



Authorized Onsite Soil Evaluator / Professional Engineer Report for **Construction Permit**

Property
Location:

Lot: _____ Subdivision: **Quantico National Cemetery**

Map Reference: _____

Other Property ID / Acreage: **18424 Joplin Road**

Applicant / Client and Address:

Quantico National Cemetery
18424 Joplin Road
Triangle, VA 22172
Attn: Karl McDonald
Phone: (703) 221-2185

Prepared by:

David K. Hogan, AOSE #00356
Balzer & Associates Inc.
15871 City View Drive, Suite 200
Midlothian, VA 23113
(804) 794-0571

Date of Report: **8/24/2011**A.O.S.E. / P.E. Job Number: **C1100218.00**

Revisions: _____

Health Dept. ID No.: _____

Contents / Index of this Report:

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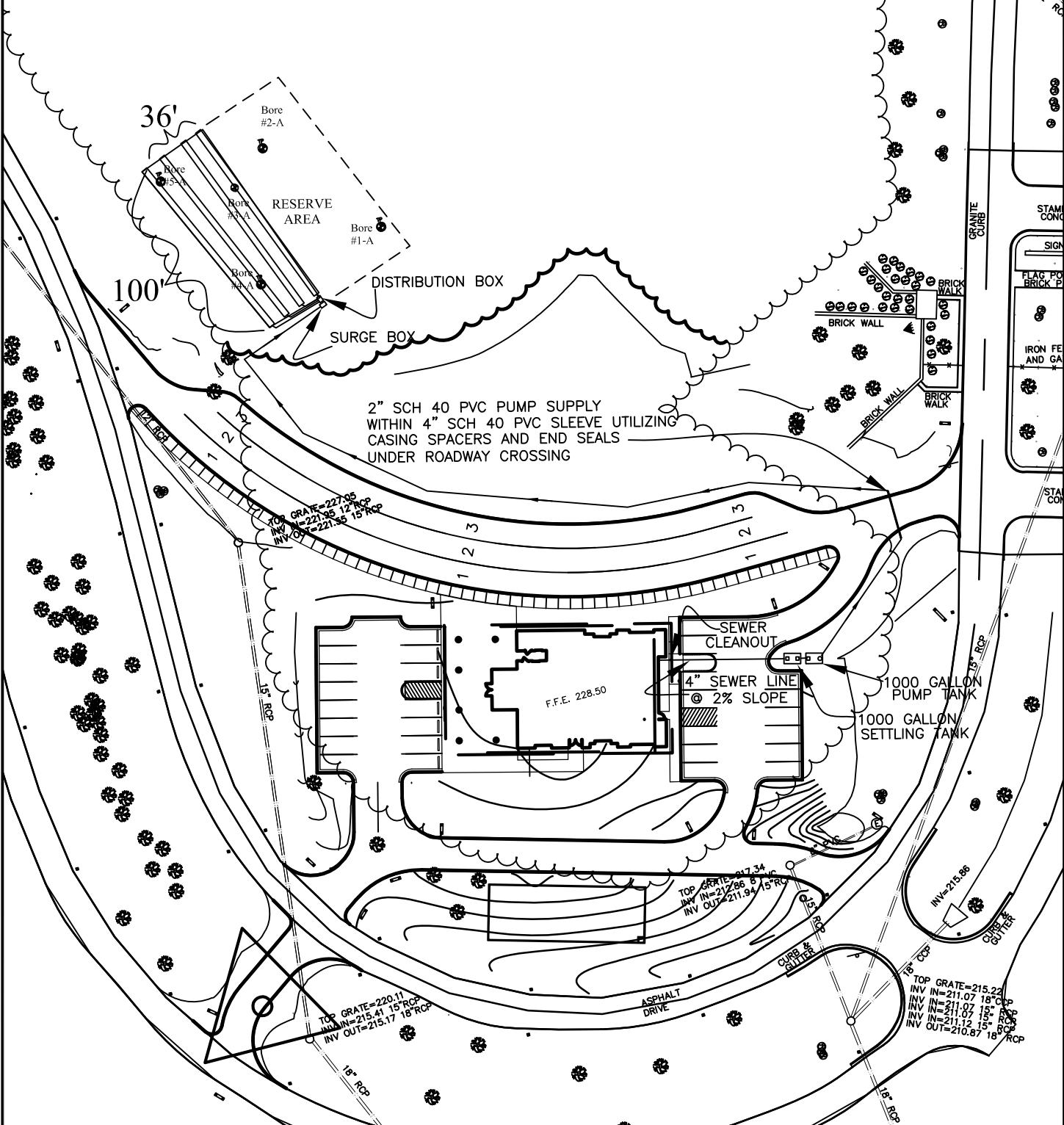
Site Layout / Construction Drawings	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>2</u>
Soil Summary Report	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>3</u>
Soil Profile Descriptions	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>4</u>
Construction Specifications	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>5</u>
Pump Specifications	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>6 - 9</u>
Abbreviated Design Form	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>10</u>
Septic Care & Maintenance	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<u>11</u>
Water Supply Design Specs	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<u>:</u>

Certification Statement:

I hereby certify that the evaluations and/or designs contained herein were conducted in accordance with the Sewage Handling and Disposal Regulations (12 VAC5-610), the Private Well Regulations (12 VAC5-630) and all other applicable laws, regulations and policies implemented by the Virginia Department of Health. I further certify that I currently possess any professional license required by the laws and regulations of the Commonwealth that have been duly issued by the applicable agency charged with licensure to perform the work contained herein.

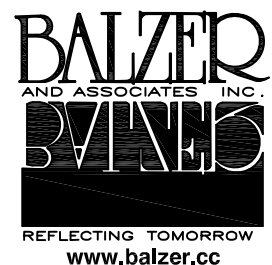
I recommend a permit1 be approved2.

A.O.S.E. / P.E Stamp
Signature & Date



SEPTIC DESIGN & LAYOUT
QUANTICO NATIONAL CEMETERY
ADMINISTRATION BUILDING
Triangle, Virginia

DATE: 08/24/2011
SCALE: 1"=70'
JOB NO: C1100218.00
Pur: MACTEC



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Soil Summary Report

GENERAL INFORMATION

Date: **08/24/2011** Submitted to **Prince William County** Health Department

Applicant: **David K. Hogan AOSE, Balzer and Associates Inc.** Phone: **804-794-0571**
Address: **15871 City View Drive Suite 200 Midlothian, VA 23113**

Owner: **Quantico National Cemetery**
Address: **18424 Joplin Road, Triangle, VA 22172**

Location: **18424 Joplin Road**

Tax Map: _____ Subdivision: **Quantico National Cemetery** Lot: _____

SOIL INFORMATION SUMMARY

1. Position in landscape satisfactory: Yes ☒ No ☐
Describe: **Side Slope**
2. Slope: **9%**
3. Depth to rock or impervious strata: Max. **>46"** Min. **>42"** None **X**
4. Depth to seasonal water table (gray mottling or gray color): No ☒ Yes ☐
**** (Redoximorphic indicators at 24" in Reserve Area Only) ****
5. Free water present: No ☒ Yes ☐ _____ range in inches
6. Soil percolation rate estimated: Yes ☒ No ☐ Texture group **III**
Estimated rate of **60** min/inch
7. Permeability test performed: Yes ☐ No ☒
If yes, note type of test performed and attach _____

☒ Site Approved: Drainfield to be placed at a depth of **27"** at site designated on permit.

☐ Site Disapproved:

Reasons for rejection:

1. ☐ Position in landscape subject to flooding or periodic situation.
2. ☐ Insufficient depth of suitable soil over hard rock.
3. ☐ Insufficient depth of suitable soil to seasonable water table.
4. ☐ Rates of absorption too slow.
5. ☐ Insufficient area of acceptable soil for required drainfield, and/or Reserve Area.
6. ☐ Proposed system too close to well.
7. ☐ _____ (attach additional pages if necessary)

SOIL PROFILE DESCRIPTION REPORT

Evaluation Location: **Quantico National Cemetery, Admin Building - MACTEC**

☒ See application sketch☐ See construction permit

☐ See sketch on reverse side or attached to this form.

[illegible]



Sewage Disposal System Construction Specifications

General Information	
Use: Residential <input checked="" type="checkbox"/> Commercial <input type="checkbox"/> 30 employees @ 10 GPD each = 300 GPD design New <input checked="" type="checkbox"/> Repair <input type="checkbox"/> Expanded <input type="checkbox"/> Termite Treatment <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Gravity Conventional <input type="checkbox"/> Pump Conventional <input checked="" type="checkbox"/> Basement <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Alternative _____ <input type="checkbox"/> Fixtures in Basement <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Owner: <u>Quantico National Cemetery</u> Address: <u>18424 Joplin Road, Triangle, VA 22172</u> For a Type <u>II</u> Sewage disposal system which is to be constructed on/at <u>18424 Joplin Road</u> Subdivision: <u>Quantico National Cemetery</u> Lot: _____ Actual or estimated water use: <u>360 GPD (15 Employees @ 10GPD, 80 Visitors @ 2.6 GPP)</u>	
DESIGN	NOTES
Water Supply: <input checked="" type="checkbox"/> Public <input type="checkbox"/> Private <input type="checkbox"/> New <input checked="" type="checkbox"/> Existing To be installed: class _____ cased _____, grouted _____,	
Building sewer: <u>4</u> I.D. PVC 40 or equivalent. Slope 2% (minimum). <input type="checkbox"/> Other _____	
Septic tank: Capacity <u>(1) 1000 gallon settling tank</u> (minimum) <input type="checkbox"/> Other _____	
Inlet-outlet structure: PVC 40, 4" tees or equivalent. <input type="checkbox"/> Other _____	
Pump and pump station: No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> <u>(1) 1000 gallon pump tank.</u> If Yes: <u>See Pages 6 - 9 for Pump Specs (Time Dose MVP Panel)</u>	
Gravity mains: 3" or larger I.D., minimum 6" fall per 100', SCH 40 PVC <input type="checkbox"/> Other _____	
Distribution Box: Pre-cast concrete with <u>8</u> ports. <input type="checkbox"/> Other _____	
Header Lines: Material: 4" I.D.Sch. 40 PVC from distribution box extending to 2' into absorption trench Slope: 2"/100' minimum <input type="checkbox"/> Other _____	
Percolation Lines: Gravity 4" plastic 1000 lb. Per foot bearing load or equivalent, slope 2" 4" (min. max.) per 100' <input type="checkbox"/> Other _____	
Absorption Trenches: Square ft. required: <u>1200 ft²</u> ; Depth to bottom of trench: <u>27"</u> ; Trench width: <u>3'</u> Depth of aggregate: <u>12"</u> ; Trench length: <u>100'</u> ; Number of trenches: <u>4</u>	

Pump System Design Criteria, Specifications, and Calculations

A. Employees + Visitors	<u>95</u>	
B. Average Gallons	<u>3.789</u>	Gal
C. Design flow in gallons per day (A x B)	<u>359.955</u>	GPD
D. Minimum pump capacity in gallons per minute (enhanced flow distribution)	<u>36</u>	GPM
E. Maximum pump capacity in gallons per minute using 2" force main	<u>84</u>	GPM
F. Relative elevation of force main at surge basin / distribution box	<u>235</u>	ft
G. Relative elevation of pump off float switch	<u>221</u>	ft
H. Static head in feet (F-G)	<u>14</u>	ft
I. Equivalent length of 2" pipe in feet for this system (all materials are 2"):		
1 Length of 2" force main	<u>485</u>	ft
2 <u>4</u> 90 degree bends at <u>5.2</u> feet per bend =	<u>20.8</u>	ft
3 <u>2</u> 45 degree bends at <u>2.8</u> feet per bend =	<u>5.6</u>	ft
4 <u>1</u> Check valve <u>1.4</u> feet per valve =	<u>1.4</u>	ft
5 <u>1</u> Gate valve <u>17.2</u> feet per valve =	<u>17.2</u>	ft
Total (1+2+3+4+5)	<u>530</u>	ft
J. Friction loss in feet per 100' of pipe (2" pipe, C=150, <u>36</u> GPM)	<u>2.19</u>	ft
K. Number of 100' pipe increments (I/100)	<u>5.3</u>	ft
L. Friction head for this system (J x K)	<u>11.61</u>	ft
M. Total Dynamic Head (H + L)	<u>25.61</u>	ft
N. Pump chamber volume in gallons	<u>1000</u>	Gal
O. Gallons per inch in pump chamber	<u>21.64</u>	Gal
(inside length = _____", inside width= _____")		
P. Number of soil absorption trenches	<u>4</u>	
Q. Length of soil absorption trenches	<u>100</u>	ft
R. Total linear feet of percolation piping (P x Q)	<u>400</u>	ft
S. Volume pumped per pump cycle in gallons (R x 0.653 x 60%)	<u>156.72</u>	Gal
T. Volume pumped per pump cycle in inches (S/O)	<u>7.24</u>	in.
U. Minimum emergency storage in gallons (C/4)	<u>89.98875</u>	Gal
V. Minimum emergency storage in inches (U/O)	<u>4.16</u>	in.
W. Maximum pump run time in minutes (S/D)	<u>4.35</u>	min.
X. Minimum pump run time in minutes (S/E)	<u>1.87</u>	min.

Pump Selection:

Pump must provide a minimum of 36 GMP at a Total Dynamic Head of 25.607 feet.

Pump Zoeller (or equivalent) Model # 151

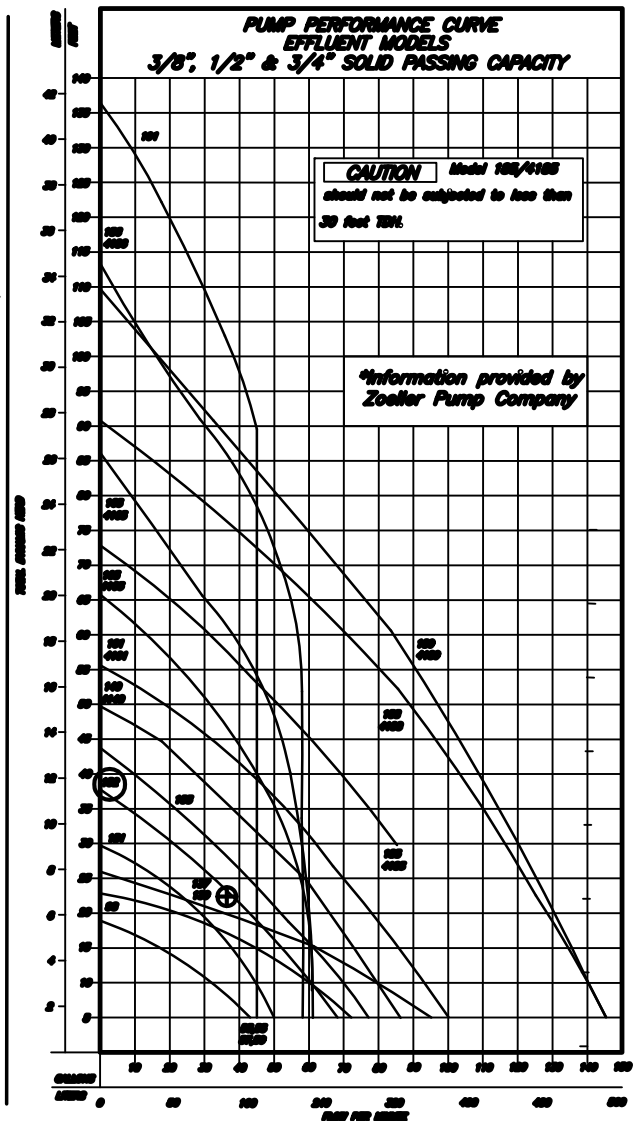
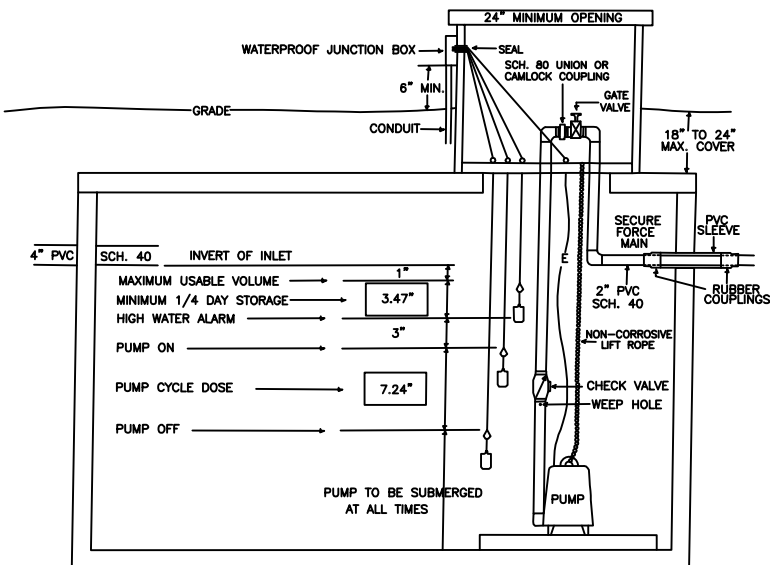
PUMP SYSTEM PLANS AND SPECIFICATIONS

Pump Chamber Size in Gallons	1000
Drawdown in Gallons (Each Pump Cycle)	156.72
Drawdown in Inches (Each Pump Cycle)	7.24

Force Main Shall be 2" Diameter SCH. 40 PVC Pressure Pipe with Pressure Fittings.
Pump must Provide 36 Gallons per Minute Minimum and 84 Gallons per Minute Maximum at System Head

Maximum Pump Cycle Time (Drawdown in Gallons / 36 GPM)	=	4.35	Minutes,	Seconds
Minimum Pump Cycle Time (Drawdown in Gallons / 60 GPM)	=	1.87	Minutes,	Seconds

Pump shall be of the open face centrifugal type designed to pump sewage.
The pump station must be provided with controls for automatically starting and stopping the pump based on water level.
The electrical motor control center and master disconnect switch shall be placed in a secure location above grade remote from the pump station.
Each motor control center shall be provided with a manual override switch.
A high water alarm with remote sensing and electrical circuitry separate from the motor control center circuitry shall be provided.
The alarm shall be audiovisual and shall alarm in an area where it may be easily monitored
All electrical connections shall be hardwired.
Do not use compression fittings.
Force main shall be deep enough to prevent freezing.
Pump chamber shall be level and watertight.



DESIGN REQUIREMENTS



PUMP TANK SPECIFICATIONS FOR
Quantico National Cemetary
18424 Joplin Rd.
Triangle, Virginia

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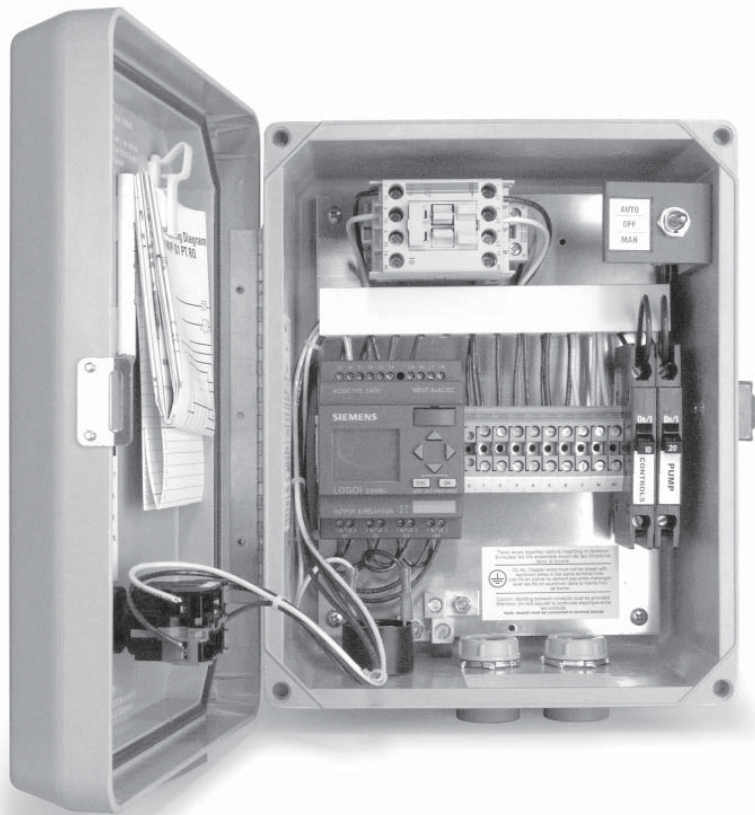
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MVP-Simplex Control Panel

Applications

The MVP-Simplex control panel is ideal for timed and on-demand dosing in single-pump systems. All MVPs include an easy-to-use, programmable logic unit that incorporates many timing and logic functions, such as multiple timing intervals to adjust for changing flow conditions and a built-in elapsed time meter and counter. Any water or wastewater system that requires a timer would benefit from the MVP's accuracy and versatility.



Easy to set, accurate, and surprisingly affordable, the MVP brings intelligent control technology to the water and wastewater handling industries.

To Order

Call your nearest Orenco Systems®, Inc. distributor. For nearest distributor, call Orenco at 800-348-9843, or go to www.orenco.com and click on "Distributor Locator."

APS-CP-MVP-1
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Orenco Systems®, Inc.


Orenco Systems®
Incorporated
*Changing the Way the
World Does Wastewater®*
800-348-9843
www.orenco.com

Standard Features & Benefits

- Eight inputs and four outputs
- Intervals as long as 99 hours can be set with an accuracy of $\pm 1\%$
- Simple setting instructions are easy to remember
- Built-in programming keys allow reprogramming in the field without a portable computer
- Parameters have understandable abbreviations
- Multiple timer intervals (e.g., normal timer, override timer) can be set to accommodate varying flow conditions
- High-level alarm delay is adjustable
- When an alarm condition is reached, a minimum number of override cycles can be set to allow tank levels to drop, thus eliminating nuisance alarms
- Large, backlit LCD display is easy to read
- Ability to use one model of float for all functions simplifies installation
- UL 508 listed in the United States and Canada
- Complete instructions and diagrams come with panel and are affixed to the inside, for reference in the field
- Three-year limited warranty

Standard Features for System Maintenance

- Visual cues (indicators of float position and different alarm/light signals for varying alarm conditions) aid system maintenance
 - Built-in counters for low-level alarms, high-level alarms, overrides (on panels with timer), and power failures. Records total hours in service. These features provide valuable information for system maintenance and troubleshooting
 - Timed delays on float inputs prevent chattering and pump burnout
 - Automatic reactivation of silenced alarm (when problem is not corrected) helps prevent system failure
- (Optional features on back.)*

Optional Features & Benefits

- Removable EEPROM card for reprogramming the panel in the shop or in the field
- UL698A (Intrinsically Safe listing) for use in hazardous locations
- Self-regulating anticondensation heater (radiates additional wattage as temperature drops)
- Current sensor to signal pump failures; ideal for recirculating filters
- Pump run light to indicate pumping activity

Standard Models

MVP-S1 PTR0, MVP-S2 PTR0
MVP-S1 R0, MVP-S2 R0

Model Code for Ordering

MVP-S 1 PT

Options (should appear in the following order):

IR = intrinsically safe relay
PT = programmable timer
RO = redundant off
CS = current sensor
DS = disconnect switch
RA = remote alarm (dry contact)
TS = test switch
HT = heater
PRL = pump run light
PL = power light
SA = surge arrestor

Pump voltage:*

1 = 115 VAC

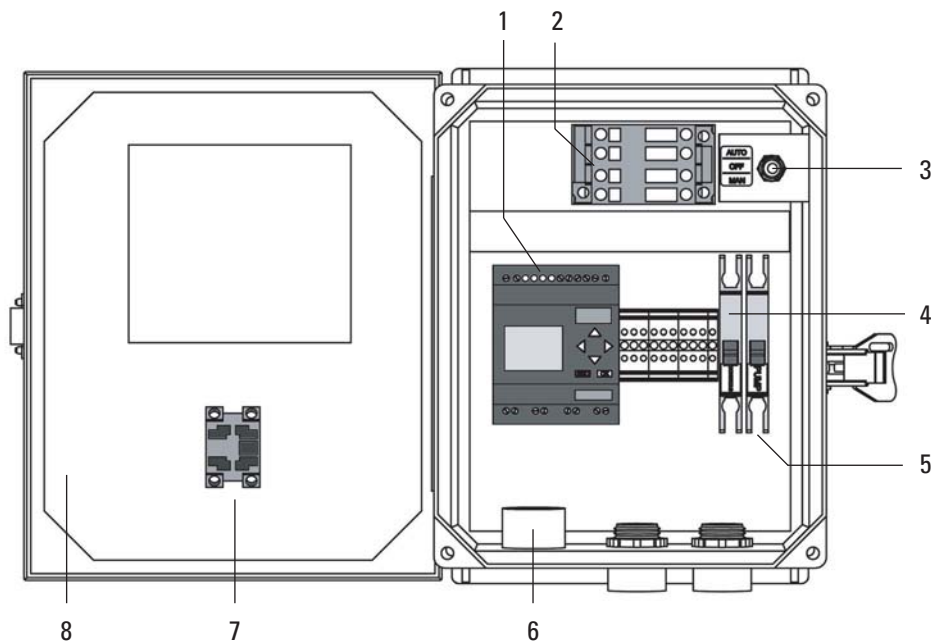
2 = 230 VAC

Simplex series

MVP control panel

* All panels require 115 VAC for the controls

1. Programmable Logic Unit
2. Motor-Start Contactor
3. Toggle Switch
4. Controls Circuit Breaker
5. Pump Circuit Breaker
6. Audible Alarm
7. Visual Alarm
8. Panel Enclosure



Distributed By:

Abbreviated Design Form

For use with gravity and pump drainfields, enhanced flow systems and low-pressure distribution systems when applying for a certification letter or subdivision approval.

Design Basis

- A. Estimated Percolation Rate: 60 min/inch
- B. Area required per 100 gallons:
(Table 5.4 Sewage Handling and Disposal Regulations) 331 ft²
- C. Hundreds of gallons: 3.6

Area Calculations

- D. Length of trench: 100'
- E. Width of trench: 3'
- F. Number of trenches: 4
- G. Center-to-center spacing: 9'
- H. Width required: 30'
G (F-1)+E
- I. Total square footage required:
(line B times line C) 1191.6 ft²
- J. Square footage in design:
(D*E*F) 1200 ft²
- K. Is a reserve area required: ☒ Yes ☐ No

**Alternative
Pump
Reserve
Required**



IMPORTANT FACTORS TO CONSIDER WHEN INSTALLING AND MAINTAINING SEPTIC TANK DRAINFIELD SYSTEMS

DRAINFIELD DISTURBANCE: The designated drainfield area (primary and reserve), must remain undisturbed until installation. The client is responsible for all parties that are involved in the home construction process and any destruction to the restricted area. The drainfield area is not to be driven on, parked on, or disturbed in anyway (i.e. soil compaction). Vehicles (trucks, tractors, and heavy equipment) especially should avoid this area. Our design package is final and cannot be deviated from without permission from our department. If the area is disturbed to a point where the area is no longer feasible as a drainfield site, the additional costs will fall on the client for our company or another AOSE to find another appropriate drainfield area.

LOGGING AND CLEARING: The clearing of a drainfield area is sometimes necessary, but must be followed according to the AOSE's specifications. The area must be hand-cleared when an engineered or alternative system has been specified with an install depth of 24 inches or less. Logging on or around the drainfield area is prohibited without permission from the AOSE. Heavy logging traffic and logging decks must be kept at least 50' feet away from the designated area (primary and reserve). If the area is disturbed to a point where the area is no longer feasible as a drainfield site, the additional costs will fall on the client for our company or another AOSE to find another appropriate drainfield area.

MULCH / IRRIGATION: We do not recommend the use of bark, sawdust, or plastic sheeting on drainfield sites. The purpose of these mulch beds is to prevent evaporation and retain water, while the primary function of a drainfield is to percolate water through the soil system with evapo-transpiration being an integral part of that process. Mulch can lead to an early failing of your septic system. Yard irrigation systems are not recommended for use on or within 25 feet of the drainfield trenches. Additional water added to the drainfield area can increase the likelihood of premature drainfield failure. The drainfield should be graded and seeded and maintained as a lawn for optimal performance. Consult your local Extension Service office for seed, lime, and fertilizer recommendations.

GARBAGE DISPOSERS AND KITCHEN WASTE: If a garbage disposal unit is installed within a home, the kitchen plumbing should be plumbed to a separate outlet and a 1250/1500-gallon septic tank/grease trap installed to receive only kitchen effluent. This effluent can then flow to the primary or a separate drainfield site. We do not recommend garbage disposal units with conventional drainfields that do not have a dedicated septic tank/grease trap. Grease/kitchen waste build-up can lead to premature failure of your septic system.

The client is responsible for maintaining the drainfield site and minimizing the disturbance on or around our designated area. It is also the responsibility of the client to ensure that the installer is supplied with the most updated version of all drawing and specifications, including a current Health Department approval letter. It is also your responsibility to pass care and maintenance information on to the eventual homeowner. We assume no liability outside of our specifications and design package. If any questions arise, do not hesitate to call for any advice or consultation.

David K. Hogan, AOSE CPSS