Study Plan for CWA Section 319(h) and Ohio SWIF Projects

Pre-Implementation Monitoring for Fiscal Year 2014 Projects
and
Post-Implementation Monitoring for Selected Previous Years Projects

Division of Surface Water
Ecological Assessment Section
May 30, 2014

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Objectives

1. Establish baseline biological and physical habitat quality in five new 319 project water bodies by evaluating fish and macroinvertebrate communities, along with assessing physical habitat conditions. This will include evaluation of the attainment status of designated or recommended aquatic life uses of the water bodies expected to be restored by each project.

2. Biological monitoring will also occur at seven previously implemented 319 and three SWIF project sites where restoration work has been completed for at least one year.

3. Complete a report summarizing the aquatic biological results by project area.

Sampling Activities

Biological Community Assessment

The fish communities will be assessed at each sampling site using wading or boat electrofishing methods. Artificial substrate quantitative samplers will be set at applicable macroinvertebrate sampling stations. At all sites or where small stream size, low stream flow conditions, or other contingencies will not support placement of artificial substrate samplers, qualitative macroinvertebrate sampling will be conducted. Sampling locations are listed in Table 1 and Figures 1-15.

Stream Habitat Assessment

Stream habitat will be evaluated at each biological sampling site and will be used in the overall environmental assessment of the waterbodies.

Results

The results of the data collected will provide pre-implementation water resource conditions at each of five FY14 319 project areas. The biological community assessment and physical habitat data will be used to assign/confirm the appropriate aquatic life use, determine aquatic life use attainment/impairment status, and assess physical habitat condition at each water body project area. At seven previously implemented 319 project sites, and three SWIF project areas, post-construction biological community and physical habitat conditions will be assessed to compare with baseline monitoring results collected prior to project implementation.

Quality Assurance/Sampling Methods

Ohio EPA Manuals

All biological, data processing, and data analysis methods and procedures adhere to those specified in Biological Criteria for the Protection of Aquatic Life, Volumes II - III (Ohio EPA 1987, 1989a, 1989b, 2013b, 2013c) for biological community assessments, and The Qualitative Habitat Evaluation Index (QHEI); Rationale, Methods, and Application (Ohio EPA 1989c, 2006) for stream habitat assessment.

Use Attainment

Attainment/non-attainment of aquatic life uses will be determined by using biological criteria codified in Ohio Administrative Code (OAC) 3745-1-07, Table 7-17. Numerical biological criteria are based on multimetric biological indices including the Index of Biotic Integrity (IBI) and modified Index of Well-Being (MIwb), indices measuring the response of the fish community, and the Invertebrate Community Index (ICI), which indicates the response of the macroinvertebrate community.

Performance expectations for the tiered aquatic life uses (Warmwater Habitat [WWH], Exceptional Warmwater Habitat [EWH], and Modified Warmwater Habitat [MWH]) were developed using the regional reference site approach (Hughes et al. 1986; Omernik 1987). This fits the practical definition of biological integrity as the biological performance of the natural habitats within a region (Karr and Dudley 1981). Attainment of an aquatic life use is FULL if all three indices (or those available) meet the applicable criteria, PARTIAL if at least one of the indices did not attain and performance did not fall below the fair category, and NON if all indices either fail to attain or any index indicates poor or very poor performance.

Stream Habitat Assessment

Stream habitat is evaluated using the Qualitative Habitat Evaluation Index (QHEI) developed by the Ohio EPA for streams and rivers in Ohio (Ohio EPA 1989c, Ohio EPA 2006). Various attributes of the available habitat are scored based on their overall importance to the establishment of viable, diverse aquatic faunas. Evaluations of type and quality of substrate, amount of instream cover, channel morphology, extent of riparian canopy, pool and riffle development and quality, and stream gradient are among the metrics used to evaluate the characteristics of a stream segment, not just the characteristics of a single sampling site. As such, individual sites may have much poorer physical habitat due to a localized disturbance yet still support aquatic communities closely resembling those sampled at adjacent sites with better habitat, provided water quality conditions are similar. QHEI scores from hundreds of segments around the state have indicated that values higher than 60 were generally conducive to the establishment of warmwater faunas while those which scored in excess of 75-80 often typify habitat conditions which have the ability to support exceptional faunas.

Biological Community Assessment

Artificial substrate collections of macroinvertebrates will be collected at all sites with greater than 20 mi^2 drainage areas or at reference site locations. This sample provides quantitative data and consists of a composite sample of five modified Hester-Dendy multiple-plate artificial substrate samplers colonized for six weeks. Qualitative macroinvertebrate sampling will be conducted at all sampling locations. This sampling effort consists of an inventory of all observed macroinvertebrate taxa from the natural stream habitats at each site with no attempt to quantify populations other than notations on the predominance of specific taxa or taxa groups within major macrohabitat types (e.g., riffle, run, pool, margin). Detailed macroinvertebrate assemblage sampling protocols are documented in Biological Criteria for the Protection of Aquatic Life, Volume III (1989b, 2013c).

Fish will be sampled at each sampling location using pulsed DC headwater, wading, or boat electrofishing methods depending on watershed size at each sampling zone. Sites with drainage areas greater than 20 mi^2 or at reference site locations will be sampled twice during the sampling index period. Fish are processed in the field which includes identifying each individual to species, counting individuals at all sites, weighing individuals at wading and boat sites, and recording any external abnormalities. Detailed fish assemblage sampling protocols are documented in Biological Criteria for the Protection of Aquatic Life, Volume III (1989b, 2013c).

Project Descriptions

The following summaries describe projects that have been awarded FY14 Section 319(h) subgrants. These projects were identified during the course of the review as having met fund eligibility requirements and having the highest potential for water quality improvements within the watershed where they will be implemented. All pre-implementation projects are assigned to the following EA^3 project: Grant Year 2014 319 Projects (Pre-Project Monitoring).

City of Stow 14(h)EPA-12: Project will restore approximately 2,400 linear feet of a tributary to Mud Brook (Figure 1) by a raise-grade approach to place the stream in a historic alignment, restore approximately 1.75 acres of the existing and created floodplain by planting native grasses, trees, shrubs, and live stakes. The 10 acre property that contains the restoration area will be maintained as a public space. This project is being implemented consistent with recommendations within the Lower Cuyahoga River TMDL and/or state-endorsed Watershed Action Plan.
Contact: Sheila Rayman (330-689-2710); srayman@stow.oh.us

City of Lancaster 14(h)EPA-13: Project will restore approximately 960 linear feet of Baldwin Run by removing debris; and by providing invasive species management, channel enhancements, bank stabilization, and riparian corridor plantings (Figure 2). The City has discussed the easements with the property owners and will replace the 1939 easement with an inclusive conservation easement. The new easement will be signed and the old easement vacated prior to project completion. This project is being implemented consistent with recommendations within the Hocking River TMDL and/or state-endorsed Watershed Action Plan.
Contact: Denise Crews (740-687-6614); dcrews@ci.lancaster.oh.us

Village of Reminderville 14(h)EPA-18: Project will restore function to approximately 1,200 linear feet of a tributary to Pond Brook and adjacent wetland/riparian wetland systems and will improve habitat, provide shading, and limit further bank erosion of approximately 1,500 linear feet of stream bank

(Figure 3). Liberty Ledges, LLC. is committed to providing a conservation easement of the project area. This project is being implemented consistent with recommendations within the Lower Cuyahoga River TMDL and/or state-endorsed Watershed Action Plan.
Contact: Eugene Esser (330-562-1234); epesser@krockesser.com

Madison Village 14(h)EPA-19: Project will restore approximately 600 linear feet of a small headwater habitat stream that flows through Fairview Memorial Park cemetery and re-forest approximately 0.7 acre of riparian corridor (Figure 4). The Village owns and maintains the Fairview Memorial Park and will continue to do so in perpetuity. The proposed project area was not planned as an active cemetery plot area and will be protected by the Village in the future as a natural stream corridor and floodplain area.
Contact: David McCallops (440-428-7526); dave_mccallops@urscorp.com

City of Solon 14(h)EPA-25: Project will restore approximately 430 linear feet of stream through natural streambank stabilization and the restoration of 1.0 acre of riparian corridor and vegetated floodplain on Hawthorne Creek, a tributary of Tinkers Creek (Figure 5). An existing utility easement provides perpetual protection to the site. This project is being implemented consistent with recommendations within the Lower Cuyahoga River TMDL and/or state-endorsed Watershed Action Plan.
Contact: John Busch (440-248-1155); jbusch@solonohio.org

The following projects were awarded prior year Section 319(h) subgrant funding or Ohio SWIF funding and for which follow-up monitoring is being conducted. Pre-implementation monitoring results are assigned to various EA3 projects as noted and links are provided to baseline reports which provide more detailed project information including site locations, maps, and baseline monitoring results and conclusions.

Village of Chagrin Falls 08(h)EPA-29: The project site was approximately ½ mile upstream of the Village of Chagrin Falls, on the mainstem of the Chagrin River (Figure 6). Lowering the dam occured in two phases and allowed the restoration of approximately 2,200 linear feet of the Chagrin River that is currently impaired. The existing dam was lowered at the spillway by 10.4 feet. Pre-monitoring results can be found at:
http://epa.ohio.gov/portals/35/documents/319MonitoringReport2008.pdf

City of Mason 10(h)EPA-14: The project restored two sites totaling 1,400 linear feet of Muddy Creek, a tributary to the Little Miami River (Figure 7). The project will resolved existing bank erosion and habitat degradation problems within the stream using natural channel design principles. This project expanded upon approximately 7,000 linear feet of restoration in Muddy Creek that the city of Mason completed in 2009. Stream restoration work occured upstream and downstream from the locally funded project and consisted of cross vanes to direct flow away from steeply eroded stream banks, establishment of a flood plain bench, removal of invasive species, and re-establishment of native riparian plant communities. Successful completion will reduce sedimentation from severely eroding stream banks and improve riparian and stream functions. Pre-monitoring results can be found at:
http://epa.ohio.gov/portals/35/documents/319_Projects_2010_TSD.pdf

Village of Hunting Valley 10SWIF-GLRI-CUY-068: This project has reduced sediment loadings into the Chagrin River (Figure 8) and stabilized 400 linear feet of severely eroding stream bank using "green" stabilization and engineering practices (vegetative rip-rap). Three tenths of an acre adjacent to the project area was planted with native trees and shrubs. Pre-monitoring results can be found at:
http://epa.ohio.gov/portals/35/documents/319_SWIF_TSD_2011.pdf

City of Willoughby Hills 10(h)EPA-10: The project was designed to re-establish a natural area within the floodplain of the Chagrin River by expanding and improving the riparian forest, re-forestation of the floodplain, restoration of natural function and flow by removing an existing levee and restoring riparian wetland areas (Figure 9). Restoration activities associated with this project included removal of 650 linear feet of existing earthen levee, invasive species control practices on approximately 11.4 acres, restoration of 3.9 acres of previously existing wetlands on the site, and riparian restoration plantings including 17 acres of native tree and shrub species. Additionally, a 6-acre meadow site was planted down gradient from the restored wetland outlet structure. Pre-monitoring results can be found at: http://epa.ohio.gov/portals/35/documents/319_Projects_2010_TSD.pdf

City of Akron 10(h)EPA-17: Phase 2 involved the restoration of 1,600 linear feet of the Little Cuyahoga River and lowering the Kelly Avenue dam by five feet in Akron, Ohio (Figure 10). Phase 2 also modified the Kelly Avenue Dam which impounds the river and causes excess sedimentation, elevated water temperatures, and low dissolved oxygen levels. Following lowering of the dam, the former impoundment was restored using natural channel design methods and included developing an appropriately sized channel, meandering pattern, and functional floodplain. Removing the dam in its entirety is not a viable option due to upstream bridge structures and in-stream abutments. Successful completion of this project will also result in the restoration of 6 small riparian wetlands within the project site. Pre-monitoring results can be found at: http://epa.ohio.gov/portals/35/documents/319_Projects_2010_TSD.pdf

Liberty Township 10SWIF-145: Five hundred linear feet of Wildcat Run was restored with natural channel design that used stone riffles and eddy rock groupings (Figure 11). This project utilized storm water management practices by constructing a self-forming channel on a previously channelized feeder stream and constructing a vegetated swale with rock check dams within the swale. This project was part of a larger initiative to establish a storm water management demonstration site for innovative storm water practices that will serve as a model for other townships and developers. With a conservation covenant, the Liberty Township Park secured 30 acres of wooded stream corridor to be protected in perpetuity. Pre-monitoring results can be found at:
http://epa.ohio.gov/portals/35/documents/319_SWIF_TSD_2011.pdf

University of Toledo 09(h)EPA-20: This project restored 900 linear feet of impaired waters of the Ottawa River and address habitat and hydromodification impacts on the main campus of the University of Toledo (Figure 12). Stream restoration incorporated natural channel design, including grade work in areas adjacent to stream structures, to restore a more natural stream channel and functional floodplain. The project installed habitat and flow control features such as riffles, bend-way weirs, low flow concentrators and hydrologic cover stones. Bank shape and stability was addressed using bioengineering techniques at this highly visible site. Streambank restoration and stabilization work included planting native grasses, shrubs and trees, and will include live stakeing, establishing vegetated terraces, and protecting and enhancing storm water discharge points and placement of vegetated filter strips. Pre-monitoring results can be found at:
http://epa.ohio.gov/portals/35/documents/319_SWIF_TSD_2011.pdf

Toledo Botanical Garden 11(h)EPA-21: The Hill Ditch restoration project at the Toledo Botanical Garden included the removal of two lowhead dam structures and restoration of a 1,050 foot segment of Hill Ditch that flows through their facilities (Figure 13). The two low-head dams impounded the east and west Crosby Lake ponds at Toledo Botanical Gardens and were removed during the project. Removal

restored natural flow conditions to Hill Ditch and stream channel restoration activities followed using natural channel design and included the installation of five instream grade control structures and replanting of 0.32 acres of riparian areas, as well as 1.7 acres of previously impounded deep water areas. Pre-monitoring results can be found at:
http://epa.ohio.gov/portals/35/documents/319_SWIF_TSD_2011.pdf

City of Aurora 11(h)EPA-14: Project restored 550 linear feet of Harmon Run and an unamed tributary to Harmon Run using natural channel design and installing six grade control structures to eliminate down-cutting and erosion within the project area (Figure 14). The project also restored 11 acres of previously occurring wetlands and 17.5 acres of riparian corridor. The project site and surrounding acreage will be permanently protected by conservation easements placed on more than 100 acres. Pre-monitoring results can be found at: http://epa.ohio.gov/portals/35/documents/319_SWIF_TSD_2011.pdf

City of Cuyahoga Falls 12SWIF-10: Restored and stabilized 1,000 linear feet of Kelsey Creek stream channel, 350 feet of which is two-stage channel (Figure 15). Installed 10 in-stream habitat structures and 10 grade control structures. Regraded and stabilized nearly 1,875 feet of eroding stream bank (both sides) using native plants and bio-engineering techniques. Replaced 3.3 acres of lawn with 1.68 acres of riparian forest (includes 1.4 acres of native trees and shrubs plus 0.28 acres of supplemental plantings, 0.25 acres of wet meadow and 1.4 acres of native grasses and forbs). Pre-implementation results are pending.

Table 1. FY14 Section 319(h) projects - baseline and follow-up monitoring locations, 2014.

HUC12 Stream name(s) Project Number	Monitoring Type	Stream Code	Station	Latitude	Longitude	Sample Type	River Mile	Drainage Area	Location
04110002 04 01									
Trib to Mud Brook		19-024-001	302676	41.176558	-81.462717	F,Mq	1.5	0.65	1434 Berkshire Rd, Stow, OH 44224
14(h)EPA-12	Baseline		302675	41.174552	-81.466139	F,Mq	1.3	0.96	1165 Inverness Ln, Stow, OH 44224
			F01G25	41.171800	-81.478100	F,Mq	0.4	2.9	At Hudson Drive
05030204 04 02									
Baldwin Run		01-046-000	302671	39.715431	-82.580474	F,Mq	0.6	11.7	Goslin Rd. Dst. Confluence
			J01S15	39.709296	-82.582959	F,Mq	0.3	12.9	In Lancaster, at Lawrence Rd.
Fetter's Run		01-047-000	302673	39.731433	-82.583981	F,Mq	1.15	6.1	At Lancaster High School, off Arbor Valley Dr.
Ewing Run		01-046-001	302672	39.718833	-82.578832	F,Mq	0.1	5.18	At Goslin and Pleasantville Rd, Lancaster
14(h)EPA-13	Baseline								
04110002 05 01									
Trib to Pond Brook		19-008-004	302680	41.339017	-81.418956	F,Mq	0.9	1.23	At Liberty Rd, Reminderville
14(h)EPA-18	Baseline		302678	41.340100	-81.412074	F,Mq	0.5	1.31	At Glenway Dr, Reminderville
			302677	41.337798	-81.403386	F,Mq	0.01	1.55	At Outriggers Cove, Reminderville
04110003 02 03									
Trib to Arcola Creek		07-011-001	302684	41.765958	-81.042183	F,Mq	0.75	0.22	Ust Fairview Memorial Park, dst Tribs, off Hunington Woods Dr, or access through cemetary
14(h)EPA-19			302682	41.766728	-81.043978	F,Mq	0.6	0.3	At Fairview Memorial Park, off of River St./ OH-528, Madison, OH
			302681	41.771965	-81.045866	F,Mq	0.12	0.4	At East Main St, near Madison Local Schools, ust. Trib
04110002 05 04									
Hawthorne Creek		01-007-008	302670	41.409667	-81.484233	F,Mq	3.45	3.68	At Cannon Rd/Richmond Rd, Solon, OH. Ideally Ust Bridge
14(h)EPA-25	Baseline		302669	41.404000	-81.487000	F,Mq	2.8	5.26	Ust Aurora Rd Bridge near Richmond Rd., Solon, OH
			302668	41.404000	-81.486900	F,Mq	2.7	5.26	Dst Aurora Rd Bridge near Richmond Rd., Solon, OH in Golf course
04110003 03 04									
Chagrin River		15-001-000	D01W11	41.438653	-81.378134	F2,MQ	30.6	56	Chagrin R. At Chagrin Falls, Upst. Mill Pond, Dst. 1st Dam
08(h)EPA-29	Follow-up		D01P09	41.437858	-81.381350	F2,MQ	30.4	57	Chagrin R. At Chagrin Falls, Upst. Dam, In Mill Pond
			D01P10	41.434368	-81.387213	F2,MQ	30	57	Chagrin R. At Chagrin Falls @ S. Cleveland St.

HUC12 Stream name(s) Project Number	Monitoring Type	Stream Code	Station	Latitude	Longitude	Sample Type	River Mile	Drainage Area	Location
05090202 09 01									
Muddy Creek		11-020-000	301223	39.351390	-84.319770	F,Mq	6.2	5.1	At Mason @ Tylersville Rd.
10(h)EPA-14	Follow-up		301222	39.352530	-84.316520	F,Mq	5.9	6.2	At Mason @ St. Susanna Church
			301221	39.362190	-84.299140	F,Mq	4.5	8.2	At Mason, 0.5 Miles Dst. Kings Mills Rd.
			M05W62	39.371700	-84.288300	F,Mq	3.5	10	Muddy Creek N Of Mason @ St. Rt. 741
			M05P06	39.369400	-84.248300	F,Mq	0.5	15.2	Muddy Creek Near S. Lebanon @ Mason-Morrow-Milgrove Rd.
04110003 04 02									
Chagrin River		15-001-000	301235	41.495510	-81.401530	F2,MQ	20.1	156	Upst. Hunting Valley Restoration Area
10SWIF-GLRI-CUY-068	Follow-up		301234	41.497030	-81.402570	F2,MQ	19.9	156	Adj. Hunting Valley Restoration Area
			301233	41.498770	-81.400690	F2,MQ	19.7	157	Dst. Hunting Valley Restoration Area
10(h)EPA-10	Follow-up		201256	41.576450	-81.415636	F2,MQ	12.5	178	At Old River Farm Picnic Area
			D01G05	41.588694	-81.401917	F2,MQ	11.1	186	At Old Pleasant Valley Rd.
			301232	41.591760	-81.406850	F2,MQ	10.6	186	Chagrin R. Dst. Pleasant Valley Park
04110002 03 04									
Little Cuyahoga River		19-030-000	F01S84	41.060300	-81.463100	F2,MQ	7.1	31	Akron @ Massillon Rd.
10(h)EPA-17	Follow-up		301216	41.063111	-81.480250	F2,MQ	6.2	47	At Akron, Upst. Kelly Ave. Dam (Impounded)
			F01S82	41.072200	-81.486100	F2,MQ	5.2	47	At Akron @ Bank St
05060001 11 01									
Wildcat Run		02-400-041	301422	40.190130	-83.082170	F,Mq	1.7	1.1	N Of Powell @ Liberty Twp. Park
10SWIF-145	Follow-up		301201	40.192517	-83.077611	F,Mq	1.4	1.3	N Of Powell, Upst. Liberty Rd.
04100001 03 08									
Ottawa River		04-300-000	P11K59	41.657650	-83.621190	F2,MQ	11.6	154	Secor Rd
09(h)EPA-20	Follow-up		P11S74	41.659700	-83.612500	F2,MQ	11.1	154	Stadium Drive
			301443	41.661690	-83.604850	F2,MQ	10.9	155	Douglass Avenue
04100001 03 07									
Hill Ditch		04-300-007	P11K61	41.665410	-83.670030	F,Mq	2.2	6.3	Upst. Reynolds Rd, downstream Toledo Botanical Gardens ponds
11(h)EPA-21	Follow-up		301450	41.667220	-83.675350	F,Mq	2.6	3.5	Dst. Carriage Drive, upstream Toledo Botanical Gardens ponds

HUC12 Stream name(s) Project Number	Monitoring Type	Stream Code	Station	Latitude	Longitude	Sample Type	River Mile	Drainage Area	Location
04110003 03 02									
Harmon Run		15-005-003	301765	41.281700	-81.324800	F,Mq	2.1	0.5	SE Of Sunny Lake, Dst. Page Rd.
Unnamed Trib to Harmon Run		15-005-006	301766	41.283125	-81.324186	F,Mq	0.1	0.1	Trib To Harmon Run (2.0) SE of Sunny Lake, Dst Page Rd. Near Mouth
11(h)EPA-14	Follow-up								
04110002 03 05									
Kelsey Creek		19-001-035	302254	41.141363	-81.456402	F,Mq	0.25	3.3	At Cuyahoga Falls, Dst. Munroe Falls Blvd.
12SWIF-10	Follow-up		302253	41.136796	-81.456786	F,Mq	0.6	3	At Cuyahoga Falls @ Footbridge In Kennedy Park
			302252	41.134461	-81.455780	F,Mq	0.75	2.6	At Cuyahoga Falls @ Intersection Kelsey/Rainier

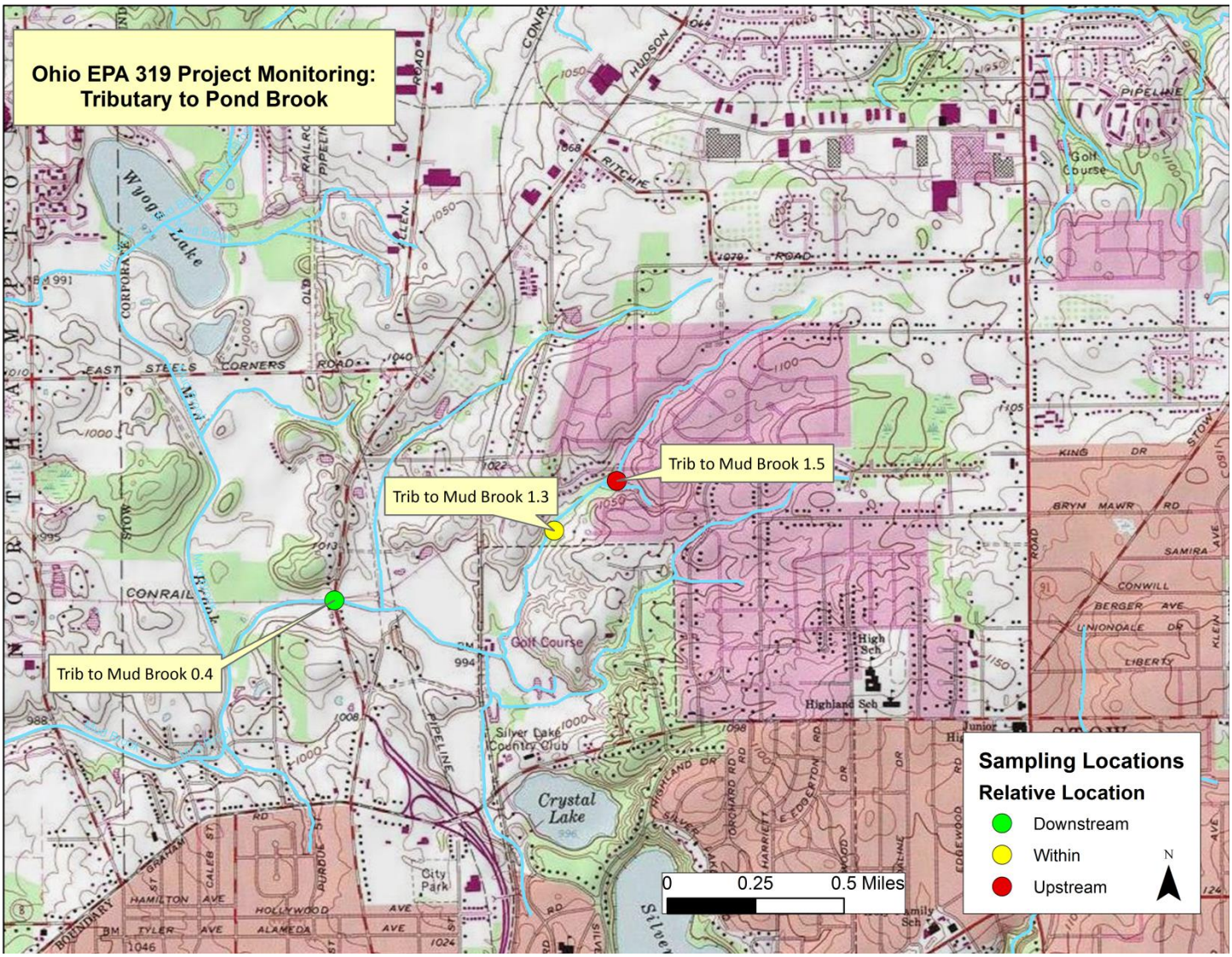

Figure 1. Tributary to Mud Brook sampling locations, 2014 [14(h)EPA-12].

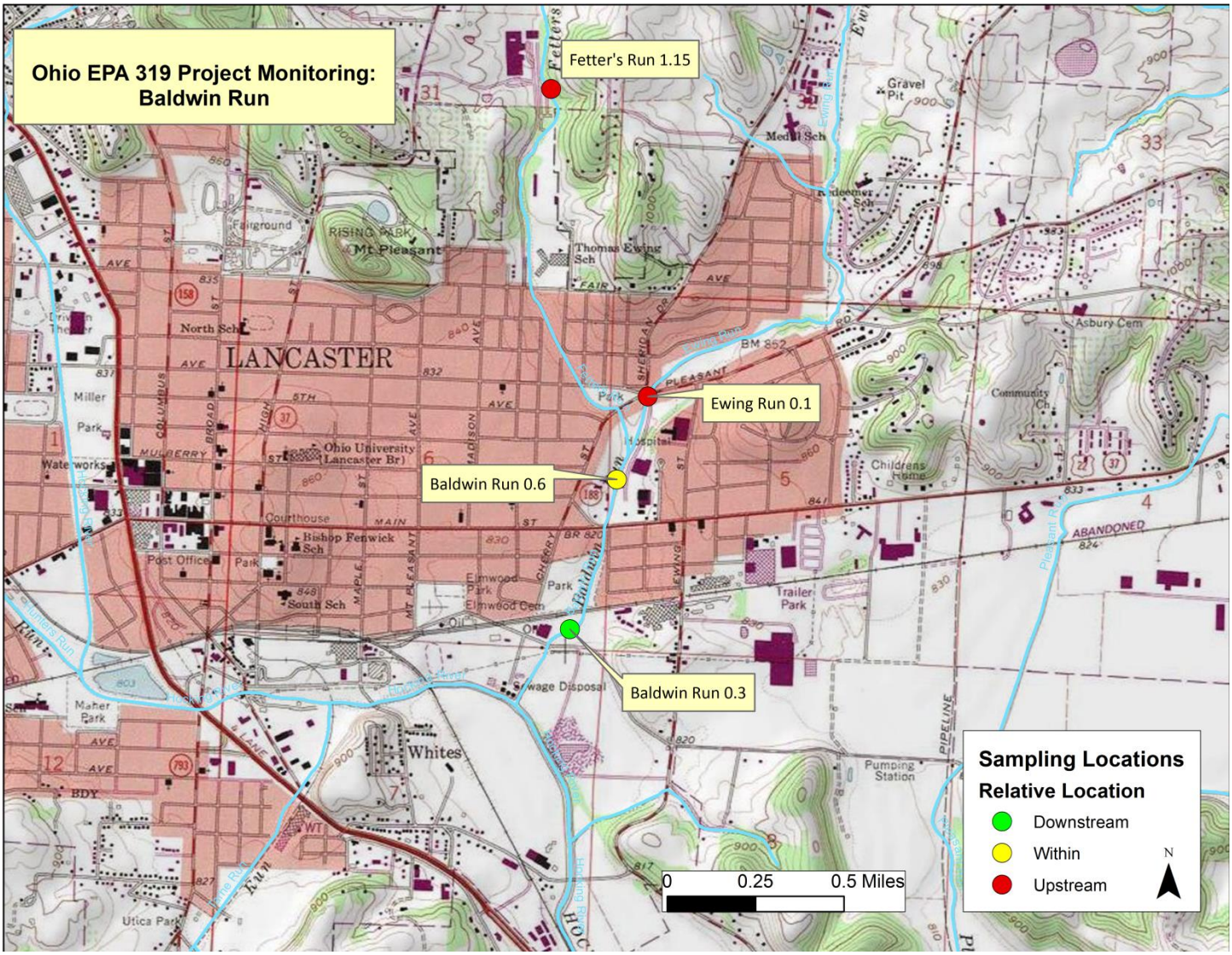

Figure 2. Baldwin Run sampling locations, 2014 [14(h)EPA-13].

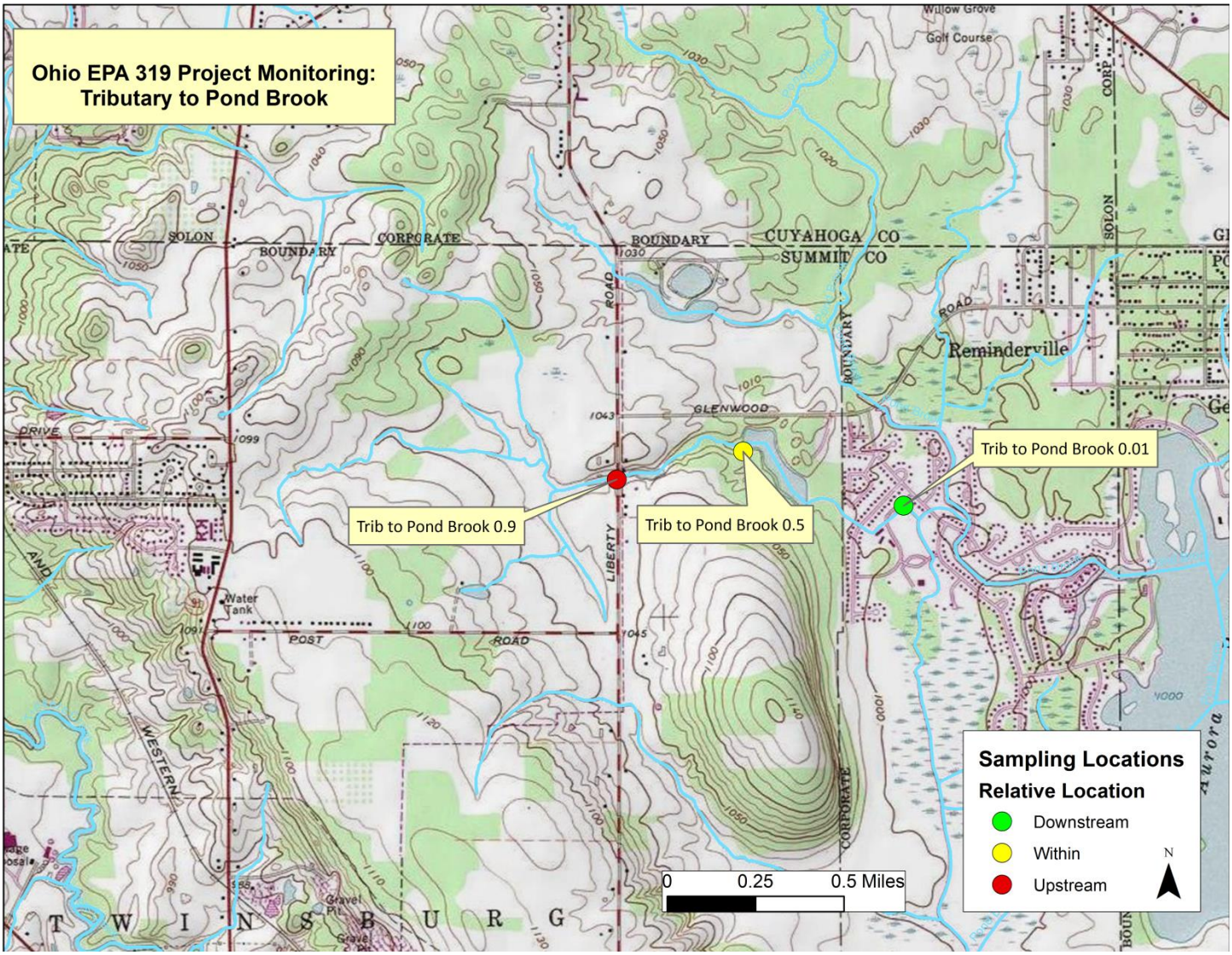

Figure 3. Tributary to Pond Brook sampling locations, 2014 [14(h)EPA-18].

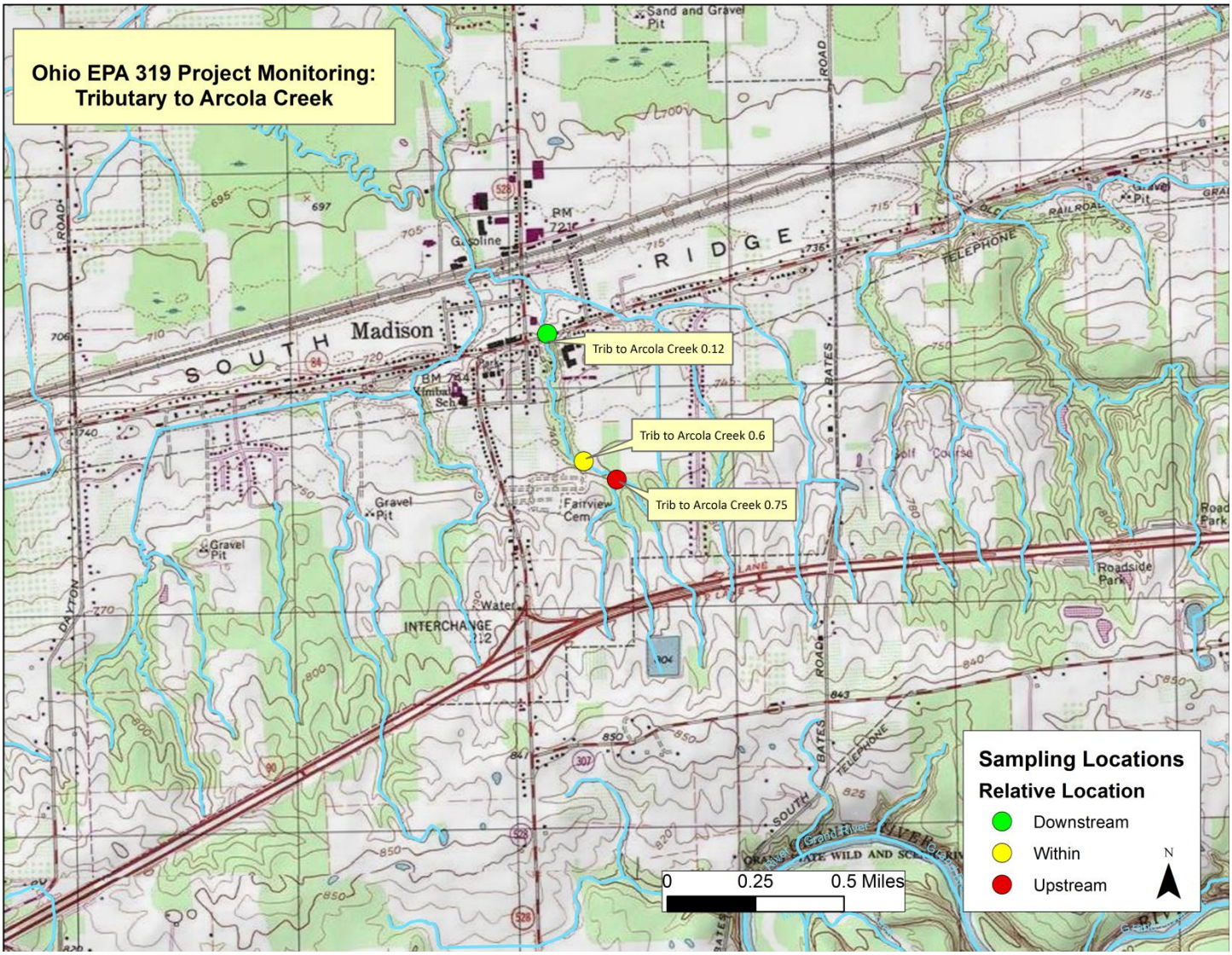

Figure 4. Tributary to Arcola Creek sampling locations, 2014 [14(h)EPA-19].

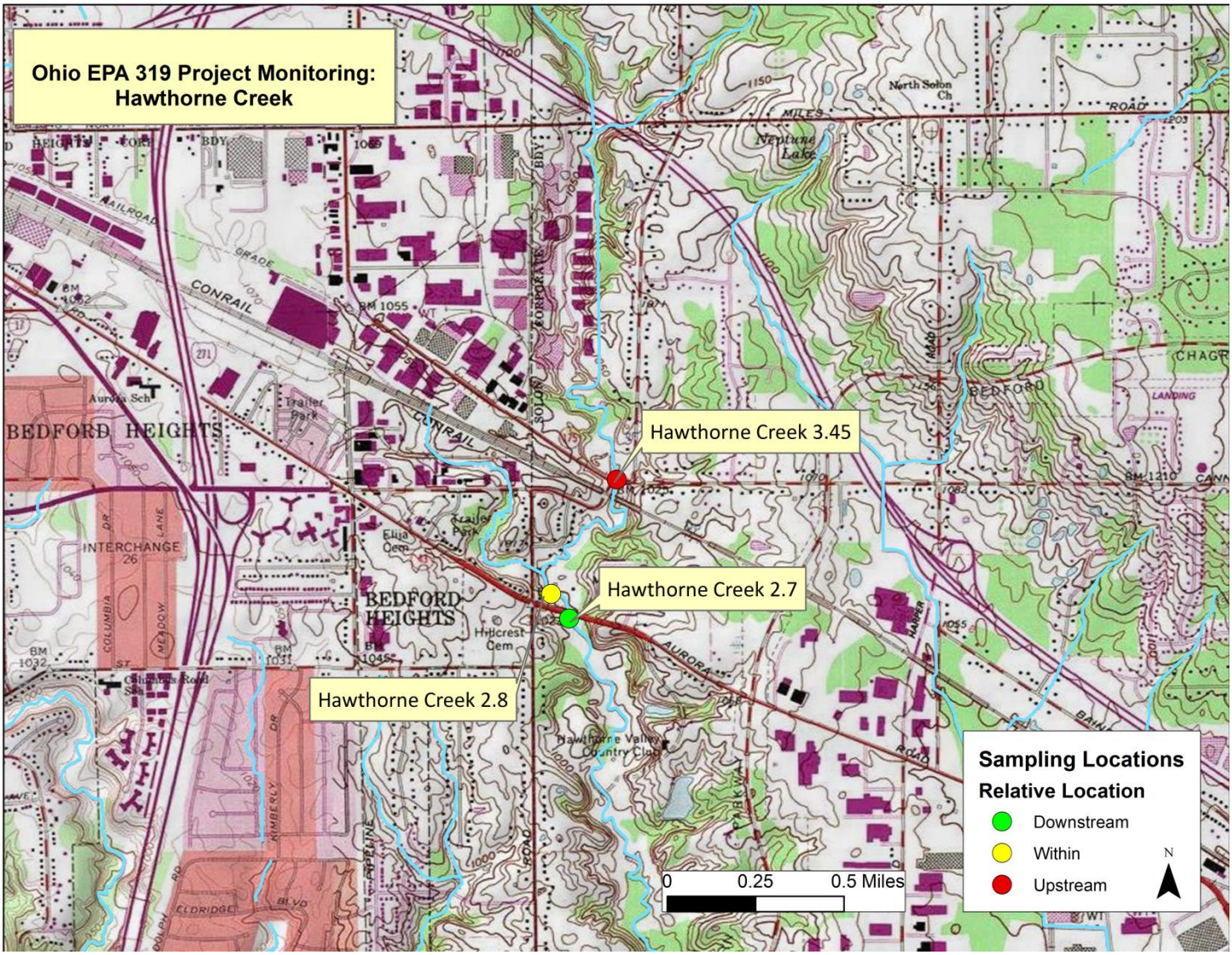

Figure 5. Hawthorne Creek sampling locations, 2014 [14(h)EPA-25].

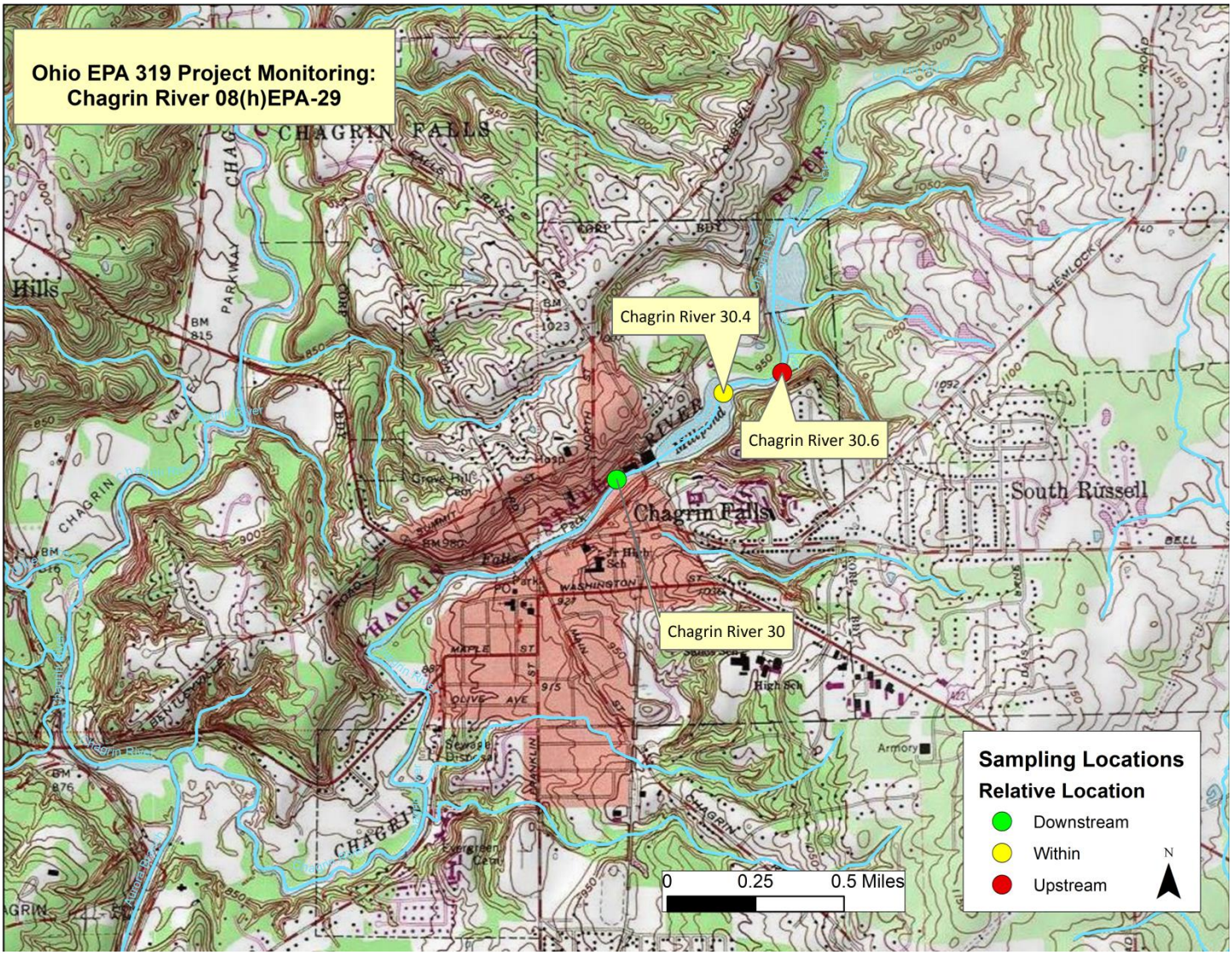

Figure 6. Chagrin River sampling locations, 2014 [08(h)EPA-29].

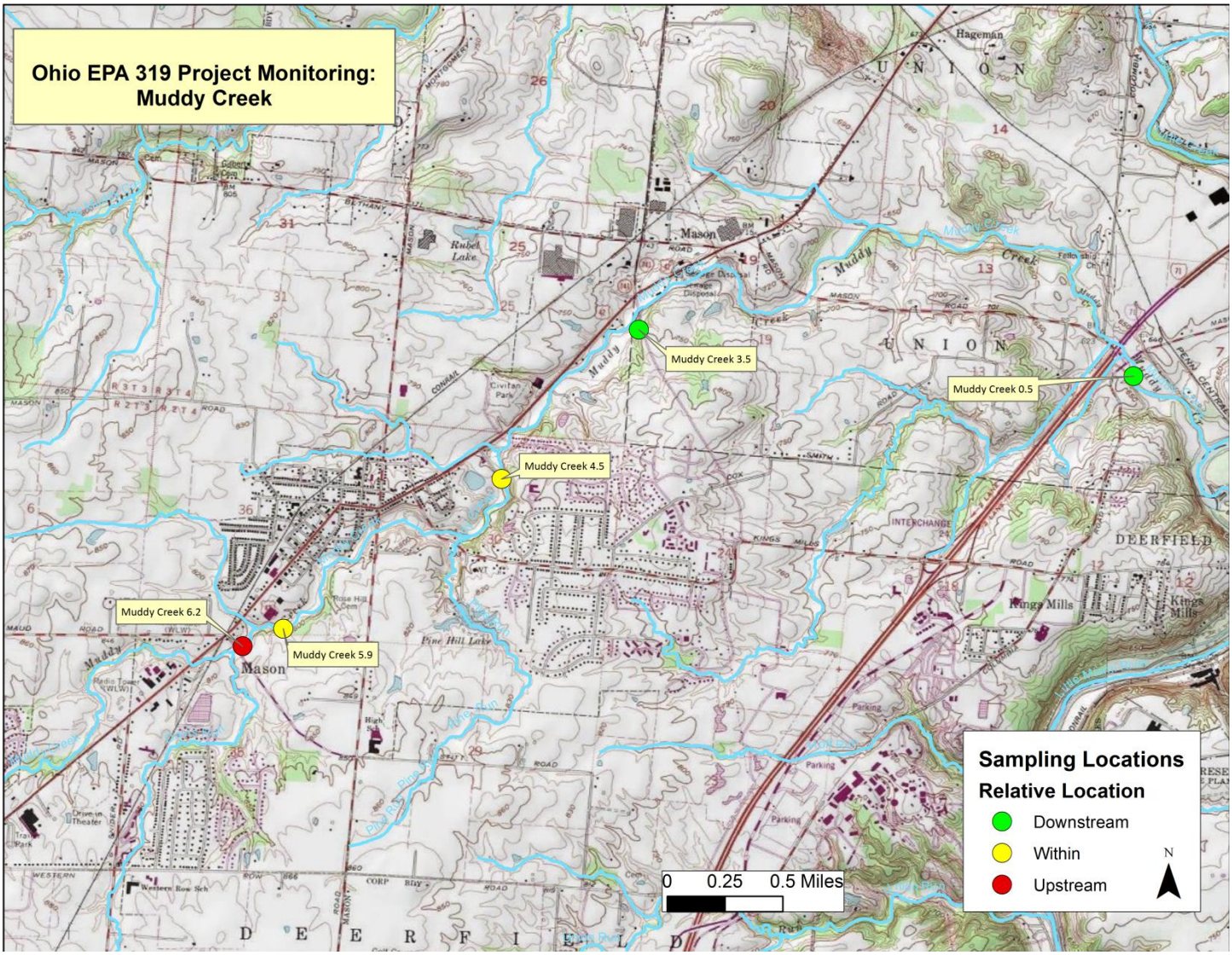

Figure 7. Muddy Creek sampling locations, 2014 [10(h)EPA-14].

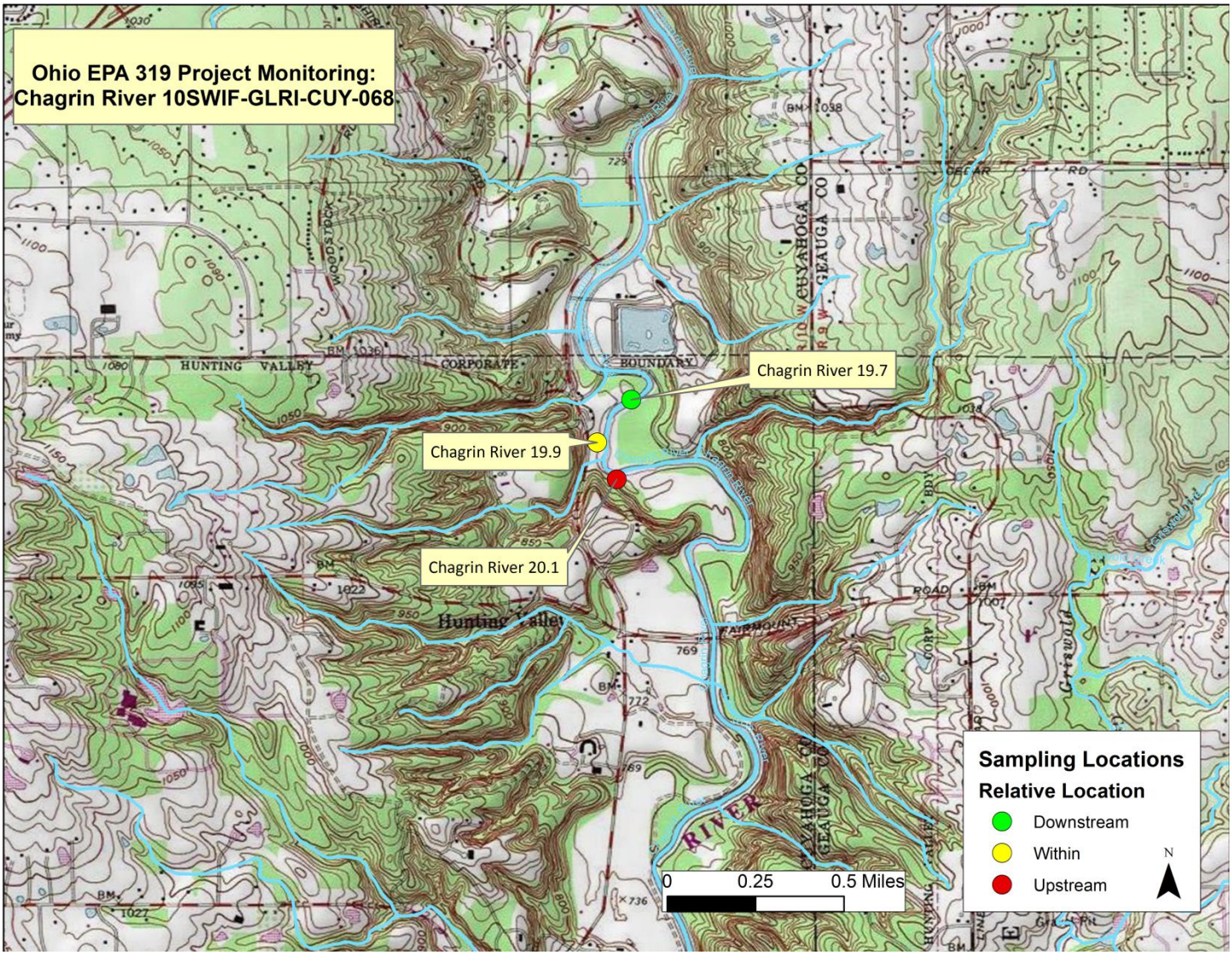

Figure 8. Chagrin River sampling locations, 2014 [10SWIF-GLRI-CUY-068].

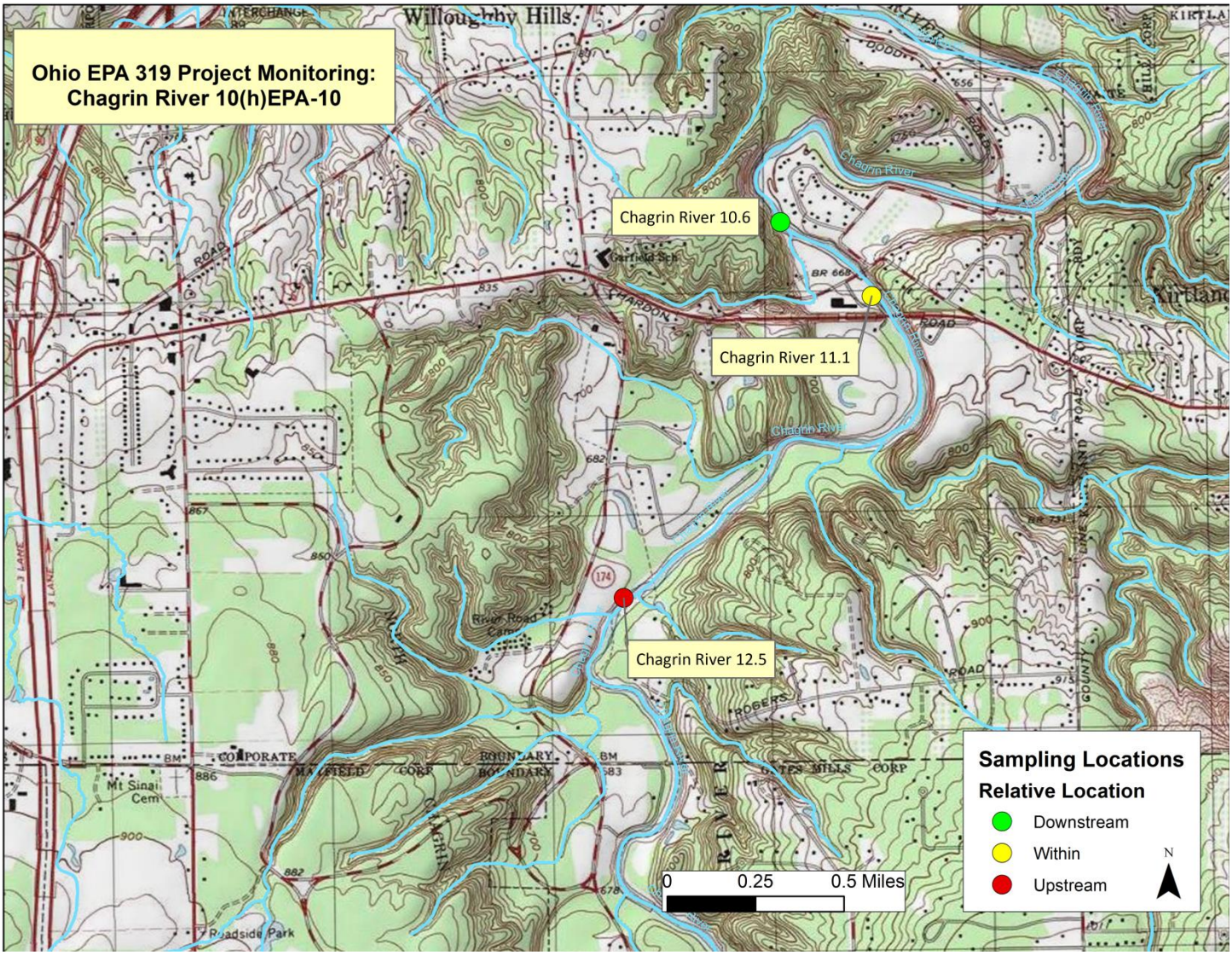

Figure 9. Chagrin River sampling locations, 2014 [10(h)EPA-10].

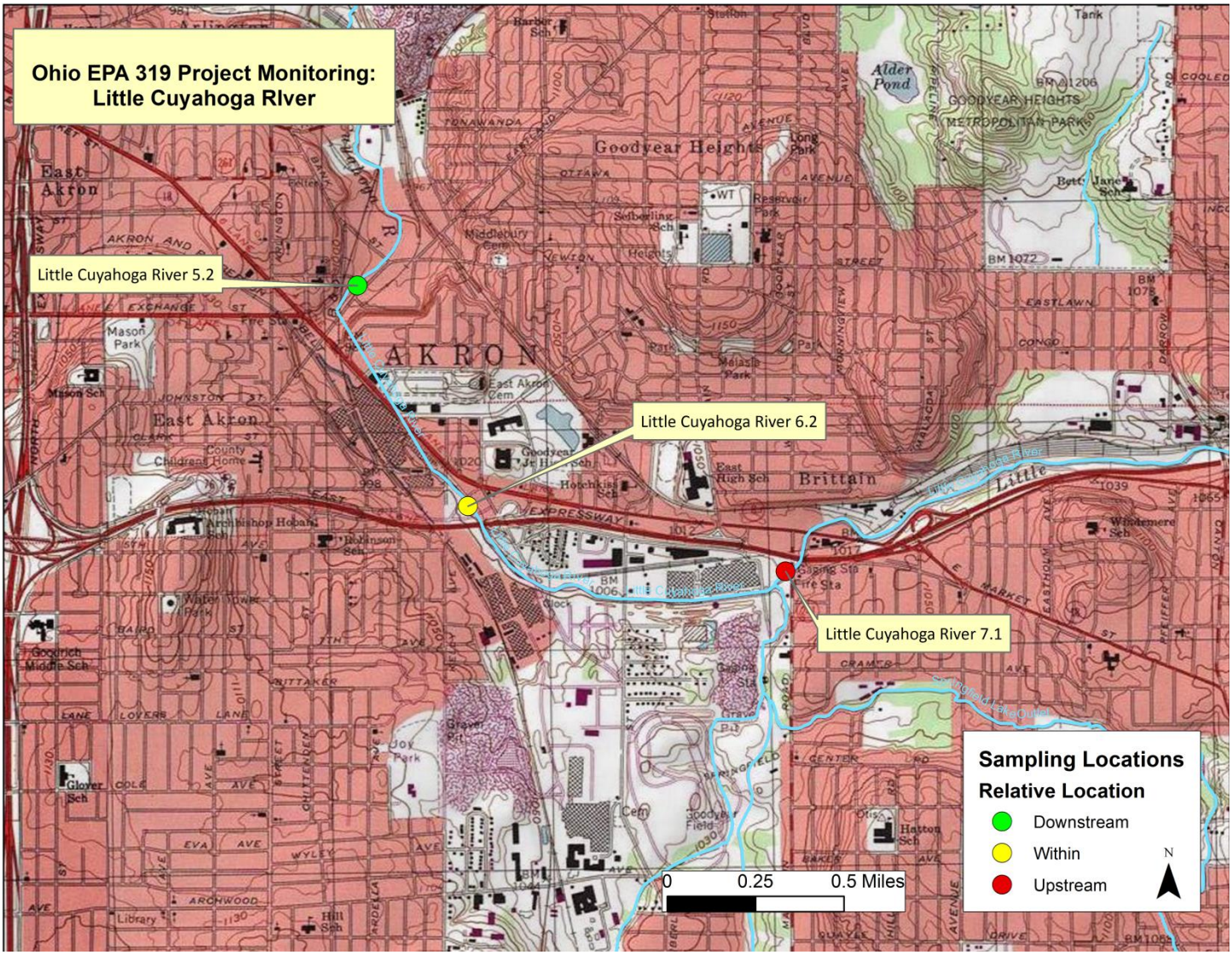

Figure 10. Little Cuyahoga River sampling locations, 2014 [10(h)EPA-17].

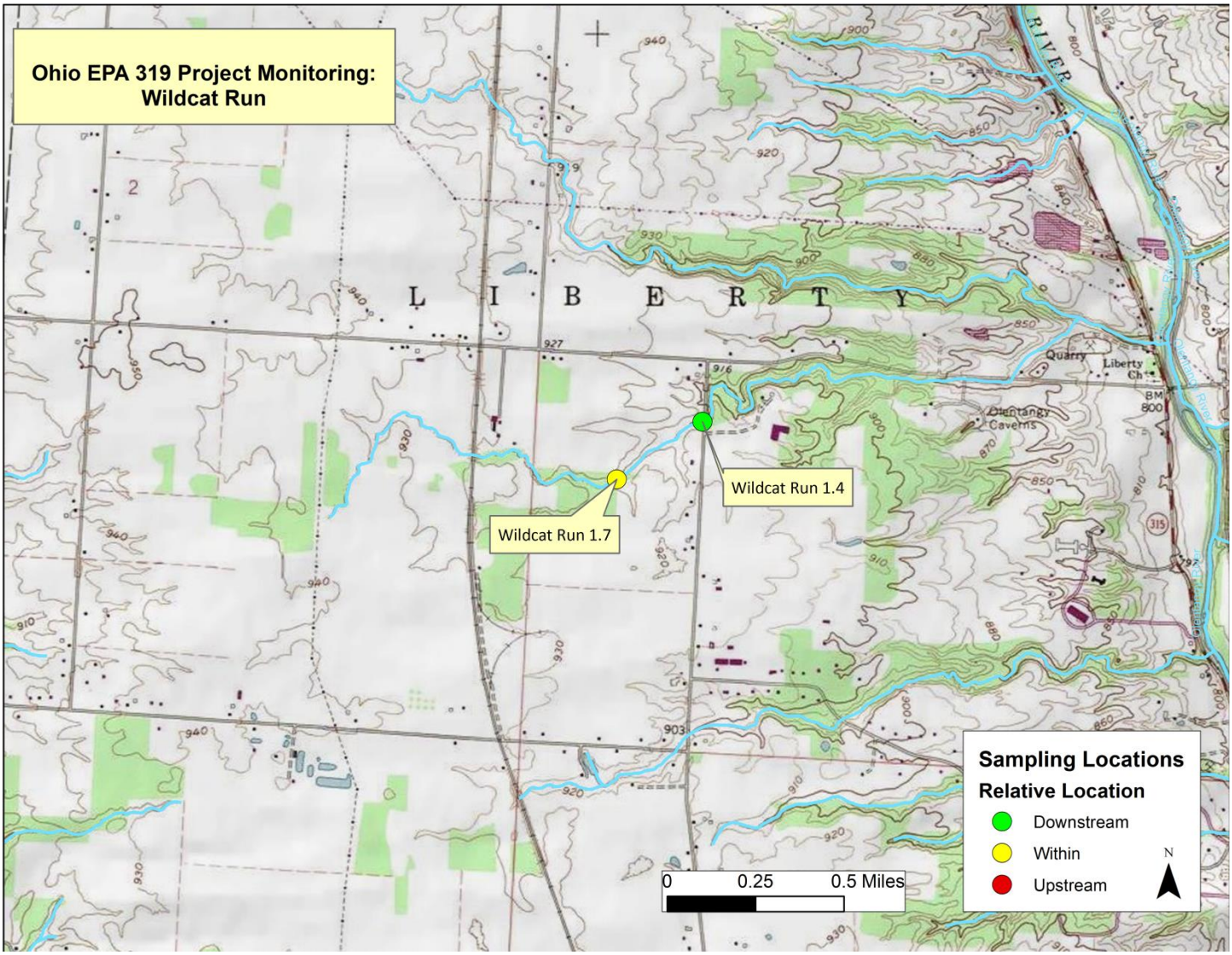

Figure 11. WIldcat Run sampling locations, 2014 [10SWIF-145].

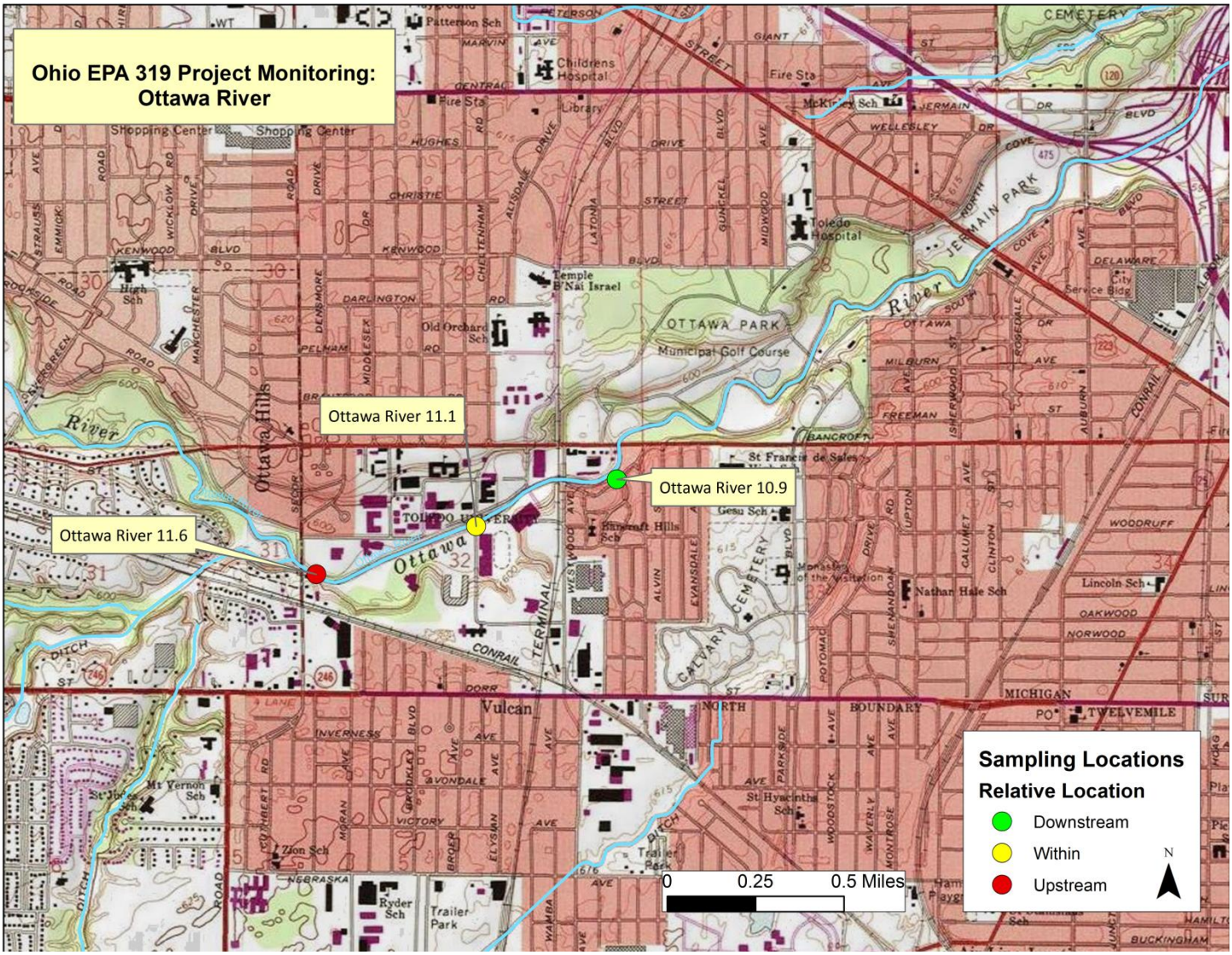

Figure 12. Ottawa River sampling locations, 2014 [09(h)EPA-20]

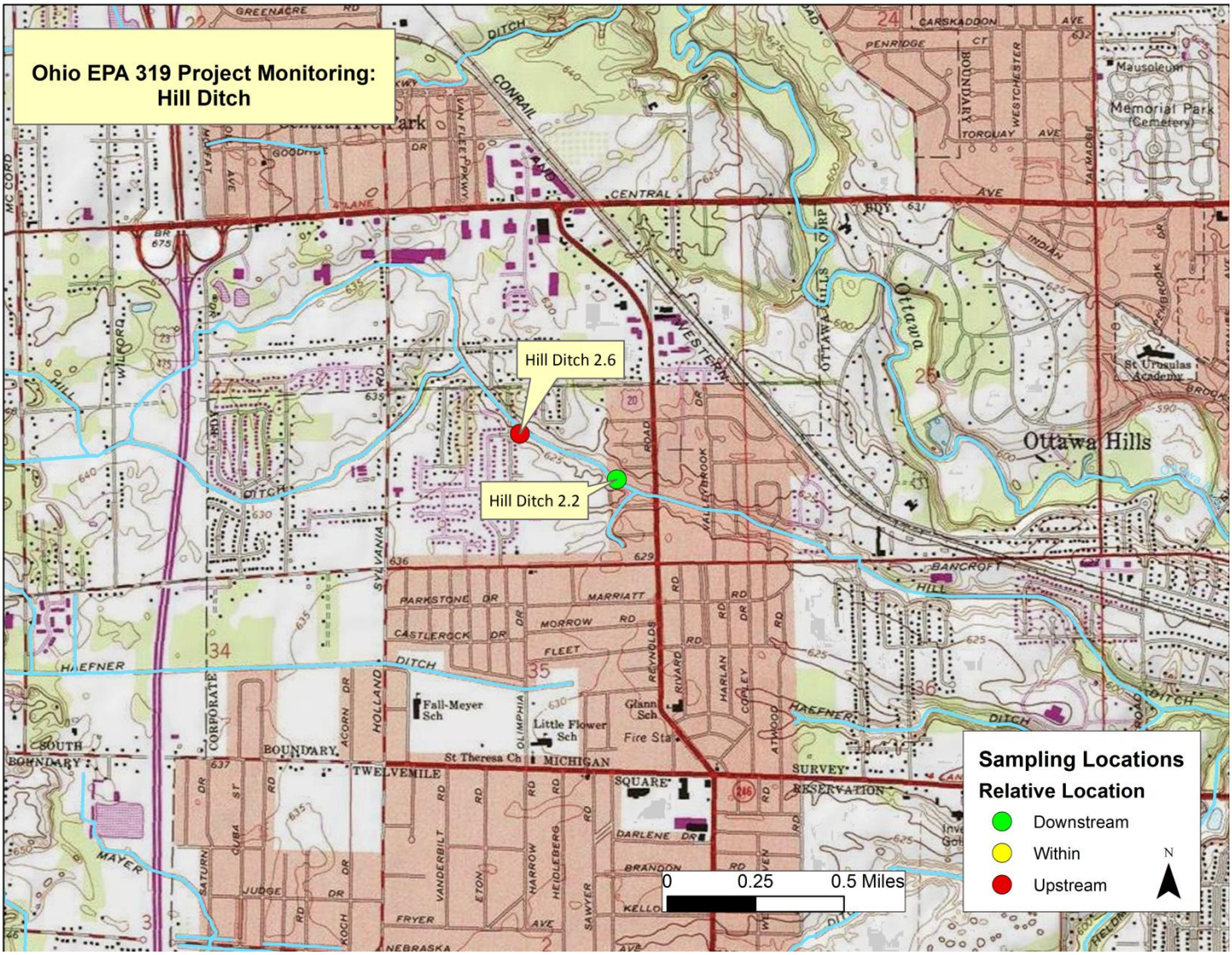

Figure 13. Hill Ditch sampling locations, 2014 [11(h)EPA-21].

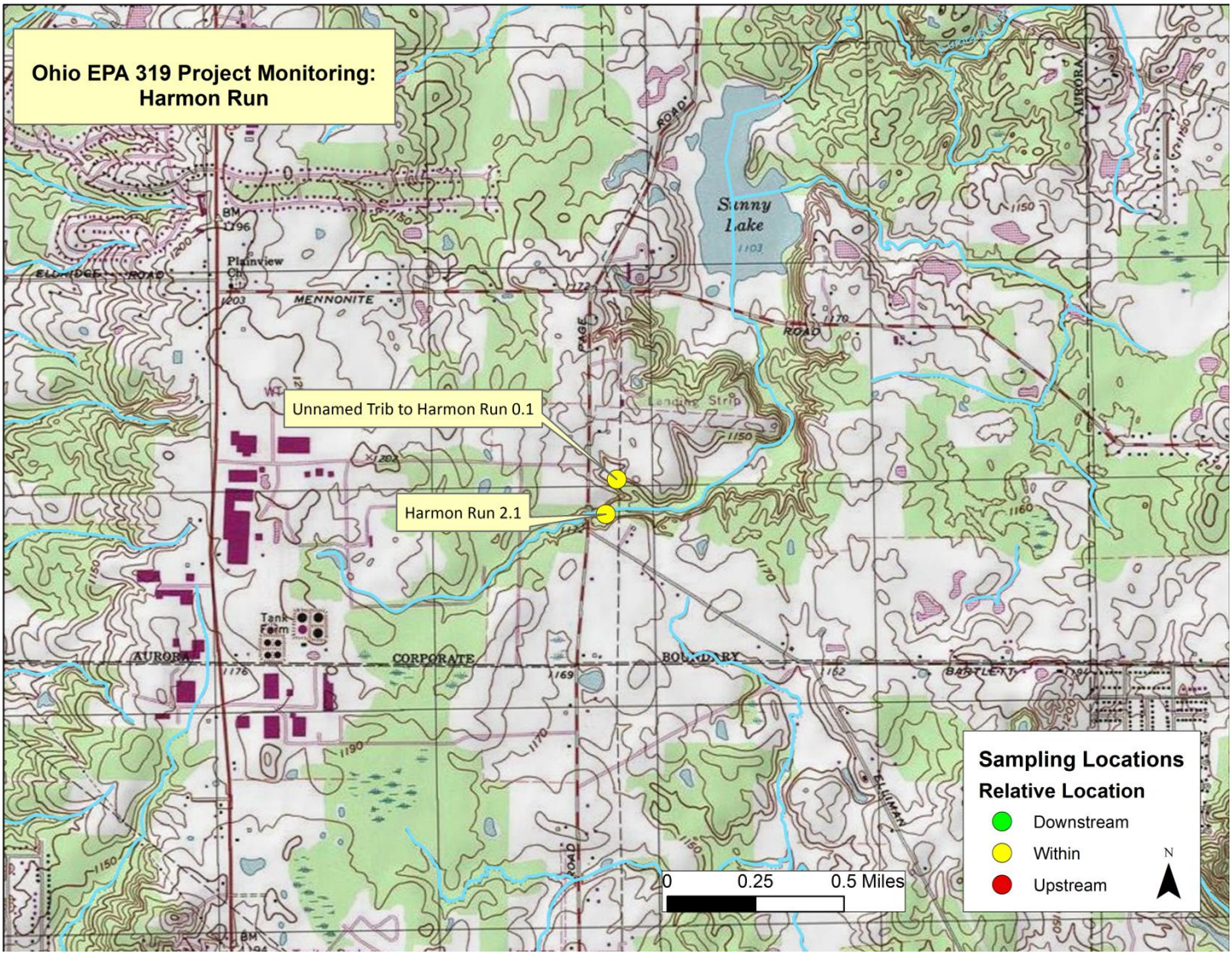

Figure 14. Harmon Run sampling locations, 2014 [11(h)EPA-14].

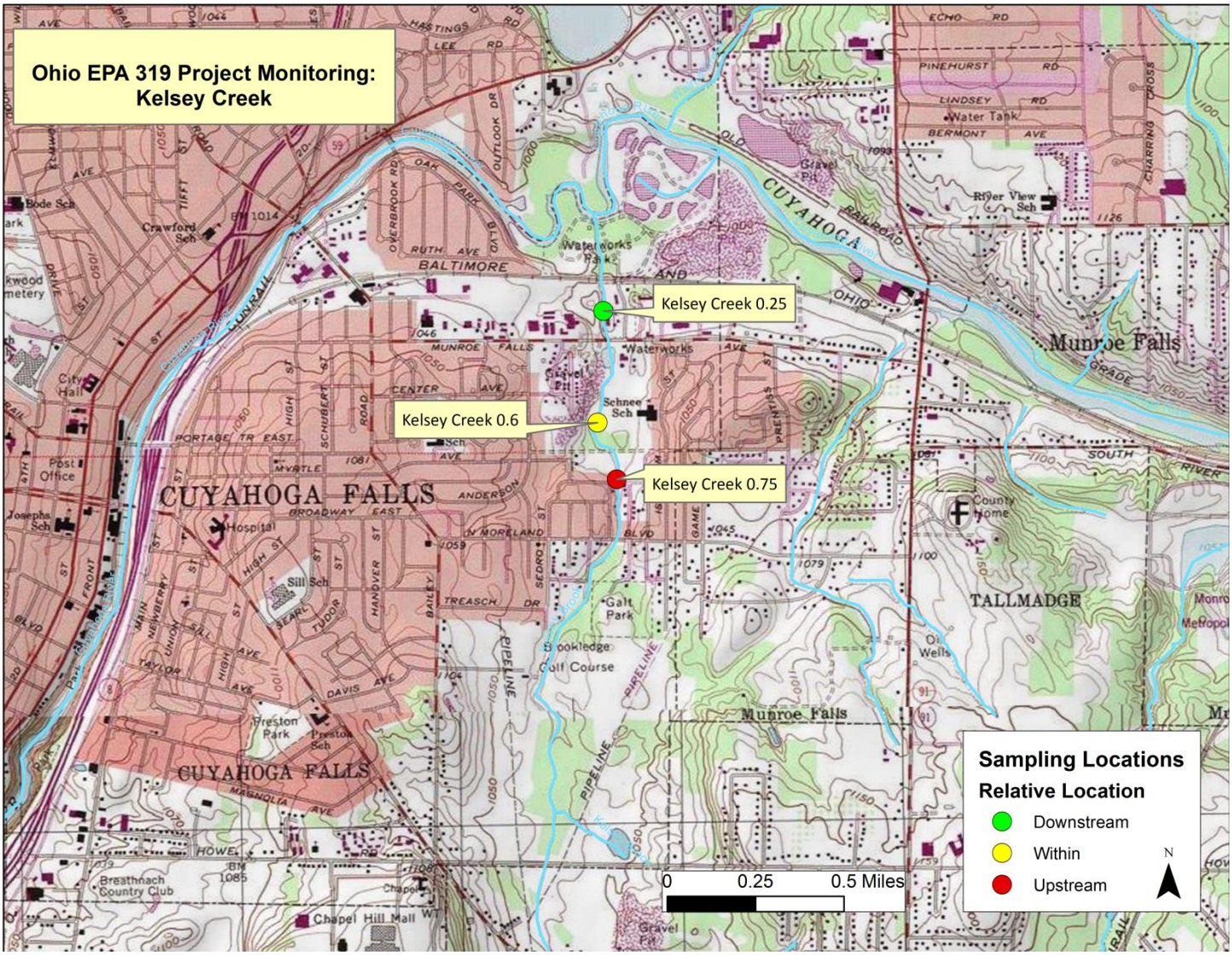

Figure 15. Kelsey Creek sampling locations, 2014 [12SWIF-10].

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