

**Wayne County Illicit Discharge Elimination Program
ARC IDEP Services 2017 Report
January 2018**

Summary

Wayne County performed source identification advanced investigations within the City of Plymouth as well as performed field screening/water quality sampling at 16 locations within three priority areas identified in the Rouge River Collaborative IDEP Plan. Five specific street segments identified in 2016 were televised by the City in 2017. The televising of the storm sewers in the investigation areas was inconclusive and did not directly identify illicit discharge sources. Since no sources were identified during the televising, the City of Plymouth and Wayne County contacted residents in the target areas and began dye testing residences on a voluntary basis.

The dye testing is ongoing in the investigation areas. Two illicit connections were identified at two of the residences dye tested in the Harvey Street target area. The residences dye tested in the Mill Street target area, as of the date of this report, have all been connected to the sanitary sewer.

The results of the field screening/water quality sampling suggest that future source identification advanced investigations should be focused on areas tributary to sites L51A and D62A.1. Additional investigations upstream of sites G94A and D62A, outfall #24 (OF24) and the Kellogg Street outlet are also recommended for future source identification advanced investigations.

Introduction

Wayne County Department of Public Services, Water Quality Management Division (WQMD) utilized IDEP Field Investigation funding (ARC 2017 Budget TC2 allocated to Wayne County to perform source identification advanced investigation in the City of Plymouth, perform field screening in priority areas identified by the ARC Technical Committee, and provide written and oral summaries of activities at ARC Technical Committee meetings and for the ARC's Annual Report.

Task 1: Field Investigations

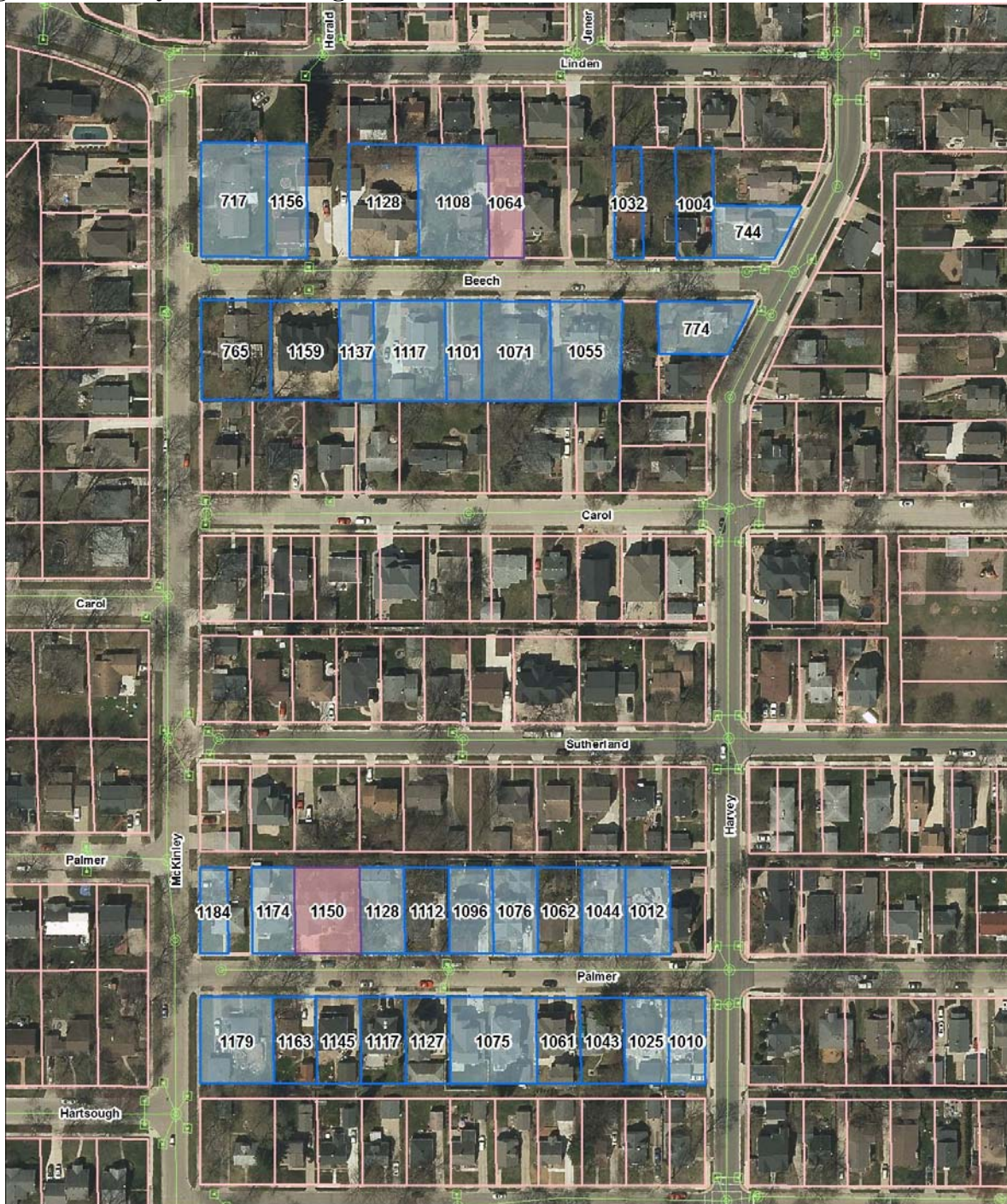
WQMD coordinated with ARC staff and the City of Plymouth to perform dye testing in residential areas in the Harvey Street and Park Street municipal separate storm sewer systems (MS4). The Harvey Street MS4 is tributary to Byron Creek which flows into the South Branch of Tonquish Creek. The Park Street MS4, where Mill Street drains, discharges into the Middle Branch of the Rouge River. The parties met in August 2017 where the City of Plymouth provided an update on the City's sewer televising. The televising effort did not lead to any conclusive findings, and the parties formed a plan for residential dye testing as needed in the priority areas. WQMD provided the City sample dye test notification letters to utilize in drafting communications to residents about voluntarily arranging for dye tests. WQMD and the City collaborated on identifying parcels, addresses, and property owners to contact.

Harvey Street Investigation Area – September-December 2017

The City of Plymouth mailed out notification letters to residents on Beech and Palmer streets within the Harvey Street investigation area in September 2017 and performed residential dye tests beginning in October 2017. There are 39 addresses targeted in the investigation area. The City dye tested 25 residences. Two of the residences were discovered to be discharging to the storm sewer, as illicit connections (see Figure 1). Appendix 1a contains a list of residences dye tested in this investigation

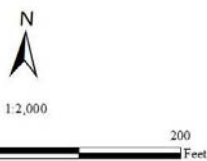
area. Figure 1 is the investigation area status map. Sixty-four percent of targeted residences were dye tested.

Figure 1: Harvey Street Investigation Area Status



PLYMOUTH, MI
Harvey Street
Investigation Area
Figure 1

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


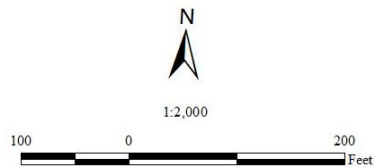
-  Stormwater gravity main
-  Stormwater catch basin
-  Stormwater manhole
-  Parcel boundary
-  Tested property
-  Targeted property
-  Illicit connector

Figure 2: Mill Street Investigation Area Status



PLYMOUTH, MI
Mill Street
Investigation Area
Figure 2



- Stormwater gravity main
- Stormwater catch basin
- Stormwater manhole
- Parcel boundary
- Tested property
- Targeted property

Park Street/Mill Street-December 2017

WQMD coordinated with the City of Plymouth to perform dye testing of residences on Mill Street. There are 21 addresses identified on Mill Street that were mailed notification letters. WQMD performed residential dye tests with the assistance of City of Plymouth staff in November and December 2017. Seven residences were dye tested; all of these were connected to the sanitary sewer. Appendix 1b contains a list of residences dye tested in this investigation area. Figure 2 above is the investigation area status map. Thirty-three percent of residences in the Mill Street investigation area were dye tested.

Hartsough Street City of Plymouth, North Branch Tonquish Creek-September 2017

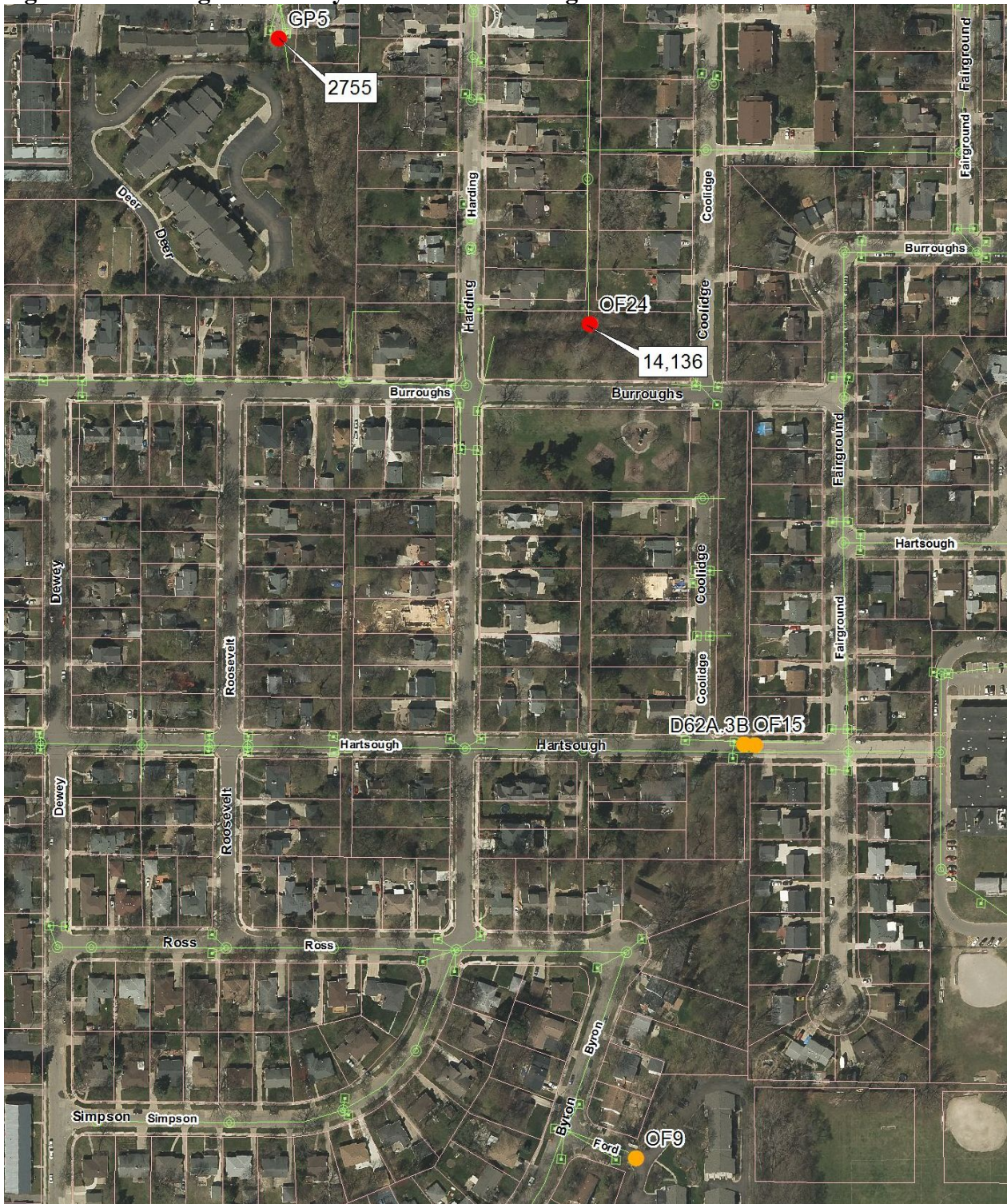
WQMD completed dry weather screening/water quality monitoring in a section of the North Branch Tonquish Creek in the City of Plymouth in order to identify potential sources of elevated *E. coli* detected during previous monitoring efforts. This monitoring was performed on September 26, 2017. The investigation focused on the North Branch Tonquish Creek between Ford Street and the dead end of Kellogg Street (where the Tonquish Creek opens after being enclosed under downtown Plymouth). Three water samples were collected at outfalls flowing during dry weather. One sample was collected at the Kellogg Street outlet. The sanitary sewer crossing under Burroughs Street was checked and no leakage observed. The monitoring data is located in Appendix A Table 2. Table 1 summarizes the results. Figure 3 below is the map of this dry weather screening area.

Table 1: Dry Weather Screening Results

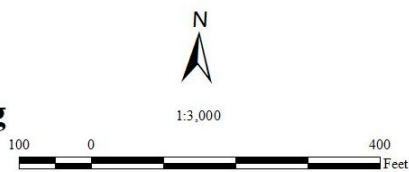
Site ID	Site Description	Date	<i>E. coli</i> (MPN)	Total Coliforms (MPN)	Odor
OF9	Ford St outfall	09/26/17	771	17329	None/Natural
D62A.3B	North Branch Tonquish/Hartsough outfall east	09/26/17	<10	987	None/Natural
OF15	North Branch Tonquish/Hartsough outfall west	09/26/17	NA	NA	None/Natural
GP5	Kellogg St outlet	9/26/2017	2755	>24196	None/Natural
OF24	Outfall left bank Tonquish east of Harding St.	9/26/2017	14136	>24196	Musty

It is recommended that the dye testing continue in the City of Plymouth residential target areas until the list of residential properties is completed. Further investigation upstream of outfall #24 (OF24) and the Kellogg Street outlet to determine sources of elevated *E. coli* at these sites is also recommended.

Figure 3: Hartsough Street Dry Weather Monitoring



PLYMOUTH, MI
Hartsough Street
Dry Weather Monitoring
Figure 3



- Stormwater gravity main
- Stormwater catch basin
- Stormwater manhole
- Sampling Location
- Sampling Location - High *E. coli*

Field Screening Priority Areas

Under this subtask, WQMD identified 18 sites for monitoring, procured lab services, collected water samples and provided data management and analysis. Samples collected were analyzed for *E. coli*. dissolved oxygen, conductivity, water temperature and visual observations were also recorded at each site. The sites sampled were within priority areas identified in the ARC's Collaborative IDEP. The purpose of the sampling was to help further isolate/refine source identification priority areas for future collaborative IDEP advanced investigations. Table 2 lists the sites that were sampled. The samples were collected from within the Lower 1, Middle 1-Tonquish Creek, and the Upper Rouge (Beitz Drain and Bell Creek). The communities where the sampling occurred are: Canton Township, Van Buren Township, Plymouth Township, Cities of Plymouth and Livonia. The map of the sites is in Figure 4.

Table 2: 2017 IDEP Field Screening Sampling Locations

Site ID	Site Description	Branch	Community
L51A.1	Fisher-Leng Drain/ Belleville Rd	Lower	Van Buren Township
L51A	Fisher-Leng Drain (McKinstry Drain tributary) /Sheldon Rd	Lower	Canton Township
L51.B2	McKinstry Drain/Sheldon Rd Crossing North	Lower	Van Buren Township
L51.B3	McKinstry Drain/Sheldon Rd Crossing South	Lower	Van Buren Township
L51	McKinstry Drain/Michigan Ave	Lower	Canton Township
G94A	Sines Drain/Beck Rd	Lower	Canton Township
G94A.1	Sines Drain/Denton Rd	Lower	Canton Township
D62D	South Tonquish/JoAnn St	Middle	Plymouth Township
D62A	North Branch Tonquish/Ford St	Middle	Plymouth City
D62A.1	North Branch Tonquish/Hartsough St	Middle	Plymouth City
D62A.3B	North Branch Tonquish/Hartsough outfall east	Middle	Plymouth City
D62A.3A	North Branch Tonquish/Hartsough outfall west	Middle	Plymouth City

Site ID	Site Description	Branch	Community
D62.4	North Branch Tonquish/Burroughs St	Middle	Plymouth City
U15	Beitz/Six Mile Rd	Upper	Livonia
U14.1	Bell Creek/Farmington Rd	Upper	Livonia
U14.2	Barlow Drain Outfall	Upper	Livonia
U14.3	Gates Drain/Amherst	Upper	Livonia
U14.4	LD-11 Extension North of Five Mile East of Ellen Dr	Upper	Livonia
U14.5	Bakewell Drain	Upper	Livonia
U14.6	Bell Creek/Oakdale	Upper	Livonia
U14.7	Bell Creek/Six Mile Rd	Upper	Livonia

WQMD surveyed 21 sites including the ARC IDEP monitoring sites listed in Table 2 above. Sixteen dry weather samples were collected (17 including a replicate) as four sites did not have any dry weather flow and one site, an outfall, was receiving backflow from its receiving stream and was not sampled. The sampling was performed during dry weather (48 hours or more without precipitation greater than 0.10 inches) on July 21, 2017 (see Appendix B for complete results). Table 3 is a summary of the monitoring data by subwatershed, number of samples per subwatershed, and the breakdown of the results by the Collaborative IDEP *E. coli* screening criteria.

Table 3 Monitoring Data Summary Utilizing Collaborative IDEP Screening Criteria

Subwatershed	Number of samples	Number of dry weather samples 0-1000MPN/100mL <i>E. coli</i>	Number of dry weather samples 1000- 5000 MPN/100mL <i>E. coli</i>	Number of Dry Weather samples >5000MPN <i>E. coli</i>
Upper	7	3	4	0
Middle 1	5	1	3	1
Lower 1	4	3	1	0

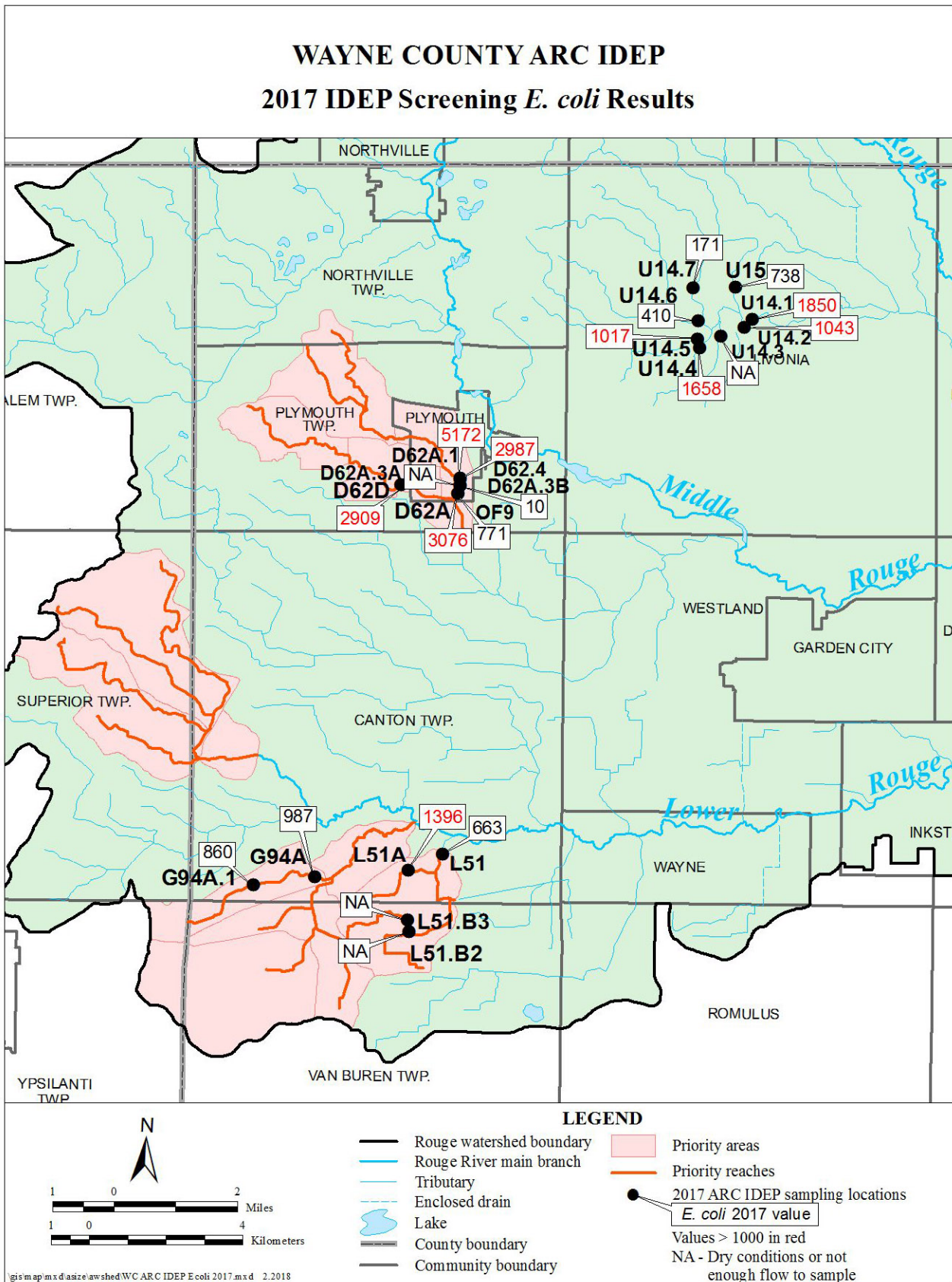
Nine of the 16 sites sampled had *E. coli* concentrations exceeding 1,000 MPN/100mL (56 percent). One site exceeded 5000MPN/100mL. The sites exceeding 1,000 MPN/100mL are summarized in Table 4 including sampling results from 2016 where applicable.

Table 4: 2018 Dry Weather Screening Sites with *E. coli* concentrations 1000MPN or greater

Site ID	Site Description	<i>E. coli</i> (MPN)	Water shed	Community	Comments
L51A	Fisher-Leng Drain (McKinstry Drain tributary) /Sheldon Rd	1396	Lower	Canton Township	Ammonia <0.25 ppm; Surfactant 0.25 ppm. During 2016 IDEP monitoring, this site has a result of 14,136MPN/100mL
D62D	South Tonquish/JoAnn St	2909	Middle	Plymouth Township	Ammonia <0.25 ppm; Surfactant 0 ppm. During 2016 IDEP monitoring, this site has a result of 146 MPN/100mL
D62A	North Branch Tonquish/Ford St	3076	Middle	Plymouth City	Ammonia 0 ppm; Surfactant 1 ppm. During 2016 IDEP monitoring, this site has a result of 717 MPN/100mL
D62A .1	North Branch Tonquish/Hart sough St	5172	Middle	Plymouth City	Instream sample. Observed small fish. During 2016 IDEP monitoring, this site had a result of 146 MPN/100mL
D62. 4	North Branch Tonquish/Burroughs St	2987	Middle	Plymouth City	Sample collected instream. During 2016 IDEP monitoring, this site was not sampled.
U15	Beitz/Six Mile Rd	738	Upper	Livonia	observed ducks at sample site
U14. 1	Bell Creek/Farming ton Rd	1850	Upper	Livonia	During the 2016 IDEP monitoring, this site was not sampled. It was sampled during Wayne County SAW monitoring six times. <i>E. coli</i> exceeded 1000MPN/100mL twice (1500 and 1106 MPN/100mL respectively).
U14. 2	Barlow Drain Outfall	1043	Upper	Livonia	Manhole sample. Manhole is located in a park. Trickle flow
U14. 4	LD-11 Extension North of Five Mile East of Ellen Dr	1658	Upper	Livonia	
U14. 5	Bakewell Drain	1017	Upper	Livonia	Replicate collected here. Replicate <i>E. coli</i> 744 Total coliform >24196

The results of the sampling suggest that future source identification advanced investigations should be focused on areas tributary to sites U14 and D62. Additional monitoring, upstream of sites L51A and D62A is also recommended in further refining areas for continued source identification advanced investigations. Since there are recurring elevated concentrations of *E. coli* in these investigation areas, it is recommended that these sites or sites upstream, be considered when sites Bacterial Source Tracking are selected for 2018 monitoring efforts and for further screening.

Figure 4: 2017 Field Screening Sampling Locations



Task 2 IDEP Training

The IDEP Investigator Training, funded by the ARC and the Alliance of Downriver Watersheds (ADW) and sponsored/hosted by the Macomb County Department of Public Works Office, was held October 18, 2017 at the Macomb County Intermediate School District. Sixty-five people attended the workshop. The attendees reported on the workshop survey that the training was informative and worthwhile, especially the group problem solving exercise. Nineteen of the 65 attendees were from the ARC community membership (see Appendix C). Due to the demand for the workshop, a waiting list was generated for a future training. Fifteen people are on this waiting list; thirteen of the 15 are affiliated with ARC member communities.

Task 3 Reporting

Written progress summaries of IDEP activities were provided with each quarterly invoice. The 2016 IDEP Activities Summary was completed and the 2017 activities summary was drafted.

Appendix A
2017 ARC IDEP Field Investigations
City of Plymouth

Table 1a: Residential Dye Testing- Harvey Street Area
Table 1b: Residential Dye Testing-Mill Street Area
Table 2: Hartsough Street source monitoring

CITY OF PLYMOUTH
RESIDENTIAL DYE TESTING
HARVEY STREET INVESTIGATION AREA

Number	Address	Homeowner	Phone Number	Date of Appt./Test	Time of Appt.	Description of plumbing in the home	Description of fixture	Time Dye In	Dye In By	Time Dye Out	Observed By	Location of Dye	Manhole Location	Confidence of Connection to Lead
1	1095 Palmer	Ron		10/16/2017	7:30 AM	3 main stacks								
						Plumbing stack with first floor powder room was utilized for test.	Toilet	8:00 AM	Adam	8:15 AM	Mike	Sanitary	Intersection of Harvey and Palmer	
2	1071 Beech	Dylan and Katie	248-425-0244	10/18/2017	7:30 AM	1 main stack								
						New construction home with existing foundation. Existing sewer lead reused in basement	Kitchen sink	7:52 AM	Adam	8:07 AM	Mike	Sanitary	Intersection of Harvey and Beech	Confirmed
3	1076 Palmer	Doug and Jody	734-673-1410	10/20/2017	7:30 AM	2 stacks								
						Additions were made onto existing basement foundation. Homeowner does not know how the two stacks combine into one lead that was sleeved to the street.	Basement utility sink	7:49 AM	Adam	8:08 AM	Mike	Sanitary	Intersection of Harvey and Palmer	
4	1174 Palmer	Mark and Casey	248-760-6635	10/20/2017	8:30 AM	2 stacks								
						Kitchen is on one stack, 2 bathrooms and laundry is on the other	Basement utility sink	8:24 AM	Adam	8:36 AM	Greta	Sanitary	Mid block on Palmer	
5	1179 Palmer	Matt		10/20/2017	9:50 AM	New construction								
						Only foundation walls have been poured		9:55 AM		10:04 AM		Sanitary	Mid block on Palmer	
6	1044 Palmer	Orris	734-453-2189	10/20/2017	10:00 AM	1 main stack on a crawl								
						Bathroom, kitchen, and laundry all on the same stack	Toilet	10:20 AM		10:25 AM	Greta, Mike	Sanitary	Intersection of Harvey and Palmer	Confirmed
7	1096 Palmer	Kristen	734-377-4649	10/23/2017	7:30 AM	2 stacks								
						Kitchen, basement, bath on one stack. Upstairs bath and main floor on other.	Basement toilet	7:39 AM	Adam	7:58 AM	Mike	Sanitary	Intersection of Harvey and Palmer	
8	1128 Beech	Jim	269-352-1954	10/26/2017	10:30 AM	2 stacks								
						New construction home built on existing foundation. Basement floor was saw cut between 2 stacks for repair. Connection together is evident. 1 stack is laundry, kitchen, and half bath, other is upstairs bath and master bath.	Master bath toilet	10:42 AM	Adam	10:53 AM	Mike	Sanitary	Mid block on Beech	

CITY OF PLYMOUTH
RESIDENTIAL DYE TESTING
HARVEY STREET INVESTIGATION AREA

Number	Address	Homeowner	Phone Number	Date of Appt./Test	Time of Appt.	Description of plumbing in the home	Description of fixture	Time Dye In	Dye In By	Time Dye Out	Observed By	Location of Dye	Manhole Location	Confidence of Connection to Lead
9	1064 Beech	Elizabeth	207-712-0581	10/27/2017	7:30 AM	4 stacks + sump								
						Basement bath has sanitary sump pump. Main sewer leads out of basement wall approx. 2' off floor. All stacks drop into main line along west wall of basement	First floor half bath toilet	8:02 AM	Adam	8:35 AM	Adam Mike	Storm	Intersection of Harvey and Beech	
10	1025 Palmer	Theresa	734-274-1086	10/27/2017	9:30 AM	1 stack								
						3 bathrooms, kitchen, and laundry. First floor bath utilized for test.	Toilet	9:26 AM	Adam	9:33 AM	Mike	Sanitary	Intersection of Harvey and Palmer	
11	1108 Beech	Ed	734-536-1500	10/30/2017	9:30 AM	1 stack								
						2 full baths, 2 kitchens, laundry. First floor toilet was utilized for test.	Toilet	9:38 AM	Adam	9:44 AM	Mike	Sanitary	Mid block on Beech	
12	744 S. Harvey	Kurt	734-459-6633	10/31/2017	11:00 AM	1 stack								
						1 bath, kitchen, and laundry	Toilet	11:04 AM	Adam	11:06 AM	Mike	Sanitary	Intersection of Beech and Harvey	
13	1055 Beech	Deborah	734-674-5477	11/2/2017	8:30 AM	1 stack								
						Sewer lead enters home 3' +/- off basement floor. Sanitary sump pump for basement bath. 3 full baths, 2 half baths, kitchen, and laundry.	First floor half bath toilet	8:26 AM	Adam	8:41 AM	Mike	Sanitary	Intersection of Beech and Harvey	
14	1156 Beech	Brian	313-570-1198	11/3/2017	7:30 AM	1 stack on a crawl								
						2 baths, kitchen, and laundry. First floor bathroom was utilized for test.	Toilet	7:42 AM	Adam	8:15 AM	Mike	Sanitary	Mid block on Beech	Confirmed
15	717 McKinley	Leo	313-845-6028	11/13/2017	11:00 AM	2 stacks								
						1: Kitchen and master bath, 2: Lower level bathroom, upper level full bath, laundry room	Lower level toilet	11:02 AM	Adam	11:42 AM	Steve	Sanitary	Mid block on Beech	
16	1101 Beech	Jay	248-383-3696	11/15/2017	9:30 AM	1 stack								
						Bathroom, laundry, kitchen, full bath second floor	First floor toilet	9:46 AM	Adam	9:52 AM	Steve	Sanitary		
17	1184 Palmer	Scott	313-820-3119	11/15/2017	10:30 AM	1 stack								
						1 toilet, 3 sinks (1 downstairs)	First floor toilet	10:35 AM	Ray	10:45 AM	Steve	Sanitary	Mid block on Palmer	

CITY OF PLYMOUTH
RESIDENTIAL DYE TESTING
HARVEY STREET INVESTIGATION AREA

Number	Address	Homeowner	Phone Number	Date of Appt./Test	Time of Appt.	Description of plumbing in the home	Description of fixture	Time Dye In	Dye In By	Time Dye Out	Observed By	Location of Dye	Manhole Location	Confidence of Connection to Lead
18	1012 Palmer	Lael	248-882-1827	11/17/2017	3:30 PM									
						1 full bath first floor, basement toilet disconnected, kitchen & laundry	First floor toilet	3:48 PM	Adam	3:51 PM	Chris H.	Sanitary		
19	1117 Beech	Tom	734-355-3676	11/20/2017	7:30 AM	1 stack								
						1 full bath, 1 powder room, 1 master bath, kitchen, lead out west side of house	First floor half bath toilet	7:55 AM	Adam	8:01 AM	Mike	Sanitary	Mid block on Beech	
20	1075 Palmer	Lisa	734-335-7700	11/21/2017	3:30 PM	1 stack								
						2.5 baths, kitchen, laundry, sewer lead out east wall of foundation 3' off floor	First floor half bath toilet	3:45 PM	Adam	4:06 PM	Greta	Sanitary	Intersection of Harvey and Palmer	
21	1137 Beech	Tom	734-355-3676	11/27/2017	7:30 AM	1 stack								
						Laundry, full bath first floor, kitchen	Full bath toilet	7:33 AM	Adam	7:41	SF & AG	Sanitary	Mid block on Beech	
22	1032 Beech	Joan	734-516-4619	11/28/2017	8:30 AM	1 stack								
						5 bathrooms. Main sewer through wall 6" +/- off basement floor. Basement bath into sanitary sump pump.	First floor bath toilet	8:34 AM	Adam	8:40 AM	Adam	Sanitary		
23	774 S. Harvey	Kara	248-672-7961	12/13/2017	11:30 AM	No contact made with resident.								
24	1150 Palmer	Wayne	734-459-9658	12/14/2017	11:00 AM									
						Sanitary through basement 2' +/- off floor. 3 baths, kitchen, laundry.	First floor half bath toilet	11:21 AM	Adam	11:35 AM	SF & AG	Storm		
25	1010 S. Harvey	Pat		12/21/2017	12:00 PM	1 stack								
						1.5 bath, kitchen, laundry	First floor full bath toilet	12:23 PM	Adam	12:29 PM	Adam Mike	Sanitary	Intersection of S. Harvey and Hartsough	

CITY OF PLYMOUTH
RESIDENTIAL DYE TESTING
MILL STREET INVESTIGATION AREA

Number	Address	City	Homeowner	Phone Number	Date of Appt./Test	Time of Appt.	Description of plumbing in the home	Description of fixture	Time Dye In	Color	Dye In By	Time Dye Out	Observed By	Location of Dye	Manhole Location
1	240 N. Mill St	Plymouth	Jean Scheppele		11/21/2017	10:00AM	one main stack. Sink in Kitchen and 1 bathroom with shower, toilet and sink. Laundry sink and floor drains in basement. Sawcuts in floor where leads from these fixtures were connected to the main line. One floor drain near west wall had water in trap.	Toilet	10:17 AM	Green	Sue Thompson	10:23 AM	Mike Flowers and Adam Gerlach	Sanitary	middle of Mill St near 161 N. Mill
2	188 N. Mill St	Plymouth	Beatrice Gray	734-453-6613	11/21/2017	11:00AM	one main stack. No plumbing in basement, there is a stormwater sump in basement. Second floor bathroom stacked. Sink in kitchen. First floor restroom bathrom tested. No fixtures in garage	Toilet	10:41 AM	Red	Sue Thompson	10:49 AM	Mike Flowers and Adam Gerlach	Sanitary	middle of Mill St near 161 N. Mill
3	161 N. Mill St	Plymouth	Jessica Rinna	734-740-9944	11/22/2017	8:30AM	no basement. Could not assess number of stacks. Three bathrooms and laundry room, sink in kitchen.	Toilet in laundry room	8:45 AM	Green	Sue Thompson	8:50 AM	Mike Flowers and Steve Faiman	Sanitary	intersection of Mill and Amelia
								Kitchen sink	8:50 AM	Red	Sue Thompson	8:55 AM	Mike Flowers and Steve Faiman	Sanitary	intersection of Mill and Amelia
4	175 N. Mill St	Plymouth	Nicole Hermann	248-982-4008	11/22/2017	9:30AM	1 main stack and a small stack. Sump in basement. Laundry sink, toilet and shower in basement. First floor bathroom and kitchen sink.	Toilet-basement	9:03AM	Green	Sue Thompson	9:08 AM	Mike Flowers and Steve Faiman	Sanitary	intersection of Mill and Amelia
								Toilet-first floor	9:08AM	Red	Sue Thompson	9:13AM	Mike Flowers and Steve Faiman	Sanitary	intersection of Mill and Amelia
5	314 N. Mill St	Plymouth	Amy Lupton, owner or Laura Byrne real estate agent	734-502-4520	11/28/2017	10:00AM	2 main stacks and stormwater sump in basement laundry room. Bathrooms on all floors. Second floor bathroom above kitchen. Other bath stacked with first floor bathroom	Toilet-basement	9:58AM	Green	Sue Thompson	10:02AM	Mike Flowers and Steve Faiman	Sanitary	near 300 N. Mill St
								Toilet-first floor	10:02AM	Red	Sue Thompson	10:05AM	Mike Flowers and Steve Faiman	Sanitary	near 300 N. Mill St

CITY OF PLYMOUTH
RESIDENTIAL DYE TESTING
MILL STREET INVESTIGATION AREA

Number	Address	City	Homeowner	Phone Number	Date of Appt./Test	Time of Appt.	Description of plumbing in the home	Description of fixture	Time Dye In	Color	Dye In By	Time Dye Out	Observed By	Location of Dye	Manhole Location
6	225 N. Mill St	Plymouth	George Thomas Kazen (son in law Bob made appointment)		12/7/2017	10:00AM	basement finished so exact stack location unknown. Plumbing is stacked on three floors- basement restroom, kitchen sink first floor, and second floor bathroom). Floor drain in basement furnace room	Toilet-basement	10:07AM	Green	Sue Thompson	10:15AM	Nancy Gregor, Steve Faiman, and Adam Gerlach	Sanitary	near 300 N. Mill St
7	172 N. Mill St	Plymouth	Lee R. and Quinn Anderson	734-788-2869	12/12/2017	10:00AM	one main stack in basement. Plumbing is stacked on two floors, sink in kitchen, first and second floor bathrooms, and basement laundry	toilet-first floor bathroom	10:09AM	Green	Sue Thompson	10:12AM	Mike Flowers and Steve Faiman	Sanitary	near 114 N. Mill St

Site ID	Site Description	Date	Time	<i>E. coli</i> (MPN)	Total Coliforms (MPN)	Dry Weather Flow Depth (in)	Watershed	Community	Water Clarity	Water Color	Odor	Visible Debris/Pollution	Comments
OF9	Ford St outfall	09/26/17	12:45	771	17329	3	Middle	Plymouth City	Clear	Clear	None/Natural	None	outfall is located west side Tonquish Creek under Ford St bridge
D62A.3B	North Branch Tonquish/Hartsough outfall east	09/26/17	13:10	<10	987	6	Middle	Plymouth City	Clear	Clear	None/Natural	None	outfall is located under east side of Hartsough St crossing
OF15	North Branch Tonquish/Hartsough outfall west	09/26/17	13:15	NA	NA	NA	Middle	Plymouth City	NA	NA	None/Natural	None	outfall is located under west side of Hartsough St crossing
GP5	Kellogg St outlet	9/26/2017	13:40	2755	>24196	6	Middle	Plymouth City	Moderately Turbid	Brown;light	None/Natural	None	Tonquish Creek daylight here. Sedimentation present
OF24	Outfall left bank Tonquish east of Harding St.	9/26/2017	13:30	14136	>24196	8	Middle	Plymouth City	Clear	Clear	Musty	None	Outfall sampled in 3/24/10: 2400 MPN <i>E. coli</i>

Appendix B
2017 ARC IDEP Field Screening

Data Table

2017 WATER QUALITY DATA
ARC IDEP FIELD SCREENING

Site ID	Site Description	Date	Time	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	Water Temperature (°C)	<i>E. coli</i> (MPN)	Total Coliforms (MPN)	Dry Weather Flow Depth (in)	Watershed	Community	Water Clarity	Water Color	Odor	Visible Debris/Pollution	Precipitation	Comments
L51A.1	Fisher-Leng Drain/ Belleville Rd	7/21/2017	NA	NA	NA	NA	NA	NA	NA	Lower	Van Buren Township	NA	NA	NA	NA	None	No dry weather flow. No sample taken
L51A	Fisher-Leng Drain (McKinstry Drain tributary) /Sheldon Rd	07/21/17	10:05	4.16	1.218	23.5	1396	>24196	3	Lower	Canton Township	Clear	Clear	None/Natural	None	None	Ammonia <0.25 ppm; Surfactant 0.25 ppm
L51.B2	McKinstry Drain/Sheldon Rd Crossing North	7/21/2017	NA	NA	NA	NA	NA	NA	NA	Lower	Van Buren Township	NA	NA	NA	NA	None	No dry weather flow. Water not present at crossing. No sample taken. Aquatic plants and phragmites present on the west side of the drain.
L51.B3	McKinstry Drain/Sheldon Rd Crossing South	7/21/2017	NA	NA	NA	NA	NA	NA	NA	Lower	Van Buren Township	NA	Lower	NA	NA	None	Trickle dry weather flow from a stormwater pond outlet into drain. Not enough dry weather flow for a sample.
L51	McKinstry Drain/Michigan Ave	07/21/17	10:15	4.11	1.095	21.2	663	>24196	6	Lower	Canton Township	Moderately turbid	Clear	None/Natural	None	None	
G94A	Sines Drain/Beck Rd	07/21/17	10:30	1.08	0.863	25.1	987	>24196	3	Lower	Canton Township	Clear	Clear	None/Natural	None	None	Ammonia 0 ppm; Surfactant 0 ppm. Upstream of the sample site is a large stormwater pond serving large warehouse facilities
G94A.1	Sines Drain/Denton Rd	07/21/17	11:00	1.3	2.108	20.9	860	>24196	1	Lower	Canton Township	Clear	Clear	None/Natural	None	None	
D62D	South Tonquish/JoAnn	07/21/17	11:25	7.23	0.694	22	2909	>24196	4	Middle	Plymouth Township	Clear	Clear	None/Natural	None	None	Ammonia <0.25 ppm; Surfactant 0 ppm
D62A	North Branch Tonquish/Ford St	07/21/17	11:45	7.65	2.263	22	3076	>24196	6	Middle	Plymouth City	Clear	Clear	None/Natural	None	None	Ammonia 0 ppm; Surfactant 1 ppm
D62A.1	North Branch Tonquish/Hartsough	07/21/17	11:50	7.47	2.052	22	5172	>24196	12	Middle	Plymouth City	Clear	Clear	None/Natural	None	None	D62A.3 is sample number. Instream sample. Observed small fish
D62A.3B	North Branch Tonquish/Hartsough outfall east	07/21/17	11:55	NA	NA	NA	10	727	1	Middle	Plymouth City	Clear	Clear	None/Natural	None	None	Sample collected from east outfall under Hartsough crossing
D62A.3A	North Branch Tonquish/Hartsough outfall west	7/21/2017	NA	NA	NA	NA	NA	NA	NA	Middle	Plymouth City			None	None	None	No sample collected. Water backflow from Creek into outfall.
D62.4	North Branch Tonquish/Burroughs	7/21/2017	12:10	7.22	2.065	21.8	2987	>24196	8	Middle	Plymouth City	Clear	Clear	None/Natural	None	None	Sample collected instream
U15	Beitz/Six Mile	7/21/2017	12:40	6.41	1.156	19.8	738	>24196	12	Upper	Livonia	Clear	Clear	None/Natural	None	None	Observed ducks at sample site
U14.1	Bell Creek/Farmington Rd	7/21/2017	12:50	6.16	1.713	23.2	1850	>24196	6	Upper	Livonia	Slightly Turbid	Clear	None/Natural	None	None	
U14.2	Barlow Drain Outfall	7/21/2017	13:15	NA	NA	NA	1043	>24196	trickle	Upper	Livonia	Clear	Clear	None/Natural	None	None	Manhole sample. Manhole is located in a park. Trickle flow
U14.3	Gates Drain/Amherst	7/21/2017	NA	NA	NA	NA	NA	NA	NA	Upper	Livonia	NA	NA	NA	NA	None	Open drain- no flow and stream dry to bed
U14.4	LD-11 Extension North of Five Mile East of	7/21/2017	13:35	2.5	1.453	19	1658	11199	24	Upper	Livonia	Highly turbid	Clear	None/natural	None	None	
U14.5	Bakewell Drain	7/21/2017	13:45	10.14	2.401	25.4	1017	>24196	24	Upper	Livonia	Moderately Turbid	Clear	None/Natural	None	None	Replicate collected here. Replicate <i>E. coli</i> 744 Total coliform >24196

2017 WATER QUALITY DATA
ARC IDEP FIELD SCREENING

Site ID	Site Description	Date	Time	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	Water Temperature (°C)	<i>E. coli</i> (MPN)	Total Coliforms (MPN)	Dry Weather Flow Depth (in)	Watershed	Community	Water Clarity	Water Color	Odor	Visible Debris/Pollution	Precipitation	Comments
U14.6	Bell Creek/Oakdale	7/21/2017	14:10	6.3	2.333	24.6	410	>24196	2	Upper	Livonia	Clear	Clear	None/Natural	Natural (leaves, limbs, weeds)	None	
U14.7	Bell Creek/Six Mile	7/21/2017	14:20	5.31	1.291	23.4	171	>24196	6	Upper	Livonia	Clear	Clear	None/Natural	None	None	
OF9	Ford St outfall	09/26/17	12:45	NA	NA	NA	771	17329	3	Middle	Plymouth City	Clear	Clear	None/Natural	None	None	Outfall is located west side Tonquish Creek under Ford St bridge

Appendix C
2017 Regional IDEP Training Workshop
Attendees List

APPENDIX C
 REGIONAL IDEP TRAINING WORKSHOP ATTENDEES
 OCTOBER 18, 2017

MACOMB COUNTY INTERMEDIATE SCHOOL DISTRICT

Number	Name	Affiliation	Type
1	Allen, Ashley	Hubbell, Roth & Clark, Inc.	Consultant
2	Collins, Rebecca	Hubbell, Roth & Clark, Inc.	Consultant
3	Carpenter, Jennifer	KER Engineering/Commerce	Consultant
4	Saif, Sermed	Tri-County engineering/City of Orchard Lake	Consultant
5	Diesing, Eric	Clinton River Watershed Council	Environmental group
6	Einheuser, Matt	Clinton River Watershed Council	Environmental group
7	Lane Abby	Clinton River Watershed Council	Environmental group
8	Theobald, Brian	City of Eastpointe	Macomb County
9	Verellen, Mitch	Clinton Township	Macomb County
10	Sucharski, Lara	Macomb County DPW	Macomb County
11	Wizniuk, Claudette	Macomb County DPW	Macomb County
12	DeCaussin, Joe	Macomb County Health Department	Macomb County
13	Bednar Jeff	Macomb County Public Works	Macomb County
14	Matthews, Barb	Macomb County Public Works	Macomb County
15	Apley, Carol	City of Eastpointe	Macomb County community
16	Jablway, Drew	City of Eastpointe	Macomb County community
17	Loffredi, Nick	City of Eastpointe	Macomb County community
18	Paolucci, Darin	City of Eastpointe	Macomb County community
19	Wolgast, Shaun	City of Eastpointe	Macomb County community
20	Cross, Ron	City of Roseville	Macomb County community
21	Maas, Tom	City of Roseville	Macomb County community
22	Schulte, Brian	City of Roseville	Macomb County community
23	Allen, Danielle	Shelby Charter Township	Macomb County community
24	Miller, Dave	Shelby Township DPW	Macomb County community
25	Nastasy, Frank	Shelby Township DPW	Macomb County community
26	Shaddock, Rob	Shelby Township DPW	Macomb County community
27	LaPeer, Allen	Village of Romeo	Macomb County community
28	Siegel, Kim	Oakland County Road Commission	Oakland County
29	Hendricks, Mark	Bloomfield Township	Oakland County Community
30	Campbell, Scott	City of Farmington Hills	Oakland County Community
31	Low, John	City of Rochester	Oakland County Community
32	Perry, Austin	City of Rochester	Oakland County Community
33	Oswald, Sean	Farmington Hills DPW	Oakland County Community
34	Parrish, Pete	Farmington Hills DPW	Oakland County Community
35	Richert, Jeremy	Village of Lake Orion	Oakland County Community
36	Whitten, Tim	Walled Lake	Oakland County Community
37	Harden, Yvette	VA Ann Arbor Health Care System	other
38	Rochon, Karen	Algonac Community Schools	School
39	Woolston, Johh	Farmington Public Schools	School
40	Smith, Shun	Huron Valley Schools	School
41	Puranen, Dave	Macomb Intermediate School District	School
42	Koester, David	Port Huron Schools Facilities	School
43	Jacobs, Bob	Ida Township	St. Clair County community
44	Jarvi, Eric	Ira Township	St. Clair County community
45	Giorio, Ryan	Oakland University	University
46	Webb, Jerry	Wayne County	Wayne County
47	Bame, Bob	City of Livonia	Wayne County Community

APPENDIX C
 REGIONAL IDEP TRAINING WORKSHOP ATTENDEES
 OCTOBER 18, 2017

MACOMB COUNTY INTERMEDIATE SCHOOL DISTRICT

Number	Name	Affiliation	Type
48	Hoffman, Edwin	City of Livonia	Wayne County Community
49	Smith, Chris	City of Livonia	Wayne County Community
50	Unsworth, Justin	City of Livonia	Wayne County Community
51	Wieler, Jeff	City of Livonia	Wayne County Community
52	Carney, Gerald	City of Romulus	Wayne County Community
53	Plank, Craig	City of Romulus	Wayne County Community
54	Mayhew, Greg	City of Taylor	Wayne County Community
55	Dionne, Gerald	Grosse Ile Township	Wayne County Community
56	Marx, George	Grosse Ile Township	Wayne County Community
57	Glinski, Paul	Huron Charter Township DPW	Wayne County Community
58	Hinojosa, Jeff	Huron Charter Township DPW	Wayne County Community
59	Bartel, Kevin	Redford Township	Wayne County Community
60	Kniffen, Robert	Redford Township	Wayne County Community
61	Morton, Shaun	Redford Township	Wayne County Community
62	Smith, Devin	Redford Township	Wayne County Community
63	Watts, Kyle	Redford Township	Wayne County Community
64	Wenzel, Arthur	Village of South Rockwood	Wayne County Community
65	Wenzel, Franklin	Village of South Rockwood	Wayne County Community

ARC Member community attendees highlighted