



REPORT OF CANINE INVESTIGATION OF HUMAN WASTEWATER CONTAMINATION

Maplewood Lake, Jenison, MI

Prepared For: Georgetown Township, MI

Prepared By: Environmental Canine Services LLC

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Introduction: Canine Source Tracking

Environmental Canine Services LLC (ECS) uses scent trained canines to identify and source track human wastewater contamination in stormwater systems and surface waters. They have been nationally recognized as a useful rapid screening tool for human sewage bacterial contamination and utilized in over 50 illicit discharge field investigation projects in 13 different states since the company began in 2009.

Human wastewater components ECS canines can detect include sewage, detergents, and fats/oils/grease. The canines will alert to the presence of human wastewater by providing a trained behavior, such as a sit, down, or a bark, when smelling containers of collected water samples or at field investigation sites, such as at outfalls, stormwater manholes or catch basins, drains, creeks, rivers, or shorelines. This rapid detection can lead to immediate source tracking in the field and provide valuable information for future monitoring and investigations. Combining the canine results with concurrent and/or historical bacterial, surfactant, and/or other testing results for sites investigated provides further information on the type and significance of the contamination.

Field Investigation Summary

On July 18, 2016, ECS President Karen Reynolds and her canine Sable and Canine Handler Dan Ringel and his canine Abbey worked with Rod Weersing from Georgetown Township, MI to conduct field investigations and source tracking of possible human wastewater contamination of Maplewood Lake. Also accompanying ECS personnel and Mr. Weersing, to observe the process of how canine field investigations are conducted, were Dr. Randall DeJong and undergraduate student Harry Ervin from the Biology Department at Calvin College.



The investigations began by collecting water samples at three locations along the north side of the lake where E. coli testing is conducted on a regular basis. The samples were scent tested by



both ECS canines. Canine Sable alerted to the presence of human wastewater in the sample from the northwest side of the lake, directly downhill of two houses at the end of Elmwood Drive. Investigation of the park property along the back fences of those houses resulted in Sable alerting at a large patch of grass that was greener than the surrounding grass, next to the back yard fence of the house at the end of Elmwood Drive

and showing interest in scent in the air coming from the back yard of the house. Both canines alerted on the samples collected from the creek outfalling to the lake at the northwest side of the lake and also at next to the dock towards the northeast side of the lake.

The two stormwater outfalls along the east side of the lake and the manholes and catch basins along 12th Avenue associated with those stormwater systems were investigated. Both canines alerted at the outfall on the northeast side of the lake. An upstream investigation of the manholes and catch basins in this stormwater system resulted in one canine alerting on the manhole directly upstream of the outfall, one canine alerting on two of the catch basins directly upstream of the outfall, and both canines alerting on the catch basin at the top of the stormwater system, near the intersection of 12th Avenue and the entrance to Maplewood Park. It was noted that the sewer lift station is located near this site.



One canine alerted at the stormwater outfall on the southeast side of the lake and to the catch basin draining to it. Suds were visible inside the catch basin, indicating a possible discharge of detergents to that basin. It was noted that the resident of the house across the street from the outfall and catch basin was power washing carpets in his driveway. No suds were visible on the driveway, and the resident told ECS personnel that no detergents were being used. The suds may have originated from car washing or a similar activity using detergents at another residence along the street that flowed into the catch basins, which was the probable cause of the canine alert.

The canine teams investigated the entire shoreline of the south side of the lake, and neither canine alerted along the shore. In a fenced area overgrown with vegetation next to the last house on the southwest shore, a water sample was taken directly from the flow from the concrete outfall above the lake. The outfall flow was very heavy, and both canines alerted on the sample taken from it. It is believed that the outfall drains an area of housing on the hill above the lake on the southwest side.

The final investigations were conducted at and near the farm on the northwest side of the lake in order to access upstream of the creek outfall to the lake in that area, which both canines alerted on earlier in the day. Both canines alerted on water samples taken from the creek at several locations upstream along the farm and its fields. An old manhole structure with a crumbling concrete foundation was found near the southwest side of the farm house, across the road from and close to the creek. Both canines checked the structure, and one of the canines alerted. Mr. Weersing informed ECS after the investigation was completed that the manhole structure is from a stormwater system that runs beside the farm house.

The canine alerts on the creek upstream past the farm house became hard to access for further investigation on foot. It was noted on a map of the area that the creek appeared to either end or cross the road farther upstream on Bauer Road, just east of 20th Avenue, and that a large housing addition was located along the northwest side of the creek in that area. The investigation teams drove to the area and found that the creek was dry at Bauer Road and appeared to end there on the south side. Canine Sable investigated the dry creek area near the road and alerted.

A spreadsheet of the canine field investigation results is presented on page 5 and a Google Earth image of the results is presented on page 6.

Key Findings and Recommendations for Follow Up

The following are key findings of the canine field investigations and recommendations for follow up to further source track human wastewater contamination discharges into Maplewood Lake:

Key Findings:

1. There is a strong indication of contamination of the creek that outfalls to the lake on the northwest side of the lake. Some possible sources of contamination may be:
 - a. The farm house near the outfall to the lake. The house may have a faulty septic system or a connection to a sewer system that is leaking.
 - b. The stormwater system along the west side of the farm house. Due to the apparent old age and crumbling condition of the manhole structure, the stormwater system itself may also be old and cracking. If any sewer lines run near the stormwater system and are leaking or there is a nearby faulty septic system, the stormwater system may be conveying some of the leaking sewage to an outfall at the creek.
 - c. The housing addition along the northwest side of the creek, south of Bauer Road and east of 20th Avenue. There may be sewer line leaks and/or faulty septic systems in this area.
2. There is a strong indication of contamination of the stormwater outfall to the lake on the south side of the lake, which was flowing heavily during dry weather. This outfall

may be draining a large housing area that has a leaking sewer system and/or faulty septic systems.

3. There is the possibility of a faulty septic system at either the house at the west end of Elmwood Drive and/or the house next to it to the southeast, which is flowing downhill to the lake.
4. There is the possibility that the stormwater outfall on the northeast side of the lake is being contaminated by leaks from sanitary sewer lines nearby and/or upstream that flow through the ground and enter the stormwater system.
5. Either the water current from the contaminated creek outfall on the northwest side of the lake is carrying the contamination along the north shore to the dock area, or there is a possibility that the sewer system at the bathrooms at Maplewood Park is leaking and flowing downhill into that area.

Recommendations:

- Determine which homes or building structures in the key areas identified above that are near or uphill of the lake are connected to a sewer system and which are connected to a septic system.
 - If all homes and buildings are on city water, the ones that are receiving sewer bills are on sewer and the ones not receiving sewer bills should be on septic.
 - If some homes and buildings have water wells, the water well drilling records may contain information about the location and age of a septic system due to its proximity to the water well.
- If a house or building is on a septic system, this needs to be investigated to find out the age, size, and use of the system and how it has been maintained. Any system older than 20 years is suspect, and even less than that if it has not been maintained. An examination by a professional to determine whether the system is failing and needs to be repaired or replaced may be needed. The Health Department may be able to assist with this.
- Investigate the stormwater system on the west side of the farm house to determine if there are cracks, and investigate any nearby sewer lines and septic systems for leaks and failures.
- The sewer systems associated with the key areas may need to be examined for leaks by video camera and/or the houses or buildings dye tested to find problems.
- Any lift stations and the pipes connected to them nearby the key areas should be examined for problems that may be causing leaking sewage.
- The sewer systems for the bathrooms at Maplewood Lake may need to be examined for leaks by video camera and/or through dye testing to find problems.

ENVIRONMENTAL CANINE SERVICES LLC
FIELD INVESTIGATION RESULTS FOR MAPLEWOOD LAKE, JENISON, MI

Date: July 18, 2016

Canine 1: Abbey

Canine 2: Sable

Canine Results:

| | |
|--|---|
| | Two canine alerts to presence of human wastewater |
| | One canine alert to presence of human wastewater |
| | No canine alerts to presence of human wastewater |

| # | Site ID, Field Blank, or Sewage Sample | Site Type* | Location Description | GPS N | GPS W | Canine 1 Response | Canine 2 Response | Comments |
|----|--|------------|--|-----------|------------|-------------------|-------------------|--|
| 1 | N1 | GS-L | Sample from NW side of lake | 42.915905 | -85.815839 | - | + | |
| 2 | N2 | GS-C | Sample from creek outfalling into lake near site 1 | | | + | + | |
| 3 | D | GS-L | Sample from next to dock | 42.914938 | -85.81348 | + | + | |
| 4 | | O | Park ground NW of park, behind house on corner | 42.916389 | -85.815601 | - | + | Alert on the ground near house fence. Green patch on ground. Ground slopes downhill from house to lake near where sample N1 was taken. |
| 5 | | OF | Stormwater system outfall E side of lake, W side of 12th Ave, across street from church entrance | | | + | + | |
| 6 | | CB | Catch basin on E side of 12th Ave across street from site 5 | | | + | - | |
| 7 | | CB | Catch basin on W side of 12th Ave near site 5 | | | - | - | |
| 8 | | MH | Stormwater manhole in grass near outfall at site 5 | | | + | - | Standing water in MH. Outfalls to lake. |
| 9 | | MH | Stormwater manhole in center of street between sites 6 & 7 | | | - | + | |
| 10 | | GS-L | Sample from lake S of outfall at site 5 | | | - | - | |
| 11 | | CB | Catch basin to stormwater system upstream of manhole at site 8 | 42.91554 | -85.811893 | + | + | Top of the stormwater line. Lift station is very close upstream. |
| 12 | | OF | Stormwater outfall into lake near S end of 12th Ave | 42.911738 | -85.811813 | - | + | |
| 13 | | CB | Catch basin draining to outfall at site 12 | | | - | + | Suds in water in catch basin. Resident across street power washing rugs but denied using any detergents. |
| 14 | | GS-OF | Sample from water flowing from stormwater outfall structure | 42.910976 | -85.814094 | + | + | Very heavy stormwater flow in dry weather |
| 15 | | GS-C | Sample from creek at farm upstream of site 2 outfall | 42.916255 | -85.817496 | + | + | |
| 16 | | MH | Manhole close to creek at farm, near site 15 | 42.91638 | -85.81753 | + | - | Very old manhole structure with crumbling concrete and holes in ground for K9s to sniff. |
| 17 | | GS-C | Sample from creek upstream of site 15 | 42.916509 | -85.818463 | + | + | |
| 18 | | C | End of creek at Bauer Rd, upstream of site 17 | | | NA | + | Dry creek bed. Houses along creek here and all the way downstream almost to site 17. Septic systems? |

*Site Type Codes: OF=Outfall MH=Manhole CB=Catch Basin D=Drain/Ditch ST=Stream/Trib R=River L=Lake SH=Shoreline O=Other (Describe) FB=Field Blank
 GS=Grab sample, followed by Site Type code.

