Town of Whitby

Service Area Asset Management Plan

Municipal Information Systems (MIS)

DECEMBER 2017

ASSET HEALTH GRADE

B

FINANCIAL CAPACITY GRADE

A

KEY PERFORMANCE INDICATOR

=

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Executive Summary

Infrastructure is directly linked to the economic, social and environmental advancement of a community. Municipalities own and manage nearly 60% of the public infrastructure stock in Canada.

The Town of Whitby's infrastructure portfolio comprises seven distinct Service Areas: Road Right-of-Way, Facilities, Fire, Municipal Information Systems (MIS) Equipment, Parks, Library Resource and Fleet. Together, these assets have a total valuation of approximately $2 billion, with MIS comprising $2.6 million of this portfolio.

Strategic asset management is critical in extracting the highest total value from public assets at the lowest lifecycle cost. In this regard, the Town of Whitby has developed a Service Area Asset Management Plan (SAAMP) for each of its seven asset categories. This SAAMP details the state of infrastructure of the Town's MIS Service Area and provides asset management and financial strategies designed to facilitate the Town's pursuit of developing an advanced asset management program and mitigate long-term funding gaps.

Based on age data and replacement cost, while 70% of the municipality's MIS assets are in good to Very Good condition, more than 30% are in poor to very poor condition. As such, an **Overall Asset Health Grade of 'B'** has been assigned to the municipality.

The Asset Health Grade is a snapshot in time (December 31, 2015) – and does not look at future asset assumptions or future funding needs to continue to adequately maintain our assets. It is also important to note that the Asset Health Grade is an average of all the Service Area's assets, and some individual assets have a condition higher or lower than what the average grade indicates.

The average annual investment requirement for Whitby's MIS assets total $336,900. Annual revenue currently allocated to these assets for capital purposes is $333,000. As such, the Town is funding 99% of its annual needs. As a result, the **municipality received an 'A' for its financial sustainability grade**.

Condition assessments are vital components of a sustainable asset management program. Given increasing digitization and the growing dependence of services on information systems, we recommend the Town establish condition assessment protocols for MIS with a portion of capital funding dedicated to the initiative. In addition, establishment of a risk prioritization framework will further augment the Town's ability to prioritize future projects related to MIS, and more optimally allocate available funding. The Town should review on an annual basis its levels of service (LOS) and condition-related key performance indicators (KPIs). The LOS and KPIs should reflect the short- and long-term demand that will be placed on the infrastructure. This is the Town's first SAAMP for its MIS assets. We recommend the Town update this report on an annual basis.

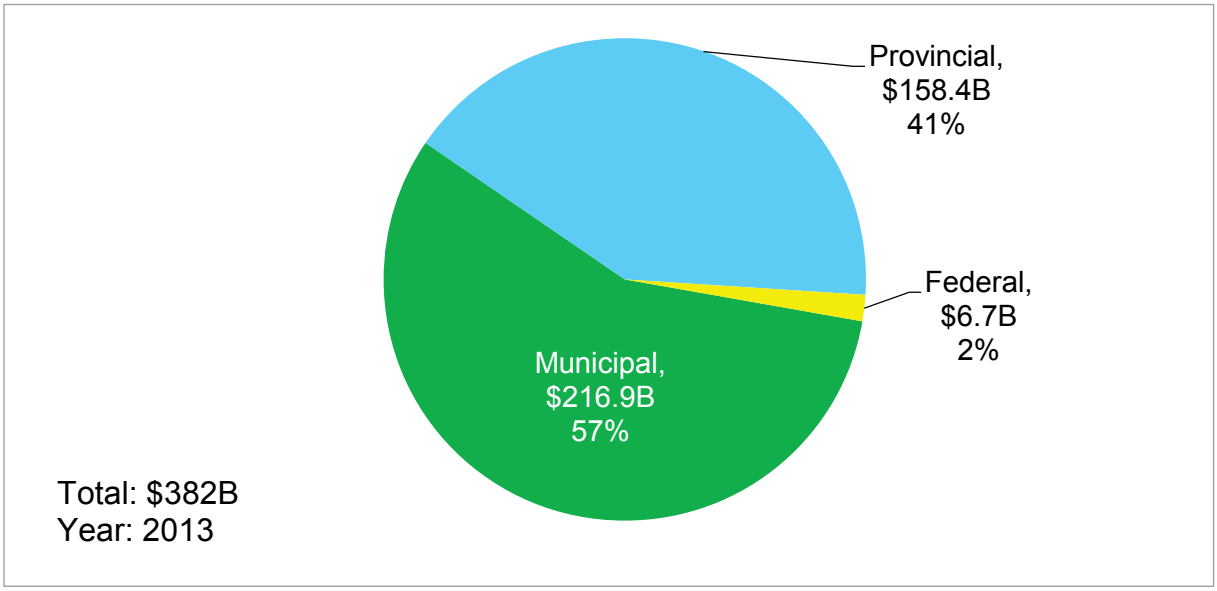
This SAAMP is a living document and will continually be updated and built upon. To ensure that future versions are meaningful documents that support the Town's ability to continue to build a strong asset management program, the following items are recommended:

1. The municipality should establish an MIS condition assessment program and that a portion of capital funding is dedicated to this.
2. The Town should update its SAAMP on an annual basis.
3. The Town should undertake the development of a long-term financial strategy.

1. Introduction

Ontario's municipalities own more of the province's infrastructure assets than both the provincial and federal government combined. Across Canada, the municipal share of public infrastructure increased from 22% in 1955 to nearly 60% in 2013.

Figure 1-1 Distribution of Net Stock of Core Public Infrastructure

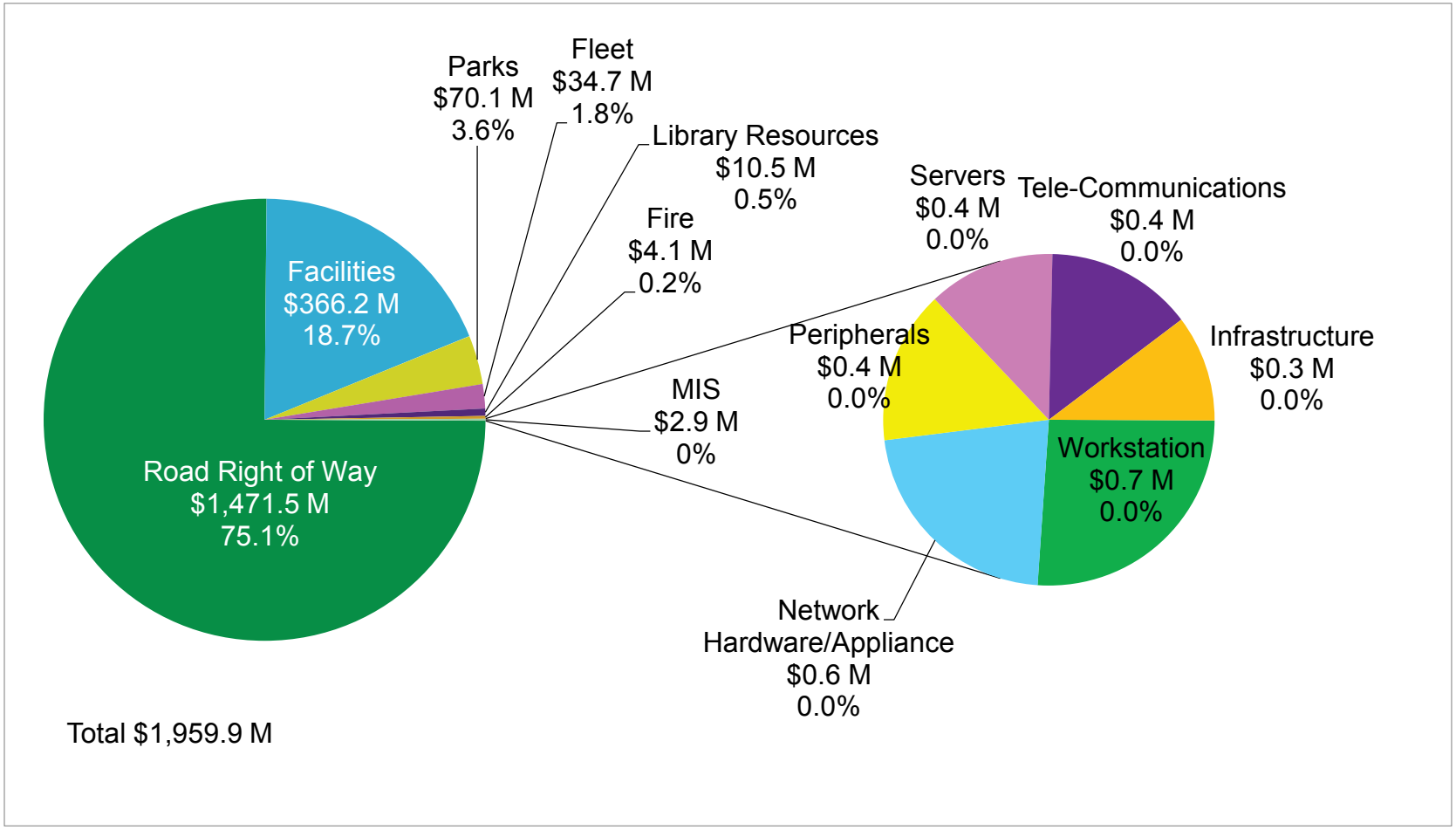


The asset portfolios managed by Ontario's municipalities are also highly diverse. The Town of Whitby owns approximately $2 billion of these public assets in seven distinct Service Areas:

1. Road Right-of-Way
2. Facilities
3. Fire
4. Municipal Information Systems (MIS) Equipment
5. Parks
6. Library Resources
7. Fleet

Figure 1-2 illustrates the breakdown of the Town's asset portfolio by Service Area.

Figure 1-2 Asset Portfolio by Service Area – Based on 2016 Replacement Value



Whitby relies on these assets to provide residents, businesses, employees and visitors with safe access to important services, such as transportation, recreation, culture, economic development and much more. As such, it is critical that the Town manage these assets by making the right decisions, at the right time, for the right reasons, and for the right costs.

This Municipal Asset Management Plan (MAMP) will assist the municipality in this pursuit of judicious asset management for its seven service areas.

1.1 What is Asset Management?

Asset Management (AM) can be best defined as an integrated business approach within an organization that minimizes the lifecycle costs of owning, operating, and maintaining assets, at an acceptable level of risk, while continuously delivering expected levels of service for present and future customers.

AM includes the planning, design, construction, operation and maintenance of infrastructure used to provide services. Infrastructure needs can be prioritized over time by utilizing AM processes, while also ensuring timely investments to minimize repair and rehabilitation costs and maintain municipal assets.

Key questions municipalities must ask themselves today as they develop their AMPs and programs are the following:

- What is the asset worth?
- What is the asset's condition and expected remaining service life?
- What is the level of service expectation, and what needs to be done?
- When do you need to do the preventative maintenance, rehabilitation, or replacement?
- How much will the remedial works cost and what is the acceptable level of risk(s)?
- What are the overall life cycle needs/costs?
- What are the long-term sustainable financing needs?

1.2 Goals of the Municipality

The 2014-18 Goals of Whitby Council lists specific objectives that contribute to the vision of an inclusive, thriving and sustainable community. Asset Management is related to four of the goals:

3. To continue the Whitby tradition of responsible financial management and respect for taxpayers; and to understand the importance of affordability to a healthy, balanced community.
4. To ensure Whitby is clearly seen by all stakeholders to be business- and investment-friendly and supportive; and to strive to continuously improve the effectiveness and efficiency of service delivery.
7. To remain the community of choice for families and become the community of choice for seniors and job creators; and to focus new growth around the

principles of strong, walkable and complete neighbourhoods that offer mobility choices.

Achievement of these objectives depends on a wide range of assets that support the Town's services, including transportation, parking, solid waste collections, fire protection, parks, recreation and culture. Delivery of these services depends on the availability of suitable and reliable infrastructure assets. Maintaining, renewing, expanding and disposing of these assets can be costly, so it is essential to understand what level of service is required by the community, and how different asset maintenance and capital improvement strategies will impact the service delivered.

Through increased understanding of how infrastructure assets and management of those assets affects its services, the Town will be able to more efficiently deliver services and achieve its vision of being a 'Community of Choice'.

1.3 Asset Management Vision

The Town of Whitby's Asset Management vision is: *Providing the framework for responsibly managing all Town owned infrastructure.*

1.3.1 Asset Management Objectives

The Town works as a collaborative team to comprehensively and consistently undertake the following objectives for all Town owned assets. These asset management objectives help to inform the implementation of the Town's asset management vision:

- **Inventory**: Capture all asset types, inventories and historical data.
- **Current Valuation**: Calculate current condition ratings and replacement values.
- **Life Cycle Analysis**: Identify Maintenance and Renewal Strategies & Life Cycle Costs.
- **Service Level Targets**: Define measurable Levels of Service Targets
- **Risk & Prioritization**: Integrates all asset categories through risk and prioritization strategies.
- **Sustainable Financing**: Identify sustainable Financing Strategies for all asset categories.
- **Continuous Processes**: Provide continuous processes to ensure asset information is kept current and accurate.
- **Decision Making & Transparency**: Integrate asset management information into all corporate purchases, acquisitions and assumptions.
- **Monitoring & Reporting**: At defined intervals, assess the assets and report on progress and performance.

1.4 Purpose of the SAAMP

This SAAMP is one component of the Town of Whitby's overarching Municipal Asset Management Plan (MAMP) and was developed to support the Town's strategic vision for its asset management practice and programs. It provides key asset attribute data, including current composition, inventory, useful life etc., summarizes the physical health of the capital assets in its MIS Service Area, assess the Town's current capital spending

framework, and enumerates financial strategies to achieve infrastructure sustainability in the long-term and mitigate any funding gaps.

1.5 Contents of the SAAMP

This Service Area Asset Management Plan focuses on MIS, one of the seven Service Areas managed the Town. For discussion, and analysis purposes, the MIS Service Area has been broken down into the following Primary Asset Categories:

1. Network Appliances
2. Servers
3. Workstations
4. Peripherals
5. Telecommunications
6. Infrastructure

This SAAMP is developed in accordance with the Province of Ontario's *Building Together: Guide for Municipal Asset Management Plans* and includes the following core components:

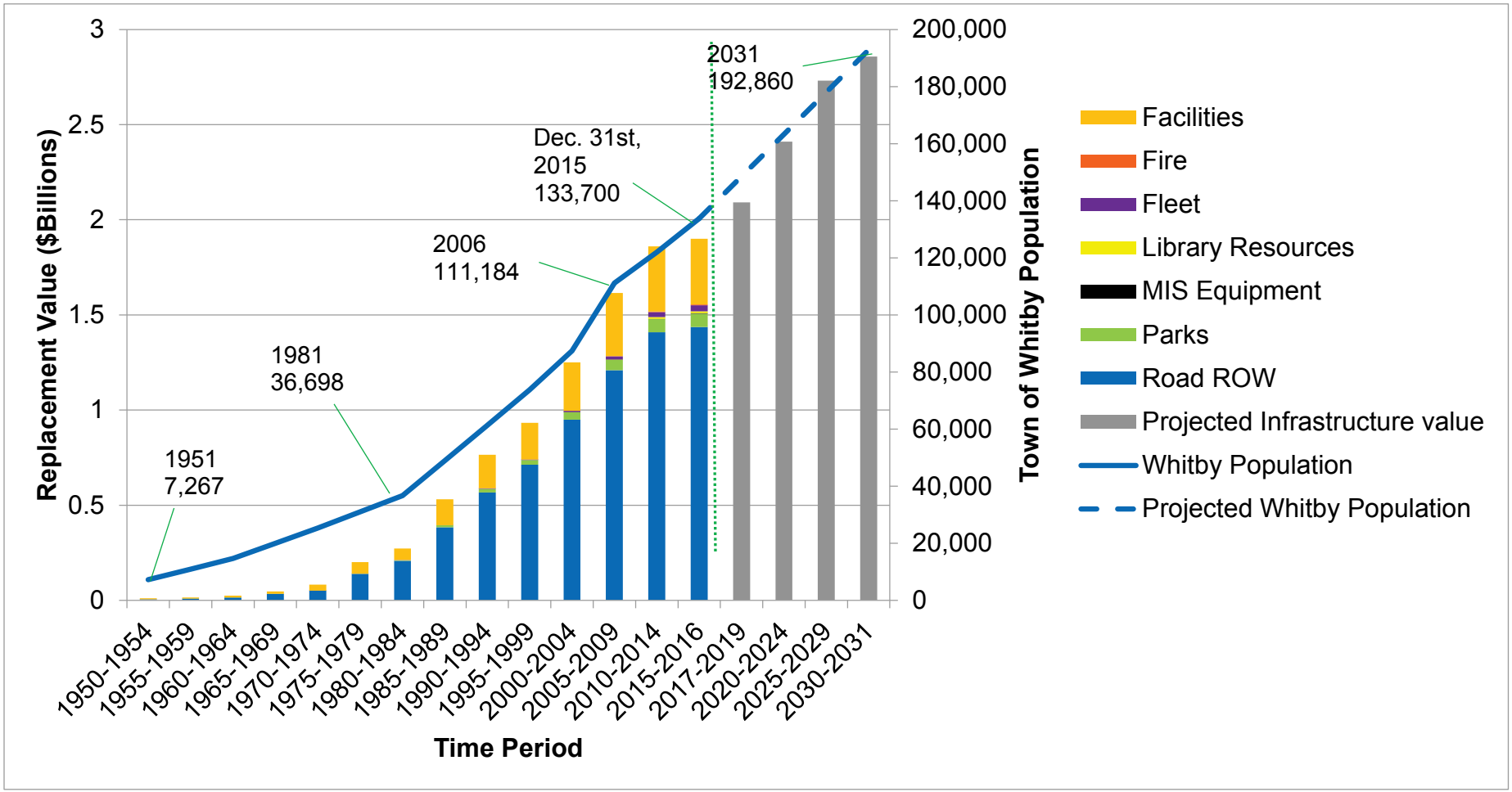
Table 1-1 Contents of the SAAMP

#	Section Title	Description
1	Introduction	Explains how the goals of the municipality are dependent on infrastructure, and clarifies the relationship of the MAMP to municipal planning and financial documents.
2	State of Existing Infrastructure	Summarizes the asset hierarchy, inventory, valuation, age distribution and condition. Also discusses how and when information regarding the characteristics, value, and condition of assets will be updated.
3	Levels of Service	Defines levels of service through performance indicators and targets, and outlines current performance. Describes external trends or issues that may affect expected levels of service.
4	Asset Maintenance and Renewal Strategies	The asset maintenance and renewal strategies are the set of planned actions that will enable the assets to provide the desired levels of service in a sustainable way, while managing risk, and at the lowest life cycle cost.
5	Financial Plan	This section integrates asset management planning with financial planning and budgeting.
6	Recommendations	Provides a summary of the state of the infrastructure, current level of service, and recommended asset management and funding strategies. Also summarizes recommendations for monitoring achievement of the AM objectives and for continuous improvement of the MAMP in future updates.
	Appendix A	Provides a summary of analytical assumptions used in the AM Plan, including benchmark costs, asset service lives, capital growth, etc.

1.6 Growth and Demand

Growth is a critical infrastructure demand driver for most infrastructure services. As such, the municipality must not only account for the lifecycle cost for its existing asset portfolio, but those of any anticipated and forecasted capital projects associated specifically with growth. Whitby has experienced rapid population growth since 1980, and its infrastructure investments reflect this trend. The chart below shows how the population has evolved over time and the estimated growth increase for the next 15 years. While Whitby's population growth rate has decreased since the mid-2000s, the forecasts used by the municipality anticipate a second wave of rapid population increase, with an expected population of 193,000 by 2031, an increase of approximately 50% from its 2013 population of 130,145.

Figure 1-3 Whitby's Population Trend



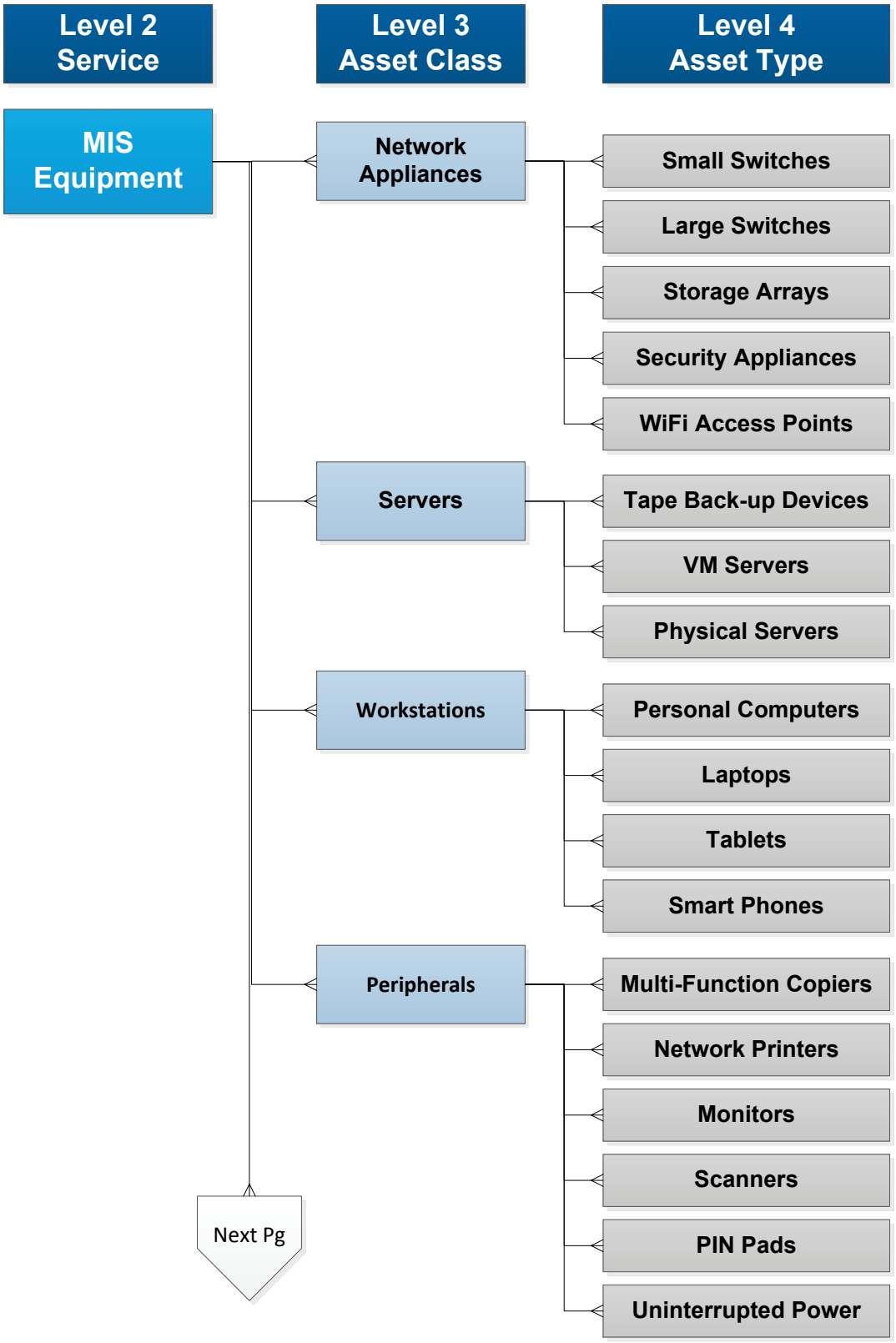
2. State of Local Infrastructure

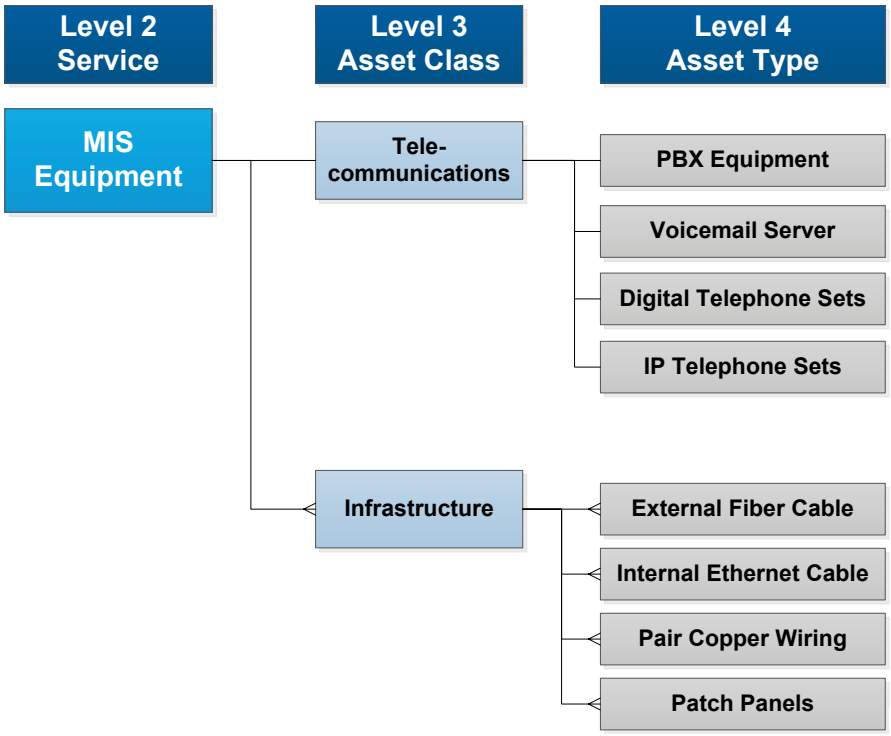
In this section, we summarize key elements of the Town's MIS services portfolio. This includes a detailed outline of the Town's asset inventory and the condition of assets. When observed data was not available, we relied on the age of the assets to approximate their conditions.

2.1 Asset Hierarchy

The asset hierarchy illustrates the relationship of individual assets and their components to a wider, more expansive network and system, with the 'Town of Whitby' as Level 1 in the hierarchy. Each level provides greater detail.

Figure 2-1 Asset Hierarchy and Breakdown





2.2 Asset Inventory

Whitby's MIS state of the infrastructure analysis includes the following Level 3 assets:

- Network Appliances
- Servers
- Workstations
- Peripherals
- Tele-communications
- Infrastructure

Table 2-1 details the Town's inventory for its MIS Service Area at the component level.

Table 2-1 Asset Inventory

Service	Asset Class	2010 Quantity	2015 Quantity	Current Quantity
MIS Equipment	Network Appliances	Unknown	176	196
	Servers	Unknown	18	26
	Workstations	Unknown	473	548
	Peripherals	Unknown	610	670
	Tele-ComPBX	Unknown	471	471
	Infrastructure	Unknown	29,651m	29,651 m

2.3 Replacement Cost Valuation

Replacement values determined using unit costs for individual asset components will yield more reliable estimates of current market prices. The Town provided replacement costs. The estimated replacement value totaled $2,597,536 for Whitby's MIS portfolio. The total cost per household is approximately $57 using 45,772 household. In this section, we detail the replacement value of all MIS assets by asset class.

Figure 2-2 Estimate 2016 Asset Valuation by Level 3

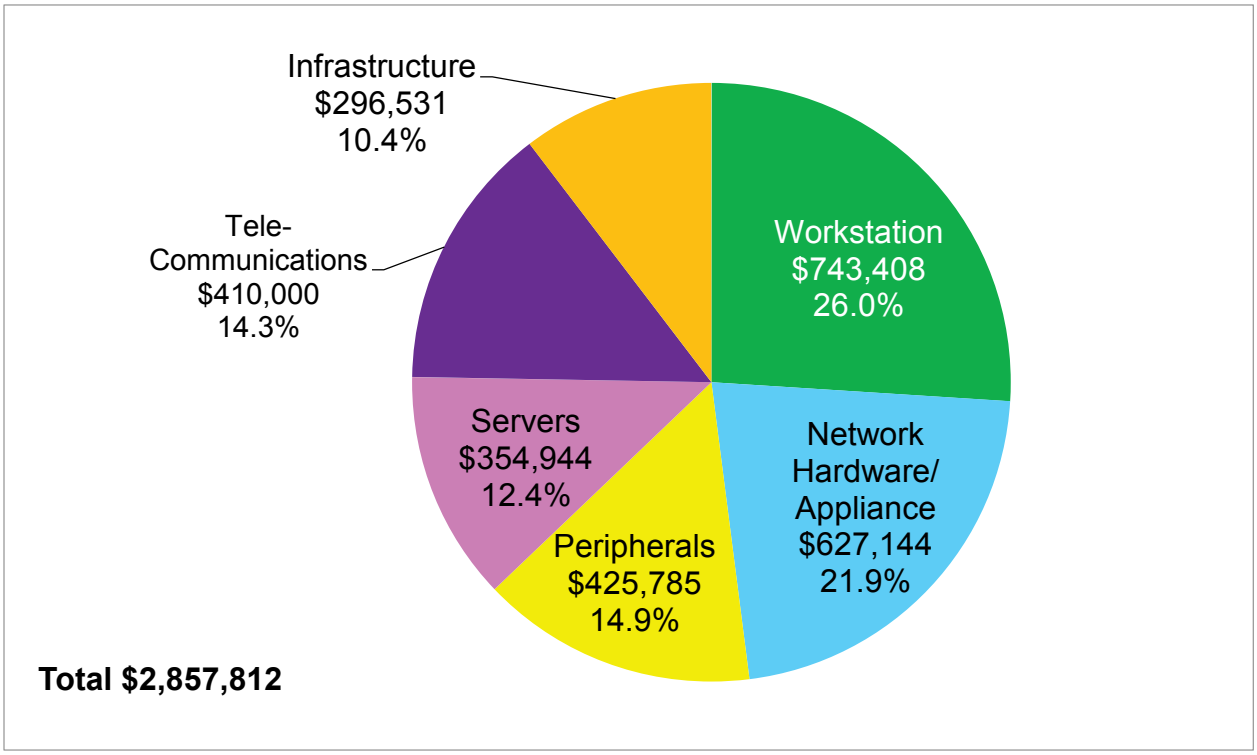
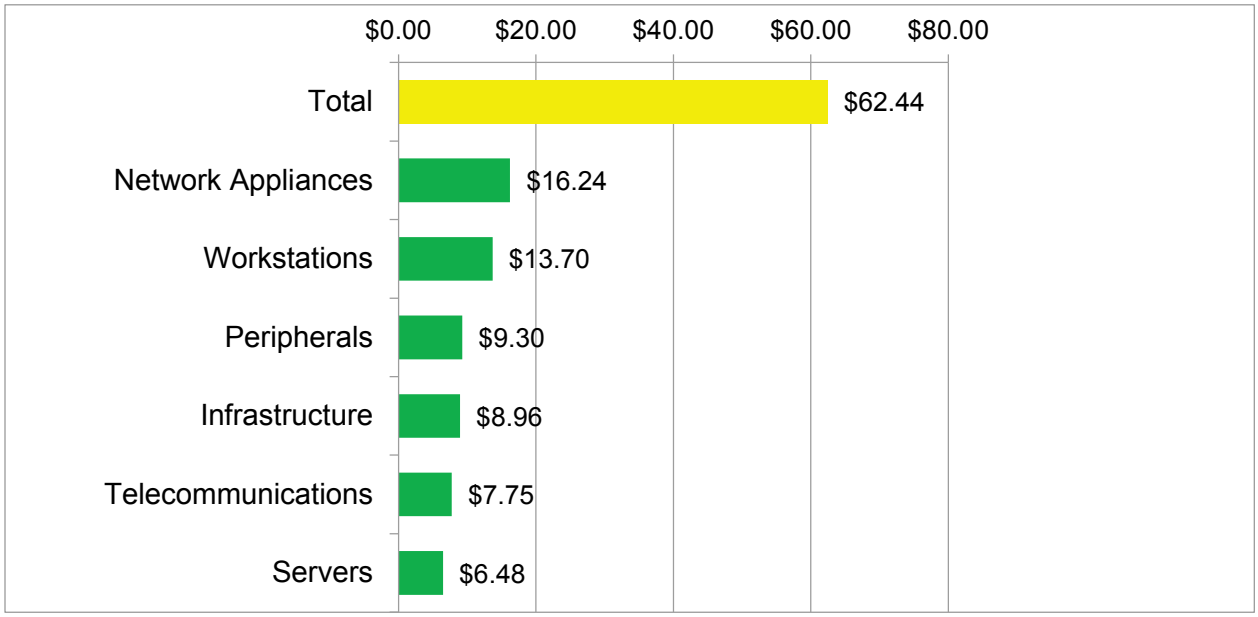


Figure 2-3 Replacement Value Per Household



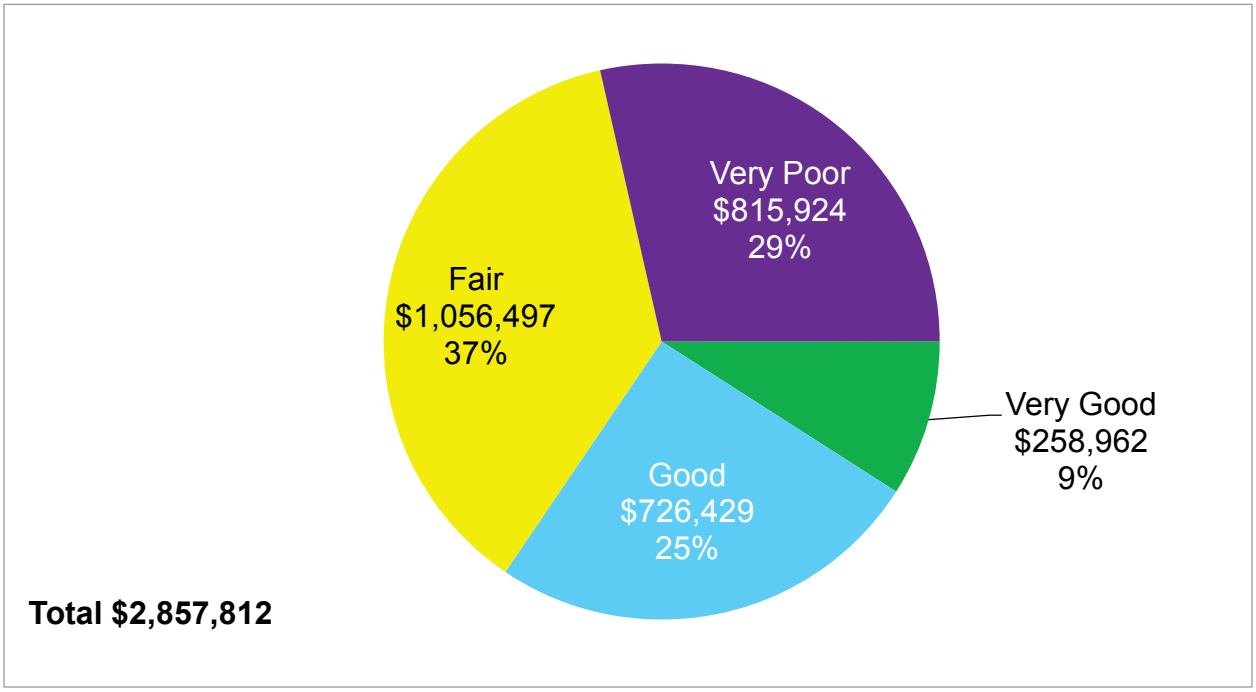
2.4 Asset Condition and Remaining Useful Life

Understanding the current condition of the assets and their remaining useful life can provide the Town with a more complete picture of its infrastructure portfolio and upcoming short, medium and long-term needs. The Town has developed condition scales for its MIS assets. These are provided in the Appendix.

2.4.1 Asset Condition Distribution

This section provides detail on the physical condition of the Town of Whitby's MIS assets. Based on age data and replacement cost, while 71% of the municipality's MIS assets are in fair to Very Good condition, 29% are in very poor condition. The overall condition of MIS assets are shown in Figure 2-4.

Figure 2-4 Condition Distribution by Level 3 – MIS



The following graphs illustrate the condition distribution of each of the Town's MIS Level 3 assets

Figure 2-5 Asset Condition – Network Appliances

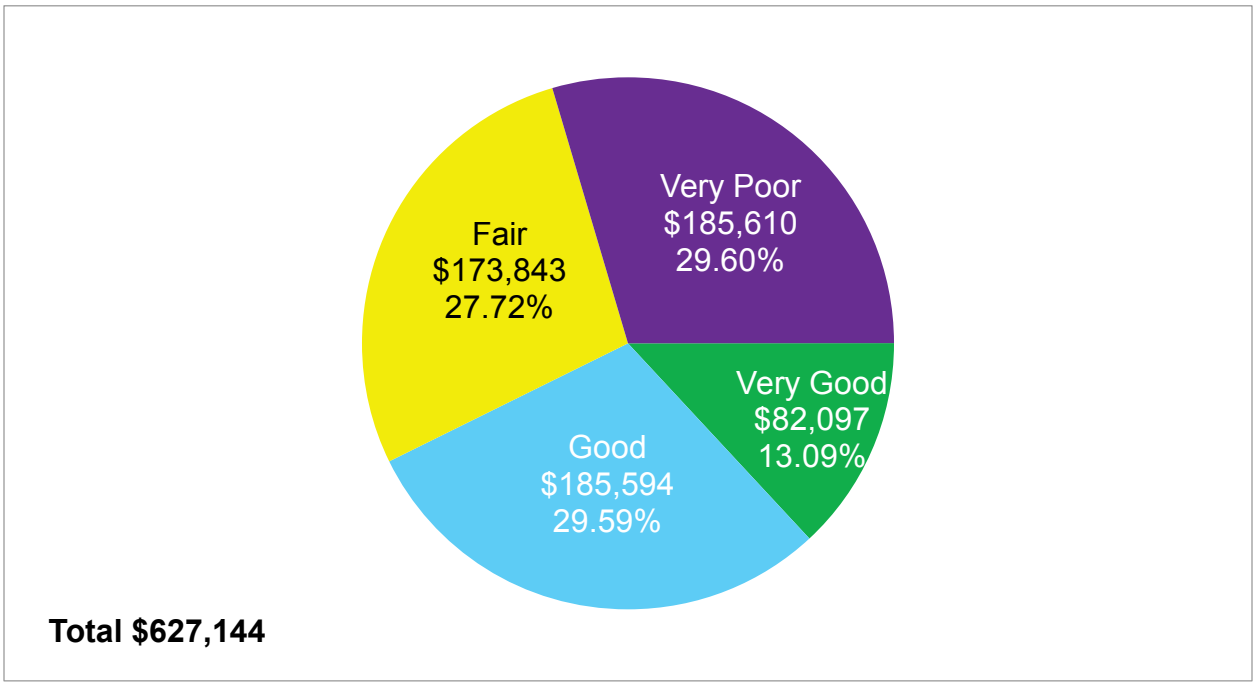


Figure 2-6 Asset Condition – Servers

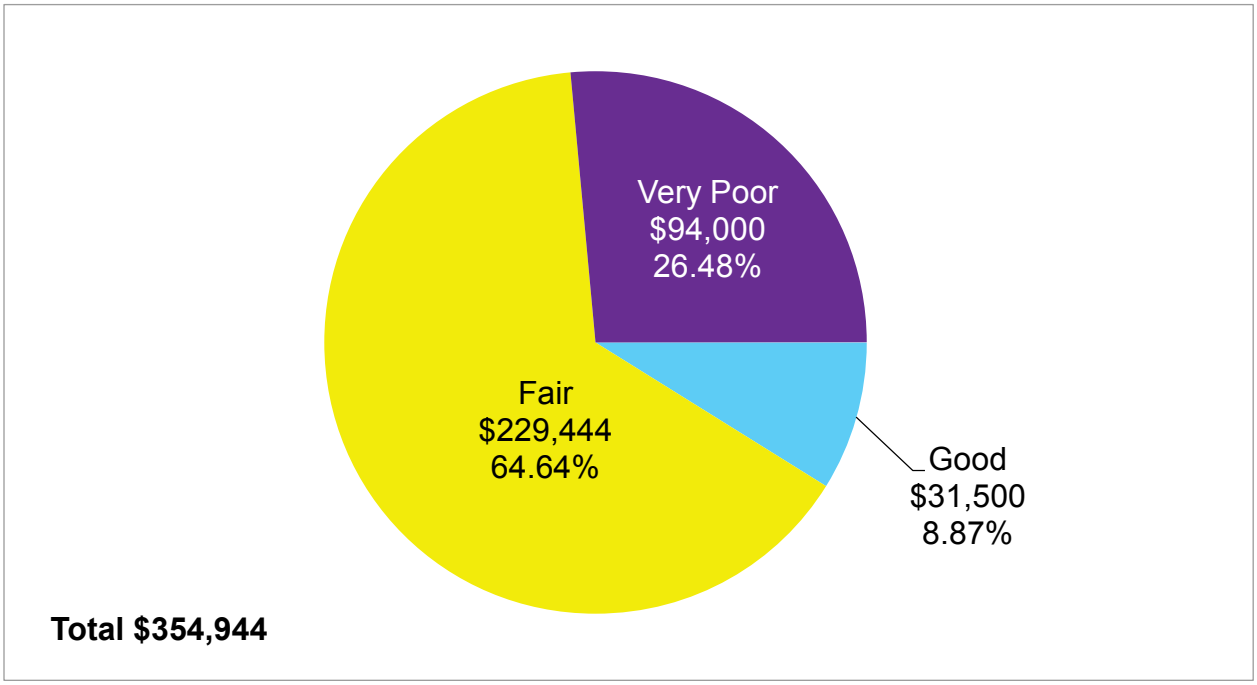


Figure 2-7 Asset Condition – Workstations

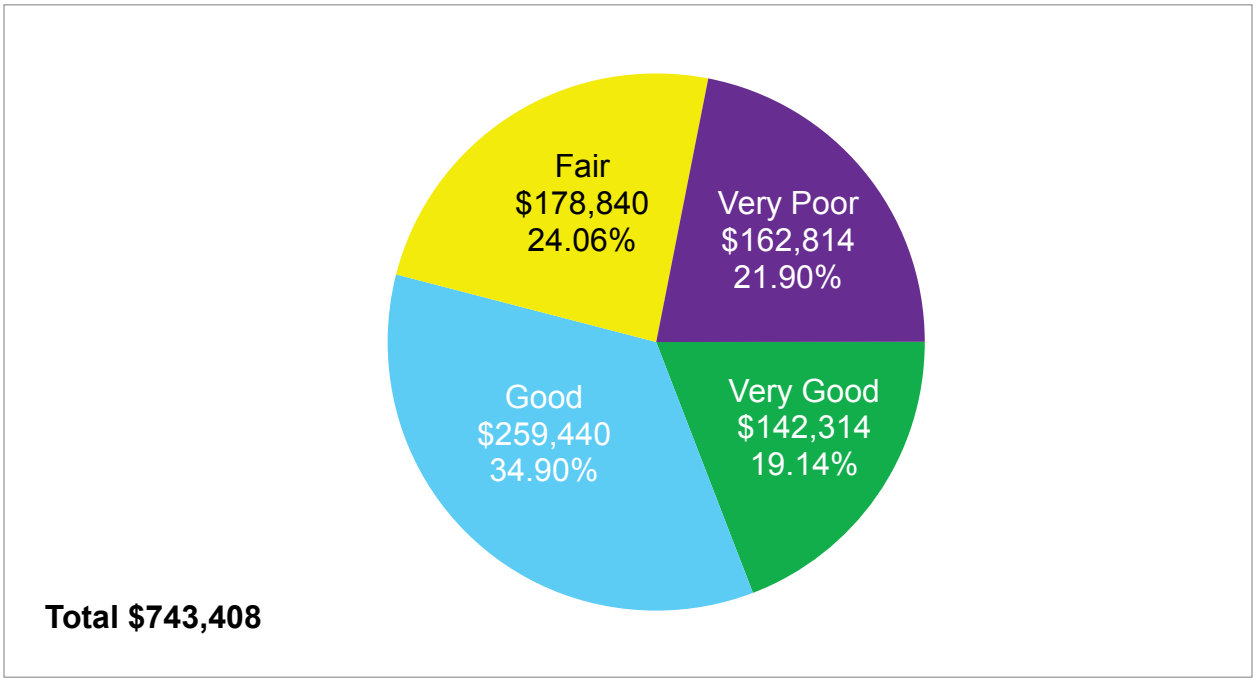


Figure 2-8 Asset Condition – Peripherals

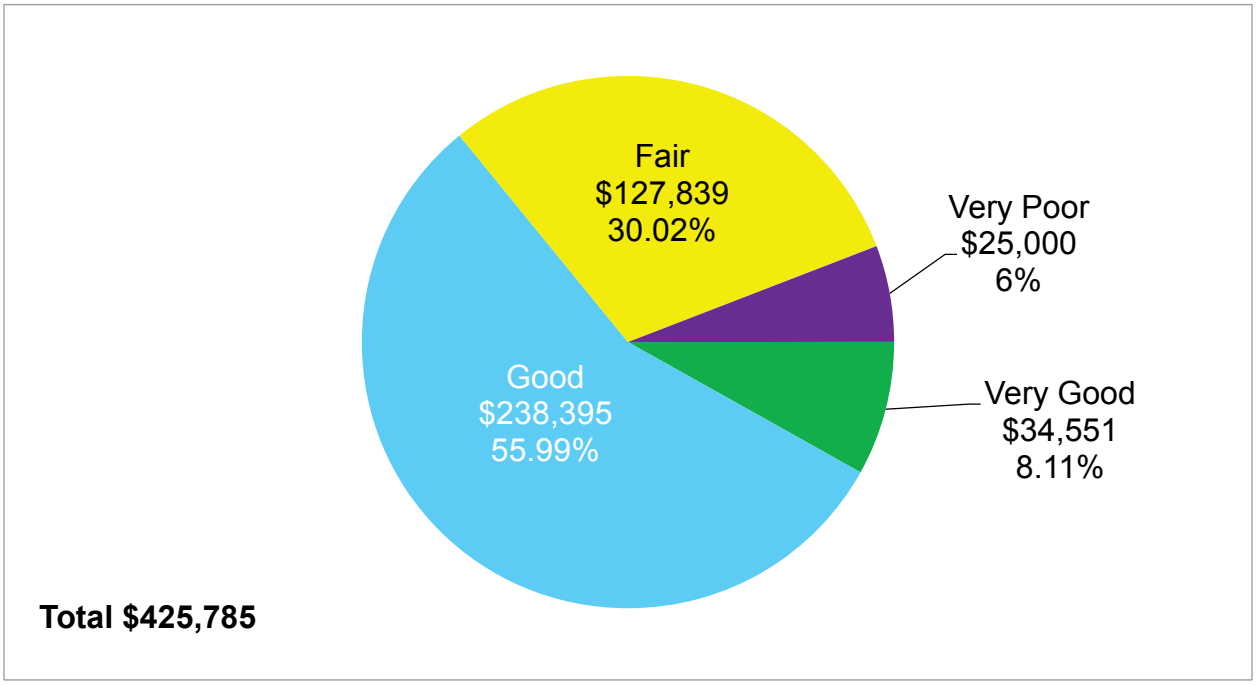


Figure 2-9 Asset Condition – Tele-communications

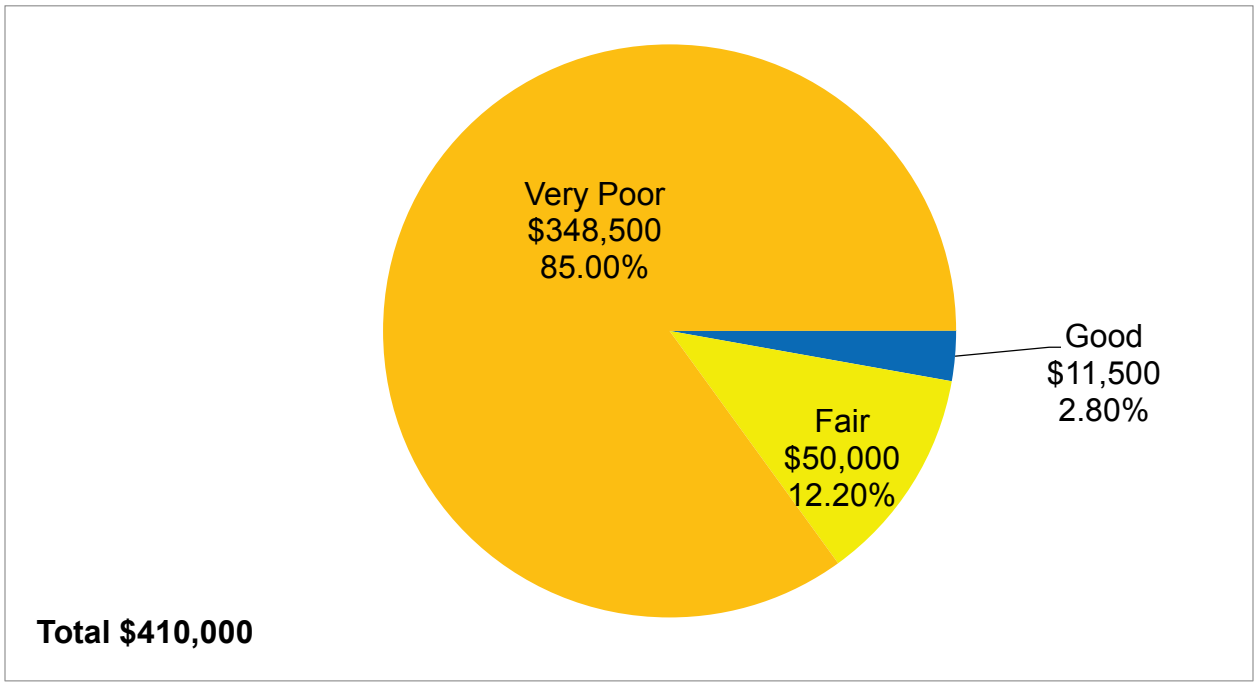
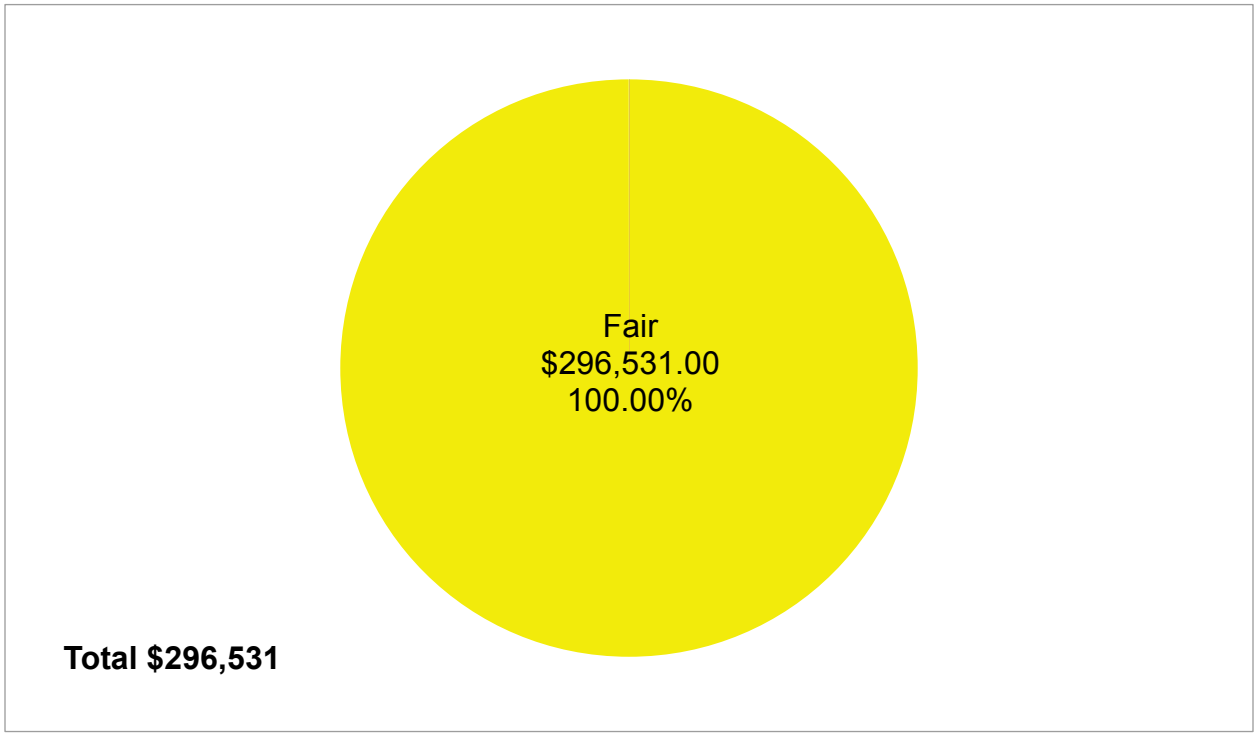


Figure 2-10 Asset Condition – Infrastructure



2.4.2 Infrastructure Report Card

The asset management plan is a complex document, but one with direct implications on the public, a group with varying degrees of technical knowledge. To facilitate communications, we have developed an Infrastructure Report Card that summarizes our findings in accessible language that municipalities can use for internal and external distribution. The report card is developed using two key, equally weighted factors:

1. **Asset Health**: As shown in Table 2-3, using either field inspection data as available or age-based data, the asset health provide a grades for each infrastructure class based on the portion of assets in poor to Very Good condition (0-100%). We use replacement cost to determine the weight of each condition group within the asset class.
2. **Financial Sustainability**: As shown in Table 5-2, a municipality's Financial Sustainability is determined by how well it is meeting the average annual investment requirements (0-100%) for each infrastructure class.

Table 2-2 Infrastructure Report Card – Asset Health Grading Scale

Letter Grade	Numerical Scale	Rating	Description
A	4.50-5.0	Very Good	Asset is new or recently rehabilitated
B	3.50-4.49	Good	Asset is no longer new, but is fulfilling its function. Preventative maintenance is beneficial at this stage.
C	2.50-3.49	Fair	Deterioration is evident but asset continues to fulfill its function. Preventative maintenance is beneficial at this stage.
D	1.50-2.49	Poor	Significant deterioration is evident and service is at risk.
F	1.0-1.49	Very Poor	Asset is beyond expected life and has deteriorated to the point that it may no longer be fit to fulfill its function.

Table 2-3 Infrastructure Report Card - Asset Health

Asset Class (Level 3)	**Asset Health Grade**
Network Appliances	C
Servers	C
Workstations	C
Peripherals	B
Tele-communications	F
Infrastructure	C
Overall Service Area Grade	**C**

Based on age data and replacement cost, while 70% of the municipality's MIS assets are in good to Very Good condition, more than 30% are in poor to very poor condition.

The asset health grade for each asset class was derived using weighted average of its replacement cost according to the following equation:

Asset Class Health Grade = ((5 * asset value in Very Good condition) + (4 * asset value in good condition) + (3 * asset value in fair condition) + (2 * asset value in poor condition) + (1 * asset value in very poor condition)) / total asset value.

2.5 Asset Age

The useful life indicated for the asset types below was assigned by the municipality. In the absence of observed data, the useful life values and the associated asset life stage can guide the maintenance, rehabilitation or replacement related activities of major assets. The data is presented in the following order to provide a comprehensive summary of Whitby's MIS assets:

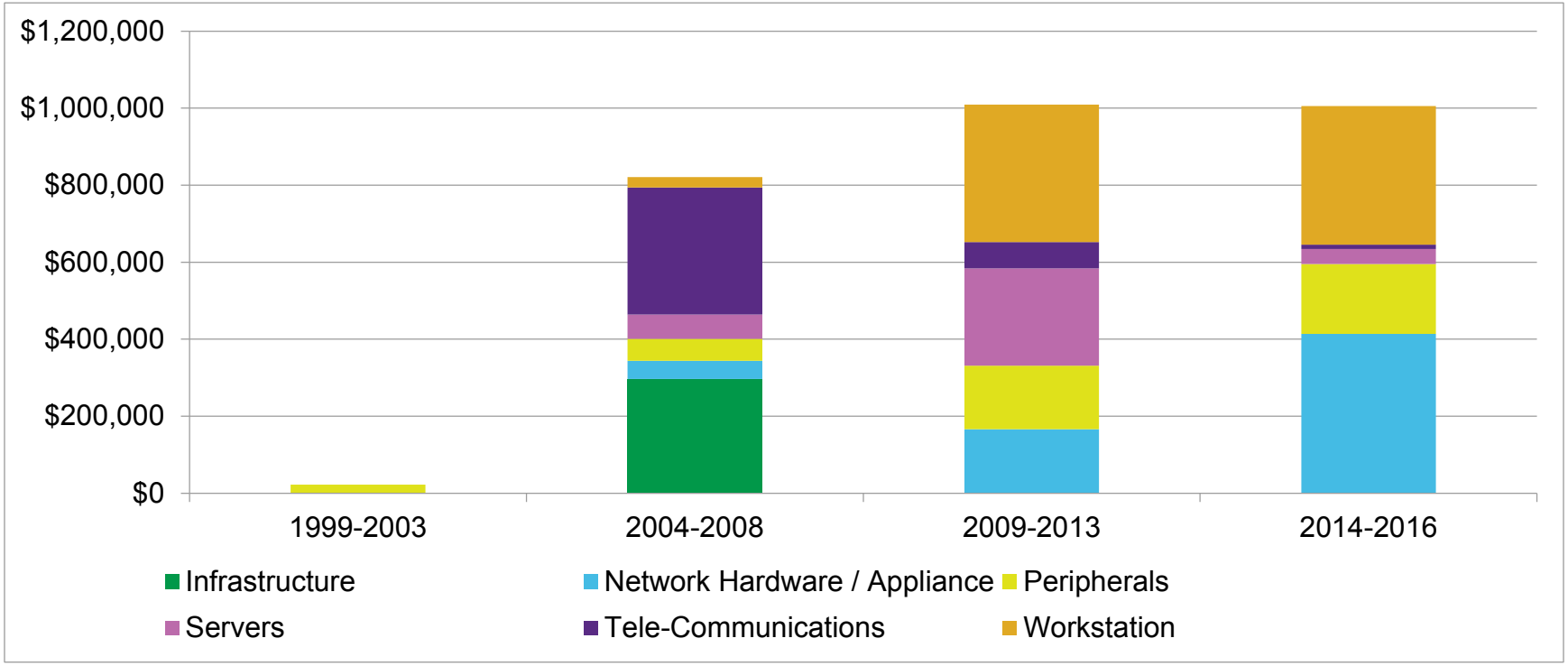
Table 2-4 Asset Useful Life in Years

Service Area	Asset Class	Asset Type	Expected Useful Life
MIS Equipment	Network Appliances	Switches	5
		Storage Arrays	5
		Security Appliances	5
		Wifi Access Points	5
	Servers	Tape Backup Devices	5
		VM Servers	5
		Physical Servers	5
	Workstations	Desktops	5
		Laptops	4
		Tablets	3
	Peripherals	Large Multifunction copiers	5
		Network Printers	5
		Monitors	5
		Scanners	3
		Projectors	3
		Rack Mounted Uninterrupted Power Supplies	5
	Tele-Communications	PBX Equipment	15
		Digital Telephone Sets	10
		IP Telephone Sets	10
	Infrastructure	External Fibre Cable	35

2.5.1 Installation Profile: Infrastructure Investment in Whitby

In this section, we provide the installation profile and asset life consumption rate using in-service data. Together, these graphs can illustrate infrastructure investment trends and upcoming needs at Whitby. Figure 2-7 illustrates the level of investment in Whitby's MIS assets since 2000.

Figure 2-11 Aggregate Installation Profile



The majority of the Town's MIS Equipment investments have occurred in the last 15 years. Between 2000 and 2016, more than $2 million was invested into the Town's MIS services, with Infrastructure, Network Appliances and Workstations comprising the largest share. The following graphs illustrate the installation profile by asset class.

Figure 2-12 Asset Installation Profile – Network Appliances

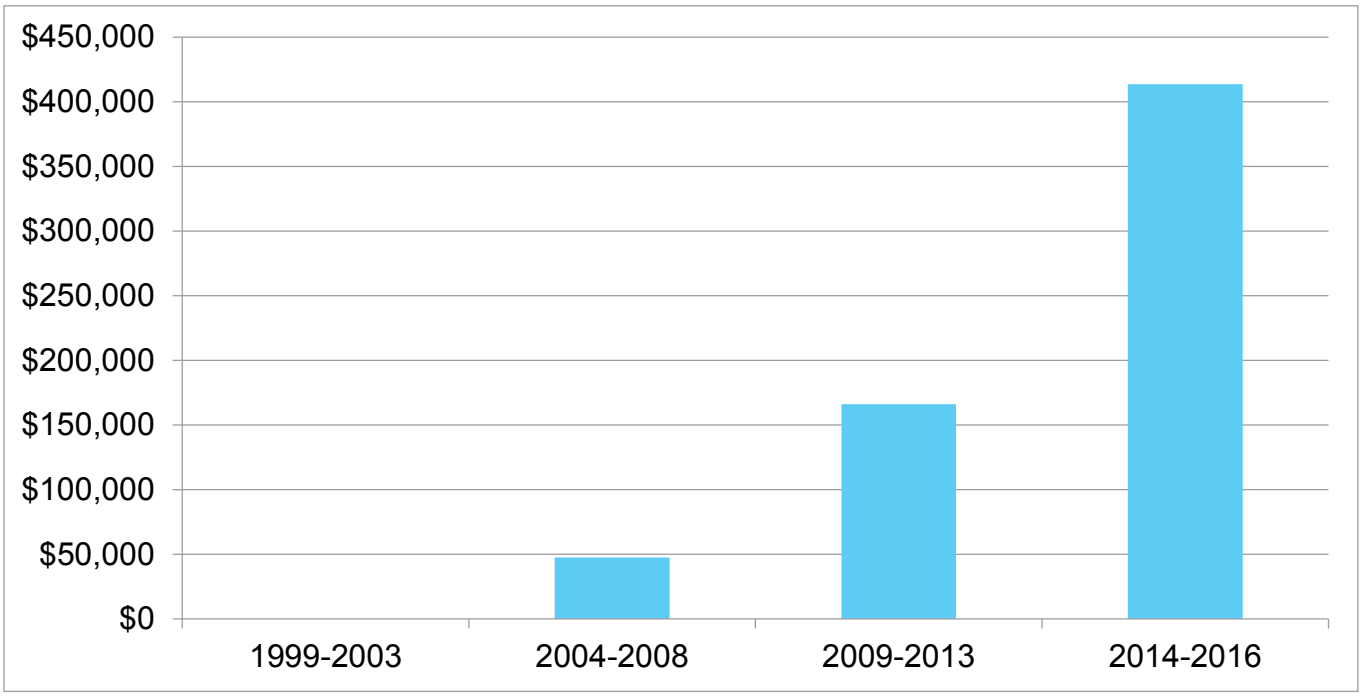


Figure 2-13 Asset Installation Profile – Servers

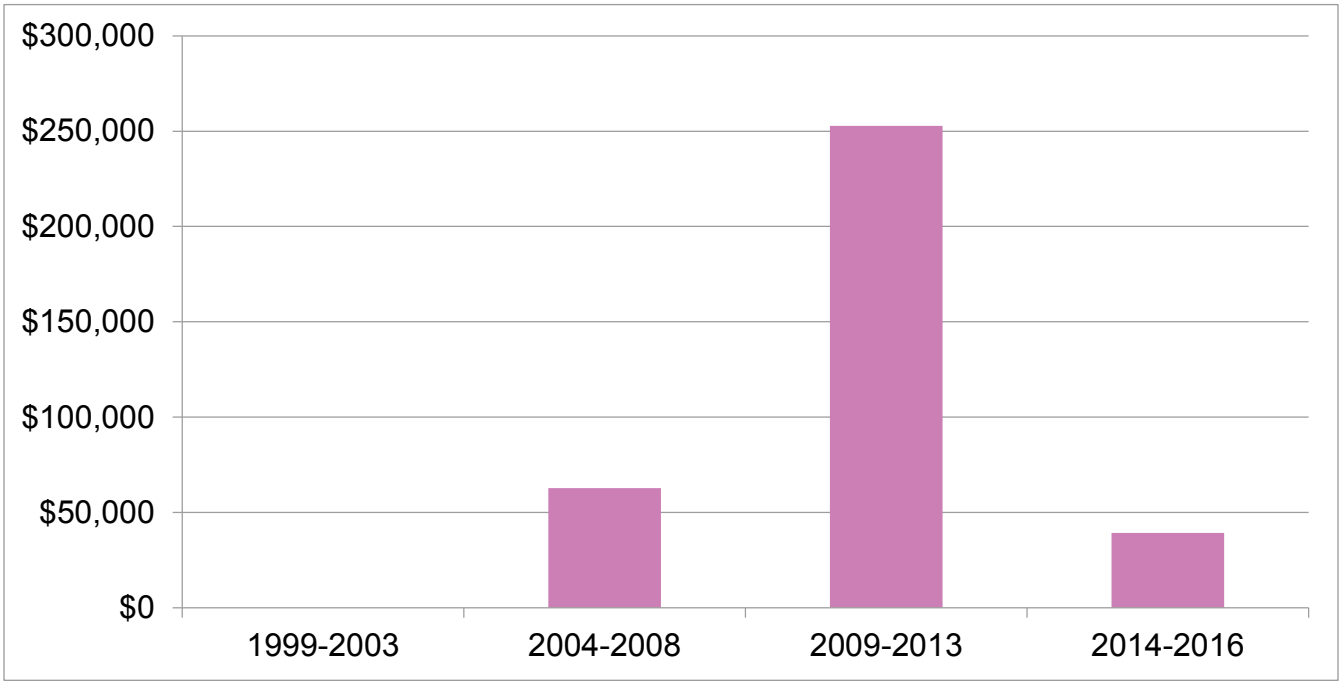


Figure 2-14 Asset Installation Profile – Workstations

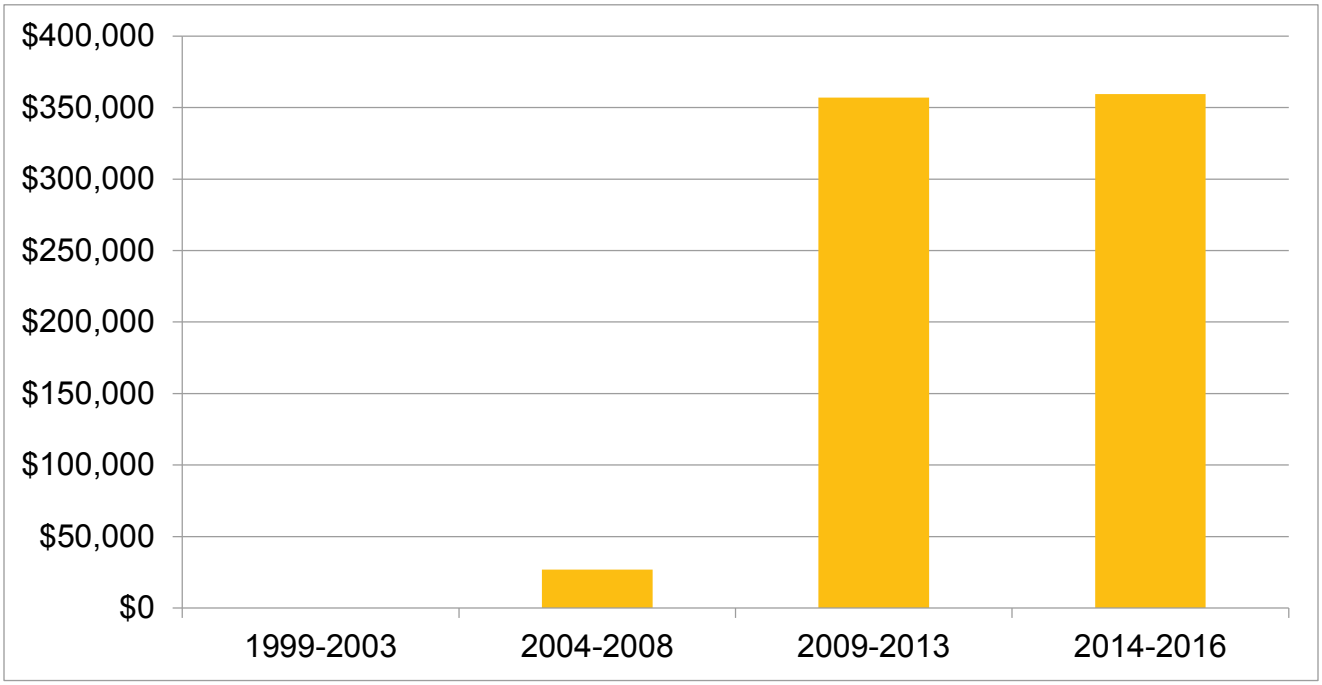


Figure 2-15 Asset Installation Profile – Peripherals

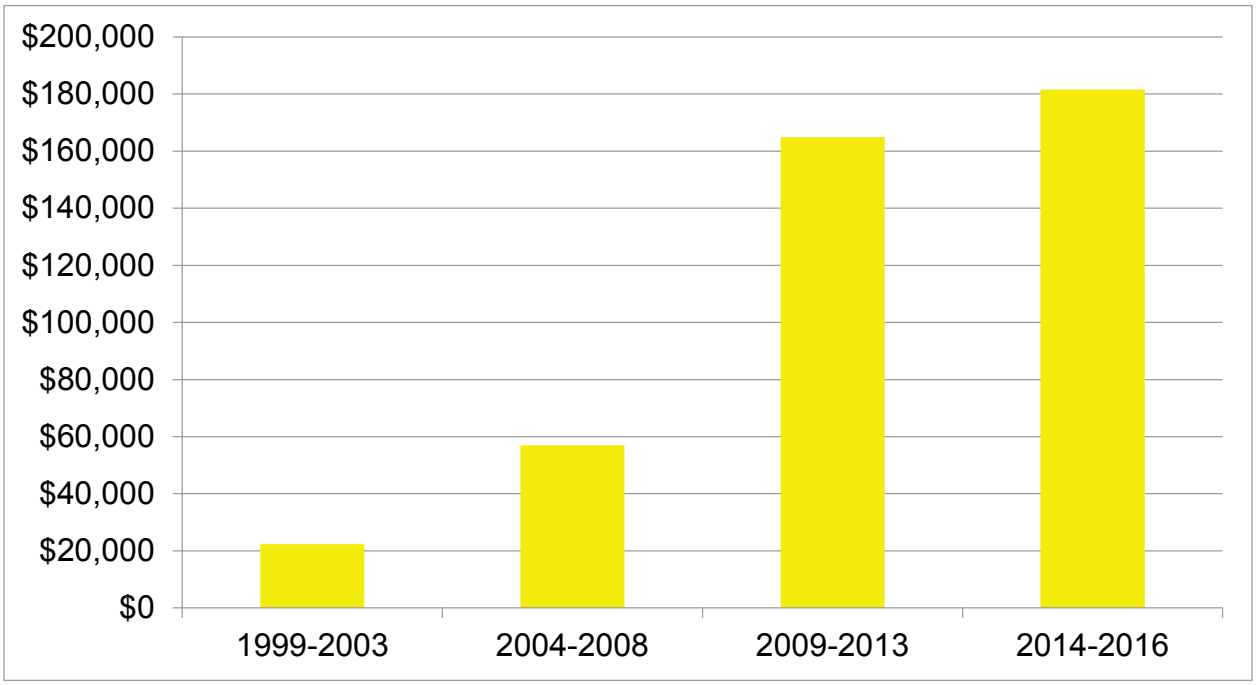


Figure 2-16 Asset Installation Profile – Telecommunications

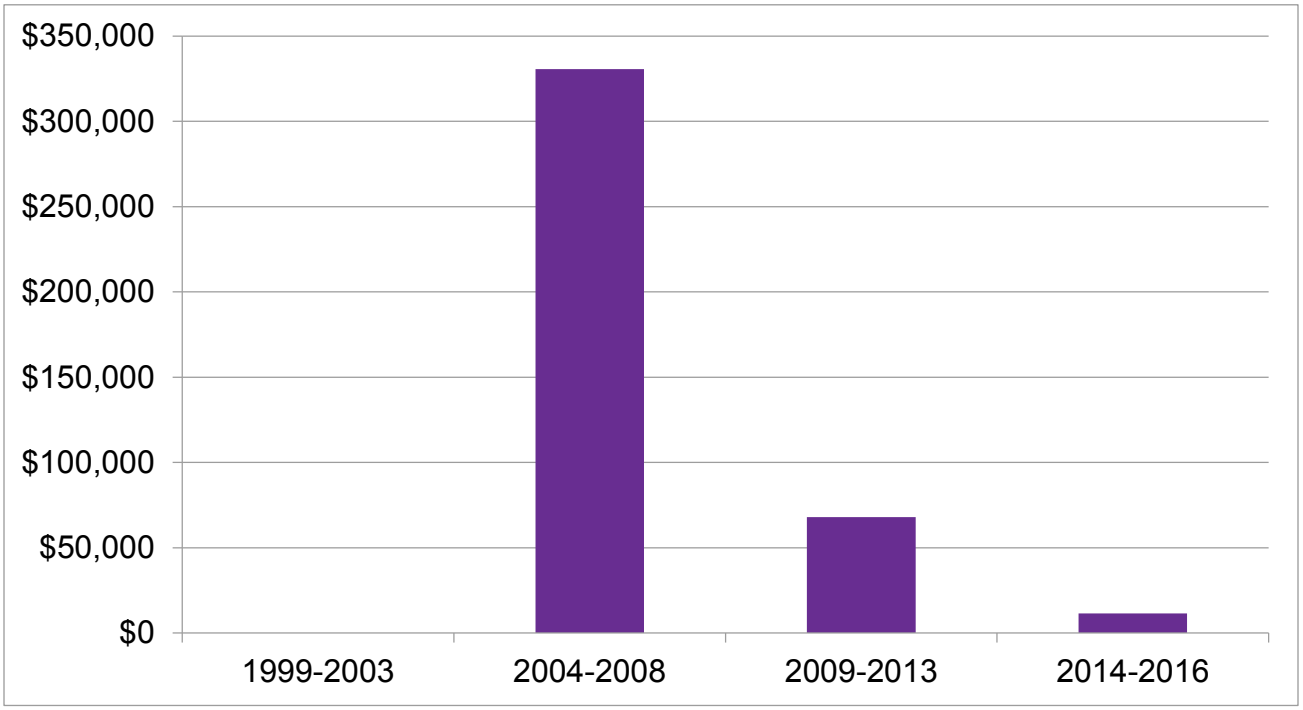
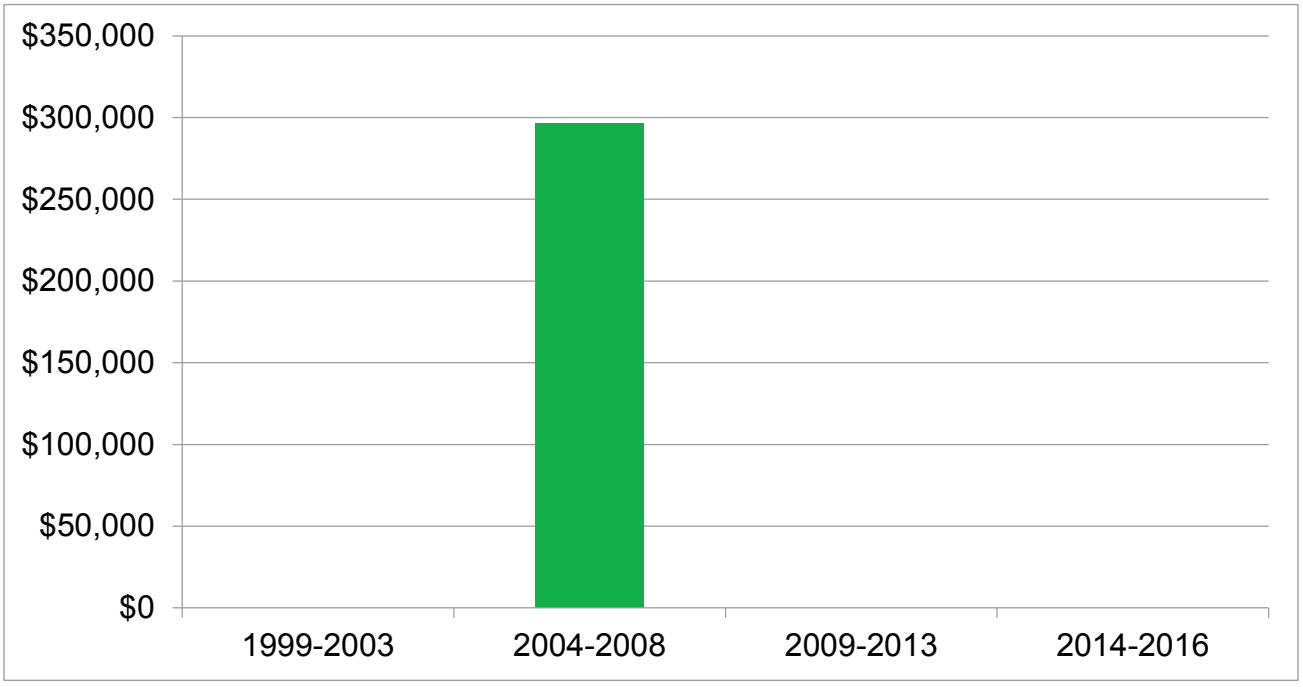


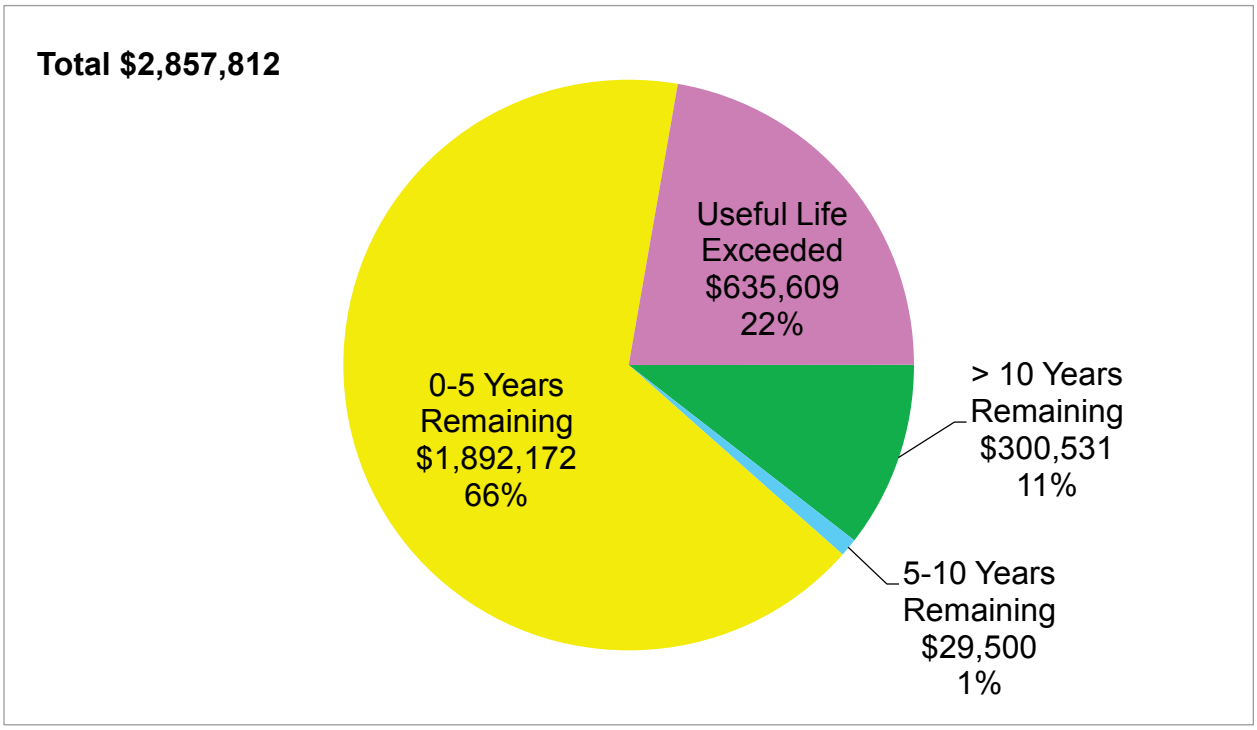
Figure 2-17 Asset Installation Profile – Infrastructure



2.6 Useful Life Consumption

In this section, we detail the extent to which each asset class has consumed its useful life based on the above, established useful life standards.

Figure 2-18 Aggregate Useful Life Consumption



Based on age data and useful life standards, more than 22% of the assets, with a valuation of $635,609 remain in service beyond their useful life. In addition, 66% of the Town's MIS assets will expire in the next five years.

The following graphs illustrate the useful life consumption distribution by asset class.

Figure 2-19 Useful Life Consumption – Network Appliances

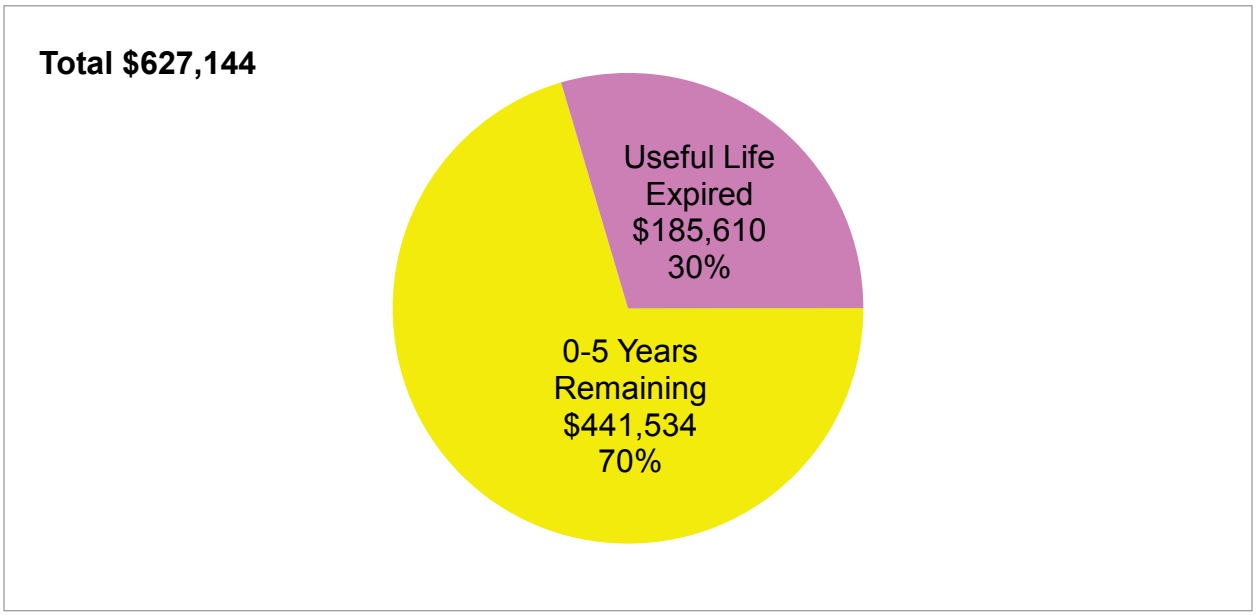


Figure 2-20 Useful Life Consumption – Servers

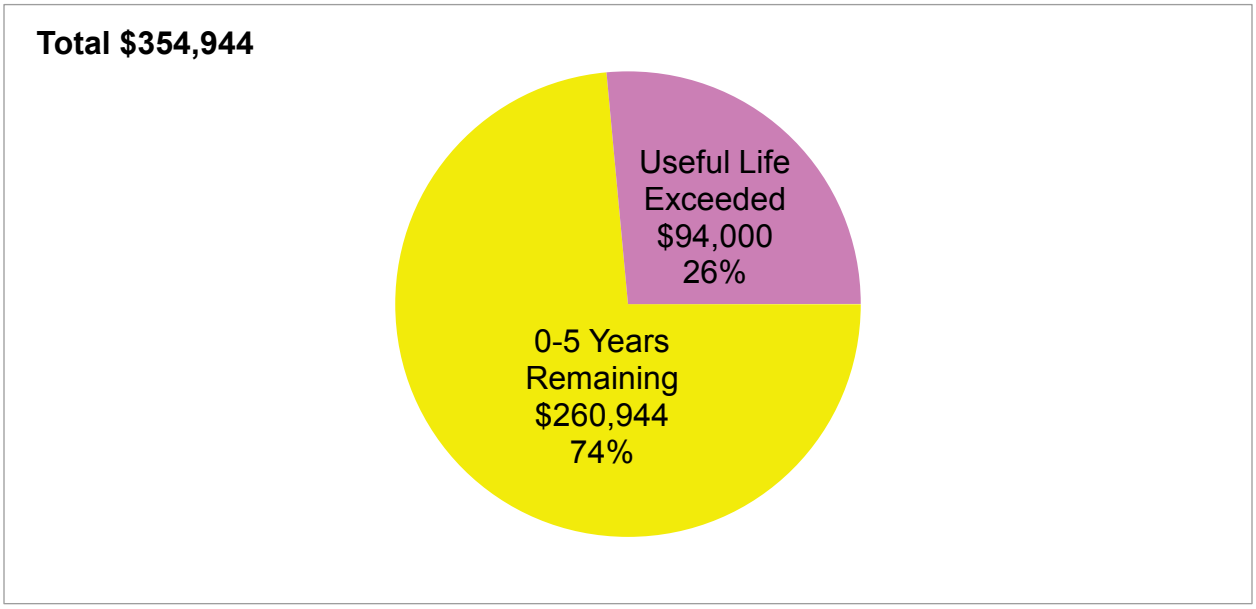


Figure 2-21 Useful Life Consumption – Workstations

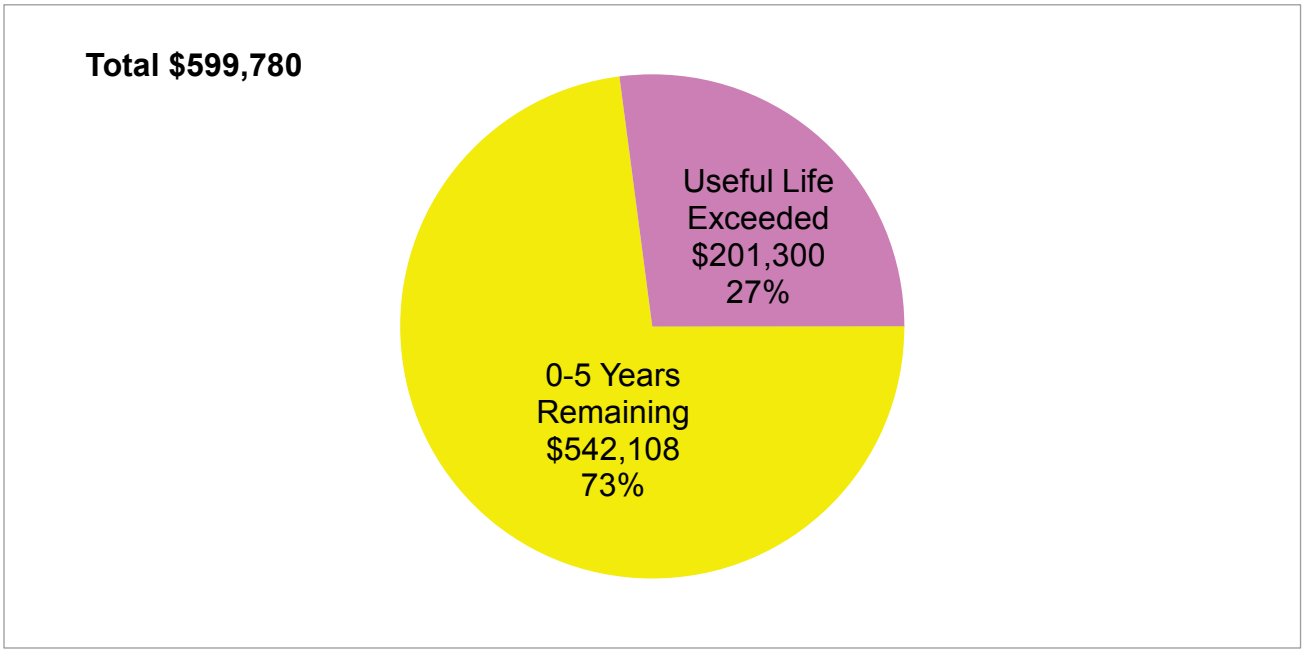


Figure 2-22 Useful Life Consumption – Peripherals

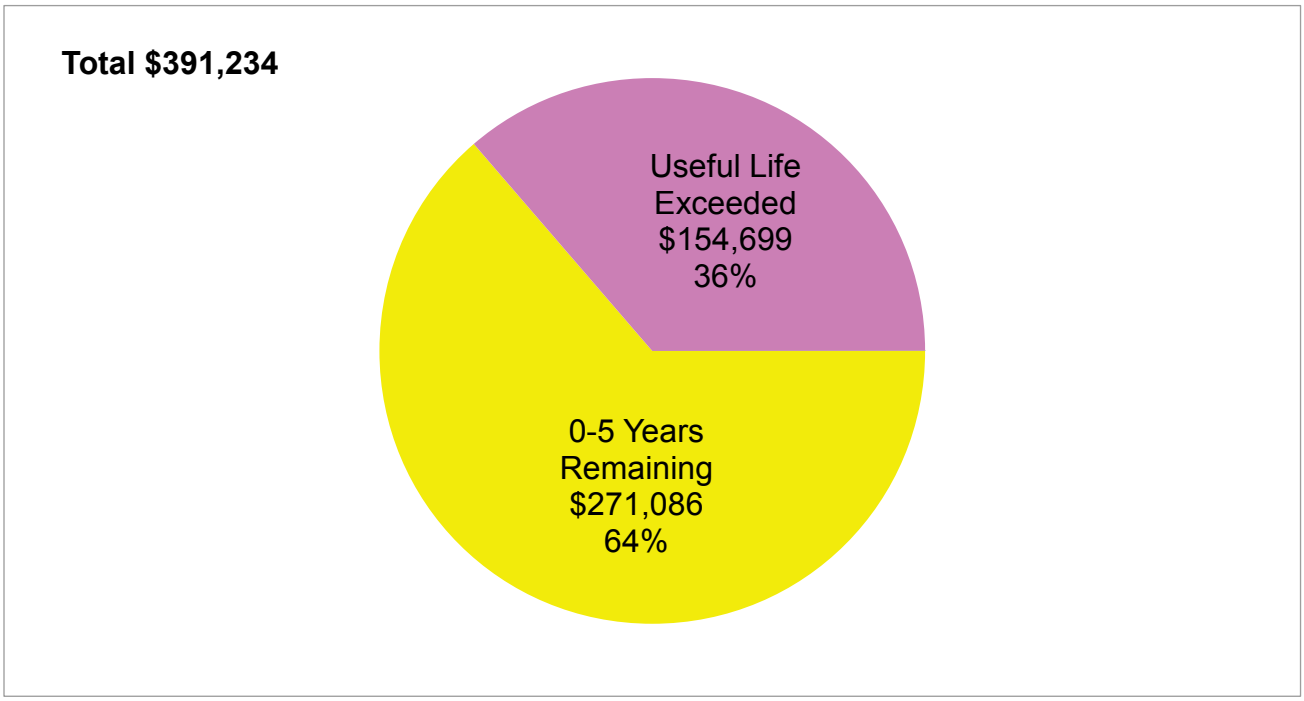


Figure 2-23 Useful Life Consumption – Telecommunications

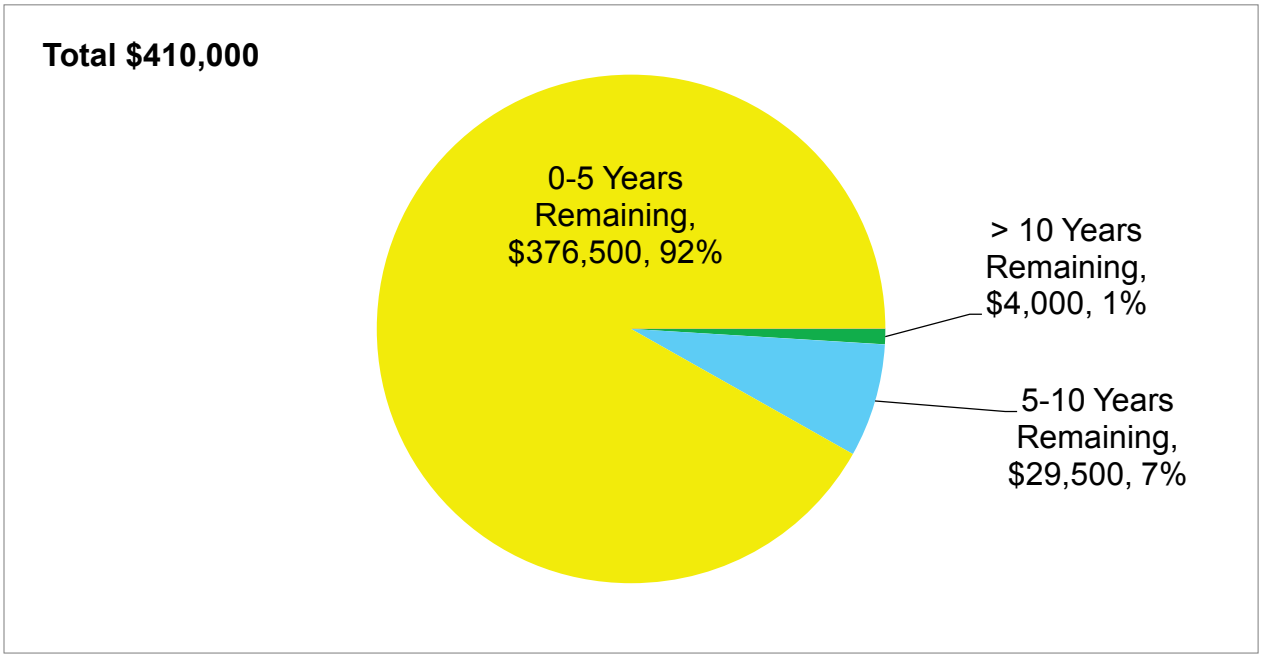
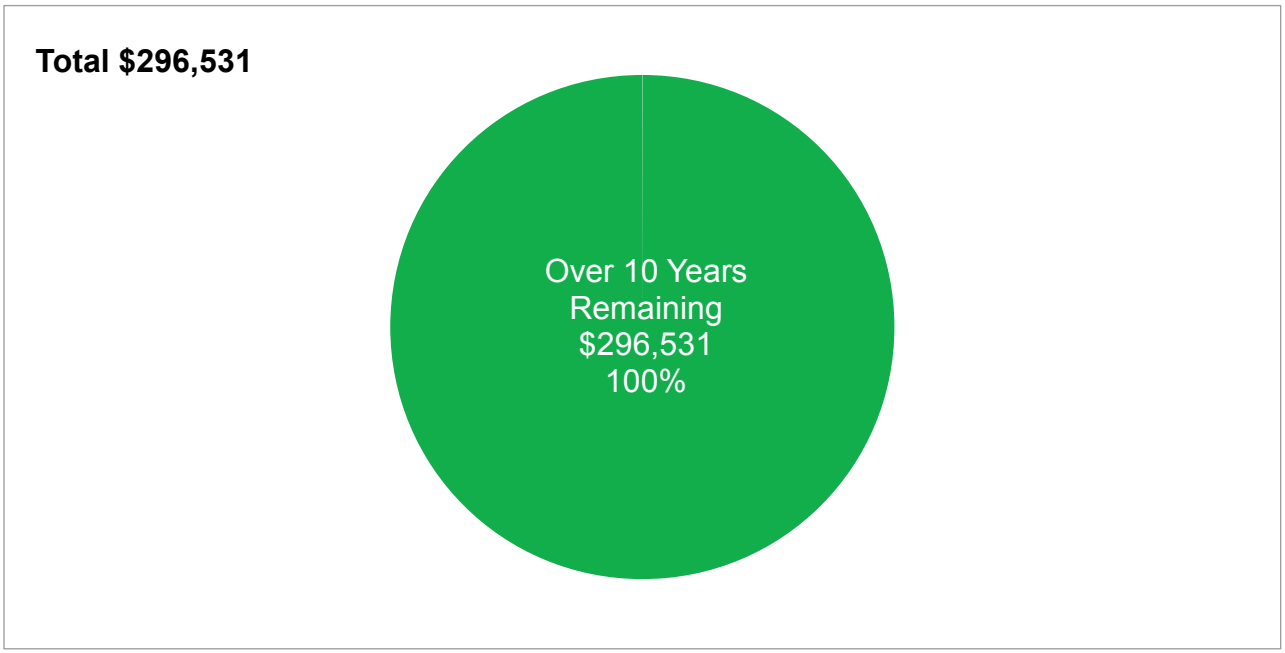


Figure 2-24 Useful Life Consumption – Infrastructure



3. Levels of Service

The two primary risks to a municipality's financial sustainability are the total lifecycle costs of infrastructure, and establishing levels of service (LOS) that exceed its financial sustainability. In this regard, municipalities face a choice: overpromise and underdeliver; underpromise and overdeliver; or promise only that which can be delivered sustainably.

Developing realistic LOS using meaningful key performance indicators (KPIs) can be instrumental in managing citizen expectations, identifying areas requiring higher investments, driving organizational performance and securing the highest value for money from public assets. However, municipalities face diminishing returns with greater granularity in their LOS and KPI framework. That is, the objective should be to track only those KPIs that are relevant and insightful and reflect the priorities of the Town.

3.1 Overview of Performance Management

Beyond meeting regulatory requirements, levels of service established should support the intended purpose of the asset and its anticipated impact on the community and the municipality. LOS generally have an overarching corporate description, a customer oriented description, and a technical measurement. Many types of LOS, e.g., availability, reliability, safety, responsiveness and cost effectiveness, are applicable across all Service Areas in a municipality. The following levels of service categories have been established as guiding principles for the LOS that “each service should strive to provide internally to the organization (Town of Whitby) and externally to customers and regulators.

- **Available**: Services of sufficient capacity are convenient and accessible to the entire community
- **Cost Effective**: Services are provided at the lowest possible cost for both current and future customers, for a required level of service, and are affordable
- **Reliable**: Services are predictable and continuous
- **Responsive**: Opportunities for community involvement in decision making are provided; and customers are treated fairly and consistently, within acceptable timeframes, demonstrating respect, empathy and integrity
- **Safe**: Services are delivered such that they minimize health, safety and security risks
- **Suitable**: Services are suitable for the intended function (fit for purpose)
- **Sustainable**: Services preserve and protect the natural and heritage environment.

While the above categories provide broad strategic direction to council and staff, specific and measurable KPIs related to each LOS category are needed to ensure the Town remains steadfast in its pursuit of delivering the highest value for money to various internal and external stakeholders.

3.2 Risk Management & Prioritization

3.2.1 Project Prioritization

Generally, infrastructure needs exceed municipal capacity. As such, municipalities must carefully select projects based on the state of infrastructure, economic development goals, and the needs of an evolving and growing community. These factors, along with social and environmental considerations will form the basis of a robust risk management framework.

From an asset management perspective, risk is a function of:

- the consequences of failure (e.g., the negative economic, financial, and social consequences of an asset in the event of a failure); and
- the probability of failure (e.g., how likely is the asset to fail in the short- or long-term).

As identified by Whitby, the consequences of failure are typically reflective of:

- An asset’s importance in an overall system
- The criticality of the function performed
- The exposure of the public and/or staff to injury or loss of life

The probability of failure is generally a function of an asset's physical condition, which is heavily influenced by the asset's age and the amount of investment that has been made in the maintenance and renewal of the asset throughout its life.

Risk mitigation is traditionally thought of in terms of safety and liability factors. In asset management, the definition of risk should heavily emphasize these factors but should be expanded to consider the risks to the Town's ability to deliver targeted levels of service

- The impact that actions (or inaction) on one asset will have on other related assets
- The opportunities for economic efficiency (realized or lost) relative to the actions taken

Figure 3-1 below illustrates a range of risk factors and describes, in general terms, how the consequences of asset failure can be evaluated relative to each factor. The weightings placed on the various factors should reflect the criticality of each asset and the degree to which the public is directly exposed to risk.

Figure 3-1 Risk Factors and Consequence of Failure

	Level of Service	Other Assets	Economic Efficiency	Life, Safety and Liability
High (5)	The asset will cease to function and service will be unavailable to many users	Other assets will not be functional or will deteriorate more quickly	Opportunities for significant life extending/cost-saving rehabilitation will be missed	The asset's failure could lead directly to loss of life or injury
Medium (3)	The asset will still function but the quality of the service will be reduced for many users	The functionality of other assets will be reduced	Opportunities for moderate life extending rehabilitation will be missed	The asset's failure could lead indirectly to loss of life or injury
Low (1)	The asset will function but the quality of the service will be reduced for a few users	The function or condition of other assets will not be impacted	Replacement at failure is the only efficient option and can be easily accomplished	The potential for minor claims is increased

Using the system above, a risk matrix will illustrate each asset's overall risk, determined by multiplying the probability of failure (Pof) scores with the consequence of failure (Cof) score, as illustrated in the table below. This can be completed as a holistic exercise against any data set by determining which factors (or attributes) are available and will contribute to the Pof or Cof of an asset. The following diagram (known as a bowtie model in the risk industry) illustrates this concept. The probability of failure is increased as more and more factors collude to cause asset failure.

In order to generate an infrastructure risk matrix, or a heat map, for Whitby's MIS assets, we will use the following consequence of risk scoring and probability of risk as shown below in Tables 3-1 and 3-2. The primary determinant of the probability of failure is the condition of the assets.

Table 3-1 Consequence of Failure

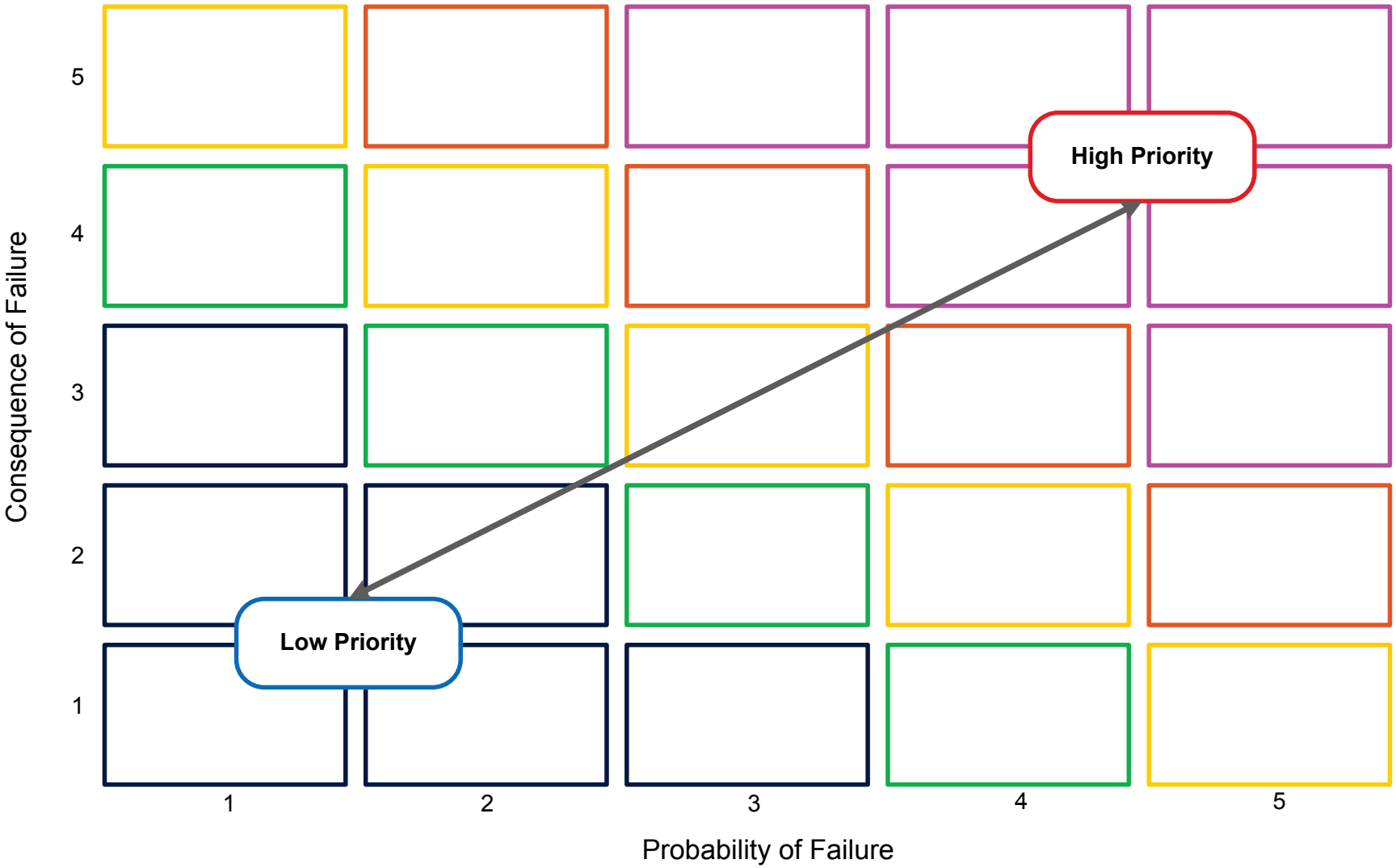
Asset Class	Consequence of Failure	Description
Servers	5	High service criticality with direct impact on service delivery and municipal datasets
Network Appliances	5	High service criticality with direct impact on service delivery and municipal datasets
Tele-communications	4	High value assets central to service provision
Infrastructure	3	Medium value assets with medium level service criticality; required to provide services but no direct impact on public safety
Workstations	2	Low value assets with minimal service criticality; assets are easily replaced
Peripherals	1	Low value assets without service criticality; assets are easily replaced

Table 3-2 Probability of Failure (of all asset classes)

Condition Rating	Probability of Failure
0-20 Very Poor	5 – Very High
21-40 Poor	4 – High
41-60 Fair	3 – Moderate
61-80 Good	2 – Low
81-100 Very Good	1 – Very Low

The position of the assets on the risk matrix indicates their risk exposure and priority. Figure 3-3 shows how assets are categorized into their respective priority levels based on the probability of failure and the consequence of a failure event.

Figure 3-2 Categorizing Assets Based on Risk



The risk matrix below categories the Town's asset classes in its MIS services area based on their consequence of failure and the probability of failure events.

Figure 3-3 Aggregate Risk Matrix

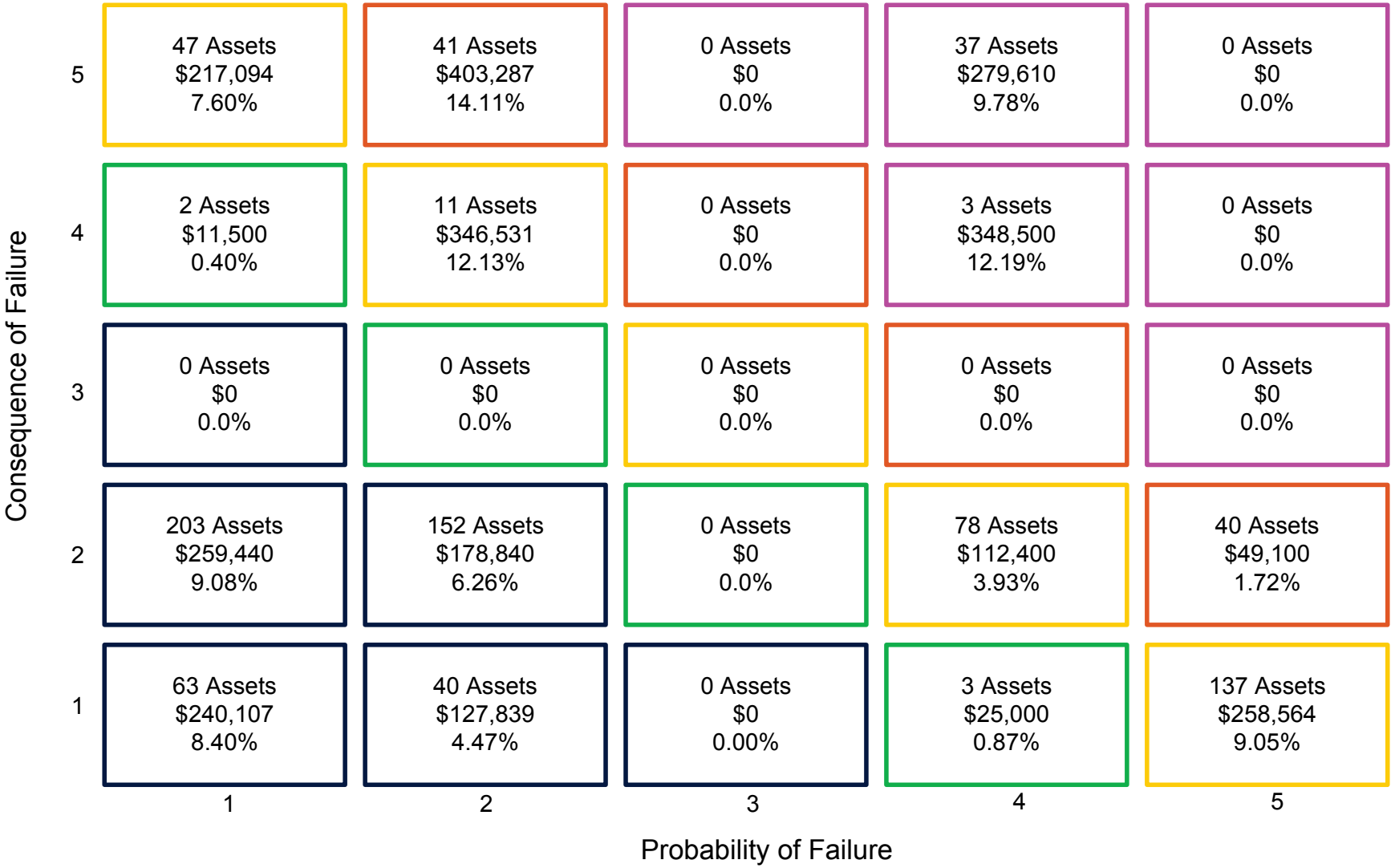


Figure 3-4 Risk Matrix – Network Appliances

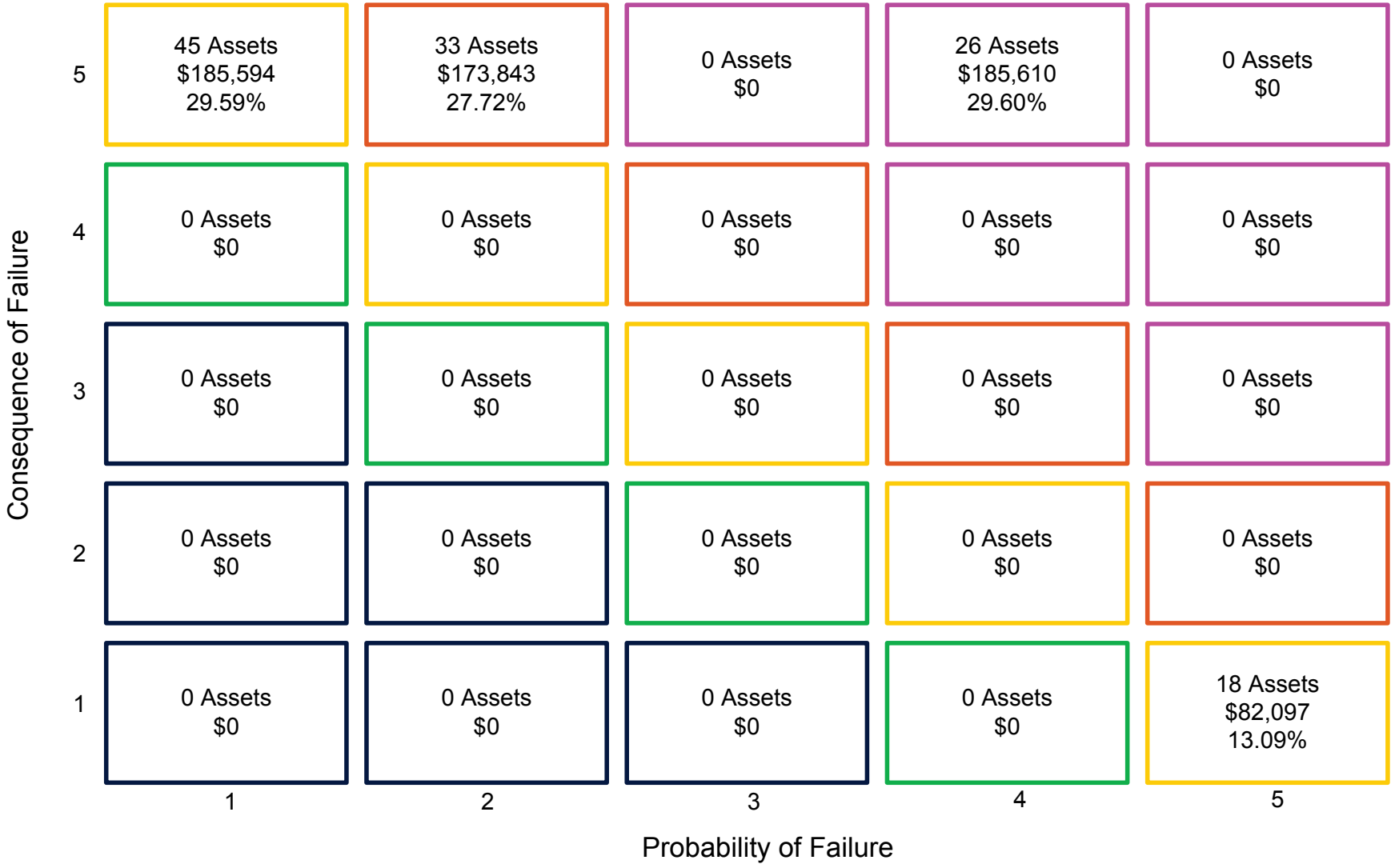


Figure 3-5 Risk Matrix – Servers

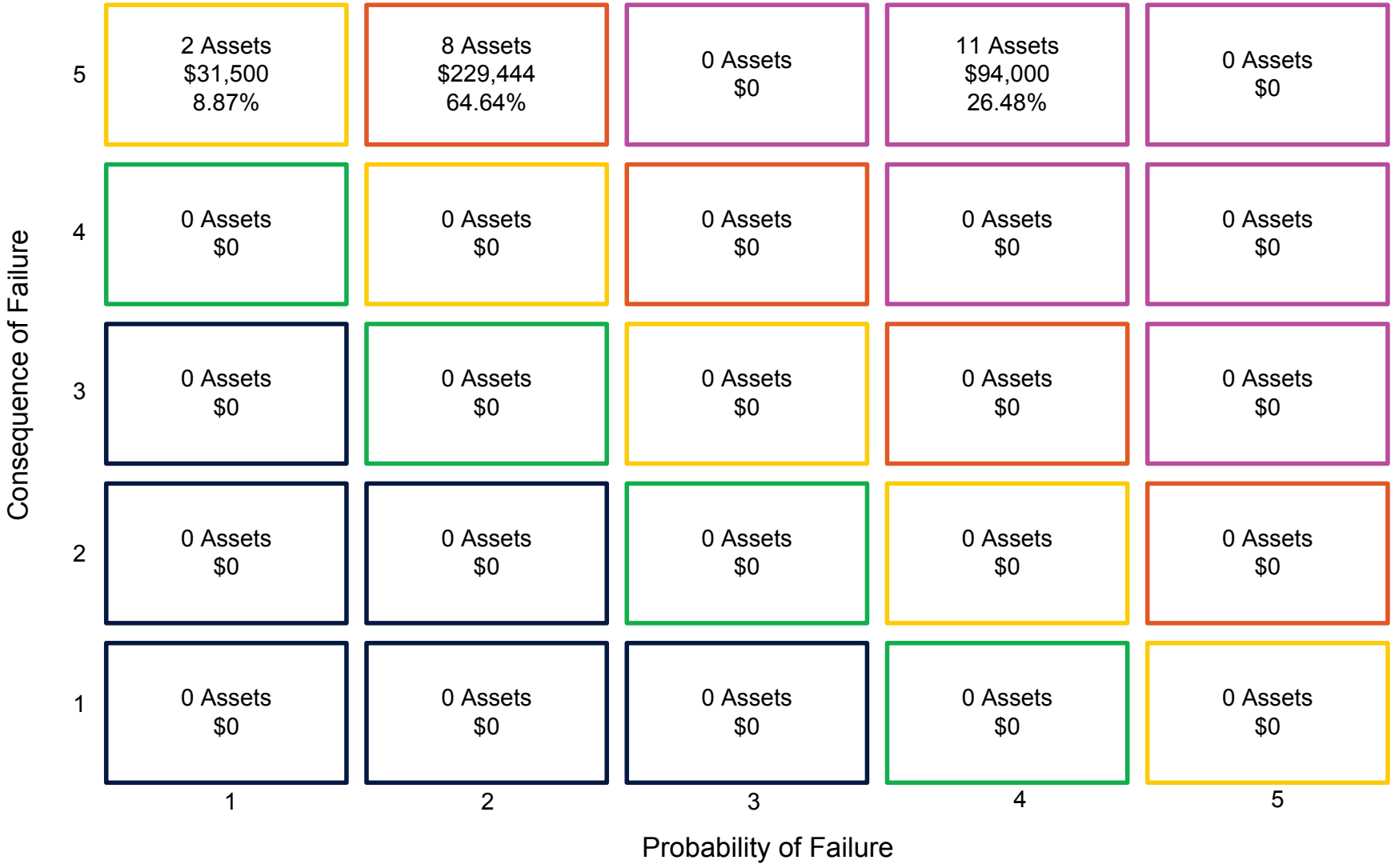


Figure 3-6 Risk Matrix – Workstations

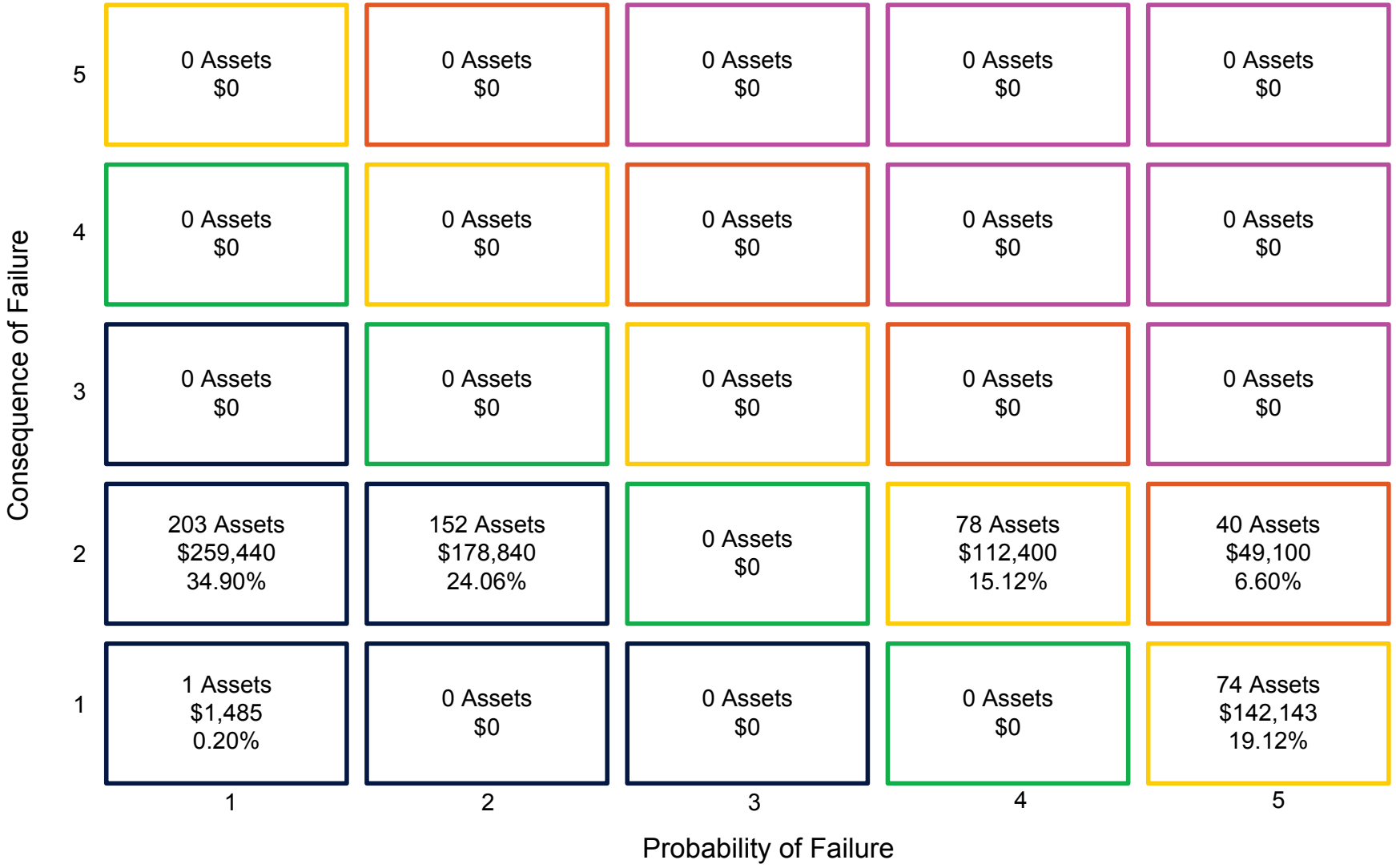


Figure 3-7 Risk Matrix – Peripherals

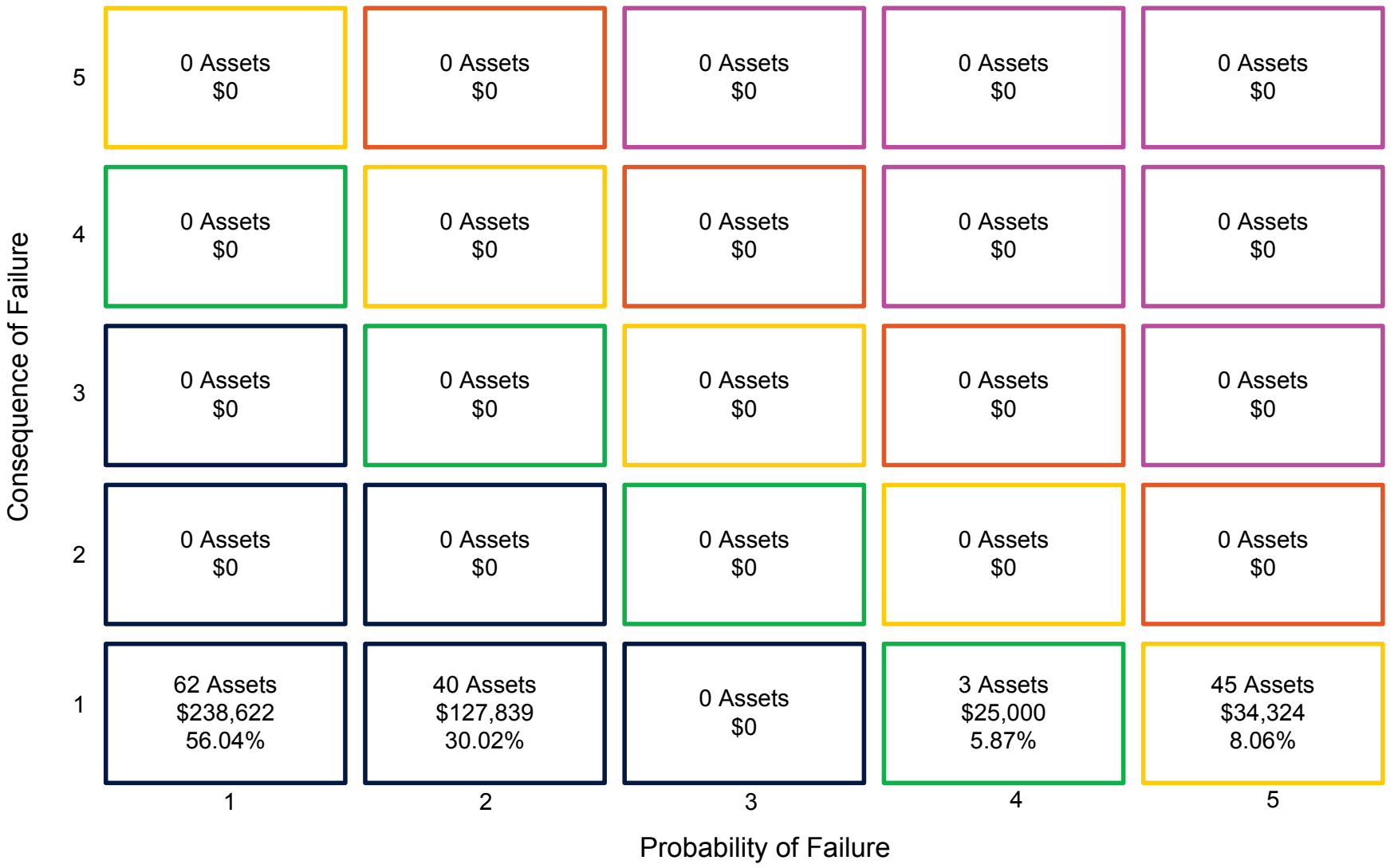


Figure 3-8 Risk Matrix – Telecommunications

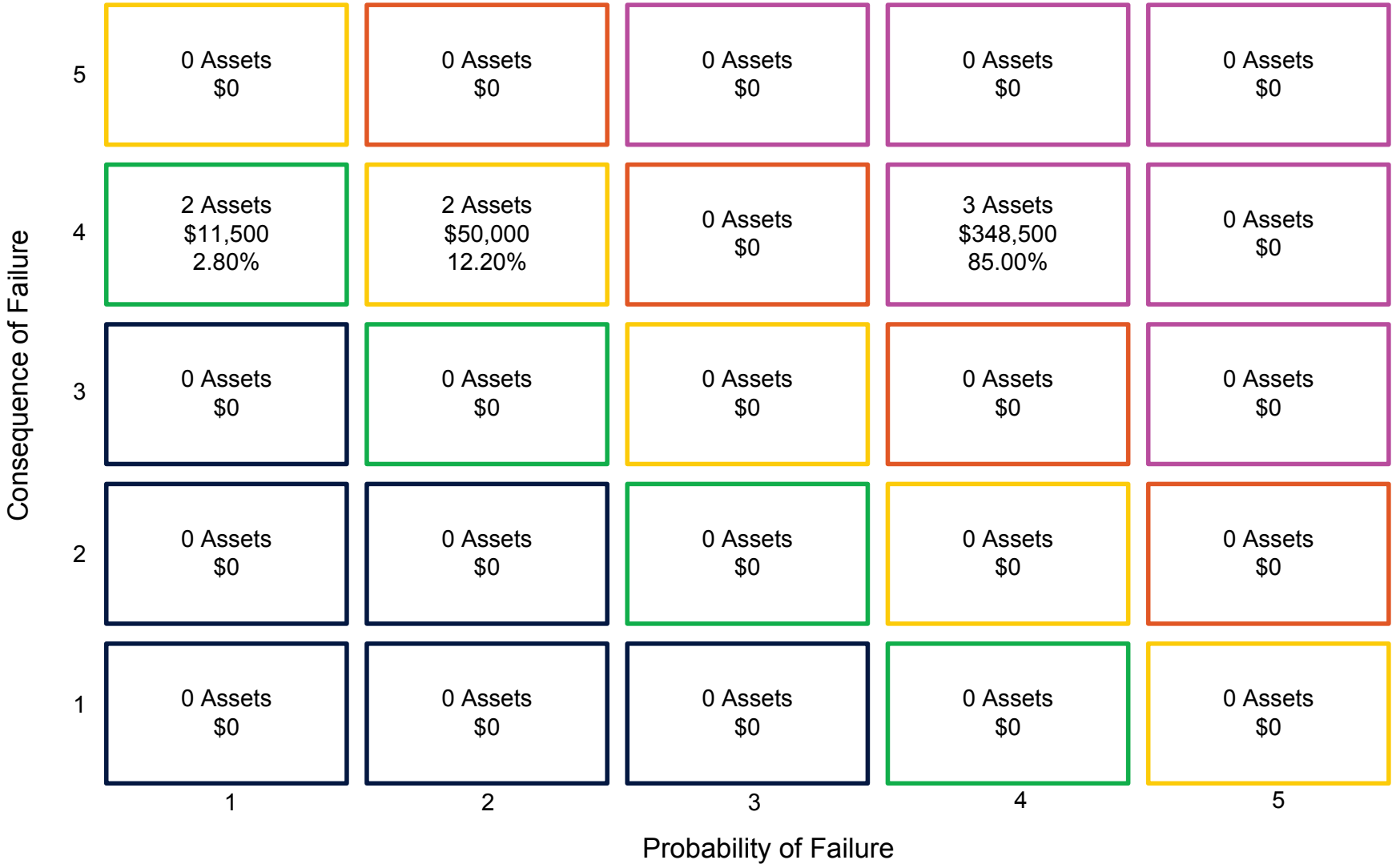
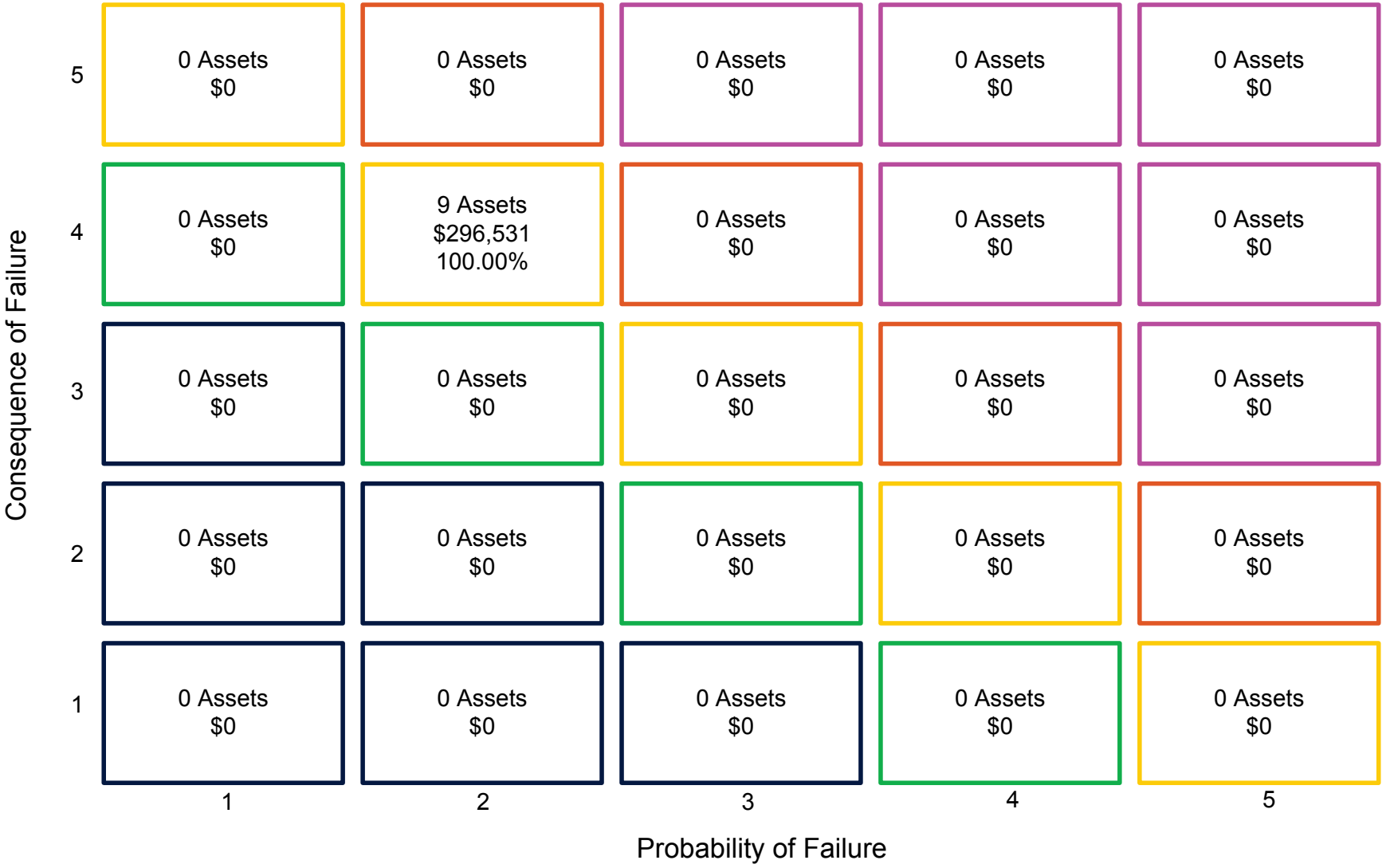


Figure 3-9 Risk Matrix – Infrastructure



3.3 Key Performance Indicators and Targets

We recommend condition-related KPIs and service oriented KPIs for the Town's MIS assets. Condition related KPIs gauge the functionality of assets, e.g., observed condition rating and investments in maintenance. Service oriented KPIs illustrate whether assets meet community expectations. In subsequent iterations of this SAAMP, the 'Future Level' of KPIs for each asset class can be entered, illustrating a trend.

Table 3-3 Key Performance Indicators (KPIs)

Asset Class	KPI Target – Condition Related	Current Level	KPI Status	Previous Level	KPI Trend
Network Appliances	• At least 95% of assets in fair of better condition. • Critical Assets within this class must be at least 99% in good condition or better.	66%	☒	☒	=
Servers	• At least 95% of assets in fair or better condition. • Critical Assets within this class must be at least 99% in good condition or better.	74%	☒	☒	=
Workstations	• At least 95% of assets in fair or better condition.	73%	☒	☒	=
Peripherals	• At least 75% of assets in fair or better condition.	94%	☑	☑	=
Tele-communications	• At least 95% of assets in fair or better condition.	15%	☒	☒	=
Infrastructure	• At least 95% of assets in fair or better condition.	100%	☑	☑	=

Critical Network Appliances:
- Core switch
- SAN
- Fibre Channel Switch
- Firewall

Critical Servers
- VMWare Servers

3.4 Future Performance

In addition to the Financial Sustainability, and legislative requirements, e.g., the *Accessibility for Ontarians with Disability Act*, many factors, internal and external, can influence the establishment of LOS and their associated KPIs, both target and actual.

The municipality's overarching strategic goals as a community will determine the types of services it will provide to its residents, the associated demand on infrastructure, and the level of service it can feasibly deliver. These LOS are directly influenced by – and should reflect – not only the municipality's financial capacity to maintain the assets, but also the current state of the infrastructure.

Public expectations and opinions can also play an important part in prioritizing investments in infrastructure and service delivery standards. The public should be consulted in establishing LOS; however, the discussions should be centered on clearly outlining the lifecycle costs associated with delivering any improvements in LOS. Citizenship expectations and insights will also reflect the demographic composition of the community. Further, a growing community can place added demand on critical infrastructure, and may reduce levels of service standards.

Lastly, the wider global context can have direct consequence on a municipality's capacity to provide established levels of service. Fluctuations in macroeconomic variables such as interest rates and fuel costs, and environmental considerations such as climate change, should be considered prior to making infrastructure investments and changing the municipality's asset portfolio.

3.5 Monitoring, Updating and Actions

The Town should collect data on its current performance against the KPIs listed in section 3.3. These established targets should reflect the current fiscal capacity of the municipality, its corporate and strategic goals, and changes in demographics that may place additional demand on its MIS assets.

We also recommended that MIS condition data be collected on an annual basis such that the results of this data can be tracked and monitored against the KPI targets set out within this SAAMP.

3.6 Non-Infrastructure Solutions and Requirements

The municipality should explore, as requested through the provincial requirements, which non-infrastructure solutions should be incorporated into the budgets for its MIS services. Non-Infrastructure solutions are such items as studies, policies, condition assessments, consultation exercises, etc., that could potentially extend the life of assets or lower total asset program costs in the future without a direct investment into the infrastructure.

Typical solutions for a municipality include linking the asset management plan to the strategic plan, growth and demand management studies, infrastructure master plans, better integrated infrastructure and land use planning, public consultation on levels of service, and condition assessment programs. As part of future asset management plans, a review of

these requirements should take place, and a portion of the capital budget should be dedicated for these items in each programs budget.

It is recommended, under this category of solutions, that the municipality should establish a condition assessment programs for its MIS assets. This will advance the understanding of asset needs, improve budget prioritization methodologies, and provide clearer path of what is required to achieve sustainable infrastructure programs.

4. Asset Maintenance & Renewal Strategies

The asset management and renewal strategy will develop an implementation process that can be applied to the needs identification and prioritization of renewal, rehabilitation, and maintenance activities. This will assist in the production of a 10-year plan, including growth projections, to ensure the best overall health and performance of the municipality's infrastructure.

This section includes an overview of condition assessment; the life cycle interventions required; and prioritization techniques, including risk, to determine which priority projects should move forward into the budget first.

The following tables illustrate the lifecycle activities associate with each asset component within the MIS assets.

Table 4-1 Lifecycle Activities – Network Appliances: Wireless Access Point

Year	Activity	Cost
0	Purchase	$534
5	Replace	$534

Table 4-2 Lifecycle Activities – Network Appliances: Switches

Year	Activity	Cost
0	Purchase	$2,743
7	Replace	$2,743

Table 4-3 Lifecycle Activities – Network Appliances: NAC

Year	Activity	Cost
0	Purchase	$17,946
7	Replace	$17,946

Table 4-4 Lifecycle Activities – Network Appliances: Storage

Year	Activity	Cost
0	Purchase	$44,604
10	Replace	$44,604

Table 4-5 Lifecycle Activities – Servers

Year	Activity	Cost
0	Purchase	$7,338
5	Replace	$7,338

Table 4-6 Lifecycle Activities – Servers: VM Servers

Year	Activity	Cost
0	Purchase	$9,080
10	Replace	$9,080

Table 4-7 Lifecycle Activities – Servers: Backup Drive

Year	Activity	Cost
0	Purchase	$11,634
7	Replace	$11,634

Table 4-8 Lifecycle Activities – Workstations

Year	Activity	Desktops	Laptops	Tablets
0	Purchase	$767	$1,674	$1,554
5	Replace	$767	$1,674	$1,554

Table 4-9 Lifecycle Activities – Peripherals: Printers

Year	Activity	Cost
0	Purchase	$1,842
4	Replace	$1,842

Table 4-10 Lifecycle Activities – Peripherals: Others

Year	Activity	Cost
0	Purchase	$370
5	Replace	$370

Table 4-11 Lifecycle Activities – Telecommunications

Year	Activity	Cost
0	Purchase	$545
15	Replace	$545

Table 4-12 Lifecycle Activities – Infrastructure

Year	Activity	Cost
0	Purchase	$10/m
25	Replace	$10/m

4.1 Condition Assessment Programs

When establishing the condition assessment of an entire asset class, the cursory approach (metrics such as good, fair, poor, very poor) is used. While MIS assets have a relatively low asset value, technology and digitization are central in modern service provision. As such, a condition assessment program can be invaluable in minimizing system down-time and ensure continuity of service delivery. A rudimentary approach will be sufficient, yet will still provide valuable data, and will allow for further inspections on those assets captured as poor or critical condition later.

It is recommended that a preventative maintenance routine is defined and established for all MIS assets and that a software is utilized for the overall management of the program.

4.2 Lifecycle Framework

MIS assets follow a purchase-replace protocol. The best approach to develop a 10-year needs list for the Town's MIS assets would first be through a defined preventative maintenance program as described in the previous section to identify pre-failure states in Equipment. As previously described, the preventative maintenance program would serve to determine budget requirements for operating and capital expenditures.

4.3 Monitoring, Updating and Action

To continue to develop its asset management program, we recommend the following:

- The Town of Whitby should establish a condition assessment program to assess the condition of its MIS assets and dedicate a portion of its capital funding to this assessment.
- Risk should be reviewed annually to ensure assets are being maintained effectively.

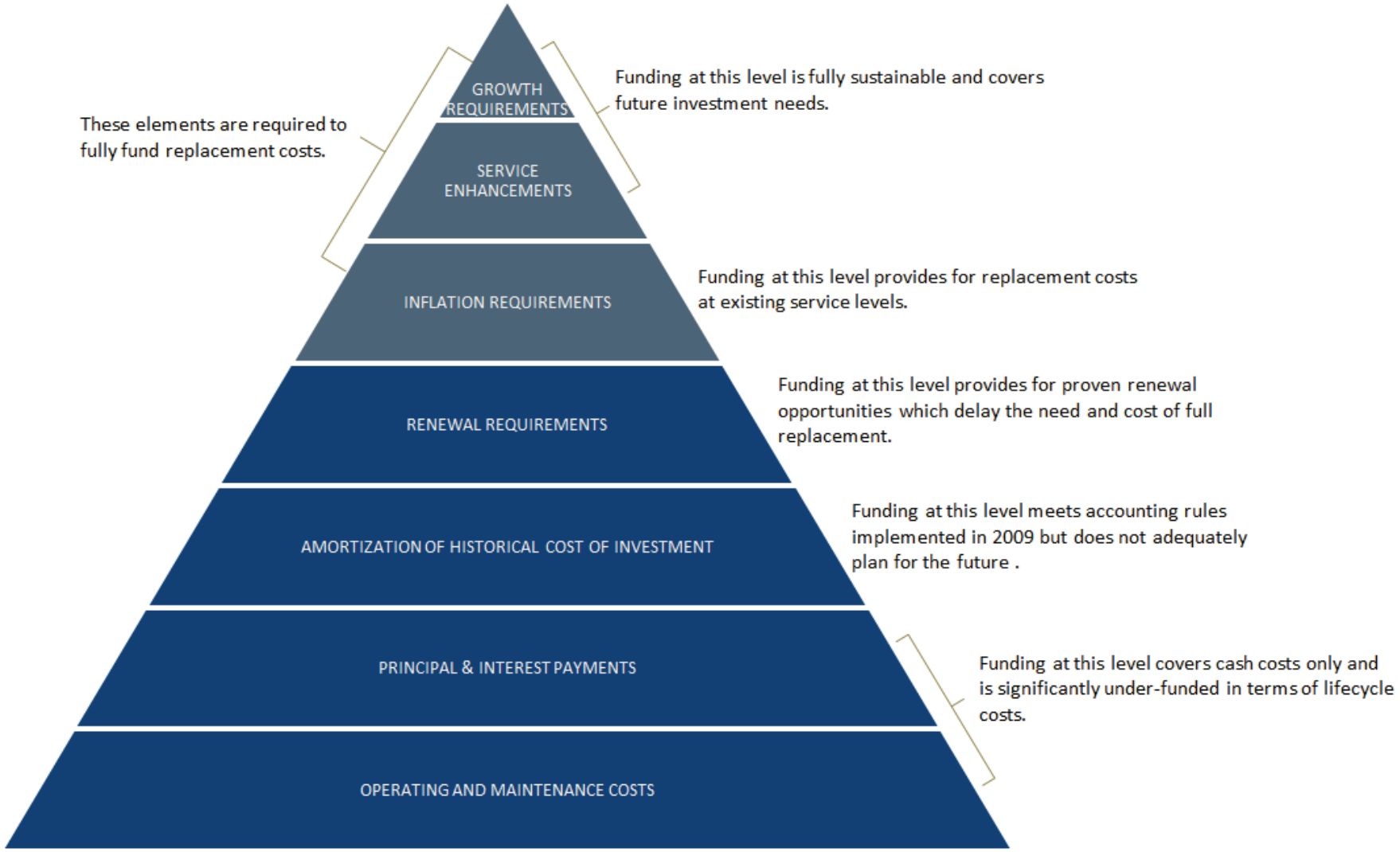
5. Financial Strategy

5.1 General Overview of Financial Plan Requirements

In order for an AMP to be effectively put into action, it must be integrated with financial planning and long-term budgeting. The development of a comprehensive financial plan is underway (expected Q1 2017) and will be accompanied by an updated Development Charge Background Study and the Long Term Financial Strategy (2017). This will allow The Town of Whitby to identify the financial resources required for sustainable asset management based on existing asset inventories, desired levels of service, and projected growth requirements.

The following pyramid depicts the various cost elements and resulting funding levels that should be incorporated into AMPs that are based on best practices.

Figure 5-1 Cost Elements



This report develops such a financial plan by presenting several scenarios for consideration and culminating with final recommendations. As outlined below, the scenarios presented model different combinations of the following components:

1. the financial requirements (as documented in the SOTI section of this report) for:
   - existing assets
   - existing service levels
   - requirements of contemplated changes in service levels (none identified for this plan)
   - requirements of anticipated growth (none identified for this plan)

If the financial plan component of the 2016 AMP results in a funding shortfall, the Province requires the inclusion of a specific plan as to how the impact of the shortfall will be managed. In determining the legitimacy of a funding shortfall, the Province may evaluate a municipality's approach to the following:

1. in order to reduce financial requirements, consideration has been given to revising service levels downward
2. all asset management and financial strategies have been considered. For example:
   - if a zero debt policy is in place, is it warranted? If not, the use of debt should be considered.
   - do user fees reflect the cost of the applicable service? If not, increased user fees should be considered.

This SAAMP includes recommendations that avoid long-term funding deficits.

5.2 Current Financial Profile

Table below outlines the Town of Whitby's capital requirements over the next 100 years. Table 5-2 compares the Town's current funding allocation with its sustainable life cycle requirements.

Table 5-1 Short-, Medium-, and Long-term Needs

Service	Asset Type	5 Year Requirement (Short-term)	10 Year Requirement (Medium-term)	25 Year Requirement (Medium-term)	50 Year Requirement (Long-term)	100 Year Requirement (Long-term)
MIS Equipment	Infrastructure	$0	$0	$0	$296,531	$889,593
	Network Appliances	$545,047	$1,172,191	$3,053,623	$6,189,343	$12,460,783
	Peripherals	$417,317	$857,902	$2,190,940	$4,390,348	$8,803,964
	Servers	$354,944	$709,888	$1,774,720	$3,549,440	$7,098,880
	Tele-Communications	$330,500	$406,000	$1,146,500	$2,006,000	$4,030,000
	Workstation	$763,899	$1,649,590	$4,341,682	$8,734,773	$17,624,718
		$2,411,707	**$4,795,571**	**$12,507,465**	**$25,166,435**	**$50,907,938**

Table 5-2 Infrastructure Requirements & Current Funding

Service Area	Asset Type	5 Year Average Annual Requirement (Short-term)	10 Year Average Annual Requirement (Medium-term)	25 Year Average Annual Requirement (Medium-Term)	50 Year Average Annual Requirement (Long-term)	100 Year Average Annual Requirement (Long-term)	Sustainable Average Annual Lifecycle Requirement
MIS Equipment	Infrastructure	$0	$0	$0	$5,931	$8,896	$8,472
	Network Appliances	$109,009	$117,219	$122,145	$123,787	$124,608	$125,429
	Peripherals	$83,463	$85,790	$87,638	$87,807	$88,040	$88,434
	Servers	$70,989	$70,989	$70,989	$70,989	$70,989	$70,989
	Tele-Communications	$66,100	$40,600	$45,860	$40,120	$40,300	$40,267
	Workstation	$152,780	$164,959	$173,667	$174,695	$176,247	$177,716
	Total Average Annual Requirement	**$482,341**	**$479,557**	**$500,299**	**$503,329**	**$509,079**	**$511,307**
	Current Funding Available	**$398,966**	**$398,966**	**$398,966**	**$398,966**	**$398,966**	**$398,966**
	Surplus/(Deficit)	**-$83,375**	**-$80,591**	**-$101,333**	**-$104,363**	**-$110,113**	**-$112,341**

5.3 Forecasting Replacement Needs

In the following sections, we illustrate the short-, medium- and long-term infrastructure spending requirements (replacement only) for each asset class. The backlog represents the immediate replacement needs that were deferred over previous years or decades.

Figure 5-2 Forecasting Aggregate Replacement Needs

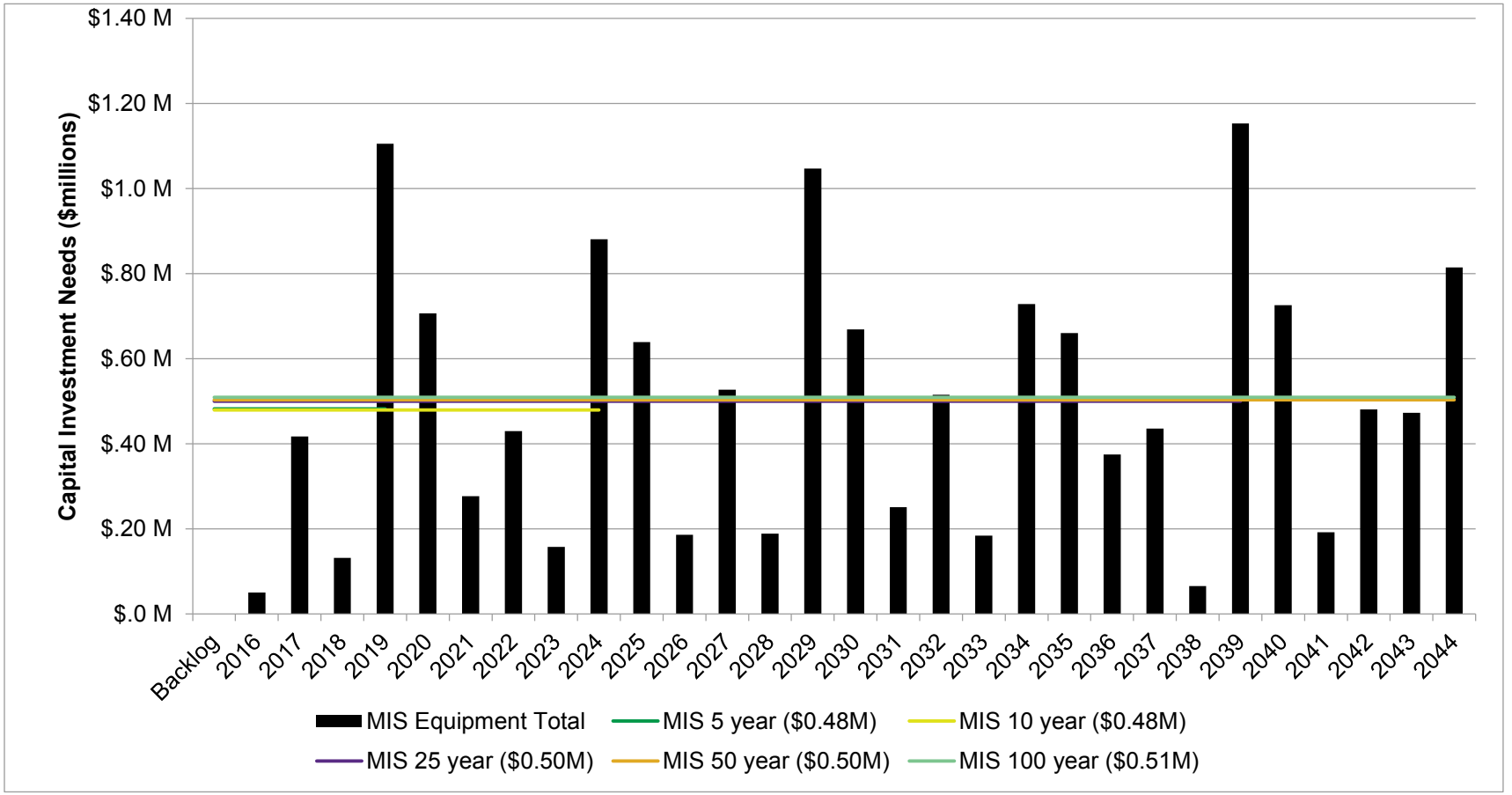


Figure 5-3 Forecasting Replacement Needs – Network Appliances

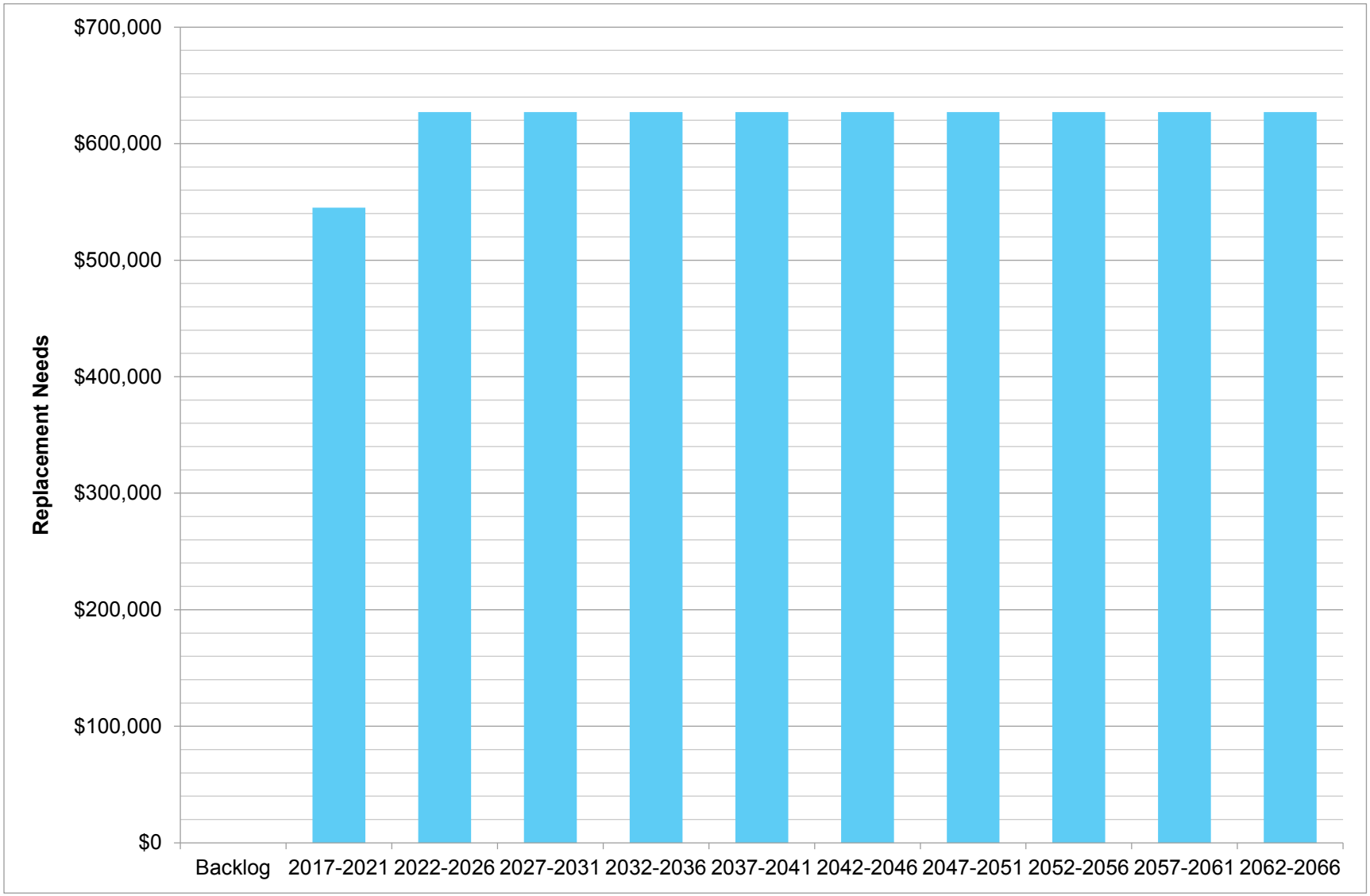


Figure 5-4 Forecasting Replacement Needs – Servers

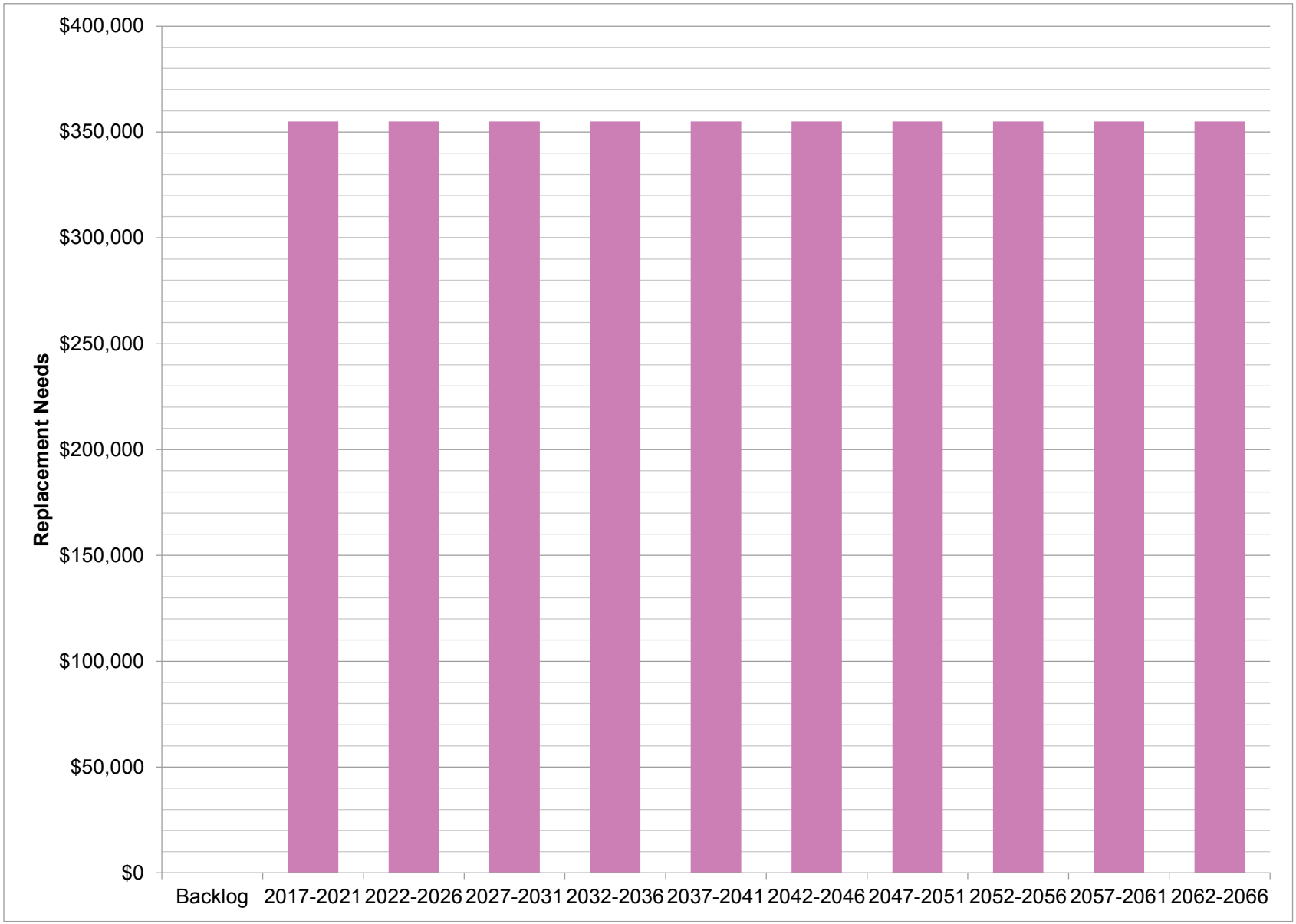


Figure 5-5 Forecasting Replacement Needs – Workstations

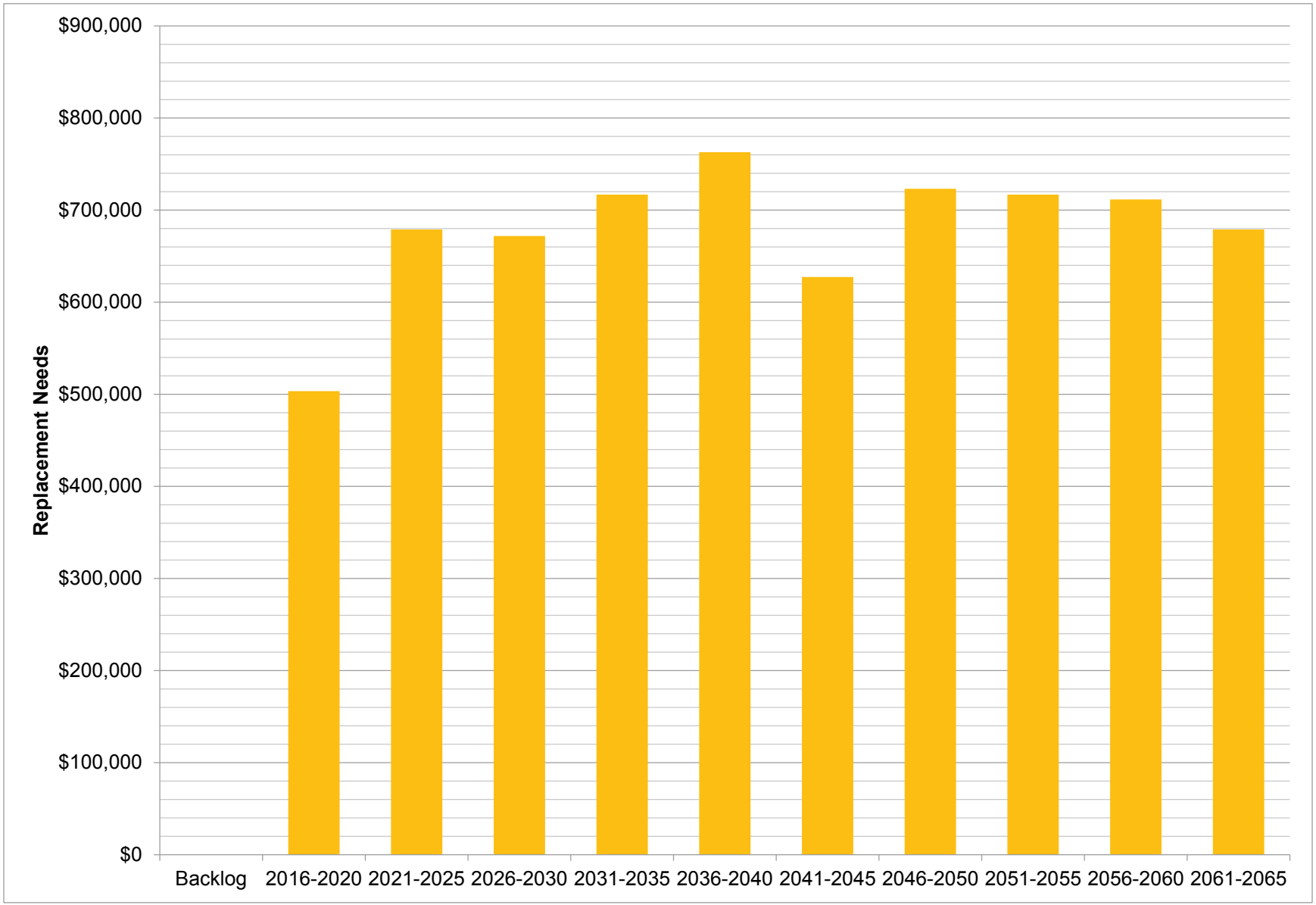


Figure 5-6 Forecasting Replacement Needs – Peripherals

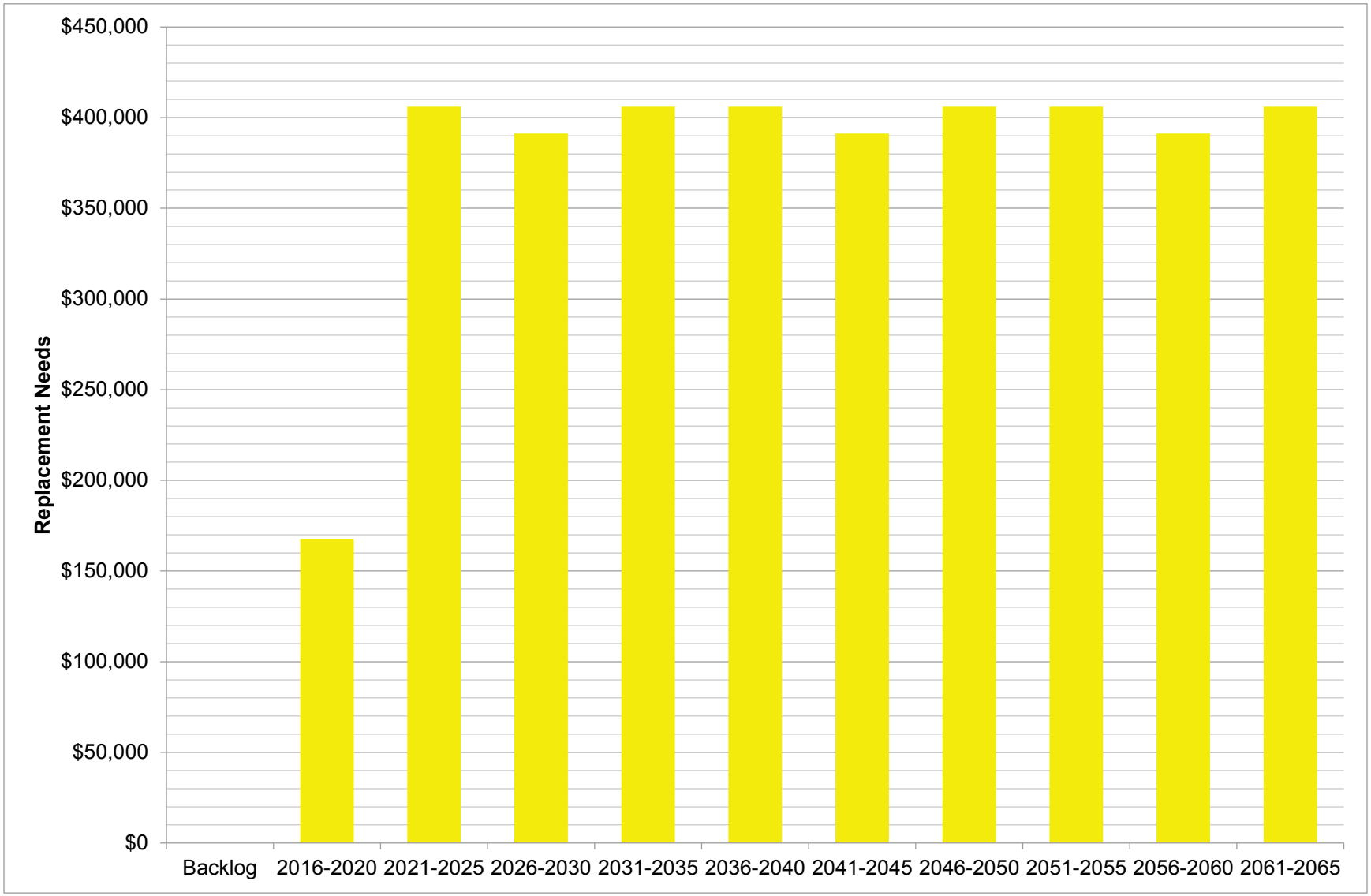


Figure 5-7 Forecasting Replacement Needs – Telecommunications

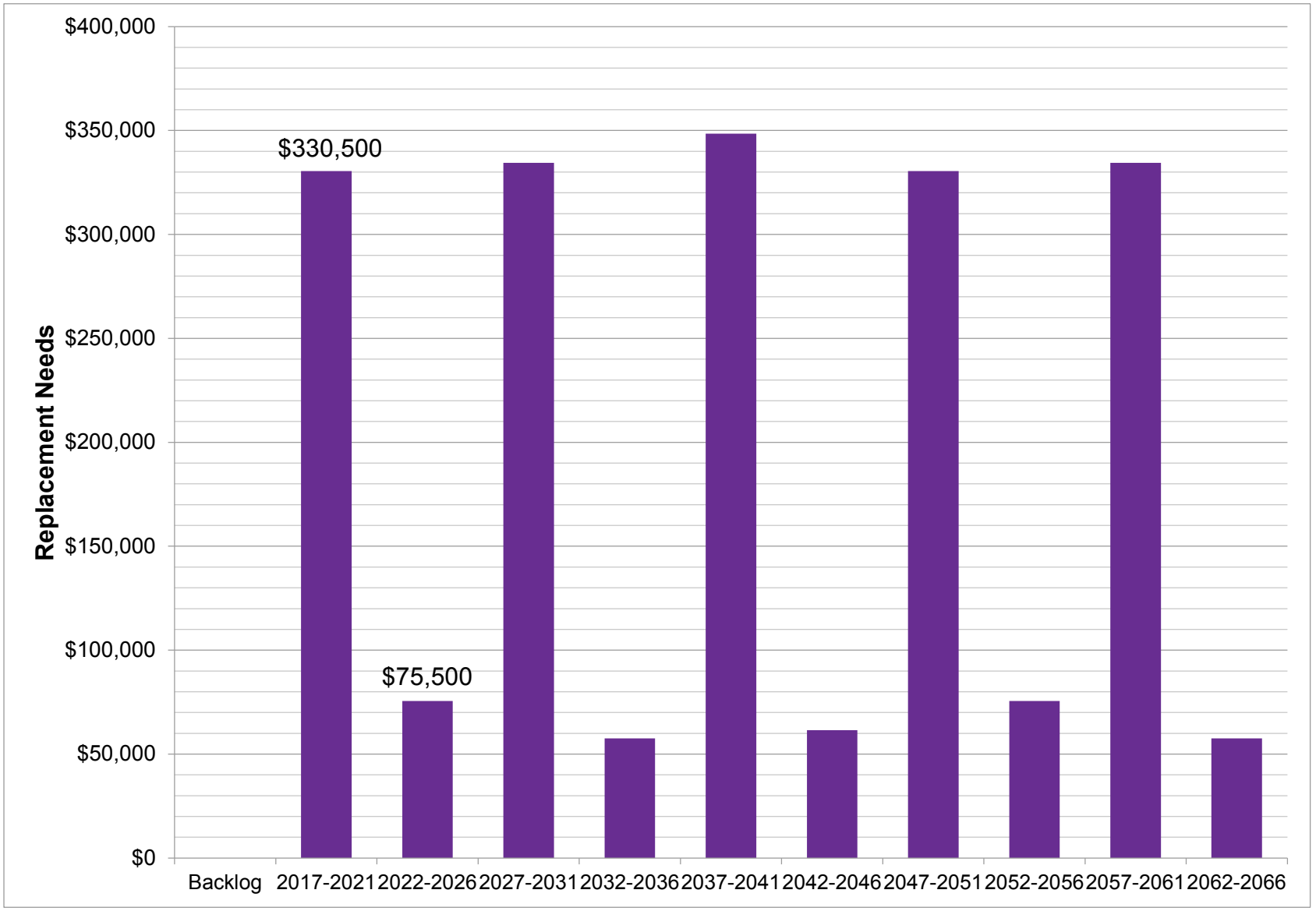
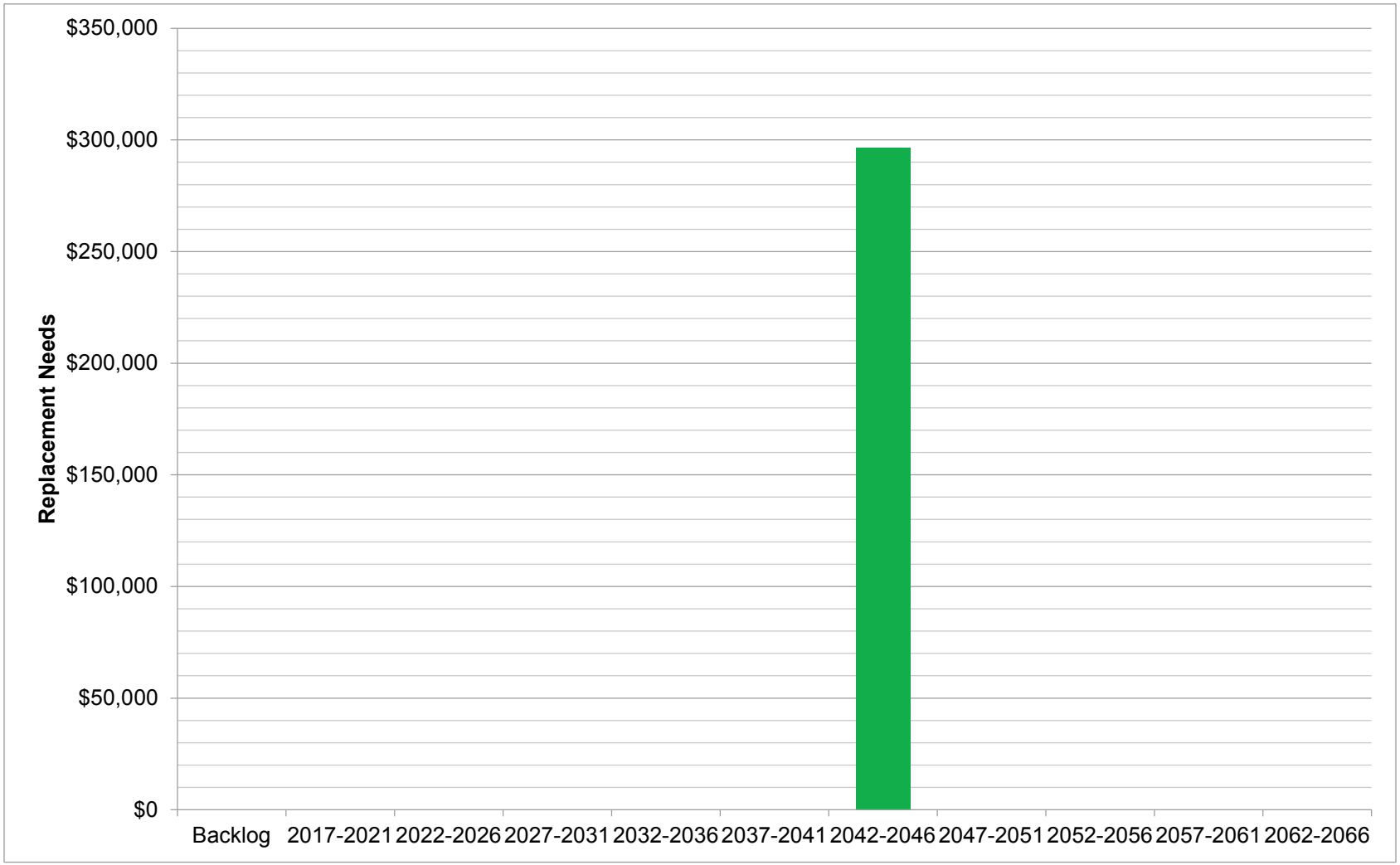


Figure 5-8 Forecasting Replacement Needs – Infrastructure



5.4 Financial Sustainability

The average annual investment requirement for Whitby's MIS assets total $511,307. Annual revenue currently allocated to these assets for capital purposes is $398,966. As such, the Town is funding 78% of its annual needs. In the short-term, MIS assets are partially funded, but the medium- and long-terms are significantly underfunded. As a result, the municipality received an 'D' for its financial sustainability grade.

Table 5-3 Financial Capacity Grading Scale

How well is the municipality funding its long-term infrastructure requirements?

- Short Term ➔ Less than 5 years
- Medium Term ➔ 5 to 20 years
- Long Term ➔Greater than 20 years

Letter Grade	Rating	Short-Term Needs Met	Medium-Term Needs Met	Long-Term Needs Met	Description
A	Very Good	Yes	Yes	Yes	The municipality is fully prepared for its short-, medium- and long-term replacement needs based on existing infrastructure portfolio.
B	Good	Yes	Yes	No	The municipality is well prepared to fund its short-term and medium-term replacement needs but requires additional funding strategies in the long-term to begin to increase its reserves.
C	Fair	Yes	No	No	The municipality is underpreparing to fund its medium- to long-term infrastructure needs. The replacement of assets in the medium-term will likely be deferred to future years.
D	Poor	Partly	No	No	The municipality is not well prepared to fund its replacement needs in the short-, medium- or long-term. Asset replacements will be deferred and levels of service may be reduced.
F	Very Poor	No	No	No	The municipality is significantly underfunding its short-term, medium-term, and long-term infrastructure requirements based on existing funds allocation. Asset replacements will be deferred indefinitely. The municipality may have to divest some of its assets (e.g., bridge closures, arena closures) and levels of service will be reduced significantly.

6. Recommendations

This is the Town of Whitby's first Service Area Asset Management Plan (SAAMP) for its MIS Services Area. To ensure it is a meaningful document that augments the Town's ability to build a strong asset management program, we recommend the following key actions:

1. The municipality should establish an MIS condition assessment program and that a portion of capital funding is dedicated to this.
2. The Town should update its SAAMP on an annual basis.
3. The Town should undertake the development of a long-term financial strategy.

7. Appendix: Condition Rating Scale

MIS Desktop/Printer/Peripherals/Switch

Rating		Description	More Information
5	Very Good	Asset is between 0-5 years and is typically new or recently rehabilitated.	IT Asset concerns are captured on a reactive basis through routine refresh cycles, maintenance, or problems reported by the user to the helpdesk.
4	Good	Asset is between 5 - 10 years and in good condition. Meets the operational needs.	Unlike most types of assets owned by the Town of Whitby, IT assets like desktops, laptops, switches and printers have a short estimated useful life.
1	Very Poor	Assets do not reach this level as they are decommissioned when they no longer work.	Given the normally short useful life of the assets it is not practical to implement a condition monitoring program. Most IT assets are run to failure, obsolescence or end of useful life.

MIS Infrastructure (Fibre, long-term disk storage)

Rating		Description
5	Very Good	Asset is typically new or recently rehabilitated
4	Good	Asset is in good condition. Some elements show normal signs of deterioration over time. It is not affecting the overall performance of the asset.
1	Very Poor	Assets do not reach this level as they are decommissioned when they no longer perform.