

# The Water Reservoir

Your Municipality wants to use your tax dollars to repair or recondition the water reservoir that is in your town. The decision will depend on the cost. The options that they are considering are:

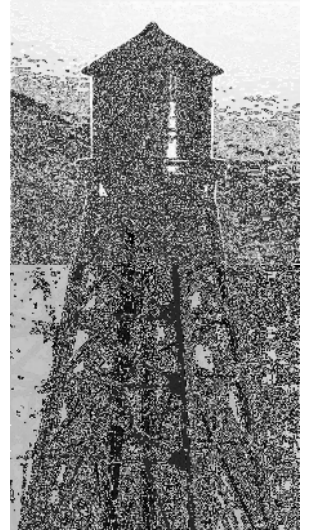
Option 1 - to replace the sheet metal on the outside of the reservoir

or

Option 2 - to sandblast, prime and paint the outside of the reservoir

Also, the main center pipe (from the bottom of the reservoir to the ground needs to be replaced).

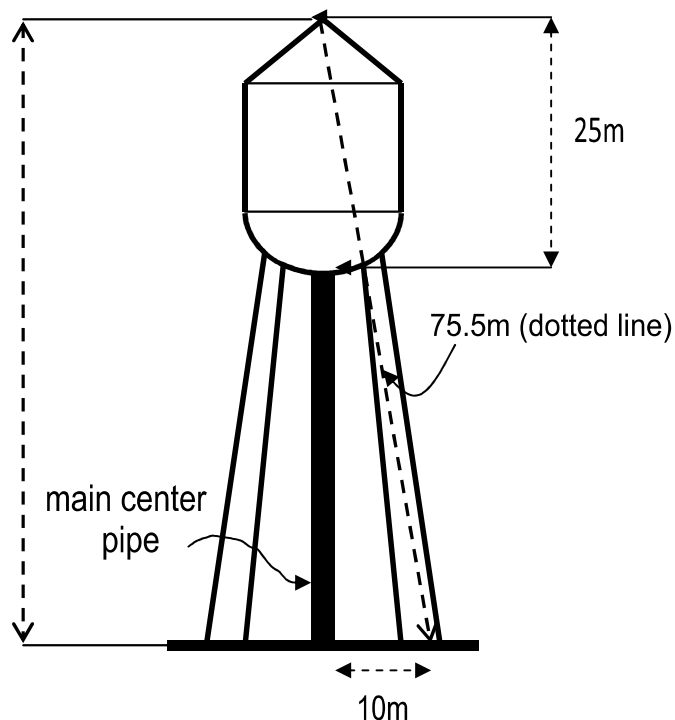
The cost of labour has been determined by the municipality and will be the same for either option. You will be part of the decision making process where cost will be an important factor.



## Capacity of reservoir:

Before proceeding with this project, the municipality wants to make sure the reservoir will hold enough water to accommodate all of the residences of your town. The population has increased in the last decade, therefore the capacity of water needed is 2 200 000 L.

- The reservoir has a diameter of 12.5 m and a total height of 25 m. It is composed of a cone, a cylinder, and a half-sphere.
- The height of the cone is half that of the cylinder.



### **Option 1 - Replacing the sheet metal**

The cost to replace the sheet metal that covers the surface area of the reservoir is \$12.75 per m<sup>2</sup>.

### **Option 2 - Painting**

The steps required to prepare the surface for painting is as follows:

- sandblasting the outside of the reservoir to remove old paint and rust.
  - priming the surface area of the reservoir for protection.
  - painting the surface area of the reservoir.
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- 1 m<sup>3</sup> of sand can sandblast 10 m<sup>2</sup> of surface area.  
The cost of sand is \$5.00 per m<sup>3</sup>.
  - 1 L of primer covers 30 m<sup>2</sup> of surface area.  
The cost of primer is \$45.00 per L.
  - 1 L of paint covers 18 m<sup>2</sup> of surface area.  
The cost of paint is \$65.00 per L. Two coats of paint will be required.

### **Main center pipe**

**Replacement of the main center pipe is necessary and needs to be added to the cost.**  
The cost of the pipe is based on its length only and is \$1.25 per cm.

**Your task is to:**

- **determine the capacity of the reservoir**
- **determine which option is the most cost effective**
- **determine the length of pipe needed for the main center pipe**
- **determine the total cost**