TECHNICAL MEMORANDUM

TO: JON STERLING, GENERAL MANAGER

FROM: ALFONSO MANRIQUE, CONTRACT DISTRICT ENGINEER
AM CONSULTING ENGINEEERS

SUBJECT: DRINKING WATER PH

DATE: 4/26/2016

The purpose of this Technical Memorandum (TM) is to describe what pH is, how it is measured and regulated, and the potential health effects of high pH. This memo was requested by Jon Sterling, General Manager of Groveland Community Services District (GCSD), after receiving a request from a GCSD customer regarding the potential health effects of the high pH measured in their drinking water.

pH falls into the Environmental Protection Agency's (EPA) National Secondary Drinking Water Regulations (NSDWRs) category, that sets non-mandatory water quality standards for 15 contaminants including pH. The pH of water is a measure of the acid–base equilibrium. The pH is of major importance in determining the corrosiveness of water. In general, the lower the pH, the higher the level of corrosion. The EPA's secondary standard for pH ranges between 6.5 and 8.58, however, neither the EPA or the State Water Resources Control Board Division of Drinking Water (SWRCB-DDW) enforce these "secondary maximum contaminant levels" (SMCLs). They are established only as guidelines to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor. Secondary Drinking Water contaminants are not considered to present a risk to human health.

Although pH usually has no direct impact on water consumers, it is one of the most important operational water-quality parameters. Careful attention to pH control is necessary at all stages of water treatment to ensure satisfactory water clarification and disinfection. The pH of the water entering the distribution system must also be controlled to minimize the corrosion of water mains and pipes in household water systems. Failure to do so can result in the contamination of drinking-water and in adverse effects on its taste, odor, and appearance.

The optimum pH will vary in different supplies according to the composition of the water and the nature of the construction materials used in the distribution system, but is often in the range 6.5–9.5. GCSD's water comes from the Hetch Hetchy Reservoir which has very low alkalinity and can be very corrosive. GCSD must maintain a higher pH level than is recommended in the EPA's secondary drinking water standards to avoid corrosion problems in the distribution system. Corrosive water in a distribution system can dissolve lead in old piping systems and create a serious health hazard. The most recent example of the consequences of corrosive water is Flint Michigan where corrosive water caused lead contamination in homes.

In conclusion, high pH does not present a human health risk by itself, but is an important factor in the overall health of a water distribution system. Due to the low alkalinity present in the water GCSD receives from Hetch Hetchy Reservoir, GCSD must maintain a higher level of pH to neutralize the water's corrosive effects on water mains and private household pipes.