LOS ANGELES UNIFIED SCHOOL DISTRICT

Assessment and Recommendations for

Safe, Healthful Use of Recycled Water at Schools

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TABLE OF CONTENTS

APPENDICES

ASSESSMENT AND RECOMMENDATIONS FOR SAFE, HEALTHFUL USE OF RECYCLED WATER AT LAUSD SCHOOLS

1.0 OVERVIEW

As a major stakeholder for water conservation, the Los Angeles Unified School District (LAUSD) will join with the Los Angeles Department of Water and Power (LADWP) in a partnering effort for distribution of recycled water at new and existing LAUSD schools. By using recycled water for landscape watering and flushing of toilets and urinals at selected schools, LAUSD could substantially reduce usage of "potable" (i.e., suitable for drinking) water, thereby preserving scarce resources and avoiding water cost increases. Planning is now in progress to install new "purple pipe" recycled water connections at selected new and/or existing schools over the next five years, depending on availability of funds and evaluation of appropriate site usage. School selection will be based on proximity to about 50 miles of available LADWP recycled water pipelines. LAUSD has incorporated use of recycled water in designs for several new schools, e.g., Central Region High School #13 (also known as the former Taylor Yard). The first existing school scheduled for conversion to use of both potable and recycled water is Van Nuys High School.

This document presents background information to assess the value and potential concerns associated with recycled water use, with discussions of the regulation, treatment and testing of recycled water, and potential health, environmental, and aesthetics problems. Finally, this document identifies Office of Environmental Health and Safety (OEHS) recommendations for "Best Management Practices" when using recycled water at school sites, with special considerations for unique school-use scenarios.

2.0 BENEFITS ASSOCIATED WITH RECYCLED WATER USE

Recycled water use protects scarce potable water resources and may reduce future water costs. While California's population has been growing, water supplies have been diminishing. Drought conditions over the past three years have impacted surface and groundwater resources, resulting in a predicted 2009 drop to 60-70% of normal water levels in reservoirs and aqueducts. To conserve scarce drinking water resources, water purveyors and local governments have imposed volume and use restrictions and raised rates for potable water. Conversely, however, to

encourage use of recycled water, purveyors have discounted rates, and not imposed volume restrictions.

When properly treated in accordance with state standards (i.e., Title 22, California Code of Regulations), recycled water is suitable for agricultural and landscape irrigation, toilet/urinal flushing, commercial-industrial processes, and ground-water recharge.

Over 50% of regional water supplies are currently used for outdoor irrigation; therefore, the use of recycled water for agricultural and landscape irrigation can significantly help to conserve potable water for drinking uses. Additionally, recycling provides environmental benefits by decreasing wastewater discharges, reducing or preventing pollution, sustaining reliable water reserves during fluctuations in seasonal/annual precipitation, and reducing water diversion from sensitive ecosystems.

3.0 NATURE AND SOURCES OF RECYCLED WATER

The earth has filtered, cleansed, and reused water for billions of years through the natural water cycle, in which rainwater and snow-melt percolate as groundwater through rock and soil. However, current use of the term "recycled water" (also called "reclaimed" water) generally refers to highly-treated municipal wastewater that meets or exceeds federal and state health and safety standards for its intended purpose.

In Los Angeles County, 6,500 miles of sewer pipelines collect and feed sewage into 11 County and three City wastewater treatment facilities, and into one ocean discharge facility. Additional treatment facilities are operated by the City of Burbank, Las Virgenes Municipal Water District, and West Basin Municipal Water District. The Sanitation Districts in Los Angeles County are a partnership of 24 independent Special Districts which provide both wastewater and solid waste management services. These facilities treat approximately 510 million gallons of wastewater daily, with over 200 million gallons made available for reuse.

The wastewater system operated by the City of Los Angeles serves over four million people in 27 cities. Water for LAUSD uses will come from four wastewater and water reclamation facilities operated by the City of Los Angeles, Department of Public Works, Bureau of Sanitation, which are: a) Tillman (San

Fernando Valley); b) Los Angeles-Glendale; c) Hyperion/West Basin; and d) Terminal Island.

Sewage and wastewater are conveyed through sewers into pre-treatment facilities to improve the influent quality of raw wastewater, and then into treatment facilities. Wastewater undergoes a succession of treatments before it is considered "recycled", noted as follows:

1) **Preliminary and Primary Treatment**, using screening and clarifiers to remove up to 85% of organic and inorganic solids, such as primary sludge, oil and grease, plastics, trash, etc.

2) **Secondary Treatment**, using oxidation and beneficial microorganisms in aeration tanks and settling basins to remove dissolved organic materials and suspended solids. At some facilities, including most Public Owned Treatment Works (POTWs), nitrification and de-nitrification also take place to remove nutrients (nitrogen compounds), using bacteria to convert ammonia into nitrates and nitrites, then into nitrogen gas for release into the atmosphere.

3) **Tertiary Treatment**, using coagulation and direct filtration, with filters containing layers of anthracite coal, sand, and gravel to remove additional suspended solids.

4) **Disinfection,** using chlorine or ultraviolet radiation to destroy bacteria, viruses, and other pathogens; after disinfection, remaining chlorine is removed.

5) **Advanced Treatment,** using micro-filtration and reverse osmosis, with additional disinfection through use of ultraviolet light and/or peroxide to remove additional salts, organics, and microorganisms. Advanced treatment is primarily utilized for ultra-pure potable water, and for recycled water supplies used for seawater intrusion barriers and groundwater recharge.

Following treatment, recycled water is reasonably clean and clear, ready to be used for irrigation and industrial purposes, or to be discharged to surface waters

and the ocean in accordance with requirements of Waste Discharge permits, and National Pollutant Discharge Elimination System permits. Recycled water is distributed to users through distinctive purple-colored pipelines in a separate distribution system from potable water pipelines; please see **Appendix A, FLOWCHART, "CLEAN WATER 101 – A PRIMER ON TREATMENT LEVELS", PUBLISHED BY LOS ANGELES DEPARTMENT OF WATER & POWER**.

4.0 PUBLIC ENTITIES USING RECYCLED WATER

Although regulatory requirements vary for wastewater treatment and water quality standards, recycled water is used in many countries, including the United States (U.S.), Great Britain, Australia, Singapore, Indonesia, Israel, China, and Spain. Most uses are for non-potable purposes by large-scale entities; however, residential usage is also approved in some areas. In the U.S., recycled water has been used for crop irrigation for more than 100 years, landscape irrigation for 70 years, and indirect potable reuse (groundwater recharge) for more than 15 years. Currently, recycled water systems are successfully operating in 32 states, including: Arizona, Colorado, Georgia, Hawaii, New Mexico, North Carolina, Oregon, Virginia, and Washington; however, more than 90% of national water reuse occurs in California, Nevada, Texas, and Florida.

More than 200 water reclamation facilities in the U.S. provide recycled water to approximately 1,600 park, playground, and school sites. Use of recycled water at parks, playgrounds, and school grounds is documented in at least 19 California counties, including Los Angeles. Of 162 California cities using recycled water, 26 cities also use it for landscape irrigation at school grounds. Within Los Angeles County, recycled water is provided to approximately 1,500 sites.

Numerous Southern California school districts use recycled water, including two of the three largest school districts in the state: San Diego City School District and Long Beach Unified School District. Approximately 200 schools in Los Angeles County use recycled water. Recycled water is also used for irrigation of baseball, softball, football, and soccer playfields and running tracks at many of these schools, at California State Universities at Dominguez Hills and Long Beach, and at the Home Depot Sports Center in Carson.

5.0 APPLICABLE RECYCLED WATER REGULATIONS & REQUIREMENTS

In 1992, the United States Environmental Protection Agency (USEPA) developed "*Guidelines for Water Reuse*" as a framework for subsequent state legislation; this technical document was updated in 2004 "to ensure the safety of many water recycling projects that have been developed in the United States." In 1998, USEPA also published "*Water Recycling and Reuse: The Environmental Benefits*" (Water Division Region IX – EPA 909-F-98-001) to promote the use of recycled water.

Regulations to allow and encourage use of recycled water have also been established by individual states. California's recycled water regulations were first developed in 1977 (pre-dating USEPA's original guidelines), and revised in the 1997 strategic plan. Please see **Appendix B, TABLE 1, "TITLE 22 ALLOWED USES OF RECYCLED WATER", PREPARED BY LOS ANGELES DEPARTMENT OF WATER & POWER, EXCERPTED FROM APPENDIX Q OF "THE PURPLE BOOK, CALIFORNIA HEALTH LAWS RELATED TO RECYCLED WATER".** State health agencies have determined that disinfected, tertiary-treated recycled water is legal, safe, and appropriate for many uses, including irrigation of parks, playgrounds, school yards, and flushing of toilets/urinals.

In fact, California statute now *requires* public agencies to use recycled water wherever possible, in order to preserve potable water supplies. The Water Code, section 13551, states that public agencies "…shall not use water from any source of quality suitable for potable domestic use for non-potable uses, including cemeteries, golf courses, parks, highway landscaped areas, and industrial and irrigation uses *if suitable recycled water is available*" (emphasis added), and is deemed safe for use by the California Department of Public Health (CDPH)."

On February 11, 2009, the State Water Resources Control Board (SWRCB) issued the "*Recycled Water Policy"*, providing criteria for issuance of permits to increase the use of recycled water from municipal wastewater sources in a manner that implements state and federal water quality laws. One of the statewide goals enumerated in the SWRCB's "*Recycled Water Policy"* is to increase the statewide use of recycled water over 2002 levels by at least one million acre-feet per year by 2020, and at least two million acre feet per year by 2030.

Recycled water uses and quality are strictly regulated under California state laws, including the Water Code (Division 7), Health and Safety Code (Divisions 6, 13, and 104), and the California Code of Regulations, Title 22 (Division 4, Chapter 3), and Title 17 (Division 1, Chapter 5). The CDPH, Office of Drinking Water, reviews and establishes water recycling criteria, testing standards, and regulations. CDPH also makes recommendations to nine Regional Water Quality Control Boards (RWQCBs). The RWQCBs incorporate these standards and recommendations with additional conditions for the safe use of recycled water into master permits, issued to city and county agencies, and into specific project permits.

The permitted agencies have responsibility for testing and compliance with the RWQCB permits, and also oversee water purveyors for recycled water distribution projects. In Los Angeles County, wastewater treatment is conducted by: a) City of Los Angeles' Department of Public Works, Bureau of Sanitation; b) Sanitation Districts of Los Angeles County; c) City of Burbank; d) Las Virgenes Municipal Water District, and e) West Basin Municipal Water District, in accordance with state permits issued by the Los Angeles RWQCB. Distribution of recycled water is conducted by water purveyors, such as LADWP, also in accordance with state permits issued by the Los Angeles RWQCB; water suppliers are responsible for maintenance of potable and recycled water distribution systems. Additionally, the Los Angeles County Department of Public Health (LACDPH), Bureau of Environmental Protection, permits and regulates onsite recycled water pipeline construction, installation, and safe use for the protection of domestic water supplies and public health. Please see **Appendix C, "GUIDE TO SAFE RECYCLED WASTEWATER USE, PIPELINE CONSTRUCTION, AND INSTALLATION", PUBLISHED BY LOS ANGELES COUNTY, DEPARTMENT OF HEALTH SERVICES, ENVIRONMENTAL HEALTH, CROSS-CONNECTION AND WATER POLLUTION CONTROL PROGRAM.**.

6.0 TESTING OF RECYCLED WATER BEFORE DISTRIBUTION

While USEPA and state government establish and enforce water quality standards, local governments and private water suppliers have direct responsibility for potable and recycled water quality testing. The Los Angeles City and County Sanitation Districts are responsible for treatment and testing of recycled water, in conjunction with permit requirements, for most of Los Angeles

County. Water quality is monitored before, during, and after treatment. Water quality test schedules vary for 170 constituents of concern; tests may be conducted daily, weekly, monthly, quarterly, semi-annually, and/or annually. Test results are summarized and published in annual reports available to the public. Test results submitted to CDPH for City-operated treatment facilities are available on the LADWP website (www.ladwp.com).

Recycled water is regulated somewhat differently than drinking water. National standards for drinking water and water quality protection are set by USEPA in accordance with the Clean Water Act of 1972 and the Safe Drinking Water Act of 1974, as amended, codified in the Code of Federal Regulations. Primary potable water quality standards, called "Maximum Contaminant Levels" (MCLs), have been established by USEPA and CDPH to define the legal risk-based threshold concentrations for more than 80 hazardous substances that are allowed in potable water; concentrations above these limits are deemed to pose a risk to public health. USEPA and CDPH also recommend standards for secondary drinking water quality standards that apply to aesthetic concerns, e.g., taste, odor, or cosmetic problems, such as tooth discoloration.

Although recycled water is not approved for drinking purposes, state law requires dischargers to monitor chemical and microbiological constituents of concern in recycled water to ensure that it also meets the primary and secondary MCLs. Tertiary-treated, disinfected recycled water from County Sanitation District facilities consistently meets MCLs. For comparison purposes, LADWP also provided OEHS with recycled water data from the four City of Los Angeles wastewater treatment plants, for test periods between April 2008 and February 2009. A qualitative comparison of values in the recycled water data showed that results for all reported constituents were within acceptable limits, and were substantially below primary MCLs.

7.0 POTENTIAL HEALTH OR ENVIRONMENTAL CONCERNS

Most of the health concerns associated with non-potable reuse of treated municipal wastewater revolve around the potential for transmission of infectious diseases by microbial pathogens (bacteria, parasites, helminthes, and viruses), although concern over potential hazards presented by low levels of

pharmaceuticals and other chemicals has recently surfaced.[1] Currently, either total or fecal coliform bacteria are the preferred indicator organisms for possible presence of microbial pathogens in recycled water in the U.S., except for Colorado, which uses E. coli as the indicator. Factors that influence the likelihood of presence of pathogens include, but are not limited to, treatment processes, type of disinfection, and specific characteristics of the wastewater being treated.[2]

Virus monitoring on tertiary effluent has been performed by the Los Angeles County Sanitation Districts since 1979. Typically, total coliform bacteria levels in tertiary-treated recycled water are below detection levels of one per 100 milliliters. Since 1979, more than 1,350 samples consisting of over 1.4 million liters of tertiary-treated recycled water have been analyzed, with only two viruses being identified. To put this into perspective, one would have to drink two liters of recycled water a day for about 980 years to encounter a single virus.[3]

According to the WaterReuse Foundation (2005), there are minimal health concerns associated with chemical constituents where recycled water is used for landscape irrigation. During wastewater treatment, hazardous substances, e.g., pesticides, heavy metals, and organic chemicals, are usually reduced to acceptably low levels, and would not be expected to present any risks to health from exposures through incidental contact, ingestion, or inhalation of recycled water used for irrigation. Tertiary-treatment effectively eliminates most pathogenic bacteria, while use of chlorination and ultraviolet disinfection effectively inactivates bacteria, most viruses, and common parasites.[4]

Disinfection by chlorination is used for both potable and recycled water to significantly lower the number of bacteria; however, chlorination may also increase proportions of "Disinfection By-Products (DBPs)", that is, potentially carcinogenic compounds such as chloroform. Due to potential health concerns, DBPs are also tested and monitored at water treatment facilities prior to water

[1] WaterReuse Foundation, "Irrigation of Parks, Playgrounds, and Schoolyards with Reclaimed Water", Alexandria, Virginia, 2005, WateReuse Foundation Project Number WRF-04-006, page 2.
[2] WateReuse Foundation, "Application of Microbial Risk Assessment Techniques to Estimate Risk Due to Exposure to Reclaimed Waters", Alexandria, Virginia, 2007, WateReuse Foundation Project Number WRF-04-011, pages 1-2.
[3] Per Earle C. Hartling, Water Recycling Coordinator, Los Angeles County Sanitation District.
[4] WateReuse Foundation, ""Irrigation of Parks, Playgrounds, and Schoolyards with Reclaimed Water", Alexandria, Virginia, 2005, WateReuse Foundation Project Number WRF-04-006, page 2.

discharge. Generally, test results for DBPs in tertiary-treated, recycled water have been well below MCLs.[5]

The 2009 *Recycled Water Policy* indicates plans for the SWRCB and CDPH to convene a "blue-ribbon" advisory panel to study literature and risks from "emerging contaminants", with submittal of a report and recommendations to be issued within one year. Regulatory limits have not yet been established for over 3,000 "constituents of emerging concern" that may be found in potable water, recycled water, and indirect potable use/aquifer recharge of recycled water. Examples of these constituents include: endocrine disruptors (e.g., hormones); pharmaceutical chemicals (e.g., antibiotics, steroids, tranquilizers, anti-hypertensives, anti-convulsants, chemo-therapeutics, etc.), pesticides and herbicides, preservatives, additives, flame retardants, and personal care products. Many of these chemicals can be treated by advanced treatment, using ozone and membrane technologies. One recent health study, which researched relative exposure doses for 43 unregulated chemical compounds of concern, identified only two compounds for which fewer than seven glasses of recycled water (discharged to aquifers) drunk per day would result in potential human health impacts.[6]

Tertiary-treated, disinfected recycled water is approved for "indirect potable use", allowing discharge to surface water (e.g., rivers, lakes, oceans) or to land surfaces where it will percolate through rock and soil, undergoing additional filtration, for purposes of groundwater/aquifer recharge. However, where recycled water will be directly discharged into groundwater injection wells, it must first undergo Advanced Treatment, including micro-filtration, reverse osmosis, and disinfection with ozone, ultra-violet light, and/or peroxide.

The 2009 *Recycled Water Policy* indicates plans for the SWRCB to develop salt and nutrient management plans for local groundwater basins. In the absence of secondary treatment including nitrification and de-nitrification, recycled water may contain higher levels of nutrients (e.g., nitrogen, phosphorus) than are found in potable water. While nutrients in recycled water may help fertilize plants, they

[5] WateReuse Foundation, ""Irrigation of Parks, Playgrounds, and Schoolyards with Reclaimed Water", Alexandria, Virginia, 2005, WateReuse Foundation Project Number WRF-04-006, page 17.
[6] Nellor, Margaret, Nellor Environmental Associates, Inc., "Tools to Understand the Relative Risks of Indirect Potable Reuse Projects", WateReuse Foundation Project WRF-06-018, 5/19/2009.

may also result in increased salt and nutrient conditions, which may threaten or exceed water quality objectives.

Disinfected, tertiary-treated recycled water is also approved for many industrial and institutional uses, which require different permits than landscape permits. For example, recycled water may be used for floor trap priming, cooling towers, and air conditioning systems. However, if public exposure to aerosols, mist, or spray may occur, the California Water Code (§ 13552.8) requires that appropriate mist mitigation or mist control be provided, such as the use of "mist arrestors" or "drift eliminators" (i.e., baffle-like devices through which air must travel after leaving the fill and spray zones) and/or the addition of biocides to the water to prevent or reduce potential exposure through inhalation of contaminants. During the cooling process, particulate matter (PM), volatile organic compounds, and hazardous compounds (e.g., metals) from water treatment additives may be emitted as gas, or dissolved and suspended in water drift droplets. "Drift" refers to droplets of water entrained in the air stream which exit the tower through the fan stack(s). Emissions of cooling tower treatment chemicals can create salting near the tower and PM10 emissions. Biocides, such as chlorine, bleach, and bromine, may be added to inhibit bacterial growth (e.g., Legionella, mold).

8.0 POTENTIAL HEALTH CONCERNS FOR CHILDREN

There are no epidemiological studies, and limited data to provide a direct assessment of health risks from exposure to recycled water that are specific to children or sensitive subgroups at different life stages within the general population. While several states, including California, have developed water reuse standards for non-potable uses that include treatment requirements and microbial and other water quality limits, no existing state regulations for recycled water are based on risk assessment methodology.[7]

For environmental health risk assessments, children are considered "sensitive receptors". Children under 8 years of age have less developed immune systems than older children or adults, and may be physically more susceptible to health effects from organisms and chemicals that affect learning, motor skills, and hormones during growth stages. As noted in the 2004 school site risk assessment

[7] WateReuse Foundation, "Application of Microbial Risk Assessment Techniques to Estimate Risk Due to Exposure to Reclaimed Waters", Alexandria, Virginia, 2007, WateReuse Foundation Project Number WRF-04-011, page 2.

guidance developed by the California Office of Environmental Health Hazard Assessment,

> "Children differ from adults anatomically, physically, and behaviorally in ways that may affect their exposure or their response to exposure from environmental contaminants. For example, on a body weight basis, children require more oxygen, food, and water, and have a higher skin surface area than adults. Children's activity patterns are different. Children are in a period of continuous change as they move from infancy through puberty and into adulthood."[8]

Children's behavior may also result in greater exposures to organisms and chemicals from many sources. For example, while playing on the ground, young children often place their hands and/or other objects in their mouths, increasing potential for exposure through dermal contact, inhalation, and/or accidental ingestion of pathogenic organisms or chemical contaminants, such as those in grass, soil, or plants wet from recycled water spray.

However, hundreds of schools throughout the U.S. have been successfully using recycled water for irrigation, without documentation of increased incidence of disorders or health impacts from exposure to irrigation water. State regulations do not differentiate or otherwise restrict uses of recycled water for parks, playgrounds, and school yards, including day care and kindergarten facilities, and/or for irrigation of crops where edible portions come in contact with recycled water.

9.0 POTENTIAL AESTHETICS PROBLEMS

Two aesthetics issues, occasionally associated with recycled water, are concerns about odors and water color. In the event that potable or recycled water remains in a distribution pipeline due to lack of demand, odors may develop. Additionally, recycled water is generally colorless, although water color may be noticeable when recycled water is used for toilet flushing. Iron, used in the treatment process as a coagulant, may add a slight color to otherwise clear water. Neither the odors nor colors pose actual health threats; however, if the odors are

[8] California Environmental Protection Agency, Office of Environmental Health Hazard Assessment, "Guidance for Assessing Exposure and Health Risks at Existing and Proposed School Sites, Pursuant to Health & Safety Code Section 901(f)", February 2004.

pervasive, some may consider the objectionable odors to be a nuisance. LADWP oversees periodic pipe flushing for both potable and recycled water, which should reduce or prevent odor problems. Additionally, color and odor problems can be reduced by installation of either: a) filters or b) injection stations at connection points to inject chlorine or hydrogen peroxide into pipelines. LADWP policy requires placement of filters at the point of connection when recycled water will be used for indoor toilet flushing.

10.0 OEHS RECOMMENDATIONS; SPECIAL CONSIDERATIONS

OEHS has determined that use of recycled water (i.e., disinfected, tertiary-treated recycled water distributed in "Purple Pipes") at school sites has been approved under state law, and is generally appropriate for: 1) landscape irrigation at school yards and playgrounds/athletic fields; and 2) flushing of indoor toilets and urinals at new schools, so long as compliance is maintained with regulatory requirements (see Section 5.0, above), and use site controls, as specified in the Recycled Water User Requirements (see Section 11.0 below). Prior to installation of dual piping systems at new schools, or addition/conversion to "purple pipelines" at existing schools, LAUSD must submit an application and fee for plan check, inspection, and pipeline testing to Los Angeles County, Department of Public Health. Following installation, a preventive maintenance program must be implemented and monitored. Annual inspections will be conducted by Los Angeles County to ensure ongoing compliance with all state and local requirements.

OEHS recommends that conditions at each school site be individually evaluated to assess potential impacts or cumulative effects of accidental or incidental exposures of children to recycled water. OEHS has identified special school use scenarios where area-specific restrictions and/or increased vigilance are recommended if recycled water will be used. These scenarios will require public access controls; application controls, such as shielding of impacted areas (e.g., picnic tables, drinking fountains, etc.) during application; or use restrictions to prevent unwanted exposures to recycled water through inhalation, dermal contact, or incidental ingestion (e.g., water application only during off-use hours). The special school use scenarios include:

1) Cooling of artificial turf on playfields, or rubber matting in play areas or under climbing equipment;
2) Landscape watering of playfields or similar areas specifically designated for direct use by younger children or special education children (e.g., pre-

kindergarten/kindergarten facilities; early childhood education centers; special education facilities; day care facilities at continuation schools);

3) Watering of demonstration gardens or community gardens with edible vegetation;
4) Landscape watering near grandstands, bleachers, picnic areas, water fountains, where overspray could occur, or where droplets could become aerosolized and possibly inhaled;
5) Cooling towers and air conditioning systems with possible exposure of workers or students and staff to aerosols, mists, or spray; such systems may require installation of drift eliminators and use of biocides in treatment waters.

11.0 RECYCLED WATER USER REQUIREMENTS; SITE USE APPLICATIONS

Recycled Water User Requirements are currently specified in the **"Recycled Water Urban Irrigation User's Manual" (Appendix D)**, which was prepared in February 2005 by the Los Angeles County Recycled Water Advisory Committee, a consortium consisting of water utilities, regulatory agencies, and other interested entities. These requirements include:

a) No unapproved uses of recycled water, e.g., for drinking, washing, bathing, or swimming;
b) No inter-connections or cross-connections between onsite potable and recycled water lines;
c) No use of same equipment for recycled and potable water systems (e.g., quick couplers, tools, etc.), in order to avoid cross-contamination;
d) No use of recycled water in unapproved areas;
e) No hose bibs on recycled water systems (unless public access is restricted);
f) Proper labeling of recycled water pipelines and fixtures;
g) Repair and reporting upon discovery of leaks or spills;
h) Water application during periods of least use and/or least public exposure, preferably between 10 PM and 6 AM;
i) Minimize direct or indirect discharge from recycled water use areas to storm drains;
j) Minimize runoff within or outside the approved use areas;
k) Minimize ponding within or outside of the approved use areas;

l) Minimize windblown spray from leaving the approved use areas (e.g., shielding of drinking fountains, designated eating areas); and

m) CDPH review of engineering reports is also required for use of recycled water for toilets and urinal flushing at new facilities. (CDPH does not permit retrofits of existing facilities for this purpose.)

Additionally, the Recycled Water User Requirements include a provision for designation of one or more Site Supervisors at each school location. Site Supervisors undergo initial training and periodic update training to gain familiarity with recycled water applications and maintenance requirements, and will also have the knowledge and authority to conduct inspections, ensure proper signage, maintain appropriate records, respond to emergencies, and if necessary, ensure correction of any violations. The name and position of designated Site Supervisors will be reported to the OEHS Safety Officer, the water purveyor, and Los Angeles County Department of Health Services.

12.0 CONTACTS AND REFERENCES

For assistance or further information, please contact Ed Morelan, Site Assessment Manager, Office of Environmental Health and Safety (OEHS) 213-241-6283, or visit the OEHS website at: http://www.lausd-oehs.org.

For additional reference information, please see the following website links:

1) California Department of Public Health, Recycled Water Program: http://www.cdph.ca.gov/HealthInfo/environhealth/water/Pages/Waterrecycling.aspx

2) State Water Resources Control Board, Recycled Water Policy: http://www.waterboards.ca.gov/water_issues/programs/water_recycling_policy/index.shtml

3) Los Angeles County, Sanitation Districts: http://www.lacsd.org/info/water_reuse/recycled_water_program_resources_and_information.asp

4) Los Angeles County, Environmental Health Recycled Water Use Permits, Approved Devices: http://lapublichealth.org/eh/docs/ep_cross_con_recycle.pdf http://dpw.lacounty.gov/wwd/web/waterquality/docs/devices.pdf

5) Los Angeles Department of Water and Power, Dialogue on Recycled Water Use: http://www.ladwp.com/ladwp/cms/ladwp011339.jsp

6) City of Los Angeles, Bureau of Sanitation, Wastewater: http://www.lacitysan.org/wastewater/index.htm

7) WateReuse Foundation: http://www.watereuse.org/foundation

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APPENDIX A

FLOWCHART, "CLEAN WATER 101 – A PRIMER ON TREATMENT LEVELS", PUBLISHED BY LOS ANGELES DEPARTMENT OF WATER & POWER

APPENDIX B

TABLE 1, "TITLE 22 ALLOWED USES OF RECYCLED WATER", PREPARED BY LOS ANGELES DEPARTMENT OF WATER & POWER, EXCERPTED FROM APPENDIX Q OF "THE PURPLE BOOK, CALIFORNIA HEALTH LAWS RELATED TO RECYCLED WATER"

APPENDIX C

"GUIDE TO SAFE RECYCLED WASTEWATER USE, PIPELINE CONSTRUCTION, AND INSTALLATION", PUBLISHED BY LOS ANGELES COUNTY, DEPARTMENT OF HEALTH SERVICES, ENVIRONMENTAL HEALTH, CROSS-CONNECTION & WATER POLLUTION CONTROL PROGRAM

APPENDIX D

RECYCLED WATER URBAN IRRIGATION USER MANUAL", DEVELOPED BY LOS ANGELES COUNTY RECYCLED WATER ADVISORY COMMITTEE, FEBRUARY 2005