Sentinel Site Selection
DRAFT – February 1, 2016

References to "sentinel sites" and testing protocols are from "**Testing Plan, Process & Protocols DRAFT – January 27, 2016" and "Establish Criteria for Safe Drinking Water DRAFT – February 1, 2016".**

Principles for establishing sentinel sites:

1. A number of sentinel sites will be established for ongoing lead and copper monitoring, and perhaps other water quality monitoring.
2. 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.
3. DEQ will propose the specific sentinel sites based on the criteria described below by January 31, 2016.
4. DEQ will share these proposed sentinel sites with EPA and the City in a meeting on February 1, 2016 for the purposes of coordination and concurrence. Points of contact for this coordination meeting will include Bryce Feighner (DEQ), Richard Benzie (DEQ), Jim Sygo (DEQ), Bob Kaplan (EPA), Miguel Deltoral (EPA), Mike Glasgow (City), Natasha Henderson (City), Mayor Weaver (City).

Criteria utilized by DEQ for selection of proposed sentinel sites:

1. During the door to door water distribution, many residents (1,951) volunteered to participate in ongoing monitoring. Sentinel sites will be selected from those 1,951 residences.
2. Previous documents have indicated the need to identify 200 residences for the ongoing sentinel site monitoring. Since many sites will not be available for ongoing monitoring based on the initial inspection, residents subsequently choosing not to participate, etc., approximately 400 sentinel sites will be selected for the initial sentinel site sampling pool.
3. All lead and lead combination service lines identified by the City that are also included in the 1,951 volunteer sampling sites pool will be included in the initial sentinel site sampling pool (156).
4. Additional sites will be selected based on spatial distribution assuring all 9 wards of the City are adequately covered.
5. Additional sites will be selected in areas identified by Dr. Mona Hanna-Attisha as having high blood levels and based on hydraulic indicators of water age.
6. Additional sites will be selected based on Environmental Justice considerations; specifically, lead paint indicators, minority population, and low income.

As a separate project, sentinel sites will be selected from the approximately 130 customers served by the City of Flint but located outside of the City's boundaries. These 130 customers are located in the City of Burton, Flint Township, Genesee Township, or Mt. Morris Township.

Testing Plan, Process & Protocols
DRAFT – January 27, 2016

Five Prong Approach to Overall Testing:

1. **Residential Testing coordinated by the DEQ, DHHS & the City**
2. **School Testing coordinated by DEQ & DLARA**
3. **Elevated Blood Level Testing coordinated by DEQ, DHHS & GCHD**
4. **Food Service Establishments coordinated by DEQ, MDARD & GCHD**
5. **Establishing Sentinel Sites coordinated by EPA, DEQ & the City**

1. **Residential Testing coordinated by the DEQ, DHHS & the City**
   - **a.** Coordination points of contact include Mike Glasgow (City), George Kristian (DEQ), Linda Dykema (DHHS)
   - b. Testing continues on a weekly basis associated with the City's drinking water distribution system
   - **c.** Testing is offered to all residents with an emphasis on zip codes 48503 and 48504 which were identified by Dr. Mona Hanna-Attisha as having the greatest risk for lead exposure
   - d. The DEQ Lab is EPA certified. In addition, a random set of samples will be split and samples will be tested by the EPA laboratory to ensure data integrity
   - **e.** Those exceeding 100 PPB are referred to DHHS for offer of wrap around services
   - **f.** If initial blood testing result is greater than 5 ug/dl then elevated blood level investigation ensues
   - **g.** In the event elevated blood lead levels are identified in the residents of the priority homes, DEQ and DHHS will partner to develop a sampling plan for additional homes adjacent to the homes of residents with elevated levels.
   - **h.** If a water result is greater than 15 PPB then a follow up test will be offered to see if levels are coming down and if remediative efforts are working
   - **i.** Residents will receive an official laboratory report, indicating whether or not lead or copper were detected in their water. Test results will be supplied through the City as well as on the www.michigan.gov/flintwater website
   - **j.** All residents are being told to continue the use of filters and bottled water until the emergency health advisory has been listed for the city or the their area

2. **School Testing coordinated by DEQ & DLARA**
   - **a.** Coordination points of contact include George Kristian (DEQ), Shelly Edgerton (LARA) and various managers of affected schools, facilities and programs
   - **b.** Testing includes all public, charter and parochial schools, daycare programs, boys and girls clubs as well as facilities with at risk individuals

c. To date, no lead service lines have been identified in the Flint Community Schools
d. Eight teams being stood up to conduct plumbing evaluations to identify fixtures that need to be repeated
e. Follow up action is then taken in coordination with DLARA to remove and replace all fixtures identified as needing replacement
f. Follow up sampling is then done to ensure that remediative actions worked
g. Sampling protocol goes way beyond the lead / copper rule and identifies sources of contamination (example: some schools have had over 250 samples taken on a single day)

3. **Elevated Blood Level (EBL)Testing coordinated by DEQ, DHHS & GCHD**
   a. Coordination point of contact includes George Kristian (DEQ), Linda Dykema (DHHS), Jim Henry (GCHD)
   b. When DHHS identifies residents with elevated blood lead levels those residents are offered a free evaluation of their home to identify potential exposure pathways of their home; these evaluations now include the addition of water testing
   c. The water testing that is done is similar to the school testing in that it is comprehensive in nature
   d. Initial samples are taken at points in the home where water is used for consumptive purposes
   e. After initial samples are taken, a series of ten consecutive one liter samples are taken to identify potential issues deeper in the plumbing
   f. In addition to the evaluations, residents are provided with information in ways to reduce exposure risks

4. **Food Service Establishments coordinated by DEQ, MDARD & GCHD**
   a. Coordination points of contact include George Kristian (DEQ), Sandra Walker (MDARD), Jim Henry (GCHD)
   b. MDARD is sending out staff to collect samples from food service establishments to see if the water being used in soft drink dispensers, ice machines, coffee machines and other similar equipment contains high levels of lead.
   c. These samples are being sent to the DEQ Lab for analysis and the reports sent back to MDARD for follow up.

5. **Establishing Sentinel Sites coordinated by EPA, DEQ & City**
    a. Coordination points of contact George Krisztian (DEQ), Jim Sygo (DEQ), Bob Kaplan (EPA), Miguel Deltoral (EPA), Mike Glasgow (City), Natasha Henderson (City), Mayor Weaver (City)
    b. There will be 200 residences identified that will serve as sentinel sites for ongoing lead and copper testing. After the initial round of testing, these sites will be resampled every two weeks for an additional four, two week cycles. The purpose for this testing is to establish a baseline and to be able to do trend analysis to see how quickly the protective layer is being rebuilt through the supplemental phosphate that the city is adding to the water that it receives from the DWSD.
    c. After the initial round has been completed the data will be shared with all of the partners so that a consensus can be reached as to what the data means. This process will be repeated with every sampling round and areas of the city will be cleared provided that a scientific analysis of the data shows through consensus agreement that such action is warranted.
    d. It is likely that even after the city returns to a condition of compliance under the lead and copper rule that areas of concern will remain. Efforts will be made to identify these areas of concern so that additional services can be provided to identify and remediate sources of lead contamination in these isolated instances.
    e. Within sentinel testing, looking to achieve 90% of the samples at 5 PPB

Establish Criteria for Safe Drinking Water
DRAFT – February 1, 2016

2. Establish Criteria for Safe Drinking water
The DEQ will coordinate with all partners, including the Department of Health and Human Services (DHHS), the City of Flint, Genesee County Health Department, EPA, and others, to determine what criteria are needed in order to declare the water in Flint safe.

The Environmental Protection Agency (EPA) has already established the criteria for determining the safety of drinking water by setting enforceable monitoring, treatment and health standards for drinking water. These standards are contained in the federal and state Safe Drinking Water Acts (SDWAs). However, due to the extraordinary nature of this event and out of an abundance of caution, the following criteria (No. 1 - No. 4), which go beyond SDWA requirements, must be met before declaring no further drinking water precautions are necessary. These declarations will indicate that the use of bottled water or water filters are no longer necessary and may be issued for certain areas of the city while other areas of the city are still under the advisory.

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A. To address concerns regarding *Legionella*:

The federal and state Surface Water Treatment Rules (SWTRs) were implemented to reduce illnesses caused by disease-causing pathogens in drinking water, including *Legionella*. The City of Detroit provides treated surface water to the City of Flint and is responsible for maintaining physical removal and disinfection of pathogens at their water treatment plant in accordance with the SWTR. However, the City of Flint must also:

1. Maintain a detectable level of chlorine residual at all monitoring points in the distribution system.

B. To address concerns regarding water corrosivity: (Note - Lead and copper sampling results in and of themselves are not a good surrogate to determine if optimum corrosion control is achieved).

2. Maintain 3.1 mg/L as PO4 phosphate residual at all designated monitoring sites in the distribution system.
3. Maintain established water quality parameters limits at all designated monitoring sites in the distribution system.

C. To address concerns regarding lead:

4. When the 90th percentile lead level from two consecutive rounds of sampling at "sentinel sites" is 7.5 parts per billion (ppb) or less, sentinel sample may be discontinued and the area may be cleared and the advisory discontinued. (This is more stringent than the SDWA because the Action Level is 15 ppb rather than 7.5 ppb. Monitoring once every two weeks at every sentinel site is recommended.)

Proposed Drinking Water Advisory Timeline:

Short:
1/29/2016 – All known lead service lines will be mapped
2/5/2016 – "sentinel sites" will be identified
2/5/2016 – sentinel sampling team identified and trained

Mid:
2/8/2016 – Sample collection begins at sentinel sites
2/8/2016 – Technical committee proposes acceptable lead levels for clearing areas and establishes water quality parameter ranges to demonstrate optimum corrosion control has been achieved and maintained
2/15/2016 - Lead Consumer Notice provided with all results for sentinel and compliance monitoring sites

Long:
3/1/2016 - Clear neighborhoods where two rounds of results from sentinel sites meet acceptable level as determined by the technical advisory group
3/1/2016 – Schools cleared or problems being remediated
3/8/2016 – Lead service line replacement may begin

KWA Timeline:

Four options are available with the following estimated completion dates:

1) Immediate: Stay on DWSD/GLWA water.

2) One year: Construct a temporary pipeline to supply raw water from KWA to the Flint water Treatment Plant and initiate the evaluation process to demonstrate successful plant operation (EPA recommendation for evaluation process is two months). In doing so, the city will be able to continue receiving finished water from Detroit to serve residents while the city is conducting the treatment evaluation process. Estimated time: 1 year. Estimated cost: $4-6 Million.

3) Two years: Construct a permanent interconnection between the existing Genesee County distribution system and the city of Flint. The new interconnection would require significant infrastructure repairs and ancillary improvements and take an estimated two years, but has the advantage of providing a permanent alternate source of drinking water for both Flint and Genesee County, reducing the likelihood of having to ever rely on the Flint River as a source. This option delays to switch to KWA by an additional year. Estimated time: 2 years. Estimated cost: $20 million.

4) One year to switch to KWA; two to three years to achieve permanent solution: Implement both Options 2 and 3. In doing so, the city would be able to more rapidly provide water at lower costs to customers while ultimately improving the reliability of their service and reducing the likelihood of relying upon the Flint River should an emergency arise in the future.