



CLOSE DOWN AND START-UP PROCEDURES MANUAL#

*Rideau Canal
Skateway Shelters*

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Rideau Canal Sketeway Shelters

The following is a set of instructions for close-down, start-up and commissioning procedures and shall be used as a minimum guide for preventive Mechanical and Electrical maintenance plan for the New Rideau Canal Shelters.

The procedures shall be reviewed with maintenance staff and modified according to site specific fact-findings and staff observations and recommendations.

The preventive Mechanical and Electrical maintenance plan for the New Rideau Canal Shelters shall recognize different work surroundings and shall be tailored with focus on the following:

- 1) **Close down procedure** must be sensitive to:
 - a) Since the structure is still on the ice, protection of the environment is crucial. All work that may cause sewage or chemical leaks must be closely monitored and avoided. The emergency procedure to deal with possible leaks must be in place.
 - b) Work will most likely commence at the outdoor temperatures below freezing point. Prevention against pipe, tanks and fixture damage due to freeze up is imperative. All chambers (pipes, tanks, p-traps, etc.) must be drained or filled with anti-freeze solution.
 - c) Due to the time and location of the New Rideau Canal Shelters during the close-down procedure, adequate cleanup and disinfection procedures are not possible. A great deal of attention is required to clean services with basic disinfection precautions.

- 2) **Start-up procedure** must be scheduled when chalets are placed on dry canal to perform work while outdoor temperature is above zero:
- a) Power connection is to be arranged. The heat shall be maintained for 48 hr. prior to start of any mechanical work.
 - b) Since the structure is placed on the ice, protection of the environment is crucial. All work that may cause sewage or chemical leaks must be closely monitored and avoided. The emergency procedure to deal with possible leaks must be in place.
 - c) Adequate cleanup and disinfection procedures must be performed during start-up procedure.
 - d) All Mechanical & Electrical services must be tested and any required repairs performed. Any damages and deficiencies must be recorded for further improvement of preventive Mechanical and Electrical maintenance plan.
 - e) Upon completion of all tasks the New Rideau Canal Shelters will be ready for operation on the Rideau Canal. The chalets will remain powered and heated until the completion of Winterlude at which time the shut-down procedure will be implemented.

Warranty Issues

Electrical Warranty

Thomas Fuller Construction, as the general contractor, is responsible for the overall warranty of this project. Thomas Fuller Construction will accept all calls about electrical work, hire any and all electrical contractors and cover material and labour costs for warranty issues.

Contact information for Thomas Fuller Construction:

2700 Queensview Dr.
Ottawa, Ontario
K2B 8H6
T: 613-820-6000
F: 613-829-7296
Email: build@fuller.ca

Mechanical Warranty

Thomas Fuller Construction, as the general contractor, is responsible for the overall warranty of this project. Rideau mechanical will accept calls about mechanical work and will be the mechanical contractors. Rideau mechanical will cover any and all material and labour costs for warranty issues.

Contact information for Rideau Mechanical:

74 Blackburn Ave.
Ottawa, Ontario
K1N 8A5
T: 613-730-6005
F: 613-730-6007
Email: rideau-mech@bellnet.ca

Contact information for Thomas Fuller Construction:

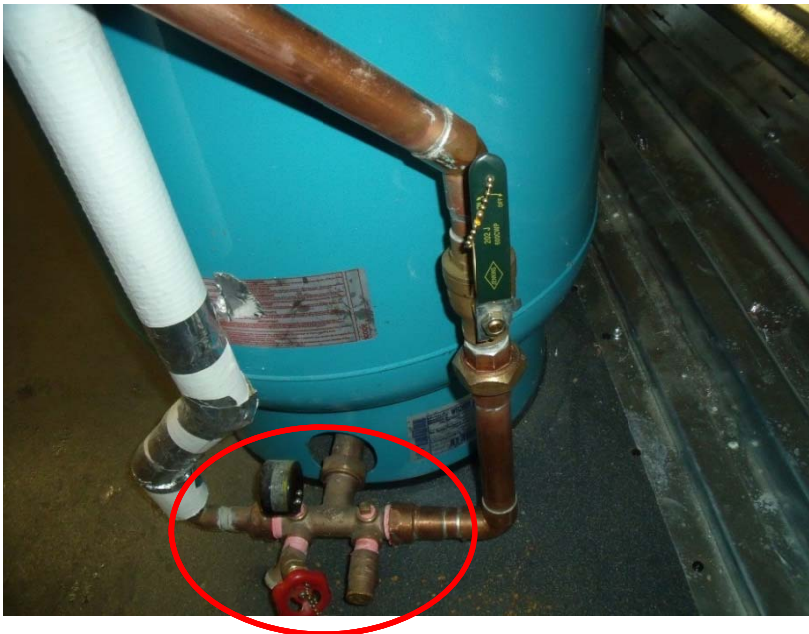
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Close-down before shipping to storage yard

1. Turn breakers off for water pumps.
2. For NAC Chalet, close valve on supply water, outside Chalet, and proceed to step 5.
3. Drain water storage tank (this is clean water, it can be evacuated outside).



4. Drain pressurized water tank (this is clean water, it can be evacuated outside).



5. Flush all toilets to evacuate water from the bowl and turn on all taps until water stops running. Pipes are now ready for compressed air "blow down".

6. Close valves for pressure gauges.
7. Slowly open service valve on compressed air line connected to the water line.



Air line valve connecting air line to water line

8. Activate each tap until water is evacuated and flush each toilet until no water is poured into the bowl.
9. Turn off breakers for air compressor.
10. Slowly open drain valve on air compressor tank and allow air to bleed out.
11. Pour ½ gal of plumbers anti-freeze in each sink and urinal.
12. Pour ½ gal of plumbers anti-freeze in each toilet and flush. Repeat this twice.
13. Open the top hatch of the sewage transfer tanks and fill with 20 gal of 10% chlorine solution.



Top hatch of sewage holding tank

14. Drain sewage transfer tanks, force pump to controlled operation on "HAND" mode



Sewage transfer tank drain

15. Turn off breakers for sewage pumps.
16. Use shop-vac to evacuate remaining sewage in transfer tank. Transfer waste to holding tank.
Use pumping truck to empty holding tank in same fashion as regular service. Spray the inside of the sewage holding tank with 20 gal of 10% chlorine solution. Repeat emptying tank procedure.
17. Use pressure washer and scrub brush to clean the inside of the tanks. Flush contents into sewage holding tank.
18. Open drain valve on sewage holding tank and manually drain remaining liquid from sewage holding tank. Use shallow container to capture waste. Transfer waste to pumping truck.



Sewage storage tank drain valve and drain

19. Pour 4 gal of plumbers anti-freeze into sewage holding tank.
20. Close drain and water valves at service box outside.
21. Apply vaseline to rubber ring on each flapper of each toilet.
22. Perform a full visual inspection of all visible exterior vents, louvers and service connections for any signs of damage and make repairs where required.
23. Perform emergency lighting test: Press test button for 30 seconds and verify that the lamps come on. Check for any physical damage on each unit and the alignment of the light beams. Perform any repairs as needed. A test log book is to be kept at all times.
24. Verify the emergency lighting battery's life cycle and replace accordingly.
25. Disconnect all emergency lighting from batteries for storage.
26. Ensure main disconnect switches are in the off position before disconnecting the outdoor power cables.
27. Check that the power cables are not damaged in any way.
28. Check that all disconnect switches and panel covers are closed and locked and that all fixture covers are secure before transporting the chalet.
29. Perform a full visual inspection of visible exterior wiring for any signs of damage and make repairs where required.
30. Disconnect outdoor power cables.
31. For NAC Chalet, disconnect heat trace cable and water supply pipes, outside Chalet, and store them in the Chalet.
32. Record in digital photo format overall building condition. Prepare close-down note validating procedures performed, sign documents and submit to manager.
33. Structure is ready for transfer.

Start-up procedure on dry canal

1. This procedure is to be performed shortly after transporting the structures onto the dry canal.
2. Visually inspect the building and points of entry for power, water and sewage services.
3. Ensure power cables are not damaged. Repair any damage as needed.
4. Ensure that the main disconnect switches are in the off position before connecting the outdoor power cables.
5. Open the main disconnect switches and ensure the fuses are still in place and in the proper positions.
6. For NAC Chalet, make sure heat trace cables and supply water pipes that are stored in the Chalet are not damaged.
7. For NAC Chalet, slowly open water supply valve, outside Chalet, and let it spill onto the ice surface to verify that the pipe is not frozen, then close this valve.
8. For NAC Chalet, connect water supply pipes and heat trace cable.
9. For NAC Chalet, slowly open water supply valve outside Chalet.
10. Connect outdoor power cables.
11. Make sure all breakers are on and not tripped.
12. With the use of a thermographic tool, verify that all heating units are operational and increase the temperature to ensure thermostats are still functional. If not, verify the breaker, thermostat and the manufacturer installed built-in high limit switches.
13. Connect all emergency lighting to batteries.
14. Perform emergency lighting test: Press test button for 30 seconds and verify that the lamps come on. Check for any physical damage on each unit and the alignment of the light beams. Perform a 90 minute full functional test as well, checking the battery and leads for corrosion. Test both battery and charging circuit voltages and clean the unit. Perform any repairs as needed. A test log book is to be kept at all times.
15. Verify outdoor lighting controls such as motion or night time sensors.
16. Verify all indoor lighting is operational, replace lamps if necessary.
17. Turn on heating for 48 hr. prior to mechanical services commissioning.
18. Turn on breaker energizing compressor and dryer, check operation, check filter. Follow manufacture recommended start-up /maintenance procedure.
19. Close and tighten all loose and disconnected sanitary, air and water pipe joints. Inspect tank gaskets. Make sure the tanks are airtight.
20. Spray inside of water storage tank with 5 gal of 5% chlorine solution.
21. Spray inside of sewage holding tank with 5 gal of 10% chlorine solution.
22. Spray inside of sewage transfer tanks with 5 gal of 10% chlorine solution.

23. Drain water storage tank. Water has high chlorine level and should be disposed of properly.



24. Fill $\frac{1}{2}$ of water storage tank with water. Check for leaks.

25. Check that all valves (except for drain on water storage tank, pressurized water tank and service box) are open for water lines.

26. Turn on breaker energizing compressor and dryer.

27. When starting up the air compressor, refer to the manual. Ensure there is oil in the crankcase. Visually inspect the unit. Make any repairs as needed. Open the compressor's ball valve, start the compressor and let it run for 30 minutes. After 30 minutes close the ball valve and allow the compressor to reach operating pressure (ensure compressor shuts down at the pre-set pressure).

28. Open valves on all air lines (except service valve connected to water line). Check for leaks.

29. Check that all valves are open for air lines (except valve connected to water line).



30. Check air filter on dryer.
31. Check that all valves (except for drain on sewage storage tank and at service box at the back of the chalet) are open for sewage lines



Valves on the sewage line shown in the open position

32. Turn all breakers on and allow pressurized water tank to be filled. Check for leaks.
33. Check pressure gauge for pressurized water tank during filling process and when filling process is complete.
34. Flush all toilets several times, run all taps for several minutes and pour approximately 2 gal of water into each urinal. Check for leaks.
35. Make sure sewage transfer tanks are full with enough liquid for pumps to turn on. Once pumps turn on, check for leaks. Verify floats operation.
36. Clean all fixtures and mechanical equipment.
37. Start-up is now complete.

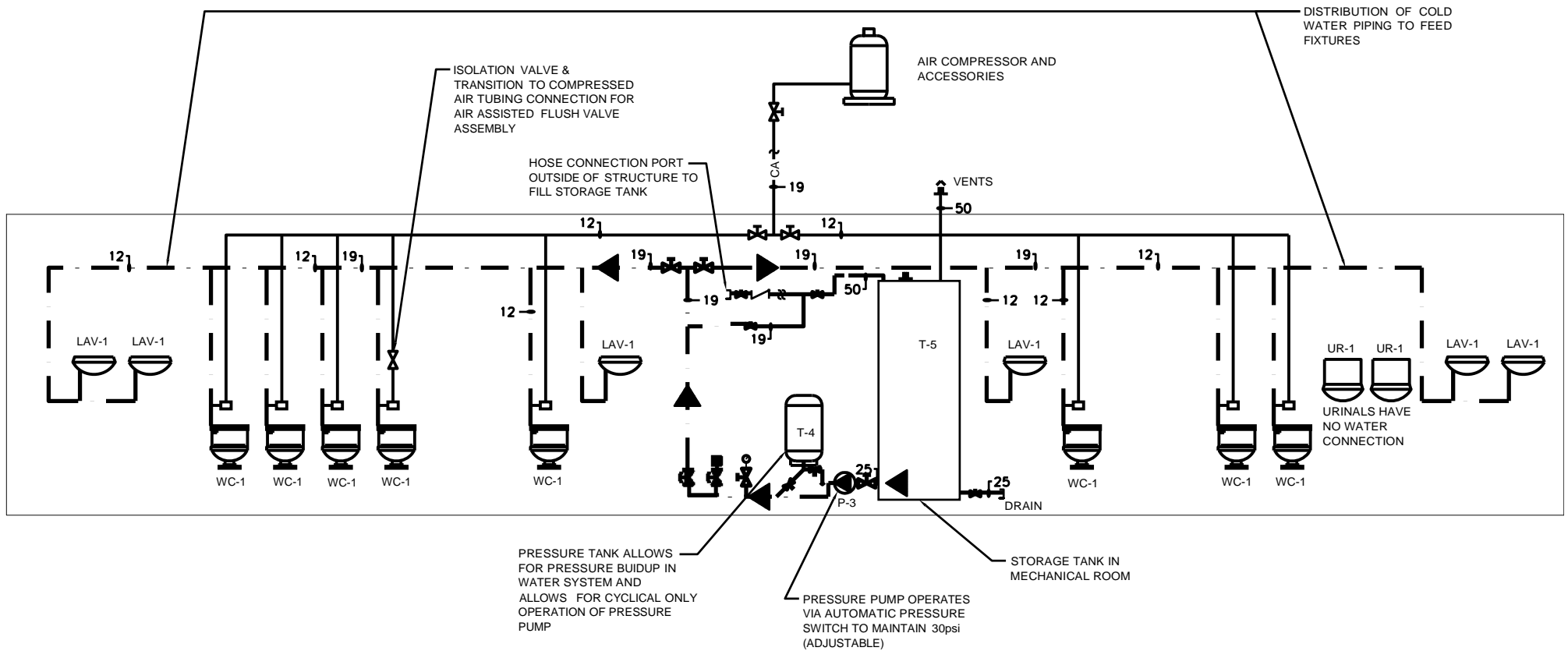
Typical Troubleshooting Guide

Toilet won't flush	Check breakers to make sure power is being supplied to magic eye and water pressure tank
	Test magic eye to see if it activates flushing sequence, does flapper open, does water enter the bowl? Replace magic eye if necessary
	Hold flapper open and flush again
Sewage transfer tank fills up	Check breakers to make sure power is being supplied to transfer pumps
	Check floats
	Check valves between transfer tank and holding tank to make sure they are in the open position
Sewage smell present in mechanical room	Check integrity of gaskets on sewage transfer tanks
Tap doesn't produce water	Check breakers to make sure power is being supplied to water pressure tank
	Check spring inside tap
	Check water valves to make sure they are in the open position
	Replace tap if necessary
Lights are not on	Check breakers to make sure power is being supplied to lighting
	Replace light(s) if necessary
Leak found in water or sewer piping	Check any joints near where leak is found, tighten any loose joint
	Call maintenance contractor if leak persists
Drop in air pressure	Check breakers to make sure power is being supplied to air compressor
	Check air valves to make sure they are in the open position

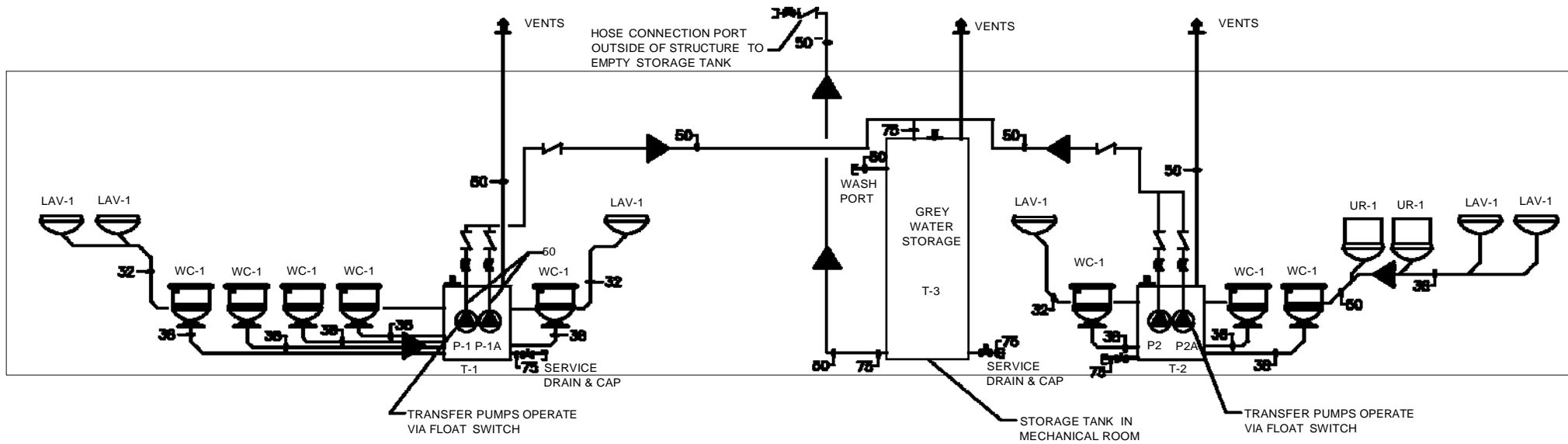
Operations Checklist

Operation	Daily	Weekly	Annually	Procedure	Troubleshooting
Check operation of all fixtures	✓			Flush all toilets, activate all taps and pour approx. 1L of water into urinals.	If fixture(s) not operational, call maintenance contractor.
Check water level in water storage tank	✓			Visually inspect.	If water level is inadequate, call water supply contractor.
Check sewage level in sewage storage tank	✓			Visually inspect.	If sewage level is too high, call sewage contractor.
Visually check for leaks for all piping	✓			Visually inspect.	If leak is found, call maintenance contractor. Plumbing contractor may be required.
Check indoor lighting	✓			Visually inspect for burnt out or flickering lights.	If indoor lighting is burned out, call maintenance contractor to replace.
Check emergency lighting		✓		Unplug emergency lights and verify that the lights turn on.	If lights don't turn on, call maintenance contractor. Electrical contractor may be required.
Check breakers		✓		Visually inspect that no breakers are tripped to the off position.	If breaker is in the off position, move to on position.
Check float alarms		✓		Lift and observe strobe light	Check connection, call maintenance contractor
Check pumps operation and floats (lead/lag)		✓		Lift in sequence.	Call maintenance contractor.
Check fan			✓	Turn on/off.	Repair/replace.
Check heating cable			✓	Plug and feel.	Replace.
Check air filter on dryer			✓	See Maintenance Manual for detailed procedure.	Call maintenance contractor.
Check air compressor			✓	See Maintenance Manual for detailed procedure.	Call maintenance contractor.

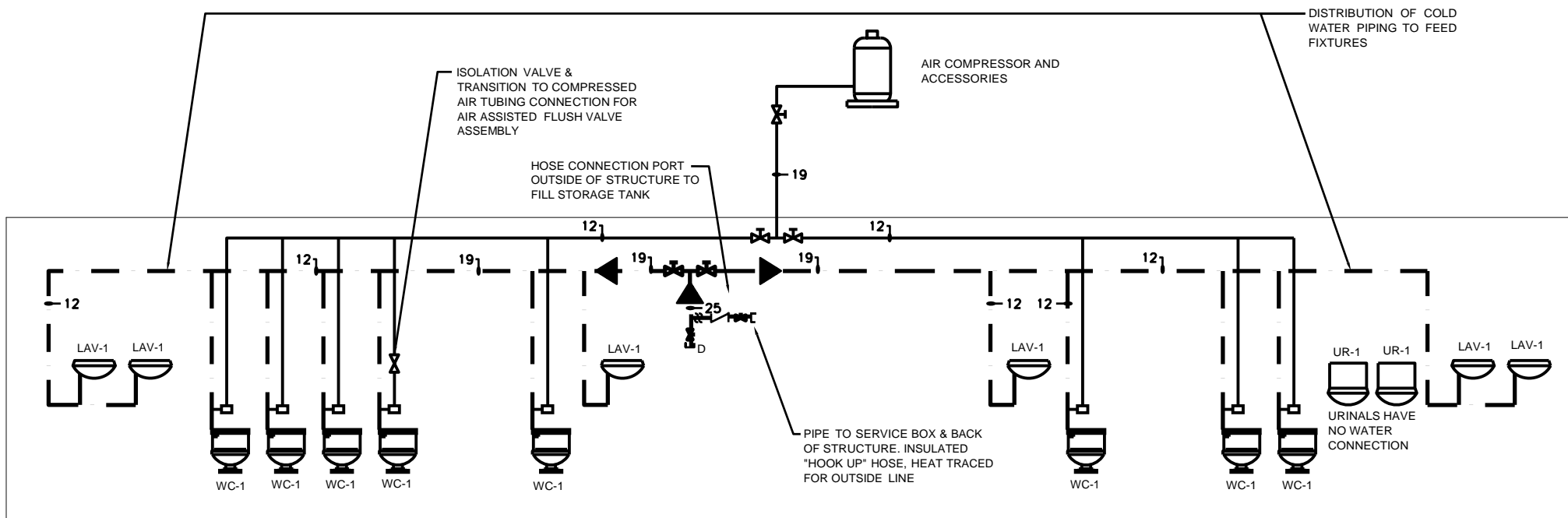
Self Contained Chalet – Water and Air Flow Diagram



Self Contained Chalet – Sanitary Flow Diagram



City Connected Chalet – Water and Air Flow Diagram



City Connected Chalet – Sanitary Flow Diagram

