

Assembly	Sub-Assembly	Components	QTY or multiplier	Price ea	Sub total		Basis	Reference
RESERVOIR						\$225,343.39		
	long life components							
	Water Storage							
		4400 gal SS tanks	5	\$16,320.00	\$81,600.00		Use 5 manufactured tanks in lieu of site built concrete reservoir	https://www.tankandbarrel.com/metal-water-cisterns-tanks-stainless-steel-water-cisterns-tanks-c-192_358_360.html
		allowance for Misc & missed parts, taxes & contingencies	0.4		\$32,640.00			
		Material			\$114,240.00			
		Labor Material ratio	0.75					
		Labor			\$85,680.00			
		Water Storage Assembly Total			\$199,920.00	\$199,920.00		
	mid life componets							
	Interconnect Piping							
		Gate Valves; 6", steel	4	\$1,107.00	\$4,428.00		NIBCO+B18:B23, class 125, \$1106.75 ea from grainger	https://www.grainger.com/search/plumbing/plumbing-valves/shut-off-valves/gate-valves?tv_optin=true&searchQuery=6%22+gate+valves&searchBar=true&tier=Not+Applicable
		Check Valve, 6", steel	1	\$1,042.00	\$1,042.00		Milwaukee 4EVKS from grainger	https://www.grainger.com/product/MILWAUKEE-VALVE-Swing-Check-Valve-Single-Flow-4EVKS
		6" flanged T	2	\$620.00	\$1,240.00		150; ductile iron	https://www.buyfittingsonline.com/pipe-fittings-flanged-black-cast-iron-125-lb-ductile-iron-150-lb-flanged-tees/?_bc_fsnf=1&Size%20(inches)=6.00%20(6%22)
		6" flanged elbow	2	\$464.00	\$928.00			https://www.buyfittingsonline.com/pipe-fittings-flanged-black-cast-iron-125-lb-ductile-iron-150-lb-flanged-90-degree-elbows/?_bc_fsnf=1&Size%20(inches)=6.00%20(6%22)
		6" iron pipe	8	\$130.00	\$1,040.00		130 per 1" section	Black Steel, 6 in Nominal Pipe Size, Pipe - 1CRA6 21416LSGR - Grainger
		Fill Guage	1	\$1,000.00	\$1,000.00		Pricing based on 2022 replacement	
		Material Sub Total allowance for Misc & missed parts, taxes & contingencies			\$9,678.00			
		Material Total	0.387		\$3,745.39		Allowance for missing detail	
		Material Total			\$13,423.39			
		Labor	80	\$150.00	\$12,000.00		80 man hours @ \$150	
		Interconnect Piping Assembly Total			\$25,423.39	\$25,423.39		
PUMP HOUSE EQUIPMENT						\$173,973.62		
	FILTRATION					\$57,717.88		
	Filtration, Short Life							
		Ozone Generator	1	\$1,936.00	\$1,936.00		Installed 8/2018 at \$1477 atdusted for 7% inflation, 4 years (x1.31)	
		O3 Gen install labor	1	\$591.00	\$591.00		451 x 1.31; Labor not included below; from last install	
		O3 injector	1	\$50.00	\$50.00		catalog	https://www.oxidationtech.com/products/accessories/ozone-injection/ozone-venturi.html
		Air dryer	1	\$1,238.00	\$1,238.00		catalog	https://www.oxidationtech.com/vmd-8.html
		Vent	1	\$400.00	\$400.00		catalog	https://www.oxidationtech.com/products/accessories/air-vents.html
		Misc Parts	1	\$100.00	\$100.00		check valve, tubing	
		Ozone Generator Total			\$4,315.00		no need to add anything; from recent billing	
		Well Preassure buffer tank	1	\$950.00	\$950.00		catalog price of similar item	https://www.supplyhouse.com/Amtrol-WX-255D-WX-255-149S147-81-Gal-WELL-X-TROL-Well-Tank-w-Durabase-Stand
		estimated install labor	3	\$150.00	\$450.00		3 hours at 150 (single item0	
		Other Labor	8	\$150.00	\$1,200.00		Note some labor is included above	
		Mn greensand	30	\$253.00	\$7,590.00		\$ 253 per cubic feet; 2 tanks at 15 cu' each	https://www.waterdealerdirect.com/collections/resin/products/greensand-5-cu-ft

Assembly	Sub-Assembly	Components	QTY or multiplier	Price ea	Sub total	Basis	Reference
		berm	25	\$105.00	\$2,625.00		https://www.waterdealerdirect.com/search?type=product&q=berm
		Labor to install	24	\$150.00	\$3,600.00		
		filter recharge sub totsl			\$13,815.00		
		Filtration, Short Life Assembly Total				\$20,730.00	
	Filtration, Medium Life						
		36", 280 gal tank, FG	1	\$1,911.00	\$1,911.00	Catalog price	https://www.greatwatersofteners.com/shop/commercial/res-tanks/meral-tanks-res-tanks/36x72-inch-composite-mineral-tank-wbase-and-6-inch-flange-top/
		30" filter tanks,FG	2	\$1,616.00	\$3,232.00	Catalog price	https://www.greatwatersofteners.com/shop/commercial/res-tanks/meral-tanks-res-tanks/30x72-inch-composite-mineral-tank-wbase-and-6-inch-flange-top/
		Filter Tank Valve & Timer	2	\$8,000.00	\$16,000.00	present day equivalent	Fleck 3900 Softener Valve With NXT Control (flecksystems.com)
		High \$ item subtotal			\$21,143.00		
		Solenoid valve	2	\$207.00	\$414.00	Catalog price	https://shop.prmfiltration.com/collections/solenoid-valves/products/solenoid-valve-2-inch-npt-brass-body-zero-differential
		Meters	2	\$300.00	\$600.00	well & backwash; brass, catalog price	https://shop.prmfiltration.com/collections/multi-jet-totalizing-water-meters/products/prm-multi-jet-water-meters-2-inch
		2" sched 80 PVC Pipe	60	\$6.06	\$363.60	50' based on pump house dims	https://www.usplastic.com/catalog/item.aspx?itemid=38256
		2" sched 80 PVC Unions	20	\$17.00	\$340.00	Catalog price; 1 union per valve	https://shop.prmfiltration.com/collections/pvc-schedule-80-unions-socket/products/era-sch-80-pvc-union-2-inch-socket-connection
		2" sched 80 PVC Valves	20	\$33.00	\$660.00	catalog includes check valves, same cost; count from drawing	https://shop.prmfiltration.com/collections/pvc-schedule-80-true-union-ball-valves-socket?_pf&pf_t_size=pvcsize%3A2%20Inch
		2" sched 80 PVC T's	20	\$13.00	\$260.00	catalog	https://shop.prmfiltration.com/collections/pvc-schedule-80-straight-tees/products/era-sch-80-pvc-straight-tee-2-inch-socket-connect
		2" sched 80 PVC elbows	40	\$8.00	\$320.00	catalog	https://shop.prmfiltration.com/collections/pvc-schedule-80-90-degree-elbows/products/era-sch-80-pvc-90-degree-elbow-2-1-2-inch-socket-connect
		Low \$ item subtotal			\$2,957.60		
		Allowance for other fittings, etc	0.3		\$887.28	at 50% of low dollar total covers gauges, small tubes, etc	
		Labor	80	\$150.00	\$12,000.00		
		medium life filtration Assembly Total				\$36,987.88	
	DISTRIBUTION					\$116,255.74	
	didtribution, short life						
		3 HP booster pump	2	\$2,557.00	\$5,114.00	Granger catalog; matches pipe size & power; Goulds 3BF1H1C0	https://www.grainger.com/product/GOULDS-WATER-TECHNOLOGY-Centrifugal-Pump-3-hp-3CCT9
		well head buffer tank	1	\$470.00	\$470.00	Well Trol WX203 32 gal, well head buffer	https://www.supplyhouse.com/Amtrol-WX-203-WX-203-146530-32-Gal-WELL-X-TROL-Well-Tank-Stand
		backwash Preasure buffer tank	1	\$287.00	\$287.00	Well Trol WX201, 14 gal	WX-201 - Amtrol WX-201 - WX-201 (143529), 14 Gal WELL-X-TROL Well Tank (Stand) (supplyhouse.com)
		Sum of above items		\$5,871.00			
		allowance for Misc & missed parts, taxes & contingencies	0.387	\$2,272.08	\$2,272.08	30% contingency 8.7% taxes	
		Sub Total			\$8,143.08		
		Labor	8	\$150.00	\$1,200.00		
		distribution, short life assembly subtotal				\$9,343.08	
	didtribution, mid life						
		Hydropneumatic tank controls					
		air volume control for Hydropneumatic tanks	1	\$2,587.00	\$2,587.00	This appears to be similar to the one there. Note the size of the tanks drive this up in price.	D610 Air Rite Air Compressor (Whitewater Mfg) - \$2,576.87 : Water Softner Parts. Water Softner Parts (watersoftener-parts.com)
		misc. parts, contingencies taxes	0.387	\$1,001.17	\$1,001.17		
		sub total			\$3,588.17		

Assembly	Sub-Assembly	Components	QTY or multiplier	Price ea	Sub total	Basis	Reference
		labor	4	\$150.00	\$600.00		
		distribution, mid life assembly sub total					\$4,188.17
	distribution, long life						
		Hydroneumatic tanks	4.5	\$3,459.00	\$15,565.50	The current tanks are custom built. Here is an air tank of smaller volume. Estimate based on equivalent volume	Industrial Air 021-0414, Vertical Receiver Tank, 30" Diameter, 200 Gallon, 175 PSI (globalindustrial.com)
		misc parts; contingencies & taxes	0.387	\$6,023.85	\$6,023.85		
		labor	32	\$150.00	\$4,800.00	labor to install & set up tanks	
		Large diameter piping					
		Gate Valves; 6", steel	2	\$1,107.00	\$2,214.00	NIBCO+B18:823, class 125, \$1106.75 ea from grainger	https://www.grainger.com/search/plumbing/plumbing-valves/shut-off-valves/gate-valves?tv_optin=true&searchQuery=6%22+gate+valves&searchBar=true&tier=Not+Applicable
		Check Valve, 6", steel	1	\$1,042.00	\$1,042.00	Milwaukee 4EVKS from grainger	https://www.grainger.com/product/MILWAUKEE-VALVE-Swing-Check-Valve-Single-Flow-4EVKS
		6" flanged T	5	\$620.00	\$3,100.00	150; ductile iron, incl 1 buried	https://www.buyfittingsonline.com/pipe-fittings-flanged-black-cast-iron-125-lb-ductile-iron-150-lb-flanged-tees/?_bc_fsnf=1&Size%20(inches)=6.00%20(6%22)
		6" flanged elbow	2	\$464.00	\$928.00	150; ductile iron	https://www.buyfittingsonline.com/pipe-fittings-flanged-black-cast-iron-125-lb-ductile-iron-150-lb-flanged-90-degree-elbows/?_bc_fsnf=1&Size%20(inches)=6.00%20(6%22)
		6" cast iron pipe	1	\$473.00	\$473.00	3' length	https://www.grainger.com/product/1CRA7?guid=N:N:PS:Paid:MS:CSM-2295:TVRYAD:20501231&gclid=e19d8aa68bfc162e5e36eccc22a8d852&gclid=e19d8aa68bfc162e5e36eccc22a8d852
		6" coupling flanges	6	\$127.00	\$762.00		https://www.buyfittingsonline.com/pipe-flanges-black-cast-iron-threaded-hydrant-piping-flanges-125-lb/?_bc_fsnf=1&Size+28inches%29=8.00+%288%22%29
		6" to 2" reducing flanges	4	\$241.00	\$964.00		https://www.buyfittingsonline.com/pipe-flanges-6-in-x-13-1-2-in-125-lb-cast-iron-black-reducing-companion-flange/
		8" to 6" reducer	1	\$573.00	\$573.00		https://www.buyfittingsonline.com/pipe-fittings-flanged-cast-iron-eccentric-reducers-8-in-x-6-in-125-lb-ul-listed/
		8" flanged T	3	\$778.00	\$2,334.00	150; ductile iron	https://www.buyfittingsonline.com/pipe-fittings-flanged-black-cast-iron-125-lb-ductile-iron-150-lb-flanged-tees/?_bc_fsnf=1&Size+%28inches%29%5B%5D=6.00+%286%22%29&Size+%28inches%29%5B%5D=8.00+%288%22%29
		8" flanged elbow	1	\$763.00	\$763.00	buried	https://www.buyfittingsonline.com/pipe-fittings-flanged-black-cast-iron-125-lb-ductile-iron-150-lb-flanged-90-degree-elbows/?_bc_fsnf=1&Size+%28inches%29=8.00+%288%22%29
		8" to 2" reducing flanges	5	\$390.00	\$1,950.00		https://www.buyfittingsonline.com/pipe-flanges-black-cast-iron-reducing-companion-piping-flanges-125-lb/?_bc_fsnf=1&Size+%28inches%29=8.00+%288%22%29
		8" pipe	1	\$629.09	\$629.09	estimate based on size relative to 6"	
		sub total, large diameter piping		\$15,732.09			
		allowance for misc parts; contingencies & taxes	0.387	\$6,088.32	\$6,088.32		
		small diameter piping					
		2" valves, bronze	13	\$159.00	\$2,067.00	from grainger, Milwaukee valve	https://www.grainger.com/search/plumbing/plumbing-valves/shut-off-valves/gate-valves?attrs=Body+Material+-+Valves%7CBronze+Pipe+Size+-+Valves%7C2+in+Valve+Class%7CClass+125&filters=attr%3CwebParentSkuKey&searchQuery=6%22+gate+valves&webParentsSkuKey=WP89976&sst=4&gwwRemoveOp=inch%7C6&tv_optin=true
		2" check valves, bronze	4	\$368.00	\$1,472.00	Apollo, from grainger	https://www.grainger.com/search/plumbing/plumbing-valves/check-valves-and-backflow-preventers/check-valves?attrs=Connection+Type%7CFNPT+FNPT+Pipe+or+Tube+Size%7C2+in%7C6+in+ATRS+Valve+Body+Material%7CBronze&filters=attr%3CsearchQuery=6%22+gate+valves&sst=4&tv_optin=true
		2" unions, galvanized	8	\$38.00	\$304.00		https://www.buyfittingsonline.com/pipe-fittings-galvanized-piping-fittings-unions-150-lb-galvanize-malleable-iron/?_bc_fsnf=1&Size+%28inches%29=2.00+%282%22%29
		2" T's, galvanized	15	\$26.00	\$390.00		https://www.buyfittingsonline.com/pipe-fittings-galvanized-piping-fittings-tees-150-lb-galvanize-malleable-iron/
		2" galvanized elbows	8	\$18.00	\$144.00		https://www.buyfittingsonline.com/pipe-fittings-galvanized-piping-fittings-90-degree-elbows/
		2" galvanized plugs	8	\$10.00	\$80.00		https://www.buyfittingsonline.com/pipe-fittings-galvanized-piping-fittings-square-head-plugs-150-lb-galvanize-malleable-iron

Assembly	Sub-Assembly	Components	QTY or multiplier	Price ea	Sub total		Basis	Reference
		2" galvanized pipe; 5 lengths	4	\$60.00	\$240.00			https://www.acehardware.com/departments/plumbing/pipe/galvanized-iron-pipe/42893?x429=true&x429=true&gclid=4a44a1ea220b1e92f8a8c599c5547f80&gclid=4a44a1ea220b1e92f8a8c599c5547f80&gclid=4a44a1ea220b1e92f8a8c599c5547f80&gclid=4a44a1ea220b1e92f8a8c599c5547f80&utm_source=bing&utm_medium=cpc&utm_campaign=PLAs_N4_Plumbing_Other_All_All&utm_term=4581252644063994&utm_content=Plumbing_Pipe_All_All
		sub total small diameter piping		\$4,697.00				
		allowance for misc parts, contingencies & taxes	0.387	\$1,817.74	\$1,817.74			
		Labor	320	\$150.00	\$48,000.00			
		distribution, long life				\$102,724.50		
		Assembly total						
End of Pump House Equipment								
WELL						\$20,116.15		
	well, long life							
		well and casing	160	\$60.00	\$9,600.00		\$60', used higher # because of 6" diameter; gross cost, labor included	https://upgradedhome.com/cost-to-drill-a-well/
		Allowance for Misc parts, contingencies & taxes	0.387	\$3,715.20	\$3,715.20			
		Well long life						
		Assembly total				\$13,315.20		
	well, short life							
		submersible pump	1	\$2,250.00	\$2,250.00			https://www.aquascience.net/gouids-35gs30412cl-35gpm-3hp-230v-3-wire-4-stainless-steel-submersible-well-pump
		wiring	200	\$2.05	\$410.00			https://nassaunationalcable.com/collections/submersible-pump-wire/products/heavy-duty-flat-w-grnd-thw-submersible-pump-cable-copper-600v
		lead in tubing	1	\$513.00	\$513.00		200' roll, 160 psi	https://www.aquascience.net/products/pumps-tanks-well-components/pipe
		Allowance for Misc parts, contingencies & taxes	0.387	\$1,227.95	\$1,227.95			
		install labor	16	\$150.00	\$2,400.00			
		well, short life						
		Assembly total				\$6,800.95		
GENERATOR						\$14,936.84		
	All compoants, middle lifetime		1	\$12,903.00	\$12,903.00	\$14,936.84	All inclusive, based on invoice, Dec 2019	
		inflation escalation to 2023	0.16	\$2,033.84	\$2,033.84			
PUMP HOUSE STRUCTURE						\$54,869.72		
	Long life components							
		structure, 24'x24' enhanced electrical service	576	\$60.00	\$30,810.00		\$60 per square foot less roof costs, see below	https://homeguide.com/costs/cost-to-build-a-garage
		Allowance for Misc parts, contingencies & taxes	1	\$5,000.00	\$5,000.00		300(?) amp hookup for equipment, specialized raceways, etc.	
		Allowance for Misc parts, contingencies & taxes	0.387	\$13,858.47	\$13,858.47			
		Pump houe sructrue						
		Long life components				\$49,668.47		
	mid life components							
		roof	750	\$5.00	\$3,750.00		750 sq' roof (5 in 12 pitch, 18" overhang). Roof quoted seperatly since lifetime is different.	https://homeguide.com/costs/cost-to-build-a-garage

Assembly	Sub-Assembly	Components	QTY or multiplier	Price ea	Sub total		Basis	Reference
		Allowance for Misc parts, contingencies & taxes	0.387	\$1,451.25	\$1,451.25			
		Pump house structure				\$5,201.25		
		Middle life components						
Distribution mains						\$1,104,295.21		
	Long life components							
		underground distribution piping			\$982,392.50	\$982,392.50	See next sheet for detailed piping calculations The cost to replace underground piping is between \$150 and \$250 per foot depending on the details of the installation. Here we use \$200 per foot	https://getpvf.com/schedule-40-pvc-dwv-pipe/
	mid life components							
		6" gate valves	11	\$1,107.00	\$12,177.00		see above pump house equipment	
		check valves	2	\$1,042.00	\$2,084.00		see above pump house equipment	
		hydrants	6	\$6,000.00	\$36,000.00		includes installation labor	https://www.angi.com/articles/how-much-fire-hydrant-cost.htm
		allowance for other components	0.1	\$5,026.10	\$5,026.10			
		Contingencies, taxes, misc. components	0.387	\$16,683.61	\$16,683.61			
		mid life component sub total				\$71,970.71		
	short life components							
		meters	24	\$1,500.00	\$36,000.00			
		Contingencies, taxes, misc. components	0.387	\$13,932.00	\$13,932.00			
						\$49,932.00	includes labor & fittings, based on recent installations	