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RULE NO. R161-26.02

NOTICE OF PROPOSED RULE **POSTING DATE: August 24, 2026**

The Director of Austin Water proposes to adopt the following rule on October 1, 2026.

EFFECTIVE DATE OF PROPOSED RULE

A rule proposed in this notice may not become effective before the effective date established by a separate notice of rule adoption. A notice of rule adoption may not be posted before September 25, 2026, or after November 2, 2026 (the 70th day after the date of this notice).

If a proposed rule is not adopted on or before November 2, 2026, it is automatically withdrawn and cannot be adopted without first posting a new notice of a proposed rule.

REQUEST FOR COMMENTS ON PROPOSED RULES

The City requests comments from the public with respect to the proposed rule included in this Notice. Comments must be submitted in writing to the contact person below no later than September 24, 2026. A summary of the written comments received will be included in the notice of rule adoption that must be posted for the rule to become effective.

Contact Person:

Eric Langhout
Austin Water Department
eric.langhout@austintexas.gov
512-972-0073

TEXT OF PROPOSED RULE

The text of the proposed rule indicating changes from the current text is attached to this notice.

BRIEF EXPLANATION OF PROPOSED RULE

R161-26.02: Proposed revision to UCM Sections 2.5, 2.7, 2.9.2, 2.9.3 & 2.9.4

Rule 1 — Revisions to Utility Criteria Manual Sections 2.5, 2.7, 2.9.2, 2.9.3 & 2.9.4

1. SECTION 2.5.0 — Construction Plan Information and Submittal Requirements - **Section 2.5.1.E.15** - Information about the pressure zone needs to be located in the AW General Notes Sheet.

2. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.A** – Updated/clarified deliverables to be submitted electronically and added language to specify criteria for when a detailed engineering report is required.

3. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.A.1** – Revised the expected service life of lift stations to 50 years to reflect a more accurate and practical operational lifespan.

4. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.A.5** – Language added to instruct applicants of scheduling a pre-submittal meeting, formalizing a requirement not previously stated in the UCM.

5. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.B** – Added language to clarify that the engineering report must be updated concurrently with any updated plans.

6. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.C** – Updated language based on Impact Fee Ordinance, which references the Wastewater Impact Fee Service Area, not ETJ.

7. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.C.1** – Water removed since it does not apply.

8. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.C.1.a** – Language revised to indicate that Submersible non-clog wastewater pumping facilities will be the only type of lift station allowed.

9. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.C.1.b** – AW no longer allows dry wells.

10. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.1.C.2** – Language removed since AW lift stations are within the Wastewater Impact Fee Service Area, not ETJ.

11. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.2** – Revised language for clarity.

12. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.2.A** – Language added to streamline and better organize submittals from applicant.

13. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.3.C, D** – General language clarification.

14. SECTION 2.7.0 — Lift Station Review, Approval, and Acceptance - **Section 2.7.3.F** – Updated deliverables to be submitted electronically.

15. SECTION 2.9.2 — Water System — **Section 2.9.2.B.23** — Add information about Shut-Down Periods for Large Mains.

16. SECTION 2.9.3 — Reclaimed Water Systems — **Section 2.9.3.B.16** — Add information about Shut-Down Periods for Large Mains.

17. SECTION 2.9.3 — Reclaimed Water Systems — **Section 2.9.3.D.2** — Add language that backflow prevention assemblies are required on services supplying reclaimed water to irrigation systems and cooling towers.

18. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J** – Revised vague and obsolete language.

19. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.1.a, b, c, e** – Amended language to align with current terminology. Equations removed since they were previously referenced in 2.9.4.A.

20. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.1.d** – Included MDWF, which is needed to calculate maximum detention time.

21. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.2.a, b, d** – Revised vague language and added clarification to align with current terminology.

22. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.2.e, f** – Calculation method removed to be more conservative.

23. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.2.g**– Language added for wet well aeration system requirement.

24. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.3.a** – Revised vague language and added clarification to align with current terminology.

25. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.4** – Revised vague language and added clarification to align with current terminology.

26. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.6** – Removed suction piping design, which is not used currently.

27. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.7.b** – Language removed to clarify force main velocities.

28. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.7.f** – Alternative measures are implemented to manage sulfide, and there is no longer a need to calculate theoretical sulfide potential.

29. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.8.a** – Hazen Williams coefficients updated to distinguish between PVC/HDPE and Ductile Iron pipe.

30. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.9** – Added language for clarification.

31. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.11,12, 13.g** –Calculations are not needed.

32. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.13** – AW no longer allows wet well/dry well station configurations.

33. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.13.f** – Language updated to include current power costs instead of fixed price.

34. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.14** – AW no longer uses sump pumps.

35. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.a** – Added language for clarification.

36. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.b** – AW no longer allows dry wells.

37. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.c** – AW no longer allows horizontal pump/motors.

38. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.d** – Updated language to reflect approved lift station specifications.

39. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.e** – Lift station design changed to submersible pumps and this section is no longer applicable.

40. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.f** – Anything deeper than 45ft exceeds the limit of the jib crane depth, after which a deep lift would be required.

41. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.g, i** – Lift stations no longer allow dry wells.

42. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.j** – Language updated to reflect TCEQ changes.

43. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.15.l** – Language was added to exclude lift station crews from the responsibility of maintaining drainage easements.

44. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.16.a.2)** – Language updated to add detailed requirements for paved roadways on lift stations.

45. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.16.b.3)** – Language added to clarify requirement for driveway sizing based on a WB-40 design vehicle.

46. SECTION 2.9.4 — Wastewater Systems — **Section 2.9.4.J.16.b.4)** – Language updated to reflect minimum requirement for culvert sizing.

An affordability impact statement regarding the proposed rule is available by contacting Eric Langhout, eric.langhout@austintexas.gov or 512-972-0073.

AUTHORITY FOR ADOPTION OF PROPOSED RULE

The authority and procedure for adoption of a rule to assist in the implementation, administration, or enforcement of a provision of the City Code is provided in City Code Chapter 1-2 (*Adoption of Rules*). The authority to adopt this rule is established in City Code Section 15-9-9 (*Criteria Manuals*).

CERTIFICATION BY CITY ATTORNEY

By signing this Notice of Proposed Rule R16l-26.02, the City Attorney certifies the City Attorney has reviewed the rule and finds that adoption of the rule is a valid exercise of the Director's administrative authority.

REVIEWED AND APPROVED:

Shay Ralls Roalson

Date: 8/7/2026

Shay Ralls Roalson, P.E., Director
Austin Water

Deborah Thomas

Date: 8/11/2026

Deborah Thomas
City Attorney

2.5.0 CONSTRUCTION PLAN INFORMATION AND SUBMITTAL REQUIREMENTS

2.5.1 General

E. All water, reclaimed water, and wastewater plans will include the following items:

1. Engineer's dated signature and seal of a Professional Engineer licensed in the State of Texas on each plan sheet and including the engineering firm name and Texas registration number (Title 22 TAC § 137.33 and § 137.77).
2. Date of Plans and revisions.
3. North arrow and scale must be shown. The standard horizontal scale for plan and profile sheets shall be 1" = 40', 30' or 20' for the plan view. The vertical scale shall be 1" = 4', 3' or 2', respectively. The same scale shall be used on all plan and profile sheets. All Texas Department of Transportation design build projects, Capital Improvement Projects, and General Permit projects shall be 1"=20' horizontal scale for the plan view. For sheets other than plan and profile, horizontal scales of 1" = 40', 30' or 20' may be used as appropriate. Where relevant and applicable, a scale of 1" = 10' for plan views and a scale of 1" = 1', 2', 3', 4', or 5', as needed to fit the area on the page and provide the most clarity for profiles, shall be used for detailed water, reclaimed water, and wastewater connections, designs, utility crossings, and/or special detail drawings. The minimum size for plan and profile sheets shall be 22" × 34". Plan view and associated profile shall appear on the same sheet with the plan view at the top half of the sheet.
4. A general location map, showing MAPSCO and grid numbers.
5. Current standard COA Water and Wastewater construction notes.
6. Indicate on the cover sheet, the subdivision file number and show all required permit numbers such as development permit, Texas Department of Transportation permit, railroad crossing permit, etc.
7. Volume and page number of recorded easement and of any temporary working space.
8. For sites and subdivisions, show GIS numbers of all existing mains and appurtenances. For City-funded, City-reimbursed, and City-cost-participation projects, show GIS numbers for all existing and proposed mains and appurtenances.
9. Property lines and dimensions, legal description, lot and block numbers, right-of-way dimensions, and curb and sidewalk locations and street names.
10. Location, size, and material of all existing and proposed water, reclaimed water, and wastewater mains, lines and services with respect to easements and rights-of-way. Existing and proposed mains 24 inches and larger shall be shown by double lines indicating pipe outside diameter. The direction of flow in the wastewater mains shall be indicated on the drawings. COA record drawings for potable water, wastewater, and reuse water may not be reliable. The Engineer is encouraged to collect subsurface utility data according to American Society of Civil Engineers (ASCE), Standard Guidelines for the Collection and Depiction of Existing Subsurface Utility Data, Standard CI/ASCE 38, latest edition.

11. Location, size, and description of all other existing and proposed infrastructure and improvements within the limits of construction. Existing and proposed utilities 24 inches and larger shall be shown by double lines indicating the outside diameter.
12. Curve data for roads, property lines, water, and reclaimed water lines.
13. Final plat recording or land status report.
14. Street address for all existing structures shall be shown on the lot(s) where the structures are located.
15. Indicate on the AW General Notes Sheet, ~~P~~pressure zone designation for subject tract and zone boundaries where applicable.
16. Where water, wastewater, and/or reclaimed water mains cross each other, details shall be shown to indicate compliance with TCEQ requirements.
17. Typical cross sections showing multiple utilities proposed to be within private streets or easements.
18. An index on the cover sheet or on the 2nd page of the drawings.
19. Construction drawings shall contain Overall Location Maps and Key Maps for any individual water, reclaimed water, or wastewater line that requires three or more plan and profile sheets.
20. Current, applicable City of Austin Standard drawings (modified Standard drawings are not permitted). For Standard drawings in portrait orientation, provide a maximum of 8 detail pages per sheet and adjust the size accordingly to utilize the entire sheet. For Standard drawings in landscape orientation, provide it on a dedicated plan sheet and adjust the size accordingly to utilize the entire sheet. Ensure that all AW details are on dedicated AW detail sheets (not interspersed with details from other departments). Ensure that all Standard drawings are legible and being obtained directly from COA's Municode site.
21. Supplementary drawings in the form of special details, as needed, to clearly and concisely convey the design intent.
22. Inclusion of current version of the Austin Water General Information and Construction Notes Sheet, latest Standard Austin Water Construction Notes, Service Extension Request documentation, meters, fire flow tests, and Reclaimed Water and Onsite Water Reuse System Meter Demand Sheet.

2.7.0 LIFT STATION REVIEW, APPROVAL AND ACCEPTANCE

2.7.1 Engineering Report, Plans and Specifications Review and Approval

A. Prior to design, ~~four (4) copies~~ one electronic copy of a detailed engineering report shall be submitted to Austin Water (AW) for review and approval by Austin Water Facility Engineering (AWFE) of the lift station and all related line work. The report shall be submitted for existing lift stations that need modifications, lift stations that need to be modified while under construction, and for proposed lift stations. The engineering report shall include the following:

1. Justification for the proposed lift station. The report must clearly show that gravity lines are not available and are not economically feasible and that the number of lift stations has been minimized. This justification must include a cost benefit analysis of gravity versus lift station project including ~~30~~ 50 years of operation and maintenance of the proposed system.
2. A master development plan for the service area of the proposed lift station shall be prepared. This plan shall include a map showing the location of the lift station, the service area, the boundaries of the drainage basin it is in and the location of the nearest existing wastewater interceptor within that basin.
3. Engineering calculations and data described in Sections 2.9.4.A and 2.9.4.H shall be contained in the engineering report.
4. The Engineering Report shall be approved by AW***FE*** prior to beginning preparation of the plans and specifications.
5. The Applicant shall visit the AWFE website to schedule a pre-submittal meeting and obtain checklists. The meeting request shall include a copy of the Service Extension Request (SER).

B. During the review process and ~~P~~prior to construction, ~~four (4) complete sets of~~ the plans and specifications shall be submitted to AWFE for review and approval. These plans and specifications shall be prepared, sealed, signed and dated by a Registered Professional Engineer licensed to practice in Texas and shall be in compliance with the approved Engineering Report. The plans and specifications for the lift station shall also include all related line work and a comprehensive site plan including any required access road(s) and easement(s). The engineering report shall be updated concurrently with any plan updates, corrections, and/or revisions to reflect changes in the design.

C. All drawings and specifications for AW lift stations ~~within the City of Austin extra-territorial jurisdiction (ETJ)~~, submitted for review and approval, must demonstrate compliance with current AW Design Criteria and ~~standard~~ AWFE approved lift station specifications. Approval of the lift station plans and specification***s*** does not imply AW will accept the lift station for operation and maintenance (Refer to 2.7.3).

1. Within the ~~Water and~~ Wastewater Impact Fee Service Area, ~~submersible non-clog pump facilities~~ the following type of Lift Stations may be submitted for review and approval:
   a. Submersible ~~or grinder~~ non-clog wastewater pumping facilities ~~with rated horsepower no greater than 25 BHP for the largest pump~~.
   ~~b. For installation with a required rated horsepower motor greater than 25 BHP AW prefers wet/dry well type installation. However, submersible non-clog pump facilities with a rated horsepower of between 25 BHP and 50 BHP may be considered on a case-by-case basis.~~

~~The Engineer must submit cost comparisons for submersible versus wet/dry well installations. The cost comparison should include initial station costs, pump replacement costs, installation costs and all operational and maintenance cost including energy costs over the life of the station. The comparison should assume a typical service life for submersible pumps.~~

~~2. Within the City of Austin ETJ but outside the AW Impact Fee Service Area, submersible non-clog pump facilities with a rated horsepower of 25 to 50 BHP may be considered on a case-by-case basis.~~

Source: Rule No. R161-17.15, 8-23-2017; Rule No. R161-22.09, 8-8-2022.

2.7.2 Submittal and Shop Drawing Review

Once the engineering report, ~~drawings~~ plans, and specifications have been approved, ~~at least four (4)~~ the Applicant shall transmit electronic copies of complete sets of submittals and shop drawings ~~shall be provided to the Facility Engineering Division of~~ to AWFE. These submittals shall contain complete detailed information and drawings for all lift station equipment and components. The following is required of all submittals and shop drawings:

A. The Applicant shall maintain an electronic submittal log which is updated weekly and shared with AWFE until review of all applicable documents is complete.

Source: Rule No. R161-17.15, 8-23-2017.

2.7.3 City Operation and Maintenance Acceptance

The City of Austin may accept a lift station with a firm pumping capacity greater than 25 gpm for operation and maintenance provided the following conditions are met:

A. The station is located within the City's approved wastewater service area and impact fee area.

B. The City has inspected the lift station and determined that it is constructed in conformance to the City's requirements. Any lift station not conforming to AW standards shall be upgraded to AW standards before the City of Austin will accept the lift stations for operation and maintenance.

C. The owner or ~~his~~ their representative has provided all information requested in Sections 2.7.1 and 2.7.2 above, ~~five (5)~~ complete set~~s~~ of all Operations and Maintenance Manuals for all equipment installed and has received AW's approval.

D. The owner has granted the City a wastewater easement for the lift station and access road, including the construction of the lift station and access road. A copy of the recorded easement plat, legal description and any other legal documents granting the easement shall be delivered to AW prior to plan approval. The easement shall extend to at least five (5) feet outside the lift station fence and shall include access road with turn-around areas that extend back to paved public right-of-way. This easement shall be separate and in addition to any necessary pipeline easement.

If the lift station is to become a permanent installation, transfer of ownership and title to the land may be required by the Director of AW prior to acceptance of the station for operation and maintenance.

E. A letter of assignment has been written to the City from the owner transferring title of the lift station and related equipment to the City of Austin. This letter shall be delivered to AW before acceptance of the lift station for operation and maintenance. The original owner may regain title to a temporary lift station that was designed and constructed entirely at his expense and for which no refund was made by the City. After written notification by the City that the lift station has been abandoned, the original owner has one (1) month to notify the City in writing of his intent to regain title to the lift station.

F. One (1) complete set of ~~reproducible Mylar of the~~ as-built drawings, including one (1) paper and six (6) thumb drive copies ~~and a copy of the file on disk(s)~~ in an electronic format as specified by AWFE ~~Facility Engineering~~ shall also be provided to AW prior to acceptance of the lift station for operation and maintenance.

Source: Rule No. R161-17.15, 8-23-2017.

2.9.2 Water Systems

B. Mains

23. Shutout Periods for Water Transmission Mains

If a shutout is required for a connection to or relocation of an existing water transmission main (typically 24-inch and larger in diameter), the Engineer shall coordinate with the AW Project Sponsor and/or AW Plan Reviewer to discuss the shutout procedure and determine if any additional requirements need to be incorporated into the plans. If AW determines that a concurrence process is required prior to shutting out a transmission main, the Engineer shall make provisions within the construction plans (including drawings) to notify the contractor that these shutouts are typically only allowed during the fall or winter (generally, from October 1 to March 31). Projects will be reviewed on a case-by-case basis.

The plans shall include maps highlighting the shutout limits and include a list of all valves to be closed. Double-valve shutout limits should be shown if the shutout involves butterfly valves. If necessary, waterlines should be color coded to indicate different pressure zones. Drawings shall also contain the following notes for the contractor to adhere to during construction:

a. Shutout of Waterline {fill in blank} will require prior approval via the AW concurrence process prior to shutting off water. Isolation of this waterline is typically only allowed during the fall or winter (generally, from October 1 to March 31).

b. COA inspector shall submit a shutout request to AWValveExercising@austintexas.gov six or more weeks before desired schedule for the subject shutout.

c. No shutout will proceed until the contractor is fully prepared to perform work related to the shutout, i.e., all required material, equipment, and labor are on site.

d. Reference sheets {fill in blank} for shutout limits.

2.9.3 Reclaimed Water Systems

B. Mains

16. Shutout Periods for Reclaimed Water Transmission Mains

If a shutout is required for a connection to or relocation of an existing reclaimed water transmission main, the Engineer shall coordinate with the AW Project Sponsor and/or AW Plan Reviewer to discuss the shutout procedure and determine if any additional requirements need to be incorporated into the plans. If AW determines that a concurrence process is required prior to shutting out a reclaimed transmission main, the Engineer shall make provisions within the construction plans (including drawings) to notify the contractor that these shutouts are typically only allowed during the fall or winter (generally, from October 1 to March 31). Projects will be reviewed on a case-by-case basis.

The plans shall include maps highlighting the shutout limits and include a list of all valves to be closed. Double-valve shutout limits should be shown if the shutout involves butterfly valves. If necessary, waterlines should be color coded to indicate different pressure zones. Drawings shall also contain the following notes for the contractor to adhere to during construction:

a. Shutout of Reclaimed Waterline {fill in blank} will require prior approval via the AW concurrence process prior to shutting off reclaimed water. Isolation of this reclaimed waterline is typically only allowed during the fall or winter (generally, from October 1 to March 31).

b. COA inspector shall submit a shutout request to AWValveExercising@austintexas.gov six or more weeks before desired schedule for the subject shutout.

c. No shutout will proceed until the contractor is fully prepared to perform work related to the shutout, i.e., all required material, equipment, and labor are on site.

d. Reference sheets {fill in blank} for shutout limits.

D. Services

1. Reclaimed water services shall be in accordance with COA Standard Details.

2. The plans shall show the locations of private backflow prevention assemblies, which are required on services supplying reclaimed water to irrigation systems and cooling towers.

2.9.4 Wastewater Systems

J. Lift Stations (Excluding ~~low pressure~~ alternative collection systems).

Lift stations ~~are discouraged and~~ will be allowed only where conventional gravity service is not feasible and a cost-benefit analysis indicates ~~(~~Lift Station installation cost plus the expected life-span O&M expense is less than installation cost for gravity systems~~)~~. This subsection details the specific design criteria for wastewater lift stations proposed for immediate or future AW ~~City~~ operation and maintenance ~~within the City of Austin or its approved wastewater service area ETJ~~. Additional requirements for individual lift stations may be imposed by the Director of AW or ~~his~~ their designee as conditions warrant.

In addition to these criteria, all lift stations must meet TCEQ rules and AW Submersible ~~Wastewater~~ Lift Station ~~General~~ Specifications.

1. Flow Development.

Calculation of wastewater flow shall be done in accordance with Section 2.9.4.A. The following calculations shall be included:

a. ~~Maximum~~ Peak Wet Weather Flow (PWWF ~~Design Flow~~).

This flow is used to determine the lift station design capacity. All lift stations shall be designed to handle the ~~maximum~~ peak wet weather flow for its service area.

~~Equation:~~

~~(Population of service area × 70 gallons per capita per day (gpcd) × maximum flow peaking factor) + (750 gallons per acre served).~~

b. ~~Maximum~~ Peak Dry Weather Flow (PDWF).

This flow is used to determine pipe size in the collection system.

~~Equation:~~

~~(Population of service area) × (70 gpcd) × (maximum flow peaking factor)~~

c. Average Dry Weather Flow (ADWF).

This is the flow developed without the maximum flow peaking factor. This flow is used to determine the average detention time in the wet well.

~~Equation:~~

~~(Population of service area) × (70 gpcd)~~

d. Minimum Dry Weather Flow (MDWF).

This flow is used to determine the maximum detention time in the wet well.

Equation:

(Population of service area) × (70 gpcd) × (minimum flow peaking factor)

$MDWF = ADWF \times (0.2 \times (0.0144 \times ADWF^{0.198}))$

e. A minimum of 2 pumps shall be required for all lift stations. The capacity of the pumps shall be such that the ~~maximum~~ peak wet weather flow can be handled with the largest pump out of service.

2. Wet Well Design.

a. The bottom of the wet well shall have a minimum slope to the intake of 2 vertical to 1 horizontal with a smooth concrete surface, or 1 vertical to 1 horizontal with an ~~slick~~ epoxy-coated surface per SPL WW-511. There shall be no projections in the wet well, which would allow deposition of solids.

b. The wet well volume shall be sized to provide adequate storage volume at peak design flows and a pump cycle time of sufficient duration to prevent pump short cycling and consequential motor damage. Pump cycle time, defined as the sum of "pump off" time plus "pump on" time, shall be as follows:

Motor H.P.	θ Min (Minimum Cycle Time in Minutes)
2 to 50	10
51 to 75	15
76 to 250	30
251 to 1,500	45

Volume between "all pumps on" and "all pumps off" elevation of the primary controls (of the pump cycle) shall be determined by the following criteria:

$$V = \frac{\theta q}{4}$$

Where: q = pump capacity in gpm and θ is the minimum cycle time in minutes

c. All "pump on" levels shall have a minimum separation of 1 foot between levels. All "pump off" levels shall be at least 6 inches above the top of the pump casing. For more than 2 pumps, the "pump off" levels shall be staged with a minimum separation of 1 foot between levels.

d. An example of a 2-pump staging sequence follows:

Influent elevation

High-level alarm

Pump 2 (Lag) backup

Pump 1 (Lead) backup

Pump 2 (Lag) ~~Lag~~ pump on

Pump 1 (Lead) ~~Lead~~ pump on

Pump 2 (Lag) ~~Lag~~ pump off

Pump 1 (Lead) ~~Lead~~ pump off

Top of pump casing

Low-level alarm

The high level alarm shall be at least 1 foot above the last (highest) "pump on" level in the wet well and also at least 1 foot below the flow line of the lowest influent line into the wet well.

~~e. For lift stations with 3 pumps or more, the following method for calculating the wet well volume may be used:~~

$$V = \frac{\theta \times q_1}{4}$$

~~and K = (q 1 - q 2) ÷ q 1~~

~~V2 = V' × N × V 1~~

~~Where:~~

~~V 1 = working volume for the first pump in gallons~~

~~θ = minimum cycle time in minutes~~

~~Q 1 = capacity of the first pump in gpm~~

~~Q 2 = capacity of the second pump in gpm~~

~~K = the ratio of the discharge increment to the discharge of the first pump, dimensionless~~

~~V 2 = working volume for the second pump gallons~~

~~V' = the ratio of additional draw down volume to the volume for one pump, dimensionless~~

~~N = number of pumps~~

~~1) Calculate V1 and K;~~

~~2) Locate K on Table 1 and read the corresponding value for V');~~

~~3) then calculate V2.~~

~~f. An example of a 3-pump starting sequence is as follows:~~

~~High-level alarm~~

~~Third pump on~~

~~Second pump on~~

~~First pump on~~

~~Third pump off~~

~~Second pump off~~

~~First pump off~~

~~Low Level alarm~~

~~For the location of the high-level alarm, refer to the example of a two-pump starting sequence.~~

TABLE 1: V' values Corresponding to various K Values

K	V'	K	V'	K	V'
0.00	0.00	2.10	1.36	3.49	2.63
0.33	0.00	2.13	1.39	3.53	2.67
0.44	0.01	2.17	1.42	3.57	2.70
0.53	0.04	2.20	1.45	3.61	2.74
0.62	0.08	2.23	1.49	3.65	2.77
0.70	0.12	2.27	1.52	3.69	2.81
0.77	0.16	2.30	1.55	3.73	2.85
0.84	0.21	2.34	1.58	3.77	2.88
0.90	0.25	2.37	1.62	3.81	2.92
0.96	0.29	2.41	1.65	3.85	2.96
1.02	0.34	2.45	1.68	3.89	3.00
1.07	0.38	2.48	1.71	3.93	3.03
1.12	0.42	2.52	1.75	3.97	3.07
1.17	0.46	2.55	1.78	4.01	3.11
1.22	0.51	2.59	1.81	4.05	3.15
1.26	0.55	2.62	1.84	4.09	3.18
1.30	0.59	2.66	1.88	4.13	3.22
1.34	0.63	2.70	1.91	4.17	3.26
1.38	0.66	2.73	1.94	4.21	3.30
1.42	0.70	2.77	1.97	4.25	3.34
1.46	0.74	2.81	2.01	4.29	3.38
1.50	0.78	2.84	2.04	4.33	3.42
1.54	0.81	2.88	2.07	4.38	3.45
1.57	0.85	2.92	2.11	4.42	3.49
1.61	0.89	2.95	2.14	4.46	3.53
1.65	0.92	2.99	2.18	4.50	3.57
1.68	0.96	3.03	2.21	4.54	3.61
1.72	0.99	3.07	2.24	4.58	3.65
1.75	1.03	3.10	2.28	4.63	3.69
1.79	1.06	3.14	2.31	4.67	3.73
1.82	1.09	3.18	2.35	4.71	3.77
1.86	1.13	3.22	2.38	4.75	3.81
1.89	1.16	3.26	2.42	4.79	3.85
1.92	1.19	3.29	2.45	4.84	3.89
1.96	1.23	3.33	2.49	4.88	3.93
1.99	1.26	3.37	2.52	4.92	3.97
2.03	1.29	3.41	2.56	4.96	4.01
2.06	1.33	3.45	2.59	5.01	4.05

K = Pump discharge (Dimensionless) V' = Volume (Dimensionless) Source: ALBERT PINCINE

e. A wet well aeration system shall be installed on all new lift stations as well as existing lift stations which are modified.

3. Wet Well Detention Time.

a. Calculate the detention time (Td) in the wet well for ~~the~~ three flow scenarios including ~~maximum~~ peak wet weather flow, ~~maximum~~ peak dry weather flow, and average dry weather flow using the following equation:

$T_d = t_f + t_e$

Where:

T_f = (v) ÷ (i) = time to fill the wet well in minutes

T_e = (v) ÷ (q - i) = time to empty the wet well in minutes

v = Volume of wet well between "all pumps on" and "all pumps off" elevation of the primary controls in gallons

q = Pumping capacity in gpm

i = flow into the station corresponding to the ~~maximum~~ peak wet weather flow, ~~maximum~~ peak dry weather flow or average dry weather flow in gpm.

b. Maximum detention time shall be calculated with i = minimum dry weather flow.

c. Odor control shall be provided for the wet well if the total detention time in the wet well and force main system exceeds 180 minutes.

4. Static Head.

The static head shall be calculated for "high level alarm" and "low level alarm" ~~"pump on" and "pump off"~~ elevations in the wet well.

5. Net Positive Suction Head.

The net positive suction head (NPSH) required by the pump selected shall be compared with the NPSH available in the system at the eye of the impeller. The engineer shall consult the pump manufacturer for the NPSH required values for that pump and compare them with calculated values for the NPSH available. The NPSH available should be greater than the NPSH required for a flooded suction pump. The following equation may be used for calculating the NPSH available:

$NPSH_A = P_B + H_s - P_v - Hf_s$

Where:

P_B = barometric pressure in feet absolute,

H_s = minimum static suction head in feet,

P_v = vapor pressure of liquid in feet absolute,

Hf_s = friction loss in suction in feet.

For lift stations in Austin's service area a barometric pressure of 33.4 feet may be used and a vapor pressure of 1.4 feet may be used. These values are based on the following assumptions: An

altitude of 500 feet above sea level, a water temperature of 85ºF and a specific gravity of water of 0.996 at 85ºF.

~~6. Suction Piping Design.~~

~~a. All suction piping shall be flanged ductile iron and have a minimum diameter of 4 inches. Each pump shall have a separate suction pipe.~~

~~b. Suction piping shall have a velocity of 3 to 5 fps.~~

~~c. All suction pipes inside the wet well shall be equipped with a flare type, down-turned intake. The distance between the bottom of the flare and the floor of the wet well shall be between D/3 and D/2 where D is the diameter of the flare inlet.~~

6~~7~~. Force Main Design.

a. All force main pipe and fittings outside the lift station site shall be high density polyethylene (HDPE) except where HDPE components of the required size, pressure class, or configuration are not available. In those cases, alternative materials will be considered, subject to AW approval. Flexible fittings shall be provided at the exit wall.

b. Force mains shall be a minimum of 4 inches in diameter and sized so that the flow velocity is between 3 and 6 feet per second ~~at initial and ultimate development. Initially, the force main shall be sized so the flow velocity is at least 3 feet per second and less than 4 feet per second for the most efficient operations~~. Velocities above 4 feet per second will be reviewed/approved on a case-by-case basis. The pump size may need to be increased above the minimum size pump in order to meet the minimum flow rate in the force main. ~~During initial development phases for lift stations with 3 or more pumps, flow velocities may be as low as 2.5 feet per second with one pump running.~~

c. The maximum time required to flush the force main shall be calculated on the basis of average dry weather flow. Flush time shall be calculated for average dry weather flow using the following equations:

$$T_{flush} = (t_f + t_e) \times \frac{\text{(Force Main Length)}}{(\theta/2)\ (V_{fm})\ (60\ \text{sec/min})}$$

Where:

*See Section 2.9.4.J.3.a, "Wet Well Detention Time", for an explanation of v and q.

d. Odor and corrosion control shall be provided for the force main if the force main detention time exceeds 30 minutes if dual force mains are not feasible.

e. Location and size of all combination air valves shall be evaluated for odor or nuisance potential to adjacent property by the design engineer.

~~f. Sulfide Generation Potential.~~

~~Lift station/force main systems shall be evaluated for their sulfide generation potential and their ability to achieve scouring velocities during average dry weather flow periods. If the evaluation indicates that sulfide concentration of greater than two (2) ppm and solids deposition are likely, the design shall:~~

~~1) Define a workable sulfide control technique that will minimize sulfide formation in the force main,~~

~~2) Include "pig" launching stations and recovery points to allow cleaning of the force main, and~~

~~3) Protect the gravity main and manholes downstream of the force main from corrosion. The length of pipe to be protected shall be determined on a case-by-case basis.~~

f~~g.~~ The force main shall discharge into its own distinct polymer manhole. (i.e. multiple force mains shall not discharge into a single manhole.)

g~~h.~~ Thrust restraint when required shall be shown on the plan view.

h~~i.~~ All HDPE-pipe-to-HDPE-pipe and HDPE-pipe-to-HDPE-fitting connections shall be fused.

i~~j.~~ HDPE MJ adaptors per AW SPL WW-706A shall be used to join HDPE pipe to valves and ductile iron fittings. HDPE flange adaptors may be used only on a case-by-case basis and with pre-approval by AW.

j~~k.~~ Anchors to control thermal thrust forces and Poisson Effects forces shall be specified at locations where HDPE force mains discharge into manholes, gravity wastewater pipes or under any similar circumstances where excessive movement of gasketed joints at or beyond the end of the fused HDPE pipe could occur. The anchors shall be designed using accepted engineering practice and assuming a Poisson's Ratio of 0.35, the thermal coefficient of expansion of PE is 1 x 10^{-4} in/in/°F, the apparent elastic modulus is 55,000 psi, and the temperature change is 40°F. The anchor shall be located on the HDPE pipe as close as possible to the end of the fused pipe.

k~~l.~~ Where force mains transition from HDPE pipe to a different pipe material (ductile iron pipe, PVC pipe, etc.), the HDPE pipe segments shall be designed to undergo hydrostatic testing separately from the segments of different pipe material by way of isolation valves or other means.

l~~m~~. Valves (plug valves for isolation purposes).

A force main shall have valves spaced at no more than 2,000-foot intervals to facilitate initial testing and subsequent maintenance and repairs. Valves shall be plug valves in compliance with SPL WW-703.

7~~8.~~ Head Loss Curves.

a. Data points for the system capacity curve shall be provided in tabular form and graphed with pump head capacity curve on the same graph. Two system capacity curves shall be plotted for the force main. Ductile Iron pipe shall use the Hazen Williams coefficient values of C = 100 and C = 140. PVC and HDPE force mains shall be plotted using the Hazen Williams coefficient values of C = 130 and C = 150.

b. Pump output in gpm at maximum and minimum head shall be clearly shown on the system curve for each pump and combination of pumps.

c. For stations with two (2) or more pumps operating in parallel, multiple and single operation points shall be plotted on the system curve.

d. Pumps with the highest efficiencies at all operating points shall be used.

e. If pumps are equipped with smaller impellers during start up to handle lower than design flows, impellers sized to handle the design flow shall also be provided.

8~~9~~. Buoyancy Calculations.

The lift station design shall include a complete analysis of buoyant forces on the entire lift station structure including the wet well and valve vault.

9~~10~~. Water Hammer.

a. Calculations for water hammer showing maximum pressures, which would occur upon total power failure while pumping, shall be provided using the following equations.

$$p = \frac{(a)(V)}{(2.31)(g)} + \text{operating pressure of pipe (psi)}$$

$$a = 12 \div \left\{ \frac{w}{g} \left[\frac{1}{k} + \frac{d}{Et} \right] \right\}^{0.5}$$

Where:

p = water hammer pressure (psi)

a = pressure wave velocity (ft/s)

w = specific weight of water (62.4 lb/ft^3)

g = acceleration of gravity (32.2 ft/s^2)

k = bulk modulus of water (300,000 psi)

d = inside diameter of pipe (in)

E = Young's modulus of pipe (psi)

t = pipe wall thickness (in)

v = flow velocity in pipe (ft/s)

Surge control measures shall be provided when pressures, including those due to water hammer, exceed the pressure rating of the pipe.

~~11. Suction Specific Speed.~~

~~Suction specific speed of the pumps shall be calculated using the following formula:~~

~~$SSS = \Omega(Q)^{.5}/(H)^{.75}$~~

~~Where:~~

~~SSS = suction specific speed (rpm)~~

~~Q = flow at the best efficiency point, gallons per minute (gpm)~~

~~H = net positive suction head required at maximum impeller speed (feet)~~

~~Q = speed of pump and motor in rpm~~

~~Suction specific speed should be below 9,000 rpm to ensure that the pump will not cavitate because of internal recirculation.~~

~~12. Stiffness Ratio.~~

~~In order to ensure that the pump shaft does not bend an excessive amount, the engineer shall calculate the stiffness ratio of the shaft using the following equation:~~

~~Stiffness Ratio = L^3/D^4~~

~~where:~~

~~L = distance from impeller centerline to the centerline of the inboard bearing (inches)~~

~~D = diameter of shaft (inches)~~

~~The stiffness ratio shall not exceed 60.~~

10~~13~~. Energy Calculations.

~~For lift stations with flows exceeding 75 gpm but less than 1,000 gpm, and if the engineer is considering a submersible type lift station as an option then the engineer shall submit cost comparisons for submersible stations versus wet well/dry well stations. These cost comparisons should include the initial station costs, installation costs and power costs for the life of the station.~~

Energy costs for each type station shall be calculated using the following equations:

a. Calculate the water horsepower required.

$$P = \frac{(Q)(h)(8.34\ lb/gal)}{33{,}000\ ft\text{-}lb\ min/hp}$$

where:

P = water horsepower (hp)

Q = flow, gallons per minute (gpm)

h = head, feet (ft)

b. Calculate the brake horsepower required.

$$Bhp = \frac{P}{pump\ efficiency^*}$$

where: Bhp = brake horsepower (hp)
P = water horsepower (hp)

* Use the most efficient pumps for the application.

c. Calculate the electrical horsepower required.

$$Ehp = \frac{Bhp}{\text{motor efficiency}}$$

where: Ehp = electrical horsepower (hp)
Bhp = brake horsepower (hp)

Use the most efficient motors for the application.

d. Calculate the power required in kilowatts.

EkW=(Ehp)(0.746 Kw/hp)

e. Calculate daily power consumption in kilowatt-hours.

$E = [(EKW_1)(t_1) + (EKW_2)(t_2) + (E\ KW_3)(t_3)...]$

where: E = total power consumption, kilowatt hours (kWh) per day
EkW^n = power required, kilowatts for pumps 1,2,...,n
t^n = estimated pump run time in hours per day for pumps 1,2,...,n

f. Calculate the estimated cost for power consumption over the life of the station.

C = (E)(power cost~~$0.06~~/kWh)(T)

where:

C = cost of power over the life of the station (dollars)

E = power consumption (kilowatt-hour per day - kWh/day)

T = time the station is expected to be in service (days)

~~g. Stress and thrust calculations for internal station piping and bends shall be provided for stations with flows over 1,000 gpm.~~

~~14. Sump Design.~~

~~The following items apply for lift station dry well sump pumps:~~

~~a. Dual submersible sump pumps, each with a minimum capacity of 1,000 gallons per hour (gph), shall be provided.~~

~~b. The design head of the sump pumps should be the static head from the sump to one foot above the hundred-year flood level plus allowances for pipe friction both inside and outside the pump chamber.~~

~~c. Sump piping shall be galvanized steel with a minimum diameter of two (2) inches.~~

~~d. Sump discharge from the dry well shall be installed through the wall of the wet well at a point not less than 12 inches above the top of the influent pipe and grouted in place with a watertight seal.~~

~~e. The dry well floor shall slope toward the sump pit.~~

11~~15~~. Specific Station Requirements.

a. All stations will be required to have ~~an equipment-lifting device~~ a jib crane.

~~b. Engineering calculations are required showing that temperatures inside the dry well do not exceed 85°F, while the pumps are operating.~~

~~c. Stations with motors greater than 100 hp shall use a horizontal pump/motor configuration.~~

b~~d.~~ Stations with motors 50~~75~~ hp and larger shall have reduced voltage ~~starters of the~~ auto transformer or solid-state soft start type. Part winding starters and motors are not acceptable. ~~Motors larger than 75 hp shall be designed with a maximum temperature rise not to exceed 80°C over a 40°C ambient temperature. Motors larger than 300 hp may require a higher temperature rise and may be specifically approved with such.~~

~~e. Motors 75 hp and smaller shall be provided with high efficiency frames. Maximum temperature rise shall not exceed 90°C over a 40°C ambient temperature.~~

c~~f.~~ Submersible lift s~~S~~tations deeper than 45~~30~~ feet, measured from the finished floor to the top of the wet well lid ~~entrance tube~~, will not be allowed. ~~shall require an electrically powered personnel lift.~~

~~g. Entrance hatches larger than 40 inches in diameter shall be spring loaded.~~

d~~h.~~ Valves higher than six (6) feet above the floor shall have chain operators.

~~i. Any potable water supply below the overflow elevation of the wet well shall be protected by an air gap.~~

e~~j.~~ All lift stations must have a back-up power source~~. Looped service from two (2) different substations is adequate backup power. If a back-up electric system is not feasible, a diesel generator may be located on the lift station site instead.~~ Natural gas shall be the primary fuel source on the lift station site to support refueling operations during adverse weather conditions. Diesel-fueled generators will only be considered acceptable on a case-by-case basis. Generator shall be equipped with noise and air pollution control devices.

f~~k.~~ Flow monitoring will be provided for all lift stations.

g. No drainage easement, detention pond, or water quality pond shall be located within the lift station site and easement.

12~~16~~. All-weather access roadway.

a. General.

1) An access road shall be designed and constructed within an established access easement that connects a lift station facility to a paved public roadway.

2) Roadways shall have a concrete or asphalt concrete pavement as the roadway's surface. The permanent pavement shall be in place prior to final acceptance of the lift station by the City.

b. Design.

1) Roadway shall have a longitudinal slope not to exceed 15%, a minimum transverse slope of 2%, no vertical grade break greater than 12%, no vertical curve greater than 1% per horizontal foot, a centerline radius of no less than 50 feet, a minimum width of 12 feet.

2) Road base material and sub-base material as recommended by Geotechnical Report for the site specific soil and load conditions.

3) ~~Roadway shall include a means for equipment to turn around.~~ The roadway adjacent to the lift station will be reviewed on a case-by-case basis, but in general shall provide sufficient space and geometry to allow a WB-40 design vehicle to enter, position off the public roadway, and exit without requiring external traffic control. Full-circle turnaround within the lift station property is not required; alternative configurations such as hammerhead or T-turns are acceptable if verified by swept-path analysis.

4) Culverts, where required, shall be minimum of ~~12~~18 inches in diameter. Culvert lengths shall reach to the toe of the fill without changing the side slope of the fill.

c. Easements.

1) Easements for access roadways shall be a minimum of 25 feet wide with the roadway centered on the easement. Narrower easements will be considered where the Engineer provides evidence, to the satisfaction of AW, that maintenance activities will not be hindered by the reduced width.

2) Easement documents and the metes and bounds shall be reviewed and approved by AW UDS - Pipeline Engineering prior to recordation in the real property records of the appropriate county. Easement recordation in the real property records of the appropriate county is required prior to AW approval of construction plans.

13~~17~~. Wastewater Lift Station Specifications.

In addition to the design criteria presented in this document, AW has "Wastewater Lift Station General Specifications and Drawings". These documents delineate minimum City requirements as they relate to the construction and installation of wastewater lift stations. Copies of these documents are available and can be obtained from AW.

14~~18~~. Alternate Wastewater Systems.

a. General.

Low-pressure wastewater systems are discouraged and will be allowed only where conventional gravity service is not possible. For the purpose of these criteria, low-pressure sewer service is defined as private grinder pump facilities or private septic tank effluent pump facilities that do not convert to gravity flow at or prior to the property line. There shall be no more than one grinder pump facility per single family or duplex residential lot. Each grinder pump shall discharge to a gravity flow system. Grinder pump facilities for commercial establishments, Public Utility Districts (PUD), Municipal Utility Districts (MUD), Water Control and Improvement Districts (WCID) or condominiums will be considered on a case-by-case basis.

The distance for each grinder pump from the property line to the gravity main shall not exceed 200 feet.

Flows may be calculated using the Lift Station Design Criteria disregarding the Infiltration/Inflow flow component.

If the above criteria are applicable and a low-pressure wastewater service is necessary, AW will be responsible for maintaining the portion within the right-of-way only.

Design and installation of the property owner's pumping system, as well as all associated plumbing shall be reviewed, approved and inspected by the City of Austin. The system shall be designed as a complete system including all connections, pumps, etc. for lots being served by the system. If the above criteria are not applicable, refer to Lift Station design criteria.

b. Connection to Gravity Main.

Each grinder pump facility shall be individually tied into a manhole on the existing gravity sewer or an existing force main. If a manhole does not exist, one shall be constructed. Construction costs and all other associated costs shall be the responsibility of the property owner.

The connection to the gravity main shall be designed to minimize turbulence and the release of hydrogen sulfide. The discharge point shall be at or below the springline of the gravity main.

c. Cleanout and Valve Assemblies.

A cleanout and corrosion resistant eccentric plug valve shall be placed just inside of the right-of-way where City maintenance begins and private maintenance ends. This cleanout will allow the property owner's system to be isolated and the City's portion of the system to be pressurized, flushed or rodded.

Cleanouts and corrosion resistant eccentric plug valves shall also be installed at bends of 45 degrees and greater. All fittings, valves and bends shall be at least two (2) inches in diameter and all bends, tees, and wyes with a change of direction of 45 degrees or greater shall be made up of sweeping or long radius components. Force Mains shall not include any pipe with a diameter smaller than 1&half inches.

Refer to applicable standard Detail(s) in the City of Austin Standards Manual.

d. Separation Requirements.

The separation between low-pressure sewer lines and waterlines shall comply with City of Austin Standard Specifications and all other applicable rules and regulations.

e. Grinder Pump System General Specifications and Drawings.

In addition to the design criteria presented in this document, AW maintains "Grinder Pump System General Specifications and Drawings." These documents delineate minimum City requirements as they relate to the construction and installation of grinder pump systems. Copies of these documents are available and can be obtained from AW.

Source: Rule No. R161-17.08, 5-31-2017; Rule No. R161-17.16, 8-23-2017; Rule No. R161-18.02, 3-2-2018; Rule No. R161-18.04, 6-1-2018; Rule No. R161-18.14, 9-14-2018; Rule No. R161-19.18, 11-13-2019; Rule No. R161-20.11, 8-14-2020; Rule No. R161-22.03, 2-14-2022; Rule No. R161-22.09, 8-8-2022; Rule No. R161-23.07, 2-24-2023; Rule No. R161-23.13, 8-10-2023; Rule No. R161-24.02, 5-8-2024.