

ASSUMPTIONS

General Assumptions:

1 million gallons is equal to	3.07 acre feet
Current Discount Rate=	4.000%
	0.04000
Planning Horizon	50
Annuity of PW (A=P....)	0.047
Present worth of future cost (P=F)	0.14
Present worth of annuity (P=A)	21.48

Sherman Assumptions

EDR Daily O&M Cost	#NAME?	per kgal
Brine Disposal Cost	#NAME?	per kgal
Brine Average Reject Rate	#NAME?	

Denison Assumptions

Capital Cost of the 2 mgd add-on RO Process	#NAME?	one time
Date to Be Built		2040
RO O&M Cost	#NAME?	per thousand gallons
2 MGD Water Treated		1121 acre feet/ yr
2 MGD Water Treated	#NAME?	mgd

TDS Assumptions

EPA TDS Limit		500
Texas TDS Limit		1000
ENR Index 2011		5041 (Average of January-September)
ENR Index 2001		3574
Update Factor		1.41
Without Project: % of time TDS is <1000	#NAME?	
With Project: % of time TDS is <1000	#NAME?	

Chloride Assumptions

Without Project: % of time Chloride is >300	59%
With Project: % of time Chloride is >300	43%

DAMAGE COEFFICIENTS

Combined Municipal Damage Coefficient

Component	Average Annual Cost (2001)	Average Annual Cost (2011)
Residential:		
Water Piping	\$22.55	\$31.81
Wastewater Piping	\$12.54	\$17.69
Water Heaters	\$39.86	\$56.22
Faucets	\$48.35	\$68.20
Toilet Flushing Mechanisms	\$11.64	\$16.42
Garbage Disposals	\$10.96	\$15.46
Washing Equipment (Dishes & Clothes)	\$36.05	\$50.85
Cooking Utensils	\$6.10	\$8.60
Washable Fabrics(4 People @\$800/ea)	\$27.64	\$38.99
Soap and Detergent Use	\$18.55	\$26.16

Subtotal Residential Damages	\$234.24	\$330.39
Public:		
Supply & Production Equipment	\$3.49	\$4.92
Distribution Piping	\$0.45	\$0.63
Storage Facilities	\$0.38	\$0.54
Utility Service Lines	\$0.28	\$0.39
Water Meters	\$0.25	\$0.35
Sewage Facilities	\$6.32	\$8.91
Subtotal Public Damages	\$11.17	\$15.75
Total Annual Damage Cost Differential	\$245.41	\$346.14
Damage Cost per 1000 Gallons (With Assumed 100,000 Gallon Annual Usage)	\$2.45	\$3.46
Damages per 1,000 Gal per 100 mg/l TDS	\$0.16	#NAME?

Industrial Damage Coefficient

Table 1-10

**Industrial Damage Coefficient
(\$/1000 Gal/100 mg/l of TDS)**

Year	ENR BCI	Indexed	Adjusted
		Coefficient	Coefficient
1967 (Avg.)	676	\$0.01	-
1980 (Jan.)	1895	\$0.04	-
1999 (Jan.)	3425	\$0.07	\$0.04
2000 (Jan.)	3503	\$0.07	\$0.04
2001 (Jan.)	3545	\$0.08	\$0.05
2011	5041		#NAME?

WATER PROJECTIONS

SHERMAN

Values in Ac-Ft/Yr	Projected Population and Dema		
	2010	2020	2030
Projected Population	39300	44400	50600
Projected Water Demand			
Municipal Demand	10081	11240	12696
Manufacturing, Steam Electric, and Customer Demand	10949	12432	13973
Total Projected Demand	21030	23672	26669
Currently Available Water Supplies			
Trinity Aquifer	4083	4083	4083
Woodbine Aquifer	3463	3463	3463
Greater Texoma Utility Authority (Lake Texoma, Treated, limited by WTP)	8000	8000	8000
Greater Texoma Utility Authority (Lake Texoma, Raw)	5600	5600	5600
Total Current Supplies	21146	21146	21146
Need (Demand-Current Supply)	0	2526	5523
Water Management Strategies			
Water Conservation	67	217	333
Grayson County Water Supply Projects(WTP Expansions and water from GTUA)	0	5600	8400
Supplemental Wells	0	0	0
Total Water Management Strategies	67	5817	8733
Reserve (Shortage)	183	3291	3210
		Projected Population and Dema	

Values in Mgd	2010	2020	2030
Projected Population	39300	44400	50600
Projected Water Demand			
Municipal Demand	9.00	10.03	11.33
Manufacturing, Steam Electric, and Customer Demand	9.77	11.09	12.47
Total Projected Demand	18.77	21.13	23.80
Currently Available Water Supplies	0.00	0.00	0.00
Trinity Aquifer	3.64	3.64	3.64
Woodbine Aquifer	3.09	3.09	3.09
Greater Texoma Utility Authority (Lake Texoma, Treated, limited by WTP)	#NAME?	7.14	7.14
Greater Texoma Utility Authority (Lake Texoma, Raw)	5.00	5.00	5.00
Total Current Supplies	18.87	18.87	18.87
Need (Demand-Current Supply)	0.00	2.25	4.93
Water Management Strategies	0.00	0.00	0.00
Water Conservation	0.06	0.19	0.30
Grayson County Water Supply Projects(WTP Expansions and water from GTUA)	0.00	5.00	7.50
Supplemental Wells	0.00	0.00	0.00
Total Water Management Strategies	0.06	5.19	7.79
Reserve (Shortage)	0.16	2.94	2.86

GTUA

Planned Supplies Ac Ft per Year	2010	2020	2030
Projected Demands	16,037	30,134	42,683
Currently Available Supplies			
Lake Texoma (Potable)	8,000	8,000	8,000
Usable Lake Texoma Raw	5600	5,600	5,600
Supply for Pottsboro (from Denison)	560	560	560
Collin Grayson Municipal Alliance Pipeline Project	1,928	5,400	5,400
Potable Water Available	10,488	13,960	13,960
Currently Available Supplies	16,088	19,560	19,560
Need (demand-Supply)	0	10,574	23,123
Water Management Strategies			
Conservation (Wholesale Customers)	68	592	1,271
Lake Texoma Pump Station	0	0	0
Additional SEP Supply (Raw)	0	6,726	6,726
Grayson County Water Supply Project (more potable)	200	7,560	10,920
More NTMWD (Current Facilities)	65	0	0
CGMA East-West Pipeline	0	3,255	8,614
Parallel CGMA Pipeline (NTMWD)	0	0	0
Supplies from Strategies	333	18,133	27,531
Total Supplies	16,421	37,693	47,091
Total Potable Supplies	10,821	25,367	34,765
Reserve or (Shortage)	384	7,559	4,408
TOTAL	8,353	29,101	37,820

Planned Supplies MGD	2010	2020	2030
Projected Demands	16,037	30,134	42,683
Currently Available Supplies			
Lake Texoma (Potable)	7.1	7.1	7.1
Usable Lake Texoma Raw	5.0	5.0	5.0
Supply for Pottsboro (from Denison)	0.5	0.5	0.5

Collin Grayson Municipal Alliance Pipeline Project	1.7	4.8	4.8
Potable Water Available	9.4	12.5	12.5
Currently Available Supplies	14.4	17.5	17.5
Need (demand-Supply)	0.0	9.4	20.6
Water Management Strategies			
Conservation (Wholesale Customers)	0.1	0.5	1.1
Lake Texoma Pump Station	0.0	0.0	0.0
Additional SEP Supply (Raw)	0.0	6.0	6.0
Grayson County Water Supply Project (more potable)	0.2	6.7	9.7
More NTMWD (Current Facilities)	0.1	0.0	0.0
CGMA East-West Pipeline	0.0	2.9	7.7
Parallel CGMA Pipeline (NTMWD)	0.0	0.0	0.0
Supplies from Strategies	0.3	16.2	24.6
Total Supplies	14.7	33.6	42.0
Total Potable Supplies	9.7	22.6	31.0
Reserve or (Shortage)	0.3	6.7	3.9

GTUA TOTAL #NAME? #NAME? #NAME?

DENISON

Values in MGD	Projected Population and Dema		
	2010	2020	2030
Projected Population (in City)	25,000	28,000	30,000
Projected Water Demand			
Municipal Water Demand	4.90	5.40	5.70
Manufacturing and Customers	1.26	1.32	1.35
Total Projected Demand	6.16	6.72	7.05
Currently Available Water Supplies			
Lake Randell	1.25	1.25	1.25
Lake Texoma	5.17	5.17	5.17
Trinity Aquifer	0.14	0.14	0.14
Woodbine Aquifer	0.14	0.14	0.14
Total Current Supplies	6.70	6.70	6.70
Need (Demand-Current Supply)	0.00	0.03	0.36
Water Management Strategies			
Water Conservation	0.04	0.13	0.36
2 MGD WTP Expansion and more Texoma	0.00	0.00	0.00
Supplemental Wells	0.00	0.00	0.00
Total Water Management Strategies	0.04	0.13	0.36
Reserve (Shortage)	0.57	0.10	0.01
DENISON TOTAL	#NAME?	6.42	6.42

NTMWD

MGD

Planned Supplies MGD	2010	2020	2030
Projected Demands (including losses for Treatment & Delivery)	387,574	492,647	580,733
Existing			
Lake Lavon	100	99	98
Lake Texoma	69.0	69.0	69.0
Lake Chapman	42	42	42
Wilson Creek Reuse	45	54	64
Lake Bonham	5	5	5
East Fork Reuse (with Ray Hubbard Pass through)	46	60	78
Interim GTUA	14	0	0

Upper Sabine Basin	44	26	9
Direct Reuse for Irrigation (Collin & Rockwall Co)	2	2	2
Total Available Supplies	367	358	366
Need (Demand-Supply)	0	82	152
Water Management Strategies	0	0	0
Conservation (Wholesale Customers)	5	24	41
Texoma Pump Station Expansion	0	0	0
Additional Direc Reuse-Rockwall County Irrigation	0	0	0
Renewed Interim GTUA	0	20	20
Main Stem PS (additional East Fork)	0	31	13
Chapman Booster Pump Station	0	0	0
Planned Supplies	0	0	0
Lower Bois d'Arc Creek Res.	0	50	107
Additional Lake Texoma-Blend with new supplies	0.00	0.00	61.76
Fannin County Water Supply System	0	0	0
Marvin Nichols	0	0	78
Toledo Bend Phase 1	0	0	0
Oklahoma	0	0	0
Total Supplies from Strategies	5	125	321
Total Supplies	372	483	687
Reserve or (Shortage)	26	43	169
NWTMD TOTAL	#NAME?	#NAME?	#NAME?

TXU

Water Rights 16400 acre feet per year
14.64 mgd

RRA

Water Rights 2250 acre feet per year
2.01 mgd

Chloride and TDS Co

Plan	Chloride Concentr		
	1	5	10
Without	540	428	410
With	484	384	367

Plan	TDS Concentrat		
	1	5	10
Without	1000	1000	1000
With	1000	1000	1000

*For TDS concentrations above 1000, the water would be treated so the c

UNCERTAINTY

	DIST	L	M	
#NAME?	TRIAN		\$0.34	\$0.43
#NAME?	TRIAN		\$1.58	\$1.97
#NAME?	TRIAN		12%	15%

	DIST	L	M	
#NAME?	TRIAN		\$3,200,000	\$4,000,000
#NAME?	TRIAN		\$0.80	\$1.00
#NAME?	TRIAN		0.90	1.00

	DIST	L	M	
#NAME?	TRIAN		55%	61%
#NAME?	TRIAN		65%	72%

	DIST	L	M	
#NAME?	TRIAN		48%	53%
#NAME?	TRIAN		33%	37%

#NAME?	DIST TRIAN	L	M \$0.18	\$0.23
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#NAME?	DIST TRIAN	L	M \$0.06	\$0.07
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md

2040	2050	2060
57700	67000	80000
14348	16586	19804
15494	16894	18700
29842	33480	38504
4083	4083	4083
3463	3463	3463
8000	8000	8000
5600	5600	5600
21146	21146	21146
8696	12334	17358
958	1513	1968
8400	14000	19600
0	0	0
9358	15513	21568
662	3179	4210

md

2040	2050	2060
57700	67000	80000
12.80	14.80	17.67
13.83	15.08	16.69
26.63	29.88	34.36
0.00	0.00	0.00
3.64	3.64	3.64
3.09	3.09	3.09
7.14	7.14	7.14
5.00	5.00	5.00
18.87	18.87	18.87
7.76	11.01	15.49
0.00	0.00	0.00
0.85	1.35	1.76
7.50	12.49	17.49
0.00	0.00	0.00
8.35	13.84	19.25
0.59	2.84	3.76

2040	2050	2060
52,299	63,409	76,316

8,000	8,000	8,000
5,600	5,600	5,600
560	560	560
5,400	5,400	5,400
13,960	13,960	13,960
19,560	19,560	19,560
32,739	43,849	56,756

2,176	3,457	4,958
0	0	0
6,726	6,726	6,726
13,440	19,040	24,640
0	0	0
11,400	11,400	11,400
2,792	9,204	16,012
36,534	49,827	63,736
56,094	69,387	83,296
43,768	57,061	70,970
3,795	5,978	6,980
45,918	57,930	70,338

2040	2050	2060
52,299	63,409	76,316

7.1	7.1	7.1
5.0	5.0	5.0
0.5	0.5	0.5

	DIST	L	M	
#NAME?	TRIAN		6.43	7.14

4.8	4.8	4.8
12.5	12.5	12.5
17.5	17.5	17.5
29.2	39.1	50.7

1.9	3.1	4.4
0.0	0.0	0.0
6.0	6.0	6.0
12.0	17.0	22.0
0.0	0.0	0.0
10.2	10.2	10.2
2.5	8.2	14.3
32.6	44.5	56.9
50.1	61.9	74.3
39.1	50.9	63.3
3.4	5.3	6.2

#NAME? #NAME? #NAME?

md

2040	2050	2060
31,000	32,000	33,000
5.79	5.95	6.14
1.39	1.44	1.50
7.19	7.39	7.64

1.25	1.25	1.25
5.17	5.17	5.17
0.14	0.14	0.14
0.14	0.14	0.14
6.70	6.70	6.70
0.49	0.69	0.94

0.48	0.54	0.61
1.00	1.00	1.00
0.00	0.00	0.00
1.48	1.54	1.61
0.99	0.85	0.66

#NAME? 7.42 7.42

2040	2050	2060
667,711	736,064	789,466

97	95	94
69.0	69.0	69.0
42	42	42
64	64	64
5	5	5
91	91	91
0	0	0

	DIST	L	M
#NAME?	TRIAN	6.71	7.45
#NAME?	TRIAN	23.37	25.97
#NAME?	TRIAN	30.38	33.75
#NAME?	TRIAN	36.88	40.98
#NAME?	TRIAN	46.53	51.70
#NAME?	TRIAN	56.49	62.77

	DIST	L	M
#NAME?	TRIAN	5.78	6.42
#NAME?	TRIAN	6.68	7.42

8	8	8
2	2	2
378	377	376
217	280	328
0	0	0
53	63	72
0	0	0
0	0	0
20	0	0
0	0	0
0	0	0
0	0	0
0	0	0
105	103	101
61.13	100.84	100.84
0	0	0
78	156	156
0	89	89
0	0	45
317	512	564
695	890	940
99	233	235
#NAME?	#NAME?	#NAME?

	DIST	L	M	
#NAME?	TRIAN		62.09	68.98
#NAME?	TRIAN		62.09	68.98
#NAME?	TRIAN		117.67	130.74
#NAME?	TRIAN		117.10	130.11
#NAME?	TRIAN		152.84	169.83
#NAME?	TRIAN		152.84	169.83

Concentration Tables

Concentrations (mg/L)							
Percent of Time Equalled or Exceeded							
20	43	50	59	80	90	95	99
387	335	319	300	254	228	207	162
347	300	285	268	227	204	186	145

Concentrations (mg/L)							
Percent of Time Equalled or Exceeded							
20	32	42	50	80	90	95	99
1000	1000	1000	948	737	642	569	474
1000	1000	938	889	691	601	534	440

end product would have a TDS concentration of 1000.

H	\$0.52	
	\$2.36	
	18%	
H	\$4,800,000	
	\$1.20	
	1.10	
H	67%	
	79%	
H	58%	
	41%	

H

\$0.28

H

\$0.08

H

7.85

H

8.20
28.57
37.13
45.08
56.87
69.05

H

7.06
8.16

H

75.88
75.88
143.81
143.13
186.81
186.81