Level 3 Project Study Plan

2016 Mill Creek Environmental Monitoring

(1) Objectives

In 2016, the Northeast Ohio Regional Sewer District (NEORSD) plans to conduct stream monitoring activities at four sites on Mill Creek, an urbanized tributary to the Cuyahoga River. Mill Creek has a natural waterfall, Mill Creek Falls, which is a fish migration barrier at river mile (RM) 2.80. NEORSD will assess habitat and water chemistry conditions and evaluate the fish and benthic macroinvertebrate communities at each site. The purpose of the 2016 monitoring is to continue the assessment of the biology downstream of the falls and to satisfy permit requirements. The four sites, which are along Mill Creek's main branch, are located at RMs 8.30, 2.75, 0.70, and 0.12. These sites were first surveyed in 1995 as part of the Mill Creek Watershed Management Project, and were all surveyed again in 2011 through 2015.

A comparison of the fish and macroinvertebrate communities and the corresponding habitat and water chemistry data will be used to determine the status of the biological communities and the overall health of the creek segments. Additionally, sampling at RM 0.12 and 8.30 is required to be sampled as part of the Ohio Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) Permit No. 3PA00002*HD.

The 2016 survey will continue to support several NEORSD capital improvement projects designed to provide wet weather flow relief, stormwater storage capacity, and reduction/elimination of CSOs for several communities in the Mill Creek watershed. The Miles Avenue Relief Sewer (MARS) was completed in June 2010, the Lee Road Relief Sewer (LRRS) was completed in June 2012, and the Phase Three of the Mill Creek Tunnel Project (MCT-3C) was completed in late 2012. The stream monitoring surveys, which are considered post-construction monitoring for LRRS, MARS and MCT-3C, will enable future evaluations of the effectiveness of the capital improvement projects in restoring the chemical and biological health of Mill Creek.

Stream monitoring activities will be conducted at each site by NEORSD Level 3 Qualified Data Collectors certified by Ohio EPA in Fish Community Biology, Benthic Macroinvertebrate Biology, Chemical Water Quality, and Stream Habitat Assessment. Fish and macroinvertebrate community health will be evaluated through the use of appropriate Ohio EPA methods, which may include: Index of Biotic Integrity (IBI) and the Invertebrate Community Index (ICI). An examination of the specific characteristics of the biological communities will be used in conjunction with water quality data, the NEORSD Macroinvertebrate Field Sheet, and Qualitative Habitat Evaluation Index (QHEI) results in order to identify

impacts to the communities. Results will be compared to historic data to show temporal as well as spatial trends. Water chemistry data will also be compared to the Ohio Water Quality Standards to determine attainment of applicable uses (Ohio EPA, 2016)[1].

(2) Nonpoint/Point Sources

Point Sources	Nonpoint Sources
Combined Sewer Overflows	Urban Runoff
Sanitary Sewer Overflows	Spills
Storm Sewer Outfalls	Sedimentation
Home septic systems	

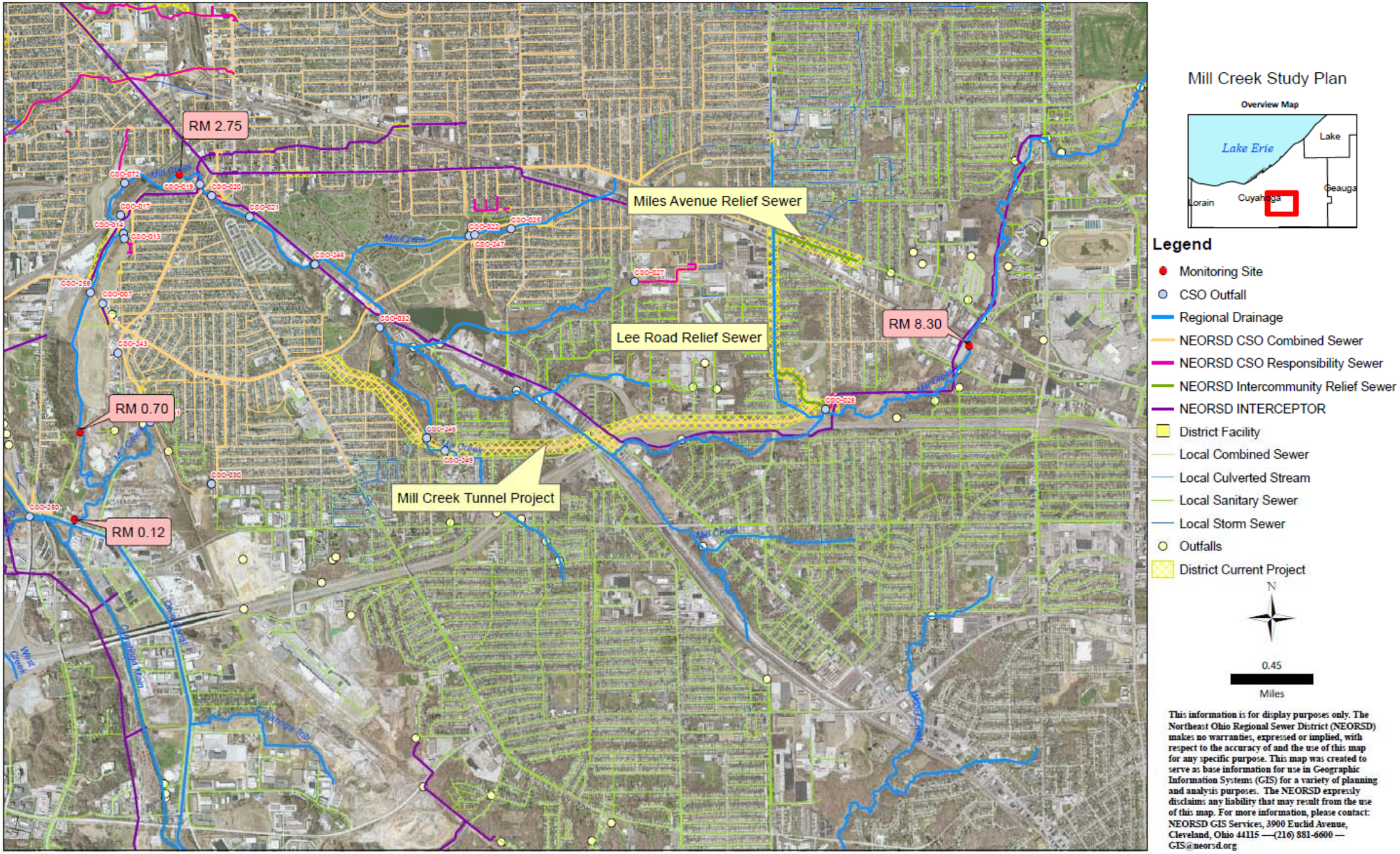
A map has been provided in Section 6 to show point sources that may be influencing the water quality at each sample location. These sources, along with the nonpoint sources listed in the table above, may be impacting the health of the fish and benthic macroinvertebrate communities in Mill Creek. Other factors that may influence ecological conditions during the study include periods of drought or precipitation.

(6) Sampling Locations

The following water chemistry, habitat, electrofishing, and macroinvertebrate sample locations on Mill Creek, listed from upstream to downstream, will be surveyed during the 2016 field season. Benthic macroinvertebrate and water chemistry collection sites are located within each electrofishing zone, indicated by RM. The GPS coordinates are recorded at the downstream end of each electrofishing zone.

[1] See appendix H for a list of all references.

Water Body	Latitude	Longitude	River Mile	Location Information	USGS HUC 8 Number - Name	Purpose
Mill Creek	41.4305	-81.5442	8.30	Upstream of South Miles Road, first site upstream of NEORSD CSOs	04110002 Cuyahoga	Evaluate watershed health, support of Capital Improvement projects. Site required by Ohio EPA NPDES Permit
Mill Creek	41.4451	-81.6271	2.75	Downstream of the Mill Creek Falls	04110002 Cuyahoga	Evaluate watershed health, support of Capital Improvement projects.
Mill Creek	41.4240	-81.6376	0.70	Upstream of the Warner Road Tributary, adjacent to 5000 Warner Road	04110002 Cuyahoga	Evaluate watershed health, support of Capital Improvement projects.
Mill Creek	41.4178	-81.6387	0.12	Upstream of Canal Road	04110002 Cuyahoga	Evaluate watershed health, support of Capital Improvement projects. Site required by Ohio EPA NPDES Permit


RM 2.75
RM 8.30
RM 0.70
RM 0.12
Miles Avenue Relief Sewer
Lee Road Relief Sewer
Mill Creek Tunnel Project
Mill Creek Study Plan
Overview Map
Lake Erie
Lake
Lorain
Cuyahoga
Geauga
Legend
Monitoring Site
CSO Outfall
Regional Drainage
NEORSD CSO Combined Sewer
NEORSD CSO Responsibility Sewer
NEORSD Intercommunity Relief Sewer
NEORSD INTERCEPTOR
District Facility
Local Combined Sewer
Local Culverted Stream
Local Sanitary Sewer
Local Storm Sewer
Outfalls
District Current Project
N
0.45
Miles
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