

CAPE DORSET  
TRUCKFILL STATION

**OPERATION AND  
MAINTENANCE MANUAL**

**Volume 1 - MECHANICAL**

# CHAPTER 1

## **CAPE DORSET TRUCKFILL STATION**

### **INTRODUCTION**

**OPERATION AND MAINTENANCE MANUAL**

**VOLUME 1**

**TRUCKFILL STATION**

**AT**

**CAPE DORSET - N.W.T.**

**CHAPTER 1**

**INTRODUCTION**

Year of Completion - 1993

Original Scope - Truckfill Station, Storage Tank Filling and Heating, Water  
Chlorination

This manual has been updated to include:

Date	Description of Change

This project involved the following participants:

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Government of the Northwest Territories

Department of Government Services and Public Works

Baffin Region

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# CHAPTER 2

## **CAPE DORSET TRUCKFILL STATION**

## **GENERAL INDEX**

## CHAPTER 2

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# CHAPTER 3

## **CAPE DORSET TRUCKFILL STATION**

### **BACKGROUND AND DESIGN DATA**

Contractor

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# CHAPTER 2

## **CAPE DORSET TRUCKFILL STATION**

## **GENERAL INDEX**

W. L. WARDROP & ASSOC. LTD.  
ENGINEERING CONSULTANTS

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ENGINEERING CONSULTANTS

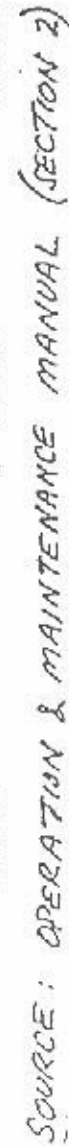


FIGURE 1

### **1.2.2 Water Supply Pipeline**

#### General

The supply line, built in 1973, carries water by gravity from the 1,200 L (265 Ig) head tank in the heater building, (refer to Figure 1).

The line is on a continuously falling grade between the heater house and the truckfill station. It consists of approximately 1,040 m of 75 mm victaulic coupled insulated steel pipe, complete with a heating cable installed inside the line.

### **1.2.3 In-Town Water Storage Tank/Truckfill Building**

#### General

A 91 m<sup>3</sup> (20,000 Ig) storage tank was located in the truckfill building, south of the downtown core of the Community (refer to Figure 2). Both the tank and building were constructed in 1973 and were made obsolete by the new truckfill station and water storage tank.

### **1.2.4 Delivery Infrastructure**

A Consultant's report indicated that the present delivery infrastructure comprising trucked services, is more cost effective than pipe services. The report indicated that trucked services will continue to be the more cost effective option for many years to come.



## **2.0 OBJECTIVES**

The objectives of the truckfill station and water storage tank project are outlined below.

Construct new facilities in accordance with the recommendation made in a Consultant's report, to incorporate the following improvements:

- a) Provide a new storage tank and truckfill building at a location outside the limit of the new subdivision. The location proposed in this alternative is west of the southern tip of the subdivision at or near the location recommended in the Consultant's report (refer to Figure 2); and
- b) Dismantle and remove the lower section of the supply line, to resolve the conflict with new land development activities.

It is suggested that the dualing of the supply line from Tee Lake be excluded from this project and be deferred until the time comes to replace the 1973 vintage supply line (perhaps in 3 to 10 years). The issue can then be addressed at that time. The grades for this portion of the line are steep, and anchoring of the line has resulted in a relatively stable structure. Moreover, experience has shown that most of the maintenance problems have occurred along the lower section of the supply line.

## **3.0 DESIGN PARAMETERS**

### **3.1 General**

All design decisions were based on the application of relevant MACA Guidelines/Standards and Criteria in consultation with MACA officials.

### **3.2 Planning Horizons**

The planning horizon for design purposes was 10 years for sizing water storage facilities, and 20 years for all other components of the water supply system.



The current 5-Year Capital Plan provided for completion of construction in 1993. Therefore, the planning periods being considered are 1993 to 2003 for sizing the storage tank, and 1993 to 2013 for all other system components.

### 3.3 Projected Populations

Projected Populations are presented below:

- 1993 (year 0) = 1,076 persons
- 2003 (year 10) = 1,356 persons
- 2013 (year 20) = 1,641 persons

Source: GNWT Bureau of Statistics, February 21, 1990

### 3.4 Projected Water Consumption

Projected water consumption rates, based on MACA Planning Buildings for populations between 0 and 2000 persons, are presented below:

- 1993 (year 0) = 112.3 L/c/d = 120.8 m<sup>3</sup>/d
- 2003 (year 10) = 118.1 L/c/d = 160.1 m<sup>3</sup>/d
- 2013 (year 20) = 124.0 L/c/d = 203.5 m<sup>3</sup>/d

Note: Design Water = (90 L/c/d) x [1.0 + (0.00023 x population)] Consumption

### 3.5 In-Town Water Storage Capacity

The net accessible in-town storage capacity comprises three components, viz. operating storage, emergency "loss of supply" storage, and fire storage.

#### Operating Storage

Daily trucked demand in year 2003 (10 year planning horizon):

$$\begin{aligned} &= 118.1 \text{ L/c/d} \times 1,356 \text{ persons} \times 10^{-3} \text{ L/m}^3 \\ &= \underline{160.1 \text{ m}^3} \end{aligned}$$



The Operation and Maintenance Manual indicates that with continuous pumping from Tee Lake, the maximum capacity of the system is approximately 454 m<sup>3</sup>/d (100,000 gpd).

A one day operating storage of 160.1 m<sup>3</sup> is generally considered adequate. This will result in a pumping/filling cycle of approximately 6.5 hours per day in 1993, and 8.5 hours per day in 2003.

An increase in the operating storage (say 2-day or 3-day) will provide no economic benefit. However, if no operating storage is provided, then possibly costly modifications to the intake/heating system and ill control system will be required, to enable almost continuous pumping/filling of the storage tank.

#### Emergency "Loss of Supply" Storage

MACA Standards and Criteria indicate that the amount of emergency storage is based on the "longest inoperable period in days", in the event of a loss of supply. Generally, a 2-day emergency storage is considered adequate. System reliability will be enhanced significantly when the single water supply line from Tee Lake is dualled in the future (See Section 2.0).

A 2-day emergency "loss of supply" storage at year 2003 demand amounts to 160.1 m<sup>3</sup> x 2 days = 320.2 m<sup>3</sup>

#### Fire Storage

According to the Cold Climate Utilities Manual (Edited by D. Smith, 1986), the minimum storage required for an adequate truck relay fire protection system is about 54 m<sup>3</sup>. This amounts to a truckfilling capacity of 900 L/min for 1 hour.

#### Total Storage Capacity

The total net accessible water storage capacity required is 535.3 m<sup>3</sup>.