# ASSET MANAGEMENT

Core Concepts and Application

MacLean Consulting

### What Is Asset Management?

A systematic, data-based, practice focused on maximizing the value delivered by assets



### What is the goal of a Community Government?



The City delivers services

Delivering services introduces risk

Delivering services and managing risks costs money

# **Delivering Services - A Balancing Act**



The goal of the City is to deliver services at the minimum sustainable cost

# **How Asset Management Fits**



The City delivers services

It owns assets to deliver services

Owning assets and delivering services introduces risk

Managing assets and risks costs money

# **Levels of Service**



# Why are they important?

Common Expectations

Clear Goals

Celebrate success

Focus Improvement





# **Levels of Service - Getting Specific**

What <u>exactly</u> do we deliver?

- ► To who?
- What amount?
- ► When?
- ► What quality?
- How consistently?
- How safe?
- At what cost?

How do we prove it? What are we going to measure? How is that data collected? How do we communicate it?

# **Levels of Service Framework**





Roughly how many services does The City of Yellowknife provide?

Less than 20
20 to 40
40 to 60
60 to 100



# What is Risk?

# Hazard — Risk = Likelihood x Severity



# **Risk Matrix**



# Framework





### **Asset Risk**

### **Risk = Likelihood x Severity**

# Asset Risk = Condition x Criticality

# **Challenges with Risk**

### Managing risk means spending money so that nothing happens

### There is no zero risk scenario

# **Risk Roles**

Administration - Risk Awareness and Management

Identify risks

- Identify controls and costs
- Manage controls
- Council Risk Tolerance
  - Determine acceptable risk levels
  - Approve spending on risk treatment



# Cost

### Capital

Operations & Maintenance



# Life-Cycle Cost

- Acquisition
- Operations & Maintenance
- Renewal/Replacement
- Disposal



Which has the lower life-cycle cost?

### Option 1

- 10,000,000 to build
- 200,000 O&M annually
- ▶ 20 year life
- > \$700,000/year

### Option 2

- ▶ 20,000,000 to build
- ▶ 100,000 O&M annually
- 30 year life
- \$766,000/year

Which has the lower life-cycle cost?

### Option 1

- 10,000,000 to build
- 200,000 O&M annually
- ▶ 20 year life
- > \$700,000/year

### Option 2

- ▶ 20,000,000 to build
- ▶ 100,000 O&M annually
- 35 year life
- \$671,000/year

Are gifted assets actually free?

- Acquisition
  - Operations & Maintenance
- Renewal/Replacement
- Disposal

# **A Question**

#### How often should we replace our graders?



Hourly Cost of Ownership

= Capital Cost + Fuel + Consumables + Maintenance - Residual Value

**Operating Hours** 

When is this smallest?

# **Capital Cost**

#### Hourly Cost of Capital

= Capital Cost Operating Hours



# **Cost of Fuel and Consumables**

#### Hourly Cost of Fuel and Consumables

= Fuel + Consumables

**Operating Hours** 

#### Fuel and Consumables Cost / hr \$200 \$180 \$160 \$140 \$120 \$100 \$80 \$60 \$40 \$20 \$0 20,000 5,000 10,000 15,000 25,000

# **Cost of Maintenance**

#### Hourly Cost of Maintenance

Maintenance =

**Operating Hours** 



# **Residual Value**

#### Hourly Residual Value

- Residual Value

Operating Hours



Hourly Cost of Ownership

= Capital Cost + Fuel + Consumables + Maintenance - Residual Value

**Operating Hours** 







Assume 1000 hours/year

@ \$69/hr x 1000 hr/yr = \$69,000/year

@ \$61/hr x 1000 hr/yr = \$61,000/year

Potential cost reduction of \$8,000/year for each unit

# The Real World

# **Data Requirements**

- Purchase Cost History
- Historical Unit Hours
- Historical Actual Maintenance costs (in 2023 dollars)
- Historical Residual Values from Auction/Trade-in (in 2023 dollars)

# **Another Question**

How much should we charge for water?



Which part of the Life-cycle typically costs the most?

Acquisition

Operations & Maintenance

- Renewal/Replacement
- Disposal

Which aspect of life-cycle cost carries the most risk to services?

- Acquisition
- Operations & Maintenance

Renewal/Replacement

Disposal

# Life-Cycle Cost - City Hall

- Built in 1976 for \$1.9M
- Estimated useful life of 50 yrs, until 2026
- Annual Operations \$306k
- Annual Maintenance \$116k
- Annualized Renewal \$89k
- Estimated replacement cost \$22.1M
   442k/year



# Why is replacement such a risk?

We forget its coming

We underestimate the cost

We don't save enough



What was the inflation rate between 2010 and 2020?









Depends on what you are talking about

# Inflation

- CPI is not applicable to physical assets
- Different assets inflate at different rates
- Regions inflate at different rates
- Inflation affects replacement cost



# Inflation - Rule of 72

# # Years until cost doubles = $\frac{72}{Inflation\%}$



What is the inflation rate of Graders in Yellowknife?





Unit	Model	Year Acquired	Acquisition Cost
2034-11	140M Grader	2011	\$261,702.00
2036-13	140M2 AWD Grader	2013	\$315,183.75
2037-14	140M2 AWD Grader	2014	\$315,183.75
2038-18	140M3 Motor Grader	2018	\$409,450.00
2033-20	150 AWD Grader	2020	\$403,450.79
**NEW**	150 AWD Grader	2021	\$418,633.10





# **City Hall**

Built in 1976 for \$1.9M

\$9.1M in 2023 dollars using CPI

Estimated replacement cost \$22.1M

3.4% 5.3%

### What if we extend the life?

### City Hall

\$22.1M over 50 years - 442k / year

> 25 more years at 5% - 997k / year

▶ 50 more years at 5% - 2,534k / year



What is the estimated service life of water and sewer pipes at installation?





Roughly how much does replacing water and sewer mains cost?

\$800/m
\$1600/m
\$3200/m

▶ \$4800/m





### **Pipes**

> \$3200/m over 50 years - \$64/m/year

> 25 more years at 3% - \$89/m/year

▶ 50 more years at 3% - \$140/m/year



# Why do we Replace Assets?

Physical Failure

Functional Failure

Fiscal Failure

Unacceptable risk





# **Asset Trivia**

What is our oldest asset?

Wildcat Café (1937, 86 years old)

What has been the most expensive asset to acquire to date?

Water Treatment Plant (34.4M in 2015)

What is the most expensive asset to replace?

Fiddler's Lagoon

# **Asset Registry**

One source of the truth for all asset related data including

- Service supported
- Year built
- Acquisition Cost
- Current Condition
- Asset Risk
- Estimated Life
- Asset Inflation Rate
- Estimated Future Replacement Cost

# Why is an Asset Registry important?

- Build more accurate, farther looking, capital financial forecasts
- ► KNOW that we are financially sustainable
- Prioritize investment based on condition and risk

# City of Yellowknife Asset Management Policy

### **Principals**

Service Delivery to Customers Systematic, Data-Based Decisions Minimum Sustainable Cost Risk Management Whole Organization Continuous Improvement



### **FILED UNDER: The Differences**



Source: gapingvoid Culture Design Group

# **Takeaways**

▶ Think in terms of levels of service, risk, and cost

Ask for life-cycle cost information

It's a matter of when, not if, plan for the future

