RINCON DEL DIABLO MUNICIPAL WATER DISTRICT

New Water Main Chlorination and Bacteriological Testing Protocol (Rev. 01 – October 2026)

1. Purpose and Governing Requirements

This protocol establishes Rincon Del Diablo Municipal Water District (District) requirements for the disinfection, flushing, bacteriological testing, and acceptance of new potable water mains before connection to the active District distribution system.

Work shall comply with applicable law, permit conditions, contract documents, District standards, and the District-approved project plans. The Contractor shall comply with ANSI/AWWA C651, Disinfecting Water Mains, using the edition identified in the contract documents, except where this protocol or other District requirements are more stringent. Where requirements conflict, the most stringent requirement shall govern unless the District provides written direction otherwise.

California regulations require newly constructed water mains to be disinfected and to have negative coliform results before being placed into service. District requirements in this protocol may exceed that minimum regulatory baseline.

2. Planning and Preparation

2.1 Chlorination Plan and Water Source

Before construction, the Contractor shall submit a chlorination and discharge plan for District approval. The plan shall identify the proposed potable water source, temporary piping schematic, backflow protection, chlorine injection point, isolation valves, sample taps, flushing/discharge points, dechlorination measures, anticipated discharge volumes and rates, receiving location, and proposed schedule.

The District shall designate an appropriate potable water source based on proximity, system conditions, and available flow. District Water Operations shall confirm source-flow adequacy before use. A dedicated potable water source location will typically be a fire hydrant or wharf head.

2.2 Water Meter and Backflow Prevention

A dedicated fire-hydrant water meter and a reduced pressure principle backflow prevention assembly (RP assembly) shall be installed at the District-designated source location. The District will install the water meter unless otherwise directed in writing. The Contractor shall furnish, install, rigidly support, and arrange testing of the RP assembly before any connection to the new main. The testing shall be witnessed by an authorized District representative.

The Contractor shall provide a current passing test report prepared by a qualified backflow prevention assembly tester and shall submit the report to the District before water is introduced into the new main. The RP assembly and temporary conveyance system shall be sized and configured to maintain the District-approved filling and flushing flow. The RP assembly shall not be smaller than the District-approved meter outlet/connection configuration.

2.3 Chlorinated Water Discharge Plan

The Contractor shall submit a plan for managing, monitoring, and neutralizing chlorinated-water discharges in accordance with District requirements. The plan shall include anticipated discharge volumes, rates, locations, receiving locations, dechlorination chemicals, BMPs, monitoring, and applicable notifications or authorizations.

If projected discharge exceeds 1.0 acre-foot per day (approximately 325,851 gallons per day), the plan shall specifically address applicable discharge requirements. Regardless of discharge volume, the Contractor shall comply with all applicable federal, State, Regional Water Board, municipal, and District requirements, including any required coverage, monitoring, BMPs, dechlorination, notification, or reporting.

2.4 Potable Water Conveyance Pipe/Hose

The Contractor shall furnish clean hose or PVC piping to convey water from the approved source to the new main. All wetted materials and plumbing components shall be certified to NSF/ANSI/CAN 61, as applicable, for potable-water contact. Standard fire hose is not acceptable.

Temporary conveyance pipe/hose shall be sized to achieve District-approved filling and flushing flows. As a minimum guideline, use not less than 2-inch-diameter temporary conveyance for mains up to 12 inches in diameter; larger mains require District-approved meter and temporary conveyance sizing, typically not less than 4 inches where necessary to achieve required flow.

2.5 Physical Separation and Test Plates

The new main shall not be hydraulically connected to the existing District drinking water system except through the District-approved, RP-protected temporary source connection. Physical separations or test plates shall be installed at all future/final tie-in points. The District Inspector shall confirm the physical separation before testing. Testing against a closed valve is not acceptable.

2.6 Bacteriological Testing Plan

The bacteriological sampling plan shall include a sample set at least every 1,200 feet, one sample set at the end of each line, and at least one sample set from each branch one pipe length or longer, unless otherwise directed in writing by the District. This is a District sampling requirement.

The Contractor shall provide smooth, non-threaded sampling ports no larger than 1/2 inch in diameter, discharging downward, at each District-designated sample location. Hydrants should not be used for sample collection unless specifically approved by the District. A sample set means the samples collected at a single designated sample location during one sampling round.

2.7 Laboratory Testing and Sampling Coordination

If Contractor-selected laboratory services are used, the Contractor shall submit laboratory information, sampler qualifications, laboratory Environmental Laboratory Accreditation Program (ELAP) accreditation, analytical methods, and the proposed chain-of-custody form for District review. The Contractor shall coordinate collection so that the District Inspector can witness sampling. The laboratory shall transmit final results to the District in the District-prescribed format.

If District laboratory services are used, the Contractor shall coordinate sampling with the District Inspector or District staff. The District will coordinate laboratory analysis and communicate results to the Contractor.

2.8 District Notification and Documentation

The Contractor shall provide at least ten working days' notice before pressure testing, chlorination, flushing/dechlorination, pre-sampling retention, and bacteriological sampling. The District will identify sample collection points and provide or approve the sampling plan.

The District Inspector shall use a District-provided form, or equivalent District-approved documentation, to record the tested-main diagram, location and type of sample points, meter serial number and beginning/ending totalizer readings, RP assembly test report, chlorine product and dose, field chlorine residuals, test method/instrument, flushing and discharge information, static-pressure hold observations, sample dates/times, chain of custody, and laboratory results.

3. PRESSURE TESTING

Pressure testing shall be performed in accordance with the District standards and project specifications in effect on the bid date, unless modified by written change order. Combined pressure testing and chlorination may be used only with District pre-approval.

4. CHLORINATION

4.1 Initial Flushing

Before chlorinated water is introduced, the new main shall be thoroughly flushed to remove sediment, construction debris, and stagnant water. Field turbidity and water-temperature measurements may be used as supplemental indicators of flushing adequacy.

4.2 Chlorination Method and Materials

The continuous-feed method of chlorination described in ANSI/AWWA C651 is the only acceptable method unless the District approves an alternative in writing. Tablet chlorination and slug chlorination are not acceptable.

Chlorine may be liquid sodium hypochlorite certified to NSF/ANSI/CAN 60 for potable-water use, or chlorine gas applied through a vacuum-operated chlorinator. Chlorine shall be injected downstream of the RP assembly at a District-approved location that provides adequate mixing and prevents contamination or damage to temporary equipment. Chlorine shall not be introduced at the RP assembly.

4.3 Chlorine Dose and Verification

The new main shall be filled with chlorinated water dosed to achieve 25 to 150 mg/L free chlorine residual at all designated sample points. The Contractor shall ensure chlorinated water reaches all dead ends, branches, and services within the test segment.

The District Inspector shall confirm the required initial free chlorine residual at each designated sample point using a calibrated field instrument or titration method suitable for the concentration range being measured. The Contractor shall provide safe access and all support needed for testing.

The District Inspector shall witness operation of isolation valves within the tested main segment. Valves shall be exercised as directed by the District and left in the District-approved position for chlorination and testing.

4.4 Contact Period and Residual Chlorine Verification

After filling and verification of the initial residual, the tested main shall remain isolated under static pressure for a minimum 24-hour contact period. The temporary source connection may remain connected but shall be valved off and isolated after filling. No unapproved water addition, flow-through, or depressurization is permitted.

After the minimum 24-hour contact period, the District Inspector shall verify a free chlorine residual of at least 10 mg/L at each designated sample point. If the required residual is not present at every designated point, the District shall direct corrective action, which may include repeat chlorination.

5. Bacteriological Water Quality Testing

5.1 Flushing and Dechlorination

After successful residual verification, the Contractor shall flush the chlorinated water from the main in accordance with the District-approved discharge plan. The Contractor shall implement District-approved BMPs and apply dechlorination measures as necessary to prevent environmental harm and comply with applicable discharge requirements.

The District Inspector shall inspect BMPs and verify chlorine residuals during flushing. Before the pre-sampling retention period, flushed-water chlorine residual shall be within the District-approved tolerance of source-water residual and shall not exceed 4 mg/L free chlorine unless the District approves otherwise. Calibrated turbidity measurements may be used to document flushing adequacy and minimize interference with bacteriological results.

5.2 Pre-Sampling Retention

After flushing, the tested main shall remain under static pressure with no flow through the meter for at least 16 hours before sampling. The downstream isolation valve immediately after the RP assembly shall be closed, and the tested main shall remain positively pressurized. The District Inspector shall verify the no-flow condition using meter totalizer readings, pressure observations, or other District-approved means.

The Contractor shall not depressurize the main during disinfection or testing without District authorization. Any unauthorized flow, flushing, or depressurization may require the District to restart the retention period, repeat testing, or require repeat disinfection.

5.3 BACTERIOLOGICAL SAMPLING

After the minimum 16-hour retention period and District verification that no unauthorized water passed through the meter, bacteriological samples may be collected at each designated sample point. Flushing immediately before sampling is prohibited. Unauthorized flushing requires restart of the static-pressure holding period.

Unless the District approves Option A in writing before chlorination begins, sampling shall use the District-approved paired-sample procedure: collect two samples at each sample point at least 15 minutes apart, with the sample tap left running between the paired samples only as directed by the District-approved sampling procedure. The District shall identify the applicable sampling option and any required sampling details before work begins.

5.4 POST-SAMPLING RETENTION

After sampling, the temporary source may be turned on as directed by the District to maintain continuous positive pressure on the tested main. The main shall remain connected to the water meter and RP-protected source, physically isolated from the active distribution system, and maintained under positive pressure until laboratory results are reviewed and accepted by the District.

Only District Water Operations staff may authorize depressurization for the scheduled tie-in. Emergency isolation or depressurization shall be reported to the District immediately and may require repeat disinfection and sampling.

6. SAMPLE RESULTS AND ACCEPTANCE

Before the new main is approved for tie-in, the Contractor shall obtain two consecutive rounds of satisfactory bacteriological results from all District-designated sampling locations, unless the District approves an alternative in writing. In addition to the State minimum requirement for negative coliform results before service, the District requires acceptable total coliform, E. coli, and heterotrophic plate count (HPC) results as stated below.

Samples shall be analyzed by an ELAP-accredited laboratory using District-approved methods for total coliform bacteria, E. coli, and HPC. Results shall be reported as absent/non-detect or below the laboratory method reporting limit, as applicable. Any E. coli detection is unacceptable and requires District-directed corrective action.

Condition	Total Coliform Bacteria	E. coli	HPC	Chlorination	Flushing	Testing
Acceptance: two consecutive passing rounds	Absent/non-detect or <1.0 MPN at all samples	Absent/non-detect at all samples	<500 CFU/mL or method equivalent at all samples	Not required	Not required	No additional testing after second passing round
Elevated HPC only	Passing total coliform results	Absent/non-detect	≥500 CFU/mL or method equivalent at any sample	District determination	Flush affected site(s) as directed	Resample affected site(s) as directed
First round: limited total coliform-positive results	Detection at fewer than 25% of sample locations	Absent/non-detect	Not applicable	District determination	Flush all sites	Repeat all sites
First round: widespread total coliform-positive results	Detection at 25% or more of sample locations	Absent/non-detect	Not applicable	Required	Flush all sites	Repeat all sites
After first round: total coliform detection	Detection at any sample location	Absent/non-detect	Not applicable	Required	Flush all sites	Repeat all sites
Any E. coli detection	Any total coliform result	Detected	Not applicable	Required	Flush all sites	Repeat all sites

The District will determine and document corrective action based on laboratory results, field observations, and probable cause. Corrective action may include investigation, additional flushing, repeat chlorination, repeat sampling, or other measures. An elevated HPC result may be evaluated by the District for site-specific corrective action; it does not automatically establish a need for rechlorination unless directed by the District.

7. TIE-IN

The final tie-in shall occur as soon as practicable after District acceptance and no later than 14 calendar days from the date of collection of the second passing bacteriological sampling round, unless the District approves otherwise in writing. Until tie-in, the main shall remain physically isolated, protected from contamination, and maintained under positive pressure.

If the tie-in occurs more than 14 calendar days after collection of the second passing sampling round, bacteriological testing shall be repeated. The District shall determine whether repeat chlorination is required based on site conditions, maintenance of positive pressure, integrity of isolation, and elapsed time.

8. District Acceptance

The new main shall not be connected to or placed into service in the active District distribution system until the District has reviewed the required documentation and issued acceptance for tie-in. District acceptance does not relieve the Contractor of responsibility for complying with contract requirements, permits, safety requirements, or applicable law.