



# ALLEN CREEK DRAIN MONITORING

**ANN ARBOR  
WASHTENAW COUNTY, MI**

**PREPARED FOR  
GELMAN SCIENCES INC.**

**FOR SUBMITTAL TO THE**

**MICHIGAN DEPARTMENT OF ENVIRONMENT,  
GREAT LAKES AND ENERGY (EGLE)**

# TABLE OF CONTENTS

<b>1.0</b>	<b>INTRODUCTION</b> .....	<b>1</b>
<b>2.0</b>	<b>WORK PLAN</b> .....	<b>2</b>
2.1	Flow Data Collection.....	2
2.2	Precipitation Data Collection .....	4
2.3	Water Quality Data Collection .....	4
2.4	Data Analysis/Reporting .....	5
<b>3.0</b>	<b>HEALTH AND SAFETY</b> .....	<b>5</b>
<b>4.0</b>	<b>SCHEDULE</b> .....	<b>5</b>

## LIST OF FIGURES

Figure 1	Allen Creek Drain and its Branches .....	1
Figure 2	Proposed Flow Monitoring Locations .....	3
Figure 3	Proposed Water Quality Monitoring Locations .....	4

## LIST OF ACRONYMS

EGLE	Michigan Department of Environment, Great Lakes, and Energy
F&V	Fleis & VandenBrink Engineering, Inc.
QA/QC	Quality Assurance/Quality Control
VOC	Volatile Organic Compound
ug/L	micrograms per liter
US EPA	United States Environmental Protection Agency
WCWRC	Washtenaw County Water Resources Commissioner

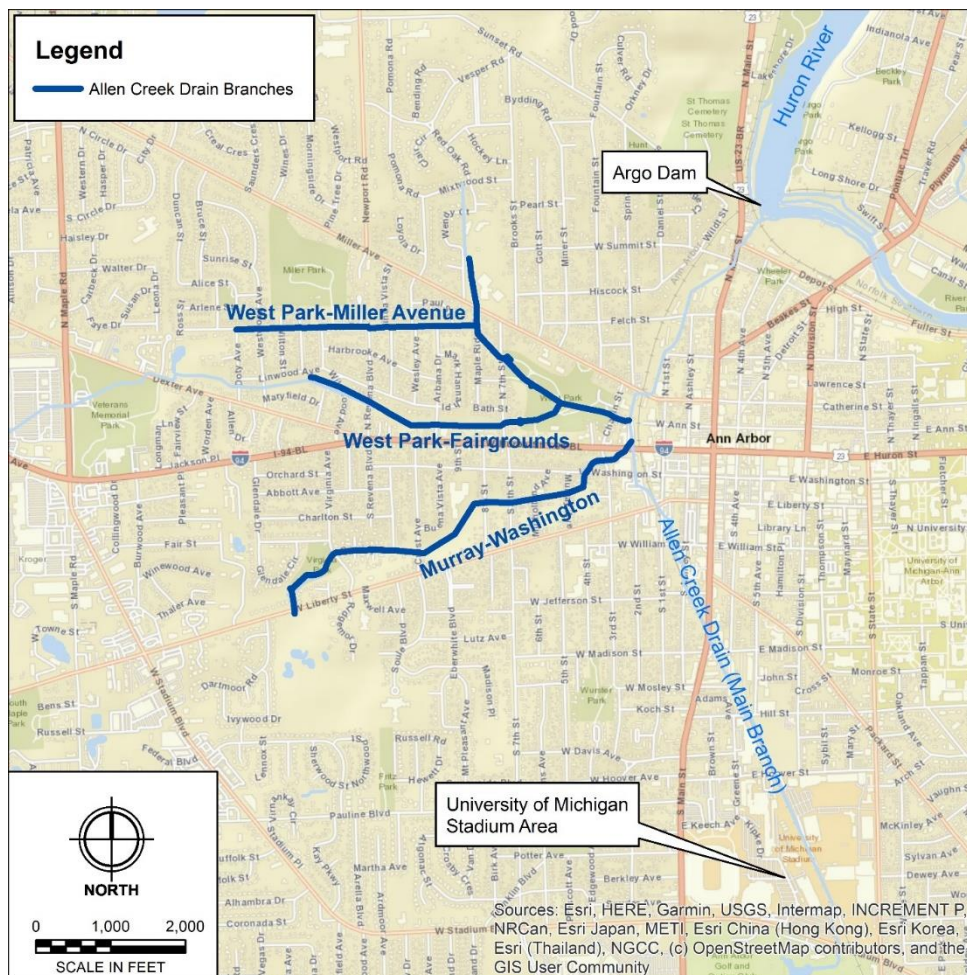
# 1.0 INTRODUCTION

The Allen Creek Drain is an underground drain that is located predominantly within the City of Ann Arbor, Washtenaw County, Michigan. The Allen Creek Drain and its branches were historically natural drainage areas. The drainage has been engineered into underground drains to more efficiently convey water, facilitate urbanization, and control flooding. The Allen Creek Drain and its branches are managed under the jurisdiction of the Washtenaw County Water Resources Commissioner (WCWRC).

The main branch of the Allen Creek Drain begins near the University of Michigan Stadium area and drains northward to an outlet on the Huron River just south of Argo Dam. There are three branches that originate west of the main branch and flow generally towards the east that are the focus of this proposed work. These branches are shown on Figure 1 and include:

- West Park-Miller Avenue
- West Park-Fairgrounds
- Murray-Washington

Figure 1 – Allen Creek Drain and its Branches



In 2019, Gelman Sciences, with the cooperation of the WCWRC office implemented an EGLE-designed water sampling program that involved the collection of monthly water quality samples from locations along the three branches of the Allen Creek Drain for a period of six months. Results from this sampling program established that 1,4-dioxane is consistently present in the downstream reach of the West Park-Fairgrounds branch and periodically present at trace levels in the Murray-Washington branch. 1,4-Dioxane was determined not to be present in the West Park-Miller Avenue branch. The findings of this work were summarized by EGLE in the report titled: Allen Creek Drain Sampling Investigation, West Park Area of the City of Ann Arbor, November 2019 ([https://www.michigan.gov/documents/egle/egle-rrd-GS-AllenCreekDrainSummaryReport-11-20-19\\_673069\\_7.pdf](https://www.michigan.gov/documents/egle/egle-rrd-GS-AllenCreekDrainSummaryReport-11-20-19_673069_7.pdf)).

Years of mapping of the Gelman plumes, groundwater flow data, and shallow groundwater investigations by Gelman completed in 2016 indicate that the West Park-Miller Avenue and Murray-Washington branches are not in a position relative to the Gelman plumes to receive groundwater containing significant concentrations of 1,4-dioxane related to the Gelman site. In particular, these branches would not be expected to receive concentrations that would approach the threshold set forth in EGLE's updated MS4 Compliance Assistance Document, which would be 280 ug/L for 1,4-dioxane.<sup>1</sup> This interpretation is consistent with the findings of EGLE's 2019 drain sampling investigation, which did not identify 1,4-dioxane in the West Park-Miller Avenue branch and found only trace concentrations of 1,4-dioxane in the Murray-Washington branch. That same conclusion cannot be confirmed with respect to the West Park-Fairgrounds branch without further investigation. As such, the primary focus of this investigation will be on the West Park-Fairgrounds branch.

The objectives of this work plan are as follows:

1. Determine the locations where groundwater is entering the West Park-Fairgrounds branch by:
  - a. Examining videos of the drain.
  - b. Collecting and analyzing flow data from the drain.
  - c. Collecting and analyzing 1,4-dioxane data from the drain.
2. Determine the likelihood of an exceedance of the MS4 compliance option threshold for 1,4-dioxane in the West Park-Fairgrounds branch through the evaluation of mass loading data.
3. Monitor 1,4-dioxane concentrations and other water quality parameters in the West Park-Miller Avenue and Murray-Washington branches to compare to early data.
4. To the extent 1,4-dioxane related to the Gelman site is determined to be entering the Allen Creek Drain/branches, use the collected data to help determine what MS4 compliance option(s) developed by EGLE is the most appropriate and to identify any additional actions to be taken.

## 2.0 WORK PLAN

### 2.1 FLOW DATA COLLECTION

F&V proposes to collect flow data at manhole locations along the West Park-Fairgrounds branch between the area of Wildwood Avenue and the confluence with the West Park-Miller Avenue branch, provided these locations are conducive to flow measurements. These proposed locations are shown on Figure 2 below.

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<sup>1</sup> This work plan assumes, without acknowledging, that the Allen Creek Drain and its branches are properly classified as MS4 drains.



Figure 2 – Proposed Flow Monitoring Locations



F&V will first inspect the manhole locations and determine their viability to accommodate flow monitoring equipment. Where the locations are conducive to flow monitoring, F&V will install pressure transducers into the drain channel to measure water level depth in the channels. Data from the pressure transducers will be augmented with periodic channel velocity measurements. These data will be used with drain construction data/drawings to calculate drain flows.

Data will be collected for a period of three months. Depth data will be recorded at a five-minute frequency. The objectives of this work are:

1. to establish the contribution of groundwater into the drain;
2. quantify flows; and

- determine, along with the video information, which segments/areas have groundwater entering the drain and the volume of groundwater entering the drain in those segments/areas.

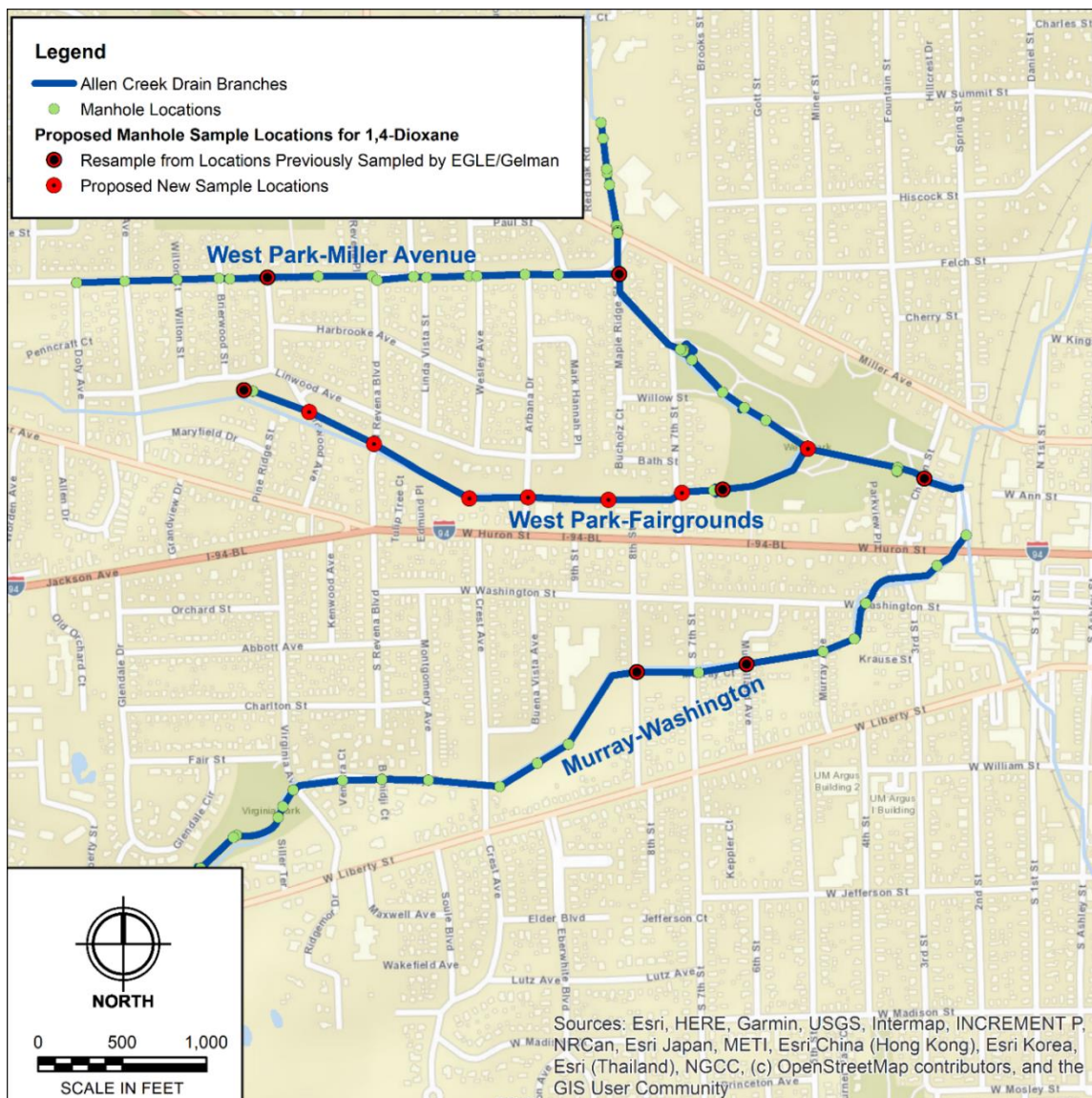
## 2.2 PRECIPITATION DATA COLLECTION

F&V will install an automated rain gauge and data logger in the area of the West Park-Fairgrounds branch. If a secure location for the gauge cannot be found, the rain gauge will be installed at the Gelman Wagner Road facility. The rain gage data will be used to determine potential contribution surface water runoff (vs. groundwater infiltration).

## 2.3 WATER QUALITY DATA COLLECTION

F&V will collect water quality samples from all manhole locations along the West Park-Fairgrounds branch between Wildwood Avenue and the confluence with the West Park-Miller Avenue branch. Additionally, locations previously sampled by EGLE will be resampled. The proposed locations are shown on Figure 3 below.

Figure 3 – Proposed Water Quality Monitoring Locations





The samples will be collected monthly for three months (generally equally spaced in time). The following methods will be used:

All sampling locations will be accessed from existing storm sewer manholes. Grab samples of water from the main flow of the storm water conveyance will be collected. The samples will be collected from the manholes directly using an extension rod fitted with a bottle holder at the end, or a nitrile gloved hand if water is accessible at a shallow depth in the manhole. Entering the manhole (confined space entry) will not be conducted. The water sample will be collected by dipping a clean plastic 500 ml bottle with the dip-pole or gloved hand. The sample will be dispensed from the 500 ml collection bottle into laboratory provided sample containers. All personnel handling sample bottles will use nitrile gloved hands. The samples will be transported under chain-of-custody to the Gelman Laboratory and analyzed for 1,4-dioxane using US EPA Method 8260 modified. A selected subset of the samples will also be analyzed for volatile organic compounds (VOCs) by Ann Arbor Technical Services using US EPA method 8260. It is anticipated that EGLE will occasionally split samples with Gelman for analysis by EGLE's environmental laboratory.

The following QA/QC samples will be collected for laboratory analysis of 1,4-dioxane and VOCs:

- Equipment Rinsate Blank – One rinsate blank per sampling event will be collected from the 500 ml plastic bottle using reagent-grade water provided by the laboratory.
- Duplicates – One duplicate sample will be collected per sampling event from a randomly selected location.

## 2.4 DATA ANALYSIS/REPORTING

Gelman will prepare a report of its findings. The report will include the data collected from this investigation and interpretations of the data. The report will also include recommendations regarding:

1. Longer-term monitoring of the drains.
2. If applicable, investigations of the groundwater outside the drain that would be needed to determine compliance with water quality objectives. Gelman would consider such investigations if the surface water sampling suggests there is a potential for exceedances of the water quality-based standard.

## 3.0 HEALTH AND SAFETY

F&V will prepare a project specific health and safety plan for this project. F&V staff do not plan on entering manholes for this project. If there becomes a need to enter a confined space, F&V will follow its protocols for confined space entry.

F&V samplers will wear brightly colored reflective vests, safety glasses, and nitrile gloves (when collecting the water samples) during the sample collection events.

F&V will follow required traffic control in areas where traffic control is necessary. This will include obtaining traffic control permits from the City of Ann Arbor (as required).

## 4.0 SCHEDULE

F&V proposes to implement this investigation within one month of approval by EGLE. F&V will prepare a report of its findings within one to two months of the data collection.