Dublin San Ramon Services District
Water, wastewater, recycled water

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QUESTIONS & ANSWERS: STUDY OF THE REGIONAL HYDROGEOLOGY OF NORTHWEST LIVERMORE VALLEY GROUNDWATER BASIN

Q1. Why did the Dublin San Ramon Services District (DSRSD) commission a technical study of its wastewater treatment plant operations?

In recent years, there has been increased national attention on a group of man-made chemicals referred to as Perfluoroalkyl and Polyfluoroalkyl substances (PFAS), which can be detected in the air, land, and water. PFAS exposure has been linked to a number of health problems. PFAS are among the many chemicals received at wastewater treatment plants each day from residential, commercial, and industrial customers (wastewater treatment plants are referred to as "passive receivers" of these substances). Traditional wastewater treatment methods do not create or eliminate PFAS, but PFAS have been detected in the water discharged from wastewater treatment plants.

For this reason, DSRSD sought to understand the potential for its wastewater treatment plant operations (including treated water discharges, biosolids and recycled water applications) to contribute to the presence of PFAS detected in the main groundwater basin (Main Basin) of the Livermore Valley Groundwater Basin. The technical study, performed by Luhdorff & Scalmanini Consulting Engineers (LSCE) in 2023 and 2024, adds to previous studies conducted by other agencies to detect the presence of PFAS in drinking water, groundwater, and wastewater in the Tri-Valley.

Q2. Where is DSRSD's wastewater treatment plant located and what does it include?

DSRSD provides wastewater treatment service for approximately 165,000 residents of Dublin, Pleasanton, and the southern portion of San Ramon. Located in Pleasanton near the southeast corner of the intersection of I-680 and I-580, DSRSD's wastewater treatment plant processes wastewater in accordance with regulatory standards before it is discharged via pipe to San Francisco Bay. This plant also processes biosolids and houses a separate treatment facility that further treats wastewater to produce recycled water used for landscape irrigation.

The wastewater treatment plant is located on two different sites. The main wastewater treatment plant is approximately 20 acres and houses all liquid and recycled water treatment. Located to the north, the second treatment site encompasses 100 total acres where solids that are byproducts of the wastewater treatment plant process are deposited into six lagoons whose total surface area of water covers 27 acres. After four to five years in the lagoons, the solids become biosolids, which are removed and injected 8 to 12 inches beneath ground level for final disposal at a 55-acre dedicated biosolids land disposal site.

Q3. What were the objectives of this study?

The study's objective was to analyze the potential for PFAS detected at the second treatment site to migrate southeast toward the Main Basin lower aquifer (from which drinking water supplies are pumped in the Tri-Valley) and to migrate towards nearby surface water channels. The study also evaluated the relationship between the landscape application of recycled water produced by DSRSD and the known "footprint" of PFAS detected in the Main Basin to determine whether recycled water could be a contributor of PFAS to groundwater.

Q4. What area was studied?

In addition to DSRSD's wastewater treatment plant site, the total study area is approximately 5,940 acres, primarily within the "North Fringe Management Area" of the Livermore Valley Groundwater Basin. The North Fringe Management Area is of interest to DSRSD due to the location of DSRSD facilities in this area and the use of recycled water provided by DSRSD for landscape irrigation in this area. The approximate boundaries of the study area are the basin boundaries in the west and northeast, the county line in the north, Tassajara Creek in the east, and Arroyo Mocho in the south. Relative to the area of the Main Basin where PFAS have been detected, the North Fringe Management Area is located to the northwest and has different geological and groundwater characteristics than the Main Basin in terms of thickness, groundwater flow, and water quality.

Q5. What methodology was utilized in conducting this study?

A hydrogeologic conceptual model of the study area was developed to help determine historical groundwater elevation, flow rates, and direction (vertically and horizontally), as well as areas of recharge/discharge and interactions with surface water. Prior assessments and studies of the basin geology were utilized to develop this model. In addition, the study authors drew samples from water quality monitoring wells and surface water on-site and near the wastewater treatment plant, as well as the biosolids lagoons and dedicated land disposal area that make up DSRSD's second treatment site. Prior groundwater models and pond infiltration studies of the biosolids lagoons were also reviewed. The authors performed analytical calculations and numerical modeling to determine migration rates within these underground layers.

To determine any contribution from landscape application of recycled water, the authors evaluated the areas of application compared to the known PFAS footprint in the Main Basin.

Q6. What are the findings of this study?

Available data and hydrogeologic conditions show DSRSD's wastewater treatment site is not contributing in any significant way to downstream surface water or downgradient groundwater PFAS concentrations. The study also identified minimal potential for future impacts to municipal water sources in the Livermore Valley Groundwater Basin. The occurrence of PFAS detected in monitoring wells at the wastewater treatment site is limited to a very small and shallow area and contained almost exclusively in a low-permeability thick clay layer that exists between the surface and the underlying upper aquifer. This clay layer is approximately 40-50 feet thick beneath the second treatment site and acts as a natural barrier to restrict vertical and horizontal migration of constituents of concern, including PFAS, to off-site locations. Beyond the site boundaries, this clay layer is up to 70 feet thick. The estimated travel times for chemicals or substances of concern moving from shallow groundwater at the site to the nearest surface water or aquifer locations down-gradient of the site are multiple decades or even centuries long.

The study also concluded that there is only minor overlap between areas irrigated with recycled water and the detected PFAS footprint that has been mapped in the Main Basin, which indicates a lack of contribution of PFAS from recycled water.

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