



## MEMORANDUM

**TO:** Town of Canton Permanent Municipal Building Committee  
**FROM:** Jeff Alberti, LEED-AP, Weston & Sampson  
**DATE:** March 18, 2013  
**SUBJECT:** Canton, CT DPW – Cost/Benefit Analysis for the Vehicle/Equipment Storage Garage portion of the Proposed New Public Works Facility

At the request of the Town of Canton Permanent Municipal Building Committee, Weston & Sampson prepared a cost/benefit analysis to identify the cost differential associated with the storage of vehicles in a minimally heated storage garage compared to fully exposed exterior vehicle storage. The analysis involved preparing a cost / benefit analysis based on our past experience with more than 80 DPW facility projects in New England.

### **Operational Analysis**

The analysis first focused on clearly identifying the types of operations which take place in vehicle / equipment storage areas. Many believe that this space is used to simply store the vehicles and equipment when not in use. However, based on current industry practices, the following is a list of the activities which take place within this area:

- Vehicle and equipment storage
- Material storage (cold patch, stone, barrels, barricades, etc.)
- Emergency vehicle and equipment repairs
- Repair and replacement of plow blades
- Minor vehicle maintenance (e.g. headlights, tail lights, mirrors, hydraulic hoses)
- Material loading and unloading operations
- Staging area for vehicle and equipment accessories (plows, towed trailers, towed compressors, etc.)
- Overflow workshop area during down time periods



## **Impacts Associated with an Unheated Space**

Furthermore, many have questioned the need to provide heat for this area. Consequently, we have identified a list of impacts associated with not heating the space. It is important to note that the space is only heated to 45 to 50 degrees Fahrenheit. Consequently, it is more appropriate to refer to the space as a tempered vehicle / equipment storage area. The following is a summary of potential impacts if the space is unheated:

- Cold storage results in the fuel becoming more viscous. This contributes to no-start conditions as well as generates an excessive amount of exhaust due to incomplete combustion of the fuel source.
- Vehicle warm-up times will be increased dramatically resulting in an increase in non-productive labor. It is estimated that the warm-up time will be increased by up to 30 minutes per vehicle each day based on actual field tests.
- Any vehicle with a water source will need to be drained and filled each day resulting in an increase in non-productive labor.
- Condensate in the air tanks for the vehicle compressed air braking systems can potentially freeze requiring the tanks to be defrosted prior to operating.
- Excess wash water will freeze which can potentially damage vehicle parts such as salt/sand conveyor belts.
- Cold storage results in the hydraulic oil becoming more viscous. This overstresses hydraulic pumps which in turn damages or reduces the life expectancy of the pumps.
- Cold storage reduces the flexibility of the hydraulic hoses. Rigid hoses coupled with viscous hydraulic oil increases the potential for damaged or broken hydraulic hoses.
- Increase in response times due to no start conditions and increased warm-up periods.
- Snow pack on vehicles will not melt. This requires vehicles to be “defrosted” before vehicles are placed back into service or before maintenance activities can be performed.
- Salt/Sand product in spreader bodies will freeze which can damage spreader system. This will require all salt/sand product to be loaded or unloaded each day.
- Increase in operational costs (refer to the Cost / Benefit Analysis).

## **Cost / Benefit Analysis**

Weston & Sampson prepared a cost/benefit analysis to determine the financial impact of storing a portion of the fleet outdoors. For the purpose of this analysis, the fleet study group consisted of vehicles which may be able to be stored in a new DPW support building. This study group assumed a total of 15 vehicles/equipment including; eight large vehicles (dump trucks), five small vehicles (1-ton pickup), and two pieces of construction equipment (front end loader/backhoe). The analysis compared the cost to construct, maintain, and operate a new 11,200 SF vehicle / equipment storage area to the additional costs incurred by storing these vehicles and equipment outdoors (increased maintenance, reduced vehicle life expectancy, and non-productive labor for vehicle preparation). This analysis determined that the cost to store vehicles outdoors over the 50 year life of a building is approximately \$13.1 million vs. \$6.4 million to construct, operate, and maintain a new vehicle storage garage. For comparison



purposes, these figures were converted to represent the net present value. This process converts the value of future costs and benefits to their actual value today based on the assumption that the dollar in future years does not have the same value as the dollar today. Consequently, the net present value to store vehicles outdoors is therefore \$4.2 million vs. \$2.7 million to construct, operate, and maintain a new vehicle storage garage. It is important to note that this analysis does not identify additional costs associated with storing other support equipment outdoors such as tractors, mowers, skid steers (bobcats), etc. If this support equipment were to be stored outdoors, the Town would incur additional costs associated with the accelerated deterioration of this equipment.

It is important to note that this cost/benefit analysis does not take into consideration the following item which could result in additional costs if the vehicles are stored outdoors:

- Costs associated with potential injuries to the public due to unsafe conditions resulting from inclement weather and/or delayed response times. The DPW is on call 24 hours a day for, among other things, snow storms, tropical storms, water main breaks, flooding, downed trees, and removal of road obstructions. The equipment that is used to respond to these emergencies is temperature sensitive and, if stored outdoors during the cold weather months, may be subject to starting problems or damage from severe weather that can delay the DPW's response time during these. This can result in unsafe conditions for the public. In addition to starting problems, employees may be required to waste valuable time warming up and cleaning off a vehicle prior to responding to an emergency.

## **Conclusions**

Based on the results of the operational analysis, impacts associated with unheated storage, and the results of the cost/benefit analysis, it is our opinion that that the construction of a minimally heated vehicle/equipment storage garage with proper ventilation is the most efficient, safe, and cost effective option for vehicle / equipment storage operations.