



OxyPro 1000C-G

Operation and Maintenance Manual



This product has been tested and is listed under NSF/ANSI Standard 40 and is hereby certified as a Class I Aerobic Wastewater Treatment Plant.

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INTRODUCTION:

Aeration Systems has made every attempt to design the OxyPro system so that it is easy to operate and install. That being said, OxyPro is still a highly advanced wastewater treatment system and must be properly maintained to function at optimal performance. We encourage operators to familiarize themselves with all aspects of the OxyPro system in order to provide efficient quality service. If you have any questions about the OxyPro system, please feel free to contact our technical support specialists. We are eager to help in any way possible.

Normal operation of the OxyPro is controlled by a PLC-base control panel. The PLC operates the blower, waste pump and dose pump (if equipped). It also monitors the air pressure in the air line and water levels in the tank. In the event of a blower failure or an effluent pump failure, the PLC will trigger an appropriate alarm. During an alarm, the PLC will continue to operate the system. In the event that the alarm condition is corrected, the alarm will stay on to indicate a past problem. To reset the alarm once it has been investigated and resolved, reset the control panel by holding the silence button for five seconds.

Maintenance of the OxyPro system consists of inspection visits every six months, response to alarms, and repair or replacement of inoperative components. The requirements and methods for these responsibilities are laid out in the following manual.

MAINTENANCE SCHEDULE:

At a minimum, the OxyPro system ought to be inspected once every six months. Each inspection visit should consist of the following:

- Verification of proper operation of the blower.
- Verification of proper operation of the waste pump.
- Verification of proper operation of the effluent pump (if equipped).
- Verification of proper operation of PLC control and alarms.
- Clean the air intakes on the blower enclosure.
- Clean the filter on the blower.
- Determine the level of sludge on the bottom of the clarifier and adjust waste cycle accordingly.
- Visual and olfactory inspection of the effluent.
- Take samples for laboratory analysis (once per year).

In addition, the septic tank must be pumped at least once every three years. This is the owner's responsibility.

VERIFICATION OF COMPONENT OPERATION:

Control Panel

- Confirm that the supplemental protectors are in the on position.
- Confirm that the power light is on and that the PLC indicates proper inputs and outputs.
- Confirm the toggle switch on the PLC is in the Run position.

Blower Enclosure

- Check to ensure the air intakes are clear of debris.
- Check operation of ventilation fan.
- Check operation of compressor and clean filter.
- Check the integrity of the air line and sensor fittings in enclosure.

Processor Tank

- Check to ensure aeration is fine and even across tank.
- Confirm Operation of waste pump. Force pump to run at control panel and listen for water returning from septic tank.
- Confirm operation of effluent pump (if equipped). Trigger pump control float manually and observe water level drop.
- Examine with visual and olfactory methods effluent as described below.
- Take samples for laboratory analysis if required. See description below.

VISUAL AND OLFACTORY INSPECTION OF EFFLUENT AND MIXED LIQUOR:

In the inlet (aerator) compartment, the water should be relatively clear, with most of the bacteria growing attached to the synthetic ribbon media. The growth should be brown and should not clump the media into a ball. Large flaps of the growth will slough off the ribbon and be present in the water until they are moved to the clarifier and settled.

Little growth on the media with a murky liquor indicate either a system that has recently started or one that is lacking enough food to establish a healthy colony. Heavy growth with clumped media suggests high water use and/or a high organic load in the water.

The effluent in the outlet (clarifier) compartment of the OxyPro ought to be clear and odorless. In some cases, the water may have a slight tannic color, and/or a slight musty odor similar to wet hay. The biomass should readily settle to the bottom of the clarifier, where it is removed by the waste pump.

Floating clumps of sludge indicate a need to increase the wasting cycle. Increase the pump runtime or the number of cycles per day to reduce the amount of sludge sitting on the bottom of the clarifier.

Small pinfloc present in the effluent indicate a system that has recently started up or low water temperatures. The pinfloc are not usually a long-term problem, but should be monitored.

LABORATORY SAMPLES AND ANALYSIS:

Effluent quality produced by the system shall fall within the following limits for CBOD₅ and TSS:

CBOD₅: <30 mg/L
TSS: <30 mg/L

The samples should be taken from the clarifier using a bailer or similar device designed to collect a sample of water from slightly below the surface. Avoid scraping growth from the sides of the tank or other structures.

If the effluent quality limits described above are not reached, then influent samples should be taken to determine if the influent quality is abnormal. The design basis for the influent is the following:

CBOD₅ mean: 190 mg/L or 0.793 lb/day
TSS mean: 199 mg/L or 0.830 lb/day

REPAIR OR REPLACEMENT INSTRUCTIONS:

Before working on any component of the OxyPro system, make sure that the power to the unit has been turned off. Replacement components are available from:

Aeration Systems, LLC
155 Gray Rd.
Falmouth, ME 04105.
Phone Number: (207) 797-7351
Email Address: aeration@maine.rr.com

Blower - If the blower is not operational, confirm that the problem does not lie in the control panel. If the blower does need to be replaced, turn the system off, expose the top of the blower enclosure and remove the cover. Disconnect the blower from the rubber hose connection to the enclosure outlet. Cut the electrical connections to the blower and remove the old blower. Replace the blower with a new or rebuilt blower. Connect the new blower to the enclosure outlet, and make the new electrical connections with heat shrink butt connectors. Use a heat gun to seal the connectors against water intrusion. Confirm proper operation of the new blower. Place the enclosure cover back into place, and cover with the dirt removed earlier. Ensure that the air intakes are clear of debris.

Waste Pump - If the waste pump is not operational, turn power to the system off. Open the outlet cover of the OxyPro. Cut the discharge pipe for the waste pump and pull the waste pump out for inspection. Remove the impeller cover plate from the pump by removing the screws that hold it in place. Look for obstructions in the impeller and in the discharge line. If an obstruction is found remove it, reassemble the pump and confirm proper operation. If no obstruction is found, test the pump to see if it is operational. If not, the pump will have to be replaced. Remove the intake and outlet pipes from the old waste pump. Take care to prevent them from falling back into the tank. Expose the cover of the junction box on the top of the OxyPro tank and cut the connections for the waste pump. Remove the old pump and cord. Feed the wire for the new waste pump through the cord grip in the bottom of the junction box and make the electrical connections using heat-shrink butt connectors. Attach the inlet and outlet piping to the new waste pump and ensure proper operation of the new pump. Make sure that all the air is removed from the inlet piping to prevent the pump from getting air bound.

If the waste pump will not draw water through the inlet piping, make sure the pump is not air bound. If the intake piping is clogged, connect the inlet pipe to the pump discharge and run the pump to force water backwards through the inlet. This will help to dislodge any obstruction.

Discharge Pump - If the discharge pump is not operational confirm that the force main to the disposal area is not obstructed. If the pump does not operate, expose the junction box on top of the OxyPro tank and disconnect the discharge pump. Open the outlet cover of the tank and remove the pump by releasing the quick disconnect on the outlet. Pull the pump out of the tank and remove the discharge elbow and the base plate with the pump leg. Attach the discharge elbow and the base plate to the new pump and place back into position, ensuring solid connection of the quick disconnect. Feed the wire through the cord grip and make the electrical connections with heat shrink butt connectors. Check to confirm proper operation of the pump.

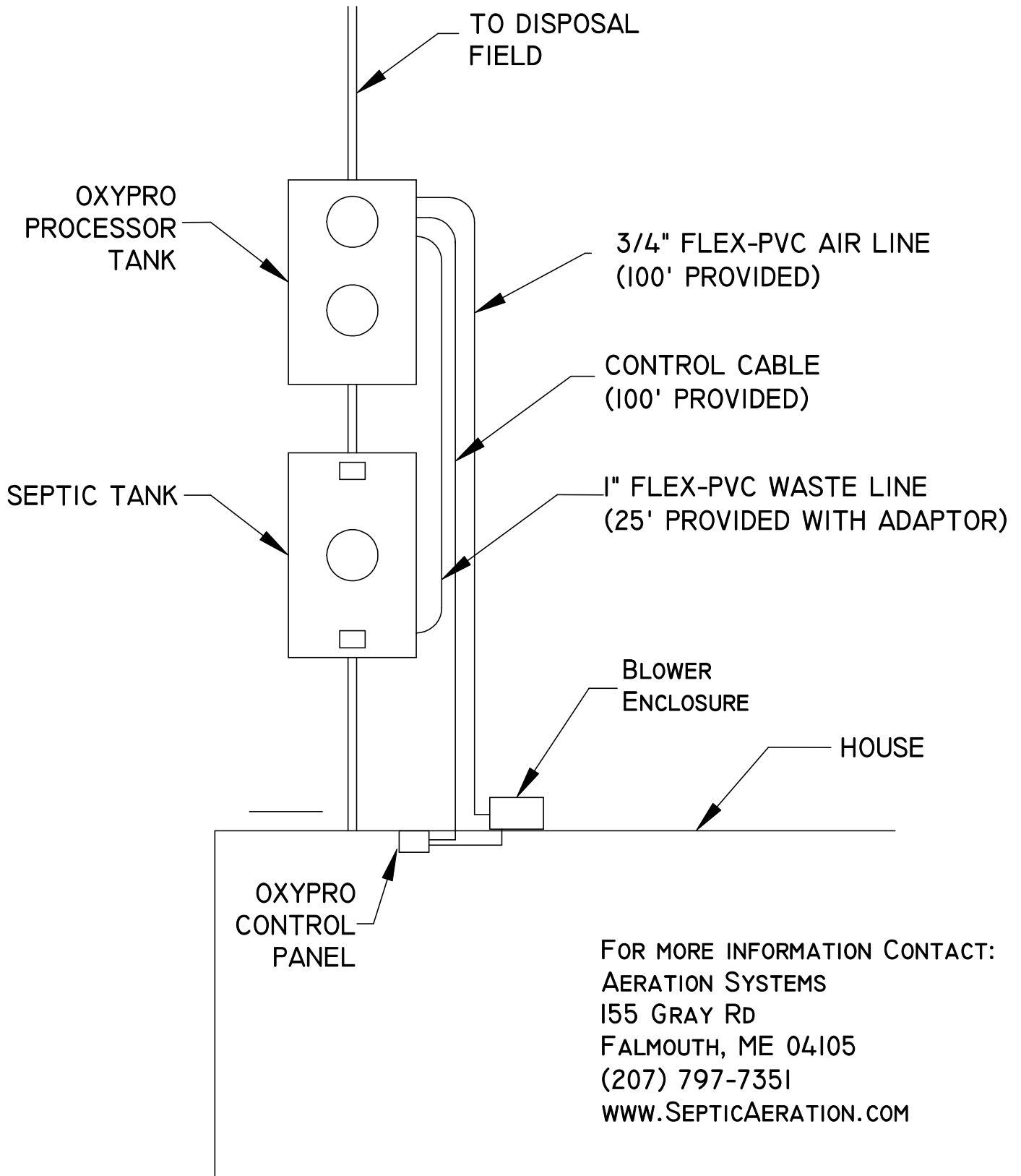
PLC - If the PLC is not operational, turn the power off. Remove the wiring harness by removing the two screws (one on each end) from the PLC. Pull the Din rail clamp on the PLC down to release the PLC from the Din rail. Replace the old PLC with a new one and snap onto the din rail, ensuring positive attachment to the Din rail. Connect the wiring harness to the new PLC and restore power to the system. Place the toggle switch on the PLC in Terminal mode and upload the appropriate program. Place the PLC in Run mode and confirm proper operation of all components

Trouble Shooting Guide

Alarm Conditions	Symptoms	Possible Causes	Solutions
Alarm light on steady	Blower not running with water in tank	Blower failure	Check electrical connections, check safety disconnect in the blower, replace or rebuild blower if necessary
	Blower running but no aeration in tank	Disconnected air line	Locate break and repair with PVC cement and fittings
	Blower running, good aeration, normal water level	Corrected high water condition	Inspect OxyPro system, reset panel
Alarm light on blinking	Water level above normal	Current high water	Pump tank down, inspect electrical connections, and pump operation, make sure force main is not plugged, replace pump if necessary
Alarm sounds without light	Audible alarm sounds without alarm light	Any alarm with a burned out alarm light	Check electrical connections, replace lamp if necessary
No power light	System operating, no power light	Power light burned out or disconnected	Check for power at panel, confirm operation of PLC, replace lamp if necessary
	Power at control panel, PLC dead or only inputs working	PLC failure	Replace PLC if necessary
	No power at control enclosure or supplemental protectors tripped	No power	Reset supplemental protectors, or circuit breaker as required, look for electrical shorts.

Non-alarm Conditions	Symptoms	Possible Causes	Solutions
Too much sludge on bottom of clarifier	Waste pump runs and moves water to septic tank, but sludge builds up over time	Inadequate waste run times	Increase cycle time or frequency to move more sludge
	Waste pump does not run, impellor jammed	Waste pump failure	Repair/replace waste pump as necessary
	Waste pump runs, but does not move water	Clogged suction manifold or line	Clear line by connectin line to discharge on pump and running pump to force water though line backwards
	Waste pump moves water, but no water reaches septic tank	Clogged waste return line	Clear waste return line.
Floating clumps of sludge	Caused by inadequate wasting, see above section on too much sludge on bottom of clarifier		

Non-alarm Conditions	Symptoms	Possible Causes	Solutions
Uneven aeration	Coarse bubbles in one spot in tank	Disconnected diffuser	Pump tank and reconnect diffuser, or replace diffuser with concrete weighted diffuser
	More aeration on one side or end of the tank	Diffusers not level	If aeration is uneven side to side, there isn't much that can be done. If aeration is uneven inlet to outlet, ball valves may be placed on each line to equalize the air flow
Clumped media	Thick growth, solid mass of media, odor	High organic loading	Consider an effluent filter on septic tank, educate homeowner on proper disposal practices regarding water use patterns, garbage disposals, etc.
Odor	Temporary condition on start-up after a power failure, last about 4 hours	Power failure	Temporary condition, self correcting
	Gravity inlet to OxyPro - occurs during periods of high water use (draining a bath tub, multiple loads of laundry, etc.)	High surge volumes	Educate homeowner to spread flows more evenly
	Pumped inlet to OxyPro - Occurs when the pump feeding OxyPro turns on with too large a dose.	Dose volume too high	Reduce the dose volume



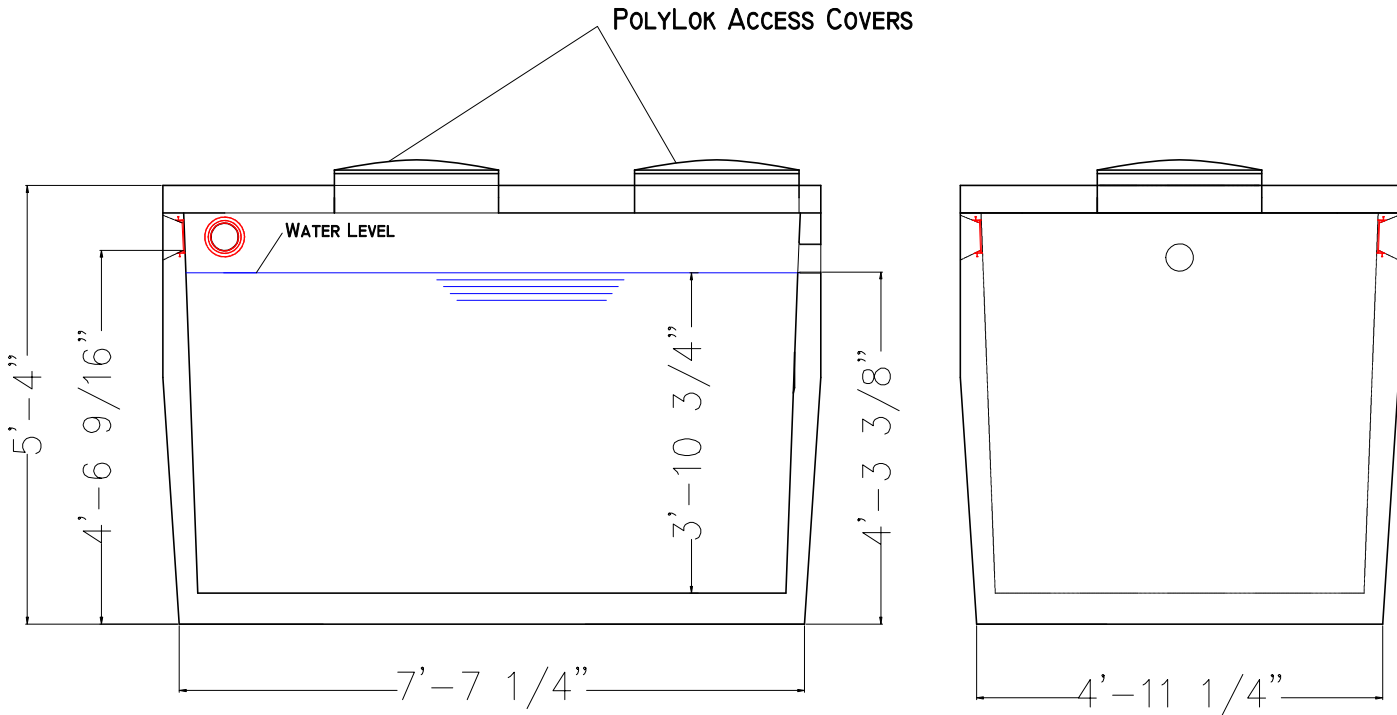
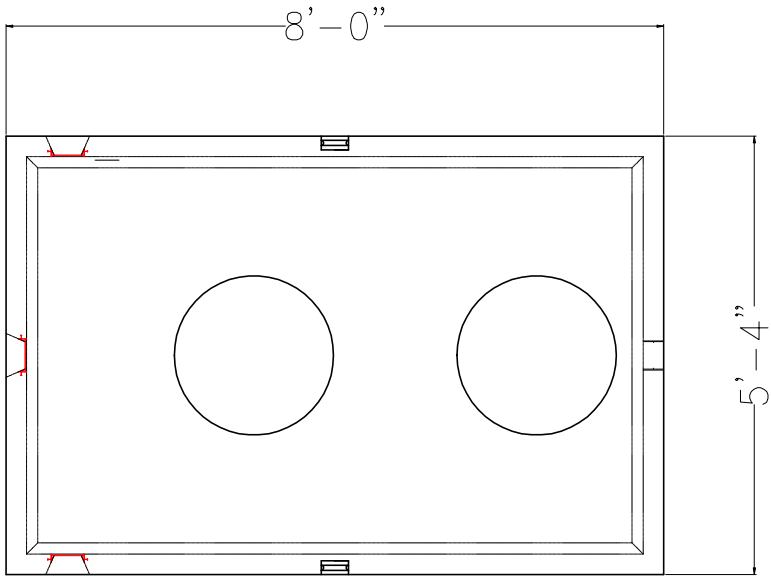
OXYPRO TYPICAL INSTALLATION

SCALE: N/A

DATE: 5-17-06

DRAWING TYPE: PROJECT PLANNING USE





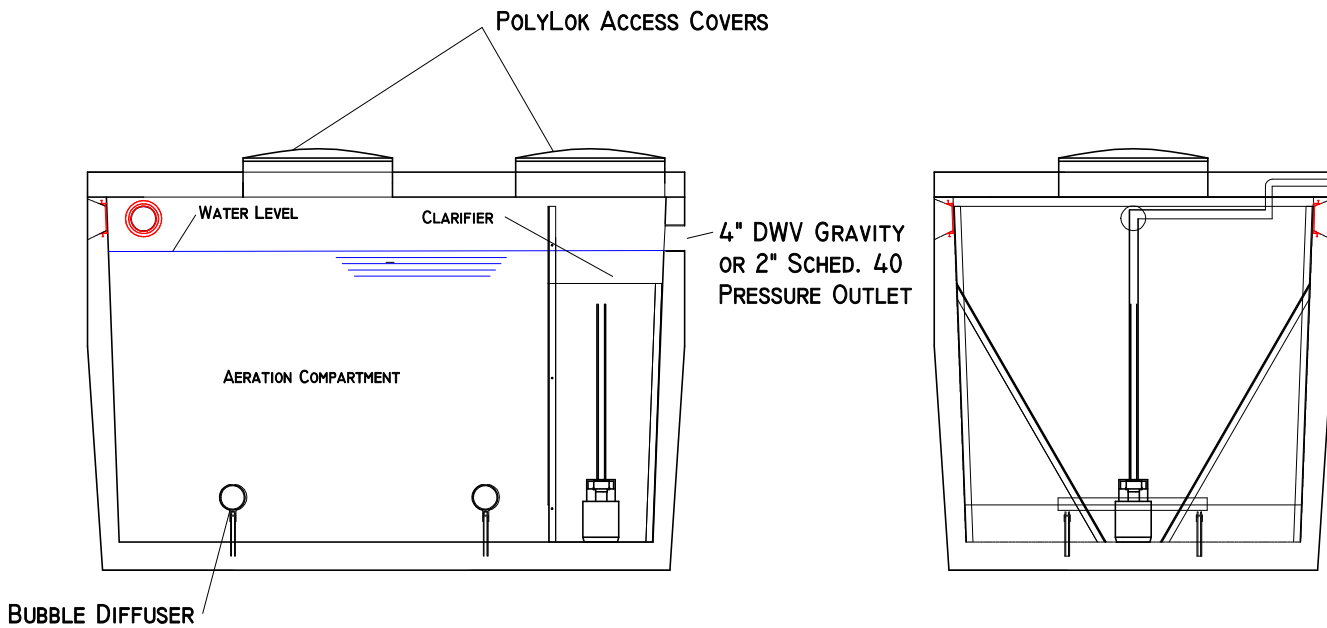
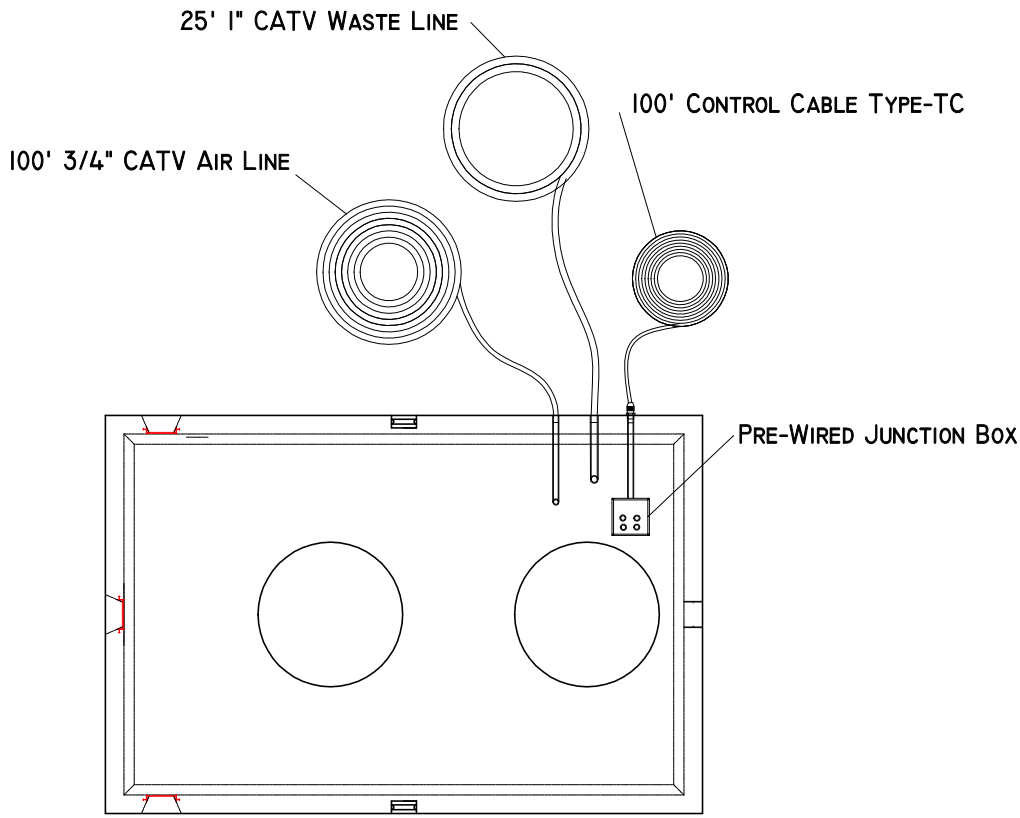
OXYPRO 1000C CONCRETE MODULE

SCALE: 1"=3' DATE: 3/13/01

REQUESTED BY: NA

DRAWING TYPE: INSTALLATION MANUAL





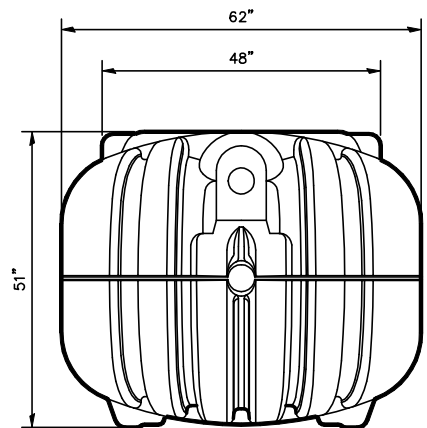
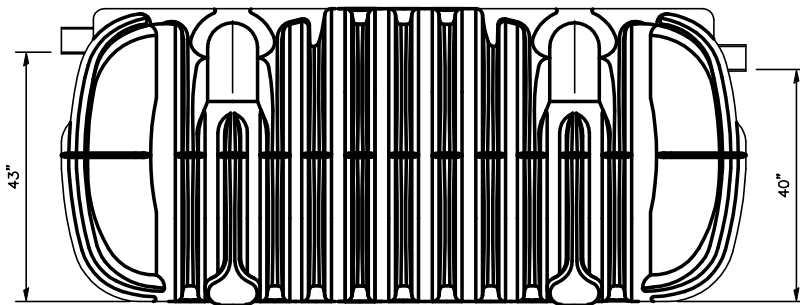
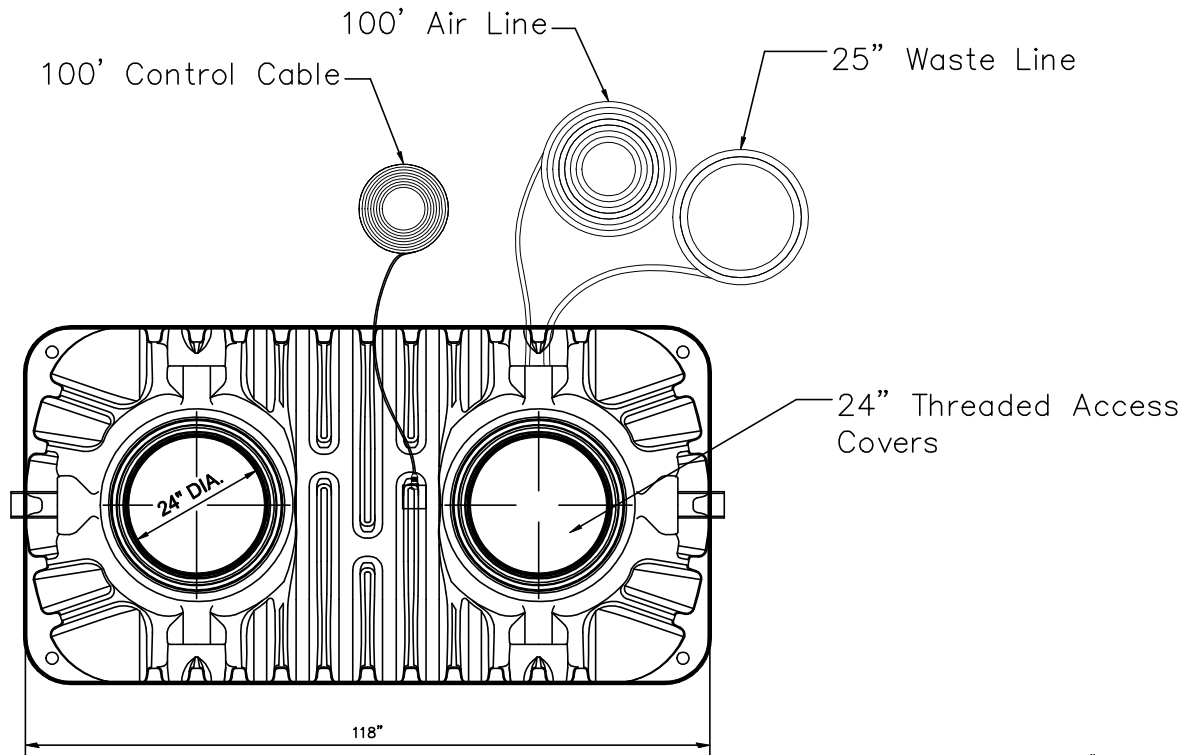
OXYPRO 1000C CONCRETE MODULE

SCALE: NTS DATE: 11-06-08

REQUESTED BY: NA

DRAWING TYPE: INSTALLATION MANUAL





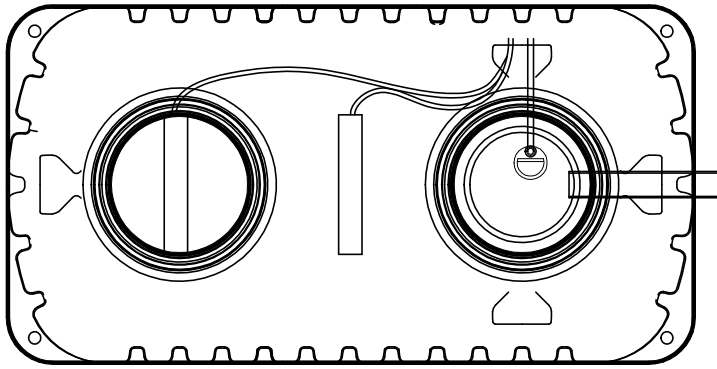
OxyPro 1000CHDPE – Exterior

SCALE: N/A | Date: 1-9-07

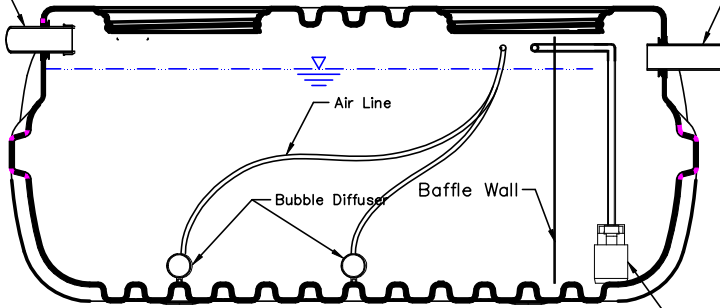
Requested By: Eric Cordis

Drawing Type: Project Planning Use

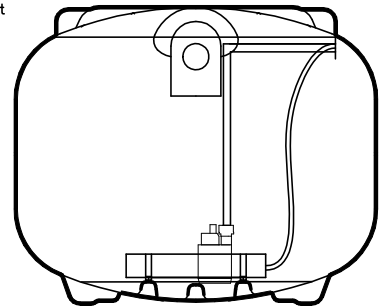




4" Sched. 40 Inlet



4" Sched 40 Outlet
or 2" Sched. 40
Pressure Outlet



Waste Pump

OxyPro 1000CHDPE Module

SCALE: N/A

Date: 1-9-09

Requested By:

Drawing Type: Project Planning Use



OxyPro 1000C-Gravity Electrical Hookup

A 15 amp 120VAC branch circuit is required to provide power to the OxyPro system.

Each OxyPro treatment tank will be delivered with 100 feet of 7 conductor 14 AWG tray cable attached. Cable diameter is 0.5 inches. Below is the wire color coding, its function, and its terminal designation at the controller.

Treatment tank cable - 7/16 tray cable:

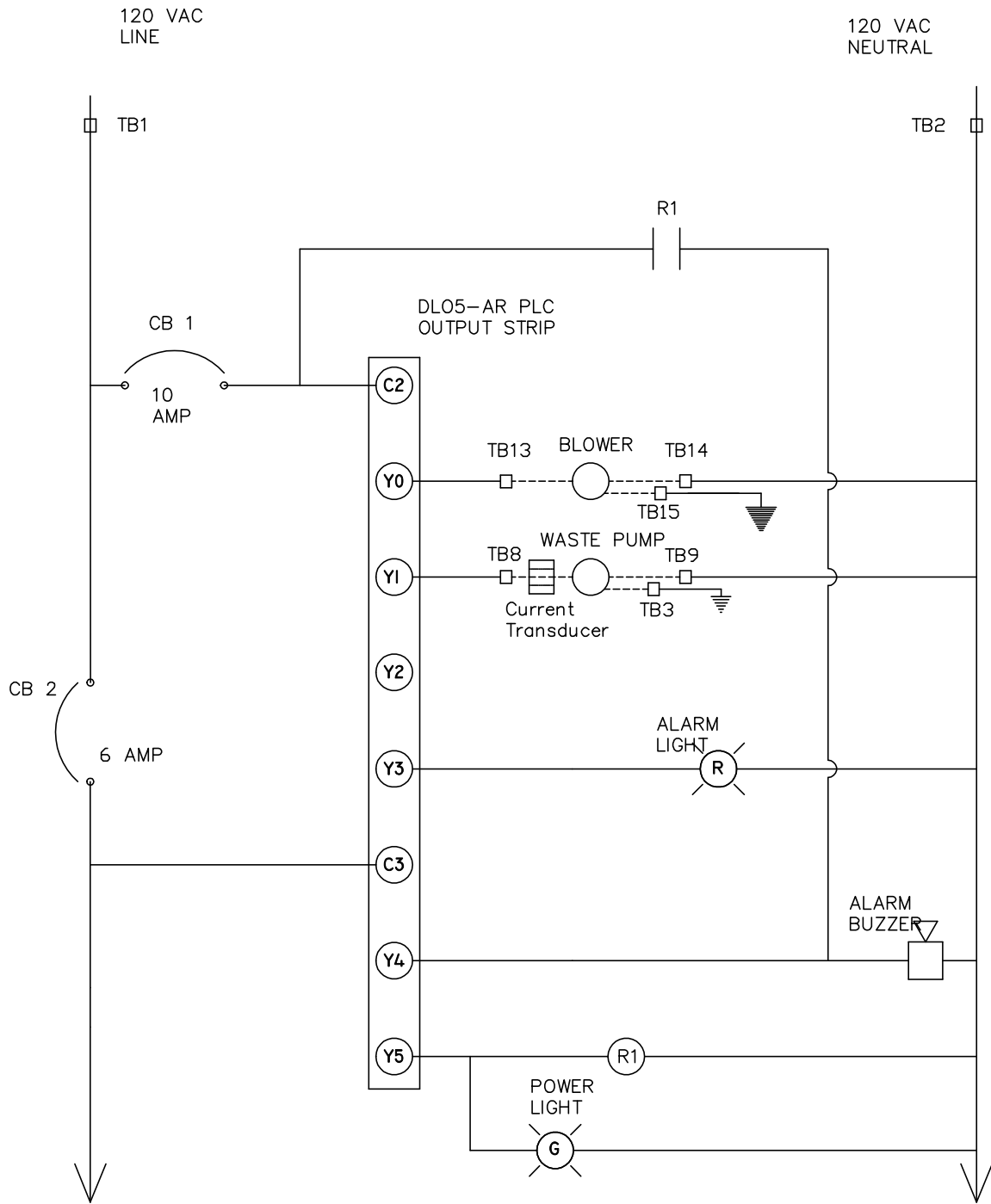
Yellow	Ground	TB-3
Blue	Float Switch L1	TB-4
Orange	Low Level Float	TB-5
Brown	High Level Float	TB-7
Black	Waste Pump L1	TB-8
Red	Waste Pump Neutral	TB-9
Red/Black	Unused	

This model of OxyPro is equipped with a separate blower enclosure. The blower enclosure is delivered with 25 feet of 5 conductor 14 AWG tray cable. Below is the wire color coding, its function, and its terminal designation at the controller.

Black	Blower L1	TB-13
Red	Blower Neutral	TB-14
Yellow	Blower Ground	TB-15
Blue	Air Switch L1	TB-16
Orange	Air Switch Neutral	TB-17

The controller will have a label on its interior describing the function of each terminal. These are repeated below:

TB-1	120 VAC Power from 15A breaker at house panel
TB-2	Neutral from house panel
TB-3	Ground
TB-4	Float Switch L1
TB-5	Low Level Float
TB-6	Unused in this model
TB-7	High Water Float
TB-8	Waste Pump L1
TB-9	Waste Pump Neutral
TB-10	Unused in this model
TB-11	Unused in this model
TB-12	Unused in this model
TB-13	Blower L1
TB-14	Blower Neutral
TB-15	Blower Ground
TB-16	Air Switch L1
TB-17	Air Switch Neutral



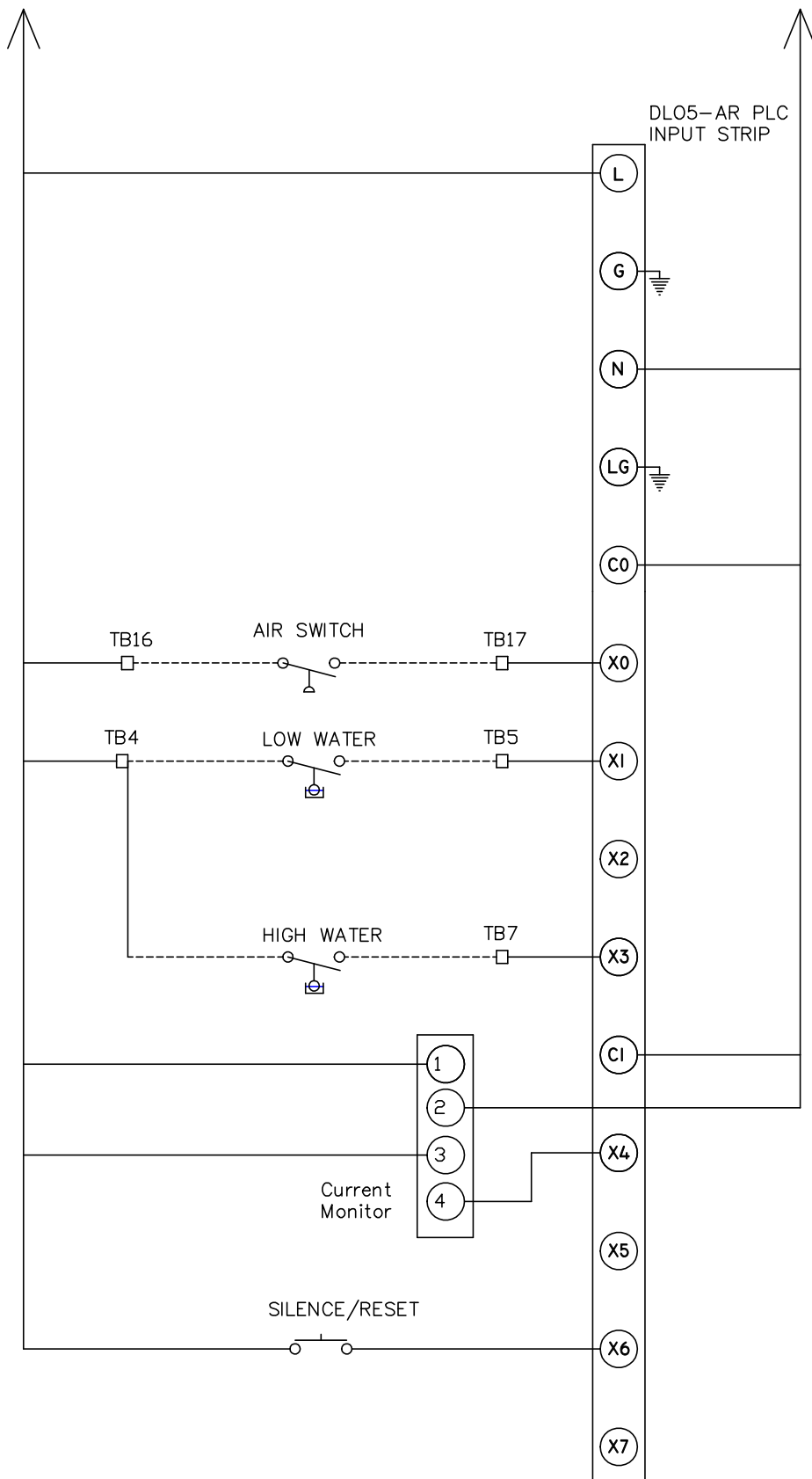
OXYPRO 1000C-G CONTROL PANEL

DATE: 08-25-08

DRAWING TYPE: ELECTRICAL SCHEMATIC

PAGE 1 OF 2





OXYPRO I000C-G CONTROL PANEL

DATE: 8-28-08

DRAWING TYPE: ELECTRICAL SCHEMATIC

PAGE 2 OF 2



OxyPro 1000C-Pumped Electrical Hookup

A 20 amp 120VAC branch circuit is required to provide power to the OxyPro system.

Each OxyPro treatment tank will be delivered with 100 feet of 10 conductor 14 AWG tray cable attached. Cable diameter is 0.5 inches. Below is the wire color coding, its function, and its terminal designation at the controller.

Treatment tank cable - 10/14 tray cable:

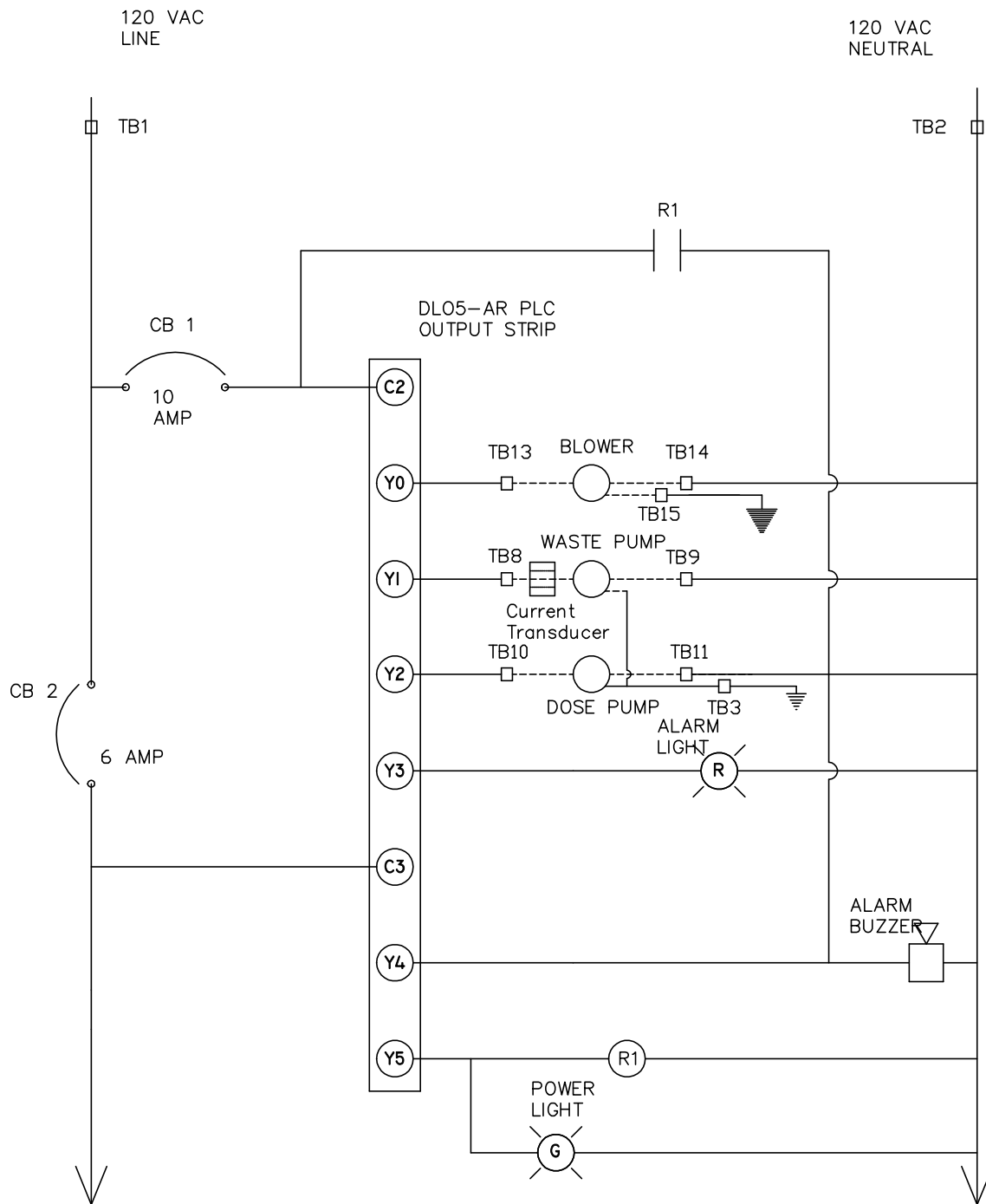
YELLOW	GROUND	TB-3
BLUE/BLACK	FLOAT SWITCH FEED	TB-4
ORANGE/BLACK	LOW LEVEL FLOAT	TB-5
BLUE	DOSE PUMP ON	TB-6
ORANGE	HIGH LEVEL FLOAT	TB-7
BLACK	WASTE PUMP HOT	TB-8
RED	WASTE PUMP NEUTRAL	TB-9
YELLOW/BLACK	DOSE PUMP HOT	TB-10
RED/BLACK	DOSE PUMP NEUTRAL	TB-11
BROWN	UNUSED	

This model of OxyPro is equipped with a separate blower enclosure. The blower enclosure is delivered with 25 feet of 5 conductor 14 AWG tray cable. Below is the wire color coding, its function, and its terminal designation at the controller.

Black	Blower L1	TB-13
Red	Blower Neutral	TB-14
Yellow	Blower Ground	TB-15
Blue	Air Switch l1	TB-16
Orange	Air Switch Neutral	TB-17

The controller will have a label on its interior describing the function of each terminal. These are repeated below:

TB-1	120 VAC Power from 15A breaker at house panel
TB-2	Neutral from house panel
TB-3	Ground
TB-4	Float Switch L1
TB-5	Low Level Float
TB-6	Dose Pump Control
TB-7	High Water Float
TB-8	Waste Pump L1
TB-9	Waste Pump Neutral
TB-10	Dose Pump L1
TB-11	Dose Pump Neutral
TB-12	Unused in this model
TB-13	Blower L1
TB-14	Blower Neutral
TB-15	Blower Ground
TB-16	Air Switch L1
TB-17	Air Switch Neutral



PUMPED OXYPRO 1000C-P CONTROL PANEL

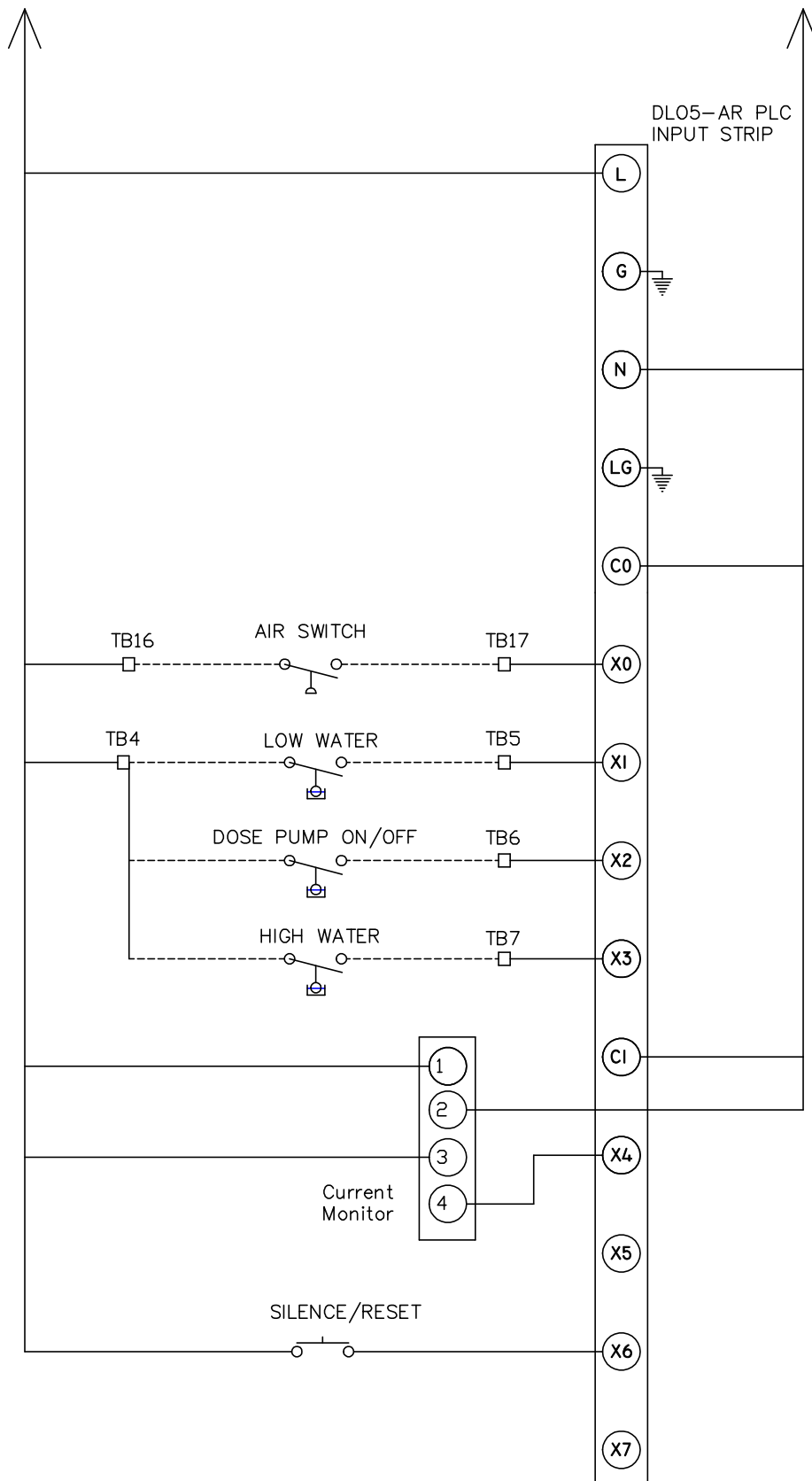
DATE: 9-5-08

STEPHEN PIPER

DRAWING TYPE: ELECTRICAL SCHEMATIC

PAGE 1 OF 2





PUMPED OXYPRO 1000C-P CONTROL PANEL

DATE: 9-5-08	STEPHEN PIPER
DRAWING TYPE: ELECTRICAL SCHEMATIC	
PAGE 2 OF 2	



COMPONENT SPECIFICATIONS:

Tank:	1000-Gallon Concrete Tank
Waste Pump:	Goulds LSP03 1½ outlet pump
Air Compressor:	HiBlow HP-80 Linear Diaphragm Pump
PLC:	Direct Logic D0-05AR
Relay:	Automation Direct 781-1C-120A
Supplemental Protectors:	Cutler-Hammer WMS1B06 Cutler Hammer WMS1C10
Bubble Diffuser:	Environmental Dynamics 00250
Air Line:	¾-inch CATV
Waste Line:	1-inch CATV