Buzzards Bay Stormwater Collaborative

Discharge Investigation Trailer Manual

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Massachusetts Maritime Academy

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Buzzards Bay, MA 02532

Buzzards Bay National Estuary Program

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Mattapoisett, MA 02739

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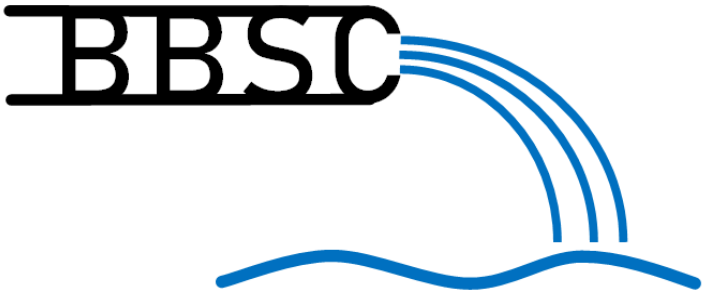

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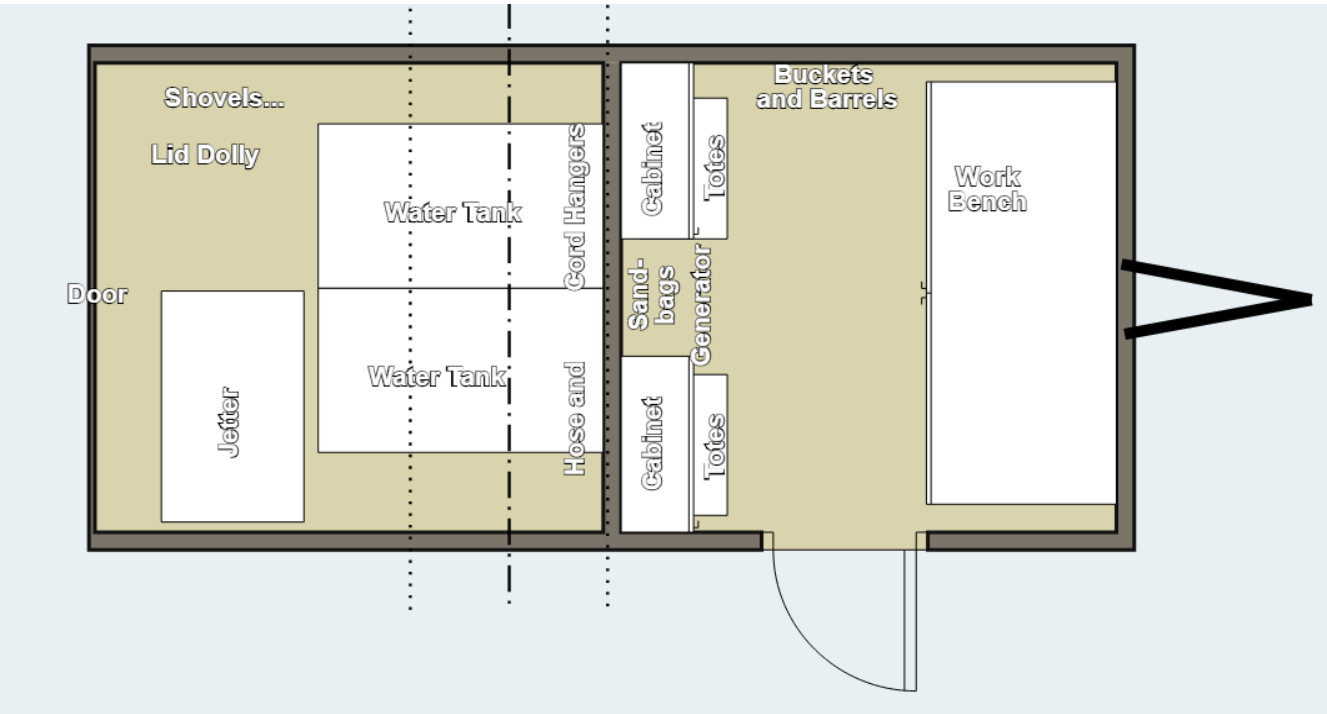
Equipment List

1. Adjustable Ball mount w/ clip, trailer ball, jack block, and (2) wheel wedges
2. Tote: (2) Spotlight assemblies
3. Tote: Spare parts
4. Tote: Liquid Supplies
    a. Diluted Tracer Dye
    b. Gas Can
    c. Marking Paint – white and red
    d. Small engine oil
5. Hydrant Connection: backflow preventer assembly, hydrant wrench, pipe wrench, and supports
6. Laser Pointer, Laser Cradle, and safety glasses
7. Drop light
8. Smoke Test Blower and Smoke Candles – 60 second (12 pack)
9. Tracer Dye – full strength
10. Electric Generator with short cord
11. (2) 50 foot Extension Cords and (1) 15 foot Extension Cord
12. Drain Pipe Inspection Video Camera
13. Pipe Snake (100 foot)
14. Ridgid KJ-3100 Water Jetter
15. (8) Filled Sand Bags
16. Garden Hoses (1) 75-foot, (1) 50-foot, and (3) 10-foot
17. Electric dewatering pump with Drain Hose
18. Small utility pump – for dye and waste
19. Water Tank (35 gallon) – for dye and waste
20. 6 Gallon Water Tote
21. (2) 32 Gallon Barrels
22. (4) 5 Gallon Buckets
23. Tarps and rope
24. Magnetic Lid Lifter Steel Dolly
25. Yard Tools - Rake, Spade, Flat blade shovel, Push Broom, Loppers, and Clam Shovel
26. 48” Pry Bar, 24” Pry Bar, Manhole hook, and 10-lb Hammer
27. Hand Tools: sockets, wrenches, plyers, screwdrivers, pentagon socket
28. Hand Tools: pry bar assortment, pipe wrench, 3-lb hammer, adjustable wrench
29. 200 foot Tape Measure
30. Measuring Wheel
31. Survey level, tripod, and pole
32. Survey supplies – measuring tape, chalk line, stakes, plumb bob, masonry nails, and flagging
33. Utility Magnetic Locator
34. PVC Guide Pipe Set
35. Tote: Confined Space Harness, tripod wench
36. Confined Space Tripod
37. Confined Space Gas Detector
38. Safety Cones
39. PPE – Hard Hats, Work Gloves, Face Shield or Safety Googles
40. Staple Items: trash bags, duct tape, Teflon tape, cable ties, rags, nitrile gloves

Trailer Layout and Specifications

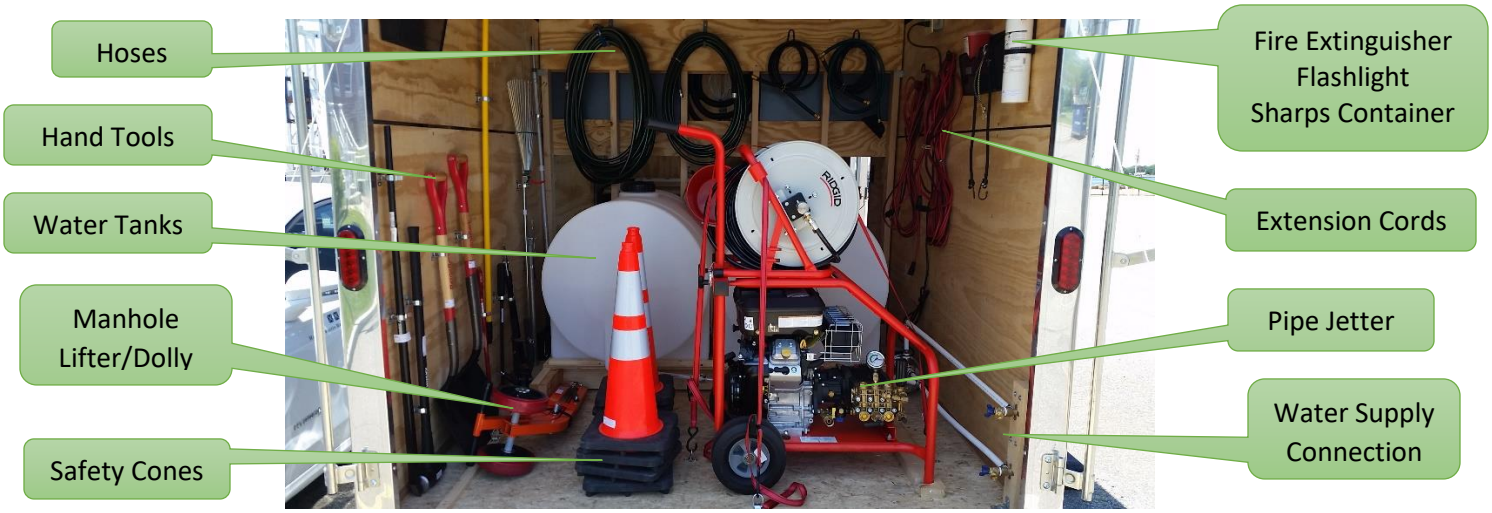


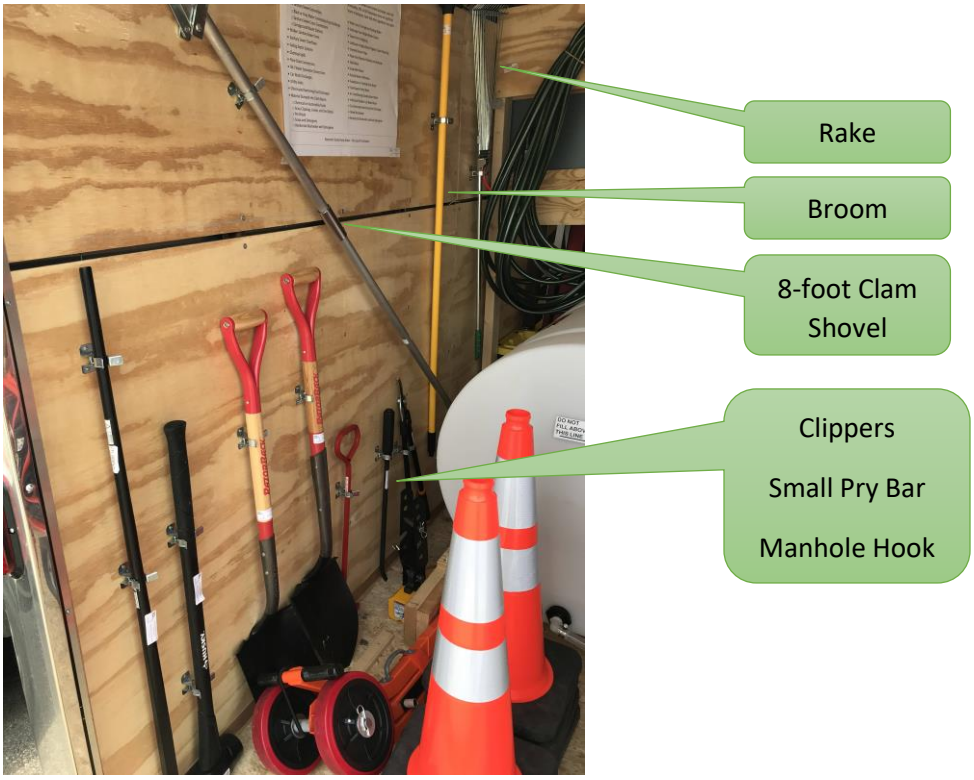
- Store all equipment in its designated area to maintain proper weight distribution
- Fasten all equipment and supplies securely before moving trailer
- Use photos posted in trailer to determine how to stow equipment
- Be sure trailer hitch on the tow vehicle is at the correct height – between 18” and 20”
- Adjustable ball mount is available to set proper height
- Use ball size 2 5/16”
- Be sure the tow vehicle has the correct electrical connection
- Tow vehicle should be rated for no less than 7000 pounds towing capacity
- Limit water tanks to 100 gallons each when transporting with full complement of equipment
- Use jack block when parking trailer for storage
- Use wheel wedges when trailer is parked on an incline
- Keep trailer clean and tidy

		I 714 TA2
Overall	Length	17' 8"
	Width	7' 10"
	Height	8' 7"
Interior	Length	14' 4"
	Width	6' 8"
	Height	6' 8"
Side wall	Height	6' 1/2"
Distance between w/w		72"
Rear Door		Double
	Width	6' 2"
	Height	6'
Hitch Weight		220 lbs.
	Height	19"
	Ball Size	2 5/16"
Platform height		20"
G.V.W.R.		7,000 lbs.
Curb Weight		2,270 lbs.
Payload Capacity		4,730 lbs.
Axles (single)		3,500 lbs.
Brakes		Electric
Tires		ST205 75/r15 (c)
Wheels		5 on 4 1/2
Frame		6" I-beam
Floor (24" o/c)		3/4" plywood
Side Walls (16" o/c)		3/8" plywood

Location and Stowage of Equipment

Back





Front

35 Gallon Water Tank Storage – **Do Not Store with Water**

Confined Space Tripod

Magnetic Utility Detector

Surveying Rod

Totes

32 gal Barrels

Generator

Dewatering Pump

Sand Bags

Totes and 6 gal Water Jug

Discharge Investigation Process

1. Clean area structures before beginning investigation
2. Gather relevant documentation and review
3. Plan the investigation approach - Start from the end discharge pipe and work upstream
4. Verify all connections and junctions to highest inlet
5. Sample at the end discharge pipe to determine if there is a potential illicit discharge
6. If there are no water quality issues, only connectivity needs to be determined
7. Sample at junctions to narrow down search
8. Use the tools below to determine connectivity and to detect illicit connections

Tool	Task
Pipe Camera	• Inspecting pipe and structure condition • Determining source of dry weather flow • Determining origination of a pipe • Locating and/or inspecting buried structures • Viewing illicit connections • Locating and inspecting fittings (elbows, wyes, and tees…) •
Smoke Machine	• Verifying up gradient pipe connection • Detecting damaged pipes and structures • Detecting illicit sewer connections • Detecting illicit drain connections • Detecting building connections •
Tracer Dye	• Verifying down gradient pipe connection • Locating obscured pipe in brush or wetland • Locating submerged pipe • Detecting flow from building drain • Detecting flow from a sewer pipe connection • Detecting flow from a septic system •
Laser Pointer	• Verifying straight pipe connection • Projecting pipe direction above ground • Determining pipe direction from structure • Detecting a submerged pipe •
Sandbag Dams	• Detecting intermediate flows by blocking outlet pipe (may take days) • Concentrating low flows for sampling • Isolating part of a stormdrain network • Preventing flows from entering part of the stormdrain network • Covering catchbasins to stop water from entering • Diverting channel flow •
Sampling Kit	• Detecting water quality issues (may or may not be illicit) • Determining which pipe at a junction may be the source of an illicit connection •

Season Preparation Checklist

1. Check tires (50 psi)
2. Remove antifreeze from jetter pump
3. Re-stock battery devices from indoors
4. Inventory supplies
5. Check all elastic cords and straps for wear
6. Check tail lights, brake lights, and directional signals

Fieldwork Preparation Checklist

1. Inventory supplies – verify everything is securely stowed in its proper place
2. Check fuel in generator and jetter
3. Securely connect trailer to tow vehicle
4. Connect electric cable to tow vehicle – verify lights work

Fieldwork Closeout Checklist

1. Collect records, field notes, and sketches
2. Disconnect generator
3. Store and secure equipment
4. Drain hoses
5. Sweep floors
6. Inventory supplies
7. Secure doors
8. Connect to tow vehicle if needed

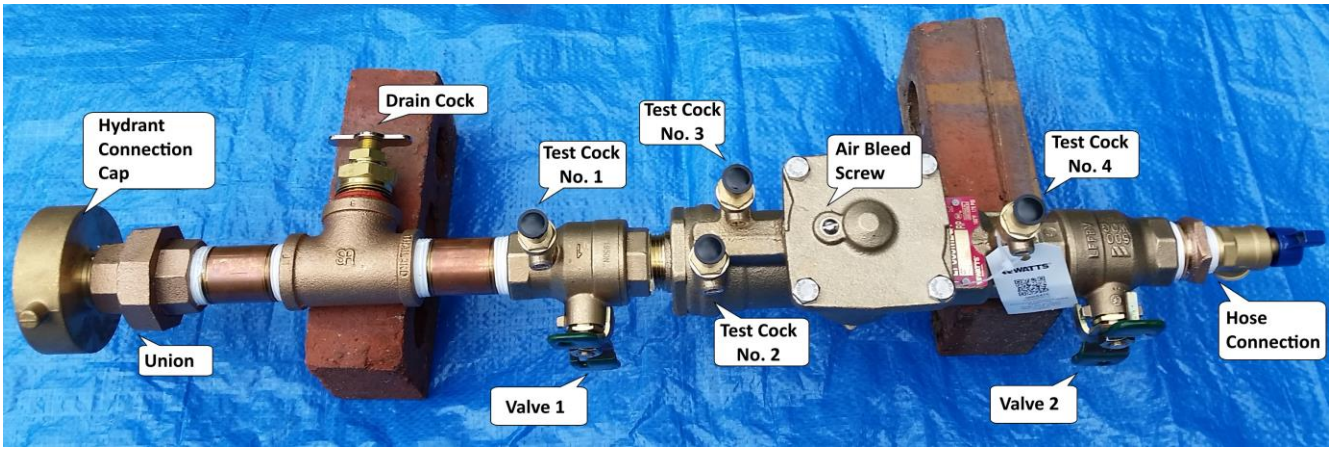
Winterizing – Season Closeout Checklist

1. Drain water tanks, pump, and piping
2. Add antifreeze to jetter pump if storing outdoors
3. Clean equipment
4. Move battery devices indoors
    a. Gas Detector
    b. Laser Pointer
    c. Flashlight
    d. Video Camera
5. Move liquid stock indoors
6. Inventory equipment
7. List needed repairs
8. Check fire extinguisher
9. Replace sharps container if needed
10. Replace elastic cords and straps as needed
11. Restock first aid kit
12. Restock trash bags, cable ties, rags, nitrile gloves
13. Wash Trailer
14. Lubricate hinges and chassis

Using the Trailer Water Supply

1. Maintain airgap when filling tanks
2. Check for leaks often
3. Only fill the tanks mark when the trailer is fully loaded with equipment
4. Only use clean water
5. The pressure connection requires electric pump is activated with switched outlet
6. Do not run the pump for more than a few of minutes without open flow – monitor pump temperature

Using the Hydrant Connection



Note: Improper use of a fire hydrant can severely damage a water distribution system and contaminate the public water supply.

1. Notify and get authorization from the water district or owner of the water utility
2. Remove 2 ½" cap from the fire hydrant
3. Connect the 2 ½" hydrant connection cap and union to the hydrant
4. Connect the remainder of the assembly at the union
5. Verify that valve 1, valve 2, and the hose connection are in the closed position
6. Connect the union and backflow preventer assembly – maintain proper orientation
7. Support assembly with appropriate length wood post
8. Open the drain cock to release air from the hydrant barrel
9. Turn the hydrant valve **slowly** until it is completely open
10. When water is flowing cleanly – close the drain cock
11. Bleed air from test cock number 1
12. Open valve 1 on backflow preventer
13. Bleed remaining three test cocks in order (see illustration)
14. Open air bleed screw to release air – then close
15. Open valve 2 on backflow preventer
16. Check flow from hose connection
17. Connect hose to assembly
18. When done – **slowly** turn hydrant valve to close
19. Remove the assembly
20. Replace hydrant cap
21. Dry assembly and hoses before storing

Using the Pipe Jetter

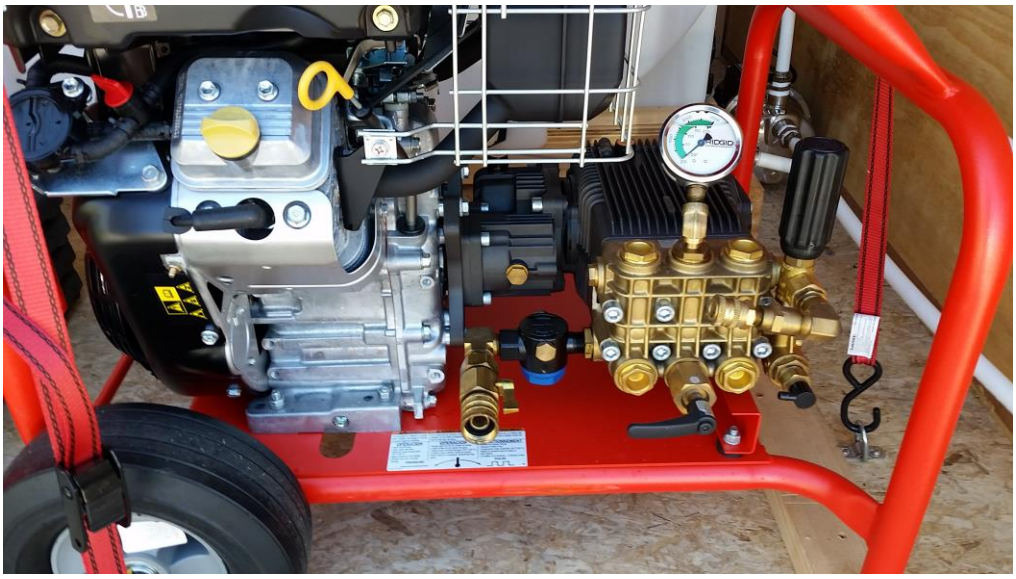
Never operate the jetter with the hose end outside the drain. When jetting the operator must always have at least one hand on the jetter hose.

1. Check fuel level and oil levels in engine, gearbox, and pump
2. Connect to water tank pump or other water supply with garden hose – 5 ½ GPM minimum
3. Assemble the jetter
   a. Remove hose reel from top of the jetter
   b. Place hose reel within 3 feet of the pipe opening
   c. Connect hose reel to the outlet of the foot valve
   d. Connect inlet of the foot valve to the pressure hose
   e. Connect the pressure hose to the outlet of the jetter

4. Flow water through the jetter by turning water supply pump on – inspect all hose connections
5. Ensure water is flowing through the hose and air is displaced – turn off water supply pump

6. Choose proper nozzle for task
   a. Reverse Jet Nozzle (H-111) or Bullet Nozzle – back flush pipe
   b. Forward Jet Nozzle (H-112) – forward flush pipe or remove blockage
   c. Root Ranger (RR3000) – cut roots or debris
7. Attach appropriate nozzle to hose on reel (hand tighten)

8. Operator: Equip yourself with hardhat, gloves, and face shield
9. Operator: Take position at pipe opening
    a. Never feed the hose through a fixture
    b. Use 2” PVC guider pipe inside manhole or catchbasin to maintain control
10. Operator must be able to operate the foot valve, securely handle the hose, and operate the hose reel
11. Operator: Place hose in pipe (note mark on hose which is 4 feet from nozzle)
12. Helper: Flow water through the jetter by turning water pump on



13. Helper: Start engine – Never start engine without water supply turned on
    a. Confirm that the pulse actuator lever is in the pressure position
    b. Open fuel lever
    c. Switch to on position
    d. Move the throttle to low
    e. Engage choke if needed
    f. Operator: Depress foot valve to release pressure
    g. Pull cord
14. Helper: When started disengage choke and increase the throttle to medium or high
15. Operator: Use foot valve to control flow and guide hose into pipe
16. Helper: Monitor water supply, pump temperature, jetter functions, and keep bystanders clear
17. Operator: Guide hose through pipe to remove debris – do not allow jetter hose to exit the pipe
18. Do not allow the jetter to run an extended period of time with the foot valve off
19. Helper: When complete or water is depleted – reduce the throttle and turn off jetter engine
20. Helper: Turn off water pump
21. Operator: Remove jetter hose from the pipe – depress foot valve to release pressure
22. Disassemble hoses and foot valve – remove and store nozzle
23. Allow jetter engine to cool and close fuel line before storing
24. Drain all hoses and clean equipment before securely stowing in the trailer

Using the Generator

1. Check fuel and oil
2. Do not start with a load
3. Turn fuel cap to on position
4. Set dial to chock position
5. Pull cord to start
6. Turn dial to on position
7. To connect to trailer use connector at front drivers side of the trailer
8. Plug in cords as needed
9. May be used directly or through the trailer connection
10. When done – turn dial to off position, turn fuel cap to off position, disconnect cords
11. Allow to cool and store securely

Using the Dewatering Pump

1. Remove large debris from sump
2. Keep electrical connections dry and away from water
3. Connect 2-inch PVC pipe to the pump
4. Connect discharge hose to 2-inch PVC pipe
5. Direct hose to desired location or into a waste tank
6. Secure end of hose
7. Plug in pump to generator or other power source
8. Lower pump into sump
9. Remove pump when sump water is down to desired level
10. Disassemble drain hose and pipe and store dry

Using the Smoke Machine

1. Notify police department, fire department, and local residents as needed
2. Cover nearby catchbasins with tarp and sandbags as needed
3. Attach smoke machine hose to blower
4. Insert smoke machine hose into drain pipe to be tested
5. Start blower and ignite smoke candle
6. Observe related pipes, nearby buildings, nearby grounds, and sewer structures for signs of smoke
7. Mark areas where smoke is appearing
8. When candle is finished (60-seconds) clear ash, disassemble and store blower

Using the Pipe Inspection Camera

1. Attach camera to the end of the cable
2. Open case and turn power on – verify image is displaying
3. Unclip reel and carefully unwind cable
4. Direct camera into pipe or structure - use 2” PVC guider pipe to direct camera into structure
5. Move the camera forward while observing the image to inspect pipe
6. Try not to allow camera to exit other end of pipe – it may be difficult to retrieve
7. Continue to make observations while retrieving camera
8. When complete, remove camera from cable and clean

Using Tracer Dye – Stormwater Pipe

1. Notify Board of Health, Conservation Department, Harbormaster and local residents as needed
2. In some cases, flowing water without dye might be adequate
3. Dilute tracer dye in mixing bottle to 1/8-strength
4. Dilute tracer dye to usable strength with 1/8-strength diluted dye:
   a. For 6-gallon water jug – one tablespoon for full jug
   b. For 35-gallon water tank – 6 tablespoons for full water tank
   c. For 70 gallons use 35-gallon water tank – 12 tablespoons to full tank of water (or use 1 ½ tablespoons of full strength dye) - Run dye water and clear water simultaneously at the same rate
5. Add dye water to stormdrain pipe to be tested
   a. Connect hose to 35-gallon tank
   b. Insert hose into stormwater pipe or use utility pump if needed
   c. For hard-to-reach places use 2” PVC guider pipe to direct hose into structure
6. Add more water as needed
7. Observe flows at exit of pipe
8. Rinse hoses after complete
9. Dry hoses before storing
10. Store 35-gallon tank empty only

Using Tracer Dye – Building Connection

1. Notify Board of Health, Conservation Department, Harbormaster and local residents as needed
2. Notify Sewer Department
3. Communicate with the building owner or manager where testing will occur
4. Add one drop of diluted tracer dye to suspected drain, sink, or toilet and flush thoroughly
5. Observe stormwater structures and pipes

Contact Phone Numbers

For all Emergencies Call 911

Buzzards Bay Stormwater Collaborative Manager – Maura Flaherty: 774.283.3918

	Acushnet	Bourne	Dartmouth*	Fairhaven
Primary Stormwater Contact	Merilee Kelly 508.998.0202	Sam Haines 508.759.0600 x1344	Marc Garrett 508.910.1829	Vinnie Furtado 508.979.4030
Police Department (non-emergency)	508.998.0240	508.759.4451	508.910.1735	508.997.7421
Fire Department (non-emergency)	508.998.0250	508.759.0600 x2	508.910.1735 Police Dispatch	508.994.1428
Department of Public Works	508.998.0230	508.759.0600 x3	508.999.0740	508.979.4030
Conservation Department	508.998.0202	508.759.0600 x1344	508.910.1829	508.979.4023 x128
Board of Health	508.998.0275	508.759.0600 x1513	508.910.1804	508.979.4023 x125
Harbormaster	NA	508.759.2512	508.999.0759	508.979.4023 x124
Water Department or District	508.998.0230	508.563.2294	508.999.0742	508.979.4030
Sewer Department		508.759.0600		

	Marion	Mattapoisett	Wareham*	Westport
Primary Stormwater Contact	Meghan Davis 508.748.3540 x204	Nick Nelson 508.758.4106 x3	Dave Menard 508.295.5300	Jim Hartnett 508.636.1037
Police Department (non-emergency)	508.748.1212	508.758.4141	508.295.1212	508.636.1122
Fire Department (non-emergency)	508.748.3595	508.758.4150	508.295.0450 (W) 508.295.2122 (O)	508.636.1110
Department of Public Works	508.748.3540	508.758.4181	508.295.5300	508.636.1020
Conservation Department	508.748.3515	508.758.4100 x219	508.291.3100 x6505	508.636.1019
Board of Health	508.748.3530	508.758.4100 x213	508.291.3100 x3197	508.636.1015
Harbormaster	508.748.3515	508.758.4191	508.291.3100 x3180	508.636.1105
Water Department or District	508.748.3540	508.758.4161	508.295.0450 (W) 508.295.0603 (O)	508.636.1004
Sewer Department			508.295.6144	NA

* Dartmouth has three fire departments – contact police dispatch; Wareham has two fire/water districts – the Wareham Fire District and the Onset Fire District