

**Recommendations from Flints Safe Drinking Water Task Force (Draft)**

The initial recommendations from the Flint Safe Drinking Water Task Force can be found at...

<http://www.epa.gov/flint/flint-safe-drinking-water-task-force>

#	Task	Sampling Scope/Description/Purpose	Role of EPA	Role of MDEQ	Role of City Of Flint
1	Identification of Residences with Lead Service Lines	1) Digitization of existing records on lead service lines [TF 2.1] 2) GIS mapping support for overlaying data [TF 2.1] 3) Use of historical construction data to attempt to produce layers of maps of service line and house plumbing 4) Home inspection project, including Sentinel sites sampling and plumbing analysis 5) Sequential sampling project (see #8) 6) Service line identification project (hydrovac - Lansing Board of Power and Light) 7) Ground penetrating radar (EM) 8) Online water analysis for Pb material identification (Prevost/Palin method) (See #12)	1) NA 2) NA 3) NA 4) NA 5) Lab analysis of samples, technical support, data review 6) NA 7) NA 8) Develop summary of approach, engage in discussion of application	<p><b>1) Assigned to:</b> MDEQ-IMT GIS <b>Status:</b> Completed <b>Task / Role:</b> Parcel mapping / digitizing effort converting the City's historical information on service lines.</p> <p><b>2) Assigned to:</b> MDEQ-IMT GIS <b>Status:</b> Completed <b>Task / Role:</b> Coordination of other parcel mapping efforts by U of M Flint and data sets from ROWE Engineering.</p> <p><b>3) Assigned to:</b> MDEQ-IMT GIS <b>Status:</b> Completed <b>Task / Role:</b> Evaluation of residential parcels based upon age of construction; overlay data set.</p> <p><b>4) Assigned to:</b> Field Group MDEQ-IMT GIS <b>Status:</b> Ongoing <b>Task / Role:</b> Weekly updating of lead service line parcel information based upon home inspections &amp; other field verifications. Home inspections for Sentinel sites is completed. Home visits for High Lead results continues. Home visits for any resident who has concerns also continues. Over 2,300 homes were visited, and approximately 913 homes were inspected by the Sentinel teams (DEQ staff, plumber, and community member).</p> <p><b>5) Assigned to:</b> Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Data agreement finalized for sharing of EPA sequential sampling results. Met with EPA field staff on 02/26/2016 at USEPA Field Office at Kettering University in Flint for weekly coordination meeting. Topics of discussion included EPA's efforts to date, DEQ's efforts update. Also had a detailed discussion on the logistics of data sharing from EPA to DEQ. EPA has designated as point of contact to develop means for sharing of EPAs data. Follow-up meeting to occur the week of 02/29/2016.</p> <p><b>6) Assigned to:</b> Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Hydrovac excavation at valve box for service line identification.</p> <p><b>7) Assigned to:</b> Field Group <b>Status:</b> Ongoing <b>Task / Role:</b> Field experiment and analysis of identifying different type of service lines. Field experiment was completed 2/24/16. Meeting set up for 3/1/16 to discuss findings with university partners &amp; determine if this is a viable option for identification. Waiting on response from email to US Army (4/1/16) if we can discuss further investigation strategy.</p> <p><b>8) Assigned To:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Relying primarily on EPA to develop sampling protocol that provides evidence of lead service line with a high level of confidence to serve as another tool for identification of unknown lines.</p>	1-3) Provided maps and materials as requested 6) Provide assistance to MDEQ as requested and/or as resources are available.
2	Impact of Water Use/House Occupancy on Stability and Lead Release from Lead and Other Premise Piping.	1) Identification of unoccupied /reoccupied homes and development of guidelines (MDEQ) [TF 2.5] 2) Sampling from unoccupied homes/assessment of issues/ recommendations to address (EPA) [TF 6.1]	1) NA 2) Depending on resources*, the EPA will help develop plans for sampling the unoccupied homes, run analyses, and interpret data.	<p><b>1) Assigned to:</b> MDEQ-IMT GIS, SEOC GIS, Infrastructure Group <b>Status:</b> Ongoing <b>Task / Role:</b> Unoccupied homes were identified through a US Postal Service data set; flushing guidelines for when homes become reoccupied is being developed.</p> <p><b>2) Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Coordinate evaluation and review of reoccupied samples. Suggested city rely upon requests to reactivate water service or for a transfer of ownership as opportunities to provide guidance; assisted with flushing guidance that will be printed in both English and Spanish.</p>	1) Flushing and resampling requirements to be established upon water service being activated
3	Risk communication on lead service lines	Development of communication materials for household use, including potential risk from physical disturbances to LSL, aerator cleaning, filter maintenance, hot water heater issues, and lead reservoirs in other pipes downstream of LSLs (will be informed by results from 8 and 4 below) [TF 6.3] Transition to local authority	The EPA will help craft communication materials in conjunction with the city and state	<p><b>Assigned to:</b> Infrastructure Group <b>Status:</b> Ongoing <b>Task / Role:</b> Educational materials have been produced for door to door visits, online tutorials and additional guidance is being provided with residential water sample results that are mailed through the US Postal Service.</p>	Assist with distribution of educational materials in the future.
4	Protocol for exposure estimation sampling for health- related studies (premise & building plumbing)	Develop sampling protocol for determining exposure to lead as distinguished from corrosion control assessment sampling or LCR compliance sampling. This is needed to accurately track public health goals.	Depending on available resources*, the EPA will develop the exposure sampling protocol, will discuss with respondents potential vehicles, and will provide expertise to project team.	<p><b>Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Rely on protocol and guidance from EPA and monitor as needed. Need to involve DHHS, LHD &amp;/or medical experts for activities to be initiated in response to exposure sampling.</p>	Will assist in identification of contractual vehicles that may be available to do this work.

5	Corrosion control treatment optimization studies	Installation of lead pipe loop rig at drinking water plant and use in evaluation of the effects of water quality changes and different levels of orthophosphate treatment on lead release from the existing pipe scales in order to select the most effective treatment when the switch is made to KWA water (TF 5.2). Sampling of water passing through pipe	The EPA will construct, transport, and help install lead pipe loop rigs at the drinking water plant; develop the sampling protocol including future roles; help train city staff in the sampling of the pipe rigs; and analyze water samples	<b>Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Monitor, observe and document activities as needed. DEQ assigned engineering staff (KWA Team) to provide oversight and input as needed in studies designed to evaluate current OCCT (phosphate) and to determine appropriate OCCT before switch to KWA. A RFP is being developed to identify and assess the activities that will need to be conducted before the Flint WTP is re-activated, which will include an evaluation of optimal corrosion control treatment.	Work with EPA and contractor to locate and extract 4-6' long lead line segments in order to construct the pipe loops. Looking for different parts of pipe coming from geographically diverse parts of the distribution system to evaluate how scale may differ within each section of pipe. Pipe rig to be assembled and displayed at the water plant. Will monitor and sample pipe rigs when protocol is established and training is complete.
6	Lead Service Line Extraction	Extraction of approximately twenty lead line segments with active water for construction of pipe loops.	EPA will provide guidance on how to extract the lead service lines and will work with the city to identify the best locations for pipe extraction	<b>Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Monitor, observe and document activities as needed. DEQ assigned engineering staff (KWA Team) to observe BWL extraction technique and document as needed. Pipe loops have been constructed using lead line segments brought to the Flint WTP.	Work with EPA and contractor to locate and extract 4-6' long lead line segments in order to construct the pipe loops. Looking for different parts of pipe coming from geographically diverse parts of the distribution system to evaluate how scale may differ within each section of pipe. Pipe rig to be assembled and displayed at the water plant.
7	Lead service line pipe scale assessment	Analysis of lead scale from segments of four lead service lines will identify chemical makeup and quality of existing scale in areas with high and low residual chlorine levels. Will be used to inform corrosion control assessments and treatment studies. (TF 5.4)	EPA will conduct the analysis of the lead scale	<b>Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Monitor, observe and document activities as needed. Observe & document activities for possible future consideration.	Work with EPA and contractor to locate and extract 4-6' long lead line segments in order to construct the pipe loops. Looking for different parts of pipe coming from geographically diverse parts of the distribution system to evaluate how scale may differ within each section of pipe. Pipe rig to be assembled and displayed at the water plant.
8	Sequential sampling of drinking water at tap	Lead Source/Release Diagnostic Evaluation (TF 5.3) using sequential sampling. EPA is sampling of 60 – 100 residences with lead service lines by drawing sequential samples to assess the quality of water throughout the internal plumbing from faucet to main. Samples analyzed for lead levels and other characteristics/chemicals. EPA will draw from this pool (or supplement as needed) for evaluation to determine what the relative contributions of lead are from different plumbing sources in order to assure optimization of lead and other metal release from the service lines and premise plumbing. EPA estimates that approximately 45 homes will need to be identified for ongoing profile sampling to inform the treatment optimization process consisting of approximately 10 homes each with different combinations of lead service lines with varying interior plumbing materials (e.g. copper, galvanized, plastic, mixed)	EPA field team will collect the samples until a transition is made to state/local entities. Region lab will run samples, EPA field team will identify plumbing configuration (basic followed by detailed), provide technical support and evaluate data.	<b>Assigned to:</b> Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Potential to participate in sequential sampling. Will monitor, observe and communicate with EPA through their actions. Discussion of Sequential sampling with EPA was done at the weekly coordination meeting on 02/26/2016. DEQ has agreed to share all data on any sequential testing that it may do and in addition it will share the addresses of the homes with lead service lines that it has identified. The sharing of the information will occur sometime during the week of 02/29/2016.	NA
9	Lead particle identification and characterization	Corrosion byproduct particles accumulated on aerators and filters and passing through the tap will be tested and characterized; results will be useful in identifying the source of lead release. Develop a protocol that may include the following: 1) Exhausted filter dissection. Dissect removed filters and characterize the nature of trapped particles. Consider microbial sampling. 2) Finished tap water particle characterization (size, composition, etc.). 3) Collect tap water samples that contain suspended particles. Separate particles and analyze their compositions. This will be done in conjunction with home plumbing assessment, and will be combined with corrosion control assessment field sampling (TF 5.3)	The EPA will arrange for solids and surface analysis along with protocol.	<b>Assigned to:</b> Field Group <b>Status:</b> Ongoing <b>Task / Role:</b> Continue to initiate and implement high lead home visits for residential water samples with lead results from 100- 149 ppb (within 7 days) and equal to or greater than 150 ppb (within 48 hours). Remediation services provided at each home visit such as cleaning the aerator, checking water filters and requesting an additional sample. EPA has requested and was provided with the addresses of our known residences with lead service lines so they can conduct additional testing and sampling.	NA

10	Distribution System Optimization Activities	A multi-prong effort to assess and improve distribution system water quality (chlorine residual) will be completed. Activities in rough order of implementation may include 1) an organized repetitive chlorine sampling program at approximately 25 (small main) sites to establish the success of the current chlorination objectives being carried out in Flint, MI, 2) develop and implement an ongoing water quality trending analysis effort, 3) conduct hold studies to assess chlorine decay, 4) conduct investigative distribution system residual sampling to identify areas of poor water quality, 5) develop manual and automated low-flow flushing programs targeting areas of poor water quality, 6) evaluate water quality in storage facilities, 7) potentially identify optimization- based approaches to modify storage tank operation/design, booster chlorination operations, and system hydraulics, 8) conduct Comprehensive Performance Evaluation (CPE) of distribution system.	The EPA has started this project and continues to engage with the Region, State, and City. Depending on available resources*, the EPA will help develop and implement plans for efforts 1-7 as resources permit. Will engage as appropriate and as resources allow in Flint's effort to conduct a CPE (#8). EPA, State and AWWA members prepared an RFP to address overall distribution system optimization activities that will address, in part, completion of identified tasks. The RFP was advertised by the City on 3/25/16; bids are due 5/5/16.	<b>Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Evaluate the monitoring results. Coordinate with EPA's Area Wide Optimization Program (AWOP). Assist AWOP team to extent possible on development of a calibrated, hydraulic distribution system model. The RFP has been posted by the City of Flint and we will assist in evaluating submittals when the posting ends in early May.	Overall: RFP has been advertised that will address distribution system optimization. Specific ongoing work: 1) Support and ultimately take over chlorine monitoring program as part of R-TCR monitoring 2-4) Coordinate with EPA team on conducting trending analysis and chlorine decay. 5) Assist EPA team in the field on flushing program. Upon training, will continue flushing program. 6-7) Assist EPA team on evaluation of storage facilities and distribution system hydraulics. 8) Retain consulting services for a Comprehensive Program Evaluation (CPE) to be developed. Coordinate with EPA's Area Wide Optimization Program (AWOP).
11	KWA Start Up	After optimizing current water system, the EPA Flint Safe Drinking Water Task Force recommends that Flint develop and implement a Performance Assessment Plan prior to distribution of water from the Karegnondi Water Authority (KWA) source. The plan must address how the treatment plant will be brought online, and how finished drinking water will be introduced to the distribution system. This plan is particularly important given the City has no experience treating the KWA-supplied water, and is operating a distribution system that is still recovering from the past upset. Flint should work with its consultant and MDEQ to establish objective water quality and plant performance criteria. The plan must include operation of Flint's drinking water treatment plant for a reasonable period of time to treat KWA-supplied water until: (1) the treated water meets finished water quality goals; (2) the finished water quality is consistently maintained; (3) potential plant operational and mechanical start-up issues are identified and addressed; and (4) water plant operations staff are proficient in treating the new source. KWA water should not be distributed to the public until these conditions are satisfied. FTF 15-5.	Once plant is operational, operator training may be available through the EPA's Area Wide Optimization Program (AWOP). Will work with the state and city on developing a treatment master plan RFP.	<b>Assigned to:</b> Public Health Group <b>Status:</b> Ongoing <b>Task / Role:</b> Participate in KWA design meetings, provide comprehensive plan reviews, make recommendations and monitor progression of the overall project. Review and issue Part 41 permits. Underway with meeting on 02/29/2016 to discuss KWA alternatives to allow Flint WTP to operate for a shakedown period without interrupting service to customers from GLWA; Have begun analyzing data from the GLWA's Lake Huron WTP that currently treats water very similar to water quality provided by KWA; Identified training history of current certified operators and developing list of possible additional courses for future training. A RFP is being developed to identify and assess the activities that will need to be conducted before the Flint WTP is re-activated, which will include an evaluation of optimal corrosion control treatment and overall plant performance. It is anticipated that KWA water will be available for full plant scale testing that demonstrates satisfactory performance before water is delivered to customers.	Work with MDEQ and EPA on necessary Contract RFP for conducting a Master Plan development for water treatment (Kick off conference call held on 4/6/16). Work with consulting firm LAN to complete upgrades to treatment plant prior to KWA. Work with consultant and MDEQ to determine treated water quality objectives for transition to KWA.
12	Lead Service Line Detection Methodology Development	Verification of the presence of lead service lines is necessary for identification and extraction of lead service lines, sampling for treatment assessment, Lead and Copper Rule compliance sampling, risk/exposure/BLL evaluation and implementation of a lead service line replacement program. This methodology development is designed to determine if a simple water sampling protocol can give a convenient means to verify with some level of confidence, whether or not a residence has a lead service line, through relatively non-intrusive water sampling. The strategy to be employed is based on published protocols with improvements being researched by Polytechnique Montreal (Michele Prevost, Elise Deshommes, Clement Cartier). This requires staffing for coordination with Flint paper records, resident contact, plumbing mapping, field sampling (TBD, but estimated at 20 locations with no LSLs for "control" purposes, and 50 locations believed to have LSL for validation. (TF 5.1)	Depending on available resources*, the EPA will develop the sampling protocol, will discuss with respondents potential vehicles, and will provide expertise to project team.	<b>Assigned to:</b> Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Continued refinement of field verification techniques to identify lead service lines across the City. Current approaches include: ground penetrating radar, hydrovac excavation, sequential sampling and other techniques as they are identified and vetted.	Assist with analyses when feasible.

Other known sampling efforts for which EPA requests data

13	Residential/Commercial drinking water testing	All volunteer water testing results for City of Flint not associated with the Sentinel or LCR sites (53b). Sampling is conducted on a voluntary basis in coordination with the overall commodities mission (lead by MSP and FEMA). MDEQ provides sample bottles and instructions for residents/businesses to collect grab water samples of unfiltered water from the tap, after a stagnation period. Samples are delivered to collection points in the City of Flint the couriered to the MDEQ drinking water lab for analysis. FTF-3 Item 2.2	Provide data	<b>Assigned to:</b> Administration Group / Infrastructure Group <b>Status:</b> Ongoing <b>Task / Role:</b> Analyze residential water samples on a daily basis at the DEQ lab, post information daily on the <a href="http://www.michigan.gov/flintwater">www.michigan.gov/flintwater</a> website, notify residents of test results through the US mail and provide additional educational and self remediation materials. Samples submitted to the 5 collection stations in Flint are picked up and transported daily to the State Laboratory in Lansing. Any individual or business is welcome to submit a sample. The MDEQ is collecting samples from residents, schools, daycare homes, and working with MDARD to collect samples from food establishments, and working with DLARA and MSHDA to collect samples from publicly funded housing. A meeting is scheduled for the week of 03/07/2016 to develop a multiagency work plan for sampling and addressing MSHDA and HUD facilities in the water service area.	Provide regional depository locations (5 fire stations) across the City for residents to drop off their water samples.
14	Distribution System Modeling	Identification of the location of each of the water quality parameter locations (addresses) used for water quality parameter measurements (pH, alkalinity, orthophosphate, chlorine, total Coliform) in the distribution system, along with copies of the water quality parameter analytical results for past 4 rounds of monitoring. Includes support of distribution system modeling by EPA. FTF-3 Item 2.6	Will work with the city's model to inform representative TCR sampling sites (see #10).	<b>Assigned to:</b> Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Require the professional services consultant (ROWE Engineering) to update the City's 2013 Reliability Study; provide comprehensive reviews and comments as needed. ROWE provided an initial work order and outline of next steps on 2/25/16. ROWE electronically submitted a draft 2016 Reliability Study on 3/15/16. The documents are currently being reviewed. Meeting with ROWE to discuss next steps scheduled for 4/11/16.	Require the retained professional services consultant (LAN) to develop a hydraulic model (done). Provide distribution system model to EPA (done), and any SCADA data to calibrate and validate the model. Re-evaluate monitoring / sampling locations for R-TCR.
15	Sentinel Site & Lead and Copper rule compliance sampling	A number of sentinel sites have been established for ongoing lead and copper monitoring, and perhaps other water quality monitoring. These sites will be resampled periodically to help determine when areas of the City may be "cleared" and the drinking water advisory discontinued. These sites will also be used to help determine when and where corrosion control treatment is effective. The initial site selection is approximately 400 locations and sampling is beginning the week of Feb 8th. A sub-set of these samples will be used for LCR compliance sampling during system restoration activities.	NA	<b>Assigned to:</b> Field Group / Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Sentinel locations (604 as of 02/26/2016) are scheduled to have samples collected every two weeks from 02/15/2016 through 04/13/2016 with analysis and evaluation of results over that same time period. Continue to initiate and implement high lead home visits for residential water samples with lead results from 100- 149 ppb (within 7 days) and equal to or greater than 150 ppb (within 48 hours). Notify residents of test results through the US mail and provide additional educational and self remediation materials for water samples with lead results from 16- 99 ppb. The first round of sentinel samples has been collected and is in the process of being analyzed and the data compiled. This information will be posted to the <a href="http://www.michigan.gov/flintwater">www.michigan.gov/flintwater</a> website. It is hoped that residents will continue to participate throughout the series of tests. As additional data sets are generated they will be posted to the <a href="http://www.michigan.gov/flintwater">www.michigan.gov/flintwater</a> website and a detailed explanation will be given at the weekly coordination meetings. Results will provide data to assist in the assessment of the effectiveness of the corrosion control and the determination of when the drinking water advisory can be discontinued. In addition, a baseline sample has been taken for the schools. Follow up samples will commence once the schools have completed a total fixture replacement which is scheduled through DLARA. These results will assist in determining when the drinking water advisory can be discontinued for each school.	Assist MDEQ with Lead and Copper rule compliance sampling, and for developing sample pool for future rounds of monitoring conducted by the City.
16	State/Local Strike Team Sampling for Lead and Copper	MDEQ responds to locations where lead sampling results are at over above 100 ppb lead and/or copper sampling results are over that 1,300 ppb. The follow up sampling includes grab samples from both filtered (Brita/Pur) and unfiltered water to determine if any lead consumption exposure exists. Longer term, MDEQ will begin re-sampling at locations where 15 ppm or greater has been detected. In addition to re-sampling, MDEQ, in coordination with local authorities provide plumbing evaluation, health consultation, and commodities deliveries to residents.	NA	<b>Assigned to:</b> Field Group / Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Continued evaluation of residential sample results after high lead home visits have been made and remediation services provided; focusing on locations that have had multiple samples provided. MDEQ responds to locations where lead sampling results are at or greater than 100 ppb lead and/or copper sampling results greater than 1,300 ppb. Residential water samples with lead results from 100 - 149 ppb are visited within 7 days; water samples equal to or greater than 150 ppb are visited within 48 hours; water samples between 16-99 ppb are mailed information by the Environmental Assistance Center and invited to call to schedule a home visit. Follow up at these locations includes a plumbing assessment, a health consult by DHHS, consumer education on filters, filter replacement, cleaning of aerators, etc., and a new sample bottle for a follow up sample (along with instructions on how to properly collect a sample). Residents will receive a packet of information at the time of the home visit. If the resident is not at home, the packet and new sample bottle will be left at the residence with a request that they call the Environmental Assistance Center to schedule a convenient time for a home visit. The resident may then submit additional samples for analysis over time. If the additional samples are also greater than 100 ppb lead and/or 1,300 ppb copper, the resident is contacted by phone to see if any additional services (filters, bottled water, etc) are needed. The study to determine the effectiveness of the filters has been completed.	NA

17	Strike Team Short Term / Emergent Sampling Tasks	<p>1 - Filter Efficacy Evaluation: Determine if Brita/Pur filters are effective at removing lead where MDEQ sampling indicates concentration about 150 parts-per-billion, which is what the filters are rated for.</p> <p>2 - Rash Complaints: Provide technical assistance to health agencies (MDHHS, GCHD) to determine if water quality parameters are within appropriate range when rashes may be attributed to water exposure</p> <p>3 - Water Quality: Provide rapid field screening of water quality parameters when complaints, concerns, or requests for technical assistance are received.</p>	Conduct studies, Provide data and interpretation	<p><b>Assigned to:</b> Administration Group <b>Status:</b> Ongoing <b>Task / Role:</b> Continue to provide daily lab results for residential water tests that have lead levels 100 ppb or greater and copper levels greater than 1,300 ppb to MDHHS and GCHD.</p>	3) Continue to respond to complaints and concerns received by City, and provide testing of water quality parameters.
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\* It is acknowledged that FTE, supply and equipment, or extramural resources with available contractual vehicles may be needed to accomplish an activity.

The available resources can be effectively utilized regardless of whether they are realized at the city, state, or federal level.