

B2.1 WELL THEORETICAL OPERATION AND PERFORMANCE DESIGN MODEL

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WELL DESCRIPTION: **Little Creek Well #1**

NOTE: Use this Work Sheet for Planning a New Well. Use Work Sheet B2.2 for an Existing Pump Application.

Estimated Well Test Pump Rating (Q): **2,100 gpm**
 Test Duration: **24 hours**
 Well % Reserve Requirement: **0.00%**
 Estimated Final Well Rating (Q): **2,100 gpm**
 Continuous Acre Feet Rating: **3,387.30 ac-ft / yr**
 Amortize Well over: **15 years**
 Annual Interest Rate: **6.88 %**
 Annual Power Inflation (Escalation) Rate: **1.50 %**
 Peak Demand Month: **July**

Estimated Total Developed Well Cost: **670,000 dollars**
 Estimated Total Dynamic Pumping Head (H) at Collar: **1,200 feet**
 Peak Month Duty Cycle Limit Factor (0% to 100%): **88.00%**
 Continuous Acre Feet @ Duty: **2,980.82 ac-ft / yr**
 Effective Annual Operational Well Yield: **1,602.33 ac-ft / yr**
 Annual Peaking Factor: **1.86**
 Power Rate #: **6**
 Power (Energy) Costs per Kilowatt Hour: **0.0277 \$/kW-hr**
 Power Demand Charge per Kilowatt/Month: **10.66 \$/kW/Month**
 Design Pump Efficiency: **80.00 % Eff.**
 Design Motor Efficiency: **80.00 % Eff.**

MONTH	Monthly Percent of Annual Demand	Percent of Peak Monthly Flow	Pump Duty Cycle per mo.	Hours of Pump Operation per mo.	Effective Average Monthly (Q) gpm	Acre Feet per Month	Est. Ave. Well Draw Down (ft)	Est. Total Dynamic Head (ft.)	Average Horse-Power HP Required	Average kW Power Required	Monthly Power Cost of Pumping	Monthly Energy Cost of Pumping	Monthly TOTAL Cost of Pumping
January	4.86%	31.27%	27.51%	204.70	577.79	79.16	60	1,260	1,044.03	778.43	8,298	4,414	12,712
February	5.00%	32.15%	28.29%	190.10	594.07	73.51	60	1,260	1,044.03	778.43	8,298	4,099	12,397
March	4.03%	25.93%	22.82%	169.79	479.25	65.66	60	1,260	1,044.03	778.43	8,298	3,661	11,959
April	4.72%	30.37%	26.73%	192.43	561.26	74.41	70	1,270	1,052.32	784.61	8,364	4,182	12,546
May	7.34%	47.26%	41.59%	309.45	873.44	119.66	80	1,280	1,060.61	790.79	8,430	6,778	15,208
June	14.09%	90.67%	79.79%	574.46	1,675.52	222.15	80	1,280	1,060.61	790.79	8,430	12,584	21,013
July	15.54%	100.00%	88.00%	654.72	1,848.00	253.18	90	1,290	1,068.89	796.97	8,496	14,454	22,949
August	13.95%	89.77%	79.00%	587.73	1,658.90	227.28	90	1,290	1,068.89	796.97	8,496	12,975	21,470
September	12.02%	77.35%	68.07%	490.08	1,429.40	189.52	90	1,290	1,068.89	796.97	8,496	10,819	19,315
October	8.46%	54.41%	47.88%	356.23	1,005.48	137.76	80	1,280	1,060.61	790.79	8,430	7,803	16,233
November	5.32%	34.21%	30.11%	216.77	632.23	83.82	70	1,270	1,052.32	784.61	8,364	4,711	13,075
December	4.68%	30.10%	26.49%	197.08	556.28	76.21	60	1,260	1,044.03	778.43	8,298	4,250	12,548
TOTAL	100.00%		47.30%	4,143.54	993.39	1,602.33					100,697	90,729	191,426
PEAK	15.54%	100.00%	88.00%	654.72	1,848.00	253.18	90	1,290	1,068.89	796.97			

TOTAL Fixed Capital Cost per GPM: **34.76**
 TOTAL Variable Operational Cost per GPM: **91.16**
 TOTAL Cost per GPM: **125.92**

TOTAL Fixed Capital Cost per Acre-Foot: **45.56**
 TOTAL Variable Elec. Cost per Acre-Foot: **119.47**
 Total Cost per Acre-Foot: **165.03**

Annual Well Capital Cost: **73,006**
 TOT. Annual (Capital/Power) COST: **264,432**
 Present Worth (Power): **3,193,392**
 TOTAL WELL PRESENT WORTH: **3,863,392**

Total Theoretical System Efficiency: **0.64 %**
 Specific Capacity (in gpm/foot): **23.33**

Electrical Cost / 1,000 Gallons: **0.37**
 Total Cost per 1,000 Gallons: **0.51**

Specific Capacity Cost/gpm/ft: **28,714**

RATE STRUCTURE and STATISTICS:	
Total Annual Revenue per Customer:	1,393.25
Average per Month per Customer:	116.10
Peak Month Fee per Customer:	263.50
Rate Peaking Factor:	2.27
Base Rate to Peak Month Factor:	4.79
Total Base Rate Revenue per Customer:	660.00
Total Overage Rate Revenue per Customer:	733.25
Annual Rate as a Percent of Median Household Income:	2.53%
Total Revenue for this Type of Customer:	639,502
Total Base Revenue for this Type or Area of Cust:	302,940
Total Overage Revenue for this Type or Area of Cust:	336,562
Potential Revenue Lost from Non-Read Meter Months:	96,390
Average Revenue per 1,000 Gallons:	4.98
Average Revenue per Acre-Foot:	1,621
Base Gallons:	60,000
Base Revenue per 1,000 Gallons:	11.00
Overage Gallons:	158,750
Overage Revenue per 1,000 Gallons:	4.62

USAGE or DEMAND STRUCTURE:	Single Unit	All Units
Gallons per Year:	280,000	128,520,000
Ac-Ft per Year (AYD):	0.86	394
Peak Demand Gallons per Day (PDD):	1,524	699,605
Average Demand Gallons per Day (ADD):	767	352,110
PDD - gpm:	1.06	486
ADD - gpm:	0.53	245
Typical Peak Hour Demand (PHD) gpm:	1.33	611
Typical Peak Instantaneous Demand (PID) gpm:	2.66	1,223
Peaking Factor:	2.03	2.03
Average Winter Non-Read Use per Month (gallons):	13,750	6,311,250
Average Winter Non-Read Use per Year (gallons):	96,250	44,178,750
Estimated Indoor Use (gallons):	147,000	67,473,000
Estimated Outdoor Use (gallons):	133,000	61,047,000

C³ (Cubic Conservation Curve) or Polynomial Rate: $Y = -3.23058E-13 X^3 + 6.14032E-08 X^2 + 0.002395935 X + 55.00$

R²: 0.99968692
 ROOT: 226174.756



