-008	Intersection of Seminole Hwy & Manitou Way	929.3	925.5	-3.8	4.3	925.4	-3.9	-0.1	4.1	-0.2	-4.9%	925.2	-4.1	-0.3	3.7	-0.5	-12.7%
3	WI02-C-0190-H-000	BC_JCT_51_BC_JCT_52	Intersection of Chippewa Dr & Nakoma Rd	873.0	874.7	1.7	284.9	874.5	1.5	-0.2	268.2	-16.7	-5.9%	874.1	1.1	-0.6	239.2	-45.7	-16.0%
4	WI02-C-0188-H-000	3961-050_BC_JCT_50	Intersection of Chippewa Dr & Cherokee Dr	892.8	894.2	1.3	271.8	894.1	1.3	-0.1	256.5	-15.3	-5.6%	894.0	1.2	-0.2	234.0	-37.8	-13.9%
5	AS3862-003	3862-018_3862-003	Intersection of Yuma Dr & Cherokee Dr	912.8	910.8	-2.0	75.5	910.7	-2.1	-0.2	70.7	-4.7	-6.3%	910.4	-2.4	-0.4	61.6	-13.8	-18.3%
6	WI02-C-0188-H-011	3763-008_3763-016	Intersection of Midvale Blvd & Cherokee Dr	967.5	968.0	0.5	28.5	968.0	0.5	0.0	26.5	-2.1	-7.2%	967.9	0.4	-0.1	23.1	-5.4	-19.0%
7	WI02-C-0188-H-017	BC_JCT_140_BC_JCT_142	Intersection of Chippewa Dr & Council Crest	937.9	938.1	0.1	184.8	938.0	0.1	0.0	174.7	-10.1	-5.5%	938.0	0.1	0.0	156.4	-28.4	-15.4%
8	IN3761-056	WAITECIRCLE_3861-045	West end of Waite Circle	956.8	958.4	1.6	174.3	958.2	1.4	-0.1	163.8	-10.4	-6.0%	957.9	1.1	-0.4	146.3	-27.9	-16.0%
9	AS3760-034	3760-034_3760-015	Intersection of Midvale Blvd & Odana Rd	986.9	986.4	-0.5	37.5	986.3	-0.6	-0.2	37.2	-0.3	-0.8%	985.9	-1.0	-0.6	36.7	-0.9	-2.3%
10	AS3762-026	3762-035_3762-026	Intersection of Midvale Blvd & SW Bike Path	972.7	969.1	-3.6	4.4	969.1	-3.6	0.0	4.3	-0.1	-2.4%	969.1	-3.6	-0.1	4.1	-0.3	-6.3%
11	WI02-C-0324-H-000	3765-017_BC_JCT_129	Verona Road, Immediately North of Beltline Highway	1002.7	1002.7	0.0	29.2	1002.7	0.0	0.0	26.0	-3.2	-10.9%	1002.7	0.0	0.0	20.4	-8.8	-30.0%
12	WI02-C-0324-H-005	7645-023_10_BC_JCT_106	Intersection of Hammersley Rd & Beltline Hwy - Southwest of Hwy	997.2	998.6	1.5	9.7	998.6	1.4	-0.1	8.8	-0.9	-9.4%	998.5	1.3	-0.2	7.5	-2.2	-22.3%
13	STOR_12	3562-001_3662-002	Odana Golf Course - Entrance of 42" Storm Sewer	978.0	979.5	1.5	21.7	979.4	1.4	-0.1	19.8	-1.9	-8.6%	979.2	1.2	-0.3	16.8	-4.9	-22.5%
14	PD_3462-002	PD_3462-002_WEIR_1 PD_3462-002_WEIR_2 Link636	Odana Pond	980.0	979.5	-0.5	111.0	979.4	-0.6	-0.1	87.3	-23.7	-21.4%	979.2	-0.8	-0.3	60.4	-50.6	-45.6%
15	WI01-A-0179-H-001	3460-019_3461-001	Intersection of Milward Dr & Wedgewood Way	982.3	983.5	1.1	13.5	983.3	1.0	-0.1	12.5	-0.9	-6.9%	983.1	0.7	-0.4	10.9	-2.6	-19.2%
16	WI01-A-0179-H-003	3461-007_3461-008	Intersection of Milward Dr & Dearholt Rd	981.3	982.4	1.1	20.2	982.4	1.1	0.0	18.8	-1.5	-7.3%	982.3	1.0	-0.1	16.6	-3.7	-18.2%
17	WI01-A-0179-H-006	3460-002_3460-003	Intersection of Sherwood Rd & Dearholt Rd	989.6	990.5	1.0	8.7	990.5	0.9	-0.1	8.6	-0.1	-0.9%	990.4	0.8	-0.1	8.5	-0.2	-2.3%
18	WI01-A-0180-H-002	3360-020_3360-019	Intersection of Odana Rd & Segoe Rd	1005.9	1006.6	0.7	7.7	1006.5	0.6	-0.1	6.9	-0.8	-10.6%	1006.5	0.6	-0.1	5.3	-2.4	-31.2%
19	WI01-A-0187-H-006	3359-006_3359-008	Intersection of Tokay Blvd & Whitney Way	1018.7	1018.8	0.1	24.6	1018.8	0.1	0.0	21.9	-2.7	-11.1%	1018.8	0.1	0.0	17.7	-6.9	-28.1%
20	WI01-A-0183-H-001	3160-002_BC_JCT_21	Odana Rd, approximately 325-ft west of Medical Circle	1028.6	1029.5	0.9	134.9	1029.4	0.8	-0.1	121.1	-13.8	-10.2%	1029.3	0.7	-0.2	102.9	-32.0	-23.7%
21	PD_3362-020	WW_GW_07_WW_GW_09	Orchard Ridge Valley Park Pond	979.0	979.8	0.8	119.3	979.6	0.6	-0.1	116.0	-3.3	-2.8%	979.4	0.4	-0.4	110.3	-9.0	-7.5%
22	WI01-B-0184-H-010	3261-016_3261-017	Intersection of Shroeder Rd & Shroeder Ct	1002.0	1002.1	0.1	52.2	1002.1	0.1	0.0	48.3	-3.9	-7.6%	1002.1	0.1	0.0	40.7	-11.5	-22.0%
23	WI01-B-0184-H-000	3362-012_3362-015	Intersection of Whitney Way & Gilbert Rd	981.7	982.2	0.5	150.5	982.1	0.5	0.0	141.3	-9.2	-6.1%	982.0	0.4	-0.1	125.4	-25.1	-16.7%
24	WI01-B-0181-H-001	3365-013_3365-024	Tolman Ter low-point, approximately 425-ft east of Gilbert Rd	1038.6	1039.8	1.2	4.5	1039.6	1.1	-0.1	4.3	-0.1	-3.0%	1039.4	0.9	-0.3	4.1	-0.3	-6.9%
25	WI01-B-0182-H-006	3164-028_3164-008	Intersection of Piping Rock Rd & Manhasset Pl	1004.9	1005.1	0.2	23.7	1005.1	0.2	0.0	22.3	-1.4	-6.1%	1005.1	0.2	0.0	20.0	-3.7	-15.4%

Appendix E. Willow Creek Phase I Analysis

MSA Memo

To: Caroline Burger, PE – City of Madison

From: Alistair Hancox, PE and Eric Thompson, PE – MSA Professional Services

Subject: Willow Creek – Green Infrastructure Assessment

Date: September 21, 2021

PURPOSE

This memorandum summarizes results of modeling simulations of the installation of Distributed Green Infrastructure (DGI) uniformly throughout the Willow Creek watershed for purposes of reducing the frequency and/or severity of flooding. Specific to this evaluation, DGI means installation of practices designed to reduce runoff volumes during rainfall events. While this implies infiltration of runoff, for this event-based study, the target volumes were simply retained in the upper watershed areas and not allowed to pass downstream.

METHODOLOGY

The City of Madison, in conjunction with other consultants, had conducted green infrastructure assessments in studies predating MSA's work in the Willow Creek Watershed. These prior studies all utilized a traditional hydrology model which divided each sub-watershed up into Directly Connected Impervious Area (DCIA), Unconnected Impervious Area (UCIA), and Pervious Area. To estimate the benefits of green infrastructure, and simulate the interception of flow from impervious areas and the subsequent diversion of these flows to pervious areas where they were allowed a chance to infiltrate, a fraction of the estimated existing DCIA was converted to UCIA (10% and 25%, for the respective simulations).

The Willow Creek Watershed Study model was built using a Rain-on-Grid hydrologic method which generates runoff everywhere throughout the catchment simultaneously, depending on the unique ground cover and infiltration parameters of each individual grid cell. Impervious areas cannot be designated by the user as either DCIA or UCIA and so allocations could not be reapportioned as they were with the prior studies. To estimate the effects of a 10% and 25% reduction in DCIA, MSA built a greatly simplified version of the watershed model, reducing all input to a single traditional-hydrology 1-D node representing the entire 1,913-acre watershed. This model was calibrated by adjusting the subcatchment width parameter until runoff volumes matched, within reason, those of the full detail calibrated rain-on-grid Existing Conditions model. The single 1-D node model was then adjusted to convert 10% and 25% of DCIA to UCIA and solved to determine the resulting reduction in total watershed runoff volume for the 50% AEP, 10% AEP, and 1% AEP (a total of six scenarios). The single 1-D node model was then set aside from this study and the full detail rain-on-grid model was modified to include distributed 1-D hydraulic storage nodes distributed proportionately throughout the study area such that their cumulative volume equaled the volume reduction reported for each scenario evaluated using the single 1-D node model.

RESULTS

Attached are detailed tabulated results for peak elevation and peak flow rates at 28 selected locations within the rain-on-grid Willow Creek model. The locations were chosen to provide an even distribution throughout the watershed, as well as at key locations where known flooding occurs.

The Willow Creek XP-SWMM model results did show some instabilities in 1D results at some of the nodes and links analyzed during this assessment. The result of such instabilities was for some nodes to show greater flood depths during the greater DCIA disconnected scenarios. These instances were reviewed, and it was determined that these conditions result from specific issues associated with flood conditions occurring within the model during selected flood event resulting from specific physical conditions that the model is predicting to occur and are independent of the DGI analysis. An unfortunate effect of these instabilities is that without interpretation they provide misleading results. For purposed of this study, those nodes should be ignored.

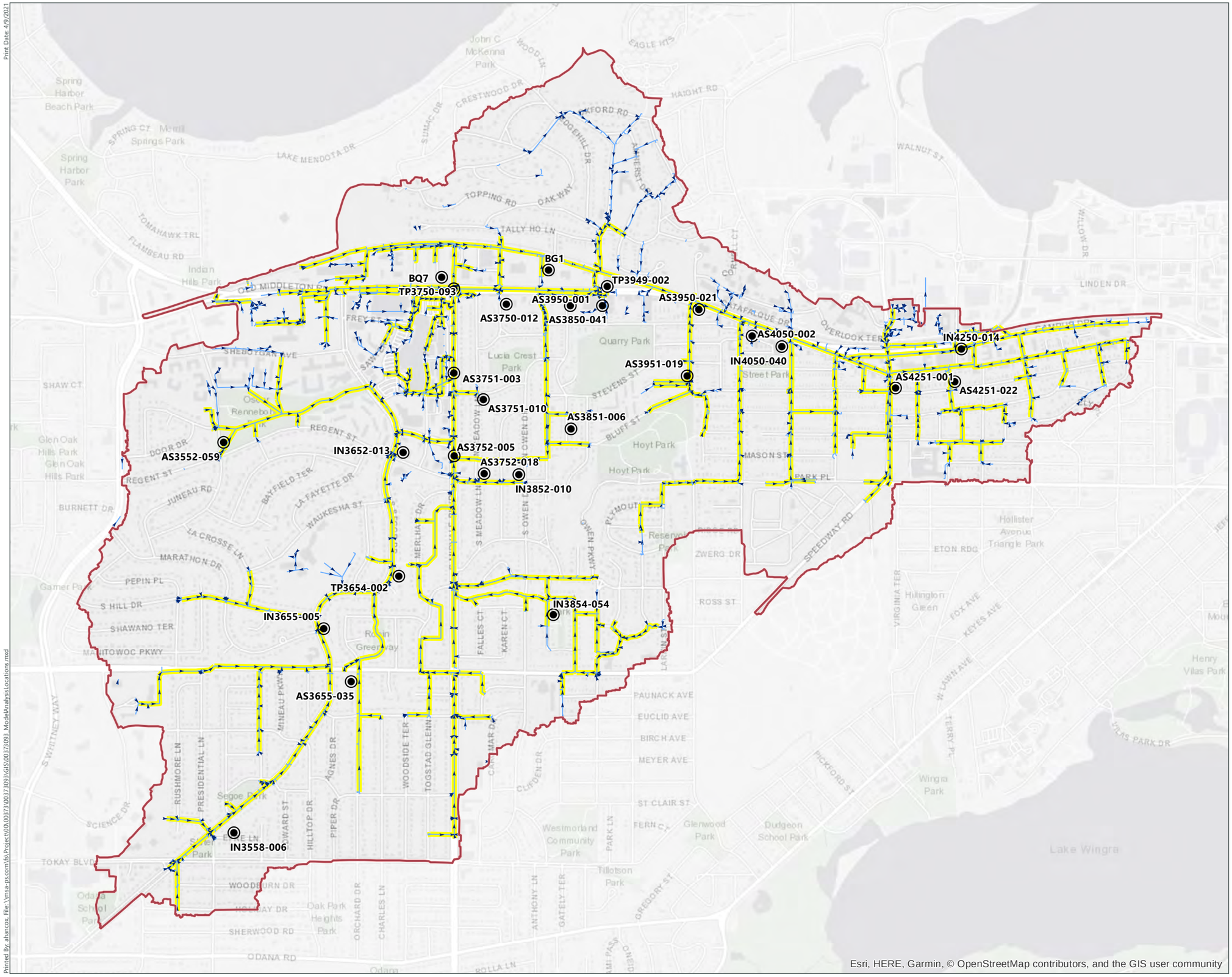
In general, the Flood Elevation Results show minor improvements throughout the watershed for 10% DCIA disconnection and slightly greater improvements for 25% DCIA disconnection. Improvements were most evident during the 50% AEP (smaller) event and were somewhat negligible for the 1% AEP (large) event.

Print Date: 4/9/2021

Model Analysis Locations

WIllow Creek Watershed Study

City of Madison



Willow Creek Watershed

Existing Stormwater Pipe

Modeled Pipes in XPSWMM

Proposed Analysis Location (27)

Data Sources:
Storm System: City of Madison
Proposed 96" Pipe: KL Engineering

MSA

0 0.125 0.25 Miles

Printed By: ahancox, File: \\msa-ps.com\fs\Project\00\00373\00373093\GIS\00373093_ModelAnalysisLocations.mxd

Green Infrastructure Analysis - Willow Creek Watershed Study

Flood Elevation Results

Node	Ground Elevation	Existing						10% DCIA Disconnected						25% DCIA Disconnected					
		2-Year		10-Year		100-Year		2-Year		10-Year		100-Year		2-Year		10-Year		100-Year	
		Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Change	Elevation	Change	Elevation	Change	Elevation	Change	Elevation	Change	Elevation	Change
IN3854-054	986.74	984.43	0.00	986.75	0.01	988.09	1.35	984.21	0.0	986.18	0.0	988.10	0.0	983.83	0.0	984.66	0.0	988.02	-0.1
IN3558-006	983.90	983.16	0.00	985.48	1.58	985.98	2.08	983.08	0.0	985.43	-0.1	985.98	0.0	983.01	0.0	985.40	-0.1	985.94	0.0
AS3655-035	938.30	937.13	0.00	939.80	1.50	940.66	2.36	937.14	0.0	939.80	0.0	940.65	0.0	937.16	0.0	939.63	-0.2	940.62	0.0
AS3552-059	931.16	932.51	1.35	933.52	2.36	934.17	3.01	932.37	-0.1	933.42	-0.1	934.13	0.0	932.23	-0.3	933.16	-0.4	934.07	-0.1
IN3655-005	926.50	925.52	0.00	927.34	0.84	928.03	1.53	925.31	0.0	927.31	0.0	928.04	0.0	925.05	0.0	927.31	0.0	927.85	-0.2
TP3654-002	911.21	911.66	0.45	912.25	1.04	912.94	1.73	911.54	-0.1	912.26	0.0	912.94	0.0	911.33	-0.3	912.01	-0.2	912.81	-0.1
IN3652-013	901.54	903.23	1.69	904.40	2.86	904.92	3.38	903.06	-0.2	904.24	-0.2	904.92	0.0	902.65	-0.6	903.62	-0.8	904.76	-0.2
AS3851-006	897.67	899.55	1.88	899.98	2.31	900.71	3.04	899.54	0.0	899.98	0.0	900.70	0.0	899.50	0.0	899.94	0.0	900.67	0.0
AS3752-018	893.84	894.77	0.93	896.15	2.31	897.14	3.30	894.51	-0.3	896.04	-0.1	897.14	0.0	891.85	-0.9	893.57	-2.3	896.76	-0.4
IN3852-010	893.63	894.72	1.09	896.07	2.44	897.14	3.51	894.54	-0.2	895.87	-0.2	897.15	0.0	893.77	-1.0	894.85	-1.2	896.76	-0.4
AS3752-005	893.09	894.76	1.67	895.73	2.64	896.76	3.67	894.58	-0.2	895.69	0.0	896.74	0.0	888.79	-1.7	889.12	-2.6	896.29	-0.5
AS3751-003	890.10	891.16	1.06	891.90	1.80	892.65	2.55	891.01	-0.2	891.86	0.0	892.64	0.0	884.90	-1.1	887.61	-1.8	892.29	-0.4
AS3751-010	889.77	891.69	1.92	892.48	2.71	893.34	3.57	891.49	-0.2	892.43	0.0	893.32	0.0	890.69	-1.0	891.30	-1.2	892.93	-0.4
AS3951-019	889.35	890.69	1.34	890.87	1.51	891.09	1.74	890.70	0.0	890.86	0.0	891.09	0.0	890.68	0.0	890.87	0.0	891.09	0.0
TP3750-093	884.99	889.25	4.26	890.61	5.62	889.31	4.32	890.71	1.5	888.23	-2.4	891.63	2.3	879.34	-4.3	887.50	-3.1	889.15	-0.2
AS3750-012	884.20	886.62	2.42	887.21	3.01	887.92	3.72	886.46	-0.2	887.16	0.0	887.92	0.0	880.80	-2.4	882.23	-3.0	887.62	-0.3
BQ7	883.35	886.61	3.26	887.48	4.13	888.56	5.21	885.89	-0.7	887.45	0.0	888.51	0.0	881.10	-3.3	884.34	-3.1	888.10	-0.5
BG1	881.57	881.88	0.31	883.36	1.79	883.83	2.26	881.67	-0.2	883.05	-0.3	883.83	0.0	876.46	-0.3	881.69	-1.7	883.56	-0.3
TP3949-002	880.18	880.45	0.27	882.35	2.17	882.77	2.59	880.80	0.4	882.31	0.0	882.77	0.0	874.69	-0.3	880.49	-1.9	882.55	-0.2
AS3950-021	879.78	880.94	1.16	882.46	2.68	881.86	2.08	881.04	0.1	882.22	-0.2	882.10	0.2	873.43	-1.2	880.92	-1.5	882.53	0.7
AS3950-001	879.30	881.07	1.77	882.71	3.41	883.32	4.02	880.22	-0.8	882.64	-0.1	883.29	0.0	876.56	-1.8	880.12	-2.6	882.91	-0.4
AS3850-041	879.03	881.07	2.04	882.76	3.73	883.34	4.31	880.24	-0.8	882.69	-0.1	883.37	0.0	876.53	-2.0	880.14	-2.6	882.98	-0.4
AS4050-002	875.54	876.40	0.86	878.10	2.56	880.08	4.54	874.45	-0.9	877.93	-0.2	879.59	-0.5	873.00	-0.9	876.43	-1.7	878.78	-1.3
IN4050-040	874.68	873.98	0.00	878.04	3.36	880.02	5.34	873.84	0.0	877.29	-0.7	879.48	-0.5	872.66	0.0	873.44	-3.4	878.69	-1.3
AS4251-001	871.38	868.24	0.00	870.93	0.00	874.45	3.07	867.81	0.0	870.44	0.0	873.67	-0.8	866.85	0.0	868.23	0.0	872.80	-1.7
AS4251-022	870.26	866.59	0.00	869.74	0.00	871.00	0.74	866.26	0.0	868.32	0.0	870.28	-0.7	865.09	0.0	866.72	0.0	870.26	-0.7
IN4250-014	857.08	859.28	2.20	860.14	3.06	865.60	8.52	859.19	-0.1	859.83	-0.3	864.48	-1.1	858.75	-0.5	859.59	-0.5	861.36	-4.2

* Denotes a node were minor instabilities have occurred in the 1D model results.
* Flood Depths Reduced due to DCIA Reduction.
* Flood Depths Increased due to DCIA Reduction.

Green Infrastructure Analysis - Willow Creek Watershed Study

Pipe Flow Results

Pipe	Existing			10% DCIA Disconnected						25% DCIA Disconnected					
	2-Year	10-Year	100-Year	2-Year		10-Year		100-Year		2-Year		10-Year		100-Year	
	Flow (cfs)	Flow (cfs)	Flow (cfs)	Flow (cfs)	Change	Flow (cfs)	Change	Flow (cfs)	Change	Flow (cfs)	Change	Flow (cfs)	Change	Flow (cfs)	Change
IN3558-006_IN3558-001	100.9	132.2	132.0	89.3	-11%	129.4	-2%	128.7	-3%	86.7	-14%	129.0	-2%	130.1	-1%
IN3854-054_DT3854-006	60.2	90.4	102.3	56.3	-6%	83.8	-7%	102.3	0%	49.9	-17%	63.2	-30%	101.7	-1%
AS3655-035_DT3655-036	9.3	20.0	20.4	9.3	0%	20.0	0%	20.3	-1%	9.4	1%	19.9	0%	20.2	-1%
AS3552-059_AS3552-057	15.6	15.9	16.0	14.8	-5%	15.9	0%	15.7	-2%	12.3	-21%	15.5	-3%	16.1	1%
IN3655-005_IN3654-041	317.4	350.2	349.6	308.7	-3%	351.5	0%	351.3	0%	296.0	-7%	349.4	0%	353.4	1%
TP3654-002_IN3653-012	267.7	266.7	264.5	266.7	0%	265.9	0%	260.8	-1%	271.7	2%	264.7	-1%	261.1	-1%
IN3652-013_TEE5	312.1	324.8	288.7	303.5	-3%	313.8	-3%	279.5	-3%	290.1	-7%	332.8	2%	362.2	25%
AS3851-006_AS3851-001	9.8	10.3	10.6	9.9	1%	10.3	0%	10.6	0%	11.5	17%	12.1	18%	10.7	0%
AS3752-018_AS3752-056	29.6	49.9	51.9	30.2	2%	48.9	-2%	51.1	-1%	31.0	5%	38.3	-23%	51.1	-1%
IN3852-010_AS3752-022	18.2	22.0	22.5	18.7	3%	21.9	-1%	22.8	1%	18.9	4%	22.1	0%	22.8	1%
AS3752-005_TP3752-004	387.6	368.4	363.9	338.8	-13%	380.3	3%	399.0	10%	106.1	-73%	69.0	-81%	264.8	-27%
AS3751-003_AS3751-002	555.7	539.7	552.7	539.7	-3%	540.9	0%	552.7	0%	183.9	-67%	316.7	-41%	550.3	0%
AS3751-010_AS3751-017	9.5	9.2	8.5	9.4	-1%	9.3	1%	8.6	1%	8.5	-11%	9.1	-1%	9.0	5%
AS3951-019_AS3951-018	3.5	2.8	2.9	3.4	-2%	2.8	0%	3.0	1%	3.4	-3%	3.4	19%	3.0	0%
TP3750-093_TP3750-058	483.2	472.6	423.9	482.1	0%	457.3	-3%	464.0	9%	233.6	-52%	400.6	-15%	284.4	-33%
AS3750-012_AS3849-026	69.7	65.8	41.6	75.4	8%	50.0	-24%	54.7	32%	15.7	-78%	31.5	-52%	53.3	28%
BQ6_BQ5	39.6	38.5	37.7	38.0	-4%	38.5	0%	37.9	0%	6.3	-84%	20.4	-47%	37.9	1%
BG1_TP3849-005	440.9	431.5	428.6	489.5	11%	434.8	1%	430.8	1%	331.0	-25%	442.1	2%	441.8	3%
TP3949-002_TP3949-001	540.5	498.2	517.0	515.0	-5%	501.9	1%	528.0	2%	354.0	-35%	475.3	-5%	502.1	-3%
AS3950-021_TP4050-008	586.2	659.1	646.4	547.8	-7%	640.8	-3%	674.1	4%	370.7	-37%	484.2	-27%	658.4	2%
AS3950-001_IN3949-010	30.8	30.8	31.0	25.4	-18%	30.1	-2%	30.1	-3%	20.6	-33%	30.4	-1%	30.4	-2%
AS3850-041_IN3850-036	102.0	123.0	84.9	102.3	0%	117.9	-4%	89.4	5%	21.2	-79%	106.8	-13%	135.6	60%
AS4050-002_TP4150-004	585.3	560.7	537.5	525.3	-10%	667.1	19%	589.6	10%	404.7	-31%	571.9	2%	540.2	1%
AS4050-002_TP4150-004.1	542.8	769.9	717.4	536.8	-1%	764.7	-1%	721.5	1%	424.2	-22%	512.4	-33%	713.3	-1%
AS4251-001_AS4251-033	597.1	746.8	817.6	570.6	-4%	680.8	-9%	820.1	0%	451.8	-24%	571.5	-23%	743.2	-9%
AS4251-022_AS4251-016	643.9	731.2	846.2	612.0	-5%	715.6	-2%	837.4	-1%	479.9	-25%	641.3	-12%	796.9	-6%
IN4250-014_IN4250-013	4.8	4.1	6.3	6.1	27%	4.6	11%	6.4	2%	4.8	-1%	5.4	31%	6.3	0%

* Denotes a pipe were minor instabilities have occurred in the 1D model results.
* Flows Reduced due to DCIA Reduction.
* Flows Increased due to DCIA Reduction.

MSA Memo

To: Lauren Striegl P.E., City of Madison

From: Alistair Hancox P.E. & Eric Thompson P.E., MSA Professional Services

Subject: Willow Creek Watershed Study - Hydraulic Model Instabilities

Date: September 24, 2021

The purpose of this memo is to discuss the variability in modeling results across Existing and Proposed condition scenarios for the Willow Creek Watershed Study XP SWMM model. It has been known to MSA, and we have shared with the City, that 1D modeling results recorded at some locations within the model have identified rapid changes in pipe flow and water elevation. The model calibration process and the August 2018 simulation results give us confidence that the model is producing reliable outputs, irrespective of the 1D instabilities. The model results were also discussed with multiple Innovyze technical experts who also saw no reason for concern.

However, with the hope of producing a better product for the City, we have strived to reduce the occurrences of the instabilities as much as possible. Variables modified to increase stability were:

- Reducing the 1D Hydraulic timestep from 60 seconds to 1 second. Additional timesteps were tested (5 seconds and 0.5 seconds), but the best balance of model accuracy and simulation time was achieved with the 1 second timestep.
- Checking “Additional mass balance iteration” within the 2D Job Controls.

The main changes to previous model results can be observed in the smaller storm events. On the following page, images of both the Existing Conditions 2-year and 100-year simulation change in peak depth are shown. Raster depth changes of less than 0.1 ft are not shown on these maps. It should be reiterated that these images are not inundation maps, but the difference between the two versions of the peak inundation depth raster. We can see in Image 1 that the 2-year event produces less inundation along Midvale Blvd and University Ave, when incorporating the above modeling changes. The changes had little to no influence on the 100-year results. As the storm frequency reduced, the difference became less significant.

The 1D elevation results from the University Ave/Shorewood intersection give greater insight into why the peak inundation depths may have changed. See Figures 1 and 2 below. These show that with the smaller 1D timestep there is less oscillation between the spill elevation of the node (Ground Elevation) and the surcharged water level. There is a significant reduction in peak elevation during the 2-year event, but not during the 100-year event. The oscillations which occur when the node begins to surcharge are smoothed slightly in the revised model which is then reflected on the inundation depth result file.

As mentioned above, decreasing the 1D timestep does come at a cost to model solve time, which is why this was initially set high, at 60 seconds. Reducing this to 1 second, seems to add approximately 20 – 30% to model solve time.

Image 1 – Existing Condition 2-year Peak Depth Change

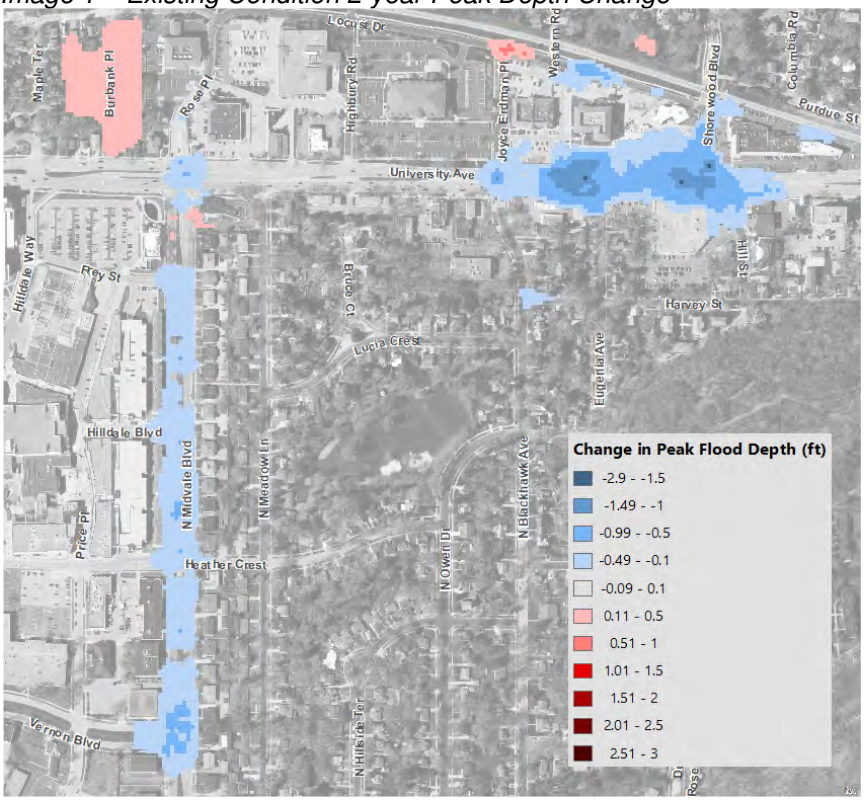


Image 2 – Existing Condition 100-year Peak Depth Change

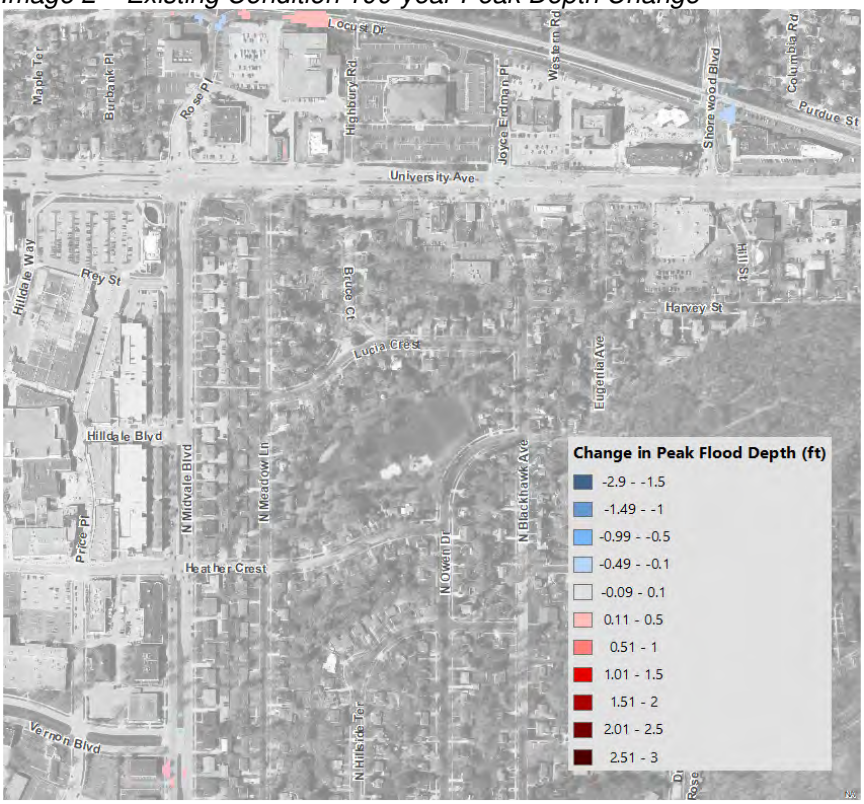


Figure 1 - Water Elevation Result at Node P900E (University Ave/Shorewood Blvd) during the 2-year Event

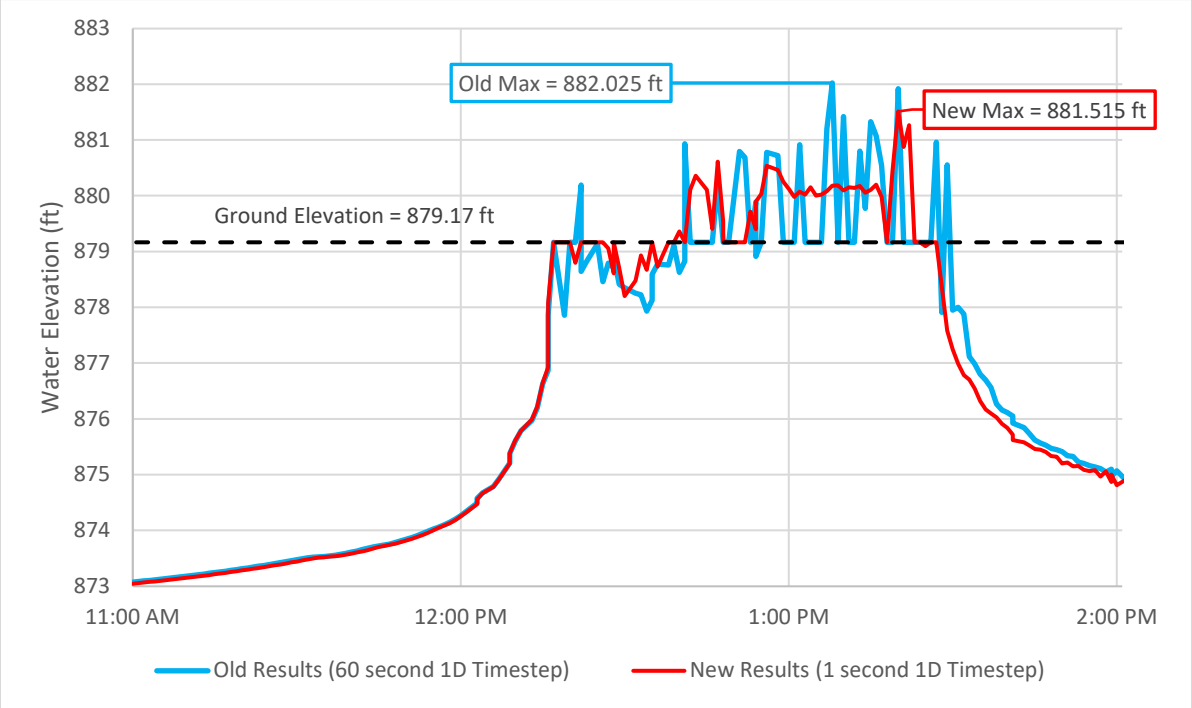
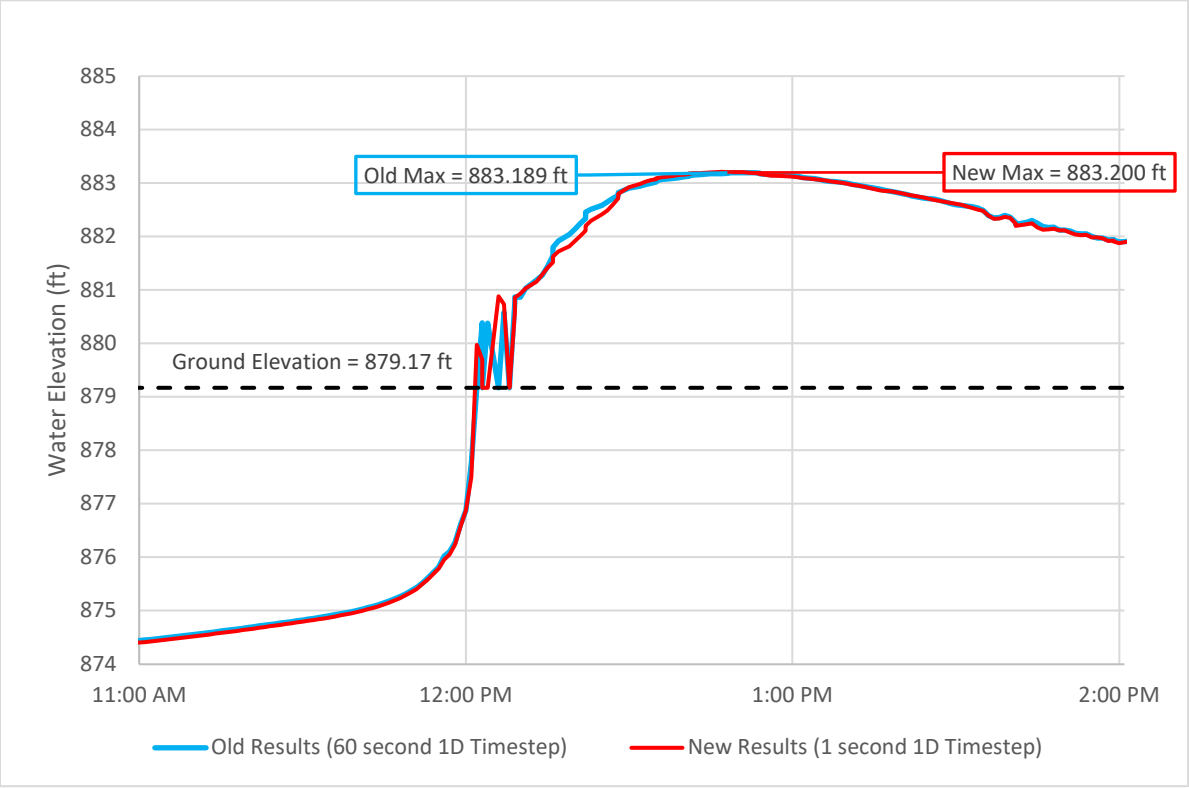


Figure 2 - Water Elevation Result at Node P900E (University Ave/Shorewood Blvd) during the 100-year Event



Appendix G. Meeting Summary – Meeting with Parks regarding Blackhawk Pond Reconstruction

Burger, Caroline

From: Burger, Caroline
Sent: Wednesday, December 8, 2021 8:13 AM
To: Knepp, Eric; Freiwald, Ann; Close, Sarah; Kane, Kathleen
Cc: Schmidt, Janet; Fries, Gregory; OBrien, Joanna; Lerner, Sarah
Subject: Engineering/Parks - Pheasant Branch Watershed Study - Blackhawk Pond Discussion Summary

Hello,

Thank you all for taking the time to talk about the proposed Blackhawk Pond mitigation measure for the Pheasant Branch Watershed Study last Friday.

Below is a summary of the discussion. Please let me know if there are revisions, or, if the summary reflects your understanding of the discussion.

The homes and streets around Blackhawk Pond experience chronic flooding issues in medium to large storm events. Many homes experienced significant flood damages during the August 2018 event. The results of the Pheasant Branch Watershed Study show that improvements to Blackhawk Pond can reduce and/or eliminate the flood risk during medium and larger storm events.

The majority of the improvements would occur on Stormwater Utility land and City ROW. However, to be most effective, some City Park land would be required. The proposal is to add additional wet weather storage to the pond by expanding the flood storage area south into City Park land. The current proposal is to add the storage where the current low mow/no mow area is located. And, if amenable, some of the excavated soil could be used to improve the current soccer fields, if they are in need of additional soil.

Parks representatives indicated they see no red flags to the proposal. There is currently a tennis court area sited for one of the proposed pond storage areas, however, Parks representatives did not think that would be going forward, and as such, expanding pond storage in this area should be acceptable.

Parks and Engineering representatives both agreed that, if the project goes forward, the improvements to the pond would also add Park amenities where feasible.

As a result of the discussion, Engineering will continue to include the Blackhawk Pond improvements as a flood mitigation measure for the watershed study. If/when the project begins, Engineering will work cooperatively with Parks staff on the improvements.

During the meeting, the improvements to Glen Oak Park, as well as a potential watershed study overview presentation to the Parks Commission, were briefly discussed. Follow-up discussions will be scheduled to further explore both of those topics.

Thank you,

Caroline Burger, PE, ENV SP
(she/her/hers) (what's this?)
Engineer 4
Engineering Division
City-County Building, Room 115
210 Martin Luther King, Jr. Blvd.
Madison, WI 53703

☎ Desk: 608-266-4913
✉ cburger@cityofmadison.com

Please note some City offices currently closed to the public due to COVID-19, but most staff is still working. See our website (link below) for the most up to date information on how to best continue working with each department.
https://www.cityofmadison.com/health-safety/coronavirus/service-updates

Appendix H. Water Quality Modeling Information

Wexford Pond Stage Storage

"Minimum" Project

North Pond	
Elevation	Area (SF)
967	66336
968	66895
969	177841
970	183353
971	201504
972	222939
973	233622
974	245948
975	257633
976	268441
977	278827
978	289905

Dredging and removing peninsula

South Pond	
Elevation	Area (SF)
969	18938
970	20522
971	27128
972	33946
973	37438
974	40859
975	44040
976	47094
977	50549
978	56052

Dredging Only

Areas are same as existing since we aren't altering the pond at all.

"Full" Project

North Pond	
Elevation	Area (SF)
965	10717
966	12589
967	165513
968	172880
969	180476
970	188183
971	197036
972	221573
973	233622
974	245948
975	257633
976	268441
977	278827
978	289905

Dredging, forebay installation, and removing peninsula

Area above 972 is same as above

South Pond	
Elevation	Area (SF)
965	7456
966	8618
967	15246
968	17700
969	20628
970	22949
971	25851
972	34635
973	37438
974	40859
975	44040
976	47094
977	50549
978	56052

Dredging, excavation to 967 and Forebay Installation

Area above 972 is same as above

Appendix I. Proposed Conditions Peak Water Surface Elevations and Peak Flows

Table I-1 Proposed Solutions Results

2-year, 24-hour MS4 Storm Event

			Existing Conditions		Proposed Conditions	
Recording Location	**SWMM Recording Line/Node**	**Location**	**Peak Flow**	**Peak WSE**	**Peak Flow**	**Peak WSE**
1	Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond	Outlet of Swallowtail Pond crossing Pleasant View Road	49	1,014.16	70	1,012.20
2	Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond	Target Pond Outlet (3 culverts) West to East Under Beltline	208	1,047.86	96	1,046.61
2b	TargetRelief1	Target Relief Pipe	N/A	N/A	173	N/A
3	2D Flow Line 104	Sauk Creek Greenway, Downstream of S High Point Road	255	1,038.60	392	1,038.43
4	*2D Flow Line 8*	*Sauk Creek Greenway, Downstream of Tree Lane*	*260*	*1,029.31*	*411*	*1,028.14*
5	*2D Flow Line 54/1D Node N_Wexford_Pond*	*Wexford Pond (middle)*	*342*	*976.35*	*102*	*974.61*
5b	1D Conduit AS2349-008_AS2349-011	Wexford Inflow from High Point Road	251	N/A	261	N/A
6	2D Flow Line 44	Culverts East to West under Beltline just downstream of Wexford Pond	378	972.40	279	970.96
7	Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond	Old Sauk Trails Business Park Ponds (middle)*	480	968.83	480	962.94
8	2D Flow Line 17	Watershed Outlet*	440	957.98	440	958.20

*Old Sauk Trails North Pond Outlet Structure will be designed to reduce flows to no greater than existing conditions peak flows

10-year, 24-hour MS4 Storm Event

			Existing Conditions		Proposed Conditions	
Recording Location	**SWMM Recording Line/Node**	**Location**	**Peak Flow**	**Peak WSE**	**Peak Flow**	**Peak WSE**
1	Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond	Outlet of Swallowtail Pond crossing Pleasant View Road	68	1,016.33	136	1,013.44
2	Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond	Target Pond Outlet (3 culverts) West to East Under Beltline	310	1,049.14	160	1,047.43
2b	TargetRelief1	Target Relief Pipe	N/A	N/A	278	N/A
3	2D Flow Line 104	Sauk Creek Greenway, Downstream of S High Point Road	376	1,039.22	602	1,039.07
4	*2D Flow Line 8*	*Sauk Creek Greenway, Downstream of Tree Lane*	*376*	*1,029.67*	*646*	*1,028.62*
5	*2D Flow Line 54/1D Node N_Wexford_Pond*	*Wexford Pond (middle)*	*521*	*977.29*	*273*	*976.52*
5b	1D Conduit AS2349-008_AS2349-011	Wexford Inflow from High Point Road	293	N/A	386	N/A
6	*2D Flow Line 44*	*Culverts East to West under Beltline just downstream of Wexford Pond*	*670*	*975.49*	598	972.06
7	Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond	Old Sauk Trails Business Park Ponds (middle)*	821	971.57	821	964.95
8	2D Flow Line 17	Watershed Outlet*	812	958.84	812	959.19

Table I-1 Proposed Solutions Results

25-year, 24-hour MS4 Storm Event

			Existing Conditions		Proposed Conditions	
Recording Location	**SWMM Recording Line/Node**	**Location**	**Peak Flow**	**Peak WSE**	**Peak Flow**	**Peak WSE**
1	Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond	Outlet of Swallowtail Pond crossing Pleasant View Road	176	1,016.65	189	1,014.34
2	Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond	Target Pond Outlet (3 culverts) West to East Under Beltline	385	1,050.45	210	1,047.99
2b	TargetRelief1	Target Relief Pipe	N/A	N/A	386	N/A
3	2D Flow Line 104	Sauk Creek Greenway, Downstream of S High Point Road	463	1,039.57	782	1,039.24
4	*2D Flow Line 8*	*Sauk Creek Greenway, Downstream of Tree Lane*	*473*	*1,029.92*	*839*	*1,029.01*
5	*2D Flow Line 54/1D Node N_Wexford_Pond*	*Wexford Pond (middle)*	*615*	*977.86*	*438*	*978.04*
5b	1D Conduit AS2349-008_AS2349-011	Wexford Inflow from High Point Road	309	N/A	527	N/A
6	2D Flow Line 44	Culverts East to West under Beltline just downstream of Wexford Pond	958	976.51	887	972.83
7	Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond	Old Sauk Trails Business Park Ponds (middle)*	1,295	972.52	1,295	966.60
8	2D Flow Line 17	Watershed Outlet*	1,299	959.66	1,299	959.74

100-year, 24-hour MS4 Storm Event

			Existing Conditions		Proposed Conditions	
Recording Location	**SWMM Recording Line/Node**	**Location**	**Peak Flow**	**Peak WSE**	**Peak Flow**	**Peak WSE**
1	Conduit N_PV_Road_Pipe and 2D Flow Line 11/1D Node North_Blackhawk_Pond	Outlet of Swallowtail Pond crossing Pleasant View Road	248	1,016.95	266	1,015.98
2	Conduit TO2255-024_TO2355-056/1D Node Junction_Ridge_Pond	Target Pond Outlet (3 culverts) West to East Under Beltline	497	1,052.52	281	1,048.84
2b	TargetRelief1	Target Relief Pipe	N/A	N/A	625	N/A
3	2D Flow Line 104	Sauk Creek Greenway, Downstream of S High Point Road	576	1,040.01	1,171	1,040.09
4	*2D Flow Line 8*	*Sauk Creek Greenway, Downstream of Tree Lane*	*591*	*1,030.22*	*1,230*	*1,029.57*
5	*2D Flow Line 54/1D Node N_Wexford_Pond*	*Wexford Pond (middle)*	*797*	*978.54*	*823*	*979.93*
5b	1D Conduit AS2349-008_AS2349-011	Wexford Inflow from High Point Road	394	N/A	819	N/A
6	2D Flow Line 44	Culverts East to West under Beltline just downstream of Wexford Pond	1,506	977.36	1,532	975.00
7	Ex 2D Flow Line 6 - Pr 1D OSTrStoNPond/OSTrSouthPond	Old Sauk Trails Business Park Ponds (middle)*	2,255	973.70	2,255	969.69
8	2D Flow Line 17	Watershed Outlet*	2,278	960.85	2,278	960.54

Appendix J. Planning Level Cost Estimates

Conceptual Cost Estimate - Old Sauk Trails Business Park Ponds and Greenways PB_1

v2021_10_08

BRIC Grant Estimate
$8,600,000

\\Gisserver\d\DESIGN\Projects\11981\Proposed Solutions\OSTrPonds\ForFEMAGrant\Sub-Application\04 Budget

Includes the following plus other misc items		Construction C	Design/Permitting Cost	Percent of Construction	Total Design/Permitting/Construction
Old Sauk Trails Ponds	PB_1_1	$ 2,823,500	$ 250,000	35%	$ 3,073,500
Old Sauk Trails East Greenway	PB_1_2	$ 1,539,350	$ 175,000	19%	$ 1,714,350
Driveway to OSTr Ponds (Culverts)	PB_1_5	$ 120,000	$ 25,000	2%	$ 145,000
Deming Way north of OSTr Ponds (Culverts)	PB_1_6	$ 1,509,975	$ 60,000	19%	$ 1,569,975
In OSTr Ponds (Culverts)	PB_1_7	$ 505,000	$ 75,000	6%	$ 580,000
Fourier Drive east of OSTr Ponds (Culverts)	PB_1_8	$ 1,004,925	$ 45,000	13%	$ 1,049,925
Deming Way SS (included in local sewer)		$ 458,950	$ 20,000	6%	$ 478,950
		$ 7,961,700	$ 650,000	100%	$ 8,611,700

	FEMA BRIC Grant Estimate:	$ 8,611,700	8611700
FEMA BRIC			$ -
Engineering	300000		
Permitting/We	350000		
Construction	7961700		
Deming Way SS	$ 458,950		
	$ 7,502,750		

Conceptual Cost Estimate - Deming Way west of OSTr Ponds (Culverts) PB_1_4

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 20,039	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	120	L.F.	$ 15	N/A	$ 1,800	
50226	UTILITY TRENCH PATCH TYPE III	267	S.Y.	$ 80	N/A	$ 21,333	Assume 20' wide trench
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB11	5'x10' BOX CULVERT	120	L.F.	$ 1,700	N/A	$ 204,000	
PB19	5'x10' / 6'x10' BOX CULVERT WING WALLS	1	EACH	$ 40,000	N/A	$ 40,000	
PB25	5'x10' / 6'x10' BOX CULVERT GATES	1	EACH	$ 15,750	N/A	$ 15,750	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	4	EACH	$ 4,000	N/A	$ 16,000	Counted 2 sewer/water/storm utility conflict/crossings; assuming same number of other utility conflict
				Subtotal		**$ 421,000**	
				Contingency	**25%**	**$ 106,000**	
				Design	**10%**	**$ 43,000**	
				Total		**$ 570,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 570,000**	

Conceptual Cost Estimate - Blackhawk Pond PB_3

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 246,485	Set to 5% of subtotal cost
20101	EXCAVATION CUT	131,800	C.Y.	$ 25	$ 15	$ 1,977,000	Reduced unit cost due to larger amount of excavation for project
20221	TOPSOIL	19,580	S.Y.	$ 9.50	$ 7.50	$ 146,850	Reduced unit cost due to larger amount of topsoil for project
20705	DETENTION BASIN SEEDING	19,580	S.Y.	$ 3	N/A	$ 58,740	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	19,580	S.Y.	$ 4	N/A	$ 68,530	
50226	UTILITY TRENCH PATCH TYPE III	16,000	S.Y.	$ 80	N/A	$ 1,280,000	Assume 10 foot wide trench to reconstruct storm sewer
50409	36 INCH TYPE I RCP STORM SEWER PIPE	1,600	L.F.	$ 175	N/A	$ 280,000	
50726	6'X6' STORM SAS	11	EACH	$ 9,500	N/A	$ 104,500	
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB3	DETENTION BASIN OUTLET STRUCTURE	1	EACH	$ 10,000	N/A	$ 10,000	
PB4	CLAY LINER	21,160	C.Y.	$ 40	N/A	$ 846,406	
PB39	CLEARING & GRUBBING	4	ACRE	$ 15,000	N/A	$ 60,668	
PB41	UTILITY CONFLICT ALLOWANCE	3	EACH	$ 4,000	N/A	$ 12,000	Assume storm sewer can be reconstructed on same alignment but will be a few conflicts due to larger pipe
				Subtotal		**$ 5,177,000**	
				Contingency	**25%**	**$ 1,295,000**	
				Design	**10%**	**$ 518,000**	
				Total		**$ 6,990,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation.
				Total Total		**$ 6,990,000**	

Conceptual Cost Estimate - Swallowtail Pond Reconstruction PB_2
v2022_01_25

Use draft estimate from Strand, will be updated as get further into design, added
$2,203,300

\\Gisserver\d\DESIGN\Projects\11981\Proposed Solutions\SwallowtailPond\Estimate

Conceptual Cost Estimate - Wexford PB_4

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 138,521	N/A	$ 171,449	Set to 5% of subtotal cost
20101	EXCAVATION CUT	84,100	C.Y.	$ 25	$ 15	$ 1,261,500	Reduced unit cost due to larger amount of excavation for project
20221	TOPSOIL	9,720	S.Y.	$ 9.50	$ 7.50	$ 72,900	Reduced unit cost due to larger amount of topsoil for project
20705	DETENTION BASIN SEEDING	9,720	S.Y.	$ 3	N/A	$ 29,160	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	9,720	S.Y.	$ 4	N/A	$ 34,020	
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB3	DETENTION BASIN OUTLET STRUCTURE	1	EACH	$ 10,000	$ 20,000	$ 20,000	Outlet structure assumed to be larger than typical pond outlet structure
PB4	CLAY LINER	18,910	C.Y.	$ 40	N/A	$ 756,400	
PB5	DREDGING	4,000	C.Y.	$ 45	N/A	$ 180,000	
PB39	CLEARING & GRUBBING	10	ACRE	$ 15,000	N/A	$ 150,000	
PB41	UTILITY CONFLICT ALLOWANCE	5	EACH	$ 4,000	N/A	$ 20,000	Assumed 5 conflicts for purposes of this estimate
PB49	PEDESTRIAN BRIDGE - 230 LF	1	EACH	$ 520,000	N/A	$ 520,000	
PB50	STORMWATER PUMP STATION - 4-12 CFS CAPACITY	1	EACH	$ 300,000	N/A	$ 300,000	
				Subtotal		**$ 3,601,000**	
				Contingency	**25%**	**$ 901,000**	
				Design		**$ 282,100**	Cost of current design contract
255253.1076				**Total**		**$ 4,784,100**	
				Land Acquisition		**$ -**	
428703.4211				**Wetland Mitigation**		**$ -**	Assume no mitigation.
88992				**Total Total**		**$ 4,784,100**	

Conceptual Cost Estimate - Sauk Creek Greenway Reconstruction, Stabilization
v2021_10_08

PB_5

Draft estimate from previous design work
$4,000,000

Conceptual Cost Estimate - Target Relief Pipe PB_6

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 391,659	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40101	CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 1	53,778	TON	$ 23	N/A	$ 1,236,889	Assuming 2 lanes (12' wide) will be reconstructed
40102	CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 2 OR NO. 3	4,889	TON	$ 23	N/A	$ 112,444	Assuming 2 lanes (12' wide) will be reconstructed
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	2,750	L.F.	$ 15	N/A	$ 41,250	
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB14	6'x12' BOX CULVERT	2,750	L.F.	$ 2,000	N/A	$ 5,500,000	
PB20	5'x12' / 6'x12' BOX CULVERT WING WALLS	1	EACH	$ 45,000	N/A	$ 45,000	
PB26	5'x12' / 6'x12' BOX CULVERT GATES	1	EACH	$ 16,500	N/A	$ 16,500	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	4	EACH	$ 2,500	N/A	$ 10,000	2 known connections plus 2 additional assumed connections
PB41	UTILITY CONFLICT ALLOWANCE	28	EACH	$ 4,000	N/A	$ 112,000	Counted 14 sewer/water/storm utility crossings/conflicts; assuming same number of other utility conf
PB48	CONCRETE PAVEMENT, 9 INCHES THICK	7,330	S.Y.	$ 90	N/A	$ 659,700	Assuming 2 lanes (12' wide) will be reconstructed
				Subtotal		**$ 8,225,000**	
				Contingency	**25%**	**$ 2,057,000**	
				Design	**10%**	**$ 823,000**	
				Total		**$ 11,105,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 11,105,000**	

Conceptual Cost Estimate - Old Sauk Road and Westfield Road Intersection Reconstruction PB_7

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment
50413	60 INCH TYPE I RCP STORM SEWER PIPE	660	L.F.	$ 250	N/A	$ 165,000	
50726	6'X6' STORM SAS	4	EACH	$ 9,500	N/A	$ 38,000	Assume 4 access structures
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB41	UTILITY CONFLICT ALLOWANCE	6	EACH	$ 4,000	N/A	$ 24,000	Count 3 sewer/water crossings/conflicts; assume 3 additional other utility conflicts
Other	STREET RECONST ESTIMATE FROM ENG STREETS					$ 1,132,600	
				Subtotal		**$ 1,435,000**	
				Contingency	**25%**	**$ 359,000**	
				Design	**10%**	**$ 144,000**	
				Total		**$ 1,938,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 1,938,000**	

Conceptual Cost Estimate - High Point Road west of Wexford Pond (Greenway Crossing) PB_8

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 26,023	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	200	L.F.	$ 15	N/A	$ 3,000	
50226	UTILITY TRENCH PATCH TYPE III	444	S.Y.	$ 80	N/A	$ 35,556	Assume 20' wide trench
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB9	4'x10' BOX CULVERT	200	L.F.	$ 1,600	N/A	$ 320,000	
PB18	4'x10' BOX CULVERT WING WALLS	1	EACH	$ 37,000	N/A	$ 37,000	
PB24	4'x10' BOX CULVERT GATES	1	EACH	$ 15,000	N/A	$ 15,000	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	2	EACH	$ 4,000	N/A	$ 8,000	Counted 0 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts
				Subtotal		**$ 547,000**	
				Contingency	**25%**	**$ 137,000**	
				Design	**10%**	**$ 55,000**	
				Total		**$ 739,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 739,000**	

Conceptual Cost Estimate - High Point Road from Sauk Creek to Wexford Pond (Greenway Crossing) PB_9

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 344,520	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40101	CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 1	1,516	TON	$ 23	N/A	$ 34,858	Assuming 2 lanes (12' wide) will be reconstructed
40102	CRUSHED AGGREGATE BASE COURSE, GRADATION NO. 2 OR NO. 3	1,378	TON	$ 23	N/A	$ 31,689	Assuming 2 lanes (12' wide) will be reconstructed
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	1,550	L.F.	$ 15	N/A	$ 23,250	
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB14	6'x12' BOX CULVERT	3,100	L.F.	$ 2,000	N/A	$ 6,200,000	2 parallel box culverts
PB20	5'x12' / 6'x12' BOX CULVERT WING WALLS	1	EACH	$ 45,000	N/A	$ 45,000	
PB26	5'x12' / 6'x12' BOX CULVERT GATES	1	EACH	$ 16,500	N/A	$ 16,500	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	8	EACH	$ 2,500	N/A	$ 20,000	6 known connections plus 2 additional assumed connections
PB41	UTILITY CONFLICT ALLOWANCE	12	EACH	$ 4,000	N/A	$ 48,000	Counted 6 sewer/water/storm utility crossings/conflicts; assuming same number of other utility
PB48	CONCRETE PAVEMENT, 9 INCHES THICK	4,130	S.Y.	$ 90	N/A	$ 371,700	Assuming 2 lanes (12' wide) will be reconstructed
				Subtotal		**$ 7,235,000**	
				Contingency	**25%**	**$ 1,809,000**	
				Design	**10%**	**$ 724,000**	
				Total		**$ 9,768,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 9,768,000**	

Conceptual Cost Estimate - Old Sauk Road Greenway Crossing PB_10

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 23,345	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	0	L.F.	$ 15	N/A	$ -	Cost included in Old Sauk Road/Westfied Road Intersection Reconstruction
50226	UTILITY TRENCH PATCH TYPE III	0	S.Y.	$ 80	N/A	$ -	Cost included in Old Sauk Road/Westfied Road Intersection Reconstruction
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB12	5'x12' BOX CULVERT	180	L.F.	$ 1,700	N/A	$ 306,000	
PB20	5'x12' / 6'x12' BOX CULVERT WING WALLS	1	EACH	$ 45,000	N/A	$ 45,000	
PB26	5'x12' / 6'x12' BOX CULVERT GATES	1	EACH	$ 16,500	N/A	$ 16,500	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	0	EACH	$ 2,500	N/A	$ -	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	0	EACH	$ 4,000	N/A	$ -	Assume 1 connection
				Subtotal		**$ 491,000**	
				Contingency	**25%**	**$ 123,000**	
				Design	**10%**	**$ 50,000**	
				Total		**$ 664,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 664,000**	

Conceptual Cost Estimate - Westfield Road (Greenway Crossing) PB_11

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 14,658	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	150	L.F.	$ 15	N/A	$ 2,250	
50226	UTILITY TRENCH PATCH TYPE III	250	S.Y.	$ 80	N/A	$ 20,000	Assume 15' wide trench
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB7	4'x6' BOX CULVERT	150	L.F.	$ 800	N/A	$ 120,000	
PB16	4'x6' BOX CULVERT WING WALLS	1	EACH	$ 28,000	N/A	$ 28,000	
PB22	4'x6' BOX CULVERT GATES	1	EACH	$ 9,000	N/A	$ 9,000	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	3	EACH	$ 4,000	N/A	$ 12,000	Counted 1 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts
				Subtotal		**$ 308,000**	
				Contingency	**25%**	**$ 77,000**	
				Design	**10%**	**$ 31,000**	
				Total		**$ 416,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 416,000**	

Conceptual Cost Estimate - Tree Lane east of High Point Road (Greenway Crossing) PB_12

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 41,136	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	160	L.F.	$ 15	N/A	$ 2,400	
50226	UTILITY TRENCH PATCH TYPE III	533	S.Y.	$ 80	N/A	$ 42,667	Assume 30' wide trench
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB13	6'x10' BOX CULVERT	320	L.F.	$ 1,900	N/A	$ 608,000	
PB19	5'x10' / 6'x10' BOX CULVERT WING WALLS	1	EACH	$ 40,000	N/A	$ 40,000	
PB25	5'x10' / 6'x10' BOX CULVERT GATES	1	EACH	$ 15,750	N/A	$ 15,750	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	3	EACH	$ 4,000	N/A	$ 12,000	Counted 1 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts
				Subtotal		**$ 864,000**	
				Contingency	**25%**	**$ 216,000**	
				Design	**10%**	**$ 87,000**	
				Total		**$ 1,167,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 1,167,000**	

Conceptual Cost Estimate - High Point Road south of Tree Lane (Greenway Crossing) PB_13

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 27,050	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	90	L.F.	$ 15	N/A	$ 1,350	
50226	UTILITY TRENCH PATCH TYPE III	300	S.Y.	$ 80	N/A	$ 24,000	Assume 15' wide trench
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB13	6'x10' BOX CULVERT	180	L.F.	$ 1,900	N/A	$ 342,000	
PB19	5'x10' / 6'x10' BOX CULVERT WING WALLS	1	EACH	$ 40,000	N/A	$ 40,000	
PB25	5'x10' / 6'x10' BOX CULVERT GATES	1	EACH	$ 15,750	N/A	$ 15,750	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	4	EACH	$ 4,000	N/A	$ 16,000	Counted 2 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts
				Subtotal		**$ 569,000**	
				Contingency	**25%**	**$ 143,000**	
				Design	**10%**	**$ 57,000**	
				Total		**$ 769,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 769,000**	

Conceptual Cost Estimate - Tree Lane west of High Point Road (Greenway Crossing) PB_14

v2021_10_08

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	N/A	$ 10,000	
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 25,009	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	80	L.F.	$ 15	N/A	$ 1,200	
50226	UTILITY TRENCH PATCH TYPE III	267	S.Y.	$ 80	N/A	$ 21,333	Assume 15' wide trench
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB13	6'x10' BOX CULVERT	160	L.F.	$ 1,900	N/A	$ 304,000	
PB19	5'x10' / 6'x10' BOX CULVERT WING WALLS	1	EACH	$ 40,000	N/A	$ 40,000	
PB25	5'x10' / 6'x10' BOX CULVERT GATES	1	EACH	$ 15,750	N/A	$ 15,750	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	4	EACH	$ 4,000	N/A	$ 16,000	Counted 2 sewer/water/storm utility conflict/crossings; assuming 2 other utility conflicts
				Subtotal		**$ 526,000**	
				Contingency	**25%**	**$ 132,000**	
				Design	**10%**	**$ 53,000**	
				Total		**$ 711,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 711,000**	

Conceptual Cost Estimate - Beltline downstream of Wexford Pond (Greenway Crossing) PB_15

v2022_01_06

DRAFT

Item #	Item	Quantity	Unit	"Average" Unit Cost	Revised Unit Cost	Cost	Reason for Adjustment/Notes
10701	TRAFFIC CONTROL	1	LUMP SUM	$ 10,000	$ 2,000,000	$ 2,000,000	Added significant cost due to Beltline location
10911	MOBILIZATION	1	LUMP SUM	$ 145,000	N/A	$ 190,084	Set to 5% of subtotal cost
20221	TOPSOIL	400	S.Y.	$ 10	N/A	$ 3,800	
20231	MEDIUM RIPRAP - GLACIAL FIELD STONE	50	C.Y.	$ 160	N/A	$ 8,000	
20704	INFILTRATION SEEDING	400	S.Y.	$ 3	N/A	$ 1,200	
21073	EROSION MATTING, CLASS II, TYPE C - ORGANIC	400	S.Y.	$ 4	N/A	$ 1,400	
40381	REMOVE AND REPLACE CONCRETE CURB & GUTTER, MACHINE PLACED - RESURFACING	353	L.F.	$ 15	N/A	$ 5,288	Placeholder for Beltline restoration over box culverts; additional costs included in Traffic Control
50226	UTILITY TRENCH PATCH TYPE III	1,175	S.Y.	$ 80	N/A	$ 94,000	Placeholder for Beltline restoration over box culverts; additional costs included in Traffic Control
PB1	EROSION CONTROL	1	LUMP SUM	$ 25,000	N/A	$ 25,000	
PB2	SITE DEWATERING / STORM CONTROL	1	LUMP SUM	$ 50,000	N/A	$ 50,000	
PB14	6'x12' BOX CULVERT	705	L.F.	$ 2,000	N/A	$ 1,410,000	
PB20	5'x12' / 6'x12' BOX CULVERT WING WALLS	3	EACH	$ 45,000	N/A	$ 135,000	
PB26	5'x12' / 6'x12' BOX CULVERT GATES	3	EACH	$ 16,500	N/A	$ 49,500	
PB40	MISCELLANEOUS STORM SEWER CONNECTION ALLOWANCE	1	EACH	$ 2,500	N/A	$ 2,500	Assume 1 connection
PB41	UTILITY CONFLICT ALLOWANCE	4	EACH	$ 4,000	N/A	$ 16,000	Assuming 4 utility conflicts
				Subtotal		**$ 3,992,000**	
				Contingency	**25%**	**$ 998,000**	
				Design	**10%**	**$ 400,000**	
				Total		**$ 5,390,000**	
				Land Acquisition		**$ -**	
				Wetland Mitigation		**$ -**	Assume no mitigation
				Total Total		**$ 5,390,000**	

Appendix K. Public Comments and Response to Comments

Pheasant Branch Public Comment Period – Comments and Responses

A 30-day Public Comment Period was held for the Pheasant Branch Watershed Study. The Public Comment Period ended September 2, 2022.

The City received a variety of questions and comments from residents. All comments and questions received are shown below with identifying information removed. Where questions were similar, the City copied the question received, then and provided a response below for each. Where a commenter provided multiple questions, responses are listed below each question.

Contents

Sauk Creek Greenway Stabilization 1

Report Figures 16

Status 16

Commenter 55 16

Commenter 56 18

Sauk Creek Greenway Stabilization

The majority of the comments provided were regarding the Sauk Creek Greenway Project. The comments are found below.

A general response and clarifications about the Sauk Creek Greenway project is listed below, and individual replies are in-line beneath each comment.

General Response:

The Sauk Creek Greenway project was initially proposed to address excessive erosion that occurs in this channel. The eroded materials find their way downstream and impact other waters such as the Wexford Pond and also the Old Sauk Trails Business Park greenway and pond. That water also eventually drains into the Pheasant Branch Conservancy. This channel was never engineered when it was dedicated to the public and needs to be repaired to solve the excessive erosion that occurs.

Being able to stabilize this channel, which was impacted in the 2018 flooding, is important to prevent further damage and tree loss in the areas immediately adjacent to the channel.

There was one public input meeting to date, held in March of 2018, prior to the historic and damaging flooding event that occurred on the west side. After that flood event occurred the project was halted to evaluate the channel from a flood perspective.

The purpose of the Watershed Study was to understand the causes of flooding and what can be done to reduce the flooding. Through the computer modeling, the City learned that using the Sauk Creek

Greenway for extensive stormwater storage (removing trees and creating new ponds within the greenway) will not significantly reduce flooding downstream. As such, that option is listed as "not recommended".

The recommended solutions resulting from the Watershed Study are high-level, conceptual solutions. They do not include many of the details the comments ask for including tree removal estimates, restoration plans or details on features unrelated to the flood study, such as a multi-use path. Those details are determined during the design process. The City expects to begin engagement in spring 2023 once there is a preliminary design to share. We appreciate your patience.

A fact sheet has been created about the design specifics of the Sauk Creek Greenway Restoration Project. You can view it here: https://www.cityofmadison.com/engineering/documents/projects/SaukCreekGreenway2022_10_17_FAQ.pdf

1. *With regard to the Sauk Creek stabilization, I strongly support the professional staff of the City and I am disturbed by the scare tactics and misinformation coming out of ad hoc groups of residents.*

   Response: Thank you for your comment.

2. *Removing trees from the greenway will not help a situation caused by a small culvert under Old Sauk Road. If water is allowed to move faster through this section, it will only overwhelm the ponds behind High Point church and cause more flooding in the Wexford Park neighborhood. Please consider alternative ways to mitigate flood damage upstream with modern water control techniques.*

   Response: The model shows that the greenway needs to be able to convey additional water as part of the overall suite of solutions for the study. The solution proposed at Wexford pond, and the pipe upsizing needed on High Point Road, Old Sauk Road and under the beltline all function together to reach the flood mitigation targets.

3. *There surely is a need to engage in Sauk Creek stabilization in the Sauk Creek Greenway. However it can and should be done carefully: stabilizing the bank and doing some stream back modifications at specific locations in the stream (not a wholesale channelization). There should be a limited targeted removal of trees aimed at removing current tree snags, trees on the bank that are likely to topple in the near future and limited careful harvest of a modest amount of other trees in the Greenway. The current forested nature of the Greenway is a textbook new generation storm water management practice. A forested canopy will have reduce erosion in the Greenway. If selective cutting is done it will allow natural regeneration. Retention of as many trees as possible consistent with the prime use of stormwater management is necessary and appropriate for the City to undertake to meet climate change and sustainability goals. The forested Greenway has the ancillary benefits of providing important urban wildlife. It is also important to have a conservatively designed maintenance road in the Greenway to permit access to do proper management of the stream and to allow access to do proper silvicultural management of the forest, such as removing trees that become downfalls. Be smart about the reconstruction. The aforementioned conservation and climate changes goal are complimentary to proper storm water management.*

Response: Thank you for your comment. Many of these suggestions will be utilized when the greenway is designed and you will have a variety of opportunities to provide feedback on the how these suggestions were implemented in the design.

4. *We are grateful for the work the city is planning to do in our Pheasant Branch Watershed to prevent floods like this! But we would hate to lose the wooded area right behind out house in this process. This green corridor was one of the main reasons we purchased this home many years ago. We enjoyed countless walks through these wonderful woods since – in all seasons! The woods protect us from the noise from the beltline. Please let us not sacrifice this green oasis during the much-needed flood prevention work. Especially - let us not sacrifice these woods for a bike path, which is not even necessary.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

5. *We've heard that the proposed "stabilization" will include the removal of more than half of the trees in the Greenway and the addition of a paved bicycle path. The loss of so many trees is contrary to the City's professed desire to keep green areas and protect trees. The loss of trees will increase noise levels from the nearby Beltline. Adding paved bikeway will dramatically change the character of the neighborhood and endanger walkers who frequently use the current unpaved paths/trails. Neighbors who have attended recent meeting (I note that most of the meetings listed above occurred 3 years ago) say that the nature and extent of changes (including the destruction of so many trees) was not made clear and only further investigation revealed that VERY drastic plans are being rushed through despite high levels of neighborhood dissatisfaction over the loss of trees and addition of paved recreational use bike paths -- a tradeoff that is at odds with the city's professed desire to protect nature rather than encourage more development and paving.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

6. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
   The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

7. *There are less destructive solutions than the proposed clearing of many of the trees.*

   Response: Thank you for your comment.

8. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects. - Why aren't the undersized underground stormwater drainage culverts being addressed first? Until larger stormwater drainage culverts under*

the beltline and High Point Road are replaced, the bottlenecks will continue and street and Westfield flooding will continue. - Cost!! $8-12 million dollars and we lose an incredibly valuable, beautiful urban woods forever. - Bikes and walkers do not mix well. Our homes/neighborhood were not designed with a bike path right behind them. The bike path's close proximity to houses will negatively affected neighborhood since it was not in original neighborhood plan.

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
Additionally, the Sauk Creek greenway project was previously budgeted due to the erosion issues within the channel, so there is already some funding available to address this part of the suggested Pheasant Branch Watershed Study solutions.
The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

9. *I am very concerned about three aspects: the number of trees being cut down in the greenway; the proposal to add a bike path to the greenway; and the proposal to connect the bike path to a bike path in Wexford Park.*

   Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

10. *I would like to have a more thoughtful approach with planning so that the maximum number of trees are saved in our area. I would like this urban woodland to remain an urban woodland. This would include saving as many trees as possible and making sure that May path that is created remains as natural as possible.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

11. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects. Why aren't the undersized underground stormwater drainage culverts being addressed first? Until larger stormwater drainage culverts under the beltline and High Point Road are replaced, the bottlenecks will continue and street and Westfield flooding will continue. - Cost!! $8-12 million dollars and we lose an incredibly valuable, beautiful urban woods forever.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
    Additionally, the Sauk Creek greenway project was previously budgeted due to the erosion issues within the channel, so there is already funding available to address this part of the suggested Pheasant Branch Watershed Study solutions.
    The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

12. *1. Minimize tree removal in the Sauk Creek Greenway Project. 2. Develop project like Owen Woods Park that spared hundreds of trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

13. *I understand that regarding the Sauk Creek greenway is necessary to prevent further eroding and flooding. However, I am VERY concerned about the wording used in the plan (along the lines of healthy trees will be preserved if possible). This forested area is an urban oasis and is home to a variety of wildlife. I am worried more trees than desired will be removed, leaving us with an open space instead of our cherished wooded walking space.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

14. *Keep the trees*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

15. *In contrast to verbal assurances that existing tree preservation would be given a high priority, report text is disturbingly vague. The density of trees and the resulting canopy make this space a sanctuary for many people. I urge you to explicitly give tree preservation a top priority in this report, and in your follow-up actions. There are model greenway-park areas in Madison and statewide, Owen Park being an example, which show it is possible to achieve water control and a tree-rich environment which welcomes the public to enter. I also urge you to not include a bike path in your solution, as this will only add noise and bike-pedestrian conflict in the narrow space available.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

16. *There is no need to destroy all the trees in the greenway! Leave the greenway alone and find another project that would benefit from the ridiculous amount of money being provided to destroy our greenway.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

17. *Need to save as many trees as possible for wildlife, beltline sound barrier, birds, environment/climate, incredible beauty and serenity the woods provides. Too many trees were removed in the two previous upstream projects. Additionally, I don't see how removing a lot of trees is going to help environmentally as we know that trees help prevent flooding and provide huge benefits to the ecology of an area.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

The trees that were removed in the upstream projects were highly invasive, non-native, and/or unhealthy. The restoration of these projects utilized native vegetation to promote high-quality habitat.

18. *1. To begin with, the Sauk Creek Greenway budget is missing from the report. It also states the $4M is based on the previous design work. Can you explain what previous design work-the neighbors have not seen a design yet? 2. Can you please update the report with this missing information? 3. The two Federal wetlands are not mentioned in the report. The one that is by my house is not working at all given the sewer road that was installed through it; if it were fixed such that the water could drain properly into it, then it can house/hold any excess water and save some trees by doing so. This would be a cost effective solution. 4. The piping in the channel near my house and the federal wetland is clogged with debris/trees. I believe the piping leads into the wetland or an underground storage tank. This was not mentioned in the report; fixing it would be a cost effective solution to move water to the wetland and/or underground tank nearby. 5. The large freshwater emergent federal wetland near High Point and Old Sauk could be deepened to hold more water, if it is not a jurisdictional wetland and subject to 404 regulations. 6. There was no focus group for the Sauk Creek Greenway since there was no flooding to the houses near the channel in 2018. Therefore, no community input for the Sauk Creek Greenway is in the report. 7. With no flooding in 2018 to houses near the channel, then why should the trees pay the price for root cause upstream and the undersized culverts in High Point Road and the beltline. Until these culverts are addressed/fixed first the flooding problem with not be addressed. 8. Madison is a Green city. It would be horrible if thousands of trees were removed in Sauk Creek without considering other solutions. Thank you for your consideration*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. Your questions about the wetlands, which are where the existing ponds are, are answered in the FAQ as well. To note, the amount of water flowing down the greenway would fill up the pond area very quickly, even if it was maximized. Therefore it is possible that the pond areas could be a part of the solution, but there is not enough space in the pond areas to make them big enough to prevent doing any work within the greenway.

19. *I am very concerned about the proposed tree removal of the Sauk Creek Greenway project. This is important for wildlife, to keep the noise level from the Beltline down, and it's a very beautiful area. It would be much better if the city developed a project to spare the trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

20. *Any solution should require community engagement in the design of the proposed. This his has not happened. Several residents met with the Mayor on this and asked about community engagement, she said the engineering department would hold a public meeting to discuss the project. There is a vast difference between a public meeting and public engagement. A public meeting is where Engineering will come in with their design, let the community vent for two hours, which allows them to say they held public comment, and then they do what they were going to do before the meeting ever took place. Public engagement is where the public is invited to provide feedback into the design process, which is usually a multiple step process, and results in a collaborative design between the needs of the city and the residents being impacted. That is what is needed with this project. Get the Community engaged in helping to design the final project plan for this greenway. For everyone that*

lives in the area, the impact of a clearcutting of the greenway would have negative impacts on most people who live in the area. The trees and ground vegetation in forest ecosystems slow water movement and help stabilize soil. Prevention or reduction of soil erosion helps reduce sedimentation type pollution. Trees reduce the effect of erosive forces using their root systems and foliage. Tree roots begin as thick stems that branch into fine filaments to create a network of flexible tendrils that help stabilize the soil around the tree and hold it in place. The leaves and branches of trees create a flexible screen that reduces the force of wind and rain in the surrounding area. There have been numerous studies published on the negative financial impacts that occur on property values when adjacent or proximal green space is removed. The loss of so many trees would impact our local environment causing higher daily pollution counts and higher temperatures, let alone the impact on the entire city. As an environmentally friendly city, it is counter intuitive to me that they don't take a more surgical approach to the removal of established and healthy trees that remove a substantial amount of carbon from the air. The loss of habitats. The greenspace is home to many species, and they would be displaced or lost. This habitat adds to the uniqueness of this area, and it would be a shame to lose that. Last, you have significant expertise that live in this area, engage them in the process to develop a win-win solution for the city and the residents.

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

21. *Please don't remove trees. We need them.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

22. *Tree preservation, concern for property. Again excessive tree removal*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

23. *Very concerned about the number of trees being proposed to be cut down.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

24. *The proposed mitigation is very hard to find in the content provided online. My understanding is that the mitigation plan is to remove most of the trees in the Sauk Creek area. This is a mistake. Studies show that a healthy tree canopy provides numerous environmental benefits, including reductions in stormwater runoff, air pollution and greenhouse gases. Please see this report: https://www.cityofvancouver.us/sites/default/files/fileattachments/public_works/page/1125/cityofvancouver_watershed_health_assessment_finalreport2019.pdf*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

25. *No flooding on Sauk Creek Cir. during 2018 event. Sauk Creek Circle is the lowest lying area along the greenway. Flooding took place in the intersection of Old Sauk Road and High Point Road due to the culverts being covered in debris. The report noted that the Sauk Creek Greenway is one of only a*

few forested areas in the watershed. It should be vital to maintain of the "few forested areas in the watershed."

Response: The flood model showed flooding without debris clogging the culverts. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions including how tree preservation would be balanced with the other goals of the project.

26. *It is important that we are environmentally friendly in any storm water projects. The Sauk Creek greenway is also important wildlife habitat that helps link other small patches of ponds and parks.*

    Response: Thank you for your comment.

27. *Please minimize the removal of trees along this greenway. One solution would be to make the Sauk Creek deeper with minimal widening so more water could be moved during and after storms. Another solution is to clean out and repair retention ponds so they perform their intended function. The city is capable of creating a functional and pleasing greenway, as evidenced by what was done in Owen Park.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. The City will work to decrease the footprint of the channel as much as possible, while still designing a stable channel, in order to preserve more trees.

28. *I want to comment on plans for the Sauk Creek Greenway Stabilization project (p. 58?). I think there needs to be more consultation with the neighborhoods affected, and also consultation between the Engineering Department and the Parks Department (and any other appropriate city entities) on this project. I have lived in my home for 34 years, and was the second president of the Sauk Creek Neighborhood Association. I have appreciated the joys and benefits of residing in the Sauk Creek Conservancy area, have enjoyed and appreciated its natural beauty and have marveled at the wildlife, plants, etc. that have made the conservancy area their homes over the years. As Neighborhood President, I worked with the Parks Department, the Engineering Department and other city entities to try to ensure that the area retained and enhanced its beauty and attractiveness while working together to address some of the issues that arise in a neighborhood--parks, traffic, noise, soil erosion, etc. At this point, I have attended a few meetings recently to try to gain a better understanding of what is proposed. I have listened to some discussions and reviewed the proposal. There are definitely certain changes needed. At the moment, there are dead trees that are clogging the creek's natural flow, which need to be removed. The creek running through the greenway needs to be dredged and deepened, the slopes need to be stabilized to prevent erosion, the detention ponds need to be dredged, and the storm pipes have to be fixed so that they can become operational. Nonetheless, I have some concerns: • First, a substantial number of trees are likely to be removed. A recent tree inventory showed that there are 5,595 trees in the Greenway. It is estimated that 50% will be removed for the new straightened drainage channel, the graded banks on each side of the drainage channel, and for the maintenance path. (Question: Can trees that are located on banks help prevent further erosion, as well as help reduce carbon emissions that are part of the climate change issue? And does the drainage channel have to be straightened in terms of the speed and power that will occur with a straight line channel versus having some natural bends and flows? Finally, does the maintenance path have to be expanded to include a proposed bicycle path*

that will result in even more trees being removed when bicycle improvements and lanes have been established recently in the areas that surround the Greenway?) It is also estimated from the tree inventory that only 976 of the 5,595 trees are considered to be "quality trees." (There are some "noxious trees"—box elders, buckthorns, et. al. that should be removed.) All in all, there are estimates that by the completion of the project up to 80% of the trees may eventually be removed. If there is any doubt, the area that is behind the Walgreen's store on Mineral Point Road reflects how the Sauk Creek Greenway might look. • Second, there does not appear to be much substantive discussion or coordination between the City Engineering Department and the Parks Department, or between the city departments and the neighborhoods on the project. The Engineering Department might send a postcard alerting you to some work in the area and the opportunity to express concerns. However, the project is generally ready to go. A few decades ago, we met with the Engineering Department when the detention area, berm, storm pipes and service path near the Old Sauk Road/High Point intersection were in the final planning stages before construction. The engineer assured us our concerns regarding the oak trees, water flows, storm pipe effectiveness, etc. would be taken care of. I appreciate his commitment and sincerity. However, in the first week, the contractors came in and immediately removed two giant oak trees, and the sizes of the storm pipes subsequently were not large enough to handle the water flow effectively. I might add that the City Engineering Department has recently requested the authority to allow staff to remove or prune trees in city greenways when necessary. Based on past experience, these decisions are likely to be made on the spot or with either token or no neighborhood input. I appreciate the opportunity to provide input and a long-term neighborhood perspective. Thank you.

Response: Thank you for your comments. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to many of the questions you asked. A few additional things to note—there is no estimate that 50% of the trees will be removed. Additionally, the channel will not be straightened. While the exact shape of the channel is unknown (depth and width), it will primarily be located along the same alignment as the current channel. This will reduce the amount of tree removals needed.

29. *Page 58 provided little information on the Sauk Creek Greenway project, so specific comments are very difficult. It seems like you are just checking off the box that says you allowed community input, but we have no plans to respond to. What are the plans for the broken retaining pond behind St Lawrence Circle? Do you plan to dredge the Highpoint Rd/Old Sauk retaining pond? It seems very shallow. With 80% of trees in the inventory deemed poor quality, will we have many trees left after the large machinery leaves? If you lived along these woods, you'd understand why we are so passionate to want to save it so much!! Mature trees are magnificent and do so much for us. Just look at the grass and see where it is brown and where it is still lush green under the trees. Two upstream projects, and Nautilus Point Park removed too many trees and unfortunately you have lost the communities' trust. This beautiful, urban woods needs to be respected and preserved as best as possible. We do not support a bike path in this greenway. We are concerned the bike federation has so much power and citizens do not. That is not democracy, that is lobbying. I have neighbors trying to decide if they should sell and move out of Madison, before they have a bike trail outside their bathroom windows, much less the increased tax assessments. Why not work with upstream commercial properties (who caused the problem) to add more retaining ponds, ditches, Restorative Stormwater Conveyance systems, etc. That option seems to be tossed aside. Better PR is needed to provide more information for the community. People who feel helpless/unheard get anxious and this has caused divisions and mistrust in Madison government that did not need to occur. Patting us on the head and saying it's all going to be fine, "We are engineering experts", then seeing upstream*

projects completed that took out so many trees, has caused the community to be very upset. Please create a great tree saving plan and save the Sauk Creek trees/wildlife and climate. Each of these projects, that cut down mature trees, does affect climate and heat zones, one tree at a time. This woods is a blessing to so many, across all socio-economic classes. The community needs more calm, safe areas to decompress and commune with nature that prairies do not provide. Please tell us what you are planning and help us understand why. Thank you.

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. The comment period of the Pheasant Branch Watershed Study Draft Final Report was intended to allow community input on the Sauk Creek Greenway as a conceptual solution in relation to the watershed study solutions—that the greenway will need to accommodate greater flows of stormwater as flooding is mitigated in other areas of the watershed. There will be specific engagement on the Sauk Creek greenway project once the project is re-started. At that point, the City would provide a more detailed design for the community to provide feedback on. Additionally, at that point the City would be able to have an estimate of how many trees may be removed based on the initial design as well as general information about the restoration goals and long-term maintenance of the greenway. The City anticipates that there will be variety of opportunities for residents to provide feedback, and that this process would last the majority of 2023.
All upstream development was constructed in accord with the requirements in place at the time of development (as was the development along the channel). Stormwater requirements have increased significantly since the first ordinance that was put in place in 1983. Functionally, lands east of the channel had no stormwater management requirements, and lands west of the channel to the beltline had to meet the very first iteration of stormwater requirements. Development of lands west of the beltline have met ever more stringent requirements as the lands move west. In regards to solutions on upstream lands, the City does not have the ability to mandate that upstream commercial properties fix downstream flooding issues. However, when properties re-develop, additional redevelopment requirements are in place. Madison is one of only two (2) municipalities with redevelopment requirements in the State. For information about future development and redevelopment of commercial properties, please see the Watershed Study Learning Hub and view the "New Development/Re-Development Flood Prevention" topic or visit the Development Services Center and view the "Storm Water Management" topic.

30. *Minimize tree removal in the Sauk Creek Greenway Project Develop this project like Owen Woods Park that spared hundreds of trees. Minimize tree removal.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

31. *I'm sad to hear that part of the forest will be destroyed for a bike path that is not needed. I'm a HUGE road and mountain cyclist and really do not see the value in adding a 0.5 mile stretch of path that doesn't connect up with any other major bike paths. There are owls in the woods, it's beautiful, a path is not needed.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

32. *Minimize tree removal in the Sauk Creek Greenway Project Develop this project like Owen Woods Park that spared hundreds of trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

33. *Please minimize tree removal in the Sauk Creek Greenway project and develop this like the Owen Woods Park project that spared hundreds of trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

34. *Minimize tree removal in the Sauk creek Greenway Project*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

35. *Sauk Creek Greenway Reconstruction, maximize tree retention. Native tree cover in place over time has produced "natural habitat" for wildlife including mammals, birds, salamanders and the like as well as insects and soil inhabitants. Given that destruction of some habitat is necessary to reshape and stabilize the waterway, I would like to see native trees outside the bank stabilization zone retained. If trees need to be destroyed to allow equipment access it would be advisable to prioritize native trees for retention and invasives like locust and buckthorn removed. In addition, the notion of allowing bike riders in close proximity to/on walking trails is dangerous to both types of users.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

36. *Minimize tree removal and destruction of natural habitats, look at other methods to control runoff with native grass species in areas other than just the greenway, we have a river running thru some of the houses, this all ends up multiplying the impact on the greenway.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.
    Additionally, you can find more information on Green Infrastructure and Watershed Studies at please see the Watershed Study Learning Hub and view the "Green Infrastructure/Water Quality/Ecological Information" topic.

37. *The lack of a plan, or perhaps lack of transparency, is concerning. Can the woods be preserved? If preservation is not a priority, why isn't it?*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions. The City will share details about the design once there is something for the community to provide feedback on. Preservation of the woods is a priority to the City.

38. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen*

many species of birds, some of which I believe to be rare in this area. We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

39. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen many species of birds, some of which I believe to be rare in this area. We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

40. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen many species of birds, including wild turkeys and the Yellow-throated Warbler (currently listed as endangered in Wisconsin). We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

41. *Please minimize the tree removal in the Sauk Creek Greenway Project. I understand this is possible based on other projects like the Owen Woods Park project that spared hundreds of trees. I have seen many species of birds, including wild turkeys and the Yellow-throated Warbler (currently listed as endangered in Wisconsin). We would like to preserve this habitat as much as possible. Please do not install a bike path in this greenway as it would substantially impact the habitat not to mention the nearby residents.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

42. *I am concerned that this project may remove an unnecessary amount of trees on the Sauk Creek. If the city proposes to take out as many as it did for the southern length (behind Walgreens on Mineral point) then I oppose this approach. The amount of trees removed was excessive and it seemed entirely possible to leave twice as many while still having access to the stream for construction purposes. The greenway is very important to me and many others in the area. We would hate to see the canopy removed. Please consider this when making decisions about tree removals.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

43. *I am very concerned with human impact on climate and nature. It is highly preferable to minimize tree removal in the Sauk Creek Greenway Project, and to have a strong plan for sparing trees and replanting in a way that preserves the environment. Thank you for your consideration.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

44. *I object to the removal of non-invasive trees and distraction of this creek forest. It is important to wildlife and conservation of natural habitats. Please work to preserve as much of this sanctuary as possible. Work with neighbors and parks district to assure the character of this space is protected.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

45. *A mountain biking loop will not correct any ongoing issues, Thin out the trees obviously here and everywhere else they have been neglected. Too residential for proposed mountain biking loop! Already too much congestion and not enough parking, just like the rest of Madison. Dog park will be a waste of time w/ excess traffic on a residential street.*

    Response: The single track project is proposed on Park land and is not related to the watershed study.

46. *Clearly the Sauk Creek Greenway needs to be cleared of debris, including fallen trees, original farm wind mill fan, etc. That debris has caused erosion on the bank as water from larger storms rerouting. However, the houses on the Tamarack Community side of the creek that experienced damage from the 2018, 11" rain revived water from poor water control and plugged sewers on Tamarack Property, not the condition of nor the capacity of Sauk Creek. That night Sauk Creek carried all the water collected from the drainage south of Tree Lane and Tamarack without flooding Tamarack. All of the neighbors bordering this end are concerned about the planned removal of trees and other vegetation that provides both sound and visual screening for our neighborhoods. I and my neighbors understand that invasive plant removal is long overdue, but we have several concerns with the report: 1. Unnecessary removal of many mature trees not obstructing water flow in the Creek. 2. No plan to replace/replant trees and understory in order to replace the current sound+visual screen trees and vegetation provide. 3. A lack of plan for follow up maintenance of Sauk Creek. 4. No mention of the purpose/need for adding a bike trail along the Creek.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

47. *We want you to spare trees and maximize greenery and healthy ground cover. The woods are a source of enjoyment for families, a safe place for animals, and necessary for our ecosystem. We don't want it destroyed.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

48. *Minimize tree removal in the Sauk Creek Greenway Project & Develop project like Owen Woods Park that spared hundreds of trees.*

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

49. *I am writing this letter in opposition to the City of Madison's current reconstruction plan for the Sauk Creek Greenway, and instead encourage the development of a more ecologically friendly approach to improve the stormwater situation at the Sauk Creek Waterway. Such an ecologically responsible plan should not significantly disrupt the greenway's rich diversity in ecological habitats (southern hardwood forest, prairie/savannah, wet prairie, floodplain forest, pine plantation, and black locust), abundant population of 5,595 trees across 25.4 acres, wildflower diversity across its wet prairies, and winter habitat for wildlife across its pine plantations. My family lives at 317 Sauk Creek Drive. I would like to take this time to explain my qualifications to justify my viewpoint. I am the Director and Senior Scientist of the Nelson Institute Center for Climatic Research at the University of Wisconsin-Madison, where I have worked for 20 years. I am a member of the Climate Working Group of the Wisconsin Initiative on Climate Change Impacts (WICCI). I hold a PhD in Atmospheric Sciences from the University at Albany. To clarify, I am not writing this letter to express the views of UW-Madison or WICCI but from my own perspective, given my vast expertise in regional climate change and its impacts on terrestrial and aquatic ecosystems. According to Governor Evers' Executive Order #52 (https://evers.wi.gov/Documents/EO/EO052-ClimateChange.pdf), "climate change is a grave threat to the health, safety, and economic well-being of people and communities throughout the State of Wisconsin." The executive order established the Governor's Task Force on Climate Change, with the charge to "assess the best-available scientific research from both state and national sources to evaluate the impacts of climate change on the state's citizens and environment," to "work with the University of Wisconsin System, the Wisconsin Technical College System, other state educational institutions, and Wisconsin's business community," and to "work with the Wisconsin Initiative on Climate Change Impacts (WICCI) and the University of Wisconsin Nelson Institute for Environmental Studies to update and re-issue the WICCI's 2011 report, 'Wisconsin's Changing Climate: Impacts and Adaptation." This effort led to the "2021 Assessment Report: Wisconsin's Changing Climate." The 2021 WICCI report recommends the following actions: (1) Wisconsin should "maintain and expand forest cover and urban tree canopy, targeting lands that offer the greatest potential for continued carbon storage and sequestration." (2) Wisconsin should "improve resilience to increasing precipitation and flood events that cause nutrient and sediment runoff by avoiding…natural vegetation conversion to…urban development." (3) Wisconsin should "preserve and protect large tracts of land for wildlife, implement habitat management changes to provide food and cover for wildlife that align with expected future climate conditions…" (4) "Large canopy trees can play a big role in helping urban areas become more resilient to climate change. A diverse tree canopy, both in terms of age and species type, can not only make cities more resilient as the climate changes, but can also cool urban landscapes and capture and slow runoff during extreme rain events." (5) "Forests…provide a unique opportunity to address climate change because they can both reduce concentrations of greenhouse gases while simultaneously providing essential social, environmental, and economic benefits. Forests are a natural carbon sink that absorb 10-15 percent of our nation's greenhouse gases." At the county level, the Dane County Office of Energy and Climate Change issued the "2020 Dane County Climate Action Plan: Today's Opportunity for a Better Tomorrow" (https://daneclimateaction.org/climate-action-plan#Download%20Here). Within the sector of forestry, the report focuses on strategies to "keep forests as forests", "create new forests through reforestation and afforestation", "manage existing forests", "protect, maintain, and increase urban forests", and "increase the use of forest products". The report states that: (1) "Dane County will encourage land use planning that maintains existing forest canopy…" (2) The "Office of Energy & Climate Change will work with*

cities and villages in Dane County to increase public investments in restoring, maintaining, and expanding urban forests, particularly to address insect and disease impacts." At the City of Madison level, "The Madison Sustainability Plan: Fostering Environmental, Economic and Social Resilience" report urges city planners to: (1) "minimize loss of tree cover and green space in public rights of way" (2) "promote, expand and replace tree canopy trees whenever possible and encourage landowner collaboration on strengthening tree canopy and woodlands" (3) "create and adopt strategies and requirements to minimize urban heat islands, optimize carbon sequestration and promote water retention (e.g., green roof, bio swales, urban tree canopy, vegetative parking)" To summarize, the environmental marching orders from the state, county, and city are clear that urban green spaces, such as the Sauk Creek Woods, should be protected in order to minimize the urban heat island effect, support carbon sequestration and lower concentrations of atmospheric greenhouse gases, reduce runoff from increased intensity precipitation events, foster biodiversity, and continue to provide shelter and food to wildlife. I urge the City of Madison to develop an alternative plan to clean up the Sauk Creek Greenway that does not involve significant loss of trees and natural habitats.

Response: The City values urban forests as a resource both for climate resiliency as well as for habitat and biodiversity. We will be working to mitigate the impact to the woods while balancing the stormwater conveyance needs within the channel. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

50. *Minimize tree removal in Sauk Creek Greenway Project. Do tree removal like Owen Woods that saved many trees.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

51. *Our duty to protect of the environment and the mayor's plans for more trees in the city mandate that a critical mass of the trees in the Sauk Creek Greenway remain. The creek needs repair. Many invasive species need to be removed. However, the city engineering plans for Sauk Creek Greenway Stabilization that call for excessive widening of the creek, erosion controlled by grasses on the banks rather than trees, more retention ponds in the greenway, a bike trail, and no attention for the current quality trees along the banks that need help to survive erosion challenges are great concerns. We cannot thoughtlessly remove 4000 trees (the number of non-quality trees from your study) and allow city engineering's unneeded destruction of trees, wildlife and trails during its scorch-the-earth practices of bulldozing greenways to get equipment into construction areas. Our needs to stop the ravages of climate change and adhere to the mayor's and the neighbors' mandates to protect the environment need to guide this project. I do not see any indication that the city engineers are hearing that concern. Communication with the engineers has been poor.*

    Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

52. *Our duty to protect of the environment and the mayor's plans for more trees in the city mandate that a critical mass of the trees in the Sauk Creek Greenway remain. The creek needs repair. Many invasive species need to be removed. However, the city engineering plans for Sauk Creek Greenway Stabilization that call for excessive widening of the creek, erosion controlled by grasses on the banks*

rather than trees, more retention ponds in the greenway, a bike trail, and no attention for the current quality trees along the banks that need help to survive erosion challenges are great concerns. We cannot thoughtlessly remove 4000 trees (the number of non-quality trees from your study) and allow city engineering's unneeded destruction of trees, wildlife and trails during its scorch-the-earth practices of bulldozing greenways to get equipment into construction areas. Our needs to stop the ravages of climate change and adhere to the mayor's and the neighbors' mandates to protect the environment need to guide this project. I do not see any indication that the city engineers are hearing that concern. Communication with the engineers has been poor.

Response: Thank you for your comment. Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

Report Figures

53. *First - there is a tremendous amount of very good work in this report, but it is too difficult to read. The text refers to diagrams where it is impossible to decipher where on the map I am located or even nearby street names. Would it be possible to link to a map that can be enlarged with detail of street names? Thanks.*

Response: Current online mapping showing the existing inundation for the 1% chance event can be found here: https://cityofmadison.maps.arcgis.com/apps/webappviewer/index.html?id=939cd73b0b594a0aa2d926a6b0e41f40

Status

54. *What is the real status of the project?*

Response: The project schedule is posted on the project website and in the Public Information Presentations. The next step is to finalize the Watershed Study Report and bring it before the Board of Park Commissioners and Board of Public Works for final approvals.

Commenter 55

55.

1. *The proposed culvert size increase on Westfield Road north of the intersection with Tree Lane, i.e., the location upstream of the TT swale that flows west into the Sauk Creek Greenway.*

   Response: The current culvert at this location does not meet the City's target of passing the 1% chance event without road overtopping. The recommended solution is to increase the size of the culvert to meet the City's target.

2. *Any planned stormwater improvements planned for Tree Lane from Westfield west to Randolph Drive.*

   Response: A local sewer project is recommended in this location. It would be constructed when the street is reconstructed.

3. *What impacts would the any project mentioned in 2 have on the flooding problems occurring on Tamarack property south of Tree Lane that result from storm and groundwater flowing from the cemetery on to Tamarack property?*

   Response: The proposed storm sewer and inlets would intercept some of the water flowing overland from the cemetery.

4. *What impact would the changes proposed in the study have on the flooding condition that occurs at the intersection of Tree Lane and Randolph Drive?*

   Response: The proposed storm sewer and inlets should reduce flooding at this intersection.

5. *Can a channel be completed from the aforementioned Randolph/Tree Lane intersection directly north into the Sauk Creek Greenway?*

   Response: A channel in this location is not proposed at this time. The model shows we can reach our flood targets by upsizing the storm sewer without the additional cost of a channel.

6. *What is proposed to be done to reduce stormwater flow down the Randolph Drive hill southward from Mineral Point Road to the intersection with Tree Lane and into the Sauk Creek Greenway?*

   Response: A local sewer project is recommended for this section. It would be constructed when the street is reconstructed.

7. *Is the City looking to properly locate the stormwater inlet currently on the cemetery property south of Tamarack property adjacent to Randolph Drive? It does not intercept any significant stormwater flowing west on the cemetery property to Randolph Drive?*

   Response: This is a local drainage issue. The inlet is a private inlet. The City will require that additional measures will be taken the next time a permit is required.

8. *What will the impact be on the Sauk Creek Greenway north of Tree Lane by the increase in culvert size under Tree Lane adjacent to Haen Park?*

   Response: Flow will be increased to Sauk Creek Greenway. Sauk Creek is part of the City stormwater conveyance system, therefore, this is where stormwater is designed to go.

9. *A general discussion on the current Engineering Division plans regarding the changes to the Sauk Creek Greenway north of Tree Lane bordering Tamarack Trails and adjacent neighborhoods to the north including methods being looked at for stabilizing Sauk Creek, impact on the forest in the Greenway, timeframe for proposing a conceptual plan, proposed public input process, current status of the budget for the project including what is being proposed in the City's 2023 budget.*

   Response: Please view the general information above, as well as the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

10. *What major new major flood retention proposals are being proposed by the City west of the Beltline on the large existing commercial properties (Menards/Target) to reduce downstream flooding of properties resulting from those large impervious properties?*

    Response: No new regional detention on existing developed lands is proposed. New development will be required to comply with the stormwater retention requirements of the City's stormwater ordinance, which now includes requirements to account for existing unintended detention For additional information about future development and redevelopment of commercial properties, please see the Watershed Study Learning Hub and view the "New Development/Re-Development Flood Prevention" topic or visit the Development Services Center and view the "Storm Water Management" topic

Commenter 56

56. *Thank you for your hard work on the Watershed projects. This is a very complex issue. The Pheasant Branch Watershed survey did not have much room for public comments so I am sending you my questions/comments regarding the project in this email.*
    How can we provide meaningful public comments when there is no Project Plan for the Sauk Creek Greenway Restoration in the August 1, 2022, 393 page, Pheasant Branch Watershed Study?
    Page 58. One page only. "The project information used in this study is planning level information; the design project will use design-level information."

    Response: The recommended solutions included in the watershed study report are high-level, conceptual solutions to understand what can be done to meet the City's flood targets and reduce flooding. They are not design-level solutions. The public comment period is for the watershed study approach, processes, and methodology. Robust public input for each recommended solution will occur during the design of each project when there are more specific details to share with the public based on design-level information.

    1. *Will the Sauk Creek Greenway project follow regenerative stormwater conveyance practices, that includes trees in their projects plans to stabilize the banks?*

    Response: A Regenerative Stormwater Conveyance channel is not feasible in this location. Per the Regenerative Stormwater Conveyance System design practices, the longitudinal slope needs to be greater than it is in Sauk Creek, and the drainage area to the practice should be less than 50 acres. While the design details are not known for Sauk Creek, the design would consider what natural features could be sustainably included into the system.

    2. *It appears Greenbriar Apartments owns the section of land between the already completed SC Greenway segment and the 1 mile proposed project (see attached picture below, Red roofed apartments bottom right).*
    What is the cost to taxpayers and plan for that section of the creek which appears to be on private property?

    Response: There are currently no plans to improve this section as it is not owned by the City.

3. How will the contracted loggers accomplish selective forestry on this project when they have not on previous Watershed projects? (See before and after pictures below)
Is it a conflict of interest for contacted loggers to determine which trees to remove? Will the "Do Not Cut" trees be marked before the loggers arrive?

Response: The City contracts the construction of the greenway, and the contractors hire a tree removal company to remove the trees called out on the plans. When and how trees are marked prior to the removals depends on how each contract is written, which is done at the end of the design and outreach process, so this detail is not yet figured out for this project. It is important to note that on projects with high quality trees, the City charges damages for any trees that are removed that were not called out on the plans and critical trees are protected with construction fence to provide a visual to keep contractors away from the tree. The way the contracts are written, there is no incentive for the Contractors to remove any trees that are not specifically called to be removed on the plans.

4. What will be the total loss of carbon credits when the mature trees are removed? Along with the trees that were removed in previous projects, and proposed projects throughout the city?
How will the loss of trees affect bats, birds, deer, other wildlife, and sound barrier from the Beltline noise?

Response: Calculation of carbon credits is outside the scope of the watershed study and was not completed. Noise impacts will vary with the season due to leaf cover and the source of noise that you are tracking (neighbor's lawn mower, High Point Road, or the Beltline. These potential impacts are not part of the watershed study. The concerns regarding the impact from loss of trees will be reviewed during the design of the project. Please see the Ecological Restoration in Stormwater Ponds and Greenways Storymap for more information on the impact of restoration projects on habitat.

5. Why hasn't there been any maintenance of the creek channel or retention ponds in the past?
Many neighbors have put on their own waders and removed fallen limbs and dams on the creek over the years that city crews never cleared out. It would have been a much less expensive option.
Even without any maintenance of the creek, in the 2018 deluge, there were no houses flooded from rising creek water along the creek; no Sauk Creek Neighborhood focus groups (Pg 279).

Response: The City has completed routine maintenance to clean the sanitary sewer since the sanitary maintenance path was built in the early 2010's. However, the sanitary sewer maintenance path does not allow access to the majority of the channel. Maintenance access would be included as part of the design to stabilize, both for the contractor to have access to the channel to improve it, as well as the City to be able to maintain it.

6. What exactly are the plans for reconstructing/dredging the "broken" retention pond in Sauk Creek Greenway, by Sauk Creek Dr and St. Lawrence? It is shown as outside the Greenway Project Area on the Project Maps. Although it has been "broken" for over 15 years, it is on all of the

watershed maps as a retention pond. It does not collect any street water. We don't hear anything about the plans for this valuable non-functioning retention pond. It could be incorporated into a Regenerative Stormwater Conveyance system.

Response: Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

7. Who is funding the proposed single track bike path that the neighborhood does not feel is a good fit in this location? We hear that the Bike Federation is pushing hard for these paths that the neighborhood community does not support.
The neighborhood has repeatedly suggested the other proposed Walnut Grove Park mountain bike trail for the schools' Mountain Bike teams be located in Mineral Point Park providing easy access for Vel Phillips Memorial High School/Jefferson Middle School, and nearby John Muir and Stevenson Elementary School students and their families. It would really increase use of that park. With adequate parking, rolling hills, and other amenities.

Response: The bike path and single track pike path is outside the scope of the watershed study. That project is being explored through the Parks Division.

8. The $4million dollar budget for this one project seems to be the same since 2018. Is that really an accurate budget in 2022? Page 58 The Sauk Creek Greenway was budgeted for reconstruction prior to the August 2018 flood event and prior to the watershed study.

Response: Please view the Sauk Creek Greenway Restoration FAQ where we have aggregated responses to these commonly asked questions.

9. The answer to the incredibly undersized, poorly planned Menard/Pet Smart area and Target Mall area retention ponds, seems to be to just push all of the water towards Sauk Creek faster. With new building being planned SW of Menards, these commercial areas will still continue to have flooding with high rain storm events.

Response: All upstream development was and is constructed in accord with the requirements in place at the time of development (as was the development along the channel). Storm water requirements have increased significantly since the first ordinance that was put in place in 1983. Functionally, lands East of the channel had no stormwater management requirements, and lands West of the channel to the beltline had to meet the very first iteration of stormwater requirements. Development of lands West of the beltline have met ever more stringent requirements as the lands move west. In regards to solutions on upstream lands, the City does not have the ability to mandate that upstream commercial properties fix downstream flooding issues. However, when properties re-develop, additional redevelopment requirements are in place. Madison is one of only two (2) municipalities with redevelopment requirements in the State. Currently, New Development is required to comply with the City's stormwater ordinance, including detention up to the 200-yr storm event and infiltration practices. For more information, please see the Watershed Study Learning Hub and view the "New Development/Re-Development Flood Prevention" topic or visit the Development Services Center and view the "Storm Water Management" topic

10. From the Survey pg 46: "Solution Caution - If this solution (Draining Target pond under Beltline into Sauk Creek) could be implemented, it would send stormwater downstream faster. Computer modeling indicates the sections of the Sauk Creek Greenway just downstream of the Beltline culverts do not have capacity for the additional stormwater that would come from this solution. The flooding experienced in the Target Area would be moved downstream to the properties adjacent to the upstream sections of the Sauk Creek Greenway. Therefore, if aspects of this solution are to be implemented, the design should account for the capacity of the downstream Sauk Creek Greenway sections. Any back of the creek would cause more flooding in residential areas.
Page 49 "Reason for Exclusion - The sections of Sauk Creek Greenway just downstream of the beltline and Target Area Pond are not large enough to convey the additional capacity from the improvement."

Response: Extensive computer modeling evaluations were conducted to understand the most effective solutions to relieve the flooding on Mineral Point Road for purposes of emergency vehicle passability and relieve the flooding in the Target Area. Alternatives include detaining 100 percent of the stormwater from undeveloped areas, increasing the size of the outlet of the Target Area pond, and rerouting some of the stormwater from the Target Area Pond. Computer modeling indicates the most effective solution for this area is the Target Area Relief Sewer.

11. Page 58 3. Menards Parking Lot – Flooding approximately 1 to 2 feet deep a. Solutions that Benefit Area - The local conveyance system (series of culverts and channels) along Commerce Drive was replaced with a box culvert for the full length. This greatly reduces the inefficiencies in the system. b. Flood Reductions Observed - The ponding in the Menards parking lot is ***reduced. (Not eliminated)***
These commercial areas need larger ponds!! Menard' pond is basically non-existent. Dredging and deforesting Sauk Creek is not the answer!

Response: Construction of additional retention in the Target/Menards are required land acquisition of existing developed land. At this time, the City is not evaluating solutions that require this type of land acquisition. All upstream development was constructed in accord with the requirements in place at the time of development (as was the development along the channel). Storm water requirements have increased significantly since the first ordinance that was put in place in 1983. Functionally, lands East of the channel had no stormwater management requirements, and lands West of the channel to the beltline had to meet the very first iteration of stormwater requirements. Development of lands West of the beltline have met ever more stringent requirements as the lands move west. In regards to solutions on upstream lands, the City does not have the ability to mandate that upstream commercial properties fix downstream flooding issues. However, when properties re-develop, additional redevelopment requirements are in place. Madison is one of only two (2) municipalities with redevelopment requirements in the State.

12. Focus Groups: Page 279: There was no focus group for Sauk Creek Neighborhood, because here was no flooding along Sauk Creek.

Response: Focus groups were held in the neighborhoods that experienced the most devastating flooding to receive information about the flooding that was experienced to help build a useful computer model.