

2017 ILLICIT DISCHARGE INVESTIGATIONS IN OAKLAND COUNTY'S PORTION OF THE ROUGE RIVER WATERSHED

FINAL REPORT

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EXECUTIVE SUMMARY

Illicit discharge investigations were conducted in 2017 on multiple Oakland County storm drains within the Rouge River Watershed. Investigations were conducted by the Oakland County Water Resources Commissioner (WRC) as follow up to potential illicit discharges identified in 2014 and investigative work conducted in 2015 and 2016. IDEP investigations to date have identified 3 illicit sanitary connections and 2 septic systems as illicit discharge sources. These illicit discharges were corrected and removed in 2017. Follow up sampling and investigations conducted in 2017 on five (5) County Drains has identified one (1) additional suspected illicit connection and two (2) additional suspect properties as potential sources of illicit discharges in need of further investigation. A summary of the illicit discharges corrected and additional suspect illicit discharge sources found along with follow up recommendations appears in the table below. A “suspect illicit connection” is indicated in the table when *E. coli* counts exceeded 10,000 CFU /100 ML, but a specific source has not been identified. A “potential illicit discharge” is indicated when *E. coli* counts were below the 10,000 CFU/100 ML and no physical signs of sanitary sewage is observed. Additional follow up investigations of the suspect and potential sources will be conducted on these drains in 2018.

Summary of 2017 identified potential and suspect illicit connections and discharge sources and recommended follow up actions.

Drain Community	Identified potential and suspect Illicit connections and discharge sources	Recommended Follow-up Actions
US-16 Farmington	(3) Illicit Discharges from residential homes connected to the drain were eliminated in 2017 by the City of Farmington	Scheduled Dry Weather Screening and evaluation of the drain under Oakland County’s IDEP program beginning in Spring of 2018 is recommended.
Fracassi Southfield	Additional CCTV inspections identified one (1) additional potential illicit connection. Dye testing notices were sent out to seven (7) suspect properties. A Community Center and one (1) residence were dye tested. No illicit connections have been confirmed	Additional sampling, investigation, completion of CCTV inspection of storm laterals in the project area and dye testing of additional properties with suspected illicit connections is recommended in 2018
Austin Southfield	2017 sampling eliminated storm drain laterals on Janette St. as a suspect illicit discharge source. Upstream <i>E. coli</i> sampling indicates a low potential for continual sewage sources	Additional upstream investigations are not recommended at this time. Continued periodic DWS and evaluation of the system on Santa Barbara St. under Oakland County’s IDEP Program is recommended.
Devonshire Bloomfield Twp.	A Septic System on the Bloomfield Highlands Drain identified in 2016 has permitted to be relocated on the property under a new construction permit issued by OCHD. 2017 Sampling indicates there is little potential for continued upstream illicit discharge sources to the drain	Additional investigation of the drain for Illicit Discharge sources is not recommended at this time. Scheduled DWS and evaluation of the drain under Oakland County’s IDEP Program is recommended.
Claude H. Stevens 1	Upstream sampling and evaluation of the drain indicates it as having low potential	No further upstream sampling and investigations are recommended. Follow

	for illicit discharge sources. Residual soap suds were found in a connected CB at one (1) suspect property. Several maintenance issues on the drain were also identified.	up on potential soap suds issue at the identified suspect property and flow up on identified maintenance issues recommended.
Claude H Stevens 3 Bloomfield Twp.	One (1) failed Septic System on Charing Cross identified 2016 was eliminated by Bloomfield Twp. in 2017. Follow up sampling indicates additional upstream sources may still be present. Investigations have not identified any additional upstream sources yet.	Additional upstream sampling and investigation of the drain, is recommended. It is recommended that WRC work with Bloomfield Twp. and OCHD as necessary to locate and eliminate additional sources to the drain in 2018
Claude H Stevens 4 Bloomfield Twp.	One (1) local connected storm Drain on Dover St. has been identified as a suspect source for upstream discharges. No upstream sources or potential illicit connections have been identified.	Information on the drain system on Dover St. is needed to complete an evaluation of system. It is recommended that WRC work with Bloomfield Twp. to obtain information and conduct additional investigations of the suspect storm drain in 2018.
Claude H Stevens 10 Bloomfield Twp.	One (1) suspect property was identified in 2017. Investigations have not identified a potential discharge source	Additional inspection of suspect property to confirm and identify the discharge source is recommended in 2018

BACKGROUND

Five (5) County Drains were identified by WRC within the Rouge River Watershed as being in need of illicit discharge investigation for the purpose of identifying and eliminating sources of sewage contamination to the drains and to the Main and Upper Branches of the Rouge River in Oakland County. Drains selected for further investigation during this project period include:

- US-16 Drain in Farmington;
- Claude H. Stevens 1, 3, 4 and 10 Drain sections; and Devonshire and Bloomfield Highlands Drains in Bloomfield Township;
- Fracassi and Austin Drains Southfield;

Drain locations are depicted in Figure 1. These drains were selected for investigation based upon historical elevated *E. coli* dry weather screening data collected by WRC under the Illicit Discharge Elimination Program (IDEP) for Oakland County and follow up sampling and IDEP investigations conducted in 2013 through 2016. Drains with elevated counts of *E. coli* bacteria can indicate that upstream illicit discharge sources are present. Therefore, additional sampling and investigations were deemed necessary to determine if illicit discharges are occurring and to locate the source of those discharges within the drains.

These efforts support the activities required under Oakland County's municipal stormwater permit and the Alliance of Rouge Communities (ARC) Rouge River Collaborative Illicit Discharge Elimination Plan. This work is being funded by the ARC and carried out by the WRC.

INTRODUCTION

During the project period, elimination of five (5) illicit discharge sources located on the US 16 Drain, Claude H. Stevens No 3. Drain and Bloomfield Highlands Drain were completed. Additional sampling and Investigations were conducted on the Fracassi Drain, Claude H. Stevens No. 1,3,4 & 10 Drains, Devonshire Drain and Austin Drain.

Maps of local connecting storm drain systems were obtained from the communities; the drains have been segmented based on manhole locations. Surveys were conducted at select manholes for evidence of sewage contamination (toilet paper, grey water, soap suds, staining, etc.). Water samples were collected at locations exhibiting dry weather flow. Samples were analyzed for *E. coli* bacteria at the Walled Lake–Novi Waste Water Treatment Facility (WWTF). Physical observation and sampling data was reviewed and used to identify segments of each drain with suspected sanitary discharges. Additional samples were collected and observations were made and used to confirm and isolate specific segments of the drains, where possible, to identify specific inlet(s) with evidence of sanitary sewage. Closed Circuit Televised (CCTV) inspections were further used to identify specific possible sanitary illicit connections to the drain. Dye testing was used to confirm the presence of an illicit connection to the drain and or verify connection of internal plumbing fixtures to the sanitary sewer at suspect properties. A summary of sampling results and investigations conducted on each drain is provided herein. Location maps and results of sampling and investigations are provided as figures for each drain. Notes, from drain surveys and investigations are included in Appendix A. Copies of CCTV and MH inspections, and dye testing inspections are included in Appendix B. A complete list of *E. coli* sampling results is included in Appendix C. Copies of illicit discharge and dye testing notification letters are included in Appendix D.

US-16 DRAIN INVESTIGATION

Background

The US-16 Drain is a large enclosed storm drain located along the northern border of Farmington and Farmington Hills. The drain parallels Grand River Ave and Shiawassee Road and discharges to the Upper Rouge River in Shiawassee Park near Farmington Road. The Drain services local storm water road drain laterals in residential subdivisions on both the north and south side of Shiawassee Road and from businesses along Grand River Ave. west of Shiawassee. Historically the US 16 Drain was a combined sewer system with sanitary sewer overflow connections to the drain. The local storm drains were separated and overflows eliminated with the construction of a new sanitary system in the 1990s.

Previous Investigation Summary

Segmenting and sampling of the drain for *E. coli* in 2013 and 2014 isolated a segment of the drain along Shiawassee with potential illicit discharges of sanitary sewage. Smoke testing of the drain in this area indicated multiple potential illicit connections from residences along Shiawassee, along with possible potential issues with sanitary bulkheads and possible connections between the sanitary and storm laterals on Hillcrest and Glenview Streets. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for details.

In 2015, the City of Farmington completed a CCTV inspection of the US 16 Drain and the sanitary sewer system along Shiawassee Road. Results identified three illicit connections to the drain with evidence of sanitary sewage from 3 houses, 33550 and 33431 Shiawassee Road and 33840 Grand River Avenue to the US 16 Drain. Dye testing of the residences by WRC and the City of Farmington was conducted to confirm sanitary connections to the drain. A follow up survey and sampling of the storm drain laterals by WRC on Hillcrest and Glenview Streets did not identify any additional issues.

In 2016, staff from WRC met with the City of Farmington to discuss the status of the illicit connections to the drain on Shiawassee Road. The homeowners were notified of the illicit connections. The City of Farmington indicated that because house lateral connections should have been eliminated and connected to the Farmington sanitary system during upgrades to the system in the 1990s, that they would agree to make corrections. Due to location of the drain in Shiawassee Road and the complexity of going under the US 16 Drain to connect to the sanitary sewer, the City put out bids and hired an engineering firm to complete construction and design plans and a budget for a project to eliminate the illicit connections. The project was submitted to the City Council for approval and funding in 2017.

Current 2017 Corrective Actions

The project was approved but was delayed in order to coordinate work in Shiawassee Road with planned improvements to the Road by MDOT in 2017. The project was completed and the connections were eliminated in September of 2017. Costs for eliminating the Illicit connections include; \$15,000 for the project preparation of the bid proposal and funding securement and \$86,000 for the illicit connection elimination and connection to the sanitary sewer by the City of Farmington and contractors.

Results

The (3) illicit connections to the US 16 Drain on Shiawassee from residential homes have been eliminated by The City of Farmington. The illicit connections were corrected by disconnecting the house leads from the US 16 Drain and reconnecting them to the sanitary sewer. No additional illicit discharge issues have been identified. A map of showing the location of the properties is included as Figure 2.

Recommendations

The following activities are recommended based on activities to date on the US-16 Drain:

- Follow up sampling on the US 16 Drain will be conducted by WRC in 2018 as part of WRC's IDEP Program.

FRACASSI DRAIN INVESTIGATIONS

Background

The Fracassi Drain is a series of interconnected enclosed drains located in the southwest corner of Southfield at Inkster Rd. and 8 Mile Rd. The drains services residential neighborhoods and extends four blocks east of Inkster Rd. and from 8 Mile Rd north to Adeline St. Historically, the Fracassi Drain was part of the Hazel Drain, which is an older Chapter 4 Drain built in the 1920s servicing sub divisions west

of Inkster Road. and south of Shiawassee Road. The Hazel Drain connects to the Clareville Drain which discharges to Upper Branch of the Rouge River south of 8 Mile Rd in Farmington Hills. In the early 1970s, the Drain was improved by the City of Southfield and disconnected at Emmet St. and Inkster Rd. which is the community border between Southfield and Farmington Hills. Portions of the drain running east to west on Emmet Street were abandoned and storm laterals on the side streets east of Inkster were connected to a new line constructed on Byron St running west to east. The Fracassi Drain currently connects to the Emily Drain on Indian Street south of Byron Street. The Emily Drain discharges to Middle Branch of the Rouge River at Beech Daly Road just north of Shiawassee Road.

Previous Investigation Summary

In 2013 and 2014 elevated *E. coli* levels were detected in the storm drain laterals connecting to the Fracassi Drain on Byron Street. Additional samples were taken to locate segments of the drain with suspected illicit connections. Samples revealed elevated *E. coli* counts between 20,000 and 592,000 CFU /100 ML within the main trunk line along Byron Street and in the drain laterals located along Seminole, Poinciana, Negaunee, and Indian Streets. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for further details.

In 2016, staff from WRC met with the City of Southfield to obtain plans for local drain and sanitary systems and develop a plan for additional IDEP investigations to locate illicit discharges to the drain. Dry weather screening inspections and sampling for *E. coli* were conducted at forty-eight (48) manhole locations on storm laterals connecting to Byron Street from Indian, Negaunee, Poinciana and Seminole Streets and on Inkster Road at Byron, Emmett, Sedalia, Shiawassee Road and Adeline Streets.

Based on *E. coli* results and manhole inspections, it was decided to conduct CCTV inspections of the laterals on Seminole, Negaunee, Poinciana, and Indian from Byron Street north to Adeline Street and on lateral storm drain connections from Inkster Road to Seminole Street, at Emmet, Sedalia, and Adeline Streets. The 2016 CCTV inspections of storm drain segments located four (4) 6-inch clay tile pipe connections to the drain from residential properties at 21705, 21351, 21317 and 21159 Seminole Street. No flow or sanitary debris was indicated at these connections. In addition, an examination of connections to catch basin 13703 and manhole 6193 on Seminole St. were conducted. These are both 12- inch reinforced concrete pipe (RCP) connections from the west running under the driveway at 21823 Seminole St. and through the yard at 21681 Seminole St. No dry weather flow or visual evidence of sanitary flow was seen at these connections. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for further details.

Current 2017 Investigations

In 2017 additional observations were conducted on the drain and connecting laterals at twenty-nine (29) manhole locations and *E. coli* samples were collected from twenty-four (24) manholes exhibiting dry weather flow. Sampling results were used to further evaluate the project area for continued illicit discharge sources and prioritize areas in need of additional CCTV work. Additional sample results in this area were used also to help evaluate identify and prioritize suspect properties with identified suspect

illicit connections for dye testing. A map of sampling locations and *E. coli* results is included as Figure 3. A table of sampling results is included in Appendix C.

Additional Closed-Circuit Televising (CCTV) inspections were planned and completed in 2017. 2017 sampling results indicate that potential illicit discharges of sanitary sewage are occurring on Indian, Negaunee, Poinciana and Seminole Streets. CCTV inspection of the drain on Seminole St. was completed in 2016. CCTV of Indian, Negaunee and Poinciana Street drains were proposed in 2017. CCTV inspections the drain on Indian Street and part of Negaunee Street were completed during the project period. Heavy cleaning of the drain systems on the streets in this area was required in order to get the camera system through the drain to complete the CCTV Inspections. Additional, cleaning and CCTV Inspections are planned to be completed on drains for Negaunee and Poinciana Streets in 2018. A map of proposed and actual CCTV sections completed along with locations of suspected connections to the drain is included as Figure 4. Copies of CCTV Inspection records and Inspectors log are included in Appendix B.

Dye testing of suspected Illicit connections found in 2016 and one (1) additional suspected illicit connection found in 2017 began during the project period. Additional sampling collected in 2017 indicated potential sewage discharges at manhole locations downstream of the four (4) suspect 6-inch clay tile connections found in 2016 along with the additional suspect 6-inch clay tile connection found on Indian Street. A map of suspect Illicit connections and suspect properties is included as Figure 4. Arrangements were made with the City of Southfield to dye test the John Grace Community Center on Indian St. and dye testing notification letters were sent to six (6) additional residential properties on Seminole St. in connection with the four (4) suspect connections found in 2016. Dye testing of the John Grace Community Center was partially completed and dye testing at one (1) of the residential properties was scheduled and completed during the project period. Copies of dye the testing inspections are included in Appendix B. A discussion of results of sampling, CCTV Inspections and dye testing by street occurs below.

Results

Indian Street.

Manhole inspections and sampling indicate continue dry weather flow and high concentrations of *E. coli* in the drain on Indian Street south of the Shiawassee Road that is indicative of sanitary sewage. The highest concentrations, greater than 1,002,500 CFU/100 ML were found at MH 2610 just south of Emmet St. across from the John Grace Community Center. Visible observations at this MH also indicated the possible presence of dissolve toilet paper. A CCTV inspection of this section of drain between MH 6210 and 6211 found a connection of a 6-inch clay tile pipe inlet to the drain from the east in line with the south end of the John Grace Community Center Building. WRC met with the City of Southfield and arrangements were made to dye test the Community Center. Dye testing of the Community Center verified that bathrooms and connected fixtures along the front (west) side of the building located in the north, central and south end of the building and upstairs are connected to the sanitary sewer on Indian. However, dye testing of the bathroom and the kitchen in the southeast corner of the building along with

a mop sink and floor drains in the electrical room on the east side of the building and floor drains located in the basement of the old boiler room was inconclusive. For these fixtures, the tracer dye did not show up in the storm drains or sanitary sewer systems for the property and adjacent areas. Sanitary sewer plans for the property were attained by the City of Southfield which shows the locations of three (3) septic tanks in front of the property with connections to storm drain on Indian. Notations on the plans indicate the 3 tanks were abandoned, with the leads to the storm drain being disconnected. The plan shows sanitary manholes were added and leads from the building were disconnected and rerouted to the sanitary manhole on Indian Street. A survey of the manholes on the property and dye testing of the bathroom fixtures at the front of the building confirms these connections. Plans also indicate 4-inch clay tile pipe along the front (western) foundation of the building for footing and internal roof conductor drainage. Notations on the plans indicate that it was not connected to new sanitary sewer lead, but plans do not show the extent of this system or the connection to the storm drain. A complete survey of the property including the portion of the old Hazel Drain running across the property to the south and the storm and sanitary systems on Emmet Street and Van Buren Street to the east did not find any evidence of tracing dye or connectivity to these systems. The Community Center building is John Grace Elementary School which has undergone several building renovations and additions over the years. It is believed there is probably an older drain system which connects the floor drains, roof conductors and other drains on the eastern side the building. The City of Southfield is checking with the School District to see if additional building plans are available. Additional investigation of the building drainage system and unverified sanitary fixtures is planned for 2018.

Negaunee Street

Manhole inspections and sampling of dry weather flow indicate high *E. coli* concentrations in the drain south of Shiawassee Rd to Byron St. with the highest concentration of 649,000 CFU/100 ML at MH 6219 south of Emmet Street. Cleaning and CCTV inspection of the storm drain on Negaunee Street began in 2017. Sections of the drain from MH 6224 south of Shiawassee Road to MH 2221 south of Sedalia Street were completed during the project period. No connections to the drain were found during CCTV inspection of these sections. Additional CCTV inspections of sections south of this point to Byron Street are expected to be scheduled in 2018.

Poinciana Street

Manhole inspections and sampling of dry weather flow indicate high *E. coli* concentrations in the drain south of Shiawassee Rd. to Byron St. with the highest concentration 214,500 CFU/100 ML at MH 6228 south of Emmet Street. Cleaning and CCTV inspection of the drain on Poinciana St. was unable to be done in 2017. Plans are to complete this section of the drain in 2018. It should also be noted that the catch basin connected to MH 6232 on Poinciana Street which was indicated as a suspect illicit discharge source in 2016 was re-examined in 2017. Inspection of the catch basin not find any evidence of an illicit discharge occurring. This catch basin contained a blue-grey color liquid in the catch basin sump in 2016. Water in the catch basin sump in 2017 was clean and clear and there is no evidence of flow in the connected road ditch or driveway culvert would indicate that a continued discharge is occurring. It is suspected that this may have been a one-time dumping or spill of material to the ditch. The catch basin was removed as a continued suspected illicit discharge source at this time.

Seminole Street

Manhole inspections and sampling of dry weather flow indicate that Seminole Street is continuing to experience high concentrations of *E. coli* from dry weather flow sources. Results indicate that potential sanitary sources may exist over the entire length of the drain from its upper terminus at MH location at Adeline Street south to the drain outlet on Byron St. Results indicate high concentrations of *E. coli* north of Shiawassee Road with concentrations of 203,000 CFU/100 ML at MH 6193 and south of Shiawassee Road with concentrations of 153,000 CFU/100 ML at MH 6239. Concentrations at the outlet of the drain at Byron St. were also highly elevated at 89,553 CFU/100 ML. Sampling at MH 6194 at the intersection of Adeline Street and Seminole showed *E. coli* concentrations of 56,679 CFU/100 ML. This may also indicate that there is an upstream illicit discharge source coming in from connected drain lateral to the west on Adeline Street. In 2016, inspection and sampling of the connecting MH 6195 indicates that there is a continual dry weather flow source coming from a connected local storm drain north on Inkster Road. 2016 CCTV inspection of the segment of the drain on Adeline Street between MH 6195 and 6194 did not find any illicit connections the drain. MH 6195 was unable to be inspected and sampled in 2017 due to utility construction at the corner of Inkster Road and Adeline Street during this period. This issue will have to be revisited in 2018. Inspection and sampling of additional storm drain laterals from Inkster Road connecting to Seminole on Sedalia, Emmet and Byron Streets does not indicate that any of these laterals are a source of illicit discharges to the drain.

CCTV inspections of the drain on Seminole was conducted in 2016. Four (4) 6-inch clay tile connections to the drain were found at 21705, 21317, 21315, and 21159 Seminole. Due to continued high concentrations of *E. coli* in the drain at MH locations downstream of these suspect connections it was decided to dye test residential properties to confirm connections of internal plumbing fixtures to the sanitary sewer or verify any miss-connection of sanitary sewage from the identified suspected illicit connections to the storm drain. Due to the location of suspected illicit connections at two (2) of the properties and their proximity to adjacent property lot lines, two (2) additional properties, 21337 and 21341 were also added to the list of properties to be dye tested. Homeowners were sent dye testing notification letters at the end of November in 2017. An appointment was made and 21159 Seminole was dye tested by WRC and the City of Southfield in December of 2017. Dye testing confirmed that all sanitary fixtures in the home are properly connected to the sanitary sewer on Seminole Street. No response from the additional five (5) requests sent to homeowners for dye testing have been received as of this reporting period. The homeowners will be contacted, and additional residences will be dye tested in 2018. Location of suspect illicit connection and properties to be dye tested are indicated on Figure 4. Results of dye testing inspections are included in Appendix B. Copies of dye testing notification letters sent to homeowners are included in Appendix D.

Recommendations

The following activities are recommended for 2018.

- Complete cleaning and CCTV Inspections of drains on Negaunee and Poinciana Streets to identify additional potential Illicit connections.
- Conduct additional investigations and dye testing to confirm any new suspect connections and discharge sources.
- Conduct additional research, investigation and dye testing as necessary to confirm connections of unverified sanitary fixtures at the John Grace Community Center.
- Complete dye testing of residences on Seminole Street to verify or eliminate the remaining identified suspect illicit connections to the drain.

- Conduct additional sampling and investigations as needed to confirm illicit discharge sources from the connected local drainage to MH 6195 on Inkster Rd.

AUSTIN DRAIN INVESTIGATIONS

Background

The Austin Drain is a large enclosed storm drain system which runs west from Southfield Road along 10 Mile Road and discharges in to the storm collection system for Northwestern Highway just west of Evergreen Road in Southfield. The drain services the commercial facilities along a portion of Southfield Road north of 10 Mile, and west along 10 Mile Rd to Evergreen Road. The drain also services residential subdivisions north and south of 10 Mile Road through laterals connecting to the system on 10 Mile Road.

Summary of Previous Sampling and Investigations

The outlet of the Austin Drain has been previously tested for *E. coli* in 2008, 2012, and 2013 during dry weather by WRC under their IDEP program. Sampling results placed the drain on a priority list to be investigated for illicit discharges.

In 2014, the drain was segmented and sampled for *E. coli*. Results of sampling isolated a segment of the drain on Santa Barbara Street as a potential source of illicit discharges. Additional sampling and investigation indicated a local storm drain connecting Jeanette Street west of Santa Barbara St. as a suspected source of upstream illicit connections. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for details.

2017 Sampling and Investigations

In 2017 additional samples were collected on October 5 and November 11, 2017 to further evaluate the drain on Santa Barbara and connected local storm drain laterals on Janet Street for potential illicit discharges sources.

Results

E. coli results from samples taken in October on the Austin Drain on Santa Barbara Street just south of Janette Street at MH 5169 showed *E. coli* concentration of 7,361 CFU/100 ML. Sampling of upstream flow coming into MH 5170 just north of Janette Street showed and *E. coli* concentration of 8,907 CFU/100 ML. This indicates that there is probability of an illicit discharge source to the drain upstream of this location. Examination of both the east and west storm drain laterals connecting to MH 5170 on Santa Barbara Street did not exhibit dry weather flow. Results of sampling of water in the connected catch basin sumps did not indicate that either lateral is a source of potential illicit discharges to the drain. A resampling of the upstream dry weather flow source in MH 5169 in November showed *E. coli* concentrations to be 50 CFU/100 ML This indicates that upstream discharges to the drain may be intermittent. Although the October sampling *E. coli* concentrations were above 1,000 CFU/100 ML, it is below the 10,000 CFU/100 ML concentration indicative of a sanitary sewage source. The drain is

considered a low priority for continued upstream investigations at this time. Additional DWS data is needed to evaluate and prioritize the drain for further investigations. A map of sampling locations and results is included as Figure 5. A table of sampling results is included in Appendix C.

Recommendations

The following is recommended for 2018:

- No additional advance IDEP Investigations are recommended at this time.
- Additional DWS data is needed to evaluate the drain for upstream illicit discharges and investigations. It is recommended that WRC collect additional dry weather screening data under their IDEP Program at the drain lateral on Santa Barbara Street in 2018.

DEVONSHIRE DRAIN INVESTIGATIONS

Background

The Devonshire Drain is a large enclosed drain that runs along the south side of Square Lake Road west of Woodward Avenue in Bloomfield Twp. The drain services commercial properties along Square Lake Road and Woodward Avenue and residential properties in subdivisions south of Square Lake Road. The drain also collects flow from the Bloomfield Highlands Drain, north of Square Lake Road. The drain discharges to Rouge River just south of Devon Street downstream of Heather Lake.

Summary of Previous Investigations

The outlet of the drain has been previously tested for *E. coli* in 2005, 2009 and 2013 during dry weather by WRC under their IDEP program. Sampling results showed elevated *E. coli* concentrations ranging from 1,974 CFU/100 ML to 4,472 CFU/100 ML which placed the drain on a priority list to be further evaluated for illicit discharges.

In 2014, the drain was segmented and *E. coli* samples were collected at seven manhole locations along Wendover Street and east and west on Square Lake Road. Samples exhibited moderately high *E. coli* concentrations between 2,030 CFU/100 ML and 3,666 CFU/100 ML. However, no physical evidence of sanitary sewage (i.e., floatables, solids, color, odor, etc.) was observed. A need for additional sampling data to evaluate flow from the connected Bloomfield Highland Drain to the west and subdivisions north of Square Lake Rd. and from commercial properties along Woodward Ave and local drainage from residential subdivisions east of Woodward Avenue was indicated. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for details.

Although no additional sampling was conducted in 2016 it was noted in the “2016 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” that the Oakland County Health Department evaluated the septic system at 127 S. Berkshire and it was found that the drain field for the existing system had been constructed over the top of the Bloomfield Highlands Drain. This information resulted from a new construction permit application filed with the Oakland County Health Department for construction of an additional dwelling on the property. As part of the Permit application a new septic system will be installed at an alternate location on the property.

The Permit was issued by the Heath Department in 2017. A copy of the permit which shows the location of the proposed septic system is included in Appendix D. Communication with Health Department indicates that construction of the foundation for the new building has begun but installation of the new septic system is still pending.

2017 Sampling and Investigations

In 2017, additional sampling was conducted on the Devonshire Drain to evaluate and identify the need for additional advanced upstream IDEP investigations on the Devonshire and or Bloomfield Highlands Drains. Additional samples were collected and tested for *E. coli* at seven (7) locations in October and November of 2017. Samples were collected from the east and west flow inlets for Square Lake Rd at MH 1375 on Wendover St. Flow was also collected from MH 1386 where the Bloomfield Highlands Drain connects to the Devonshire Drain south of Square Lake Rd and at two (2) MH locations at the east end of the drain at MH 1391, where the drain crosses from the east side of Woodward Ave and at MH 219 where the drain crosses Square lake Rd, west of Lahser Rd. A map of sampling locations and *E. coli* results is included as Figure 6. A table of sampling results is included in Appendix C.

Results

Only one sample exhibited *E. coli* concentrations greater than 300 CFU/100 ML. This was the 11/9/2017 sample from the connected Bloomfield Highlands Drain, MH 1386, which was 557 CFU/100 ML. None of the sampling indicates that ether the east or west section of the drain has a high potential for upstream illicit discharges occurring.

Recommendations

The following is recommended for 2018:

- No additional sampling or investigation of the drain is recommended at this time.
- The drain will be put back on the list for periodic dry weather screening by WRC under their IDEP Program beginning in 2018.
- Follow up with the Oakland County Health Department on the status of the permit for new construction for the septic system located at 127 S. Berkshire in 2018 is recommended.

CLAUDE H. STEVENS DRAINS NO. 1, 3, 4, & 10 INVESTIGATIONS

Background

The Claude H. Stevens Drain is a conglomeration of 10 separate sections of enclosed storm drains located throughout Bloomfield Township. Outlets for the separate drain sections have been dry weather screened and sampled for *E. coli* by WRC under their IDEP Program. Four (4) sections of the drain, Claude H. Stevens 3, Claude H. Stevens 4 and Claude H. Stevens 10, showed evidence of possible illicit discharges occurring and were placed on the list for additional investigations. A summary of sampling and investigations conducted on each drain follows:

Claude H. Steven No 1 Drain

Background

The Claude H Stevens 1 Drain is an enclosed drain system located in the northeast corner of Bloomfield at the border of Pontiac. The drain is located north of Square Lake Road and east of Woodward Avenue. The drain services commercial properties along Woodward Avenue and residential properties to the east in the East Bloomfield Highlands Subdivision. The drain runs east along Highland Avenue and connects with the Hamlin Drain on Traymore Drive.

Previous Sampling and Investigations

Sampling of the drain at the outlet to the Hamlin Drain by WRC in 2013 and 2014 showed *E. coli* concentrations of 1,680 CFU/100 ML and 4,623 CFU/100 ML. Based on the sampling results the drain was placed on the list for additional sampling and investigation to determine the potential for upstream illicit discharges sources.

2017 Sampling and Investigations

In 2017, the drain was segmented and dry weather screening inspections were conducted and *E. coli* samples were collected at the outlet of the drain and at four (4) additional upstream MH locations to evaluate the drain for potential upstream illicit discharge sources. A map of sampling locations and results is included as Figure 7. A table of sampling results is included in Appendix C.

Results

E. coli sampling at the outlet to Hamlin Drain, at MH 5567 at Highland Avenue and Traymore Drive showed *E. coli* concentrations of 14,646 CFU/100 ML. The next upstream MH on Highland Avenue, MH 652, could not be located. It is believed to be buried under the dirt road. The connecting road ditch catch basin and inlets on the south side of the road and drainage ditch culvert inlet on the north side of the road were examined and no problems were indicated. However, conversations with a local resident indicated that there are road flooding issues at this location during rain events. *E. coli* samples were collected at the upstream manholes 554, 556 and 559. All upstream locations exhibited *E. coli* concentrations of less than 300 CFU/100ML and no indication of upstream sanitary discharges to the

drain was found. A trickle flow observed at MH 554 from a connected catch basin located in driveway off Winthrop for the Rectory at St. Georges Orthodox Church and School. Inspection of the catch basin found a residual trace of soap suds in the catch basin sump. No flow was observed in the connected property drain inlet. A survey of the Church and School parking lots did indicate any activities that would contribute to soap suds in the catch basin.

An additional sample was collected at MH 5565 on 11/14/2017. The MH is located on the Hamlin Drain upstream of the outlet from the C.H. Stevens No. 1 located at MH 5567. *E. coli* concentrations at MH 5565 were 9,873 CFU/100 ML. The outlet pipe from the CH Stevens Drain to the Hamlin Drain at MH 5567 is deep in the manhole and hard to sample and it is suspected that flow streams for the C.H. Stevens Drain No. 1 Drain and the Hamlin Drain may be hard to separate at this location.

Recommendations

The following follow up activities are recommended:

- No additional sampling or investigations of the C. H Stevens No. 1 Drain are recommended at this time.
- Follow up with WRC Drain Maintenance and Bloomfield Twp. on buried manhole cover and possible flooding issues at MH 652 is recommended.
- Follow up with Bloomfield Twp. on soap suds issue in the catch basin for St. George's Church and School Property is recommended.
- Additional follow up sampling on the Hamlin Drain in 2018 is recommended.

Claude H. Stevens No. 3 Drain

Background

The Claude H. Stevens No. 3 Drain is located east of Squirrel Road and North of Wattles Road and services residential subdivisions in this area. The drain runs east from Squirrel Road and discharges to a branch of the Rouge River just east of Farhill Street.

Previous Investigation Summary

In 2013, sampling of the outlet of the drain showed an *E. coli* concentration of 7,194 CFU/100 ML. In 2014, the Claude H. Stevens 3 Drain was investigated and sampled for *E. coli* at select upstream manhole locations in order to identify potential illicit discharge sources. Segmenting and sampling of the drain at upstream road crossings indicated elevated *E. coli* counts at all manholes the highest being manhole 408 on Charing Cross with concentration of 226,500 CFU/100 ML. High *E. coli* and physical evidence of sewage at this location (floatable, soap suds, solids) indicated a likely illicit discharge of sanitary sewage.

In 2016, staff from WRC met with Bloomfield Twp. to review previous sampling and investigation results and obtain available storm and sanitary maps for the subdivisions. A map of properties with septic systems was obtained which indicated the property at 4158 Charring Cross located adjacent to MH 408 is on a septic system. This Information was forwarded to the Health Department as a possible source of contamination to the drain. An investigation of the property was conducted by the Health Department

and WRC on January 12, 2017. A survey of the property identified a failed septic field on the property leaching into the storm drainage ditch on Charing Cross. See the “2014” and “2016 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Reports” for further details.

2017 Corrective Action Summary

Notice of the failed septic system was sent to the homeowner on Jan 24, 2017 by the Health Department. A subsequent Notice was sent to the Homeowner on Jan 25, 2017 by Bloomfield Township requiring connection to the Township sanitary sewer within 30 days. The existing septic tank was eliminated and the house lead was connected to the sanitary sewer in Feb. of 2017. Copies of The Health Department and Bloomfield Township Notice Letters are Included in Appendix D.

2017 Follow Up Sampling and Investigations

Follow up sampling was conducted on the Claude H. Stevens Drain No. 3 Drain in October and November of 2017 at three (3) locations, near the lower terminus of the drain at MH 405 off Far Hill, at MH 408 near 4158 Charing Cross and at an additional upstream MH 407 on Charing Cross. Sampling was conducted to evaluate the drain after elimination of the failed septic system to see if additional IDEP investigations would be necessary. A map of sampling locations and results is included as Figure 8. A table of sampling results is included in Appendix C.

Results

Results of *E. coli* sampling indicates that the drain is still experiencing elevated *E. coli* concentrations indicative of upstream sources of sewage contamination. Sampling of dry weather flow on 10/5/2017 near the outfall of the drain on Far Hill at MH 405 had concentrations of 7,361 CFU/100 ML and sampling of drain at MH 408 on Charing Cross had concentrations in excess of 1,002,500 CFU/100 ML. It should be noted that samples were taken from ponding water in MH 408. There was no flow in upstream MH 407 to the north and the ditch line along Charing Cross to the south was dry. A survey of the septic drain field area at 4158 Charing Cross did not indicate the presence of sanitary sewage or wet soil. The Health Department was contacted to inquire if sanitary sewage could still be leaching from the drain field for a period of time after the septic system had been disconnected, especially during periods of wet weather. They indicated that this was a possibility. MH 408 was sampled again on 11/14/2017. This time there was a little more flow in the drain. A sample was also obtained from upstream MH 407. There was not enough flow in the drain to sample any additional upstream MH locations. *E. coli* concentrations in MH 408 were greatly reduced at 5,273 CFU/100 ML and concentrations at upstream MH 407 were 4,684 CFU/100 ML. Elevated upstream *E. coli* levels indicate that additional illicit discharge sources to the drain may still be present. Low flow conditions in the drain prevented any additional investigation for upstream sources at this time.

Recommendations

The following follow up activities are recommended:

- Additional sampling and observation of the drain at MH 408 and along the ditch line for the property at 4158 Charing Cross should be conducted during dry and wet conditions to determine if additional upstream illicit discharges are occurring. This area should be revisited in spring of 2018.

Claude H. Stevens No. 4 Drain

Background

The Claude H. Stevens No. 4 Drain is located south of Wattles Road east of Kensington Road and services residential subdivisions south of Wattles Road between Kensington and Adams Road. The drain runs east of Kensington Road and discharges to a branch of the Rouge River just east of Burnley Street.

Previous Investigation Summary

In 2013, sampling of the outlet of the drain showed an *E. coli* concentration of 10,909 CFU/100 ML.

In 2014, the drain was segmented and sampled for *E. coli* at the first upstream manhole location and MH locations at Tullamore and Haddington streets. All manholes had elevated *E. coli* counts ranging from 876 CFU/100 ML to 4,802 CFU/100 ML. Inspections of manholes did not find any other physical evidence of sanitary sewage in the drain. Upstream manhole locations in Kensington Road were not sampled at this time due to concerns of working in the road right of way. An evaluation of the drain for the potential of upstream illicit discharges was inconclusive. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for details. No additional sampling of the drain was conducted in 2016.

2017 Sampling and Investigations

In 2017 the drain was sampled for *E. coli* at four (4) locations including; MH 3375 near the outlet of the Drain on Burnley Street, at MH 420 on Haddington Street and at MH 417 in Kensington Rd. A connected MH from a local drain system on Dover Street was also sampled. A map of sampling locations and results is included as Figure 9. A table of sampling results is included in Appendix C.

Results

All MH locations showed *E. coli* concentrations greater 1,000 CFU/100 ML. Sampling of the upper terminus of the drain at MH 417 in Kensington Road showed *E. coli* concentrations of 7,240 CFU/100 ML. Examination of this manhole showed connections for catch basins picking up road drain ditches on the northeast and southeast corners of Kensington Road and Dover Street. An additional inlet with a connecting MH in Dover Street was also identified. The inlet exhibited dry weather flow was found to be from a 6-inch clay tile crock drain under the center of the street. Sampling of flow in the connected drain showed *E. coli* concentrations of 14,308 CFU/100 ML. This drain system is not connected to the

road drainage ditches on the north or south corners of Dover Street. A survey of Dover Street along the dirt road and adjacent properties on the north and south side of the street was unable locate any defined ditch, swale or storm water collection system or storm water inlets or access points to the center street drain system. The route and location of the of the upstream drain system is unknown. A continued investigation for an upstream discharge source was unable to be conducted at this time.

Recommendations

The following follow up activities are recommended:

- The location of the drainage system for Dover Street is needed before an evaluation for upstream illicit discharge sources can continue. WRC should work in conjunction with Bloomfield Twp. to determine the route an extent of the drain system on Dover Street.

Claude H. Stevens No. 10 Drain

Background

The Claude H. Stevens No. 10 Drain is located east of Telegraph Road and south of Maple Road. The drain services private subdivisions along County Club, Birmingham Club, Fairlane Street and Hidden Woods Drive where it discharges to a natural tributary just south of Hidden Woods Drive. The tributary is connected to the Nichols Drain and is tributary to the Rouge River.

Previous Investigation Summary

In 2013, sampling of the outlet of the drain showed an *E. coli* concentration of 61,128 CFU/100 ML. In 2014 an upstream investigation and sampling of the drain for *E. coli* was conducted. Results of sampling in upstream manholes showed *E. coli* concentrations of 4,623 CFU/100 ML and 2,524 CFU/100 ML. Although these counts were elevated, they were not extremely high and the lack of any physical evidence of sanitary sewage made it inconclusive as to whether or not upstream sanitary discharges were occurring. See the “2014 Illicit Discharge Investigation in Oakland County’s Portion of the Rouge River Watershed Final Report” for details.

2017 Sampling and Investigations

In 2017 additional samples were collected at seven locations including; the drain outlet, connected local drain street catch basin inlets, road drainage ditch inlets on Hidden Woods Drive and at upstream MH locations on Fairlane Street and Birmingham Club Road. A map of sampling locations and results are included as Figure 10. A table of sampling results is included in Appendix C.

Results

Sampling at the drain outlet and connected street catch basin inlets on Hidden Woods Drive and upstream MH locations on Fairlane Street and Birmingham Club Roads exhibited low *E. coli* concentrations not indicative of an upstream sewage source. Sampling results do not indicate that illicit discharges are coming from the upstream connected subdivisions on Fairlane Street and Birmingham Club Roads.

While sampling at the drain outlet a conversation with a local resident on Hidden Woods Drive pointed out a stand of dead trees on the north side of Hidden Woods Drive along the property line west of the drain for 4061 Fairlane Street indicating that area is continually wet with flow coming off the property. An examination of the area found flow coming off the property to the drainage ditch along the north side of Hidden Woods Drive. Sampling of the flow coming off the property showed *E. coli* concentrations of 2,260 CFU/100 ML. Flow did not have any discoloration or odor indicative of sanitary sewage. A visual observation of the property from the road right of way indicated that a large portion of the back yard is wet with ponding water and flow coming off the property. There was also an indication of excavation along the foundation of back wall of the house. An examination and sampling of flow in connecting MH 6532 on the north side of the drain road crossing showed an *E. coli* concentration of 3,258 CFU/100 ML in the manhole and a concentration of 2,450 CFU/100 ML from flow coming in from the ditch line inlet. An additional 4-inch PVC pipe inlet is located in the MH coming from the property at 4061 Fairlane Street. The pipe has constant flow. Sampling of the flow from the PVC pipe had an *E. coli* concentration of less than 50 CFU/100 ML indicating it is probably groundwater flow from the adjacent property. It is unknown as to whether flow coming off the property is groundwater, surface water runoff, sanitary sewage or a combination of all three.

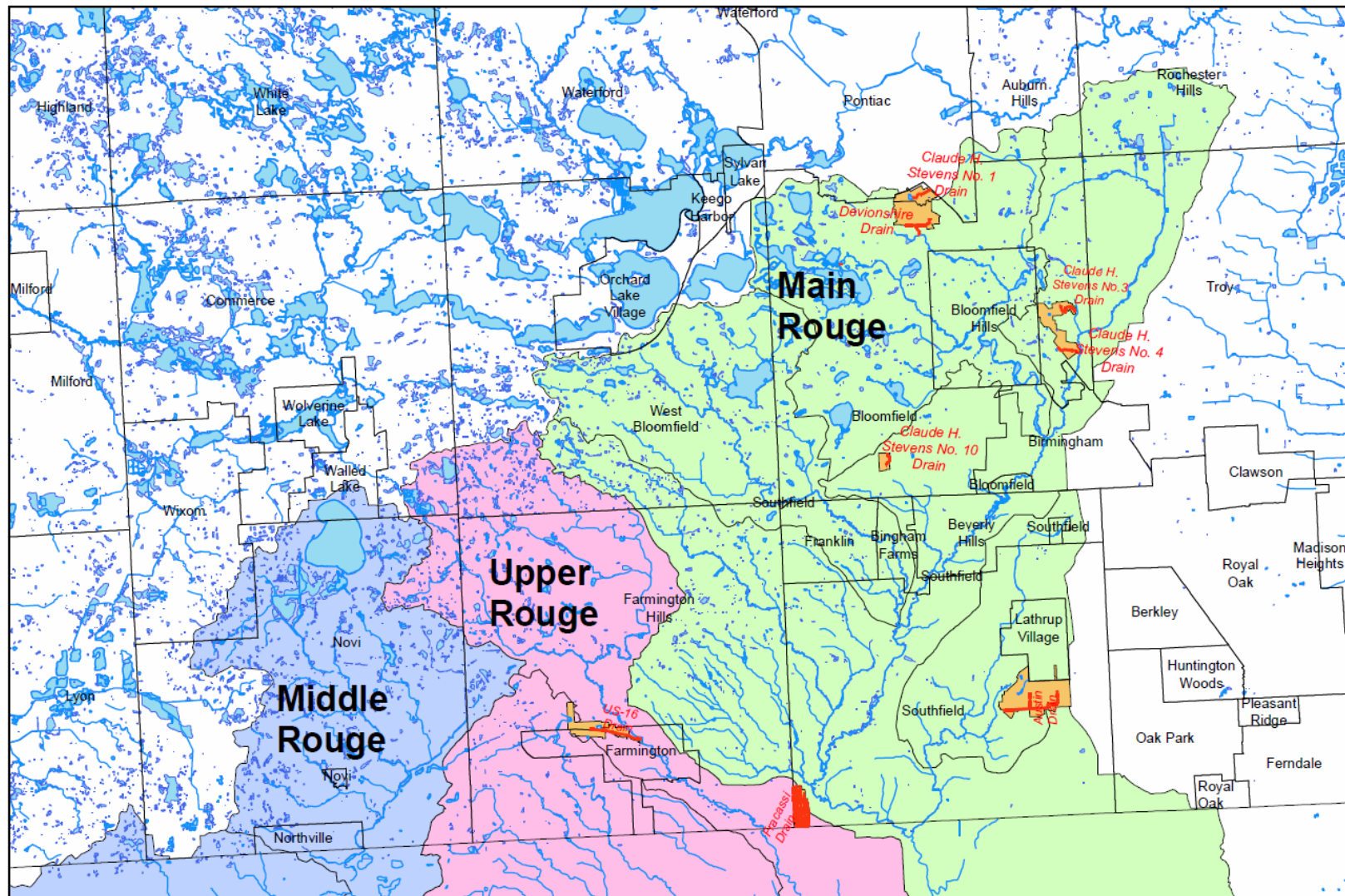
Recommendations

The following follow up activities are recommended:

- An inspection of the suspect property is recommended to determine the source and nature of flow coming of the property.
- Follow up on the dead trees along road right of way is also recommended.

Figures

Figure 1: Location of 2017 IDEP Project Areas



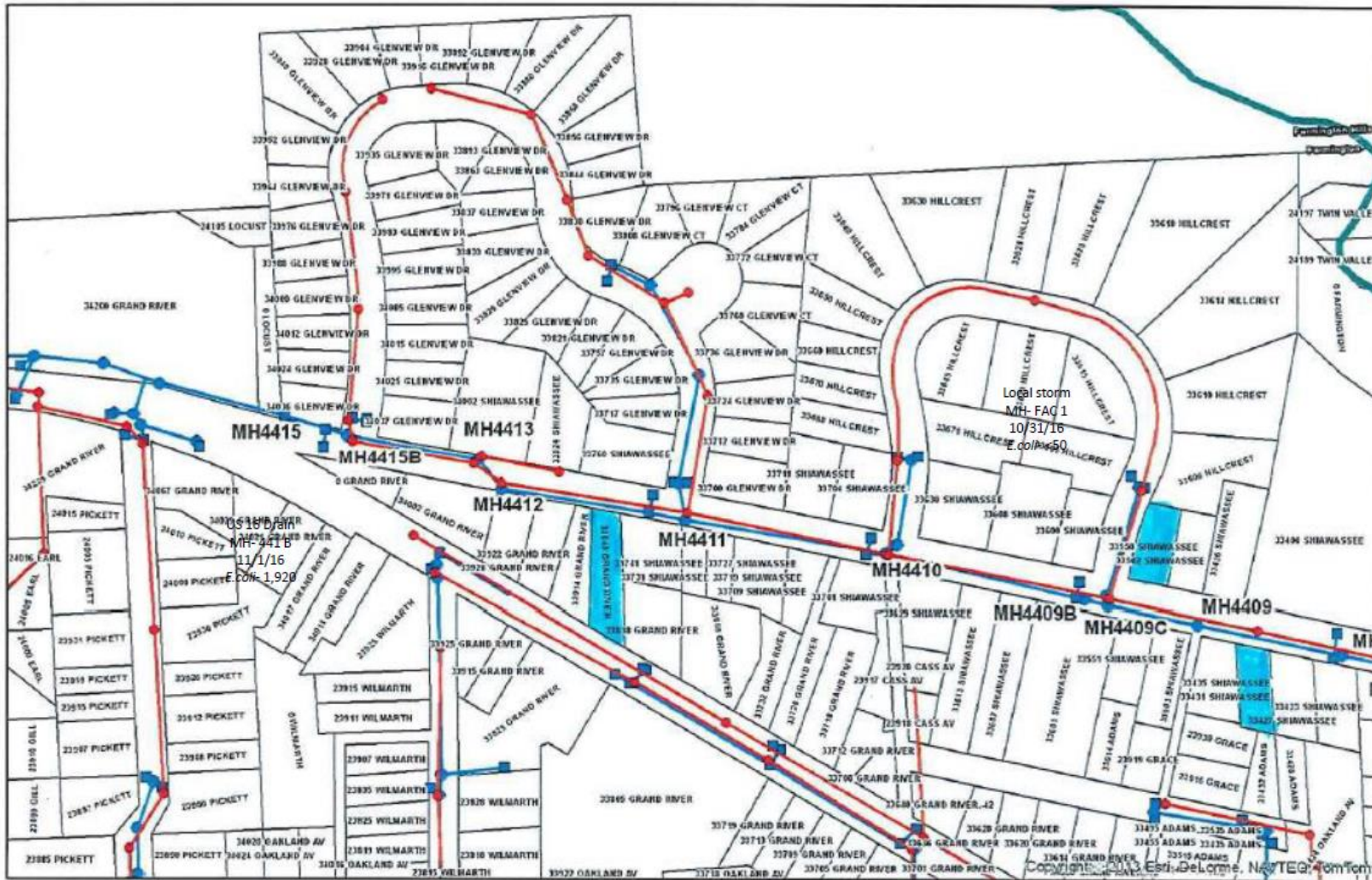
Legend

- | | | |
|--|--|--|
| Main Rouge | County Drains | Drain Distric Area |
| Middle Rouge | Watercourse | Municipal Boundaries |
| Upper Rouge | Water Body | |

2017 IDEP Project Area Locations



Figure 2: Location of Properties with Illicit connections to the US 16 Drain



City of Farmington Identified Properties with Illicit Connections to the US 16 Drain

Legend

- Parcel Boundary
- Storm Sewer Line
- Sanitary Sewer Line
- Storm Sewer Manhole
- Sanitary Manhole
- Catch Basin
- Properties with Illicit Connections



Figure 3: Fracassi Drain 2017 *E. coli* Sampling Locations and Results.



Fracassi Drain, 2017 IDEP Project E.coli Sampling, Southfield

Legend

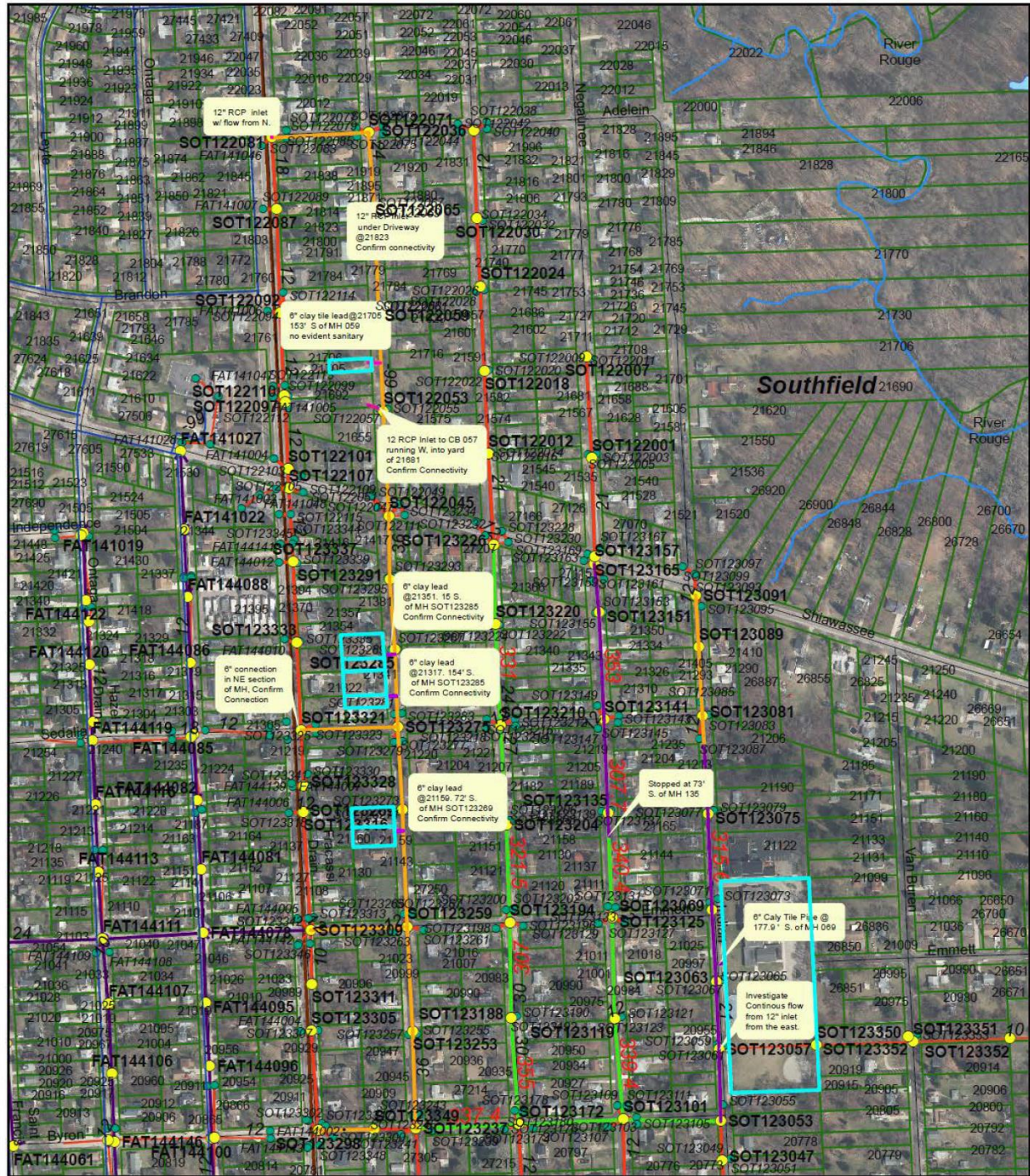
- ★ Drain Outlet
- MH Locations
- ★ Sampling Locations
- Fracassi Drain
- Emily Drain
- Open Water Course
- ▭ Municipal Boundary



Oakland County
Illicit Discharge
Elimination Program



Figure 4: Fracassi Drain 2017 CCTV Locations and Inspection Results



Fracassi Drain, 2017 IDEP Project, CCTV Locations, Southfield

Legend

- MH Locations
- Fracassi Drain
- Proposed 2017 CCTV Sections
- Suspect Properties
- CB Inlet Structures
- Emily Drain
- 2017 Completed CCTV Sections
- Municipal Boundary
- Open Water Course

Proposed 2017 CCTV	Actual 2017 CCTV
19 Segments	9 Segments
Total Linear Feet= 5,728	Total Linear Feet= 2,117

WRC
WATER RESOURCES CORPORATION

Figure 5: 2017 Austin Drain Sampling Locations and Results



Austin Drain, E.coli Sampling Map 10/5/17 & 11/14/17 Southfield

Legend

- ★ MS4 DP
- Austin Drain
- Open Water Course
- Drain Structures
- ▭ Municipal Boundary



Oakland County
Illicit Discharge
Elimination Program



Figure 6: Devonshire Drain Sampling Locations and Results



- Legend**
- ★ Drain Discharge Point
 - Drain Structure
 - Devonshire Drain
 - Bloomfield Highland Drain
 - Open Water Course

**Devonshire Drain,
E.coli Sampling, 10/4 & 11/9 2017
Bloomfield Twp.**

Figure 7: Claude H. Stevens Drain No. 1 Sampling Locations and Results



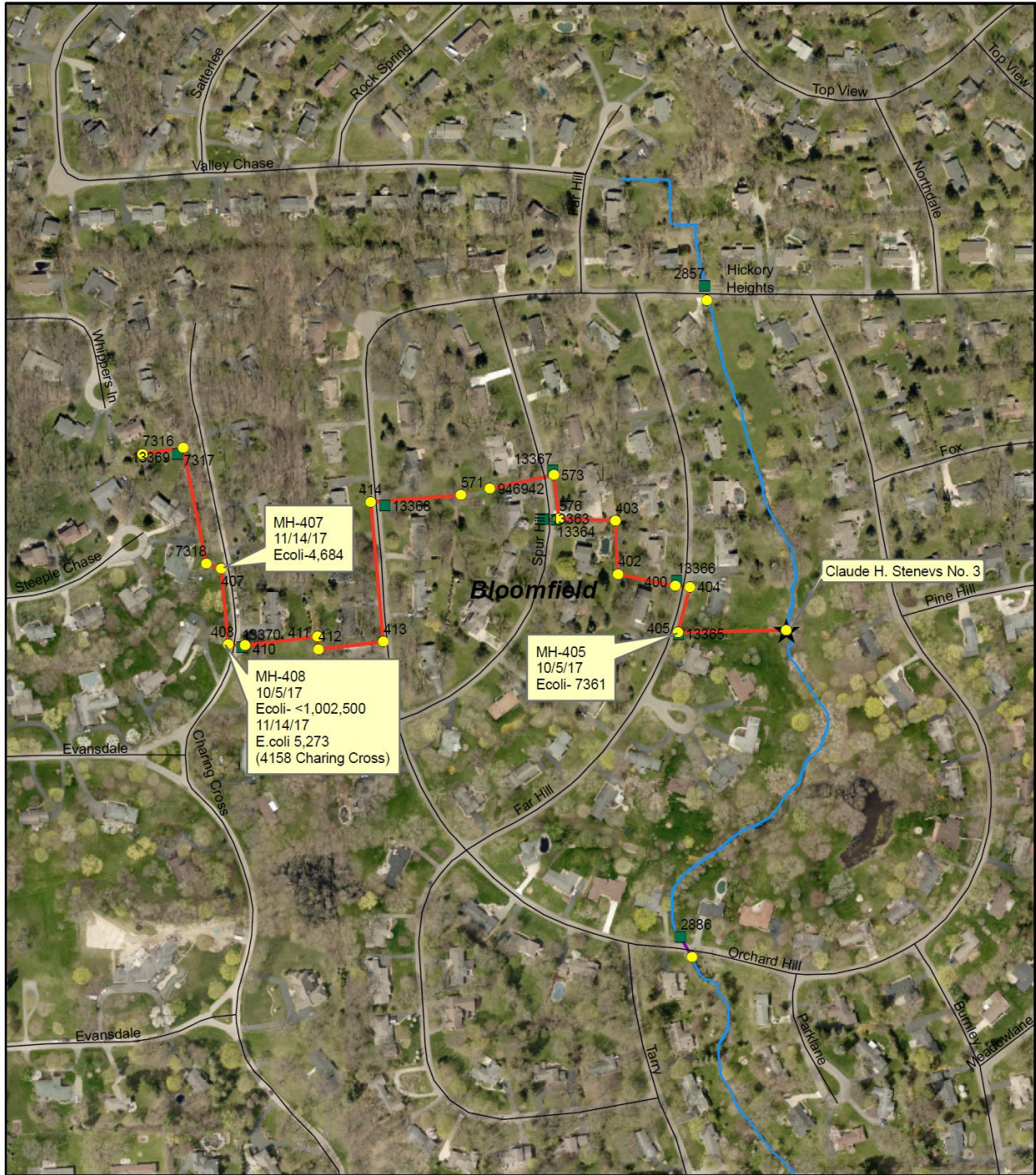
**Claude H. Stevens No.1 Drain
Investigation & Sampling Results, 11/9 & 11/14 2017
Bloomfield Twp.**

Legend

- ★ Drain Discharge Point
- Manhole Structures
- Inlet Structures
- Claude H Stevens Drain
- Hamlin Drain
- Open Water Course
- Municipal Boundary



Figure 8: Claude H. Stevens No. 3 Drain Sampling Locations and Results



**Claude H. Stevens No. 3 Drain
E.coli Sampling 10/5 & 11/14 2017
Bloomfield Twp.**

legend

- ★ MS4 Discharge Point
- Manhole Structures
- Inlet Structures
- Claude H Stevens Drain
- Open Water Course
- ▭ Municipal Boundary



Oakland County
Illicit Discharge
Elimination Program



Figure 9: Claude H. Stevens No. 4 Drain Sampling Locations and Results



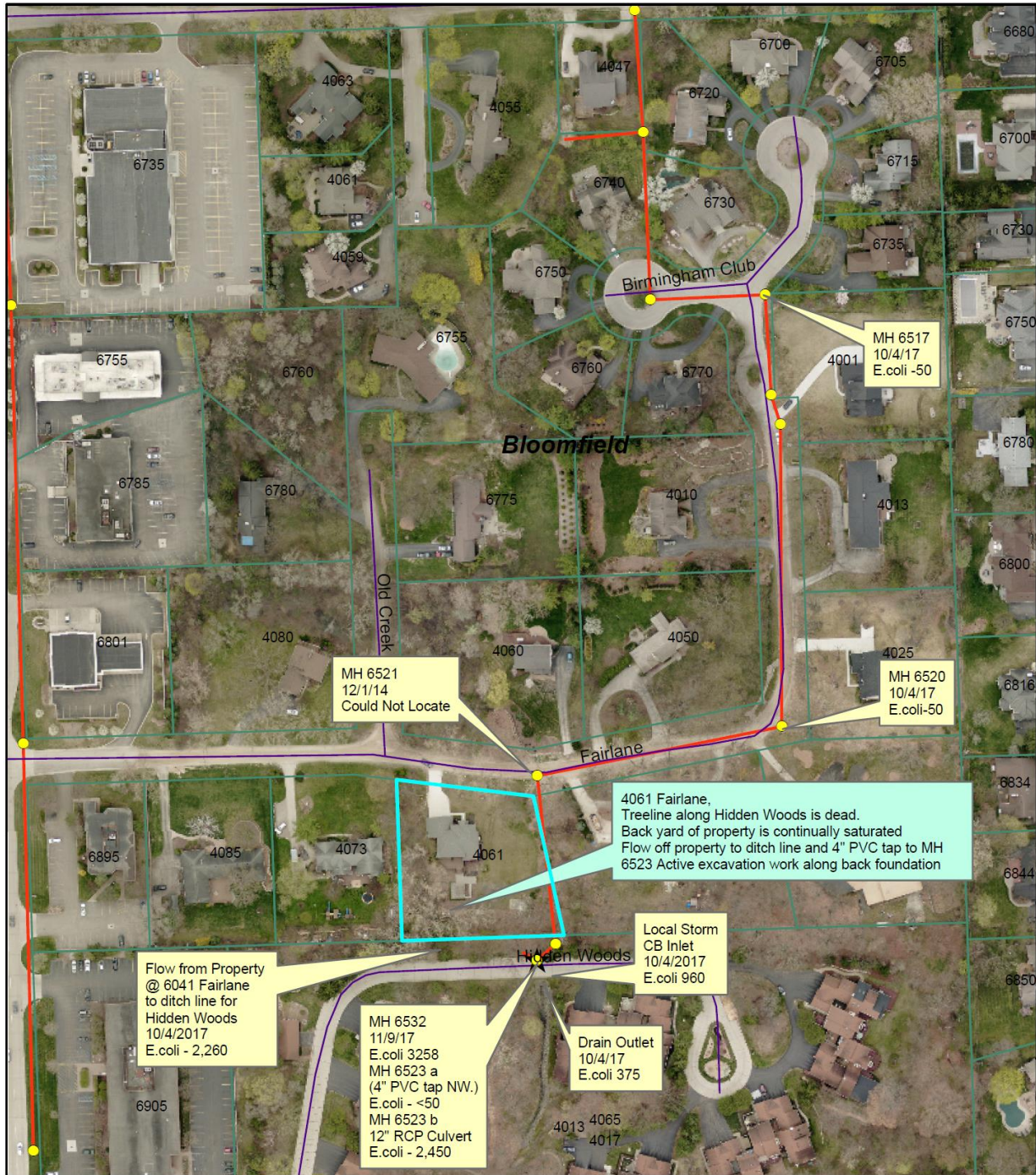
**Claude H. Stevens No. 4 Drain
E.coli Sampling Results 10/5 & 11/4 2017
Bloomfield Twp.**

Legend

- ★ MS4 Discharge Point
- Manhole Structures
- Inlet Structures
- Claude H Stevens Drain
- Open Water Course
- ▭ Municipal Boundary



Figure 10: Claude H Stevens No. 10 Drain Sampling Locations and Results



**Claude H. Stevens No.10 Drain
IDEP Investigation & E.coli Sampling, 10/4 &11/9 2017
Bloomfield Twp.**

Legend

- ★ MS4 Discharge Points
- Drain Structures
- Claude H. Stevens No. 5 & 10 Drains
- Open Water Course



APPENDIX A: FRACASI DRAIN FIELD NOTES, OBSERVATIONS & PHOTOS

APPENDIX A: DRAIN SURVEYS, FIELD OBSERVATIONS & RECOMENDATIONS

Drain Survey Inspection, Notes, Observations, and Follow Up Actions

Bloomfield Twp.

Claude H. Stevens Drain

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions
11/9/2017	5567	CH Stevens 1	Bloomfield TWP	Outlet to Hamlin Drain @ Highland Ave & Traymore Dr.	Yes	None	None	None	None	None	14646	12" Pipe in MH From W. Outlet of CH Stevens No. 1 to Hamlin Drain. Constant flow. Deep inside MH just above channel for the Hamlin Drain	Upstream Investigation Needed.
11/14/2017	554	CH Stevens 1	Bloomfield TWP	NW corner of Winthrop & Highland DR	Yes	None	None	None	Soap Suds	None	155	Pipe form NW, connecting CB with trickle flow. Residual Soap Suds in CB Sump. CB is in Drive for St. George's Rectory. No flow from connected drain system	Examined parking lot for St. George's School and Church. No Activity. Follow up needed.
11/14/2017	556	CH Stevens 1	Bloomfield TWP	Connecting MH @ Highland Ave.	Yes	None	None	None	None	None	<50	Connects flow from Woodward to Highland Ave	No further action needed
11/14/2017	559	CH Stevens 1	Bloomfield TWP	MH @ ST. Georges Parking Lot	Yes	None	None	None	None	None	<50	MH on E side of Woodward N. of drive for St. George's Church and School. Receives flow form pond on E. side of Woodward	No further action needed.
11/14/2017	5565	CH Stevens 1	Bloomfield TWP	1st MH Upstream of CH Stevens 1 Outlet on the Hamlin Drain	Yes	None	None	None	None	None	9873	1st Upstream MH from C. H. Stevens No. 1 outlet on the Hamlin Drain	Follow up sampling needed.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions Recommendations
10/5/2017	405	CH Stevens 3	Bloomfield TWP	MH @ 4079 Far Hill	Yes	None	None	None	None	None	7361	1st Upstream Manhole from Outlet at 4079 Far Hill. Low Flow in drain from W. Hard to sample	Upstream investigation needed
10/5/2017	408	CH Stevens 3	Bloomfield TWP	MH @ 4158 Charing Cross	Yes	None	None	Yellow	May be dissolve solids present	Yellow Brown Staining on MH wall	>1,102,500	Low flow in drain. Sampled from ponding at outlet for S. to E. turn in MH. Brown / yellow staining on MH wall believed to be from inlet flow from ditch line. Sample is yellow brown and turbid. May be some solids present.	May be inflow from failed septic field at 4158 Charing Cross. House was connected to the san. Sewer in 2017. Not enough flow from drain to N. to sample upstream MH. A survey of ditch line and property did not find any evidence of sanitary.
11/14/2017	408	CH Stevens 3	Bloomfield TWP	MH @ 4158 Charing Cross	Yes	None	None	None	None	None	5273	Follow up to sample taken on 10/5/17. More flow in drain. No color or sanitary solids or odor present	Upstream investigation needed.
11/14/2017	407	CH Stevens 3	Bloomfield TWP	Upstream of MH 408	Yes	None	None	None	None	Non	4684	Upstream of MH 408 on Charing Cross. Pass through MH. Low flow, hard to sample. Not enough flow in Upstream MH to sample	Upstream Investigation needed.
10/5/2017	7315	CH Stevens 4	Bloomfield TWP	MH @ lot line between 4800 & 4872 Burnely Dr.	Yes	None	None	None	None	None	8660	1st Upstream Manhole from Outlet at 4079 Burnley Dr. Sample flow w. drain inlet	Upstream Investigation needed

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
10/5/2017	420	CH Stevens 4	Bloomfield TWP	MH @ lot line between 4848 & 4866 Haddington Dr.	Yes	None	None	None	None	None	1852	Sample in MH at Haddington Rd Drain Crossing. Flow in drain from W.	Upstream Investigation needed
10/5/2017	417	CH Stevens 4	Bloomfield TWP	MH in Kensington Rd @ Dover Rd	Yes	None	None	None	None	None	7240	MH is in S. Bound Kensington Rd near curb across from Dover St. Has road Inlets for NE and SE corner of Kensington and Dover which were dry and additional inlet to the E. from a connect MH in Dover St. with flow.	Sampled Flow In MH. Need to look at flow source on Dover St.
11/14/2017	Local	CH Stevens 4	Bloomfield TWP	MH @ Kensington & Dover (Local Storm)	Yes	None	None	None	None	None	14308	Local Storm MH on Dover St Connected to MH 417 On Kensington. 6" clay tile crock drain. E. under Dover. Survey of dirt Road could not locate upstream MH or storm inlet to the drain	Need plans for storm drain system on Dover to complete investigation.
11/9/2017	6115	CH Stevens 5	Bloomfield TWP	MH In Drive at 6405 Telegraph	Yes	None	None	None	Non	None	<50	MH located S. drive for Samaritas Senior Apts. on Telegraph Connects flow from W. side of Telegraph and from the N. on Telegraph	No further upstream investigation needed.
10/4/2017	6522	CH Stevens 10	Bloomfield TWP	N of Drain Stream Crossing @ Hidden Woods Dr.	Yes	None	None	None	None	None	375	1st MH upstream of Rd Crossing Outlet at MH 6523	No issues found.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
10/4/2017	Local	CH Stevens 10	Bloomfield TWP	Local Storm CB to outlet @ SW side of Stream Crossing	Yes	None	None	None	None	None	960	Local Storm CB outlet on SE side of Rd crossing outlet.	No issues found.
10/4/2017	4061 Fairlane	Private	Bloomfield TWP	4061 Fairlane property drainage to ditch line on Hidden Woods	Yes	None	None	None	None	None	2,260	Sampled flow from wet area in back yard of 4061 Fairlane to ditch line on N Side of Hidden Woods Dr. at Tree line. May also be excavation going on along house foundation.	May be associated sanitary issue. High groundwater, surface runoff, sump discharge may also be present.
10/4/2017	6520	CH Stevens 10	Bloomfield TWP	MH @ 4035 Fairlane Dr.	Yes	None	None	None	None	None	50	MH in front yard of property, sampled flow form North	No issues found.
10/4/2017	6517	CH Stevens 10	Bloomfield TWP	MH @ 4001 Fairlane Dr.	Yes	None	None	None	None	None	50	MH at corner of lot at Fairlane & Birmingham Club. Sampled flow from W.	No Issues Found.
11/9/2017	6523	CH Stevens 10	Bloomfield TWP	MH @ Hidden Woods Dr. Stream Crossing	Yes	None	None	None	None	None	3258	MNH on S. Side of Hidden Woods Drive at Stream Crossing has 12 " inlet from ditch line W. and 4" PVC pipe inlet from property to the W. both with flow. Sampled MH	Need to follow up on flow in ditch line and PVC Pipe inlet to determine source
11/9/2017	19043	CH Stevens 10	Bloomfield TWP	Inlet from Rd ditch W. to MH 6523	Yes	None	None	None	None	None	< 50	4" PVC Pipe to MN 6523 from property to west. Clean clear constant flow. May be sump pump discharge	Probably ground water flow. Need to follow up and see if homeowner has tap permit.
11/9/2017	19042	CH Stevens 10	Bloomfield TWP	Inlet from MH 6522 to MH 6523	Yes	None	None	None	None	None	2450	12" RCP inlet from ditch line on Hidden Woods W. Flow in ditch line. Sampled	Follow investigation needed to determine source of flow.

Devonshire Drain

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions /Recommendations
10/4/2017	1386	Devonshire Drain	Bloomfield TWP	Bloom. High. Drain connecting MH	Yes	None	None	None	None	None	50	Sampled trickle flow coming into MH from connected Bloomfield Highlands Drain on N side of Square Lake Rd. MH is behind Fence line on S. Side oh Sq. Lk.	No further upstream investigation needed.
10/4/2017	1375	Devonshire Drain	Bloomfield TWP	MH @ Sq. Lk. & Wendover	Yes	None	None	None	None	None	<50	NH is in Wendover @ Sq. Lk. Flow From E. & W. Inlets with outlet to the S. Sampled combined flow in MH.	No issues found.
10/4/2017	1391	Devonshire Drain	Bloomfield TWP	MH on S. Woodward N. of Sq. Lk.	Yes	None	None	None	None	None	100	MH is S of Drive for Commercial Property at NW corner of Sq. Lk and Woodward. Sampled flow form N and E. side of Woodward.	No further upstream investigation needed.
11/9/2017	219	Devonshire Drain	Bloomfield TWP	MH @ Woodward & Lasher	Yes	None	None	None	None	None	158	MH on W. side of Lasher S. of Square Lk. Connects N. side Square Lk. Sampled flow in drain	No further upstream investigation needed.
11/9/2017	1375a	Devonshire Drain	Bloomfield TWP	Square Lk. @ Wendover W. inlet	Yes	None	None	None	None	None	<50	MH in Wendover S. of Square Lk. 15" RCP inlets from W. and E. Sampled flow from W. inlet	No further upstream investigation needed.
11/9/2017	1375b	Devonshire Drain	Bloomfield TWP	Square Lk. @ Wendover E. inlet	Yes	None	None	None	None	None	210	MH in Wendover S. of Square Lk. 15" RCP inlets from W. and E. Sampled flow from E. inlet	No further upstream investigation needed.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions /Recommendations
11/9/2017	1386	Devonshire Drain	Bloomfield TWP	Bloom. Highlands Drain Connecting MH	Yes	None	None	None	None	None	557	Flow from Bloomfield Highlands Drain to the Devonshire Drain. Low flow. MH is behind fence line on Square Lk. Rd.	No further upstream investigation needed.

City of Southfield

Austin Drain

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions /Recommendations
10/5/2017	5168	Austin	Southfield	MH SW Corner of Santa Barbara @ Janette	Yes	None	None	None	None	None	7361	MH is at SE Corner Santa Barbara & Janette. Sample from MH 5169 to the S.	Upstream investigation needed.
10/5/2017	5169	Austin	Southfield	MH NW Corner of S. Barbara @ Janette	Yes	None	None	None	None	None	8970	MH is at NE corner of Santa Barbara and Janette. Has inlets for E and W Janette St. Sampled flow coming in from upstream to the N	Upstream investigation needed.
10/5/2017	Janette St. E	Local	Southfield	MH E Janette to MH 5169	No	None	None	None	None	None	375	CB for Janette St. E connected to MH 5169. No flow in inlet. Sampled water in CB sump.	No Issues Found
10/5/2017	Janette St. W.	Local	Southfield	MH W Janette to MH 5169	No	None	None	None	None	None	50	CB for Janette St. W connected to MH 5169. No flow in inlet. Sampled water in CB sump.	No Issues Found
11/14/2017	Janette St. E.	Local	Southfield	MH for E Janette to MH 5169	Yes	None	None	None	None	None	50	CB for Janette St. E connected to MH 5169. No flow in inlet. Sampled water in CB sump.	No issues found.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
11/14/2017	5169	Austin	Southfield	MH @ San Barbara @ Janette	No	None	None	None	None	None	50	Follow up to sampling on 10/5/17. Sampled upstream flow coming from N.	No further upstream investigation needed.
11/14/2017	Janette St W.	Local	Southfield	MH for W Janette to MH 5169	No	None	None	None	None	None	364	CB for Janette St. W connected to MH 5169. No flow in inlet. Sampled water in CB sump.	No issues found.

Fracassi Drain

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
8/31/2017	6217	Fracassi	Southfield	Indian St. & Byron St.	Yes	None	None	None	None	None	29,144	Flow form N. on Indian & W. on Byron. Sampled flow coming from Indian.	Upstream investigation needed.
8/31/2017	6209	Fracassi	Southfield	Indian St.	Yes	None	None	None	None	None	980	1st MH N. of Byron on Indian. Sampled Flow in main channel. Steady flow in pipe coming from the east	Flow form east is old Hazel Drain. Flow is not sanitary. Investigate source.
8/31/2017	6216	Fracassi	Southfield	Negaunee St & Byron St.	Yes	None	None	None	None	None	99,143	Sampled Main Flow in in E-W Channel. Trickle Flow coming from N inlet NE,S,NW inlets were dry	Upstream investigation needed.
8/31/2017	6219	Fracassi	Southfield	Negaunee St	Yes	None	None	None	None	Toilet Paper	649,000	First MH N. of Byron on Negaunee. possible Toilet paper in MH	Upstream investigation needed.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
8/31/2017	6227	Fracassi	Southfield	Poinciana St & Byron St	Yes	None	None	None	None	None	98,048	Sampled flow in Main E /W Channel. Trickle flow from N. Inlet. S, NW,NE,SW, & SE Inlets were dry	Upstream investigation needed.
8/31/2017	6228	Fracassi	Southfield	Poinciana St	Yes	None	None	None	None	None	214,500	Sampled flow in Main E /W Channel. Trickle flow from N. Inlet. S, NW,NE,SW, & SE Inlets were dry	Upstream investigation needed.
8/31/2017	6235	Fracassi	Southfield	Seminole St. & Byron St	Yes	None	None	None	None	None	89,553	MH N. of Byron on Seminole. Sample flow in Main N/S channel. All other inlets were dry	Upstream investigation needed.
8/31/2017	6236	Fracassi	Southfield	Seminole St.	Yes	None	None	None	None	None	16,328	Sampled flow in main E/W channel. Trickle flow coming in from N. Inlet. All other inlets were dry.	Upstream investigation needed.
8/31/2017	6237	Fracassi	Southfield	Seminole St. & Emmet St.	Yes	None	None	None	None	None	5,818	Intersection of Seminole & Emmet. Sampled flow in Main N/S channel. Inlets for Emmet and Road drain ditch inlets were dry.	Upstream investigation needed.
8/31/2017	6242	Fracassi	Southfield	Inkster & Byron	No	None	None	None	None	None	Not Sampled	Elbow in MH for Inkster Rd N to Byron St. MH was Dry	No further Inv. Needed
9/12/2017	6211	Fracassi	Southfield	Indian St & Emmet St.	Yes	None	None	None	None	None	252,000	MH at Indian & Emmet. N & W Road Ditch Inlets were dry. Sampled Main Channel	Upstream Inv. needed

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions Recommendations
9/12/2017	6213	Fracassi	Southfield	Indian St. & Sedalia St.	Yes	None	None	None	None	None	8,231	MH 6213 at Indian & Sedalia. N,S, E road drain Inlets were dry. Sampled Main Flow channel	Upstream Inv. needed
9/12/2017	6215	Fracassi	Southfield	Indian S. of Shiawassee	No	None	None	None	None	None	Not Sampled	Dry .Upper Terminus MH. . Connects Local on &N. of Shiawassee.	No further Upstream Inv. Needed
9/12/2017	6224	Fracassi	Southfield	Negaunee S. of Shiawassee	No	None	None	None	None	None	Not Sampled	Manhole Wet. No Flow from Inlets	No further Upstream Inv. Needed
9/12/2017	6225	Fracassi	Southfield	Negaunee N. of Shiawassee	No	None	None	None	None	None	Not Sampled	Dry. No flow from inlets	No further Upstream Inv. Needed
9/12/2017	6222	Fracassi	Southfield	Negaunee St. & Sedalia St.	Yes	None	None	None	None	None	12,274	Rd. Inlets dry. Sampled Flow from N. in Main Channel	Upstream investigation needed.
9/12/2017	6220	Fracassi	Southfield	Negaunee St. & Emmet St.	Yes	None	None	None	None	None	27,353	Rd. Inlets dry. Sampled Flow from N. in Main Channel	Upstream investigation needed.
9/12/2017	6229	Fracassi	Southfield	Poinciana St. & Emmet St.	Yes	None	None	None	None	None	2,865	Rd. Inlets dry. Sampled Flow from N. in Main Channel	Upstream investigation needed.
9/12/2017	6231	Fracassi	Southfield	Poinciana St & Sedalia St.	Yes	None	None	None	None	None	7,714	Rd. Inlets dry. Sampled Flow from N. in Main Channel	Upstream investigation needed.
9/12/2017	6233	Fracassi	Southfield	Poinciana St S. of Shiawassee	No	None	None	None	None	None	Not Sampled	Rd. Inlet dry. MH is wet. MH N. of Shiawassee was dry	No further Upstream Investigation needed.
9/12/2017	6190	Fracassi	Southfield	Seminole St. S of Shiawassee	Yes	None	None	None	Debris , Trash	None	56,038	Rd. Inlets dry, debris in MH, Sampled flow From N	Upstream investigation needed.
9/12/2017	6239	Fracassi	Southfield	Seminole St. & Sedalia St.	Yes	None	None	None	None	None	6,113	Rd. Inlets dry. Sampled Flow from N. in Main Channel	Upstream investigation needed.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
9/12/2017	6245	Fracassi	Southfield	Inkster Rd. & Emmet St.	Yes	None	None	None	None	None	<50	N. S. drain inlets and Rd. drain inlets were dry. MH located directly W. of MH 6245 is Upper Terminus MH for the Hazel Drain. It was tapped to MH 6245 in 2017. It receives flow from the old Hazel Drain N. on Inkster. Tap was made to relieve flooding on Inkster Rd.	No further Upstream Investigation needed.
9/28/2017	6248	Fracassi	Southfield	Inkster Rd & Sedalia	Yes	None	None	None	None	None	158	Sampled flow from Main Channel Inlet from Inkster Rd. Inlets for N and S. Sedalia Rd. drain ditches were dry	No further Upstream Investigation needed.
9/28/2017	6194	Fracassi	Southfield	Seminole & Adeline	Yes	None	None	None	None	None	56,679	Sampled flow from W. on Adeline. Construction at Inkster & Adeline prevented examination of upstream MH 6195	Upstream investigation needed.
9/28/2017	6193	Fracassi	Southfield	Seminole St. S of Adeline	Yes	None	None	None	None	None	203,000	Rd. drain inlets were dry. Sampled flow in main channel from the N	Upstream investigation needed.
9/28/2017	6191	Fracassi	Southfield	Seminole St. N. of Shiawassee	Yes	None	None	Grey	None	None	48,374	Rd. drain inlets were dry. Sampled flow from N. Possible grey water.	Upstream investigation needed.
9/28/2017	6190	Fracassi	Southfield	Seminole & S. of Shiawassee	Yes	None	None	None	None	None	21,809	Rd. drain inlets were dry. Sampled flow in main channel from the N	Upstream investigation needed.

Inv. Date	ID	Drain Name	CVT	Location	Flow	Structure Damage	Odor	Color	Floatables	Deposits / Stains	Results	Observations	Follow Up Actions/ Recommendations
9/28/2017	6239	Fracassi	Southfield	Seminole & Sedalia	Yes	None	None	None	None	None	153,000	Rd. drain inlets were dry. Sampled flow from N.	Upstream investigation needed.
9/28/2017	6237	Fracassi	Southfield	Seminole & Emmet	Yes	None	None	None	None	None	49,236	Rd. drain inlets were dry. Sampled flow from the N.	Upstream investigation needed.
9/28/2017	6245	Fracassi	Southfield	Inkster & Emmet	Yes	None	None	None	None	None	<50	Revisited site, resampled flow from Hazel Drain	No further Upstream Investigation needed.
11/8/2017	6209	Fracassi	Southfield	Indian St.	Yes	None	None	None	None	None	43,479	Across from John Grace Community Center yard. Inlet from hazel drain E. Sampled main flow from N	Upstream investigation needed.
11/8/2017	6210	Fracassi	Southfield	Indian St.	Yes	None	None	None	None	Dissolved Toilet Paper	>1,002,500	Across from John Grace Community Center at S. end of building. Dissolved Toilet paper MH	Upstream investigation needed. Sewage in the drain. May be from Community Center.
11/8/2017	6219	Fracassi	Southfield	Negaunee St N. of Byron St.	Yes	None	None	None	None	None	442,500	1st Upstream MH on Negaunee N. of Byron. Sampled flow from N.	Upstream investigation needed.
11/8/2017	6228	Fracassi	Southfield	Poinciana St. N. of Byron St	Yes	None	None	None	None	None	9,256	1st Upstream MH on Poinciana N. of Byron. Sampled flow from N.	Upstream investigation needed.
11/8/2017	6236	Fracassi	Southfield	Seminole St.	Yes	None	None	None	None	None	37,398	1st Upstream MH on Seminole N. of Byron. Sampled flow from N.	Upstream investigation needed.
11/8/2017	6245	Fracassi	Southfield	Inkster Rd. & Emmet St.	Yes	None	None	None	None	None	>50	Connection MH for Inkster Rd to Emmet . Sampled flow from tap to Manhole form Hazel Drain to the W.	No further Upstream Investigation needed.

APPENDIX B – FRACASSI DRAIN CCTV & MH INSPECTION REPORTS

APPENDIX B: FRACASSI DRAIN CCTV, MH & DYE TESTING INSPECTIONS



PIPELINE MANAGEMENT COMPANY
 2673 E. Maple Road
 Milford, MI., 48381
 Tel: 248-685-1500 Fax: 248-684-7615

Date:	9/28/17
Emergency Mobilization	
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Owners Name WRC OAKLAND DRAIN	Project Name FRACASSI DRAIN
Field Contact Name & Phone # NONE	Worksite Location SOUTHFIELD

LABOR HOURS		Start Time	End Time	Total Hours	Travel Time	Down Time	Billable Hours
Class	Employees Name						
<i>Labor Classes: O = Operator/Driver SL = Spot Liner Driver/Operator F = Foreman L = Laborer FS = Field Superintendent</i>							
O	BILL BARSH	0600	1600	10.00			10.00
O	TIM MINOCK	0600	1600	10.00			10.00
L	ISAAC QUINONES	0600	1200	6.00			6.00
L	JOSH CLARK	0600	1600	10.00			10.00

Describe Work Performed	SIZE	US	DS	LINE	CCTV	JET	
COMPUTER 9412 - 7117							
SOT123081 TO SOT123075; HEAVY SAND	18	081	075		320	320	
SOT123075 TO SOT123069; HEAVY SAND	18	075	069		309	309	
TOTALS						629	629

CALIBRATION RECORD (TO BE PERFORMED ON THE FIRST WORKING DAY OF EACH MONTH)

Unit # 1 S/N		Reading Before Adjustment				Unit # 2 S/N			
Date	Confirm Fresh Air Zero	Reading Before Adjustment				Reading After Adjustment			
		%LEL	%O ₂	CO	H ₂ S	%LEL	%O ₂	CO	H ₂ S
No. 1	Yes <input type="checkbox"/> No <input type="checkbox"/>								
No. 2	Yes <input type="checkbox"/> No <input type="checkbox"/>								
PMC Signature		Bill Barsh				Owner/Inspector Signature			



PIPELINE MANAGEMENT COMPANY
 2673 E. Maple Road
 Milford, MI., 48381
 Tel: 248-685-1500 Fax: 248-684-7615

Date:	9/28/17
FRACASSI DRAIN	

EQUIPMENT USAGE				EQUIPMENT USAGE			
Equipment Description	Hourly Usage	Daily Usage	Idle Time	Equipment Description	Hourly Usage	Daily Usage	Idle Time
Jetter Vac Combo w/one Hose	10			Lateral Grouting Packer (15" - 24")			
Extra Lay Flat Disch. Hose (50')				Reinstatement Cutter			
TV Grout Unit	10			Root Cutter 8"-12" (Carbide Blade)			
Off Road CCTV Unit				Root Cutter 15"-24" (Carbide Blade)			
UV Spot Liner Unit				Root Cutter 8"-12" (Chain Knocker)			
Supervisors Vehicle				Root Cutter 15"-24" (Chain Knocker)			
3/4 Ton & Less Support Vehicle				Confined Space Entry Equipment		1	
Cargo Van	10			Traffic Cones		20	
F450 Stake Truck				Traffic Barrels			
Easement Machine w/Trailer				Traffic Signs		2	
10' Tag Trailer				Arrow Board			
Mobile Grout Reel				Sewer Plug 8" to 24"			
Trailer Mounted Grout Reel				Sewer Plug 24" to 36"			
Joint Grouting Packer (8"-10")				Chain Saw			
Joint Grouting Packer (12"-15")				2000 - 3500 Watt Generator			
Joint Grouting Packer (18"-21")				Chipping Hammer			
Joint Grouting Packer (24"-42")				Air Compressor to 175 CFM			
Lateral Insp. From The Main				Drysuit			
Lateral Cleaning Equipment				Sonde Manhole Locator			
Lateral Grout Packer (8"-12")				Waders			

DISPOSAL			
Manifest #	Quantity	UM	Location

MATERIALS, RENTALS, SUBCONTRACTORS & OTHER PROJECT COMMENTARY			
PROJECT CONSUMABLES:	Tyveks	Each	Cement Bags
	Hydro	Pails	Masonry Bricks
	Propane	Each	Masonry Block
			Flash Drive
			Salt
			Other

List Project Notes, Other Consumables, Rentals and Direct Project Costs Below - Attach Invoice Copies
 HEAVY CLEANING OF STORMWATER LINES DUE TO SIGNIFICANT SAND/DEBRIS.

Bill Barsh
 Owner/Inspector Signature *[Signature]*



PIPELINE MANAGEMENT COMPANY

2673 E. Maple Road
 Milford, MI., 48381
 Tel: 248-685-1500

Fax: 248-684-7615

Date: 9/29/17

Emergency Mobilization

Owners Name	Project Name
WRC OAKLAND DRAIN	FRACASSI DRAIN
Field Contact Name & Phone #	Worksite Location
NONE	SOUTHFIELD

LABOR HOURS		Start Time	End Time	Total Hours	Travel Time	Down Time	Billable Hours
Class	Employees Name						
<i>Labor Classes: O = Operator/Driver SL = Spot Liner Driver/Operator F = Foreman L = Laborer FS = Field Superintendent</i>							
O	BILL BARSH	0600	1600	10.00			10.00
O	TIM MINOCK	0600	1600	10.00			10.00
L	ISAAC QUINONES	0600	1600	10.00			10.00
L	JOSH CLARK	0600	1600	10.00			10.00

Describe Work Performed	SIZE	US	DS	LINE	CCTV	JET
COMPUTER 9412 - 7117						
SOT123069 TO SOT123063; HEAVY SAND	18	069	063		234	234
SOT123063 TO SOT123057; HEAVY SAND	18	063	057		220	220
TOTALS					454	454

CALIBRATION RECORD (TO BE PERFORMED ON THE FIRST WORKING DAY OF EACH MONTH)

Unit # 1 S/N		Reading Before Adjustment				Unit # 2 S/N			
Date	Confirm Fresh Air Zero	%LEL	%O ₂	CO	H2S	%LEL	%O ₂	CO	H2S
No. 2	Yes <input type="checkbox"/> No <input type="checkbox"/>								
PMC Signature		Bill Barsh				Owner/Inspector Signature			



PIPELINE MANAGEMENT COMPANY

2673 E. Maple Road

Milford, MI., 48381

Tel: 248-685-1500

Fax: 248-684-7615

Date: 9/29/17

FRACASSI DRAIN

EQUIPMENT USAGE				EQUIPMENT USAGE			
Equipment Description	Hourly Usage	Daily Usage	Idle Time	Equipment Description	Hourly Usage	Daily Usage	Idle Time
Jetter Vac Combo w/one Hose	10			Lateral Grouting Packer (15" - 24")			
Extra Lay Flat Disch. Hose (50')				Reinstatement Cutter			
TV Grout Unit	10			Root Cutter 8"-12" (Carbide Blade)			
Off Road CCTV Unit				Root Cutter 15"-24" (Carbide Blade)			
UV Spot Liner Unit				Root Cutter 8"-12" (Chain Knocker)			
Supervisors Vehicle				Root Cutter 15"-24" (Chain Knocker)			
3/4 Ton & Less Support Vehicle				Confined Space Entry Equipment		1	
Cargo Van	10			Traffic Cones		20	
F450 Stake Truck				Traffic Barrels			
Easement Machine w/Trailer				Traffic Signs		2	
10' Tag Trailer				Arrow Board			
Mobile Grout Reel				Sewer Plug 8" to 24"			
Trailer Mounted Grout Reel				Sewer Plug 24" to 36"			
Joint Grouting Packer (8"-10")				Chain Saw			
Joint Grouting Packer (12"-15")				2000 - 3500 Watt Generator			
Joint Grouting Packer (18"-21")				Chipping Hammer			
Joint Grouting Packer (24"-42")				Air Compressor to 175 CFM			
Lateral Insp. From The Main				Drysuit			
Lateral Cleaning Equipment				Sonde Manhole Locator			
Lateral Grout Packer (8"-12")				Waders			

DISPOSAL

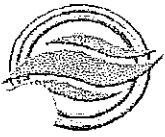
Manifest #	Quantity	UM	Location

MATERIALS, RENTALS, SUBCONTRACTORS & OTHER PROJECT COMMENTARY

PROJECT CONSUMABLES	Tyveks	Each	Cement Bags	Flash Drive
	Hydro	Pails	Masonry Bricks	Salt
	Propane	Each	Masonry Block	Other

List Project Notes, Other Consumables, Rentals and Direct Project Costs Below - Attach Invoice Copies
 HEAVY CLEANING OF STORMWATER LINES DUE TO SIGNIFICANT SAND/DEBRIS. VACTOR 0015 TAKEN TO WRC DUMPSITE; UNLOADED 5.5 YARDS OF DEBRIS/SAND.

Bill Barsh
 Owner/Inspector Signature



PIPELINE MANAGEMENT COMPANY
 2673 E. Maple Road
 Milford, MI., 48381
 Tel: 248-685-1500 Fax: 248-684-7615

Date:	10/2/17
Emergency Mobilization	
<input type="checkbox"/>	<input checked="" type="checkbox"/>

Owners Name	Project Name
WRC OAKLAND DRAIN	FRACASSI DRAIN
Field Contact Name & Phone #	Worksite Location
NONE	SOUTHFIELD

LABOR HOURS		Start Time	End Time	Total Hours	Travel Time	Down Time	Billable Hours
Class	Employees Name						
<i>Labor Classes: O = Operator/Driver SL = Spot Liner Driver/Operator F = Foreman L = Laborer FS = Field Superintendent</i>							
O	BILL BARSH	0600	1600	10.00			10.00
O	TIM MINOCK	0600	1600	10.00			10.00
L	ISAAC QUINONES	0600	1600	10.00			10.00
L	JOSH CLARK	0600	1600	10.00			10.00

Describe Work Performed	SIZE	US	DS	LINE	CCTV	JET
COMPUTER 9412 - 7117						
SOT123057 TO SOT123151; HEAVY SAND AND DEBRIS	21	057	053		226	226
SOT123157 TP SPT123151; HEAVY SAND AND DEBRIS	21	157	151		84	84
SOT123151 TO SOT123141; HEAVY SAND AND DEBRIS	21	151	141		349	349
TOTALS					659	659

CALIBRATION RECORD (TO BE PERFORMED ON THE FIRST WORKING DAY OF EACH MONTH)

Unit # 1 S/N		Reading Before Adjustment				Unit # 2 S/N				Reading After Adjustment			
Date	Confirm Fresh Air Zero	%LEL	%O ₂	CO	H ₂ S	%LEL	%O ₂	CO	H ₂ S				
No. 1	Yes <input type="checkbox"/> No <input type="checkbox"/>												
No. 2	Yes <input type="checkbox"/> No <input type="checkbox"/>												
PMC Signature		Bill Barsh				Owner/Inspector Signature							



PIPELINE MANAGEMENT COMPANY

2673 E. Maple Road
 Milford, MI., 48381
 Tel: 248-685-1500

Fax: 248-684-7615

Date:	10/2/17
FRACASSI DRAIN	

EQUIPMENT USAGE				EQUIPMENT USAGE			
Equipment Description	Hourly Usage	Daily Usage	Idle Time	Equipment Description	Hourly Usage	Daily Usage	Idle Time
Jetter Vac Combo w/one Hose	10			Lateral Grouting Packer (15" - 24")			
Extra Lay Flat Disch. Hose (50')				Reinstatement Cutter			
TV Grout Unit	10			Root Cutter 8"-12" (Carbide Blade)			
Off Road CCTV Unit				Root Cutter 15"-24" (Carbide Blade)			
UV Spot Liner Unit				Root Cutter 8"-12" (Chain Knocker)			
Supervisors Vehicle				Root Cutter 15"-24" (Chain Knocker)			
3/4 Ton & Less Support Vehicle				Confined Space Entry Equipment		1	
Cargo Van	10			Traffic Cones		20	
F450 Stake Truck				Traffic Barrels			
Easement Machine w/Trailer				Traffic Signs		2	
10' Tag Trailer				Arrow Board			
Mobile Grout Reel				Sewer Plug 8" to 24"			
Trailer Mounted Grout Reel				Sewer Plug 24" to 36"			
Joint Grouting Packer (8"-10")				Chain Saw			
Joint Grouting Packer (12"-15")				2000 - 3500 Watt Generator			
Joint Grouting Packer (18"-21")				Chipping Hammer			
Joint Grouting Packer (24"-42")				Air Compressor to 175 CFM			
Lateral Insp. From The Main				Drysuit			
Lateral Cleaning Equipment				Sonde Manhole Locator			
Lateral Grout Packer (8"-12")				Waders			

DISPOSAL

Manifest #	Quantity	UM	Location

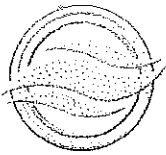
MATERIALS, RENTALS, SUBCONTRACTORS & OTHER PROJECT COMMENTARY

PROJECT CONSUMABLES	Tyveks	Each	Cement Bags	Flash Drive
	Hydro	Pails	Masonry Bricks	Salt
	Propane	Each	Masonry Block	Other

List Project Notes, Other Consumables, Rentals and Direct Project Costs Below - Attach Invoice Copies
 HEAVY CLEANING OF STORMWATER LINES DUE TO SIGNIFICANT SAND/DEBRIS.

Bill Barsh

Owner/Inspector Signature



PIPELINE MANAGEMENT CO., INC.

2673 E. Maple Road
Milford, MI., 48381
Tel: 248-685-1500 • 248-685-7615

Work Order: _____

Date: 10/03/2017

Page 2 of 2

EQUIPMENT USAGE				EQUIPMENT USAGE			
Equipment Description	Hourly Usage	Daily Usage	Idle Time	Equipment Description	Hourly Usage	Daily Usage	Idle Time
Jetter Vac Combo w/ one discharge hose	10.00			Large Diameter Packer (21" - 42")			
Extra Lay Flat Discharge Hose (50')		2.00		Large Diameter Packer (48")			
TV Grout Unit	10.00			Large Diameter Packer (54")			
UV Spot Liner Unit (6" - 27")				Root Cutter (8"-12")			
Mobile Grout Reel				Root Cutter (15"-24")			
Easement Machine w/Trailer				Sewer Plug (8"-24")			
Off Road CCTV Unit				Sewer Plug (24"-36")			
Trailer Mounted Grout Unit				Sewer Plug (36"-48")			
3/4 Ton & Less Stake Truck				Electric Pump - 2"			
Supervisor Vehicle				Electric Pump - 3"			
Cargo Van	10.00			Chain Saw			
F450 Stake Truck				2000 to 3500 Watt Generator			
10' Tag Trailer				48 KW Sound Suppressed Generator			
Confined Space Equipment				Chipping Hammer			
Traffic Cones		20.00		Air Compressor (to 175 CFM)			
Traffic Barrels				Dry Suit			
Traffic Signs		2.00		Sonde Manhole Locator			
Arrow Board				REINSTATEMENT CTR			

DISPOSAL

Manifest #	Quantity	UM	Location

MATERIALS, RENTALS, SUBCONTRACTORS & OTHER PROJECT COMMENTARY

Cloth Gloves _____ Pair ■ Latex Gloves _____ Pair ■ Rubber Gloves _____ Pair ■ Tykeks _____ Each ■ Cement Bags _____ Each
 Hydro Cement _____ Palls ■ Masonry Bricks _____ Each ■ Salt _____ Each ■ Propane _____ Each ■ Flash Drives _____ Each

List Consumables & Rentals Below - Attach Invoice Copies

PMC Signature: _____

Owner/Inspector Signature: [Signature]

Between Structures No. 075 and

Page 1 of 1

Project: Fracassi Drain	W/O Number:	Date: 9-28-17	Plan Sheet #:
Contractor: Pipeline Management Co.	Location: Indian St		
Inspector's Signature:	Foreman:		
Inspector's Printed Name: Cody Wakeford	Inspector's Hours Worked: From: 7:00am To: 330pm Total: 8hrs		

Weather (A.M./P.M.): cloudy/cloudy	Temp. (A.M./P.M.): 50/70	Day: Thursday
------------------------------------	--------------------------	---------------

CCTV/ Cleaning Into

Station From	Station To	Lineal Feet	Pipe Size	Kind of Pipe	Type of Joint	Supplier/Remarks	Pipe Lot No.
SOT1 23081	SOT12 3075	321.7'	18"	RCP			
SOT1 23075	SOT12 3069	315.6	18"	RCP			

Structure Information

Plan Station	Actual Station	Type	Size	Total MH Height	Supplier/Remarks
N/A					

Labor/Classification		No.	Hrs.	Equipment/Type		Model	Hrs.
1.	Foreman	1	9	1	TV/ Grout Unit	Telespector	9
2.	Operator	1	9	2	Cargo Van	Ford	9
3.	Laborer	2	18	3	Vactor Truck	Sterling	9
4.				4			
5.				5			
6.				6			
Hours Total			36	Hours Total			27

No.	Pay Item Description	Location	Quantity	Unit	Plan Sheet	Posted By	Remarks

JIM NASH
OAKLAND COUNTY WATER RESOURCES COMMISSIONER

04/04/08

INSPECTOR'S DAILY REPORT

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Project: Fracassi Drain	W/O # 663640	Date: 9-28-17	Plan Sheet:
-------------------------	--------------	---------------	-------------

House Lead Address/Lot #	Direction Wye or T	Joint/Pipe	Lead Length	Wye Distance to Downstream M.H.	Invert Elevation at Property Line

Interference/Description	Location/Depth	Remarks
N/A		

Grade And Line Verification				
Station	Proposed Elevation	Actual Elevation	Difference	↔ From Center Line
N/A				

Remarks

On site at 8:00. Pipeline Management already on site. Crew is cleaning out OT123075 so they can send the camera down the line. WRC Engineer Ron on site at 9:30 to go over plans for the project. Was told that the crew is cleaning only what is needed to get camera through. And to be looking for any leads, possibly house leads, tapping into the pipe. Ron asked me to take sample of any lines if flowing into structure to check for ECOLI. The line has a lot of silt sand in it so Pipeline is vactoring out silt to be able to get the camera through. Ron off site at 9:30. Crew moved Vac truck down to SOT123069 to clean debris out and jet line to be able to continue the camera down stream. Crew wrapped up for the day and off site at 3:00.

INSPECTOR'S DAILY REPORT

Between Structures No. 075 and

Project: Fracassi Drain	W/O Number:	Date: 9-29-17	Plan Sheet #:
Contractor: Pipeline Management Co.		Location: Indian St	
Inspector's Signature:		Foreman:	
Inspector's Printed Name: Cody Wakeford		Inspector's Hours Worked: From: 7:00am To: 330pm Total: 8hrs	

Weather (A.M./P.M.): clear/sunny	Temp. (A.M./P.M.): 66/67	Day: Friday
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CCTV/ Cleaning Into

Station From	Station To	Lineal Feet	Pipe Size	Kind of Pipe	Type of Joint	Supplier/Remarks	Pipe Lot No.
SOT1 23069	SOT12 3063	235.4'	18"	RCP			
SOT1 23063	SOT12 3057	40'	21"	RCP			

Structure Information

Plan Station	Actual Station	Type	Size	Total MH Height	Supplier/Remarks
N/A					

Labor/Classification		No.	Hrs.	Equipment/Type		Model	Hrs.
1.	Foreman	1	9	1	TV/ Grout Unit	Telespector	0
2.	Operator	1	9	2	Cargo Van	Ford	9
3.	Laborer	2	18	3	Vactor Truck	Sterling	18
4.				4			
5.				5			
6.				6			
Hours Total			36	Hours Total			27

No.	Pay Item Description	Location	Quantity	Unit	Plan Sheet	Posted By	Remarks

JIM NASH
OAKLAND COUNTY WATER RESOURCES COMMISSIONER

INSPECTOR'S DAILY REPORT

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Project: Fracassi Drain	W/O # 663640	Date: 9-29-17	Plan Sheet:
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House Lead Address/Lot #	Direction Wye or T	Joint/Pipe	Lead Length	Wye Distance to Downstream M.H.	Invert Elevation at Property Line
177.9' S of SOT123069	East				

Interference/Description	Location/Depth	Remarks
N/A		

Grade And Line Verification				
Station	Proposed Elevation	Actual Elevation	Difference	↔ From Center Line
N/A				

Remarks

On site at 8:30 with Nate Robinson. Pipeline vac truck full and need to go dump. Took crew to dump site off of Chavez rd . Crew dumped about 5.5 yd of material. Headed back to site after. I had to swing by the Hamlin Drain on the way back to go over punch list items. Back on site at the Fracassi at 11:00. Crew is continuing to jet lines as they are about 1/4full of sand. Crew noticed 6" lead 177.9' South of SOT123069 tapped in on the east. Crew was able to clean part of the line 063 to 057 before wrapping up for the day. Off site at 2:45.

INSPECTOR'S DAILY REPORT

1 of 2

Project: Fracassi Drain IDEP Project	WRC W/O #	Date: 10-2-17	Plan Sheet:
Contractor: PIPELINE MANAGEMENT CO.		Location:	
Inspector's Signature:		Foreman: Bill Barsh (248) 318-1292	
Inspector's Printed Name: Cody Wakeford		Inspector's Hours Worked: From 7:00am To 3:30pm Total: 8hours	

Weather (A.M./P.M.) Clear/sunny	Temp. (A.M./P.M.): 50/74	Day: Monday
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CCTV / Cleaning Information

US MH	DS MH	Lineal Feet	Pipe Size	Kind of Pipe	Condition of Pipe	Pipe Condition/Remarks	Run WO No.
SOT 123057	SOT 123053	232.4'	21"	RCP	Good		
SOT123157	SOT 123151	160'	21"	RCP	Good		666258
SOT123151	SOT123141	260'					666266
<i>Daily CCTV Totals:</i>							CCTV total:

Labor/Classification		No.	Hrs.	Equipment/Type		Model	Hrs.
1.	Foreman	1	10	1.	TV / Grout Unit	Telespector	5
2.	Operator	1	10	2.	Cargo Van	Ford	10
3.	Laborer	2	20	3.	Vactor	Sterling	10
4.				4.			
5.				5.	20-cones		
6.							Day
Hours Total (includes 1hr of drive time per)			40	Hours Total (includes 1hr of drive time per)			25
<i>Consumable Goods:</i>	Latex Gloves:	Rubber Gloves:		Cloth Gloves:	Tyvek suits:		0 each

JIM NASH
OAKLAND COUNTY WATER RESOURCES COMMISSIONER

09/09/13

Project: Fracassi Drain IDEP Project	Job No: Multiple	Date: 10-2-17	Plan Sheet:
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Remarks

On site at 8:00. Pipeline management on site and jetting line SOT123057 to SOT123053. After they jetted the line and sent camera down crew moved to Negaunee st. Pipeline is set up at SOT123151 with TV truck. At 10:00 am. Crew jetted from SOT123151 to SOT123157 and sent camera up the line at 11:00. Crew TV'd 80' towards SOT123157 and there was no taps noticed. Could not send camera any further as the pipe was almost half full of debris after jetting 3 times. Pipeline didn't feel the need to camera any further as they zoomed in and didn't see any taps. Crew moved down stream with the vector to jet up towards 151. The pipe is very heavy with debris. Ron on sight at 12:30, he took me to investigate some possible grey water on SOT123220 also to investigate the continuous water flow at AOT123057. Ron off site at 1:00. Line running from 151 to 141 very heavy with sand and debris. Crew spent the rest of the day jetting line. Off site at 2:30. Crew was still jetting and will be off site at 3:30.

I have reviewed all the information and have found it to be accurate and complete.

Contractor's Representative - Print:	Sign:	Date:
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JIM NASH
OAKLAND COUNTY WATER RESOURCES COMMISSIONER

09/09/13

Project: Fracassi Drain IDEP Project	WRC W/O #	Date: 10-3-17	Plan Sheet:
Contractor: PIPELINE MANAGEMENT CO.		Location:	
Inspector's Signature:		Foreman: Bill Barsh (248) 318-1292	
Inspector's Printed Name: Cody Wakeford		Inspector's Hours Worked: From 7:00am To 3:30pm Total: 8hours	

Weather (A.M./P.M.) Clear/sunny	Temp. (A.M./P.M.): 66/81	Day: Tuesday
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CCTV / Cleaning Information

US MH	DS MH	Lineal Feet	Pipe Size	Kind of Pipe	Condition of Pipe	Pipe Condition/Remarks	Run WO No.
SOT 123141	SOT 123135	307.7	24"	RCP	Good		666283
SOT123135	SOT12325	60'	24"	RCP	Good		667256
<i>Daily CCTV Totals:</i>							CCTV total:

Labor/Classification		No.	Hrs.	Equipment/Type		Model	Hrs.
1.	Foreman	1	10	1.	TV / Grout Unit	Telespector	5
2.	Operator	1	10	2.	Cargo Van	Ford	10
3.	Laborer	1	10	3.	Vactor	Sterling	10
4.				4.			
5.				5.	20-cones		
6.							Day
Hours Total (includes 1hr of drive time per)			30	Hours Total (includes 1hr of drive time per)			25
Consumable Goods:	Latex Gloves:	Rubber Gloves:	Cloth Gloves:	Tyvek suits:	0 each		

JIM NASH
OAKLAND COUNTY WATER RESOURCES COMMISSIONER

09/09/13

Project: Fracassi Drain IDEP Project	Job No: Multiple	Date: 10-3-17	Plan Sheet:
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Remarks

On site at 8:00. Pipeline management on site and jetting line SOT123141 towards SOT123135. The pipe is almost half full with debris. Crew is step cleaning the line in order to get the camera down the pipe. Crew made it to MH135 at 1:00. Then continued to jet line from mh135 towards SOT123125. Crew has to pause to vactor out debris every time the jet the line. It is a very long process being able to only get the camera about 20' every pull. I spoke with Bill and they will camera to 60' past 135 towards 125 and wrap up. I am off site at 2:40.

I have reviewed all the information and have found it to be accurate and complete.

Contractor's Representative -- Print:	Sign:	Date:
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JIM NASH
OAKLAND COUNTY WATER RESOURCES COMMISSIONER

09/09/13

Inspection # 301490 : WRC-Illicit Discharge Inv

Inspection Date: 12/4/2017

Work Order: 665056

Status: CLOSED

Priority: Low

Inspector: Ron Fadoir

Resolution Completed

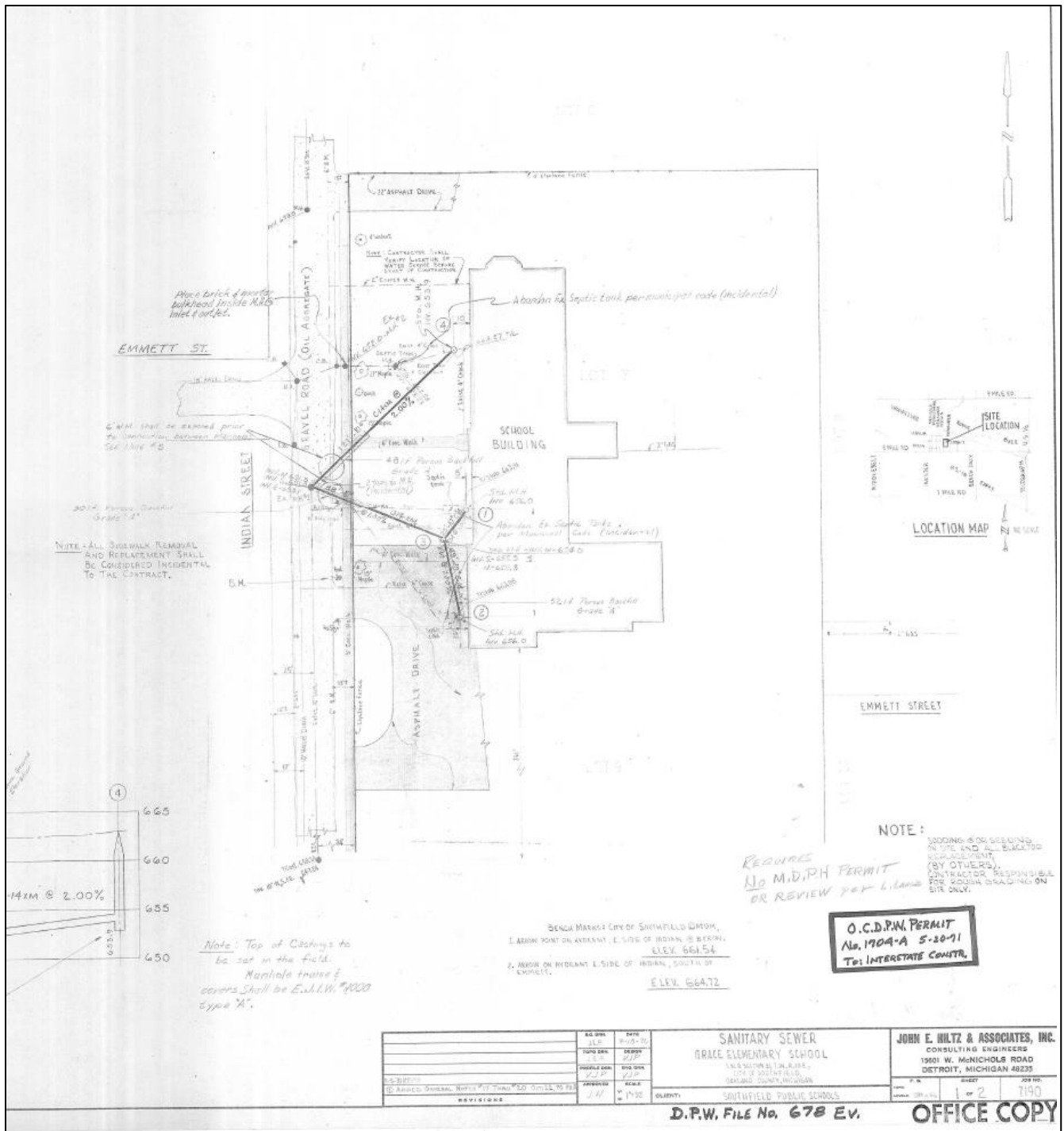
Address: 21030 Indian St, City of Southfield, 48033

Notes: Dye Tested the John Grace Grace Community Center 12/4/2017 w/ the City of Southfield. Confirmed sanitary connections of bathrooms on W. Side of Building but could not confirm Kitchen, bathroom and utility room connection on the E.side of building.

Question	Answer
Complaint or Follow Up	Follow Up
Drain Name	Fracassi
GPS Discharge Sample Point	Not Applicable
Contact Name	Brandy Siedlaczek
Department/Division	Storm Water Manager
Business/Organization	City of Southfield
Address	26000 Evergreen Rd
City	Southfield
State	MI
Zip	48076
Phone Number	(248) 796-4806
Comments	John Grace Community Center is under City of Southfield Parks and Rec. Facility is former John Grace Elementary School.
Weather Conditions	Cloudy
Previous 24 our Rain (INCHES)	0
Previous 48 Hour Rain (INCHES)	0
Source	No illicit Discharges found
Source Ownership	Not Applicable
Type of Illicit Connection Pollutant(s) Found	None
Estimated Volume	None
Flow Depth (INCHES)	Not Applicable
Structure Damage	Not Applicable
Odor	Not Applicable
Color	Not Applicable
Turbidity	Not Applicable
Floatables	Not Applicable
Deposits/Stains	Not Applicable
Vegetation	Not Applicable
GPS Discharge Sample Point	Not Applicable
Photo	Not Applicable
Sample	Not Applicable
Results	Not Applicable
Comments	Front and upstairs bathrooms on the W. side of the building are connected to the sanitary sewer on Indian St. Connections for kitchen, bathroom, utility room and basement floor drains is unknown. Dye was not found in the sanitary or storm drain systems for the property. Follow up investigation is needed.



Diagram of John Grace Elementary School Sanitary Sewer Plan.



Inspection # 301491 : WRC-Illicit Discharge Inv

Inspection Date: 12/11/2017

Work Order: 665056

Status: CLOSED

Priority: Low

Inspector: Ron Fadoir

Resolution Completed

Address: 21159 Semonole St, City of Southfield, 48033

Notes: Dye Tested Residence at 21159 Seminole St. on 12/11/2017 w/ the City of Southfield. Confirmed connection of house lead and of all fixtures to the sanitary sewer on Seminole St.

Question	Answer
Complaint or Follow Up	Follow Up
Drain Name	Fracassi
GPS Discharge Sample Point	Not Applicable
Contact Name	Gerald & Barb Ignash
Department/Division	Resident
Business/Organization	
Address	21159 Seminole St.
City	Southfield
State	MI
Zip	48033
Phone Number	(248) 536-7197
Comments	Works during the day evening or weekend appt. needed
Weather Conditions	Cloudy
Previous 24 our Rain (INCHES)	0
Previous 48 Hour Rain (INCHES)	0
Source	No illicit Discharges found
Source Ownership	Not Applicable
Type of Illicit Connection Pollutant(s) Found	None
Estimated Volume	None
Flow Depth (INCHES)	Not Applicable
Structure Damage	Not Applicable
Odor	Not Applicable
Color	Not Applicable
Turbidity	Not Applicable
Floatables	Not Applicable
Deposits/Stains	Not Applicable
Vegetation	Not Applicable
GPS Discharge Sample Point	Not Applicable
Photo	Not Applicable
Sample	Not Applicable
Results	Not Applicable
Comments	Upstairs kitchen, bathroom and downstairs bathroom, laundry sink and floor drains are connected to the sanitary sewer on Seminole St. A 6" clay tile crock drain under the basement floor is connected to a sump pit on the N. wall. The sump picks up ground water flow and discharges to a 4" PVC pipe connected to the drainage ditch at S.W corner of the driveway culvert. The clay tile drain is believed to be a portion of the old house lead which was disconnected from the septic system in the back yard

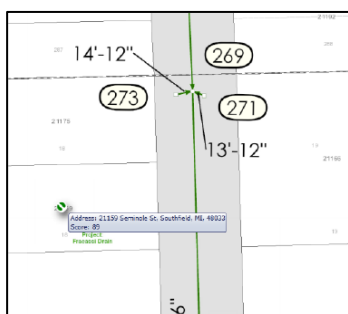
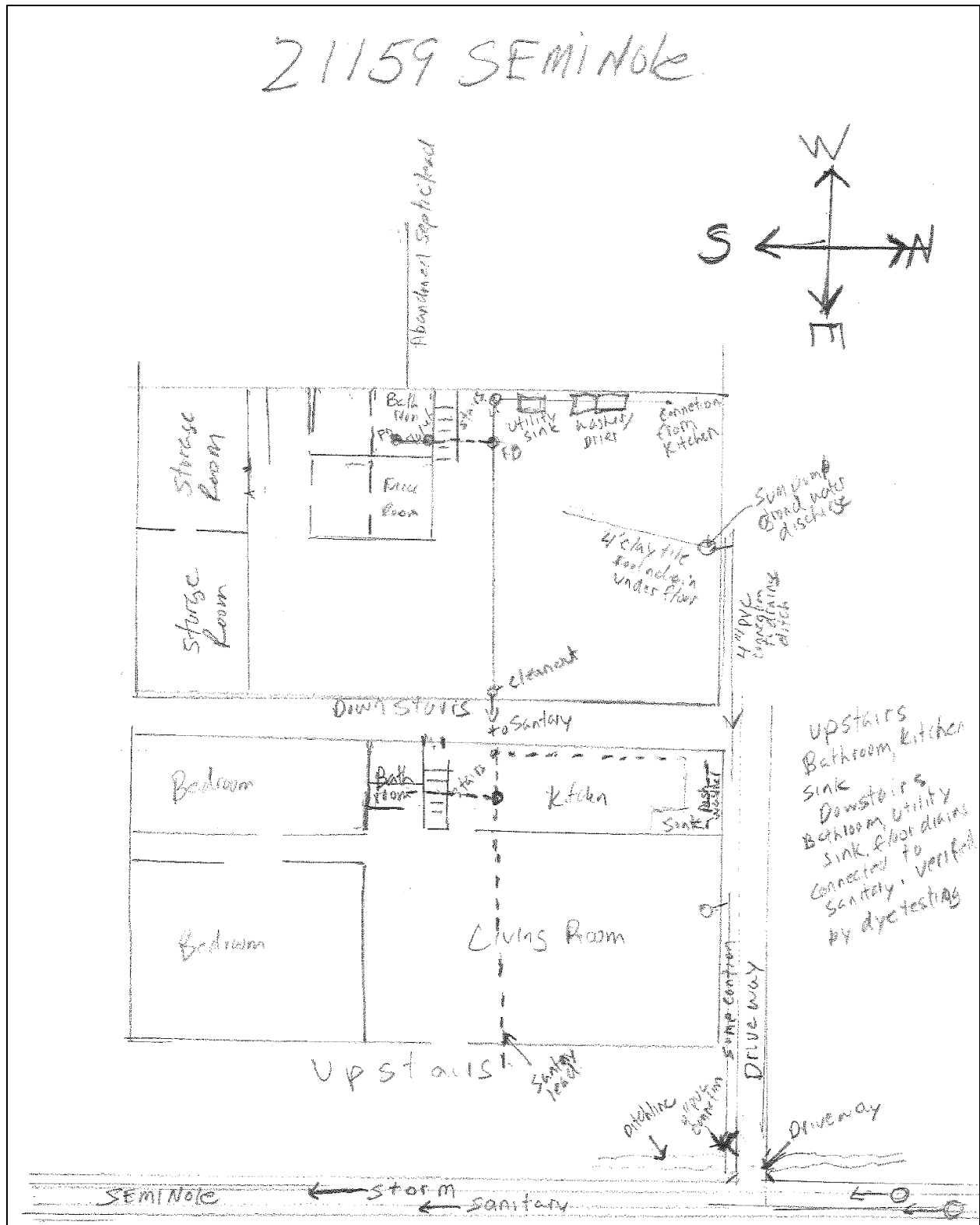


Diagram of House Connection and Plumbing Fixtures at 21159 Seminole



APPENDIX C – E.COLI SAMPLING RESULTS

APPENDIX C – *E. COLI* SAMPLING RESULTS

APPENDIX C – *E. coli* Sampling Results

Sample Date	Sample ID	Drain Name	Location	Results	Units
8/31/2017	FD 6217	Fracassi	Southfield	29,144	CFU / 100 ML
8/31/2017	FD 6209	Fracassi	Southfield	980	CFU / 100 ML
8/31/2017	FD 6216	Fracassi	Southfield	99,143	CFU / 100 ML
8/31/2017	FD 6219	Fracassi	Southfield	649,000	CFU / 100 ML
8/31/2017	FD 6227	Fracassi	Southfield	98,048	CFU / 100 ML
8/31/2017	FD 6228	Fracassi	Southfield	214,500	CFU / 100 ML
8/31/2017	FD 6235	Fracassi	Southfield	89,553	CFU / 100 ML
8/31/2017	FD 6236	Fracassi	Southfield	16,328	CFU / 100 ML
8/31/2017	FD 6237	Fracassi	Southfield	5,818	CFU / 100 ML
9/12/2017	FD 6211	Fracassi	Southfield	252,000	CFU / 100 ML
9/12/2017	FD 6213	Fracassi	Southfield	8,231	CFU / 100 ML
9/12/2017	FD 6222	Fracassi	Southfield	12,274	CFU / 100 ML
9/12/2017	FD 6220	Fracassi	Southfield	27,353	CFU / 100 ML
9/12/2017	FD 6229	Fracassi	Southfield	2,865	CFU / 100 ML
9/12/2017	FD 6231	Fracassi	Southfield	7,714	CFU / 100 ML
9/12/2017	FD 6190	Fracassi	Southfield	56,038	CFU / 100 ML
9/12/2017	FD 6239	Fracassi	Southfield	6,113	CFU / 100 ML
9/12/2017	FD 6245	Fracassi	Southfield	<50	CFU / 100 ML
9/28/2017	FD 6248	Fracassi	Southfield	158	CFU / 100 ML
9/28/2017	FD 6194	Fracassi	Southfield	56,679	CFU / 100 ML
9/28/2017	FD 6193	Fracassi	Southfield	203,000	CFU / 100 ML
9/28/2017	FD 6191	Fracassi	Southfield	48,374	CFU / 100 ML
9/28/2017	FD 6190	Fracassi	Southfield	21,809	CFU / 100 ML
9/28/2017	FD 6239	Fracassi	Southfield	153,000	CFU / 100 ML
9/28/2017	FD 6237	Fracassi	Southfield	49,236	CFU / 100 ML
9/28/2017	FD 6245	Fracassi	Southfield	1,874	CFU / 100 ML
10/4/2017	CH Stevens 6522	CH Stevens 10	Bloomfield TWP	375	CFU / 100 ML
10/4/2017	Hidden Woods Dr. local CB	CH Stevens 10	Bloomfield TWP	960	CFU / 100 ML
10/4/2017	4061 Fairlane Dr.	CH Stevens 10	Bloomfield TWP	2,260	CFU / 100 ML
10/4/2017	CH Stevens 6520	CH Stevens 10	Bloomfield TWP	50	CFU / 100 ML
10/4/2017	CH Stevens 6517	CH Stevens 10	Bloomfield TWP	50	CFU / 100 ML
10/4/2017	Devonshire 1386	Devonshire Drain	Bloomfield TWP	50	CFU / 100 ML
10/4/2017	Devonshire 1375	Devonshire Drain	Bloomfield TWP	<50	CFU / 100 ML
10/4/2017	Devonshire 1391	Devonshire Drain	Bloomfield TWP	100	CFU / 100 ML
10/5/2017	CH Stevens 405	CH Stevens 3	Bloomfield TWP	7361	CFU / 100 ML
10/5/2017	CH Stevens 408	CH Stevens 3	Bloomfield TWP	>1,102,500	CFU / 100 ML
10/5/2017	CH Stevens 7315	CH Stevens 4	Bloomfield TWP	8660	CFU / 100 ML
10/5/2017	CH Stevens 420	CH Stevens 4	Bloomfield TWP	1852	CFU / 100 ML
10/5/2017	CH Stevens 417	CH Stevens 4	Bloomfield TWP	7240	CFU / 100 ML

Sample Date	Sample ID	Drain Name	Location	Results	Units
10/5/2017	Austin 5168	Austin	Southfield	7361	CFU / 100 ML
10/5/2017	Janette St. E	Local Storm	Southfield	375	CFU / 100 ML
10/5/2017	Janette St. W	Local Storm	Southfield	50	CFU / 100 ML
10/5/2017	Austin 5169	Austin	Southfield	8970	CFU / 100 ML
11/8/2017	FD 6209	Fracassi	Southfield	43,479	CFU / 100 ML
11/8/2017	FD 6210	Fracassi	Southfield	>1,002,500	CFU / 100 ML
11/8/2017	FD 6219	Fracassi	Southfield	442,500	CFU / 100 ML
11/8/2017	FD 6228	Fracassi	Southfield	9,256	CFU / 100 ML
11/8/2017	FD 6236	Fracassi	Southfield	37,398	CFU / 100 ML
11/8/2017	FD 6245	Fracassi	Southfield	>50	CFU / 100 ML
11/9/2017	CH Stevens 6523	CH Stevens 10	Bloomfield TWP	3258	CFU / 100 ML
11/9/2017	CH Stevens 6523 a	CH Stevens 10	Bloomfield TWP	< 50	CFU / 100 ML
11/9/2017	CH Stevens 6523 b	CH Stevens 10	Bloomfield TWP	2450	CFU / 100 ML
11/9/2017	CH Stevens 6115	CH Stevens 5	Bloomfield TWP	<50	CFU / 100 ML
11/9/2017	CH Stevens 5567	CH Stevens 1	Bloomfield TWP	14646	CFU / 100 ML
11/9/2017	Devonshire 219	Devonshire Drain	Bloomfield TWP	158	CFU / 100 ML
11/9/2017	Devonshire 1375a	Devonshire Drain	Bloomfield TWP	<50	CFU / 100 ML
11/9/2017	Devonshire 1375b	Devonshire Drain	Bloomfield TWP	210	CFU / 100 ML
11/9/2017	Devonshire 1386	Devonshire Drain	Bloomfield TWP	557	CFU / 100 ML
11/14/2017	Hamlin 5565	Hamlin	Bloomfield TWP	9873	CFU / 100 ML
11/14/2017	CH Stevens 554	CH Stevens 1	Bloomfield TWP	155	CFU / 100 ML
11/14/2017	CH Stevens 556	CH Stevens 1	Bloomfield TWP	<50	CFU / 100 ML
11/14/2017	CH Stevens 559	CH Stevens 1	Bloomfield TWP	<50	CFU / 100 ML
11/14/2017	CH Stevens 408	CH Stevens 3	Bloomfield TWP	5273	CFU / 100 ML
11/14/2017	CH Stevens 407	CH Stevens 3	Bloomfield TWP	4684	CFU / 100 ML
11/14/2017	CH Stevens 417	CH Stevens 4	Bloomfield TWP	14308	CFU / 100 ML
11/14/2017	Janette St. E	Austin	Southfield	50	CFU / 100 ML
11/14/2017	Austin 5169	Austin	Southfield	50	CFU / 100 ML
11/14/2017	Janette St. W	Austin	Southfield	364	CFU / 100 ML

APPENDIX D – Failed Septic Notifications, New Septic Permit Application and Dye Testing Notifications

APPENDIX D – ILLICIT DISCHARGE NOTIFICATIONS, SEPTIC PERMIT APPLICATION & DYE TESTING LETTERS



OAKLAND COUNTY EXECUTIVE L. BROOKS PATTERSON

HEALTH DIVISION

Kathleen Forzley, Manager
(248) 858-1280 | health@oakgov.com

CERTIFIED MAIL

January 24, 2017

DEBRA HORNING
4158 CHARING CROSS RD
BLOOMFIELD MICHIGAN 48304

Parcel ID: 19-13-326-039
Application Tracking Number: Complaint 63268275

**RE: ON-SITE SEWAGE DISPOSAL SYSTEM AT 4158 CHARING CROSS RD,
BLOOMFIELD TOWNSHIP, OAKLAND COUNTY, MI**

Dear Debra Horning:

On January 5, 2017 the Oakland County Health Division (OCHD) was contacted by a representative of the Oakland County Water Resource Commission (OCWRC). During OCWRC routine water sampling conducted in the storm drain in front and to the north (downstream) of your home, multiple elevated E. coli levels were observed. OCWRC investigated and found that your home is the only home in the surrounding area where high E. coli samples were observed that is still connected to an on-site sewage disposal system (septic system).

On January 12, 2017 OCWRC and OCHD made a joint site visit to your address. A visual inspection of the storm drain was conducted at that time. Soap suds were observed pooling in the ditch in front of the above referenced address. In looking for the sanitary sewer manhole cover in the southeast part of the front yard, a patchy grass area with standing water was observed and the smell of sewage was noticed. A bacteria water sample was taken from this location. The results of this sample obtained from the OCHD laboratory confirm E. coli present at a level of 1,156 M.P.N./100 ml. The conditions described above are contrary to Oakland County Sanitary Code Article III, Section 2.1, which states in part:

Under no conditions may the sewage from an existing or hereafter constructed premise be deposited upon the surface of the ground, into roadside ditches, watercourses, inland lakes, or into any closed drain other than a sanitary sewer.

Pursuant to Article III of the Oakland County Sanitary Code, you are hereby ordered to:

Immediately:

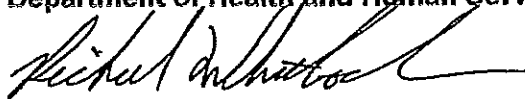
- 1) You shall have the septic tank pumped and continue doing so as often as necessary to contain the sewage within the system. Submit pumping receipts to this office as verification and documentation. The receipts may be mailed or faxed to 248-452-9758 or emailed to whitlockr@oakgov.com. It is your responsibility to keep sewage off the ground at all times.

- 2) You shall contact Bloomfield Township Building Department and the Oakland County Water Resource Commission to begin the procedure required to connect your sewage disposal system to the available sanitary sewer.
- 3) Within 20 days you shall provide to this office a detailed plan describing the specifics, including a timeline, of connecting your septic system to the available sanitary sewer.

You should know that your failure to follow the requirements of Article III of the Oakland County Sanitary Code, in the manner described above, may result in legal action being taken against you by this Division as provided for in the law. This case may be forwarded to Oakland County Prosecutor's Office.

Sincerely,

OAKLAND COUNTY HEALTH DIVISION
Department of Health and Human Services



Richard Whitlock
Public Health Sanitarian
Environmental Health Services

cc: Bloomfield Township Municipal Offices
Olivia Olszty-Bundry, PE, Bloomfield Township Engineer
Ron Fadior, Environmental Planner, Oakland County Water Resource Commission
Tom Trice, Director of Bloomfield Township Department of Public Works
First Class Mail



Bloomfield Township

Leo C. Savoie, Supervisor • Janet Roncelli, Clerk • Brian E. Kepes, Treasurer
David Buckley, Trustee • Neal J. Barnett, Trustee • Michael Schostak, Trustee • Dani Walsh, Trustee

January 25, 2017

Debra Horning
4158 Charing Cross Road
Bloomfield Hills, MI 48304

Dear Ms. Horning:

Bloomfield Township was contacted by the Oakland County Health Department (OCHD) to inform us that the existing septic system serving your home has failed. The letter from the OCHD is attached. This issue poses both a public health concern and nuisance and must be corrected.

Sanitary sewer is available for this property; therefore you will be required by the Township Sewer Ordinance (Chapter 38, Article III, Division 2) to connect to the Township sanitary sewer system within 30 days of this notice.

Please contact the Department of Public Works at 248-594-2800 for the applicable sewer connection charges. A plumbing permit will also be required from the Building Department prior to the start of work.

Bloomfield Township is a community committed to protecting and preserving its natural resources. We thank you in advance for your timely response and cooperation. Please notify our department once the corrections have been made. Should you have any questions, please do not hesitate to call me at 248-594-2800.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Trice".

Tom Trice

Director of Public Works

cc: Olivia Olsztyn-Budry, P.E., Bloomfield Twp. Engineering & Environmental Services
Brenda Schlutow, Bloomfield Twp. Building, Planning & Ordinance
Ronald Fadoir, Oakland County Water Resources Commissioner
Rich Whitlock, Oakland County Health Department

PERMIT TO INSTALL AN ON-SITE SEWAGE DISPOSAL SYSTEM

PERMIT #:	<u>108-16-000046</u>	Issue Date:	11/09/2016 16:59
APPLICATION TRACKING #:	63262686	APPLICATION RECEIPT DATE:	05/18/2016
PARCEL ID #:	19-04-476-057	LAST ACTIVITY:	11/10/1981
PROPERTY ADDRESS:	127 S BERKSHIRE RD BLOOMFIELD HILLS MI 48302 -0411	SUBDIVISION NAME:	Bloomfield Highlands
SEPTIC INFORMATION:	Proposed Use of Septic: Residential Type of Establishment:	Type of Septic: No. of Bedrooms:	New 6
OWNER:	APPLICANT:		
Name: LUBINA LAPCHAK	Name: Ellis Trucking & Excavating		
Address: 127 S BERKSHIRE RD BLOOMFIELD HILLS MI 48302	Address: 4629 White Lake Court Clarkston MI 48346		
Phone: Home: Work: (248)693-6900	Phone: Home: (810)602-0465 Work: (810)602-0465		

PERMIT APPROVED SUBJECT TO THE FOLLOWING CONDITIONS:

Tank: Two compartment tank recommended

<u>Size of Septic Tank (Gallons)</u>	<u>No. of Compartments</u>	<u>Tank Type</u>	<u>Risers Required</u>
1000.0	1	Septic Tank (Concrete)	Yes
1500.0	2	Septic Tank (Concrete)	Yes
1000.0	1	Pump Chamber	Yes

Final Disposal:

Drainage beds consisting of 3026.0 sq.ft.

Stipulations:

Locate drain field over soil borings A & B
Cut drainage bed 100% 0.0 ft. to 0.0 ft. to scarify topsoil, per engineered plan
Call for a cut down inspection prior to backfilling.
Backfill 2NS sand to drainage system grade

STANDARD PERMIT REQUIREMENTS:

- Must install system in accordance with OCHD Sanitary Code, Article III and/or Michigan Criteria for Subsurface Sewage Disposal.
- Required isolation distances must be verified by the installer.
- Call to schedule all necessary inspections prior to the completion of the Installation.
- ACT 53 - P.A. 1974 requires the applicant to notify the public utilities prior to excavation. In addition you must call 1-800-MISS DIG to locate public underground utilities.
- This On-Site Sewage Permit **DOES NOT** apply to any addition or expansion of the proposed/existing building.
- This On-Site Sewage Disposal Permit does not ensure a Water Well Permit. An On-Site Sewage Disposal installation may reduce or eliminate an approved well area resulting in denial of an application for a Water Well Permit.

THIS PERMIT IS VOID AFTER TWO (2) YEARS FROM DATE OF ISSUE

Sanitarian: Amanda Anderson

Supervisor: Christy Fedototszkin

SEE PAGE 2 FOR SPECIAL CONDITIONS AND ADDITIONAL REQUIREMENTS

PERMIT#: 108-16-000046
Parcel ID: 19-04-476-057
Application Tracking Number: 63262686

Property Address:
 127 S BERKSHIRE RD
 BLOOMFIELD HILLS MI 48302 -0411

Replacement Area:

Adequate replacement space available. Yes Another area(Indicate on sketch)

Pre-Final Inspection:

Bed-Call for Midcut Inspection prior to backfilling

Comments:

Minimum Isolation Distances to be Maintained:

50 feet from Private well
 10 feet from Building foundations

Special Conditions:

- Plan#: 16-485 Rev. Date: 10/31/2016 Eng's Name: Michael C. Powell
 Plan approval is contingent upon the designing engineer establishing all grades. Making sufficient inspections during construction to assure compliance with plans and providing this office with a signed statement to that affect. A final inspection by the Health Division is required.
- The existing septic tank must be properly abandoned.

APPROVED BORINGS:

Soils Observed by : Amanda Anderson

Date Observed : 11/09/2016

Boring :6

Boring Label : 6
 GPS Coordinates: X: Y:
 HSWT Observed: Yes HSWT Indicator: Mottled Depth of HSWT: 3.00 Feet
 Ground Water Observed: No Depth of Ground Water:
 Captured Date: 05/26/2016 15:27 Captured By: Andersonam

Texture :

Depth:	12.00 Inch	Soil Info:	Topsoil
Size:		Topsoil Texture:	Sandy Loam
Wetness:		Color:	
Depth:	6.00 Inch	Soil Info:	Sandy Loam
Size:		Topsoil Texture:	
Wetness:		Color:	

PERMIT#: 108-16-000046
Parcel ID: 19-04-476-057
Application Tracking Number: 63262686

Property Address:
 127 S BERKSHIRE RD
 BLOOMFIELD HILLS MI 48302 -0411

APPROVED BORINGS:

Soils Observed by : Amanda Anderson

Date Observed : 11/09/2016

Boring :6

Boring Label : 6
GPS Coordinates: X: Y:
HSWT Observed: Yes **HSWT Indicator:** Mottled **Depth of HSWT:** 3.00 Feet
Ground Water Observed: No **Depth of Ground Water:**
Captured Date: 05/26/2016 15:27 **Captured By:** Andersonam

Texture :

Depth: 1.50 Feet	Soil Info: Clay Loam
Size:	Topsoil Texture:
Wetness:	Color:
Depth: 2.00 Feet	Soil Info: Clay Loam
Size:	Topsoil Texture:
Wetness:	Color: Mottled
Depth: 4.00 Feet	Soil Info: Clay
Size:	Topsoil Texture:
Wetness:	Color: Mottled
Depth: 1.00 Feet	Soil Info: Clay
Size:	Topsoil Texture:
Wetness:	Color: Blue

Boring :7

Boring Label : 7
GPS Coordinates: X: Y:
HSWT Observed: Yes **HSWT Indicator:** Mottled **Depth of HSWT:** 3.00 Feet
Ground Water Observed: No **Depth of Ground Water:**
Captured Date: 05/26/2016 15:28 **Captured By:** Andersonam

Texture :

Depth: 12.00 Inch	Soil Info: Topsoil
Size:	Topsoil Texture: Sandy Loam
Wetness:	Color:
Depth: 6.00 Inch	Soil Info: Loamy Sand
Size:	Topsoil Texture:
Wetness:	Color:

PERMIT#: 108-16-000046
Parcel ID: 19-04-476-057
Application Tracking Number: 63262686

Property Address:
 127 S BERKSHIRE RD
 BLOOMFIELD HILLS MI 48302 -0411

Boring :7

Boring Label : 7
GPS Coordinates: X: Y:
HSWT Observed: Yes **HSWT Indicator:** Mottled **Depth of HSWT:** 3.00 Feet
Ground Water Observed: No **Depth of Ground Water:**
Captured Date: 05/26/2016 15:28 **Captured By:** Andersonam

Texture :

Depth:	6.00 Inch	Soil Info:	Sandy Loam
Size:		Topsoil Texture:	
Wetness:		Color:	
Depth:	1.00 Feet	Soil Info:	Clay Loam
Size:		Topsoil Texture:	
Wetness:		Color:	
Depth:	2.00 Feet	Soil Info:	Clay Loam
Size:		Topsoil Texture:	
Wetness:		Color:	Mottled
Depth:	5.00 Feet	Soil Info:	Clay
Size:		Topsoil Texture:	
Wetness:		Color:	

Boring :9

Boring Label : A
GPS Coordinates: X: Y:
HSWT Observed: Yes **HSWT Indicator:** Mottled **Depth of HSWT:** 3.00 Feet
Ground Water Observed: No **Depth of Ground Water:**
Captured Date: 10/28/2016 15:00 **Captured By:** Andersonam

Texture :

Depth:	12.00 Inch	Soil Info:	Topsoil
Size:		Topsoil Texture:	Sandy Loam
Wetness:		Color:	
Depth:	6.00 Inch	Soil Info:	Sandy Loam
Size:		Topsoil Texture:	
Wetness:		Color:	
Depth:	1.50 Feet	Soil Info:	Sandy Clay Loam
Size:		Topsoil Texture:	
Wetness:		Color:	
Depth:	1.50 Feet	Soil Info:	Clay Loam
Size:		Topsoil Texture:	
Wetness:		Color:	Mottled

PERMIT#: 108-16-000046
Parcel ID: 19-04-476-057
Application Tracking Number: 63262686

Property Address:
 127 S BERKSHIRE RD
 BLOOMFIELD HILLS MI 48302 -0411

Boring :9

Boring Label : A
GPS Coordinates: X: Y:
HSWT Observed: Yes **HSWT Indicator:** Mottled **Depth of HSWT:** 3.00 Feet
Ground Water Observed: No **Depth of Ground Water:**
Captured Date: 10/28/2016 15:00 **Captured By:** Andersonam

Texture :

Depth: 1.00 Feet	Soil Info: Sandy Loam
Size:	Topsoil Texture:
Wetness:	Color: Mottled

Boring :10

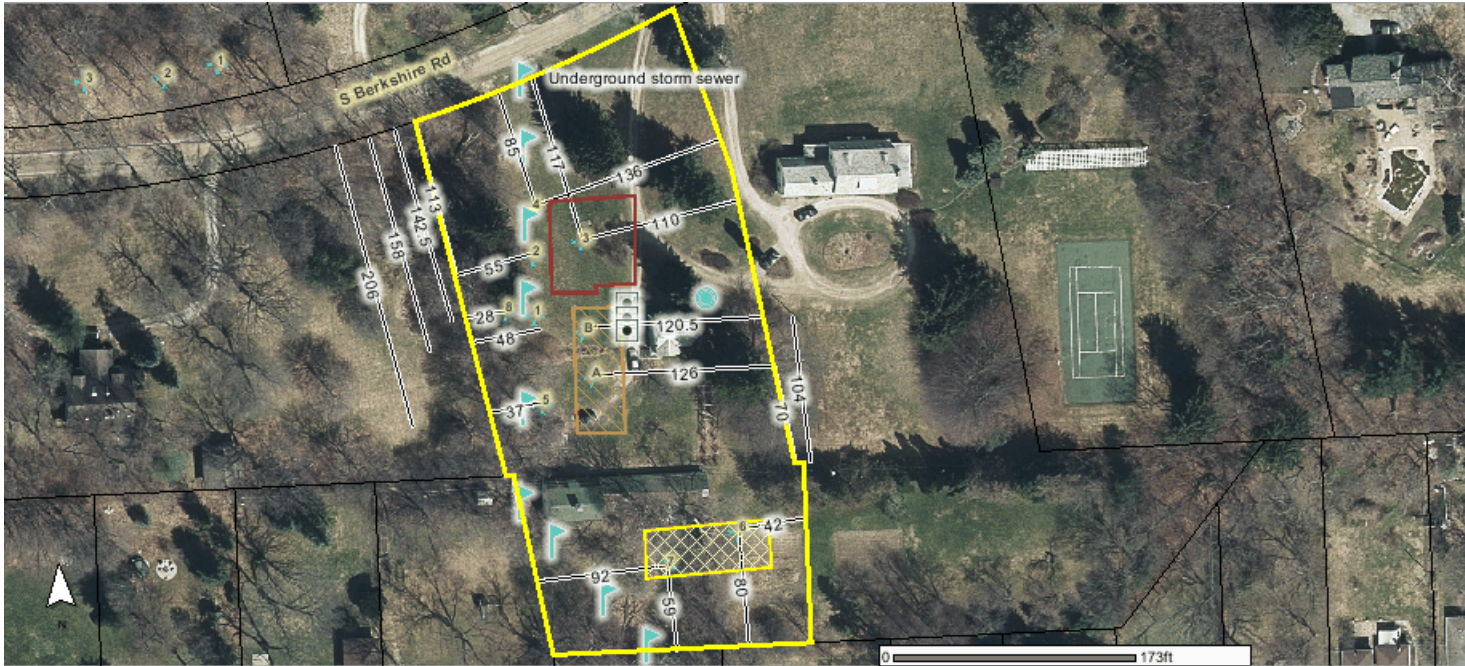
Boring Label : B
GPS Coordinates: X: Y:
HSWT Observed: Yes **HSWT Indicator:** Mottled **Depth of HSWT:** 3.50 Feet
Ground Water Observed: No **Depth of Ground Water:**
Captured Date: 10/28/2016 15:02 **Captured By:** Andersonam

Texture :

Depth: 12.00 Inch	Soil Info: Topsoil
Size:	Topsoil Texture: Sandy Loam
Wetness:	Color:
Depth: 2.50 Feet	Soil Info: Loamy Sand
Size:	Topsoil Texture:
Wetness:	Color:
Depth: 1.00 Feet	Soil Info: Loamy Sand
Size:	Topsoil Texture:
Wetness: Damp	Color: Mottled
Depth: 6.00 Inch	Soil Info: Loam
Size:	Topsoil Texture:
Wetness:	Color: Mottled

PERMIT#: 108-16-000046
Parcel ID: 19-04-476-057
Application Tracking Number: 63262686

Property Address:
 127 S BERKSHIRE RD
 BLOOMFIELD HILLS MI 48302 -0411



Disclaimer: The information provided herewith has been compiled from recorded deeds, plats, tax maps, surveys and other public records. It is not a legally recorded map or survey and is not intended to be used as one. Users should consult the information sources mentioned above when questions arise.

Jim Nash

November 22, 2017

Gerald Ignash
21159 Seminole St.
Southfield, MI. 48033

SAMPLE

RE: Dye Testing of Sanitary Sewer House Leads and Plumbing Fixtures

Dear Water / Sewer Customer:

An investigation and inspection of the storm drainage system in your neighborhood has indicated the presence of sanitary sewage in the storm drain. Some of the homes in your area may have connections to the storm drain instead of the sanitary sewer. Connection of the sanitary service leads to the storm drains is a direct source of pollution to the Rouge River. To determine if this is the case with your residence, our office needs to perform a dyed water test of the plumbing fixtures in your home to verify that they are connected to the sanitary sewer system.

This testing will require entry into your house and will take approximately one hour to complete. During the test, an inspector will flush an approved environmentally safe tracing dye through a representative number of plumbing fixtures in your home and the sanitary sewer and storm drain pipes in the roadway will be monitored for the presence of the dye. The result will be verification of your plumbing system connection.

This test is being done in cooperation with the City of Southfield as part of Federal stormwater permit requirements issued to Oakland County and the City of Southfield. Your cooperation is necessary in helping eliminate this potential public health concern and in protecting and improving water quality in the Rouge River

Please contact our Office between the hours of 8:00 a.m. and 4:30 p.m. at (248) 858-5248 **by December 8, 2017** to schedule an appointment for dye testing.

Your cooperation in this matter is greatly appreciated.

Respectfully,



Ronald J Fadoir
Environmental Planner
Oakland County Water Resources Commissioner's Office.

CC:
Brandy Bakita Siedlaczek, City of Southfield

