



FLORIDA RURAL WATER ASSOCIATION

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Lift Station Bypass Pump & Connection Assembly Instructions

Loss of power during hurricanes causing sanitary sewer overflows (SSOs) at Lift Stations is a widespread concern to the public, FDEP and wastewater utilities. Sanitary sewer overflows have been featured in Florida news after recent hurricanes and as result the public is becoming more concerned – justifiably so as SSOs are environmental and health hazards, can contaminate water supplies, damage homes, and disrupt traffic.

Florida wastewater systems must be more vigilant and proactive against the potential of sanitary sewer overflows. Utilities have three options for eliminating and/or managing sanitary sewer overflows:

1. Locate Standby / Emergency Generators at each lift station or use mobile generators with common receptacles to hop scotch between 6 to 10 lift stations on a daily basis until power is completely restored,
2. Equip every lift station with bypass piping and providing sufficient pumps to hop scotch between lift stations, and/or
3. Use vacuum trucks and septic haulers to hop scotching between lift stations.

FRWA offers the following practical option using low cost trash pumps and quipping every lift station with bypass piping, see the figure below. One trash pump should be able to serve between 6 to 10 lift stations daily during a hurricane by hopping scotch between lift stations.

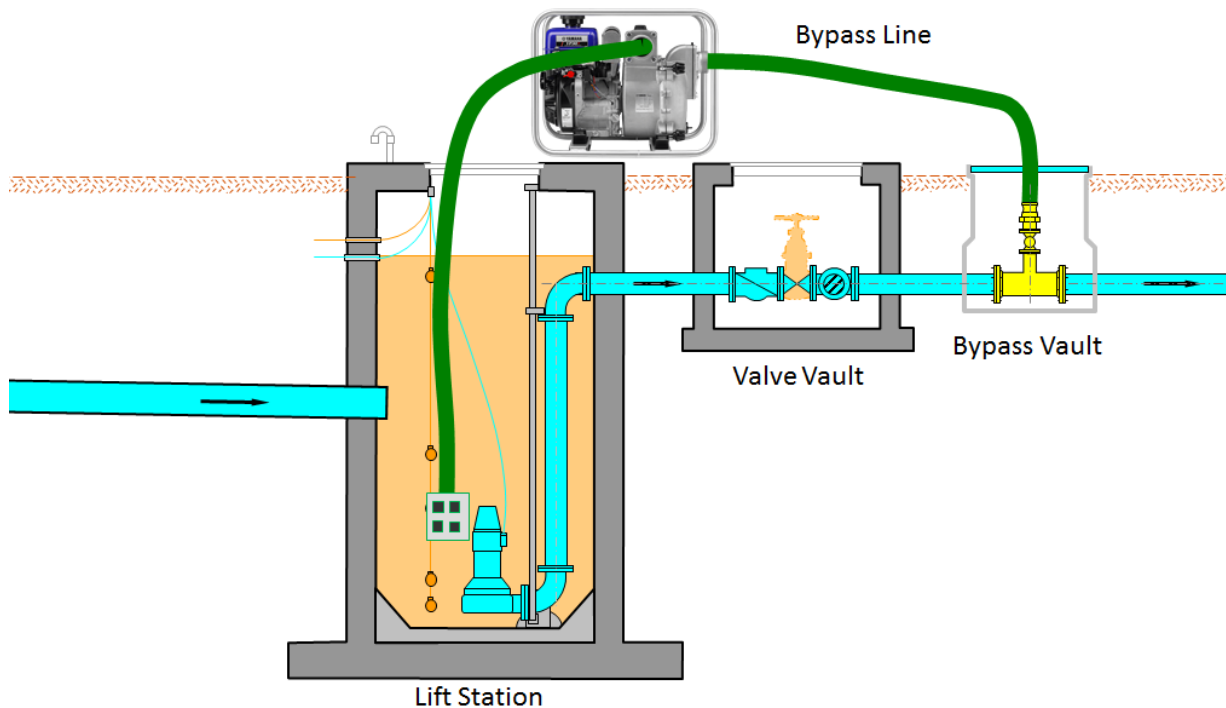


Figure 1 ~ Lift Station Bypass Pump and Piping Arrangement

Step 1 ~ Selecting a Self-Priming Semi-Trash Bypass Pump.

Your first step is to choose a bypass trash pumps that match lift station requirements. One of the best sources for these pumps include Northern Tool, Grainger, USABlueBook, etc.

The **2-inch** Self-Priming Semi-Trash Pump has an ultimate capacity of 166 gpm at 0 psi, 100 gpm at 27 psi, 5/8-in. Solids Capacity, 160 cc Honda GX160 Engine.

The **3-inch** Self-Priming Semi-Trash Pump has an ultimate capacity of 264 gpm at 0 psi, 150 gpm at 28 psi, 3/4-in. Solids Capacity, 200 cc Honda GX160 Engine.

The **4-inch** Self-Priming Semi-Trash Pump has an ultimate capacity of 384 gpm at 0 psi, 250 gpm at 21 psi, 3/4-in. Solids Capacity, 270 cc Honda GX160 Engine.

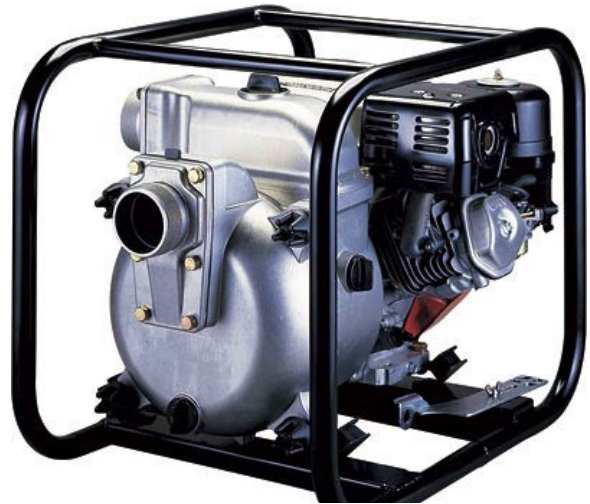


Figure 2 ~ Bypass Trash Pump

Use the table below to help you select the trash pump that best meets your lift station needs. If you need assistance please contact your FRWA Wastewater Circuit Rider for more help and advice.

Trash Pump Size	2-inch	3-inch	4-inch
Solid Handling Capacity	5/8-in	3/4-in	3/4-in
Engine	160 cc	200 cc	270 cc
Approx. Cost	\$500	\$625	\$1,000
Force Main Pressure	Rated Capacity	Rated Capacity	Rated Capacity
0 gpm	43 psi	39 psi	39 psi
50 gpm	35 psi	35 psi	35 psi
100 gpm	27 psi	32 psi	32 psi
150 gpm	14 psi	28 psi	28 psi
200 gpm	---	22 psi	24 psi
250 gpm	---	16 psi	21 psi
300 gpm	---	9 psi	17 psi
350 gpm	---	---	12 psi
400 gpm	---	---	6 psi

Using the table below to select the minimum Trash Pump size for your system.

Force Main Diameter	Minimum Trash Pump Size
2-in and smaller	2-inch or larger
3-in and smaller	3-inch or larger
4-in and smaller	4-inch or larger
6-inch and larger	Godwin or Thompson 6-inch Bypass Pump

Step 2 ~ Choosing How Many Pumps to Purchase.

The number of bypass trash pumps that you'll need depends on how many lift stations you have and the lift station pump capacity. The general rule of thumb is one trash pump should be able to serve between 6 to 10 lift stations daily during a hurricane by hopping scotch between lift stations.

If you have 3 or more lift stations it might be a good idea to purchase two (2) 4-inch Self-Priming Semi-Trash Pumps along with hoses and fittings.

Step 3 ~ Choosing Bypass Pump Hoses and Fittings

Your next step is to order hoses and fittings for the bypass trash pumps – purchase these items from the same trash pump source.

Hoses and Fittings Needed for each Trash Pump	Quantity (min.)	Description
Pump Suction Hose	1 or 2	20-ft. each, Rigid, NPT x NPT. You may need 2 suction hoses if you have deep lift stations.
Pump Discharge Hose	1	20-ft. each, Rigid, NPT x Female Cam-Lock
Strainer	1	To protect pump from debris – important!
Cam-Lock Fitting	1	Female Cam-Lock to connect to bypass piping



Figure 3 ~ Suction & Discharge Hoses, Rigid, NPT x Female Cam-Lock



Figure 4 ~ Suction End Strainer

Step 4 ~ Building the Bypass Piping at each Lift Station.

Each lift station should have identical diameter cam-lock connections so that trash pumps can be interchangeable and redundant in case where one pump fails to operate.

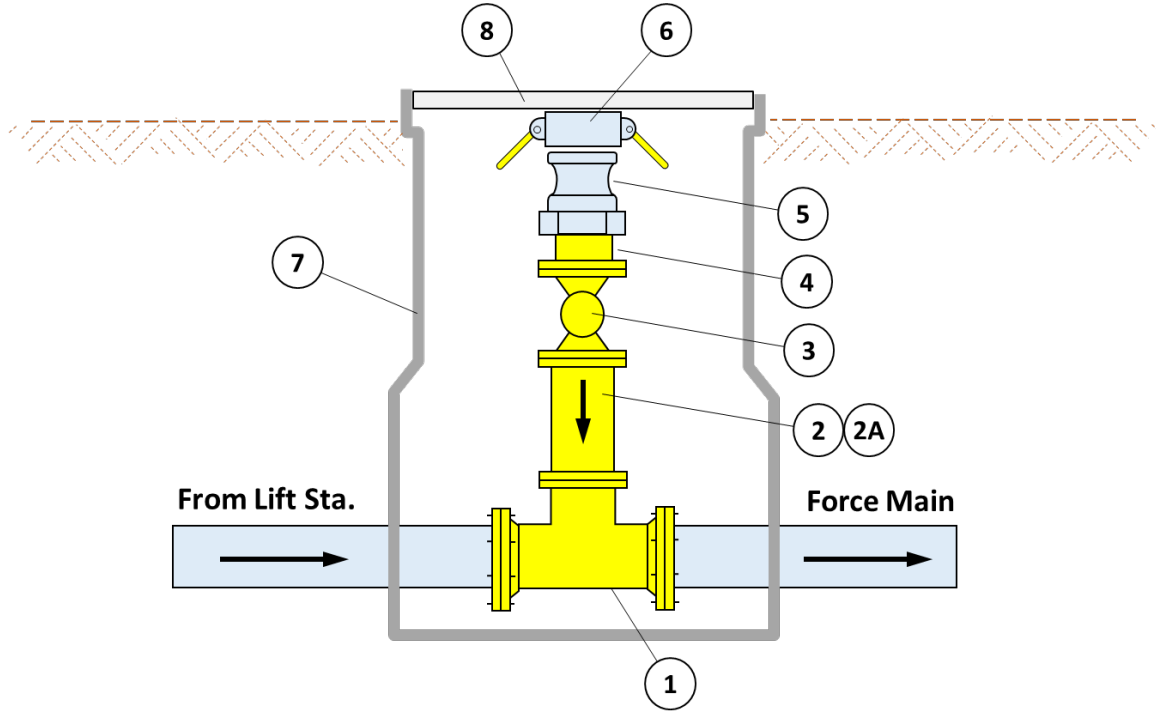


Figure 5 ~ Bypass Piping Vault

Parts List for Bypass Piping Vault

Item No.	Quantity (min.)	Description
1	1	Tee or Wye. Cut-in force main. First isolate and drain force main into lift station by propping check valves open. Secure new fitting using mechanical joints (or equal) to the existing force main.
2	1	Pipe Spool Segment – length will vary according to depth. Field verify. Segment length approx. 18-in for underground installation or 4-ft for aboveground installation.
2A	1	Pipe Reducer – sized to match existing pipe and pump discharge hose. This will vary according to force main diameter and pump discharge. Field verify. For instance if the force main is 2-in and the pump is 4-in you will need a 2-in x 4-in reducer.
3	1	Valve. The valve could be a Ball Valve (Brass or Sch 80 PVC) or Flanged Plug Valve.
4	1	Pipe Spool & Coupling (MNPT) – Segment length approx. 6-in. Field verify.
5	1	Cam-Lock type Coupling. Aluminum Male Adapter x MNPT, diameter to match pump.
6	1	Cam-Lock type Dust Cap. Aluminum Female, diameter to match pump.
7	1	Valve Vault. Concrete or fiberglass vault for bypass connection and valve. Min. 24-in wide x 36-in long x 48-in deep. This can be eliminated for above grade installations.
8	1	Vault Cover. Concrete or fiberglass to match vault. This can be eliminated for above grade installations.
9	TBD	Miscellaneous fittings, coupling, and restraints as needed.

Notes:

1. Before beginning work and ordering parts, excavate existing force main adjacent to the lift station. Verify line size, construction material, etc.
2. Assemble fittings 2 thru 6 before cutting into the existing force main.
3. Fittings should match existing force main – ductile iron pipe, mechanical joint, flange, PVC slip on, etc.
4. Alternative – you may wish to eliminate the valve vault and cover (parts 7 and 8) by installing fittings 3 thru 6 above grade.