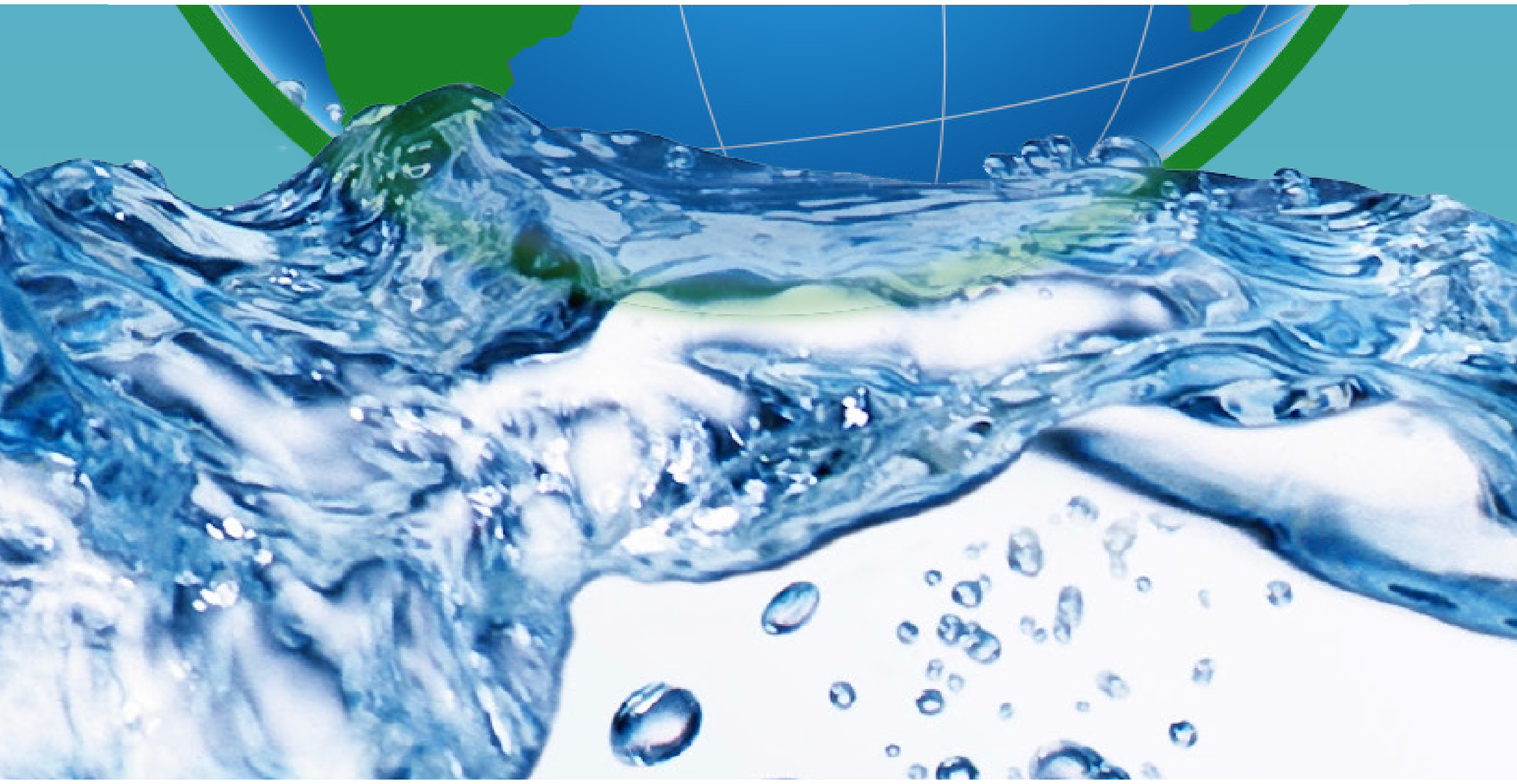
GLOBAL℠
GREEN LIFTS



Changing The Way Water Moves

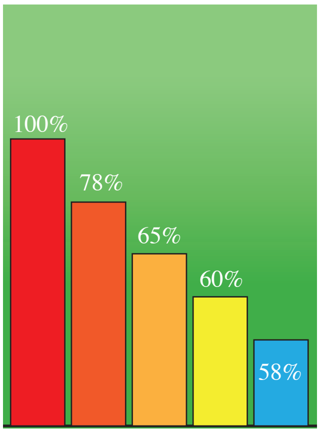
Ft Lauderdale, FL 954-540-2863 • www.globalgreenlifts.com

WELCOME TO THE ENERGY SAVING GREEN LIFT STATION DESIGN

Introducing the wastewater lift station design that is sure to become the new industry standard. It's the first true breakthrough in lift station operating design since the traditional design was developed in the 1940's In addition, this design far exceeds the efficiency promises of variable speed pumps for wastewater lift stations.

In today's fiscal environment, governmental agencies are striving to:

1. Identify funding sources for much needed Infrastructure Improvements
2. Reduce operating costs
3. Reduce greenhouse gas and carbon footprint
4. Identify processes that increase efficiency



We can help.

This design uses our patented system control panel to accomplish each of these goals in a big way!
Waste water Re-Pump stations retrofitted using our Green Lift Station Design will experience:

- ✓ **Up to 73%** | energy cost savings over a 25 year project life (see case study Table 2)
- ✓ **Up to 79%** | maintenance cost savings over the same project life (see case study Table 2)
- ✓ **Up to 73%** | green house gas footprint reductions
- ✓ **Up to 35%** | initial construction cost savings
- ✓ Pumps operating at an efficiency rate of 60 % vs. variable speed pump rates of 12 %

These energy and maintenance cost savings pay off the initial investment in three years.
Retrofitting traditional two pump lift stations accomplishes the same goals:

- ✓ **Over 35%** | energy cost savings over a 20 year project life
- ✓ **Up to 67%** | maintenance cost savings over the same project life
- ✓ **Up to 35%** | green house gas footprint reductions

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Traditional 2 Pump Lift Stations	Efficient Green 3 Pump Lift Stations
Pump horsepower (hp) must be large enough to handle the maximum waste water inflow resulting in:	**Pump hp selection is based on the pump rated efficiency curve and impellers are trimmed as needed resulting in:**
ø Low efficiency pump operation	✓ High efficiency pump operation
ø Higher energy demand per start	✓ Lower energy demand per start
The backup pump must be of the same hp capacity to move the waste water if the primary pump fails. Two high hp pumps often experience:	**The primary, backup and standby emergency pumps each have the same lowest possible hp with the backup and standby pumps assisting the primary pump:**
ø Periods of short cycling when the backup pump assists the primary pump due to the combined high hp gallons per minute (gpm) outflow rate	✓ Short cycling is eliminated through the use of our patented control panel and the operating sequence of the low hp pumps
The primary pump turns on and off continuously resulting in:	**Primary pump runs continuously, backup pump turns on occasionally and the standby pump runs rarely:**
ø Loss of kinetic energy per stop	✓ Kinetic energy is maintained
ø Heat buildup from motor stops	✓ No motor stop heat buildup
ø Debris entering a stopped impeller causing excess resistant force on start ups	✓ With the primary pump running continuously, debris does not settle against impellers
ø The motor burns out in a few years as a result of so many start/stops, the increased heat and the excess resistant force on start ups	✓ The life of all three motors is maximized for above 3 reasons and the monthly 3 pump operating sequence rotation made possible by our control panel

Energy Efficient Green 4 Pump Lift Stations outperform **Traditional Re-Pump Lift Stations** for the same reasons as those presented in the **Traditional 2 Pump** comparison above.

Variable Speed Pumps have been introduced into the waste water lift station design with hopes of improved efficiency operation. However, **Variable Speed Pumps:**

- Cost more to purchase than single speed pumps
- Have been proven to be less energy efficient than single speed pumps in waste water lift stations by actual documented tests

The following is an excerpt out of:

Assessing variable speed pump efficiency in water distribution systems
By Thomas Walski

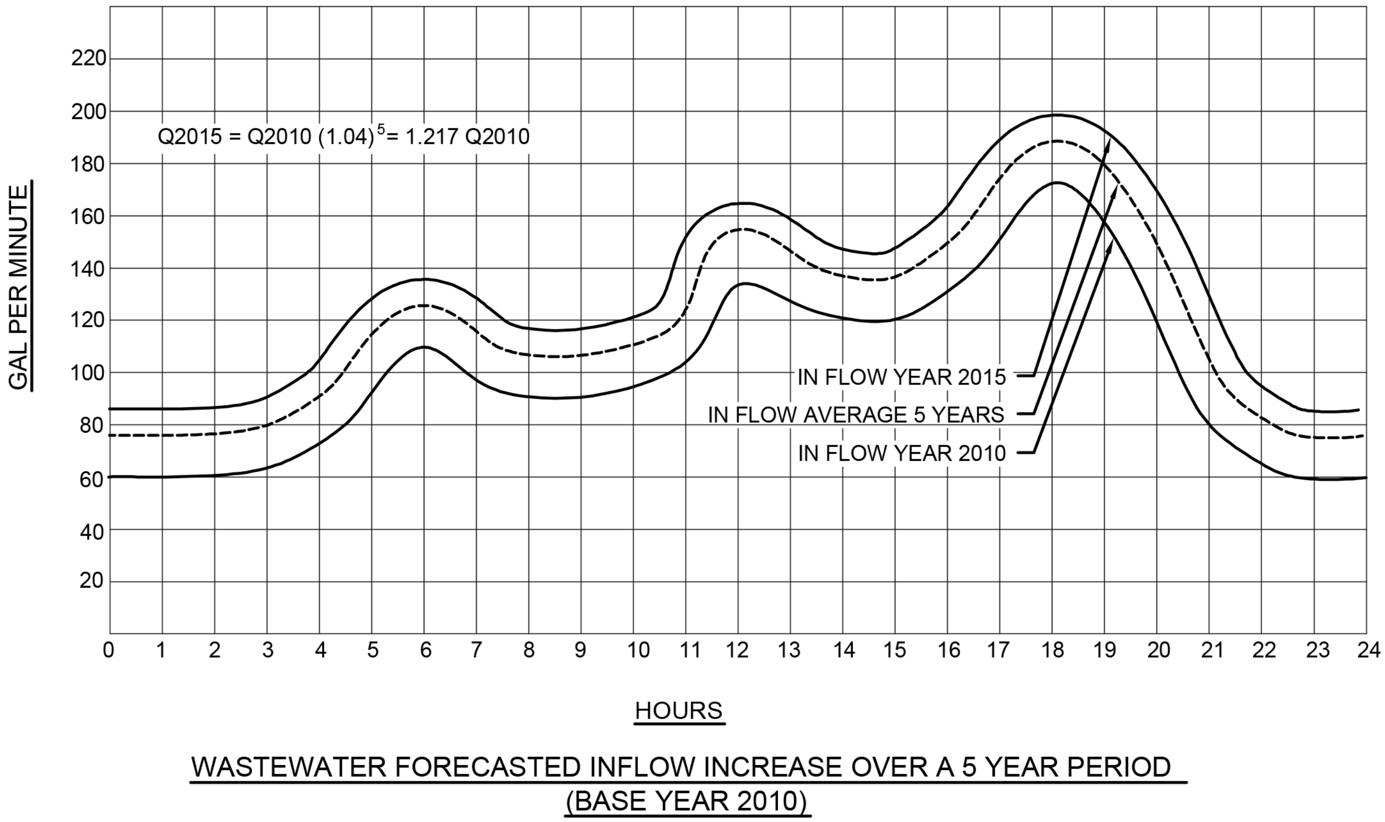
"Use of variable speed pumping with storage:

I have conducted numerous analyses comparing variable speed pumping to constant speed pump in systems for the relatively flat system head curves in water distribution systems (Walski, 2001, 2005, 2111; Walski, Bowdler and Wu, 2005). In each case, when a pump is selected to correctly match the system, the constant speed pump has a lower energy cost than the variable speed pump whether the storage is on the discharge side as in elevated water storage or on the suction side as in a wet well at a sewage pumping station.

I have done these comparisons so many times that I jokingly refer to it as Walski's Law, "The most efficient speed to run a variable speed pump is OFF." As long as there is storage to enable the pump to be turned off, it is best to run it at an efficient point and then turn it off. Running a variable speed pump at a low speed is inefficient."

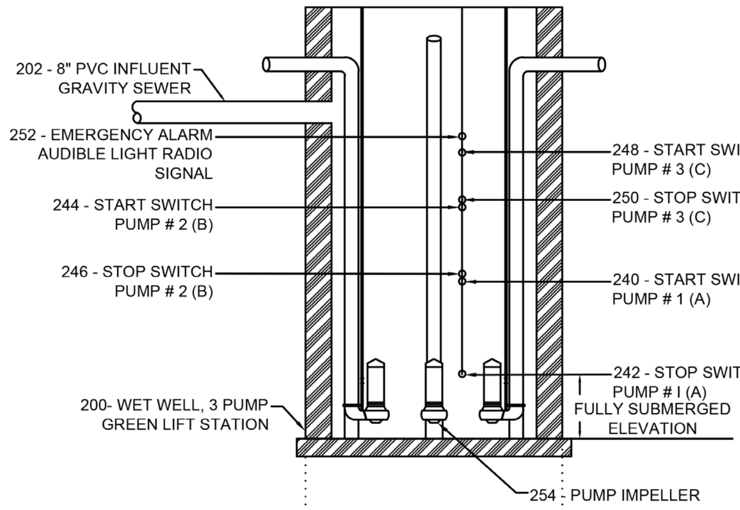
(Dr. Thomas Walski, Vice President of Engineering for Haestad Methods, was recently elected to the membership rank of "Fellow" by the American Society of Civil Engineers (ASCE). Dr. Walski is one of the most published and recognized water-resources modeling experts and educators in the world. He is a three-time winner of the best paper award in Distribution and Plant Operation for the Journal of the American Water Works Association and is the former editor of the Journal of Environmental Engineering.)

Selecting the most efficient pump to run a lift station



Traditional 2 pump lift station pumps are selected so that the maximum inflow at any point in time can be moved out of the well by a single pump having a GPM rate equal or greater than the inflow GPM rate.

Our green 3 pump lift stations utilize 3 pumps of equal GPM rates that are equal to the minimum inflow rate. Because the primary pump runs continuously and is assisted by the secondary pump when higher water inflow occurs, the two pumps operating together are able to accomplish the necessary discharge while minimizing the number of times the secondary pump turns on and off. The third pump is the emergency backup pump and it turns on during times of extraordinary inflows or if one of the other two pumps fail.



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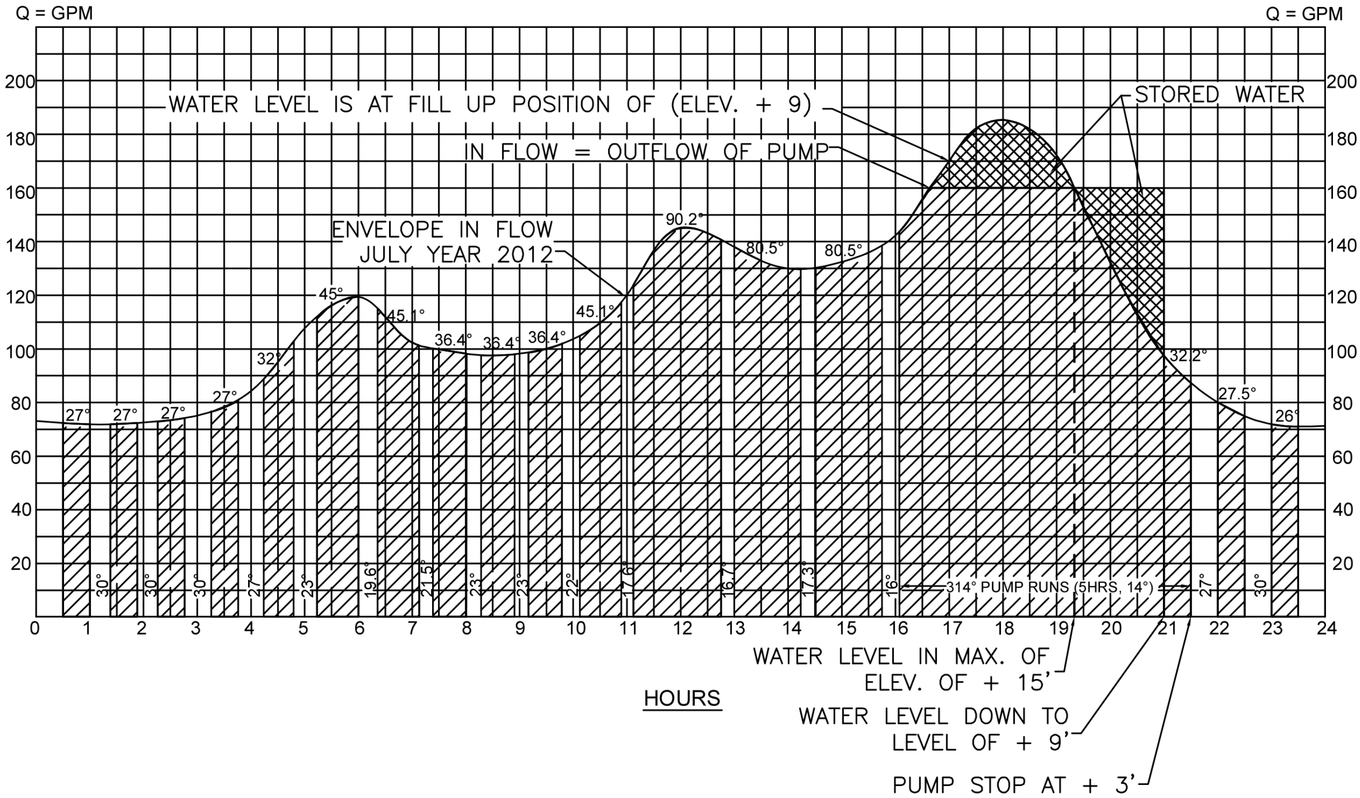
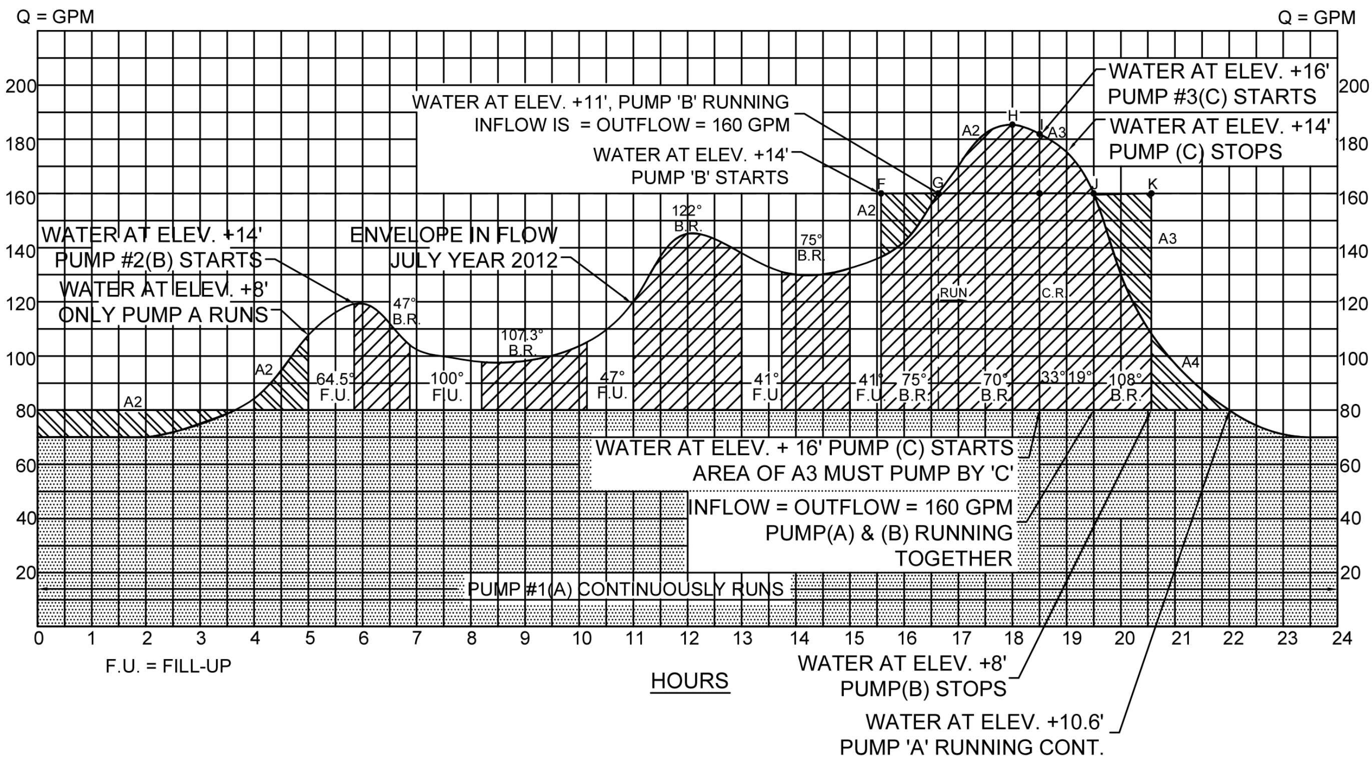
PERIODIC FILL-UPS AND PUMPING

Traditional lift station with 2 pumps, 160 GPM/each, pump #1A cycles on and off as determined by flow and pump #2B is the backup



Green lift station with 3 pumps, 80 GPM/each, pump #1A runs continuously, pump #2B runs periodically & pump #3C rarely runs/operating as stand-by



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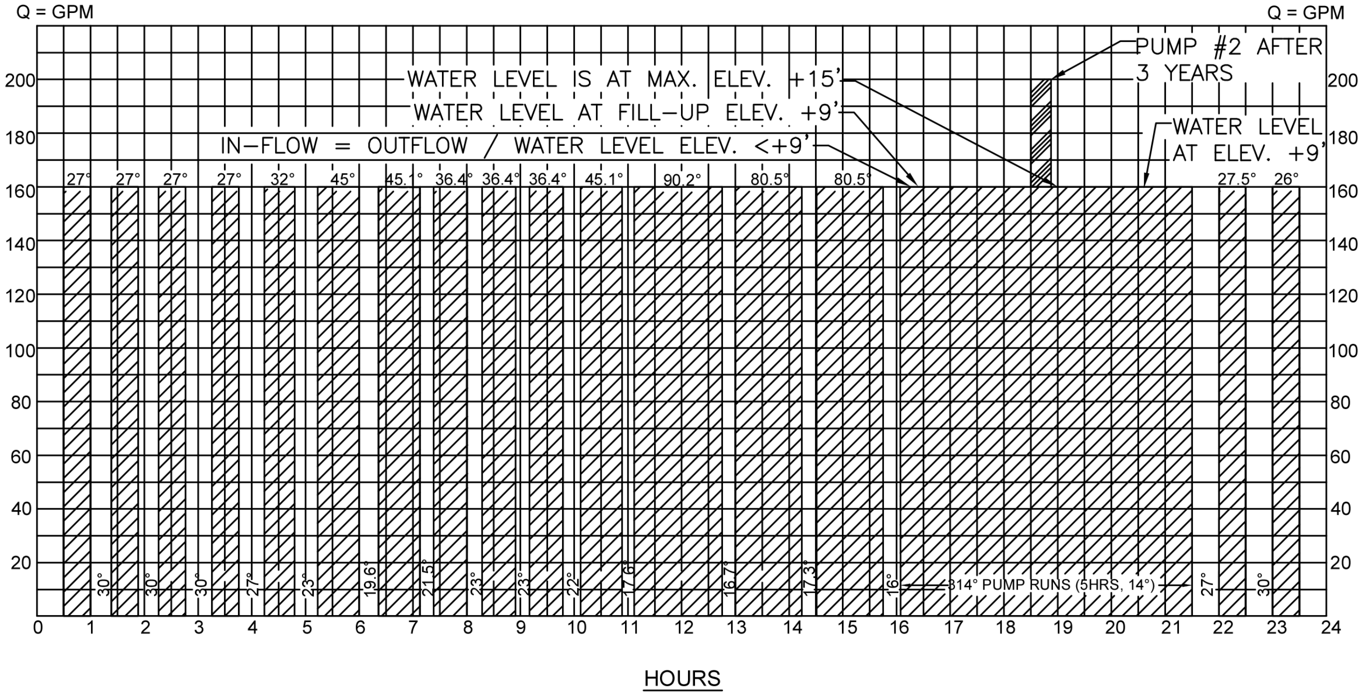
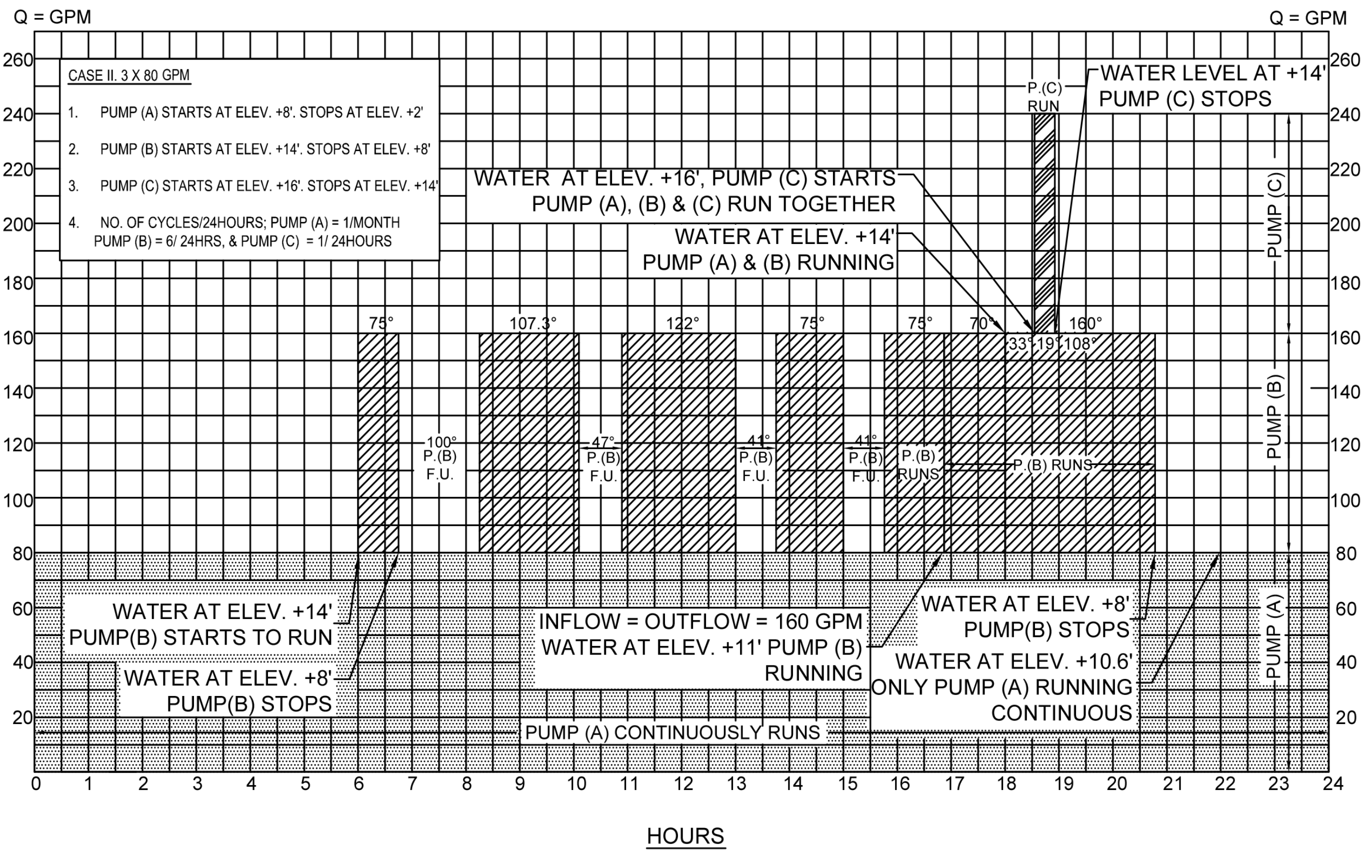
Manufacturers Determine Pump Life by the Number of On/Off Cycles

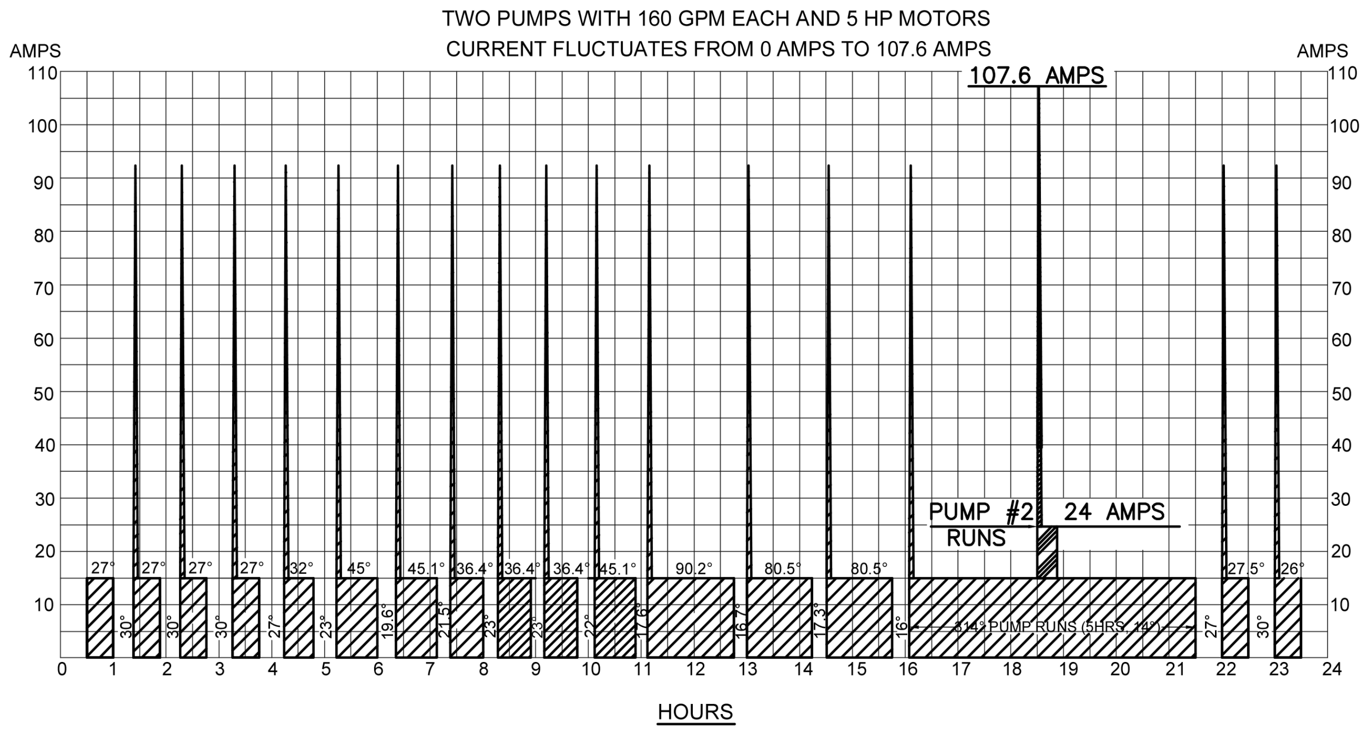
Operating time of 160 GPM pump in the traditional 2 pump lift station; pump #1A cycles 17 times/24 hrs, pump #2B cycles 1 time/24 hrs



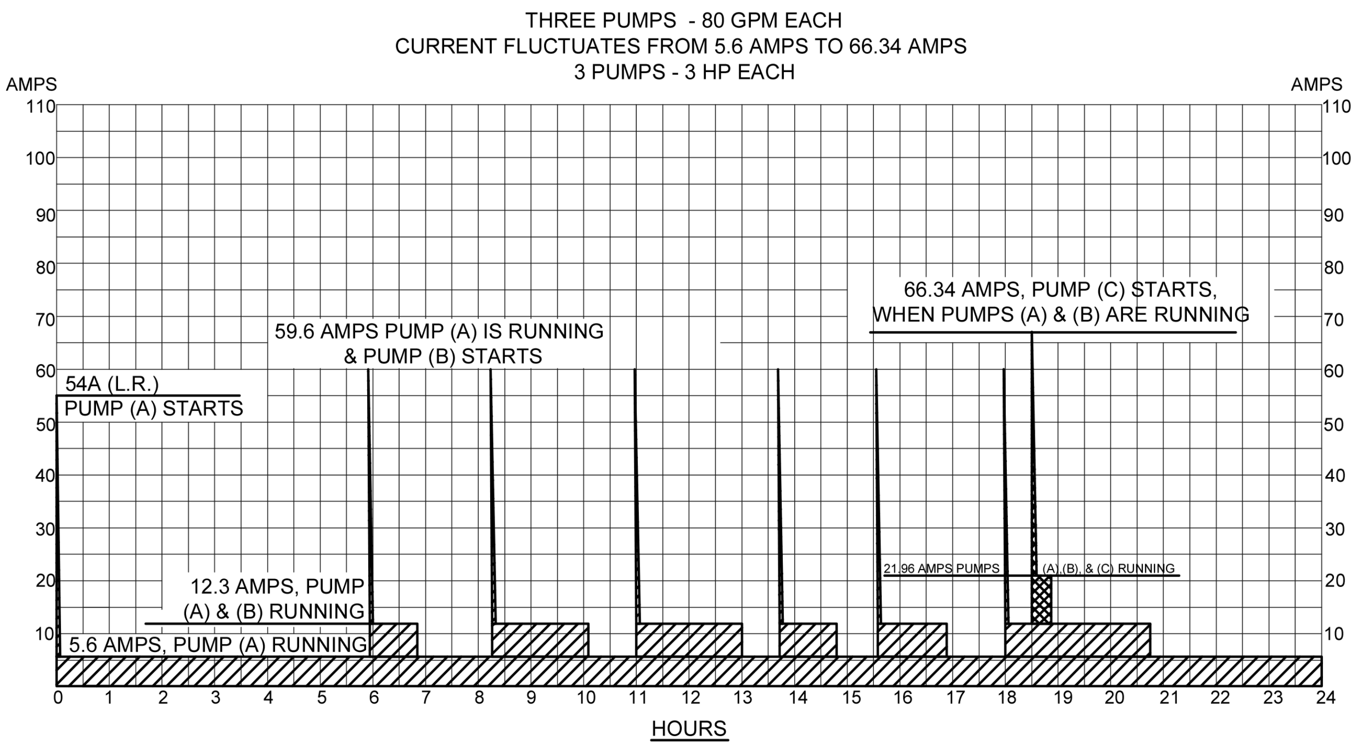
Operating times of 80 GPM pumps in the green design 3 pump lift station; pump #1A cycles 1 time per month, pump #2B cycles 6/24 hrs and pump #3C cycles 1 time/24 hrs



Power demand on a utility company – traditional 2 pump lift station



Power demand on a utility company – green design 3 pump lift station



Traditional max = 107.6 amps vs **Green** max of 66.34 amps resulting in **38% reduction on power** demand from the utility company by green designed station.

CASE STUDY

We have performed a case study of an existing, traditional design, re-pump station. The study compared criteria and specifications (Table 1 below) of the traditional station with those of an energy efficient green designed station. Comparative costs of the construction of the traditional and green designed stations are presented in Table 2. Finally, the maintenance and energy cost savings of each designed station are provided in Table 3.

TABLE 1

Item Description	Traditional Design	Green Design
Wet Well		
Inner Diameter X Wall Thickness	12'x1'	12'x1'
Depth	30'	24'
Pumps		
Average Operating Efficiency	**12%**	**63%**
Maximum Inflow to Well	1750 GPM	1750 GPM
Pump Rated Power	85 HP	30 HP
Voltage	480 V	480 V
Nominal Rated Amps	109 A	36 A
Rush in Current (LRA)	685 A	231 A
Rated Speed	1185 RPM	1755 RPM
Impeller Diameter	15.875"	5.9375"
Pump Height	56.5"	39.25"
Pump Wieght (With/Without Jacket)	2066/1900	665/600

CRITERIA AND SPECIFICATIONS
TRADITIONAL RE-PUMP STATION VS. GREEN DESIGN

TABLE 2

Item Description	Compiling Cost Items	TRADITIONAL		GREEN DESIGN		GREEN DESIGNED STATION SAVINGS	
		Materials	Labor	Materials	Labor	Materials	Labor
Cost Of Construction							
Wet-Well	13/C.I.	$29,767	$14,034	$23,054	$11,417	22.55%	18.65%
Pumps & L	2/C.I.	$144,426	$15,865	$73,316	$6,831	49.24%	56.94%
Piping & Valves	12/C.I.	$43,996	$22,000	$24,474	$12,237	44.37%	44.38%
Electrical	16/C.I.	$158,028	$62,070	$96,720	$38,795	38.80%	37.50%
Emergency Generator	3/C.I.	$70,820	$18,665	$52,480	$13,500	25.90%	27.67%
Coffer Dam	9/C.I.	$40,022	$16,000	$34,653	$16,000	13.42%	0.00%
Excavation	11/C.I.	$8,307	$8,667	$6,069	$6,429	26.94%	25.82%
Dewatering	6/C.I.	$6,400	$7,680	$4,800	$5,760	25.00%	25.00%
Wet-Well Installation	20/C.I.	$24,454	$23,077	$17,512	$17,727	28.39%	23.18%
Totals		$526,220	$188,058	$333,078	$128,696	36.70%	31.57&
Total Cost Materials & Labor		**$714,278**		**$461,774**		**35.35%**	

CONSTRUCTION COST COMPARISON

TABLE 3

COST OF OPERATION (25 YRS)	TRADITIONAL	GREEN DESIGN	GREEN DESIGNED STATION SAVINGS
Maintenance	$1,435,516	$300,482	**79.07%**
Operating Energy Cost	$6,072,525	$1,602,660	**73.61%**

25 YEAR PROJECT LIFE SAVINGS

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