

NORTH MARIN WATER DISTRICT

STANDARD SPECIFICATIONS

SECTION 15152 RECYCLED WATER FACILITIES (ONSITE)

PART 1 GENERAL

1.01 DESCRIPTION

This section includes special provisions, materials, and identification of onsite (post meter) private recycled water irrigation or plumbing systems.

1.02 REFERENCE STANDARDS

The publications listed below form part of this specification to the extent referenced and are referred to in the text by the basic designation only. Reference shall be made to the latest edition of said standards unless otherwise called for.

AWWA American Waterworks Association Guidelines for Distribution of non-potable Water

CCR California Code of Regulations Title 22 and Title 17.
CDPH California Department of Public Health

1.03 RELATED WORK SPECIFIED ELSEWHERE

NMWD Standard Drawings

1.04 OFFSITE AND ONSITE CRITERIA

Recycled water facilities are separated into two categories:

- A. "Offsite" (pre-meter) public recycled water facilities consist of those facilities which are on the upstream side of the meter. These facilities are, or will be, owned, operated and maintained by the District. Specification Section 15151 details the requirements for construction of Offsite Recycled Water Facilities.
- B. "Onsite" (post-meter) private recycled water facilities consist of those facilities which are on the downstream side of the water meter. These are facilities which will be owned, operated and maintained by the customer. This specification will detail the requirements for the design, installation and testing of onsite recycled irrigation and plumbing systems.

1.05 CONDITIONS OF SERVICE

- A. Recycled water service shall be provided by the District pursuant to District Regulations from time to time in effect.
- B. All recycled water will be provided to the user as specified in the Agreement or Permit For Recycled Water Service. Recycled water use will be subject to the same restrictions as stated in these specifications and the regulatory requirements of CDPH.
- C. Recycled water service may be suspended at any time the District Regulations or Recycled Water Facilities (onsite) specifications are violated the quality or when the quality of the recycled water does not comply with regulatory agency requirements.

1.06 DESIGN CRITERIA - ONSITE RECYCLED SYSTEMS

- A. The design of onsite recycled water facilities, including the preparation of plans and specifications, shall be under the responsibility of a licensed Landscape Architect or Civil Engineer registered with the State of California. A Declaration of Responsible Charge shall appear on the title sheet of any plans.
- B. The design of onsite recycled facilities shall conform to the most current provisions set forth herein and to any other conditions, standards, and requirements set forth by the District.
- C. The recycled water facilities (onsite) shall be separate and independent of any potable water system. Cross connections between potable water facilities and recycled water facilities are prohibited.
- D. Recycled water facilities (onsite) shall be designed to include backflow prevention per the requirements of the Recycled Water Facilities (onsite) Specifications. A more stringent method of backflow prevention may be required when a fertilizer or pesticide injection system is shown on the Approved Plans. Backflow prevention shall be provided at all potable points of connection according to NMWD Standard No. 19 and Specification 15112.
- E. In areas where the District has determined that recycled water will be supplied in the future, but recycled water is not immediately available, the onsite facilities shall be designed to use recycled water. Provisions shall be made, as directed by the District, to enable future connection to the recycled water distribution main. In the interim, potable water may be supplied through a temporary potable water connection to the onsite facilities using a master reduced pressure principal backflow device installed per the Recycled Water Facilities (onsite) Specifications. When recycled water becomes available, the Customer shall remove the backflow prevention device in the presence of, and as directed by, the District. The onsite system will be connected to the recycled water distribution main per the requirements of the Recycled Water Facilities (onsite) Specifications at the time the connection is made.

- F. Hose bibs on recycled water facilities are prohibited.
- G. Fire hydrants, wharf hydrants, or other appurtenances shall only be included in the design when these appurtenances are expressly approved by the District and CDPH.
- H. There shall be no direct contact of recycled water with a drinking fountain. Protection of drinking fountains can be accomplished either by maintaining a horizontal separation of at least thirty (30) feet between the drinking fountain and the nearest spray type emitter, spray head modification, or by the use of a covered fountain. The manner used to protect drinking fountains from the spray of recycled water shall be approved by the District and CDPH.
- I. Potable and recycled pipelines shall not to be installed in the same trench. Recycled pipelines shall be designed to be installed below the potable pipelines where the two pipelines run parallel to each other. Where this is not possible, the recycled pipeline shall be installed in a casing. Details of this installation shall be clearly shown on the plans.
 - 1. Onsite recycled water and potable water facilities shall be designed/installed in accordance with the following criteria:
 - i. The horizontal separation between onsite recycled and potable lines shall be a minimum of forty-eight (48) inches, measured between outside diameters.
 - ii. In general, onsite recycled water lines shall be installed below potable water lines, with a minimum vertical separation of twelve (12) inches, measured between outside diameters. Exceptions to this general requirement are as follows:
 - a. Recycled water lines may be installed above potable water lines where the recycled lines (laterals) are intermittently pressurized. No special construction requirements are necessary, provided the twelve (12) inches vertical separation is maintained.
 - b. Constantly pressurized recycled water lines may be installed above potable water lines providing the recycled pressured line has an automatic flow control/shut-off device installed, or the recycled line is sleeved. An automatic flow control/shut-off device shall terminate all flow to a lateral automatically should the flow exceed a preset maximum gpm. Sleeving shall extend five (5) feet each side from the center-line of the potable line, for a total length of ten (10) feet . The sleeve shall be purple PVC. In all cases, the twelve (12) inches vertical separation shall be maintained.

2. Recycled water facilities (onsite) shall be designed/installed to the following minimum top of pipe depth requirements:
 - i. Intermittent pressure lines two (2) inches and smaller – twelve (12) inches.
 - ii. Constant pressure lines smaller than six (6) inches – eighteen (18) inches.
 - iii. Constant pressure lines six (6) inches and larger – thirty (30) inches.
- J. Recycled water irrigation facilities (onsite) shall be designed to meet the peak demand of the intended use including plant material to be irrigated. For plant irrigation the use of moisture sensors is encouraged, but not mandatory.
- K. Recycled water irrigation facilities (onsite) shall be designed to apply irrigation water in a manner compatible with the infiltration rates of the soil types within the approved use area. Evidence that infiltration rates have been assessed shall be included with the design. Where varying soil types are present, the system design shall be compatible with the lowest infiltration rate present.
- L. Recycled water facilities (onsite) shall be designed to prevent discharge onto areas not under control of the Customer. Appropriate sprinklers, bubblers, emitters, rotors, etc., shall be employed in the design to confine the discharge to the approved use area. The design shall avoid spray patterns which results in ponding and/or runoff to landscape or areas not intended for irrigation.
- M. Recycled water irrigation facilities (onsite) shall be designed to provide a physical separation between adjacent areas irrigated with potable water. The means of separation shall be provided by either a distance of ten (10) feet, concrete mow strips, approved fence or other approved means. Where concrete mow strips or other means are used, they shall be shown on the plans.
- N. Recycled water facilities (onsite) shall be designed to operate during periods of minimal public use in the area. The total time required to irrigate the design area shall not exceed nine (9) hours in any twenty four (24) hour period. The system shall be designed to operate between the hours of 9 PM and 6 AM.
- O. Recycled water facilities (onsite) designs shall include automatic system control devices which can be easily adjusted to minimize ponding and runoff.
- P. Recycled water facilities (onsite) design plans shall contain the following information for each meter requested:
 1. Meter location and size
 2. Gross and net irrigation area served by each meter (sq ft or acres)
 3. Peak flow through the meter in gpm
 4. Estimate of the yearly demand (acre-feet)

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5. Design operating pressure at the meter in psi
- Q. Recycled water facilities (onsite) design plans shall contain a legend showing the pertinent data for the materials to be used in the system construction. Included shall be a pipe schedule (listing pipe sizes and materials of construction), valve types (including quick-coupling type valves), and the following information for each type of sprinkler device:
1. Manufacturer and model number
 2. Sprinkler radius in feet
 3. Operating pressure in psi
 4. Flow in gpm
 5. Sprinkler pattern
- R. Recycled water facilities (onsite) design plans shall contain the following detailed information:
1. Points of connection
 2. Routing of all pipes
 3. Gate valves
 4. Control valves
 5. Quick-coupling valves
 6. Routing of control wires
 7. Control stations
 8. The area controlled by each control station
 9. Signage plan and sign detail
 10. Cross connection test station locations and detail
 11. Location of mow strips, fences, walls, or other barriers
 12. Adjacent parcels, lots or home sites irrigated with potable water
- S. Recycled water facilities (onsite) design plans shall clearly detail backflow prevention devices, all potable water lines, buildings, walls, exterior drinking, and decorative fountains, swimming pools, playgrounds, or any other permanent facilities in the design area. If none of the items listed in this paragraph are present in the design area, it shall be specifically stated on the plans that none

exist.

- T. The District's Recycled Water Use Notes are to be included on all onsite recycled water system design plans. These notes, as appended, may be expanded or otherwise modified as directed by the District.
- U. The name(s) and 24-hour contact telephone number for the party responsible for operation and maintenance of the system shall appear on the cover sheet of the design plans..
- V. An Inspection Note shall be shown on each page of the design plans. The note shall be as follows: The District Inspector shall be notified 48 hours (2 working days) prior to the start of construction. All work performed without benefit of inspection shall be subject to rejection and removal.

1.07 WARNING/IDENTIFICATION TAPE

All irrigation pipe, both potable and recycled, shall include the installation of Warning/Identification Tape.

PART 2 MATERIALS

2.01 ONSITE RECYCLED WATER FACILITIES

- A. Pipe shall be solid purple-colored PVC material conforming to the following:
 - 1. Three (3) inches or smaller pipe shall conform to ASTM-D1784, Type 1, Grade 1, PVC-1120 for schedule 40 or 80, or ASTM-D2241, Type 1, Grade 1, PVC-1120 for SDR rated pipe. Ends shall be solvent welded joints conforming to ASTM-D2672.
 - 2. Four (4) inches and larger pipe shall conform to either AWWA C900 or C905 with elastomeric ring bell-type pipe ends, conforming to ASTM-D3139. Where purple pipe is unavailable, 0.008 inches or 8 mils purple plastic sleeve material maybe used in accordance with Section 15151 of NMWD Standard Specifications.
 - 3. Identification markings shall be continuous on two sides of the pipe. Markings shall include the nominal pipe size, PVC type, ASTM or AWWA designation, pressure rating and the words "CAUTION-RECYCLED WATER".
- B. Fittings for PVC pipe shall conform to the following:
 - 1. Three (3) inches and smaller pipe shall use solvent weld joint type fittings, minimum Schedule 40, with a working pressure rating no lower than that of the pipe. Schedule 40 fittings shall conform to ASTM-D2466 and Schedule 80 fittings to ASTM-D2464 and D-2467. PVC solvent cement

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shall conform to ASTM-D2564.

2. Four (4) inches and larger pipe shall use either push-on or flanged fittings conforming to AWWA C110 and C111.
- C. Warning tape shall be an inert plastic film formulated for prolonged underground conditions. The minimum thickness shall be 0.004 inches or 4 mils and the overall width shall be a minimum of three (3) inches. The tape shall have purple printing on a silver background or black printing on a purple background with the words "CAUTION: RECYCLED WATERLINE BELOW", or as District approved.
- D. Quick-coupling valves shall be acme thread type for operation with a special coupler key. They shall be constructed of brass with a solid purple-colored locking rubber or vinyl cover. The locking cover shall have the warning "NON-POTABLE- DO NOT DRINK" in English and Spanish, and the International "DO NOT DRINK" symbol. The warnings shall be permanently molded into the cover.
- E. Irrigation sprinklers, rotor heads and other types of dispersion heads shall have the exposed surface colored purple. The exposed surface shall be colored through the use of integrally molded purple plastic or permanently attached purple plastic ring or disc.
- F. Valve boxes shall be per industry standards with solid purple-colored lids as a minimum. The entire box may be molded from purple-colored PVC. The lids shall have the warning "NON-POTABLE- DO NOT DRINK" in English and Spanish and the International "DO NOT Drink" symbol. The warnings shall be permanently molded into the lid.
- G. Valves shall have their exterior surface painted purple and be tagged with identification tags. The purple paint shall be as listed on the Approved Materials List. Identification tags shall be 3 inches x 4 inches weatherproof purple plastic. The plastic tags shall be imprinted in black permanent markings with the words "Caution: Recycled Water- Do Not Drink" on one side and "Peligro: Agua Impura- No Beber" on the opposite side.
- H. Warning labels and signs shall be required and installed per the approved signage plans. Labels and signs shall be submitted to the District Engineer for approval prior to installation. The labels and signs shall notify that the system contains recycled water that is unsafe to drink. They shall be in English and Spanish with the international "Do Not Drink" symbol. As a minimum, signs shall be installed at impoundments, ingress and egress points, and on the exterior front panel of irrigation controllers.
- I. Strainers shall be the same nominal size as the service meter and shall have a ball valve on the strainer leg for flushing. Two (2) inches and smaller wye pattern strainers shall be bronze body, in-line type with stainless steel screens. Strainers shall have a ½ inch bronze ball valve installed on the strainer's wye leg. Three (3) inches and larger wye pattern strainers shall be cast-or ductile-iron and have the size ball valve recommended by the manufacturer installed on the strainer's wye leg

- J. Check valves shall be in-line, spring-loaded, bronze-body construction. Check valves shall be globe, wafer, or dual check type valves with stainless steel springs. Check valves shall be the same size as the service meter.

2.02 WARNING/IDENTIFICATION TAPE

Warning/Identification Tape materials shall conform to Section 15000 of NMWD Standard Specifications.

PART 3 EXECUTION

3.01 ONSITE RECYCLED WATER FACILITIES

- A. Recycled water facilities onsite shall not be installed until the plans have been approved by the District and the California Department of Public Health (CDPH), and a pre-construction meeting has been held with the District. If any portion of the onsite recycled system is installed prior to plan approval and/or inspection, all or any portion of the system shall be exposed and corrected as directed by the District.
- B. Recycled water facilities onsite shall be installed as shown on the approved plans. Deviations from these plans by the installer shall not be permitted until the revised plans have been submitted to, and approved by, the District.
- C. Installation of recycled water facilities onsite shall conform to the approved plans and designed per paragraph 1.06 of this Section.
- D. Warning/Identification Tape shall be installed on all onsite potable and recycled lines as called for in Section 15000.
- E. Hydrotesting shall be performed on all constant pressure lines in the presence of the District Engineer. The test pressure shall be a minimum of 50 psi above the rating of the pipe, and shall be maintained for a minimum duration of 2 hours. No leakage (drop in pressure) shall be allowed. If leakage exceeds this rate, the leak points shall be located and repaired, and the hydrotest repeated until there is zero leakage.
- F. Only potable water shall be used for hydrotesting, flushing, the operational test and the cross connection test (if required). Potable water shall be supplied through a separate temporary water meter obtained from the District and located at a District-approved potable water source. A reduced pressure principal backflow device shall be installed at ground level immediately downstream of the temporary potable water meter. A temporary above ground line shall be installed to supply the proposed recycled irrigation system during the construction and testing period.
- G. A wye strainer and check valve shall be installed in accordance with District

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Standard Drawings selected from the Approved Materials List.

1. For meter sizes $\frac{3}{4}$ inches through two (2) inches, the strainer and check valve shall be installed in a separate one (1) inch meter box abutted to the service meter box.
 2. For meter sizes larger than two (2) inches, the strainer and check valve shall be installed in a separate vault adjacent to meter vault. The vault shall be of sufficient size to provide adequate room for maintenance and removal of the strainer and check valve.
 3. The strainer and check valve shall be installed and inspected prior to service being established.
- H. Cross connection test stations shall be installed at the locations shown on the Approved Plans and detailed on the Standard Drawings. In general, one test station shall be identified directly downstream of each point of connection, downstream of any pressure reducing valves. Additional cross connection station(s) may be required as indicated on the Approved Plans.
- I. A controller recycled irrigation map shall be prepared and submitted to the District prior to commencing service.
- J. The Customer or Customer's representative shall contact the District's Inspector and arrange for a coverage test inspection. The Customer or Customer's representative must be in attendance along with persons capable of making system adjustments. If modifications to the system are required, other than minor adjustments, the Customer will be notified in writing of the changes required. To avoid suspension of service, the modifications must be made in a timely manner. All modifications to the system are the responsibility of the owner, Customer or applicant, and said owner, Customer or applicant shall pay all costs associated with such modifications.
- K. Either prior to or at the time of the coverage test, a Final Inspection shall also be performed. The following items must be completed to the satisfaction of the District before permanent service will be established:
1. Application for recycled service has been made to the District.
 2. Warning signs and labels are installed.
 3. Quick coupling valves, valve boxes, controllers and other system components are clearly identified with the proper markings indicating distribution of either recycled or potable water.
 4. Windblown spray, runoff and ponding have been limited or prevented.
 5. Controller clocks are set to operate during the approved hours.
 6. Controller maps have been submitted to the District.

7. Site supervisor and twenty four (24) hour contact phone number identified.

3.02 OPERATION AND MAINTENANCE

A. General:

1. The operation, surveillance, maintenance, and repair of all onsite recycled water facilities are the responsibility of the customer. The customer's designated "On-Site Recycled Water Supervisor" shall bear the responsibility for the distribution of recycled water in accordance with the District Regulations. The District shall receive the following information regarding the individual designated as "On-Site Supervisor": their name, address and telephone number of their location during normal working hours, and a telephone number at which they can be reached during off hours.
2. The District must be notified in writing of any change in the information in Section 15152.3.02.A.1 within ten (10) working days.

B. The customer shall have the following responsibilities pertaining to operation of onsite facilities:

1. To ensure that all operations and maintenance personnel are trained and familiarized with the use of recycled water.
2. To ensure precautionary measures be taken to minimize direct contact with recycled water. For work involving more than a casual contact with recycled water, employees must be provided with proper protective equipment. Adequate first aid supplies should be available on the premises. All cuts and abrasions should be promptly treated to prevent infection.
3. To furnish their operations and maintenance personnel with maintenance instructions, irrigation schedules, controller charts, and as-built plans to ensure proper operation in accordance with District Specifications and Regulations.
4. To ensure all recycled water facilities are operated and maintained in accordance with District Specifications and Regulations and other documents governing recycled water systems within the District.

C. The customer shall be responsible for any and all subsequent uses of the recycled water. Appropriate operation, maintenance and control measures shall include but are not limited to the following:

1. Operation of onsite recycled water facilities shall be operated to prevent or minimize discharge onto areas not under control of the customer so as to minimize public contact.

2. Operation of the onsite recycled water facilities shall be during periods of minimal human use of the service area. Consideration shall be given to allow a maximum dry-out time before the irrigated area will be used by the public.
3. Utilization of automatic controller systems to minimize ponding and runoff of recycled water. Total sprinkler run times shall not be greater than the time needed to supply the landscape's water requirement. If runoff occurs before the landscape's water requirements are met, the automatic controllers shall be reprogrammed with a greater number of water cycles of shorter duration to meet the requirements. This method of operation is intended to minimize ponding and runoff.
4. The customer reporting to the District any and all failures in the recycled water system that cause an unauthorized discharge of recycled water.
5. Protection of all drinking fountains located within the approved use area from contact with windblown recycled water spray, direct application through irrigation or other approved uses by location and/or a protecting structure. Protection shall be by design, construction practice and system operation.
6. Protection of facilities that may be used by the public. They include but are not limited to, eating surfaces and playground equipment located within the approved use areas. These shall be protected by siting and/or shelter from contact with recycled water to the maximum extent possible. Windblown spray, direct contact through wash down or by irrigation application, or other approved uses are considered sources of recycled water. Protection shall be by design, construction practice and system operation.
7. Notification of the District of all updates and proposed changes. Approval by the District and CDPH shall be obtained prior to construction in accordance with District procedures. All updates and proposed changes shall comply with these Rules and Regulations and the governing documents of all other regulatory agencies.

D. The customer shall enforce the following prohibitions:

1. Cross-connections: Cross-connections, as defined by the California Code of Regulations, Title 17, resulting from the use of recycled water or from the physical presence of a recycled water service, whether by design, construction practice or system operation, are strictly prohibited.
2. Hose Bibs: Use or installation of permanent hose bibs on any customer water system that presently operates or is designed to operate with recycled water, regardless of the hose bib construction or identification, is prohibited.
3. Runoff: Conditions that directly or indirectly cause runoff of recycled water

either within or outside of the approved use area, whether by design, construction practice or system operation, are prohibited.

4. Ponding: Conditions that directly or indirectly cause recycled water to pond either within or outside of the approved use area, whether by design, construction practice, or system operation, are prohibited.
5. Windblown Spray: Conditions that directly or indirectly permit windblown spray to pass outside of the approved use area, whether by design, construction practice, or system operation, are prohibited.
6. Disposal in Unapproved Areas: Disposal of recycled water for any purposes, including approved uses, in areas other than those specifically approved by the District and without the prior knowledge and approval of the governing regulatory agencies, is prohibited.
7. Unapproved Uses: Use of recycled water for any purposes other than those specifically approved by the District, is prohibited.

3.03 MONITORING AND INSPECTION

The District shall monitor and inspect the entire recycled distribution facility, including both offsite and onsite facilities. The District shall conduct monitoring programs, maintain records as deemed necessary, inspect onsite facilities for compliance with District Specifications and Regulations, and provide reports as requested by other regulating agencies. For these purposes, the District shall have the right to enter upon the customer's premises during reasonable hours to inspect onsite recycled water facilities and approved use areas. Reasonable hours shall include hours when irrigation is occurring. The District, Regional Water Quality Control Board and CDPH shall have the right to enter upon the customer's premises during reasonable hours, from time to time, to verify that the customer's irrigation practices conform with District Specifications and Regulations. Where necessary, keys and/or lock combinations shall be issued upon request to the District to provide such access.

3.04 VIOLATION AND NOTIFICATION

- A. The District reserves the right to determine whether a violation of the District Specifications and Regulations has resulted from any action or occurrence that is the responsibility of a customer. Insofar as the violation of these Standards Specifications constitutes a violation of any regulatory agency requirement, the District shall make its determination with consultation on behalf of the concerned agency.
- B. Specific violations shall include those that directly cause noncompliance with any one of the specific prohibitions as listed in these Specifications. However, by definition, noncompliance with any condition or conditions of these Specifications, whether willfully or by accident, shall constitute a violation.
- C. It is the responsibility of the customer to notify the District of any and all failures in

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in the onsite recycled water system whether or not in the customer's opinion the failures resulted in violations. Failures may occur as a result of the customer's action, an action by unauthorized personnel or any non-designated use of the recycled water service. If there are any doubts regarding whether a violation has occurred, the customer should notify the District so that a determination can be made.

- D. Notification of failures and violations should be made by telephone, as soon as possible, to the District. If the failure occurs after normal business hours, notification should be made no later than 9:00 a.m. on the next regular business day following the occurrence.

3.05 CORRECTIVE ACTION

- A. If the District's investigation results in the determination that a violation has occurred, then it shall be the responsibility of the customer to initiate corrective action. Pertinent violations will be documented and a copy of this notice will be hand-delivered or mailed to the customer.
- B. A timetable for completing the corrective action should be negotiated with the District by the customer. Such corrections can involve human factors, such as additional training or procedures modifications, as well as physical alterations to the system. Corrections not made in accordance with the timetable shall result in the termination of service by shutting off and locking the meter.
- C. If, in the opinion of the District, the violation constitutes an immediate danger to the public health, then service shall be terminated immediately by shutting off the meter or service and locking it. Service shall be resumed only after the violation has been corrected to the satisfaction of the District.
- D. The customer is to maintain a written log of all system failures and violations, including corrective action taken. The log will be reviewed by the District regularly.

3.06 ADMINISTRATIVE REVIEW

A mandatory administrative review will be conducted to examine customer's irrigation practice if three written violations are issued within a 30-day period. The District and customer or agent is required to present reasons for non-compliance with District Specifications and Regulations. The customer shall present a plan for corrective action acceptable to the District and the regulatory agencies. The accepted plan and implementation schedule shall be adhered to or service may be suspended.

END OF SECTION