

Storage Tank Analyses

February 19, 2013

Ground Storage

- Total Storage of 6 million gallons
- Two 3 MG tanks



Ground Storage Needs

- Because there is only one feed from Fort Worth, TCMUD system is highly dependent upon ground storage.

Average		
	617	gallons per connection per day
5000 connections		3,085,000
6000 connections		3,702,000

Peak		
	1,549	gallons per connection per day
5000 connections		7,500,000
6000 connections		9,000,000

Elevated Storage



- Total of 900,000 gallons elevated storage
- TCMUD Tank
← 400,000 gallons
- Town Tank → 500,000 gallons



TCEQ Storage Requirements

	Min. Required Gal/Connection	Number Current Connections	Gallons Required By TCEQ	Current Storage Capacity (gal)	Number of New Connections Before Additional Storage Required
Ground Storage	200	4000	800,000	6,000,000	26,000
Elevated Storage	100		400,000	900,000	5,000

Peak Day & Fire Flow Considerations

What is available for fire flow?

EST 1 Capacity (gallons)	400,000
EST 2 Capacity (gallons)	500,000
Total Gallons	<u>900,000</u>
Less Operational Reserve (20%)	(180,000)
Gallons Available for Fire Fighting	720,000

TCMUD Usage Data

Average Month/Connection 18,500 gallons	Peak Month/Connection 46,472 gallons
Average Day/Connection 617 gallons	Peak Day/Connection 1549 gallons
Average Hour/Connection 25.69 gallons	Peak Hour/Connection 64.54 gallons
Average GPM 0.43	Peak GPM 1.08

PEAKING FACTOR:	2.5
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Fire Flow Storage Requirements

	Required Flow GPM	Duration (HOUR)	Required Fire Storage (Gal)
Required Storage to Meet Domestic Demand During Fire Flow Event	3500	3	630,000

TCMUD Flow Data for Fire Fighting

Usage Conditions	Flow Rate (GPM)	Duration (HOUR)	Gallons Per Connection
Average Day	0.43	3	77
Peak Day	1.08	3	194

Available Connections

Average Day Demand (ADD)

Maximum Number of Meters	Max Connections
Before Additional Elevated Storage Necessary	$720,000 \text{ gal} / 77 \text{ gal per connection} =$ 9,351

Peak Day Demand (PDD)

Maximum Number of Meters	Max Connections
Before Additional Elevated Storage Necessary	$720,000 \text{ gal} / 194 \text{ gal per connection} =$ 3,711

Elevated Storage Required at Build-out

<u>EXPECTED BUILDOUT = 5000</u>	<u>(TC Only)</u>	<u>Additional Operational Reserve (20%)</u>	<u>Total</u>
Elevated Needed for ADD	385,000	77,000	462,000
Elevated Needed for PDD	970,000	194,000	1,164,000

<u>EXPECTED BUILDOUT = 6000</u>	<u>(TC + Solana)</u>	<u>Additional Operational Reserve (20%)</u>	<u>Total</u>
Elevated Needed for ADD	462,000	92,400	554,400
Elevated Needed for PDD	1,164,000	232,800	1,396,800

Recommendations

- Need additional 2 million gallons of ground storage within next 2.5 years.
- Need additional 0.5 million gallon elevated storage in next 2 years.
- Determine if its feasible to replace 400K tank on existing property with a 1 MG tank. Replacement vs. Addition saves \$ in the long-term. However it is sometimes operationally challenging without redundancy so may need to purchase land and add new elevated (for 3 total tanks).
- Need to perform engineering study to determine reliability of wells for the long-term and consider additional feed from City of Fort Worth.
- Also, in the meantime, work to reduce daily peaks: odd/even watering through high usage months on a permanent basis.
- Revise Drought Contingency Plan (revise stages, stage responses, and enforcement methods).