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Hon. James F. Gennaro, Chair

**February 24, 2023**

 **Oversight - New York City’s Water and Sewage Testing Infrastructure**

**Int. No. 530:** By Council Members Gennaro, Hanif, Gutiérrez, Restler, Sanchez and De La Rosa

**Title:** A Local Law to amend the administrative code of the city of New York, in relation to notification of discolored water or reduction of water pressure

**Administrative Code:** Adds new section 24-370

**Int. No. 633:** By Council Members Powers, Bottcher, Brewer, Restler, Hanif, Nurse, Gutiérrez, Yeger, Sanchez and De La Rosa

**Title:** A Local Law to amend the administrative code of the city of New York, in relation to the creation of a permanent COVID-19 wastewater testing program and the reporting of testing results, and to repeal section 24-531 of such code, relating to the creation of a pilot program to test sewage for SARS-CoV-2 RNA

**Administrative Code:** Adds new section 24-531

**Int. No. 797:** By Council Members Nurse, Louis, Hanif, Avilés, Brewer, Cabán, Dinowitz, Joseph, Ayala, Williams, Abreu, Restler, Marte, Hudson, Ossé, Gutiérrez and De La Rosa

**Title:** A Local Law to amend the administrative code of the city of New York, in relation to testing drinking water for the presence of microplastics

**Administrative Code:** Adds new section 24-370

1. **Introduction**

On February 24, 2023, the Committee on Environmental Protection, chaired by Council Member James F. Gennaro, will hold an oversight hearing on “New York City’s Water and Sewage Testing Infrastructure”. The Committee will also hear Int. No 530, in relation to notifications of discolored water and reduced water pressure ; Int. No. 633 in relation to the creation of a permanent COVID-19 wastewater testing program; and Int. No.797 in relation to testing New York City drinking water for the presence of micro-plastics. Those invited to testify include representatives from the Department of Environmental Protection (DEP), academics in the field of microbiology, environmental advocates, public health advocates, and other interested parties.

1. **Background**

As of February 17, 2023, there have been more than 678,346,543 confirmed COVID-19 cases and more than 6,788,139 deaths worldwide, including more than 104,918,830 cases and more than 1,141,862 deaths in the United States.[[1]](#footnote-1) As of that date, there have been more than 6,927,861 cases and more than 76,895 deaths in New York State,[[2]](#footnote-2) including more than 2,282,831 cases and 39,927 confirmed deaths in New York City.[[3]](#footnote-3) Approximately 90.3% percent of all New York City residents have received at least one dose of a COVID-19 vaccine, while roughly 9.7 percent of the population remaining unvaccinated.[[4]](#footnote-4) Of all adults in New York City, nearly 99 percent have received at least one dose of a vaccine.[[5]](#footnote-5) According to Department of Health and Mental Hygiene (DOHMH) data, those who are unvaccinated are about 5 times more likely to be hospitalized or die from COVID-19 than individuals who are vaccinated but not boosted.[[6]](#footnote-6) There are severe equity concerns when examining COVID-19 data and the impact of the pandemic on communities that are marginalized.[[7]](#footnote-7) Available COVID-19 data[[8]](#footnote-8) indicates that those living in high poverty areas and/or the Bronx as well as those who are Black/African American, Hispanic/Latino, and/or older are more likely to be hospitalized and die from COVID-19.[[9]](#footnote-9)

*COVID Testing in Wastewater*

Wastewater monitoring for SARS-CoV-2, the virus that causes COVID-19, RNA presents an opportunity for pooled testing that tracks changes in COVID-19 infection levels through a community.[[10]](#footnote-10) New York City has 14 wastewater treatment plants, also known as wastewater resource recovery facilities (WRRF), categorized into three regional areas: north, south, and east.[[11]](#footnote-11) Each of the 14 plants serves a distinct geographical area,[[12]](#footnote-12) referred to as a sewershed.[[13]](#footnote-13) In total, these plants have a combined treatment capacity of 1.3 billion gallons per day.[[14]](#footnote-14) Wastewater monitoring for SARS-CoV-2 RNA at the treatment plant level can provide trend data for COVID-19 infections that is specific to the communities serviced by each facility.[[15]](#footnote-15) It is not currently possible to extrapolate sewage testing data into specific numbers of infected individuals, and testing at the treatment plant level would not capture evidence of infected individuals not serviced by the municipal sewer system.[[16]](#footnote-16)

[[17]](#footnote-17)

The above map shows the location of wastewater treatment plants, their processing capacity, as well the area served by each plant. Each sewershed covers the area of several community districts; and the capacity of treatment plants varies from Newtown Creek’s 310 MGD at the high end to Oakwood Beach’s 40 MGD at the low end.

*Wastewater Based Epidemiology and Metagenomic Next Gen Sequencing*

 Wastewater based epidemiology is based on the assumption that any substance that is excreted by humans and is stable in wastewater can be used to calculate the original concentration excreted by a given population.[[18]](#footnote-18) In the past, this framework has been used to calculate illicit drug use, prevalence of Tamiflu use during the 2009 influenza pandemic, and to monitor the prevalence of diseases such as polio.[[19]](#footnote-19) Because viruses do not grow outside of host cells, changes in concentration of viral particles in wastewater can be used for detection of new viral outbreaks, the emergence of new viral strains, and potentially be extrapolated to determine the extent of infection in a given population.[[20]](#footnote-20) In the early days of the COVID-19 pandemic, wastewater monitoring was hypothesized as a means of near-real-time outbreak data monitoring due to the continual supply of viral particles shed by infected humans in their urine and feces, regardless of whether individuals were showing symptoms or asymptomatic.[[21]](#footnote-21)

 Metagenomic next generation (“next gen”) sequencing refers to any high-throughput genetic sequencing methods that allow billions of nucleic acid fragments to be simultaneously and independently sequenced.[[22]](#footnote-22) Using computational approaches, overlapping gene sequences are identified, pieced together, then compared to a library of reference genomes in order to show which organisms have contributed genetic material to the sample.[[23]](#footnote-23) This method of sequencing can simultaneously identify genetic material from completely different kingdoms of organisms, and provide data pertaining to what microbes are present in a given sample, and in what proportions.[[24]](#footnote-24) As such, its utility in wastewater based epidemiology is not limited to COVID-19 detection, but potentially a wide range of infectious diseases and pathogens.

*New York City’s SARS -CoV-2 Wastewater Monitoring Pilot Program*

 Local Law 28 of 2021 required the Commissioner of Environmental Protection, in consultation with the Commissioner of Health and Mental Hygiene to create a pilot program to test the city’s wastewater treatment plants for the presence of SARS-CoV-2 and submit a report with the results of the program to the New York City Council.[[25]](#footnote-25) On February 17th of 2022, a report titled “Analysis of the effectiveness of a pilot program to monitor SARS-CoV-2 presence in wastewater in New York City” was submitted to the Council, with a summary of responses to the LL 28 reporting requirements, and outlining the findings of the pilot program study.[[26]](#footnote-26) While the report stated that the pilot was highly effective in developing NYC’s capacity for WBE (wastewater based epidemiology), and allowing DEP to establish methods of measuring SARS-CoV-2 levels, detecting SARS-CoV-2 variants in wastewater, and for developing strong relationships with academic, state, and federal partners, initial expectations about the utility of WBE for providing a leading indicator of COVID-19 infection rates were not borne out.[[27]](#footnote-27)

For the purposes of the pilot program, DEP collected samples of wastewater entering each of NYC’s 14 wastewater resource recovery facilities every three hours over a 24-hour period, then combined those samples into one sample corresponding to a 24-hour period.[[28]](#footnote-28) Samples were tested using reverse-transcriptase quantitative polymerase chain reaction (RT-qPCR) twice weekly beginning August 31, 2020, then reduced to once weekly from January 31, 2021 to April 18, 2021.[[29]](#footnote-29) DEP also carried out localized monitoring in two NYC sewersheds in order to establish protocols.[[30]](#footnote-30) While DEP was able to demonstrate the utility of subsewershed monitoring in producing localized

measurements of SARS-CoV-2 RNA, the agency ultimately determined that localized sampling was too labor intensive, and diverted staff from other monitoring duties required for DEP’s regulatory compliance.[[31]](#footnote-31) Due to the need to test each round of sampling to verify results, and the effort involved in reconnaissance of manhole sites, and coordination of traffic control needed to safely undergo sampling, DEP found that the localized sampling would best be utilized in very limited fashion, over small areas, and under specific circumstances.[[32]](#footnote-32)

DEP and its partners at CUNY (City University of New York) utilized a targeted sequencing approach to identify variants within sewersheds.[[33]](#footnote-33) Because the approach only sequenced a portion of the SARS-COV-2 genome, it could not distinguish between all the known SARS-COV-2 variants, but was able to detect the most prevalent variants, such as Alpha, Delta, and Omicron in NYC’s wastewater.[[34]](#footnote-34) Additionally, DEP was able to identify SARS-CoV-2 mutations that were not detected in sequencing of clinical specimens in NYC, specifically in the sewersheds of Oakwood Beach and Owls Head. Localized sampling was utilized to pinpoint the origin of some mutations to one of the nine subsewersheds served by the Oakwood Beach WRRF in Staten Island.[[35]](#footnote-35)

In order to be useful as a leading indicator, data from wastewater testing would need to be able to identify peaks in advance of the percent positivity rate of the City’s testing apparatus.[[36]](#footnote-36) However, the study found that while the figures from wastewater testing tended to corroborate the percent positivity rate, there was a lag of about two weeks in the wastewater data as compared to the percent positivity data.[[37]](#footnote-37) The sensitivity level of current testing methods and the high rate of dilution of potential samples was identified as a potential reason for this lag, though evaluation of how trends in SARS-CoV-2 RNA levels can be used as a leading indicator is still ongoing.[[38]](#footnote-38)

In August of 2022, the New York State Department of Health (NYSDOH) and the DOHMH announced that poliovirus had been detected in New York City wastewater samples, urging local residents who had not been vaccinated against the virus to consider doing so. [[39]](#footnote-39) On September 9, 2022, Governor Kathy Hochul announced a state of emergency in response to the evidence of community spread of the virus, after poliovirus was detected in wastewater samples collected from Rockland County, Orange County, Sullivan County, New York City, and Nassau County.[[40]](#footnote-40) A permanent monitoring program that tests New York City wastewater for pathogens and viruses of concern may be useful in monitoring public health trends for emerging risks.

*Microplastics*

 According to the United States National Oceanic and Atmospheric Administration, microplastics are categorized as small pieces of any plastic material under 5 millimeters in length.[[41]](#footnote-41) Microplastics are ubiquitous in the environment, having been found in both marine and freshwater habitats, in the atmosphere, in food and water systems, and even being found as far as both the north and south poles.[[42]](#footnote-42) While the health ramifications of microplastic exposure in humans are still unclear,[[43]](#footnote-43) in 2022, a study analyzing blood samples from 22 anonymous donors found the presence of microplastics in 80% of the individuals tested.[[44]](#footnote-44) Microplastic particles can latch onto red blood cells, potentially limiting their ability to transport oxygen, can accumulate in the placentas of pregnant individuals, and can collect in the hearts, brains, and organs of rat fetuses.[[45]](#footnote-45) A 2017 study undertaken by environmental advocacy group Orb Media analyzing 159 samples of tap and bottled water from 14 countries found that over 80% of specimens tested were contaminated with microplastics, with 94% of samples from the United States found to be contaminated.[[46]](#footnote-46)

**IV. Conclusion**

 During today’s hearing, the Committee hopes to hear testimony from representatives of the relevant City agencies on the utility and limits of New York City’s wastewater based epidemiology program. The Committee would like to hear from academics in the field of wastewater based epidemiology, environmental advocates, and other interested parties

**V. Legislation**

 **Int. No. 530** would require DEP to notify relevant community boards and district offices of affected council members 48 hours in advance of any work the agency might do that could lead to discolored water or the reduction or loss of water pressure, except for in cases of emergency work due to imminent risks to public health and safety, where DEP will be required to inform the relevant community boards and members offices via e-mail within 5 days of the conclusion of the work. This local law would take effect immediately.

**Int No. 633** would require DEP and the Department of Health and Mental Hygiene to permanently establish the COVID-19 Wastewater Testing Program initially established through Local Law 28 of 2021. The bill would also require the DOHMH to publish results on a public facing website on a weekly basis, and submit a report in consultation with DEP to the Mayor and the Speaker of the City Council by August 31 of each year. This local law would take effect immediately.

**Int. No. 797** would require the DEP to add microplastics testing to its standard drinking water testing of street-side drinking water sample testing stations, and to post the resulting tests online. The bill would also require DEP to promulgate regulations or create standards for testing the city’s drinking water for microplastics. This local law would take effect 180 days after it becomes law.

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| [This Page Intentionally Left Blank]Int. No. 530 By Council Members Gennaro, Hanif, Gutiérrez, Restler, Sanchez and De La Rosa A Local Law to amend the administrative code of the city of New York, in relation to notification of discolored water or reduction of water pressure Be it enacted by the Council as follows: Section 1. Subchapter 4 of chapter 3 of title 24 of the administrative code of the city of New York is amended by adding a new section 24-370 to read as follows:§ 24-370 Notification of discolored water or reduction of water pressure. a. Except as provided herein, the department shall notify via electronic mail all relevant community boards and all district offices of relevant council members at least 48 hours prior to the undertaking of any work by the department or at the request of the department which the department reasonably knows could lead to discolored water, or the reduction or loss of water pressure at water faucets within such district.b. The notice requirements of subdivision a of this section shall not apply in situations where such work must proceed due to an imminent risk to public health or public safety.  In such cases, where such 48-hour notice is not given, the department shall within five days of the conclusion of such work inform via electronic mail all such relevant community boards and district offices of relevant council members of the reason that the notice was not provided.§ 2. This local law takes effect immediately.     Session 12MHLLS #85696/10/22 Session 11SS, MMBLS #545Int. 701-2018 |
| Int. No. 633 By Council Members Powers, Bottcher, Brewer, Restler, Hanif, Nurse, Gutiérrez, Yeger, Sanchez and De La Rosa A Local Law to amend the administrative code of the city of New York, in relation to the creation of a permanent COVID-19 wastewater testing program and the reporting of testing results, and to repeal section 24-531 of such code, relating to the creation of a pilot program to test sewage for SARS-CoV-2 RNA Be it enacted by the Council as follows: Section 1. Section 24-531 of the administrative code of the city of New York is REPEALED and a new section 24-531 is added to read as follows:§ 24-531 COVID-19 wastewater testing program. a. Definitions. For the purposes of this section, the following terms have the following meanings:PCR using N1 primer. The term “PCR using N1 primer” means the measurement of the copies of the targeted viral RNA segment in wastewater sample using a polymerase chain reaction based method.SARS-CoV-2. The term “SARS-CoV-2” means severe acute respiratory syndrome coronavirus 2, which is the strain of coronavirus that causes the disease COVID-19.Wastewater-based epidemiology. The term “wastewater-based epidemiology” means the chemical analysis of pollutants, viruses, and biomarkers in raw wastewater to obtain qualitative and quantitative data on disease activity among inhabitants within a given wastewater catchment.b. Wastewater sampling and testing. The commissioner, in consultation with the commissioner of health and mental hygiene, shall conduct wastewater-based epidemiology sampling and testing to quantify the levels of SARS-CoV-2 RNA in wastewater at each city wastewater treatment plant in accordance with this section. Such sampling shall occur on a frequency of no less than twice per week and shall measure the number of copies of SARS-CoV-2 RNA levels through the PCR using N1 primer testing method or another testing method that reflects industry best practices.c. Weekly publication of results. The commissioner of health and mental hygiene shall publish the results of testing provided for in subdivision b of this section no less than weekly on the department of health and mental hygiene’s website.d. Annual report. No later than August 31, 2023, and every year thereafter, the commissioner of health and mental hygiene, in consultation with the commissioner of environmental protection, shall submit to the mayor and the speaker of the council a report which shall include but not be limited to the following:1. Results of all sampling of SARS-CoV-2 conducted pursuant to this section, disaggregated by the site where the sample was collected, the date the sample was collected, and the date the sample was tested, in order to monitor the leading indicators of increases or decreases in SARS-CoV-2 present in each drainage area;2. Any sequencing testing method other than PCR using N1 primer that the department used to test samples for SARS-CoV-2;3. The total cost of the COVID-19 wastewater-based epidemiology testing program for the previous fiscal year; and4. Analysis of the effectiveness of the COVID-19 wastewater-based epidemiology testing program in testing for SARS-CoV-2.§ 2. This local law takes effect immediately.     DPMLS #6622, 7965, 82418/4/2022 4:32 PM |
| Int. No. 797 By Council Members Nurse, Louis, Hanif, Avilés, Brewer, Cabán, Dinowitz, Joseph, Ayala, Williams, Abreu, Restler, Marte, Hudson, Ossé, Gutiérrez and De La Rosa A Local Law to amend the administrative code of the city of New York, in relation to testing drinking water for the presence of microplastics Be it enacted by the Council as follows:Section 1. Subchapter 4 of chapter 3 of title 24 of the administrative code of the city of New York is amended by adding a new section 24-370 to read as follows:§ 24-370 Testing drinking water for microplastics. a. Definitions. For the purposes of this section, the following terms have the following meanings:Microplastic. The term “microplastic” means a piece of plastic that is one nanometer to five millimeters in size.Street-side drinking water sampling station. The term “street-side drinking water sampling station” means a drinking water sampling station located at the end point of the city’s drinking water distribution system, before drinking water enters the local service line.b. The department, as part of its regular testing protocol, shall test for the presence of microplastics in drinking water at each street-side drinking water sampling station. Such testing results shall be included in any report the department prepares on the sampling, testing and monitoring of the city’s drinking water.  The department shall post on its website such testing results.c. The department shall promulgate regulations to create standards or methods for testing the city’s drinking water for microplastics.§ 2. This local law takes effect 180 days after it becomes law.    JSALS #899010/12/2022  |

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5. *Id.* [↑](#footnote-ref-5)
6. *Id.*  [↑](#footnote-ref-6)
7. *Id.* [↑](#footnote-ref-7)
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