

# East Bay Regional Park District

## Wastewater Pump Station Operators Guide

### Control, Monitor, Maintenance

Version 2.06



This manual is intended to assist Park District personnel with the operation of a Wastewater Pump station equipped with a MultiTrode control panel featuring the MultiSmart controller. This manual is to be used by “Qualified Personnel” only.

“Qualified Personnel” refers to East Bay Regional Park District employees who have received training on the operation of the system and understand the hazards associated with this equipment.



## Overview

### 1. Panel Exterior

#### Door

The panel exterior door is equipped with a 3-point locking system.

Located top center and bottom center are recessed slotted  $\frac{1}{4}$  turn latches. These latches must be rotated using a flat head screwdriver so the slot is facing vertical for closed/latched and horizontal for open/unlatched.

The latches must be properly secured when the panel is closed to ensure door seal compression.

Located middle right side of the cover is the door opener handle. Rotating the handle out from the recess and  $\frac{1}{4}$  turn will release the door to be opened.

If door does not open, do not force. Stop and check both upper and lower latches.

The handle must be stowed securely in recess when panel is closed to ensure door seal compression and security of interior components.

**Note: Due to the sensitive electronic equipment within this panel, Proper latching of door hardware is critical to system reliability!**

#### Alarm

The exterior alarm has two components.

First a red beacon type light located on the top of the panel serves as a visual indication that the system needs to be checked for a possible malfunction.

Second is a horn located on the left side of the panel. This horn serves as an audible indication that the system is in High Level Alarm.

## Interior

### Door

Opening the exterior door will expose all of the operator controls. The exterior door is equipped with a latch open mechanism to ensure the safety of the operator.

When opening the exterior door, always open to fully engage the hold-open arm. When properly engaged, the arm will prevent the door from accidentally closing and injuring the operator. The hold-open arm automatically engages when the door is opened 90 degrees.

To close the exterior door, the hold-open arm must be manually disengaged. Disengagement is by lifting the arm and closing the door. The arm will automatically move into the stored position when the door is closed.

The door is also equipped with a document holder for all reference material.

**Note: No documentation is located or allowed behind the interior control panel.**

### Control panel

The control panel contains all of the controls for operating and monitoring the pumping equipment in the wet well.

The control system consists of three groups

Group (A) Circuit Breakers

Group (B) Operators

Group (C) Indicators

**Group A** contains the circuit breakers that protect the operator and equipment from accidental discharge or release of energy. All circuit breakers must be on for the system to work properly. The Main Circuit Breaker controls the main power to the panel. This circuit breaker controls power for all functions within the system and is the only point of shutting off all power.

Pump 1 & Pump 2 circuit breaker only connect and disconnect power to the individual pumps respectively. These must be on for the specific pump to operate.

**Note: The control system can indicate a pump running, however if the pump circuit breaker is off, the pump will not run.**

The GFCI circuit breaker provides power to the GFCI receptacle located on the face of the interior control panel and the panel interior heater. The heater prevents moisture inside the panel. This circuit breaker does not impact the operation of the panel or pumps.

**Group B** is any device that has the function of operating any piece of equipment. This includes the switches, buttons and the Multismart controller.

### **Selector Switches**

The switches are labeled P1 and P2. Each switch controls the operation of the indicated pump. P1 controls pump 1 and P2 controls pump 2. In the off position (center) the pump will not run regardless of the circuit breaker position or the Multismart controller. *Off means Off.*

In the auto position (right), whenever the liquid level in the station reaches the pump down level, the pump will automatically start and pump the station down. In the event that the Multismart controller is unable to function, the secondary control system will automatically take control and pump the station down when the level reaches the High Alarm state. The P1 and P2 switches must be in the auto position for the pumps to operate.

The hand (left) position is a spring return position that must be manually held for the pump to run. In the Hand position, the pump will run regardless of the liquid level in the station. This function is used only for testing the pump or pumping the station down manually in the event of a control system failure. The hand position requires the operator to be present at the station holding the switch in the manual position for the pump to run.

### **Buttons**

The buttons are push type momentary contact. Pushing the button activates the switch, releasing the button deactivates the switch.

### **Pump Reset Button**

Reset buttons are used to reset a pump controller when the circuit breakers are on, the switch is in auto and the liquid level has reached the pump down stage. However the pump has not started. Prior to pushing the reset button, the pump can be tested using the Hand position of the switch. In Hand if the pump starts, then the reset is not necessary. However if the pump fails to start in the Hand position, push and release the reset button.

### **Test Alarm**

Test alarm is used to verify the operation of both the red beacon on top of the panel and the horn on the side of the panel.

### **Horn Silence**

Horn silence is used to turn the horn off during an alarm condition. Horn silence should only be used to silence the horn following notification of problem to proper dept.

### **Backup Reset**

Backup reset is used to reset the control system to the Multismart controller following a malfunction that required the system to switch automatically to backup.

### **Lamp Test**

Each of the three indicator lights (Pump 1 On, Pump 2 On, and Backup On) has a built in push to test lamp function.

Simply push on the lens until it stops. The lamp will automatically illuminate until the lens is released. If the lamp does not illuminate when pressed, the lamp needs to be replaced.

**Note: Lamps must be replaced by Maintenance Department personnel only.**

*Group C* is any device that indicates the operation of equipment.

**Indicator lights**

**Pump Run**

The Pump 1 and Pump 2 Run lights indicate when the pump in the wet well is running. This light will illuminate either in automatic or manual operation.

**Backup On**

When illuminated, the backup system has automatically taken control due to a failure in the Multismart controller. This light will clear when the Backup Reset is initiated.

**Alarm Beacon**

The alarm beacon is activated by any condition within the system that requires immediate attention from Maintenance Department personnel.

**Alarm Horn**

The alarm horn will sound with the activation of the alarm strobe during High Level Alarm. The horn can be silenced.

## Multismart Controller



The Multismart controller is a computer based pump station control unit capable of monitoring the entire system from controls to pumps.

The Multismart unit looks at each component of the system individually and operates based on the information it receives. The controller will monitor the liquid level in the wet well while also monitoring the condition of the pumps.

The LCD screen provides the operator with information at a glance. From the main screen the operator can see the liquid level as displayed in percentage full on the bar graph at the right of the screen. Information regarding the pumps is displayed as well as voltage monitoring and faults. The soft keys allow the operator to scroll through information the controller has acquired.

### Power

The power LED is at the bottom left corner of the unit. When illuminated, the LED indicates that the power is on.

### Faults

The Fault LED is located above the power LED and indicates when a fault is present. The fault LED will blink once per second when a fault is detected.

Pressing the soft key at the lower right of the screen will display the fault condition. The Multismart controller will not allow a pump to run while a fault is present.

## **Liquid level**

The bar graph on the right of the screen indicates the liquid level in the wet well. The short vertical lines to the left of the level indicator graph are the set points for alarms (low level, backup pump on and high level).

The long vertical lines to the right of the level indicator graph are the set points for the pumps to come on and off.

The liquid level bar graph only shows the level when the system is being controlled by the Multismart controller. When the backup system is activated, the bar graph will not show the liquid level of the wet well.

## **Pump Control**

The LCD screen has a window for each of the pumps. To the left of each pump screen is a soft key used to select the pumps operation. Each time the key is pressed, the cursor will move one position. The Multismart controller should always be in the Auto position for the system to operate.

## **Contrast**

The screen contrast button is located left of the MultiTrobe symbol on the lower right corner of the controller. The contrast button is used to adjust the screen to varying light levels for ease of viewing.

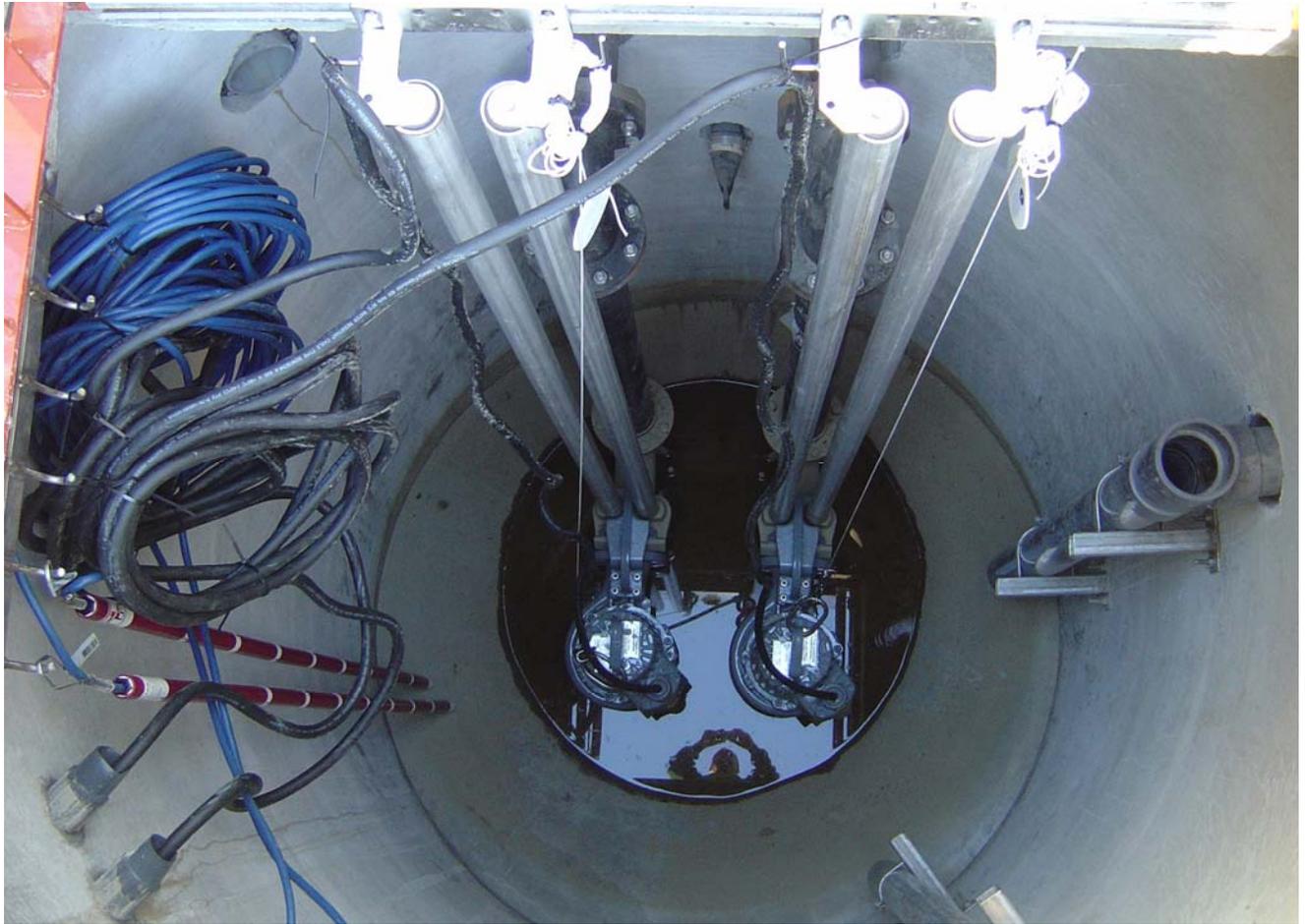
## **Home**

The home button is located above the contrast button and is used to bring the operator to the main menu as displayed in the above example.

## **Key Pad**

The numeric key pad is used to enter data for programming purposes only. The key pad should not be used by operators.

**Note: Never make changes to the program. This can severely damage the unit.**



## **2. Wet Well**

### **Cover**

The cover is a single, diamond plate spring assisted lid with a hatch lock and padlock. The hatch lock needs to be manually released for the cover to be opened. The hatch lock release handle is located in the control panel.

### **Safety Grate**

The safety grate is exposed when the cover is opened. The safety grate is a two part interlocking grate that allows the operator to visually inspect the wet well safely. The safety grate must always remain closed during routine inspections.

### **Pumps**

Each Wastewater Pump Station is equipped with two submersible pumps. These are self aligning and need no operational service. Visual & audible inspection is all that is required of the operator.

## **Level Probes**

Each station is equipped with two level indicating probes. Each probe is 10' in length, red in color and has a white band every 12" for a total of ten bands per length of probe.

Each band represents ten percent capacity of the pumping system range.

When the liquid level comes in direct contact with each band, the bar graph on the Multismart controller will advance 10%.

Increase 10% as station liquid level rises, decrease 10% as station liquid level falls

One probe is the primary level detector for the Multismart controller. The second probe is for the emergency backup system in the event of a controller failure.

## **Check Valves**

Two swing type check valves are located in the valve box on the discharge side of the wet well.

One check valve for each pump. The arm on the side of the check valve is for visual inspection.



# Operation

## Automatic Mode

- 1: Open wet well and confirm liquid level in well.  
Check the level probes for debris. Clean if necessary.  
Remove any floating debris that poses potential problems to level probes or pumps.
- 2: Open control panel exterior door.  
Main circuit breaker is turned on.  
Multismart power light is illuminated; Multismart unit Home screen is displayed.
- 3: Pump 1 circuit breaker is on.
- 4: Pump 2 circuit breaker is on.
- 5: Push to test lamps for,  
Pump 1 Run  
Pump 2 Run  
Backup On
- 6: Pump 1 selector switch.  
Momentarily switch to hand to verify pump operation.  
Place in Auto position following hand test.
- 7: Pump 2 selector switch.  
Momentarily switch to hand to verify pump operation.  
Place in Auto position following hand test.
- 8: Test Alarm. (Push Alarm Test button)
- 9: Using soft key located to the left of Pump 1 screen on Multismart,  
Press key until "AUTO is highlighted.
- 10: Using soft key located to the left of Pump 2 screen on Multismart,  
Press key until "AUTO is highlighted.
- 11: System is now in automatic mode and will operate based on the level in the wet well.
- 12: Verify no faults are present on system.
- 13: Close wet well cover and secure pad lock.
- 14: Close control panel exterior cover. Secure three-point latch system and padlock.

## **Hand Mode**

- 1: Follow steps 1 thru 5 as described for “Automatic Mode”.
- 2: Turn selector switch for chosen pump to “Hand” position and hold, pump will continue to operate while switch is held in “Hand position.
- 3: Release switch to stop pump. Switch will automatically return to the off position.
- 4: Follow steps 13 -14 as described in “Automatic Mode”.

## **Monitor Station Weekly**

### **Responsibility**

Park District staff that have been trained in the operation of a Wastewater Pump Station shall be responsible for,

- 1: Monitor / maintain all pump stations in a reliable and ready condition.  
*Monitor refers to visual inspection of system to verify reliability of pumping equipment and controls.*  
*Maintain refers to overall cleanliness and housekeeping of site.*

### **ALL EQUIPMENT SERVICE SHALL BE PERFORMED BY TRAINED MAINTENANCE DEPT. PERSONEL.**

- 2: Respond quickly to prevent or minimize any negative environmental impact, if a problem does occur.
- 3: Take quick decisive action to (1) stop the incident and (2) to protect the public from potential health risks in the event of an overflow.
- 4: Promptly notify Park District Maintenance personnel of any emergencies, operating problems, alarms or changes in pumping characteristics.

## **Control Panel**

- 1: Unlock and open all cabinets and pit covers.
- 2: Power supply LED light on Multismart controller should be on.
- 3: If there is a fault indicated on the controller, report the fault and check to see if cleared.  
If cleared, reset.
- 4: Check Control Cabinet (free of moisture, dust, dirt, debris, odor).
- 5: Test any “push to test” lights.
- 6: Ensure all breakers are on.  
*If a breaker is not on, determine why the breaker is off...*  
*If there is no obvious reason to explain why the breaker is off, turn the breaker on.*  
*If the breaker is tripped, do not rest the breaker. Notify maintenance for service.*
- 7: Operate pump in “Hand” mode using selector switch on panel.  
Check wet well for turbulence, unusual noise and inspect the check valve to see if it has moved. After the pump has been tested, turn off pump and place back in AUTO mode.

## **Wet Well**

- 1: Check wet well for grease and debris.
- 2: Check level probes for debris. Clean if any debris is on probes.
- 3: Close and secure the wet well cover.
- 4: Close and secure valve box cover.

## **Housekeeping**

- 1: Clean up any spills found at the site.
- 2: Wipe down station as needed.
- 3: Pick up any litter found at the site.

## **Leaving pump station**

- 1: Ensure that all switches, controls and valves are in the correct position.
- 2: Ensure the pumps are in AUTO mode.
- 3: **Record results of inspection in the logbook.**  
*Note any problems found. If no problems were found, note that no problems were found.*
- 4: **Record required data in log book.**
- 5: Ensure all cabinets and pits are closed.
- 6: Ensure all locks are in place.
- 7: Ensure the gate is locked *if applicable*.
- 8: Inform crew leader, supervisor and maintenance dept. of any problems found at the pump station.

## **Special tools**

- 1: Standard flat head screw driver (for control panel door release).
- 2: Lid release “T” handle (located in control panel next to document holder)
- 3: Padlock key (Master key # 0838)

## **Maintenance**

### **Control Panel**

- 1: Keep exterior of panel clean and free of sprinkler overspray.
- 2: Check door gasket periodically for wear and abrasion. Report damage to Maintenance Dept.
- 3: If moisture and or water is found within the control panel, Report to Maintenance Dept.
- 4: Keep pad lock lubricated and in good working order.
- 5: Visually inspect alarm strobe and horn for vandalism. Report damage to Maintenance Dept.
- 6: Record information in log book located in control panel.

### **Wet Well**

- 1: Keep lid clean and free of vegetation, rocks and overgrown lawn.
- 2: Keep padlock lubricated and in good working order.
- 3: Keep Probes clear of rags and tissue. This entanglement can cause the system to malfunction.  
*Probes can be cleaned / serviced by,*
  - 1: Turn pump selector switches to “OFF”
  - 2: Using disposable gloves, remove probe by simply pulling up out of wet well.
  - 3: Clean probe/remove debris, dispose of debris properly.
  - 4: Reinstall probe and hang from suspension hook in same position.
  - 5: Repeat steps 3 & 4 for second probe.
  - 6: Remove protective gloves and dispose of properly.
  - 7: Turn pump selector switches to “AUTO”.
- 4: Report any evidence of debris hazard within wet well.

**Note: Never attempt to enter the Wet Well for any reason.**

# East Bay Regional Park District

## Wastewater Pump Station

### Environmental Event Report

Facility Name: \_\_\_\_\_

Event Type: \_\_\_\_\_ Operating Area: \_\_\_\_\_

Date Discovered: \_\_\_\_\_ Time Discovered: \_\_\_\_\_

Date Began: \_\_\_\_\_ Time Began: \_\_\_\_\_

Date Resolved: \_\_\_\_\_ Time Resolved: \_\_\_\_\_

Cause of Event: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Material Involved: \_\_\_\_\_

Amount: \_\_\_\_\_

What actions were taken to correct the problem: \_\_\_\_\_  
\_\_\_\_\_

Was the event preventable? \_\_\_\_ Yes \_\_\_\_ No.

If Yes, what steps should have been taken to prevent the event?  
\_\_\_\_\_  
\_\_\_\_\_

What steps will be taken to prevent recurrence? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Was the event reported? \_\_\_\_ Yes \_\_\_\_ No.

If Yes, to whom and when was the event reported? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Additional Comments: *Please add additional comments to the back side of this page.*

Completed by: \_\_\_\_\_ Date: \_\_\_\_\_

# East Bay Regional Park District

## Wastewater Pump Station Maintenance Log

Wastewater Pump Station maintenance review to be conducted once a week.  
 Verify all items on the weekly maintenance schedule.  
 Check off items upon completion of station review  
 Make note of any actions taken during review

Date	Time	Panel ✓	Wet Well ✓	Notes	Initials
12/4/06	10:10	✓	✓	No problem noted	RG
12/11/06	1:30	✓	✓	No Problem Noted	RG
12/19/06	8:25	✓	✓	Cleaned rags tangled on probes	RG
12/27/06	4:00	✓	✓	No Problem Noted	RG
1/03/07	7:45	✓	✓	Lock missing on wet well, installed new one	RG
1/8/07	11:15	✓	✓	Moisture in panel, notified supervisor	RG

**Note: The maintenance log book and log sheets must remain with the panel.**