

**BEFORE
THE TENNESSEE PUBLIC UTILITY COMMISSION**

)
)
PETITION OF LIMESTONE WATER)
UTILITY OPERATING COMPANY,)
LLC TO INCREASE CHARGES, FEES)
AND RATES AND FOR APPROVAL)
OF A GENERAL RATE INCREASE)
AND CONSOLIDATED RATES)
[PHASE 2 INCREASE])
)
)

Docket No. 24-00044

**DIRECT TESTIMONY
of
WILLIAM H. NOVAK**

**ON BEHALF OF
THE CONSUMER ADVOCATE DIVISION
OF THE
OFFICE OF THE TENNESSEE ATTORNEY GENERAL**

March 26, 2026

TABLE OF CONTENTS

	<u>Page</u>
I. PHASE 1 RATE DESIGN.....	3
II. LIMESTONE PROPOSED PHASE 2 RATE DESIGN.....	8
III. PHASE 2 RATE DESIGN RECOMMENDATIONS	14

ATTACHMENTS

Attachment WHN-1	Commission Staff Tariff Approval Letter
Attachment WHN-2	Equivalent Residential Unit (ERU) Reference Table
Attachment WHN-3	WHN Rate Design Calculations

1 **Q1. PLEASE STATE YOUR NAME, BUSINESS ADDRESS AND**
2 **OCCUPATION FOR THE RECORD.**

3 A1. My name is William H. Novak. My business address is 19 Morning Arbor Place,
4 The Woodlands, TX, 77381. I am the President of WHN Consulting, a utility
5 consulting and expert witness services company.¹

6

7 **Q2. ARE YOU THE SAME WILLIAM H. NOVAK THAT PREVIOUSLY**
8 **ENTERED TESTIMONY IN THIS DOCKET?**

9 A2. Yes.

10

11 **Q3. ON WHOSE BEHALF ARE YOU TESTIFYING IN THIS PROCEEDING?**

12 A3. I am testifying on behalf of the Consumer Advocate Division (“Consumer
13 Advocate” or “CA”) of the Office of the Tennessee Attorney General.

14

15 **Q4. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN PHASE 2 OF THIS**
16 **PROCEEDING?**

17 A4. My testimony will support and address the Consumer Advocate’s positions and
18 concerns with respect to Limestone Utility Operating Company, LLC’s
19 (“Limestone” or “the Company”) proposed Phase 2 rate design. Specifically, I
20 will address the following:

21 i. The Commission’s Phase 1 rate design.

22 ii. Limestone’s proposed rate design for Phase 2 of this proceeding.

¹ State of Tennessee, Registered Accounting Firm ID 3682.

1 iii. Phase 2 rate design recommendations.

2
3 ***Q6. WHAT DOCUMENTS HAVE YOU REVIEWED IN PREPARATION OF***
4 ***YOUR TESTIMONY?***

5 A6. I reviewed the Commission’s July 10, 2025 Order Setting Utility Rates in this
6 Docket. I also reviewed the Commission Staff’s Phase 1 Tariff Approval Letter
7 in this Docket dated August 20, 2025. In addition, I reviewed the Company’s
8 filing for the Phase 2 rate design in this Docket filed on March 2, 2026, along
9 with the testimony and exhibits. Finally, I have reviewed the Company’s
10 workpapers supporting its proposed Phase 2 rate design.

11
12 ***Q7. MR. NOVAK, PLEASE SUMMARIZE YOUR SIGNIFICANT FINDINGS***
13 ***AND MAJOR RECOMMENDATIONS IN THIS CASE.***

14 A7. My most significant findings and recommendations are as follows:

- 15 • I recommend that the Commission calculate the rate design for residential
16 water customers and residential sewer customers by using the same billing
17 determinants that were found to be appropriate in Phase 1 of this proceeding.
- 18 • I recommend that the Commission consider additional evidence on the
19 appropriate billing structure on commercial sewer rates, since the use of the
20 equivalent residential unit methodology was never presented in evidence by
21 any party or considered during Commission deliberations. Along with this
22 recommendation, I also recommend that the existing rates from Phase 1 for
23 commercial sewer customers remain unchanged until the Commission
24 provides further guidance on the rate design structure.
- 25 • I recommend that the Commission allow Limestone to recover the costs
26 associated with the deferral of its Phase 2 revenue deficiency of \$54,347 over
27 a three-year period.

28 I will discuss each of these findings and recommendations in more detail later in
29 my testimony.

1 **I. PHASE 1 RATE DESIGN**

2
3 ***Q8. MR. NOVAK, WHAT WAS THE REVENUE DEFICIENCY APPROVED***
4 ***BY THE COMMISSION IN THIS DOCKET?***

5 A8. The Commission found a revenue deficiency of \$432,751 for water operations
6 and a revenue deficiency of \$929,573 for sewer operations resulting in a total
7 revenue deficiency of \$1,362,324.²

8
9 ***Q9. HOW DID THE COMMISSION SET RATES FOR THIS REVENUE***
10 ***DEFICIENCY OF \$1,362,324?***

11 A9. The Commission chose to implement the total revenue deficiency on a company-
12 wide basis with approximately half of the increase to be effective on May 1, 2025
13 (“Phase 1”) and the remaining increase amount to be implemented on May 1,
14 2026 (“Phase 2”).³ The total revenue increase approved by the Commission for
15 Phase 1 is \$722,038 as shown below in Table 1.

Table 1 – Phase 1 Revenue Increase	
Customer Class	Phase 1 Increase
Residential Water	\$108,474
Residential Sewer	371,482
Commercial Sewer	242,082
Total	\$722,038

16
17 ***Q10. HOW WERE THE SPECIFIC RATES DESIGNED FOR PHASE 1 TO***
18 ***PRODUCE THIS REVENUE INCREASE?***

² *Order Setting Utility Rates*, p. 105, TPUC Docket No. 24-00044 (July 10, 2025).

³ *Id.* at 106.

1 A10. The approved rate design for water customers for Phase 1 that increases revenues by
 2 \$108,474 is shown below in Table 2.

3

Table 2 – Phase 1 Water Rate Design⁴				
Item	Existing Revenues	Billing Determinants	Phase 1 Rates	Phase 1 Revenues
Water:				
Candlewood	\$58,080	1,452	\$50.00	\$72,600
Aqua	138,973	5,424	31.00	168,144
Usage		21,240,360	3.05	64,783
Total	\$197,053	6,876		\$305,527

4 The approved rate design for residential sewer customers for Phase 1 that
 5 increases revenues by \$371,482 is shown below on Table 3.

Table 3 – Phase 1 Residential Sewer Rate Design⁵				
Item	Existing Revenues	Billing Determinants	Phase 1 Rates	Phase 1 Revenues
Res. Sewer:				
Aqua	\$113,761	4,440	\$35.00	\$155,400
Cartwright 2BR	17,136	408	65.00	26,520
Cartwright 3BR	155,682	3,348	70.00	234,360
Cartwright 4BR	119,808	2,304	75.00	172,800
Cartwright 5BR	5,304	96	75.00	7,200
Arrington+	293,709	5,316	75.00	398,700
Chapel Woods	50,460	1,740	40.00	69,600
Shiloh Falls	34,094	3,816	25.00	95,400
Lakeside Estates	1,844	60	55.00	3,300
Total	\$791,798	21,528		\$1,163,280

6 The approved rate design for commercial sewer customers for Phase 1 that
 7 increases revenues by \$242,082 is shown below on Table 4.

8
 9
 10

⁴ *Id.* at Attachment #4.

⁵ *Id.*

Table 4 – Phase 1 Commercial Sewer Rate Design⁶				
Item	Existing Revenues	Billing Determinants	Phase 1 Rates	Phase 1 Revenues
Comm. Sewer:				
Aqua	\$2,460	432	\$35.00	\$15,120
Cartwright 2BR	1,509	0	65.00	0
Cartwright Fix	289,259	2,496	168.96	421,724
Cartwright Use	91,230	10,426	8.75	91,230
Shiloh Falls	55,868	1,644	55.60	91,406
Lakeside Estates	31,452	1,716	55.00	94,380
Total	\$471,778	16,714		\$713,860

1

2 ***Q11. DID THE COMMISSION AFFIRM THE RATES FOR THE PHASE 1***
3 ***RATE DESIGN?***

4 A11. Not entirely. The voting panel in this Docket noted that they did not have enough
5 underlying data for sewer billing determinants to set commercial sewer rates and
6 directed Limestone and the Commission Staff to develop a rate design for
7 commercial sewer customers to generate an additional \$242,076 of the \$722,038
8 revenue deficiency for Phase 1.⁷

9

10 ***Q12. IS IT PROBLEMATIC THAT THE COMMISSION DID NOT AFFIRM***
11 ***THE PHASE 1 RATE DESIGN FOR COMMERCIAL CUSTOMERS?***

12 A12. It could be. The Commission Staff and Limestone implemented a commercial
13 rate design structure that is based on Equivalent Residential Units (“ERUs”).
14 Under this approach, the usage for each individual commercial customer is
15 determined from an index published in 1998 that is based on the business line

⁶ *Id.*

⁷ *Id.* at 107.

1 engaged in by the commercial customer. However, no party in this Docket
2 introduced any evidence in support of an ERU rate design, and such a rate design
3 has never been adopted by the Commission.
4

5 **Q13. WAS THE TARIFF FOR LIMESTONE'S PROPOSED ERU**
6 **MEASUREMENT APPROVED BY THE COMMISSION?**

7 A13. Yes. As shown on Attachment WHN-1, on August 20, 2025, the Commission
8 Staff sent a Tariff Approval Letter to Limestone with an effective date of May 1,
9 2025, which reads in part as follows:

10 *These filings will be recorded as Tariff No. 2025-0029 and **are***
11 ***consistent** with the Commission's decision on April 14, 2025, in*
12 *Docket No. 24-00044. [Emphasis added.]*

13 However, since the use of ERUs for commercial rate design had not been
14 discussed or included as evidence by any party prior to the Commission's
15 deliberation in this case, it would be impossible for Limestone's tariff to be
16 consistent with the Commission's decision on April 14, 2025.
17

18 **Q14. HOW IS THE ERU DETERMINED FOR EACH COMMERCIAL**
19 **BUSINESS?**

20 A14. As mentioned, the ERU for each customer is based on the results from a 1998
21 study. I have attached a full copy of the results from this study to my testimony
22 as Attachment WHN-2 and extracted a subset of this information below in Table
23 5.
24
25

Table 5 – ERU Reference Table			
Facility	Unit	Flow, gallons/unit/day	
		Range	Typical
Airport	Passenger	2-4	3
Apartment House	Person	40-80	50
Apartment, Resort	Person	50-70	60
Assembly Hall	Seat	2-4	3
Automobile Service Station	Vehicle Served	8-15	12
	Employee	9-15	13

1 As can be seen in Table 5, an ERU value is assigned based on the type of
2 commercial business. For example, as shown in Table 5, the typical flow for an
3 apartment house would be 50 gallons per day. If three people lived in a particular
4 apartment unit, then the expected water usage would be 150 gallons per day.

5

6 ***Q15. DO YOU AGREE WITH THE USE OF ERUS AS A COMPONENT OF***
7 ***THE RATE DESIGN STRUCTURE FOR COMMERCIAL SEWER***
8 ***BILLS?***

9 A15. At this point, there is not enough evidence in the record to support using ERU as a
10 rate design billing component. Specifically, there have been no comparisons
11 made with actual billed water usage to confirm the accuracy of the ERU
12 methodology. In addition, no one has produced a complete copy of the 1998
13 study that calculated the ERU values shown on Table 5. Further, the Commission
14 has never approved the use of the ERU methodology for any utility. Since the use
15 of ERU methodology for rate design represents a new major question, I believe
16 that it needs significantly more vetting than what has been done.

17

18

1 **II. LIMESTONE PROPOSED PHASE 2 RATE DESIGN**

2
3 ***Q16. MR. NOVAK, WHAT IS THE REVENUE DEFICIENCY FOR THE***
4 ***PHASE 2 RATE DESIGN IN THIS DOCKET?***

5 A16. The Phase 2 revenue deficiency is \$640,285. This represents the remaining
6 balance from the Commission’s total revenue deficiency of \$1,362,324 less the
7 \$722,039 increase already implemented in Phase 1.⁸

8
9 ***Q17. HOW HAS LIMESTONE PROPOSED TO ALLOCATE THIS PHASE 2***
10 ***REVENUE DEFICIENCY OF \$640,285 BETWEEN WATER AND SEWER***
11 ***CUSTOMERS?***

12 A17. Limestone has proposed allocating the Phase 2 revenue deficiency using the same
13 percentages adopted by the Commission in the Phase 1 rate design as shown
14 below on Table 6.⁹

Item	Water	Sewer	Total
Revenue Deficiency	\$432,751	\$929,573	\$1,362,324
Phase 1 Increase	\$108,474	\$613,565	\$722,039
Phase 1 Percentage	15.02%	84.98%	100.00%
Phase 2 Increase	\$96,192	\$544,093	\$640,285
Phase 2 Percentage	15.02%	84.98%	100.00%

**Amounts may not precisely tie to source data because of rounding.*

15 Under this methodology, 15.02% of the Phase 2 rate increase is allocated to water
16 customers and the remaining 84.98% is allocated to sewer customers. The total

⁸ *Order Setting Utility Rates*, p. 105, TPUC Docket No. 24-00044 (July 10, 2025).

⁹ Company Response to Consumer Advocate DR No. 1-16 (March 18, 2026).

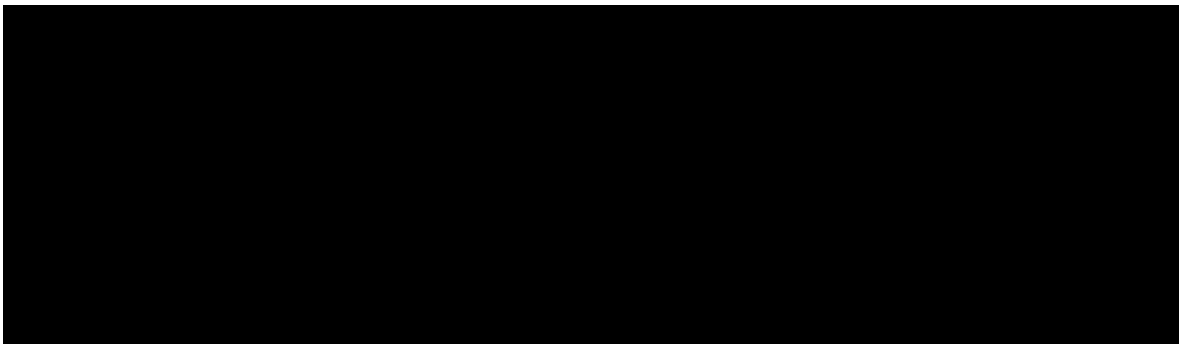
1 \$640,285 Phase 2 revenue increase is then allocated to each customer class as
2 shown below in Table 7.



3

4 ***Q18. WHAT SPECIFIC RATES HAS LIMESTONE PROPOSED FOR PHASE***
5 ***2?***

6 A18. Limestone has proposed the following Phase 2 rate design for water customers
7 that increases revenues by \$96,192 as shown below in Table 8. However,
8 Limestone has materially altered the billing determinants for Phase 2 to produce
9 the rates shown in Table 7, which I address later in my testimony.



10

11 Limestone has proposed the following Phase 2 rate design for residential sewer
12 customers that increase revenues by \$412,998 as shown below in Table 9.

13

¹⁰ *Direct Testimony of Aron Silas*, Exhibit AJS-3 Rate Design Phase 2 (March 2, 2026). *See also* Spreadsheet, File <CONFIDENTIAL Proposed Phase 2 Final Limestone Rate Design.xlsx>, Tab “AJS 3 Rate Design Phase 2” (March 2, 2026).

¹¹ *Id.*

Table 9 – Phase 2 Residential Sewer Rate Design^{12*}				
Item	Phase 1 Revenues	Billing Determinants	Phase 2 Rates	Phase 2 Revenues
Res. Sewer:				
Aqua	\$155,400	4,507	\$46.70	\$210,448
Cartwright 2BR	26,520	424	84.74	35,954
Cartwright 3BR	234,360	3,336	95.23	317,732
Cartwright 4BR	172,800	2,277	102.84	234,134
Cartwright 5BR	7,200	96	102.84	9,900
Arrington+	398,700	5,144	105.08	540,534
Chapel Woods	69,600	1,695	55.66	94,360
Shiloh Falls	95,400	3,947	32.77	129,338
Lakeside Estates	3,300	67	57.59	3,878
Total	\$1,163,280	21,493		\$1,576,278
<i>*Amounts may not precisely tie to source data because of rounding.</i>				

1

2 Limestone has proposed the following Phase 2 rate design for commercial sewer
3 customers that increase revenues by \$131,097 as shown below in Table 10.

Table 10 – Phase 2 Commercial Sewer Rate Design^{13*}				
Item	Phase 1 Revenues	Billing Determinants	Phase 2 Rates	Phase 2 Revenues
Comm. Sewer:				
Aqua	\$15,120	444	\$46.70	\$20,734
Cartwright 2BR	0	0	84.74	0
Cartwright Fix	421,724	2,736	208.97	571,749
Cartwright Use	91,230	0	0.00	0
Shiloh Falls	91,406	756	163.92	123,923
Lakeside Estates	94,380	2,232	57.59	128,551
Total	\$713,860	6,168		\$844,957
<i>*Amounts may not precisely tie to source data because of rounding.</i>				

4

5

6

¹² *Id.*

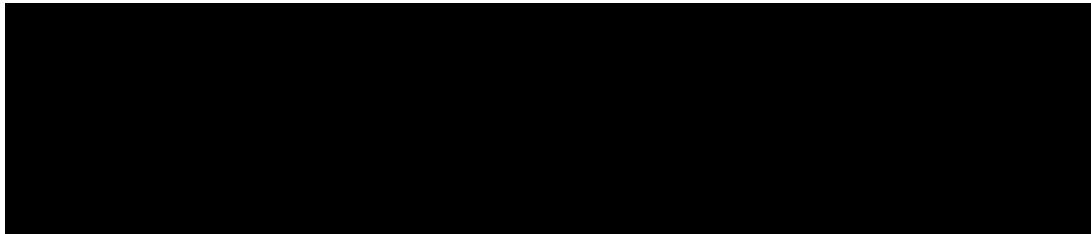
¹³ *Id.*

1 ***Q19. HAS LIMESTONE ALSO SOUGHT TO RECOVER THE CARRYING***
2 ***CHARGES ASSOCIATED WITH THE PHASE 2 DEFERRED RATE***
3 ***INCREASE OF \$640,287?***

4 A19. Yes. In the Phase 1 Order, the Commission allowed Limestone to apply its
5 authorized return to the Phase 2 revenue deficiency of \$640,287 to calculate
6 carrying costs of \$54,347 as shown below in Table 11.¹⁴

Customer Class	Phase 1 Increase
Phase 2 Revenue Deficiency	\$640,287
Authorized Rate of Return	8.488%

7 Limestone then allocated the carrying cost between water and sewer by using the
8 same allocation factors shown previously in Table 6. Next Limestone divided
9 these allocated charges by its anticipated billing determinants to get the carrying
10 cost surcharge rates shown in Table 12.



11 Limestone then proposes to recover these carrying costs from customers over a
12 one-year period.

13

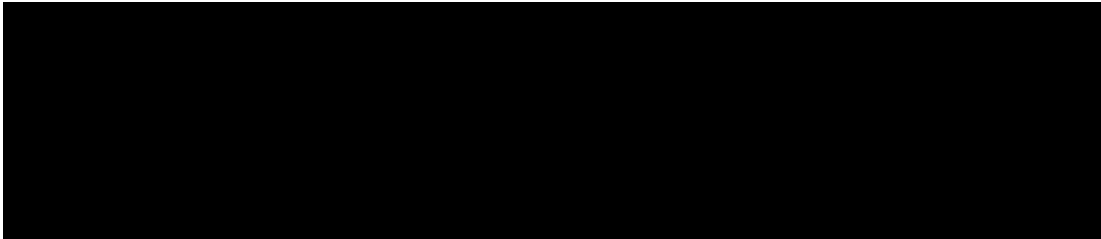
¹⁴ *Order Setting Utility Rates*, p. 105, TPUC Docket No. 24-00044 (July 10, 2025).

¹⁵ *Direct Testimony of Aron Silas*, Exhibit AJS-3 Rate Design Phase 2 (March 2, 2026). *See also* Spreadsheet File <CONFIDENTIAL Proposed Phase 2 Final Limestone Rate Design.xlsx>, Tab “AJS 3 Rate Design Phase 2” (March 2, 2026).

¹⁶ *Id.*

1 **Q20. DO YOU AGREE WITH LIMESTONE'S PROPOSED TARIFF RATES**
2 **FOR PHASE 2?**

3 A20. No. Limestone has updated the billing determinants for the Phase 2 rate design
4 from what the Commission approved in Phase 1 as shown below Table 13.



5 In my opinion, Limestone's changes to the billing determinants for Phase 2 go
6 beyond the imagined scope for the implementation of Phase 2 billing rates and
7 represents a separate single-item rate case. The Commission's purpose for
8 phasing in rates over a two-year period was to avoid rate shock for customers.¹⁸
9 Therefore, the only update that should be considered now by the Commission
10 should be implementation of the remaining Phase 2 revenue deficiency. All other
11 billing determinants should be left as they were in the Commission's Phase 1
12 Order.

13

14 Further, Limestone has not provided the individual ERU calculations for
15 commercial customers despite requests to do so.¹⁹ Without these calculations, the

¹⁷ *Id.*

¹⁸ *Order Setting Utility Rates*, pp. 105-106, TPUC Docket No. 24-00044 (July 10, 2025).

¹⁹ Company Responses to Consumer Advocate DR Nos. 1-8 and 1-18. Of particular note, the Company's responses contain either unreferenced hard-coded values or references to other sources that were not provided.

1 Commission has no basis to affirm the accuracy of Limestone’s ERU rate design
2 for Phase 2.

3

4 Finally, Limestone has proposed to recover the carrying costs associated with the
5 deferral of the Phase 2 revenue deficiency over one year. The Commission
6 typically considers recovery for these type of costs over a multi-year period.

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

1 **III. PHASE 2 RATE DESIGN RECOMMENDATIONS**

2
3 ***Q21. MR. NOVAK, DO YOU HAVE A PHASE 2 RATE DESIGN***

4 ***RECOMMENDATION FOR THE COMMISSION’S CONSIDERATION?***

5 A21. Yes. To calculate Phase 2 residential water and sewer rates, I used the same
6 billing determinants that the Commission found appropriate for Phase 1. The
7 calculations for my recommended Phase 2 tariff rates for water and residential
8 sewer charges are shown in detail in Attachment WHN-3 and summarized below
9 on Tables 14 and 15.

10

Table 14 – Water Rate Design	
Area/Determinant	Rate
Candlewood – Bills	\$65.74
Aqua – Bills	40.76
Aqua – Usage	4.01

Table 15 – Residential Sewer Rate Design	
Area/Determinant	Rate
Aqua – Bills	\$47.43
Cartwright – 2 BR	88.08
Cartwright – 3 BR	94.85
Cartwright – 4 BR	101.63
Cartwright – 5 BR	101.63
Arrington+	101.63
Chapel Woods	54.20
Shiloh Falls	33.88
Lakeside Estates	74.53

11 The rates shown in Tables 14 and 15 represent the total water and residential
12 sewer rates that I believe would have been put in place by the Commission if
13 there had not been a phase-in rate design. The calculation for these rates
14 considers both the total costs and billing determinants that the Commission
15 recognized in the Phase 1 proceeding.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

Q22. HAVE YOU ALSO DEVELOPED A RATE DESIGN FOR COMMERCIAL SEWER RATES?

A22. For commercial sewer rates, I recommend that the Commission take additional evidence on the appropriate billing structure for this tariff, since the use of the ERU methodology was never presented as evidence by any party or formally considered by the Commission. Along with this recommendation, I recommend that the existing rates from Phase 1 for commercial sewer customers remain unchanged until the Commission provides further guidance for this tariff structure.

Q23. DO YOU HAVE A RECOMMENDATION ON THE RECOVERY OF CARRYING CHARGES FROM THE DEFERRAL OF THE PHASE 2 REVENUE DEFICIENCY?

A23. Yes. I agree with the Company’s carrying cost calculation of \$54,347 but recommend that these costs be recovered over a three-year period instead of the single-year recovery proposed by Limestone. The three-year recovery period most closely represents the period allowed by the Commission for recovery of rate case costs in other cases. As a result, I recommend that the Commission allow the Company to implement a surcharge for this cost of \$0.40/month for water customers and \$0.55/month for sewer customers.²⁰

²⁰ Attachment WHN-3.

1 **Q24. DOES THIS COMPLETE YOUR TESTIMONY?**

2 A24. Yes, it does. However, I reserve the right to incorporate any new data that may
3 subsequently become available.

4

5

6

7

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

ATTACHMENT WHN-1
TPUC Tariff Approval

TENNESSEE PUBLIC UTILITY COMMISSION



Andrew Jackson State Office Bldg.
502 Deaderick Street, 4th Floor
Nashville, TN 37243-0001

August 20, 2025

Melvin J. Malone, Esq.
Butler Snow
The Pinnacle at Symphony Place
150 3rd Avenue South, Suite 1600
Nashville, TN 37201
Melvin.Malone@butlersnow.com

Re: TPUC Docket No. 24-00044 – Petition of Limestone Water Utility Operating Company, LLC to Increase Charges, Fees, and Rates and for Approval of a General Rate Increase and Consolidated Rates

TPUC Tariff No. 2025-0029

Dear Mr. Malone:

This is to acknowledge receipt of Limestone Water Utility Operating Company's letters dated July 2, 2025, and August 14, 2025, which include revised Tariff Rate Schedules and Rules and Regulations.

The filing received on July 2, 2025, removes the usage component for the Aqua residential sewer rate to reflect a flat rate. The filing received on August 14, 2025, includes the previously omitted DSH (Lakeside Estates) tap fee and all prior revisions.

These filings will be recorded as Tariff No. 2025-0029 and are consistent with the Commission's decision on April 14, 2025, in Docket No. 24-00044. Therefore, the tariff filing became effective on May 1, 2025.

Please refer to the above-referenced tariff number in any correspondence regarding this filing.

Sincerely,

Michelle Mairs

Michelle Mairs
Deputy Director of Utilities Division

GM 25-15

cc: Russ Mitten (via Email) Rmitten@cswrgroup.com
Aaron Silas (via Email) Asilas@cswrgroup.com

Telephone (615) 741-2904, Toll-Free 1-800-342-8359, Facsimile (615) 741-5015
www.tn.gov/tpuc
www.facebook.com/tennesseepuc

ATTACHMENT WHN-2
Equivalent Residential Unit
Reference Table



DWR-NPDES-SOP-G-02-WW Design Criteria Chapter 2-072020
Design Criteria for Review of Sewage Works Construction Plans and Documents
Chapter 2

APPENDIX 2-A

DESIGN BASIS FOR WASTEWATER FLOW AND LOADING

Typical Wastewater Flow Rates from Commercial and Industrial Sources

(Source: Crites and Tchobanoglous, 1998)

FACILITY	UNIT	Flow, gallons/unit/day	
		Range	Typical
Airport	Passenger	2-4	3
Apartment House	Person	40-80	50
Apartment, resort	Person	50-70	60
Assembly Hall	Seat	2-4	3
Automobile Service Station	Vehicle Served	8-15	12
	Employee	9-15	13
Bar	Customer	1-5	3
	Employee	10-16	13
Boarding House	Person	25-60	40
Bowling Alley	Alley	150-250	200
Camps:			
Pioneer Type	Person	15-30	25
Children's with central toilet/bath	Person	35-50	45
Day, with meals	Person	10-20	15
Day, without meals	Person	10-15	13
Luxury, private bath	Person	75-100	90
Trailer Camp	Person	75-125	125
Campground-developed	Person	20-40	30
Cocktail Lounge	Seat	12-25	20
Coffee Shop	Customer	4-8	6
	Employee	8-12	10
Country Club	Guests on-site	60-130	100
	Employee	10-15	13
Department Store	Toilet Room	400-600	500
	Employee	8-15	10
Dining Hall	Meal Served	4-10	7
Dormitory/bunkhouse	Person	20-50	40
Fairground	Visitor	1-2	2
Hospital, Medical	Bed	125-240	165
	Employee	5-15	10
Hospital, Mental	Bed	75-140	100
	Employee	5-15	10
Hotel	Guest	40-60	50
	Employee	8-13	10
Industrial Building (sanitary waste only)	Employee	7-16	13



DWR-NPDES-SOP-G-02-WW Design Criteria Chapter 2-072020
Design Criteria for Review of Sewage Works Construction Plans and Documents
Chapter 2

Laundry (self-service)	Machine	450-650	550
	Wash	45-55	50
Office	Employee	7-16	13
Picnic Park, flush toilets	Visitor	1-2	2
Prison	Inmate	80-150	120
	Employee	5-15	10
Public Lavatory	User	3-6	5
Rest Home	Resident	50-120	90
	Employee	5-15	10
Restaurant (with toilet)	Meal	2-4	3
	Conventional Customer	8-10	9
	Short Order Customer	3-8	6
	Bar/ cocktail lounge Customer	2-4	3
School, day only			
With cafeteria, gym, showers	Student	15-30	25
With cafeteria only	Student	10-20	15
Without cafeteria, gym or showers	Student	5-17	11
School boarding	Student	50-100	75
Shopping Center	Employee	7-13	10
	Parking Space	1-3	2
Store, resort	Customer	1-4	3
	Employee	8-12	10
Swimming Pool	Customer	5-12	10
	Employee	8-12	10
Theater	Seat	2-4	3
Visitor Center	Visitor	4-8	5

The flow for a residential house is typically 300 gallons/unit/day.

15A NCAC 02T .0114 WASTEWATER DESIGN FLOW RATES

(a) This Rule shall be used to determine wastewater flow rates for all systems governed by this Subchapter unless alternate criteria are provided by a program-specific rule or for flow used for the purposes of 15A NCAC 02H .0105. Higher flow rates shall be required where usage and occupancy are atypical, including those in Paragraph (e) of this Rule. Wastewater flow calculations shall take hours of operation and anticipated maximum occupancies and usage into account when calculating peak flows for design.

(b) In determining the volume of sewage from dwelling units, the flow rate shall be 120 gallons per day per bedroom. The minimum volume of sewage from each dwelling unit shall be 240 gallons per day and each additional bedroom above two bedrooms shall increase the volume by 120 gallons per day. Each bedroom or any other room or addition that can function as a bedroom shall be considered a bedroom for design purposes. When the occupancy of a dwelling unit exceeds two persons per bedroom, the volume of sewage shall be determined by the maximum occupancy at a rate of 60 gallons per person per day.

(c) The following table shall be used to determine the minimum allowable design daily flow of wastewater facilities. Design flow rates for establishments not identified below shall be determined using available flow data, water-using fixtures, occupancy or operation patterns, and other measured data.

Type of Establishments	Daily Flow For Design
Barber and beauty shops	
Barber Shops	50 gal/chair
Beauty Shops	125 gal/booth or bowl
Businesses, offices and factories	
General business and office facilities	25 gal/employee/shift
Factories, excluding industrial waste	25 gal/employee/shift
Factories or businesses with showers or food preparation	35 gal/employee/shift
Warehouse	100 gal/loading bay
Warehouse – self storage (not including caretaker residence)	1 gal/unit
Churches	
Churches without kitchens, day care or camps	3 gal/seat
Churches with kitchen	5 gal/seat
Churches providing day care or camps	25 gal/person (child & employee)
Fire, rescue and emergency response facilities	
Fire or rescue stations without on site staff	25 gal/person
Fire or rescue stations with on-site staff	50 gal/person/shift
Food and drink facilities	
Banquet, dining hall	30 gal/seat
Bars, cocktail lounges	20 gal/seat
Caterers	50 gal/100 sq ft floor space
Restaurant, full Service	40 gal/seat
Restaurant, single service articles	20 gal/seat
Restaurant, drive-in	50 gal/car space
Restaurant, carry out only	50 gal/100 sq ft floor space
Institutions, dining halls	5 gal/meal
Deli	40 gal/100 sq ft floor space
Bakery	10 gal/100 sq ft floor space
Meat department, butcher shop or fish market	75 gal/100 sq ft floor space
Specialty food stand or kiosk	50 gal/100 sq ft floor space
Hotels and Motels	
Hotels, motels and bed & breakfast facilities, without in-room cooking facilities	120 gal/room
Hotels and motels, with in-room cooking facilities	175 gal/room
Resort hotels	200 gal/room
Cottages, cabins	200 gal/unit
Self service laundry facilities	500 gal/machine
Medical, dental, veterinary facilities	
Medical or dental offices	250 gal/practitioner/shift
Veterinary offices (not including boarding)	250 gal/practitioner/shift

Petitioner’s Exhibit AJS-4: North Carolina Guide for Assigning Equivalent Residential Units

Veterinary hospitals, kennels, animal boarding facilities	20 gal/pen, cage, kennel or stall
Hospitals, medical	300 gal/bed
Hospitals, mental	150 gal/bed
Convalescent, nursing, rest homes without laundry facilities	60 gal/bed
Convalescent, nursing, rest homes with laundry facilities	120 gal/bed
Residential care facilities	60 gal/person
Parks, recreation, camp grounds, R-V parks and other outdoor activity facilities	
Campgrounds with comfort station, without water or sewer hookups	75 gal/campsite
Campgrounds with water and sewer hookups	100 gal/campsite
Campground dump station facility	50 gal/space
Construction, hunting or work camps with flush toilets	60 gal/person
Construction, hunting or work camps with chemical or portable toilets	40 gal/person
Parks with restroom facilities	250 gal/plumbing fixture
Summer camps without food preparation or laundry facilities	30 gal/person
Summer camps with food preparation and laundry facilities	60 gal/person
Swimming pools, bathhouses and spas	10 gal/person
Public access restrooms	325 gal/plumbing fixture
Schools, preschools and day care	
Day care and preschool facilities	25 gal/person (child & employee)
Schools with cafeteria, gym and showers	15 gal/student
Schools with cafeteria	12 gal/student
Schools without cafeteria, gym or showers	10 gal/student
Boarding schools	60 gal/person (student & employee)
Service stations, car wash facilities	
Service stations, gas stations	250 gal/plumbing fixture
Car wash facilities	1200 gal/bay
Sports centers	
Bowling center	50 gal/lane
Fitness, exercise, karate or dance center	50 gal/100 sq ft
Tennis, racquet ball	50 gal/court
Gymnasium	50 gal/100 sq ft
Golf course with only minimal food service	250 gal/plumbing fixture
Country clubs	60 gal/member or patron
Mini golf, putt-putt	250 gal/plumbing fixture
Go-kart, motocross	250 gal/plumbing fixture
Batting cages, driving ranges	250 gal/plumbing fixture
Marinas without bathhouse	10 gal/slip
Marinas with bathhouse	30 gal/slip
Video game arcades, pool halls	250 gal/plumbing fixture
Stadiums, auditoriums, theaters, community centers	5 gal/seat
Stores, shopping centers, malls and flea markets	
Auto, boat, recreational vehicle dealerships/showrooms with restrooms	125 gal/plumbing fixture
Convenience stores, with food preparation	60 gal/100 sq ft
Convenience stores, without food preparation	250 gal/plumbing fixture
Flea markets	30 gal/stall
Shopping centers and malls with food service	130 gal/1000 sq ft
Stores and shopping centers without food service	100 gal/1000 sq ft
Transportation terminals – air, bus, train, ferry, port and dock	5 gal/passenger

(d) Design daily flow rates for proposed non-residential developments where the types of use and occupancy are not known shall be designed for a minimum of 880 gallons per acre, or the applicant shall specify an anticipated flow based upon anticipated or potential uses.

Petitioner's Exhibit AJS-4: North Carolina Guide for Assigning Equivalent Residential Units

(e) Design daily flow rates for residential property on barrier islands and similar communities located south or east of the Atlantic Intracoastal Waterway and used as vacation rental as defined in G.S. 42A-4 shall be 120 gallons per day per habitable room. Habitable room shall mean a room or enclosed floor space used or intended to be used for living or sleeping, excluding kitchens and dining areas, bathrooms, shower rooms, water closet compartments, laundries, pantries, foyers, connecting corridors, closets, and storage spaces.

(f) An adjusted daily sewage flow design rate shall be granted for permitted but not yet tributary connections and future connections tributary to the system upon showing that the capacity of a sewage system is adequate to meet actual daily wastewater flows from a facility included in Paragraph (b) or (c) of this Rule without causing flow violations at the receiving wastewater treatment plant or capacity-related sanitary sewer overflows within the collection system as follows:

- (1) Documented, representative data from that facility or a comparable facility shall be submitted by an authorized signing official in accordance with Rule .0106 of this Section to the Division for all flow reduction requests, as follows:
 - (A) dates of flow meter calibrations during the time frame evaluated and indication if any adjustments were necessary;
 - (B) a breakdown of the type of connections (e.g. two bedroom units, three bedroom units) and number of customers for each month of submitted data as applicable. Identification of any non-residential connections including subdivision clubhouses and pools, restaurants, schools, churches and businesses. For each non-residential connection, information identified in Paragraph (c) of this Rule (e.g. 200 seat church, 40 seat restaurant, 35 person pool bathhouse);
 - (C) a letter of agreement from the owner or an official, meeting the criteria of Rule .0106 of this Section, of the receiving collection system or treatment works accepting the wastewater and agreeing with the adjusted design rate;
 - (D) age of the collection system;
 - (E) analysis of inflow and infiltration within the collection system or receiving treatment plant, as applicable;
 - (F) if a dedicated wastewater treatment plant serves the specific area and is representative of the residential wastewater usage, at least the 12 most recent consecutive monthly average wastewater flow readings and the daily total wastewater flow readings for the highest average wastewater flow month per customers, as reported to the Division;
 - (G) if daily data from a wastewater treatment plant cannot be used or is not representative of the project area: 12 months worth of monthly average wastewater flows from the receiving treatment plant shall be evaluated to determine the peak sewage month. Daily wastewater flows shall then be taken from a flow meter installed at the most downstream point of the collection area for the peak month selected that is representative of the project area. Justification for the selected placement of the flow meter shall also be provided; and
 - (H) an estimated design daily sewage flow rate shall be determined by calculating the numerical average of the top three daily readings for the highest average flow month. The calculations shall also account for seasonal variations, excessive inflow and infiltration, age and suspected meter reading and recording errors.
- (2) The Division shall evaluate all data submitted but shall also consider other factors in granting, with or without adjustment, or denying a flow reduction request including: applicable weather conditions during the data period (i.e. rainy or drought), other historical monitoring data for the particular facility or other similar facilities available to the Division, the general accuracy of monitoring reports and flow meter readings, and facility usage, such as whether the facility is in a resort area.
- (3) Flow increases shall be required if the calculations required by Subparagraph (f)(1) of this Rule yield design flows higher than that specified in Paragraphs (b) or (c) of this Rule.
- (4) The permittee shall retain the letter of any approved adjusted daily design flow rate for the life of the facility and shall transfer such letter to a future permittee.

*History Note: Authority G.S. 143-215.1; 143-215.3(a)(1);
Eff. September 1, 2006;
Readopted Eff. September 1, 2018.*

ATTACHMENT WHN-3
WHN Rate Design
Calculations

SOURCE: WHN Workpapers, <WHN Analysis of Rate Design>, Tab "2026-WHN-4"

Residential Water Rate Design

Item	Attrition Revenues	Phase 1					Phase 2					Total	
		Determinants	Rates	Revenues	Increase	% Increase	Determinants	Rates	Revenues	Increase	% Increase	Increase	% Increase
Candlewood Bills	\$58,080	1,452	\$50.00	\$72,600	\$14,520	25.00%	1,452	\$65.74	\$95,457	\$22,857	31.48%	\$37,377	64.35%
Aqua Bills	138,973	5,424	31.00	168,144	29,171	20.99%	5,424	40.76	221,082	52,938	31.48%	82,109	59.08%
Aqua Usage	0	21,240,360	3.05	64,783	64,783		21,240,360	4.01	85,179	20,396	31.48%	85,179	
Total	\$197,053			\$305,527	\$108,474	55.05%			\$401,719	\$96,192	31.48%	\$204,666	103.86%
									\$401,719				

Residential Sewer Rate Design

Item	Attrition Revenues	Phase 1					Phase 2					Total	
		Determinants	Rates	Revenues	Increase	% Increase	Determinants	Rates	Revenues	Increase	% Increase	Increase	% Increase
Aqua	\$113,761	4,440	\$35.00	\$155,400	\$41,639	36.60%	4,440	\$47.43	\$210,571	\$55,171	35.50%	\$96,810	85.10%
Cartwright Creek - 2 Bedroom	17,136	408	65.00	26,520	9,384	54.76%	408	88.08	35,935	9,415	35.50%	18,799	109.71%
Cartwright Creek - 3 Bedroom	155,882	3,348	70.00	234,360	78,678	50.54%	3,348	94.85	317,564	83,204	35.50%	161,882	103.98%
Cartwright Creek - 4 Bedroom	119,808	2,304	75.00	172,800	52,992	44.23%	2,304	101.63	234,149	61,349	35.50%	114,341	95.44%
Cartwright Creek - 5 Bedroom	5,304	96	75.00	7,200	1,896	35.75%	96	101.63	9,756	2,556	35.50%	4,452	83.94%
Arrington+	293,709	5,316	75.00	398,700	104,991	35.75%	5,316	101.63	540,250	141,550	35.50%	246,541	83.94%
Chapel Woods	50,460	1,740	40.00	69,600	19,140	37.93%	1,740	54.20	94,310	24,710	35.50%	43,850	86.90%
Shiloh Falls	34,094	3,816	25.00	95,400	61,306	179.81%	3,816	33.88	129,270	33,870	35.50%	95,176	279.16%
Lakeside Estates	1,844	60	55.00	3,300	1,456	78.98%	60	74.53	4,472	1,172	35.50%	2,628	142.52%
Total	\$791,798	21,528		\$1,163,280	\$371,482	46.92%	21,528		\$1,576,277	\$412,997	35.50%	\$784,479	99.08%
									\$228,051				

Commercial Sewer Rate Design

Item	Attrition Revenues	Phase 1					Phase 2					Total	
		Determinants	Rates	Revenues	Increase	% Increase	Determinants	Rates	Revenues	Increase	% Increase	Increase	% Increase
Aqua	\$2,460	432	\$35.00	\$15,120	\$12,660	514.71%							
Cartwright Creek - 2 Bedroom	1,509	0	65.00	0	-1,509	-100.00%							
Cartwright Creek - Fixed	289,259	2,496	168.96	421,724	132,466	45.79%							
Cartwright Creek - Usage	91,230	10,426	8.75	91,230	0	0.00%							
Shiloh Falls	55,868	1,644	55.60	91,406	35,539	63.61%							
Lakeside Estates	31,452	1,716	55.00	94,380	62,928	200.08%							
Total	\$471,777	16,714		\$713,860	\$242,084	51.31%							

Recommend that Phase 2 Rates be frozen pending further investigation on appropriate rate design.

Carrying Cost Surcharge:

Description	Carrying Costs	Phase 1 Determinants	Carry Cost Per Bill	3-Year Recovery
Water	\$8,165	6,876	\$1.19	\$0.40
Sewer	46,183	27,816	1.66	0.55
Total	\$54,347	34,692		