This re-claimed water application presents several design challenges. Dirty pond water needs to be pumped out of the pond, sufficiently filtered, and pumped out at a constant and sufficient pressure to irrigation zones up to 2,000 feet away. The pond water intakes and filtering system must be self-cleaning to minimize maintenance overhead. Demands for irrigation water could occur at any time, either through the automated zone controllers or the quick-coupler valve (QCV) ports throughout the property. Flow rates vary wildly. System pressure must be maintained at no-flow, and with minimum energy consumption. The system must also supply water to the pond fountain and other future water features.

The retention pond tends to collect a considerable amount of floating debris (sticks, leaves, plastic bags, plastic bottles), which created a considerable challenge when trying to pump the water and slurry out of the pond during the 2014 dredging project. As a result of those problems, a deep buried sand filter intake system was chosen over a shore-line shallow depth intake system. Although shore-line intake systems now included a self-cleaning mechanism, none of them are capable of grinding or completely removing the accumulated debris from the pond. There was concern that the debris would quickly re-accumulate around the intake after a cleaning cycle. The buried sand filter intake system does not suffer from this problem, and in addition provides nearly-clean pre-filtered water to the pump station, which lessens the demand on the secondary filter.

The intake field consists of two parallel 4' wide x 3' deep x 120' long trenches, separated by 50', dug into the shale pond bed. Each trench contains two parallel 4" PVC pipes running the full length of the trench. Half the length of each pipe is perforated with four rows of ½" holes every 6". The pipes are embedded in 3/4" stone, followed by a layer of stone dust, followed by 2' of sand mixed with 2" stone. The 2" stone is to provide structural support for heavy equipment in future dredging operations, so the equipment doesn't sink in the trenches and damage the sand bed and intake piping. The far end of the 4" perforated PVC intake pipes are sealed with threaded plugs and rise above the floor of the pond. In the event of a serious clog, the pond can be partially drained, the exposed plugs removed, and the intake lines flushed out. The pipe caps could also be located and opened by a diver.

The 2014 dredging removed up to 4' of accumulated material from the bottom of the pond, much of it being decomposed leaves. It is therefore critical to collect fallen leaves from the property to prevent them from being flushed down the storm drains and in to the pond. However, material will still wash in from upstream sources, and over time will again build up on the bottom of the pond. To maintain filter efficiency, an intake pipe backwash capability is provided by the pump station. Individual intakes in one trench can be switched in to backwash mode and flushed with water drawn from the remaining two intakes in the other trench. This is why there are two separate trenches, and why there are two pipes in each trench.

The irrigation system has wildly varying water demands, from as low as a single drip irrigation zone, to 8 high-volume rotary zones running simultaneously. On average, the system consumes over 60,000 gallons of water a day, with about 50,000 gallons going out over the 90 minute 3am watering cycles. This works out to a peak demand of around 550 gallons per minute. The design target for each 4" intake pipe was 150 gpm, or 2.5 gpm per foot of intake pipe. The resulting water velocity through the filter is 300 gpm / 480 sq. ft. = 0.625 gpm per sq. ft., which should be low enough to avoid filter-sand ingestion. One intake was field tested with a 3" gasoline-powered trash pump, with a resulting flow rate of around 140 gpm, and with minimal sand in the effluent. Static head was around 7', and frictional losses in the 150' of pipe and fittings (one 45 and one 90 degree elbow) from the intakes to the pump were responsible for an additional 7' of dynamic head.

Water is delivered to the Canterbury/Chesterfield loop via a 4" PVC main located beneath the sidewalk along Chesterfield Drive, intercepting the loop near building 12. The Harwick/Buckingham loop is supplied with another 4" PVC main, also running alongside Chesterfield Drive, intercepting the loop near the building 43 pump house. The Lancaster loop is supplied by a third 4" PVC main running across the dry tributary of the pond and up to the base of the hill by building 29, where it intercepts the loop. The Hampshire loop runs under the pump shed and is intercepted there.

The pump system must maintain a constant water pressure in the outlet pipe, regardless of flow, including no-flow. There are a variety of ways to meet these requirements and minimize wasted energy.

The first challenge is maintaining pressure in the outlet pipe even when there is no demand for water. The pump must be running to build pressure, and there must be a place for the water to go whenever the pump is running. If the pump is pumping in to a dead-end, it is only a matter of time before a variety of catastrophic failure modes will result. Typically, this problem is solved by installing a pressure-activated bypass valve (PBV) on the outlet pipe, which routes just enough water back around to the pump intake to maintain a constant pressure at the outlet.

The problem with this solution is that at anything other than full-flow conditions, energy is being wasted. In this application, the pump would re-circulate for about 22 of every 24 hours. The wasted energy could be reduced by putting the pump on a timer and only run it for 2 hours at night, however irrigation water could be needed at any time, night or day. Most irrigation controllers can output a signal that activates the pump only when a zone turns on. Although it is technically possible to connect all 13 irrigation controllers to a common "pump on" signal, it is still not practical to run the wiring, and this still won't automatically turn the pump on when water is needed at the QCV ports. A second smaller pump in parallel with the primary pump could be added, which still wastes energy re-circulating water under no or low-flow conditions, however it wastes less energy. Finally, a pressure tank can be added to the pump outlet. When the tank pressure drops, the pump turns on briefly to restore full pressure. In this application, it turns out that we can take advantage of the pond fountain to provide a constant path to re-circulate water. This will create continuous pressure in the outlet pipe, and the energy to re-circulate the water is not really wasted since we want the fountain feature.

The second challenge is to provide outlet pressure control with minimum wasted energy. This requires the use of variable-speed pumps. By varying the speed of the pump, the flow of water is also varied, and the pump can be operated just fast enough to maintain the required pressure at the outlet. No energy is wasted, as there is no excess pumping capacity that has to be re-routed back to the pump intake. Pressure regulation is handled by pressure sensors on the pump outlet, which feed in to the programmable logic controller (PLC) implementing a software PID algorithm. Pump speed is controlled using a variable-frequency drive (VFD) unit connected to each pump. The VFD converts the singe-phase input power to the variable-frequency three-phase output power required by the pump. The PLC commands the VFD over a serial data bus, typically RS-485. VFD units over 5 HP generally require three-phase power input, which is not available at this location. A three-phase unit can be used with single-phase power, if an appropriate derating factor is applied. The larger input current requires larger rectifier diodes and larger DC bus capacitance, both of which are provided in a larger HP capacity unit, at the expense of increased cost. Typically, the HP rating is multiplied by two. For example, a 25 HP motor would require a 50 HP VFD if operated with single-phase input.

The third challenge is providing flow over the full range of demand. Pumps have a minimum operating speed, below which either the pump is spinning too slowly to overcome the head losses in the intake and outlet piping and no water flows, or the pump overheats due to the low rotational speed of its internal cooling fans. Pump manufacturers usually recommend not going below 20 to 25% of the pumps full speed. Systems with widely varying flow rates will use multiple pumps connected in parallel of different capacities to cover the full range of flow demands. In this application, a 10HP pump handles flow demands up to 100 gpm, while a larger 25HP pump handles flow demands up to 500 gpm. If necessary, both pumps can operate together to supply roughly the sum of their individual capacities. The PLC is responsible for staging the two pumps accordingly. Since it is possible that one pump is operating while the other pump is stopped, check valves are installed on the output of each pump to avoid water re-circulation though the stopped pump.

System priming is a semi-automatic process. On command, the PLC initiates a priming sequence wherein the intake C priming valve is closed by the operator, and the intake C pipe is manually primed with an external water source. Once intake C is manually primed, the PLC uses intake C water to automatically prime the remaining 3 intakes through the backwash valves. The operator is prompted to open and close various air bleed valves during the process. This procedure requires water to enter the intake pipe at the pump station end faster than the water drains back in to the pond at the other end. It is assumed that the pond intake sand filter will produce enough resistance to achieve this. If not, and if the backup priming option becomes necessary on a frequent basis, intake priming valves may have to be retrofitted on the other three intake lines.

Although the primary intake sand filter removes most of the debris from the intake water, it does not provide sufficient filtering to prevent the eventual clogging of irrigation system valves, heads, and drip-lines. Therefore, a strainer is provided prior to each pump inlet, to catch any larger material that somehow makes it through the primary sand filter in the pond. The strainer also acts to reduce turbulence at the pump intake. In addition, a secondary 80-micron self-cleaning filter is located after the pumps to remove the remaining smaller particles. The PLC continuously monitors the differential pressure across the filter via an inlet and an outlet pressure transducer. When the differential pressures reaches 7 psi, the PLC initiates a filter wash cycle by operating a control solenoid on the filter for 10 seconds. This causes an internal filter membrane vacuum to pass over the filter surface and suck up any residue, which is discharged back to the pond through a waste line. A flow switch on the waste line allows the PLC to confirm the wash cycle is functioning properly.

The DEP limits the amount of water than can be drawn from the pond on a yearly basis. Thus, the pump station has a water meter in the outlet pipe to confirm compliance with the DEP requirements. Water which is returned to the pond for the fountain or filter washing is not recorded by the meter. The water meter has a pulser contact in it, which is connected to the PLC so flow can also be electronically logged and anomalous conditions reported.

Since a single pumping station now supplies the entire complex, it becomes more practical to implement a fertigation/chemigation system. Fertilizers and/or pesticides can be injected into the pump station outlet pipe and automatically distributed to all the turf areas. It appears that this is not prohibited in NJ, although the usual pesticide/fertilizer applicator licensing rules apply. Thus, provisions are made to inject pesticides and/or fertilizers at the end of the outlet pipe. Typically, injection would be done with a venturi device, however in this application it is not advisable to introduce any additional constrictions in the outlet pipe. Therefore, the liquids would have to be injected by a separate pump at a pressure greater than the regulated outlet pressure. The PLC would have control over this pump, so pesticide/fertilizer injection can be synchronized with irrigation cycles to avoid treating areas that shouldn't be treated such as the drip zones.

A pressure-relief valve (PRV) is installed in the pump outlet manifold, prior to the filter, with the discharge routed back to the pump inlet manifold. The PRV will kick-in if the PLC pressure regulation loop fails. A flow-switch on the PRV outlet port triggers an alarm in the PLC which will shut down the pump and notify maintenance personnel. The PRV is not designed to operate continuously as a pressure-bypass valve (PBV). If such functionality is required in the future, the PRV could be swapped out with a PBV. Due to the level of damage that could result from a system over-pressure condition, a redundant PRV is also installed at the outlet of the filter, with its outlet port also routed back to the pump intake manifold through a second flow switch.

Pump shed environmental control requires consideration due to the size of the pumping equipment and its efficiency ratings. It can be assume that motor efficiency is around 85% for a total of 35 HP of motors, which would result in about 13,000 BTH/HR from the motors. It is assumed that any heat generated by the pump itself will be transported away by the water passing through it. No ventilation is provided in the pump shed. Instead, pond water is passed through a fan coil to cool the interior of the shed. Water drawn from the bottom of the pond should be cool enough for this purpose. The coil is installed in a bypass configuration, with the coil inlet connected to the pump outlet after the filter, and the coil outlet connected to the pump intake manifold. The fan coil contains its own valve, metering, and temperature controls. The PLC monitors pump shed air temperature via its own sensor, and sends an alarm message to maintenance personnel when the temperature exceeds a threshold. In addition, an extreme over-temperature condition also shuts off the pumps.

No effort is made to provide heat in the pump shed, as the entire irrigation system, including the pump station, will be turned off, drained, and winterized at the end of the season. To facilitate winterization, ports are provided to attach an air-compressor, and the PLC will prompt the user and operate the valves to fully evacuate water from the system. It may also be possible to evacuate all four irrigation loops from the pump station. Currently, the air-compressor has to be relocated and separately attached to each loop. In case the weather cools before the system is winterized, the PLC will sense a low-temperature freeze condition, and send an alarm message to maintenance personnel. In addition, the pumps may need special winterization procedures performed.

A smoke detector is installed in the pump shed. Upon activation, an alarm message is sent to maintenance personnel, and the PLC shuts off all electrical equipment within its control. As the pump shed is sealed and not ventilated, it is assumed that the fire will self extinguish after consuming the available oxygen. A heat-activated fire sprinkler in the ceiling of the pump shed is connected to the outlet pipe. Due to the thousands of feet of irrigation system piping, it is assumed that sufficient water and pressure will be available in the piping to operate the sprinkler for several minutes. The fire-sprinkler is not a code requirement. It is there in an attempt to protect the pumping equipment from fire damage.

A dry-well in one corner of the pump shed floor contains a two-stage water level sensor. The sensor is monitored by the PLC, and upon a first-stage activation, an alarm message will be sent to maintenance personnel. Upon a second-stage activation, the pumps are shut down as well.

Any anomalous environmental or operational conditions of enough severity to require intervention will cause an alarm message to be sent to maintenance personnel. The alarm message will be resent every hour, so long as the anomalous condition still exists. In addition, an exterior alarm light on the pump shed will be illuminated by the PLC. The light will go out when the condition is cleared.

A standard hose-bib is provided on the outside of the pump shed. Also, a 5" fire department connection is provide, at the request of the Piscataway fire marshals.

The pond water level is monitored by a sensor installed in a vertical 4" level sensing pipe installed at the shore of the pond. The pipe has a 90 degree elbow on the end, which then extends several feet in to the sand filter, alongside the C and D intake lines. The water level in the vertical section of the level sensing pipe will exactly mirror the level of water in the pond. The level sensing pipe is installed about 2 feet above the actual bottom of the pond, since it is not necessary to measure more than about a 12" drop in water level. The PLC monitors the pond level, to avoid drawing the water below an acceptable level. As the level of water drops in the pond, the spill-way will no longer release water downstream. The DEP requires that some water is constantly released from the pond, so an additional pipe is installed from the pump station outlet to the spill-way, so a controlled amount of water can always be released downstream. The released water does not need to be metered.

Parts Cost Estimate

Quantity	Description	Cost
8	Electric ball-valves	$908
1	25 HP pump	$3,300
1	10 HP pump	$3,000
1	25/50 HP VFD	$4,200
1	10/20 HP VFD	$2,800
1	Electric panel and breakers	$1,000
1	660 gpm filter	$10,000
1	Strainers	$1,000
3	Flow sensors	$1,000
1	Water level sensor	$900
2	Pressure relief valves	$500
1	Pressure regulating valve	$600
1	Programmable logic controller	$3,000?
1	Cooling fan coil	$1,000?
2	PRV flow switch	$200
3	Pressure transducers (gems)	$400
2	Check valves	$500
	SCH80 fittings and pipe	$5,000
	Misc valves	$1,000
	Total	$50,100

Drawing Summary

Reclaimed Water System
Design Discussion

Sheet: 1 of 9	Rev: 2	Drawn By: KW	October 16, 2016
Size: B	Scale: NTS	Tolerances:	
H:\Projects\Irrigation\SingleStage\DesignDiscussion.cdr			

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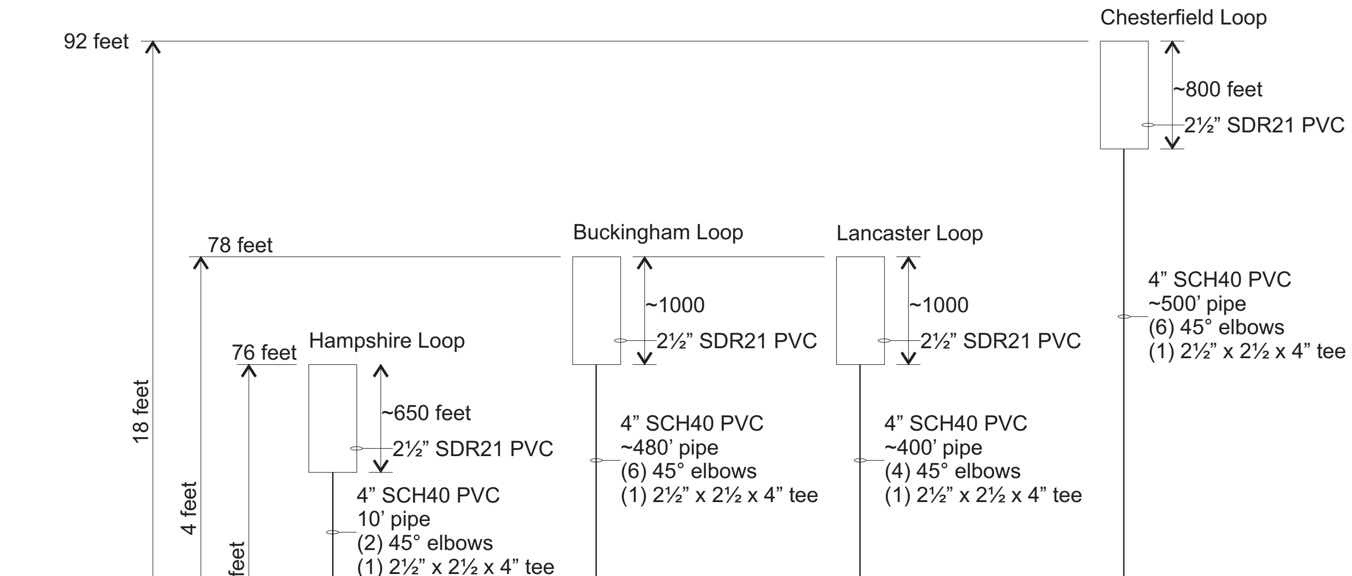
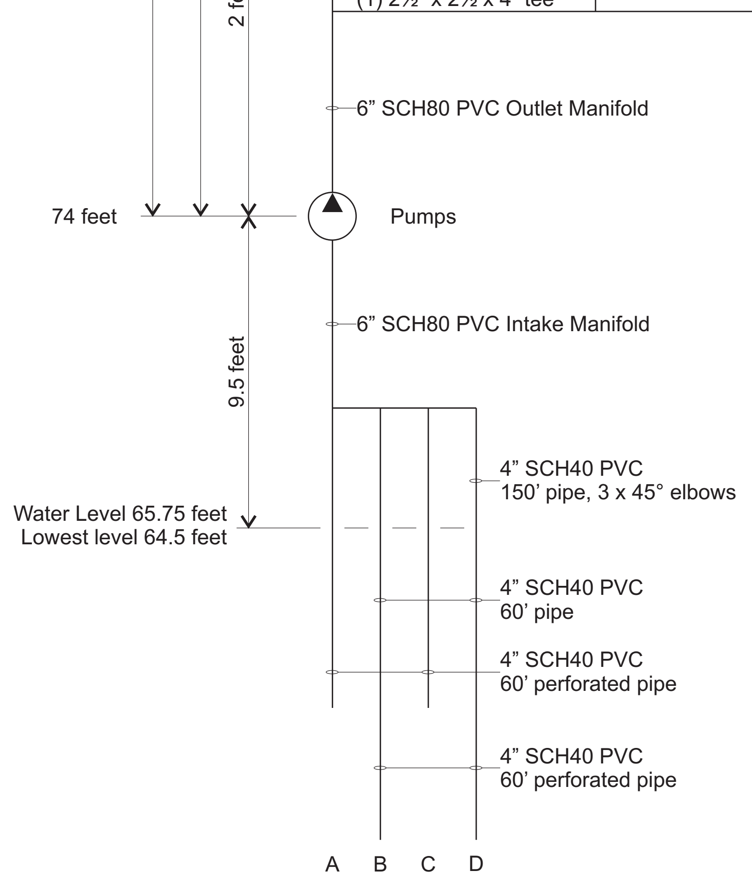




Pump Head Requirement

10' suction static + 5' suction friction + 7' of 4" line static + 3' of 4" line friction + 20' of 2½" line static + 23' of 2½" line friction + 16' filter + 105' sprinkler discharge = 190'

Pump outlet pressure must be around 105 PSI at 400 GPM at least.

Intake Pipe Network Equivalent Head Loss
All Intake Pipe 4" SCH40 PVC

Equivalent Pipe Length
Intake A: 150' pipe + 3 x 5' (45° elbows) + 60' pipe = 225'
Intake B: 150' pipe + 3 x 5' (45° elbows) + 120' pipe = 285'
Intake C: 150' pipe + 3 x 5' (45° elbows) + 60' pipe = 225'
Intake D: 150' pipe + 3 x 5' (45° elbows) + 120' pipe = 285'

Dynamic Head Loss at 100 gpm
Intake A: 225' x 0.0063 = 1.42'
Intake B: 285' x 0.0063 = 1.80'
Intake C: 225' x 0.0063 = 1.42'
Intake D: 285' x 0.0063 = 1.80'

Equivalent Head Loss
Still haven't found how to calculate this. It might be an iterative process. Assuming the intake system head loss is less than the individual head losses, and since the head losses are small as compared to the static head, I'm going to ignore them.

Outlet Pipe Network Equivalent Head Loss
Distribution pipe is 4" SCH40 PVC
Irrigation loop pipe is 2½" SDR21 PVC
Most irrigation nozzles are specified at 45 PSI
Individual zones need an average of 50 GPM
Up to two zones may be operating simultaneously on any loop
Up to four zones *could* operate on any loop, but flow limits it to two.

From measurement, about 70 PSI is needed at the loop injection point to get 45 PSI at the heads of the furthest zone with two zones running.

Net Positive Suction Head Calculations

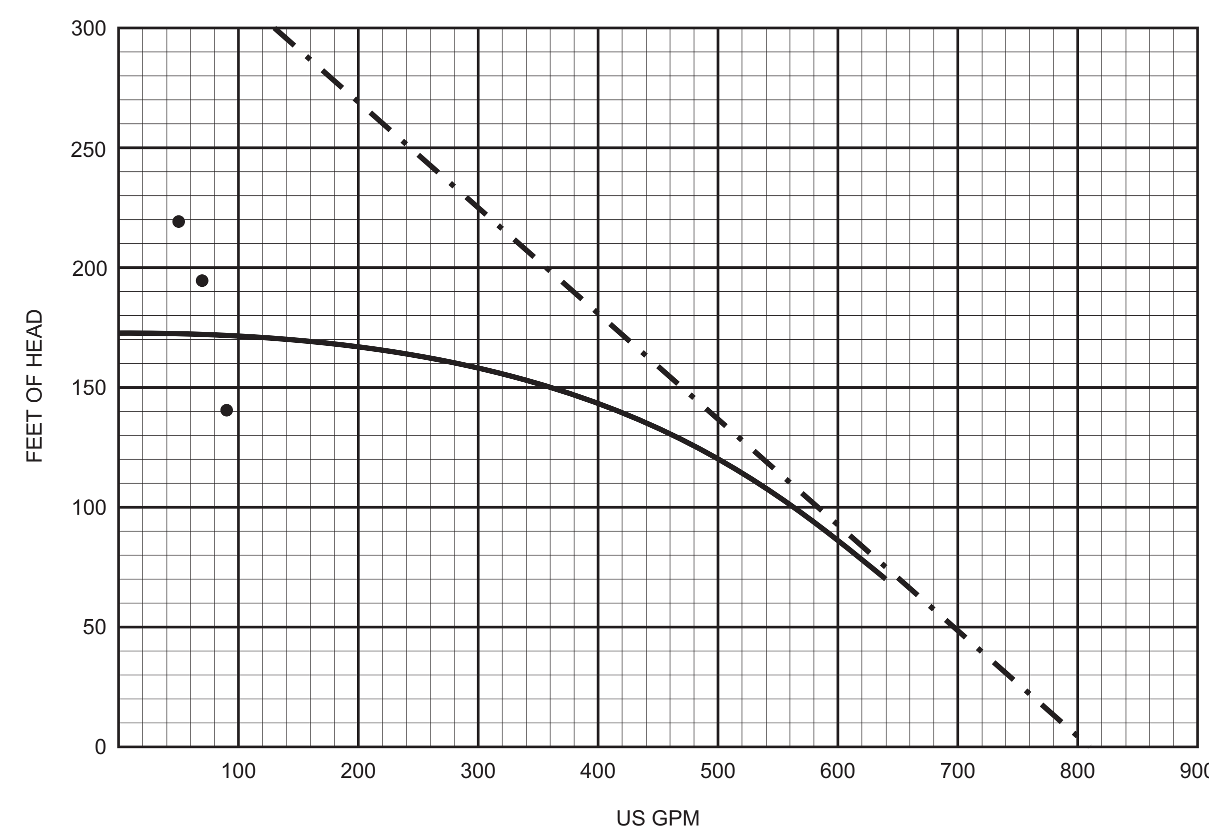
H_A = Absolute pressure of source liquid, 15 PSI at sea level, or 35'
H_Z = Suction lift, 10'
H_F = Friction losses in suction piping, assume 5'
H_V = Usually small, assume 0'
H_{VP} = Vapor pressure of water, at 68°, is 0.0231 ATM, or 0.78'

$NPSH_A = H_A \pm H_Z - H_F + H_V - H_{VP}$
$NPSH_A$ = 35' - 10' - 5' + 0' - 1'
$NPSH_A$ = 19'

$NPSH_R$ = 18', from pump curves

See http://www.pumpschool.com/applications/npsh.pdf

Pump Curve
Goulds Water Technology
Model 16AI/BF
4" Inlet, 3" Outlet, 8" Impeller



Reclaimed Water System Head Calculations			
Sheet: 2 of 9	Rev: 0	Drawn By: KW	October 29, 2016
Size: B	Scale: NTS	Tolerances:	
H:\Projects\Irrigation\SingleStage\HeadCalculations.cdr			

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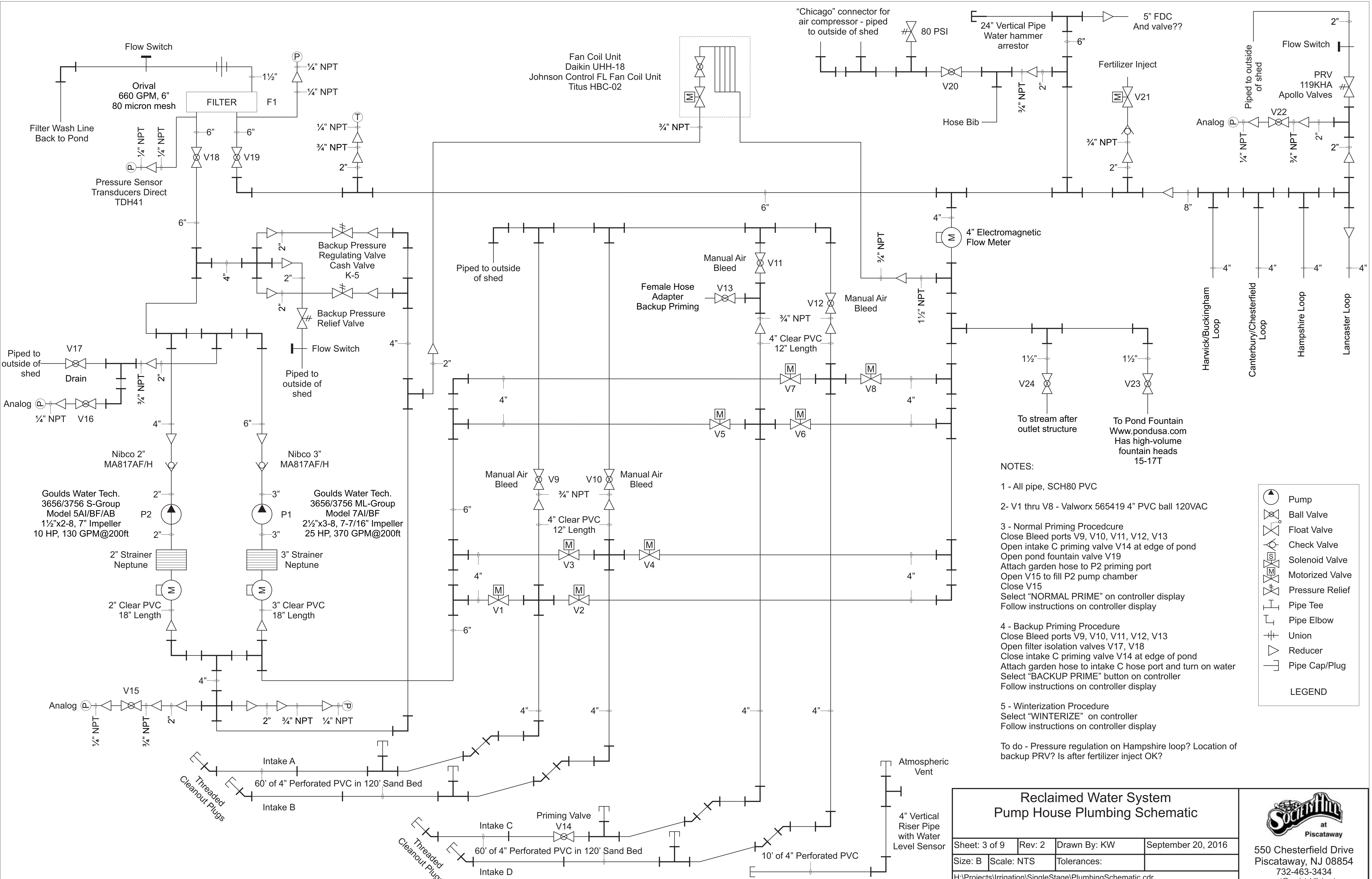

NOTES:

1 - All pipe, SCH80 PVC

2- V1 thru V8 - Valworx 565419 4" PVC ball 120VAC

3 - Normal Priming Procedcure
Close Bleed ports V9, V10, V11, V12, V13
Open intake C priming valve V14 at edge of pond
Open pond fountain valve V19
Attach garden hose to P2 priming port
Open V15 to fill P2 pump chamber
Close V15
Select "NORMAL PRIME" on controller display
Follow instructions on controller display

4 - Backup Priming Procedure
Close Bleed ports V9, V10, V11, V12, V13
Open filter isolation valves V17, V18
Close intake C priming valve V14 at edge of pond
Attach garden hose to intake C hose port and turn on water
Select "BACKUP PRIME" button on controller
Follow instructions on controller display

5 - Winterization Procedure
Select "WINTERIZE" on controller
Follow instructions on controller display

To do - Pressure regulation on Hampshire loop? Location of backup PRV? Is after fertilizer inject OK?

LEGEND

- Pump
- Ball Valve
- Float Valve
- Check Valve
- Solenoid Valve
- Motorized Valve
- Pressure Relief
- Pipe Tee
- Pipe Elbow
- Union
- Reducer
- Pipe Cap/Plug

Reclaimed Water System
Pump House Plumbing Schematic

Sheet: 3 of 9	Rev: 2	Drawn By: KW	September 20, 2016
Size: B	Scale: NTS	Tolerances:	

H:\Projects\Irrigation\SingleStage\PlumbingSchematic.cdr

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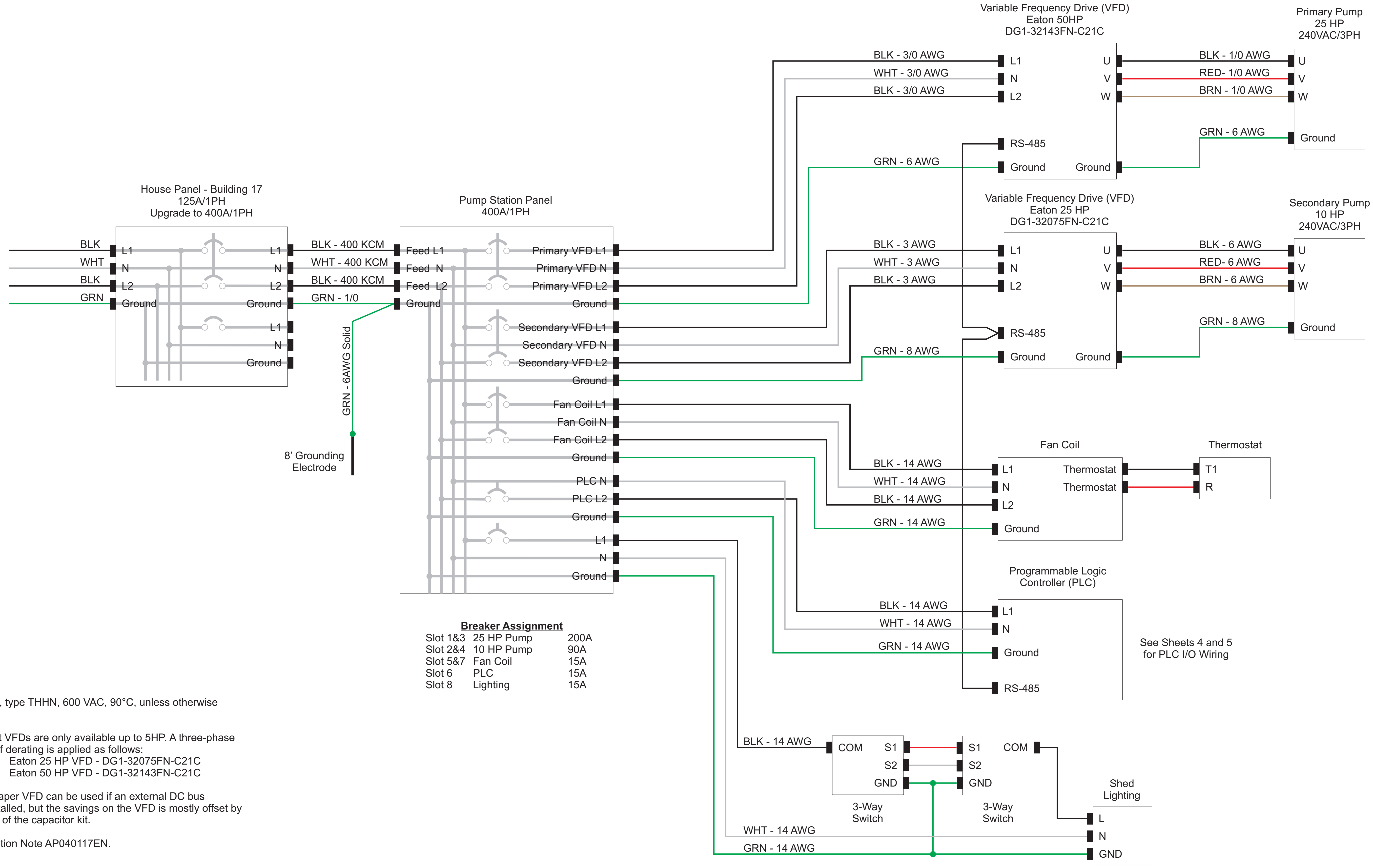

Breaker Assignment

Slot 1&3	25 HP Pump	200A
Slot 2&4	10 HP Pump	90A
Slot 5&7	Fan Coil	15A
Slot 6	PLC	15A
Slot 8	Lighting	15A

Notes

All Cables, copper, type THHN, 600 VAC, 90°C, unless otherwise noted.

Single-phase input VFDs are only available up to 5HP. A three-phase unit can be used, if derating is applied as follows:
10 HP Pump   Eaton 25 HP VFD - DG1-32075FN-C21C
25 HP Pump   Eaton 50 HP VFD - DG1-32143FN-C21C

A smaller and cheaper VFD can be used if an external DC bus capacitor kit is installed, but the savings on the VFD is mostly offset by the additional cost of the capacitor kit.

See Eaton Application Note AP040117EN.

Reclaimed Water System Electrical Schematic

Sheet: 4 of 9	Rev: 2	Drawn By: KW	October 11, 2016
Size: B	Scale: NTS	Tolerances:	

H:\Projects\Irrigation\SingleStage\ElectricalSchematic.cdr

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INPUTS

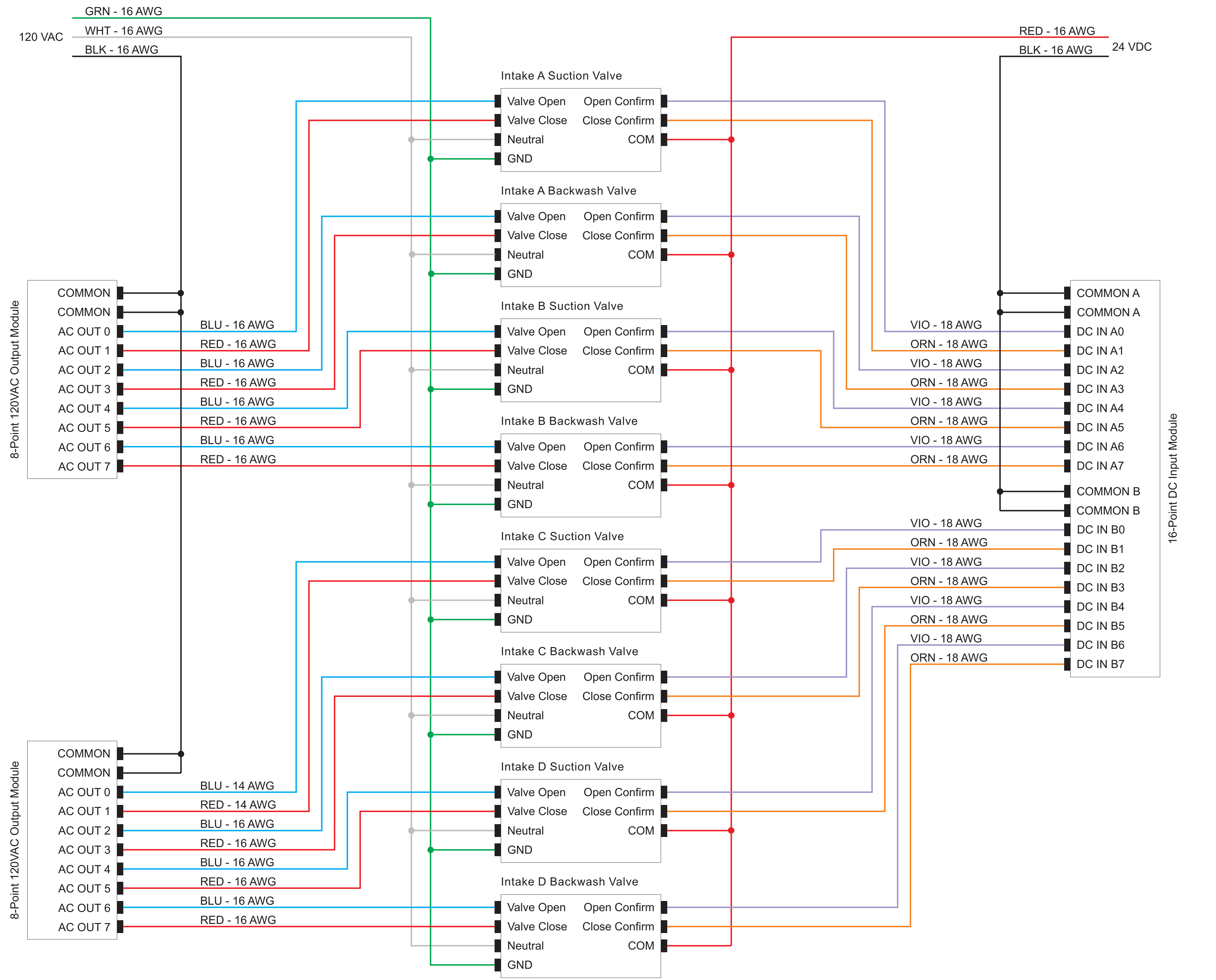
Slot	Point	Type	Description
1	A0	DC	Intake A Suction Valve Open
1	A1	DC	Intake A Suction Valve Closed
1	A2	DC	Intake A Backwash Valve Open
1	A3	DC	Intake A Backwash Valve Closed
1	A4	DC	Intake B Suction Valve Open
1	A5	DC	Intake B Suction Valve Closed
1	A6	DC	Intake B Backwash Valve Open
1	A7	DC	Intake B Backwash Valve Closed
1	B0	DC	Intake C Suction Valve Open
1	B1	DC	Intake C Suction Valve Closed
1	B2	DC	Intake C Backwash Valve Open
1	B3	DC	Intake C Backwash Valve Closed
1	B4	DC	Intake D Suction Valve Open
1	B5	DC	Intake D Suction Valve Closed
1	B6	DC	Intake D Backwash Valve Open
1	B7	DC	Intake D Backwash Valve Closed
2	A0	DC	Fertilizer Inject Valve Open
2	A1	DC	Fertilizer Inject Valve Closed
2	A2	DC	Water Meter Pulser
2	A3	DC	Pre-Filter PRV Flow
2	A4	DC	Post-Filter PRV Flow
2	A5	DC	Filter Wash Discharge Flow
2	A6	DC	Pump Shed Upper Flood Sensor
2	A7	DC	Pump Shed Lower Flood Sensor
2	B0	DC	Pump Shed Smoke Detector
2	B1	DC	PLC Cabinet Door Sensor
2	B2	DC	Pump Shed Doors Sensor
2	B3	DC	
2	B4	DC	
2	B5	DC	
2	B6	DC	
2	B7	DC	
3	0	4-20mA	Intake A Pressure Transducer
3	1	4-20mA	Pre-filter Pressure Transducer
3	2	4-20mA	Post-filter Pressure Transducer
3	3	4-20mA	Pond Water Level
3	4	4-20mA	Pond Water Temperature
3	5	4-20mA	Pump Shed Air Temperature
3	6	4-20mA	
3	7	4-20mA	

OUTPUTS

Slot	Point	Type	Description
5	0	120 VAC	Intake A Suction Valve Open
5	1	120 VAC	Intake A Suction Valve Close
5	2	120 VAC	Intake A Backwash Valve Open
5	3	120 VAC	Intake A Backwash Valve Close
5	4	120 VAC	Intake B Suction Valve Open
5	5	120 VAC	Intake B Suction Valve Close
5	6	120 VAC	Intake B Backwash Valve Open
5	7	120 VAC	Intake B Backwash Valve Close
6	0	120 VAC	Intake C Suction Valve Open
6	1	120 VAC	Intake C Suction Valve Close
6	2	120 VAC	Intake C Backwash Valve Open
6	3	120 VAC	Intake C Backwash Valve Close
6	4	120 VAC	Intake D Suction Valve Open
6	5	120 VAC	Intake D Suction Valve Close
6	6	120 VAC	Intake D Backwash Valve Open
6	7	120 VAC	Intake D Backwash Valve Close
7	0	120 VAC	Fertilizer Inject Valve Open
7	1	120 VAC	Fertilizer Inject Valve Close
7	2	120 VAC	80-micron Filter Solenoid
7	3	120 VAC	Exterior Attention Light
7	4	120 VAC	RFU - Cooling Fans
7	5	120 VAC	
7	6	120 VAC	
7	7	120 VAC	

COMMUNICATIONS

Slot	Type	Description
CPU	RS-485	Pump VFDs
CPU	Ethernet	



Reclaimed Water System Programmable Logic Controller (PLC) Backwash Valves			
Sheet: 5 of 9	Rev: 1	Drawn By: KW	October 4, 2016
Size: B	Scale: NTS	Tolerances:	
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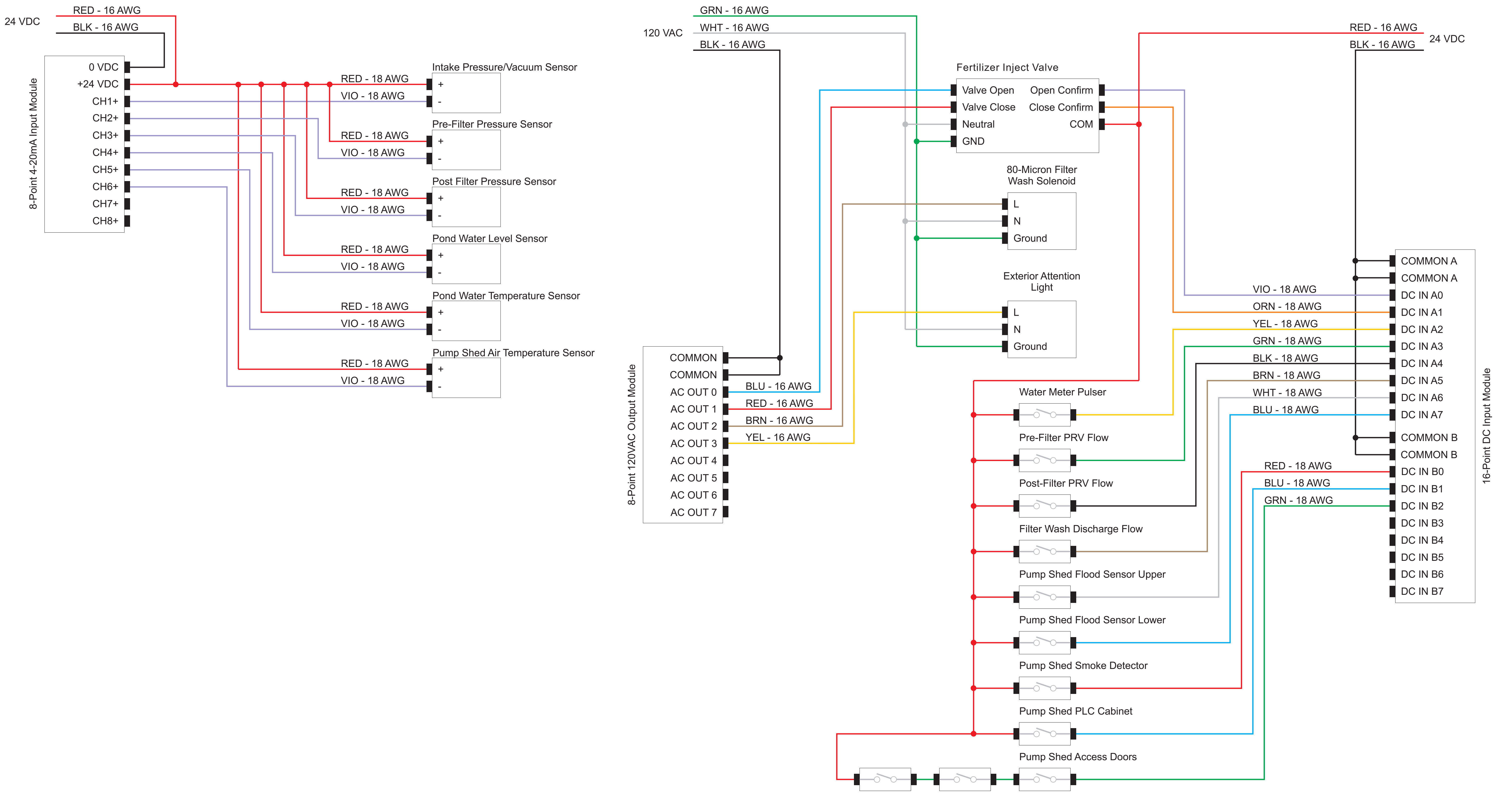

Reclaimed Water System Programmable Logic Controller (PLC) Pressure Sensors and Other I/O				Society Hill at Piscataway 550 Chesterfield Drive Piscataway, NJ 08854 732-463-3434 management@societyhillpiscataway.com
Sheet: 6 of 9	Rev: 1	Drawn By: KW	October 4, 2016	
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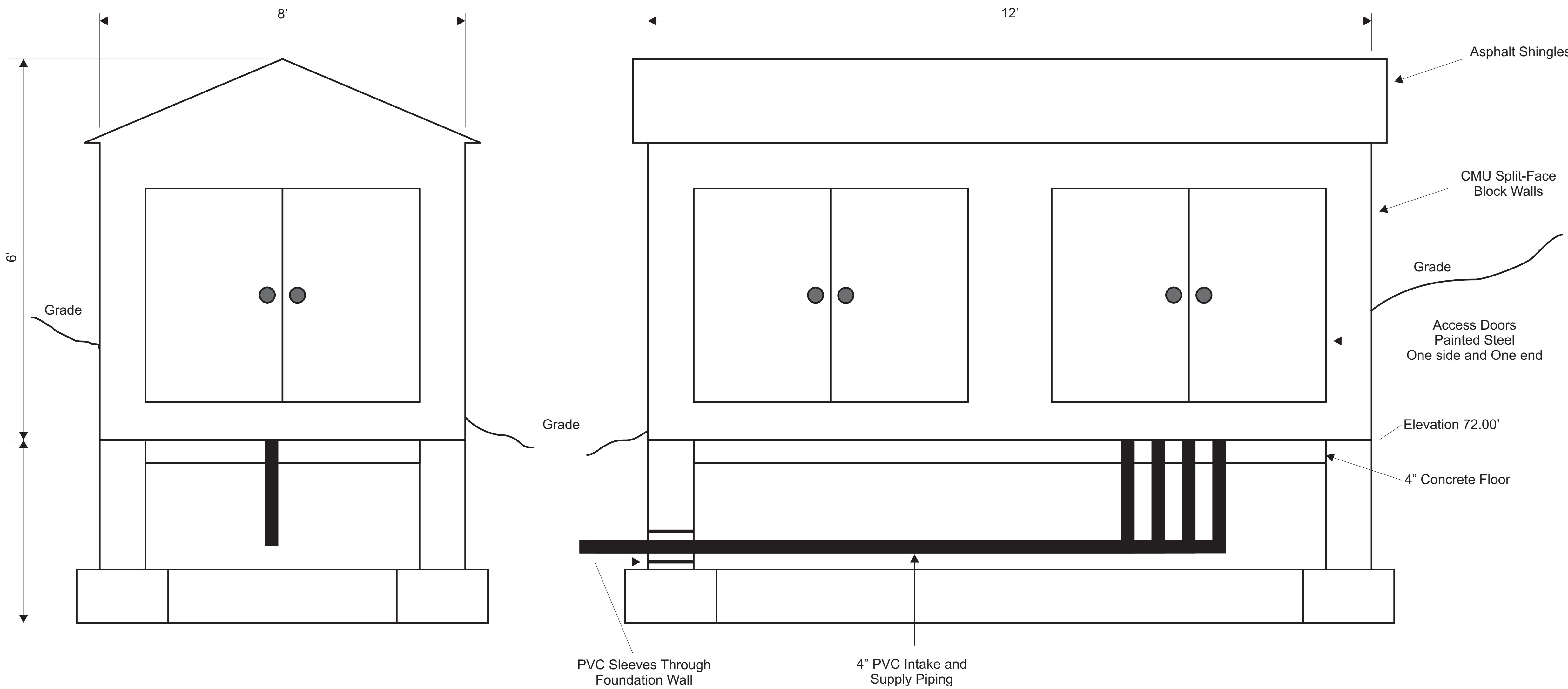

Reclaimed Water System Pump House				
Sheet: 7 of 9	Rev: 1	Drawn By: KW	October 1, 2016	
Size: B	Scale: NTS	Tolerances:		
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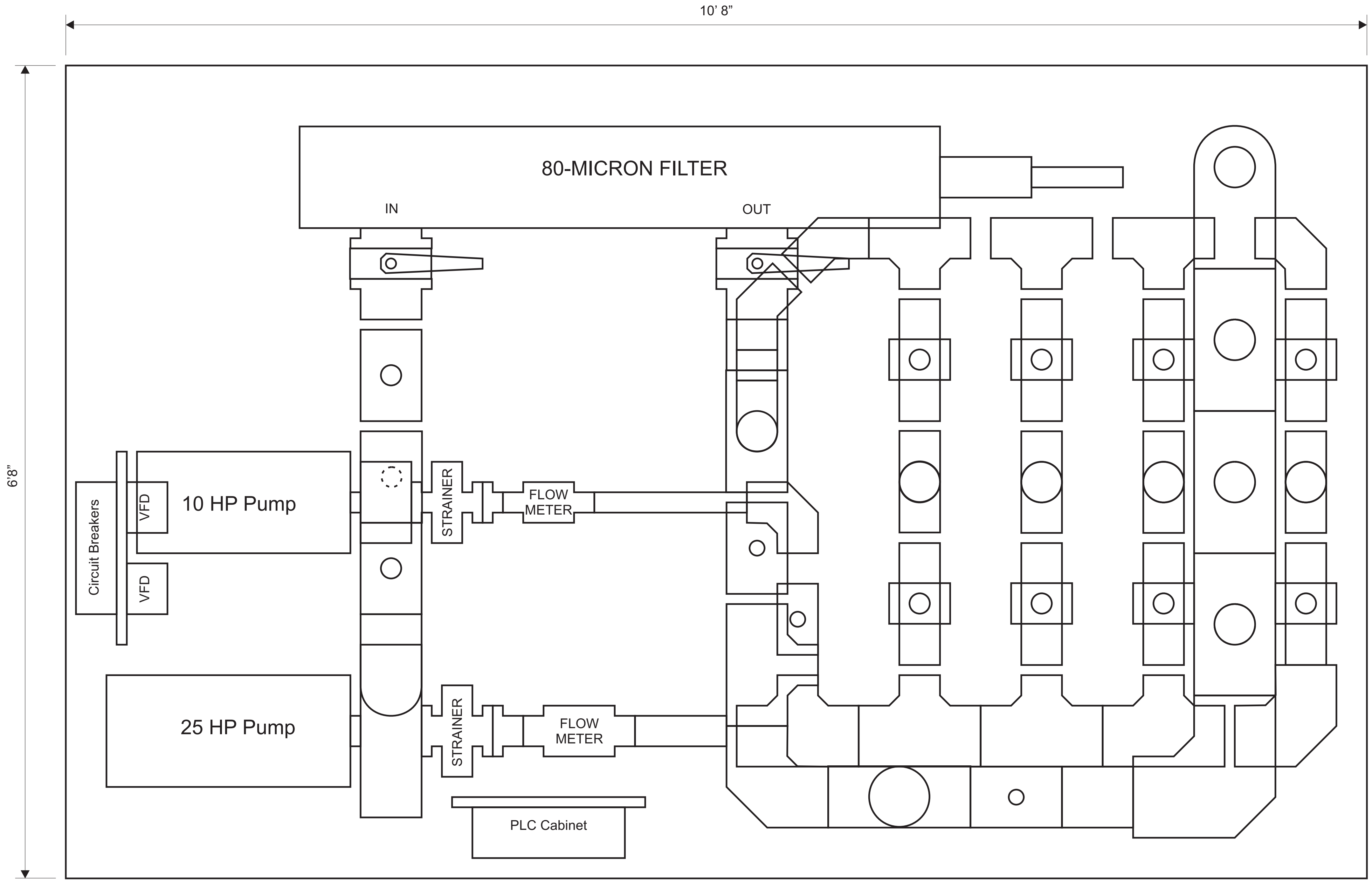

Reclaimed Water System Pump House Plumbing Layout			
Sheet: 8 of 9	Rev: 2	Drawn By: KW	October 1, 2016
Size: B	Scale: 1"=1'	Tolerances:	
H:\Projects\Irrigation\SingleStage\PlumbingLayout.cdr			

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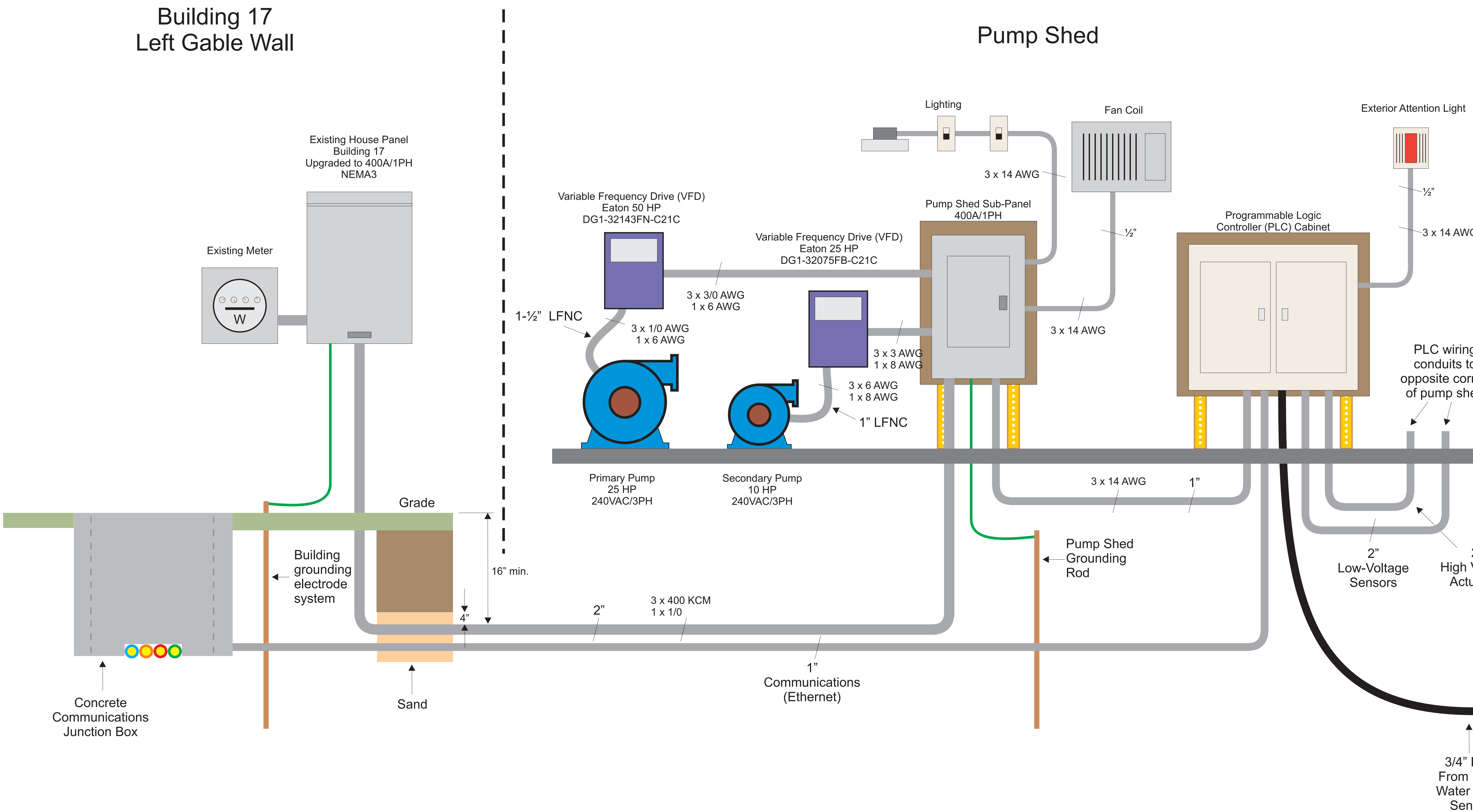

Notes

All conduit, RNC, unless otherwise noted.
All cables, type THHN, 600 VAC, 90C, unless otherwise noted.

Reclaimed Water System
Electrical Layout

Sheet: 9 of 9	Rev: 1	Drawn By: KW	October 25, 2016
Size: B	Scale: NTS	Tolerances:	

H:\Projects\Irrigation\SingleStage\ElectricalLayout.cdr

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